

SNMP and OpenNMS



Part –2 OpenNMS

Parts of this presentation were shamelessly copied from a presentation by the project's maintainer, Tarus Balog with the author's permission.

Zeev Halevi

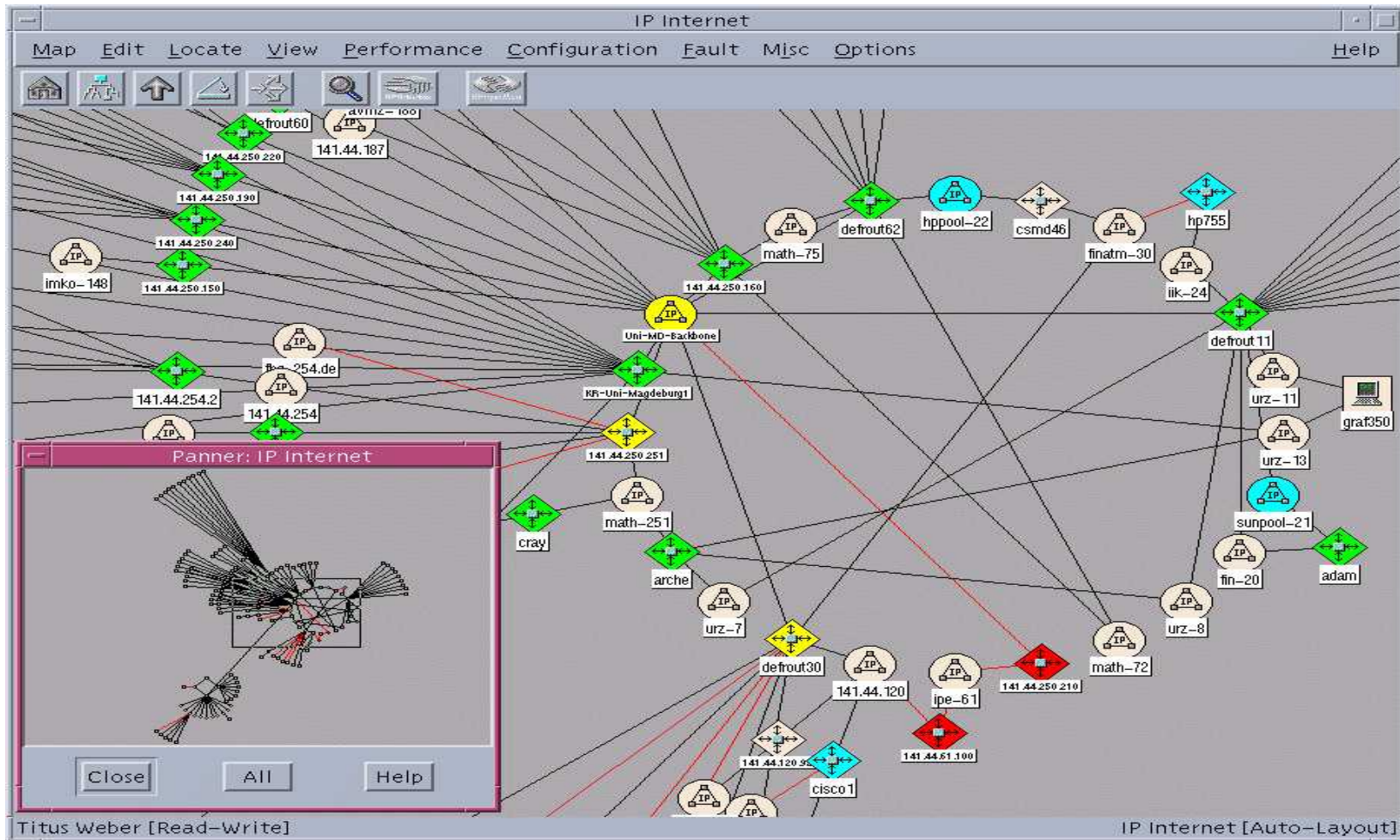
NMS - ISO Definition: FCAPS

- Fault Management
- Configuration Management
- Accounting
- Performance
- Security

FCAPS and OpenNMS

- ***Fault Management***
- Configuration Management
- Accounting
- ***Performance***
- Security

He-Who-Must-Not-Be-Named of the NMS world



The Three "Halves" of OpenNMS

- Service Scanning: Is a given network service available?
- SNMP Data Collection: Traditional network performance measurement via SNMP
- Event Management and Notification

Services Available by Default

- ICMP
 - SNMP
 - FTP
 - HTTP
 - SMTP
 - DNS
 - Citrix
 - SSH
 - SQLServer (TCP)
 - Informix (TCP)
 - Sybase (TCP)
 - MySQL
 - Postgres
 - Oracle (TCP)
 - DHCP
 - Notes IIOP
 - IMAP
 - POP3
- MExchange

On-line demo

- http://www.opennms.org/onmsdemo/onms_ex0_main_view.htm
- <http://nms.nws.orst.edu:8080/publicnms/index.jsp>
- (look at /performance/index.jsp for reports)

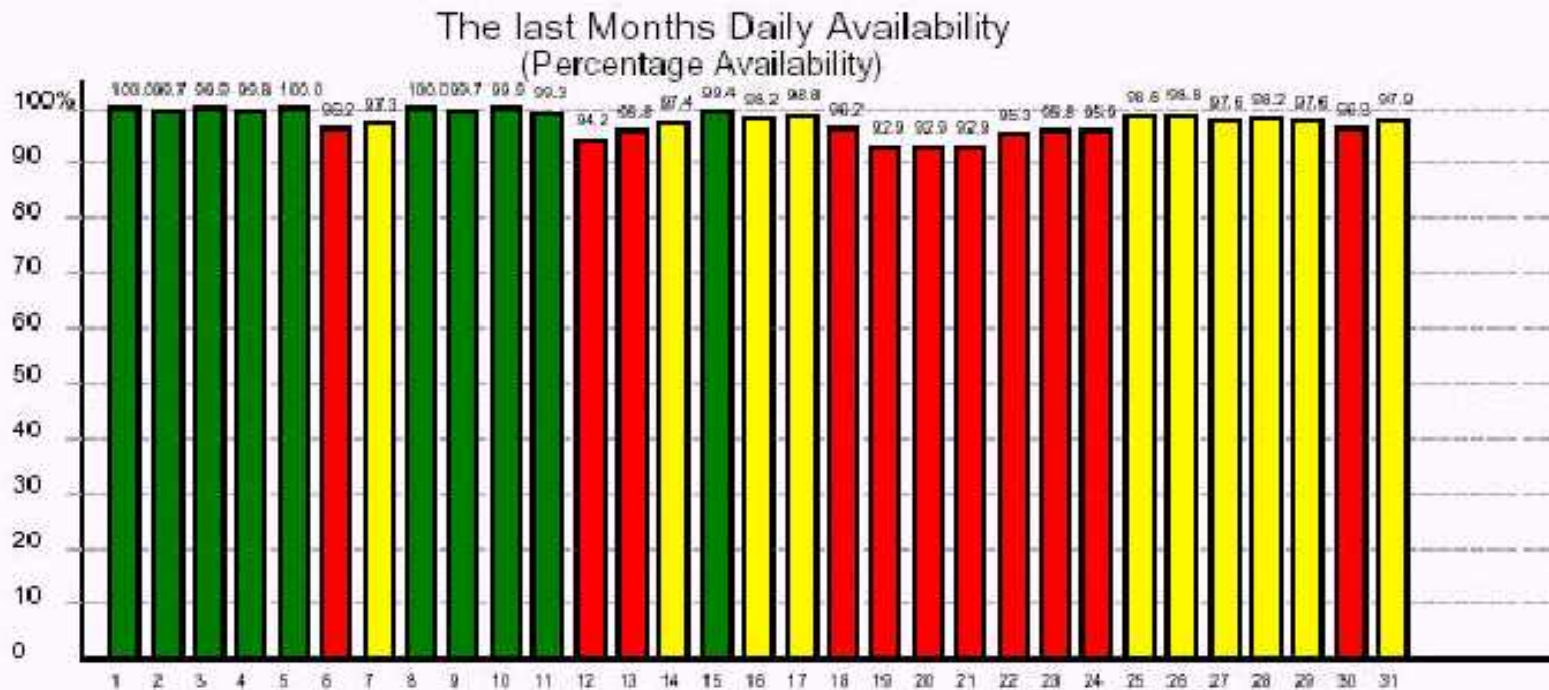
Concurrent management tasks

Concurrent Task	Name of daemon	Description
Action daemon	<code>actiond</code>	Auto-action execution facility, for automated action (workflow) based on incoming events.
Collection daemon	<code>collected</code>	Collects data from managed nodes.
Capability daemon	<code>capsd</code>	Performs capability check on discovered nodes. It typically checks the ports of an interface for support of known service protocols.
DHCP daemon	<code>dhcpcd</code>	Provides DHCP client functionality for OpenNMS.
Discovery daemon	<code>discovery</code>	Provides initial and ongoing regular discovery of managed network nodes.
Events manager daemon	<code>eventd</code>	Manages and stores (into RDBMS) events originating from other concurrent tasks
Notification daemon	<code>notifd</code>	Performs external notification to users.
Outage manager daemon	<code>outaged</code>	Consolidates events to provide an ongoing historical outage view to each managed node/service.
Poller daemon	<code>pollerd</code>	Polls managed nodes/services regularly to determine operational status.
RTC manager daemon	<code>rtcd</code>	Collects data in real time to provide availability information for user-defined categories of managed nodes/services.
SNMP trap daemon	<code>trapd</code>	Handles SNMP traps (events).
Threshold service daemon	<code>threshd</code>	Monitors managed nodes/services based on attribute values reaching specified thresholds.

Extending OpenNMS Service Monitoring

- Create a custom capability plugin
- Create a custom poller monitor
- People wrote pollers to JMX agents, CORBA servers etc.
- We did it for E1 / T1 service level monitoring
- Example: <http://www-106.ibm.com/developerworks/java/library/j-jmx3/>

Now you can generate “Availability Reports”



Daily Average of svcs monitored and availability of svcs divided by the total svc minutes (last month)
From Jan 01, 2002 to Jan 31, 2002

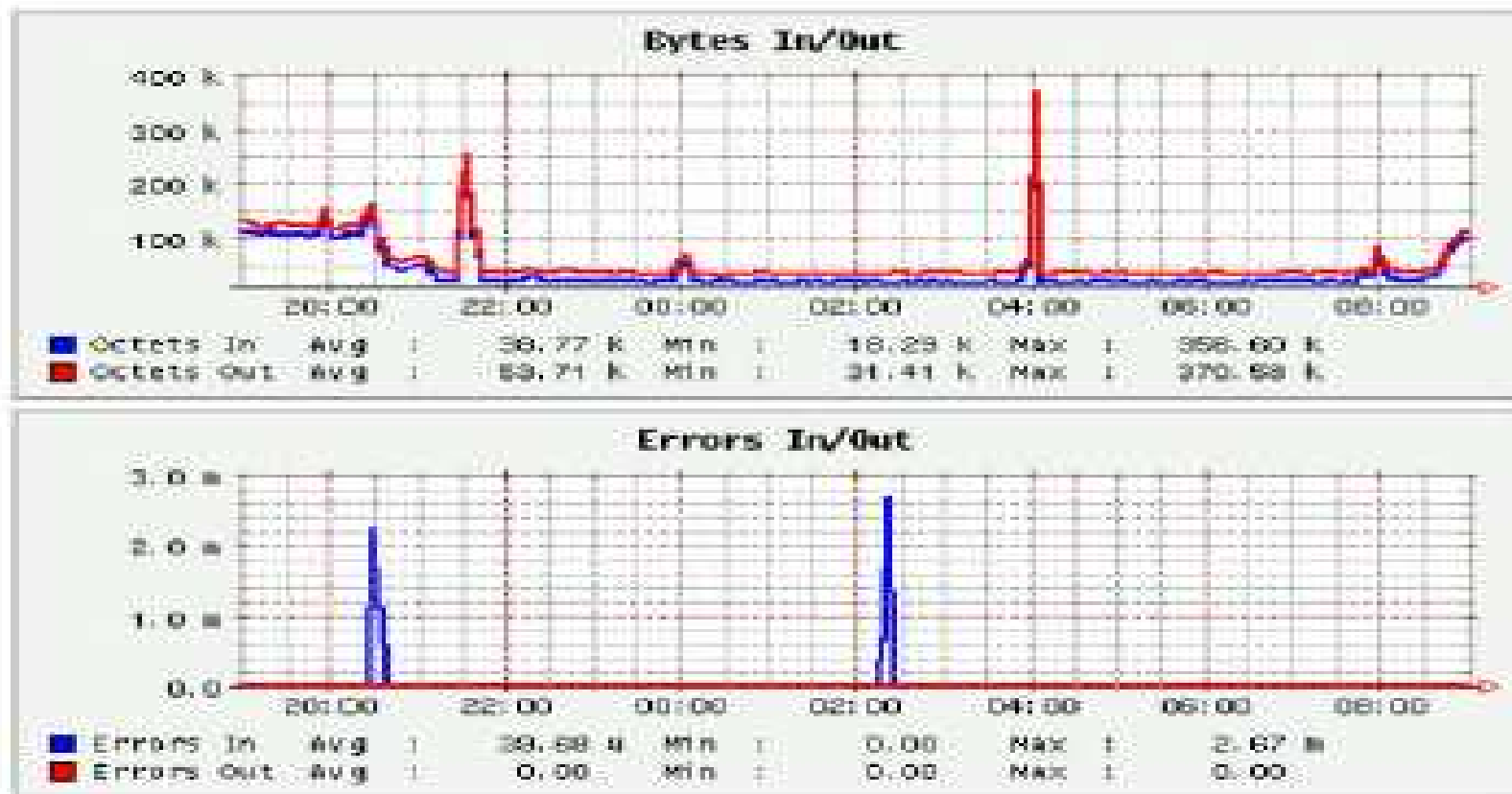
SNMP Data Collection

- OpenNMS uses RRDtool (the end result of MRTG) to store and graph SNMP data.
- Configurable: the polling interval, data collection and how the data is stored.
- Custom Reports: Almost any report possible with RRDtool can be built into OpenNMS.

Data Collection Configuration example

```
<group      name = "signalQuality_DOWN" ifType = "128">
  <mibObj oid=".1.3.6.1.2.1.10.127.1.1.4.1.2" instance="ifIndex"
alias="sigQUnerroreds_DN" type="counter"/>
  <mibObj oid=".1.3.6.1.2.1.10.127.1.1.4.1.3" instance="ifIndex"
alias="sigQCorrecteds_DN" type="counter"/>
  <mibObj oid=".1.3.6.1.2.1.10.127.1.1.4.1.4" instance="ifIndex"
alias="sigQUncorrect_DN" type="counter"/>
  <mibObj oid=".1.3.6.1.2.1.10.127.1.1.4.1.5" instance="ifIndex"
alias="sigQSignalNoise_DN" type="integer"/>
  <mibObj oid=".1.3.6.1.2.1.10.127.1.1.4.1.6" instance="ifIndex"
alias="sigQMicroreflec_DN" type="integer"/>
</group>
```

Performance Reports



Events and Notification

- OpenNMS currently has no map.
- Can receive both internal and external (SNMP Trap) events. Automatic actions can be built to execute on event reception.
- Events can trigger Notifications
- Notifications walk a "destination path" to insure that alerts reach the proper people.

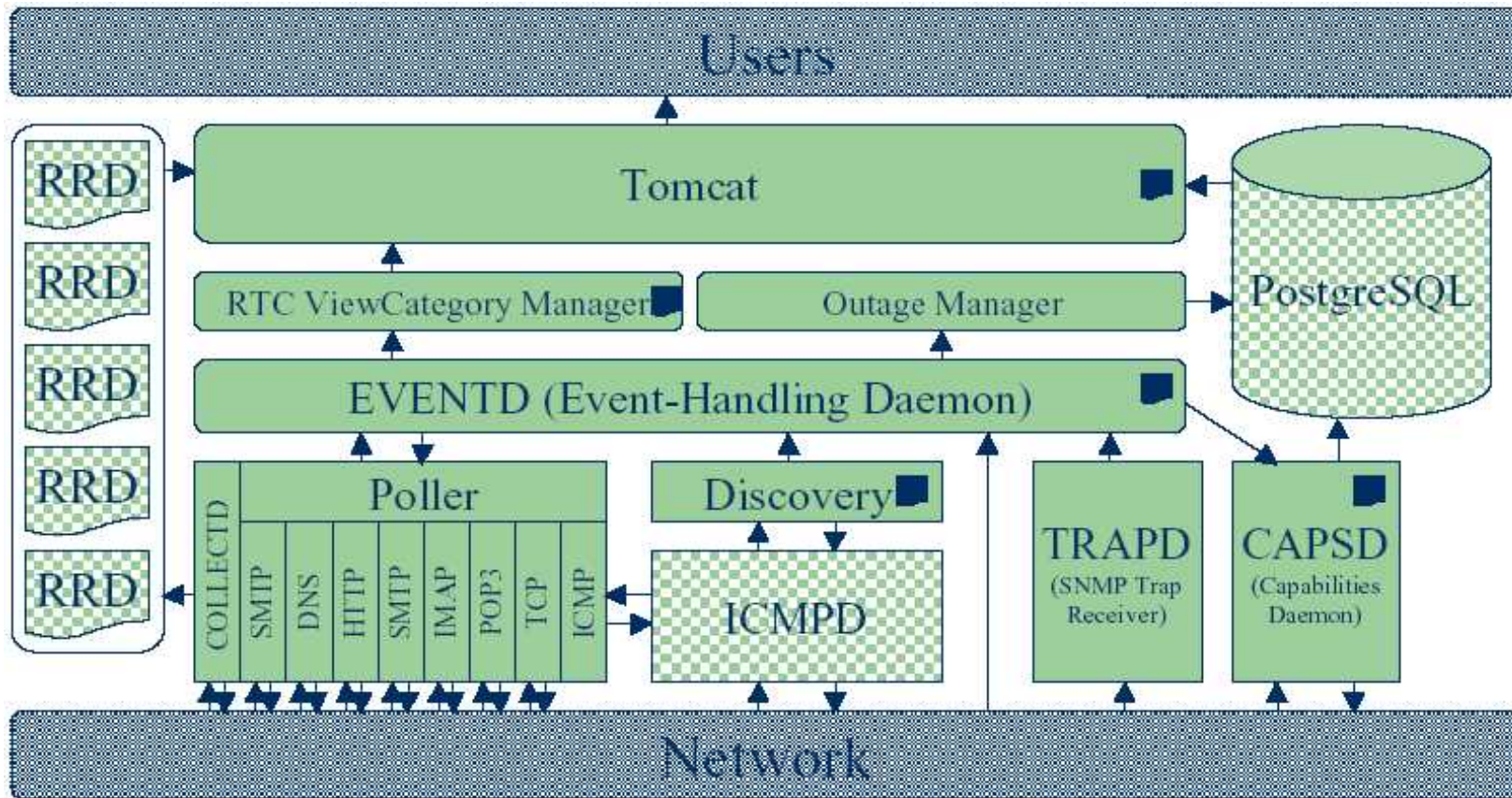
Events configuration example

```
<event>
<mask>
  <maskelement>
    <mename>id</mename>
    <mevalue>.1.3.6.1.4.1.9.9.33.2</mevalue>
  </maskelement>
  <maskelement>
    <mename>generic</mename>
    <mevalue>6</mevalue>
  </maskelement>
  <maskelement>
    <mename>specific</mename>
    <mevalue>2</mevalue>
  </maskelement>
</mask>
<uei>uei.opennms.org/vendor/Cisco/traps/cipCsnaLlc2ConnectionLimitExceeded</uei>
<event-label>CISCO-CIPCSNA-MIB defined trap event: cipCsnaLlc2ConnectionLimitExceeded</event-label>
<descr>This trap indicates that a connection .....
</descr>
<logmsg dest='logndisplay'>&lt;p&gt;Cisco Event: Connection Limit Exceeded.&lt;/p&gt;</logmsg>
<severity>Warning</severity>
</event>
```

Threshold configuration

```
<threshold type="high" ds-  
  name="cpuPercentBusy" ds-type="node"  
  value="90" rearm="50" trigger="3"/>
```


The Architecture



Components

- PostgreSQL
- SNMP Stack
- Jrobin (<http://www.jrobin.org/>)
- Tomcat
- [Castor: data binding framework for Java](#)

My conclusions

- Java Java
- Friendly installer will make you popular
- Introducing Linux is hard (even in high-tec companies)

Finally.....

Take a look at:

[Netbox, the last word in network management hardware](http://dspace.dial.pipex.com/hugeglobalnet/netbox.shtml)

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