NNM 8i
Let's Get Down to Brass Tacks, How Much For the Ape?

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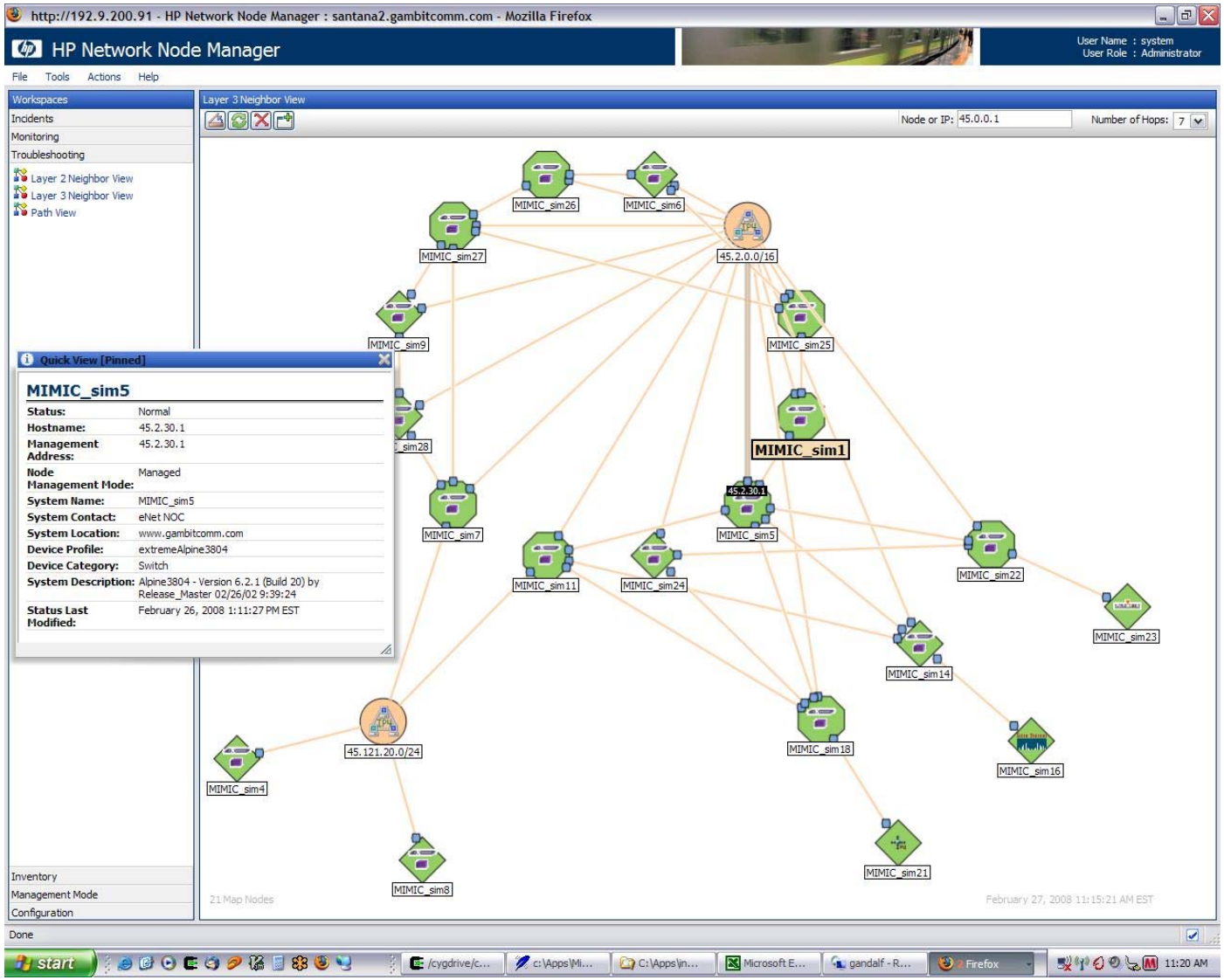
Las Vegas, Nevada

Session Topics

- NNM 8i product roadmap and positioning
- Requirements
- Migration Considerations
- Product Architecture with details on:
  - Spiral Discovery
  - Network State Polling
  - Event Pipeline and Incidents
  - Causal Engine
  - Continuous Spiral Discovery
  - Performance SPI Features
  - Databases
- Assorted tips and tricks from the field
- MIMIC SNMP Simulator – NNM 8i migration tool
- Backup Slides

NNM 8i:

- Level 3 topology view



NNM 8i History

- NNMi 8.00 released 11/22/2007
  - Support for Windows and HP-UX only
  - NNMi 8.0 provided to existing NNM SE/AE customers on support free of charge
  - Entitlement for parallel deployment alongside NNM 7.x
- NNMi 8.01 released 2/13/2008
  - Support for Solaris, Linux added
  - NNM iSPI for Performance Support
  - *Many* feature enhancements over 8.00 (see relNotes)

Requirements

- **Windows**
  - Windows Server 2003 Enterprise x64 w/ SP2 or R2
  - Intel or AMD - Itanium Processor Family (IPF) **not** supported
  - Windows 32-bit operating systems **not** supported
  - Microsoft SNMP
- **HP-UX**
  - HP-UX 11iv3 (11.23) IPF
  - Mozilla Firefox 2.0.0.4 or later
  - Embedded database (postgres) or remote Oracle 10.0.2.0
  - Prerequisite OS & JAVA patches
- **Solaris**
  - 2.10 SPARC, intel architecture not supported
- **Linux**
  - RedHat Enterprise Server AS 4.0 or ES 4.0
  - 64-bit libstdc++ library dependencies
- **All**
  - Embedded database (postgres) local or remote Oracle 10.2.0.x
  - Client browsers: IE 7.0.5730.11+ OR Mozilla Firefox 2.0.0.11+ (IE 6, Safari no good)

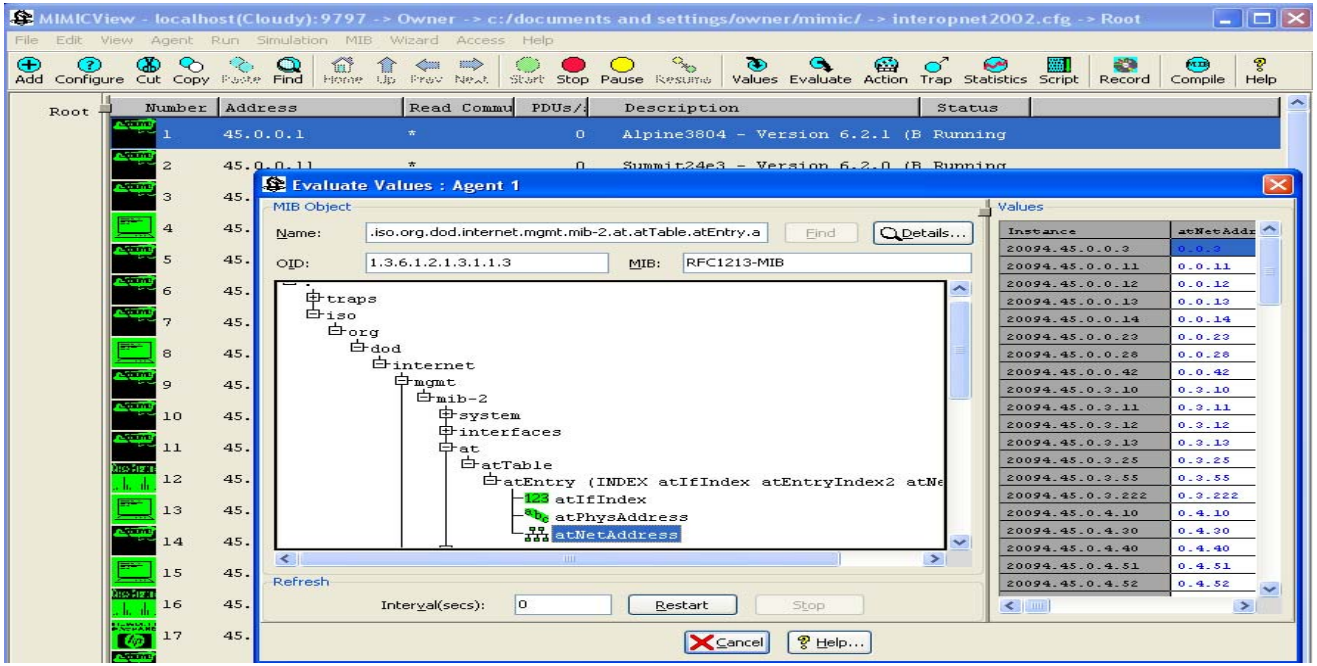
NNM 8i vs 7.x

- NNM V1 through 7.x is OSI Level 3-centric
- NNM 8i is OSI Level 2-centric
- 8i is supported only on 64-bit hardware and OS
- Gone in 8i:
  - ipmap, ovw map, topology & object dbs
  - *netmon and* APA (7.x APA ≠ 8i APA)
  - All *xnm** apps (mib browser, etc)
  - *snmpCollect* and reporting database
  - ECS-based event correlation (composer, manager)
- Retained in 8i:
  - Extended topology
    - Not all views available in 8.00, however
  - ovspmd
  - pmd (and ov_event subsystem)
    - Allows events to be forwarded to/from legacy nnm

```
C:\>ovstatus -c
 Name
 OVsPMD
 pmd
 nnmtrapd
 ovjboss
 nmsdbmgr
 ovet_dhelpserv
 ovet_dhsnmp
 ovet_discoA
 ovet_discoC
 ovet_bridge
 ovet_daAlctelSw
 ovet_daAlcTimSw
 ovet_daAvayaSw
 ovet_daBaySSw
 ovet_daCDP
 ovet_daCentSw
 ovet_daCiscoSwS
 ovet_daDetails
 ovet_daEDP
 ovet_daENDP
 ovet_daEntSw
 ovet_daExtSw
 ovet_daFDP
 ovet_daFoundrySw
 ovet_daHwSw
 ovet_daILMI
 ovet_daIfDetail
 ovet_daMcnAtm
 ovet_daMcnLan
 ovet_daNDP
 ovet_daPassSw
 ovet_daProSw
 ovet_daProSwStkPP
 ovet_daRstoneSw
 ovet_daStdSw
 ovet_daSS3ComSw
```

NNM 8i vs 7.x

- 8i features to come?
  - Container and other ET views
  - Configuration entry points (causal engine, etc)
  - Distributed Poller, Syslog feature
  - Command line fault analysis tools (rnetstat, netcheck, natping…)
  - SNMP MIB Browser - MIMIC simulated agent MIB Browser:



6/7 – 8i Migration paths

- No upgrade direct migrations supported in 8.00
- HP recommends separate install/side by side evaluation
- HP plans to support 7.x at least through 2008
- Expect additional point versions of 7.x in ‘08
- “Migration tools to come”
  - Discovery options
  - SNMP configuration
  - SNMP events
  - Network polling
  - Device/Interface filters
  - Tools to migrate from 6.x/7.x

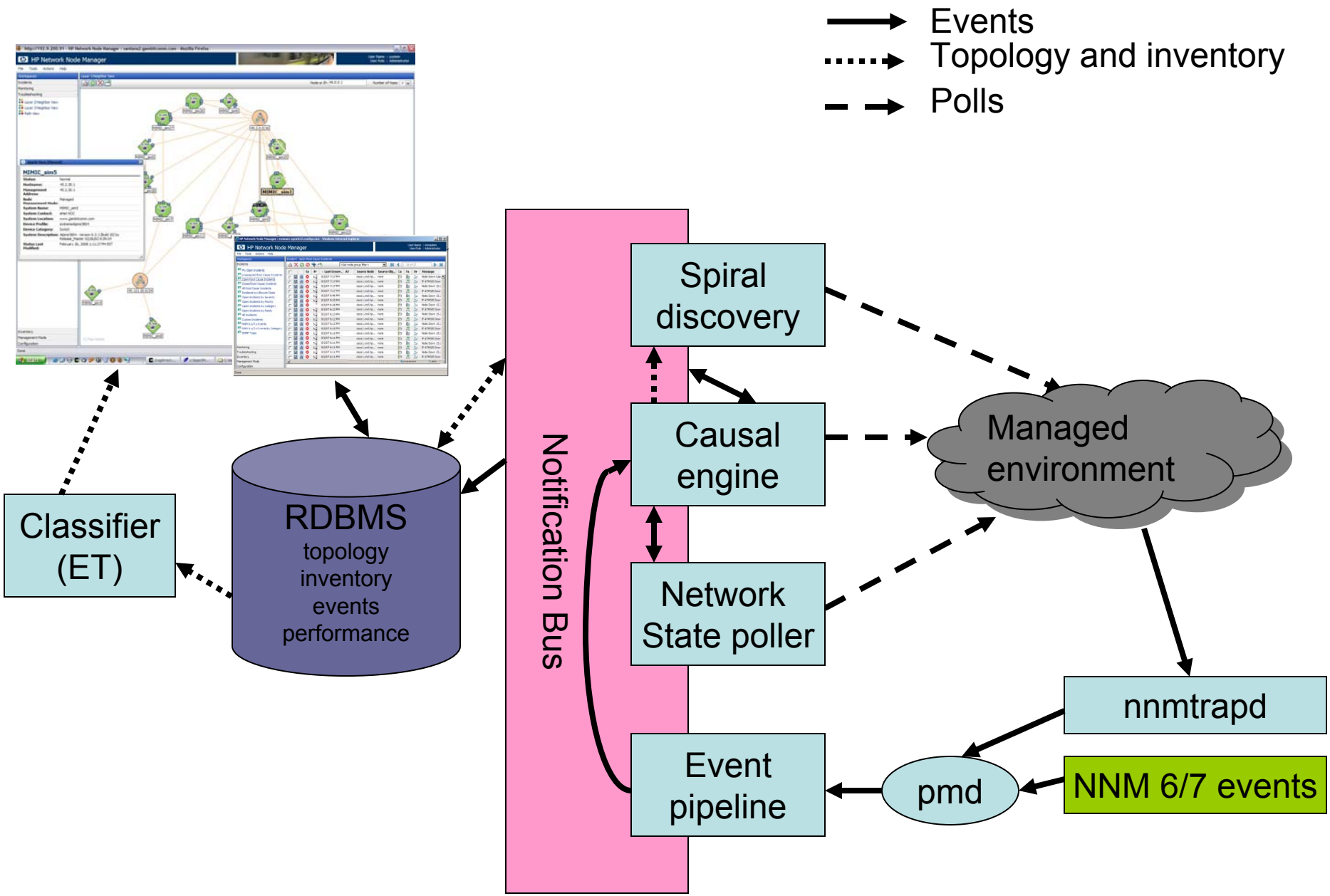
Architecture

- Elements
  - Web UI
  - RDBMS - embedded=postgres or oracle
  - J2EE Application Server (jboss)
    - Web Services
    - Classifier
    - Notification Bus
    - Event Pipeline
    - Causal Engine
    - Network State Poller
    - Continuous Spiral Discovery
    - Communication Protocol Support (SNMP, ICMP)

Architecture

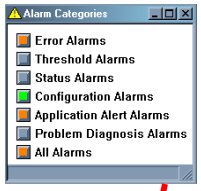
- More details
  - –SOA (service-oriented architecture) based integration interface
  - –Classifier provides for automatic containerization and grouping (extended topology manager)
  - –Notification bus ensures accurate and real-time updates
  - –Event Pipeline provides high performance event correlation
  - –Causal Engine provides advanced deterministic RCA
  - –Network state poller with aggressive polling intervals
  - –Continuous spiral discovery delivers hyper-accurate topology in dynamic environments

8i Architecture

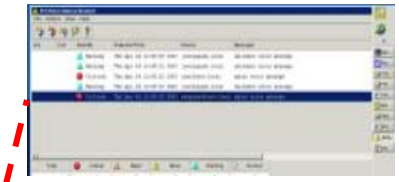


7.X Architecture

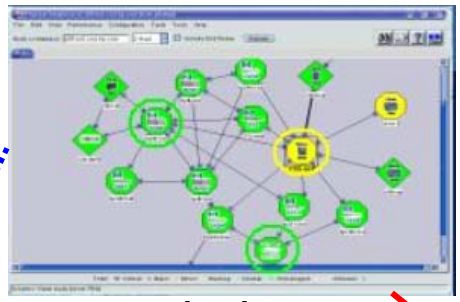
For comparison



Alarm Browser



Web Alarm Browser



Dynamic Views

ovw

ovalarmsrv

eventdb

Extended Topology

ovet_bridge

NNM Topology

NNM Object

Map db

NNM

ET

ovet_pathengine

ECS

pmd

Topology/Discovery

Traps/Status

Path data

ET functions

NNM functions

Shared functions

ovet_poll

netmon

ovtrapd

ovet_disco

Fault Analysis

Status polls

L2 Discovery

L3 Discovery

L3 Configuration polls

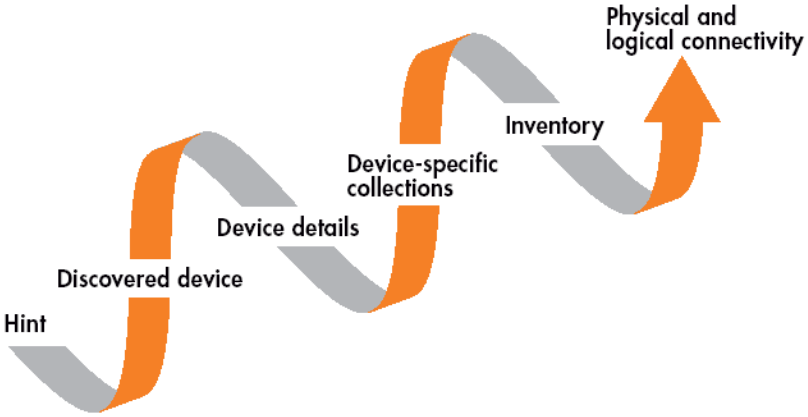
Status polls

SNMP Traps

L2 Discovery

L2 Configuration

Architecture



- Continuous Spiral Discovery
  - Topology aware
  - Staged discovery
  - Proprietary MIB's modeled
  - Level 2 and 3, Vlan, VPM, MPLS aware
- Network State Polling
  - Collects and correlates fault and performance data
  - Monitoring policies based on categorizations
  - Highly threaded and optimized (getbulk)
- Causal Engine
  - Topology and inventory aware
  - Actively re-polls to get tunnel-down and more global state data
  - Determines overall status and clears problems

Architecture

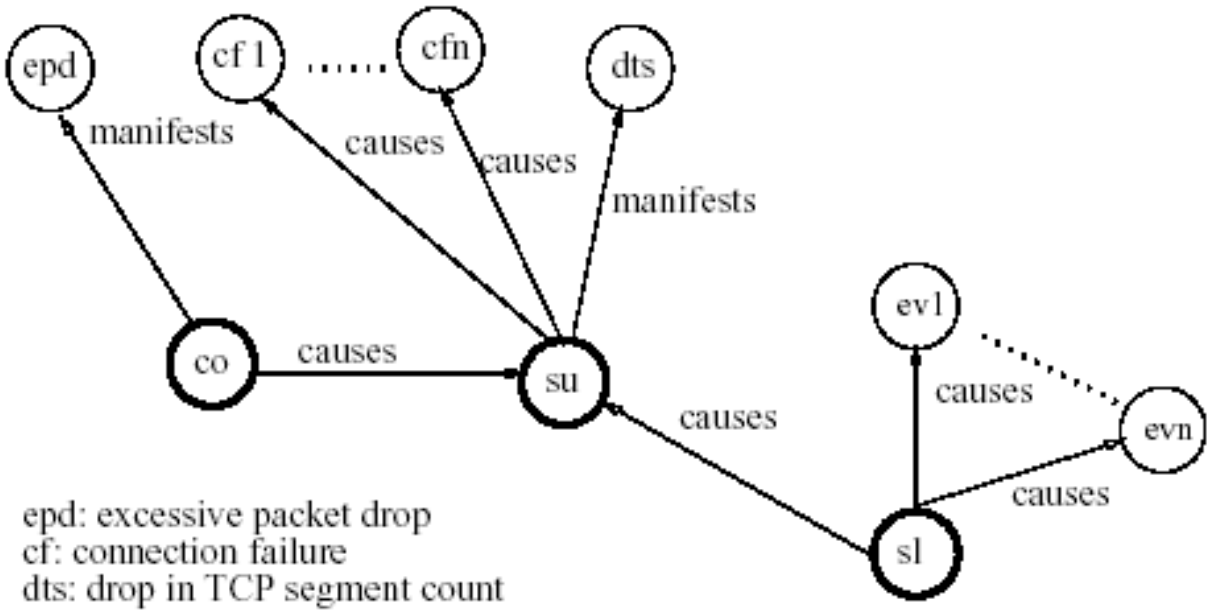
- Event Pipeline
  - Comprised of plug and play independent functions (stages):
    - Incident Receiver: Takes input from Causal Engine
    - Type Enforcement: Populates config'd incident, trap or event fields
    - Resolver: Checks topology for source node
    - Store Bulk: Logs incident to DB
    - Notification: Passes incidents to bus to inform NNM processes
    - Pairwise: Performs configured pairwise correlations
    - Rate: Performs configured rate count correlations
    - De-dup: Performs configured dedup correlations
    - Relate: Cancels incidents correlated by the Causal Engine
    - Actions: Performs configured actions
  - Event Pipeline receives events and supplies *state* to the Causal Engine

Architecture

- Causal Engine
  - Causality relationships/scenarios
    - Causality graphs define common network problems
    - Defined in a language file
    - Causality is heavily dependent on SysObjectID
  - Incident Reports
    - Outputs Incident Description; health of object; likely causes
  - Configuration Interface
    - Unexposed in 8.00 and 8.01

Architecture

- Causal Engine
  - Hypothetical Causality Graph



Communication Configuration

- SNMP/ICMP Timeouts and retries
  - 1st retry is 100% of timeout, 2nd thru nth is 150% of previous value
  - If V2 & V1 supported, pollers will try V2 then V1
  - V1: 10 Sec + 4 retries = 2.2 min
  - V2: 10 Sec + 4 retires = 4.4 min
- Example:
  - 1st poll: NNM waits 100% (10 seconds)
  - 1st retry: NNM waits 150% of 10 seconds (15 seconds)
  - 2nd retry: NNM waits 150% of 15 seconds (22.5 seconds)
  - 3rd retry: NNM waits 150% of 22.5 seconds (33.75 seconds)
  - 4th retry: NNM waits 150% of 33.75 seconds (50.625 seconds)
  - 50.625 + 33.75 + 22.5 + 15 + 10 = 131.875 (2.2 min)

Communication Configuration

- Network Regions (Regions tab)
  - Specify Comm. Config for a subset of devices
  - By IP Address ranges (required)
  - Optionally specify SNMP Community strings
  - Optionally specify host name wildcards
- Specific Nodes (Specifics tab)
  - Specify Target Hostname and Preferred SNMP Address

Communication Configuration

- nnmcommload.ovpl
  - Reads NNM communication config data for nodes
    - -proto SNMP|ICMP –host <hostname>
  - Writes config data from a file
    - -file <filename>
    - File contains Target, Community String, Preferred Address

      <*hostname*>,,

      <*hostname*>,<*READ-ONLY string*>,

      <*hostname*>,,<node *address*>

      <*hostname*>,<*READ-ONLY string*>, <*node address*>

Discovery

- Discovery Policies
  - Discover Everything
    - Set an autodiscovery rule as follows:
      - Ordering 500 (HP recommendation);
        - » Higher numbers = higher precedence wrt other rules
      - Enable auto-discovery; enable discover any SNMP device
      - Enable discovery any Non-SNMP device
      - Create at least one IP Address Range
      - Do not add OID ranges; Add at least one discovery seed
  - Limit auto discovery
    - Set rules that use SNMP OID's
    - Set rules that use limited IP address ranges
    - Set rules that disable auto-discovery for certain IP ranges
      - Equivalent of netmon.noDiscover
  - Do not use auto discovery
    - Do not set any auto-discovery rules (default)

Discovery

- General notes
  - Configure Communication Configuration
    - SNMP community not set to public by default
    - Verify using nnmsnmpwalk -c <string> >node>
  - Re-Discovery interval 24 hrs by default
    - Adjust via Control Group – rediscovery Interval
    - Minimum is 1 hour
  - Seeding
    - At least one seed is required
    - Optionally use nnmloadseeds.ovpl to externally load from a file
  - Name Resolution – 3-level hierarchy
    - Choose among these choices:
      - Short Name DNS (1st default)
      - FQDN
      - Short SNMP sysName (2nd default)
      - Full SNMP sysName
      - IP Address (3rd default)
    - $DataDir/shared/nnm/conf/hostNoLookup.conf – stops reverse lookups for hosts
    - $DataDir/shared/nnm/conf/ipNoLookup.conf - stops fwd lookups for IP addresses

Discovery

- Subnet connection rules allow NNM to connect interfaces on devices which do not run Layer 2 Discovery protocols, such as CDP.

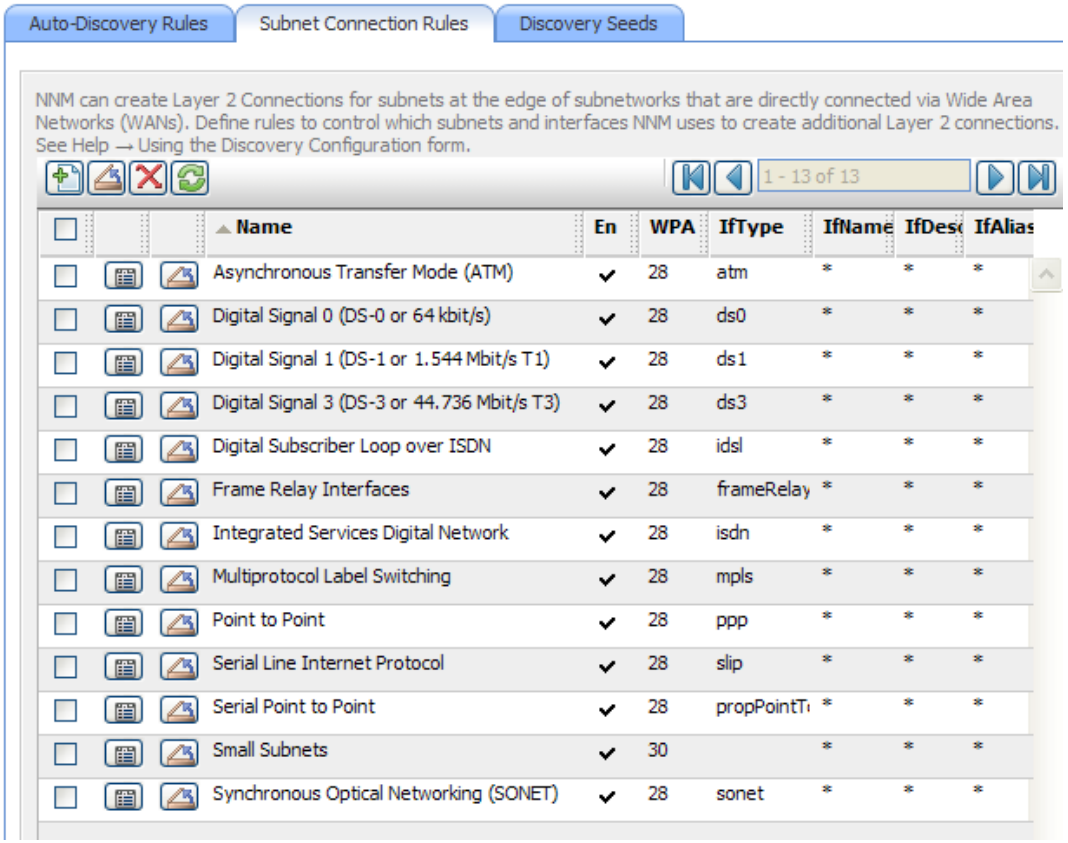
- WPA: Widest Prefix Allowed

Maximum Prefix

Specify the prefix for the subnet for which you want to create Layer 2 connections. Possible prefix values are described in the following table:

Valid Maximum Prefix Values

Valid Maximum Prefix Value	Number of Usable IPv4 Addresses
28	14 (16-2=14)*
29	6 (8-2=6)*
30	2 (4-2=2)*
31	2



Discovery

- Verify/validate discovery
  - Global discovery status:
    - Help – About Network Node Manager
  - Node discovery status
    - Discovery state in node form: 3 values:
      - Newly Created (discovered, but polling not complete)
      - Discovery Completed
      - Re-discovery In Process (discovery actively polling node)
  - Seed discovery status
    - Discovery status column in discovery seeds tab
  - View results
    - View IP Addresses view or Nodes View
    - View Layer 2 Neighbors from Nodes view
  - Force a configuration poll
    - Can be done from GUI or using nnmconfigpoll.ovpl

Discovery

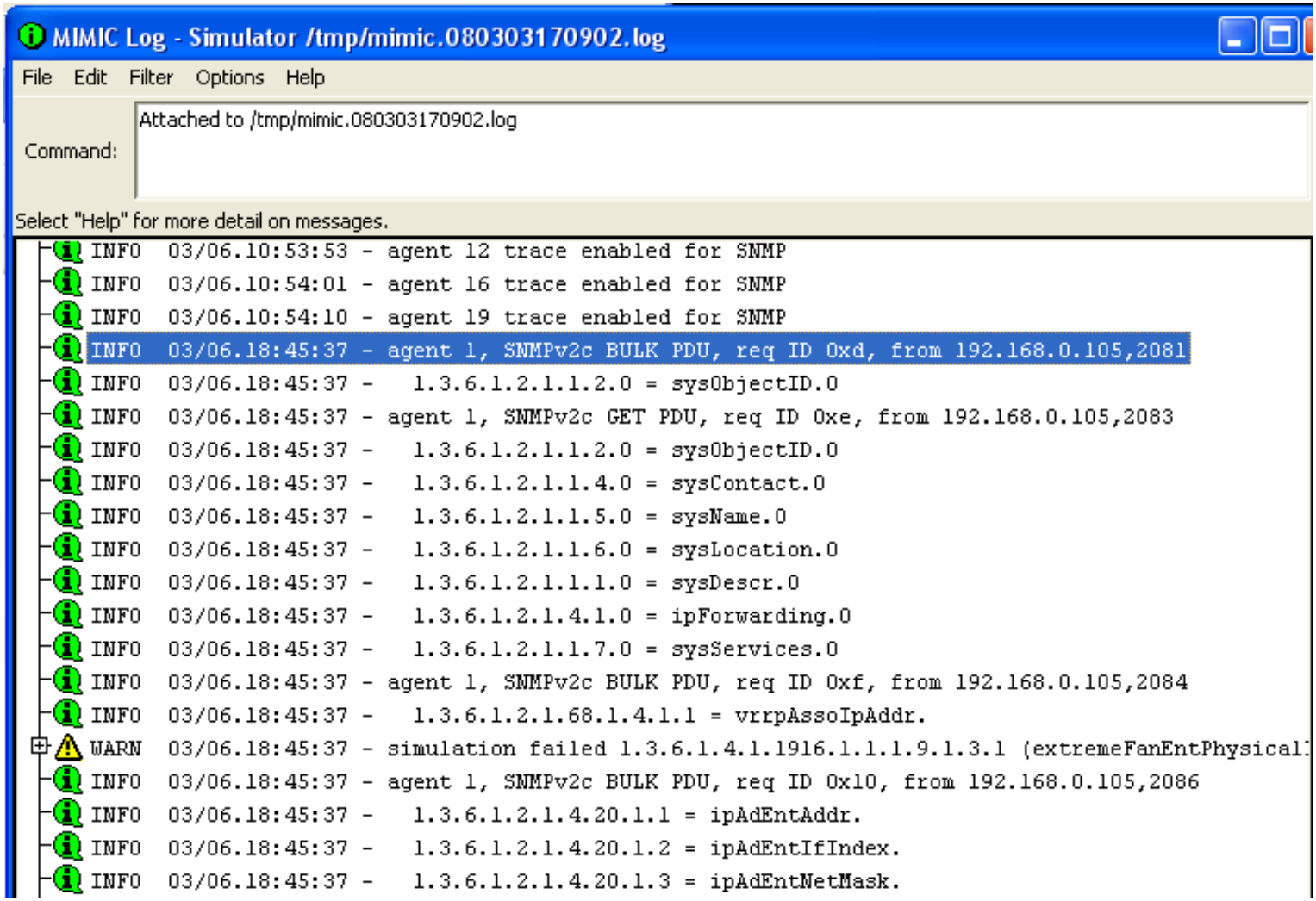
- Configuration Poll

Configuration Poll of 45.2.0.1

```
Connecting to server for configuration poll.
09:07:37  **** Starting configuration poll of node 45.2.0.1 ****
09:07:38  Supports SNMP V2C
09:07:38  Get NodeInfo. Found entries:1
09:07:38  Get MigratableAddresses retrieved no data because this device does not support
a way of collecting data.
09:07:38  Get Addresses. Found entries:24
09:07:38  Get AddressesIFType. Found entries:23
09:07:43  0 IP Addresses created, 0 IP Addresses deleted
09:07:43  0 IP Addresses changed, 23 IP Addresses unchanged 1 IP Addresses skipped
09:07:58  Supports SNMP V2C
09:07:58  Get Interfaces. Found entries:123
09:07:58  Created 0 new Interfaces deleted 0 interfaces, 123 interfaces unchanged
09:07:58  BasicNodeAnalyzer has Completed
09:07:58  ArpCacheAnalyzer is working on node: MIMIC_sim1
09:07:58  XdpAnalyzer is working on node: MIMIC_sim1
09:07:58  Get XDP. Found entries:6
09:07:58  XdpAnalyzer has Completed
09:07:59  Get ArpCache. Found entries:101
09:07:59  SubnetAnalyzer has Completed
09:07:59  ArpCacheAnalyzer has Completed
09:07:59  **** End of configuration poll for node 45.2.0.1 ****
```

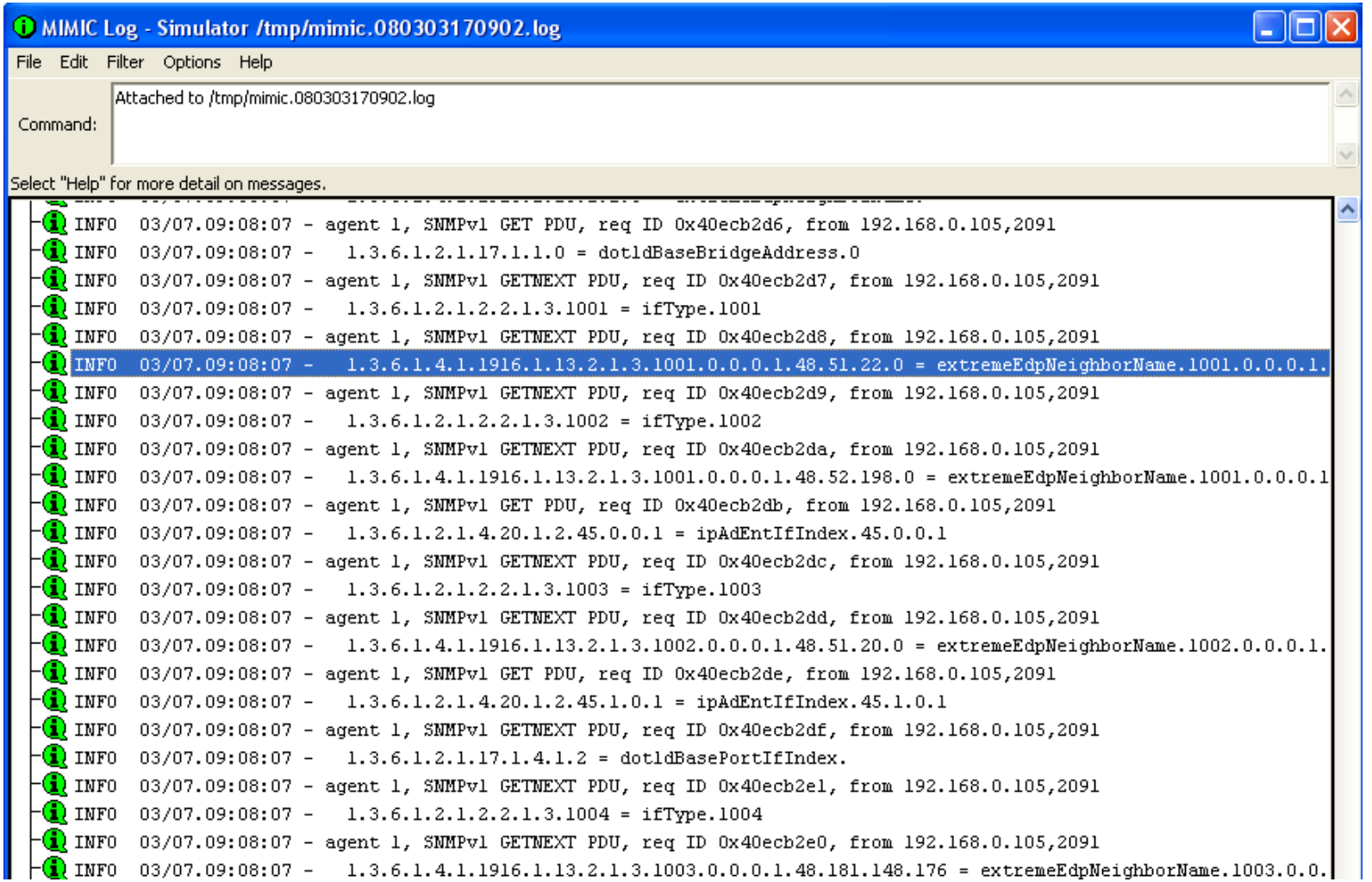
Discovery

- Discovery trace (MIMIC)
  - Note GetBulk calls



Discovery

- Discovery trace (MIMIC)
  - Agent-specific SNMP gets via ovet_daExtSw

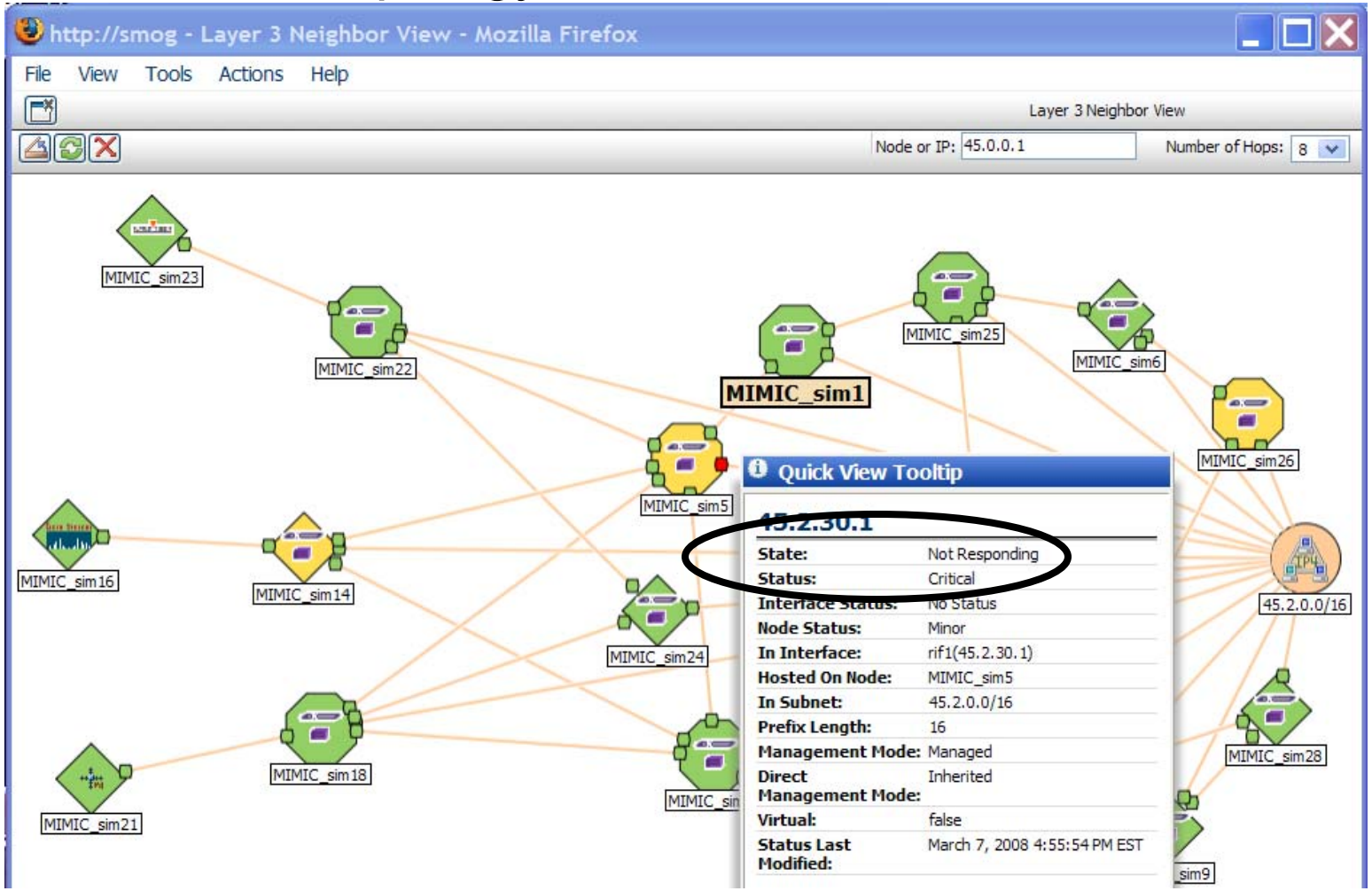


State/Status Polling

- Modules
  - State Poller determines **State**
    - Pings IPv4 addresses
    - Checks each SNMP agent for responsiveness
    - Checks ifAdminStatus and ifOperStatus
    - Extendible to monitor unconnected interfaces (default=off)
    - States: Responding; Not Responding; Unset; Not Polled
  - Causal Engine determines **Status**
    - Inputs from State Poller, Discovery and incidents
    - Condition Listener – collect symptoms
    - Hypothesis Engine – Analysis to determine relationships
    - Blackboard – updates status and posts incidents

State/Status Polling

- *Status* is reflected in topology, not *State*



State/Status Polling

- Status

Color	Meaning	Color	Meaning	Color	Meaning	Color	Meaning
	Unknown		Minor		Disabled or Unset		Unmanaged*
	Normal		Major		No Status		Restricted*
	Warning		Critical		Informational		Testing*

Color	Meaning	Description
	Unknown	Indicates one of the following: • The node has just been added to the NNM database and the Causal Engine has not yet calculated its health status. • The node is unreachable and cannot be polled.
	Disabled or Unset	Indicates the object has an administrative status of "disabled" or "unset". This status prevents the device from being polled. As a result, the node appears on maps, but is not monitored. When Spiral Discovery detects a change in administrative status, monitoring resumes. Administrative status is the current value stored in MIB II ifAdminStatus.
	No Status	Indicates that NNM's current configuration excludes this device from monitoring so the Status is not calculated because the device is set to Unmanaged/Out Of Service.
	Informational	Indicates the object has an administrative status of "unmanaged". Administrative status is the current value stored in MIB II ifAdminStatus.
	Unmanaged*	Indicates the object has an administrative status of "unmanaged". Administrative status is the current value stored in MIB II ifAdminStatus.
	Restricted*	Indicates the object has an administrative status of "restricted". Administrative status is the current value stored in MIB II ifAdminStatus.
	Testing*	Indicates the object has an administrative status of "testing". Administrative status is the current value stored in MIB II ifAdminStatus.

State/Status Polling

- Management Events - Status

Incident Configuration Name	Description
AddressNotResponding	Address is not responding to ICMP
ConnectionDown	Both (or all) ends of a connection not responding to SNMP
ConnectionPartiallyUnresponsive	Connection partially unresponsive. undiscovered device down
ImportantNodeorConnectionDown	Node not responding to ICMP or SNMP. Also: only one neighbor is down so NNM can't determine if node or connection is down.
ImportantNodeUnmanageable	Node not responding to SNMP.
InterfaceDisabled	Interface explicitly disabled.
InterfaceDown	Interface is not responding to SNMp/ICMP polls.
ModifiedConnectionDown	Connection disconnected and/or moved and is not responding to SNMP.
NodeDown	NNM's APA has determined the node is down based on : 100% of the addresses assigned to this node are unreachable The SNMP agent installed on this machine is not responding At least 2 neighbors have problems with connectivity to node
NodeOrConnectionDown	Not responding to ICMP or SNMP. Also: only one neighbor is down
NonSNMPNodeUnresponsive	Node down, or undiscovered device between node and NNM is down.
WANEdgeRouterUnresponsive	Router down, or undiscovered device between router and NNM down.
RateCorrelation	Template to measure number of incoming incidents within period.
DuplicateCorrelation	Template to configure deduplication attributes

State/Status Polling

- Management Events – Performance and other

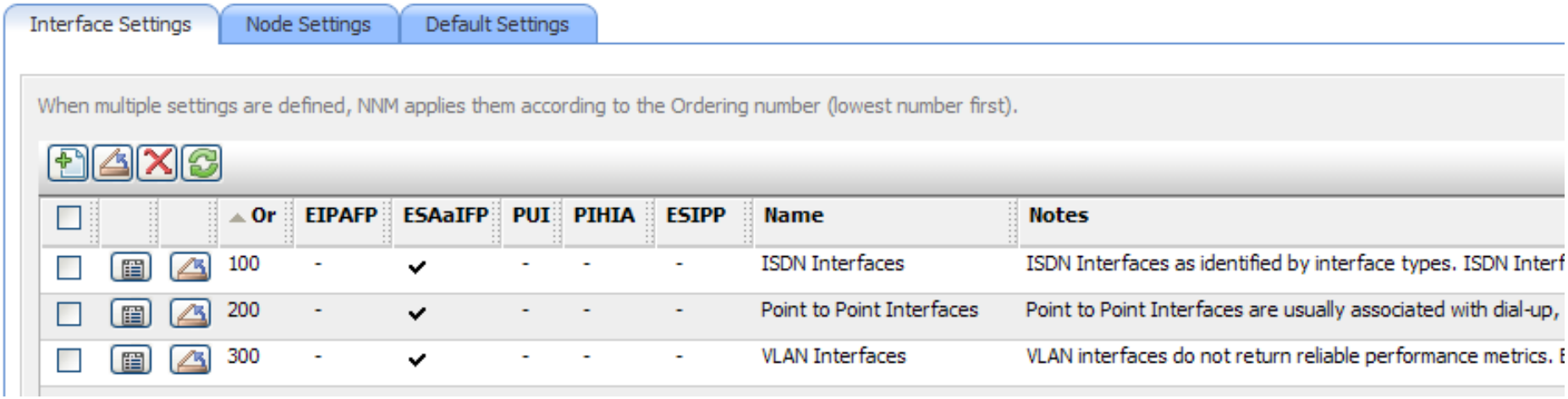
•**Incident Configuration Name**	**Description**
InterfacePerformanceCritical	Interface performance has reached a Critical severity.
InterfacePerformanceWarning	Interface performance has reached a Warning severity.
InterfaceInputDiscardRateHigh	Indicates a high input discard rate percentage.
IntefaceInputErrorRateHigh	Indicates a high input error rate percentage.
InterfaceInputUtilizationHigh	Indicates a high input utilization percentage.
IntefaceInputUtilizationLow	Indicates a low input utilization percentage.
InterfaceOutputDiscardRateHigh	Indicates a high output discard rate percentage.
InterfaceOutputErrorRateHigh	Indicates a high output error rate percentage.
InterfaceOutputUtilizationHigh	Indicates a high output utilization percentage.
InterfaceOutputUtilizationLow	Indicates a low output utilization percentage.
LicenseExpired	NNM license has reached expiration.
LicenseMismatch	License capacity doesn't match Perf SPI license capacity.
LicenseNodeCountExceeded	# of discovered nodes exceeds the licensed managed node count.

State/Status Polling

- Set default monitoring rules attributes:
  - Interval, Enable ICMP, Enable SNMP
  - Poll unconnected interfaces (disabled by default)
  - Poll Interfaces hosting IP Addresses
    - Enabled by default for “Routers” node group
    - Any unconnected interface that addresses associated with it
    - Any unconnected If with ifAdminStatus and ifOperStatus set
  - (PerfSPI): Enable performance monitoring
  - Performance polling interval
- Set Interface and Node monitoring rules
  - Same set of attributes above
  - Added attributes for Node|Interface Group & Ordering
  - Ordering precedence: Interface – Node – Default
- Ad-hoc status poll from command line:
  - nnmstatuspoll.ovpl –node <name|IP> -t <sec> -v

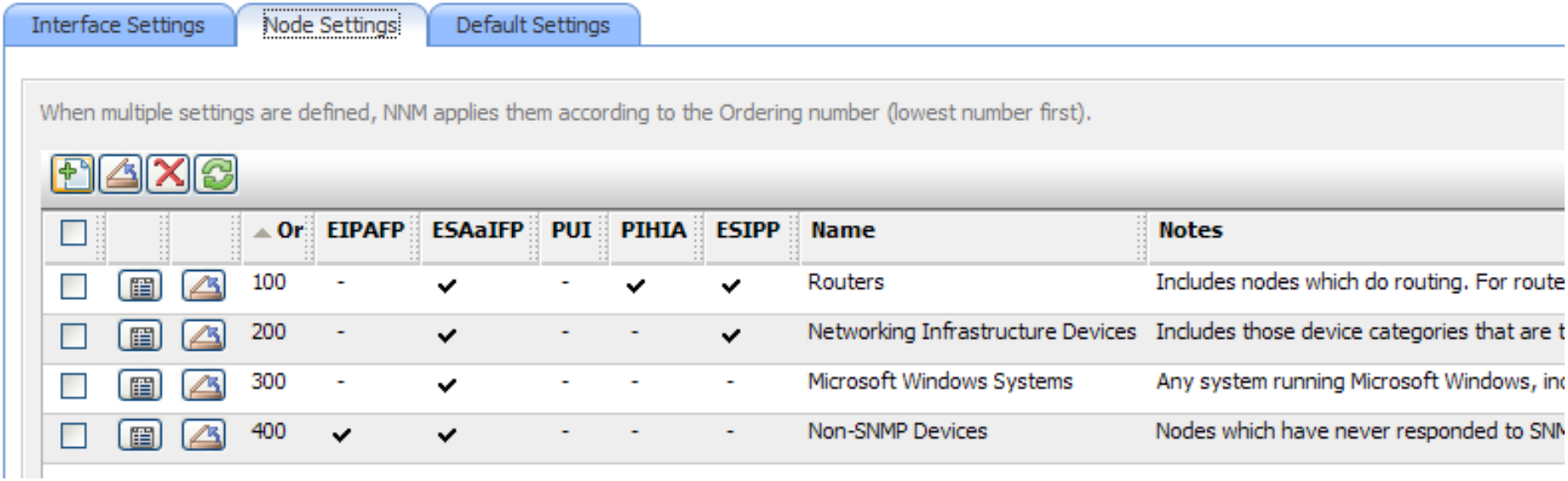
Monitoring Configuration

- Interface Group Configuration
  - Column Headings:
    - Or: Order
    - EIPAFP: Enable ICMP Ping Addr Fault Polling
    - ESAaIFP: Enable SNMP Agent & Interface Fault Polling
    - PUI: Poll Unconnected Interfaces
    - PIHIA: Poll Interfaces Hosting IP Addresses
    - ESIPP: Enable SNMP Interface Performance Polling
  - Default monitoring configuration settings:



Monitoring Configuration

- Node Group Configuration
  - Column headings:
    - Or: Order
    - EIPAFP: Enable ICMP Ping Addr Fault Polling
    - ESAaIFP: Enable SNMP Agent & Interface Fault Polling
    - PUI: Poll Unconnected Interfaces
    - PIHIA: Poll Interfaces Hosting IP Addresses
    - ESIPP: Enable SNMP Interface Performance Polling
  - Default monitoring configuration settings:



Filters

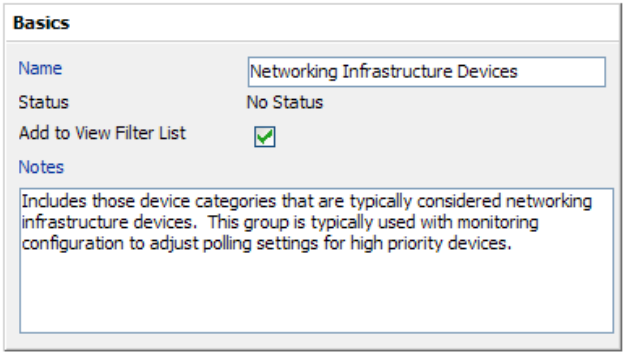
- Old Old filters (nnm 7.x and Earlier):
  - $OV_CONF/C/filters file
- Old filters (NNM 7.x only)
  - $OV_CONF/nnmet/topology/filter/TopoFilters.xml
  - $OV_CONF/nnmet/paConfig.xml
- New filters
  - In DB – configured only through GUI
  - Defaults: Management stations; Node groups; Interface Groups

View Filter Possibilities

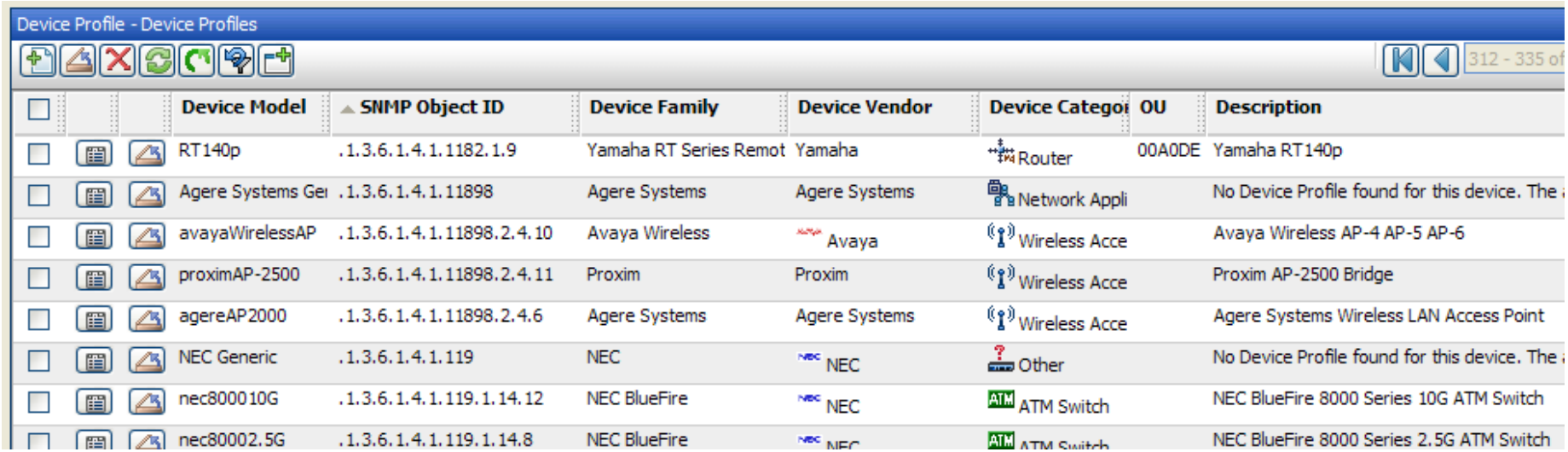
Filter	View: Object Type			
	Incident	Node	Interface	IPv4 Address
NNM 6.x/7.x Management Stations "View NNM 6.x and 7.x Management Stations "	x			
Node Groups "Node Group Filters"	x	x	x	x
Interface Groups "Interface Group Filters"			x	x

Filters

- Filter Config:

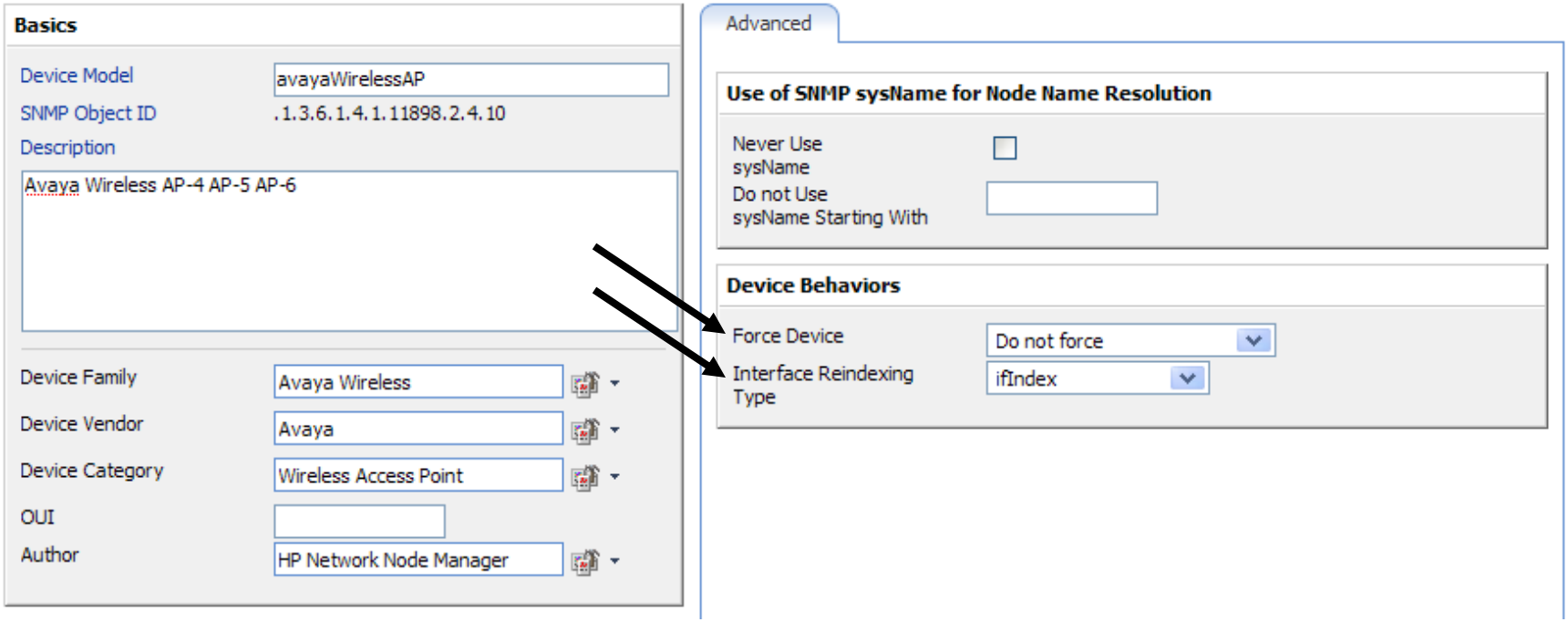


- Device profiles:



Filters

- Device Profiles
  - OID dependent
  - Force Device to: Router; Switch; Switch & router; End Node;
  - Interface reindexing Type:
    - Choose which attribute indicates change:
    - ifIndex; ifName; ifDescr; ifAlias; ifName & ifDescr

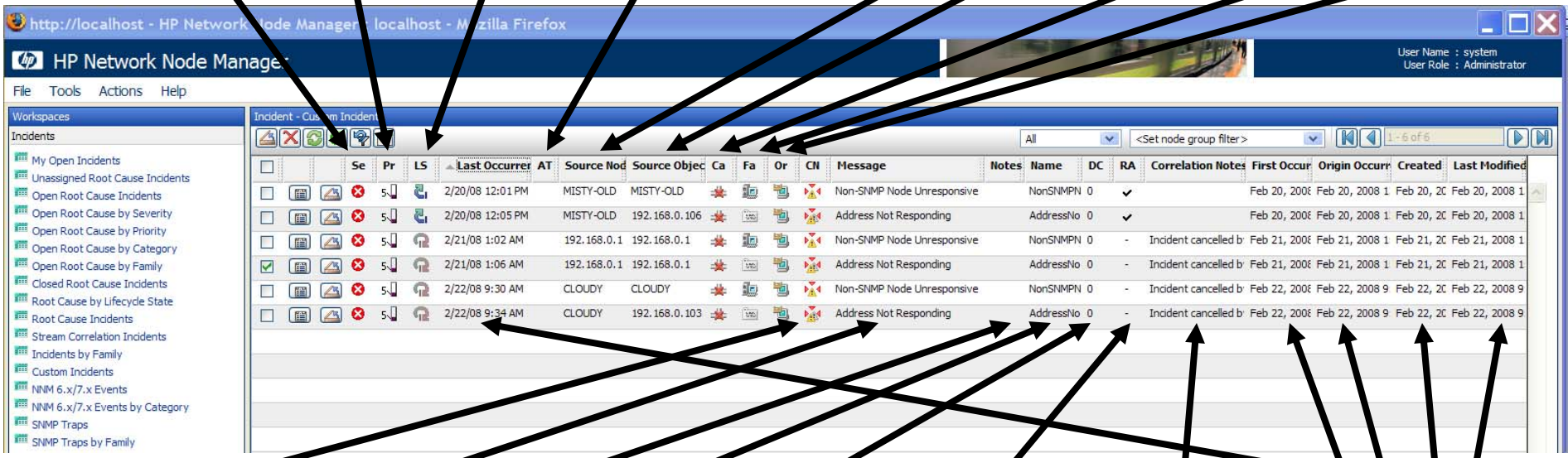


Incidents

- Incident sources
  - – Causal Engine
    - Origin = Management Software
  - –NNM events
    - Forwarded from NNM 6.x and 7.x
  - –SNMP Traps

Incidents

- Incident Form
  - Severity; Priority; Lifecycle; Assigned To; Source Node/Object; Category; Family; Origin

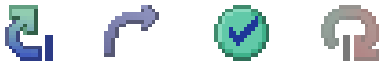


  - Correlation; Message; Notes; Name; Dup Count; RCA Active; Corr Notes; 5 time stamps
  - View ALL Incidents: Select Custom View; ALL filter

Incidents

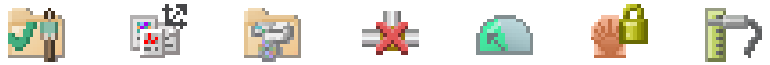
- Severity
  - Normal, Warning, Minor, Major, Critical

- Lifecycle States:
  - Registered, In-progress, Completed, Closed



- Priority States:
  - None (5), Low (4), Medium (3), High (2), Top (1)

- Category:
  - Accounting*, App Status, Config, Fault, Perf, Security, Status



- Family:
  - Addr, Agg Port, Board, Connection, Corr, HSRP, IF, Node, OSPF

- Origin:
  - Mgmt Software, Manual, Remote, SNMP, Syslog

- Correlation Nature:
  - Root, Secondary, Symptom (trap), Stream (dedup, rate or pairwise)

* = not used by NNM

Incidents

- Management Events
  - Faults
  - Performance

AddressNotResponding	✔	Critical		Address
ConnectionDown	✔	Critical		Connection
ConnectionPartiallyUnresponsive	✔	Critical		Connection
ModifiedConnectionDown	✔	Critical		Connection
ImportantNodeOrConnectionDown	✔	Critical		Node
ImportantNodeUnmanageable	✔	Critical		Node
InterfaceDisabled	✔	Critical		Interface
InterfaceDown	✔	Critical		Interface
NodeDown	✔	Critical		Node
NodeOrConnectionDown	✔	Critical		Node
NonSNMPNodeUnresponsive	✔	Critical		Node

DuplicateCorrelation	✔	Warning		Correlation
InterfaceInputDiscardRateHigh	-	Critical		Interface
InterfaceInputErrorRateHigh	-	Critical		Interface
InterfaceInputUtilizationHigh	-	Critical		Interface
InterfaceInputUtilizationLow	-	Minor		Interface
InterfaceInputUtilizationNone	-	Minor		Interface
InterfaceOutputDiscardRateHigh	-	Critical		Interface
InterfaceOutputErrorRateHigh	-	Critical		Interface
InterfaceOutputUtilizationHigh	-	Critical		Interface
InterfaceOutputUtilizationLow	-	Minor		Interface
InterfaceOutputUtilizationNone	-	Minor		Interface
InterfacePerformanceCritical	✔	Critical		Interface
InterfacePerformanceWarning	✔	Warning		Interface
RateCorrelation	✔	Warning		Correlation

Incidents

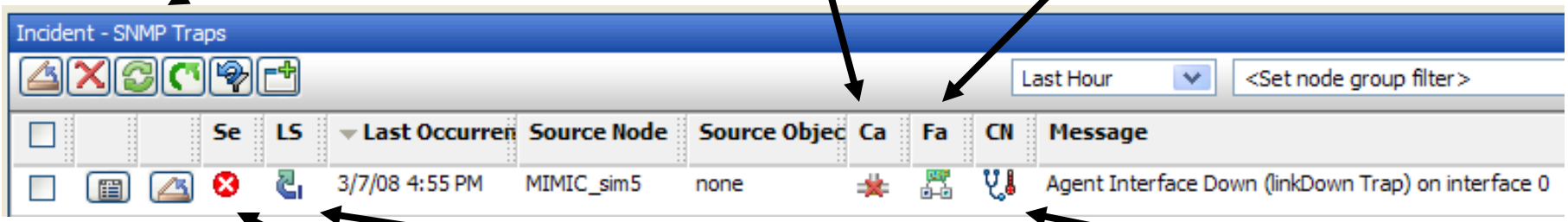
- Management Events - faults

Name	En	Severity	Ca	Family
AddressNotResponding	✔	Critical		Address
ConnectionDown	✔	Critical		Connection
ConnectionPartiallyUnresponsive	✔	Critical		Connection
ModifiedConnectionDown	✔	Critical		Connection
ImportantNodeOrConnectionDown	✔	Critical		Node
ImportantNodeUnmanageable	✔	Critical		Node
InterfaceDisabled	✔	Critical		Interface
InterfaceDown	✔	Critical		Interface
NodeDown	✔	Critical		Node
NodeOrConnectionDown	✔	Critical		Node
NonSNMPNodeUnresponsive	✔	Critical		Node

- Address fails ICMP
- Both ends fail SNMP
- Undiscovered device in connection down
- Connection fails SNMP or was moved
- Fails ICMP & SNMP & 1 neighbor down
- Fails SNMP
- ifAdmin status = disabled
- Fails SNMP and/or ICMP
- All Ifs & Mgmt Addr down & >1 neighbors
- All Ifs & Mgmt down & only 1 neighbor
- Node down or undiscovered device down

Incidents

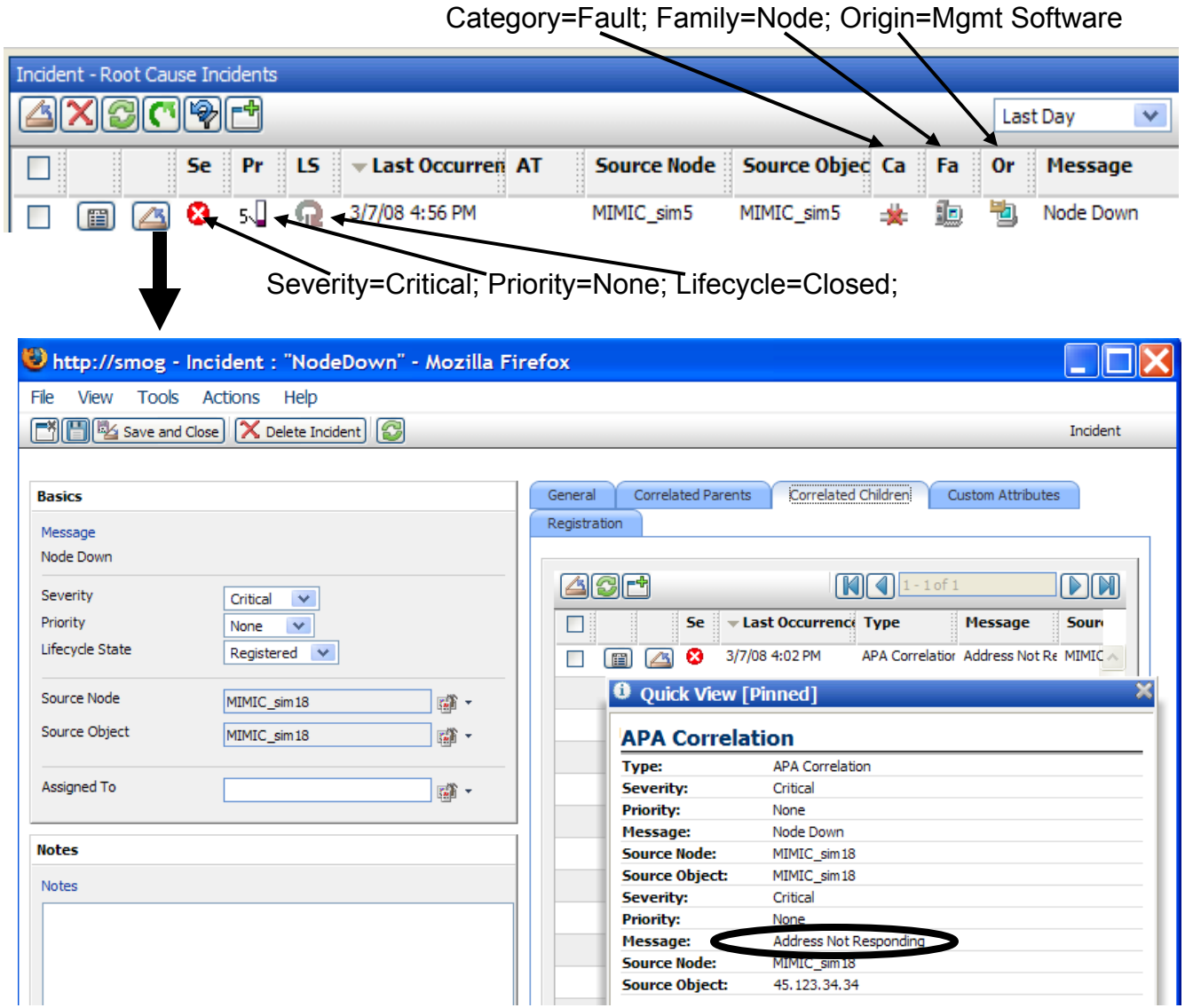
- Example: LinkDown
  - Source: SNMP Trap, Category: Fault; Family: Interface



  - Severity: Critical; Lifecycle: Registered; Correlation Nature: Symptom

Incidents

- Example:
  - Node Down
  - Details:



Incidents

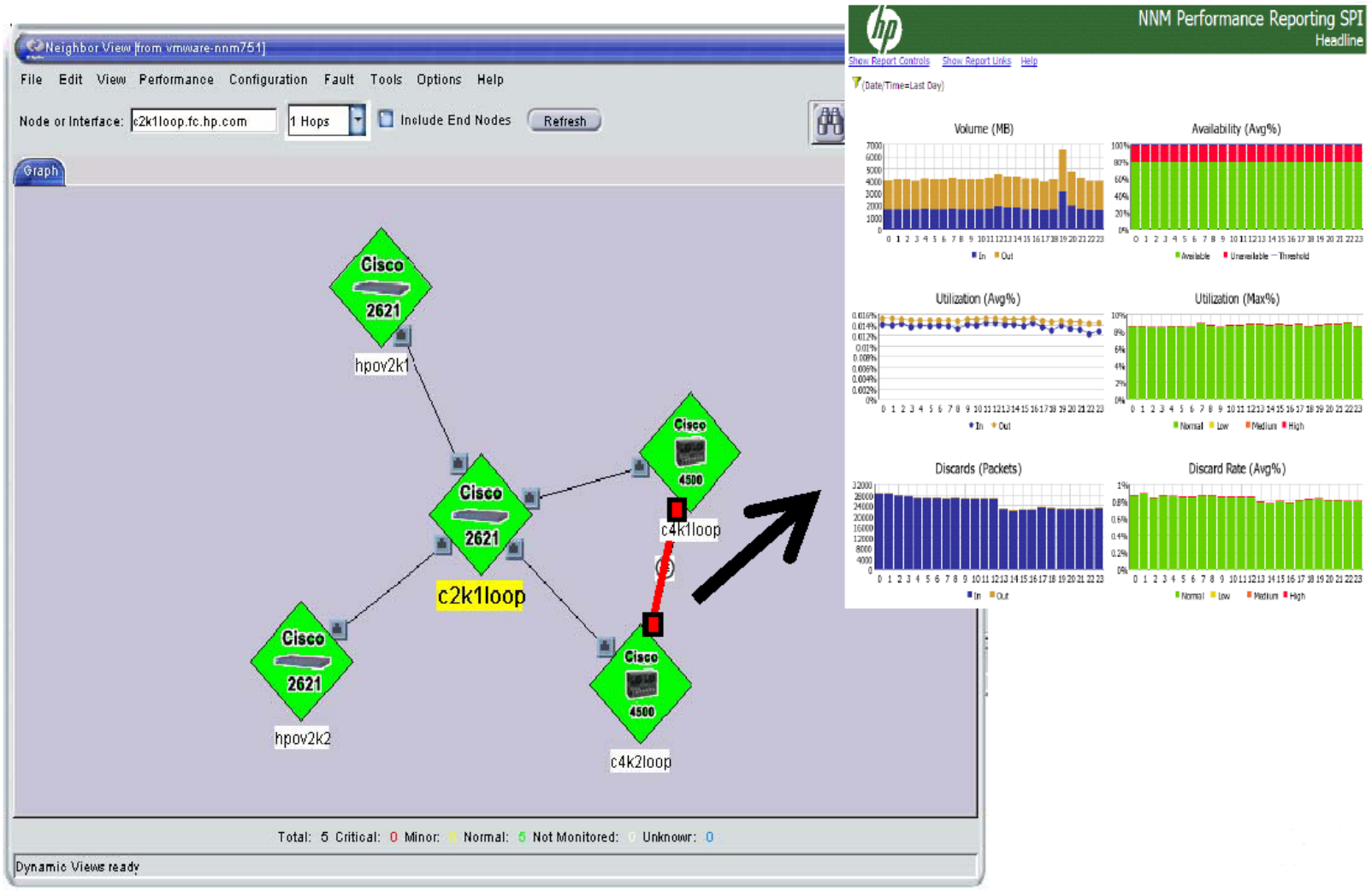
- nnmincidentcfg.ovpl
  - Equivalent of xnmevents –load (trap macros from MIB)
  - nnmincidentcfg.ovpl -loadTraps "C:\Cisco Mibs\CISCO-VTP-MIB.my"
- nnmloadmib
  - Equivalent of xnmloadlib (Load MIBs for all SNMP apps)
- nnmconfigexport –e incident
  - Backup/export incident configuration to xml schema
- nnmincidentcfg.ovpl
  - Equivalent of xnmevents –load (trap macros from MIB)
- nnmdumpevents
  - dump contents of event db (equivalent of ovdumpevents)

    usage: [-f <filename>] [-t] [-l <minutes>][-c | -s <streamName>]
    [-d <database pathName>]

Incidents

- nnmtrapd
  - Equivalent to ovtrapd in previous versions
  - -W -b 2000 -r 30 suppresses subsequent traps if more than 2000 are received within 30s
- nnmtrapd.conf
  - Block traps from sources via ip range or OID
- pmd
  -

Performance SPI



Performance SPI

Perf SPI

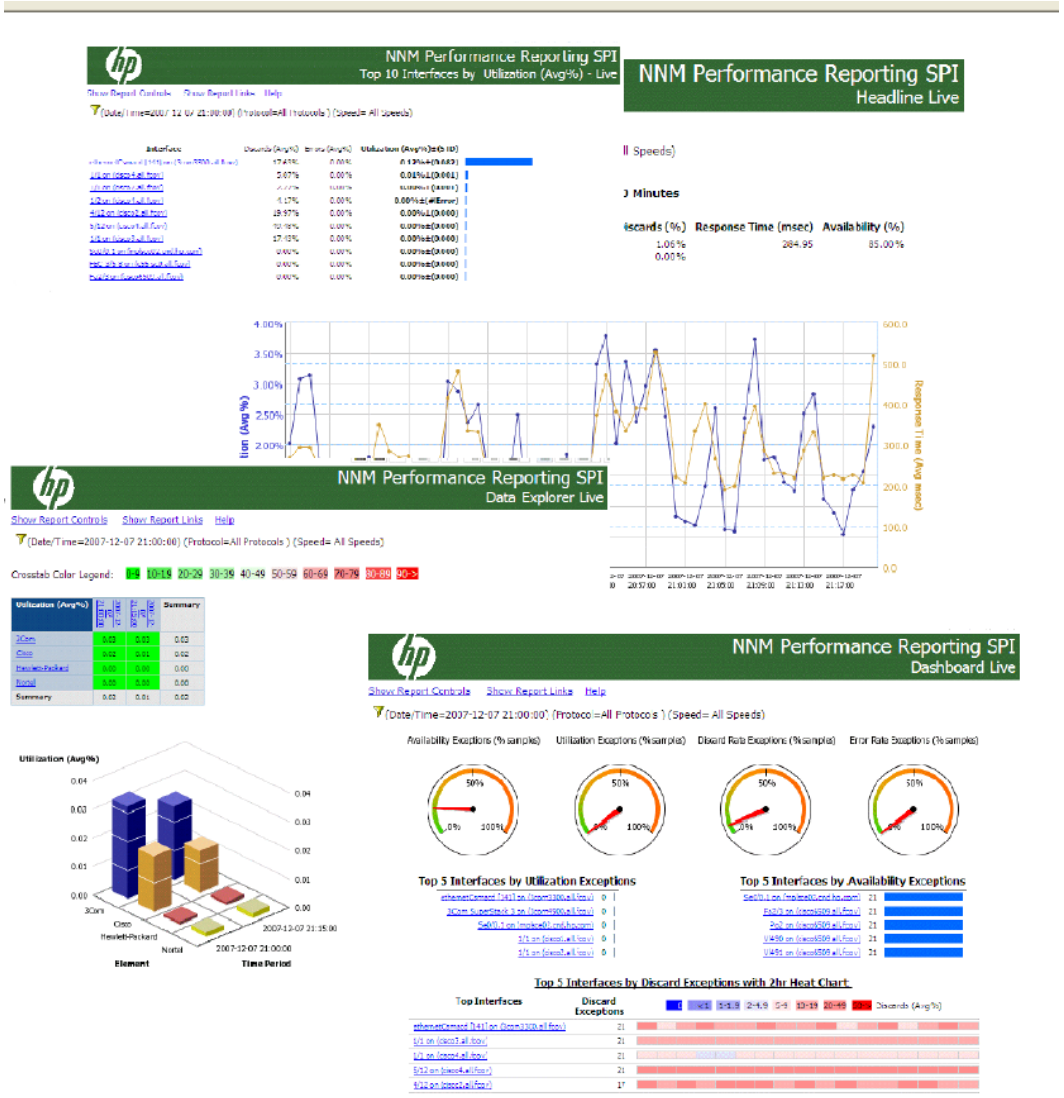
- Fixed collection – network only
- Limited report changes
- Retention 9 weeks only
- Specialized cube storage
- 1 min polling – can enhance PI's collection
- Feeds PI – *integration in 1.0*

PI

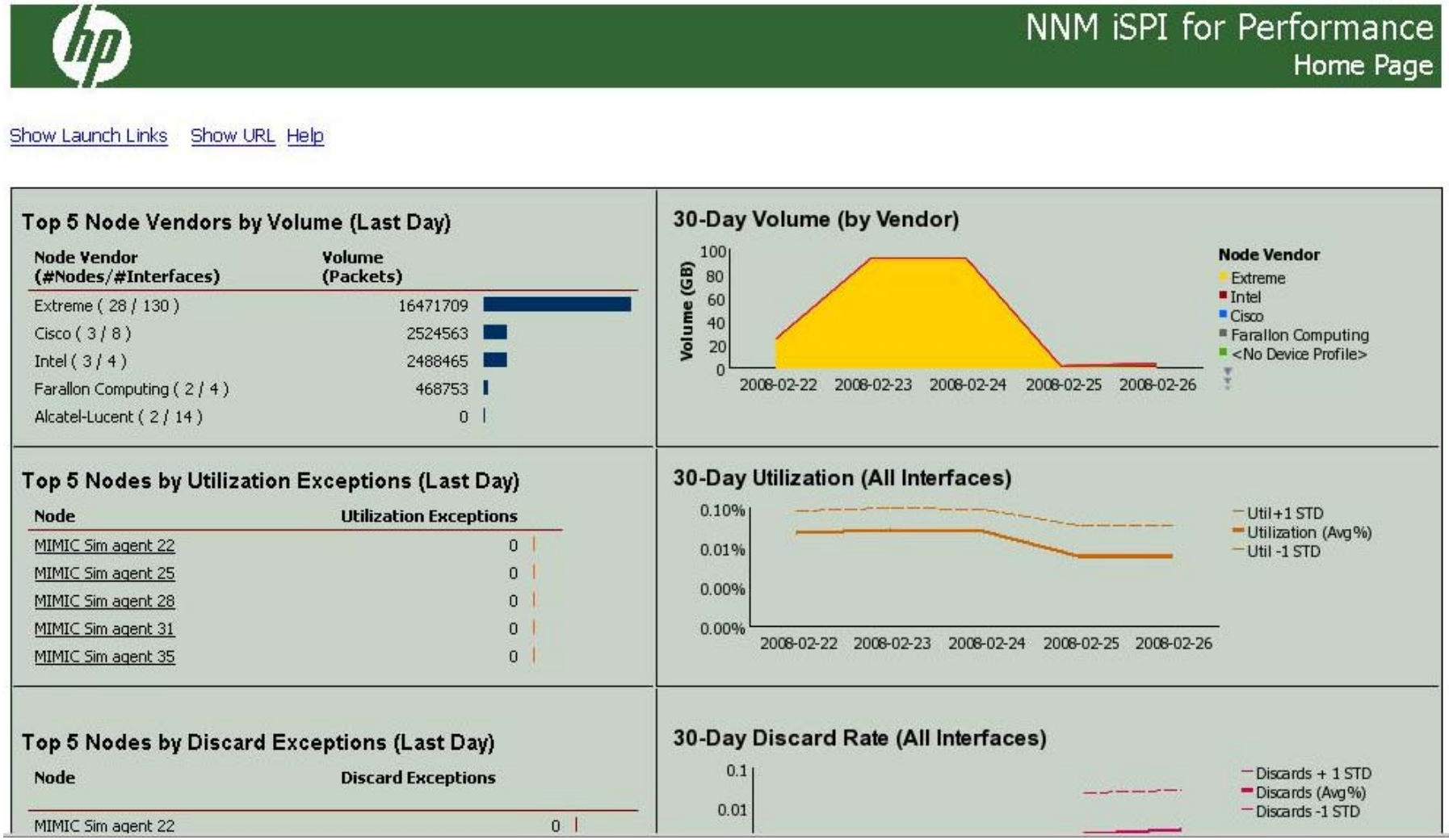
- Customizable collection – cross domain
- Full report authoring
- Long retention
- Full data warehouse
- 5 min polling (for now)
- Can consolidate multiple Perf SPIs

Performance SPI

- Report Types
  - Dashboard
  - Headline
  - Monthly Heat Chart
  - Calendar
  - Top Ten
  - Most Changed
  - Data Explorer



Performance SPI



Performance SPI

- Report Types

Hide Launch Links Show URL Help

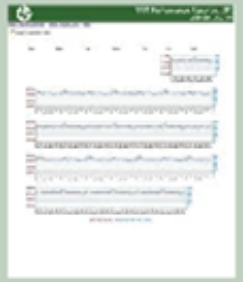
Report Links

BI Server Portal Query Studio My Folders NNM

Home Page

Headline

Calendar

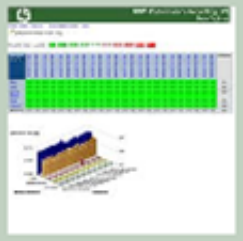


Heat Chart

Most Changed

Top N
Live
Summary Archive

Data Explorer
Live
Summary Archive



Dashboard
Live
Summary

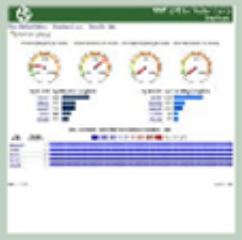
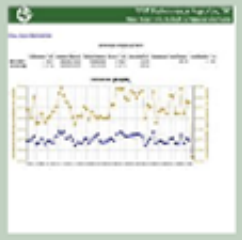


Chart Detail
Live
Archive



Web Interface

- Primary URL: https://server_name/nnm
- Ports used:
  - jboss.http.port=80
  - jboss.http.port=8004
  - jboss.jnp.port=1099
  - jboss.https.port=443
  - jboss.rmi.port=1098
  - jboss.jrmp.port=4444
  - jboss.pooled.port=4445
  - jboss.socket.port=4446
  - jboss.bisocket.port=4457
  - jboss.ws.port=8083
  - jboss.ejb3.port=3873
- Port Configuration:
  - *$OV_DATA_DIR*/shared/nnm/conf/nnm.ports.properties

Web Interface

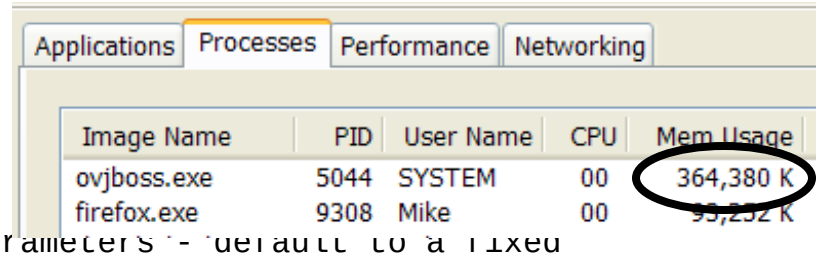
- JBOSS Troubleshooting
  - Footprint/heap size - Config files:

    %INSTALLED_DIR%\shared\nnm\conf\ovjboss

    Ovjboss.jvm/properties (2GB XP Pro):

```
# JVM Memory parameters
# -Xms: Initial Java Heap Size
# -Xmx: Maximum Java Heap Size
#
-Xms25m
-Xmx1024m

#
# Permanent Generation JVM heap parameters - default to a fixed
# size of 128 MB
#
-XX:PermSize=56m
-XX:MaxPermSize=100m
```



  - Logfiles: \log\nnm\jbossServer.log, ovjboss.log

Web Interface

- Jboss Memory footprint:
  - Shown: 32 Bit, XP Pro, 2GB
    - 32 nodes, 2000 interfaces (sim)
  - Win 2003 Ent x64 SP2
    - 926 managed nodes (sim)
    - ovjboss takes 1.2G memory

Image Name	PID	User Name	CPU	Mem Usage
nmsdbmgr.exe	2088	SYSTEM	00	5,280 K
nnmtrapd.exe	4220	SYSTEM	00	4,228 K
ovet_agent.exe	228	SYSTEM	00	7,796 K
ovet_agent.exe	648	SYSTEM	00	7,772 K
ovet_agent.exe	748	SYSTEM	00	7,792 K
ovet_agent.exe	856	SYSTEM	00	7,832 K
ovet_agent.exe	1112	SYSTEM	00	7,920 K
ovet_agent.exe	1764	SYSTEM	00	7,780 K
ovet_agent.exe	1960	SYSTEM	00	7,788 K
ovet_agent.exe	2124	SYSTEM	00	7,792 K
ovet_agent.exe	2224	SYSTEM	00	7,796 K
ovet_agent.exe	2340	SYSTEM	00	7,788 K
ovet_agent.exe	2616	SYSTEM	00	7,772 K
ovet_agent.exe	2776	SYSTEM	00	7,808 K
ovet_agent.exe	2892	SYSTEM	00	7,808 K
ovet_agent.exe	3012	SYSTEM	00	7,820 K
ovet_agent.exe	3144	SYSTEM	00	7,812 K
ovet_agent.exe	3272	SYSTEM	00	7,804 K
ovet_agent.exe	3280	SYSTEM	00	7,812 K
ovet_agent.exe	3748	SYSTEM	00	7,796 K
ovet_agent.exe	3856	SYSTEM	00	7,808 K
ovet_agent.exe	3956	SYSTEM	00	7,772 K
ovet_agent.exe	3968	SYSTEM	00	7,808 K
ovet_agent.exe	4068	SYSTEM	00	7,828 K
ovet_agent.exe	4092	SYSTEM	00	7,808 K
ovet_agent.exe	5936	SYSTEM	00	8,112 K
ovet_agent.exe	6128	SYSTEM	00	7,804 K
ovet_agent.exe	6140	SYSTEM	00	7,804 K
ovet_bridge.exe	4872	SYSTEM	00	6,252 K
ovet_dhsnmp.e...	5164	SYSTEM	00	41,740 K
ovet_discoA.exe	5004	SYSTEM	00	13,536 K
ovet_discoC.exe	5176	SYSTEM	00	12,372 K
ovet_helpserv....	4992	SYSTEM	00	7,996 K
ovjboss.exe	2208	SYSTEM	01	385,724 K
ovspmd.exe	860	SYSTEM	00	4,756 K
pmd.exe	3476	SYSTEM	00	6,132 K
postgres.exe	2656	nmsdbmgr	00	8,788 K
postgres.exe	3208	nmsdbmgr	00	2,172 K
postgres.exe	3764	nmsdbmgr	00	5,148 K
postgres.exe	3776	nmsdbmgr	00	2,412 K
postgres.exe	5360	nmsdbmgr	00	5,084 K
postgres.exe	5400	nmsdbmgr	00	3,376 K
postgres.exe	7476	nmsdbmgr	00	5,668 K
postgres.exe	9884	nmsdbmgr	00	3,840 K

Troubleshooting

- Process Log files
  - %INSTALL_DIR%\Data\Log
    - nmsdbmgr.log, ovjboss.log, ovspmd.log, etc

```
jvmArgs[25]: -XX:+HeapDumpOnCtrlBreak
jvmArgs[26]: -XX:+HeapDumpOnOutOfMemoryError
jvmArgs[27]: -XX:HeapDumpPath=nnm.hprof
jvmArgs[28]: -Dsun.rmi.dgc.client.gcInterval=3600000
jvmArgs[29]: -Dsun.rmi.dgc.server.gcInterval=3600000
jvmArgs[30]: -Dpython.verbose=error
jvmArgs[31]: -Djboss.http.port=80
jvmArgs[32]: -Djboss.jnp.port=1099
jvmArgs[33]: -Djboss.https.port=443
jvmArgs[34]: -Djboss.rmi.port=1098
jvmArgs[35]: -Djboss.jrmp.port=4444
jvmArgs[36]: -Djboss.pooled.port=4445
jvmArgs[37]: -Djboss.socket.port=4446
jvmArgs[38]: -Djboss.bisocket.port=4457
jvmArgs[39]: -Djboss.ws.port=8083
jvmArgs[40]: -Djboss.ejb3.port=3873
appArgs[0]: -c
appArgs[1]: nms
appArgs[2]: -b
appArgs[3]: 0.0.0.0
/DE/COMMON/util_libs/src/ovutil/ExecJava.cpp:355 Can't create Java Virtual Machine: JNI_CreateJavaVM()
returned -4
```

Troubleshooting

- Windows ovpl output to a file:

  Use complete path to perl and program to work around this:

  C:\Program Files\HP OpenView\support>"%NnmInstallDir%\nonOV\perl\a\bin\perl.exe" "%NnmInstallDir%\support\dumpstatepollerjmx.ovpl" -all >a.txt

- nnmprintcounts.ovpl (support dir)
  – Equivalent of legacy ovtopodump -L
- nnmmibcapture.ovpl (support\mibcapture dir)
  – Captures agents responses to SNMP OID's in oids.txt file for nodes in hosts.txt file
-

  –d

MIMIC SNMP Simulator

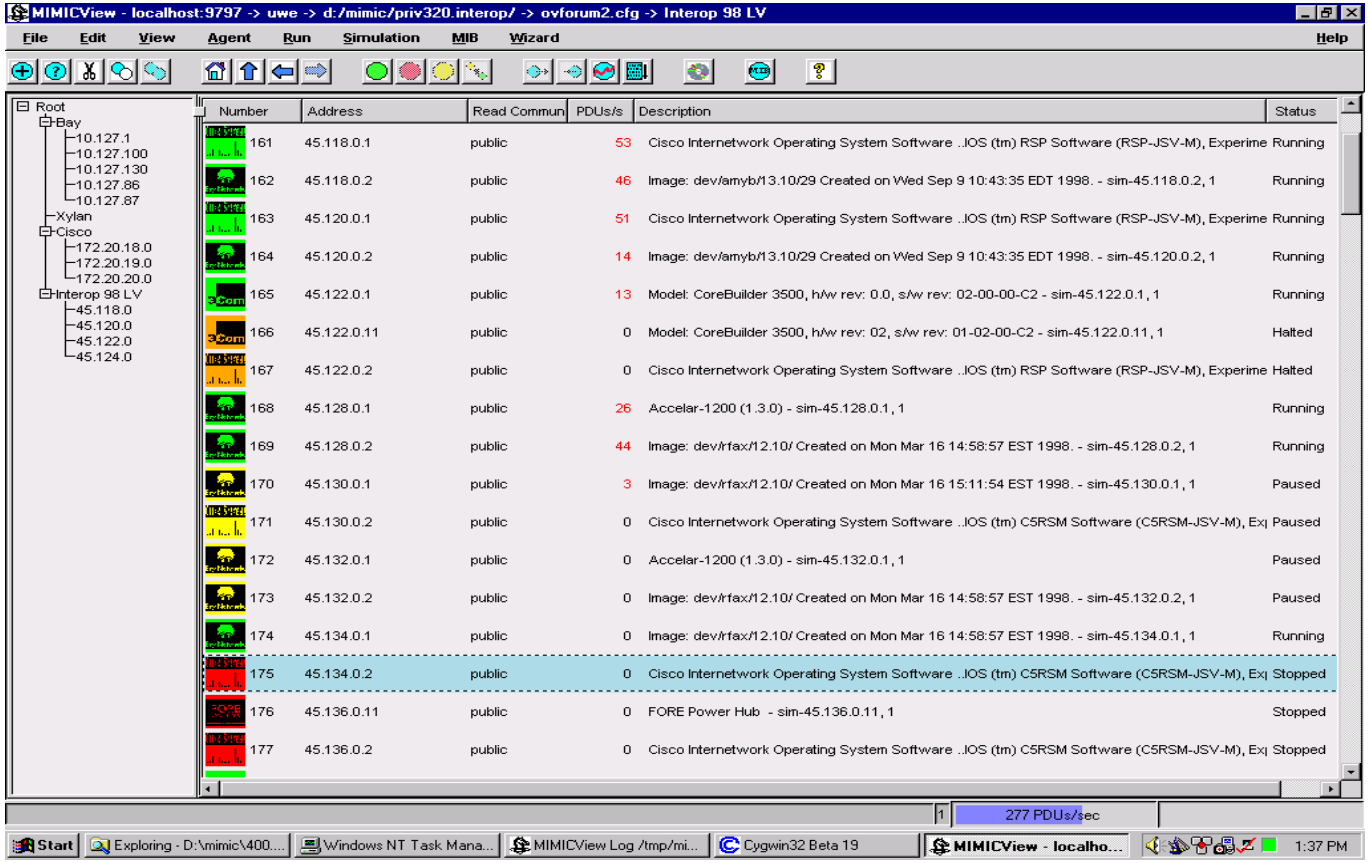
- 20,000 SNMP agents in one workstation
- Easy to compare / migrate from NNM 7 to NNM 8i
- SNMPv1, v2 and v3, RMON 2, IPv6
- Cisco/IOS,TL1,IPMI, TFTP, DHCP, ToD, Telnet, SSH
- Network recording tools

- Platforms – Windows, Solaris and Linux
  – 32 and 64 bit support
- Languages – Java, Tcl/Tk, Perl, C++

MIMIC Simulator

Control/populate SNMP agent data

Discover/model existing agents



Summary

- Features/functionality - will trickle in over time
- Migration - we'll miss you *ovw*
- Performance SPI - vast improvements but its an add-on
- Scalability/Distribution – mostly good news
- SOA – let's all get on the Service Bus
- jboss – popular, good DB citizen, open, but footprint?
- MIMIC Simulator – a big help in migration

- Thanks for attending!

www.fognet.com
www.gambitcomm.com

Backup Slides
NNM 8i Licensing

NNM v7.x

Product Licensing

- Advanced Edition + Standard Edition
- 250, 1000, 5000, Unlimited Node Packs (by monitored device)
- SPIs: varies (lump sum, phone packs)

Example

- 1 each NNM AE 1000 Node Pack LTU
- 1 each NNM AE 250 Node Pack LTU

NNMi

Core Product Licensing

- NNMi (today), NNMiadv (future)
- 50 node pack with quantity breaks (by discovered device)
- Unlimited license (7.x update and CSL only)
- i SPIs: 50 node packs

Example

- 25 each NNMi 50 Node Pack LTU

Backup Slides:

- Directories on Windows:
  - Base:
    - C:\Program Files\HP OpenView\
    - C:\Program Files (x86)\HP Openview\
  - Online Documentation Web URL:
    - Program Files/HP OpenView/nonOV/jboss/nms/server/nms/tmp/deploy/tmp51831nnmDocs_en-exp.war/index.html
- 32 Bit Installation:
  - Touch %TEMP%\bypass64check
  - Consider C:\Program Files\HP OpenView\contrib\source\pthreads.zip