

Procedure for the

Installation of an IMS Server

Ubuntu, Synapse and Services Software

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1 Purpose

The purpose of this document is to capture the procedure for installing Ubuntu, Synapse and IMS Services Software.

2 Preparation

2.1 Get Ubuntu CD or USB

The version of Ubuntu to be installed is:

- Latest Ubuntu Desktop 12.04 LTS release (currently 12.04.2 LTS 64 bit)
 - 32 bit version (for 32 bit hardware)
 - 64 bit version (for 64 bit hardware)

The installation must be done from either a CD or a USB disk created as follows:

- Download the correct ISO image from one of the following sites:
 - http://software.imseismology.org/os
 - http://www.ubuntu.com/download/desktop
- Create the CD or USB (see the 'Show me How' section of the Ubuntu web page)

2.2 Set PC BIOS

- Boot PC
- Enter BIOS
- Set boot sequence to CD or USB first
- Set Hardware Clock to UTC (GMT)
- Set AC Recovery to on
- Enable **Hyper-Threading** (if available)

2.3 RAID

If the system is planned for a RAID configuration

- Boot PC
- Enter BIOS
- Setup RAID as required (if available)

2.3.1 RAID on a Dell Workstation

Dell Workstations do not have a hardware raid controller, therefore RAID should not be configured.

2.3.2 RAID on a Dell Server

Dell Servers are usually configured with four harddrives. Configure RAID 1 to produce two virtual disks.

2.4 Network setup

The local network (not customer site unless the installation is taking place at the customer site) settings must be available

• DHCP (only requires proxy settings)

or

- Static
 - IP address and netmask
 - DNS IP
 - DNS domain
 - Gateway IP address
 - Proxy IP and port (if required)

3 Install Ubuntu

3.1 Boot from the CD or USB

With USB stick or CD boot the PC (you may need to enter boot menu to select the correct boot device)

```
If you use a USB stick and get the error message
```

Unknown keyword in configuration file: gfxboot versamenu.c32: not a COM32R image

at the prompt

boot:

type

help

and after the help list is displayed, Enter to boot This will take you to the **Live Ubuntu** If you are installing 12.04.x you may get this

When Ubuntu boots for installation (after selecting from boot menu), screen is left blank an unable to continue.

To fix it, try this

- At first Ubuntu splash screen (Picture of keyboard and universal access), press any key to enter graphical selection menu.
- Press F6 for Options and enable nomodeset
- Choose installation of Ubuntu, and install as per usual and reboot
- As soon as BIOS is finished loading, press and hold the shift key to enter grub
- Navigate to default Ubuntu entry and press e to edit
- After the entry quiet splash (in GRUB_CMDLINE_LINUX_DEFAULT) add nomodeset
- Ctrl-x to save and boot Ubuntu
- Now edit and update grub for future reboots/shutdowns
- In a Terminal: gksudo gedit /etc/default/grub, the line should be: GRUB_CMDLINE_LINUX_DEFAULT="quiet splash nomodeset"
- Save and exit and make sure to update grub:

sudo update-grub

There are two ways to start the install

• Run the Live Ubuntu

 Once the boot is complete start the Ubuntu install by clicking on the icon called Install Ubuntu 12.04.* LTS

• Install Ubuntu

- takes you directly to step 1 of the install process

3.2 Select Local Settings

• language (English)

- local timezone (**not** the customer's timezone this is important because Ubuntu uses the local timezone setting to select the best software package repository servers to use based on region; these repositories will be used in a later step of this document to update the system, and install the required packages)
- keyboard (according to the keyboard in use eg USA with Euro symbol on 5)

3.3 Partition the disk

• for a multi-disk system (with or without raid) put /data and /home on a second or third disk

Description	Disk	Mount	Туре	Primary	Minimum Size
		point		Logical	[GB]
EFI Boot	1		EFI boot	Primary	0.01 (10 MB)
Root partition	1	/	ext4	Primary	50
Log files and spool data	1	/var	ext4	Logical	10
Swap space	1	-	swap	Logical	twice memory size
IMS spare data area	1	/data1	ext4	Logical	rest of drive 1
Home directory	2	/home	ext4	Primary	100
IMS data area	2	/data	ext4	Logical	rest of drive 2

Table 1: Minimum partition sizes for a 2 disk system.

- select **Specify partitions manually (advanced)**
- delete all existing partitions if the PC has a pre-installed OS
 - if this is an upgrade preserve /data and /home
- create partitions as required (see table 1)

Note:

For drives larger than 2.2 TB you will need to install gparted and format the drives using a GUID Partition Table (GPT).

3.4 Create ims user

When prompted, create a user

- login: ims
- password: as required
- Select Require my password to login

go to the next step and

- Select Advanced
- Enter the **Network proxy** as required to get an Internet connection.

3.5 Install the software

- Review all the settings (in the summary and correct if needed)
- Select **Install** on the final step of the process
- After the install completes, Select **Restart now**

4 Network Settings

If the LAN does not have a DHCP server, the static network settings need to be setup before the following steps are followed. If the LAN has a DHCP server and the proxy settings set in section 3.4, must be set and applied system wide.

System > Preferences > Network Connections

and the proxy settings

System > Preferences > Network Proxy

- set as required
- apply system wide

5 Update Ubuntu

After the reboot, Ubuntu must be updated to the latest versions of the packages:

- Either select:
 - System > Administration > Update manager from the menu, or...
 - wait until the Update manager is run automatically
- When prompted to **restart** do so
- After the reboot is complete, disable update notifications:
 - Update manager ▷ Settings ▷ Updates ▷ Automatically check for updates should be set to: Never

6 Server Preperation

6.1 Additional Packages required by IMS

A number of additional packages should be installed to support the IMS.

A script called

ubuntu_extra.sh

is available to do this and is listed in section 1.

The script is in the IMS_extras folder on the USB supplied by IMS or can be downloaded from http://software.imseismology.org/os/ubuntu_extras.sh.

Run the script, it will determine the package dependencies and select them. When prompted to continue or not, answer

Y

for Yes.

The postfix installation will ask for some information

- select **OK**
- select local only

6.2 nVidia Graphics Driver

The nVidia graphics driver should be installed if the hardware is nVidia. Please note that the graphics driver should only be installed once all the Ubuntu updates have been applied.

Select

$Dash \mathrel{\triangleright} Additional \ drivers \ or \ System \mathrel{\triangleright} Administration \mathrel{\triangleright} Additional \ drivers$

which will scan for non-Ubuntu supported hardware drivers.

- select the recommended nVidia driver and install it
- reboot to activate the driver

If the graphic driver is not detected by Ubuntu, the following alternative installation method can be used:

- Download the nVidia driver:
 - http://software.imseismology.org/os/NVIDIA-Linux-x86_64-295.20.run
- Enter <Ctrl + Alt + F2>
- Kill the X-server:
 - sudo service gdm stop
 - or
 - sudo service lightdm stop
- Install the nVidia driver
- Reboot the PC

Caveats If the X-server fails to start, check that the permissions on /tmp are set to 777. This problem could be caused by installing a Moxa driver or by running Ubuntu updates.

6.3 Hardware RAID utility, megacli for PERC

If the disk controller is a Dell PERC H series hardware RAID controller, then install the megacli utility to enable monitoring or changing the disk status.

A version of the package for Ubuntu 12.04 is available at URL: http://software. imseismology.org/os/ or the latest may be obtained from http://hwraid. le-vert.net/ubuntu/pool-precise/ or configure the repository by following instructions at http://hwraid.le-vert.net/wiki/DebianPackages. If a .deb file has been downloaded, install with sudo dpkg -i megacli*.deb, there should be no problems with dependencies.

To find the device ID's of the installed disks and check their status, run

```
sudo megacli -PDList -a0
```

Check that the error counts for all devices are 0. The <code>smartmontools</code> package should have been installed in step 6.1 above and running <code>megacli</code> creates the device file <code>/dev/megaraid_sas_ioctl_node</code> which the smart utilities use. So running

sudo smartctl -a -d megaraid,0 /dev/sda

should list the S.M.A.R.T. info for disk 0. Repeat for all device ID's listed by megacli. To enable continuous monitoring by smartd, add a line like

```
/dev/sda -d megaraid,0 -a
```

to /etc/smartd.conf for each disk.

Ensure that smartd will be started at boot by uncommenting the line

start_smartd=yes

in /etc/default/smartmontools. Also, to ensure that the smartd messages are reported by logwatch (on Ubuntu 12.04 at least) create a file /etc/logwatch/- conf/services/smartd.conf with the line

LogFile = syslog

Add an entry to root's cron to run the above megacli command once a day. And finally, try to divert root's mail to someone who will read it, by setting an alias in /etc/aliases, and running the command newaliases.

6.4 Create root password

Normally Ubuntu does not have a login for root - all access is via the sudo command using the ims password. For some cases a root login is useful

The following commands will create the root login

sudo passwd

- enter the ims password when prompted
- enter the technical services root password (twice) when prompted

6.5 Create hardware summary of system

A unified summary of the system hardware is useful for future technical support, and should be generated using the lshw command:

• sudo lshw -html > lshw.html

This command will create a summary of the system hardware (including the DELL service tag number) in a file called <code>lshw.html</code>. This file should be uploaded to the relevant entry in Orderzilla.

6.6 Grub Configuration

- Edit the following file (root privileges required):
 - /etc/default/grub
- Add the following lines at the end of the file:

```
# If this option is set, it overrides the default
# recordfail setting. The default setting is -1,
# which causes GRUB to wait for user input.
# This option should be set on headless and appliance
# systems where access to a console is restricted
# or limited.
GRUB_RECORDFAIL_TIMEOUT=30
```

and change the line

GRUB_HIDDEN_TIMEOUT=0

to

```
# Setting deprecated when used in conjunction
# with GRUB_TIMEOUT
#GRUB_HIDDEN_TIMEOUT=0
```

- Run the command (root privileges required):
 - update-grub

6.7 Remove IMS database from locate DB

The locate database must not be left to run on the IMS database partitions

- Edit the following file (root privileges required)
 - /etc/updatedb.conf
- make sure that the following partitions are added to the PRUNEPATHS entry
 - /data/ims
 - /data1/ims (if used)

7 Install IMS Software

All software packages detailed below are strictly IMS server based packages, with the exception of packages marked with a star (*), that can also be installed on the client PC's.

Cron Entries

The following file contains example cron entries for all the IMS software packages:

http://software.imseismology.org/documents/example_cron_entries

Activate programs by removing the comments from the file.

7.1 System Setup

During this step IMS databases and default configuration files are created. **Please note that this step must be performed before installing any other software**, and that the PC should preferrably have an internet connection. If an internet connection is not available, older configuration files that were bundled with the installers, will be copied to the server.

Required information before starting the installation:

- The netid (e.g. 23)
- The root directory where the databases will be stored (e.g. /data/ims)
- The database name (e.g. tst)

Installers (currently only Linux), can be downloaded from http://software. imseismology.org/system

- 64 bit: e.g. ims_system_setup_linux_amd64_2011-11-30.zip
- 32 bit: e.g. ims_system_setup_linux_i386_2011-11-30.zip

Installation:

- unzip the package and cd to the created directory
- ./setup

7.2 Services Software Packages - All

During installation, all available software packages will be installed in ~/ims_services. After installation, packages can be selected and activated by adding them to the cron.

Important note - 9 December 2013

Please note that recent installers prompt the user for input fields and automatically configures the settings files according to the type of installation (IMS services customer, RTS->Synapse conversion etc.). The configuration instructions below are left as an example for reconfiguration.

Installers can be downloaded from http://software.imseismology.org/services

- 64-bit Installer: e.g. ims_services_linux_amd64_2012-06-11.zip
- 32-bit Installer: e.g ims_services_linux_i386_2012-06-11.zip

Installation:

• Run installer

7.2.1 IMS ATU Generator

Generates ATU's by sending breaks to the serial port.

- Location: ~/ims_services/ims_atu_d
- Cron entry to keep the server alive:
 - Substitute HOME with the full home path and note the network id argument:
 - **** HOME/ims_services/ims_atu_d/bin/keep_ims-atu-d_alive.sh <NET_ID> >/dev/null 2>&1

7.2.2 IMS Auto Processing Server

Automatically processes events recorded by Synapse.

To enable auto processing on the server:

- 1. Edit the Auto Processing Settings using the Con Editor in Synapse:
 - (a) Check the **Enabled** box
 - (b) Set the **Minimum Number of Triggers** before an event is automatically processed
- 2. Configure the **Auto Processing Server** and add it to the cron (**NB settings are now autoconfigured**)
 - (a) Location: ~/ims_services/ims_autoproc_server
 - (b) Settings files:
 - Global settings: ~/.ims/autoprocserver/etc/autoprocserver.properties
 - Per database settings: ~/.ims/autoprocserver/etc/profile/profile_dbname.properties
 - Rename the template file by changing **dbname** to the correct database name

- Edit the contents of the file by replacing references to dbname, updating the netid and setting other parameters
- Cron entry to keep the server alive (substitute HOME with the full home path):
 - */5 * * * HOME/ims_services/ims_autoproc_server/bin/autoproc_server >/dev/null 2>&1

7.2.3 Event Exporter

The IMS event exporter, exports seismic events in different event formats using an optional filter.

- Location: ~/ims_services/ims_event_exporter
- Three output formats are available (more to be added in future):
 - evp, msrap and msblast
- New filters can be created using Trace, or predefined filters can be down-loaded from:
 - http://software.imseismology.org/services/filters/
 - Downloaded filters must be copied to ~/.ims/filterdef/ims.commons.event.EventSummary
- Run the program, without paramters to view the usage:
 - cd ~/ims_services/ims_event_exporter/bin
 - ./event_exporter

Examples:

- Export events in EVP format (default evp filter will be used if no filter is specified):
 - cd ~/ims_services/ims_event_exporter/bin
 - ./event_exporter -back 1 -db /data/ims/tstIMS -output /home/iss/iss/temp/tst.evp -format evp

- Export events in MS-RAP format using the msrap-manual filter (down-loaded from our website):
 - cd ~/ims_services/ims_event_exporter/bin

7.2.4 Daily summary

Create a ~/bin directory if necessary and make a link to jprdaysum:

```
cd bin
ln -s ../ims_services/ims_jprdaysum/bin/ims_jprdaysum jprdaysum
```

7.2.5 IMS Seismogram Cleanup Program

Cleans the IMS databases by removing seismograms from the trig and/or untrig directories (buckets). By default seismograms in the trig bucket are kept for 90 days before being removed.

- Location: ~/ims_services/ims_sgram_cleanup
- Settings files (NB settings are now autoconfigured):
 - Global settings: ~/.ims/sgramcleanup/settings.properties
 - Per database settings: ~/.ims/sgramcleanup/databases/database_dbs.properties
 - * Rename the template file by changing **dbname** to the correct database name
 - * Edit the contents of the file by replacing references to dbname, updating the number of days to keep old seismograms and the bucket that should be cleaned
- Cron entry (substitute HOME with the full home path):
 - 04***HOME/ims_services/ims_sgram_cleanup/bin/sgramcleanup>/dev/null
 2>&1

7.2.6 IMS Configuration Tracking Monitor

Tracks changes to configuration settings for all available network ids.

- Location: ~/ims_services/ims_conmonitor
- Settings files (NB settings are now autoconfigured during initial installation):
 - Global settings: ~/.ims/conmon/settings.properties
 - * log-path=/home/ims/.ims/conmon/log (the directory where config changes are logged)
 - * delay-millis=60000 (the delay between consecutive runs)
- Cron entry (substitute HOME with the full home path):
 - */15 * * * HOME/ims_services/ims_conmonitor/bin/conmonitor>/dev/null 2>&1

7.3 Services Software Packages - ISS to IMS Converters

7.3.1 IMS Config Convertor

Converts ISS to IMS configuration files. Needed for hybrid (ISS RTS and IMS Synapse) systems or if the existing ISS database will be accessed via the Database Server (for Ticker3D).

- Location: ~/ims_services/ims_conconvertor
- Settings files (NB settings are now autoconfigured):
 - Global settings: ~/.ims/conconvertor/etc/conconvertor.properties
- Cron entry (substitute HOME with the full home path):
 - 0 3 * * * HOME/ims_services/ims_conconvertor/bin/conconvertor >/dev/null 2>&1

7.3.2 IMS Event Convertor

The IMS event converters should only be run once the configuration files have been converted using the IMS Config Convertor or Trace.

IMS Convertor

Server that continously converts live ISS to IMS events.

- Location: ~/ims_services/ims_convertor
- Settings files (NB settings are now autoconfigured):
 - Global settings: ~/.ims/convertor/etc/settings.properties
 - Per database settings: ~/ims/convertor/etc/profile/profile_dbname.properties
 - * Rename the template file by changing **dbname** to the correct database name
 - * Edit the contents of the file by replacing references to dbname, updating the netid and setting other parameters
- Cron entry to keep the server alive (substitute HOME with the full home path):
 - */5 * * * HOME/ims_services/ims_services/ims_convertor/bin/convert_events >/dev/null 2>&1

IMS Once Off Convertor

Program that converts ISS to IMS events in a single sweep. It can be used when an ISS RTS system is converted to an IMS Synapse system and the data has to be converted into the new format.

- Location: ~/ims_services/ims_convertor
- Display the usage of the program:
 - cd ~/ims_services/ims_convertor/bin
 - ./convert_once
- Example convert all events in the specified database (no -d option specified):
 - ./convert_once -imsc /home/iss/iss/.ims/conf -issc /home/iss/iss/etc issdb /data/iss/tst -imsdb /data/ims/tst

7.4 Services Software Packages - Services Customers

7.4.1 Portal

Usually portal will be set up remotely by the IMS Processing department and this step may be skipped.

Portal can be downloaded from http://software.imseismology.org/
portal

Installation:

- untar portal-install.tar.gz in the home directory
- cd ~/portal-install
- Run die installation script and follow the instructions
 - Change the installation directory to: /home/ims/ims_services
- Copy the portal.properties file (supplied by Hendrik) to the ~/ims_services/portal directory
- Edit portal.properties as needed:
 - Change the send and receive directories:
 - * send directory: ~/ims_portal/send
 - * receive directory: ~/ims_portal/receive
 - Change the proxy settings as supplied by the mine. If the Synapse server and the RTS will be running on the same PC, the existing ISS portal settings can be copied
- Add the ~/ims_services/portal/check-portal-running script to the cron (substitute HOME_DIR with the home directory):
 - */5 * * * * HOME_DIR/ims_services/portal/check-portal-running

7.4.2 IMS Event Packer

Packs automatically processed events as well as unprocessed events that did not meet autoprocessing criteria. Events are sent via portal to IMS.

- Location: ~/ims_services/ims_event_packer
- Settings files (NB settings are now autoconfigured):
 - Global settings: ~/.ims/event_packer/settings.properties
 - Per database settings: ~/.ims/event_packer/databases/database_db.properties
 - * Rename the template file by changing **db** to the correct database name
 - * Edit the contents of the file by replacing references to **db**, updating the netid and setting other parameters
- Cron entry to keep the server alive (substitute HOME with the full home path):
 - */5 * * * HOME/ims_services/ims_event_packer/bin/ims_pack_events >/dev/null 2>&1

7.4.3 IMS Jautoexec

Replaces ISS autoexec and runs on the IMS server as well as on the client PC. Unpacks events, processed by IMS, into raw and cooked databases.

Important Note - 11 June 2012:

The *settings files directory* has been moved from ~/.ims_jautoexec to ~/.ims/jautoexec. Older installations may still refer to the old directory structure.

- Location: ~/ims_services/ims_jautoexec
- Settings files (NB settings are now autoconfigured):
 - Global settings: ~/.ims/jautoexec/settings.properties
 - Per database settings: ~/.ims/jautoexec/databases/database_dbname.properties

- * Rename the template file by changing **dbname** to the correct database name
- * Edit the contents of the file by replacing references to dbname, updating the netid and setting other parameters
- Cron entry to keep the server alive (substitute HOME with the full home path):
 - */5 * * * HOME/ims_services/ims_jautoexec/bin/jautoexec >/dev/null 2>&1

7.4.4 IMS Application Manager

The IMS Application Manager manages small programs that are executed periodically. Currently it manages 5 programs namely the Event Syncer, the ATU-, Sitemon- and Issuemon -Senders and a disk space checker.

- Location: ~/ims_services/ims_app_manager
- Settings files:
 - Global settings: ~/.ims/app_manager/settings.properties.
 - * Edit the contents of the file by replacing references to dbName, and the minimum number of trigger events that are allowed to be synced.
- Cron entry to keep the manager alive :
 - */15 * * * * /home/ims/ims_services/ims_app_manager/start-ims-apps.sh >/dev/null 2>&1

7.5 Synapse (Server and GUI *)

Please follow the installation and setup instructions in SynapseGettingStarted.pdf.

Caveats Please ignore the following error message, if displayed during the installation process:

Domain creation process involves a step that creates primary key and self-signed server certificate. This step failed for the reason shown below. This could be because JDK provided keytool program could not be found (e.g. you are running with JRE) or for some other reason. No need to panic, as you can always use JDK-keytool program to do the needful. A temporary JKS-keystore will be created. You should replace it with proper keystore before using it for SSL. Refer to documentation for details. Actual error is: keytool error: java.lang.IllegalStateException: masked envelope

7.6 Database Server

The database server is a web-based program for accessing ISS or IMS seismic events without reading these events directly from a local or mounted database. Events can therefor also be accessed from a remote PC. The database server is mainly used to view events in Ticker3D and in Trace. Please note that the saving of events in Trace via the database server are currently not supported.

During installation, please enter the relevant information as configuration files will be created automatically.

The installation process consist of two parts, the installation of Glassfish and the installation of the database server.

Installation:

Step 1 - Install Glassfish

- This step is only necessary if the Synapse server has not been installed. Installers can be dowloaded from: http://software.imseismology.org/dbserver
 - 64-bit Installer: e.g. ims_glassfish_installer_linux_amd64_2012-01-04.zip
 - 32-bit Installer: e.g. ims_glassfish_installer_linux_i386_2012-01-04.zip

Step 2 – Install the Database Server

- Installers can be downloaded from http://software.imseismology.org/dbserver
 - 64-bit and 32-bit: e.g. ims_database_server_installer_2012-06-01.zip
- Location: ~/database_server (start and stop scripts)
- Settings files:
 - Global settings:
 - * ~/.ims/dbserver/settings.properties
 - Per database settings (created **automatically** by the installer):
 - * ~/.ims/dbserver/databases/db_dbnameISS.properties
 - * ~/.ims/dbserver/databases/db_dbnameIMS.properties
- Cron entry to keep the server alive (substitute HOME with the full home path):
 - */15 * * * HOME/database_server/keep_dbserver_alive >/dev/null 2>&1
- Cron entry to automatically download and install updates:
 - */15 * * * HOME/database_server/try_db_server_update >/dev/null 2>&1

Caveats Please ignore the following error message, if displayed during the installation process:

Domain creation process involves a step that creates primary key and self-signed server certificate. This step failed for the reason shown below. This could be because JDK provided keytool program could not be found (e.g. you are running with JRE) or for some other reason. No need to panic, as you can always use JDK-keytool program to do the needful. A temporary JKS-keystore will be created. You should replace it with proper keystore before using it for SSL. Refer to documentation for details. Actual error is: keytool error: java.lang.IllegalStateException: masked envelope

7.7 Ticker3D *

Installers can be downloaded from http://software.imseismology.org/ticker3d

- Linux 64 bit: ims_ticker3d-current-linux-amd64.sh
- Linux 32 bit: ims_ticker3d-current-linux-i386.sh
- Windows 32 bit: ims_ticker3d-current-windows-i386.exe
- Windows 64 bit: ims_ticker3d-current-windows-amd64.exe

Installation:

- Run installer
- Accept default installation settings
- Run program and install latest updates (balloon will pop up with update instructions)

7.8 Trace *

Installers can be downloaded from http://software.imseismology.org/
trace

- Linux 64 bit: ims_trace-current-linux-amd64.sh
- Linux 32 bit: ims_trace-current-linux-i386.sh
- Windows 64 bit: ims_trace-current-windows-amd64.exe
- Windows 32 bit: ims_trace-current-windows-i386.exe

Installation:

- Run installer
- Keep default installation settings
- Run program and install latest updates (balloon will pop up with update instructions)

7.9 Vantage *

Jdi installers can be downloaded from http://software.imseismology.org/jdi Vantage installers can be downloaded from http://software.imseismology.org/vantage

- Linux 64 bit: ims_vantage-current-linux-amd64.sh
- Linux 32 bit: ims_vantage-current-linux-i386.sh
- Windows 32 bit: ims_vantage-current-windows-i386.exe
- Windows 64 bit: ims_vantage-current-windows-amd64.exe

Installation:

- Run installer
- Keep default installation settings
- Run program and install latest updates (balloon will pop up with update instructions)

7.10 Dongles

Dongle drivers can be downloaded from http://software.imseismology.org/dongles/ It is important to always install the latest drivers.

Linux installation:

- Install from either:
 - Debian package: e.g. http://software.imseismology.org/dongles/linux/2.1.1deb/
 - Script installer: e.g. http://software.imseismology.org/dongles/linux/2.1.1script/
- Please follow the installation instructions in the **readme** file located next to the installation package

Linux troubleshooting: To get dongles working on Ubuntu, follow these steps:

- Download one of the following files:
 - Linux 64 bit: http://software.imseismology.org/dongles/linux/hasp_libraries/64bit-hasp.zip
 - Linux 32 bit: http://software.imseismology.org/dongles/linux/hasp_libraries/32bit-hasp.zip
- Extract the files as super user into /usr/lib

If experiencing further problems on Ubuntu 12.04 or later, follow these steps:

- Follow the driver installation instructions in the **readme** file
- After installing the driver, with the dongle disconnected, execute the following line:
 - sudo sed -i -e 2s/SYSFS/ATTR/g /etc/udev/rules.d/80-hasp.rules
- Connect dongle and run software

8 Customise Ubuntu

The operating system should only be customised for the local customer once the computer is on site.

8.1 Network

8.2 Serial Ports

Usually serial ports appear in the /dev directory owned by root user, and dialout group. It should therefore be sufficient to add the ims user to the dialout group:

• sudo adduser ims dialout

The following rules should be added depending on the type of serial port.

8.2.1 USB port

- Create or edit the following file:
 - /etc/udev/rules.d/ttyUSB.rules
- Contents of the file should be:

rules for USB serial cables: change ownership to ims:dialout SUBSYSTEM=="tty", KERNEL=="ttyUSB*", OWNER="ims", GROUP="dialout"

8.2.2 Standard serial ports

- Create or edit the following file:
 - /etc/udev/rules.d/ttyS.rules:
- Contents of the file should be similar to:

```
# rules for serial ports: change ownership to ims:dialout
SUBSYSTEM=="tty", KERNEL=="ttyS*", OWNER="ims", GROUP="dialout"
# uncomment the next line for NTP with GPS on ttyS0
#SUBSYSTEM=="tty", KERNEL=="ttyS0", SYMLINK+="gps0"
```

8.2.3 Moxa terminal servers (N-ports)

This unfortunately has to be done in a non-portable way, because the driver does not go through udev.

- Edit the following file:
 - /etc/rc.local:
- Contents of the file should be (note the line to be uncommented for GP-S/NTP applications):

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```
# change ownership of Moxa serial ports to ims:dialout
chown ims:dialout /dev/ttyr[01][0-9]
# uncomment the next 4 lines for NTP with GPS on ttyr00, and change
# ln -s /dev/ttyr00 /dev/gps0
# chown -h ims:dialout /dev/gps0
# stty 9600 -F /dev/ttyS0
# stty 9600 -F /dev/ttyS0
```

NB Caveat

Please note that the Moxa driver installer changes the permissions on the /tmp directory. This may cause the X-server to fail after the PC is rebooted and cause the IMS software packages to misbehave. After driver installation, change the permissions on /tmp:

sudo chmod -R 777 /tmp

8.2.4 Serial port for monitoring GPS NMEA sentences

• Unfortunately the NTP daemon supplied with Ubuntu 10.04 does not obey the mode server directive which can be used to instruct NTP to open the serial port at 9600 BAUD. Instead an entry in /etc/rc.local should be added to change the baudrate at boot time:

change baudrate of serial port to 9600 for GPS NMEA sentences stty 9600 -F /dev/ttyS0 # sometimes stty fails, hardly ever does it fail twice in a row... stty 9600 -F /dev/ttyS0

8.3 Time Synchronisation (NTP)

The Synapse server should synchronise to external time servers and will act as the time server for IMS devices in the field.

Most mines should have an NTP server on the local LAN (IP address supplied by the IT department).

A list of Internet NTP servers is provided and maintained by the POOL.NTP.ORG project. Time servers that are relatively close to the network location should be

used; so if possible use servers that are specific to the country, or else servers in nearby countries, or servers in the appropriate world region. See pool.ntp. org for servers in the appropriate pool. Note that using Internet server's assumes that the port used by NTP (123) is allowed past the firewall etc.

8.3.1 Synchronising to GPS

Where time synchronisation is via a GPS, the GPS's NMEA port should be connected to a serial port on the server, with the PPS signal on the DCD line of the serial port. Remember to make the correct symbolic link (/dev/gps0) to the serial port at boot time - refer to section 8.2.

The NTP program is started by the system by ntp user which will not have permission to read from the serial port. Based on how serial port ownership and permissions have been configured (section 8.2), add the ntp user to the dialout group as follows:

• sudo adduser ntp dialout

AppArmor ntpd profile By default Ubuntu will have an AppArmor profile enabled which restricts ntpd's access to the serial port. As a result ntpd will not be able to access the GPS NMEA messages via the serial port. The symptoms of this are that the GPS clock (refid: .GPS.) will not be visible in the output of the ntpq -p program command. There should also be a message in the system logs (/var/log/syslog and/or /var/log/messages) with fields such as: apparmor="DENIED", profile="/usr/sbin/ntpd" and name="/dev/ttyS0".

To disable this behaviour, put AppArmor's ntpd profile into complain mode, which will log attempts by ntpd to open the serial port, but will not disallow it. An AppArmor profile can be put into complain mode by using the aa-complain command. aa-complain should have been installed by the ubuntu-extras.sh script, but if it is not installed on the machine, you can do so by typing: sudo apt-get install apparmor-utils.

To put the ntpd program into complain mode, run the following command:

sudo aa-complain /usr/sbin/ntpd

8.3.2 NTP configuration file

- The NTP configuration file should always contain an entry for the local clock (server 127.127.1.0) so that if all external servers are unreachable, the server can still act as a time source to clients (IMS devices).
- *Never have only 2 servers defined* (not including the local clock) 1 is better, 4 to 5 are recommended.
- Edit /etc/ntp.conf, commenting out all servers defined by default in Ubuntu, and add entries for the local clock, regional servers, local server and GPS. Example sections of the ntp.conf file defining the servers (with comments) is available for Ubuntu 10.04 and 12.04 at the following URL's (note: these files are different):
 - Ubuntu 10.04: http://software.imseismology.org/documents/ ntp.conf-servers-example_ubuntu10.04.txt
 - Ubuntu 12.04: http://software.imseismology.org/documents/ ntp.conf-servers-example_ubuntu12.04.txt
- Restart ntp:
 - sudo service ntp restart
- Check NTP status:
 - ntpq -p

8.3.3 Hardware Clock

It is important that the hardware clock (a.k.a. BIOS clock, RTC, etc.) is kept up to date and synchronised to UTC, so that after a reboot or power cycle the server starts up with reasonably accurate time (accurate enough for NTP to slave the local clock to external time servers, i.e. within a few seconds/couple of minutes of UTC). This is handled automatically by the operating system and NTP, but it is possible that the hardware clock can fall far out of sync (e.g. due to the BIOS battery running flat or other software changing the hardware clock to localtime).

For this reason the Synapse Server software will periodically check the hardware clock, and raise an issue if the hardware clock time is out of sync with UTC, but to be able to do this the hardware clock driver device file needs to be made accessible (readable) to the ims user. This can be achieved with a udev rule:

- Create or edit the following file:
 - /etc/udev/rules.d/imsRTC.rules:
- Contents of the file should be:

```
# Rule to grant read access to Real Time Clock
# Changes group ownership to ims and give group read permission
SUBSYSTEM=="rtc", KERNEL=="rtc*", GROUP="ims", MODE="0640"
```

8.4 VNC Server

Steps to set up a VNC server on Ubuntu:

- Install the server:
 - sudo apt-get install tightvncserver
- Run: tightvncserver
 - Enter a new password when prompted
 - Caveat:
 - * This will create a computer:1 session that is greyed out and unusable
 - * Remove the startup file:
 - · rm ~/.vnc/xstartup
 - Run tightvncserver for a second time
 - * This creates computer:2 which displays a proper desktop
 - Caveat:
 - * If the server is using the Unity 3D desktop VNC will only display the desktop background
 - * edit the startup file ~/.vnc/xstartup
 - replace the line (comment out using #)

/etc/X11/Xsession

• with

/usr/bin/gnome-session --session=ubuntu-2d &

To make sure that VNC is started after a reboot, Edit the /etc/rc.local file, and add the following:

starting first instance for port 5901
su - ims -c 'tightvncserver -dontdisconnect -nevershared'
starting second instance for port 5902
su - ims -c 'tightvncserver -dontdisconnect -nevershared'

8.5 SAMBA

8.5.1 Setting up SAMBA shares:

Samba can be set up either graphically or from the commandline. Either way at least one data share must be setup to share the IMS database (/data/ims) for remote access by Windows Trace clients:

From a Graphical Login:

- On the server, open Nautilus file browser:
 - Places ▷ Home
- Create the directory you wish to share if necessary
- Right click on the folder and select **Sharing Options**
 - Check the **Share this folder** checkbox (e.g. /data/ims)
 - Add a share name and comment (e.g. "ims_data" and "IMS databases share")
 - Check the Allow others to create and delete files option ONLY IF NECESSARY
 - Ensure Guest access checkbox is left UN-CHECKED
 - Click Create share
 - * Click on the **Add permissions automatically** if prompted to do so

OR From the Command-Line:

- Open a terminal
- Type the following command:
 - net usershare add ims_data /data/ims/ "IMS databases share" ims:F guest_ok=n
 - If this command fails with an error about you not having permissions to create a usershare, then you should add the ims user to the "sambashare" group as follows:
 - * sudo adduser ims sambashare
 - * Logout and login again for the new group membership changes to take affect: you can check what groups the user belongs to by typing:

• groups

- Once you have added the ims user to the sambashare group, run the above "net usershare..." command again
- This adds a share called "ims_data" with description/comment "IMS databases share", which shares the /data/ims directory with full permissions for the ims user, guest access is not allowed
- To check the created usershare, type:
 - net usershare info --long
 - You should see the following output:

```
[ims_data]
path=/data/ims/
comment=IMS databases share
usershare_acl=TSTIMS1\ims:F,
guest_ok=n
```

Final Steps:

- Create a SAMBA password for the ims user (if not already done):
 - sudo smbpasswd -a ims (use the same password as the system ims user)

- Ensure ims user is enabled in local smbpasswd file:
 - sudo smbpasswd -e ims
 - sudo service smbd restart
- On Windows client:
 - Browse to the share by entering \hostname\share_name in Windows explorer file browser
 - Map network drive as usual for use with Trace/JDi

8.6 Timezone

8.7 Change ssh server settings

Edit the file /etc/ssh/sshd_config and make sure the following are set correctly

- Protect ssh root access
 - PermitRootLogin no
- Disable reverse DNS lookup
 - UseDNS no

8.8 IT requirements for Seismic Processing and Reporting Services

This document can be downloaded from:

http://software.imseismology.org/documents/IMS_IT_requirements.pdf

Change Record

Date	Description	Revision	
Change Control Record			
2011/11/29	Original document by Errol de Kock	1	
2012/02	Updated by Ilana Loubser	2	
2012/05/16	Updated by Ilana Loubser	3	
2012/05/30	Updated by Ilana Loubser	4	
2012/06/01	Updated by Ilana Loubser	5	
2012/06/11	Updated by Ilana Loubser	6	
2012/06/13	Updated by Ilana Loubser	7	
2012/06/13	Updated by Ilana Loubser	8	
2012/06/18	Updated by Ilana Loubser	9	
2012/06/19	Updated NTP section (by Gareth Goldswain)	10	
2012/06/20	Adding ims and ntp users to dialout group (by Gareth	11	
	Goldswain)		
2012/06/21	Added moxa drivers and /tmp warning to serial ports	12	
	section (by Ilana Loubser)		
2012/06/22	Updates to version numbers, added hyperref (by Ernest	13	
	Lötter)		
	Updates to NTP and serial ports sections (by Gareth		
	Goldswain)		
2012/08/13	Updated link to new IT requirements document (by Ilana	14	
	Loubser)		
2012/09/18	Formatted overflowing text	15	
2012/10/16	Comment about local timezone (by Gareth Goldswain)	16	
	Update drive partitioning recommendations (by Gareth		
	Goldswain)		
	Disable updates (by Gareth Goldswain)		
	System hardware summary using Ishw (by Gareth		
	Goldswain)		
	Move this table to the end of the document (by Gareth		
2012/10/20	Goldswain)	1.7	
2012/10/30	Updated Auto Processing Server section (by Ilana	17	
2012/11/05		10	
2012/11/06	Added link to file containing example cron entries (by	18	
	Hana Loubser)		
	Noved Synapse server installation section (by Ilana		
	Loubser)		

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Date	Description	Revision
2012/12/05	Added section on the IMS Application Manager (by	19
	Hendrik Petzer)	
2013/02/21	Added caveat for VNC in Unity (by Errol de Kock)	20
	Added minibox for Ubuntu 12.04 blank display issue	
	(requested by Andries van Zyl)	
	Changed name of sub-section for clarity (requested by	
	Rudie de Jongh)	
2013/02/27	Added AppArmor ntpd profile section (by Gareth	21
	Goldswain)	
2013/03/13	Latest Ubuntu version is 12.04.2 LTS	22
	Fixed typo	
	Updated ubuntu_extras script with –yes option	
2013/06/07	Renamed Section 6. Added Section 6.6 (by Dolf	23
	Bredenkamp)	
2013/06/14	Added cron entry for automatic Database server updates	24
	(to both document and default cron entries file)	
	Added the target directory for downloaded event filters	
	Added a section on 7.10	
	(by Ilana Loubser)	
2013/09/17	Added megacli utility for hardware RAID controllers 6.3	25
	(by Peter Mountfort)	
	Separated the Services Software Packages into 7.2 All,	
	7.3 ISS to IMS Converters and 7.4 Services Customers	
	(requested by Frans Cronjé)	
	Wrapped the server certificate error messages (requested	
	by Riaan Enslin)	
2013/12/09	Updated IMS Services installation section - automatic	26
	configuration (by Ilana Loubser)	
	Section on the IMS Seismogram Cleanup program (by	
	Ilana Loubser)	
	Appended >/dev/null 2>&1 to all cron entries (by Ilana	
	Loubser)	
2014/01/13	Enable the ims username in the local smbpasswd file	27
	incase it was disabled for some reason, and restart smbd	
	(requested by Riaan Enslin)	
	Changed hyperlink formatting to use blue text, no boxes	
	(by Gareth Goldswain)	

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Date	Description	Revision
2014/06/20	Changed grub configuration in Section 6.6 (by Dolf	28
	Bredenkamp).	
	Updated ubuntu_extras.sh listing (by Dolf Bredenkamp).	
2014/11/06	Changed Ubuntu version to 12.04 (by Ilana Loubser)	29
	Replaced Insight with Vantage (by Ilana Loubser)	
2015/01/13	Added section on IMS Configuration Tracking Monitor	30
	(by Ilana Loubser)	
2015/03/25	Clarified difference of servers defined in ntp.conf for use	31
	by Ubuntu 10.04 vs 12.04 (by Gareth Goldswain)	
	Added lines to example /etc/rc.local for GPS/NMEA	
	applications with Moxa N-ports (by Gareth Goldswain)	
	Added sshpass to ubuntu_extras.sh script - useful for	
	updating many netSP's in batch mode (by Gareth	
	Goldswain)	
2015/04/28	Removed sshpass from, and added libxml-xpath-perl to	32
	ubuntu_extras.sh script (by Gareth Goldswain)	
2015/06/15	Added EFI boot partition, ssh setup changes, gnome-2-0	33
	to ubuntu_extras entry for updatedb.conf (by Errol de	
	Kock)	
2015/06/22	Fixed the convert command for once off event	34
	conversion	
2015/08/20	Hardware clock and udev rule section 8.3.3 (by Gareth	35
	Goldswain)	

Table 3: Change record

Appendix 1

Listing 1: Script for extra packages

```
#!/bin/bash
# install extra packages for IMS
#
# date 2012/01/23
#
```

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August 20, 2015

```
# Author: Errol de Kock
#
# Added --- yes option to all installs
# Edk 2013/03/13
#
# Added by GG 2015/03/25 (good idea to update the package index early
sudo apt-get ---yes update
sudo apt-get ---yes install openssh-server
sudo apt-get --- yes install postfix logwatch fortune
sudo apt-get ---yes install ntp
# Removed by DB 2014/05/20 for security reasons.
# See document IMS-PROC-ADVISORY-201302-EdK rev 0
# (IMS_Apache_PHP_Ubuntu.pdf) for additional requirements
# regarding Ubuntu installations intended for ISS RTS servers
#sudo apt-get ---yes install apache2 php5 php5-cgi apache2-suexec
sudo apt-get ---yes install samba nfs-kernel-server
sudo apt-get --- yes install tcptraceroute
sudo apt-get —yes install curl
sudo apt-get --- yes install vim emacs
sudo apt-get --- yes install smartmontools
sudo apt-get ---yes install wdiff
sudo apt-get ---yes install screen
# Added 2012/03/17
sudo apt-get --- yes install ia32-libs
sudo apt-get --- yes install strace
sudo apt-get --- yes install mutt
sudo apt-get --- yes install tftp-hpa tftpd-hpa
# Added IL 2012/05/14
# Changed to v7 by IL 2014/11/24
sudo apt-get ---yes install openjdk-7-jdk
sudo apt-get --- yes install minicom
# Added EdK 2012/06/14
sudo apt-get ---yes install dos2unix
sudo apt-get --- yes install tightvncserver
# Added IL 2012/06/18
sudo adduser ims dialout
# Added EdK 2012/08/02
sudo apt-get --- yes install traceroute
# Added GG 2013/02/27
# - required for aa-complain,
# to put ntpd into complain mode
```

sudo apt-get — yes install apparmor-utils
Added by IL 2013/07/24 (needed by Team Viewer etc.)
sudo apt-get — yes install wine
Added by EdK 2014/04/22
sudo apt-get — yes install xrdp
Added by IL 2014/11/24 (as requested in bug #3497)
sudo add-apt-repository — yes ppa:webupd8team/java
sudo apt-get — yes install oracle-java8-installer
Added by GG 2015/04/28
sudo apt-get — yes install libxml-xpath-perl
Added by EdK 2015/06/15
sudo apt-get — yes install libgnome2-0