Satellite 6 Automation with Puppet

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Agenda

- Configuration management with Satellite 5.x

- Satellite 6 new features

- Introduction to Puppet

- Demonstration

- Puppet and Satellite 6

  - Why Puppet ?

  - Considerations if you want to move to Satellite 6

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Satellite 5.x Configuration management

Satellite 5.x – Configuration management features

- Manage all of your machines configurations from one central location

- Create configuration channels for a machines or a group of machines

- Create new files or upload existing config files

- Manage revision, compare versions

- **Deploy configuration changes as part of config management or associate with kickstart process**

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Systems ▼ [   ] Search

| Overview | Systems | Errata | Channels | Audit | **Configuration** | Schedule | Users | Admin | Help |

NO SYSTEMS SELECTED MANAGE CLEAR

- Overview
- Configuration Channels
- Configuration Files
- Systems

⚙ Configuration Overview ❓

The list below shows all of the configuration files that are managed by your organization in Red Hat Satellite. This list includes files that are managed centrally in configuration channels and files that are managed locally via individual system profiles.

Configuration Summary	
Systems with Managed Configuration Files:	2 systems
Configuration Channels:	3 channels
Centrally-managed Configuration Files:	3 files
Locally-managed Configuration Files:	0 files

Configuration Actions
View Systems with Managed Configuration Files
View All Managed Configuration Files
View All Managed Configuration Channels
Create a New Configuration Channel
Enable Configuration Management on Systems

Recently Modified Configuration Files:

1 - 3 of 3

Filename	Configuration Channel	Modified
📄 /etc/hosts	📺 hosts	17 weeks ago
📄 /etc/hosts	📺 Formation	39 weeks ago
📄 /var/www/html/index.html	📺 Apache	159 weeks ago

1 - 3 of 3

Recently Scheduled Configuration File Deployments:

No deployment actions.

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Knowledgebase | Documentation

USER: **mlessard** | ORGANIZATION: **Red Hat** | **Preferences** | **Sign Out**

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Systems ▾ [ ] Search

| Overview | **Systems** | Errata | Channels | Audit | Configuration | Schedule | Users | Admin | Help |

NO SYSTEMS SELECTED | MANAGE | CLEAR

Overview

Systems
- All
- Physical Systems
- Virtual Systems
- Out of Date
- Requiring Reboot
- Extra Packages
- Unentitled
- Ungrouped
- Inactive
- Recently Registered
- Proxy
- Duplicate Systems
- System Currency

System Groups
System Set Manager
Advanced Search
Activation Keys
Stored Profiles
Custom System Info
Kickstart
Software Crashes

vm1.mlc.dom

⊕ add to ssm | ⊖ delete system

Details   Software   Configuration   Provisioning   Groups   Audit   Events

Overview   View/Modify Files   Add Files   Deploy Files   Compare Files   Manage Configuration Channels

List/Unsubscribe from Channels   Subscribe to Channels   View/Modify Rankings

Configuration Channels

Below are all the centrally-managed configuration channels to which this system is subscribed. They are in priority order with the highest-ranked channels appearing first in the list.

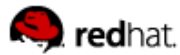Filter by Channel Name: [ ] Go

1 - 1 of 1 (0 selected)

☐	**Channel Name**	**Channel Label**	**Total Files**	**Deployable Files***	**Rank**
☐	hosts	hosts	1 file	1 file	1

Select All

1 - 1 of 1 (0 selected)

Unsubscribe

***- Note:** Deployable Files are files in a configuration channel that are not outranked by files in greater priority configuration channels nor overridden by files in the systems local configuration channel.

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| Systems ▼ | | Search |

| Overview | Systems | Errata | Channels | Audit | **Configuration** | Schedule | Users | Admin | Help |

NO SYSTEMS SELECTED | MANAGE | CLEAR

hosts ?

⊖ delete channel

- Overview
- Configuration Channels
- Configuration Files
- Systems

Overview   List/Remove Files   Add Files   Deploy Files   Systems

Channel Properties (Edit Properties)

Name:	hosts
Label:	hosts
Description:	Hosts for demonstration

Channel Information

Number of Files:	1 files, 0 directories, 0 symlinks (1 total)
Systems:	2 systems subscribed
Most-Recently Subscribed System	vm1.mlc.dom 17 weeks ago
Most-Recently Modified File	/etc/hosts by mlessard 17 weeks ago

Configuration Actions

Deploy Files

- Deploy all configuration files to all subscribed systems
- Deploy selected configuration files to all subscribed systems
- Deploy all configuration files to selected subscribed systems
- Deploy selected configuration files to selected subscribed systems

Compare Files

- Compare all files in channel to files on all subscribed systems

Add/Create Files

- Create new configuration file or directory
- Upload configuration files
- Import a file from another channel or system

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Revision 19 of /etc/hosts from channel hosts [?]

Details   Manage Revisions   Deploy File   Copy File   Compare File

File Details

Configuration Channel:	📺 hosts
Revision:	19 (view other revisions)
Creation Date:	145 weeks ago
Last Modified:	17 weeks ago by 👤 mlessard
File Type:	Text File ⇕ Click here for more information on the differences between text and binary files.
Next revision number:	20

File Properties

Filename/Path *:	/etc/hosts	
Ownership:	User name *:	root
	Group name *:	root
	Tip: If the user and/or group indicated here does not exist on system(s) to which this file is deployed, the deploy will fail.	
File Permissions Mode *:	644	
	Tip: '644' for text files and '755' for directories and executables will allow global access or execution (but not modification).	
SELinux context:		
	Tip: Enter SELinux context like: user_u:role_r:type_t:s0-s15:c0.c1024 (Note: you don't have to enter all parts)	

Additional File Details

MD5 Sum:	md5:203da6d9737851e127c20b8eb6d2f3ce
Macro Delimiters *:	Start Delimiter: {| End Delimiter: |} **Tip:** A full listing of the available macros is listed in the RHN Reference Guide.

File Contents

```
1 127.0.0.1    localhost localhost.localdomain localhost4
  localhost4.localdomain4
2 ::1          localhost localhost.localdomain localhost6
  localhost6.localdomain6
3 192.168.100.100 satellitedemo.mlc.dom
4 192.168.100.41 vm1.mlc.dom
5 192.168.100.48 vm2.mlc.dom
6 192.168.100.46 vm3.mlc.dom
7 192.168.100.1 laptop.mlc.dom
```

Overview
Configuration Channels
Configuration Files
  Centrally Managed Files
  Locally Managed Files
Systems

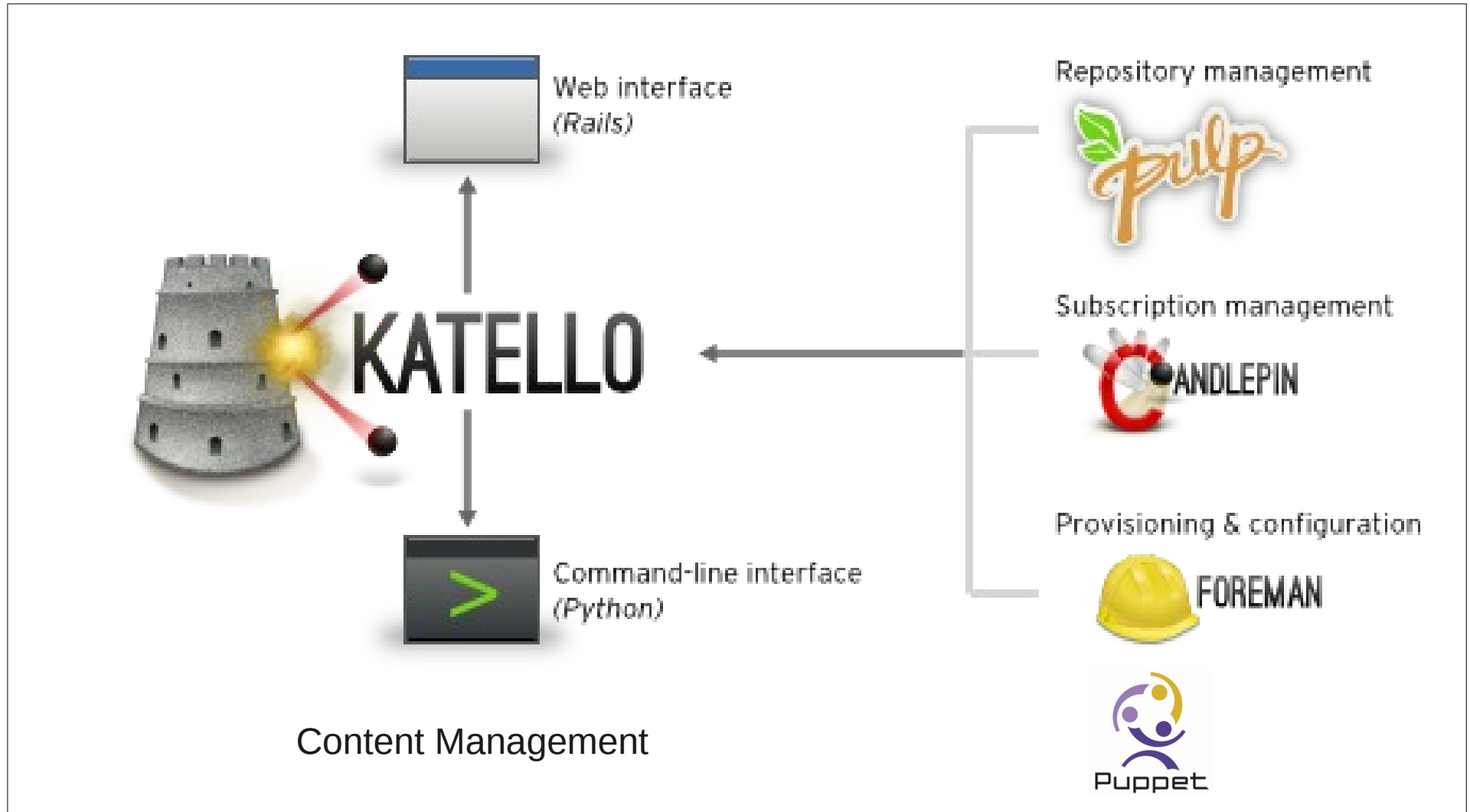# Satellite 5.x – Configuration management cl

```
[r/]# rhncfg-manager create-channel rhel6-prod
    Creating config channel rhel6-prod

[r/]# rhncfg-manager add --channel rhel6-prod /etc/hosts
    Using server name satellitedemo.mlc.dom
    Pushing to channel rhel6-prod

[r/]# rhncfg-manager diff --channel=rhel6-prod /etc/hosts
    - 192.168.100.4 vm2.mlc.dom
    + 192.168.100.56 friday.mlc.dom

[r/]# rhncfg-client get /etc/hosts
    Deploying /etc/hosts
```

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Satellite 6 – Foundation

Web interface
(Rails)

Repository management

Subscription management

Provisioning & configuration

KATELLO

Command-line interface
(Python)

FOREMAN

Puppet

Content Management

Satellite 6 – Automation with Puppet

Red Hat Satellite 5 & 6 Core Capabilities

Red Hat Satellite 5

- ✓ Provision 10s – 1000s systems
- ✓ Configuration Management
- ✓ Automated Software Distribution
- ✓ Lifecycle Management
- ✓ Administrator Dashboard

Red Hat Satellite 6

- ✓ Provision 10s – 10,000+ systems
- ✓ Recipe-Style Configuration Management
- ✓ Automated Software Distribution
- ✓ Refined Lifecycle Management
- ✓ Customizable Dashboards
- ✓ Simplified Content Management
- ✓ Drift Management
- ✓ Federated Services & Management
- ✓ Deploy on VMware, RHEV, EC2, and OpenStack

Introduction to Puppet

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What is Puppet ?

- Think of it as infrastructure code

- Describe stats, no step

- Paint a picture of your ideal and most clean system Puppet does the rest

- Puppet focuses on managing constructs like users, services and packages

- Puppet can detect the current state of the system (Facter)

- Won't make changes unless necessary

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Puppet Architecture

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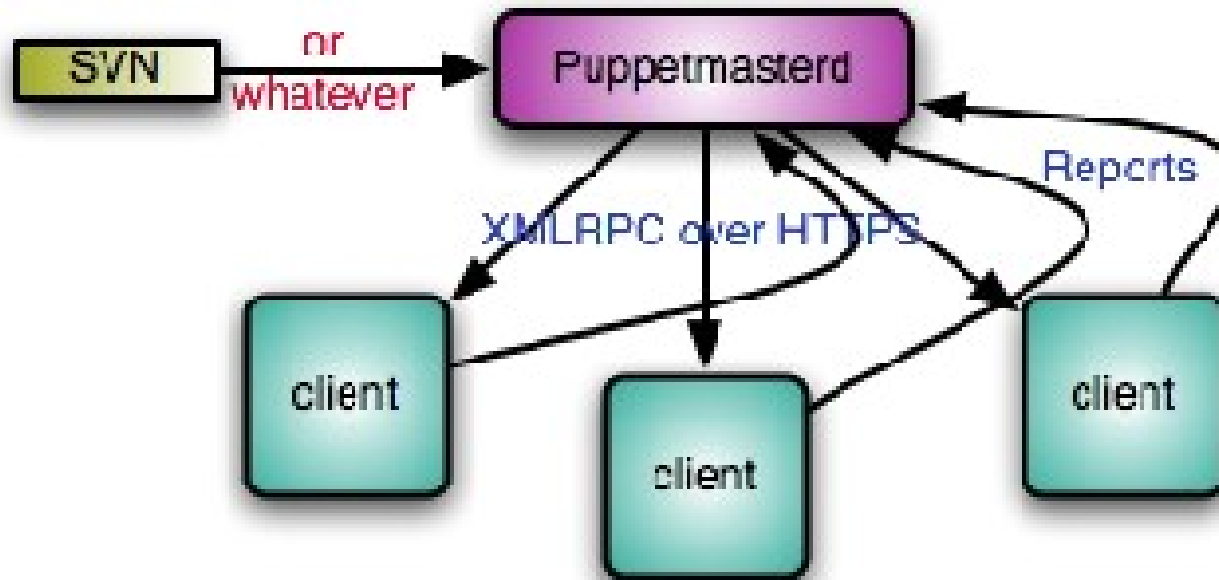
PUPPET DSL
Example – managing ntp services with puppet

```
class ntp {
    package { "ntp":
        ensure => installed,
    }

    file { "ntp.conf":
        path => '/etc/ntp.conf',
        ensure => file,
        require => Package[ "ntp" ],
        source => "puppet:///modules/ntp/ntp.conf",
    }

    service { 'ntp':
        name => 'ntpd',
        ensure => running,
        enable => true,
        subscribe => File[ "ntp.conf" ],
    }

}
```

PACKAGE

CONFIGURATION

SERVICE

Example – managing sshd service

```
class sshd {
    augeas { "sshd_config":
        context => "/files/etc/ssh/sshd_config",
        changes => [
        "set PermitRootLogin yes",
        "set UsePAM no",
        ],
        notify => Service[ "sshd" ]
}
    service { "sshd":
        ensure => running,
        enable => true,
        hasrestart => true,
    }
}
```

How does Puppet know about your system ?

- Using the Ruby library Facter

- Facter supports a large numbers of predefined facts

- Customs facts can be defined

```
# facter
architecture => x86_64
bios_vendor => Seabios
bios_version => 0.5.1
blockdevices => vda,vdb
interfaces => eth0,lo
ipaddress => 172.16.27.44
ipaddress_eth0 => 172.16.27.44
is_virtual => true
kernel => Linux
kernelmajversion => 2.6
kernelrelease => 2.6.32-431.el6.x86_64
kernelversion => 2.6.32
etc, ...
```

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Installation

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Installation Puppet server (RHEL 6)

```
[r/]# rhn-channel -a -c  rhel-x86_64-server-optional-6

[r/]# rpm -ivh http://yum.puppetlabs.com/puppetlabs-release-el-6.noarch.rpm

[r/]# yum install puppet-server puppet

[r/]# puppet --version
3.4.3

[r/]# chkconfig puppetmaster on ; service puppetmaster start

[r/]# chkconfig puppet on ; service puppet start
```

DON'T FORGET DNS RESOLUTION AND TIME SYNCHRONISATION

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Installation Puppet client (RHEL 6)

```
[r/]# rhn-channel -a -c  rhel-x86_64-server-optional-6

[r/]# rpm -ivh http://yum.puppetlabs.com/puppetlabs-release-el-6.noarch.rpm

[r/]# yum install puppet

[r/]# vim/etc/puppet/puppet.conf  (add the following at the bottom)

server = puppet.example.com
runinterval = 120
report = true


[r/]# chkconfig puppet on ; service puppet start

On the puppetmaster server, sign the certs (possible to auto-sign)
[r/]# puppet cert sign puppet-client.example.com
```

DON'T FORGET DNS RESOLUTION AND TIME SYNCHRONISATION

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Demonstration

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First example 1/2 - deploy some files

```
[r/]# cd /etc/puppet/modules

[r/]# mkdir -p specdirs/{files,manifests}

[r/]# vim /etc/puppet/modules/specfirs/manifest

class specdirs {
        file { ['/test/','/test/etc','/test/etc/rc/','/test/etc/rc/shared']:
                ensure => "directory",
                owner => "root",
                group => "root",
                mode => "750",
        }
}
```

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First example 2/2

```
[r/]# vim /etc/puppet/manifests/site.pp

#--------------------------------------------------------
# site.pp
#--------------------------------------------------------
include specdirs

[r/]# puppet apply /etc/puppet/manifests/site.pp
Notice: Compiled catalog for puppetmaster.mlc.dom in environment production in 0.05
seconds
Notice: /Stage[main]/Specdirs/File[/test/]/ensure: created
Notice: /Stage[main]/Specdirs/File[/test/etc]/ensure: created
Notice: /Stage[main]/Specdirs/File[/test/etc/rc/]/ensure: created
Notice: /Stage[main]/Specdirs/File[/test/etc/rc/shared]/ensure: created
Notice: Finished catalog run in 0.09 seconds

On the puppet client :
Test the communication with the server

[r/]#  puppet agent --test --waitforcert 60
```

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Puppet dashboard Installation

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Install Puppet – Dashboard 1/3

On the Puppetmaster server

[r/]# yum install mysql mysql-server puppet-dashboard

[r/]# vi /etc/my.cnf (add the following)
max_allowed_packet = 32M

[r/]# chkconfig mysqld on ; service mysqld start

[r/]# vi /usr/share/puppet-dashboard/config/settings.yml (change the following)
(run rake time:zones:local to find your timezone)
time_zone: 'Eastern Time (US & Canada)'

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Install Puppet – Dashboard 2/3

```
[r/]# mysql

mysql> CREATE DATABASE dashboard CHARACTER SET utf8;

mysql> CREATE USER 'dashboard'@'localhost' IDENTIFIED BY 'my_password';

mysql> GRANT ALL PRIVILEGES ON dashboard.* TO 'dashboard'@'localhost';

mysql> quit

[r/]# cd ~puppet-dashboard && rake RAILS_ENV=production db:migrat
```

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Install Puppet – Dashboard 3/3

[r/]# chkconfig puppet-dasboard on ; service puppet-dashboard start

[r/]# vi /etc/puppet/puppet.conf

[master]
reports = store, http
reporturl = http://puppet.example.com:3000/reports/upload

[r/]# touch /usr/share/puppet-dashboard/log/production.log

[r/]# chmod 666 /usr/share/puppet-dashboard/log/production.log

[r/]# chkconfig puppet-dashboard-workers on ; service puppet-dashboard-workers start

 http://puppetmaster.mlc.dom:3000

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PUPPET AND SATELLITE 6

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What Puppet does than Satellite doesn't

- Start/restart services

  - Restart a service after a configuration change

- Create users, remove users

- Aware of your systems state

- Enforce something

- Manages BSD/*nix and Windows (2003, 2008, 7)

- Resources relationship

- Edit a configuration file

Why Puppet ?

Puppet vs Chef vs Ansible vs Salt

	Puppet 3.0	**Chef 11.4**	**Ansible 1.3**	**Salt 0.17**
Pros	▪ Modules can be written in Ruby or a simpler, Puppet-specific subset of Ruby ▪ Push commands let you trigger modifications immediately ▪ Web UI handles reporting, inventorying, and real-time node management ▪ Detailed and in-depth reporting on agent runs and node configurations	▪ Cookbooks and recipes can leverage the full power of Ruby ▪ Centralized JSON-based "data bags" allow scripts to populate variables during runtime ▪ Web UI lets you search and inventory nodes, view node activity, and assign Cookbooks, roles, and nodes	▪ Modules can be written in nearly any language ▪ No agent required on managed clients ▪ Web UI lets you configure users, teams, and inventories, and apply Playbooks to inventories ▪ Extremely simple to set up and get running	▪ State files can be simple YAML configuration templates or complex Python or PyDSL scripts ▪ Can communicate with clients through SSH or through a locally installed agent ▪ Web UI offers views of running jobs, minion status, and event logs, and lets you execute commands on clients ▪ Extremely scalable
Cons	▪ Requires learning Puppet DSL or Ruby ▪ Installation process lacking in error checking and error reporting	▪ Requires knowledge of Ruby programming ▪ Currently lacks functional push commands ▪ Documentation is sometimes vague	▪ Lacks support for Windows clients ▪ Web UI doesn't tie into an existing Ansible deployment automatically; inventories must be imported	▪ Web UI is not as mature or complete as competitors ▪ Lacks deep reporting capabilities
Pricing	Free open source version; Puppet Enterprise costs $100 per machine per year	Free open source version; Enterprise Chef free for 5 machines, $120 per month for 20 machines, $300 per month for 50 machines, $600 per month for 100 machines, and so on	Free open source version; AWX free for 10 machines, then $100 or $250 per machine per year depending on support	Free open source version; SaltStack Enterprise costs $150 per node per year, with volume discounts and site licenses available

Orchestrators at a glance

Source :
http://www.infoworld.com/d/data-center/review-puppet-vs-chef-vs-ansible-vs-salt-231308?page=0,0

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Puppet / Satellite 6 considerations

- Keep Puppet modules as modular as possible and single tasked

- Using role and profile classes is recommended.

    - This will allow users to map the modules or role and profile classes to Satellite host groups.

- User should consider building module artifacts as archives as if using Puppet Forge. This will allow import of modules into Satellite 6 and for it to display details of the module.

- Define Modulefiles for modules so dependencies are explicitly declared

Puppet / Satellite 6 considerations

- Manifests inside of modules are supported, but manifests containing classes outside of modules will not be supported

- The use of node definitions within manifests is not supported

  ```
  node vm1.example.com {
  file { '/tmp/test.txt' :
  content => "Bye bye !!\n",
      }
  }
  ```

- Hiera function call will be supported. (Foreman, alt: smart variables)

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Puppet Forge

- A community driven web service

- A repository of modules

```
[r/]# puppet module list

[r/]# puppet module search apache

[r/]# puppet module install puppetlabs-apache

[r/]# puppet module upgrade puppetlabs-apach –version -.0.3
```

http://docs.puppetlabs.com/guides/module_guides/bgtm.html

puppet forge

Search from 2,235 modules   Find

Search · apache

Found 60 modules matching '*apache*'

Relevancy | Latest release | Most Downloads

Filters   clear

Operating System
- Any -

Puppet Version
- Any -

Puppet Enterprise Version
- Any -

☐ Puppet Enterprise Supported Modules only

Apply Filters

Note: Modules that do not have information about compatibility in their metadata will not appear in filtered results.

Authors: Learn how to add compatibility to your modules.

example42/apache   297,661 downloads
Puppet module for apache

Version 2.1.7 released **Apr 2, 2014** | 154 downloads of this version

puppetlabs/apache   143,071 downloads
Puppet module for Apache

Version 1.0.1 is a **Puppet Enterprise supported module**
Version 1.0.1 released **Mar 4, 2014** | 11,691 downloads of this version

supported

theforeman/apache   1,462 downloads
Apache HTTP server configuration

Version 1.4.0 released **Dec 2, 2013** | 539 downloads of this version

vStone/apache   1,447 downloads
Manage apache and vhosts with puppet.

Version 0.13.1 released **Aug 2, 2013** | 327 downloads of this version

ghoneycutt/apache   1,233 downloads

Version 1.0.1 released **Aug 11, 2010** | 1,071 downloads of this version

---

Puppet Enterprise Supported Modules   *new*

puppetlabs/stdlib (3.2.1)

puppetlabs/apt (1.4.2)

puppetlabs/concat (1.0.2)

puppetlabs/registry (1.0.0)

puppetlabs/inifile (1.0.3)

puppetlabs/ntp (3.0.3)

puppetlabs/reboot (0.1.5)

puppetlabs/mysql (2.2.3)

puppetlabs/apache (1.0.1)

puppetlabs/firewall (1.0.2)

puppetlabs/java_ks (1.2.3)

puppetlabs/postgresql (3.3.3)

Learn more | View all

Popular Searches

network

openstack

storage

ssh

References

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References

- Convert Satellite 5 Configuration channels into Puppet Modules : Puppetize (http://youtu.be/x-mR8EfxJZw)

- A tool that takes arbitrary local file input and outputs puppet DSL : Lambchop (https://github.com/thoraxe/lambchop)

- http://docs.puppetlabs.com/geppetto/latest/index.html Integrated development for puppet : Geppetto Eclipse module

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Questions ?

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Puppet debugging notes

- Port 8140

- Cert troubles

  - yum remove puppet

  - rm -rf /var/lib/puppet

  - rm -rf /etc/puppet

  - On master

    # puppet cert list (to see which ones require a signature)

    # puppet cert list --all (show all certificates)

    # puppet cert clean vm1.mlc.dom

    # puppet cert revoke vm1.mlc.dom

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Scaling Puppet

- WEBrick, default webserver, 10 nodes max

- **Passenger** or Mongrel

  - Passenger : mod_rail or mod_rack (Apache 2 module)

- Don't use the deamon, use cronjob

  - Puppet agent --onetime

- No central host (rsync, git) - scales infinitely

- More tricks in the puppet documentation

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THANK YOU !

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