



OpenClovis

# *An Introduction to OpenClovis*

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CLOVIS I<sup>er</sup>

# Overview

- *What is OpenClovis?*
- *What OpenClovis can do*
- *Benefits of OpenClovis*
- *Problems with OpenClovis*



# What is OpenClovis?

- *Open source Management Infrastructure*

- *Has two parts:*

- *Application Service Platform*

- *Integrated Development Environment*

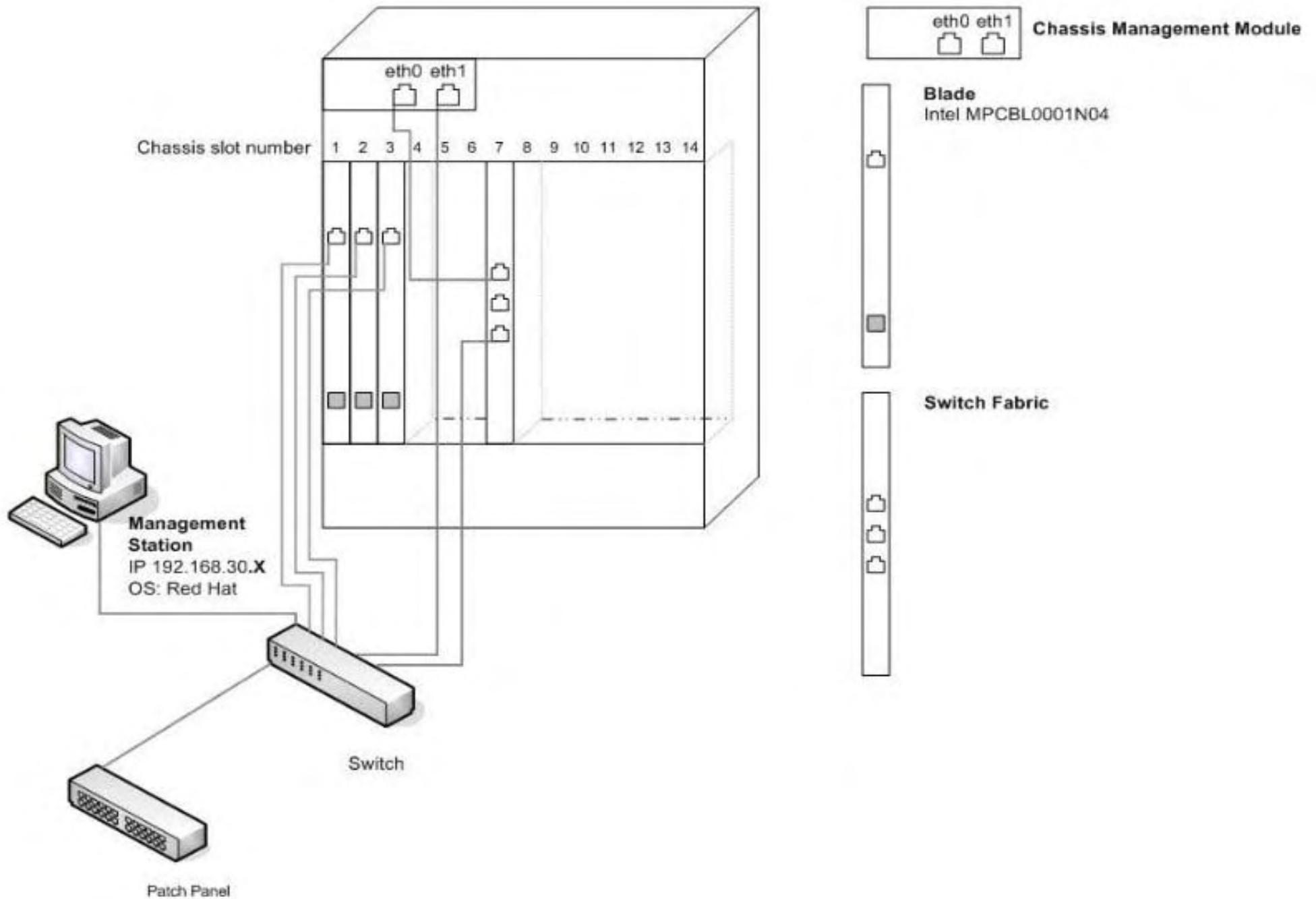


# OpenClovis ASP

- *Runtime decision maker*
- *Able to be deployed across all blades, shelves and racks*
- *Example of ASP*



# Hardware Setup



# My Hardware Setup

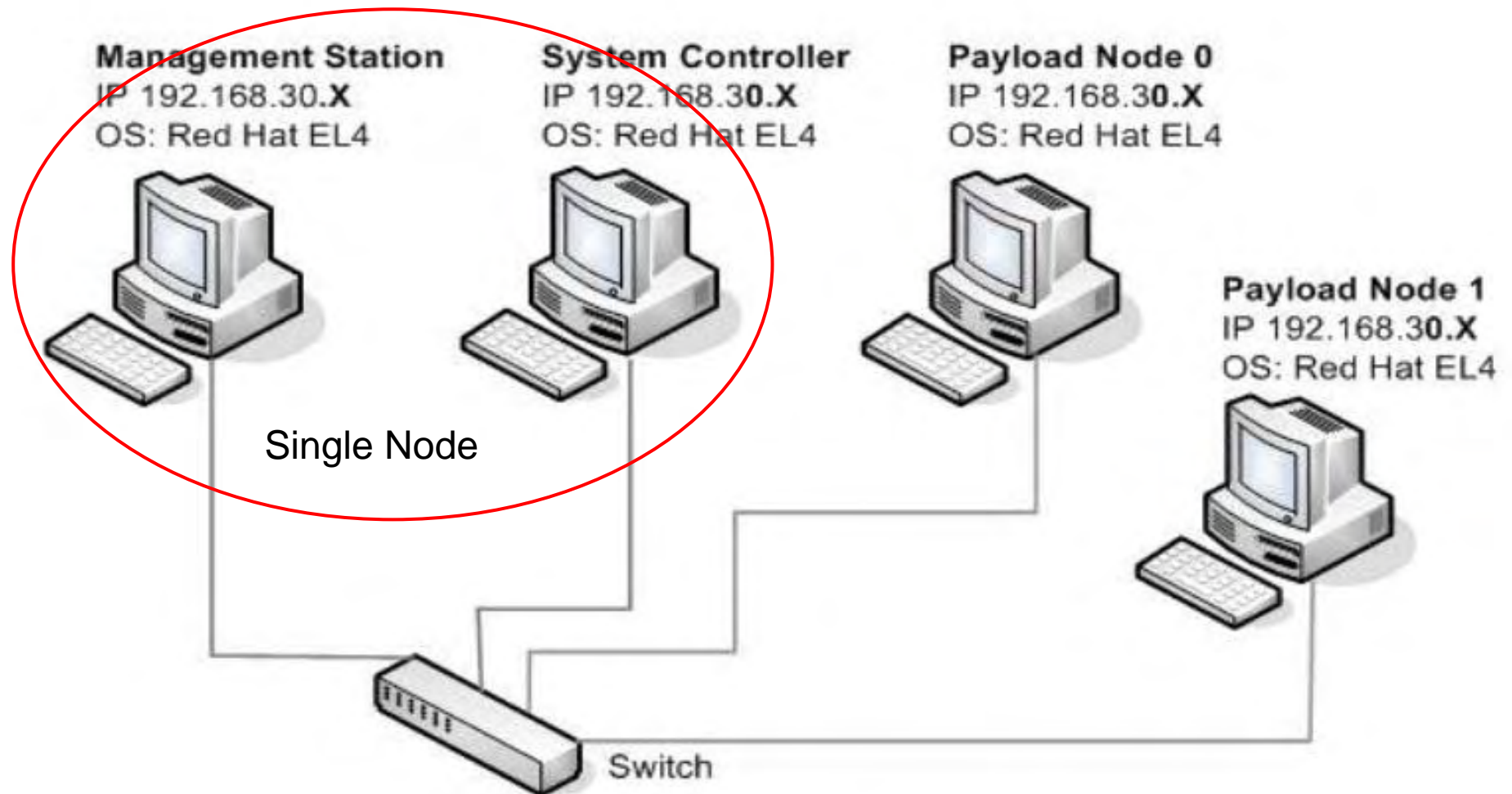


Figure 3.4: Runtime Hardware Setup 2.2

# ASP Example

## Things to Observe

- Where OpenClovis is implemented
- Remote Management (Assignment, Unlock, Instantiation)
- Failover / Checkpointing



```
Applications Places System [taskbar icons]
root@sauron:~/sisp/etc/init.d
File Edit View Terminal Tabs Help
[root@sauron init.d]# ./sisp start
Starting sisp_amf: [ OK ]
[root@sauron init.d]#
```

Sauron: Payload Node 1

```
Jason@localhost:~/sisp/etc/init.d
File Edit View Terminal Tabs Help
[root@localhost init.d]# ./sisp start
Starting sisp_amf: [ OK ]
[root@localhost init.d]#
```

Jason: System Controller

```
root@saruman:~/sisp/etc/init.d
File Edit View Terminal Tabs Help
[root@saruman init.d]# ./sisp start
Starting sisp_amf: [ OK ]
[root@saruman init.d]#
```

Saruman: Payload Node 2

```
Jason@localhost:/home/Jason/Desktop
File Edit View Terminal Tabs Help
3517 pts/4 Ss 0:00 bash
3531 pts/4 S 0:00 su
3534 pts/4 S 0:00 bash
3629 pts/1 Sl 0:00 ./sisp_amf -c 0 -l 1 -n SCNodeI0 -p BootConfig
3630 pts/1 S 0:00 /bin/bash ./sisp start
3631 pts/1 S 0:00 sleep 60
3639 ? Sl 0:00 /root/sisp/bin/sisp_logd
3644 ? SLl 0:00 /root/sisp/bin/sisp_gms gmsconfig.xml
3653 ? Sl 0:00 /root/sisp/bin/sisp_event
3656 ? Sl 0:00 /root/sisp/bin/sisp_txn
3667 ? Sl 0:00 /root/sisp/bin/sisp_name
3670 ? Sl 0:00 /root/sisp/bin/sisp_ckpt
3675 ? Sl 0:00 /root/sisp/bin/sisp_cor
3692 ? Sl 0:00 /root/sisp/bin/sisp_alarm
3698 ? Sl 0:00 /root/sisp/bin/sisp_fault
3702 ? Sl 0:00 /root/sisp/bin/sisp_snmp
3711 ? Sl 0:00 /root/sisp/bin/csaSnmpSubAgentComp -p
3727 pts/4 R+ 0:00 ps ax
[root@localhost Desktop]#
```

```

root@sauron:~/sisp/etc/init.d
File Edit View Terminal Tabs Help

csal03CompI0: Waiting for CSI assignment...
csal03CompI0: checkpoint_initialize
csal03CompI0: Checkpoint service initialized (handle=0x0)

PID[3545]:File[clCkptWrap.c]:Func[clCkptCheckpointOpen]:Line[325]: Ckpt: Checkpo
int0open failed rc[0x 160004]

csal03CompI0: Checkpoint opened (handle=0x1)
csal03CompI0: Section created

```

```

jason@localhost:~/sisp/bin
File Edit View Terminal Tabs Help

[root@localhost bin]# ./lockutil.sh la 103
Successfully changed state of csal03SGI0 to LockAssignment
[root@localhost bin]#

```

```

root@saruman:~/sisp/etc/init.d
File Edit View Terminal Tabs Help

csal03CompI1: Waiting for CSI assignment...
csal03CompI1: checkpoint_initialize
csal03CompI1: Checkpoint service initialized (handle=0x0)
csal03CompI1: CheckpointOpen with CREATE succeeded
csal03CompI1: Checkpoint opened (handle=0x1)

```

```

root@sauron:~
File Edit View Terminal Tabs Help

2534 ?      Ss      0:00 /usr/libexec/gdmgreeter
2563 ?      Ss      0:00 sshd: root@pts/1
2565 pts/1   Ss      0:00 -bash
3061 pts/1   Sl      0:00 ./sisp_amf -c 0 -l 3 -n PayloadNodeI0 -p BootC
3069 ?      Sl      0:00 /root/sisp/bin/sisp_logd
3074 ?      Sll     0:00 /root/sisp/bin/sisp_gms gmsconfig.xml
3082 ?      Sl      0:00 /root/sisp/bin/sisp_event
3086 ?      Sl      0:00 /root/sisp/bin/sisp_txn
3096 ?      Sl      0:00 /root/sisp/bin/sisp_name
3099 ?      Sl      0:00 /root/sisp/bin/sisp_ckpt
3111 ?      Sl      0:00 /root/sisp/bin/sisp_alarm
3114 ?      Sl      0:00 /root/sisp/bin/sisp_fault
3249 pts/1   S+     0:00 tail -f /var/log/csal03CompI0.log
3279 ?      Sl      0:00 /root/sisp/bin/csal03 -p
3302 ?      Ss      0:00 sshd: root@pts/2
3306 pts/2   Ss      0:00 -bash
3339 pts/2   R+     0:00 ps ax
[root@sauron ~]# kill -9 3279
[root@sauron ~]#

```

```

root@sauron:~/sisp/etc/init.d
File Edit View Terminal Tabs Help
csa103CompI0: Hello World! (seq=44)
csa103CompI0: Hello World! (seq=45)
csa103CompI0: Hello World! (seq=46)
csa103CompI0: Hello World! (seq=47)
csa103CompI0: Hello World! (seq=48)
csa103CompI0: Hello World! (seq=49)
csa103CompI0: Hello World! (seq=50)
csa103CompI0: Hello World! (seq=51)
csa103CompI0: Hello World! (seq=52)
csa103CompI0: Hello World! (seq=53)
csa103CompI0: Hello World! (seq=54)
csa103CompI0: Hello World! (seq=55)
csa103CompI0: Hello World! (seq=56)
csa103CompI0: Hello World! (seq=57)
csa103CompI0: Hello World! (seq=58)
csa103CompI0: Hello World! (seq=59)
csa103CompI0: Hello World! (seq=60)

```

```

Jason@localhost:~/sisp/bin
File Edit View Terminal Tabs Help
[root@localhost bin]# ./lockutil.sh la 103
Successfully changed state of csa103SGI0 to LockAssignment
[root@localhost bin]# ./lockutil.sh ul 103
Successfully changed state of csa103SGI0 to Unlock
[root@localhost bin]#

```

```

root@saruman:~/sisp/etc/init.d
File Edit View Terminal Tabs Help
csa103CompI1: Checkpoint opened (handle=0x1)

PID[2584]:File[clCkptWrap.c]:Func[clCkptSectionCreate]:Line[1149]: Ckpt: Section
creation error rc[0x 160016]

csa103CompI1: ERROR: Failed to create checkpoint section
csa103CompI1: CSI Set called
csa103CompI1: Failed [0x160016] to initialize checkpoint

PID[2584]:File[clEo.c]:Func[main]:Line[529]: Create Callout Failed 160016

csa103CompI1: Waiting for CSI assignment...
csa103CompI1: checkpoint_initialize
csa103CompI1: Checkpoint service initialized (handle=0x0)
csa103CompI1: CheckpointOpen with CREATE succeeded
csa103CompI1: Checkpoint opened (handle=0x1)
csa103CompI1: CSI Set called
csa103CompI1: Standby state requested

```

```

root@sauron:~
File Edit View Terminal Tabs Help
2474 tty7 Ss+ 0:00 /usr/bin/Xorg :0 -audit 0 -auth /var/gdm/:0.Xa
2534 ? Ss 0:00 /usr/libexec/gdmgreeter
2563 ? Ss 0:00 sshd: root@pts/1
2565 pts/1 Ss 0:00 -bash
3061 pts/1 Sl 0:00 ./sisp_amf -c 0 -l 3 -n PayloadNodeI0 -p BootC
3069 ? Sl 0:00 /root/sisp/bin/sisp_logd
3074 ? Sll 0:00 /root/sisp/bin/sisp_gms gmsconfig.xml
3082 ? Sl 0:00 /root/sisp/bin/sisp_event
3086 ? Sl 0:00 /root/sisp/bin/sisp_txn
3096 ? Sl 0:00 /root/sisp/bin/sisp_name
3099 ? Sl 0:00 /root/sisp/bin/sisp_ckpt
3111 ? Sl 0:00 /root/sisp/bin/sisp_alarm
3114 ? Sl 0:00 /root/sisp/bin/sisp_fault
3249 pts/1 S+ 0:00 tail -f /var/log/csa103CompI0.log
3302 ? Ss 0:00 sshd: root@pts/2
3306 pts/2 Ss 0:00 -bash
3580 ? Sl 0:00 /root/sisp/bin/csa103 -p
3606 pts/2 R+ 0:00 ps ax
[root@sauron ~]# kill -9 3580

```

```

root@sauron:~/sisp/etc/init.d
File Edit View Terminal Tabs Help
csa103CompI0: Hello World! (seq=63)
csa103CompI0: Hello World! (seq=64)
csa103CompI0: Hello World! (seq=65)
csa103CompI0: Hello World! (seq=66)
csa103CompI0: Hello World! (seq=67)
csa103CompI0: Hello World! (seq=68)
csa103CompI0: Hello World! (seq=69)
csa103CompI0: Hello World! (seq=70)
csa103CompI0: Hello World! (seq=71)
csa103CompI0: Hello World! (seq=72)
csa103CompI0: Waiting for CSI assignment...
csa103CompI0: checkpoint_initialize
csa103CompI0: Checkpoint service initialized (handle=0x0)
csa103CompI0: CheckpointOpen with CREATE succeeded
csa103CompI0: Checkpoint opened (handle=0x1)
csa103CompI0: CSI Set called
csa103CompI0: Standby state requested

```

```

Jason@localhost:~/sisp/bin
File Edit View Terminal Tabs Help
[root@localhost bin]# ./lockutil.sh la 103
Successfully changed state of csa103SGI0 to LockAssignment
[root@localhost bin]# ./lockutil.sh ul 103
Successfully changed state of csa103SGI0 to Unlock
[root@localhost bin]#

```

```

root@saruman:~/sisp/etc/init.d
File Edit View Terminal Tabs Help
csa103CompI1: Waiting for CSI assignment...
csa103CompI1: checkpoint_initialize
csa103CompI1: Checkpoint service initialized (handle=0x0)
csa103CompI1: CheckpointOpen with CREATE succeeded
csa103CompI1: Checkpoint opened (handle=0x1)
csa103CompI1: CSI Set called
csa103CompI1: Standby state requested
csa103CompI1: CSI Set called
csa103CompI1: Active state requested from state 2
csa103CompI1 reading checkpoint
csa103CompI1 read checkpoint: seq = 73
csa103CompI1: Hello World! (seq=73)
csa103CompI1: Hello World! (seq=74)
csa103CompI1: Hello World! (seq=75)
csa103CompI1: Hello World! (seq=76)
csa103CompI1: Hello World! (seq=77)
csa103CompI1: Hello World! (seq=78)

```

```

root@sauron:~
File Edit View Terminal Tabs Help
2534 ? Ss 0:00 /usr/libexec/gdmgreeter
2563 ? Ss 0:00 sshd: root@pts/1
2565 pts/1 Ss 0:00 -bash
3061 pts/1 Sl 0:00 ./sisp_amf -c 0 -l 3 -n PayloadNodeI0 -p BootC
3069 ? Sl 0:00 /root/sisp/bin/sisp_logd
3074 ? SLl 0:00 /root/sisp/bin/sisp_gms gmsconfig.xml
3082 ? Sl 0:00 /root/sisp/bin/sisp_event
3086 ? Sl 0:00 /root/sisp/bin/sisp_txn
3096 ? Sl 0:00 /root/sisp/bin/sisp_name
3099 ? Sl 0:00 /root/sisp/bin/sisp_ckpt
3111 ? Sl 0:00 /root/sisp/bin/sisp_alarm
3114 ? Sl 0:00 /root/sisp/bin/sisp_fault
3249 pts/1 S+ 0:00 tail -f /var/log/csa103CompI0.log
3302 ? Ss 0:00 sshd: root@pts/2
3306 pts/2 Ss 0:00 -bash
3580 ? Sl 0:00 /root/sisp/bin/csa103 -p
3606 pts/2 R+ 0:00 ps ax
[root@sauron ~]# kill -9 3580
[root@sauron ~]#

```

```

root@sauron:~/sisp/etc/init.d
File Edit View Terminal Tabs Help
csal03CompI0: checkpoint_initialize
csal03CompI0: Checkpoint service initialized (handle=0x0)

PID[3644]:File[clCkptWrap.c]:Func[clCkptCheckpointOpen]:Line[325]: Ckpt: Checkpo
intOpen failed rc[0x 160004]

csal03CompI0: Checkpoint opened (handle=0x1)
csal03CompI0: Section created
csal03CompI0: CSI Set called
csal03CompI0: Standby state requested
csal03CompI0: CSI Remove called
csal03CompI0: CSI Set called
csal03CompI0: Standby state requested
csal03CompI0: CSI Remove called
csal03CompI0: CSI Set called
csal03CompI0: Standby state requested
csal03CompI0: CSI Remove called

```

```

jason@localhost:~/sisp/bin
File Edit View Terminal Tabs Help
cliocUnloadModule.sh hpipower snmpd
csal01 hpireset snmptrapd
csal02 hpiensor

[root@localhost bin]# ./lockutil.sh la 103
Successfully changed state of csal03SGI0 to LockAssignment
[root@localhost bin]# ./lockutil.sh ul 103
Successfully changed state of csal03SGI0 to Unlock
[root@localhost bin]# ./lockutil.sh la 103
Successfully changed state of csal03SGI0 to LockAssignment
[root@localhost bin]# ./lockutil.sh ul 103
Successfully changed state of csal03SGI0 to Unlock
[root@localhost bin]# ./lockutil.sh la 103
Successfully changed state of csal03SGI0 to LockAssignment
[root@localhost bin]# ./lockutil.sh ul 103
Successfully changed state of csal03SGI0 to Unlock
[root@localhost bin]# ./lockutil.sh la 103
Successfully changed state of csal03SGI0 to LockAssignment
[root@localhost bin]#

```

```

root@saruman:~/sisp/etc/init.d
File Edit View Terminal Tabs Help
csal03CompI1: Hello World! (seq=17)
csal03CompI1: Hello World! (seq=18)
csal03CompI1: Hello World! (seq=19)
csal03CompI1: Hello World! (seq=20)
csal03CompI1: Hello World! (seq=21)
csal03CompI1: Hello World! (seq=22)
csal03CompI1: CSI Set called
csal03CompI1: Hello World! (seq=23)
csal03CompI1: QUIESCED
csal03CompI1: CSI Remove called
csal03CompI1: CSI Set called
csal03CompI1: Active state requested from state 3
csal03CompI1: Hello World! (seq=24)
csal03CompI1: Hello World! (seq=25)
csal03CompI1: Hello World! (seq=26)
csal03CompI1: CSI Set called
csal03CompI1: QUIESCED
csal03CompI1: CSI Remove called

```

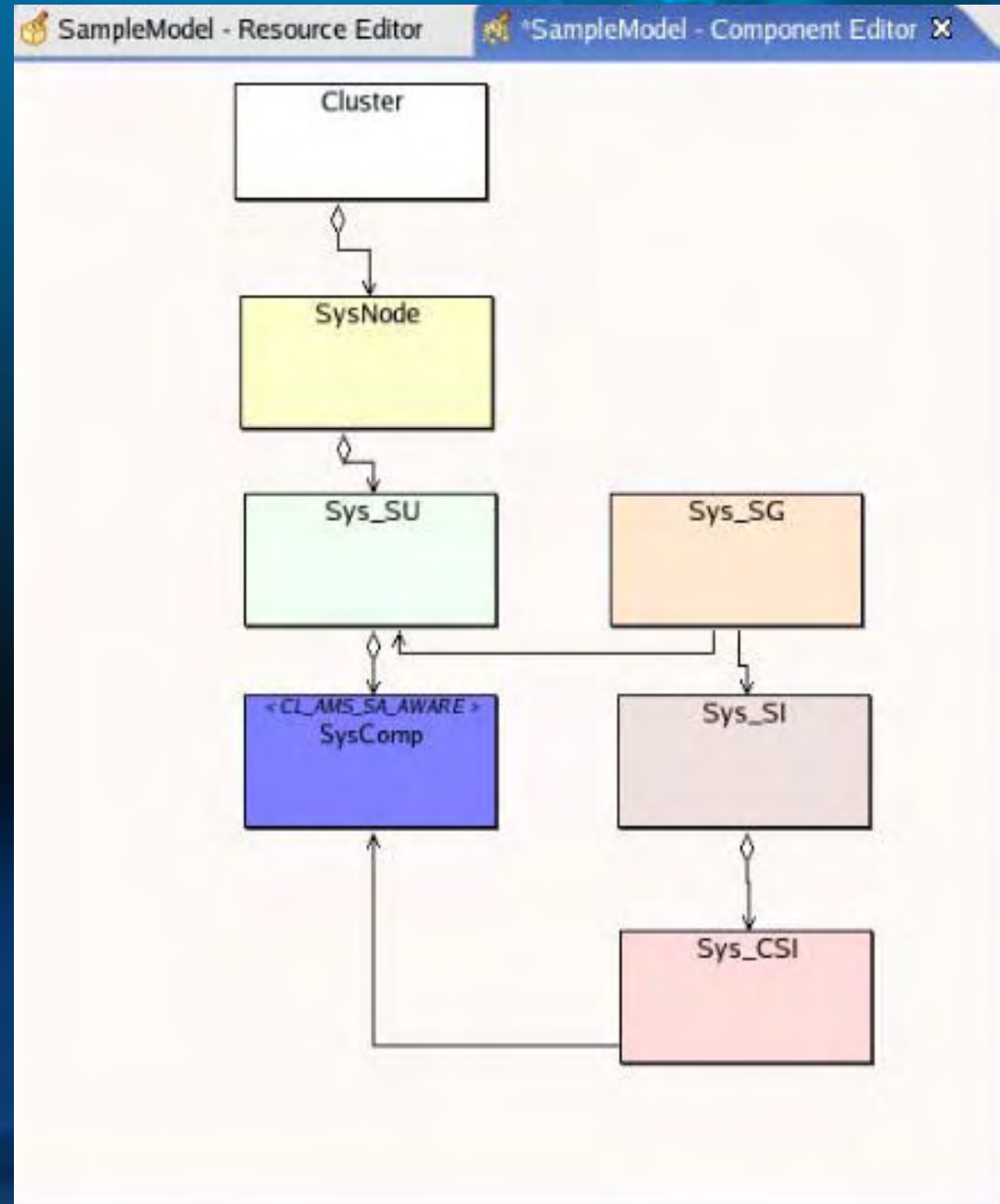
```

root@sauron:~
File Edit View Terminal Tabs Help
2534 ? Ss 0:00 /usr/libexec/gdmgreeter
2563 ? Ss 0:00 sshd: root@pts/1
2565 pts/1 Ss 0:00 -bash
3061 pts/1 Sl 0:00 ./sisp_amf -c 0 -l 3 -n PayloadNodeI0 -p Boot
3069 ? Sl 0:00 /root/sisp/bin/sisp_logd
3074 ? Sll 0:00 /root/sisp/bin/sisp_gms gmsconfig.xml
3082 ? Sl 0:00 /root/sisp/bin/sisp_event
3086 ? Sl 0:00 /root/sisp/bin/sisp_txn
3096 ? Sl 0:00 /root/sisp/bin/sisp_name
3099 ? Sl 0:00 /root/sisp/bin/sisp_ckpt
3111 ? Sl 0:00 /root/sisp/bin/sisp_alarm
3114 ? Sl 0:00 /root/sisp/bin/sisp_fault
3249 pts/1 S+ 0:00 tail -f /var/log/csal03CompI0.log
3302 ? Ss 0:00 sshd: root@pts/2
3306 pts/2 Ss 0:00 -bash
3580 ? Sl 0:00 /root/sisp/bin/csal03 -p
3606 pts/2 R+ 0:00 ps ax
[root@sauron ~]# kill -9 3580
[root@sauron ~]#

```

# OpenClovis IDE

- Eclipse-based graphical development environment



# Benefits of OpenClovis

- It's Free (As in \$\$, but not time)
- Everything is well packaged and self contained, easy to install (but possibly very hard to have it work)
- Has extensive documentation for installation and evaluation



# Problems with OpenClovis

- Despite extensive documentation, evaluation may not work
- Support from OpenClovis.org is minimal
- OpenClovis is kernel sensitive



# Future Ventures

- Understand how OpenClovis triggers failovers
- Understanding how to implement OpenClovis to more complex and realistic systems
- Investigate Kernel sensitivity

