

geoland²

Towards an Operational GMES Land Monitoring Core Service

AGI SDI Server 2011 G2 System Administration Manual

CCC-DDD-NNNN

[example: BP-RP-D_BP010]

Draft 1.1

EC Proposal Reference No. **FP-7-218795**

Due date of deliverable: **_____**

Actual submission date: May **05, 2011**

Start date of project: 01.09.2008

Duration: 50 months

Organisation name of lead contractor for this deliverable: **Astrium GmbH**

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geoland2, FP7-SPACE-2007-1

Date Issued: 28.01.2011

Issue: D/IX.YY



Project co-funded by the European Commission within the Seventh Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

Document Release Sheet

Book captain:	Vytautas Jonaitis (AGI)	Sign	Date
Approval	Ervin Goor (VITO)	Sign	Date
Endorsement:	Co-ordinator (ITD)	Sign	Date
Distribution:	All Geoland consortium, or Sub-task members, or Selected partners <i>(Comment: please respect IPR issues !)</i>		

TABLE OF CONTENTS

1 BACKGROUND OF THE DOCUMENT.....	8
1.1 EXECUTIVE SUMMARY.....	8
1.2 SCOPE AND OBJECTIVES.....	8
1.3 CONTENT OF THE DOCUMENT.....	8
1.4 RELATED DOCUMENTS.....	9
1.4.1 Input.....	9
1.4.2 Output.....	9
2 TECHNICAL DESCRIPTION.....	10
2.1 GENERAL CONCEPT.....	10
2.2 SPECIFICATIONS.....	10
2.2.1 Linux Operating System.....	10
2.2.2 SDI services.....	11
2.3 PRE-INSTALLED APPLICATIONS.....	11
2.4 PRE-CONFIGURED DATABASES.....	12
2.5 DOWNLOADS.....	13
3 INSTALLATION OF THE SERVER.....	15
3.1 PREPARATION TO INSTALL – SYSTEM REQUIREMENTS.....	15
3.2 SYSTEM INSTALLATION.....	16
4 POST-INSTALL SYSTEM CONFIGURATION.....	26
4.1 CREATE NEW USER.....	26
4.2 MANAGEMENT OF THE USER ACCOUNTS.....	26
4.3 CHANGE THE NETWORK CONNECTION SETTINGS.....	27
4.3.1 Set up the host name.....	27
4.3.2 Set up the DNS parameters.....	27
4.3.3 Set up the static IP address.....	28
4.3.4 Restart the network.....	28
4.4 RESTARTING THE SYSTEM.....	28
4.5 UPDATING THE SYSTEM.....	28
4.6 MODIFY DEEGREE CSW TO SUPPORT MORE SEARCH PARAMETERS (optional).....	29
5 SERVICES CONFIGURATION AND PERSONALIZATIONN.....	30

5.1 CHANGE THE DEFAULT PASSWORDS.....	30
5.1.1 root.....	30
5.1.2 Database administrator and user.....	30
5.1.3 Tomcat manager.....	30
5.1.4 Deegree database connection.....	31
5.1.5 GeoServer administrator.....	32
5.1.6 Webmin password.....	32
6 USING SDI SERVER - ACCESS TO WEB APPLICATIONS AND FTP.....	33
6.1 WEBMIN.....	33
6.2 APACHE TOMCAT.....	33
6.3 deegree.....	33
6.4 GEOSERVER.....	34
6.5 proftpd.....	34
7 TECHNICAL SUPPORT.....	35
8 LICENSING.....	36

List of Figures

Figure 1: Remastersys Installer.....	17
Figure 2: Create partitions.....	18
Figure 3: Select a drive to partition.....	18
Figure 4: cfdisk.....	19
Figure 5: swap partition.....	20
Figure 6: root partition.....	20
Figure 7: home partition.....	21
Figure 8: Enter root password.....	22
Figure 9: Enter new username.....	22
Figure 10: Enter hostname.....	23
Figure 11: Select grub location.....	24
Figure 12: Select time zone.....	24
Figure 13: Verification before install.....	25
Figure 14: Installation complete.....	25

List of Tables

Table 1: Configuration options.....	11
Table 2: Pre-configured databases.....	13

1 BACKGROUND OF THE DOCUMENT

1.1 EXECUTIVE SUMMARY

AGI SDI Server 2011 G2 is an open source server solution, that is a highly customized system with a pre-installed and configured set of software, which makes it a fully functional ready-to-go out-of-the-box solution for powering large-scale Spatial Data Infrastructure (SDI). This product was developed as a simple out-of-the-box solution for establishment of new SDI nodes by FP7 Geoland-2 (G2) project data providers. With the bundled open source SDI tools, the minimum required services can be established, which enable the connection to G2 SDI portal at <http://www.geoland2.eu>.

1.2 SCOPE AND OBJECTIVES

The manual provides instructions and guidelines for G2 data providers on installing and configuring SDI server with a minimum set of SDI services and populating them with corresponding data files and metadata records. The list of described SDI services includes

- data download services (FTP/HTTP),
- SDI data portrayal services (WMS),
- SDI metadata catalog services (CSW).

Implementation of all the services is demonstrated on open source GeoServer and Deegree software packages. The report also provides detailed instructions on creation and editing of metadata records with the help of on-line GMES Metadata Editor developed by G2 SDI Team. All the examples and instructions are demonstrated on the examples of G2 SATCHMO VHR datasets and metadata. The current report is part of deliverables produced by G2 SATCHMO and SDI components.

1.3 CONTENT OF THE DOCUMENT

This document consists of these major sections:

- Installation of AGI SDI Server 2011 G2
- Configuration and customization of WMS and CSW services

1.4 RELATED DOCUMENTS

1.4.1 Input

Overview of former deliverables acting as inputs to this document.

Document ID	Descriptor
CCC-DDD-NNNN	Practical guidelines for setting up SDI services with datasets and metadata
--	AGI SDI Server User Manual (2010)

1.4.2 Output

Overview of other deliverables for which this document is an input.

Document ID	Descriptor
CCC--DDD-NNNN	

2 TECHNICAL DESCRIPTION

2.1 GENERAL CONCEPT

AGI SDI Server 2011 is a custom remastering of Debian Squeeze (version 6.0), bundled with a minimum collection of the best system management tools, spatial (geo-) data processing libraries, deployment containers, on-line data distribution services and web mapping interfaces. It is a complete Open Source Spatial Data Infrastructure (SDI) server solution, developed by a team of experts working at the Applied Research Center of the Institute of Aerial Geodesy in Kaunas (Lithuania) under the EC FP7-SPACE-2007-1 project "*Geoland2 - Towards an Operational GMES Land Monitoring Core Service*" (Grant Agreement No.218795). The abbreviation "AGI" stands for the Lithuanian name of the company UAB "Aerogeodezijos institutas" (Institute of Aerial Geodesy, also known as AGI).

A distinctive feature of AGI SDI Server is that it is designed as a highly customized system with ready-to-use pre-installed collection of software and pre-configured SDI elements – including even database containers, which makes it a fully functional out-of-the-box solution for powering large-scale Spatial Data Infrastructure (SDI), implemented on the basis of open source technologies – including both operating system and software. AGI SDI Server also includes customised scripts designed to automate the process of configuration and activation of SDI services with minimum input required from the Administrator.

The first version of the AGI SDI Server was released for operational testing by FP7 "Geoland 2" project team in late August 2009. It appeared in 4 variants (editions) - "LITE", "PRO", "COMBO" and "CAT" activating different applications for SDI services. The same concept of different servers with different level of complexity and functionality, dedicated for either small or large spatial data deployments will be maintained in future as well.

The second (updated) version of AGI SDI Server was released on April, 2011. It appears in 2 editions - "G2" and "FULL" (see section 1.3 of the current manual). Difference between editions is what services are running:

- "G2" edition by default has only HTTP/Tomcat, FTP, WMS and CSW services enabled (other services are installed, but disabled);
- "FULL" edition has all services installed (disabled by default) - they can be enabled as needed by using customised scripts via Tomcat Manager.

2.2 SPECIFICATIONS

2.2.1 Linux Operating System

Second preview version of AGI SDI Server (2011) was released on April 2011. All components were updated to current versions - operating system now is Debian GNU/Linux 6.0.

The current release of the Server is built on Linux kernel version 2.6. To avoid any possible hardware conflicts, we reduced the system down to the absolute minimum of interface

requirements. There is no GUI interface in the AGI SDI Server 2011, instead of that we deployed the best available open source web applications dedicated for management of Linux operating systems and services. The AGI SDI Server 2011 uses all the latest versions of applications and libraries available from Debian 6.0.x repositories, and there are no system components and applications, which would be "locked" to a certain version with pending restrictions on upgrades.

2.2.2 SDI services

Deegree 2.4 software offers OGC WebServices for Web Map Service (WMS) 1.1.1, Web Feature Service (WFS) 1.1, Web Coverage Service (WCS) 1.0 and Catalogue Service Web-Profile (CSW) 2.0.2. WMS and WCS are the official reference implementations of the Open Geospatial Consortium; WFS and CSW are fully transactional. CSW supports ISO19115/ISO19119 Application Profile and DE-Profile 1.0.1. More details are available on Deegree 2.4 features web page.

GeoServer 2.0.3 is fully compliant to WMS 1.1.1, WFS (1.0 and 1.1, transactions and locking) and WCS (1.0 and 1.1) specifications, as tested by the CITE conformance tests. GeoServer additionally serves as Reference Implementation for WCS 1.1 and WFS 1.0 and 1.1. A detailed description of capabilities is presented in [GeoServer features web page](#).

2.3 PRE-INSTALLED APPLICATIONS

AGI SDI Server has a complete set of tools and applications for effective and user-friendly management of the Linux system, it's users and databases, as well as support of the core Internet services, including file transfer protocols, web interfaces for building SDI, web mapping projects and publishing of the on-line content.

There are two AGI SDI Server 2011 activation options:

- G2 (former COMBO) version (GeoServer WMS, Deegree CSW)
- FULL version (services are enabled as needed)

The following table summarizes the most essential software applications and services pre-installed and configured on AGI SDI Server 2011 and activated with the above-mentioned 2 options:

Table 1: Configuration options

Applications	G2	FULL
<i>System/database management tools:</i>		
- SSH 5.5	+	+
- Midnight Commander 4.7.0	+	+
- Webmin 1.540	+	+

<i>Relational databases:</i>		
- PostgreSQL 8.4.7	+	+
- PostGIS 1.5.1	+	+
<i>Internet applications:</i>		
- Apache Tomcat 6.0.28 (with Sun-Java6-LDK 6.24)	+	+
- Apache HTTP Server 2.2.16	+	+
- ProFTPD 1.3.3	+	+
<i>SDI applications:</i>		
- GeoServer 2.0.3	+	*
- Deegree 2.4	+	*
- G2 soap2http-proxy (required for Deegree CSW)	+	*
<i>SDI services:</i>		
- WMS (Web Map Service)	+	*
- WFS (Web Feature Service)	-	*
- WCS (Web Coverage Service)	-	*
- CSW (Catalogue Service) with soap2http-proxy	+	*
- WPS (Web Processing Service)	-	*

Links to on-line documentation of the main web applications installed on the AGI SDI Server 2011 are available in **Section 5** of the current manual.

2.4 PRE-CONFIGURED DATABASES

All the PostgreSQL/PostGIS databases loaded on the AGI SDI Server (except the GEODATA) are dedicated and connected to SDI web applications and interfaces. All the tables, functions and content of those databases are automatically generated by SQL scripts following the installation instructions of the corresponding applications. Those databases also contain some examples of data records used for testing of web applications, but deployment of new data records is perfectly possible as soon as the servers would become operational.

The following table summarizes relational GIS-enabled databases pre-installed and configured on AGI SDI Server 2011:

Table 2: Pre-configured databases

Databases	Description
POSTGRES	PostgreSQL/PostGIS default system database.
POSTGIS	PostGIS database template with UTF-8 encoding - to be used for creation of new GIS-enabled (PostGIS) databases.
GEODATA	<p>A general purpose spatial database for storing and processing attribute tables and vector data layers imported from external sources. Contains the following DB schemas :</p> <ul style="list-style-type: none"> • public (default schema for the public access); • import (for importing shapes, temp. storage); • work (for processing of tables and features); • data (for storing of processed geo-data outside the public access area).
CSW	A special database pre-configured and connected to the Deegree Web Catalogue CSW application.

GEODATA is the only general-purpose AGI SDI Server database with pre-installed GIS functionality, which is intended to be used for deployment of the operational vector GIS datasets for further publishing through the available SDI services. Due to technological limitations of PostGIS, it is currently possible to load only attribute tables and vector data. PostGIS raster data functionality is under development.

Additional databases can be created by the user if needed.

2.5 DOWNLOADS

AGI SDI Server is distributed as ISO disk image files, which must be downloaded and either burned to CD or DVD disks using standard applications, or used as ISO installation media for virtual machines. The current repository of those ISO files is on a web server of the Institute of Aerial Geodesy in Kaunas (Lithuania):

`http://www.agi.lt/sdi-iso`

ISO files of AGI SDI Server are named according to the year of release, also indicating if the system has support for 32 or 64-bit processors. Checksums (md5) of the ISO files (named accordingly) are provided for the download as well. The current Manual is available as a separate PDF file at the same FTP folder as the ISO images.

AGI SDI Server 2011 ISO files :

- agi-sdi-server-2011-G2-amd64.iso 64-bit (x86_64)

For the operational "production" servers you should consider using modern hardware with sufficient storage capacity, processing power and memory. Please note that both modern Intel and AMD processors are designed to support 64-bit and 32-bit operating system architecture. **We recommend to use 64-bit version of AGI SDI Server.**

For legacy systems, that do not support 64-bit instructions, 32-bit AGI SDI Server is available.

3 INSTALLATION OF THE SERVER

3.1 PREPARATION TO INSTALL – SYSTEM REQUIREMENTS

Network connectivity:

- DNS registration of your server hostname;
- Firewall/router protected network with DMZ access to some ports:
 - minimum - Tomcat (8080), FTP (21), SSH (22)
 - optional: HTTP (80)
- Transfer speed - internet UPLOAD speed MUST be at least 2 Mbps, if you expect to use SDI Server in production environment.

Computer hardware:

- Minimum: a modern PC with at least
 - Intel Dual Core processor (64 bits)
 - Minimum: 2 Gb of RAM (4 Gb recommended)
 - At least 20 Gb HDD space + disk space for the datasets
 - DVD-ROM reading device (optional, if installing to virtual machine)
- No special requirements for multimedia components
 - Video card, sound – not essential

Other requirements:

- For servers, that MUST be operational on 24/7 basis:
 - High-quality hardware components;
 - UPS;
 - Air-conditioning of the room may be also required (depending on the conditions).

Download an appropriate ISO image file from <http://www.agi.lt/sdi-iso> and "burn" the DVD disk by using any commercial or open source software on any operating system (e.g. Brasero on Ubuntu Linux). You can also use downloaded ISO image as is for virtual machine boot media. If you have "modern" processor, we strongly recommend using 64-bit distributions (Intel Dual-core processors support both 32-bit and 64-bit instructions) - this will allow you to install with more than 4GB RAM and provide significant improvement in performance, especially with large databases.

Before you start installation process, please read the current Manual - at least Sections 2 and 3 ("Installation" and "Configuration"). This will give you an insight on what software components are included into the operating system, and what are the obligatory post-install/configuration steps to be performed before your server can be opened for public access.

3.2 SYSTEM INSTALLATION

Insert the Live CD and start the PC. SDI Server operating system will start and load (as Live-CD) automatically. The system loads with pre-defined user "custom".

However, in order to start the installation process, you first have to switch from an ordinary user ("custom") to the system to administrator ("root"). Type command `sudo su` ("super-user") at the console . To switch back to the ordinary user account, type `exit` at the command prompt.

```
sudo su
...
exit
```

Installation of AGI SDI Server is guided by a special application called `remastersys-installer` which has a minimalistic, yet very straight-forward text interface with minimum questions to be answered. The most complicated part is disk partitioning with `cfdisk` program. It is a pretty simple and usual step for those with previous experience in Unix systems. However, if you are a new Linux user, we strongly advice you to read `cfdisk` pages in google and consult someone with experience in Unix/Linux filesystems.

To start the installation process, switch to the root user (by entering "sudo su" at the command prompt) and start installer:

```
sudo su
remastersys-installer
```

SDI Server installation process will start with the following warning:

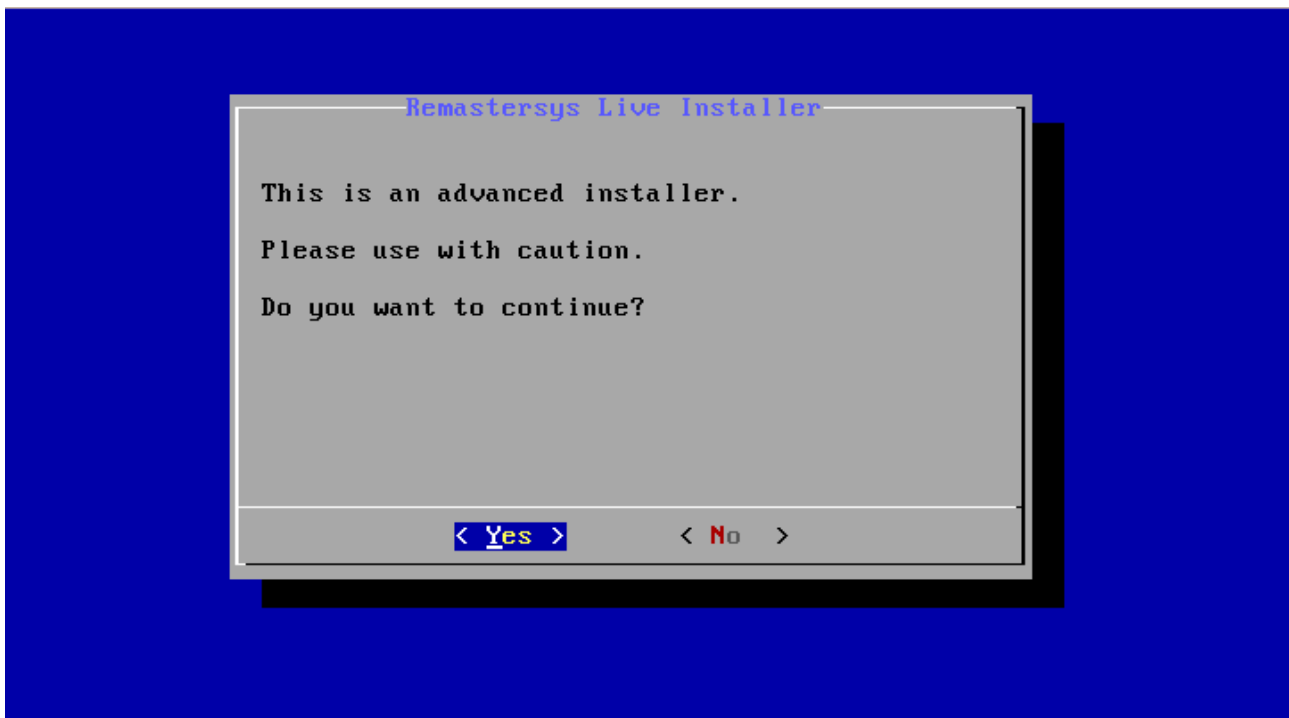


Figure 1: Remastersys Installer

The first (and most complicated/important) stage of the server installation configures disk space for deployment of the operating system and your data. This is where the setup of the system will actually start. You'll be instructed how to proceed with disk partitioning:

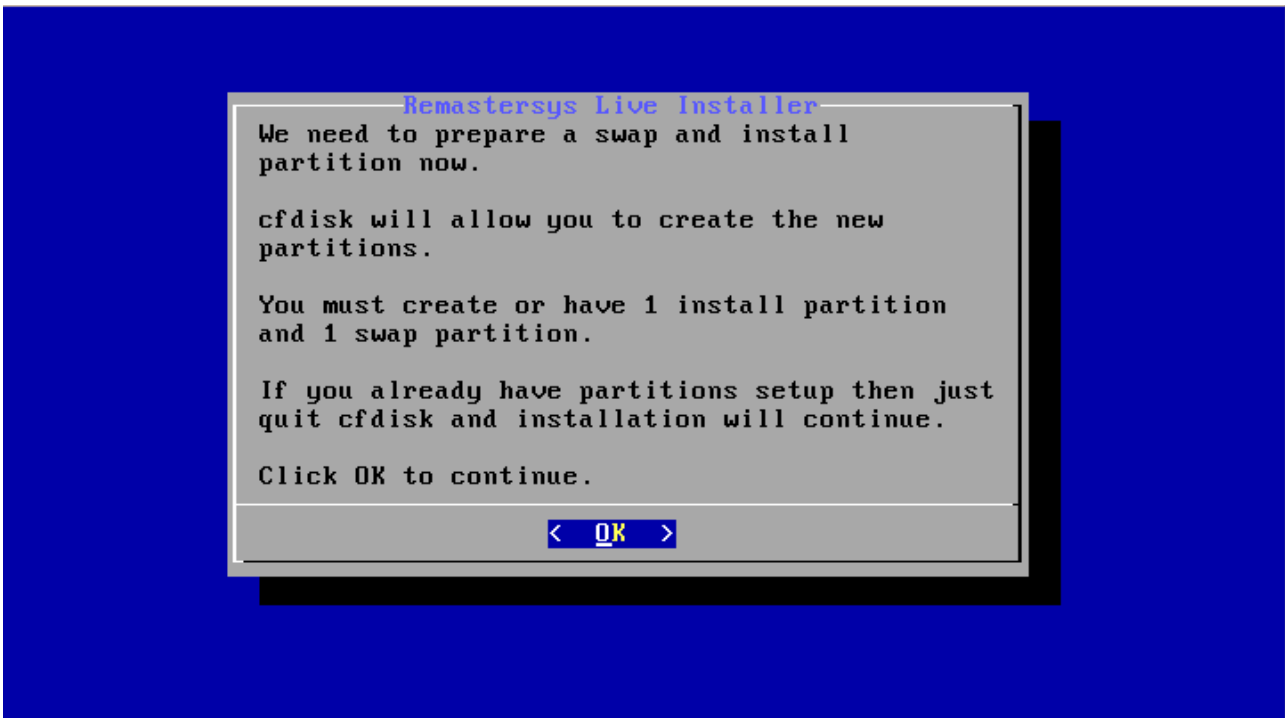


Figure 2: Create partitions

Then, you will have to select a physical disk (hardware) for further partitioning:

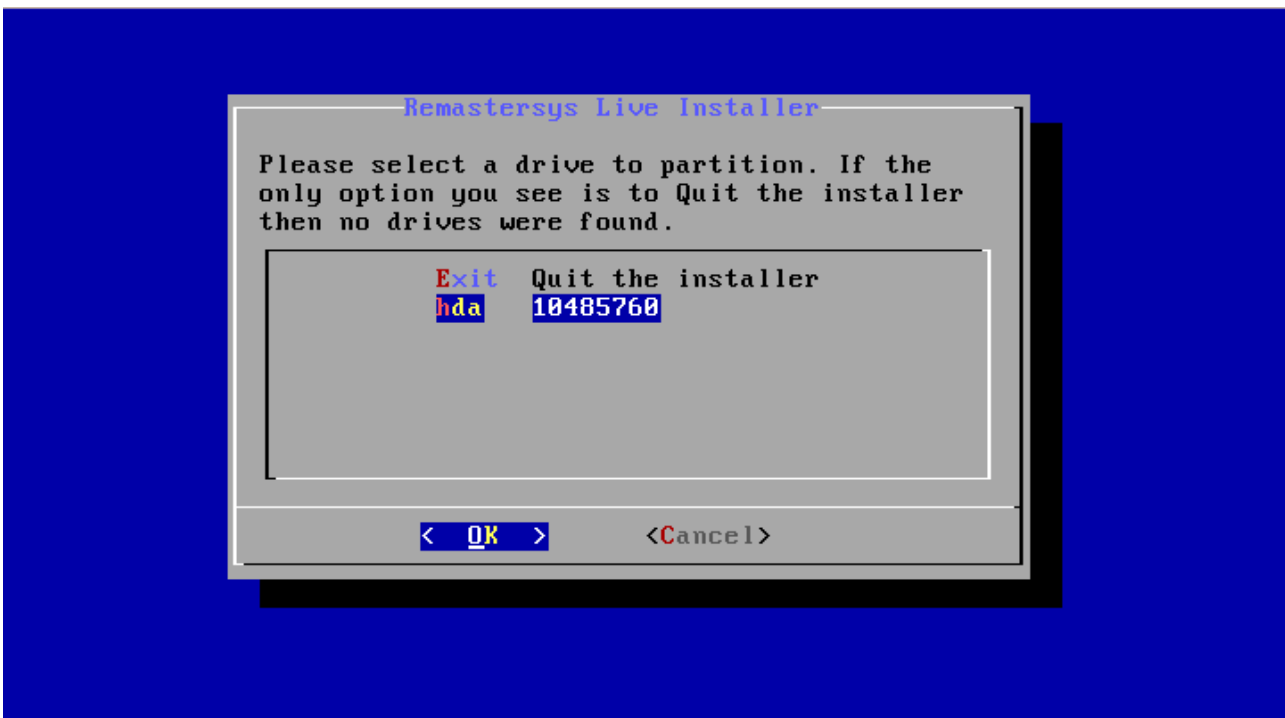


Figure 3: Select a drive to partition

After you choose the hardware, a special disk partitioning program, called `cfdisk`, will start:

```
cfdisk (util-linux-ng 2.13.1.1)
      Disk Drive: /dev/hda
      Size: 10737418240 bytes, 10.7 GB
      Heads: 16   Sectors per Track: 63   Cylinders: 20805

-----
Name      Flags      Part Type  FS Type      [Label]      Size (MB)
-----
hda1      Boot       Primary    Linux
hda2      [ ]        Primary    Linux swap   Solaris
-----
8000.01
2737.38

[Bootable] [ Delete ] [ Help ] [Maximize] [ Print ]
[ Quit ] [ Type ] [ Units ] [ Write ]

Write partition table to disk (this might destroy data)_
```

Figure 4: cfdisk

While using `cfdisk` utility, you must **BE VERY CAREFUL – ALL DATA ON THAT DISK WILL BE LOST.**

A generic disk partitioning schema could look like this: first primary partition (e.g. `sda1`) of ext3 type (83) with boot flag can take the whole disk, while the second primary partition of swap type (82) and the size of double your RAM can be created in the end of the disk.

The installer allows you to put `/home` folder to a separate partition, so you can optionally create a primary bootable (type 83) `sda1` partition for the system (`/`), primary (type 83) partition for user data (`/home`) and swap (type 82) partition for the swap space.

What partition layout to choose is up to you, but for testing purposes (or if you are not familiar with Linux operating systems), 2 partitions (`/` and swap) would be enough.

After setting up of the disks is completed, choose `[Write]` and `[Quit]`.

After you are done with disk partitioning, the installer will first ask you to identify swap space - you should select `hda2` (or `sda2` – depending on hardware configuration) for the swap partition:



Figure 5: swap partition

The next question is about root partition - you should select hda1 (or sda2 – depending on hardware configuration) as root partition of your system:

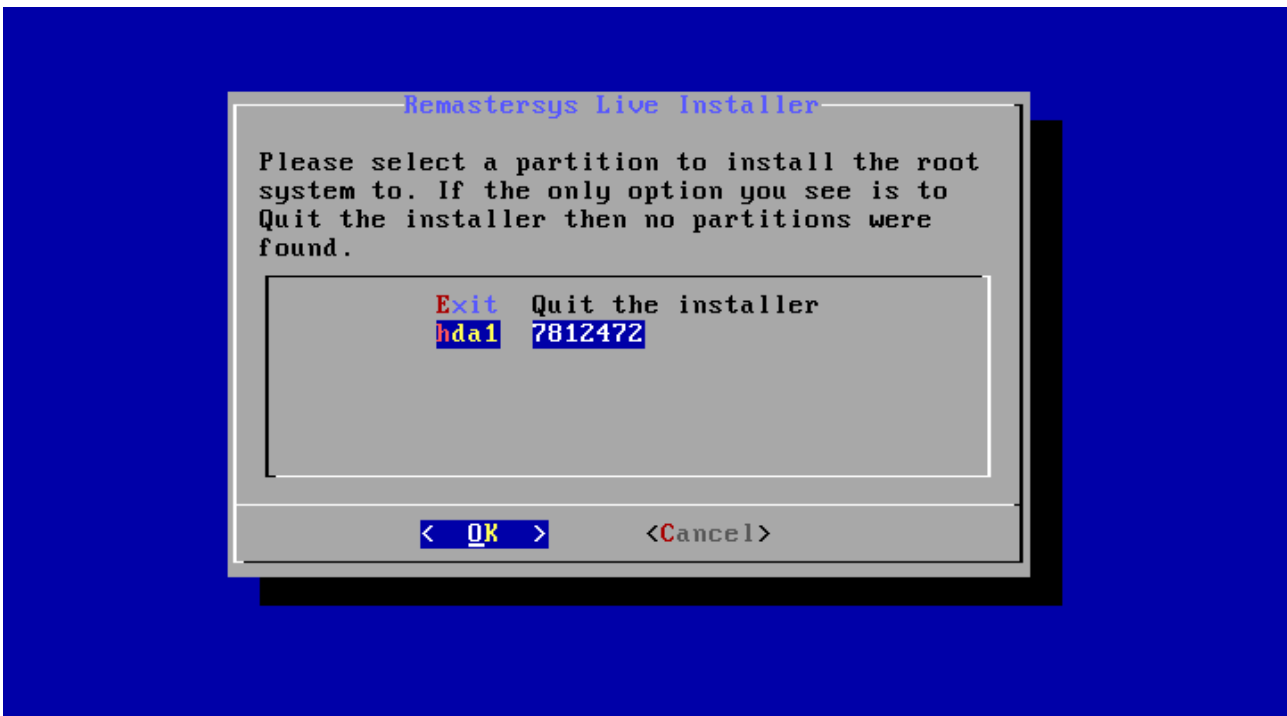


Figure 6: root partition

In next screen you will be asked to choose file system type for root partition - leave ext3 (default).
Then you will be warned that your /home folder will be placed at the same partition as /root (the system) - which is OK for the default configuration, as most of your data is likely to be located in the PostgreSQL/PostGIS database OR in /sdi folder:

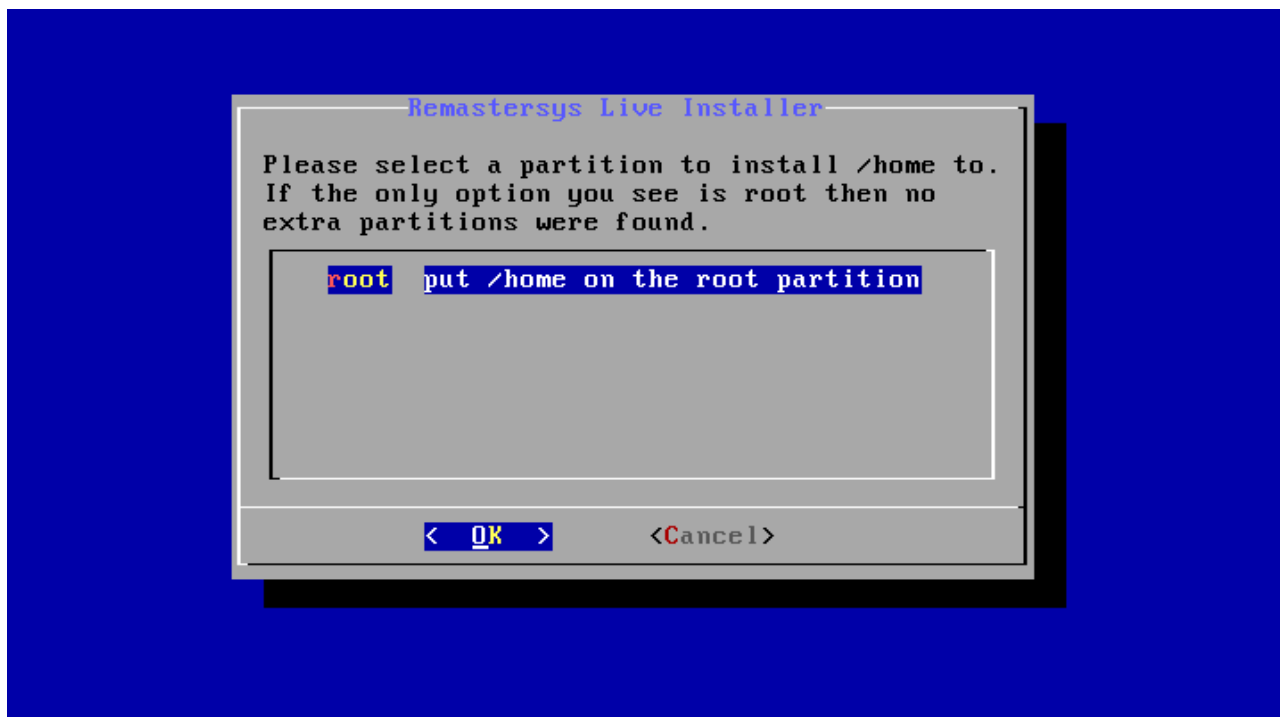


Figure 7: home partition

However, there is a possibility to create one separate partition for /home with remastersys-installer if you wish to do so. All partitions should be created in earlier stage with `cfdisk` utility.

When asked, create (new) root password. Strong passwords should have at least 8 symbols (upper and lower case letters, numbers), or you can use pass-phrase (for example: password - fJk8ER2, passphrase – configuring5_this).

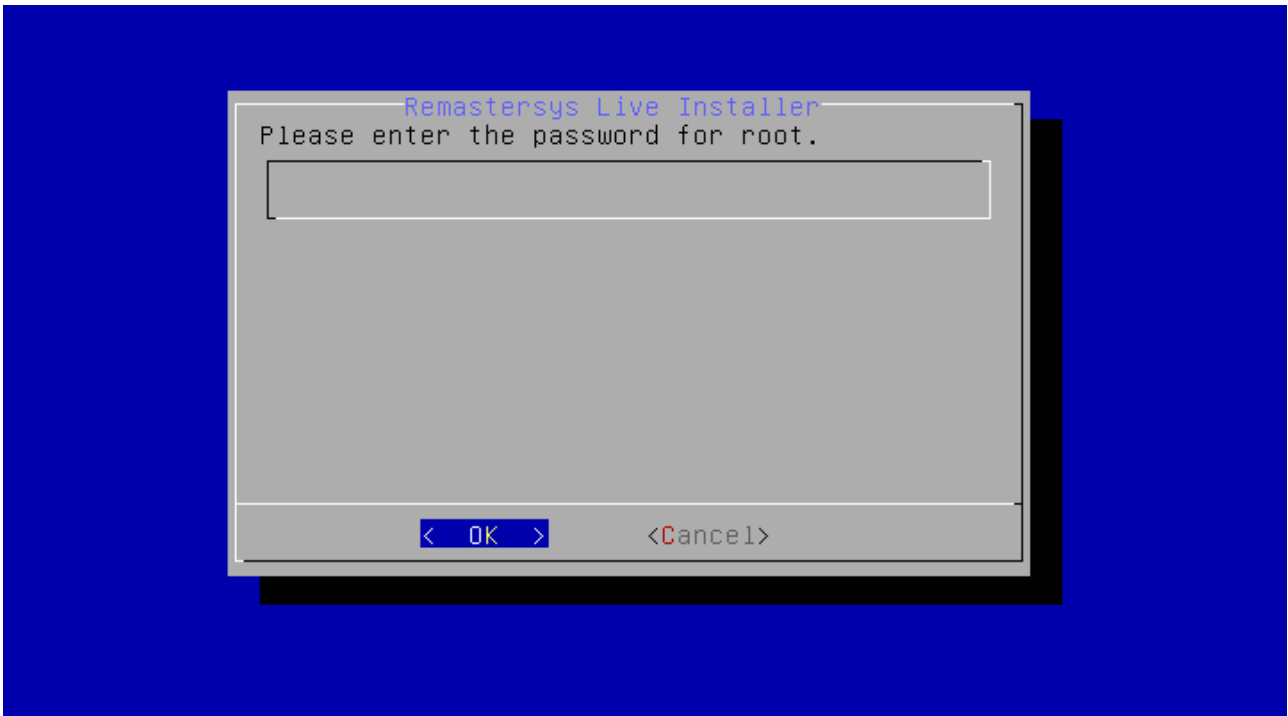


Figure 8: Enter root password

Then enter server user's real name (or just press ENTER), and username (you will use it to login):

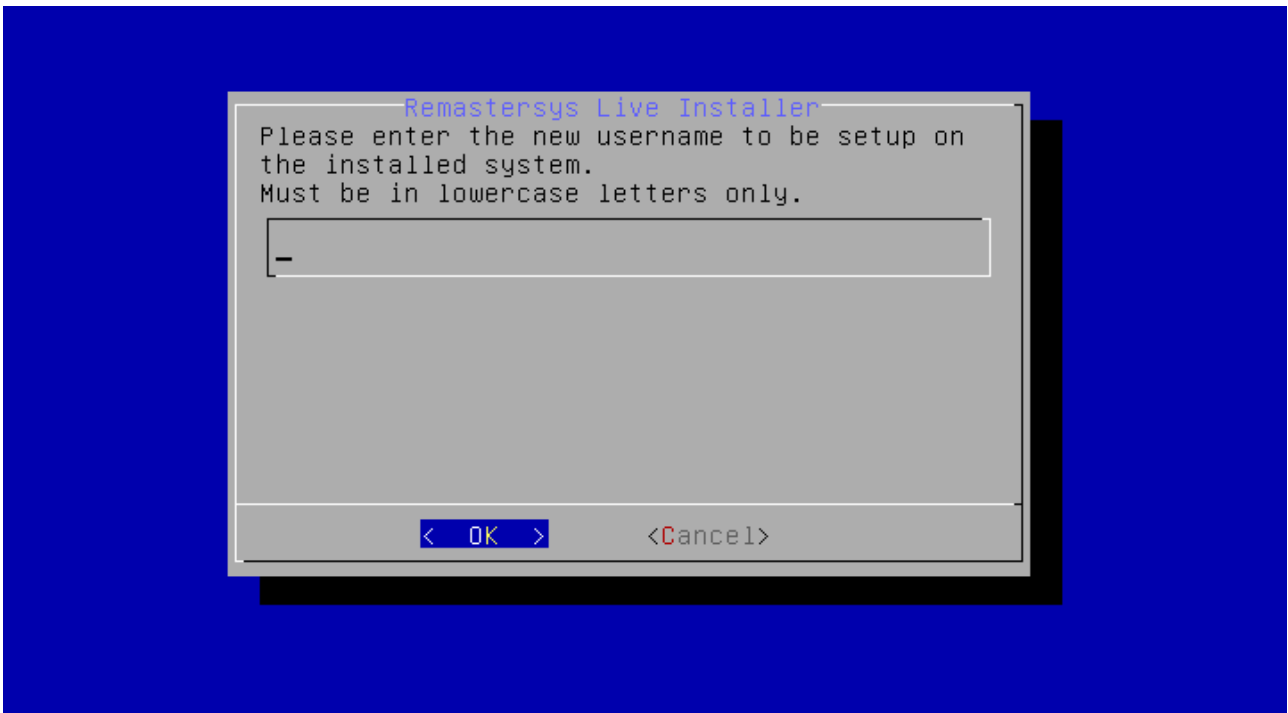


Figure 9: Enter new username

In next screen enter password for just created user. The same rules as for root password apply.

Note. **Due to an error in current version of remastersys-installer, only root user is actually created.** This error in the installer software will be hopefully corrected in the later releases, but currently it results in a certain inconvenience – even though a new user is being created during the system setup, it will not actually appear in the system. Therefore, after rebooting the freshly installed system, the users will have to login as root for the first time, and create the user once again (as described later in section 4.1).

The installer then will also ask you for your server host name (consult your network administrator):

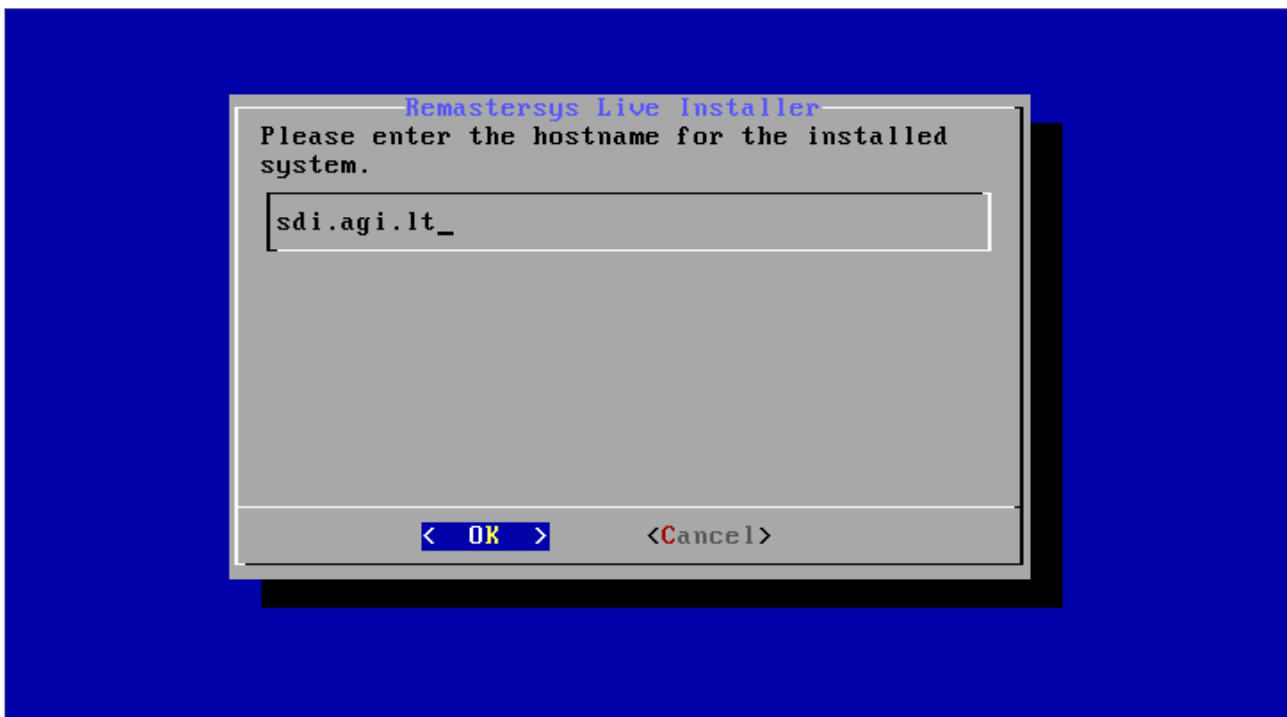


Figure 10: Enter hostname

... and location to install system loader grub (the Master Boot Record - MBR - is a good choice for a server):

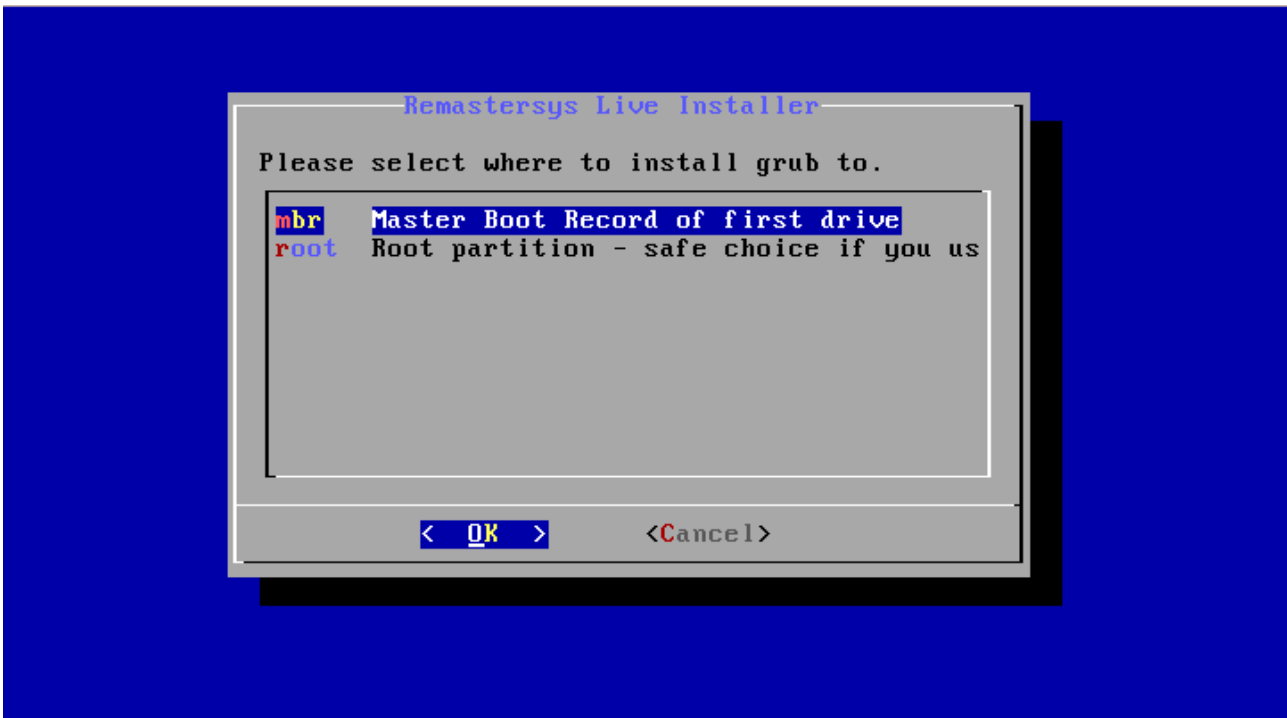


Figure 11: Select grub location

Finally, you will be asked to set clock (answer YES) and choose your time zone - geographical region:

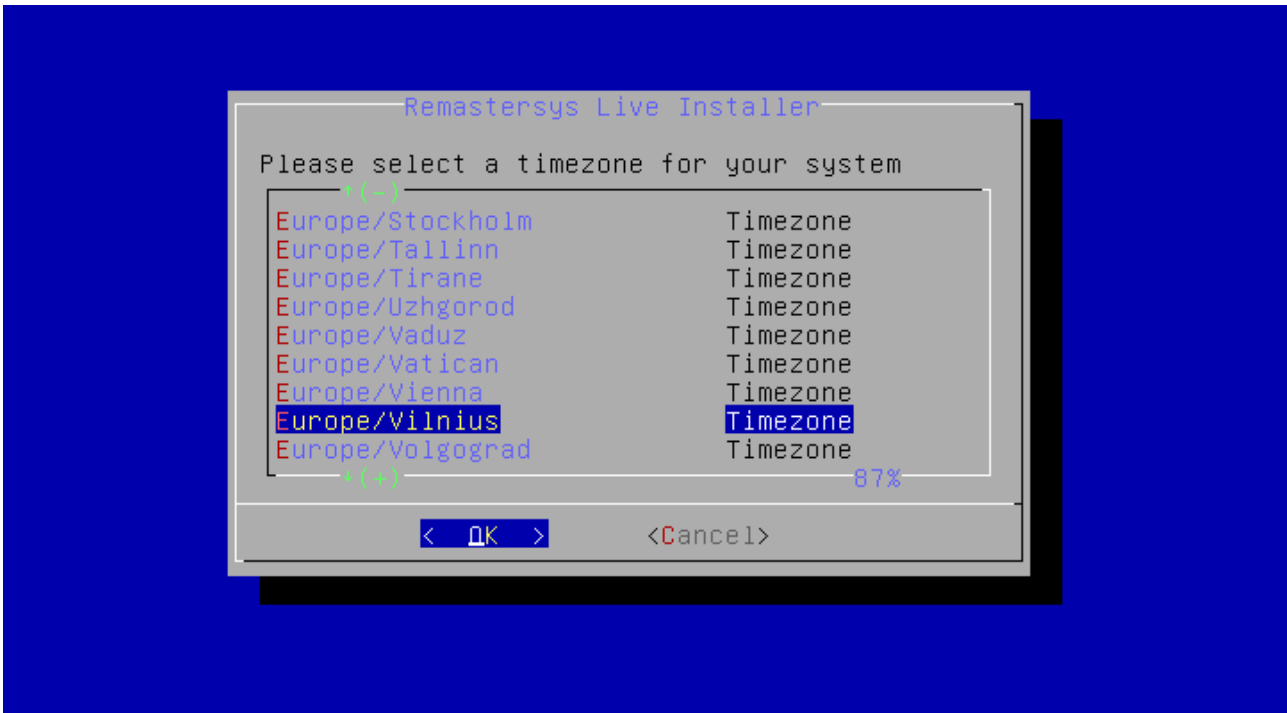


Figure 12: Select time zone

After final confirmation of your system settings, the disk partitions will be created and formatted, and SDI Server system will be installed:

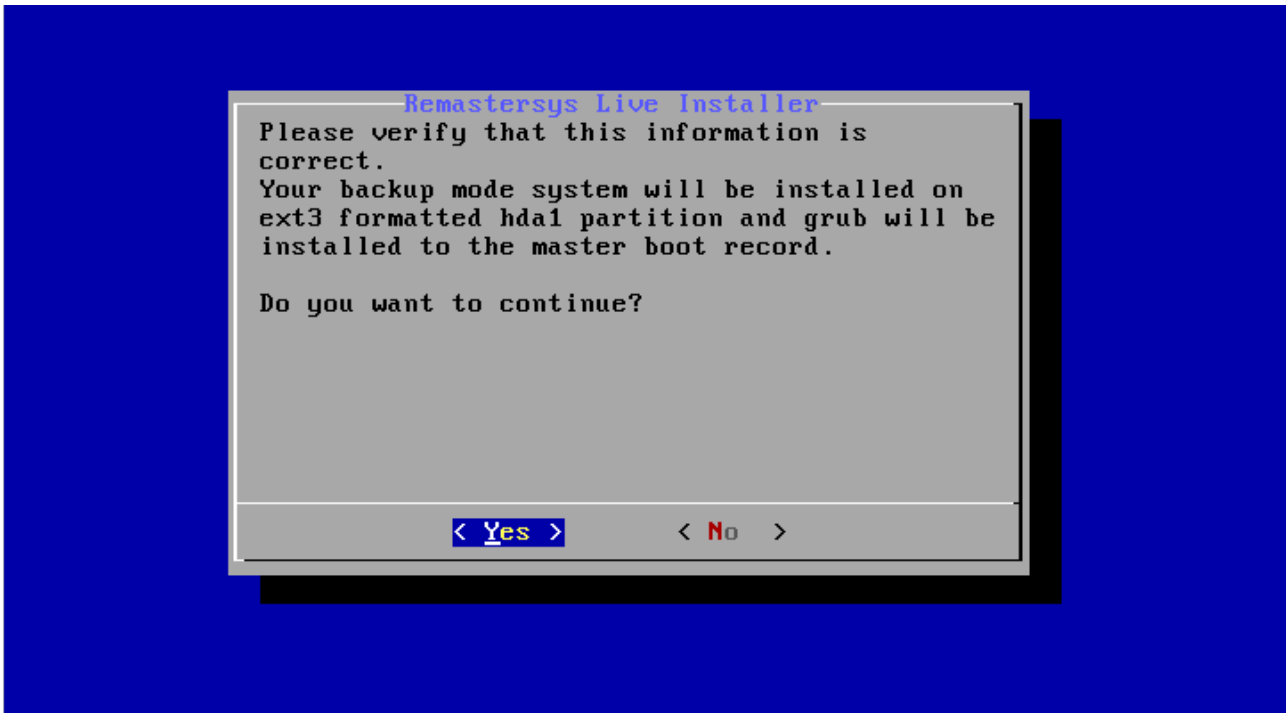


Figure 13: Verification before install

After the installation is complete, you should restart the system and remove the Live CD:



Figure 14: Installation complete

4 POST-INSTALL SYSTEM CONFIGURATION

AGI SDI Server comes as completely functional system with pre-configured network connection and logins/passwords all over the system, databases and applications, therefore you **MUST** change all the passwords before "going public" with your SDI Server. If you fail to comply to this essential security requirement, all your data and services will be completely unprotected, and sooner or later will be violated or even destroyed.

In just installed system there is only one user - root - configured. It is recommended to create additional user for every-day tasks.

4.1 CREATE NEW USER

New users are created with `adduser` command. At command prompt enter:

```
adduser <new_user_name>
```

You will probably want to do sytem configuration tasks with the same user (using `sudo` command), so after creating new user, add it to sudo group:

```
usermod -a -G sudo <new_user_name>
```

4.2 MANAGEMENT OF THE USER ACCOUNTS

Creating new users (besides root and your primary login) on your system is **OPTIONAL**, but could be very useful if you need to temporary open some FTP or SSH connections to the outside world for the purpose of data upload/download, diagnostics, training, etc. To create a new user, enter the following command and provide password, full name, etc. when asked:

```
sudo adduser <new_user_name>
```

It is **NOT RECOMMENDED** to keep the additional user accounts as soon as they become unnecessary, as this may increase vulnerability of your server. To completely delete any of the users on your system (except the root and some system-managed accounts), including their personal folders, passwords and config files, you should type the following command:

```
sudo userdel -r <user_name>
```

For mode information about `adduser` and `userdel` commands type in command prompt:

```
man adduser
```

```
man userdel
```

If you want to add only FTP user without login rights, use `/usr/bin/passwd` as shell when creating user.

4.3 CHANGE THE NETWORK CONNECTION SETTINGS

Debian installer used in AGI SDI Server will try to establish a network connection via DHCP, and (if successful) doesn't offer any other options for network configuration. Therefore AGI SDI Server has a default pre-configured DHCP network connection, which worked well on our testing setups.

However, for the production servers, it is often necessary to define stationary connections with fixed host/IP/netmask/gateway/DNS parameters. Most likely you will go for this option as well, so it will be necessary to setup network parameters for your server. To find out what is your dynamic IP address during the current session, type the following command (as root) :

```
sudo ifconfig -a
```

Find the `inet_addr:` parameter in `eth0` section - this is your current IP address.

While testing the server, try using a pre-installed Midnight Commander (`mc`) to navigate around the system, or try connecting to the server from external computer via `ssh` (for the first connection accept the `ssh` public key with "yes", then enter user password) :

```
ssh -l <your_user> your_server_IP_address
```

You can also test some internet services and applications from external computer connected to the same sub-net. See **Section 5** for detailed description of the bundled applications.

Before proceeding any further, please study the Debian networking guide at the following URL:

<http://www.debianhelp.co.uk/network.htm>

Setting up network connection in Debian systems is pretty simple and well documented. See paragraphs below.

4.3.1 Set up the host name

Modify the configuration file:

```
sudo nano /etc/hostname
```

Exit the editor by pressing `Ctrl+X` and answer Yes to save the changes (nano editor commands and options are shown in the bottom of editor screen). OR enter the commands as shown in [Debian networking guide](#).

4.3.2 Set up the DNS parameters

Modify the configuration file:

```
sudo nano /etc/resolv.conf
```

Exit the editor by pressing `Ctrl+X` and answer Yes to save the changes (nano editor commands and options are shown in the bottom of editor screen).

4.3.3 Set up the static IP address

Modify the configuration file:

```
sudo nano /etc/network/interfaces

iface eth0 inet dhcp
#iface eth0 inet static
#address 192.168.1.1
#netmask 255.255.255.0
#gateway 192.168.1.254
```

This configuration file offers a pre-defined template for you to uncomment and fill in. Exit the editor by pressing Ctrl+X and answer Yes to save the changes (nano editor commands and options are shown in the bottom of editor screen).

4.3.4 Restart the network

```
sudo /etc/init.d/networking restart
```

4.4 RESTARTING THE SYSTEM

After completing all the above-mentioned post-installation steps you should restart your system:

```
sudo reboot
```

When the system is re-loaded, log in as `sdi` user and test the network connection by running a couple of simple ping tests:

```
ping <your_server_IP>
ping <your_server_host_name_and_domain>
ping 193.219.50.12
```

If ping works properly (bytes are returned back from your server and an external host 193.219.50.12), then your network is configured and works well.

4.5 UPDATING THE SYSTEM

It is also very useful to run system upgrade immediately after it's deployment and regularly during the whole period of it's operation. Programs aptitude or apt-get can be used for this task:

```
sudo apt-get update
sudo apt-get upgrade
```

```
sudo apt-get purge
```

4.6 MODIFY DEEGREE CSW TO SUPPORT MORE SEARCH PARAMETERS (OPTIONAL)

In default configuration, Deegree CSW does not support search by `TempExtent_begin` and `TempExtent_end` values. If such functionality is required, `mapping2_0_2.properties` file must be updated:

- ✦ **Get `mapping2_0_2.properties` file. It is inside `deegree2.jar` file, for example**
`/var/lib/tomcat6/webapps/deegree-csw/WEB-INF/lib/deegree2.jar`
- ✦ **Make a copy of `deegree2.jar` to your home directory, unpack (will need JDK installed):**
`cd ~`

`cp /var/lib/tomcat6/webapps/deegree-csw/WEB-INF/lib/deegree2.jar .`

`jar xf deegree2.jar`
`org/deegree/ogcwebservices/csw/iso_profile/mapping2_0_2.properties .`
- ✦ **Edit `mapping2_0_2.properties`, add these lines to "# Additional queryable properties common to all information resources":**
`./apiso:TempExtent_begin=app:dataIdentification/app:MD_DataIdentification/app:temporalExtent/app:EX_TemporalExtent/app:begin_`

`./apiso:TempExtent_end=app:dataIdentification/app:MD_DataIdentification/app:temporalExtent/app:EX_TemporalExtent/app:end_`
- ✦ **Update `deegree2.jar` with new `mapping2_0_2.properties` file:**
`jar uf deegree2.jar`
`org/deegree/ogcwebservices/csw/iso_profile/mapping2_0_2.properties`
- ✦ **Stop Deegree CSW service, copy updated `deegree2.jar` to the install location, for example:**
`cp deegree2.jar /var/lib/tomcat6/webapps/deegree-csw/WEB-INF/lib`
- ✦ **Start Deegree CSW service and test query with**
`apiso:TempExtent_begin/apiso:TempExtent_end.`

5 SERVICES CONFIGURATION AND PERSONALIZATION

Debian Squeeze 6.0 operating system provides a solid foundation for a secure internet server. However, AGI SDI Server has a broad variety of sophisticated web applications and databases with pre-configured and documented default logins and passwords, which makes the default system completely open and unprotected. Therefore the most important step of the Server post-install configuration is OBLIGATORY modification of all passwords and fixing the database connections. The following instructions will lead you all the way towards a complete replacement of the default passwords, thus creating a secure SDI server. Personalisation

5.1 CHANGE THE DEFAULT PASSWORDS

5.1.1 root

```
sudo passwd root      (enter the new root user password)
```

5.1.2 Database administrator and user

Passwords of PostgreSQL/PostGIS database administrator and user can be changed by using web administration applications (PhpPgAdmin or Webmin), but the "traditional" way is logging into the PostgreSQL database and changing the passwords directly there. Enter the following commands to become PostgreSQL database administrator and change the passwords:

```
sudo su postgres

psql -U postgres -d template1 -c "ALTER USER postgres WITH PASSWORD
'<new_password>';"

psql -U postgres -d template1 -c "ALTER ROLE u_geodata WITH
PASSWORD '<new_password>';"

psql -U postgres -d template1 -c "ALTER ROLE u_csw WITH PASSWORD
'<new_password>';"

exit
```

5.1.3 Tomcat manager

In many production environments, it is very useful to have the capability to deploy a new web application, or undeploy an existing one, without having to shut down and restart the entire container. In addition, you can request an existing application to reload itself, even if you have not declared it to be reloadable in the Tomcat 6 server configuration file.

To support these capabilities, Tomcat 6 includes a web application (installed by default on context path `http://your.server.name:8080/manager/html`) that supports the following functions:

- ✦ Deploy a new web application from the uploaded contents of a WAR file.
- ✦ Deploy a new web application, on a specified context path, from the server file system.

- ⤴ List the currently deployed web applications, as well as the sessions that are currently active for those web apps.
- ⤴ Reload an existing web application, to reflect changes in the contents of /WEB-INF/classes or /WEB-INF/lib.
- ⤴ List the OS and JVM property values.
- ⤴ List the available global JNDI resources, for use in deployment tools that are preparing <ResourceLink> elements nested in a <Context> deployment description.
- ⤴ List the available security roles defined in the user database.
- ⤴ Start a stopped application (thus making it available again).
- ⤴ Stop an existing application (so that it becomes unavailable), but do not undeploy it.
- ⤴ Undeploy a deployed web application and delete its document base directory (unless it was deployed from file system).

It would be quite unsafe to ship Tomcat with default settings that allowed anyone on the Internet to execute the Manager application on your server. Therefore, the Manager application is shipped with the requirement that anyone who attempts to use it must authenticate themselves, using a username and password that have the appropriate role associated with them. Further, there is no username in the default users file (/etc/tomcat6/tomcat-users.xml) that is assigned an appropriate role. Therefore, access to the Manager application is completely disabled by default.

Stop the Tomcat 6 service:

```
sudo /etc/init.d/tomcat stop
```

Edit the Tomcat 6 users configuration file:

```
sudo nano /etc/tomcat6/tomcat-users.xml
```

Find the following line and replace sdi and geoland to some new login/password combination.

```
<user username="sdi" password="geoland" roles="manager"/>
```

Note that those are not related to the system user sdi and its password, so you can use any combination here. Exit the editor by pressing Ctrl+X and answer Yes to save the changes (nano editor commands and options are shown in the bottom of editor screen).

Start the Tomcat 6 service:

```
sudo /etc/init.d/tomcat start
```

5.1.4 Deegree database connection

Deegree Catalog Server (CSW) needs to be connected to PostGIS database. To fix the pre-configured deegree-csw database connection, you have to change only one line in csw database connection config file:

```
sudo nano /var/lib/tomcat6/webapps/deegree-csw/WEB-INF/conf/csw/featuretypes/csw_postgres.xsd
```

Replace geoland with the new postgres user password (see [Section 5.1.2](#)) in the following line:

```
<Password>geoland</Password>
```

Exit the editor by pressing Ctrl+X and answer Yes to save the changes.

5.1.5 GeoServer administrator

GeoServer has a default login "admin" with password "geoserver". To change those to your own combination, you have to edit the GeoServer users properties file:

```
sudo nano /sdi/geoserver/data/security/users.properties
```

Replace "geoserver" with any other password. You can also change the login "admin", and even add new lines like the uncommented one to define additional users with administrator role. Exit the editor by pressing Ctrl+X and answer Yes to save the changes.

5.1.6 Webmin password

You can change password for Webmin admin user using this script:

```
sudo /usr/share/webmin/changepass.pl /etc/webmin admin <new_password>
```


6 USING SDI SERVER - ACCESS TO WEB APPLICATIONS AND FTP

6.1 WEBMIN

AGI SDI Server system administration can be made in a very user-friendly way by using the Webmin application. Go to the following URL (make sure you connect to https, not http port) and login as root with your new root password. In the original server setup the password is "geoland", but you must change the root password as instructed in previous section.

```
https://your.server.name:10000
```

Navigation in Webmin interface is very simple, but you have to be experienced in administration of Linux systems in order not to avoid destructive actions. Webmin detects all the services and servers available on your system and provides interfaces for their administration. You can even run management tasks such as backups of the whole system and databases in Webmin environment. There is a comprehensive [Webmin Wiki](#) and [module documentation](#) pages available on [Webmin documentation](#) web page.

6.2 APACHE TOMCAT

Apache Tomcat Java Servlet platform has useful administration and management tools for, where you can check the system status and available resources, as well as control the status of Java applications deployed on the system. The Tomcat front-page is accessible on port 8080 of your server:

```
http://your.server.name:8080
```

It is important to note that all the SDI applications deployed on the AGI SDI Server run on Tomcat 6 platform, and the most efficient way to control them is by using the Tomcat Manager. Click on [Tomcat Manager] in [Administration] section on top of the left-side menu and enter login/password as specified in `/etc/tomcat6/tomcat-users.xml` file (see [Section 5.1.3](#)). In the default configuration we used "sdi" login with "geoland" password. There is a comprehensive collection of [Tomcat 6 on-line documents](#) on the Apache Tomcat web site.

6.3 DEEGREE

AGI SDI Server is powered by Deegree 2.4 suite of applications, which can be accessed directly on port 8080 of your server:

```
http://your.server.name:8080/deegree-csw(CSW - web catalogue server)
```

There is no other post-install configuration needed for Deegree 2.2 applications, except CSW (catalogue) connection to the PostGIS database (csw). There is no need to enter any passwords directly while working with Deegree applications, but after changing the database user password,

you must also change the password in CSW config file (see [Section 5.1.4](#)). You should study PDF manuals of the above-mentioned applications available on the [Deegree 2.4 download](#) page.

6.4 GEOSERVER

AGI SDI Server is powered by GeoServer 2.0 which provides WMS, WFS and WCS services (see Section 1.3). GeoServer application can be accessed at port 8080 of your server:

```
http://your.server.name:8080/geoserver
```

All the geoserver and data management tasks are done in [Config] section, where the default login is "admin" and password "geoserver". You should immediately change the admin user password as described in Section 4.1.6. No database connection needs to be configured for GeoServer 2.0 at the setup phase. There is a comprehensive on-line [GeoServer 2.0 Users Manual](#) available on GeoServer web site.

6.5 PROFTPD

A powerful and highly customizable FTP server (proftpd) has been included into AGI SDI Server in order to enable file exchange using the FTP protocol. The default setup of proftpd server is restricted only to password protected user access (i.e. there is no public FTP service available). In order to maintain system security, we strongly recommend using temporary user accounts for FTP access (see Section 4.2). You can read more about proftpd server configuration and management at <http://www.proftpd.org>.

If you want to add FTP-only user (without login rights), use `/usr/bin/passwd` as shell when creating user. By default, users are restricted to their home directory.

7 TECHNICAL SUPPORT

A limited technical support on installation, configuration and maintenance of AGI SDI Server will be provided free of charge within FP7 "Geoland 2" project. Requests for technical support, comments, inquiries and suggestions and can be addressed to the main designer of this system, who is also responsible for it's further development:

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8 LICENSING

AGI SDI Server is built on free software and therefore it is free software as well; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version. The Debian GNU/Linux 5.0 (Lenny) license text can also be found at <http://www.gnu.org/copyleft/gpl.html> and `/usr/share/common-licenses/GPL-2` on AGI SDI Server.

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