What is Puppet?

Puppet is the local SysAdmin

- According to Puppet Lab: "*Put simply, Puppet is a system for automating system administration tasks.*"
- It's a **declarative language** for expressing system configuration, a **client and server** for distributing it, and a **library** for realizing the configuration.
- Basically, it's a configuration management tool, performs post-[OS]-installation administrative tasks.
- Takes a generic instructions (e.g. ensure MySQL is installed) and performs the task the "right way".
- Uses Facter - a system assay tool, which makes system information available to Puppet as variables - to get the lay of the land.

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Installation: Various repo

Fairly simple: yum install < puppet-server | puppet >

- Use tmz ***epel-puppet*** for the latest version:

```
[epel-puppet]
name=epel puppet
baseurl=http://tmz.fedorapeople.org/repo/puppet/epel/5/$basearch/
enabled=0
gpgcheck=0
```

- ***epel*** is still required for other dependencies.
- ***puppetlab*** and ***ruby*** are also required for puppet-dashboard:

```
[puppetlabs]
name=Puppet Labs Packages
baseurl=http://yum.puppetlabs.com/base/
enabled=0
gpgcheck=0
```

```
[ruby]
name=ruby
baseurl=http://repo.premiumhelp.eu/ruby/
gpgcheck=0
enabled=0
```

Basic Design

Typically a Client/Server [Master/Agent] formation

- Two-part installation: ***puppet-server*** on the server and ***puppet****[-agent]* on the client machine.
- ***puppetmasterd*** runs on server; ***puppetd*** runs on the agents.
- Each *agent* contacts the *master* periodically for updates (default: 30 mins)

Sample 1: *motd*

/etc/puppet/modules/motd/manifests/init.pp

```
class motd {
    $ascii = generate('/bin/sh', '-c', "/usr/bin/figlet -c -w 60 ${hostname}")

    file { 'motd':
        name => '/etc/motd', mode => '0664',
        owner => 'root', group => 'root',
        content => template('motd/motd.erb’
    }
}
```

/etc/puppet/modules/motd/templates/motd.erb:

```
<%= ascii %>
================================================
Welcome to <%= fqdn %>
Access to and use of this server is restricted to those
activities expressly permitted by the system administration
staff. If you're not sure if it's allowed, then DON'T DO IT.
```

manifests/modules.pp:
import ‘motd’

manifests/nodes.pp:
include motd

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Puppet: Dashboard

Basically a facility management tool

- A Ruby-on-Rail web app - graphical representation of Puppet Network.
- Provides a quick visual snapshot of important system information and delivers valuable reports.
- Comparatively a new project but overall stable
- Requirements:
  - Ruby - v1.8.7 is required (v1.9.2 is not fully supported)
  - RubyGems
  - Rubygem-rake
  - MySQL
  - Ruby-MySQL
- LS6/RHEL6 is recomended; Installing on SL5/RHEL5 somewhat impossible because of the version Ruby used

Dashboard : Installation

- Three main installation options – rpm, source from Git and tarball
- Official yum repo (and deb) provided by Puppet Labs

```
[puppetlabs]
name=Puppet Labs Packages
baseurl=http://yum.puppetlabs.com/el/6/products/$basearch
Enabled=1
gpgcheck=1
gpgkey=http://yum.puppetlabs.com/RPM-GPG-KEY-puppetlabs
```

- epel-repo is also required for additional packages
- *"yum install puppet-dashboard"* should take care of all the dependencies
- Default installation location: */usr/share/puppet-dashboard*
- Files/directories should be owned by *puppet-dashboard* user
- Values are specified in: */etc/sysconfig/puppet-dashboard*

Dashboard : Configuration[1]

Setting up database

- Dashboard needs a *user/password* and at least one database
- Can be install on remote machine as well

```
mysql> CREATE DATABASE pup_dash CHARACTER SET utf8;
Query OK, 1 row affected (0.00 sec)

Mysql> GRANT ALL PRIVILEGES ON pup_dash.* TO 'puppet'@'localhost' IDENTIFIED BY
'pup_db_password';
Query OK, 0 row affected (0.00 sec)
```

Tuning

- Needs to configure the *Maximum Packet Size* to accommodate the larger rows in the database (in /etc/my.cnf)

```
## Up to [occasional] 17MB row is possible
max_allowed_packet = 24M
```

Dashboard : Configuration^2

Configuration files

- Main configuration files – config/database.yml & config/settings.yml
- Need to add the database parameter in database.yml

```
production:
  host: puppet.hep.phy.cam.ac.uk
  database: pup_dash
  username: puppet
  password: pup_db_user
  encoding: utf8
  adapter: mysql
```

```
development:
  host: puppet.hep.phy.cam.ac.uk
  database: pup_dash
  username: puppet
  password: pup_db_user
  encoding: utf8
  adapter: mysql
```

- *production* gives the best performance, *development* yields better logging
- The same database can be used for production and development
- Supplied settings.yml.example can simply be copied to *settings.yml* and doesn't required any changes for normal operations.

Dashboard : Configuration[3]

Preparing the Schema

- Rail doesn't consider *production* as the default environment; must be specified manually
- Database table creation is done manually using *db:migrate* rake task and can be run multiple time without any problem.

```
rake RAILS_ENV=production db:migrate
```

- Dashboard now can be started using Ruby's built-in WEBrick server

```
cd /usr/share/puppet-dashboard
sudo -u puppet-dashboard ./script/server -e production
```

- Dashdoard instance on default port 3000 using "production" environment.
- The UI is available at *http://localhost:3000*

Dashboard : Configuration[4]

Using dashboard as Reporter

- Two requirements for dashboard to receive reports:
  - Agents have to be configured to submit reports to the master
  - Master needs to be configured to send the reports to Dashboard

```
## puppet.conf (on the master)
[master]
    reports = store, http, log
    reportdir = /var/lib/puppet/reports
    reporturl = http://localhost:3000/reports/upload
```

```
## puppet.conf (on agents)
[agent]
    report = true
```

- Testing from the agent: *puppet agent –test* [or *puppetd –t*]
- Conformation on the web GUI: *1 pending task*
- *delayed_job* workers must be activated to asynchronously process the tasks

```
env RAILS_ENV=production script/delayed_job -p dashboard -n 4 -m start
```

Dashboard : Web GUI

puppet dashboard • 1.2.7 • Home • Nodes • Groups • Classes • Reports • File Search • Inventory Search

Background Tasks

All systems go

Nodes

2 Unresponsive
3 Failed
0 Pending
2 Changed
0 Unchanged
0 Unreported
7 All

Add node

Group

Add group

Class

Add class

Daily run status

Number and status of runs during the last 30 days:

All | Unresponsive | Failed | Pending | Changed | Unchanged

Export nodes as CSV

	Node	↓ Latest report	Resources Total	Failed	Pending	Changed	Unchanged
Total			193	0	0	32	161
!	disk12.hep.phy.cam.ac.uk	2012-05-09 23:40 UTC	0	0	0	0	0
!	farm052.hep.phy.cam.ac.uk	2012-05-09 23:39 UTC	0	0	0	0	0
✓	disk11.hep.phy.cam.ac.uk	2012-05-09 23:33 UTC	62	0	0	11	51
✓	farm011.hep.phy.cam.ac.uk	2012-05-09 23:33 UTC	52	0	0	10	42
!	disk02.hep.phy.cam.ac.uk	2012-05-09 23:25 UTC	0	0	0	0	0
✓	farm021.hep.phy.cam.ac.uk	2012-05-09 11:38 UTC	79	0	0	11	68
!	disk10.hep.phy.cam.ac.uk	2012-05-09 00:37 UTC	0	0	0	0	0

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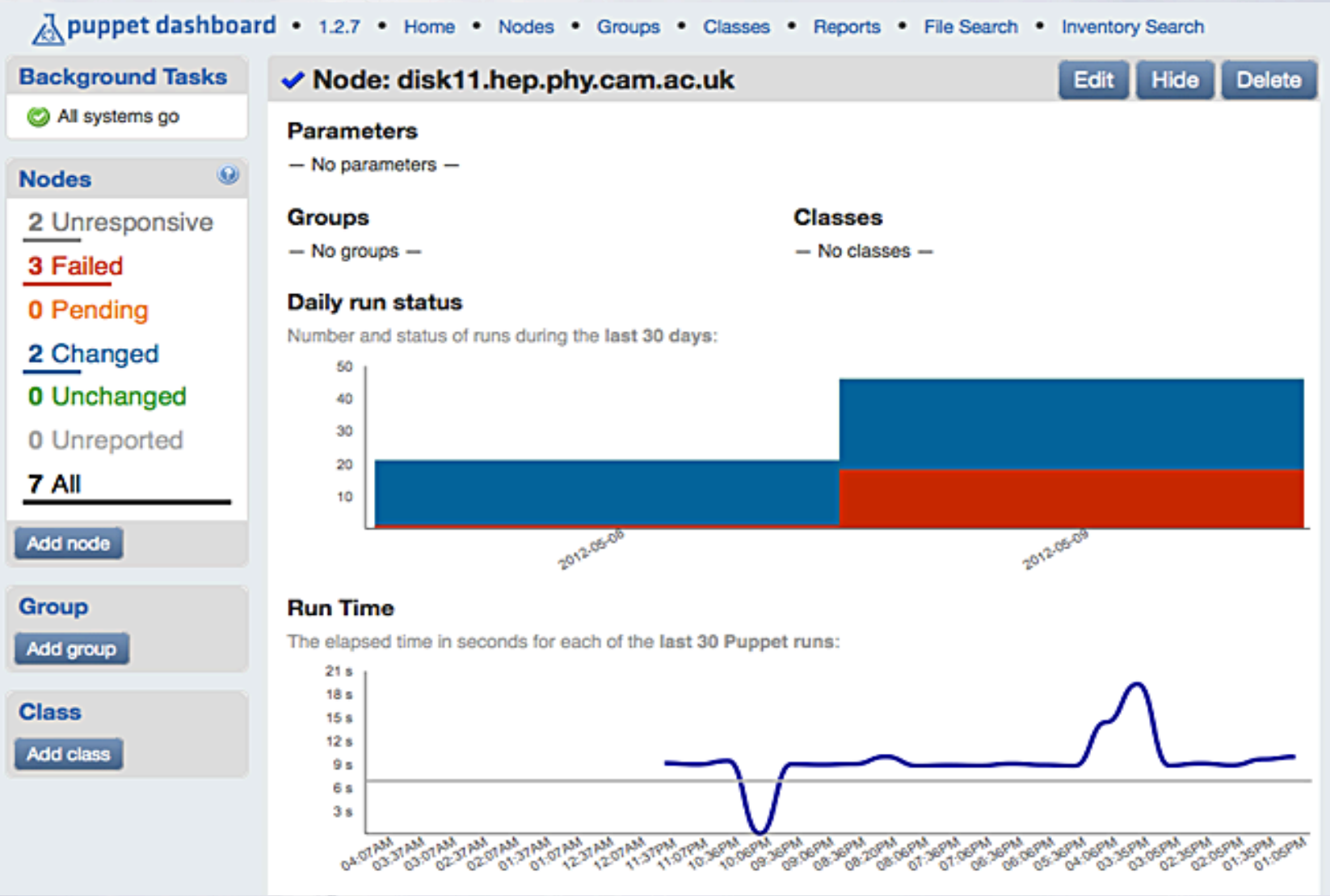
Dashboard : Web GUI



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Dashboard : Web GUI

Recent reports (67)

	Reported at ↓	Total	Failed	Changed	Unchanged	Pending	Skipped	Failed restarts	Config retrieval	Runtime
✔	2012-05-09 23:33 UTC	62	0	11	51	0	6	0	1.84 s	10.19 s
✔	2012-05-09 23:03 UTC	62	0	11	51	0	6	0	1.84 s	10.18 s
✔	2012-05-09 22:33 UTC	62	0	11	51	0	6	0	1.91 s	10.10 s
✔	2012-05-09 22:03 UTC	62	0	11	51	0	6	0	1.84 s	9.98 s
✔	2012-05-09 20:40 UTC	62	0	11	51	0	6	0	1.84 s	9.89 s
✔	2012-05-09 20:10 UTC	62	0	11	51	0	6	0	2.50 s	15.73 s
✔	2012-05-09 19:40 UTC	62	0	11	51	0	6	0	1.86 s	9.84 s
✔	2012-05-09 19:10 UTC	62	0	11	51	0	6	0	1.85 s	9.95 s
✔	2012-05-09 18:40 UTC	62	0	11	51	0	6	0	1.85 s	14.86 s
✔	2012-05-09 18:10 UTC	62	0	11	51	0	6	0	1.84 s	9.81 s

More »

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Dashboard : Production Server

Dashboard with Apache/Passenger

- Default WEBrick server suffers from performance issue
- More reliable using Apache (2.2) with Phusion Passenger (mod_rail)
- 2 [most easiest] ways to install Passenger:

```
gem install passenger
passenger-install-apache2-module
```

```
yum install http://passenger.stealthymonkeys.com/rhel/6/passenger-release.noarch.rpmpassenger-install-apache2-module

yum install mod_passenger
```

- Sample vhost file is provided as *ext/dashboard-vhost.conf*
- Passenger runs Rails apps in the production environment by default

Dashboard : Production Server

Dashboard with Apache/Passenger

```
PassengerRoot /usr/lib/ruby/gems/1.8/gems/passenger-2.2.2
PassengerRuby /usr/bin/ruby
PassengerHighPerformance on
PassengerMaxPoolSize 12
PassengerPoolIdleTime 1500
PassengerStatThrottleRate 120
RailsAutoDetect On
```

Dashboard : Production Server

Dashboard with Apache/Passenger

```
<VirtualHost *:80>
    ServerName puppet.hep.phy.cam.ac.uk
    DocumentRoot /usr/share/puppet-dashboard/public/
    <Directory /usr/share/puppet-dashboard/public/>
        Options None
        Order allow,deny
        allow from all
    </Directory>
    ErrorLog /var/log/httpd/puppet-dashboard_error.log
    LogLevel warn
    CustomLog /var/log/httpd/puppet-dashboard_access.log combined
    ServerSignature On
```

Dashboard : Error Messages

- **Could not retrieve catalog: can't convert nil into String**

  This error message happens when a template file is missing.

- **undefined method `closed?' for nil:NilClass**

  Some error in a template - for example missing a closing quote.

- **Could not retrieve catalog from remote server**

  This can occur if /var/lib/puppet/client_yaml/ is missing on the client

- **Could not intern from pson: Could not convert from pson:**

  For several reason: Version of puppet agent is higher then puppet master, WEBrick fails to handle requests etc.

- **Cannot override local resource on node**

  There is a duplicate definition. Search the database like this: "select hosts.name from hosts,resources where restype='Opsviewmonitored' and title='foo' and hosts.id = resources.host_id;"

Thank you!!

Any Questions??

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