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-LIGO-
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**ART OF REVIVING LLO CDS
COMPUTERS/SYSTEMS
FROM A POWER OUTAGE**

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1) ABSTRACT

This document describes the best methods to undertake after a power outage to successfully revive the LIGO Livingston Observatory's (LLO) Control and Data Systems' (CDS) computers and systems to normal operation.

2) INTRODUCTION

The LLO CDS sun workstations/processors are running at all times and a sudden power outage will not cleanly shutdown these sun workstations and processors. This creates problems when the sun workstations/processors come back up by themselves or are powered up by the user. The interdependencies of different sun workstations/processors also pose problems. Also some of the services/programs that are running on the processors start automatically while others have to be started manually. This is done on purpose to prevent programs dependent on other systems from crashing if the other systems are not yet running or due to the limitations that exist in them.

Also since the user home directories and the dtt/dataviewer directories are also mounted on all the sun workstations from central point servers, certain procedures have to be followed to get the systems up and running right.

All the interferometer related single board computers (SBC) such as Pentiums, bajas and mv162s load their boot/startup files from disks on LLO CDS server (LLO1). So these depend on the CDS Server for them to even boot.

The boot procedure may be different for different power outage scenarios. A power outage for short duration (say, less than 20 minutes) calls for a reboot procedure that does not involve any sun workstations in the mass storage room since the UPS in the mass storage room handles up to 20 minutes. A power outage of long duration calls for a different procedure. The restart procedure for most of the scenarios are looked at in this document and defined as clearly as possible.

Hence, the requirement for a procedure to revive the CDS computers/systems after a power outage.

3) LLO CDS SYSTEM

The LLO CDS System's broad block diagram in figure 1 clearly shows the layout of different CDS systems at LIGO Livingston.

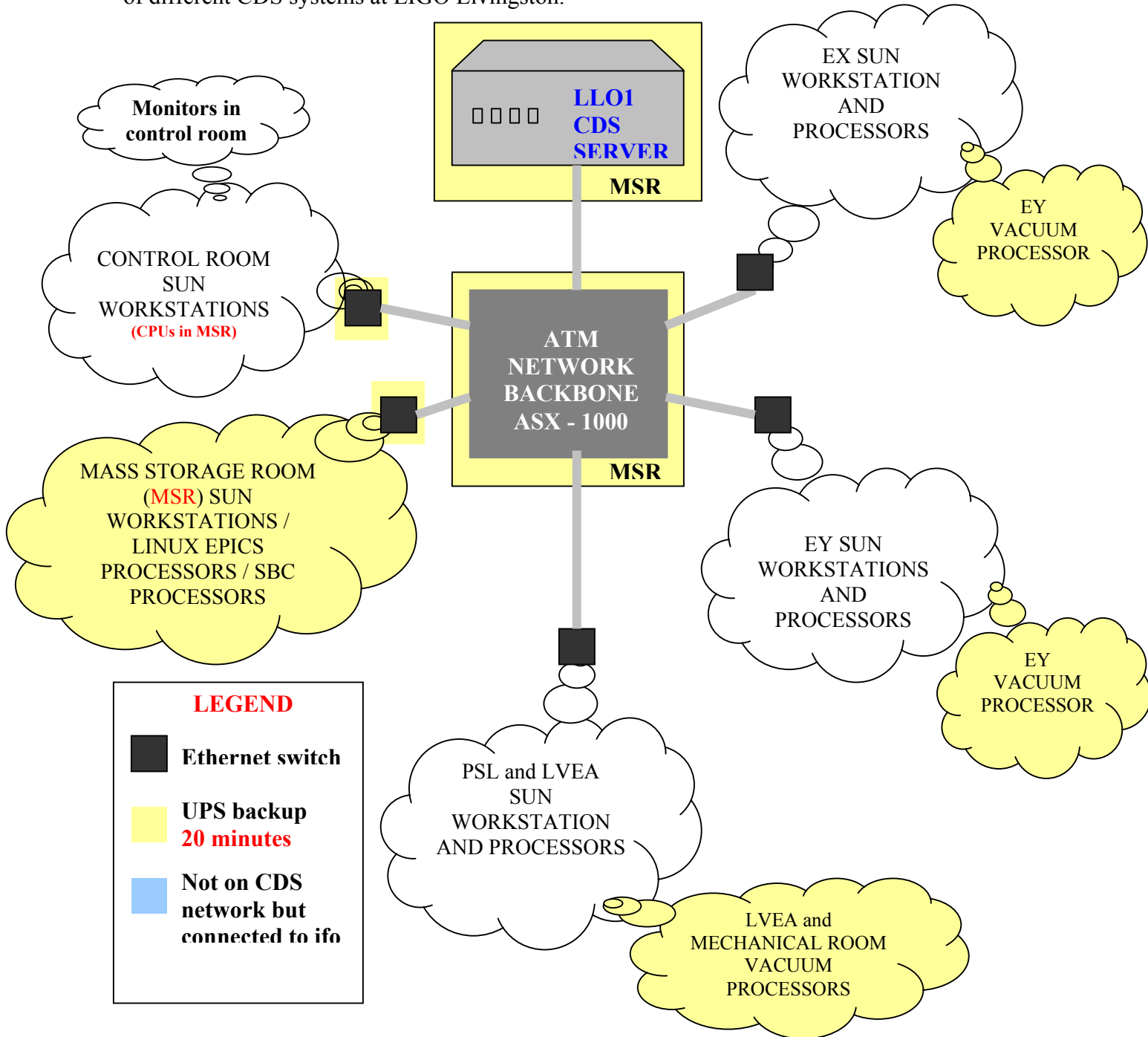


Figure 1: LLO CDS Layout.

3.1) LLO1 – LLO CDS SERVER

As seen in figure 1, LLO1 - LLO CDS Server running on Sun Enterprise 280 is the main and the most important system of the CDS network. This sun server located in the mass storage room (MSR) handles and servers the user accounts, the files required to boot single board computers (SBC) such as Pentiums, bajas and mv162s, and also holds the configuration files required by most of the systems. This sun server has a UPS backup from the MSR UPS which will keep it running for 20 minutes incase of a power outage.

3.2) CDS NETWORK

The CDS Network is an ATM based network with a combination of multi-mode and single-mode fiber and, 10 Base T Ethernet and 100 Base T Fast Ethernet cat 5 cable. The backbone of the network is the ASX 1000 switch in the MSR. The ASX 1000 is also backed up by the MSR UPS. Local Network switches – Fore systems 3810, are installed at all locations that provide Ethernet connections to the processors and sun workstations. These are indicated by the black squares in figure 1. There are three 3810 switches in the MSR with one each in the LVEA and the End Stations. Except for the MSR switches, the others do not have a UPS backup and will cut off network connections even for a shorter power glitch.

3.3) UPS BACKUP

Currently the CDS Network has Uninterrupted Power Supply (UPS) installed in the MSR, the vacuum rack in the LVEA, vacuum rack in the mechanical room (MR), and in the vacuum racks in the End Stations. Each of these is good for about 20 minutes of backup power under fully charged conditions. All the systems that are UPS backed are indicated by the yellow background color in the figure.

3.4) SUN SERVERS and WORKSTATIONS

Sun servers and workstations are spread out through out the interferometer. Most of the critical sun machines are located in the MSR and are backed up by the MSR UPS. The control room sun workstations are also moved to the MSR and will also be on the

UPS (except for the monitors). All other sun workstations in the control room, LVEA, High bay, end stations, EE lab and, Chethan and Ash's room are all clients that have similar setups and are considered to be way lower on the ladder for the case of reviving after a power outage. Recently these systems have been automated to boot and upgraded to self-correct disk errors without any human interference. After a power outage, these systems will restart themselves and display a login prompt. Do not login to these sun workstations till you are sure the MSR sun servers are running. Some of the MSR sun workstations will have to be shutdown and brought up in a proper order even if they have come up after a power outage as described in the following sections.

3.6) SINGLE BOARD COMPUTERS (SBC)

The most critical part of the CDS Network is the SBC processors such as Pentiums, bajas and mv162s which interface directly with the components of the interferometer. Utmost care has to be taken before rebooting some of these processors after a power outage. It is important to make sure these processors are turned "ON" only after we are sure the LLO CDS Server (LLO1) is running. Also more important is to disable the drive outputs to the coils. The LVEA and End station vacuum processors control the liquid level in the cryopumps and are considered important to be brought up first and working properly after a power outage. After this the processors along the optical path starting from the PSL can be brought up one by one as described below.

4) POWER OUTAGE SCENARIOS

With the existing CDS setup, power outage can be divided into two scenarios – short power outage (SPO) of less than 20 minutes and long power outage (LPO) of greater than 20 minutes.

For the *SPO scenario*, the UPS backup if fully charged, kicks in for approximately 20 minutes (more or less times can be anticipated depending on the charge remaining on the batteries) and hence, the main CDS Server, other sun workstations and the SBC processors in the MSR will stay on. Similarly, the vacuum processors in the LVEA, MR and the End Stations will also continue running even though they lose their

network connection to the LLO1 CDS Server. The monitors in the control room will shutdown and also their sun CPUs in the MSR will shutdown. The network connection to the LVEA, MR and the End Stations will be disconnected. Figure 2 shows the state of the CDS network and systems for a SPO scenario. It is best to walk around and access the situation and understand what processors/sun workstations have shutdown before beginning the revival process.

For the *LPO scenario*, the whole of the CDS Network and systems will completely shutdown taking down the machines in the MSR and the vacuum systems along with it. In such a case, dial down the high voltage power supply. Also arrange for manual fill of the cryopumps (call Allen Sibley/Russ Wooley) if the power outage lasts more than six hours and close gate valves (Refer Vacuum document). Figure 3 shows the pictorial representation of the state of the CDS network for a LPO scenario.

Restarting computers/systems after the power outage is different for both the scenarios. For a SPO scenario, we have to deal with fewer machines in the LVEA and the End Stations, and is much easier than for a LPO scenario where all the systems have to be brought up.

The following sections of the document describe the procedure for reviving the CDS network and systems for each power outage scenario. The following assumptions are made:

- 1) vxWorks boot up files and processor startup.cmd files exist in the right directories and have not been changed. **A common problem is when the startup.cmd file is renamed with a different name or extension. For example, startup.cmd.good**
- 2) No changes are done to database and object files before the power outage.

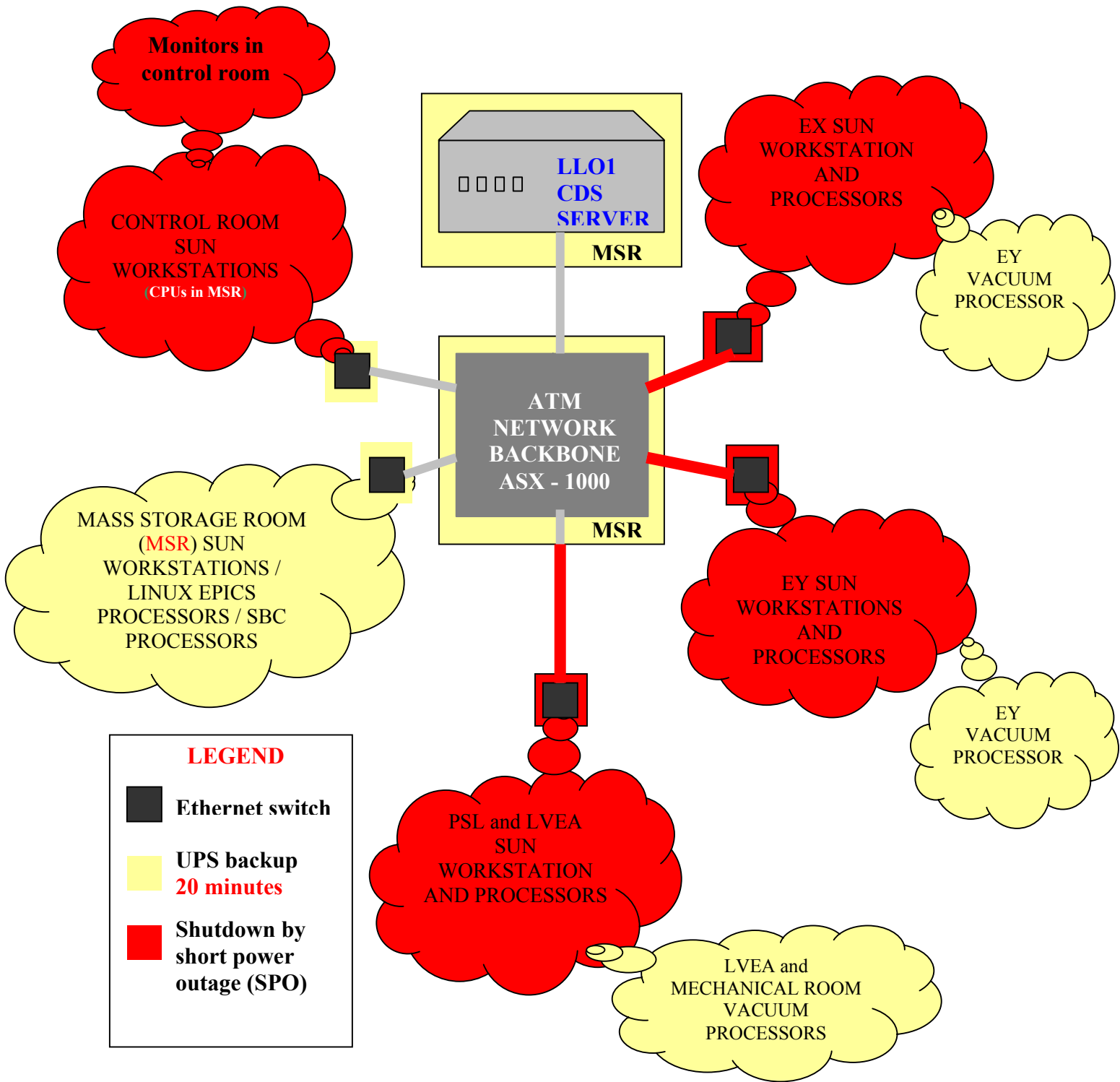


Figure 2: State of CDS Network/systems for Short Power Outage (SPO) Scenario

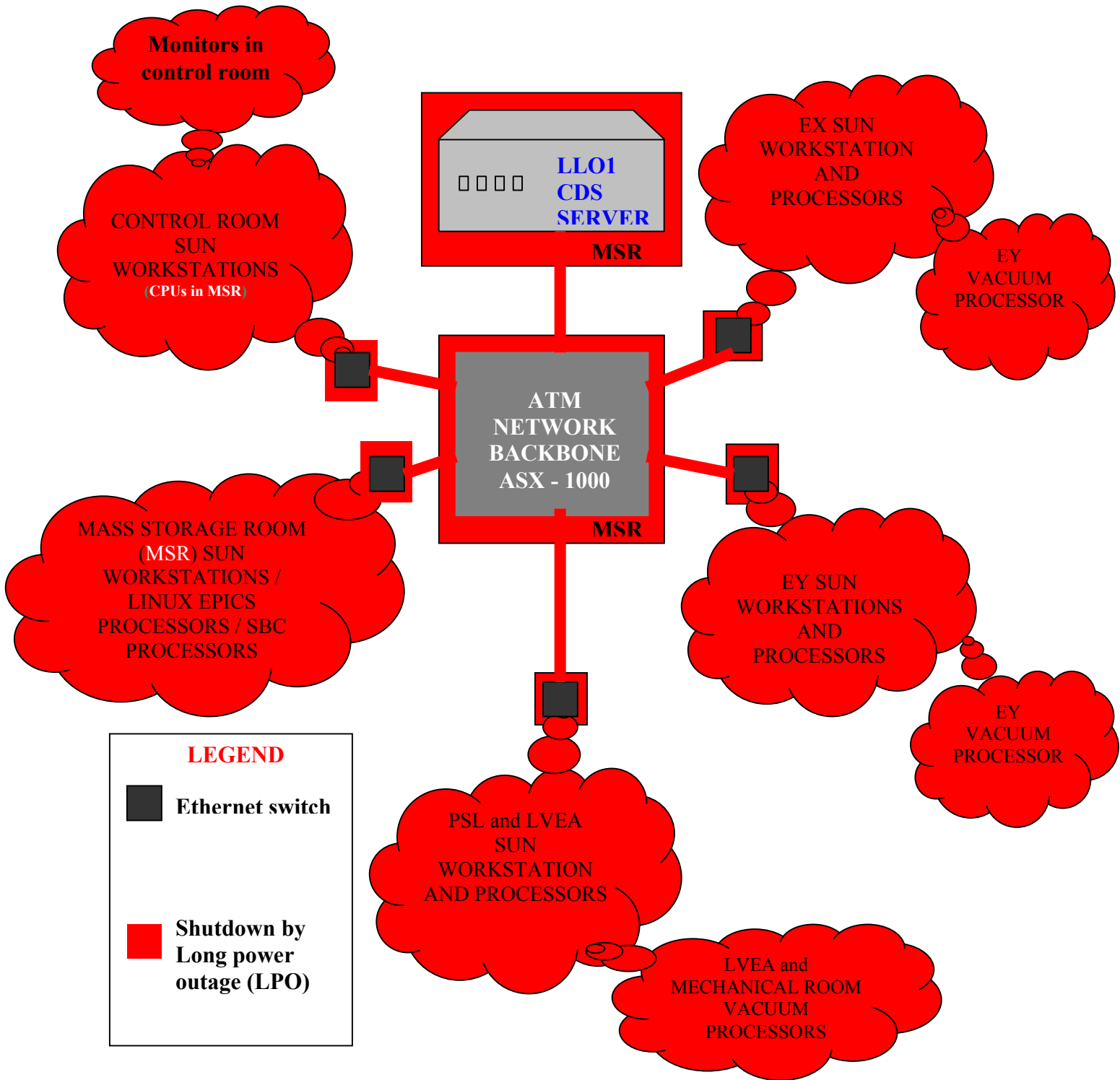


Figure 3: State of CDS Network/systems for Long Power Outage (LPO) Scenario

5) REVIVING

Reviving the CDS network for both the scenarios after the power to the site is back are described below.

5.1) SHORT POWER OUTAGE (SPO) SCENARIO

This is the slightly easier of the two since the MSR machines have not been shutdown. However care should be exercised to check the coil drive outputs and the fine actuator outputs when bring up the other processors.

Before you embark on the following procedures, please make sure that the MSR power didn't go down and the sun workstations (especially LLO1) are actually working.

If the sun workstations are working, you can login to one of the control room machines and bring up medm screen sitemap to monitor during boot up of the processors. If not, then the MSR also went through a power shutdown (faulty UPS maybe), then follow the instructions for the LPO scenario.

Note some of the processors have built in boot up scripts that would have already started them. However we still need to check the processors and burt restore them. The following order is recommended.

a) LVEA and End Station sun workstations

These should be up and running after the power returns. These can be used immediately since the MSR didn't go down.

b) Vacuum processors – 10velx, 10vely, 10vemr, 10veex, 10veey – mv162

Open up medm screens for the vacuum processors and make sure they are still running. For a short power outage, they should not have stopped running (unless a UPS failure).

If not, reboot the vacuum processors by pressing the 'RESET' button on the processor and burt restore the values to a time before the power

outage. Click on the ‘START’ Button to start the PID loop for the cryopumps level control.

c) l1susauxl0 – The suspension auxiliary processor – mv162

This processor should already be up after the power returns. Open the L1SUS_WATCHDOGS screen. Burt restore the l1susauxl0 processor to a time before the power outage. **SHUTDOWN/DISABLE ALL THE LVEA OPTICS.**

d) l1seiwd1 and l1seiwd2 – Hepi watchdog processor – baja4700

This processor should already be up after the power returns. Open the L1SEI_WATCHDOGS screen. Burt restore the l1seiwd1 and l1seiwd2 processors to a time before the power outage. **SHUTDOWN/DISABLE ALL THE HEPI DRIVE TO THE CHAMBERS/OPTICS.**

e) l1iscauxex – The X End station suspension auxiliary processor – mv162

This processor should already be up after the power returns. Open the L1SUS_WATCHDOGS screen. Burt restore the l1iscauxex processor to a time before the power outage. **SHUTDOWN/DISABLE THE ETMX OPTIC.**

f) l1iscauxey – The Y End station suspension auxiliary processor – mv162

This processor should already be up after the power returns. Open the L1SUS_WATCHDOGS.adl screen. Burt restore the l1iscauxey processor to a time before the power outage. **SHUTDOWN/DISABLE THE ETMY OPTIC.**

g) l1psl – PSL processor – baja 4700

This processor should already be up after the power returns. Open the L1PSL.adl screen. Burt restore the l1psl processor to a time before the power outage.

h) l1susepics – Suspension (SUS) epics processor – linux box

The SUS epics processor is backed by UPS power, it should not go down and must be running after the power returns. The l1susepics processor handles the suspension epics for all the corner station optics except the auxiliary controls stuff and the end station suspension epics (which is

handled by the 11hepiepics). Open the L1SUS_(optic).adl medm screen. Make sure the epics displays are resolved. The numbers on the medm screen might be still frozen since the front-end suspension processors (11dscl0, 11dscl1, 11dscl2, 11dscl3) are not running. Since the epics did not go down, **burt restore is not needed.**

If the processor does shut down (for reasons like UPS failure), then the processor has to be started manually. SSH to 11susepics with username “controls” and password (located in the envelope in the control room). When logged in successfully, you should be in the directory /cvs/cds/llo/target/11susepics. Start the epics processor by running the command “./**startupL1**” without the quotes. Burt restore the 11susepics processor to a time before the power outage.

i) 11iscepics – Interferometer Sensing and Control (ISC) epics processor – linux box

The ISC epics processor is backed by UPS power, it should not go down and must be running after the power returns. The 11iscepics processor handles all the LSC, ASC epics except the auxiliary controls stuff. Open the L1LSC.adl or L1ASC_WFS_MASTER.adl medm screen. Make sure the epics displays are resolved. The numbers on the medm screen might be still frozen since the front-end LSC (11lscl0) and ASC (11asc10) processors are not running. Since the epics did not go down, **burt restore is not needed.**

If the processor does shut down (for reasons like UPS failure), then the processor has to be started manually. SSH to 11iscepics with username “controls” and password (located in the envelope in the control room). When logged in successfully, you should be in the directory /cvs/cds/llo/target/11iscepics. Start the epics processor by running the command “./**startupL1**” without the quotes. Burt restore the 11iscepics processor to a time before the power outage.

Turn off the LSC outputs to the optics on the L1LSC.adl screen and the ASC outputs to the optics on the L1ASC_WFS_MASTER, L1ASC_MC_MASTER, and the L1ASC_QPD_MASTER screens.

IMPORTANT NOTE: This processor also handles the alignment of Input Beam into Model Cleaner, i.e., has epics controls for the PZTs. After a power outage, the input beam alignment to the mode cleaner may be disturbed even though the processor is burt restored.

j) 11hepiepics – Hydraulic External Pre-Isolation (HEPI) epics processor – linux box

The HEPI epics processor is backed by UPS power, it should not go down and must be running after the power returns. The 11hepiepics processor handles all the corner station and end station hepi epics and also the end station suspension epics. Open the L1SEI_(optic).adl or L1SUS_ETM*.adl medm screen. Make sure the epics displays are resolved. The numbers on the medm screen might be still frozen since the front-end hepi processors (11hepi1, 11hepi2, 11hepiex, 11hepiey) and End Station suspension (11iscex, 11iscey) processors are not running. Since the epics did not go down, **burt restore is not needed.**

If the processor does shut down (for reasons like UPS failure), then the processor has to be started manually. SSH to 11hepiepics with username “controls” and password (located in the envelope in the control room). When logged in successfully, you should be in the directory /cvs/cds/llo/target/11hepiepics. Start the epics processor by running the command “./startupL1” without the quotes. Burt restore the 11hepiepics processor to a time before the power outage.

Turn off the HEPI Drive outputs to the optics on the L1SEI_(optic).adl screen.

k) 11lsc10 – LSC front end processor – Pentium

This Pentium processor does all the LSC calculations and is an important processor in terms of timing of the CDS system. All other digital suspension control (dsc) processors are synced to the LSC processor such

that they are exactly 1 cycle behind. This processor has to be manually started by telneting into the 11lsc10 processor.

At the prompt type:

➔ /cvs/cds/llo/target/11lsc10/startup.cmd

This should start the front end successfully. To exit, simply close the terminal window or type ^] to get a telnet prompt and then type quit. DO NOT EXIT OR LOGOUT.

KNOWN BUG:

Sometimes the Pentium processor waits for F1 key to be pressed. To do this, connect a keyboard and a monitor to the 11lsc10 processor and press the F1 key. The processor continues to load the operating system and presents you with a prompt. Load the startup file as shown above. Remove the keyboard and monitor.

l) 11asc10 – ASC front end processor – Pentium

This Pentium processor does all the ASC calculations. This processor has to be manually started by telneting into the 11lsc10 processor.

At the prompt type:

➔ /cvs/cds/llo/target/11asc10/startup.cmd

This should start the front end successfully. To exit, simply close the terminal window or type ^] to get a telnet prompt and then type quit. DO NOT EXIT OR LOGOUT.

KNOWN BUG:

Sometimes the Pentium processor waits for F1 key to be pressed. To do this, connect a keyboard and a monitor to the 11lsc10 processor and press the F1 key. The processor continues to load the operating system and presents you with a prompt. Load the startup file as shown above. Remove the keyboard and monitor.

m) 11dsc10 – small optics digital suspension controller – front end - Pentium

This Pentium processor does the calculations for the small optics systems in the LVEA except MC2 which is done by 11dsc13. This processor has to be manually started by telneting into the 11dsc10 processor.

At the prompt type:

➔ /cvs/cds/llo/target/11dscl0/startup.cmd

This should start the front end successfully. To exit, simply close the terminal window or type ^] to get a telnet prompt and then type quit. DO NOT EXIT OR LOGOUT.

KNOWN BUG:

Sometimes the Pentium processor waits for F1 key to be pressed. To do this, connect a keyboard and a monitor to the 11dscl0 processor and press the F1 key. The processor continues to load the operating system and presents you with a prompt. Load the startup file as shown above. Remove the keyboard and monitor.

n) 11dscl1 – RM/BS digital suspension controller – front end – Pentium

This Pentium processor does the calculations for the RM/BS optics suspensions in the LVEA. This processor has to be manually started by telnetting into the 11dscl1 processor.

At the prompt type:

➔ /cvs/cds/llo/target/11dscl1/startup.cmd

This should start the front end successfully. To exit, simply close the terminal window or type ^] to get a telnet prompt and then type quit. DO NOT EXIT OR LOGOUT.

KNOWN BUG:

Sometimes the Pentium processor waits for F1 key to be pressed. To do this, connect a keyboard and a monitor to the 11dscl0 processor and press the F1 key. The processor continues to load the operating system and presents you with a prompt. Load the startup file as shown above. Remove the keyboard and monitor.

o) 11dscl2 – ITM digital suspension controller – front end – Pentium

This Pentium processor does the calculations for the ITM optics suspensions in the LVEA. This processor has to be manually started by telnetting into the 11dscl2 processor.

At the prompt type:

➔ /cvs/cds/llo/target/l1dsc12/startup.cmd

This should start the front end successfully. To exit, simply close the terminal window or type ^] to get a telnet prompt and then type quit. DO NOT EXIT OR LOGOUT.

p) l1dsc13 – MC2 digital suspension controller – front end – Pentium

This Pentium processor does the calculations for the MC2 optic suspensions in the LVEA. This processor has to be manually started by telneting into the l1dsc13 processor.

At the prompt type:

➔ /cvs/cds/llo/target/l1dsc13/startup.cmd

This should start the front end successfully. To exit, simply close the terminal window or type ^] to get a telnet prompt and then type quit. DO NOT EXIT OR LOGOUT.

q) l1iscex – ETMX digital suspension processor – Pentium

This Pentium processor does the calculations for the ETMX optic suspensions in the End X. This processor has to be manually started by telneting into the l1iscex processor.

At the prompt type:

➔ /cvs/cds/llo/target/l1iscex/startup.cmd

This should start the front end successfully. To exit, simply close the terminal window or type ^] to get a telnet prompt and then type quit. DO NOT EXIT OR LOGOUT.

r) l1iscey – ETMY digital suspension processor – Pentium

This Pentium processor does the calculations for the ETMY optic suspensions in the End Y. This processor has to be manually started by telneting into the l1iscey processor.

At the prompt type:

➔ /cvs/cds/llo/target/l1iscey/startup.cmd

This should start the front end successfully. To exit, simply close the terminal window or type ^] to get a telnet prompt and then type quit. DO NOT EXIT OR LOGOUT.

ON THE LIISC_NETWORK MEDM SCREEN CHECK IF ALL PROCESSOR'S CPU AND THE LSC SKEW IS WITHIN LIMITS. IF NOT REPEAT THE REBOOT PROCEDURE ACCORDINGLY.

s) l1hepi1 – LVEA HAM chambers HEPI Processor – Pentium

This Pentium processor does the calculations for the HAM chambers HEPI in the LVEA. This processor has to be manually started by telneting into the l1hepi1 processor.

At the prompt type:

➔ /cvs/cds/llo/target/l1hepi1/startup.cmd

This should start the front end successfully. To exit, simply close the terminal window or type ^] to get a telnet prompt and then type quit. DO NOT EXIT OR LOGOUT.

t) l1hepi2 – LVEA BSC chambers HEPI Processors – Pentium

This Pentium processor does the calculations for the BSC chambers HEPI in the LVEA. This processor has to be manually started by telneting into the l1hepi1 processor.

At the prompt type:

➔ /cvs/cds/llo/target/l1hepi2/startup.cmd

This should start the front end successfully. To exit, simply close the terminal window or type ^] to get a telnet prompt and then type quit. DO NOT EXIT OR LOGOUT.

u) l1hepiex – END X Hepi Processor – Pentium

This Pentium processor does the calculations for the BSC chamber HEPI in the End station X. This processor has to be manually started by telneting into the l1hepiex processor.

At the prompt type:

➔ /cvs/cds/llo/target/l1hepiex/startup.cmd

This should start the front end successfully. To exit, simply close the terminal window or type ^] to get a telnet prompt and then type quit. DO NOT EXIT OR LOGOUT.

v) l1hepiey – END Y Hepi Processor – Pentium

This Pentium processor does the calculations for the BSC chamber HEPI in the End station Y. This processor has to be manually started by telneting into the l1hepiey processor.

At the prompt type:

➔ /cvs/cds/llo/target/l1hepiey/startup.cmd

This should start the front end successfully. To exit, simply close the terminal window or type ^] to get a telnet prompt and then type quit. DO NOT EXIT OR LOGOUT.

w) l1iool0 – IOO mode cleaner EO Shutter/pico controls processor – mv162

This processor will also be up and running after the power returns. Open the L1:IOO-MC_LOCK medm screen. Burt restore the l1iool0 processor to a time before the power outage.

x) l1iool1 – IOO mode cleaner lock controls processor

This processor will also be up and running after the power returns. Open the L1:IOO-MC_LOCK medm screen. Burt restore the l1iool1 processor to a time before the power outage. Disable the Mode Cleaner Auto locker script till you are ready to lock the Mode Cleaner.

y) l1adcuex – End X Analog Data collection unit – Pentium

This processor handles the PEM and other analog data from the End X. After the power returns, this processor should be up and running. Open the L0DAQ_Detail medm screen and check the indication for the l1adcuex. If green, this processor is running.

Check the channels on this processor using a dataviewer to see if they the processor resolved correctly after the power outage. If not, reboot it shutting down the crate and restarting it.

KNOWN BUG:

The ICS 110B A/D Converter loses its clock sync if the GPS receiver is not synced before the processor reboots. Rebooting the crate fixes this.

z) l1adcuey – End Y Analog Data collection unit – Pentium

This processor handles the PEM and other analog data from the End Y. After the power returns, this processor should be up and running. Open the L0DAQ_Detail medm screen and check the indication for the l1adcuey. If green, this processor is running.

Check the channels on this processor using a dataviewer to see if they the processor resolved correctly after the power outage. If not, reboot it shutting down the crate and restarting it.

KNOWN BUG:

The ICS 110B A/D Converter loses its clock sync if the GPS receiver is not synced before the processor reboots. Rebooting the crate fixes this.

aa) l1adcupem – LVEA PEM Analog Data collection unit – Pentium

This processor handles the PEM analog data from the LVEA. After the power returns, this processor should be up and running. Open the L0DAQ_Detail medm screen and check the indication for the l1adcupem. If green, this processor is running.

Check the channels on this processor using a dataviewer to see if they the processor resolved correctly after the power outage. If not, reboot it shutting down the crate and restarting it.

KNOWN BUG:

The ICS 110B A/D Converter loses its clock sync if the GPS receiver is not synced before the processor reboots. Rebooting the crate fixes this.

bb) l1adcusus – LVEA SUS Analog Data collection unit – Pentium

This processor handles the SUS analog data from the LVEA. After the power returns, this processor should be up and running. Open the L0DAQ_Detail medm screen and check the indication for the l1adcusus. If green, this processor is running.

Check the channels on this processor using a dataviewer to see if they the processor resolved correctly after the power outage. If not, reboot it shutting down the crate and restarting it.

KNOWN BUG:

The ICS 110B A/D Converter loses its clock sync if the GPS receiver is not synced before the processor reboots. Rebooting the crate fixes this.

cc) l1iocstat – iocstat processor – Sun Blade 100

Reboot this machine by pressing the ON/OFF switch in front of the sun workstation.

To check iocstat process is running, open the L1IFO_Status medm screen or its sub screens and make sure it is not white. Burt restore l1iocstat to a time before the power outage.

To restart any of these three processes - iocstat, the best option is to reboot the machine.

If you still have problems,

check if the iocstat processes are running on this sun machine. Login as controls. Password in the control room envelope.

Files located in the target directory:

/cvs/cds/llo/target/l1iocstat.

dd) l1awgl0 (gds1vea1) – GDS Arbitrary waveform generator

This processor handles the excitation of the channels. After the power returns, this processor should be up and running. This processor is now located in the MSR.

Check the excitation channels using DTT to see if they the processor resolved correctly after the power outage. If not, reboot it shutting down the crate and restarting it.

KNOWN BUG:

The ICS 115B D/A Converter loses its clock sync if the GPS receiver is not synced before the processor reboots. Rebooting the crate fixes this.

OPTICS DAMPING AND HEPI REVIVAL:

TURN THE OPTICAL LEVER DAMPING OFF ON ALL LARGE OPTICS AND DAMP ALL THE OPTICS, BOTH LARGE AND SMALL ON OSEM DAMPING. THEN TURN ON THE OPTICAL LEVER DAMPING AND MAKE SURE THE OPTICS IS STILL DAMPED. CHECK TO SEE IF THE PITCH AND YAW ANGLE OFFSETS ARE SET RIGHT ON THE L1IFO_ALIGN MEDM SCREEN. ENABLE THE LSC AND ASC OUTPUTS AS NEEDED.

TO TURN ON THE HEPI DRIVE THE SUSPENSION WATCHDOGS MUST BE ON, i.e., in “NORMAL” POSITION. TURN ON THE HEPI DRIVES ONE CHAMBER AT A TIME. SLOWLY RAMP UP THE MASTER GAIN TO 1.000 IN TWO STEPS. THE GAIN HAS TO RAMP UP IN STEPS OF 0.01 UPTO 0.1 WITH A PAUSE OF 2-3 SECONDS PER STEP AND THEN IN STEPS OF 0.1 UPTO 1.00 WITH A PAUSE OF 2-3 SECONDS PER STEP.

This completes the steps required to bring back the CDS network and systems after a short power outage (SPO).

5.2) LONG POWER OUTAGE (LPO) SCENARIO

The first place to start for this scenario is the MSR. Even though other sun workstations and processors might be up, it does not do good till LLO1, the ATM backbone and other machines are up.

DO NOT LOGIN TO ANY CONTROL ROOM, LVEA, AND END STATION SUN WORKSTATIONS TILL THE MSR MACHINES ARE UP.

a) LLO1 – LLO CDS Server – Sun Enterprise 280

This sun server is the main important machine of the CDS network. It handles all the user accounts, the main /cvs/cds directory required by all other suns and processors. After the power returns, this sun server should restart without any intervention. On the monitors in the MSR, select LLO1 and check to see if it is displaying the login screen.

This sun server has been configured to self-correct for disk errors and also not depend on any other machine to be up and running.

Make sure the A1000 disk array below the sun server is also on.

Check if conlog is running:

Login as ops. Password in the control room and make sure the conlog process is running. This should have started when rebooted.

If not, the location of the files is at:

/cvs/cds/llo/web/conlog

Check if the nameserver is running:

Check if the nameserver process is running. It should have started when rebooted.

If not, the location of the nameserver file is at:

/cvs/cds/scripts/

b) LLOCDSsw0 – ATM switch – ASX1000

The ASX 1000 is the network backbone for the CDS Network. It loads its configuration file /tftpboot/lacs.cfg from LLO1.

The ATM might restart faster than LLO1. Hence, even though this switch is running after the power returns, please reboot it to make sure it loads the configuration file.

c) LLOMSR, LLOMSR1 and LLOMSR2 – 3810 Network switches in the MSR

The next ones in line are the 3810 network switches in the MSR. These switches have to be on for machines to communicate. Even though the 3810 network switches are already running please reboot it to configure the switch.

d) control3 – Application server – Ultra 60

This ultra 60 sun server holds the /opt/apps application directory, the /data directory and the /users directory without which all the other suns will freeze when logged in.

Reboot this sun server to refresh its network connection. Make sure the A1000 disk array below the sun server is also on.

AFTER THIS YOU SHOULD BE ABLE TO LOGIN TO ANY CONTROL ROOM SUN AND BRING UP MEDM SCREENS.

e) LLOLVEA, LLORightEnd and LLOLeftEnd – 3810 Network switches in the MSR

The next ones in line are the 3810 network switches in the LVEA and END Stations. These switches have to be on for machines to communicate. Even though the 3810 network switches are already running please reboot it to configure the switch.

AT THIS POINT FOLLOW THE INSTRUCTIONS OF THE SHORT POWER OUTAGE SCENARIO TO BRING UP ALL THE LVEA, MECHANICAL ROOM AND END STATION PROCESSORS.

NOTE: ALL PROCESSORS HAVE TO BE REBOOTED IF THEY ARE ALREADY UP TO REFRESH THEIR CONNECTION TO LLO1

f) l0daqctrl – DAQ Controller – Pentium

This processor is the heart of the DAQ system. This processor should be rebooted by keying the crate off. This processor may sometimes take more than a few minutes if the GPS is not synced. Rebooting will load the correct master.config file and also reset the Test Point manager.

g) Fb0 – Frame Builder 0 – Enterprise 450

This frame builder is our backup frame builder and also has its disks in the MSR. First make sure the disk arrays A1000 and the D1000 are both ON, Reboot the Frame Builder to load the master.config file from LLO1.

If you still have problems,

check if the daqd daemon and the nds daemon are running on the framebuilder. Login as controls. Password in the control room envelope.

Files located in the directory:

/usr/controls/

h) Fb1 – Frame Builder 1 – Sun Blade 2000

This frame builder is main frame builder whose disks are in the LDAS room in the new building across the street. First make sure the disk array from LDAS is up and running. Reboot the Frame Builder to load the master.config file from LLO1.

If you still have problems,

check if the daqd daemon and the nds daemon are running on the framebuilder. Login as controls. Password in the control room envelope.

Files located in the directory:

/export/home/controls/

This frame builder also runs the frame broadcaster on it.

i) london (gateway) – CDS web gateway - Ultra 60

This sun server is the CDS web gateway to the world. It runs the apache server and also the ndsproxy required to run the dataviewer and DTT outside CDS network. Reboot the sun workstation to get the apache daemon and the ndsproxy to run. Note: The ndsproxy requires the frame builders to be running to configure itself.

On any control room sun, check if you can see the CDS web page. To check the ndsproxy, use dataviewer on GC to connect to london.ligo-la.caltech.edu with port 8088 or 8089.

If you still have problems,

check if the apache httpd daemon and the ndsproxy is running. Login as ops. Password in the control room envelope.

Apache files located at:

/usr/apache/bin , /var/apache/ , /etc/apache

ndsproxy files located at:

/cvs/cds/llo/web/ndsproxy

j) river (river) – CDS user gateway – Ultra 60

This sun server is the CDS user gateway to and from the CDS network. Reboot this sun workstation. Check by logging into this machine using ssh with your assigned username and password.

k) LLO2 – web-epics interface – Ultra 2

This sun workstation is used to display the real time medm snapshots on the web page.

Reboot this machine. Login as ops. Password in the control room envelope

Open medm screens that you wish to display on all the six workspaces.

Minimize all windows except the screens that need to be snapshot. Open a terminal and run the command

/cvs/cds/scripts/wrkspcerotate.dtksh

Minimize the terminal window.

l) Delaronde, clearwater (E 450), pickerel and nesslin (Sun Blade 1000) – GDS DMT suns

Reboot all the four sun machines. Check the GDS web page

http://london.ligo-la.caltech.edu/gds/dmt/Monitors/spiM_LLO.html

to see if the monitors are running on the three machines.

If you still have problems, call John Zweizig or Szabi Marka.

m) alvar – GDS gateway

This is a 1u size computer running linux and is mounted above the delaronde. Reboot his processor and turn it on.

n) l0llosuper – CDS epics security processor

Reboot this processor (Note: This will also reboot the l0tidal and l0llotime processor) to load the security database and configuration file.

Burt restore this processor to a time before the power outage.

o) l0llotime – CDS epics time processor

Reboot this processor (Note: This will also reboot the l0tidal and l0llosuper processor) to load the time database and sequencer.

Burt restore this processor to a time before the power outage

p) l0tidal – Tidal servo processor and tidal prediction script

This processor is used for the tidal servo calculations and tidal prediction.

Reboot this epics processor by pressing the reset button on the processor (Note: This will also reboot the l0llosuper and l0llotime processor) and burt restore it to a time before the power outage.

For tidal prediction, a data file loaded by the processor sitetide_current.dat file must exist in the directory:

`/cvs/cds/llo/tidal/`

The tidal.pl paladin program to generate the tide prediction information must run once every week on Sunday at 00:00 hrs to update this sitetide_current.dat file as cronjob on the sun machine LLO1.

q) control4 – disk backup sun workstation

Reboot this sun workstation and turn it on.

r) control21, control22 – figure of merit display – sun blade 150

Reboot this processor. Setup the DMT viewer and the figure of merit screens on the display. Control21 has figure of merit 1 and 2 on each display and control22 has figure of merit 3 on display 1. Note: These are also snapshot and elogged on the ilog and displayed on the CDS web page. Hence the location of these figure of merit displays have to be in their proper location. A cronjob running a perl program to snapshot, elog and display is on the LLO2 processor.

s) control31 – epics display sun – Ultra 10

This sun workstation is used to display a medm screen that represents the whole interferometer. This medm screen will be a guide to indicate any problems in the system.

This completes the steps required to bring back the CDS network and systems after a Long power outage (LPO).

PROBLEMS KNOWN:

- 1) Sometimes the ports on the 3810 do not work. Hence processors do not boot up but complain about network problem. Solution: Move the Ethernet cable to the next port on the 3810 switch and reboot.
- 2) Changed database and object files that were put in the target area but was not loaded before the power outage. Since these new files are loaded during power outage, we may run into problems during boot up.
- 3) Ports on the bypass switches for the 5579 network and the 5565 network may not be open when powered up. Reboot the crate containing the 5594 bypass switch in the MSR (for the 5579 Network) and the 5595 bypass rack mount unit (for the 5565 Network).

NOTE: Some of the actions will physically move optics, chambers and drive currents through various coils, so these procedures must be carried out with utmost care and a watchful eye must look out for any unwanted states of the interferometer.

If you still need help, Please contact Chethan Parameswariah – cparames@ligo-la.caltech.edu