HW-4 Vera Li.

Contact: Vera_xuanyingli@ge.com

IT Operations - Automation and Orchestration

https://www.youtube.com/watch?v=JTv1QWjTWS8&index=1&list=PLLO4AVszo1SOkNPAv4E824AFScdduO9NF

http://cloudmesh.github.io/introduction_to_cloud_computing/class/lesson/devops/ansible.html#ref-class-lesson-devops-ansible

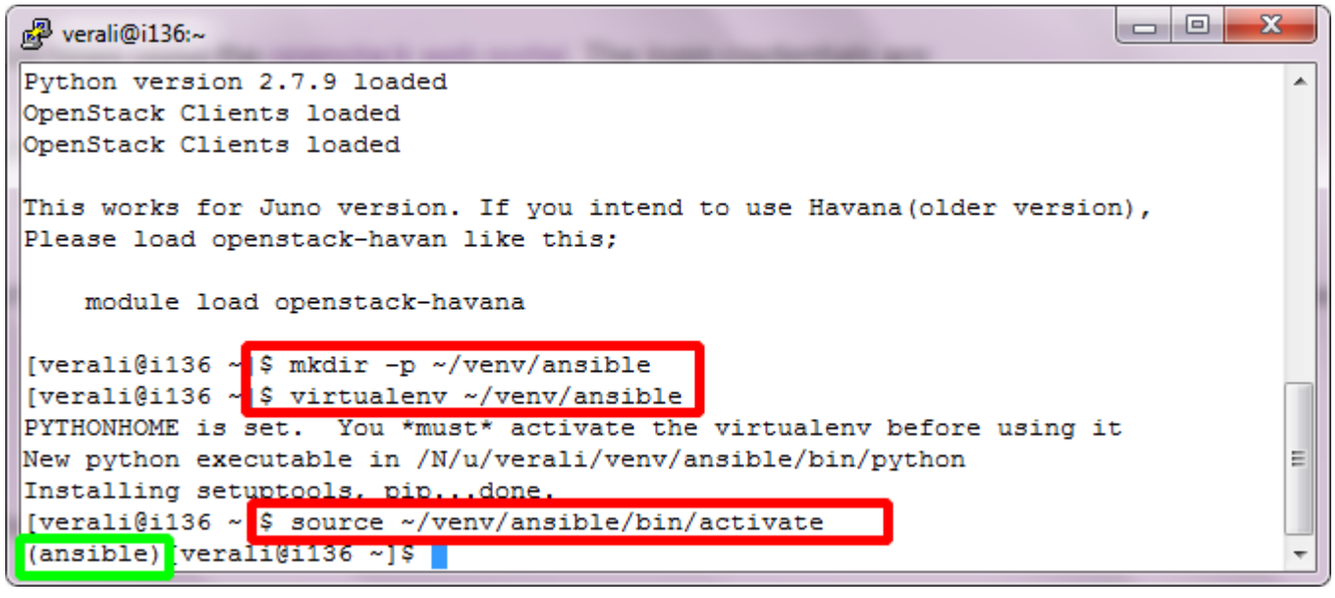
Ansible

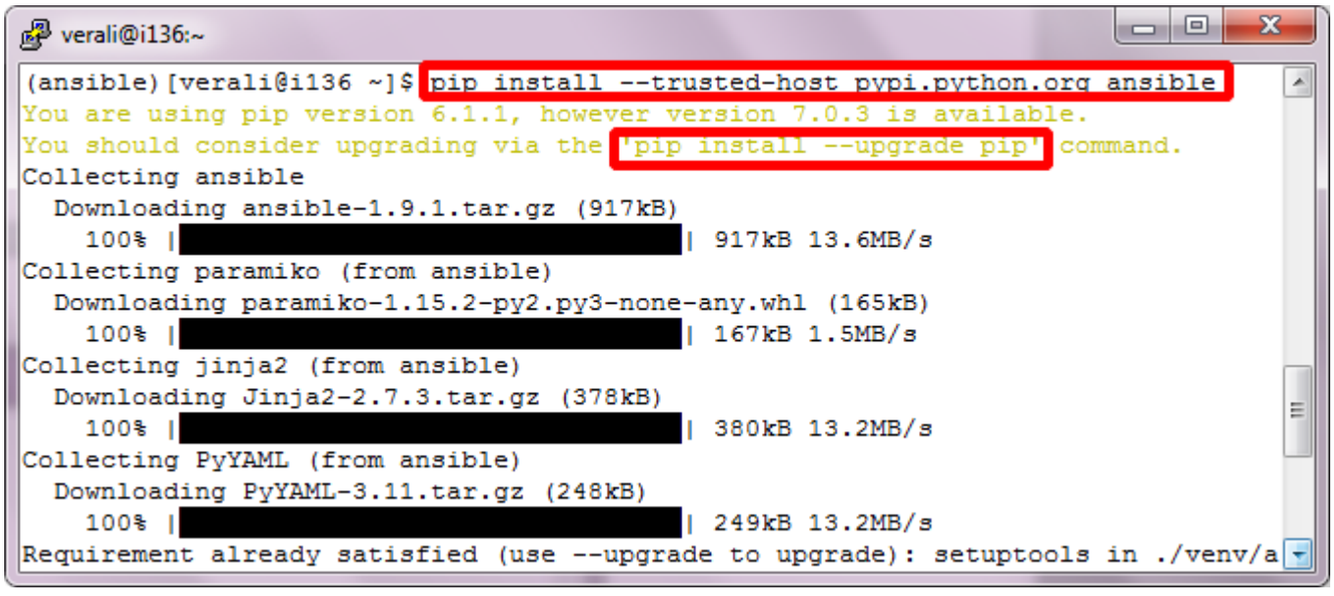
Tutorial: Ansible Basic commands

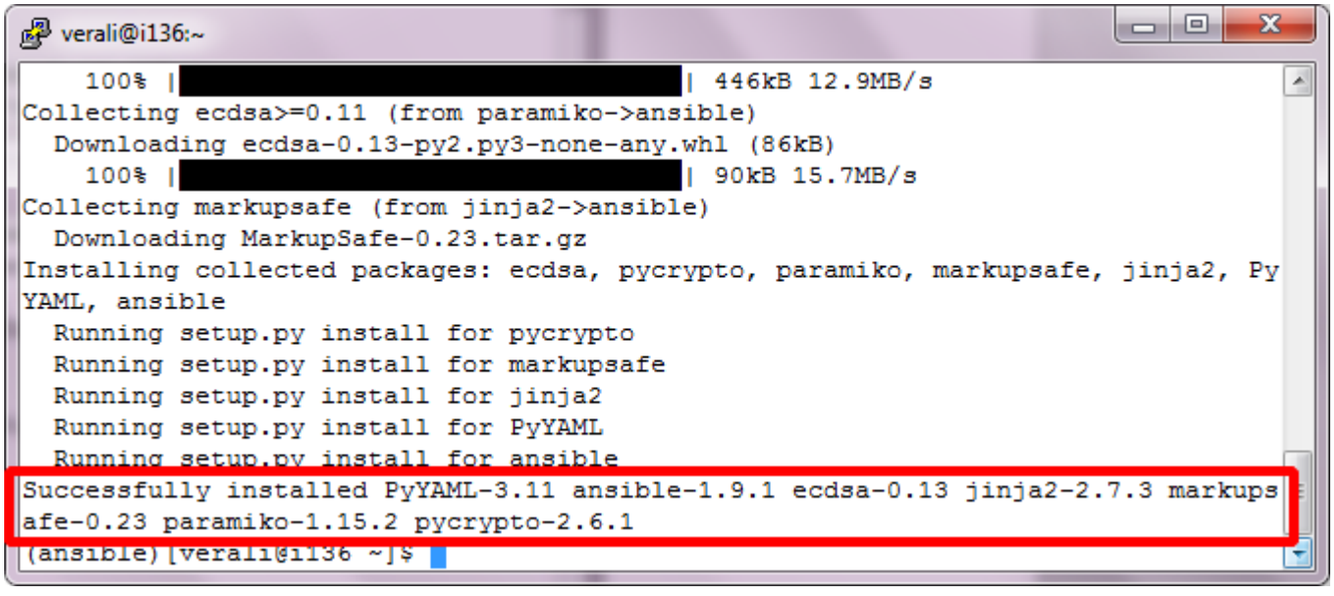
Keep in mind that `ansible` is a main program and `playbook` is a template that you would like to use. Ansible has two types of servers: a control machine and a managed node. Typically, a single control machine executes tasks over the one or more nodes.

Control machine

create a seperate virtualenv and install Ansible







Managed machines

Launch 3 vms on openstack – with IP address as below:

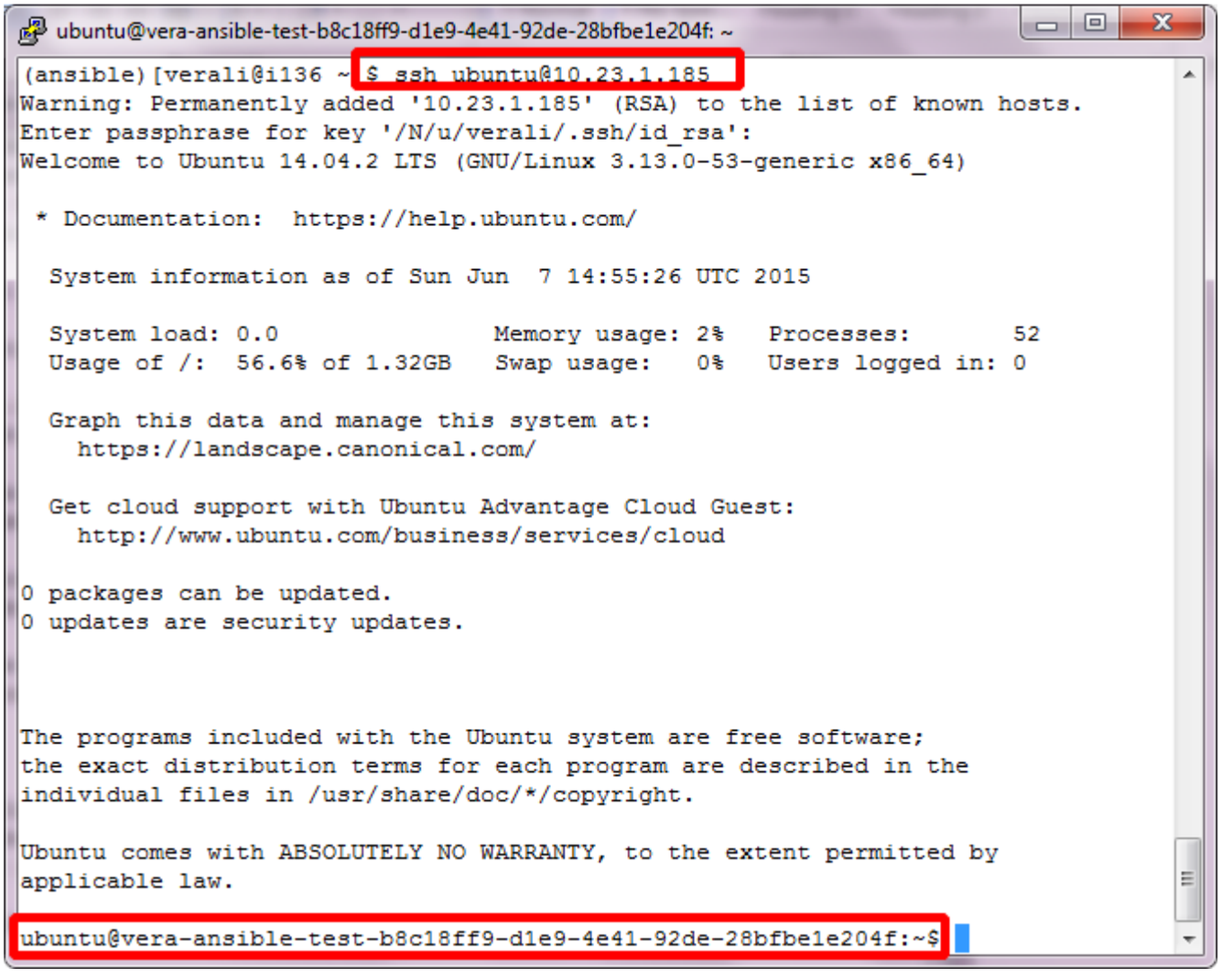
10.23.1.184

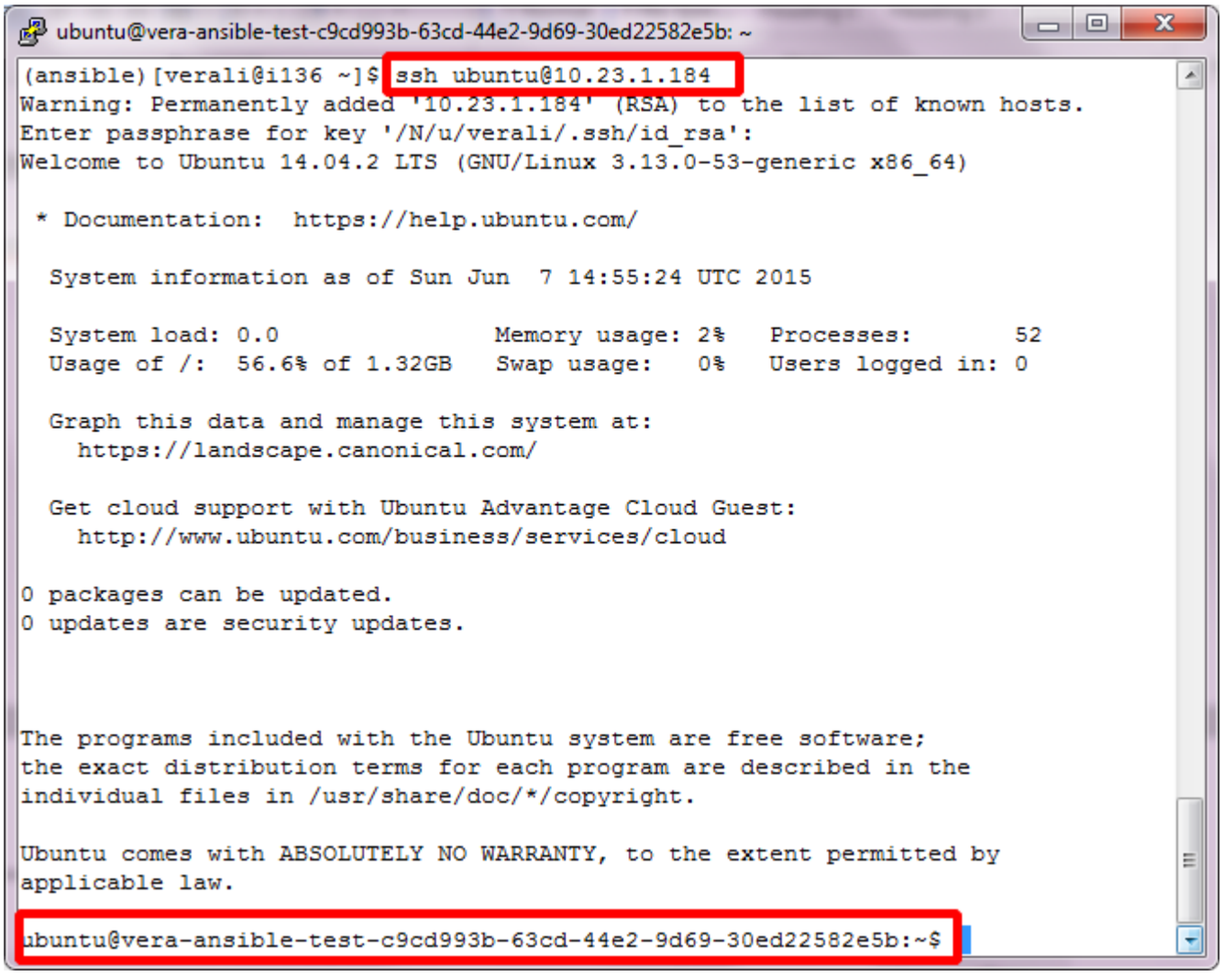
10.23.1.185

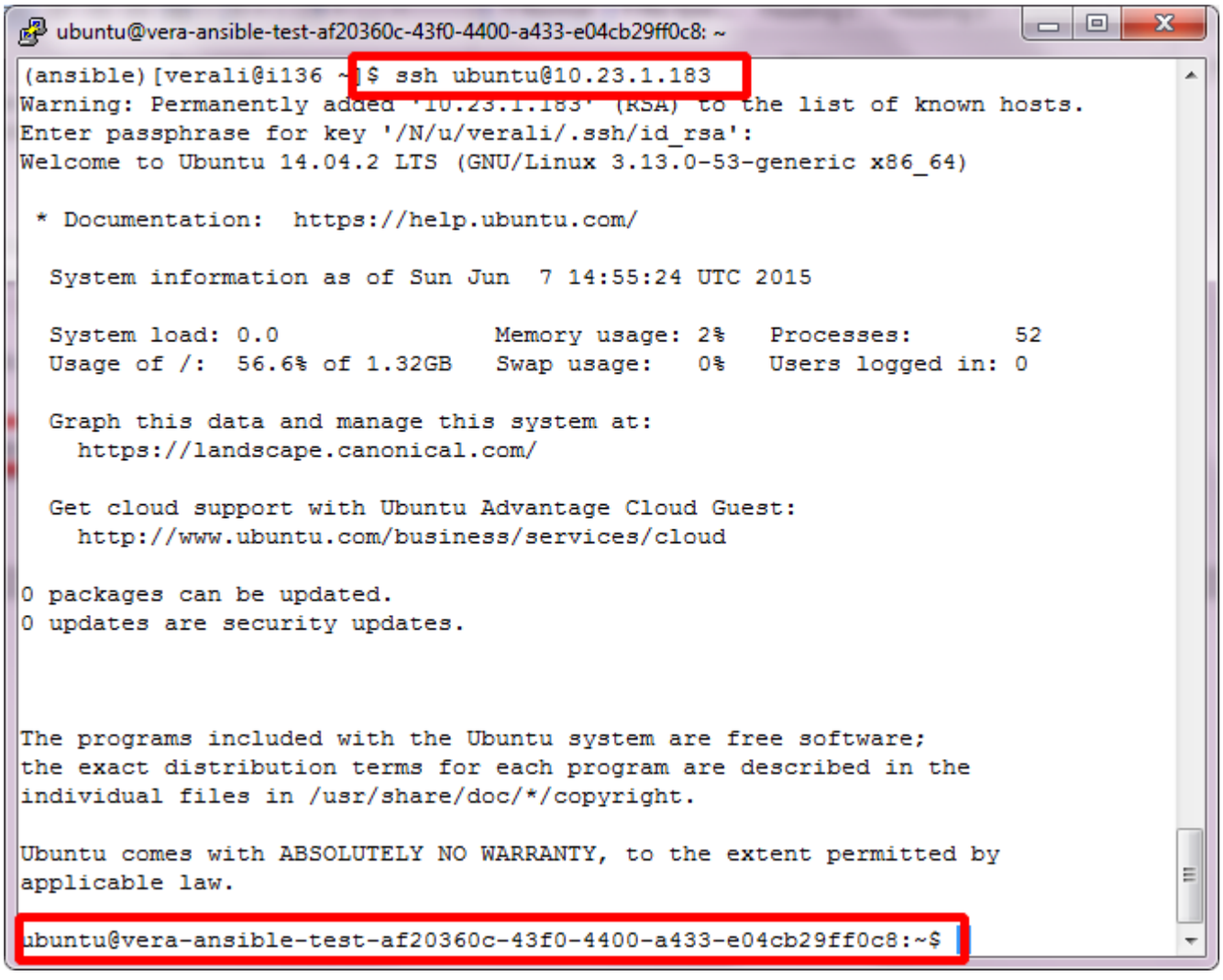
10.23.1.183

Instance Name	Image Name	IP Address	Size	Key Pair	Status	Availability Zone	Task	Power State	Time since created
vera-ansible-test-c9cd993b-63cd-44e2-9d69-30ed22582e5b	futuresystems/ubuntu-14.04	10.23.1.184	m1.small	vera_xuanying_li	Active	nova	None	Running	1 minute
vera-ansible-test-b8c18ff9-d1e9-4e41-92de-28bfbe1e204f	futuresystems/ubuntu-14.04	10.23.1.185	m1.small	vera_xuanying_li	Active	nova	None	Running	1 minute
vera-ansible-test-af20360c-43f0-4400-a433-e04cb29ff0c8	futuresystems/ubuntu-14.04	10.23.1.183	m1.small	vera_xuanying_li	Active	nova	None	Running	1 minute

Sanity check using SSH:

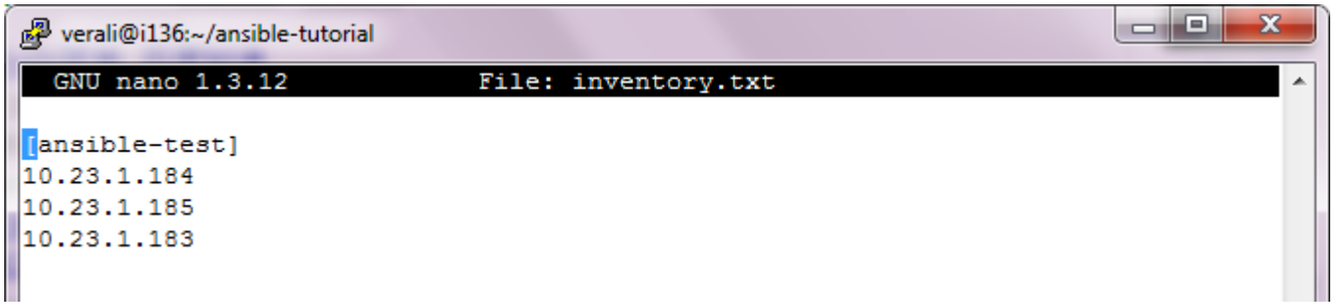



ubuntu@vera-ansible-test-c9cd993b-63cd-44e2-9d69-30ed22582e5b: ~
(ansible)[verali@i136 ~]$ ssh ubuntu@10.23.1.184
Warning: Permanently added '10.23.1.184' (RSA) to the list of known hosts.
Enter passphrase for key '/N/u/verali/.ssh/id_rsa':
Welcome to Ubuntu 14.04.2 LTS (GNU/Linux 3.13.0-53-generic x86_64)
* Documentation: https://help.ubuntu.com/
System information as of Sun Jun 7 14:55:24 UTC 2015
System load: 0.0 Memory usage: 2% Processes: 52
Usage of /: 56.6% of 1.32GB Swap usage: 0% Users logged in: 0
Graph this data and manage this system at:
https://landscape.canonical.com/
Get cloud support with Ubuntu Advantage Cloud Guest:
http://www.ubuntu.com/business/services/cloud
0 packages can be updated.
0 updates are security updates.
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.
ubuntu@vera-ansible-test-c9cd993b-63cd-44e2-9d69-30ed22582e5b:~$

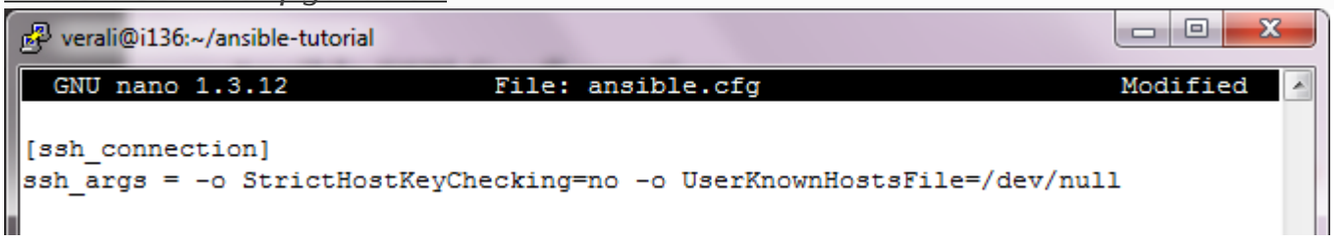


Create inventory file:

```
(ansible)[verali@i136 ~]$ mkdir ansible-tutorial
(ansible)[verali@i136 ~]$ cd ansible-tutorial/
(ansible)[verali@i136 ansible-tutorial]$ emacs inventory.txt
```

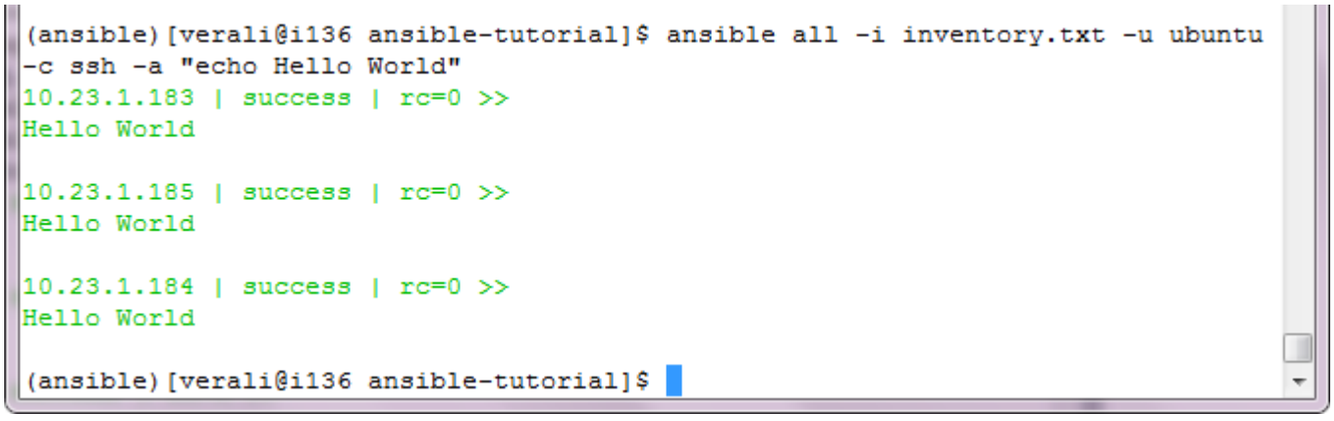


Ansible SSH Configuration



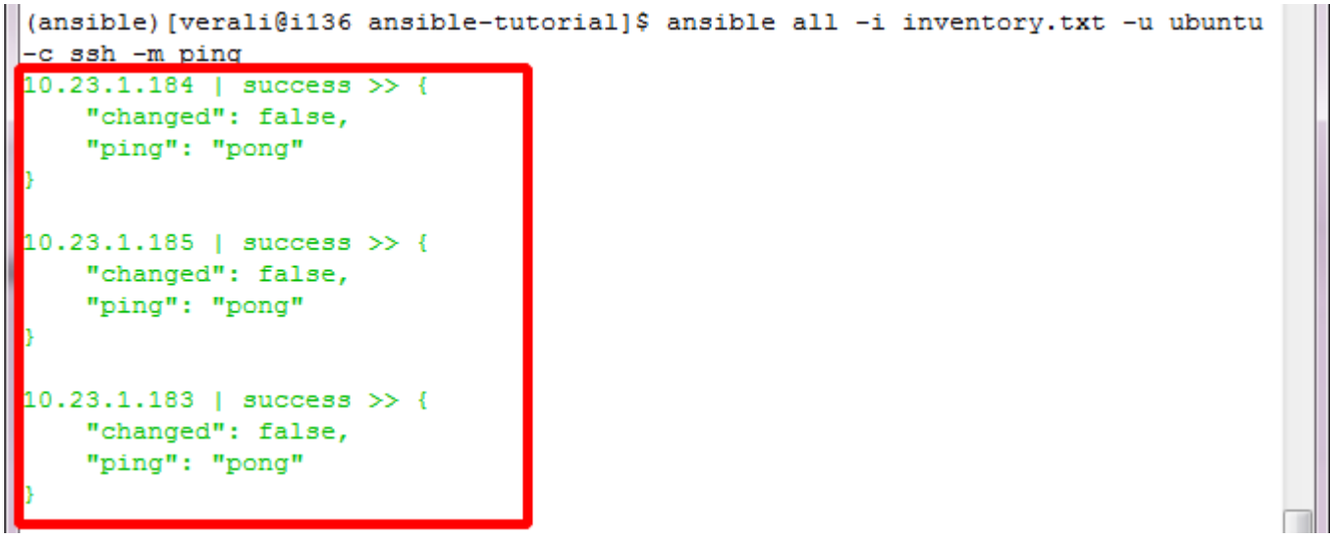
Shell module: Hello World

```
ansible all -i inventory.txt -u ubuntu -c ssh -a "echo Hello World"
```



Ping module

```
ansible all -i inventory.txt -u ubuntu -c ssh -m ping
```



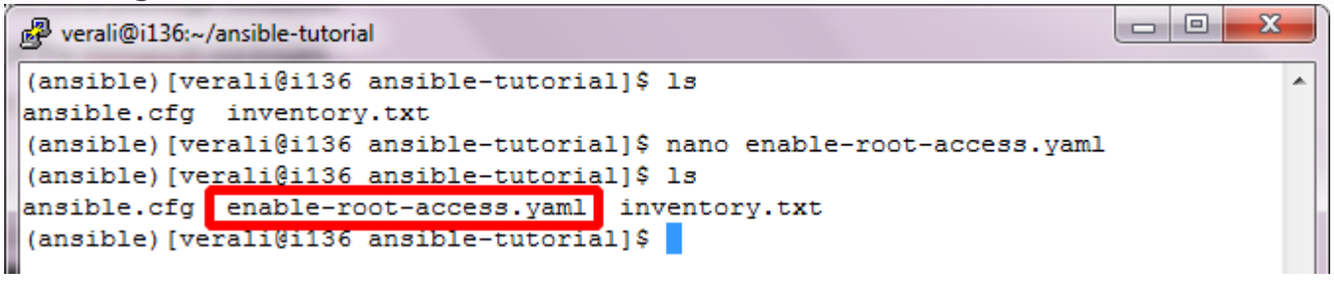
Ansible Playbooks

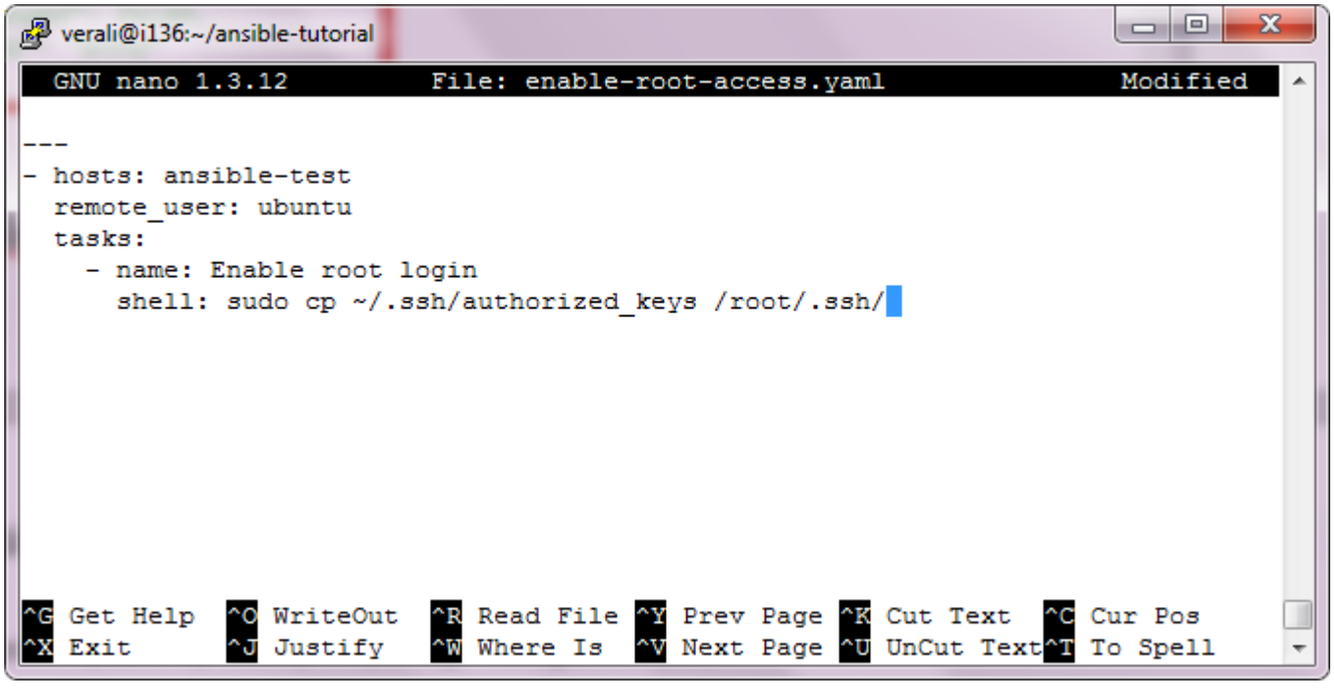
First playbook for MongoDB Installation

Task list

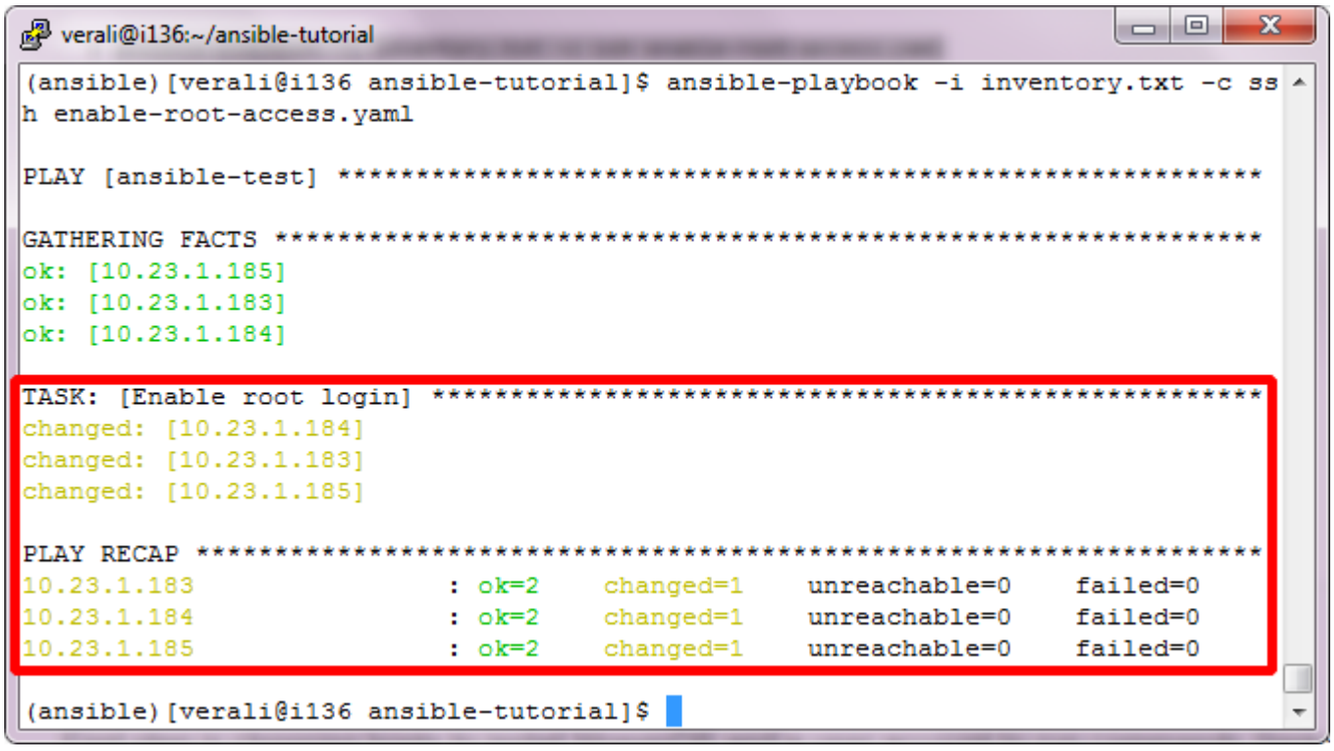
- Import the public key used by the package management system
- Create a list file for MongoDB
- Reload local package database
- Install the MongoDB packages
- Start MongoDB

Enabling Root SSH Access





Run the playbook:



Hosts and Users

Playbook for mongodb:

```
---
- hosts: ansible-test
  remote_user: root
  tasks:
  - name: Import the public key used by the package management system
    apt_key: keyserver=hkp://keyserver.ubuntu.com:80 id=7F0CEB10 state=present
  - name: Add MongoDB repository
    apt_repository: repo='deb http://downloads-distro.mongodb.org/repo/ubuntu-upstart dist 10g$
  - name: install mongodb
    apt: pkg=mongodb-org state=latest update_cache=yes
    notify:
    - start mongodb
  handlers:
    - name: start mongodb
      service: name=mongod state=started
```

verali@i136:~/ansible-tutorial

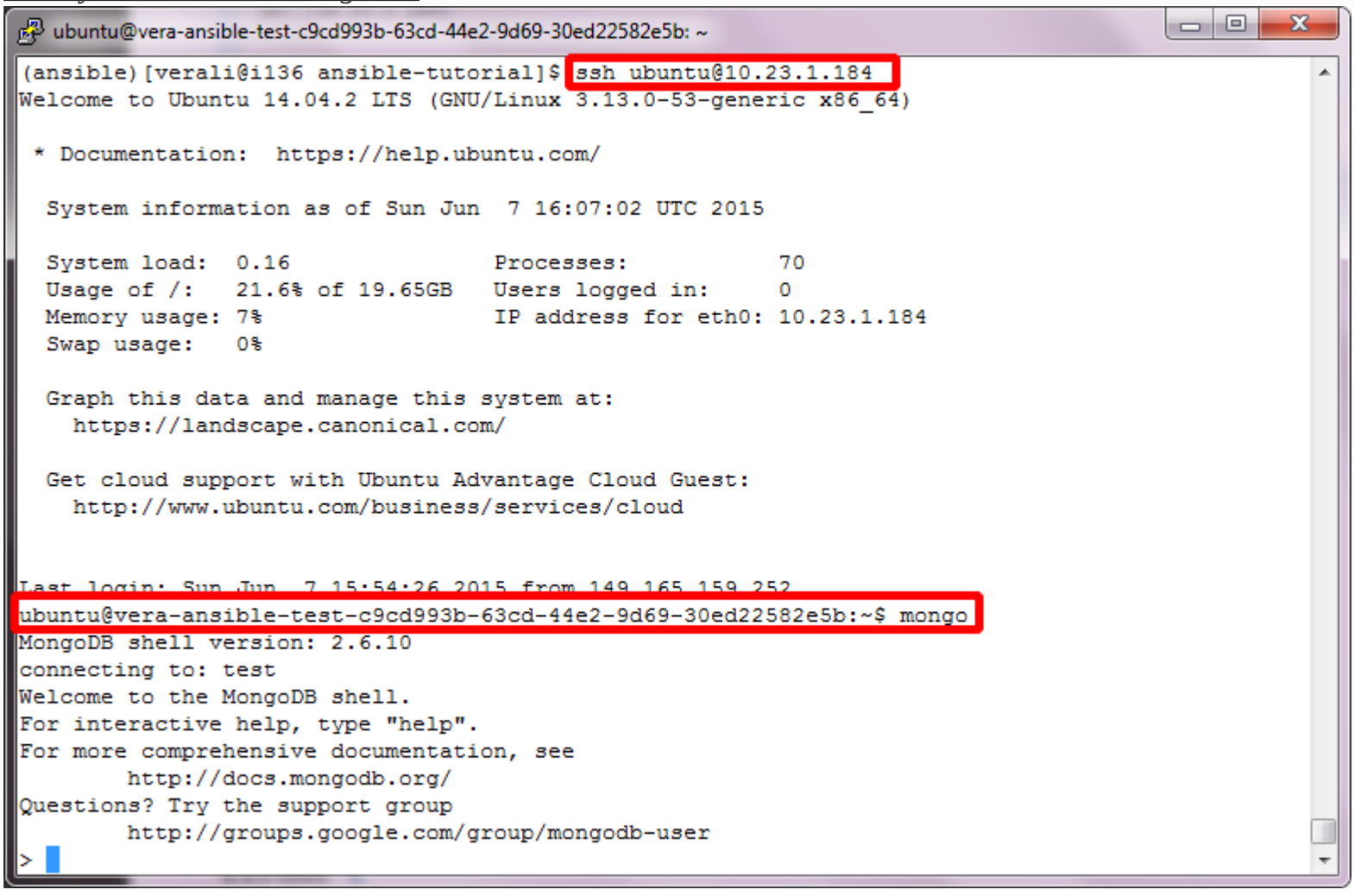
```
  GNU nano 1.3.12                File: mongodb.yaml

---
- hosts: ansible-test
  remote_user: root
  tasks:
  - name: Import the public key used by the package management system
    apt_key: keyserver=hkp://keyserver.ubuntu.com:80 id=7F0CEB10 state=present
  - name: Add MongoDB repository
    apt_repository: repo='deb http://downloads-distro.mongodb.org/repo/ubuntu-upstart dist 10g$
  - name: install mongodb
    apt: pkg=mongodb-org state=latest update_cache=yes
    notify:
    - start mongodb
  handlers:
    - name: start mongodb
      service: name=mongod state=started
```

ansible-playbook -i inventory.txt -c ssh mongodb.yaml

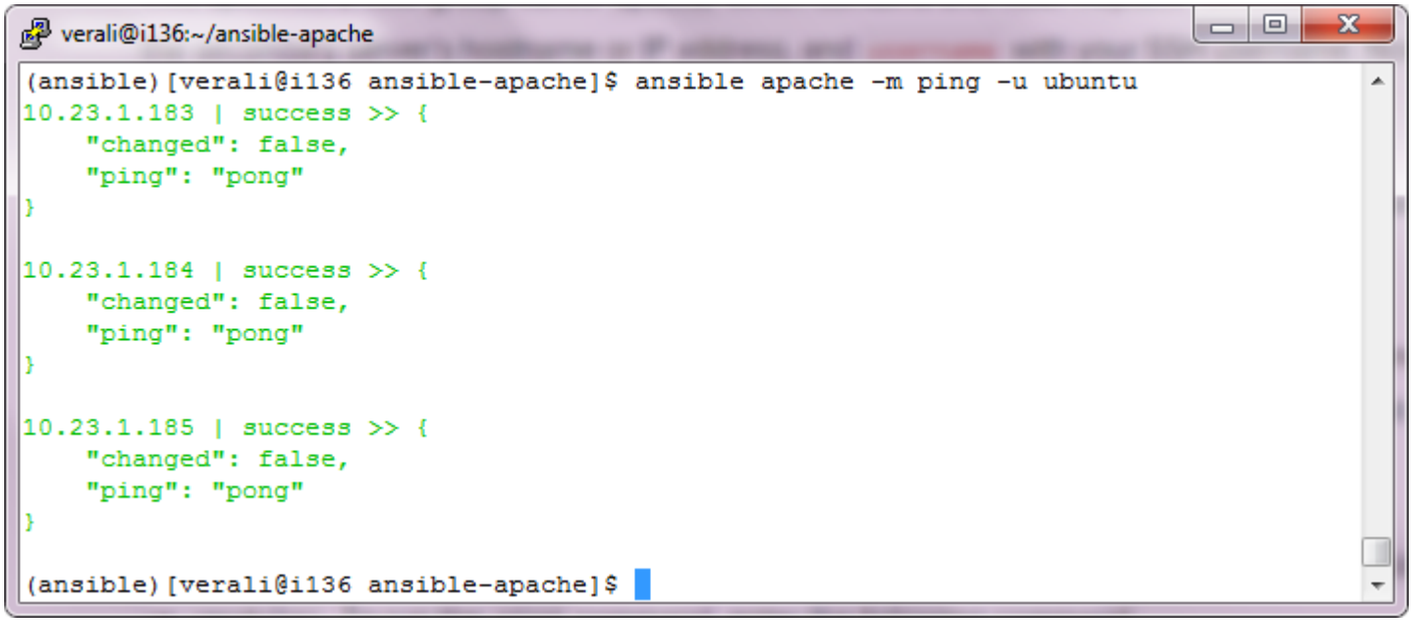
verali@i136:~/ansible-tutorial

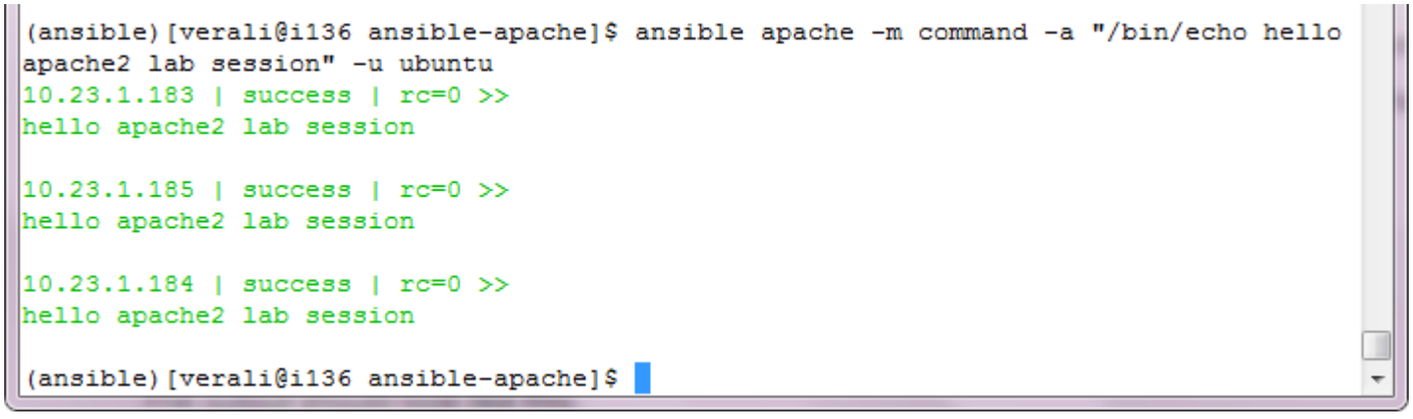
```
(ansible)[verali@i136 ansible-tutorial]$ nano mongodb.yaml
(ansible)[verali@i136 ansible-tutorial]$ ansible-playbook -i inventory.txt -c ssh mongodb.yaml

PLAY [ansible-test] ***********************************************************

GATHERING FACTS ***************************************************************
ok: [10.23.1.183]
ok: [10.23.1.184]
ok: [10.23.1.185]

TASK: [Import the public key used by the package management system] ************
ok: [10.23.1.184]
ok: [10.23.1.183]
ok: [10.23.1.185]

TASK: [Add MongoDB repository] ************************************************
ok: [10.23.1.184]
ok: [10.23.1.183]
ok: [10.23.1.185]

TASK: [install mongodb] *******************************************************
ok: [10.23.1.185]
ok: [10.23.1.184]
ok: [10.23.1.183]

PLAY RECAP ********************************************************************
10.23.1.183                : ok=4    changed=0    unreachable=0    failed=0
10.23.1.184                : ok=4    changed=0    unreachable=0    failed=0
10.23.1.185                : ok=4    changed=0    unreachable=0    failed=0

(ansible)[verali@i136 ansible-tutorial]$
```

Sanity Check: Test MongoDB



Lab session


verali@i136:~/ansible-apache
(ansible)[verali@i136 ansible-apache]$ ansible apache -m ping -u ubuntu
10.23.1.183 | success >> {
"changed": false,
"ping": "pong"
}
10.23.1.184 | success >> {
"changed": false,
"ping": "pong"
}
10.23.1.185 | success >> {
"changed": false,
"ping": "pong"
}
(ansible)[verali@i136 ansible-apache]$


(ansible)[verali@i136 ansible-apache]$ ansible apache -m command -a "/bin/echo hello
apache2 lab session" -u ubuntu
10.23.1.183 | success | rc=0 >>
hello apache2 lab session
10.23.1.185 | success | rc=0 >>
hello apache2 lab session
10.23.1.184 | success | rc=0 >>
hello apache2 lab session
(ansible)[verali@i136 ansible-apache]$

```
verali@i136:~/ansible-apache

(ansible)[verali@i136 ansible-apache]$ ansible-playbook apache.yml -u ubuntu

PLAY [apache] ******************************************************************

GATHERING FACTS ****************************************************************
ok: [10.23.1.185]
ok: [10.23.1.183]
ok: [10.23.1.184]

TASK: [run echo command] *******************************************************
changed: [10.23.1.185]
changed: [10.23.1.184]
changed: [10.23.1.183]

PLAY RECAP *********************************************************************
10.23.1.183                : ok=2    changed=1    unreachable=0    failed=0
10.23.1.184                : ok=2    changed=1    unreachable=0    failed=0
10.23.1.185                : ok=2    changed=1    unreachable=0    failed=0

(ansible)[verali@i136 ansible-apache]$
```

```
---
- hosts: apache
  remote_user: root
  tasks:
    - name: install apache2
      apt: name=apache2 update_cache=yes state=latest
```

```
(ansible)[verali@i136 ansible-tutorial]$ ansible-playbook -i inventory.txt apache.yml

PLAY [ansible-test] ************************************************************

GATHERING FACTS ****************************************************************
ok: [10.23.1.184]
ok: [10.23.1.185]
ok: [10.23.1.183]

TASK: [install apache2] ********************************************************
```

OpenStack Heat

https://mix.office.com/watch/1ry7jrkuvkfwh

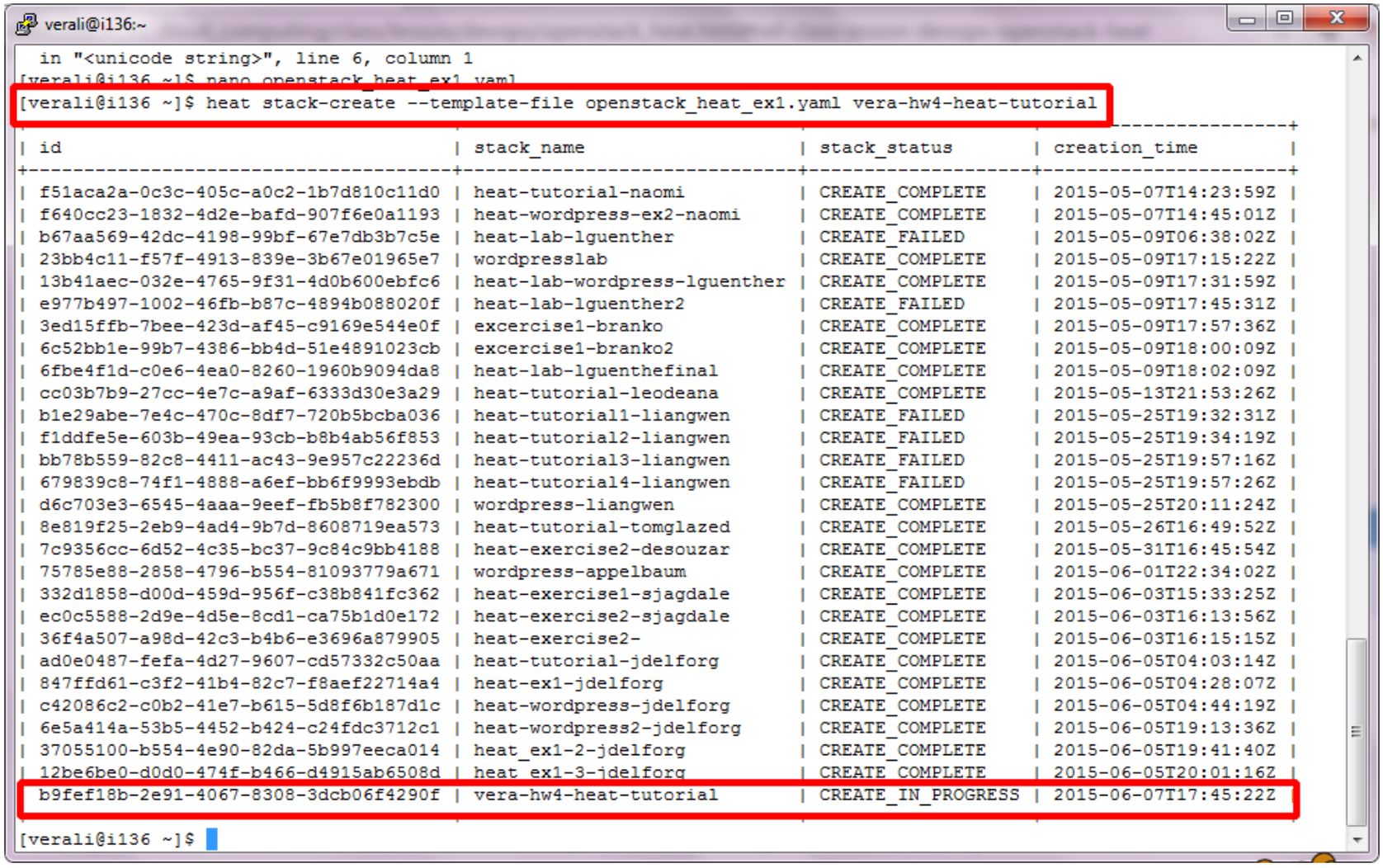
http://cloudmesh.github.io/introduction_to_cloud_computing/class/lesson/devops/openstack_heat.html#ref-class-lesson-devops-openstack-heat

Heat Client Tool & Stack List

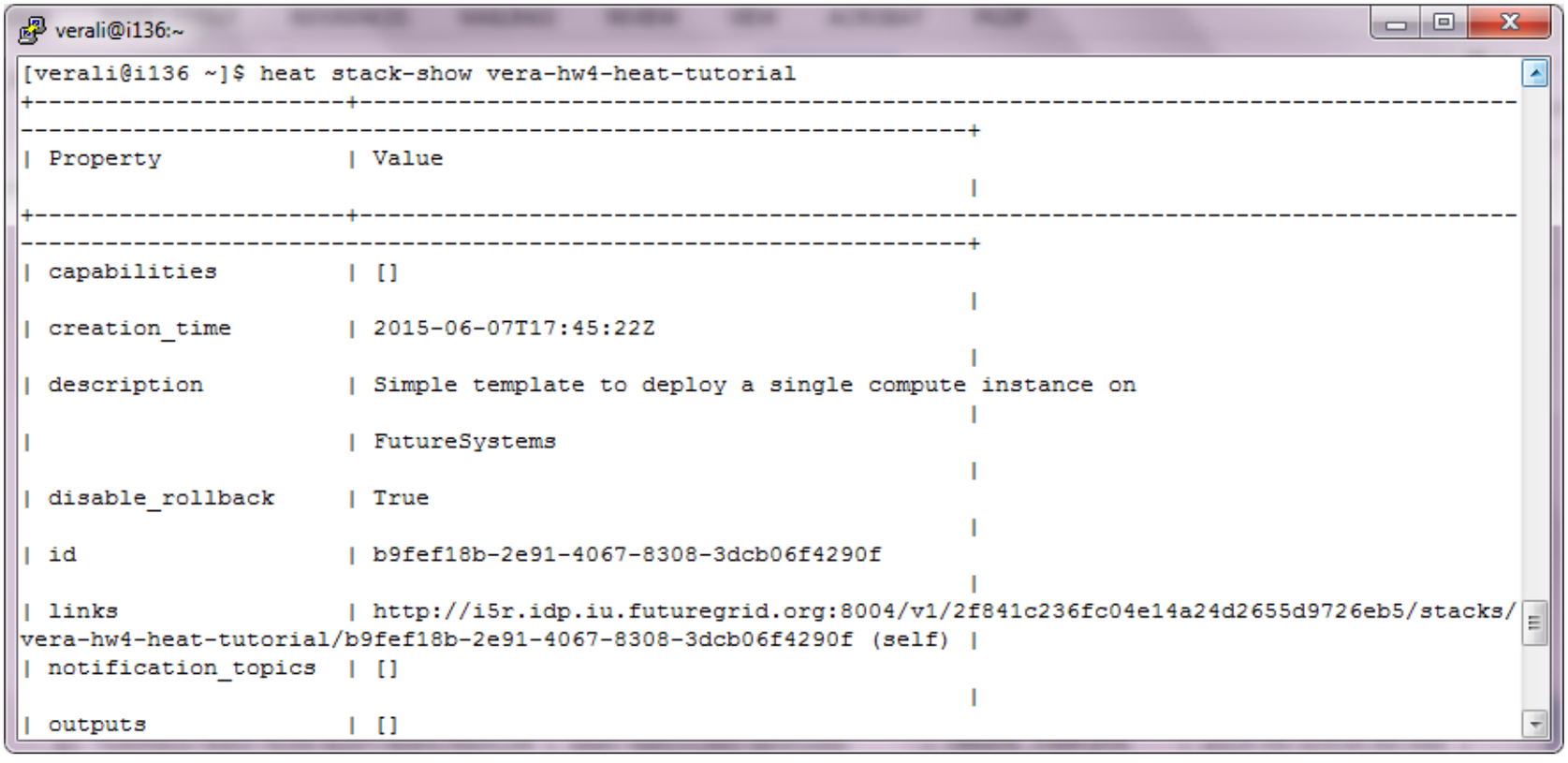
```
verali@i136:~
[verali@i136 ~]$ module load openstack
Python version 2.7.9 loaded
OpenStack Clients loaded
[verali@i136 ~]$ source $HOME/.cloudmesh/clouds/india/juno/openrc.sh
[verali@i136 ~]$ heat stack-list
+--------------------------------------+------------------------------+---------
--------+----------------------+
| id                                   | stack_name                   | stack_st
atus     | creation_time        |
+--------------------------------------+------------------------------+---------
--------+----------------------+
| f51aca2a-0c3c-405c-a0c2-1b7d810c11d0 | heat-tutorial-naomi          | CREATE_C
OMPLETE | 2015-05-07T14:23:59Z |
| f640cc23-1832-4d2e-bafd-907f6e0a1193 | heat-wordpress-ex2-naomi     | CREATE_C
OMPLETE | 2015-05-07T14:45:01Z |
| b67aa569-42dc-4198-99bf-67e7db3b7c5e | heat-lab-lguenther           | CREATE_F
AILED   | 2015-05-09T06:38:02Z |
| 23bb4c11-f57f-4913-839e-3b67e01965e7 | wordpresslab                 | CREATE_C
OMPLETE | 2015-05-09T17:15:22Z |
```

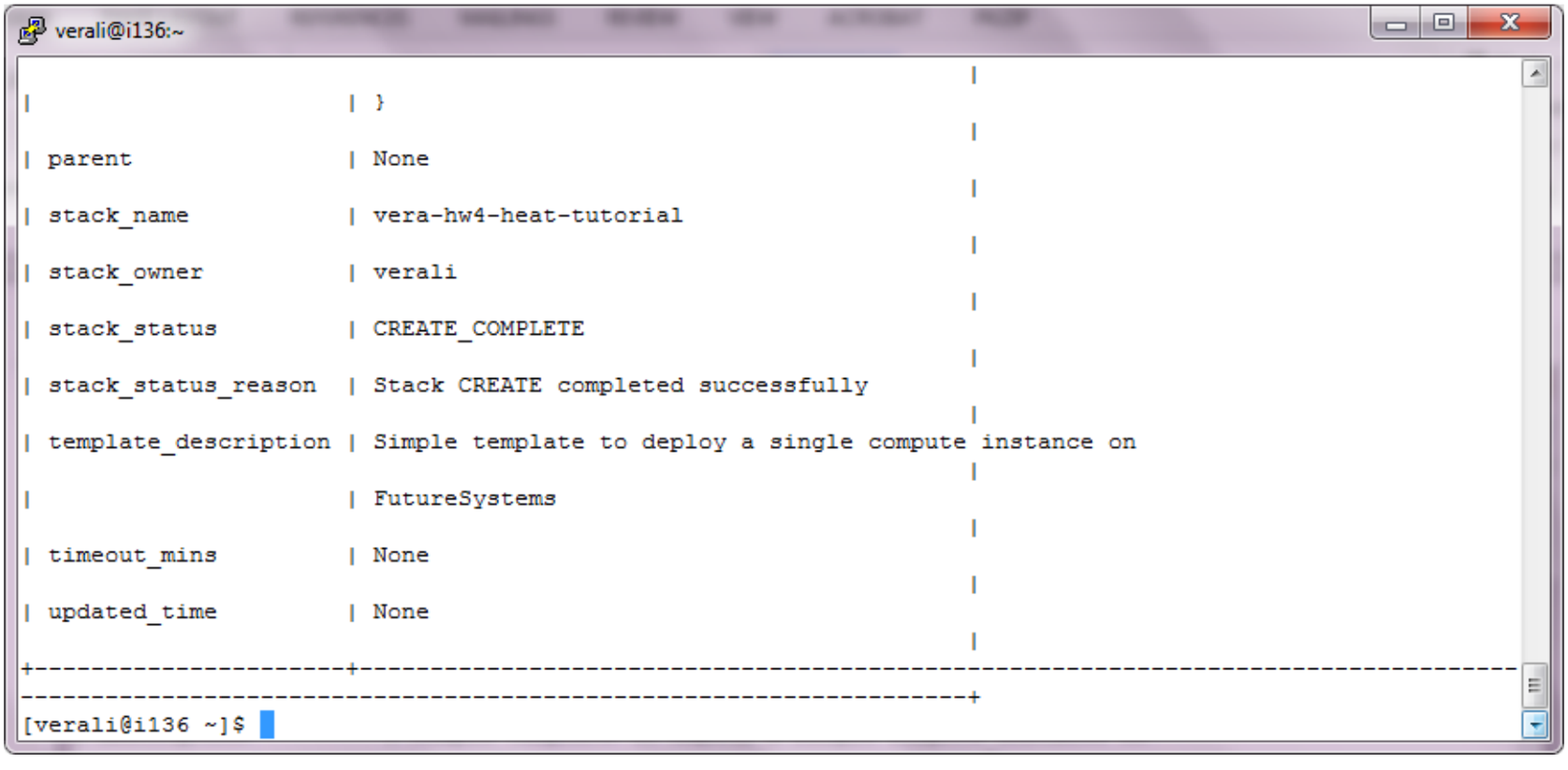
Create a template in yaml

```
verali@i136:~
  GNU nano 1.3.12         File: openstack_heat_ex1.yaml              Modified

heat_template_version: 2013-05-23

description: Simple template to deploy a single compute instance on
FutureSystems

resources:
  my_instance:
    type: OS::Nova::Server
    properties:
      key_name: vera_xuanying_li
      image: futuresystems/ubuntu-14.04
      flavor: m1.small

^G Get Help  ^O WriteOut  ^R Read File ^Y Prev Page ^K Cut Text  ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is  ^V Next Page ^U UnCut Text^T To Spell
```

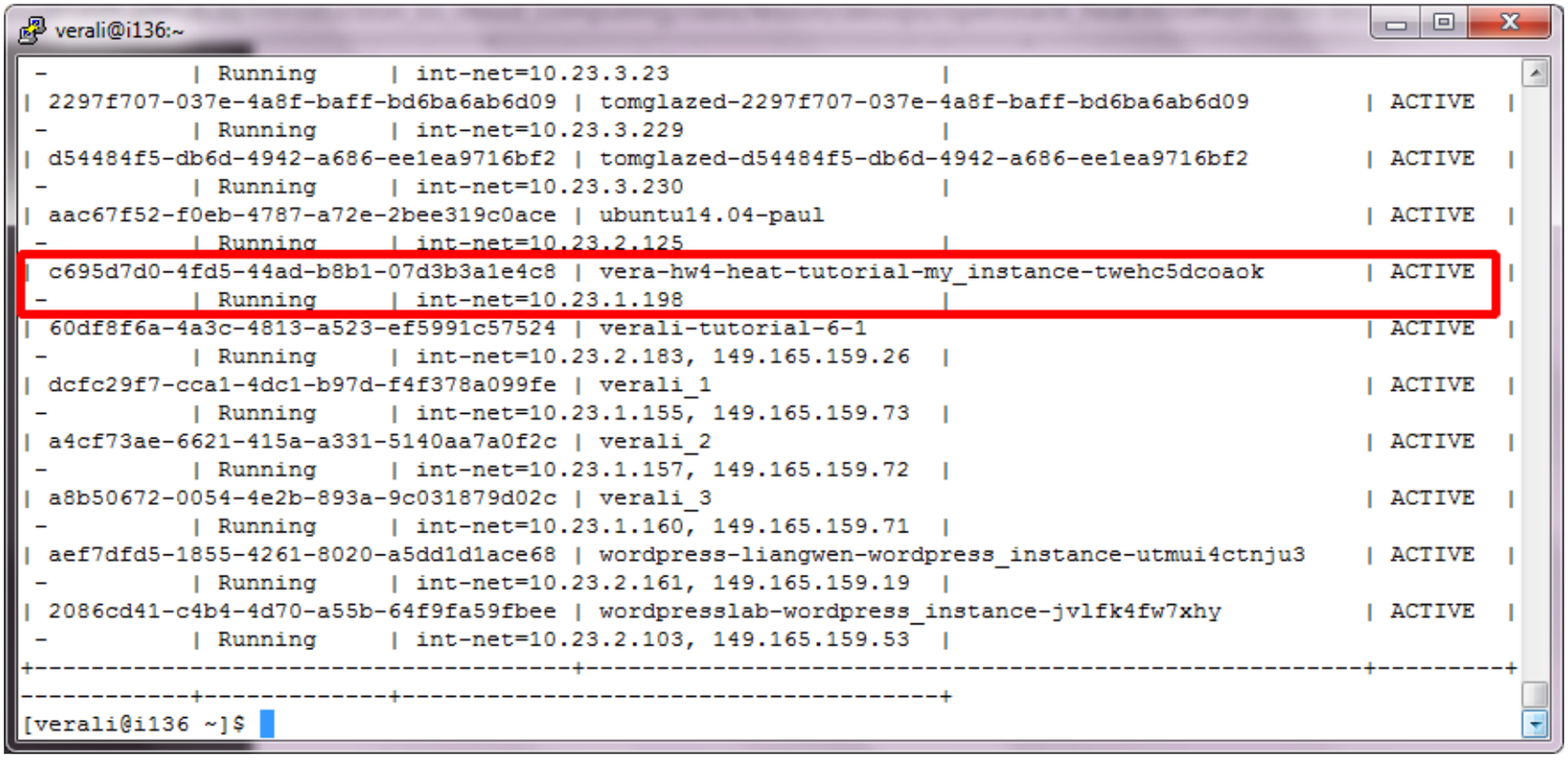


Check my stack details:

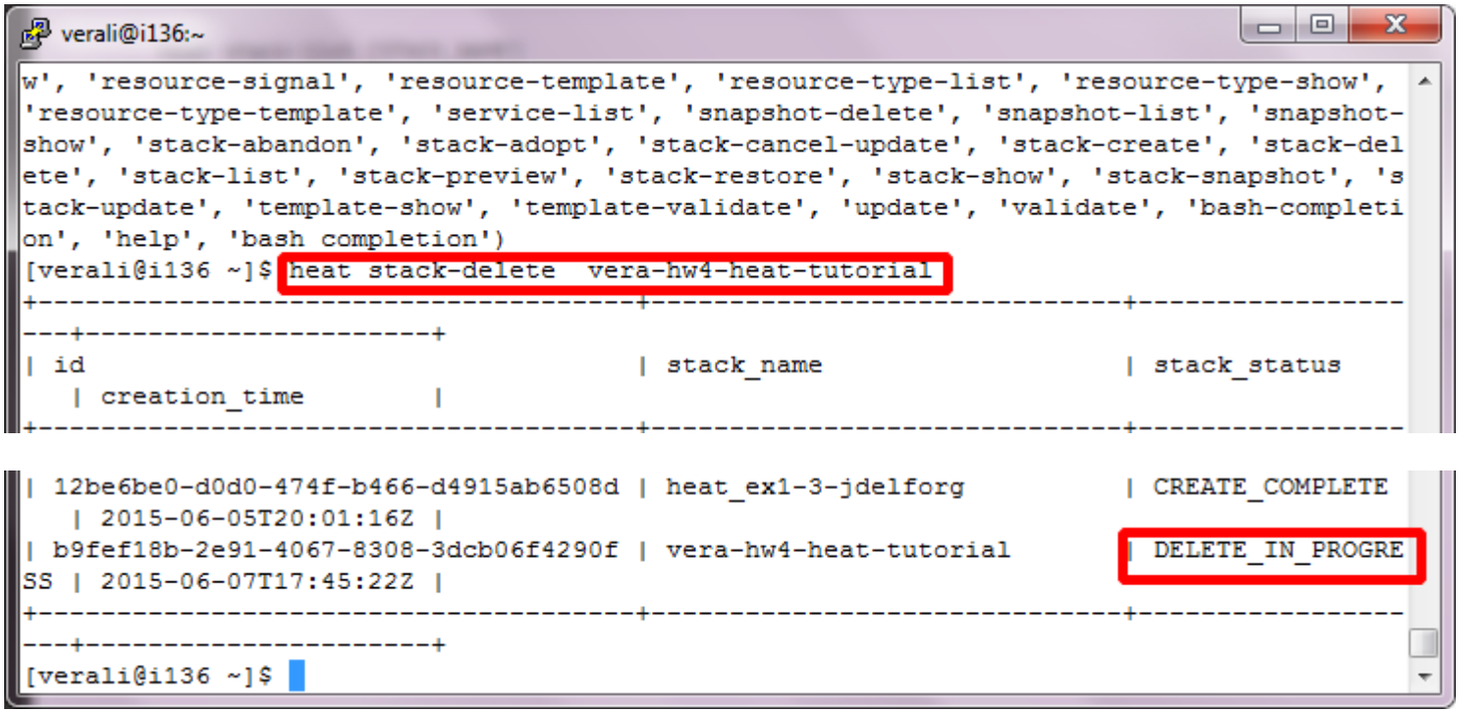




Nova list to check instance:

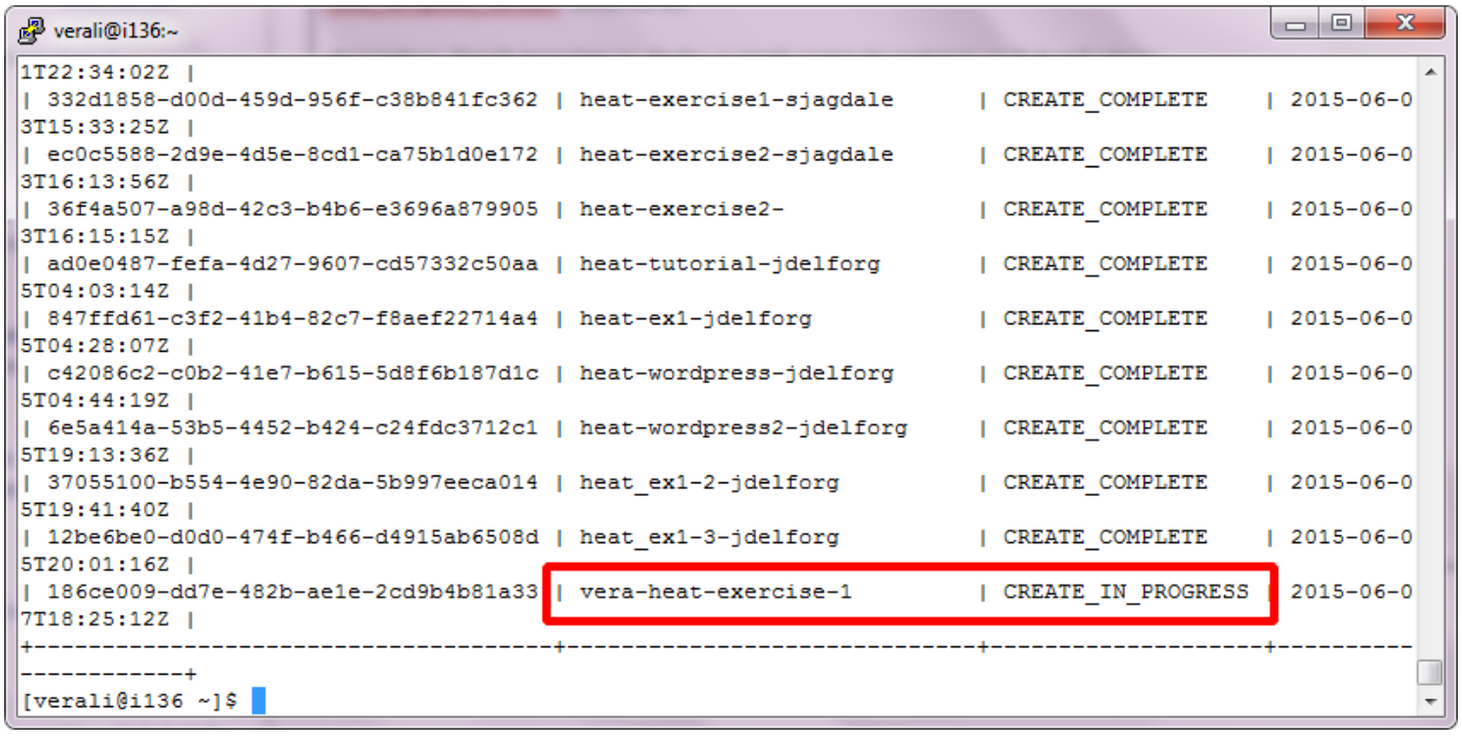


Delete a stack:



Exercises 1:

```
heat_template_version: 2013-05-23

description: Heat Exercise 1

parameters:
  key_name:
    type: string
    label: key name
    default: vera_xuanying_li
  image_id:
    type: string
    label: Image name
    default: futuresystems/ubuntu-14.04
  instance_type:
    type: string
    label: Instance flavor
    default: m1.small

resources:
  secgroup:
    type: OS::Neutron::SecurityGroup
    properties:
      rules:
        - protocol: tcp
          remote_ip_prefix: 0.0.0.0/0
          port_range_min: 22
          port_range_max: 22

  instance_port:
    type: OS::Neutron::Port
    properties:
      network: int-net
      security_groups:
        - default
        - { get_resource: secgroup }

  instance:
    type: OS::Nova::Server
    properties:
      key_name: { get_param: key_name }
      image: { get_param: image_id }
      flavor: { get_param: instance_type }
      networks:
        - port: { get_resource: instance_port }
```



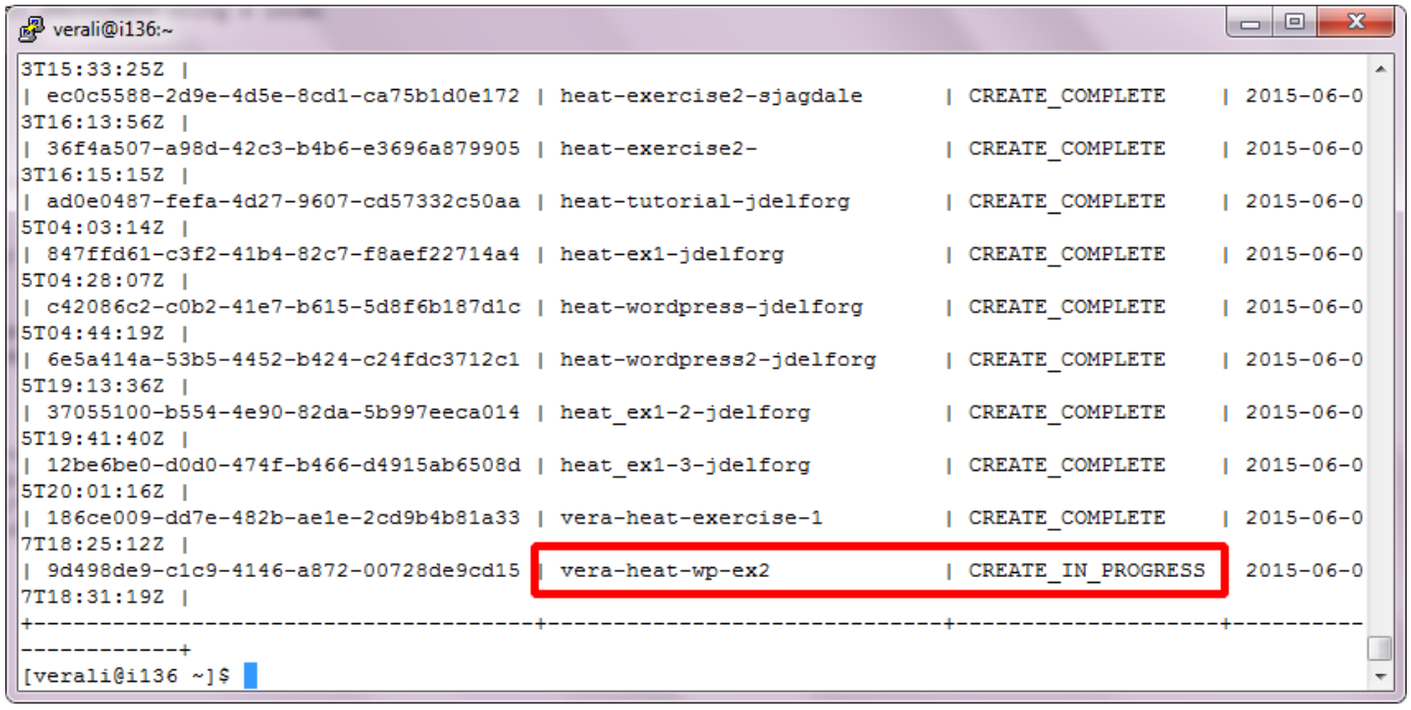
Exercise 2

```
heat_template_version: 2013-05-23

description: >
  Heat WordPress template on Fedora 21, using only Heat OpenStack-native
  resource types (adapted from  HOT examples), and without the requirement for
  heat-cfntools in the image.  WordPress is web software you can use to create
  a beautiful website or blog.
  This template installs a single-instance WordPress deployment using a local
  MySQL database to store the data.

parameters:

  key_name:
    type: string
    description : Name of a KeyPair to enable SSH access to the instance
  instance_type:
    type: string
    description: Instance type for WordPress server
    default: m1.small
    constraints:
      - allowed_values: [m1.small, m1.medium, m1.large]
        description: instance_type must be one of m1.small, m1.medium or m1.large
  image_id:
    type: string
    description: >
      Name or ID of the image to use for the WordPress server.
      Recommended values are fedora-20.i386 or fedora-20.x86_64;
      get them from http://cloud.fedoraproject.org/fedora-20.i386.qcow2
      or http://cloud.fedoraproject.org/fedora-20.x86_64.qcow2.
```

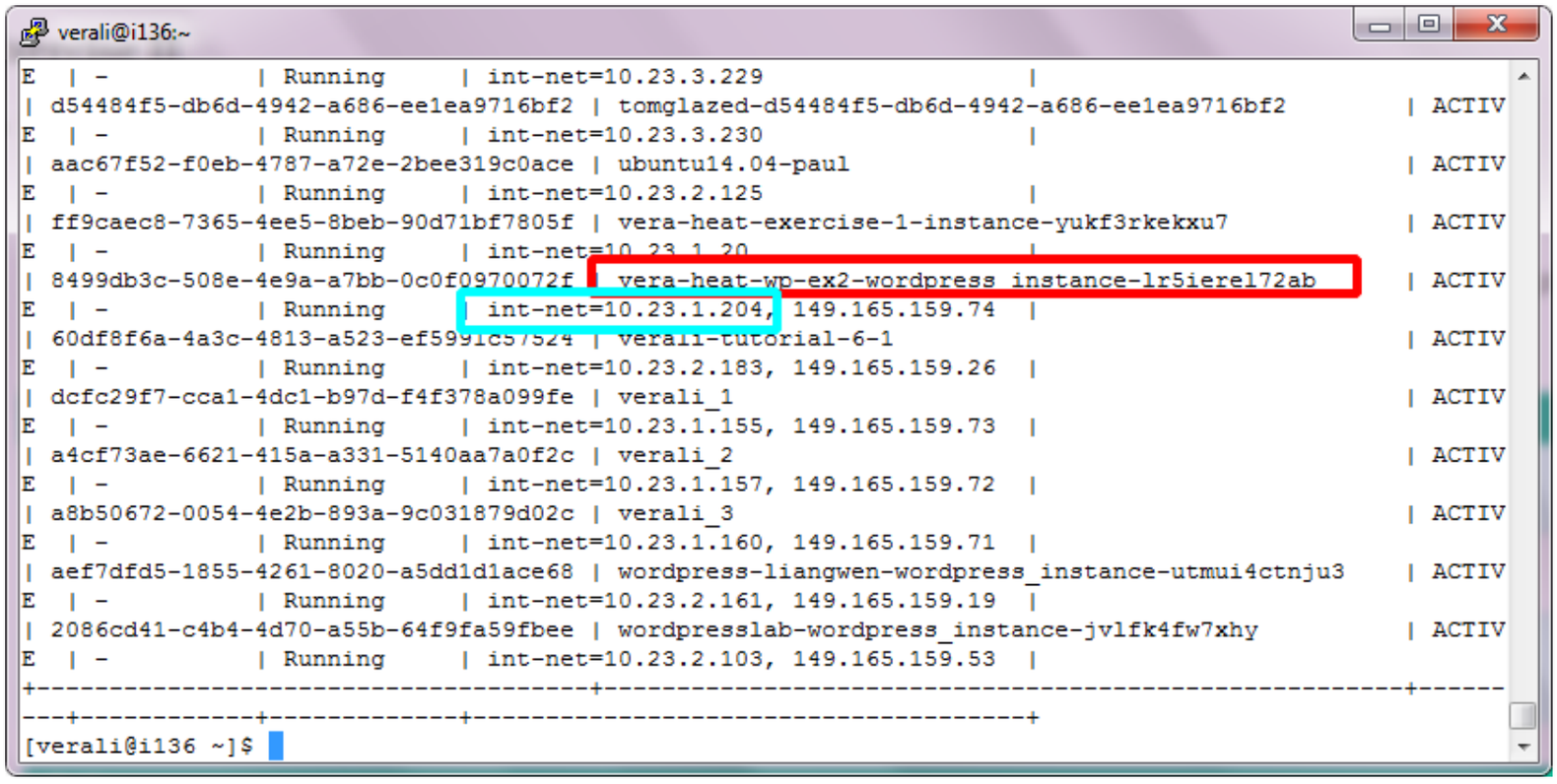
```
    Futuresystems has fedora-21.
   default: futuresystems/fedora-21

  db_name:
   type: string
   description: WordPress database name
   default: wordpress
   constraints:
    - length: { min: 1, max: 64 }
      description: db_name must be between 1 and 64 characters
    - allowed_pattern: '[a-zA-Z][a-zA-Z0-9]*'
      description: >
       db_name must begin with a letter and contain only alphanumeric
       characters
  db_username:
   type: string
   description: The WordPress database admin account username
   default: admin
   hidden: true
   constraints:
    - length: { min: 1, max: 16 }
      description: db_username must be between 1 and 16 characters
    - allowed_pattern: '[a-zA-Z][a-zA-Z0-9]*'
      description: >
       db_username must begin with a letter and contain only alphanumeric
       characters
  db_password:
   type: string
   description: The WordPress database admin account password
   default: admin
   hidden: true
   constraints:
    - length: { min: 1, max: 41 }
      description: db_password must be between 1 and 41 characters
    - allowed_pattern: '[a-zA-Z0-9]*'
      description: db_password must contain only alphanumeric characters
  db_root_password:
   type: string
   description: Root password for MySQL
   default: admin
   hidden: true
   constraints:
    - length: { min: 1, max: 41 }
      description: db_root_password must be between 1 and 41 characters
    - allowed_pattern: '[a-zA-Z0-9]*'
      description: db_root_password must contain only alphanumeric characters

resources:
  security_group:
   type: AWS::EC2::SecurityGroup
   properties:
    GroupDescription: "SSH (22), HTTP (80)"
    SecurityGroupIngress:
    - IpProtocol: "tcp"
      FromPort: "22"
```

```
      ToPort : "22"
      CidrIp : "0.0.0.0/0"
    - IpProtocol: "tcp"
      FromPort: "80"
      ToPort: "80"
      CidrIp: "0.0.0.0/0"
floatingip:
  type: OS::Nova::FloatingIP
  properties:
    pool: ext-net
wordpress_instance:
  type: OS::Nova::Server
  properties:
    image: { get_param: image_id }
    flavor: { get_param: instance_type }
    key_name: { get_param: key_name }
    security_groups:
      - "default"
      - { get_resource: security_group }
    user_data:
      str_replace:
        template: |
          #!/bin/bash -v

          yum -y install mariadb mariadb-server httpd wordpress
          touch /var/log/mariadb/mariadb.log
          chown mysql.mysql /var/log/mariadb/mariadb.log
          systemctl start mariadb.service

          # Setup MySQL root password and create a user
          mysqladmin -u root password db_rootpassword
          cat << EOF | mysql -u root --password=db_rootpassword
          CREATE DATABASE db_name;
          GRANT ALL PRIVILEGES ON db_name.* TO "db_user"@"localhost"
          IDENTIFIED BY "db_password";
          FLUSH PRIVILEGES;
          EXIT
          EOF

          sed -i "/Deny from All/d" /etc/httpd/conf.d/wordpress.conf
          sed -i "s/Require local/Require all granted/" /etc/httpd/conf.d/wordpress.conf
          sed -i s/database_name_here/db_name/ /etc/wordpress/wp-config.php
          sed -i s/username_here/db_user/ /etc/wordpress/wp-config.php
          sed -i s/password_here/db_password/ /etc/wordpress/wp-config.php

          systemctl stop httpd.service
          systemctl start httpd.service
        params:
          db_rootpassword: { get_param: db_root_password }
          db_name: { get_param: db_name }
          db_user: { get_param: db_username }
          db_password: { get_param: db_password }
association:
  type: OS::Nova::FloatingIPAssociation
  properties:
```

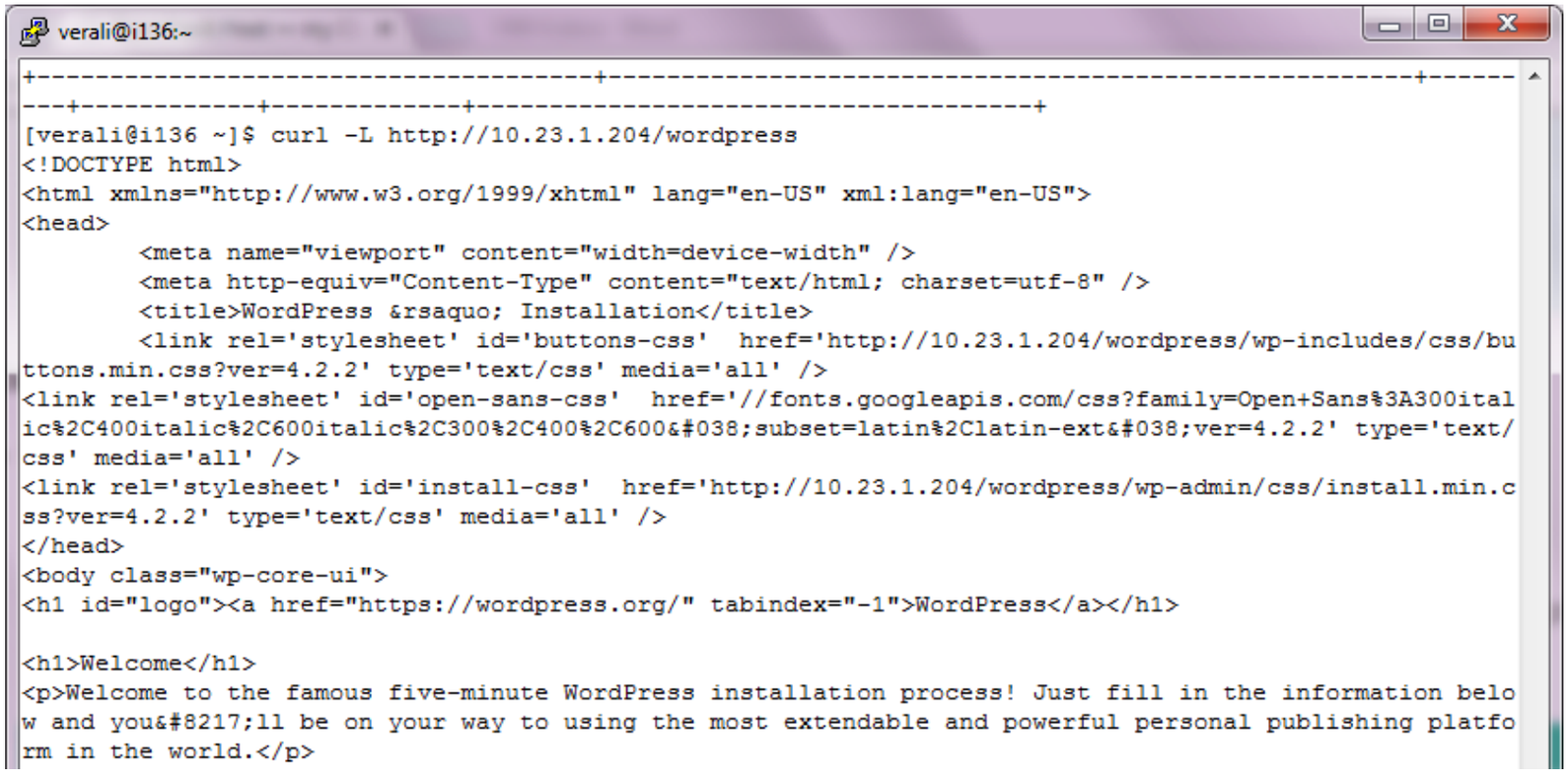
```
    floating_ip: { get_resource: floatingip }
    server_id: { get_resource: 'wordpress_instance' }

outputs:
  WebsiteURL:
    description: URL for Wordpress wiki
    value:
      str_replace:
        template: http://host/wordpress
        params:
          host: { get_attr: [ floatingip, ip ] }
```



Nova list



Generate WordPress page on: IP: 10.23.1.204



```
/* <![CDATA[ */
var _wpUtilSettings = {"ajax":{"url":"\/wp-admin\/admin-ajax.php"}};
/* ]]> */
</script>
<script type='text/javascript' src='http://10.23.1.204/wordpress/wp-includes/js/wp-util.min.js?ver=4.2
.2'></script>
<script type='text/javascript' src='http://10.23.1.204/wordpress/wp-admin/js/user-profile.min.js?ver=4
.2.2'></script>
<script type='text/javascript' src='http://10.23.1.204/wordpress/wp-admin/js/language-chooser.min.js?v
er=4.2.2'></script>
</body>
</html>
[verali@i136 ~]$
```

Check out web page: http://149.165.159.74/wordpress -> http://149.165.159.74/wordpress/wp-admin/install.php