Ansible

Configuration Management System done right

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Outline

Intro

About me

- IT Consultant since 2004
- Ansible user since 2013

Today's problems

- Auditability
- Job-hopping
- Speed
- Scalability
- Horizontal scaling (IaaS "cloud")
- Expected QoS

Automation

Advantages

- Infrastructure as Code
  - Code is the infrastructure documentation*
  - Simplify auditability
- Infrastructures with no humans with *root* powers
- Easy and quick to scale out

Automation Options

Agent (pull) vs agent-less (push)

Agent
An Agent is a daemon that runs on every controlled machine and that will check with the server (master) every N minutes to ensure that the host is aligned with the latest configuration version. If this is not the case, the Agent will download the lastest configuration version and apply it.

- Advantages
    - High performance during commands execution
    - Connection between clients and server is client managed
- Disadvantages
    - Forces the master to be in the least secure network segment
    - Resources are used even if no changes are being applied
    - More daemons to take care of
    - Chicken and Egg problem

Idempotence

Definition
Idempotence is the property of certain operations in mathematics and computer science, that can be applied multiple times without changing the result beyond the initial application.

Chef

- Written in Ruby
- Pull mode only
- Advantages
  - Very well integrated with git
  - Rich collection of available modules
  - Easy to install
- Disadvantages
  - Code driven
  - Complex tool
  - Steep learning curve

Puppet

- Written in Ruby
- Mainly pull mode
- Advantages
  - Very large user base
  - High number of modules available
- Disadvantages
  - Steep learning curve
  - Complex to setup

SaltStack

- Written in Python
- Both push and pull mode
- Advantages
  - Very consistent use of YAML for input, output, and configs
  - Strong community
  - Highly scalable and resilient
  - Very good introspection tools
- Disadvantages
  - Very complex to setup
  - Very steep learning curve
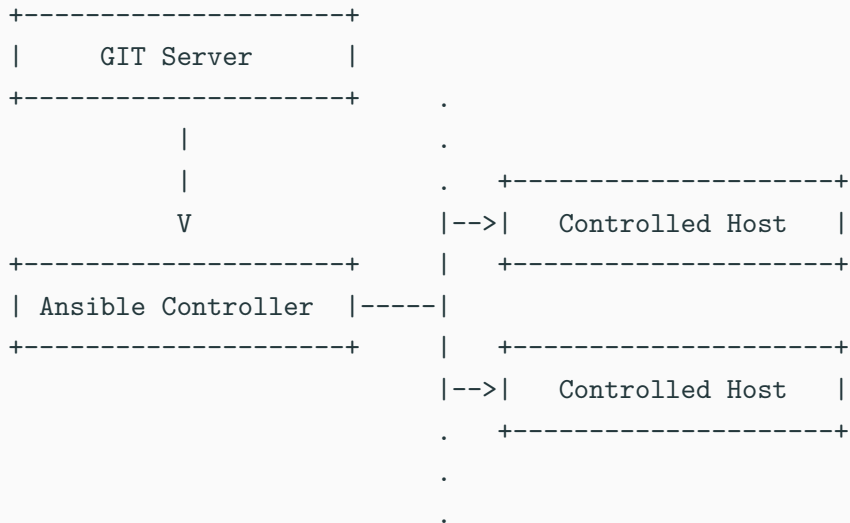
Ansible

- Written in Python
- Mainly push mode
- Advantages
    - Infrastructure as **Data** (in YAML format)
    - Very gentle learning curve
    - Very simple setup
    - Balanced tool
- Disadvantages
    - Not very good introspection tools
    - Community is young

Ansible

Ansible terminology

- **Host**: Target of the execution
- **Module**: Modules can control system resources, like services, packages, or files (anything really), or handle executing system commands.
- **Module library**: Default set of modules coming with Ansible basic installation
- **Task**: An istance of a Module
- **Role**: A way to abstract a collection of tasks that has a specific role and is idempotent
- **Playbook**: A collection of Tasks and Roles that could be idempotent (or not)

Ansible infrastructure

```
+--------------------+
|    GIT Server      |
+--------------------+          .
         |                      .
         |                      .   +--------------------+
         V                 |-->|    Controlled Host   |
+--------------------+     |   +--------------------+
| Ansible Controller |-----|
+--------------------+     |   +--------------------+
                           |-->|    Controlled Host   |
                           .   +--------------------+
                           .
                           .
```

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Infrastructure as Data

- Really simple to write
- Even simpler to read
- Only the bit important to you need to be written

Example of syntax

```yaml
---
- hosts: all
  become: True
  tasks:
  - name: Ensure mysql is installed
    yum:
      name: mysql
      state: present
  - name: Ensure tom user is present
    user:
      name: tom
      state: present
```

Usual deployment process

- Automate few actions with Ansible Playbooks
- Create Ansible Roles for the setup of a simple machine type
- Rollout of the first machines completely managed with Ansible
- Migration of all machines to Ansible

Additional resources

- Laboratorio ICT, 14:00 - Workshop su come automatizzare l'IT con Ansible
- Slides: https://static.fale.io/slides/20161025-en-ansible.pdf
- Official documentation: http://docs.ansible.com
- Videos: https://www.ansible.com/videos
- Whitepapers: https://www.ansible.com/whitepapers
- Ebooks: https://www.ansible.com/ebooks