

更新日 : 2020/3/1

本手順は Contrail(2003.1.40)、OpenStack(Queens)、Kubernetes を Ansible Deployer を使用し、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

OpenStack と K8S を同時にインストールする場合、Contrail Command からはインストールできず、Ansible を使用する必要がある

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:

Command + Ansible : 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 Node01 : 192.168.0.41 / 192.168.1.41

OpenStack Node02 : 192.168.0.42 / 192.168.2.42

K8S Master : 192.168.0.8 / 192.168.1.8

K8S Node01 : 192.168.0.31 / 192.168.1.31

K8S Node02 : 192.168.0.32 / 192.168.1.32

Step0: OS Install

上記 6 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: Ansible Install

Command+Ansible Server にて以下を実施

以下のサイトから `contrail-ansible-deployer-2003.1.40.tgz` をダウンロード

<https://support.juniper.net/support/downloads/>

```
yum -y install epel-release
```

```

yum -y install git sshpass
yum -y remove PyYAML python-requests
yum -y install python-pip
pip install ansible==2.7.10
pip install PyYAML requests
tar xzvf contrail-ansible-deployer-2003.1.40.tgz

```

Step2: Ansible を使用してインストールするサーバの事前設定

以下のファイルを編集

contrail-ansible-deployer/config/instances.yaml

<pre> global_configuration: CONTAINER_REGISTRY: hub.juniper.net/contrail CONTAINER_REGISTRY_USERNAME: xxxx CONTAINER_REGISTRY_PASSWORD: xxxx provider_config: bms: ssh_pwd: contrail123 ssh_user: root ntpserver: 210.173.160.27 domainsuffix: local instances: contrail1: provider: bms ip: 192.168.0.3 roles: config_database: config: control: analytics_database: analytics: analytics_alarm: analytics_snmp: webui: appformix_bare_host: # contrail-tsn: # provider: bms # ip: 192.168.0.12 # roles: # vrouter: # TSN_EVPN_MODE: True # openstack_compute: os-ctl: provider: bms ip: 192.168.0.9 roles: openstack: appformix_bare_host: </pre>	<pre> <- contrail registry の user name <- contrail registry の password <- provider_config は後述の instances で定義する 各サーバの共通設定 <- "instances"ではどのサーバにどの role を割り 当てるか(インストールするか)を設定する <- "contrail1"は contrail controller 用 <- contrail service node は ToR SW と OVSDDB 接続 するケースが必要。今回は不要のためコメント アウト <- os-ctl は openstack controller 用 </pre>
---	---

<pre> os-cmp1: provider: bms ip: 192.168.0.41 roles: openstack_compute: appformix_bare_host: vrouters: CONTROL_NODES: 192.168.1.3 PHYSICAL_INTERFACE: eth1 VROUTER_GATEWAY: 192.168.1.254 os-cmp2: provider: bms ip: 192.168.0.42 roles: openstack_compute: appformix_bare_host: vrouters: CONTROL_NODES: 192.168.1.3 PHYSICAL_INTERFACE: eth1 VROUTER_GATEWAY: 192.168.2.254 k8s-master: provider: bms ip: 192.168.0.8 roles: k8s_master: kubemanager: appformix_bare_host: k8s-worker1: 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: 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 </pre>	<p><- os-cmp1 は openstack compute 用。compute が複数台ある場合は本設定箇所をコピー</p> <p><- "CONTROL_NODES"には contrail controller の data plane 側 IP を指定(xmpp 接続用)。 "PHYSICAL_INTERFACE" は openstack compute node の data plane 側 interface 名を指定</p> <p><- k8s-master は kubernetes master 用</p> <p><- k8s-worker1 は kubernetes worker 用。worker が複数台ある場合は本設定箇所をコピー</p>
---	--

<pre> appformix: ip: 192.168.0.6 provider: bms roles: appformix_controller: appformix-flow: ip: 192.168.0.7 provider: bms roles: appformix_flows: appformix_bare_host: appformix_configuration: appformix_license: /opt/software/appformix/appformix-internal- openstack-k8s-3.1.sig xflow_configuration: clickhouse_retention_period_secs: 7200 loadbalancer_collector_vip: 192.168.0.99 kafka_broker_port: 9195 zookeeper_client_port: 3281 redis_port: 6479 contrail_configuration: CLOUD_ORCHESTRATOR: openstack CONTRAIL_VERSION: "2003.1.40" CONTRAIL_CONTAINER_TAG: "2003.1.40" # TSN_NODES: 192.168.1.12 RABBITMQ_NODE_PORT: 5673 ENCAP_PRIORITY: VXLAN,MPLSoUDP,MPLSoGRE AUTH_MODE: keystone KEYSTONE_AUTH_URL: http://192.168.0.9:35357/v3 KEYSTONE_AUTH_HOST: 192.168.0.9 KEYSTONE_AUTH_URL_VERSION: /v3 KEYSTONE_AUTH_ADMIN_TENANT: admin KEYSTONE_AUTH_ADMIN_USER: admin KEYSTONE_AUTH_ADMIN_PASSWORD: contrail123 KEYSTONE_AUTH_PROJECT_DOMAIN_NAME: default KEYSTONE_AUTH_USER_DOMAIN_NAME: default CONTROLLER_NODES: 192.168.0.3 CONTROL_NODES: 192.168.1.3 OPENSTACK_VERSION: queens kolla_config: </pre>	<pre> <- 2008 以降で不要 <- kafka_broker_port, zookeeper_client_port, redis_ port は appformix/xflow が同一サーバの場合に必要 <- contrail_configuration は contrail controller の設定。 "CLOUD_ORCHESTRATOR"は openstack, kubernetes を指定可能であり、本インストールでは両方を インストールするが、keystone 認証を使用する ため openstack を指定する必要がある <- openstack controller の mgmt ip を指定 <- contrail controller の mgmt ip <- contrail controller の data ip <- contrail controller の mgmt ip </pre>
--	--

```

customize:
  nova.conf: |
    [libvirt]
    virt_type=qemu
    cpu_mode=none
kolla_globals:
  contrail_api_interface_address: 192.168.0.3
  enable_haproxy: "no"
kolla_passwords:
  keystone_admin_password: contrail123

```

Step3: Ansible を使用して Contrail、OpenStack、K8S のインストール

<pre> cd contrail-ansible-deployer #ansible-playbook -i inventory/ playbooks/provision_instances.yml ansible-playbook -i inventory/ -e orchestrator=openstack playbooks/configure_instances.yml ansible-playbook -i inventory/ playbooks/install_openstack.yml ansible-playbook -i inventory/ -e orchestrator=openstack playbooks/install_k8s.yml ansible-playbook -i inventory/ -e orchestrator=openstack playbooks/install_contrail.yml </pre>	<pre> <-各 server の os install が可能だが今回は不要 <- 上記 instances.yml に記述した各 Server の基本設定を実施する <- openstack install <- kubernetes install <- contrail install </pre>
--	--

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
- proxy . /etc/resolv.conf
+ forward . 10.47.255.253

```

```

kubectl edit deployment -n kube-system coredns
-> delete livenessProbe, readinessProbe
-> 以下を削除
  livenessProbe:
  failureThreshold: 5
  httpGet:

```

```
path: /health
port: 8080
scheme: HTTP
initialDelaySeconds: 60
periodSeconds: 10
successThreshold: 1
timeoutSeconds: 5
```

Step4: Login

OpenStack GUI :

<http://192.168.0.9> admin/contrail123

TungstenFabric GUI :

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

K8S GUI :

<http://192.168.0.8:8443>

※loginに必要なtokenはk8s masterの/root/k8s_dashboard_token.txtに保存されている

OpenStack CLI :

Openstack controller に ssh 接続後、"docker exec -it kolla_toolbox bash"にて pod に接続
"source /var/lib/kolla/config_files/admin-openrc.sh"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

Step5: Contrail Command Install

※Contrail Command が不要の場合、本手順は不要

Step5.1 : Contrail Command Install のための事前準備

Ansible+Command サーバにて以下を実施

```
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-18.06.0.ce
systemctl enable docker
systemctl start docker

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

以下で使用可能な Tag を確認しファイルの取得(今回は 2003.1.40)

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

```
docker pull hub.juniper.net/contrail/contrail-command-deployer:2003.1.40
```

Appformix 準備(2008 以降で不要)

```
mkdir /opt/software
mkdir /opt/software/appformix
mkdir /opt/software/xflow
```



/opt/software/xflow に以下の Image を保存(2008 以降で不要)

```
appformix-flows-ansible-1.0.7.tar.gz
appformix-flows-1.0.7.tar.gz
```

/opt/software/appformix に以下の Image を保存(2008 以降で不要)

```
appformix-3.1.15.tar.gz
appformix-dependencies-images-3.1.15.tar.gz
appformix-kubernetes-images-3.1.15.tar.gz
appformix-lxc-images-3.1.15.tar.gz
appformix-network_device-images-3.1.15.tar.gz
appformix-openstack-images-3.1.15.tar.gz
appformix-platform-images-3.1.15.tar.gz
```

/opt/software/ppformix に License を保存(2008 以降で不要)

```
appformix-internal-kubernetes-3.1.sig
appformix-internal-openstack-3.1.sig
```

以下のファイルを作成

/root/command_servers.yml

```
---
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: "2003.1.40"
    container_registry_username: xxxx
    container_registry_password: xxxx
    config_dir: /etc/contrail
```

<-2008 以降で不要

<- Contrail Command の IP

<pre> contrail_config: database: type: postgres dialect: postgres password: contrail123 keystone: assignment: data: users: admin: password: contrail123 insecure: true client: password: contrail123 </pre>	<pre> <- OpenStack Install 時に指定した admin password </pre>
---	--

Step5.2: Contrail Command Install

インストール済みの Contrail, OpenStack, K8S を Import し、Contrail Command をインストールする

Ansible+Command サーバにて以下を実施

```
cp contrail-ansible-deployer/config/instances.yaml /root/cc-instances.yaml
```

Contrail Command は OpenStack, K8S どちらか片方しかサポートしていないため、K8S をコメントアウト

/root/cc-instances.yaml

```

# k8s-master:
# provider: bms
# ip: 192.168.0.8
# roles:
#   k8s_master:
#   kubemanager:
#   appformix_bare_host:
# k8s-worker1:
# provider: bms
# ip: 192.168.0.31
# roles:
#   k8s_node:
#   appformix_bare_host:
# vrouter:
#   CONTROL_NODES: 192.168.1.3
#   PHYSICAL_INTERFACE: eth1
#   VROUTER_GATEWAY: 192.168.1.254
# k8s-worker2:
# provider: bms

```

```
# ip: 192.168.0.32
# roles:
# k8s_node:
# appformix_bare_host:
# vrouter:
# CONTROL_NODES: 192.168.1.3
# PHYSICAL_INTERFACE: eth1
# VROUTER_GATEWAY: 192.168.2.254
```

```
docker run -td --net host -e orchestrator=openstack -e action=import_cluster -v
/root/command_servers.yml:/command_servers.yml -v /root/cc-instances.yml:/instances.yml --
privileged --name contrail_command_deployer hub.juniper.net/contrail/contrail-command-
deployer:2003.1.40
```

以下で Install 状況確認

```
docker logs -f contrail_command_deployer
```

Step5.3: Login

Contrail Command GUI:

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

Step6: Appformix Install

[Appformix]

```
yum install -y epel-release
yum groupinstall -y 'Development Tools'
yum install -y openssl-devel libffi libffi-devel
yum install -y python-pip python-devel
yum install -y docker-ce-18.06.0.ce
yum install -y libvirt-client
systemctl enable docker
systemctl start docker
pip install ansible==2.3.0
pip install markupsafe httplib2 requests
```

```
ssh-keygen -t rsa
ssh-copy-id -i ~/.ssh/id_rsa.pub root@k8s-master
ssh-copy-id -i ~/.ssh/id_rsa.pub root@k8s-worker1
ssh-copy-id -i ~/.ssh/id_rsa.pub root@k8s-worker2
ssh-copy-id -i ~/.ssh/id_rsa.pub root@appformix
ssh-copy-id -i ~/.ssh/id_rsa.pub root@os-ctl
ssh-copy-id -i ~/.ssh/id_rsa.pub root@os-cmp1
ssh-copy-id -i ~/.ssh/id_rsa.pub root@os-cmp2
```

[K8S Master]


```
cPMKCSVEy0zxpnu7voqP3R_VHCtKD7tQNodfuOoAmtuDYO9_nBbH73tSisio6FPOZVhfz5dx5IK5hvlELcmu
Ac18vKN7W3g4eVkh7GCLV4D9xCSP2Aughm7xPRuGtiofG2ASAAQWzNeNNzoFR3O14NtGjm1irr9UA0_n
bQ9lsmCfEOKIJ1YU76WubzHBcRy72sB_sRvt2HcEplwP9UgTffCCMPDNh6Sz_7ip4tMi3d7Dvi3l0GLFGNQq
qsKtAxIEQypdX37QQ
```

OpenStack Dashboard にて以下を実施

"appformix" Project 作成

"appformix" Project"に appformix" User を作成

"appformix" User に admin Role をアサイン

[Appformix Node]

以下の File を Download

```
appformix-3.1.15.tar.gz
appformix-dependencies-images-3.1.15.tar.gz
appformix-kubernetes-images-3.1.15.tar.gz
appformix-lxc-images-3.1.15.tar.gz
appformix-network_device-images-3.1.15.tar.gz
appformix-openstack-images-3.1.15.tar.gz
appformix-platform-images-3.1.15.tar.gz
```

K8S, OpenStack 用 Appformix License を保存

```
appformix-internal-openstack-k8s-3.1.sig
```

```
tar -xvzf appformix-3.1.15.tar.gz
cd appformix-3.1.15
mkdir group_vars
```

/root/appformix-3.1.15/inventory

```
[compute]
k8s-master
k8s-worker1
k8s-worker2
os-cmp1
os-cmp2
[appformix_controller]
appformix
[openstack_controller]
os-ctl
```

/root/appformix-3.1.15/group_vars/all

```
appformix_license: /root/appformix-internal-openstack-k8s-3.1.sig
appformix_docker_images:
- /root/appformix-dependencies-images-3.1.15.tar.gz
- /root/appformix-kubernetes-images-3.1.15.tar.gz
- /root/appformix-lxc-images-3.1.15.tar.gz
```

```
- /root/appformix-network_device-images-3.1.15.tar.gz
- /root/appformix-openstack-images-3.1.15.tar.gz
- /root/appformix-platform-images-3.1.15.tar.gz
appformix_version: 3.1.15
appformix_dns_version: 2
contrail_analytics_url: http://192.168.0.3:8081
contrail_config_url: http://192.168.0.3:8082
appformix_jti_network_device_monitoring_enabled: True
appformix_kvm_instance_discovery: True
network_device_discovery_enabled: True
appformix_network_device_monitoring_enabled: True
kubernetes_platform_enabled: True
openstack_platform_enabled: True
appformix_remote_host_monitoring_enabled: True
appformix_use_hypervisor_hostname: True
appformix_haproxy_datamanager_port_http: 8200
appformix_haproxy_datamanager_port_https: 8201
appformix_openstack_log_plugins:
- { plugin_info: 'certified_plugins/keystone_logparser.json',
  log_file_path: '/var/lib/docker/volumes/kolla_logs/_data/keystone/keystone.log' }
- { plugin_info: 'certified_plugins/neutron_logparser.json',
  log_file_path: '/var/lib/docker/volumes/kolla_logs/_data/neutron/neutron-server.log' }
- { plugin_info: 'certified_plugins/nova_logparser.json',
  log_file_path: '/var/lib/docker/volumes/kolla_logs/_data/nova/nova-api.log' }
appformix_plugins:
- '{{ appformix_network_device_factory_plugins }}'
- '{{ appformix_openstack_heavy_hitters_plugins }}'
- '{{ appformix_remote_host_factory_plugins }}'
- '{{ appformix_application_factory_plugins }}'
- '{{ appformix_contrail_factory_plugins }}'
- '{{ appformix_snmp_trap_factory_plugins }}'
# - '{{ appformix_flows_factory_plugins }}'
openstack_auth_url: http://192.168.0.9:35357/v3
openstack_project_domain_name: Default
openstack_user_domain_name: Default
openstack_username: admin
openstack_password: contrail123
openstack_project_name: admin
openstack_tenant_name: admin
openstack_identity_api_version: 3
openstack_interface: internal
openstack_baremetal_api_version: 1.29
kubernetes_cluster_url: https://192.168.0.8:6443
kubernetes_auth_token: eyJhbGciOiJSUzI1NiIsImtpZCI6IiJ9.eyJpc3MiOiJrdWJlcm5ldGVzL3NlcnZpY2VhY2NvdW50Iiwia3ViZXJuZXRlcy5pby9zZXJ2aWVudC9uYW1lc3BhY2UiOiJkZWZhdWx0Iiwia3ViZXJuZXRlcy5pby9zZXJ2aWVudC9zZWNyZXQubmFtZSI6ImFwc291bnR5cGU6Ym9keS1hY2NvdW50IiwiaWF0IjoiYm9keS1hY2NvdW50Lm5hbWUuOiJhcHBmb3JtaXg1LC
```

```
JrdWJlcm5ldGVzLmlvL3NlcnZpY2VhY2NvdW50L3NlcnZpY2UtYWNjb3VudC51aWQoOiJhYjFizjc2Mi1hMTh  
jLTeXZWEtOWM5ZC01MjU0MDAxZWl2ZDAiLCJzdWliOiJzeXN0ZW06c2VydmljZWJyY291bnQ6ZGVmYXVs  
dDphcHBmb3JtaXgifQ.jrP6AtjuUtJ9iz1MOVcuQY8EOPxUzpy6ss5memCyGASCM44DxrTFJ_R7_Eq4uWxd  
WvPBV9zgzloz05cPMKCSVEy0zxpnu7voqP3R_VHctKD7tQNodfuOoAmtuDYO9_nBbH73tSisio6FPOZVhfz5  
dx5lK5hvlELcmuAc18vKN7W3g4eVkh7GCLV4D9xCSP2Aughm7xPRuGtiofG2ASAAQWzNeNNzoFR3O14Nt  
Gjm1irr9UA0_nbQ9lsmCfEOKIJ1YU76WubzHBcRy72sB_sRvt2HcEplwP9UgTffCCMPDNh6Sz_7ip4tMi3d7  
Dvi3i0GLFGNqqqsKtAxIEQypdX37QQ
```

[OpenStack Controller]

```
docker exec -it kolla_toolbox bash  
cat /var/lib/kolla/config_files/admin-openrc.sh
```

[Appformix]

/root/appformix-3.1.15/openrc

```
export OS_PROJECT_DOMAIN_NAME=Default  
export OS_USER_DOMAIN_NAME=Default  
export OS_PROJECT_NAME=admin  
export OS_TENANT_NAME=admin  
export OS_USERNAME=admin  
export OS_PASSWORD=contrail123  
export OS_AUTH_URL=http://192.168.0.9:35357/v3  
export OS_INTERFACE=internal  
export OS_IDENTITY_API_VERSION=3  
export OS_REGION_NAME=RegionOne  
export OS_AUTH_PLUGIN=password  
export OS_BAREMETAL_API_VERSION=1.29
```

```
source openrc  
ansible-playbook -i inventory --skip-tags=install_docker appformix_openstack_on_kubernetes.yml
```

```
$ cat /opt/appformix/etc/appformix_token.rst  
{"Token": {"UserName": "", "Description": "Generated during Ansible installation 2020-05-  
28T03:04:21.872765Z", "Roles": ["admin"], "TokenId": "eea3b960-a08f-11ea-af0a-0242ac120005",  
"ExpiresAt": 1622084661000, "IssuedAt": 1590635063000}}
```

Appformix Login

<http://192.168.0.6:9000>

Openstack : admin / contrail123

Kubernetes: "kubernetes_auth_token"を使用

Appformix : eea3b960-a08f-11ea-af0a-0242ac120005

Step7: Appformix FlowInstall

[Appformix-Flow]

```
yum install -y docker-ce-cli-18.09.0-3.el7
```

```
yum install -y docker-ce-18.09.0-3.el7
systemctl enable docker
systemctl start docker
```

[Contrail Command]

```
docker exec -it contrail_command bash
```

[2005 以前]

```
cd /usr/share/contrail/appformix-ansible-deployer/xflow
source venv/bin/activate
bash deploy_xflow.sh /var/tmp/contrail_cluster/<cluster-id>/instances.yml
```

[R2005]

```
cd /usr/share/contrail/appformix-ansible-deployer/xflow
bash deploy_contrail_insights_flows.sh /var/tmp/contrail_cluster/<cluster-id>/instances.yml --cluster-id
<cluster_id>
```

Step6: Compute Node 追加

Step5 まで完了し、後から OpenStack Compute を追加したい場合は以下を実施

Ansible+Command サーバにて、Instances.yaml に以下を追加
contrail-ansible-deployer/config/instances.yaml

```
os-cmp2:
  provider: bms
  ip: 192.168.0.43
  roles:
    vrouter:
      CONTROL_NODES: 192.168.1.11
      PHYSICAL_INTERFACE: eth1
      VROUTER_GATEWAY: 192.168.1.254
  openstack_compute:
```

```
ansible-playbook -i inventory/ -e orchestrator=openstack playbooks/configure_instances.yml
ansible-playbook -i inventory/ --tags nova playbooks/install_openstack.yml
ansible-playbook -i inventory/ -e orchestrator=openstack playbooks/install_contrail.yml
```