Automating Nokia SR OS with Ansible

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What are we going to discuss today?

- Why do you need a network automation?
- Why should you care about Ansible?
- How can Ansible help with Nokia SR OS?
- How to collect data from Nokia routers using Ansible? [LIVE DEMO]
- How to configure Nokia routers using Ansible? [LIVE DEMO]
- What's next?

Why do you need a network automation?

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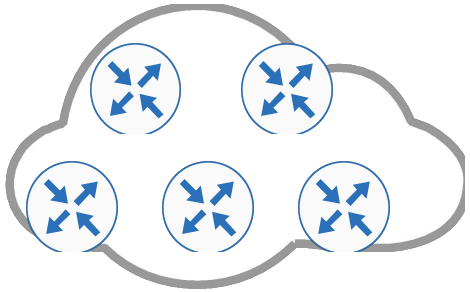
This is how typical network change is implemented:

Receive change request

Schedule maintenance

Implement change



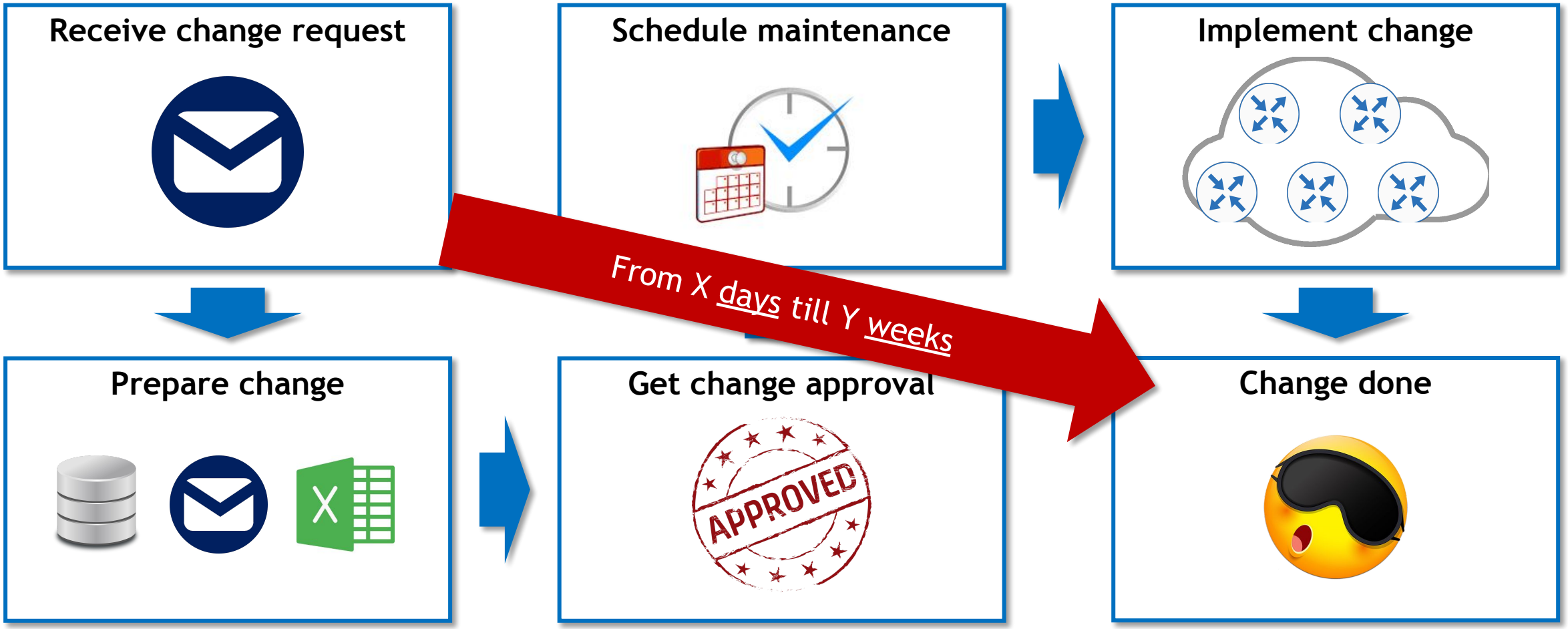
Prepare change

Get change approval

Change done

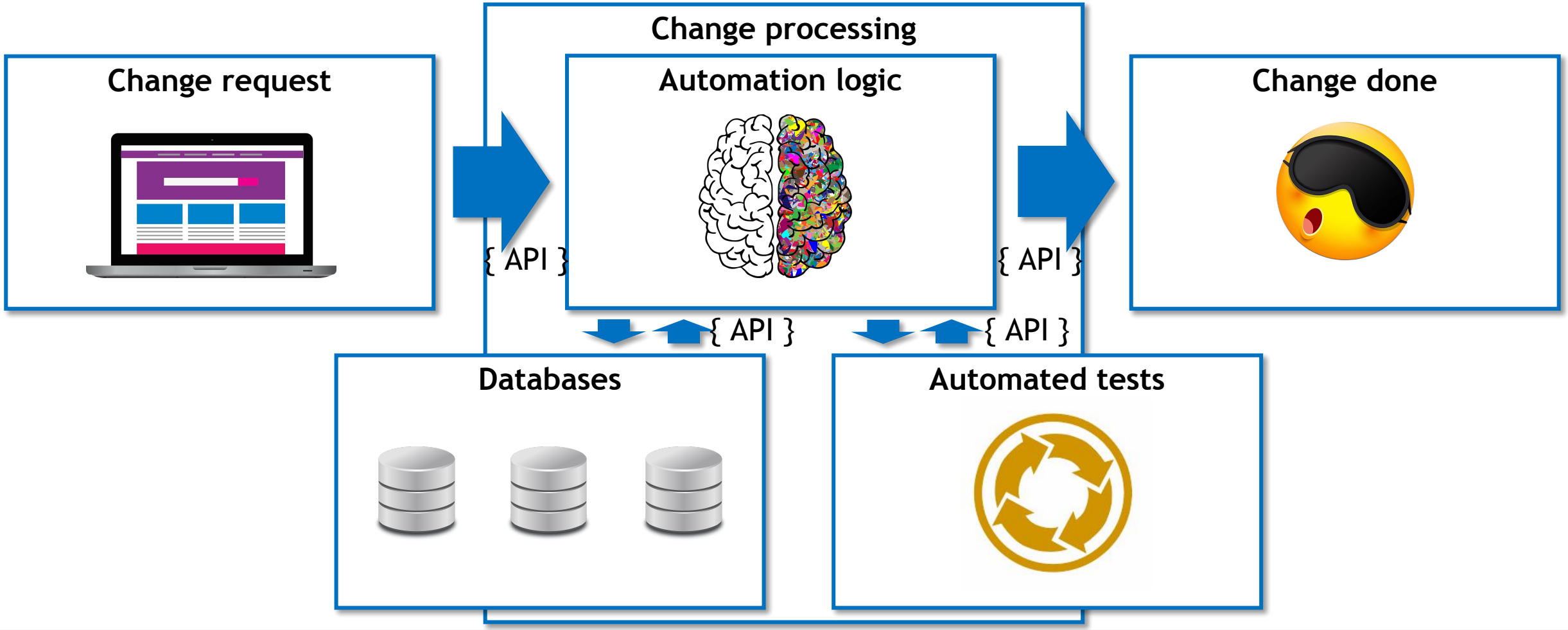
Why do you need a network automation?

This is how typical network change is implemented:



Why do you need a network automation?

And this is how it can be done:

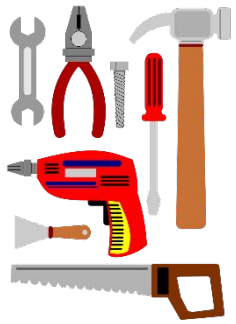


Why do you need a network automation?

The big picture of the network automation:

Fault management

Automated proactive network troubleshooting and restoration based on pre-defined scenarios



Configuration management

Vendor-independent zero touch provisioning based on abstraction device profiles

Accounting management

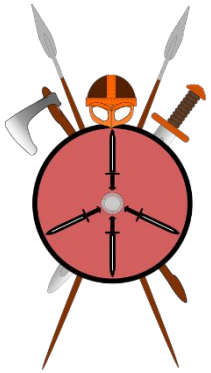
Collect information about customers' actions and perform automatic actions based perform the business logic

Performance management

Automatically requesting network reconfiguration based on the application trends

Security management

Analysing all the security related activities/alerts and performing certain tasks based on the certain logic



Why should you care about Ansible?

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Ansible is...

ANSIBLE

Ansible is a radically simple IT automation engine that automates cloud provisioning, configuration management, application deployment, intra-service orchestration, and many other IT needs.
The term "ansible" was coined by Ursula K. Le Guin in her 1966 novel Rocannon's World, and refers to fictional instantaneous communication systems.

Key characterises

Feature rich

Available on all platforms

mac OS

Easy to start work with

0+

https://docs.ansible.com/

Why should you care about Ansible?

Why Ansible is so popular:

Huge amount of modules

Open source

Free of charge

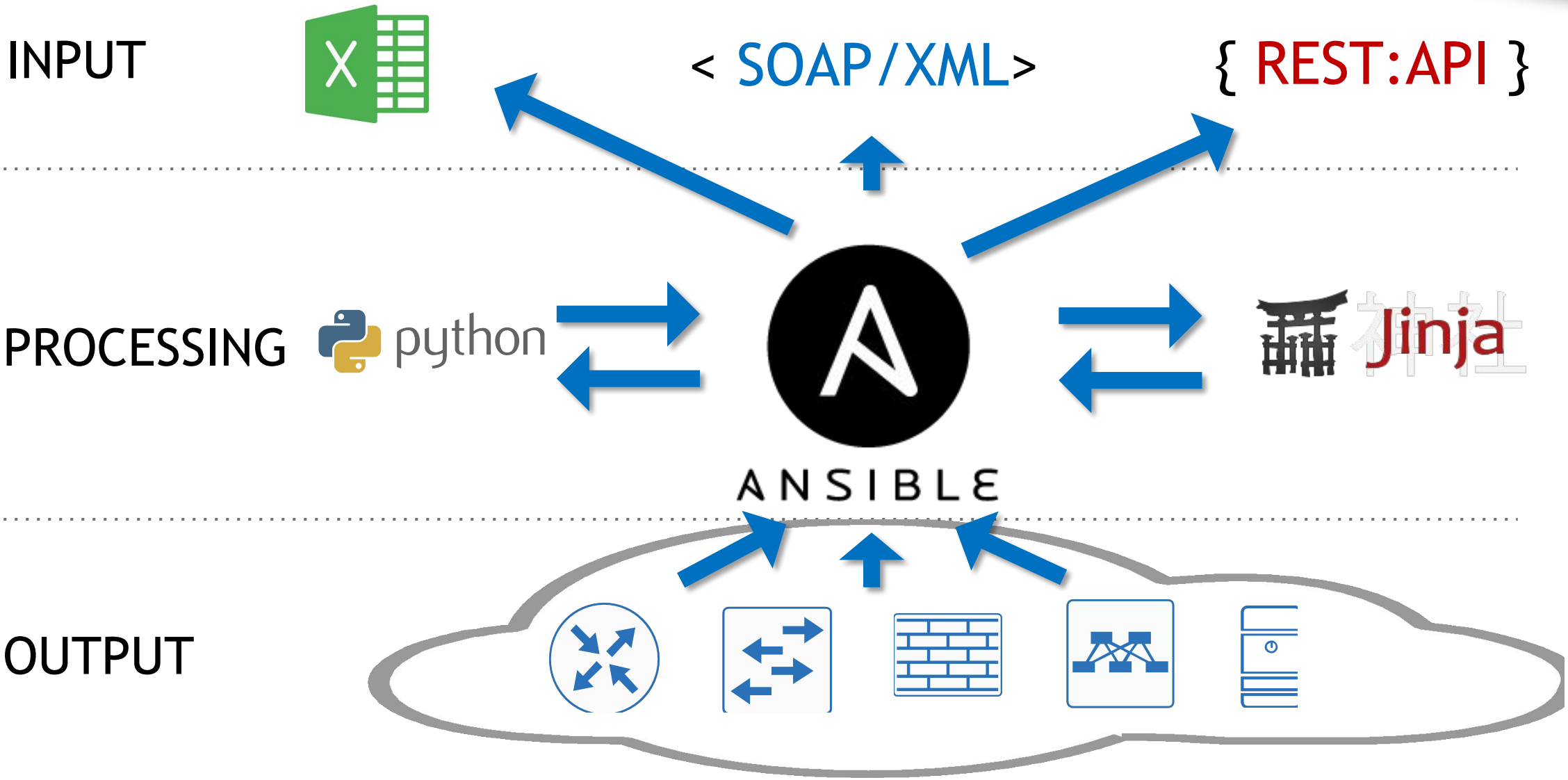
Great community

Agentless

Extended features and paid support (if needed)

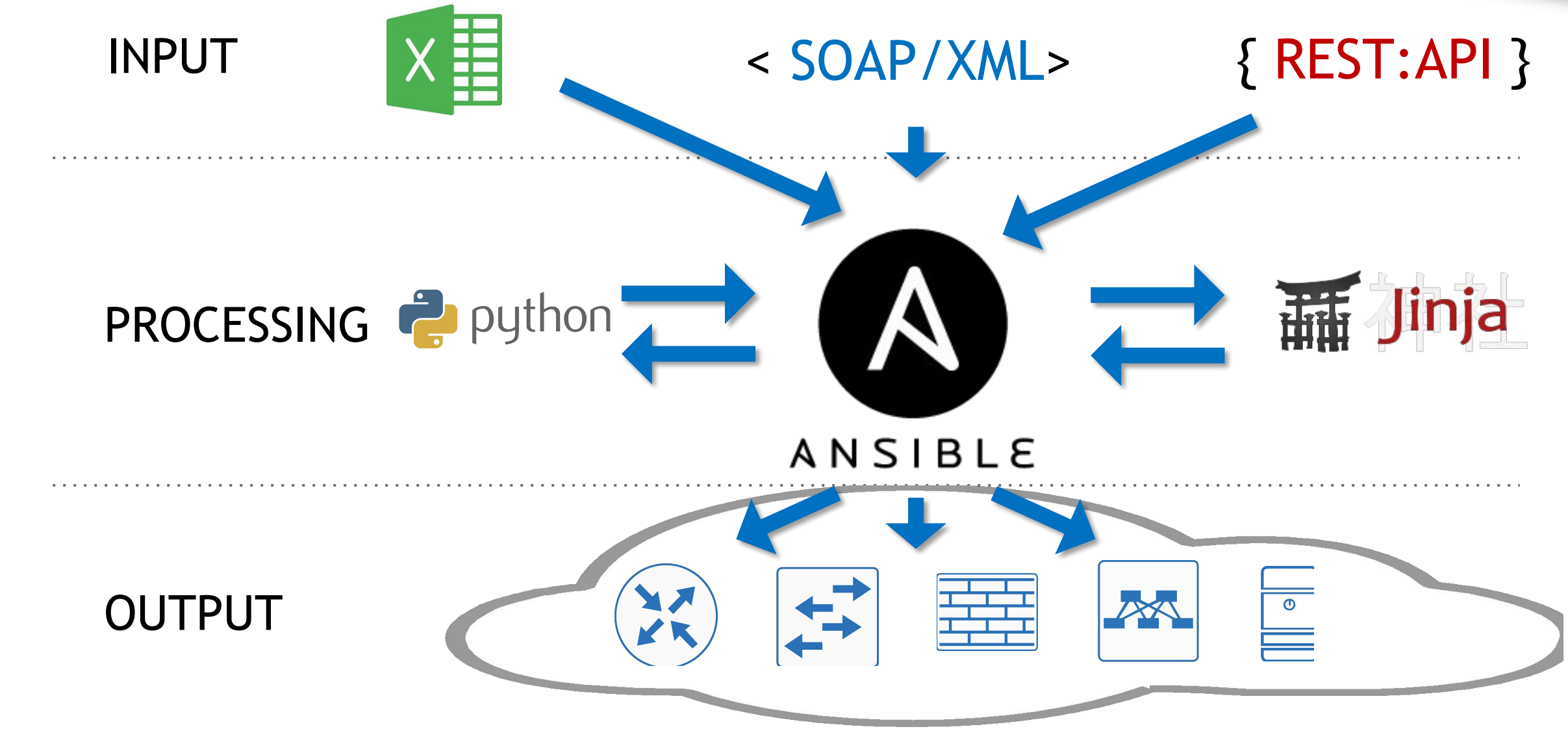
Why should you care about Ansible?

COLLECTION



Why should you care about Ansible?

PROVISIONING



How can Ansible help with Nokia SR OS?

How can Ansible help with Nokia SR OS?

Working with CLI...

WHY?

- Legacy SW versions don't support NETCONF
- Till 19.10.R1 there were no YANG model published
- There is an existing script-based automation

WHAT?

ANSIBLE

- Configuration of the network functions at mass scale
- Collection of the data from the network elements
- Working with the text-based files (e.g. CSV)

HOW?

- Usage of the Nokia SR OS specific Ansible modules
- Usage of the Jinja2 templates
- Usage of the modules to work with files

https://karneliuk.com/2016/12/ansible-part-2-parametrization-for-nokia-alcatel-lucent-sr-os-and-cisco-ios-xr/

How can Ansible help with Nokia SR OS?

Working with NETCONF...

WHY?

- Manage the network elements in the model-driven way
- Persistent configuration not-depending on the sequencing
- Easy integratable with controller

WHAT?

ANSIBLE

- Configuration of the network functions at mass scale
- Collection of the data from the network elements
- Working with devices using YANG modules

HOW?

netconf

- Usage of the NETCONF modules
- Automatic generation of the XML body out of the JSON input
- Assurance after the configuration

https://github.com/akarneliuk/service_provider_fabric

How can Ansible help with Nokia SR OS?

Working with REST API...

WHY?

- Integrate the devices in the end-to-end automation pipeline
- Most of the modern controllers have an REST API
- Avoid working locally with files

WHAT?

- Get the information out of the databases for device configuration
- Import the entries into the proper format as network plan
- Update the database with actual states

HOW?

{ REST:API }

- Usage of the URI modules
- Automatic conversion of the collected data into the Ansible variables
- All type of REST API requests

https://karneliuk.com/tag/rest-api/

How to collect data from Nokia routers using Ansible?

How to collect data from Nokia routers using Ansible?

Ansible can be installed using yum tool or using python installation tool (pip)
The latest available version is 2.9.3

```
# sudo yum install ansible
# ansible --version
```

CONFIG

```
$ cat
/etc/ansible/ansible.cfg
#
# Config files
# abc
#
```

INVENTORY

```
$ cat /etc/ansible/hosts
[network]
XR1
SR1
EOS1
VX1

$ cat /etc/hosts
192.168.100.51 XR1
192.168.100.52 EOS1
192.168.100.53 VX1
192.168.100.54 SR1
```

PLAYBOOK

```
$ cat ~/your_proj/play.yml
---
- name: NETWORK MANAGEMENT
  hosts: nokia
  gather_facts: yes
  connection: netwwork_cli

  tasks:
    - name: DO SOME STUFF
      sros_command:
        commands:
          - doing stuff
...
```

How to collect data from Nokia routers using Ansible?

Playbook structure:

DEFINITION

```
$ cat simple_playbook.yml
---
- hosts: VX1
  connection: local
  gather_facts: no

  tasks:
    - name: COLLECT INFO
      sros_commands:
        commands:
          - show interface
...
```

Header statements

Tasks

How to collect data from Nokia routers using Ansible?

Ansible modules for Nokia:

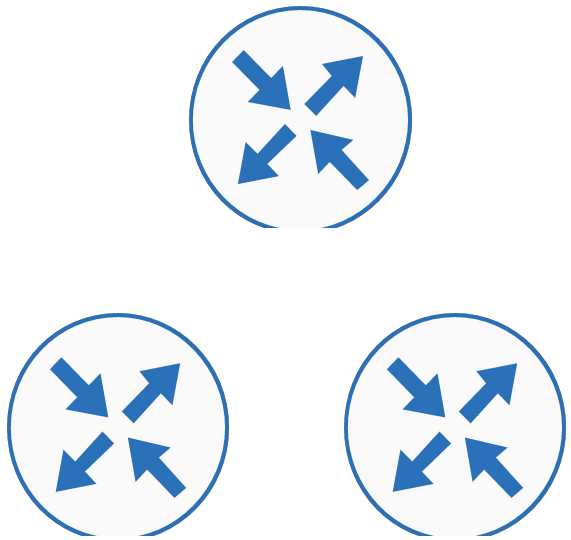
https://docs.ansible.com/ansible/latest/modules/list_of_network_modules.html#sros

How to collect data from Nokia routers using Ansible?

Ideas about workflow:

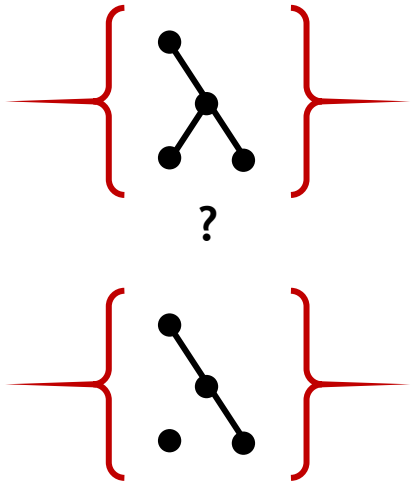
Collect operational data

NOKIA



Compare with the baseline

ANSIBLE



Generate a diff report

Jinja

```
{% if A == B %}
Status: OK
{% else %}
Status: NOT OK
{% endif %}
```

How to collect data from Nokia routers using Ansible?

sros_command – Run commands on remote devices running Nokia SR OS

Sends arbitrary commands to an SR OS node and returns the results read from the device. This module includes an argument that will cause the module to wait for a specific condition before returning or timing out if the condition is not met.

DEFINITION

```
$ cat simple_playbook.yml
---
- hosts: nokia_devices
  connection: network_cli
  gather_facts: no

  tasks:
- name: run multiple commands and evaluate the output
  sros_command:
    commands:
      - show version
      - show port detail
...
```

How to collect data from Nokia routers using Ansible?

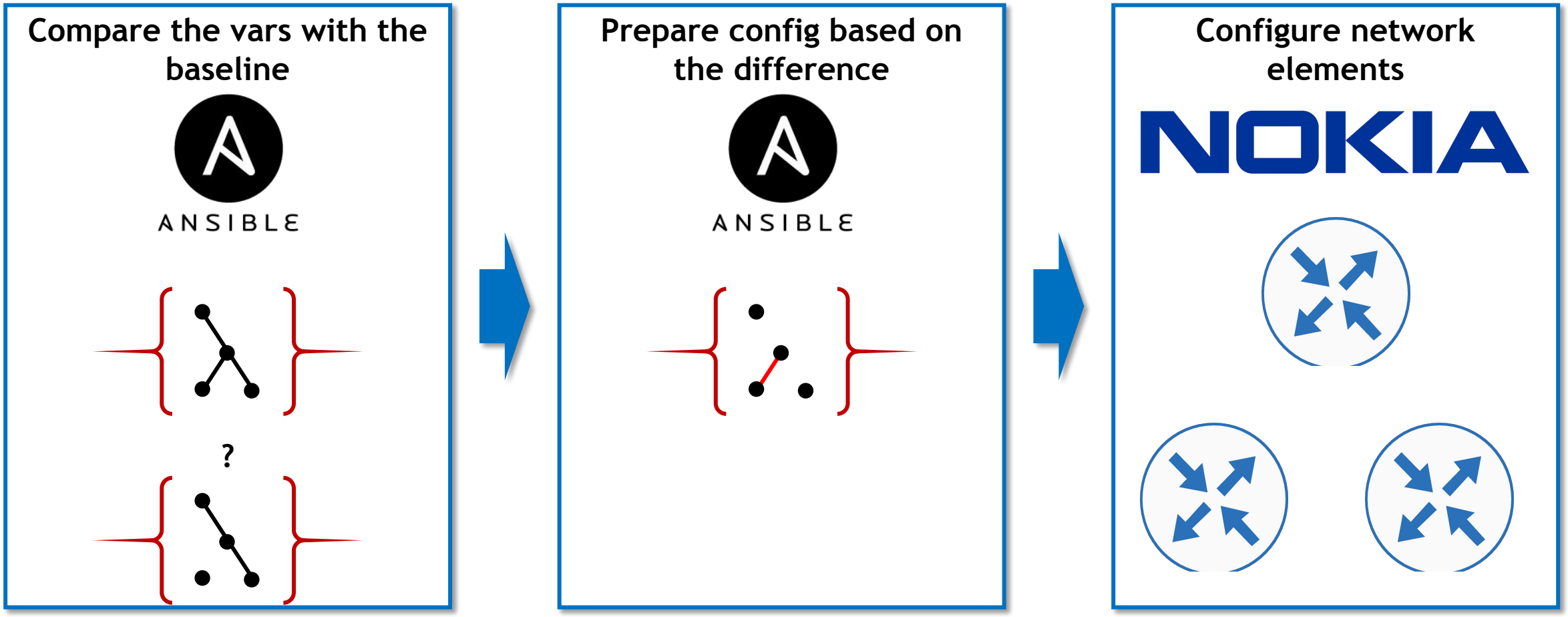
[LIVE DEMO] Data collection from the Nokia router using Ansible

Time to get hands dirty!

How to configure Nokia routers using Ansible?

How to configure Nokia routers using Ansible?

Ideas about workflow:



How to configure Nokia routers using Ansible?

sros_config – Manage Nokia SR OS device configuration

Nokia SR OS configurations use a simple block indent file syntax for segmenting configuration into sections. This module provides an implementation for working with SR OS configuration sections in a deterministic way.

DEFINITION

```
$ cat simple_playbook.yml
---
- hosts: nokia_devices
  connection: network_cli
  gather_facts: no

  tasks:
  - sros_config:
      lines:
        - name "{{ inventory_hostname }}"
      parents:
        - configure
        - system
...
```

How to configure Nokia routers using Ansible?

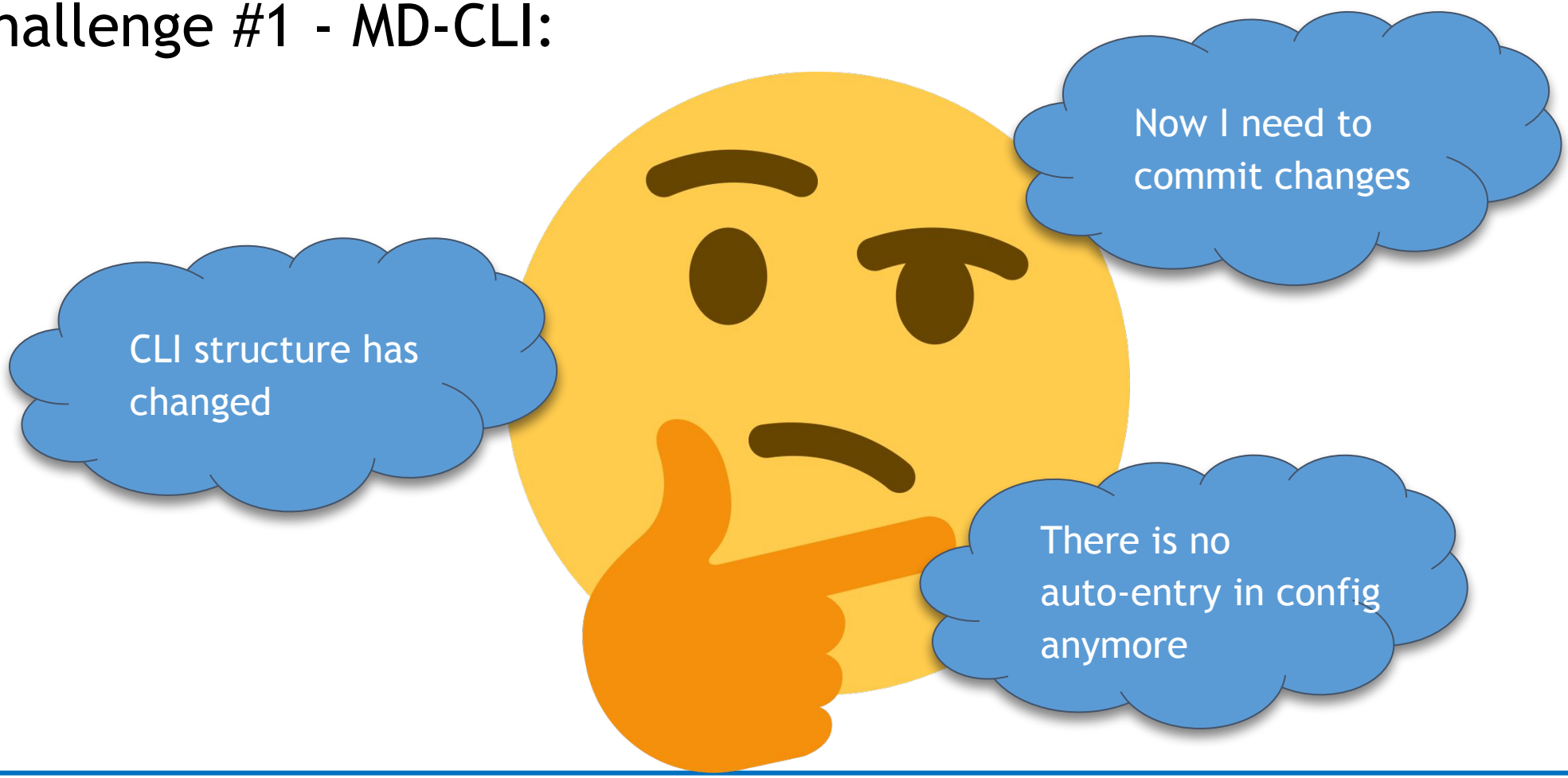
[LIVE DEMO] Configuration of the Nokia router using Ansible

Time to get hands dirty!

What’s next?

What’s next?

Challenge #1 - MD-CLI:



https://karneliuk.com/2018/06/model-driven-command-line-interface-md-cli-in-nokia-sr-os-16-0/

What's next?

Challenge #1 - MD-CLI: Modify your playbook

DEFINITION

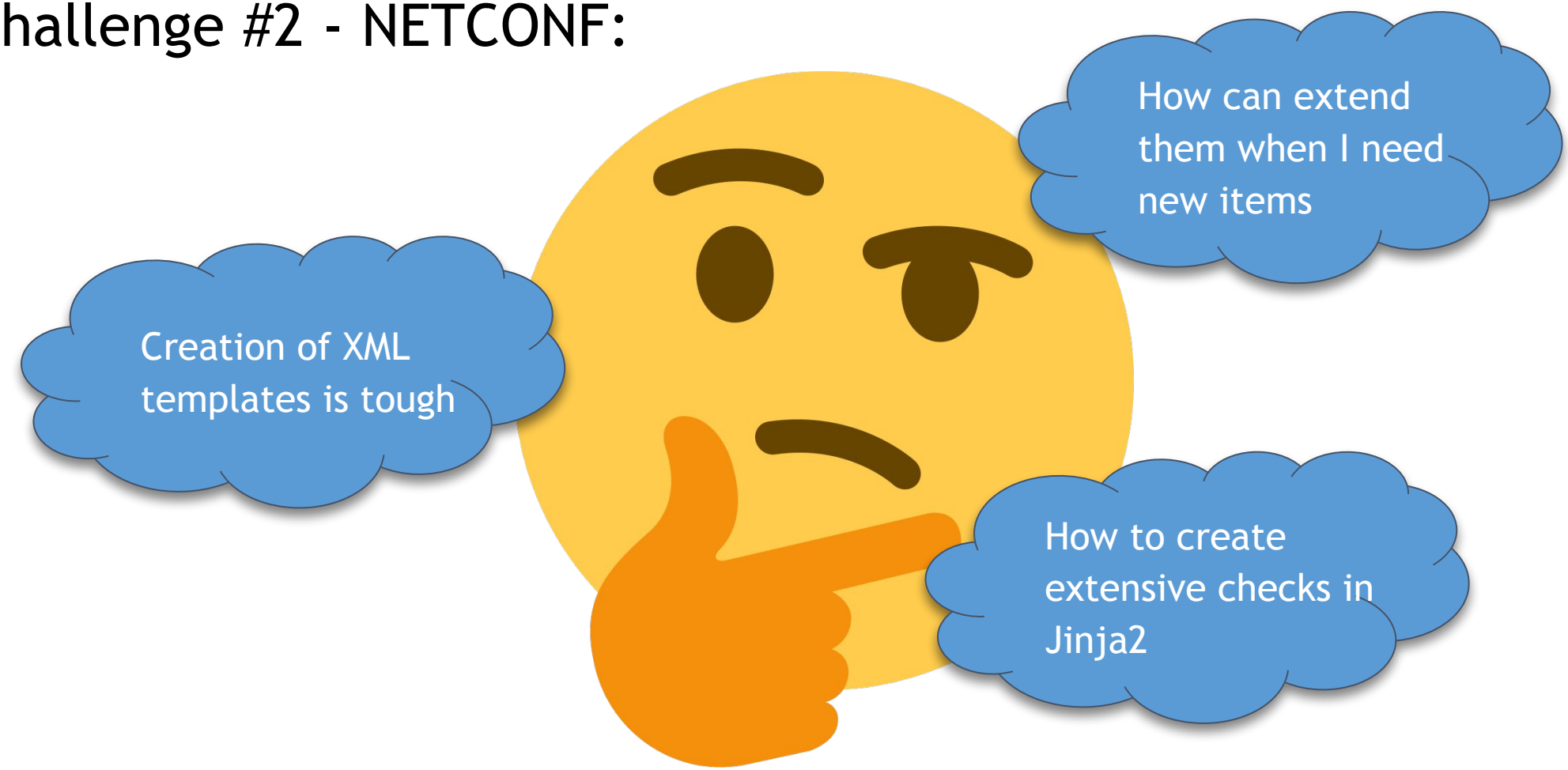
```
$ cat simple_playbook.yml
---
- hosts: nokia_devices
  connection: network_cli
  gather_facts: no

  tasks:
  - sros_config:
      lines:
        - name "{{ inventory_hostname }}"
        - commit
      parents:
        - configure global
        - system
```

https://karneliuk.com/2018/06/model-driven-command-line-interface-md-cli-in-nokia-sr-os-16-0/

What’s next?

Challenge #2 - NETCONF:



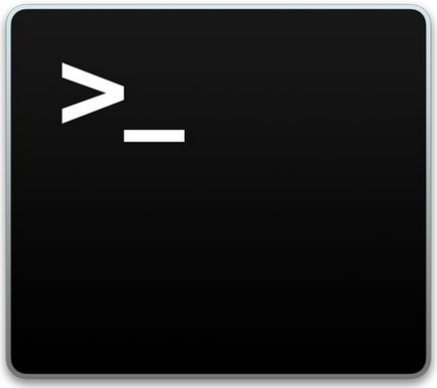
What's next?

Challenge #2 - NETCONF: Use automatic JSON/XML conversion

Create JSON file

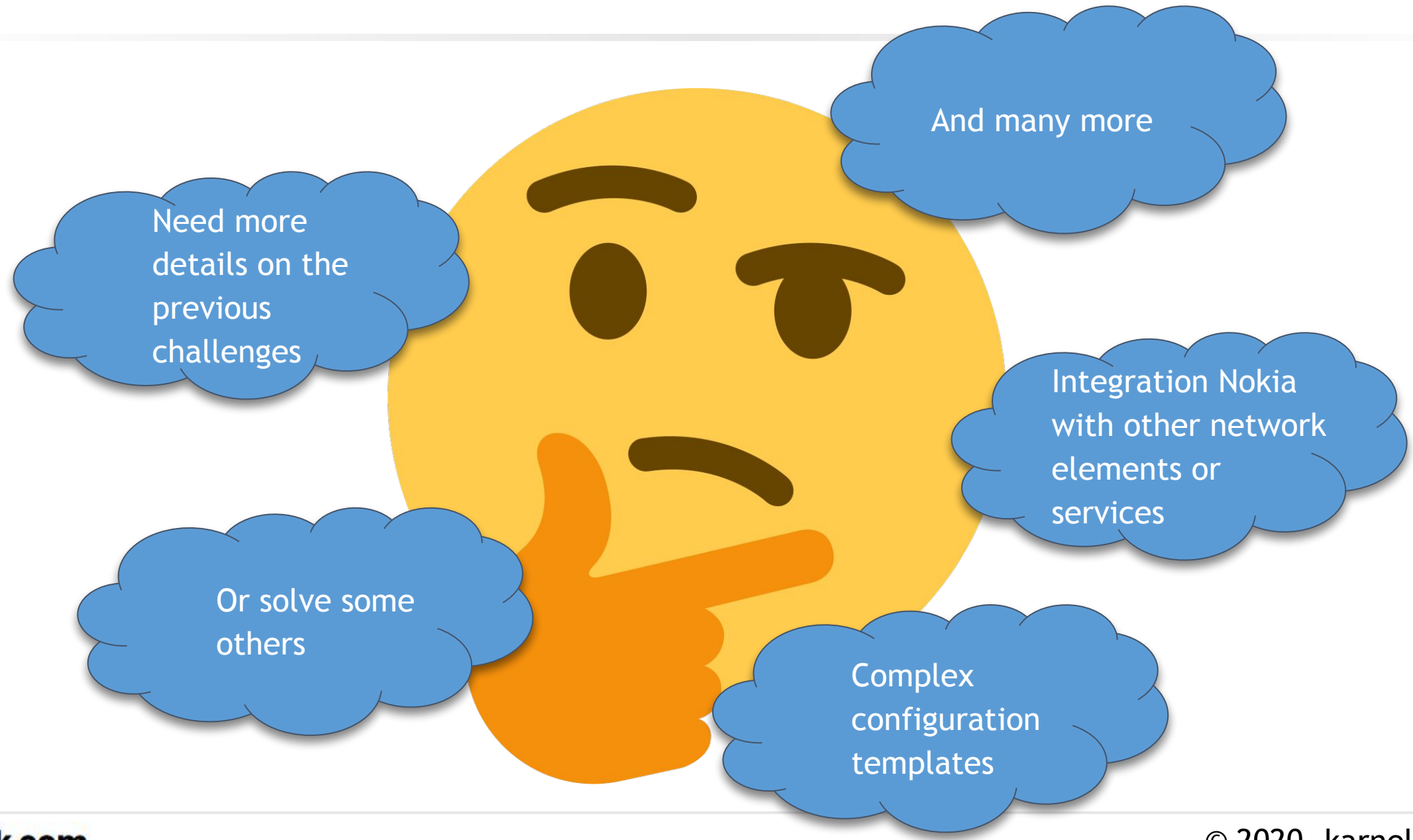
Convert it into XML

Use XML into NETCONF message



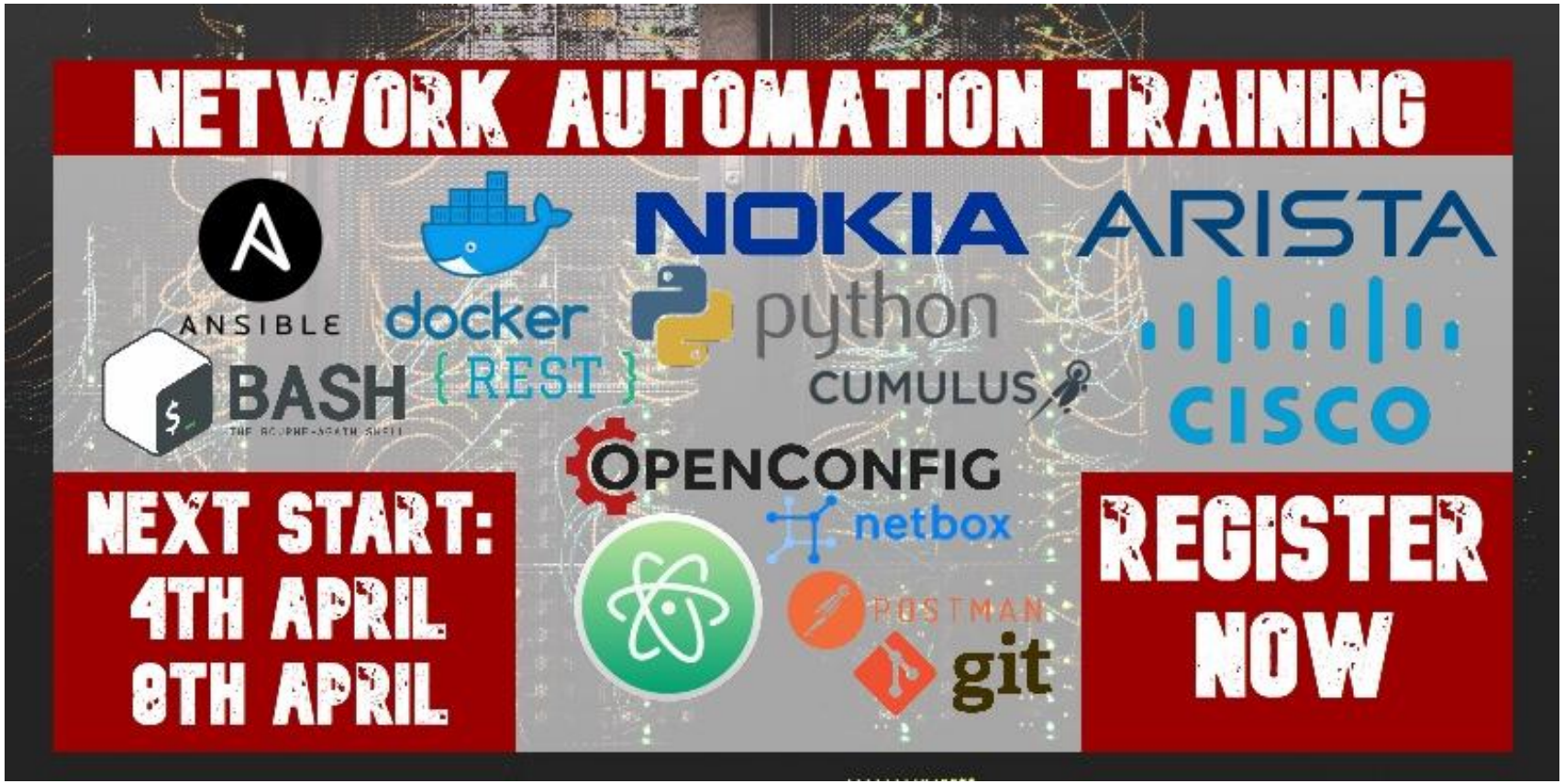
https://karneliuk.com/2018/08/openconfig-part-3-advanced-openconfig-w-ansible-for-arista-eos-cisco-ios-xr-and-nokia-sr-os-route-policy-bgp-and-interfaces-again/

What’s next?



What's next?

Join us to learn much more about network automaton:



https://training.karneliuk.com

Thank you very much for your attention!

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Backup

About karneliuk.com

Brief description

In industry: since 2007
Education: MSc. Telecommunication
Certificates: 2x CCIE #49412 (RS, SP), NRS1, CAPM, ITIL-F
Industry-recognized blog about a multivendor interop, SDN, automation and programmability: https://karneliuk.com
GitHub repo with multivendor SDN and network automation: https://github.com/akarneliuk
Speaker: Cisco Live 2019, SReXperts 2019
Author: Network Programmability and Automation, Volume 1, Cisco Press
Awards: #CiscoChampion 2019/2020 as one of the top tech influencers world-wide

Anton Karneliuk

Delivered projects in

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Expertise with

cisco NOKIA paloalto DELL {REST} ANSIBLE Terraform Grafana Kapacitor docker OPENCONFIG
ARISTA CUMULUS Mellanox WatchGuard Vagrant influxdb netbox KVM