



HP Software Forum

THINGS CHANGE. BE READY.

JUNE 19 – 23, 2006

MIAMI BEACH, FLORIDA



Title: Peeling the Oranges (and Reds and Greens)

Session #:322

Speaker: Mike Peckar

Company: Fognet



OpenView Forum
ADVOCACY • COMMUNITY • EDUCATION

Welcome

- General greetings and a query as to the audience's well-being.
- Affirmation of audience's well being.
- Statement of own well-being.
- Survey of surroundings.
- Improvised analogy comparing surroundings to different surroundings.
- Sarcastic jab at expected length of proceedings.

Jon Stewart, Naked Pictures of Famous People.



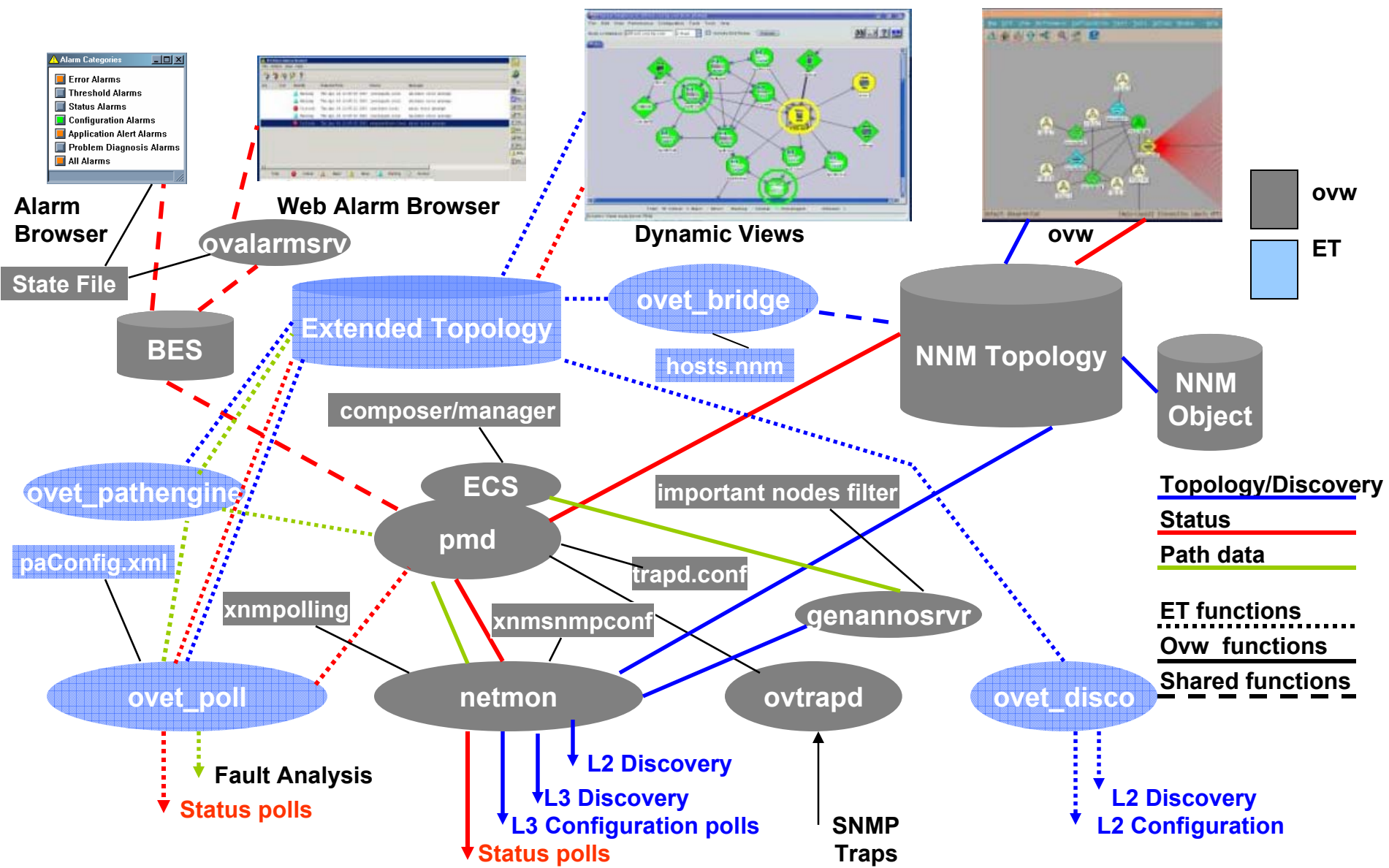
Overview

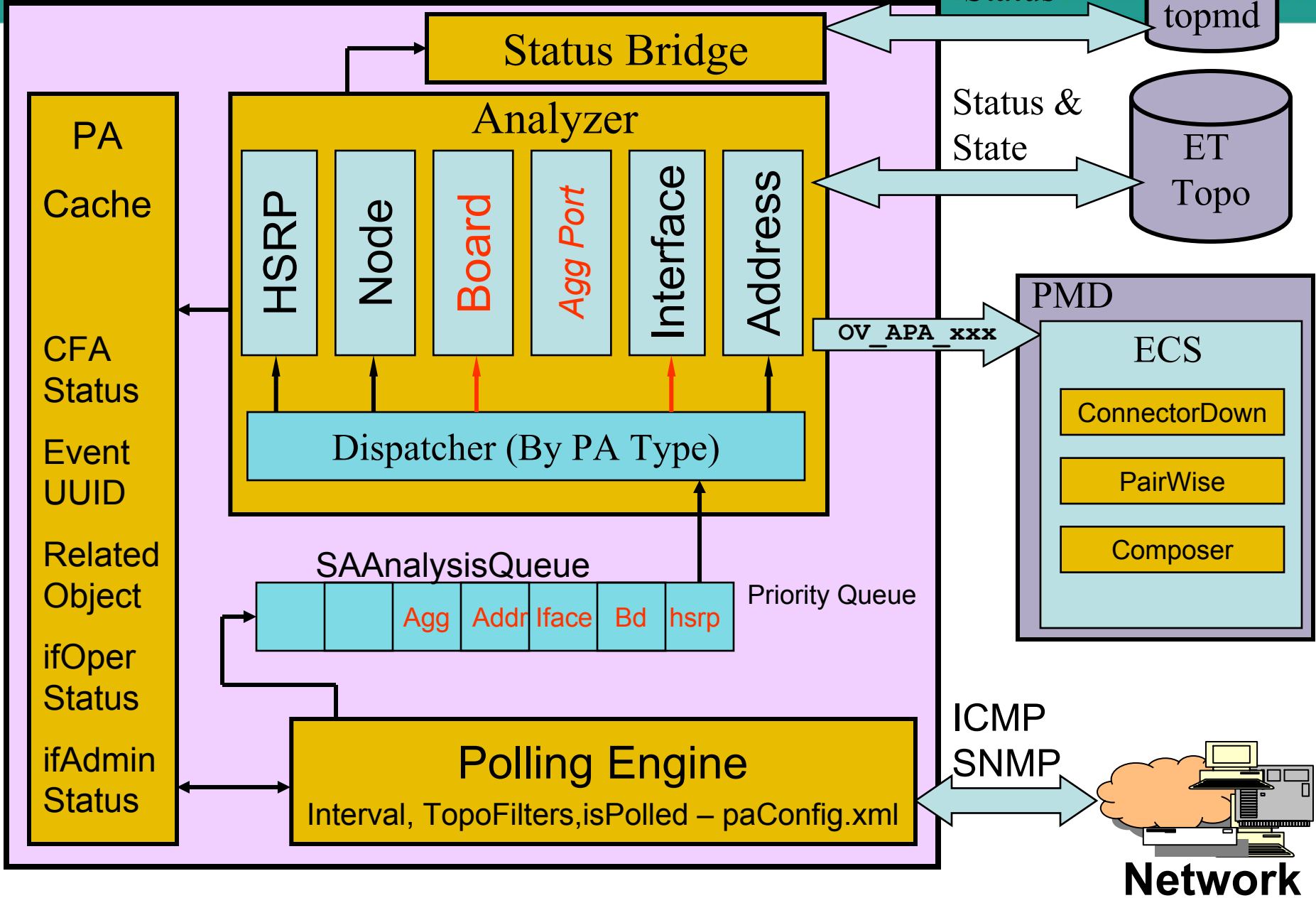
- This session will be useful if you:
 - Are using APA now
 - Are planning on or interested in using APA
 - Tried using APA and it didn't work out
- This session will not be useful if you:
 - Are happy using *netmon* for status polling
 - Are not interested in heavy technical content
 - Plan to continue using *netmon*
 - last year's session covered *netmon* in more detail
 - Year before, even more
 - Do not plan to customize NNM



NNM status subsystems in a nutshell

- *netmon* performs discovery and status polling (old poller)
 - 4 areas of polling: Discovery, Configuration, Status, Path
 - *netmon* continues to be responsible for Discovery/Config after switch to APA
 - ICMP only, or in very limited cases, SNMP-only, but never both
 - Multiple configuration entry points; limited dynamic reconfiguration
- APA (*Active Problem Analyzer*) in 7.01+; *ovet_poll* (new poller)
 - Used for HSRP & OAD by default for ET-discovered devices
 - Issues ICMP *and* SNMP polls; layer two-based status, path analysis
 - Address-aware; Intelligent algorithms for status based on ET knowledge
- *Event Correlation* (ECS embedded runtime; correlation composer)
 - Provides state-based logic that is applied to both poller's status streams
 - Some overlap between APA fault analysis and ECS correlation
 - APA fault analysis is performed before events are generated
 - ECS acts on events after they have been sent into the NNM event subsystem





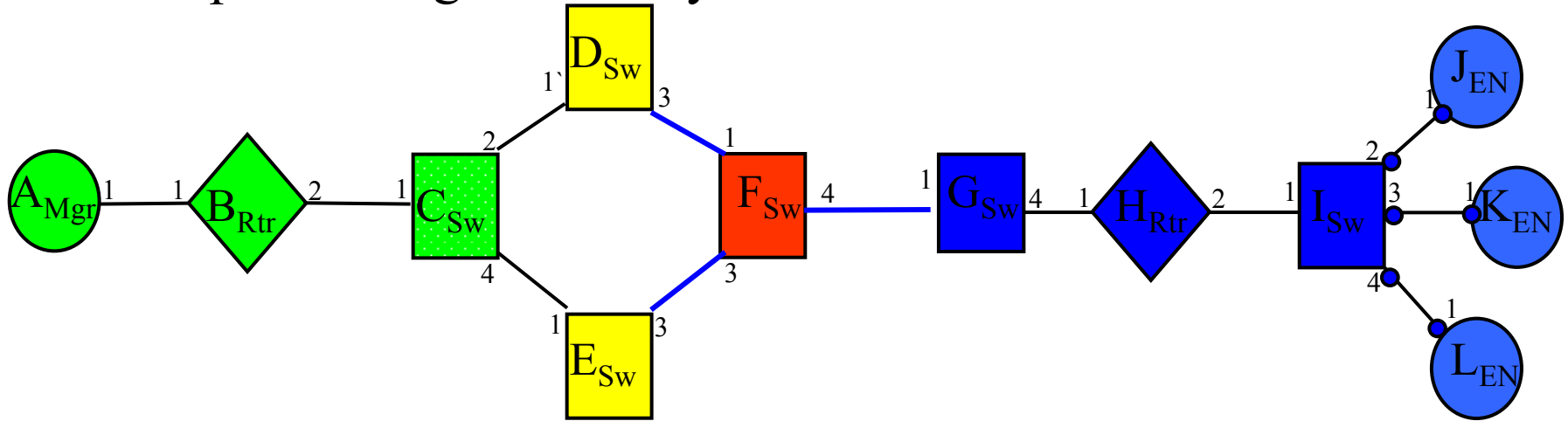


APA Analysis Overview

- Polling engine
 - Issues ICMP and SNMP polls
 - Uses traceroute for status
 - Interprets SNMP events (link up/down)
- Status Analyzer
 - Connectivity Fault Analysis
 - Uses traceroute for determining fault area
 - Performs Neighbor Analysis
 - uses ET topology data
 - HSRP



Example of Neighbor Analysis



- ET Topology Status:

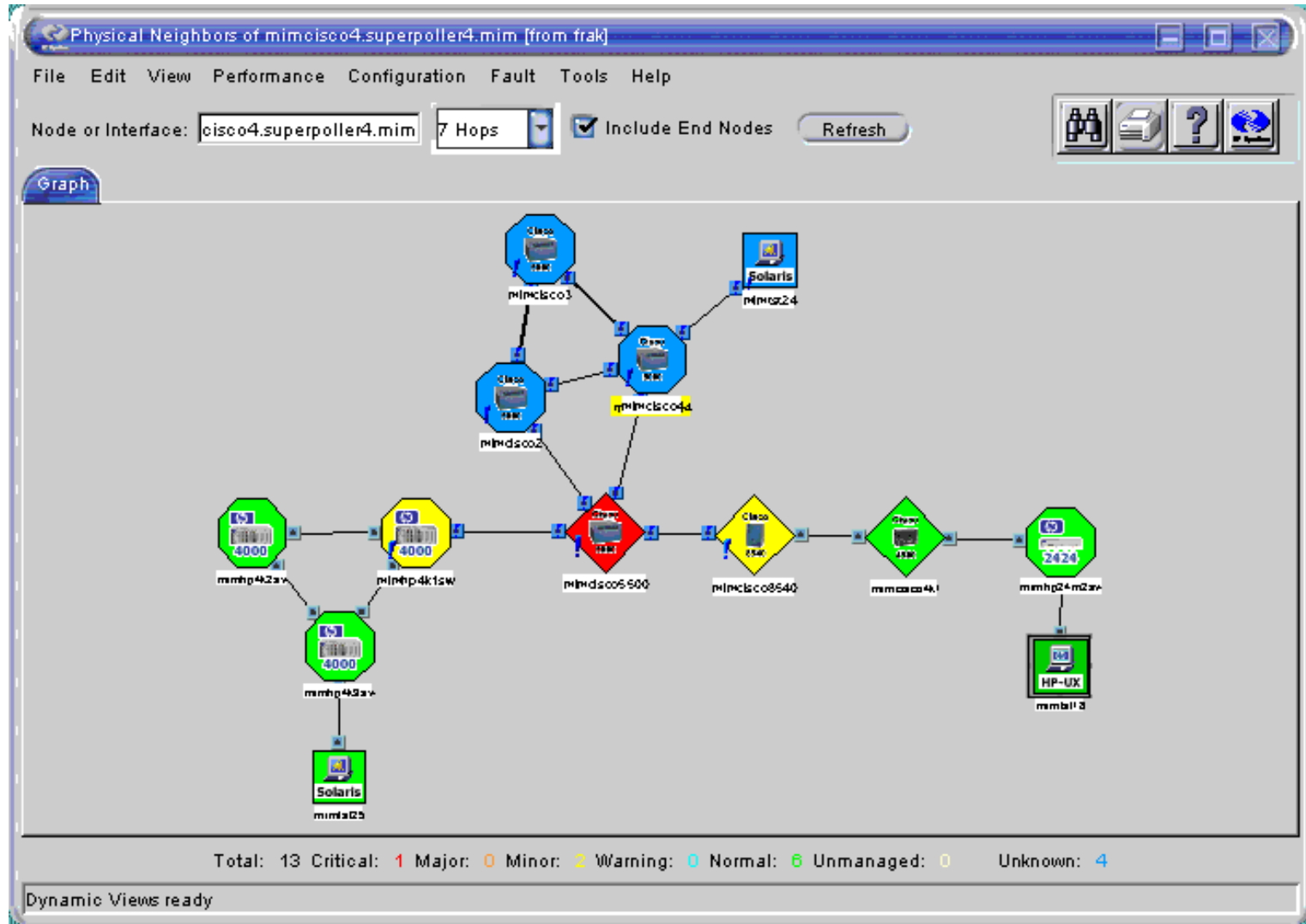
- If node responds to ICMP but not SNMP, issue [SnmAgentNotResponding](#) alarm and set the node critical.
- If ICMP and SNMP do not respond, kick off Neighbor Analysis and correlate alarms.
- Nodes D, E Marginal; F Critical
- Interfaces D3, E3, F1, F3, F4, Unknown

- Alarms correlated by ConnectorDown:

- OV_APA_Node_Down: F:
 - OV_APA_CONNECTION_UNREACHABLE: D3-F1
 - OV_APA_CONNECTION_UNREACHABLE: E3-F3
 - OV_APA_INTERFACE_UNREACHABLE: F4



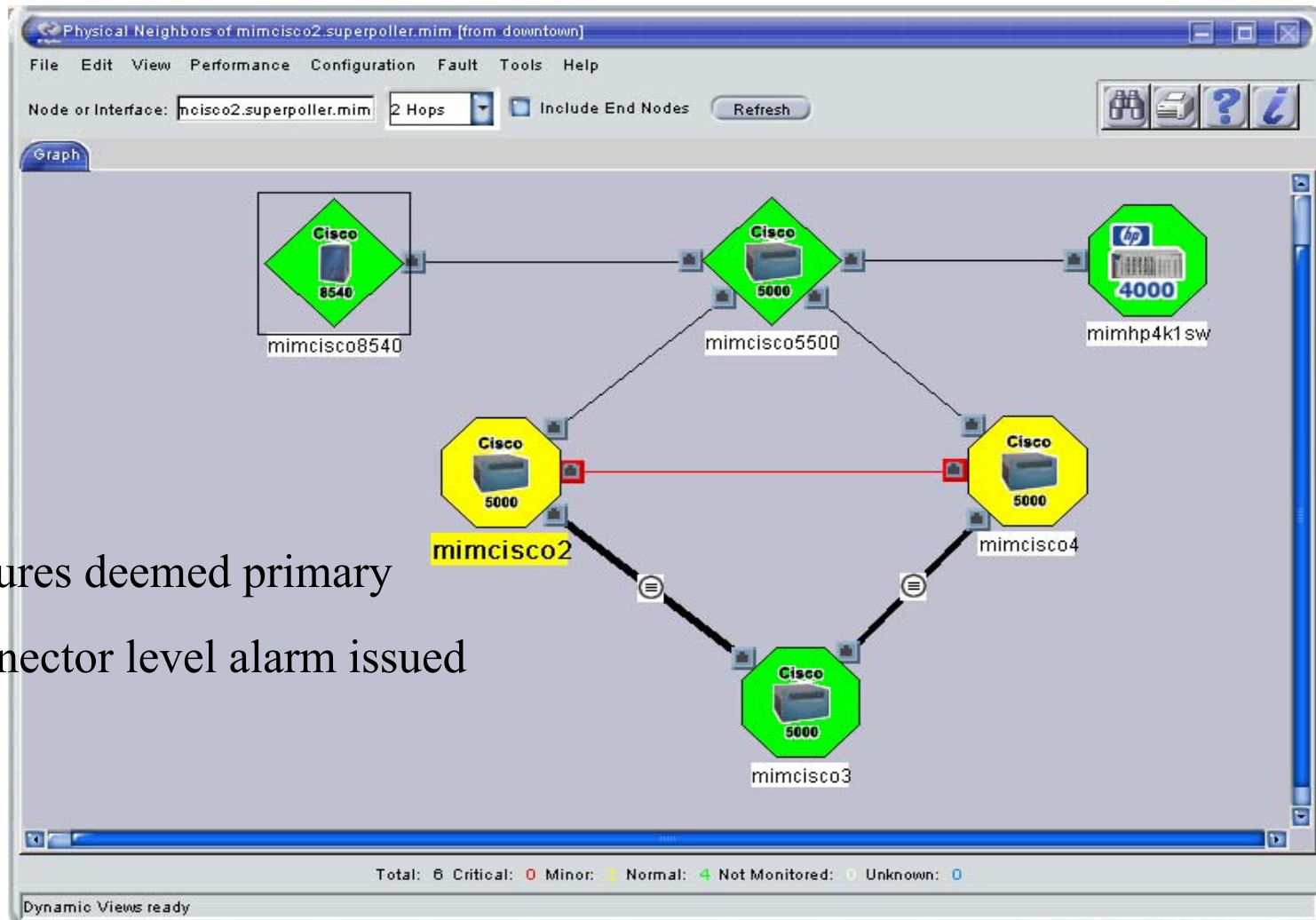
Neighbor View showing neighbor analysis and downstream failures.





Connection Down Analysis targets both interfaces

- Root cause could be: Cable; Interface A; Interface B



Both If failures deemed primary

Single Connector level alarm issued



APA status polling pros

- Multi-threaded, multi-protocol (combines ICMP & SNMP, other protocols)
- Switched-topology-aware, duplicate IP-aware, neighbor state-aware
- Event-triggered polling based on NNM and device-generated events
- Provides status at six different entity levels:
 - Address
 - Interface
 - Node
 - Connection
 - AggPort
 - Board
- Provides more dynamic polling based on queued status & ET-stored state
- Grouped SNMP queries
- Special support for OAD, HSRP, IPv6, RAMS
- Provides advanced connection-oriented and device-oriented status analysis
- Provides neighbor analysis algorithm
- Less reliant on complexities of ECS – more correlation at the source
- Generates fewer log-only and embedded status events by default
- Direct migration paths from NNM 6.2, 6.41, 7.01 to 7.5



Netmon vs APA topology model

netmon

Node

SNMP Addr

- DupIP is not supported.
- Addr and interface are indistinguishable.
- SNMP Address only used for discovery purposes & switch interface monitoring.
- No support for boards & aggregate interfaces.
- Unreliable path analysis algorithm – Resulting in lots of alarms.

Interface

Interface/Addr

Interface

Interface/Addr

APA

Node

MgmtAddr

- DupIP is supported.
- Addr and interface are monitored separately.
- SNMP Mgmt Address can be monitored (routers out of the box).
- Support for boards & aggregate interfaces.
- Reliable analysis algorithm – 1000:1 alarm reduction.
- Rich/Fine-Grained configuration via paConfig.xml.
- Active HSRP polling and analysis.

AggInterface

Interface
Addr

Interface

Board 1

Interface

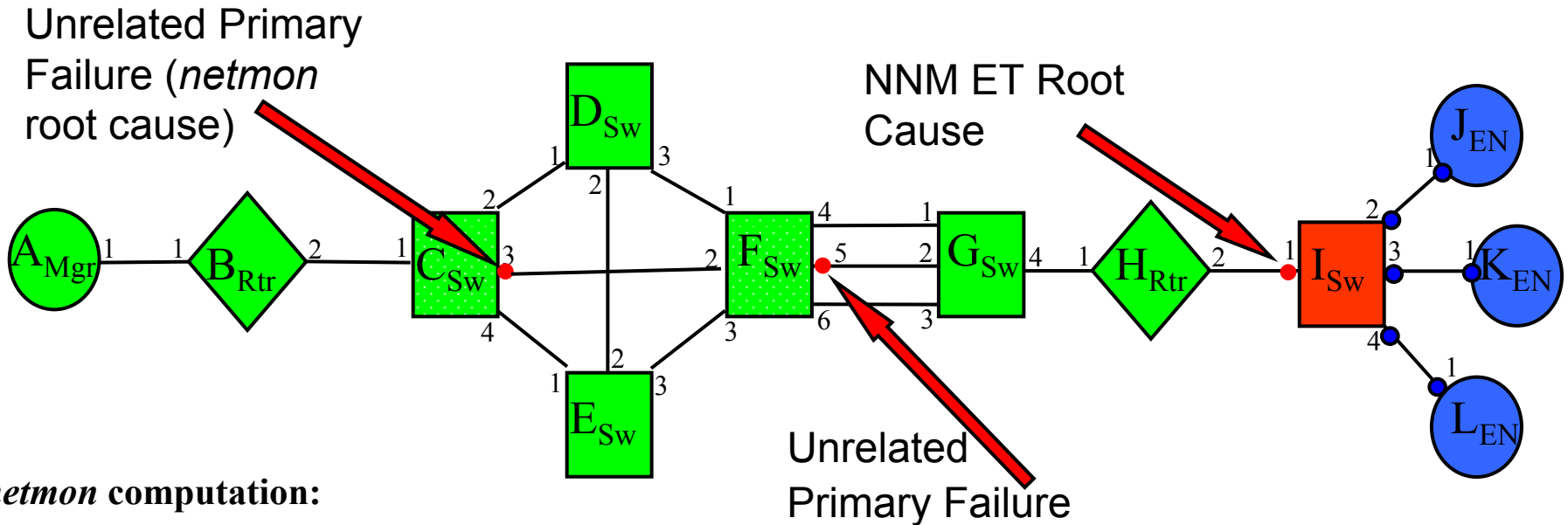
Addr Addr

Board 2

(e.g. Supervisor)



netmon vs. ET/APA Path Analysis



netmon computation:

A.1 B.1 B.2 C.1 C.3 F.2 F.5 G.2 G.4 H.1 H.2 I.1 I.2 J.1

Netmon-based events: Primary: C3; Secondary to C3: F5, I1, J1, K1, L1

ET path engine computation (APA) using connector fault analysis (CFA):

A.1 B.1 B.2 C.1 - **MESH** (C.2 D.1 C.3 F.2 C.4 E.1 D.2 E.2 D.3 F.1 E.3 F.3)

AGGR (F.4 G.1 F.5 G.2 F.6 G.3) - G.4 H.1 H.2 I.1 I.2 J.1

APA-based events: Primary: C3, F5, I1; Secondary to I1: J1, K1, L1



Big Switch

- Read `$OV_DOC/whitepapers/Active_Problem_Analyzer.pdf`
- Exit GUI sessions
- Run `setupExtTopo.ovpl`, then `etrestart.ovpl`. Wait a while
- Run `ovet_apaConfig.ovpl`
 - `ovet_apaConfig.ovpl -enable APAPolling`
 - `ovet_apaConfig.ovpl -disable APAPolling`
- What does this script do?
 - Runs `xnmpolling` with options to switch polling control between `netmon/ovet_poll`
 - `xnmpolling -statPollOff -ovetPollingOn`
 - `xnmpolling -ovetPollingOff -statPollOn`
 - Makes changes to the `$OV_CONF/nnmet/paConfig.xml` APA configuration file
 - Populates `$OV_DB/nnmet/hosts.nnm` from *netmon*-discovered topology
 - `ovet_bridge` uses this file to designate what hosts are polled by APA
 - Restarts appropriate background processes
- Watch `ovstatus` carefully
 - `ovstatus -v netmon` Should say “Polling 0 interfaces”
 - `ovstatus -v ovet_poll` Should say “Polling devices”



Determining poller control

V7.5:

APA on:

```
C:\>ovet_apaConfig.ovpl -query APAPolling  
PollNormalIP true  
StatusBridgeEnabled true
```

Fault ->

Network Connectivity ->

Poll Node

(nmdemandpoll)

The screenshot shows a window titled "Poll Node" with a menu bar (File, View, Help). Below the menu bar is a text field labeled "Name or address:" containing "misty.fognet.com". Below that is a section titled "Poll Results" containing a log of events:

```
14:56:55 ***** Starting demand poll of node misty.fognet.com *****  
14:56:55     APA (ovet_poll) polling enabled, skipping status polls  
14:56:55     Current polling parameters  
14:56:55         scheduled configuration check at 01/04/05 14:54:08  
14:56:55         auto-adjusted discovery polling interval is 5 minutes  
14:56:55     Determine supported SNMP versions
```

An arrow points from the text "(nmdemandpoll)" to the first line of the log output.



Issuing Ad hoc Status Polls:

- V7.5: ovet_demandpoll.ovpl introduced

The screenshot shows the HP Network Configuration Assistant (NCA) interface. The 'Fault' menu is open, and the 'APA Status Poll Node' option is selected. The 'APA Status Poll' dialog box is displayed, showing the 'Name or address' field with the value 'gw.fognet.com'. Below the dialog box, a terminal window displays the output of the demand poll:

```
APA Received Demand Poll
Polled Address 192.168.1.1 Status Normal
Polled Interface gw.fognet.com[ 0 [ 0 ] ] Status Normal
Completed Demand Poll of Node gw.fognet.com Status Normal
```



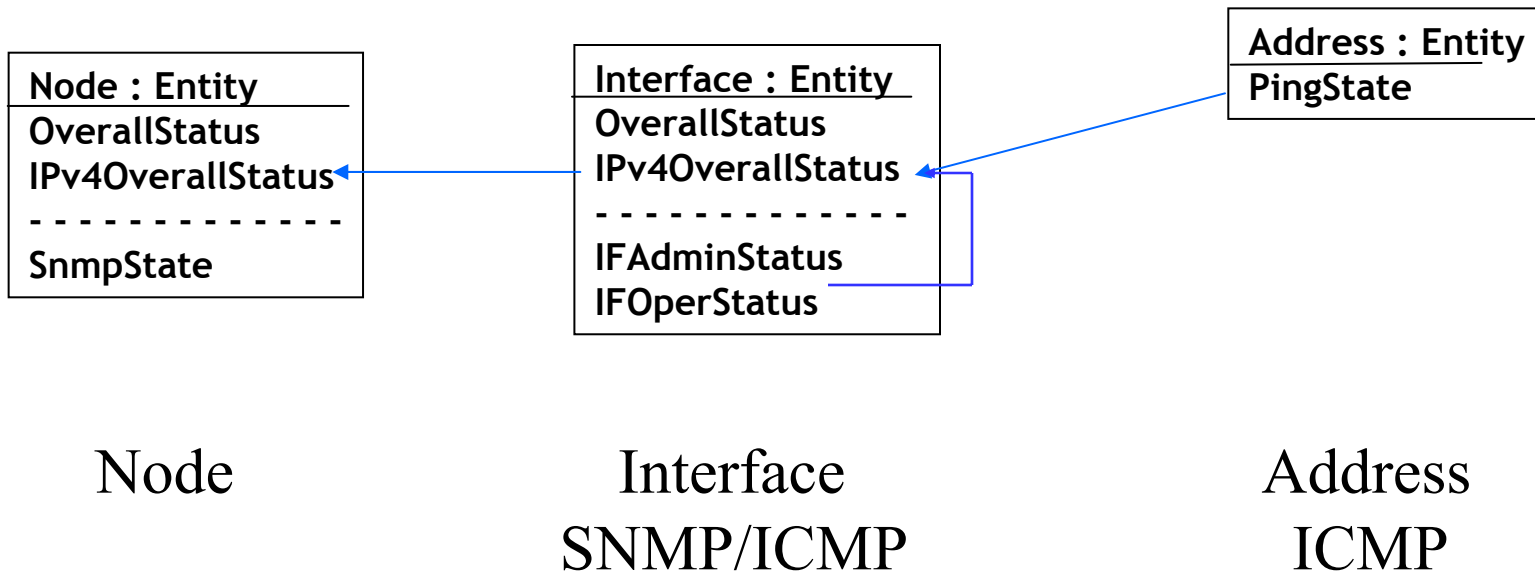
ovet_demandpoll.ovpl

- Issues APA Configuration Poll
 - Gathers Board and Interface data:
 - ifAlias, ifName, ifDescr, PhysAddress, etc
- Scheduled through paConfig.xml
 - 24 hours by default
- Detects interface and board renumbering.
 - Issues OV_APA_NODE_RENUMBERING event
- Provides detailed update/tracing
 - -V option provides verbose tracing to std out (patch to V7.5)
 - -B forces status bridge update, correcting inconsistencies (patch to V7.5)
 - -d dumps internal state of APA objects without polling device (patch to V7.5)



Understanding APA Status

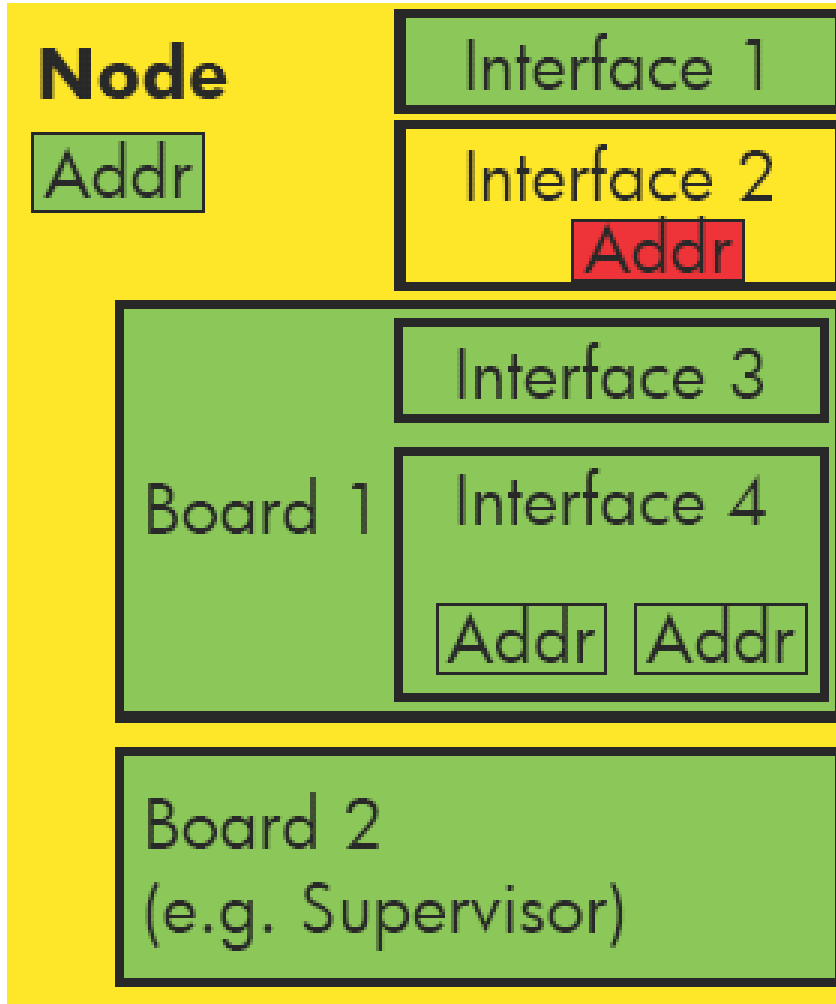
- APA is stateful, *netmon* is not
- Simplified IPv4 state entity diagram:



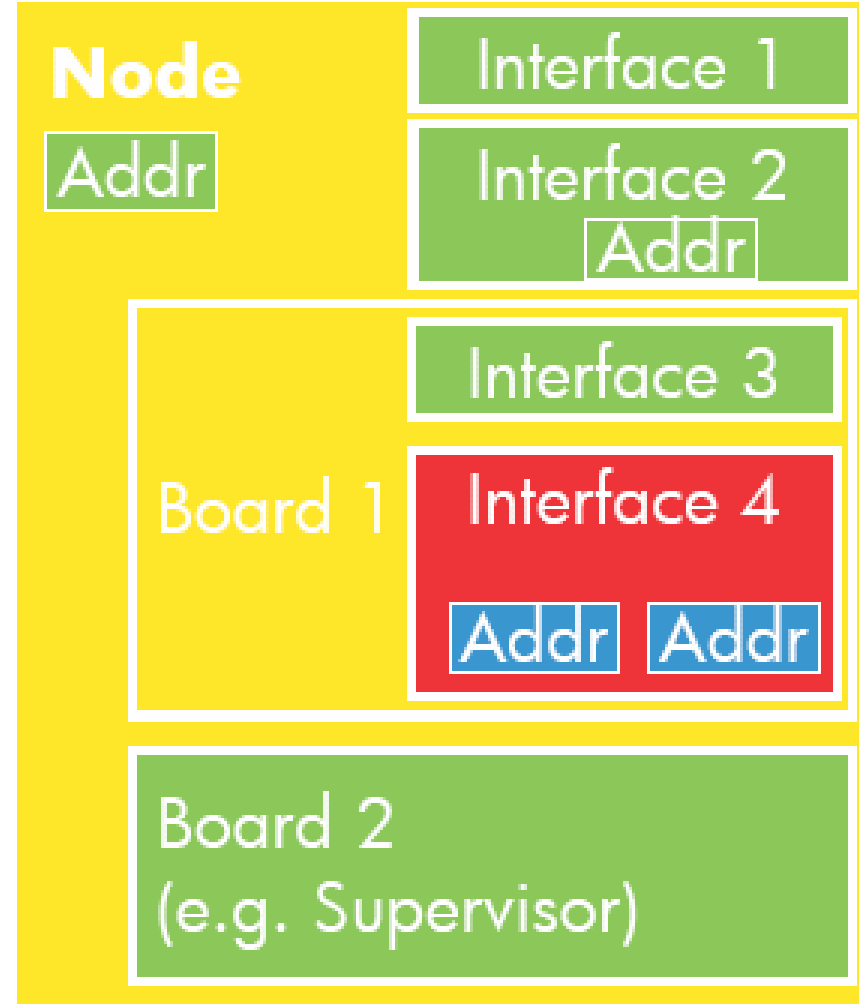
- HSRP, IPv6 and OAD status is layered on top of this



ET Topology Status Address Failure



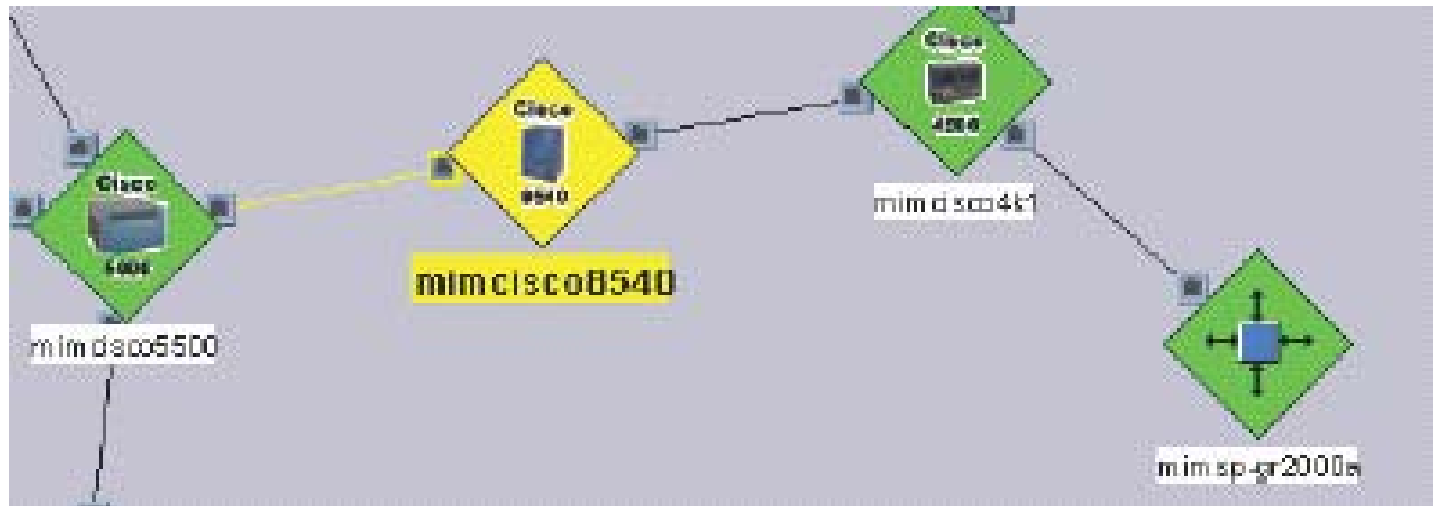
Interface failure





ET Topology Status

Address Failure:



Interface Failure:





Address Status
communicated
as Ping State.

Node mimcisco8540 Details - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites Media Go Links

Address <http://downtown.cnd.hp.com:7510/topology/topoDetail?uuid=bee27b9c-65b0-71d9-09d1-0f02703d0000>

Node Details for mimcisco8540

[General](#) [Capabilities](#) [Addresses](#) [Interfaces](#) [Boards](#) [Aggregate Ports](#) [VLANs](#) [Layer 2](#)

Addresses

IP Level: IPv4

IPv4 Address: 10.97.249.129

IPv4 Ping State: responding

IPv4 Management Address:

- **Management IP Address:** 10.97.249.1
- **Address Type:** IPv4
- **Address ID:** c5863f1a-65b0-71d9-09d1-0f02703d0000
- **Associated Entity ID:** c5830b06-65b0-71d9-09d1-0f02703d0000
- **Private IP Address:** 10.97.249.1
- **Ping State:** responding

Address	IP Version	Type	Ping State
10.97.249.129	IPv4	-	responding
10.97.249.1	IPv4	-	responding
10.97.249.2	IPv4	-	responding
10.97.249.33	IPv4	-	responding
10.97.249.65	IPv4	-	not responding

Done Local intranet



APA Ping State Values in Dynamic Views

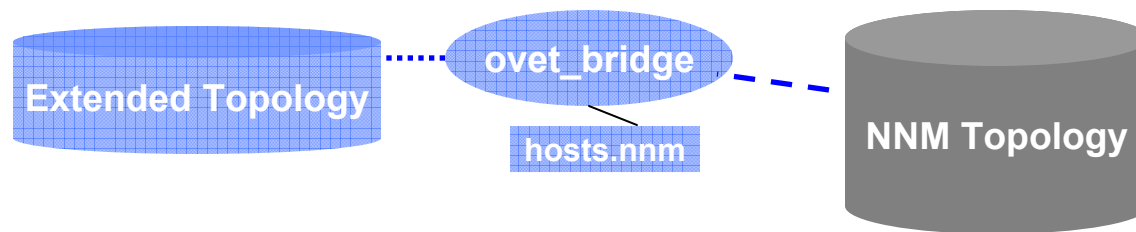
- **responding:**
Address responds to ping.
- **not_responding:**
Address does not respond to ping and is the Primary Failure.
- **unreachable:**
Address does not respond to ping and is a Secondary Failure.
- **disabled:**
This address is not monitored.

APA address status conveyed to IPMAP topology via status bridge



Bridge Status (ovet_bridge) in IPMAP Topology (topmd)

- Propagated from APA interface to APA interfaces only (not nodes)
- Addresses and Boards not modeled at all
- Unmanaged interfaces are never updated
- Interfaces in IPMAP that are not polled in APA = Normal
- Interfaces in IPMAP that don't exist in ET = Unknown
- Primary failures = Critical
- Secondary Failures do not update status in IPMAP





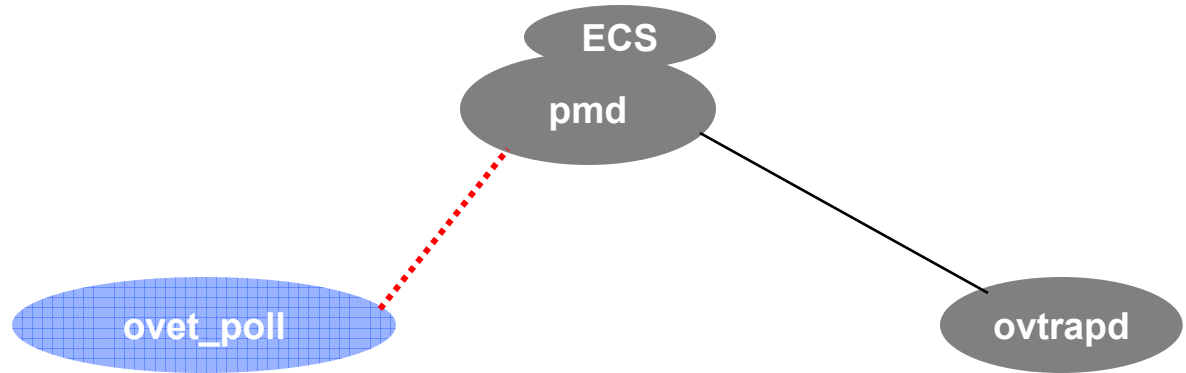
Map Status – Dynamic Views vs. IPMAP Topology

VALUE	COLOR	topmd (<i>netmon</i>)	topmd (Bridge)	Dyn Views –APA
Normal	Green	N: All IFs Up I: IF or Addr is Up	N: All Ifs Up I: IF or Addr is Up	Object Up
Warning	Cyan	N: One IF Down / I: NA	N: One IF Down / I: NA	N: NA / I: NA
Minor	Yellow	N: >1 IF Down / I: NA	N: >1 IF Down/ I: NA	O: Contents Down
Major	Orange	N: One IF Up / I: NA	N: One IF Up / I: NA	Not Used
Unmanaged	EggShell	Unmanaged	N: Not Discovered I: Left Unmanaged	Not Used
Unknown	Blue	SecondaryFail	N/I: Not mapped/ Normal	SecondaryFail
Restricted	Pink	NA	NA	NA
Critical	Red	PrimaryFail	PrimaryFail	PrimaryFail
Testing	Tan	ifAdminStatus=Testing	NA	NA
Disabled	Brown	ifAdminStatus=Down	ifAdminStatus=Down	ifAdminStatus=Down
NoStatus	EggShell	NA	Left Normal	NotMonitored

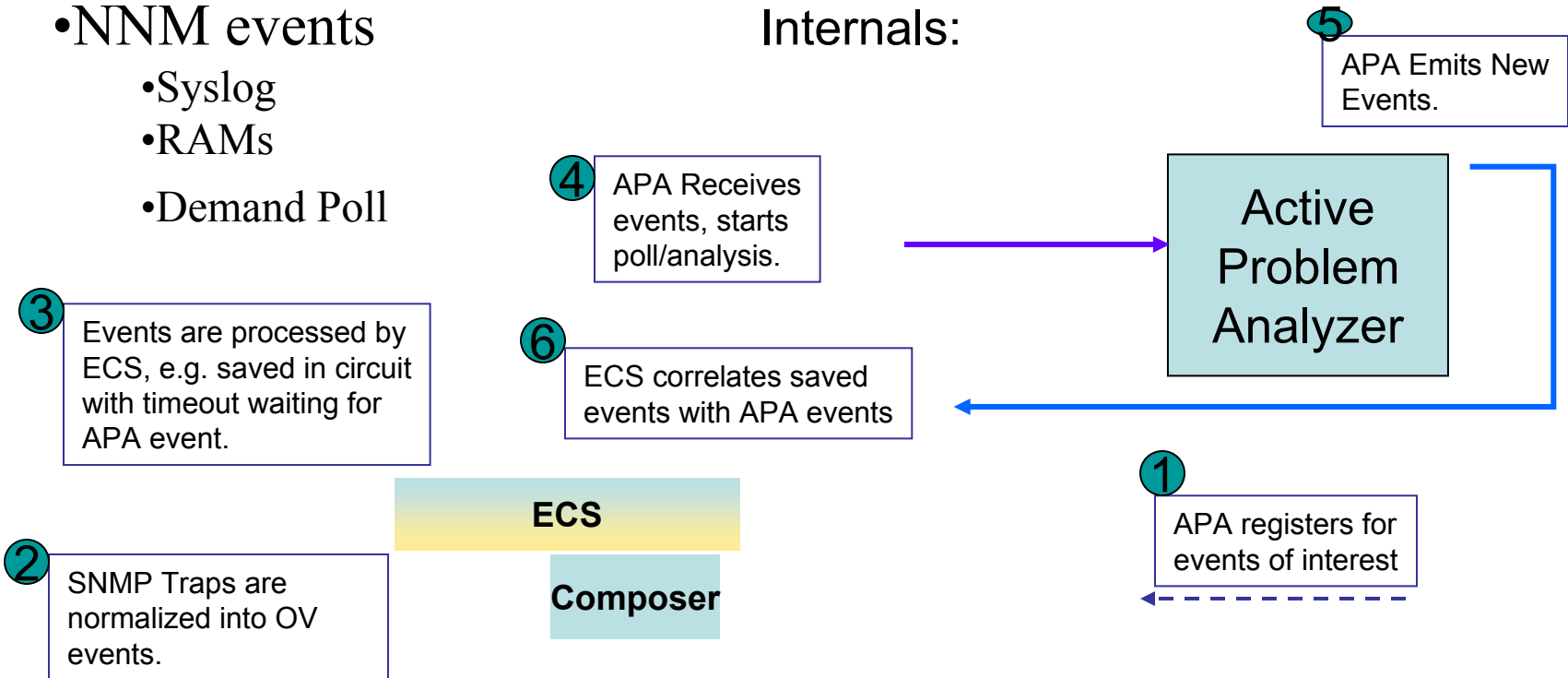


Event-triggered Polling

- **SNMP Traps**
 - Link Up/Down
 - Cold/Warm Start
 - HSRP State Change
- **NNM events**
 - Syslog
 - RAMs
 - Demand Poll



Internals:





Layer 3 Edge Connectivity

- NNM 7.5 Utilizes Subnet + Subnet Mask info
 - Derives Point-to-Point edge connectivity
 - APA uses this info in status analysis.
 - Some issues with devices ET has no connectivity info for.
 - Addressed in patch via CriticalNodes.xml file
- Supported Devices:
 - Forwarding DB Tables (Switches)
 - CDP (Cisco + Procurve)
 - EDP (Extreme)
 - ILMI (Where ATM MIB supported)
 - FDP (Foundry)



APA alarms and poller granularity

- APA-generated status events: `OV_APA_IF_DOWN` (58983012)
 - APA status results propagated through 5 entity levels:
 - **Address, Interface, Node, Connection**
 - **AggPort** and **Board**-level's distinguished in NNM 7.5
 - Polling granularity defined using **ET Topology filters** (7.01 defaults below)
 - Unreachable refers to secondary entity failure status
 - `OV_APA_IF_REMOVED` sent if `ifOperStatus` returns `noSuchObj` (patch to v7.5)
- NNM 7.01 filtered polling matrix (NNM)
 - NNM 7.5 greatly expands on this – looses standards-based only approach
 - Default: Poll via both ICMP and SNMP

IsRouter isSwitch isEndNode UncRtrIf UncSwchIf UncEndNode NotConnIf

snmpEnable	true	true	false	true	false	false	false
pingEnable	true	false	true	true	false	true	false



APA status events - summary

- OV_APA_ADDR_DOWN
 - OV_APA_ADDR_Intermittent
 - OV_APA_ADDR_UNREACHABLE
 - * OV_APA_ADDR_UP

 - OV_APA_CONNECTION_DOWN
 - OV_APA_CONNECTION_Intermittent
 - OV_APA_CONNECTION_UNREACHABLE
 - * OV_APA_CONNECTION_UP

 - OV_APA_IF_DISABLED
 - OV_APA_IF_DOWN
 - OV_APA_IF_Intermittent
 - OV_APA_IF_UNREACHABLE
 - * OV_APA_IF_UP

 - OV_APA_NODE_DOWN
 - OV_APA_NODE_Intermittent
 - OV_APA_NODE_RENUMBERING
 - * OV_APA_NODE_RENUMBERING_FIXED
 - OV_APA_NODE_SNMP_NOT_RESPONDING
 - OV_APA_NODE_UNREACHABLE
 - * OV_APA_NODE_UP
- OV_APA_BOARD_DOWN
 - OV_APA_BOARD_REMOVED
 - OV_APA_BOARD_UNREACHABLE
 - * OV_APA_BOARD_UP

 - OV_APA_AGGPORT_DEGRADED
 - OV_APA_AGGPORT_DISABLED
 - OV_APA_AGGPORT_DOWN
 - * OV_APA_AGGPORT_NOTDEGRADED
 - OV_APA_AGGPORT_UNREACHABLE
 - * OV_APA_AGGPORT_UP
 - OV_APA_AGGPORTCONN_DOWN
 - * OV_APA_AGGPORTCONN_UP
- * = “Log-Only” Events

This list excludes Informational, OAD, HSRP, & RAMS-based APA Events
OV_APA_IF_REMOVED and OV_APA_AGGPORT_REMOVED added
in V7.5 patch to handle case where ifOperStatus returns ‘NoSuchObject’



APA status events varbinds (Node, Connector, Address, Interface)

•Example event texts:

- **IF Down \$5 \$10 \$6 Capabilities: \$15**
- **Node Down \$10 Capabilities: \$15**
- **Address Down \$5 \$10 \$6 Capabilities: \$15**
- **Connection Down \$5 \$10 connected to \$16 \$18 \$23 Capabilities**

Varbind #

Description

\$2	Timestamp event occurred *Note this exception to general rule
\$3	Hostname of node that caused the event
\$5	Label of the responsible interface
\$6	ifAlias of the responsible interface
\$8	ifIndex of the responsible interface
\$9	ifDescr of the responsible interface
\$10	Responsible Level 3 address or port #
\$11	Responsible Level 2 address
\$12	Number of bits in the Subnet Mask
\$13	Route Distinguisher
\$15	Capabilities
\$16-\$28	Varbinds associated with double-object failures if connector failure
\$29-\$42	Varbinds associated with primary failure if a secondary failure



APA events -Aggregated Port – V7.5

- Multiple Physical ports = an ET trunk virtual port
- Support for Cisco PAgP only
- Pre- NNM Trunk support now called “redundant connection support”
- Fine tuning via the following ET Topology filters

isAggregatedIF

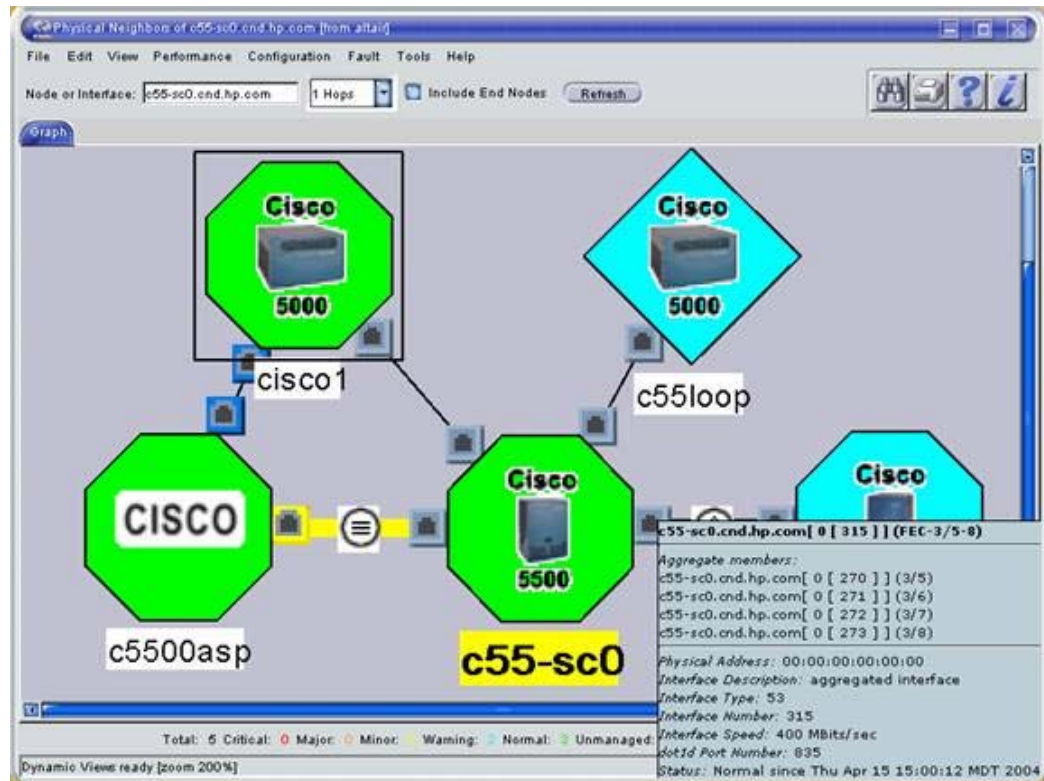
virtual interface

isPartOfAggregatedIF

physical interface

Scenario:

- One physical port goes down on a trunk;
- TrunkDegraded event issued;
- Trunk virtual port status changes to Minor in ET;
- Physical Interface changes to Critical;
- Interface Down APA event correlated/embedded by ConnectorDown correlation





APA events -Aggregated Port – 7.5

```
OV_APA_AGGPORT_DEGRADED  
OV_APA_AGGPORT_DISABLED  
OV_APA_AGGPORT_DOWN  
OV_APA_AGGPORT_NOTDEGRADED  
OV_APA_AGGPORT_UNREACHABLE  
OV_APA_AGGPORT_UP  
OV_APA_AGGPORTCONN_DOWN  
OV_APA_AGGPORTCONN_UP
```

•Descriptions:

- **Degraded:** The aggregate port connection between two nodes is responding to polls and some of the interfaces are down.
- **Disabled:** the primary aggregated port is not responding to polls in a normal fashion. This could be because all the interfaces' ifAdminStatus are Down|Testing.
- **Down:** the aggregate port connection between two nodes is not responding to polls and all interfaces on this side of the connection may be down.
- **Unreachable:** The aggregate port connection between two nodes is not responding to polls. The problem is due to another entity. (bug fixed in patch)
- **Connection Down:** the aggregate port connection between two nodes is not responding to polls and all interfaces may be down on both sides of the connection.
- **Port Removed:** Added in patch to V7.5 when ifOperStatus returns noSuchObj



APA Aggregated Port status events varbinds (NNM 7.5)

Description	Entity 1 Varbind #	Entity 2 Varbind #
Timestamp event occurred	\$2	\$2
Hostname of node that caused the event	\$3	\$21
Label of the Aggregated interface	\$5	\$23
ifAlias of the responsible interface	\$6	\$24
ifIndex of the responsible interface	\$8	\$26
ifDescr of the responsible interface	\$9	\$27
Number of contained interfaces down	\$10	\$28
Number of contained interfaces	\$11	\$29
Management address of host	\$12	\$30
Number of bits in the subnet mask	\$13	\$31
Route Distinguisher	\$15	\$33
Capabilities	\$16	\$34

•Event text: **Aggregate Port Down \$5 \$6 connected to \$21 \$23 \$24**



APA events – Board Entities - 7.5

- Only Cisco Stack, Rhino and C2900 MIBs Supported
- subBoards treated as boards in V7.5
- Look for more support in V8.0
- Unreachable means secondary failure
- Events:

OV_APA_BOARD_DOWN
 OV_APA_BOARD_REMOVED
 OV_APA_BOARD_UNREACHABLE
 OV_APA_BOARD_UP

Board Details	
Board Name	c55-sc0.cnd.hp.com:9
Status	Normal
Operational Status	Up
Administrative Status	Not Available
Model	WS-X5156
Serial Number	7764622
Hardware Version	2.1
Firmware Version	1.3
Software Version	12.0(24)W5(26a)
Board Index	9
Number of Ports with Interfaces	2
Ports with Interfaces	
c55-sc0.cnd.hp.com [0 [12]]	Normal
c55-sc0.cnd.hp.com [0 [13]]	Normal



APA Board status events varbinds (NNM 7.5)

Varbind #	Description
\$2	Timestamp event occurred
\$3	Name of the node that contains the board
\$5	Capabilities
\$6	Management Address
\$7	Route Distinguisher
\$9	index of the responsible board
\$11	subBoard index of the responsible board
\$13	Serial Number
\$14	Module Name
\$15	Module Description
\$16	Hardware Version
\$17	Software Version

- Event text: **Board Down - \$14**



APA configuration files

- paConfig.xml
 - Central configuration point
- topofilters.xml
 - Topology filters file
- MyHostID.xml
 - Important node filter for secondary status
 - Set far nodes status to Critical vs. Unreachable
- CriticalNodes.xml
 - NOT the important nodes filter, which is defined in paConfig.xml
 - This file should contain devices that ET can't determine status for
 - Example: Edge router minor when down - ET has no connectivity
 - Added via Patch to NNM V7.5

APA default status configuration file: paConfig.xml

- \$OV_CONF/nnet/paConfig.xml
- Schema defined in paConfigSchema.xsd
- Changes take affect when *ovet_poll* process restarted with ovstart
- Backup pxConfig.xml file before making changes
- Simplified schema with parameterList examples:

<paConfig>

<subSystemConfig> PollingEngine, StatusAnalyzer, Talker, StatusBridge

<globalParameters> statisticsEnable, statusAnalyzerThreadPoolSize

<configGroupList>

<configGroup> pollingSettings; Traceroute; PingSettings; configPollSettings

<generalParameters> cfaDebugLevel, GenerateDegradedEvent

<classSpecificParameters>

<defaultParameters> interval; snmpEnable ; timeout

<classSpecification> isRouter, isSwitch, isEndNode

<parameterList> interval; snmpEnable ; timeout



paConfig.xml polling settings and topology filters

- ClassSpecifications defined using extended topology filters
- Extended topology filters are separate entity from NNM traditional filters
- Run `ovet_topodump.ovpl -l filt` to see a list of all existing filters.
- To see a dump of discovered devices that pass a given filter, run:
 - `ovet_topodump.ovpl -node -filt [filtername]`

```
C:\>ovet_topodump.ovpl -node -filt isSwitch
Name                Status    CommAddr    PrivateAddr    OADId    IPVer  Index
switch1.fognet.com  Normal   192.168.1.3    -              0        4
```

- ClassSpecification filters are evaluated in xml file order
 - First match found in file applies.
 - Example: Device matching `isSwitch` *and* `isRouter`: `isRouter` rules apply
- Extended Topology Filters
 - Defined in `$OV_CONF/nnmet/topology/filter/TopoFilters.xml`
 - Similar filter definition logic to traditional NNM filters, only in xml



APA configuration file – major configuration groups

- PollingEngine
 - Manages APA Tasks
 - Issues ICMP and SNMP polls
- StatusAnalyzer
 - Queues poller results (states)
 - Determines connectivity faults
 - Generates events based on poller results
- StatusBridge
 - Communicates status info to ovw topology DB and IPMAP
- Talker
 - Communicates, via talker modules, to ET device-specific processes



paConfig.xml polling settings – Engine Settings

- SubSystemConfig: PollingEngine
- ConfigGroup: PollingSettings
- Global Parameters:
 - BasicPollingEnable All entities true
 - PollNormalIP Entities not in OAD true
 - ReceiveEvents i.e. Link down/up true
 - HSRPPollingEnable true
 - StatisticEnable true
 - StatisticInterval 300
 - ReportBusyObjectsAtStatisticInterval
 - XPL trace objects busy in PA Cache false
 - ReportBusyObjectsInAlarmBrowser
 - Send object busy in PA cahce data to alarm browser false
 - ReportPollingResultsInAlarmBrowser
 - Send polling result trace data along with polling results false
 - PollingEngineThreadPoolSize 16



paConfig.xml polling settings – Engine Settings

- SubSystemConfig: PollingEngine
- ConfigGroup: PollingSettings
- Class Specific default Parameters:
 - interval - default interval (300 seconds)
 - snmpEnable - true
 - pingEnable - true
 - hsrpEnable - true



paConfig.xml polling settings – Engine Settings

- SubSystemConfig: PollingEngine
- ConfigGroup: PollingSettings
- Class Specific default Parameters: pickManagementAddress
 - MgmtAddrAddrInhibited false
If mgmt address fails, use pickManagementAddress. False means use pickManagementAddress; true implies node will be set down if mgmt address becomes unreachable.
 - MgmtAddr-Preferred false
“If true, the address will be considered for a new management address over an address where this parameter is false as a management address if the current management address fails.”
 - MgmtAddrMaxSnmpQueries 10
 - Max number of simultaneous queries during search for new mgmt addr.
 - Note: Mgmt Addr fixed during netmon discovery; use nmdemandpoll to update
 - Example procedure for limiting pickManagementAddr choices to follow



paConfig.xml polling settings – Engine Settings

- SubSystemConfig: PollingEngine
- ConfigGroup: PollingSettings
- Class Specific default parameters: pollingBackoff
 - pollingBackoff_FFF 8
Far From Fault backoff multiplier. $5 \text{ min} * 8 = 40 \text{ minutes}$ (SNMP, ICMP)
 - pollingBackoff_NodeDown 6
Node inside fault area polling backoff multiplier (SNMP, ICMP)
 - pollingBackoff_AdminDown 10
Address or Interface that is administratively down (ifAdminStatus) (SNMP)
 - pollingBackoff_OperDown 2
Administratively up (ifAdminStatus), operationally down (ifOperStatus) (SNMP)
 - pollingBackoff_OperUp 4
ifAdminStatus up and ifOperStatus up, but ICMP fails (ICMP)



paConfig.xml polling settings – Engine Settings

- SubSystemConfig: PollingEngine
- ConfigGroup: PollingSettings
- Class Specifications

Class Specification	snmpEnable	pingEnable	Filter Definitons
* APANoPollNodes	false	false	Do not poll entries in APANoPollNodes.xml
isIpPhone	false	false	46xx series Avaya phones w/ IP Telephony SPI
ifsWithAnycastAddr	n/a	false	Interfaces with duplicate IP addresses
isRouter	true	true	Inherited from NNM topodb capability flag
AvayaIptDevices	true	true	Avaya IPT equipment, e.g. s8700CM, etc.
NotConnectedSnmpSwitch	n/a	true	ET finds no L2 connection to a managed device
isSwitch	true	false	Inherited from NNM topodb capability flag
isEndNode	false	true	Not a switch or a router
* WanIf	true	false	Defined in filters xml via ifType & ifSpeed
* IfTypeFilter	n/a	false	Placeholder for filters based on ifType

* = “commented out” xml file definitions



paConfig.xml polling settings – Engine Settings

- SubSystemConfig: PollingEngine
- ConfigGroup: PollingSettings
- Class Specifications

Class Specification	snmpEnable	pingEnable	Filter Definitons
isPartOfAggregatedIF	true	n/a	Interfaces not port aggregating
IFInNotConnectedSwitch	n/a	true	ET finds no connection to mgd device
UnconnectedAdminUpOrTestRouterIf	true	true	Unconnected If is admin up or testing
UnconnectedAdminUpOrTestSwitchIf	false	false	Unconnected If is admin up or testing
UnconnectedAdminDownRouterIf	false	false	Unconnected If is admin down
UnconnectedAdminDownSwitchIf	false	false	Unconnected If is admin down
UnconnectedEndNode	false	true	Unconnected and isEndNode
NotConnectedIF	false	false	Matches any unconnected interface
* AllBoards	false	n/a	Currently only Cisco boards supported
* NoPingAddresses	n/a	false	Do not ping addrs matching this filter

* = “commented out” xml file definitions



paConfig.xml polling settings – Engine Settings (Cont'd)

- SubSystemConfig: PollingEngine
- ConfigGroup: ConfigPollSettings (these apply to ovet_demandpoll.ovpl)
- Class Specific Default Parameters: :
 - interval 86400 (1 day)
 - enable true
 - interfaceDetailFields ifAlias,ifName,ifPhysAddress,ifDescr
Fields used in interface re-numbering check
Interface Renumbering event: OV_APA_NODE_RENUMBERING
Also logged to \$OV_PRIV_LOG/ovet_poll.log.txt
 - boardDetailFields serialNumber
Fields used in board renumbering check
 - noSuchObjectEnabled false
Enable IF renumber event if SNMP No Such Object error returned
- Class Specific Parameters:
 - isAggregatedIF (applies to noSuchObjectEnabled)
 - APANoPollNodes filter as placeholder (commented out in topoFilters.xml)



paConfig.xml polling settings – Engine Settings

- SubSystemConfig: PollingEngine
- ConfigGroup: TraceRoute
- ClassSpecific default parameters:
 - timeout (milliseconds) 3000
 - minTimeToLive (initial ttl in first outgoing probe packet) 1
 - maxTimeToLive (max ttl number of hops) 30
 - maxTimeOuts (max number timeouts before ending traceroute) 0 = never
- SubSystemConfig: PollingEngine
- ConfigGroup: PingSettings
- ClassSpecific default parameters:
 - timeout (milliseconds) 1000
 - numberOfRetries 2

Note timeout redoubles on every retry, so default = 7 seconds



paConfig.xml Status Analyzer settings

- SubSystemConfig: StatusAnalyzer
- GlobalParameters:
 - validateOnStartup false
perform full ovet_poll validate and status bridge sync for every node in topology.
set this to true only in stable and smaller scaled environments
 - loadOnlyPolledObjectsIntoMemory false
When this parameter is true, ovet_poll will perform the validate and status bridge sync operation at startup on every node in topology
 - statusAnalyzerThreadPoolSize 10
 - statusAnalyzerQueueSize (input queue of poll results) 65000
 - PAStatusAnalyzerDebugLevel 0
0 is no debugging; 1-4 debug other areas such as polling engine, status analyzer, etc.
 - PAStatusAnalyzerMasterDebugSwitchNode (null)
FQDN of host to start detailed tracing for
 - newNodeAlarmCategory (category for newly-discovered nodes) ""
 - PASendStatusAnalyzerSyncEvent (send OV_PESA_Message) false
Sends a sync message upon completion of each analysis



paConfig.xml Connectivity Fault Analyzer

- SubSystemConfig: StatusAnalyzer
- ConfigGroup: ConnectivityFaultAnalyzer (distinguishes primary/secondary failures)
- General Parameters:
 - cfaEventFunctionTracingEnabled (generate function trace events) false
 - cfaDebugLevel (4 is most verbose, 0 is no tracing) 0
 - cfaDoCompositeRoute (enable trace route and findActiveRoute to determine primary) false
Should be set to true under normal circumstances
 - cfaTraceRouteSeedPattern (null)
The value of the parameter is of form: cfaTraceRouteSeedPattern = A B C D
cfaTraceRouteSeedValue = E F G H ...where each letter is an ipAddress. If a trace route result comes back that exactly matches the pattern part (A B C D) then substitute the result with the value part (E F G H).
 - cfaTraceRouteSeedValue (see above) (null)
 - cfaTraceRouteThroughFirewall false
False means composite route algorithm will use trace route results only when route distinguisher = 0. Excluded path obtained by findActiveRoute which computes a path by examining ipRouteTable MIBs along the path
 - cfaStpConvergenceTimeSecs (time to delay polling for STP Convergence) 50



paConfig.xml Connectivity Fault Analyzer

- **SubSystemConfig: StatusAnalyzer**
- **ConfigGroup: ConnectivityFaultAnalyzer** (distinguishes primary/secondary failures)
- **Class Specific Default Parameters:**
 - **analysisMaxNumberRetries** (overrides snmp config timeouts during analysis) 1
Issues one retry to reduce expected SNMP timeouts during analysis
 - **isImportantNode** (suppress/enable secondary failure reporting) false
True: node or connection goes down and is symptomatic: primary alarm generated
False: node/connection goes down and is symptomatic: Symptomatic alarm embedded
 - **useIcmpIfSnmpNoSuchObj** true
Only if the ICMP query also timesout, will the interface be considered down or unreachable by the APA CFA analyzer
 - **isCriticalNode** false
On a secondary failure due to CFA, a node unreachable event is sent. If true, generate node down/up instead. Use on WAN edge routers which may not have connectivity through a cloud.
- **ClassSpecifications:**
 - **ImportantNodes:** filterName for nodes not to suppress entered into MyHostID.xml file
 - **CriticalNodes:** filterName for nodes to set down vs. unreachable entered into CriticalNodes.xml file



paConfig.xml HSRP and Talker Settings

- SubSystemConfig: StatusAnalyzer
- ConfigGroup: HSRP
- General Parameters:
 - HSRPTransientWait Milliseconds to wait for failover to stabilize (1 min) 60000
 - GenerateNoStandbyEvent (generate “No Standby” events) true
 - GenerateDegradedEvent (generate “degraded” events) true
 - GenerateFailoverEvent (generate failover events) true
 - GenerateStandbyChangedEvent (generate “standby changed” events) true
- SubSystemConfig: Talker
- ConfigGroup: SnmpTalker
- General Parameters:
 - snmpTalkerSessionCacheSize (# of open SNMP sessions) 3
Increase to speed polling performance at expense of system resources
 - NumberOfOIDsPerPDU (controls size of SNMP PDUs) 50



paConfig.xml Status Bridge Settings

- SubSystemConfig: StatusBridge
- Global Parameters:
 - StatusBridgeEnabled (ovet_apaConfig.ovpl -enable APAPolling) **false**
 - FullTopoSync (full topology synchronization at initialization) **false**
- ConfigGroup: BridgeSettings
- Class Specific Default Parameters:
 - DisableNNMPolling (ovet_apaConfig.ovpl -enable APAPolling) **true**
 - PrimaryStatusOnly (topology changes only reflected for primaries) **false**
 - SecondaryFailureStatus **ET**
If PrimaryStatusOnly = false, SecondaryFailureStatus will match whatever CFA determines the status to be. Allowable values are "ET", "Critical", and "Unknown".
 - CorrelateSecondaryFailures **true**
If PrimaryStatusOnly = false, then the status bridge will attempt to correlate the interface failure with a primary interface failure. If set to false, then the status bridge will not attempt to correlate symptomatic failures, with the result that the status message will be a primary failure in NNM



APA XML configuration file best practices

1. Make a backups of the paConfig.xml file, track revisions for reverting
2. Keep offline documentation of *netmon* and APA configuration customizations
3. Set intervals for custom class spec to unique values for checkPollCfg
4. Use `ovet_topodump.ovpl` to test that the nodes or interfaces pass the class filter
5. Validate your XML syntax using your favorite xml editor or any web browser
6. Test changes using checkPollCfg in the support subdirectory
7. Restart the `ovet_poll` process to begin using the new settings



Determining a Device's polling settings using checkPollCfg

- -o option for specific objects:

```
C:\OpenView\NNM\support\NM>checkPollCfg -o switch1
```

node	ifName	Board	address	IndexNum	pollInterval	isPolled	pollDisabled	snmp?	ping?	important?
switch1.fognet.com				-		-	0	-		-0
	IF	[	4]		300	1	0	1	0	-
	IF	[	11]		300	1	0	1	0	-
192.168.1.3				-	300	0	0	0	0	-
	IF	[	21]		300	0	0	0	0	-
	IF	[	61]		300	0	0	0	0	-
	IF	[	81]		300	0	0	0	0	-

- -A option for all
- -l [ell] option for summary:

```
C:\OpenView\NNM\support\NM>checkPollCfg -l
```

```
Number of unpolled interfaces : 24 ( total 28 )
Number of unpolled addresses : 1 ( total 3 )
Number of unpolled cards      : 0 ( total 0 )
```

- Patch to NNM V7.5 fixed issue with addresses not being tied to nodes



Fine Tuning a Device's polling settings using ovet_toposet

- -a option *allows* APA polling for that entity
- -s option *suppresses* APA polling for that entity
- Use in conjunction with ovw ovtopofix -G to unmanage devices
- Not available in 7.01, look for a GUI front-end in NNM 8
- Notification of ovet_toposet via OV_TOPOLOGY_Attr_Change_Notification

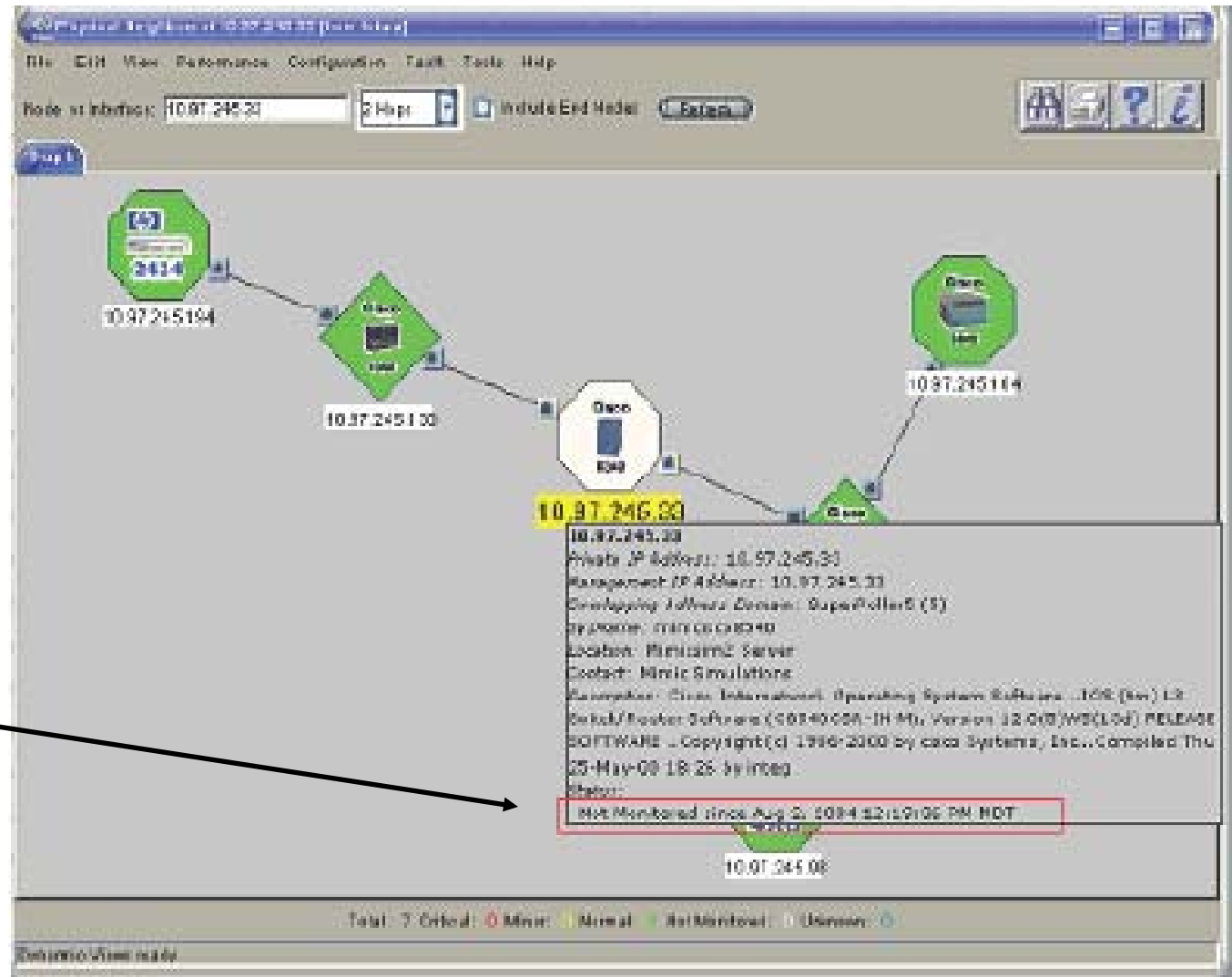
•Usage:

```
C:\OpenView\NNM\support\NM>ovet_toposet
Usage: ovet_toposet <command>
Where <command> can be any of the following :
    [-h] Prints this help message
    [-s|-a] [-node <nodeName>]
    [-s|-a] [-nodeif <nodeName>]      [-if <Extended Topology ID|Interface Name>]

    [-s|-a] [-board <nodeName>]      [-index<index>] [-subindex<subindex>]
    [-s|-a] [-addr ]                  [IPv4 IP Address]      [-OADIId<OADIId>]
```



Fine Tuning a Device's polling settings using ovet_toposet



Details show when polling was disabled



ovet_toposet example: Stopping APA polling to an interface

C:\OpenView\NNM\support\NM>checkPollCfg -o sunny

node	ifName	Board	address	IndexNum	pollInterval	isPolled	pollDisabled	snmp?	ping?	important?
sunny.fognet.com				-	-	-	0	-	-	-0
	IF	[	2]		300	1	0	0	1	-
192.168.1.6				-	300	1	0	0	1	-
	IF	[	3]		300	1	0	0	1	-
192.168.1.7				-	300	1	0	0	1	-
	IF	[	1]		300	0	0	0	1	-

C:\OpenView\NNM\support\NM>ovet_topodump.ovpl -nodeif sunny

Name	Status	CommAddr	PrivateAddr	OADId	IPVer	Index
sunny.fognet.com	Normal	192.168.1.6	-	0	4	
hme0	NotMon	-	-	0	4	2
	Rspd	192.168.1.6	-	0		
hme0:1	NotMon	-	-	0	4	3
	Rspd	192.168.1.7	-	0		
lo0	NotMon	-	-	0	4	1

C:\OpenView\NNM\support\NM>ovet_toposet -s -nodeif sunny -if hme0:1

C:\OpenView\NNM\support\NM>checkPollCfg -o sunny

node	ifName	Board	address	IndexNum	pollInterval	isPolled	pollDisabled	snmp?	ping?	important?
sunny.fognet.com				-	-	-	0	-	-	-0
	IF	[	2]		300	1	0	0	1	-
192.168.1.6				-	300	1	0	0	1	-
	IF	[	3]		300	0	1	0	1	-
192.168.1.7				-	300	0	1	0	1	-
	IF	[	1]		300	0	0	0	1	-



paConfig.xml Example: Disable ICMP polling on a Firewall

- This requires establishing a new node assertion and new class specification.
- Steps:
 - Backup paConfig.xml and TopoFilters.xml
 - Determine the SNMP sysObjectID of the firewall:
 - Neighbor View, Right Click, details, or
 - `snmpget -T <firewallName> system.sysObjectID.0`
 - In TopoFilters.xml, copy and paste an entire OID-based node assertion block
 - Change the name, title, description and OID block to match your firewall device
 - Check xml syntax and confirm filter matches your devices by running:
 - `ovet_topodump.ovpl -node -filt <newNodeAssertionName>`
 - In paConfig.xml, copy entire isRouter ClassSpecification; paste *before* isRouter
 - Change the ClassSpecification Name to match new nodeAssertion filter name
 - Change pingEnable parameter to false
 - Check xml syntax and confirm polling settings updates for firewall by running
 - `$OV_SUPPORT/checkPollCfg -o <firewallName>`
 - Apply your changes by running `ovstop/ovstart` on `ovet_poll`

paConfig.xml Example: Filtering by ifType

- Two default filters shipped with paConfig.xml in NNM 7.5
 - Both commented out by default
 - IfTypeFilter sets Ping to false; useful to prevent polls “waking” ifs
 - WanIf stops polling of matching interfaces to suppress *connection* level events
 - WanIf is defined as wanIfTypes filter anded with slowIfSpeeds filter
 - slowIfSpeeds include: 9k, 16k, 56K, 64K
 - slowIfSpeeds changed from bits/sec to kb/sec via patch to NNM V7.5
- To Enable:
 - In paConfig.xml remove comments at end and beginning of filter definition
 - Modify default ifTypes in TopoFilters.xml if desired
 - ovstop ovet_poll; ovstart ovet_poll



paConfig.xml Example: Filtering by ifType

IfType Filter definition in TopoFilters.xml:

```
<interfaceAssertion name="IfTypeFilter" title="IfTypeFilter"  
description="Interfaces of a particular type">  
  <operator oper="OR">  
    <attribute>  
      <ifType>  
        <address>20</address>  
      </ifType>  
    </attribute>  
    <attribute>  
      <ifType>  
        <address>28</address>  
      </ifType>  
    </attribute>  
  </operator>  
</interfaceAssertion>
```



ifTypes used to suppress using WanIf or IfTypeFilter

- Complete/Official list at: <http://www.iana.org/assignments/ianaiftype-mib>
 - ifTypes used by IfTypeFilter:
 - 20 - basicISDN
 - 28 - SLIP (Serial Line IP)
 - ifTypes used by WanIf and wanIfType:
 - 23 - ppp
 - 63 - ISDN and X.25 (basic rate ISDN)
 - 75 - ISDN S/T interface
 - 76 - ISDN U interface
 - 77 - lapd, Link Access Protocol D
 - 81 – ds0
 - Additional ifTypes of interest
 - 18 - ds1 (t1 carrier)
 - 21 – primaryISDN
 - 22 - proprietary Point to Point Serial, found on voip routers
 - 53- proprietary virtual/internal, like fxp0 on Junipers, etc.



Switching Routers (routing switches) (multi-layer switches)

- Generally, APA treats these as routers
 - isRouter class specification precedes isSwitch in paConfig.xml
 - In some cases swapping placing in xml file can produce desired results
- Routers APA polled for all interfaces, connected and unconnected
 - Connected means: connected to another node in ET, so user ports excluded
 - Want to SNMP poll just connected interfaces on device
- How to handle:
 - Create a node filter for these devices in TopoFilters.xml
 - Create matching interface and interface assertion filters in TopoFilters.xml
 - Add a new class for the device, and connected and unconnected IF classes
 - checkpollcfg, restart ovet_poll and ovet_demandpoll device

Switching Routers (routing switches) (multi-layer switches)

- Working with new pickManagementAddr function (patch to V7.5)
 - APA has ability to pick new SNMP address if primary address not available
 - Switching routers may provide separate mgmt adrs for controlling layers
 - No easy way to force address selection by APA, but:
 - Telling APA what addresses NOT to pick may offer a solution:
 - Outline of procedure:
 - Create new assertion group in TopoFilters.xml for undesired mgmt adrs
 - See next slide for example
 - Order in XML file matters
 - Check filter with ovet_topodump.ovpl
 - Create new class specification in paConfig.xml using filter
 - See two slides forward for example
 - Place above NoPingAddresses class specification
 - Check with checkpollcfg, restart ovet_poll, ovet_topodump.ovpl
 - Test by temporarily changing SNMP addresses' community string



Switching Routers (routing switches) (multi-layer switches)

- topoFilters.xml node assertion for limiting pickManagementAddr

```
<addressAssertion name="NoMgmtAddresses" title="No Management Addresses"
description="Addresses which should not be used as management addresses">
  <operator oper="OR">
    <attribute>
      <IPAddress>
        <IPv4>
          <address>10.*.*.*</address>
        </IPv4>
      </IPAddress>
    </attribute>
    <attribute>
      <IPAddress>
        <IPv4>
          <address>127.0.0.1</address>
        </IPv4>
      </IPAddress>
    </attribute>
  </operator>
</addressAssertion>
```

Switching Routers (routing switches) (multi-layer switches)

- psConfig.xml class spec for limiting pickManagementAddr

```
<!-- This class specification to disallow IP addresses to become management
addresses -->
<classSpecification>
  <filterName>NoMgmtAddresses</filterName>
  <parameterList>
    <parameter>
      <name>MgmtAddrInhibited</name>
      <title>Mgmt Address Inhibited</title>
      <description>
        Inhibit the address from being a management address
      </description>
      <varValue>
        <varType>Bool</varType>
        <value>>true</value>
      </varValue>
    </parameter>
  </parameterList>
</classSpecification>
```



Troubleshooting Class Specification Filter Mappings

- Most common problems relate to mapping of isSwitch and isRouter
 - isSwitch and isRouter flags assigned by *netmon* during discovery
 - Check Firewalls for SNMP/ICMP blocking.
 - Force isRouter with G flag; isSwitch with B flag in oid_to_type
 - Browse SNMP MIBS; check for cut tables that may prevent visibility to:

.1.3.6.1.2.1.1	systemTable	OID for oid_to_type
.1.3.6.1.2.1.17.1	dot1dBaseTable	isSwitch
.1.3.6.1.2.1.4.20.1	ipAdEntTable	
.1.3.6.1.2.1.2.1	ifTable	isRouter/isSwitch
.1.3.6.1.2.1.31.1.1.1.1	ifName	
.1.3.6.1.2.1.31.1.1.1.18	ifAlias	
.1.3.6.1.2.1.4.1.0	ipForwardingTable	isRouter
.1.3.6.1.2.1.4.21	ipRouteTable	isRouter
.1.3.6.1.2.1.4.22.1	ipNetToMediaTable	isSwitch
.1.3.6.1.2.1.3.1.	atTable	

- Example query:

```
snmpwalk <target> 1.3.6.1.2.1.1
```



Characterizing status behaviors

- APA E-Care white papers (requires login):
 - APA_Adjustments
 - ET_Filters
 - APA_Swouters
 - APA_FAQs
 - APA_Mgmt_Addr
- APA logfiles
 - UNIX:
 - /var/opt/OV/log/ovet_poll.log.txt
 - /var/opt/OV/log/ovet_poll_err.log
 - Windows:
 - <install_dir>data/log/ovet_poll.log.bin
 - Use <install_dir>\bin\ovlogdump.exe to view log
 - <install_dir>data/log/ovet_poll_err.log
- APA Tracing
 - Mostly XPL based tracing (See XPL tracing guide)
 - See ovtreadm, ovtrecfg, and ovtregui (windows only) in \$OV_SUPPORT

Forcing ET/APA to Recognize New Objects

- After discovering new objects, or forcing via loadhosts:
 - netmon discovered devices show in IPMAP topology, but not ET topology
 - No command to force an object into ET Topology
- Crude methods: ovstop/ovstart will force update, as will etRestart.ovpl -disco
- Better: from home base, select Discovery Status, then ET Configuration
 - Initiate full discovery now
 - Or change “enable discovery for a specified number of NNM changes”
 - Default threshold is 2500 – restart everything after modifying.
- Be patient



APA tracing via log-only events

- OV_TOPOLOGY_Attr_Change_Notification
 - Issued whenever an ET topology object's attribute changes
- OV_TOPOLOGY_Life_Cycle_Notification
 - Issued when an ET object is created or deleted
- OV_TOPOLOGY_Topology_State_Notification
 - Rich data pertaining to the status of ET Discovery
- OV_TOPOLOGY_Status_Change_Notification
 - Issued for every ET topology status change



OV_TOPOLOGY_Status_Change_Notification varbinds of interest

- 2 The name of the object whose attribute changed
- 6 The Entity Type whose status changed. This value could be:
 - E_Unknown=0, E_Node=1, E_Interface=2,
 - E_LogicalInterface=3, E_Vlan=4, E_Card=5,
 - E_PSU=6, E_Subnet=7, E_Module=8,
 - E_Mesh=10, E_HSRP=11, E_IfC=12,
 - E_Address=25
- 7 The new status of the object:
 - NoStatus=0, Normal=1, Unknown=2,
 - Warning=3, Marginal=4, Major=5,
 - Critical=6
- 8 The previous status of the object
- 9 IPv6 entity status types



OV_TOPOLOGY_Attr_Change_Notification varbinds of interest

- 2 The name of the object whose attribute changed
- 5 The Entity Type whose status changed. This value could be:
 - E_Unknown=0, E_Node=1, E_Interface=2,
 - E_LogicalInterface=3, E_Vlan=4, E_Card=5,
 - E_PSU=6, E_Subnet=7, E_Module=8,
 - E_Mesh=10, E_HSRP=11, E_IfC=12,
 - E_Address=25
- 6 The type of the Attribute that changed
 - HSRP_State=0, HSRP_Certainty=1, IfAdmin_Status=2,
 - IfOper_Status=3, Ping_State=4, Snmp_State=5,
 - HSRP_Priority=6 IfC_AssocState=7, Extensible_Attribute=8
- 7 The data type of the Attribute Val that changed. (E_Integer or E_String)
- 8 The Value of attribute 6 if attribute 7 is is E_Integer (0)
- 9 The Value of attribute 6 if attribute 7 is E_String (1)
- 10 The Address Id if entity type is HSRP.
- 12 The name of the User Defined Extensible



APA Polling Statistics

- Collected/updated on 5 minute intervals – details in APA white paper
 - OV_APA_Statistics log-only event also reports these (see ovdumpevent output)
 - Statistics available from home base main window

```
1082644801 1 Thu 04 22 10:40:01 2004 patchy.fognet.com p OV_APA_Statistics APA
stats: Addresses_Polled:5 CfaAddr:0 CfaAnalysisTime:0.000000 CfaIface:0 CfaN
ode:0 CfaSubnet:0 CfaTasks:0 HSRP_AnalysisTime:0.000000 HSRP_Tasks:0 Interf
aces_Polled:2 PAOC_NumBusyObjects:0 PAOC_NumBusyReferences:0 PE_HSRPGroupsPol
led:0 PE_QueueUsage:0 PE_TasksProcessed:6 PE_TimeOnQueue:0.000000 PE_TimeOnQ
ueueAvg:0.000000 SA_ActiveWorkers:0 SA_BlockedEntries:0 SA_QueueSize:65000 S
A_QueueUsage:0 SA_ThreadNum:10 SA_TimeOnQueue:0.000000 SA_TimeOnQueueAvg:0.00
0000 SA_TimeOnQueueOld:0.000000 SA_WorkProcessed:0 SA_WorkersWaiting:10 ;1 1
7.1.0.58983032 0
```

Statistic	Current	Max	Min	MaxTime
Active Analyzer Tasks	0	0	0	Mar 18, 20
Waiting Poller Tasks	0	0	0	Mar 18, 20
Interfaces Polled (SNMP)	2	2	2	Mar 18, 20
Addresses Polled (ICMP)	5	8	5	Mar 18, 20
HSRP Groups Polled	0	0	0	Mar 18, 20
Waiting Analyzer Tasks	0	0	0	Mar 18, 20



APA Polling Statistics

- Active Analyzer Tasks
 - The number of polling results currently under analysis. Should trend toward zero.
 - If not trending down, increase the number of threads in the status analyzer thread pool.
- Waiting Poller tasks
 - Maximum number of polling tasks waiting to be completed during the last interval.
 - If trending up, the APA poller may be unable to keep up with the polling load.
- Addresses Polled (ICMP):
 - The number of addresses pinged during the last statistics reporting interval.
- Interfaces Polled (SNMP):
 - The number of interfaces queried for status through SNMP in the reporting interval.
- Waiting Analyzer Tasks:
 - The number of polling results waiting to be analyzed. Should trend toward zero.
 - Temporary surges should be expected when there are many failures.
- HSRP Groups Polled:
 - The number of HSRP groups queried for status in the last reporting interval.



APA Polling Statistics in APA_Statistics event

Note all statistics based on the statistics polling interval (5 minutes)

- PE_HSRPGroupsPolled Same as the stat in “Polling/Analysis Summary” table.
- PE_TimeOnQueue Time last task in Polling Engine Queue has been waiting
- PE_TimeOnQueueAvg Average time tasks the Polling Engine Queue are waiting
- PE_TasksProcessed Number tasks in Polling Engine Queue processed in interval
- PE_QueueUsage Current number of tasks on the Polling Engine Queue.
- SA_TimeOnQueue Time last task in the Status Analyzer Queue has been waiting
- SA_TimeOnQueueAvg Average time tasks on Status Analyzer Queue are waiting
- SA_TimeOnQueueOld Current max time task waiting on the Status Analyzer Queue
- SA_WorkProcessed Number tasks processed in Status Analyzer Queue in interval
- cfaAnalysisTime Total time that analysis has taken since last statistics event
- HSRP_AnalysisTime Total time that HSRP analysis has taken since last event

ET Discovery Troubleshooting

- `ovet_topoconndump.ovpl`
 - Dump ET connections for a node supplied or all if no args
 - `$OV_MAIN_DIR/support/NM/ovet_topoconndump.ovpl`
- `ovet_topoconnedit.ovpl`
 - Add, Delete or Ignore connection between two interfaces
 - `$OV_MAIN_DIR/support/NM/ovet_topoconnedit.ovpl`
 - Example of the connectionEdits file:

```
insert into disco.connectionEdits
(m_Name,m_NbrName,m_Command)
values ('4kfct5me6m01.fognet.com[ 0 [ 1 ] ]','24c3lk09.fognet.com[ 0 [ 25 ] ]',0);
```

See Connection Editor White Paper



ET Discovery Troubleshooting

- Improving ET Discovery
 - Enable a discovery protocols like CDP, FDP, or EDP.
 - If the above protocols aren't available, run discovery during an active time on your network to better grab Forwarding Database tables in switches.
 - Consider if you need to manage all your end nodes. Managing end nodes improves L2 connectivity accuracy but may cause more events.
 - Check DNS performance. ET is as dependent on DNS lookups as netmon.



Questions?

Important! Please complete the session survey

Thank You

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