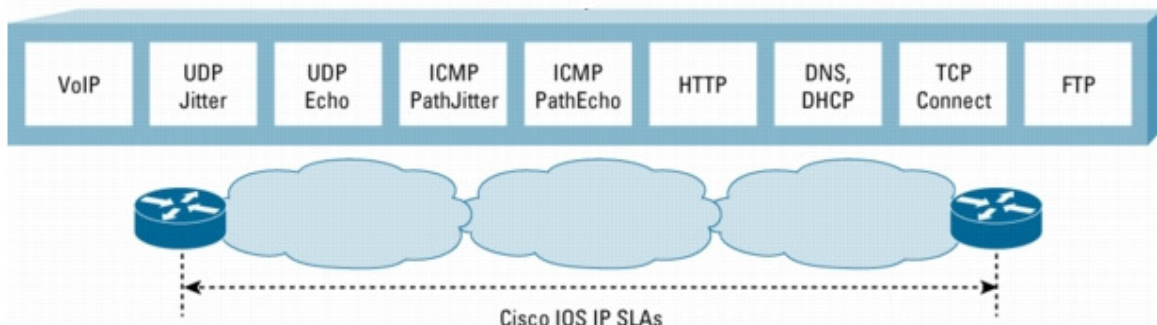
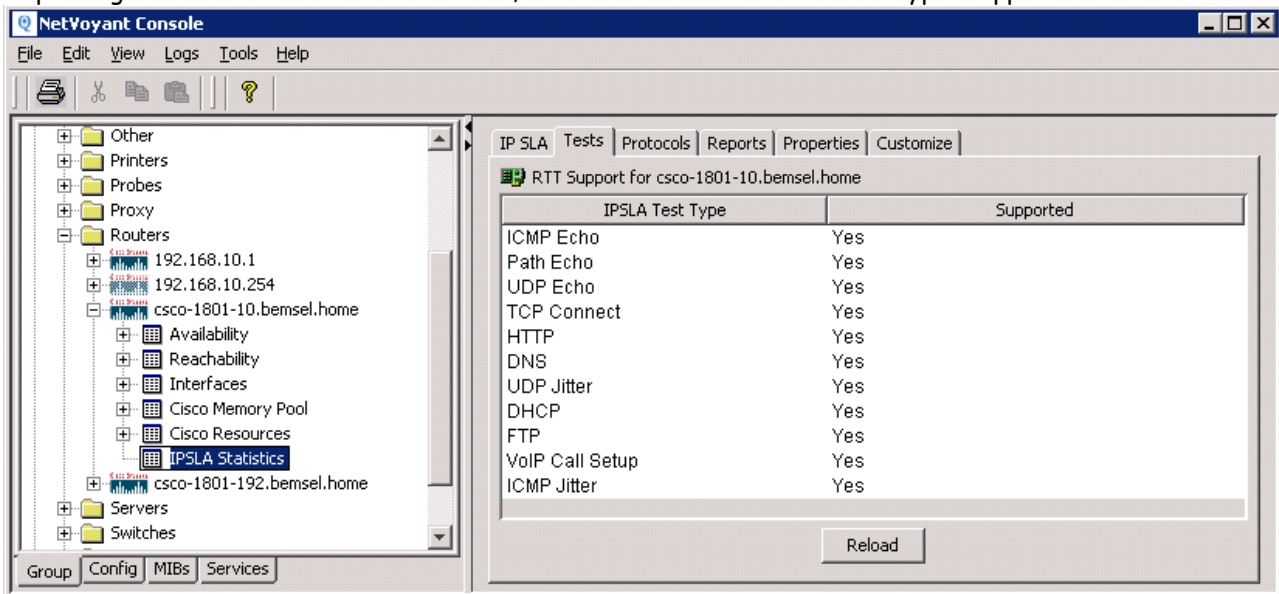


Cisco's IP SLA, in earlier versions of IOS referred to as Service Assurance Agent (SAA), is a technology available on Cisco routers that enables the router to act as active response-time probes, sending out and recording results of various protocol operations over the network. IP SLA operations are typically used to validate the network delivery infrastructure, verify Service Level Agreements (SLA), and measure Voice over IP (VoIP) quality. The central theme of IP SLA operations is round-trip-time, or latency measurement which has a common designation of RTT. Additionally, errors encountered during the operation as well as completion statistics for the RTT operations are maintained by the router for all operations. Using SNMP, NetVoyant is able to access the RTT results from Cisco routers based on definitions found in the CISCO\_RTTMON\_MIB. There are several types of IP SLA operations that provide statistics additional to RTT, such as jitter and MOS scores for VoIP, TCP connect times, DNS lookup times, and many other useful round-trip-time based statistics.



Depending on the IOS loaded on the router, there are a set of IPSLA Test Types supported.



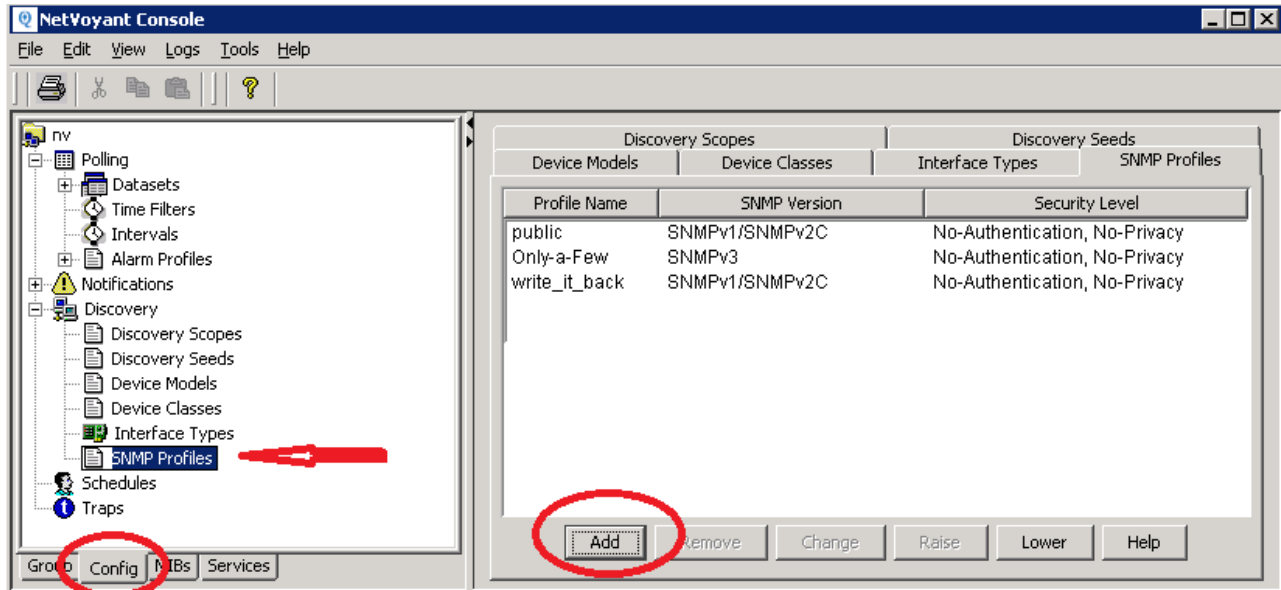
IPSLA Test Type	Supported
ICMP Echo	Yes
Path Echo	Yes
UDP Echo	Yes
TCP Connect	Yes
HTTP	Yes
DNS	Yes
UDP Jitter	Yes
DHCP	Yes
FTP	Yes
VoIP Call Setup	Yes
ICMP Jitter	Yes

In this example I used UDP Echo being configured with the wizard integrated in NetQoS NetVoyant

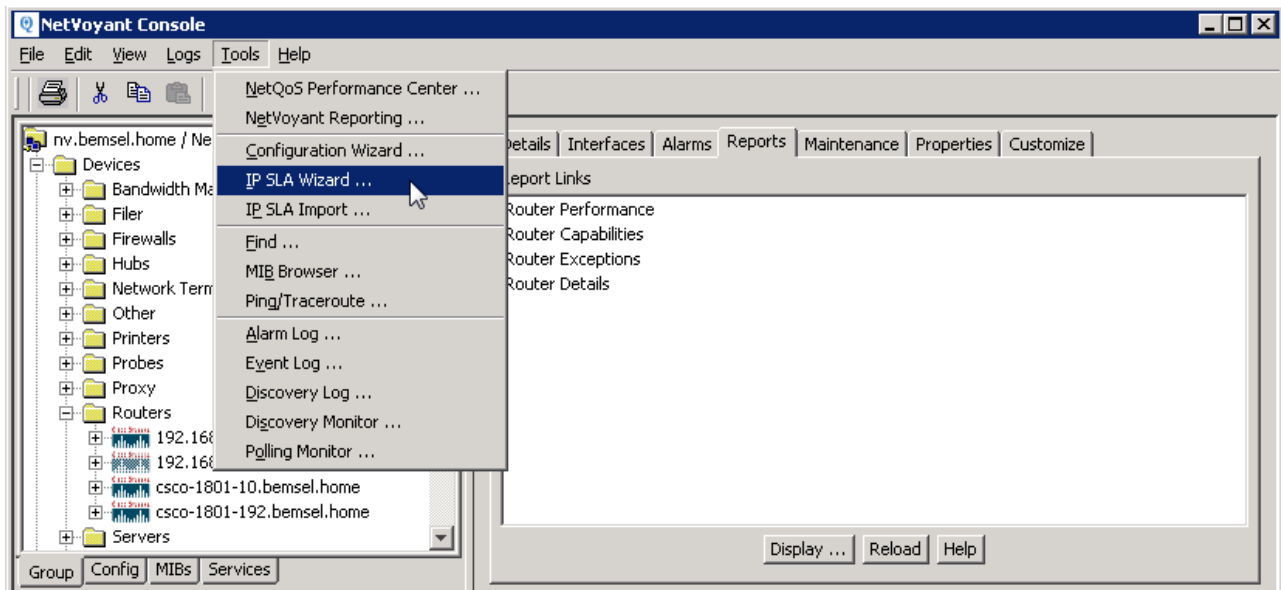
## How to setup UDP Echo?

1. To be able to upload the new configuration to the router, you need to have SNMP write community configured inside NetVoyant

To do so, click on the config tab and add the desired community string



2. Run the Wizard, by clicking on Tools -> IP SLA Wizard



### 3. Select Measurement Type for UDP Echo

Select Measurement Type

IP SLA Test Type: UDP Echo

Name: ICMP Echo

Description: Path Echo

Timeout (ms): TCP Connect

Frequency (sec): HTTP

VerifyData: DNS

RTT Threshold (ms): UDP Jitter for VoIP

Save to Running config:

Source Routers:  Edit...

### 4. Change Timeout, Frequency & RTT Threshold if required

Select Measurement Type

IP SLA Test Type: UDP Echo

Name: Echo\_DataCenter

Description: UDP Echo - <SRC-IP> - <DST-IP>

Timeout (ms): 5000

Frequency (sec): 60

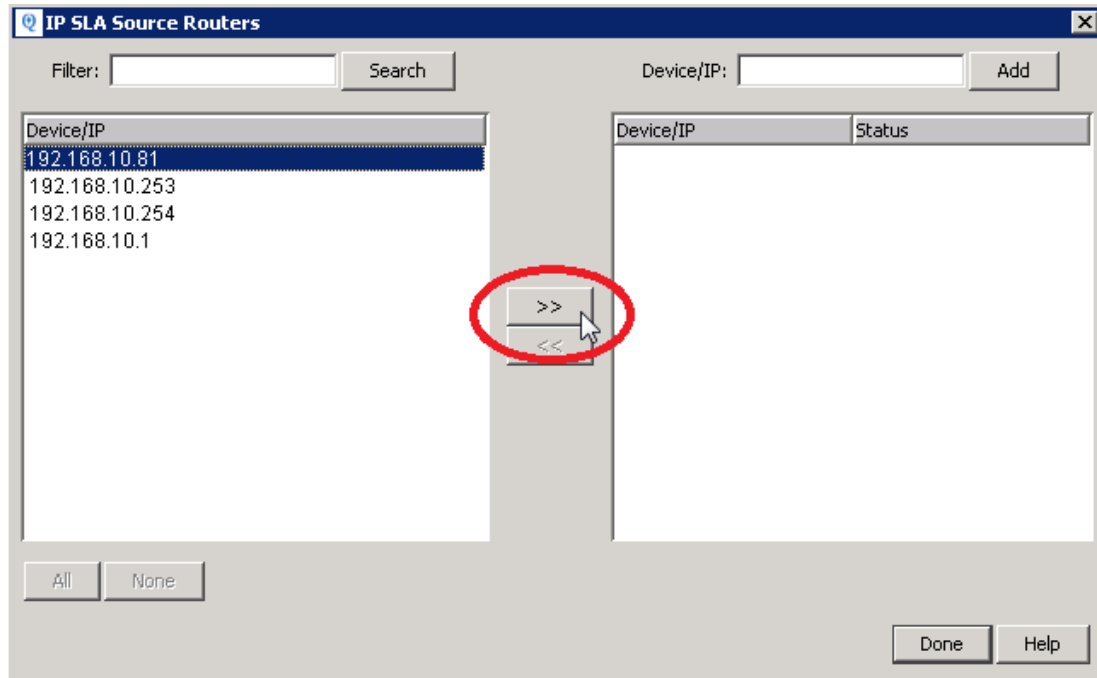
VerifyData: False

RTT Threshold (ms): 100

Save to Running config:

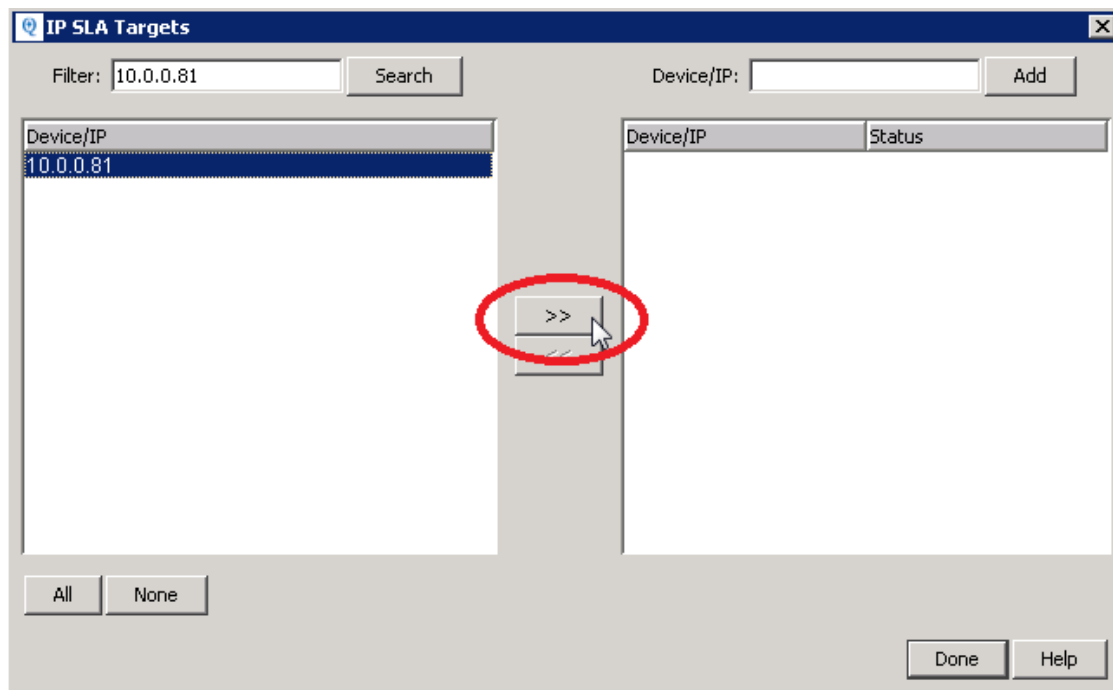
Source Routers:  Edit...

Next Click on Edit to choose Source Router from the List.



Choose the required Device/IP and move it to the right pane. You can also choose more devices. At the end of those configuration wizard, all routers will be updated with the new IPSLA commands (if write community is correct and ACL allow access to the router)

5. Search for the target and move the discovered device to the right pane



6. Change any parameters you may need

Select Echo Parameters

Target Addresses: 10.0.0.81 Edit...

Target Port: 101

ToS Setting: 0

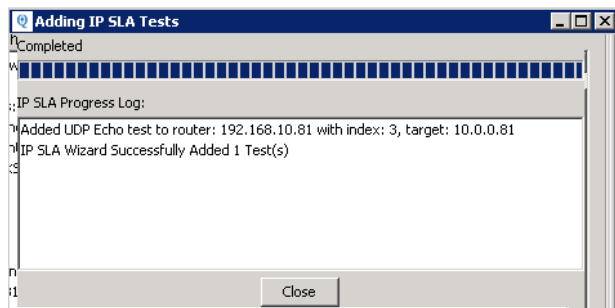
Request Packet Size: 16

Enable Control Messages: True

Source Address:

VRF Name:

7. Upload the new test by clicking on Finish

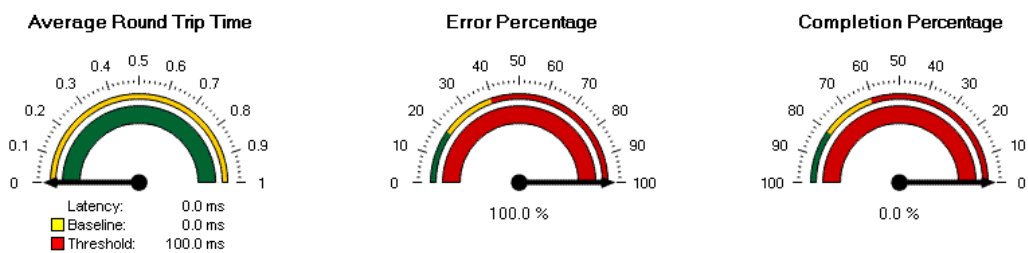


Finally, the new UDP ECHO IP SLA Test is active and starts running periodically sending out the requests.

UDP Echo Response

31 Jan 2011 14:50 - 15:50 CET

UDP Echo: cisco-1801-10.bemsel.home:UDP Echo - 192.168.10.81 - 10.0.0.81  
Destination: 10.0.0.81:101



As you can see, completion percentage is at 0.0%. What is wrong?

- a) Target IP Address is not reachable
- b) Target IP Address is not configured as Responder

In fact, my target router (CSCO-1801-192 - 10.0.0.81) was not configured as Responder. This is a manual task and has to be set by the router admin. IP SLA Wizard in NetVoyant does not configure responder as of today.

### 8. Configure target Router as Responder

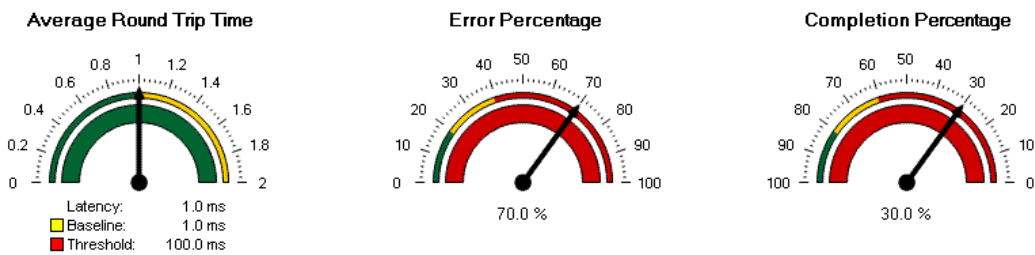
This is a single line config. Telnet or SSH into the Router, got to config mode and type following command.

```
CSCO-1801-192(config)#ip sla responder
```

#### UDP Echo Response

31 Jan 2011 15:07 - 16:07 CET

UDP Echo: cisco-1801-10.bemsel.home::UDP Echo - 192.168.10.81 - 10.0.0.81  
Destination: 10.0.0.81:101



### Optional

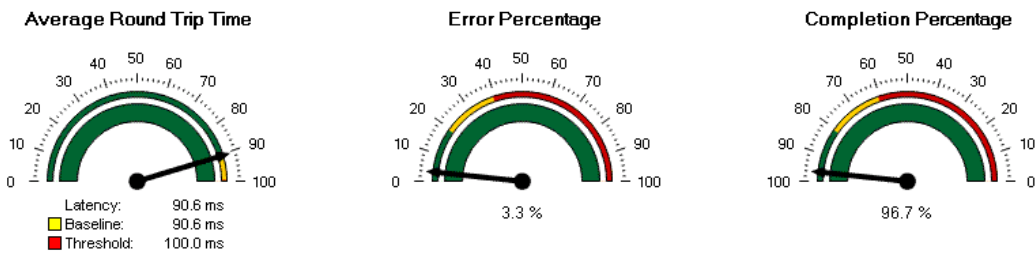
I introduced a WAN Simulator within those two routers in my lab. Later I will add more delay to cross the threshold.

- 85ms Round Trip Delay
- 0.02% Packet Loss
- For a short period of time an increase to 102ms Round trip Delay

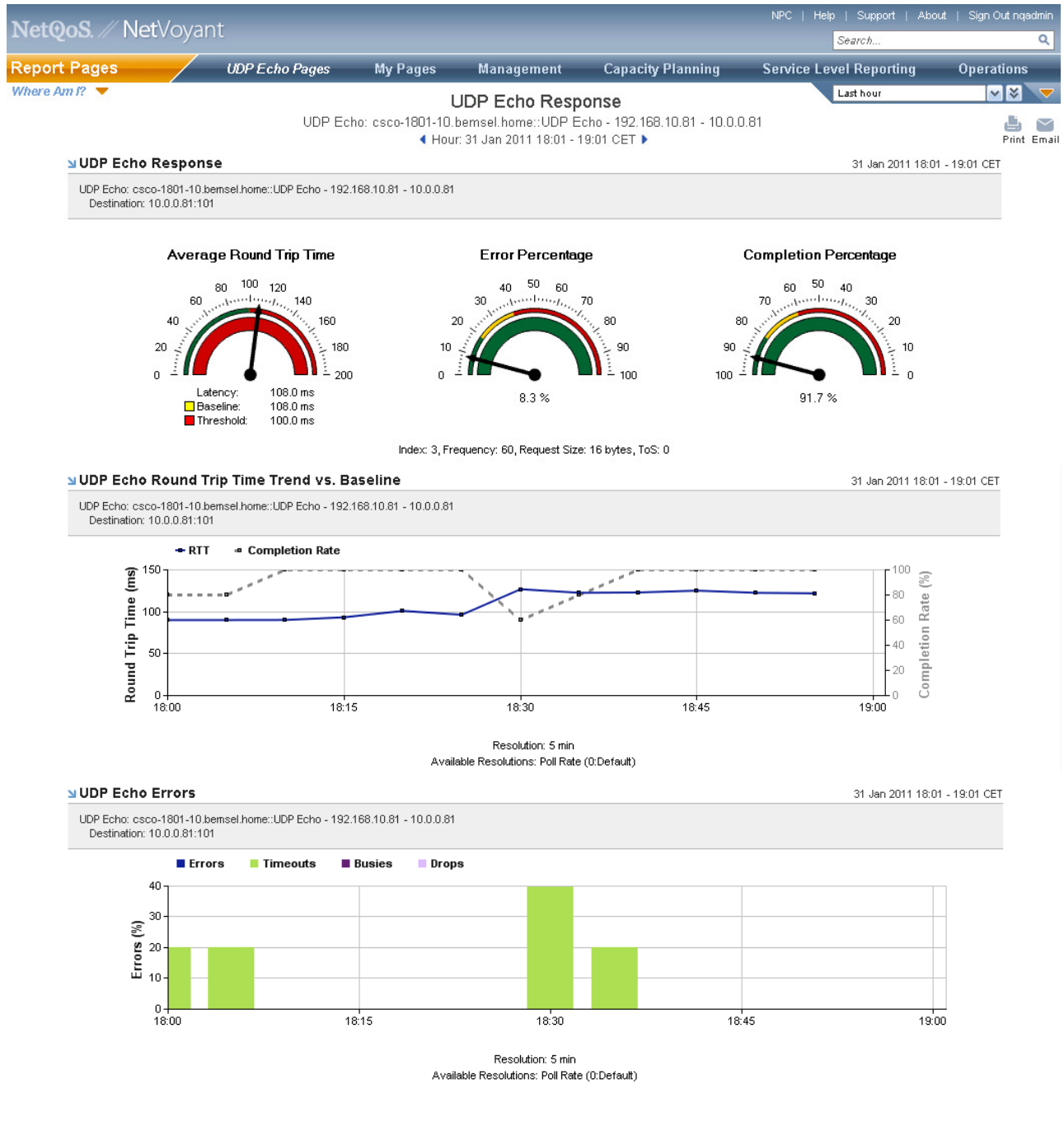
#### UDP Echo Response

31 Jan 2011 17:28 - 18:28 CET

UDP Echo: cisco-1801-10.bemsel.home::UDP Echo - 192.168.10.81 - 10.0.0.81  
Destination: 10.0.0.81:101



This is the IP SLA UDP Echo Response Webpage in NetVoyant.



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As you may see, the threshold has been crossed around 18:20. Also a few errors, because of the introduced packet loss on my wan simulator



From a dashboard perspective, please also have a look at NetQoS Performance Center IP SLA Dashboard

**NetQoS Performance Center** | Reports | Maps | Analysis | Inventory | Admin | Help | Sign Out (nqadmin) | Search

**IP SLA Dashboard** Group: / All Groups [change] | Last hour | 31 Jan 2011 18:06 - 31 Jan 2011 19:06 CET

**IP SLA Summary** 2011-01-31 18:06 - 2011-01-31 19:06 CET

- Avg Round Trip Time:** Avg RTT: 108.0 ms, Baseline: 108.0 ms
- Error Percentage:** 6.7%
- Completion Percentage:** 93.3%

**IP SLA Availability Scorecard** 2011-01-31 18:06 - 2011-01-31 19:06 CET

Group	Target	Dec 19	Dec 26	Jan 2	Jan 9	Jan 16	Jan 23	Jan 30	Average
All Groups	>= 98.000	--	--	--	--	--	--	--	--
System Groups	>= 98.000	--	--	--	--	--	--	--	--

**IP SLA Operations List** 2011-01-31 18:06 - 2011-01-31 19:06 CET

Name	Type	Src	Dst	Avg RTT (ms)	Error Rate (%)	Comp Rate (%)
cisco-1801-10.bemsel.home::UDP Echo - 192.168.10.81 - 10.0.0.81	UDP Echo	cisco-1801-10.bemsel.home	10.0.0.81:101	108.0 ms	6.667%	93.333%

**IP SLA Operations by Rtt Type** 2011-01-31 18:06 - 2011-01-31 19:06 CET

Name	Avg RTT (ms)	Error Rate (%)	Comp Rate (%)	Count
UDP Echo	108.0 ms	6.667%	93.333%	1

**IP SLA Operations by Router** 2011-01-31 18:06 - 2011-01-31 19:06 CET

Name	Avg RTT (ms)	Error Rate (%)	Comp Rate (%)	Count
cisco-1801-10.bemsel.home	108.0 ms	6.667%	93.333%	1

**IP SLA Over-Threshold Scorecard** 2011-01-31 18:06 - 2011-01-31 19:06 CET

Group	Target	Dec 19	Dec 26	Jan 2	Jan 9	Jan 16	Jan 23	Jan 30	Average
All Groups	>= 10.000	--	--	--	--	--	--	--	--
System Groups	>= 10.000	--	--	--	--	--	--	--	--

**Top IP SLA Errored Operations** 2011-01-31 18:06 - 2011-01-31 19:06 CET

cisco-1801-10.bemsel.home::UDP Echo - 0% Errored Operations

**Top IP SLA RTT Deviation From Norm** 2011-01-31 18:06 - 2011-01-31 19:06 CET

Name	Deviation (%)
cisco-1801-10.bemsel.home::UDP Echo - 192.168.10.81 - 10.0.0.81	0.000

**Top IP SLA Least Available** 2011-01-31 18:06 - 2011-01-31 19:06 CET

cisco-1801-10.bemsel.home::UDP Echo - Availability (%)

**Top IP SLA Over Threshold** 2011-01-31 18:06 - 2011-01-31 19:06 CET

cisco-1801-10.bemsel.home::UDP Echo - % Over Threshold

A context driven drill-down is possible on every Top-N View and leads to NetVoyant at the end.

