

18/03/2019Ansible Concepts

# ANSIBLE CONCEPTS

Ansible Introduction

➔ Ansible Concepts

Ansible Playbooks

Plugins & Dynamic inventories

Playbooks Advanced

Ansible Roles

AWX / Ansible Tower Overview

©2019 edc-4it B.V.

1

©c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# concepts

## overview

©2019 edc-4it B.V.

2.1

©c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# overview

inventory

playbooks

modules

```
[web]
10.20.1.2
10.20.1.3
[db]
monaco.example.com
```

play «many»

task

handler

Ansible module

2.2

©c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# inventory

## DEFINES TARGET SYSTEMS

### STATIC OR DYNAMIC

```
mail.example.com

[webservers]
web-1.example.com
web-2.example.com

[dbservers]
psql-1.example.com
psql-2.example.com
psql-3.example.com
```

May user other formats

2.3

©c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# MODULES

## ACTION TO PERFORM

(e.G. `package`, `copy`, `service...`, )

## IDEMPOTENT

1,600+ ansible modules

2.4

©c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# PLAYBOOK

## CONFIGURATION, DEPLOYMENT, AND ORCHESTRATION DSL

2.5

©c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# PLAYBOOK

CONFIGURATION, DEPLOYMENT, AND ORCHESTRATION DSL

```
- hosts: tv-series-web-servers
...
tasks:
- name: ensure https is at the latest version
  package:
    name: httpd
    state: present
- copy:
  src: resources/index.html
  dest: /var/www/html
- name: ensure apache is running
  service:
    name: httpd
    state: started
```

2.5

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# AD-HOC

## LOOK mum, NO PLAYBOOK

```
$ ansible all -m copy \
-a "src=resources/index.html dest=/var/www/html"

$ ansible all -a "cat /etc/os-release" # default->command module
```

Helpful for one-off and "getting started"

Otherwise not very useful

2.6

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# HOW ANSIBLE WORKS

(overview)

```
graph LR
    inventory[inventory] -- 1 lookup host --> Ansible[Ansible]
    Ansible -- 2 read module --> module[Ansible module]
    module -- 3 generate code --> script1[executable script]
    Ansible -- 4 copy sftp/scp --> target[target system]
    Ansible -- 5 execute script --> script2[executable script]
```

2.7

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# ANSIBLE INVENTORIES

3.1

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# HOSTS

```
mail.example.com
web-1.example.com
web-2.example.com
psql-1.example.com
psql-2.example.com
psql-3.example.com
```

3.2

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# GROUPS

```
mail.example.com

[webservers]
web-1.example.com
web-2.example.com
monaco.example.com

[dbservers]
psql-1.example.com
psql-2.example.com
psql-3.example.com
monaco.example.com
```

Notice **monaco** is in multiple groups

3.3

(c) 2019 edc-4it B.V.

18/03/2019

Ansible Concepts

# GROUP OF GROUPS

```
[webservers]
web-1.example.com
...

[dbservers]
psql-1.example.com
...

[restservers]
rest1-1.example.com

[centos:children]
webservers
dbservers
```

3.4

(c) 2019 edc-4it B.V.

18/03/2019

Ansible Concepts

# PASSING PORT INFORMATION

```
10.20.1.2
10.20.1.3:2222
10.20.1.4
```

More on this later

3.5

(c) 2019 edc-4it B.V.

18/03/2019

Ansible Concepts

# PASSING AN INVENTORY

using -i «file»	ansible -i myhosts
comma-separated	ansible -i "10.20.3.10,"
ansible.cfg	inventory = ../../setup/hosts

Same for ansible-playbook

3.6

(c) 2019 edc-4it B.V.

18/03/2019

Ansible Concepts

# PICKING HOSTS

USING **PATTERNS** TO HOSTS

```
$ ansible 10.20.* -i inv-range ...
$ ansible db.example.com:mail.example.com ...
```

PATTERNS normally a refers TO GROUPS

\$ ansible dbservers ...	# group
\$ ansible dbservers:mailservers ...	# list of groups
\$ ansible dbservers:!postgreservers ...	# exclude
\$ ansible dbservers:berlin ...	# intersect
\$ ansible ~(mail db).*\.example\.com ...	# regex

3.7

(c) 2019 edc-4it B.V.

18/03/2019

Ansible Concepts

# DEFAULT GROUPS

all, ungrouped

```
$ ansible all ...
$ ansible ungrouped ...
```

3.8

(c) 2019 edc-4it B.V.

18/03/2019

Ansible Concepts

# LISTING HOSTS

```
$ ansible dbservers -i hosts-groups --list-hosts
hosts (4):
psql-1.example.com
psql-2.example.com
psql-3.example.com
monaco.example.com
```

3.9

(c) 2019 edc-4it B.V.

18/03/2019
Ansible Concepts

# USING ansible-inventory

```
$ ansible-inventory -i my-hosts--graph
```

3 / 10

(c) 2019 edc-4it B.V.

18/03/2019
Ansible Concepts

# USING ansible-inventory

```
$ ansible-inventory -i my-hosts--graph
@all:
  |--@dbservers:
  | |--psql-1.example.com
  | |--psql-2.example.com
  |--@webservers:
  | |--web-1.example.com
  |--@ungrouped:
```

3 / 10

(c) 2019 edc-4it B.V.

18/03/2019
Ansible Concepts

# USING yaml

```
all:
  children:
    all:
      hosts:
        mail.example.com:
    dbservers:
      hosts:
        monaco.example.com:
        psql-1.example.com:
        psql-2.example.com:
        psql-3.example.com:
    webservers:
      hosts:
        monaco.example.com:
        web-1.example.com:
        web-2.example.com:
```

3 / 11

(c) 2019 edc-4it B.V.

18/03/2019
Ansible Concepts

# CONFIG

4 / 1

(c) 2019 edc-4it B.V.

18/03/2019
Ansible Concepts

# THREE LEVELS

3. ansible.cfg
2. environment variables
1. command line options (some)

4 / 2

(c) 2019 edc-4it B.V.

18/03/2019
Ansible Concepts

# ansible-config

Action	description
view	show active config contents
dump	show all values
list	list all available settings

4 / 3

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# EXAMPLE SETTING

## DEFAULT\_REMOTE\_USER

```
$ ansible-config list | grep -A 8 "DEFAULT_REMOTE_USER"
DEFAULT_REMOTE_USER:
  default: null
  description: [Sets the login user for the target machines, 'When ]
               connection plugin's default, normally the user currently exe
  env:
    - {name: ANSIBLE_REMOTE_USER}
  ini:
    - {key: remote_user, section: defaults}
  name: Login/Remote User
```

4.4

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# ansible.cfg

## LOCATION

1. ANSIBLE\_CONFIG
2. './ansible.cfg'
3. '~/ansible.cfg
4. /etc/ansible/ansible.cfg

) not from a "world-writable" directory

4.5

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# ansible.cfg EXAMPLE

```
[defaults]
inventory = hosts
host key checking = false
remote_user = vagrant
ask_pass = true
```

(from first lab)

4.6

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# VARIABLES & FACTS

5.1

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# SCOPES

Global	from configuration & environment variables
Play	var declarations inside playbook
Host	facts, host/group variables, set_fact

5.2

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# USED IN JINJA2

## TEMPLATES

```
{{proxy_address}}
"restarted {{service_name}}"
{{admin_email | lower}}
{{n + 10}}
{{ node_version is version('10.6', '>=') }}
{{a is superset(b)}}
```

More later!

5.3

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# PLAY SCOPE

```
---
- hosts: all
  user: vagrant
  vars:
    host: proxy01.example.com
    port_no: 8443
    proxy_address: http://{host}:{port_no}
  tasks:
    - name: Ensure proxy set in .npmrc
      blockinfile:
        path: "/home/vagrant/.npmrc"
        block: |
          proxy={{proxy_address}}
          https-proxy={{proxy_address}}
          marker: '# {mark} proxy settings'
          insertbefore: EOF
          create: yes
```

5.4

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# HOST SCOPE

## FACTS

GATHERED WHEN RUNNING PLAYBOOK  
(BY **setup** module)

```
ansible-playbook -i ../../setup/hosts play-scope.yaml

PLAY [all] *****

TASK [Gathering Facts] *****
ok: [10.20.1.3]
ok: [10.20.1.4]
ok: [10.20.1.2]

Can be Switched off gather_facts: no
```

5.5

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# calling **setup** ad-HOC

```
$ ansible -i ../../setup/hosts all -m setup -u vagrant

{
  "ansible_all_ipv4_addresses": [
    "10.0.2.15",
    "10.20.1.4"
  ],
  ...
  "ansible_env": {
    "HOME": "/home/vagrant",
    "LANG": "en_GB.UTF-8",
    "LESSOPEN": "|/usr/bin/lesspipe.sh %s",
    ...
  },
  ...
}
```

many, many(!) facts

5.6

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# USING FACTS

```
...
blockinfile:
  path: "{{ ansible_env.HOME }}/.npmrc"
  block: |
    proxy={{proxy_address}}
    https-proxy={{proxy_address}}
    marker: '# {mark} proxy settings'
  insertbefore: EOF
  create: yes
```

5.7

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# LOCAL FACTS

/etc/ansible/facts.d/

- ini or json files
- executables (STDOUT json)

Location can be overridden using `fact_path`

5.8

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# HOST SCOPE

## Inventory

HOST variables

collection of facts for *specific* host

GROUP variables

collection of facts for a *group* host

5.9

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# inside inventory

## HOST VARIABLE (INI FILES)

```
[webservers]
node01 ansible_user=thomas conf_location=/etc/app.conf
node02 ansible_user=thomas conf_location=/var/app.conf
node03 ansible_user=thomas
...
```

5. 10

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# inside inventory

## HOST VARIABLE (YAML)

```
all:
  children:
    webservers:
      hosts:
        node01:
          ansible_user: thomas
          conf_location: /etc/app.conf
        node02:
          ansible_user: thomas
          conf_location: /var/app.conf
        node03:
          ansible_user: thomas
```

5. 11

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# inside inventory

## GROUP VARIABLE (INI FILES)

```
[webservers]
node01
node02
node03

[webservers:vars]
ansible_user=thomas
logfile_location=/var/log
```

5. 12

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# inside inventory

## GROUP VARIABLE (YAML)

```
all:
  children:
    webservers:
      vars:
        ansible_user: thomas
        logfile_location: /var/log
      hosts:
        node01:
        node02:
        node03:
```

5. 13

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# inside inventory

## sePARATING group\_vars/ hosts\_vars/

```
logfile_location: /var/log
proxy: proxy0.example.com
```

May omit file extension

5. 14

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# MAGIC VARIABLES

- `hostvars[grp]` - access vars of other hosts
- `group_names` - array of host' groups
- `groups` - all groups/hosts
- `ansible_play_hosts` - list of active hosts
- ...

5. 15

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# ANSIBLE MODULES

## overview

6.1

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# USE BY ansible TO INTERACT WITH SYSTEMS

6.2

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# MOST are IDEMPOTENT

6.3

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# USED on command line or WITHIN PLAYS

6.4

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# EXAMPLE MODULES

Module	Description
Command	Executes a Single command <i>without</i> an environment
Shell	Executes a scripts or set of commands while <i>including</i> an environment
Copy	Copy a file/directory
Template	Generate a file based on facts and copy it

6.5

(c) 2019 edc-4it B.V.

18/03/2019Ansible Concepts

# command line examples

```
$ ansible localhost -m ping
$ ansible localhost -m shell -a whoami
$ ansible localhost -m shell -a hostname
$ ansible localhost -m setup -a 'filter=ansible_hostname'
$ ansible localhost -m shell -a '~/scripts/test.sh'
$ ansible localhost -m copy -a 'src=/tmp/test dst=/home/user01'
$ ansible -v localhost -m file \
  -a "path=~/.test recurse=no state=absent"
$ ansible -v localhost -m file \
  -a "path=~/.test/test recurse=yes state=directory"
```

6.6

(c) 2019 edc-4it B.V.



18/03/2019

Ansible Concepts

LAB 2

ANSIBLE CONCEPTS

7

(c) 2019 edc-4it B.V.

18/03/2019

Ansible Concepts

done!

Ansible Introduction

Ansible Concepts

➔ Ansible Playbooks

Plugins & Dynamic inventories

Playbooks Advanced

Ansible Roles

AWX / Ansible Tower Overview

8

(c) 2019 edc-4it B.V.