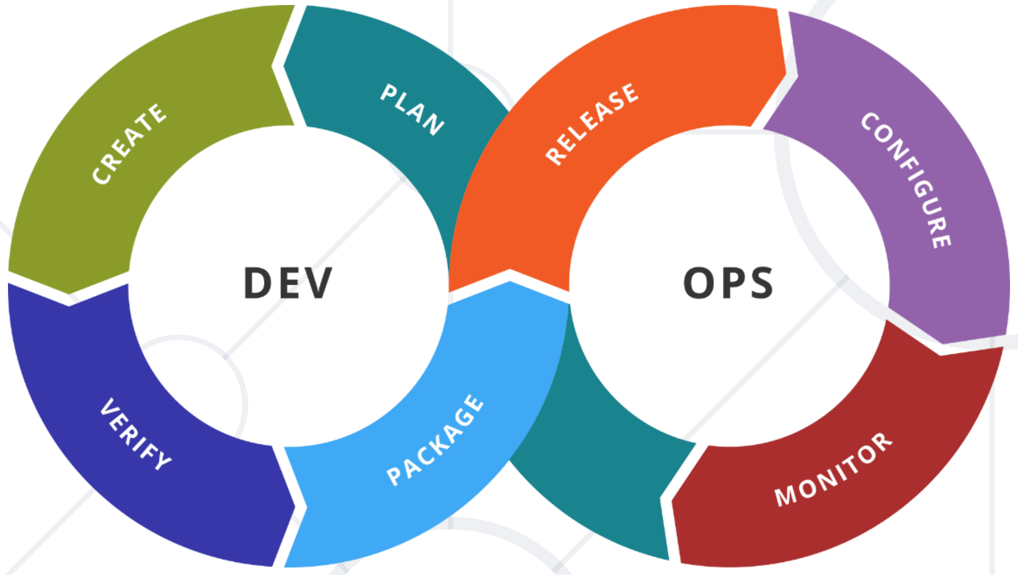
Chef

Introduction and Basic Techniques



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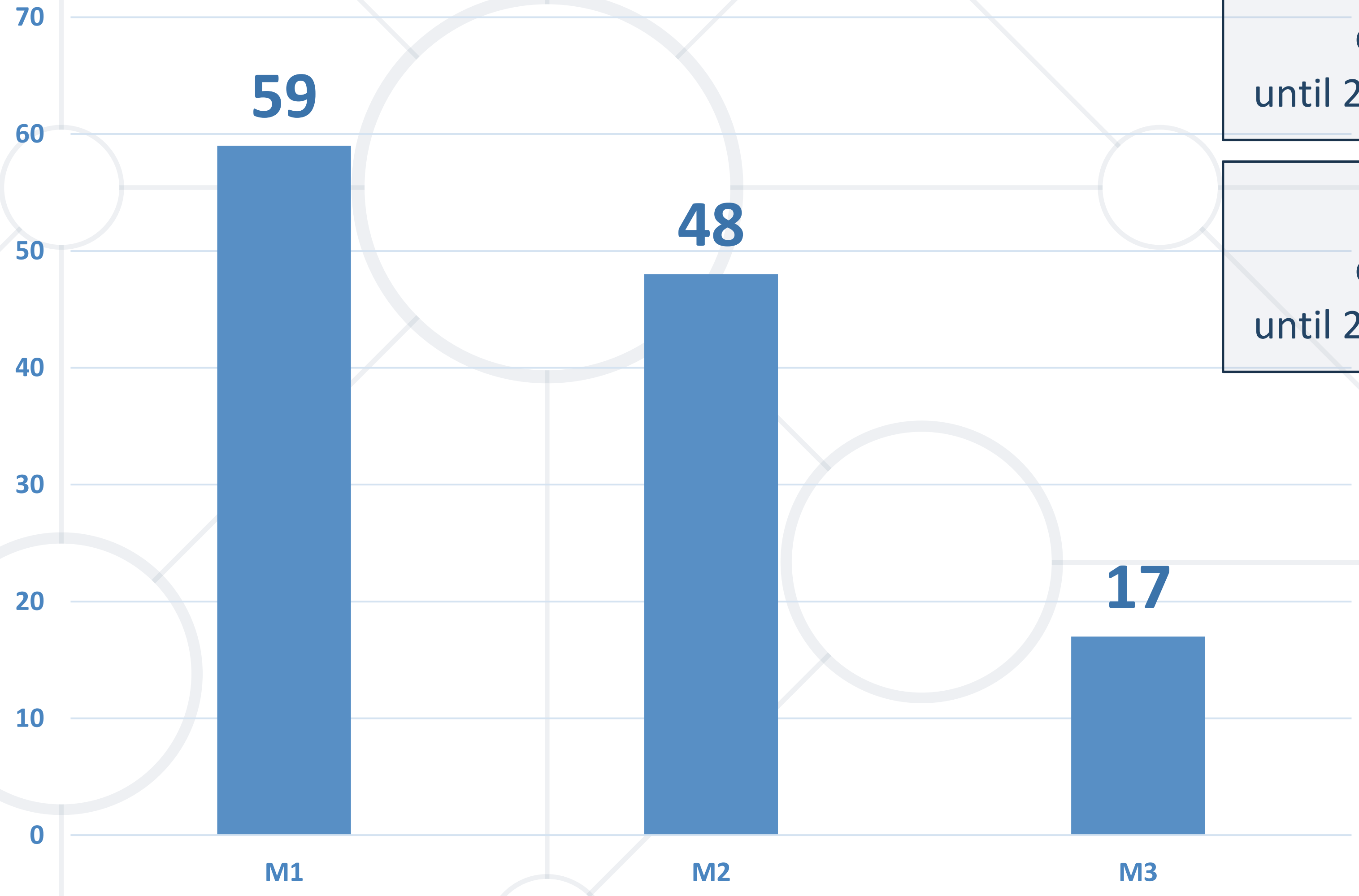
Homework Progress



Solutions for M3
can be submitted
until 23:59 on 26.04.2023

Solutions for M4
can be submitted
until 23:59 on 03.05.2023

Previous Module (M3)

Quick Overview

What We Covered

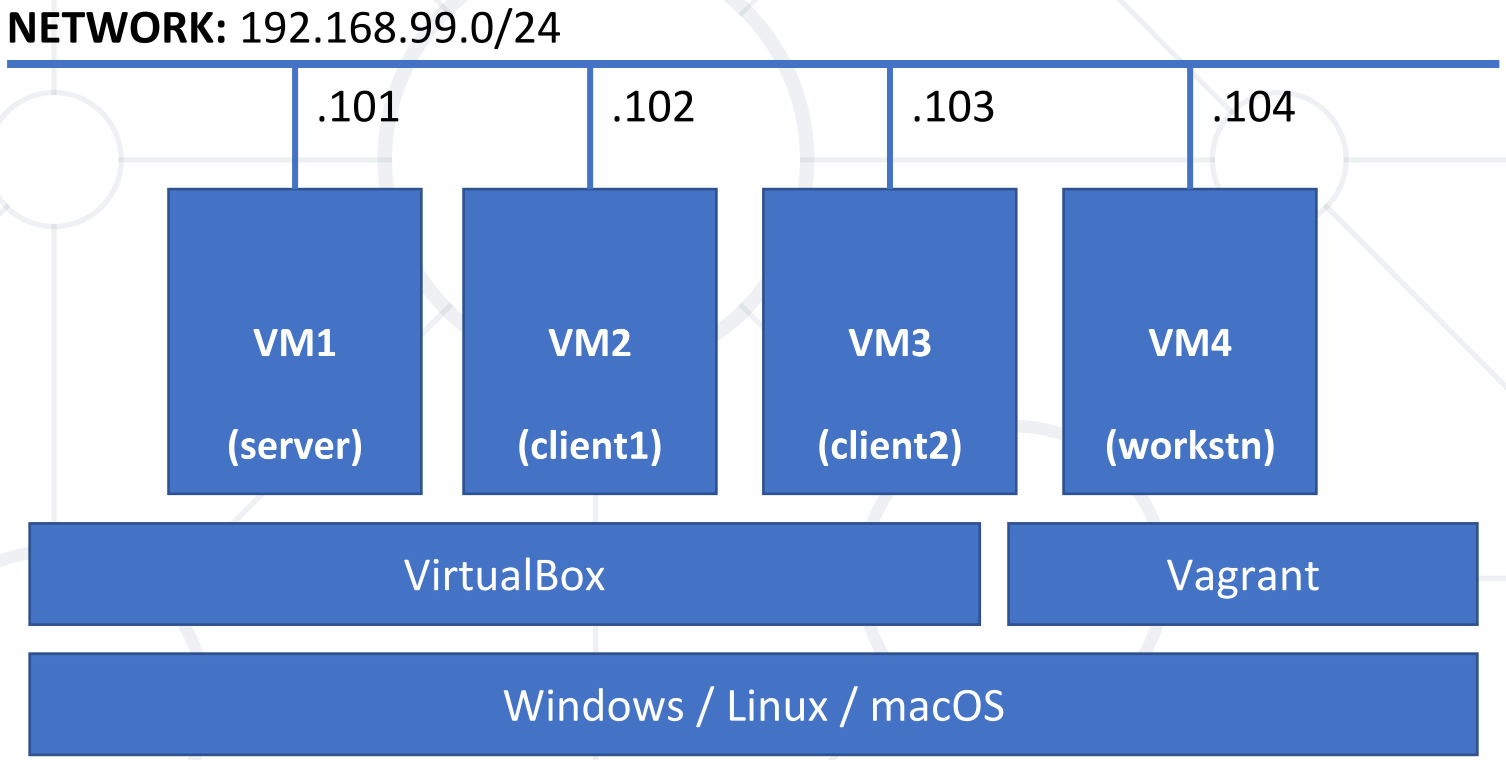
1. Introduction to Salt
   - Salt introduction and architecture
   - Installation and basic scenarios
2. Working with Salt
   - Basic scenarios and files
   - Pillars, filtering, and beacons
3. Advanced Salt
   - Custom modules

This Module (M4)

Topics and Lab Infrastructure

Table of Contents

Lab Infrastructure



Chef 101

Introduction. Architecture. Installation

Chef Products

- **Chef Infra**
  - Configure and manage infrastructure
- **Chef InSpec**
  - Build and run profiles for compliance automation
- **Chef Habitat**
  - Define, package, and deliver applications
- **Chef Automate**
  - Dashboards for operational visibility

Chef Enterprise Automation Stack (Chef EAS)

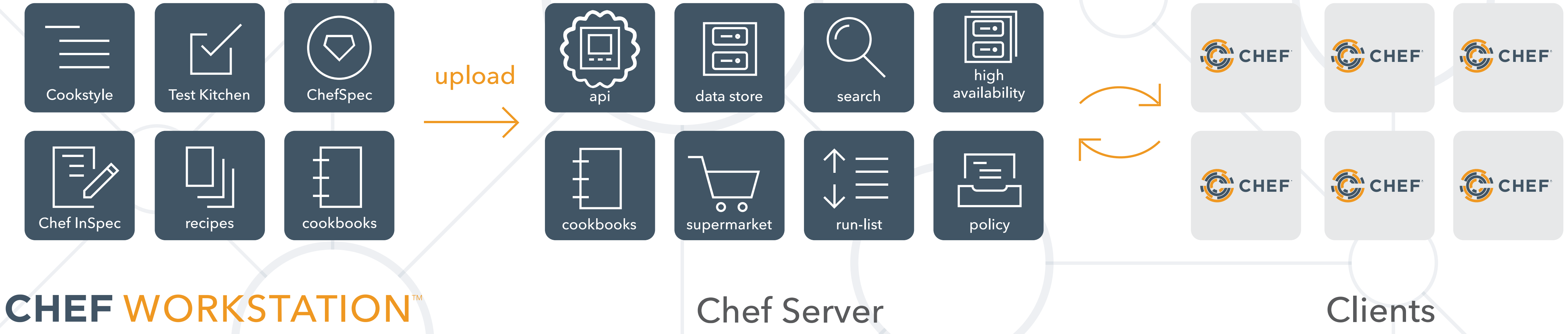
Introduction (Chef Infra)

- Solution for infrastructure and application automation
- Instructions are written in **Ruby DSL**
- Master-agent model, pull-based approach
- Server portion can be installed only on Linux
- Management part can be installed on Linux/macOS/Windows
- Client can be installed on Linux/Unix/Windows

Components and Workflow (1)

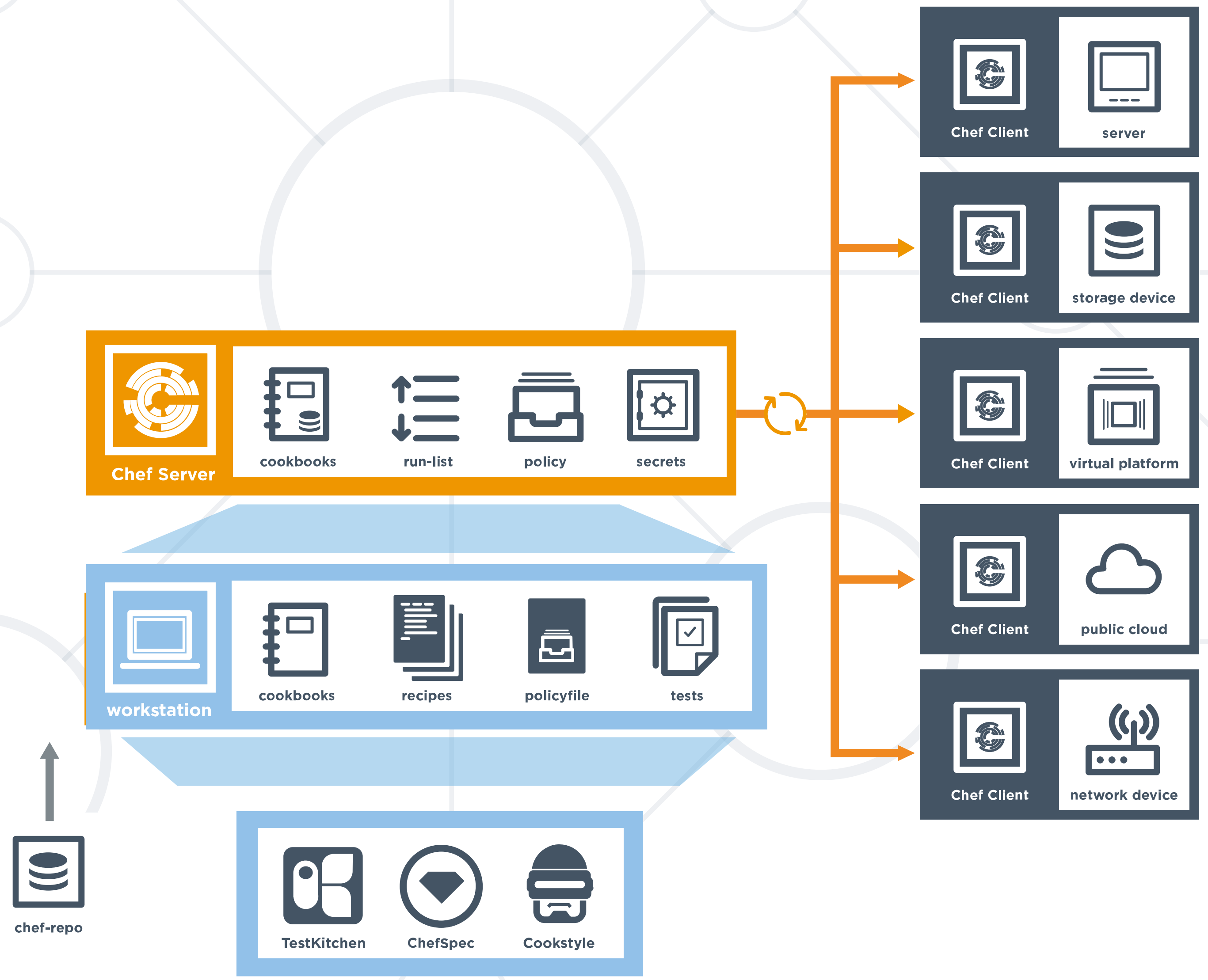
- **Chef workstation** is the point where users can author and test cookbooks and interact with the Chef server
- **Chef client nodes** are the machines that are managed by Chef
- **Chef client** is installed on each node and is used to configure the node to its desired state
- **Chef server** acts as a hub for cookbooks, policies, and metadata
- Nodes use the Chef client to ask the Chef server for configuration details, such as recipes, templates, and file distributions

Components and Workflow (2)



https://docs.chef.io/chef_overview/

Components and Workflow (3)



https://docs.chef.io/chef_overview/

Artifacts

- **Resource** is a statement of configuration policy that describes the desired state for a configuration item, declares the steps needed, artifact type, and set of properties
- **Recipes** specify the resources to use and the order in which they are to be applied
- **Cookbooks** are the fundamental unit of configuration and policy distribution. They define a scenario and contain everything that is required to support it

Practice: Chef 101

Live Demonstration in Class

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Chef 102

Resource (1)

- A statement of configuration policy
- Describes the desired state for a configuration item
- Declares the steps needed to bring that item to the desired state
- Specifies a resource type (such as package, template, or service
- Lists additional details (also known as resource properties), as necessary
- Resources are grouped into recipes, which describe working configurations

https://docs.chef.io/resource/

Resource (2)

- It is a Ruby block which has four components
  - a type
  - a name
  - one (or more) properties with values
  - one (or more) actions

```
type 'name' do
  attribute 'value'
  action :type_of_action
end
```

https://docs.chef.io/resource/

Recipes

- Collection of resources
- Helper code is added around resources using Ruby, when needed
- Must define everything that is required to configure part of a system
- Must be stored in a cookbook and may be included in another recipe
- May use the results of a search query and read the contents of a data
- May have a dependency on one (or more) recipes
- Must be added to a run-list before it can be used by Chef Infra Client
- Always executed in the same order as listed in a run-list

https://docs.chef.io/recipes/

Cookbooks

- Fundamental unit of configuration and policy distribution
- Define a scenario and contains everything that is required to support that scenario
- Recipes that specify which resources to use, as well as the order in which they are to be applied
- Attribute values, which allow environment-based configurations such as dev or production
- Custom Resources for extending Chef Infra beyond the built-in resources
- Files and Templates for distributing information to systems

https://docs.chef.io/cookbooks/

Cookbooks Folder Structure *

- **attributes** store additional settings and data in one or more files
- **files** store files that can be later distributed on nodes
- **recipes** store recipes each in separate file
- **templates** used to insert dynamic content to files
- **libraries** store Ruby code for new classes or extensions
- **metadata.rb** contains information about the cookbook

https://docs.chef.io/cookbooks/

Attributes

- An attribute is a specific detail about a node
- Determine the value that is applied to a node during run
- Used to understand the current state of a node, the state it was at the end of the previous run, and the state that it should has after the current run
- Defined by nodes, passed on the command line, cookbooks and policy files
- Attributes list is built during every run

https://docs.chef.io/attributes/

Attribute Types

- **default** is with lowest precedence and reset on every run
- **force_default** guarantees that a cookbook defined attribute will take precedence over an attribute set by role or environment
- **normal** is a setting that persists in the node object
- **override** is reset on every run and can be specified in recipe or attribute file for a role or environment
- **force_override** ensure that a cookbook defined attribute will take precedence over an override attribute set by role or environment
- **automatic** store data identified by Ohai at the beginning of every run and cannot be modified

https://docs.chef.io/attribute_types/

Templates

- An Embedded Ruby (ERB) template for dynamic generation of static text files
- May contain expressions and statements
- Expressions are delimited by open and close tags

```
<%= "I like #{$color} cars" %>
```

- Statements are delimited by a modifier like **`if`**, **`elsif`** and **`else`**

```
if condition
  # execute if true
else
  # execute if false
end
```

https://docs.chef.io/templates/

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Practice: Chef 102

Live Demonstration in Class

Chef 103

Custom Resources and Libraries. Tests

Custom Resources

- Ship directly in cookbooks
- Can utilize built-in resources and additional custom Ruby code
- Act like the existing built-in resources

```
provides :resource_name

property :property_name, RubyType, default: 'value'

action :action_a do
 # a mix of built-in Chef Infra resources and Ruby
 # this is the default action (provided first)
end

action :action_b do
 # a mix of built-in Chef Infra resources and Ruby
end
```

https://docs.chef.io/custom_resources/

Libraries

- Allow arbitrary Ruby code to be included in a cookbook
- Mostly used to write helpers that are used throughout recipes and custom resources
- Anything allowed by Ruby can take place in a library
- As well as extending built-in Chef classes

https://docs.chef.io/libraries/

Testing

- **Test Kitchen** is easily activated on and used with Chef Workstation
- Driver plugin architecture is used to run code on various platforms
- Supported **drivers** are Vagrant, Amazon EC2, Docker, etc.
- Supported **transports** are SSH and WinRM
- Supported **provisioners** are Chef Infra, Shell, Ansible, etc.
- Supported **verifiers** include Chef InSpec, ServerSpec, Bats, etc.
- Managed via YAML configuration file (**kitchen.yml** or **kitchen.local.yml**)
- Used to be named with dot (.kitchen.yml or .kitchen.local.yml). Still available
- Controlled via the **kitchen** utility

https://kitchen.ci/

Practice: Chef 103

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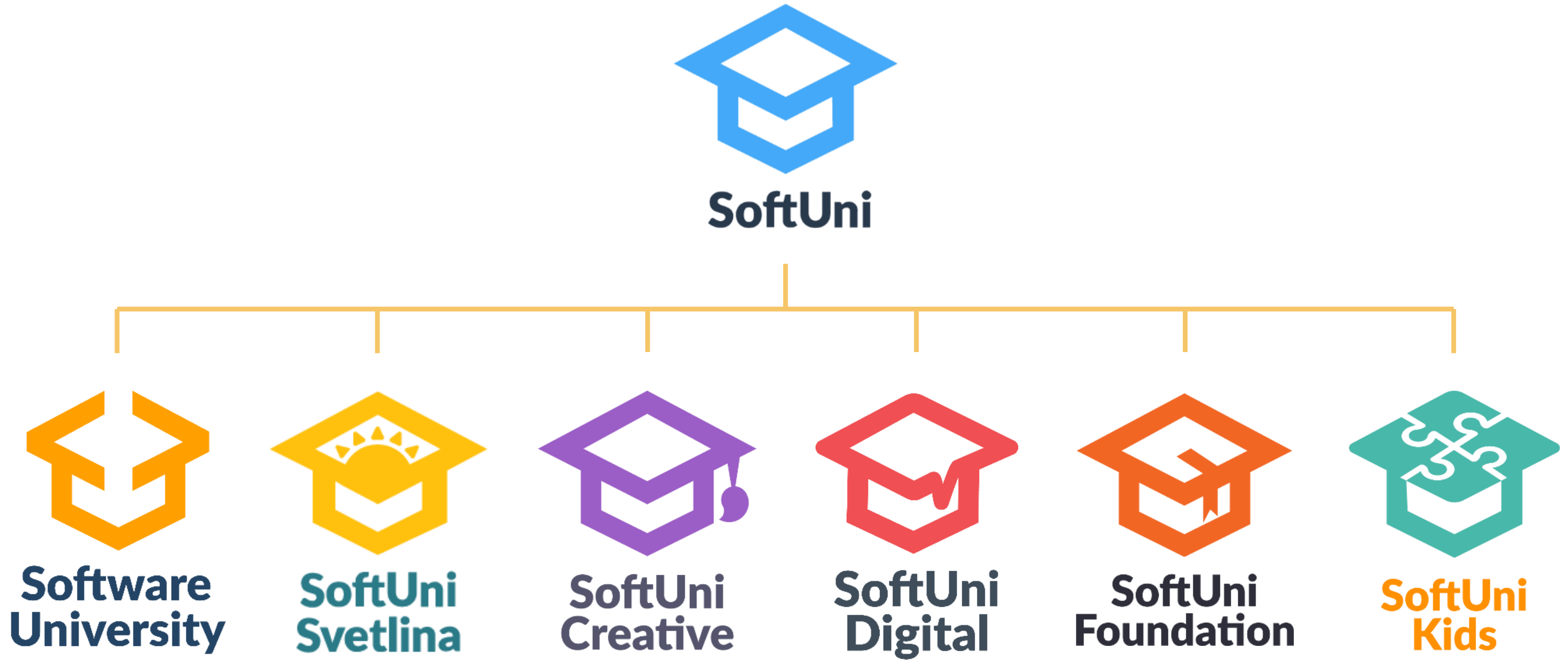
Questions?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