

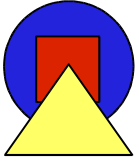
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# Host and Service Monitoring Efforts at SLAC

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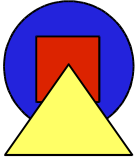
[alfw@slac.stanford.edu](mailto:alfw@slac.stanford.edu)



# History

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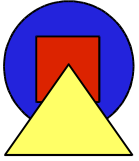
- “Monitoring” at SLAC:
  - Does not really exist
  - “ranger”
    - formerly known as “patrol”
    - modified at DESY: “scout”
    - local checks and fixes on Unix machines
    - emails to users or administrators about problems
  - BaBar started some monitoring using Ganglia (pretty graphs but no alarming)
- Monitoring at Fermi Lab: NGOP
- Monitoring at CERN: LHC Era Monitoring (Lemon)



# Monitoring

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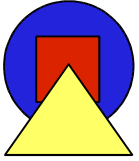
- Why:
  - Health status at current time
  - Alarming in case of problems (ideally: fix the problem)
  - Long term trend analysis
- What:
  - Systems being alive and healthy
  - Services are running and functional
  - Service level agreements are met
- How:
  - Run a probe against or on a device
  - Gather data in central place
  - Display data and allow "data mining"



# What to Monitor

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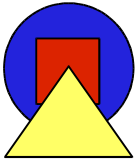
- Networked devices:  
network gear, printers, computers, appliances, UPS,  
thermal elements
- Services provided by those devices:  
OS, disk/memory space, CPU  
NFS, AFS, printing, DHCP, electrical power,  
temperature reading
- Service levels provided by those services:  
50% free /tmp space, 90% batch computing,  
95% AFS capacity, temperature  $\leq 25^{\circ}\text{C}$



# Nagios

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- Open-source framework for Monitoring  
<http://www.nagios.org/>
- Nagios consists of
  - Scheduler for data collection
  - Alarming engine
  - Basic web interface for status display
- Not part of Nagios core:
  - plug-ins for measurements ("probes")
  - plug-ins for data storage and graphing
- Extensive collection of both as contributed source



# Data Measurements...

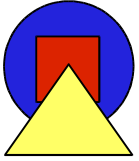
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- Nagios master pulls (requests) data
- Most probes work locally on a machine
- Several mechanisms to remotely execute a probe:  
Nagios Remote Plugin Executor (NRPE) at SLAC
- Each probe decides whether measurement is  
OK, WARNING, CRITICAL, UNKNOWN
- Each probe can (but does not have to) return  
"performance data":

```
% ./check_users -w 5 -c 10
```

```
USERS OK - 3 users currently logged in |
```

```
users=3;5;10;0
```

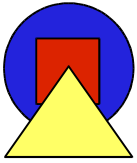


## ...Data Measurements

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- NRPE executes probe on a remote machine on behalf of Nagios master:  

```
% ./check_nrpe -H noric10 -c check_users  
USERS OK - 37 users currently logged in  
|users=37;110;150;0
```
- External programs can write measurements into file which Nagios checks regularly ("push")
- Probes for Unix, Windows, Mac OS X, SNMP, HP's JetDirect etc. already exist
- Simple to write your own: e.g. AFS::Monitor Perl module



# Data Storage

- Handler for Performance Data from Services
  - nagiosgraph
    - rrd files
    - older data gets coarser
  - PerfParse
    - MySQL database
    - full resolution for entire data collection
    - basic "data mining" web interface

**PerfParse** Add On for Nagios PerfParse Metric Analysis v0.105.6

[Return to main menu](#)  
[Select new Metric](#)

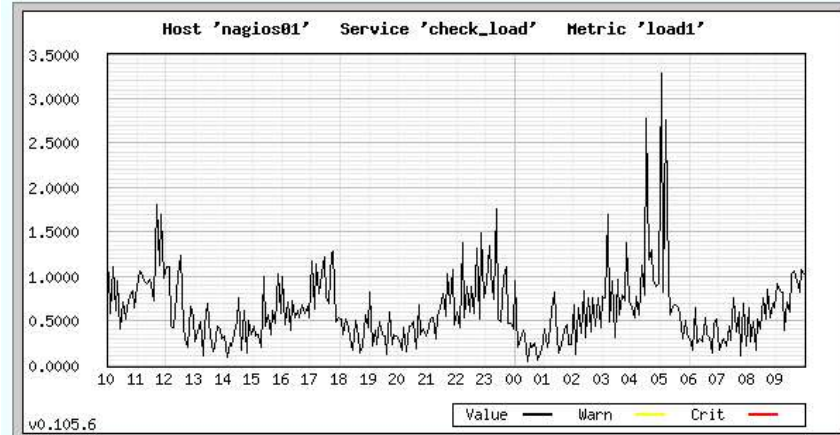
Host: nagios01 Service: check\_load Metric: load1

Scale: Automatic User Min: 0.000000 Max: 0.000000

Period:  Relative  Absolute  
Abs From: 2005-04-04 09:58:29 Abs To: 2005-04-05 09:58:29

Output: Histogram Size: Normal

Plot:  Value  Smooth\*  Warning  Critical  Stan. Dev\* (\* Where Used)



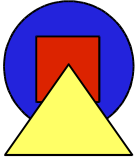
Draw Graph

**Advanced Options.**

Graph Legend: Host 'nagios01' Service 'check\_load' Metric 'load1'

Smooth Plot: Gaussian  
Average: Width (pixels): 14.0 (Large = Slow, see FAQ)

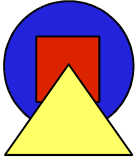
Save graph for future reference:  Save with Title: Host 'nagios01' Service 'check\_load' Metric 'lo:



# Data Presentation

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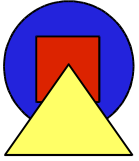
- Web interface for
  - State information
  - Rrd graphs (nagiosgraph)
  - MySQL DB (PerfParse)
- Web services interface for state information (NagiosWS)



# Problems

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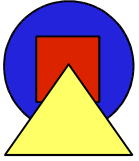
- SLAC or Nagios have some problems
  - Web interface in version 1.x does not scale very well
    - Much better in version 2.x (still beta)
    - Still browser rendering performance problems
  - Lot of probes are not usable in large scale production
  - Works on Windows but need to write our own probes
  - Like to have action that simply reboots a machine
  - DB support for configuration was ripped out in version 2.x



## Current State at SLAC

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- Ranger on all Unix machines
- Ganglia for BaBar
- Nagios for SCS
- Ganglia front-end for Nagios data
- Soon, Grid interfaces for Ganglia and Nagios
- Where to go from here???



# References

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- Nagios:  
<http://www.nagios.org/>
- NRPE and other plug-ins (click on "Categories" tab)  
<http://www.nagiosexchange.org/>
- NagiosGraph  
<http://nagiosgraph.sourceforge.net/>
- PerfParse  
<http://perfparse.sourceforge.net/>
- NagiosWS  
<http://www.i-xs.de/nagiosws/>