Network Monitoring and Management

Nagios®

INNOG 6

March 23 - 25, 2023

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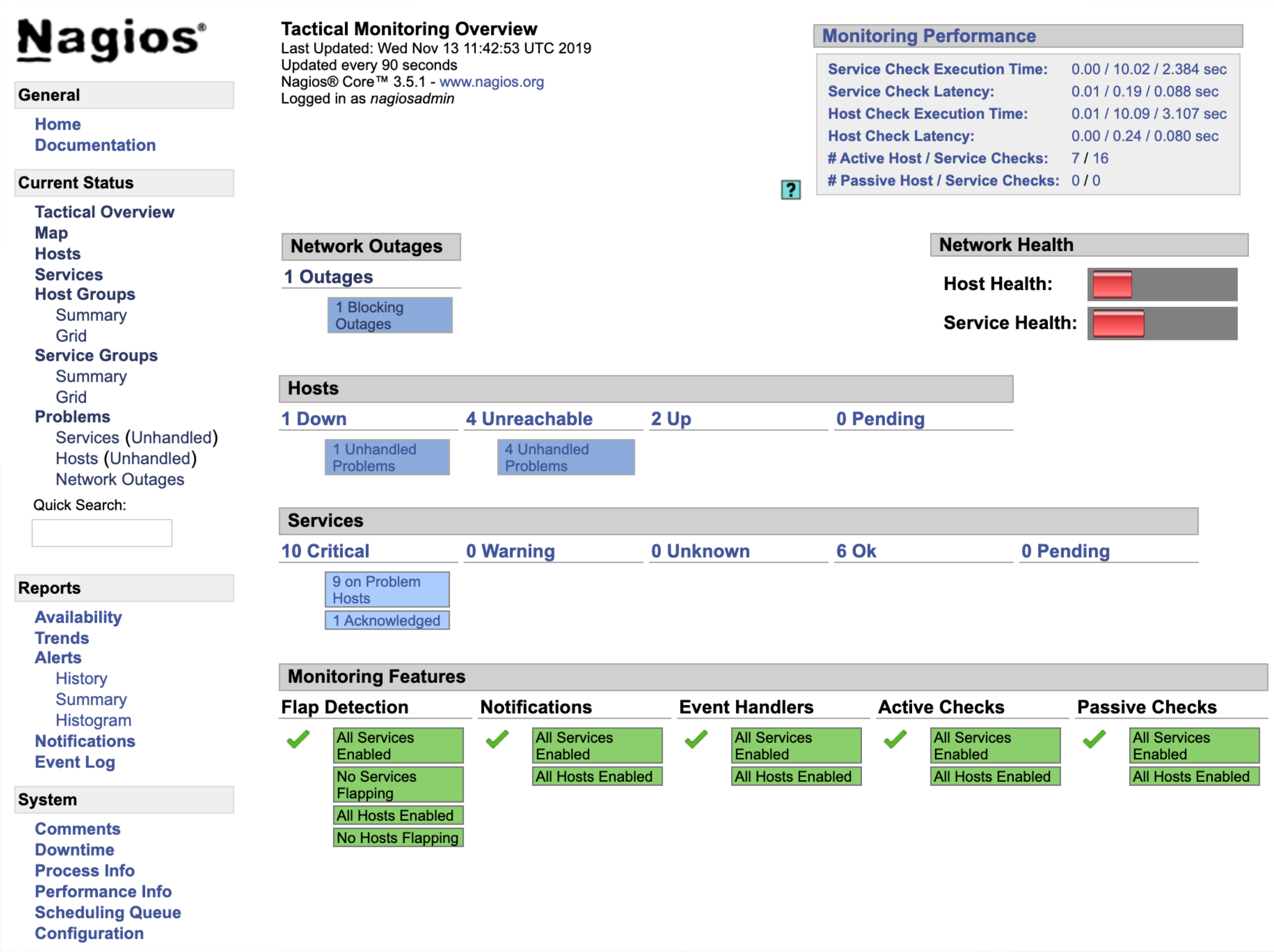
Introduction

- Possibly the most used open source network monitoring software
- Web interface for viewing status, browsing history, scheduling downtime etc
- Sends out alerts via E-mail. Can be configured to use other mechanisms, e.g. SMS
- Nagios actively monitors the ***availability*** of
    - Hosts (devices)
    - Services

Nagios: Tactical Overview



Nagios®

General

- Home
- Documentation

Current Status

- Tactical Overview
- Map
- Hosts
- Services
- Host Groups
  - Summary
  - Grid
- Service Groups
  - Summary
  - Grid
- Problems
  - Services (Unhandled)
  - Hosts (Unhandled)
  - Network Outages

Quick Search:

Reports

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

System

- Comments
- Downtime
- Process Info
- Performance Info
- Scheduling Queue
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Tactical Monitoring Overview

Last Updated: Wed Nov 13 11:42:53 UTC 2019
Updated every 90 seconds
Nagios® Core™ 3.5.1 - www.nagios.org
Logged in as *nagiosadmin*

?

Monitoring Performance

Service Check Execution Time:	0.00 / 10.02 / 2.384 sec
Service Check Latency:	0.01 / 0.19 / 0.088 sec
Host Check Execution Time:	0.01 / 10.09 / 3.107 sec
Host Check Latency:	0.00 / 0.24 / 0.080 sec
# Active Host / Service Checks:	7 / 16
# Passive Host / Service Checks:	0 / 0

Network Outages

1 Outages

1 Blocking Outages

Network Health

Host Health: 🟥

Service Health: 🟥

Hosts

1 Down	4 Unreachable	2 Up	0 Pending
1 Unhandled Problems	4 Unhandled Problems		

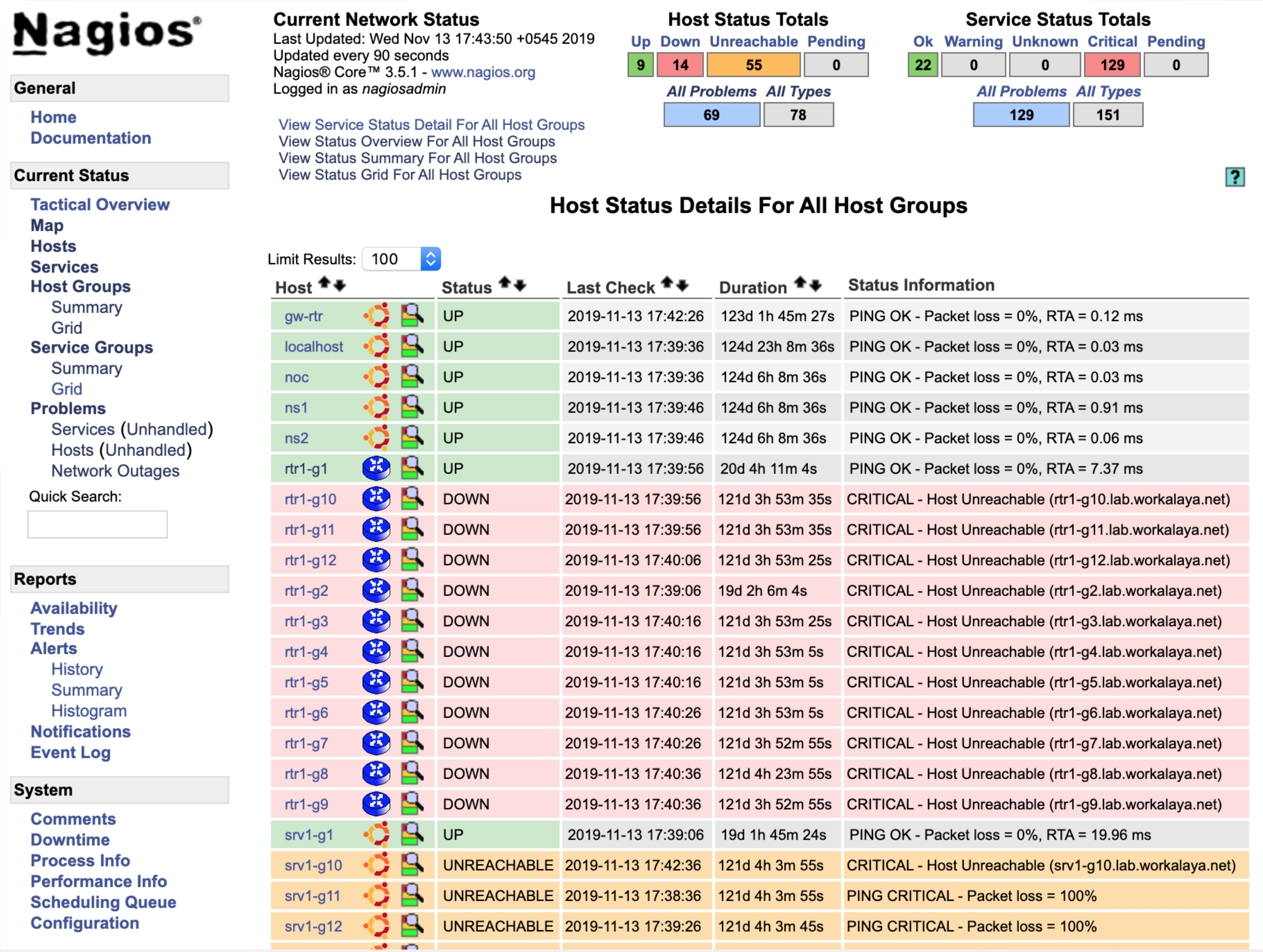
Services

10 Critical	0 Warning	0 Unknown	6 Ok	0 Pending
9 on Problem Hosts 1 Acknowledged				

Monitoring Features

Flap Detection	Notifications	Event Handlers	Active Checks	Passive Checks
✓ All Services Enabled No Services Flapping All Hosts Enabled No Hosts Flapping	✓ All Services Enabled All Hosts Enabled	✓ All Services Enabled All Hosts Enabled	✓ All Services Enabled All Hosts Enabled	✓ All Services Enabled All Hosts Enabled

Nagios: Host Detail View



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Current Network Status

Last Updated: Wed Nov 13 17:43:50 +0545 2019
Updated every 90 seconds
Nagios® Core™ 3.5.1 - www.nagios.org
Logged in as *nagiosadmin*

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

Host Status Totals

Up	Down	Unreachable	Pending
9	14	55	0

All Problems	*All Types*
69	78

Service Status Totals

Ok	Warning	Unknown	Critical	Pending
22	0	0	129	0

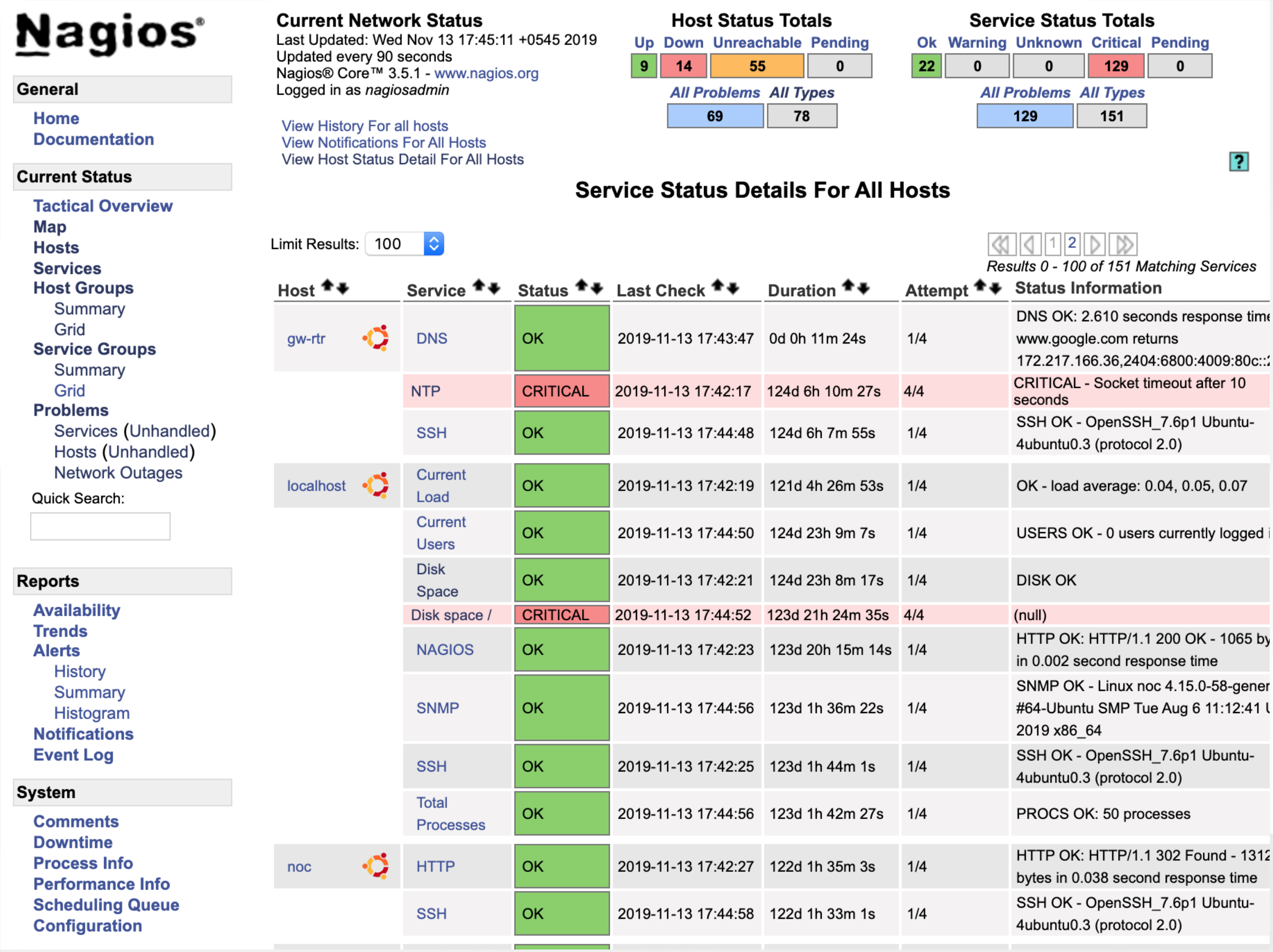
All Problems	*All Types*
129	151

Host Status Details For All Host Groups

Limit Results: 100

Host	Status	Last Check	Duration	Status Information
gw-rtr	UP	2019-11-13 17:42:26	123d 1h 45m 27s	PING OK - Packet loss = 0%, RTA = 0.12 ms
localhost	UP	2019-11-13 17:39:36	124d 23h 8m 36s	PING OK - Packet loss = 0%, RTA = 0.03 ms
noc	UP	2019-11-13 17:39:36	124d 6h 8m 36s	PING OK - Packet loss = 0%, RTA = 0.03 ms
ns1	UP	2019-11-13 17:39:46	124d 6h 8m 36s	PING OK - Packet loss = 0%, RTA = 0.91 ms
ns2	UP	2019-11-13 17:39:46	124d 6h 8m 36s	PING OK - Packet loss = 0%, RTA = 0.06 ms
rtr1-g1	UP	2019-11-13 17:39:56	20d 4h 11m 4s	PING OK - Packet loss = 0%, RTA = 7.37 ms
rtr1-g10	DOWN	2019-11-13 17:39:56	121d 3h 53m 35s	CRITICAL - Host Unreachable (rtr1-g10.lab.workalaya.net)
rtr1-g11	DOWN	2019-11-13 17:39:56	121d 3h 53m 35s	CRITICAL - Host Unreachable (rtr1-g11.lab.workalaya.net)
rtr1-g12	DOWN	2019-11-13 17:40:06	121d 3h 53m 25s	CRITICAL - Host Unreachable (rtr1-g12.lab.workalaya.net)
rtr1-g2	DOWN	2019-11-13 17:39:06	19d 2h 6m 4s	CRITICAL - Host Unreachable (rtr1-g2.lab.workalaya.net)
rtr1-g3	DOWN	2019-11-13 17:40:16	121d 3h 53m 25s	CRITICAL - Host Unreachable (rtr1-g3.lab.workalaya.net)
rtr1-g4	DOWN	2019-11-13 17:40:16	121d 3h 53m 5s	CRITICAL - Host Unreachable (rtr1-g4.lab.workalaya.net)
rtr1-g5	DOWN	2019-11-13 17:40:16	121d 3h 53m 5s	CRITICAL - Host Unreachable (rtr1-g5.lab.workalaya.net)
rtr1-g6	DOWN	2019-11-13 17:40:26	121d 3h 53m 5s	CRITICAL - Host Unreachable (rtr1-g6.lab.workalaya.net)
rtr1-g7	DOWN	2019-11-13 17:40:26	121d 3h 52m 55s	CRITICAL - Host Unreachable (rtr1-g7.lab.workalaya.net)
rtr1-g8	DOWN	2019-11-13 17:40:36	121d 4h 23m 55s	CRITICAL - Host Unreachable (rtr1-g8.lab.workalaya.net)
rtr1-g9	DOWN	2019-11-13 17:40:36	121d 3h 52m 55s	CRITICAL - Host Unreachable (rtr1-g9.lab.workalaya.net)
srv1-g1	UP	2019-11-13 17:39:06	19d 1h 45m 24s	PING OK - Packet loss = 0%, RTA = 19.96 ms
srv1-g10	UNREACHABLE	2019-11-13 17:42:36	121d 4h 3m 55s	CRITICAL - Host Unreachable (srv1-g10.lab.workalaya.net)
srv1-g11	UNREACHABLE	2019-11-13 17:38:36	121d 4h 3m 55s	PING CRITICAL - Packet loss = 100%
srv1-g12	UNREACHABLE	2019-11-13 17:39:26	121d 4h 3m 45s	PING CRITICAL - Packet loss = 100%

Nagios: Service Detail View



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Current Network Status
Last Updated: Wed Nov 13 17:45:11 +0545 2019
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Logged in as *nagiosadmin*

View History For all hosts
View Notifications For All Hosts
View Host Status Detail For All Hosts

Host Status Totals

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Service Status Totals

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All Problems	*All Types*
129	151

Service Status Details For All Hosts

Limit Results: 100

Results 0 - 100 of 151 Matching Services

Host	Service	Status	Last Check	Duration	Attempt	Status Information
gw-rtr	DNS	OK	2019-11-13 17:43:47	0d 0h 11m 24s	1/4	DNS OK: 2.610 seconds response time www.google.com returns 172.217.166.36,2404:6800:4009:80c::2
	NTP	CRITICAL	2019-11-13 17:42:17	124d 6h 10m 27s	4/4	CRITICAL - Socket timeout after 10 seconds
	SSH	OK	2019-11-13 17:44:48	124d 6h 7m 55s	1/4	SSH OK - OpenSSH_7.6p1 Ubuntu-4ubuntu0.3 (protocol 2.0)
localhost	Current Load	OK	2019-11-13 17:42:19	121d 4h 26m 53s	1/4	OK - load average: 0.04, 0.05, 0.07
	Current Users	OK	2019-11-13 17:44:50	124d 23h 9m 7s	1/4	USERS OK - 0 users currently logged i
	Disk Space	OK	2019-11-13 17:42:21	124d 23h 8m 17s	1/4	DISK OK
	Disk space /	CRITICAL	2019-11-13 17:44:52	123d 21h 24m 35s	4/4	(null)
	NAGIOS	OK	2019-11-13 17:42:23	123d 20h 15m 14s	1/4	HTTP OK: HTTP/1.1 200 OK - 1065 by in 0.002 second response time
	SNMP	OK	2019-11-13 17:44:56	123d 1h 36m 22s	1/4	SNMP OK - Linux noc 4.15.0-58-gener #64-Ubuntu SMP Tue Aug 6 11:12:41 U 2019 x86_64
	SSH	OK	2019-11-13 17:42:25	123d 1h 44m 1s	1/4	SSH OK - OpenSSH_7.6p1 Ubuntu-4ubuntu0.3 (protocol 2.0)
	Total Processes	OK	2019-11-13 17:44:56	123d 1h 42m 27s	1/4	PROCS OK: 50 processes
noc	HTTP	OK	2019-11-13 17:42:27	122d 1h 35m 3s	1/4	HTTP OK: HTTP/1.1 302 Found - 1312 bytes in 0.038 second response time
	SSH	OK	2019-11-13 17:44:58	122d 1h 33m 1s	1/4	SSH OK - OpenSSH_7.6p1 Ubuntu-4ubuntu0.3 (protocol 2.0)

Features

- Utilizes topology to determine dependencies.
  - Differentiates between what is ***down*** vs. what is ***unreachable***. Avoids running unnecessary checks and sending redundant alarms
- Allows you to define how to send notifications based on combinations of:
  - Contacts and lists of contacts
  - Devices and groups of devices
  - Services and groups of services
  - Defined hours by persons or groups
  - The state of a service

Plugins

Plugins are used to verify services and devices:

- Nagios architecture is simple enough that writing new plugins is fairly easy in the language of your choice.
- There are many, many plugins available (thousands).
    - http://exchange.nagios.org/
    - http://nagiosplugins.org/

Pre-installed Plugins for Ubuntu

/usr/lib/nagios/plugins

```
check_apt       check_file_age      check_imap         check_nagios    check_pop        check_swap
check_breeze    check_flexlm        check_ircd         check_nntp      check_procs      check_tcp
check_by_ssh    check_fping         check_jabber       check_nntps     check_real       check_time
check_clamd     check_ftp           check_ldap         check_nt        check_rpc        check_udp
check_cluster   check_game          check_ldaps        check_ntp       check_rta_multi  check_ups
check_dbi       check_host          check_load         check_ntp_peer  check_sensors    check_users
check_dhcp      check_hpjd          check_log          check_ntp_time  check_simap      check_wave
check_dig       check_http          check_mailq        check_nwstat    check_smtp       negate
check_disk      check_icmp          check_mrtg         check_oracle    check_snmp       urlize
check_disk_smb  check_ide_smart     check_mrtgtraf     check_overcr    check_spop       utils.pm
check_dns       check_ifoperstatus  check_mysql        check_pgsql     check_ssh        utils.sh
check_dummy     check_ifstatus      check_mysql_query  check_ping      check_ssmtp
```

/usr/lib/nagios/plugins

```
apt.cfg       dns.cfg     games.cfg     load.cfg   netware.cfg  ping.cfg     ssh.cfg
breeze.cfg    dummy.cfg   hppjd.cfg     mail.cfg   news.cfg     procs.cfg    tcp_udp.cfg
dhcp.cfg      flexlm.cfg  http.cfg      mailq.cfg  nt.cfg       real.cfg     telnet.cfg
disk-smb.cfg  fping.cfg   ifstatus.cfg  mrtg.cfg   ntp.cfg      rpc-nfs.cfg  users.cfg
disk.cfg      ftp.cfg     ldap.cfg      mysql.cfg  pgsql.cfg    snmp.cfg
```

How Checks Work

- Periodically nagios calls a plugin to test the state of each service. Possible Responses are:
    - OK
    - WARNING
    - CRITICAL
    - UNKNOWN
- If a service is not OK it goes into a “soft” error state. After a number of retries (default 3) it goes into a “hard” error state. At that point an alert is sent.
- You can also trigger external event handlers based on these state transitions

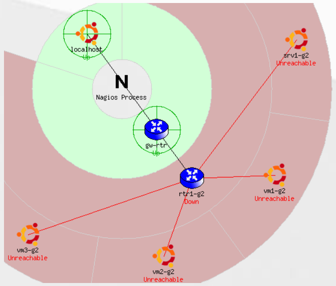
How Checks Work (Continued)

- **Parameters**
  - Normal checking interval
  - Retry interval (i.e. when not OK)
  - Maximum number of retries
  - Time period for performing checks
  - Time period for sending notifications
- **Scheduling**
  - Nagios spreads its checks throughout the time period to even out the workload
  - Web UI shows when next check is scheduled

Hierarchy: The Concept of Parents

Hosts can have parents:

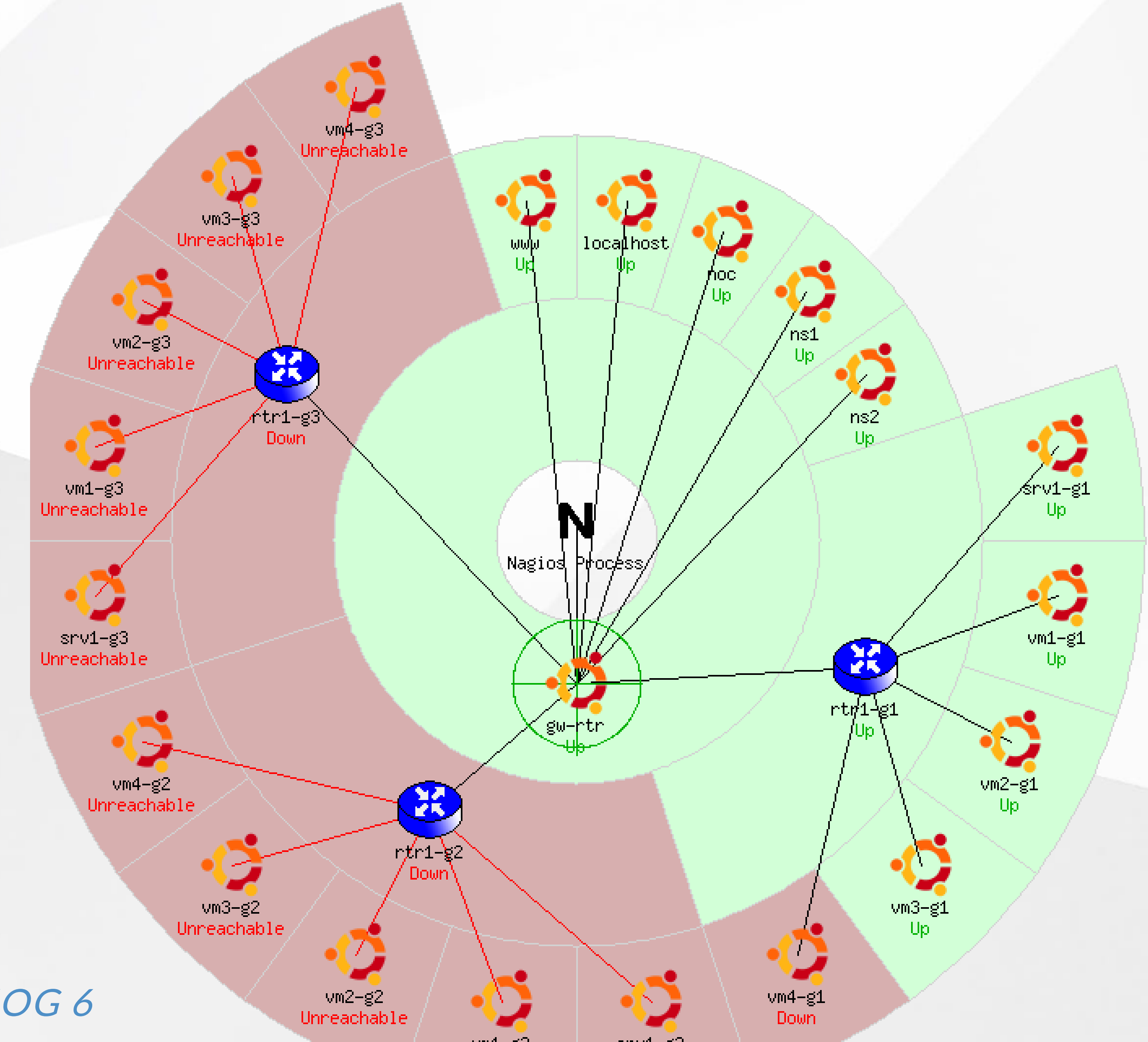
- The parent of a `server` connected to a `switch` would be the `switch` or `router`.
- Allows us to specify the dependencies between devices.
- Avoids sending alarms when parent does not respond.
- A node can have multiple parents (dual homed).



Network Viewpoint

- Where you locate your Nagios server will determine your point of view of the network
- The Nagios server becomes the “root” of your dependency tree

Network Viewpoint Map



Demo of Nagios

http://noc.lab.shakya.io/nagios/

nagioisadmin/nagios

More Features

- Allows you to acknowledge an event
  - A user can add comments via the GUI
- You can define maintenance periods
  - By device or a group of devices
- Maintains availability statistics and generates reports
- Can detect flapping and suppress additional notifications
- Allows for multiple notification methods:
  - e-mail, pager, SMS, winpopup, audio, etc...
- Allows you to define notification levels for escalation

More info and documentation

- Nagios web site
  https://www.nagios.org/
- Nagios plugins site
  https://nagios-plugins.org/
- Nagios Exchange site
  https://exchange.nagios.org/
- A Debian tutorial on Nagios
  http://www.debianhelp.co.uk/nagios.htm
- Commercial Nagios support
  http://www.nagios.com/

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