Monitoring with

Koen de Jonge

About me

- *Koen de Jonge*
- *Using Linux and Apache since 1994*
- *Using Nagios since 1999*
- *Using and contributing to WebGUI since 2001*
- *Co-founder of ProcoliX (PlainBlack hosting partner)*

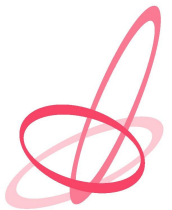
Overview

Presentation based on Ethan Galstad's presentation at FOSDEM 2005

- **Presentation (40 minutes)**
  - Background and overview
  - In-depth information on specific topics
  - Do's and dont's
- **Question & Answer (10 Minutes)**

What is Nagios?

- Open Source (GPL) network monitoring application
- Runs on Linux, FreeBSD, Solaris, etc.
- Monitors hosts and services on your network
- Provides you with an overview of the status of your systems
- Notifies you know when things are go wrong
- Allows you to resolve problems faster
- Provides availability reports for SLAs, etc

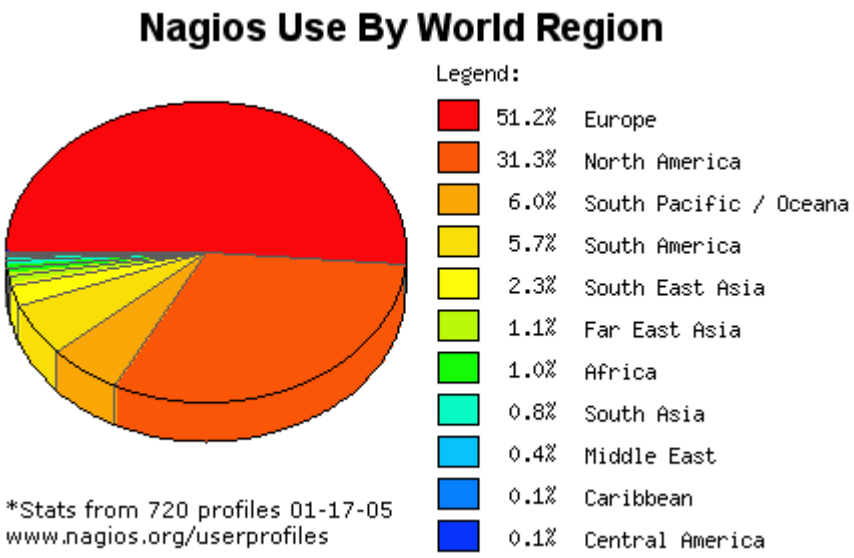


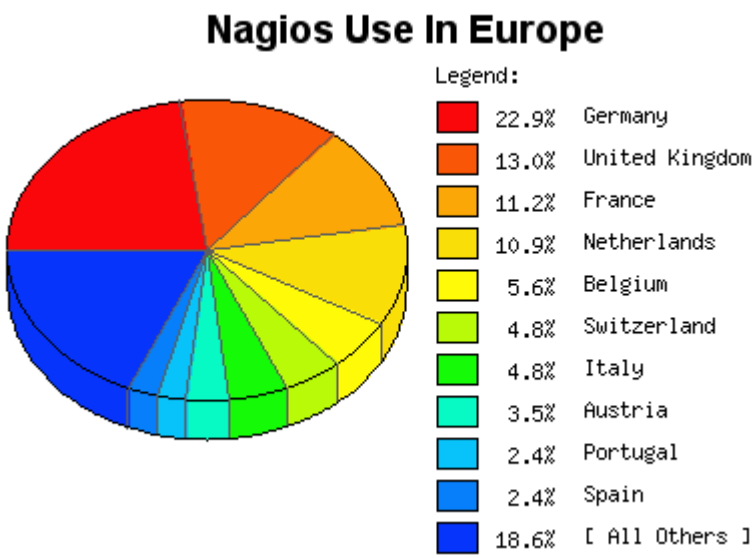
How it started

- Development started in January 1999
- Wanted to provide monitoring services to local businesses
- No suitable (cost- and feature-wise) commercial or free solution was available
- Originally designed to monitor small LAN (~20 servers)
- Initially anticipated a small user base (~20 users)

Where it is now

- Six years and nine major versions later
- Top installations monitor thousands of hosts and services
- Over 150,000 downloads of latest stable version (1.2)





The name

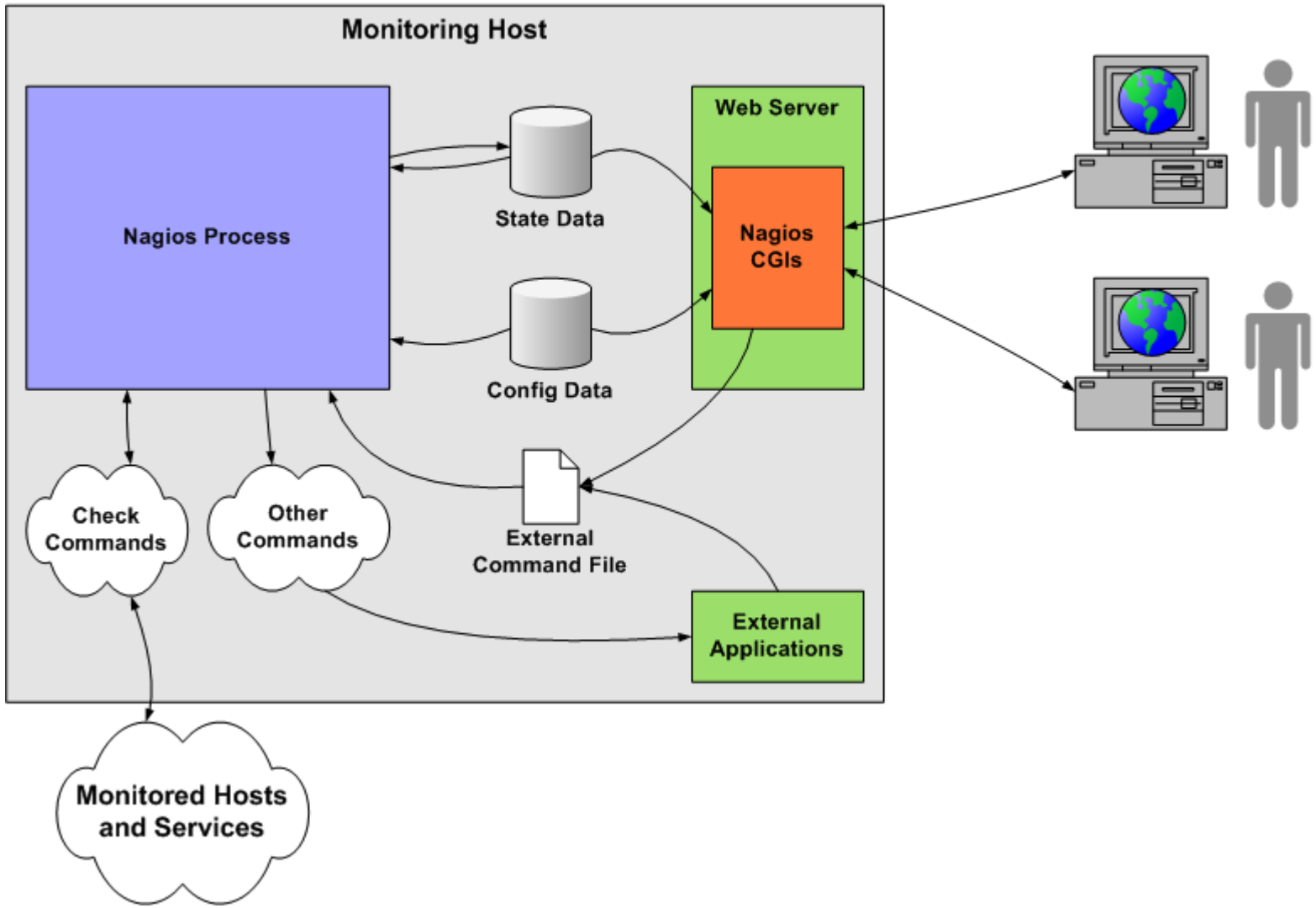
- Originally released under the name “NetSaint” (netsaint.org)
- Name changed to “Nagios” in 2001 for trademark reasons
- N.A.G.I.O.S. = “Nagios Ain't Gonna Insist On Sainthood”
- Trademark registration for Nagios®
- I pronouce it as “nah-ghee-ose”
- Correct pronunciation: however you'd like

Nagios Overview

Design Overview

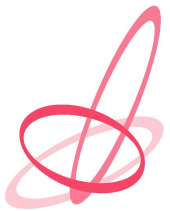
- Designed in a modular fashion
- Daemon contains the monitoring logic and coordinates things
- CGIs allow users to view status information through web browser
- External applications handle the low-level monitoring work
- External commands can be triggered to manage alerts, state changes, and monitoring information
- Can be integrated with 3rd-party applications fairly easily

Nagios Overview



Nagios Overview

- **What can be monitored?**
  - Servers, workstations, printers, routers,etc.
  - More genericly, anything that:
    - has or is associated with an address of some kind
    - is “reachable”
  - Nagios doesn't know or care about network protocols or addresses
  - Not limited to monitoring standard network equipment and services
- **Monitoring subjects/targets**
  - Hosts
  - Services

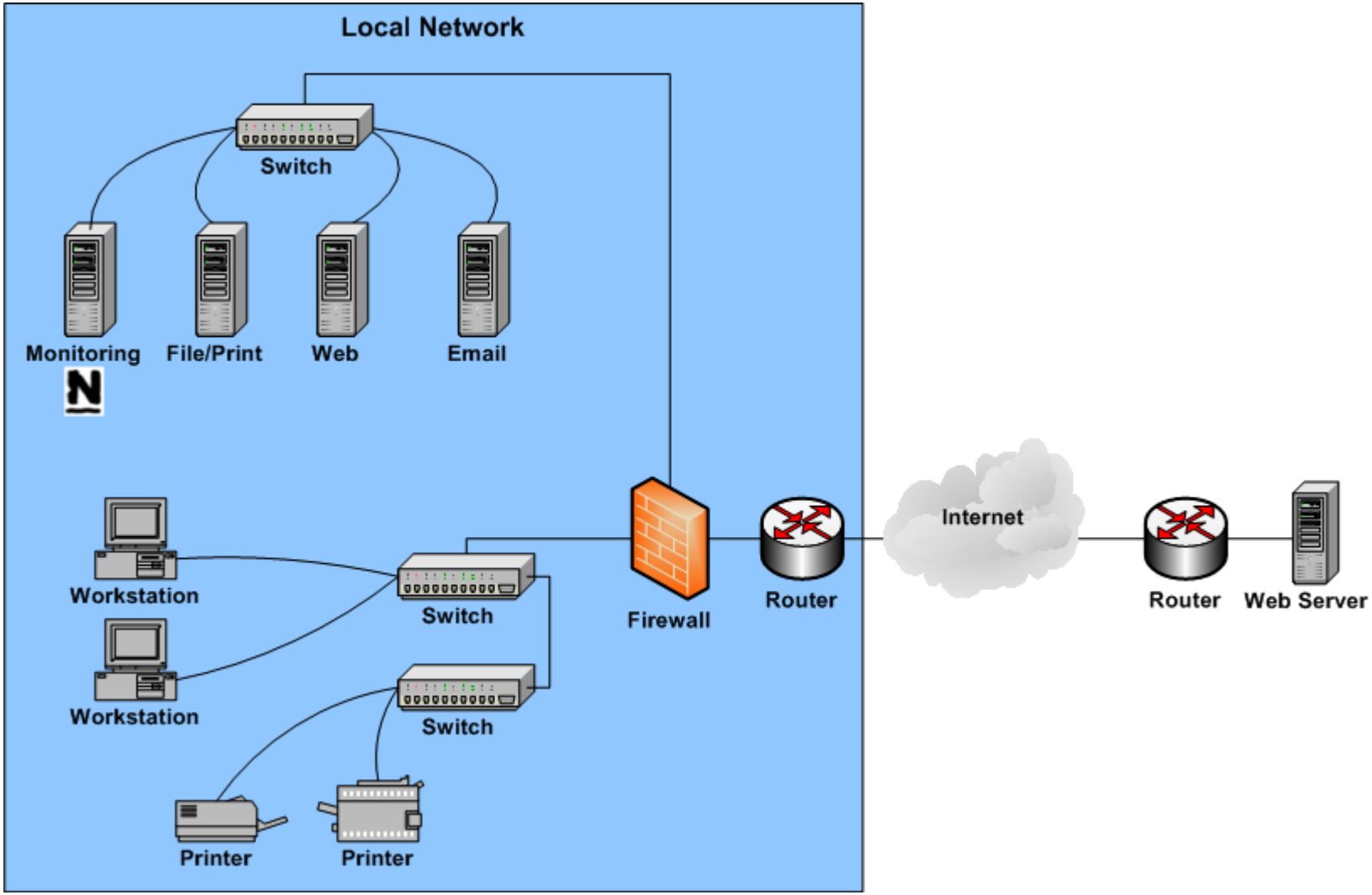


Nagios Overview

- **Hosts**
  - Usually physical objects (server, switches, routers, printers, etc.)
  - Can have parent/child relationships with other hosts
  - Provide one or more services
- **Services**
  - Things associated with or provided by a host
  - Tangible services (e.g. disk usage, printer toner supply)
  - Intangible services (e.g. HTTP, SMTP, IMAP, POP3, DNS)

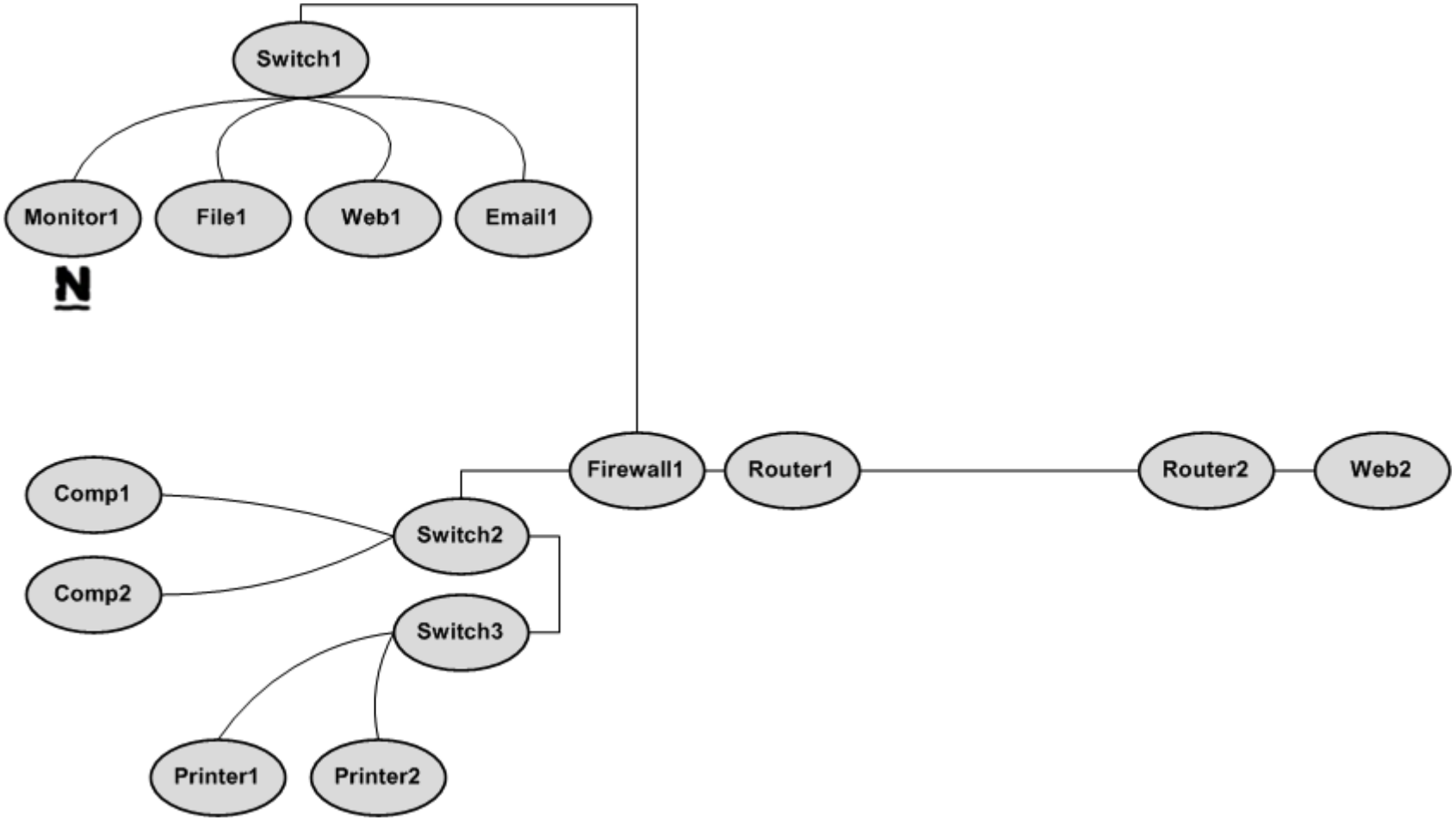
Nagios Overview

- *Example: Small Network Layout*



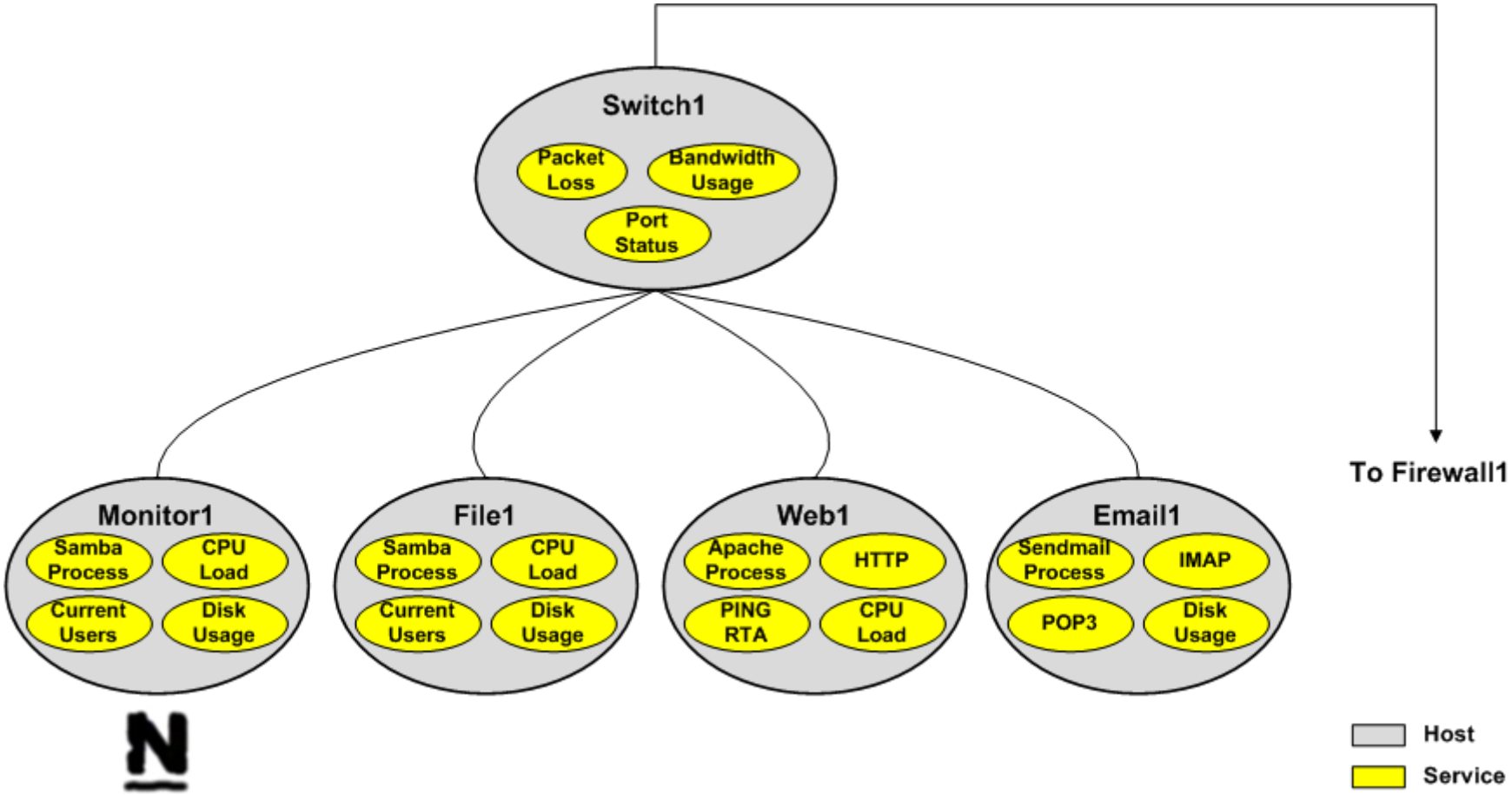
Nagios Overview

- *Hosts as viewed by Nagios*



Nagios Overview

- Services as viewed by Nagios

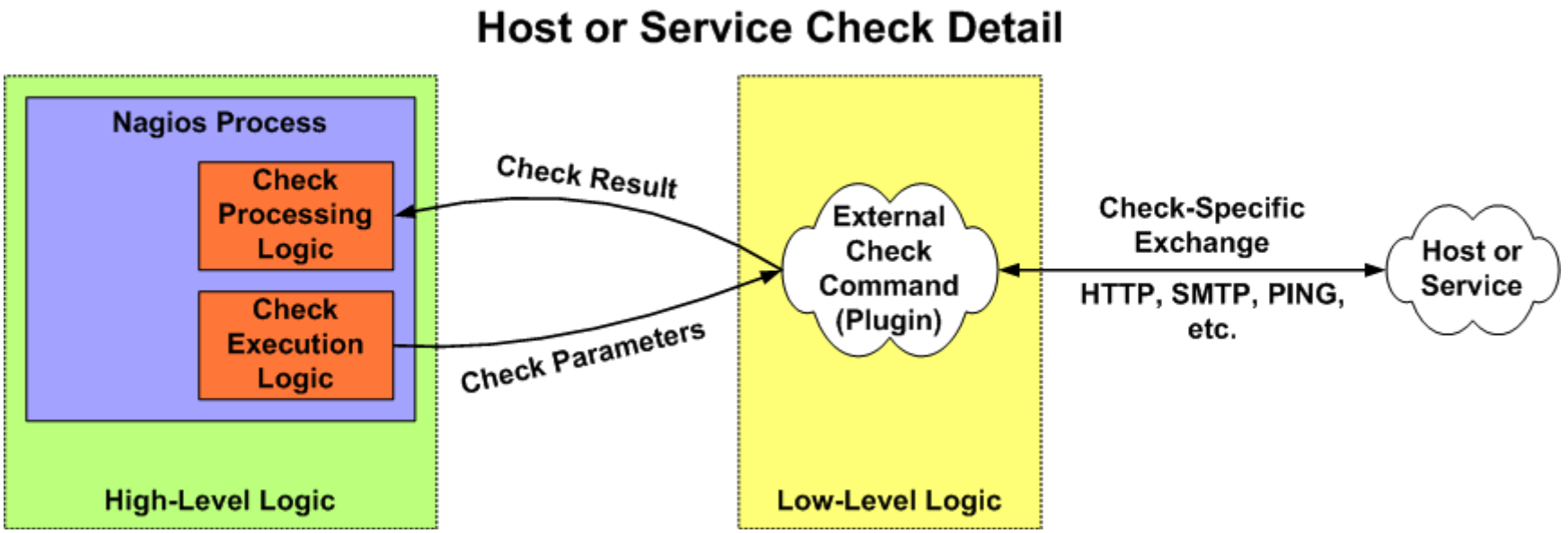


Nagios Plugins

Nagios Plugins

- ***How are hosts and services monitored?***
  - *Nagios doesn't understand network addresses, protocols, or services*
  - *Nagios passes information about what needs to be checked to external commands (plugins)*
  - *Plugins perform the actual checks of hosts and services and return information back to Nagios*
- ***What are plugins?***
  - *Shell or perl scripts, executables, etc.*
  - *Understand network addresses, protocols, services, etc.*

Nagios Plugins

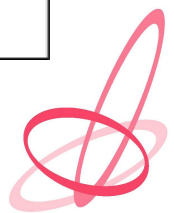


Nagios Plugins

- ***What information do plugins return?***
- *Text output*
  - *Shown to users via the web interface, in notifications, etc.*
- *Return code*
  - *This is what Nagios uses to determine the status of things*
  - *Four possible return codes used to indicate different states*
    - 0 = OK
    - 1 = WARNING
    - 2 = CRITICAL
    - 3 = UNKNOWN

Example Plugin Output:

```
[nagios@monitor ~]# /usr/local/nagios/libexec/check_ping -H www.google.com -w 40,40% -c 100,80%
PING WARNING - Packet loss = 0%, RTA = 48.31 ms
[nagios@monitor ~]# echo $?
1
[nagios@monitor ~]#
```

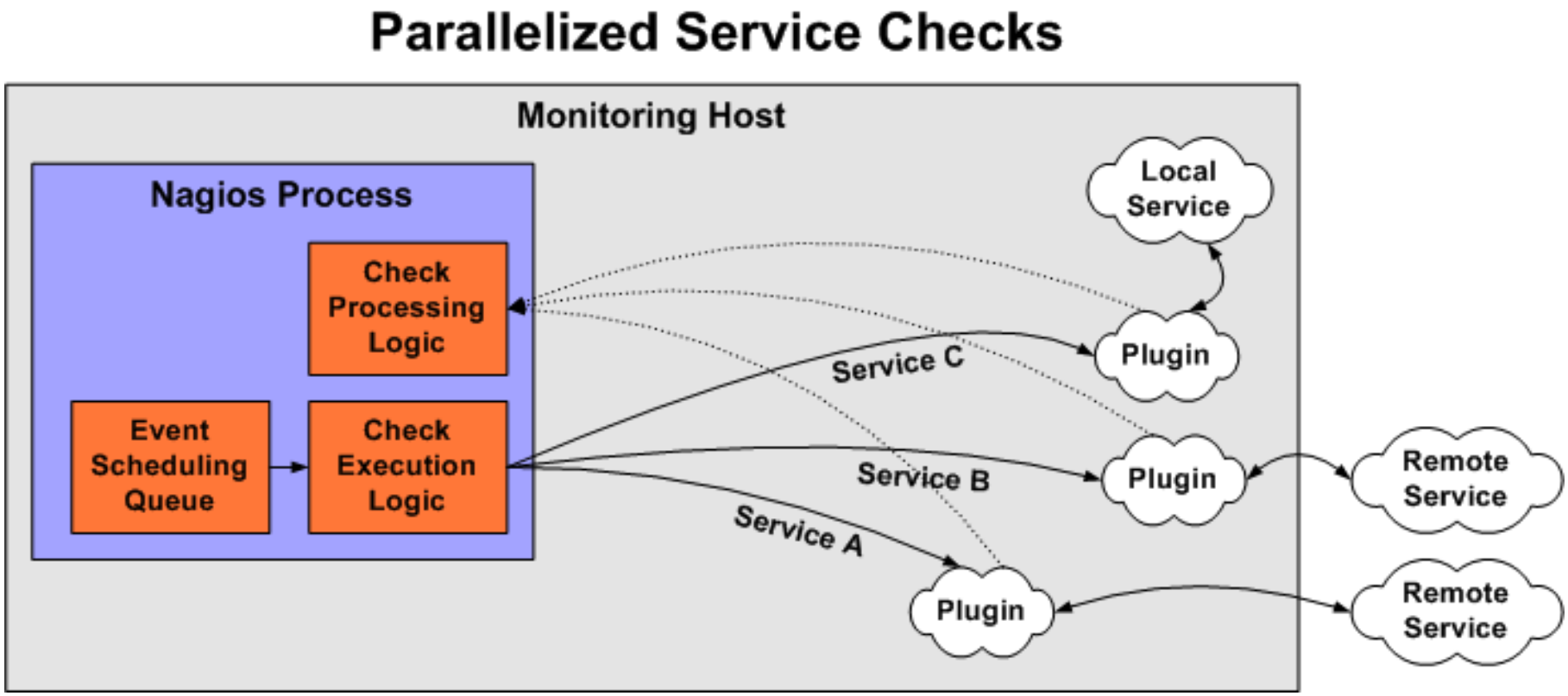
Service Checks

Service Checks

- ***Services***
  - *Services are the main reason we monitor things*
  - *If a host offers no useful services, why would we monitor it?*

- ***Service checks***
  - *Checks are performed at regularly scheduled intervals using plugins*
  - *Multiple service checks can be run in parallel*
  - *Four possible states: OK, WARNING, CRITICAL, and UNKNOWN*
  - *You can monitor anything you can write a plugin for:*
    - Simple: HTTP, IMAP, DNS, disk usage, etc.
    - More complicated: Web transactions, mail loop detection, etc

Service Checks



Host Checks

Host Checks

- ***Hosts***
  - *"Containers" for services*
- ***Host Checks***
  - *As with services, checks are performed using plugins*
  - *Checks are performed on-demand after service state changes*
    - Critical decision point: is the host or the service the real problem?
    - Need timely and accurate information on host status
  - *Three possible states: UP, DOWN, and UNREACHABLE*
  - *Can trigger a route verification*

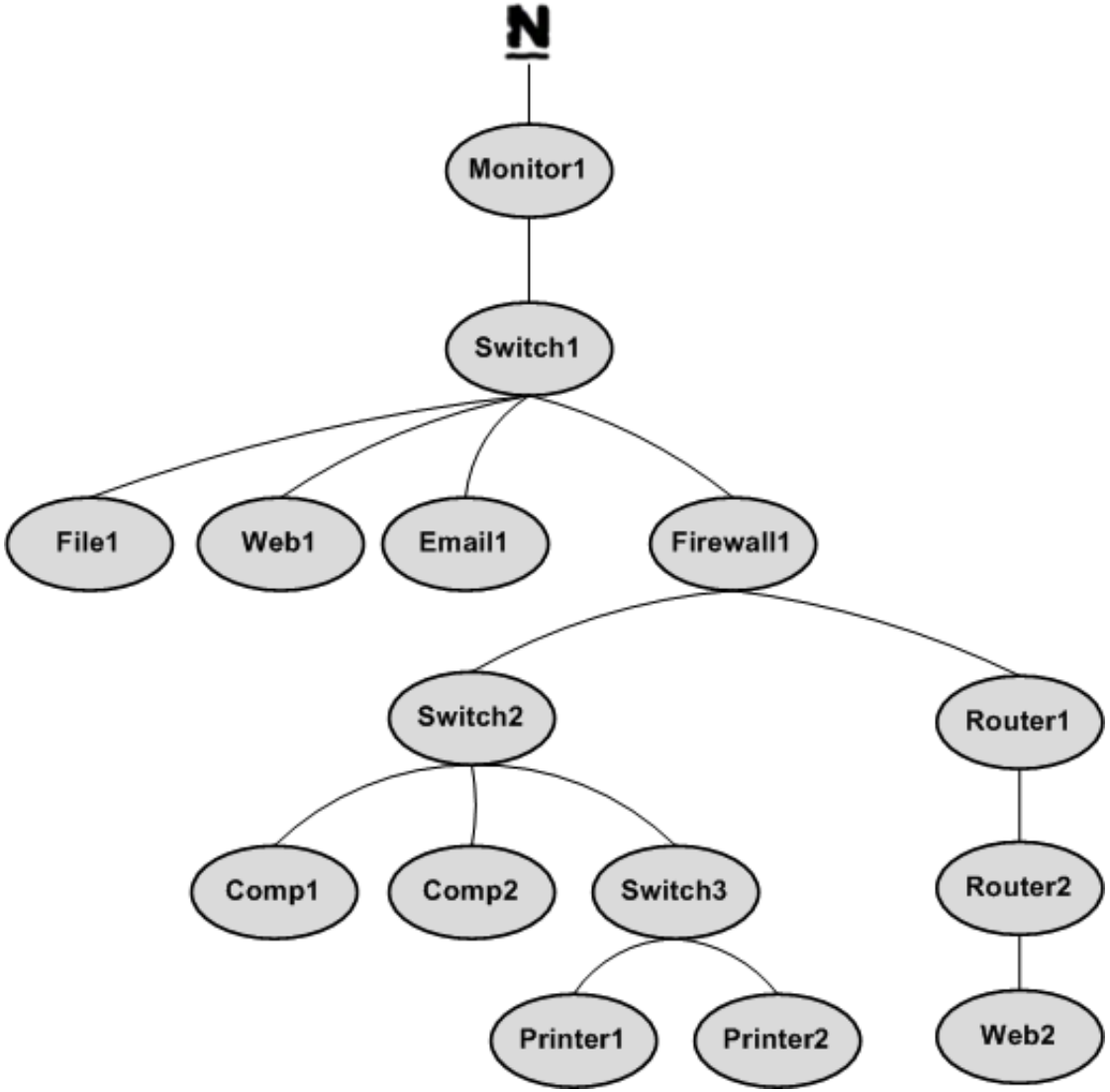
Route Verification

Host Route Verification

- ***Why might a host not be UP?***
  - *The host is DOWN*
  - *The route to the host is blocked by one or more other hosts (UNREACHABLE)*
- ***Route verification***
  - *Determines whether hosts are DOWN or UNREACHABLE*
  - *Can be very time-intensive if network problems are widespread*
- ***Why is it useful?***
  - *Helpful in determining the "real" cause of widespread problems*
  - *Different host states may be acted upon differently by processing and notification logic*

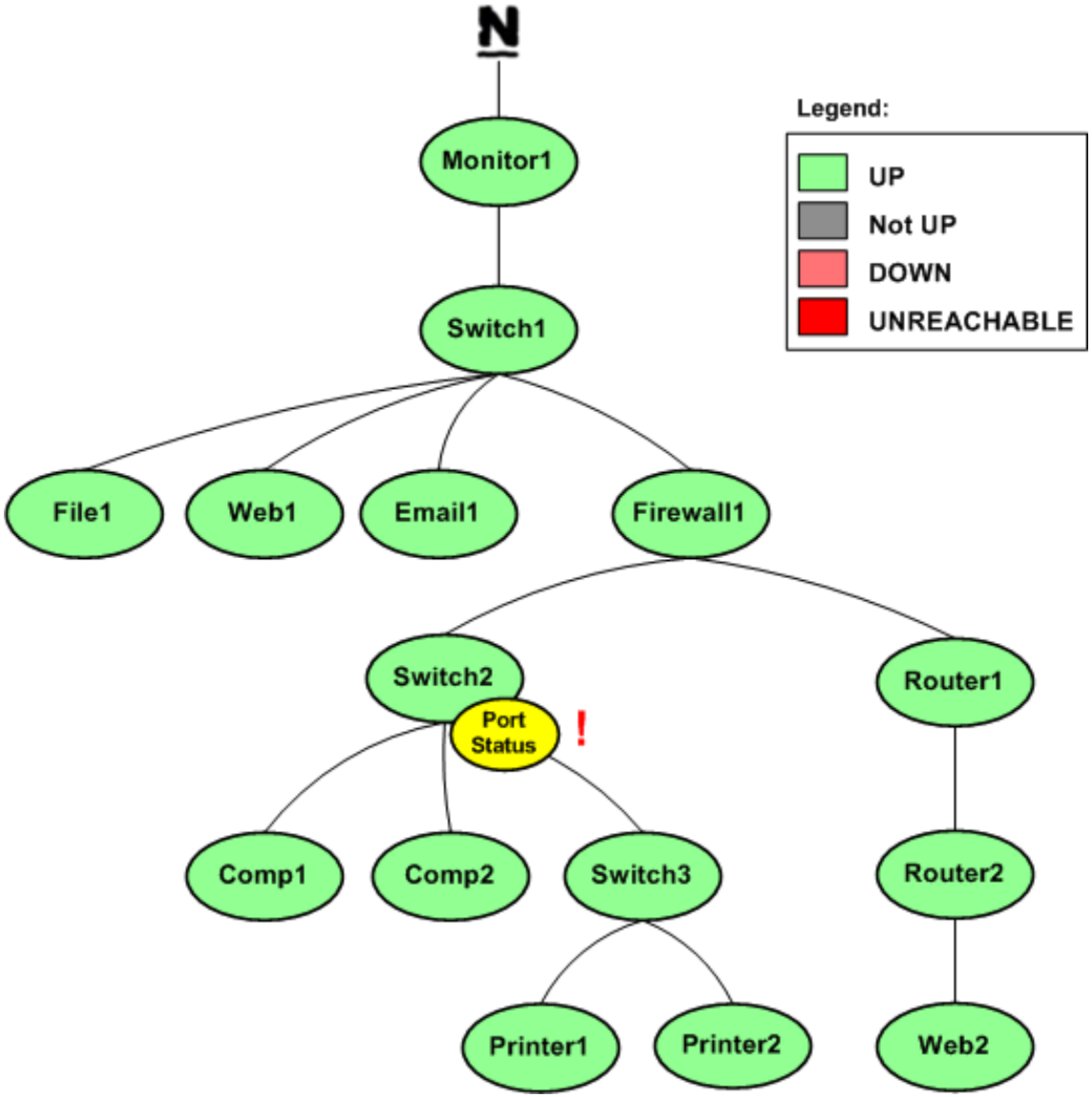
Host Route Verification

- *Logical host relationships - The world according to Nagios*



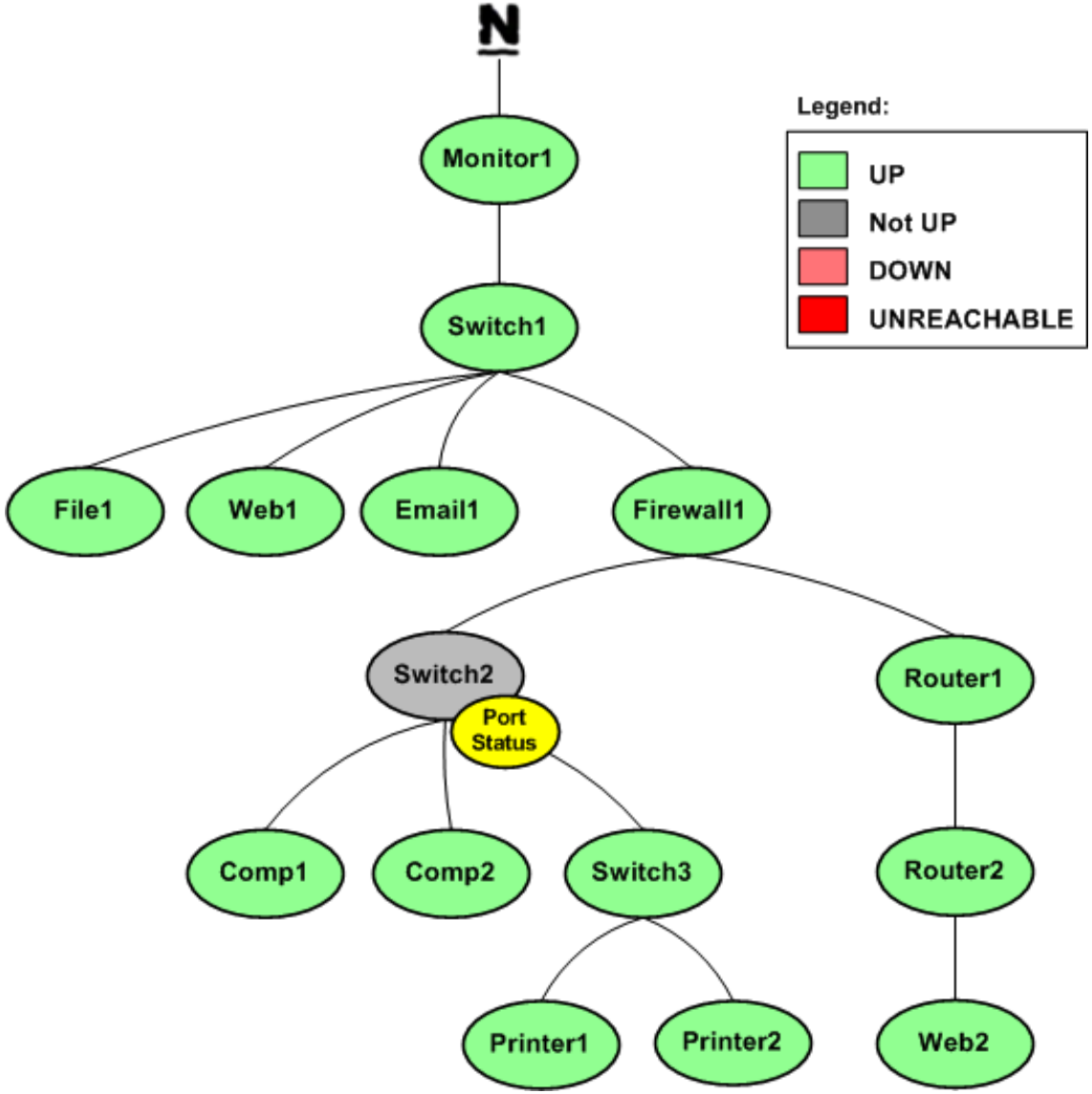
Host Route Verification

- *A problem is detected with 'Port Status' service on Switch2.*



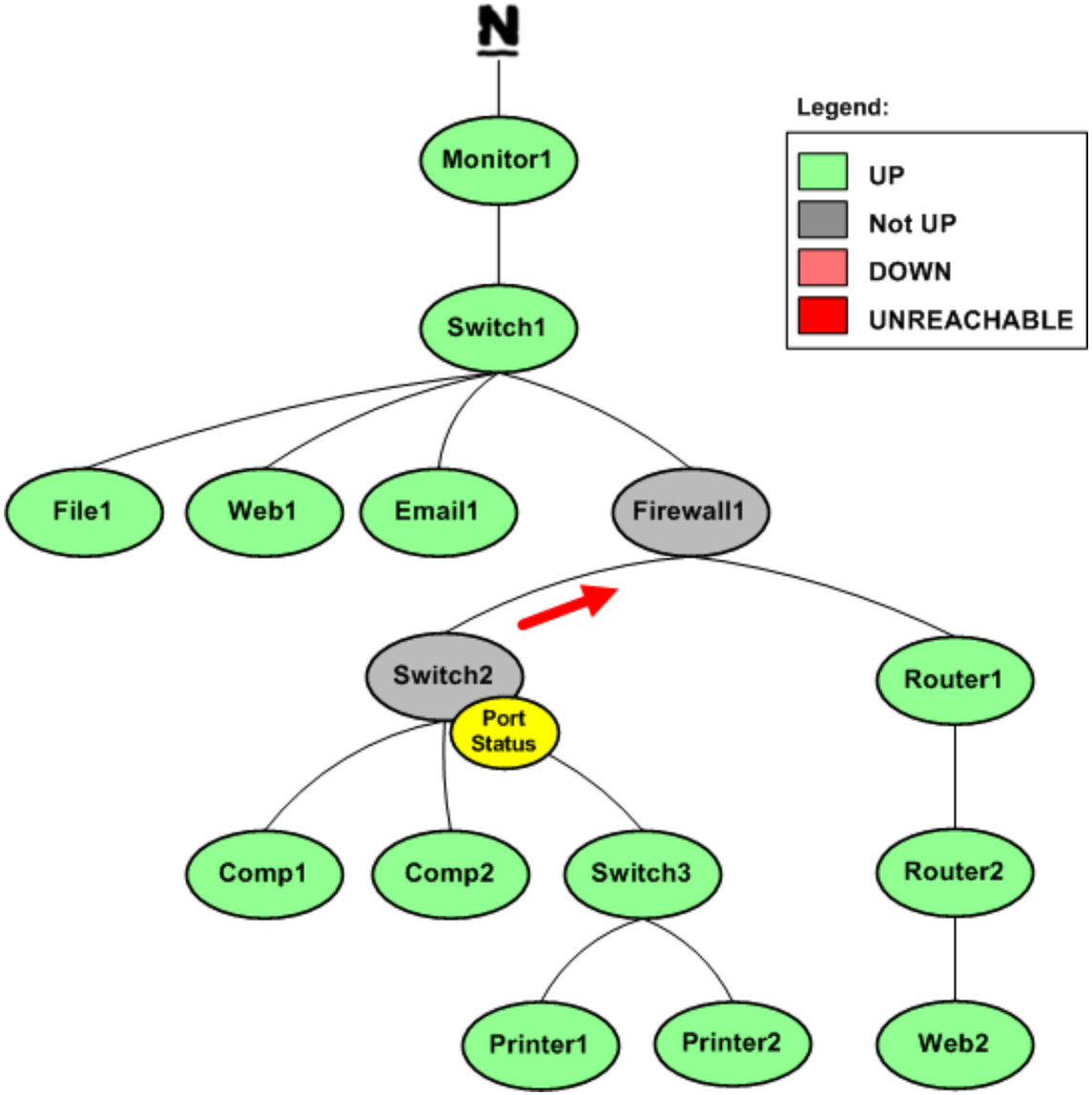
Host Route Verification

- *Switch2 is checked for problems and found to NOT be UP…*



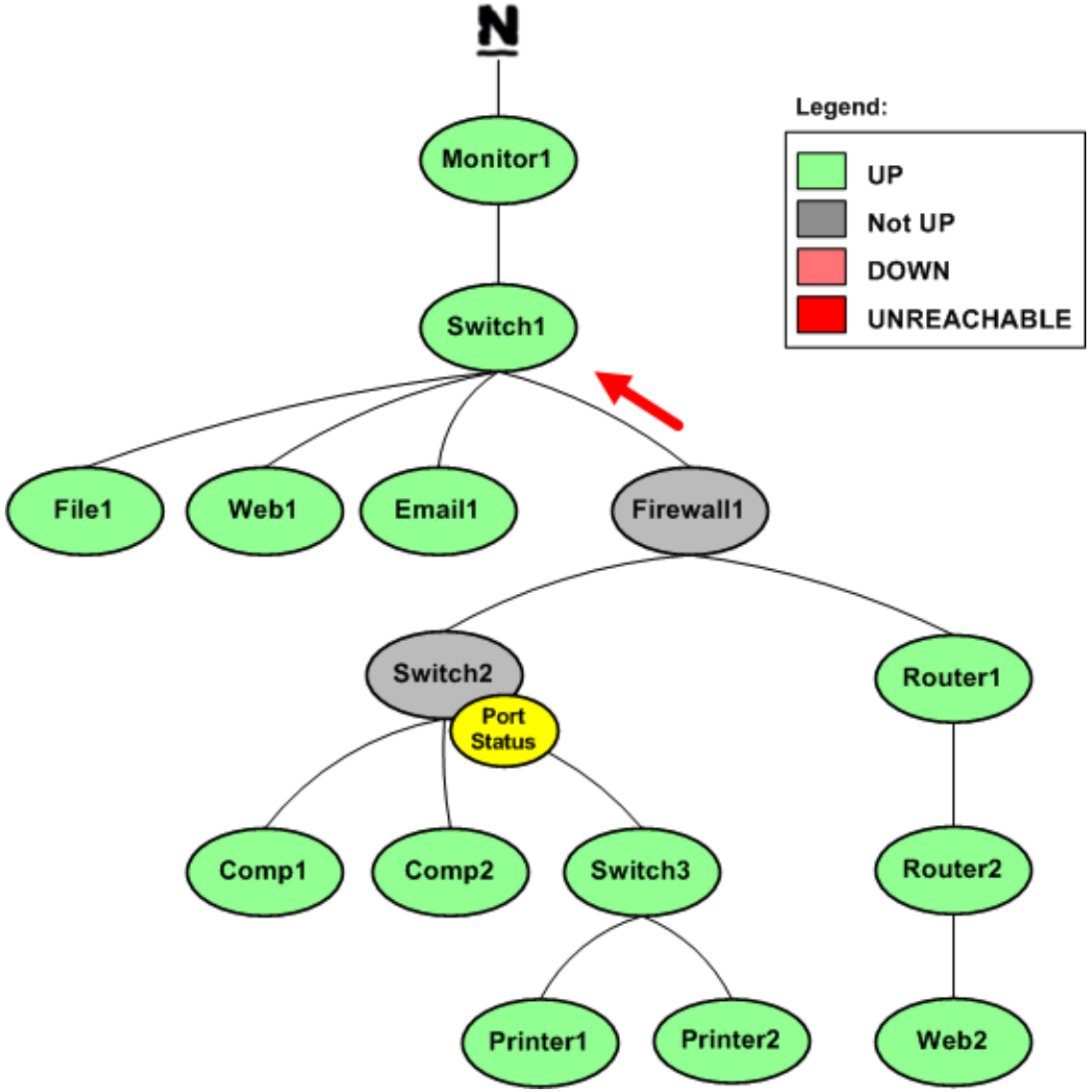
Host Route Verification

- *Check is propagated upstream to Firewall1, which is also NOT UP…*



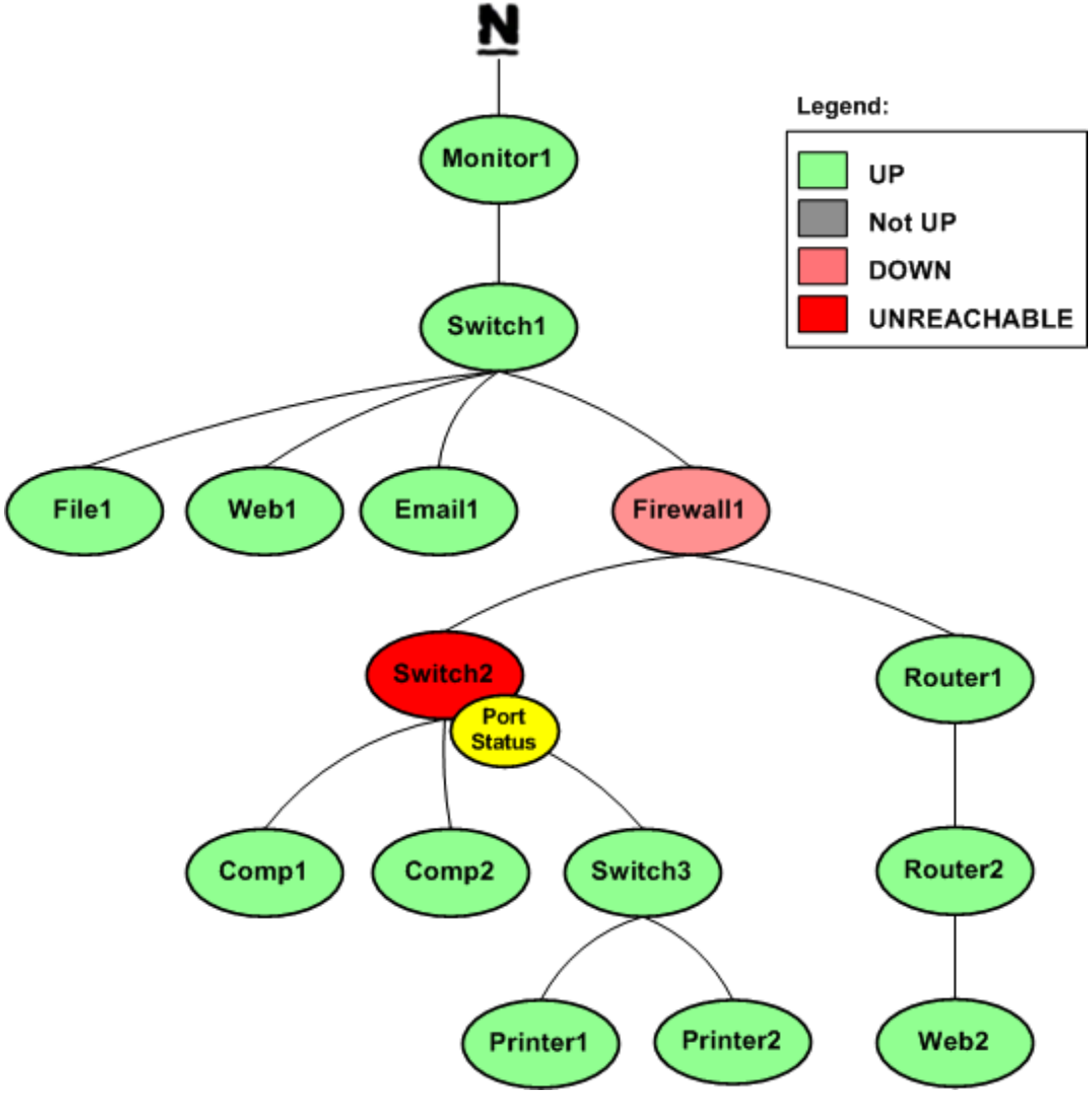
Host Route Verification

- *Check is propagated upstream to Switch1, which IS found to be UP*



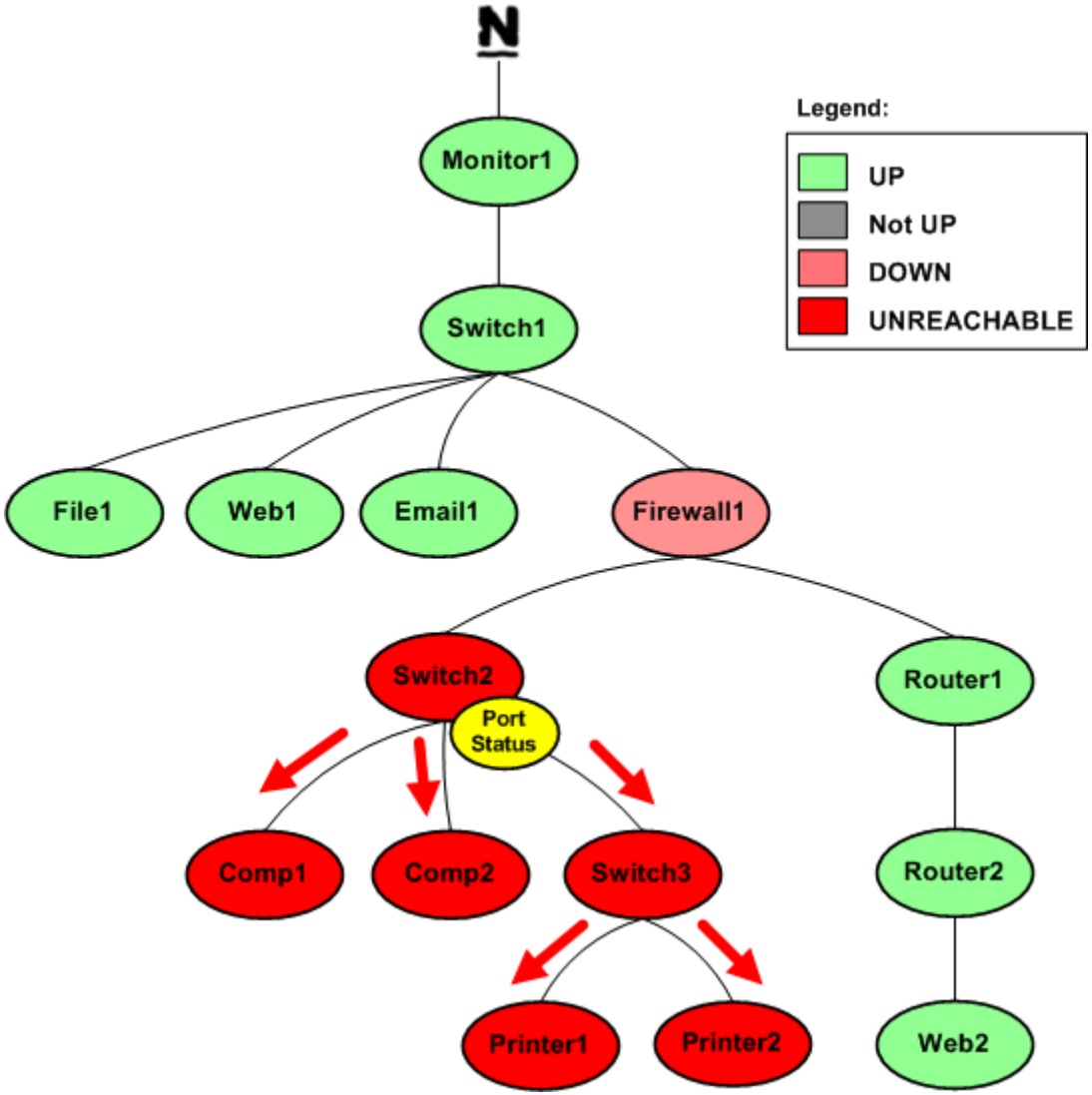
Host Route Verification

- *Reachability of Switch2 can now be determined - Firewall1 is DOWN and Switch2 is UNREACHABLE.*



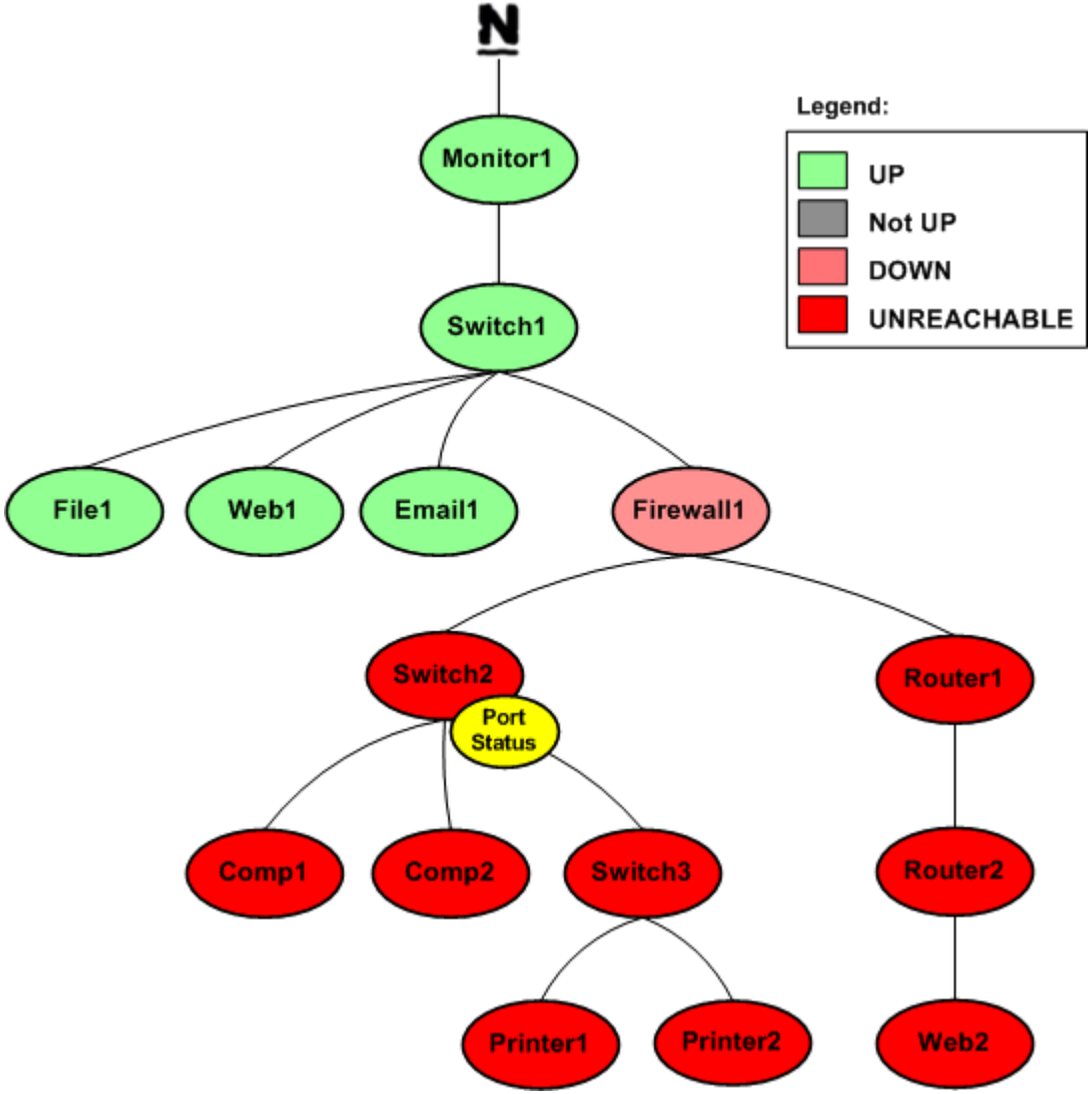
Host Route Verification

- *Checks are propagated to children of SWITCH2, which are found to be UNREACHABLE*



Host Route Verification

- *Other children of Firewall1 are checked later, found to be UNREACHABLE*



External Application Interfaces

External Application Interfaces

- External Commands
- Passive Checks
- Event Handlers (not discussed)
- OCSP/OCHP Commands (not discussed)
- Performance Data (not discussed)

External Commands

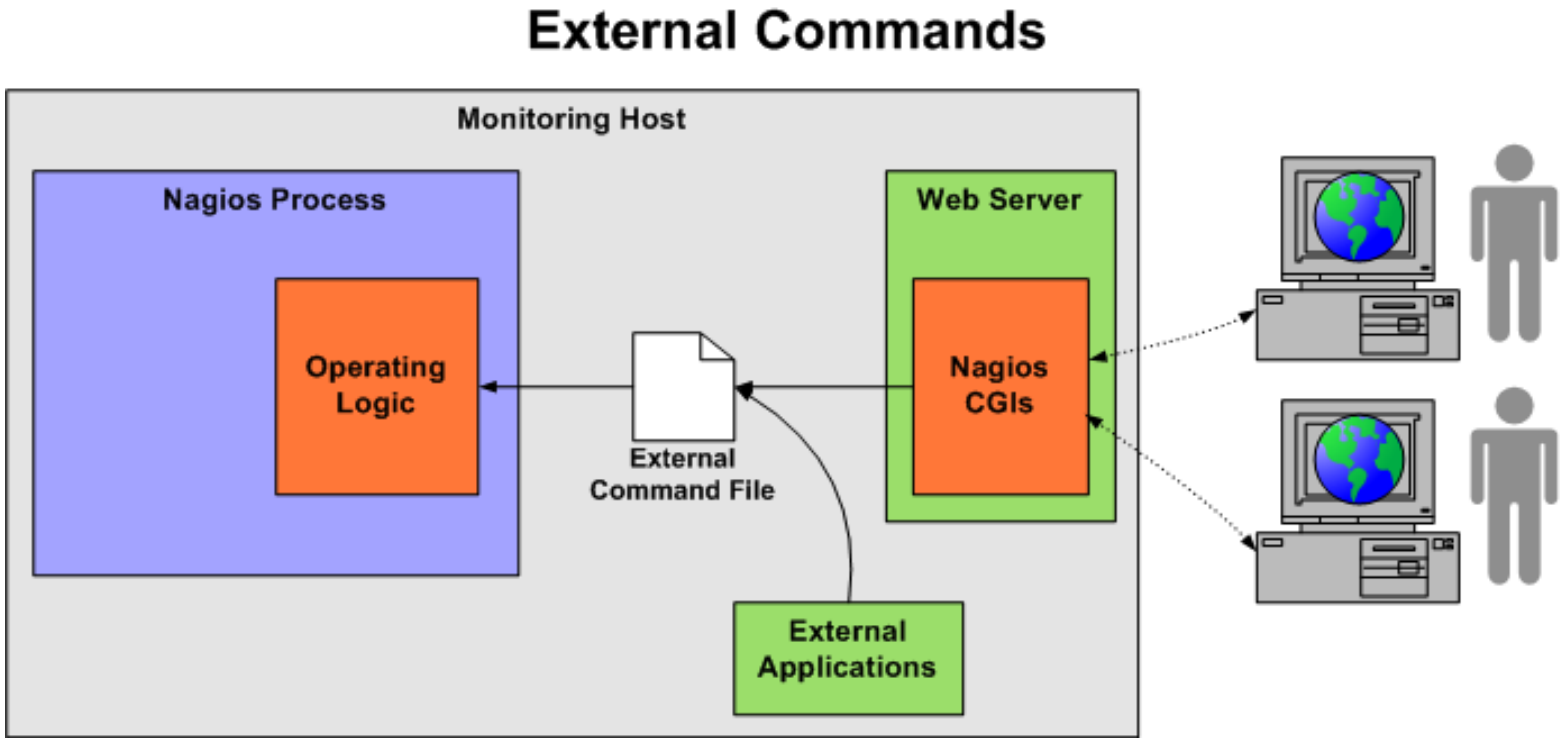
External Commands

- Nagios can accept control commands and data from third-party applications through the external command interface

- **What can external commands be used for?**
  - Controlling aspects of the monitoring and processing logic
    - Disabling/enabling host and service checks
    - Disabling/enabling notifications
    - etc.
  - Submitting host and service check results

External Commands

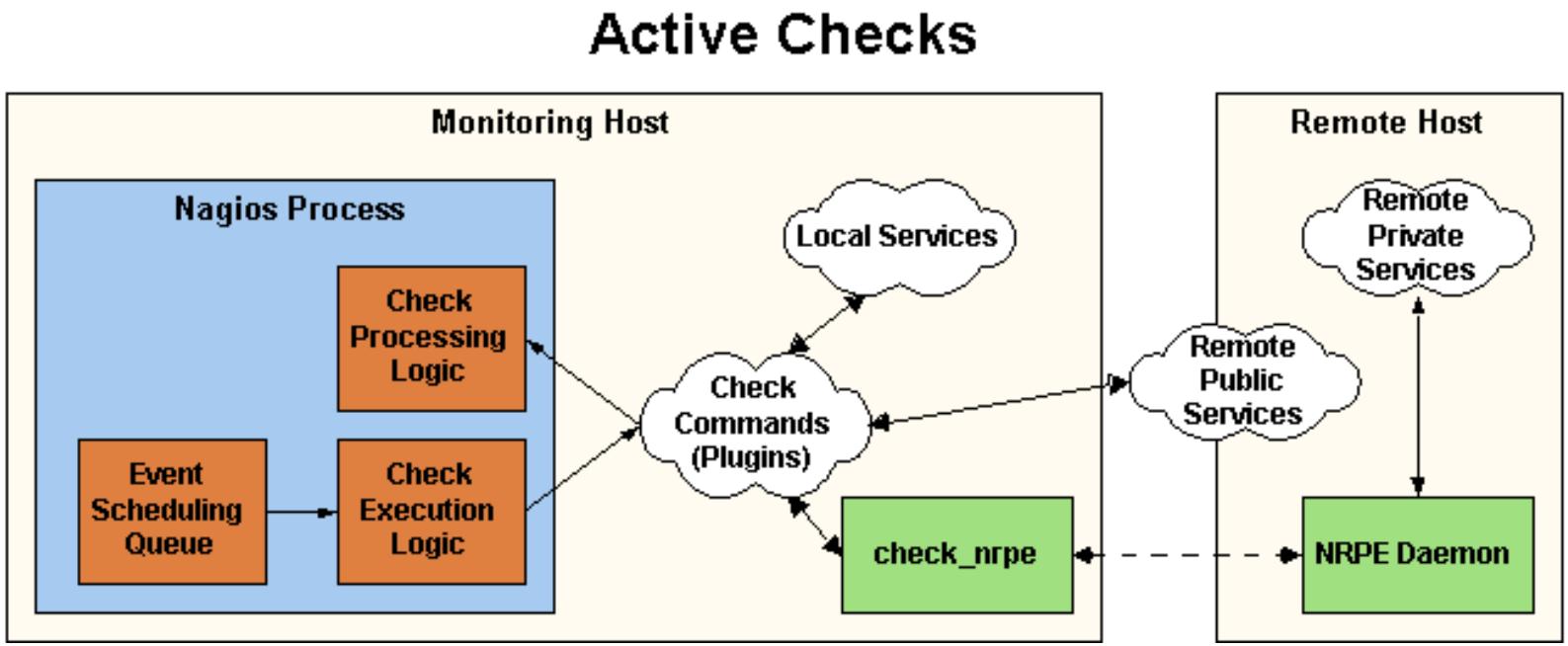
- **How are commands submitted?**
  - Nagios creates a named pipe (FIFO) at startup, reads the file at regular intervals and processes any new commands that are found
  - CGIs and 3rd-party applications submit commands to Nagios by writing to the external command file



Passive Checks

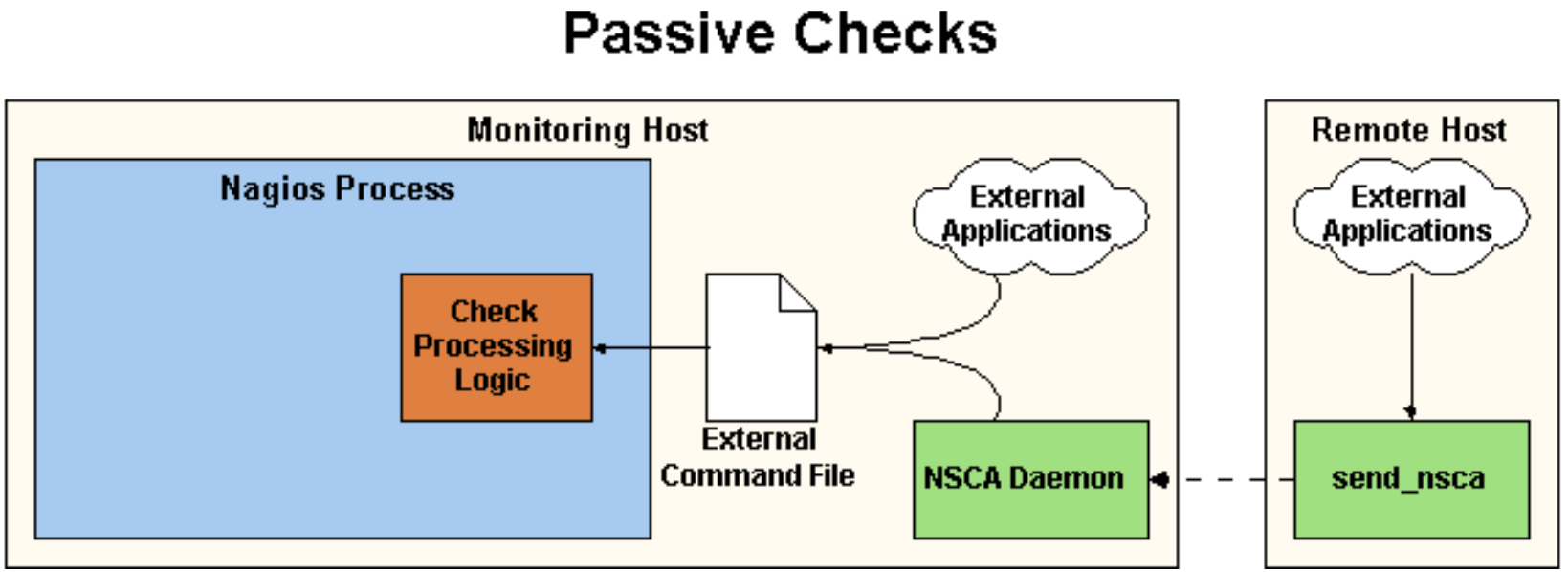
Passive Checks

- **Methods for checking hosts and services**
  - Actively
  - Passively
- **Active checks**
  - Synchronous in nature
  - Scheduled and initiated by Nagios



Passive Checks

- **Passive checks**
  - Performed by external applications
  - Check results are submitted through the external command file
  - Asynchronous in nature
  - Results are processed using the same logic as active checks
  - Ideal for incorporating security alerts



Do's and Dont's

Do's and Dont's

First of all:

- Nagios is a program, not a person
- Nagios cannot replace disciplined support staff
- Nagios is supposed to help your support staff, not bother them
- Nagios can be your best friend in maintainance

Do's and Dont's

Do's:

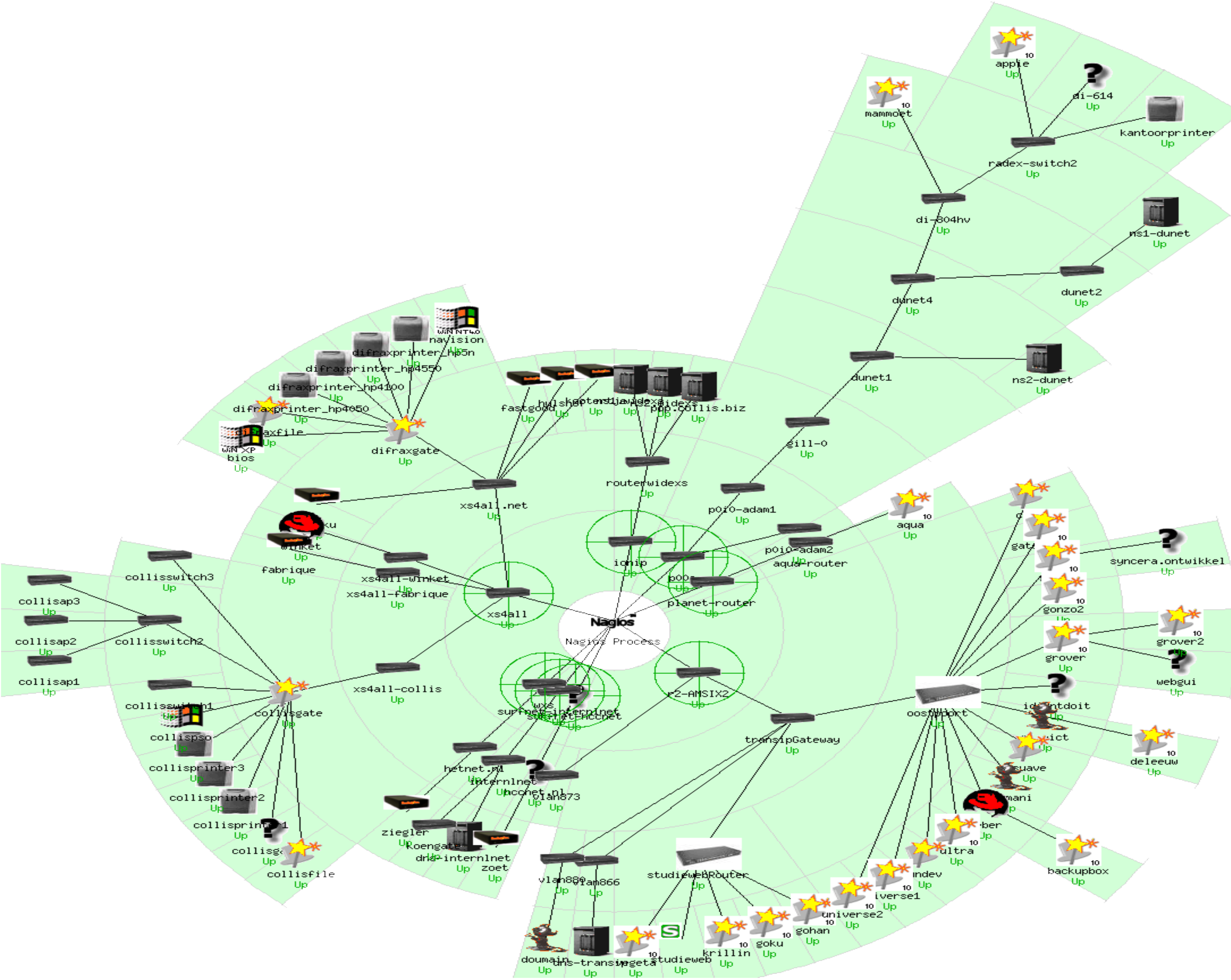
- Use Nagios to check everything you used to check manually
- Create checks for everything that might cause serious problems
- Create checks for everything that is easy to check
- Make sure your list of problems is always empty
- Create time periods
(you don't care about printers in the middle of the night)
- Check less important services less often
- Use a dedicated machine for Nagios

Do's and Dont's

Do not:

- Use Nagios to check the discipline of your staff
- Leave problems 'dangling', ACKNOWLEDGE them!
- Create 'progressing' checks, always use hard limits
- Check hosts or services you have no control over
- Think you can configure Nagios without reading the documentation
- Trust Nagios blindly, check the checks periodically

And Finally...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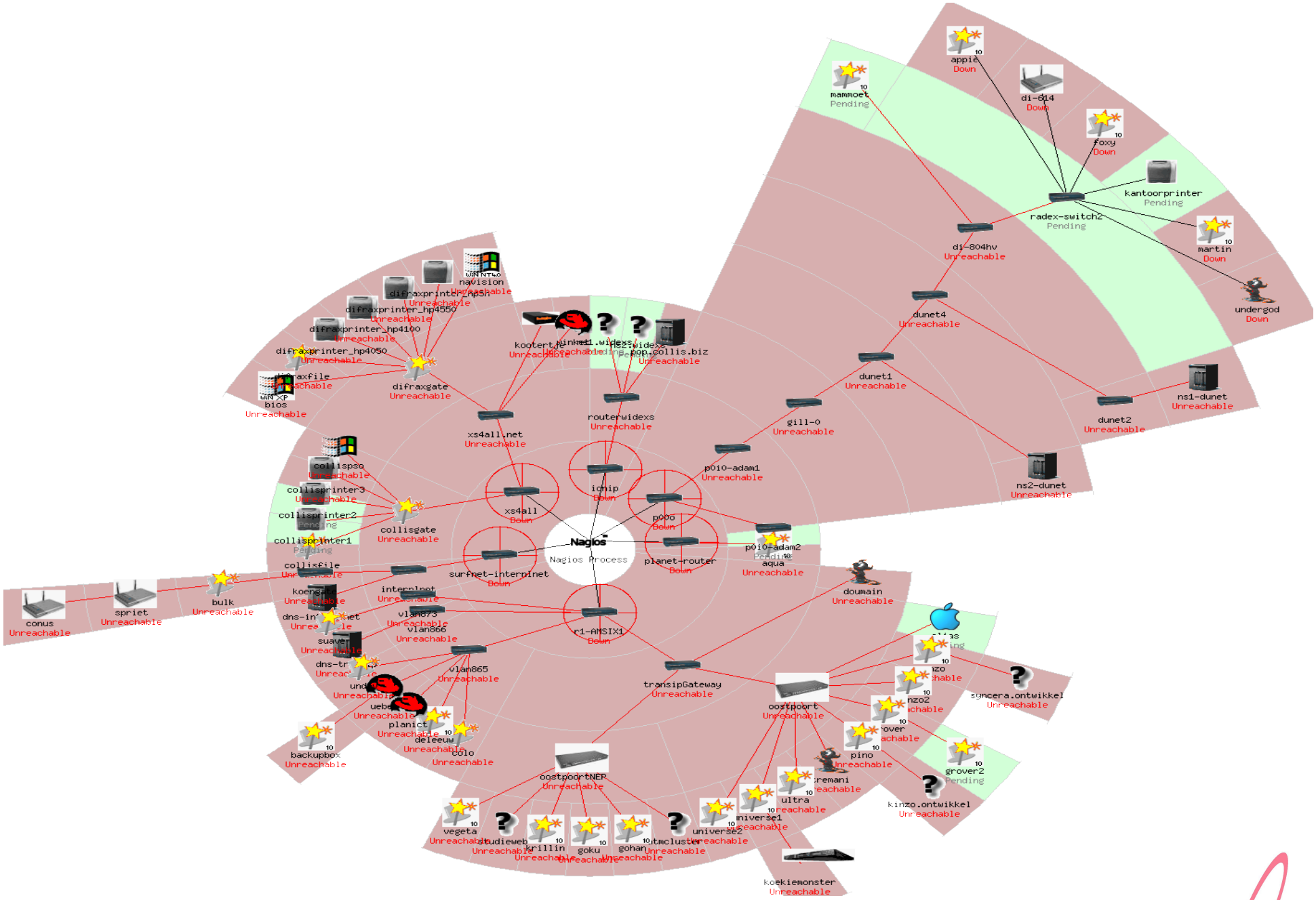
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grover2
Pending
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References

For more information on Nagios look here:

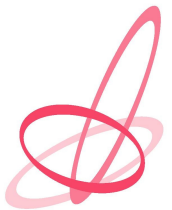
- http://www.nagios.org
- http://nagiosplug.sourceforge.net

For performance data and trend analyses look here

- http://www.cacti.net
- http://people.ee.ethz.ch/~oetiker/webtools/rrdtool/

For information on Koen de Jonge

- http://www.procolix.com
- http://www.gevat.nl (dutch)



Questions?