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Leverage Event Driven Ansible to reduce your automation reaction time

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GSE UK Conference
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TOC

Event-Driven Ansible

How does EDA work

EDA Examples

Takeaways

About me

- Working in IT since 2004, mostly in operations roles
- Ansible user since 2013
- Author of 5 books, 4 of which on Ansible
- EMEA Principal Specialist Solution Architect for Ansible @ Red Hat

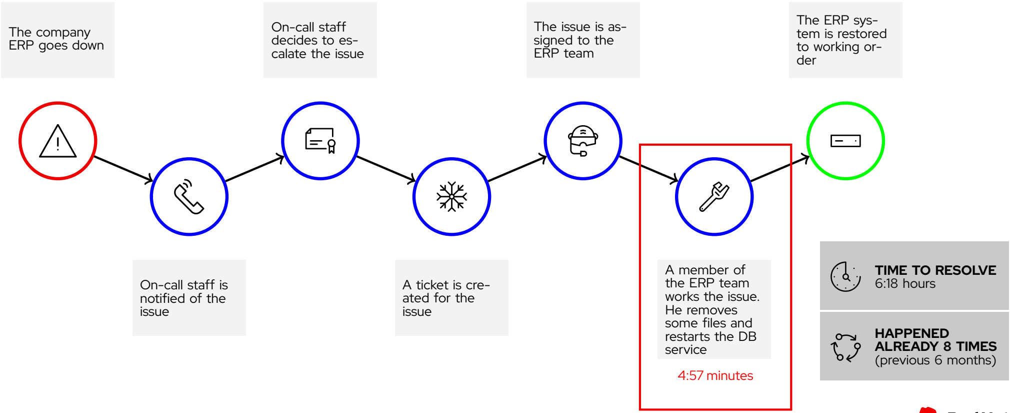
Disclaimer

Everything we will discuss today is fully Open Source.

It works in the same way on both Community and Enterprise editions.

erEdge R300

What happened



The company ERP goes down

On-call staff is notified of the issue

On-call staff decides to escalate the issue

A ticket is created for the issue

The issue is assigned to the ERP team

A member of the ERP team works the issue. He removes some files and restarts the DB service

4:57 minutes

The ERP system is restored to working order

TIME TO RESOLVE
6:18 hours

HAPPENED ALREADY 8 TIMES
(previous 6 months)

Event-Driven Ansible

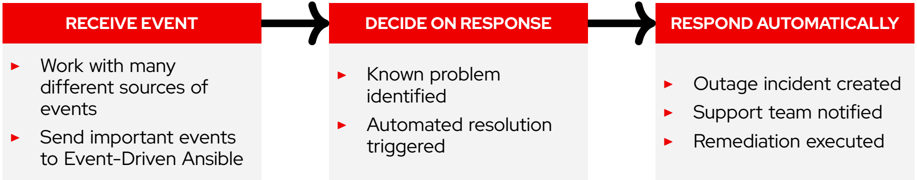
Ansible

- Suite of Infrastructure as Code tools
- 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

Ansible Playbook

```
---
 - hosts: all
   become: True
   tasks:
     - name: Ensure httpd is installed
       ansible.builtin.package:
         name: httpd
         state: latest
     - name: Ensure httpd is started
       ansible.builtin.service:
         name: httpd
         state: started
```

Automate event workflow



RECEIVE EVENT

- Work with many different sources of events
- Send important events to Event-Driven Ansible

DECIDE ON RESPONSE

- Known problem identified
- Automated resolution triggered

RESPOND AUTOMATICALLY

- Outage incident created
- Support team notified
- 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

Event-Driven Ansible advantages

Flexible event-driven automation

Flexible from source to rule to action with multiple event sources. Create and change automation easily.

IT environment friendly

Automate any IT use case quickly and simply. Jumpstart with many content collections available.

Robust automation handling

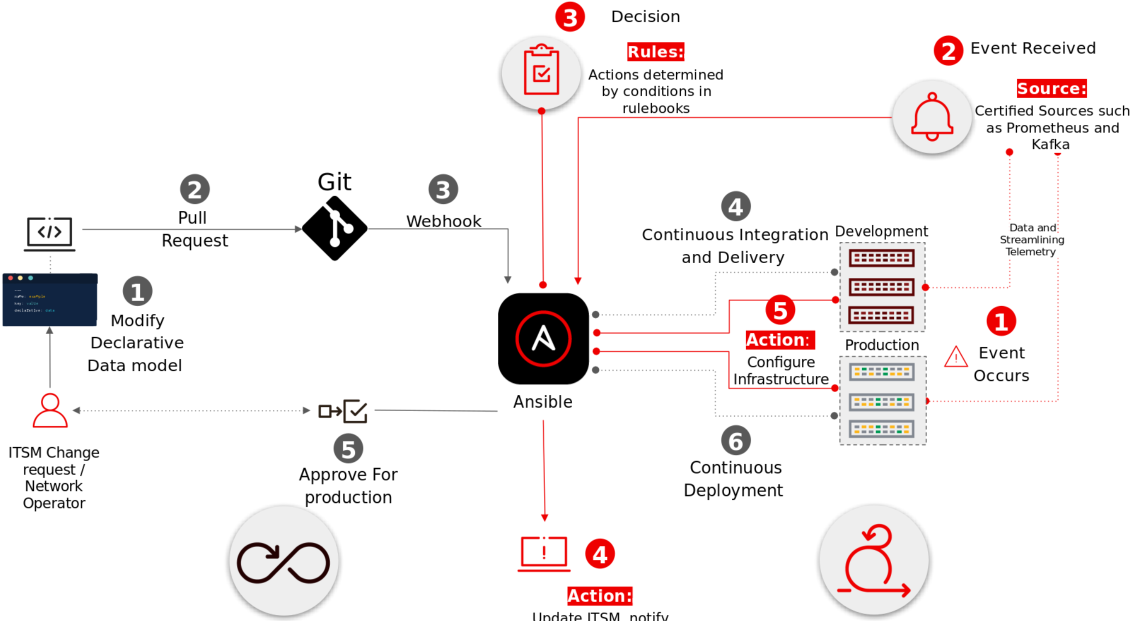
Scalable decisioning and implementation with flexible actions.

Single automation platform

Choose your automation style, leverage existing automation content and extend skills.

Common use cases

- **Networking**: port events, route events
- **Infrastructure**: resource limits events
- **Security**: IDS events, user creation events
- **Applications**: service events
- **Cloud**: scaling events, service bus events
- **Logs**: logs enrichment



1 Modify Declarative Data model

2 Pull Request

3 Webhook

4 Continuous Integration and Delivery

5 Approve For production

6 Continuous Deployment

ITSM Change request / Network Operator

1 Event Occurs

2 Event Received

Source: Certified Sources such as Prometheus and Kafka

3 Decision

Rules: Actions determined by conditions in rulebooks

4 **Action:** Update ITSM, notify administrators

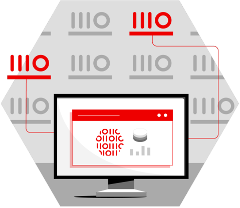
5 **Action:** Configure Infrastructure

GitOps Workflow

EDA Workflow

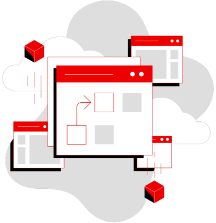
How does EDA work

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

Events sources

- Common
  - file (loading facts from yaml)
  - file_watch
  - journald
  - range
  - url_check (url status check)
  - webhooks
- Clouds
  - AWS CloudTrail
  - AWS SQS
  - Azure Service Bus

- Specific software
  - CrowdStrike
  - F5
  - IBM Instana
  - IBM Turbonomic
  - LogicMonitor
  - Kafka (AMQ Streams)
  - Palo Alto Networks
  - PostgreSQL PubSub
  - Prometheus/Alertmanager
  - Red Hat Insights
  - Zabbix
- Brying your own

Webhook event source

```
sources:
 - ansible.eda.webhook:
   host: 0.0.0.0
   port: 5000
```

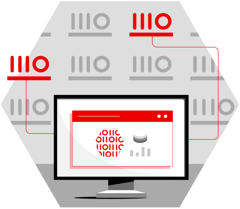
Events Filters

- Clearing out the extra data and defining what is relevant
- Provided filters:
  - Include and exclude keys from the event object with `json_filter`
  - Change dashes in all keys in the payload to underscores with `dashes_to_underscores`
- Each event has the `eda.builtin.insert_meta_info` filter added by ansible-rulebook
- Filters can be chained one after the other
- Bring your own filters!

Filters: an example

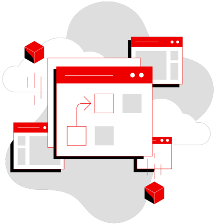
```
filters:
  - json_filter:
      include_keys: ['clone_url']
      exclude_keys: ['*_url', '_links', 'base']
  - dashes_to_underscores:
```

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

Rules

- Event-Driven Ansible uses rules to determine if an action or actions should take place
- Can have a single or multiple conditions
- Can have a single or multiple actions

Rules Conditions

- Conditions can use information from:
    - Received event
    - Previously saved events within a rule
    - Longer term facts about a system
    - Variables provided by vars
- A condition can contain:
    - One condition
    - Multiple conditions where `all` of them have to match
    - Multiple conditions where `any` one of them has to match
- Supported condition data types: integers, strings, booleans, floats, `null`
- Is possible to set `facts` and `events` in rules

Rules Actions

- Simple YAML structure for logical conditions
- Events can trigger different types of actions:
  - `run_playbook`
  - `run_template`
  - `run_module`
  - `set_fact`
  - `post_event`
  - `print_event`
  - `retract_fact`
  - `shutdown`
  - `debug`

Rules: an example

```
rules:
  - name: A remediation rule with one condition and one action
    condition: event.outage == true
    action:
      run_playbook:
        name: remediate_outage.yml

  - name: A remediation rule with multiple conditions and actions
    condition:
      all:
        - event.outage == true
        - fact.ansible_os_family == "linux"
    actions:
      - run_playbook:
          name: remediate_outage.yml
      - print_event:
          pretty: true
```

Rules throttling

- Group events by attributes
- Possible to run the first time in a timeframe with `once_within`
- Possible to collect the events in the timeframe and then run with `once_after`
- Time units are milliseconds, seconds, minutes, hours, days

Rules throttling: an example

```
rules:
  - name: Throttle example reactive
    condition: event.outage == true
    throttle:
      once_within: 5 minutes
      group_by_attributes:
        - event.meta.hosts
        - event.code
    action:
      run_playbook:
        name: notify_outage.yml
  - name: Throttle example passive
    condition: event.outage == true
    throttle:
      once_after: 5 minutes
      group_by_attributes:
        - event.meta.hosts
        - event.code
    action:
      run_playbook:
        name: notify_outage.yml
```

Rulesets

- A ruleset requires:
  - A unique name
  - A defined event source(s)
  - Hosts similar to Ansible Playbooks
  - A list of defined rules
- Rulesets run separate sessions in the Rules Engine
  - Events and Facts are kept separate for each ruleset
  - Actions allow a Ruleset to post events or facts to itself or other Rulesets in a Rulebook

Rulesets: an example

```
---
- name: My ruleset
  hosts: all
  sources:
    - ansible.eda.webhook:
        host: 0.0.0.0
        port: 5000
  filters:
    - json_filter:
        include_keys: ['clone_url']
        exclude_keys: ['*_url', '_links', 'base']
  rules:
    - name: My remediation rule
      condition: event.outage == true
      action:
        run_playbook:
          name: remediate_outage.yml
```

Rulebooks

- Rulebooks are made of one or more rulesets
- Multiple different sources can be defined in a Rulebook
- Rulebooks can have a similar structure to a Playbook with multiple plays.

Rulebooks: an example

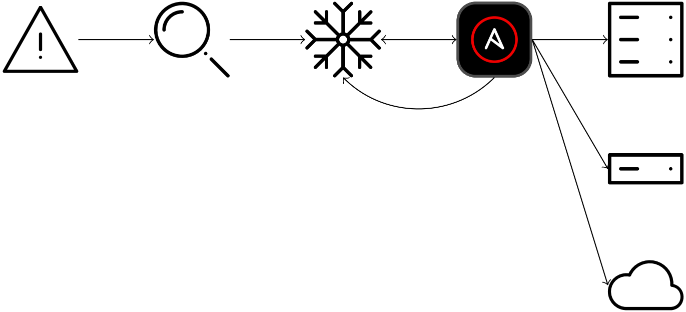
```
---
- name: My ruleset 1
  hosts: all
  sources:
    - ansible.eda.webhook:
        host: 0.0.0.0
        port: 5000
  rules:
    - name: My remediation rule
      condition: event.outage == true
      action:
        debug:
- name: My ruleset 2
  hosts: all
  sources:
    - ansible.eda.webhook:
        host: 0.0.0.0
        port: 5001
  rules:
    - name: My remediation rule
      condition: event.outage == true
      action:
        debug:
```

EDA Examples

Logs enriching

- Automatically generated tickets are often raised with limited information in them.
- It takes time for the operator to extract the needed logs.
- There are some logs that are always useful (at least for certain classes of issues).

Logs enriching



z/VM: Workload pressure

- Virtual machine based workload on z/VM (Apache, WAS, MQ, etc.)
- Workload distributed between VMs in two z/VM systems by a load balancer
- One system becomes constrained
- Possible solutions
  - Reconfigure LB
  - Relocate VM(s)
  - Reconfigure VM(s)
- All those options can be automated with EDA + AAC

Takeaways

Takeaways

- Triggering automation from events can help reduce or prevent outages
- Event-Driven Ansible can reuse the Ansible code you already have
- As long as you have an event generator, you can use Event-Driven Ansible
- Event-Driven Ansible can simplify Mainframes-related processes

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