Automate Smart Management Workshop

Automate Smart Management for System Administrators and Operators
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

Topics Covered:

- Automation and Smart Management
  - Red Hat Ansible Automation Platform
  - Red Hat Satellite
Automation happens when one person meets a problem they never want to solve again.
Many organizations share the same challenge

Too many unintegrated, domain-specific tools
Break down silos

Different teams a single platform

Consistent governance
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 Smart Management
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.”

Source:

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Manage. Secure. Operate. Smart!
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](#)
Smart Management 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 Automation and Smart Management
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

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Physical | Virtual | Private cloud | Public cloud

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**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
  - continued next slide
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

**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
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
The lab environment today

- Practice what we preach
  [https://github.com/ansible/workshops](https://github.com/ansible/workshops)

- Learn with the real thing
  - Red Hat Ansible Automation Platform
  - Red Hat Satellite

- Red Hat Enterprise Linux

- CentOS Linux
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).

*Completed during workshop deployment*
Infrastructure as Code Architecture

Day 1 configuration of Satellite

- Developer IDE
  - Content View definitions
  - Lifecycle Environment definitions
  - Repository definitions
  - Activation Key definitions

- SCM

Configure Satellite job execution

Red Hat Satellite

- Activation Keys
- Repositories
- Content Views
- Lifecycle Environments

Build
Publish
Deliver
Infrastructure as Code architecture

Day 1 configuration of Automation controller

- Inventory definitions
- Job Template definitions
- Project definitions

Configure Controller job execution

Red Hat Ansible Automation Platform cluster

Build
Publish
Deliver

- Inventory
- Inventory Source
- Job Templates
- Projects
Lab Time

Begin exercise *0-intro* now in your lab environment

~35 minutes
Exercise 1

Compliance / Vulnerability Management

- Create an OpenSCAP compliance policy
- Create an Ansible template and automate an OpenSCAP scan
- Review ARF reporting in Satellite
75% of CIOs are investing to improve cyber-risk mitigation
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
OpenSCAP Workflow

Using Ansible Automation Platform to automate OpenSCAP in your environment

1 - At scheduled time
scan process is initiated by Controller

2 - Controller job
starts, host scan tasks initiated

3 - Satellite provides compliance policy for host scan

4 - Completed scan results uploaded to Satellite

5 - Controller reports scan process completed;
host asset report available on Satellite
Lab Time
Complete exercise 1-openscap now in your lab environment
~35 minutes
Exercise 2

Patch Management

- Automate Patching Prerequisites
- Automate Patch Deployment
Automate Where Possible

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

-Gartner

Source: Gartner
ID: 451113_C

https://www.gartner.com/document/3981432
Satellite and Ansible Controller Integration

Documented best practices to help optimize use of both products

**Dynamic Inventory**
Allows Ansible Controller to use Satellite as a dynamic inventory and source of current systems state

**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
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
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
Lab Time
Complete exercise **2-patching** now in your lab environment
~35 minutes
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.
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](http://developers.redhat.com))
- Dev & CI/CD to ensure RHEL compatibility: **Red Hat Developer program** ([developers.redhat.com](http://developers.redhat.com))
- Dev & CI/CD to ensure RHEL+1 compatibility: **CentOS Stream**
- Developing containerized applications: **RHEL Universal Base Image (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](http://connect.redhat.com))
Steps of the migration

**ANALYZE**
- CentOS / Oracle Linux
  - 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

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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 Convert2RHEL 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.
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)
Lab Time
Complete exercise **3-convert2rhel** now in your lab environment
~45 minutes
Next Steps

GET STARTED
ansible.com/resources/get-started
AAP-trial

WORKSHOPS & TRAINING
aap2.demoredhat.com/
Red Hat Training

JOIN THE COMMUNITY
ansible.com/community

SHARE YOUR STORY
Follow us @Ansible
Friend us on Facebook
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
Red Hat Consulting offering: Transition to Red Hat Satellite 6

SATELLITE TRAINING AND VIDEOS

NEW COURSE - 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
Thank you