Monitoring with Nagios and graphing with PerfParse

CINLUG

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What is Nagios?

- Open Source (GPL) monitoring
- Runs on *nix
- Monitors hosts, services, and anything else
- Provides a status overview (dashboard)
- Sends notifications
- Triggers events
- Over 150,000 downloads of the stable 1.2 branch

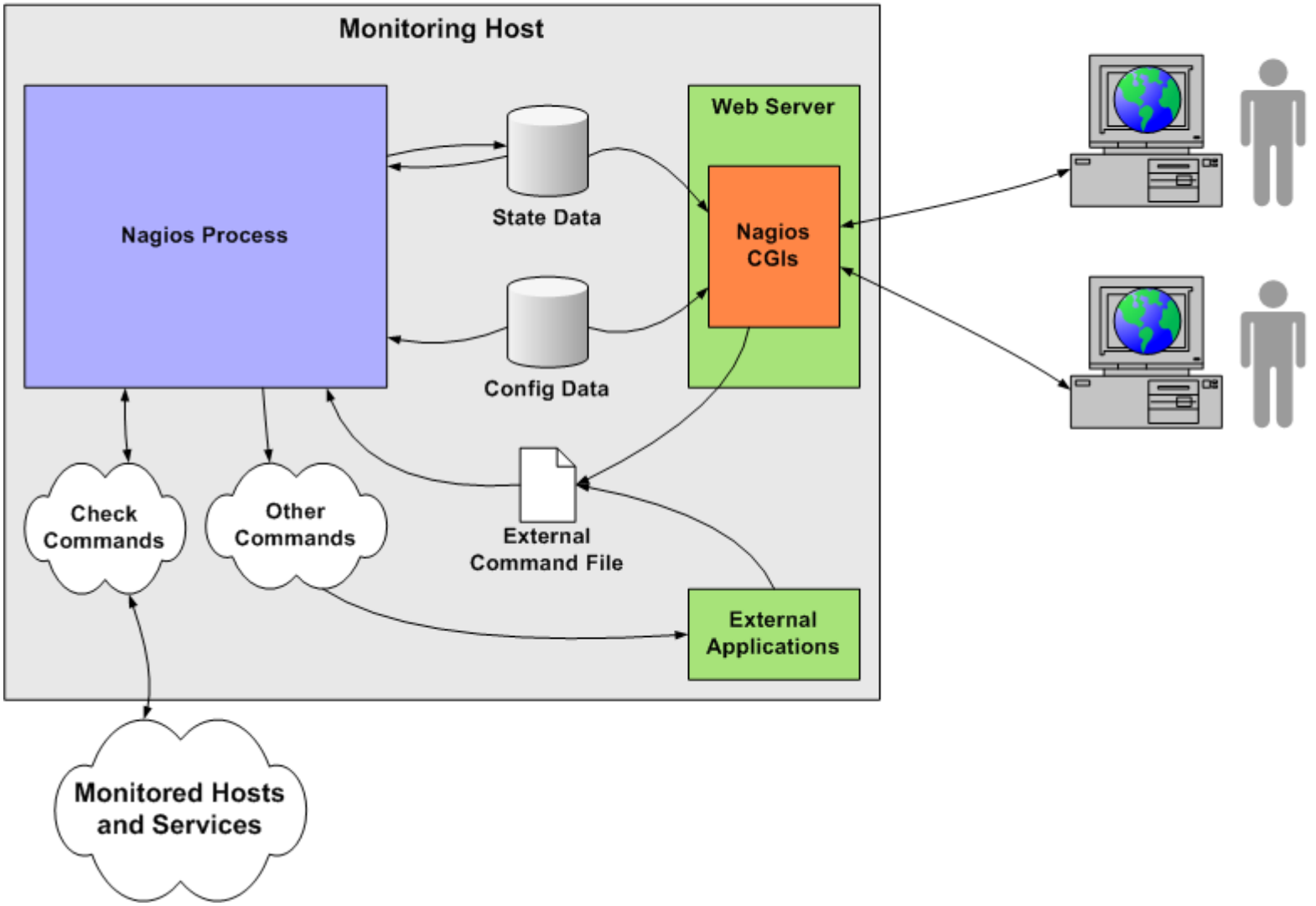
Why monitor?

- Know about an issue before it causes problems
- Know before someone complains
- Be proactive about problems (then automate)
- Performance metrics
- More time for projects instead of putting out fires
- Prove uptime (SLA's, raises, etc)

Architecture

- Modular design
- Nagios daemon contains monitoring logic and task coordination
- CGI's allow users to view status and submit commands
- External Plugins handle the actual monitoring
- External commands can be triggered to manage alerts or take action
- Easy to integrate with 3rd party apps

Nagios Overview

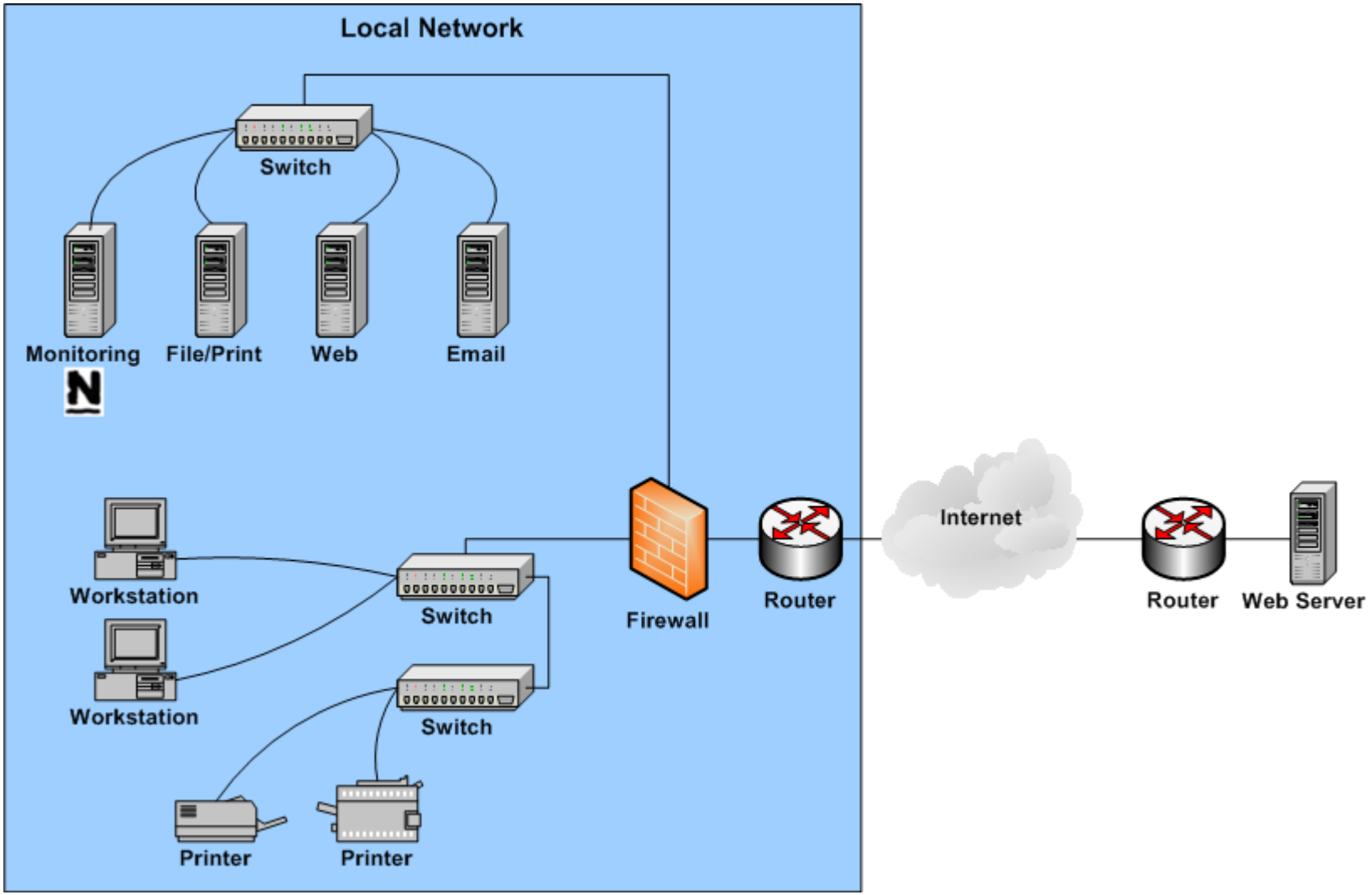


Nagios Overview

- Hosts
  - Usually a physical object (server, switch, 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 (disk usage, printer toner supply)
  - Intangible services (HTTP, SMTP, IMAP, DNS)

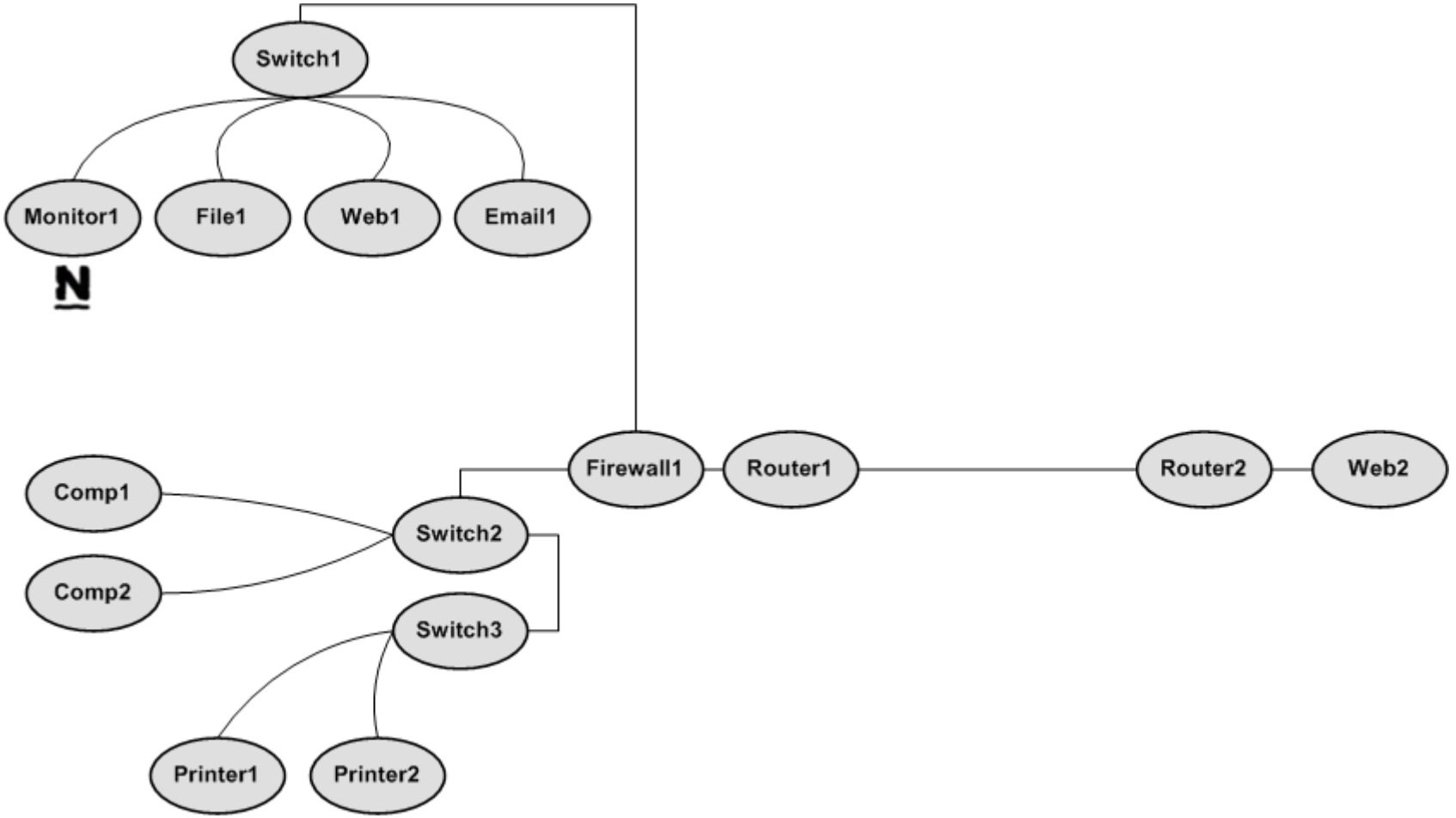
Nagios Overview

- Example: Small Network Layout



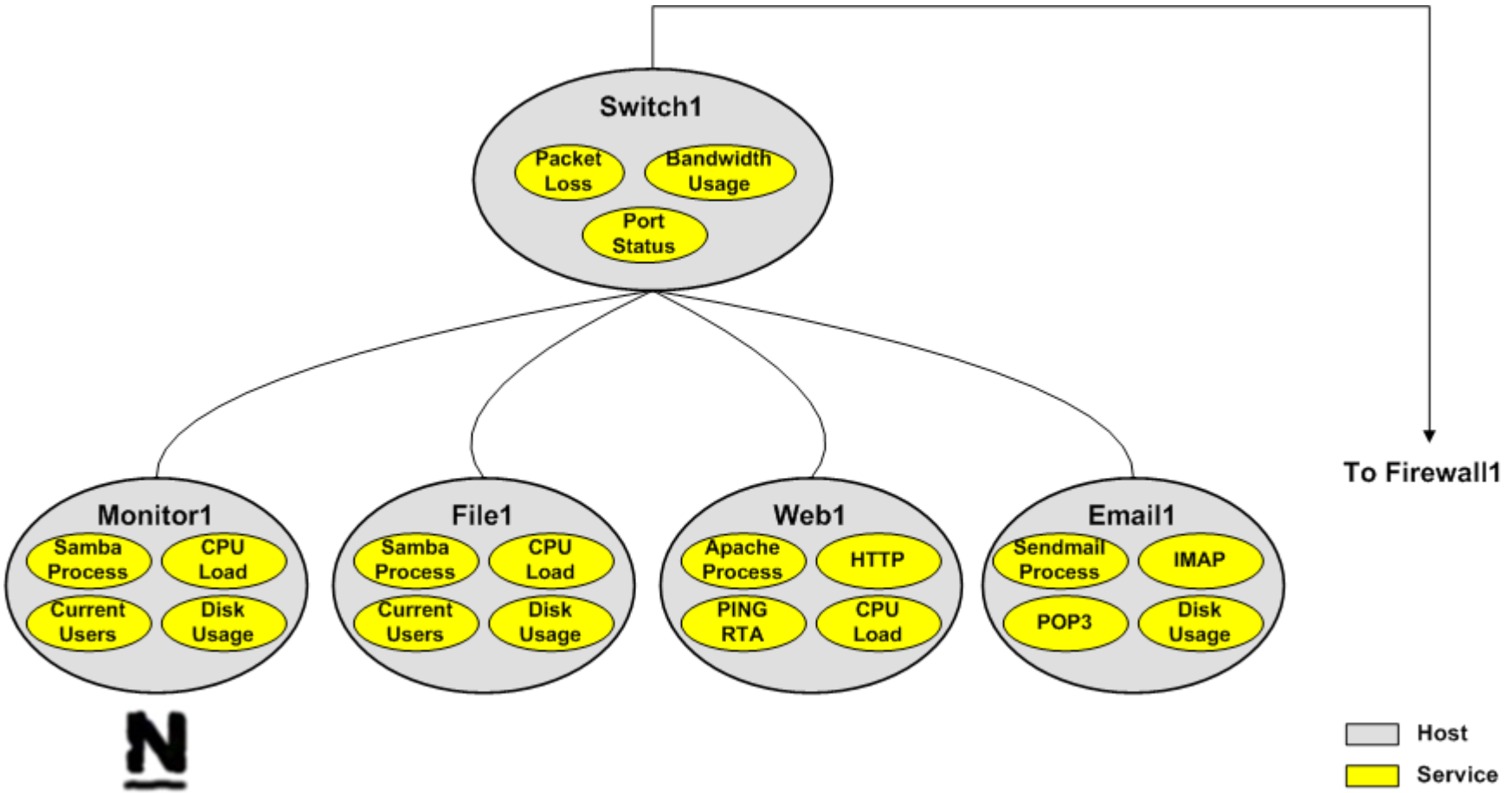
Nagios Overview

- Hosts as viewed by Nagios



Nagios Overview

- Services as viewed by Nagios



Host Checks

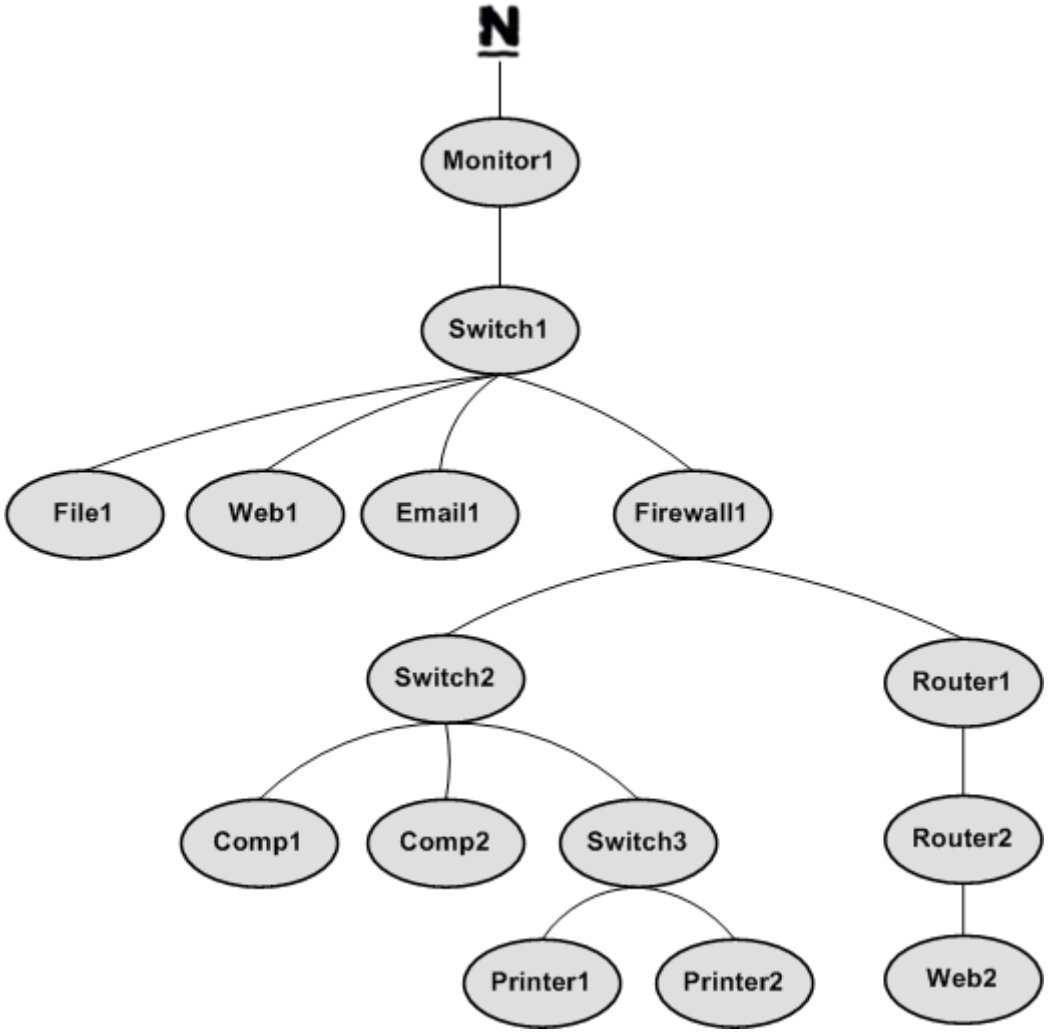
- Hosts
  - “Containers” of services
  - Three states: UP, DOWN, UNREACHABLE
- Host Checks
  - Checked with plugins like services (usually icmp)
  - Checks are performed on-demand after service state changes
    - Critical decision point: is the host or the service the real problem?
  - Can trigger a 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
  - Suppressing a flood of notifications

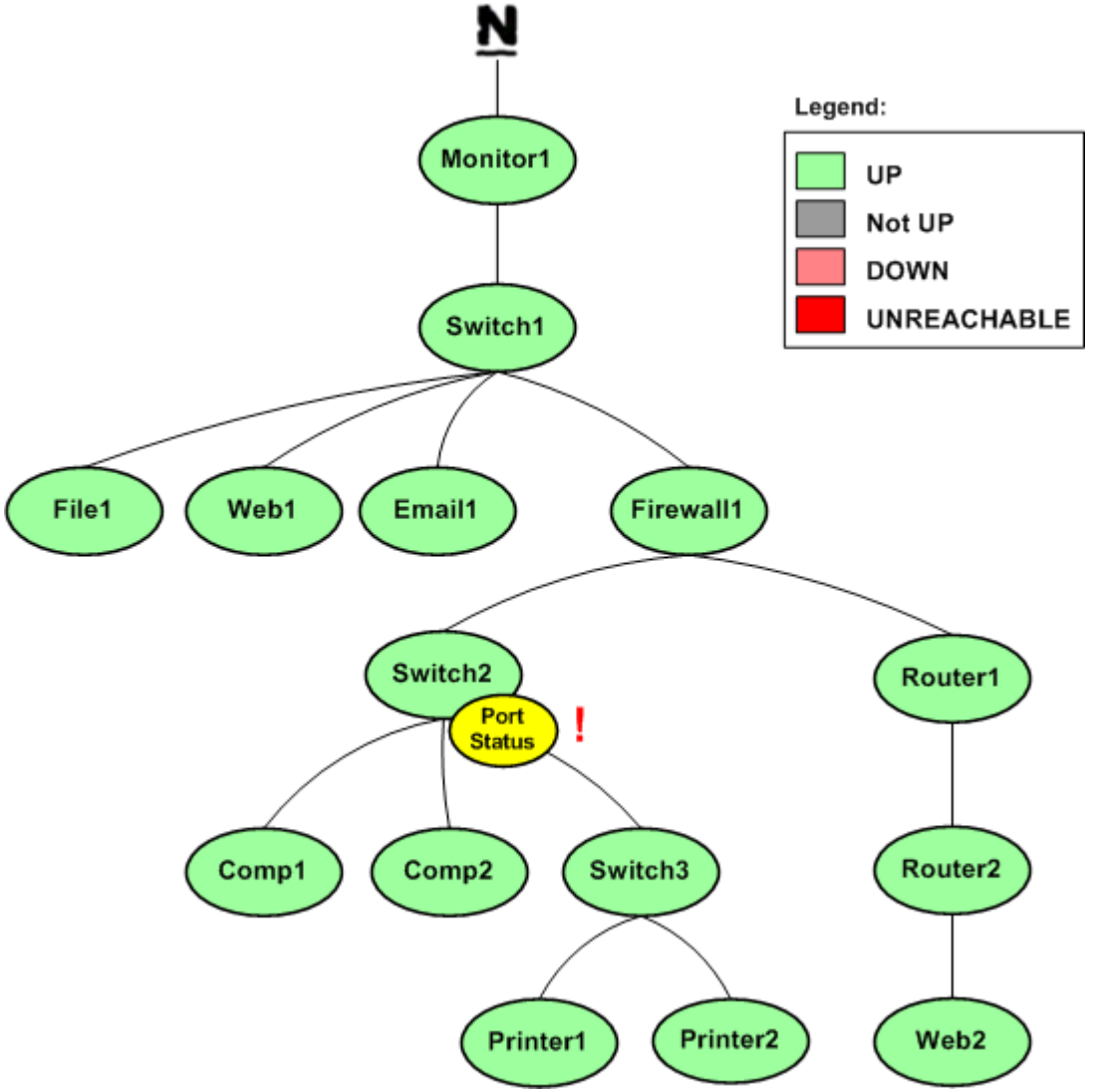
Host Route Verification

- Logical host relationships - The world according to Nagios



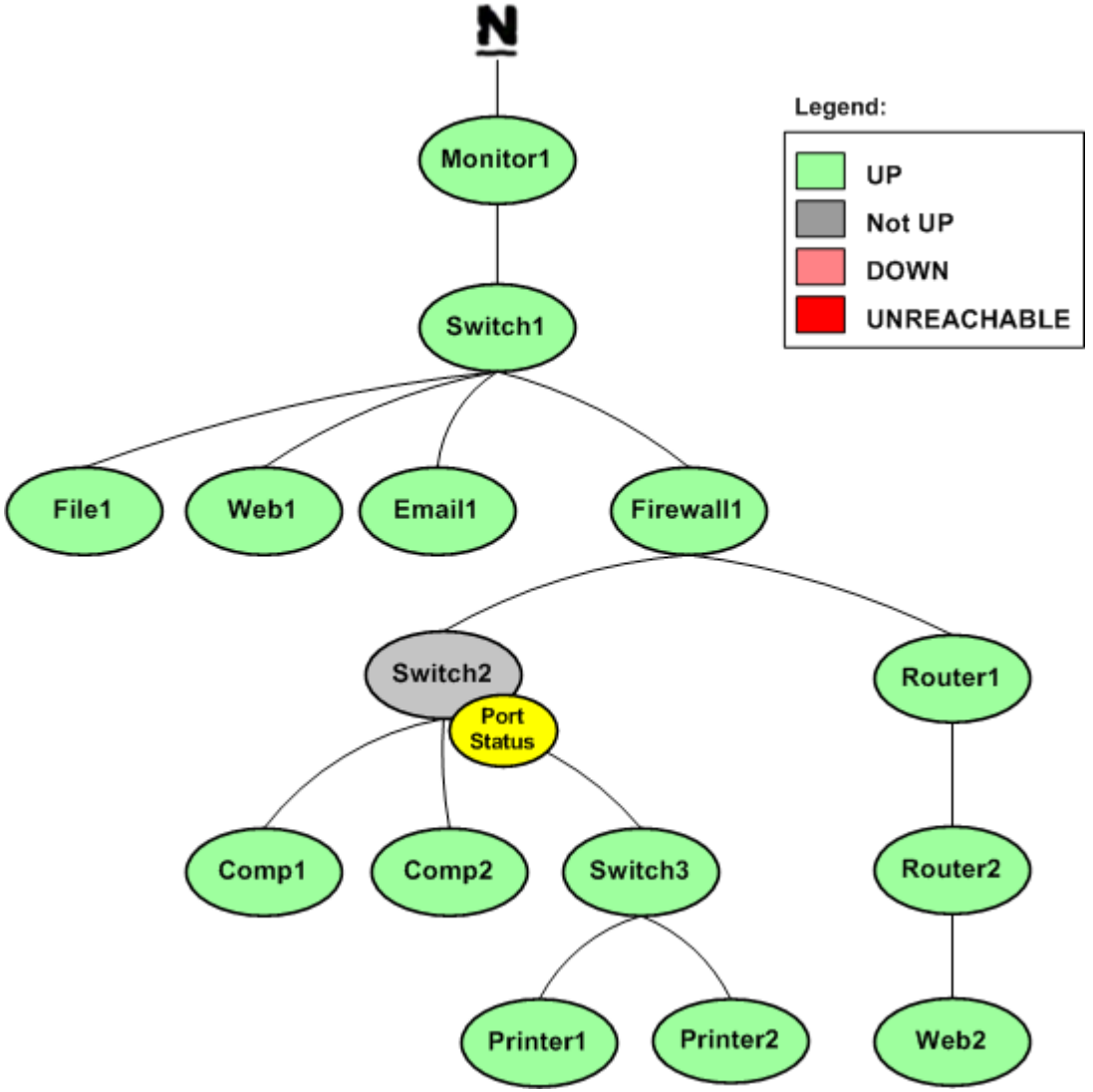
Host Route Verification

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



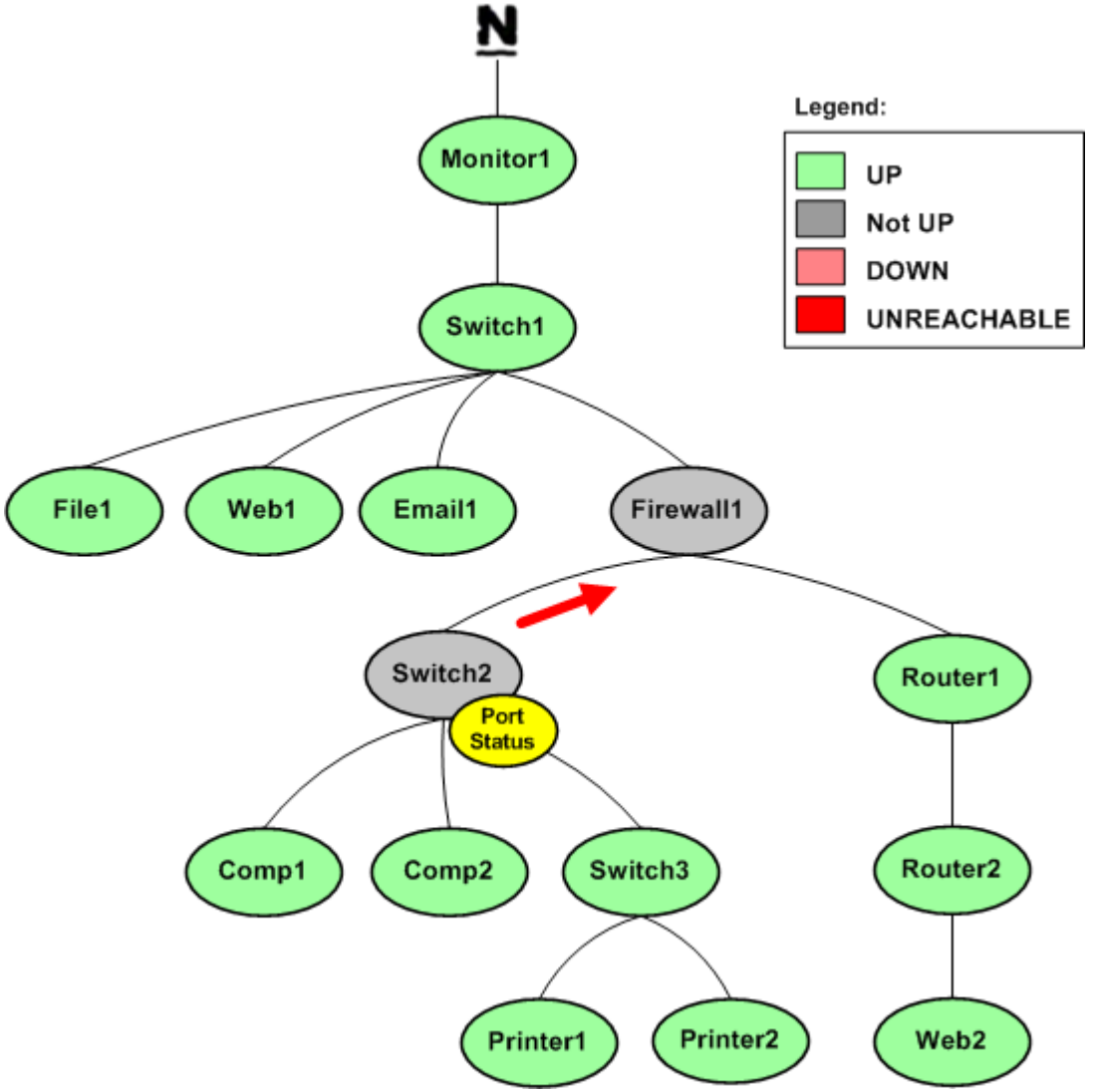
Host Route Verification

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



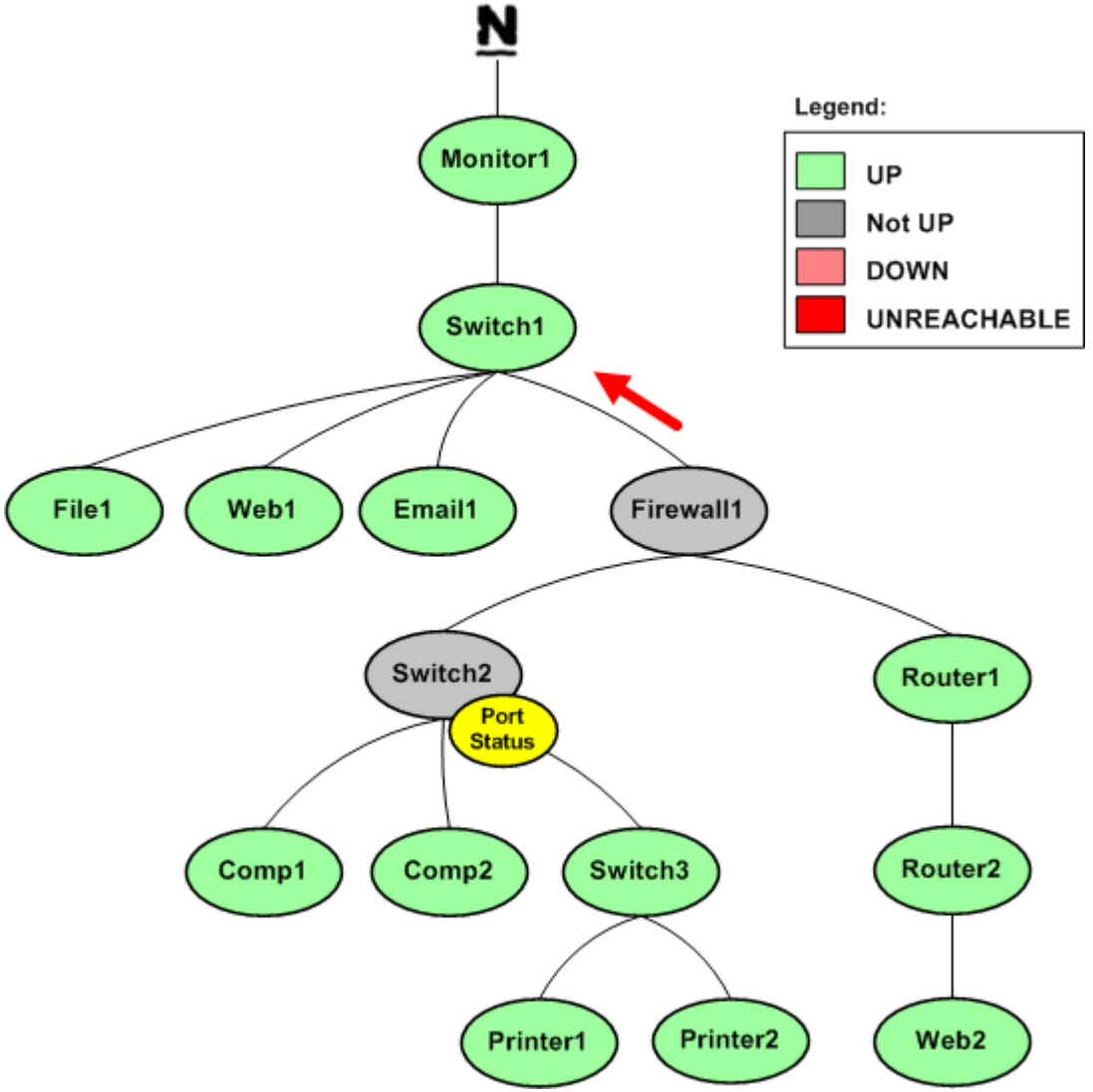
Host Route Verification

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



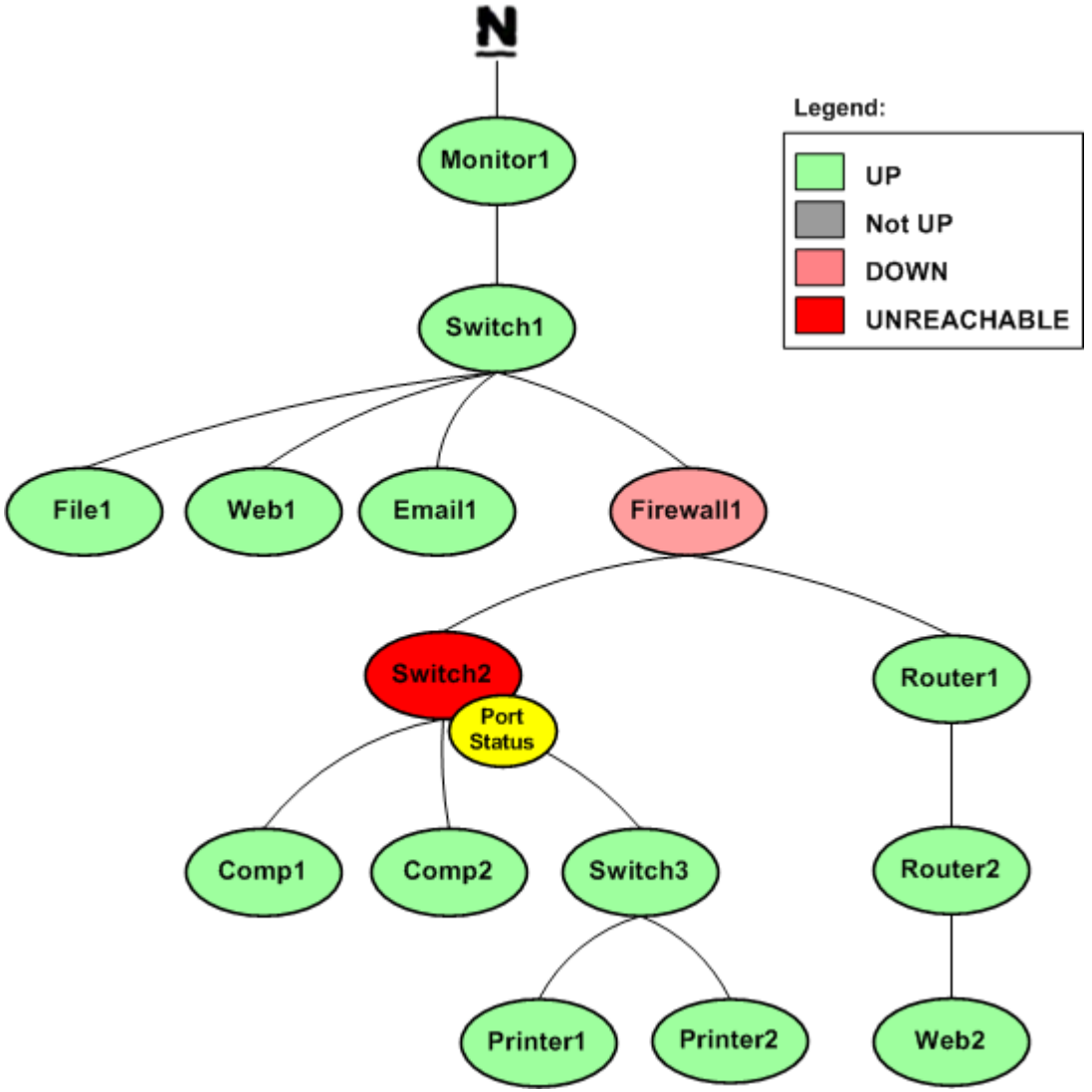
Host Route Verification

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



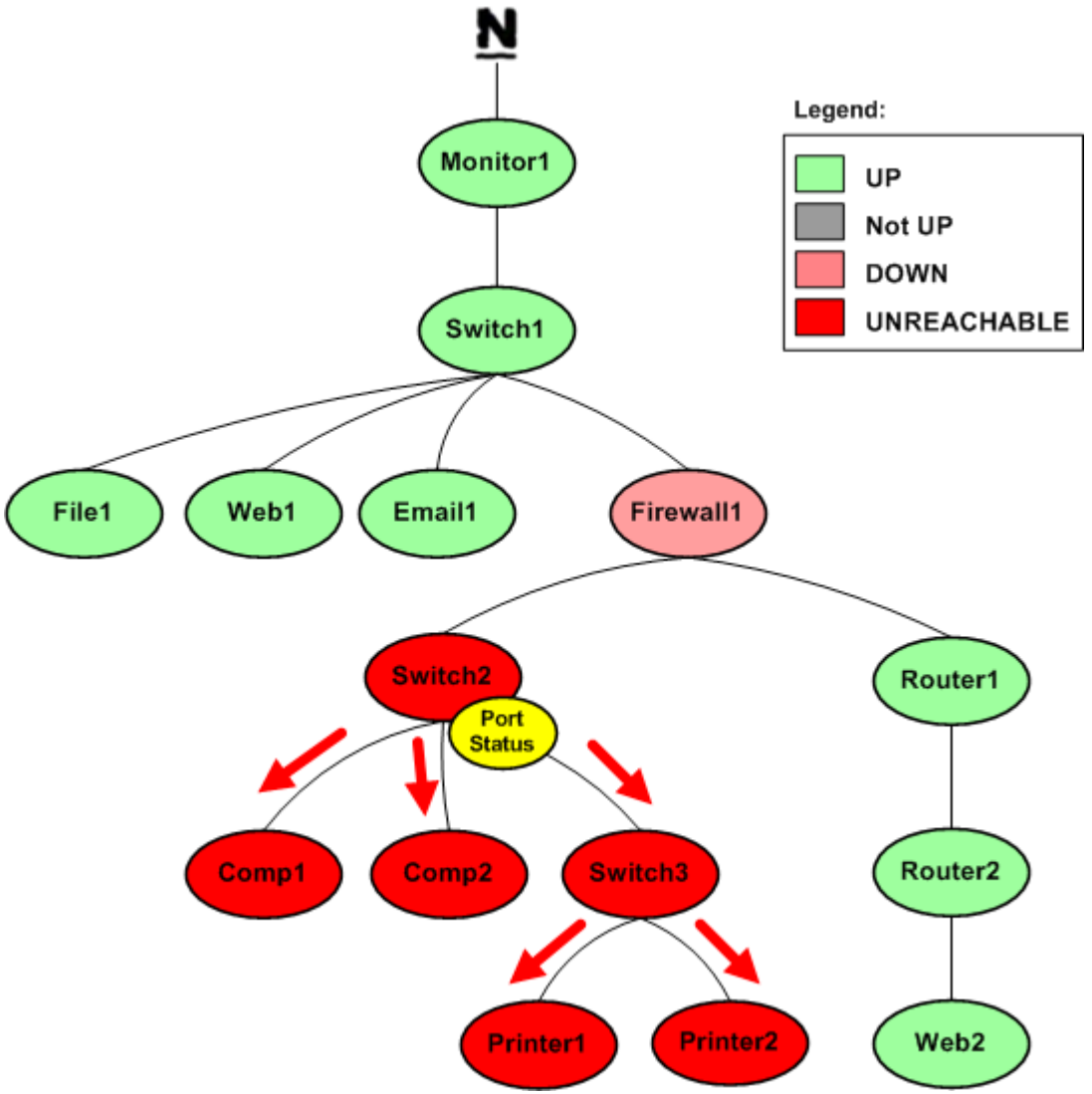
Host Route Verification

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



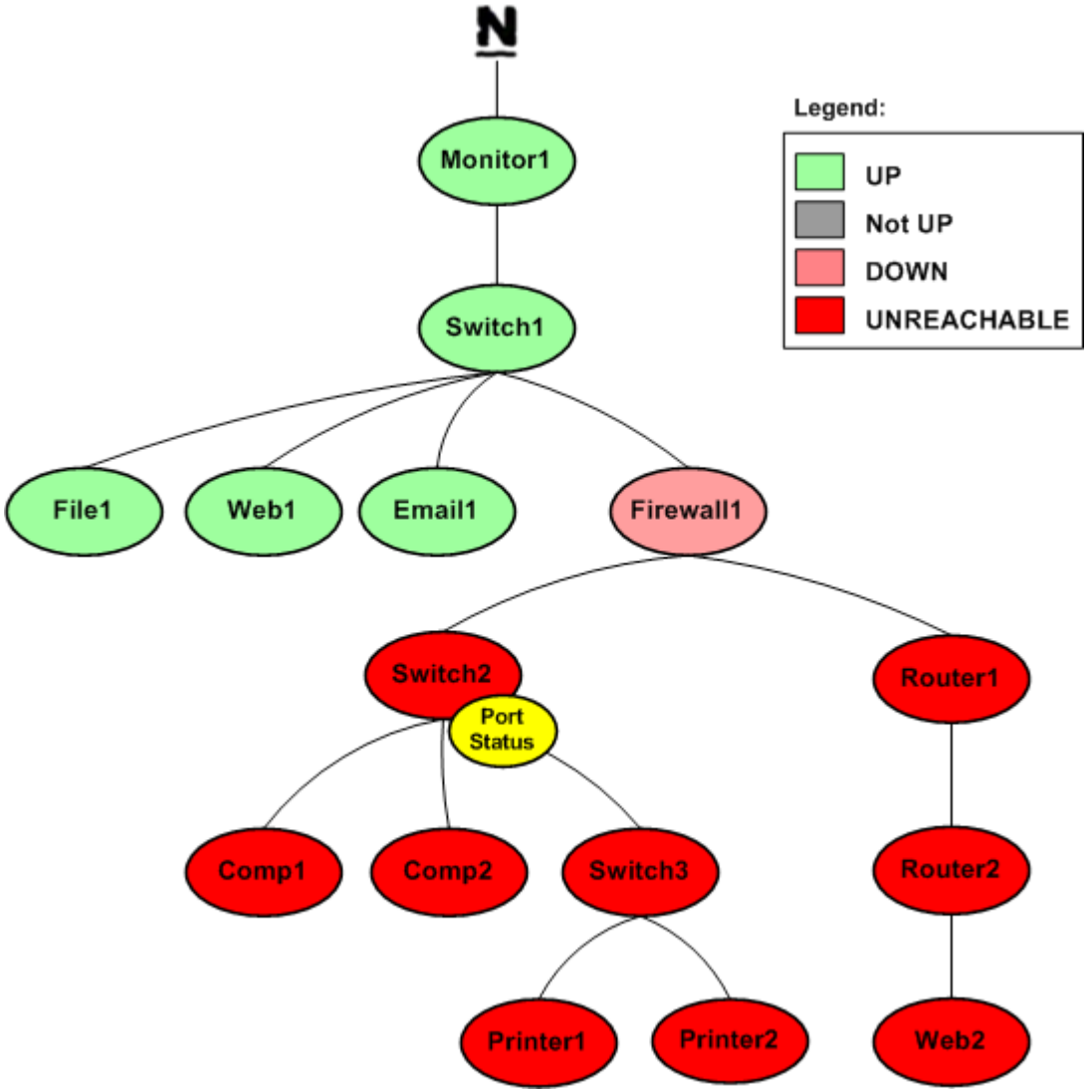
Host Route Verification

- 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

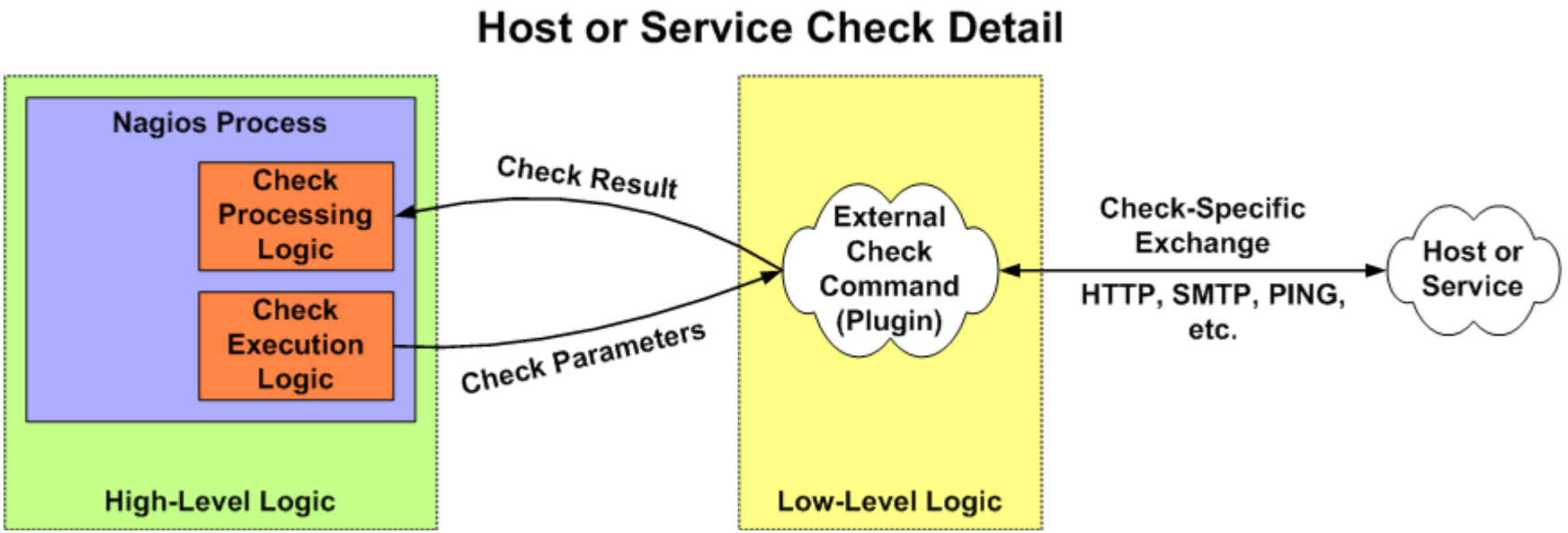


Service Checks

- Services
  - Services are why we monitor
- Service checks
  - Checks are performed at regularly scheduled intervals using plugins
  - Multiple checks may be run in parallel
  - Four possible states: OK, WARNING, CRITICAL, and UNKNOWN
  - You can monitor anything you can write a plugin for

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



Plugins

- Coded in C, PHP, Perl, Python, shell scripts, etc
- Return error codes and hopefully performance data
- Official plugins available on nagios.org
- NagiosExchange is the place to share plugins
- ANYTHING that can output text can be fed into nagios for alerts and graphed.

Plugins

- Uses exit codes to show state status
  - 0 = OK
  - 1 = Warning
  - 2 = Critical
  - 3 = Unknown

```
[root@nagios]# check_mem -w 80 -c 95
OK: 19% Used Memory | MemUsed=19%;80;95
[root@nagios]# echo $?
0
```

Service Checks

- Active
  - synchronous
  - scheduled and initiated by nagios
- Passive
  - asynchronous
  - SNMP traps
  - security events
  - Distributed monitoring

Plugins

- Local plugins
  - ran from host being checked
    - check_mem
    - check_disk
    - check_procs
- Remote plugins
  - ran from nagios server
    - check_icmp
    - check_http
    - check_tcp

Local checks on Remote Hosts

- NRPE
  - runs as a daemon on the nagios server
  - client ran via xinetd/inetd
  - encrypted
  - runs local checks

- NSClient / check_nt
  - NSClient runs as service on windows host
  - check_nt performs checks from nagios server
  - encrypted (needs mcrypt libs)

NSCA

- sends passive checks
- nsca daemon runs on nagios server
- send_nsca sends encrypted data to nsca on nagios server
- Used with asynchronous (or non nagios scheduled) events
  - SNMP Traps
  - Security events
  - Distributed Monitoring

Something is on fire, what now?

- Notifications
  - who to notify?
- Scheduled Downtime
  - are we in it? has it started?
- Event Handlers

Notifications

- When do they occur?
  - At first occurrence of a problem
  - Each *x* minutes during continued problem (can be annoying)
  - During changes between problem states
  - At time of recovery
  - At start and stop of flapping
- Who do they get sent to?
  - By default, to primary contacts for the host or service
  - Can be escalated to different contacts, depending on:
    - Current state of host or service
    - Current notification number
    - Timeperiod (day of week, time of day)

Notifications

- How are notifications sent?
  - Nagios executes a user-defined command
  - Any shell script or executable can be used
  - Alert information provided via macros and environment vars
- Some potential notification methods:
  - Email
  - Pager
  - SMS
  - Instant Messages (IM, Jabber, ICQ)
  - Audible
  - Visual alerts (billboards, indicator lights)

Event Handlers

- If you have a problem, let nagios solve it
- Simply add the event handler to services.cfg
- You can pass it environment variables such as $SERVICESTATE$ $SERVICEATTEMPT$ which can be used by your script in a case statement.
- Can be run on the remote machine via nrpe or have the nagios server ssh out with predefined keys

Configuration Files

- Runtime Configuration
  - cgi config (cgi.cfg)
  - daemon config (nagios.cfg)
- Basic Objects
  - check commands / plugin syntax (checkcommands.cfg)
  - contacts (contacts.cfg)
  - hosts (hosts.cfg)
  - services (services.cfg)
- Advanced Objects
  - host groups (hostgroups.cfg)
  - contact groups (contactgroups.cfg)
  - escalations (escalations.cfg)
  - time periods (timeperiods.cfg)
  - PerfParse (perfparse.cfg)

nagios.cfg

```
cfg_file = $NAGPATH$/etc/perfparse.cgi

process_performance_data=1

xpdfile_service_perfdata_file=$NAGPATH$/var/rw/perfdata-
    service.log
```

- this is a named pipe owned by nagios:nagioscmd

```
host_perfdata_command=process-host-perfdata

service_perfdata_command=process-service-perfdata
```

contacts.cfg

- Whom, When, Why, and How to alert people

```
define contact {
    contact_name                    garrett
    alias                           Garrett Honeycutt
    service_notification_period     24x7
    host_notification_period        24x7
    service_notification_options    w,u,c,r
    host_notification_options       d,u,r
    service_notification_commands   email,pager
    host_notification_commands      host-email,host-pager
    email                           fire@garretthoneycutt.com
    pager                           317-xxx-xxxx@pager.com }
```

hosts.cfg

- entities out there that provide the services we care about

```
define host {
    host_name                   web1.foo.bar
    alias                       web1
    parents                     switch1
    address                     10.10.10.2
    notification_enabled        1
    check_command               check-host-alive
    max_check_attempts          10
    notification_interval       60
    notification_period         24x7
    notification_options        d,u,r }
```

checkcommands.cfg

- Links the plugins to usuable config objects
- uses environment variables

```
# check_sslcert
define command{
    command_name    check_sslcert
    command_line    $USER1$/check_http -H $HOSTADDRESS$ -S
      -C $ARG1$
}
```

services.cfg

- Resources provided by out hosts

```
define service{
    name                            SSL_Cert
    notification_options            w,u,c,r
    notification_interval           60
    check_period                    24x7
    max_check_attemps               3
    normal_check_interval           3
    retry_check_interval            1
    host_name                       web1
    contacts                        garrett
    check_command                   check_sslcert!28        }
```

PerfParse

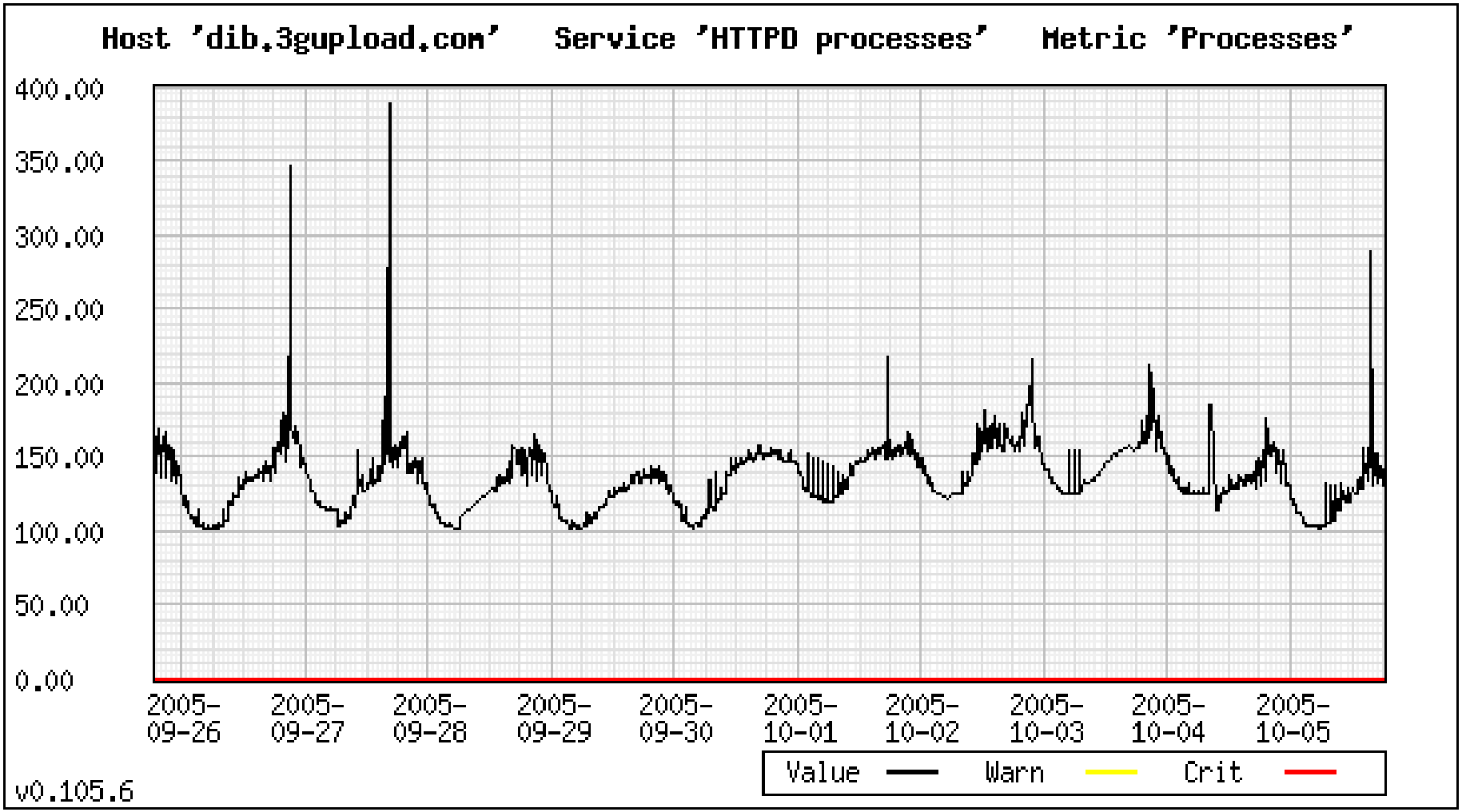
- Written in C
- Stores info from named pipe into MySQL
- Great for trending and making predictions
- Only one graph at a time
- Only one metric per graph
- Extremely easy to compile and setup

Performance Data

- Plugins should have it. If not it is easy to add.
- One line of text output, can return multiple metrics
- Use the same return codes
- 'label'=value[UOM];[warn];[crit];[min];[max]

```
[root@nagios]# check_mem -w 80 -c 95
OK: 33% Used Memory | MemUsed=33%;80;95
```

PerfParse Sample



Other Resources

- http://nagios.org
- http://nagiosexchange.org
- http://perfparse.sourceforge.net
- Nagiosplug-help mailing list
- gh@garretthoneycutt.com

Questions?

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