
AGI SDI SERVER

Release 2009-12

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1. TECHNICAL DESCRIPTION

1.1. General concept

AGI SDI Server is a custom remastering of Debian Lenny (version 5.0.2), bundled with 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 - see Section 6 for details).

A distinctive feature of AGI SDI Server is that it is a highly customized system with a completely pre-installed setup of software and configuration of all elements, including even database containers, which makes it a fully functional ready-to-go out-of-the-box solution for powering large-scale Spatial Data Infrastructure (SDI), implemented on the basis of Open Source operating system and software technology. AGI SDI Server 2009 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 - "LITE", "PRO", "COMBO" and "CAT" activating different applications for SDI services (see [section 1.3](#) of the current manual). 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. New releases of AGI SDI Server will be compiled as new stable versions of SDI software will become available.

1.2. Specifications

1.2.1. Linux Operating System

[Debian GNU/Linux 5.0.2](#) - the first preview version of AGI SDI Server 2009 was released on June 27, 2009. Testing of the system and updating the SDI applications with their new versions lasted for about 6 months, and the stable version was ready during the first week of 2010. Therefore we may consider the first (2009) release of AGI SDI Server as an SDI platform providing the latest stable open source software released before the end of 2009.

The current release of the Server is built on Linux kernel version 2.6.26-17. 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 current release of the AGI SDI Server 2009, instead of that we deployed the best available open source web applications dedicated for management of Linux operating systems and services (see [Section 5](#) of the current manual). The AGI SDI Server 2009 uses all the latest versions of applications and libraries available from Debian 5.0.x repositories, and there are no system components and applications, which would be "locked" to a certain version with pending restrictions on upgrades.

1.2.2. SDI services

In Deegree 2.2, there are OGC WebServices for Web Map Service (WMS) 1.1.1, Web Feature Service (WFS) 1.1.0, Web Coverage Service (WCS) 1.0.0 and Catalogue Service Web-Profile (CSW) 2.0.0 available. 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 2.2 features web page](#).

GeoServer 2.0 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](#).

1.3. Pre-installed applications

AGI SDI Server has a complete set of tools and applications for effective and user-friendly management of the Linux system, its 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 4 AGI SDI Server 2009 activation options:

1. LITE version (GeoServer WMS, WFS and WCS - no CSW!)
2. PRO version (Deegree CSW, WMS, WFS, WCS, WPS and iGeoPortal)
3. COMBO version (GeoServer WMS, WFS and WCS + Deegree CSW)
4. CAT version (Deegree CSW only)

The following table summarizes the most essential software applications and services pre-installed and configured on AGI SDI Server 2009 and activated with the above-mentioned 4 options:

APPLICATIONS	LITE	PRO	COM	CAT
<i>System/database management tools :</i>				
- SSH 5.1	+	+	+	+
- Midnight Commander 4.6.2	+	+	+	+
- Webmin 1.480	+	+	+	+
- phpPGAdmin 4.2.2	+	+	+	+
<i>Relational databases :</i>				
- PostgreSQL 8.3.7	+	+	+	+
- PostGIS 1.3.3	+	+	+	+
<i>Internet servers :</i>				
- Apache2 2.2.9	+	+	+	+
- PHP5 5.2.6	+	+	+	+
- Tomcat 5.5.26 (with Admin and Webapps)	+	+	+	+
with Sun-Java6-JDK 6.12)	+	+	+	+
- ProFTPD 1.3.1	+	+	+	+
<i>Spatial data processing libraries :</i>				
- gdal 1.5.2	+	+	+	+

- ogdi 3.2.0	+	+	+	+
- geotiff 1.2.4	+	+	+	+
- libgeos 3.0.0	+	+	+	+
- libtiff4 3.8.2	+	+	+	+
- libpng3 1.2.27	+	+	+	+
- libjpeg62	+	+	+	+
<i>SDI applications :</i>				
- GeoServer 1.7.6	+	-	+	-
- Deegree 2.2	-	+	+	+
<i>SDI services :</i>				
- WMS (Web Map Service)	+	+	+	-
- WFS (Web Feature Service)	+	+	+	-
- WCS (Web Coverage Service)	+	+	+	-
- CSW (Catalogue Service)	-	+	+	+
- WPS (Web Processig Service)	-	+	-	-
- WPVS (Web Perspective View Service)	-	+	-	-
<i>Web-mapping applications :</i>				
- MapBender 2.6	+	+	+	+
- OpenLayers 2.8	+	+	+	+
- MapServer 5.0.3	+	+	+	+
- Deegree 2.2. iGeoPortal	-	+	-	-
<i>Web Content Management Systems :</i>				
- MediaWiki 1.12	+	+	+	+

Links to on-line documentation of the main web applications installed on the AGI SDI Server 2009 are available in [Section 5](#) of the current manual.

1.4. Pre-configured databases

All the PostgreSQL/PostGIS databases loaded on the AGI SDI Server 2009 (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 scrips 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 2009:

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).
MEDIAWIKI	A special database pre-configured and connected to MediaWiki application (see Section 5.7).
MAPBENDER	A special database pre-configured and connected to MapBender application (see Section 5.6).
CSW	A special database pre-configured and connected to the Deegree Web Catalogue CSW application (see Section 5.4).

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. Procedures of general database management, vector data deployment into PostGIS databases and PostGIS geoprocessing are described in Section 6.1 of the current manual.

1.3. Downloads

AGI SDI Server 2009 is distributed as ISO disk image files, which must be downloaded and burned to CD-ROM disks using standard applications. The current repository of those ISO files is on a web server at the Institute of Aerial Geodesy in Kaunas (Lithuania) :

<http://www.agi.lt/sdi-iso>

ISO files of AGI SDI Server 2009 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.

There are 2 ISO files in the first (2009) release of AGI SDI Server :

agi-sdi-server-2009-i386.iso 32-bit (Intel)
agi-sdi-server-2009-amd64.iso 64-bit (AMD, Intel DualCore)

For the operational "production" servers you should consider using modern hardware with sufficient storage capacity, processing power and memory. Please note that modern multi-core Intel processors are designed to support 64-bit operating system architecture, so it would be a good idea to install 64-bit version of AGI SDI Server on such hardware, although the traditional approach is to use 32-bit software on Intel processors. So, if you are deploying the SDI server on modern hardware, we strongly recommend you to use ag-sdi-server-2009-amd64.iso

2. INSTALLATION OF THE SERVER

2.1. Preparation to install

Network connectivity

- DNS registration of your server hostname
- Firewall/router protected network with DMZ access to some ports
- Minimum: HTTP (80), Tomcat (8080), FTP (21), SSH (22)
- Optional: HTTPS (10000)
- TCP/IP cable connection
 - Internet UPLOAD speed MUST be at least 10 Mbps

Computer hardware

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

Other requirements

- MUST be operational on 24/7 basis
- High-quality hardware components
- External UPS device is mandatory
- 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). No specific requirements, except to you DVD-ROM disk type if your software doesn't support over-burning the CD-ROM to make use of 800 Mb disk space). If you have "modern" processor, we strongly recommend using 64-bit distributions (Intel Dual-core processors support 64-bit instructions) - this will allow you to install >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.

2.2. Installation of the system

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 "sdi" and password "sdi" into `/home/sdi` location.

However, in order to start the installation process, you first have to switch from an ordinary user ("sdi") of the system to administrator ("root"). Type a very short command `su` ("super-user") at the console and enter "geoland" as the root password. To switch back to the ordinary user account, type `exit` at the command prompt.

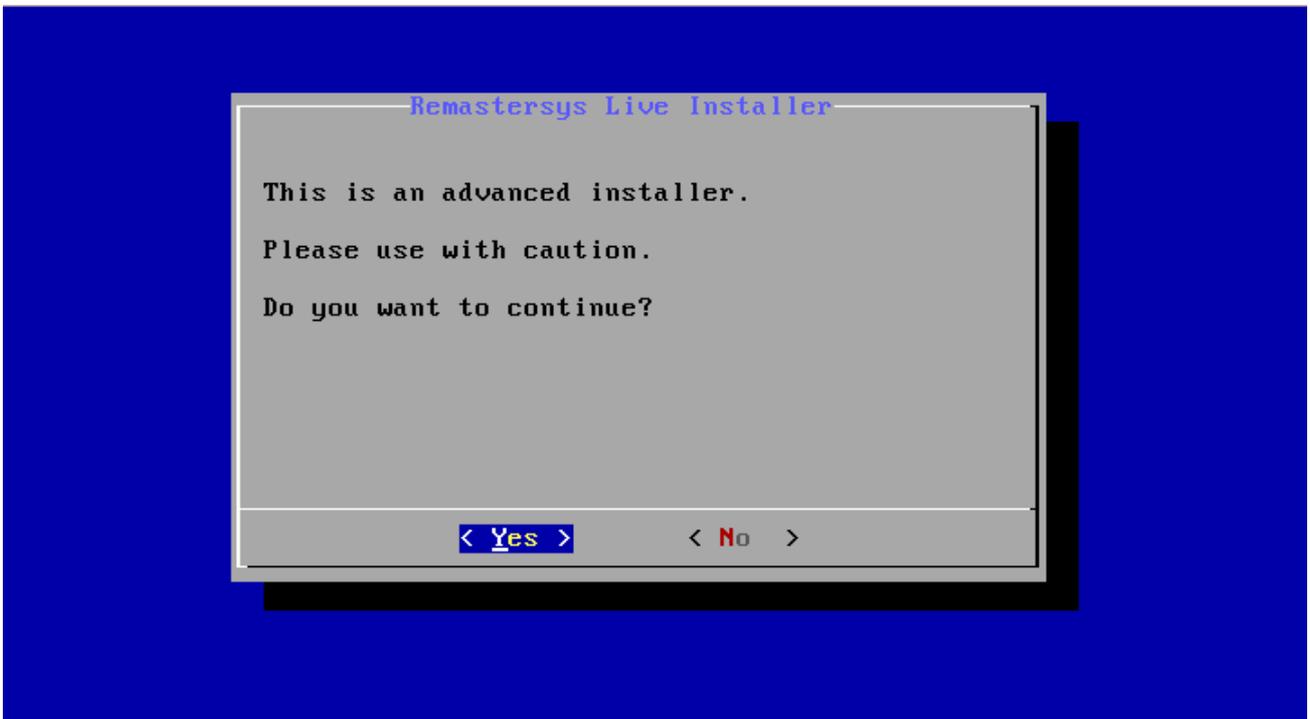
```
su
...
exit
```

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 `cdisk` 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 `cdisk` pages in google and consult someone with experience in Unix/Linux filesystems.

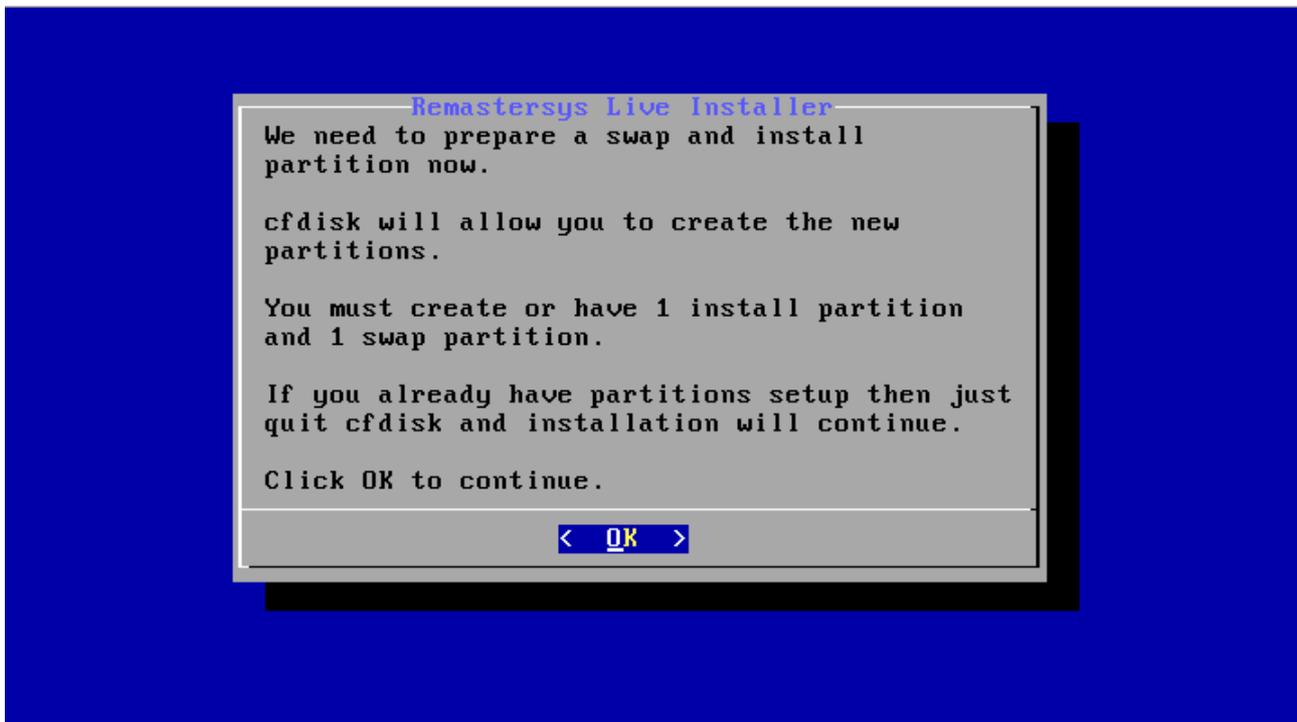
To start the installation process, switch to the root user (by entering "su" at the command prompt and typing in "geoland" password) and enter the following command :

```
remastersys-installer
```

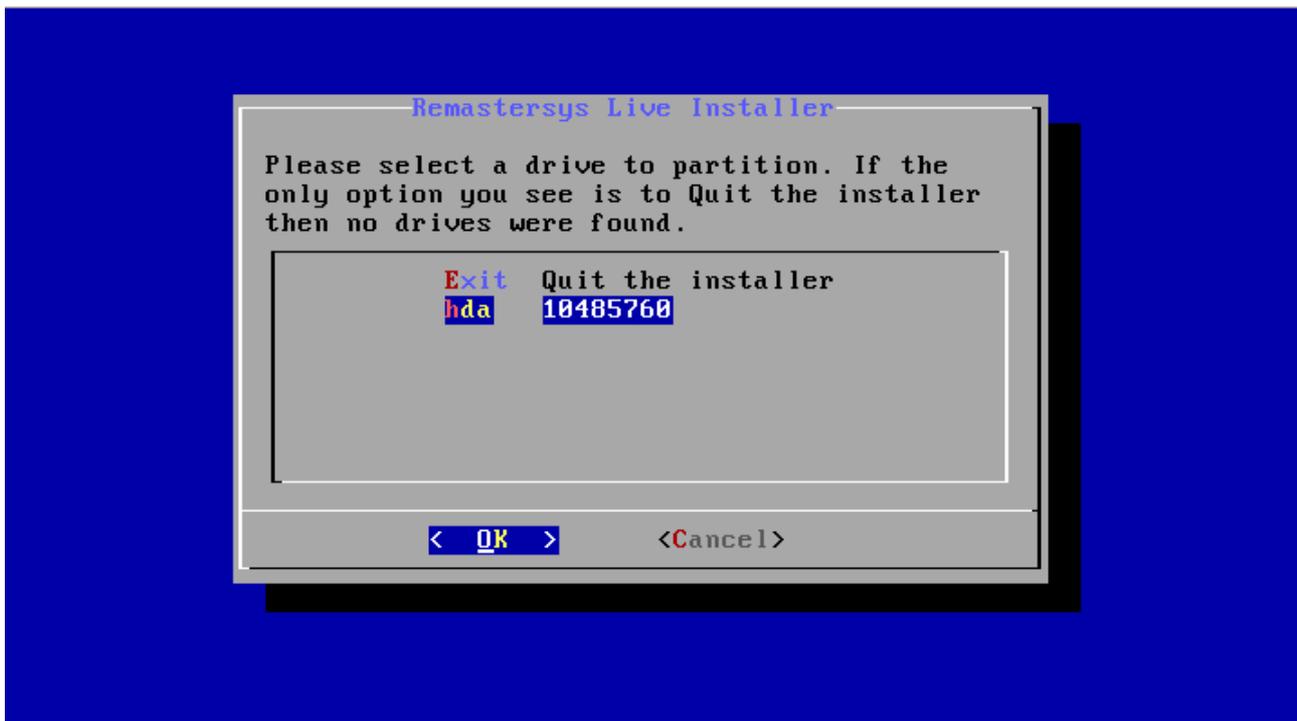
SDI Server installation process will start with the following warning:



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:



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



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         Solaris       8000.01
hda2      [ ]        Primary    Linux swap    Solaris       2737.38
-----

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

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

```

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 (e.g. `ext2`) 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. After completing the disk setup, choose `[Write]` and `[Quit]`. For practical purposes we recommend not to use a separate partition for `/home`, because additional partitioning may compromise your system's ability to deploy large amounts of data in future.

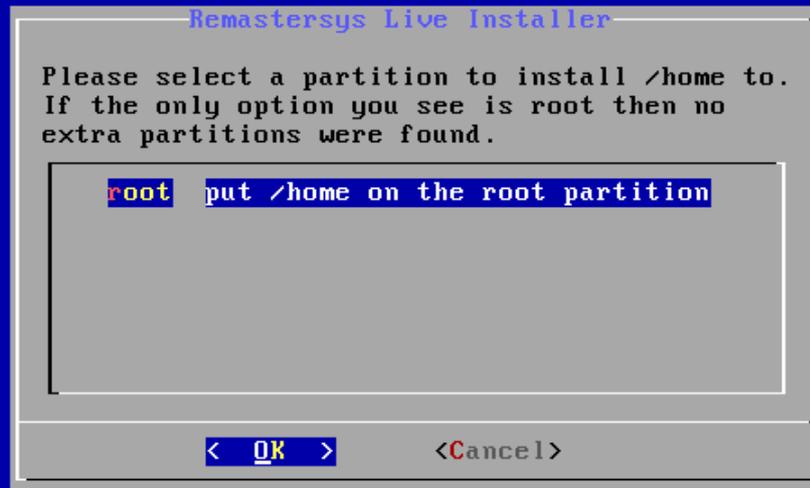
After you are done with disk partitioning, the installer will first ask you to identify swap space - you should select `sda5` the swap partition:



The next question is about root partition - you should select sda1 as root partition of your system:

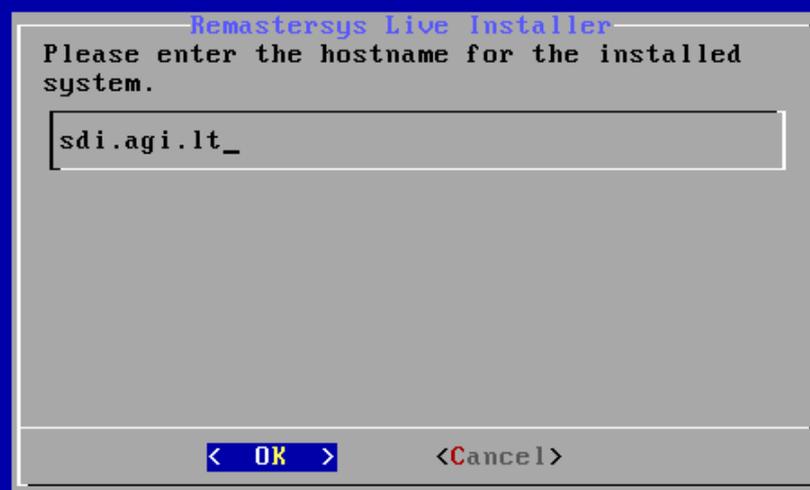


Then you will be warned that your /home folder will be placed at the same partition as /root (the system) - which is OK for the default configuration, as most of your data is likely to be located in the PostgreSQL/PostGIS database OR in /sdi/data folder:

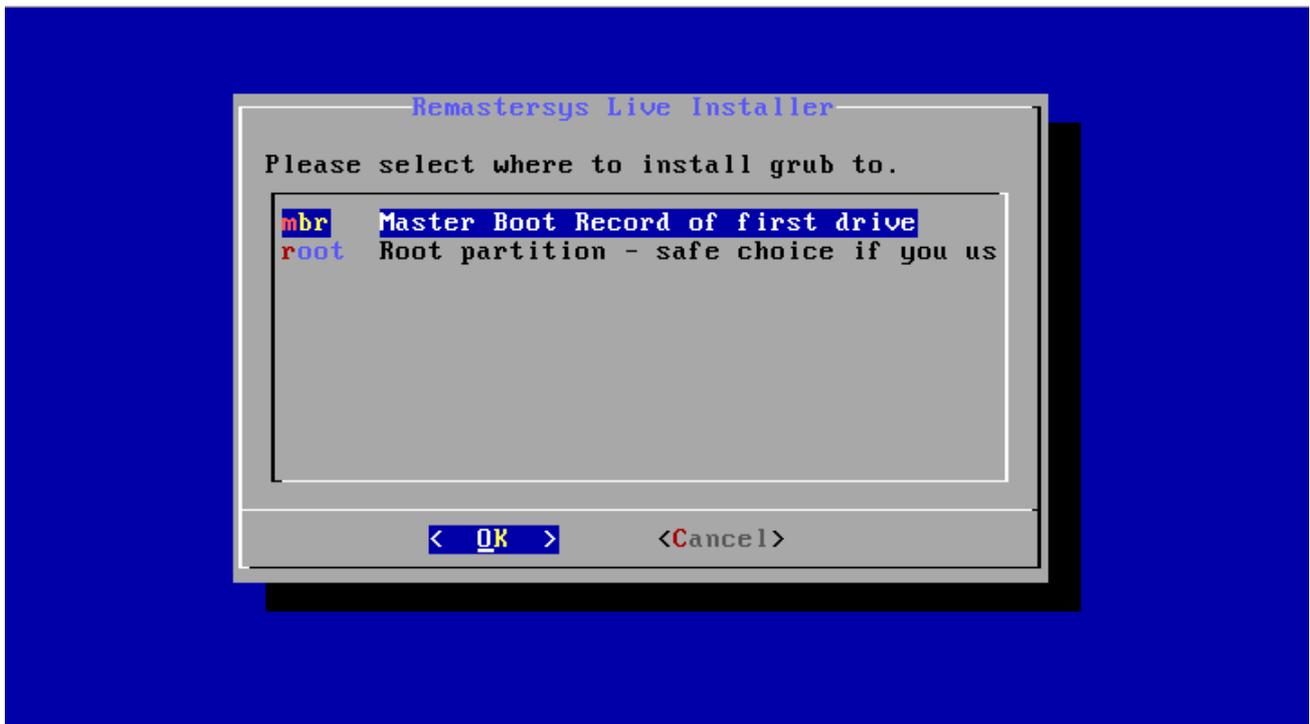


However, there is a possibility to create one separate partition for /home with remastersys-installer if you wish to do so. All partitions should be created in earlier stage with `cfdisk` utility.

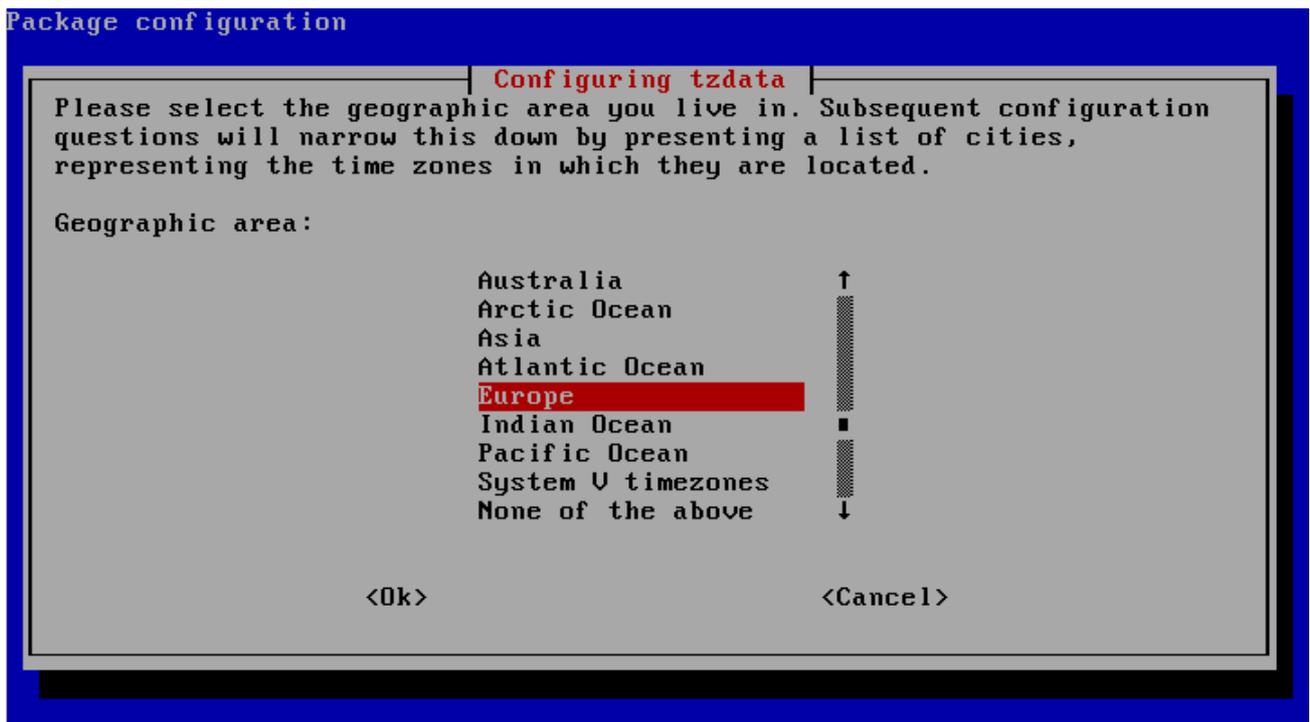
The installer will also ask you for your server host name (consult your network administrator):



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



Finally, you will be asked to choose your time zone - geographical region:

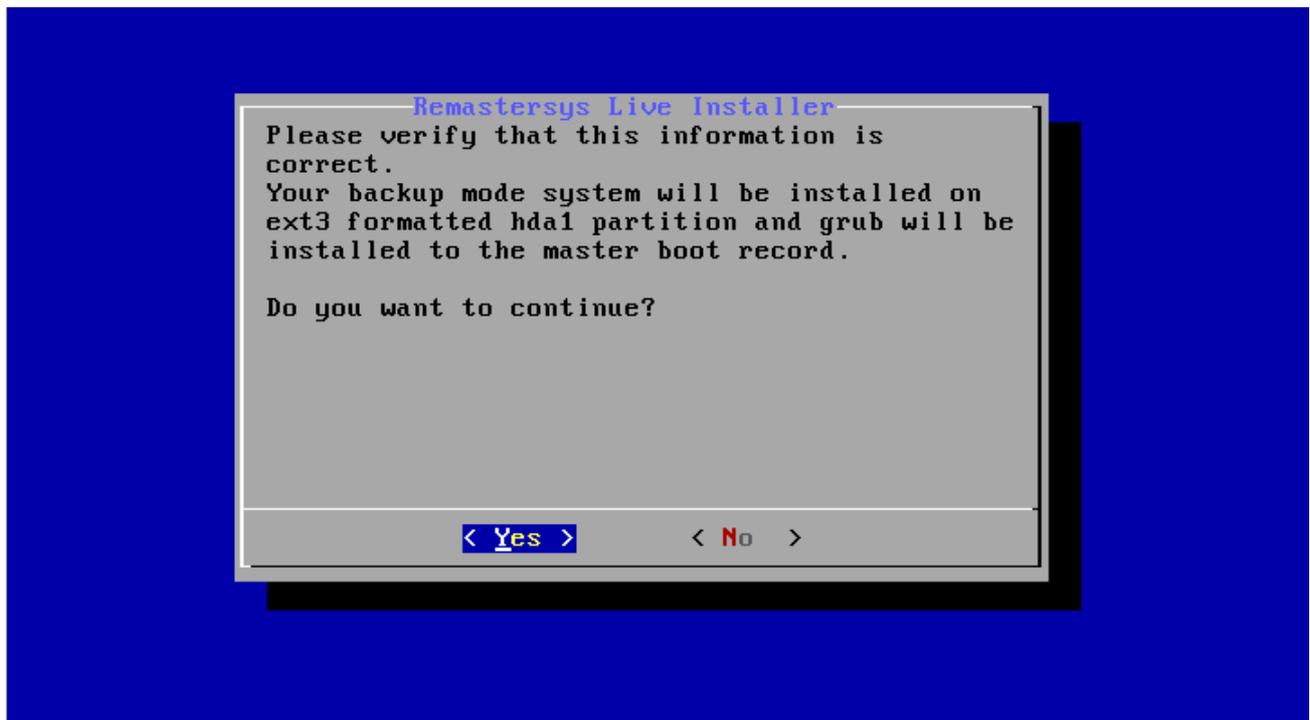


... and country:

Package configuration



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



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

Remastersys Live Installer

Installation is complete.

If everything went well you should have your new system installed and ready.

Do you want to reboot now to try it out?

< Yes >

< No >

3. POST-INSTALL CONFIGURATION

After installing and rebooting the system, you will get exactly the same environment as during the testing (before installing), i.e. you will have one user ("sdi" with password "sdi" and /home/sdi personal folder) and administrator "root" with password "geoland" pre-installed, so you can log into the system as one of them to start post-configuration of your system.

AGI SDI Server 2009 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.

There are 3 configuration scripts in the home folder of the default sdi user (/home/sdi), which you must execute as described in the README.TXT file to complete activation of your SDI Server:

- 1_ssh.sh** (recreates the ssh authentication keys)
- 2_xml.sh** (modifies all the original Deegree 2.2 configuration XML files by inserting the user-specified information into the "SERVICE PROVIDER SECTION")
- 3_sdi.sh** (activates one of the 4 pre-defined combinations of SDI services on your system)

Before executing the scripts, you must first become administrator (user "root"). Type the following command in your console:

```
su
```

and give 'geoland' as password when prompted (no brackets).

```
Debian GNU/Linux 5.0 sdi.agi.lt tty1
sdi.agi.lt login: sdi
Password:
Linux sdi.agi.lt 2.6.26-2-686 #1 SMP Wed Nov 4 20:45:37 UTC 2009 i686

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
You have mail.
sdi@sdi:~$ su
Password:
sdi:/home/sdi# mc_
```

After successful login as root, type

mc

at the command prompt and press [Enter], which will start a Midnight Commander application. We recommend you to use the Midnight Commander for easy navigation around the file system and editing (F4) of the 2_xml.sh script:

```
Left      File      Command  Options  Right
<- /sdi  <- /home/sdi
Name      Size      MTime    Name      Size      MTime
/..       UP--DIR   /..       UP--DIR
/config   4096      Jan  6 17:10  /.mc      4096      Feb  3 17:34
~deegree  16        Feb  5 20:21  .bash_history  21        Feb  4 13:35
/deegree-2.2 4096      Jan  5 20:48  .bash_logout  220       Aug 27 2009
~geoserver 28        Jan  7 01:30  .bashrc    3116      Aug 27 2009
/geoserver-2.0 4096      Dec 16 12:40  .profile   675       Aug 27 2009
~mapbender 18        Jan  7 01:30  *1_ssh.sh  1437      Jan  6 22:51
/mapbender-2.6 4096      Dec 12 18:22  *2_xml.sh  12832     Jan  7 00:37
~openlayers 19        Jan  7 01:30  *3_sdi.sh  8057      Jan  6 18:50
/openlayers-2.8 4096      Dec 18 15:40  README.TXT 4412      Jan  6 23:03

/..
/..

Hint: Do you want lynx-style navigation? Set it in the Configuration dialog.
sdi:/home/sdi#
1Help  2Menu  3View  4Edit  5Copy  6RenMov  7Mkdir  8Delete  9PullDn  10Quit
```

The first script 1_ssh.sh is completely automatic, and you don't have to do anything else, but execute it as root. You need to run this script only once.

In order to use the second 2_xml.sh script, you must first update ALL the corresponding values of the listed variables, as explained in the examples given in the script file. You can run this script as many times as necessary in case if you need to apply further changes to your company profile in Deegree XML files. All the editing you've made in 2_xml.sh script will be stored after you save the file before it's execution.

The third 3_sdi.sh script doesn't require any editing, but you have to make 2 consecutive decisions related to activation of SDI services on toye system (run the script as root and follow the instructions). With this script you can change the configuration of your active SDI services, or switch them all off at any time without loosing your data and settings.

It is absolutely essential that you execute those scripts in the given order, especially (1) during the first activation of the server and (2) in case if your server host name has changed due to some reason. So, in those particular cases you MUST first of all edit 2_xml.sh file and execute it as root (see Step 3) of the README.TXT, and after that execute 3_sdi.sh file as root (Step 4) in order to activate the new configuration.

3.1. Fixing the network connection

Debian installer used in AGI SDI Server 2009 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 2009 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) :

```
ifconfig
```

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 "sdi" password) :

```
ssh -l sdi 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. You have to :

3.1.1. Setting up the host name

Modify the configuration file :

```
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](#)

3.1.2. Setting up the DNS parameters

Modify the configuration file :

```
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).

3.1.3. Setting up the static IP address

Modify the configuration file :

```
nano /etc/network/interfaces
```

The config which already has 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).

3.1.4. Restarting the network

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

3.2. Creating the SSH public keys

If you didn't create SSH public keys during the testing phase, you must do that after installing the SDI Server 2009. Log in as root and run the script :

```
/home/sdi/1_ssh.ssh
```

3.3. Restarting the system

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

```
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), your network is configured and works well.

It is also very useful to run system upgrade immediately after it's deployment and regularly during the whole period of its operation :

```
aptitude update  
aptitude dist-upgrade  
aptitude purge
```

4. SYSTEM SECURITY

Debian Lenny 5.0.2 operating system provides a solid foundation for a secure internet server. However, AGI SDI Server 2009 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 for the "production" environment.

4.1. CHANGE THE PASSWORDS

4.1.1. Default system user and root

```
su
passwd sdi      (enter the new sdi user password)
passwd root    (enter the new root user password)
```

4.1.2. 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 :

```
su postgres
psql -d template1 -U postgres
ALTER USER postgres WITH PASSWORD 'new_password';
ALTER ROLE gis WITH PASSWORD 'new_password';
\q
exit
```

4.1.3. Tomcat administrator and manager

Stop the Tomcat 5.5 service :

```
/etc/init.d/tomcat5.5 stop
```

Edit the Tomcat 5.5 users configuration file :

```
nano /etc/tomcat5.5/tomcat-users.xml
```

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

```
<user username="sdi" password="geoland" roles="admin,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 5.5 service :

```
/etc/init.d/tomcat5.5 start
```

4.1.4. Mediawiki database connection and administrator

```
nano /etc/mediawiki/LocalSettings.php
```

Find the following line and replace geoland with the new postgres user password (see [Section 4.1.2](#)).

```
$wgDBpassword = "geoland";
```

You can also edit the following line and change the name of your MediaWiki site.

```
$wgSitename = "SDI Server";
```

After fixing the database connection, open your MediaWiki site :

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

Login as administrator with "geoland" password, click on [my preferences] link on top of the page and change the administrator password. Click [Save] after you finish.

4.1.5. Deegree database connection

Deegree has the only application - Catalog Server (CSW) - which 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 :

```
nano /sdi/deegree/deegree-csw/WEB-INF/conf/csw/  
featuretypes/csw_postgres.xsd
```

Replace geoland with the new postgres user password (see [Section 4.1.2](#)) in the following line :

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

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

4.1.6. 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 :

```
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.

4.1.7. MapBender database connection and administrator

MapBender web mapping application requires a rather complicated configuration procedure to get up and running, but in AGI SDI Server it is already completely pre-configured, so that you need just to fix the database connection and administrator password :

```
nano /sdi/mapbender/conf/mapbender.conf
```

Find the following line and replace geoland with the new postgres user password (see [Section 4.1.2](#)).

```
define("PW", "geoland");
```

Note that there are also proxy connection settings in mapbender.conf file, which you can modify if necessary. Exit the editor by pressing Ctrl+X and answer Yes to save the changes.

MapBender has a default login "root" with password "root". To change those to your own combination, open your MapBender startup page :

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

Login as mentioned above and change the administrative login/password in the [admin2_en] -> [User Management] section. Note that connection will not be possible, unless you complete the first step of MapBender post-configuration (fix the database connection).

4.2. Management of the user accounts

Creating new users 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 :

```
su ; 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 :

```
su ; userdel -r <user_name>
```

For instructions on modifying the existing user accounts, see [Section 4.1.1](#).

5. ACCESS TO WEB APPLICATIONS

As it was mentioned in [Section 1.3](#), the AGI SDI Server 2009 includes the latest versions of essential system and database management tools, as well as SDI and CMS applications. Those on-line tools are intended to provide the system with a sufficient remote administration platform and replace the missing GUI component, but first of all the pre-installed web applications provide the user interface to SDI components of the system.

5.1. Webmin

AGI SDI Server 2009 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 [Section 4.1.1](#).

```
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](#).

5.2. PhpPGAdmin

[PhpPGAdmin](#) is a special on-line tool for PostgreSQL/PostGIS database management is included in AGI SDI Server 2009, yet many of database administration tasks can be performed in Webmin as well. We chose PhpPGAdmin as one of the most common PostgreSQL database applications, along with desktop application PAdmin.

To load PhpPGAdmin, open the following URL and login as postgres with its password (the original password is "geoland"). You must change postgres password as shown in [Section 4.1.2](#).

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

While logged into PhpPGAdmin, be careful not to damage the existing databases, as the postgres user has all the ownership rights on all the existing databases. There are some useful FAQs of the [PhpPGAdmin documentation web page](#).

5.3. 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 2009 run on Tomcat 5.5 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/tomcat5.5/tomcat-users.xml` file (see [Section 4.1.3](#)). In the default configuration we used "sdi" login with "geoland" password. There is a comprehensive collection of [Tomcat 5.5 on-line documents](#) on the [Apache Tomcat web site](#).

5.4. Deegree

AGI SDI Server 2009 is powered by [Deegree](#) 2.2 suite of applications (see [Section 1.3](#)), which can be accessed directly on port 8080 of your server :

<code>http://your.server.name:8080/deegree-wms</code>	(WMS - web map server)
<code>http://your.server.name:8080/deegree-wfs</code>	(WFS - web feature server)
<code>http://your.server.name:8080/deegree-wcs</code>	(WCS - web coverage server)
<code>http://your.server.name:8080/deegree-csw</code>	(CSW - web catalogue server)
<code>http://your.server.name:8080/deegree-wps</code>	(WPS - web processing server)
<code>http://your.server.name:8080/deegree-wpvs</code>	(WPVS - web perspective view)
<code>http://your.server.name:8080/geoportal</code>	(iGeoPortal application)

If you have already completed the post-install configuration (editing and running `2_xml.sh` script), 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 postgres password, you must also change the CSW config file (see [Section 4.1.5](#)). You should study PDF manuals of the above-mentioned applications available on the [Deegree 2.2 download page](#).

5.5. GeoServer

AGI SDI Server Lite is powered by [GeoServer](#) 2.0 which provides WMS, WFS and WCS services (see [Section 1.3](#)). GeoServer is under an intensive development, currently on a transition to its version 2, so please be careful with versions while reading on-line documentation. 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.

5.6. MapBender

MapBender is another web application installed only in the Lite version of the AGI SDI Server 2009 as an advanced web mapping application interface (analogue to Deegree iGeoPortal). Administration section of MapBender can be accessed at :

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

The default login and password is "root", which you must change as suggested in [Section 4.1.7](#). Development of custom web mapping interfaces can be done by using MapBender GUI interfaces. There are comprehensive on-line resources (Manual, Tutorial, Examples) on the [MapBender Wiki page](#).

5.7. MediaWiki

Content Management System (CMS) is an essential element of any web server, so we included the current MediaWiki version available from Debian Lenny (5.0.2) repositories. MediaWiki can be accessed at the following URL :

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

The default MediaWiki login is "administrator" with "geoland" password, but you must change it and modify PostgreSQL database connection parameters (change the postgres password in the database connection) and administrator password of your MediaWiki site as described in [Section 4.1.4](#). There are comprehensive on-line resources (Manual, Tutorial, Examples) on the [MediaWiki web site](#).

5.8. MapServer

There are many web mapping applications developed on the basis of a "classical" application - the [Minnesota Map Server](#), therefore we included the current MapServer version available from Debian Lenny (5.0.2) repositories. MapServer is provided as-is without any additional configuration. You can test this application by entering a console command :

```
/usr/lib/cgi-bin/mapserv -v
```

OR opening the following URL on you server :

```
http://your.server.name/cgi-bin/mapserv
```

There is a comprehensive documentation available as PDF Manual and collection of on-line documents available on the [MapServer documentation page](#).

5.9. OpenLayers

[OpenLayers JavaScript API](#) is becoming one of the most popular web mapping solutions, after development of [Community MapBuilder](#) has been suspended. On the AGI SDI Server 2009 OpenLayers is available as a stand-alone SDI application. OpenLayers.js can be accessed at :

```
/sdi/openlayers/OpenLayers.js
```

There is a comprehensive [on-line documentation](#) and lots of [examples](#) available on [OpenLayers web site](#).

5.10. proftpd

A powerful and highly customizable FTP server ([proftpd](#)) has been included into both versions of the AGI SDI Server 2009 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> .

6. HOW TO USE THE SDI SERVER

6.1. Management of the databases

[TBD]

6.2. Management of SDI services

[TBD]

6.3. Management of web interfaces

[TBD]

7. TECHNICAL SUPPORT

A limited technical support on installation, configuration and maintenance of AGI SDI Server 2009 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 :

Dr. Gediminas VAITKUS

Applied Research Center
Institute of Aerial Geodesy
Pramones pr. 13, 51327 Kaunas
LITHUANIA

tel.: +370-37-755226

fax.: +370-37-451497

mob.: +370-620-72870

e-mail: gedas.vaitkus@gmail.com

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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59 Temple Place, Suite 330,
Boston, MA 02111-1307 USA

