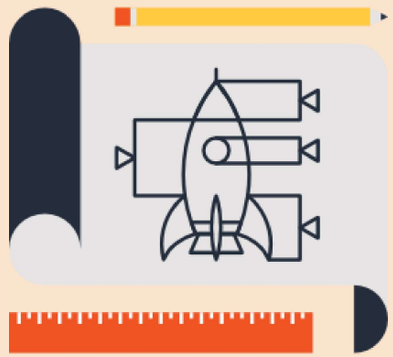
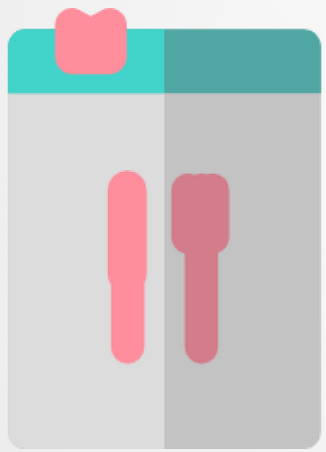


TOPICS

- MODULES
- CLASSES
- ORDERING
- NODE CLASSIFICATION
- NOTIFICATION AND HANDLERS

MODULES



- modules are the packages with manifests and supporting files
- have 1:1 mapping with the applications
- let you create a library of reusable code

ANATOMY

manifests

files

templates

data

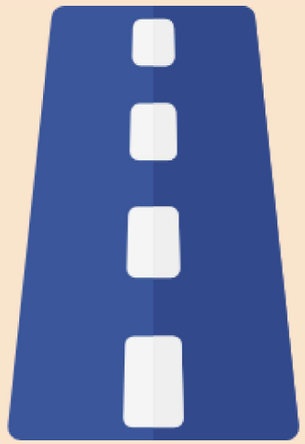
spec

examples

metadata.json

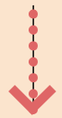
README.MD

MODULEPATH



- Modules are stored on Puppet Master
- Puppet Master has a **code** directory to store modules and rest of the configurations
- The default code dir needs to be changed in case want to point to a custom path.

```
master-code-dir: /etc/puppetlabs/code
```



```
master-code-dir:  /workspace/code
```

Copy existing structure to our workspace

```
cp -r /etc/puppetlabs/code /workspace/code
```

Edit File : /etc/puppetlabs/puppetserver/conf.d/puppetserver.conf

Change from

master-code-dir: /etc/puppetlabs/code

Change to

master-code-dir: /workspace/code

Restart Puppet Master

```
service puppetserver restart
```

GROUP EXERCISE

Problem Statement

You have been asked to deploy a java application server with tomcat. You have been tasked to create automation code with puppet to set it up.

TOMCAT

GROUP EXERCISE

APP SERVER MODULES

Solution:

- We would create a module to setup **tomcat** server and apply it to automate the task
- As a prerequisite, we also need to install **Java**. We will create a module to install openjdk.

GROUP EXERCISE

TASKS

1. Generate modules for java and tomcat
2. Create class to install java and
3. Create a node definition to apply the classes
4. Create classes to install tomcat and start the service, apply
5. Write classes to manage configuration files

AUTO GENERATING MODULES

```
root@puppet:/workspace# puppet help module


USAGE: puppet module <action> [--environment production

ACTIONS:
  build        Build a module release package.
  changes      Show modified files of an installed modul
  generate     Generate boilerplate for a new module.
  install      Install a module from the Puppet Forge or
  list         List installed modules
  search       Search the Puppet Forge for a module.
  uninstall    Uninstall a puppet module.
  upgrade      Upgrade a puppet module.
```

- **puppet module** is a utility which comes with code generator
- it can let you create, search install, upload modules (to and from puppet forge)

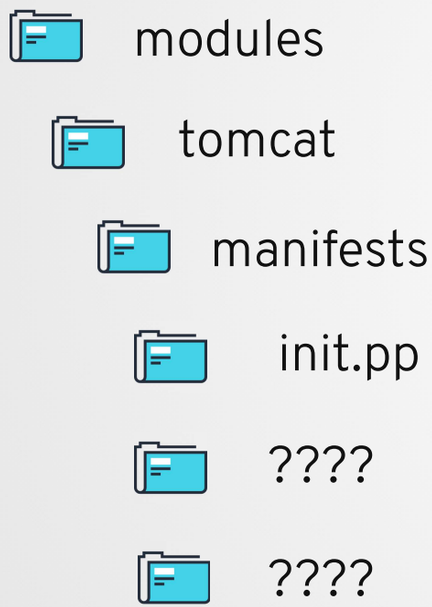
GROUP EXERCISE

GENERATING MODULES SKELETON

```
cd /workspace/code/environments/production/modules

puppet module generate --skip-interview user-java

puppet module generate --skip-interview  user-tomcat
```

```
-- java
|   |-- Gemfile
|   |-- README.md
|   |-- Rakefile
|   |-- examples
|   |   `-- init.pp
|   |-- manifests
|   |   `-- init.pp
|   |-- metadata.json
|   `-- spec
|       |-- classes
|       |   `-- init_spec.rb
|       `-- spec_helper.rb
```

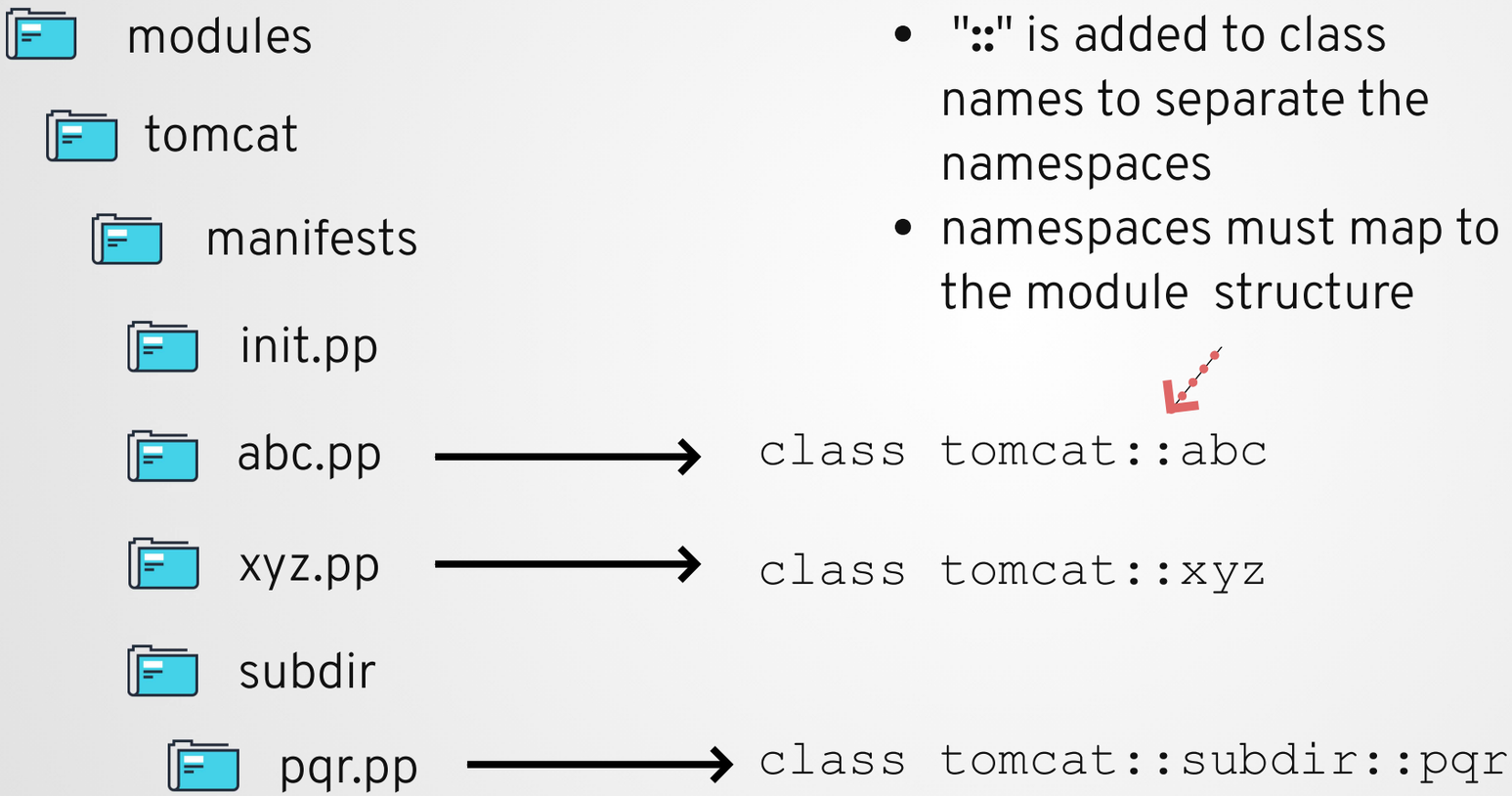
WRITING MANIFESTS

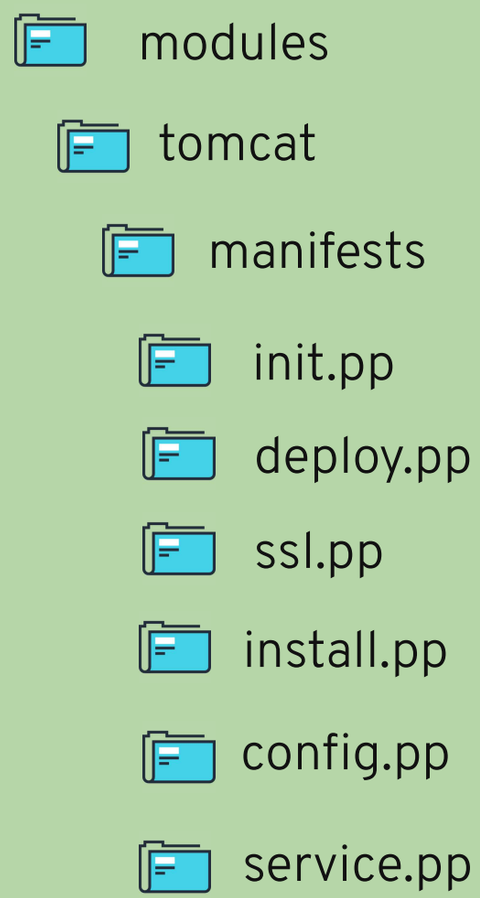


- puppet module generator creates a scaffolding required to write manifests
- it also generates the default manifest (init.pp)
- additional manifests can be added to modules/xxx/manifest directory

CLASSES

- each manifest contains a **class**, a named container, which encompasses one or more resources
- "**::**" is added to class names to separate the namespaces
- namespaces must map to the module structure





STRATEGIES

- every feature gets its own class, and in turns a manifest
- create a separate classes for each phase of application lifecycle. This provides more granular control

GROUP EXERCISE

TOMCAT EXAMPLE

phases		classes
• install packages to setup web server application and pre requisites	→	`tomcat::install`
• manage configurations for web servers	→	`tomcat::config`
• start/stop service	→	`tomcat::service`

GROUP EXERCISE

JAVA MODULE

phases		classes
• install packages to setup openjdk	→	`java::install`

GROUP EXERCISE

JAVA MANIFEST

file: modules/java/manifests/install.pp

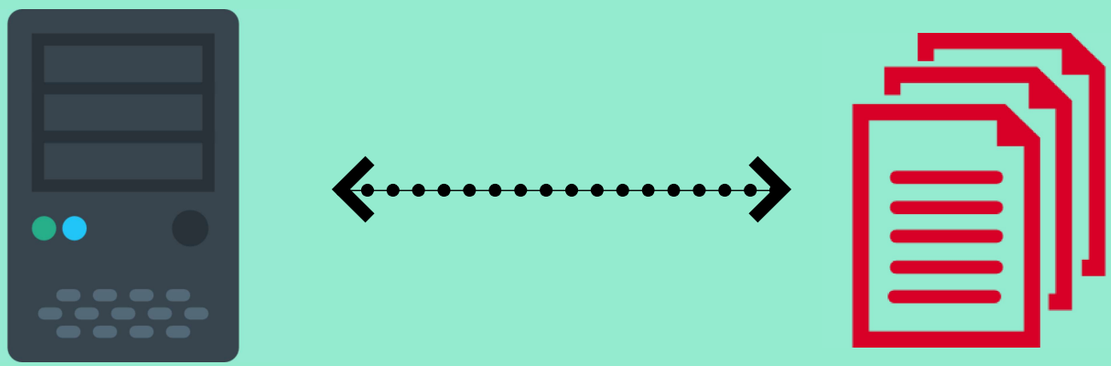
```
class java::install {

  package { [ 'epel-release', 'java-1.7.0-openjdk'] :
    ensure => installed,
  }

}
```

TASKS

1. Generate modules for java and tomcat
2. Create class to install java and
3. Create a node definition to apply the classes
4. Create classes to install tomcat and start the service, apply
5. Write classes to manage configuration files

“ now that we have written the class, lets learn how to apply it, in a client server model

NODE DEFINITION



node

list of classes

NODE DEFINITION

```
node 'nodename' {

    include class1
    include class2
    include class3, class4

    class { 'class3':

       param1 => val1,
       param2 => val2,
       param3 => val3,


    }

}

node 'app1.example.io', 'app2.example.io', 'app3.example.io' {
  include class1
  include class2
}


node /^(app|web)\.blr\d+\.example\.io$/ {
  include class1
  include class2
}
```

simple

groups

regex

CLASSIFYING NODES

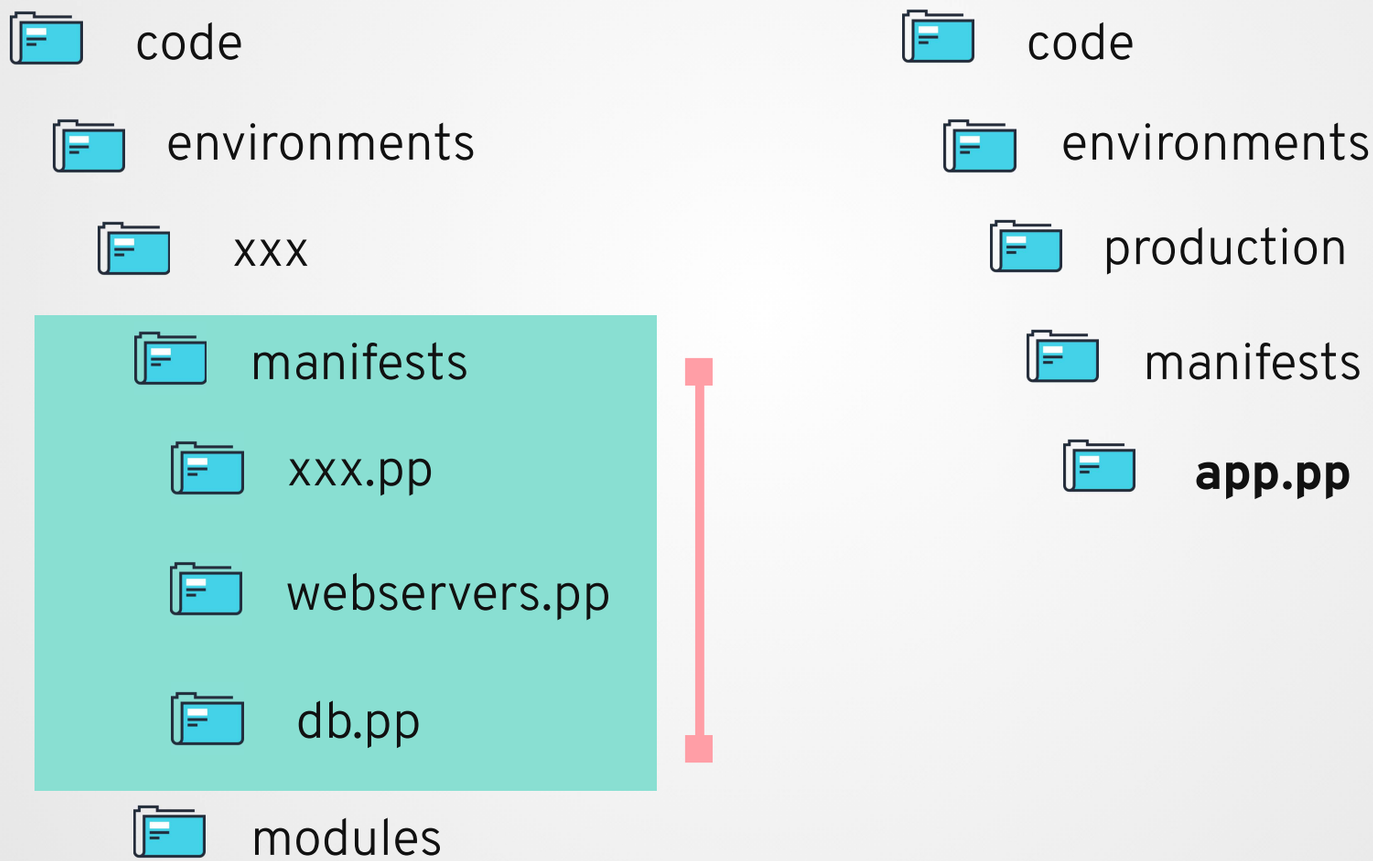
ENC

Puppet Entperprise

- node definition provides a mapping between nodes and a list of classes to apply
- node definition resides on the puppet master
- its the simplest way of classifying nodes
- there are more options available for node classification

NODE DEFINITION TERRITORY

NODE DEFINITION TERRITORY



GROUP EXERCISE

CREATE A NODE DEFINITION

file: environments/production/manifests/app.pp

```
node 'node1' {

   include java::install

}
```

GROUP EXERCISE

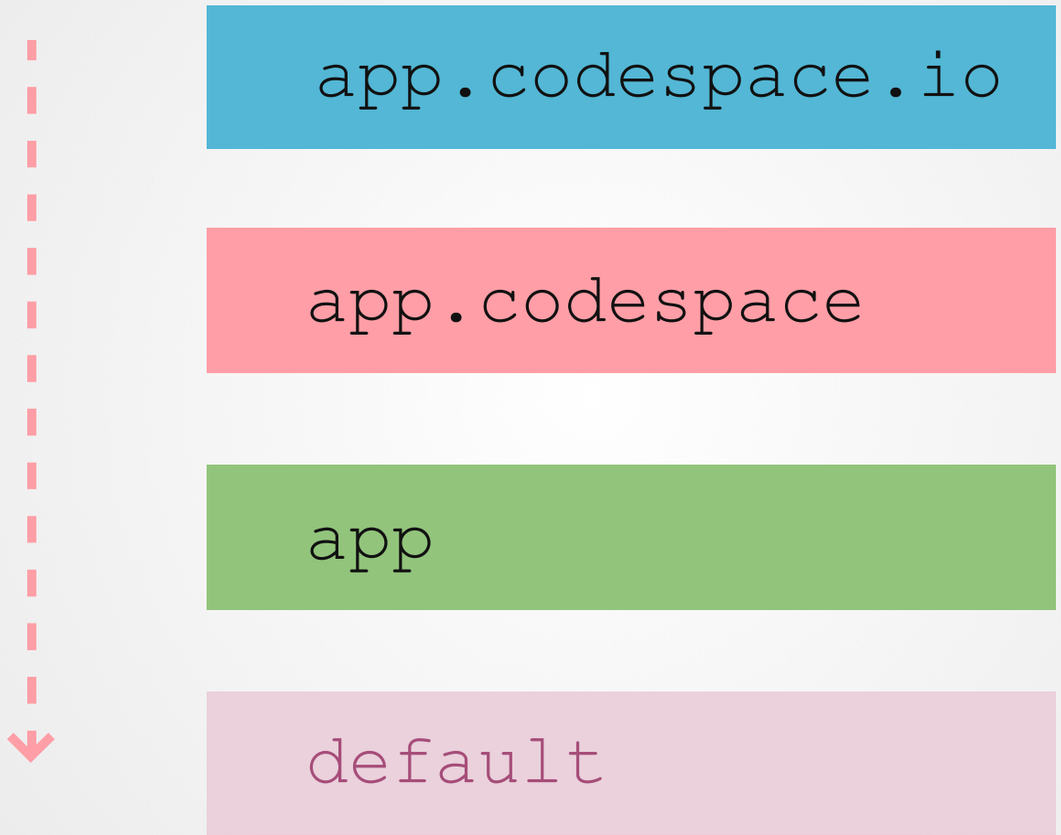
PULL AND APPLY FROM NODE 1

```
ssh devops@node1

sudo su

puppet agent -t
```

GROUP EXERCISE

APPLY ON NODE 2

```
ssh devops@node2

sudo su

puppet agent -t
```


app.codespace.io
app.codespace
app
default

GROUP EXERCISE

DEFAULT BLOCK

file: production/manifests/site.pp

```
node default {

  notify{'checkpoint_1':

    message => '

        CHECKPOINT_1

        DEFAULT BLOCK APPLIED
        Looks like there is no node definition for this host

    '
  }
}
```

PRO TIP

notify

PRO TIP

```
notify{'checkpoint_1':

    message => '

        CHECKPOINT_1

        DEFAULT BLOCK APPLIED
        Looks like there is no node definition for this host

    '
}
```

```
notify{'checkpoint_1':}
```

- notify is a resource and a metaparameter (will talk about this later)
- as a resource, can be used for checkpointing
- prints a message in the run log
- useful to check if a particular block of code is being called or not

LAB EXERCISE

- Create a node definition for **node2**
- Include the same **java** class that you applied earlier for node1
- Apply and validate on node2

DISCUSSION

What would this code do?

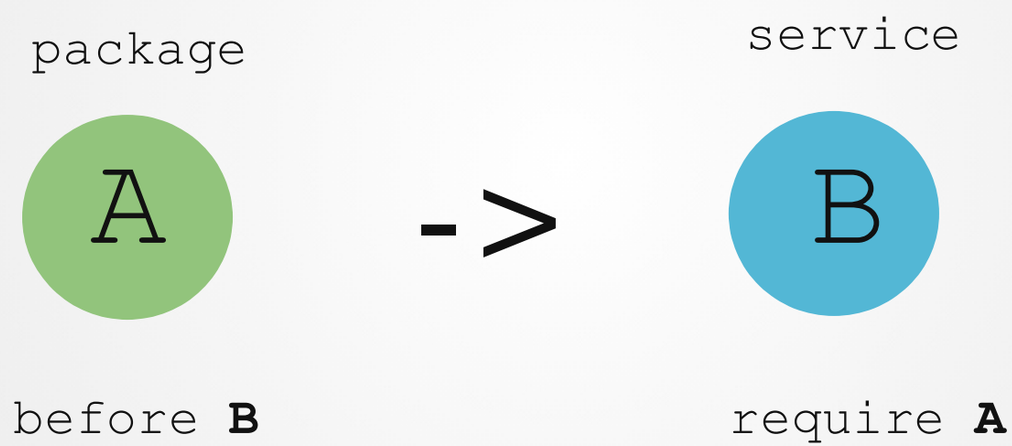
```
package { 'httpd':
  ensure => absent,
}

package {'nginx':
  ensure => $nginx_version,
  require => Package['httpd'],
}
```

ORDERING

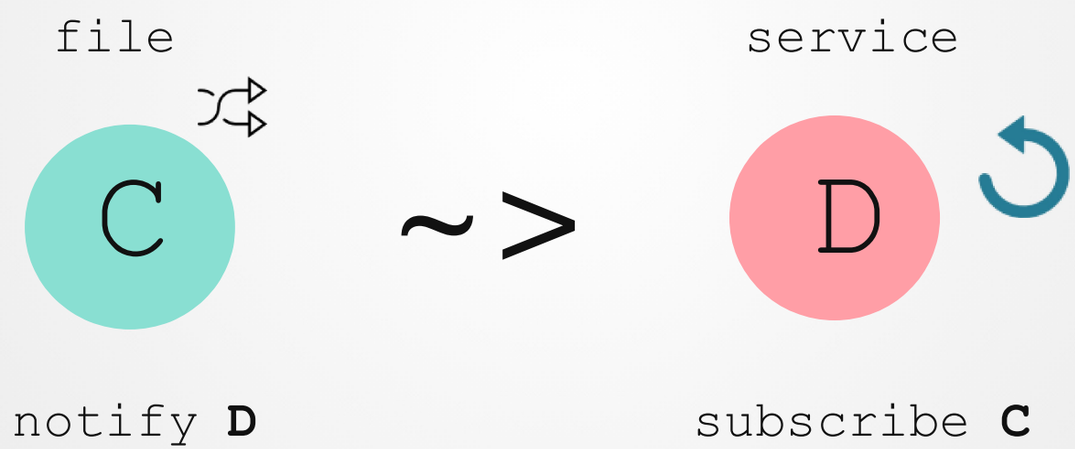
why ?

how ?

ORDERING



ORDERING WITH NOTIFICATION



SAMPLE

sample ordering.pp

```
package { 'nginx':
  ensure  => installed,
  before  => Service["nginx"],
}

file { 'nginx.conf':
  ensure  => file,
  mode    => '0644',
  notify  => Service["nginx"],
}

service { 'nginx':
  ensure      => running,
  enable      => true,
  hasrestart  => true,
  hasstatus   => true,
  require     => [ Package["nginx"], File["nginx.conf"] ]
  subscribe   => File["nginx.conf"],
}

Package["nginx"] -> File["nginx.conf"] ~> Service["nginx"]
```

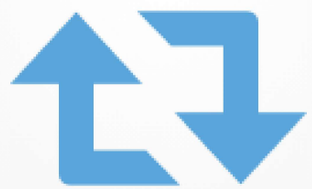
Type['title']

CAPS

META - PARAMETERS

before

require



notify

subscribe

```
puppet describe -sm package
```

```
Meta Parameters
---------------
    alias, audit, before, consume, export,
    loglevel, noop, notify, require,
    schedule, stage, subscribe, tag
```

TASKS

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2. Create class to install java and
3. Create a node definition to apply the classes
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5. Write classes to manage configuration files

LAB EXERCISE

LAB EXERCISE

Create and apply the following recipes for tomcat

INSTALL

create a tomcat::install recipe to install tomcat along with example apps. Packages to install are

- **tomcat**
- **tomcat-webapps**

SERVICE

create a tomcat::service recipe to start and enable **tomcat** service

Service should depends on package **tomcat**

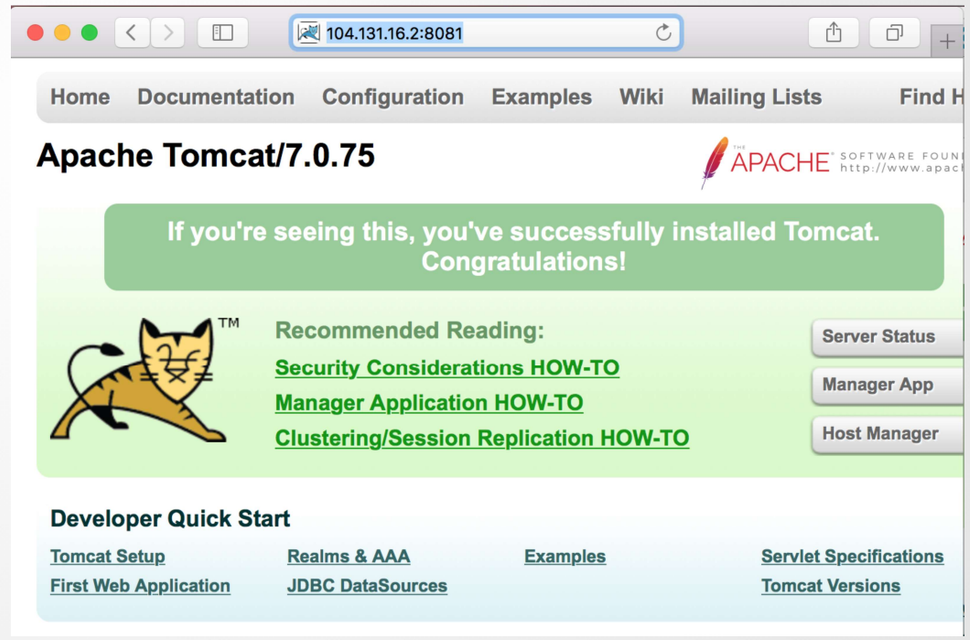
LAB EXERCISE

LAB

EXPECTED OUTPUT

- You should be able to browse to http://ipaddress:8081 port in the browser
- Tomcat home page is the expected output

http://IPADDR:8081



GROUP EXERCISE

SIMPLIFY NODE DEFINITION

Lets call all other manifests from init.pp

```
class tomcat {

  include java::install
  include tomcat::install
  include tomcat::service

}
```

```
node 'node1' {

  include tomcat

}


node 'node2' {

   include tomcat

}
```

GROUP EXERCISE

DEPENDENCIES

- we included java cookbook in tomcat init.pp
- We would also add dependency in metadata.json of tomcat module that depends on java

```
{
  "name": "user-tomcat",
  "version": "0.1.0",
  "author": "user",
  "summary": null,
  "license": "Apache-2.0",
  "source": "",
  "project_page": null,
  "issues_url": null,
  "dependencies": [
    {"name":"puppetlabs-stdlib","version_requirement":">= 1.0.0"}
  ],
  "data_provider": null
}
```

TASKS

1. Generate modules for java and tomcat
2. Create class to install java and
3. Create a node definition to apply the classes
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5. Write classes to manage configuration files

MANGING FILES

- We will need to manage configurations eg. tomcat.conf
- since chef is a centralized configuration management system, we will keep the files centrally in cookbooks, which will then be copied to all managed nodes

LAB EXERCISE

MANGING FILES

- modules
  - tomcat
    - manifests
      - init.pp
      - install.pp
      - service.pp
      - config.pp
    - files
      - tomcat.conf

- Create tomcat.conf file in tomcat modules' files directory.

- add tomcat::config class to copy these files to the relevant locations on destination hosts

link to tomcat.conf source

destination path in nodes:
/etc/tomcat/tomcat.conf

LAB EXERCISE

MANGING FILES

- cookbooks
  - tomcat
    - recipes
      - default.rb
      - install.rb
      - service.rb
      - config.rb
    - files
      - tomcat.conf
      - tomcat-users.xml

- Generate tomcat.conf using chef generate file in tomcat cookbook directory.

- add tomcat::config recipe to copy these files to the relevant locations on destination hosts

link to tomcat.conf source
path: /etc/tomcat/tomcat.conf

link to tomcat-users.xml source
path: /etc/tomcat/tomcat-users.xml

GROUP EXERCISE

TOMCAT.CONF

file: cookbooks/tomcat/files/default/tomcat.conf

```
TOMCAT_CFG_LOADED="1"

JAVA_HOME="/usr/lib/jvm/jre"
JAVA_OPTS="-Xms64m -Xmx128m -XX:MaxPermSize=128M -Djava.security.egd=file:/dev/./urand

CATALINA_BASE="/usr/share/tomcat"
CATALINA_HOME="/usr/share/tomcat"
JASPER_HOME="/usr/share/tomcat"
CATALINA_TMPDIR="/var/cache/tomcat/temp"


TOMCAT_USER="tomcat"

SECURITY_MANAGER="false"

SHUTDOWN_WAIT="30"

SHUTDOWN_VERBOSE="false"

CATALINA_PID="/var/run/tomcat.pid"
```

GROUP EXERCISE

TOMCAT::CONFIG

file: modules/tomcat/manifests/config.rb

```
class tomcat::config {

  file { '/etc/tomcat/tomcat.conf':
    source    => 'puppet:///modules/tomcat/tomcat.conf',
    owner     => 'tomcat',
    group     => 'tomcat',
    mode      => '0644'
  }

}
```

TOMCAT::CONFIG

file: cookbooks/tomcat/recipes/config.rb

```
cookbook_file '/etc/tomcat/tomcat.conf' do
  source 'tomcat.conf'
  owner 'tomcat'
  group 'tomcat'
  mode  0644
  action :create
end

cookbook_file '/etc/tomcat/tomcat-users.xml' do
  source 'tomcat-users.xml'
  owner 'tomcat'
  group 'tomcat'
  mode  0644
  action :create
end
```

REFRESHING SERVICE

file: modules/tomcat/manifests/config.rb

```
class tomcat::config {

  file { '/etc/tomcat/tomcat.conf':
    source    => 'puppet:///modules/tomcat/tomcat.conf',
    owner     => 'tomcat',
    group     => 'tomcat',
    mode      => '0644',
    notify    => Service['tomcat']
  }
```

TOMCAT::CONFIG

Update file: cookbooks/tomcat/recipes/config.rb

```
cookbook_file '/etc/tomcat/tomcat.conf' do
  source 'tomcat.conf'
  owner 'tomcat'
  group 'tomcat'
  mode  0644
  action :create
  notifies :restart, 'service[tomcat]', :delayed
end
```

Note: Add config.rb recipe to default.rb

TOMCAT::CONFIG

file: cookbooks/tomcat/recipes/config.rb

```
cookbook_file '/etc/tomcat/tomcat.conf' do
  source 'tomcat.conf'
  owner 'tomcat'
  group 'tomcat'
  mode  0644
  action :create
  notifies :restart, 'service[tomcat]', :delayed
end

cookbook_file '/etc/tomcat/tomcat-users.xml' do
  source 'tomcat-users.xml'
  owner 'tomcat'
  group 'tomcat'
  mode  0644
  action :create
  notifies :restart, 'service[tomcat]', :delayed
end
```