IP Routing Configuration Commands

1 RIP Commands

1.1 auto-summary

Use this command to enable automatic summary of RIP routes. Use the **no** form of this command to disable this function

auto-summary

no auto-summary

Parameter Description	Parameter	Description
	N/A	N/A

Defaults   Automatic summary of RIP routes is enabled by default

Command Mode   Routing progress configuration mode

Usage Guide   Automatic RIP route summary means the subnet routes will be automatically summarized into the routes of the classified network when they traverse through the subnet. Automatic route summary is enabled by default for RIPv1 and RIPv2.

Automatic RIP route summary improves the flexibility and effectiveness of the network. If the summarized route exists, the sub-routes contained in the summarized route cannot be seen in the routing table, reducing the size of the routing table significantly.

Advertising the summarized route is more efficient than advertising individual routes in light of the following factors:

■ The summarized route is always processed preferentially when you query the RIP database.

■ Any sub-route is ignored when you query the RIP database, reducing the processing time.

■ If you want to learn the specific sub-routes instead of the summarized route, disable the automatic route summary function. Only when RIPv2 is configured, the automatic route summary function can be disabled. For the RIPv1, the automatic route summary function is always enabled.

    The range of the supernet route is wider than that of the classful network. Therefore, this command takes no effect on the supernet route.

Configuration Examples   The following example disables automatic route summary of RIPv2.

```
Orion Alpha A28X (config)# router rip
Orion Alpha A28X (config-router)# version 2
Orion Alpha A28X (config-router)# no auto-summary
```

Related Commands	Command	Description
	version	Defines the RIP software versions: v1 or v2.

	Both v1 and v2 are supported by default.

Platform   N/A
Description

1.2   default-information originate

Use this command to generate a default route in the RIP progress. Use the **no** form of this command to delete the generated default route.

default-information originate [**always]** **[metric** *metric-value*] [**route-map** *map-name*]

no default-information originate [**always**] [**metric**] [**route-map** *map-name*]

<table>
<tr><th>Parameter
Description</th><th>Parameter</th><th>Description</th></tr>
<tr><td rowspan="3"></td><td>always</td><td>(Optional) Enables RIP to generate the default route, no matter whether the default route exists or not.</td></tr>
<tr><td>metric metric-value</td><td>(Optional) The original metric value of the default route with the value range 115 of metric-value.</td></tr>
<tr><td>route-map map-name</td><td>(Optional) Name of the associated route-map. Route-map is not associated by default.</td></tr>
</table>

Defaults   No default route is generated by default.
The default metric value is 1.

Command
Mode   Routing process configuration mode

Usage Guide   By default, RIP will not advertise the default route if the default route exists in the routing table of the router. In this case, use the **default-information originate** command to notify the neighbor of the default route.

With the parameter always configured, no matter whether the default route exists in the RIP routing process or not, the default route will be advertised to the neighbor but is not shown in the local routing table. You can use the **show ip rip database** command to view the RIP routing information database to confirm whether the default route is generated.

Use the parameter **route-map** to control more about the default route advertised to RIP. For example, use the **set metric** command to set the metric value of the default route.

The route-map set metric rule takes precedence over the parameter metric value configuration of the default route. If the parameter metric is not configured, the default metric value is used by the default route.

🛈   If the default route can be generated in the RIP process by using this command, RIP will not learn the default route advertised from the neighbor.

🛈   For the default route generated by using the ip default-network command, the default-information originate command is required to add the default route to RIP.

Configuration   The following example generates a default route to the RIP routing table.
Examples   `Orion Alpha A28X(config-router)# default-information originate always`

Command	Description
ip rip default-information	Notifies the default route through an interface.
redistribute	Redistributes the routes from other protocols to RIP.

Platform Description N/A

1.3 default-metric

Use this command to define the default RIP metric value. Use the **no** form of this command to restore the default setting.

default-metric *metric-value*

no default-metric

Parameter Description

Parameter	Description
metric-value	Indicates the default metric value with the range from 1 to 16. If the metric value is greater than or equal to 16, the RGNOS regards the route unreachable.

Defaults The default is 1.

Command Mode Routing process configuration mode

Usage Guide This command needs to work with the command **redistribute**. When the routes are redistributed to the RIP routing process from a routing protocol process, the route metric value cannot be converted due to the incompatibility of the metric calculation mechanisms for different protocols. During the conversion, therefore, it is required to redefine the metric values of redistributed routes in the RIP routing domain. If there is no clear definition of the metric value in redistributing a routing protocol process, the RIP uses the metric value defined with **default-metric**. If the metric value is defined, this value overwrites the metric value defined with default-metric. If this command is not configured, the default value of default-metric is 1.

Configuration Examples The following example enables the RIP routing protocol to redistribute the routes learned by the OSPF routing protocol, whose initial RIP metric value is set to 3.

```
Orion Alpha A28X (config)# router rip
Orion Alpha A28X (config-router)# default-metric 3
Orion Alpha A28X (config-router)# redistribute ospf 100
```

Related Commands

Command	Description
redistribute	Redistributes the routes from one routing domain to another routing domain.

| **Platform Description** | N/A |

1.4 distance

Use this command to set the management distance of the RIP route. Use the **no** form of this command to restore the default setting.

distance *distance* [*ip-address wildcard*]

no distance [*distance ip-address wildcard*]

Parameter Description	**Parameter**	**Description**
	distance	Sets the management distance of a RIP route, an integer in the range from 1 to 255.
	ip-address	Indicates the prefix of the source IP address of the route.
	wildcard	Defines the comparison bit of the IP address, where 0 means accurate matching and 1 means no comparison.

| **Defaults** | The default is 120. |

| **Command Mode** | Routing process configuration mode |

| **Usage Guide** | Use this command to set the management distance of the RIP route. |
| | You can use this command to create several management distances with source address prefixes. When the source address of the RIP route is within the range specified by the prefixes, the corresponding management distance is applied; otherwise, the route uses the management distance configured by the RIP. |

Configuration Examples   The following example sets the management distance of the RIP route to 160, and specifies the management distance of the route learned from 192.168.2.1 as 123.

```
Orion Alpha A28X(config)# router rip
Orion Alpha A28X(config-router)# distance 160
Orion Alpha A28X(config-router)# distance 123 192.168.12.1 0.0.0.0
```

Related Commands	**Command**	**Description**
	N/A	N/A

| **Platform Description** | N/A |

1.5 distribute-list in

Use this command to control route update for route filtering. Use the **no** form of this command to restore the default setting.

distribute-list { [*access-list-number* | *name*] | **prefix** *prefix-list-name* [**gateway** *prefix-list-name*] | [

gateway *prefix-list-name*] } **in** [*interface-type interface-number*]

no distribute-list { [*access-list-number* | *name*]] | **prefix** *prefix-list-name* [**gateway** *prefix-list-name*] | [**gateway** *prefix-list-name*] } **in** [*interface-type interface-number*]

Parameter Description	Parameter	Description
	access-list-number	*name*	Specifies the ACL. Only the routes that are allowed by the ACL can be accepted.
	prefix *prefix-list-name*	Uses the prefix list to filter the routes.
	gateway *prefix-list-name*	Uses the prefix list to filter the source of the routes.
	interface-type interface-number	(Optional) Applies the distribution list only to a specified interface.

Defaults   The distribution list is not defined by default.

Command Mode   Routing process configuration mode

Usage Guide   To deny receiving some specified routes, you can process all the received route update packets by configuring the route distribute control list.

Without any interface specified, the system will process the route update packets received on all the interfaces.

Configuration Examples   The following example enables RIP to control the routes received from the Fastethernet 0/0, only permitting the routes starting with 172.16.

```
Orion Alpha A28X (config)# router rip
Orion Alpha A28X (config-router)# network 200.168.23.0
Orion Alpha A28X (config-router)# distribute-list 10 in fastethernet 0/0
Orion Alpha A28X (config-router)# no auto-summary
Orion Alpha A28X (config-router)# access-list 10 permit 172.16.0.0
0.0.255.255
```

Related Commands	Command	Description
	access-list	Defines the ACL rule.
	prefix-list	Defines the prefix list.

Platform Description   N/A

1.6 distribute-list out

Use this command to control route update advertisement for filtering routes. Use the **no** form of this command to restore the default setting.

distribute-list { [*access-list-number* | *name*] | **prefix** *prefix-list-name* } **out** [*interface* | [**connected** | **ospf** *process-id* | **rip** | **static**]]

no distribute-list { [*access-list-number* | *name*] | **prefix** *prefix-list-name* } **out** [*interface* |

[**connected | ospf** *process-id* **| rip | static**]]

	Parameter	Description
Parameter Description	*access-list-number* | *name*	Specifies the ACL.
	prefix *prefix-list-name*	Uses the prefix list to filter routes.
	interface	(Optional) Applies route update advertisement control to a specified interface in the distribution list.
	connected	(Optional) Applies route update advertisement control to only connected routes in this distribution list.
	ospf *process-id*	(Optional) Applies route update advertisement control to only routes introduced from OSPF in this distribution list. *process-id* specifies an OSPF instance.
	rip	(Optional) Applies route update advertisement control to only RIP routes in this distribution list.
	static	(Optional) Applies route update advertisement control to only static routes in this distribution list.

Defaults   No route update advertisement is configured by default.

**Command
Mode**   Routing process configuration mode

Usage Guide   If this command relates to none of optional parameters, route update advertisement control applies to all interfaces. If this command relates to interface options, route update advertisement control applies to only the specified interface. If this command relates to other route process parameters, route update advertisement control applies to only the specific route process.

**Configuration
Examples**   The following example advertises only the 192.168.12.0/24 route.
```
Orion Alpha A28X (config)# router rip
Orion Alpha A28X (config-router)# network 200.4.4.0
Orion Alpha A28X (config-router)# network 192.168.12.0
Orion Alpha A28X (config-router)# distribute-list 10 out
Orion Alpha A28X (config-router)# version 2
Orion Alpha A28X (config-router)#access-list 10 permit 192.168.12.0
0.0.0.255
```

	Command	Description
Related Commands	**access-list**	Defines the ACL rule.
	prefix-list	Defines the prefix list.
	redistribute	Configures route redistribution.

**Platform
Description**   N/A

1.7 enable mib-binding

Use this command to bind a MIB with a specified RIP instance. Use the **no** form of this command to restore the default setting

enable mib-binding

no enable mib-binding

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Routing process configuration mode.

Usage Guide As RIP MIB does not have RIP instance information, you can only operate only one RIP instance using SNMP.

Configuration Examples

Related Commands	Command	Description
	show ip rip	Displays the global configuration of RIP.

Platform Description N/A

1.8 graceful-restart

Use this command to configure the RIP graceful restart (GR) function for a device. Use the **no** form of this command to restore the default configuration.

graceful-restart [**grace-period** *grace-period*]

no graceful-restart [**grace-period**]

Parameter Description	Parameter	Description
	graceful-restart	Enables the GR function.
	grace-period	(Optional) Configures the grace period.
	grace-period	(Optional) Indicates the user-defined GR period. The default value is the smaller value between twice the update time and 60 seconds. The range is from 1 to 1,800. The unit is second.

Defaults This function is enabled by default.

Command Routing process configuration mode

Mode

Usage Guide   The GR function is configured on the RIP instances. Different parameters can be configured for
different RIP instances.

The GR period refers to the time from the startup to the end of RIP GR. During this period, the
forwarding table remains unchanged and the RIP route is restored to the state before protocol
restart. When the GR period expires, RIP exits the GR state and performs normal RIP operation.

The **graceful-restart grace-period** command enables users to modify GR period. Note: Make sure
that GR is completed before the RIP route is validate and after an RIP route update cycle elapses. If
an improper value is configured, non-stop data forwarding cannot be ensured during the GR
process. For example, if the GR period is longer than the time when the neighbor's route is
unavailable and GR is not completed before the route is validated, then the neighbor is not re-
informed of the route and forwarding of the neighbor's route is terminated when it is validated, which
results in data forwarding interruption. Therefore, unless otherwise specified, it is not recommended
to adjust the GR period. If the period needs to changed, determine that the grace period is longer
than the route update cycle and shorter than the time when the route is unavailable in combination
with the configuration of the **timers basic** command.

⚠️ During the RIP GR period, the network must be stable.

Configuration   The following example enables the RIP GR function and configures the GR period parameters of the
Examples   GR function.

```
Orion Alpha A28X(config)# router rip
Orion Alpha A28X(config-router)# graceful-restart grace-period 90
```

Related
Commands

Command	Description
timers basic	Configures RIP timers.

Platform   N/A
Description

1.9   ip rip authentication key-chain

Use this command to enable RIP authentication and specify the keychain used for RIP
authentication. Use the **no** form of this command to restore the default setting.

ip rip authentication key-chain *name-of-keychain*
no ip rip authentication key-chain

Parameter
Description

Parameter	Description
name-of-keychain	Indicates the name of the keychain, which specifies the keychain used for RIP authentication.

Defaults   The keychain is not associated by default.

Command   Interface configuration mode

Mode

Usage Guide If the keychain is specified in the interface configuration, use the key chain global configuration command to define the keychain. Otherwise, RIP data packet authentication fails.

RIPv2 instead of RIPv1 supports authentication of the RIP data packet.

Configuration Examples The following example enables RIP authentication on the fastEthernet 0/1 with the associated keychain ripchain.

```
Orion Alpha A28X (config)#interface fastEthernet 0/1
Orion Alpha A28X (config-if-FastEthernet 0/1)#ip rip authentication key-
chain ripchain
```

Meanwhile, use the **key chain** command to define this keychain in global configuration mode.

```
Orion Alpha A28X(config)#key chain ripchain
Orion Alpha A28X(config-keychain)#key 1
Orion Alpha A28X(config-keychain-key)#key-string Hello
```

Related Commands

Command	Description
ip rip authentication mode	Defines the RIP authentication mode.
ip rip authentication text-password	Enables RIP authentication, and sets the password string of RIP plaintext authentication. RIP data packet authentication is supported only by RIPv2.
ip rip receive version	Defines the version of RIP packets received on the interface.
ip rip send version	Defines the version of RIP packets sent on the interface.
key chain	Defines the keychain and enters keychain configuration mode.

Platform Description N/A

1.10 ip rip authentication mode

Use this command to define the RIP authentication mode. Use the **no** form of this command to restore the default setting.

ip rip authentication mode { **text | md5** }

no ip rip authentication mode

Parameter Description

Parameter	Description
text	Configures RIP authentication as plaintext authentication.
md5	Configures RIP authentication as MD5 authentication.

Defaults It is plaintext authentication by default.

Command	
Mode	Interface configuration mode
Usage Guide	During the RIP authentication configuration process, the RIP authentication modes of all devices requiring exchange of RIP routing information must be the same. Otherwise, RIP packet exchange will fail.
	If the plaintext authentication mode is adopted, but the password string of the plaintext authentication or the associated keychain is not configured, no authentication occurs. In the same way, if the MD5 authentication mode is adopted, but the associated keychain is not configured, no authentication occurs.
	RIPv2 instead of RIPv1 supports authentication of the RIP data packet.
Configuration Examples	The following example configures the RIP authentication mode on the fastEthernet 0/1 as MD5.

```
Orion Alpha A28X (config)#interface fastEthernet 0/1
Orion Alpha A28X (config-if-FastEthernet 0/1)# ip rip authentication mode
md5
```

Related Commands

Command	Description
ip rip authentication key-chain	Enables the RIP authentication mode and specifies the keychain used for RIP authentication. Only RIPv2 supports authentication of the RIP data packet.
ip rip authentication text-password	Enables the RIP authentication mode, and sets the password string of RIP plaintext authentication. Only RIPv2 supports authentication of the RIP data packet.
key chain	Defines the keychain and enters the keychain configuration mode

Platform Description N/A

1.11 ip rip authentication text-password

Use this command to enable RIP authentication and set the password string of RIP plaintext authentication. Use the **no** form of this command to restore the default setting.

ip rip authentication text-password [**0** | **7**] *password-string*

no ip rip authentication text-password

Parameter Description

Parameter	Description
0	Specifies that the key is displayed as plaintext.
7	Specifies that the key is displayed as cipher text.
password-string	Indicates the password string of the plaintext authentication, in the length of 1-16 bytes.

Defaults	No password string of RIP plaintext authentication is configured by default.

Command Mode	Interface configuration mode

Usage Guide	This command works only in plaintext authentication mode.
	To enable the RIP plaintext authentication function, use this command to configure the corresponding password string, or use the associated key chain to obtain the password string. The latter takes the precedence over the former one.
	RIPv1 does not support RIP authentication but RIPv2 does.

Configuration Examples	The following example enables the RIP plaintext authentication on fastEthernet 0/1 and sets the password string to hello.

```
Orion Alpha A28X(config)#interface fastEthernet 0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip rip authentication text-
password hello
```

Related Commands

Command	Description
ip rip authentication mode	Defines the RIP authentication mode.
ip rip authentication key-chain	Enables the RIP authentication mode and specifies the keychain used for RIP authentication. Only RIPv2 supports authentication.

Platform Description	N/A

1.12 ip rip default-information

Use this command to advertise the default route through a RIP interface. Use the **no** form of this command to restore the default setting.

ip rip default-information { **only** | **originate** } [**metric** *metric-value*]

no ip rip default-information

Parameter Description

Parameter	Description
only	Notifies the default route rather than other routes.
originate	Notifies the default route and other routes.
metric *metric-value*	Specifies the metric value of the default route, in the range from1 to 15.

Defaults	No default route is configured by default. The default metric value is 1.

Command Mode	Interface configuration mode

Usage Guide	After you configure this command on a specified interface, a default route is generated and notified

through the interface. If the **ip rip default-information** command of the interface and the **default-information originate** command of the RIP process are configured at the same time, only the default route of the interface is advertised.

> RIP will no longer learn the default route notified by the neighbor if any interface is configured with the ip rip default-information command.

Configuration Examples	The following example creates a default route which is notified on ethernet0/1 only.

```
Orion Alpha A28X(config)#interface ethernet 0/1
Orion Alpha A28X(config-if-Ethernet 0/1)#ip rip default-information only
```

Related Commands	**Command**	**Description**
	default-information originate	Generates a default route in the RIP process.

Platform Description N/A

1.13 ip rip receive enable

Use this command to enable RIP to receive the RIP data package on a specified interface. Use the **no** form of this command to restore the default setting.

ip rip receive enable

no ip rip receive enable

Parameter Description	**Parameter**	**Description**
	N/A	N/A

Defaults RIP packages can be received through the interface by default.

Command Mode Interface configuration mode

Usage Guide To prevent an interface from receiving RIP packets, use the no form of this command in interface configuration mode. This command works on interfaces configured with this command. You can use the **default** form of this command to enable the interface to receive the RIP data package.

Configuration Examples	The following example prohibits receiving RIP data packages on fastEthernet 0/1.

```
Orion Alpha A28X (config)# interface fastEthernet 0/1
Orion Alpha A28X (config-if-FastEthernet 0/1)# no ip rip receive enable
```

Related Commands	**Command**	**Description**
	ip rip send enable	Enables or disables the interface to send RIP data packages.
	passive-interface	Configures a passive RIP interface.

Platform Description	N/A

1.14 ip rip receive version

Use this command to define the version of RIP packets received on an interface. Use the **no** form of this command to restore the default setting.

ip rip receive version [**1**] [**2**]

no ip rip receive version

Parameter Description	Parameter	Description
	1	(Optional) Receives only RIPv1 packets.
	2	(Optional) Receives only RIPv2 packets.

Defaults	The default behavior depends on the configuration with the version command.

Command Mode	Interface configuration mode

Usage Guide	This command overwrites the default configuration of the **version** command. It affects only RIP packet receiving through the interface and allows RIPv1 and RIPv2 packets to be received on the interface at the same time. If the command is configured without parameters, data package receiving depends on the configuration of the version.

Configuration Examples	The following example enables receiving both RIPv1 and RIPv2 data packages.
	Orion Alpha A28X (config)#interface fastEthernet 0/1
	Orion Alpha A28X (config-if-FastEthernet 0/1)# ip rip receive version 1 2

Related Commands	Command	Description
	version	Defines the default version of the RIP packets received/sent on the interface.

Platform Description	N/A

1.15 ip rip send enable

Use this command to enable RIP to send a RIP data package on a specified interface. Use the **no** form of this command to restore the default setting.

ip rip send enable

no ip rip send enable

Parameter Description	Parameter	Description
	N/A	N/A

Defaults	RIP packages can be sent through the interface by default.
Command Mode	Interface configuration mode
Usage Guide	To prevent an interface from sending RIP packets, use the **no** form of this command in interface configuration mode. This command works on interfaces configured with this command. You can use the **default** form of this command to enable the interface to send the RIP data package.

Configuration Examples	The following example prohibits sending RIP data packages on fastEthernet 0/1.
	`Orion Alpha A28X (config)# interface fastEthernet 0/1`
	`Orion Alpha A28X (config-if-FastEthernet 0/1)# no ip rip send enable`

Related Commands	Command	Description
	ip rip receive enable	Enables or disables receiving RIP packets on the interface.
	passive-interface	Configures a passive RIP interface.

Platform Description	N/A

1.16 ip rip send supernet-routes

Use this command to enable RIP to send the supernet route on a specified interface. Use the **no** form of this command to disable this function.

ip rip send supernet-routes

no ip rip send supernet-routes

Parameter Description	Parameter	Description
	N/A	N/A

Defaults	This function is enabled by default.
Command Mode	Interface configuration mode
Usage Guide	When the RIPv1 router monitors a RIPv2 router response packet and if the supernet routing information is monitored, incorrect route information is learned because the RIPv1 ignores the subnet mask of the routing information. In this case, you are advised to use the no form of this command on the RIPv2 router to disable advertising the supernet route on the corresponding interface. This command works only on interfaces configured with this command. ● This command is only valid upon sending the RIPv2 packets on the interface and it is used to control sending the supernet route.
Configuration Examples	The following example disables sending RIP supernet routes on the fastEthernet 0/1 interface. `Orion Alpha A28X(config)# interface fastEthernet 0/1`

```
Orion Alpha A28X(config-if-FastEthernet 0/1)# no ip rip send supernet-
routes
```

	Command	Description
Related Commands	**version**	Defines the RIP version
	ip rip send enable	Enables or disables sending the RIP package on the interface.

Platform Description N/A

1.17 ip rip send version

Use this command to define the version of the RIP packets sent on the interface. Use the **no** form of this command to restore the default setting.

ip rip send version [**1**] [**2**]

no ip rip send version

	Parameter	Description
Parameter Description	**1**	(Optional) Receives only RIPv1 packets.
	2	(Optional) Receives only RIPv2 packets.

Defaults The default behavior depends on the configuration with the version command.

Command Mode Interface configuration mode

Usage Guide This command overwrites the default configuration of the **version** command. It affects only RIP packet sending through the interface and allows RIPv1 and RIPv2 packages sent on the interface at the same time. If the command is configured without parameters, package receiving depends on the configuration of the version.

Configuration Examples The following example enables sending both RIPv1 and RIPv2 packages on the fastEthernet 0/1 interface.

```
Orion Alpha A28X (config)# interface fastEthernet 0/1
Orion Alpha A28X (config-if-FastEthernet 0/1)# ip rip send version 1 2
```

	Command	Description
Related Commands	**version**	Defines the default version of the RIP packets received/sent on the interfaces.

Platform Description N/A

1.18 ip rip split-horizon

Use this command to enable split horizon. Use the **no** form of this command to disable this function.

ip rip split-horizon [**poisoned-reverse**]

no ip rip split-horizon [**poisoned-reverse**]

Parameter	Description
poisoned-reverse	(Optional) Enables split horizon with poisoned reverse.

Parameter Description

Defaults This function is enabled by default.

Command Mode Interface configuration mode

Usage Guide When multiple devices are connected to the IP broadcast network and run a distance vector routing protocol, the split horizon mechanism is required to prevent loop. The split horizon prevents the device from advertising routing information from the interface that learns that information, which optimizes routing information exchange between multiple devices.

For non-broadcast multi-path access networks (such as frame relay and X.25), split horizon may cause some devices to be unable to learn all routing information. Split horizon may need to be disabled in this case. If an interface is configured the secondary IP address, attentions shall be paid also for split horizon.

If the **poisoned-reverse** parameter is configured, split horizon with poisoned reverse is enabled. In this case, devices still advertise the route information through the interface from which the route information is learned. However, the metric value of the route information is set to unreachable.

The RIP routing protocol is a distance vector routing protocol, and the split horizon issue shall be cautioned in practical applications. If it is unsure whether split horizon is enabled on the interface, use the show ip rip command to judge. This function makes no influence on the neighbor defined with the **neighbor** command.

Configuration Examples The following example disables the RIP split horizon function on the interface fastethernet 0/0.

```
Orion Alpha A28X (config)# interface fastethernet 0/1
Orion Alpha A28X (config-if)# no ip rip split-horizon
```

Related Commands

Command	Description
neighbor (RIP)	Defines the IP address of the neighbor of RIP.
validate-update-source	Enables the source address authentication of the RIP route update message.

Platform Description N/A

1.19 ip rip summary-address

Use this command to configure port-level convergence through an interface. Use the **no** form of this command to disable this function.

ip rip summary-address *ip-address ip-network-mask*

no ip rip summary-address *ip-address ip-network-mask*

Parameter Description	Parameter	Description
	ip-address	Indicates the IP addresses to be converged.
	ip-network-mask	Indicates the subnet mask of the specified IP address for route convergence.

Defaults The RIP routes are automatically converged to the classful network edge by default.

Command Mode Interface configuration mode

Usage Guide The **ip rip summary-address** command converges an IP address or a subnet on a specified port. RIP routes are automatically converged to the classful network edge. The classful subnet can be configured through only port convergence.

ⓘ The summary range configured by this command cannot be a super class network, that is, the configured mask length is greater than or equal to the natural mask length of the network.

Configuration Examples The following example disables the automatic route convergence function of RIPv2. Interface convergence is configured so that fastEthernet 0/1 advertises the converged route 172.16.0.0/16.

```
Orion Alpha A28X (config)# interface fastEthernet 0/1
Orion Alpha A28X (config-if-FastEthernet 0/1)# ip rip summary-address
172.16.0.0 255.255.0.0
Orion Alpha A28X (config-if-FastEthernet 0/1)# ip address 172.16.1.1
255.255.255.0
Orion Alpha A28X (config)# router rip
Orion Alpha A28X (config-router)# network 172.16.0.0
Orion Alpha A28X (config-router)# version 2
Orion Alpha A28X (config-router)# no auto-summary
```

Related Commands	Command	Description
	auto-summary	Enables the automatic convergence of RIP routes.

Platform Description N/A

1.20 ip rip triggered

Use this command to enable triggered RIP based on links. Use the **no** form of this command to restore the default setting.

ip rip triggered

ip rip triggered retransmit-timer *timer*

ip rip triggered retransmit-count *count*

no ip rip triggered

no ip rip triggered retransmit-timer

no ip rip triggered retransmit-count

	Parameter	Description
Parameter Description	**retransmit-timer** *timer*	Configures the interval at which the Update Request and Update Response packets are retransmitted. The range is from 1 to 3,600. The unit is second. The default is five.
	retransmit-count *count*	Configures the maximum times that the Update Request and Update Response packets are retransmitted. The range is from 1 to 3600. The default is 36.

Defaults   This function is disabled by default.

Command Mode   Interface configuration mode

Usage Guide   Triggered RIP (TRIP) is the extension of RIP on the wide area network (WAN), mainly used for demand-based links.

With the TRIP function enabled, RIP no longer sends route updates periodically and sends route updates to the WAN interface only if:

■ Update Request packets are received.

■ RIP routing information is changed.

■ Interface state is changed.

■ The router is started.

As periodical RIP update is disabled, the confirmation and retransmission mechanism is required to ensure that update packets are sent and received successfully over the WAN. The **retransmit-timer** and **retransmit-count** commands can be used to specify the retransmission interval and maximum retransmission times for request and update packets.

⚠ The function can be enabled in the case of the following conditions: a) The interface has only one neighbor. b) There are multiple neighbors but they interact information using unicast packets. You are advised to enable the function for link layer protocols such as PPP, frame relay, and X.25.

⚠ You are advised to enable split horizon with poison reverse on the interface enabled with the function; otherwise invalid routing information might be left.

⚠ Make sure that the function is enabled on all routers on the same link; otherwise the function

will be invalid and the routing information cannot be exchanged correctly.

⚠️ The function cannot be enabled at the same time with BFD and RIP functions.

⚠️ To enable the function, make sure that the RIP configuration is the same on both ends of the link, such as RIP authentication and the RIP version supported by the interface.

⚠️ If this function is enabled on this interface, the source address of packets on this interface will be checked no matter whether the source IP address verification function (validate-update-source) is enabled.

Configuration Examples	The following example enables TRIP and sets the retransmission interval and maximum retransmission time to 10 seconds and 18 respectively for Update Request and Update Response packets.

```
Orion Alpha A28X(config)# interface fastEthernet 0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip rip triggered
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip rip triggered retransmit-
timer 10
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip rip triggered retransmit-
count 18
```

Related Commands

Command	Description
show ip rip database	Displays the summarized routing information of the RIP database.
show ip rip interface	Displays the RIP interface information.
ip rip split-horizon	Configures RIP split horizon.

Platform Description N/A

1.21 ip rip v2-broadcast

Use this command to send RIPv2 packets in broadcast rather than multicast mode. Use the **no** form of this command to restore the default setting.

ip rip v2-broadcast

no ip rip v2-broadcast

Parameter Description

Parameter	Description
N/A	N/A

Defaults The default behavior depends on the configuration of the version command.

Command Mode Interface configuration mode

Usage Guide This command overwrites the default of the **version** command. This command affects only sending

RIP packets on the interface. This command allows RIPv1 and RIPv2 packages sent on the interface simultaneously. If this command is configured without parameters, package receiving depends on the version setting.

Configuration Examples	The following example sends RIPv2 packets in broadcast mode on the fastEthernet 0/1 interface.

```
Orion Alpha A28X(config)# interface fastEthernet 0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# no ip rip split-horizon
```

	Command	Description
Related Commands	**version**	Defines the default version of the RIP packets received and sent on the interface.

Platform Description	N/A

1.22 neighbor

Use this command to define the IP address of a RIP neighbor. Use the **no** form of this command to restore the default setting.
neighbor *ip-address*
no neighbor *ip-address*

	Parameter	Description
Parameter Description	*ip-address*	Indicates the IP address of the neighbor. The IP address must be that of the network connected to the local device.

Defaults	The neighbor is not defined by default.

Command Mode	Routing process configuration mode

Usage Guide	By default, RIPv1 uses the IP broadcast address (255.255.255.255) to advertise routing information, and RIPv2 uses the multicast address 224.0.0.9 to do so. If you do not want to allow all the devices on the broadcast network or non-broadcast multi-path access network to receive routing information, use the **passive-interface** command to configure related interfaces as passive interfaces and then define only some neighbors who can receive the routing information. This command has no impact on the receiving of RIP information. The passive interface is configured. No request packet is sent after the interface is enabled.

Configuration Examples	The following RIP advertises routing information to neighbor IP address 192.168.1.2 only.

```
Orion Alpha A28X(config)# router rip
Orion Alpha A28X(config-router)# passive-interface default
Orion Alpha A28X(config-router)# neighbor 192.168.1.2
```

	Command	Description
Related Commands		

| passive-interface | Configures the interface as a passive interface. |

Platform Description N/A

1.23 network

Use this command to define the list of networks to be advertised in the RIP routing process. Use the **no** form of this command to delete the defined network.

network *network-number* [*wildcard*]

no network *network-number* [*wildcard*]

Parameter Description

Parameter	Description
network-number	Indicates the network number of the directly-connected network. The network number is a natural one. All interfaces whose IP addresses belong to that natural network can send/receive RIP packages.
wildcard	Defines the IP address comparing bit: 0 refers to accurate matching, and 1 refers to no comparison.

Defaults N/A

Command Mode Routing process configuration mode

Usage Guide The *network-number* and *wildcard* parameters can be configured simultaneously to enable the IP address of the interface within the IP address range to join RIP running.

Without the *wildcard* parameter, switch make the interface IP address within the classful address range join the RIP running.

Only when the IP address of an interface is in the network list defined by RIP, RIP route update packets can be received and sent on the interface.

Configuration Examples The following example defines two network numbers associated with RIP and allows the interface IP address between 192.168.12.0/24 and 172.16.0.0/24 to join RIP running.

```
Orion Alpha A28X (config)# router rip
Orion Alpha A28X (config-router)# network 192.168.12.0
Orion Alpha A28X(config-router)# network 172.16.0.0 0.0.0.255
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

1.24 offset-list

Use this command to increase the metric value of received or sent RIP routes. Use the **no** form of this command to restore the default setting.

offset-list { access-list-number | name } { **in** | **out** } offset [interface-type interface-number]

no offset-list { access-list-number | name { **in** | **out** } offset [interface-type interface-number]

Parameter Description

Parameter	Description
*access-list-number	name*	Specifies the ACL.
in	Modifies the metric of the received routes using the ACL.
out	Modifies the metric of the sent routes using the ACL.
offset	Indicates the offset of changed metric values. The value is in the range from 0 to16.
interface-type	Applies the ACL to a specified interface.
interface-number	Specifies the interface number.

Defaults   No offset is specified by default.

Command Mode   Routing process configuration mode

Usage Guide   If a RIP route matches against both the offset-list of the specified interface and the global offset-list, it will increase the metric value of the offset-list of the specified interface.

Configuration Examples   The following example increases the metric of the RIP routes by 7 in the range specified by ACL 7.

```
Orion Alpha A28X (config-router)# offset-list 7 out 7
```

The following example increases the metric of the RIP routes by 7 in the range specified by ACL 7 and learned by fastethernet 0/1.

```
Orion Alpha A28X (config-router)# offset-list 8 in 7 fastethernet 0/1
```

Related Commands

Command	Description
N/A	N/A

Platform Description   N/A

1.25 output-delay

Use this command to modify the delay to send RIP update packets. Use the **no** form of this command to restore the default setting.

output-delay *delay*

no output-delay

Parameter Description

Parameter	Description

delay	Sets the delay to send RIP update packets, in the range from 8 to 50 in the unit of milliseconds.

Defaults   No sending delay is configured by default.

**Command
Mode**   Routing process configuration mode

Usage Guide   In normal cases, the size of a RIP update packet is 512 bytes including 25 routes. If the number of updated routes is greater than 25, update packets will be sent through multiple routes. Note that the update packets should be sent as fast as possible.

However, when a high-speed device sends a large number of packets to a low-speed device, the low-speed device may not process all the packets timely, resulting in packet loss. In this case, you can use this command to increase the delay to send packets on the high-speed device so that the low-speed device can process all the update packets.

**Configuration
Examples**   The following example sets the delay to send RIP update packets to 30 milliseconds.
```
Orion Alpha A28X(config)# router rip
Orion Alpha A28X(config-router)# output-delay 30
```

**Related
Commands**

Command	Description
N/A	N/A

**Platform
Description**   N/A

1.26 passive-interface

Use this command to disable the function of sending update packets on an interface. Use the **no** form of this command to restore the default setting.
passive-interface { **default |** *interface-type interface-num* }
no passive-interface { **default |** *interface-type interface-num* }

**Parameter
Description**

Parameter	Description
default	Sets all interfaces to the passive interfaces.
interface-type interface-num	Indicates the interface type and number.

Defaults   Interfaces are set to the non passive interfaces by default.

**Command
Mode**   Routing process configuration mode

Usage Guide   The **passive-interface default** command sets all interfaces to the passive interfaces. You can use **no passive-interface** *interface-type interface-num* command to set specified interfaces as non-passive interfaces.

After you set an interface to the passive interface, RIP route update packets will no longer be sent

but can be received through the interface. In this case, route update packets can be sent to a specified neighbor through the interfaces by using the **neighbor** command. You can use the **ip rip send enable** and **ip rip receive enable** commands to control whether route update packets can be sent or received through the interface.

Configuration Examples

The following example sets all interfaces to the passive interfaces and then sets ethernet0/1 to the non-passive interface.

```
Orion Alpha A28X(config-router)# passive-interface default
Orion Alpha A28X(config-router)# no passive-interface gigabitEthernet 0/1
```

Related Commands

Command	Description
ip rip receive enable	Enables or disables receiving RIP packets on the interface.
ip rip send enable	Enables or disables sending RIP packets on the interface.

Platform Description

N/A

1.27 redistribute

Use this command to redistribute external routes in route configuration mode. Use the **no** form of this command to restore the default setting.

redistribute { **connected**| **ospf** *process-id* | **static** } [**match** { **internal** | **external** [**1|2**] | **nssa-external** [**1|2**] }] [**metric** *metric-value*] [**route-map** *route-map-name*]

no redistribute { **connected**| **ospf** *process-id* | **static** } [**match** { **internal** | **external** [**1|2**] | **nssa-external** [**1|2**] }] [**metric** *metric-value*] [**route-map** *route-map-name*]

Parameter Description

Parameter	Description
connected	Is redistributed from a connected route.
ospf *process-id*	Is redistributed from OSPF and specifies an OSPF instance through process-id. The value is in the range from 1 to 65535.
static	Is redistributed from static routes.
match	Is used when OSPF route redistribution is configured and filters a route with a specific level for redistribution.
metric *metric-value*	Sets the metric value of the redistributed route and specifies the metric value by using the metric-value parameter. The value is in the range from 1 to 16.
route-map *route-map-name*	Sets the redistribution filtering rule.

Defaults

By default:

All the routes of the sub types of the instance are redistributed when you configure redistributing OSPF.

All the routes of the protocol are redistributed for other routing protocols.

The metric of the redistributed routes is 1 by default.

The route-map is not associated.

| **Command Mode** | Routing process configuration mode |

Usage Guide   This command is executed to redistribute external routes to RIP.

It is unnecessary to convert the metric of one routing protocol into that of another routing protocol for route redistribution, since different routing protocols use different metric measurement methods. For RIP, the metric value is calculated based on hop counts; for OSPF, the metric value is calculated based on bandwidths. Therefore, their metrics are not comparable. However, a symbolic metric value must be set for route redistribution. Otherwise, route redistribution will fail.

When you configure redistribution of OSPF routes without the match parameter, the OSPF routes of all sub types are redistributed by default. Then the first configured match parameter is used as the original one. Only the routes matching the specific type can be redistributed. The no form of this command restores the setting to the default value.

The rule of configuring the no form of the redistribute command is as follows:

1. If the no form of this command specifies certain parameters, the parameters must be restored to the default configuration.

2. If the **no** form of this command does not specify any parameter, the command must be deleted.

⚠ The redistribute command cannot redistribute the default route of other protocol to the RIP process. To this end, use the **default-information originate** command.

Configuration Examples   The following example redistributes static routes to RIP.

```
Orion Alpha A28X(config-router)# redistribute static
```

Related Commands

Command	Description
default-metric *metric*	Sets the default metric of the route to be redistributed.
default-information originate	Generates the default route in the RIP process.

Platform Description   N/A

1.28 router rip

Use this command to create the RIP routing process and enter the routing process configuration mode. Use the **no** form of this command to restore the default setting.

router rip

no router rip

Parameter Description

Parameter	Description
N/A	N/A

Defaults   No RIP process is running by default.

Command Mode	Global configuration mode
Usage Guide	One RIP routing process must be defined with one network number. If a dynamic routing protocol runs on asynchronous lines, configure the **async default routing** command on the asynchronous interface.
Configuration Examples	The following example creates the RIP routing process and enters the routing process configuration mode. ``` Orion Alpha A28X (config)# router rip Orion Alpha A28X(config-router)# ```

Related Commands	**Command**	**Description**
	network (RIP)	Defines the network number of the RIP process.

Platform Description	N/A

1.29 show ip rip

Use this command to display the RIP process information.

show ip rip

Parameter Description	**Parameter**	**Description**
	N/A	N/A

Defaults	N/A

Command Mode	Privileged EXEC mode/ Global configuration mode/ Routing process configuration mode

Usage Guide	It is used to display the three timers, routing distribution status, routing re-distribution status, interface RIP version, RIP interface and network range, metric, and distance of the RIP process quickly.

Configuration Examples	The following example displays the basic information of the RIP process such as the update time and management distance.
	
	``
	Orion Alpha A28X#show ip rip
	Routing Protocol is "rip"
	  Sending updates every 10 seconds, next due in 4 seconds
	  Invalid after 20 seconds, flushed after 10 seconds
	  Outgoing update filter list for all interface is: not set
	  Incoming update filter list for all interface is: not set
	  Default redistribution metric is 2
	  Redistributing: connected
	``

```
 Default version control: send version 2, receive version 2
   Interface            Send  Recv
   FastEthernet 0/1       2     2
   FastEthernet 0/2       2     2
  Routing for Networks:
   192.168.26.0 255.255.255.0
   192.168.64.0 255.255.255.0
  Distance: (default is 50)
Graceful-restart enabled
  Restart grace period 60 secs
  Current Restart remaining time 16 secs
```

Related Commands	Command	Description
	N/A	N/A

Platform Description   N/A

1.30 show ip rip database

Use this command to display the route summary information in the RIP routing database.

show ip rip database [*network-number network-mask*] [**count**]

no address-family ipv4 vrf *vrf-name*

Parameter Description	Parameter	Description
	network-number	(Optional) Indicates the ID of the subnet on which route information is to be displayed.
	network-mask	Indicates the subnet mask. It must be specified if the network number is specified.
	count	(Optional) Displays the abstract of the route statistics in the RIP database.

Defaults   N/A

Command Mode   Privileged EXEC mode/ Global configuration mode/ Routing process configuration mode

Usage Guide   Only when the related sub-routes are converged, the converged address entries appear in the RIP routing database. When the last sub-route information in the converged address entries becomes invalid, the converged address information will be deleted from the database.

Configuration Examples   The following example displays all converged address entries in the RIP routing database.

```
Orion Alpha A28X# show ip rip database
192.168.1.0/24    auto-summary
```

```
192.168.1.0/30    directly connected, Loopback 3
192.168.1.8/30    directly connected, FastEthernet 0/1
192.168.121.0/24    auto-summary
192.168.121.0/24    redistributed
[1] via 192.168.2.22, FastEthernet 0/2
192.168.122.0/24    auto-summary
192.168.122.0/24
[1] via 192.168.4.22, Serial 0/1  00:28    permanent
```

The following example displays the converged address entries related with 192.168.121.0/24 in the RIP routing database.

```
Orion Alpha A28X# show ip rip database 192.168.121.0 255.255.255.0
192.168.121.0/24    redistributed
[1] via 192.168.2.22, FastEthernet 0/1
```

The following example displays the statistical information summary of various routes in the RIP routing database.

```
Orion Alpha A28X# show ip rip database count
             All    Valid   Invalid
database       5      5        0
auto-summary   5      5        0


connected      1      1        0
rip            4      4        0
```

Related Commands	Command	Description
	show ip rip	Displays the information of the currently-running routing protocol process.

Platform Description   N/A

1.31 show ip rip external

Use this command to display the information of the external routes redistributed by the RIP protocol.
show ip rip external [connected | ospf process-id | static]

Parameter Description	Parameter	Description
	connected	Displays redistributed directly-connected routes.
	ospf *process-id*	Displays redistributed OSPF routes. The process-id parameter indicates OSPF process ID. The range is from 1 to 65535.
	static	Displays redistributed static routes.

Defaults   N/A

Command   Privileged EXEC mode/ Global configuration mode/ Routing process configuration mode

Mode

Usage Guide   N/A

Configuration   The following example displays direct routes redistributed by the RIP process.

Examples
```
Orion Alpha A28X# show ip rip external
Protocol connected route:
[connected] 192.100.3.0/24 metric=0
     nhop=0.0.0.0, if=2
 [connected] 192.101.1.0/24 metric=0
     nhop=0.0.0.0, if=3
Protocol static route:
 [static] 10.1.1.1/32 metric=0
     nhop=0.0.0.0, if=4096
 [static] 10.1.2.1/32 metric=0
     nhop=0.0.0.0, if=4096
Protocol ospf 1 route:
 [ospf] 1.1.1.1/32 metric=2
     nhop=192.100.3.2, if=2
 [ospf] 90.1.1.1/32 metric=2
     nhop=192.100.3.2, if=2
```

Related
Commands

Command	Description
show ip rip	Displays the information of the currently running routing protocol process.
ip vrf	Creates a VRF.

Platform   N/A
Description

1.32 show ip rip interface

Use this command to display the RIP interface information.

show ip rip interface [interface-type interface-number]

Parameter
Description

Parameter	Description
[*interface-type interface-number*]	Displays the specified interface type and interface number (optional).

Defaults   N/A

Command
Mode   Privileged EXEC mode/ Global configuration mode/ Routing process configuration mode

Usage Guide   This command is used to display the information about RIP interfaces. If no RIP interface exists, no information is displayed.

Configuration Examples	The following example displays the RIP interface information.
	``
	Orion Alpha A28X# show ip rip interface
	FastEthernet 0/1 is up, line protocol is up
	Routing Protocol: RIP
	Receive RIPv2 packets only
	Send RIPv2 packets only
	Recv RIP packet total: 0
	Send RIP packet total: 3
	Passive interface: Disabled
	Split Horizon with Poisoned Reverse: Enabled
	Triggered RIP Enabled:
	Retransmit-timer: 5, Retransmit-count: 36
	V2 Broadcast: Disabled
	Multicast registe: Registed
	Interface Summary Rip:
	Not Configured
	Authentication mode: Text
	Authentication key-chain: ripk1
	Authentication text-password: Orion Alpha A28X
	Default-information: only, metric 5
	IP interface address:
	192.168.64.100/24, next update due in 14 seconds
	2.2.1.1/24, next update due in 24 seconds
	    neighbor 2.2.1.6, next update due in 3 seconds
	    neighbor 2.2.1.77, next update due in 13 seconds
	2.2.2.57/24, next update due in 16 seconds
	``

Related Commands	

Command	Description
show ip rip	Displays the information of the currently running routing protocol process.

Platform Description	N/A

1.33 show ip rip peer

Use this command to show the RIP peer information. RIP records a summary for the RIP routing information source learnt (source addresses of RIP route update packets) for the convenience of user monitoring. This routing information source is called RIP neighbor information.

show ip rip peer [*ip-address*]

Parameter Description	

Parameter	Description
ip-address	(Optional) Displays the IP address of a specified RIP neighbor.

Defaults	N/A
Command Mode	Privileged EXEC mode/ Global configuration mode/ Routing process configuration mode
Usage Guide	This command is used to display the RIP neighbor information. If no RIP neighbor exists, no information will be displayed.
Configuration Examples	The following example displays the RIP neighbor information.

```
Orion Alpha A28X# show ip rip peer
Peer 192.168.3.2:
  Local address: 192.168.3.1
  Input interface: GigabitEthernet 0/2
  Peer version: RIPv1
  Received bad packets: 3
  Received bad routes: 0
  BFD session state up
```

Related Commands

Command	Description
show ip rip	Displays the information of the routing protocol process that is running.

Platform Description N/A

1.34 timers basic

Use this command to adjust the RIP clock. Use the **no** form of this command to restore the default setting.

timers basic *update invalid flush*

no timers basic

Parameter Description

Parameter	Description
update	Indicates the route update time in seconds. The update keyword defines the period at which the device sends route update packets. Each time an update packet is received, the "Invalid" and "Flush" clocks are reset. By default, a route update packet is sent every 30 seconds.
invalid	Indicates the route invalid time in seconds, starting from the last valid update packet. The "invalid" defines the period when the route in the routing table becomes invalid due to no update. The invalid period of route shall be at least three times the route update period. If no update packet is received within the route invalid period, the related route becomes invalid and enters into the "invalid" state. If an update packet is received within the period, the clock resets. By default, the

	Invalid time is 180 seconds.
flush	Indicates the route flushing time in seconds, starting when a RIP route enters into the invalid status. When the flush time is due, the routes in the invalid status will be cleared out of the routing table. The default Flush time is 120 seconds.

Defaults   By default, the update time is 30 seconds, the invalid time is 180 seconds, and the flushing time is 120 seconds.

Command Mode   Routing process configuration mode

Usage Guide   Adjusting the above clocks may speed up routing protocol convergence and fault recovery. Devices connected to the same network must have consistent RIP clock values. Adjustment of RIP clocks is not recommended unless otherwise specified.

To check the current RIP clock parameters, use the **show ip rip** command.

⚠ If you set the clock to a small value on low-speed links, some risks will be caused because numerous update packets may use up the bandwidth. In general, the clocks can be configured with smaller values on Ethernet or the lines of above 2 Mbit/s to reduce the convergence time of routes.

Configuration Examples   The following example enables the RIP update packets that are sent every 10 seconds. If no update packet is received within 30 seconds, related routes become invalid and enter the invalid status. When another 90s elapses, they will be cleared.

```
Orion Alpha A28X (config)# router rip
Orion Alpha A28X (config-router)# timers basic 10 30 90
```

Related Commands

Command	Description
N/A	N/A

Platform Description   N/A

1.35 validate-update-source

Use this command to validate the source address of the received RIP route update packet. Use the **no** form of the command to disable this function.

validate-update-source

no validate-update-source

Parameter Description

Parameter	Description
N/A	N/A

Defaults   This function is enabled by default.

Command	
Mode	Routing process configuration mode

Usage Guide You can validate the source address of the RIP route update packet. The validation aims to ensure that the RIP routing process receives only the route update packets from the same IP subnet neighbor.

Disabling split horizon on the interface causes the RIP routing process to enable update message source address validation, no matter whether it has been configured with the **validate-update-source** command in routing process configuration mode.

In addition, for the ip unnumbered interface, the RIP routing process does not implement update message source address validation, no matter whether it has been configured with the command **validate-update-source**.

Configuration Examples The following example disables verification of the source IP address of the update packet.

```
Orion Alpha A28X (config)# router rip
Orion Alpha A28X (config-router)# no validate-update-source
```

Related Commands

Command	Description
ip split-horizon	Enables split horizon.
ip unnumbered	Defines the IP unnumbered interface.
neighbor (RIP)	Defines the IP address of a RIP neighbor.

Platform Description N/A

1.36 version

Use this command to define the RIP version of a device. Use the **no** form of this command to restore the default setting.

version { **1** | **2** }

no version

Parameter Description

Parameter	Description
1	Defines the RIP version 1.
2	Defines the RIP version 2.

Defaults The route update packets of RIPv1 and are received by default, but only the RIPv1 route update packets are sent.

Command	
Mode	Routing process configuration mode

Usage Guide This command defines the RIP version running on the device. It is possible to redefine the messages of which RIP version are processed on every interface by using the **ip rip receive version** and **ip rip send version** commands.

Configuration Examples   The following example configures the RIP version as version 2.

```
Orion Alpha A28X (config)# router rip
Orion Alpha A28X (config-router)# version 2
```

Related Commands

Command	Description
ip rip receive version	Defines the version of RIP packets received on the interface.
ip rip send version	Defines the version of RIP packets sent on the interface.
show ip rip	Displays RIP information.

Platform Description   N/A

2 OSPFv2 Commands

2.1 area

Use this command to configure the specified OSPF area. Use the **no** form of this command to restore the default setting.

area *area-id*
no area *area-id*

Parameter Description	Parameter	Description
	area-id	ID of the OSPF area. The value can be a decimal integer or an IP address.

Defaults
No OSPF area is configured by default.

Command Mode
Routing process configuration mode

Usage Guide
Use the no form of this command to remove the specified OSPF area and its configuration, including the area-based **area authentication, area default-cost, area filter-list, and area nssa** commands.

● Do not remove the OSPF area configuration under the following conditions:

● Virtual links exist in the backbone area. The virtual links must be removed at first.

● The corresponding network area command exists in any area. All network segment commands added to an area must be removed at first.

Configuration Examples
The following example removes the configuration of OSPF area 2.

```
Orion Alpha A28X(config)# router ospf 2
Orion Alpha A28X(config-router)# no area 2
```

Related Commands	Command	Description
	network area	Defines the interface where OSPF runs and the belonging area of the interface.

Platform Description
N/A

2.2 area authentication

Use this command to enable OSPF area authentication. Use the **no** form of this command to restore the default setting.

area *area-id* **authentication** [**message-digest**]

no area *area-id* **authentication**

<table>
<tr><th>Parameter
Description</th><th colspan="2"></th></tr>
<tr><td></td><td>**Parameter**</td><td>**Description**</td></tr>
<tr><td></td><td>*area-id*</td><td>Specifies ID of the area enabled with OSPF. The value can be a
decimal integer or an IP address.</td></tr>
<tr><td></td><td>**message-digest**</td><td>(Optional) Enables MD5 (message digest 5) authentication mode.</td></tr>
</table>

Defaults   No authentication is enabled by default.

Command
Mode   Routing process configuration mode

Usage Guide   The switch software supports three authentication types:

1) 0, no authentication. The authentication type in the OSPF packet is 0when this command is not
executed to enable OSPF authentication. 2) 1, plain text authentication mode. When this command
is configured, the message-digest option is not used.3) 2, MD5 authentication mode. When this
command is configured, the message-digest option is used.

All devices in the same OSPF area must use the same authentication type. If authentication is
enabled, the authentication password must be configured on an interface connecting neighbors. You
can use the **ip ospf authentication-key** command to configure the plain text authentication
password, and the **ip ospf message-digest-key** command to configure the MD5 authentication
password in interface configuration mode.

Configuration   The following example uses MD5 authentication and the authentication password backbone in area
Examples   0 (backbone area) of the OSPF routing process.

```
Orion Alpha A28X(config)# interface fastEthernet 0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip address 192.168.12.1
255.255.255.0
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip ospf message-digest-key 1
md5 backbone
Orion Alpha A28X(config)# router ospf 1
Orion Alpha A28X(config-router)# network 192.168.12.0 0.0.0.255 area 0
Orion Alpha A28X(config-router)# area 0 authentication message-digest
```

Related
Commands

<table>
<tr><th>Command</th><th>Description</th></tr>
<tr><td>**ip ospf authentication-key**</td><td>Defines the OSPF plain text authentication
password.</td></tr>
<tr><td>**ip ospf message-digest-key**</td><td>Defines the OSPF MD5 authentication
password.</td></tr>
<tr><td>**area virtual-link**</td><td>Defines a virtual link.</td></tr>
</table>

Platform   N/A
Description

2.3 area default-cost

Use this command to define the cost (OSPF metric) of the default aggregate route advertised to the stub area or not-so-stubby area (NSSA) in routing process configuration mode. Use the **no** form of this command to restore the default setting.

area *area-id* **default-cost** *cost*

no area *area-id* **default-cost**

Parameter		Description
Parameter Description	*area-id*	ID of the stub area or NSSA
	cost	Cost of the default aggregate route advertised to the stub area or NSSA. The range is from 0 to 16777215.

Defaults The default is 1.

Command Mode Routing process configuration mode

Usage Guide This command takes effect only on the Area Border Router (ABR) of the stub area or the ABR/Autonomous System Border Router (ASBR) of the NSSA.

The ABR can advertise a Link State Advertisement (LSA) indicating the default route in the stub area. The ABR/ASBR can advertise an LSA indicating the default route in the NSSA. You can use the **area default-cost** command to modify the LSA cost.

Configuration Examples The following example sets the cost of the default aggregate route to 50.

```
Orion Alpha A28X(config)# router ospf 1
Orion Alpha A28X(config-router)# network 172.16.0.0 0.0.255.255 area 0
Orion Alpha A28X(config-router)#network 192.168.12.0 0.0.0.255 area 1
Orion Alpha A28X(config-router)# area 1 stub
Orion Alpha A28X(config-router)# area 1 default-cost 50
```

Related Commands	Command	Description
	area stub	Sets an OSPF area as a stub area.
	area nssa	Sets an OSPF area as an NSSA.

Platform Description N/A

2.4 area filter-list

Use this command to filter the inter-area routes on the ABR. Use the **no** form of this command to restore the default setting.

area *area-id* **filter-list** { **access** *acl-name*| **prefix** *prefix-name* } { **in** | **out** }

no area *area-id* **filter-list** { **access** *acl-name* | **prefix** *prefix-name* } { **in** | **out** }

Parameter Description	Parameter	Description
	area-id	Area ID
	acl-name	Name of an Access Control List (ACL)
	prefix-name	Prefix-list name
	in | **out**	Applies the ACL rule to the routes incoming/outgoing the area.

Defaults   No filtering is configured by default.

Command Mode   Routing process configuration mode

Usage Guide   This command can be configured only on an ABR.

You can use this command when it is required to filter the inter-area routes on the ABR.

Configuration Examples   The following example sets area 1 to learn only the inter-area routes of 172.22.0.0/8.

```
Orion Alpha A28X# configure terminal
Orion Alpha A28X(config)# access-list 1 permit 172.22.0.0 0.255.255.255
Orion Alpha A28X(config)# router ospf 100
Orion Alpha A28X(config-router)# area 1 filter-list access 1 in
```

Related Commands	Command	Description
	N/A	N/A

Platform Description   N/A

2.5   area nssa

Use this command to set an OSPF area as an NSSA in routing process configuration mode. Use the **no** form of this command to delete the NSSA or the NSSA configuration.

area *area-id* **nssa** [**no-redistribution**] [**default-information-originate** [**metric** *value*] [**metric-type** *type*]] [**no-summary**] [**translator** [**stability-interval** *seconds* \| **always**]]

no area *area-id* **nssa** [**no-redistribution**] [**default-information-originate** [**metric** *value*] [**metric-type** *type*]] [**no-summary**] [**translator** [**stability-interval** \| **always**]]

Parameter Description	Parameter	Description
	area-id	NSSAID
	no-redistribution	Imports the routing information to a common area other than the NSSA for the NSSA ABR.
	default-information originate	Generates and imports the default Type 7 LSA to the NSSA. This option takes effect only on the NSSA ABR or ASBR.
	metric *value*	Sets the metric of the generated default LSA. The range is from 0 to 16777214. The default value is 1.
	metric-type *type*	Sets the type of the generated LSA to N-1 or N-2. The default value

	is N-2.
no-summary	Prevents the NSSA ABR from sending summary LSAs (Type-3 LSA).
translator	Configures the translator for the NSSA ABR.
stability-interval *seconds*	Configures the stability interval in seconds for the NSSA ABR that functions as a translator to change to a non-translator. The range is from 0 to 2147483647. The default value is 40.
always	Configures that an NSSA ABR always functions as a translator. The NSSA ABR is the backup translator by default.

Defaults   No NSSA is defined by default.

Command

Mode   Routing process configuration mode

Usage Guide   The default-information-originate parameter is used to generate the default Type-7 LSA. However, on the NSSA ABR, the default Type-7 LSA will always be generated; On the ASBR (which is not an ABR at the same time), the default Type-7 LSA is generated only when the default route exists in the routing table.

The no-redistribution parameter prevents the OSPF from advertising the external routes imported with the redistribute command to the NSSA on the ASBR. This option is generally used when the NSSA device is both an ASBR and an ABR.

To reduce the number of LSAs sent to the NSSA, you can configure the no-summary parameter on the ABR to prevent it from advertising summary LSAs (Type-3 LSAs) to the NSSA. In addition, you can use the area default-cost command on the NSSA ABR to configure the cost of the default route advertised to the NSSA. By default, this cost is 1.

If an NSSA has multiple ABRs, the ABR with the greatest ID is selected as the Type-7 or Type-5 translator. To configure that an NSSA ABR always functions as a translator, you can use the translator always parameter. If the translator role of an ABR is taken away by another ABR, the ABR still possesses the conversion capability within stability-interval. If the ABR fails to take back its translator role when stability-interval expires, the LSA that changes from Type-7 to Type-5 will be removed from the autonomous domain.

To avoid route loops, Type-5 LSAs generated from Type-7 convergence will be eliminated immediately after the current device stopped serving as a translator, with no need to wait until the stability-interval expires.

In a same NSSA, you are recommended to configure the **translator always** parameter on only one ABR.

When the Type-7 LSAs are translated to Type-5, forwarding addresses (FA) of Type-7 LSAs are included in the translated Type-5 LSAs.

Configuration   The following example sets area 1 as an NSSA on all routers of the area.

Examples
```
Orion Alpha A28X(config)#router ospf1
Orion Alpha A28X(config-router)#network 172.16.0.0 0.0.255.255 area0
Orion Alpha A28X (config-router)#network 192.168.12.0 0.0.0.255 area 1
Orion Alpha A28X(config-router)# area1nssa
```

Related

Command	**Description**

Commands		
	area default-cost	Defines the cost (OSPF metric) of the default aggregate route advertised to the NSSA.

Platform Description N/A

2.6 area range

Use this command to configure inter-area route aggregation for OSPF. Use the **no** form of this command to delete route aggregation. Use the **no** form with the cost parameter to restore the default metric of the aggregate route, but not delete route aggregation.

area *area-id* **range** *ip-address net-mask* [**advertise** | **not-advertise**] [c**ost** *cost*]

no area *area-id* **range** *ip-address net-mask* [cost]

Parameter Description	Parameter	Description
	area-id	ID of the area where the aggregate route is injected into. The value can be a decimal integer or an IP address.
	ip address net-mask	Network segment whose routes are to be aggregated
	advertise | not-advertise	Whether to advertise the aggregate route
	cost *cost*	Sets the priority of the interface. The range is from 0 to 16777215.

Defaults No inter-area route aggregation is configured by default.

The configured aggregation range is advertised by default.

The default metric of the aggregate route depends on whether the device is compatible with RFC1583. If yes, the default metric is the smallest cost of the aggregate route. If no, the default metric is the largest cost of the aggregate route.

Command Mode Routing process configuration mode

Usage Guide This command takes effect only on the ABR to aggregate multiple routes of an area into a route and advertise it to other areas. Route combination occurs only on the border of an area. The devices inside an area see the specific routing information, but the devices outside the area see only one aggregate route. The advertise and not-advertise options can set whether to advertise the aggregate route for filtering and masking. The aggregate route is advertised by default.

You can use the cost option to set the metric of the aggregate route.

You can define route aggregate in multiple areas to simplify the routes in the whole OSPF routing area. This improves the network forwarding performance, especially in large networks.

The area range of route aggregation is determined according to the longest match when multiple aggregate routes with direct inclusion relationships are configured.

Configuration Examples The following example aggregate the routes of area 1 into a route 172.16.16.0/20.

```
Orion Alpha A28X(config)#router ospf 1
Orion Alpha A28X(config-router)#network 172.16.0.0 0.0.15.255area0
Orion Alpha A28X((config-router)#network 172.16.17.0 0.0.15.255area1
```

```
Orion Alpha A28X(config-router)#area1range 172.16.16.0 255.255.240.0
```

	Command	Description
Related Commands	**discard-route**	Enables a discarded route to be added to a routing table.
	summary-address	Configures the OSPF external route aggregation.

Platform Description   N/A

2.7 area stub

Use this command to set an OSPF area as a stub area or full stub area. Use the **no** form of this command to restore the default setting.

area *area-id* **stub** [**no-summary**]

no area *area-id* **stub** [**no-summary**]

	Parameter	Description
Parameter Description	*area-id*	Stub area ID
	no-summary	(Optional) Prevents the ABR from advertising the network summary link to the stub area. Here the stub area is called the full stub area. Only the ABR needs this parameter.

Defaults   No stub area is defined by default.

Command Mode   Routing process configuration mode

Usage Guide   All devices in the OSPF stub area must be configured with the area stub command. The ABR only sends three types of link state advertisement (LSA) to the stub area: 1) type 1, device LSA; 2) type 2, network LSA; 3) type 3, network summary LSA. For the routing table, the devices in the stub area can learn only the routes inside the OSPF routing domain, including the internal default routes generated by the ABR.

To configure a full stub area, use the area stub command with the no-summary keyword on the ABR. The devices in the full stub area can learn only the routes in the local area and the internal default routes generated by the ABR.

Two commands can configure an OSPF area as a stub area: the area stub and area default-cost commands. All devices connected to the stub area must be configured with the area stub command, but the area default-cost command can be executed only on the ABR. The area default-cost command defines the initial cost (metric) of the internal default route.

Configuration Examples   The following example sets area 1 as the stub area on all devices in area 1.

```
Orion Alpha A28X(config)# router ospf1
Orion Alpha A28X(config-router)# network172.16.0.0 0.0.255.255 area 0
Orion Alpha A28X (config-router)# network 192.168.12.0  0.0.0.255 area 1
```

```
Orion Alpha A28X(config-router)# area 1 stub
```

Related Commands

Command	Description
area default-cost	Defines the cost (OSPF metric value) of the default aggregate route advertised to the stub area.

Platform Description

N/A

2.8   area virtual-link

Use this command to define the OSPF virtual link in routing process configuration mode. Use the **no** form of this command to restore the default setting.

area *area-id* **virtual-link** *router-id* [**authentication** [**message-digest** | **null**]] [**dead-interval** *{ seconds* | **minimal hello-multiplier** *multiplier }*] [**hello-interval** *seconds]* [**retransmit-interval** *seconds]* [**transmit-delay** *seconds*] [[**authentication-key** [**0|7**] *key*] | [**message-digest-key** *key-id* **md5** [**0|7**] *key*]]

no area *area-id* **virtual-link** *router-id* [**authentication**] [**dead-interval**] [**hello-interval**] [**retransmit-interval**] [**transmit-delay**] [[**authentication-key**] | [**message-digest-key** *key-id*]]

Parameter Description

Parameter	Description
area-id	ID of the OSPF transition area. The value can be a decimal integer or an IP address.
router-id	ID of the router neighboring to the virtual link. It can be viewed with the show ip ospf command.
dead-interval *seconds*	(Optional) Defines the time to declare neighbor loss in seconds. The range is 0 to 2147483647.This value must be consistent with that of the neighbor.
minimal	Enables the Fast Hello function and sets the death clock to 1 second.
hello-multiplier	Multiplies dead-interval with hello-interval in the Fast-Hello function.
multiplier	Specifies the number of Hello packets that are sent every second in the Fast Hello function. The range is from 3 to 20.
hello-interval *seconds*	(Optional)Defines the interval at which the HELLO packet is sent by the OSPF to the virtual link in seconds. The range is from1 to 65535.This value must be consistent with that of the neighbor.
retransmit-interval *seconds*	(Optional) OSPF LSA retransmission interval in seconds. The range is from 0 to 65535. The parameter setting must consider the round-trip time of packets on the link.
transmit-delay *seconds*	(Optional) OSPF LSA transmission delay in seconds. The range is from 0 to 65535. This value adds the LSA keep alive period. When the LSA keep alive period reaches a threshold, the LSA will be refreshed.

authentication-key [0|7]*key*	(Optional) Defines the OSPF plain text authentication key. The plain text authentication key between neighbors must be the same. The service password-encryption command enables the key to be displayed in encrypted manner. 0 indicates that the key is displayed in plain text. 7 indicates that the key is displayed in cipher text.
message-digest-key *key-id***md5 [0|7]***key*	(Optional) Defines the OSPF MD5 authentication key and key ID. The MD5 authentication key ID and key between neighbors must be the same. The service password-encryption command enables the key to be displayed in encrypted manner. 0 indicates that the key is displayed in plain text. 7 indicates that the key is displayed in cipher text.
authentication	Sets the authentication type to plain text.
message-digest	Sets the authentication type to MD5.
null	Sets the authentication type to no authentication.

Defaults   The following are the default values:

dead-interval: 40seconds

hello-interval: 10seconds

retransmit-interval: 5seconds

transmit-delay: 1second

authentication: null

The Fast Hello function is disabled by default.

The other parameters do not have default values.

Command

Mode   Routing process configuration mode

Usage Guide   A virtual link can connect an area to the backbone area, or another non-backbone area. In the OSPF routing domain, all areas must connect to the backbone area. If an area disconnects from the backbone area, a virtual link to the backbone area is required. Otherwise, the network communication will become abnormal. The virtual link is created between two ABRs. The area that belongs to both ABRs is called the transition area, which can never be a stub area or NSSA.

The router-id parameter indicates the ID of OSPF neighbor router and can be displayed with the show ip ospf neighbor command. You can configure the loopback address as the router ID.

The area virtual-link command defines only the authentication key for a virtual link. You can use the area authentication command to enable the OSPF packet authentication in areas connected over the virtual link in routing process configuration mode.

 OSPF supports the Fast Hello function.

If the Fast Hello function is enabled, the OSPF can discover neighbors and detects invalid neighbors quickly. You can enable the OSPF Fast Hello function by specifying the keywords minimal and hello-multiplier, and the multiplier parameter. You can set the death clock to 1 second in minimal and hello-multiplier to a value equal to or greater than 2. In this case, the Hello packet sending interval is less than 1 second.

The hello-interval field of a Hello packet received by a virtual link is omitted if the Fast Hello function is enabled on the virtual link and the hello-interval field is set to 0 for Hello packets advertised from the virtual link.

No matter the Fast Hello function is enabled or not, the values of dead-interval must be consistent on both ends of a virtual link. The values of hello-multiplier on both ends can be different if at least one Hello packet can be received within dead-interval. You can use the show ip ospf virtual-links command to monitor dead-interval and hello-interval configured for a virtual link.

For the Fast Hello function, you can only configure either the **dead-interval minimal hello-multiplier** parameter or the **hello-interval** parameter.

Configuration Examples	The following example sets area 1 as the transition area to establish virtual link with neighbor *2.2.2.2.*

```
Orion Alpha A28X(config)# router ospf 1
Orion Alpha A28X(config-router)# network 172.16.0.0 0.0.15.255 area0
Orion Alpha A28X(config-router)# network 172.16.17.0 0.0.15.255 area1
Orion Alpha A28X(config-router)#area1 virtual-link2.2.2.2
```

The following example sets area 1 as the transition area to establish a virtual link with neighbor *1.1.1.1*. This virtual link connects area 10 and the backbone area, and works with the OSPF packet authentication inMD5 mode.

```
Orion Alpha A28X(config)# routerospf1
Orion Alpha A28X(config-router)# network172.16.17.0 0.0.15.255area1
Orion Alpha A28X(config-router)# network172.16.252.0 0.0.0.255 area10
Orion Alpha A28X(config-router)# area 0 authentication message-digest
Orion Alpha A28X(config-router)# area1virtual-link 1.1.1.1message-digest-
key1md5hello
```

The following example sets area 1 as the transition area to establish a virtual link with neighbor 1.1.1.1, enables the Fast Hello function on this virtual link, and sets the multiplier to 3.

```
Orion Alpha A28X(config)# routerospf1
Orion Alpha A28X(config-router)# network172.16.17.0 0.0.15.255 area1
Orion Alpha A28X(config-router)# network 172.16.252.0 0.0.0.255 area10
Orion Alpha A28X(config-router)# area1 virtual-link1.1.1.1dead-interval
minimal hello-multiplier 3
```

Related Commands

Command	Description
area authentication	Enables the OSPF area packet authentication and define the authentication mode.
show ip ospf	Displays the OSPF process information, including the router ID.
show ip ospf virtual-links	Monitors information about a virtual link.

Platform Description   N/A

2.9 auto-cost

Use this command to enable the auto-cost function and set the reference bandwidth according to the reference bandwidth. Use the **no** form of this command to restore the default setting.

auto-cost [**reference-bandwidth** *ref-bw*]

no auto-cost [**reference-bandwidth**]

	Parameter	Description
Parameter Description		
	ref-bw	Reference bandwidth, in the range from1 to 4294967 Mbps.

Defaults	The default is 100Mbps.
Command Mode	Routing process configuration mode
Usage Guide	By default, the cost of an OSPF interface is equal to the reference value of the auto cost divided by the interface bandwidth.
	Run the **auto-cost** command to obtain the reference value of the auto cost. The default value is 100 Mbps.
	Run the **bandwidth** command to set the interface bandwidth.
	The costs of OSPF interfaces on several typical lines are as follows:
	64Kbps serial line: The cost is 1562.
	E1 line: The cost is 48.
	10M Ethernet: The cost is 10.
	100M Ethernet: The cost is 1.
	If you run the **ip ospf cost** command to configure the cost of an interface, the configured cost will automatically overwrite the cost that is computed based on the auto cost.
Configuration Examples	The following example configures the reference bandwidth as 10 Mbps.

```
Orion Alpha A28X(config)# routerospf1
Orion Alpha A28X(config-router)# network172.16.10.0 0.0.0.255 area0
Orion Alpha A28X(config-router)# auto-costreference-bandwidth10
```

	Command	Description
Related Commands		
	show ip ospf	Displays the OSPF global configuration information
	ip ospf cost	Sets the cost value of the OSPF interface.
	bandwidth	Sets the interface bandwidth. This setting does not affect data transmission rate.

Platform Description	N/A

2.10 capability opaque

Use this command to enable Opaque LSA. Use the **no** form of this command to disable this function.

capability opaque

no capability opaque

	Parameter	Description
Parameter		

Description		
	N/A	N/A

Defaults   Opaque LSA is enabled by default.

Command Mode   Routing process configuration mode.

Usage Guide   N/A

Configuration Examples

The following example disables Opaque LSA capability.

```
Orion Alpha A28X(config)# router ospf 1
Orion Alpha A28X(config-router)# no capability opaque
```

Related Commands

Command	Description
show ip ospf	Displays the global configuration of OSPF.

Platform Description   N/A

2.11 clear ip ospf process

Use this command to clear and restart the OSPF instance.

clear ip ospf *(process-id)* **process**

Parameter Description

Parameter	Description
process-id	OSPF instance ID. When the ID is specified, the command clears data related to the specified instance and restarts the OSPF instance. When no ID is specified, the command clears data related to all running OSPF instances and restarts all the running OSPF instances.

Defaults   The rule recommended in the RFC 1583 is used by default.

Command Mode   Privileged EXEC mode

Usage Guide   Resetting the entire OSPF process causes that all neighbors are re-established and OSPF is greatly affected. Therefore, you are prompted to confirm the execution for deliberation.

Configuration Examples

The following example clears data of OSPF instance 1 and restarts OSPF instance 1.

```
Orion Alpha A28X#clearipospf1process
```

Related Commands

Command	Description
N/A	N/A

Platform Description	N/A

2.12 compatible rfc1583

Use this command to determine the RFC 1583 or RFC 2328 rule for selecting the optimal route among route table several routes to the same destination out of the Autonomous System (AS).

compatible rfc1583

no compatible rfc1583

Parameter Description	Parameter	Description
	N/A	N/A

Defaults	The RFC 1583 rule is used by default.

Command Mode	Routing process configuration mode

Usage Guide	N/A

Configuration Examples	The following example determines the best route with the RFC 2328 rule.

```
Orion Alpha A28X(config)# routerospf1
Orion Alpha A28X(config-router)# nocommpatiblerfc1583
```

Related Commands	Command	Description
	show ip ospf	Displays the OSPF global configuration information

Platform Description	N/A

2.13 default-information originate

Use this command to generate a default route to be injected into the OSPF routing domain in routing process configuration mode. Use the **no** form of this command to restore the default setting.

default-information originate [**always**] [**metric** *metric*] [**metric-type** *type*] [**route-map** *map-name*]

no default-information originate [**always**] [**metric**] [**metric-type**] [**route-map** *map-name*]

Parameter Description	Parameter	Description
	always	(Optional) Generates the default route unconditionally, no matter whether the default route exists locally or not.
	metric *metric*	(Optional) Initial metric of the default route in the range from0 to 16777214

metric-type *type*	(Optional) Type of the default route. There are two type of OSPF external routes: type 1, different metrics on different devices; type 2, same metric on different devices. An external route of type 1 is more trustworthy than that of type 2.
route-map *map-name*	Associated route map name. No route map is associated by default.

Defaults No default route is generated by default.

The default value of metric is 1.

The default value of metric-type is 2.

Command

Mode Routing process configuration mode

Usage Guide When the **redistribute** or **default-information** command is executed, the OSPF-enabled device automatically turns into the ASBR. The ASBR cannot generate the default route automatically or advertise it to all the devices in the OSPF routing domain. The ASBR can generate the default route with the **default-information originate** command in routing process configuration mode.

If the always parameter is used, the OSPF routing process advertises an external default route to neighbors, no matter the default route exists or not. However, the local device does not display the default route. To make sure whether the default route is generated, use the **show ip ospf database** command to display the OSPF link state database. The external link identified with 0.0.0.0 indicates the default route. You can use the show ip route command on the OSPF neighbor to display the default route.

The metric of the external default route can be defined only with the **default-information originate** command.

There are two types of OSPF external routes: type 1 external routes have changeable routing metrics, while type 2 external routes have constant routing metrics. For two parallel routes with the same route metric to the same destination network, the type 1 route takes precedence over the type 2 route. As a result, the **show ip route** command displays only the type 1 route.

This command generates a default route of Type-5 LSA, which will not be flooded to the NSSA area. To generate a default route in the NSSA area, use the **area nssa default-information-originate** command.

The routers in the stub area cannot generate external default routes.

⚠ The range of set metric is 0 to 16777214 for the associated route map. If the value exceeds the range, introducing a route fails.

Configuration

Examples The following example configures that OSPF generates an external default route and injects it to the OSPF routing domain. The default route is of type 1 and the metric 50.

```
Orion Alpha A28X(config)#routerospf 1
Orion Alpha A28X(config-router)#network172.16.24.0 0.0.0.255 area 0
Orion Alpha A28X(config-router)#default-information originate
alwaysmetric50metric-type1
```

Related

Commands

Command	Description
show ip ospf database	Displays OSPF link state database.
show ip route	Displays the IP route table.

redistribute	Redistributes routes of other routing processes.

Platform Description N/A

2.14 default-metric

Use this command to set the **default metric** of OSPF redistribution route. Use the **no** form of this command to restore the default setting.

default-metric *metric*

no default-metric

Parameter Description

Parameter	Description
metric	Default metric of the OSPF redistribution route in the range from1 to 16777214

Defaults The default metric is not configured by default.

Command Mode Routing process configuration mode

Usage Guide The **default-metric** command must work with the **redistribute** command in routing process configuration mode to modify the initial metric of all redistributed routes.

The configuration result of the **default-metric** command does not take effect for the external routes injected into the OSPF routing domain with the **default-information originate** command.

Configuration Examples The following example configures the default metric of the OSPF redistribution route as 50.

```
Switch(config)# router rip
Orion Alpha A28X(config-router)# network192.168.12.0
Switch(config-router)# version 2
Orion Alpha A28X(config-router)# exit
Orion Alpha A28X(config)# routerospf1
Orion Alpha A28X(config-router)# network172.16.10.0 0.0.0.255area0
Switch(config-router)# default-metric 50
Orion Alpha A28X(config-router)# redistribute rip subnets
```

Related Commands

Command	Description
redistribute	Redistributes the routes of other routing processes.
show ip ospf	Displays the OSPF global configuration information.

Platform Description N/A

2.15 discard-route

Use this command to enable adding the discard-route into the core route table. Use the **no** form of this command to disable this function.

discard-route { **internal | external** }

no discard-route { **internal** | **external** }

Parameter Description	Parameter	Description
	internal	Enables adding the discard-route generated with the area range command
	external	Enables adding the discard-route generated with the summary-address command.

Defaults	Adding the discard-route is enabled by default.
Command Mode	Routing process configuration mode
Usage Guide	After route aggregation, the range may exceed the actual network range of the route table, and sending the data to the nonexistent network may cause loops or increase router loads. To prevent this situation, the discard-route is added to the route table on the ABR or the ASBR. The discard-route is generated automatically and will not be transmitted.
Configuration Examples	The following example disables adding the discard routes generated with the area range command.

```
Orion Alpha A28X(config)# router ospf 1
Orion Alpha A28X(config-router)# no discard-route internal
```

Related Commands	Command	Description
	area range	Configures the route aggregation between OSPF areas.
	summary-address	Configures the route aggregation out of the OSPF routing domain.

Platform Description	N/A

2.16 distance ospf

Use this command to set the Administration Distance (AD) of different types of OSPF routes. Use the **no** form of this command to restore the default setting.

distance { *distance* | **ospf** { [**intra-area** *distance*] [**inter-area** *distance*] [**external** *distance*] } }

no distance [**ospf**]

Parameter Description	Parameter	Description

distance	Sets the route AD in the range from1 to 255.
intra-area *distance*	Sets the AD of the intra-area route in the range from1 to 255.
inter-area *distance*	Sets the AD of the inter-area route in the range from1 to 255.
External *distance*	Sets the AD of the external route in the range from1 to 255.

Defaults
The default value is 110.

The default intra-area distance is 110.

The default inter-area distance is 110.

The default external distance is 110.

Command

Mode OSPF Routing process configuration mode

Usage Guide This command is used to specify different ADs for different types of OSPF routes.

Configuration The following example sets the OSPF external route AD to 160.

Examples
```
Orion Alpha A28X(config)# routerospf1
Orion Alpha A28X(config-router)# distance ospf external 160
```

Related
Commands

Command	Description
N/A	N/A

Platform N/A
Description

2.17 distribute-list in

Use this command to configure LSA filtering. Use the **no** form of this command to restore the default setting.

distribute-list *{ [access-list-number | name] |* **prefix** *prefix-list-name [* **gateway** *prefix-list-name] |* **route-map** *route-map-name } in [interface-type interface-number]*

no distribute-list *{ [access-list-number | name] |* **prefix** *prefix-list-name [* **gateway** *prefix-list-name] |* route-map *route-map-name } in [interface-type interface-number]*

Parameter
Description

Parameter	Description
access-list-number	**name**	Uses the ACL filtering rule.
gateway *prefix-list-name*	Uses the gateway filtering rule.
Prefix *prefix-list-name*	Uses the prefix-list filtering rule.
route-map *route-map-name*	Uses the route-map filtering rule.
interface-type interface-number	Configures the LSA route filtering on the interface.

Defaults No filtering is configured by default.

Command

Mode Routing process configuration mode

Usage Guide   This configuration filters the received LSAs, and only those matching the filtering conditions are involved in the Shortest Path First (SPF) calculation to generate the corresponding routes. It does not affect the link status database or the route table of the neighbors. It only affects the routing entries calculated by local OSPF. This function is used to control routes that enter the ABR or ASBR. The following route-map rules will be supported if the route-map parameter is configured:

match interface

match ip address

match ip address prefix-list

match ip next-hop

match ip next-hop prefix-list

match metric

match route-type

match tag

Filtering routes by using the **distribute-list in** command affects forwarding of local routes, but does not affect route computation based on LSAs. Therefore, if route filtering is configured on the ABR, Type 3 LSAs will still be generated and advertised to other areas because routes can still be computed based on LSAs. As a result, black-hole routes are generated. In this case, you can run the **area filter-list** or **area range** (containing the **not-advertise** parameter) command on the ABR to prevent generation of black-hole routes.

Configuration   The following example configures LSA filtering.
Examples

```
Orion Alpha A28X(config)# access-list3permit172.16.0.00.0.127.255
Orion Alpha A28X(config)# router ospf 25
Orion Alpha A28X(config-router)# distribute-list 3 in ethernet 0/1
```

Related Commands

Command	Description
distribute-list out	Filters redistribution routes.

Platform Description   N/A

2.18 distribute-list out

Use this command to configure filtering redistribution routes. The function is similar to that of the **redistribute** command. Use the **no** form of this command to restore the default setting.

distribute-list *{ [access-list-number | name] |* **prefix** *prefix-list-name }* **out** [**connected** | **ospf** *process-id* | **rip** | **static**]

no distribute-list *{ [access-list-number | name] |* **prefix** *prefix-list-name }* **out** [**connected** | **ospf** *process-id* | **rip** | **static**]

Parameter Description

Parameter	Description
access-list-number	name	Uses the ACL filtering rule.
prefix prefix-list-name	Uses the prefix-list filtering rule.
connected	**| ospf**	Source of the routes to be filtered

process-id| **rip | static**	

Defaults   No filtering is configured by default.

Command
Mode   Routing process configuration mode

Usage Guide   Similar to the redistribute route-map command, the distribute-list out command filters the routes that other protocols redistribute to the OSPF. However, the distribute-list out command does not redistribute routes by itself. It works with the redistribute command in most cases. The ACL filtering rule and the prefix-list filtering rule cannot coexist in the configuration, that is, the two rules cannot be configured at the same time for routes from the same source.

Configuration   The following example filters the redistributed static routes.
Examples
```
Orion Alpha A28X(config)# routerospf1
Orion Alpha A28X(config)# redistribute static subnets
Orion Alpha A28X(config-router)# distribute-list 22 outstatic
Orion Alpha A28X(config-router)# distribute-list prefix jjj out static
% Access-list filter exists, please de-config first
```

Related
Commands

Command	Description
distribute-list in	Configures LSA filtering.
redistribute	Redistributes routes of other routing processes.

Platform   N/A
Description

2.19 enable mib-binding

Use this command to bind the Management Information Base (MIB) with the specified OSPFv2 process. Use the **no** form of this command to restore the default setting.
enable mib-binding
no enable mib-binding

Parameter
Description

Parameter	Description
N/A	N/A

Defaults   The MIB is bound with the OSPFv2 process with the smallest ID by default.

Command
Mode   Routing process configuration mode

Usage Guide   OSPFv2 MIB has no OSPFv2 process information, so the user operates a sole OSPFv2 process by SNMP. By default, OSPFv2 MIB is bound with the OSPFv2 process with the smallest ID. User operations take effect for this process.
To operate the specified OSPF process over Simple Network Management Protocol(SNMP), use

this command to bind the MIB to SNMP.

Configuration Examples	The following example operates OSPFv2 process 100 over SNMP: ``` Orion Alpha A28X(config)# routerospf100 Orion Alpha A28X(config-router)# enable mib-binding ```

	Command	Description
Related Commands	**show ip ospf**	Displays the OSPF global configuration information.
	enable traps	Configures the OSPF TRAP function.

Platform Description	N/A

2.20 enable traps

The OSPFv2 process supports 16 kinds of TRAP packets, which are classified into four categories. Use this command to enable sending the specified TRAP messages. Use the **no** form of this command to restore the default setting.

enable traps [**error** [**IfAuthFailure** | **IfConfigError** | **IfRxBadPacket** | **VirtIfAuthFailure** | **VirtIfConfigError** | **VirtIfRxBadPacket**] | **lsa** [**LsdbApproachOverflow** | **LsdbOverflow** | **MaxAgeLsa** | **OriginateLsa**] | **retransmit** [**IfTxRetransmit** | **VirtIfTxRetransmit**] | **state-change** [**IfStateChange** | **NbrRestartHelperStatusChange** | **NbrStateChange** | **NssaTranslatorStatusChange** | **RestartStatusChange** | **VirtIfStateChange** | **VirtNbrRestartHelperStatusChange | VirtNbrStateChange**]]

no enable traps [**error** [**IfAuthFailure** | **IfConfigError** | **IfRxBadPacket** | **VirtIfAuthFailure** | **VirtIfConfigError** | **VirtIfRxBadPacket**] | **lsa** [**LsdbApproachOverflow** | **LsdbOverflow** | **MaxAgeLsa** | **OriginateLsa**] | **retransmit** [**IfTxRetransmit** | **VirtIfTxRetransmit**] | **state-change** [**IfStateChange** | **NbrRestartHelperStatusChange** | **NbrStateChange** | **NssaTranslatorStatusChange** | **RestartStatusChange** | **VirtIfStateChange** | **VirtNbrRestartHelperStatusChange | VirtNbrStateChange**]]

	Parameter	Description		
Parameter Description	**error**	Configures all traps switches related to errors. Use this parameter to set the following specified error traps switches.		
		Ifauthfailure	Interface authentication error	
		Ifconfigerror	Interface parameter configuration error	
		Ifrxbadpacket	Error packets received on the interface	
		Virtifauthfailure	Authentication error on the virtual interface	
		Virtifconfigerror	Parameter configuration error on the virtual interface	
		Virtifrxbadpacket	Error packets received on the virtual interface	
	isa	Configures all traps switches related to the LSA. Use this parameter		

		to set the following specified LSA traps switches.	
		Lsdbapproachoverflow	External LSA count has reached the 90% of the upper limit.
		Lsdboverflow	External LSA count has reached the upper limit.
		Maxagelsa	LSA reaching the aging time
		Originatelsa	Generates new LSA
retransmit		Configures all traps switches related to the retransmission. Use this parameter to set the following specified retransmit traps switches.	
		Iftxretransmit	Packet retransmission on the interface
		Virtiftxretransmit	Packet retransmission on the virtual interface
state-change		Configures all traps switches related to the state change. Use this parameter to set the following specified state-change switches.	
		Ifstatechange	Interface state change
		NbrRestartHelper StatusChange	State change during the neighbor GR process
		Nbrstatechange	Neighbor state change
		NssaTranslatorStatusChange	State change of the NSSA translator
		RestartStatusChange	State change of the GR Restarter on the device
		Virtifstatechange	State change on the virtual interface
		VirtNbrRestartHelper StatusChange	Status change of the virtual neighbor GR process
		Virtnbrstatechange	State change on the virtual neighbor

Defaults   All TRAP switches are disabled by default.

Command

Mode   Routing process configuration mode

Usage Guide   The **snmp-server enable traps ospf** command must be configured before you configure this command, for it is limited by the **snmp-server** command.

This command is not limited by the binding of process and MIB, allowing to enable the TRAP switch for different processes simultaneously.

Configuration   The following example enables all TRAP switches of OSPFv2 process 100.

Examples
```
Orion Alpha A28X(config)# routerospf100
Orion Alpha A28X(config-router)# enable traps
```

Related

Commands

Command	Description
show ip ospf	Displays the OSPF global configuration information.

| enable mib-binding | Binds the OSPFv2 process with MIB. |
| snmp-server enable traps ospf | Enables the OSPF TRAP notification function. |

| **Platform Description** | N/A |

2.21 graceful-restart

Use this command to enable the graceful restart (GR) of OSPF on the device. Use the **graceful-restart grace-period** command to configure the grace period parameter and enable the OSPF GR function. Use the **no** form of this command to disable this function.

graceful-restart [**grace-period** *grace-period* | **inconsistent-lsa-checking**]

no graceful-restart [**graceful-period**]

Parameter Description

Parameter	Description
grace-period *grace-period*	Indicates the grace period, which is the maximum time from occurrence of an OSPF failure to completion of the OSPF GR. The value of the graceperiod varies from 1s to 1800s. The default value is 120s.
inconsistent-lsa-checking	Enables topological change detection. If any topological change is detected, OSPF exits the GR process to complete convergence. After GR is enabled, topological change detection is enabled by default.

Defaults This function is enabled by default.

Command Mode Routing process configuration mode

Usage Guide GR is configured based on the OSPF instance. Different instances could be configured with different parameters according to the actual situation.

The graceful restart interval is the longest time between the OSPF restart and the graceful restart. In this period, you can perform link status reconstruction to restore the OSPF status to the original. With the interval times out, the OSPF will exit GR and perform common OSPF operations.

The GR interval is 120 seconds set with the graceful-restart command, and the graceful-restart grace-period command allows you to change the interval explicitly.

GR is unavailable when the Fast Hello function is enabled.

Configuration Examples The following example enables GR for the OSPF instance 1 and sets the restart interval for GR.

```
Orion Alpha A28X(config)# router ospf 1
Orion Alpha A28X(config-router)# graceful-restart
Orion Alpha A28X(config-router)# graceful-restart grace-period 60
```

Related Commands

Command	Description
graceful-restart helper	Enables the OSPF graceful-restart helper.

Platform Description	N/A

2.22 graceful-restart helper

Use this command to enable the graceful restart helper function. Use the **no** form of this command to restore the default setting.

graceful-restart helper disable

no graceful-restart helper disable

graceful-restart helper { **strict-lsa-checking** | **internal-lsa-checking**}

no graceful-restart helper {**strict-lsa-checking** | **internal-lsa-checking**}

Parameter Description	Parameter	Description
	disable	Prohibits a device from acting as a GR helper for another device.
	strict-lsa-checking	Indicates that changes in Type 1 to Type 5 and Type 7 LSAs will be checked during the period that the device acts as a GR helper to determine whether the network changes. If the network changes, the device will stop acting as the GR helper.
	internal-lsa-checking	Indicates that changes in Type 1 to Type 3 LSAs will be checked during the period that the device acts as a GR helper to determine whether the network changes. If the network changes, the device will stop acting as the GR helper.

Defaults   The GR helper is enabled by default.

The router enabled with the GR helper does not check the LSA change by default.

Command Mode   Routing process configuration mode

Usage Guide   This command is used to configure the GR helper capability of a router. When a neighbor router implements GR, it sends a Grace-LSA to notify all neighbor routers. If the GR helper function is enabled on the local router, the local router becomes the GR helper on receiving the Grace-LSA, and helps the neighbor to complete GR. The **disable** option indicates that GR helper is not provided for any device that implements GR.

After a device becomes the GR helper, the network changes are not detected by default. If any change takes place on the network, the network topology converges after GR is completed. If you wish that network changes can be quickly detected during the GR process, you can configure **strict-lsa-checking** to check Type 1 to 5 and Type 7 LSAs that indicate the network information or **internal-lsa-checking** to check Type 1 to 3 LSAs that indicate internal routes of the AS domain. When the network scale is large, it is recommended that you disable the LSA checking options (**strict-lsa-checking** and **internal-lsa-checking**) because regional network changes may trigger termination of GR and consequently reduce the convergence of the entire network.

Configuration Examples   The following example disables the GF helper and modifies the policy of checking network changes.

```
Orion Alpha A28X(config)# router ospf1
Orion Alpha A28X(config-router)# graceful-restart helper disable
```

```
Orion Alpha A28X(config-router)# no graceful-restart helper disable
Orion Alpha A28X(config-router)# graceful-restart helper
strict-lsa-checking
```

Related Commands	Command	Description
	graceful-restart	Enables GR on the device.

Platform Description   N/A

2.23 ip ospf authentication

Use this command to configure the authentication type. Use the **no** form of this command to restore the default setting.

ip ospf authentication [**message-digest** | **null**]

no ip ospf authentication

Parameter Description	Parameter	Description
	message-digest	Enables MD5 authentication on the interface.
	null	Enables no authentication.

Defaults   No authentication mode is configured and that of the local area is used on the interface by default.

Command Mode   Interface configuration mode

Usage Guide   Plaintext authentication is applicable when **no** option is used with the command. Note that the no form of this command restores the default value. Whether authentication is used actually depends on authentication mode configured for the local area of the interface. If authentication mode is configured as **null,** no authentication is enabled. When both the interface and its area are configured with authentication, the one for the interface takes precedence.

Configuration Examples   The following example configures MD5 authentication for OSPF on fastEthernet 0/1.

```
Orion Alpha A28X (config)#interface fastEthernet0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# ipaddress172.16.1.1
255.255.255.0
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip ospf authentication
message-digest
```

Related Commands	Command	Description
	area authentication	Enables authentication and defines authentication mode in the OSPF area.
	ip ospf authentication-key	Configures the plain text authentication key.
	ip ospf message-digest-key	Configures the MD5 authentication key.

2.24 ip ospf authentication-key

Use this command to configure the OSPF plain text authentication key in interface configuration mode. Use the **no** form of this command to restore the default setting.

ip ospf authentication-key [**0** | **7**] *key*

no ip ospf authentication-key

	Parameter	Description
Parameter Description	**0**	Displays the key in plain text.
	7	Displays the key in cipher text.
	key	Key containing at most eight characters.

Defaults　　It is disabled by default.

Command

Mode　　Interface configuration mode

Usage Guide　　The **ip ospf authentication-key** command configures the key that will be inserted in all OSPF packet headers. As a result, if the keys are inconsistent, the OSPF neighbor relationship cannot be established between two devices directly connected, and thus route information exchange is impossible.

The keys may vary by interface, but the devices that are connected to the same physical network segment must use the same key.

To enable the OSPF area authentication, execute the area authentication command in routing process configuration mode.

The authentication can be enabled separately on an interface by executing the ip ospf authentication command in interface configuration mode. When both the interface and the area are configured with authentication, the one for the interface takes precedence.

Configuration　　The following example configures the OSPF authentication key ospfauth for fast Ethernet *0/1*.

Examples
```
Orion Alpha A28X (config)#interfacefastEthernet0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# ipaddress172.16.1.1
255.255.255.0
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip ospf authentication-key
ospfauth
```

	Command	Description
Related Commands	**area authentication**	Enables OSPF area authentication and defines authentication mode
	ip ospf authentication	Enables authentication on the interface and defines authentication mode

Platform Description	N/A

2.25 ip ospf cost

Use this command to configure the cost (OSPF metric) of the OSPF interface for sending a packet in interface configuration mode. Use the **no** form of this command to restore the default setting.

ip ospf cost *cost*

no ip ospf cost

Parameter Description	Parameter	Description
	cost	OSPF interface cost in the range from 0 to 65535

Defaults The default interface cost is calculated as follows:

Reference bandwidth/Bandwidth

The reference bandwidth is *100* Mbps by default.

Command Mode Interface configuration mode

Usage Guide By default, the OSPF interface cost is 100Mbps/Bandwidth, where Bandwidth is the interface bandwidth configured with the bandwidth command in interface configuration mode.

The default costs of different types of lines are as follows:

● 64K serial line: 1562

● E1 line: 48

● 10M Ethernet: 10

● 100M Ethernet: 1

The OSPF cost configured with the **ip ospf cost** command will overwrite the default configuration.

Configuration Examples The following example configures the OSPF cost of fastEthernet 0/1 to100.

```
Orion Alpha A28X(config)# interfacefastEthernet0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# ipospfcost100
```

Related Commands	Command	Description
	bandwidth	Specifies the interface bandwidth. This setting does not affect the data transmission rate.
	show ip ospf	Displays the OSPF global configuration information

Platform Description	N/A

2.26 ip ospf database-filter all out

Use this command to stop advertising LSAs of an interface, that is, the LSA update packets are not sent on the interface. Use the **no** form of the command to restore the default setting.

ip ospf database-filter all out

no ip ospf database-filter

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is disabled and all LSA update packets can be sent on the interface by default.

Command Mode Interface configuration mode

Usage Guide To stop sending LSA update packets on the interface, enable this function on the interface. Then, the device maintains the neighboring connections and accepts LSAs from neighbors, but stops sending LSAs to neighbors.

Configuration Examples The following example stops sending LSA update packets of fastEthernet 0/1.

```
Orion Alpha A28X(config)# interface fastEthernet 0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip address 172.16.10.1
255.255.255.0
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip ospf database-filter all
out
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.27 ip ospf dead-interval

Use this command to configure the interval for determining the death of an interface neighbor in interface configuration mode. Use the **no** form of this command to restore the default setting.

ip ospf dead-interval { *seconds* **| minimal hello-multiplier** *multiplier* }

no ip ospf dead-interval

Parameter Description	Parameter	Description
	seconds	Defines the interval for determining the neighbor death in seconds. The range is from 0 to 2,147,483,647.
	minimal	Indicates that the Fast Hello function is enabled to set the dead interval to 1s.

hello-multiplier *multiplier*	Indicates the number of Hello packets sent per second in the Fast Hello function. The value ranges from 3 to 20.

Defaults   The value of dead-interval is 4 times the interval configured with the **ip ospf hello-interval** command by default.

Command Mode   Interface configuration mode

Usage Guide   The OSPF dead interval is contained in the Hello packet. If OSPF does not receive a Hello packet from a neighbor within the dead interval, it declares that the neighbor is invalid and deletes this neighbor record form the neighbor list. By default, the dead interval is four times the Hello interval. If the Hello interval is modified, the dead interval is modified automatically.

When using this command to manually modify the dead interval, pay attention to the following issues:

1. The dead interval cannot be shorter than the Hello interval.
2. The dead interval must be the same on all routers in the same network segment.

OSPF supports the Fast Hello function.

After the OSPF Fast Hello function is enabled, OSPF finds neighbors and detects neighbor failures faster. You can enable the OSPF Fast Hello function by specifying the **minimal** and **hello-multiplier** keywords and the **multiplier** parameter. The **minimal** keyword indicates that the death interval is set to 1s, and **hello-multiplier** indicates the number of Hello packets sent per second. In this way, the interval at which the Hello packet is sent decreases to less than 1s.

If the Fast Hello function is configured for a virtual link, the Hello interval field of the Hello packet advertised on the virtual link is set to 0, and the Hello interval field of the Hello packet received on this virtual link is ignored.

No matter whether the Fast Hello function is enabled, the death interval must be consistent and the **hello-multiplier** values can be inconsistent on routers at both ends of the virtual link. Ensure that at least one Hello packet can be received within the death interval.

Run the **show ip ospf virtual-links** command to monitor the death interval and Fast Hello interval configured for the virtual link.

The **dead-interval minimal hello-multiplier** and **hello-interval** parameters introduced for the Fast Hello function cannot be configured simultaneously.

Configuration Examples   The following example configures the interval for determining the death of the OSPF neighbor on fastEthernet 0/1 to30seconds.

```
Orion Alpha A28X(config)# interface fastEthernet 0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip address 172.16.10.1
255.255.255.0
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip ospf dead-interval30
```

The following example configures the value of hello-multiplier to3.

```
Orion Alpha A28X(config)# interface fastEthernet 0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip address 172.16.10.1 255.255.255.0
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip ospf dead-interval minimal hello-
multiplier 3
```

Related Commands	Command	Description
	ip ospf hello-interval	Specifies the interval at which the OSPF sends Hello packets
	show ip ospf interface	Displays OSPF interface information.

Platform Description   N/A

2.28 ip ospf disable all

Use this command to prevent the specified interface from generating OSPF packets. Use the **no** form of this command to restore the default setting.

ip ospf disable all

no ip ospf disable all

Parameter Description	Parameter	Description
	N/A	N/A

Defaults   OSPF packets are generated on the specified interface by default.

Command Mode   Interface configuration mode

Usage Guide   The interface configured with this command will ignore whether the network areas are matched. After this command is configured, an interface will not generate OSPF packets even if the interface belongs to the network; therefore, the interface does not receive or send any OSPF packets or participate in OSPF calculation.

Configuration Examples   The following example prevents the specified interface from generating OSPF packets.

```
Orion Alpha A28X(config)# interface fastEthernet 0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip address172.16.10.1
255.255.255.0
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip ospf disable all
```

Related Commands	Command	Description
	N/A	N/A

Platform Description   N/A

2.29 ip ospf hello-interval

Use this command to set the interval for sending Hello packets in interface configuration mode. Use the **no** form of this command to restore the default setting.

ip ospf hello-interval *seconds*

no ip ospf hello-interval

Parameter Description	Parameter	Description
	seconds	Interval for sending Hello packets in seconds. The range is from1 to 65535.

Defaults   The defaults are as follows:

10secons for Ethernet

10seconsfor PPP or HDLC encapsulated interfaces

10secons for frame relay PTP interfaces

30secons for non-frame relay PTP sub-interface and X.25 interfaces

Command

Mode   Interface configuration mode

Usage Guide   The interval of sending the Hello packets is included in the Hello packet. A shorter interval means that OSPF detects the topological change faster, which will increase network traffic. The Hello packet sending intervals for all the devices in the same network segment must be the same. To manually modify the interval to determine neighbor death, ensure that the Hello packet sending interval cannot be greater than dead-interval of the neighbor.

Configuration   The following example configures the interval of sending the Hello packets on fastEthernet 0/1 to15.

Examples

```
Orion Alpha A28X(config)# interface fastEthernet 0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip address172.16.10.1
255.255.255.0
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip ospf hello-interval15
```

Related Commands	Command	Description
	ip ospf dead-interval	Sets the interval for determining the death of the OSPF neighbor.

Platform   N/A

Description

2.30 ip ospf message-digest-key

Use this command to configure the MD5 authentication key in interface configuration mode. Use the **no** form of this command to restore the default setting.

ip ospf message-digest-key *key-id* **md5** [**0** | **7**] *key*

no ip ospf message-digest-key *key-id*

Parameter Description	Parameter	Description
	key	Key of up to 16 characters
	0	Displays the key in plain text.

7	Displays the key in cipher text.
key-id	Key identifier in the range from1 to 255

Defaults   No MD5 key is configured by default.

Command
Mode   Interface configuration mode

Usage Guide   The **ip ospf message-digest-key** command configures the key that will be inserted in all OSPF
packet headers. As a result, if the keys are inconsistent, the OSPF neighboring relationship cannot
be established between two devices directly connected, and thus route information exchange is
impossible.

The keys can be different for different interfaces, but the devices that are connected to the same
physical network segment must be configured with the same key. For neighbors, the same key
identifier must correspond to the same key.

To enable OSPF area authentication, execute the **area authentication** command in routing process
configuration mode. The authentication can be enabled separately on an interface by executing the
ip ospf authentication command in interface configuration mode. When both the interface and the
area are configured with authentication, the one for the interface takes precedence.

The switch software supports smooth modification of MD5 authentication keys, which shall be added
before deleted. When an MD5 authentication key of the device is added, the device will regard other
devices have not had new keys and thus send multiple OSPF packets by using different keys, till it
confirms that the neighbors have been configured with new keys. When all devices have been
configured with new keys, it is possible to delete the old key.

Configuration   The following example adds a new OSPF authentication key "hello5" with key ID 5 for fastEthernet
Examples   0/1.

```
Orion Alpha A28X(config)# interface fastEthernet 0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip address 172.16.24.2
255.255.255.0
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip ospf authentication
message-digest
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip ospf message-digest-key
10 md5 hello10
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip ospf message-digest-key
5md5 hello5
```

When all neighbors are added with new keys, the old keys shall be deleted for all devices.

```
Orion Alpha A28X(config)# interface fastEthernet 0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# no ip ospf message-digest-
key10md5 hello10
```

Related
Commands

Command	Description
area authentication	Enables OSPF area authentication and defines authentication mode.
ip ospf authentication	Enables authentication on the interface and defines authentication mode.

Platform Description	N/A

2.31 ip ospf mtu-ignore

Use this command to disable the MTU check when an interface receives the database description packet. Use the **no** form of this command to restore the default setting.

ip ospf mtu-ignore

no ip ospf mtu-ignore

Parameter Description	Parameter	Description
	N/A	N/A

Defaults	MTU check is disabled by default.

Command Mode	Interface configuration mode

Usage Guide	After receiving the database description packet, the device will check whether the MTU of the neighbor interface is the same as its own MTU. If the received database description packet indicates an MTU greater than the interface's MTU, the neighboring relationship cannot be established. This can be fixed by disabling the MTU check.

Configuration Examples	The following example disables the MTU check function on fastEthernet 0/1.
| | ```
Orion Alpha A28X(config)# interface fastEthernet 0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip ospf mtu-ignore
``` |

Related Commands	Command	Description
	N/A	N/A

Platform Description	N/A

2.32 ip ospf network

Use this command to configure the OSPF network type in interface configuration mode. Use the **no** form of this command to restore the default setting.

ip ospf network { **broadcast | non-broadcast |**
point-to-multipoint [**non-broadcast**] **| point-to-point** }

no ip ospf network

Parameter Description	Parameter	Description
	broadcast	Sets the OSPF network type as the broadcast type.
	non-broadcast	Sets the OSPF network type as the non-broadcast multi-path access

	type, i.e. NBMA network.
point-to-multipoint [non-broadcast]	Sets the OSPF network type as the point-to-multipoint type. The value is the point-to-multipoint broadcast type by default. The non-broadcast option means the point-to-multipoint non-broadcast type.
point-to-point	Sets the OSPF network type as the point-to-point type.

Defaults The default configurations are as follows:

PTP network type: Point-to-Point Protocol(PPP), Serial Line Internet Protocol(SLIP), frame relay point-to-point (PTP) sub-interface, X.25 PTP sub-interface encapsulation

NBMA network type: frame relay (except for PTP sub-interface), X.25 encapsulation (except for PTP sub-interface)

Broadcast network type: Ethernet encapsulation

By default, the network type is the point-to-multipoint network type.

Command Mode Interface configuration mode

Usage Guide The broadcast type requires that the interface must have the broadcast capability.

The P2P type requires that the interfaces are interconnected in one-to-one manner.

The NBMA type requires full-meshed connections, and all interconnected routers can directly communicate with each other.

The P2MP type does not raise any requirement.

Configuration Examples The following example configures the frame relay interface network as the P2P type.

```
Orion Alpha A28X(config)# interface Serial 1/0
Orion Alpha A28X(config-Serial 1/0)#ip address 172.16.24.4 255.255.255.0
Orion Alpha A28X(config-Serial 1/0)# encapsulation frame-relay
Orion Alpha A28X(config-Serial 1/0)# ip ospf network point-to-point
```

The following example configures the frame relay interface network as the NBMA type.

```
Orion Alpha A28X(config)# interface Serial 1/0
Orion Alpha A28X(config-Serial 1/0)# ip address 172.16.24.4 255.255.255.0
Orion Alpha A28X(config-Serial 1/0)# encapsulation frame-relay
Orion Alpha A28X(config-Serial 1/0)# ip ospf network non-broadcast
Orion Alpha A28X(config-Serial 1/0)#exit
Orion Alpha A28X(config)# router ospf 20
Orion Alpha A28X(config-router)# neighbor 172.16.24.2 priority 1 poll-interval 150
```

Related Commands

Command	Description
dialer map ip	Defines the mapping between IP address and dialing number.
frame-relay map	Defines the mapping between IP address and frame DLCI.
neighbor(OSPF)	Defines the IP address of neighbor applicable to NBMA network type and point-to-multipoint

	non-broadcast type only.
X25 map	Defines the mapping between IP address and X.25 network address.

Platform Description N/A

2.33 ip ospf priority

Use this command to configure the OSPF priority in interface configuration mode. Use the **no** form of this command to restore the default setting.

ip ospf priority *priority*

no ip ospf priority

Parameter Description

Parameter	Description
priority	Sets the OSPF priority of the interface in the range from 0 to 255.

Defaults The default is 1.

Command Mode Interface configuration mode

Usage Guide The interface priority is included in the Hello packet. When DR/BDR election occurs in the OSPF broadcast type network, the device with higher priority will become the DR or BDR. If the devices have the same priority, the one with higher ID will become the DR or BDR. The device with priority 0 cannot become DR or BDR. This command is valid only for OSPF broadcast and non-broadcast network types.

Configuration Examples The following example configures the priority offastethernet 0/1 as 0.

```
Switch(config)#interface fastethernet 0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# ipospfpriority0
```

Related Commands

Command	Description
ip ospf network	Configures the network type of the interface.

Platform Description N/A

2.34 ip ospf retransmit-interval

Use this command to define the interval for sending the link state update (LSU) packet on the interface in interface configuration mode. Use the **no** form of this command to restore the default setting.

ip ospf retransmit-interval *seconds*

ip ospf retransmit-interval

Parameter Description	Parameter	Description
	seconds	Interval for sending the LSU packets in seconds. The range is from 1 to 65535. This interval must be greater than the round trip delay of packets between two neighbors.

Defaults   The default is 5.

Command Mode   Interface configuration mode

Usage Guide   After the device sends an LSU packet, the LSU packet stays in the transmission buffer queue. If no confirmation from the neighbor is obtained in the interval defined with the **ip ospf retransmit-interval** command, the LSU will be sent once again.

In serial lines or virtual links, the retransmission interval shall be slightly larger. The LSU packet retransmission interval of virtual links is defined with the area virtual-link command followed with the keyword retransmit-interval.

Configuration Examples   The following example configures the LSU packet retransmission interval on fastEthernet 0/1 as 10 seconds.

```
Orion Alpha A28X(config)# interface fastEthernet 0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip ospf retransmit-interval
10
```

Related Commands

Command	Description
area virtual-link	Defines an OSPF virtual link.

Platform Description   N/A

2.35 ip ospf source-check-ignore

Use this command to disable the source address check in the point-to-point link. Use the **no** form of this command to restore the default setting

ip ospf source-check-ignore

no ip ospf source-check-ignore

Parameter Description	Parameter	Description
	N/A	N/A

Defaults   This function is enabled by default.

Command Mode   Interface configuration mode

Usage Guide   For OSPF, the source address of the received packet is required to be in the same network segment with the receiving interface. However, in a point-to-point link, the addresses of two ends of the link

are individually set, and they are not required to be in the same network segment. The peer address is informed during the process of point-to-point link negotiation; therefore, OSPF will check whether the source address of the packet is the informed one. If no, the OSPF regards this packet as illegal and drops it. In some applications, the addresses informed during the negotiation are shielded. You need to disable the source address check to ensure the normal establishment of OSPF neighbors. The source address check shall be never enabled, especially for the unnumbered interfaces.

Configuration Examples

The following example disables the source address check function in the point-to-point link.

```
Orion Alpha A28X(config)# interface serial 1/0
Orion Alpha A28X(config-if)# ip ospf source-check-ignore
```

Related Commands

Command	Description
N/A	N/A

Platform Description

N/A

2.36 ip ospf transmit-delay

Use this command to define the LSU packet transmission delay in interface configuration mode. Use the **no** form of this command to restore the default setting.

ip ospf transmit delay *seconds*

no ip ospf transmit delay

Parameter Description

Parameter	Description
seconds	LSU packet transmission delay in seconds in the range from 1 to 65535.

Defaults

The default is 1.

Command Mode

Interface configuration mode

Usage Guide

Before the LSU packet is transmitted, the Age field in all the LSAs of the packet will be increased by the value defined with the **ip ospf transmit-delay** command in interface configuration mode. The configuration of this parameter shall consider the transmission and line transmission delay of the interface. For low-rate lines, the transmission delay of the interface shall be slightly larger. The LSU packet transmission delay of the virtual link is defined with the **area virtual-link** command followed with the keyword retransmit-interval.

The switch software will resend or request resending the LSA with Age up to 3600. If no update is obtained in time, the aged LSA will be cleared from the link state database.

Configuration Examples

The following example configures the transmission delay of fastEthernet 0/1 as 10.

```
Orion Alpha A28X(config)# interface fastEthernet 0/1
Orion Alpha A28X(config-if-FastEthernet 0/1)# ip ospf transmit-delay 10
```

Related Commands

Command	Description
area virtual-link	Defines an OSPF virtual link.

Platform Description N/A

2.37 log-adj-changes

Use this command to enable the logging of the neighbor state changes. Use the **no** form of the command to disable this function.

log-adj-changes [**detail**]

no log-adj-changes [**detail**]

Parameter Description

Parameter	Description
detail	Records the detail of changes.

Defaults This function is enabled by default. Without the detail parameter, the system records the logs that the neighbor enters or exits the full state.

Command Mode Routing process configuration mode

Usage Guide N/A

Configuration Examples The following example logs the neighbor state changes.

```
Orion Alpha A28X(config)# router ospf 1
Orion Alpha A28X(config-router)# log-adj-changes detail
```

Related Commands

Command	Description
show ip ospf	Displays the OSPF global configuration information.

Platform Description N/A

2.38 max-concurrent-dd

Use this command to specify the maximum number of DD packets that can be processed (initiated or accepted) at the same time. Use the **no** form of this command to restore the default setting.

max-concurrent-dd *number*

no max-concurrent-dd

Parameter Description

Parameter	Description
number	Maximum number of DD packets in the range from1 to 65535

Defaults	The default is 5.
Command Mode	Routing process configuration mode
Usage Guide	When a router is exchanging data with multiple neighbors, its performance will be affected. This command is configured to limit the maximum number of DD packets that each OSPF instance can have at the same time.
Configuration Examples	The following example sets the maximum number of DD packets to 4. After the configuration, the device can initiate to interact with four neighbors and can concurrently accept the interaction. That is, the device can interact with a maximum of eight neighbors.

```
Orion Alpha A28X(config)# routerospf10
Orion Alpha A28X(config-router)# max-concurrent-dd4
```

Related Commands	**Command**	**Description**
	router ospf max-concurrent-dd	Sets the maximum number of neighbors allowed in concurrent interaction for all OSPF routing processes.

Platform Description	N/A

2.39 max-metric

Use this command to set the maximum metric of the router-lsa, so that this routing device will not firstly be used as the transmission node by other devices in SPF computing. Use the **no** form of this command to restore the default setting.

max-metric router-lsa [external-lsa *[max-metric-value]]* [**include-stub**] [**on-startup** *[seconds]*] [**summary-lsa** *[max-metric-value]]*

no max-metric router-lsa [external-lsa *[max-metric-value]]* [**include-stub**] [**on-startup** *[seconds]*] [**summary-lsa** *[max-metric-value]]*

Parameter Description	**Parameter**	**Description**
	router-lsa	Configures the maximum metric (0XFFFF) of non-stub links in the Router LSA.
	external-lsa	Uses the maximum metric instead of the external-lsa metric (including the Type-5 and Type-7).
	max-metric-value	Maximum metric of the LAS. The range is 1 to 16777215.The default value is 16711680,
	include-stub	Configures the maximum metric of the stub links in the Router LSA.
	on-startup	Advertises the maximum metric when the routing device starts up.
	seconds	Interval of advertising the maximum metric. The range is 5 to 86400. The default value is 600 seconds.

summary-lsa	Uses the maximum metric to replace the summary LSA metric. (including Type-3 and Type-4)

Defaults The normal metric LSAs are used by default.

Command

Mode Routing process configuration mode

Usage Guide With the **max-metric router-lsa** command enabled, the maximum metric of non-stub links in the Router LSA generated by the routing device is set. The link's normal metric is restored after canceling this configuration or reaching the timer.

By default, with this command enabled, the normal metric of the stub links is still advertised, which is the output interface cost. If the **include-stub** parameter is configured, the maximum metric of the stub links will be advertised.

When the device acts as an ABR, if no interval flow transmission is expected, use the **summary-lsa** parameter to set the summary LSA as the maximum metric.

When the device acts as an ASBR device, if no external flow transmission is expected, use the **external lsa** parameter to set the external LSA as the maximum metric.

The **max-metric router-lsa** command is usually used in the following scenes:

The device is restarted, which generally makes the IGP protocol converge faster, so that other devices attempt forwarding the dataflow through the new started-up device. In this case, use the **on-startup** parameter to set certain delay, so that this device can serve as a transmission node after restarting.

The device is added into the network without being used for dataflow transmission. If the backup path exists, the current device is not used for the dataflow transmission. Otherwise, this device is still used to transmit the dataflow.

Remove the device from the network gracefully. With this command enabled, the current device advertises the maximum metric to all devices, as that the other devices in this network can choose the backup path to for the dataflow transmission before the current device is removed.

ⓘ For the OSPF implementation in the earlier versions (RFC 1247 or earlier versions), the links with the maximum metric (0xFFFF) in the LSA will not participate in the SPF calculation, that is, no dataflow will be sent to the router that have generated these LSAs.

Configuration The following example configures the LSA maximum metric as 100 seconds after starting the device.

Examples
```
Orion Alpha A28X(config)# router ospf 20
Orion Alpha A28X(config-router)# max-metric router-lsa on-startup 100
```

Related

Commands

Command	Description
show ip ospf	Displays the OSPF related configurations.

Platform N/A

Description

2.40 neighbor

Use this command to define the OSPF neighbor in routing process configuration mode. Use the **no** form of this command to restore the default setting.

Neighbor *ip-address* [**poll-interval** *seconds*] [**priority** *priority*] [**cost** *cost*]]

no neighbor *ip-address* [[**poll-interval**] [**priority**] | [cost]]

Parameter Description

Parameter	Description
ip address	IP address of the neighbor
poll-interval *seconds*	(Optional) Specifies the interval of polling neighbors in seconds. The range is from 0 to 2147483647. Only the non-broadcast (NBMA) network type supports this option.
priority *priority*	(Optional) Configures the priority of non-broadcast network neighbors. The range is from 0 to 255. Only the non-broadcast (NBMA) network type supports this option.
cost *cost*	(Optional) Configures the cost to each neighbor in point-to-multipoint network, not defined by default, where the cost configured on the interface will be used. The range is from 0 to 65535. Only the point-to-multipoint [non-broadcast] network type supports this option.

Defaults

No neighbor is defined by default.

The default neighbor polling interval is 120 seconds.

The default NBMA neighbor priority is 0.

Command Mode

Routing process configuration mode

Usage Guide

The switch software must explicitly configure the neighbor information for every non-broadcast network neighbor. The IP address of a neighbor must be the master IP address of that neighbor interface.

In the NBMA network, if the neighbor device becomes inactive, in other words, if the Hello packet is not received within the device dead-interval, the OSPF will send more Hello packets to the neighbor. The interval at which the Hello packets are sent is called the polling interval. When the OSPF starts to work for the first time, it sends Hello packets only to the neighbor whose priority is not 0, so that the neighbor whose priority is set as 0 will not participate in the DR/BDR election. When the DR/BDR is generated, the DR/BDR sends the Hello packets to all neighbors to establish the neighbor relationship.

Since the point-to-multipoint non-broadcast network has no broadcast capability, neighbors cannot be found dynamically. So, it is required to use this command to manually configure neighbor. In addition, it is possible to configure the cost to each neighbor through the cost option for the point-to-multipoint network type.

Configuration Examples

The following example declares an OSPF non-broadcast network neighbor, with the IP address 172.16.24.2, priority 1 and polling interval 150 seconds.

```
Orion Alpha A28X(config)# routerospf 20
```

```
Orion Alpha A28X(config-router)# network 172.16.24.0 0.0.0.255 area 0
Orion Alpha A28X(config-router)# neighbor 172.16.24.2 priority 1 poll-
interval 150
```

Related Commands	Command	Description
	ip ospf priority	Sets the interface priority.
	ip ospf network	Sets the network type

Platform Description   N/A

2.41 network area

Use this command to define which interfaces run OSPF and the OSPF areas they belong to in routing process configuration mode. Use the **no** form of this command to restore the default setting.

network *ip-address wildcard* **area** *area-id*

no network *ip-address wildcard* **area** *area-id*

Parameter Description	Parameter	Description
	ip-address	IP address of the interface
	wildcard	Defines the comparison bits in the IP address, with 0 for exact match and 1 for no comparison
	area-id	OSPF area identifier. An OSPF area is always associated with an address range. For easy of management, a subnet can be used as the OSPF area identifier.

Defaults   No OSPF area is configured by default.

Command Mode   Routing process configuration mode

Usage Guide   The ip-address and wildcard parameters allow associating multiple interfaces with one OSPF area. To run OSPF on an interface, it is required to include the primary IP address and secondary IP address of the interface in the IP address range defined by the network area command. If only the secondary IP address is included, OSPF cannot be enabled on the interface.

You can determine the OSPF process that the interface takes part in by the means of the best match if the IP address of the interface matches the IP address ranges defined by the network command in multiple OSPF processes.

Configuration Examples   The following example defines:

Three areas: 0, 1 and 172.16.16.0

The interfaces whose IP addresses fall into the 192.168.12.0/24 range to area 1

The interfaces whose IP addresses fall into the 172.16.16.0/20 range to area 2

The remaining interface being assigned to area 0.

```
Orion Alpha A28X(config)# routerospf 20
```

```
Orion Alpha A28X(config-router)# network172.16.16.0
0.0.15.255 area172.16.16.0
Orion Alpha A28X(config-router)# network192.168.12.0
0.0.0.255 area 1
Orion Alpha A28X(config-router)# network0.0.0.0 255.255.255.255 area0
```

Related Commands	Command	Description
	router ospf	Creates the OSPF routing process.

Platform Description N/A

2.42 overflow database

Use this command to configure the maximum number of LSAs supported by the current OSPF instance. Use the **no** form of this command to restore the default setting.
overflow database *number* [**hard** | **soft**]
no overflow database

Parameter Description	Parameter	Description
	number	Maximum number of LSAs. The range is from 1 to 4294967294.
	**hard	soft**	hard: shuts down the OSPF instance when the number of LSAs exceeds that number. soft: issues an alarm when the number of LSAs exceeds that number.

Defaults The maximum number of LSAs supported by the current OSPF instance is not restricted by default.

Command Mode Routing process configuration mode

Usage Guide To shut down the OSPF instance when the number of LSAs exceeds that number, use the hard parameter; otherwise, use the soft parameter.

Configuration Examples The following example configures that OSPF instance 10 will be shut down when there are more than 10 LSAs.

```
Orion Alpha A28X(config)# router ospf 10
Orion Alpha A28X(config-router)# overflow database 10 hard
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

2.43 overflow database external

Use this command to configure the maximum number of external LSAs and the waiting time from the overflow state to the normal state. Use the **no** form of this command to restore the default setting.

overflow database external *max-dbsize wait-time*

no overflow database external

<table>
<tr>
<th>Parameter
Description</th>
<th colspan="2"></th>
</tr>
<tr>
<td></td>
<td>Parameter</td>
<td>Description</td>
</tr>
<tr>
<td></td>
<td>max-dbsize</td>
<td>Maximum number of external LSAs (the value shall be the same for all routing devices in the same AS). The range is from 0 to 2147483647.</td>
</tr>
<tr>
<td></td>
<td>wait-time</td>
<td>Waiting time of the routing device from the overflow status to normal status. The range is from 0 to 2147483647.</td>
</tr>
</table>

Defaults
The maximum number of external-LSAs is not restricted by default.

If the maximum number of external-LSAs is restricted, the normal status cannot be restored when the maximum number is exceeded.

Command Mode
Routing process configuration mode

Usage Guide
When the number of external-LSAs exceeds the value of max-db size, the device enters the overflow state. Then no more external-LSA will be loaded and the external-LSAs generated locally will be cleared. After wait-time expires, the device restores to the normal state and external-LSAs are reloaded.

⚠️ When using this function, ensure that all routers of the OSPF backbone area and common areas use the same max-db size value. Otherwise, the following situations occur:

⚠️ The link status is inconsistent on the entire network and neighbors fail to achieve the Full state.

⚠️ Incorrect routes occur, including loops.

⚠️ AS-External-LSAs may be frequently retransmitted.

Configuration Examples
The following example configures that the maximum number of external LSAs is 10, and it turns to the overflow status upon timeout, and the time interval attempting to restore from the overflow state to the normal state is 3 seconds.

```
Orion Alpha A28X(config)# routerospf10
Orion Alpha A28X(config-router)# overflow database external10 3
```

<table>
<tr>
<th>Related
Commands</th>
<th colspan="2"></th>
</tr>
<tr>
<td></td>
<td>Command</td>
<td>Description</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
<td>N/A</td>
</tr>
</table>

Platform Description
N/A

2.44 overflow memory-lack

Use this command to allow OSPF to enter the OVERFLOW state when the memory lacks. Use the **no** form of this command to disable this function.

overflow memory-lack

no overflow memory-lack

Parameter Description	Parameter	Description
	N/A	N/A

Defaults This function is enabled by default

Command Mode Routing process configuration mode

Usage Guide The action of OSPF entering the OVERFLOW state is to discard the newly-learned external route and effectively prevent the memory from increasing.

It is possible that enabling this function causes the route loop in the whole network. To reduce that possibility, OSPF will generate a default route directing to the NULL port and this default route will exist in the OVERFLOW state.

Use the **clear ip ospf process** command to reset the OSPF and remove the OSPF OVERFLOW state.

Use the no form of this command to prevent the OSPF to enter the OVERFLOW state when the memory is insufficient, which may result in the constantly consumption of the memory resources. If the memory is exhausted to some degree, the OSPF instance will stop and all learned routes will be removed.

Configuration Examples The following example prevents the OSPF from entering the OVERFLOW state when the memory is insufficient.

```
Orion Alpha A28X(config)# router ospf 1
Orion Alpha A28X(config-router)# no overflow memory-lack
```

Related Commands	Command	Description
	clear ip ospf process	Resets the OSPF instances.
	show ip protocols ospf	Displays the OSPF information.

Platform Description N/A

2.45 passive-interface

Use this command to configure the specified network interface or all interface as the passive interfaces. Use the **no** form of this command to restore the default setting.

passive-interface { **default |** *interface-type interface-number | interface-type interface-number ip-address* }

no passive-interface { **default |** *interface-type interface-number | interface-type interface-number ip-address* }

Parameter Description	Parameter	Description
	interface-type interface-number	Interface to be set as a passive interface
	default	Sets all the interfaces as passive interfaces
	interface-type interface-number ip-address	Sets the address of the specified interface as a passive address.

Defaults No interface is configured as a passive interface by default. All interfaces are allowed to receive or send OSPF packets.

Command Mode Routing process configuration mode

Usage Guide To prevent other devices in the network from dynamically learning the routing information of the device, set the specified network interface of this device as a passive interface or the IP address of the specified network interface as a passive address

Configuration Examples The following example configures fastEthernet 0/1 as a passive interface and the IP address of the interface 1.1.1.1 as the passive address.

```
Orion Alpha A28X(config)# routerospf 30
Orion Alpha A28X(config-router)# passive-interface fastEthernet 0/1
Orion Alpha A28X(config-router)# passive-interface fastEthernet 0/1
1.1.1.1
```

Related Commands	Command	Description
	show ip ospf interface	Displays the configuration information of the interface.

Platform Description N/A

2.46 redistribute

Use this command to redistribute the external routing information. Use the **no** form of this command to restore the default setting.

redistribute { **connected | ospf** *process-id* **| rip | static** } [**match** { **internal | external** [**1|2**] **|nssa-external** [**1|2**] }] [**metric** *metric-value*] [**metric-type** { *1|2* }] [**route-map** *route-map-name* **]** [**subnets**] [**tag** *tag-value*]

no redistribute {| connected | ospf *process-id* **| rip | static** } [**match** { **internal | external** [**1|2**] **| nssa-external** [**1|2]}**] [**metric** *metric-value*] [**metric-type** { *1|2* }] [**route-map** *route-map-name*] [**subnets**] [**tag** *tag-value*]

Parameter	Parameter	Description

connected	Redistribution from direct routes
ospf *process-id*	Redistribution from an ospf instance specified in process-id in the range from 1 to 65,535
rip	Redistribution from rip
static	Redistribution from static routes
match	Filters specified routes for configuring OSPF route redistribution. By default, all the OSPF routes are redistributed.
metric *metric-value*	Specifies the metric of an OSPF external LSA in the range from 0 to 16777214.
metric-type{1|2}	Sets the external routing type as E-1 or E-2.
route-map *route-map-name*	Redistribution filter rule
subnets	Redistributes the routes of non standard networks.
tag *tag-value*	Sets the tag value of the routes redistributed to the OSPF in the range from 0 to 4294967295.

Defaults Redistribution configuration is not supported by default.

If you configure OSPF redistribution, all subtype routes of the instance are redistributed.

In other cases, all routings of this type are redistributed.

The default value of metric-type is E-2.

No route-map is associated by default.

Command

Mode Route configuration mode

Usage Guide After the command is configured, the router will become an ASBR, and the related routing information is imported into the OSPF domain and broadcasted to other OSPF routers through type-5 LSAs.

When you configure OSPF router distribution without the match parameter, the OSPF routes of all sub types are redistributed by default. Then the first configured match parameter is used as the original one. Only the routes matching the specific type can be redistributed. Use the no form of this command to restore the default configuration.

When you filter routes for redistribution by following the route-map rule, the match rule of the route-map rule is specific for the original redistribution parameters. The route-map rule works only when the redistributed OSPF routes follow the match rule.

⚠️ The range of set metric is from 0 to 16777214 for the associated route-map. If the value exceeds the range, introducing a route fails.

ℹ️ The following are the rules for configuring the no form of the redistribute command:1. If the **no** form specifies some parameters, restore their default values.2. If the **no** form contains no parameter, delete the whole command..

Configuration

Examples

Related

Commands

Command	Description

summary-address	Configures the aggregate route for the external route of the OSPF route area.
default-metric	Sets the default metric of the OSPF redistribution route.

Platform Description   N/A

2.47 router ospf

Use this command to create the OSPF routing process in global configuration mode. Use the **no** form of this command to restore the default setting.

router ospf

no router ospf *process-id*

Parameter Description

Parameter	Description
process-id	ID of an OSPF process. If the process ID is not configured, process 1 is configured.

Defaults   No OSPF routing process exists by default.

Command Mode   Global configuration mode

Usage Guide   Based on the original implementation, the switch10.1 adds the routing process ID to multi-instance OSPF. Different OSPF instances are mutually independent and can be approximately considered as two routing protocols that run independently.

Configuration Examples   N/A

Related Commands

Command	Description
show ip protocols	Displays the routing protocol information.
show ip ospf	Displays the OSPF information.

Platform Description   N/A

2.48 router ospf max-concurrent-dd

Use this command to specify the maximum number of DD packets that can be processed (initiated or accepted) at the same time. Use the **no** form of this command to restore the default setting.

router ospf max-concurrent-dd *number*

no router ospf max-concurrent-dd

Parameter Description	Parameter	Description
	number	Maximum number of DD packets in the range from 1 to 65535.

Defaults The default is 10.

Command Mode Global configuration mode

Usage Guide When a routing device is exchanging data with multiple neighbors, its performance will be affected. This command is configured to limit the maximum number of DD packets that each OSPF instance can have (initiated or accepted) at the same time.

Configuration Examples The following example sets the maximum number of DD packets to 4.
After the configuration, the device can initiate to interact with four neighbors and can concurrently accept the interaction. That is, the device can interact with a maximum of eight neighbors.

```
Orion Alpha A28X(config)# router ospfmax-concurrent-dd4
```

Related Commands	Command	Description
	max-concurrent-dd	Sets the maximum number of the neighbors that the OSPF routing process can concurrently interact with.

Platform Description N/A

2.49 router-id

Use this command to set the router ID. Use the **no** form of this command to restore the default setting.

router-id *router-id*

no router-id

Parameter Description	Parameter	Description
	router-id	Router ID in IP address form

Defaults The OSPF routing process will select the maximal interface IP address as the router ID by default. If the loopback interface of an IP address is not configured, the OSPF routing process will select the maximum IP address among all its physical interfaces as the router ID.

Command Mode Routing process configuration mode

Usage Guide You can configure any IP address as the router ID. However, the router ID should be unique. Note that once the router ID changes, the OSPF protocol will do a lot of processing. Therefore, it is not recommended to change the router ID. The device can be changed only when no LSA is generated.

Configuration Examples

The following example modifies the router ID to 0.0.0.36.

```
Orion Alpha A28X(config)# router ospf 20
Orion Alpha A28X(config-router)# router-id0.0.0.36
```

Related Commands

Command	Description
show ip protocols	Displays the routing protocol information.

Platform Description

N/A

2.50 show ip ospf

Use this command to display the OSPF information.

show ip ospf [*process-id*]

Parameter Description

Parameter	Description
process-id	OSPF process ID

Defaults

N/A

Command Mode

Privileged EXEC mode

Usage Guide

This command displays the information of the OSPF routing process.

Configuration Examples

The following example displays the output of the **show ip ospf** command.

```
Orion Alpha A28X# show ip ospf
Routing Process "ospf 1" with ID 1.1.1.1
Domain ID type 0x0105, value 0x010101010101
Process uptime is 4 minutes
Process bound to VRF default
Memory Overflow is enabled.
Router is not in overflow state now.
Conforms to RFC2328, and RFC1583Compatibility flag isenabled
Supports only single TOS(TOS0) routes
Enable two-way-maintain
Supports opaque LSA
Supports Graceful Restart
This router is an ASBR (injecting external routing information)
Originating router-LSAs with maximum metric
Condition:on startup for 100 seconds, State:inactive
Advertise stub links with maximum metric in router-LSAs
Advertise summary-LSAs with metric 16711680
Advertise external-LSAs with metric 16711680
Unset reason:timer expired, Originated for 100 seconds
Unset time:00:02:02.080, Time elapsed: 00:23:54.656
```

```
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
Initial LSA throttle delay 0 msecs
Minimum hold time for LSA throttle 5000 msecs
Maximum wait time for LSA throttle 5000 msecs
Lsa Transmit Pacing timer 40 msecs, 10 LS-Upd
Minimum LSA arrival 1000 msecs
Pacing lsa-group:240 secs
Number of incomming current DD exchange neighbors 0/5
Number of outgoing current DD exchange neighbors 0/5
Number of external LSA 4. Checksum 0x0278E0
Number of opaque AS LSA 0. Checksum 0x000000
Number of non-default external LSA 4
External LSA database is unlimited.
Number of LSA originated 6
Number of LSA received 2
Log Neighbor Adjency Changes :Enabled
Graceful-restart disabled
Graceful-restart helper support enabled
Number of areas attached to this router: 1
BFD enabled
Area 0 (BACKBONE)
Number of interfaces in this area is 1(1)
Number of fully adjacent neighbors in this area is 1
Area has no authentication
SPF algorithm last executed 00:01:26.640 ago
SPF algorithm executed 4 times
Number of LSA 3. Checksum 0x0204bf
Area 1 (NSSA)
Number of interfaces in this area is 1(1)
Number of fully adjacent neighbors in this area is 0
Number of fully adjacent virtual neighbors through this area is 0
Area has no authentication
SPF algorithm last executed 02:09:23.040 ago
SPF algorithm executed 4 times
Number of LSA 6. Checksum 0x028638
NSSA Translator State is disabled, Stability Interval expired in 00:00:03
```

Field	Description
Router ID	ID of a router.
Process uptime	Effective time of the current OSPF process (the process does not take effect when device-id is 0.0.0.0)
Bou to VRF	VRF of the current OSPF

Conforms to RFC2328	Same as the RFC2328
RFC1583Compatibilit flag	Whether the RFC1583 or RFC2328 is adopted for the calculation of external routes. This policy is used in the selection of best ASBR and in the route comparison.
Support Tos	Supports Only TOS0.
Supports opaque LSA	Supports opaque-LSA.
Graceful-restart	GR Restart capability described in the RFC3623 Graceful Restart
Graceful-restart helper	GR Help capability described in the RFC3623 Graceful Restart
Router Type	OSPF device type, including normal, ABR, and ASBR
SPF Delay	Delay before the SPF calculation is invoked after the topology change is received
SPF-holdtime	Minimum holdtime between two SPF calculations
LsaGroupPacing	Parameter used for LSA pacing, checksum calculation, and aging interval
Incomming current DD exchange neighbors	Number of neighbors under interaction. The incoming neighbors are those entering the exstart status for the first time.
Outgoing current DD exchange neighbors	Number of neighbors under interaction. The outgoing neighbors are those exiting from the higher status to the exstart status for re-interaction.
Number of external LSA	Number of external LSAs stored in the database
External LSA Checksum Sum	Checksum sum of external LSAs stored in the database
Number of opaque LSA	Number of external LSAs stored in the database
Opaque LSA Checksum Sum	Checksum sum of external LSAs stored in the database
Number of non-default external LSA	Number of external LSAs with non-default routes
External LSA database limit	Limit of external LSA number
Exit database overflow state interval	Time of exiting the overflow status
Database overflow state	Whether the current OSPF process is in the overflow status

Number of LSA originated	Number of LSAs generated
Number of LSA received	Number of LSAs received
Log Neighbor Adjency Changes	Whether the record switch for neighbor status change is enabled
Number of areas attached to this router	Total number of areas on the devices
Area type	Area type, including normal, stub, and nssa
Number of interfaces in this area	Number of interfaces in this area
Number of fully adjacent neighbors in this area	Number of Full neighbors of the area
Number of fully adjacent virtual neighbors through this area	Number of Full neighbors with virtual connections in the area. It is effective only in the non-backbone default-type areas.
Area authentication	Authentication mode of the area
SPF algorithm last executed	Time from the previous SPF calculation to the current time
SPF algorithm executed times	Times of SPF calculations
Number of LSA	Total number of LSAs in this area
Checksum Sum	Checksum sum of the LSAs in the area
NSSATranslatorState	Whether to convert the NSSA LSA to External LSA. It is effective on the ABR OSPF process in the NSSA.
BFD enabled	Enables BFD for OSPF.

The 29 series products do not support BFD and VRF.

Related Commands	**Command**	**Description**
	N/A	N/A

Platform Description   N/A

2.51 show ip ospf border-routers

Use this command to display the OSPF internal routing table on the ABR/ASBR.

show ip ospf [*process-id*] border-routers

Parameter Description	Parameter	Description
	process-id	OSPF process ID

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command displays the OSPF internal routes from the local routing device to the ABR or ASBR. The OSPF internal routing table is different from the one displayed with the show ip route command. The OSPF internal routing table has the destination address of the router ID instead of the destination network.

Configuration Examples The following example displays the output of the **show ip ospf border-mrouters** command.

```
Orion Alpha A28X# show ip ospf border-routers
OSPF internal Routing Table
Codes:i - Intra-area route, I - Inter-area route
i 1.1.1.1 [2] via 10.0.0.1, FastEthernet 0/1, ABR, ASBR, Area 0.0.0.1
select
The following table describes fields in the output.
```

Field	Description
Codes	Route type code, where "i" means intra-area routes, while "I" means inter-area routes.
I	Intra-area routes
1.1.1.1	Displays the OSPF ID of the border device.
[2]	Displays the cost to the border device.
via 10.0.0.1	Displays the next-hop gateway to the border device.
FastEthernet 0/1	Displays the interface to the border device.
ABR, ASBR	Displays the type of the border device, including ABR, ASBR, or both.
Area 0.0.0.1	Displays the area that learns the route.
select	Indicates the currently selected optimal path when there are multiple paths to the ASBR.

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

2.52 show ip ospf database

Use this command to display the OSPF link state database information. Use the **no** form of this command to restore the default setting. Different formats of the command will display different LSA

information.

show ip ospf [*process-id* [*area-id* | *ip-address*]] **database** [{ **asbr-summary** | **external** | **network** | **nssa-external** | **opaque-area** | **opaque-as** | **opaque-link** | **router** | **summary** }] [{ **adv-router** *ip-address* | **self-originate** } | *link-state-id* | **brief**] [**database-summary** | **max-age** | **detail**]

Parameter Description

Parameter	Description
area-id	(Optional) Displays the area ID.
adv-device	(Optional) Displays the LSA information generated by the specified advertising device.
link-state-id	(Optional) Displays the LSA information of the specified OSPF link state identifier.
self-originate	(Optional) Displays the LSA information generated by the device itself.
Max-age	(Optional) Displays the LSAs aged.
router	(Optional) Displays the OSPF device LSA information.
network	(Optional) Displays the OSPF network LSA information.
summary	(Optional) Displays the OSPF summary LSA information.
asbr-summary	(Optional) Displays the ASBR summary LSA information.
external	(Optional) Displays the OSPF external LSA information.
nssa-external	(Optional) Displays the category 7 OSPF external LSA information.
opaque-area	(Optional) Displays type 10 LSAs.
opaque-as	(Optional) Displays type 11 LSAs.
opaque-link	(Optional) Displays type 9 LSAs.
database-summary	(Optional) Displays the statistics of LSAs of the link state database.
detail	Displays detailed information of LSAs of the OSPF.
brief	Displays the brief information of the LSAs of the specified type.

Defaults   N/A

Command Mode   Privileged EXEC mode

Usage Guide   When the OSPF link state database is very large, you should display the information on the link state database by item. Proper use of commands may help OSPF troubleshooting.

Configuration Examples   The following example displays the output of the **show ip ospf database** command.

```
Orion Alpha A28X# show ip ospf database
OSPF Device with ID (1.1.1.1) (Process ID 1)
Device Link States (Area 0.0.0.0)
Link ID         ADV Device      Age    Seq#        CkSum  Link count
1.1.1.1         1.1.1.1         2      0x80000011  0x6f39 2
3.3.3.3         3.3.3.3         120    0x80000002  0x26ac 1
Network Link States (Area 0.0.0.0)
Link ID         ADV Device      Age    Seq#        CkSum
192.88.88.27    1.1.1.1         120    0x80000001  0x5366
Summary Link States (Area 0.0.0.0)
```

```
Link ID         ADV Device     Age  Seq#        CkSum  Route
10.0.0.0        1.1.1.1        2    0x80000003 0x350d 10.0.0.0/24
100.0.0.0       1.1.1.1        2    0x8000000c 0x1ecb 100.0.0.0/16
Device Link States (Area 0.0.0.1 [NSSA])
Link ID         ADV Device     Age  Seq#        CkSum  Link count
1.1.1.1         1.1.1.1        2    0x80000001 0x91a2 1
        Summary Link States (Area 0.0.0.1 [NSSA])
Link ID         ADV Device     Age  Seq#        CkSum  Route
100.0.0.0       1.1.1.1        2    0x80000001 0x52a4 100.0.0.0/16
192.88.88.0     1.1.1.1        2    0x80000001 0xbb2d 192.88.88.0/24
NSSA-external Link States (Area 0.0.0.1 [NSSA])
Link ID         ADV Device     Age  Seq#        CkSum  Route
Tag
20.0.0.0        1.1.1.1        1    0x80000001 0x033c E2 20.0.0.0/24
0
100.0.0.0       1.1.1.1        1    0x80000001 0x9469 E2 100.0.0.0/28
0
AS External Link States
Link ID         ADV Device     Age  Seq#        CkSum  Route
Tag
20.0.0.0        1.1.1.1        380  0x8000000a 0x7627 E2 20.0.0.0/24
0
100.0.0.0       1.1.1.1        620  0x8000000a 0x0854 E2 100.0.0.0/28
0
```

The following table describes the fields in the output of the **show ip ospf database** command.

Field	Description
OSPF Device with ID	Displays the Router ID.
Device Link States	Displays the device LSA information.
Net Link States	Displays the network LSA information.
Summary Net Link States	Displays the summary network LSA information.
NSSA-external Link States	Displays the type 7 autonomous external LSA information.
AS External Link States	Displays the type 5 autonomous external LSA information.
Link ID	Displays the Link ID.
ADV Device	Displays the ID of the device that advertises the LSAs.
Age	Displays the keepalive period of the LSA.
Seq#	Displays the sequence number of the LSA, which is used to check aged or duplicate LSAs.
Cksum	Displays the checksum of LSAs.
Link-Count	Displays the number of links in the device LSA information.
Route	Displays the device information included in the LSA.

Tag	Displays the tag of the LSA.

The following example displays the output the **show ip ospf database asbr-summary** command.

```
Orion Alpha A28X# show ip ospf database asbr-summary
      OSPF Device with ID (1.1.1.35) (Process ID 1)
        ASBR-Summary Link States (Area 0.0.0.1)
LS age: 47
Options: 0x2 (*|-|-|-|-|-|E|-)
LS Type: ASBR-summary-LSA
Link State ID: 3.3.3.3 (AS Boundary Device address)
Advertising Device: 1.1.1.1
LS Seq Number: 80000001
Checksum: 0xbe8c
Length: 28
Network Mask: /0
      TOS: 0  Metric: 1
```

The following table describes the fields in the output of the **show ip ospf database asbr-summary** command.

Field	Description
OSPF Device with ID	Displays the router ID.
AS Summary Link States	Displays the summary LSA information in the AS.
LS age	Displays the keepalive period of the LSA.
Options	Option
LS Type	Displays the type of the LSA.
Link State ID	Displays the link ID of the LSA.
AdvertisingRouter	Displays the device advertising the LSA.
LS Seq Number	Displays the sequence number of the LSA.
Checksum	Displays the checksum of the LSAs.
Length	Displays the length (in bytes) of the LSA.
Network Mask	Displays the network mask of the route corresponding to the LSA.
TOS	TOS value, which can be only 0 now.
Metric	Displays the metric of the route corresponding to the LSA.

The following example displays the output of the **show ip ospf database external** command.

```
Orion Alpha A28X# show ip ospf database external
      OSPF Device with ID (1.1.1.35) (Process ID 1)
        AS External Link States
LS age: 752
Options: 0x2 (*|-|-|-|-|-|E|-)
LS Type: AS-external-LSA
Link State ID: 20.0.0.0 (External Network Number)
Advertising Device: 1.1.1.1
LS Seq Number: 8000000a
```

```
Checksum: 0x7627
Length: 36
Network Mask: /24
      Metric Type: 2 (Larger than any link state path)
      TOS: 0
      Metric: 20
      Forward Address: 0.0.0.0
      External Route Tag: 0
```

The following table describes the fields in the output of the **show ip ospf database external** command.

Field	Description
OSPF Device with ID	Displays the router ID.
Type-5 AS External Link States	Displays autonomous external LSA information.
LS age	Displays the keepalive period of the LSA.
Options	Option
LS Type	Displays the type of the LSA.
Link State ID	Displays the link ID of the LSA.
Advertising Router	Displays the device advertising the LSA
LS Seq Number	Displays the sequence number of the LSA.
Checksum	Displays the checksum of the LSAs.
Length	Displays the length (in bytes) of the LSA.
Network Mask	Displays the network mask of the route corresponding to the LSA.
Metric Type	Indicates the external link type.
TOS	TOS value, which can be 0 only now.
Metric	Displays the metric of the route corresponding to the LSA.
Forward Address	IP address through which traffic is forwarded to the destination network. If this address is 0.0.0.0, the data traffic will be forwarded to the device that generates the link state.
External Route Tag	External route tag. Each external route has a 32-byte route tag. The OSPF does not use the route tag by itself, but it will be used by other routing processes to redistribute OSPF routes.

The following example displays the output of the **show ip ospf database network** command:

```
Orion Alpha A28X# show ip ospf database network
OSPF Router with ID (1.1.1.1) (Process ID 1)
Network Link States (Area 0.0.0.0)
LS age: 572
Options:0x2 (*|-|-|-|-|-|E|-)
LS Type:network-LSA
Link State ID:192.88.88.27 (address of Designated Router)
```

```
Advertising Router:1.1.1.1
LS Seq Number: 80000001
Checksum:0x5366
Length: 32
Network Mask: /24
Attached Router:1.1.1.1
Attached Router:3.3.3.3
```

The following table describes the fields in the output of the **show ip ospf database network** command.

Field	Description
OSPF Router with ID	Displays the router ID corresponding to the follow-up information and the process ID corresponding to the OSPF.
Network LinStates	Displays the network LSA information.
LS age	Displays the keepalive period of the LSA.
Options	Option
LS Type	Displays the type of the LSA.
Link State ID	Displays the link ID of the LSA.
Advertising Device	Displays the device advertising the LSA.
LS Seq Number	Displays the sequence number of the LSA.
Checksum	Displays the checksum of LSAs.
Length	Displays the length (in bytes) of the LSA.
Network Mask	Displays the network mask of the network corresponding to the LSA.
Attached Router	Displays the device that is connected with the network.

The following example displays the output of the **show ip ospf database device** command:

```
Orion Alpha A28X# show ip ospf database router
OSPF Router with ID (1.1.1.1) (Process ID 1)
Router Link States (Area 0.0.0.0)
LS age: 322
Options:0x2 (*|-|-|-|-|-|E|-)
Flags:0x3 :ABR ASBR
LS Type:router-LSA
Link State ID:1.1.1.1
Advertising Router:1.1.1.1
LS Seq Number: 80000012
Checksum:0x6d3a
Length: 48
Number of Links: 2
Link connected to:Stub Network
(Link ID) Network/subnet number: 100.0.1.1
(Link Data) Network Mask: 255.255.255.255
Number of TOS metrics: 0
TOS 0 Metric: 0
```

The following table describes the fields in the output of the **show ip ospf database device** command.

Field	Description
OSPF Device with ID	Displays the router ID.
Device Link States	Displays the device LSA information.
LS age	Displays the keepalive period of the LSA.
Options	Option
Flag	Flag
LS Type	Displays the type of the LSA.
Link State ID	Displays the link ID of the LSA.
Advertising Router	Displays the device advertising the LSA.
LS Seq Number	Displays the sequence number of the LSA.
Checksum	Displays the checksum of LSAs.
Length	Displays the length (in bytes) of the LSA.
Number of Links	Displays the number of links associated with the device.
Link connected to	Displays what the link is connected to and the network type.
(Link ID)	Link identifier
(Link Data)	Link data
Number of TOS metrics	TOS value, supporting TOS0 only
TOS 0 Metrics	TOS0 metric

The following example displays the output of the **show ip ospf database summary** command:

```
Orion Alpha A28X# show ip ospf database summary
      OSPF Device with ID (1.1.1.1) (Process ID 1)
         Summary Link States (Area 0.0.0.0)
LS age: 499
Options: 0x2 (*|-|-|-|-|-|E|-)
LS Type: summary-LSA
Link State ID: 10.0.0.0 (summary Network Number)
Advertising Device: 1.1.1.1
LS Seq Number: 80000004
Checksum: 0x330e
```

```
Length: 28
Network Mask: /24
      TOS: 0  Metric: 11
```

The following table describes the fields in the output of the **show ip ospf database summary** command.

Field	Description
OSPF Router with ID	Displays the router ID.
Summary Net Link States	Displays the summary network LSA information.
LS age	Displays the keepalive period of the LSA.
Options	Option
LS Type	Displays the type of the LSA.
Link State ID	Displays the link ID of the LSA.
Advertising Router	Displays the device advertising the LSA.
LS Seq Number	Displays the sequence number of the LSA.
Checksum	Displays the checksum of LSAs.
Length	Displays the length (in bytes) of the LSA.
Network Mask	Displays the network mask of the route corresponding to the LSA.
TOS	TOS value, supporting only 0 now
Metric	Displays the metric of the route corresponding to the LSA.

The following example displays the output of the **show ip ospf database nssa-external** command:
```
Orion Alpha A28X# show ip ospf database nssa-external
      OSPF Device with ID (1.1.1.1) (Process ID 1)
NSSA-external Link States (Area 0.0.0.1 [NSSA])
LS age: 1
Options: 0x0 (*|-|-|-|-|-|-|-)
LS Type: AS-NSSA-LSA
Link State ID: 20.0.0.0 (External Network Number For NSSA)
Advertising Device: 1.1.1.1
LS Seq Number: 80000001
Checksum: 0x033c
Length: 36
Network Mask: /24
      Metric Type: 2 (Larger than any link state path)
```

```
       TOS: 0
       Metric: 20
       NSSA: Forward Address: 100.0.2.1
       External Route Tag: 0
```

The following table describes the fields in the output of the **show ip ospf database nssa-external** command.

Field	Description
OSPF Router with ID	Displays the router ID.
NSSA-external Link States	Displays the type 7 autonomous external LSA information.
LS age	Displays the keepalive period of the LSA.
Options	Option
LS Type	Displays the type of the LSA.
Link State ID	Displays the link ID of the LSA.
Advertising Router	Displays the device advertising the LSA.
LS Seq Number	Displays the sequential number of the LSA.
Checksum	Displays the checksum of the LSAs.
Length	Displays the length (in bytes) of the LSA.
Network Mask	Displays the network mask of the route corresponding to the LSA.
Metric Type	Displays the metric type.
TOS	TOS value, which can be 0 only now.
Metric	Displays the metric of the route corresponding to the LSA.
NSSA:Forward Address	IP address through which traffic is forwarded to the destination network. If this address is 0.0.0.0, the data traffic will be forwarded to the device that generates the link state.
External Route Tag	External route tag. Each external route has a 32-byte route tag. The OSPF does not use the route tag by itself, but it will be used in redistributing OSPF routes by other routing process.

The following example displays the output of the **show ip ospf database external** command:

```
Orion Alpha A28X# show ip ospf database external
      OSPF Device with ID (1.1.1.1) (Process ID 1)
          AS External Link States
LS age: 1290
Options: 0x2 (*|-|-|-|-|-|E|-)
LS Type: AS-external-LSA
Link State ID: 20.0.0.0 (External Network Number)
Advertising Device: 1.1.1.1
LS Seq Number: 8000000a
Checksum: 0x7627
Length: 36
Network Mask: /24
      Metric Type: 2 (Larger than any link state path)
      TOS: 0
      Metric: 20
      Forward Address: 0.0.0.0
      External Route Tag: 0
```

The following table describes the fields in the output of the **show ip ospf database external** command.

Field	Description
OSPF Device with ID	Displays the router ID.
Type-7 AS External Link States	Displays the type 7 autonomous external LSA information.
LS age	Displays the keepalive period of the LSA.
Options	Option
LS Type	Displays the type of the LSA.
Link State ID	Displays the link ID of the LSA.
Advertising Router	Displays the device advertising the LSA.
LS Seq Number	Displays the sequence number of the LSA.
Checksum	Displays the checksum of the LSAs.
Length	Displays the length (in bytes) of the LSA.
Network Mask	Displays the network mask of the route corresponding to the LSA.
Metric Type	Displays the metric type.
TOS	TOS value, which can be 0 only now.

Metric	Displays the metric of the route corresponding to the LSA.
Forward Address	IP address through which traffic is forwarded to the destination network. If this address is 0.0.0.0, the data traffic will be forwarded to the device that generates the link state.
External Route Tag	External route tag. Each external route has a 32-byte route tag. The OSPF does not use the route tag by itself, but it will be used in redistributing OSPF routes by other routing process.

The following example displays the output of the **show ip ospf database database-summary** command:

```
Orion Alpha A28X# show ip ospf database database-summary
OSPF process 1:
Device Link States      : 4
Network Link States     : 2
Summary Link States     : 4
ASBR-Summary Link States : 0
AS External Link States  : 4
NSSA-external Link States: 2
```

The following table describes the fields in the output of the command **show ip ospf database database-summary**.

Field	Description
OSPF Process	OSPF process ID
Router Link	Number of device LSAs in the area
Network Link	Number of network LSAs in the area
Summary Link	Number of summary LSAs in the area
ASBR-Summary Link	Number of ASBR summary LSAs in the area
AS External Link	Number of NSSA LSAs in the area
NSSA-external Link	Number of NSSA LSAs in the area

Related Commands

Command	Description
N/A	N/A

Platform Description   N/A

2.53 show ip ospf interface

Use this command to display the OSPF-associated interface information.

show ip ospf [*process-id* **] interface [** *interface-type interface-number* **| brief]**

Parameter Description

Parameter	Description
process-id	OSPF process ID
interface-type	(Optional) type of the specified interface
interface-number	(Optional) number of the specified interface
brief	Displays the summary of the interface.

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide This command displays the OSPF information on the interface.

Configuration Examples The following example displays the output of the **show ip ospf interface fastEthernet** *0/1* command:

```
Orion Alpha A28X# show ip ospf interface fastEthernet0/1
FastEthernet 0/1 is up, line protocol is up
Internet Address 192.88.88.27/24, Ifindex 4, Area 0.0.0.0, MTU 1500
Matching network config: 192.88.88.0/24
Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State DR, Priority 1,BFD enabled
Designated Router (ID) 1.1.1.1, Interface Address 192.88.88.27
Backup Designated Router (ID) 3.3.3.3, Interface Address 192.88.88.72
Timer intervals configured,Hello 10,Dead 40,Wait 40,Retransmit 5
Hello due in 00:00:03
Neighbor Count is 1, Adjacent neighbor count is 1
Crypt Sequence Number is 70784
Hello received 1786 sent 1787, DD received 13 sent 8
LS-Req received 2 sent 2, LS-Upd received 29 sent 53
LS-Ack received 46 sent 23, Discarded 1
```

The following table describes the fields in the output of the **show ip ospf interface serial** *1/0* command.

Field	Description
FastEthernet 0/1 State	State of the network interface; UP means normal working and Down means faults.
Internet Address	Interface IP address
Area	OSPF area of the interface
MTU	Corresponding MTU
Matching network config	Network area configured for the corresponding OSPF

Process ID	Corresponding process ID
Router ID	OSPF router id
Network Type	OSPF network type
Cost	OSPF interface cost
Transmit Delay is	OSPF interface transmit delay
State	DR/BDR state ID
Priority	Priority of the interface
Designated Router(ID)	DR ID of the interface
DR's Interface address	Address of the DR of the interface
Backup designated device(ID)	Router ID of the BRD of the interface
BDR's Interface address	Address of the BDR of the interface
Time intervals configured	Hello, Dead, Wait, and Retransmit intervals of the interface
Hello due in	Time when the previous Hello is sent
Neighbor count	Total number of neighbors
Adjacent neighbor count	Number of Full neighbors
Crypt Sequence Number	The corresponding md5 authentication number of the interface
Hello received send	Statistics on the Hello packets sent and received
DD received send	Statistics on the DD packets sent and received
LS-Req received send	Statistics on the LS request packets sent and received
LS-Upd received send	Statistics on the LS update packets sent and received
LS-Ack received send	Statistics on the LS response packets sent and received
Discard	Statistics on the discarded OSPF packets

Related Commands

Command	Description
N/A	N/A

Platform Description   N/A

2.54 show ip ospf neighbor

Use this command to display the OSPF neighbor list.

show ip ospf [*process-id*] **neighbor**[**statistics** | { [*interface-type interface-number*] | [*neighbor-id*] | [**detail**] }]

Parameter Description

Parameter	Description

process-id	Displays ID of the process.
detail	(Optional) Displays the neighbor details.
interface-type interface-number	(Optional) Displays the neighbor information of the specified interface
neighbor-id	(Optional) Displays the information of the specified neighbor
statistics	(Optional) Displays the neighbor statistics.

Defaults   N/A

Command Mode   Privileged EXEC mode

Usage Guide   This command displays neighbor information usually used to check whether the OSPF is running normally.

Configuration Examples

Related Commands

Command	Description
N/A	N/A

Platform Description   N/A

2.55 show ip ospf route

Use this command to display the OSPF routes.

show ip ospf [*process-id*] **route** [**count |** *ip-address mask*]

Parameter Description

Parameter	Description
process-id	OSPF process ID. All OSPF routes will be displayed without an ID specified.
count	Statistics of various OSPF routes
ip-address mask	Statistics of routes which have a specified prefix and mask.

Defaults   N/A

Command Mode   Privileged mode

Usage Guide   This command displays the OSPF routing information. The count option displays the OSPF routing statistics.

Configuration Examples   The following example displays the output of the **show ip ospf route** command.

```
OSPF process 1:
Codes: C - connected, D - Discard , O - OSPF,
IA - OSPF inter area  N1 - OSPF NSSA external type 1, N2 - OSPF NSSA
```

```
external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
E2 100.0.0.0/24 [1/20] via 192.88.88.126, FastEthernet 0/1
C  192.88.88.0/24 [1] is directly connected,FastEthernet 0/1,Area 0.0.0.1
```

The following table describes the fields in the output of the **show ip ospf route** command.

Field	Description
codes	Route type and corresponding abbreviation and description
100.0.0.0/24	Route prefix
[1]	Route cost
via	Route next hop and interface

Related Commands

Command	Description
N/A	N/A

Platform Description   N/A

2.56 show ip ospf spf

Use this command to display the routing count in the OSPF area.

show ip ospf [*process-id*] **spf**

Parameter Description

Parameter	Description
process-id	OSPF process ID

Defaults   N/A

Command Mode   Privileged EXEC mode

Usage Guide   This command displays the routing counts within the latest 30 minutes in the OSPF area and current routing total counts.

Configuration Examples   The following example displays the output of the **show ip ospf [***process-id***] spf** command:

```
Orion Alpha A28X# show ip ospf 1 spf

OSPF process 1:
Area_id     30min_counts    Total_counts
0              32              1235
1               6               356
```

The following table describes the fields in the output of the **show ip ospf [***process-id***] spf** command.

Field	Description
Area_id	OSPF area ID
30min_counts	OSPF routing counts within the latest 30 minutes

Total_counts	Total counts of the OSPF routing till now

Related Commands	Command	Description
	show ip ospf	Displays the OSPF summary.

Platform
Description N/A

2.57 show ip ospf summary-address

Use this command to display the converged route of all redistributed routes.

show ip ospf [*process-id***] summary-address**

Parameter Description	Parameter	Description
	process-id	ID of the OSPF process. All OSPF routing processes will be displayed if this parameter is not configured.

Defaults N/A

Command
Mode Privileged EXEC mode

Usage Guide This command is valid only on the NSSA ABR, and displays only the routes with local aggregation operations.

Configuration The following example displays the output of the **show ip ospf summary-address** command:
Examples
```
Orion Alpha A28X# show ip ospf summary-address
OSPF Process 1, Summary-address:
172.16.0.0/16, Metric 20, Type 2, Tag 0, Match count 3, advertise
```

Field	Description
Summary Address	IP address to be aggregated
Summary Mask	Mask to be aggregated
Advertise	Whether to advertise the aggregated route
Status	Whether the aggregation range takes effect
Aggregated subnets	Number of external routes included in the aggregation range

Related Commands	Command	Description
	N/A	N/A

Platform
Description N/A

2.58 show ip ospf virtual-link

Use this command to display the OSPF virtual link information.

show ip ospf [*process-id*] **virtual-link** [*ip-address*]

Parameter Description	Parameter	Description
	process-id	ID of the OSPF process. All OSPF routing processes will be displayed if this parameter is not configured.
	ip-address	Associated ID of a virtual link neighbor

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide If no virtual link is configured, the command displays the neighbor status and other related information. The show ip ospf neighbor command does not display the neighbor of the virtual link.

Configuration Examples The following is the output of the **show ip ospf virtual-links** command:

```
Orion Alpha A28X# show ip ospf virtual-links
Virtual Link VLINK0 to device 1.1.1.1 is up
Transit area 0.0.0.1 via interface FastEthernet 0/1
Local address 10.0.0.37/32
Remote address 10.0.0.27/32
Transmit Delay is 1 sec, State Point-To-Point,
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:05
Adjacency state Full
```

The following table describes the fields in the output.

Field	Description
Virtual Link VLINK0 to router	Displays the virtual link neighbors and their status.
Virtual Link State	Displays the virtual link state.
Transit area	Displays the transit area of the virtual link.
via interface	Displays the associated interface of the virtual link.
Local address	Local interface address
Remote Address	Peer interface address
Transmit Delay	Displays the transmit delay of the virtual link.
State	Interface state
Time intervals configured	Hello, Dead, Wait, and Retransmit interval of the interface
Adjacency State	Neighbor state, where FULL means the stable state

Related	Command	Description

Commands		
N/A		N/A

Platform N/A
Description

2.59 summary-address

Use this command to configure the aggregate route out of the OSPF routing domain. Use the **no** form of this command to restore the remove the aggregate route.

summary-address *ip-address net-mask* [**not-advertise** | **tag** *value* | **cost** *cost*]

no summary-address *ip-address net-mask* [**not-advertise** | **tag** | **cost**]

Parameter
Description

Parameter	Description
ip address	IP address of the aggregate route
net-mask	Network mask of the aggregate route
not-advertise	Does not advertise the aggregate route. If the parameter is not configured, the aggregate route is advertised.
tag *value*	Sets the tag value of an aggregate route. The range is from 0 to 4,294,967,295.
cost *cost*	Cost value of the aggregate route. The range is from 0 to 16,777,214.

Defaults No aggregate route is configured by default.

Command
Mode Routing process configuration mode

Usage Guide When routes are redistributed by another routing process into the OSPF routing process, every route is advertised to the OSPF-enabled device separately in external LSAs. If the incoming routes are continuous addresses, the autonomous border device can advertise only one aggregate route, reducing the scale of routing table greatly.

Unlike the **area range** command, the area range command aggregates inter-OSPF-area routes, while the summary-address command aggregates external routes of the OSPF routing domain.

For the NSSA, the **summary-address** command is valid only on the NSSA ABR now, and aggregates only redistributed routes.

Configuration The following example generates an external aggregate route 100.100.0.0/16.
Examples
```
Orion Alpha A28X(config)# router ospf20
Orion Alpha A28X(config-router)# summary-address100.100.0.0 255.255.0.0
Orion Alpha A28X(config-router)# redistribute static subnets
Orion Alpha A28X(config-router)# network200.2.2.0 0.0.0.255 area 1
Orion Alpha A28X(config-router)# network172.16.24.0 0.0.0.255area 0
Orion Alpha A28X(config-router)# area1nssa
```

Related

Command	Description

Commands		
area-range	Configures route convergence on the OSPF area border device.	
redistribute	Redistributes routes of other routing processes.	

Platform Description N/A

2.60 timers lsa arrival

Use this command to configure the time delay for the same LSA received. Use the **no** form of this command to restore the default setting.

timers lsa arrival *arrival-time*

no timers lsa arrival

Parameter Description

Parameter	Description
arrival-time	Configures the time delay when receiving the same LSA. The range is from 0 to 600000 in the unit of milliseconds.

Defaults The default is 1000.

Command Mode Routing process configuration mode

Usage Guide No action is done when the same LSA is received within the specified time.

Configuration Examples The following example configures the time delay for the same LSA as 2seconds.

```
Orion Alpha A28X(config)# routerospf1
Orion Alpha A28X(config-router)# timers arrival-time 2000
```

Related Commands

Command	Description
show ip ospf	Displays the OSPF information.

Platform Description N/A

2.61 timers pacing lsa-group

Use this command to configure the LSA grouping and then refresh the whole groups as well as the update interval for the aged link state. Use the **no** form of this command to restore the default setting.

timers pacing lsa-group *seconds*

no timers pacing lsa-group

Parameter

Parameter	Description

Description		
	seconds	Parameter used for LSA pacing, checksum calculation, and aging interval. The range is from 10 to1800 in the unit of seconds.

Defaults   The default is 30.

Command Mode   Routing process configuration mode

Usage Guide   Each LSA has its own update and aging time (LSA age). If you update and age LSAs separately, many CPU resources will be consumed. To effectively use CPU resources, you can update LSAs of a device in batches.

You can use this command to modify the value of seconds, whose default value is 240 seconds. This parameter needs not to be adjusted often. The optimal group pacing interval is inversely proportional to the number of LSAs that need to be calculated. For example, if you have approximately 10000 LSAs in the database, decreasing the pacing interval would be better. If the switch has a small database (40 to 100 LSAs), increasing the pacing interval to 10 to 20 minutes might be better.

Configuration Examples   The following example configures the pacing time as 120 seconds.

```
Orion Alpha A28X(config)# deviceospf 20
Orion Alpha A28X (config-router)# timers paing lsa-group 120
```

Related Commands

Command	Description
show ip ospf	Displays the OSPF information.

Platform Description   N/A

2.62 timers pacing lsa-transmit

Use this command to transmit the LSA grouping updating. Use the **no** form of this command to restore the default setting.

timers pacing lsa-transmit *transmit-time transmit-count*

no timers pacing lsa-transmit

Parameter Description

Parameter	Description
transmit-time	Configures the interval of sending the LSA grouping. The range is from 10 to 1000.
transmit-count	Configures the number of LS-UPD packets per group. The range is from 1 to 200.

Defaults   The default configurations are as follows:

Transmit-time: 40 milliseconds.

Transmit-count: 1

Command	
Mode	Routing process configuration mode
Usage Guide	If there are a large number of LSAs and the load on the system is heavy, you can properly use the **transmit-time** and **transmit-count** to inhibit the flooding LS-UPD packet number in the network. If the CPU and network bandwidth loads are not too much, reduce **transimi-time** and increase **transimit-count** to quicken the environment convergence.
Configuration Examples	The following example sets the interval of sending the LS-UPD packets as 50ms, the packets number as 20.

```
Orion Alpha A28X(config)# routerospf1
Orion Alpha A28X(config-router)# timers pacing lsa-transmit 50 20
```

Related Commands	Command	Description
	show ip ospf	Displays the OSPF process information, including the router ID.

Platform Description	N/A

2.63 timers spf

Use this command to configure the delay for SPF calculation after the OSPF receives the topology change as well as the interval between two SPF calculations. Use the **no** form of this command to restore the default setting.

timers spf *spf-delay spf-holdtime*

no timers spf

Parameter Description	Parameter	Description
	spf-delay	Defines the SPF calculation waiting period in seconds. The range is from 0 to 2147483647.After receiving the topology change, the OSPF routing process must wait for the specified period to start the SPF calculation.
	spf-holdtime	Defines the interval between two SPF calculations in seconds. The range is from 0 to 2147483647.When the waiting time is up but the interval between two calculations is still elapsing, the SPF calculation cannot start.

Defaults	For the switch not supporting the timers throttle spf command, the default values are as follows: spf-delay: 5seconds; spf-holdtime: 10 seconds. For the switch supporting the timers throttle spf command, by default, the timers spf command takes no effect. Spf-delay depends on the default configuration of the timers throttle spf command.
Command	Routing process configuration mode

Mode	
Usage Guide	Smaller values of *spf-delay* and *spf-holdtime* mean that OSPF adapts to the topology change faster, and the network convergence period is shorter, but this will occupy more CPU of the router.

⚠ The configurations of the **timers spf command** and the timers throttle spf command may overwrite each other.

Configuration Examples	The following example configures the delay and holdover period of the OSPF as 3 and 9 seconds respectively.

```
Orion Alpha A28X(config)# deviceospf20
Orion Alpha A28X(config-router)# timersspf 3 9
```

Related Commands

Command	Description
show ip ospf	Displays the configuration information of the ospf.
timers throttle spf	Configures the exponential back off delay for SPF calculation. The command is recommended to replace the timers spf command because it is more powerful.

Platform Description	N/A

2.64 timers throttle lsa all

Use this command to configure the exponential back off algorithm for the LSA. Use the **no** form of this command to restore the default setting.

timers throttle lsa all *delay-time hold-time max-wait-time*

no timers throttle lsa all

Parameter Description

Parameter	Description
delay-time	Configures the time delay of generating the LSA first. The range is from 1 to 600000.
hold-time	Configures the minimum interval of refreshing the LSA between the first time and second time. The range is from1 to 600000.
max-wait-time	Configures the maximum interval of successive refreshing the LSA., which determines whether the LSA is refreshed successively. The range is from1 to 600000

Defaults	The default configurations are as follows: **Delay-time:** 0 millisecond, **Hold-time:** 5000 milliseconds, **Max-wait-time:** 5000 milliseconds.
Command	Routing process configuration mode

Mode

Usage Guide If high convergence performance is required for the link change, the value of delay-time can be relatively small. if you expect to reduce the CPU consumption, increase appropriately several values.

⚠️ The value of hold-time cannot be smaller than that of delay-time, and the value of max-wait-time cannot be smaller than that of hold-time.

Configuration Examples The following example configures the first delay as 10ms, hold-time as 1second and the longest delay as 5seconds.

```
Orion Alpha A28X(config)# routerospf1
Orion Alpha A28X(config-router)# timers throttle lsa all 10 1000 5000
```

Related Commands

Command	Description
show ip ospf	Displays the configuration information of the ospf

Platform Description N/A

2.65 timers throttle route

Use this command to configure the delay time of route calculation on receiving the ASBR summary LSA and the external summary LSA. Use the **no** form of this command to restore the default setting.
timers throttle route { **inter-area** *ia-delay* | **ase** *ase-delay* }
no timers throttle route { **inter-area** | **ase** }

Parameter Description

Parameter	Description
inter-area	Calculates the inter area routes.
ia-delay	Sets the delay time of the inter-area route calculation, in the range from 0 to 600,000 in the unit of milliseconds. On receiving the ASBR summary LSA, the router will not calculate the inter-area routes until the ia-delay time runs out.
ase	Calculates the external routes.
ase-delay	Defines the delay time of the external route calculation, in the range from 0 to 600,000 in the unit of milliseconds. On receiving the external summary LSA, the router will not calculate the external routes until the ase-delay time runs out.

Defaults The default values are as follows:
ia-delay: 0,
ase-delay: 0,

Command Mode Routing process configuration mode

Usage Guide	The default setting is recommended if the network needs to be fast converged. For the instable network where multiple inter-area and external routes exist, if you want to optimize the route calculation and save the CPU resources, increase the delay time.
Configuration Examples	The following example sets the .delay time of the inter-area route calculation to one second. ``` Orion Alpha A28X(config)# router ospf 1 Orion Alpha A28X(config-router)# timers throttle route inter-area 1000 ```

Related Commands	Command	Description
	N/A	N/A

Platform Description	N/A

2.66 timers throttle spf

Use this command to configure the topology change information for OSPF, including the delay for SPF calculation as well as the interval between two SPF calculations in routing process configuration mode. Use the **no** form of this command to restore the default setting.

timers throttle spf *spf-delay spf-holdtime spf-max-waittime*

no timers throttle spf

Parameter Description	Parameter	Description
	spf-delay	Defines the SPF calculation waiting period, in the unit of milliseconds, in the range from1 to 600,000. After receiving the topology change, the OSPF routing process must wait for the specified period to start the SPF calculation.
	spf-holdtime	Defines the interval between two SPF calculations in seconds in the range from1 to 600,000.
	spf-max-waittime	Defines the maximum interval between two SPF calculations, in milliseconds in the range from1 to 60,0000.

Defaults	The default configurations are as follows: spf-delay: 1000ms; spf-holdtime: 5000ms; spf-max-waittime: 10000ms.
Command Mode	Routing process configuration mode
Usage Guide	The spf-delay parameter indicates the delay time of the topology change to the SPF calculation. The spf-holdtime parameter indicates the minimum interval between two SPF calculations. Then, the interval of the consecutive SPF calculations is at least twice as the last interval until it reaches to spf-max-waittime. If the interval between two SPF calculations has exceeded the required value, the SPF calculation will restart from spf-holdtime.

Smaller spf-delay and spf-holdtime values can make the topology converge faster. A greater spf-max-waittime value can reduce the system resource consumption of SPF calculation. Those configurations can be flexibly adjusted according to the actual stability of the network topology. Compared with the timers spf command, this command is more flexible. It speeds up the SPF calculation convergence, and reduces the system resource consumption of SPF calculation due to the topology change. To this end, the timers throttle spf command is recommended.

> ⓘ The value of spf-holdtime cannot be smaller than the value of spf-delay, or the value ofspf-holdtime will be set to be equal to the value of spf-delay;
> The value of spf-max-waitime cannot be smaller than the value of spf-holdtime, or the value of spf-max-waitime will be set to be equal to the value of spf-holdtime automatically;
> The configurations of the timers spf command and the timers throttle spf command may overwrite each other.
> If both the timers spf command and the timers throttle spf command are not configured, the default value of the timers throttle spf command is used.

Configuration Examples	The following example configures the delay and holdtime and the maximum time interval of the OSPF as 5ms, 1000ms and 90000ms respectively. If the topology changes consecutively, the SPF calculation intervals are: 5ms, 1second, 3 seconds, 7 seconds, 15 seconds, 31 seconds, 63 seconds, 89 seconds, 179 seconds, 179+90seconds…

```
Orion Alpha A28X(config)# routerospf20
Orion Alpha A28X(config-router)# timersspf 5 1000 90000
```

Related Commands	**Command**	**Description**
	show ip ospf	Displays the configuration information of OSPF
	timers spf	Configures the SPF calculation delay. This command is supported in versions earlier than switch 10.4. It is recommended to replace the timers spf command with the timers throttle spf command.

Platform Description	N/A

2.67 two-way-maintain

Use this command to enable the OSPF two-way-maintain function. Use the **no** form of this command to disable this function.

two-way-maintain

no two-way-maintain

Parameter Description	**Parameter**	**Description**
	N/A	N/A

Defaults	This function is enabled by default.

Command

Mode   Routing process configuration mode

Usage Guide   In the large-scale network, partial packets delay or dropped may exist due to much CPU and
                  memory are occupied caused by lots of packet transmission. If the Hello packets are handled over
                  dead-interval, the corresponding adjacency will be disconnected. In this case, you can enable the
                  two-way-maintain function for the packets such as DD, LSU, LSR and LSAck packets from a
                  neighbor in the network (except for the Hello packets), avoiding the neighbor invalidation caused by
                  delayed or dropped Hello packets.

Configuration The following example disables the OSPF two-way-maintain function.
Examples
```
Orion Alpha A28X(config)# routerospf1
Orion Alpha A28X(config-router)# notwo-way-maintain
```

Related
Commands

Command	Description
show ip ospf	Displays the configuration information of the OSPF

Platform   N/A
Description

3 OSPFv3 Commands

3.1 area authentication

Use this command to configure OSPFv3 area authentication. Use the **no** form of this command to restore the default setting.

area *area-id* **authentication ipsec spi** *spi* [**md5 | sha1**] [**0 | 7**] *key*

no area *area-id* **authentication**

Parameter Description	Parameter	Description
	area-id	Specifies an area ID. It can be an integer or the prefix of an IPv4 address.
	spi	Specifies a security parameter index, in the range from 256 to 4294967295.
	md5	Specifies a message digest 5 (MD5) authentication mode.
	sha1	Specifies a secure hash algorithm 1 (SHA1) authentication mode.
	0	Indicates that a key is displayed in a plain-text format.
	7	Indicates that a key is displayed in a cipher-text format.
	key	Specifies an authentication key.

Defaults   Authentication is not performed by default.

Command Mode   Routing process configuration mode

Usage Guide   switch supports three authentication modes:

- null authentication mode, which is configured when authentication is not needed
- MD5 authentication mode
- SHA1 authentication mode

If OSPFv3 area authentication is configured, the configuration takes effect on all interfaces (except for those of virtual links) in the area. Interface authentication configuration, however, takes precedence over area authentication configuration.

Configuration Examples   The following example specifies MD5 authentication for area 1 where OSPFv3 routing processes reside, and sets the authentication password to aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa.

```
Orion Alpha A28X(config-router)# area 1 authentication ipsec spi 300 md5
aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
```

Related Commands

Command	Description
ipv6 ospf authentication	Specifies interface authentication.
area virtual-link authentication	Specifies virtual link authentication.

Platform   N/A

Description

3.2 area default-cost

Use this command to set the cost of the default route for the ABR in the stub or NSSA area. Use the **no** form of this command to restore the default setting.

area *area-id* **default-cost** *cost*

no area *area-id* **authentication**

Parameter	Description
area-id	Area ID of the stub or NSSA area. It can be an integer or an IPv4 prefix.
cost	Cost of the default route of the stub or NSSA area in the range from 0 to 16777215.

Parameter Description (label for the table above)

Defaults   The default cost is 1.

Command Mode   Routing process configuration mode.

Usage Guide   This command can only work in the ABR connected to the stub area.

Configuration Examples   The following example sets the cost of the default route of stub area 50 to 100.

```
ipv6 router ospf 1
area 50 stub
area 50 default-cost 100
```

Related Commands

Command	Description
area stub	Sets a stub area.

Platform Description   N/A

3.3 area encryption

Use this command to enable encryption authentication for an OSPFv3 area. Use the **no** form of this command to restore the default setting.

area *area-id* **encryption ipsec spi** *spi* **esp null** [**md5** | **sha1**] [**0** | **7**] *key*

no area *area-id* **encryption**

Parameter	Description
area-id	Specifies an area ID. It can be an integer or the prefix of an IPv4 address.
spi	Specifies a security parameter index, in the range from 256 to

Parameter Description (label for the table above)

	4294967295.
null	Specifies the null encryption mode.
md5	Specifies the MD5 authentication mode.
sha1	Specifies the SHA1 authentication mode.
0	Indicates that a key is displayed in the plain-text format.
7	Indicates that a key is displayed in the cipher-text format.
Key	Specifies an authentication key.

Defaults Encryption authentication is not performed by default.

Command Mode Routing process configuration mode

Usage Guide switch supports the null encryption mode and two authentication modes: MD5 and SHA1.

If encryption authentication is configured for an OSPFv3 area, the configuration takes effect on all interfaces (except for those of virtual links) in the area. Encryption authentication configuration on interfaces, however, takes precedence over that of the OSPFv3 area.

Configuration Examples The following example specifies null encryption and MD5 authentication for area 1 where OSPFv3 routing processes reside, and sets the authentication password to aaaaaaaaaaaaaaaaaaaaaaaaaaaaa.

```
Orion Alpha A28X(config-router)# area 1 encryption ipsec spi 300 esp null
md5 aaaaaaaaaaaaaaaaaaaaaaaaaaaaa
```

Related Commands

Command	Description
ipv6 ospf encryption	Specifies interface encryption authentication.
area virtual-link encryption	Specifies virtual link encryption authentication.

Platform Description N/A

3.4 area-range

Use this command to set the range of the converged inter-area addresses. Use the **no** form of this command to restore the default setting.

area *area-id* **range** *ipv6-prefix*/*prefix-length* [**advertise|not-advertise**]

no area *area-id* **range** *ipv6-prefix*/*prefix-length*

Parameter Description

Parameter	Description
area-id	ID of the area in which the addresses are converged. It can be an integer or an IPv4 prefix.
ipv6-prefix/prefix-length	Range of the converged addresses.
advertise	Advertises the range of converged addresses.
not-advertise	The range of the converged addresses is not advertised. By default, the function is enabled.

Defaults	No converged inter-area address range is defined by default.
Command Mode	Routing process configuration mode
Usage Guide	This command applies only to ABR. Use this command to converge multiple routes of an area into one route and advertise it to other areas. This command applies only to ABR. Use this command to converge multiple routes of an area into one route and advertise it to other areas. The routing information combination only takes place on the area border. The specific routing information is seen on the intra-area routers, but only one converged route can be seen on the devices in other areas. By configuring the two options of advertise and not-advertise, you can decide whether to advertise the convergence range to enable blocking and filtering. By default, the range is advertised to the outside. The option cost can be used to set the metric value of convergence routing. A number of route convergence commands can be defined. In this way, the number of the routes in the OSPF AS is reduced. Particularly for a large network, the forwarding performance will be improved. When a number of routes are converged, and the containment relationship exists between items, the area range converged is determined by the longest match principle.

Configuration Examples	The following example converges the routes in area 1. ``` ipv6 router ospf 1 area 1 range 2001:abcd:1:2::/64 ```

Related Commands

Command	Description
summary-prefix	Sets the range of the external routes to be converged.

Platform Description	N/A

3.5   area stub

Use this command to create a stub area or set its attributes. Use the **no** form of this command to restore the default setting.

area *area-id* **stub** [**no-summary**]

no area *area-id* **stub** [**no-summary**]

Parameter Description

Parameter	Description
area-id	ID of the stub area. It can be an integer or an IPv6 prefix.
no-summary	This option applies only to the ABR in the stub area, indicating that the ABR only advertises the type 3 LSA indicating the default route to the stub area, not other type 3 LSAs.

Defaults	No stub area is defined by default.

Command	
Mode	Routing process configuration mode
Usage Guide	If an area is at the end of an entire network, it can be designed as the stub area, in which all the routers must execute the area stub command. If the area is designed as the stub area, it cannot learn the AS external routing information (type 5 LSAs). In practical application, the external routing information takes a large proportion of the link state database, so the devices in the stub area can only learn very little routing information, thus reducing the system resources required for the running of the OSPFv3 protocol. By default, a type 3 LAS advertisement indicating default routing on the ABR in the stub area is generated, then the devices in the stub area can get to the outside of the AS. If a totally stub area needs to be configured, just select the keyword **no-summary** when executing the **area stub** command on the ABR.
Configuration Examples	The following example enables the ABR in stub area 10 to advertise the default route to the stub area. ``` ipv6 router ospf 1 area 10 stub area 10 stub no-summary ```

Related Commands	Command	Description
	area default-cost	Sets the cost of the default route in the stub area.

Platform Description	N/A

3.6 area virtual-link

Use this command to create a virtual link or set its parameters. Use the **no** form of this command to restore the default setting.

area *area-id* **virtual-link** *router-id* [**hello-interval** *seconds*] [**dead-interval** *seconds*] [**retransmit-interval** *seconds*] [**transmit-delay** *seconds*] [**instance** *instance-id*] [**authentication ipsec spi** *spi* [**md5** | **sha1**] [**0** | **7**] *key*] [**encryption ipsec spi** *spi* **esp null** [**md5** | **sha1**] [**0** | **7**] *key*]

no area *area-id* **virtual-link** *router-id* [**hello-interval**] [**dead-interval**] [**retransmit-interval**] [**transmit-delay**] [**instance**] [**authentication**] [**encryption**]

Parameter Description	Parameter	Description
	area-id	ID of the area in which the virtual link is located. It can be an integer or an IPv6 prefix.
	Router-id	Neighbor router ID of the virtual link.
	hello-interval *seconds*	Sets the interval to send the hello message on the local virtual link interface in the range from 1 to 65535 in the unit of seconds.
	dead-interval *seconds*	Interval for the local interface of the virtual link to wait before considering that the neighbor fails.

	It is in the range from 1 to 65535 in the unit of seconds.
retransmit-interval *seconds*	Interval for retransmitting LSA on the local interface of the virtual link .
	The range is from 1 to 65535 in the unit of seconds.
transmit-delay *seconds*	Delay on the local interface of the virtual link in sending LSA.
	The range is from 1 to 65535 in the unit of seconds.
instnace *instance-id*	Specifies the instance corresponding to the virtual link. No virtual link can be established between different instances. Range: 0.-255
authentication ipsec spi *spi* [**md5** | **sha1**] [**0** | **7**] *key*	Specifies OSPFv3 authentication.
	ⓘ Authentication configuration on two neighboring devices must be consistent. The **service password-encryption** command enables a key to be displayed in the cipher-text format.
	spi specifies a security parameter index, in the range from 256 to 4294967295.
	md5 specifies the MD5 authentication mode.
	sha1 specifies the SHA1 authentication mode.
	0 indicates that a key is displayed in the plain-text format.
	7 indicates that a key is displayed in the cipher-text format.
	key specifies an authentication key.
encryption ipsec spi *spi* **esp null** [**md5**| **sha1**] [**0**|**7**] *key*	Specifies OSPFv3 encryption authentication.
	ⓘ Authentication configuration on two neighboring devices must be consistent. The **service password-encryption** command enables a key to be displayed in the cipher-text format.
	spi specifies a security parameter index, in the range from 256 to 4294967295.
	null specifies the null encryption mode.
	md5 specifies the MD5 authentication mode.
	sha1 specifies the SHA1 authentication mode.
	0 indicates that a key is displayed in the plain-text format.
	7 indicates that a key is displayed in the cipher-text format.
	key specifies an authentication key.
authentication ipsec spi *spi* [**md5** | **sha1**] [**0** | **7**] *key*	Specifies OSPFv3 authentication.
	ⓘ Authentication configuration on two neighboring devices must be consistent. The **service password-encryption** command enables a key to be displayed in the cipher-text format.
	spi specifies a security parameter index, in the range from 256 to 4294967295.
	md5 specifies the MD5 authentication mode.
	sha1 specifies the SHA1 authentication mode.
	0 indicates that a key is displayed in the plain-text format.
	7 indicates that a key is displayed in the cipher-text format.
	key specifies an authentication key.

Defaults   No virtual link is defined by default

hello-interval: 10 seconds;

dead-interval: four times of the hello-interval;

retransmit-interval: five seconds;

transmit-interval: one second.

Authentication and encryption are not performed by default.

Command Mode	Routing process configuration mode

Usage Guide	In the OSPFv3 AS, all the areas must be connected with the backbone area to ensure that they can learn the routes of the whole OSPFv3 AS. If an area cannot be directly connected with the backbone area, it can connect it through a virtual link.

> ⚠ The virtual link shall not be in the stub or NSSA area.

> ⚠ configuration, **dead-interval** and **instance** shall be configured consistently on both sides of the virtual link neighbors, otherwise neighboring relationship cannot be set up between the virtual neighbors.

Configuration Examples	The following example configures a virtual link.

```
Orion Alpha A28X(config)# ipv6 router ospf 1
Orion Alpha A28X(config-router)# area 1 virtual-link 192.1.1.1
```

Related Commands	**Command**	**Description**
	show ipv6 ospf	Displays the OSPFv3 routing process information.
	show ipv6 ospf neighbor	Displays the OSPFv3 neighbor information.
	show ipv6 ospf virtual-links	Displays the OSPFv3 virtual link information.

Platform Description	N/A

3.7 auto-cost

The metric of the OSPFv3 protocol is the interface-based bandwidth. Use this command to enable the bandwidth-based interface metric calculation or modify the reference bandwidth. Use the **no** form of this command to restore the default setting.

auto-cost [**reference-bandwidth** *ref-bw*]

no auto-cost [**reference-bandwidth**]

Parameter Description	**Parameter**	**Description**
	reference-bandwidth *ref-bw*	Reference bandwidth in the range from 1 to 4294967 Mbps.

Defaults	The interface metric is calculated based on the reference bandwidth, which is 100Mbps.

Command Mode	Routing process configuration mode

Usage Guide	Use **no auto-cost reference-bandwidth** to restore it to the default reference bandwidth.
	You can use **ipv6 ospf cost** in the interface configuration mode to set the cost of the specified interface, and it takes precedence over the metric calculated based on the reference bandwidth.

Configuration Examples The following example changes the reference bandwidth to 10M.

```
ipv6 router ospf 1
auto-cost reference-bandwidth 5
```

Related Commands	Command	Description
	ipv6 ospf cost	Sets the cost of an interface.
	show ipv6 ospf	Displays the OSPFv3 routing process information.

Platform Description N/A

3.8 clear ipv6 ospf process

Use this command to clear and restart the OSPF process.

clear ipv6 ospf { **process** | *process-id*]

Parameter Description	Parameter	Description
	process-id	OSPF process ID, in the range from 1 to 65535

Defaults N/A

Command Mode	Privileged EXEC mode

Usage Guide	In normal case, it is not necessary to use this command.
	Use the parameter *process-id* to clear only one specific OSPFv3 instance. If no *process-id* is specified, all the OSPFv3 instances will be cleared.

Configuration Examples The following example restarts the OSPF process.

```
enble
clear ipv6 ospf process
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

3.9 default-information originate

Use this command to generate a default route to the OSPFv3 routing domain in the routing process mode. Use the **no** form of this command to restore the default setting.

default-information originate [**always**] [**metric** *metric*] [**metric-type** *type*] [**route-map** *map-name*]

no default-information originate [**always**] [**metric**] [**metric-type**] [**route-map** *map-name*]

Parameter Description

Parameter	Description
always	(Optional) It makes OSPFv3 generate the default route unconditionally, no matter whether the default route exists locally or not.
metric *metric*	(Optional) Initial metric value of the default route, in the range from 0 to 16777214
metric-type *type*	(Optional) Type of the default route. There are two type of OSPF external routes: type 1, different metrics seen on different routers; type 2, the same metric seen on different routers.
route-map *map-name*	Associated route-map name, no associated route-map by default

Defaults

No default route is created;
The initial metric value is 1;
The default route type is type 2.

Command Mode

Routing process configuration mode

Usage Guide

When the **redistribute** or default-information command is executed, the OSPFv3-enabled router automatically turns into the autonomous system border router (ASBR). But the ASBR cannot generate the default route automatically or advertise it to all the routers in the OSPFv3 routing domain. The ASBR generates default routes by default. It is required to configure with the routing process configuration command **default-information originate**.

If the always parameter is used, the OSPF routing process advertises an external default route to the neighbors, no matter whether the default route in the core routing table exists or not. However, the local router does not display the default route. To make sure whether the default route is generated, execute **show ipv6 ospf database** to observe the OSPF link state database. The execution of the **show ipv6 route** command on the OSPF neighbor will display the default route.

The metric of the external default route can be defined only with the **default-information originate** command and cannot be set with the **default-metric** command.

There are two types of OSPFv3 external routes: type 1 external routes have changeable routing metrics, while type 2 external routes have constant routing metrics. For two parallel routes with the same route metric to the same destination network, type 1 takes precedence over type 2. As a result, the **show ipv6 route** command displays only the type 1 route.

This command generates a default route of Type-5 LSA, which will not be flooded to the NSSA area. To generate a default route in the NSSA area, use the **area nssa default-information-originate** command.

The routers in the stub area cannot generate external default routes.

Configuration Examples	The following example generates a default route.
| | ```
default-information originate always
``` |

Related Commands	Command	Description
	redistribute	Redistribute routes.
	show ipv6 ospf	Displays the OSPFv3 routing process information.
	show ipv6 ospf database	Displays the OSPFv3 link state database information.

Platform Description	N/A

3.10 default-metric

Use this command to set the default metric for the routes to be redistributed. Use the **no** form of this command to restore the default setting

default-metric *metric-value*

no default-metric

Parameter Description	Parameter	Description
	metric-value	Default metric for the routes to be redistributed. Its range is from 1 to 16777214.

Defaults	The default is 20.

Command Mode	The default route type is type 2.

Usage Guide	This command can be used together with **redistribute** to set the default metric for the routes to be redistributed. But this command does not apply to two types of routes: ● The **default route generated** with default-information originate; ● The redistributed direct route, for which 20 is always the default metric value.

Configuration Examples	The following example sets the default metric for the routes to be redistributed to 10.
| | ```
Orion Alpha A28X(config)# ipv6 router ospf 1
Orion Alpha A28X(config-router)# default-metric 10
``` |

Related Commands	Command	Description
	redistribute	Redistributes the routes.
	show ipv6 ospf	Displays the OSPFv3 routing process information.

Platform	N/A

3.11 distance

Use this command to set the management distance corresponding to different types of OSPFv3 routes. Use the **no** form of this command to restore the default setting.

distance { *distance* | **ospf** { **intra-area** *distance* | **inter-area** *distance* | **external** *distance* } }

no distance [**ospf**]

Parameter Description

Parameter	Description
distance	Sets the management distance of the route, in the range from 1 to 255.
intra-area *distance*	Sets the management distance of the intra-area route, in the range from1 to 255.
inter-area *distance*	Sets the management distance of the inter-area route, in the range from 1 to 255.
external *distance*	Sets the management distance of the external route, in the range from 1 to 255.

Defaults
The default value is 110.
Management distance of the intra-area route :110,
Management distance of the inter-area route :110
Management distance of the external-area route: 110.

Command Mode
Routing process configuration mode.

Usage Guide
This command is used to specify different management distances for different types of OSPFv3 routes. The management distance of the route is used for the comparison of routing priority, the smaller the management distance is, the higher the routing priority.

⚠ The priority of the route generated by different OSPFv3 processes must be   compared using the management distance.

⚠ Setting the management distance as 255 indicates the routing entry is unreliable and will not for the packet forwarding.

Configuration Examples
the following example sets the OSPFv3 external route management distance to 160.

```
Orion Alpha A28X(config)# ipv6 router ospf 20
Orion Alpha A28X(config-router)# distance ospf external 160
```

Related Commands

Command	Description
ipv6 router ospf	Enables the OSPFv3 routing process .

Platform Description
N/A

3.12 distribute-list in

Use this command to filter routes that are computed based on Link State Advertisement (LSA). Use the **no** form of this command to restore the default setting.

distribute-list { *name* | **prefix-list** *prefix-list-name* } **in** [*interface-type interface-number*]

no distribute-list { *name* | **prefix-list** *prefix-list-name* } **in** [*interface-type interface-number*]

Parameter Description	Parameter	Description
	name	Specifies an ACL filtering rule.
	prefix-list *prefix-list-name*	Specifies a prefix list filtering rule.
	interface-type interface-number	Specifies an interface on which LSA-based routes are filtered.

Defaults   Routes are not filtered by default.

Command Mode   Routing process configuration mode

Usage Guide   Filter the routes computed based on LSA. Only the routes meeting filtering conditions can be forwarded. Route filtering does not affect the link state database and the routing tables of the neighbors. The ACL and prefix list filtering rules cannot be set at the same time. You can set only the ACL filtering rule or the prefix list filtering rule for a specific interface.

The routing filtering rules affect only forwarding of local routes but not route computation based on LSA. When route filtering is configured on an ABR, LSA can still compute routes and generate and send inter-area LSAs with prefixes to other areas. This will cause blackhole routes. To prevent the generation of blackhole routes, you can run the **area range** command with the **not-advertise** keyword.

Configuration Examples   The following example filters routes that are computed based on Link State Advertisement (LSA).

```
Orion Alpha A28X(config)# ipv6 prefix-list aaa seq 10 permit 2001::/64
Orion Alpha A28X(config)# ipv6 router ospf 25
Orion Alpha A28X(config-router)# redistribute rip metric 100
Orion Alpha A28X(config-router)# distribute-list prefix-list aaa in
ethernet 0/1
```

Related Commands	Command	Description
	area range	Configures route aggregation in an area.

Platform Description   N/A

3.13 distribute-list out

Use this command to filter routes that are re-distributed. This command has the similar function as the **redistribute** command. Use the **no** form of this command to restore the default setting.

distribute-list { *name* | **prefix-list** *prefix-list-name* } **out** [**connected** | **ospf** *process-id* | **rip** | **static**]
no distribute-list { *name* | **prefix-list** *prefix-list-name* } **out** [**connected** | **ospf** *process-id* | **rip** | **static**]

Parameter Description	Parameter	Description
	name	Specifies the ACL filtering rule.
	prefix-list *prefix-list-name*	Specifies the prefix list filtering rule.
	connected	**ospf** process-id	**rip**	**static**	Specifies the source from which the routes are filtered.

Defaults Routes are not filtered by default.

Command Mode Routing process configuration mode

Usage Guide The **distribute-list out** command has the similar function as the **redistribute route-map** command. It can be used to filter the routes that are re-distributed based on other protocols into an OSPFv3 area. It does not directly re-distribute routes but works with the **redistribute** command to re-distribute routes. The ACL and prefix list filtering rules cannot be configured at the same time. You can set only the ACL filtering rule or the prefix list filtering rule to filter the routes from a specific source.

Configuration Examples The following example filters static routes that are re-distributed.
```
Orion Alpha A28X(config)# ipv6 router ospf 1
Orion Alpha A28X(config-router)# redistribute static subnets
Orion Alpha A28X(config-router)# distribute-list prefix-list jjj out
static
```

Related Commands	Command	Description
	redistribute	Re-distributes routes that are carried by other routing processes.

Platform Description N/A

3.14 enable mib-binding

Use this command to bind MIB to a specific OSPFv3 process. Use the **no** form of this command to restore the default setting.
enable mib-binding
no enable mib-binding

Parameter Description	Parameter	Description
	N/A	N/A

Defaults	MIB is bound to an OSPFv3 process with the smallest process number by default.
Command Mode	Routing process configuration mode
Usage Guide	OSFPv3 MIB has no configuration information about OSFPv3 processes. You can operate only one OSFPv3 process through SNMP. OSFPv3 MIB is bound to the OSFPv3 process with the smallest process number by default. Users' operations take effect on this process. To operate a specific OSFPv3 process through SNMP, you can bind OSFPv3 MIB to the process.

Configuration Examples	The following example enables users to operate the OSPFv3 process with the process number of 100 through SNMP.
	
	```Orion Alpha A28X(config)# ipv6 router ospf 100```
	```Orion Alpha A28X(config-router)# enable mib-binding```

Related Commands

Command	Description
show ipv6 ospf	Displays global OSPFv3 configuration information.
enable traps	Enables the OSPFv3 trap function.

Platform Description	N/A

3.15 enable traps

OSPFv3 processes support eight types of trap information, which are classified into two categories. Use this command to send specific trap information. Use the **no** form of this command to restore the default setting.

enable traps [**error** [**IfConfigError | IfRxBadPacket | VirtIfConfigError | VirtIfRxBadPacket**] | **state-change** [**IfStateChange | NbrStateChange | NssaTranslatorStatusChange | VirtIfStateChange | VirtNbrStateChange**]]

no enable traps [**error** [**IfConfigError | IfRxBadPacket | VirtIfConfigError | VirtIfRxBadPacket**] | **state-change** [**IfStateChange | NbrStateChange | NssaTranslatorStatusChange | VirtIfStateChange | VirtNbrStateChange**]]

Parameter Description

Parameter	Description	
Error	Configures all error-related trap types. This keyword can also specify the following types of error traps:	
	IfConfigError	Specifies an interface parameter error;
	IfRxBadPacket	Specifies incorrect packets received by an interface;
	VirtIfConfigError	Specifies a parameter error on a virtual interface;
	VirtIfRxBadPacket	Specifies incorrect packets received by a virtual interface.

		Configures all traps related to state change. This keyword can also specify the following traps related to state change:	
state-change		**IfStateChange**	Specifies state change of an interface;
		NbrStateChange	Specifies state change of a neighbor;
		NssaTranslatorStatusChange	Specifies status change of the NSSA translator.
		VirtIfStateChange	Specifies state change of a virtual interface;
		VirtNbrStateChange	Specifies state change of a virtual neighbor.

Defaults All traps are disabled by default.

Command Mode Routing process configuration mode

Usage Guide Before configuring this command, you must run the **snmp-server enable traps ospf** command; otherwise, OSPFv3 trap information cannot be sent correctly**.** This is because the function of this command is restricted by the **snmp-server** command.

You can synchronously enable the trap function of different processes even if MIB is not bound to these processes.

Configuration Examples The following example enables all traps of OSPFv3 process 100.
```
Orion Alpha A28X(config)#ipv6 router ospf 100
Orion Alpha A28X(config-router)# enable traps
```

Related Commands

Command	Description
show ipv6 ospf	Displays global OSPFv3 configuration information.
enable mib-binding	Binds MIB to an OSPFv3 process.
snmp-server enable traps ospf	Enables OSPFv3 to send trap information.

Platform Description N/A

3.16 graceful-restart

Use this command to enable the OSPFv3 graceful restart (GR) function and to set the GR period.

Use the **no** form of this command to restore the default setting.

graceful-restart [**grace-period** *grace-period* | **inconsistent-lsa-checking**]

no graceful-restart [*graceful-period*]

Parameter Description

Parameter	Description

grace-period *grace-period*	Configures the GR period. The GR period is the longest interval that lasts from the moment when OSPFv3 fails to the moment when OSPFv3 gracefully restarts. The GR period is in the range from 1 to 1800 in the unit of seconds. The default is 120.	
inconsistent-lsa-checking	Configures the topology change detection. Once the topology change is detected, the device will exit GR and finish the convergence, This function is enabled by default after GR is enabled.	

Defaults   This function is enabled by default.

Command

Mode   Routing process configuration mode

Usage Guide   GR is configured based on the OSPFv3 instance. Different instances could be configured with different parameters.

Use this command to configure the GR period. The GR period is the longest interval that lasts from the moment when OSPFv3 fails to the moment that OSPFv3 gracefully restarts. In this period, the device will perform link reconstruction to restore OSPFv3. When the GR period expires, OSPFv3 exits GR and finishes regular operation.

To enable the GR function and set the GR period to the 120 seconds, use the **graceful-restart** command. To modify the GR period, use the **graceful-restart grace-period** command. Topology stability is indispensable for uninterrupted forwarding. If topology changes, OSPFv3 finishes convergence instead of continuing GR to avoid long time interruption

1) Disabling the topology change detection: If the topology cannot converge in time in the hot backup process, the long term forwarding interruption may occur.

2) Enabling the topology change detection: Forwarding interruption may occur but the interruption time is much shorter than the time it takes to disable topology detection.

It is not recommended to disable the topology change detection. In some scenario where long term forwarding interruption does not occur, disabling the topology change detection minimizes the forwarding interruption time.

The GR function is unavailable when the Fast Hello function is enabled.

Configuration   The following example enables GR for OSPFv3 instance 1 and sets the GR period to 60 seconds.

Examples
```
Orion Alpha A28X(config)# ipv6 router ospf 1
Orion Alpha A28X(config-router)# graceful-restart
Orion Alpha A28X(config-router)# graceful-restart grace-period 60
```

Related

Commands

Command	Description
N/A	N/A

Platform   N/A

Description

3.17 graceful-restart helper

Use this command to enable the OSPFv3 graceful restart helper function. Use the **no** form of this command to disable this function.

graceful-restart helper disable

no graceful-restart helper disable

Use this command configure the topology change detection method of OSPFv3 GR helper. Use the **no** form of this command to cancel the configuration.

graceful-restart helper { **strict-lsa-checking** | **internal-lsa-checking**}

no graceful-restart helper {**strict-lsa-checking** | **internal-lsa-checking**}

	Parameter	Description
Parameter Description	**disable**	Disables the device to assist other devices in performing GR.
	strict-lsa-checking	Checks the change of the LSA of types 1-5 and 7 to judge whether the network topology changes. If the topology changes, the GR helper function will be disabled.
	internal-lsa-checking	Checks the change of the LSA of types 1–3 to judge whether the network topology changes. If the topology changes, the GR helper function will be disabled.

Defaults The GR helper is enabled by default.
The device where the GR helper is enabled does not check the LSA change by default.

Command Mode Routing process configuration mode

Usage Guide Use this command to enable the GR helper function. When one neighbor device performs graceful restart, the Grace-LSA is advertised to all neighbors. If the device enabled with the GR helper receives the Grace-LSA, it will become the GR Helper to help the neighbors perform GR. The **disable** option means that it is not allowed to perform the GR helper function for any device in GR. The GR helper does not perform the network change detection by default. The convergence is not performed again until the GR is implemented even if the network changes. Use the **strict-lsa-checking orinternal-lsa-checking** command to enable the device to detect the change of network topology during the GR. The former checks any LSA (types 1-5,7) that stands for the network information, the latter checks the LSA that stands for the AS inner-area route. In the large scale network, it is not recommended to enable the LSA check option because the partial network changes trigger the ending of the GR, decreasing the convergence speed of the entire network.

Configuration Examples The following example disables the GF helper function of the OSPFv3 instance 1 and modifies the topology change detection policy.

```
Orion Alpha A28X(config)# ipv6 router ospf 1
Orion Alpha A28X(config-router)# graceful-restart helper disable
Orion Alpha A28X(config-router)# no graceful-restart helper disable
Orion Alpha A28X(config-router)# graceful-restart helper strict-lsa-
checking
```

Related Commands	**Command**	**Description**
	N/A	N/A

Platform Description	N/A

3.18 ipv6 ospf area

Use this command to enable the interface to participate in the OSPFv3 routing process. Use the **no** form of this command to restore the default setting.

ipv6 ospf *process-id* **area** *area-id* [**instance** *instance-id*]

no ipv6 ospf *process-id* **area** [**instance** *instance-id*]

Parameter Description	**Parameter**	**Description**
	process-id	OSPF process ID.
	area *area-id*	OSPFv3 area in which the interface participates. It can be an integer or an IPv4 prefix.
	instance *instance-id*	Configures the specific OSPFv3 instance on the interface.

Defaults	This function is disabled by default.

Command Mode	Interface configuration mode.

Usage Guide	You can use this command to enable the OSPFv3 on an interface, and then configure the OSPFv3 process with **ipv6 router ospf**. it will be automatically started after this command is used., it will be automatically started after this command is used. Use **no ipv6 ospf area** to disable the specified interface to participate in the OSPFv3 routing process. Use **no ipv6 router ospf** to disable all the interfaces to participate in the OSPFv3 routing process. The neighbor relationship can only be established between the routers with the same instance ID. After this command is configured, all the prefix information on the interface will be used in the operation of the OSPFv3.

Configuration Examples	The following example starts the OSPFv3 process on int fastethernet 0/0 for the specified area of the specified instance.

```
int fastethernet 0/0
ipv6 ospf 1 area 2 instance 2
```

Related Commands	**Command**	**Description**
	ipv6 router ospf	Starts the OSPFv3 routing process.
	passive-interface	Setsthe a passive interface.
	show ipv6 ospf interface	Displays the OSPFv3 interface information.

Platform	N/A

3.19 ipv6 ospf authentication

Use this command to configure OSPFv3 interface authentication. Use the **no** form of this command to restore the default setting.

ipv6 ospf authentication [**null | ipsec spi** *spi* [**md5 | sha1**] [**0 | 7**] *key*]

no ipv6 ospf authentication

Parameter Description

Parameter	Description
null	Indicates that authentication is not performed.
spi	Specifies a security parameter index, in the range from 256 to 4294967295.
md5	Specifies the MD5 authentication mode.
sha1	Specifies the SHA1 authentication mode.
0	Indicates that a key is displayed in the plain-text format.
7	Indicates that a key is displayed in the cipher-text format.
key	Specifies an authentication key.

Defaults Authentication is not performed by default.

Command Mode Interface configuration mode

Usage Guide switch supports three authentication modes:

● null authentication mode, which is configured when authentication is not needed
● MD5 authentication mode
● SHA1 authentication mode

ⓘ OSPFv3 authentication parameters configured on interconnected interfaces must be consistent.

Configuration Examples The following example specifies MD5 authentication in OSPFv3 interface configuration mode and sets the authentication password to aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa.

```
Orion Alpha A28X(config-if)# ipv6 ospf authentication ipsec spi 300 md5
aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
```

Related Commands

Command	Description
ipv6 ospf authentication	Specifies interface authentication.
area virtual-link authentication	Specifies virtual link authentication.

Platform Description N/A

3.20 ipv6 ospf cost

Use this command to set the cost of the interface. Use the **no** form of this command to restore the default setting

ipv6 ospf cost *cost* [**instance** *instance-id*]

no ipv6 ospf cost [**instance** *instance-id*]

Parameter Description

Parameter	Description
Cost	Cost of interface, in the range from 0 to 65535.
instance *instance-id*	Configures the specific OSPFv3 instance on the interface, in the range from 0 to 255.

Defaults
The default interface cost is the reference bandwidth/Bandwidth (100Mbps by default).

Command Mode
Interface configuration mode.

Usage Guide
By default, the cost of the OSPFv3 interface is 100Mbps/Bandwidth, in which the Bandwidth is the bandwidth of the interface and configured with the command **bandwidth** in the interface configuration mode.

The default costs of OSPFv3 interfaces for several typical lines are:

●   64K serial line: 1562;

●   E1 line: 48

●   10M Ethernet: 10

●   100M Ethernet: 1

The OSPFv3 cost configured with the command **ipv6 ospf cost** will overwrite the default configuration.

Configuration Examples
The following example sets the cost of the interface to 1:

```
Orion Alpha A28X(config)# int fastethernet 0/0
Orion Alpha A28X(config-if)# ipv6 ospf cost 1
```

Related Commands

Command	Description
show ipv6 ospf interface	Displays the OSPFv3 interface information.
ipv6 ospf area	Sets the interface to participate in the OSPFv3 routing process.

Platform Description
N/A

3.21 ipv6 ospf dead-interval

Use this command to set a dead interval of neighbors on an interface. If no hello packet is received from a neighbor within the interval, the neighboring relationship is considered to fail. Use the **no** form of this command to restore the default setting

ipv6 ospf dead-interval { *seconds* | **minimal hello-multiplier** *multiplier* } [**instance** *instance-id*]
no ipv6 ospf dead-interval [**instance** *instance-id*]

	Parameter	Description
Parameter Description	*seconds*	Dead interval of neighbors. Its range is from 1 to 65535 in the unit of seconds.
	minimal hello-multiplier *multiplier*	Enables the fast hello function, which takes 1s as the dead interval of neighbors. *Multiplier* specifies the number of hello packets sent in one second, in the range from 3 to 20.
	instance *instance-id*	Configures the specific OSPFv3 instance on the interface, in the range from 0 to 255.

Defaults   If the fast hello function is not enabled, the dead interval of neighbors is four times longer than the hello interval.

⚠ If the hello interval is changed, the dead interval of neighbors varies automatically.

Command Mode   Interface configuration mode

Usage Guide   The dead interval of neighbors must be longer than the hello interval.
The OSPFv3 fast hello function allows OSPFv3 to fast discovery neighbors and detect whether neighboring relationships are valid. To enable the OSPFv3 fast hello function, you can specify the **minimal** and **hello-multiplier** keywords and the *multiplier* parameter in this command. **minimal** specifies the deal interval of neighbors to be 1s; **hello-multiplier** specifies the number of times that hello packets are sent in a second. Therefore, this configuration reduces the hello interval to be shorter than 1s.
If an interface is enabled with the fast hello function, the **hello-interval** field of hello packets to be advertised by this interface is set to 0, and that of hello packets received from this interface is omitted**.**

ⓘ **dead-interval**, **minimal**, and **hello-multiplier** that are introduced to enable the fast hello function cannot be configured together with **hello-interval**.

No matter whether the fast hello function is configured, the dead interval of neighbors on the interconnected interfaces of neighbors must be consistent. The values of **hello-multiplier** on the interconnected interfaces can be different but you must ensure that at least one hello packet is received within the dead interval of neighbors.
You can use the **show ipv6 ospf interface** command to monitor the dead interval of neighbors and the fast hello interval on an interface.

Configuration Examples   The following example sets the dead interval of neighbors to 60 seconds on an interface.
```
ipv6 ospf dead-interval 60
```

Related	Command	Description

Commands		
ipv6 ospf hello-interval		Sets the interval for sending the Hello message on an interface.
show ipv6 ospf interface		Displays the OSPFv3 interface information.
ipv6 ospf area		Sets the interface to participate in the OSPFv3 routing process

Platform Description   N/A

3.22 ipv6 ospf encryption

Use this command to enable OSPFv3 encryption authentication on an interface. Use the **no** form of this command to restore the default setting.

ipv6 ospf encryption [**null | ipsec spi** *spi* **esp null** [**md5 | sha1**] [**0 | 7**] *key*]

no ipv6 ospf encryption

Parameter Description

Parameter	Description
null	Indicates that encryption authentication is not performed.
spi	Specifies a security parameter index, in the range from 256 to 4294967295.
null	Specifies the null encryption mode.
md5	Specifies the MD5 authentication mode.
sha1	Specifies the SHA1 authentication mode.
0	Indicates that a key is displayed in the plain-text format.
7	Indicates that a key is displayed in the cipher-text format.
key	Specifies an authentication key.

Defaults   Encryption authentication is not performed by default.

Command Mode   Interface configuration mode

Usage Guide   switch supports the null encryption mode and two authentication modes: MD5 and SHA1.

> ⓘ OSPFv3 encryption authentication parameters configured on interconnected interfaces must be consistent.

Configuration Examples

The following example specifies null encryption and MD5 authentication in OSPFv3 interface configuration mode and sets the authentication password to aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa.

```
Orion Alpha A28X(config-if)# ipv6 ospf encryption ipsec spi 300 esp null
md5 aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa
```

Related Commands

Command	Description

area encryption	Specifies area encryption authentication.
area virtual-link encryption	Specifies virtual link encryption authentication.

Platform Description N/A

3.23 ipv6 ospf hello-interval

Use this command to set the interval for the interface to send the Hello message. Use the **no** form of this command to restore the default setting

ipv6 ospf hello-interval *seconds* [**instance** *instance-id*]

no ipv6 ospf hello-interval [**instance** *instance-id*]

Parameter Description

Parameter	Description
seconds	Interval for sending the Hello message. Its range is from 1 to 65535 in the unit of seconds.
instance instance-id	Configures the specific OSPFv3 instance on the interface.

Defaults The broadcast network and point-to-point network :10 seconds. The point-to-multipoint network and NBMA network :30 seconds.

Command Mode Interface configuration mode.

Usage Guide The same hello sending intervals must be set for the neighbors, otherwise the normal adjacency cannot be established.

> ℹ The dead-interval minimal hello-multiplier and hello-interval parameters for Fast Hello cannot be configured simultaneously.

Configuration Examples The following example sets the interval for the interface to send the Hello message to 20 seconds.

```
Orion Alpha A28X(config)# int fastethernet 0/0
Orion Alpha A28X(config-if)# ipv6 ospf hello-interval 20
```

Related Commands

Command	Description
ipv6 ospf dead-interval	Sets the interval for the interface to consider that the neighbor fails.
show ipv6 ospf interface	Displays the OSPFv3 interface information.
ipv6 ospf area	Sets the interface to participate in the OSPFv3 routing process.

Platform Description N/A

3.24 ipv6 ospf mtu-ignore

Use this command to ignore the MTU check when an interface receives the database description message. Use the **no** form of this command to restore the default setting.

ipv6 ospf mtu-ignore [**instance** *instance-id*]

no ipv6 ospf mtu-ignore [**instance** *instance-id*]

Parameter Description	Parameter	Description
	instance *instance-id*	Configures the specific OSPFv3 instance on the interface, in the range from 0 to 255.

Defaults	The MTU check is enabled by default.
Command Mode	Interface configuration mode.
Usage Guide	After receiving the database description message, the OSPFv3 device will check whether the MTU of neighbor interface is the same as its own MTU. If the received database description message indicates an MTU greater than its own interface's MTU, the neighbor relationship cannot be established. This can be fixed by disabling the MTU check.

Configuration Examples

The following example disables the MTU check function on the ethernet 1/0.

```
Orion Alpha A28X(config)# interface ethernet 1/0
Orion Alpha A28X(config-if)# ipv6 ospf mtu-ignore
```

Related Commands	Command	Description
	ipv6 router ospf	Starts the OSPFv3 routing process.
	ipv6 mtu	Sets the value of IPv6 MTU of the interface.

Platform Description	N/A

3.25 ipv6 ospf neighbor

Use this command to configure the OSPFv3 neighbor manually. Use the **no** form of this command to restore the default setting.

ipv6 ospf neighbor *ipv6-address* [[**cost** <1-65535>] [poll-interval <0-2147483647> | priority <0-255>]] [instance *instance-id*]

no ipv6 ospf neighbor *ipv6-address* [[cost <1-65535>] [**poll-interval** < 0-2147483647 > | **priority** < 0-255 >]] [**instance** *instance-id*]

Parameter Description	Parameter	Description
	cost *cost*	(Optional) Configures the cost to each neighbor in point-to-multipoint network. It is not defined by default, where the cost configured on the

	interface will be used. It ranges from 1 to 65535. Only the networks of the point-to-multipoint type support this option.
poll-interval *seconds*	(Optional) Interval for polling the neighbors (in seconds), which ranges from 1 to 2147483647. Only the networks of the non-broadcast (NBMA) type support this option.
priority *priority*	(Optional) Configures the priority value of non-broadcast network neighbors, which ranges from 0 to 255. Only the non-broadcast (NBMA) type network supports this option.
instance *instance-id*	(Optional) Configures the specific OSPFv3 instance on the interface, which ranges from 0 to 255.

Defaults
No neighbor is defined;
Neighbor polling interval: 120 seconds;
Priority value of non-broadcast network neighbor: 0.

Command Mode
Interface configuration mode.

Usage Guide
You can set relevant parameters for the neighbors depending on the actual network type.

Configuration Examples
The following example shows how to configure the OSPFv3 neighbor as follows: IPv6 address: 2001:DB8:4::1, priority value: 1, polling interval: 150 seconds.

```
Orion Alpha A28X(config)# interface fastEthernet 0/1
Orion Alpha A28X(config-if)# ipv6 ospf neighbor 2001:DB8:4::1 priority 1
poll-interval 150
```

Related Commands

Command	Description
Ipv6 ospf priority	Sets the priority value of an interface.
Ipv6 ospf network	Sets the network type of an interface.

Platform Description
N/A

3.26 ipv6 ospf network

Use this command to set the network type of the interface. Use the **no** form of this command to restore the default setting.
ipv6 ospf network { **broadcast** | **non-broadcast** | **point-to-point** | **point-to-multipoint** [**non-broadcast**] } [**instance** *instance-id*]
no ipv6 ospf network [**broadcast** | **non-broadcast** | **point-to-point** | **point-to-multipoint** [**non-broadcast**]] [**instance** *instance-id*]

Parameter Description

Parameter	Description
broadcast	Specifies the broadcast network type.

non-broadcast	Specifies the non-broadcast network type.
point-to-point	Specifies the point-to-point network type.
point-to-multipoint	Specifies the point-to-multipoint network type.
point-to-multipoint non-broadcast	Specifies the point-to-multipoint non-broadcast network type.
instance instance-id	Configures the specific OSPFv3 instance on the interface with the valid id range from 0 to 255.

Defaults
Point-to-point network type: PPP, SLIP, frame relay point-to-point sub-interface and X.25 point-to-point sub-interface encapsulation.

NBMA network type: frame relay(except for the point-to-point sub-interface) and X.25 encapsulation (except for the point-to-point sub-interface)

Broadcast network type: Ethernet encapsulation.

The point-to-multipoint network type is not the default type.

Command Mode
Interface configuration mode.

Usage Guide
You can set the network type of the interface according to the actual link type applied and the topology.

Configuration Examples
The following example sets the network type of the interface that participates in the OSPFv3 to point-to-point.

```
Orion Alpha A28X(config)# interface ethernet 1/0
Orion Alpha A28X(config-if)# ipv6 ospf network point-to-point
```

Related Commands

Command	Description
ipv6 ospf priority	Sets the interface priority.
show ipv6 ospf interface	Displays the OSPFv3 interface information.
ipv6 ospf area	Sets the interface to participate in the OSPFv3 routing process.

Platform Description
N/A

3.27 ipv6 ospf priority

Use this command to set the interface priority. Use the **no** form of this command to restore the default setting.

ipv6 ospf priority *number-value* [**instance** *instance-id*]

no ipv6 ospf priority [**instance** *instance-id*]

Parameter Description

Parameter	Description
number-value	The priority of the interface. Its range is from 0 to 255.

instance *instance-id*	Configures the specific OSPFv3 instance on the interface. Its range is from 0 to 255.

Defaults	The default priority is 1.
Command Mode	Interface configuration mode.
Usage Guide	In the broadcast network type, it is necessary to elect the DR/BDR. In electing the DR/BDR, the device of a higher priority is preferred. If several devices are of the same priority, the one with the largest router-ID is preferred. The device with the priority level of 0 does not participate in the election of DR/BDR.

Configuration Examples	The following example disables the interface from being elected as the DR/BDR.
	`Orion Alpha A28X(config)# interface ethernet 1/0`
	`Orion Alpha A28X(config-if)# ipv6 ospf priority 0`

Related Commands	**Command**	**Description**
	ipv6 ospf network	Sets the network type of an interface.
	router-id	Sets the ID of a router.
	show ipv6 ospf interface	Displays the OSPFv3 interface information.
	instance *instance-id*	Configures the specific OSPFv3 instance on the interface.

Platform Description	N/A

3.28 ipv6 ospf retransmit-interval

Use this command to set the interval for the interface to retransmit the LSA. Use the **no** form of this command to restore the default setting.

ipv6 ospf retransmit-interval *seconds* [**instance** *instance-id*]

no ipv6 ospf retransmit-interval [**instance** *instance-id*]

Parameter Description	**Parameter**	**Description**
	seconds	Interval for retransmitting the LSA. Its range is from 1 to 65535 in the unit of seconds.
	instance *instance-id*	Configures the specific OSPFv3 instance on the interface.

Defaults	The default is five seconds.
Command Mode	Interface configuration mode.
Usage Guide	To ensure the reliability of the routing information transmission, the LSA sent to the neighbor shall be acknowledged by the neighbor. You can use this command to set the interval for the

acknowledgement by the neighbor. If no acknowledgement is received within the specified period, the LSA information will be retransmitted.

Configuration Examples	The following example sets the interval for retransmitting the LSA to 10 seconds.

```
Orion Alpha A28X(config)# interface ethernet 1/0
Orion Alpha A28X(config-if)# ipv6 ospf retransmit-interval 10
```

Related Commands

Command	Description
show ipv6 ospf interface	Displays the OSPFv3 interface information.
ipv6 ospf area	Sets the interface to participate in the OSPFv3 routing process.

Platform Description   N/A

3.29 ipv6 ospf transmit-delay

Use this command to set the delay on the interface in sending the LSA. Use the **no** form of this command to restore the default setting.

ipv6 ospf transmit-delay *seconds* [**instance** *instance-id*]

no ipv6 ospf transmit-delay [**instance** *instance-id*]

Parameter Description

Parameter	Description
seconds	The delay in sending LSA. Its range is from 1 to 65535 in the unit of seconds.
instance *instance-id*	Configures the ID of a specific OSPFv3 instance on the interface, in the range from 0 to 255.

Defaults   The default is one.

Command Mode   Interface configuration mode.

Usage Guide   Use this command to set the delay on the interface in transmitting the LSA.

Configuration Examples   The following example sets the delay on the interface in transmitting the LSA.

```
Orion Alpha A28X(config)# interface ethernet 1/0
Orion Alpha A28X(config-if)# ipv6 ospf transmit-delay 2
```

Related Commands

Command	Description
show ipv6 ospf interface	Displays the OSPFv3 interface information.

Platform Description   N/A

3.30 ipv6 router ospf

Use this command to start the OSPFv3 routing process. Use the **no** form of this command to restore the default setting.

ipv6 router ospf *process-id*
no ipv6 router ospf *process-id*

Parameter Description	Parameter	Description
	process-id	OSPFv3 process ID number. Without the process number configured, it indicates that process 1 is started.

Defaults No OSPFv3 routing process is started.

Command Mode Global configuration mode.

Usage Guide After the OSPFv3 process is started, the routing process configuration mode is entered.
At present, our products support up to 32 OSPFv3 processes.

Configuration Examples

Related Commands	Command	Description
	ipv6 ospf area	Configures an interface to participate in the OSPFv3 routing process.
	show ipv6 ospf	Displays the OSPFv3 routing process information.

Platform Description N/A

3.31 ipv6 router ospf max-concurrent-dd

Use this command to set the maximum concurrent interacting neighbors allowed in all OSPFv3 routing processes. Use the **no** form of this command to restore the default setting.
ipv6 router ospf max-concurrent-dd *number*
no ipv6 router ospf max-concurrent-dd

Parameter Description	Parameter	Description
	number	Maximum concurrent interacting neighbors, in the range from 1 to 65535.

Defaults The default is 5.

Command Mode	Global configuration mode
Usage Guide	When a router is exchanging data with multiple neighbors at the same time which affects its performance, by configuring this command, the maximum concurrent interacting neighbors allowed in all OSPFv3 routing processes can be restricted.
Configuration Examples	The following example sets the maximum concurrent interacting neighbors allowed in all OSPFv3 routing processes to 4. The result is that in the interaction between a large number of neighbors, interactions with up to 4 neighbors are allowed to be initiated on this device concurrently, and interactions initiated by up to 4 neighbors are allowed to be received concurrently. That is, interaction with up to 8 neighbors is allowed on this device. `Orion Alpha A28X(config)#ipv6 router ospf ` **`max-concurrent-dd`** *`4`*

Related Commands

Command	Description
max-concurrent-dd	Sets the maximum concurrent interacting neighbors in the OSPFv3 processes

Platform Description	N/A

3.32 log-adj-changes

Use this command to enable the logging of adjacency changes. Use the **no** form of this command to restore the default setting.

log-adj-changes

no log-adj-changes

Parameter Description

Parameter	Description
detail	Displays details of adjacency changes

Defaults	By default, the function is enabled.
Command Mode	Routing process configuration mode
Usage Guide	N/A
Configuration Examples	The following example turns on the log of adjacency state change. `Orion Alpha A28X(config)# ` **`router ospf`** `1` `Orion Alpha A28X(config)# ` **`log-adj-changes detail`**

Related Commands

Command	Description
show ipv6 ospf	Displays the OSPF global configuration information

Platform Description	N/A

3.33 max-concurrent-dd

Use this command to set the maximum number of DD packets that can be processed concurrently in the OSPFv3 routing process. Use the **no** form of this command to restore the default setting.

max-concurrent-dd *number*

no max-concurrent-dd

Parameter Description	Parameter	Description
	number	Maximum number of DD packets that can be processed concurrently, in the range from 1 to 65535.

Defaults	The default is 5.

Command Mode	Routing process configuration mode.

Usage Guide	When a router is exchanging data with multiple neighbors at the same time which affects its performance, by configuring this command, the maximum concurrent interacting neighbors allowed in each OSPFv3 instance can be restricted.

Configuration Examples	The following example sets the maximum concurrent interacting neighbors allowed in the current OSPFv3 routing process to 4. The result is that in the interaction between a large number of neighbors, interactions with up to 4 neighbors are allowed to be initiated on this device concurrently, and interactions initiated by up to 4 neighbors are allowed to be received concurrently. That is, interaction with up to 8 neighbors is allowed on this device.

```
router ipv6 ospf 1
max-concurrent-dd 4
```

Related Commands	Command	Description
	ipv6 router ospf max-concurrent-dd	Sets the maximum concurrent interacting neighbors allowed in the OSPFv3 processes.

Platform Description	N/A

3.34 passive-interface

Use this command to set the passive interface. Use the **no** form of this command to restore the default setting.

passive-interface { **default** | *interface-type interface-number* }

no passive-interface { **default** | *interface-type interface-number* }

Parameter Description	Parameter	Description
	default	Sets all the interfaces to passive ones.
	interface-type interface-number	Sets the specified interface to a passive one.

Defaults   No passive interface is set by default.

Command Mode   Routing process configuration mode

Usage Guide   After an interface is set to a passive one, it no longer receives or sends the hello message.

This command applies to the interfaces participating in the OSPFv3 but not to the virtual links.

Configuration Examples   The following example enables only the VLAN1 interface to participate in the OSPFv3 process.

```
Orion Alpha A28X(config)# ipv6 router ospf 1
Orion Alpha A28X(config-router)# passive-interface default
Orion Alpha A28X(config-router)# no passive-interface vlan 1
```

Related Commands

Command	Description
ipv6 ospf area	Configures an interface to participate in the OSPFv3 routing process.
show ipv6 ospf	Displays the OSPFv3 routing process information.
show ipv6 ospf neighbor	Displays the OSPFv3 neighbor information.

Platform Description   N/A

3.35 redistribute

Use this command to start the route redistribution in order to import the routing information of other routing protocols to the OSPFv3 routing process. Use the **no** form of this command to restore the default setting.

redistribute { **connected** | **ospf** *process-id* | **rip** | **static** } **match** { **internal** | **external [1|2**] | **nssa-external** [**1 | 2**] } | **metric** *metric-value* | **metric-type** {*1|2*} | **route-map** *route-map-name* | **tag** *tag-value*]

no redistribute { **connected** | **ospf** *process-id* | **rip** | **static** } **match** { **internal** | **external** [1|2] | **nssa-external** [**1 | 2**] } | **metric** | **metric-type** { *1|2* } | **route-map** *route-map-name* | tag *tag-value*]

Parameter Description	Parameter	Description
	connected	The directly connected route is redistributed.
	ospf *process-id*	The ospf is redistributed. The process-id specifies a particular ospf instance within the range of 1-65535.
	rip	The rip is redistributed.

static	The static route is redistributed.
match	It is used in the OSPFv3 route redistribution only and filters specific routes for redistribution; internal: inter-area and intra-area routes. external [1|2]: E1, E2 or all external routes. Nssa-external [1 | 2]: N1, N2 or all external routes of the NSSA area. All sub-type OSPFv3 routes are redistributed by default.
metric *metric-value*	Specifies the metric for the OSPFv3 external 2 LSA with metric-value. Its range is 0 to 16777214.
metric-type *{ 1|2 }*	Set the metric type for the external route to E-1 or E-2.
route-map *map-map-name*	Specifies the routing policy for route redistribution. The name of map-tag can be composed of up to 32 characters. No route-map is associated by default.
tag *tag-value*	Specifies the tag value redistributed to the OSPFv3 inner route, in the range of 0 to 4294967295.

Defaults
The function is disabled by default;
Metric-type: 2;
OSPFv3 routes of all sub-types are redistributed in the OSPFv3 redistribution
No route-map is associated

Command Mode
Routing process configuration mode

Usage Guide
When a device supports multiple routing protocols, the coordination between these protocols becomes an important task. The device can run the protocols at the same time, so it should redistribute the protocols. This is applicable to all IP routing protocols.
When redistributing OSPFv3 routes, you can configure *match* to redistribute the routes.of the corresponding sub-type among the redistributed OSPFv3 routes. All types of OSPFv3 routes are redistributed by default.

⚠ The metric value of the route-map associated should be in the range of 0 to 16777214. If the metric value is not in this range, the route cannot be introduced.

The rules for the **no** form of the **redistribute** command are as follows:
If some parameters are specified in the no command, restore their default settings;
If no parameters are specified in the **no** command, delete the whole command.

Configuration Examples
The following example redistributes the direct route and associates route-map test :
```
ipv6 router ospf 1
redistribute connect metric 10 route-map test
```
The associated route-map is configured as follows:
```
route-map test permit 10
match metric 20
set metric 30
```

The effect of the above configuration is to set the metric value which is 20 of the redistributed routes to 30, and that of other routes to 10

	Command	Description
Related Commands	**default-information originate**	Sets the default route to be redistributed.
	default-metric	Sets the default metric for the route to be redistributed.
	summary-prefix	Sets the converged address range of the external route.
	show ipv6 ospf	Displays the OSPFv3 routing process information.
	show ipv6 ospf database	Displays the OSPFv3 link state database information.

Platform Description   N/A

3.36 router-id

Use this command to set the router ID (device ID). Use the **no** form of this command to restore the default setting.

router-id *router-id*

no router-id

	Parameter	Description
Parameter Description	*router-id*	ID of the device in the IPv4 address format.

Defaults   The OSPFv3 routing process, the largest IPv4 address of all loopback interfaces is elected as the router ID; If there is no loopback interface with an IPv4 address, the OSPFv3 process will elect the largest IPv4 of all other interfaces as the router ID

Command Mode   Routing process configuration mode

Usage Guide   Each device that runs the OSPFv3 process shall be identified with a router ID. Router ID is in the format of IPv4 address.

Any IPv4 address can be set as the router ID, but the router ID of every routers in the AS must be unique. If multiple OSPFv3 processes are running on the same device, the router ID of every process must be unique. Note that the change of the router ID results in considerable processing work in the protocol. Therefore, it is not recommended to change any router ID without proper reason. A prompt will be given to ask whether you are sure to modify the router ID. It is recommended that you specify a router ID once an OSPFv3 process starts before configuring other parameters for the process

Configuration Examples   The following example sets the ID of the device that participates in the OSPFv3 process to 1.1.1.1.

```
Orion Alpha A28X(config)# ipv6 router ospf 1
```

```
Orion Alpha A28X(config-router)# router-id 1.1.1.1
```

	Command	Description
Related Commands	**ipv6 ospf priority**	Sets the interface priority.
	show ipv6 ospf	Displays the OSPFv3 routing process information.

Platform Description   N/A

3.37 show ipv6 ospf

Use this command to display the information of the OSPFv3 process.

show ipv6 ospf [*process-id*]

	Parameter	Description
Parameter Description	*process- id*	OSPF process ID number.

Defaults   N/A

Command Mode   Privileged EXEC mode

Usage Guide   N/A

Configuration Examples

The following example displays the information about the OSPFv3 process.

```
Orion Alpha A28X# show ipv6 ospf
Routing Process "OSPFv3 (1)" with ID 1.1.1.1
Process uptime is 24 minutes
Enable two-way-maintain
SPF schedule delay 5 secs, Hold time between SPFs 10 secs
Initial LSA throttle delay 0 msecs
Minimum hold time for LSA throttle 5000 msecs
Maximum wait time for LSA throttle 5000 msecs
Lsa Transmit Pacing timer 40 msecs, 1 LS-Upd
LSA interval 5 secs, Minimum LSA arrival 1000 msecs
Pacing lsa-group: 30 secs
Number of incomming current DD exchange neighbors 0/5
Number of outgoing current DD exchange neighbors 0/5
Number of external LSA 0. Checksum Sum 0x0000
Number of AS-Scoped Unknown LSA 0
Number of LSA originated 11
Number of LSA received 4
Log Neighbor Adjency Changes : Enabled
Number of areas in this router is 2
Area BACKBONE(0)
```

```
Number of interfaces in this area is 1(1)
SPF algorithm executed 4 times
Number of LSA 3.  Checksum Sum 0x1DDF1
Number of Unknown LSA 0
 Area 0.0.0.1 (NSSA)
     Number of interfaces in this area is 1(1)
     SPF algorithm executed 5 times
     Number of LSA 7.  Checksum Sum 0x445FE
     Number of Unknown LSA 0
```

Related Commands

Command	Description
ipv6 router ospf	Starts the OSPFv3 routing process.
default-information originate	Sets the default route to be redistributed.
default-metric	Sets the default metric for the route to be redistributed.
router-id	Sets the OSPFv3 routing process ID
timers spf	Sets the delay and the minimum and maximum intervals for the OSPFv3 to perform SPF calculation after receiving the topology change information.

Platform Description   N/A

3.38 show ipv6 ospf database

Use this command to display the database information of the OSPFv3 process

show ipv6 ospf [*process- id*] **database** [**lsa-type** [**adv-router** *router-id*]]

Parameter Description

Parameter	Description
process- id	OSPF process ID number
lsa-type	The LSA types are as follows: NSSA-external-LSA, AS-external-LSAs, Link-LSAs, Inter-Area-Prefix-LSAs, Inter-Area-Router-LSAs, Intra-Area-Prefix-LSAs, Network-LSAs, Router-LSAs If this parameter is not specified, all LSA information will be displayed.
adv-router *router-id*	Displays the LSA information generated by the specified router.

Defaults   N/A

Command Mode   Privileged EXEC mode.

Usage Guide   N/A

Configuration Examples	The following example displays the information about the OSPFv3 process database.

```
Orion Alpha A28X# show ipv6 ospf database
OSPFv3 Router with ID (1.1.1.1) (Process 1)
Link-LSA (Interface FastEthernet 1/0)
Link State ID   ADV Router      Age  Seq#       CkSum  Prefix
0.0.0.2         1.1.1.1         197 0x80000001 0x7cd8     0
0.0.0.5         2.2.2.2         206 0x80000001 0x8c86     0
                Link-LSA (Interface Loopback 1)
Link State ID   ADV Router      Age  Seq#       CkSum  Prefix
0.0.64.1        1.1.1.1          82 0x80000001 0xb760     0
                Router-LSA (Area 0.0.0.0)
Link State ID   ADV Router      Age  Seq#       CkSum    Link
0.0.0.0         1.1.1.1          17 0x80000006 0x62a1      1
0.0.0.0         2.2.2.2         156 0x80000003 0x8653      1
                Network-LSA (Area 0.0.0.0)
Link State ID   ADV Router      Age  Seq#       CkSum
0.0.0.5         2.2.2.2         157 0x80000001 0xf8f6
                Router-LSA (Area 0.0.0.1)
Link State ID   ADV Router      Age  Seq#       CkSum    Link
0.0.0.0         1.1.1.1          17 0x80000002 0x0529      0
                Inter-Area-Prefix-LSA (Area 0.0.0.1)
Link State ID   ADV Router      Age  Seq#       CkSum
0.0.0.1         1.1.1.1          77 0x80000002 0x83b4
AS-external-LSA
Link State ID   ADV Router      Age  Seq#       CkSum
0.0.0.1         1.1.1.1           1 0x80000001 0x6035 E2
```

Related Commands	**Command**	**Description**
	ipv6 router ospf	Starts the OSPFv3 routing process.

Platform Description	N/A

3.39 show ipv6 ospf interface

Use this command to display the OSPFv3 interface information.

show ipv6 ospf [*process- id*] **interface** [*interface-type interface-number* | **brief**]

Parameter Description	**Parameter**	**Description**
	interface-type interface-number	Specifies the interface type and interface number.
	process- id	OSPFv3 process ID
	brief	Displays the interface summary.

Defaults	N/A
Command Mode	Privileged EXEC mode.
Usage Guide	N/A

Configuration Examples

The following example displays the information about the OSPFv3 interface.

```
Orion Alpha A28X# show ipv6 ospf interface
FastEthernet 1/0 is up, line protocol is up
Interface ID 2
IPv6 Prefixes
fe80::2d0:22ff:fe22:2223/64 (Link-Local Address)
OSPFv3 Process (1), Area 0.0.0.0, Instance ID 0
Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State BDR, Priority 1
Designated Router (ID) 2.2.2.2
Interface Address fe80::c800:eff:fe84:1c
Backup Designated Router (ID) 1.1.1.1
Interface Address fe80::2d0:22ff:fe22:2223
Timer interval configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:02
Neighbor Count is 1, Adjacent neighbor count is 1
Hello received 26 sent 26, DD received 5 sent 4
LS-Req received 1 sent 1, LS-Upd received 3 sent 6
LS-Ack received 6 sent 2, Discarded 0
```

If the BFD has been enabled for the neighbor on the interface, the content of "BFD enabled" is also displayed. For example:

```
Orion Alpha A28X# show ipv6 ospf interface
FastEthernet 1/0 is up, line protocol is up
Interface ID 2
IPv6 Prefixes
fe80::2d0:22ff:fe22:2223/64 (Link-Local Address)
OSPFv3 Process (1), Area 0.0.0.0, Instance ID 0
Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State BDR, Priority 1, BFD enabled
Designated Router (ID) 2.2.2.2
Interface Address fe80::c800:eff:fe84:1c
Backup Designated Router (ID) 1.1.1.1
Interface Address fe80::2d0:22ff:fe22:2223
Timer interval configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:02
Neighbor Count is 1, Adjacent neighbor count is 1
Hello received 26 sent 26, DD received 5 sent 4
LS-Req received 1 sent 1, LS-Upd received 3 sent 6
LS-Ack received 6 sent 2, Discarded 0
```

Platform Description   N/A

3.40 show ipv6 ospf neighbor

Use this command to display the neighbor information of the OSPFv3 process.

show ipv6 ospf [*process- id*] **neighbor** [**interface-type** *interface-number* [**detail**]| *neighbor-id* |**detail**]

Parameter Description

Parameter	Description
process- id	OSPFv3 process ID number
detail	Displays details about the neighbor.
interface-type interface-number	Interface type and interface number
neighbor-id	Neighbor's router ID

Defaults   N/A

Command Mode   Privileged EXEC mode

Usage Guide   N/A

Configuration Examples   The following command displays the brief information about the OSPFv3 neighbor.

```
Orion Alpha A28X# show ipv6 ospf neighbor
OSPFv3 Process (1) , 1 Neighbors, 1 is Full:
Neighbor ID Pri State     Dead Time   Interface         Instance ID
2.2.2.2     1   Full/DR   00:00:33    FastEthernet 1/0  0
Orion Alpha A28X# show ipv6 ospf neighbor detail
Neighbor 2.2.2.2, interface address fe80::c800:eff:fe84:1c
In the area 0.0.0.0 via interface FastEthernet 1/0
Neighbor priority is 1, State is Full, 6 state changes
DR is 2.2.2.2 BDR is 1.1.1.1
Options is 0x000013 (-|R|-|-|E|V6)
Dead timer due in 00:00:36
Database Summary List 0
Link State Request List 0
Link State Retransmission List 0
BFD session state up
```

Command	Description
ipv6 router ospf	Starts the OSPFv3 routing process.
ipv6 ospf area	Enables the interface to participate in the OSPFv3 process.
area virtual-link	Configures the OSPFv3 virtual link.
show ipv6 ospf interface	Displays the OSPFv3 interface information.

Platform Description   N/A

3.41 show ipv6 ospf restart

Use this command to display the OSPFv3 graceful restart configuration.

show ipv6 ospf [*process- id*] **restart**

Parameter Description

Parameter	Description
process- id	OSPFv3 process ID number.

Defaults   N/A

Command Mode   Privileged EXEC mode

Usage Guide   N/A

Configuration Examples   The following example displays the restarter status.

```
Orion Alpha A28X# show ipv6 ospf restart
Routing Process is ospf 1
Graceful-restart enabled
Restart grace period 120 secs
Current Restart status is plannedRestart
Current Restart remaining time 50 secs
Graceful-restart helper support enabled
```

The following example displays the helper status.

```
Orion Alpha A28X# show ipv6 ospf restart
Routing Process is ospf 1
Neighbor 10.1.1.2, interface addr 10.1.1.2
In the area 0.0.0.0 via interface GigabitEthernet 6/0/0
Graceful-restart helper enabled
Current helper status is helping
Current helper remaining time 50 secs
```

**Related
Commands**

Command	Description

| ipv6 router ospf | Starts the OSPFv3 routing process. |

Platform Description N/A

3.42 show ipv6 ospf route

Use this command to display the OSPFv3 route information.

show ipv6 ospf [*process- id*] **route** [**count**]

Parameter Description

Parameter	Description
process- id	OSPFv3 process ID number.
count	Total number of OSPFv3 routes

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide N/A

Configuration Examples The following example displays the information about OSPFv3 routes.

```
Orion Alpha A28X# show ipv6 ospf route
OSPFv3 Process (1)
Codes: C - connected, D - Discard, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2Destination
Metric   Next-hop
E2 2001:DB8:1::/64   1/20     via fe80::c800:eff:fe84:1c, FastEthernet 1/0
O  2001:DB8:2::/64   11       via fe80::c800:eff:fe84:1c, FastEthernet
1/0, Area 0.0.0.0
```

Related Commands

Command	Description
ipv6 router ospf	Starts the OSPFv3 routing process.

Platform Description N/A

3.43 show ipv6 ospf summary-prefix

Use this command to display the external route convergence information of OSPFv3

show ipv6 ospf [*process- id*] **summary-prefix**

Parameter Description

Parameter	Description
process- id	OSPFv3 process ID number

Defaults	N/A
Command Mode	Privileged EXEC mode.
Usage Guide	N/A
Configuration Examples	The following example displays the external route convergence information of OSPFv3.

```
Orion Alpha A28X# show ipv6 ospf summary-prefix
OSPFv3 Process 1, Summary-prefix:
2001:db8::/64,Metric 16777215,Type0,Tag0,Match count0,advertise
```

Related Commands

Command	Description
ipv6 router ospf	Starts the OSPFv3 routing process.
summary-prefix	Configures the converge route outside the OSPFv3 routing domain.

Platform Description	N/A

3.44 show ipv6 ospf topology

Use this command to display the topology information about each area of OSPFv3.

show ipv6 ospf [*process- id*] **topology** [**area** *area-id*]

Parameter Description

Parameter	Description
process- id	OSPFv3 process ID number
area-id	Area ID

Defaults	N/A
Command Mode	Privileged EXEC mode
Usage Guide	N/A
Configuration Examples	The following command displays the topology information about each area of OSPFv3.

```
Orion Alpha A28X# show ipv6 ospf topology
OSPFv3 Process (1)
OSPFv3 paths to Area (0.0.0.0) routers
Router ID        Bits  Metric      Next-Hop
Interface
1.1.1.1          EB  --
2.2.2.2          E   1         2.2.2.2
FastEthernet 1/0
```

```
OSPFv3 paths to Area (0.0.0.1) routers
Router ID        Bits  Metric     Next-Hop
Interface
1.1.1.1          B    --
```

Related Commands

Command	Description
ipv6 router ospf	Starts the OSPFv3 routing process.
area range	Configures the address range of the OSPF area.

Platform Description

N/A

3.45 show ipv6 ospf virtual-links

Use this command to display the virtual link information of the OSPFv3 process

show ipv6 ospf [*process- id*] **virtual-links**

Parameter Description

Parameter	Description
process- id	OSPFv3 process ID number

Defaults

N/A

Command Mode

Privileged EXEC mode.

Usage Guide

N/A

Configuration Examples

The following command displays the information about the OSPFv3 virtual link.

```
Orion Alpha A28X# show ipv6 ospf virtual-links
Virtual Link VLINK1 to router 2.2.2.2 is down
  Transit area 0.0.0.1 via interface FastEthernet 1/0, instance ID 0
  Local address *
  Remote address 3333::1/128
  Transmit Delay is 1 sec, State Down,
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    Hello due in inactive
    Adjacency state Down
```

Related Commands

Command	Description
ipv6 router ospf	Starts the OSPFv3 routing process.
area virtual-link	Configures the OSPFv3 virtual link.
show ipv6 ospf neighbor	Displays the OSPFv3 neighbor information.

Platform

N/A

Description

3.46 summary-prefix

Use this command to configure the converged route outside the OSPFv3 routing domain in the routing process configuration mode. Use the **no** form of this command to restore the default setting.

summary-prefix *ipv6-prefix*/*prefix-length* [**not-advertise** | [**tag** *number*] [**cost** *cost*]]

no summary-prefix *ipv6-prefix*/*prefix-length* [**not-advertise** | [**tag**] [**cost**]]

Parameter Description	Parameter	Description
	ipv6-prefix/*prefix-length*	Address range of the converged route
	not-advertise	Does not advertise the converged route to neighbors. Absence of this parameter means to advertise.
	tag *number*	Tag value redistributed to the OSPFv3 inner route, in the range from 0 to 4294967295.
	cost *cost*	Range: 0-16777214

Defaults No converged route is configured by default.

Command Mode Routing process configuration mode.

Usage Guide When routes are redistributed by another routing process into the OSPFv3 routing process, every route is advertised to the OSPFv3-enabled device separately in the form of external link state. If the incoming routes are continuous addresses, the autonomous system border device can advertise only one converged route, thus reducing the scale of routing table greatly.

It is different from the **area range** command. The area range involves the convergence of routes between OSPFv3 areas, while the **summary-prefix** involves the convergence of external routes of the OSPFv3 routing domain.

Configuring the **summary-prefix** command on the ASBR can perform convergence for only redistributed routes; while configuring this command on the NSSA ABR translator can perform convergence for the redistributed routes and the Type-5 routes translated from Type-7.

Configuration Examples The following example configures the external route within the 2001:DB8::/64 to the converged route 2001:DB8::/64 to advertise it.

```
Orion Alpha A28X(config)# ipv6 router ospf 1
Orion Alpha A28X(config-router)# summary-prefix 2001:DB8::/64
```

Related Commands	Command	Description
	area-range	Configures route convergence between the OSPFv3 areas.
	redistribute	Redistributes the routes in other routing process.

Platform N/A

Description

3.47 timers lsa arrival

Use this command to configure a delay for receiving repeated LSAs. Use the **no** form of this command to restore the default setting.

timers lsa arrival *arrival-time*

no timers lsa arrival

Parameter Description	Parameter	Description
	arrival-time	Specifies the delay for receiving repeated LSAs. The range is from 0 to 600000 in the unit of milliseconds.

Defaults   The default is 1000.

Command Mode   Routing process configuration mode

Usage Guide   Configure the device not to process repeated LSAs received within the specific delay.

Configuration Examples   The following example sets the delay for receiving repeated LSAs to 2 seconds.

```
Orion Alpha A28X(config)# ipv6 router ospf 1
Orion Alpha A28X(config-router)# timers lsa arrival 2000
```

Related Commands	Command	Description
	show ipv6 ospf	Displays OSPFv3 process information, including identifiers of routing devices.

Platform Description   N/A

3.48 timers pacing lsa-group

Use this command to set an LSA group pace interval. Use the **no** form of this command to restore the default setting.

timers pacing lsa-group *seconds*

no timers pacing lsa-group

Parameter Description	Parameter	Description
	seconds	Specifies the LSA group pace interval. The range is from 10 to 1800 in the unit of seconds. The default value is 30.

Defaults   The default is 30.

Command   Routing process configuration mode

Mode

Usage Guide Each LSA has its own lifetime, that is, LSA aging time. An LSA existing for 1800s will be refreshed so that the living time of the LSA will not exceed its aging time. This ensures that normal LSAs are not cleared due to timeout of aging time. If update and aging operations of each LSA are separately computed, a large number of CPU resources will be consumed.

To effectively utilize CPU resources, configure the device to group LSAs for uniform refreshment. The time for refreshing a group of LSAs is called an LSA group pace interval. Grouping refreshment is to put the LSAs to be refreshed within an LSA group pace interval into a group and refresh them uniformly.

When the number of LSAs is fixed, a longer LSA group pace interval will allow the CPU to process more LSAs when the timer expires for one time. To keep the stability of the CPU, you are recommended not to set an over long LSA group pace interval. This prevents the CPU from processing excessive LSAs when the timer expires each time. If the CPU processes a large number of LSAs each time, it is recommended to shorten the LSA group pace interval. For example, if the database has 10000 LSAs, you need to reduce the LSA group pace interval. If it has only 40 to 100 LSAs, you can adjust the group pace interval to 10 through 20 minutes.

Configuration Examples The following example sets the LSA group pace interval to 120 seconds.

```
Orion Alpha A28X(config)# ipv6 router ospf 1
Orion Alpha A28X(config-router)#timers pacing lsa-group 120
```

Related Commands

Command	Description
show ipv6 ospf	Displays OSPFv3 configuration information.

Platform Description N/A

3.49 timers pacing lsa-transmit

Use this command to set an interval for sending LSA groups. Use the **no** form of this command to restore the default setting.

timers pacing lsa-transmit *transmit-time transmit-count*

no timers pacing lsa-transmit

Parameter Description

Parameter	Description
transmit-time	Specifies the interval for sending LSA groups. The range is from 10 to 1000 in the unit of milliseconds.
transmit-count	Specifies the number of LS-UPD packets in an LSA group. The range is from 1 to 200.

Defaults The default transmit-time is 40 and the transmit-count is 1.

Command Mode Routing process configuration mode

Usage Guide   There are usually a lot of LSAs on a network; therefore, the load of the device is very high. Setting proper **transimit-time** and **transimit-count** values can restrict flooding of LS-UPD packets on the network.

When the CPU load is not high and network bandwidth usage is not large, you can reduce the **transimit-time** value and increase the **transimit-count** value to accelerate route convergence.

Configuration Examples   The following example sets the interval for sending LS-UPDs to 50 milliseconds and the specified 20 packets to be sent each time.

```
Orion Alpha A28X(config)# ipv6 router ospf 1
Orion Alpha A28X(config-router)# timers pacing lsa-transmit 50 20
```

Related Commands

Command	Description
show ipv6 ospf	Displays OSPFv3 process information.

Platform Description   N/A

3.50 timers spf

Use this command to set the delay and interval for the OSPFv3 to calculate SPF after receiving the topology change. Use the **no** format of this command to restore the default setting.

timers spf *delay holdtime*

no timers spf

Parameter Description

Parameter	Description
spf-delay	Defines the waiting time for the SPF calculation, which ranges from 0 to 214748364 seconds. After receiving the topology change information, the OSPF routing process has to waiting for a given period before making the SPF calculation.
spf-holdtime	Defines the interval between two SPF calculations, which ranges from 0 to 214748364 seconds. If the interval has not passed even if the waiting time has elapsed, no SPF calculation can be made yet.

Defaults   There are two default situations: 1. The versions earlier than switch 10.4 do not support the command **timers throttle spf**. The system default is timers spf 5 10. 2. The switch 10.4 and the later versions do support the command **timers throttle spf**, where **timer spf** takes no effect by default. The delay for SPF calculation is subject to the default setting of the command **timers throttle spf**. Refer to the description of the command.

Command Mode   Routing process configuration mode

Usage Guide   The smaller the *spf-delay* and *spf-holdtime*, the shorter time the OSPF takes to adapt to the topology change, but the more CPU time will be used of the router.

⚠️ The **timer spf** configuration and the **timers throttle spf** configuration will overwrite each other.

Configuration Examples

The following example sets the delay and holdtime of the OSPFv3 to 3 seconds and 9 seconds respectively.

```
Orion Alpha A28X(config)# ipv6 router ospf 20
Orion Alpha A28X(config-router)# timers spf 3 9
```

Related Commands

Command	Description
clear ipv6 ospf	Restarts part of the function of the OSPFv3.
show ipv6 ospf	Displays the OSPFv3 routing process information.
timers throttle spf	Configures the exponential backoff delay of the SPF calculation

Platform Description

N/A

3.51 timers throttle lsa all

Use this command to configure an exponential backoff algorithm for generating LSAs. Use the **no** form of this command to restore the default setting.

timers throttle lsa all *delay-time hold-time max-wait-time*

no timers throttle lsa all

Parameter Description

Parameter	Description
delay-time	Specifies a shortest LSA generation delay, in milliseconds (the first batch of LSAs is usually generated immediately). The range is from 0 to 600000 in the unit of milliseconds.
hold-time	Specifies a shortest interval between the first two times of LSA refreshment, in milliseconds. The range is from 1 to 600000 in the unit of milliseconds
max-wait-time	Specifies a longest interval for consecutive two times of LSA refreshment, in milliseconds. The value is used to determine whether LSAs are refreshed consecutively. The range is from 1 to 600000 in the unit of milliseconds.

Defaults

The default *delay-time* is 0, *hold-time* is 5000 and *max-wait-time* is 5000.

Command Mode

Routing process configuration mode

Usage Guide

If high route convergence capability is needed when links are changed, set a small *delay-time* value. To reduce CPU consumption, you can properly increase the values of the parameters.

> ℹ The *hold-time* value cannot be smaller than the *delay-time* value and must be smaller than or equal to the *max-wait-time* value.

Configuration Examples	The following example sets *delay-time* to 10 milliseconds, *hold-time* to one second, and *max-wait-time* to five seconds*.*

```
Orion Alpha A28X(config)# ipv6 router ospf 1
Orion Alpha A28X(config-router)# timers throttle lsa all 10 1000 5000
```

Related Commands	**Command**	**Description**
	show ipv6 ospf	Displays OSPFv3 process information.

Platform Description	N/A

3.52 timers throttle route

Use this command to configure the delay time of route calculation on receiving the ASBR summary LSA and the external summary LSA. Use the **no** form of this command to restore the default setting.

timers throttle route { **inter-area** *ia-delay* | **ase** *ase-delay* }

no timers throttle route { **inter-area** | **ase** }

Parameter Description	**Parameter**	**Description**
	inter-area	Calculates the inter area routes.
	ia-delay	Sets the delay time of the inter-area route calculation, in the range from 0 to 600000 in the unit of milliseconds. On receiving the ASBR summary LSA, the router will not calculate the inter-area routes until the ia-delay time runs out.
	ase	Calculates the external routes.
	ase-delay	Sets the delay time of the external route calculation, in the range from 0 to 600000 in the unit of milliseconds. On receiving the external summary LSA, the router will not calculate the external routes until the ase-delay time runs out.

Defaults	The default *ia-delay* is 0 and *ase-delay* is 0.

Command Mode	Routing process configuration mode

Usage Guide	The default setting is recommended if the network needs to be fast converged. For the instable network where multiple inter-area and external routes exist, if you want to optimize the route calculation and save the CPU resources, increase the delay time.

Configuration Examples	The following example sets the delay time of the inter-area route calculation to one second.

```
Orion Alpha A28X(config)# ipv6 router ospf 1
Orion Alpha A28X(config-router)# timers throttle route inter-area 1000
```

Related Commands	**Command**	**Description**

N/A	N/A

Platform Description   N/A

3.53 timers throttle spf

Use this command to configure, the delay for SPF calculation as well as the minimum and maximum intervals between two SPF calculations after receiving the topology change information for OSPFv3 in the routing process configuration mode. Use the **no** form of this command to restore the default setting.

timers throttle spf *spf-delay spf-holdtime spf-max-waittime*

no timers throttle spf

Parameter Description

Parameter	Description
spf-delay	Specifies an SPF calculation delay after the topology change information is received. The range is from 1 to 600000 in the unit of milliseconds.
spf-holdtime	Specifies a shortest interval between two SPF calculations. The range is from 1 to 600000 in the unit of milliseconds.
spf-max-waittime	Specifies a longest interval between two SPF calculations. The range is from 1 to 600000 in the unit of milliseconds.

Defaults   The default *spf-delay* is 1000. *spf-holdtime* is 5000 and *spf-max-waittime* is 10000.

Command Mode   Routing process configuration mode.

Usage Guide   *Spf-delay* refers to the delay from the topology change to the SPF calculation. *Spf-holdtime* refers to the minimum interval between the first and the second SPF calculations. Then, the interval of the consecutive SPF calculations is at least twice as the last interval till it reaches to *spf-max-waittime*. If the interval between two SPF calculations has exceeded the required minimum value, the interval of SPF calculation will re-start from *spf-holdtime*.

Smaller *spf-delay* and *spf-holdtime* value can make the topology convergence faster. Greater *spf-max-waittime* value can reduce the SPF calculations. Those configuration are flexible according to the actual stability of the network topology.

Compared with the timers spf command, this command is more flexible. It not only speeds up the SPF convergence calculation, but also reduces the system resources consumption of SPF calculation as the topology changes continuously. Therefore, the timers throttle spf command is recommended.

🛈 The spf-holdtime cannot be smaller than spf-delay, or the spf-holdtime will be set to   be equal to spf-delay;

🛈 The spf-max-waitime cannot be smaller than spf-holdtime, or the spf-max-waittime   will be set to be equal to spf-holdtime automatically;

🛈 The configuration of the timers spf command and of the timers throttle spf command   are

overwritten each other.

ⓘ With neither timers spf command nor timers throttle spf command configured, the   default value refers to the default of the timers throttle spf command

Configuration Examples

The following example configures the delay and holdtime and the maximum time interval of the OSPFv3 as 5ms, 1000ms and 90000ms respectively. If the topology changes consecutively, the time for SPF calculation is: five milliseconds, one second, three seconds, seven seconds, 15 seconds, 31 seconds, 63 seconds, 89 seconds, 179 seconds, 179+90 seconds……

```
Orion Alpha A28X(config)# ipv6 router ospf 20
Orion Alpha A28X(config-router)# timers spf 5 1000 90000
```

Related Commands

Command	Description
clear ipv6 ospf	Restarts part of the OSPFv3 function.
show ipv6 ospf	Displays the routing process information of the OSFPv3
timers spf	Configures the SPF calculation delay .

Platform Description

N/A

3.54 two-way-maintain

Use this command to enable two-way OSPFv3 maintenance. Use the **no** form of this command to disable this function.

two-way-maintain

no two-way-maintain

Parameter Description

Parameter	Description
N/A	N/A

Defaults

Two-way OSPFv3 maintenance is enabled by default.

Command Mode

Routing process configuration mode

Usage Guide

Sometimes, there are a lot of sent and received packets on a network, occupying large CPU and memory resources. As a result, some packets cannot be processed immediately or are directly lost. If hello packets from a neighbor cannot be processed within the dead interval of neighbors, the connection with the neighbor will be interrupted due to connection timeout. If two-way OSPFv3 maintenance is enabled and a large number of packets exist on the network, besides hello packets, the two-way neighboring relationship between the device and the neighbor can also be maintained by DD, LSU, LSR, and LSAck packets from the neighbor. This prevents the neighboring relationship from failing due to receiving delay or discarding of hello packets.

Configuration

The following example disables two-way OSPFv3 maintenance.

Examples	```Orion Alpha A28X(config)# ipv6 router ospf 1``` ```Orion Alpha A28X(config-router)# no two-way-maintain```

Related Commands	**Command**	**Description**
	show ipv6 ospf	Displays global OSPFv3 configuration information.

Platform Description	N/A

4 RIPng Commands

4.1 clear ipv6 rip

Use this command to clear the RIPng routes.

clear ipv6 rip

Parameter Description	Parameter	Description
	N/A	N/A

Defaults   None

Command mode   Privileged EXEC mode

Usage Guide   Running this command removes all RIPng routes and this operation may have great impact on the RIPng protocol. This command should be used with caution.

Configuration Examples   The following example clears the RIPng routes:

```
Orion Alpha A28X# clear ipv6 rip
```

Related Commands	Command	Description
	N/A	N/A

Platform Description   N/A

4.2 default-metric

Use this command to configure the default metric for RIPng. Use the **no** form of this command to restore the default value.

default-metric *metric*

no default-metric

Parameter Description	Parameter	Description
	metric	Sets the default metric value. The valid range is from 1 to 16. The route is unreachable if the metric value is larger than or equal to 16.

Defaults   The default value is 1.

Command mode   Routing process configuration mode.

Usage Guide	This command shall be used with the **redistribute** command. When redistributing the route from one route process to RIPng, due to the incompatibility of metric calculation mechanisms of different routing protocols, it fails to translate the routing metric values. To this end, the RIPng metric value shall be defined when translating the metric values. If there is no defined metric value, use the **default-metric** command to define one; and the defined metric value will overwrite the value of the **default-metric** command. By default, the **default-metric** value is 1.
Configuration Examples	The following example shows how to set the RIPng metric value as 3 when redistributing OSPF process 100: ``` Orion Alpha A28X(config-router)# default-metric 3 Orion Alpha A28X(config-router)# redistribute ospf 100 ```

Related Commands	**Command**	**Description**
	redistribute	Redistributes the route from one route domain to another route domain.

Platform Description	N/A

4.3 distance

Use this command to set the administrative distance of RIPng. Use the **no** form of this command to restore the default value.

distance *distance*

no distance

Parameter Description	**Parameter**	**Description**
	distance	Sets the RIPng administrative distance. The range is from 1 to 254.

Defaults	The default distance is 120
Command mode	Routing process configuration mode.
Usage Guide	N/A
Configuration Examples	The following example shows how to set the RIPng administrative distance as 160: ``` Orion Alpha A28X(config)# ipv6 router rip Orion Alpha A28X(config-router)# distance 160 ```

Related Commands	**Command**	**Description**
	N/A	N/A

Platform Description	N/A

4.4 distribute-list

Use this command to filter the in/out route in the prefix list. Use the **no** form of this command to remove route filtering.

distribute-list prefix-list *prefix-list-name* { **in** | **out** } [*interface-type interface-name*]

no distribute-list prefix-list *prefix-list-name* { **in** | **out** } [*interface-type interface-name*]

Parameter Description

Parameter	Description
prefix-list *prefix-list-name*	Name of the prefix list which is used to filter the route.
in	**out**	Filters the in or out route in the distribute list.
interface-type interface-name	(Optional) Applies the distribute list to the specified interface.

Defaults By default, no distribute list is defined.

Command mode Routing process configuration mode.

Usage Guide This command is used to configure the route distribution control list to filter all update routes for the purpose of refusing to receive or send the specified routes. If the interface is not specified, the update routes on all interfaces are filtered.

Configuration Examples The following example shows how to filter the received update route on the interface eth0 (only those update routes within the **prefix-list** *allowpre* prefix list range can be received)

```
Orion Alpha A28X(config)# ipv6 router rip
Orion Alpha A28X(config-router)# distribute-list prefix-list allowpre in
eth0
```

Related Commands

Command	Description
redistribute	Sets route redistribution.

Platform Description N/A

4.5 graceful-restart

Use this command to configure the graceful restart (GR) function for the RIPng process.

graceful-restart [**grace-period** *grace-period*]

Use the **no** form of this command restore the default configurations.

no graceful-restart [**grace-period**]

Parameter Description

Parameter	Description
graceful-restart	Enables the GR function.

grace-period	Displays the configured grace period.
grace-period	Indicates the configured GR period, ranging from 1 to 1800 seconds. The default value is the smaller between twice of the update time and 60s.

Defaults

The GR function is enabled by default.

Command Mode

Routing process configuration mode

Default Level

14

Usage Guide

The GR function is configured based on RIPng instances. Different parameters can be configured for different RIPng instances as required.

The GR period indicates the maximum duration from RIPng restart to RIPng GR completion. In this time period, the forwarding table before restart is used and the RIPng route is restored to the status before restart. After the GR period expires, the RIPng process exits the GR status and the common RIPng operation is performed.

The **graceful-restart grace-period** command allows a user to modify the GR period in explicit mode. Note that GR is completed and the RIPng route is updated once before the RIPng route becomes invalid. If the GR period is improperly set, continuous data forwarding in the GR process cannot be ensured. A typical case is as follows:

If the GR period is greater than the invalid time of the neighbor route, GR is not completed before the route becomes invalid and the route is not advertised to the neighbor again. The neighbor route stops forwarding data after the route becomes invalid, resulting in data forwarding interruption. Therefore, unless otherwise specified, it is not recommended to adjust the GR period. If the GR period needs to be configured, check configuration of the **timers** command to ensure that the GR period value is greater than the route update time and smaller than the route invalid time.

When GR is performed for the RIPng process, ensure that the network environment is stable.

Configuration Examples

The following example enables the GR function for the RIPng process and configures the GR period.

```
Orion Alpha A28X(config)# ipv6 router rip
Orion Alpha A28X(config-router)# graceful-restart grace-period 90
```

Verification

Run the **show ipv6 rip** command to check whether the GR function is configured and query the configured grace period.

Prompts

N/A

Common Errors

N/A

Platform Description

N/A

4.6 ipv6 rip default-information

Use this command to generate a default IPv6 route to the RIPng. Use the **no** form of this command to remove the default route.

ipv6 rip default-information { **only** | **originate**} [**metric** *metric-value*]

no ipv6 rip default-information

Parameter Description	Parameter	Description
	only	Advertises the IPv6 default route only.
	originate	Advertises both of the IPv6 default route and other routes.
	metric *metric-value*	Sets the metric value for the default route. The valid range is from 1 to 15. The default metric is 1.

Defaults By default, no default route is configured.

Command mode Interface configuration mode

Usage Guide With this command configured on an interface, the interface advertises an IPv6 default route and the route itself is not to join the device route forwarding table and the RIPng route database.

To avoid the route loop, once this command has been configured on the interface, RIPng refuses to receive the default route update message advertised from the neighbor.

Configuration Examples The following example shows how to create a default route to the RIPng routing process on the interface ethernet0/0 and enable this interface to advertise the default route only:

```
Orion Alpha A28X(config)# interface ethernet 0/0
Orion Alpha A28X(config-if)# ipv6 rip default-information only
```

Related Commands	Command	Description
	show ipv6 rip	Displays the RIPng process and statistics.
	show ipv6 rip database	Displays the RIPng route.

Platform Description N/A

4.7 ipv6 rip enable

Use this command to enable the RIPng on the interface. Use the **no** form of this command to disable RIPng on the interface.

ipv6 rip enable

no ipv6 rip enable

Parameter Description	Parameter	Description
	N/A	N/A

Defaults It is disabled by default.

Command mode Interface configuration mode.

Usage Guide	This command is used to add the RIPng interface. Before this command is configured, if the RIPng is not enabled, use this command to enable the RIPng automatically.

Configuration Examples

The following example shows how to enable the RIPng on the interface 0/0:

```
Orion Alpha A28X(config)# interface ethernet 0/0
Orion Alpha A28X(config-if)# ipv6 rip enable
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

4.8　ipv6 rip metric-offset

Use this command to set the interface metric value. Use the **no** form of this command to remove the metric configurations.

ipv6 rip metric-offset *value*

no ipv6 rip metric-offset

Parameter Description

Parameter	Description
value	Sets the interface metric value on the interface. The valid range is from 1 to 16.

Defaults The default value is 1.

Command mode Interface configuration mode.

Usage Guide Before the route is added to the routing list, the interface metric value shall be upon the route metric. To this end, the interface metric value influences the route usage.

Configuration Examples

The following example shows how to set the metric value of the interface Ethernet 0/1 as 5:

```
Orion Alpha A28X(config)# interface ethernet 0/1
Orion Alpha A28X(config-if)# ipv6 rip metric-offset 5
```

Related Commands

Command	Description
N/A	N/A

Platform Description N/A

4.9 ipv6 router rip

Use this command to create the RIPng process and enter routing process configuration mode. Use the **no** form of this command to remove the RIPng process.

ipv6 router rip

no ipv6 router rip

Parameter Description	Parameter	Description
	N/A	N/A

Defaults	No RIPng process is configured by default.
Command mode	Global configuration mode.
Usage Guide	N/A.
Configuration Examples	The following example shows how to create the RIPng process and enter routing process configuration mode:

```
Orion Alpha A28X(config)# ipv6 router rip
```

Related Commands	Command	Description
	ipv6 rip enable	Enables the RIPng on the specified interface.

Platform Description	N/A

4.10 passive-interface

Use this command to disable the interface to send update packets. Use the **no** form of this command to enable the interface to send update packets.

passive-interface { **default** | *interface-type interface-num* }

no passive-interface { **default** | *interface-type interface-num* }

Parameter Description	Parameter	Description
	default	Enables the passive mode on all interfaces.
	interface-type interface-num	Interface type and interface number.

Defaults	No passive interface is configured by default.
Command mode	Routing process configuration mode.
Usage Guide	You can use the **passive-interface default** command to enable the passive mode on all interfaces. Then ,use the **no passive-interface** *interface-type interface-num* command to remove the specified

interface from the passive mode.

Configuration Examples	The following example shows how to enable the passive mode on all interfaces and remove interface ethernet 0/0 from the passive mode:

```
Orion Alpha A28X(config-router)# passive-interface default
Orion Alpha A28X(config-router)# no passive-interface ethernet 0/0
```

Related Commands

Command	Description
N/A	N/A

Platform Description   N/A

4.11 redistribute

Use this command to redistribute the route of other routing protocols to RIPng. Use the **no** form of this command to remove the redistribution configuration.

redistribute { **connected** | **ospf** *process-id* | **static**} [**metric** *metric-value* | **route-map** *route-map-name*]

no redistribute { **connected** | **ospf** *process-id* | **static**} [**metric** *metric-value* | **route-map** *route-map-name*]

Parameter Description

Parameter	Description
connected	Redistributes the connected routes to RIPng.
ospf *process-id*	Redistributes the OSPF routes to RIPng. *process-id* indicates the OSPF process number, and the range is from 1 to 65,535.
static	Redistributes the static routes to RIPng.
metric *metric-value*	(Optional) Sets the metric value for the route redistributed to RIPng.
route-map *route-map-name*	(Optional) Sets the redistribution route filtering.

Defaults   By default, the routes of other routing protocols are not redistributed.
If the **default-metric** command is not configured, the default metric value is 1;
By default, the **route-map** is not configured;
By default, all sub-type routes in the specified routing process are redistributed.

Command mode   Routing process configuration mode.

Usage Guide   This command is used to redistribute the external routes to RIPng.
It is unnecessary to transform the metric of one routing protocol into another routing protocol in the process of the route redistribution, for the metric calculation methods of the different routing protocols are different. The RIP and OSPF metric calculations are incomparable for the reason that the RIP metric calculation is hop-based while the OSPF one is bandwidth-based.
The instance, from where the routing information is redistributed to the RIPng, must be specified in

the process of configuring the multi-instance protocol redistribution.

Configuration Examples

The following example shows how to redistribute the static route, use the route map *mymap* to filter and set the metric value as 8:

```
Orion Alpha A28X(config)# ipv6 router rip
Orion Alpha A28X(config-router)# redistribute static route-map
mymap metric 8
```

Related Commands

Command	Description
default-metric	Defines the default RIPng metric value when redistributing other routing protocols.
distribute-list	Filters the RIPng routing update packets.

Platform Description

N/A

4.12 show ipv6 rip

Use this command to show the parameters and each statistical information of the RIPng routing protocol process.

show ipv6 rip

Parameter Description

Parameter	Description
N/A	N/A

Defaults

N/A

Command mode

Privileged EXEC mode or user mode.

Usage Guide

N/A

Configuration Examples

```
Orion Alpha A28X# show ipv6 rip
Routing Protocol is "RIPng"
Sending updates every 10 seconds with +/-50%, next due in 8 seconds
Timeout after 30 seconds, garbage collect after 60 seconds
Outgoing update filter list for all interface is:
distribute-list prefix aa out
Incoming update filter list for all interface is: not set
Default redistribution metric is 1
Default distance is 120
Redistribution:
Redistributing protocol connected route-map rm
Redistributing protocol static
Redistributing protocol ospf 1
Default version control:  send version 1, receive version 1
```

```
Interface              Send   Recv
VLAN 1                1      1
Loopback 1            1      1
Routing Information Sources:
None
```

Related Commands	Command	Description
	show ipv6 rip	Displays the parameters and each statistical information of the RIPng process.

Platform Description N/A

4.13 show ipv6 rip database

Use this command to display the RIPng route entries.

show ipv6 rip database

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command mode Privileged EXEC mode or user mode.

Usage Guide N/A

Configuration Examples
```
Orion Alpha A28X# show ipv6 rip database
Codes: R - RIPng,C - Connected,S - Static,O - OSPF,B - BGP
sub-codes:n - normal,s - static,d - default,r - redistribute,
i - interface, a/s - aggregated/suppressed
S(r)   2001:db8:1::/64, metric 1, tag 0
Loopback 0/::
S(r)   2001:db8:2::/64, metric 1, tag 0
Loopback 0/::
C(r)   2001:db8:3::/64, metric 1, tag 0
VLAN 1/::
S(r)   2001:db8:4::/64, metric 1, tag 0
Null 0/::
C(i)   2001:db8:5::/64, metric 1, tag 0
Loopback 1/::
S(r)   2001:db8:6::/64, metric 1, tag 0
Null 0/::
```

Related	Command	Description

Commands		
	N/A	N/A

Platform Description N/A

4.14 split-horizon

Use the **split-horizon** command to enable the RIPng split-horizon function in routing process configuration mode. Use the **no** form of this command to disable this function. Use the **split-horizon poisoned-reverse** command to enable the RIPng poisoned reverse horizontal split function in routing process configuration mode. Use the no form of this command to disable this function.

split-horizon [**poisoned-reverse**]

no split-horizon [**poisoned-reverse**]

Parameter Description	Parameter	Description
	poisoned-reverse	(Optional) Enables the poisoned-reverse horizontal split.

Defaults RIPng split horizon is enabled by default.

Command mode Routing process configuration mode.

Usage Guide In the process of packet updating, split-horizon function prevents some routing information from being advertised through the interface learning those routing information. The poisoned reverse horizontal split function advertises some routing information to the interface learning those routing information, and the metric value is set as 16. The RIPng routing protocol belongs to the distance vector routing protocol, so the horizontal split shall be noticed in the actual application. You can use the **show ipv6 rip** command to determine whether the RIPng split-horizon function is enabled or not.

Configuration Examples The following example shows how to disable the RIPng horizontal split:

```
Orion Alpha A28X(config)# ipv6 router rip
Orion Alpha A28X(config-router)# no split-horizon
```

Related Commands	Command	Description
	N/A	N/A

Platform Description N/A

4.15 timers

Use this command to adjust the RIPng timer. Use the **no** form of this command to restore the default settings.

timers *update invalid flush*

no timers

Parameter		Description
	Parameter	Description
update		Sets the routing update time, in seconds. The update parameter defines the period of sending the routing update packets by the device. The invalid and flush parameter reset once the update packets are received.
invalid		Sets the routing invalid time, in seconds, starting from receiving the last valid update packet. The invalid parameter defines the invalid time for the un-updated routing in the routing list. The routing invalid time shall be three times larger than the routing update time. The routing will be invalid if no update packets are received within the routing invalid time, and it will reset if the update packets are received within the invalid time.
flush		Sets the routing flush time, in seconds, starting from RIPng entering to invalid state. The invalid routing will be removed from the routing list if the flush time expires.

Defaults
The default update time is 30 seconds; the default invalid time is 180 seconds; and the default flush time is 120 seconds.

Command mode
Routing process configuration mode.

Usage Guide
Adjusting the above time may speed up the RIPng convergence time and the troubleshooting time. The RIPng time must be consistent for the devices connecting to the same network. You are not recommended to adjust the RIP time, except for the specific requirement.
Use the **show ipv6 rip** command to view the current RIPng time parameter setting.
In the low-speed link, with the short time configured, large amount of the update packets consumes a lot of bandwidth. Generally, the short time can be configured in the Ethernet or 2Mbps-higher line to shorten the convergence time of the network routing.

Configuration Examples
The following example shows how to send the RIP update packets every 10 seconds. The routing will be invalid if no update packets are received within 30 seconds, and the routing will be removed after being invalid for 90 seconds.

```
Orion Alpha A28X(config)# ipv6 router rip
Orion Alpha A28X(config-router)# timers 10 30 90
```

Related Commands

Command	Description
show ipv6 rip	Displays the parameters and the statistical information of the RIPng process.
show ipv6 rip database	Displays the RIPng routes.

Platform Description
N/A

5 NSM Commands

5.1 clear ip route

Use this command to clear the route cache.

clear ip route [**vrf** *vrf_name*] { * **|** *network* [*netmask*] **|** }

<table>
<thead>
<tr><th></th><th>Parameter</th><th>Description</th></tr>
</thead>
<tbody>
<tr><td rowspan="3">Parameter Description</td><td>*</td><td>Clears all route cache.</td></tr>
<tr><td>*network*</td><td>Specifies the route cache of the network or subnet.</td></tr>
<tr><td>*netmask*</td><td>(Optional) Subnet mask. If no subnet mask is specified, the longest match principle is used when you match *network* with the route. The cache of the longest match is cleared.</td></tr>
</tbody>
</table>

Command Mode	Privileged EXEC mode

Usage Guide	Clearing route cache clears the corresponding routes and triggers the routing protocol relearning. Please note that clearing all route cache leads to temporary network disconnection.

Examples

The following example clears the cache of the route which is the longest match with IP address 192.168.12.0.

```
clear ip route 192.168.12.0
```

Related Commands	Command	Description
	N/A	N/A

Platform Description

5.2 ip default-gateway

Use this command to configure the default gateway IP address on 2-layer devices. Use the **no** or **default** form of this command to restore the default setting.

ip default-gateway *ip-address*

no ip default-gateway

default ip default-gateway

Parameter Description	Parameter	Description
	ip-address	IPv4 address of the default gateway

Defaults   No gateway IP address is configured by default.

Command Mode   Global configuration mode

Usage Guide   When the device does not know the destination address of a packet, the device will forward the packet to the default gateway.

Examples   The following example sets the IP address of default gateway to 192.168.1.1.
```
ip default-gateway 192.168.1.1
```

Related Commands

Command	Description
N/A	N/A

Platform Description

5.3   ip default-network

Use this command to configure the default network globally. Use the **no** or **default** form of this command to restore the default setting.

ip default-network *network*

no ip default-network *network*

default ip default-network *network*

Parameter Description

Parameter	Description
network	Default network

Defaults   The default is 0.0.0.0/0.

Command Mode   Global configuration mode

Usage Guide   The goal of this command is to generate the default route. The default network must be reachable in the routing table, but not the directly connected network.

The default network always starts with an asterisk ("*"), indicating that it is the candidate of the default route. If there is connected route and the route without the next hop in the default network, the default route must be a static route.

Examples   The following example sets 192.168.100.0 as the default network. Since the static route to the network is configured, the device will automatically generate a default route.
```
ip route 192.168.100.0 255.255.255.0 serial 0/1
ip default-network 192.168.100.0
```
The following example sets 200.200.200.0 as the default network. The route becomes the default one only when it is available in the routing table.

```
ip default-network 200.200.200.0
```

	Command	Description
Related Commands	**show ip route**	Displays the routing table.

5.4 ip route

Use this command to configure a static route. Use the **no** or **default** form of this command to restore the default setting.

ip route *network net-mask* { *ip-address* | *interface* [*ip-address*] } [*distance*] [**tag** *tag*] [**permanent** | [**weight** *number*] [**description** *description-text*] [**disabled** | **enabled**]

no ip route *network net-mask* { *ip-address* | *interface* [*ip-address*] } [*distance*]

default ip route *network net-mask* { *ip-address* | *interface* [*ip-address*] } [*distance*]

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>*network*</td><td>Network address of the destination</td></tr>
<tr><td>*net-mask*</td><td>Mask of the destination</td></tr>
<tr><td>*ip-address*</td><td>The next hop IP address of the static route</td></tr>
<tr><td>*interface*</td><td>(Optional) The next hop egress of the static route</td></tr>
<tr><td>*distance*</td><td>(Optional) The administrative distance of the static route</td></tr>
<tr><td>*tag*</td><td>(Optional) The tag of the static route</td></tr>
<tr><td>**permanent**</td><td>(Optional) Permanent route ID</td></tr>
<tr><td>**weight** *number*</td><td>(Optional) Indicates the weight of the static route. The weight is 1 by default.</td></tr>
<tr><td>**description** *description-text*</td><td>(Optional) Indicates the description of the static route. By default, no description is configured. *description-text* is a string of one to 60 characters.</td></tr>
<tr><td>**disabled/enabled**</td><td>(Optional) Indicates the enable flag of the static route. The flag is enabled by default.</td></tr>
</table>

Parameter Description

Defaults   No static route is configured by default.

Command Mode   Global configuration mode

Usage Guide

The default administrative distance of the static route is 1. Setting the administrative distance allows the learnt dynamic route to overwrite the static route. Setting the administrative distance of the static route can enable route backup, which is called floating route in this case. For example, the administrative distance of the OSPF is 110. You can set its administrative distance to 125. Then the data can switch over the static route when the route running OSPF fails.

The default weight of the static route is 1. To view the static route of non default weight, execute the **show ip route weight** command. The parameter weight is used to enable WCMP. When there are load-balanced routes to the destination, the device assigns data flows by their weights. The higher the weight of a route is, the more data flow the route carries. WCMP limit is generally 32 for routers.

However, WCMP limit varies by switch models for their chipsets support different weights. When the sum of the weights of load balanced routes is beyond this weight limit, the excessive ones will not take effect.

Enablement/disablement shows the state of the static route. Disablement means the static route is not used for forwarding. The forwarding table used the permanent route until administrator deletes it. When you configure the static route on an Ethernet interface, do not set the next hop as an interface, for example, ip route 0.0.0.0 0.0.0.0 Fastethernet 0/0. In this case, the switch may consider that all unknown destination networks are directly connected to the Fastethernet 0/0. So it sends an ARP request to every destination host, which occupies many CPU and memory resources. It is not recommended to set the static route to an Ethernet interface.

Association between a static route and a track object can be specified. When association between a static route and a specified track object is configured and the advertised track object status is inactive, the static route does not take effect. If the advertised track object status is active, the static route takes effect based on another status. With association between a static route and a track object, the third-party status concerned by the track object is mainly used to determine whether the static route takes effect. Association between a static route and a track object cannot be used for routes with the permanent attribute.

Association between a static route and an ARP object can be specified. When association between a static route and an ARP object is configured and the ARP object corresponding to the next hop and egress of the route does not exist, the static route does not take effect. When the ARP object corresponding to the next hop and egress of the route exits, the static route takes effect based on another status. Association between a static route and an ARP object cannot be used for routes with the permanent attribute.

Association between a static route and a track object cannot be used together with association between a static route and an ARP object.

Examples

The following example adds a static route to the destination network of 172.16.100.0/24 whose next hop is 192.168.12.1 and administrative distance is 15.

```
ip route 172.16.199.0 255.255.255.0 192.168.12.1 155
```

If the static route has not a specific interface, data flows may be sent thought other interface in case of interface failure. The following example configures data flows to be sent through fastehternet 0/0 to the destination network of 172.16.100.0/24.

```
ip route 172.16.199.0 255.255.255.0 fastethernet 0/0 192.168.12.1
```

Related Commands

5.5   ip routing

Use this command to enable IP routing in the global configuration mode. Use the **no** or **default** form of this command to disable this function.

ip routing
no ip routing
default ip routing

Defaults	This function is enabled by default.
Command Mode	Global configuration mode
Usage Guide	IP routing is not necessary when the switch serves as bridge or VoIP gateway. When a device functions only as a bridge or VoIP gateway, the IP routing function of the switch software is not required. In this case, the IP routing function of the switch software can be disabled. After the IP routing function is disabled, the device functions as a common host. The device can send and receive packets but cannot forward packets. All route-related configurations will be deleted except the static route configuration. A large number of static routes may be configured. If a user runs the **no ip routing** command, the configuration of a large number of static routes may be lost. To prevent this situation, the static route configuration will be hidden temporarily when the **no ip routing** command is run. If the **ip routing** command is run again, the static route configuration can be restored. Note that if the process or whole system restarts when the **no ip routing** command is run, the static route configuration will not be reserved.
Examples	The following example disables IP routing. `Orion Alpha A28X(config)# no ip routing`
Related Commands	N/A
Platform Description	

5.6 ip static route-limit

Use this command to set the upper threshold of the static route. Use the **no** or **default** form of this command to restore the default setting.

ip static route-limit *number*

no ip static route-limit *number*

default ip static route-limit

Parameter Description	

Parameter	Description
number	Upper threshold of static routes in the range from 1 to 10000

Defaults	The default is 1024.
Command Mode	Global configuration mode
Usage Guide	The goal is to control the number of static routes. You can view the upper threshold of the configured

non-default static routes with the **show running-config** command.

Examples   The following example sets the upper threshold of the static routes to 900 and then restores the setting to the default value.

```
ip static route-limit 900
```

Related Commands   N/A

Platform Description

5.7 ipv6 default-gateway

Use this command to configure the default gateway IPv6 address on 2-layer devices. Use the **no** or **default** form of this command to restore the default setting.

ipv6 default-gateway *ipv6-address*

no ipv6 default-gateway

default ipv6 default-gateway

Parameter Description

Parameter	Description
ipv6-address	Sets the default gateway IPv6 address.

Defaults   No gateway IPv6 address is configured by default.

Command Mode   Global configuration mode

Usage Guide   When the device does not know the destination address of a packet, the device will forward the packet to the default gateway. Use the command **show ipv6 redirects to** display default gateway configuration.

Examples   The following example sets the default gateway IPv6 address to 10::1.

```
Orion Alpha A28X(config)# ipv6 default-gateway 10::1
```

Platform Description

5.8 ipv6 route

Use this command to configure an ipv6 static route. Use the **no** or **default** form of this command to restore the default setting.

ipv6 route *ipv6-prefix* / *prefix-length* { *ipv6-address* | *interface* [*ipv6-address*] } [*distance*] [**tag** *tag*] [**weight** *number*] [**description** *description-text*]

no ipv6 route *ipv6-prefix* / *prefix-length* { *ipv6-address* | *interface* [*ipv6-address*] } [*distance*]

Parameter	Description
prefix-length	Mask length of the destination
ipv6-address	The next hop IP address of the static route
interface	(Optional) The next hop egress of the static route
distance	(Optional) The administrative distance of the static route. The default is 1.
tag	(Optional) The tag value of the static route. The default is 0.
weight *number*	(Optional) Indicates the weight of the static route, which must be specified when you configure equal-cost routes. The weight ranges from 1 to 8. When the weights of all equal-cost routes of a route are summed up, the sum cannot exceed the maximum number of equal-cost routes that can be configured for the route. Weighting of equal-cost routes of a route indicates the traffic ratio of these routes. The weight is 1 by default.
description *description-text*	(Optional) Indicates the description of the static route. By default, no description is configured. *description-text* is a string of one to 60 characters.

Defaults   No IPv6 static route is configured by default.

Command Mode   Global configuration mode

Usage Guide

The following example adds a static route to the destination network of 2001::/64 whose next hop is 2002::2 and administrative distance are 115.

```
ipv6 route 2001::/64 2002::2 115
```

Examples   If the static route has not a specific interface, data flows may be sent thought other interface in case of interface failure. The following example configures that data flows are sent through fastehternet 0/0 to the destination network of 2001::/64.

```
ipv6 route 2001::/64 fastethernet 0/0 2002::2
```

Related Commands

Command	Description
show ipv6 route	Displays IPv6 routing table.

Platform Description

5.9 ipv6 static route-limit

Use this command to set the upper threshold of the static route. Use the **no** or **default** form of this command to restore the default setting.

Ipv6 static route-limit *number*

no ipv6 static route-limit *number*

default ipv6 static route-limit

	Parameter	Description
Parameter Description	*number*	Upper threshold of static routes in the range from 1 to 10000.

Defaults   The default is 1000.

Command Mode   Global configuration mode

Usage Guide   The goal is to control the number of static routes. You can view the upper threshold of the configured non-default static routes with the show running config command.

Examples   The following example sets the upper threshold of the ipv6 static routes to 900 and then restores the setting to the default value.

```
Orion Alpha A28X(config)# ipv6 static route-limit 900
Orion Alpha A28X(config)# no ipv6 static route-limit
```

	Command	Description
Related Commands	ipv6 route	Configures the IPv6 static route.
	show ipv6 route	Displays the IPv6 routing table.

Platform Description

5.10 ipv6 unicast-routing

Use this command to enable the IPv6 route function of the switch. Use the **no** or **default** form of this command to disable this function.

ipv6 unicast-routing

no ipv6 unicast-routing

default ipv6 unicast-routing

Parameter Description   N/A

Defaults	This function is enabled by default.
Command Mode	Global configuration mode
Usage Guide	This function can be disabled if the device is just used as the bridge-connection device or the VOIP gateway device.
Examples	The example disables the IPv6 route function of switch. `Orion Alpha A28X# no ipv6 unicast-routing`

Related Commands

Command	Description
ipv6 route	Configure the IPv6 static route.
show ipv6 route	Displays the IPv6 routing table.

Platform Description

5.11 maximum-paths

Use this command to specify the number of equivalent routes. Use the **no** or **default** form of this command is used to restore the default setting.

maximum-paths *number*
no maximum-paths *number*
default maximum-paths

Parameter Description	**Parameter**	**Description**
	number	Number of equivalent routes in the range from 1 to 32

Defaults	The default is 32 for routers. For switches, it depends on switch models.
Command Mode	Global configuration mode

Usage Guide

The number of equivalent routes is configured to control the number of equivalent routes. After the number of equivalent routes is configured by running the **maximum-paths** command, the number of load-sharing channels in load-sharing mode will not exceed the number of configured static routes. You can run the **show running config** command to query the number of configured static routes. This command takes effect both to IPv4 and IPv6 addresses. After this command is configured, the maximum number of equivalent routes to an IPv4 or IPv6 destination is equal to the configured value.

> S8600/S5750/S7600 supports 64 groups of equivalent routes. Each group supports a maximum

of 32 equivalent routes. The maximum number of equivalent routes on S3760/S5760 is 8. The number of static route groups is not restricted, that is, each route supports equivalent routes. An equivalent route group includes multiple equivalent next hops of the same prefix. On S8600/S5750/S7600, when 64 groups of equivalent routes are configured and an equivalent route needs to be configured for a prefix, the configuration is successful if the equivalent route exists in the 64 groups. Otherwise, the configuration fails.

Examples

The following example sets the number of equivalent routes to 10 and then restores the default setting.

```
maximum-paths 10
no maximum-paths 10
```

5.12 show ip redirects

Use this command to display the default gateway IP address.

show ip redirects

Use this command to display the default gateway IP address.

show ip redirects

Parameter Description	Parameter	Description
	N/A	N/A

Defaults N/A

Command Mode Privileged EXEC mode

Usage Guide Use this command to display the default gateway IP address. This command is supported on 2-layer devices or 3-layer devices with the **no ip routing** command executed.

Examples

The following example displays the default gateway.

```
Orion Alpha A28X# show ip redirects
Default Gateway: 192.168.195.1
```

Field	Description
Default Gateway	IP address of the default gateway.

Related Commands	Command	Description
	N/A	N/A

Platform Description

5.13 show ip route

Use the commands to display the configuration of the IP routing table.

show ip route *network* [*mask* [**longer-prefix**]] | **count** | *protocol* [*process-id*] | **weight**]]

show ip route [**normal** | **ecmp**] [*network* [*mask*]]

	Parameter	Description
Parameter Description	*network*	(Optional) Displays the route information to the network.
	mask	(Optional)Displays the route information to the network of this mask.
	longer-prefix	(optional) Displays the routes that match the specified prefix.
	count	(Optional)Displays the number of existent routes. (for the ECMP/WCMP route, displays one route)
	protocol	(Optional) Displays the route information of specific protocol.
	process-id	(Optional) Routing protocol process ID.
	weight	(Optional) Displays the route information of non default weight.
	normal	Displays normal routes and not equivalent routes or fast reroutes.
	ecmp	Displays only equivalent routes.

Defaults All routes are displayed by default.

Command Mode Privileged EXEC mode/ Global configuration mode/Interface configuration mode/ Routing protocol configuration mode/ Route map configuration mode

Usage Guide This command can display route information flexibly.

This command shows all routes. To show different attributes of routes, specify normal | ecmp | fast-reroute.

The following example displays the configuration of the IP routing table.

```
Orion Alpha A28X# show ip route

Codes:  C - Connected, L - Local, S - Static
        R - RIP, O - OSPF, B - BGP, I - IS-IS, V - Overflow route
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2
        SU - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
        IA - Inter area, * - candidate default
Gateway of last resort is no set
S    20.0.0.0/8 is directly connected, VLAN 1
S    22.0.0.0/8 [1/0] via 20.0.0.1
O E2 30.0.0.0/8 [110/20] via 192.1.1.1, 00:00:06, VLAN 1
R    40.0.0.0/8 [120/20] via 192.1.1.2, 00:00:23, VLAN 1
B    50.0.0.0/8 [120/0] via 192.1.1.3, 00:00:41
C    192.1.1.0/24 is directly connected, VLAN 1
C    192.1.1.254/32 is local host.
```

Examples

```
Orion Alpha A28X# show ip route 30.0.0.0
Routing entry for 30.0.0.0/8
Distance 110, metric 20
Routing Descriptor Blocks:
192.1.1.1, 00:01:11 ago, via VLAN 1, generated by OSPF, extern 2
```

```
Orion Alpha A28X# show ip route count
--------- route info ----------
the num of active route: 9
```

```
Orion Alpha A28X# show ip route weight
------------[distance/metric/weight]-----------
S    23.0.0.0/8 [1/0/2] via 192.1.1.20
S    172.0.0.0/16 [1/0/4] via 192.0.0.1
```

```
Orion Alpha A28X#show ip route normal

Codes:  C - Connected, L - Local, S - Static
        R - RIP, O - OSPF, B - BGP, I - IS-IS, V - Overflow route
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2
        SU - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
        IA - Inter area, * - candidate default
Gateway of last resort is no set
S    20.0.0.0/8 is directly connected, VLAN 1
S    22.0.0.0/8 [1/0] via 20.0.0.1
O E2 30.0.0.0/8 [110/20] via 192.1.1.1, 00:00:06, VLAN 1
R    40.0.0.0/8 [120/20] via 192.1.1.2, 00:00:23, VLAN 1
B    50.0.0.0/8 [120/0] via 192.1.1.3, 00:00:41
C    192.1.1.0/24 is directly connected, VLAN 1
C    192.1.1.254/32 is local host
```

```
Orion Alpha A28X#show ip route ecmp

Codes:  C - Connected, L - Local, S - Static
        R - RIP, O - OSPF, B - BGP, I - IS-IS, V - Overflow route
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2
        SU - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
        IA - Inter area, * - candidate default
Gateway of last resort is 192.168.1.2 to network 0.0.0.0
```

```
S*   0.0.0.0/0 [1/0] via 192.168.1.2
               [1/0] via 192.168.2.2
O IA 192.168.10.0/24 [110/1] via 35.1.10.2, 00:38:26, VLAN 1
                     [110/1] via 35.1.30.2, 00:38:26, VLAN 3
```

```
Orion Alpha A28X#show ip route fast-reroute

Codes:  C - Connected, L - Local, S - Static
        R - RIP, O - OSPF, B - BGP, I - IS-IS, V - Overflow route
        N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
        E1 - OSPF external type 1, E2 - OSPF external type 2
        SU - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
        IA - Inter area, * - candidate default
Status codes: m - main entry, b - backup entry, a – active entry

Gateway of last resort is 192.168.1.2 to network 0.0.0.0
S*   0.0.0.0/0 [ma] via 192.168.1.2
               [b] via 192.168.2.2
O IA 192.168.10.0/24 [m] via 35.1.10.2, 00:38:26, VLAN 1
                     [ba]  via 35.1.30.2, 00:38:26, VLAN 3
```

```
Orion Alpha A28X# show ip route fast-reroute 30.0.0.0
Routing entry for 30.0.0.0/8
Distance 110, metric 20
Routing Descriptor Blocks:
[m] 192.1.1.1, 00:01:11 ago, via VLAN 1, generated by OSPF, extern 2
[ba]192.1.1.1, 00:01:11 ago, via VLAN 1, generated by OSPF, extern 2
```

5.14 show ip route summary

Use this command to display the statistical information about one routing table.

show ip route summary

Use this command to display the statistical information about all routing tables.

show ip route summary all

Parameter	Parameter	Description
Description	*N/A*	N/A

Defaults   N/A

Command

Mode   Privileged EXEC mode

Usage Guideline   N/A

The following example displays the statistics of the global routing table..

```
Orion Alpha A28X# show ip route summary
Codes: NORMAL - Normal route ECMP - ECMP route FRR - Fast-Reroute route


 Memory: 2000 bytes
Entries: 22,based on route prefixes
               NORMAL ECMP FRR TOTAL
      Connected 3 0 0 3
      Static 2 1 1 4
      RIP  1 2 1 4
      OSPF 2 1 1 4
      ISIS 1 2 0 3
      BGP  2 1 1 4
      TOTAL 11 7 4 22
```

The following example displays the statistics of all routing tables.

```
Orion Alpha A28X# show ip route summary all
Codes: NORMAL - Normal route ECMP - ECMP route FRR - Fast-Reroute route


IP routing table count:2
Total
    Memory: 4000 bytes
    Entries: 44,based on route prefixes
               NORMAL ECMP FRR TOTAL
      Connected 6 0 0 6
      Static 4 2 2 8
      RIP  2 4 2 8
      OSPF 4 2 2 8
      ISIS 2 4 0 6
      BGP  4 2 2 8
      TOTAL 22 14 8 44

Global
    Memory: 2000 bytes
    Entries: 22,based on route prefixes
               NORMAL ECMP FRR TOTAL
      Connected 3 0 0 3
      Static 2 1 1 4
      RIP  1 2 1 4
      OSPF 2 1 1 4
      ISIS 1 2 0 3
      BGP  2 1 1 4
```

Examples

```
        TOTAL 11 7 4 22
```

```
VRF1
 Memory: 2000 bytes
     Entries: 22,based on route prefixes
     Entries: 29,based on route nexthops
NORMAL
ECMP FRR TOTAL
        Connected 3 0 0 3
        Static 2 1 1 4
        RIP  1 2 1 4
        OSPF 2 1 1 4
        ISIS 1 2 0 3
        BGP  2 1 1 4
        TOTAL 11 7 4 22
```

Field	Description
NORMAL	Type of the table entries. Value: NORMAL: common routes (not ECMP or FRR); ECMP: equivalent route; FRR: fast reroute; TOTAL: total
Memory	Memory occupied by the table.
Entries	Number of entries (based on prefix, not next-hop)
Connected	Protocol type. Value: Connected: direct connection; Static: static; RIP: RIP; OSPF: OSPF; ISIS: ISIS; BGP: BGP; TOTAL: total

5.15 show ipv6 redirects

Use this command to display the IPv6 default gateway IP address.

show ipv6 redirects

Use this command to display the IPv6 default gateway IP address.

show ipv6 redirects

Parameter	Parameter	Description
Description	N/A	N/A

Defaults	N/A

Command Mode   Privileged EXEC mode

Usage Guide   N/A

Examples

The following example displays the default gateway IPv6 address.

```
Orion Alpha A28X# show ipv6 redirects
Default Gateway: 10::1
```

Field	Description
Default Gateway	IPv6 address of the default gateway

Related Commands

Command	Description
N/A	N/A

Platform Description

5.16 show ipv6 route

Use the command to display the configuration of the IPv6 routing table.

show ipv6 route [[*ipv6-prefix* / *prefix-length* [**longer-prefixes**] | *protocol* [*process-id*] | **weight**]]

Use the command to display the configuration of the IPv6 routing table.

show ipv6 route [[*ipv6-prefix* / *prefix-length* [**longer-prefixes**] | *protocol* [*process-id*] | **weight**]]

Parameter Description

Parameter	Description
ipv6-prefix/*prefix-length*	(Optional) Specifies a prefix for route's IPv6 address.
longer-prefixes	(Optional) Displays the route with an IPv6 address prefix mostly matched.
protocol	((Optional) Displays the route information of specific protocol.
process-id	(Optional) Specifies a route process ID.
weight	(Optional) Displays the non-default-weight routes only.

Defaults   All routes are displayed by default.

Command Mode   Privileged EXEC mode

Usage Guide   Use this command to display route information.

Examples

Related Commands	Command	Description
	ipv6 route	Configures the IPv6 static route.

Platform Description

5.17 show ipv6 route summary

Use this command to display the statistics of the IPv6 routing table of a specified VRF.

show ipv6 route summary

Use this command to display statistics of all IPv6 routing tables.

show ipv6 route summary all

Parameter Description	Parameter	Description

Command Mode   Privileged EXEC mode

Usage Guide   N/A

Examples

The following example displays statistics of IPv6 routing table of the global VRF.

```
Orion Alpha A28X#show ipv6 route summary
IPv6 routing table name is -  Default(0) global scope - 5 entries
IPv6 routing table default maximum-paths is 32
Local         2
Connected     3
Static        0
PIP           0
OSPF          0
BGP           0
-----------------------
Total         5
```

The following example displays t statistics of all IPv6 routing tables.

```
Orion Alpha A28X#show ipv6 route summary
IPv6 routing table name is -  Default(0) global scope - 5 entries
IPv6 routing table default maximum-paths is 32
Local         2
Connected     3
Static        0
PIP           0
OSPF          0
```

```
BGP                0
-----------------------
Total              5
```

Field	Description
Memory	The memory size occupied by the current routing table.
Entries	The entries in the current routing table (based on the entry prefix instead of the next hop entry.)
Connected	Describes the protocol type of the entry. The field can be; Connected: Connected route entry. Static: Static route entry. RIP: RIP route entry. OSPF: OSPF route entry. ISIS: ISIS route entry. BGP: BGP route entry. TOTAL: Total number of all protocol entries.
IPv6 routing table count	The number of the routing tables.
Global	The name of the current routing table. The field can be: Global : Global (The default VRF) VRF1: VRF name. TOTAL: All VRF routing table summaries.

	Command	Description
Related Commands	N/A	N/A

Platform Description   This command is not supported on 2-layer devices.

6 Protocol-independent Commands

6.1 accept-lifetime

Use this command in the encryption key configuration mode to specify the lifetime of an encryption key in its receiving direction. Use the no form of this command to restore the default value.

accept-lifetime *start-time* {**infinite** | *end-time* | **duration** *seconds*}

no accept-lifetime

Parameter	Description
start-time	Start time of the lifetime. The syntax is as follows: *hh:mm:ss month date year* *hh:mm:ss date month year* ● hh—hour ● mm—minute ● ss—second ● month—month ● date—day ● year—year The default start time is Jun 1, 1993, which is also the earliest start time available.
infinite	Indicates that the encryption key is valid for ever.
end-time	*End time of the encryption key. It must be later than the start time.*
duration *seconds*	Duration of the encryption key after the start time. The value ranges from 1 to 2147483646.

Parameter description

Default infinite

Command mode Encryption key configuration mode

Usage guideline Use this command to specify the lifetime of an encryption key in its receiving direction.

Examples The following example configures the lifetime of key 1.

```
Orion Alpha A28X(config)#key chain kc

Orion Alpha A28X(config-keychain)#key 1

Orion Alpha A28X(config-keychain-key)#key-string Hello
Orion Alpha A28X(config-keychain-key)#accept-lifetime 16:30:00 Oct 1 2010
duration 43200
```

Related command	Command	Description
	-	-

Platform description	-

6.2 ip as-path access-list

Use this command to configure an autonomous system (AS) path filter using a regular expression. Use the **no** form of this command to remove the AS path filter using a regular expression.

ip as-path access-list *path-list-num* { **permit** | **deny** } *regular-expression*

no ip as-path access-list *path-list-num* [{ **permit** | **deny** } *regular-expression*]

Parameter description	Parameter	Description
	path-list-num	Specifies the AS-path access-list number. The range is from 1 to 500.
	permit	Permits advertisement based on matching conditions.
	deny	Denies advertisement based on matching conditions.
	regular-expression	Regular expression that defines the AS-path filter. The expression length range is from 1 to 255 characters.

Default	By default, no AS path filter using a regular expression is configured.

Command mode	Global configuration mode

Usage guideline	N/A

Examples	The following example configures an AS path filter matching the path which contains AS number 123 only.

```
Orion Alpha A28X(config)# ip as-path access-list 105 deny ^123$
```

Related command	Command	Description
	-	-

Platform description	-

6.3 ip community-list

Use this command to define a standard or expanded community list and control access to it. Use the **no** form of this command to remove the setting.

ip community-list { *community-list-number* | **standard** *community-list-name* } { **permit** | **deny** } [{ *community-list-number* | **internet** | **local-AS** }]

ip community-list { *community-list-number* | **expanded** *community-list-name* } { **permit** | **deny** } [

regular-expression]

Parameter	Description
community-list-name	Name of the community list.
standard	Indicates standard community list numbered in 1 to 99.
expanded	Indicates expanded community list numbered in 100 to 199.
permit	Permits access to the community list.
deny	Denies access to the community list.
community-number	Community number in the form of AA:NN(AS number/2-byte numerical) in the range of 1 to 255 characters. It may also be one of the following value: Internet: Indicates the Internet community. All paths belong to this community. no-export: Indicates that this path will not be advertised to any EBGP peers. no-advertise: Indicates that this path will not be advertised to any BGP peers. local-as: Indicates that this path will not be advertised to out of the AS. When AS confederation is configured, this path will not be advertised to other ASs or sub-ASs.

The leftmost column of the table above is labeled **Parameter description**.

Default configuration None

Command mode Global configuration mode.

Usage guidelines N/A

Examples
```
Orion Alpha A28X(config)# ip community-list standard 1 deny 100.20.200.20
Orion Alpha A28X(config)# ip community-list standard 1 permit internet
```

Related commands

Command	Description
match community	Match the community list.
set community-list delete	Remove the community value of the BGP path according to the community list.
show ip community-list	Show the community list information.

6.4 ip extcommunity-list

Use this command to create an extcommunity list and add an entry to the list. Use the **no** form of this

command to remove the setting.

ip extcommunity-list {*expanded-list* | **expanded** *list-name* } { **permit | deny** } [*regular-expression*]

ip extcommunity-list {*standard-list* | **standard** *list-name* } { **permit | deny** } [**rt** *value*] [**soo** *value*]

Parameter	Description
expand-list	Indicates an extended extcommunity list, ranging from 100 to 199. One extcommunity list may contain multiple rules.
standard-list	Indicates a standard extcommunity list, ranging from 1 to 99. One extcommunity list may contain multiple rules.
expanded *list-name*	Indicates the name of an extended extcommunity, comprising not more than 32 characters. When using this parameter, you enter the extcommunity list configuration mode.
standard *list-name*	Indicates the name of a standard extcommunity list, comprising not more than 32 characters. When using this parameter, you enter the extcommunity list configuration mode.
permit	Defines an extcommunity rule for permitting.
deny	Defines an extcommunity rule for denying.
regular-expression	(optional) Defines a matching template that is used to match an extcommunity.
sequence-number	(Optional) Defines the sequence number of a rule, ranging from 1 to 2,147,483,647. If no sequence number is specified, the sequence number automatically increases by 10 when a rule is added by default. The initial number is 10.
rt	(Optional) Sets the RT attribute value. This command can be used only for the standard extcommunity configuration, but not for the extended extcommunity configuration.
soo	(Optional) Sets the SOO attribute value. This command can be used only for the standard extcommunity configuration, but not for the extended extcommunity configuration.
value	Indicates the value of an extended community (extend_community_value).

Parameter description (label for the above table, left margin)

Default

It is disabled by default.

Command mode

Global configuration mode and ip extcommunity-list configuration mode.

Usage guidelines

This command is used to define the extcommunity list.

Examples

1.The following example defines an ip extcommunity-list.

```
Orion Alpha A28X(config)# ip extcommunity-list 1 permit rt 100:1
Orion Alpha A28X(config)# ip extcommunity-list standard aaa permit rt
100:2
Orion Alpha A28X(config)# ip extcommunity-list expanded ext1 permit 200:[0~9][0~9]
```

2. The following example displays how to use ip extcommunity.

```
Orion Alpha A28X(config)# route-map rt_in_filter
Orion Alpha A28X(config-route-map)# match extcommunity 1
Orion Alpha A28X(config-route-map)# match extcommunity ext1
Orion Alpha A28X(config)# router bgp 100
Orion Alpha A28X(config-router)# address-family vpn
Orion Alpha A28X(config-router-af)#neighbor 3.3.3.3 send-community extended
Orion Alpha A28X(config-router-af)#neighbor 3.3.3.3 route-map rt_in_filter in
```

6.5 ip prefix-list

Use this command to create a prefix list or add an entry to the prefix list. Use the **no** form of this command to remove the prefix list or an entry.

ip prefix-list *prefix-list-name* [**seq** *seq-number*] { **deny** | **permit** } *ip-prefix* [**ge** *minimum-prefix-length*][**le** *maximum-prefix- length*]

no ip prefix-list *prefix-list-name* [**seq** *seq-number*] { **deny** | **permit** } *ip-prefix* [**ge** *minimum-prefix-length*][**le** *maximum-prefix- length*]

Parameter description

Parameter	Description
prefix-list-name	Name of the prefix list
seq-number	Sequence number of an entry in the range of 1 to 2147483647. When you execute this command to add an entry without a sequence number, the system allocates a default sequence number for the entry. The default sequence number of the first entry is 5. Every subsequential entry without a sequence number uses the time of 5 larger than the previous sequence number as the default sequence number.
deny	Deny the route matching the prefix list.
permit	Permit the route matching the prefix list.
ip-prefix	Network address and mask. Network address can be any valid IP address and the mask length is in the range of 0 to 32.
minimum-prefix-length	(Optional) Minimum length of the prefix (the starting length) Note: "ge" indicates the operation of "larger than" and "equivalent to".
maximum-prefix-length	(Optional) Maximum length of the prefix (the ending length) Note: "le" indicates the operation of "less than" and "equivalent to".

Default configuration   None

Command mode	Global configuration mode.

Usage guidelines

The ip prefix-list command configures the prefix list, with the permit or deny keyword to determine the action in case of matching.

You can execute this command to define an exact match, or use "ge" or "le" to define a range match for a prefix for flexible configuration. "ge" indicates the range of minimum-prefix-length to 32; "le" indicates the range of the mask length of the IP prefix to maximum-prefix-length; "ge" and "le" indicates the range of minimum-prefix-length to maximum-prefix-length, namely, mask length of IP prefix < minimum-prefix-length < maximum-prefix-length <=32.

Examples

The following example filters the RIP routes the OSPF redistributes by the destination IP address following the rule defined in the associated IP prefix list, for example, redistribute the routes whose destination IP address is in the range 201.1.1.0/24.

```
Orion Alpha A28X# configure terminal
Orion Alpha A28X(config)# ip prefix-list pre1 permit 201.1.1.0/24
Orion Alpha A28X(config)# router ospf
Orion Alpha A28X(config-router)# distribute-list prefix pre1 out rip
Orion Alpha A28X(config-router)# end
```

6.6 ip prefix-list description

Use this command to add the description of a prefix list. Use the **no** form of this command to delete the description.

ip prefix-list *prefix-list-name* **description** *description-text*

Parameter description

Parameter	Description
prefix-list-name	Name of the prefix list
description-text	Description of the prefix list

Default configuration

No description is added for a prefix list, by default.

Command mode	Global configuration mode

Examples

The example below adds the description for the prefix list:

```
Orion Alpha A28X# configure terminal
Orion Alpha A28X(config)# ip prefix-list pre description Deny routes from
Net-A
```

6.7 ip prefix-list sequence-number

Use this command to enable sort function for a prefix list. Use the **no** form of this command to disable the sort function.

ip prefix-list sequence-number

Parameter description	Disabled
Default configuration	No sequence number is added for a prefix list, by default.
Command mode	Global configuration mode

Examples	The example below adds a sequence number for the prefix list:
	`Orion Alpha A28X# configure terminal`
	`Orion Alpha A28X(config)# ip prefix-list pre description deny routes from`
	`Net-A`

Related commands	Command	Description
	ip prefix-list	Configure the prefix list.

Platform description	N/A

6.8 ipv6 prefix-list

Use this command to create an IPv6 prefix list or add an entry in the prefix list. Use the **no** form of this command to delete an IPv6 prefix list or an entry in the prefix list.

Ipv6 prefix-list *prefix-list-name* **[seq** *seq-number* **] { deny | permit}** *ipv6-prefix* **[ge** *minimum-prefix-length* **][le** *maximum-prefix- length* **]**

no ipv6 prefix-list *prefix-list-name* **[seq** *seq-number* **] { deny | permit}** *ipv6-prefix* **[ge** *minimum-prefix- length* **][le** *maximum-prefix- length* **]**

Parameter	Parameter	Description

prefix-list-name	Name of the prefix list
seq-number	Sequence number of an entry in the prefix list. Its range is 1 to 4294967294. If the sequence number is not specified in this command, the system will allocate a default one for the entry. The default sequence number of the first entry is 5, and that of each subsequent one is the product of adding 5 to the sequence number of the proceeding entry.
permit	Permit the access to the matching result.
deny	Deny the access to the matching result.
ipv6-prefix	Network address and its mask. The network address can be any valid IP address. The mask can be 0 to 32 characters.
minimum-prefix-length	(Optional) Minimum length of the prefix (the starting length) Note: "ge" indicates the operation of "larger than" and "equivalent to".
maximum-prefix- length	(Optional) Maximum length of the prefix (the ending length) Note: "le" indicates the operation of "less than" and "equivalent to".

Default configuration   No prefix list is created.

Command mode   Global configuration mode

Usage guideline

The ipv6 prefix-list command configures the prefix list, with the permit or deny keyword to determine the action in case of matching.

You can execute this command to define an exact match, or use "ge" or "le" to define a range match for a prefix for flexible configuration. "ge" indicates the range of minimum-prefix-length to 128; "le" indicates the range of the mask length of the IP prefix to maximum-prefix-length; "ge" and "le" indicates the range of minimum-prefix-length to maximum-prefix-length, namely, Ipv6-prefix mask length < minimum-prefix-length < maximum-prefix-length <= 128

Examples

The following example filters the RIP routes the OSPF redistributes by the destination IP address following the rule defined in the associated IP prefix list, for example, redistribute the routes whose destination IP address is in the range 2222::/64.

```
Orion Alpha A28X# configure terminal
Orion Alpha A28X(config)# ipv6 prefix-list pre1 permit 2222::64
Orion Alpha A28X(config)# ipv6 router ospf
Orion Alpha A28X(config-router)# distribute-list prefix pre out rip
Orion Alpha A28X(config-router)# end
```

6.9 ipv6 prefix-list description

Use this command to add the description of an IPv6 prefix list. Use the **no** form of this command to delete the description.

ipv6 prefix-list *prefix-lis-name* **description** *description-text*

no ipv6 prefix-list *prefix-lis-name* **description** *description-text*

<table>
<tr><td rowspan="3">**Parameter description**</td><td>Parameter</td><td>Description</td></tr>
<tr><td>*prefix-lis-name*</td><td>Name of the ipv6 prefix list</td></tr>
<tr><td>*description-text*</td><td>Description of the ipv6 prefix list</td></tr>
</table>

Default configuration   No description is added for an IPv6 prefix list, by default.

Command mode   Global configuration mode

Examples   The example below adds the description for the prefix list:

```
Orion Alpha A28X# configure terminal
Orion Alpha A28X(config)# ipv6 prefix-list pre description Deny routes from
Net-A
```

<table>
<tr><td rowspan="2">**Related commands**</td><td>Command</td><td>Description</td></tr>
<tr><td>ipv6 prefix-list</td><td>Configure the IPv6 prefix list.</td></tr>
</table>

6.10 ipv6 prefix-list sequence-number

Use this command to enable the sorting function for an IPv6 prefix list. Use the **no** form of this command to remove the settings.

ipv6 prefix-list sequence-number

no ipv6 prefix-list sequence-number

Parameter description   Disabled.

Default configuration   No sequence number is added for a prefix list, by default.

Command mode   Global configuration mode

Examples   The example below adds a sequence number for the prefix list:

```
Orion Alpha A28X# configure terminal
Orion Alpha A28X(config)# ipv6 prefix-list pre description Deny routes
from Net-A
```

<table>
<tr><td>Related</td><td>Command</td><td>Description</td></tr>
</table>

commands	ipv6 prefix-list	Configure the IPv6 prefix list.

6.11 key

Use this command to define an encryption key and enter the encryption key chain configuration mode. Use the no form of this command to delete it.

key *key-id*

no key *key-id*

Parameter description	Parameter	Description
	key-id	Key ID, ranging from 0 to 2147483647.

Default No encryption key is configured.

Command mode Encryption key chain configuration mode.

Usage guideline Use this command to define an encryption key.

Examples The following example configures encryption key chain ripkeys and key 1.

```
Orion Alpha A28X(config)# key chain ripkeys
Orion Alpha A28X(config-keychain)# key 1
```

Related command	Command	Description
	-	-

Platform description -

6.12 key chain

Use this command to define a key chain and enter the key chain configuration mode. Use the no form of this command to delete it.

key chain *key-chain-name*

no key chain *key-chain-name*

Parameter description	Parameter	Description
	key-chain-name	Key chain name.

Default No key chain is configured.

Command mode Global configuration mode.

Usage guideline ⚠ For a key chain to take effect, you need to configure at least one key.

Examples	The following example configures key chain ripkeys and enters the key chain configuration mode.

```
Orion Alpha A28X(config)# key chain ripkeys
```

Related command	Command	Description
	-	-

Platform description	-

6.13 key-string

Use this command to specify a key string. Use the no form of this command to delete it.

key-string [**0**|**7**] *text*

no key-string

Parameter description	Parameter	Description
	0	Use plaintext.
	7	Use encryption.
	text	Authentication string.

Default	No key string is configured.

Command mode	Encryption key configuration mode.

Usage guideline	Use this command to specify a key string.

Examples	The following example configures key chain ripkeys, key 1 and the key string abc:

```
Orion Alpha A28X(config)# key chain ripkeys
Orion Alpha A28X(config-keychain)# key 1
Orion Alpha A28X(config-keychain-key)#key-string abc
```

Related command	Command	Description
	-	-

Platform description	-

6.14 match community

Use this command to redistribute the routes matching the Community attribute permitted by the ACL in the route map configuration mode. Use the **no** form of this command to remove the setting.

match community { *community-list-number* | *community-list-name*} [**exact-match**] [{*community-list-number* | *community-list-name*} [**exact-match**] …]

no match community { *community-list-number* | *community-list-name*} [**exact-match**] [{ *community-list-number* | *community-list-name*} [**exact-match**] …]

Parameter		Description
Parameter description	*community-list-number*	Number of the standard community list in the range 1 to 99.
		Number of the extended community list in the range of 100 to 199
	communitys-list-name	Name of the community list in the range of less than 80 characters
	exact-match	Match the community list exactly.

Default configuration   None.

Command mode   Route map configuration mode.

Usage guidelines   The match community can be followed by more than one community list number or name, but the total of community lists and names should not be greater than 6.

Each exact-match applies to only the previous list, not all the lists.

One or more match or set commands can be executed to configure one route map. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

Examples

```
Orion Alpha A28X(config)# ip community-list 1 permit 100:2 100:30
Orion Alpha A28X(config)# route-map set_lopref
Orion Alpha A28X(config-route-map)# match community 1 exact-match
Orion Alpha A28X(config-route-map)# set local-preference 20
```

Related commands

Command	Description
match as-path	Match the AS_PATH attribute.
match metric	Match the metric.
match origin	Match the source.
set as-path prepend	Set the AS_PATH attribute.
set metric	Set the metric.
set metric-type	Set the metric type.

6.15 match interface

Use **match interface** command to redistribute the routes whose next hop is the specified interface.

Use the **no** form of this command to remove the setting.

match interface *interface-type interface-number* [*…interface-type interface-number*]

no match interface *[interface-type interface-number* [*…interface-type interface-number*]]

Parameter	Description
interface-type	Interface type
interface-number	Interface number

Default   None.

configuration

Command mode
Route map configuration mode.

Usage guidelines
This command can be followed by multiple interfaces.

You can redistribute the routes from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

For route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

One or more match or set commands can be executed to configure a route map. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

Examples
The route map can be configured very flexibly for route redistribution and policy-based routing. No matter how the route map is used, the configuration principle is the same, except that different command sets are used. Even if it is used on the route redistribution, different routing protocols can use different commands with the route map.

The following example redistributes the RIP route with the next hop of fastethernet 0/0 in the OSPF routing protocol.

router ospf

```
redistribute rip subnets route-map redrip
network 192.168.12.0 0.0.0.255 area 0

route-map redrip permit 10
match interface fastethernet 0/0
```

Related commands

Command	Description
match ip address	Match the address in the access list.
match ip next-hop	Match the next-hop IP address in the access list.
match ip route-source	Match the source IP address in the access list.
match metric	Match the metric.
match route-type	Match the route type.
match tag	Match the tag.
set metric	Set the metric.
set metric-type	Set the metric type.
set tag	Set the tag.

6.16 match ip address

Use **match ip address** command to redistribute the routes matching the IP address permitted by the ACL or the prefix list. Use the **no** form of this command to remove the setting.

match ip address {*access-list-number* [*access-list-number... | access-list-name...*] |*access-list-name*

[*access-list-number...|access-list-name*] | **prefix-list** *prefix-list-name [prefix-list-name...]*]}

no match ip address [*access-list-number* [*access-list-number... | access-list-name...*] |*access-list-name* [*access-list-number...|access-list-name*] | **prefix-list** *prefix-list-name [prefix-list-name...]*]]

	Parameter	Description
Parameter description	*access-list-number*	Number of the access list
	access-list-name	Name of the access list
	prefix-list *prefix-list-name*	Specify the prefix list to match.

Default configuration None.

Command mode Route map configuration mode.

Usage guidelines

Multiple access list numbers or names may follow match ip address.

You can redistribute the routes from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

For route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

One or more match or set commands can be executed to configure a route map. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

The route map can be configured very flexibly for route redistribution and policy-based routing. No matter how the route map is used, the configuration principle is the same, except that different command sets are used. Even if it is used on the route redistribution, different routing protocols can use different commands with the route map.

The following example enables the OSPF routing protocol to redistribute RIP routes that match access list 10, with the route type being type-1 external type and the default metric being 40.

Examples

```
router ospf
redistribute rip subnets route-map redrip
network 192.168.12.0 0.0.0.255 area 0


access-list 10 permit 200.168.23.0


route-map redrip permit 10
match ip address 10
set metric 40
set metric-type type-1!
```

	Command	Description
Related commands	**access-list**	Set the access list.
	match interface	Match the next-hop interface of the route.

Command	Description
match ip next-hop	Match the next-hop address in the access list.
match ip route-source	Match the route source address in the access list.
match metric	Match the metric.
match route-type	Match the route type.
match tag	Match the tag.
set metric	Set the metric.
set metric-type	Set the metric type.
set tag	Set the tag.

6.17 match ip next-hop

Use **match ip next-hop** command to redistribute the routes whose next-hop IP address matches the access list or the prefix list. Use the **no** form of this command to remove the setting.

match ip next-hop {*access-list-number* [*access-list-number... | access-list-name...*] *|access-list-name* [*access-list-number...|access-list-name*] | **prefix-list** *prefix-list-name* [*prefix-list-name...*]}

no match ip next-hop [*access-list-number* [*access-list-number... | access-list-name...*] *|access-list-name* [*access-list-number...|access-list-name*] | **prefix-list** *prefix-list-name* [*prefix-list-name...*]]

Parameter description

Parameter	Description
access-list-number	Number of the access list
access-list-name	Name of the access list
prefix-list *prefix-list-name*	Specify the prefix list to match.

Default configuration   None.

Command mode   Route map configuration mode.

Usage guidelines

Multiple access list numbers or names may follow match ip next-hop.

You can redistribute the routes from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

For route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

One or more match or set commands can be executed to configure a route map. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

Examples

In the example below, the OSPF routing protocol redistributes the RIP routes. As long as the next hop address of the RIP route matches the access list 10 or 20, the OSPF allows for redistribution.

```
Orion Alpha A28X(config)# router ospf
Orion Alpha A28X(config-router)# redistribute rip subnets route-map redrip
```

```
Orion Alpha A28X(config-router)# network 192.168.12.0 0.0.0.255 area 0
Orion Alpha A28X(config-router)# exit
Orion Alpha A28X(config)# access-list 10 permit host 192.168.10.1
Orion Alpha A28X(config)# access-list 20 permit host 172.16.20.1
Orion Alpha A28X(config)# route-map redrip permit 10
Orion Alpha A28X(config-route-map)# match ip next-hop 10 20
```

	Command	Description
	access-list	Set the access list.
	match ip address	Match the IP address in the access list.
	match interface	Match the next-hop interface of the route.
	match ip route-source	Match the route source address in the access list.
Related commands	**match metric**	Match the metric.
	match route-type	Match the route type.
	match tag	Match the tag.
	set metric	Set the metric.
	set metric-type	Set the metric type.
	set tag	Set the tag.

6.18 match ip route-source

Use **match ip route-source** command to redistribute the routes whose source IP address matches the access list. Use the **no** form of this command to remove the setting.

match ip route-source {*access-list-number* [*access-list-number... | access-list-name...*] | *access-list-name* [*access-list-number...|access-list-name*] | **prefix-list** *prefix-list-name* [*prefix-list-name...*]}

no match ip route-source [*access-list-number* [*access-list-number... | access-list-name...*] | *access-list-name* [*access-list-number...|access-list-name*] | **prefix-list** *prefix-list-name* [*prefix-list-name...*]]

	Parameter	Description
Parameter description	*access-list-number*	Number of the access list
	access-list-name	Name of the access list
	prefix-list *prefix-list-name*	Specify the prefix list to match.

Default configuration None.

Command mode Route map configuration mode.

Usage guidelines Multiple access list numbers may follow match ip route-source.
You can redistribute the routes from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

For route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

One or more match or set commands can be executed to configure a route map. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

Examples

In the example below, the OSPF routing protocol redistributes the RIP routes. As long as the source IP address of the RIP route matches the access list 5, the OSPF allows for redistribution.

```
router ospf
redistribute rip subnets route-map redrip
network 192.168.12.0 0.0.0.255 area 0

access-list 5 permit 192.168.100.1

route-map redrip permit 10
 match ip route-source
```

Related commands

Command	Description
access-list	Set the access list.
match ip address	Match the IP address in the access list.
match interface	Match the next-hop interface of the route.
match ip next-hop	Match the next-hop IP address in the access list.
match metric	Match the metric.
match route-type	Match the route type.
match tag	Match the tag.
set metric	Set the metric.
set metric-type	Set the metric type.
set tag	Set the tag.

6.19 match ipv6 address

Use this command to redistribute the network routes permitted in the IPv6 access list or the IPv6 prefix list. Use the **no** form of this command to delete the setting.

match ipv6 address { *access-list-name*] | **prefix-list** *prefix-list-name* }

no match ipv6 address

Parameter description

Parameter	Description
access-list-name	Name of the access list.
prefix-list *prefix-list-name*	Specify the IPv6 prefix list to match.

Default configuration None

Command mode Route map configuration mode

Usage guideline

You can redistribute the routing information from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

In the route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

In configuring one route map, one or more match or set commands can be executed. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

Examples

The route map can be configured very flexibly to be used for route redistribution and policy-based routing. No matter how the route map is used, the configuration principle is the same, except that different command sets are used. Even if it is used on the route redistribution, different routing protocols can use different commands with the route map.

The following example enables the OSPF routing protocol to redistribute RIP routes that match access list v6acl, with the default metric being 30.

```
ipv6 router ospf
redistribute rip subnets route-map redrip
ipv6 access-list v6acl
10 permit ipv6 2620::64 any

route-map redrip permit 10
match ipv6 address v6acl
set metric 30
```

Related commands

Command	Description
ipv6 access-list	Set the IPV6 access list.
match interface	Match the next-hop interface of the route.
match ipv6 next-hop	Match the next-hop address in the IPv6 access list.
match ipvr route-source	Match the route source address in the IPv6 access list.
match metric	Match the route metric.
match route-type	Match the route type.
match tag	Match the route tag.
set metric	Set the metric for route redistribution.
set metric-type	Set the type for route redistribution.
set tag	Set the tag for route redistribution.

6.20 match ipv6 next-hop

Use this command to redistribute the network routes whose next-hop IP address matches the IPv6 access list or the IPv6 prefix list. Use the **no** form of this command to delete the setting.

match ipv6 next-hop { *access-list-name*] | **prefix-list** *prefix-list-name*}

no match ipv6 next hop

	Parameter	Description
Parameter description	*access-list-name*	Name of the IPv6 access list.
	prefix-list *prefix-list-name*	Specify the IPv6 prefix list to match.

Default configuration   None

Command mode   Route map configuration mode

Usage guideline

You can redistribute the routes from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

For route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

One or more match or set commands can be executed to configure a route map. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

The route map can be configured very flexibly to be used for route redistribution and policy-based routing. No matter how the route map is used, the configuration principle is the same, except that different command sets are used. Even if it is used on the route redistribution, different routing protocols can use different commands with the route map.

The following example enables the OSPF routing protocol to redistribute RIP routes that only match access list v6acl, with the default metric being 40.

Examples

```
ipv6 router ospf
redistribute rip subnets route-map redrip

ipv6 access-list v6acl
10 permit ipv6 2620::64 any

route-map redrip permit 10
match ipv6 address v6acl
set metric 40
```

	Command	Description
Related commands	**ipv6 access-list**	Set the IPV6 access list.
	match interface	Match the next-hop interface of the route.
	match ipv6 address	Match the IP address in the IPv6 access list.
	match ipv6 route-source	Match the route source address in the IPv6 access list.

match metric	Match the route metric.
match route-type	Match the route type.
match tag	Match the route tag.
set metric	Set the metric for route redistribution.
set metric-type	Set the type for route redistribution.
set tag	Set the tag for route redistribution.

6.21 match ipv6 route-source

Use this command to redistribute the network routes whose next-hop IP address matches the IPv6 access list or the IPv6 prefix list. Use the **no** form of this command to delete the setting.

match ipv6 route-source { *access-list-name*] | **prefix-list** *prefix-list-name* }

no match ipv6 route-source

Parameter description

Parameter	Description
access-list-name	Name of the IPv6 access list.
prefix-list *prefix-list-name*	Specify the IPv6 prefix list to match.

Default configuration   None

Command mode   Route map configuration mode

Usage guideline

You can redistribute the routing information from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

In the route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

In configuring one route map, one or more match or set commands can be executed. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

The route map can be configured very flexibly to be used for route redistribution and policy-based routing. No matter how the route map is used, the configuration principle is the same, except that different command sets are used. Even if it is used on the route redistribution, different routing protocols can use different commands with the route map.

The following example enables the OSPF routing protocol to redistribute RIP routes that only match access list v6acl, with the default metric being 50.

Examples

```
ipv6 router ospf
redistribute rip subnets route-map redrip

ipv6 access-list v6acl
10 permit ipv6 5200::64 any

route-map redrip permit 10
match ipv6 address v6acl
set metric 50
```

Related commands

Command	Description
ipv6 access-list	Set the IPV6 access list.
match interface	Match the next-hop interface of the route.
match ipv6 address	Match the IP address in the IPv6 access list.
match ipv6 next-hop	Match the next hop in the IPv6 access list.
match metric	Match the route metric.
match route-type	Match the route type.
match tag	Match the route tag.
set metric	Set the metric for route redistribution.
set metric-type	Set the type for route redistribution.
set tag	Set the tag for route redistribution.

6.22 match metric

Use **match metric** command to redistribute the routes of the specified metric. Use the **no** form of this command to remove the setting.

match metric *metric*
no match metric *metric*

Parameter description

Parameter	Description
metric	Route metric, in the range 0 to 4294967295

Default configuration   None.

Command mode   Route map configuration mode.

<table>
<tr><td>**Usage guidelines**</td><td>You can redistribute the routing information from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

In the route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

In configuring one route map, one or more match or set commands can be executed. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.</td></tr>
</table>

Examples

In the example below, the OSPF routing protocol redistributes the RIP routes of metric 10.

```
router ospf 1
redistribute rip subnets route-map redrip
network 192.168.12.0 0.0.0.255 area 0

route-map redrip permit 10
match metric 10
```

Related commands

Command	Description
access-list	Set the access list.
match ip address	Match the IP address.
match interface	Match the interface.
match ip next-hop	Match the next-hop IP address.
match ip route-source	Match the source IP address.
match route-type	Match the route type.
match tag	Match the tag.
set metric	Set the metric.
set metric-type	Set the metric type.
set tag	Set the tag.

6.23 match route-type

Use this command to redistribute the network routes of the specified type. Use the **no** form of this command to delete the setting.

match route-type { **static | connect | rip | local | internal | external** [**type-1 | type-2**] **no match route-type** [**static | connect | rip | local | internal | external** [**type-1 | type-2**]

Parameter description

Parameter	Description
static	Indicates the static route type.
connect	Indicates the directly connected route type.
rip	Indicates the RIP route type.
internal	Indicates the OSPF internal route type.
external	Indicates the OSPF external route type.
**type-1	type-2**	Indicates the OSPF type-1 or type-2 route type.

Default configuration   None

Command mode   Route map configuration mode

Usage guideline

You can redistribute the routing information from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

In the route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

In configuring one route map, one or more match or set commands can be executed. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

Examples

In the example below, the RIP routing protocol redistributes only the internal routes in the OSPF routing domain.

```
router rip
redistribute ospf route-map redrip
network 192.168.12.0

route-map redrip permit 10
match route-type internal
!
```

Related commands

Command	Description
access-list	Set the access list.
match ip address	Match the IP address.
match interface	Match the interface.
match ip next-hop	Match the next-hop IP address.
match ip route-source	Match the source IP address.
match metric	Match the metric.
match tag	Match the tag.
set metric	Set the metric.
set metric-type	Set the access list.
set tag	Match the IP address.

6.24 match tag

Use this command to redistribute the network routes with the specified tag. Use the **no** form of this command to delete the setting.
match tag *tag* [*…tag*]

no match tag [*tag* [*…tag*]]

<table>
<tr><td rowspan="2">**Parameter description**</td><td>**Parameter**</td><td>**Description**</td></tr>
<tr><td>*tag*</td><td>Route tag</td></tr>
</table>

Default configuration   None

Command mode   Route map configuration mode

Usage guideline

Multiple tags may follow the match tag command.

You can redistribute the routing information from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

In the route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

In configuring one route map, one or more match or set commands can be executed. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

Examples

In the example below, the RIP routing protocol redistributes only the routes with tag 50 and 80 in the OSPF routing domain.

```
Orion Alpha A28X(config)# router rip
Orion Alpha A28X(config-router)# redistribute ospf 100 route-map redrip
Orion Alpha A28X(config-router)# network 192.168.12.0
Orion Alpha A28X(config-router)# exit
Orion Alpha A28X(config)# route-map redrip permit 10
Orion Alpha A28X(config-route-map)# match tag 50 80
```

Related commands

Command	Description
access-list	Set the access list.
match ip address	Match the IP address.
match interface	Match the next-hop IP interface.
match ip route-source	Match the source IP address.
match metric	Match the metric.
match ip next-hop	Match the next-hop IP address.
match route-type	Match the route type.
set metric	Set the metric.
set metric-type	Set the metric type.
set tag	Set the tag.

6.25 memory-lack exit-policy

Use this command to configure a policy to preferentially exit a routing protocol when the memory reaches the lower limit. Use the **no** form of this command to restore the default policy, namely, exit the routing protocol which occupies the largest memory.

memory-lack exit-policy { **ospf** | **rip** }

no memory-lack exit-policy

	Parameter	Description
Parameter description	**ospf**	Preferentially exit OSPF when the memory is insufficient.
	rip	Preferentially exit RIP when the memory is insufficient.

Default   By default, the routing protocol which occupies the largest memory exits preferentially.

Command mode   Global configuration mode

Usage guideline   When the memory reaches the lower limit, you can disable a routing protocol to release the memory to ensure the normal running of other protocols.

When the system runs out of memory, disable a routing protocol which has the minimal impact on the system to ensure the operation of main services.

Configuring the policy to preferentially exit the routing protocols which are disabled cannot help the system release memory.

This command ensures the operation of main services to some extent when the memory is insufficient. If the memory is further consumed, all routing protocols will exit and stop running.

Examples

	Command	Description
Related command	-	-

Platform description   -

6.26 route-map

Use **route-map** to enter the route map configuration mode and define a route map. Use the **no** form of this command to remove the setting.

route-map *route-map-name* [**permit** | **deny**] [*sequence-number*]

no route-map *route-map-name* [{**permit** | **deny**}*sequence-number*]

	Parameter	Description
Parameter description	*route-map-name*	Name of the route map. The redistribute command references the route map according to its name. Multiple routing policies can be defined in a route map, and each policy corresponds to one sequence

	number.
permit	(Optional) If the permit keyword is defined and the rule defined by match is met, The set command controls the redistributed routes. For policy-based routing, the set command controls the packet forwarding, and exits the route map operation. If the permit keyword is defined but the rule defined by match is not met, the system performs the routing policy of the second route map till the set command is executed finally.
deny	(Optional) If the deny keyword is defined and the rule defined by match is met, no operation will be performed. Neither route redistribution nor policy-based routing is supported in the route map. The system exits the route map operation. If the deny keyword is defined but the rule defined by match is not met, the system performs the routing policy of the second route map till the set command is executed finally.
sequence-number	Sequence number of the route map. The policy with a lower sequence number is preferred, so it's noted when setting the sequence number.

Default configuration None.

Command mode Global configuration mode.

Usage guidelines

At present, the switch software primarily uses the route map for route redistribution and policy-based routing.

1. Route redistribution control

You can redistribute the routes from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

For route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

One or more match or set commands can be executed to configure a route map. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

When configuring route maps, pay attention to the following when using the sequence number of a route map:

When you create the first route map policy, if *sequence-number* is not specified, it is 10 by default;

If only one route map policy exists and *sequence-number* is not specified, no new route map policy will be created, and the existing route map policy will be accessed for configuration;

If more than one route map policy is available, the sequence number of each policy shall be specified; otherwise an error message will be displayed.

2. policy-based routing

Policy-based routing refers to a routing mechanism based on user defined policies. Compared with

traditional destination IP address-based routing, policy-based routing offers a flexibility for routing based on source IP address, length and port of IP packets. Policy-based routing can apply to the IP packets received on an interface or the IP packets sent from the local device.

Policy-based routing utilizes route map to define routing and forwarding policy. The match command defines packet filtering rule and the set command defines the action for the packets matching the filtering rules. The match command used includes match ip address and match length; the set command includes set ip tos, set ip precedence, set ip dscp, set ip [default] nexthop, set ip next-hop verify-availability, set [default] interface.

The following example enables the OSPF routing protocol to redistribute the RIP routes with the hop count of 4. In the OSPF route domain, the route type is the external route type-1, the default metric is 40 and the tag is 40.

Examples

```
!
router ospf
 redistribute rip subnets route-map redrip
 network 192.168.12.0 0.0.0.255 area 0
!
!
route-map redrip permit 10
 match metric 4
 set metric 40
 set metric-type type-1
 set tag 40
```

Related commands

Command	Description
redistribute	Redistribute the routes.

6.27 send-lifetime

Use this command in the encryption key configuration mode to specify the lifetime of an encryption key in its send direction. Use the no form of this command to restore the default value.

send-lifetime *start-time* {**infinite** | *end-time* | **duration** *seconds*}

no send-lifetime

Parameter description

Parameter	Description
start-time	Start time of the lifetime.
infinite	Indicates that the encryption key is valid for ever.
end-time	*End time of the encryption key. It must be later than the start time.*
duration *seconds*	Duration of the encryption key after the start time. The value ranges from 1 to 2147483646.

Default infinite

Command mode Encryption key configuration mode

Usage guideline	Use this command to specify the lifetime of an encryption key in its send direction.

Examples The following example configures the lifetime from 0:00 on September 9, 2000 to 0:00 on October 12, 2011

```
Orion Alpha A28X(config)# key chain ripkeys
Orion Alpha A28X(config-keychain)# key 1
Orion Alpha A28X(config-keychain-key)# send-lifetime 00:00:00 Sep 9 2000
00:00:00 Dec 12 2011
```

Related command	Command	Description
	-	-

Platform description	-

6.28 set ip default next-hop

Use this command to specify the default next-hop IP address for the packets that match the rule in the route map configuration mode. Use the **no** form of this command to remove the setting.
set ip default next-hop *ip-address* [*weight*] [*…ip-address* [*weight*]]
no set ip default next-hop [*ip-address* [*weight*] [*…ip-address* [*weight*]]]

Parameter description	Parameter	Description
	ip-address	IP address of the next hop.
	weight	Weight of the next hop.

Default configuration	None

Command mode	Route map configuration mode

Usage guideline

This command supports two operation modes: WCMP load balancing mode and non-WCMP load balancing mode. In the former mode, the system implements WCMP load balancing according to the weight inputted.
Up to 32 IP addresses may follow the **set ip default next-hop** command.
If a weight follows ip address, up to 4 next hop IP addresses can be configured.
Note: If a weight follows any next-hop, the operation mode of this command will be automatically switched to the WCMP load balancing mode. In this mode, the weight of those next hop IP addresses whose weight is not configured is 1 by default.
Differences between set ip next-hop and set ip default next-hop: After the set ip next-hop command is configured, the policy-based routing takes precedence over the routing table; while after the set ip default next-hop command is configured, the routing table takes precedence over the policy-based

routing.

Use this command to customize a default route for a specified user. If the software fails to find the forwarding route, the packet will be forwarded to the nexthop set with this command.

To use the policy-based routing, you must specify the route map for it and create the route map. A route map contains multiple policies, and each policy defines one or more match rules and the corresponding operations. After policy-based routing is applied to an interface, the packets received by the interface will be checked. The packets that do not match any policy in the route map will be forwarded through the usual route. The packets that match a policy in the route map will be processed according to the operation defined in the policy.

A route-map policy may contain multiple set operations.

Examples

The following example forwards the packets from two different nodes through different routes. For the messages received on the synchronous interface 1 from 1.1.1.1, if the software cannot find the forwarding route, they are forwarded to device 6.6.6.6. For the messages received from 2.2.2.2, if the software cannot find the forwarding route, they are forwarded to device 7.7.7.7. The other messages will be discarded if the software cannot find the forwarding route.

```
Orion Alpha A28X(config)#access-list 1 permit 1.1.1.1 0.0.0.0
Orion Alpha A28X(config)#access-list 2 permit 2.2.2.2 0.0.0.0
Orion Alpha A28X(config)#interface async 1
Orion Alpha A28X(config-if)#ip policy route-map equal-access
Orion Alpha A28X(config)#route-map equal-access permit 10
Orion Alpha A28X(config- route-map)#match ip address 1
Orion Alpha A28X(config-route-map)#set ip default next-hop 6.6.6.6
Orion Alpha A28X(config)#route-map equal-access permit 20
Orion Alpha A28X(config-route-map)#match ip address 2
Orion Alpha A28X(config-route-map)#set ip default next-hop 7.7.7.7
Orion Alpha A28X(config)#route-map equal-access permit 30
Orion Alpha A28X(config- route-map)#set default interface null 0
```

Related commands

Command	Description
route-map	Define a route map.
match ip address	Match the IP address.
set default interface	Set the default outgoing interface.
set interface	Set the outgoing interface.
set ip next-hop	Set the next hop of the packets.
set ip precedence	Set the priority of the packets.

Platform description N/A

6.29 set ip dscp

Use this command to specify the DSCP value for the packets that match the rule in the route map configuration mode. Use the **no** form of this command to remove the setting.

set ip dscp *dscp-value*

no set ip dscp

Parameter description	Parameter	Description
	dscp-value	DSCP value

Default configuration N/A

Command mode Route map configuration mode

Usage guideline N/A

Examples N/A

	Command	Description
Related commands	**route-map**	Define a route map.
	match ip address	Match the IP address.
	set default interface	Set the default outgoing interface.
	set interface	Set the outgoing interface.
	set ip next-hop	Set the next hop of the packets.
	set ip precedence	Set the priority of the packets.

6.30 set ip next-hop

Use this command to specify the next-hop IP address for the packets that meet the matching rule.
Use the **no** form of this command to remove the setting. This command is only used to configure policy-based routing.

set ip next-hop *ip-address* [*weight*] [*…ip-address* [*weight*]]

no set ip next-hop [*ip-address* [*weight*] [*…ip-address* [*weight*]]]

Parameter description	Parameter	Description
	ip-address	Indicates the next-hop IP address.
	weight	Indicates the weight of this next hop.

Default configuration None

Command mode Route map configuration mode

Usage This command supports two operation modes: WCMP load balancing mode and non-WCMP load

guideline

balancing mode. In the former mode, the system implements WCMP load balancing according to the weight entered by the user.

Multiple IP addresses may follow set ip next-hop and the number of addresses should be less than 32.

⚠️ If weight follows any next-hop, the operation mode of this command will be automatically switched to the WCMP load balancing mode. In the WCMP load balancing mode, for the nexthop address without configuring the corresponding weight, the weight is 1 by default.

If weight follows ip address, up to 4 next hop addresses can be configured.

This command can be used to set different routes for the traffic that meets different match rule. If multiple IP addresses are configured, they can be used in turn.

Policy-based routing is a packet forwarding mechanism more flexible than the routing based on the target network. After the policy-based routing is used, the device will decide how to process the packets that need be routed according to the route map, which decides the next-hop device of the packets.

To use the policy-based routing, you must specify the route map for it and create the route map. A route map contains multiple policies, and each policy defines one or more match rules and the corresponding operations. After policy-based routing is applied to an interface, the packets received by the interface will be checked. The packets that do not match any policy in the route map will be forwarded to the usual route. The packets that match a policy in the route map will be processed according to the operation defined in the policy.

A route-map policy may contain multiple set operations.

Examples

The following example enables policy-based routing on serial 1/0. When the interface receives the packets from 10.0.0.0/8, they will be sent to 192.168.100.1; when the interface receives the packets from 172.16.0.0/16, they will be sent to 172.16.100.1; all other packets will be discarded.

```
Orion Alpha A28X(config)#interface serial 1/0
Orion Alpha A28X(config-if)#ip policy route-map load-balance
Orion Alpha A28X(config)#access-list 10 permit 10.0.0.0 0.255.255.255
Orion Alpha A28X(config)#access-list 20 permit 172.16.0.0 0.0.255.255
Orion Alpha A28X(config)#route-map load-balance permit 10
Orion Alpha A28X(config-route-map)#match ip address 10
Orion Alpha A28X(config-route-map)#set ip next-hop 192.168.100.1
Orion Alpha A28X(config)#route-map load-balance permit 20
Orion Alpha A28X(config-route-map)#match ip address 20
Orion Alpha A28X(config-route-map)#set ip next-hop 172.16.100.1
Orion Alpha A28X(config)#route-map load-balance permit 30
Orion Alpha A28X(config-route-map)#set interface Null 0
```

Related commands

Command	Description
route-map	Define the route map.
match ip address	Match the IP address.
set default interface	Set the default outgoing interface.
set interface	Set the outgoing interface.
set ip default next-hop	Set the default next hop.
set ip precedence	Set the priority of the packets.

6.31 set ip precedence

Use this command to set the precedence of the IP head of the packet matching the rule in the route map configuration mode. Use the **no** form of this command to remove the configured precedence setting.

set ip precedence {*<0-7>* | *critical* | *flash* | *flash-override* | *immediate* | *internet* | *network* | *priority* | *routine* }

no set ip precedence

Parameter Description	Parameter	Description
	number	Indicates the priority of the IP header with a number, ranging from 0 to 7. 7: critical 6: flash 5: flash-override 4: immediate 3: internet 2: network 1: priority 0: routine
	critical | **flash** | **flash-override** | **immediate** | **internet** | **network** | **priority** | **routine**	Priority of an IP header.

Defaults   N/A

Command mode   Route map configuration mode

Usage guideline

With different precedence values for the IP packet head configured, the IP packets matching the PBR routing are sent according to the different precedence values.

Multiple set ip precedence commands can be executed in the route map configuration rule, but only the last one takes effect, and the precedence will be specified for the head of the IP packet matched the PBR.

Examples

The following example sets the precedence of the packet with the source IP address 192.168.217.68 received at the interface FastEthernet 0/0 as 4:

```
Orion Alpha A28X(config)#access-list 1 permit 192.168.217.68 0.0.0.0
Orion Alpha A28X(config)#route-map name
Orion Alpha A28X(config-route-map)#match ip address 1
Orion Alpha A28X(config-route-map)#set ip precedence 4
Orion Alpha A28X(config)#interface FastEthernet 0/0
```

```
Orion Alpha A28X(config-if)#ip policy route-map name
```

<table>
<tr><th colspan="2">Command</th><th>Description</th></tr>
<tr><td rowspan="10">Related commands</td><td>match interface</td><td>Match the next-hop interface.</td></tr>
<tr><td>match ip address</td><td>Match the IP address in the ACL.</td></tr>
<tr><td>match ip next-hop</td><td>Match the next-hop IP address in the ACL.</td></tr>
<tr><td>match ip route-source</td><td>Match the route source IP address in the ACL.</td></tr>
<tr><td>match metric</td><td>Match the route metric value.</td></tr>
<tr><td>match route-type</td><td>Match the route type.</td></tr>
<tr><td>match tag</td><td>Match the route tag value.</td></tr>
<tr><td>set metric-type</td><td>Set the type of redistributed route.</td></tr>
<tr><td>set tag</td><td>Set the tag value of redistributed route.</td></tr>
<tr><td>set ip tos</td><td>Set the tos for the IP packet head.</td></tr>
</table>

6.32 set ip tos

Use this command to set the tos of the IP head of the packet matching the rule in the route map configuration mode. Use the **no** form of this command to remove the configured tos setting.

set ip tos {*<0-15>* | *max-reliability* | *max-throughput* | *min-delay* | *min-monetary-cost* | *normal* }

no set ip tos

Parameter Description

Parameter	Description
number	Indicates the TOS value of an IP header with a number, ranging from 0 to 15. 2: **max-reliability** 4: **max-throughput** 8: **min-delay** 1: **min-monetary-cost** 0: **normal**
max-reliability | max-throughput | min-delay | min-monetary-cost | normal	Priority of an IP header.

Defaults   N/A

Command mode   Route map configuration mode

Usage guideline   With different TOS values for the IP packet head configured, the IP packets matching the PBR routing are transmitted with different service qualities.

The TOS value will be specified for the head of the IP packet matched the PBR.

Examples

The following example sets the TOS value of the packet with the source IP address 192.168.217.68 received at the interface FastEthernet 0/0 as 4:

```
Orion Alpha A28X(config)#access-list 1 permit 192.168.217.68 0.0.0.0
Orion Alpha A28X(config)#route-map name
Orion Alpha A28X(config-route-map)#match ip address 1
Orion Alpha A28X(config-route-map)#set ip tos 4
Orion Alpha A28X(config)#interface FastEthernet 0/0
Orion Alpha A28X(config-if)#ip policy route-map name
```

Related commands

Command	Description
match interface	Match the next-hop interface.
match ip address	Match the IP address in the ACL.
match ip next-hop	Match the next-hop IP address in the ACL.
match ip route-source	Match the route source IP address in the ACL.
match metric	Match the route metric value.
match route-type	Match the route type.
match tag	Match the route tag value.
set metric-type	Set the type of redistributed route.
set tag	Set the tag value of redistributed route.
set ip precedence	Set the precedence for the IP packet head.

6.33 set ipv6 default next-hop

Use this command to specify the default next-hop IPv6 address for the IPv6 packets that match the rule in the route map configuration mode. Use the **no** form of this command to remove the setting. This command is only used to configure policy-based routing.

set ipv6 default next-hop *global-ipv6-address* [*weight*] [*global-ipv6-address* [*weight*] ...]

no set ipv6 default next-hop global-ipv6-address [*weight*] [*global-ipv6-address* [*weight*] ...]

Parameter description

Parameter	Description
global-ipv6-address	Indicates the next-hop IPv6 address for packet forwarding. The next-hop router must be a neighbor router.
weight	Indicates the weight in the load balancing mode, ranging from 1 to 8. A larger value means larger packet traffic to be shared by the next hop.

Default configuration   None

Command mode   Route map configuration mode

Usage   With the policy-based routing applied to the interface, for the IPv6 packets matching the

guideline	corresponding rules, if the usual route (that is the non default route) with the destination of this packet is not in the routing table, this packet will be forwarded to the next hop specified by the set ipv6 default next-hop command. Otherwise it is forwarded through the usual route. Noted that the match rule should be the IPv6 corresponded.
	Packets select the egress from the policy-based routing and routing table in following priority.
	set ipv6 next-hop;
	usual route (the non default route)
	set ipv6 default next-hop
	default route.

⚠ For the switches, this function does not take effect if the mask length is beyond 64.

Examples	If this command and the set ipv6 next-hop verify-availability are both configured ,the next hop set by the set ipv6 next-hop verify-availability command will take effect preferentially

	Command	Description
Related commands	**match ipv6 address**	Set the matching rule of policy-based routing.
	ipv6 policy route-map	Use the policy-based routing on the interface.
	set ipv6 next-hop	Set the next hop of the policy-based routing.

Platform description	N/A

6.34 set ipv6 next-hop

Use this command to specify the next-hop IPv6 address for the packets that meet the matching rule. Use the **no** form of this command to remove the setting. This command is only used to configure policy-based routing.

set ipv6 next-hop *global-ipv6-address* [weight] […*global-ipv6-address* [*weight*]]

no set ip next-hop *global-ipv6-address* [weight] […*global-ipv6-address* [*weight*]]

	Parameter	Description
Parameter description	*global-ipv6-address*	IPv6 address of the next hop. The next hop router should be the neighbor router.
	weight	Weight of the next hop in the load balancing mode, in the range of 1to 8.

Default configuration	None

Command mode	Route map configuration mode

This command supports two operation modes: WCMP load balancing mode and non-WCMP load balancing mode. In the former mode, the system implements WCMP load balancing according to the weight entered by the user.

Multiple IP addresses may follow set ip next-hop and the number of addresses should be less than 32.

If weight follows ip address, up to 4 next hop addresses can be configured.

If the parameter vrf *vrf-name* is specified, packets forwarding will be across the VRF. The packets will be forwarded from VRF to pubic network with the parameter global specified. If no [vrf *vrf-name* | global] is specified, forwarding the IPv6 packets will inherit the VRF, that is the nexthop belongs to the VRF that receives this IPv6 packets.

Usage guideline

⚠ If weight follows any next-hop, the operation mode of this command will be automatically switched to the WCMP load balancing mode. In the WCMP load balancing mode, for the nexthop address without configuring the corresponding weight, the weight is 1 by default.

When the packets select the egress from the policy-based routing and routing table, the priorities are as bellows.

set ipv6 next-hop;

usual route (the non default route)

set ipv6 default next-hop

Default route.

Examples

Command	Description
match ipv6 address	Set the matching rule of policy-based routing.
ipv6 policy route-map	Use the policy-based routing on the interface.
set ipv6 next-hop	Set the next hop of the policy-based routing.

Related commands

Platform description   N/A

6.35 set ipv6 precedence

Use this command to set the precedence of the IPv6 head of the packet matching the rule in the route map configuration mode. Use the **no** form of this command to remove the configured precedence setting.

set ipv6 precedence {*<0-7>* | *critical* | *flash* | *flash-override* | *immediate* | *internet* | *network* | *priority* | *routine* }

no set ipv6 precedence {*<0-7>* | *critical* | *flash* | *flash-override* | *immediate* | *internet* | *network* | *priority* | *routine* }

	Parameter	Description
Parameter description	*critical, flash, flash-override, immediate, internet , network , priority , routine*	The precedence type of the IPv6 head.
	0~7	The configurable precedence range.

Default configuration N/A

Command mode Route map configuration mode

Usage guideline

Examples The following example sets the precedence of IPv6 packet head as "immediate":

```
Orion Alpha A28X(config-route-map)# set ipv6 precedence immediate
```

	Command	Description
Related commands	**match ipv6 address**	Configure the ACL used for matching the packet in IPv6 PBR.
	route-map	Use the route map of the policy-based routing.
	set default interface	Set the default next-hop egress.
	set interface	Set the next hop egress.
	set ipv6 default next-hop	Set the default next-hop address for forwarding packets.
	set ipv6 next-hop	Set the next-hop address for forwarding packet.
	show ipv6 policy	Show the policy-based routing
	show route-map	Show the route map configuration.

Platform description N/A

6.36 set level

Use this command to set the level of the area where the routes matching the rule are redistributed in the route map configuration command. Use the **no** form of this command to remove the setting.
set level { stub-area | backbone}
no set level

Default configuration None

Command mode Route map configuration mode

In the example below, the OSPF routing protocol redistributes the RIP protocol to the backbone area.

```
Orion Alpha A28X(config)# router ospf
Orion Alpha A28X(config-router)# redistribute rip subnets route-map
redrip
Orion Alpha A28X(config-router)# network 192.168.12.0 0.0.0.255 area 0
Orion Alpha A28X(config-router)# exit
Orion Alpha A28X(config)# route-map redrip permit 10
Orion Alpha A28X(config-route-map)# set level backbone
```

Related commands

Command	Description
match interface	Match the interface.
match ip address	Match the IP address.
match ip next-hop	Match the next-hop IP address.
match ip route-source	Match the source IP address.
match metric	Match the metric.
match route-type	Match the route type.
match tag	Match the tag.
set metric-type	Set the metric type.
set tag	Set the tag.

6.37 set metric

Use **set metric** to set the metric for the routes to be redistributed. Use the **no** form of this command to remove the setting.

set metric [+ *metric-value* | **-** *metric-value* | *metric-value*]

no set metric

Parameter description

Parameter	Description
+	Increase based on the metric of the original route
-	Decrease based on the metric of the original route
metric-value	Metric for the route to be redistributed

Default configuration

The default metric for route redistribution varies with the routing protocol.

Command mode

Route map configuration mode

You should set the metric according to the actual network topology, because the routing depends on the metric of routes. Attentions should be paid to the upper and lower limits of the routing protocols when you execute the set metric, + metric or – metric commands. When the RIP protocol redistributes the routes of other protocols, the range of the metric after increase or decrease is 1 to 16.

You can redistribute the routes from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

For route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

One or more match or set commands can be executed to configure a route map. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

Examples

The following example enables the OSPF routing protocol to redistribute the RIP routes and sets the default metric to 40.

```
Orion Alpha A28X(config)# router ospf
Orion Alpha A28X(config-router)# redistribute rip subnets route-map redrip
Orion Alpha A28X(config-router)# network 192.168.12.0 0.0.0.255 area 0
Orion Alpha A28X(config-router)# exit
Orion Alpha A28X(config)# route-map redrip permit 10
Orion Alpha A28X(config-route-map)# set metric 40
```

Related commands

Command	Description
match interface	Match the interface.
match ip address	Match the IP address.
match ip next-hop	Match the next-hop IP address.
match ip route-source	Match the source IP address.
match metric	Match the metric.
match route-type	Match the route type.
match tag	Match the tag.
set metric-type	Set the metric type.
set tag	Set the tag.

6.38 set metric-type

Use **set metric-type** to set the type of the routes to be redistributed. Use the **no** form of this command to remove the setting.

set metric-type *type*

no set metric-type

Parameter

Parameter	Description

	Type of the routes to be redistributed. At present, you can set the type of the routes that the OSPF protocol redistributes.
type	type-1: Type-1 external route;
	type-2: Type-2 external route.

Default configuration
Type-2

Command mode
Route map configuration mode

Usage guideline

You can redistribute the routing information from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

In the route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

In configuring one route map, one or more match or set commands can be executed. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

Examples

The following example enables the OSPF routing protocol to redistribute the RIP route and sets the type as type-1.

```
Orion Alpha A28X(config)# router ospf
Orion Alpha A28X(config-router)# redistribute rip subnets route-map
redrip
Orion Alpha A28X(config-router)# network 192.168.12.0 0.0.0.255 area 0
Orion Alpha A28X(config-router)# exit
Orion Alpha A28X(config)# route-map redrip permit 10
Orion Alpha A28X(config-route-map)# set metric-type type-1
```

Related commands

Command	Description
match interface	Match the interface.
match ip address	Match the IP address.
match ip next-hop	Match the next-hop IP address.
match ip route-source	Match the source IP address.
match metric	Match the metric.
match route-type	Match the route type.
match tag	Match the tag.
set metric	Set the metric.
set tag	Set the tag.

6.39 set next-hop

Use this command to specify the next-hop IP address for the routes that match the rule. Use the **no** form of this command to remove the setting. This command is only used to configure routing policies.

set next-hop *ip-address*

no set next-hop

Parameter description

Parameter	Description
ip-address	IP address of the next hop.

Default configuration   None

Command mode   Route map configuration mode

Usage guideline

You can redistribute the routing information from one routing process to another routing process. For example, you can redistribute the route in the OSPF routing domain and then advertise it to the RIP routing domain, and vice versa. The mutual route redistribution can be implemented between all the IP routing protocols.

In the route redistribution, route maps are usually used to control the mutual route redistribution between two routing domains.

In configuring one route map, one or more match or set commands can be executed. If the match command is not used, all the routes will be matched. If the set command is not used, no operation will be performed.

Examples

The following example enables the OSPF routing protocol to redistribute the RIP route and sets the next-hop to 192.168.1.2.

```
Orion Alpha A28X(config)# route-map redrip permit 10
Orion Alpha A28X(config-route-map)# match ip address 1
Orion Alpha A28X(config-route-map)# set next-hop 192.168.1.2
```

Related commands

Command	Description
match interface	Match the interface.
match ip address	Match the IP address.
match ip next-hop	Match the next-hop IP address.
match ip route-source	Match the source IP address.
match metric	Match the metric.
match route-type	Match the route type.
match tag	Match the tag.
set metric-type	Set the metric type.
set tag	Set the tag.

6.40 set tag

Use this command to set the tag for the routes to be redistributed. Use the **no** form of this command to remove the setting.

set tag *tag*

no set tag

Parameter description	Parameter	Description
	tag	Tag of the route to be redistributed

Default configuration The original routing tag remains unchanged.

Command mode Route map configuration mode

Usage guideline This command can only be used for route redistribution. If this command is not configured, the default route tag is used.

Examples The following example enables the OSPF routing protocol to redistribute the RIP route and sets the tag as 100.

```
Orion Alpha A28X(config)# router ospf
Orion Alpha A28X(config-router)# redistribute rip subnets route-map redrip
Orion Alpha A28X(config-router)# network 192.168.12.0 0.0.0.255 area 0
Orion Alpha A28X(config-router)# exit
Orion Alpha A28X(config)# route-map redrip permit 10
Orion Alpha A28X(config-route-map)# set tag 100
```

Command	Description
match interface	Match the interface.
match ip address	Match the IP address.
match ip next-hop	Match the next-hop IP address.
match ip route-source	Match the source IP address.
match metric	Match the metric.
match route-type	Match the route type.
match tag	Match the tag.
set metric	Set the metric.
set metric-type	Set the metric type.

Related commands (left label spanning match interface through match metric rows)

6.41 show ip as-path-access-list

Use this command to display the configuration of AS path access lists.

show ip as-path-access-list [*num*]

Parameter description	Parameter	Description
	num	AS path access list number.

Default	N/A

Command mode	Privileged EXEC mode

Usage guideline	N/A

Examples

The following example displays the AS path access lists.

```
Orion Alpha A28X# show ip as-path-access-list
AS path access list 30
permit ^30$
```

Field	Description
AS path access list	AS path access list number
permit	Permits advertisement based on matching conditions.
^30$	Regular expression.

Related command	Command	Description
	-	-

Platform description	-

6.42 show ip community-list

Use **show ip community-list** command to display the community list.

show ip community-list [*community-list-number* | *community-list-name*]

Parameter description	Parameter	Description
	community-list-number	Number of the community list.
	community-list-name	Name of the community list.

Default configuration	None

Command mode	Privileged EXEC mode

Usage guidelines	N/A

Examples

```
Orion Alpha A28X# show ip community-list
Community-list standard local
permit local-AS
Community-list standard Red-Giant
permit 0:10
deny 0:20
```

Related commands

Command	Description
match community	Match the route community.
set comm-list delete	Delete the community attribute in the BGP routes.

6.43 show ip extcommunity-list

Use this command to display the extcommunity list.

show ip extcommunity-list [*extcommunity-list-num | extcommunity-list-name*]

Parameter description

Parameter	Description
extcommunity-list-num	extcommunity-list number, ranging from 1 to 199.
extcommunity-list-name	extcommunity-list name.

Default

-

Command mode

Privileged EXEC mode, global configuration mode, interface configuration mode, routing protocol configuration mode and route map configuration mode.

Usage guideline

-

Examples

```
Orion Alpha A28X # show ip extcommunity-list
Standard extended community-list 1
 10 permit RT:1:200
 20 permit RT:1:100
Standard extended community-list 2
 10 permit RT:1:200
Expanded extended community-list rt_filter
 13 permit 1:100
```

Related command

Command	Description
ip extcommunity-list	Create an extcommunity-list.
match extcommunity	Match an extcommunity.
set extcommunity	Set an extcommunity.

Platform description

-

6.44 show ip prefix-list

Use **show ip prefix-list** to display the prefix list or the entries.

show ip prefix-list [*prefix-name*]

Parameter description	Parameter	Description
	prefix-name	Name of the prefix list.

Default configuration

The configuration information of all the prefix lists is displayed by default.

Command mode

Privileged EXEC mode, global configuration mode, interface configuration mode, routing protocol configuration mode, route map configuration mode.

Usage guidelines

If no prefix list is specified, the configurations of all the prefix lists are displayed, otherwise only the configuration of the specified prefix list is displayed.

Examples

```
Orion Alpha A28X# show ip prefix-list
seq pre: 2 entries
seq 5 permit 192.168.564.0/24
seq 10 permit 192.2.2.0/24
```

6.45 show ip protocols

Use this command to display information about the status of the currently running IPv4 routing protocol.

show ip protocols ospf | rip }

Parameter Description	Parameter	Description
	ospf	Displays information about the status of the OSPF protocol.
	rip	Displays information about the status of the RIP protocol.
	-	Displays information about the status of all running routing protocols.

Command Mode

Privileged EXEC mode, global configuration mode, interface configuration mode, routing protocol configuration mode, and routing map configuration mode

Default Level 14

Usage Guide

Information about the status of only the currently running routing protocol is displayed, and the information about a routing protocol that is not running is not displayed.

Examples

6.46 show ipv6 prefix-list

Use this command to display the information about the IPv6 prefix list or its entries.

show ipv6 prefix-list [*prefix-name*]

Parameter description	Parameter	Description
	prefix-name	Name of the IPv6 prefix list.

Default configuration　The configuration information of all the IPv6 prefix lists is displayed.

Command mode　Privileged EXEC mode, global configuration mode, interface configuration mode, route protocol configuration mode, route map configuration mode

Usage guideline　If no prefix list is specified, the configurations of all the prefix lists are displayed, otherwise only the configuration of the specified prefix list is displayed.

Examples

```
Orion Alpha A28X# show ipv6 prefix-list
ipv6 prefix-list p6: 2 entries
     seq 5 permit 13::/20
     seq 10 permit 14::/20
```

6.47 show key chain

Use this command to display the key chain configuration.

show key chain [*key-chain-name*]

Parameter description	Parameter	Description
	key-chain-name	(Optional) Display the configuration of the specified key chain.

Default　The configuration information of all key chains is displayed.

Command mode　Privileged EXEC mode, global configuration mode, interface configuration mode, routing protocol configuration mode, and key chain configuration mode.

Usage guideline　If no key chain is specified, the configuration information of all key chains is displayed.

Examples

```
Orion Alpha A28X# show key chain
route-map AAA, permit, sequence 10
Match clauses:
ip address 2
Set clauses:
metric 10
Orion Alpha A28X(config)#show key chain
```

```
key chain kc
    key 1 -- text "Orion Alpha A28X"
        accept-lifetime (12:11:00 May  2 2001) - (infinite)
        send-lifetime (always valid) - (always valid) [valid now]
```

Field	Description
key chain	Key chain name.
key	Key ID.
accept-lifetime	Lifetime in the accept direction.
send-lifetime	Lifetime in the send direction.

Related command	**Command**	**Description**
	-	-

Platform description -

6.48 show route-map

Use the command to display the configuration of the route map.

show route-map [*route-map-name*]

Parameter description	**Parameter**	**Description**
	route-map-name	(Optional) Display the configuration information of the specified the route map.

Default configuration The configuration information of all the route maps is displayed.

Command mode Privileged EXEC mode, global configuration mode, interface configuration mode, routing protocol configuration mode, route map configuration mode.

Usage guidelines If no route map is specified, the configurations of all the route maps will be displayed, otherwise only the configuration of the specified route map is displayed.

Examples
```
Orion Alpha A28X# show route-map
route-map AAA, permit, sequence 10
Match clauses:
ip address 2
Set clauses:
metric 10
```

Field	Description

route-map	Name of the route map.
Permit	The route map contains the permit keyword.
sequence 10	Sequence number of the route map.
Match clauses	Set the matching rule. Whether to perform the set operation depends on the permit or deny keyword in the route map.
Set clauses	Set the operation when the rule is matched.