Red Hat Ansible Automation Platform

Red Hat Satellite

Automate Satellite Workshop

Automate Satellite for System Administrators and Operators

Red Hat

What you will learn

- Introduction to Automation with Satellite
- Workshop setup & walkthrough
- Compliance & Vulnerability Management
- Patch Management / OS
- CentOS to RHEL Conversion w/ App Stack
- Introduction to Red Hat Insights

Introduction

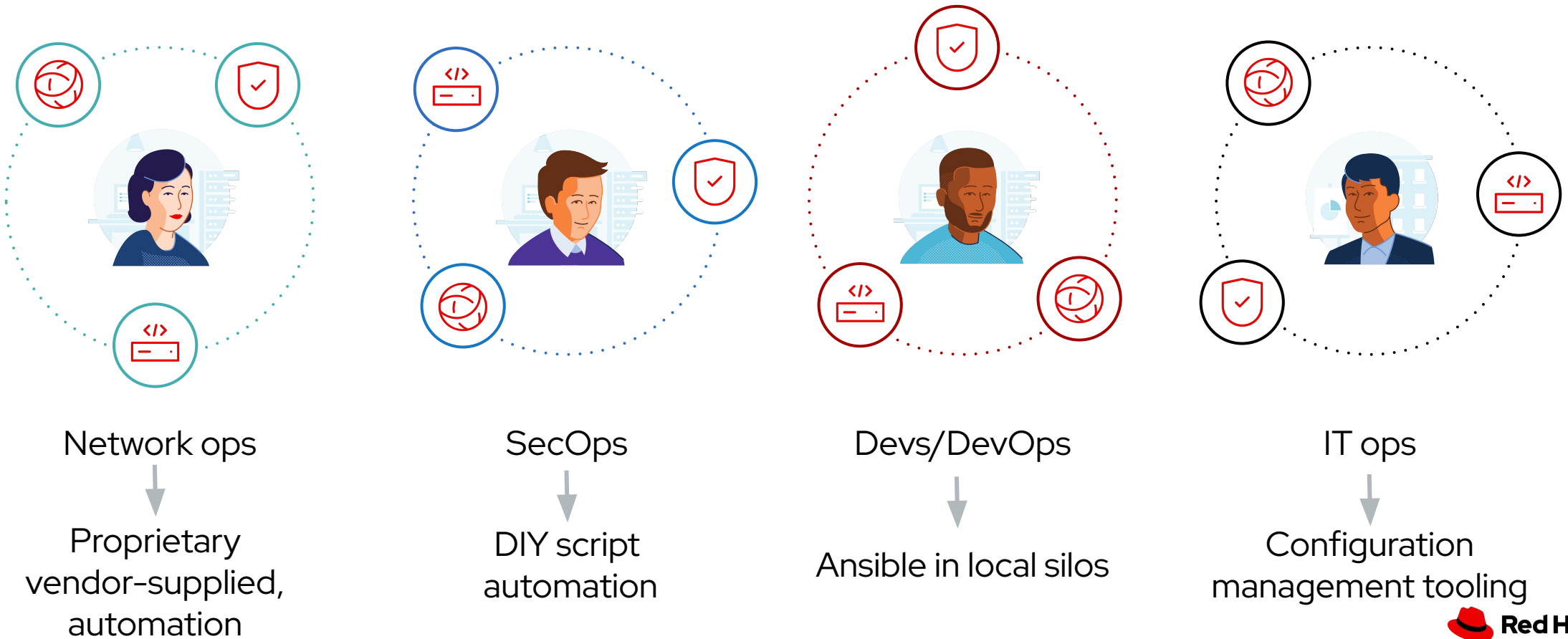Topics Covered:

- Automation <u>and</u> Satellite

    - Red Hat Ansible Automation Platform

    - Red Hat Satellite

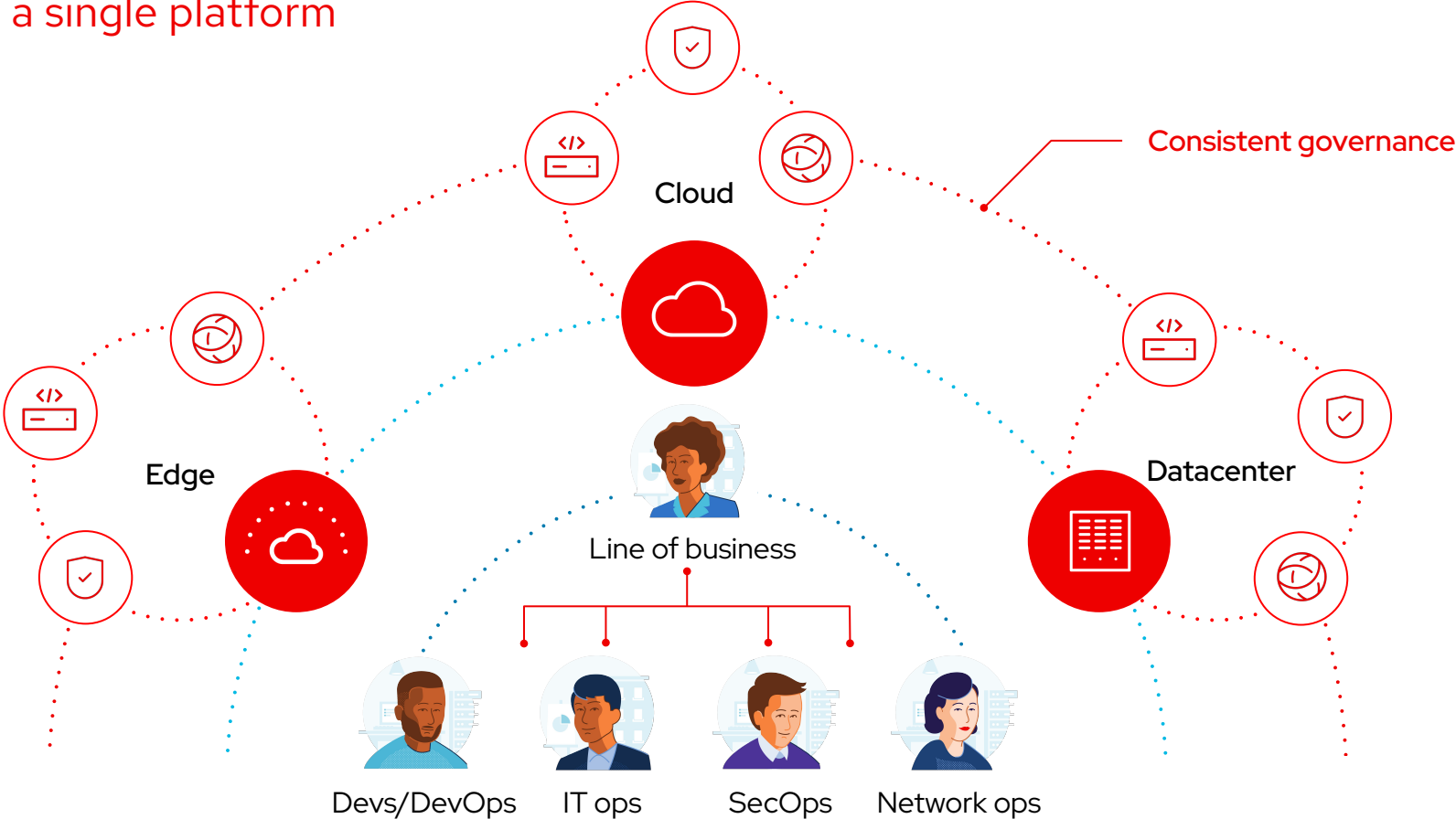Automation happens when one person meets a problem they never want to solve again

Red Hat

Many organizations share the same challenge

Too many unintegrated, domain-specific tools

Network ops

↓

Proprietary
vendor-supplied,
automation

SecOps

↓

DIY script
automation

Devs/DevOps

↓

Ansible in local silos

IT ops

↓

Configuration
management tooling

Red Hat

Break down silos

Different teams a single platform

Consistent governance

Cloud

Edge

Datacenter

Line of business

Devs/DevOps   IT ops   SecOps   Network ops

Red Hat

Automate the deployment and management of automation

Your entire IT footprint

Do this...

| Orchestrate | Manage configurations | Deploy applications | Provision / deprovision | Deliver continuously | Secure and comply |

On these...

| Firewalls | Load balancers | Applications | Containers | Virtualization platforms |

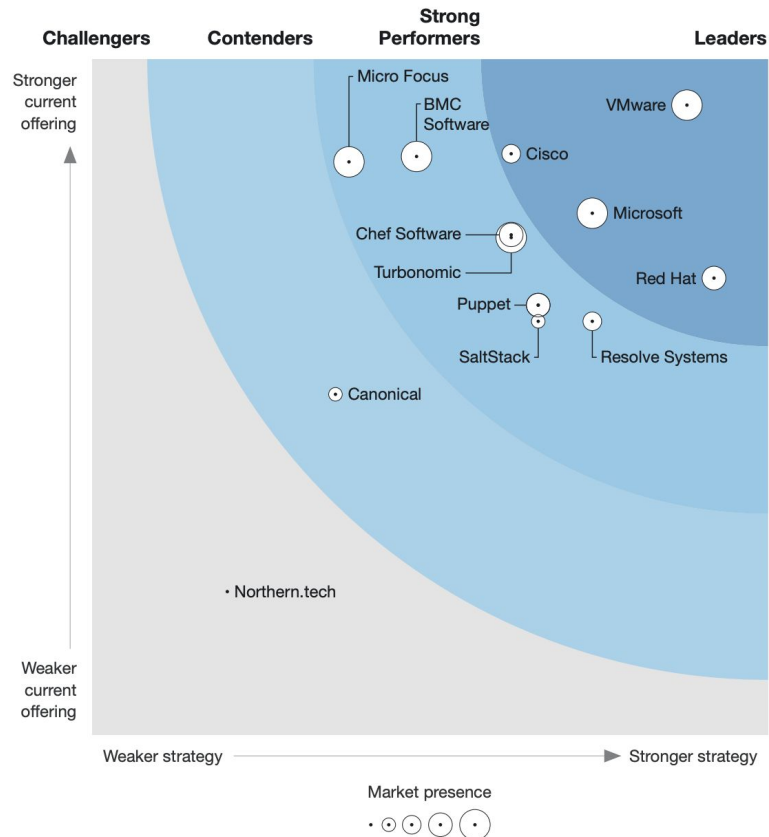| Servers | Clouds | Storage | Network devices | **Red Hat Satellite** |

Red Hat

THE FORRESTER WAVE™
Infrastructure Automation Platforms
Q3 2020

Red Hat named a Leader in The Forrester Wave™

Infrastructure Automation Platforms, Q3 2020

Received highest possible score in the criteria of:

- Deployment functionality
- Product Vision
- Partner Ecosystem
- Supporting products and services
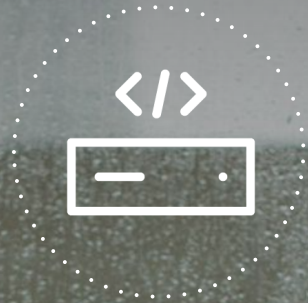- Community support
- Planned product enhancements

- "Ansible continues to grow quickly, particularly among enterprises that are automating networks. The solution excels at providing a variety of deployment options and acting as a service broker to a wide array of other automation tools."

- "Red Hat's solution is a good fit for customers that want a holistic automation platform that integrates with a wide array of other vendors' infrastructure."

Manage. Secure. Operate. Smart!

Red Hat

Gartner: Customers losing $300,000 per hour on average due to IT downtime
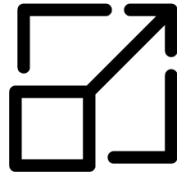
Manage sprawl

More infrastructure and complexity than ever to manage

Reducing risk

Lack of proactive assessment and management of known issues creates exposure
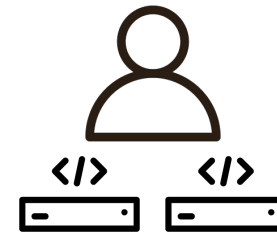
Limited resourcing

Teams are stretched and lacking Linux skills being asked to do more with flat or decreasing budgets

Source: The Cost of IT Downtime

Red Hat

Red Hat Satellite enables you to improve the reliability, availability, security and compliance of your RHEL systems, running on any platform, while reducing TCO and repetitive tasks

Red Hat

Red Hat Automation and Satellite

Life-cycle Management, Automated Operations, and Predictive Analytics

Red Hat Satellite
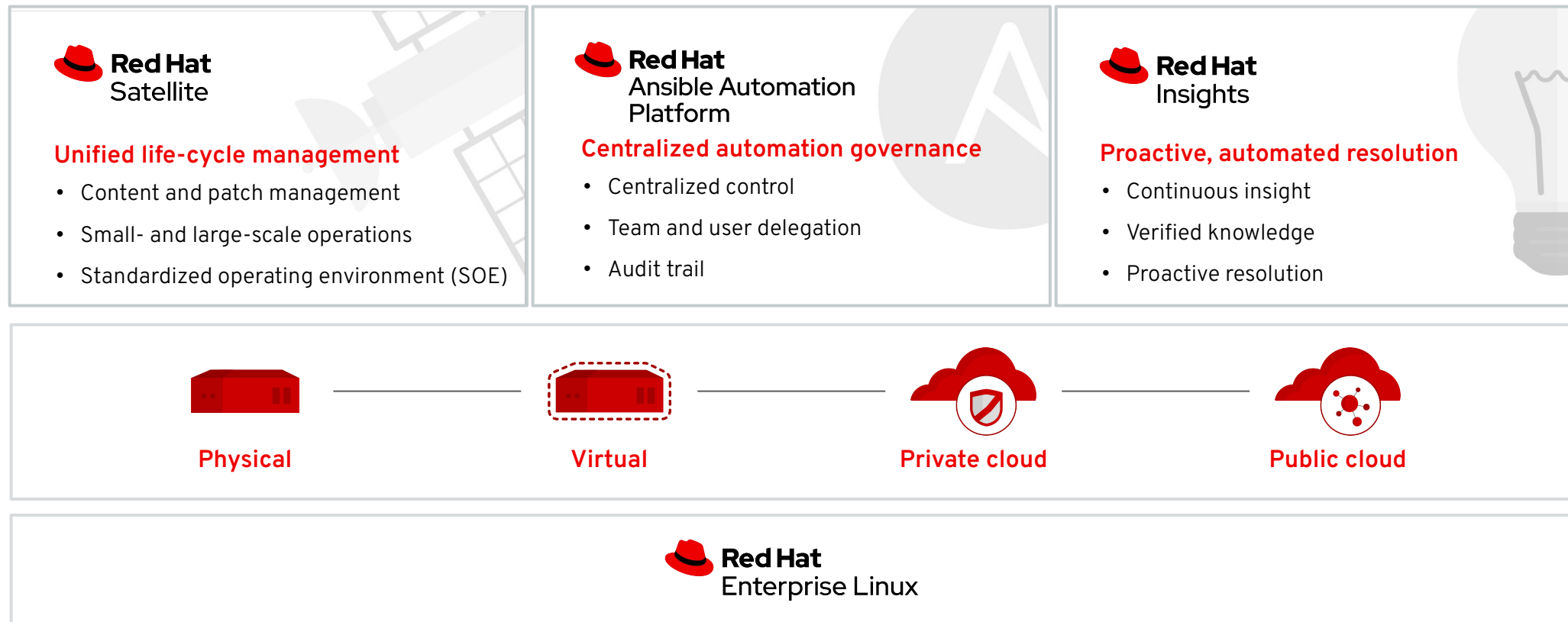
Unified life-cycle management

- Content and patch management
- Small- and large-scale operations
- Standardized operating environment (SOE)

Red Hat Ansible Automation Platform

Centralized automation governance

- Centralized control
- Team and user delegation
- Audit trail

Red Hat Insights

Proactive, automated resolution

- Continuous insight
- Verified knowledge
- Proactive resolution

Physical — **Virtual** — **Private cloud** — **Public cloud**

Red Hat Enterprise Linux

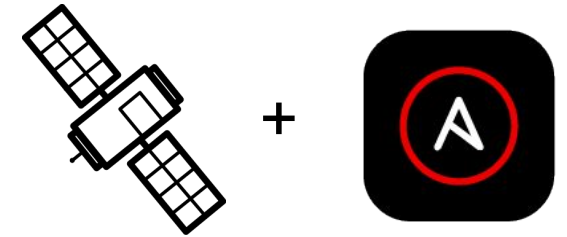# Working together to manage your Red Hat environment
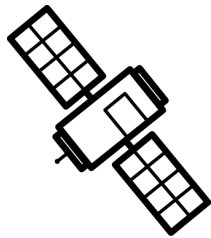
Satellite can ….

▶ Manage content repositories
▶ Manage content lifecycles
▶ Patch RHEL servers
▶ Provision RHEL servers physical, virtual or cloud

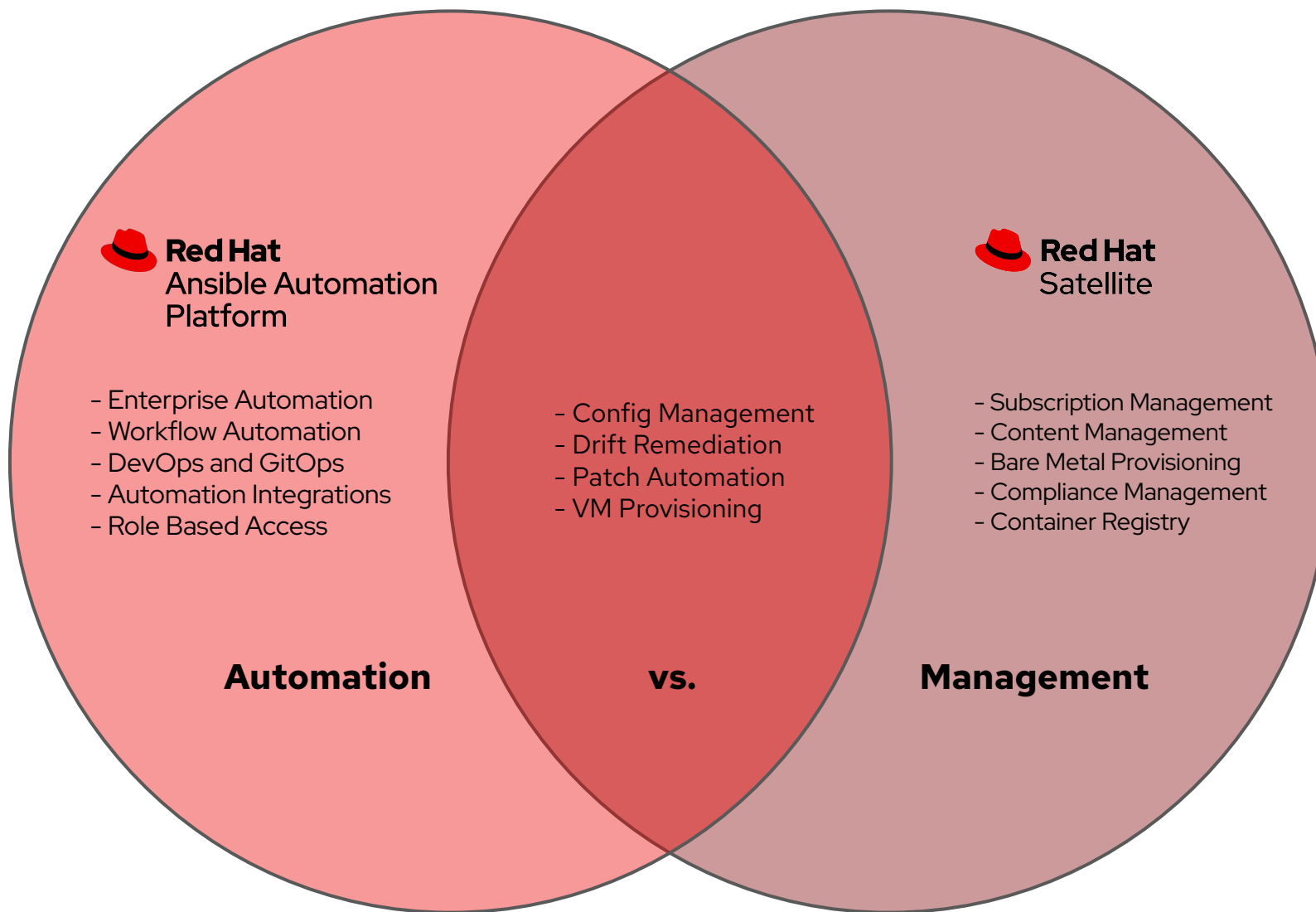**AAP can ….**

▶ Orchestration across platforms
▶ Automate all the things
▶ Integrate multiple tools and workflows

Together Satellite and AAP can …

▶ Orchestrate provisioning
▶ Automate patching
▶ Full cross platform management
  · * next slide

Red Hat
Ansible Automation Platform

– Enterprise Automation
– Workflow Automation
– DevOps and GitOps
– Automation Integrations
– Role Based Access

– Config Management
– Drift Remediation
– Patch Automation
– VM Provisioning

Red Hat
Satellite

– Subscription Management
– Content Management
– Bare Metal Provisioning
– Compliance Management
– Container Registry
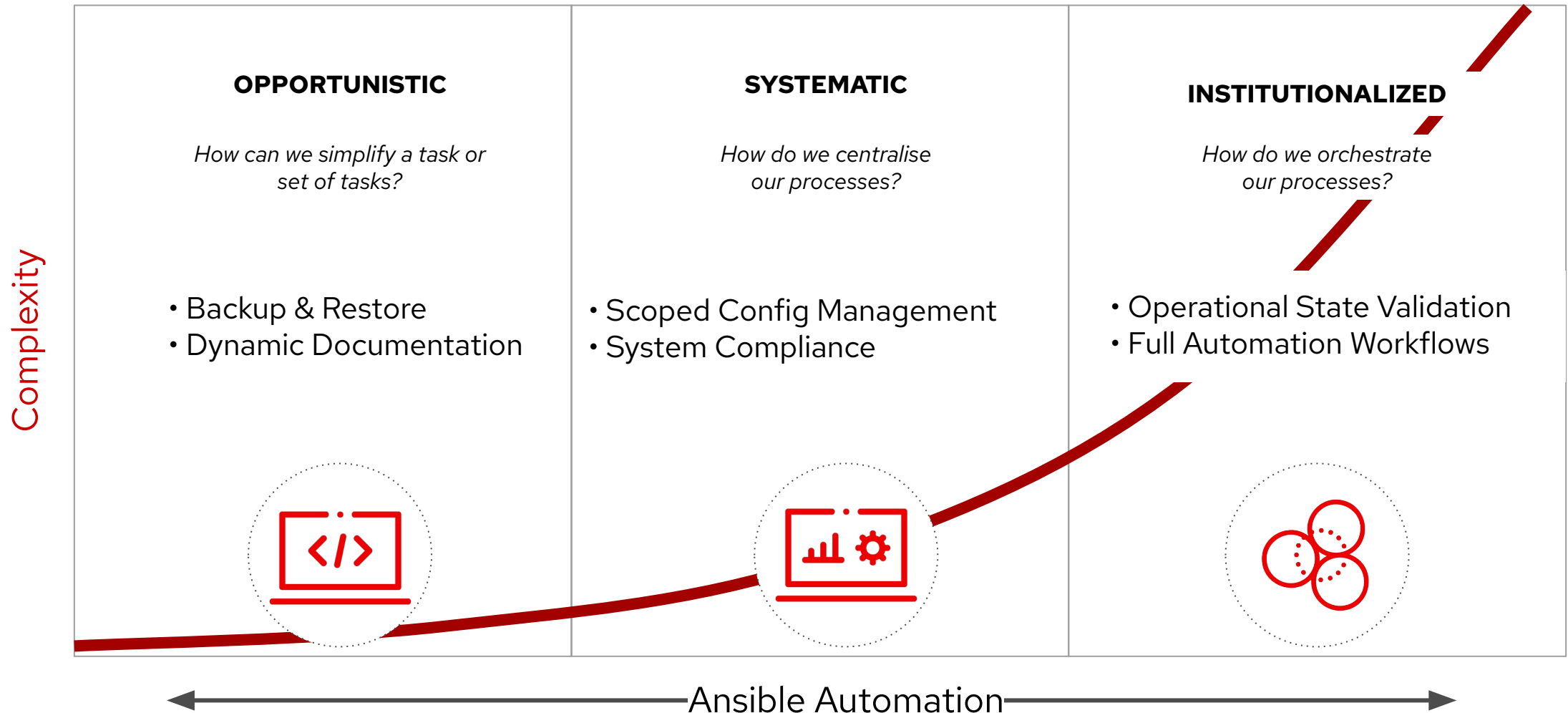
Automation

vs.

Management

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Full Cross-Platform Management

- Hybrid Cloud Dynamic Inventory
- Credential Management
- Orchestrated Workflows
- Lifecycle Patch Management
- Production Release Approvals
- Self Service Automation
- Role Based Access Control
- Red Hat Linux Automation
- Red Hat Satellite Automation

- Application startup/shutdown
- Network Services (FW/LB/DNS)
- ITSM Change Management
- Server Reboots
- Kernel Upgrades
- Service Catalog Integration
- HA/Cluster Patching
- Backups/Snapshots
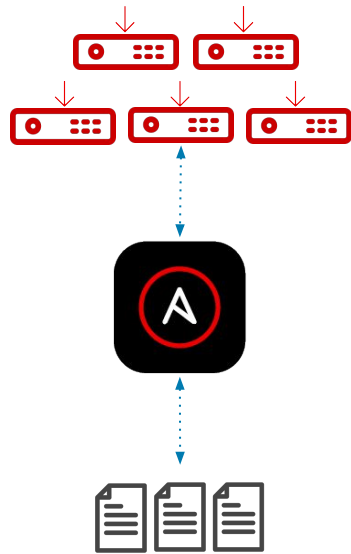- Multi-OS Patching (Linux\Unix\Windows)

Automation Journey

Complexity

OPPORTUNISTIC

How can we simplify a task or set of tasks?

- Backup & Restore
- Dynamic Documentation

SYSTEMATIC

How do we centralise our processes?

- Scoped Config Management
- System Compliance

INSTITUTIONALIZED

How do we orchestrate our processes?

- Operational State Validation
- Full Automation Workflows

Ansible Automation

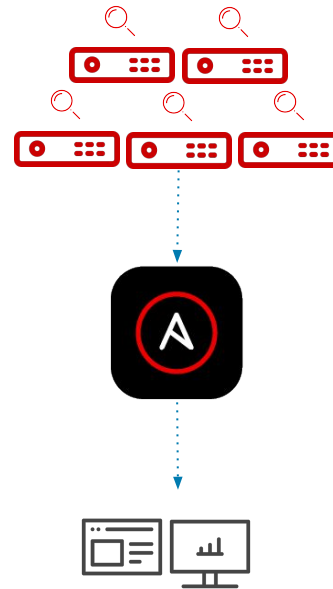Red Hat

Start Small

Quick automation victories for systems operators

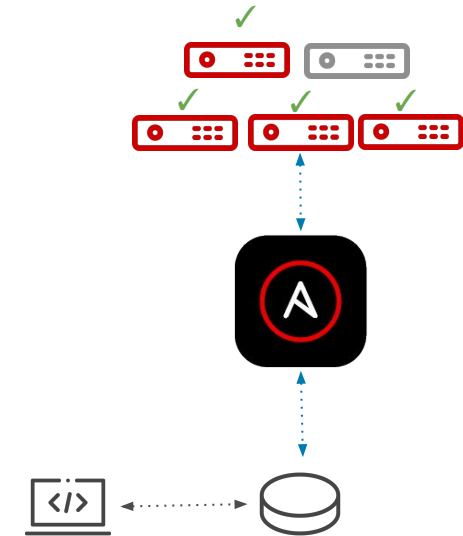## Config Backup and Restore

Ubiquitous first touch use case

- Gain confidence in automation quickly
- First steps towards infra as code
- Quickly recover system state

Dynamic Documentation

Use Ansible facts to gain information

- Read-only, no production config change
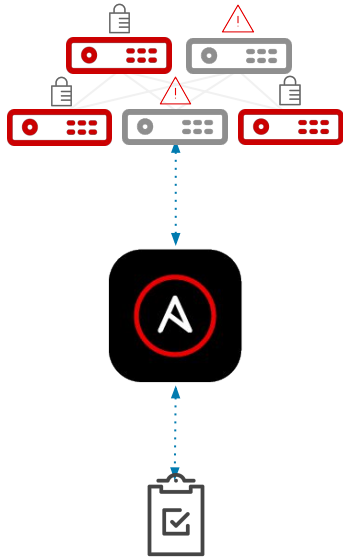- Dynamic Documentation and reporting
- Understand state of systems

Scoped Config Management

Focus on high yield victories

- Automate package management and config
- Introduce source of truth concepts
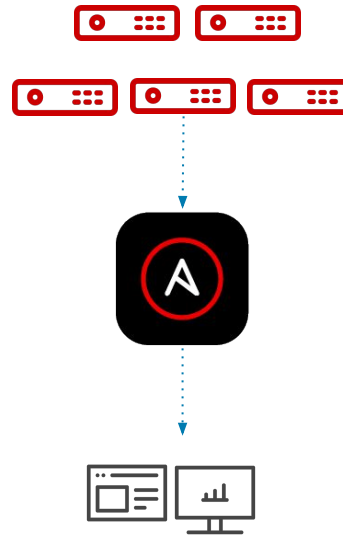- Enforce Configuration policy

Think Big

Institutionalizing automation into your organization

System Compliance

Respond quickly and consistently

- Security and config compliance for systems
- Remove human error from security responses
- Enforce Configuration policies and hardening

Operational State Validation

Going beyond config management

- Parsing operational state to structured values
- Schema validation and verification
- Enhance operational workflows
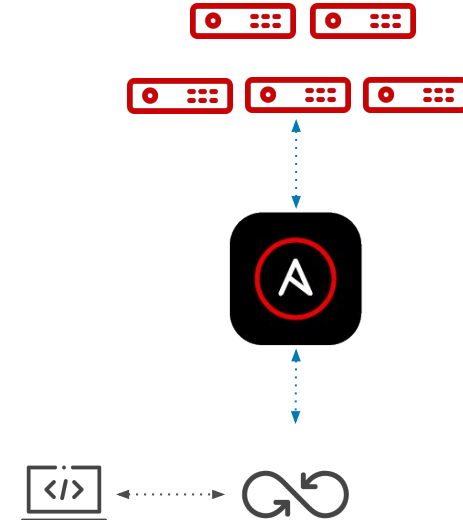
Automated SysOps

Infrastructure as code

- Data centric automation
- Deploy configuration pipelines
- GitOps for Systems Automation

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About Your Lab

Topics Covered:

- Understanding the workshop Infrastructure

- Exercise 0 – Infrastructure as Code

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The lab environment today

Workbench Topology

- **Practice what we preach**
  https://github.com/ansible/workshops
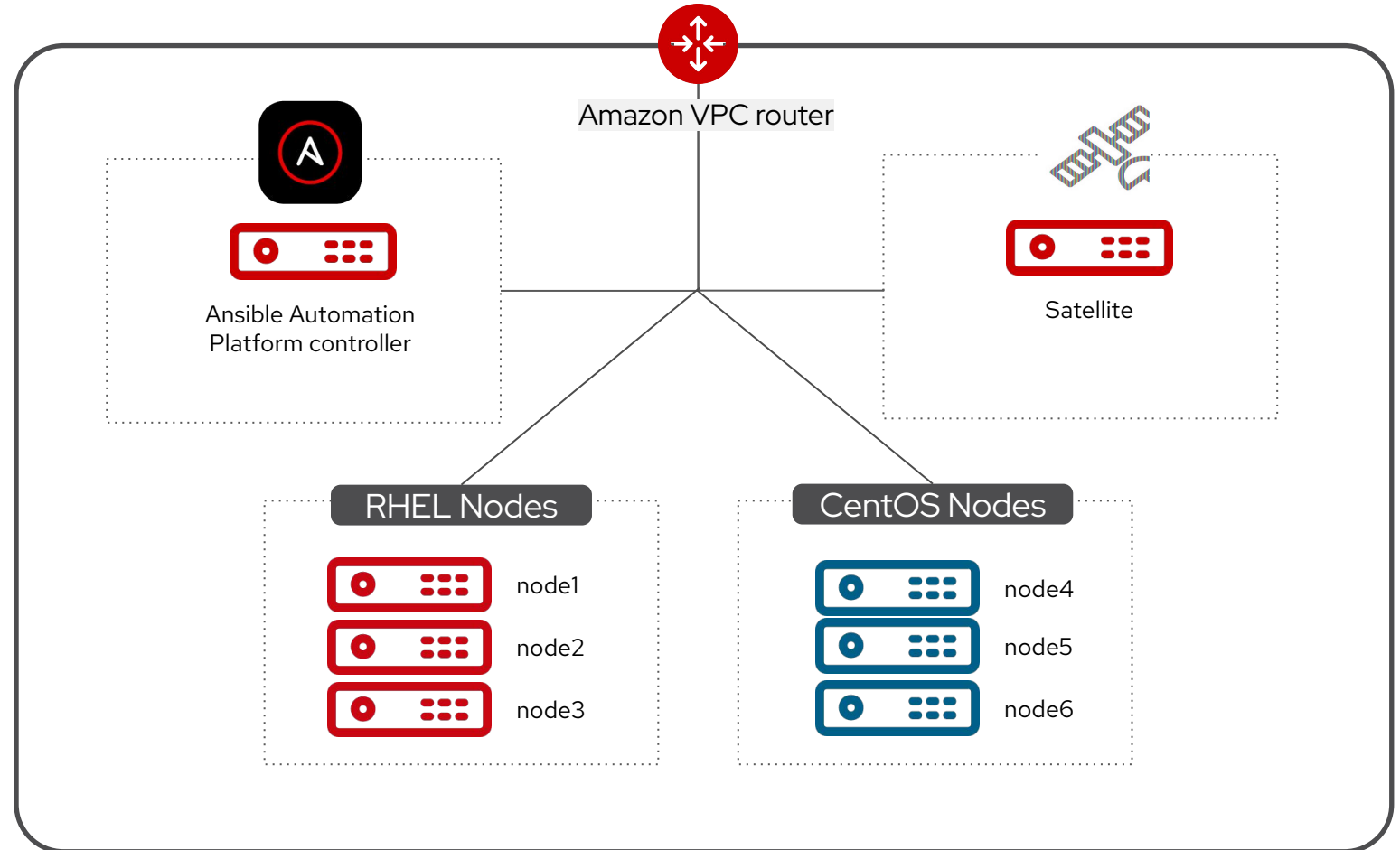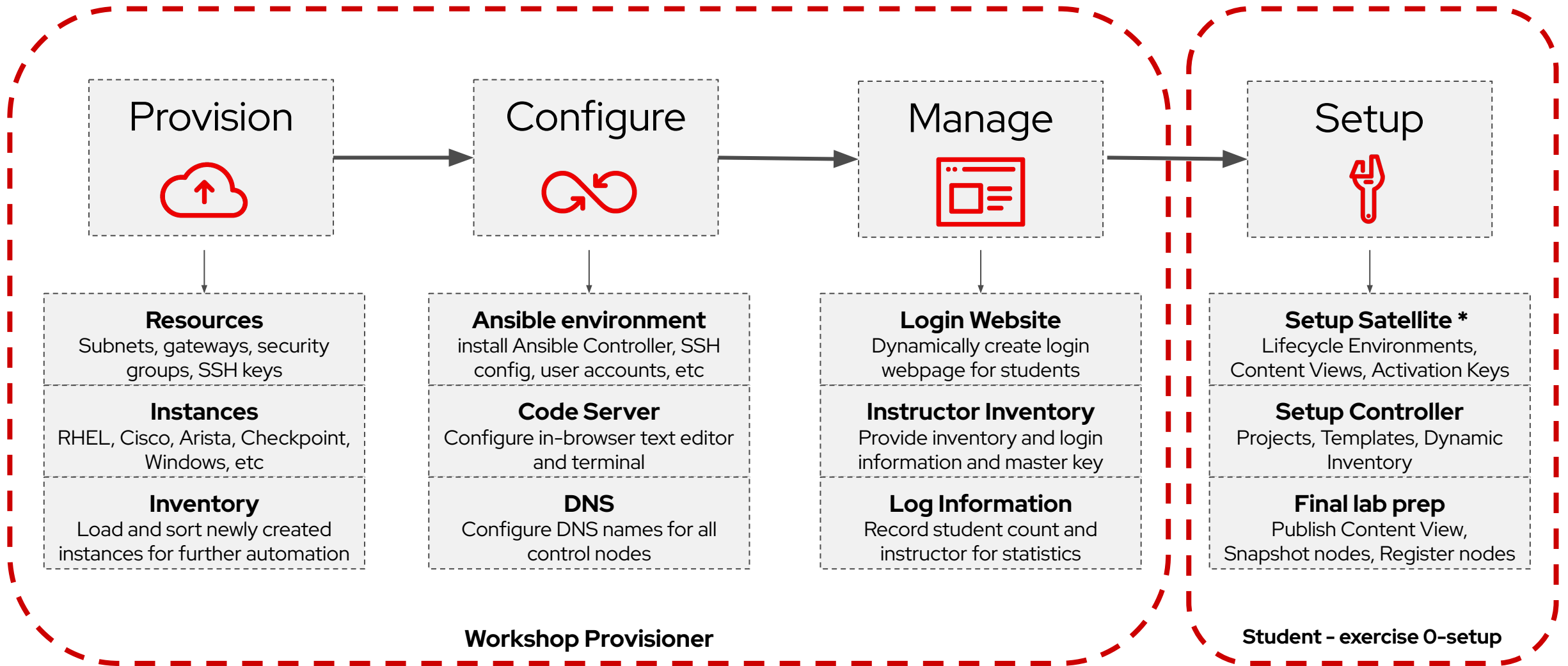
- **Learn with the real thing**
  - **Red Hat Ansible Automation Platform**
  - **Red Hat Satellite**

- **Red Hat Enterprise Linux**

- **CentOS Linux**
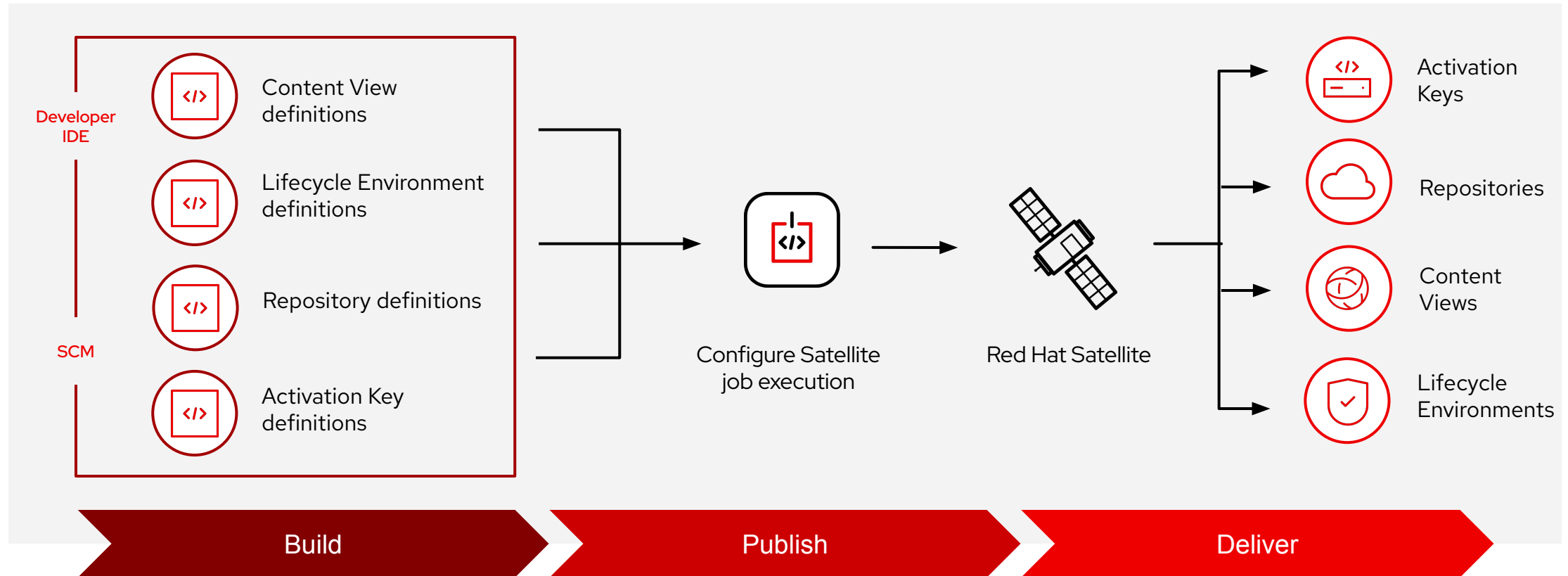
Amazon VPC router

Ansible Automation Platform controller

Satellite

RHEL Nodes
- node1
- node2
- node3

CentOS Nodes
- node4
- node5
- node6

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How does it work?

Provision

Resources
Subnets, gateways, security groups, SSH keys

Instances
RHEL, Cisco, Arista, Checkpoint, Windows, etc

Inventory
Load and sort newly created instances for further automation

Configure

Ansible environment
install Ansible Controller, SSH config, user accounts, etc

Code Server
Configure in-browser text editor and terminal

DNS
Configure DNS names for all control nodes

Manage

Login Website
Dynamically create login webpage for students

Instructor Inventory
Provide inventory and login information and master key

Log Information
Record student count and instructor for statistics

Setup

Setup Satellite *
Lifecycle Environments, Content Views, Activation Keys

Setup Controller
Projects, Templates, Dynamic Inventory

Final lab prep
Publish Content View, Snapshot nodes, Register nodes

Workshop Provisioner

Student – exercise 0–setup

* Completed during workshop deployment

Red Hat

Infrastructure as Code Architecture

Day 1 configuration of Satellite

Developer IDE

Content View definitions

Lifecycle Environment definitions

Repository definitions

SCM

Activation Key definitions

Configure Satellite job execution

Red Hat Satellite

Activation Keys

Repositories

Content Views

Lifecycle Environments

Build

Publish

Deliver

Red Hat

Infrastructure as Code architecture

Day 1 configuration of Automation controller

Developer IDE

SCM

Inventory definitions

Job Template definitions

Project definitions

Configure Controller job execution

Red Hat Ansible Automation Platform cluster

Inventory

Inventory Source

Job Templates

Projects

Build

Publish

Deliver
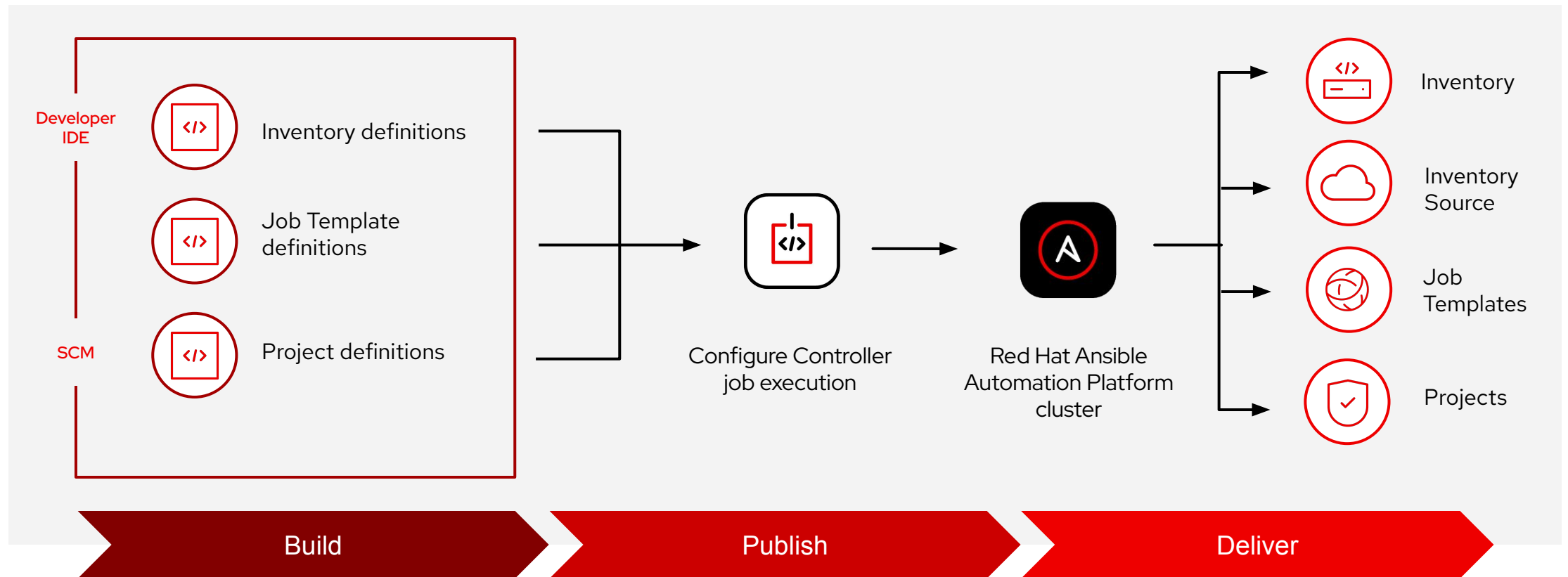
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**Red Hat
Ansible Automation
Platform**

**Red Hat
Satellite**

Lab Time
Begin exercise **0-intro** now in your lab environment
~35 minutes

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Exercise 1

Compliance / Vulnerability Management

- Create an OpenSCAP compliance policy

- Create an Ansible template and automate

  an OpenSCAP scan

- Review ARF reporting in Satellite

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75%

of CIOs are investing to improve cyber-risk mitigation

Red Hat

Compliance management adds complexity
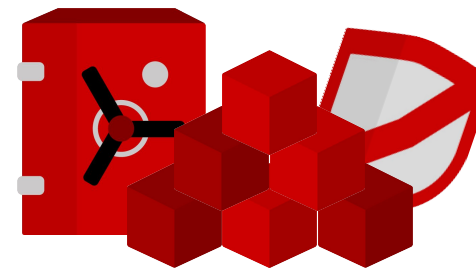
Regulatory and industry standards

- National Institute of Standards and Technology (NIST)

- National Cybersecurity Agency of France (ANSSI)

- Health Insurance Portability and Accountability Act (HIPAA)

- Federal Risk and Authorization Management Program (FedRAMP) and more

Compliance and security artifacts creation

- System security plans
- Security compliance audit documentation
- Gap analysis reports
- Audit and remediation baselines

Security automation with OpenSCAP

Red Hat's security scanner is included with Red Hat Enterprise Linux and Red Hat Satellite

Validated and certified tool
National Institute of Standards and Technology (NIST) certified
Security Content Automation Protocol (SCAP) scanner with National
Checklist content

System and container scanning
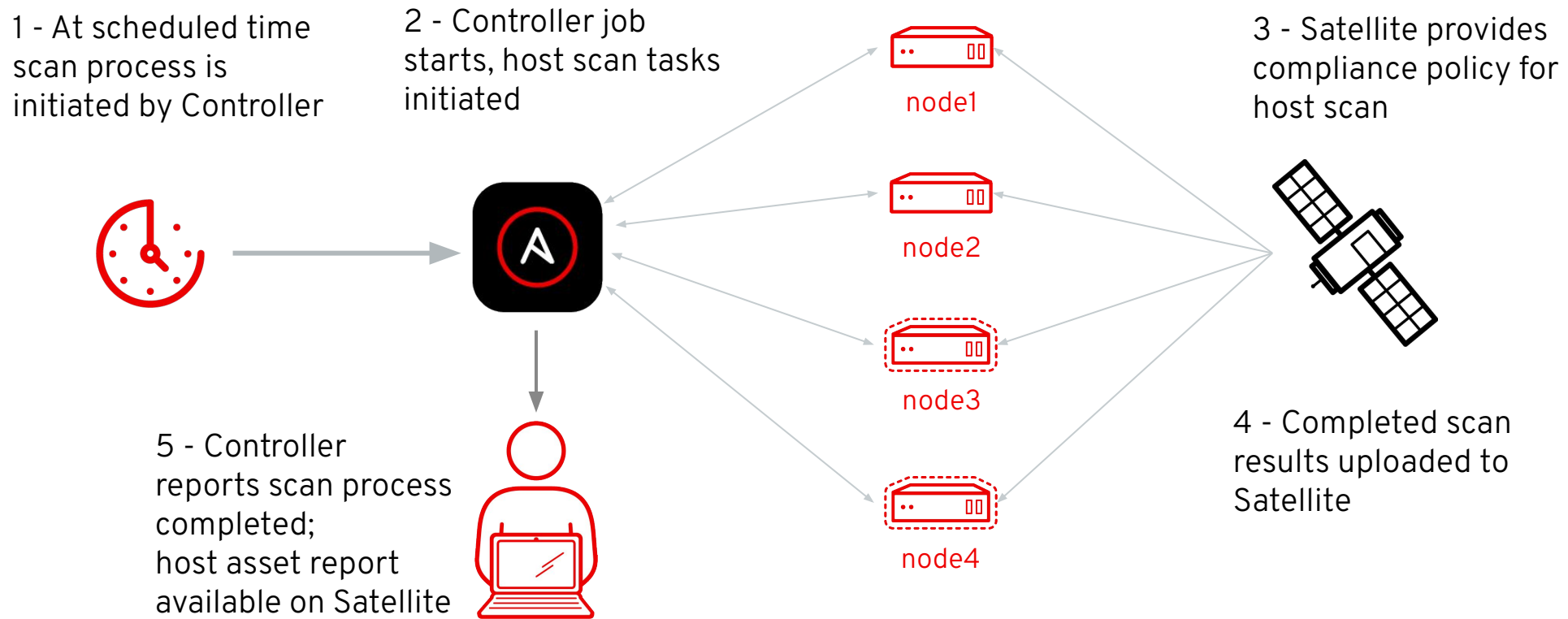Known vulnerability and security policy compliance scanning

Automation support
Red Hat® Ansible® Automation remediation Playbooks provided and
supported by Red Hat

Customizable content
Content customization through SCAP Workbench graphical interface

Red Hat Ansible Automation Platform

Red Hat Satellite

Lab Time
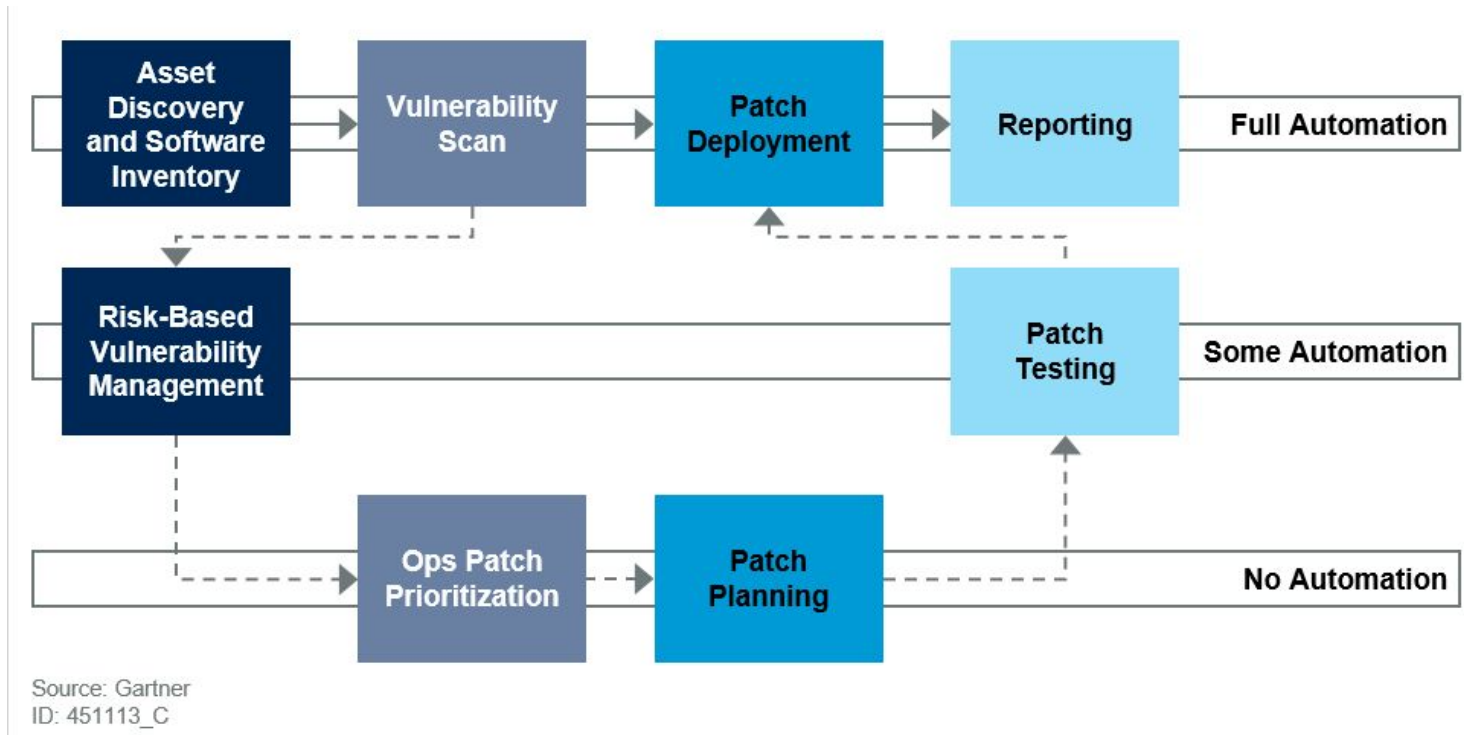Complete exercise **1-openscap** now in your lab environment

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Exercise 2

Patch Management

- Automate Patching Prerequisites

- Automate Patch Deployment

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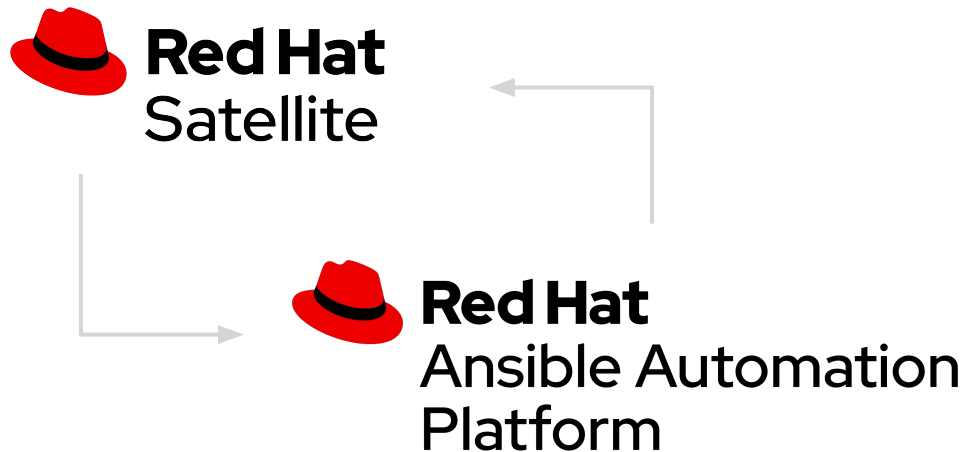# Automate Where Possible

Source: Gartner
ID: 451113_C

"Using multiple tools for patch automation is unavoidable and will improve both execution efficiency and patching success."

–Gartner

Satellite and Ansible Controller Integration

Documented best practices to help optimize use of both products

Red Hat
Satellite

Red Hat
Ansible Automation
Platform

Dynamic Inventory
Allows Ansible Controller to use Satellite as a dynamic inventory source

Satellite Content Collection
Ansible modules and roles for automating administrative tasks in Red Hat Satellite

Post-Provision
Provides systems provisioned via Satellite a means to "callback" to Ansible Controller for post-provisioning playbook runs
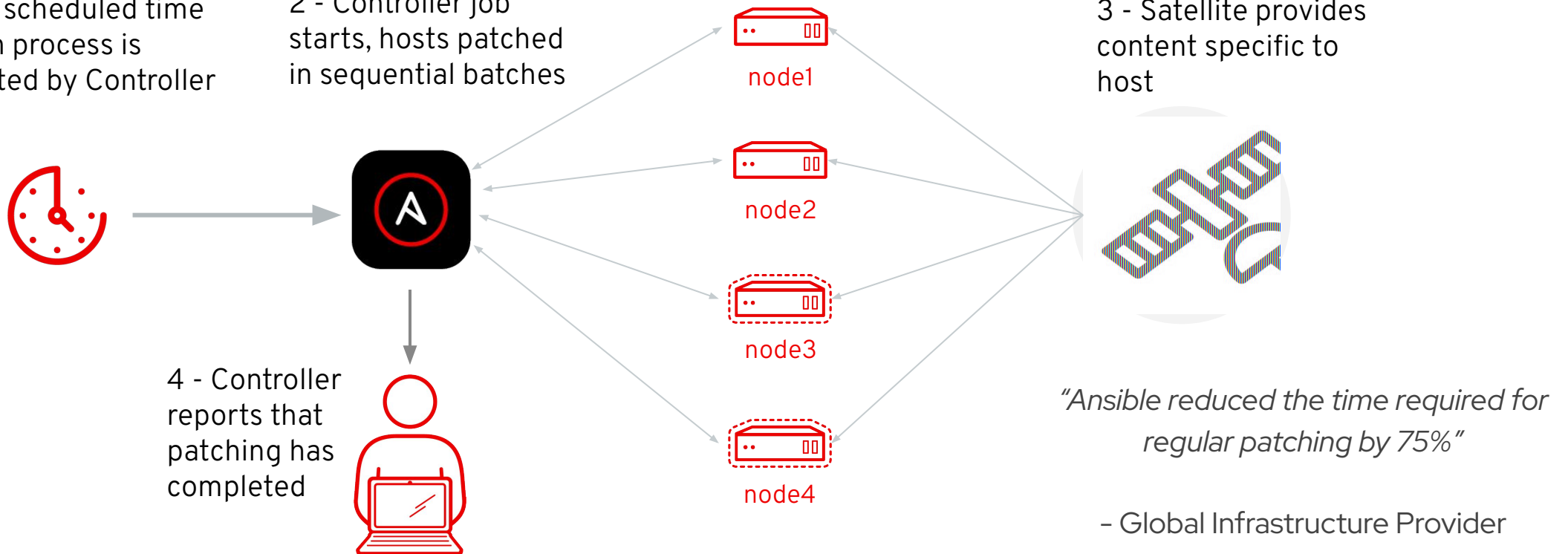
Red Hat

Automated Patching Solution

Using Ansible Automation Platform to automate patches through your environment

1 - At scheduled time patch process is initiated by Controller

2 - Controller job starts, hosts patched in sequential batches

node1

node2

node3

node4

3 - Satellite provides content specific to host

4 - Controller reports that patching has completed

"Ansible reduced the time required for regular patching by 75%"

– Global Infrastructure Provider

Red Hat

Exercise 3

CentOS to RHEL conversion

- CentOS - current/future state

- Using Satellite + Ansible Automation

  Platform w/ existing CentOS

- RHEL Conversion Process

CentOS - Previous State

- CentOS Linux 8 retired on December 31, 2021

- CentOS Linux 7 will continue to receive updates until June 30, 2024

- Customers running CentOS Linux 7/8 will need to migrate to an alternative OS.
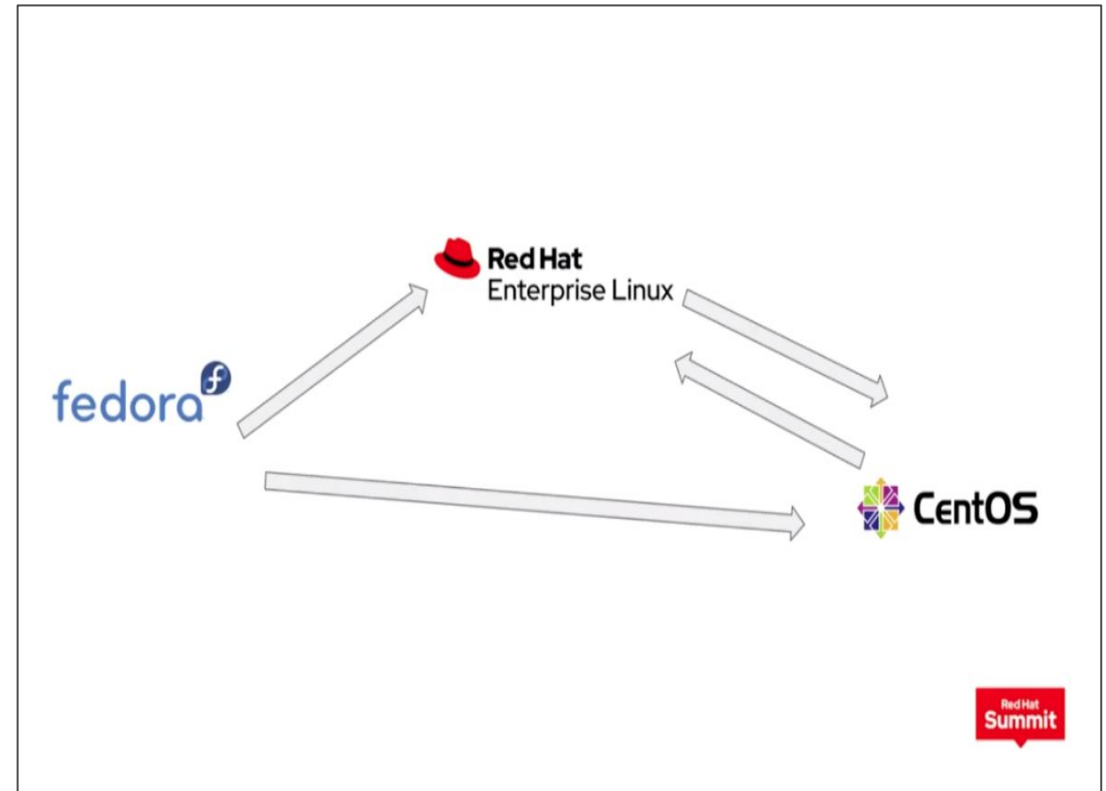
CentOS - "Stream"ing now

- Provides a **Continuous Delivery model**, for the development of RHEL

- A **rolling preview of the next minor release of RHEL**

- **Faster feedback/features in RHEL** -- the upstream **community** can merge/pull request against CentOS Stream, tracks closer to RHEL
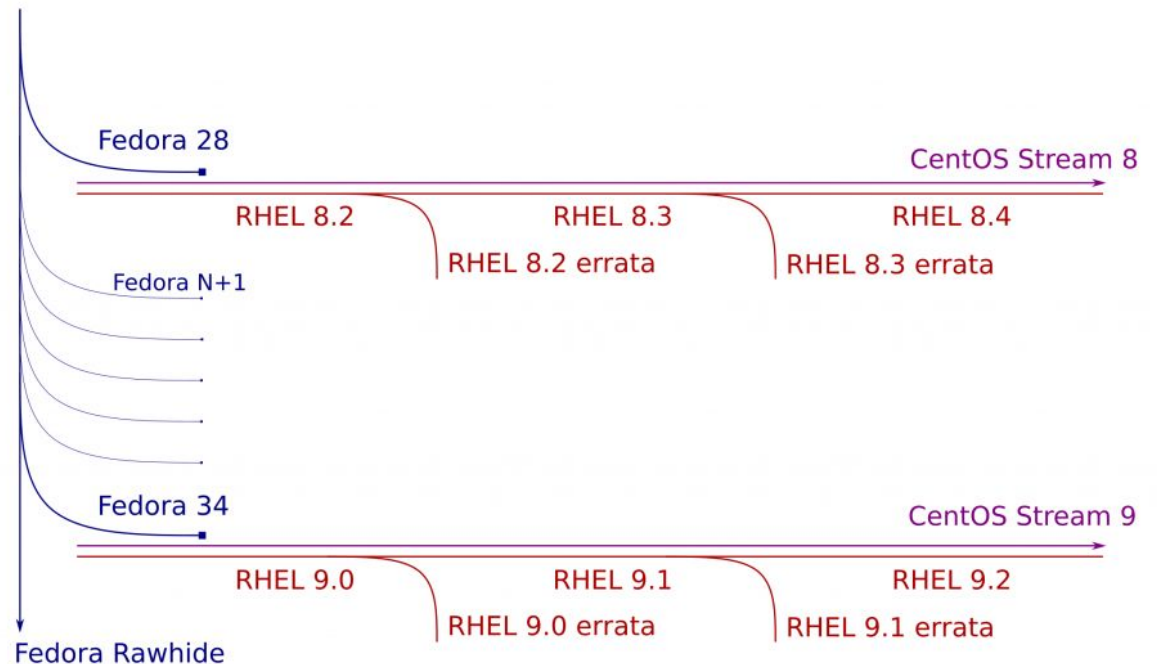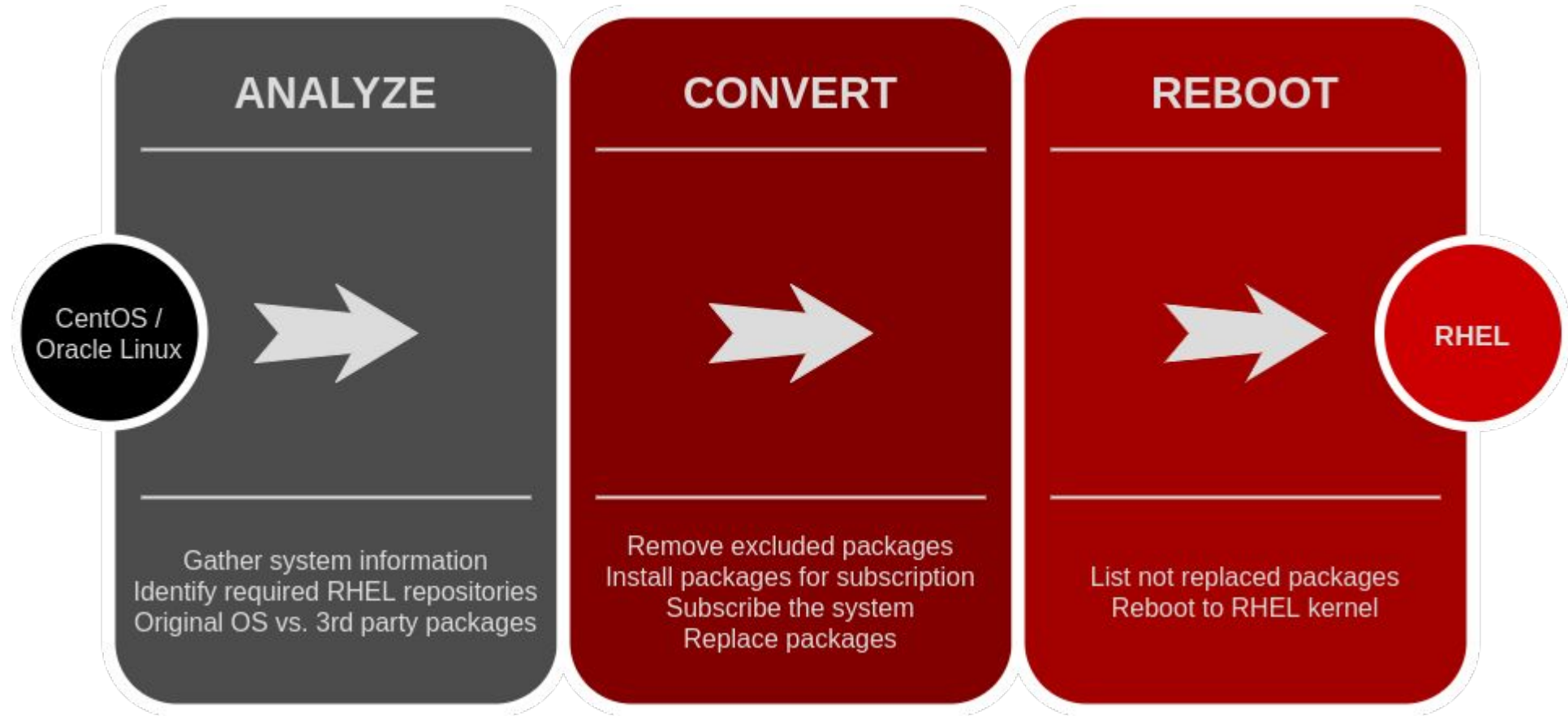
CentOS Stream: Moving Upstream
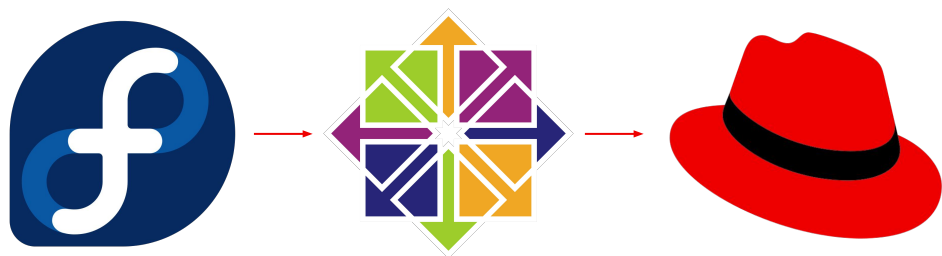
- We believe CentOS Stream represents the best way to further drive Linux innovation by giving customers and the broader ecosystem a closer connection to the development of Red Hat Enterprise Linux

- Positive interest in CentOS Stream since its introduction in 2019, including public statements from Facebook and Intel

- As an open source platform for development, CentOS Stream will become an innovation hub for Red Hat Enterprise Linux

- Red Hat is offering low- and no-cost options to ease the transition from CentOS Linux

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Which Platform is Right for You?

- Operating System development and desktop use cases: **Fedora**
- Hassle-free and secure OS for your home lab: **Red Hat Developer program** (developers.redhat.com)
- Dev & CI/CD to ensure RHEL compatibility: **Red Hat Developer program** (developers.redhat.com)
- Dev & CI/CD to ensure RHEL+1 compatibility: **CentOS Stream**
- Developing containerized applications: **RHEL UBI**
- Participate in RHEL development: **CentOS Stream**
- Running mission critical workloads: **RHEL**
- Developing software for resale or hardware: **Red Hat Partner Connect Program** (connect.redhat.com)

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Steps of the migration

CentOS / Oracle Linux

ANALYZE

Gather system information
Identify required RHEL repositories
Original OS vs. 3rd party packages

CONVERT

Remove excluded packages
Install packages for subscription
Subscribe the system
Replace packages

REBOOT

List not replaced packages
Reboot to RHEL kernel

RHEL

Red Hat

Exercise Details

▸ Our CentOS 7 nodes are registered to the Satellite system via a complete CV/LE/Activation Key arrangement where we are mirroring what a traditional RHEL7_Dev, RHEL7_QA, RHEL7_Prod env looks like and doing the same, only backed by custom CentOS repositories underpinning everything. We use subscription-manager on the CentOS nodes to register the nodes with the Satellite

▸ Utilize the <u>Convert2RHEL</u> tool *(Disclaimer: backup, test. backup, test. backup, test...)*

▸ Conversion source of RHEL packages:

  · Custom repositories (FTP, mounted ISO, etc.)

  · Red Hat Subscription Manager (CDN or Satellite) -- Satellite utilized for this exercise

▸ Roll back is possible up to the point-of-no-return, but users are advised to perform a complete system backup prior running the utility (remember the disclaimer?).

▸ All actions accomplished via Ansible roles, providing a greater understanding and following of migration process, permitting easier customization/specialization for individual conversion/migration requirements via Ansible Controller workflows on a case-by-case basis.

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Exercise Resources

- Knowledge base articles + videos

    - KB Article: How to convert from CentOS or Oracle Linux to RHEL (Jan 2021)

    - Blog: Converting from CentOS to RHEL with Convert2RHEL and Satellite (March 2020)

    - Blog: Convert2RHEL: How to update RHEL-like systems in place to subscribe to RHEL (Jan 2020)

    - YouTube: Converting from CentOS Linux 8 to CentOS Stream (Jan 2021)

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Red Hat
Ansible Automation Platform

Red Hat
Satellite

Lab Time
Complete exercise **3-convert2rhel** now in your lab environment
~45 minutes

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Exercise 4

Setup Insights

- What is Insights?

- Configuring Workshop for Insights

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What is Red Hat Insights?

Helping you better manage your hybrid and cloud environments
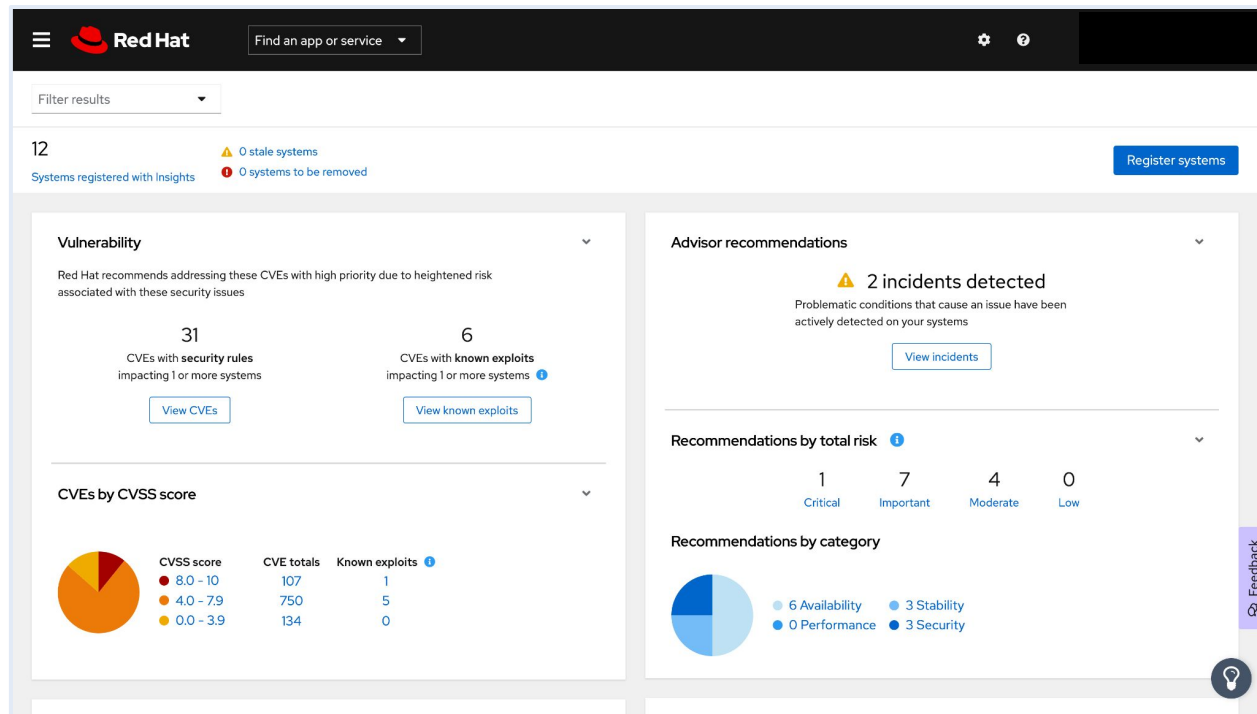
Predicting risks
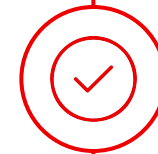
Recommending actions

Analyzing costs

What does Red Hat Insights do?

A cloud analytics platform that helps you better manage your hybrid and cloud environments

Red Hat Insights

Red Hat Enterprise Linux

Red Hat Ansible Automation Platform

Red Hat OpenShift

▸ **Gathers** configuration and utilization data from your Red Hat® products

▸ **Analyzes** the data based on Red Hat knowledge and expertise

▸ **Generates** and prioritizes insights for you to take action

Red Hat

Use Red Hat Insights to maintain your Red Hat deployments

Streamline management and security operations across your hybrid cloud environments

Red Hat Insights

Red Hat
Enterprise Linux

Red Hat
Ansible Automation
Platform

Red Hat
OpenShift

Learn more at redhat.com/insights.

Get started at cloud.redhat.com.

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Exercise Details

▸ Insights is hosted on console.redhat.com – you need an account

▸ Accounts are Associated with Subscriptions

▸ This exercise is designed for Red Hat Solution Architects to perform demo's of Insights for our customers, but can be used by anyone

▸ If you choose to do this exercise you will need:

- A Red Hat Portal Account

- Red Hat RHEL Subscriptions in that account

- An exported manifest

- An offline token

- Insights account information

▸ Specific instructions for setting up Insights Demo Environment is contained in this github repo

- https://github.com/ansible/workshops/tree/devel/exercises/ansible_smart_mgmt/4-setupinsights

Exercise 5

Explore Insights

- General exploration of Insights on

  console.redhat.com

Red Hat Insights for Red Hat Enterprise Linux

For all your hybrid-cloud challenges

Red Hat Enterprise Linux

Business Track and optimize spending	**Operations** Improve stability and performance	**Security** Reduce risk
Subscriptions	Advisor	Vulnerability
Resource optimization	Drift	Compliance
	Patch	Policies
	Image builder	Malware

Red Hat Insights

Efficient hybrid-cloud scale
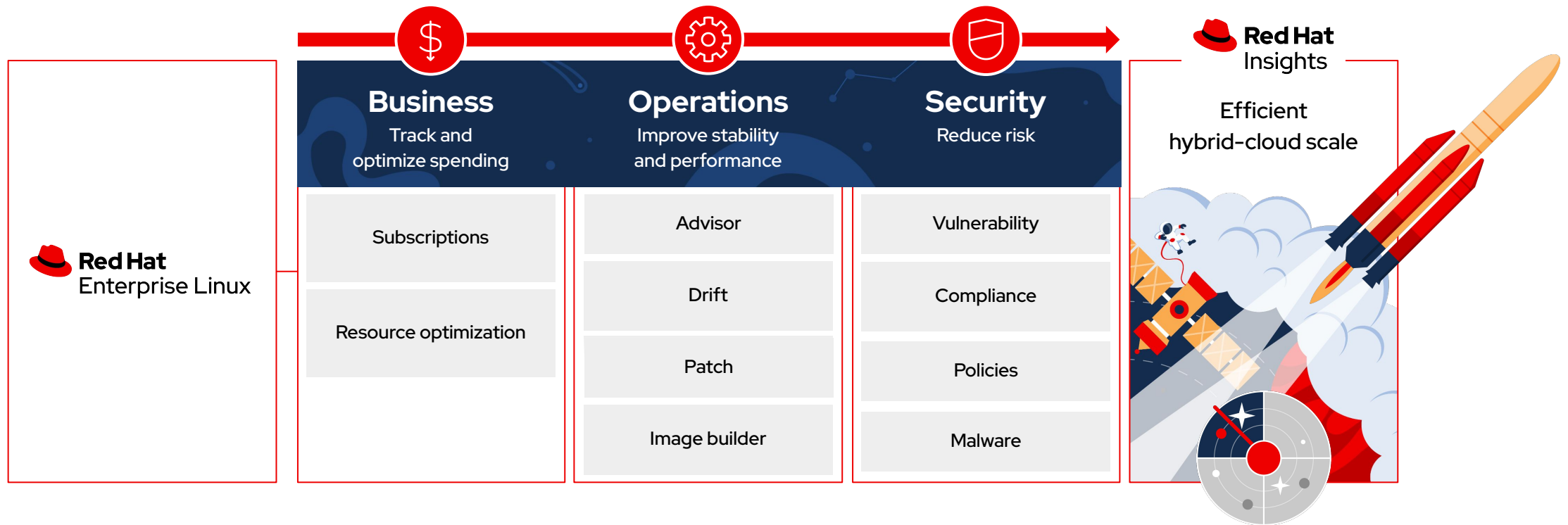
Red Hat

Dashboard

Filter results ▼

566
Systems registered with Insights

⚠ 83 stale systems
❗ 43 systems to be removed

Register systems

Vulnerability ⌄

Red Hat recommends addressing these CVEs with high priority due to heightened risk associated with these security issues

64
CVEs with **security rules**
impacting 1 or more systems

View CVEs

17
CVEs with **known exploits**
impacting 1 or more systems ⓘ

View known exploits

CVEs by CVSS score ⌄

CVSS score	CVE totals	Known exploits ⓘ
● 8.0 – 10	395	2
● 4.0 – 7.9	2030	15
● 0.0 – 3.9	346	0

Advisor recommendations ⌄

⚠ **25 incidents detected**

Problematic conditions that cause an issue have been actively detected on your systems

View incidents

Recommendations by total risk ⓘ ⌄

4	**43**	**71**	**7**
Critical	Important	Moderate	Low

Recommendations by category
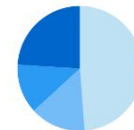
● 61 Availability ● 18 Stability
● 16 Performance ● 30 Security

Feedback

1

Exercise Details

- ▸ This exercise is much less prescriptive and is designed to provide the student with some general guidance to get started. Please feel free to explore all of the available Red Hat Insights Services

- ▸ Login to console.redhat.com using portal account credentials – https://console.redhat.com
  - · Select Red Hat Enterprise Linux –> Red Hat Insights

- ▸ This will bring you to the Overview page which depicts a dashboard of the hosts that are registered to Insights
  - · Explore this dashboard noting that each box addresses an Insights Service

- ▸ Specific instructions for this exercise are provided in this repo
  - · https://github.com/ansible/workshops/tree/devel/exercises/ansible_smart_mgmt/5-exploreinsights

Exercise 6

Remediate Vulnerability

- Use Insights and Ansible Automation

  Platform to remediate a CVE

Vulnerability

Remediate common vulnerabilities and exposures (CVEs)

- ▶ Triage, prioritize, and remediate CVEs that impact your registered systems
- ▶ Threat intelligence
  - · CVEs with known public exploits
  - · Deep threat intelligence on specific high-profile branded CVEs
- ▶ Customize and triage CVEs based on your company's definitions of risk

- ▶ Customized reporting with the right dataset based on stakeholder profile

- ▶ Automate remediation via Ansible Automation playbooks for vulnerabilities

What's New – Q2 2022:

- ● RBAC improvements

Red Hat

Vulnerability: Remediate all common vulnerabilities and exposures (CVEs)

Security

Filter results ▾

CVEs

☐ ▾ ▼ Known exploit ▾ Filter by Known exploit ▾ ⬈ ⋮   1 – 17 of 17 ▾ ‹ ›

Systems exposed 1 or more ✕   Known exploit Has a known exploit ✕   Clear filters

		CVE ID	Publish date ↓	Severity	CVSS base score	Systems exposed	Business risk	Status	
›	☐	CVE-2021-3156 Known exploit Security rule	26 Jan 2021	🛡 Important	7.8	87	Not defined	Not reviewed	⋮
˅	☐	CVE-2020-9850 Known exploit	09 July 2020	🛡 Moderate	9.8	20	Not defined	Not reviewed	⋮

CVE description

A logic issue was found in webkitgtk that affected WebKitGTK versions before 2.28.3 and WPE WebKit versions before 2.28.3. This flaw allows a remote attacker to cause arbitrary code execution. The highest threat from this vulnerability is to confidentiality, integrity, as well as system availability.

View more information about this CVE

		CVE ID	Publish date	Severity	CVSS base score	Systems exposed	Business risk	Status	
›	☐	CVE-2019-13272 Known exploit Security rule	15 July 2019	🛡 Important	7.8	3	Not defined	Not reviewed	⋮
›	☐	CVE-2019-9213 Known exploit	26 Feb 2019	🛡 Important	5.5	3	Not defined	Not reviewed	

Feedback

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Exercise Details

▸ Now that you have some familiarity with the Insights Services let's go correct an issue

▸ Prepare to Remediate a Vulnerability

  · This step shows you how to identify a vulnerability from the inventory tab and

  · Shows you how to identify the systems associated with a vulnerability

▸ Create a Remediation Playbook

  · Insights provides users with the capability to create a playbook that remediates many of the CVE's

  · This step shows you how to create that playbook

▸ Execute a Remediation Playbook using AAP

  · These part of the exercise will demonstrate how to sync the playbook created above with AAP and to execute it like any other job

▸ The complete instructions for this exercise are detailed in this git repository

  · https://github.com/ansible/workshops/tree/devel/exercises/ansible_smart_mgmt/6-remediatevulnerability

Next Steps

GET STARTED

ansible.com/resources/get-started

AAP-trial

WORKSHOPS & TRAINING

aap2.demoredhat.com/

Red Hat Training

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Next Steps

SATELLITE RESOURCES

Red Hat Satellite Blog - **https://satelliteblog.redhat.com/**

Red Hat Satellite Product page

Red Hat Satellite Customer Portal

Red Hat Satellite Documentation

SATELLITE TRAINING AND VIDEOS

RH053: Satellite Technical Overview also available on **Udemy**

RH403: Red Hat Satellite 6 Administration

Satellite 6.5 Reporting Engine Video: **https://www.youtube.com/watch?v=sBciejh1G80**

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