Configuration Management

wangth

Automate, automate, automate

❑ Automated setup of new machines

- Not just OS installation, also includes all the additional software and local configuration necessary

❑ Systematic patching and updating of existing machines

- Deploy updates to all affected machines

❑ A monitoring system

- You need some kind of monitoring system that raises an alarm as soon as problems are evident

❑ A communication system

- Keep in touch with the needs of your users
- A request-tracking system is a necessity
- A central location where users can find system status and contact information is also helpful

Infrastructure as Code (IaC) (1)

❑ A process of managing and provisioning IT infrastructure through machine-readable definition files

❑ The definition files are usually stored on a version control system, it can use either scripts or declarative definitions

❑ Three measurable categories for the value of IaC

- Cost (Reduction)

- Speed (Faster execution)

- Risk (Remove errors and security violations)

Infrastructure as Code (IaC) (2)

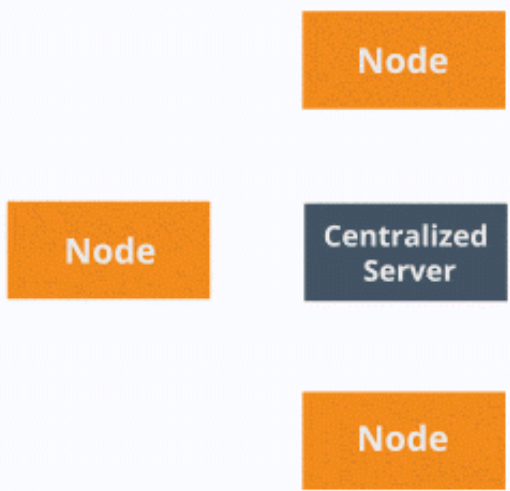❑ The spectrum of leading IaC tools available today
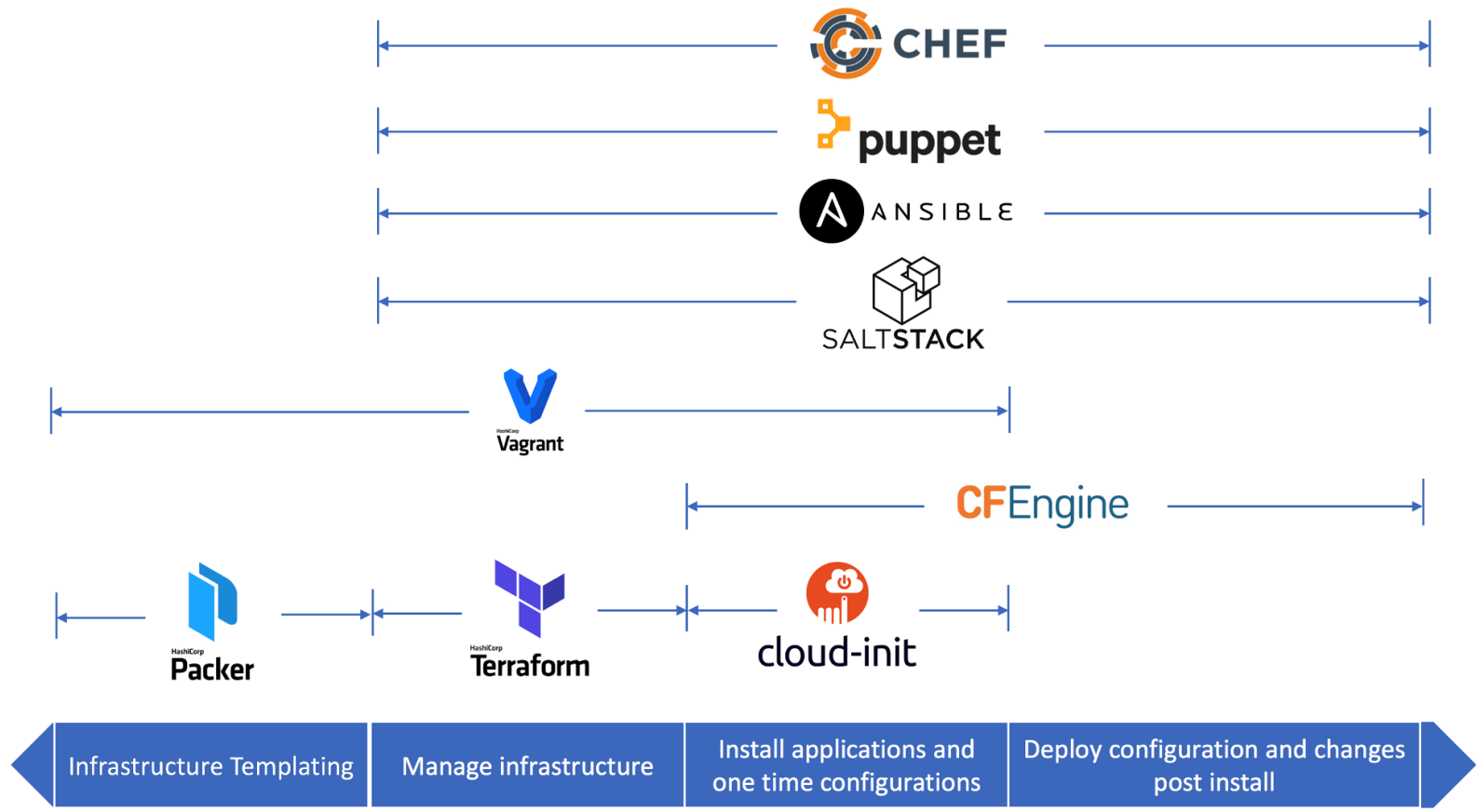
When to use which Infrastructure-as-code tool
https://medium.com/cloudnativeinfra/when-to-use-which-infrastructure-as-code-tool-665af289fbde
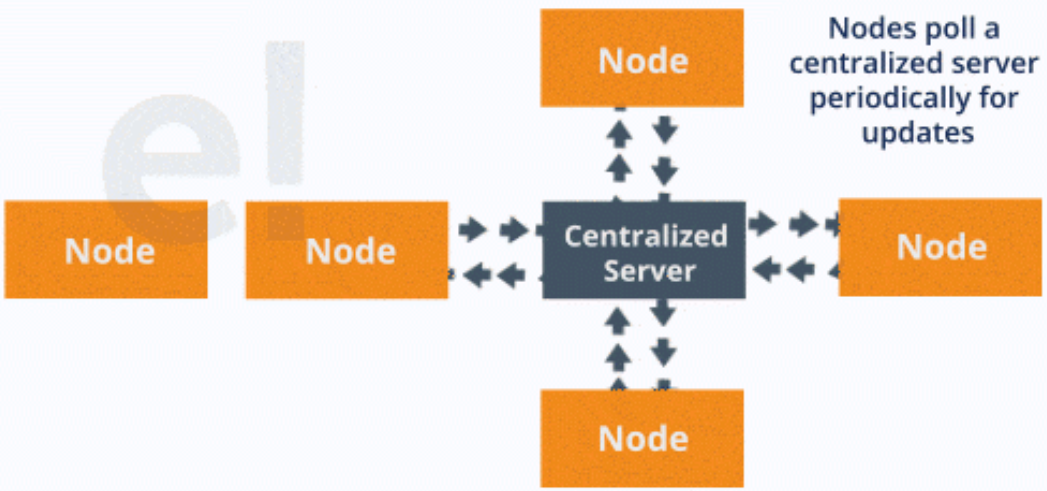
Push Model vs. Pull Model

What Is Chef? – A Tool Used For Configuration Management
https://www.edureka.co/blog/what-is-chef

Ansible – Introduction (1)

❑ An software provisioning, configuration management, and application deployment tool

❑ Manages machines in an agentless manner

❑ Cross platform

- FreeBSD, Linux, macOS, Solaris, Windows

❑ Use 'push' model by default

❑ Pull mode is provided for when you would rather have nodes check in every N minutes on a particular schedule

- ansible-pull
  - ➢ Pulls playbooks from a VCS repo and executes them for the local host

Ansible – Introduction (2)

❑ Playbook

- Ordered lists of tasks, saved so you can run those tasks in that order repeatedly

❑ Task

- The units of action in Ansible

❑ Module

- The units of code Ansible executes

❑ Ansible Galaxy

- A repository for Ansible Roles that are available to drop directly into your Playbooks

User Guide — Ansible Documentation
https://docs.ansible.com/ansible/latest/user_guide

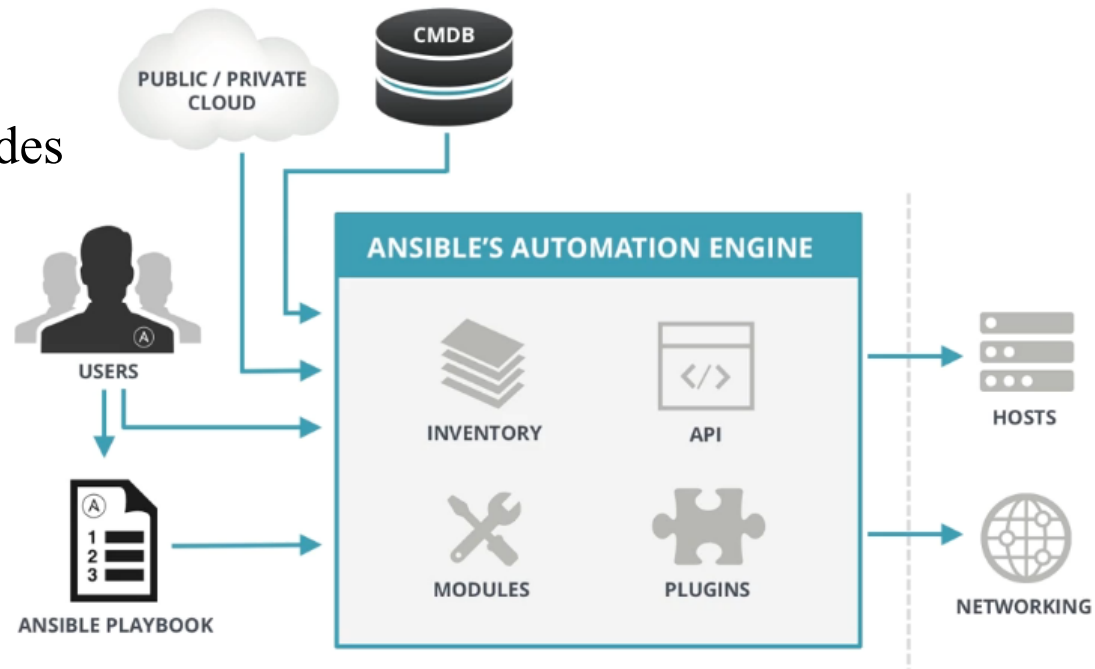# Ansible – Architecture

❑ Control node

- Any machine with Ansible installed

❑ Managed nodes

- The network devices (and/or servers) you manage with Ansible

❑ Inventory

- A list of managed nodes (hostfile)

What is Ansible? | Ansible Quick Start Video
https://www.ansible.com/resources/videos/quick-start-video

Chef – Introduction

❑ A configuration management tool written in Ruby and Erlang

❑ Cross platform agents

- FreeBSD, Linux, macOS, Windows, AIX, Solaris

❑ Use 'pull' model

❑ Cookbook

- Provide structure to your recipes and, in general, helps you stay organized

❑ Recipe

- A file that groups related resources, such as everything needed to configure a web server, database server, or a load balancer

Chef – Architecture

❑ Chef Workstation

- Allows you to author cookbooks and administer your infrastructure
- Command line tools for interacting with Chef Infra
  - ➤ knife: interacts with the Chef Infra Server, e.g., upload your cookbooks
  - ➤ chef: interacts with your local chef code repository (chef-repo)

❑ Chef Infra Server

❑ Chef Infra Client

An Overview of Chef Infra
https://docs.chef.io/chef_overview

Puppet – Introduction (1)

❑ A configuration management system written in C++, Clojure and Ruby

❑ Master-agent architecture

❑ Cross platform agents

  • FreeBSD, Linux, macOS, Windows

❑ Use 'pull' model

Master

Agent

Puppet – Introduction (2)

❑ Manifest

- Describe how your network and operating system resources should be configured

❑ Catalog

- Compiled version of the manifest

❑ Module

- Manage a specific task in your infrastructure, such as installing and configuring a piece of software
- Serve as the basic building blocks of Puppet and are reusable and shareable

❑ Puppet Forge

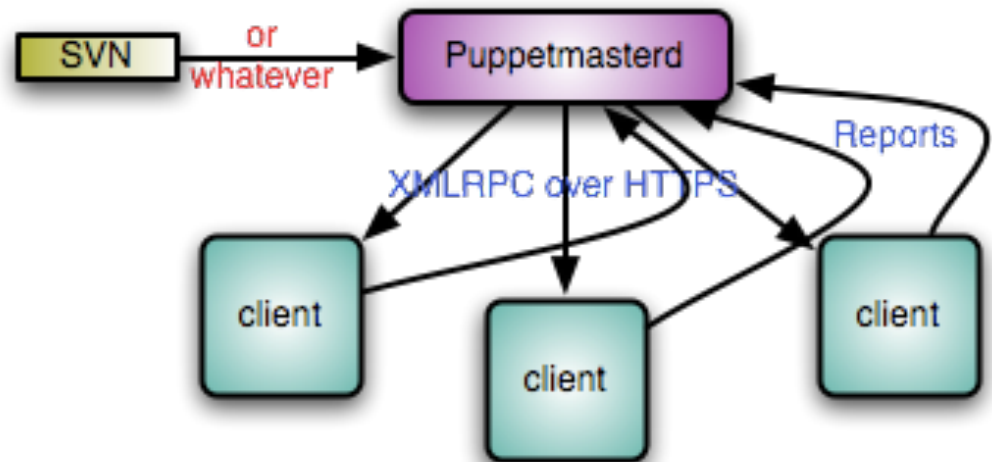- A catalogue of modules created by Puppet

Puppet – Architecture

❑ Master (Server)

- Write and keep the manifests
- Passively wait for connection from agents

❑ Agent (Client)

- Fetch manifests from master (periodically or manually)
- Compare and execute manifests if needed
- Report status to master

Cited from Puppet official site

SaltStack – Introduction

❑ A configuration management system, capable of maintaining remote nodes in defined states

❑ Server-agent communication model

❑ Cross platform agents

- FreeBSD, Linux, macOS, Windows
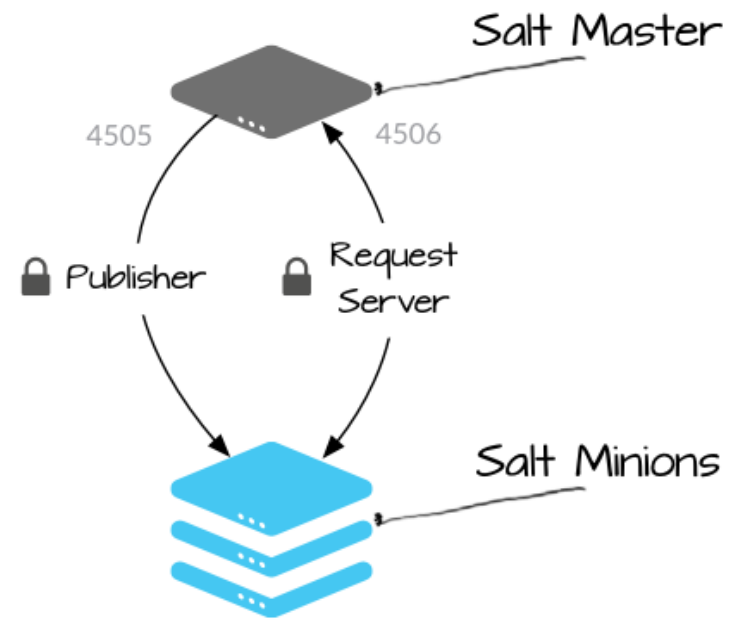
❑ Use 'pull' model

❑ State module

❑ Formula

❑ Package Manager

❑ Repo System

SaltStack – Architecture

❑ Salt Master (Server)

- Responsible for sending commands to minions, and then aggregating and displaying the results of those commands
- A single Salt master can manage thousands of systems

❑ Salt Minion (Agent)

Understanding SaltStack GET STARTED TUTORIAL
https://docs.saltstack.com/en/getstarted/system/communication.html

Comparison of CM Tools

	Ansible	Chef	Puppet	SaltStack
Method	Push, Pull	Pull	Pull, Push	Pull, Push
	Agentless	Agent	Agent Agentless (Bolt)	Agent Agentless (Salt SSH)
Configuration Language	YAML Python	Ruby DSL	Puppet DSL	YAML Python
Implementation Language	Python	Ruby Erlang	Ruby C++ Clojure	Python
Company	Red Hat	Chef	Puppet	SaltStack

DSL: Domain Specific Language

Terms used by each CM tool

Table 23.2: Configuration management Rosetta Stone

Our term	Ansible	Salt	Puppet	Chef
operation op type	task module	state function	resource resource type, provider	resource provider
op list parameter binding	tasks parameter play(book)	states parameter top file	class, manifest property, attribute classification, declaration	recipe attribute run list
master host client host client group	control host group	master minion nodegroup	master agent, node node group	server node role
variable fact	variable fact	variable grain	parameter, variable fact	attribute automatic attribute
notification handler	notification handler	requisite state	notify subscribe	notifies subscribes
bundle bundle repo	role galaxy	formula GitHub	module forge	cookbook supermarket

Reference

❑ Chef vs Puppet vs Ansible - Whizlabs Blog

- https://www.whizlabs.com/blog/chef-vs-puppet-vs-ansible

❑ User Guide — Ansible Documentation

- https://docs.ansible.com/ansible/latest/user_guide/index.html

❑ Chef Web Docs

- https://docs.chef.io

❑ Puppet documentation

- https://puppet.com/docs/puppet/latest/puppet_index.html

❑ SaltStack Documentation

- https://docs.saltstack.com/en/latest