iLAP

LABORATORY DATA MANAGEMENT SYSTEM, ANALYSIS- AND PROTOCOL DEVELOPMENT

INSTALLATION AND ADMINISTRATION MANUAL

(Version 1.3.2)

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Chapter 1

Installation

1.1 Installation overview

iLAP is a web-based JEE application which consists of three different components. **iLAP-Core** is the web-application which enables you to use the web based functionality of iLAP and is delivered in a bundled Apache Tomcat web container. This Web application accesses an **RDBMS** (relational database management system e.g. PostgreSQL) which stores all the iLAP specific data in its tables. Only the files imported in iLAP are stored separately in a dedicated Application-Data-directory which can be specified during the installation process. Authentication and authorization within iLAP is handled externally by dedicated **Usermanagement Systems**. At the moment iLAP supports the in-house developed Genome-AAS or the XML-File based Simple-AAS.

The installation itself is performed in 3 main stages which should not take more than 15 minutes by an experienced system administrator with a PostgreSQL instance:

- Installation preparations:

  - Prerequisites and planning of the installation
  - Creation of a database user and of two databases which can be accessed by this user
  - Optional creation of a local system user under which iLAP and its services should be installed and run

- Installation using the graphical installation wizard

- Initialization and user creation:

  - Starting and stopping the services
  - Depending on the used usermanagement back-end iLAP users must be created and different roles in iLAP must be assigned

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1.2   Quick installation instructions

This sections provides the shortest way to get iLAP running at your site. If these instructions are not working at your site please continue reading the subsequent chapters to get a deeper understanding of the installation procedure.

1.) Download a PostgreSQL database from http://www.postgresql.org/download/ and install it locally. If it is already installed use the local one.

2.) Create PostgreSQL user via psql:
```
CREATE ROLE ilap WITH LOGIN NOSUPERUSER INHERIT CREATEDB
NOCREATEROLE PASSWORD 'yourpassword';
CREATE DATABASE "ilap" WITH OWNER = "ilap" ENCODING = 'UTF8';
CREATE DATABASE "genomeaas" WITH OWNER = "ilap" ENCODING = 'UTF8';
```

3.) Create a local system user under which iLAP should be installed
```
Linux  : useradd -c "iLAP JEE user" -d /home/ilap -s /bin/bash ilap
            passwd ilap
Windows: use your working accunt unless you want to install it as
            service
```

4.) Switch to the ilap user either by logging in as ilap or by su - ilap

5.) Download JDK (Version 1.6 update 6) http://java.sun.com, install it and set the JAVA_HOME variable
```
Linux  : sh ./jdk-6u13-linux-i586.bin
            export JAVA_HOME=/home/ilap/jdk1.6.0_013
            export PATH=$JAVA_HOME/bin:$PATH
Windows:
            jdk-6u13-windows-i586-p.exe
```

6.) Download iLAP from http://genome.tugraz.at/iLAP/iLAPdownload.php

7.) Start Wizard under a graphical interface (Windows or local/ssh-redirected X):
```
Linux console: java -jar iLAP-1.3.2-default-install.jar
Windows      : double click on iLAP-1.3.2-default-install.exe
```

8.) Only change the database settings in the wizard

9.) Start genomeaas and ilap via shortcuts/shell e.g.
```
Linux  : iLAP/AAS/Genome-AAS/bin/run-usermanagement.sh
            iLAP/iLAPCore/bin/startup.sh
```

10.) Connect to http://localhost:8080/iLAP

11.) Login with the username and password you have specified at the wizard screen

1.3   Installation preparations

1.3.1   Prerequisites and planning of the installation

Before you start with the iLAP installation you must have installed and started a **PostgreSQL database instance** which has its TCP/IP connectivity enabled. It must be reachable by the host which is running iLAP. For more details about installation and configuration of a PostgreSQL database have a look at the following website http://www.postgresql.org.
Under Linux/Unix systems the configuration file of the database instance postgresql.conf must contain at least the instruction:

```
listen_addresses = 'localhost' # what IP address(es) to listen on;
                                # comma-separated list of addresses;
                                # defaults to 'localhost', '*' = all
port = 5432
```

Additionally to the running database there must be installed a **Sun Java Development Kit of version 1.5 or higher**. Under Linux/Unix systems you can test your JDK installation with the following lines in the command line:

```
#
# determine the version of your Java installation in your environment
#
[ilap@obeline ~]$ java -version
java version "1.6.0_13"
Java(TM) SE Runtime Environment (build 1.6.0_13-b03)
Java HotSpot(TM) Client VM (build 11.3-b02, mixed mode, sharing)
```

Finally you must provide enough disk space for storing the imported data associated within iLAP projects, protocols and analysis steps. The **adequately dimensioned disk system** must be accessible as a local directory path which by default is set to a subdirectory of the iLAP installation path. Have in mind that microscopy data can grow rapidly but don't panic because the ApplicationData path can be changed after the installation easily in a property file and the migration process consists in simply copying the content of the ApplicationData to the new destination.

1.3.2   Preparation of the database users and the necessary databases

There are several ways to create database users in PostgreSQL. The following two sections are describing the steps necessary to perform using different methods.

1.3.2.1 Using system commands

Create a database user e.g. ilap on the PostgreSQL database server and set a password using the following command under Linux/Unix.
For PostgreSQL 7.x

```
createuser -W -D -A ilap

> Password:

> CREATE ROLE

createdb -U ilap -h localhost -p 5432 -O ilap -E UTF8 ilap

> CREATE DATABASE

createdb -U ilap -h localhost -p 5432 -O ilap -E UTF8 genomeaas

> CREATE DATABASE
```

For PostgreSQL 8.x

```
createuser --no-superuser --no-createrole --createdb -W ilap

> Password:

> CREATE ROLE

createdb -U ilap -h localhost -p 5432 --owner ilap --encoding UTF8 ilap

> CREATE DATABASE

createdb -U ilap -h localhost -p 5432 --owner ilap --encoding UTF8 genomeaas

> CREATE DATABASE
```

The user must be able to access the database instance from the machine where iLAP is installed.

1.3.2.2 Using SQL statements as PostgreSQL administrator

Connect as database administrator with your preferred postgresql client to your database server and execute the following SQL statements. Make sure that you have replaced the 'yourpassword' with a save password.

```
--
-- Create the PostgreSQL user for installation using SQL
--
CREATE ROLE ilap WITH LOGIN NOSUPERUSER INHERIT CREATEDB NOCREATEROLE

PASSWORD 'yourpassword';
--
-- Create the databases used during installation
--
CREATE DATABASE "ilap" WITH OWNER = "ilap" ENCODING = 'UTF8';

CREATE DATABASE "genomeaas" WITH OWNER = "ilap" ENCODING = 'UTF8';
```

1.3.3   Optional creation of a local system user

If you want to run iLAP under a distinct local user and not under your own user create a new user in your system. This can be done under Linux/Unix system by the following command:

```
useradd -c "iLAP JEE user" iLAP
```

For more information see "man useradd". If you have decided to go with a distinct iLAP user run all subsequent commands as the newly created user.

1.4   Wizard installation

Download the newest version of iLAP from http://genome.tugraz.at/iLAP/iLAPdownload.php and store it in a local directory. After that start the graphical installer of iLAP and fill out the required parameters:

```
For Windows-based systems use double click on:
    iLAP-1.3.2-default-install.exe
```

```
On Linux system run:
    java -jar iLAP-1.3.2-default-install.jar
```

```
On MacOSX open the installation image and use double click on the installer app:
    iLAP-1.3.2-default-install.dmg
```

Attention: the installer has a graphical user interface and should therefore also be started in a graphical environment which is either Windows or the X environment under Linux/Unix systems. In order to avoid installing X on a server you can also do X- forwarding using SSH to get the user interface redirected to your local machine.
The graphical interface of the installer is starting:
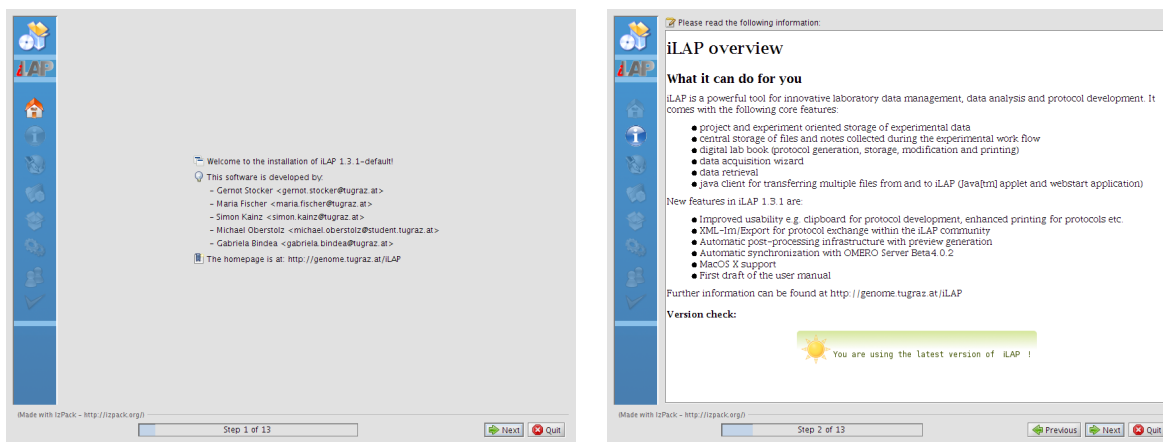
The first two screens show you general informations about iLAP, its version and the major changes between the versions.
After the license agreement you have to specify the directory path, where iLAP should be installed. It is recommended to install it in a single central place preferably under the user home directory of the newly generated system user(see section "Optional creation of a local system user"). All data including the iLAP-handled user files is stored there. It is highly recommended to include this directory into your general backup environment in order to avoid the loss of your precious data.
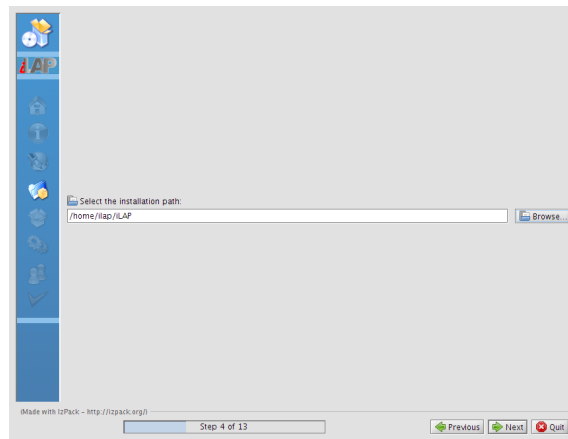
The next wizard screen shows you the package selection dialog. Those packages which are absolutely necessary for an installation can not be deselected. One very important decision which must be taken at this screen is the decision about the usermanagement you intend to use.
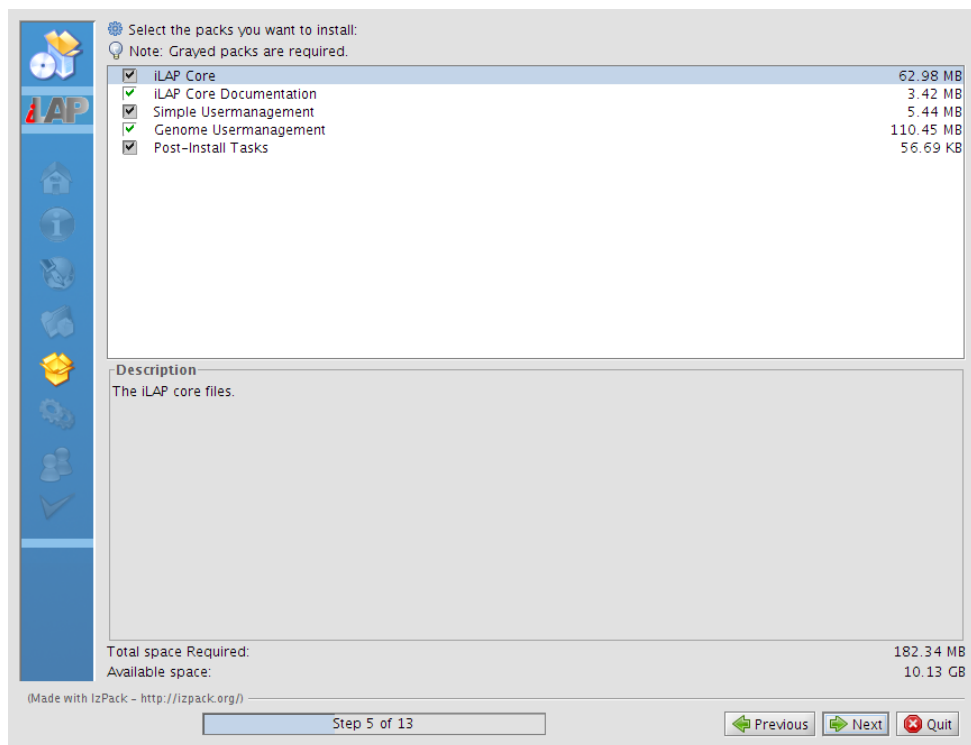
At the moment iLAP supports two different ways for handling users:

- Simple Usermanagement: this usermanagement provides a simple xml-file based usermanagement which should be used only if you have limited amount of users and fluctuation of people is very low. It supports all features which are necessary for running iLAP but it comes only with a command line based administration tool and does not support advanced features like Web Single-Sign-On.

- Genome Usermanagement: The GenomeAAS is a full featured usermanagement and is the recommended usermanagement. It is a J2EE application by it's own and gives

you a versatile web interface for all tasks regarding the user administration. Besides the web-interface it provides Single-Sign-On functionality for web-applications as well as Samba/Linux system user authentication, LDAP-support etc. These advanced features are not necessary for a basic iLAP installation and go far beyond the scope of this document. iLAP relevant features are described in the section "Account creation".

The wizard screen 6 gives you the possibility to specify the TCP/IP port settings under which iLAP should be reachable after the installation and the database connection parameters where iLAP should store your data. If you intend to run only iLAP on your server simply leave the default port settings. If you have already a JEE environment with web-container running on your server change the ports so that you have no conflicts but set them above the reserved ports in the range from 1024 to 65000.

As a practical rule of thumb leave the ports of one single JEE container in the end the same and change only the leading thousand digits e.g. from 8080, 8005, 8009 to 10080, 10005, 10009.
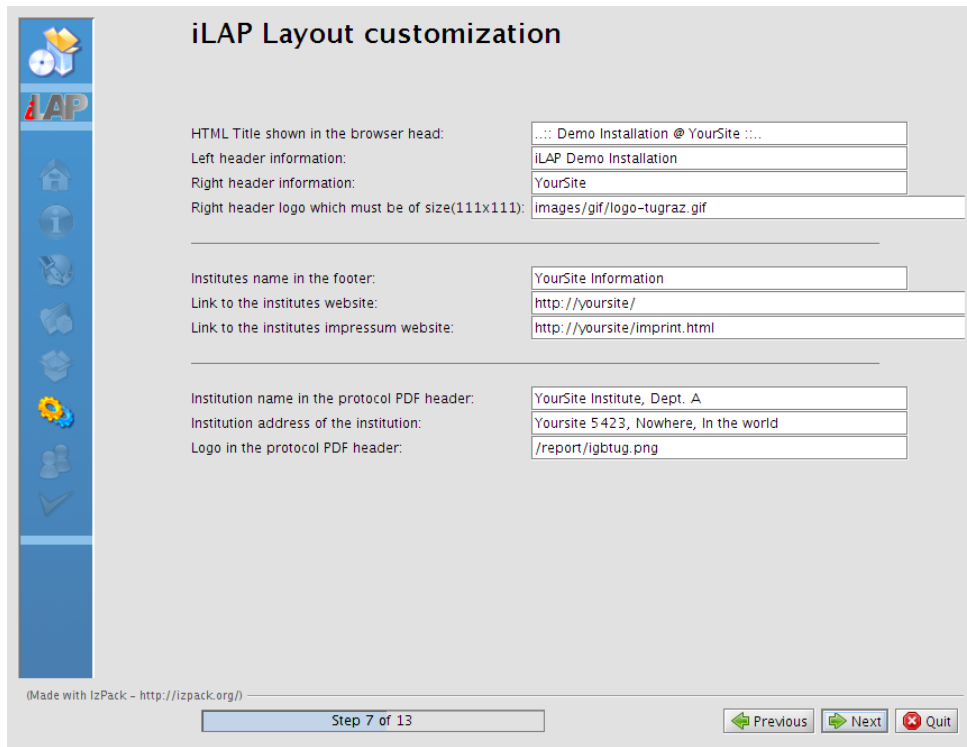
In order to make local customization for the look and feel of your installation you can change the input fields in the wizard screen 7.

The customization can be best seen in the login page above where the affected areas are highlighted in red:

1. HTML Title shown in the browser head

2. Left header information

3. Right header information and the logo

4. Logo in the center

5. Institutes name in the footer

6. Link behind the institutes name

7. Link behind the Impressum

The third part of the wizard screen 7 affects the pdf generation of the experiment protocol. There you change the header of each page permanently.

At the next screen you can specify the user specific data of the first ilap user. The second half of this screen appears only if the Genome Usermanagement is selected during the package selection.

For the Genome Usermanagement you simply have to specify the name of the database to which the iLAP database user is allowed to connect and the port range under which the Genome Usermanagement is started. This is for simplicity reasons because the JBoss application server behind the Genome Usermanagement uses several TCP/IP ports. Finally you specify the administrator password of the "admin" user with which you can create more users.

After this customizations you get a summary of the selected installation and with Next you initiate the installation process.
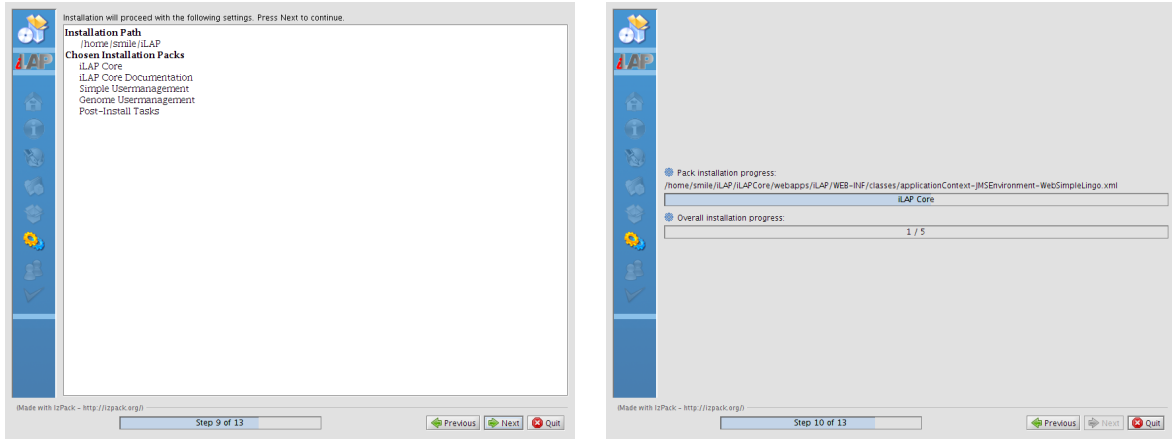
The following "Processing" screen initializes the configuration according to the wizard input and performs the database schema initialization. If you want to perform additional changes after the installation you have to perform the changes manually using an editor and changing the appropriate properties files(see in the FAQ section).
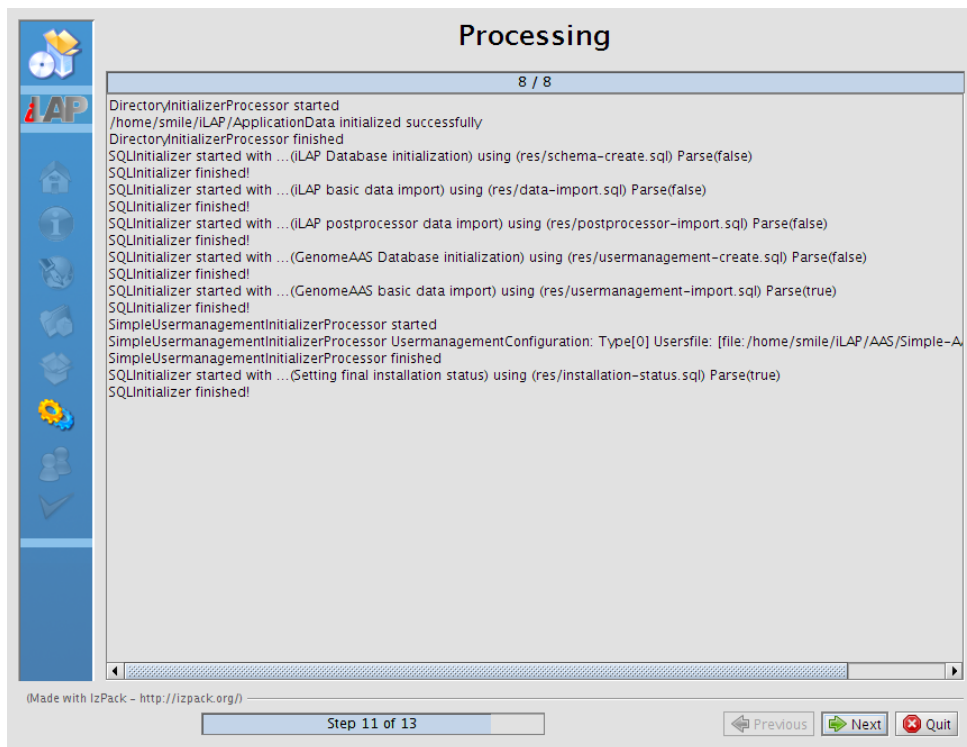
If the installation and initialization process is completed local shortcuts for starting and stopping iLAP and the Genome Usermanagement can be generated using the next screen. This detects the platform specific settings of Linux and Windows automatically.
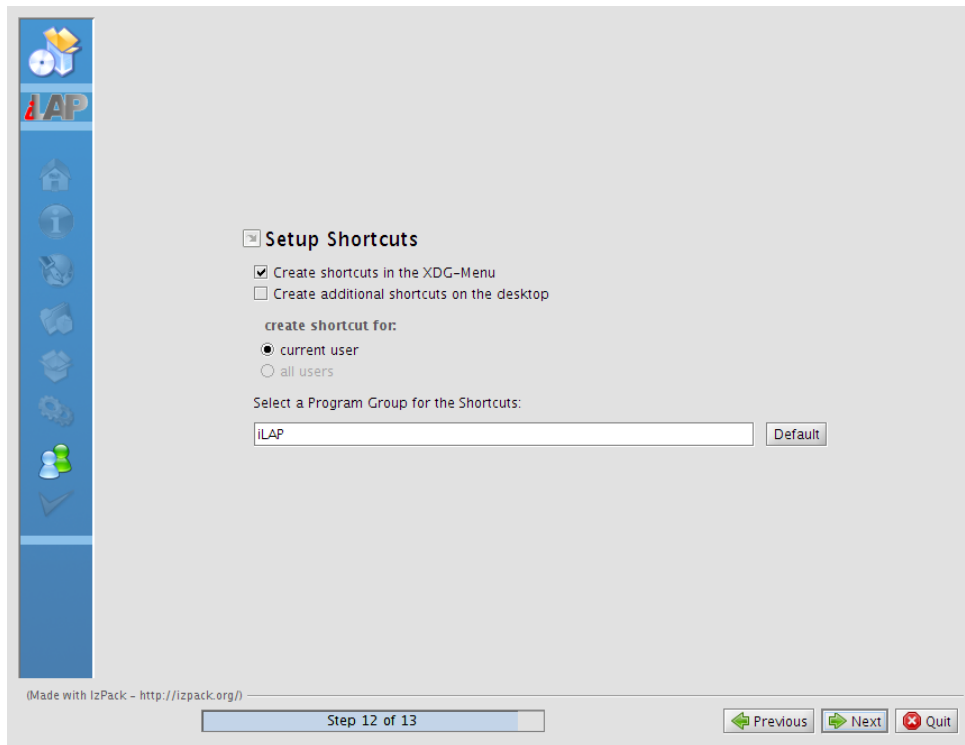
At the final wizard screen you can generate a configuration file for automatic- or text-only installation without demanding user interaction(see section "FAQ: How to perform a text-console-only installation")
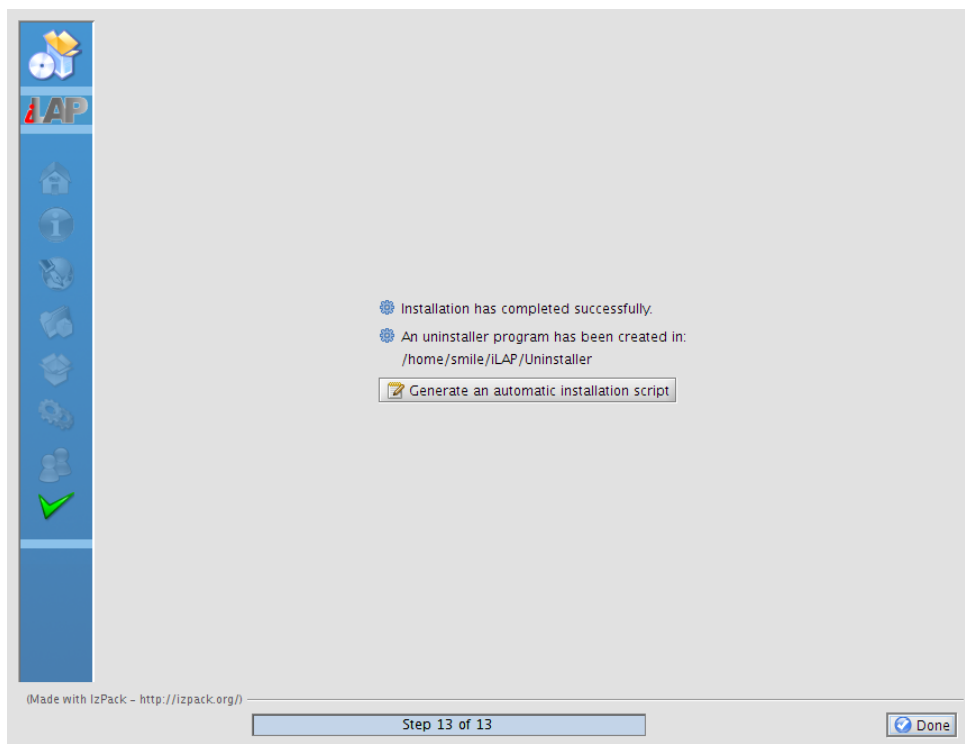
Attention: In general the default values of the installation wizard should be fine and should lead to a working installation of iLAP. If you don't understand the name of the configuration

settings simply leave them as they are.

1.5 Starting iLAP

If you have chosen to install the shortcuts you can start the necessary services for iLAP by clicking at the Shortcuts "GenomeAAS start" and "iLAP start" generated in your system menus. If you want to do it automatically at system startup you have to integrate the following scripts in the boot configuration.

```
Linux/Unix:

    <iLAP Installation Path>/AAS/Genome-AAS/bin/run-usermanagement.sh

    <iLAP Installation Path>/iLAPCore/bin/catalina.sh start
```

If all applications are successfully started the web applications for Genome Usermanagement and iLAP should be accessible under specified ports at localhost. For the default settings the URLs are:

```
    http://localhost:8080/iLAP/

    http://localhost:9080/UsermanagementWeb/
```

Chapter 2

Usermanagement administration

2.1 Genome Usermanagement

The Genome Usermanagement is a stand-alone web application and uses it's own features for it's administration. The web-application can be accessed under:

```
http://localhost:9080/UsermanagementWeb/
```

2.1.1 Login into the usermanagement

In order to administer the users of iLAP login as administrator with:

```
Username: admin
Password: can be specified during the wizard installation
```

Attention: As soon as you are logged in please change the default password of the administrator so that no unauthorized persons can administer your accounts!
In order to allow your users to login into iLAP you have to perform 4 steps:

1. Create once the organizational unit namely "institute" to which your users are belonging to. Most of the time it is the name of your own organization but if you want to subdivide your users in several working groups create them separately.

2. Create the users who should be registered in the usermanagement and assign them to the previously generated institutes.

3. Add the users to the iLAP application

4. Add the users to the group which is allowed to login in iLAP

2.1.2   Creation of an institute within the Genome Usermanagement

An institute can be simply created by clicking first on the institutes menu where create (marked with 1) appears as sub-menu. There you have to fill in the necessary attributes (marked with 2) of your institute and than simply submit the form. After this action in the user creation masks the newly created institute can be selected.
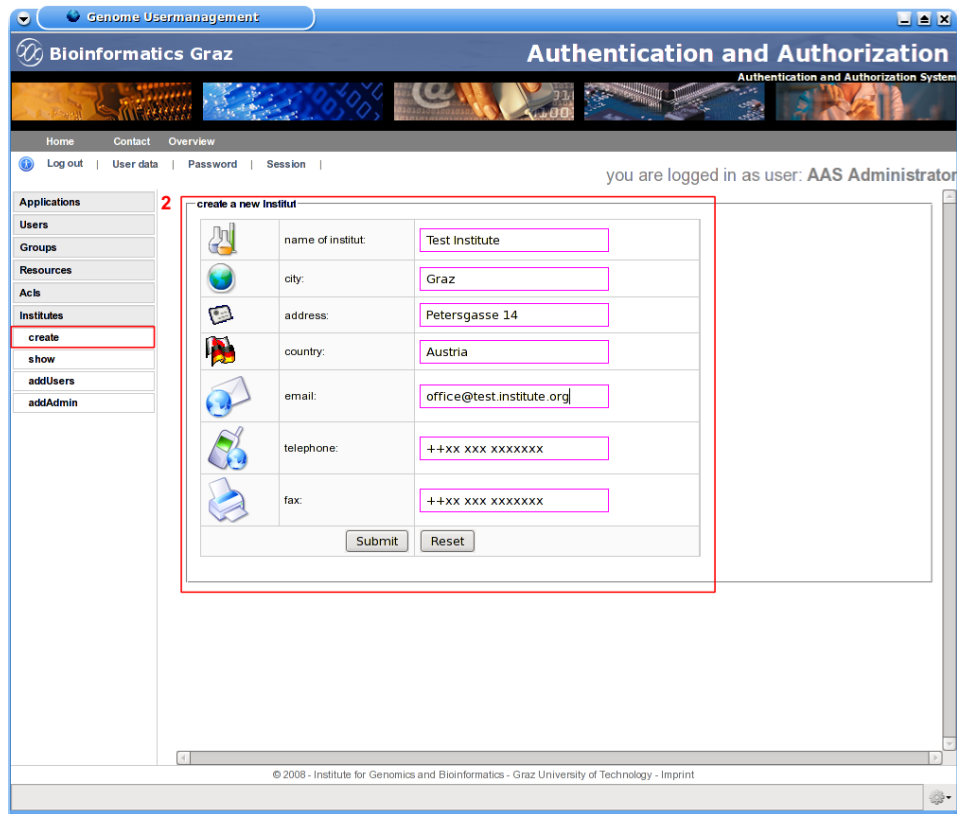
2.1.3   Creation of a user account for iLAP within the Genome Usermanagement

The user can be created on the left-hand menu under "Users" and sub-menu "Create" (marked with 1) where you have to fill in the personal data (marked with 2) as well as select the institute the user is belonging to. This influences also the sharing functionality of projects on user and institutes level. The creation is executed by pressing "Create". In this way the user is known to the usermanagement and can login there for changing the password etc.
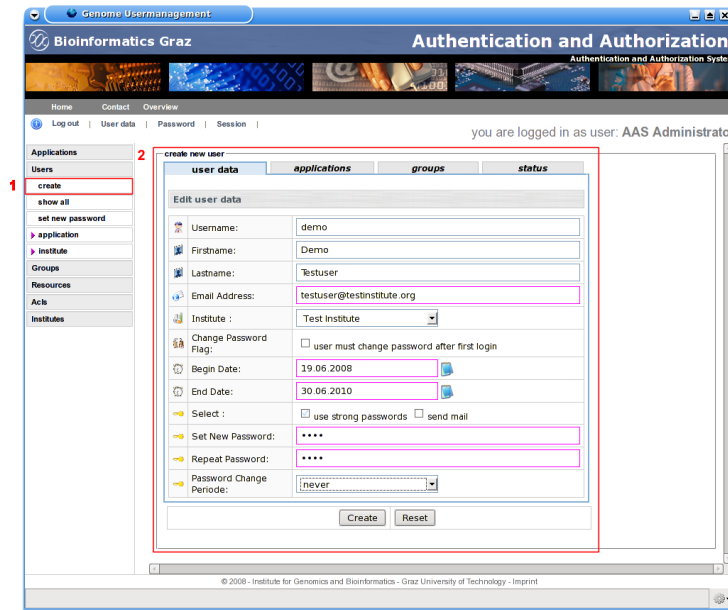
Because with the Genome Usermanagement multiple web applications but also Linux/Windows system authentication and authorization can be managed it is necessary to add the new user to the iLAP application so that the user is also known to iLAP.
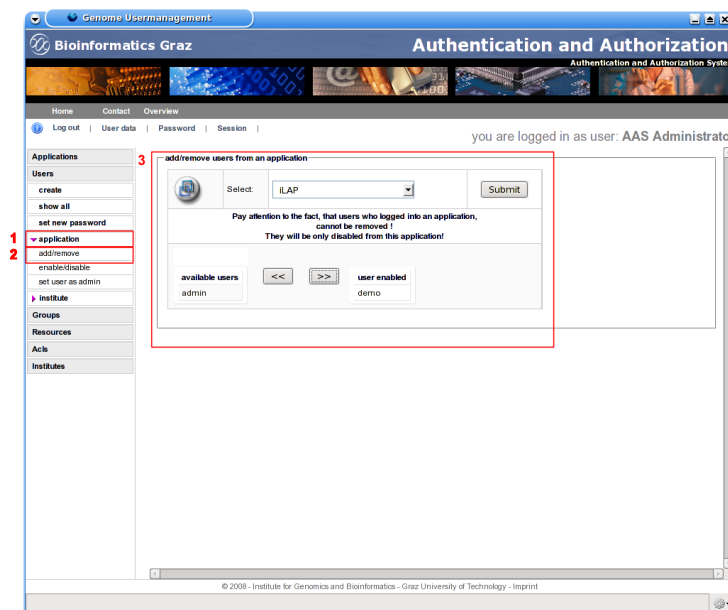
This is depicted in the screen shot above where the user is assigned using the left-hand-menu "Users", sub-menu "Applications" subsub-menu "add/remove". With the there appearing selec-

tion list iLAP can be selected and the users can be assigned to the application. Last but not least the user must get the authorizations within iLAP which is assigned by adding the user to the appropriate ROLE group. The basic role a iLAP user must posses is the ILAP_ROLE_USER.
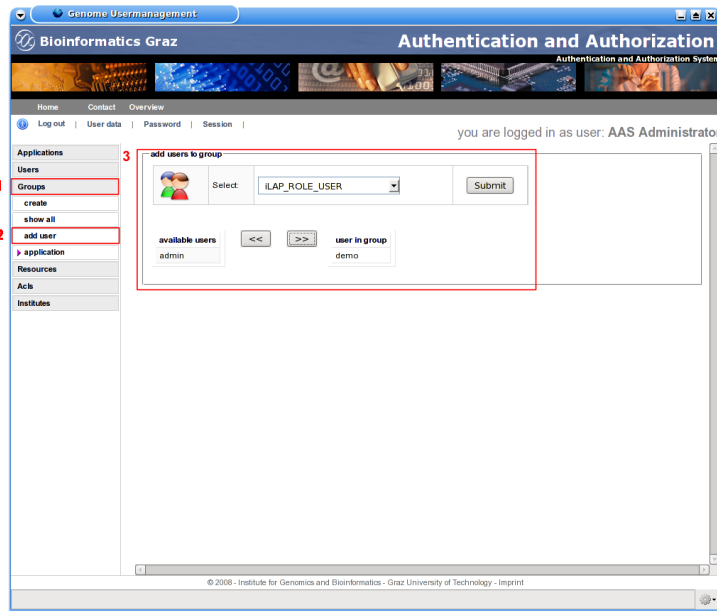
After this 4 steps your users should be able to login and work within iLAP.

2.2   Simple Usermanagement

The Simple Usermanagement is using a simple xml file which can be manipulated either with an interactive command line tool started with:

Linux/Unix:

      <iLAP Installation Path>/AAS/Simple/bin/sum_manager.sh

or by manually editing the xml file:

      <iLAP Installation Path>/AAS/Simple-AAS/etc/users.xml

Chapter 3

Testing iLAP without local installation

3.1 iLAP demo site

If you simply want to get a basic impression about the capabilities of iLAP please visit our demo site under:

```
https://ilapdemo.genome.tugraz.at
```

It will be frequently updated with the latest development version so that you can get an impression in which direction development is going.

3.2 Virtual image for quick iLAP testing

If you want to do some quick test of iLAP in your local environment or if you have a powerful Virtual Server environment than you can simply download the iLAP OVF-image from:

```
http://genome.tugraz.at/iLAP/iLAPdownload.shtml
```

It contains a CentOS 5.3 Linux installation with the complete installation of iLAP including the Genome Usermanagement and it's integration into the Apache mod_proxy front end environment. You simply can connect to the remote ip address using

```
http://your.dynamic.vmwareip.address/iLAP/
```

```
http://your.dynamic.vmwareip.address/UsermanagementWeb/
```

The login data for the image are:

```
System Users:
    root      igb-vmware5
Genome Usermanagement:
    admin     igb-vmware5
    demo      demo
```

Please be patient during boot time because it takes some time to start the web applications.

Chapter 4

FAQs

4.1 How to change the application data path of iLAP manually?

Use the editor of you choice and edit the property data_root_path in the properties file ilap-configuration.properties under the directory:

```
<iLAP Installation Path>/iLAPCore/webapps/iLAP/WEB-INF/classes
```

Attention: Under Windows operating systems the file might look strange. This is because your editor does not support Unix-documents. There the line break characters of the document are different than under windows. Make sure that your editor supports Unix document file format e.g. wordpad.

4.2 How to change the layout of iLAP manually?

Use the editor of you choice and edit the properties file iLAPWebTier.properties under:

```
<iLAP Installation Path>/iLAPCore/webapps/iLAP/WEB-INF
```

Attention: Under Windows operating systems the file might look strange. This is because your editor does not support Unix-documents. There the line break characters of the document are different than under Windows. Make sure that your editor supports Unix document file format e.g. wordpad.

4.3 How to uninstall iLAP?

If you really want to uninstall iLAP you can do this by simply executing the uninstaller.jar file under the <Path to the iLAP installation>/Uninstaller directory.

```
Linux/Unix  : java -jar Uninstaller/uninstaller.jar
Windows     : double click on the uninstaller.jar
```

This removes all files generated during the installations.
Attention: If you force the removal of the base installation directory also all the data files are
gone.

4.4   Under which license is iLAP available?

GNU AFFERO GENERAL PUBLIC LICENSE
Version 3, 19 November 2007

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  The "source code" for a work means the preferred form of the work
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A "Standard Interface" means an interface that either is an official
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Component, and (b) serves only to enable use of the work with that
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implementation is available to the public in source code form. A
"Major Component", in this context, means a major essential component
(kernel, window system, and so on) of the specific operating system
(if any) on which the executable work runs, or a compiler used to
produce the work, or an object code interpreter used to run it.

The "Corresponding Source" for a work in object code form means all
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work) run the object code and to modify the work, including scripts to
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