Practical Infrastructure Automation

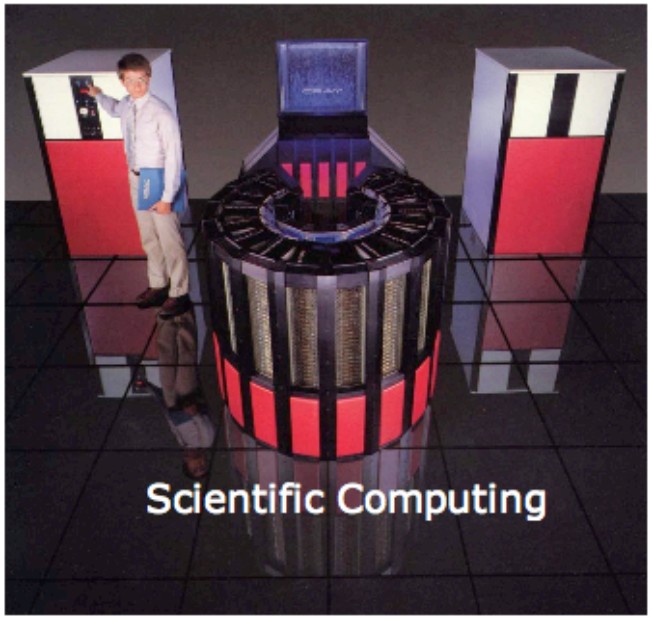
About Me.

- Over the past 12 years, I have worked as sysadmin for startups, large enterprises, small businesses, and big banks.
- Joined Reductivelabs in May of 2008.
- Took over all of the professional services and training in August of 2008.
- Have trained over 200 sysadmins to use Puppet to model their infrastructure.

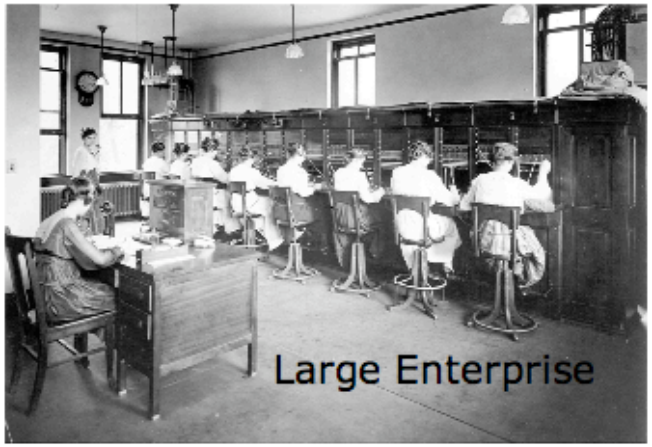
About Reductive Labs.

- We are the company behind the Puppet automation framework.
- We make our money providing support and services around the Puppet project.
- Now located in Portland, Oregon.
- As of November, we will be a full 10 people strong. As of November 1st we will be a full 10 people strong.

The Old Way



The Old Way



The Interwebs!

The interwebs!

Success means that companies must learn to operate at scale.

The interwebs!

Delivery is a service not an artifact.

The interwebs!

Customers expect Google.

The interwebs!

Infrastructure and operational knowledge become shared across the web.

A Better Way.

Good sysadmins wrote their own tools for automation.

We attacked the problem with Perl and a healthy portion of hubris.

A Better Way.

Tool set:

- automated system deployment (kickstart, jumpstart, imaging)
- ssh in a for loop
- centralized authentication
- shared storage
- scripting languages

A Better Way.

The Wizard.

A Better Way.

Each organization carries the burden of their own automation infrastructure.

The Agile Software Development Manifesto.

We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:

- Individuals and interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

That is, while there is value in the items on the right, we value the items on the left more.

The James White Manifesto

The James White Manifesto

On Infrastructure

- There is one system, not a collection of systems.
- The desired state of the system should be a known quantity.
- The "known quantity" must be machine parseable.
- The actual state of the system must self-correct to the desired state.
- The only authoritative source for the actual state of the system is the system.
- The entire system must be deployable using source media and text files.

The Practical Infrastructure Manifesto

We are uncovering better ways of developing infrastructure by doing it and helping others do it. Working together we have discovered that given a framework that allows us to:

- Consider an infrastructure collectively rather than individually
- Express the desired state of the collection
- Analyze the desired state programmatically
- Implement the desired state

We can value:

- Interaction over processes
- Delivery over documentation
- Collaboration over dispute

We recognize that the framework is an ideal we seek as a means to an end and not an end itself.

The New Way

The New Way

Shared Tools

- CFengine
- Chef
- Puppet

The New Way

Declare State

```
package { 'ntp': ensure => present }
```

The New Way

Provide a model

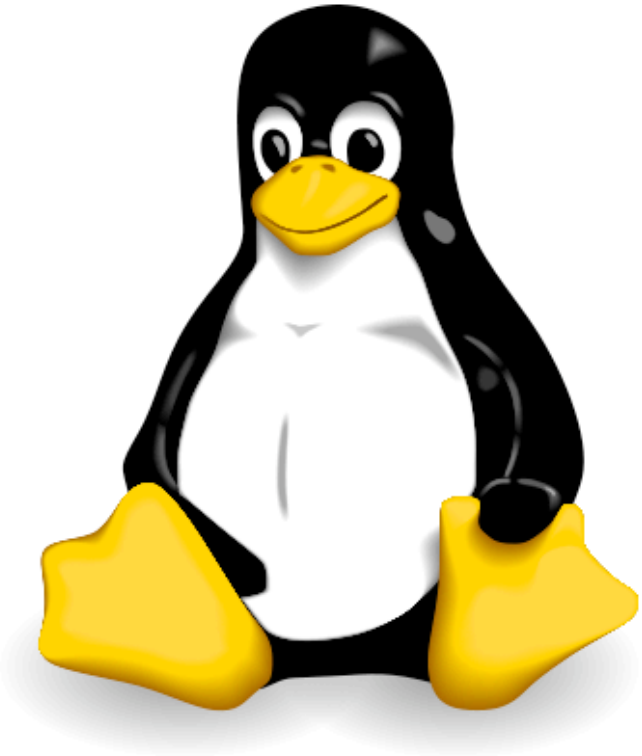
```
service { 'puppetmasterd':
    enable => 'false',
    ensure => 'running'
}
```

The New Way

Declare Dependencies

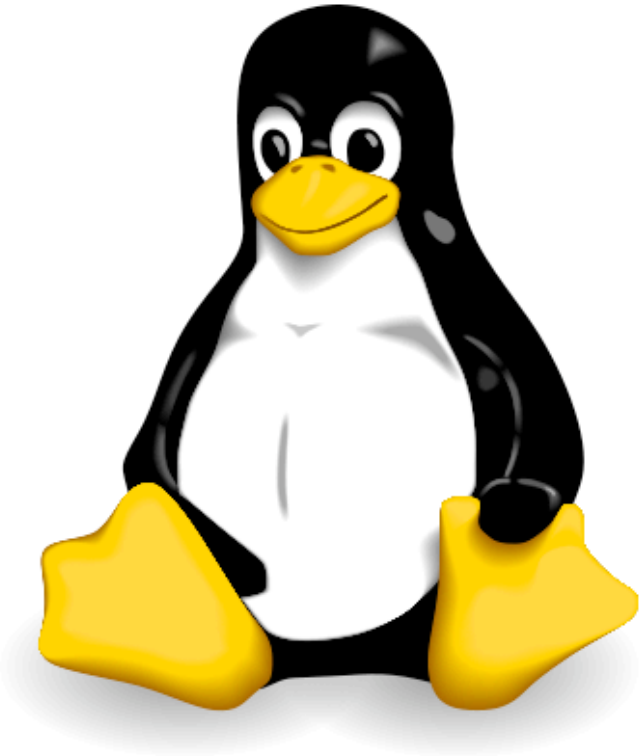
```
package { 'ntp': ensure => present }
file    { '/etc/ntp.conf':
  owner         => 'root',
  group         => 'root',
  mode          => '644',
  source        => '/etc/puppet/files/ntp/ntp.conf',
  require       => Package['ntp']
}
service { 'ntpd':
  enable        => true,
  ensure        => 'running',
  subscribe     => File['/etc/puppet/files/ntp/ntp.conf']
}
```

Tools and Components: Linux



Network based packaging systems.

Tools and Components: Linux

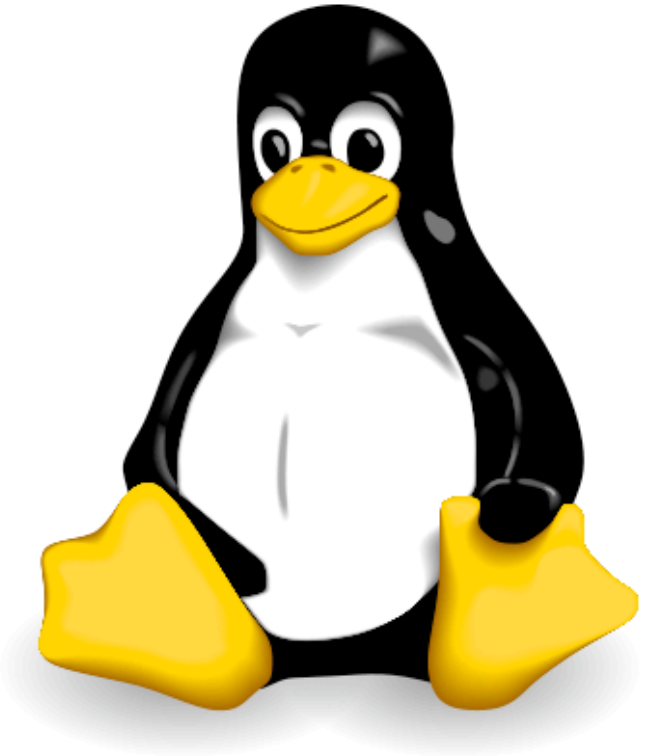


Update-able by without vendor involvement

Tools and Components: Linux

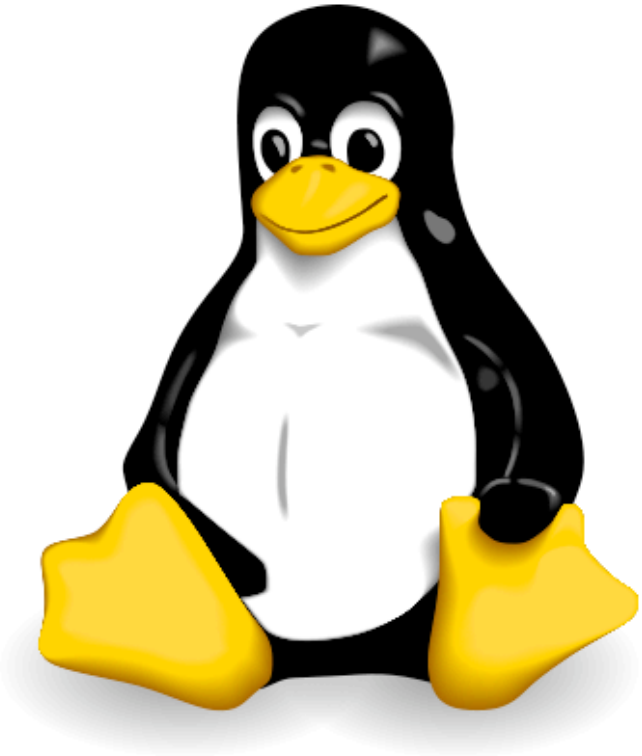
Low per node cost.

Tools and Components: Linux



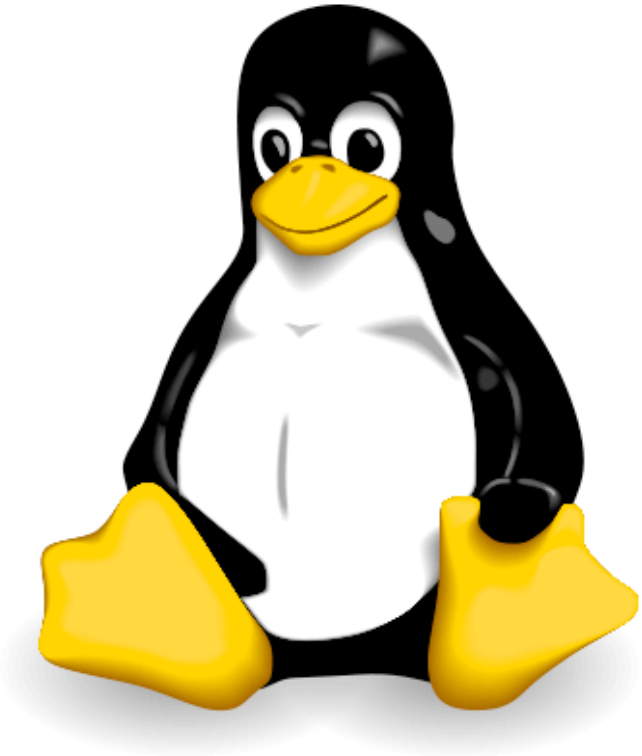
Ubiquitous.

Tools and Components: Linux



Embraces automation and virtualization

Tools and Components: Linux



The best automation tools integrate into Linux.

Tools and Components: Build on an open stack

Proprietary software vendors are not interested in uniform automation

Tools and Components: Other components.

Monitoring and testing

Tools and Components: Other components.

Provisioning and virtualization tools and continuous integration

Tools and Components: Other components.

A version control system

The small independent web development shop.

Challenges

- no dedicated infrastructure developer
- diverse deployment requirements
- failures in infrastructure appear to be failures in code

The small independent web development shop.

Solution

- Control the platform.
- avoid unnecessary complexity.
- separate common infrastructure code and data from customer specific code.
- embed infrastructure development in agile process.

Embed infrastructure in development.

- Create a shared module path for baseline system builds across customers.
- Create a per project module with the baseline classes included.
- Deploy infrastructure as part of CI or QA process.

The Enterprise.

Technology Challenges:

- Platform sprawl
- Commercial application stacks
- Diversified services
- Legacy infrastructure state

The Enterprise.

Technology Solutions:

- Implement Puppet broadly even if only in a reporting state.
- Leverage legacy CMDB.
- Enable consistent monitoring.
- Focus on common configuration.
- Focus on platform delivery.

The Enterprise.

Organizational Challenges:

- Siloed organization
- Non technical management
- Dogmatic change control process

The Enterprise.

Organizational Solutions:

- Organize Puppet code to enable participation by other groups
- Demonstrate success and recapture cycles
- Don’t be dogmatic focus on delivery
- Work within change control policies
- Leverage Reporting

Uniqueness

“You are not a beautiful and unique snowflake. You are the same decaying organic matter as everyone else, and we are all part of the same compost pile.”

~Chuck Palahniuk, Fight Club

Where do we go from here?

- Universal Provisioning.
- Orchestration.
- Integration Testing.
- Risk Analysis.
- Better Solutions Sharing!

Questions?

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