Orchestration, Automation & Virtualisation BoF

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Tim's Brief

- The general aim is to raise awareness of OAV
- Share best practices
- Facilitate discussion on common areas of interest
- Your architecture
- The tools you use
- The use cases you address
- The challenges and benefits, but it's up to you.

What is OAV ?

- Orchestration and Automation, different things to different people
- Confusion over network/application automation and orchestration
- Need a common understanding in order to discuss
- Vast array of tools & workflows
- Many ways to achieve the same thing
- Examples in our environment would help…

Network Orchestration/Automation

- Network Orchestration the "orchestration" of more than one network automation/configuration tool.
- TMF Forum "Orchestration is the coordination and management of systems in an automated fashion."
- Orchestration through the use of:
  - VNFs managers
  - Element Managers
  - Network Managers
  - Virtual Infrastructure Managers
  - SDN controllers
  - Etc...

Web Service Orchestration/Automation?

Configuration Management, Automation or Orchestration tool?

- Ansible
- Chef
- Cloudformation
- Docker/Docker Swarm
- Foreman
- Gitlab CI/CD

- Jenkins
- Kubernetes
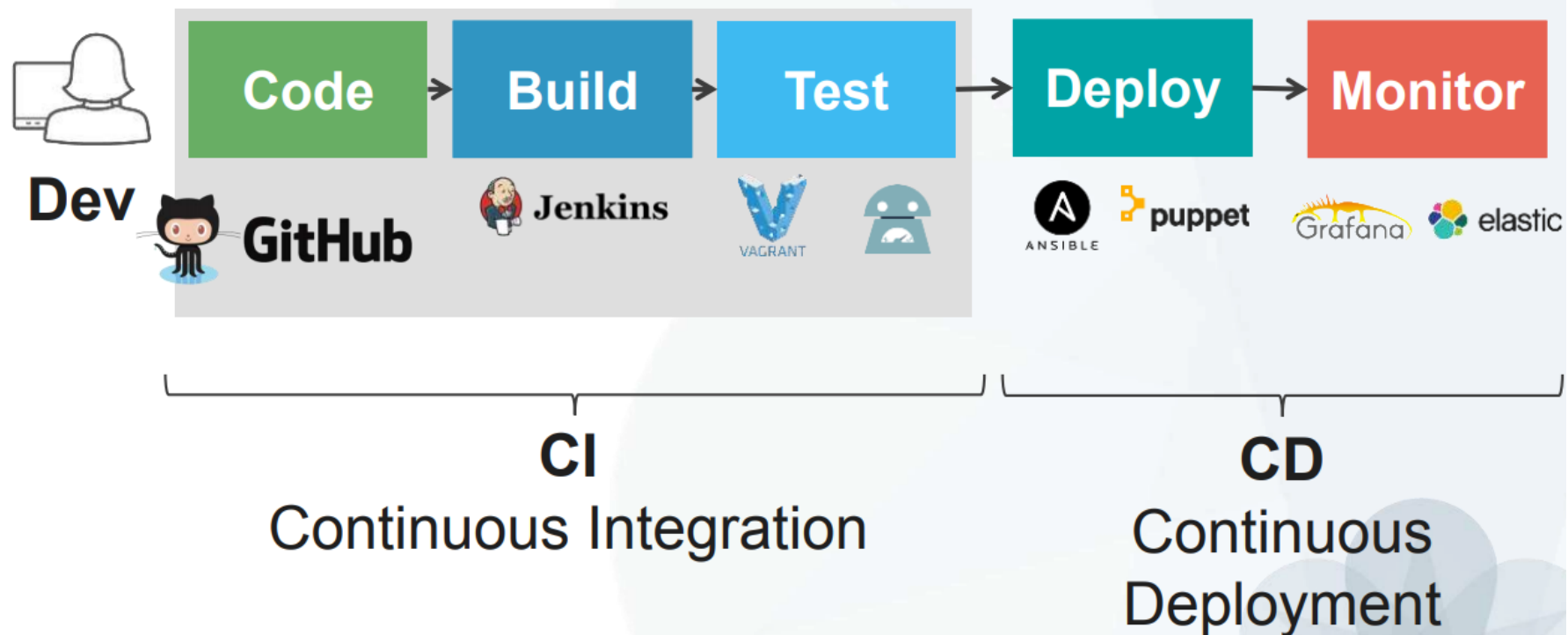- Puppet
- SaltStack
- Terraform
- Vagrant
- Never ending list…

Config Management vs Orchestration

- Ansible, Chef, Puppet, and SaltStack are all "configuration management" tools are designed to install and manage software on existing servers.

- CloudFormation and Terraform are "orchestration tools" are designed to provision the servers themselves, leaving the job of configuring those servers to other tools.

- These two categories are not mutually exclusive, as most configuration management tools can do some degree of provisioning and most orchestration tools can do some degree of configuration management.

- Git with Ansible can roll out an application, the servers, the network infrastructure, but should you…

- Many ways to achieve the same result. It is all about the workflow you chose...

HEAnet & Network Automation Today

- Islands of automation
  - Goal is to automate as much as we can
  - Service provisioning (Eline, L3VPN, IP transit) – Juniper CSD
  - New device commissioning – Git, Docker, Ansible, Juniper Space
  - Base configuration – Git, Docker, Ansible Gitlab CI/CD
  - External peers – Git, Docker, Ansible and Gitlab CI/CD
  - Data Centre Switches – Ansible

- No Orchestration
  - No SDN
  - No NFV
  - No VNF
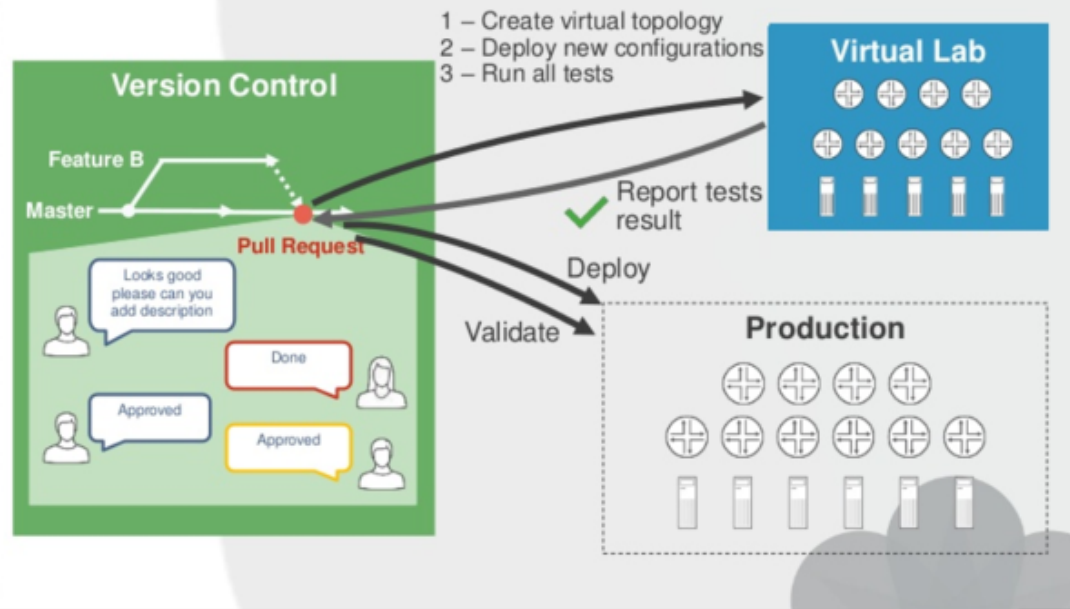
Software/Application/Network CI/CD
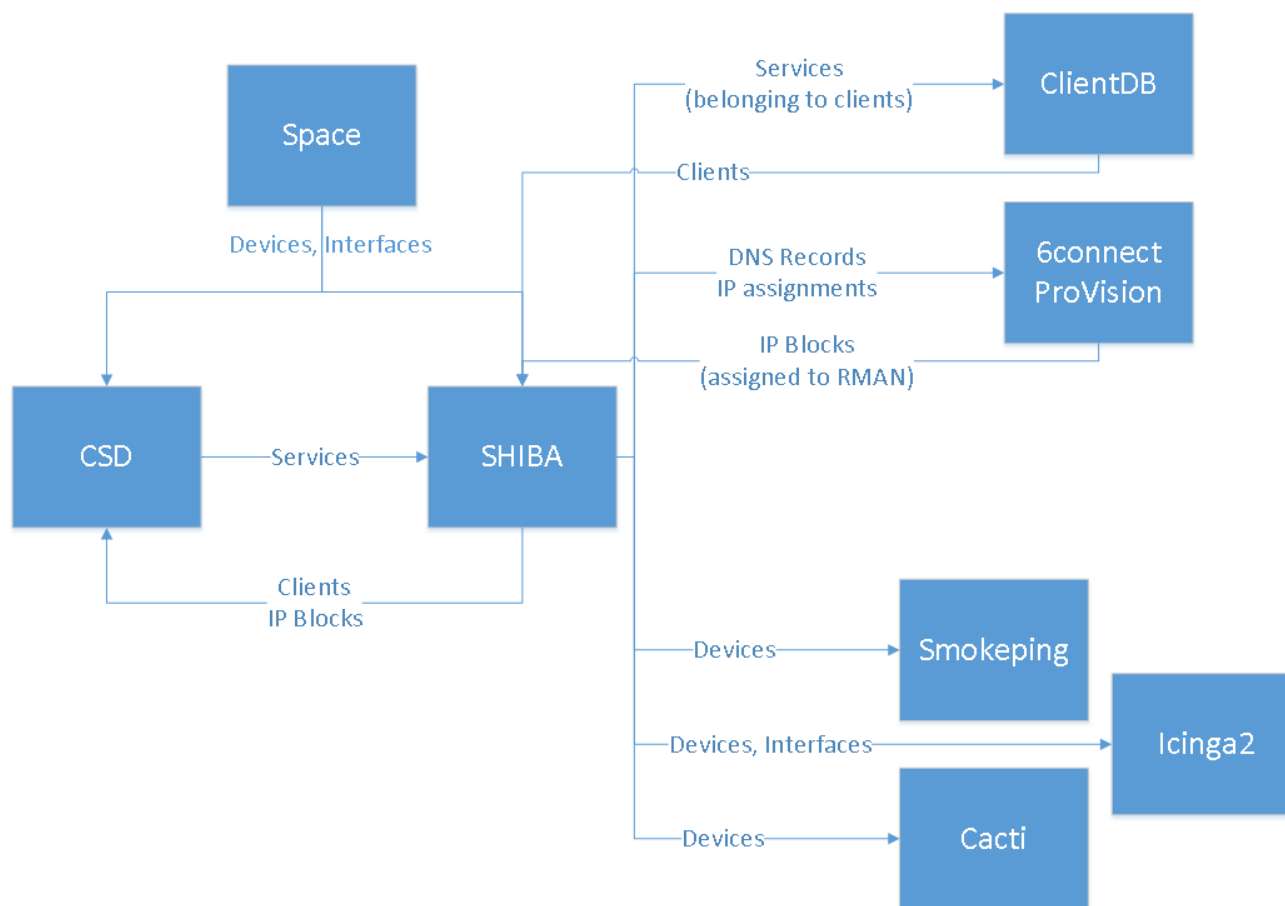

CI/CD Pipeline for Software Development

Dev → Code (GitHub) → Build (Jenkins) → Test (Vagrant) → Deploy (Ansible, puppet) → Monitor (Grafana, elastic)

CI — Continuous Integration

CD — Continuous Deployment

https://www.slideshare.net/dgarros/infrastructure-as-code-for-network

Infrastructure as code (IAC)

https://www.slideshare.net/dgarros/infrastructure-as-code-for-network

HEAnet Schools Today

- All public primary and secondary schools
  - Over 10 years in operation
  - 4000 schools, 1 physical CPE per school => cannot but automate => imposes conditions on operation
  - Managed by 6 staff, in-house developed
  - Database holds CPE settings, full config pushed to CPE (vs. idempotent of config management)
  - Content filtering and firewalls through RestAPI
  - Portal for end users to make specific set of changes in their ACL

HEAnet Server Automation Today

- Islands of automation
    - Goal is to automate as much as we can
    - Heavy use of Git and some Gitlab CI/CD
    - Server lifecycle management via Foreman and Puppet
    - Starting to use Ansible/Git Lab CI for server iptables configuration

- No Orchestration
    - Small use of Cloudformation
    - No Terraform but interested

Areas for support/collaboration?

- We like the concept of Infrastructure As Code with (Docker, Ansible and Gitlab CI/CD) and would like to share ideas, workflows etc

- Planning on modelling our network to run tests/validation tests in a CI/CD workflow. Looking for assistance/advice. Juniper NITA perhaps?

- Currently investigating running HEAnet VNFs on telco CPE – anyone else?

- We are interested in both network and web services automation/orchestration not just network automation/orchestration.

- Would like to see examples of best practices OAV solutions in NRENs or industry that could be documented and packaged up(code/tools) for use by NRENs.

Questions?

Some useful links

- https://blog.gruntwork.io/why-we-use-terraform-and-not-chef-puppet-ansible-saltstack-or-cloudformation-7989dad2865c

- https://www.slideshare.net/dgarros/infrastructure-as-code-for-network

- https://forums.juniper.net/t5/Automation/Discovering-NITA-Juniper-s-Automated-Lab-Testing-and-Deployment/ta-p/328744