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本手順は Contrail Command から Contrail Contrail Controller(2005)、Contrail Insight(Appformix)、OpenStack(Queens), K8S(1.14)をインストールする手順となる。

最新 Version の Install は本手順を参考に以下を参照下さい

https://www.juniper.net/documentation/en_US/contrail20/information-products/pathway-pages/contrail-install-and-upgrade-guide.html

Contrail Version 毎に Supported SW Version は異なっているため、以下の通りインストールする必要がある

https://www.juniper.net/documentation/en_US/release-independent/contrail/topics/reference/contrail-supported-platforms.pdf

環境情報 :

Network:

Mgmt - 192.168.0.0/24

Data1 - 192.168.1.0/24

Data2 - 192.168.2.0/24

Server:

Contrail Command	: 192.168.0.2
Contrail Controller	: 192.168.0.3 / 192.168.1.3
Appformix	: 192.168.0.6 / 192.168.1.6
Appformix Flow	: 192.168.0.7 / 192.168.1.7
OpenStack Controller	: 192.168.0.9 / 192.168.1.9
OpenStack Compute1	: 192.168.0.41 / 192.168.1.41
OpenStack Compute2	: 192.168.0.42 / 192.168.2.42
K8S Master	: 192.168.0.8 / 192.168.1.8
K8S Worker1	: 192.168.0.31 / 192.168.1.31
K8S Worker2	: 192.168.0.32 / 192.168.2.32

HA 構成の場合、Contrail Controller、OpenStack Controller をそれぞれ 3 台用意

※Contrail Command は冗長不可

Step0: OS Install

上記 10 台のサーバに CentOS 7 をインストールし、IP Address 設定、SELINUX Permissive、Yum Update を実施。

本手順では割愛する

Step1: Contrail Command Install

Docker Install

```
yum install -y yum-utils device-mapper-persistent-data lvm2
yum-config-manager --add-repo https://download.docker.com/linux/centos/docker-ce.repo
yum install -y docker-ce-18.03.1.ce
systemctl enable docker
systemctl start docker
```

Contrail Image Download のため、hub.juniper.net に login

```
docker login hub.juniper.net --username xxxx --password xxxx
```

以下で使用可能な Tag を確認(今回は 1912.32 を使用)

```
curl https://xxxx:xxxx@hub.juniper.net/v2/contrail/contrail-command/tags/list
```

Contrail Image Download

```
docker pull hub.juniper.net/contrail/contrail-command-deployer:2005.62
```

command_servers.yml を作成

```
---
user_command_volumes:
- /opt/software/appformix:/opt/software/appformix
- /opt/software/xflow:/opt/software/xflow

command_servers:
  server1:
    ip: 192.168.0.2
    connection: ssh
    ssh_user: root
    ssh_pass: contrail123
    sudo_pass: contrail123
    ntpserver: 210.173.160.27

    registry_insecure: false
    container_registry: hub.juniper.net/contrail
    container_tag: 2005.62
    container_registry_username: xxxx
    container_registry_password: xxxx
    config_dir: /etc/contrail

    contrail_config:
      database:
        type: postgres
        dialect: postgres
        password: contrail123
      keystone:
        assignment:
          data:
            users:
              admin:
                password: contrail123
      insecure: true
      client:
        password: contrail123
```

Contrail Command Install

```
docker run -td --net host -v /root/command_servers.yml:/command_servers.yml --privileged --name contrail_command_deployer hub.juniper.net/contrail/contrail-command-deployer:2005.62
```

Install 状況を以下で確認

```
docker logs -f contrail_command_deployer
```

以下のように failed が 0 であれば Install 完了

```
PLAY RECAP *****
192.168.0.2      : ok=51 changed=29 unreachable=0 failed=0
localhost       : ok=4  changed=2  unreachable=0 failed=0
```

以下のように contrail_psql, contrail_command_deployer が Up していることを確認

```
[root@command ~]# docker ps
CONTAINER ID   IMAGE                                COMMAND                  CREATED
STATUS        PORTS          NAMES
a060eab2baec   circleci/postgres:10.3-alpine      "docker-entrypoint.s..." 2 minutes
ago           Up 2 minutes   contrail_psql
beaae205299a   hub.juniper.net/contrail/contrail-command-deployer:1912.32 "/entrypoint.sh
/bin..." 4 minutes ago Up 4 minutes   contrail_command_deployer
```

Step2: Contrail Cluster, OpenStack Install

ここからは Contrail Command に GUI アクセスし、必要な設定を行う

<https://192.168.0.2:9091>

Error! Filename not specified.

Step2.1 Credential 登録

Credentials -> Add をクリック

Error! Filename not specified.

user/pass = root/contrail123 の Credential を作成

Error! Filename not specified.

Step2.2 インベントリ登録

Servers -> Add をクリック

Error! Filename not specified.

Contrail Controller^②のインベントリを作成

②Hostname: contrail , Credential: root, eth0: 192.168.0.3 , eth1: 192.168.1.3

Error! Filename not specified.

Error! Filename not specified.

上記同様に以下のインベントリを作成

Hostname: **appformix** , Credential: **root**, **eth0: 192.168.0.6** , **eth1: 192.168.1.6**

Hostname: **appformix-flow**, Credential: **root**, eth0: 192.168.0.7 , eth1: 192.168.1.7
Hostname: **os-ctl**, Credential: **root**, eth0: 192.168.0.9 , eth1: 192.168.1.9
Hostname: **os-cmp1**, Credential: **root**, eth0: 192.168.0.41 , eth1: 192.168.1.41
Hostname: **os-cmp2**, Credential: **root**, eth0: 192.168.0.42 , eth1: 192.168.2.42
Hostname: **k8s-master**, Credential: **root**, eth0: 192.168.0.8 , eth1: 192.168.1.8
Hostname: **k8s-worker1**, Credential: **root**, eth0: 192.168.0.31 , eth1: 192.168.1.31
Hostname: **k8s-worker2**, Credential: **root**, eth0: 192.168.0.32 , eth1: 192.168.2.32

Step2.3 Provisioning Option

Container Registry Username: **xxxx**

Container Registry Password: **xxxx**

NTP Server: **210.173.160.27**

Contrail Version: **1912.32**

CONTROL_NODES: **192.168.1.3** <--- Contrail Controller の DataPlaneInterface IP

PHYSICAL_INTERFACE: **eth1** <--- Contrail Controller の DataPlaneInterface Name

CONTRAIL_CONTAINER_TAG: **2005.62**

Error! Filename not specified.

HA 構成の場合、CONTROL_NODES は以下のように設定
192.168.1.3,192.168.1.4,192.168.1.5

Step2.4 Control Node

Contrail Controller 用 Server を Assigned Control nodes へ移行

※Role は自動で付与される

Error! Filename not specified.

HA 構成の場合、"High availability mode"にチェックをいれ、Contrail Controller を 3 台追加

Step2.5 Orchestrator Node

Orchestrator Type: OpenStack

Assigned OpenStack nodes に os-ctl を移行

Customize Configuration に以下を指定

```
nova.conf: |
    [libvirt]
    virt_type=qemu
    cpu_mode=none
```

Kolla Global に以下を指定

enable_haproxy: no

enable_ironic: no

enable_swift: yes

swift_disk_partition_size: 20GB

Error! Filename not specified.

Error! Filename not specified.

HA 構成の場合、Kolla Global に以下を追加し、OpenStack Controller 3 台を assigned openstack node に追加
kolla_internal_vip_address : 192.168.0.98
enable_haproxy: yes

※各 OpenStack Controller で HAProxy が稼働し、いずれか 1 台で VIP(192.168.0.98)が付与される
※Contrail 用も本 VIP が使用される

Step2.6 Compute Node

vRouter をインストールするサーバを Assigned Compute Node に移行

※今回は os-cmp1, os-cmp2 に vRouter をインストールする

Default vRouter Gateway は vRouter の Default Gateway(xmpp 接続用の DataPlane 側)

Error! Filename not specified.

Step2.7 Service Node

Service Node は使用しないのでブランクのまま

Error! Filename not specified.

Step2.8 Appformix Node

Role のアサインは以下の通り

Appformix Controller : appformix_platform_node

Error! Filename not specified.

Step2.9 Appformix Flow Node

Option1: Telemetry Interface に Out of Band(mgmt)を使用する場合

Virtual IP Address は未使用の IP を指定

Error! Filename not specified.

Option2: Telemetry Interface に In Band(DataNet)を使用する場合

Management Virtual IP Address は未使用の IP を指定

Virtual IP Address は未使用の IP を指定

VLANID: ②telemetry 用に Interface を分ける場合は VLAN 0 で OK, Data Interface と同じであれば VLAN を指定

Error! Filename not specified.

Error! Filename not specified.

Step2.10 Provisioning

Provisioning をクリックし、Install 開始

Error! Filename not specified.

Contrail Command に SSH 接続し、以下のコマンドにてインストール状況の確認

```
docker exec contrail_command tail -f /var/log/contrail/deploy.log
```

Error! Filename not specified.

Successfully になればインストール完了

Step3: Login

OpenStack GUI :

<http://192.168.0.9> admin/contrail123

※HA の場合、VIP にアクセス

TungstenFabric GUI :

<http://192.168.0.3:8143> admin/contrail123

※HA の場合、VIP にアクセス

Contrail Command GUI:

<https://192.168.0.2:9091> admin/contrail123

Contrail Insight GUI:

<http://192.168.0.6:9000> admin/contrail123

OpenStack CLI :

Openstack controller に ssh 接続後、以下にて kolla_toolbox Container に Login

```
docker exec -it kolla_toolbox bash
```

以下にて環境ファイルを読み込むことで openstack コマンドが実行可能

```
source /var/lib/kolla/config_files/admin-openrc.sh
```

Step4. K8S Install

Contrail Command にて以下を実行

```
docker exec -it ansible-player_XXXXX bash
```

/var/tmp/contrail_cluster/XXXXXX/instances.yml

以下を追記

```
k8s-master:
  ssh_user: root
  ssh_pwd: contrail123
  provider: bms
  ip: 192.168.0.8
  roles:
    k8s_master:
      kubemanager:
        appformix_bare_host:
k8s-worker1:
  ssh_user: root
  ssh_pwd: contrail123
  provider: bms
  ip: 192.168.0.31
  roles:
    k8s_node:
```

```

appformix_bare_host:
vrouters:
  CONTROL_NODES: 192.168.1.3
  PHYSICAL_INTERFACE: eth1
  VROUTER_GATEWAY: 192.168.1.254
k8s-worker2:
  ssh_user: root
  ssh_pwd: contrail123
  provider: bms
  ip: 192.168.0.32
  roles:
    k8s_node:
      appformix_bare_host:
        vrouters:
          CONTROL_NODES: 192.168.1.3
          PHYSICAL_INTERFACE: eth1
          VROUTER_GATEWAY: 192.168.2.254

```

```

cd /root/contrail-ansible-deployer
ansible-playbook playbooks/configure_instances.yml -i inventory/ -
e config_file=/var/tmp/contrail_cluster/xxxx/instances.yml -e orchestrator=openstack

ansible-playbook playbooks/install_k8s.yml -i inventory/ -e orchestrator=openstack -
e config_file=/var/tmp/contrail_cluster/xxxx/instances.yml

ansible-playbook playbooks/install_contrail.yml -i inventory/ -e orchestrator=openstack -
e config_file=/var/tmp/contrail_cluster/xxxx/instances.yml

```

K8S Worker の coredns pod が Running にならない対応

Pod network に deploy される coredns pod は worker の /etc/resolv.conf に forward される設定になっている。

Default だと pod network は underlay に接続できないため、以下の設定を実施

10.47.255.253 は vRouter の IPAM Service IP

```

kubectl edit configmap -n kube-system coredns
-   forward . /etc/resolv.conf
+   forward . 10.47.255.253

```

```

kubectl edit deployment -n kube-system coredns
-> delete livenessProbe, readinessProbe Section

```

Step4. Insights Re-Install for K8S

[K8S Master]

/root/k8s_conf.yaml

```
apiVersion: v1
kind: ServiceAccount
metadata:
  name: appformix
```

```
kubectl create -f k8s_conf.yaml
kubectl describe serviceaccount appformix
kubectl create clusterrolebinding appformix-binding --clusterrole=cluster-admin --
serviceaccount=default:appformix
kubectl auth can-i get nodes --as=system:serviceaccount:default:appformix --all-namespaces
```

```
$ kubectl cluster-info | grep 'Kubernetes master'
Kubernetes master is running at https://192.168.0.8:6443
```

```
$ kubectl describe serviceaccount appformix
Name:          appformix
Namespace:     default
Labels:        <none>
Annotations:   <none>
Image pull secrets: <none>
Mountable secrets: appformix-token-2kcgw
Tokens:        appformix-token-2kcgw
Events:        <none>
```

```
$ kubectl describe secret appformix-token-2kcgw
Name:      appformix-token-2kcgw
Namespace: default
Labels:    <none>
Annotations: kubernet.es.io/service-account.name: appformix
            kubernet.es.io/service-account.uid: 0c0dc70e-a07b-11ea-ade7-5254001eb6d0

Type: kubernet.es.io/service-account-token

Data
====
ca.crt:   1025 bytes
namespace: 7 bytes
token:     eyJhbGciOiJIUzI1NiIsImtpZCI6Ij9.eyJpc3MiOiJrdWJlcm5ldGVzL3NlcnZpY2VhY2NvdW50Liwia3ViZXJuZXRlcy5pby9zX2J2aWNlYWVudC9uZW50L3NlcnZpY2UtYWVudC51aWQiOihyYjFiZjc2Mi1hMTljLTExZWEtOWM5ZC01MjU0MDAxZWl2ZDAiLCJzdWIiOiJeXN0ZW06c2VydmVudC9uZW50Lm5hbWUiOiJhcHBmb3JtaXgiLCJrdWJlcm5ldGVzLmlvL3NlcnZpY2VhY2NvdW50L3NlcnZpY2UtYWVudC51aWQiOihyYjFiZjc2Mi1hMTljLTExZWEtOWM5ZC01MjU0MDAxZWl2ZDAiLCJzdWIiOiJeXN0ZW06c2VydmVudC9uZW50Lm5hbWUiOiJhcHBmb3JtaXgibGciOiJrP6AtjuUtJ9iz1MOVcuQY8EOPxUzpy6ss5memCyGA$CM44DxrTFJ_R7_Eq4uWxdWvPBV9zgl0z05cPMKCSVEy0zxpnpu7voqp3R_VHCTKD7tQNodfuOOamtuDYO9_nBbH73tSisio6FPOZVhfz5dx5IK5hvlELcmuAc18vkN7W3g4eVk7GCLV4D9xCSP2Aughm7xPRUGtiofG2ASAAQWzNeNNzoFR3O14NtGjm1irrUA0_n
```

```
Data
====
ca.crt: 1025 bytes
namespace: 7 bytes
token: eyJhbGciOiJSUzI1NiIsImtpZCI6IiJ9.eyJpc3MiOiJrdWJlcm5ldGVzL3NlcnZpY2VhY2NvdW50Iiwia3ViZXJuZXRlcy5pby9zZXJ2aWVudC9uYWw1Iic3BhY2UiOiJkZWZhdWx0Iiwia3ViZXJuZXRlcy5pby9zZXJ2aWVudC9zZWNyZXQubmFtZSI6ImFwcGZvcmlpeC10b2t1bi00ZnlyNCIsImt1YmVybmV0ZXMuaW8vc2VydmljZWZfY291bnQvc2VydmljZS1hY2NvdW50Lm5hbWUiOiJhZHBmb3JtaXgiLCJrdWJlcm5ldGVzLmlvL3NlcnZpY2VhY2NvdW50L3NlcnZpY2UtYWVudC51aWQiOiJhYjFiZjc2Mi1hMThtjLTExZWEtOWM5ZC01MjU0MDAxZWl2ZDAiLCJzdWliOiJzeXN0ZW06c2VydmljZWZfY291bnQ6ZGVmYXVsdDphcHBmb3JtaXgifQ.jrP6AtjuUtJ9iz1MOVcuQY8EOPxUzpy6ss5memCyGASCM44DxrTFJ_R7_Eq4uWxdWvPBV9zgzloz05cPMKCSVEy0zxpnu7voqP3R_VHCTKD7tQNodfuOoAmtuDYO9_nBbH73tSisio6FPOZVhfz5dx5IK5hvlELcmuAc18vKN7W3g4eVkh7GCLV4D9xCSP2Aughm7xPRuGtiofG2ASAAQWzNeNNzoFR3O14NtGjm1irr9UA0_n
```

```
bQ9lsmCfEOKIJ1YU76WubzHBcRy72sB_sRvt2HcEplwP9UgTffCCMPDNh6Sz_7ip4tMi3d7Dvi3IOGLFGNQq  
qsKtAxIEQypdX37QQ
```

[OpenStack Dashboard]

"appformix" Project 作成

"appformix" Project"に appformix" User を作成

"appformix" User に admin Role をアサイン

[Contrail Command]

/opt/software/appformix/inventory/group_vars/all

以下を追加

```
kubernetes_platform_enabled: True  
kubernetes_cluster_url: https://192.168.0.8:6443  
kubernetes_auth_token: eyJhbGciOiJSUzI1NiIsImtpZCI6IiJ9.eyJpc3MiOiJrdWJlcm5ldGVzL3NlcnZpY2VhY2  
NvdW50liwia3ViZXJuZXRlcy5pby9zZXJ2aWNlYWNjb3VudC9uYW1lc3BhY2UiOiJkZWZhdWx0liwia3ViZXJu  
ZXRlcy5pby9zZXJ2aWNlYWNjb3VudC9zZWNyZXQubmFtZSI6ImFwcGZvcmlpeC10b2t1bi00ZnlyNCIsImt1Y  
mVybWV0ZXMuW8vc2VydmljZWJjY291bnQvc2VydmljZS1hY2NvdW50Lm5hbWUiOiJhcHBmb3JtaXgiLC  
JrdWJlcm5ldGVzLmlvL3NlcnZpY2VhY2NvdW50L3NlcnZpY2UtYWNjb3VudC51aWQiOiJhYjFiZjc2Mi1hMTh  
jLTExZW50ZW50MDAxZWJ2ZDAiLCJzdWliOiJzeXN0ZW06c2VydmljZWJjY291bnQ6ZGVmYXVs  
dDphcHBmb3JtaXgifQ.jrP6AtjuUtJ9iz1MOVcuQY8EOPxUzpy6ss5memCyGASCM44DxrTFJ_R7_Eq4uWxd  
WvPBV9zgloz05cPMKCSVEy0zxpnu7voqP3R_VHctKD7tQNodfuOoAmtuDYO9_nBbH73tSisio6FPOZVhfz5  
dx5IK5hviELcmuAc18vKN7W3g4eVkh7GCLV4D9xCSP2Aughm7xPRuGtiofG2ASAAQWzNeNNzoFR3O14Nt  
Gjm1irr9UA0_nbQ9lsmCfEOKIJ1YU76WubzHBcRy72sB_sRvt2HcEplwP9UgTffCCMPDNh6Sz_7ip4tMi3d7  
Dvi3IOGLFGNQqqsKtAxIEQypdX37QQ
```

/opt/software/appformix/inventory/hosts

以下を追加

```
[bare_host]  
192.168.0.8  ansible_user=root ansible_ssh_pass=contrail123  
192.168.0.31  ansible_user=root ansible_ssh_pass=contrail123  
192.168.0.32  ansible_user=root ansible_ssh_pass=contrail123
```

```
ssh-keygen -t rsa
```

```
ssh-copy-id -i ~/.ssh/id_rsa.pub root@192.168.0.3
```

```
ssh-copy-id -i ~/.ssh/id_rsa.pub root@192.168.0.7
```

```
ssh-copy-id -i ~/.ssh/id_rsa.pub root@192.168.0.8
```

```
ssh-copy-id -i ~/.ssh/id_rsa.pub root@192.168.0.31
```

```
ssh-copy-id -i ~/.ssh/id_rsa.pub root@192.168.0.32
```

```
ssh-copy-id -i ~/.ssh/id_rsa.pub root@192.168.0.6
```

```
ssh-copy-id -i ~/.ssh/id_rsa.pub root@192.168.0.9
```

```
ssh-copy-id -i ~/.ssh/id_rsa.pub root@192.168.0.41
```

```
ssh-copy-id -i ~/.ssh/id_rsa.pub root@192.168.0.42
```

```
pip install ansible==2.7.11
```

```
pip install PyYAML requests
```

```
cd /opt/software/appformix/  
ansible-playbook -i inventory/ --skip-tags=install_docker contrail-insights-  
ansible/appformix_openstack_on_kubernetes.yml
```

Step5. Insights Login

<http://192.168.0.6:9000>

Openstack : admin / contrail123

Kubernetes: "K8S-Master 内の/root/k8s_dashboard_token.txt"

Appformix : "Insights 内の/opt/appformix/etc/appformix_token.rst の TokenId"