Network Monitoring, Management and Automation

Nagios®

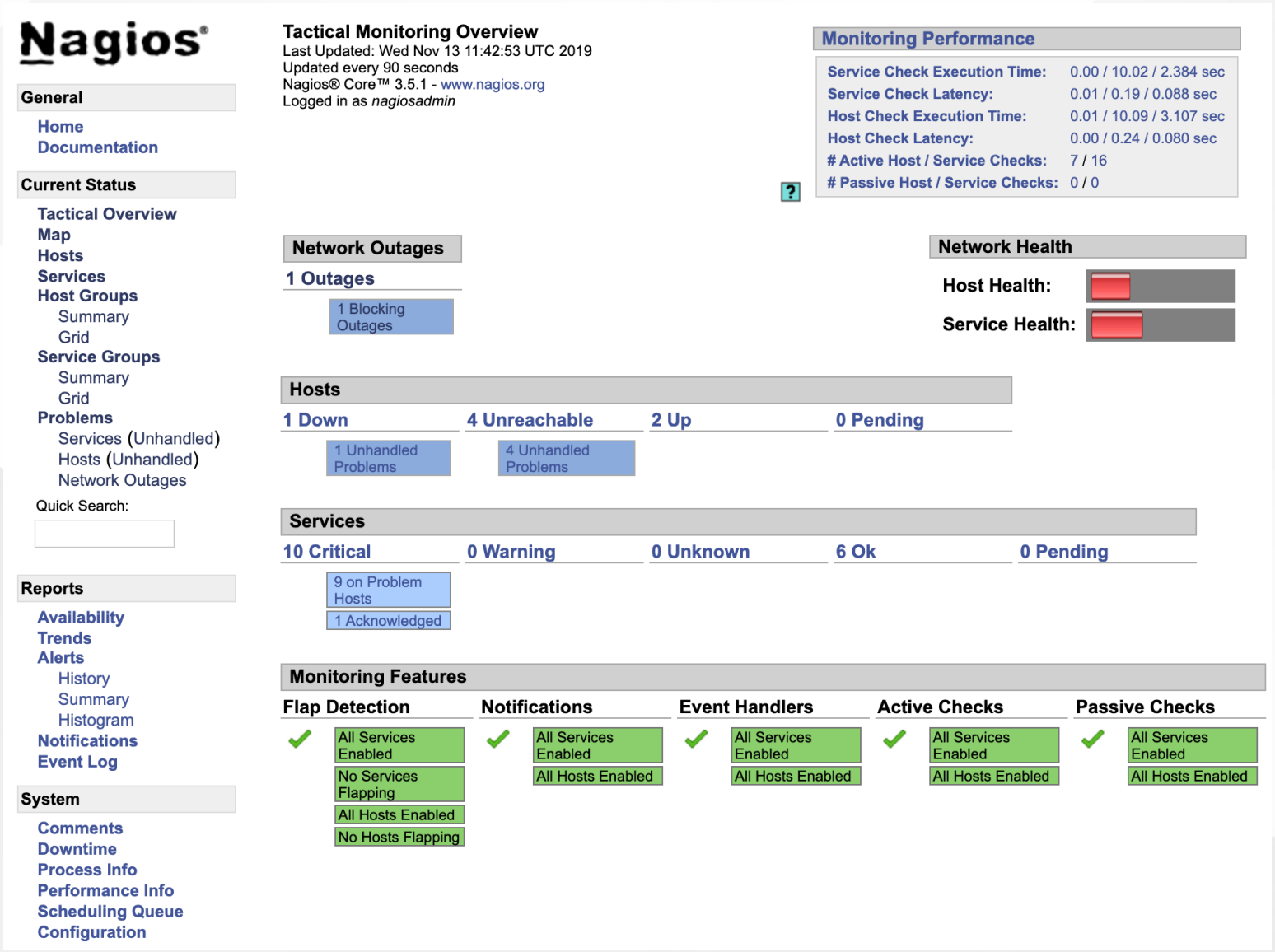
npNOG 5

Dec 8 - 12, 2019

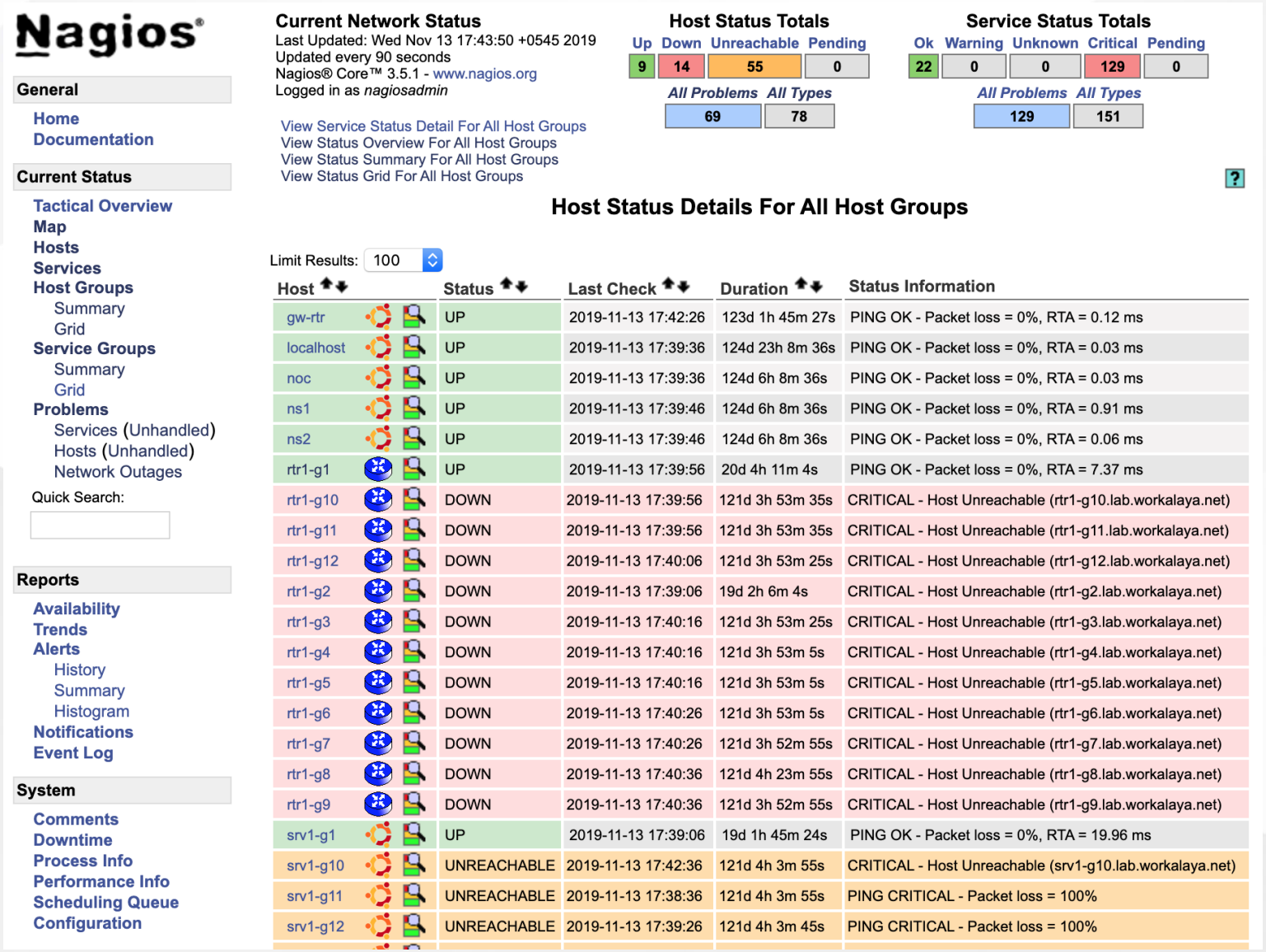
Introduction

- 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: Host Detail View



Nagios

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Current Status
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- Host Groups
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- Service Groups
  - Summary
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- Problems
  - Services (Unhandled)
  - Hosts (Unhandled)
  - Network Outages

Quick Search:

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  - Summary
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- Event Log

System
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- Downtime
- Process Info
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- Scheduling Queue
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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

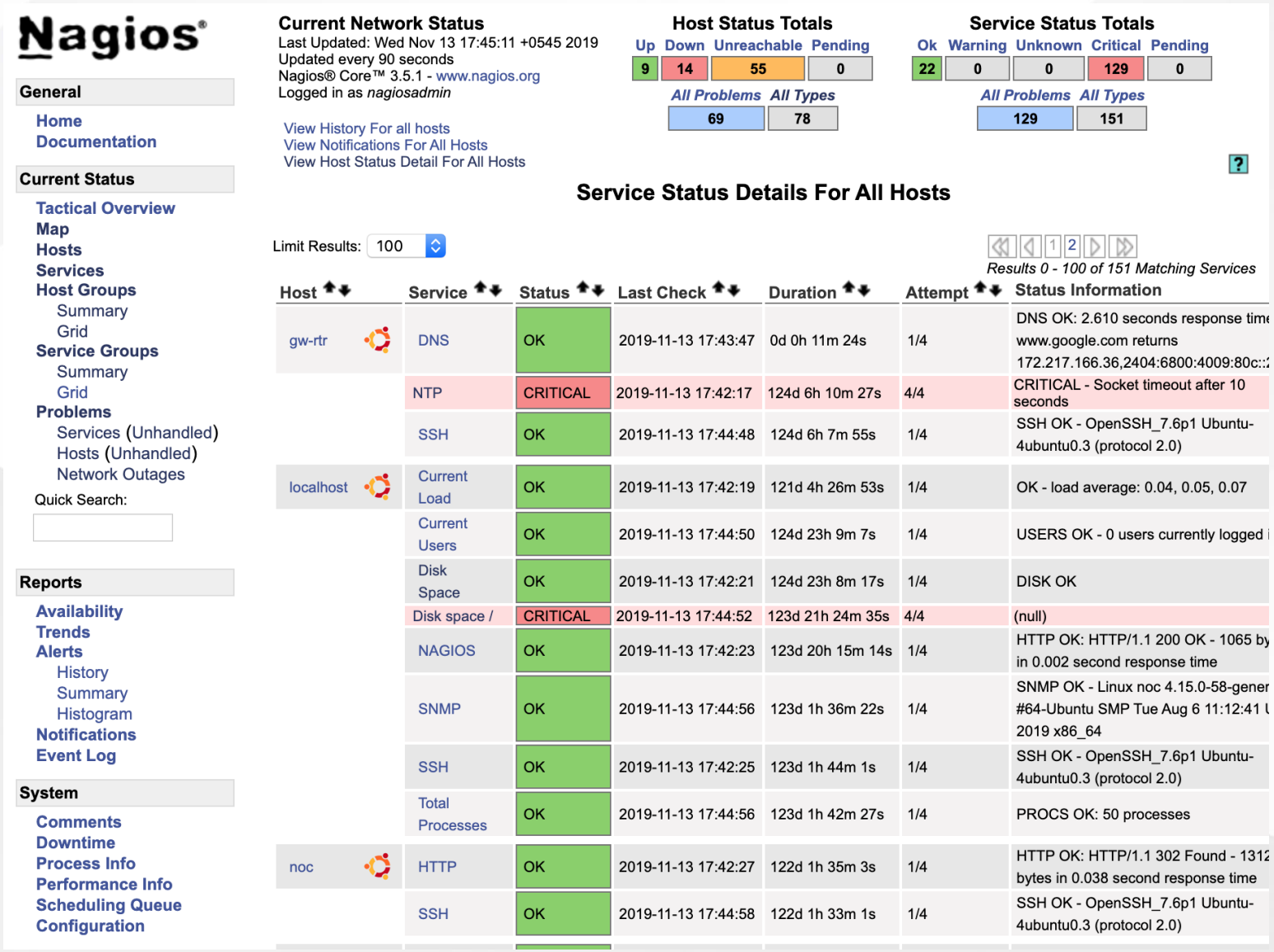
All Problems	All Types
129	151

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

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Service Status Totals

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Service Status Details For All Hosts

Limit Results: 100

1 2

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

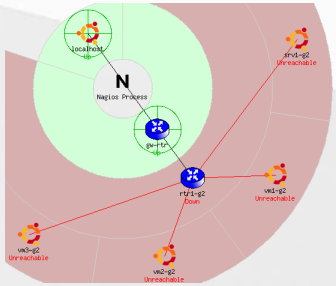
How Checks Work (Continued)

- **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:

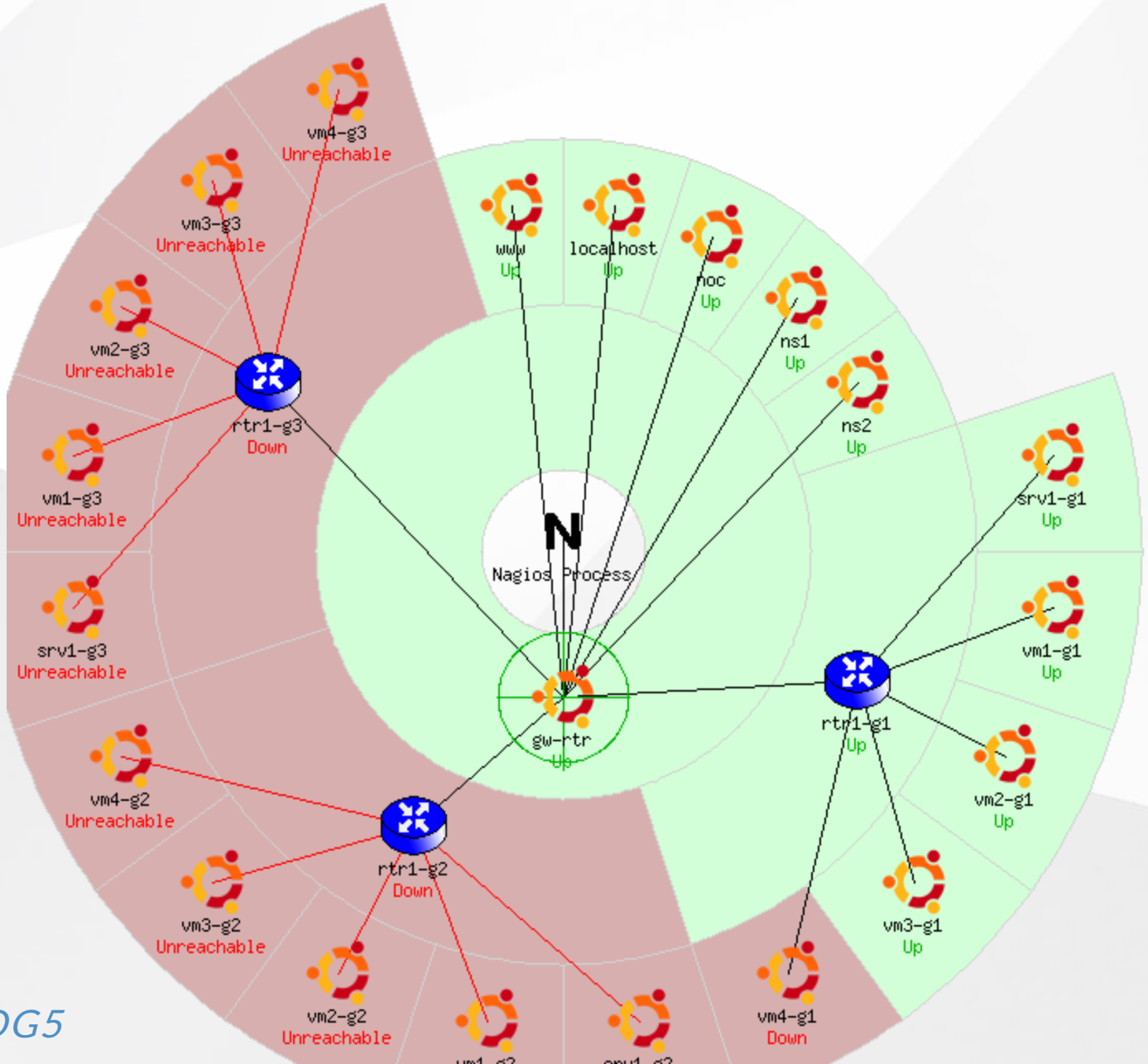
- The parent of a `server` connected to a `switch` would be the `switch` or `router`.
- Allows us to specify the dependencies between devices.
- Avoids sending alarms when parent does not respond.
- A node can have multiple parents (dual homed).



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.workalaya.net/nagios3/

nagioisadmin/<lab_password>

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/