CONFIGURE A SLURM CLUSTER WITH ANSIBLE

CSC - IT Center for Science Ltd

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FGCI/CSC

What we do - homogeneousish configuration.

STACK:

- Ansible, CentOS7, CVMFS/Easybuild, Dell, Infiniband
- KVM, NFSv4, NorduGrid ARC, PXE/kickstart, **Slurm**

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AGENDA

- history of ansible-role-slurm
- ansible modules, tasks, playbooks and roles
- what ansible-role-slurm does
- how to use it
- other tools

CREDITS / HISTORY

- @A1ve5
- @jabl
- me
- @passerim

ANSIBLE IS A CONFIG MANAGEMENT TOOL

- maybe similar to puppet, quattor, cfengine, salt, chef
- no daemon, uses ssh for push mode or cronjob for pull
- quick poll

AN ANSIBLE TASK

```
- name: start and enable slurmctld
  service: name={{ slurmctld_service }} state=started enabled=yes
```

AN ANSIBLE-PLAYBOOK:

```
- hosts: install,compute
  remote_user: root
  roles:
    - ansible-role-pam
    - ansible-role-nhc
    - ansible-role-slurm
```

A PLAYBOOK WITH TAGS (AND SUDO):

```
- hosts: install,compute
  remote_user: cloud-user
  become: True
  roles:
    - { role: ansible-role-pam, tags: [ 'auth', 'pam' ] }
    - { role: ansible-role-nhc, tags: [ 'nhc', 'slurm' ] }
    - { role: ansible-role-slurm, tags: [ 'slurm' ] }
```

WHAT DOES ANSIBLE-ROLE-SLURM DO?

- ansible-playbook install.yml --tags=slurm --list-tasks

... too many

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what it does (shortest version)

CONFIGURE ALL THE THINGS FOR SLURM

picture.png

what it does (shorter version)

configure:

- one service node
- one dbd node (could be the same as the service node)
- submit nodes
- compute nodes

what it does (short version)

- add yum repo, install slurm, munge, mysql
- add users
- create directories
- template in config files (slurm, gres, cgroup.conf)
- generate or copy in munge key
- create cluster in accounting
- setup epilog
- increase sysctl values
- setup PAM + security/access.conf to restrict ssh access

ANOTHER EXAMPLE

```
- name: install common Slurm packages
  package: name={{ item }} state=present
  with_items: "{{ slurm_packages }}"
  when: slurm_packages.0 != ""
```

SLURM.CONF AND ANSIBLE JINJA VARIABLES

```
ClusterName={{ slurm_clustername }}
ControlMachine={{ slurm_service_node }}
```

```
- name: sacctmgr show cluster siteName and store in slurm_clusterlist variable
  command: "sacctmgr -n show cluster {{ siteName }}"
  register: slurm_clusterlist
  always_run: yes
  changed_when: False

- name: add cluster to accounting
  command: "sacctmgr -i add cluster {{ siteName }}"
  when: slurm_clusterlist.stdout.find("{{siteName}}") == -1
```

(SINGLE CENTOS7 NODE) PART 1

```
#If the node has hostname "slurm-ansible" configure your ssh/config so you can ssh-
sudo yum install ansible
mkdir -p slurm_workdir/{files,roles,group_vars/all}; cd slurm_workdir
git clone https://github.com/CSC-IT-Center-for-Science/ansible-role-slurm roles/ansib
git clone https://github.com/jabl/ansible-role-pam roles/ansible-role-pam
git clone https://github.com/CSC-IT-Center-for-Science/ansible-role-nhc roles/ansible
cp roles/ansible-role-slurm/tests/inventory .
cp roles/ansible-role-slurm/tests/test.yml .
$EDITOR inventory # put "slurm-ansible" under [install] and [compute]
$EDITOR test.yml # for sudo set these in test.yml:
# remote_user: $USER
# become: True
ansible-playbook -i inventory test.yml --diff # Then run ansible!
```

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```
skipping: [slurm-ansible]

TASK [ansible-role-pam : lineinfile add admin groups to /etc/security/access.conf] ***
skipping: [slurm-ansible] => (item=admin)
skipping: [slurm-ansible] => (item=root)
skipping: [slurm-ansible] => (item=wheel)

TASK [ansible-role-pam : lineinfile deny all at the end of /etc/security/access.conf] ***
skipping: [slurm-ansible]

TASK [ansible-role-slurm : Slurm OS dependent variables] **********************
ok: [slurm-ansible] => (item=/home/myusername/Git3/slurm_workdir/roles/ansible-role-slurm/vars/
RedHat_7.yml)

TASK [ansible-role-slurm : BUILD. update all packages first] ******************
skipping: [slurm-ansible]

TASK [ansible-role-slurm : Remove duplicate CentOS repos] *********************
skipping: [slurm-ansible]

TASK [ansible-role-slurm : install EPEL6] *************************************
skipping: [slurm-ansible]

TASK [ansible-role-slurm : install EPEL7] *************************************
skipping: [slurm-ansible]

TASK [ansible-role-slurm : install softwar                red to build slurm] ***********
skipping: [slurm-ansible] => (item=[])

TASK [ansible-role-slurm : debug] *********************************************
skipping: [slurm-ansible]

TASK [ansible-role-slurm : Add FGI slurm repo] ********************************
changed: [slurm-ansible]
--- before
+++ after: dynamically generated
@@ -0,0 +1,6 @@
+[fgislurm]
+name=fgislurm
+baseurl=http://idris.fgi.csc.fi/fgci7/x86_64/fgcislurm1508
+enabled=1
+gpgcheck=1
+gpgkey=file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CSC-GRID-2


TASK [ansible-role-slurm : Import FGI slurm repo key] *************************
ok: [slurm-ansible]

TASK [ansible-role-slurm : Install FGCI repo] *********************************
ok: [slurm-ansible]

TASK [ansible-role-slurm : install common Slurm packages] *********************
```

(SINGLE NODE) PART 2

If you want 16.05 set this variable (for example in test.yml):

```
- fgci_slurmrepo_version: "fgcislurm1605"
```

WHAT ARE THE (GOOD) DEFAULTS?

- All the settings in slurm.conf are variables
- It is possible to add new settings to slurm.conf without modifying the role (add new items to an ansible variable)

NICE-TO-HAVE-LIST:

- When to restart or just SIGHUP after a config change?
- Topology Generation
- HA
- Complete Testing (setup a slurm cluster and even submit a job on every change to the ansible role)
- slurm updates

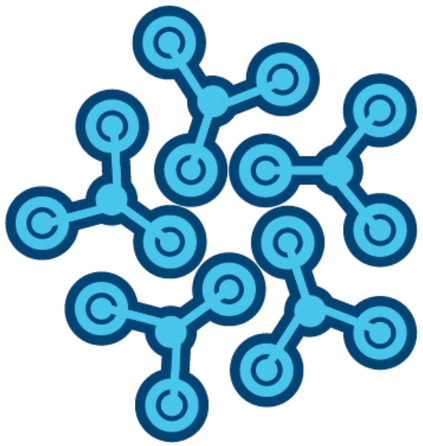
how we work / release management:

~8 clusters in Finland (the ones part of FGCI) are using https://github.com/CSC-IT-Center-for-Science/fgci-ansible which uses this ansible-role-slurm role. Triton is the largest cluster with ~613 nodes

ansible-galaxy and **requirements.yml** to restrict which version/commit of an ansible role is used

Travis CI

Grafana



InfluxDB

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SCALING

- ansible-pull
- local git-mirror
- http proxies

FIN

https://gitpitch.com/CSC-IT-Center-for-Science/ansible-role-slurm/gitpitch

@martbhell