INFN
Istituto Nazionale
di Fisica Nucleare

Foreman/Puppet

The Foreman

- **"Foreman is a complete lifecycle management tool for physical and virtual servers"**
  - http://theforeman.org/

- **Provisioning**
  - **Provision on bare-metal & public or private clouds all from one place with one simple process**

- **Configuration**
  - **Configuration management solution including an ENC for Puppet, built-in support for parameterized classes and hierarchical parameter storage**
  - **Not yet integrated with Hiera**

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

Puppet

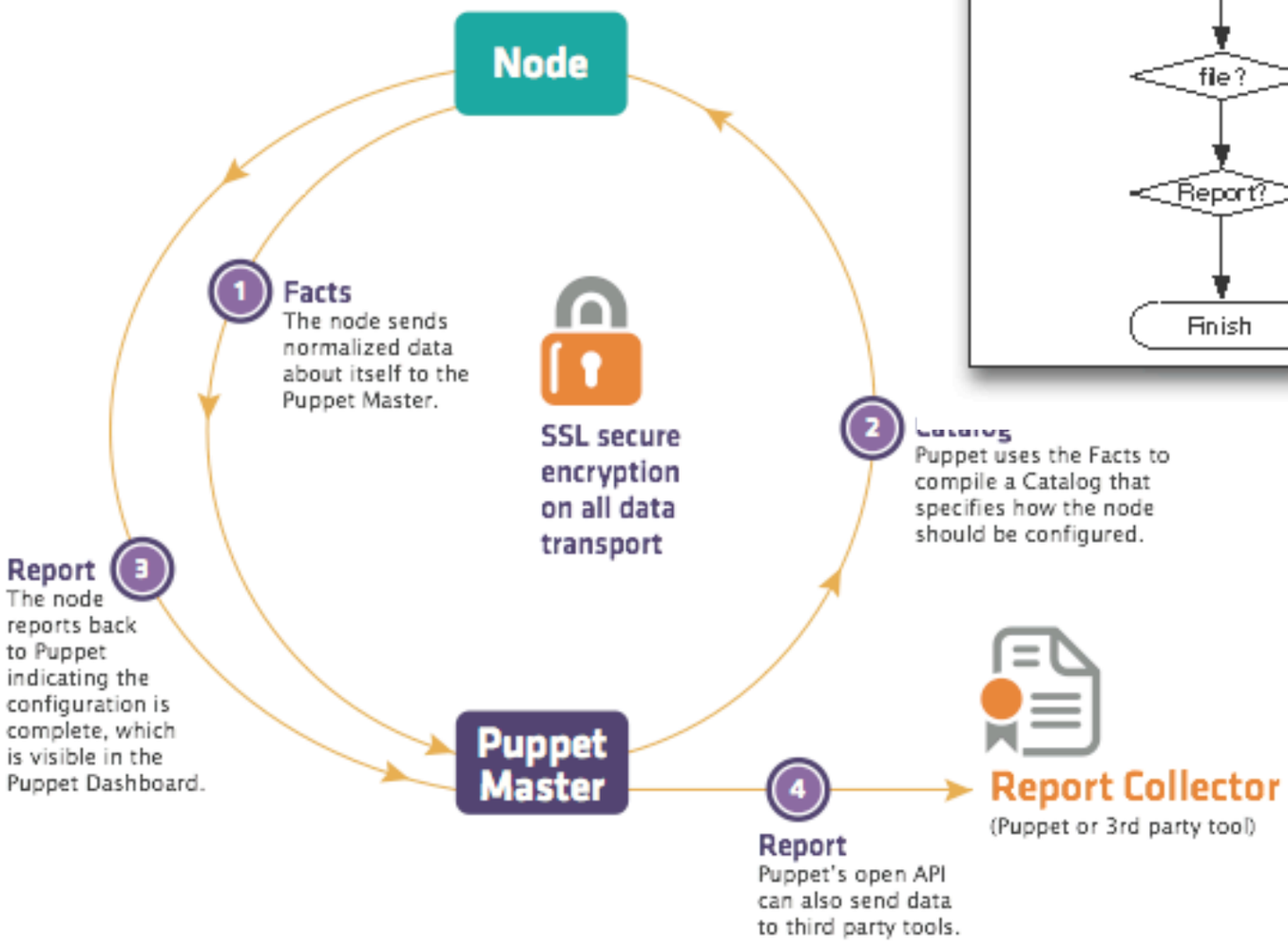
- A configuration/managements system
  - Based on Ruby classes
  - Hierarchical
    - Code hierarchy
    - Data and parameters hierarchy via Hiera
  - Inheritance
  - Templating (erb)

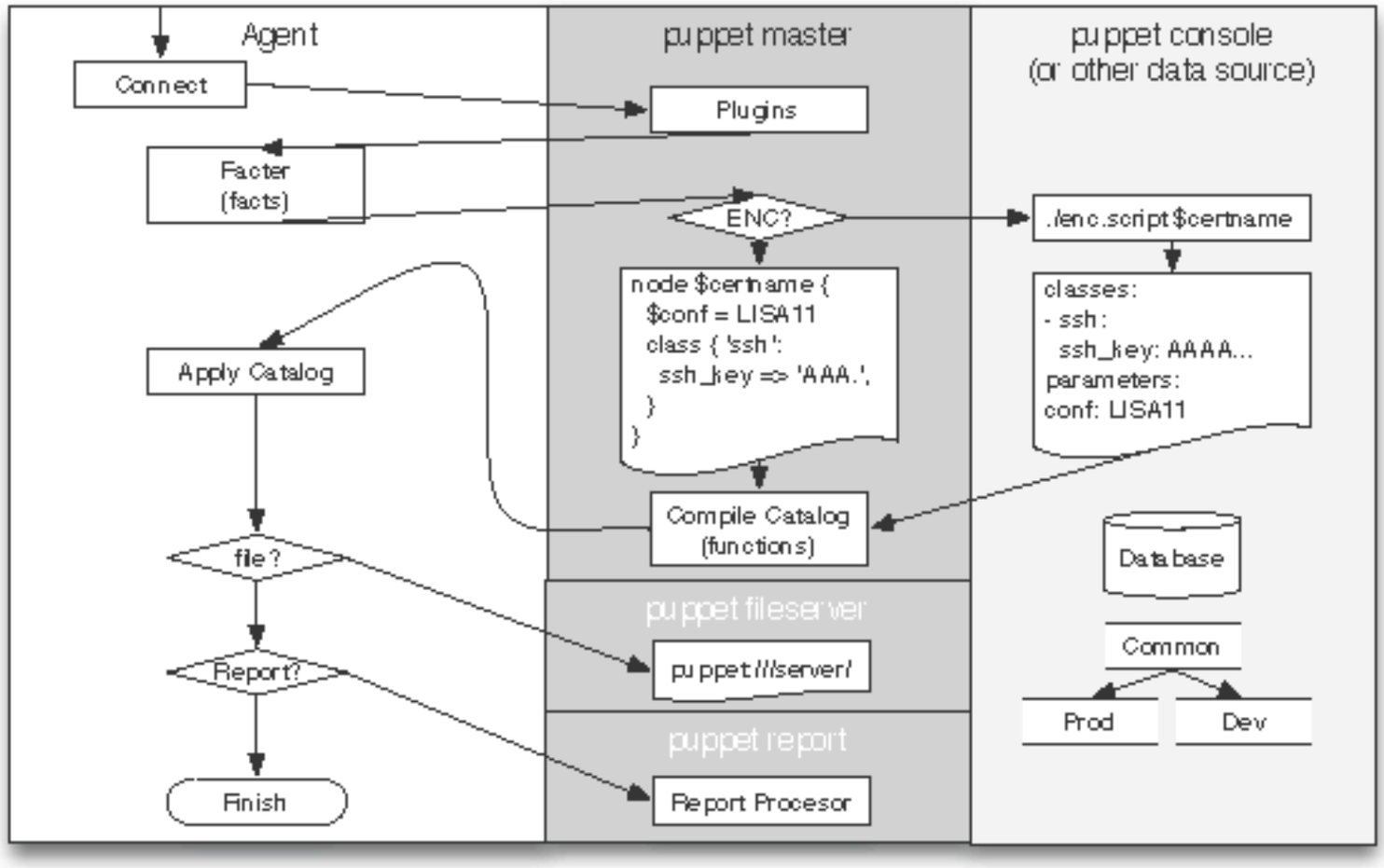
- The configuration directives are stored in puppet classes or modules
  - Modules are reusable, sharable units of Puppet code
  - Each module is build of one or more classes
  - Classes can be inherited by subclasses or implemented in other classes/modules
  - Modules and classes are store in the puppet masters and made available via secure web connections to the clients

- Puppet is made of three distinct parts
  - CA server
  - Server
    - May run standalone or via an appliation server like passenger
  - Client

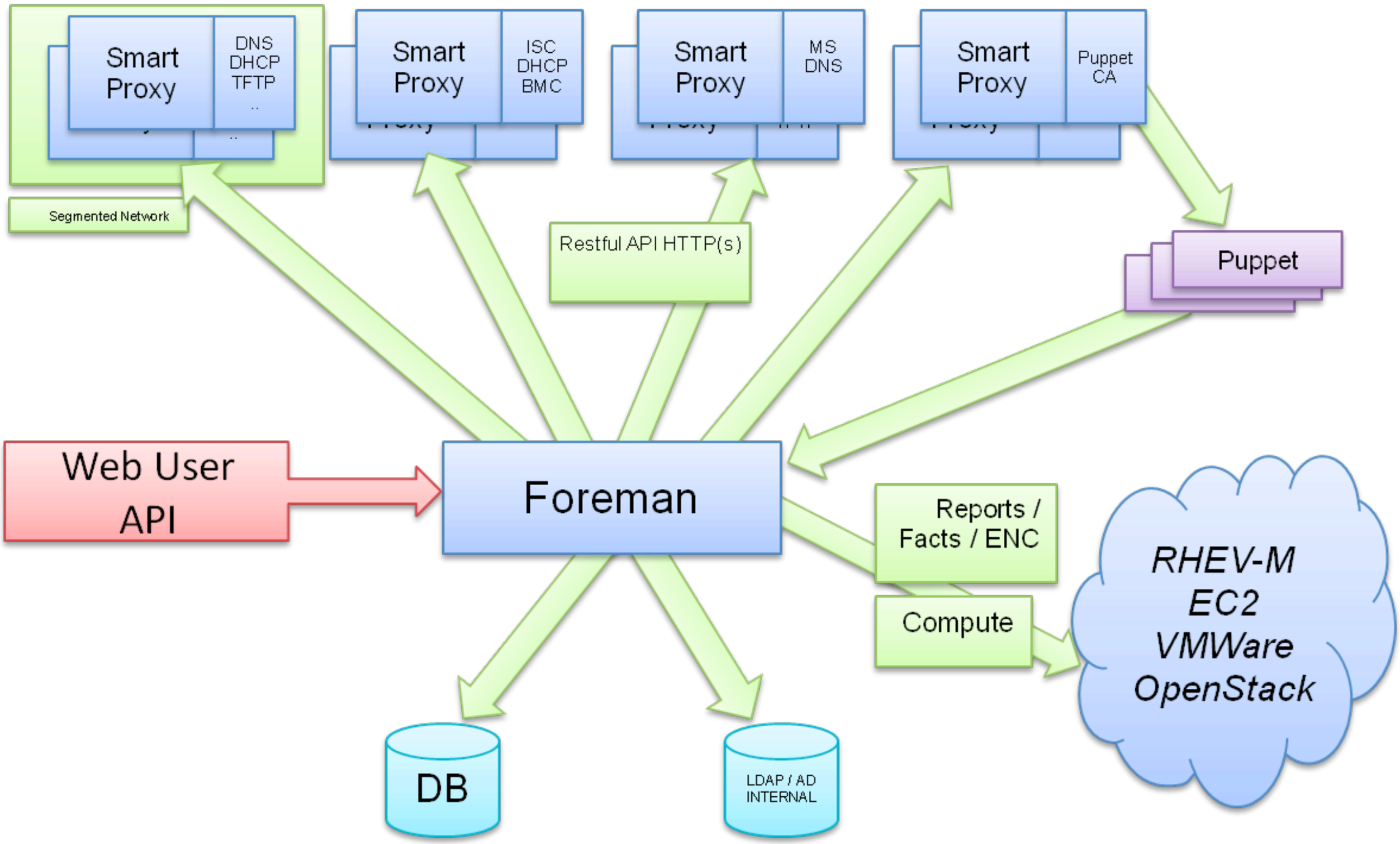
- External Nodes Classifiers can be connected to Puppet to deliver per-node configurations
  - Foreman
  - Hiera
  - LDAP
  - …

Puppet dataflow





Foreman architecture



Foreman and Puppet

- **Foreman integrates with Puppet**
  - Via Smart Proxies
  - Can run multiple instances of Puppet Masters for load balancing and failover (by default via Passenger)
  - Acts as a full-featured ENC
  - Hierarchical definition of hostgroups
  - Managing of parametrized puppet classes
  - Importing classes definition directly from the puppet master
- **Integration with other services via Smart Proxy**
  - TFTP
  - DHCP
  - DNS
- **Provisioning of OS for bare metal, plain VMs and Cloud facilities**
- **REST APIs to interact via (authenticated) CLI**
- **Plugins**

Puppet resources

- Many public domain puppet modules available from puppet forge
  - http://forge.puppetlabs.com
  - Can be downloaded via the “puppet module” command
    - puppet module install desalvo-frontier

- More code available from github
  - https://github.com/search?q=puppet&ref=cmdform

Foreman dashboard

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Overview

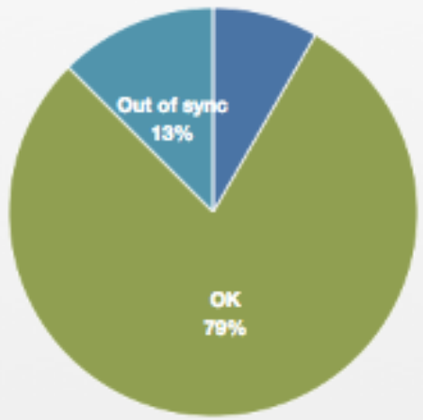
Filter ... × Search ·

Generated at 01 Jul 17:43

Host Configuration Status

Hosts that had performed modifications without error	4
Hosts in error state	0
Good host reports in the last 35 minutes	38
Hosts that had pending changes	0
Out of sync Hosts	6
Hosts with no reports	0
Hosts with alerts disabled	0

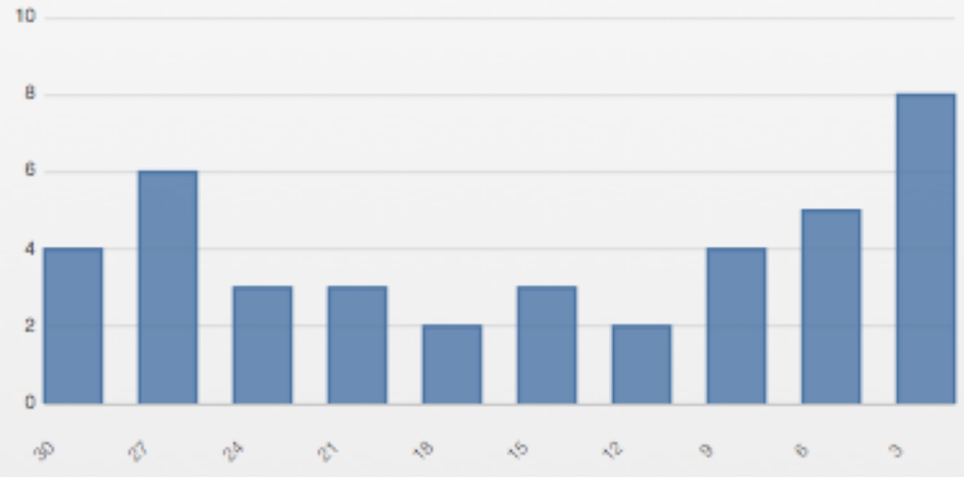
Total Hosts: 48



Latest Events

Host	A	R	F	FR	S	P
atlas-svc-1...	0	0	0	0	1	0
atlas-svc-1...	0	0	0	0	1	0
ui-btfn-7ta...	1	0	0	0	0	0
atlas-cloud...	0	0	0	0	1	0
atlas-svc-1...	0	0	0	0	1	0
atlas-svc-1...	0	0	0	0	1	0

Run distribution in the last 30 minutes



Foreman Host View

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Hosts

Filter ... × Search · New Host

Name	Operating system	Environment	Model	Host group	Last report	
atlas-ce-02.roma1.infn.it	Scientific...	production	KVM	ATLAS/Grid/CreamCE	21 minutes ago	Edit ·
atlas-cloud-fe.roma1.infn.it	CentOS 6.5	production	KVM	ATLAS/Service/Packstack	5 minutes ago	Edit ·
atlas-cloud-fe-test.roma1.i...	CentOS 6.5	production	KVM	ATLAS/Service/Packstack	23 minutes ago	Edit ·
atlasdisk1.lnf.infn.it	Scientific...	production	KVM	ATLAS_LNF/DPM_T...HeadNode	16 minutes ago	Edit ·
atlas-dpm-01.roma1.infn.it	CentOS 6.5	production	OpenStack Nova	ATLAS/Service/D...HeadNode	5 minutes ago	Edit ·
atlas-dpm-pool-01.roma1.inf...	CentOS 6.5	production	OpenStack Nova	ATLAS/Service/DPM_T...Disk	about 1 hour ago	Edit ·
atlas-splitter.roma1.infn.it	CentOS 6.5	production	OpenStack_A...	ATLAS/Grid/Int/LSF/NISc/UI	29 minutes ago	Edit ·
atlas-storage-05.roma1.infn.it	CentOS 6.5	production	X7DB8	ATLAS/Service/Gluste...Osd	29 minutes ago	Edit ·
atlas-storage-06.roma1.infn.it	CentOS 6.5	production	X7DB8	ATLAS/Service/Gluste...Osd	20 minutes ago	Edit ·
atlas-svc-00.roma1.infn.it	CentOS 6.5	production	RS700D-E6-PS8	ATLAS/Service/HA/DB	29 minutes ago	Edit ·
atlas-svc-01.roma1.infn.it	CentOS 6.5	production	RS700D-E6-PS8	ATLAS/Service/HA/DB	29 minutes ago	Edit ·
atlas-svc-02.roma1.infn.it	CentOS 6.5	production	X8DTU	ATLAS/Service/HA/DB	1 minute ago	Edit ·
atlas-svc-03.roma1.infn.it	CentOS 6.5	production	X8DTU	ATLAS/Service/HA/DB	6 minutes ago	Edit ·
atlas-svc-07.roma1.infn.it	CentOS 6.5	production	X8DT3		8 minutes ago	Edit ·
atlas-svc-10.roma1.infn.it	CentOS 6.5	production	RS700D-E6-PS8	ATLAS/Service/HA/DB	15 minutes ago	Edit ·
atlas-svc-11.roma1.infn.it	CentOS 6.5	production	RS700D-E6-PS8	ATLAS/Service/HA/DB	12 minutes ago	Edit ·
atlas-svc-12.roma1.infn.it	CentOS 6.5	production	RS700D-E6-PS8	ATLAS/Service/HA/DB	8 minutes ago	Edit ·
atlas-svc-13.roma1.infn.it	CentOS 6.5	production	RS700D-E6-PS8	ATLAS/Service/HA/DB	8 minutes ago	Edit ·
atlas-svc-14.roma1.infn.it	CentOS 6.5	production	RS700D-E6-PS8	ATLAS/Service/Packstack	6 minutes ago	Edit ·

Foreman Host Groups

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Host Groups

Filter ... × | Search | · | New Host Group | Help

Name	
ATLAS	Nest ·
ATLAS/Grid	Nest ·
ATLAS/Grid/SiteBDII	Nest ·
ATLAS/Grid/CreamCE	Nest ·
ATLAS/Grid/Int	Nest ·
ATLAS/Grid/Int/LSF	Nest ·
ATLAS/Grid/Int/LSF/NISs	Nest ·
ATLAS/Grid/Int/LSF/NISs/UI	Nest ·
ATLAS/Grid/Int/LSF/NISc	Nest ·
ATLAS/Grid/Int/LSF/NISc/UI	Nest ·
ATLAS/Grid/Int/LSF/NISc/WN	Nest ·
ATLAS/Grid/Int/UI	Nest ·
ATLAS/Grid/Int/NISs	Nest ·
ATLAS/Grid/Int/NISs/UI	Nest ·
ATLAS/Grid/Int/NISc	Nest ·
ATLAS/Grid/Int/NISc/UI	Nest ·
ATLAS_LNF	Nest ·

Foreman Puppet Classes

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Puppet classes

Filter ... × | Search | · | Import from atlas-foreman.roma1.infn.it | New Puppet class

Class name	Environments and documentation	Host group	Hosts	Keys	
afs	openstack production		0	1	Delete
afs::params	openstack production		0	0	Delete
apache	openstack production test		0	44	Delete
apache::confd::no_accf	openstack production		0	0	Delete
apache::default_confd_files	openstack production		0	1	Delete
apache::default_mods	openstack production test		0	3	Delete
apache::dev	openstack production test		0	0	Delete
apache::mod::alias	openstack production test		0	1	Delete
apache::mod::auth_basic	openstack production test		0	0	Delete
apache::mod::auth_kerb	openstack production test		0	0	Delete
apache::mod::authnz_ldap	openstack production		0	1	Delete
apache::mod::autoindex	openstack production test		0	0	Delete
apache::mod::cache	openstack production test		0	0	Delete
apache::mod::cgi	openstack production test		0	0	Delete
apache::mod::cgid	openstack production test		0	0	Delete
apache::mod::dav	openstack production test		0	0	Delete
apache::mod::dav_fs	openstack production test		0	0	Delete
apache::mod::dav_svn	openstack production test		0	0	Delete
apache::mod::deflate	openstack production test		0	0	Delete
apache::mod::dev	openstack production test		0	0	Delete

Hands-On [1]

- Create a new Foreman user for the tutorial
- Create a new Foreman HostGroup
  - HG_<name>
- Create a new project in OpenStack for the Tutorial
  - Associate the users to the new project
- Create the virtual router for the project
  - Associate a new internal subnet for the project
  - Associate the external net
  - Allocate the floating Ips
- Create a new access key and import it to OpenStack
  - ssh-keygen -t rsa -f cloud.key

Hands-On [2]

- **Create an Openstack Instance with CentOS 6.5**
  - **Use the following User Data**

```
#cloud-config
ssh_pwauth: True
packages:
  - puppet
puppet:
  conf:
    main:
      ssldir: $vardir/ssl
    agent:
      pluginsync: true
      report: true
daemon: false
      ca_server: atlas-foreman.roma1.infn.it
      environment: production
      server: "atlas-foreman.roma1.infn.it"
      certname: "%f"
users:
  - name: <username>
    gecos: <full name>
    sudo: ALL=(ALL) NOPASSWD:ALL
    ssh-authorized-keys:
      - ssh-rsa <key>
```

- **Assign a floating IP to the new machine and login via the access key as the user you defined**
- **Assign the host to the HG_<name> group in Foreman**
- **Assign classes in foreman to the HG_<name> and run puppet interactively on the machine**
  - **sudo puppet agent -t**