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1 Configuring the CLI

1.1 Introduction

The command line interface (CLI) is a window for text instruction interaction between users and network devices. Users can enter commands in the CLI to configure and manage network devices.

1.1.1 Accessing the CLI

Before using the CLI, you need to connect a terminal or PC to a network device. After you start the network device and initialize the hardware and software of the network device, you can use the CLI. If you use the network device for the first time, you can connect it only through the console port. This is called out-of-band management. After performing relevant configuration, you can connect and manage the network device by telnetting to the virtual terminal.

1.1.2 Command Modes

Since the device has many commands, you can classify them by function to facilitate their use. The CLI provides several commands modes, and all commands are registered in one or several command modes. You must enter the mode of a command before using this command. Command modes are related with each other but differ from each other.

As soon as a new session is set up between a user and the management interface of a network device, you enter user EXEC mode. In this mode, you can use a few commands and the command functions are limited, such as the **show** command. Execution results of commands in user EXEC mode are not saved.

To use more commands, enter privileged EXEC mode. Generally, you must enter a password to enter privileged EXEC mode. In privileged EXEC mode, you can use all commands registered in this command mode, and further enter global configuration mode.

Using commands in configuration modes (such as global configuration mode and interface configuration mode) affects configurations in use. If you save the configurations, these commands are saved and run when the system restarts. To enter another configuration mode, enter global configuration mode. If you perform configuration in global configuration mode, you can enter various configuration sub-modes, such as interface configuration mode.

Table 1-1 Description of the Command Modes (suppose that the name of the network device is "orion_B26Q")

Command Mode	Access Method	Prompt	Exit or Entering Next Mode	Function Description of the Mode
User EXEC mode	A user enters user EXEC mode by default when accessing a network device.	orion_B26Q>	<ul style="list-style-type: none"> ● Run the exit command to exit this mode. ● Run the enable command to enter privileged EXEC mode. 	Use this command mode to conduct basic tests or display system information.
Privileged EXEC mode	In User EXEC mode, run the enable command to enter privileged EXEC mode.	orion_B26Q#	<ul style="list-style-type: none"> ● Run the disable command to return to user EXEC mode. ● Run the configure command to enter global configuration mode. 	Use this command mode to check whether the configurations take effect. This mode is password-protected.
Global configuration mode	In Privileged EXEC mode, run the configure command to enter global configuration mode.	orion_B26Q(config)#	<ul style="list-style-type: none"> ● Run the exit or end command, or press Ctrl+C to return to privileged EXEC mode. ● Run the interface command to enter interface configuration mode. In the interface command, you must specify the interface configuration sub-mode you want to enter. ● Run the vlan <i>vlan-id</i> command to enter VLAN configuration mode. 	Use commands in this mode to configure global parameters that affect the entire network device.
Interface configuration mode	In global configuration mode, run the interface command to enter interface configuration mode.	orion_B26Q(config-if)#	<ul style="list-style-type: none"> ● Run the end command or press Ctrl+C to return to privileged EXEC mode. ● Run the exit command to return to global configuration mode. In the interface command, you must specify the interface configuration sub-mode you want to enter. 	Use this command mode to configure various interfaces of the network device.
Config-vlan (VLAN configuration mode)	In global configuration mode, run the vlan <i>vlan-id</i> command to enter VLAN configuration	orion_B26Q(config-vlan)#	<ul style="list-style-type: none"> ● Run the end command or press Ctrl+C to return to privileged EXEC mode. ● Run the exit command to return to global configuration mode. 	Use this command mode to configure VLAN parameters.

Command Mode	Access Method	Prompt	Exit or Entering Next Mode	Function Description of the Mode
	mode.			

1.1.3 System Help

When entering commands in the CLI, you can obtain help information by using the following methods:

- At the command prompt in any mode, enter a question mark (?) to list the commands supported in current command mode and command description.

```

orion_B26Q> ?
Exec commands:
  <1-99>      Session number to resume
  disable     Turn off privileged commands
  disconnect  Disconnect an existing network connection
  enable      Turn on privileged commands
  exit        Exit from the EXEC
  help        Description of the interactive help system
  lock        Lock the terminal
  ping        Send echo messages
  show        Show running system information
  telnet      Open a telnet connection
  traceroute  Trace route to destination

```

- Enter a space and a question mark (?) after a keyword of a command to list the next keyword or variable associated with the keyword.

```

orion_B26Q(config)# interface ?
Aggregateport  Aggregate port interface
Dialer         Dialer interface
GigabitEthernet Gigabit Ethernet interface
Loopback       Loopback interface
Multilink      Multilink-group interface
Null           Null interface
Tunnel         Tunnel interface
Virtual-ppp    Virtual PPP interface
Virtual-template Virtual Template interface
Vlan           Vlan interface
range          Interface range command

```

Note

If a keyword is followed by a parameter value, the value range and description of this parameter are displayed as follows:

```

orion_B26Q(config)# interface vlan ?
  <1-4094>  Vlan port number

```

- Enter a question mark (?) after an incomplete string of a command keyword to list all command keywords starting with the string.

```
orion_B26Q# d?  
debug delete diagnostic dir disable disconnect
```

- After an incomplete command keyword is entered, if the suffix of this keyword is unique, press the **Tab** key to display the complete keyword.

```
orion_B26Q# show conf<Tab>  
orion_B26Q# show configuration
```

- In any command mode, you can run the **help** command to obtain brief description of the help system.

```
orion_B26Q(config)# help  
Help may be requested at any point in a command by entering  
a question mark '?'. If nothing matches, the help list will  
be empty and you must backup until entering a '?' shows the  
available options.  
Two styles of help are provided:  
1. Full help is available when you are ready to enter a  
command argument (e.g. 'show ?') and describes each possible  
argument.  
2. Partial help is provided when an abbreviated argument is entered  
and you want to know what arguments match the input  
(e.g. 'show pr?'.)
```

1.1.4 Abbreviated Commands

If a command is long, you can enter a part of the command keyword characters that are used to identify the command keyword.

For example, the **interface gigabitEthernet 0/1** command for entering the configuration mode of interface GigabitEthernet 0/1 is abbreviated as follows:

```
orion_B26Q(config)# int g0/1  
orion_B26Q(config-if-GigabitEthernet 0/1)#
```

1.1.5 No and Default Options of Commands

Most commands have the **no** option. Generally, the **no** option is used to disable a feature or function, or perform an operation opposite to a command. For example, run the **no shutdown** command on an interface to perform the operation opposite to the **shutdown** command, that is, enable the interface. The keyword without the **no** option is used to enable a disabled feature or a feature that is disabled by default.

Most configuration commands have the **default** option. The **default** option is used to restore settings of a command to default values. Default values of most commands are used to disable this function. Therefore, in most cases, the function of the **default** option is the same as that of the **no** option. For some commands, however, the default values are used to enable this function. In this case, the function of the **default** option is opposite to that of the **no** option. At this time, the **default** option is used to enable the function of this command and set the variables to default values.

Note

For specific function of the **no** or **default** option of each command, see the command reference.

1.1.6 Prompts for Incorrect Commands

If an incorrect command is entered, an error prompt is displayed.

Table 1-1 Common CLI Errors

Error	Description	How to Obtain Help
% Ambiguous command: "show c"	The characters entered are too few to identify a unique command.	Enter the command again, and enter a question mark (?) after the ambiguous word. All the possible keywords are displayed.
% Incomplete command.	The mandatory keyword or variable is not entered in the command.	Enter the command again, and enter a space and a question mark (?). All the possible keywords or variables are displayed.
% Invalid input detected at '^' marker.	An incorrect command is entered. The symbol (^) indicates the position of the wrong word.	At the current command mode prompt, enter a question mark (?). All the command keywords allowed in this command mode are displayed.

1.1.7 History Commands

The system automatically saves commands that are entered recently. You can use shortcut keys to query or call history commands.

Table 1-1 Operation Methods

Operation	Result
Ctrl+P or the Up key	The previous command in the history command list is displayed. Starting from the latest record, you can repeatedly perform this operation to query earlier records.
Ctrl+N or the Down key	After pressing Ctrl+P or the Up key, you can perform this operation to return to a command that is more recently executed in the history command list. You can repeatedly perform this operation to query more recently executed commands.

✔ Specification

The standard terminals, such as the VT100 series, support the direction keys.

1.1.8 Featured Editing

When editing commands, you can use the keys or shortcut keys listed in the following table:

Table 1-1 Description of Shortcut Keys

Function	Key or Short-cut Key	Description
Move the cursor in a line.	Left key or Ctrl+B	Move the cursor to the left by one character.
	Right key or Ctrl+F	Move the cursor to the right by one character.
	Ctrl+A	Move the cursor to the head of the command line.
	Ctrl+E	Move the cursor to the end of the command line.
Delete an entered character.	Backspace key	Delete one character to the left of the cursor.
	Delete key	Delete one character to the right of the cursor.
Move the output by one line or one page.	Enter key	When the output is displayed, press the Enter key to move the output one line upward and display the next line. Use this key only when the output does not end yet.
	Space key	When the output is displayed, press the Space key to page down and display the next page. Only when the output does not end, use this key.

When the cursor is close to the right boundary, the entire command line moves to the left by 20 characters, and the hidden front part is replaced with a dollar (\$) sign. You can use related keys or shortcut keys to move the cursor to the characters in the front or return to the head of the command line.

For example, the entire **access-list** command may be wider than the screen. When the cursor is first close to the end of the command line, the entire command line moves to the left by 20 characters, and the hidden front part is replaced with a dollar sign (\$). Each time the cursor is close to the right boundary, the entire command line moves to the left by 20 characters.

```
access-list 199 permit ip host 192.168.180.220 host
$ost 192.168.180.220 host 202.101.99.12
$0.220 host 202.101.99.12 time-range tr
```

Press **Ctrl+A** to return to the head of the command line. At this time, the hidden tail part of the command line is replaced with a dollar sign (\$).

```
access-list 199 permit ip host 192.168.180.220 host 202.101.99.$
```

Note

The default line width of terminals is 80 characters.

1.1.9 Searching and Filtering of the Show Command Output

- To search specified content in the output of the **show** command, run the following command:

Table 1-1 Searching for Specified Content in the Output of the show Command

Command	Purpose
show <i>any-command</i> [regexp] begin <i>regular-expression</i>	Searches for specified content in the output of the show command, and outputs the first line containing the content and all information that follows this line.

- To filter specified content in the output of the **show** command, run the following commands:

Table 1-2 Filtering Specified Content in the Output of the show Command

Command	Purpose
show <i>any-command</i> [regexp] exclude <i>regular-expression</i>	Filters the output of the show command to filter out lines containing the specified content, and outputs other information.
show <i>any-command</i> [regexp] include <i>regular-expression</i>	Filters the output of the show command to output only the lines containing the specified content, and filters out other information.

Note

- The **show** command can be executed in any mode.
- Searched content is case-sensitive.

When the **regexp** keyword is specified, a regular expression can be used for filtering content. The following table describes the usages of special characters in a regular expression.

Table 1-3 Description of Usages of Special Characters in a Regular Expression

Character	Symbol	Special Meaning
Period	.	Matches any single character.
Plus sign	+	Matches one or any sequence in a string.
Caret	^	Matches the start of a string.
Underline	_	Matches commas, brackets, start and end of a string, and spaces.
Square brackets	[]	Matches a single character within a range.

To search or filter the output of the **show** command, you must enter a vertical line (|). After the vertical line, specify the search or filter rules and content to be searched or filtered (characters or strings). Content to be searched and filtered is case-sensitive.

```
orion_B26Q# show running-config | include interface
interface GigabitEthernet 0/0
interface GigabitEthernet 0/1
interface GigabitEthernet 0/2
interface GigabitEthernet 0/3
interface GigabitEthernet 0/4
interface GigabitEthernet 0/5
interface GigabitEthernet 0/6
interface GigabitEthernet 0/7
interface Mgmt 0
orion_B26Q# show running-config | regexp include GigabitEthernet [0-9]/1
interface GigabitEthernet 0/1
```

1.1.10 Command Alias

You can specify any word as the alias of a command to simplify the input of the command string.

1. Default aliases in the system

In configuration mode or privileged EXEC mode, default aliases are available for some commands. You can run the **show aliases** command to display these default aliases.

```
orion_B26Q(config)# show aliases
Exec mode alias:
  h                help
  p                ping
  s                show
  u                undebug
  un               undebug
```

Note

Default aliases in the system cannot be deleted.

2. System help regarding command aliases

- The system provides help information for command aliases. An asterisk (*) is displayed in front of an alias in the following format:

```
*command-alias=original-command
```

For example, in privileged EXEC mode, the default command alias "s" represents the keyword **show**. If you enter "s?", help information of the keywords and aliases starting with "s" is displayed.

```
orion_B26Q# s?
*s=show show start-chat start-terminal-service
```

- If the command represented by an alias contains more than one word, the command is displayed in a pair

of quotation marks.

For example, in privileged EXEC mode, configure the alias "sv" to replace the **show version** command. If you enter "s?", help information of the keywords and aliases starting with "s" is displayed.

```
orion_B26Q# s?  
*s=show *sv="show version" show start-chat  
start-terminal-service
```

- You can use an alias to obtain help information of the command represented by the alias.

For example, if you configure the alias "ia" in interface configuration mode to represent the **ip address** command, you can enter "ia?" in interface configuration mode to obtain help information of "**ip address?**", and replace the alias with the actual command.

```
orion_B26Q(config-if)# ia ?  
A.B.C.D IP address  
dhcp IP Address via DHCP  
orion_B26Q(config-if)#ip address
```

⚠ Caution

If you enter a space in front of a command alias, the command represented by this alias is displayed.

1.1.11 Character Set Encoding

The function of character set encoding enables the device to use a unified character set encoding format by configuring character set encoding. After a command is entered in the CLI of a terminal, the command is automatically converted into a command in the unified character set encoding format before delivery.

Note

When hybrid formats exist in current running configurations, you must manually delete running configurations containing the encoding format different from the target format before modifying the character set encoding format.

1.2 Restrictions and Guidelines

You can adopt UTF-8/GBK to perform configuration in Chinese. When you use the cursor to process words or delete **Backspace** in the CLI, the interface may display errors or garbled characters. You are advised to delete all current characters and then configure a unified character set encoding format. Upon word processing or Backspace deletion, you can run the **show running-config** command to check whether the configurations are correct. (To delete a Chinese character, you must press the **Backspace** key twice in the case of GBK, but must press the **Backspace** key three times in the case of UTF-8.)

1.3 Configuration Task Summary

CLI configuration includes the following tasks: All the configuration tasks below are optional. Select the configuration tasks as required.

- [Operating the Python Script](#)
- [Configuring a Command Alias](#)

- [Configuring the Privilege Level of a Command](#)
- [Configuring the Character Set Encoding Format](#)

1.4 Operating the Python Script

1. Overview

This section describes how to load and unload the Python script of CLI.

2. Procedure

(1) Enter the privileged EXEC mode.

enable

(2) Operate the Python script. The configuration steps below are mutually exclusive. Select one of them for configuration.

- Load the Python script.

cli-python insmod *python-filename*

- Unload the Python script.

cli-python rmmod *python-filename*

1.5 Configuring a Command Alias

1. Overview

You can specify any word as the alias of a command to simplify the input of the command string.

2. Restrictions and Guidelines

- The command replaced with an alias must start from the first character of the command line.
- The command replaced with an alias must be complete.
- An alias must be entered in full; otherwise, it cannot be identified.

3. Procedure

(1) Enter the privileged EXEC mode.

enable

(2) Enter the global configuration mode.

configure terminal

(3) Configure an alias to replace the front part of a command.

alias *mode command-alias original-command*

Default aliases are available for some commands in global configuration mode or privileged EXEC mode by default.

1.6 Configuring the Privilege Level of a Command

1. Overview

This section describes how to configure the privilege level of a command.

2. Procedure

(1) Enter the privileged EXEC mode.

```
enable
```

(2) Enter the global configuration mode.

```
configure terminal
```

(3) Configure the privilege level of a command.

```
privilege mode [ all ] { level level | reset } command-string
```

1.7 Configuring the Character Set Encoding Format

1. Overview

This section describes how to configure a unified character set encoding format for the device.

2. Restrictions and Guidelines

- When hybrid formats exist in current running configurations of the device, you must manually delete running configurations containing the encoding format different from the target format before modifying the character set encoding format.

3. Procedure

(1) Enter the privileged EXEC mode.

```
enable
```

(2) Enter the global configuration mode.

```
configure terminal
```

(3) Configure the character set encoding format.

```
language character-set { default | GBK | UTF-8 }
```

By default, hybrid formats are supported.

1.8 Monitoring

Run the **show** command to check the running status of a configured function to verify the configuration effect.

Table 1-1 Monitoring of the CLI

Command	Purpose
show aliases [mode]	Displays all command aliases or the command aliases in specific command mode.