

Making servers dance to your tune

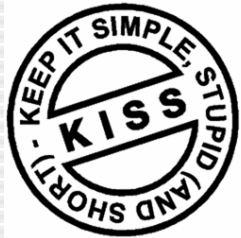
Real World Configuration Management

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<http://puppet.reductivelabs.com>

Introduction

What is Configuration Management?



Keep It Simple Stupid

Management Speak

- Management model for:
 - Infrastructure
 - Applications
 - Data
- Documentation of attributes and operations
- Consistency of attributes and operations
- Validation, audit, and verification

Where does it fit?

- Change Management
- Build Services
- Service Management
- Monitoring
- and Configuration Management...

Do you need it?

- Large number of like hosts ... that are somehow never alike
- High level of failed change
- If your shop looks like this...



Just for enterprises?

- 10, 100, 1000+?
- “Mum, what’s an enterprise?”



What are the benefits?

Reproducibility
Accuracy

Homogeneity
Decision Support

Reduced Cost
Reduce Labor



Risks and Challenges

- Tools != Process
- Information is power
- Accurate information is all-powerful

Best practice #1

- Lifecycle
 - Categorize, modularize, standardize
 - Test
 - Document
 - Implement
 - Maintain
 - Audit and Quality Assurance

Best practice #2

- Common sense works best
- Leverage existing repositories
 - LDAP
 - Asset Management
 - CMDB
- Track changes or Software Configuration Management is your friend
 - Subversion
 - Git
- Ownership and accountability

Who sells this miracle ointment?

- Proprietary software vendors
 - Tivoli
 - BMC
 - CA Unicentre
- Free Open Source Software
 - Cfengine
 - Bfg2
 - Puppet
 - ...

Why Open Source?

- Cost
- Extensibility
- Strong community support
- Agile development
- Agile solution - monolithic does a lot of stuff not very well

Requirements

- What infrastructure do you need?
- How much will it cost?
- How long will it take to implement?

An army of consultants?



A mountain of cash?



Nope...

Puppet – the fiddly bits

- Free Open Source Software
- Client-Server model
- Secure SSL encrypted communication
- Unix-centric – supports Linux, Solaris, BSD, OS X, AIX, HP-UX et al
- Allows use of external databases and LDAP
- Highly extensible
- Written in Ruby

All the same..but different

Debian

- apt-get install openssh-server
- vim /etc/ssh/sshd_config
- /etc/init.d/ssh start

Redhat

- yum install openssh-server
- vim /etc/ssh/sshd_config
- service sshd start

The Answer

SSH and a *for/while* loop is not the answer.

SSH and a for loop is the question.

The answer is “no”

Old Way

- `yum install openssh-server`
- `vim /etc/ssh/sshd_config`
- `service sshd start`

Becomes

```
package {ssh: ensure => installed}
```

```
file { sshd_config:  
  name = "/etc/ssh/sshd_config",  
  source = "puppet://server/apps/ssh/sshd_config",  
}
```

```
service { sshd: ensure => running,  
           ensure => enabled,}
```

Not Puppet...

```
# yum install ruby
# apt-get install ruby
# ports install ruby
# emerge ruby
# rpm -Uvh ruby-1.8.6.i386.rpm
# up2date ruby
# fink install ruby
# pkg_add ruby
# pkg-get ruby
# rug install ruby
# pkgadd ruby
```

Is puppet..

```
package {
  ruby: ensure => installed
}
```

What can be managed?

- SSH keys
- Packages
- Mount points
- Services
- Cron jobs
- Users
- Groups
- Solaris Zone files
- Yum repositories
- Mailing lists and aliases
- k5login files
- Nagios configuration
- Binaries and scripts
- Files, directories and sym-links
- Whatever custom types you create...

Facter

- System inventory tool
 - Returns facts about hosts
- ```
hostname => absinthe
ipaddress => 10.0.0.15
kernel => Linux
```
- Detects changes and updates information
  - Facts can be used in Puppet configurations

## The cool bits...

- Declarative language
- Abstracts configuration as resources
- Allows relationships
- Transactional

## Speaking in tongues

```
file { ["/etc/postfix/main.cf":
 source => "puppet://server/postfix/main.cf",
 mode => 0640,
 user => "postfix",
 group => "postfix",] }
```

```
user { "postfix":
 ensure => present, }
```

```
service { "postfix":
 ensure => running,
 enable => true, }
```

## Classes and definitions

```
class postfix {
 ... collection of resources ...
}
```

```
define postfix_files {
 ... Repeatable application ...
}
```

## Nodes

```
node "webserver.domain.com" {
 include webserver
}
node "db1", "db2", "db3" {
 include database
}
```

- Nodes also support inheritance

## Modules

- Collections of classes, definitions and resources
- Portable and self-contained
- Several collections of modules available online for common configurations:  
<http://reductivelabs.com/PuppetModules>

## Language Attributes

- Arrays
  - [ "red", "green", "blue" ]
- Variables
  - \$variable = value
- Conditionals
  - If/else statement
  - Case statement
  - Selectors



## Let's all get related...

- Resources must be applied before specified resources
  - `require => File["/etc/postfix"]`
- Resources must be applied after specified resources
  - `before => Exec["makealiases"]`
- Resources are applied in response to specified resources
  - `subscribe => File["/etc/postfix/main.cf"]`
  - `notify => Service["postfix"]`

## Templates

- Allows you to create template configuration files
- For file-based configurations without types
- Uses Ruby ERB
- Allows population of templates with Puppet configuration, variables and facts

## An example template

```
class resolvconf {

 $searchpath = "example.com"
 $nameservers= "10.0.0.1"

 file { ["/etc/resolv.conf"]:
 path => "/etc/resolv.conf",
 content => template("resolv.conf.erb") }
}

resolv.conf.erb:
search <%= searchpath %>
<% nameservers.each do |ns| %>nameserver <%= ns %>
<% end %>
```

## So who is using Puppet?

- Google
- The Fedora Project
- Empowering Media
- Stanford University
- Speakeasy
- SANS Network Operations Centre
- Vquence
- And others...

## Measuring success

- Availability
- Reduction in incidents
- Rate of failed change
- Build time and speed to market
- Compliance to SOE, policy & standards

## Do more with less?

- Doesn't mean headcount cuts
- Doesn't mean budget cuts
- More time to work on the projects that count
- Better use of time means happier people

## The future is a ....

- Integration & Interoperability
  - Workflow systems
  - Service Level Management
  - Compliance & Governance systems
  - Inventory

## Puppetshow

logged in as admin | Log out

**Puppetshow** SEARCH

Home Param Values Resource Tags Resources Hosts Fact Values Source Files

| Name       | IP          | Resources                                                   | Facts                                      | Last compile        |      |
|------------|-------------|-------------------------------------------------------------|--------------------------------------------|---------------------|------|
| ldb-debvm1 | 10.211.55.3 | Package[conway], Class[base], KLogin[tmp/klogin-test4], ... | kernel, serialnumber, processorscount, ... | 02/28/2008 09:31 AM | Show |

Resources for ldb-debvm1

| Name                     | Parameters                     | Tags                        | Source File                           | Line  |      |
|--------------------------|--------------------------------|-----------------------------|---------------------------------------|-------|------|
| Package[conway]          | ensure                         | package, conway, class, ... | /etc/puppet/manifests/classes/base.pp | 3     | Show |
| Class[base]              | [n/a]                          | class, base, node, ...      | [n/a]                                 | [n/a] | Show |
| KLogin[tmp/klogin-test4] | principals, principals, notify | klogin, class, base, ...    | /etc/puppet/manifests/classes/base.pp | 8     | Show |

Param Values for KLogin[tmp/klogin-test4]

| Param Name | Value       |
|------------|-------------|
| principals | stuff@stuff |
| principals | gee@gee     |
| notify     | Exec[blah]  |

3 Found

| File[tmp/thingduh] | ensure, notify       | file, thing, duh, ...        | /etc/puppet/manifests/definitions/thing.pp | 7     | Show |
|--------------------|----------------------|------------------------------|--------------------------------------------|-------|------|
| Exec[blah]         | refreshonly, command | exec, blah, class, ...       | /etc/puppet/manifests/definitions/thing.pp | 10    | Show |
| Node[ldb-debvm1]   | [n/a]                | node, ldb-debvm1, class, ... | [n/a]                                      | [n/a] | Show |
| Thing[duh]         | ensure               | thing, duh, class, ...       | /etc/puppet/manifests/classes/base.pp      | 4     | Show |
| Class[... :main ]  | [n/a]                | class, main                  | [n/a]                                      | [n/a] | Show |

8 Found

1 Found

## Links

Puppet

<http://puppet.reductivelabs.com>

Pulling Strings With Puppet

<http://www.apress.com/book/view/1590599780>

Managing Linux with Puppet

<http://mirror.linux.org.au/pub/linux.conf.au/2008/Fri/mel8-166.ogg>

## Questions?

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