EKINOPS
Optimizing Optical Networks

Ekinops Network Management Platform

The Multi-Protocol Service Network Manager

Norbert Gulczynska, Ekinops

3.2 TERABITS PER SECOND CARRIER CLASS TRANSPORT

ETHERNET, SONET/SDH, FIBER CHANNEL, UNCOMPRESSED HD/SD-SDI/ASI VIDEO FLEXIBLE MULTI-PROTOCOL AGGREGATION

Overview

Multi-Protocol Service Manager

- Single Manager for all services and protocols
  - Ethernet, SONET/SDH, Fiber Channel, etc.
- Full Redundant, Carrier Class, Scalable Network Management System
- Full Element Level and Service Level Fault, Configuration, Accounting, and Performance
  - Detailed Network Element Inventory (M.3100)
- Robust Security and Authentification
- Element, Network, and Service Level Management
  - Service Level Provisioning and Monitoring for all protocols

Benefits of the Ekinops Solution

- Quick deterministic fault isolation based on graphical displays of circuits vs. alarms

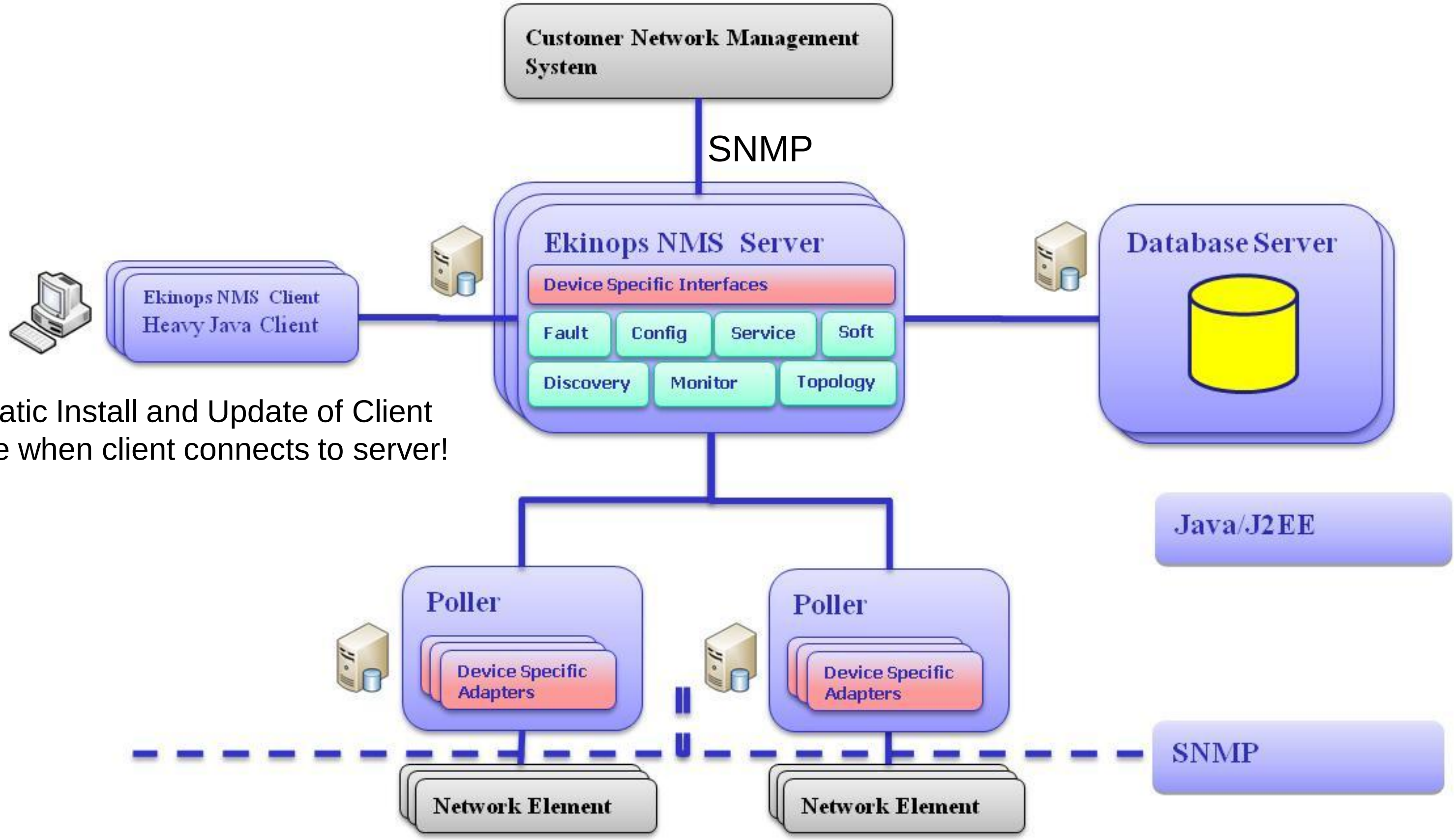
- Quick identification of "Effected" customers enabled by
  - Circuit level alarm display
  - Ability to identify effected circuits in the event of an NE failure or facility failure
  - Correlation of circuits to customers

- Ability to figure out "Effected" circuits proactively before a planned network outage

- Proactive management of SLAs via SLA thresholding

Architectural Overview

EKINOPS
Optimizing Optical Networks



Customer Network Management System

SNMP

Ekinops NMS Server

Device Specific Interfaces

Fault

Config

Service

Soft

Discovery

Monitor

Topology

Ekinops NMS Client
Heavy Java Client

Automatic Install and Update of Client software when client connects to server!

Database Server

Java/J2EE

Poller

Device Specific Adapters

Poller

Device Specific Adapters

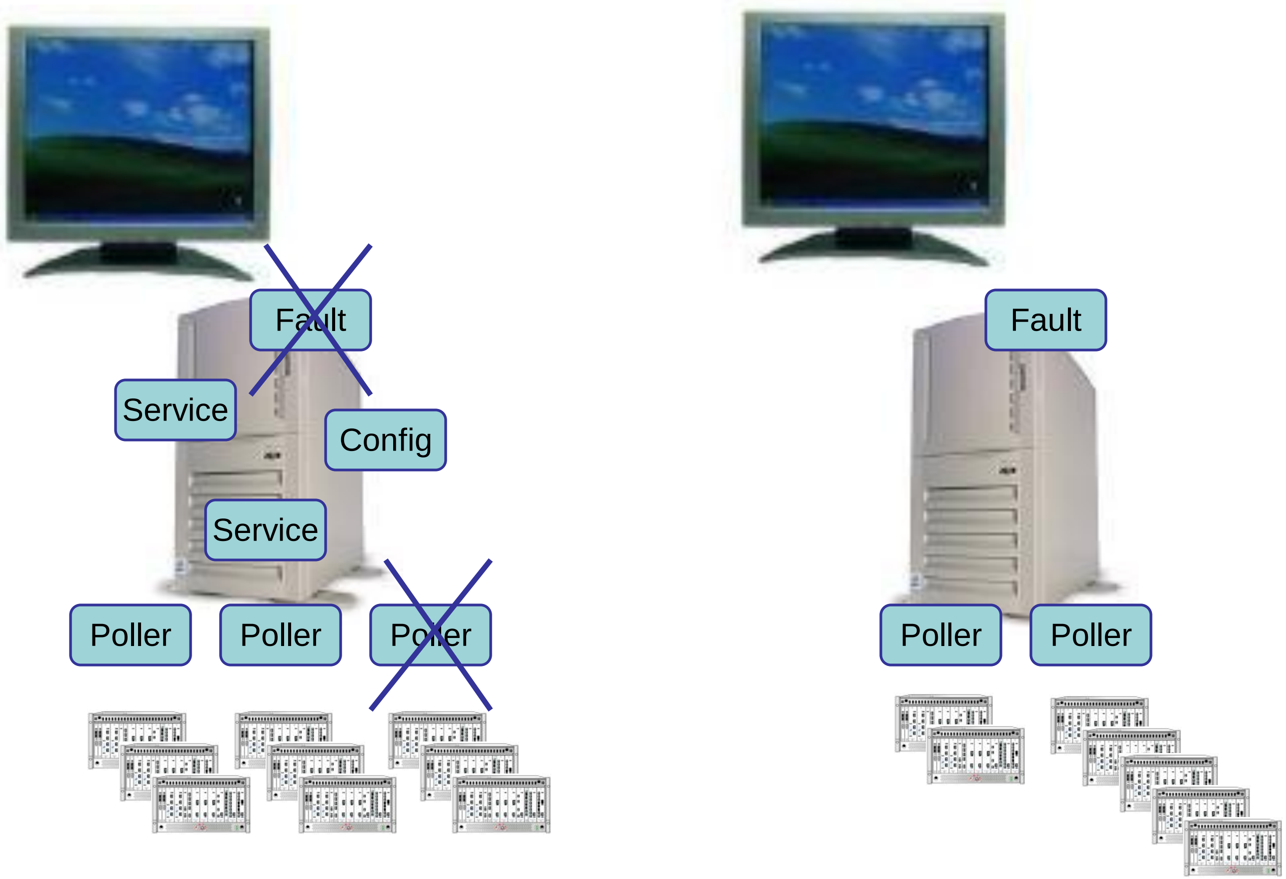
SNMP

Network Element

Network Element

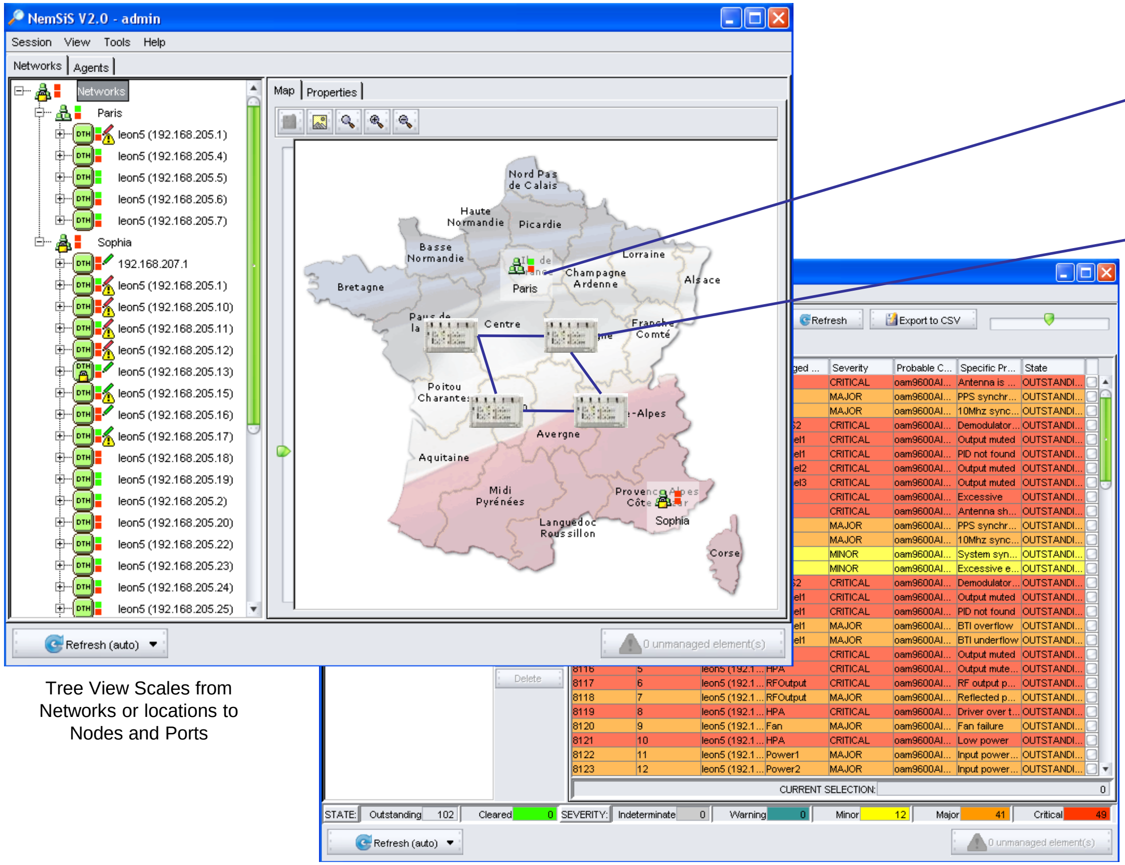
- ☐ Distribution of NE Pollers, Database, Clients, and Server for Scalability
- ☐ Windows and Linux Support for client and server
- ☐ Database Replication for hot stand-by system redundancy
- ☐ Robust Database support: MySQL, Oracle, SQL Server, PostgreSQL

Server Clustering


~~Fault~~
Service
Config
Service
Poller
Poller
~~Poller~~
Fault
Poller
Poller

- Pollers can be distributed for Performance
- Pollers take over for pollers that go down
- Server Processes that fail are restarted and moved to another server

Alarms and Topology


NemSiS V2.0 - admin
Session View Tools Help
Networks Agents
Map Properties
Nord Pas de Calais
Haute Normandie
Picardie
Basse Normandie
Bretagne
Lorraine
Champagne Ardenne
Alsace
Paris
Pays de la Loire
Centre
Franche Comté
Poitou Charentes
Rhône-Alpes
Auvergne
Aquitaine
Midi Pyrénées
Provence Alpes Côte d'Azur
Languedoc Roussillon
Sophia
Corse
Refresh (auto)
0 unmanaged element(s)
Refresh
Export to CSV
Delete

- Networks
  - Paris
    - leon5 (192.168.205.1)
    - leon5 (192.168.205.4)
    - leon5 (192.168.205.5)
    - leon5 (192.168.205.6)
    - leon5 (192.168.205.7)
  - Sophia
    - 192.168.207.1
    - leon5 (192.168.205.1)
    - leon5 (192.168.205.10)
    - leon5 (192.168.205.11)
    - leon5 (192.168.205.12)
    - leon5 (192.168.205.13)
    - leon5 (192.168.205.15)
    - leon5 (192.168.205.16)
    - leon5 (192.168.205.17)
    - leon5 (192.168.205.18)
    - leon5 (192.168.205.19)
    - leon5 (192.168.205.2)
    - leon5 (192.168.205.20)
    - leon5 (192.168.205.22)
    - leon5 (192.168.205.23)
    - leon5 (192.168.205.24)
    - leon5 (192.168.205.25)

			ged ...	Severity	Probable C...	Specific Pr...	State
				CRITICAL	oam9600Al...	Antenna is ...	OUTSTANDI...
				MAJOR	oam9600Al...	PPS synchr...	OUTSTANDI...
				MAJOR	oam9600Al...	10Mhz sync...	OUTSTANDI...
			S2	CRITICAL	oam9600Al...	Demodulator...	OUTSTANDI...
			el1	CRITICAL	oam9600Al...	Output muted	OUTSTANDI...
			el1	CRITICAL	oam9600Al...	PID not found	OUTSTANDI...
			el2	CRITICAL	oam9600Al...	Output muted	OUTSTANDI...
			el3	CRITICAL	oam9600Al...	Output muted	OUTSTANDI...
				CRITICAL	oam9600Al...	Excessive	OUTSTANDI...
				CRITICAL	oam9600Al...	Antenna sh...	OUTSTANDI...
				MAJOR	oam9600Al...	PPS synchr...	OUTSTANDI...
				MAJOR	oam9600Al...	10Mhz sync...	OUTSTANDI...
				MINOR	oam9600Al...	System syn...	OUTSTANDI...
				MINOR	oam9600Al...	Excessive e...	OUTSTANDI...
			S2	CRITICAL	oam9600Al...	Demodulator...	OUTSTANDI...
			el1	CRITICAL	oam9600Al...	Output muted	OUTSTANDI...
			el1	CRITICAL	oam9600Al...	PID not found	OUTSTANDI...
			el1	MAJOR	oam9600Al...	BTI overflow	OUTSTANDI...
			el1	MAJOR	oam9600Al...	BTI underflow	OUTSTANDI...
				CRITICAL	oam9600Al...	Output muted	OUTSTANDI...
8116	5	leon5 (192.1...	HPA	CRITICAL	oam9600Al...	Output mute...	OUTSTANDI...
8117	6	leon5 (192.1...	RFOutput	CRITICAL	oam9600Al...	RF output p...	OUTSTANDI...
8118	7	leon5 (192.1...	RFOutput	MAJOR	oam9600Al...	Reflected p...	OUTSTANDI...
8119	8	leon5 (192.1...	HPA	CRITICAL	oam9600Al...	Driver over t...	OUTSTANDI...
8120	9	leon5 (192.1...	Fan	MAJOR	oam9600Al...	Fan failure	OUTSTANDI...
8121	10	leon5 (192.1...	HPA	CRITICAL	oam9600Al...	Low power	OUTSTANDI...
8122	11	leon5 (192.1...	Power1	MAJOR	oam9600Al...	Input power...	OUTSTANDI...
8123	12	leon5 (192.1...	Power2	MAJOR	oam9600Al...	Input power...	OUTSTANDI...

CURRENT SELECTION: 0

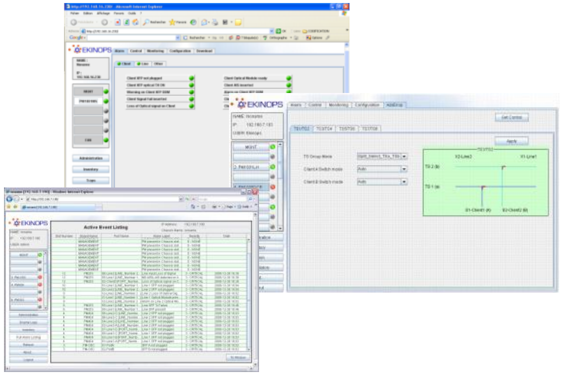
STATE: Outstanding 102 Cleared 0 SEVERITY: Indeterminate 0 Warning 0 Minor 12 Major 41 Critical 49

Tree View Scales from Networks or locations to Nodes and Ports

Containerization for Network Hierarchical Views

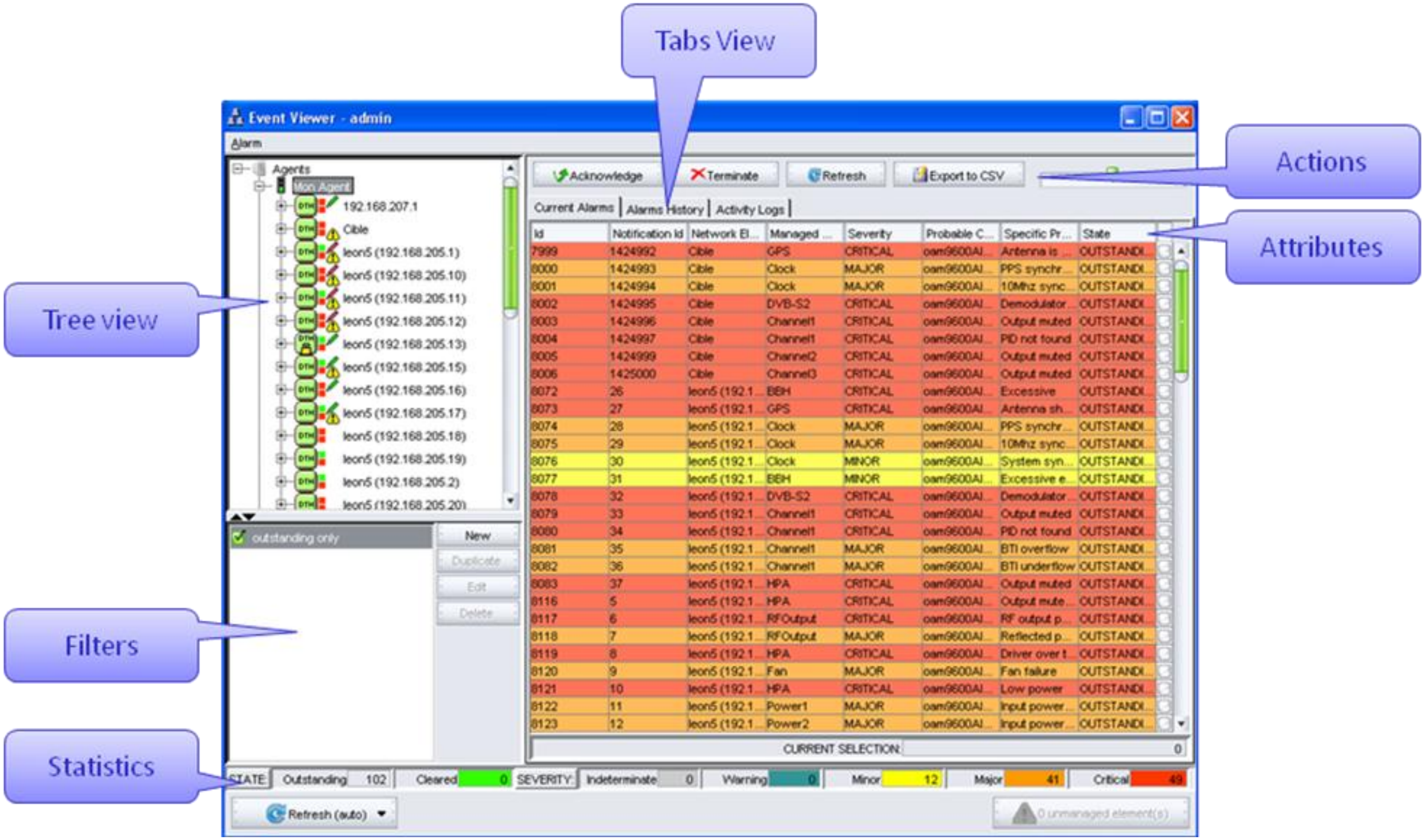
Graphical Face Plate Views

Drill down to Node Level Graphical Configuration and Monitoring



- ❑ Alarm Correlation for diagnostic Simplification
- ❑ Operator Acknowledgement for alarm tracking
- ❑ Of course, filtering and historical logging

Alarm and Event Viewer



Agents
Mon Agent
192.168.207.1
Cible
leon5 (192.168.205.1)
leon5 (192.168.205.10)
leon5 (192.168.205.11)
leon5 (192.168.205.12)
leon5 (192.168.205.13)
leon5 (192.168.205.15)
leon5 (192.168.205.16)
leon5 (192.168.205.17)
leon5 (192.168.205.18)
leon5 (192.168.205.19)
leon5 (192.168.205.2)
leon5 (192.168.205.20)

☑ outstanding only

Id	Notification Id	Network El...	Managed ...	Severity	Probable C...	Specific Pr...	State
7999	1424992	Cible	GPS	CRITICAL	oam9600Al...	Antenna is ...	OUTSTANDI...
8000	1424993	Cible	Clock	MAJOR	oam9600Al...	PPS synchr...	OUTSTANDI...
8001	1424994	Cible	Clock	MAJOR	oam9600Al...	10Mhz sync...	OUTSTANDI...
8002	1424995	Cible	DVB-S2	CRITICAL	oam9600Al...	Demodulator...	OUTSTANDI...
8003	1424996	Cible	Channel1	CRITICAL	oam9600Al...	Output muted	OUTSTANDI...
8004	1424997	Cible	Channel1	CRITICAL	oam9600Al...	PID not found	OUTSTANDI...
8005	1424999	Cible	Channel2	CRITICAL	oam9600Al...	Output muted	OUTSTANDI...
8006	1425000	Cible	Channel3	CRITICAL	oam9600Al...	Output muted	OUTSTANDI...
8072	26	leon5 (192.1...	BBH	CRITICAL	oam9600Al...	Excessive	OUTSTANDI...
8073	27	leon5 (192.1...	GPS	CRITICAL	oam9600Al...	Antenna sh...	OUTSTANDI...
8074	28	leon5 (192.1...	Clock	MAJOR	oam9600Al...	PPS synchr...	OUTSTANDI...
8075	29	leon5 (192.1...	Clock	MAJOR	oam9600Al...	10Mhz sync...	OUTSTANDI...
8076	30	leon5 (192.1...	Clock	MINOR	oam9600Al...	System syn...	OUTSTANDI...
8077	31	leon5 (192.1...	BBH	MINOR	oam9600Al...	Excessive e...	OUTSTANDI...
8078	32	leon5 (192.1...	DVB-S2	CRITICAL	oam9600Al...	Demodulator...	OUTSTANDI...
8079	33	leon5 (192.1...	Channel1	CRITICAL	oam9600Al...	Output muted	OUTSTANDI...
8080	34	leon5 (192.1...	Channel1	CRITICAL	oam9600Al...	PID not found	OUTSTANDI...
8081	35	leon5 (192.1...	Channel1	MAJOR	oam9600Al...	BTI overflow	OUTSTANDI...
8082	36	leon5 (192.1...	Channel1	MAJOR	oam9600Al...	BTI underflow	OUTSTANDI...
8083	37	leon5 (192.1...	HPA	CRITICAL	oam9600Al...	Output muted	OUTSTANDI...
8116	5	leon5 (192.1...	HPA	CRITICAL	oam9600Al...	Output mute...	OUTSTANDI...
8117	6	leon5 (192.1...	RFOutput	CRITICAL	oam9600Al...	RF output p...	OUTSTANDI...
8118	7	leon5 (192.1...	RFOutput	MAJOR	oam9600Al...	Reflected p...	OUTSTANDI...
8119	8	leon5 (192.1...	HPA	CRITICAL	oam9600Al...	Driver over t...	OUTSTANDI...
8120	9	leon5 (192.1...	Fan	MAJOR	oam9600Al...	Fan failure	OUTSTANDI...
8121	10	leon5 (192.1...	HPA	CRITICAL	oam9600Al...	Low power	OUTSTANDI...
8122	11	leon5 (192.1...	Power1	MAJOR	oam9600Al...	Input power...	OUTSTANDI...
8123	12	leon5 (192.1...	Power2	MAJOR	oam9600Al...	Input power...	OUTSTANDI...

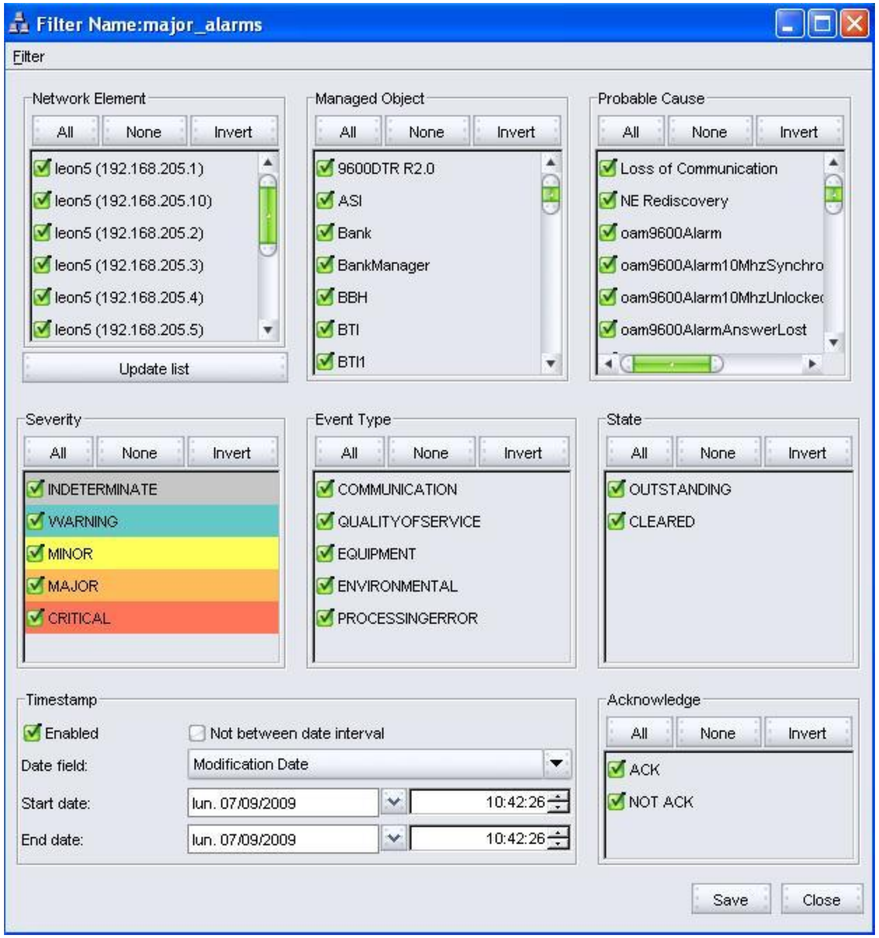
CURRENT SELECTION: 0

STATE: Outstanding 102 Cleared 0 SEVERITY: Indeterminate 0 Warning 0 Minor 12 Major 41 Critical 49

- ❑ Alarm and Event Viewer
- ❑ Flexible Filtering and Customization
- ❑ Single Line for Life Cycle of Alarm

Robust Alarm Filtering

- **Alarm filtering by:**
  - network element
  - managed object
  - probable cause
  - severity
  - alarm type
  - alarm state
  - acknowledge state
  - timestamps



Filter Name:major_alarms

Filter

Network Element
All None Invert
☑ leon5 (192.168.205.1)
☑ leon5 (192.168.205.10)
☑ leon5 (192.168.205.2)
☑ leon5 (192.168.205.3)
☑ leon5 (192.168.205.4)
☑ leon5 (192.168.205.5)
Update list

Managed Object
All None Invert
☑ 9600DTR R2.0
☑ ASI
☑ Bank
☑ BankManager
☑ BBH
☑ BTI
☑ BTI1

Probable Cause
All None Invert
☑ Loss of Communication
☑ NE Rediscovery
☑ oam9600Alarm
☑ oam9600Alarm10MhzSynchro
☑ oam9600Alarm10MhzUnlocke
☑ oam9600AlarmAnswerLost

Severity
All None Invert
☑ INDETERMINATE
☑ WARNING
☑ MINOR
☑ MAJOR
☑ CRITICAL

Event Type
All None Invert
☑ COMMUNICATION
☑ QUALITYOFSERVICE
☑ EQUIPMENT
☑ ENVIRONMENTAL
☑ PROCESSINGERROR

State
All None Invert
☑ OUTSTANDING
☑ CLEARED

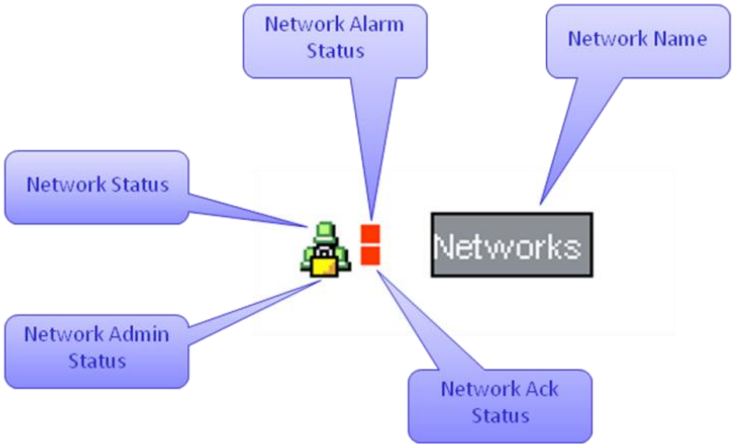
Timestamp
☑ Enabled
☐ Not between date interval
Date field: Modification Date
Start date: lun. 07/09/2009 10:42:26
End date: lun. 07/09/2009 10:42:26

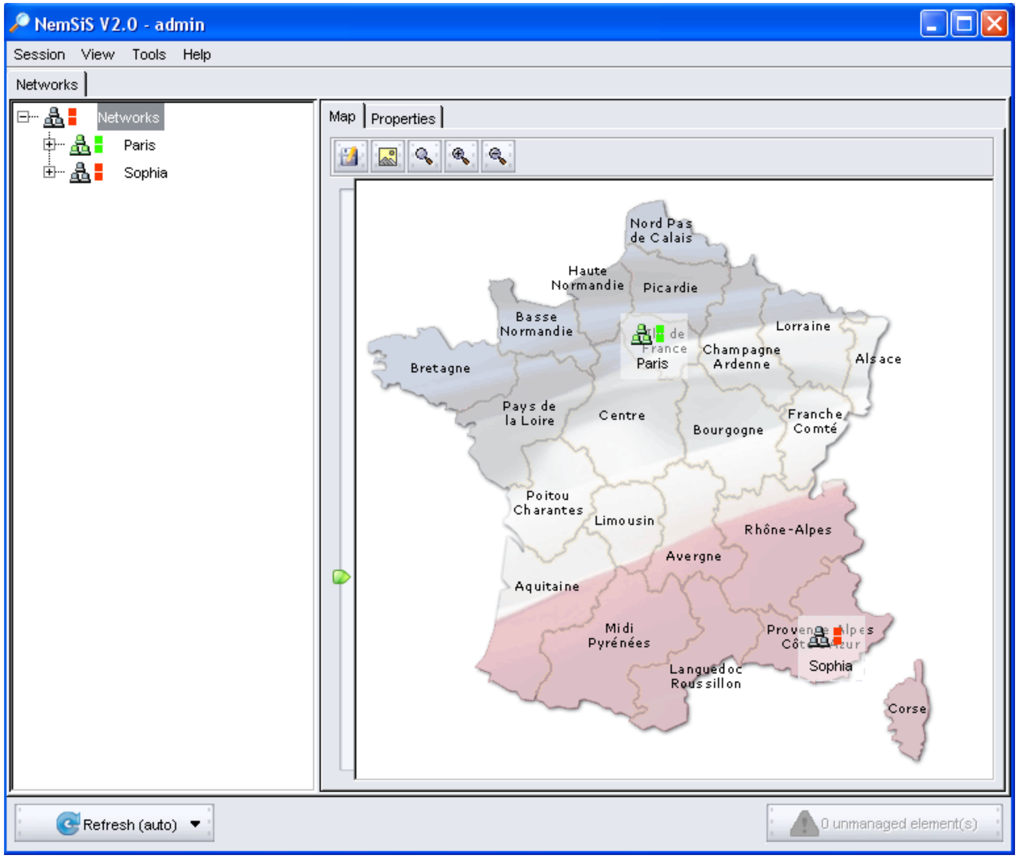
Acknowledge
All None Invert
☑ ACK
☑ NOT ACK

Save Close

- **Alarm Filtering Dialog**

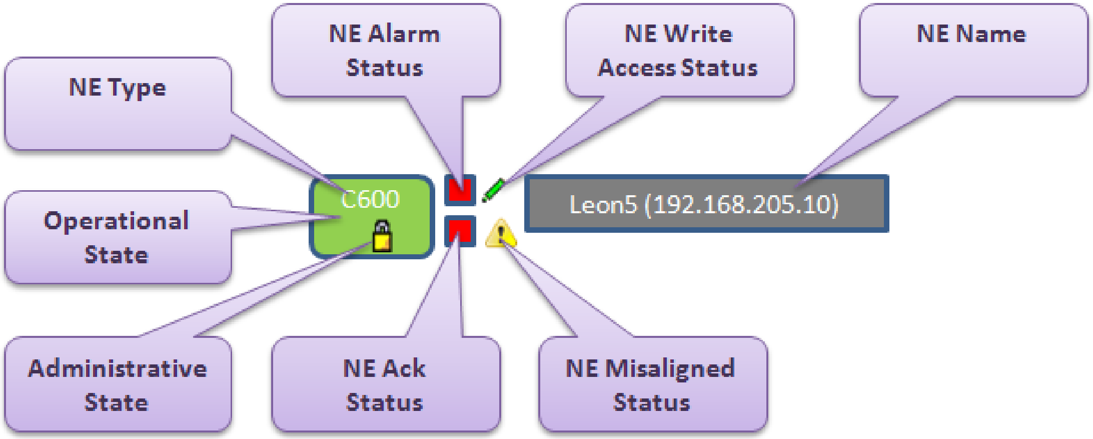
Network Topology View

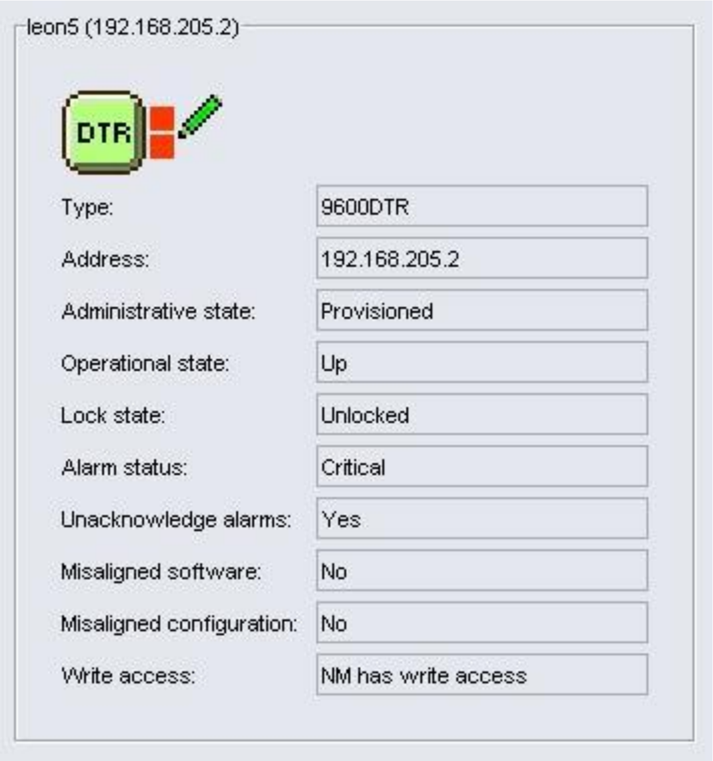

Network Alarm Status
Network Name
Network Status
Networks
Network Admin Status
Network Ack Status


NemSiS V2.0 - admin
Session
View
Tools
Help
Networks
Networks
Paris
Sophia
Map
Properties
Nord Pas de Calais
Haute Normandie
Picardie
Basse Normandie
Lorraine
Île de France
Paris
Champagne Ardenne
Alsace
Bretagne
Pays de la Loire
Centre
Bourgogne
Franche Comté
Poitou Charentes
Limousin
Rhône-Alpes
Avergne
Aquitaine
Midi Pyrénées
Provence Alpes Côte d'Azur
Sophia
Languedoc Roussillon
Corse
Refresh (auto)
0 unmanaged element(s)

- ❑ Management of Network Containers

Network Element Status Summary


NE Alarm Status
NE Write Access Status
NE Name
NE Type
C600
Leon5 (192.168.205.10)
Operational State
Administrative State
NE Ack Status
NE Misaligned Status

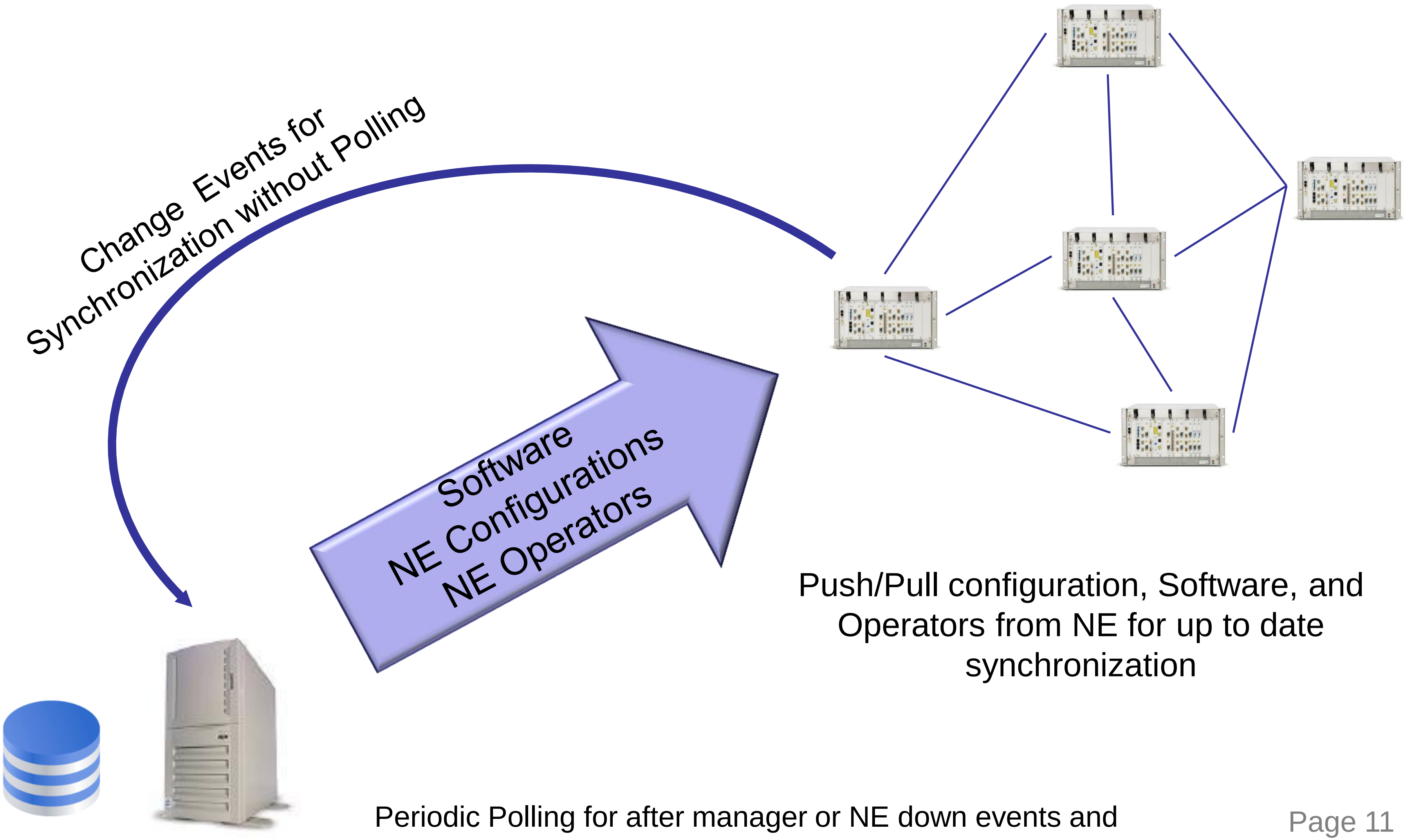


leon5 (192.168.205.2)

Type:	9600DTR
Address:	192.168.205.2
Administrative state:	Provisioned
Operational state:	Up
Lock state:	Unlocked
Alarm status:	Critical
Unacknowledge alarms:	Yes
Misaligned software:	No
Misaligned configuration:	No
Write access:	NM has write access

- Network Element Summary View

NE Configuration, Software, and Security Management



Change Events for
Synchronization without Polling

Software
NE Configurations
NE Operators

Push/Pull configuration, Software, and Operators from NE for up to date synchronization

Periodic Polling for after manager or NE down events and user customizable "synchronization check"

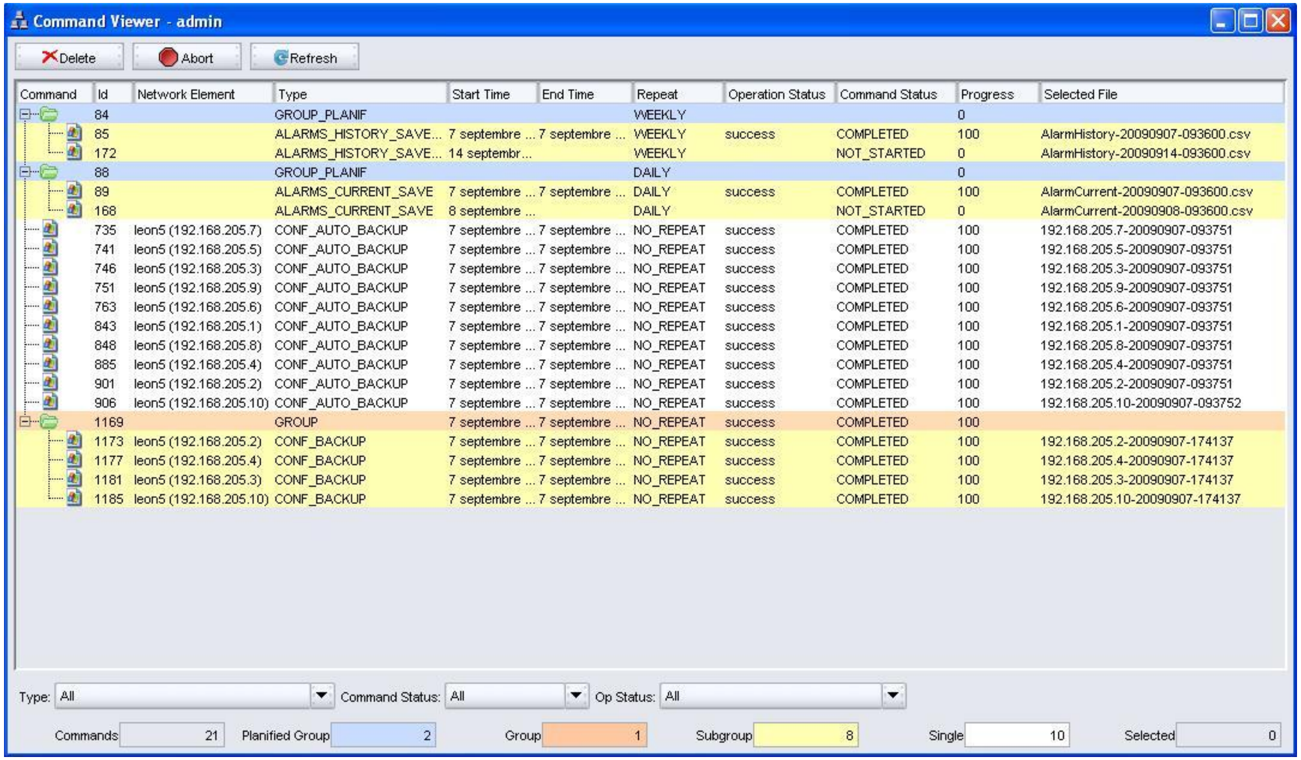
NE Configuration Actions

- Read configuration
- Configuration Backup
- Configuration Restore
- Configuration Activation
- Read Misaligned Configurations
- Align configuration
    - NM master
    - NE master

NE Software Actions

- NE Software Update
- Software Activation
- Manage Software Bank
- Switch to Previous
- Read Misaligned Software Packages
- Align Software
  - NM master
  - NE master

Tracking Configuration and Software Activities



Command	Id	Network Element	Type	Start Time	End Time	Repeat	Operation Status	Command Status	Progress	Selected File
⊟	84		GROUP_PLANIF			WEEKLY			0	
	85		ALARMS_HISTORY_SAVE...	7 septembre ...	7 septembre ...	WEEKLY	success	COMPLETED	100	AlarmHistory-20090907-093600.csv
	172		ALARMS_HISTORY_SAVE...	14 septembr...		WEEKLY		NOT_STARTED	0	AlarmHistory-20090914-093600.csv
⊟	88		GROUP_PLANIF			DAILY			0	
	89		ALARMS_CURRENT_SAVE	7 septembre ...	7 septembre ...	DAILY	success	COMPLETED	100	AlarmCurrent-20090907-093600.csv
	168		ALARMS_CURRENT_SAVE	8 septembre ...		DAILY		NOT_STARTED	0	AlarmCurrent-20090908-093600.csv
	735	leon5 (192.168.205.7)	CONF_AUTO_BACKUP	7 septembre ...	7 septembre ...	NO_REPEAT	success	COMPLETED	100	192.168.205.7-20090907-093751
	741	leon5 (192.168.205.5)	CONF_AUTO_BACKUP	7 septembre ...	7 septembre ...	NO_REPEAT	success	COMPLETED	100	192.168.205.5-20090907-093751
	746	leon5 (192.168.205.3)	CONF_AUTO_BACKUP	7 septembre ...	7 septembre ...	NO_REPEAT	success	COMPLETED	100	192.168.205.3-20090907-093751
	751	leon5 (192.168.205.9)	CONF_AUTO_BACKUP	7 septembre ...	7 septembre ...	NO_REPEAT	success	COMPLETED	100	192.168.205.9-20090907-093751
	763	leon5 (192.168.205.6)	CONF_AUTO_BACKUP	7 septembre ...	7 septembre ...	NO_REPEAT	success	COMPLETED	100	192.168.205.6-20090907-093751
	843	leon5 (192.168.205.1)	CONF_AUTO_BACKUP	7 septembre ...	7 septembre ...	NO_REPEAT	success	COMPLETED	100	192.168.205.1-20090907-093751
	848	leon5 (192.168.205.8)	CONF_AUTO_BACKUP	7 septembre ...	7 septembre ...	NO_REPEAT	success	COMPLETED	100	192.168.205.8-20090907-093751
	885	leon5 (192.168.205.4)	CONF_AUTO_BACKUP	7 septembre ...	7 septembre ...	NO_REPEAT	success	COMPLETED	100	192.168.205.4-20090907-093751
	901	leon5 (192.168.205.2)	CONF_AUTO_BACKUP	7 septembre ...	7 septembre ...	NO_REPEAT	success	COMPLETED	100	192.168.205.2-20090907-093751
	906	leon5 (192.168.205.10)	CONF_AUTO_BACKUP	7 septembre ...	7 septembre ...	NO_REPEAT	success	COMPLETED	100	192.168.205.10-20090907-093752
⊟	1169		GROUP	7 septembre ...	7 septembre ...	NO_REPEAT	success	COMPLETED	100	
	1173	leon5 (192.168.205.2)	CONF_BACKUP	7 septembre ...	7 septembre ...	NO_REPEAT	success	COMPLETED	100	192.168.205.2-20090907-174137
	1177	leon5 (192.168.205.4)	CONF_BACKUP	7 septembre ...	7 septembre ...	NO_REPEAT	success	COMPLETED	100	192.168.205.4-20090907-174137
	1181	leon5 (192.168.205.3)	CONF_BACKUP	7 septembre ...	7 septembre ...	NO_REPEAT	success	COMPLETED	100	192.168.205.3-20090907-174137
	1185	leon5 (192.168.205.10)	CONF_BACKUP	7 septembre ...	7 septembre ...	NO_REPEAT	success	COMPLETED	100	192.168.205.10-20090907-174137

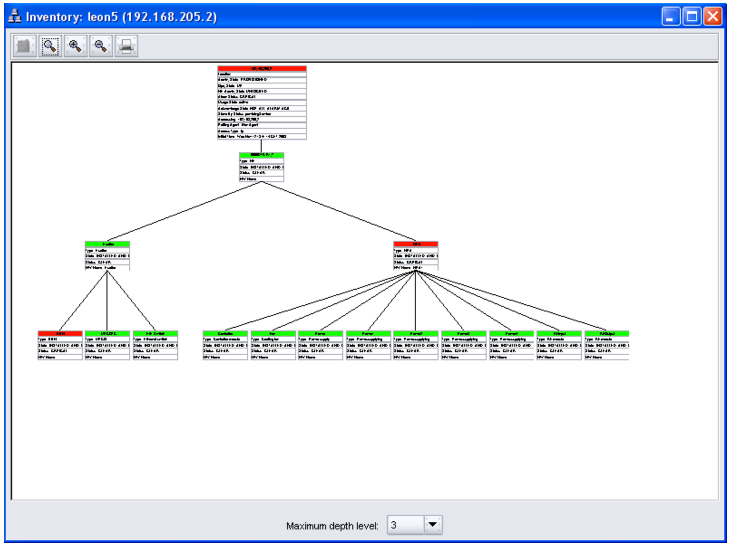
Type: All
Command Status: All
Op Status: All

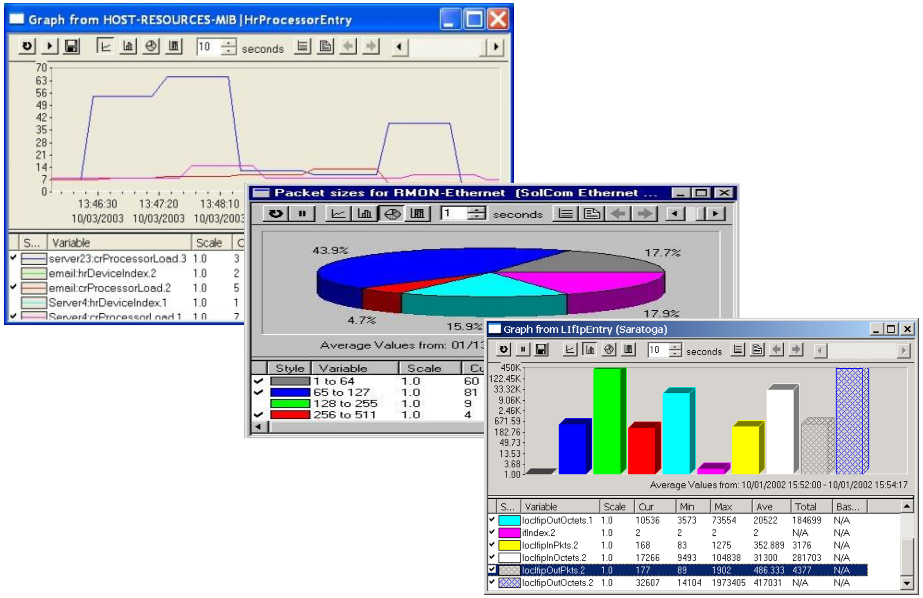
Commands 21
Planified Group 2
Group 1
Subgroup 8
Single 10
Selected 0

- Software and Configuration Activity is tracked via Command viewer
- Commands can be for one or more network elements
- Commands can be issued immediately or queued to be issued at a later date/time
- Command status shown in hierarchy

Inventory And Performance

M.3100 Equipment Browser


Inventory: leon5 (192.168.205.2)
Maximum depth level: 3


Graph from HOST-RESOURCES-MIB | HrProcessorEntry
10
seconds
70
63
56
49
42
35
28
21
14
7
0
13:46:30 10/03/2003
13:47:20 10/03/2003
13:48:10 10/03/2003
Packet sizes for RMON-Ethernet (SolCom Ethernet ...
1
seconds
43.9%
17.7%
17.9%
4.7%
15.9%
Graph from L1fIpEntry (Saratoga)
10
seconds
450K
122.45K
33.32K
9.06K
2.46K
671.59
182.76
49.73
13.53
3.68
1.00

	S...	Variable	Scale	C
✓	—	server23:crProcessorLoad.3	1.0	3
	—	email:hrDeviceIndex.2	1.0	2
✓	—	email:crProcessorLoad.2	1.0	5
	—	Server4:hrDeviceIndex.1	1.0	1
✓	—	Server4:crProcessorLoad.1	1.0	7

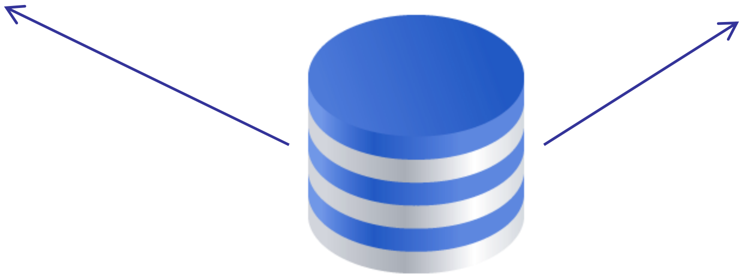
Average Values from: 01/13

	Style	Variable	Scale	Cu
✓	⬛	1 to 64	1.0	60
✓	🟦	65 to 127	1.0	81
	🟩	128 to 255	1.0	9
✓	🟥	256 to 511	1.0	4

Average Values from: 10/01/2002 15:52:00 - 10/01/2002 15:54:17

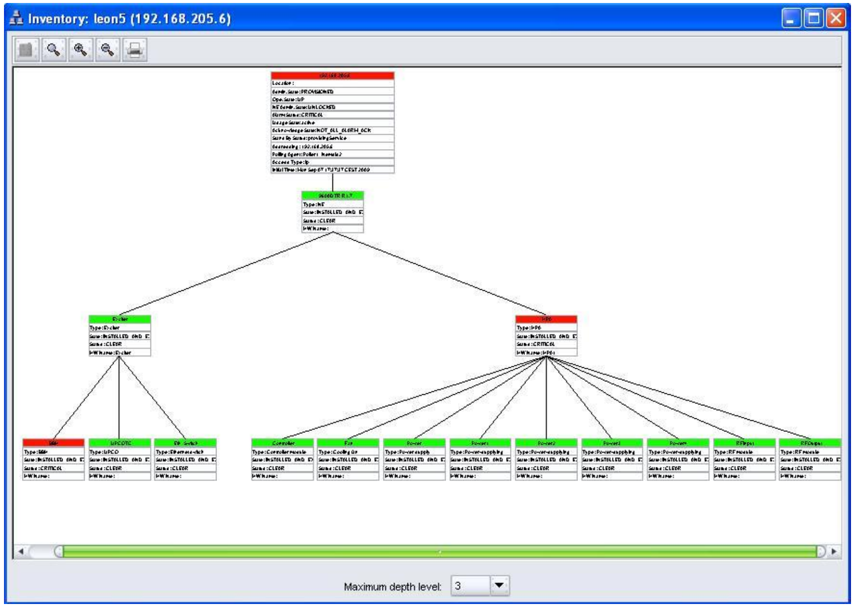
	S...	Variable	Scale	Cur	Min	Max	Ave	Total	Bas...
✓	🟦	loclfipOutOctets.1	1.0	10536	3573	73554	20522	184699	N/A
✓	🟪	ifIndex.2	1.0	2	2	2	2	N/A	N/A
✓	🟨	loclfipInPkts.2	1.0	168	83	1275	352.889	3176	N/A
✓	⬜	loclfipInOctets.2	1.0	17266	9493	104838	31300	281703	N/A
✓	▨	loclfipOutPkts.2	1.0	177	89	1902	486.333	4377	N/A
✓	▨	loclfipOutOctets.2	1.0	32607	14104	1973405	417031	N/A	N/A

Standard SQL Reporting Tools



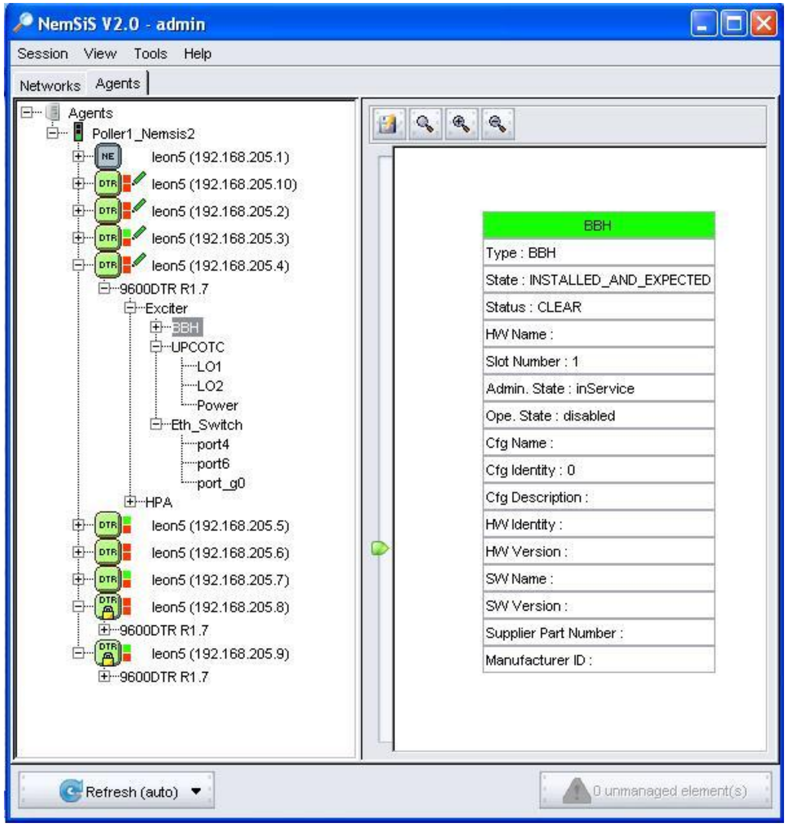
- Of course, inventory and performance data logged in SQL database and exportable… along with other statistics collected by the manager

Inventory Views



Inventory: leon5 (192.168.205.6)

Maximum depth level: 3

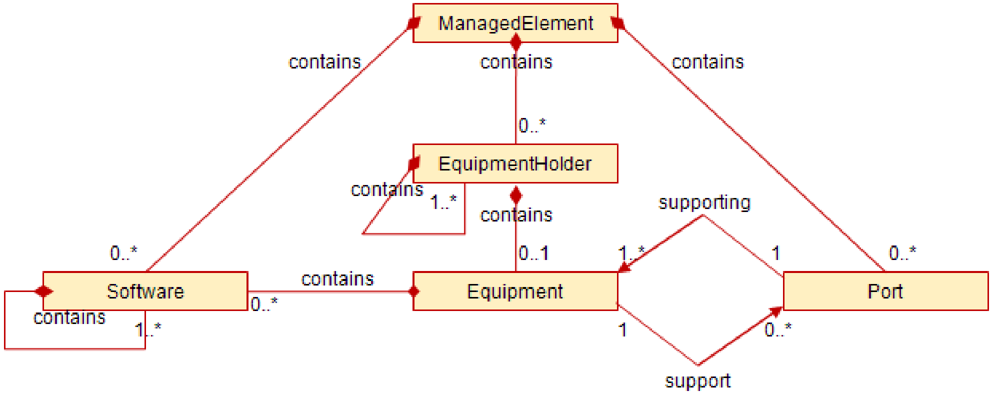


NemSiS V2.0 - admin
Session View Tools Help
Networks Agents
Refresh (auto)
0 unmanaged element(s)

- Agents
  - Poller1_Nemsis2
    - NE leon5 (192.168.205.1)
    - DTR leon5 (192.168.205.10)
    - DTR leon5 (192.168.205.2)
    - DTR leon5 (192.168.205.3)
    - DTR leon5 (192.168.205.4)
      - 9600DTR R1.7
        - Exciter
          - BBH
          - UPCOTC
            - LO1
            - LO2
            - Power
          - Eth_Switch
            - port4
            - port6
            - port_g0
        - HPA
    - DTR leon5 (192.168.205.5)
    - DTR leon5 (192.168.205.6)
    - DTR leon5 (192.168.205.7)
    - DTR leon5 (192.168.205.8)
      - 9600DTR R1.7
    - DTR leon5 (192.168.205.9)
      - 9600DTR R1.7

BBH

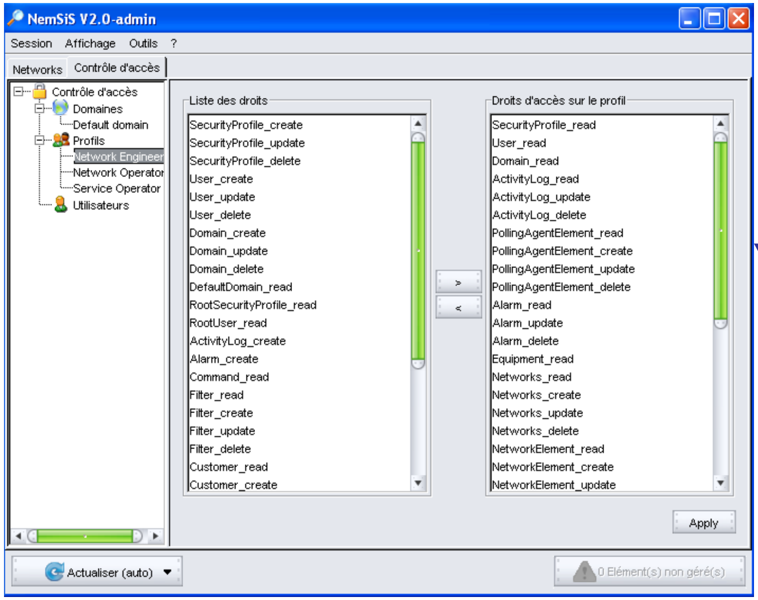
Type : BBH
State : INSTALLED_AND_EXPECTED
Status : CLEAR
HW Name :
Slot Number : 1
Admin. State : inService
Ope. State : disabled
Cfg Name :
Cfg Identity : 0
Cfg Description :
HW Identity :
HW Version :
SW Name :
SW Version :
Supplier Part Number :
Manufacturer ID :



ManagedElement
contains
contains
contains
0..*
EquipmentHolder
contains
1..*
contains
supporting
0..*
0..1
1..*
1
0..*
Software
contains
Equipment
Port
contains
0..*
1..*
1
0..*
support

- Inventory hierarchy based on M.3100 Model

NMS Security


NemSiS V2.0-admin
Session Affichage Outils ?
Networks Contrôle d'accès
Contrôle d'accès
Domaines
Default domain
Profils
Network Engineer
Network Operator
Service Operator
Utilisateurs
>
<
Apply
Actualiser (auto)
0 Elément(s) non géré(s)

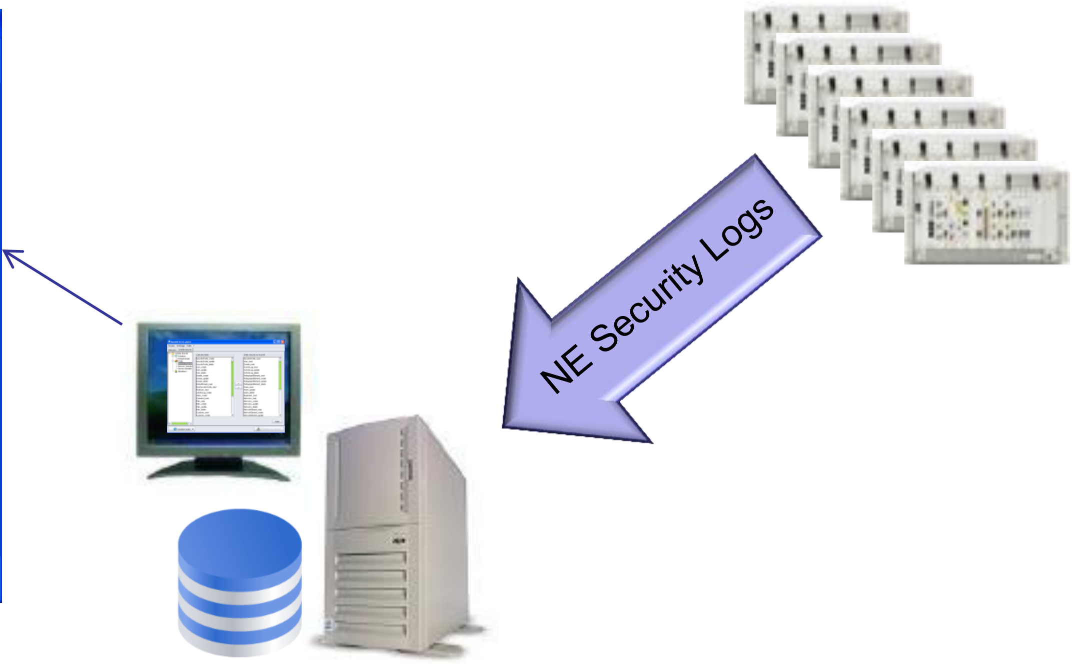
Liste des droits

- SecurityProfile_create
- SecurityProfile_update
- SecurityProfile_delete
- User_create
- User_update
- User_delete
- Domain_create
- Domain_update
- Domain_delete
- DefaultDomain_read
- RootSecurityProfile_read
- RootUser_read
- ActivityLog_create
- Alarm_create
- Command_read
- Filter_read
- Filter_create
- Filter_update
- Filter_delete
- Customer_read
- Customer_create

Droits d'accès sur le profil

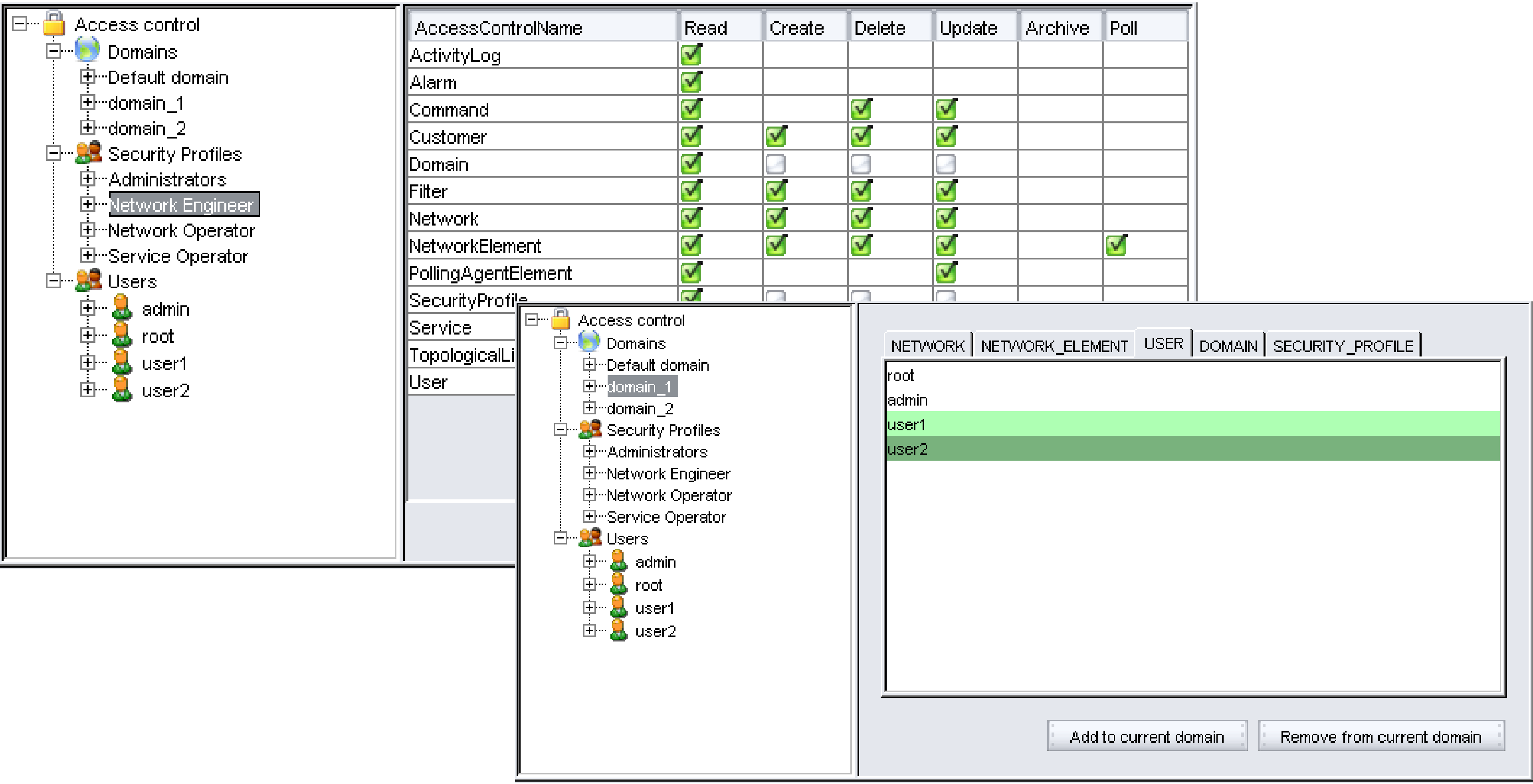
- SecurityProfile_read
- User_read
- Domain_read
- ActivityLog_read
- ActivityLog_update
- ActivityLog_delete
- PollingAgentElement_read
- PollingAgentElement_create
- PollingAgentElement_update
- PollingAgentElement_delete
- Alarm_read
- Alarm_update
- Alarm_delete
- Equipment_read
- Networks_read
- Networks_create
- Networks_update
- Networks_delete
- NetworkElement_read
- NetworkElement_create
- NetworkElement_update

Security Menu


NE Security Logs

- ❑ Robust and Granular Feature Based Security Management
- ❑ Configuration Logs at the manager and the NE, NE Logs kept historically on manager

Operator Security



- Access control
  - Domains
    - Default domain
    - domain_1
    - domain_2
  - Security Profiles
    - Administrators
    - Network Engineer
    - Network Operator
    - Service Operator
  - Users
    - admin
    - root
    - user1
    - user2

AccessControlName	Read	Create	Delete	Update	Archive	Poll
ActivityLog	☑					
Alarm	☑					
Command	☑		☑	☑		
Customer	☑	☑	☑	☑		
Domain	☑	☐	☐	☐		
Filter	☑	☑	☑	☑		
Network	☑	☑	☑	☑		
NetworkElement	☑	☑	☑	☑		☑
PollingAgentElement	☑			☑		
SecurityProfile	☑	☐	☐	☐		
Service						
TopologicalLi						
User						

- Access control
  - Domains
    - Default domain
    - domain_1
    - domain_2
  - Security Profiles
    - Administrators
    - Network Engineer
    - Network Operator
    - Service Operator
  - Users
    - admin
    - root
    - user1
    - user2

NETWORK
NETWORK_ELEMENT
USER
DOMAIN
SECURITY_PROFILE

root
admin
user1
user2

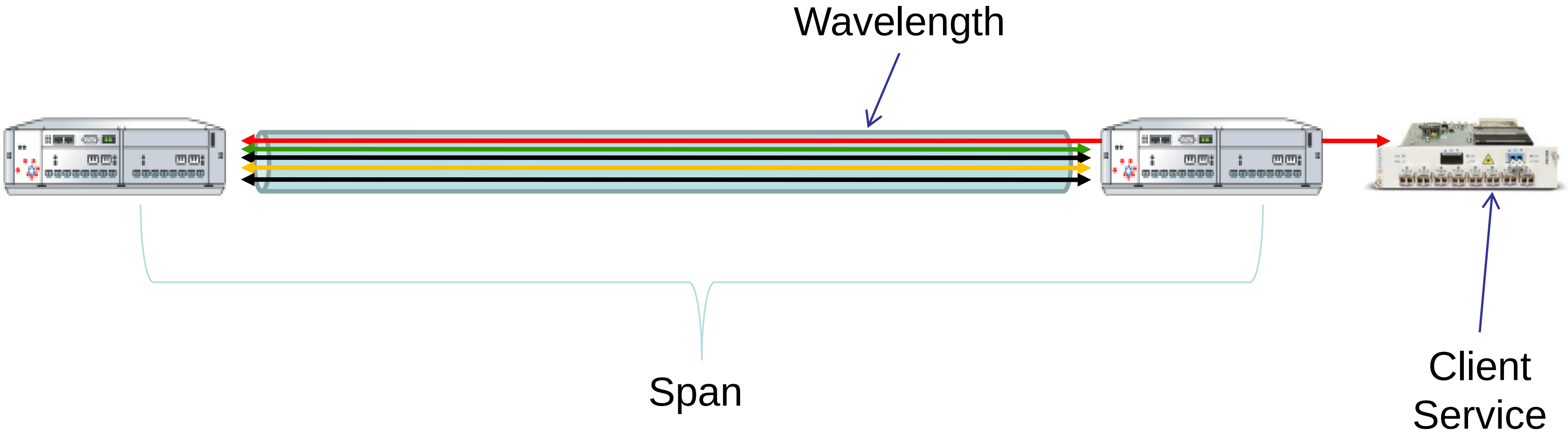
Add to current domain
Remove from current domain

- Networks can be divided into domains and users assigned to domains
- Users can be assigned to domains, Distinct security profiles can be created for domains

Service Level Management

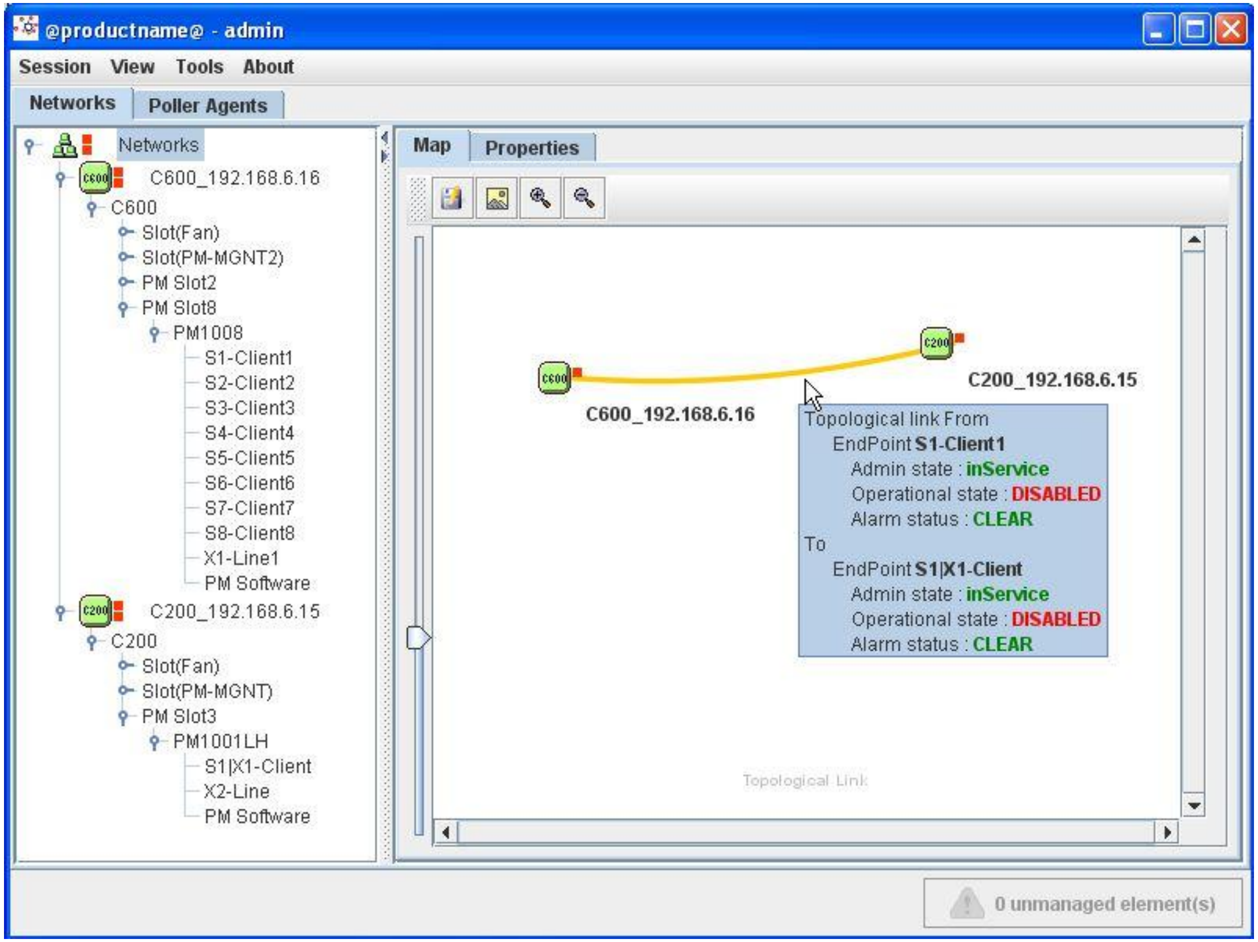
- What is a service?

- Services are hierarchical


Wavelength
Span
Client
Service

- Wavelengths traverse spans and client services ride wavelengths

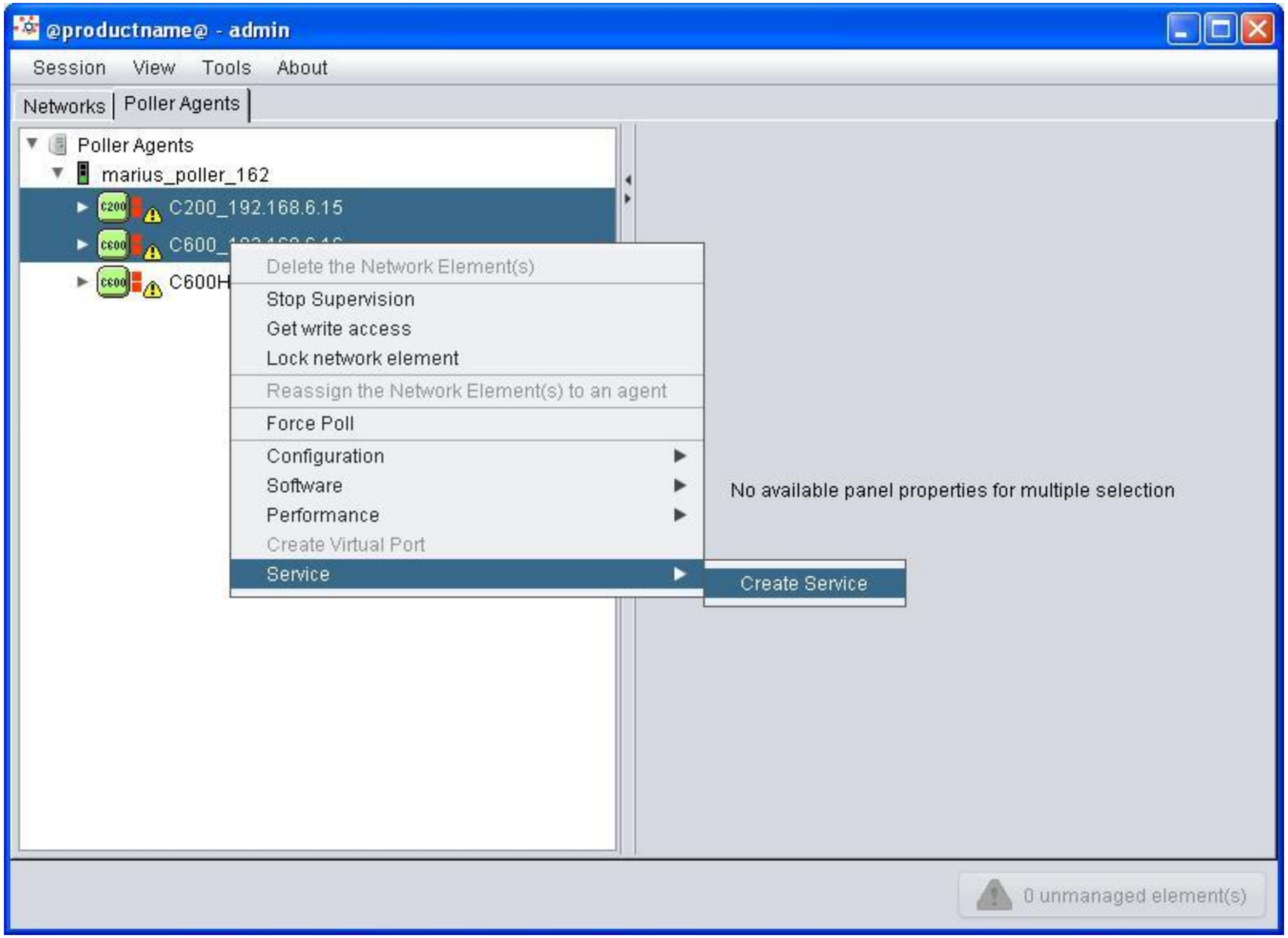
Topological Links


@productname@ - admin
Session
View
Tools
About
Networks
Poller Agents
Networks
C600_192.168.6.16
C600
Slot(Fan)
Slot(PM-MGNT2)
PM Slot2
PM Slot8
PM1008
S1-Client1
S2-Client2
S3-Client3
S4-Client4
S5-Client5
S6-Client6
S7-Client7
S8-Client8
X1-Line1
PM Software
C200_192.168.6.15
C200
Slot(Fan)
Slot(PM-MGNT)
PM Slot3
PM1001LH
S1|X1-Client
X2-Line
PM Software
Map
Properties
C600
C200
C600_192.168.6.16
C200_192.168.6.15
Topological Link
0 unmanaged element(s)

Topological link From
EndPoint **S1-Client1**
Admin state : **inService**
Operational state : **DISABLED**
Alarm status : **CLEAR**
To
EndPoint **S1|X1-Client**
Admin state : **inService**
Operational state : **DISABLED**
Alarm status : **CLEAR**

- Topological Links are added with the service level management capability
  - Just like NEs, links have administrative, operational, and alarm status

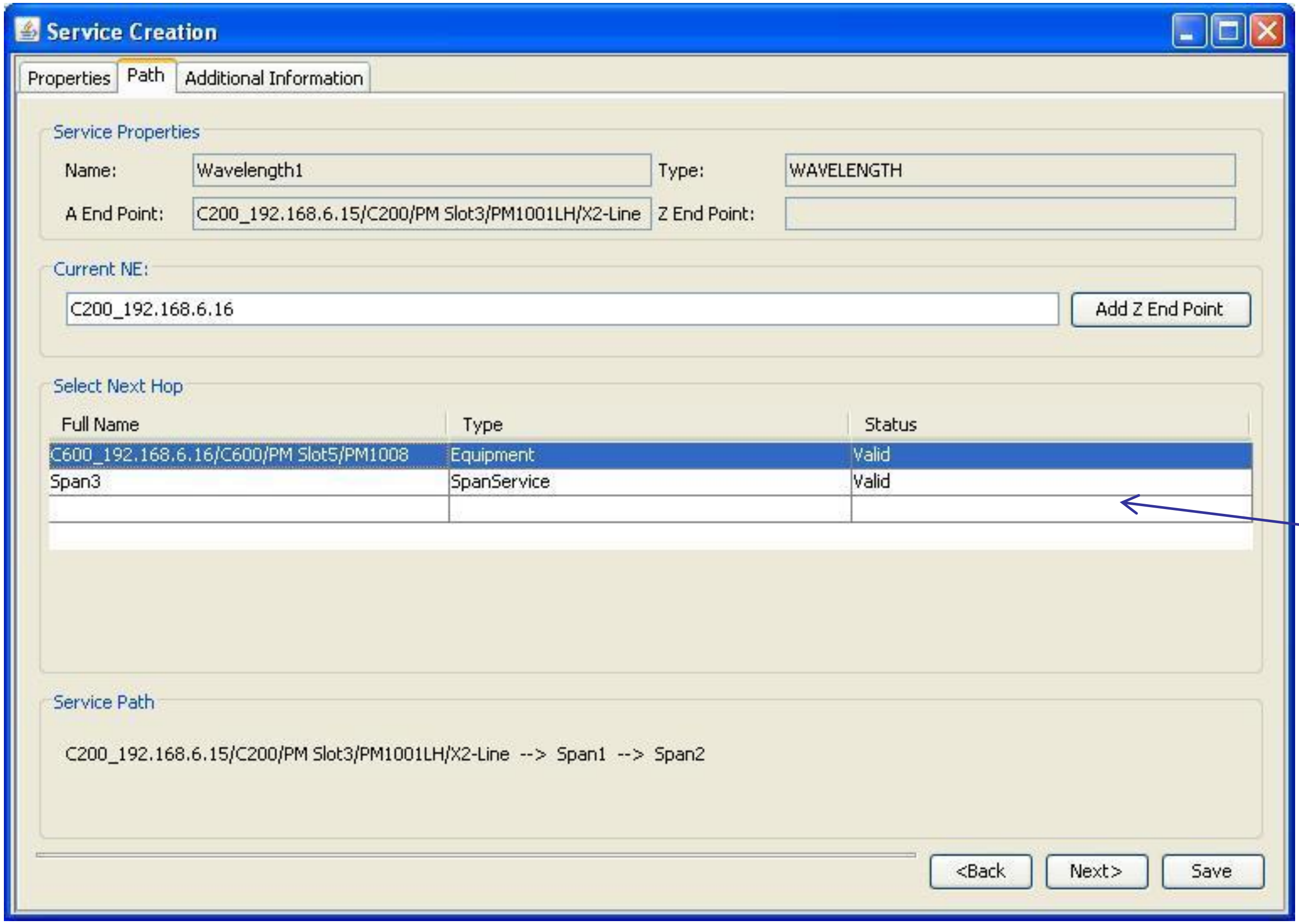
Service Creation


@productname@ - admin
Session
View
Tools
About
Networks
Poller Agents
Poller Agents
marius_poller_162
C200_192.168.6.15
C600_
C600H
Delete the Network Element(s)
Stop Supervision
Get write access
Lock network element
Reassign the Network Element(s) to an agent
Force Poll
Configuration
Software
Performance
Create Virtual Port
Service
Create Service
0 unmanaged element(s)

No available panel properties for multiple selection

- ❑ Click on 2 NEs that will service as end points

Service Creation



Service Creation
Properties
Path
Additional Information

Service Properties

Name: Wavelength1
Type: WAVELENGTH
A End Point: C200_192.168.6.15/C200/PM Slot3/PM1001LH/X2-Line
Z End Point:

Current NE:

C200_192.168.6.16

Add Z End Point

Select Next Hop

Full Name	Type	Status
C600_192.168.6.16/C600/PM Slot5/PM1008	Equipment	Valid
Span3	SpanService	Valid

Service Path

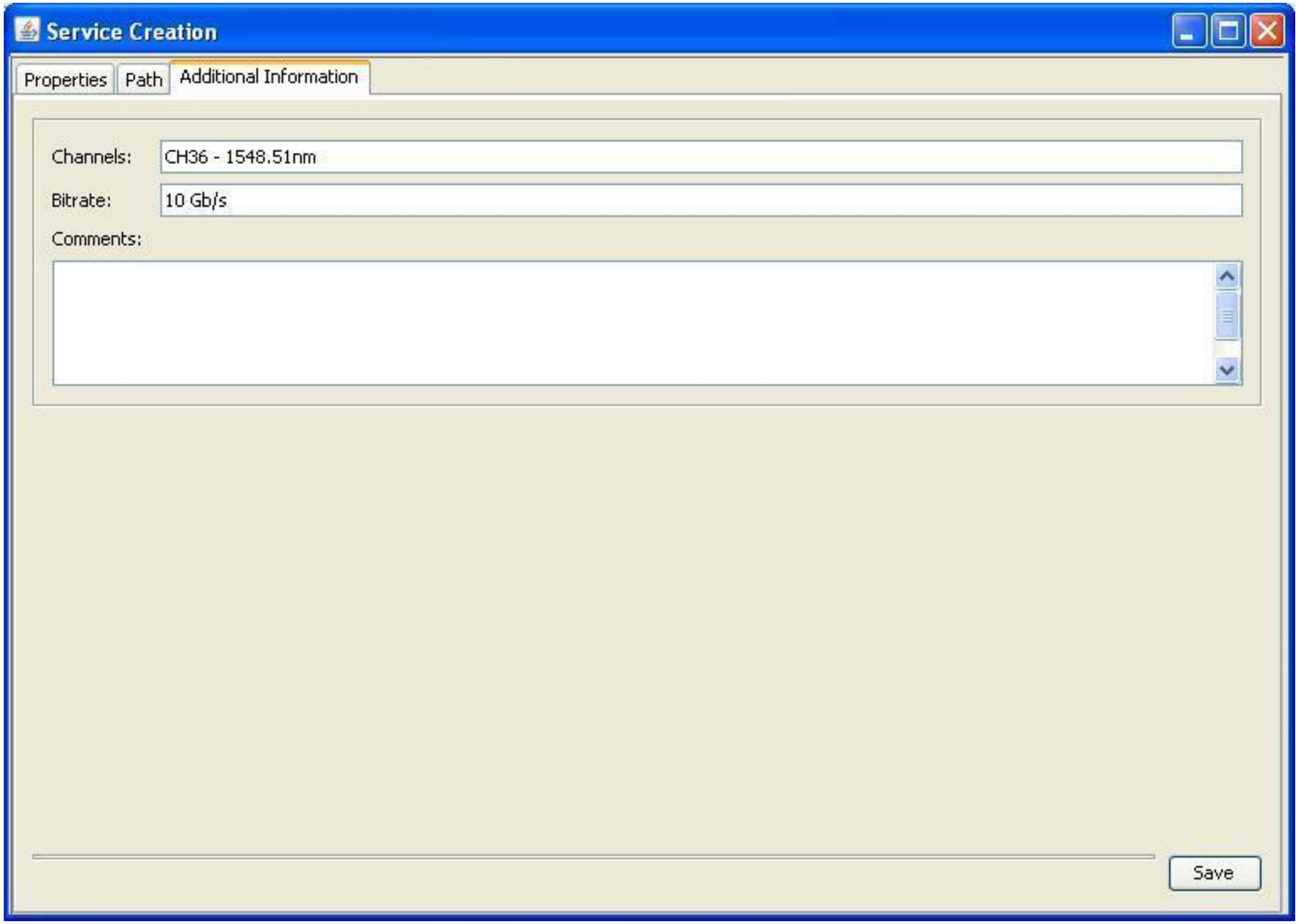
C200_192.168.6.15/C200/PM Slot3/PM1001LH/X2-Line --> Span1 --> Span2

<Back
Next>
Save

Possible Next Hops

- Creating the hops in between
- Once Wavelength services are created, we know where the client services are

Service Creation


Service Creation
Properties
Path
Additional Information
Save

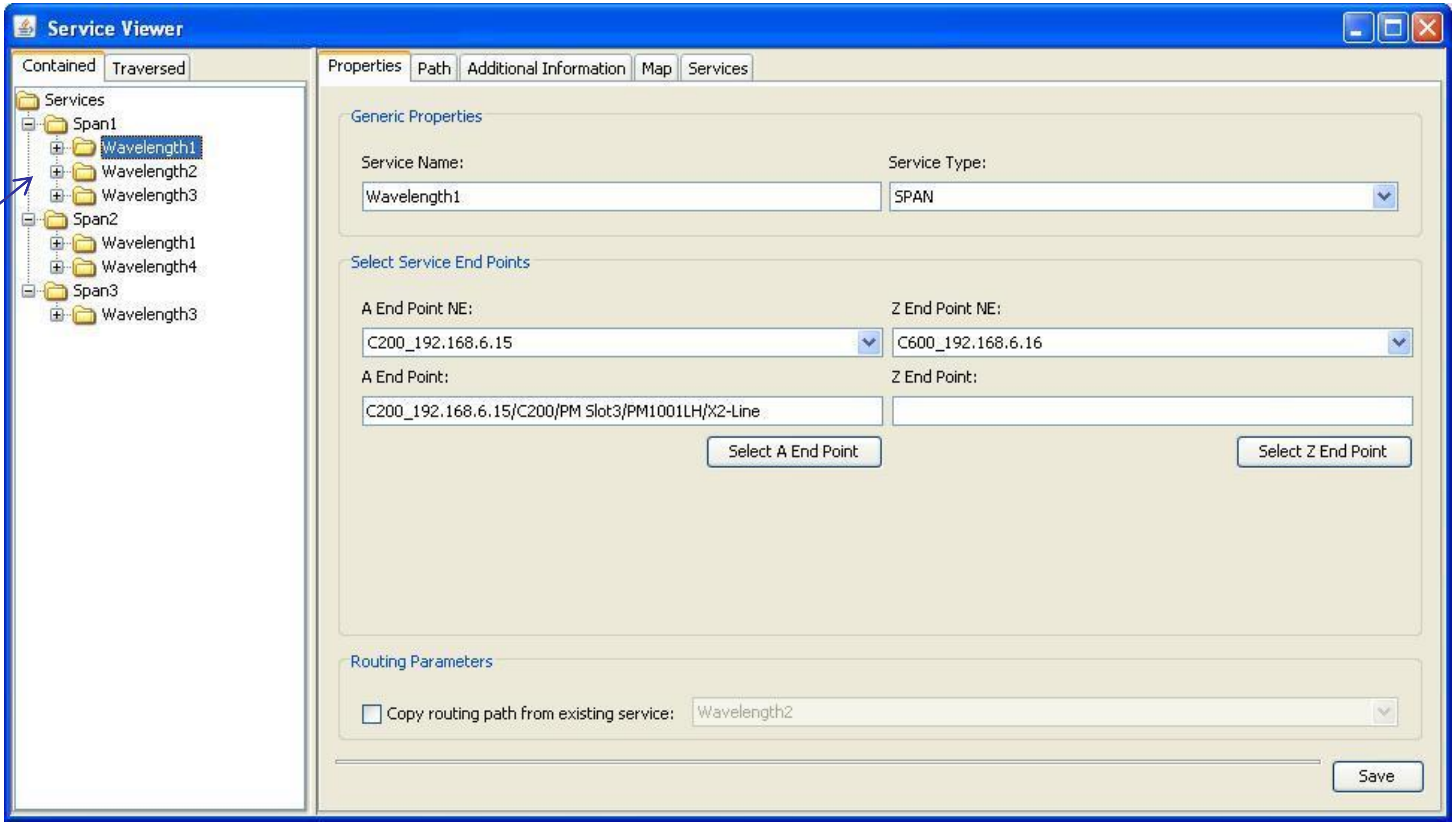
Channels: CH36 - 1548.51nm

Bitrate: 10 Gb/s

Comments:

- Additional Information on the service varies based on service type

Monitoring, Displaying, Editing


Service Viewer
Contained
Traversed
Services
Span1
Wavelength1
Wavelength2
Wavelength3
Span2
Wavelength1
Wavelength4
Span3
Wavelength3
Properties
Path
Additional Information
Map
Services
Select A End Point
Select Z End Point
Save

Generic Properties

Service Name: Wavelength1

Service Type: SPAN

Select Service End Points

A End Point NE: C200_192.168.6.15

Z End Point NE: C600_192.168.6.16

A End Point: C200_192.168.6.15/C200/PM Slot3/PM1001LH/X2-Line

Z End Point:

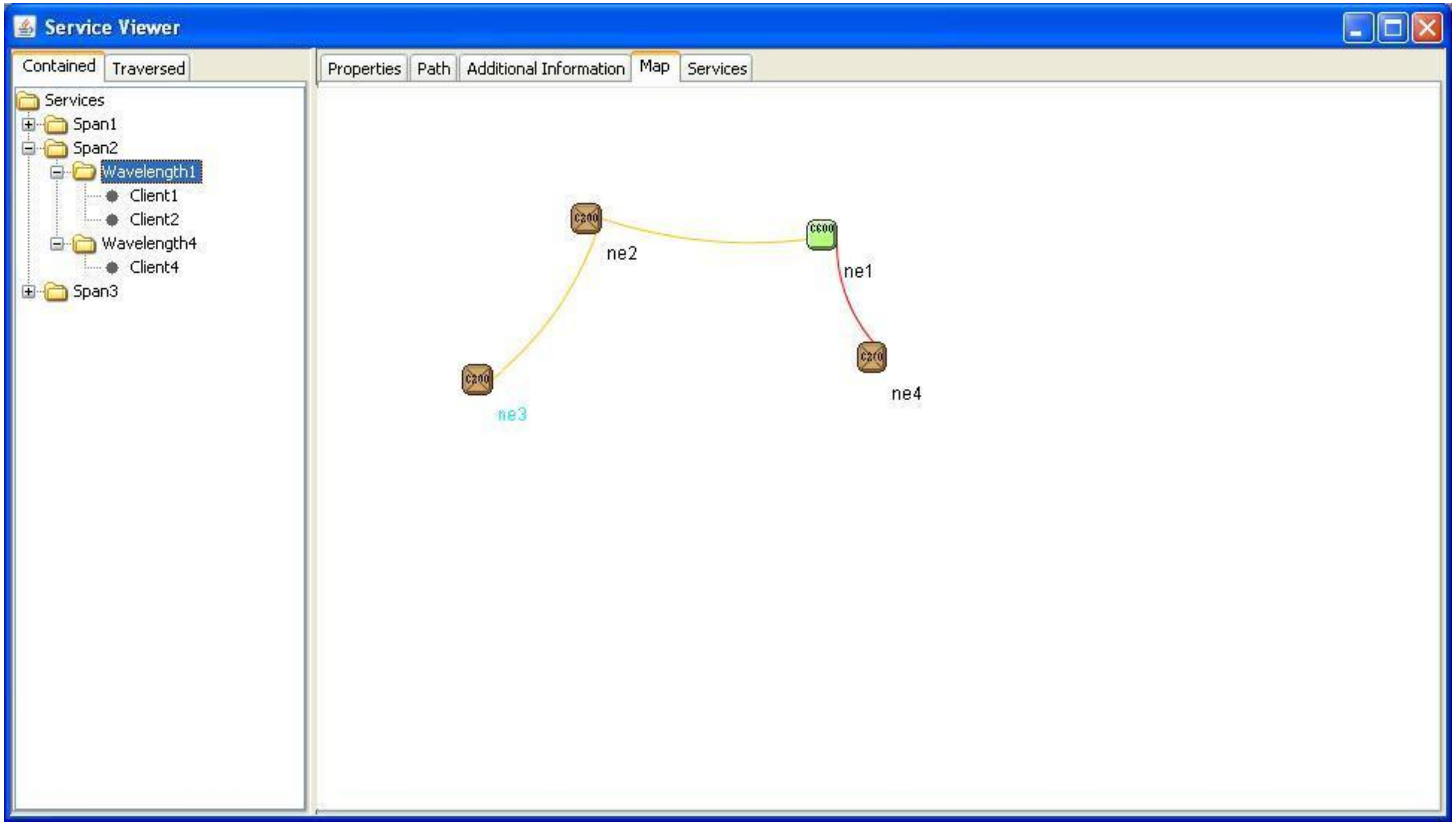
Routing Parameters

☐ Copy routing path from existing service: Wavelength2

Service Status Will be Reflected in Tree View

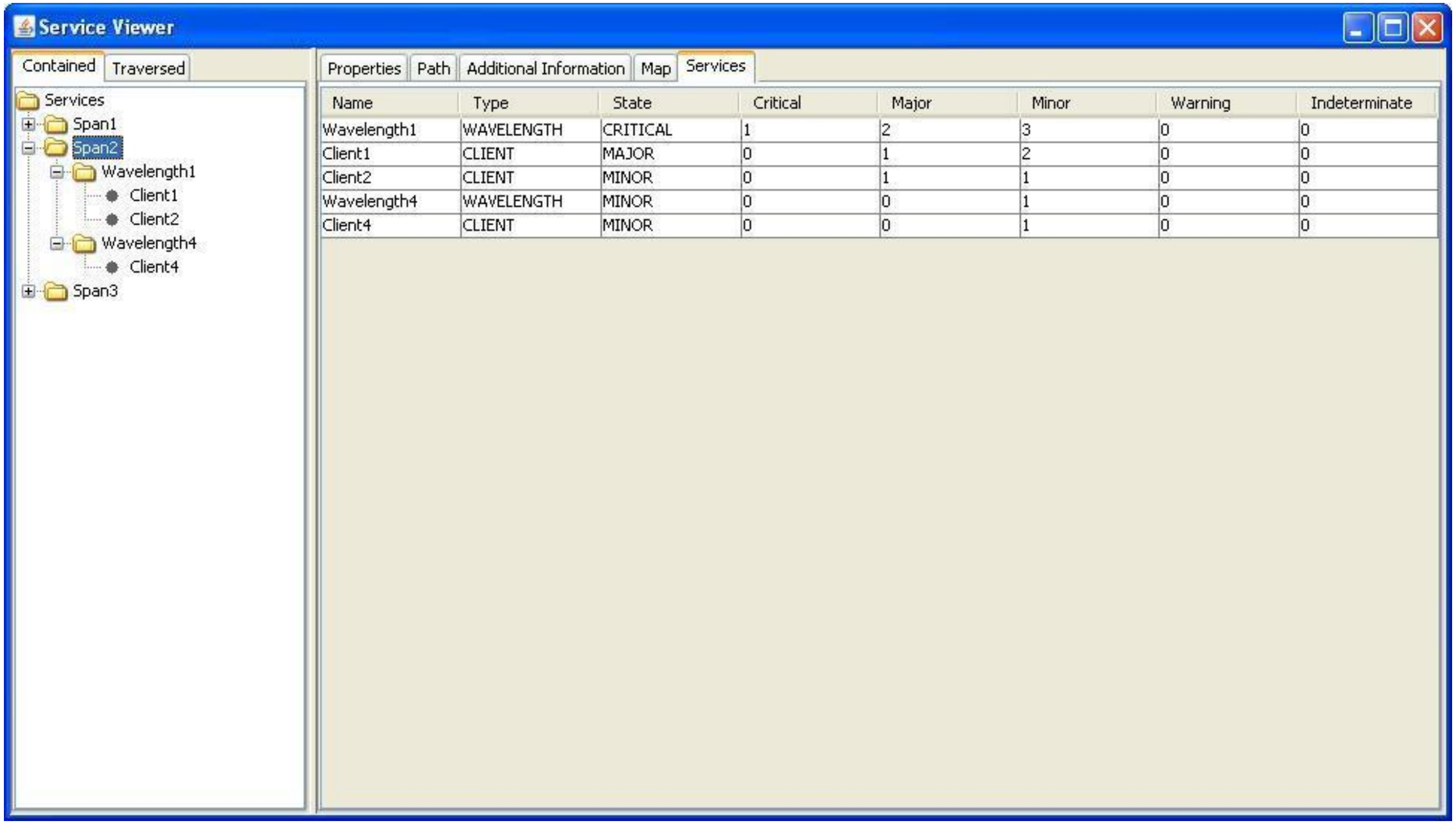
- Select the service to get status and other information
- The tree view can be inversed… client service, wavelength, span

Monitoring, Displaying, Editing


Service Viewer
Contained
Traversed
Services
Span1
Span2
Wavelength1
Client1
Client2
Wavelength4
Client4
Span3
Properties
Path
Additional Information
Map
Services
C200
ne2
C600
ne1
C200
ne3
C200
ne4

- Display Physical Path of Service
  - Links reflect status of servce
  - Clicking on the service in the tree view gets you to an alarm display filtered for that service

Monitoring, Displaying, Editing

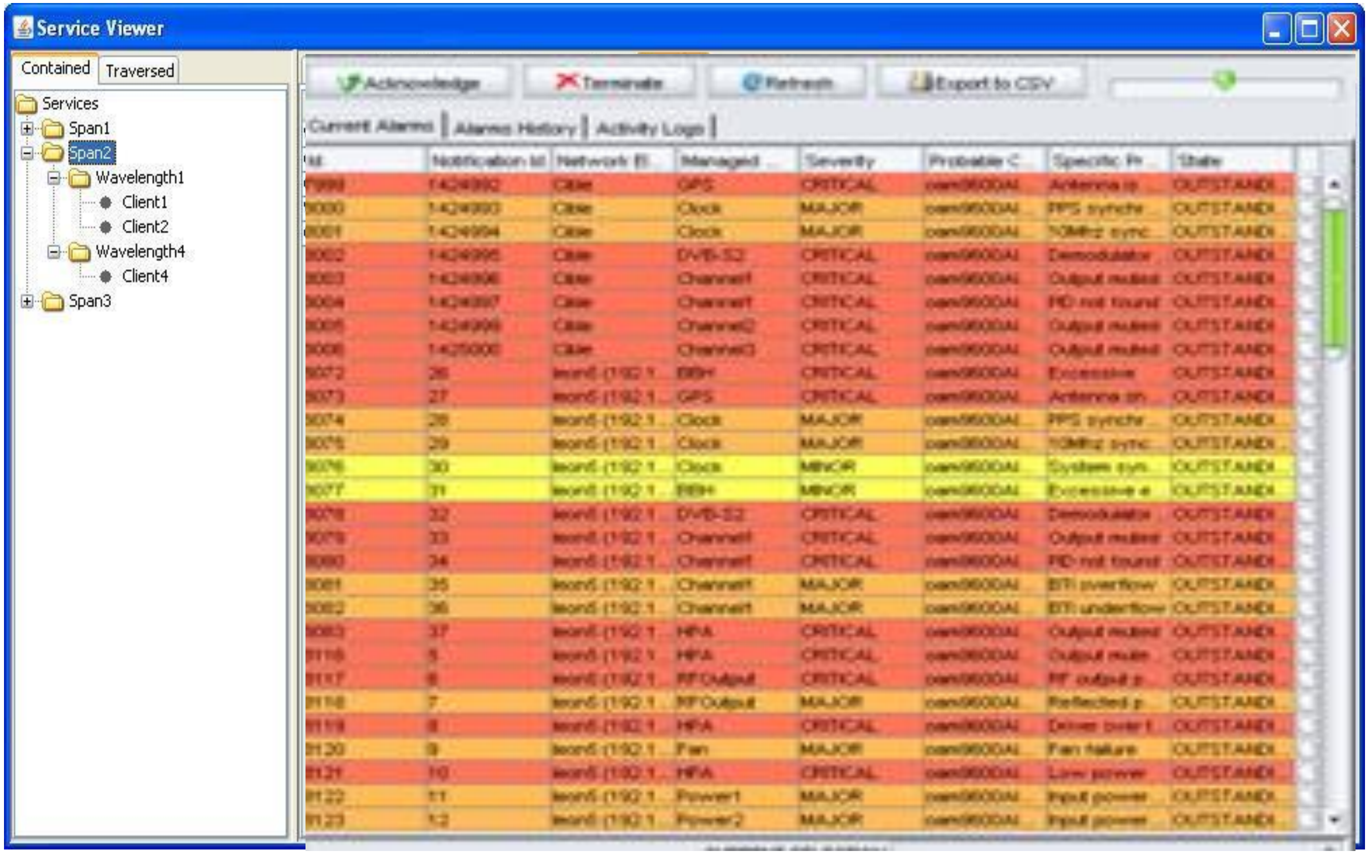

Service Viewer
Contained
Traversed
Properties
Path
Additional Information
Map
Services

- Services
  - Span1
  - Span2
    - Wavelength1
      - Client1
      - Client2
    - Wavelength4
      - Client4
  - Span3

Name	Type	State	Critical	Major	Minor	Warning	Indeterminate
Wavelength1	WAVELENGTH	CRITICAL	1	2	3	0	0
Client1	CLIENT	MAJOR	0	1	2	0	0
Client2	CLIENT	MINOR	0	1	1	0	0
Wavelength4	WAVELENGTH	MINOR	0	0	1	0	0
Client4	CLIENT	MINOR	0	0	1	0	0

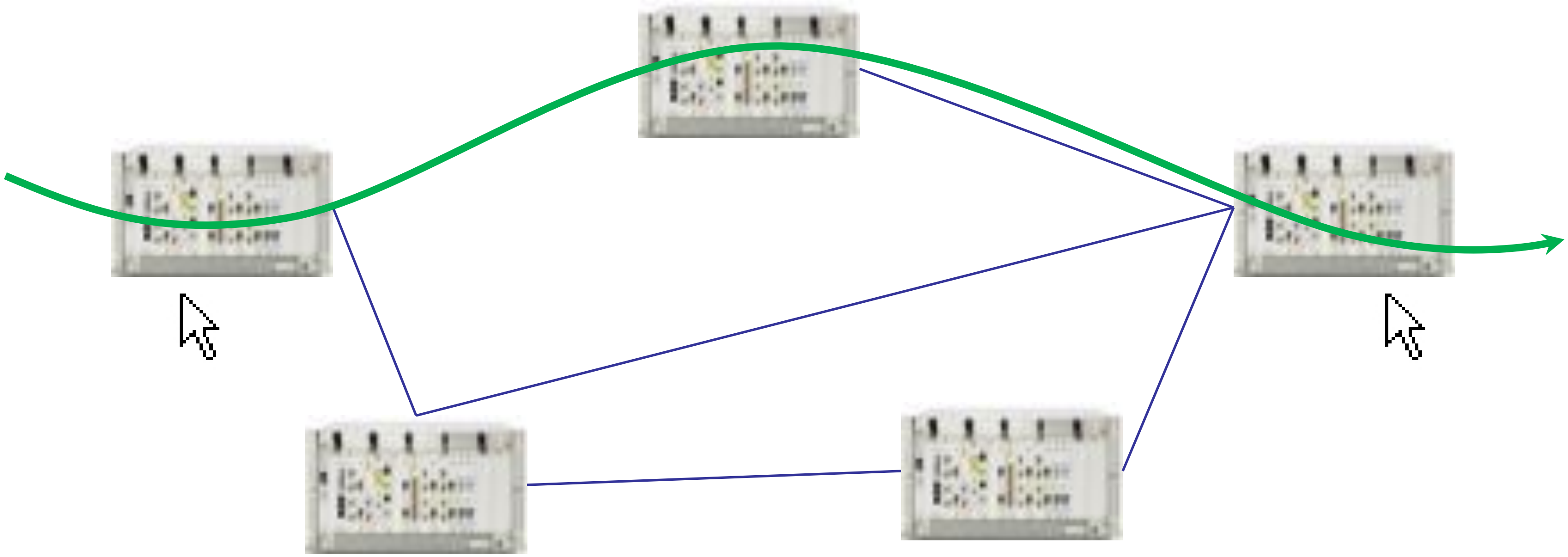
- ❑ Hierarchical view of services and status
  - ⇨ Click on a service on the left, all underlying services and status are shown on the right (Color will be added to reflect status)

Monitoring, Displaying, Editing


Service Viewer
Contained
Traversed
Services
Span1
Span2
Wavelength1
Client1
Client2
Wavelength4
Client4
Span3
Acknowledge
Terminate
Refresh
Export to CSV
Current Alarms
Alarms History
Activity Logs
Id
Notification Id
Network El...
Managed ...
Severity
Probable C...
Specific Pr...
State

- Main Alarm Display will also have a service tree for quick and easy alarm to service correlation

End-To-End Provisioning



- End-To-End, Automatically Routed
  - Pick End Points Only
  - User similar dialogs to service creation dialogs
    - If service is provisioned using MPSN, it will automatically be created in the monitoring application
  - A list of possible routes will be displayed allowing the user to select

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Video
DWDM
3GD
3GD
3GD

Thank you

3.2 TERABITS PER SECOND CARRIER CLASS TRANSPORT

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