

# Software Installation Manual

8<sup>th</sup> May 2023

## STAKEHOLDERS

### Internal

- Anand Pandey
- Hung Ta
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- Tuyen Ho
- Dennis
- Jimmy

### External

- None

## OVERVIEW

This document describes the installation of Openclovis' SDK on Ubuntu 22.04 with two nodes.

## PURPOSE

To provide detailed instructions on how to install and setup Openclovis SDK on Ubuntu 22.04 on two separate nodes.

## SCOPE

The installation instruction is valid only for Ubuntu 22.04 and assumes that the software is installed on two separate servers. No virtual machines should be used.

## PREREQUISITES

### Servers

- Need two physical servers.

### OS

- Ubuntu 22.04

### OpenClovis SDK

- 6.0

### OpenClovis 3rd Party

- 1.3

### Networking

- Both machines should be connected to the network using a cabled connection. No WiFi.
- Turn off Wifi on both the nodes. This is important.

## RESPONSIBILITIES

- Author : Vijay Kaushik
- Reviewers
  - Hung Ta
  - Sang Dinh
  - Tuyen Ho

## PROCEDURE

### Download Software, Installation

1. Download OpenClovis SDK from [here](#).
2. Download the 3rd party libraries from [here](#).
3. Extract the SDK in the \$HOME directory.
4. Create a softlink to the extracted directory running the following command.
  - a. `ln -s <extracted directory name> openclovis`
5. Copy the 3rd party library to \$HOME.

6. `cd $HOME/openclovis`
7. `sudo su root`
8. Run the command `./install`
9. You will see the following screen. Press `<enter>` to continue.

```
-----
                OpenClovis SAFplus 6.0 202304131452 Installer - Ubuntu 64-bit
-----
Welcome to the OpenClovis SAFplus 6.0 Installer

This program helps you to install:
- Required 3rd-party Packages
- The OpenClovis SAFplus Availabiltiy Scalability Platform

Installation Directory Prerequisites
- At least 512MB free disk space
- Write permission to the installation directory

Note: You may experience slow installation if the target installation
      directory is mounted from a remote file system (e.g., NFS).

Please press <enter> to continue or <ctrl-c> to quit this installer
█
```

10. You will see the following screen. Choose option 3.

```
-----
                OpenClovis SAFplus 6.0 202304131452 Installer - Ubuntu 64-bit
-----
Installation Type:

1) Standard          - Select all default options
2) Custom            - Recommended
3) Preinstall Only  - Uses your distro package manager to install needed
                    prerequisites (must be root).
4) Install Only     - Installs SAFplus code, IDE, and prerequisites not
                    supplied with your linux distro.

Please choose an installation option [default: 2]: 3
```

11. Again run `./install`

12. You will see the following screen. Press <enter> to continue.

```
-----
OpenClovis SAFplus 6.0 202304131452 Installer - Ubuntu 64-bit
-----
Welcome to the OpenClovis SAFplus 6.0 Installer

This program helps you to install:
- Required 3rd-party Packages
- The OpenClovis SAFplus Availabilitiy Scalability Platform

Installation Directory Prerequisites
- At least 512MB free disk space
- Write permission to the installation directory

Note: You may experience slow installation if the target installation
      directory is mounted from a remote file system (e.g., NFS).

Please press <enter> to continue or <ctrl-c> to quit this installer
█
```

13. You will see the following screen. This time choose option 4.

```
-----
OpenClovis SAFplus 6.0 202304131452 Installer - Ubuntu 64-bit
-----
Installation Type:

1) Standard          - Select all default options
2) Custom            - Recommended
3) Preinstall Only  - Uses your distro package manager to install needed
                    - prerequisites (must be root).
4) Install Only     - Installs SAFplus code, IDE, and prerequisites not
                    - supplied with your linux distro.

Please choose an installation option [default: 2]: 4█
```

14. You will see the following screen. Accept the default value.

```
-----
OpenClovis SAFplus 6.0 202304131452 Installer - Ubuntu 64-bit
-----
Enter the installation root directory [default: /opt/clovis]: █
```

15. Here are some transitional screenshots.

```
-----
OpenClovis SAFplus 6.0 202304131452 Installer - Ubuntu 64-bit
-----
Enter the installation root directory [default: /opt/clovis]:
TIPC : True
Install tipc module
tipc major : 2 - tipc minor : 0
/bin/sh: 1: sqlite3: not found
Working root set to [/home/vkaushik], package root at [/opt/clovis/sdk-6.0]
List ['3rdparty-base-1.30-x86_64.tar']
Beginning configure, build, and install of: net-snmp 5.8
tar xfm /home/vkaushik/3rdparty-base-1.30-x86_64.tar net-snmp-5.8.tar.gz
move into extracted folder: /home/vkaushik/openclovis-safplus-sdk-6.0-202304131452/workspace
move into extracted folder: net-snmp-5.8
█
```

```
net-snmp 5.8 was installed successfully
Beginning configure, build, and install of: openhpi-subagent 2.3.4
tar xfm /home/vkaushik/3rdparty-base-1.30-x86_64.tar openhpi-subagent-2.3.4.tar.gz
move into extracted folder: /home/vkaushik/openclovis-safplus-sdk-6.0-202304131452/workspace
move into extracted folder: openhpi-subagent-2.3.4
openhpi-subagent 2.3.4 was installed successfully
Beginning configure, build, and install of: tipc-config 2.0.2
tar xfm /home/vkaushik/3rdparty-base-1.30-x86_64.tar tipcutils-2.0.2.tar.gz
move into extracted folder: /home/vkaushik/openclovis-safplus-sdk-6.0-202304131452/workspace
move into extracted folder: tipcutils-2.0.2
tipc-config 2.0.2 was installed successfully
Beginning configure, build, and install of: JRE 1.8.0
JRE 1.8.0 was installed successfully
Beginning configure, build, and install of: eclipse 3.7.1
eclipse 3.7.1 was installed successfully
Beginning configure, build, and install of: EMF 2.7.1
EMF 2.7.1 was installed successfully
Beginning configure, build, and install of: GEF 3.7.2
GEF 3.7.2 was installed successfully
Beginning configure, build, and install of: CDT 8.0.1
cdt-master-8.0.1.zip
CDT 8.0.1 was installed successfully
Beginning configure, build, and install of: sqlite 3.6.23
tar xfm /home/vkaushik/3rdparty-base-1.30-x86_64.tar sqlite-3.6.23.tar.gz
move into extracted folder: /home/vkaushik/openclovis-safplus-sdk-6.0-202304131452/workspace
move into extracted folder: sqlite-3.6.23
█
```

16. Accept default to the prompts.

```
Installing SAFplus...
Starting IDE installation...
Linking Eclipse in /opt/clovis/sdk-6.0...
cp -rf /home/vkaushik/openclovis-safplus-sdk-6.0-202304131452/IDE /opt/clovis/sdk-6.0
rm -rf /opt/clovis/sdk-6.0/eclipse/plugins/*clovis*
cp -rl /opt/clovis/buildtools/local/eclipse /opt/clovis/sdk-6.0
sed -e '/-showsplash|org.eclipse.platform/d' /opt/clovis/sdk-6.0/eclipse/eclipse.ini > /opt/clovis/s
rm /opt/clovis/sdk-6.0/eclipse/eclipse.ini
mv /opt/clovis/sdk-6.0/eclipse/eclipse_ini.tmp /opt/clovis/sdk-6.0/eclipse/eclipse.ini
mv -f /opt/clovis/sdk-6.0/IDE/plugins/* /opt/clovis/sdk-6.0/eclipse/plugins
rm -rf /opt/clovis/sdk-6.0/IDE/plugins
cp -rf /opt/clovis/sdk-6.0/IDE/scripts/config.ini /opt/clovis/sdk-6.0/eclipse/configuration
Copying documents...
Done.
Starting utilities installation...
Working root set to [/home/vkaushik], package root at [/opt/clovis/sdk-6.0]
List []
Build SAFplus libraries for the local machine and/or installed crossbuild toolchains ? <y|n> [y]:
Where to build ? [default: /opt/clovis/sdk-6.0/prebuild]:
The following installed build tool packages are found:
local
Select the crossbuild tool(s) to build from the above list, [Default: local]

/opt/clovis/sdk-6.0/src/SAFplus/configure --with-asp-build > build.log
█
```

17. After this it will start linking and compiling. This takes about 15 minutes (depending on your server). You will see a lot of messages scroll through. Here is one of the final prompts. Accept the defaults.

```
done.
A few binaries are installed in /opt/clovis/sdk-6.0/bin.
For convenience, you can add the above directory to your PATH definition.
Alternatively, we can create symlinks for you (from a binary directory that is already in your path).

Create symbolic links for items in /opt/clovis/sdk-6.0/bin ? <y|n> [y]: y
Where to create the symbolic links ? [default: /usr/local/bin]:
Symbolic links for the binaries are created in /usr/local/bin

=====
Installation of OpenClovis SDK is now complete

Next steps:
- Run 'cl-create-project-area' to create a new project area and start
  working with the SDK
- Run 'cl-ide' to start the OpenClovis IDE
- To read more information, please consult with the user documentation
  installed under /opt/clovis/sdk-6.0/doc.
=====

Script exited cleanly.
```

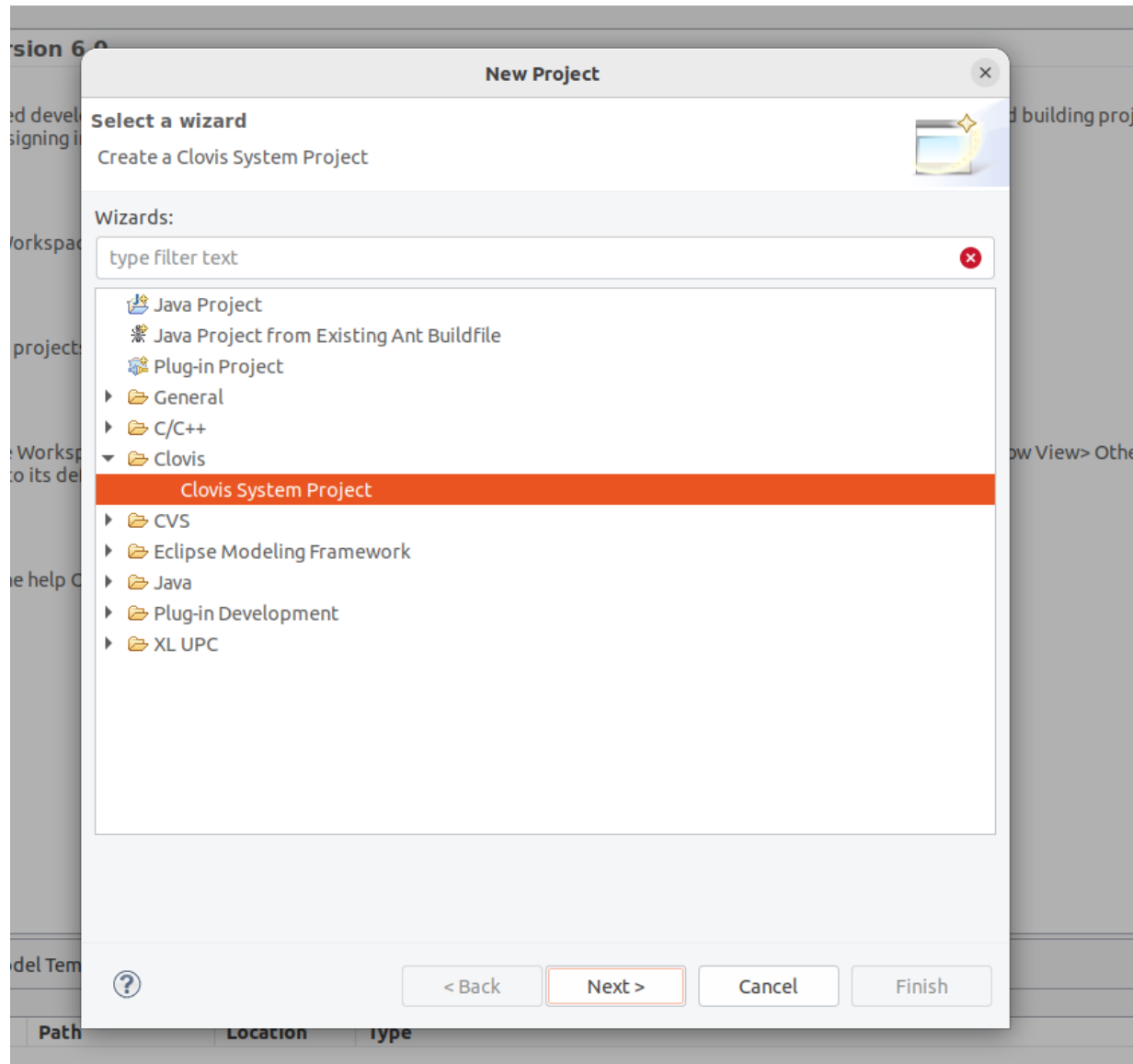
This completes the installation of the software on one of the nodes. Now we need to build an image and deploy it on one of the nodes.

## Build Image

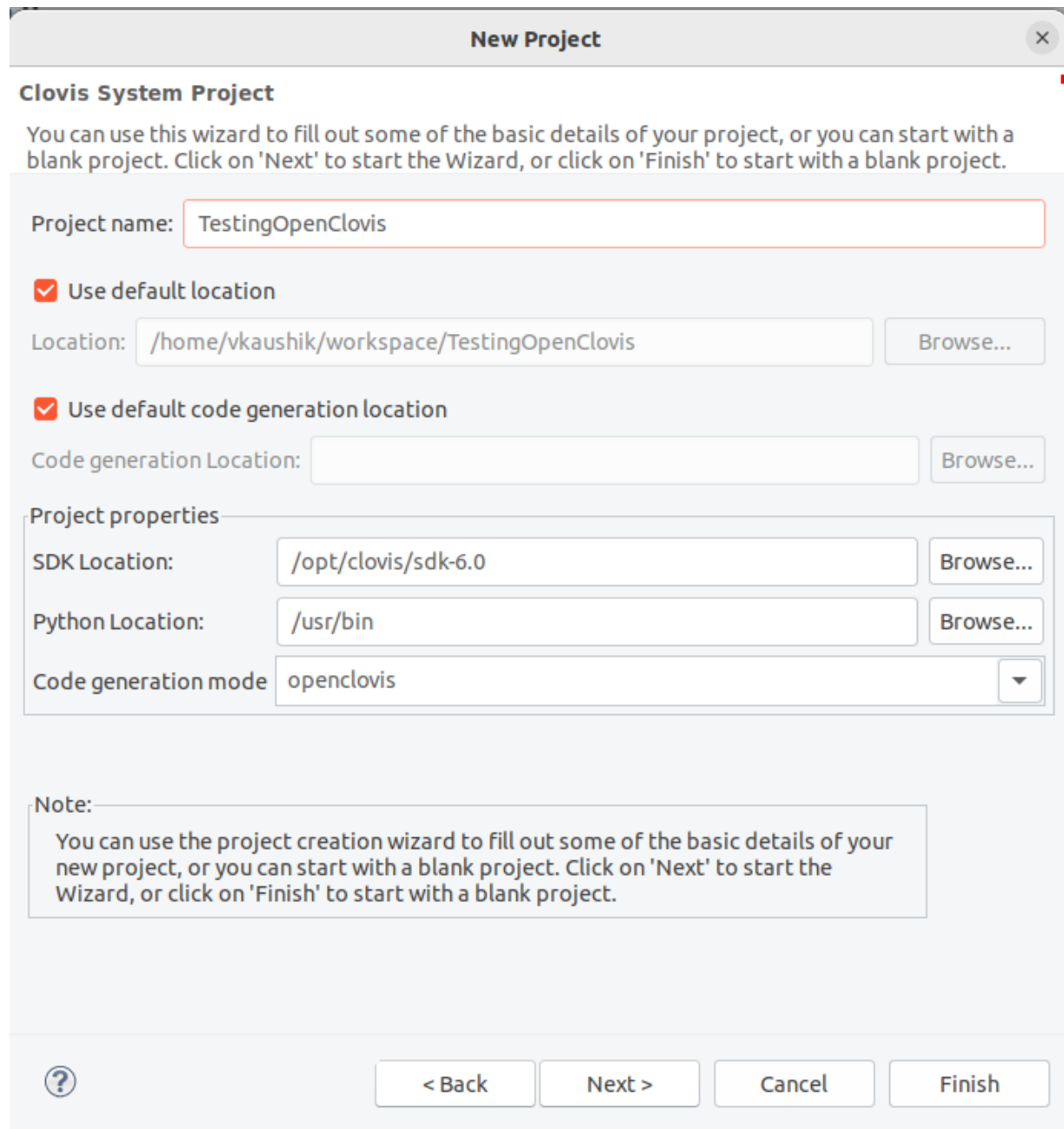
As an ordinary user, follow the following steps to build an image.

1. Run the command `cl-ide` from the command line. This will bring up the OpenClovis IDE (Eclipse).
2. Select the workspace directory you want to work with. Default is fine.
3. The OpenClovis IDE will open.
4. Create a new project of the type Clovis System Project.

- a. Go to File -> New -> Project -> Clovis -> Clovis System Project and select Next.



- b. Type in the name of Project (e.g. `TestingOpenClovis`) and accept the rest as default and click `Next`.



The screenshot shows a 'New Project' dialog box for a 'Clovis System Project'. The title bar includes a close button (X). The main heading is 'Clovis System Project'. Below it, a paragraph explains the wizard's purpose: 'You can use this wizard to fill out some of the basic details of your project, or you can start with a blank project. Click on 'Next' to start the Wizard, or click on 'Finish' to start with a blank project.'

The form contains the following fields and options:

- Project name:** A text input field containing 'TestingOpenClovis'.
- Use default location:** A checked checkbox. Below it, a text input field contains '/home/vkaushik/workspace/TestingOpenClovis' and a 'Browse...' button.
- Use default code generation location:** A checked checkbox. Below it, a text input field is empty and a 'Browse...' button is present.
- Project properties:** A section containing:
  - SDK Location:** A text input field containing '/opt/clovis/sdk-6.0' and a 'Browse...' button.
  - Python Location:** A text input field containing '/usr/bin' and a 'Browse...' button.
  - Code generation mode:** A dropdown menu with 'openclavis' selected.
- Note:** A text box containing the same explanatory paragraph as at the top of the dialog.

At the bottom of the dialog, there is a help icon (question mark in a circle) on the left and four buttons: '< Back', 'Next >', 'Cancel', and 'Finish'.



- c. Add 2 blades of the type `Default` and click `Next`.

**New Project** ✕

**Add New Blade Type**

Enter Blade details

Blade Type	Blade Name	Number of blades
Default	Blade0	2

- d. Create one node of the type `System Controller` and click `Next`.

### New Project

**Add New SAF Node Type**  
Enter Node details

Node Name	Node Class
Node0	System Controller

**Add**  
**Delete**

**Note:**  
A SAF Node is conceptually all the software running on a blade. Create multiple node 'types' if you have different software to run on each node, for example, 'controller' and 'worker' nodes. Use the Add button to create SAF Node Types. You can always add more nodes once this wizard is complete.

**? < Back Next > Cancel Finish**

- e. Add Program Name. Use default settings and click on Finish.

**New Project**

**Specify Program Names (SAF Service Type Name)**

Set Program Names

Node Type	Program Name
Node0	SAFComponent0

**Add**

**Delete**

**Note:**

Highly available programs (SAF Service Types) are composed of a variety of SAF entities (Service Group, Service Unit, etc). This wizard will autogenerate the basic SAF component hierarchy for each program you specify. Use the Add button to create and name each program (we will use this as a prefix for all SAF components associated with that program, and for the program executable name). You can always add more programs once this wizard is complete.

**? < Back Next > Cancel Finish**

- f. From the menu bar select Clovis -> AMF Configuration -> Node Instance List.
- g. Select the value of Node Type as Node0.
- h. Select the value of Blade Type as Blade0.
- i. Set the value of Node Count to 2.

- j. Click on the Service Group SAFComponent0SG and click on Create Tree instance.

The screenshot shows the 'Node Instance List' configuration window. The left sidebar has 'Node Instance List' selected. The main area contains the following fields:

- Node Type: Node0
- Blade Type: Blade0
- Node Count: 2

Below these fields is a table with the following data:

Service Group	Node Count Options
SAFComponent0SG (1 + 1)	1 or 2

At the bottom of the main area is a 'Create Instance Tree' button. The bottom of the window has 'Apply', 'Cancel', and 'OK' buttons.

- k. Click on the Service Group List. Set the value of Service Group Type to SAFComponent0SG. Select both the Associated Node Instances and click on Create Instance Tree.

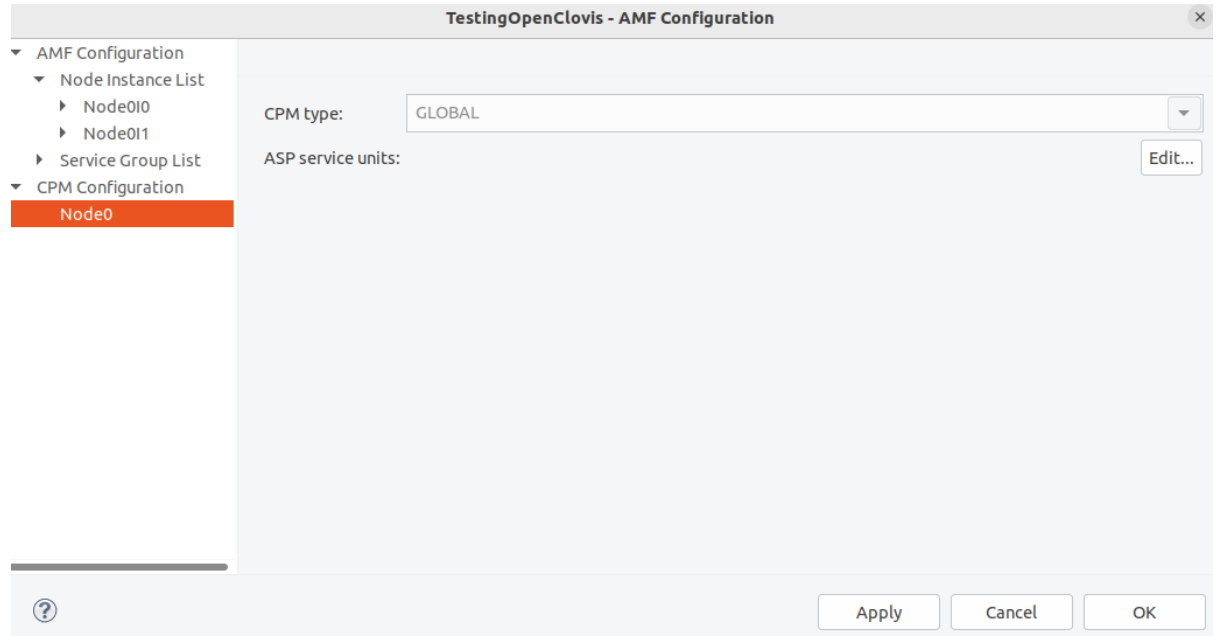
The screenshot shows the 'Service Group List' configuration window. The left sidebar has 'Service Group List' selected. The main area contains the following fields:

- Service Group Type: SAFComponent0SG
- Associated Node Instances: Node010, Node011

At the bottom of the main area is a 'Create Instance Tree' button. The bottom of the window has 'Apply', 'Cancel', and 'OK' buttons.

- l. Click OK.
- m. Go to Clovis -> AMF Configuration -> CPM Configuration -> Node0.

n. Click on Edit for ASP Service units.



- o. Disable Manageability ASP Components

**Select ASP Service Units**

**Select ASP Service Units From List**

**Core ASP Components:**

- gmsSU
- eventSU
- ckptSU

**Manageability ASP Components:**

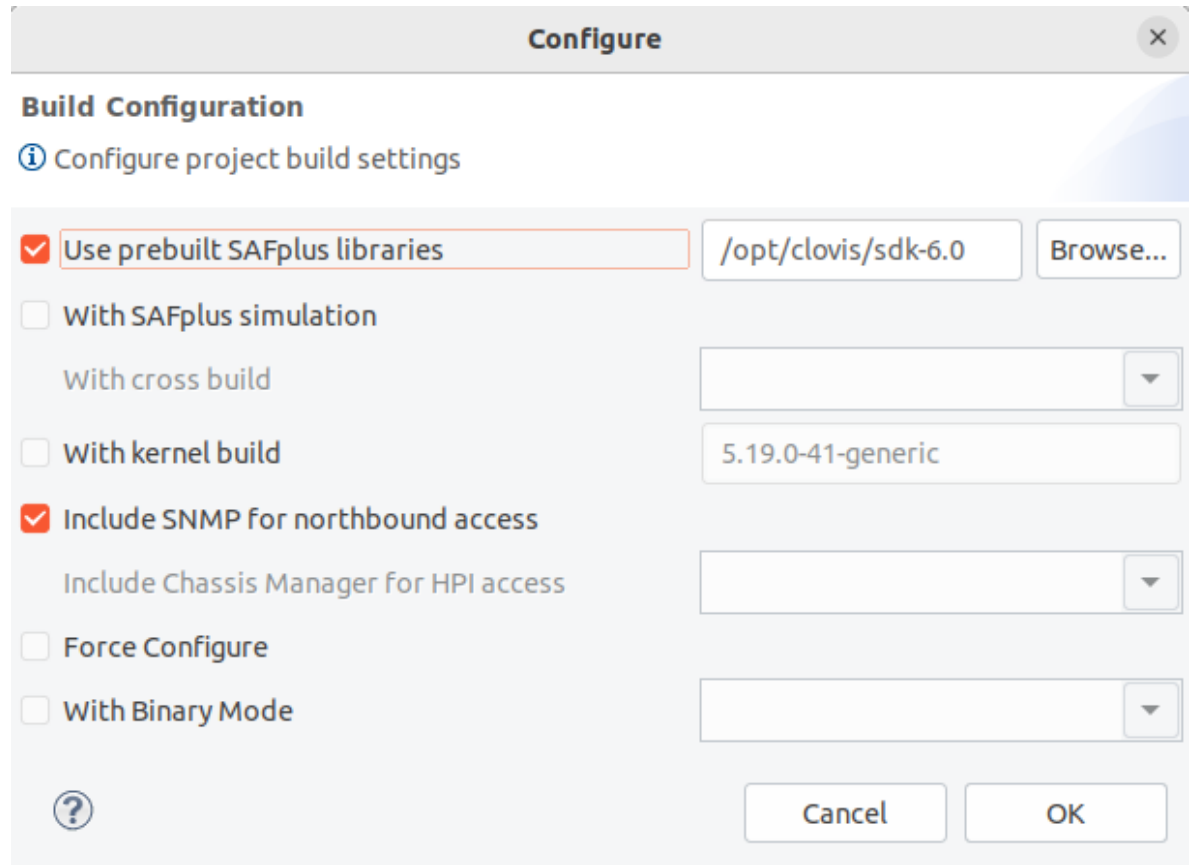
- corSU
- txnSU
- oampSU

**Miscellaneous ASP Components:**

- logSU
- nameSU
- cmSU
- msgSU

- p. Click on OK.
- q. Go to Project -> Generate Source.
- r. Go to Project -> Build Project.

- s. Check `prebuilt SAFSAFplus` libraries. The rest of the values can be default.



- t. Click on OK.
- u. Select `Project -> Make Image(s)`.
- v. On the pop-up, the Network Interface values for both the nodes need to be plugged in. Run the following command from the command line on both the nodes and get the value of the network interface. Here is an example of the command

run on one of the nodes. You need to do the same for the other node.

```
enp0s25: flags=4099<UP,BROADCAST,MULTICAST> mtu 1500
        ether f0:de:f1:5c:ec:31 txqueuelen 1000 (Ethernet)
        RX packets 0 bytes 0 (0.0 B)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 0 bytes 0 (0.0 B)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
        device interrupt 20 memory 0xf3a00000-f3a20000

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 9126 bytes 764290 (764.2 KB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 9126 bytes 764290 (764.2 KB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

wlp3s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.86.27 netmask 255.255.255.0 broadcast 192.168.86.255
    inet6 fe80::ffe3:1681:52c7:da4d prefixlen 64 scopeid 0x20<link>
    ether a0:88:b4:28:f4:e0 txqueuelen 1000 (Ethernet)
    RX packets 757748 bytes 1002461947 (1.0 GB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 329386 bytes 75431297 (75.4 MB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```



- w. Select the Slot Number as 1 and 2 respectively. Enter the values as shown and click on OK.

**Make Images**

**Make Images Configuration**

Configure make images settings

General Chassis Management 3rdParty

Trap IP: 127.0.0.1

TIPC Net ID: 1340

Create Node Specific Images

Package Images into Tarballs

Node Instance	Slot Number	Network Interface
Node010	1	wlp3s0
Node011	2	wlp3s0

? Cancel OK

- x. Images will be created under `$HOME/workspace/target/<Project Name>/images`.

## Installing Images on Nodes

Images for both the nodes reside under `$HOME/workspace/target/<Project Name>/images`. Copy the file `$HOME/workspace/target/<Project Name>/images/Node011.tgz` to the other node.

### Instructions for Node 1

1. The image for Node1 has already been installed in the directory `$HOME/workspace/target/<Project Name>/images/Node010`.
2. `cd $HOME/workspace/target/<Project Name>/images/Node011`.
3. `sudo su root`

4. Edit `etc/asp.conf` file. Ensure the value of the attribute `LINK_NAME` is set to the network interface name that was obtained previously by running the `ifconfig` command. If not, modify accordingly.
5. `cd $HOME/workspace/target/<Project Name>/images/Node010/etc/init.d.`
6. `./safplus start`
7. You should see the following lines.

```
INFO Loading TIPC
INFO Unloading TIPC ...
INFO num of bearer : 1 ...
INFO Starting SNMP daemon...
INFO Starting AMF...
INFO Starting AMF watchdog...
```

8. `cd $HOME/workspace/target/<Project Name>/images/Node010/bin.`
9. `./safplus_info`
10. You should see this output on the screen.

```
SAFplus info utility -- OpenClovis, Inc., 2008
-----
Starting interactive prompt (type 'help' for help)
[safplus_info@Node010]==> forest
SG SAFComponent0SGI0 (redundancy:1+1, state:UL/UL)
Node Node010
  SU SAFComponent0SUI0 (state:UL/UL)
  SI SAFComponent0SII0 (state:active)
  Comp SAFComponent0I0 (PS:Instantiated OS:Enabled RS:IS PID:170213)
  CSI SAFComponent0CSII0 (state:active)
[safplus_info@Node010]==> █
```

## Instructions for Node 2

1. Extract the copied image file under `$HOME/OpenClovis`.
2. `sudo su root`
3. Edit `etc/asp.conf` file. Ensure the value of the attribute `LINK_NAME` is set to the network interface name that was obtained previously by running the `ifconfig` command. If not, modify accordingly.
4. `cd $HOME/workspace/target/<Project Name>/images/Node010/etc/init.d.`
5. `./safplus start`
6. You should see the following lines.

```
INFO Loading TIPC
INFO Unloading TIPC ...
INFO num of bearer : 1 ...
INFO Starting SNMP daemon...
INFO Starting AMF...
INFO Starting AMF watchdog...
```

- 7.
8. `cd $HOME/workspace/target/<Project Name>/images/Node010/bin.`

## Connectivity Between Nodes

If the images have been installed properly, you should be able to see both the nodes by running the following command from any of the nodes.

1. `cd $HOME/workspace/target/<Project Name>/images/Node010/bin`
2. `./safplus_info`
3. As seen below you should see both the nodes.

```
root@vkaushik-ThinkPad-W520:/home/vkaushik/workspace/target/TestingOpenClovis/images/Node0I0/bin# ./safplus_info
SAFplus info utility -- OpenClovis, Inc., 2008
-----
Starting interactive prompt (type 'help' for help)
[safplus_info@Node0I0]==> forest
SG SAFComponent0SGI0 (redundancy:1+1, state:UL/UL)
  Node Node0I0
    SU SAFComponent0SUI0 (state:UL/UL)
    SI SAFComponent0SII0 (state:active)
    Comp SAFComponent0I0 (PS:Instantiated OS:Enabled RS:IS PID:173341)
    CSI SAFComponent0CSII0 (state:active)
  Node Node0I1
    SU SAFComponent0SUI1 (state:UL/UL)
    SI SAFComponent0SII0 (state:standby)
    Comp SAFComponent0I1 (PS:Instantiated OS:Enabled RS:IS PID:71875)
    CSI SAFComponent0CSII0 (state:standby)
[safplus_info@Node0I0]==> nodes
  NODE CLASS AS CAS PS OS INSTANTIABLE CLUSTER-MEMBER ISU ASU
Node0I0      B UL UL I E          Y           Y 1 1
Node0I1      B UL UL I E          Y           Y 1 1
[safplus_info@Node0I0]==> █
```

This is a good indication that both nodes are up and they can communicate with each other.

## RISKS

- Not evaluated yet.

## REFERENCES

- Not formalized yet.