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Connect

Ansible and Event-Driven Automation for Networks

Michal Zdyb,
RHCA, Senior Product Specialist Solution Architect - Ansible

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Introduction to Network Automation with Ansible

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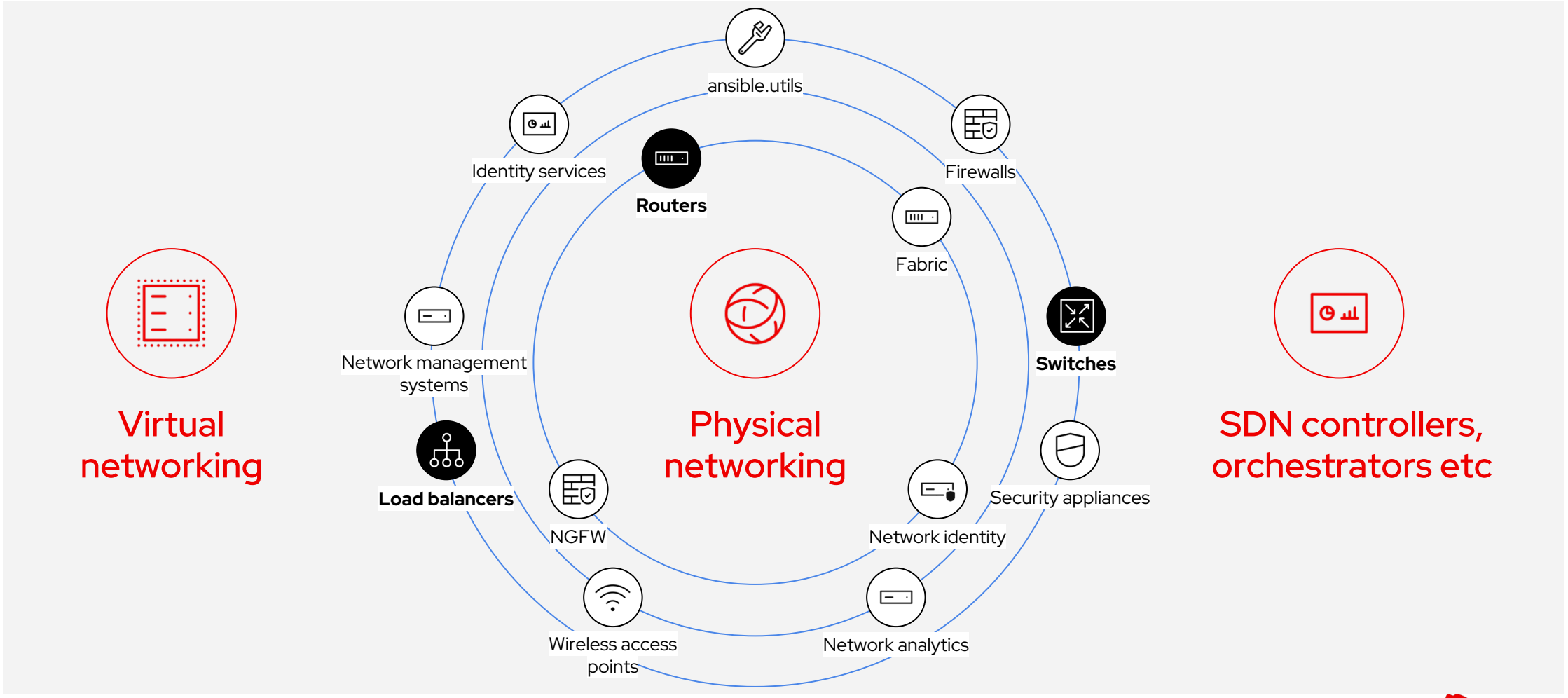
The scope of network automation with Ansible



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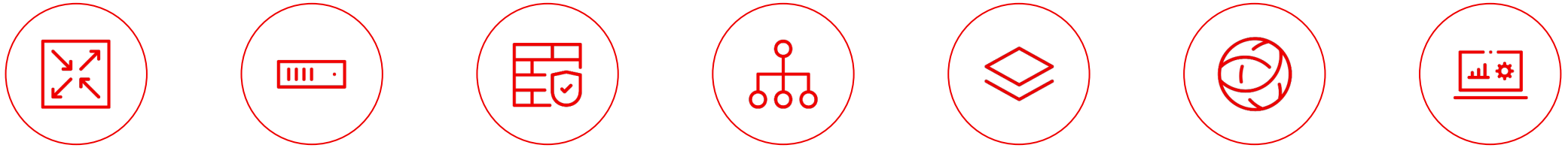
Ansible network ecosystem



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Network automation journey

Start small, think big

Complexity

Opportunistic

How can we simplify a task or set of tasks?

- Configure backup and restore
- Inventory audits and reports

Systematic

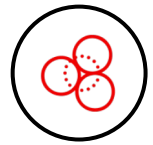
How do we centralise our processes?

- Configure hygiene
- Network compliance
- Apply a configuration SoT

Institutionalized

How do we orchestrate our processes?

- NetDevOps & CI/CD
- Automated troubleshooting (Event-Driven Ansible)
- Provisioning, retirement, and migration



Automation with Ansible Automation Platform

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Source of Truth for network automation

- Defines the desired state of network represented as structured data
- Decoupling data from configuration syntax
- Enables data-driven network automation
- Popular SoT for networks: Github, Netbox

Example of structured configuration data in yaml files on Github:

BGP config:

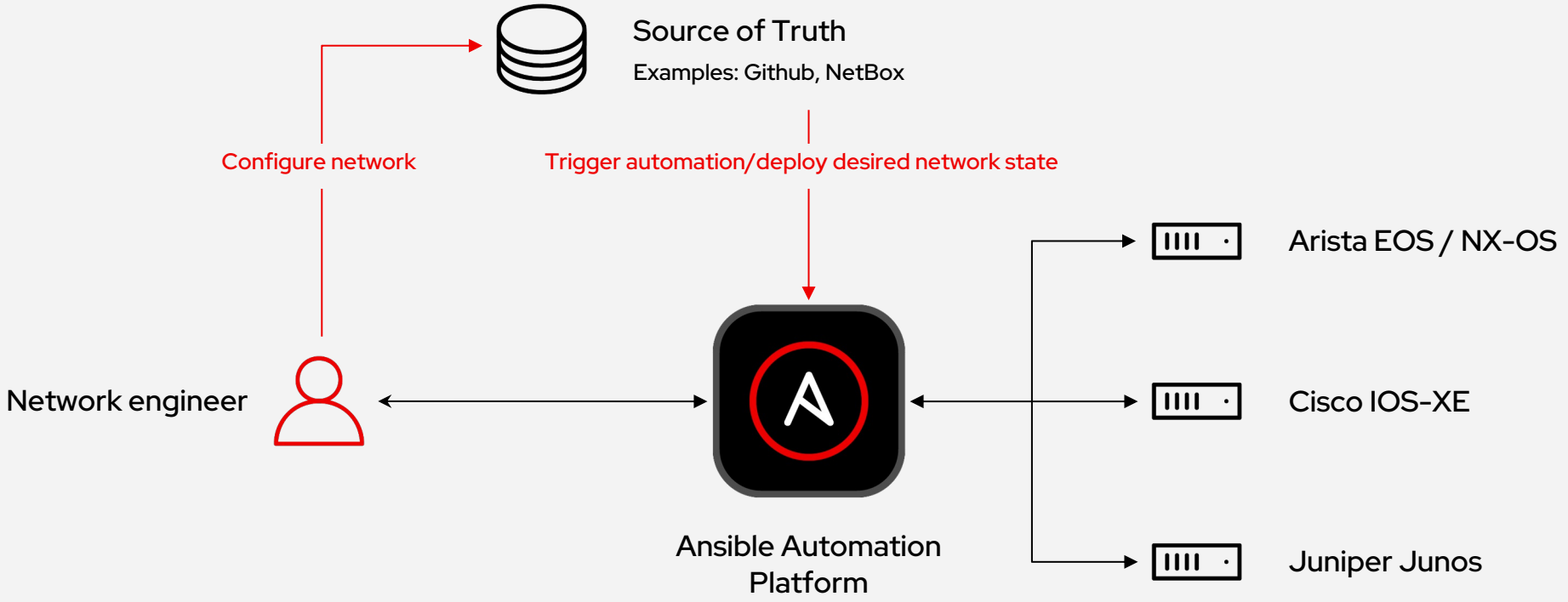
```
bgp:
  as: "64512"
  router_id: 172.16.0.1
  neighbors:
    - ip_address: 10.0.0.2
      remote_as: "64513"
      description: net01-rtr2
  networks:
    - prefix: 192.168.1.0/24
```

Interfaces config:

```
interfaces:
- name: Ethernet1
  description: to-net01-rtr2
  ipv4_address: 10.0.0.1/30
  switchport: false
  shutdown: false

- name: Ethernet2
  description: to-net01-client1
  ipv4_address: 192.168.1.1/24
  switchport: false
  shutdown: false
```

Automate configuration management with SoT



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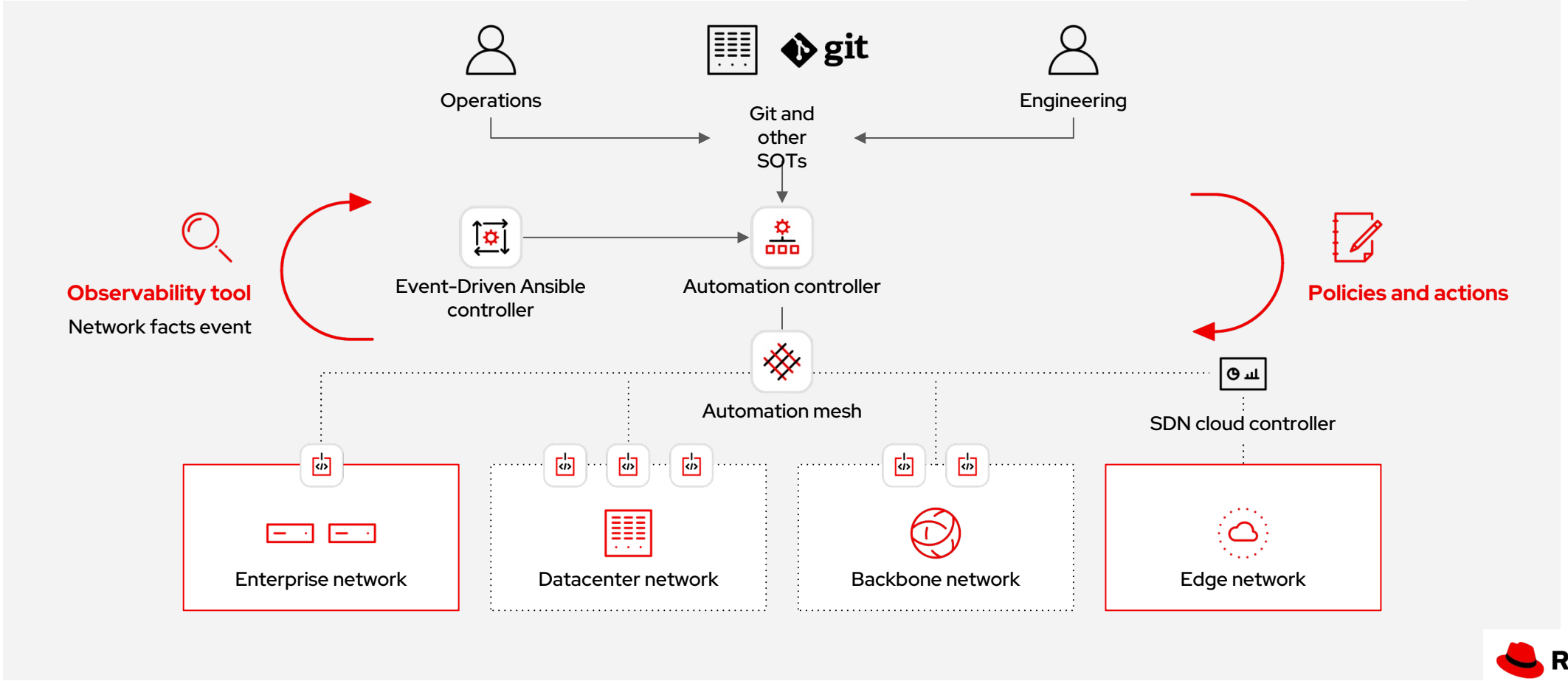
Network operations with Ansible Automation Platform

Source of Truth to operate with consistency and control



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Introduction to Event-Driven Ansible

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A typical event driven automation process

RECEIVE EVENT

- Work with third party 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-VENDOR IT OPERATIONS

Work flexibly and well with multi-vendor monitoring and other solutions across the event driven architecture with appropriate approvals, controls and awareness

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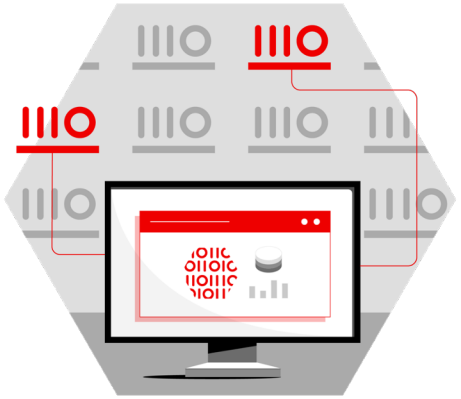
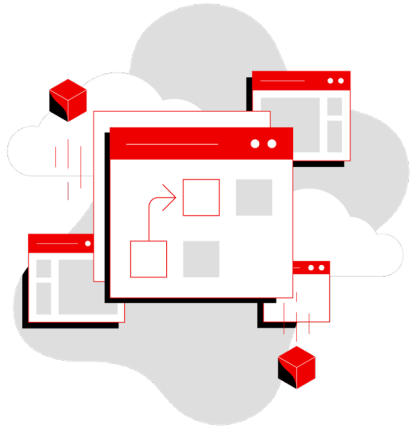
Key building blocks in Event-Driven Ansible

Simple, powerful, agentless



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

Ansible Rulebooks contain the source of the event, as well as the instructions on what steps to perform when a certain condition is met–and it is all very flexible.

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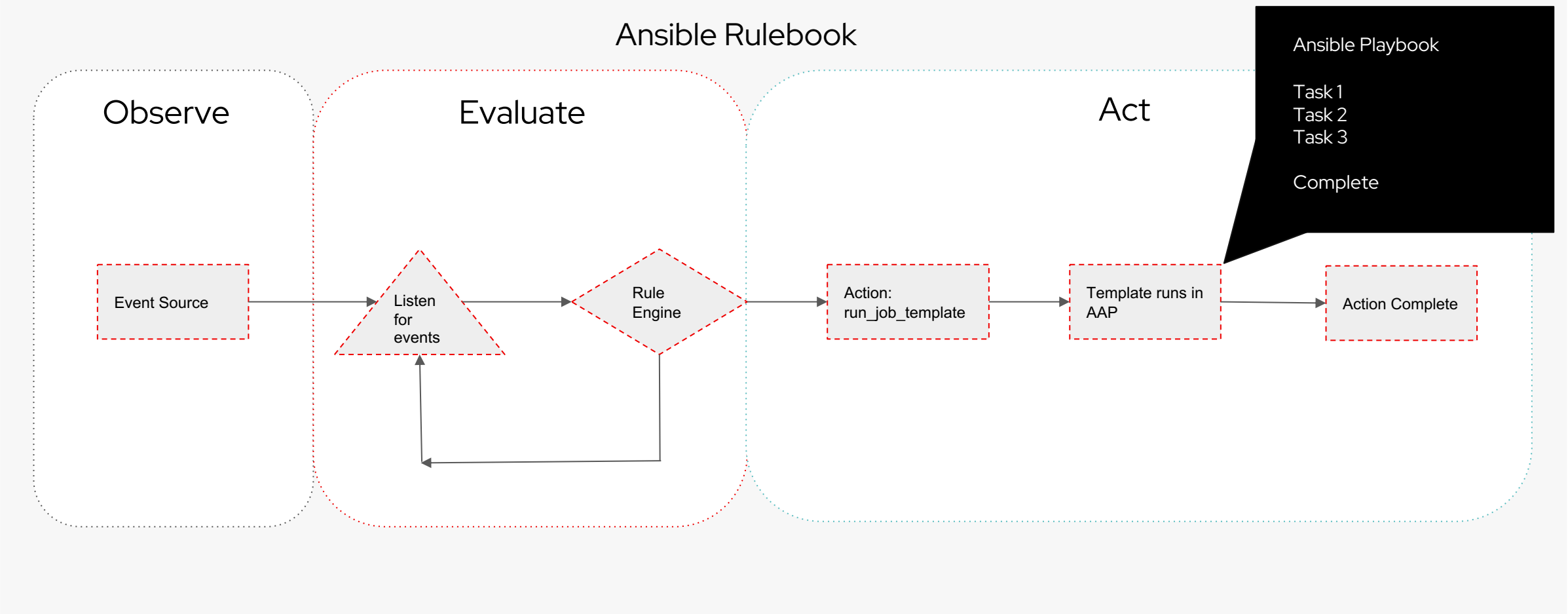
Event-Driven Ansible

Rulebook vs Playbook



Rulebooks

Ansible Playbook has many plays, Ansible Rulebook has many rulesets

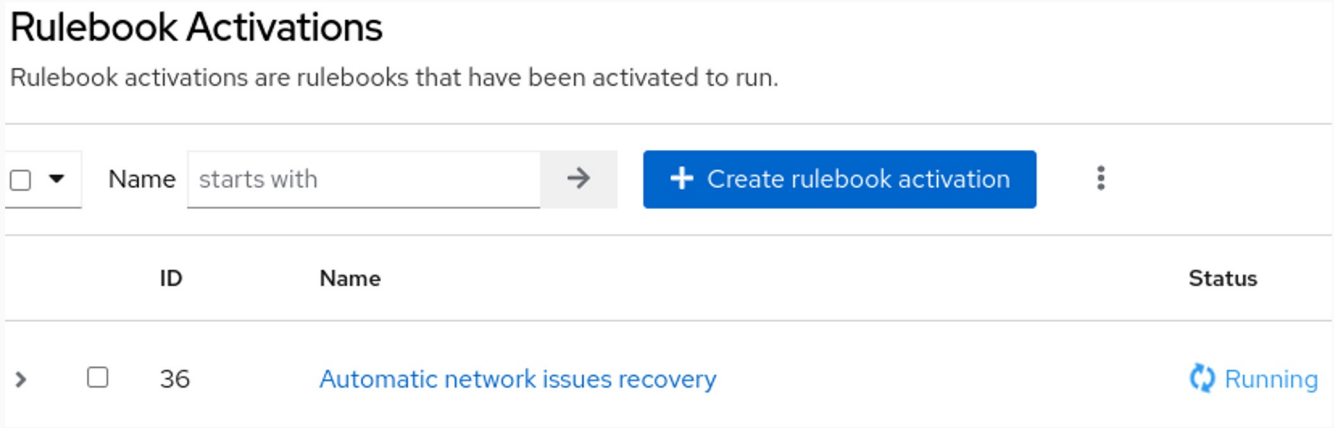
- **Rulebooks comprise of rulesets**
  - Rulebooks can contain multiple Rulesets
  - Rules trigger based on conditions and actions can be carried out by the rules engine
  - Multiple sources can be defined in a Rulebook
  - Rulebooks can have a similar structure to a Playbook with multiple plays.

```
- name: My ruleset 01
  hosts: all
  sources:
    - name: Range
      ansible.eda.range:
        limit: 5
  rules:
    - name: First rule
      condition: event.i == 1
      action:
        debug:

- name: My ruleset 02
  hosts: all
  sources:
   - name: Kafka
     ansible.eda.kafka:
       host: 192.168.122.110
       port: 9092
       topic: network-events
  rules:
    - name: First rule
      condition: event.interface.oper-status == "DOWN"
      action:
      run_workflow_template:
        - name: "Network EDA - interface recovery"
```

Rulebook Activation

Activated Automation



Rulebook Activated

Waiting for Events

Once Rulebooks are activated and running they are listening for events

Rulebook activation log:

2024-10-02 11:20:31,238 - ansible_rulebook.rule_set_runner - INFO - Waiting for actions on events from Automatic network issues recovery
2024-10-02 11:20:31,238 - ansible_rulebook.rule_set_runner - INFO - Waiting for events, ruleset: Automatic network issues recovery

Demo

Ansible and Event-Driven Automation for networks

https://github.com/mzdyb/event-driven-ansible-for-networks

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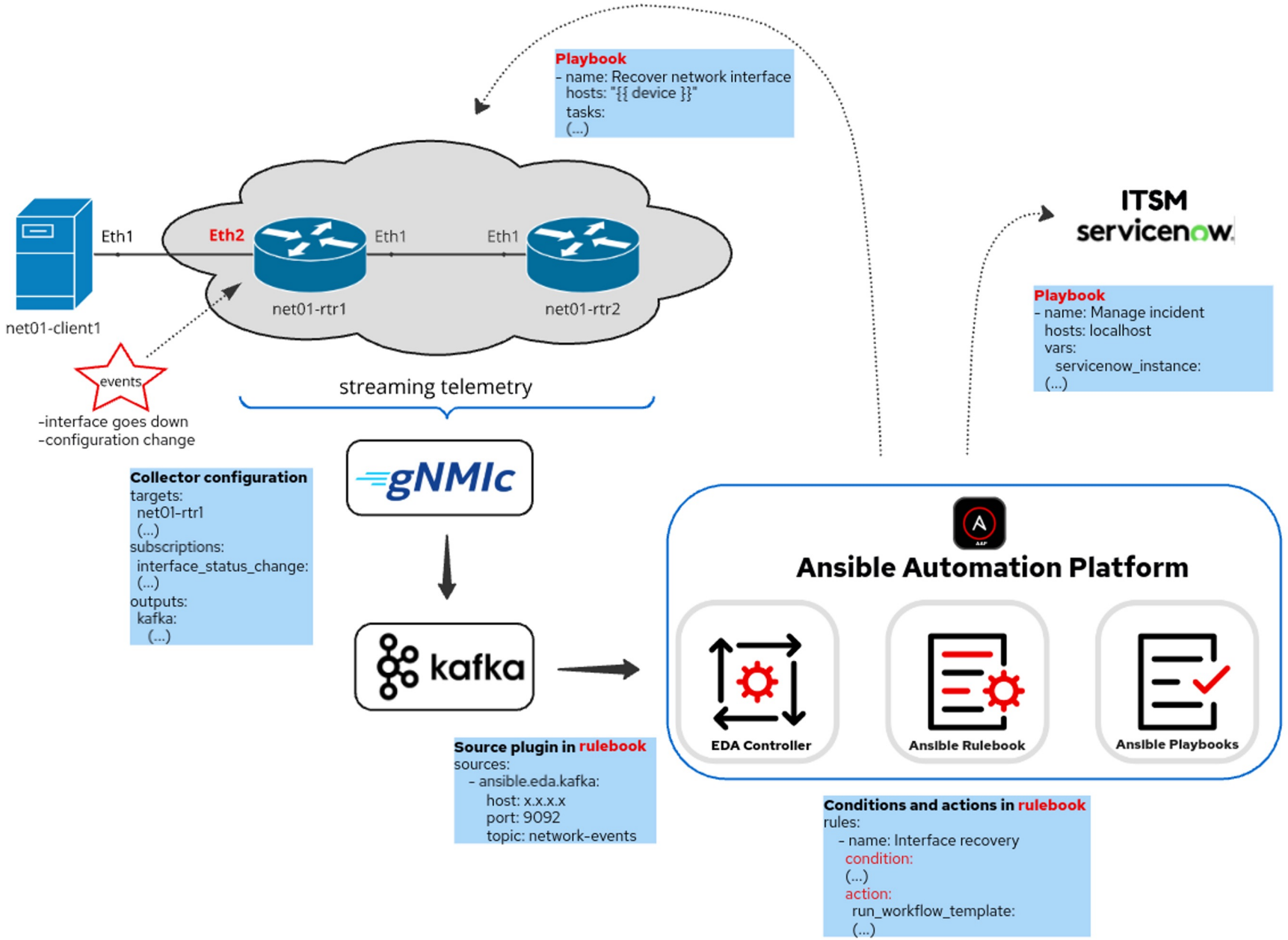
Demo topology



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Demo description

In the demo we are observing automatic reaction to the following network events:

1. Operational state change of port Ethernet2 on router net01-rtr1. It is simulated by interface *shutdown* command

```
interface Ethernet2
 shutdown
```

Action

➔ “bounce” interface Ethernet2
➔ manage ITSM incident

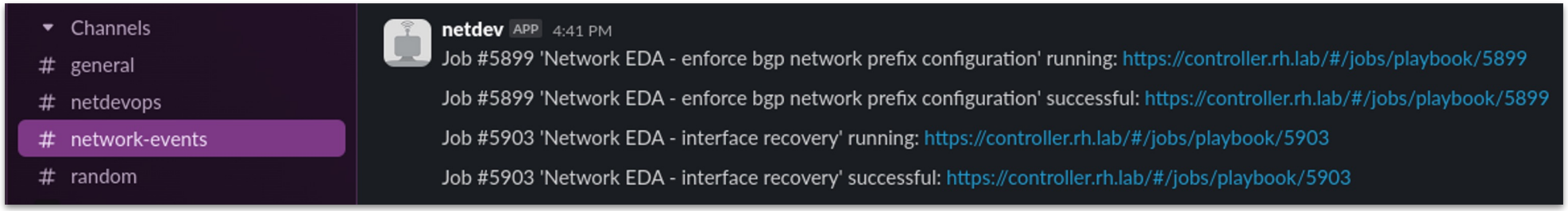
1. Any configuration change to *network* commands in 'router bgp' context on router net01-rtr1

```
router bgp 64512
 (...)
 network 192.168.1.0/24
```

Action

➔ apply configuration from SoT
➔ manage ITSM incident

Using Notification feature AAP sends information about automatic reaction to each event in real-time to Slack channel:



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