

# How Puppet fits into your existing architecture

**2011-11-10**  
**Seattle, WA**  
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# We are hiring

- **Professional Services**
- **Technical Training Manager**
- **Operations Engineer**

# Provisioning



# Provisioning

**No upgrades** – just build new systems

- solves issue of intermediate states

# Provisioning

**Start from a known base!**

# Provisioning

## PXE

- Provisions VM's and Physical systems the same way

## Cloudy API's

- May not be an option if you have physical hardware

# Provisioning

## Cobbler

- My favorite provisioning system for PXE
- Handles tftp/dhcp/dns/repo's
- Namely for RedHat-ish systems, also supports Solaris, Debian, and images (ie: memtest, windows, firmware upgrades, etc)
- <http://github.com/ghoneycutt/puppet-cobbler>

# Provisioning

## Puppet CloudPack

- Provision EC2 and VMWare systems
- Uses fog (<http://fog.io>), so easily hackable



# Provisioning

## Chicken and Egg with Software Repo's

- `--tags repo`
- Preferred over run stages for simplicity and portability in modules

# Provisioning

## Certificate management

- autosigning is your friend
- can also pre-generate certs
- `gencert.php` – uses reverse DNS

# External Node Classifier

## Puppet Dashboard

- source of truth for list of nodes
- Add/Remove hosts through API – ties into provisioning

# Package Management

## Run your own Software Repositories

- You control when package versions change
- Packages are not mysteriously missing
- Much faster provisioning

# Package Management

## Version control your repositories

- Does not mean you need to use a VCS
- `/data/repos/CentOS_5.5_Base` symlink to `/data/repos/CentOS_5.5_Base-2011062700`
- Use `hardlink(1)` to deal with duplicate files

# Package Management

**package {}**

- ensure => present or absent
- no version #'s

# Package Management

**no package { 'foo': ensure => latest }**

- not so homogeneous clusters while groups of systems converge
- ideally upgrades happen with rebuilds
- upgrades are triggered out of band – MCollective

# Account Management

## Use a directory service

- LDAP
- Active Directory



# Account Management

## Role based access control

- Groups get access, NOT users
- Who is in what team can be delegated to HR/management

# Account Management

**`/etc/security/access.conf`**

- controls groups that may access the system
- <http://github.com/ghoneycutt/puppet-pam>

# Account Management

List users as virtual resources sorted by UID and realize as necessary

```
@common::mkuser { 'apachehup':  
  
  uid      => '32001',  
  
  gid      => '32001',  
  
  home     => '/home/apachehup',  
  
  managehome => true,  
  
  comment  => 'Apache Restart User',  
  
  dotssh   => true,  
  
}
```

<http://github.com/ghoneycutt/puppet-generic>

# Data storage

## Data?

- information that your node serves or creates

# Data storage

## Keep data stored off node

- SAN / NAS / Cloudy store
- rebuilt machines reconnect to your data

# Disposable Architecture



# Disposable Architecture



<http://www.linkedin.com/in/erichedrick>

# Disposable Architecture

- not how many systems are alive
- service response times
- % of anticipated capacity



# Disposable Architecture

**Develop other metrics to determine system health**

- not how many systems are alive
- response times
- % of anticipated capacity

# Auto-scaling

## Tying it together

- (de)provision based on metrics
  - capacity, response, etc

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# Change Management with Puppet

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# What?

**Change** – “an event that results in a new status of one or more configuration items”[1]

[1] – [http://en.wikipedia.org/wiki/Information\\_Technology\\_Infrastructure\\_Library#Change\\_Management](http://en.wikipedia.org/wiki/Information_Technology_Infrastructure_Library#Change_Management)

# Why?

**Environments are the same!**

Dev == QA == Staging == ... == PROD

# Why?

## Compliance with Change Management policies

- CAB – Change Approval/Advisory Board
- Different environments have different criteria for passing to the next one

# Different Environments

**Puppet Test Area -> Dev -> QA -> Prod**

**Each environment has different teams and sometimes conflicting goals**



# Gate Examples

## **Puppet Test Area -> Dev**

- Dev's agree/know of change

## **Dev -> QA**

- Dev's have completed and self tested

## **QA -> Prod**

- QA team has verified systems
- Ops is ready (has runbooks, monitoring setup, ... )

# Documentation and Policies

## Understand your environments

- What are they?
- What is their order of precedence?
- What are their SLA's?
- Who owns them?

# Documentation and Policies

## Understand gating factors for change

- What are the gates between each environment?
- Who approves them?
- In what forum are they approved?

# VCS Structure (SVN view)

```
├── branches
│   ├── 644
│   │   ├── manifests
│   │   │   └── site.pp
│   │   └── modules
│   │       ├── apache
│   │       └── zenoss
│   └── 755
│       ├── manifests
│       │   └── site.pp
│       └── modules
│           ├── apache
│           └── zenoss
├── tags
│   ├── 2011041100
│   ├── 2011041101
│   └── 2011041200
└── trunk
    ├── manifests
    │   └── site.pp
    └── modules
        ├── apache
        └── zenoss
```

# VCS Structure (git view)

same as SVN except

- you do **not** have separate directories for
  - trunk
  - branches
  - tags

# VCS Structure

## trunk / master

- New code that is the best known **working code**
- but still not very well tested ...

# VCS Structure

## branches

- short lived
- use topical branches!
- associate branches with ticket numbers, so you can leverage your ticketing system to capture who is requesting changes and why
- avoid assigning branches to people as they tend to be long lived

# VCS Structure

## tags

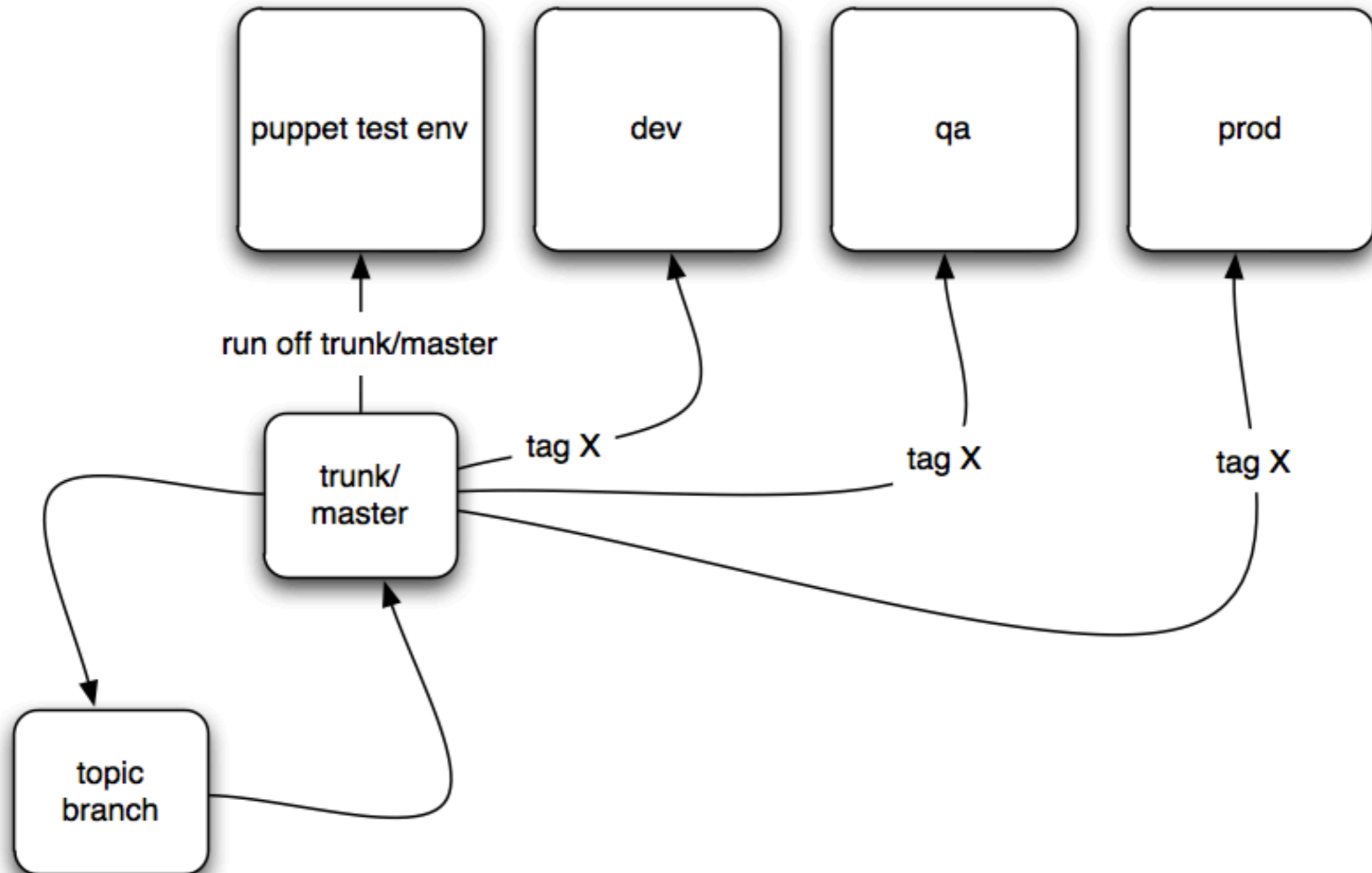
- immutable (even if you can technically make changes)
- found that BIND style serials work quite well for naming tags
- 2011041300 would be the first tag on April 13th, 2011.



# Flow

- Change request comes in (from your ticket system)
- You create a branch from trunk/master that corresponds with the request
- Make changes to the branch
- Merge the branch back into trunk/master
- test against trunk/master
- create a tag
- associate that tag with the next environment all the way through to Prod

# Flow



# Oops, we found a bug

- tags are immutable, remember?
- create a brand new tag off of trunk/master
- start the process from the beginning
- short-cuts are more expensive

# Release Management

## Multiple people making changes?

- You need a release manager to be responsible for merging from branches into trunk/master
- Potentially rotate who holds this position

# Release Management

## Multiple teams exchanging code?

- Investigate using multiple module paths
- Communication!
  - private github – can facilitate cooperation

# Mailing List of changes

## Create a mailing list for all changes

- You can always ignore it
- reach out to those writing poor code before they ask you to merge it into trunk
- svnmailer is great

# Testing trunk/master

**Create at least one representative system for each different type of system you model**

- Run these systems off the code in trunk/master
- Before cutting a tag, rebuild all these systems from scratch
  - further tests that relationships between resources are working
  - proves you can actually provision a system from scratch

# Approaches to testing branches

- Puppet's understanding of environments is good for this
- Setup a different Puppet master per branch
- Do not rely on a puppet master at all -- use puppet apply and test locally



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