Provisioning Virtual Networks using Junos, Vagrant and Ansible

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GRNOG - 3rd Technical Meeting

10 Jun 2016

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- Causes divergence in infrastructure
  - People tend to do things in different ways
  - Up to X * Y * Z possible configurations (X=# people, Y=# number of settings, Z=# ways of doing something)

Solution?

!!!Automation!!!

Solutions

Various approaches of automation at multiple levels:

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- At the configuration level (CFEngine, Puppet, Chef, Ansible, custom) - Configuration as code!

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- At the installation level (Unattended Installation, Debian preseed, FAI, Kickstart, custom)
- At the configuration level (CFEngine, Puppet, Chef, Ansible, custom) - Configuration as code!

And their combinations whenever applicable!!!

An informal survey

4 different classes (as devised by the presenter)

- No automation at all
- Image/Installation level automation
- Configuration Level automation
- Combination of 2 and 3

What is Vagrant?

Wikipedia says:

Vagrant is computer software that creates and configures virtual development environments. It can be seen as a higher-level wrapper around virtualization software such as VirtualBox, VMware, KVM and Linux Containers (LXC), and around configuration management software such as Ansible, Chef, Salt, and Puppet.

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Sounds great! Now, WHAT ACTUALLY IS Vagrant?

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In the presenter's own words ?

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- A really easy way to spin up a fleet of VMs (and/or containers)
- A way to manage the lifecycle of VMs
- A way to provision, ensure and manage the configuration of VMs
- A tool to make working with systems reproducible, less buggy and faster

A tool to just make my (our?) lives easier

Vagrant as a Framework

It's a framework. It's scaffolding and plugins, plugins, plugins

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- Plugins to "know" VMs (Linux, Windows, BSDs, CoreOS, and others)
- Plugins to communicate with VMs (SSH, WinRM, Shared folders, etc)

And a growing set of things like DNS management, Host communication, snapshots and others

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And allows you to download VM images off the internet
And YES, Juniper does provide some to the world!

Vagrant => Reproducible Environments

Key Takeaway ?

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Key Takeaway ?
REPRODUCIBLE ENVIRONMENTS!

Vagrant for the first time

Run **vagrant init** in an empty folder. You get the following Vagrantfile (minus the comments)

```
1 Vagrant.configure(2) do |config|
2   config.vm.box = "base"
3 end
```

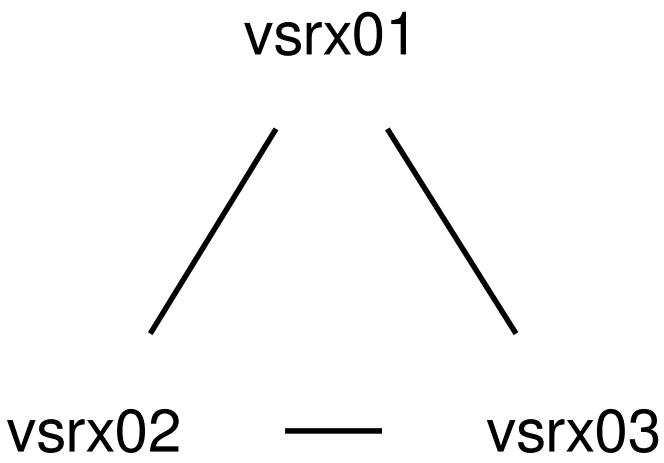
Now run **vagrant up** and you have your one base VM. Run **vagrant destroy** and kill it

Let's spice it up a bit

vagrant init juniper/ffp-12.1X47-D15.4-packetmode. Edit. It's Ruby

```
1  Vagrant.configure(2) do |config|
2    config.vm.box = "juniper/ffp-12.1X47-D15.4-packetmode"
3    config.vm.define "vsrx01" do |vsrx01|
4      vsrx01.vm.host_name = "vsrx01"
5      vsrx01.vm.network "private_network", ip: "192.168.12.11", virtualbox__intnet: "01-to-02"
6      vsrx01.vm.network "private_network", ip: "192.168.31.11", virtualbox__intnet: "03-to-01"
7    end
8    config.vm.define "vsrx02" do |vsrx02|
9      vsrx02.vm.host_name = "vsrx02"
10     vsrx02.vm.network "private_network", ip: "192.168.23.12", virtualbox__intnet: "02-to-03"
11     vsrx02.vm.network "private_network", ip: "192.168.12.12", virtualbox__intnet: "01-to-02"
12   end
13   config.vm.define "vsrx03" do |vsrx03|
14     vsrx03.vm.host_name = "vsrx03"
15     vsrx03.vm.network "private_network", ip: "192.168.31.13", virtualbox__intnet: "03-to-01"
16     vsrx03.vm.network "private_network", ip: "192.168.23.13", virtualbox__intnet: "02-to-03"
17   end
18 end
```

Let's spice it up a bit (2)



What is Ansible?

Wikipedia says:

Ansible, a free-software platform for configuring and managing computers, combines multi-node software deployment, ad hoc task execution, and configuration management. It manages nodes (which must have Python 2.4 or later installed on them) over SSH or over PowerShell. Modules work over JSON and standard output and can be written in any programming language. The system uses YAML to express reusable descriptions of systems.

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That sounds... unhelpful! WHAT ACTUALLY IS Vagrant?

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A Configuration Management System!

How does it work?

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- Apply the playbook => $ ansible-playbook -i hosts apache2.yaml

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- Define some tasks you want
- Group tasks and hosts into a playbook
- Apply the playbook => $ ansible-playbook -i hosts apache2.yaml

Let's see them quickly one by one

Ansible inventory file

Here's a very very simple ansible inventory.

```
1 [webservers]
2 www1.example.com
3 www2.example.com
4
5 [dbservers]
6 db0.example.com
7 db1.example.com
```

Ansible sample tasks

Just install apache2 as a task

```
1 - name: Install apache2 package
2   sudo: true
3   apt: name=apache2 state=installed
```

Ansible playbooks

Group them together in a playbook

```
1 - hosts: webservers
2   tasks:
3   - name: Install apache2 package
4     sudo: true
5     apt: name=apache2 state=installed
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https://github.com/Juniper/ansible-junos-stdlib

Enable RIP 1/3 - Vagrantfile

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3    config.vm.define "vsrx01" do |vsrx01|
4      vsrx01.vm.host_name = "vsrx01"
5      vsrx01.vm.network "private_network", ip: "192.168.12.11", virtualbox__intnet: "01-to-02"
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7    end
8    config.vm.define "vsrx02" do |vsrx02|
9      vsrx02.vm.host_name = "vsrx02"
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16     vsrx03.vm.network "private_network", ip: "192.168.23.13", virtualbox__intnet: "02-to-03"
17   end
18
19   config.vm.provision "ansible" do |ansible|
20       ansible.playbook = "rip.yaml"
21   end
22 end
```

Enable RIP 2/3 - rip.yaml - The playbook

```
1  ---
2  - hosts: all
3    gather_facts: no
4    connection: local
5    tasks:
6    - name: Checking NETCONF connectivity
7      wait_for: host={{ ansible_ssh_host }} port={{ ansible_ssh_port }} timeout=5
8    - name: enable RIP
9      junos_install_config:
10       host: "{{ ansible_ssh_host }}"
11       port: "{{ ansible_ssh_port }}"
12       user: root
13       ssh_private_key_file: "{{ ansible_ssh_private_key_file }}"
14       file: rip.conf
```

Enable RIP 3/3 - rip.conf - The configuration

```
protocols {
    rip {
        group rip-group {
            export advertise-routes-through-rip;
            neighbor ge-0/0/1;
            neighbor ge-0/0/2;
        }
    }
}
policy-options {
    policy-statement advertise-routes-through-rip {
        term 1 {
            from protocol [ direct rip ];
            then accept;
        }
    }
}
```

Demo

DEMO time!!

Use cases

Where to use that thing?

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- Learning
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- You name it

Questions

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