# GSE

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# About me

- Working in IT since 2004, mostly in consulting roles

- Ansible user since 2013

- Author of 5 books, 4 of which on Ansible

- EMEA Associate Principal Specialist Solution Architect @ Red Hat

Red Hat

# The problem

- ► The complexity was increasing constantly

- ► A couple of operations people left

- ► Issues started to become obvious

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# Project Diamond

- ► Reduce complexity
- ► Make every process explicit
- ► Avoid dependence of a process to certain people

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# Project ~~Diamond~~ Coal



- ► Complexity increased
- ► Every process was kind of explicit
- ► Avoided dependence of a process to certain people
- ► Changing a process depended on certain people

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# Automation

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

**Anyone can automate...**
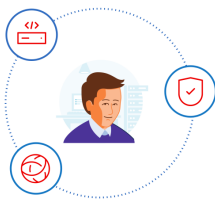but an enterprise needs
to coordinate and scale
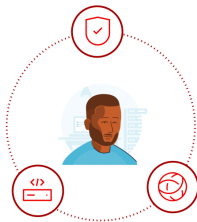
# Many organizations share the same challenge

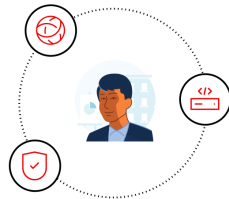Too many unintegrated, domain-specific tools



Network ops            SecOps            Devs/DevOps            IT ops

Red Hat

# Many organizations have a problem

## Too many unintegrated, domain-specific tools

**More users**

| Devs/DevOps | IT ops | SecOps | Line of business | Network ops |

**Growing number of use cases**

| Continuous integration /continuous delivery | Self-service provisioning | Security orchestration | Predictive analytics |
| Workload scaling | Configuration management | Vulnerability remediation | Artificial intelligence / smart computing |
| Serverless computing | Application life cycle | Compliance enforcement | Internet of Things |

Governance

**Many domains**

| Private clouds | | Public clouds | |
| Compute | Network | Storage | Security |

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# Break down silos

## Different teams a single platform

Consistent governance

Cloud

Edge

Datacenter

Line of business

Devs/DevOps    IT ops    SecOps    Network ops

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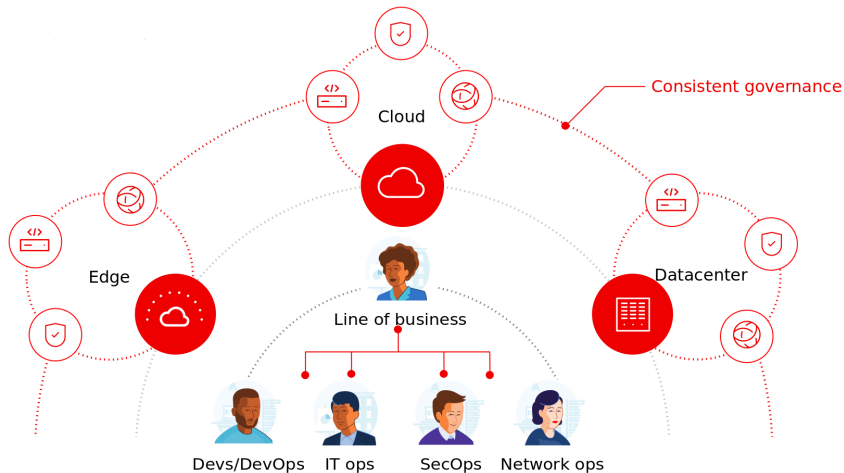
# Idempotence

## Definition
Idempotence is the property of certain operations in mathematics and computer science, that can be applied multiple times without changing the result beyond the initial application.

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# Ansible

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# Architectures

- ▶ Ansible can be used to automate all architectues (ARM, Power, s390x, x86, …)

- ▶ Ansible can be used to automate all operating systems (GNU/Linux, Microsoft Windows, Apple macOS, AIX, IBM I, z/OS, Cisco IOS, …)

- ▶ Ansible Automation Platform runs on: ARM, Power, s390x, x86

- ▶ Ansible Automation Platform runs on: RHEL, OCP

- ▶ On s390x, Ansible Automation Platform can be run on:
    - ▶ Red Hat Enterprise Linux on IBM Z & LinuxONE
    - ▶ Red Hat OpenShift on IBM Z & LinuxONE
    - ▶ IBM zCX Foundation for Red Hat OpenShift on IBM Z
    - ▶ IBM z/OS Container Extensions (zCX) on IBM Z

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# Ansible

- ► Open Source

- ► Mainly push mode (agent-less)

- ► Infrastructure as Data (in YAML format)

- ► Very gentle learning curve

- ► Very readable code

- ► Collections to support code-reusability

- ► Ecosystem

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# Ansible key concepts

- ▶ **Host**: target of the execution
- ▶ **Group**: group of hosts
- ▶ **Inventory**: collection of Hosts and groups of Hosts
- ▶ **Module**: code to control system resources, like services, packages, or files (anything really), or handle executing system commands
- ▶ **Task**: instance of a Module
- ▶ **Role**: way to abstract a collection of tasks that has a specific role and is idempotent
- ▶ **Playbook**: multiple Tasks and Roles that could be idempotent (or not) in a single file
- ▶ **Collection**: multiple Modules and Roles distributed as a single bundle
- ▶ **Execution Environment**: a container containing the ansible executable, the collections, and needed libraries

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# Inventories

- **static**: human compiled (and maintained) lists

- **dynamic**: populated at runtime by a script

    - Amazon web Services

    - Azure

    - Digital Ocean

    - Google Cloud Engine

    - OpenStack

    - Many more

    - Bring your own!

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# Ansible Playbook

```yaml
---
 - hosts: all
   become: True
   tasks:
     - name: Ensure httpd is installed
       yum:
         name: httpd
         state: latest
     - name: Ensure httpd is started
       service:
         name: httpd
         state: started
```

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# Collections

Collections are a data structure containing automation content:

- ► Modules

- ► Playbooks

- ► Roles

- ► Plugins

- ► Documentation

- ► Tests

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🏠 Home
🔍 Search
👥 Community

🔍 Search

ibm_zos_*                                          🔍   ⌄ Filters                                    (13 results)

Collections 13

IBM        **ibm_zos_core**                                        ✅ 5 / 5 Score   ⬇ 89708 Downloads
ibm        The IBM z/OS core collection includes connection plugins, action plugins, modules, filters and ansible-doc
           to automate tasks on z/OS.                              **Current Version:** 1.4.0-beta.2 uploaded 18 days ago
           🏷 ibm  z  zos  z_os  core  zos_core  ibm_zos_core  data_set  jcl  uss  mvs

IBM        **ibm_zos_sysauto**                                     ✅ 5 / 5 Score   ⬇ 1483 Downloads
ibm        The IBM Z System Automation collection includes roles and sample playbooks to access the IBM Z System
           Automation Operations REST server.                      **Current Version:** 1.0.0 uploaded 2 years ago
           🏷 ibm  z  zos  z_os  zos_sa  ibm_zos_sa  system_automation

IBM        **ibm_zos_ims**                                         ✅ 5 / 5 Score   ⬇ 27091 Downloads
ibm        The IBM z/OS IMS collection includes modules and sample playbooks to automate tasks for IBM IMS.
                                                                   **Current Version:** 1.2.0-beta.1 uploaded a year ago
           🏷 ibm  z  zos  z_os  core  zos_core  data_set  jcl  uss  mvs  ims  zos_ims

IBM        **ibm_zos_cics**                                        ✅ 5 / 5 Score   ⬇ 4978 Downloads
ibm        The Red Hat Ansible Certified Content for IBM Z CICS collection includes connection plugins, action
           plugins, modules and sample playbooks to automate tasks for CICS
                                                                   **Current Version:** 1.0.3 uploaded a year ago
           🏷 ibm  z  zos  z_os  cics  cmci

IBM        **zos_python_operator**                                 ⬇ 43 Downloads
ibm        IBM Z and Cloud Modernization Stack Operator for IBM Open Enterprise SDK for Python
                                                                   **Current Version:** 1.0.2 uploaded a month ago
           🏷 ibm  z_os  zos  zos_cloud_broker  zpm  zos_package_manager_operator  product_install
              z_and_cloud_modernization_stack_operator  zos_python_operator

IBM        **zos_java_operator**                                   ⬇ 161 Downloads
ibm        IBM Z and Cloud Modernization Stack Operator for IBM Java SDK
                                                                   **Current Version:** 1.0.2 uploaded a month ago
           🏷 ibm  z  zos  z_os  zos_cloud_broker  zpm  zos_package_manager_operator  product_install
              z_and_cloud_modernization_stack_operator  zos_java_operator

🏷 **Popular Tags**

| system | 7,800 |
| development | 3,496 |
| web | 2,963 |
| monitoring | 1,762 |
| networking | 1,397 |
| database | 1,288 |
| docker | 1,252 |
| cloud | 1,181 |
| ubuntu | 1,042 |
| security | 1,006 |

🏷 **Popular Platforms**

| EL | 25,886 |
| Ubuntu | 134,619 |
| Debian | 55,207 |
| Fedora | 47,706 |
| ArchLinux | 1,113 |
| opensuse | 9,347 |
| GenericLinux | 1,014 |
| Alpine | 834 |

# Ansible in numbers

- **2M downloads** per month (Red Hat versions only)

- **2K customers** (Red Hat versions only)

- **4M+ systems** managed (Red Hat versions only)

- **4K modules**

- **7th** of 96M proects **on GitHub** by contributors

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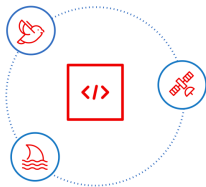# Holistic automation for your enterprise

- ► Create

- ► Operate

- ► Consume

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# Many technologies, different life cycles

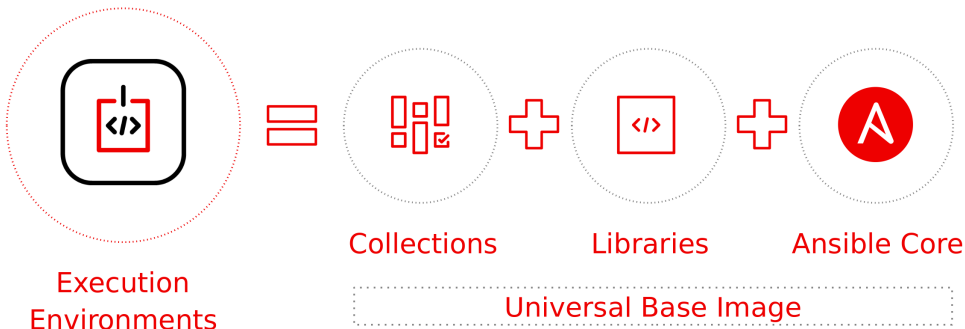How to keep runtime environment, collections, and dependencies aligned?
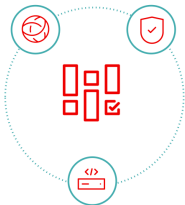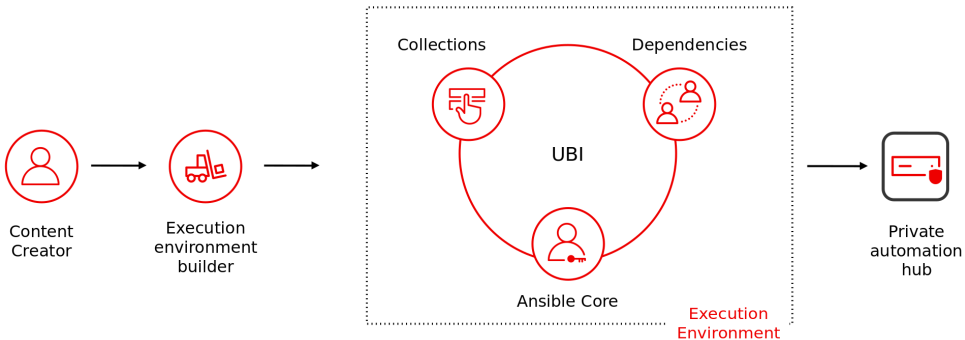


Collections



Dependencies



Runtime

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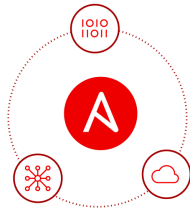
# Automation Execution Environments

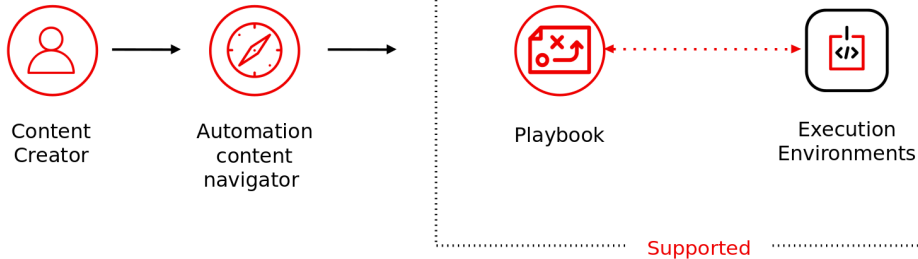Components needed for automation, packaged in a cloud-native way



Execution Environments = Collections + Libraries + Ansible Core

Universal Base Image

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# Build, create, publish

## Development cycle of an automation execution environment



Content Creator

Execution environment builder

Collections

Dependencies
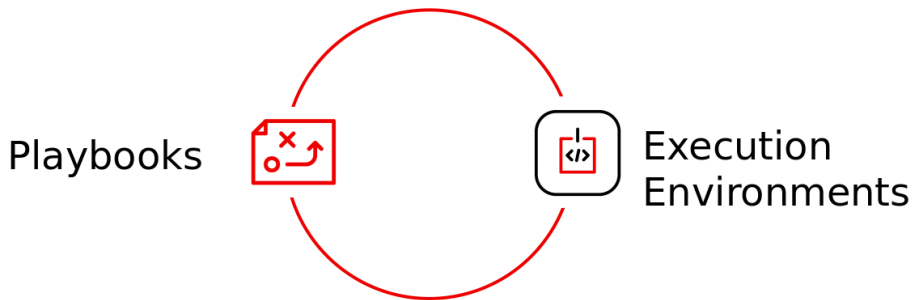
UBI

Ansible Core

Execution Environment

Private automation hub

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# Develop, test, run

How to develop, test and run containerized Ansible content

Scalable

Content
Creator

Automation
content
navigator

Playbook

Execution
Environments

Supported

Red Hat

# Components of Automation

Playbooks

Execution Environments

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# Anatomy of Automation Operation

Workflows

Credentials

API &
Webhooks

Centralized Logging
& Audit Trail

Automation
controller

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# Full architecture



Self service

Approval

Web UI

API

Automation job

Role based access control

Control plane

Execution environments

Execution Plane

Users

Users

Users

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# Event-Driven Ansible

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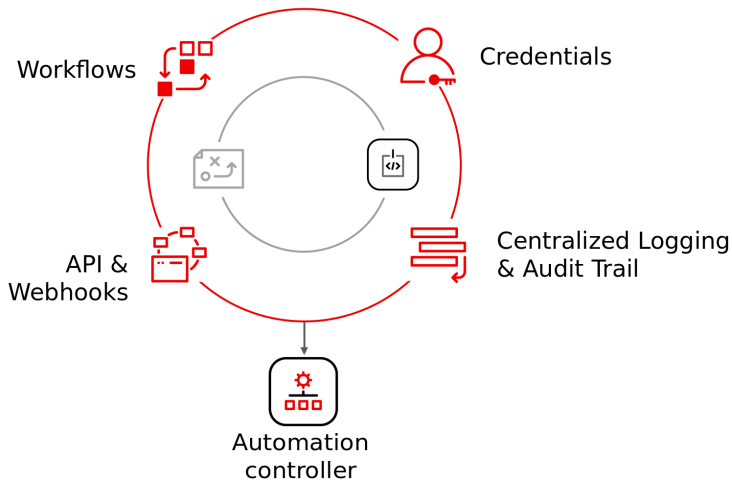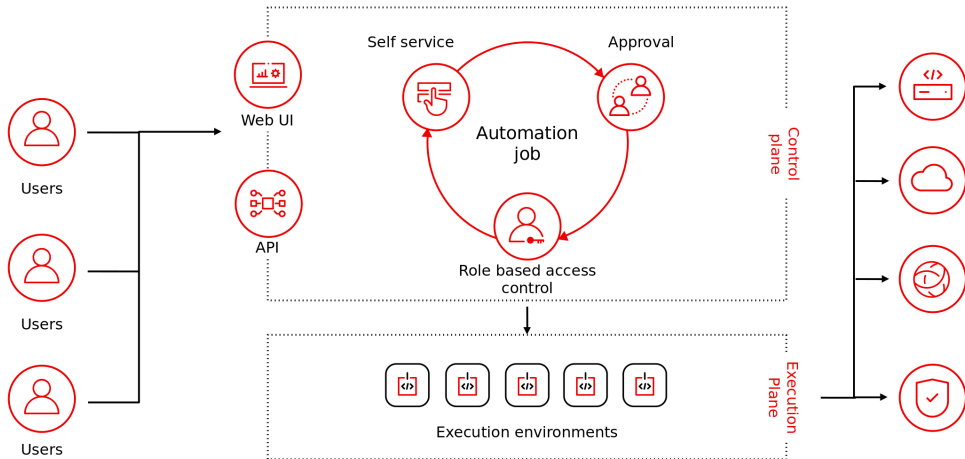
# Automate event workflow

| RECEIVE EVENT | DECIDE ON RESPONSE | RESPOND AUTOMATICALLY |
|---|---|---|
| ▶ Work with many different sources of events<br>▶ Send important events to Event-Driven Ansible | ▶ Known problem identified<br>▶ Automated resolution triggered | ▶ Outage incident created<br>▶ Support team notified<br>▶ Remediation executed |
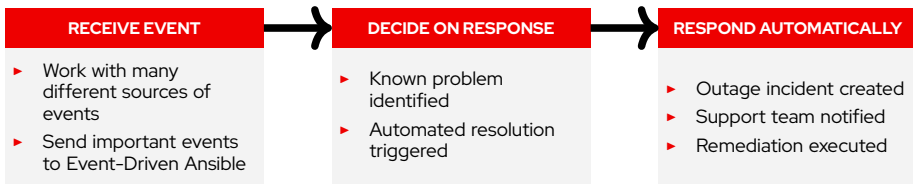
**WORK ACROSS MULTI-DOMAIN AND MULTI-VENDOR IT OPERATIONS**
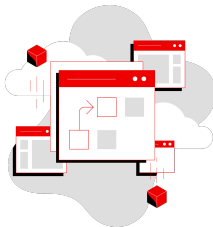
Work flexibly and well with multi-domain and multi-vendor monitoring and other solutions across the event driven architecture with appropriate approvals, controls and awareness

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# Key building blocks in EDA
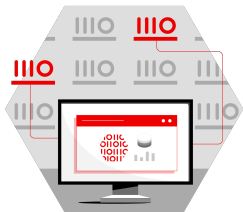


**Sources**
All the sources of event
data you want to use



**Rules**
What you will create using
Event-Driven Ansible



**Actions**
When a condition or event is met,
the Ansible Rulebook executes

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# Wrapping up

# Wrapping up

► Automation is key to simplify and optimize IT operations

► A single automation platform will provide more value, by being shared

► An automation platform requires way more than just an automation tool

► Ansible has a full ecosystem that allows it to be a full automation platform

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# Session feedback

- ► Submit your feedback at
  `https://conferences.gse.org.uk/2024V/feedback/9N`

- ► Make sure you are signed into MyGSE

- ► This session is 9N

1. What is your conference registration number?

💡 This is the three digit number on the bottom of your delegate badge

2. Was the length of this presention correct?

💡 1 to 4 = "Too Short" 5 = "OK" 6-9 = "Too Long"

1  2  3  4  5  6  7  8  9

3. Did this presentation meet your requirements?

💡 1 to 4 = "No" 5 = "OK" 6-9 = "Yes"

1  2  3  4  5  6  7  8  9

4. Was the session content what you expected?

💡 1 to 4 = "No" 5 = "OK" 6-9 = "Yes"

1  2  3  4  5  6  7  8  9