Install Guide - Regional Controller Node

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This guide instructs how to build and install an Akraino Edge Stack (AES) Regional Controller node.

Contents

Overview

The Regional Controller Node installation includes the following components:

Operating System

- Redfish Integrated Dell Remote Access Controller (iDRAC) bootstrapping and hardware configuration
- Linux OS (Ubuntu)

Regional Controller

- PostgreSQL DB
- Camunda Workflow and Decision Engine
- Akraino Web Portal
- LDAP configuration

Supplementary Components

Various supporting files are also installed on the Regional Controller, including:

- OpenStack Tempest tests
- YAML builds
- ONAP scripts
- Sample VNFs

This installation guide refers to the following by way of an example:

- **192.168.2.43 (aknode43)**: *Build Server (Linux Server with a Docker Container)*
- **192.168.2.42 (aknode42)**: *Bare Metal Server*
- **192.168.41.42**: *Bare Metal Server iDRAC*

Steps herein presume the use of a root account. All steps are performed from the Build Server.

A clean, out-of-the-box Ubuntu environment is *strongly* recommended before proceeding.

Prerequisites

AES Regional Controller installation is orchestrated from a **Build Server** acting upon a **Bare Metal Server**.

Build Server

- Any server or VM with Ubuntu Release 16.04
- Packages: Latest versions of sshpass, xorriso, and python-requests
- Docker 1.13.1 or later

Bare Metal Server

- Dell PowerEdge R740 server with no installed OS
- Two interfaces for primary network connectivity bonding
- 802.1q VLAN tagging for primary network interfaces

System Check

Build Server

Ensure **Ubuntu Release 16.04** (specifically) and **Docker 1.13.1** (or later) are installed:

```
# lsb_release -rs
16.04
# docker --version
Docker version 1.13.1, build 092cba3
```

Ensure **Python 2**, specifically **version 2.7.12** or later is installed. Ensure the latest versions of **sshpass**, **xorriso**, and **python-requests** are installed.

```
# python --version
Python 2.7.12
# apt install --upgrade sshpass xorriso python-requests
Reading package lists... Done
Building dependency tree
Reading state information... Done
python-requests is already the newest version (2.9.1-3).
sshpass is already the newest version (1.05-1).
xorriso is already the newest version (1.4.2-4ubuntu1).
0 upgraded, 0 newly installed, 0 to remove and 107 not upgraded
```

Network Connectivity

- The Build Server *must* have connectivity to the Bare Metal Server iDRAC interface on ports 22 (ssh) and 5900 (vnc).
- The Bare Metal Server *must* be reachable from the Build Server.
- The Build Server and Bare Metal Server primary networks must have one of the following characteristics:
  - The networks must be located on the same L2 network, *or*
  - DHCP requests must be forwarded from the Bare Metal Server primary network interface to the Build Server (e.g., via a DHCP relay/helper).

Specific steps to achieve this connectivity are beyond the scope of this guide. However, some verification can be performed.

First, verify that at least ports 22 and 5900 are open on the Bare Metal Server iDRAC interface:

```
# nmap -sS 192.168.41.42

Starting Nmap 7.01 ( https://nmap.org ) at 2018-07-10 13:55 UTC
Nmap scan report for 192.168.41.42
Host is up (0.00085s latency).
Not shown: 996 closed ports
PORT     STATE SERVICE
22/tcp   open  ssh
80/tcp   open  http
443/tcp  open  https
5900/tcp open  vnc

Nmap done: 1 IP address (1 host up) scanned in 1.77 seconds
```

Next, use `nmap` to check for a "clean slate" Bare Metal Server. The results will show the host as being down (due to no OS).

```
# nmap -sS 192.168.2.42

Starting Nmap 7.01 ( https://nmap.org ) at 2018-07-10 13:55 UTC
Note: Host seems down. If it is really up, but blocking our ping probes, try -Pn
Nmap done: 1 IP address (0 hosts up) scanned in 0.63 seconds
```

Verification of the Build Server and Bare Metal Server primary networks is beyond the scope of this guide.

Installation

Repository Cloning

Repositories are located under `/opt/akraino`:

```
# mkdir /opt/akraino
```

Clone the Redfish Bootstrapping Script repository for use as part of Akraino tools:

```
# git clone http://gerrit.akraino.org/redfish /opt/akraino/tools
```

Clone the Akraino Regional Controller repository:

```
# git clone https://gerrit.akraino.org/r/regional_controller /opt/akraino/region
```

Configuration

Copy the Bare Metal Server configuration template into `/opt/akraino/server-config/AKRAINO_NODE_RC`, where `AKRAINO_NODE_RC` is the Bare Metal Server name followed by `rc`:

```
# mkdir -p /opt/akraino/server-config
# cp /opt/akraino/tools/serverrc.template /opt/akraino/server-config/aknode42rc
# vi /opt/akraino/server-config/aknode42rc
```

A sample configuration file follows. Ensure the following:

- `BUILD_WEBIP` is the Build Server IP
- `SRV_NAME` is the Bare Metal Server name
- `SRV_OOB_IP` is the Bare Metal Server iDRAC IP
- `SRV_IP` is the Bare Metal Server IP
- Passwords are chosen for `SRV_OOB_PWD` and `SRV_PWD`
- All remaining `SRV_` prefixed options are adjusted as deemed appropriate

```
# Set the ip and port to use when creating the web server
BUILD_WEBIP=192.168.2.43
BUILD_WEBPORT=8090

# host name for server
SRV_NAME=aknode42

# server oem - Dell or HPE (case sensitive)
SRV_OEM=Dell

# out of band interface information for server (idrac/ilo/etc)
SRV_OOB_IP=192.168.41.42
SRV_OOB_USR=root
SRV_OOB_PWD=ROOT_PASSWORD

# mac address of server to be used during the build - not required for Dell servers
# SRV_MAC=3c:fd:fe:b8:10:60

# name of network interface used during build when ipxe.efi is booted and when os is booted
# ipxe numbers ports from 0-n in pci bus order.
# the netx value will depend on how many nics are in the server
# and which pci device number is assigned to the slot
SRV_IPXE_INF=net4

# the build interface is the nic used by the Ubuntu installed to load the OS
```

```
SRV_BLD_INF=enp94s0f0

# the boot device is the device name on which the OS will be loaded
SRV_BOOT_DEVICE=sdg

# ipxe script to use - based on the os version and kernel to install
# valid options are script-hwe-16.04.4-amd64.ipxe or script-16.04.4-amd64.ipxe
SRV_BLD_SCRIPT=script-hwe-16.04.4-amd64.ipxe

# template xml file to set bios and raid configuration settings
SRV_BIOS_TEMPLATE=dell_r740_g14_uefi_base.xml.template
SRV_BOOT_TEMPLATE=dell_r740_g14_uefi_httpboot.xml.template
SRV_HTTP_BOOT_DEV=NIC.Slot.3-1-1

# VLAN to use during build and for final network configuration
SRV_VLAN=41

# basic network information for dhcp config and final server network settings
SRV_MTU=9000
SRV_IP=192.168.2.42
SRV_SUBNET=192.168.2.0
SRV_NETMASK=255.255.255.0
SRV_GATEWAY=192.168.2.200
SRV_DNS=192.168.2.85
SRV_DOMAIN=lab.akraino.org
SRV_DNSSEARCH=lab.akraino.org
SRV_NTP=ntp.ubuntu.org

# root password for server being built
SRV_PWD=SERVER_PASSWORD

# network bond information
SRV_BOND=bond0
SRV_SLAVE1=enp94s0f0
SRV_SLAVE2=enp94s0f1
```

Operating System

In Case of Errors

The Operating System installation may produce errors. As of this writing, the following errors may be safely ignored:

```
- FAIL, detailed job message is: [{u'Message': u'Staged component configuration completed with errors.', u'MessageId': u'SYS033',
u'MessageArgs': [], u'MessageArgs@odata.count': 0}]
```

```
- FAIL: detailed error message: {"error":{"@Message.ExtendedInfo":[{"Message":"Unable to create a configuration job because an existing
configuration job is already in progress.","MessageArgs":[],"MessageArgs@odata.count":0,"MessageId":"iDRAC.1.6.RAC052","RelatedProperties":
[],"RelatedProperties@odata.count":0,"Resolution":"Retry the operation after the existing configuration job is complete, or cancel the
existing configuration job and retry the operation.","Severity":"Warning"}],"code":"Base.1.0.GeneralError","message":"A general error has
occurred. See ExtendedInfo for more information"}}
```

Begin the OS installation:

```
# /opt/akraino/tools/install_server_os.sh --rc /opt/akraino/server-config/aknode42rc --no-confirm
```

This will take time. This is an excellent time to enjoy a favorite beverage. 🙂

A successful installation will start and end as follows:

```
# /opt/akraino/tools/install_server_os.sh --rc /opt/akraino/server-config/aknode42rc --no-confirm
Beginning /opt/akraino/tools/install_server_os.sh as user [root]
in pwd [/opt/akraino/server-config] with home [/root]
Tools are ready in [/opt/akraino]
WARNING:  Preparing to build server [aknode42] using oob ip [192.168.41.42].
Beginning in 10 seconds ..........
Beginning bare metal install of os at Mon Jul 2 18:57:32 UTC 2018
...

Processing triggers for libc-bin (2.23-0ubuntu10) ...
SUCCESS:  Completed bare metal install of regional server [aknode44] at Mon Jul 2 20:09:35 UTC 2018
SUCCESS:  Try connecting with 'ssh root@192.168.2.42' as user root
```

```
Elapsed time was 9 minutes and 22 seconds
```

Note that any time estimates (e.g., *"This step could take up to 15 minutes"*) and elapsed times are likely inaccurate. The total install time is longer, on the order of hours. Enjoy that beverage. 🙂

Regional Controller

> **In Case of Errors**
> The Regional Controller installation is not idempotent at this time. If errors are encountered during this phase, it is recommended that the errors be triaged and resolved, followed by an Operating System reinstallation. This will ensure a "clean slate" Bare Metal Server before trying again.

Create an Akraino Tools run command (rc) file in `/opt/akraino`:

```
# vim /opt/akraino/.akrainorc
```

A sample `.akrainorc` file follows. Set `TARGET_SERVER_IP` to the Bare Metal Server IP. Other values may be left as-is.

```
# /opt/akraino/.akrainorc: executed by bash(1) for env of akraino setup.
export TARGET_SERVER_IP=192.168.2.42
export DB_SCHEMA_VERSION=1.0.0-201806260417
export CAMUNDA_WORKFLOW_VERSION=1.0.0
export PORTAL_VERSION=5.0
export TEMPEST_VERSION=0.0.1-SNAPSHOT
export ONAP_VERSION=0.0.1-SNAPSHOT
export YAML_BUILD_VERSION=0.0.1-SNAPSHOT
export SAMPLE_VNF_VERSION=0.0.1-SNAPSHOT
```

Source the rc file:

```
# source /opt/akraino/.akrainorc
```

Copy the Start Akraino Portal script to the Bare Metal Server:

```
# scp /opt/akraino/region/start_akraino_portal.sh root@$TARGET_SERVER_IP:/tmp/
```

Begin Regional Controller deployment on the Bare Metal Server:

```
# ssh root@$TARGET_SERVER_IP "bash /tmp/start_akraino_portal.sh \
$DB_SCHEMA_VERSION $CAMUNDA_WORKFLOW_VERSION $PORTAL_VERSION"
```

This will take time. This is an excellent time to enjoy another favorite beverage. 🙂

A successful installation will end as follows. Note that any time estimates (e.g., *"This step could take up to 15 minutes"*) and elapsed times are likely inaccurate.

```
...

Setting up tempest repository
Setting up yaml builds repository
Setting up ONAP repository
Setting up sample vnf repository
Setting up airshipinabottle repository
SUCCESS:  Portal install completed
```

The Regional Controller Node installation is now complete.

Joe D'andrea

Notes/suggestions:

- Editing text to use the imperative voice (no use of words like "you" and so on).
- Reducing the use of prepositions.
- Adjusted headings that were too deep with no top level.
- Turned ordered lists into bulleted lists where there was no explicit order needed.
- Collapsed extra blank lines throughout.
- Added sudo where it may be needed. Will verify during an actual run-through.
- Some parts are copied verbatim from other sections (e.g., prerequisites are also mentioned verbatim as installation steps, except install steps come after prerequisites, they are not the same thing).
- Some terms may be unclear (e.g., iDRAC).
- What is a "YAML build" in this context? Should this be "YAML files" or "YAML templates" - and which specific templates are they? Are they different from VNFs, for instance. Consider using the template type instead of YAML.
- Using "or later" when referring to future versions of software.
- Hardcoding of section numbers is problematic when editing. Will see if tSpace Wiki has a way to auto-number Headings.
- The Overview refers to an OS and Portal installation, but the Installation steps do not appear to mention either of these, specifically.
- It's not clear what purpose the Overview serves here. It does not appear to match up with the rest of the steps. Are there any missing parts?
- Network Setup steps are given an overview but there are no explicit steps to illustrate how to ensure this (or links to other canonical steps).
- Sample .akrainorc and Bare Metal Server config files do not fully explain the settings or how to determine alternate values.
- The document referred to "Node 42" and "Node 44" but these did not appear anywhere. Only aknode44 appears elsewhere.
- The documentation refers to a "compile" but no compilation is apparent.
- Does Akraino *only* work on a Dell PowerEdge R740 server? The instructions suggest this is the case.