Ansible III

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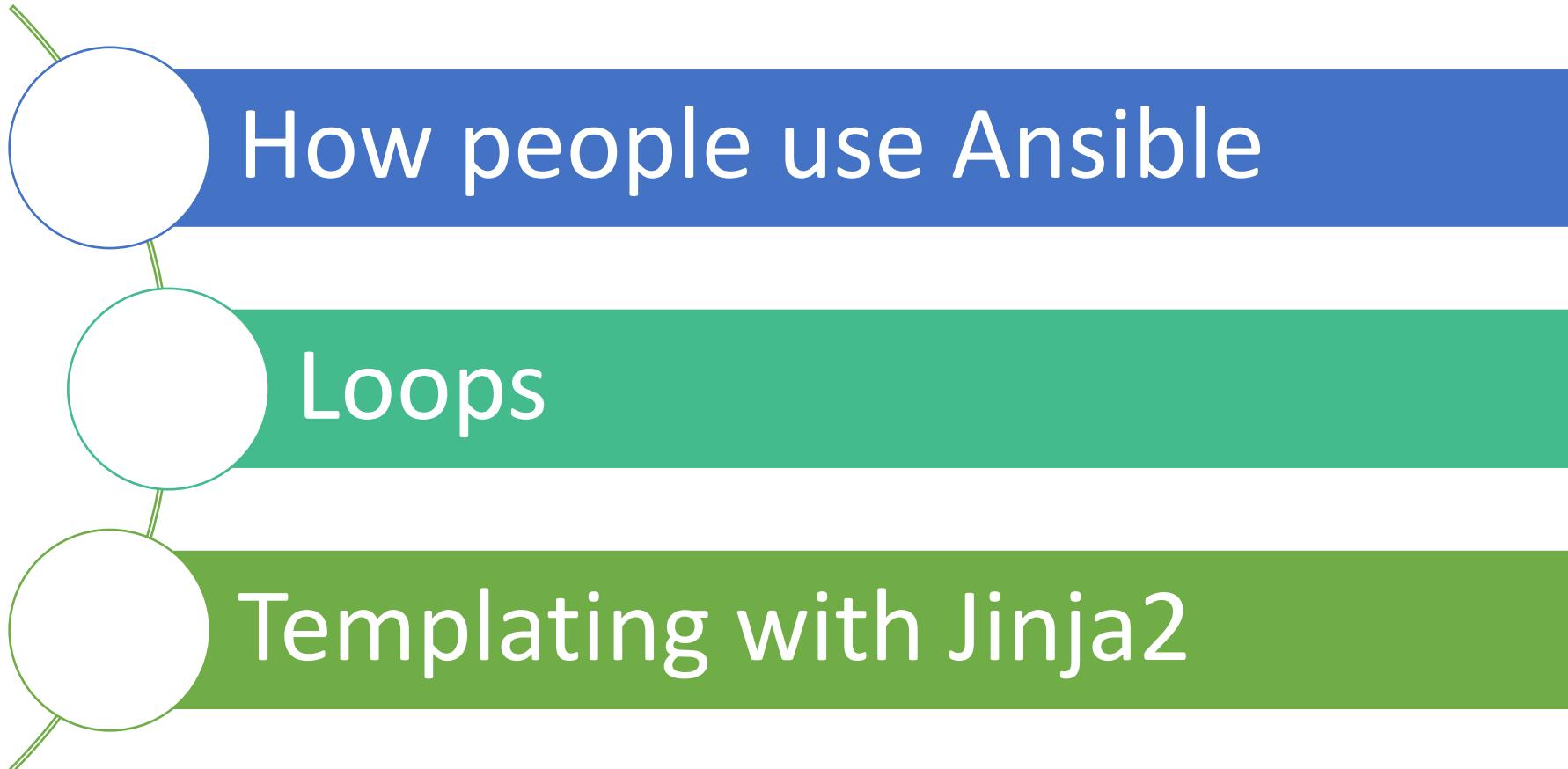
OAV training by the GÉANT project:

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In this section…

How people use Ansible

Loops

Templating with Jinja2

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How People Use Ansible

- Non-Ansible setup, run playbooks against device
  - Change default password
  - Hostname
  - Management IP address
  - Default route

- Ansible for full config
  - Subsequent changes via job-specific roles

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Loops

```yaml
- name: Print out PIM Rendezvous Point
  debug:
    msg:
    - Detected a PTP server.
    - Its IP address is {{ ptp_server }}
  when: ptp_server is defined


- name: Print out a variable
  ansible.builtin.debug:
    var: command_result
```

```
show interface description | include [Vv][Mm][Ww][Aa][Rr][Ee]
```

↓

```
vmware_ports: "['Et3','Et7','Et8','Et10','Et11']"
```

```yaml
---

- name: Push VLANs to switches
    vars:
      new_vlan_id: 60
    eos_config:
      lines:
        - switchport trunk allowed vlan add {{ new_vlan_id }}
      parents: interface {{ item }}
    with_items: "{{ vmware_ports }}"
```

```
eos_config:
  lines:
    - switchport trunk allowed vlan add {{ new_vlan_id }}
  parents: interface {{ item }}
with_items: "{{ vmware_ports }}"
```

```
eos_config:
  lines:
    - switchport trunk allowed vlan add {{ new_vlan_id }}
  parents: interface {{ item }}
register: results
loop: "{{ vmware_ports }}"
```

```yaml
  eos_config:
    lines:
      - switchport trunk allowed vlan add {{ new_vlan_id }}
    parents: interface {{ item }}
register: results
loop:
    - Et1
    - Et3
```

```yaml
-name: Using dict2items
  ansible.builtin.debug:
    msg: "{{ item.key }} - {{ item.value }}"
  loop: "{{ tag_data | dict2items }}"
  vars:
    tag_data:
        Environment: dev
        Application: payment
```

Retrying a task

```yaml
- name: Retry a task until a certain condition is met
  ansible.builtin.shell: tail -50 /var/log/radius.log
  register: result
  until: result.stdout.find("Ready to process requests") != -1
  retries: 5
  delay: 10
```

Changing Loop Variables

```yaml
eos_config:
  lines:
    - switchport trunk allowed vlan add {{ new_vlan_id }}
  parents: interface {{ interface_name }}
register: results
loop: "{{ vmware_ports }}"
loop_control:
  loop_var: interface_name
  index_var: count
  label: "Adding VLAN #{{ count }} : {{ interface }}"
```

Templating with Jinja2

- Jinja2 – a templating language for Python
  - Simple expressions
  - Built-in functions and filters
  - Control structures
  - Extensible

- Ansible executes plays & tasks in a Jinja2 context
  - ...which is why we can use {{ variable_name }} in playbooks
  - Template module

```
domain_name: networky-things.hea.net
time_zone: "Europe/Dublin"


target_version: 4.25.0F
swi_url: "tftp:192.0.2.1/EOS-{{ target_version }}.swi"
```

```
{# Bless you, oh contextual comment-writers! #}


system {
    hostname     {{ inventory_hostname }};
    domain-name {{ domain_name }};
    time-zone    {{ time_zone }};
}
```

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```
{{ ansible_facts['inventory_hostname'] }}


{
"ansible_all_ipv4_addresses": [ "REDACTED IP ADDRESS" ],
"ansible_all_ipv6_addresses": [ "REDACTED IPV6 ADDRESS" ],
"ansible_architecture": "x86_64",
"ansible_bios_date": "11/28/2020",
…
}
```

```
hostvars['sw1']['ansible_facts']['my_variable']
```

```
loopback :
    interface:    citywest-sw1
    ipv4:         192.0.2.250
    ipv4sub:      255.255.255.255
```

```
interface {{ loopback['interface'] }}

  ip address {{loopback.ipv4}} {{loopback.ipv4sub}}
```

```yaml
- name: Create Apache2 config from template
   ansible.builtin.template:
     src:      apache_conf.j2
     dest:     /etc/apache/apache2.conf
```

```yaml
- name: Create bgp config from template
   template:
     src:    bgp.j2
     dest:   configs/bgp.conf
```

```
{% if my_hostname is defined %}
hostname {{ my_hostname }}
{% else %}
hostname Forgotten_Hostname
{% endif %}
```

```
{% if defined(my_hostname) %}
hostname {{ my_hostname }}
{% else %}
hostname Forgotten_Hostname
{% endif %}
```

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```
{% if defined(my_hostname) %}
hostname {{ my_hostname }}
{% else %}
hostname Forgotten_Name
{% endif %}
```

```
hostname {{ my_hostname | default("Forgotten_Name") }}
```

```yaml
vars:
  ntp_servers:
    - ntp1.heanet.ie
    - ntp2.heanet.ie
```

```jinja
{% for clock in ntp_servers %}
ntp server {{ clock }}
{% endfor %}
```

```
vars:
  ntp_servers: ntp.heanet.ie
```

```
{% if ntp_servers is string %}
ntp server {{ ntp_servers }}
{% else %}
{% for clock in ntp_servers %}
ntp server {{clock}}
{% endfor %}
```

```
vars:
  ntp: ntp.heanet.ie
```

```
{% if ntp is iterable and ntp is not string %}
  {% for clock in ntp %}
ntp server {{ clock }}
  {% endfor %}
{% else %}
ntp server {{ ntp }}
{% endfor %}
```

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```
radsecrets:
  radius1.heanet.ie: Random%1234567
  radius2.heanet.ie: pwgen123rocks!
  radius3.heanet.ie: super^seekrit9
```

```
{% for radname,radsecret in radsecrets.items() %}
set radius-server {{radname}} {{radsecret}}
{% endfor %}
```

```
{% for radname,radsecret in radsecrets.iteritems() %}

  {% if loop.first %}
! RADIUS configuration
  {% endif}


set radius-server {{radname}} {{radsecret}}


  {% if loop.last %}
! Processed {{radsecrets.length}} RADIUS servers
  {% endif %}

{% endfor %}
```

```
radsecrets:
  radius1.heanet.ie: Random%1234567
  radius2.heanet.ie: pwgen123rocks!
```

```
"radsecrets.keys()": [
        "radius1.heanet.ie",
        "radius2.heanet.ie"
]

"radsecrets.values()": [
        "Random%1234567",
        "pwgen123rocks!"
]
```

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```yaml
---
- hosts: junos_routers
  tasks:
  - junos_command:
      commands: "show bgp summary| display json"
    register: result


  - set_fact: bgp_json="{{result.stdout[0]}}"


  - set_fact:
bgp_table="{{bgp_json.bgp-information.bgp-peer }}"
```

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Setting Facts

```
{% if "Loopback " in "{{interface_name}}" %}
{% set Has_Loopback = True %}
{% endif %}


{% if "{{interface_name}}" | regex_search('Loopback') %}
  ip address {{device_ipv4}} 255.255.255.255
{% else %}
  ip address {{device_ipv4}} {{device_subnet}}
{% endif %}
```

```yaml
---
acls:
  noweb:
    - deny tcp any any eq 80
    - permit ip any any
```

```jinja
{% for name,list in acls.items() %}
ip access-list extended {{ name }}

  {% for line in list %}
    {% set count = loop.index * 10 %}
  {{count}} {{line}}
  {% endfor %}

{% endfor %}
```

Jinja2 Indentation Control

- Jinja code (if/for) does not produce output…
  - …but the newlines stay…
  - …which makes diffs with device configs interesting

- You can supress this with Jinja2 variables

```
#jinja2:trim_blocks: True
```

Jinja2 Indentation Control (cont.)

```
#jinja2: trim_blocks: True, lstrip_blocks: True

{% for device in network_cards %}
interface {{device.name}}
  ip address {{device.ipv4}} {{device.ipv4subnet}}
  description {{device.description}}
  no shutdown
{% endfor %}
```

```yaml
- name: Assemble ssh config from a directory
  ansible.builtin.assemble:
    src: /etc/ssh/conf.d/
    dest: /etc/ssh/sshd_config
    regexp: ".conf$"
    validate: usr/sbin/sshd -t -f %s
```

```yaml
- name: Assemble router configs
  assemble:
    src: config-snippets/{{inventory_hostname}}
    dest: full_configs/{{inventory_hostname}}.conf
```

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Macros

```
{% macro banner() -%}
banner motd ^

================================================

| Stay away, evildoer!
| This device is private property

================================================

^
{% endmacro -%}


{{ banner() }}
```

```yaml
interfaces:
  - name: Ethernet10
    role: desktop
  - name: Ethernet11
    role: printer
```

```jinja
{% macro default_desc(interface_role) %}
Unused port for a {{ interface_role }}
{% endmacro %}

{% for interface in interfaces %}
interface {{ interface.name }}
  description {{ default_desc(interface.role) }}
{% endfor %}
```

```
interface Ethernet10
  description Unused port for a desktop
interface Ethernet11
  description Unused port for a printer
```

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Thank you

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