



Monitoring CC-IN2P3 Services with Nagios

HEPiX, LBNL, 2009

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OUTLINE



- Nagios at CC-IN2P3
- Architecture
- Configuration
- Tips and tuning
- Notification system
- Conclusions

OPERATION REQUIREMENTS

- Probes to monitor specific systems
 - Monitoring platform should be redundant
 - Configuration should be updated easily while on production
- NAGIOS is flexible enough to be the ideal tool but needs a fair amount of configuration

MONITORED SYSTEMS

- Storage systems (dCache, xrootd, IRODS...)
 - File systems (AFS)
 - Mass Storage System (HPSS)
 - Robotics (ACSLs)
 - Batch system
 - Database (Oracle)
 - grid nodes (BDII, CE...)
- ...to be updated

About NAGIOS (1/2)



Nagios®

Copyright (c) 1999-2008 Ethan Galstad

- Features:
 - Scheduler
 - Nagios daemon (START/STOP/RELOAD...)
 - Web interface
 - Notification system

- Hosts & Services
'Host' associated with 1 or more 'Service'

- Groups
hostgroup, contactgroup...etc



About NAGIOS (2/2)



Nagios®

General

- Home
- Documentation

Monitoring

- Tactical Overview
- Service Detail
- Host Detail
- Hostgroup Overview
- Hostgroup Summary
- Hostgroup Grid
- Servicegroup Overview
- Servicegroup Summary
- Servicegroup Grid
- Status Map
- 3-D Status Map
- Service Problems
 - Unhandled
- Host Problems
 - Unhandled
- Network Outages

Show Host:

- Comments
- Downtime
- Process Info
- Performance Info
- Scheduling Queue

Reporting

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

Configuration

- View Config

Current Network Status
 Last Updated: Tue Dec 2 16:57:46 CET 2008
 Updated every 90 seconds
 Nagios® 3.0.3 - www.nagios.org
 Logged in as nagiosadmin

[View Service Status Detail For All Host Groups](#)
[View Host Status Detail 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
39	0	0	8

All Problems	All Types
0	47

Service Status Totals

Ok	Warning	Unknown	Critical	Pending
62	1	1	4	0

All Problems	All Types
6	68

Service Overview For All Host Groups

ACSL Group (ACSL)

Host	Status	Services	Actions
acsls-virtual-host	PENDING	2 OK	
ccacsls3	UP	No matching services	
ccacsls4	UP	No matching services	

AFS Servers Group (AFS-SERVERS)

Host	Status	Services	Actions
ccafs08	UP	1 OK	
ccafs09	UP	1 OK	
ccafs10	UP	1 OK	

CE Production (CE_Prod)

Host	Status	Services	Actions
cclcqceli01	UP	2 OK	
cclcqceli02	UP	2 OK	
cclcqceli03	UP	2 OK	

DIVA Group (DIVA)

Host	Status	Services	Actions
diva-virtual-host	PENDING	4 OK	

SITE BDII (SITE BDII)

Host	Status	Services	Actions
cclcgbdiii01	UP	1 OK 1 CRITICAL	
cclcgbdiii04	UP	1 OK 1 CRITICAL	

SE SRM Production (SRM)

Host	Status	Services	Actions
ccsrm	UP	1 OK	
ccsrm02	UP	1 CRITICAL	

TOP BDII (TOP BDII)

Host	Status	Services	Actions
cclcgbdiii02	UP	1 OK	
cclcgbdiii05	UP	1 OK	
cclcgbdiii06	UP	1 OK	
cclcgtopbdii02	UP	1 OK	

BQS group (bqs)

Host	Status	Services	Actions
bqs-virtual-host	PENDING	2 OK 1 WARNING	

Databases Group (databases)

Host	Status	Services	Actions
mysql-virtual-host	PENDING	No matching services	
oracle-virtual-host	PENDING	1 OK	
postgresql-virtual-host	PENDING	No matching services	

Dcache Group (dcache-group)

Host	Status	Services	Actions
dcache-virtual-host	PENDING	1 UNKNOWN 1 CRITICAL	

Mago Servers (mago)

Host	Status	Services	Actions
ccexpl	UP	No matching services	

Saphir group (saphir)

Host	Status	Services	Actions
saphir-virtual-host	PENDING	1 OK	

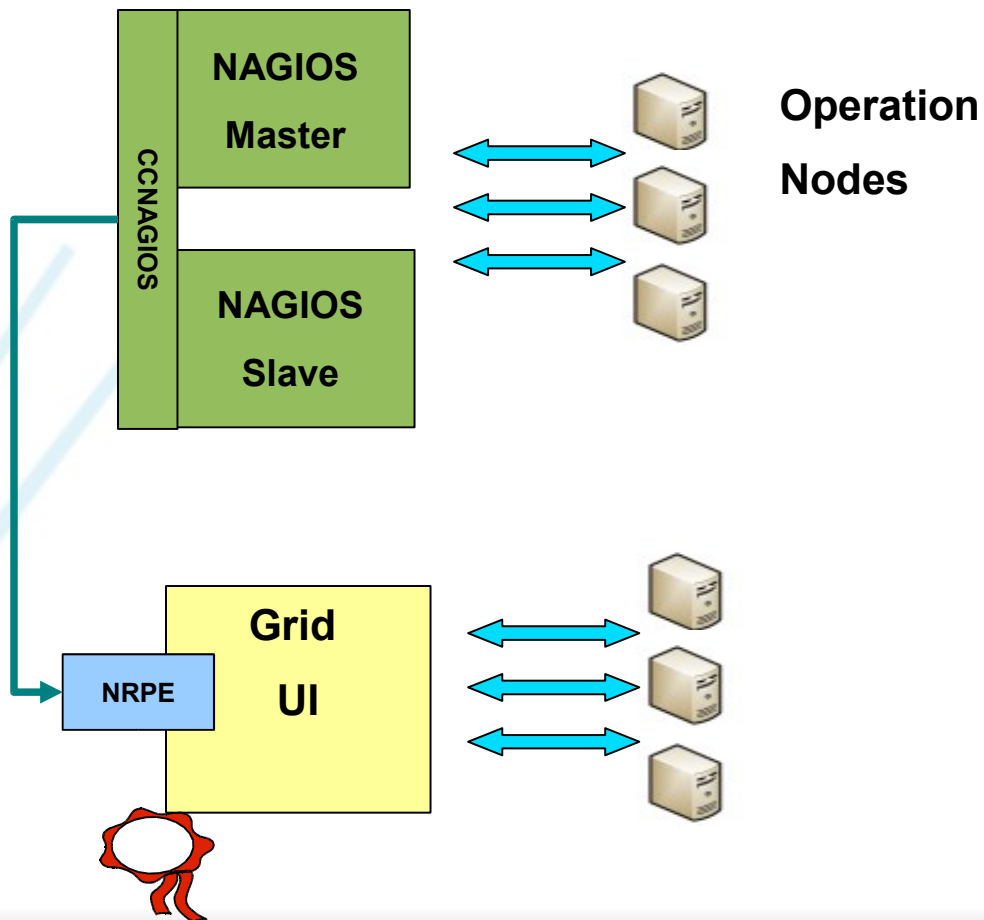
Architecture (1/3)



NAGIOS PLATFORMS

- MASTER / SLAVE
- GRID NODE
- TEST node

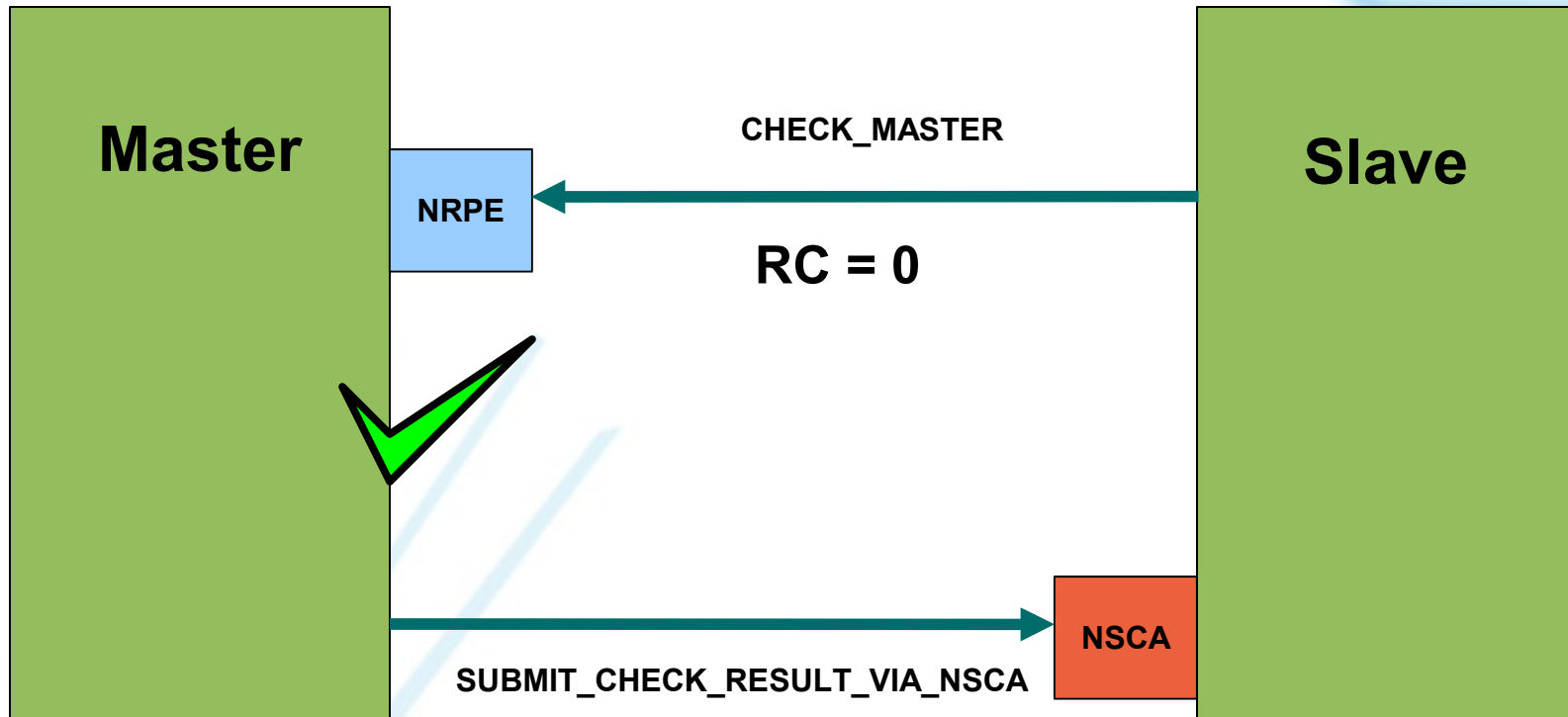
DELL PowerEdge 1950
Scientific Linux 4
Nagios 3.0.6



Architecture (2/3)



FAILOVER MECHANISM



NRPE: Nagios Remote Plugins Executor

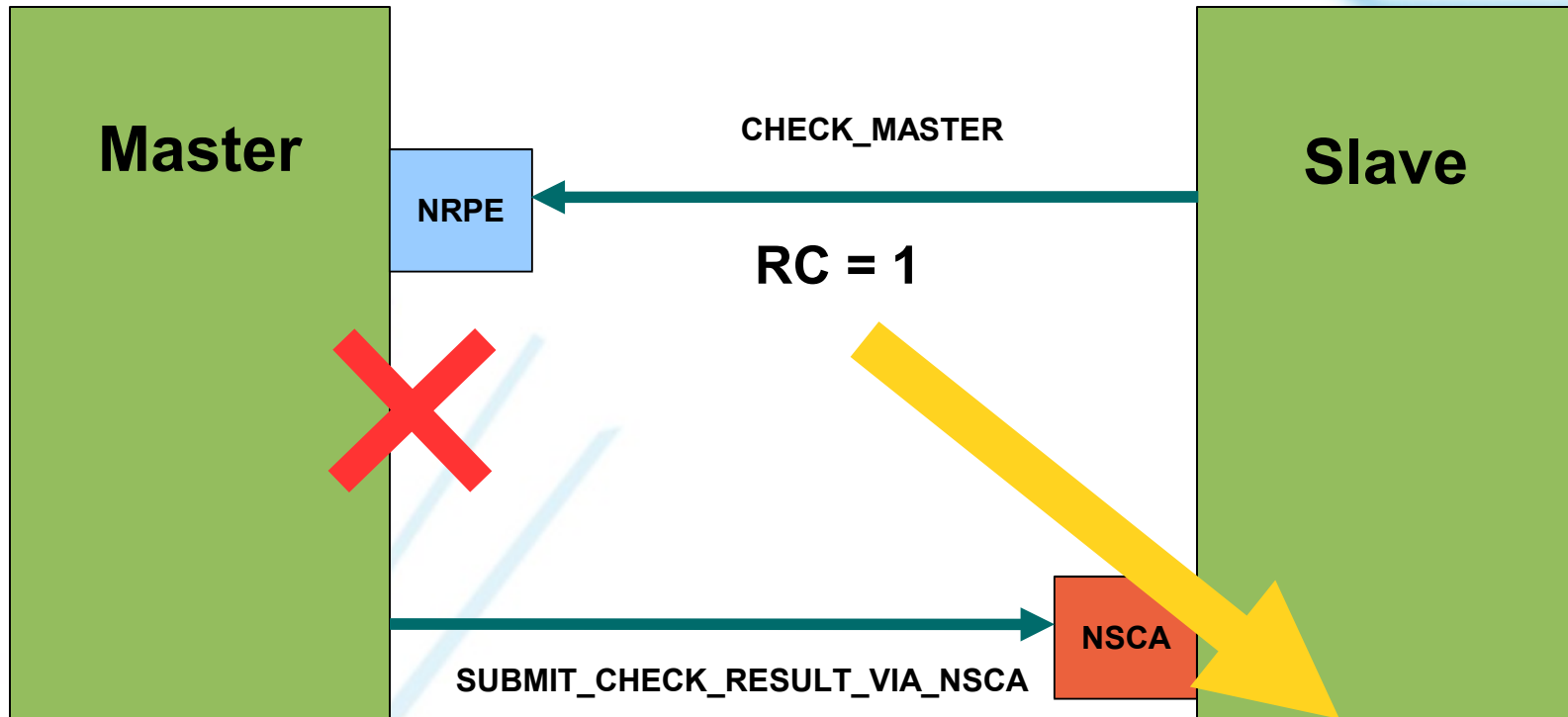
NSCA: Nagios Service Check Acceptor

NOTIFICATIONS : DISABLED
ACTIVE CHECKS : DISABLED

Architecture (2/3)



FAILOVER MECHANISM



NRPE: Nagios Remote Plugins Executor

NSCA: Nagios Service Check Acceptor

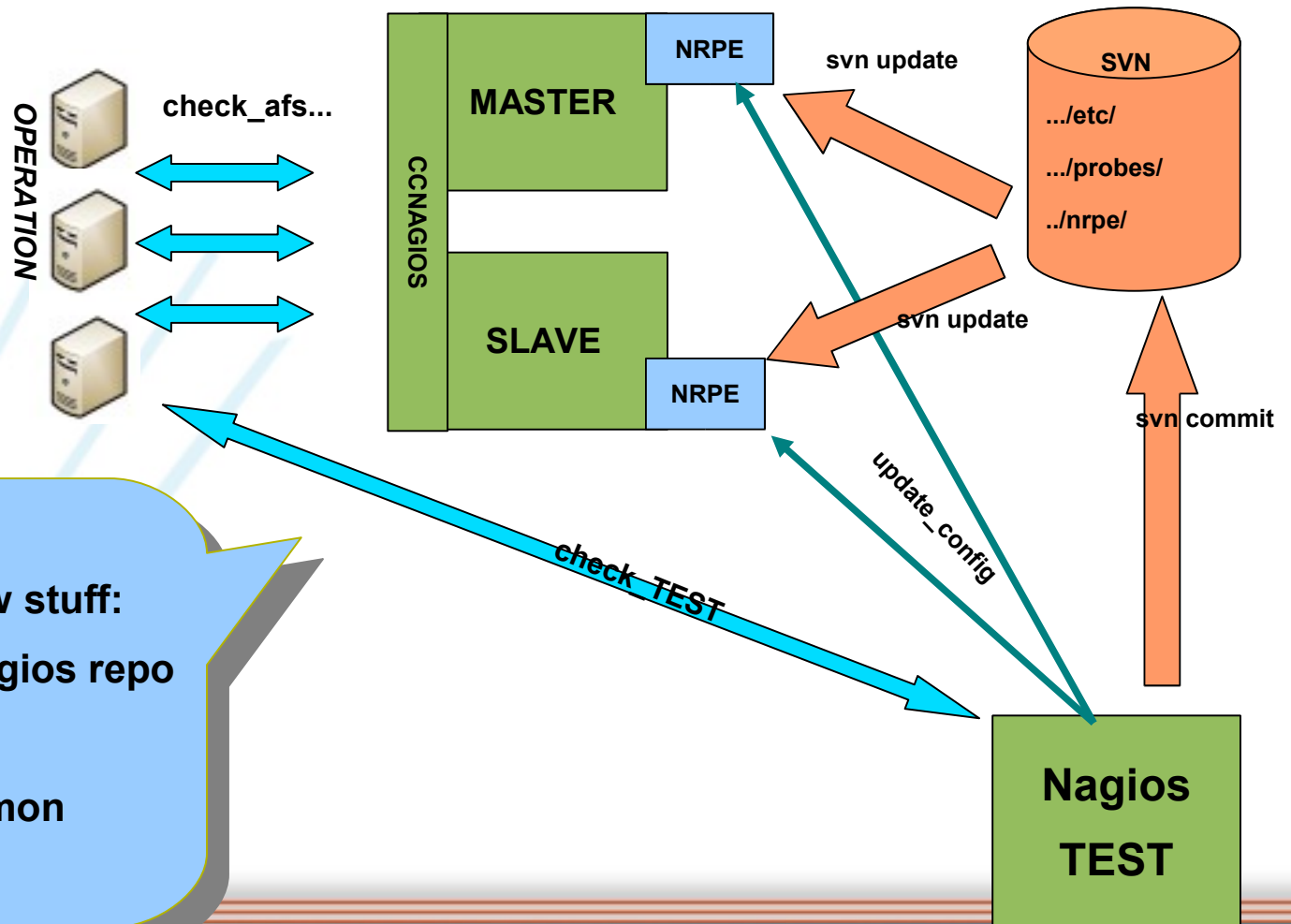
NOTIFICATIONS : ENABLED

ACTIVE CHECKS : ENABLED

Architecture (3/3)



VERSIONING & MULTI-USER DEVELOPPEMENT



To deploy the new stuff:

- COMMIT to Nagios repo
- CHECKOUT
- RELOAD daemon



Configuration (1/3)



SPLIT SYSTEMS INTO SEPARATE DIRECTORIES

```
~/etc/storage-system01/hosts.cfg  
    .../services.cfg  
    .../contacts.cfg
```

```
~/etc/storage-system02/hosts.cfg  
    .../services.cfg  
    .../contacts.cfg
```

```
~/etc/batch-system/hosts.cfg  
    .../services.cfg  
    .../contacts.cfg
```

one directory = one monitored system



Configuration (2/3)



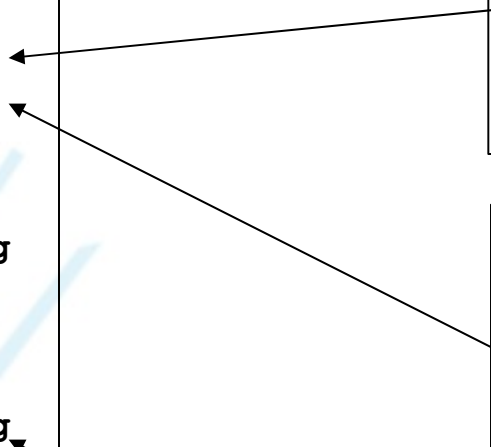
USE TEMPLATE DIR

```
/etc/templates/hosts.cfg  
  
/etc/templates/services.cfg  
  
/etc/templates/contacts.cfg
```

```
define host{  
    use grid-node  
    ...  
}
```

```
define host{  
    use worker-node  
    ...  
}
```

```
define contact{  
    ...  
}
```





Configuration (3/3)



DEPENDENCIES

- Ex: SRB storing metadata in Oracle

Define this dependency in NAGIOS :

```
define servicedependency{
    host_name                srb
    service_description      ...
    dependent_host_name      oracle
    dependent_service_description ...
    ....
}
```

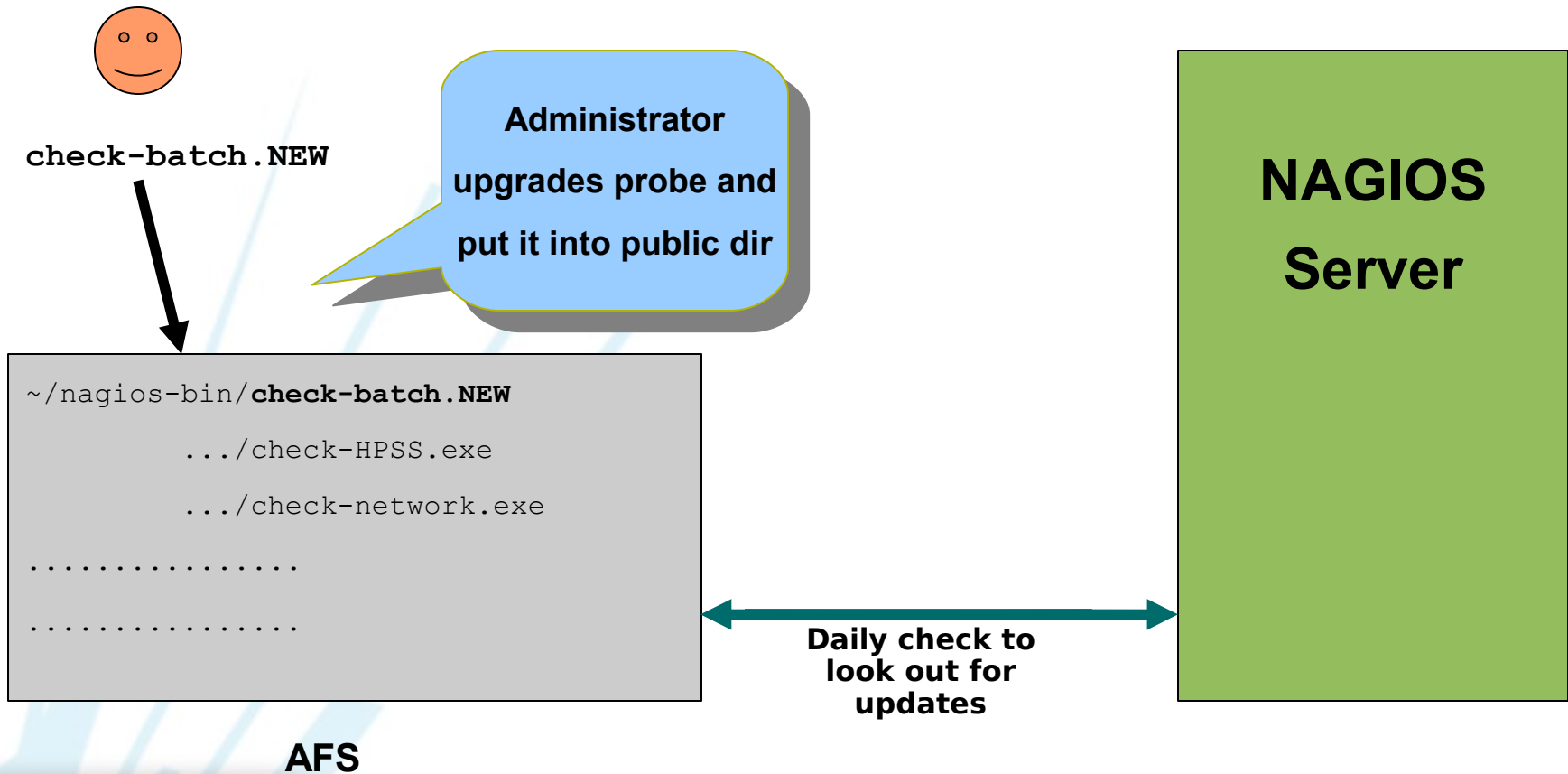
- Be aware of *bad* dependencies !

Ex: Nagios running clients from AFS to check some service

Tips and tuning (1/5)



KEEP UPDATED WITH
THE LAST PROBE VERSIONS

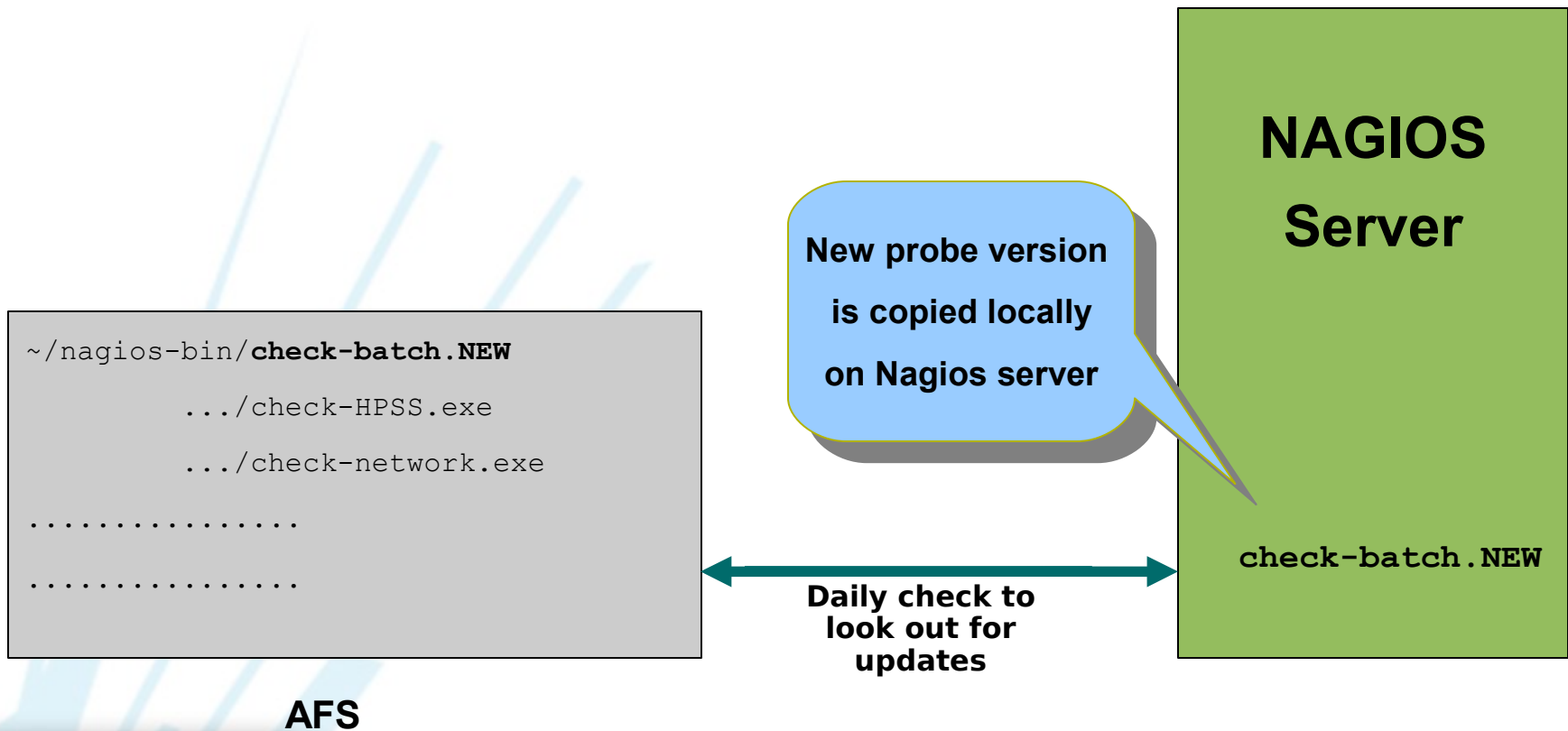




Tips and tuning (1/5)



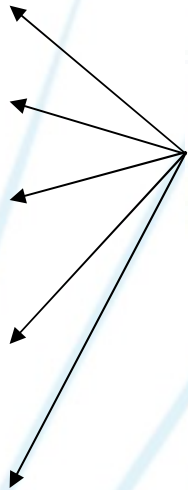
KEEP UPDATED WITH
THE LAST PROBE VERSIONS



Tips and tuning (2/5)



MULTI LEVEL MONITORING



```
host_01 UP
host_02 UP
host_03 TEST
host_04 UP
host_05 UP
host_06 UP
host_07 DOWN
host_08 UP
.....
.....
```

Status list is copied periodically on NAGIOS server

sysadmin monitoring tool generates status list of large # of hosts

Cron : 2 mins

NAGIOS

```
host_01 UP
host_02 UP
host_03 TEST
host_04 UP
host_05 UP
host_06 UP
host_07 DOWN
host_08 UP
.....
.....
```




Tips and tuning (3/5)



MULTI LEVEL MONITORING

- Lower memory usage of Nagios servers
- Minimize impact on observed system

Make both administrator and Heisenberg happy !

- Keeps light interface



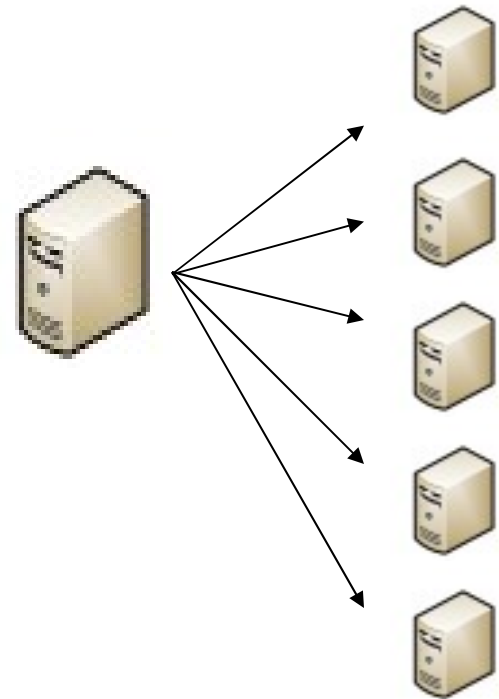
Tips and tuning (4/5)



ONE DRAWBACK THOUGH...

```
dCache-pool-01 UP  
dCache-pool-02 UP  
dCache-pool-03 UP  
...
```

Check dCache pools	Ok
------------------------------------	-----------



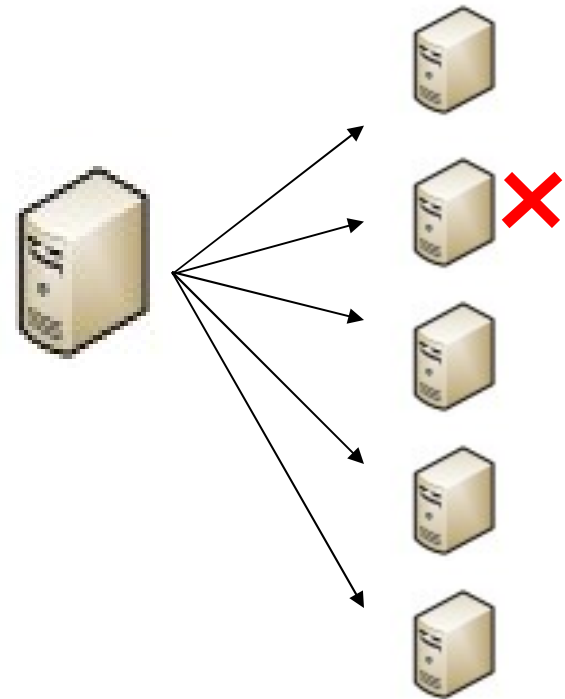


Tips and tuning (4/5)



ONE DRAWBACK THOUGH...

```
dCache-pool-01 UP  
dCache-pool-02 Down  
dCache-pool-03 UP  
...
```



Check dCache pools	CRITICAL
------------------------------------	-----------------



'NAGIOS NOTIFICATION'
'dCache-pool-02 is OFFLINE'

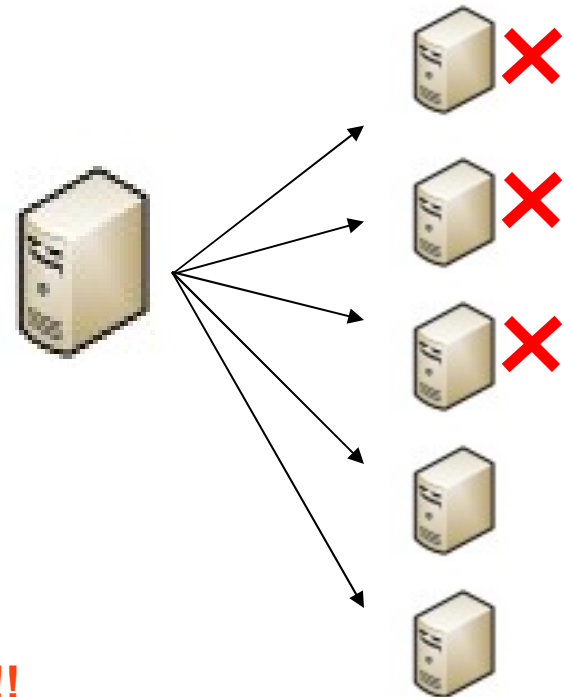


Tips and tuning (4/5)



ONE DRAWBACK THOUGH...

```
dCache-pool-01 Down  
dCache-pool-02 Down  
dCache-pool-03 Down  
...
```



Check dCache pools	CRITICAL
------------------------------------	-----------------

No new notification sent out !!!



Tips and tuning (5/5)



GET NOTIFIED USING PARALLEL PROBE

- Save the output of probe in some file
- Implement another NAGIOS check to compare successive outputs :

```
check_system
```

```
check_system_ NOTIFICATION_UPDATER
```

CRITICAL when
check_system
output differs
from previous one



Notifications (1/2)



Email

- includes URL to webpage describing encountered issue + procedure to fix it
- Email subject should be human-readable and explicit :
[NAGIOS] XRootd PROBLEM : Checking port 1094 on ccxrdri01 is CRITICAL
[NAGIOS] AFS ACKNOWLEDGEMENT : ccafs10 is DOWN
- DO NOT SPAM PEOPLE !
 - Reach relevant person
 - Every notification should trigger some sort of action



Console messaging

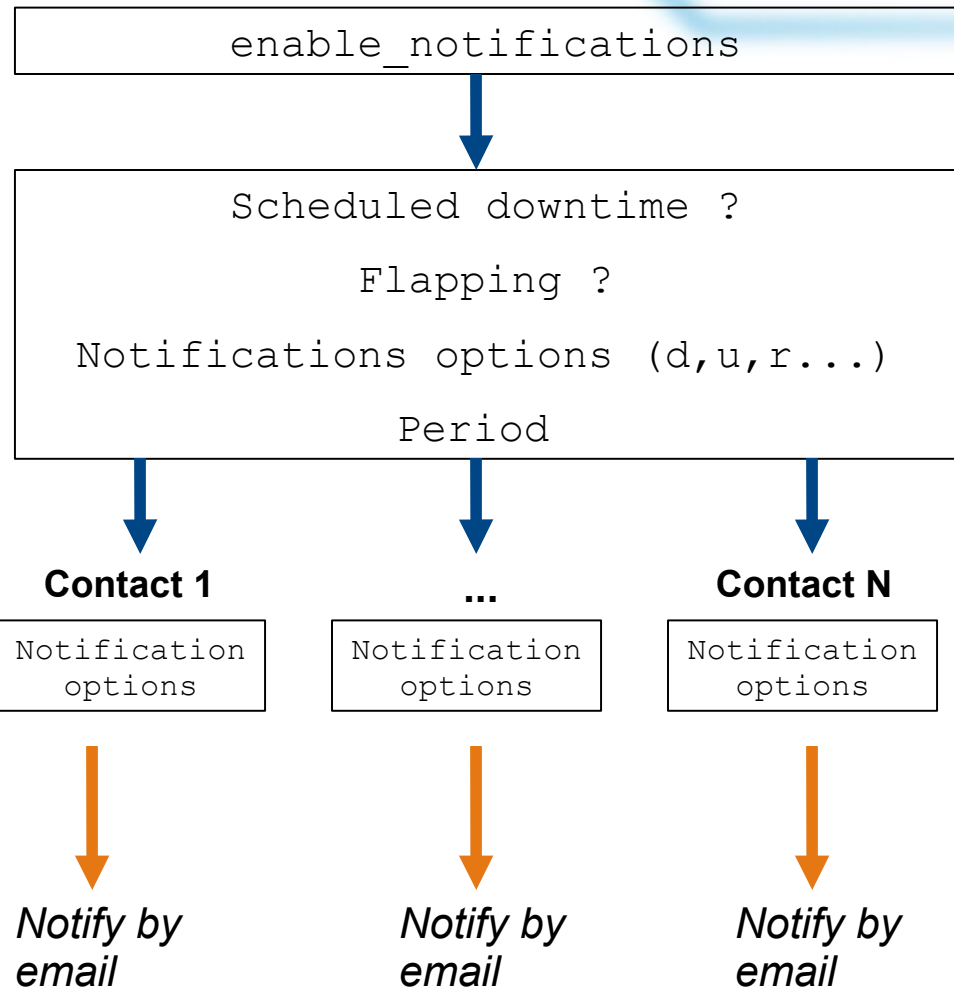
Notifications (2/2)



PROGRAM-WIDE FILTERS

SERVICE & HOST FILTERS

CONTACT FILTERS



Every contact generates its own instance of notification

Notifications (2/2)

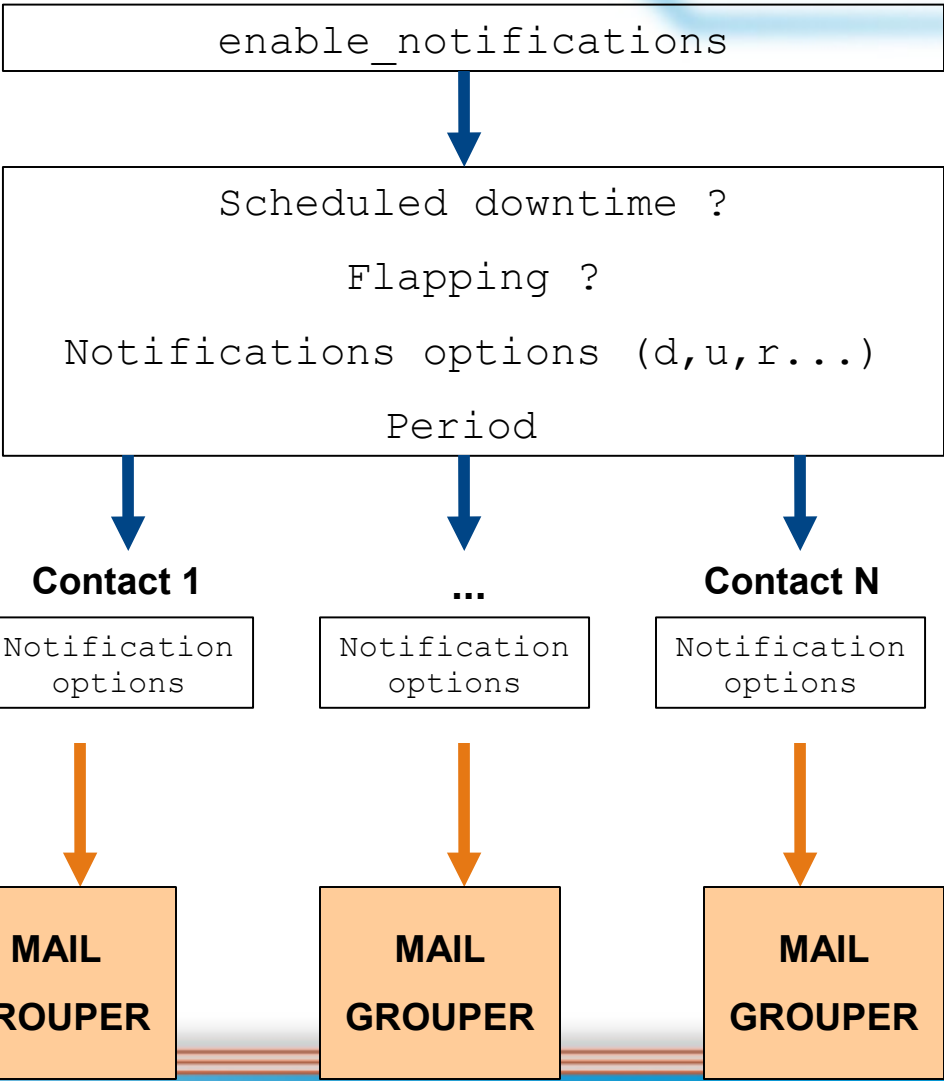


PROGRAM-WIDE FILTERS

SERVICE & HOST FILTERS

Only one notification sent out on the Nth call to 'MAIL GROUPE'

Notify by email



Conclusions



- After some tuning NAGIOS provides flexible, clean and reliable monitoring tool for the operation
- Interface gives a fair overview of service status for operation, administrators and other member of staff
- Interactive features are valuable
(Firefox plugin, downtime scheduler, acknowledgment)
- Product offers more (graphs, interface with other nodes...)