Cloud Pak for data 2.5

Deployment

Checklist

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Data and AI

This document is to validate the preparedness of the user on the requirements readiness and Installation precheck before staring the installation.

* Part 1: Deploying OpenShift and Cloud Pak for Data
* Part 2: Deploying Cloud Pak for Data on an existing OpenShift Cluster

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Fig 1: Installation using Bastion Host

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Fig 2: OpenShift 3.11 node and networking

Part 1. OpenShift 3.11 deployment checklist

# minumum Hardware & Software requirements

# for 7 nodes configuration

**MASTER**

*Master instances run the OpenShift master components, including the API server and etcd. The master components manage nodes in its Kubernetes cluster and schedules pods to run on nodes. In high availability environment functionality of the master nods are split into two different nodes namely master and infra nodes.*

3 Servers for **Master** nodes

8 cores CPU

32 GB RAM

[Disk1: 100GB root partition](https://docs.openshift.com/container-platform/3.11/install/prerequisites.html#prerequisites-storage-management)(/var 20 GB, /tmp 10GB, /var/log 30GB)

Disk2: 200GB docker storage

**WORKER**

*Worker (Application) node instances run the atomic-OpenShift-node service. These nodes run customer workload. Workload is distributed across the worker nodes as scheduled by OpenShift scheduler.*

3 Servers for **Worker** nodes

16 cores CPU

64 GB RAM

[Disk1: 100GB root partition](https://docs.openshift.com/container-platform/3.11/install/prerequisites.html#prerequisites-storage-management)(/var 20 GB, /tmp 10GB, /var/log 30GB)

Disk2: 200GB docker storage

Disk 3: 1 TB disk If Portworx setup is planned.

**BASTION HOST**

*In air-gapped environment, a bastion host is node outside of the cluster that is used to gain connectivity into cluster. This node is used for installation, can be removed after the install.*

1 node for Bastion Host

8 cores CPU

16 GB RAM

File systems/Disks – (Disk1: 100GB root partition; Disk2: 200 GB docker storage, 500GB for local yum repo, docker registry setup for airgap deployment)

/ibm 200+ GB disk space to store installation image

/var/lib/docker 200+ GB disk space to store the docker image

/repository 200+ GB disk space to store the Yum repository

**LOAD BALANCER**

*External access to OpenShift cluster is achieved using a load balancer. In high availability scenario, external load balancer server as single entry point to OpenShift cluster. Two different load balancers are used, one for control plane, separate one for application workloads (data plane) running on OpenShift.* Local ha-proxy can be setup as load balancer, when there is no external load balancer available

1 server for load balancer

4 cores CPU

8 GB RAM

File systems/Disks – (Disk1: 100GB root partition)

**NFS STORAGE**

500GB, recommended is 1 TB

If no existing NFS server, mount this disk to one of the work nodes to setup local NFS Server.

# operating system reqirements

Red Hat Enterprise Linux (RHEL) Server 7 [cat /etc/redhat-release]

Red Hat release 7.5+ [cat /etc/redhat-release]

Hardware type x86-64 [uname -m]

Application bitness 64 [lscpu]

yum works and repos enabled [yum list; yum repolist all]

SELinux enforce policy installed on all nodes [sestatus]

libselinux-python installed [yum info libselinux-python]

# Authentication requirements

Installing OpenShift cluster requires root or a sudo access. Installation can be performed using password or using password less ssh between bastion and cluster nodes.

Root user private SSH key

Root user password same on all nodes

sudo user password (you must use the same sudo user on all nodes)

Must able to SSH from the first bastion host to all other nodes

# DocKer Storage Driver requirements (OPTIONAL)

Overlay 2 driver is recommended for installation.

Raw disk (use devicemapper) [ pvdisplay ] or  Overlay2 drive (use installation path)

# Partitioning requirement

Each node must have an extra disk partition for the installer files [ parted -l; df -BG ]

Each storage node requires another additional disk partition

Both partitions must be mounted to path and formatted with XFSwith ftype functions enabled

[ mkfs.xfs -f -n ftype=1 -i size=512 -n size=8192 /<mounted-partion-path> ]

The **noatime** flag to the mount options in /etc/fstab should be added for both partition

[ /<mounted-partion-path> /installer xfs defaults,noatime 1 2 ]

# disk requirement

Disk latency test with dd command. The value must be better or comparable to: 512000 bytes (512 KB) copied, 1.7917 s, 286 KB/s.

[ dd if=/dev/zero of=/<path-to-installation-directory>/testfile bs=512 count=1000 oflag=dsync ]

Disk throughput test with dd command. The value must be better or comparable to: 1073741824 bytes (1.1 GB) copied, 5.14444 s, 209 MB/s.

[ dd if=/dev/zero of=</path-to-installation-directory>/testfile bs=1G count=1 oflag=dsync ]

use the attached partitioning script to partition and mount disk on each of the worker/master nodes

Script: partition\_script.sh

#!/bin/bash

if [[ $# -ne 2 ]]; then

echo "Requires a disk name and mounted path name"

echo "$(basename $0) <disk> <path>"

exit 1

fi

set -e

parted ${1} --script mklabel gpt

parted ${1} --script mkpart primary '0%' '100%'

mkfs.xfs -f -n ftype=1 ${1}1

mkdir -p ${2}

echo "${1}1 ${2} xfs defaults,noatime 1 2" >> /etc/fstab

mount ${2}

exit 0

example:

$sh ./partition\_disk.sh. /dev/xvdc /var/lib/docker

$sh ./partition\_disk.sh. /dev/xvde /data

# Network requirement

All nodes must be on same subnet

Minimum 1Gb network between nodes

Each node has a static IP address

Each node has a working DNS that accept lookup request and a gateway within the network [ /etc/resolv.conf, nslookup x.x.x.x, ‘ip r| grep default’ ]

An overlay network that used within OpenShift cluster

local time server, Check time syncing [ ntpstat ]

IP forwarding is enabled [ sysctl net.ipv4.ip\_forward ]

Default route exists [ route ]

Firewall is disabled [ systemctl status firewalld ]

Ping is enabled between nodes

All TCP and UDP traffic are allowed between nodes

All hostnames should be in lowercase

* [DNS](https://docs.openshift.com/container-platform/3.11/install/prerequisites.html) to resolve all host name (entry in /etc/hosts is not sufficient)
* Public URL
* [DNS wild card entry for application routing](https://docs.openshift.com/container-platform/3.11/install/prerequisites.html)

ex: (\*.apps.cloudpak.example.com. 300 IN A 192.168.133.2)

* 443, 8443 ports opened for external to Master/Load balancer

# Certificates

OpenShift generates SSL certificates during installation for inter-cluster communication that need to use during first user access. Customer can use their own certificate, if needed.

# Web browsers

Google Chrome (v.60 and higher) or  Firefox (v.54 and higher)

# Product download

* Active RH OpenShift Subscription to use on all the nodes
* RedHat Satellite Repository setup is needed for [AIRGAP](https://docs.openshift.com/container-platform/3.11/install/disconnected_install.html)
* Local Docker Registry for [AIRGAP](https://docs.openshift.com/container-platform/3.11/install/disconnected_install.html)
* [Cloud Pak for Data product is Download](https://ibm-open-platform.ibm.com/repos/beta/cpd/2.5.0/)
* Transfer Cloud Pak Installers to Bastion Host for installation

# PRE-CHECK validation

[ TBD ] Automation Script to check the requirements

Part 2. Deploying Cloud Pak for data on existing OpenShift Cluster

# requirements

* Schedulable worker node with required number of VPC and memory
* NFS storage of 1TB with dynamic storage provisioner

# User accecss Requirements

* OpenShift user with “cluster-admin” for deploying Cloud Pak for Data

$ oc adm policy add-**cluster**-role-to-user **cluster**-admin ocadmin

* You must be the Cloud Pak for Data project administrator to install Cloud Pak for Data control plane

# CLIeNT HOST setup

* Client machine or Bastion Host need connectivity to the Cluster
* Able to access IBM entitlement registry (docker 2.0), or download the product from Internet facing machine and transfer into bastion host.
* Download the Cloud Pak for Data Installer
* Access to cluster registry

$ Docker login <docker registry url> -u $(oc whoami) -p $(oc whoami -t)

* Cluster Registry Access

$ Docker login <docker registry url> -u <user> -p <password>

# Installation

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**Air-gapped clusters**

When you run the cpd download command from a client workstation, it downloads all of the images and Helm charts from a public IBM file server to the client workstation. Next, you transfer the images to your registry server. Then, from a system that can connect to the cluster, you run the cpd command to push the images to your registry server. Lastly, you run the cpd installation command, which deploys the Helm charts to a project in your OpenShift cluster.

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