NLR Tutorial
Monitoring / Network Information Database

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Layer-1 Network Monitoring

• Nagios - “First Alert” tool for the NLR NOC Service Desk

• Open source network monitoring system, web based user interface

• Custom “plugins” to monitor the NLR layer-1 optical switching equipment
Layer-I Network Monitoring

• Most optical switches speak a language called “TLI” -- Transaction Language 1

• Telcordia standard, used in many devices in the “telecom world”, ASCII based

• We use the Monfox DynamicTLI SDK (Java based) to communicate with the NLR optical switches

• Persistent poller cycles through all the NLR devices, retrieving active “critical” and “major” alarms

• Poller reports findings back to Nagios, which updates web displays, and e-mails NOC operators when a new problem is found.
Layer-1 Network Monitoring
Layer-1 Network Monitoring

<table>
<thead>
<tr>
<th>Host</th>
<th>Service</th>
<th>Status</th>
<th>Last Check</th>
<th>Duration</th>
<th>Attempt</th>
<th>Status Information</th>
</tr>
</thead>
</table>

Note: The image shows a network monitoring interface with various host and service status details. The interface includes the Nagios software, which is used for network monitoring and alerting. The screen displays the current network status, host status totals, service status totals, and service status details for all hosts. The interface allows for detailed monitoring and management of network issues.
Layer-1 Network Monitoring

Nagios

Alert History
Last Updated: Sat Jul 17 23:59:06 EST 2004
Nagios® - www.nagios.com
Logged in as: admin

View Status Detail For All Hosts
View Notifications For All Hosts

All Hosts and Services

State type options:
- All state types

History detail level for all hosts:
- All alerts
  - Hide Flapping Alerts
  - Hide Downtime
  - Hide Process Alerts
  - Other Entries First


July 15, 2004 23:00


July 15, 2004 22:00


July 15, 2004 21:00


Done
Layer-1 Network Monitoring

```
Nagios

Current Network Status
Last Updated: Sat Jul 17 23:54:09 EST 2004
Updated every 90 seconds
Nagios® - www.nagios.org
Logged in as luke

View Service Status Detail For All Host Groups
View Host Status Detail For All Host Groups
View Status Overview For All Host Groups
View Status Grid For All Host Groups

General
- Home
- Documentation

Monitoring
- Tactical Overview
- Service Detail
- Host Detail
- Status Overview
- Status Summary
- Status Grid
- Status Map
- 3-D Status Map
- Service Problems
- Host Problems
- Network Outages
- Comments
- Downtime
- Process Info
- Performance Info
- Scheduling Queue

Reporting
- Trends
- Availability
- Alert Histogram
- Alert History
- Alert Summary
- Notifications
- Event Log

Host Group | Host Status Totals | Service Status Totals
-----------|--------------------|---------------------
NLR/CENIC 15808s Los Angeles, CA <> Sunnyvale, CA (nL-CENIC-losa-sunn) | UP | CRITICAL
NLR OOB Routers (nL-OOB) | CRITICAL | OK
NLR Chicago <> STARLIGHT 15454s (nL-STAR-CHIC-15454s) | UP | OK
NLR Chicago <> Pittsburgh 15808s (nL-chic-pitt-808) | CRITICAL | OK
NLR Denver, CO <> Chicago, IL 15808s (nL-denv-chic-808) | CRITICAL | OK
NLR Seattle, WA <> Sunnyvale, WA 15808s (nL-seat-sunn-808) | CRITICAL | OK
NLR Washington, DC <> Atlanta 15808s (nL-wash-atl-808) | CRITICAL | OK
NLR Washington, DC <> Pittsburgh 15808s (nL-wash-pitt-808) | CRITICAL | OK

Status Summary For All Host Groups
```

Done
Layer-1 Network Monitoring

- The NLR Layer 1 NOC at CENIC uses Cisco Transport Manager (CTM) to monitor and manage the layer-1 optical network.
- The NLR NOC Service Desk also uses CTM to augment their view into the network.
Cisco Transport Manager
Network Information Database

- Currently under development
- Repository for contact, equipment, circuit, monitoring, and topology data
- Relational database with a web based front-end
- Drives configuration of monitoring / measurement / management systems
- Various auto-population scripts talk to network devices, collecting data to affect database state
- Consolidates monitoring/measurement system configurations in one central repository
Organizational Entities

- Record details pertaining to an organizational entity as a whole
- Vendors, customers, internal contacts
- Each entity has one or more contacts associated with it.
- Entities also are associated with “agreements” (eg. membership agreement)
• Contact Management:

• Contacts have an arbitrary number of “contact methods” such as ‘Office phone’, ‘email’, ‘cell phone’, etc.

• Contact methods are “time sensitive”

• Contacts may be associated with more than one entity
Nodes

- **Node Management:**
- **Records** “node” data, such as IP address, links to monitoring configuration, rack elevation, links to “devices” section containing physical hardware data, etc.
### Devices

**“Devices” Management:**

- Records attributes of physical devices such as serial number, slot number, hardware and software versions, device type, etc.

- Represented as a N-ary tree of arbitrary depth (e.g. Cisco ONS15808 system is a “root” device, with child “subrack 1”, which in turn has child “BT10E-I22 transponder card”)
POP facilities record the following information for each POP:

- Owner, address, longitude/latitude, CLLI code, etc.
- Manned/unmanned status

The POPs are linked to the "node" section, showing nodes which reside in this POP location.

They are also linked to the "rack" section, showing locations of bays inside the POP.
Routes

- A view into data pertaining to a single NLR route (e.g. Denver ↔ Chicago)
- Shows in-use/available channels on the route, and circuits associated with active channels
- Shows network devices on the route, in route order
- Displays POP information about the terminal sites of a route
That’s All, Folks!

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