

How to keep track of puppet with Foreman

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What does the



FOREMAN

do?

Provisioning



"Provision on bare-metal & public or private clouds all from one place."

It does with a mix of:

- hardware via network boot and automated install
- virtual by connecting to the hypervisors
- AMI customisation

Network

For network installation, it signals the target server to network boot, by communicating with the BMC or hypervisor, and creates the appropriate network boot PXE setup via the foreman proxy to install the OS.

The contents of the network boot file are built from templates and customised before starting the installation. It relies on a third party source for the installation media, and has templates available for Jumpstart, Kickstart, Preseed, AutoYast.

Image based (AMI)

For cloud based compute resources, new systems are provisioned using images, rather than running an installation. These are then finished by Foreman logging into the instance via ssh.



FOREMAN

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Dashboard

Hosts

Reports

Facts

Audits

Statistics

Trends

More

Listing compute resources

Filter ...



Search



Name

Type

AmazonSingaporeReadOnly

EC2

AmazonSydney

EC2

Sparrow

Libvirt

Architectures

Compute Resources

Domains

Hardware Models

Installation Media

Operating Systems

Partition Tables

Provisioning Templates

Subnets

Configuration

Provisioning

Users

Bookmarks

Settings

About

Supported platforms

- EC2
- Google compute engine
- Libvirt
- OpenStack Nova
- oVirt / RHEV
- Rackspace
- VMware
- Physical hardware via BMC

Inputs

When creating a system via foreman, it requires a number of details about the new system which then are used in the templates and finish scripts. This includes things like, disk size, cpus, memory, networks, puppet classes, host groups, variables, owner, availability zone, vpc, os, architecture or AMI image



New Host

Host

Puppet Classes

Network

Operating System

Virtual Machine

Parameters

Additional Information

Name

Host Group

Deploy on

Environment

Puppet CA

Use this puppet server as a CA server

Puppet Master

Use this puppet server as an initial Puppet Server or to execute puppet runs

Managed systems

If you have provisioning turned on for a system, in some cases, you will have access to the system console, and the ability to delete/rebuild the machine from the foreman console.

The screenshot displays the Foreman web interface. At the top is a navigation bar with links: Dashboard, Hosts, Reports, Facts, Audits, Statistics, Trends, and a More dropdown. Below the navigation bar is the host name **testcent5.oss.co.nz**. To the right of the host name, a red circle highlights four action buttons: Edit, Build, Run puppet, and Delete. On the left side, there are tabs for Properties, Metrics, and Templates. Under the Properties tab, there is a Details section with buttons for Audits, Facts, and YAML. Below the Details section is a table of system properties.

Properties	
Domain	oss.co.nz
IP Address	192.168.213.173
MAC Address	00:0c:29:22:e8:bc
Puppet Environment	dev

On the right side, there is a graph titled "Runtime last 7 days". The graph shows two data series: "Config Retrieval" (red) and "Runtime" (blue). The y-axis ranges from -1 to 1, and the x-axis shows a time period of 00:00:00.

Turning off provisioning

For basic usage of foreman with puppet, as I am describing in this talk, the provisioning component can be disabled. It is disabled as per below:

/etc/foreman/settings.yaml

```
# Disable foreman provisioning
:unattended: true
```

Configuration



"A complete configuration management solution including an ENC for Puppet, built-in support for parameterized classes and hierarchical parameter storage."

ENC

External Node Classifier
(replaces node definitions)

Parameters and meta information

Foreman stores variables, parameters, meta information, class and facts.

Parameterized classes

Control how your classes behave, for one or many systems

Host Groups

Group systems together and apply parameters and classes to the group. Group groups.

Host Groups

Filter ...

×

Q Search

▼

New Host Group

He

Name	
dockerboxes	<div>Nest ▼</div>

Host Group

Puppet Classes

Network

Operating System

Parameters

Parent

dockerboxes ▼

Name

webserve

Environment

dev ▼

Puppet CA

configmgmt ▼

Use this puppet server as a CA server

Puppet Master

configmgmt ▼

Use this puppet server as an initial Puppet Server or to execute puppet runs

Host Group

Puppet Classes

Network

Operating System

Parameters

Included Classes

apache
apt
puppet::devel



Available Classes

- ❏ [acl](#)
- ❏ [aide](#)
- ❏ [apache](#)
 - apache::config
 - apache::install
 - apache::params
 - apache::service
 - apache::ssl
- ❏ [apcupsd](#)
- ❏ [apt](#)
- ❏ [auditd](#)



- ❏ [my](#)
- ❏ [na](#)
- ❏ [net](#)
- ❏ [ntp](#)
- ❏ [op](#)
- ❏ [op](#)
- ❏ [pet](#)
- ❏ [pup](#)
- ❏ [pup](#)
- ❏ [rsy](#)
- ❏ [sel](#)

Monitoring



*"Collect Puppet reports and facts. Monitor host configuration.
Report status, distribution and trends."*

What did puppet do?

Reports



FOREMAN



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Dashboard

Hosts

Reports

Facts

Audits

Statistics

Trends

More ▾

Reports

eventful = true



Q Search



Host	Last report	Applied	Restarted	Failed	Restart Failures	Skipped	Pending	
logtest.oss.co.nz	4 minutes ago	8	0	0	0	0	0	Delete

info	//logtest.oss.co.nz /Puppet	Applying configuration version 'heads/production-0-g4f4de20'
notice	//logtest.oss.co.nz //File[/usr/local /bin/gitblit-list.py] /content	View Diff
info	//logtest.oss.co.nz /Puppet	FileBucket adding {md5}e8ec378b8ab18ccaf8fa3fd9ef28a725
info	//logtest.oss.co.nz //File[/usr/local /bin/gitblit-list.py]	Filebucketed /usr/local/bin/gitblit-list.py to puppet with sum e8ec378b8ab18ccaf8fa3fd9ef28a725
notice	//logtest.oss.co.nz //File[/usr/local /bin/gitblit-list.py] /content	content changed '{md5}e8ec378b8ab18ccaf8fa3fd9ef28a725' to '{md5}47012261fd06f27547c669f372ea2581'
notice	//logtest.oss.co.nz /Puppet	{"openldap"=> [{"puppetclass"=> {"name"=>"openldap::client", "created_at"=> "2013-09-27T03:58:30Z", "id"=>73, "updated_at"=> "2013-10-09T02:04:22Z"}}, {"puppetclass"=> {"name"=>"puppet:devel", "created_at"=> "2013-09-27T03:58:30Z", "id"=>67, "updated_at"=> "2013-09-27T03:58:30Z"}}, {"puppetclass"=> {"name"=>"puppet:server", "created_at"=> "2013-09-27T03:58:30Z", "id"=>65, "updated_at"=> "2013-09-27T03:58:30Z"}}], "ntp"=> [{"p
notice	//logtest.oss.co.nz //Stage[main] /Envtest:Foremanfact /Notify[pp var classes]/message	defined 'message' as '{"openldap"=> [{"puppetclass"=> {"name"=>"openldap::client", "created_at"=> "2013-09-27T03:58:30Z", "id"=>73, "updated_at"=> "2013-10-09T02:04:22Z"}}, {"puppet"=> [{"puppetclass"=> {"name"=>"puppet:devel", "created_at"=> "2013-09-27T03:58:30Z", "id"=>67, "updated_at"=> "2013-10-07T23:11:58Z"}}, {"puppetclass"=> {"name"=>"puppet:server", "created_at"=> "2013-09-27T03:58:30Z", "id"=>65, "updated_at"=> "2013-10-07T23:11:58Z"}]}], "ntp"=> [{"p
notice	//logtest.oss.co.nz /Puppet	k=openldap name: openldap::client name: openldap::tls k=puppet name: puppet:devel name: puppet:puppetpush name: puppet:server

logtest.oss.co.nz

Show log messages: All messages

Level	Resource
warning	//logtest.oss.co.nz /Puppet
info	//logtest.oss.co.nz /Puppet
info	//logtest.oss.co.nz /Puppet
info	//logtest.oss.co.nz /Puppet
info	//logtest.oss.co.nz /Puppet
info	//logtest.oss.co.nz /Puppet
info	//logtest.oss.co.nz /Puppet

Diff View

```
--- /usr/local/bin/gitblit-list.py 2013-12-03 15:16:22.364705369 +1300
+++ /tmp/puppet-file20131217-7530-17jv3al-0 2013-12-17 10:12:47.823682002 +1300
@@ -1,5 +1,5 @@
#!/usr/bin/python
-GIT_REPO_LIST='http://skud:9000/rpc?req=LIST_REPOSITORIES'
+GIT_REPO_LIST='http://skud.oss.co.nz:9000/rpc?req=LIST_REPOSITORIES'
import urllib2
import json
```

Close

Facts

you can use them to find out stuff















Fact Values

host = logtest.oss.co.nz



Q Search















Name	Value	Reported at
 selinux_policyversion	24	6 minutes ago
 netmask_lo	255.0.0.0	6 minutes ago
 netmask	255.255.255.0	6 minutes ago
 netmask_eth0	255.255.255.0	6 minutes ago
 kernelmajversion	2.6	6 minutes ago
 kernelversion	2.6.32	6 minutes ago
 clientversion	3.3.1	6 minutes ago
 puppetversion	3.3.1	6 minutes ago
 macaddress	54:52:00:63:59:00	6 minutes ago
 macaddress_eth0	54:52:00:63:59:00	6 minutes ago
 operatingsystemmajor	6	6 minutes ago
 operatingsystemmajrelease	6	6 minutes ago

Fact Values

name ~ memory
×

▾

Host	Name	Value	Reported at
laptop-vm-go.localdomain	 memorysize_mb	1023.48	20 days ago
laptop-vm-go.localdomain	 memorytotal	1023.48 MB	20 days ago
laptop-vm-go.localdomain	 memorysize	1023.48 MB	20 days ago
configmgmt.oss.co.nz	 memorytotal	1.83 GB	15 minutes ago
configmgmt.oss.co.nz	 memorysize	1.83 GB	15 minutes ago
configmgmt.oss.co.nz	 memorysize_mb	1877.50	15 minutes ago
bd3cd58dc8e7.	 memorytotal	1.96 GB	8 days ago
bd3cd58dc8e7.	 memorysize	1.96 GB	8 days ago
ubuntu-1204.psse.pco.net.nz	 memorytotal	2.96 GB	about 1 month ago
ubuntu-1204.psse.pco.net.nz	 memorysize	2.96 GB	about 1 month ago
ubuntu-1204.psse.pco.net.nz	 memorysize_mb	3030.07	about 1 month ago
puppet02.local	 memorytotal	3.68 GB	11 days ago

Are my hosts managed with puppet?

Has puppet run recently?

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Dashboard

Hosts

Reports

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More ▾

Hosts






Filter ...



Q Search



New Host

<input type="checkbox"/> Name	Operating system	Environment	Model	Host group	▼ Last report	
<input type="checkbox"/>  configmgmt.oss.co.nz	 RedHat 6.4	production	KVM		13 minutes ago	Edit ▾
<input type="checkbox"/>  bd3cd58dc8e7.	 Ubuntu 12.10	dev	kvm	dockerboxes	8 days ago	Edit ▾
<input type="checkbox"/>  puppet02.local	FreeBSD 10.04	dev	jail		11 days ago	Edit ▾
<input type="checkbox"/>  logtest.oss.co.nz	 RedHat 6.5	dev	KVM		12 days ago	Edit ▾
<input type="checkbox"/>  laptop-vm-go.localdomain	 windows 5.1	dev	VMware Virt...		20 days ago	Edit ▾
<input type="checkbox"/>  ubuntu-1204.psse.pco.net.nz	 Ubuntu 13.10	dev	VirtualBox		about 1 month ago	Edit ▾

Displaying **all 6** entries - 0 selected

Dashboard



Overview

Filter ...



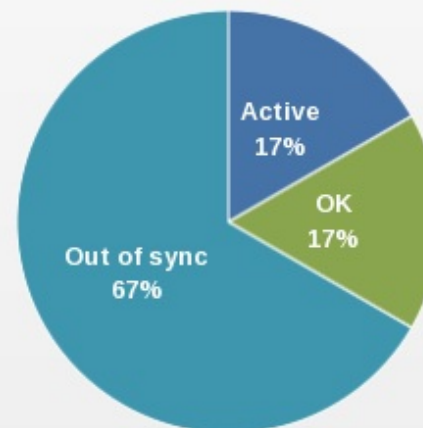
Search



Host Configuration Status

Hosts that had performed modifications without error	1
Hosts in error state	0
Good host reports in the last 35 minutes	1
Hosts that had pending changes	0
Out of sync Hosts	4
Hosts with no reports	0
Hosts with alerts disabled	0

Total Hosts: 6



Latest Events

Host	A	R	F	FR	S	P
logtest.oss...	8	0	0	0	0	0

Run distribution in the last 30 minutes

2

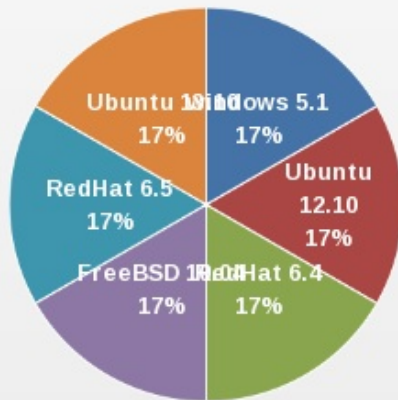
Statistics



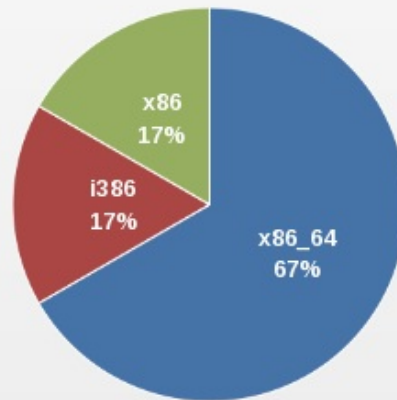
FOREMAN

[Dashboard](#)[Hosts](#)[Reports](#)[Facts](#)[Audits](#)[Statistics](#)[Trends](#)

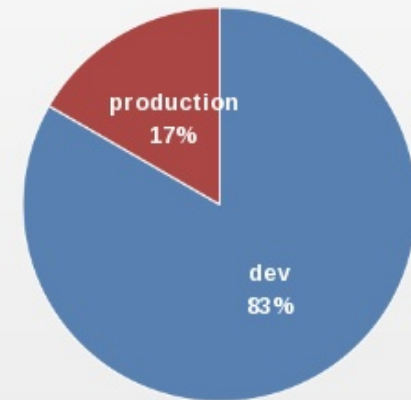
OS Distribution



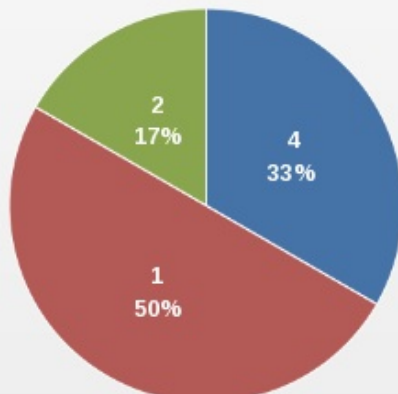
Architecture Distribution



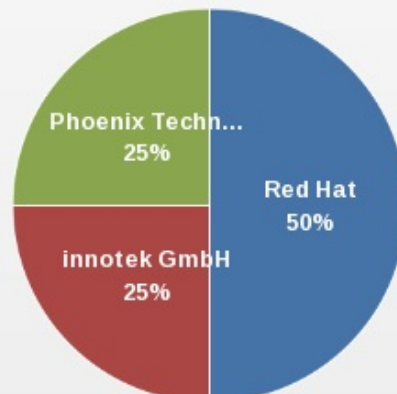
Environments Distribution



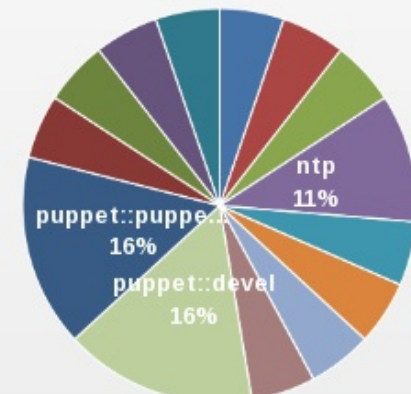
Number of CPUs



Hardware



Class Distribution



General features

- Robust API, restful. CLI as well
- Management of DHCP, DNS, TFTP, PXE
- PuppetCA
- Roles, Users, LDAP
- Packaged, managed with puppet
- Auditing

Extra cool features

Foreman data accessible from puppet manifests, removing the need for puppetdb.

- Facts for any host
- Hosts matching x
- Classes assigned to other hosts

Review

Puppet without foreman

- site.pp or nodes.pp
- maybe hiera
- read log files

- Agent runs
- Sync plugins
- Sends facts
- Puppet master looks for node matching it's name
- Compiles catalog
- Node applies catalog
- Node logs results to disk, and maybe back to the master

```
node 'common' {  
  $ntpserver = 'time.example.com'  
  include common  
}  
node "myhost.linuxbox.co.nz" inherits common {  
  $owner_name = "Glen Ogilvie"  
  include basicstuff  
  class{"mysql":  
    port => 3306,  
    listen => 192.168.213.12,  
  }  
}
```

Or maybe your using hiera

/etc/puppet/hieradata/myhost.linuxbox.co.nz.yaml

```
---  
"owner_name" : "Glen Ogilvie"  
"classes" : [  
  "mysql",  
  "basicstuff"  
],  
"mysql::port" : "3306",  
"mysql::listen" : "192.168.213.12"
```

/etc/puppet/hieradata/common.yaml

```
---  
"classes" : [ "common" ],  
"ntpserver" : "time.example.com"
```

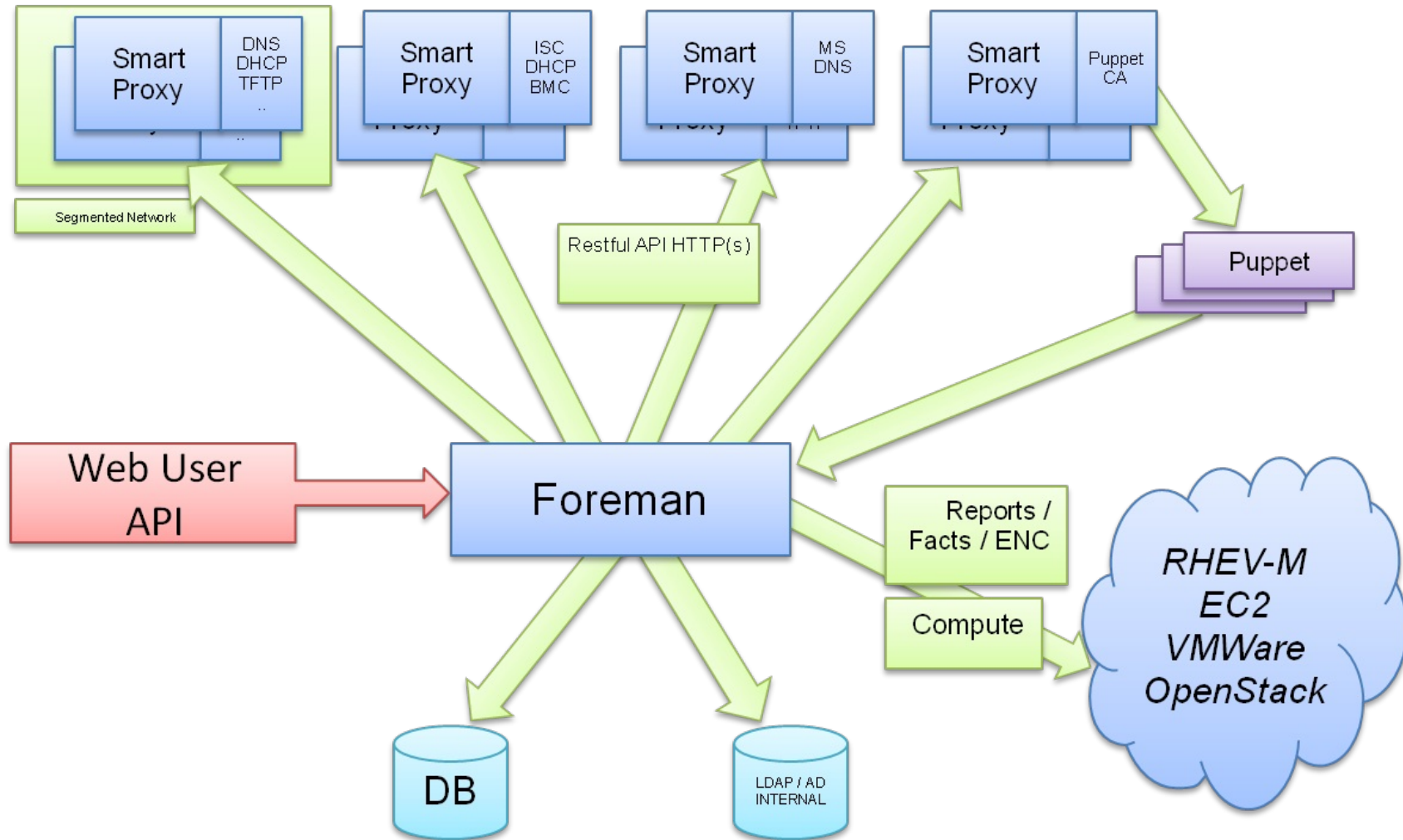

Puppet with Foreman

- Agent runs
- Sync plugins
- Sends facts
- Puppet master connects to foreman, sending node name
- Foreman returns node classes and parameters to master
- Compiles catalog
- Node applies catalog
- Node logs results to disk, and to the master
- Master sends results and facts to foreman for storage

Foreman YAML

```
---
classes:
  common:
  mysql:
    port: 3306
    listen: "192.168.213.12"
  basicstuff:
parameters:
  puppetmaster: configmgmt.oss.co.nz
  root_pw: $1$xxxxxxxxxxxxxxxxxxxxxx
  foreman_env: dev
  owner_name: Glen Ogilvie
  owner_email: gogilvie@oss.co.nz
  ntpserver: time.example.com
environment: dev
```

Foreman Architecture



Using Foreman

PuppetCA interface

to sign new servers



PuppetCA on configmngmt

Filter

[Autosign Entries](#)

Certificate Name	State	Valid from	Expires	Fingerprint	
bd3cd58dc8e7	valid	12 days ago	in almost 5 years	SHA256	Delete
configmngmt.oss.co.nz	valid	3 months ago	in almost 5 years	SHA256	Delete
laptop-vm-go.localdomain	valid	22 days ago	in almost 5 years	SHA256	Delete
logtest.oss.co.nz	valid	3 months ago	in almost 5 years	SHA256	Delete
oss-win732sp1vm.localdomain	valid	20 days ago	in almost 5 years	SHA256	Delete
puppet02.local	valid	16 days ago	in almost 5 years	SHA256	Delete
ubuntu-1204.oss.co.nz	valid	about 1 month ago	in almost 5 years	SHA256	Delete

Displaying **all 7 entries**

Import your classes and
environments



Puppet classes

Filter ...



Search



Import from configmgmt

New Puppet class

Class name	Environments and documentation	Host group	Hosts	Keys	
acl::requirements	dev production		0	0	Delete
aide	dev production		0	0	Delete
aide::params	dev production		0	0	Delete
apache	dev production		0	0	Delete
apache::config	dev production		0	0	Delete
apache::install	dev production		0	0	Delete
apache::params	dev production		0	0	Delete
apache::service	dev production		0	0	Delete
apache::ssl	dev production		0	0	Delete
apcupsd	dev production		0	9	Delete
apcupsd::bobclient	dev production		0	0	Delete
apt	dev production	dockerboxes	0	7	Delete
apt::backports	dev production		0	2	Delete

And check the rdoc based
class docs

```
/data/puppet/environments/production/modules/puppi/manifests/info/instance.pp  
/data/puppet/environments/production/modules/puppi/manifests/one.pp  
/data/puppet/environments/production/modules/puppi/manifests/helper.pp
```

Defines

check deploy helper info initialize log netinstall project report rollback run todo ze

Custom Facts

puppi_projects last_run

Classes and Modules

Class puppi::dependencies
Class puppi::extras
Class puppi::helpers
Class puppi::info
Class puppi::mcollective
Class puppi::one
Class puppi::params
Class puppi::project
Class puppi::puppi
Class puppi::skel
Class puppi::two

Defines

```
check( $project => 'default', $enable => 'true', $command, $priority => '50', $base_dir => "", $hostwide => 'no' )
```

Define puppi::check

This define creates a file with a `check` command that can be used locally. It uses Nagios plugins for all checks so that `$command` is just the plugin name with its arguments

Usage

Basic Usage: `puppi::check { "checkname":`

```
    command => "check_tcp -H localhost -p 80"
```

```
}
```

```
deploy( $project, $enable => 'true', $arguments => "", $command, $priority => '50', $user => 'root' )
```

Define puppi::deploy

Setup an existing host

- Set meta data like (environment, owner)
- Attach classes and host groups
- Set parameters, or override parametrized classes



configmgmt.oss.co.nz

Reports from the last days - 337 reports found

Edit

Build

Run puppet

Delete

Properties

Metrics

Templates

Details

Audits

Facts

Reports

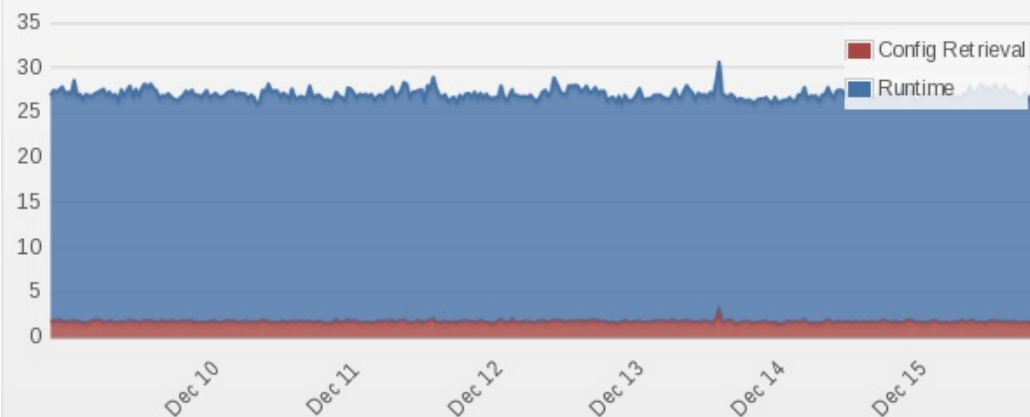
YAML

Properties

Domain	oss.co.nz
IP Address	192.168.213.34
MAC Address	52:54:00:5e:48:cc
Puppet Environment	production
Host Architecture	x86_64
Operating System	RedHat 6.4
Host group	
Owner	config

Runtime

last 7 days



Resources

last 7 days

1

Applied

Failed



Edit configmgmt.oss.co.nz

[Manage host](#)

Host

[Puppet Classes](#)[Parameters](#)[Additional Information](#)

Name configmgmt.oss.co.nz

Host Group



Environment

production



Puppet CA

configmgmt



Use this puppet server as a CA server

Puppet Master

configmgmt



Use this puppet server as an initial Puppet Server or to execute puppet runs



FOREMAN



Glen Ogilvie ▾

Dashboard

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Edit configmgmt.oss.co.nz

Manage host

Host

Puppet Classes

Parameters

Additional Information

Included Classes

ntp
openldap::client
openldap::tls
puppet::devel
puppet::puppet push
puppet::server



Available Classes

Filter classes

☐ acl
☐ aide
☐ apache
☐ apcupsd
☒ apt
apt
apt::backports
apt::debian::testing
apt::debian::unstable
apt::params
apt::release



☐ logrotate
☐ mysql
☐ nagios
☐ network
☐ ntp
☐ openldap
☐ openvpn
☐ puppet
☐ puppi
☐ rsyslog
☐ selinux



Edit configmgmt.oss.co.nz

[Manage host](#)[Host](#)[Puppet Classes](#)[Parameters](#)[Additional Information](#)

Puppet classes Parameters

Puppet class	Name	Value	Actions
--------------	------	-------	---------

Included Parameters via inheritance

Scope	Name	Value	Actions
-------	------	-------	---------

Host Parameters

Global	oss_selinux_mode	permissive	✕
Global	owner_name	Glen Ogilvie	✕

[+ Add Parameter](#)



Edit configmgmt.oss.co.nz

[Manage host](#)[Host](#)[Puppet Classes](#)[Parameters](#)[Additional Information](#)

Owned By

config ▾

Enabled

Hardware Model

Comment

select an owner

users

rhicks (rhicks)

API Ogilvie (api)

Glen Ogilvie (admin)

Glen Ogilvie (gogilvie)

Hicks rhicks (Richard)

Justin Farmiloe (jfarmiloe)

Leon Strong (lstrong)

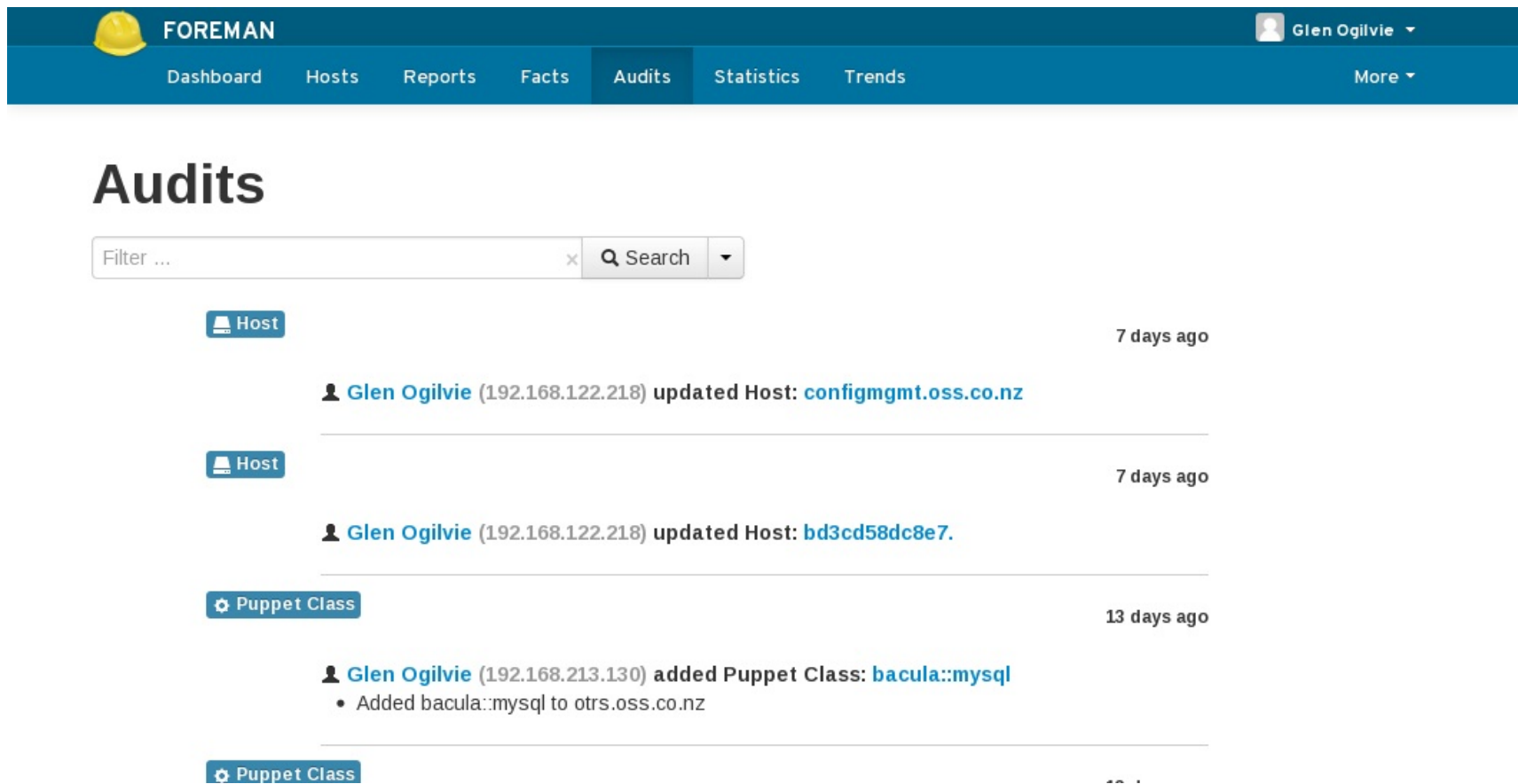
Peter Toth (ptoth)

usergroups

config

Additional information about this host

It keeps a record of changes



The screenshot shows the Foreman web interface. The top navigation bar is blue with a yellow hard hat icon and the word "FOREMAN". The user "Glen Ogilvie" is logged in. The "Audits" tab is selected in the secondary navigation bar. Below the navigation bar, the "Audits" section has a search bar and a list of audit entries. Each entry includes a category (Host or Puppet Class), a user (Glen Ogilvie), a timestamp, and a description of the change.

FOREMAN Glen Ogilvie

Dashboard Hosts Reports Facts **Audits** Statistics Trends More

Audits

Filter ... x Search

Host	7 days ago	Glen Ogilvie (192.168.122.218) updated Host: configmgmt.oss.co.nz
Host	7 days ago	Glen Ogilvie (192.168.122.218) updated Host: bd3cd58dc8e7 .
Puppet Class	13 days ago	Glen Ogilvie (192.168.213.130) added Puppet Class: bacula::mysql <ul style="list-style-type: none">Added bacula::mysql to otrs.oss.co.nz
Puppet Class		

Parameterized class

```
# Class: apt
# This module manages the initial configuration of apt.
#
# Parameters:
#   disable_keys - disables package signing check
#   always_apt_update - apt updated on every run (for dev)

class apt(
    $always_apt_update      = false,
    $disable_keys           = undef,
    $proxy_host             = false,
    $proxy_port             = '8080',
    $purge_sources_list     = false,
    $purge_sources_list_d  = false,
    $purge_preferences_d   = false
) {
# implimentaton
}
```

Host

Puppet Classes

Parameters

Additional Information

Puppet classes Parameters

Puppet class	Name	Value	
envtest::params	one	items: - part_no: A4786 descrip: Water Bucket (Filled) price: 1.47 quantity: 4 - part_no: E1628 descrip: High Heeled "Ruby" Slippers size: 8 price: 100.27 quantity: 1	
	three	<%= @host.name %>	
	two	true	<button>override</button>

Included Parameters via inheritance

Scope	Name	Value	Actions
-------	------	-------	---------

Host Parameters

envtest::params

three

testhost.oss.co.nz

✕

Environments

Global Parameters

Host Groups

Puppet Classes

Smart Variables

Smart Proxies

Configuration

Provisioning

Users

Bookmarks

Settings

About

Edit Puppet Class apt

[Puppet Class](#)[Smart Class Parameter](#)[Smart Variables](#)

Filter Parameters

[always apt update](#)☒ [disable keys](#) ✕[proxy host](#)[proxy port](#)[purge preferences d](#)[purge sources list](#)[purge sources list d](#)

@

Puppet Environments

Parameter

Description

Override

☒ i

Parameter type

 i

Default value

 i

Optional Input Validator

Required

☐ 

Validator type

None



Validator rule

Override Value For Specific Hosts

Order

fqdn
hostgroup
os
domain
lsbdistid



Match

lsbdistid=Ubuntu



Value

true



+ Add Matcher Value



Installing Foreman

Installation of foreman is actually rather straight forward. The installer, based on your answers, it does some of the below.

- Installs puppet
- Sets up a puppet master and configures it
- Installs postgresql
- Sets up tftp, pxe, bind
- dhcpd (disabled by default)
- Sets up foreman, in apache passenger

USE the Foreman-installer

and

Read the instructions, they help!

<http://theforeman.org/manuals/1.3/index.html#3.InstallingForeman>

Installing notes

- Make sure apt / yum / ruby gem works before you start
- The foreman repo will be added by the installer, if it's not available
- RHEL: make sure EPEL, RHEL optional and puppetlabs repos are available
- Make sure your hostname is what you want. SSL certs will be created with it.
- Foreman works with SELinux on, but check the audit logs if you have trouble
- Ruby versions can be a problem. I use Red Hat SCL to run on ruby 1.9.3

Puppet

Use a recent version of puppet. Your life will be easier! I recommend using the community version supplied by puppetlabs.

- <http://yum.puppetlabs.com/>
- <http://apt.puppetlabs.com/>

unless all distro's you manage with puppet have version 3.3.x or above of puppet already.



Questions?

Track me down at LCA :)

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Demo