Integrating the Cloud with Puppet

About me:

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Who is this talk for?

Cloud Users

Puppet beginners

It will cover

why integrate?

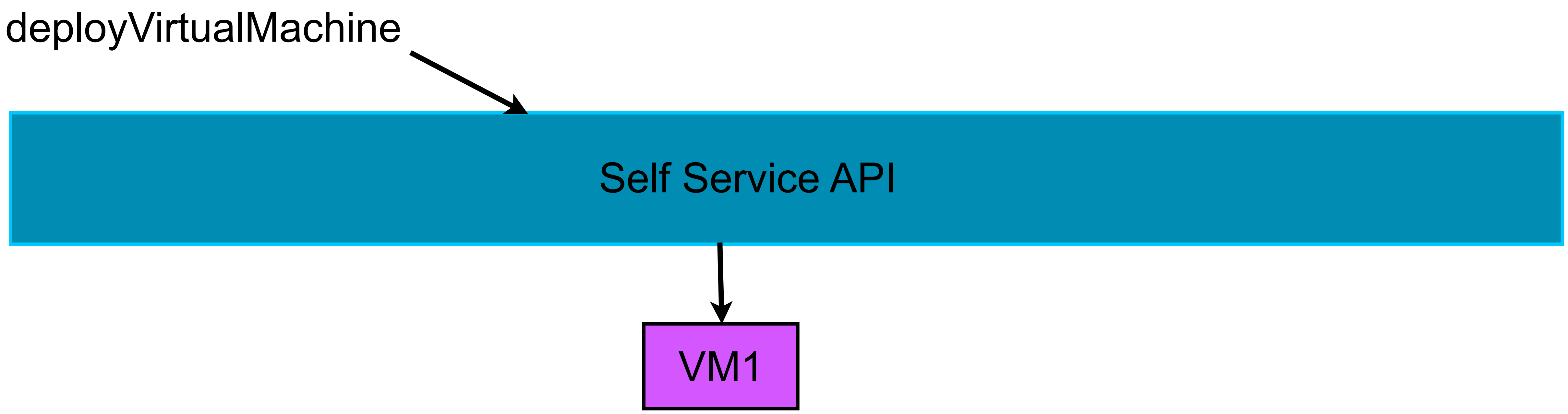
explanation of Puppet’s architecture as it applies to integration

using Puppet to model VM instances

Why Integrate?

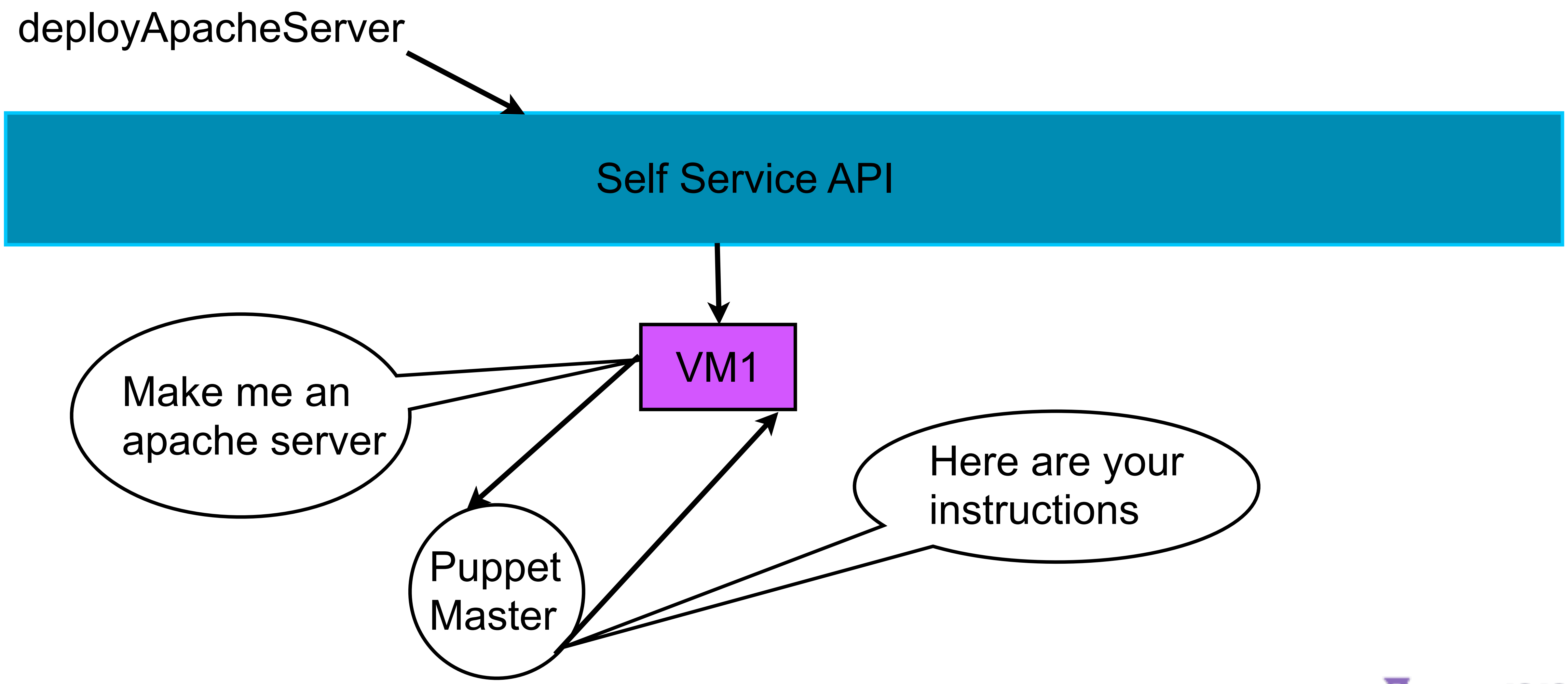
Cloud

Provisions virtual machines



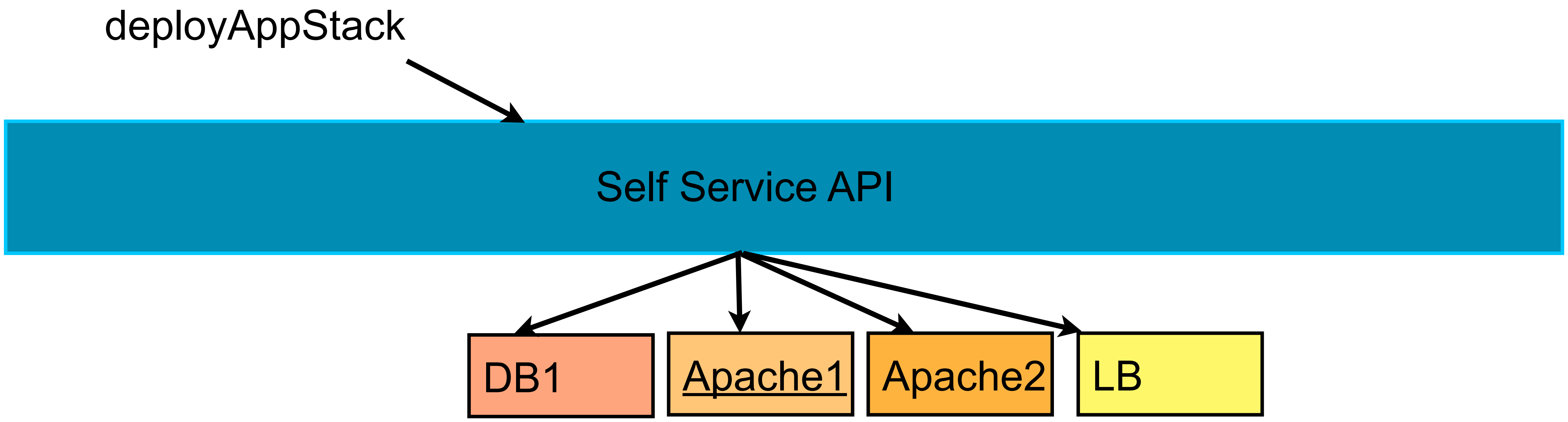
Puppet

VMs -> Applications

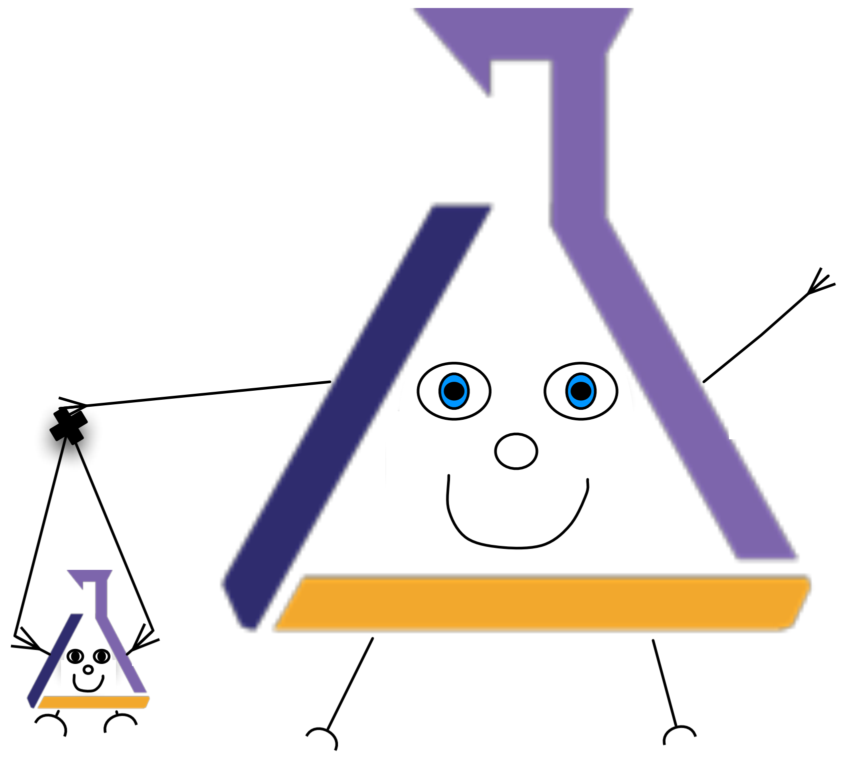


Together

PaaS



Puppet

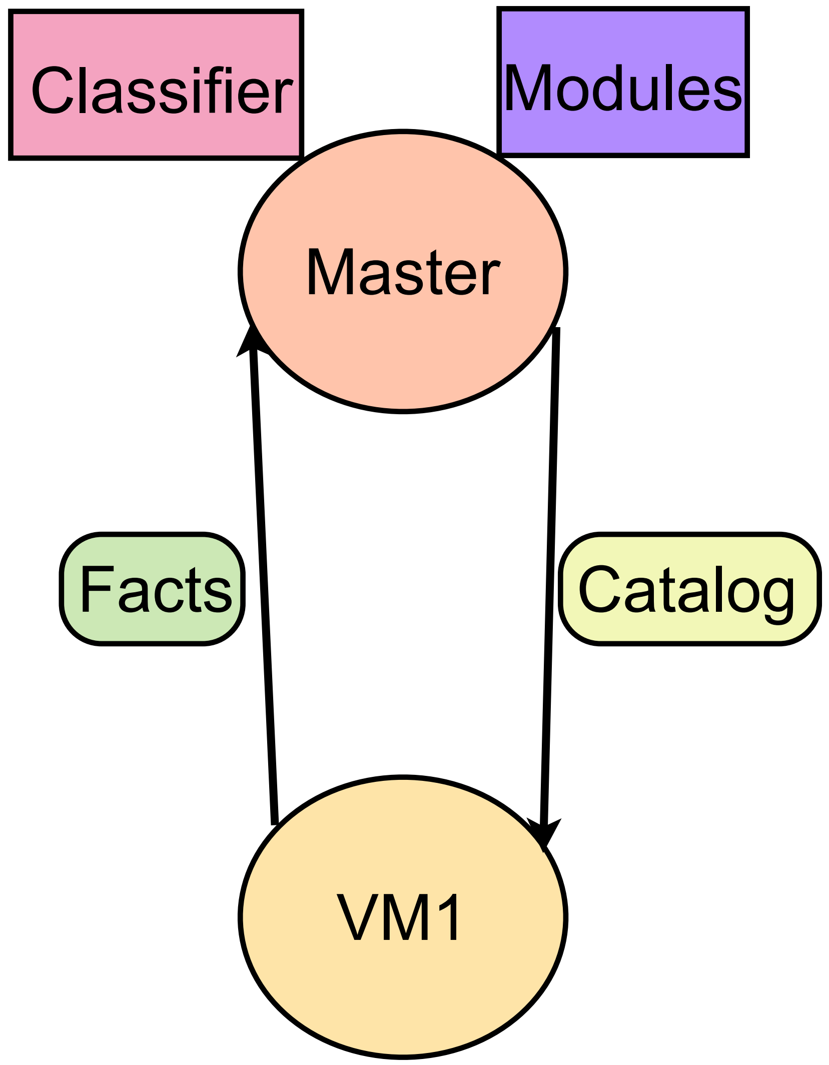


2 run modes

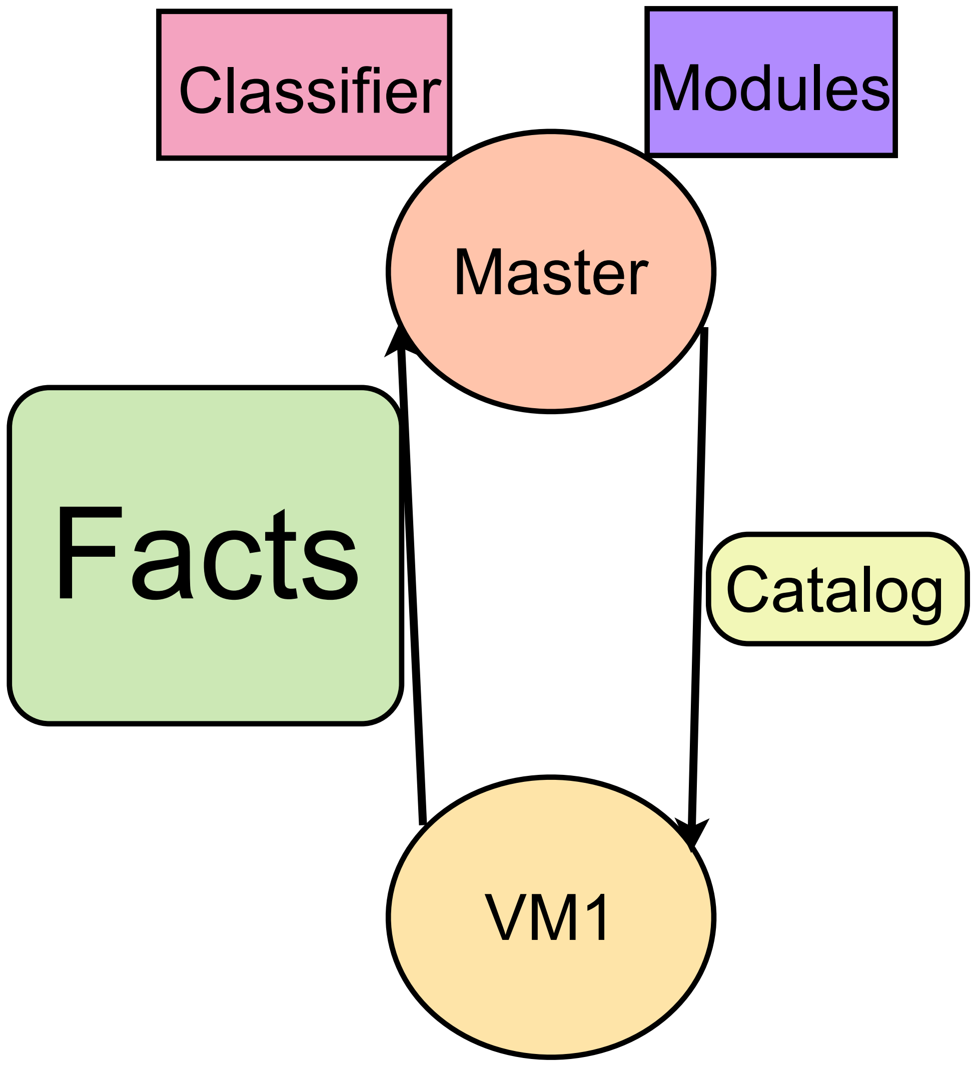
puppet apply

client/server

Puppet Client/Server



Facter



Facter

```
$ facter
architecture       => x86_64
domain              => local
fqdn                => DansLapTop.local
id                  => danbode
ec2_instance_id  => abc123abc123abc123
operatingsystem => ‘Ubunbtu’
osfamily           => ‘Debian’
.....
```

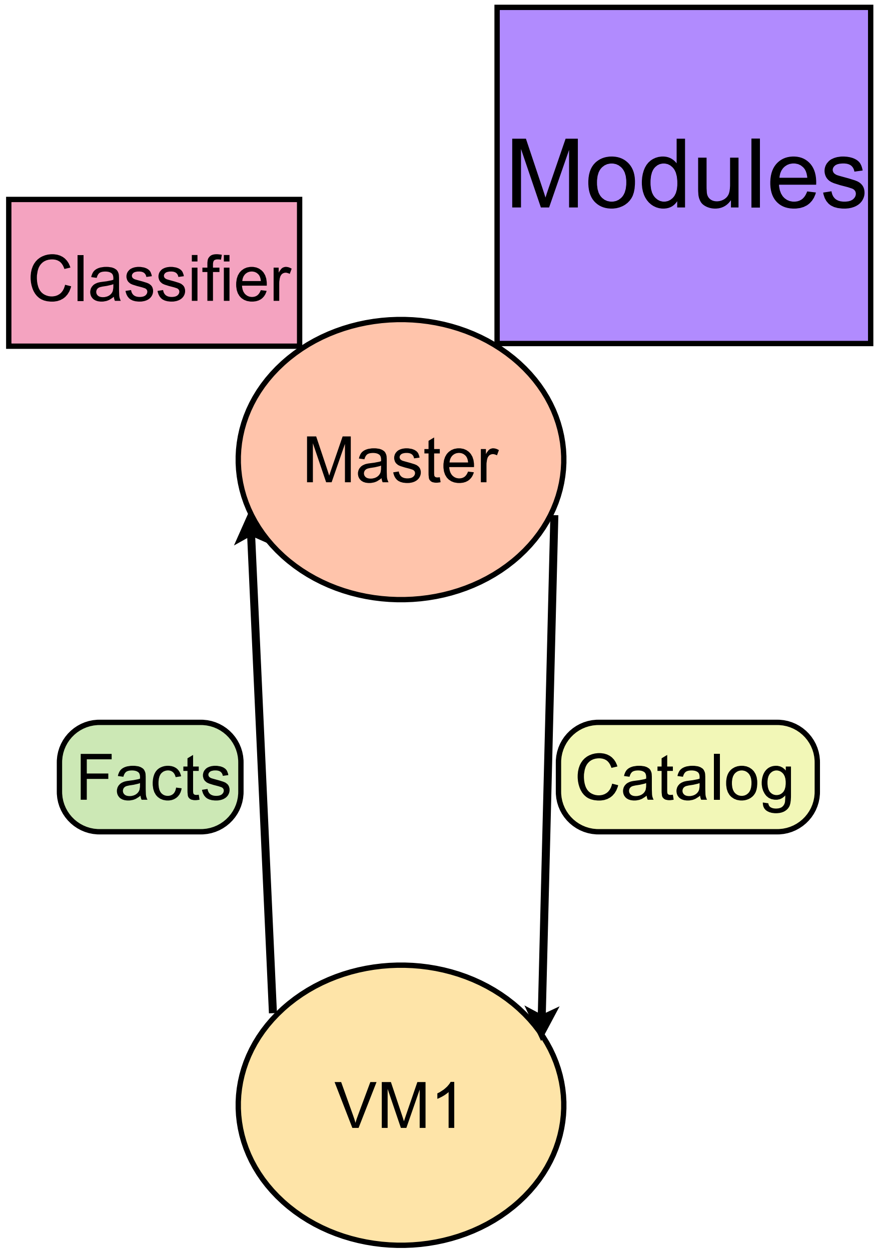
Facter

Available as top scope variables from manifests

ie : $::fact_name

Creating custom facts is easy.

Modules

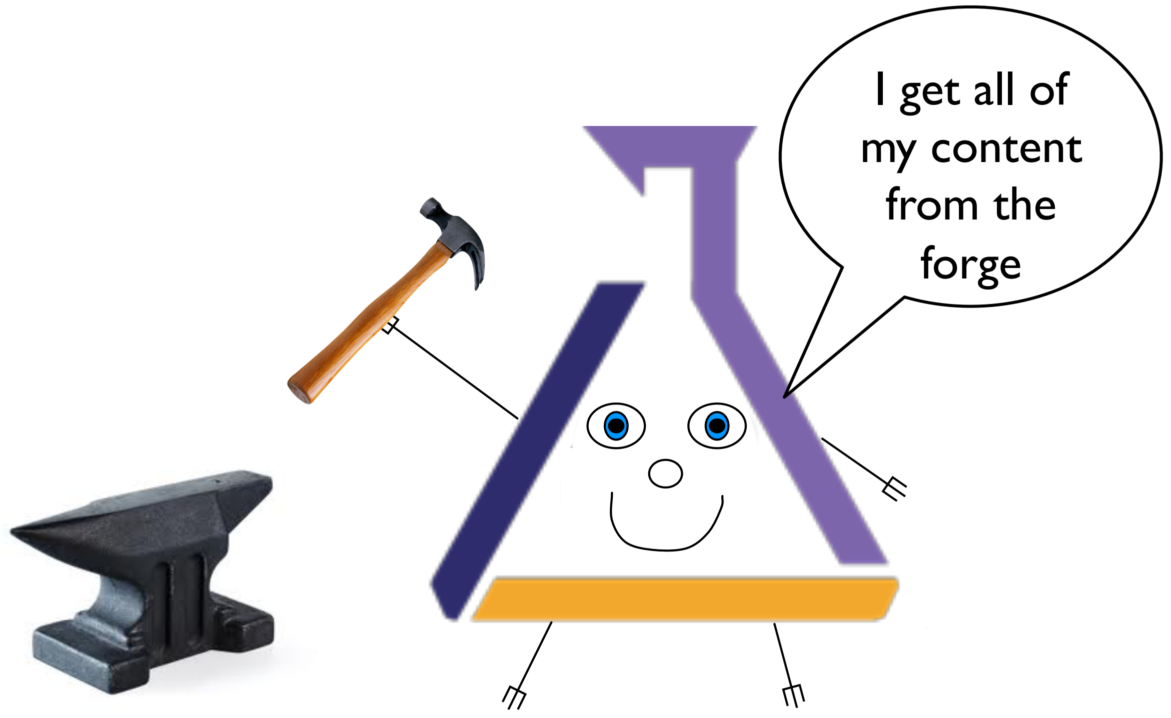


Modules

Sharable Puppet content

Module Forge

http://forge.puppetlabs.com/puppetlabs/apache



Classes/defines compose resources

Resources

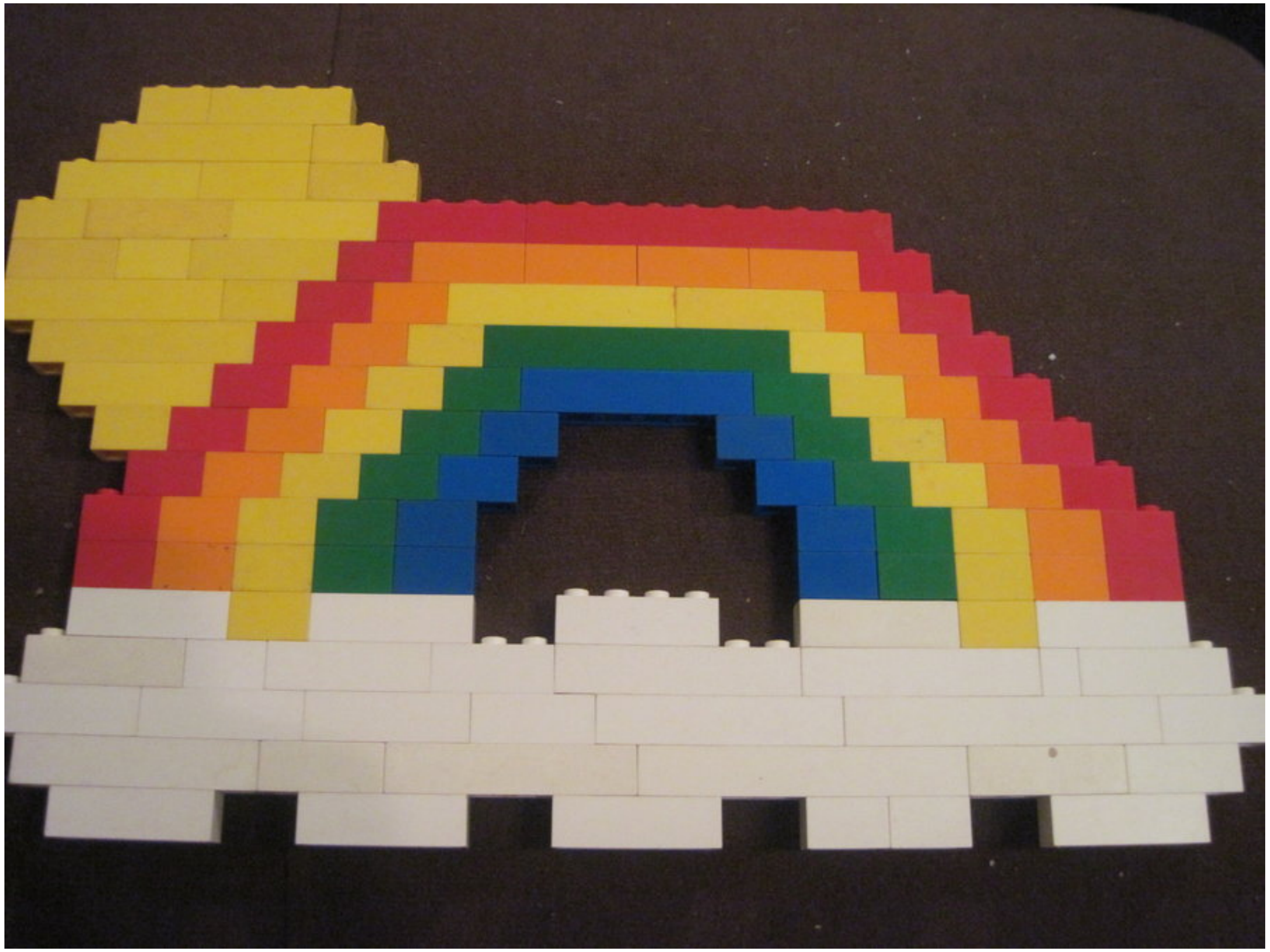
Describe the configuration state of individual system elements.

```
user { ‘dan’:                    # a  user named dan
   ...
```

```
user { ‘dan’:                    # a  user named dan
  ensure => present,         # should exist
  ...
```

```
user { ‘dan’:                    # a  user named dan
  ensure => present,           # should exist
  shell     => ‘/bin/bash’,   # with this shell
}
```

Puppet DSL and resources



Puppet DSL

Composes collections of **resources**.

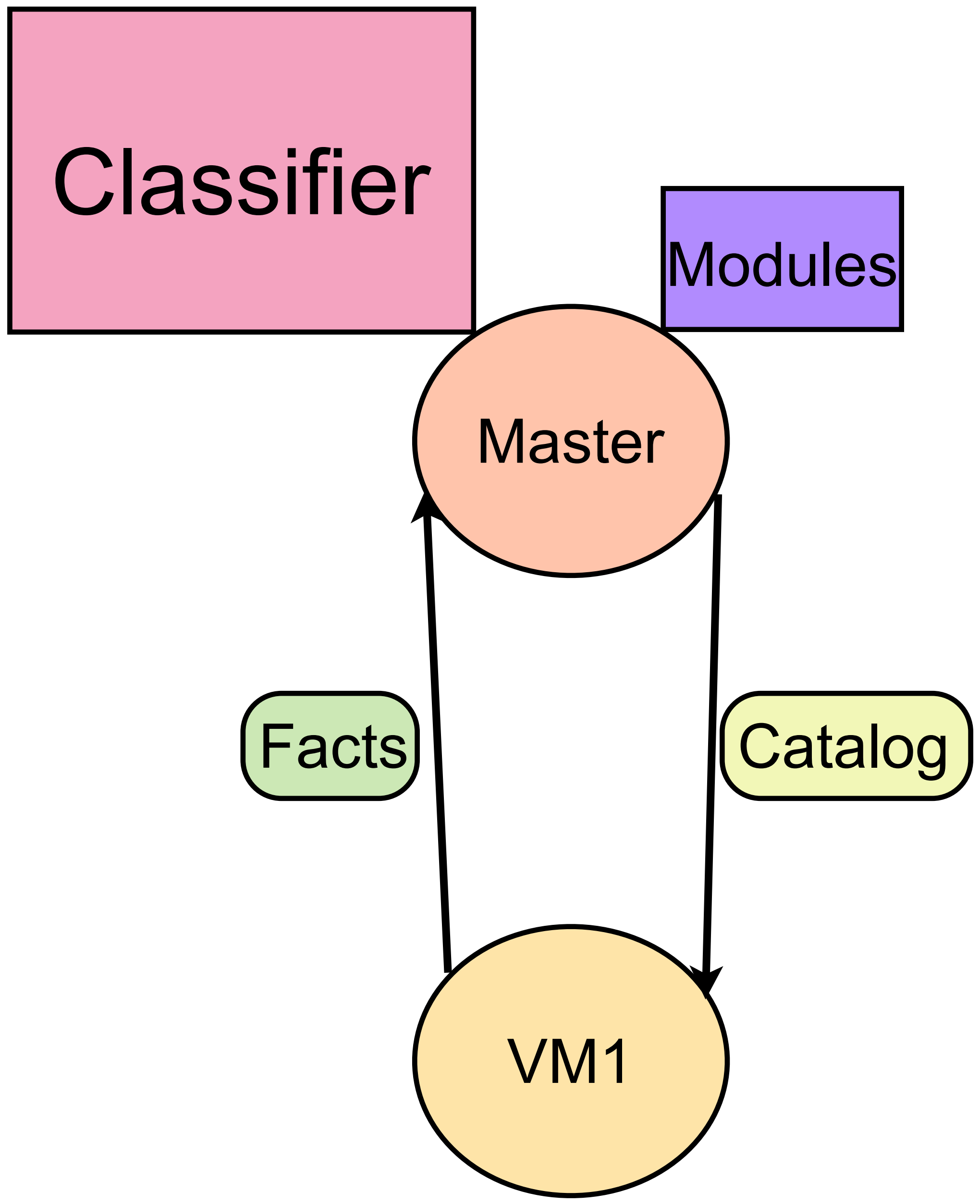
Package/File/Service

```
class webserver {
  package { ‘apache2’: ... }
  file { ‘/etc/apache2/apache2.conf’:
    ...
    require  => Package[‘apache2’],
  }
  service { ‘apache2’:
    ...
    subscribe => File[‘/etc/apache2/apache2.conf’]
  }
}
```

configure a node

```
include webserver
```

Classification (maps roles as classes)



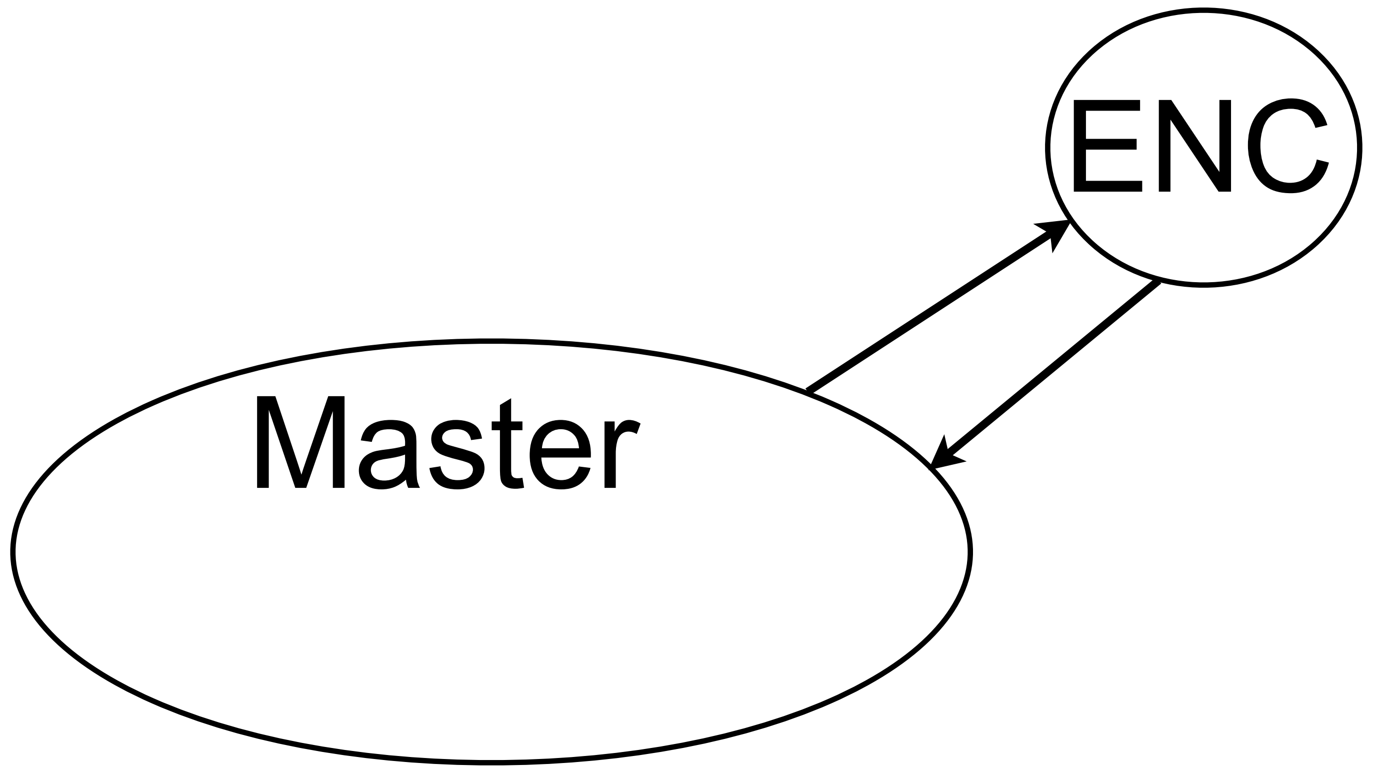
Site manifest

(/etc/puppet/manifests/site.pp)

Map a host’s certname to content from a module

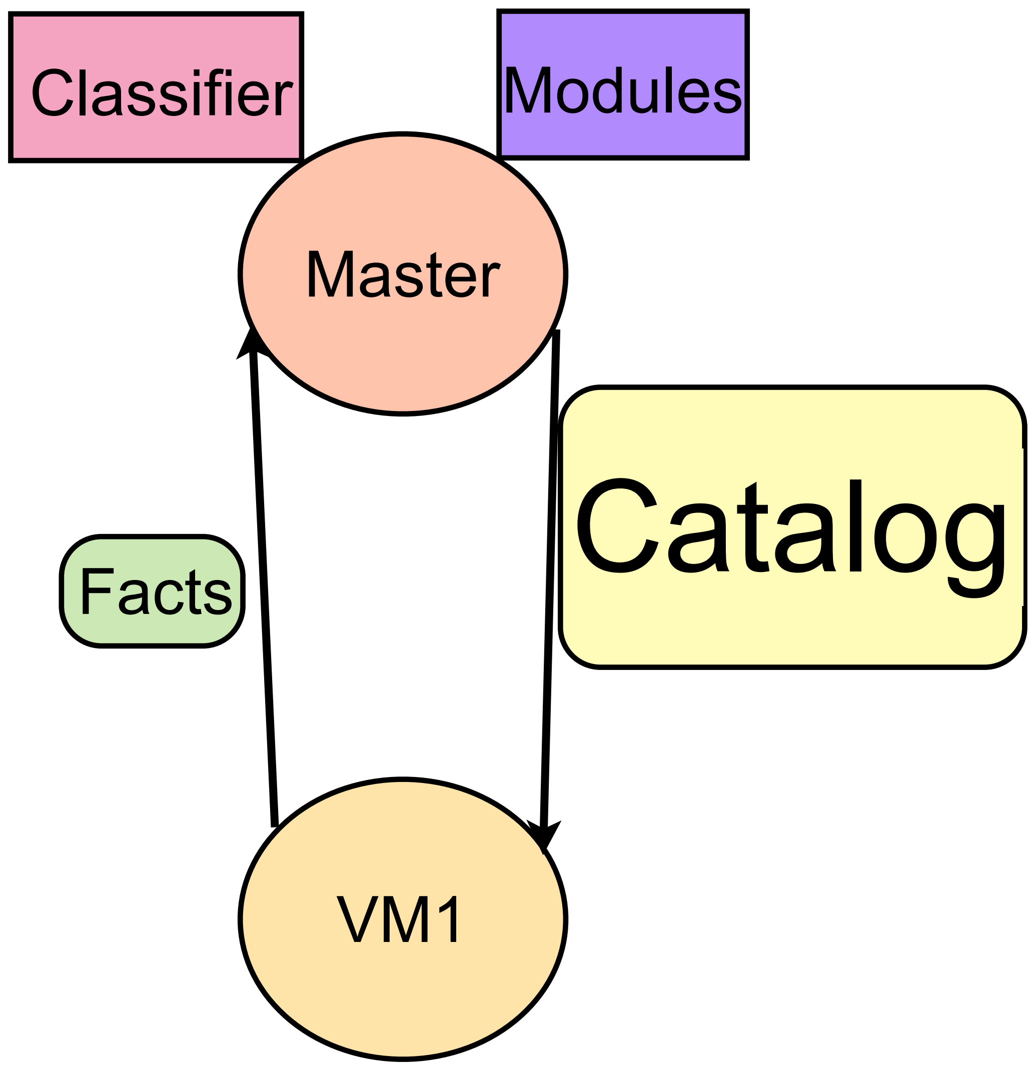
```
node /^my_node/ {
  include apache
}
```

ENC

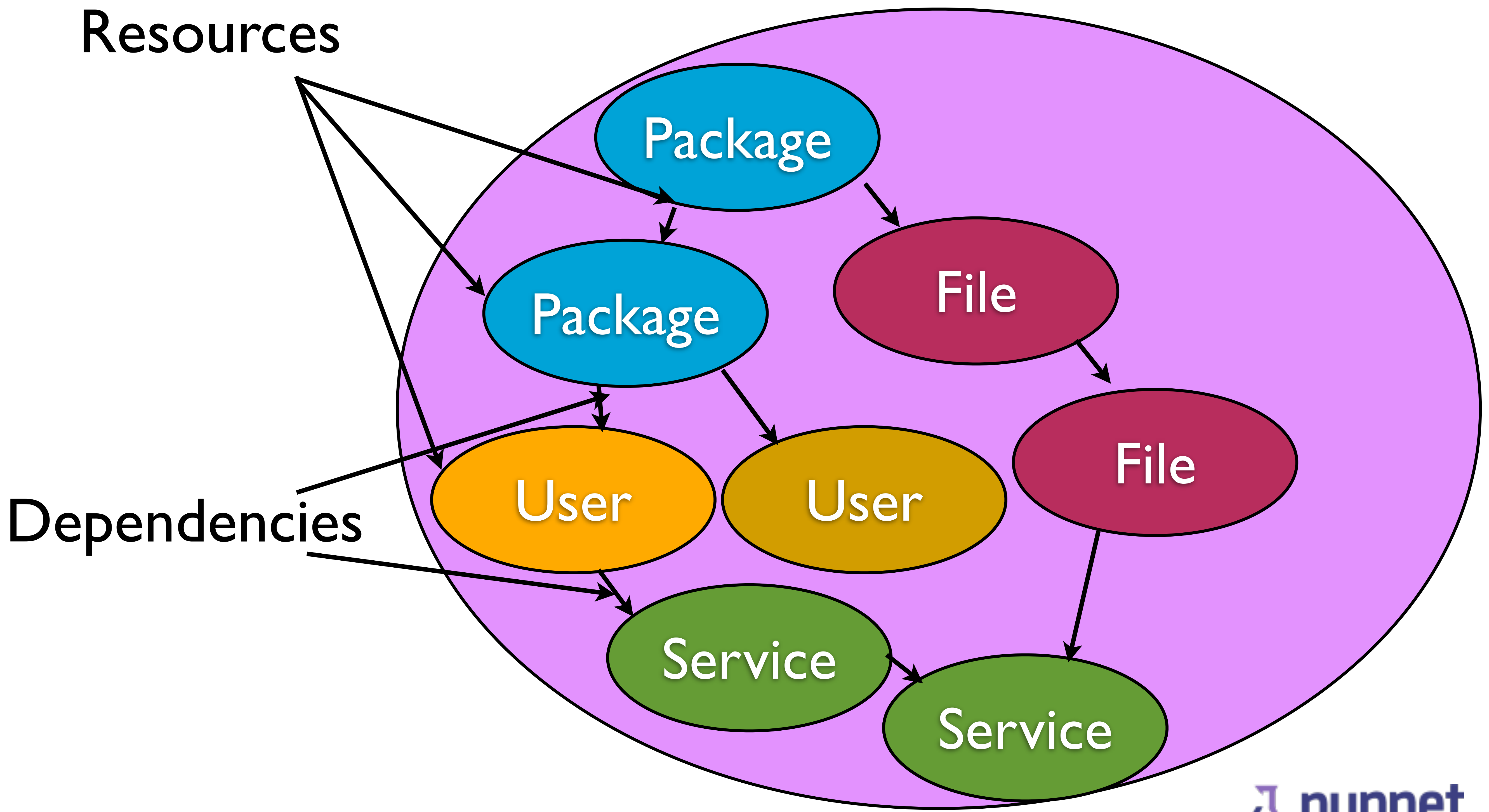


The master can call out to arbitrary executables to figure out how a node should be classified.

Puppet Client/Server



Catalog

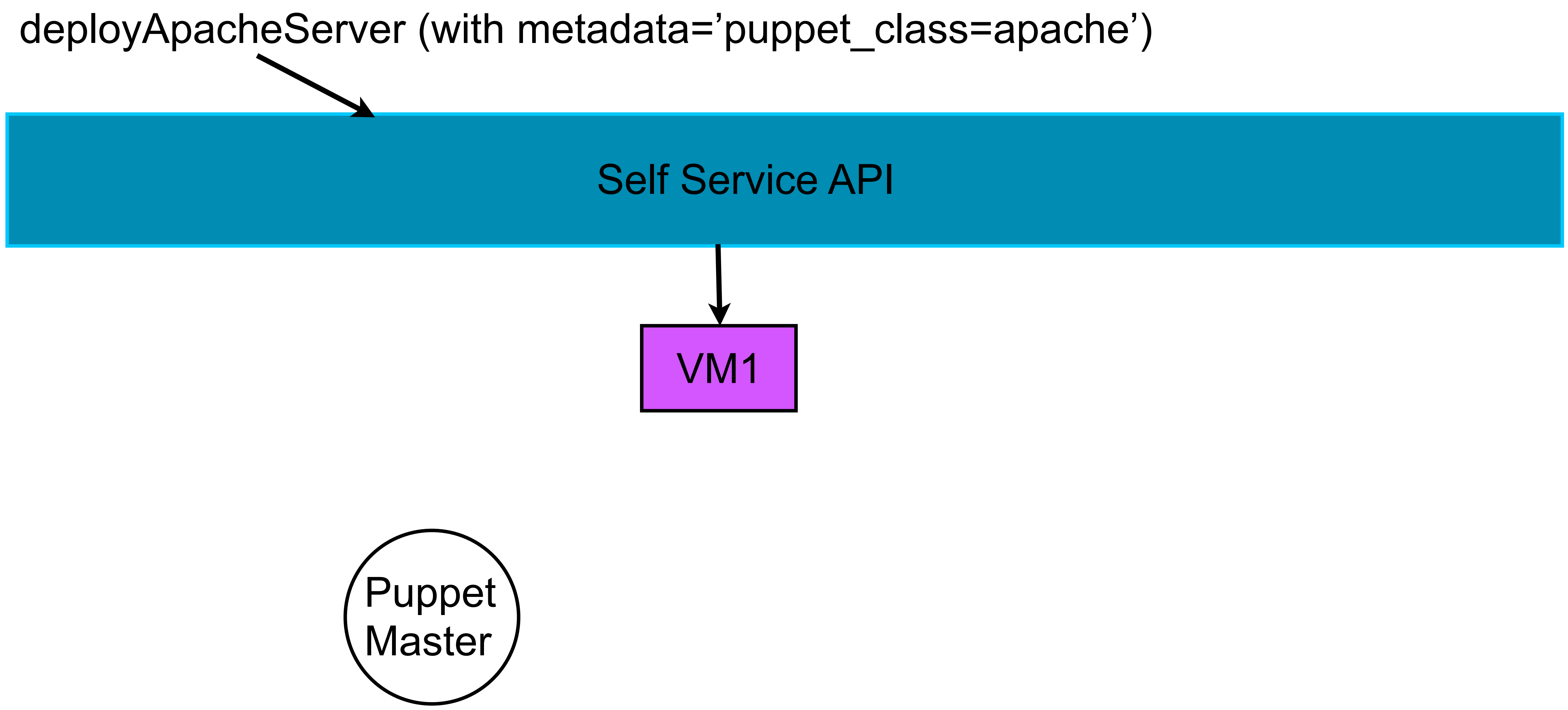

Resources
Package
Package
File
File
User
User
Dependencies
Service
Service

Integration

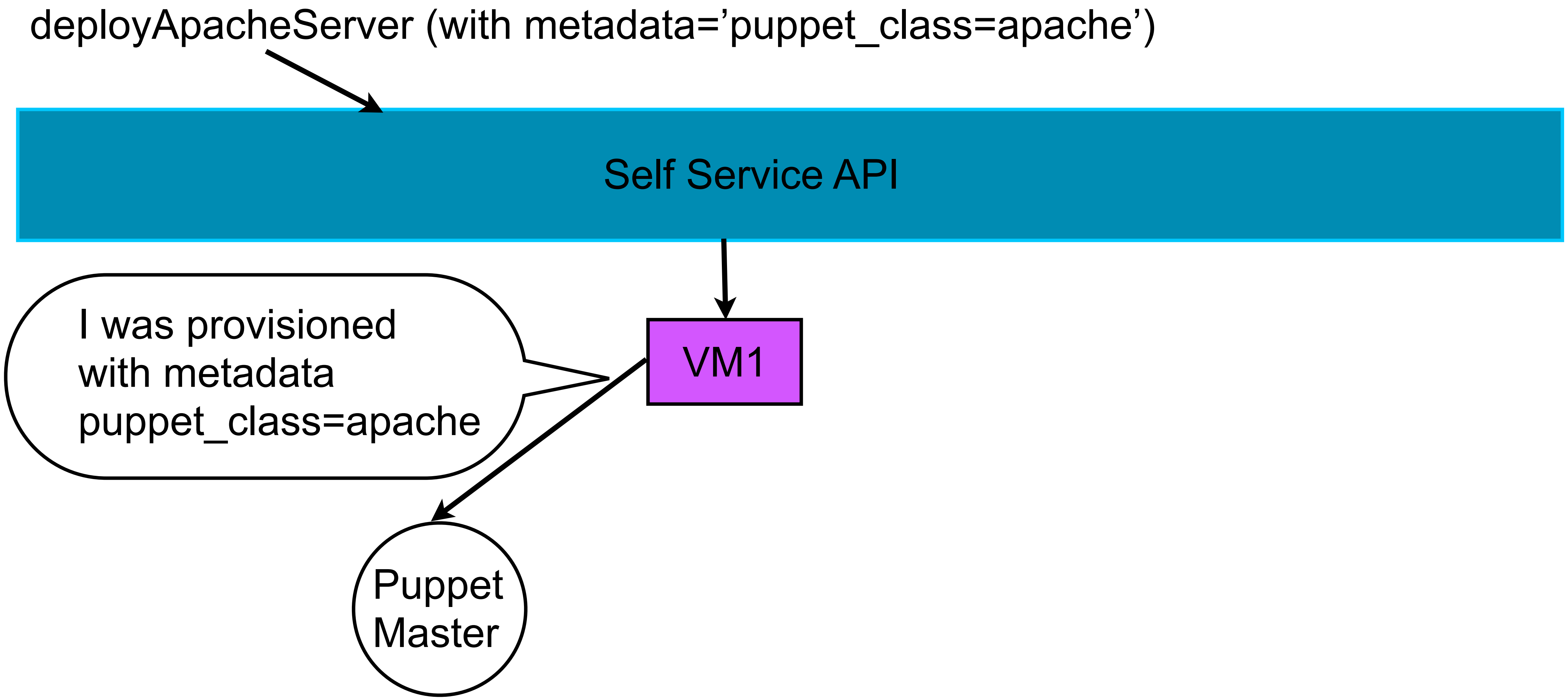
is all about

Classification

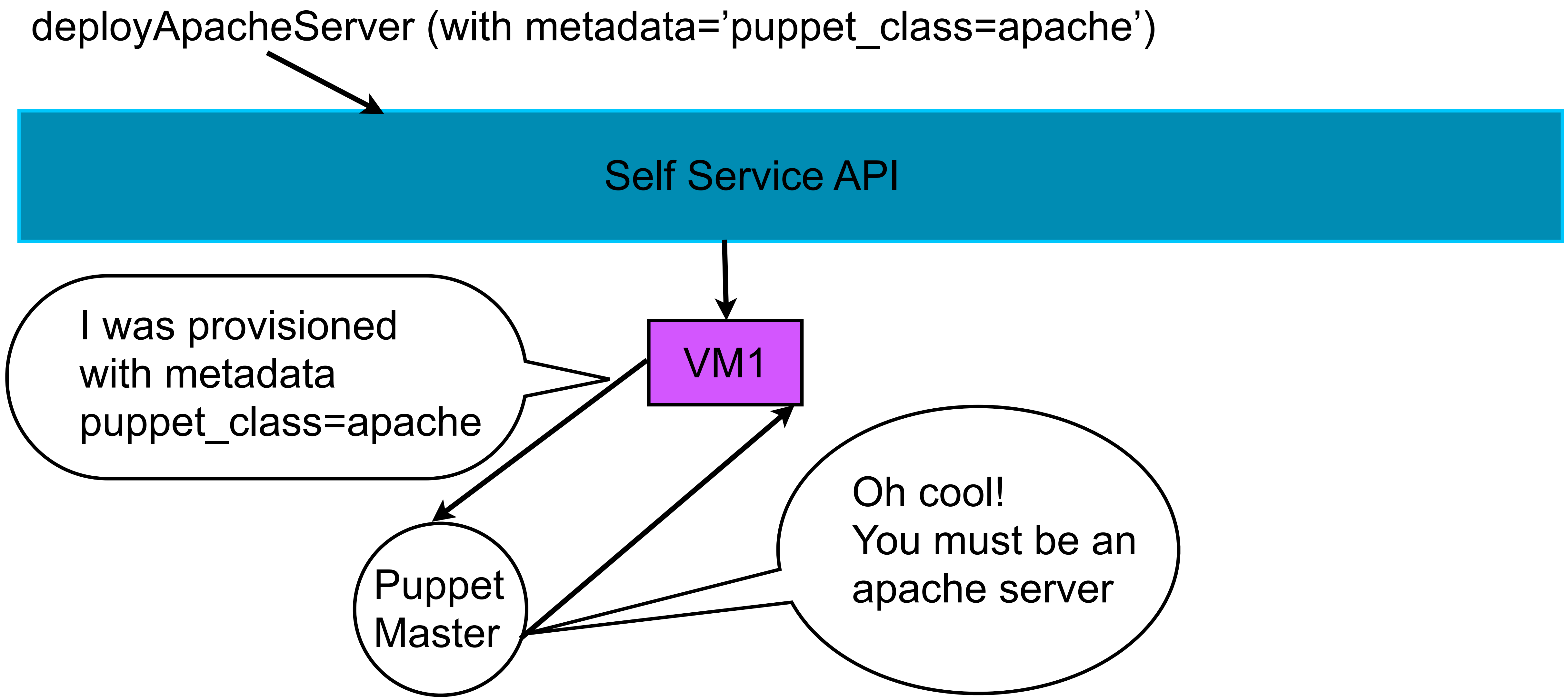
Using metadata/userdata



Using metadata/userdata


deployApacheServer (with metadata='puppet_class=apache')
Self Service API
VM1
I was provisioned with metadata puppet_class=apache
Puppet Master

Using metadata/userdata


deployApacheServer (with metadata='puppet_class=apache')
Self Service API
VM1
I was provisioned with metadata puppet_class=apache
Puppet Master
Oh cool! You must be an apache server

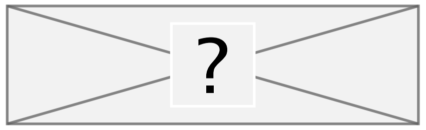
Determine role based on facts

deployVirtualMachine (with metadata)

Determine role based on facts

deployVirtualMachine (with metadata)

populate facter metadata service



Determine role based on facts

deployVirtualMachine (with metadata)

populate facter metadata service

use fact for classification

```
node default {
  include $::meta_data_role
}
```

Pros

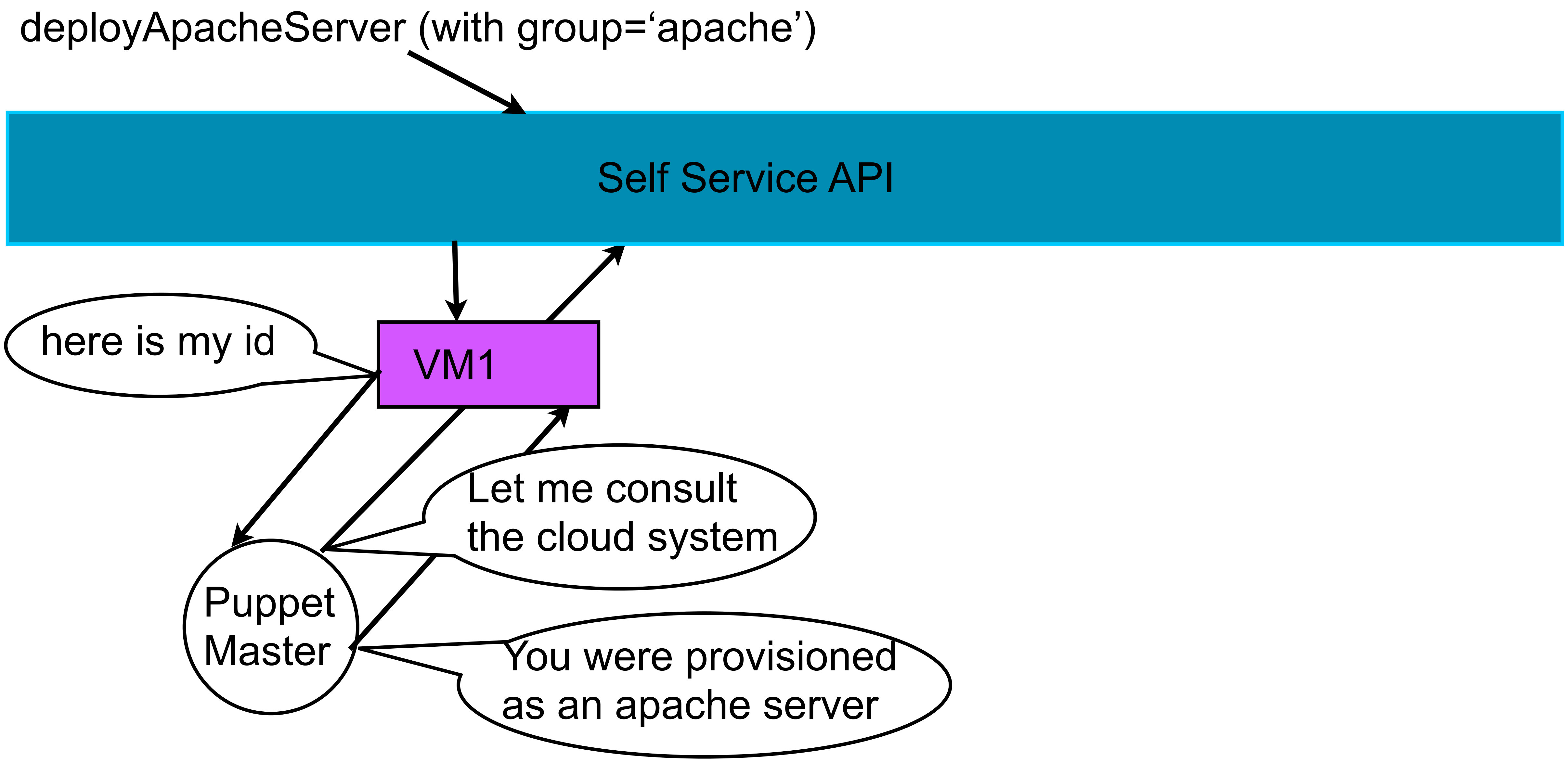
- simple

- classification information set during provisioning process

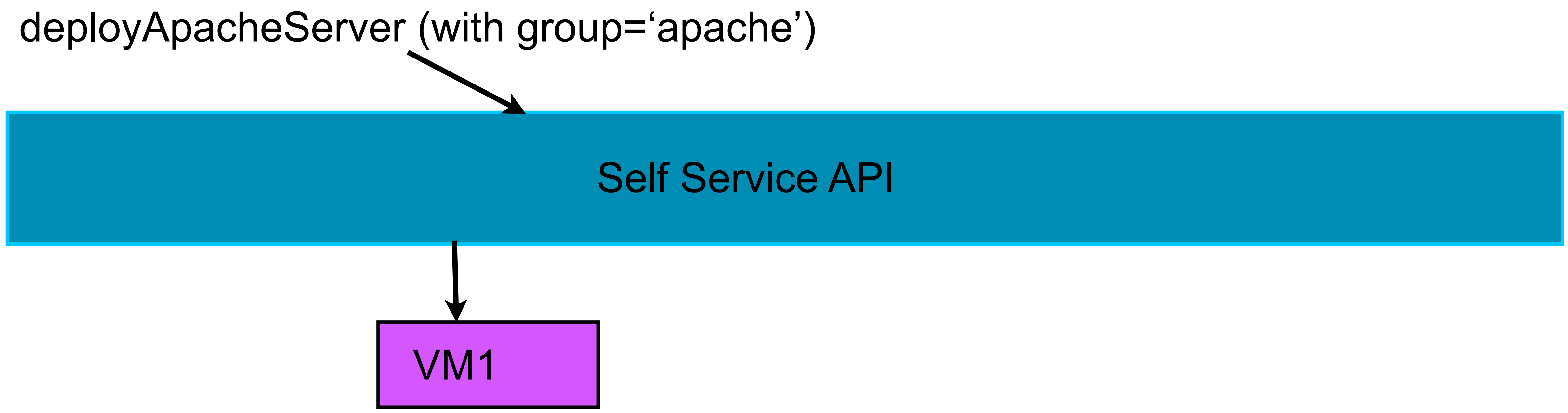
Cons

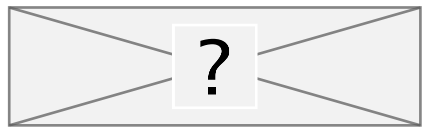
- hosts become authoritative over their role
- a single rooted host can pretend to be anyone else
- metadata/userdata is not always read/write

Using instance annotation data


deployApacheServer (with group='apache')
Self Service API
here is my id
VM1
Let me consult the cloud system
Puppet Master
You were provisioned as an apache server

Using instance annotation data





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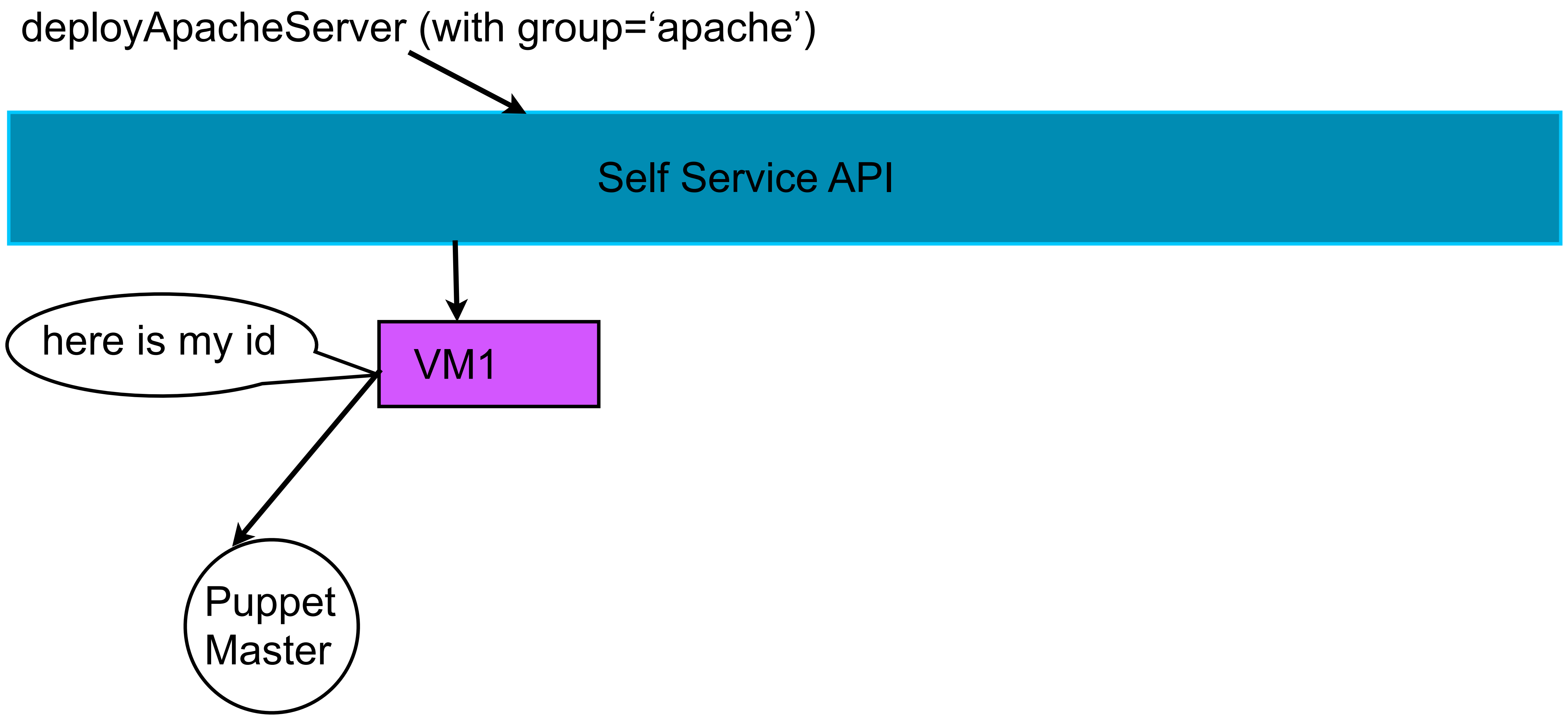
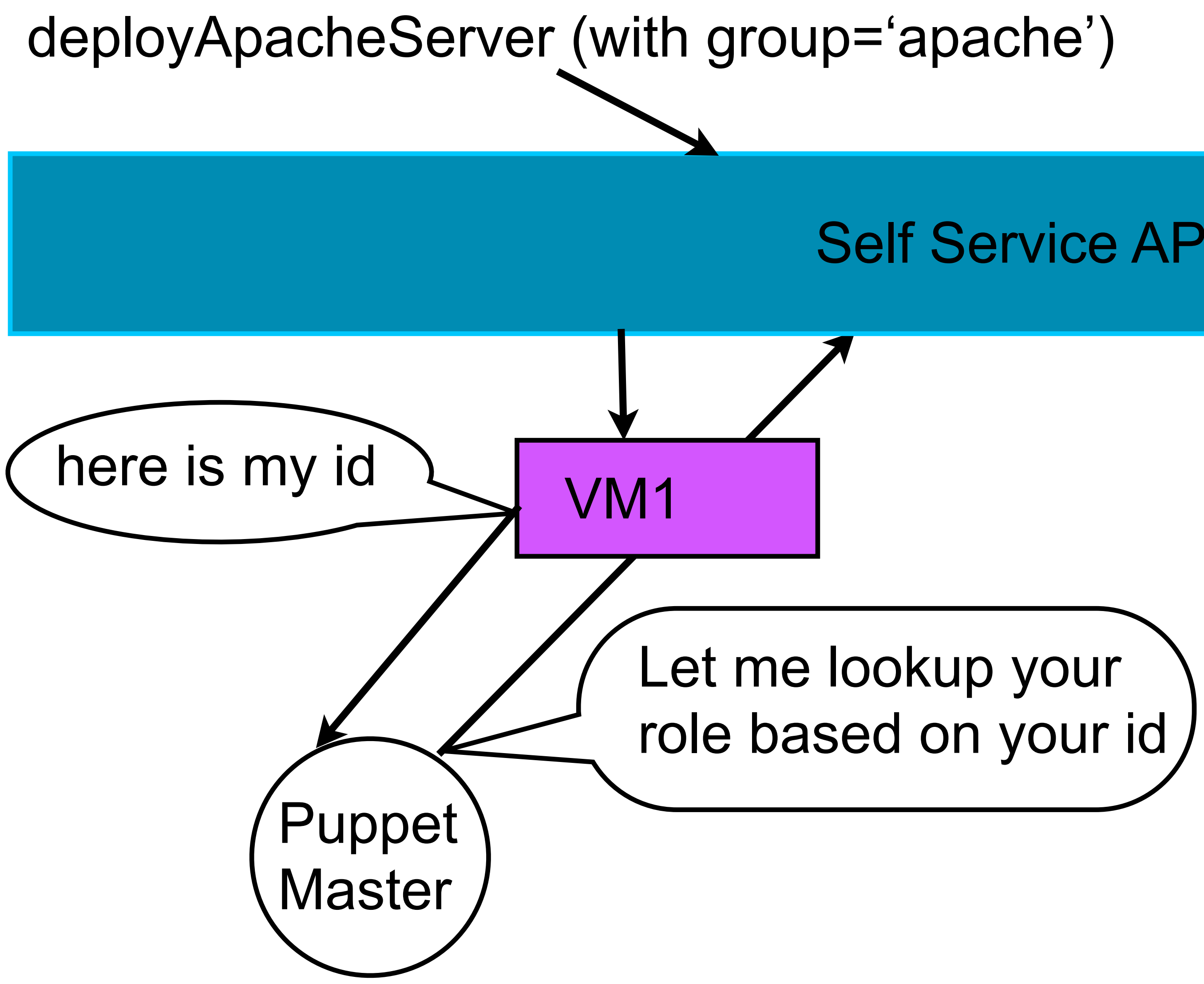
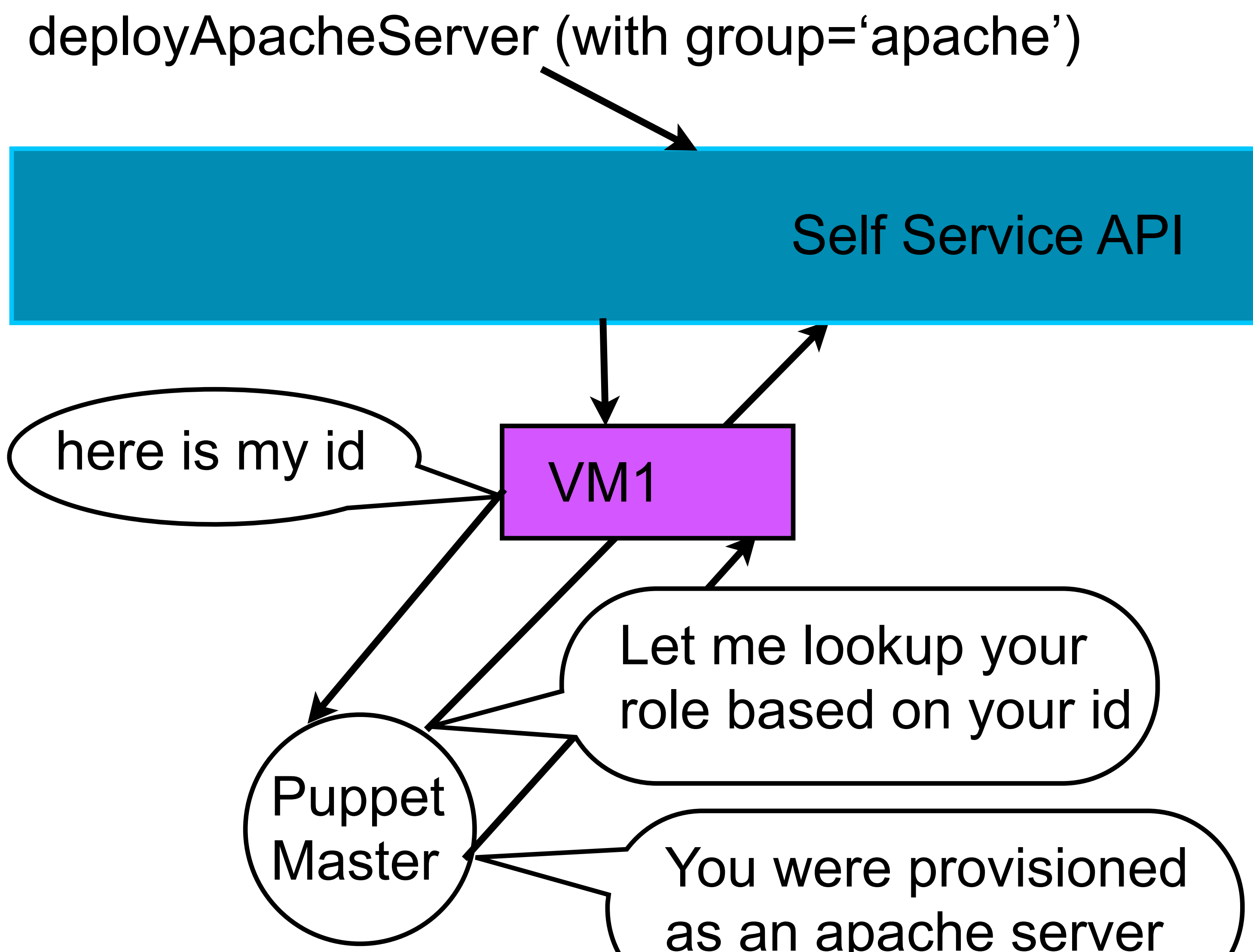


Using instance annotation data


deployApacheServer (with group='apache')
Self Service API
here is my id
VM1
Let me lookup your role based on your id
Puppet Master

Using instance annotation data


deployApacheServer (with group='apache')
Self Service API
here is my id
VM1
Let me lookup your role based on your id
Puppet Master
You were provisioned as an apache server

Pros

- provisioning credentials are used to determine role

- annotation field likely updatable

Cons

- puppetmaster must have API credentials

- may require a custom ENC

Decouple role assignment from provisioning

After provisioning is completed, ssh into a machine, set a custom fact (using facts.d), and trigger a puppet run.

pros - you can easily execute a script to install and bootstrap puppet

cons - extra step

facts.d

facts.d comes with stdlib
(http://forge.puppetlabs.com/puppetlabs/stdlib)

it converts any ‘key=value’ pairs listed in /etc/facts.d/*.txt into facts

VM provisioning with Puppet (experimental! use cases appreciated)

Share Application Stacks as text

```
class my_app_stack {
  cloudstack_instance { 'foo4':
    ensure     => present,
    group      => 'role=db',
  }
  cloudstack_instance { 'foo3':
    ensure     => present,
    group      => 'role=apache',
  }
}
```

Use resource defaults for common settings

```
Cloudstack_instance {
  image      => 'CentOS 5.6 key+pass',
  flavor     => 'Small Instance',
  zone       => 'ACS-FMT-001',
  network    => 'puppetlabs-network',
  keypair    => 'dans_keypair4',
}
cloudstack_instance { 'foo4':
  ensure     => $::ensure,
  group      => 'role=db',
}
cloudstack_instance { 'foo3':
  ensure     => $::ensure,
  group      => 'role=apache',
}
```

More issues of trust