

End-to-End Enterprise Automation

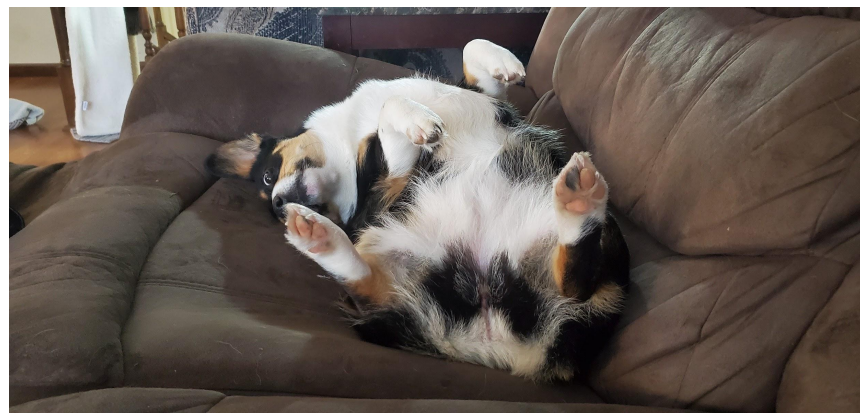
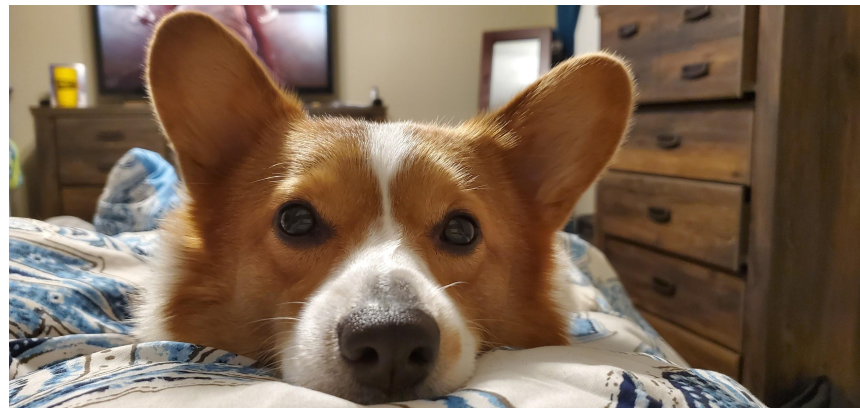
Building, Publishing, and Delivering Ansible Collections

Josh Swanson
Chief Architect
Red Hat
joshswanson@redhat.com



Josh Swanson

joshswanson@redhat.com



Agenda

- ▶ **Why Standardize on a Platform?**

The story of Red Hat Enterprises

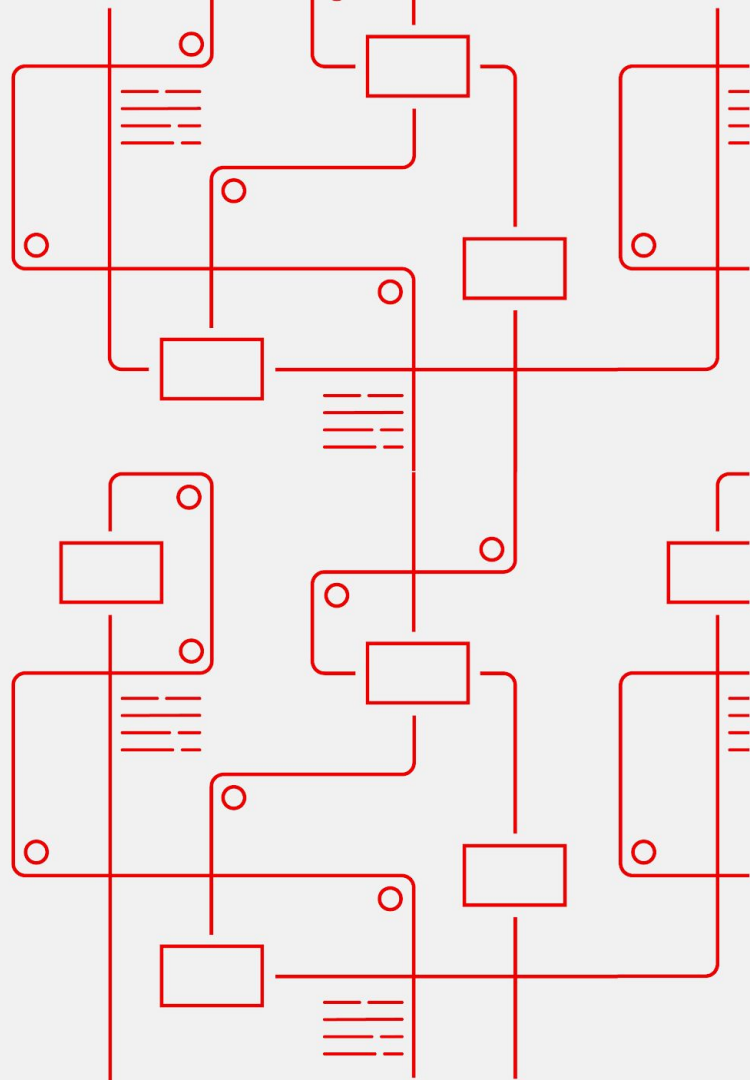
- ▶ **Ansible Content Flow**

Building, publishing, and delivering our automation

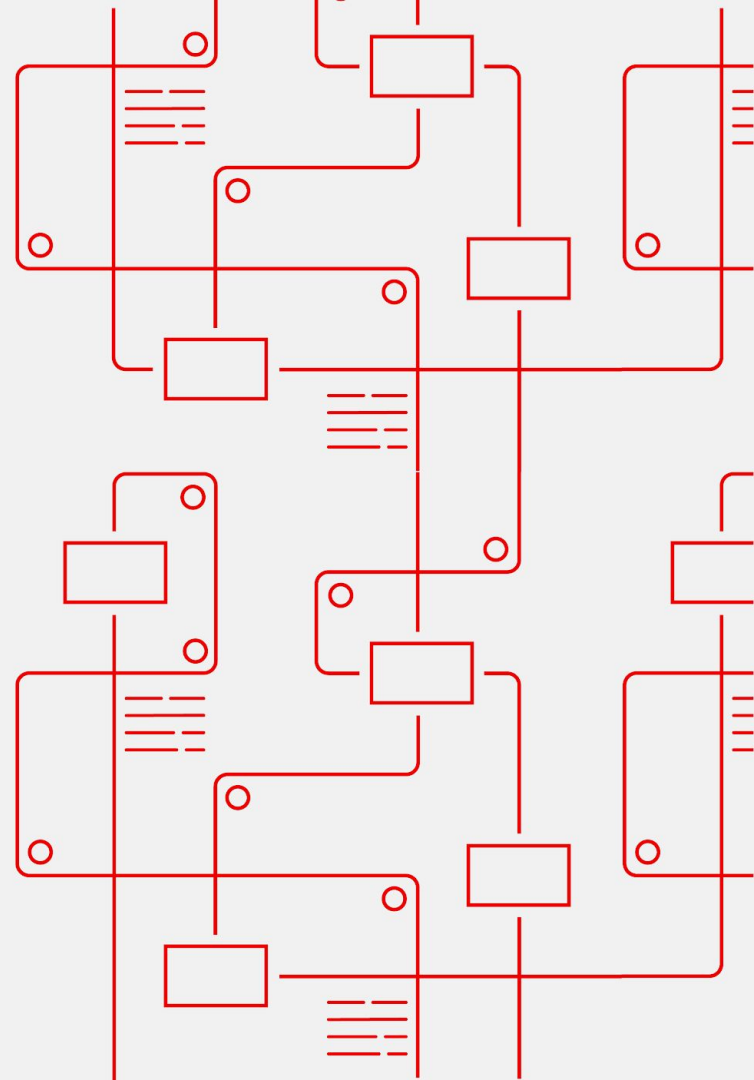
- ▶ **Quick Review**

The new state of Red Hat Enterprises

- ▶ **Q&A**

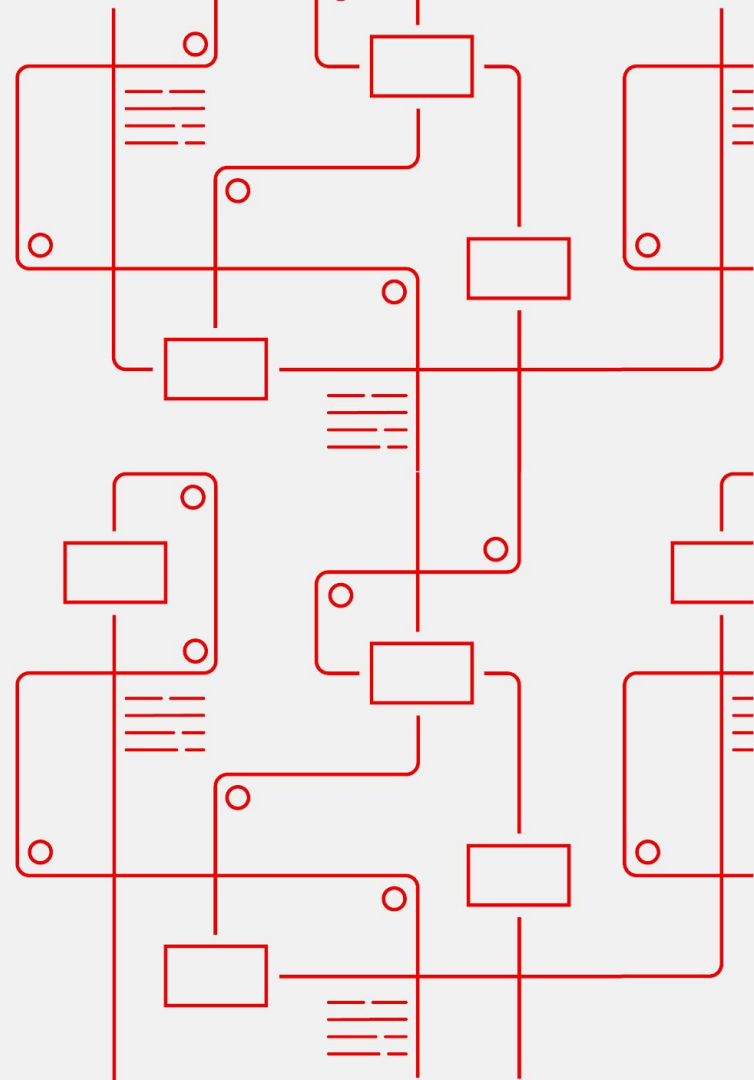


Why Standardize on a Platform?



Red Hat Enterprises

A Startup Hotel Company



Red Hat Enterprises Resource Request



Lines of Business

“We’re entering a new market space and need to quickly deploy an application to capture market share. The faster this is deployed, the more market share we’ll capture, and the more revenue we’ll drive for the business.”



Josh Swanson

Project Manager

Red Hat Enterprises Entering a New Market



Red Hat Enterprises Resource Request

Initiating the Process



Lines of Business

“We’ll need IT assets for integrating with the airline booking systems and for automatically adding reservations to our existing booking systems. We also want to increase the amount of customer information we send to our data warehouse.”



Josh Swanson

Project Manager

Red Hat Enterprises Resource Request

Reviewing the Last Time this Process was Run



Josh Swanson

Project Manager

- 5 total teams involved:
 - CMDB
 - Network
 - Virtualization
 - RHEL Admin/Ops
 - Security
- 6 tickets to those teams in ServiceNow
 - Average closure time of 2 business days
 - Total time: 10 days
- Another 5 days for app deployment
 - Bit of re-work needed
 - Have to be careful: re-requesting resources would take another ~10 business days
- The business wants this done by tomorrow EOD...

Red Hat Enterprises Key Stakeholders

It takes a village to provision infrastructure



Network

Zach Peterson



Operating System

Pete Scurek



Security

Scott Danielson



CMDB

Scott Peters



Virtualization

Jimmy Connor

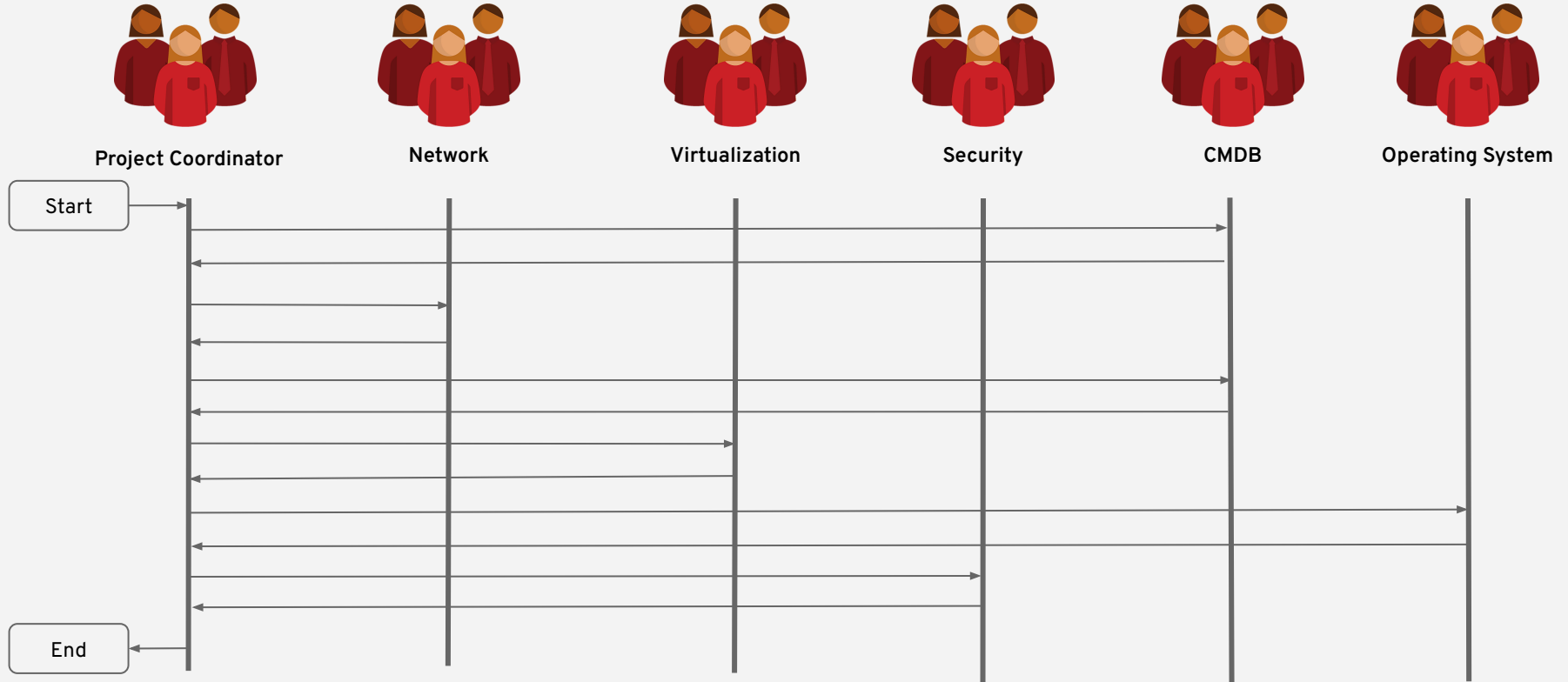


Project Manager

Josh Swanson

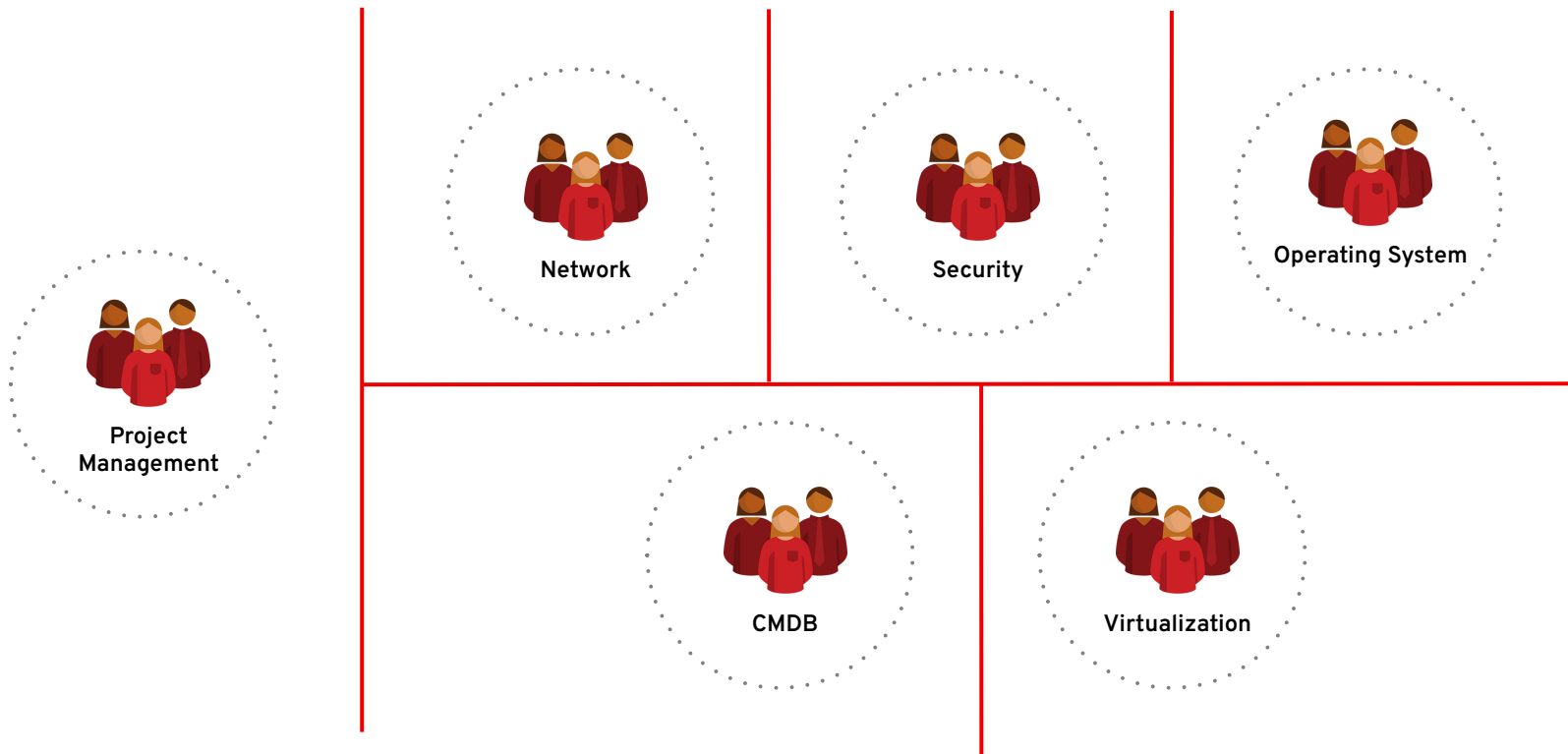
Red Hat Enterprises Provisioning Workflow

It takes a village to provision infrastructure

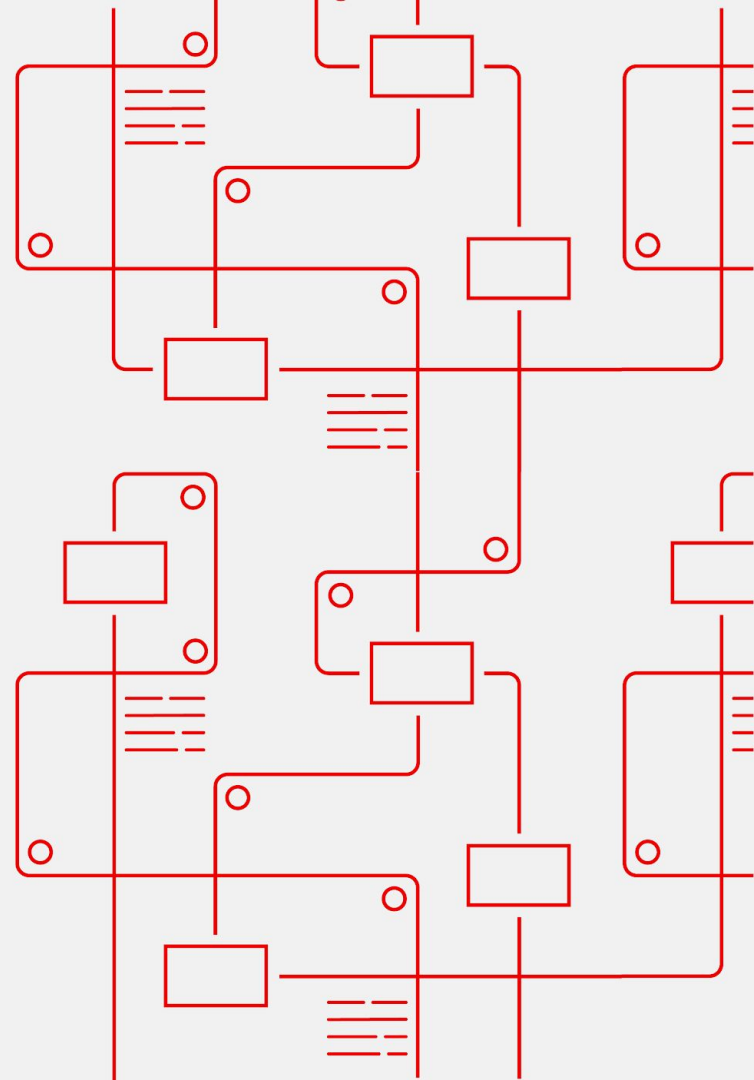


Red Hat Enterprises Key Stakeholders

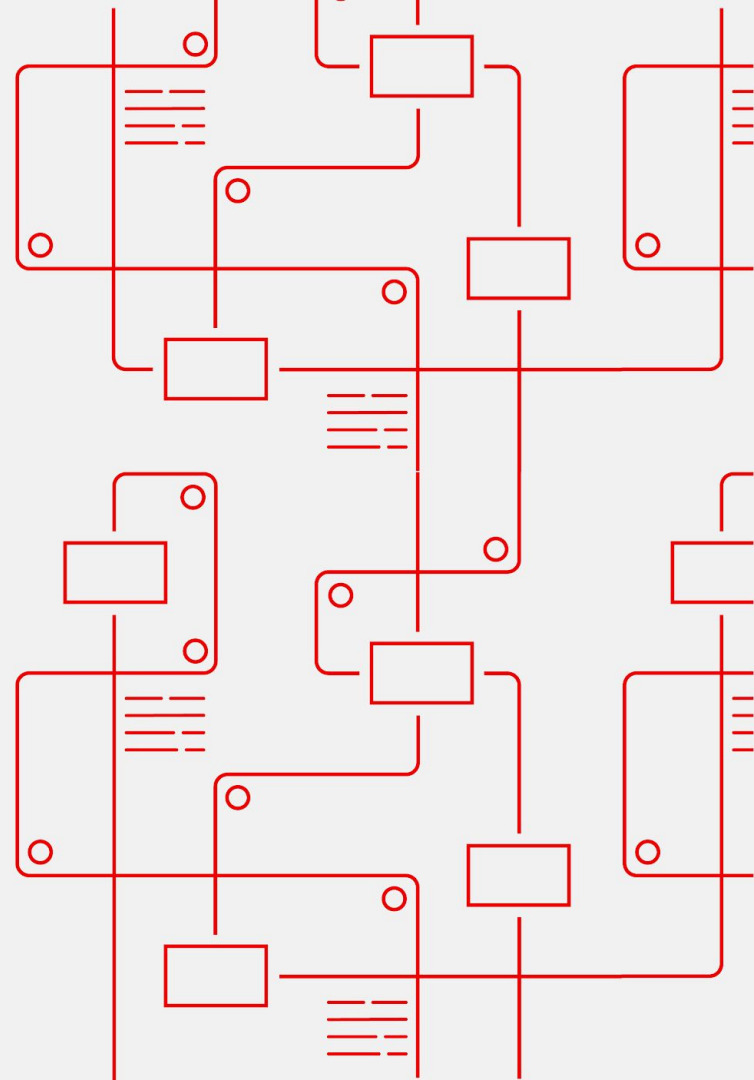
Here's What We Have Today



Conclusion: This Isn't Going to Work

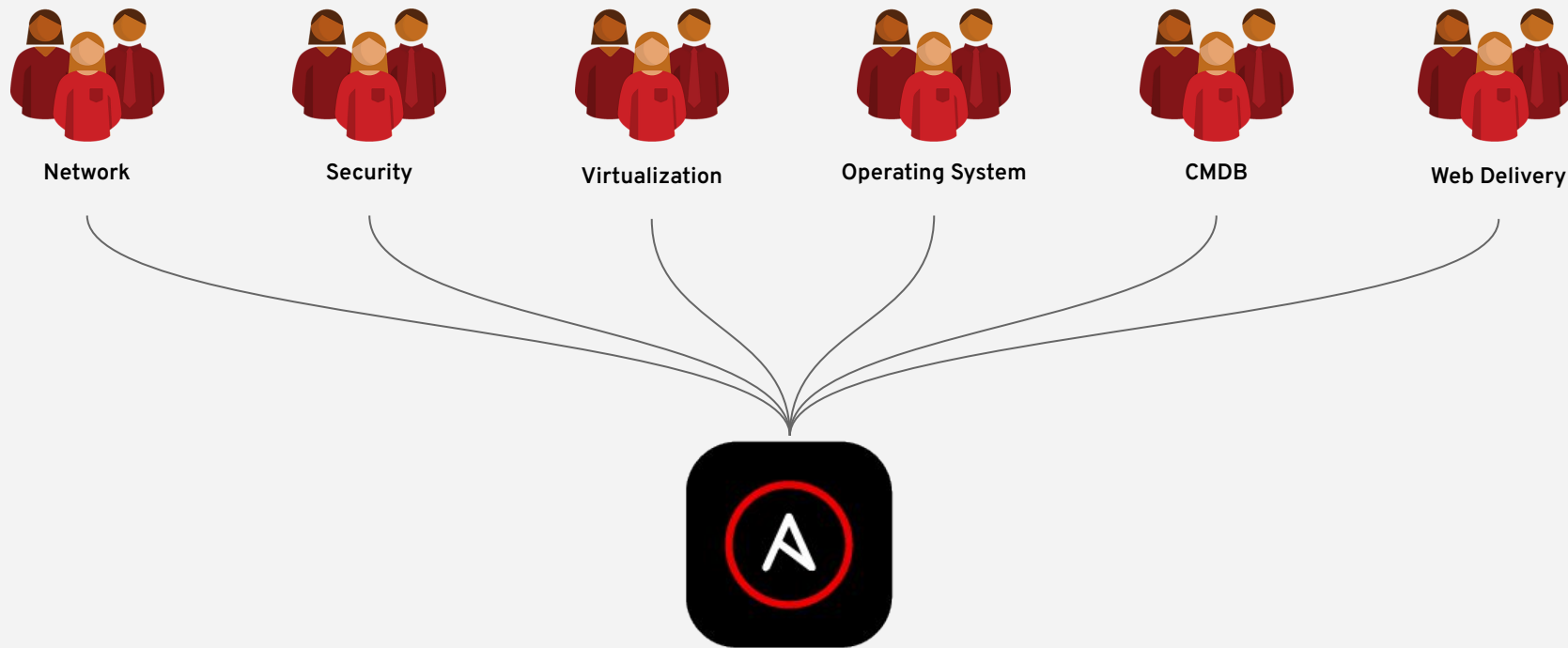


Shifting to a Different Approach



Red Hat Enterprises New Approach

Breaking down barriers by speaking the same language





Red Hat Ansible Automation Platform



Creators



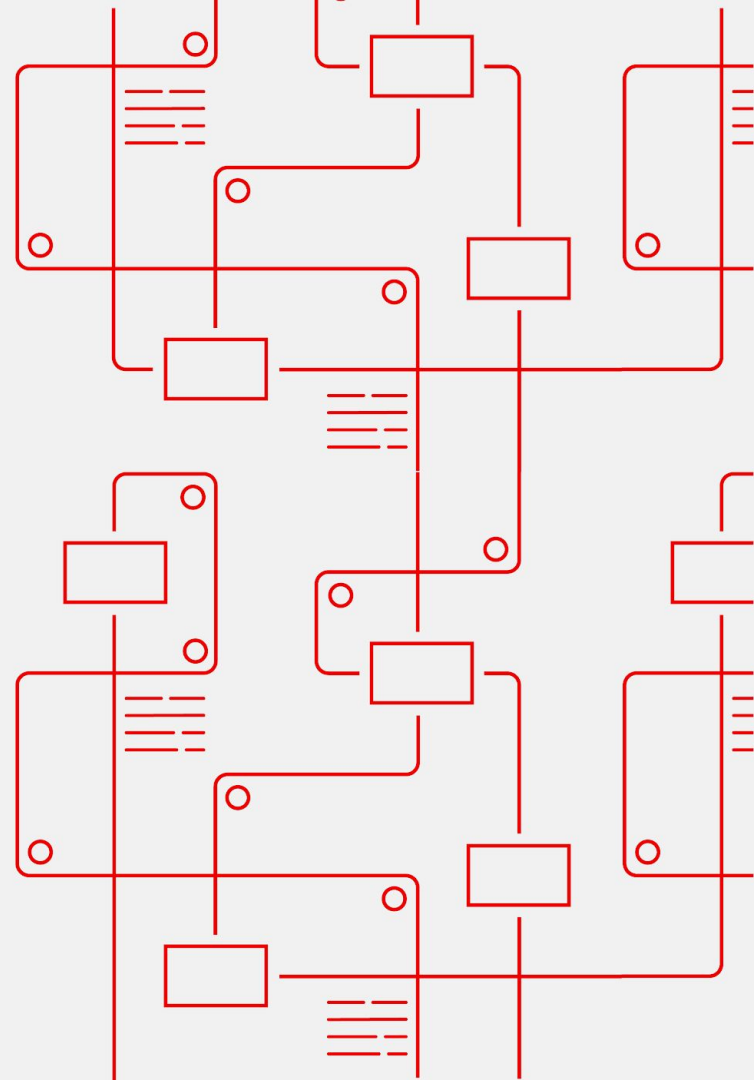
Operators



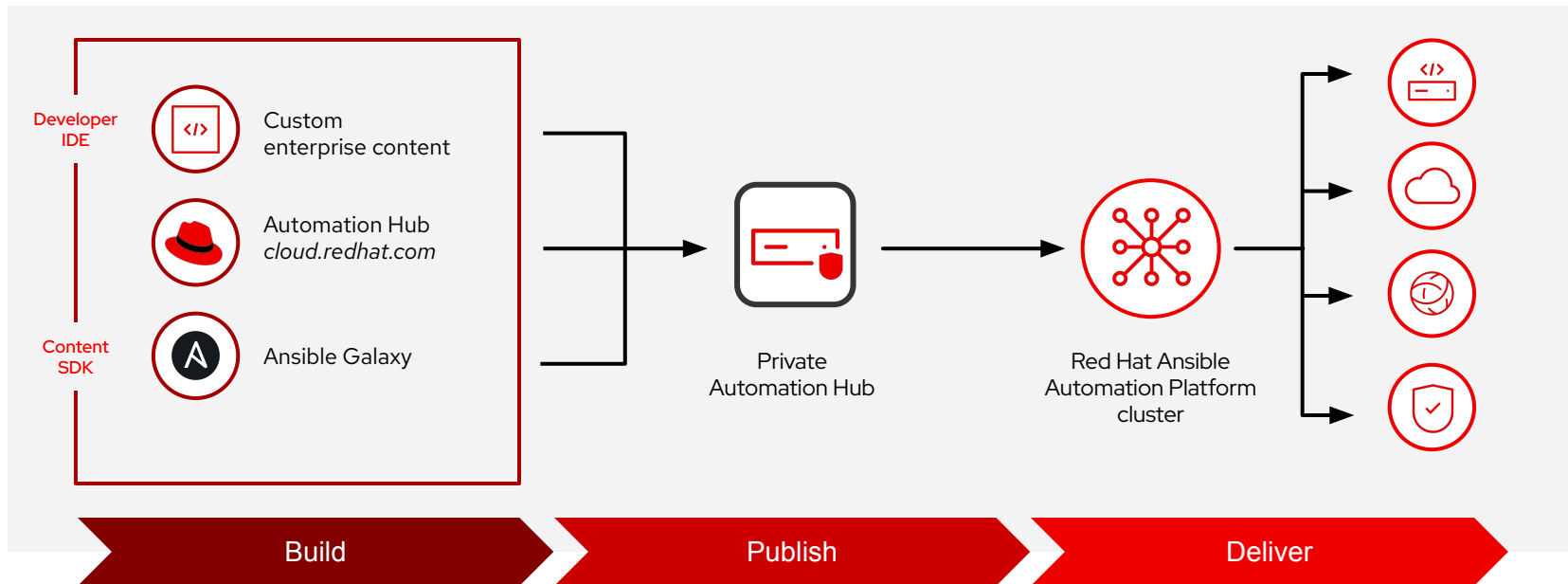
Consumers

Fueled by an open source community

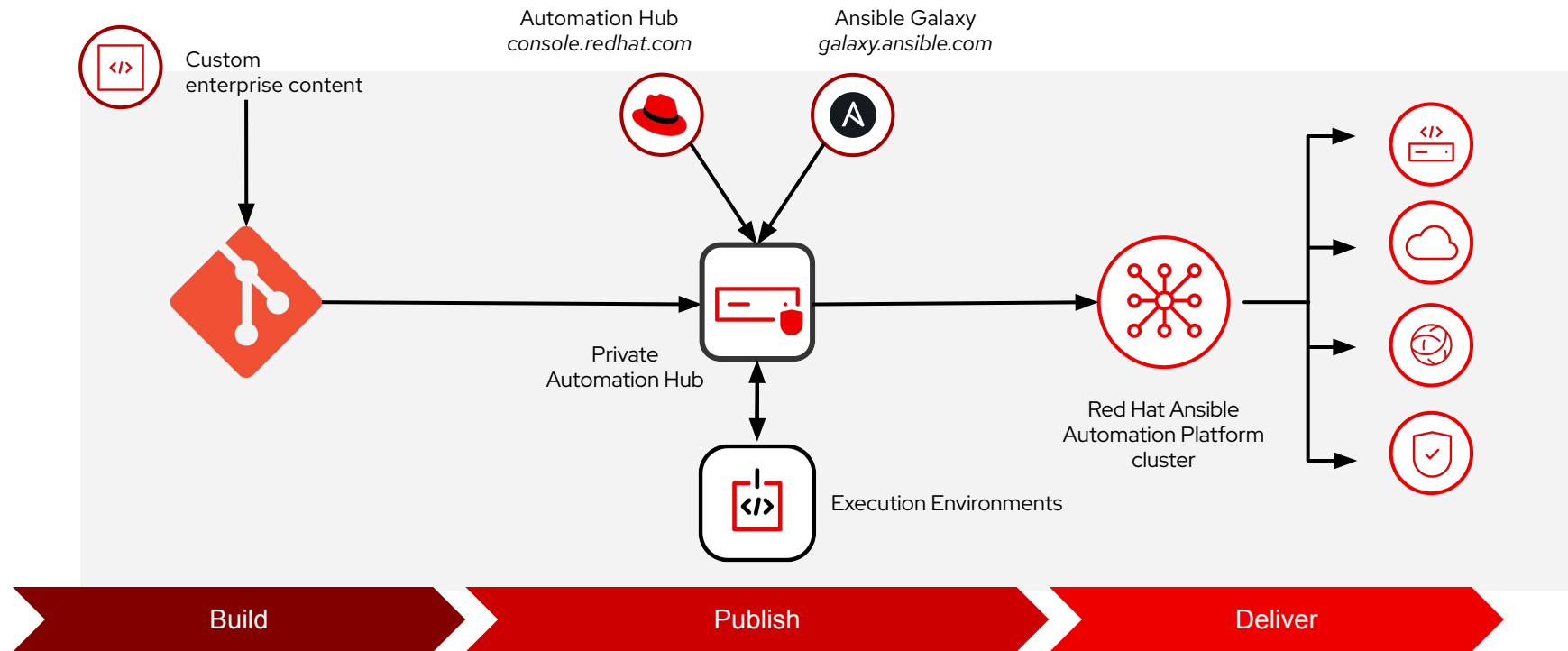
Ansible Content Flow



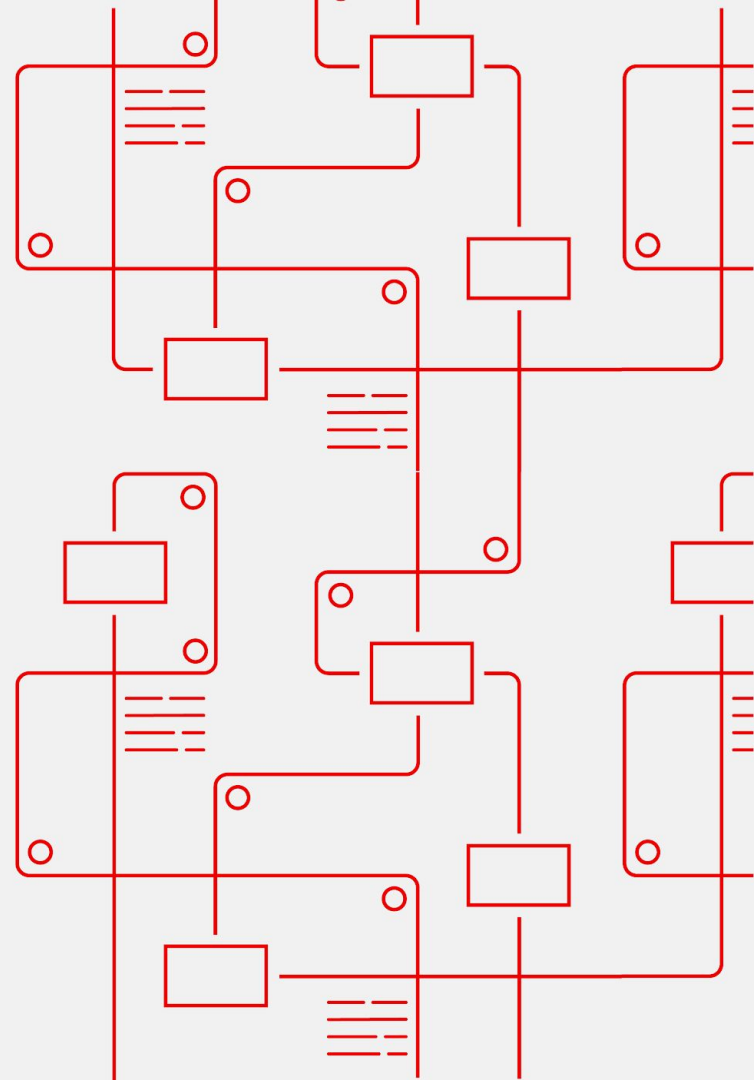
Private Automation Hub architecture



Automation Content Flow



Building Ansible Content



Building Ansible Collections

‘ansible-galaxy collection init’ To Get the Collection Shell

```
[root@DESKTOP-APP17TE ansible-code]# ansible-galaxy collection init my_namespace.my_collection
- Collection my_namespace.my_collection was created successfully
[root@DESKTOP-APP17TE ansible-code]# tree my_namespace/my_collection
my_namespace/my_collection
```

```
|— docs
|— galaxy.yml
|— plugins
|   └─ README.md
|— README.md
|— roles
```

3 directories,
3 files

docs: Documentation on the collection/plugins

galaxy.yml: Galaxy file for the collection

plugins: Modules, connection plugins, etc

README.md: Readme file for the collection

roles: Ansible roles in the collection

Building Ansible Collections

Leverage GIT Right Away

```
[root@DESKTOP-APP17TE my_collection]# pwd
/root/ansible-code/my_namespace/my_collection
```

← Be in the collection directory

```
[root@DESKTOP-APP17TE my_collection]# git init
[root@DESKTOP-APP17TE my_collection]# git status
```

On branch main

No commits yet

Untracked files:

(use "git add <file>..." to include in what will be committed)

README.md

galaxy.yml

plugins/

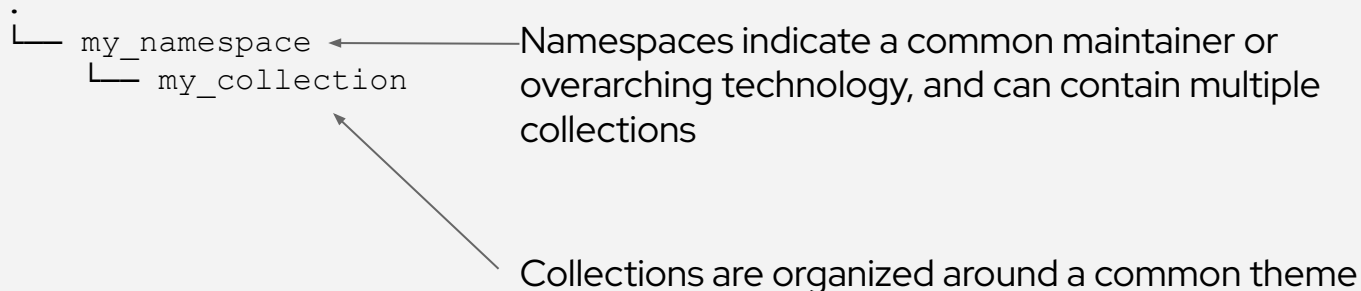
← Files/directories created by 'collection init'

nothing added to commit but untracked files present (use "git add" to track)

Building Ansible Collections

Suggestion for Namespaces and Collection Names

```
[root@DESKTOP-APP17TE ansible-code]# tree
```

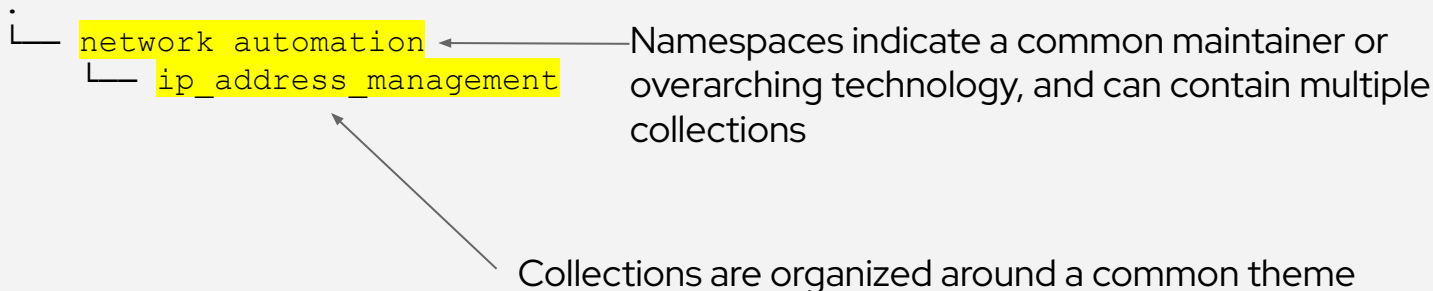


In an organization, it makes sense to group automation by team or automation domain, and have collections target common tasks or processes

Building Ansible Collections

Suggestion for Namespaces and Collection Names

```
[root@DESKTOP-APP17TE ansible-code]# tree
```



Here we establish a namespace around automation of networking and network related processes, and have a collection built for IP address management

Building Ansible Collections

Translating Namespaces and Collections to GIT

Groups

[New group](#)

Your groups Explore public groups

Last created ▾

• S	Security Automation	Owner	Namespaces become groups within source control software, tying automation to a domain and team within the organization	0	1	1	⋮
• O	Operating System Automation	Owner		0	1	1	⋮
• V	Virtualization Automation	Owner		0	1	1	⋮
• C	CMDB Automation	Owner		0	1	1	⋮
• N	Network Automation	Owner	Namespaces can contain more than one collection, manifesting as multiple repos within a group	0	2	1	⋮
• G	GitLab Instance	Owner		0	1	1	⋮

This approach also allows each group to establish their own code standards, apply their own permissions, build their own testing pipelines, and ultimately control the automation they're responsible for



Building Ansible Collections

1:1 Relationship between Collections and Repositories

Namespace and collection names clearly defined

Collection files and directories from our CLI command (plus the automation we added)



Network Automation > IP Address Management







IP Address Management  Project ID: 2 


🔗 1 Commit 🌿 1 Branch 🏷 1 Tag 📁 92 KB Project Storage 🚀 1 Release

main ip_address_management / +

Find file Web IDE ⬇ Clone

 add collection files network-automation@company.com authored 1 hour ago ef155be9 

 README  Auto DevOps enabled  Add LICENSE  Add CHANGELOG  Add CONTRIBUTING  Add Kubernetes cluster

 Configure Integrations



Name	Last commit	
collections	add collection files	
meta	add collection files	
playbooks	add collection files	1 hour ago
plugins	add collection files	1 hour ago
roles/assign_address	add collection files	1 hour ago
README.md	add collection files	1 hour ago
galaxy.yml	add collection files	1 hour ago

Playbooks can also be shipped within a collection

Building Ansible Collections

Let The Collection Document Itself

READMEs are required for collections

 README.md	add collection files	1 hour ago
 galaxy.yml	add collection files	1 hour ago

 README.md

Ansible Collection - network_automation.manage_dns_records

A collection of automation for common DNS related tasks. Ideally this would be run after acquiring an IP address from the IP Address Management Collection.

Use Cases

- Create DNS records for instances
- Create DNS records for VIPs

Contents

Roles:

- `network_automation.manage_dns_records.update_dns`: Manage DNS records, which are handled by the DNS feature of Red Hat IDM.

Modules:

Highlight the content of the collection. Here we have a role, no modules

Clearly outline use cases for the collection

Document how to consume the role:
namespace.collection.role

Building Ansible Collections

Let the Collection Components Document Themselves

READMEs are required for roles as well

Outline requirements and dependencies on python libraries, other collections, etc

add collection files 1 hour ago

README.md

Role Name

network_automation.manage_dns_records.update_dns

Requirements

The following python libraries are required:

- requests

The following collections are required:

- community.general

Role Variables

Some base information should be defined so your records point to the correct place:

```
subnet: 10.15.120.0/22
vlan: 146
address: 10.15.120.123
```

Dependencies

N/A

Example Playbook

```
- name: manage DNS records
  hosts:
    - all
  roles:
    - network_automation.manage_dns_records.update_dns
```

Describe what input or data the role requires

Example playbooks and playbook runs make great documentation as well

Building Ansible Collections

Don't Forget galaxy.yml

```
namespace: network_automation
```

```
name: manage_dns_records
```

```
version: 1.0.0
```

```
readme: README.md
```

```
authors:
```

```
- Josh Swanson <jswanson@redhat.com>
```

```
description: A collection for grabbing available IP address(es)
```

```
license:
```

```
- GPL-2.0-or-later
```

```
tags:
```

```
- dns
```

```
- idm
```

```
- freeipa
```

```
dependencies: {}
```

```
repository: https://msp-gitlab.rhug.demos.lcl/network_automation/manage_dns_records
```

```
documentation:
```

```
https://msp-gitlab.rhug.demos.lcl/network_automation/manage_dns_records/-/wikis/home
```

```
homepage: https://msp-gitlab.rhug.demos.lcl/network_automation/manage_dns_records
```

```
issues: https://msp-gitlab.rhug.demos.lcl/network_automation/manage_dns_records/-/issues
```

```
build_ignore:
```

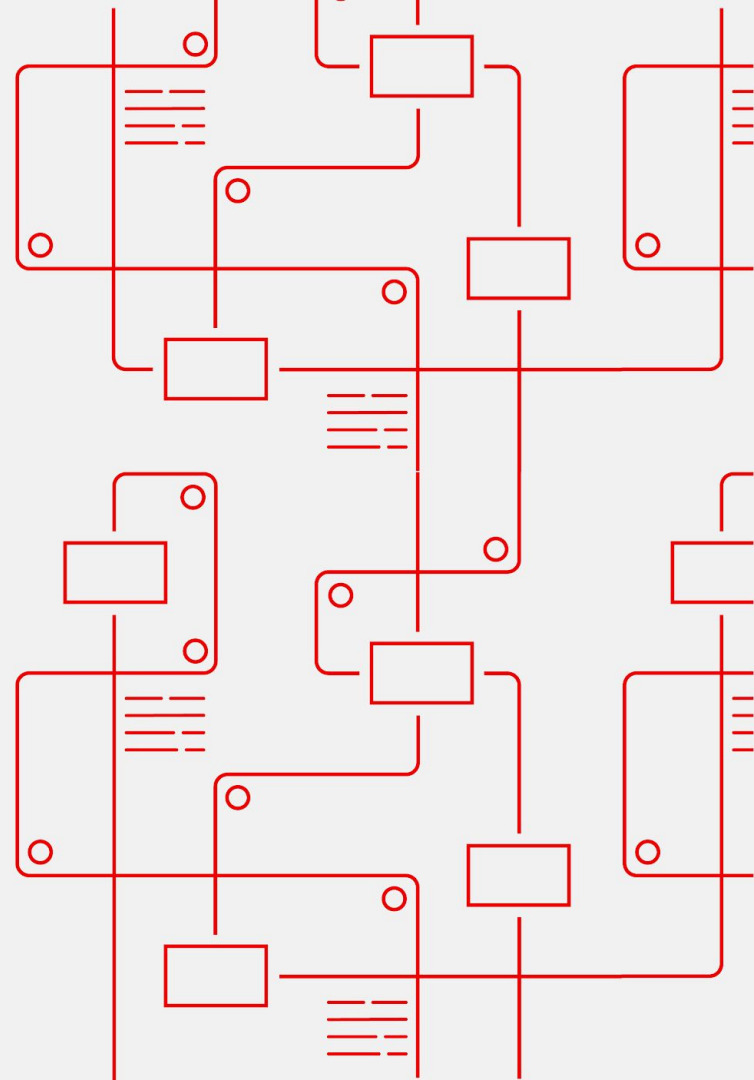
```
- collections/requirements.yml
```

```
- .git
```

Many source control systems have wikis and issue trackers built in

Tags help the collection be found in hub

Publishing Ansible Content



Publishing Ansible Collections

Uploading to Automation Hub

```
[root@DESKTOP-APP17TE my_collection]# pwd
/root/ansible-code/my_namespace/my_collection
[root@DESKTOP-APP17TE my_collection]# ansible-galaxy collection build
Created collection for my_namespace.my_collection at
/root/ansible-code/my_namespace/my_collection/my_namespace-my_collection-1.0.0.tar.gz
```

Be in the collection directory



Ansible will build our collection into an archive



Once the archive is created, it can be uploaded to Automation Hub

This is the manual process, however this is a great opportunity to build a testing and publishing pipeline using your favorite pipeline software (Gitlab CI, Github Actions, Jenkins) - Giving your team a more automated approach to developing, testing, and publishing automation

Publishing Ansible Collections

Automation Hub's Importer

Namespaces > network_automation > manage_dns_records > Import log

 manage_dns_records

Version 1.0.0 released 2 hours ago (unsig... Last updated 2 hours ago  Unsigned

[Install](#) [Documentation](#) [Contents](#) [Import log](#) [Dependencies](#)

 [Docs site](#) [Website](#) [Issue tracker](#) [Repo](#)

Status:  Completed

Approval status: waiting for import to finish

Version: 1.0.0

Hub will call out ansible-lint warnings and other errors

```
Importing with galaxy-importer 0.4.4
Getting doc strings via ansible-doc
Finding content inside collection
Loading role update_dns
Linting role update_dns via ansible-lint...
roles/update_dns/meta/main.yml:13: yamll no new line character at the end of file (new-line-at-end-of-file)
roles/update_dns/tasks/main.yml:3: fqcn-builtins Use FQCN for builtin actions.
roles/update_dns/tasks/main.yml:3: unnamed-task All tasks should be named.
roles/update_dns/tasks/main.yml:4: yamll no new line character at the end of file (new-line-at-end-of-file)
CHANGELOG.rst file not found at top level of collection.
Collection loading complete
```

Done

Publishing Ansible Collections

Automation Hub Organization

Filter by repository Published ▾

Namespaces > network_automation

Network Automation

MSP Network Automation

Collections CLI configuration Resources

Keywords ▾ Filter by keywords 🔍

[Code Repositories](#)

1 - 2 of 2 ▾ < >

[ip_address_management](#)

A collection for grabbing available IP address(es)

0 Modules 1 Role 0 Plugins 0 Dependencies

network ip_address ipv4

[manage_dns_records](#)

A collection for grabbing available IP address(es)

0 Modules 1 Role 0 Plugins 0 Dependencies

dns idm freeipa

[Upload new version](#) ⋮

Updated 2 hours ago

v1.0.0

⚠ Unsigned

[Upload new version](#) ⋮

Updated 2 hours ago

v1.0.0

⚠ Unsigned

1 - 2 of 2 ▾ << < 1 of 1 > >>

Remember those?

Publishing Ansible Collections

Collection Point of View

Namespaces > network_automation > manage_dns_records

manage_dns_records

Version 1.0.0 released 2 hours ago (unsig... Last updated 2 hours ago Unsigned

[Install](#) [Documentation](#) [Contents](#) [Import log](#) [Dependencies](#) [Docs site](#) [Website](#) [Issue tracker](#) [Repo](#)

Install

A collection for grabbing available IP address(es)

[dns](#) [idm](#) [freeipa](#) ← galaxy.yml

License GPL-2.0-or-later

Installation `ansible-galaxy collection install network_automation.manage_dns_records`

Note: Installing collections with ansible-galaxy is only supported in ansible 2.9+
[Download tarball](#)

Requires Ansible >=2.9

Ansible Collection - network_automation.manage_dns_records

A collection of automation for common DNS related tasks. Ideally this would be run after acquiring an IP address from the IP Address Management Collection.

Use Cases

- Create DNS records for instances ← README.md
- Create DNS records for VIPs


Links back to source control

Publishing Ansible Collections

Hub Publishes Our Documentation

[Namespaces](#) > [network_automation](#) > [manage_dns_records](#) > Documentation

 **manage_dns_records**

Version 1.0.0 released 3 hours ago (unsig... Last updated 3 hours ago  Unsigned

[Install](#) [Documentation](#) [Contents](#) [Import log](#) [Dependencies](#)

 [Docs site](#) [Website](#) [Issue tracker](#) [Repo](#)

 Find content

Documentation (1)

Readme

Roles (1)

update_dns

Ansible Collection - network_automation.manage_dns_records

A collection of automation for common DNS related tasks. Ideally this would be run after acquiring an IP address from the IP Address Management Collection.

Use Cases

- Create DNS records for instances
- Create DNS records for VIPs

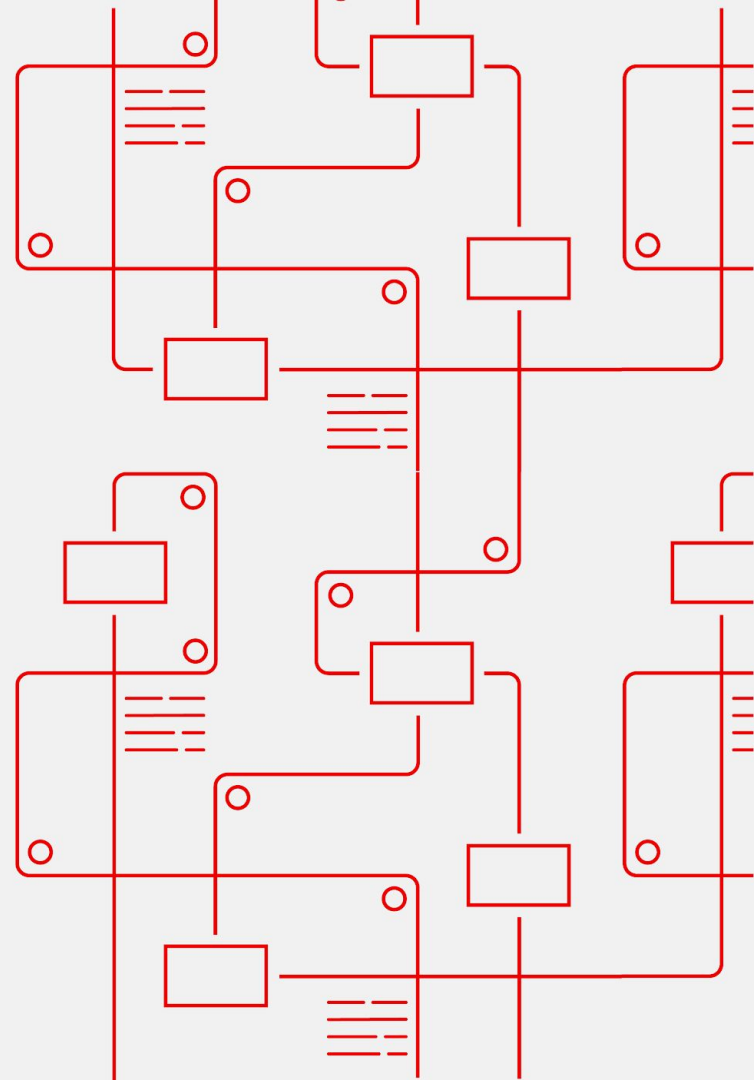
Contents

Roles:

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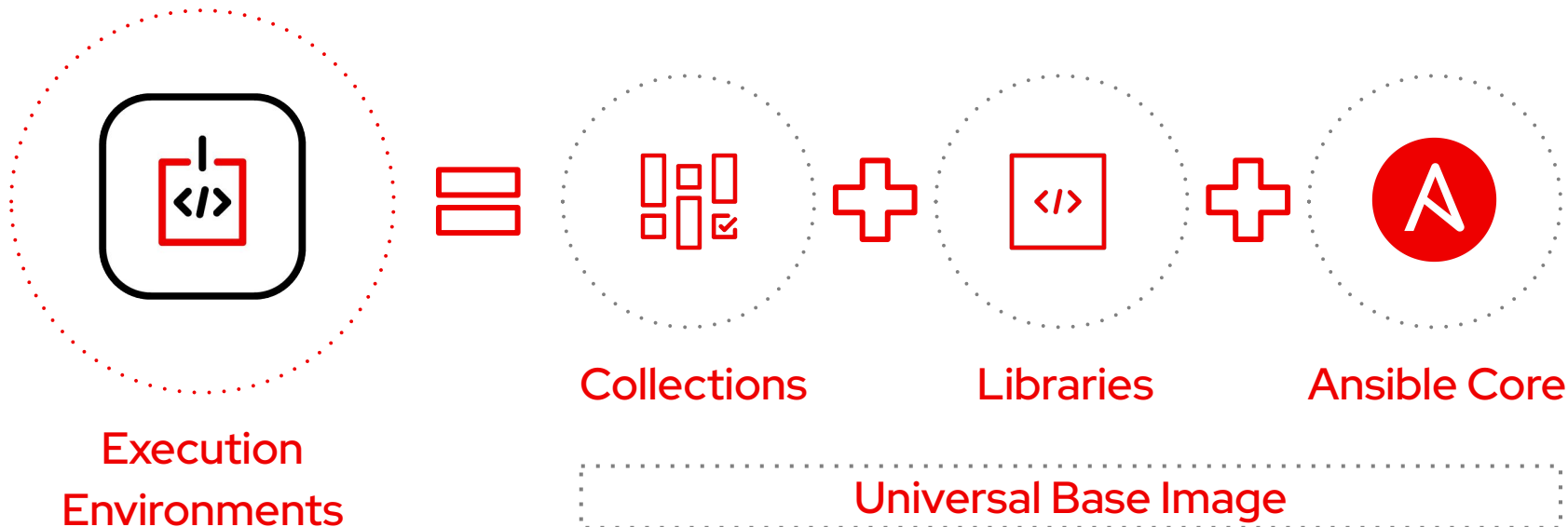
Modules:

Delivering Ansible Collections



Automation Execution Environments

Components needed for automation, packaged in a cloud-native way



Delivering Ansible Collections

Building our Execution Environment

```
[root@DESKTOP-APP17TE execution-environment]# cat execution-environment.yml
```

```
---
```

```
version: 1
```

```
ansible_config: 'ansible.cfg' ← Define your instance of Automation Hub
```

```
build_arg_defaults:
```

```
  EE_BASE_IMAGE: 'registry.redhat.io/ansible-automation-platform-22/ee-minimal-rhel8:latest'
```

```
dependencies:
```

```
  galaxy: requirements.yml
```

```
  python: requirements.txt
```

```
  system: bindep.txt
```

← The base image (just like a container, because it is a container) for the execution environment


← The additional pieces we want in this execution environment, broken out into files

Delivering Ansible Collections

Building our Execution Environment

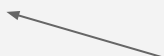
```
[root@DESKTOP-APP17TE execution-environment]# cat requirements.yml
```

```
---
```

```
roles:  No roles needed, just collections
```


```
collections:
```

```
  # Our collections
```

- name: security_automation.operating_system
- name: os_automation.rhel
- name: virtualization_automation.provision_system
- name: cmdb_automation.manage_records
- name: network_automation.manage_dns_records 
- name: network_automation.manage_ip_addresses

Pull in collections from Automation Hub

```
  # Supported collections
```

- name: redhat.satellite
- name: ansible.posix
- name: ansible.windows
- name: redhat.rhel_system_roles 

Pull in collections from console.redhat.com
or a downstream Automation Hub

Delivering Ansible Collections

Building our Execution Environment

```
[root@DESKTOP-APP17TE execution-environment]# cat requirements.txt
jmespath
pywinrm
requests
pynetbox
python-gitlab
psutil
```

← Python libraries to be included in the execution environment

```
[root@DESKTOP-APP17TE execution-environment]# cat bindep.txt
git
unzip
```

← System utilities to be installed into the execution environment

Delivering Ansible Collections

Building our Execution Environment

```
[root@DESKTOP-APP17TE execution-environment]# ansible-builder build
```

This may take a bit.

For more information, run with `'-v 3'` - more information will be printed to the command line as the execution environment is built.

Once complete, treat it like a container image - tag and push it to the image registry built into Automation Hub or your favorite image registry

Automation Mesh

Simple, flexible and reliable scaling of execution capacity

Automate at a global scale

Simple, flexible and reliable way to scale automation of large inventories across diverse network topologies and platforms.

Distributed overlay network

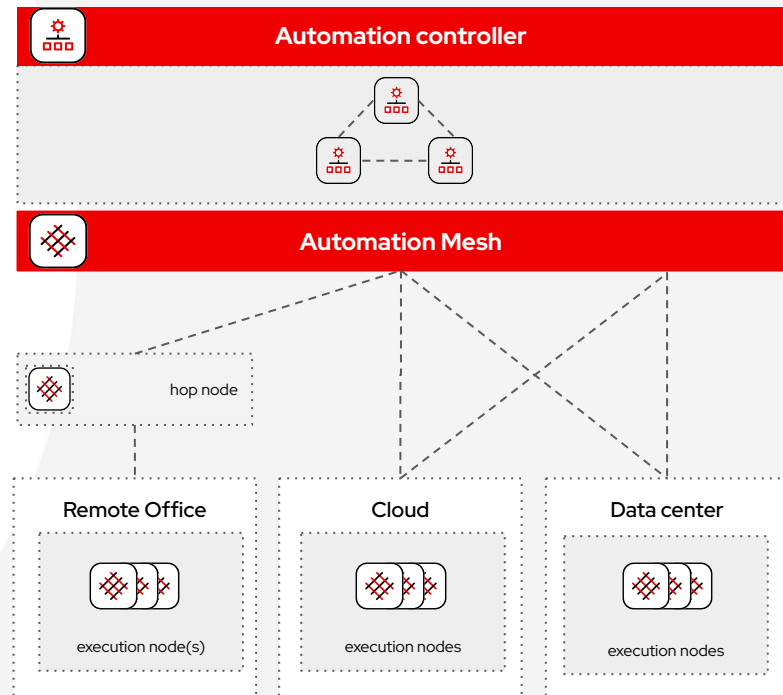
Overlay network which eases distributing automation execution
Establishes peer-to-peer connections between execution nodes across existing networks

Flexible architecture

Flexible architecture offers more design choices compared to isolated nodes

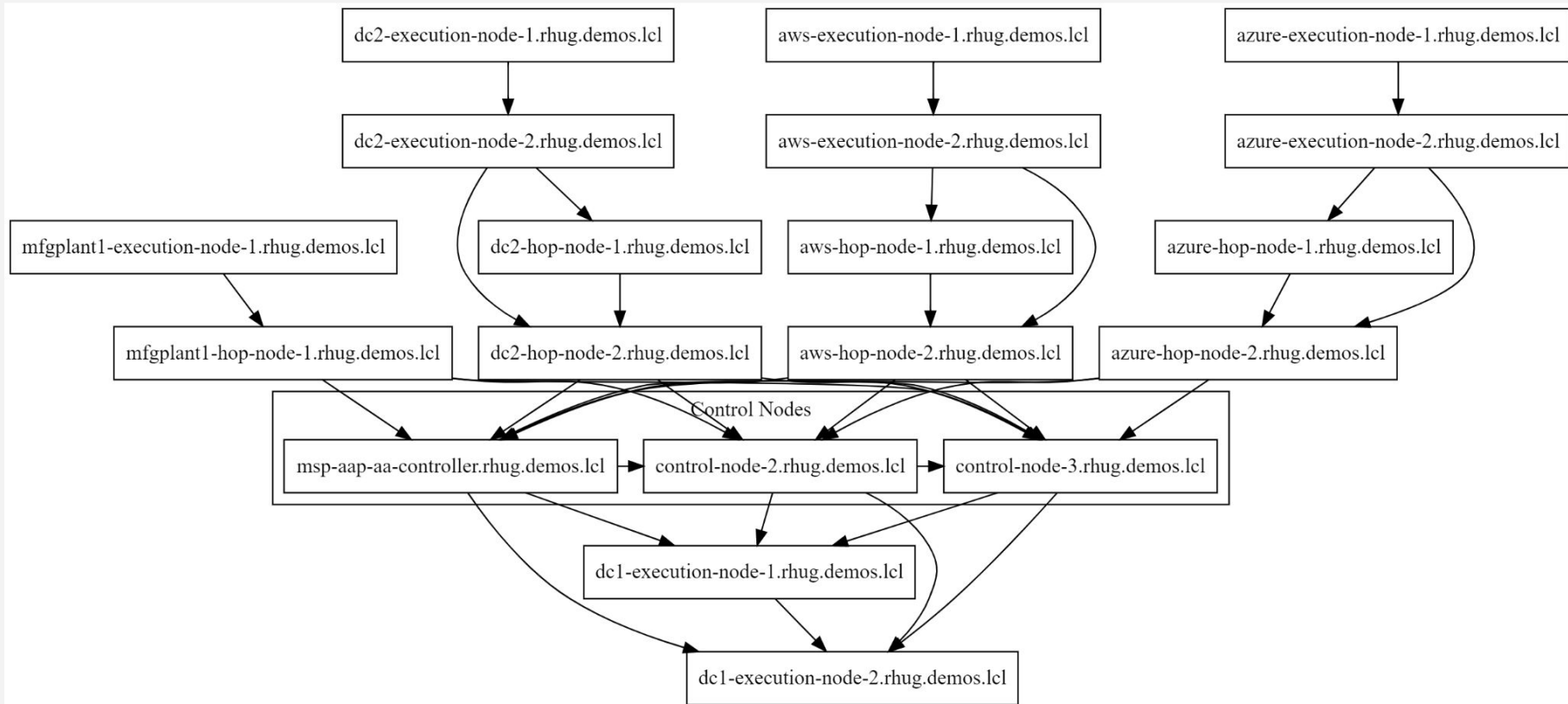
Execution node health

Health checks performed on execution nodes

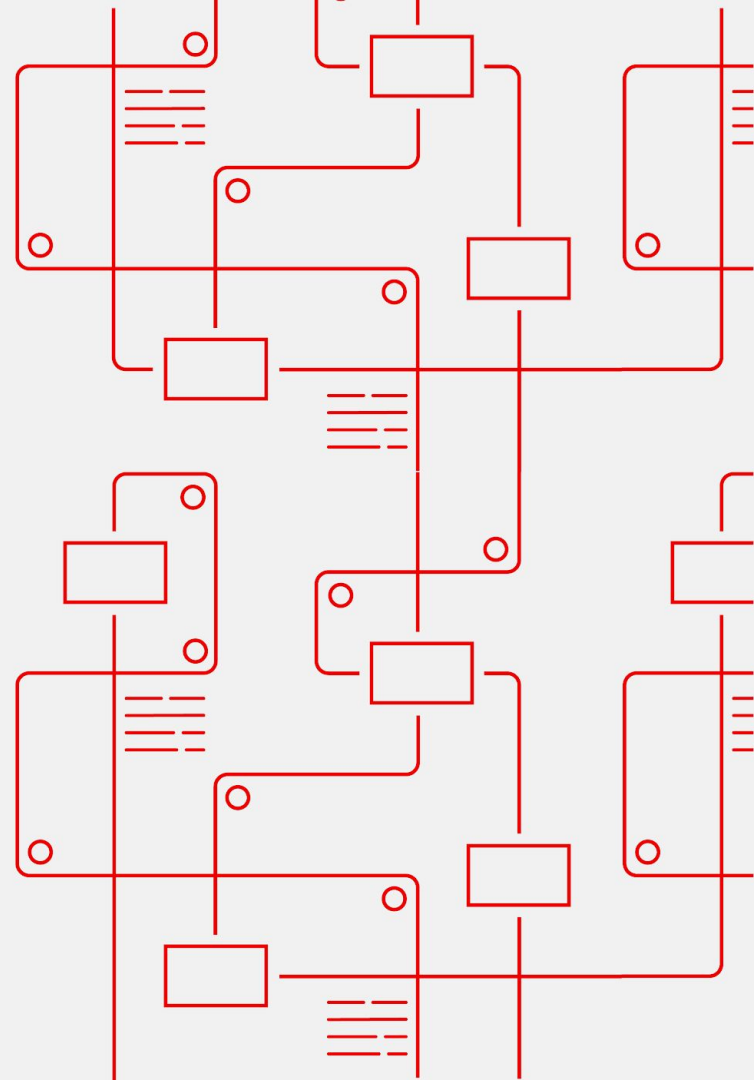


Delivering Ansible Content

Mesh + Execution Environments == Automation Everywhere

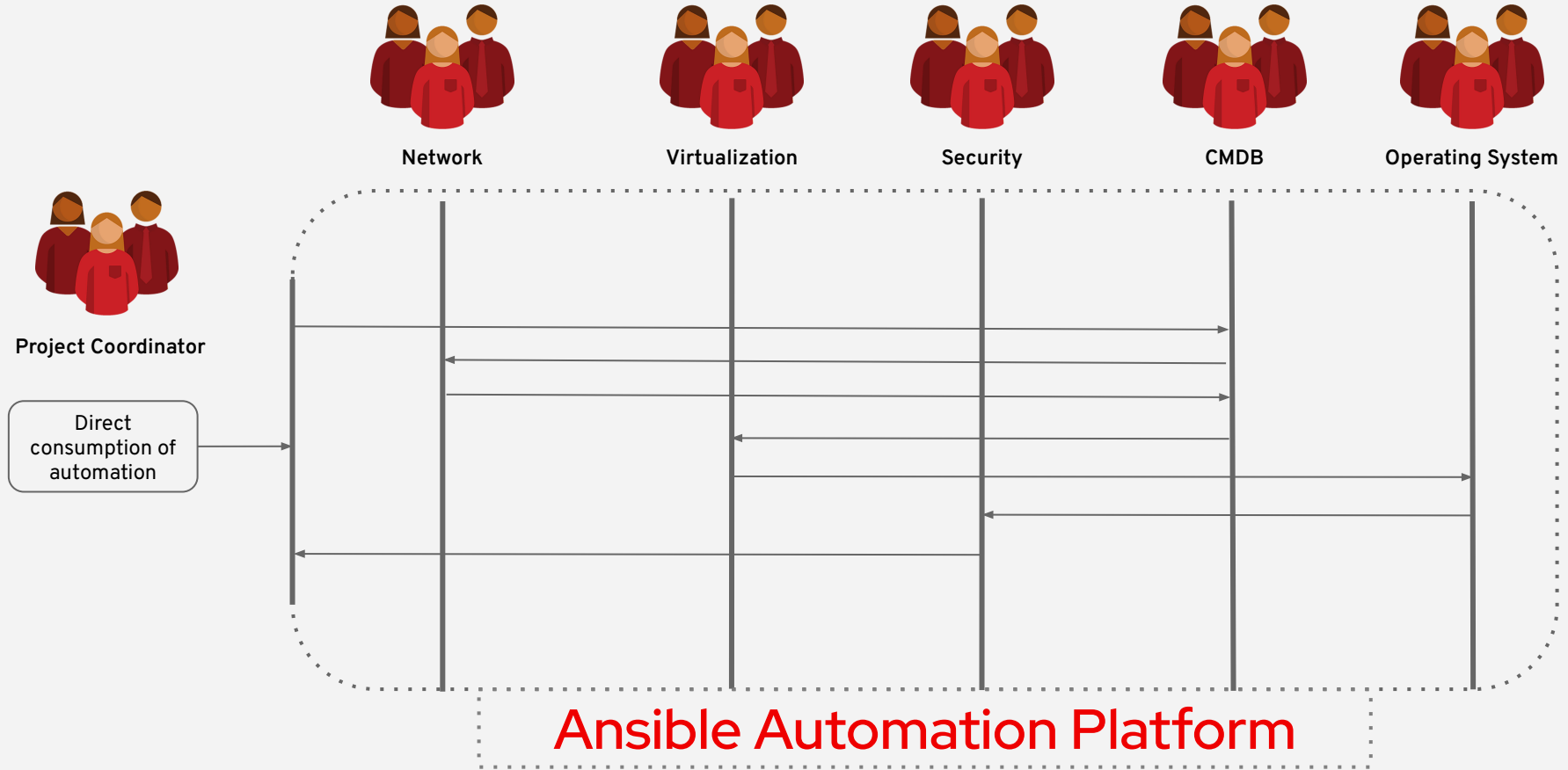


Quick Review: Where We Are Now



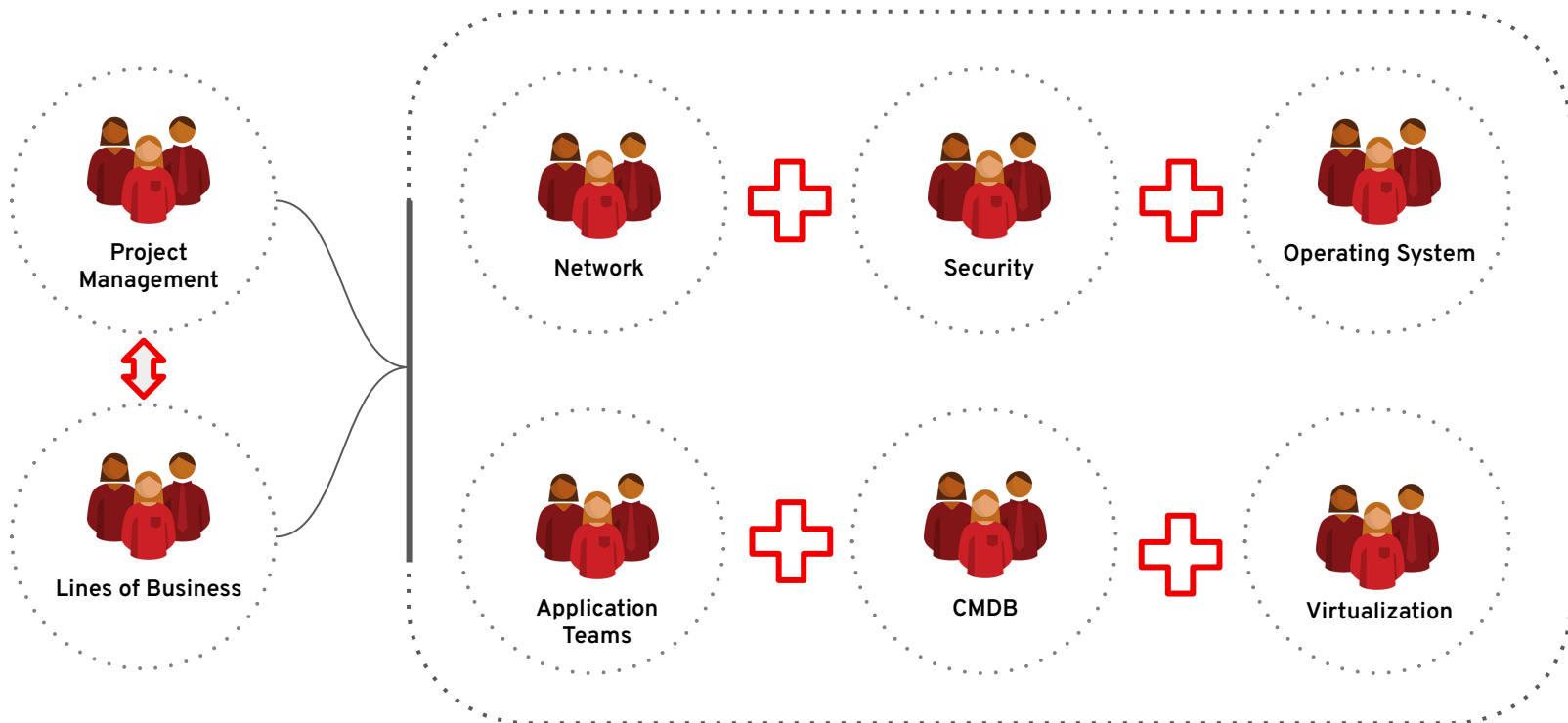
Red Hat Enterprises New Approach

A much more efficient process



Automating the Last Mile

Bringing all stakeholders together



Q+A



Thank You!

The journey of a thousand automated processes begins with a single playbook.

- *Confucius, probably*