



FOREMAN

Katello

Content Management

Ian Ballou

GitHub: [ianballou](#)

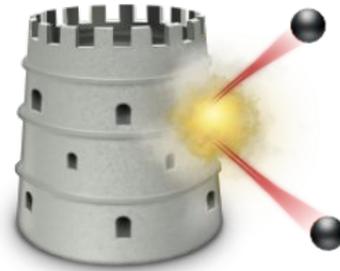
Matrix: [iballou](#)



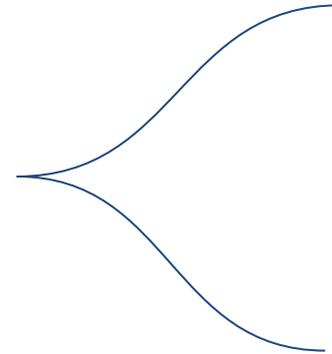
The Stack



Foreman



Katello



Candlepin



Pulp



Foreman



Provisioning



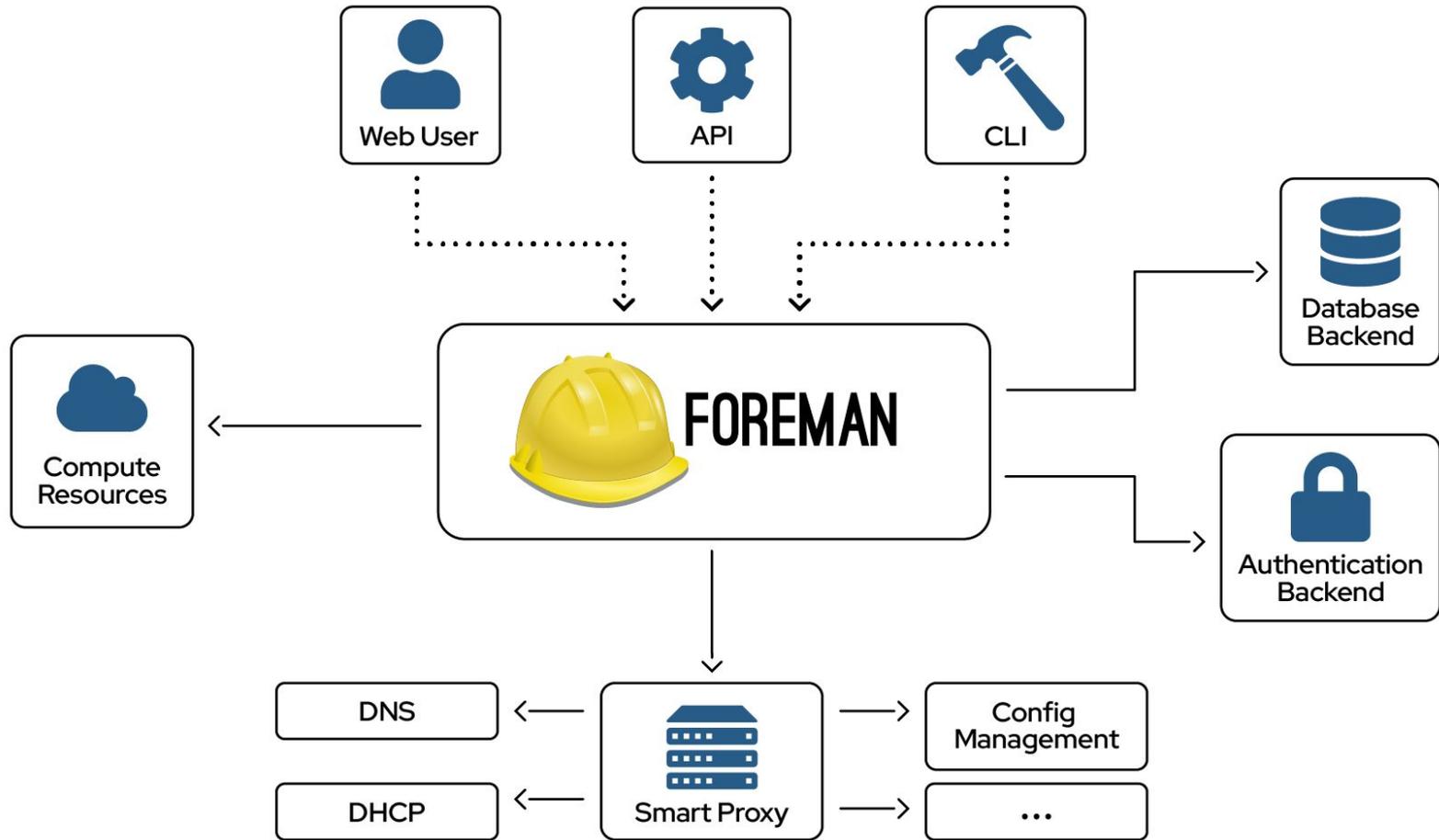
Configuration



Monitoring

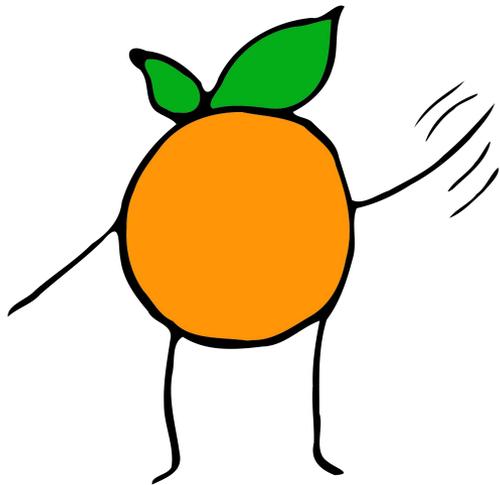


Foreman



Pulp

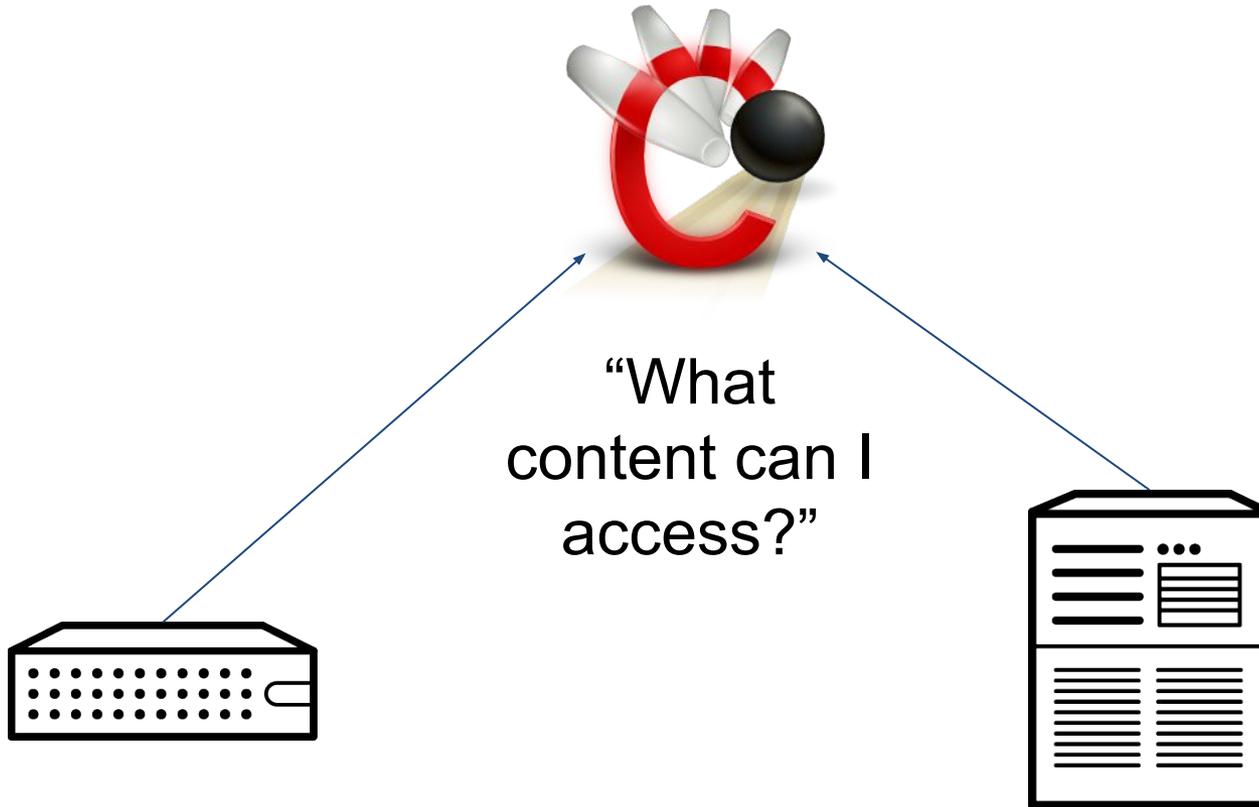
“Pulp fetches, uploads, organizes, and distributes software packages...”



- ⚙️ Ansible Playbooks
 - ⚙️ Arbitrary files
 - ⚙️ Container images
 - ⚙️ RPM content
- ... and more!



Candlepin



Core Katello



Terminology

Content: Software packages, like RPMs

Repository: A collection of content

Product: A collection of repositories

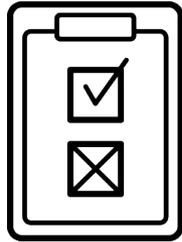
Hosts: Servers managed by Katello

Errata: Advisories with fixing packages



Katello

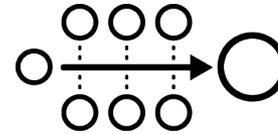
Content Management



Content
procurement and
distribution



Patching



Software lifecycle



Katello



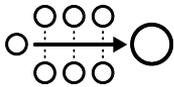
Content
procurement and
distribution

- Creating repositories of content and populating them
- Customizing content and determining access



Patching

- Installing content on hosts via Foreman Remote Execution
- Viewing errata applicable to a host and applying them
- Generating patch reports from customizable templates



Software lifecycle

- Grouping hosts by categories (“dev”, “test”, “prod”, etc)
- Snapshotting repositories and distributing them by host categories
- Promoting content through a lifecycle



Katello Repositories

The screenshot displays the Foreman web interface for managing Katello repositories. The top navigation bar includes the Foreman logo, default organization and location dropdowns, and a user profile for 'Admin User'. A left sidebar contains navigation links for Monitor, Content, Hosts, Configure, Infrastructure, Administer, and Toolbox. The main content area shows the configuration for the 'Fedora 39 Server x86_64' repository, organized into sections: Basic Information, Publishing Settings, Sync Settings, Content Counts, Upload Package, and Distribution Information.

Basic Information

Name:	Fedora 39 Server x86_64	
Label:	Fedora_39_Server_x86_64	
Description:		
Backend Identifier:	c90d0043-62d0-457a-a38d-e95b0bbe9623	
Type:	yum	

Publishing Settings

Restrict to architecture	No restriction	
Restrict to OS version	No restriction	
Metadata Expiration (Seconds):		

Sync Settings

Upstream URL:	https://uvmont.mm.fcix.net/fedora/linux/releases/39/Server/x86_64/os/	
Verify SSL:	Yes	
Upstream Authorization:		
Yum Metadata:	Default	

Content Counts

Content Type	Count
Packages	2285
Source RPMs	0
Errata	0
Package Groups	12
Module Streams	0

Upload Package

No files selected.

Distribution Information

Version	39
Architecture	x86_64
Family	



Katello Repositories

Sync Settings

Upstream URL: [https://uvermont.mm.fcix.net /fedora/linux/releases/39/Server /x86_64/os/](https://uvermont.mm.fcix.net/fedora/linux/releases/39/Server/x86_64/os/) 

Published At: [https://centos8-katello-devel-stable.example.com/pulp/content /Default_Organization/Library /custom/Buttermilk_Pancakes /Fedora_39_Server_x86_64/](https://centos8-katello-devel-stable.example.com/pulp/content/Default_Organization/Library/custom/Buttermilk_Pancakes/Fedora_39_Server_x86_64/)

Distribution Information

Version

39

Architecture

x86_64

Family

Fedora

Variant

Server

Bootable

true



Katello Repositories

Content Counts

Content Type	
Packages	2285
Source RPMs	0
Errata	0
Package Groups	12
Module Streams	0

Upload Package

No files selected.



Download Policies

On Demand

Content is
downloaded only
when requested

Immediate

Content is
downloaded at
synchronization time

Streamed

Content is never
cached, only passed
from upstream to
client



Mirroring Policies

Additive

Repo metadata is generated

Existing content is not cleared during synchronization

Content Only

Repo metadata is generated

Existing content is cleared during synchronization

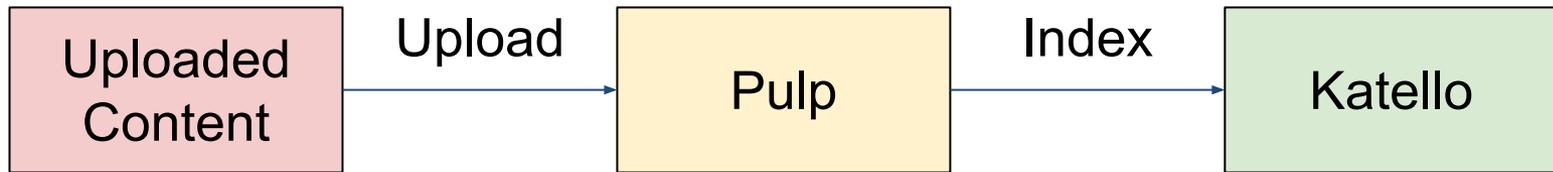
Complete Mirroring

Entire repository, including metadata, matches upstream

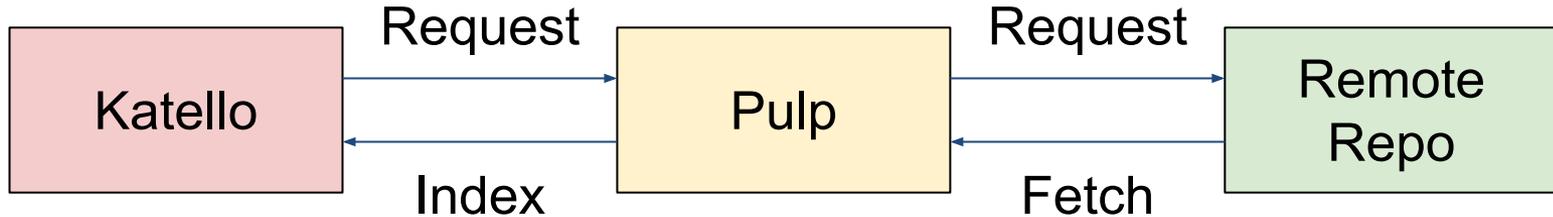


Katello Repositories

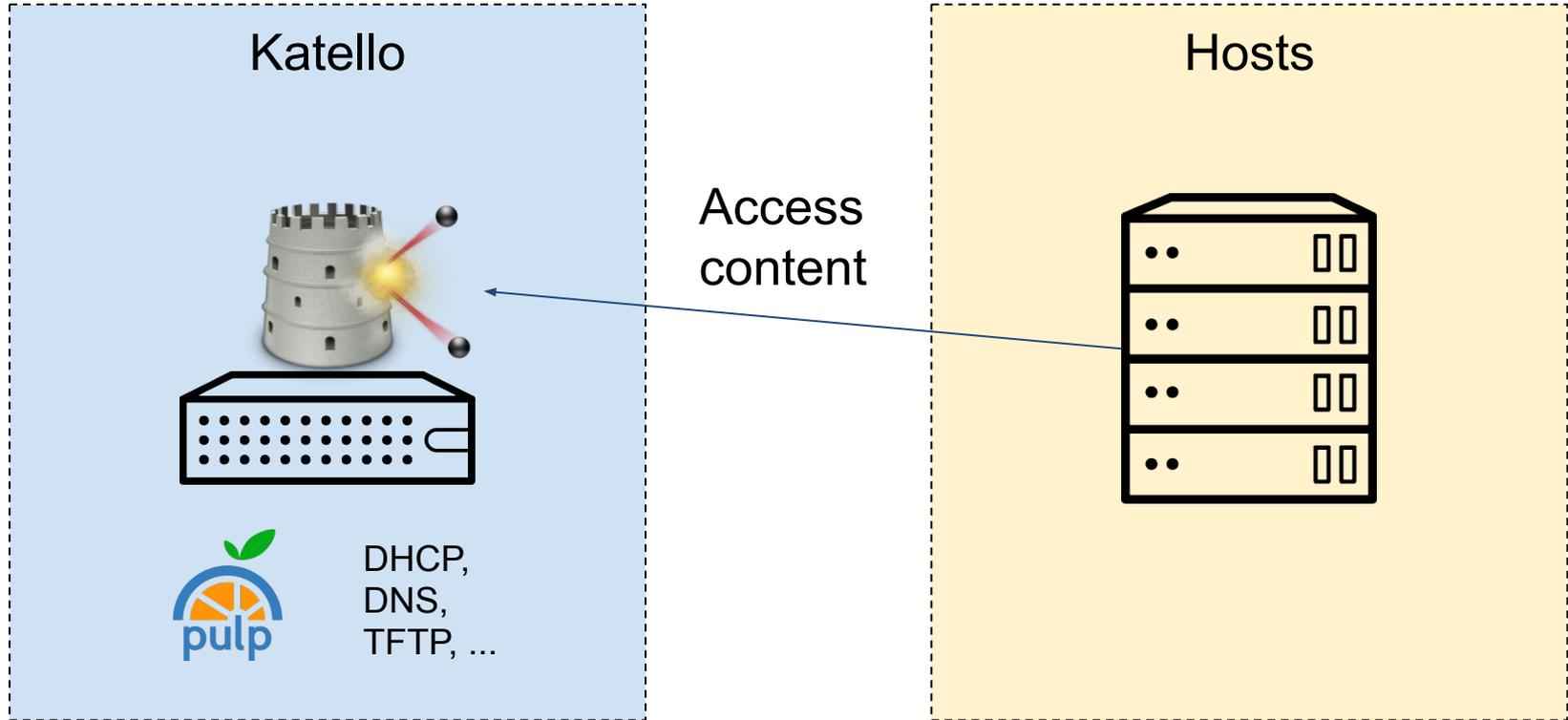
Upload scenario:



Sync scenario:



Katello Repositories



Content Views

Content View: "My Custom View"

Repositories

- Appstream
- BaseOS
- BusyBox
- Container Image
- Custom File Repo

Filters

- **Exclude Yum Packages:**
 - Wordnet-3.0-21
 - ImageMagick*
- **Include Container Tags:**
 - latest



Content Views

Publish...



Content View Versions

My Custom View Version 1.0

Yum Content

All CentOS content
except
wordnet-3.0-21 and
ImageMagick*

Container Content

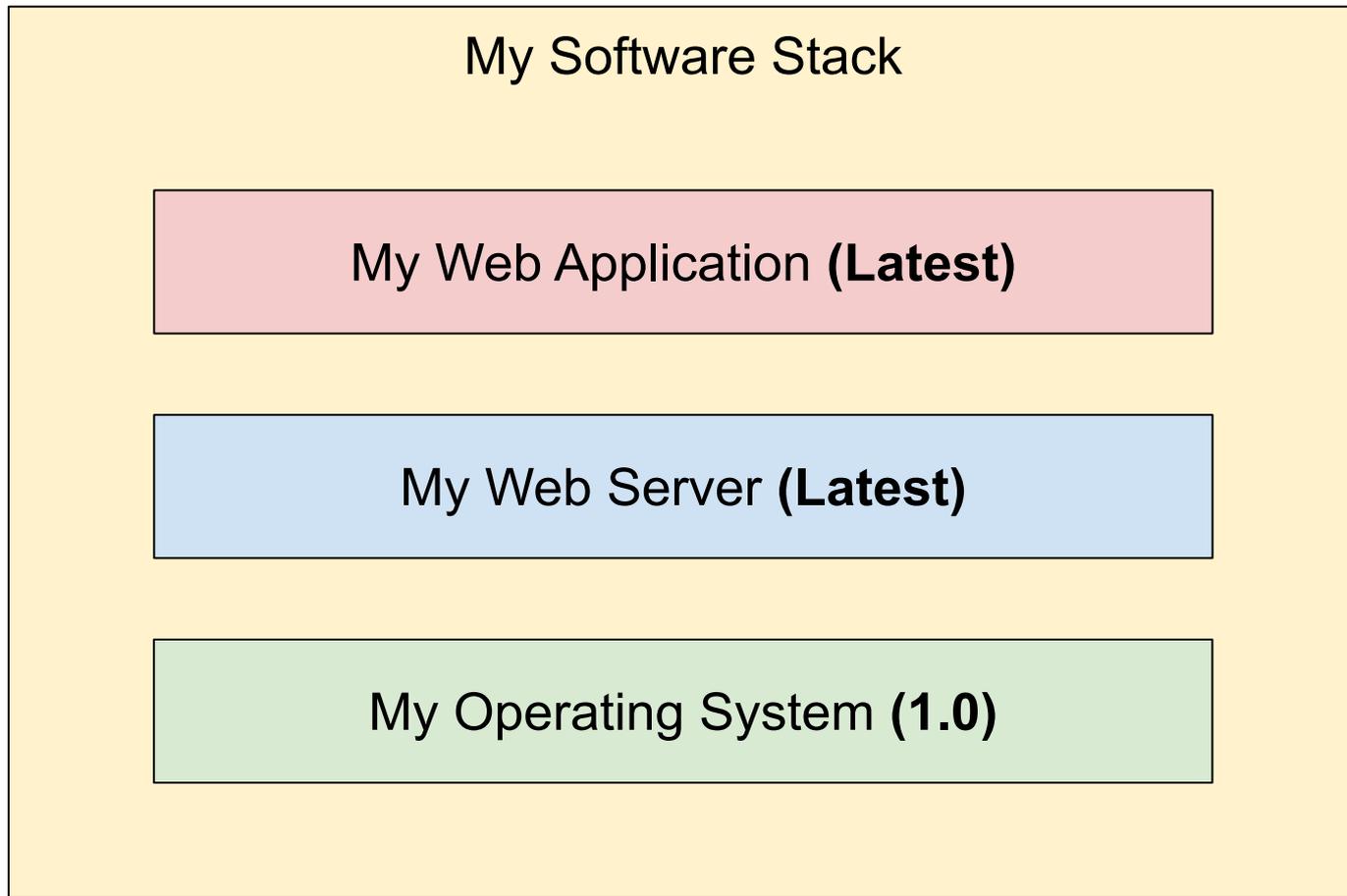
library/busybox:latest

File Content

All files in “Custom
File Repo”



Advanced CVs: Composite Content Views



Advanced CVs: Composite Content Views



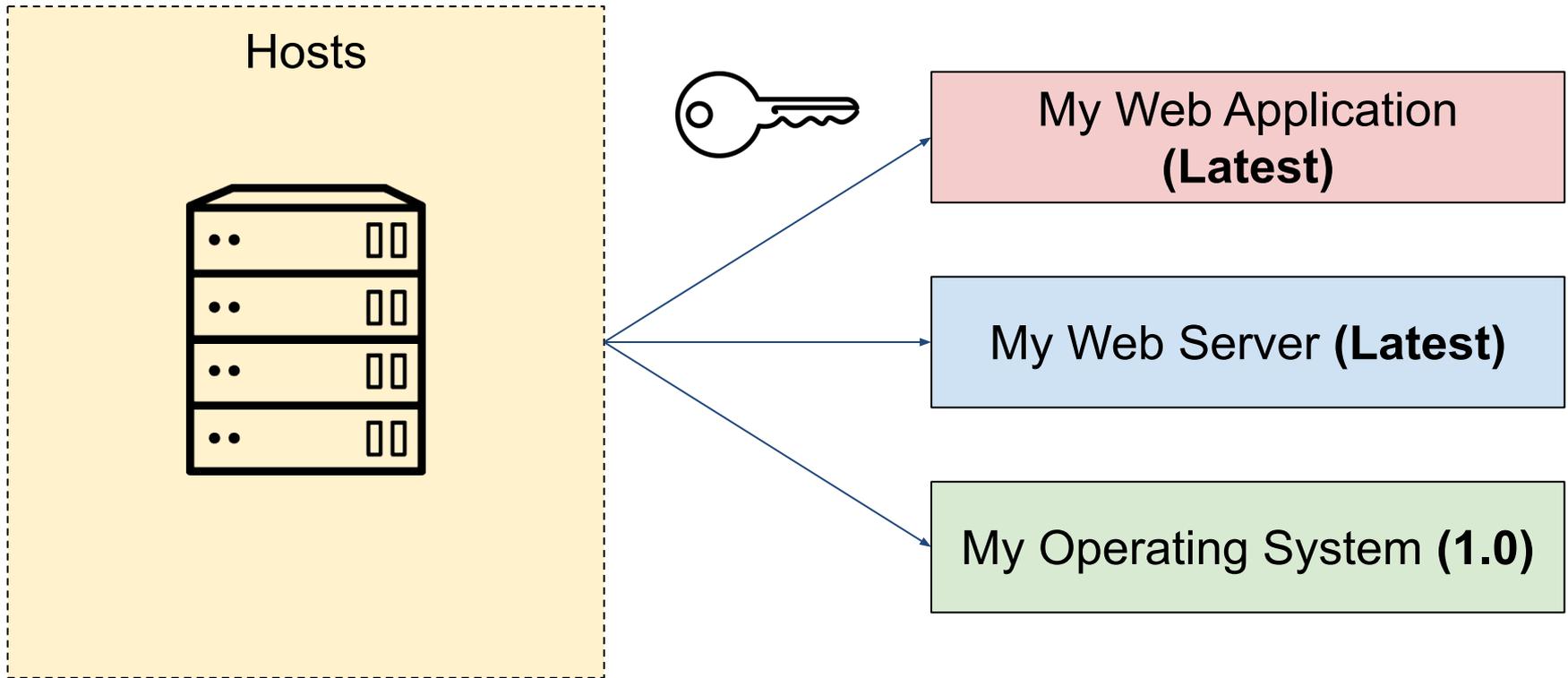
Composite Content View Auto Publish



Triggers...



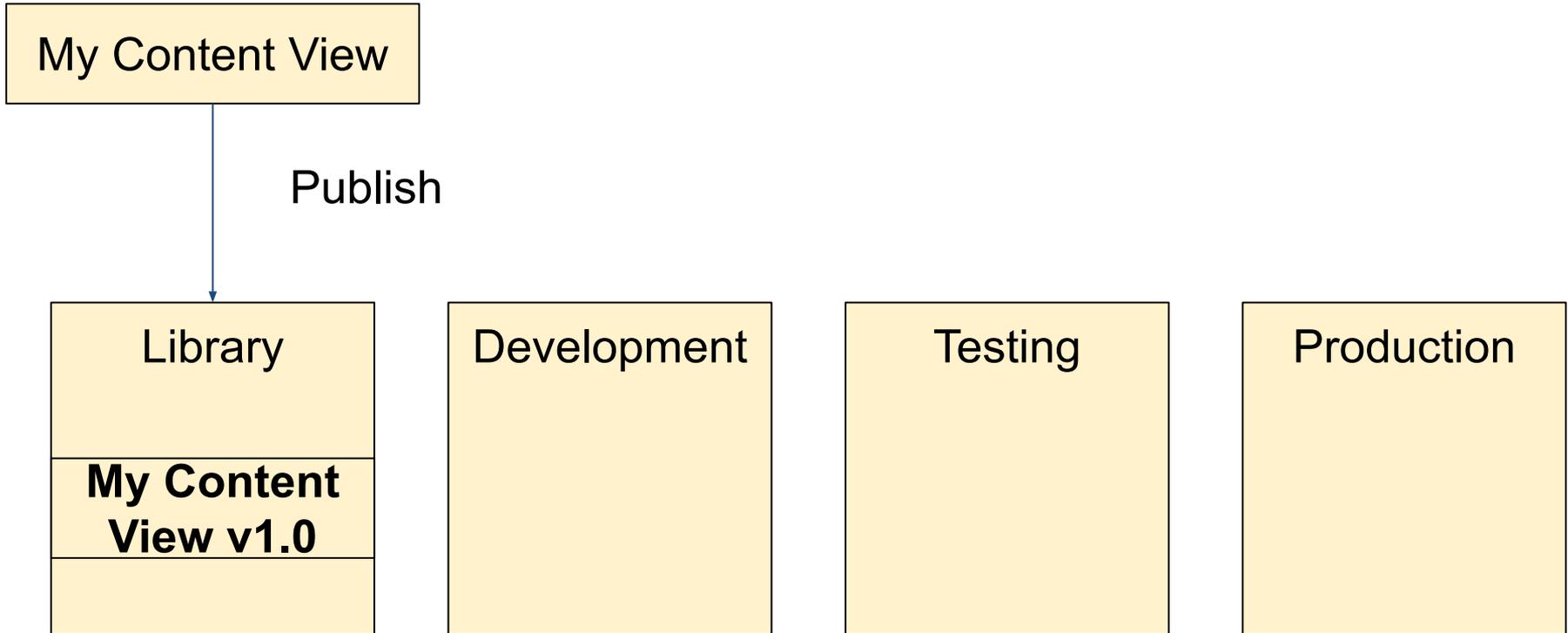
Modern Management: Multi-CV



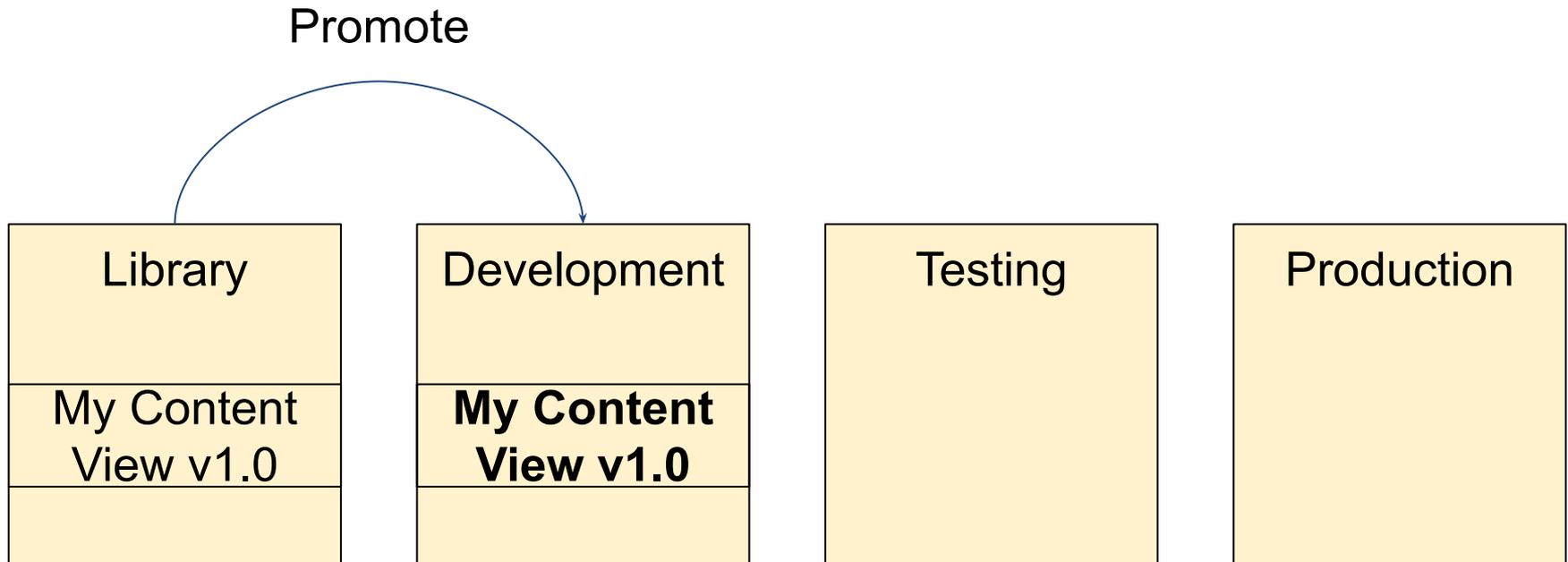
Hosts and activation keys now support registration to multiple content view environments!



Lifecycle Environments



Lifecycle Environments



Lifecycle Environments



Oops, forgot a dependency!

Library
My Content View v1.0

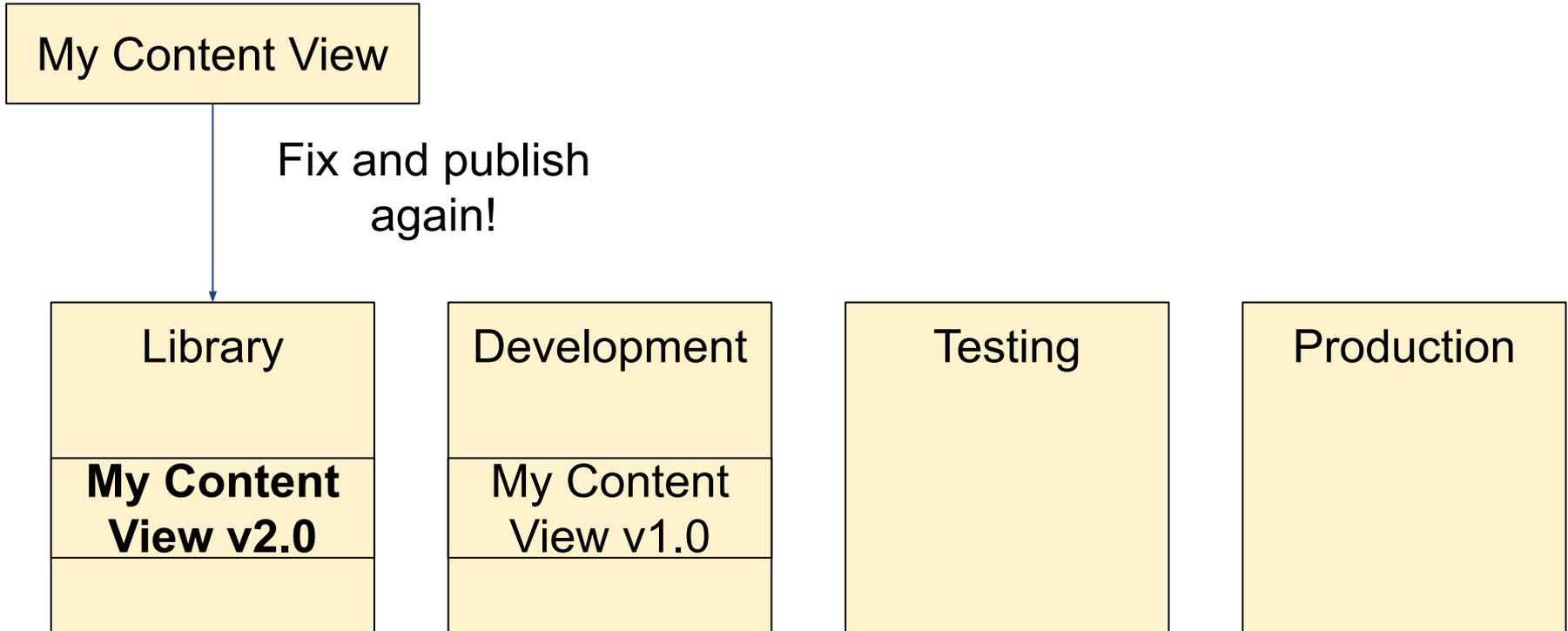
Development
My Content View v1.0

Testing

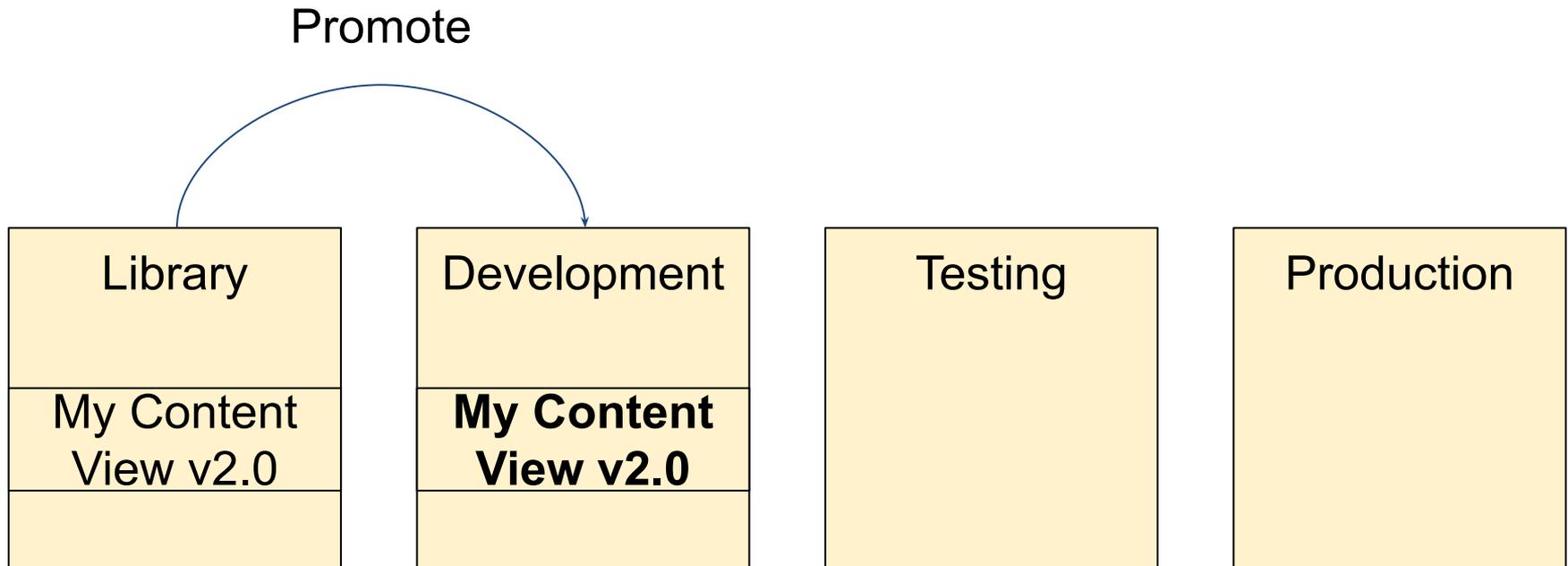
Production



Lifecycle Environments

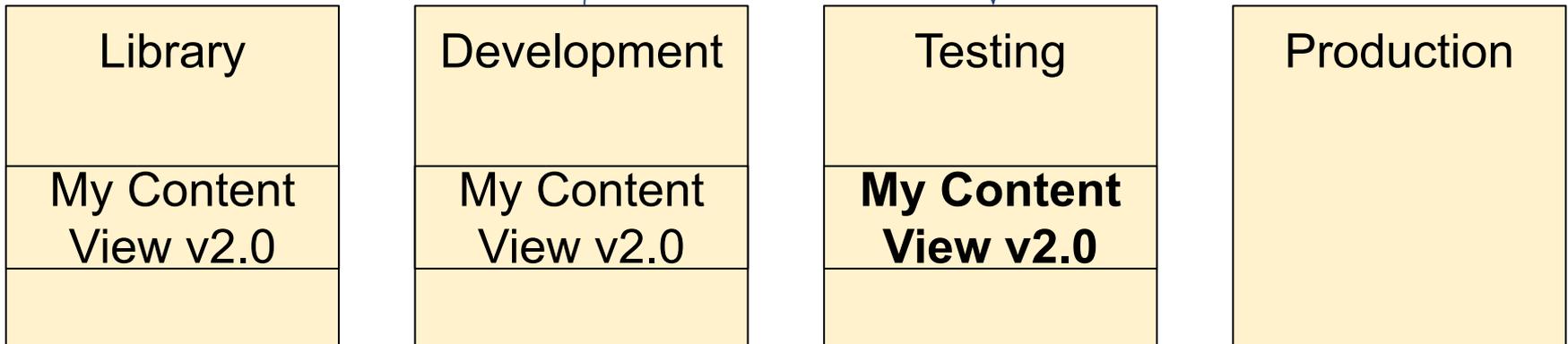


Lifecycle Environments

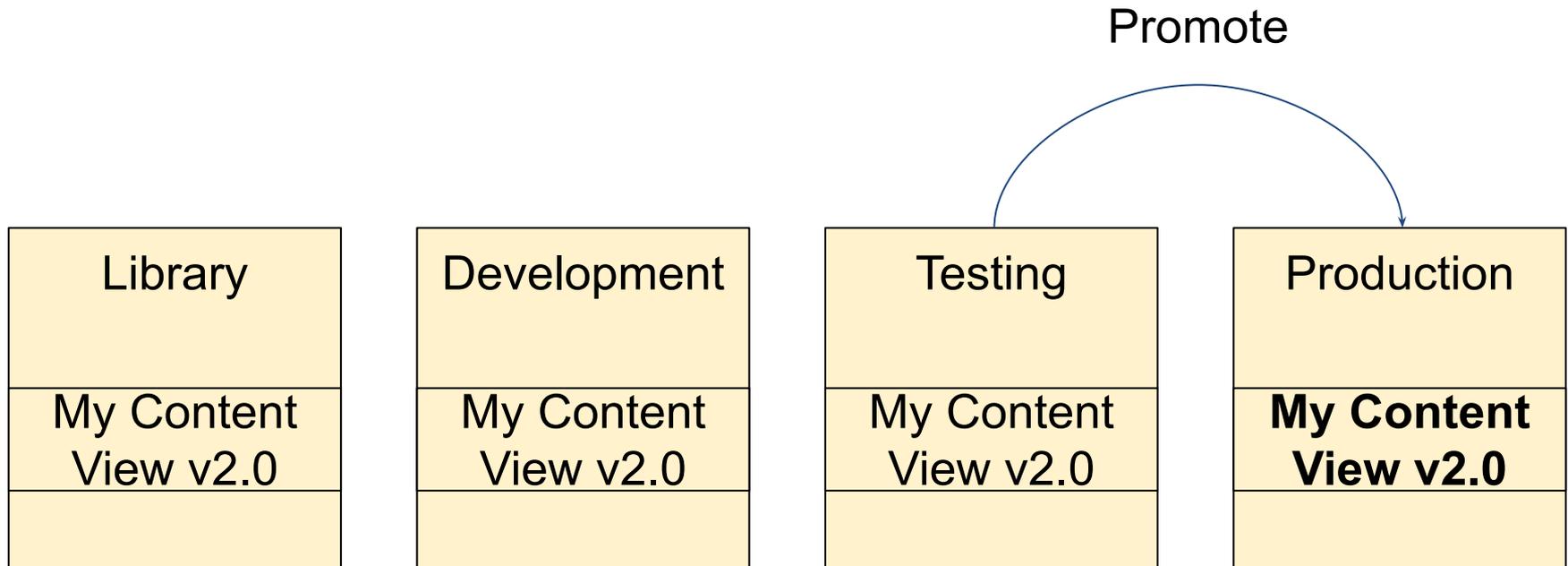


Lifecycle Environments

Promote



Lifecycle Environments



Lifecycle Environments



Oops, Production failure!



Library
My Content View v3.0

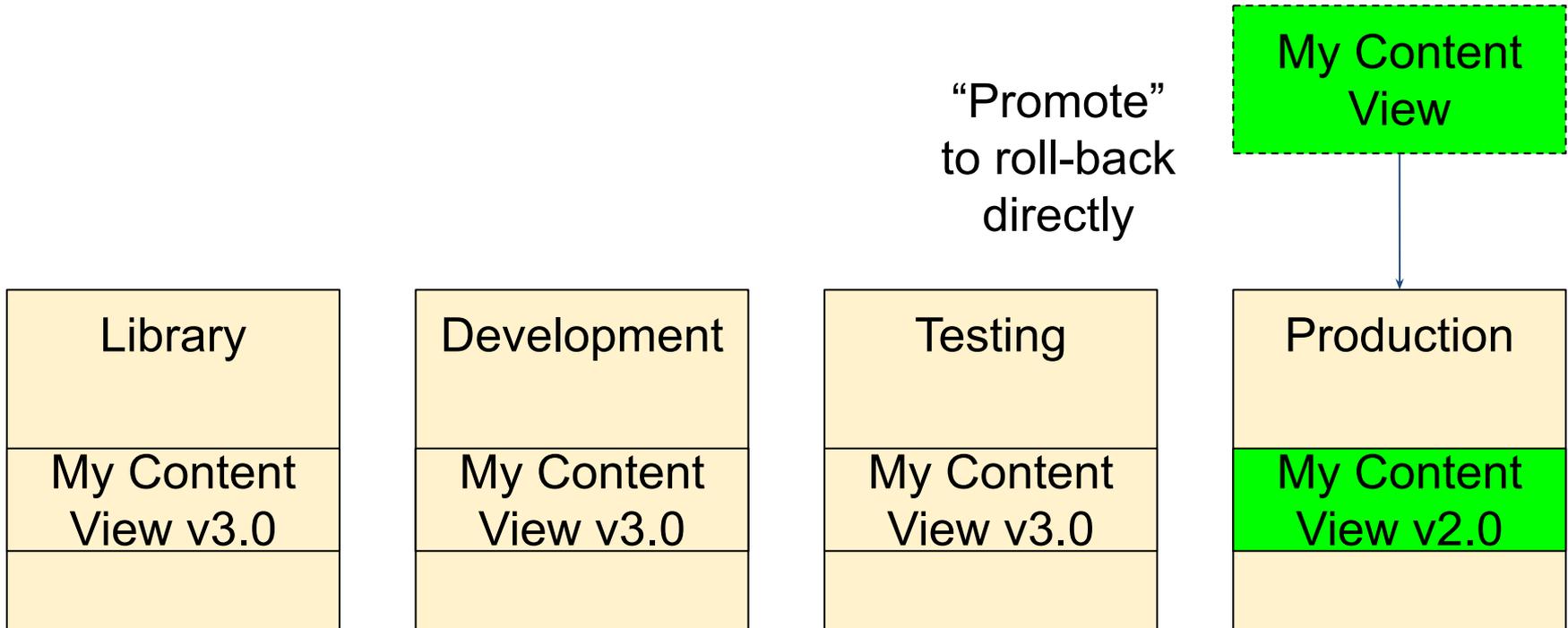
Development
My Content View v3.0

Testing
My Content View v3.0

Production
My Content View v3.0

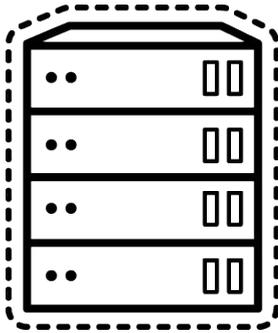


Lifecycle Environments



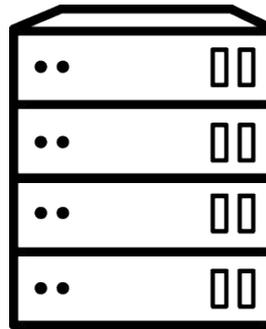
Lifecycle Environments in Practice

Development



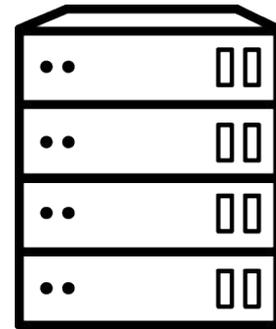
My Content
View v3.0

Testing



My Content
View v3.0

Production



My Content
View v2.0



Hosts



Hosts

rhel9-2.cannolo.example.com !

RedHat 9.2

x86_64

Schedule a job ▾

Edit ⋮

Created 8 days ago by Anonymous Admin (updated 23 hours ago)

Overview Details Content Parameters Traces Ansible Reports

Host status !

✔ 7 ⚠ 1 ! 2 🚫 2

Manage all statuses

Content view details ⋮

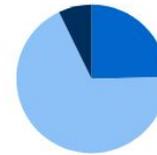
 Content view

Default Organization View Library

Errata

Applicable Installable

126 errata



- 🛡️ 31 security advisories
- 🐛 86 bug fixes
- ⚙️ 9 enhancements

Details ⏻

IPv6 address

Not available

IPv4 address

192.168.122.73 

MAC address

52:54:00:38:a:d7 

Host group

Not available

Host owner

 Admin User

Comment

Not available

Recent jobs ⋮

Finished Running Scheduled

Job Name	Time	Status
Module enable maven:3.8	3 days ago	! failed
Install errata errata_id ^ (...)	3 days ago	✔ succeeded
Upgrade package(s) aut...	3 days ago	✔ succeeded

Recent communication

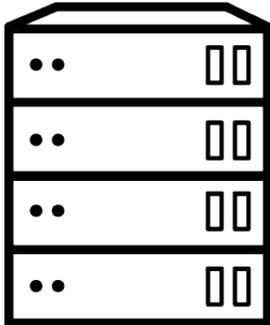
Last configuration report Never

Last check-in: 20 minutes ago

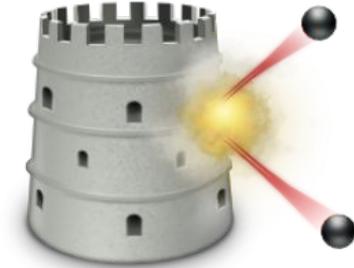


Activation Keys

Activation Key



- Subscriptions
- Lifecycle Environment
- Content View
- Content View Environments
- Repositories



Global Registration

Register Host

General Advanced

Organization ⓘ Default Organization ▾

Location ⓘ Default Location ▾

Host group Nothing to select. ▾

Operating system ⓘ ▾

Smart proxy ⓘ ▾

Insecure ⓘ

Activation Keys * ⓘ Default Library Key × ▾

Generate

Cancel

Registration command

▼ set -o pipefail && curl -sS ... 📄

```
set -o pipefail && curl -sS --insecure 'https://centos8-katello-devel-stable.example.com/register?activation_keys=Default+Library+Key&force=true&location_id=2&organization_id=1&update_packages=false' -H 'Authorization: Bearer eyJhbGciOiJIUzI1NiJ9.eyJ1c2VyX2lkIjo0LCJpYXQiOiJlE3MDYyMTYwMzksImp0aSI6Ij1MmEzMGwNTk5Njg2ZTJiNzA3NWl3MjFiZlZlNDA3ZjBmNTEzOGU4NTg0ZjA5MmYxNzc5YTEwMzRiMjNiYjMiLCJleHAiOiJlE3MDYyMzA0MzksInNjb3BlIjoicmVnaXN0cmF0aW9uI2dsb2JhbCByZWdpc3RyYXQobAqASm1fVacZyWSgIv0' | bash
```



Remote Execution

- Run shell commands
- Filter target hosts
- Make a schedule
- Receive failure reports

Run job

- 1 Category and template
- 2 Target hosts and inputs
- 3 Advanced fields
- 4 Schedule

Type of execution

- 5 Review details



Remote Execution

Hosts > rhel9-2.cannolo.example.com ↔

rhel9-2.cannolo.example.com ✓

RedHat 9.3

x86_64

Schedule a job ▾

Edit



Created 5 days ago by Anonymous Admin (updated 54 minutes ago)

Overview Details **Content** Parameters Traces Ansible Reports

Packages Errata Module streams Repository sets

3 selected ▾

Search



Upgradable ▾

Upgrade ▾



1 - 20 of 159 ▾



Package ↑

Status

Installed version ↑

✓ ca-certificates

↑ Upgradable

2022.2.54-90.2.el9_0.noarch

90.1.el9_2.noarch

✓ c-ares

↑ Upgradable

1.17.1-5.el9_2.1.x86_64

c-ares-1.19.1-1.el9.x86_64



✓ crypto-policies

↑ Upgradable

20221215-1.git9a18988.el9.noarch

crypto-policies-20230731-1.git94f0...



Upgrade via remote execution

Upgrade via customized remote execution



Errata

<input type="checkbox"/>	Errata ID	Title	Type	Content Host Counts	Updated
<input type="checkbox"/>	RHBA-2024:0076	tzdata bug fix and enhancement update	🛠️ Bug Fix Advisory - None	1 Applicable, 1 Installable	2024-01-08
<input type="checkbox"/>	RHBA-2023:7752	sssd bug fix update	🛠️ Bug Fix Advisory - None	1 Applicable, 1 Installable	2023-12-12
<input type="checkbox"/>	RHBA-2023:7748	firewalld bug fix update	🛠️ Bug Fix Advisory - None	1 Applicable, 1 Installable	2023-12-12
<input type="checkbox"/>	RHSA-2023:7749	Important: kernel security update	⚠️ Security Advisory - Important	1 Applicable, 1 Installable	2023-12-12



Errata

Errata ↓

Type ↑

Severity ↑

Installable

Synopsis

Published date ↑

▼ [RHSA-2023:7749](#)

🛡️ Security

🚨 Important

✓ Yes

Important: kernel s...

12/11/2023

> Bugs 4

> CVEs 4

> Packages 26

> Module streams 0

Synopsis

Important: kernel security update

Summary

An update for kernel is now available for Red Hat Enterprise Linux 9. Red Hat Product Security has rated this update as having a security impact of Important. A Common Vulnerability Scoring System (CVSS) base score, which gives a detailed severity rating, is available for each vulnerability from the CVE link(s) in the References section.





<input type="checkbox"/>	Power	Name	OS	Owner	Installable updates	Actions
<input type="checkbox"/>		centos8-katello-devel-stable.exa...	CentOS Stream 8		0 0 0 0	<input type="button" value="Edit"/> <input type="button" value="v"/>
<input type="checkbox"/>		rhel9-2.cannolo.example.com	RedHat 9.3	Admin...	31 86 9 281	<input type="button" value="Edit"/> <input type="button" value="v"/>
<input type="checkbox"/>		rocky8-proxy-devel.cannolo.exa...	Rocky Linux 8.5		0 0 0 0	<input type="button" value="Edit"/> <input type="button" value="v"/>



Incremental Update



Critical security update needed!



Critical security update needed!



Critical security update needed!



Critical security update needed!

Library

My Content
View v3.0

Development

My Content
View v3.0

Testing

My Content
View v3.0

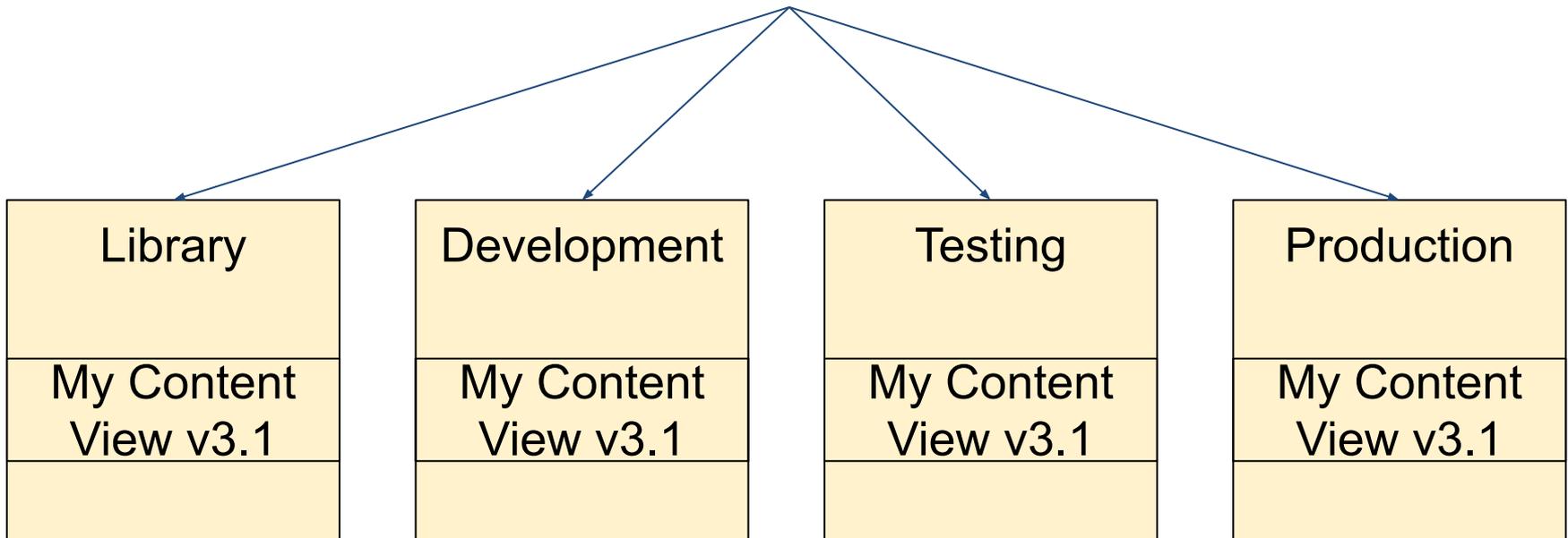
Production

My Content
View v3.0



Incremental Update

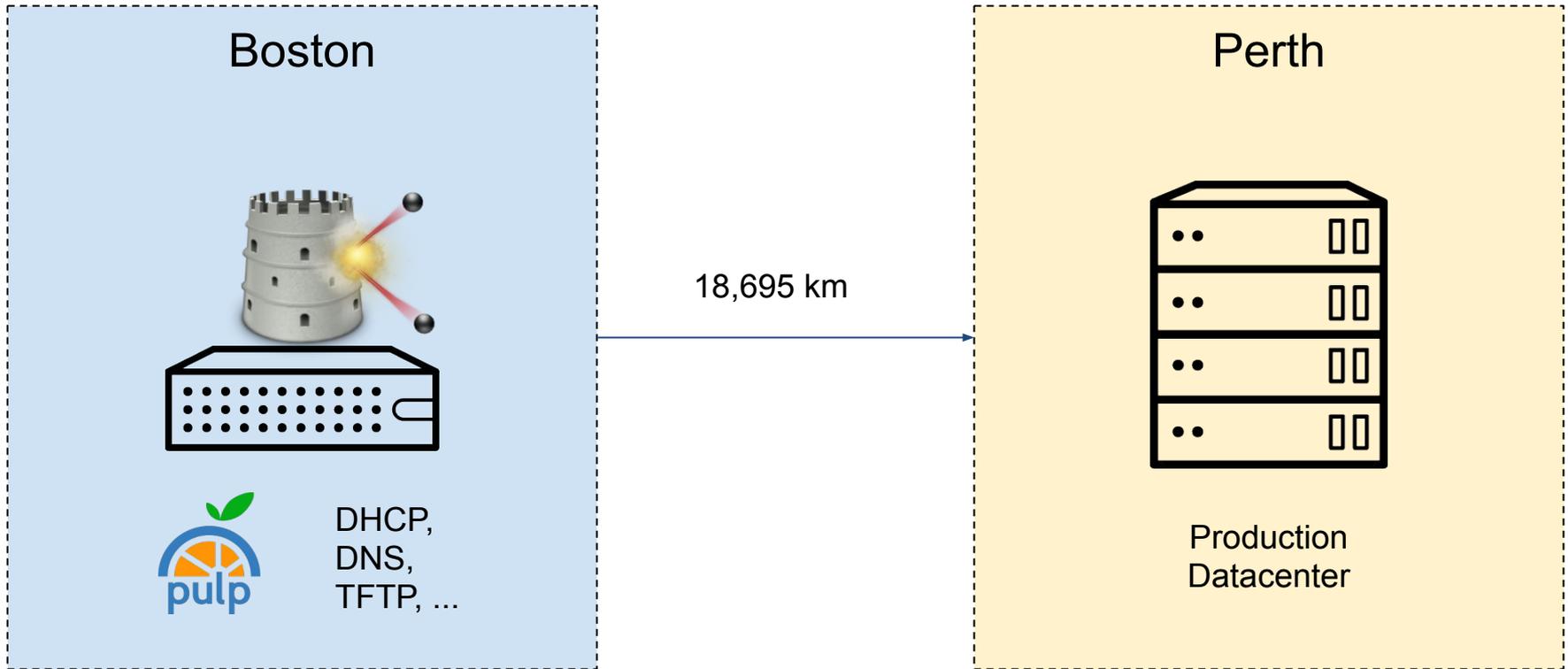
RHSA-2019:43490



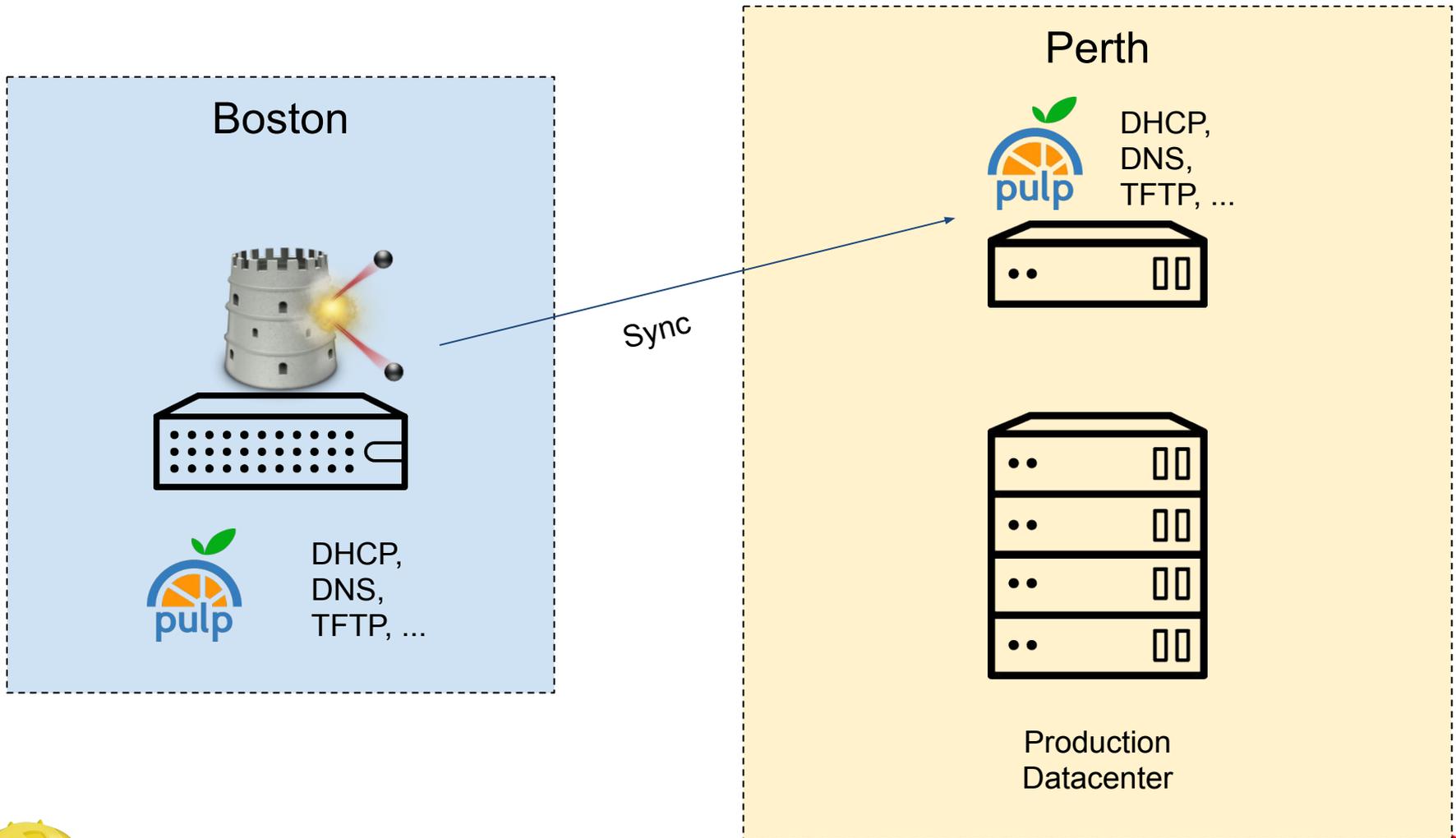
Katello + Your Infrastructure



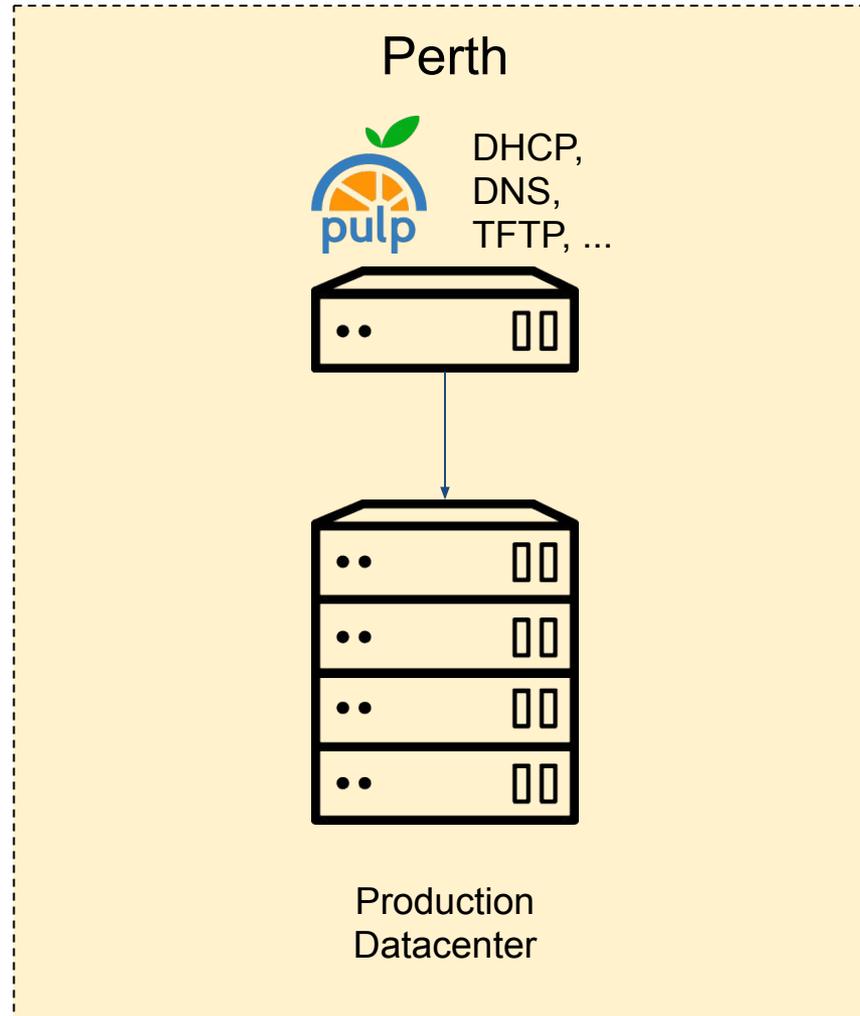
Scenario: Off-Site Hosts



Smart Proxies with Pulp



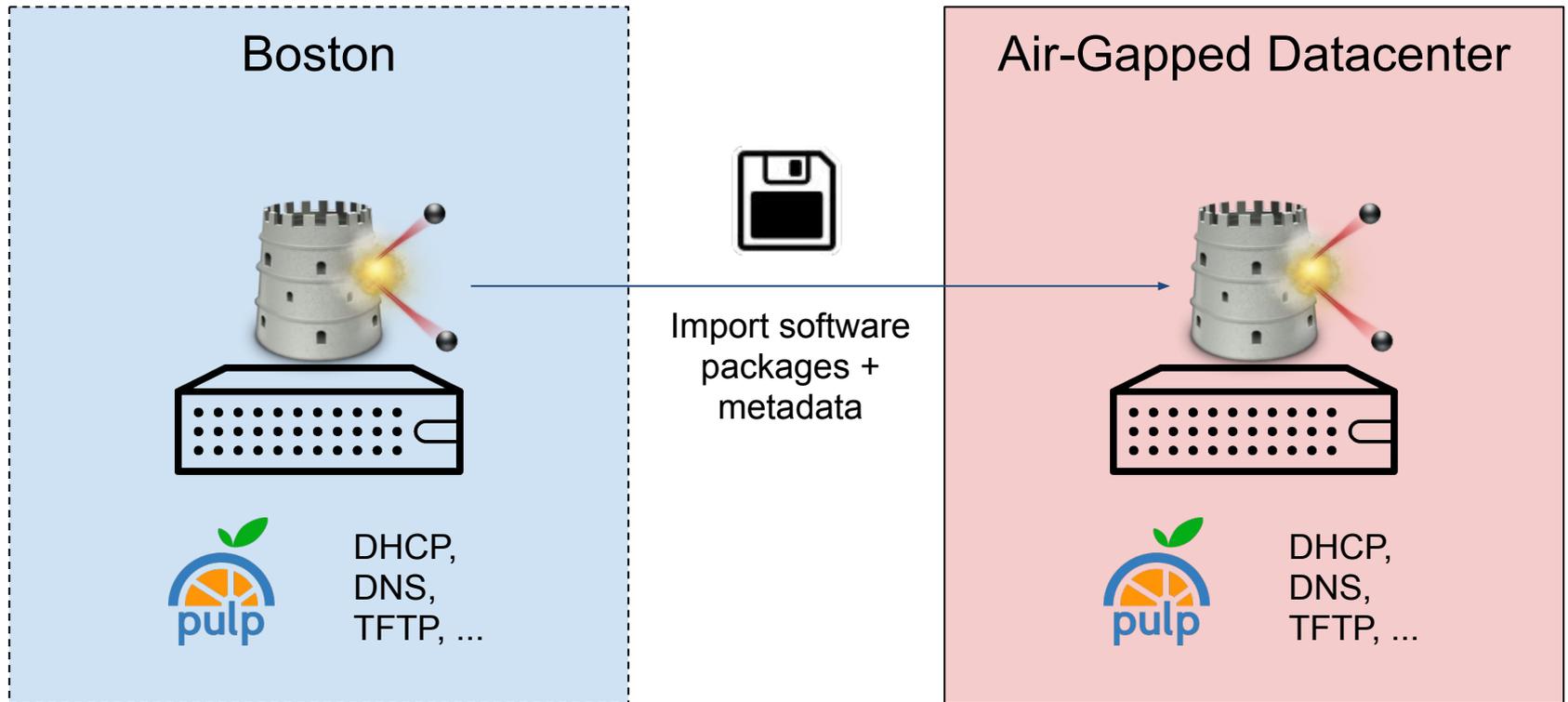
Content Enabled Smart Proxies



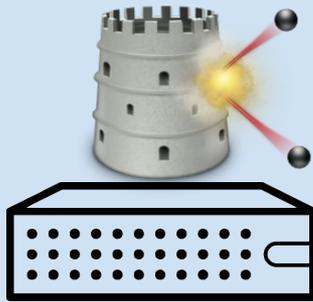
Can operate on its own until needing another sync



Infrastructure Flexibility



Boston



DHCP,
DNS,
TFTP, ...

Wales



DHCP,
DNS,
TFTP, ...



DHCP,
DNS,
TFTP, ...

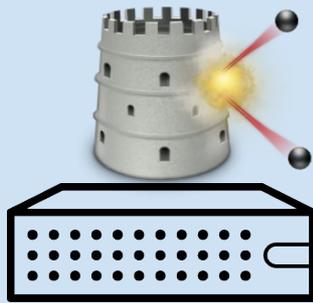


Load
balancer



Demo Prep

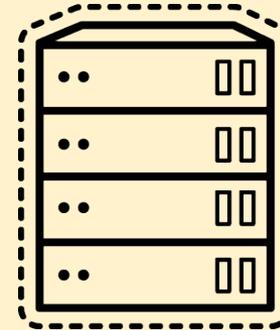
centos8-stream-katello-4.11



DHCP,
DNS,
TFTP, ...

centos8-stream-katello-4.11.
cannolo.example.com

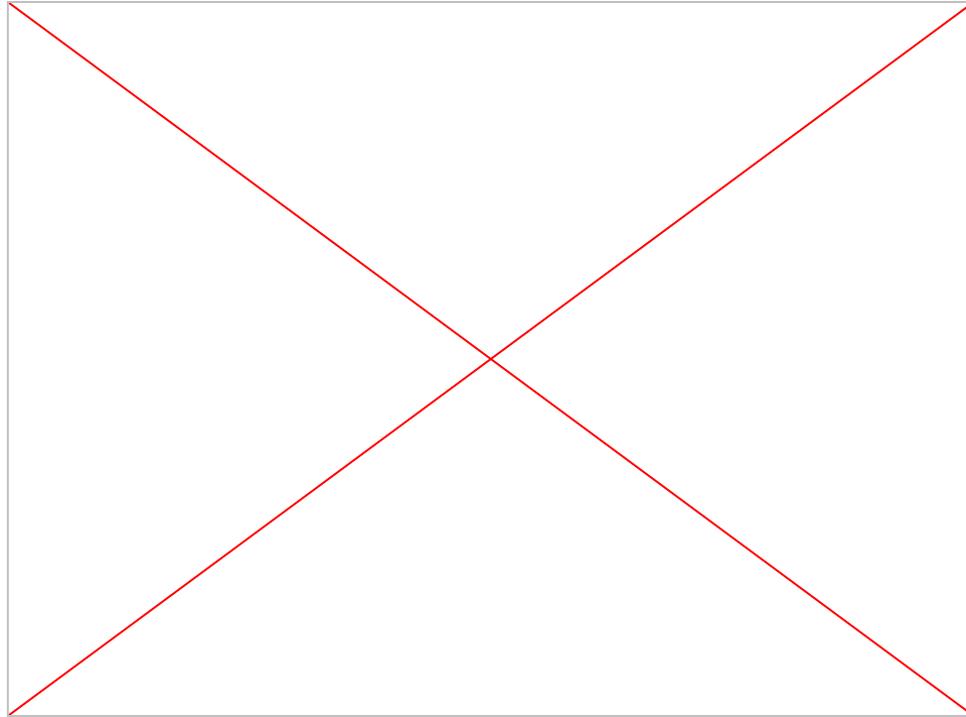
waffle-test
waffle-prod1
waffle-prod2



Apache Tomcat
“Waffle Palace”
Application



Demo



Incremental Update Demo

The screenshot shows a desktop environment with OBS Studio in the foreground and a web browser in the background. The OBS Studio window is titled "OBS 30.0.0 - Profile: Untitled - Scenes: Untitled" and displays a scene named "Scene" with a "Screen Capture" source. The web browser shows a repository management interface with a table of repository sync status.

			Sync Status	Content
			Success 1 day ago	16224 Packages 0 Errata 63 Package Groups 22 Module Streams
<input type="checkbox"/>	CentOS 9 Stream BaseOS x86_64	yum	Success 1 day ago	4323 Packages 0 Errata 34 Package Groups 0 Module Streams
<input type="checkbox"/>	Foreman Client 3.9 x86_64	yum	Success about 24 hours ago	15 Packages 0 Errata 0 Package Groups 0 Module Streams
<input type="checkbox"/>	waffle-recipe	file	N/A	1 Files





FOREMAN

Thanks!

<https://theforeman.org/>

<https://theforeman.org/plugins/katello/>