

Installation and Update Instructions for IUCLID 6 Server



IUCLID 6 is developed by the European Chemicals Agency in association with the OECD



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Changes to this document

Date	Modification
08/05/2024	Corrected a typo in a path in section 3.2. <i>IUCLID 6 Server as a Windows service</i> .
17/04/2024	Updated screenshots for IUCLID 6 Updater Tool v8.0.1.
12/01/2024	Edited the instructions for <i>IUCLID Drive</i> .
30/10/2023	Added instructions for the new feature, <i>IUCLID Drive</i> . Provided a check list for the overall update process. Described changes to the IUCLID 6 Updater Tool in v7.10.1.
22/05/2023	Described changes to the IUCLID 6 Updater Tool v7.0.0. Added instructions on how to reset the password of SuperUser to the default. Edited the section on database connections.
14/04/2023	Edited the description of how to set up <i>Windows as a Service</i> for IUCLID, and what to do on updating IUCLID 6 Server.
03/03/2023	Described changes to the IUCLID 6 Updater Tool v6.27.7. Edited the section on the <i>Data Transfer Tool</i> .
08/02/2023	Improved the descriptions of setting up <i>Derby Network Server</i> and <i>PostgreSQL</i> . Provided more information about the behaviour of the <i>Updater tool</i> .
06/02/2023	Clarified the actions required for <i>Windows as a Service</i> on update. Provided a full example of the settings file required for <i>Derby Network Server</i> .
21/12/2022	For the Updater Tool, clarified where it should be installed, and what is included in the backup it creates.
11/11/2022	Moved description of Data Transfer Tool to a section independent of database type. Fixed numbering of lists.
10/11/2022	IUCLID 6 Updater Tool v6.27.2 released. References to the Java client or “Classic” interface removed.
31/10/2022	Change to Payara 5. Setting of ports moved from the file <i>asenv.bat/asenv.conf</i> to <i>domain.xml</i> . Database configuration of “Derby Embedded with a database server” no longer possible. New Updater Tool not yet available.
04/07/2022	Added configuration to prevent IUCLID 6 Server from performing an HTTP Open Redirect. Added configuration of the server domains allowed by Cross Origin Resource Sharing (CORS). Updated the format of the configuration file for the menu in the top bar.
10/06/2022	Updated the example of the Oracle database connection. Corrected the system requirements, and the launching of the Updater Tool on Linux. Link created to SSO manual.
26/04/2022	Added support for PostgreSQL and a description of the Data Transfer Tool.
19/11/2021	Added configuration of the User password and log in policies.

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26/10/2021	Updated for IUCLID 6 Server v6.2.0. Change to the required configuration for custom ports, e.g. HTTP listener port.
11/05/2021	Added a note about the need to configure IDM on upgrading to IUCLID 6.5.15.0 where a non-default HTTP listener port is used.
28/04/2021	Corrected a command in the section on Configuring SSL on the application server.
13/01/2021	Reviewed and corrected the content in section 5.2. <i>Setting ports to non-default values</i> .
19/11/2020	Name of document changed to include a reference to the IUCLID Updater Tool. Added description of customisation of the top bar in the web interface.
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13/11/2018	Updated the section 3.2 <i>IUCLID 6 Server as a Windows service</i> .
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28/04/2017	Updated values of versions for IUCLID 6 v1.3.0.
31/01/2017	For backing up a Derby database, only vendor documentation should be used. Added more information on adjustment of memory requirements. Added advice on use of built-in JDK with the Migrator and Updater tools. Updated values for IUCLID 6 v1.2.0.
14/10/2016	Added entry to trouble shooting for OutOfMemory . For migration, set the example values of the address of the IUCLID 6 database to be consistent with the screenshot.
30/09/2016	Added location of webstart landing page. Updated values for IUCLID 6 v1.1.0.
21/06/2016	Added new section for the Updater tool.

Date	Modification
	<p>More detail is given on how to verify the results of a migration from IUCLID 5.6 to <i>IUCLID 6</i>.</p> <p>Java 7 is no longer supported by the ECHA Helpdesk for use with IUCLID 6 or any of its helper java applications.</p>
27/05/2016	<p>Added section on backup/restore of the database.</p> <p>Recommended that starting the migrator with a graphical interface is done using the script <code>i5db-ui-migrator.cmd</code>.</p> <p>Corrected and edited the section on SSL.</p> <p>Locking of the <i>User</i> SuperUser.</p> <p>Changed default value of <code>Xmx4096m</code> from 1024 to 4096.</p> <p>Corrected the version of the Derby server to 10.11.1.1.</p> <p>Added entry to trouble shooting for Invalid maximum heap size.</p>
29/04/2016	First version

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1. Introduction

IUCLID 6 Server is available to download free of charge from the IUCLID 6 website. There are two packages: one for Windows, and one for Linux. The packages contain all the necessary software to run *IUCLID 6 Server* on an existing installation of either Windows or Linux. In addition to *IUCLID 6 Server* the packages contain: Payara 5, a database of type Derby (JavaDB), and Java 8 JDK for either Windows or Linux. If required, it is possible to replace those software components with equivalents obtained separately from *IUCLID 6 Server*. See the section *Prerequisites > 2.2 Software* for more details.

The default database in the installation package is already initialised as a IUCLID 6 database. Post-installation configuration is described in section 5, *Configuration of the IUCLID 6 Server*.

2. Prerequisites

2.1. Hardware

IUCLID 6 Server and database software can be installed on the same server machine, or on two separate servers. For separate servers we recommend a 1 gigabit per second network. It is also possible to run the *IUCLID 6 Server* on a cluster of application servers with a load balancer. Clustering the database is implemented via the normal database clustering procedures.

The recommended amount of RAM available on the machines is indicated in the table below. More may be required if there are many simultaneous users, and/or a large database.

There should be at least two cores available for the application server and at least 2 cores for the database server. We recommend the use of fast and reliable server hard drives. Data should be backed-up regularly.

2.1.1. Server

Table 1: Hardware recommendations for small to medium types of server installation with 2 to 10 simultaneous users and less than 1000 Substances

	Characteristic	Value
Application server	CPU/Cores	Dual Core / 3.0 GHz
	Memory	8 GB*
Database server	CPU/Cores	Dual Core / 3.0 GHz
	Memory	4 GB
Network	Topology/Firewall/Proxy	Connection between database and application server (Gigabit wired)

* Note that if the amount of memory available for the application server is less than 8 GB this requirement can be decreased by decreasing the maximum memory allocated to Java. How to do

that is explained in section 5.5 *Set JVM memory options*. For example, if the value of the parameter `Xmx<value>` is decreased from 4 GB to 2 GB, the system requirement for the server is reduced from 8 GB to 6 GB.

Table 2: Hardware recommendations for a large type of server installation with 10s of simultaneous users and more than 1000 Substances

	Characteristic	Value
Application server	CPU/Cores	Cluster of 2 servers, each with 6 CPUs (2.40 GHz)
	Memory	8 GB per server
Database server	CPU/Cores	4 CPUs (2.40 GHz)
	Memory	8 GB
Network	Topology/ Firewall/Proxy	Connection between database and application server (Gigabit wired)

2.2. Software

In the tables below the required software is Java JDK 8, *IUCLID 6 Server*, Payara 5 and a database. *IUCLID 6 Server* comes with a Java database built-in, but for large installations with tens of simultaneous users and thousands of substance datasets, we recommend using either an Oracle or PostgreSQL database.

Releases of *IUCLID 6 Server* after October 2020 have been bundled with Open JDK instead of the Oracle Java SE 8 JDK used before April 2019. This is due to a change that was made in the way Oracle provides support. See the following link for more details

<https://www.oracle.com/technetwork/java/java-se-support-roadmap.html>.

IUCLID 6 Server does not depend on any specific Open JDK 8 distribution, although testing was performed with Red Hat and Azul Zulu Open JDK.

2.2.1. Server

Table 3: Software for small to medium types of server installation with 2 to 10 simultaneous users and less than 1000 Substances

Software	Product	Version	Source
Java	JDK	8	Azul Zulu Open JDK 8 (Supplied with <i>IUCLID 6 Server</i>) https://www.azul.com/downloads/zulu/
			Oracle Java SE 8 JDK http://www.oracle.com/technetwork/java/javase/downloads/index.html

Software	Product	Version	Source
Application server	Payara Server	5	(Supplied with <i>IUCLID 6 Server</i>) https://payara.fish/
IUCLID 6	<i>IUCLID 6 Server</i>	V6.x	http://iuclid6.echa.europa.eu/

Table 4: Software for a large type of server installation with 10s of simultaneous users and more than 1000 Substances

Software	Product	Version	Source
Java	JDK	8	Azul Zulu Open JDK 8 (Supplied with <i>IUCLID 6 Server</i>) https://www.azul.com/downloads/zulu/
			Oracle Java SE 8 JDK http://www.oracle.com/technetwork/java/javase/downloads/index.html
Application server	Payara Server	5	(Supplied with <i>IUCLID 6 Server</i>) https://payara.fish/
Database	Oracle	12c, 19c	https://www.oracle.com/database/index.html
Database driver	Oracle	**	http://www.oracle.com/technetwork/database/features/jdbc/index.html **Download the appropriate JDBC thin driver.
Database	PostgreSQL	12,13	https://www.postgresql.org
IUCLID 6	<i>IUCLID 6 Server</i>	V6.x	https://iuclid6.echa.europa.eu/

3. Installation of *IUCLID 6 Server*

Download the package for *IUCLID 6 Server* from the [IUCLID website](#). The path and name of the directory to which the package is downloaded is referred to in this manual as `<download_dir>`. Move and/or copy the package to the installation directory of *IUCLID 6*. Unzip the downloaded package. This extracts a directory named `iuclid6-server-<version>`, which is referred to in this manual as `<installation_dir>`. It contains the installation folder for Payara, which is referred to in this manual as `<payara_installation>`. Note that *IUCLID 6 Server* was delivered with `<payara_installation>` set to a value of *glassfish4* for reasons of compatibility, but it is now named *Payara 5*.

The server component of *IUCLID 6 Server*, which is deployed in Payara Server, can be started in two different ways, as described in the next two subsections. Before starting *IUCLID 6 Server*, ensure that no applications are running on conflicting ports. The defaults are 8080 and 4848.

Starting a user interface that connects to the server is described in [4.4 The welcome page of *IUCLID 6 Server*](#).

3.1. IUCLID 6 Server started and stopped from a script

IUCLID 6 Server can be started and stopped by running scripts delivered with it, as described in the subsections below. This method is convenient if you do not have administrator rights to the host machine, or you do not want to run *IUCLID 6 Server* as a service in Windows, which is described in the next section, 3.2 *IUCLID 6 Server as a Windows service*.

3.1.1. Starting and stopping IUCLID 6 Server using scripts under Windows

By default, the JDK that is delivered with *IUCLID 6 Server* is used.

The path to the JDK is controlled by the value of the parameter `AS_JAVA`, which is set within the following file:

```
<installation_dir>\payara5\glassfish\config\asenv.bat
```

Under Windows the path to the JDK is relative to the settings file `asenv.bat`. Therefore, to use the JDK that is delivered with IUCLID, the line in the file `asenv.bat` is:

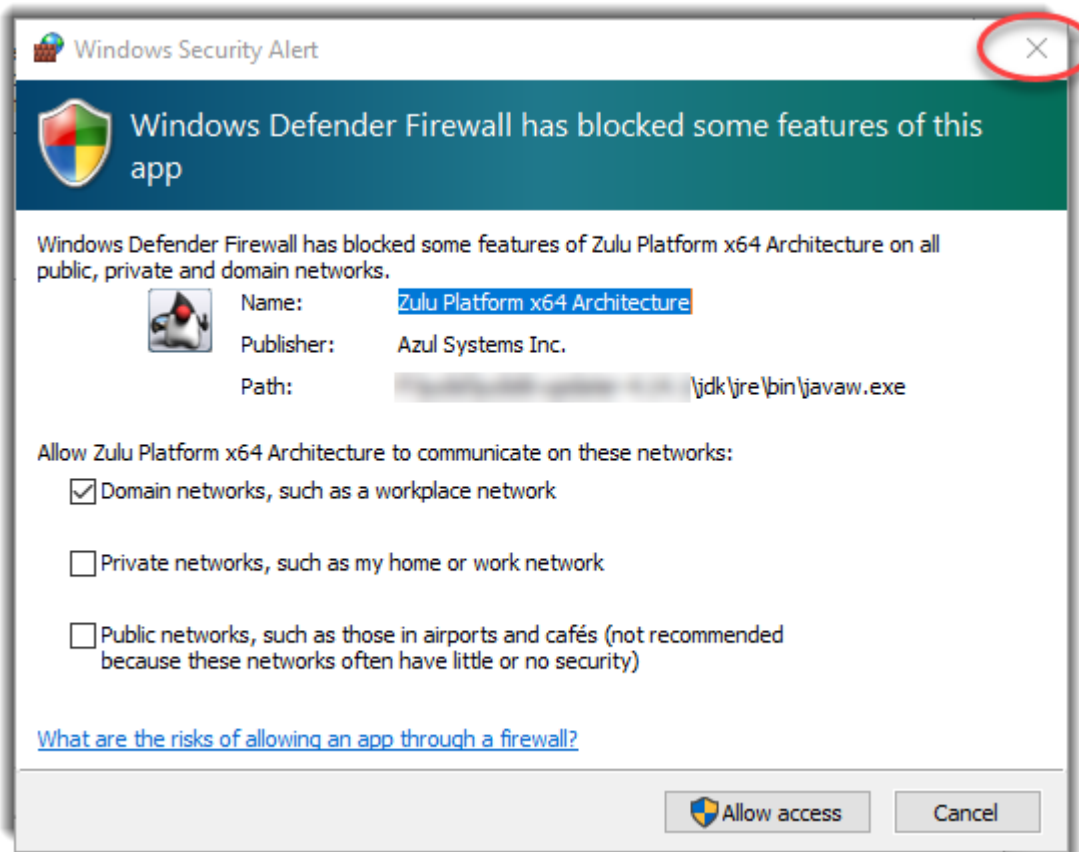
```
set AS_JAVA=..\..\..\jdk
```

If no value is set for the parameter, Windows looks for a path to JDK in the environment variable `PATH`. Alternatively, it is possible to use the absolute path to the JDK.

To start *IUCLID 6 Server*, run the following script.

```
<installation_dir>\start_Iuclid6_server.bat
```

If the following message appears, close it by clicking on the cross at the top right.

Figure 1: Windows Firewall dialogue

If the start script was not run from the command line, a command line window opens. After a few minutes the window closes, although usually the startup process has not yet finished, and can take up to a further 10 minutes.

To stop *IUCLID 6 Server*, run the following script:

```
<installation_dir>\stop_Iuclid6_server.bat
```

For instructions on how to view a graphical user interface of *IUCLID 6 Server*, proceed to section 4 *Check the Payara server from its HTML console*.

3.1.2. Starting and stopping *IUCLID 6 Server* using scripts on Linux

Some scripts need to be set as executable. Do this using the following command:

```
$ chmod +x *.sh
```

To start *IUCLID 6 Server*, run the following script.

```
<installation_dir>/start_Iuclid6_server.sh
```

To stop *IUCLID 6 Server*, run the following script:

```
<installation_dir>/stop_Iuclid6_server.sh
```

3.1.2.1. *The path to JDK*

The path to JDK is controlled using the parameter `AS_JAVA`, within the following file:

```
<installation_dir>/payara5/glassfish/config/asenv.conf
```

The value of `AS_JAVA` that is delivered in the installation package causes the JDK that was delivered with IUCLID to be used. The value is:

```
$AS_INSTALL/../../../../jdk
```

If you need to change the path to JDK consider the following.

1. To set an absolute path to the JDK of your choice, set:

```
AS_JAVA="<absolute path to JDK>"
```

2. To use a system installation of JDK, set:

```
AS_JAVA=""
```

Dependent on the system, it may be necessary to add the path of JDK to the variable `PATH` as follows:

First find JDK using the following command:

```
$ whereis java
```

Then insert the output of the command above into the command below:

```
$ export PATH=<path to JDK>:$PATH
```

Check the value of `PATH` using:

```
$ echo $PATH
```


3.2. IUCLID 6 Server as a Windows service

Stopping and starting, or restarting Windows causes IUCLID 6 Server to shut down, after which it must be restarted manually. However, it can be started automatically by running IUCLID 6 Server as a *Windows service*. To set up the service, carry out the following steps:

1. To create the service, and to run it, an absolute path to Java must be provided in the following file.

```
<payara_installation>\glassfish\config\asenv.bat
```

Edit the value of the parameter `AS_JAVA` to contain the absolute path to JDK. To use the JDK that is delivered with *IUCLID 6 Server* use the line:

```
set AS_JAVA=<installation_dir>\jdk
```

For example

```
set AS_JAVA=C:\Programs\iuclid6-server-6.27.7\jdk
```

2. Create the Windows service using a command from a console that was started using (**right-click**) **Run as Administrator**. The simplest command, which uses default values to create a service with the same name as the Payara domain for the instance of *IUCLID 6 Server* is:

```
<payara_installation>\bin\asadmin create-service domain1
```

This command installs files for the service into the installation of *IUCLID 6 Server*. The files are in a folder named `bin`, as shown below:

```
<installation_dir>\payara5\glassfish\domains\domain1\bin
```

```
domain1Service.exe  
domain1Service.exe.config  
domain1Service.xml  
domain1Service.err.log  
domain1Service.wrapper.log  
domain1Service.out.log
```

For example

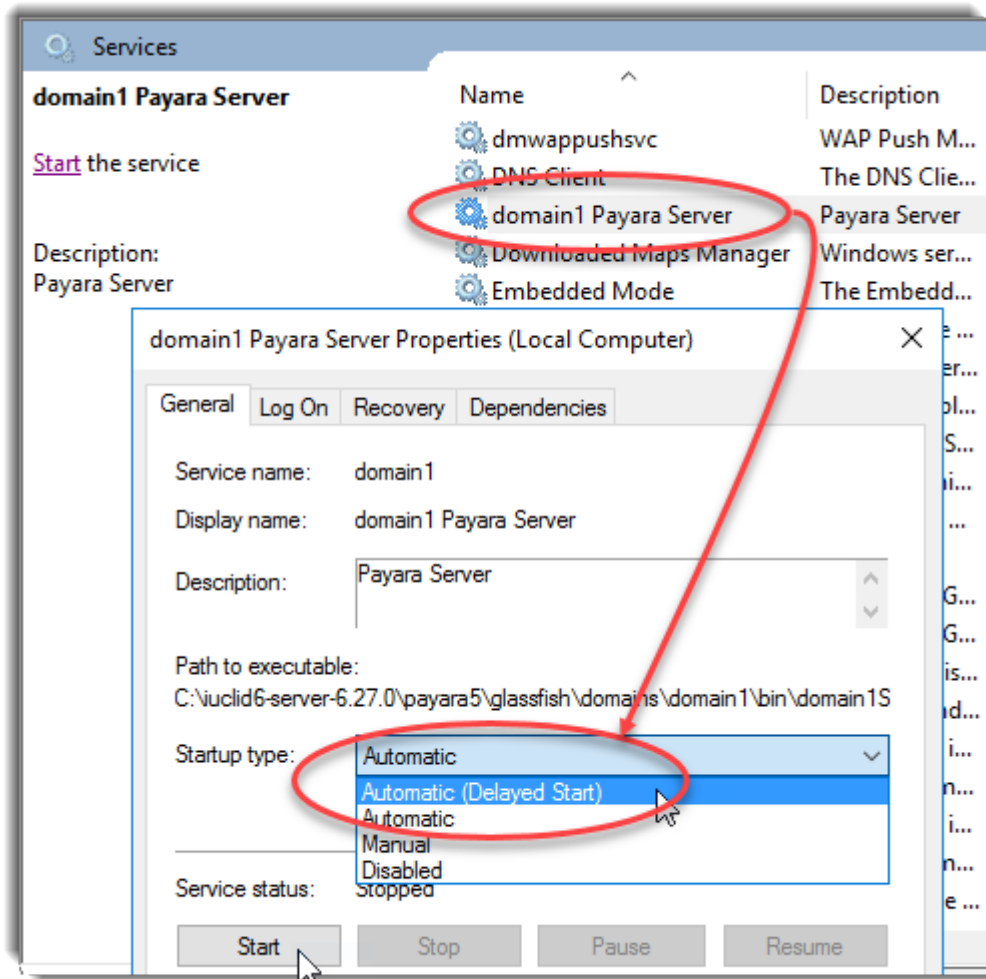
```
C:\iuclid6-server-6.27.7\payara5\glassfish\domains\domain1\bin
```

3. To check and manage the newly created service, open the management window for services in Windows using:
right-click on Start > Computer Management > Services and Applications > Services

It is recommended to set the *Startup Type* of the service to *Delayed Start*. This is set in the

properties of the service which are accessed by right-clicking on the name of the service in the list, as shown in the example below.

Figure 2: Set the Startup type of the Windows service to Automatic (Delayed Start)



4. Once the service has been created correctly, select the service, and then click on *Start the service*.
5. In the figure above, a property of the service named *Path to executable*, is visible. This is the path to `domain1Service.exe`. If the path to `domain1Service.exe` changes, or the service files do not exist, the service cannot find the executable and so the service cannot start. For example, this happens when the *Updater tool v6.27.1* or later is run, because it deletes the `bin` folder. In that case, a simple way to proceed is to delete the old service, and to then create a new one as described above. The command to delete the default *Windows service* is as follows. It is run in an Administrator Windows *Command Prompt* from any directory:

```
$ sc delete domain1
```

Check whether the service has been deleted by running the following command.

```
$ sc query state=all | findstr="*domain1*"
```

If the deletion worked, the command has no output.

4. Check the Payara server from its HTML console

This section describes the steps to check that Payara is running correctly.

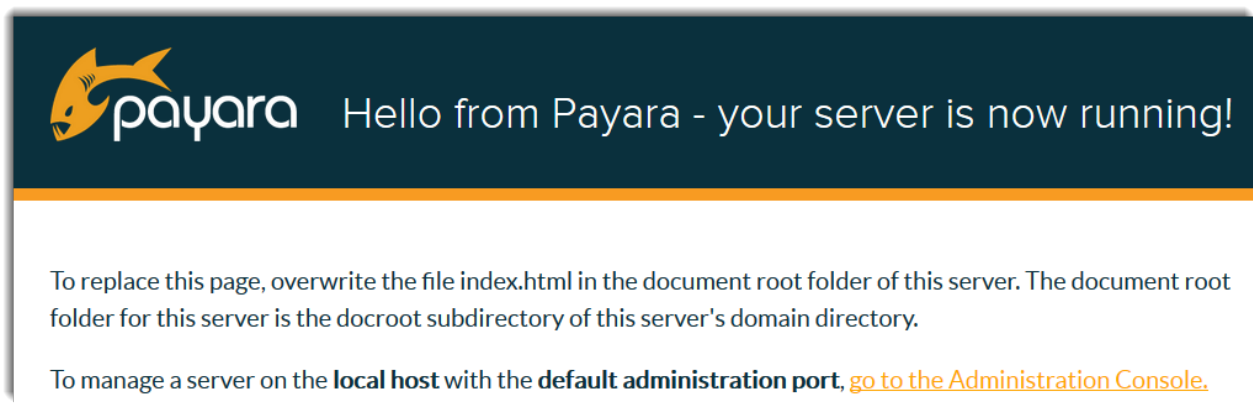
4.1. Payara Welcome page

The address of the Payara welcome page is:

`http://<host>:8080`

If the browser is running on the same machine as Payara, the value of <host> can be set to `localhost`. You should see the following.

Figure 3: Payara Server Welcome page



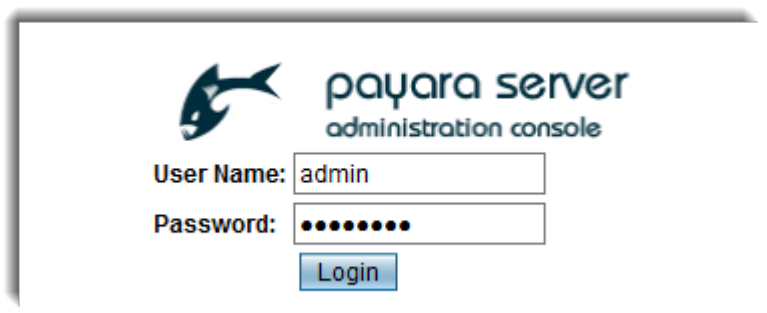
4.2. Payara Administration Console

There is a link to the administration console on the page shown above. The address is:

`http://localhost:4848`

You may need to enter user credentials. The defaults are given below.

Figure 4: Log in page of the Payara Administration Console



Log in using the credentials:

User name = admin

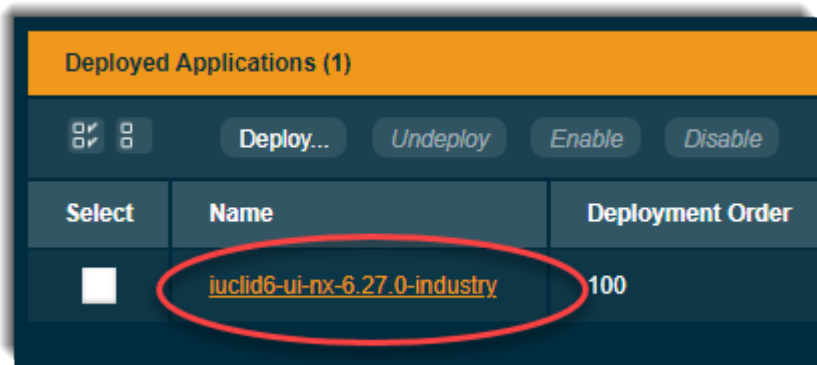
Password = admin123

Figure 5: Payara 5 Administration Console



Select *List Deployed Applications*. IUCLID 6 Server is `iuclid6-ui-nx-<version>-industry`.

Figure 6: IUCLID deployed in Payara Server



If the server is not running, check for errors in the log file shown on start-up:

`<payara_installation>\glassfish\domains\domain1\logs\server.log`

4.3. Check the file server.log

Path to log file:

<payara_installation>\glassfish\domains\domain1\logs\server.log

Expected entry in log file - example:

```
[2022-10-30T23:18:04.355+0200] [Payara 5.2022.2] [INFO] []  
[org.glassfish.osgijavaeebase] [tid: _ThreadID=164 _ThreadName=pool-  
18-thread-1] [timeMillis: 1667164684355] [levelValue: 800] deployed  
bundle eu.echa.iuclid6.war [502] at file:/C:/iuclid/iuclid6-server-  
6.27.0/payara5/glassfish/domains/domain1/osgi-  
cache/felix/bundle411/data/applications/bundle502-1666595449929/
```

4.4. The welcome page of IUCLID 6 Server

The address of the welcome page of *IUCLID 6 Server* is:

http://<host>:8080/webstart

If the browser is running on the same machine as Payara, the value of <host> can be set to `localhost`. Note that the first time *IUCLID 6 Server* is run, it may take several minutes before this page becomes available. The delay should be less for subsequent start-ups. Whilst *IUCLID 6 Server* is starting, the browser gives error 404. If the response remains as 404 for over 15 minutes, check for errors in the following log file:

<payara_installation>\glassfish\domains\domain1\logs\server.log

When *IUCLID 6 Server* has started, the browser displays the following:

Figure 7: The welcome page of IUCLID 6 Server

Unless settings have been changed, *IUCLID 6 Server* is now running using the default values supplied in the *IUCLID 6 Server* download package. The default database is in the directory shown below:

```
<payara_installation>\glassfish\domains\domain1\database
```

For the configuration of a different database, for example Oracle, see section 5.3 *Database installation and initialisation*. Even if the default database is not used, it may be useful to try it out first for testing purposes, and to become familiar with other aspects of the installation.

The next step is to open the user interface to *IUCLID 6 Server* by clicking on the button *Open IUCLID*.

4.4.1. Configuring the welcome page of IUCLID 6 Server

In some cases, it may be convenient to have the page shown above pointing at more than one instance of IUCLID 6. For example, to allow users to choose between separate test and production instances of IUCLID 6. This can be done by editing the HTML that is contained within the file `index.jsp` that is located within the installation of IUCLID 6 in the following archive file:

```
<payara_installation>\glassfish\domains\domain1\iuclid6\iuclid6-war-  
<version>.war
```

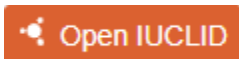
The file is at the top level of the folder structure in the archive. The archive can be opened by various applications, for example *7-Zip*.

4.5. Open the web interface of IUCLID

The address of the user interface of *IUCLID 6 Server* is:

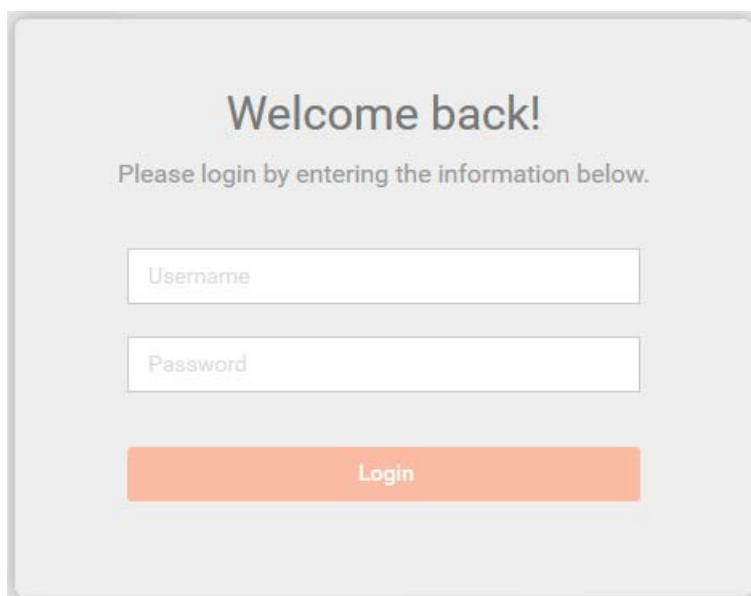
`http://<host>:8080/iuclid6-web/`

To open the interface from the welcome page, click on the button:



This opens the log-in page shown below:

Figure 8: The log-in window of the HTML user interface for *IUCLID 6 Server*

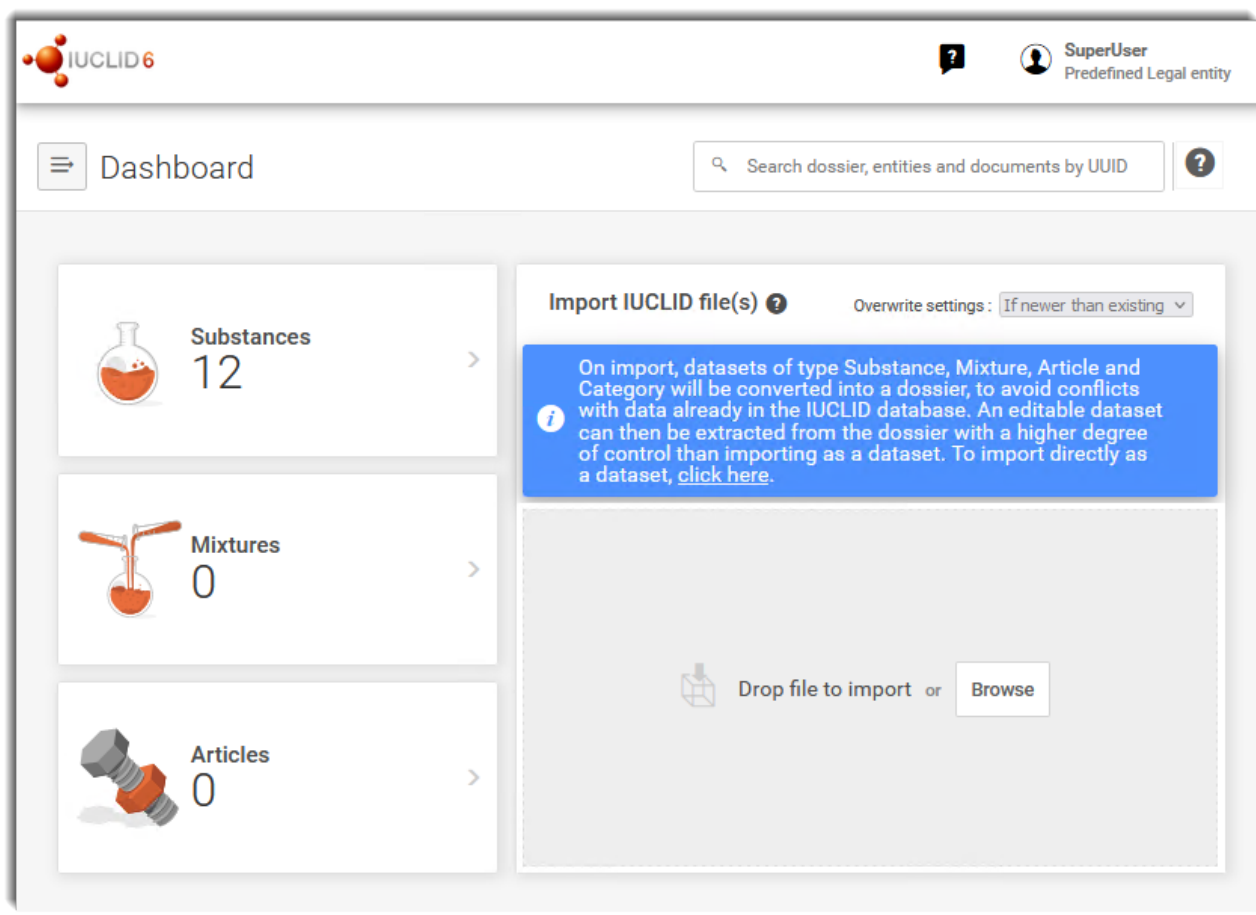
A screenshot of a login window. The window has a light gray background. At the top, it says "Welcome back!" in a large, bold, dark gray font. Below that, it says "Please login by entering the information below." in a smaller, dark gray font. There are two input fields: the first is labeled "Username" and the second is labeled "Password". Both fields are white with a thin gray border. Below the input fields is a large orange button with the word "Login" written in white text in the center.

Log in with the following credentials:

Username=SuperUser

Password=root

On logging in, the HTML interface for IUCLID 6 opens at the *Dashboard* page, as shown below.

Figure 9: The main window of the HTML user interface of IUCLID 6 Server

On starting IUCLID 6 Server, under some circumstances, it is possible to view the web interface before all its components have loaded. One way to tell when all the components have loaded is that the username is visible at the top right of the interface.

5. Configuration of the IUCLID 6 Server

The server side of *IUCLID 6 Server* is configured using the following files:

```
<payara_installation>\glassfish\domains\domain1\config\domain.xml
<payara_installation>\glassfish\domains\domain1\config\
server.settings.properties
```

Some typical changes to the default values that may be required are described below. Any changes to the files above, take effect only on starting the server.

5.1. Setting ports to custom values

To avoid port conflicts, it may be necessary to run IUCLID 6 Server at ports that differ from the default values. For example, the default value for the HTTP listener port is 8080. This port is used to access the web interface. The ports are set in the following configuration file:

```
<payara_installation>\glassfish\domains\domain1\config\domain.xml
```

The ports are set using the following properties which are shown with their default values:

```
<system-property name="ASADMIN_LISTENER_PORT" value="4848"></system-property>
<system-property name="HTTP_LISTENER_PORT" value="8080"></system-property>
<system-property name="HTTPS_LISTENER_PORT" value="8181"></system-property>
<system-property name="JAVA_DEBUGGER_PORT" value="9009"></system-property>
<system-property name="JMX_CONNECTOR_PORT" value="8686"></system-property>
<system-property name="JMS_PROVIDER_PORT" value="7676"></system-property>
```

For example, if the value of `HTTP_LISTENER_PORT` is set to 9080, after restarting IUCLID, the web interface of IUCLID is available at the address given below:

```
http://<host>:9080/iuclid6-web
```

This also works if IUCLID is run as a Windows service, as described in *section 3.2 IUCLID 6 Server as a Windows service*.

5.1.1. Authentication of Users

Prior to the October 2022 release of IUCLID 6 Server values could be entered into the file indicated below:

```
<payara_installation>\glassfish\domains\domain1\config\
idm.connection.properties
```

However, it is now obsolete/deprecated and is going to be removed in a future version. The properties can be configured in the file `domain.xml`, for example:

```
<system-property name="idm.token.s2s.service.endpoint.url" value="iuclid6-idp-
s2s-ws/service/token/"></system-property>
```

5.1.2. Running more than one IUCLID 6 Server application on the same host

Sometimes it may be required to run more than one instance of IUCLID 6 Server on the same host. For example, to compare the functionality of two different versions directly. If you do this, bear in mind the resources required. It is neither recommended nor supported to try running more than one instance of IUCLID 6 Server in the same application server. However, it is possible to run more than one instance of IUCLID 6 Server on the same host in their own application servers, by using different values for ports. For instructions on setting ports, see the section above.

5.2. Database installation and initialisation

IUCLID 6 Server is designed to work with the following types of databases:

Table 5: Types of databases that can be used with IUCLID 6 Server

Type		Comment	Identifier
Derby (JavaDB)	Embedded with no network server	Delivered with IUCLID, default	IUCLID6_Embedded_Derby_Pool
	Network Database Server	Delivered with IUCLID	IUCLID6_External_DerbyPool
PostgreSQL		Available separately	IUCLID6_POSTGRESQL
Oracle		Available separately	IUCLID6_Oracle_Pool

The connection to the database is defined in the following configuration file:

```
<payara_installation>\glassfish\domains\domain1\config\domain.xml
```

IUCLID is delivered with a predefined connection for each of the types of databases in the table above. To use a database other than the default, the definition of the database must be edited to match the real system values. Also, the properties that tell IUCLID which type of database to use must be set to the corresponding identifier, given in the table above. The identifier is entered into parameters in two XML elements of type `jdbc-resource`. The parameters are:

```
jndi-name="jdbc/iuclid6"
```

```
jndi-name="jdbc/iuclid-idp"
```

The default settings are shown below:

```
<jdbc-resource pool-name="IUCLID6_Embedded_DerbyPool"
jndi-name="jdbc/iuclid6"></jdbc-resource>
<jdbc-resource pool-name="IUCLID6_Embedded_DerbyPool"
jndi-name="jdbc/iuclid-idp"></jdbc-resource
```

The configuration of the database connections is described below in a section per type of database. For instructions on *Oracle*, go straight to section 5.3.1 *Oracle*.

There are two ways of setting up the database software *Derby (JavaDB)*, as described in the sections below. For a complete description of *Derby (JavaDB)* and *Derby Network Server*, see the documentation provided by the vendor at:

<https://db.apache.org/derby/manuals/index.html>

5.2.1. Oracle

5.2.1.1. Installation

The installation of an Oracle database is not covered by this document. Please refer to the vendor's documentation.

5.2.1.2. Initialisation

A database user must be created manually before running *IUCLID 6 Server*. All the objects belonging to the user will be created automatically when *IUCLID 6 Server* is first run. Create and configure the user manually as *sysdba* or *system*. Do not place values in quotes. Examples of the commands are given below:

Generally:

```
SQL> create user <database_user> identified by <database_password>;
```

```
SQL> alter user <database_user> default tablespace <tablespace name>  
quota unlimited on <tablespace name>;
```

```
SQL> grant connect to <database_user>;
```

```
SQL> grant resource to <database_user>;
```

The following example corresponds to the example configuration given below in section 5.2.1.5 *Database connection credentials*. Here, a datafile is defined and a constraint is applied to its size. This is useful if there is a known risk of exceeding limited resources.

```
SQL> create tablespace IUCLID6 datafile 'IUCLID6.dbf' size 2G autoextend  
on next 100M maxsize 4G;
```

```
SQL> create user IUCLID6 identified by IUCLID6;
```

```
SQL> grant connect to IUCLID6;
```

```
SQL> grant resource to IUCLID6;
```

```
SQL> alter user IUCLID6 quota unlimited on IUCLID6;
```

5.2.1.3. Database driver

A driver is supplied in the installation package of *IUCLID 6 Server*, as indicated below. By default, there may be no need to change it but bear in mind that it must be the correct JDBC thin driver for Java 8 and for the version of Oracle.

```
<payara_installation>\glassfish\domains\domain1\lib\ojdbc6-<version>.jar
```

5.2.1.4. Database type

The type of database is set in the settings file `domain.xml`, as described above in section 5.2 *Database installation and initialisation*. The identifier for Oracle is *IUCLID6_Oracle_Pool*. An example is given below:

```
<jdbc-resource pool-name="IUCLID6_Oracle_Pool" jndi-name=
"jdbc/iuclid6"></jdbc-resource>
<jdbc-resource pool-name="IUCLID6_Oracle_Pool" jndi-name=
"jdbc/iuclid-idp"></jdbc-resource
```

Warning:

In IUCLID 6 Server version 6.19.0 and earlier, the value was *IUCLID6_OraclePool*, with no underscore between *Oracle* and *Pool*. Progressive updates from such a version result in that value being retained. The absolute value does not matter so long as it is the same as the value used in the settings for the connection, which is described in the next section.

5.2.1.5. Definition of the database connection

The definition of a database connection, set in `domain.xml`, includes its identifier, the type of database, its location, and the authentication settings.

The values are placed in the attributes of elements named `property` that are in the element named `jdbc-connection-pool`. The syntax of the connection string is:

SID:

```
jdbc:oracle:thin:[<user>/<password>]@<host>[:<port>]:<SID>
```

Services:

```
jdbc:oracle:thin:[<user>/<password>]@[//]<host>[:<port>]/<service>
```

TNSNames:

```
jdbc:oracle:thin:[<user>/<password>]@<TNSName>
```

Examples for Oracle

Note the attribute/value pair below of `name="IUCLID6_Oracle_Pool"`.

```
<jdbc-connection-pool max-pool-size="96" driver-classname="" datasource-
classname="oracle.jdbc.xa.client.OracleXADataSource"
name="IUCLID6_Oracle_Pool" description="" res-type="javax.sql.XADataSource">
  <property name="URL"
value="jdbc:oracle:thin:@127.0.0.1:1521:XE"></property>
  <property name="networkProtocol" value="tcp"></property>
  <property name="serverName" value="127.0.0.1"></property>
  <property name="user" value="IUCLID6"></property>
  <property name="password" value="IUCLID6"></property>
</jdbc-connection-pool>
```

Below, the values of the properties are contained within the value of a URL instead of in separate parameters.

```
<jdbc-connection-pool max-pool-size="96" driver-classname="" datasource-
classname="oracle.jdbc.xa.client.OracleXADataSource"
name="IUCLID6_Oracle_Pool" description="" res-type="javax.sql.XADataSource">
```

```
<property name="URL"
value="jdbc:oracle:thin:IUCLID6/IUCLID6@127.0.0.1:1521:XE"></property>
</jdbc-connection-pool>
```

5.2.2. Derby Embedded

IUCLID 6 Server contains an initialised *IUCLID 6* database of type *Derby Embedded* that is fully contained within the following directory:

```
<payara_installation>\glassfish\domains\domain1\database\iuclid6
```

Where the path to the database is required, the value above is used. Bear in mind that with this configuration, only one client can connect to the database at once. For example, this means that if any database client, such as Squirrel, is connected to the database, *IUCLID 6 Server* cannot connect to the database. To connect a database client and *IUCLID 6 Server* to a Derby database at the same time, see the method described in section *Derby Network Server 5.3.4*.

5.2.2.1. Database driver

The driver for *Derby Embedded* is supplied with *Derby Embedded* and therefore you do not have to do anything. For information purposes only, the driver is:

```
<payara_installation>\javadb\lib\derby.jar
```

5.2.2.2. Database type

The type of database is set in the settings file `domain.xml`, as described in section *5.2 Database installation and initialisation*. The identifier for *Embedded Derby* is *IUCLID6_Embedded_Derby_Pool*. An example is given below:

```
<jdbc-resource pool-name="IUCLID6_Embedded_Derby_Pool" jndi-name=
"jdbc/iuclid6"></jdbc-resource>
<jdbc-resource pool-name="IUCLID6_Embedded_Derby_Pool" jndi-name=
"jdbc/iuclid-idp"></jdbc-resource>
```

Warning:

In *IUCLID 6 Server* version 6.19.0 and earlier, the value was *IUCLID6_Embedded_DerbyPool*, with no underscore between *Derby* and *Pool*. Progressive updates from such a version result in that value being retained. The absolute value does not matter so long as it is the same as the value used in the settings for the connection, which is described in the next section.

5.2.2.3. Database connection credentials

The credentials of the database connection are set in the following configuration file:

```
<payara_installation>\glassfish\domains\domain1\config\domain.xml
```

The values for the credentials are placed in the attributes of elements named `property` that are in the element named `jdbc-connection-pool` for the type of database set in section *5.3.2.2* above.

Example for Derby Embedded

Note the attribute/value pair below of `name="IUCLID6_Embedded_Derby_Pool"`.

```
<jdbc-connection-pool driver-classname="" max-pool-size="96" datasource-
classname="org.apache.derby.jdbc.EmbeddedXADataSource40" res-
type="javax.sql.XADataSource" description=""
name="IUCLID6_Embedded_Derby_Pool">
  <property name="User" value="IUCLID6"></property>
  <property name="DatabaseName" value="iuclid6"></property>
  <property name="Password" value="IUCLID6"></property>
  <property name="AttributesAsPassword" value="false"></property>
  <property name="LoginTimeout" value="0"></property>
  <property name="connectionAttributes" value=";create=true"></property>
</jdbc-connection-pool>
```

5.2.3. Derby Network Server

Derby Network Server as opposed to the embedded version of Derby allows the database to be run on a different host from *IUCLID 6 Server*. It also allows the database to be run on the same host as *IUCLID 6 Server*, but in a separate instance of Java.

5.2.3.1. Installation of Derby Network Server

An instance of *Derby Network Server* is included within *IUCLID 6 Server* in the following directory.

```
<payara_installation>\javadb
```

To run *Derby Network Server* and *IUCLID 6 Server* on the same host, but in different instances of Java, use the *Derby Network Server* from the location in which it is delivered.

To run *Derby Network Server* and *IUCLID 6 Server* on different hosts, either copy the instance of *Derby Network Server* to the other host, or make a fresh installation downloaded from the source website. Versions of *Derby Network Server* other than the one delivered with *IUCLID 6 Server* may work, but not all have been tested. For example, 10.11.1.1 works, but version 10.14.2.0 does **not** work.

The instances of the database and *IUCLID 6 Server* are started and stopped separately, using the appropriate scripts. Before starting *IUCLID 6 Server* ensure that it is configured correctly to connect to the database and that *Derby Network Server* is running.

Start, *Derby Network Server* by running the script named `startNetworkServer`, in the appropriate version for the operating system. It is in the folder `<db-derby>\bin`. For example, in Windows:

```
<db-derby>\bin\startNetworkServer.bat
```

By default, *Derby Network Server* listens on port 1527. Remember that *Derby Network Server* requires access to an installation of Java. If not done so already, this can be provided via the environment variables `JAVA_HOME` or `PATH`.

How to configure *IUCLID 6 Server* to connect to a *Derby Network Server* is described in the following sections. The database is created on the first startup of an instance of *IUCLID 6 Server*

that is configured for *Derby Network Server*. The database is fully contained within a directory that has the same name as the database. The default location is:

```
<db-derby>/bin
```

For example, for a database name of *IUCLID6*, by default the database is located within:

```
<db-derby>/bin/IUCLID6
```

5.2.3.2. Database driver

The driver for Derby Network Server is supplied with it, and therefore you do not have to do anything. For information purposes only, the driver is:

```
<db-derby>\lib\derby.jar
```

5.2.3.3. Database type

The database type is set to *Derby Network Server* in the following configuration file:

```
<payara_installation>\glassfish\domains\domain1\config\domain.xml
```

For the elements `jdbc-resource` that have an attribute of `jndi-name` set the values of the attribute `pool-name` as shown below:

```
<jdbc-resource pool-name="IUCLID6_External_DerbyPool" jndi-name="jdbc/iuclid6"></jdbc-resource>
<jdbc-resource pool-name="IUCLID6_External_DerbyPool" jndi-name="jdbc/iuclid-idp"></jdbc-resource>
```

5.2.3.4. Database connection credentials

The credentials of the database connection are set in the following configuration file:

```
<payara_installation>\glassfish\domains\domain1\config\domain.xml
```

The values for the credentials are placed in the attributes of elements named `property` that are in the element named `jdbc-connection-pool` for the type of database set in section 5.3.4.3 above.

Example for Derby Network Server

Note the attribute/value pair below of `name="IUCLID6_External_DerbyPool"`.

```
<jdbc-connection-pool max-pool-size="96" driver-classname="" datasource-classname="org.apache.derby.jdbc.ClientXADataSource40" name="IUCLID6_External_DerbyPool" description="" resource-type="javax.sql.XADataSource">
  <property name="User" value="IUCLID6"></property>
  <property name="DatabaseName" value="IUCLID6_6_27_2"></property>
  <property name="RetrieveMessageText" value="true"></property>
  <property name="Password" value="IUCLID6"></property>
```

```
<property name="Ssl" value="off"></property>
<property name="ServerName" value="localhost"></property>
<property name="SecurityMechanism" value="4"></property>
<property name="ConnectionAttributes" value=";create=true"></property>
<property name="TraceFileAppend" value="false"></property>
<property name="TraceLevel" value="-1"></property>
<property name="PortNumber" value="1527"></property>
<property name="LoginTimeout" value="0"></property>
</jdbc-connection-pool>
```


5.2.4. PostgreSQL

Consider using PostgreSQL for large databases where you want to use database software that is free of charge. A PostgreSQL database can be run on either the same host as *IUCLID 6 Server*, or on a different host. How to configure *IUCLID 6 Server* to connect to a PostgreSQL database is described in the following sections.

5.2.4.1. Installation of PostgreSQL

To obtain an instance of the *PostgreSQL* database software, download the software from the [vendor](#), and then install it according to their instructions. An installation wizard is provided. The versions supported for *IUCLID 6* are stated [here](#). Whilst installing, make a note of the administrator password. Also, if *PostgreSQL* is run at a port that differs from the default (5432), make a note of it because it must be changed in the configuration of *IUCLID 6 Server*, described in sections that follow.

Caveat

The default configuration of PostgreSQL does not work with *IUCLID*. It is essential to set the configuration parameter *max_prepared_transactions* to a non-zero value. A typical value is 200. The parameter is set in the file with the following default location:

```
C:\Program Files\PostgreSQL\12\data\postgresql.conf
```

Example

```
max_prepared_transactions = 200
```

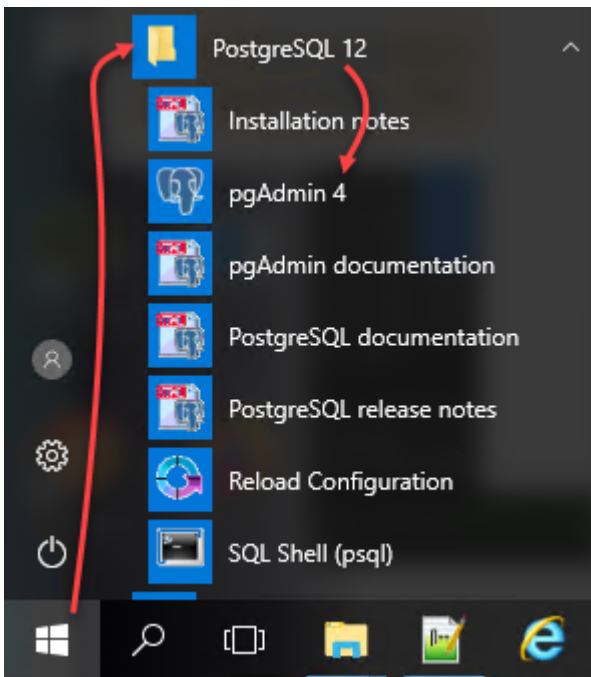
The default configuration of PostgreSQL is deliberately set to use a minimal quantity of resources. To learn how to configure the database to suit your needs, consult the documentation of PostgreSQL. For example, you may want to increase the memory that is allocated to the database by setting a larger value for the parameter *shared_buffers*.

Example

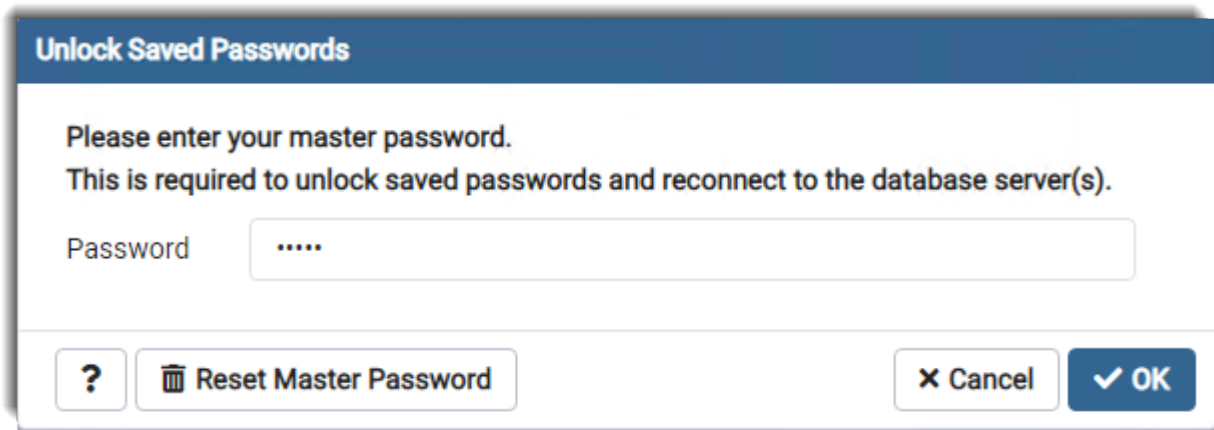
```
shared_buffers = 512MB
```

5.2.4.2. Initialisation of PostgreSQL

An empty database must be created manually before running *IUCLID 6 Server*. The required objects in the database will be created automatically when *IUCLID 6 Server* is first run. This can be done using *pgAdmin 4* which is a graphical tool that comes with PostgreSQL. In Windows, *pgAdmin 4* can be opened from the *Start* menu as shown below.

Figure 10: Start pgAdmin 4 in Windows

Log in to *pgAdmin 4* using the password what was entered during installation of PostgreSQL.

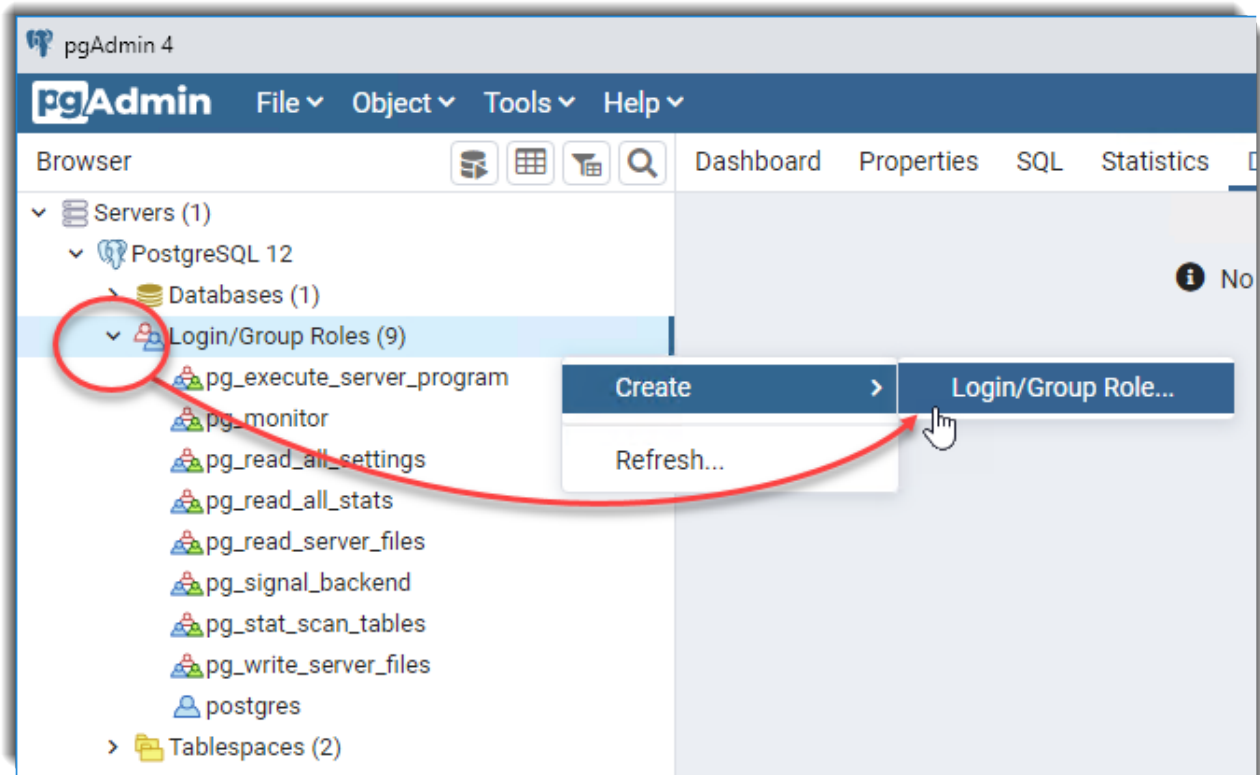
Figure 11: Log in to pgAdmin 4

In the table of contents on the left, open *Login/Group Role* by clicking on the arrows:

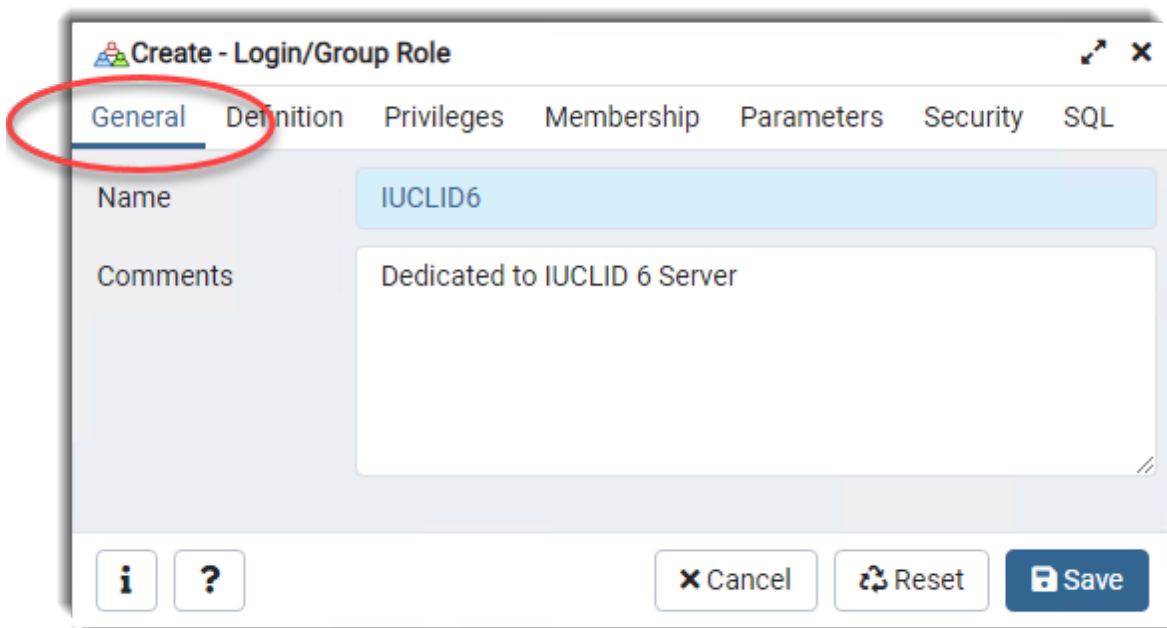
Servers > PostgreSQL 12 > Databases

Various *Login/Group Roles* are provided by default. Create one dedicated to IUCLID. Right-click in the header of *Login/Group Roles* and then select:

Create > Login/Group Role...

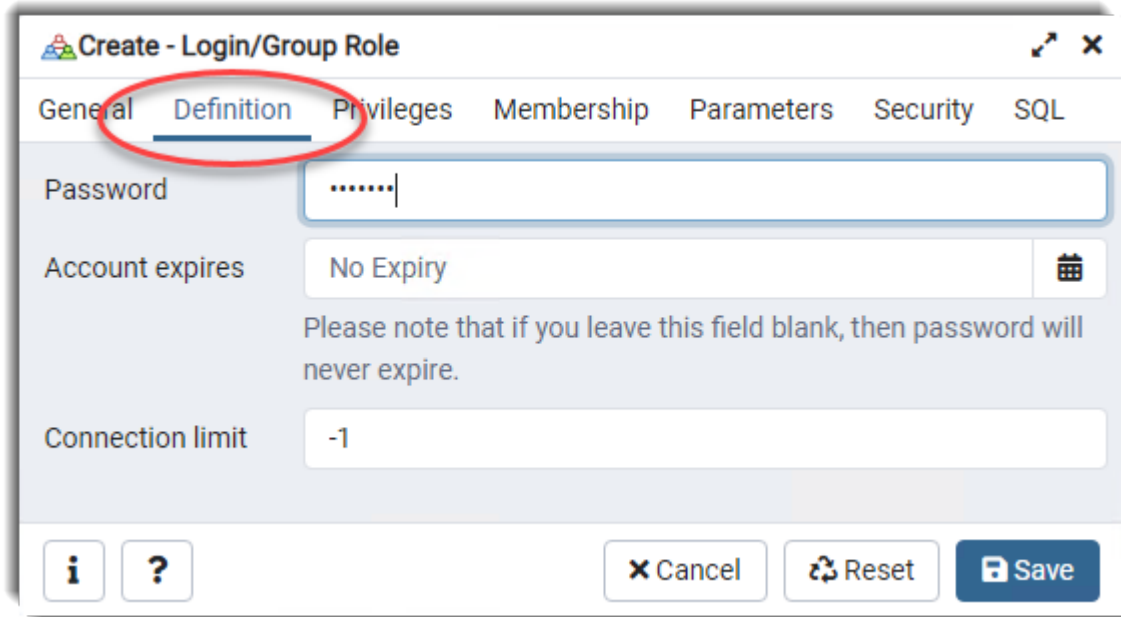
Figure 12: Create a Login/Group Role

This opens a set of menus that allow a *Login/Group Role* to be configured. Enter a name. In the example below it is IUCLID6. Make a note of this because later it will be entered into the IUCLID configuration file `domain.xml`.

Figure 13: Name the Login/Group Role

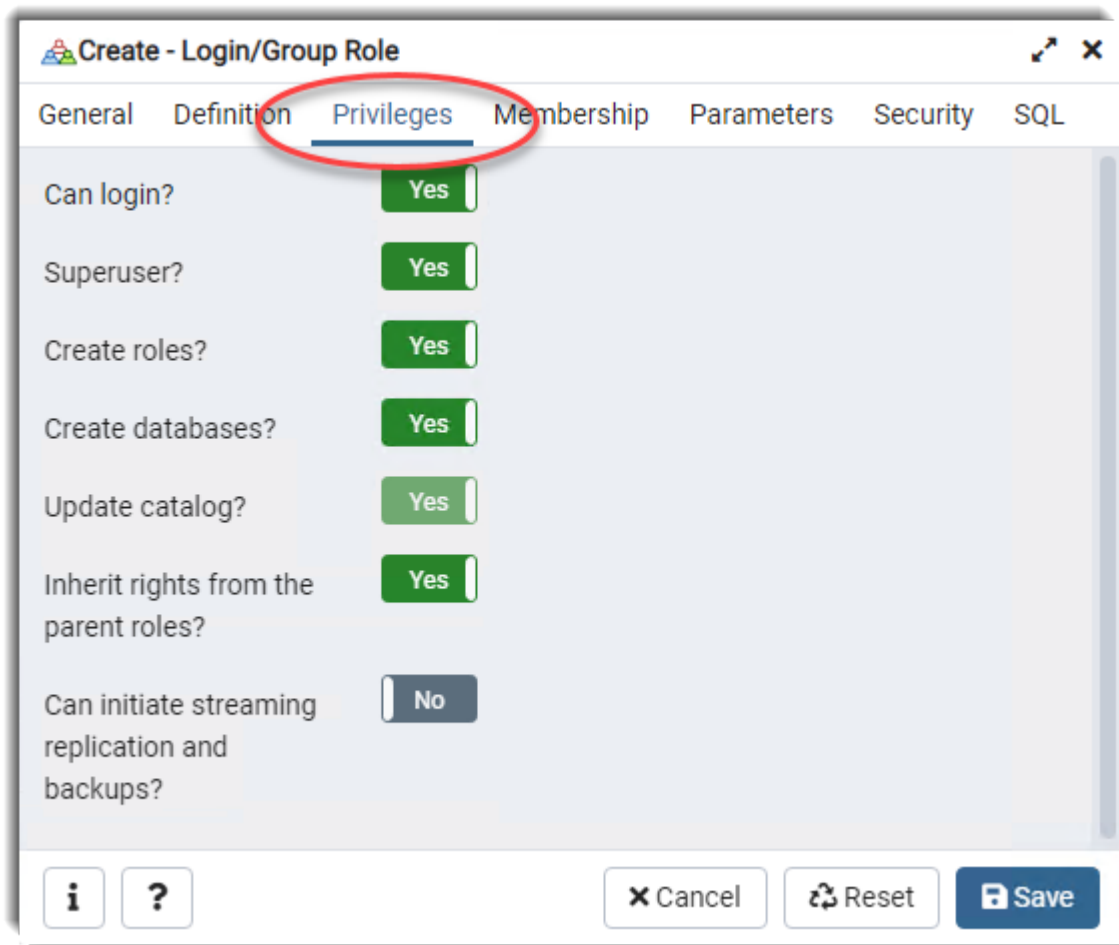
Click on the tab *Definition*. Enter a password. Make a note of this because later it will be entered into the IUCLID configuration file `domain.xml`.

Figure 14: Set a password for the Login/Group Role

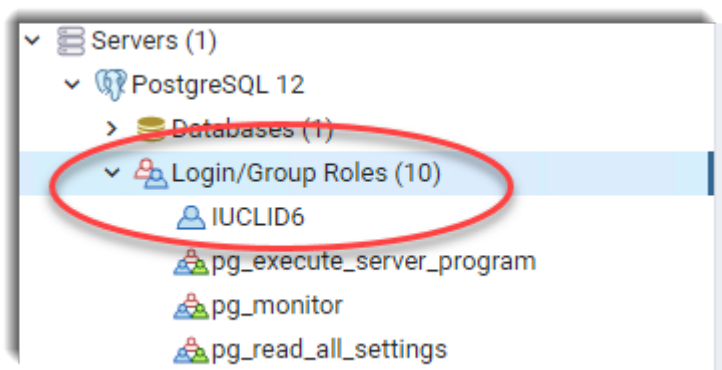


The screenshot shows a dialog box titled "Create - Login/Group Role". It has several tabs: "General", "Definition", "Privileges", "Membership", "Parameters", "Security", and "SQL". The "Definition" tab is selected and circled in red. Below the tabs, there are three main input fields: "Password" (containing six dots), "Account expires" (set to "No Expiry" with a calendar icon), and "Connection limit" (set to "-1"). Below these fields, there is a note: "Please note that if you leave this field blank, then password will never expire." At the bottom of the dialog, there are three buttons: "Cancel", "Reset", and "Save".

Click on the tab *Privileges*. Set the privileges of the *Login/Group Role* to be at least those shown in the figure below.

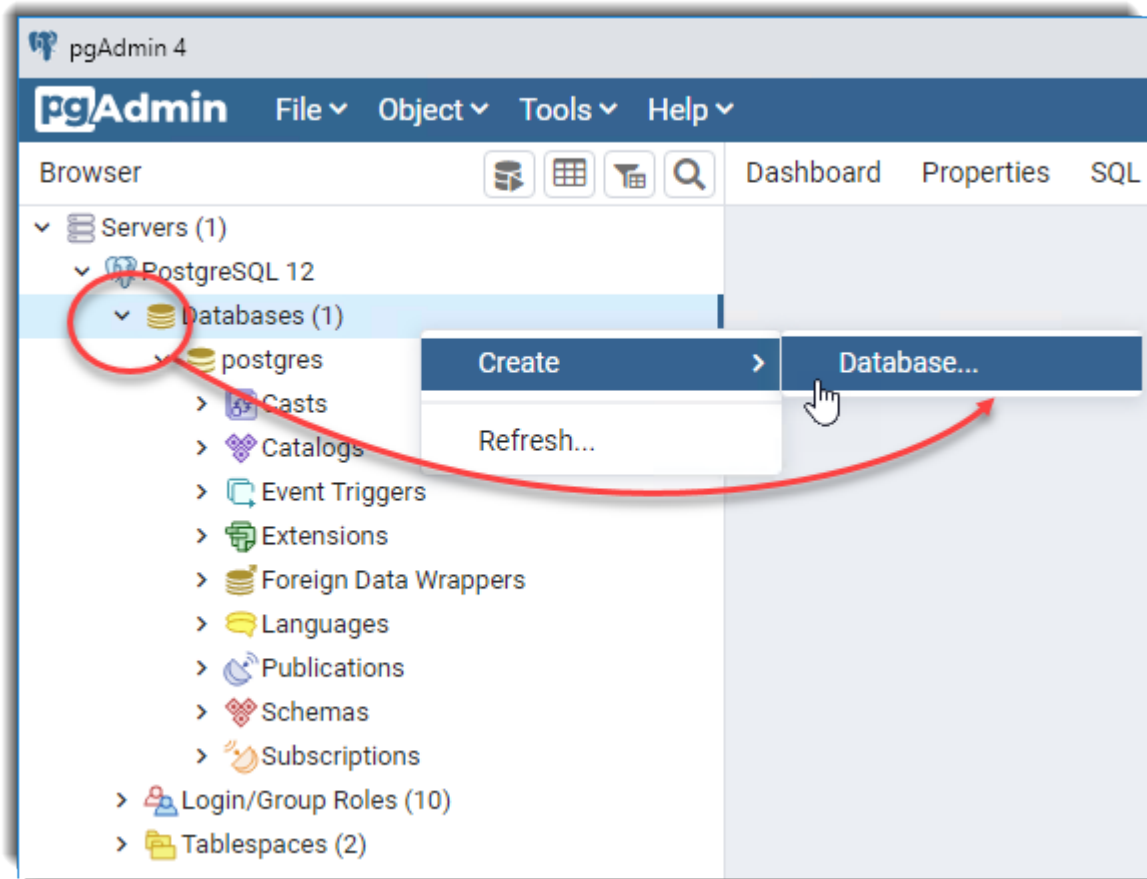
Figure 15: Set the privileges of the Login/Group Role

Click **Save** . Check that the *Login/Group Role* is present in the contents, as shown below.

Figure 16: The Login/Group Role for IUCLID 6 Server

Next, proceed with the creation of a database. In the table of contents on the left, open *Databases* by clicking in the header for that section. A database named `postgres` is present by default. Create one dedicated to IUCLID. Right-click in the header of *Databases*, and then select:

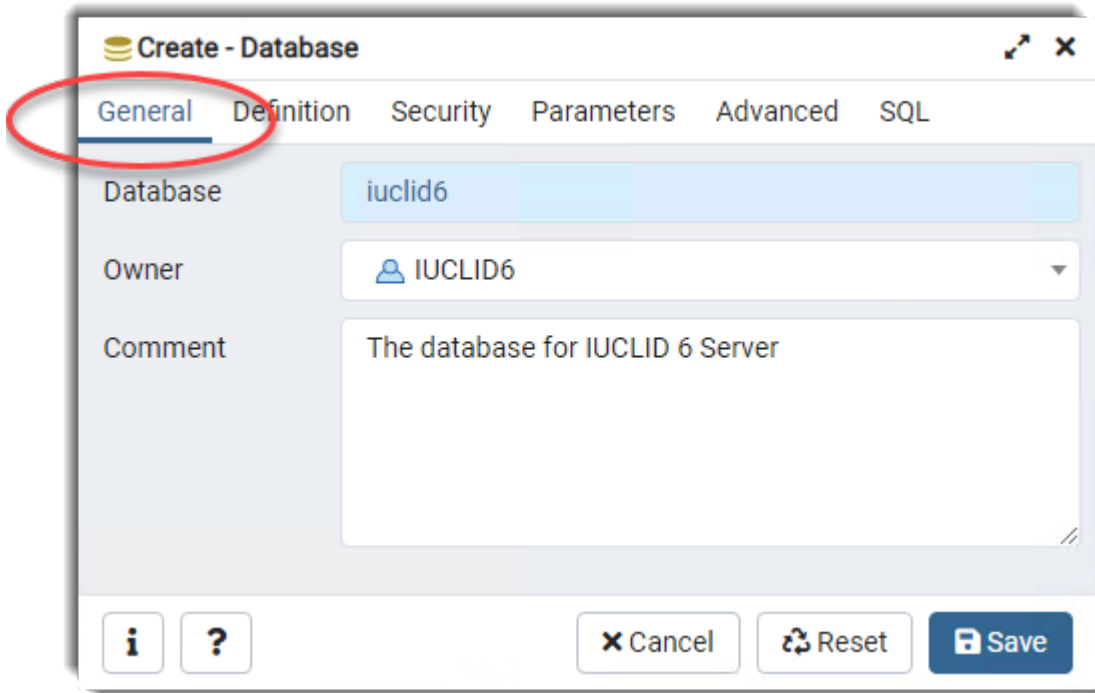
Create > Database...



This opens a set of menus that allow a *Database* to be configured. Enter a name. Make a note of this because later it will be entered into the IUCLID configuration file `domain.xml`.

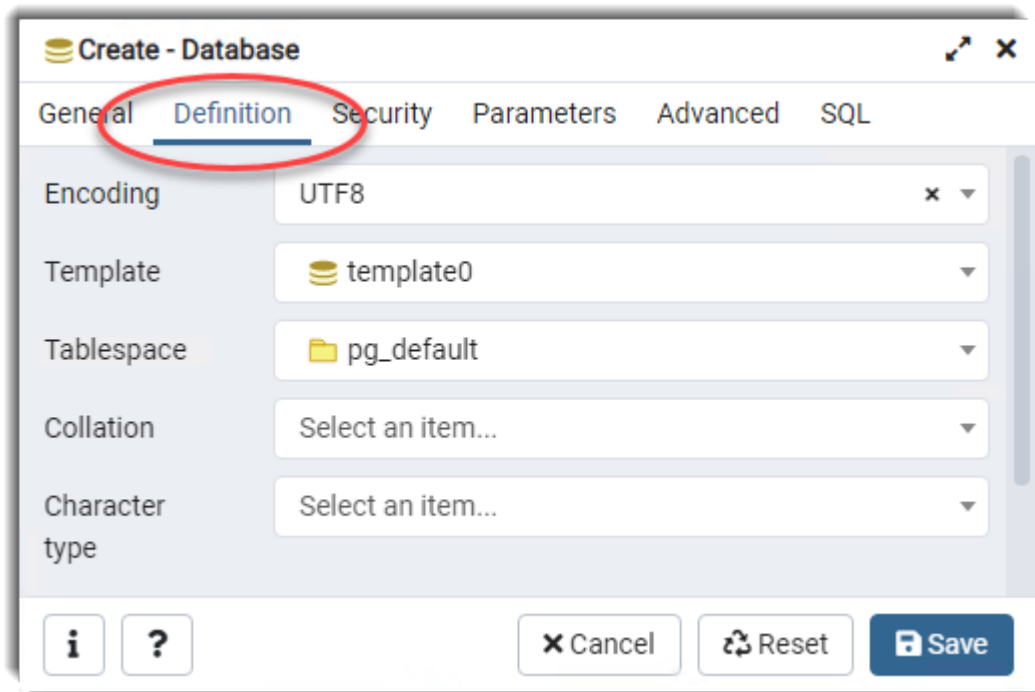
In the example below it is `iuclid6`.

Figure 17: Name the database



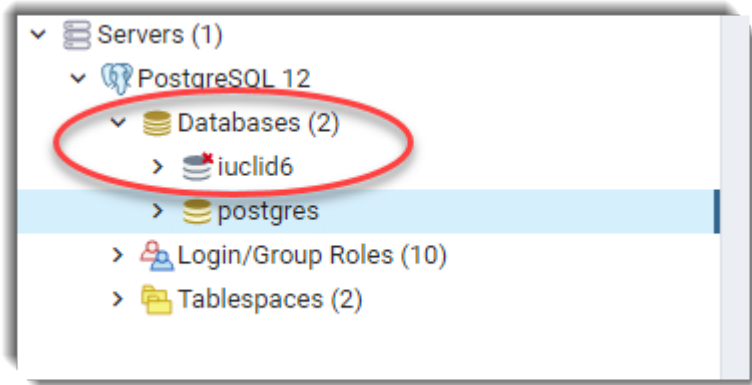
Click on the tab *Definition*. Enter the values shown below.

Figure 18: Set values in the definition of the database



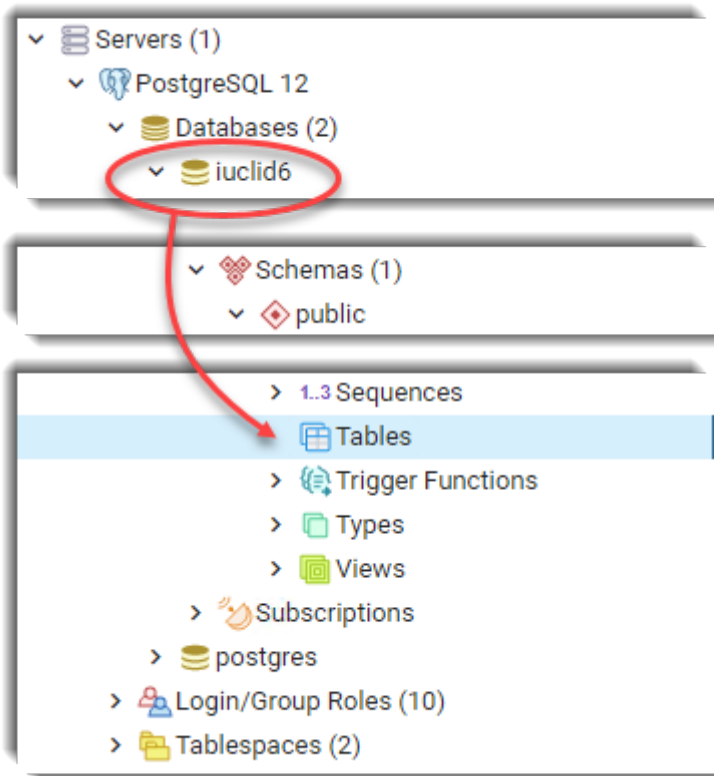
Click *Save*. Check that the *Database* is present in the contents, as shown below.

Figure 19: Newly created database is not connected



When a database has just been created, it is not connected, hence the red cross icon. To connect to the database, click in its name in the contents. Initially, the database is empty, which can be seen from the lack of entries under *Tables*.

Figure 20: Newly created empty database



After running *IUCLID 6 Server*, or the *Data Transfer Tool*, there are entries under *Tables*. The *Data Transfer Tool* is described in the next section.

5.2.4.3. Database driver

The driver is supplied in the installation package of *IUCLID 6 Server*, as indicated below. By default, there should be no need to change it, but bear in mind that it must be the correct driver for the version of PostgreSQL.

```
<payara_installation>\glassfish\domains\domain1\lib\postgresql-
<version>.jar
```

5.2.4.4. Database type

The database type is set to *PostgreSQL* in the following configuration file:

```
<payara_installation>\glassfish\domains\domain1\config\domain.xml
```

For the elements `jdbc-resource` that have an attribute of `jndi-name` set the values of the attribute `pool-name` as shown below:

```
<jdbc-resource pool-name="IUCLID6_POSTGRESQL" jndi-name=
"jdbc/iuclid6"></jdbc-resource>
<jdbc-resource pool-name="IUCLID6_POSTGRESQL" jndi-name=
"jdbc/iuclid-idp"></jdbc-resource>
```

5.2.4.5. Database connection credentials

The credentials of the database connection are set in the following configuration file:

```
<payara_installation>\glassfish\domains\domain1\config\domain.xml
```

The values for the credentials are placed in the attributes of elements named `property` that are in the element named `jdbc-connection-pool`.

Example for PostgreSQL

Note the attribute/value pairs below, where `name="IUCLID6_POSTGRESQL"`. Check the url and port number.

```
<jdbc-connection-pool datasource-
classname="org.postgresql.xa.PGXADDataSource" name="IUCLID6_POSTGRESQL" res-
type="javax.sql.XADataSource">
  <property name="url"
value="jdbc:postgresql://127.0.0.1:5432/iuclid6"></property>
  <property name="user" value="IUCLID6"></property>
  <property name="password" value="iuclid6"></property>
</jdbc-connection-pool>
```

5.2.5. Changing the type of database - Data Transfer Tool

The *Data Transfer Tool* was created to allow the type of database of IUCLID 6 Server to be changed, for example from Oracle to PostgreSQL. The *Data Transfer Tool* copies all the data from a source database to an empty target database. It is not possible to copy only a selection of data.

There can be changes in the database in any release of IUCLID, so it is recommended to use the version of the tool that is the same as the version of the source database, e.g. 6.27.7.

Transfer to *PostgreSQL* is supported, from the following types of database: *Embedded Derby*, *Derby Network Server* and *Oracle*. Transfer from *Oracle* to *Embedded Derby* has been tested and shown to work for IUCLID 6 v6.27.7.

If the source database is *Embedded Derby*, or *Derby Network Server* installed within the installation of IUCLID 6 Server, it is essential to stop IUCLID 6 Server before running the tool. For other types of sources, it is recommended.

The tool connects simultaneously to the source and target databases, and executes the following steps:

1. Checks that the source IUCLID database is in a IUCLID version that the tool supports;
2. Checks that the target database contains no data;
3. Creates the database objects in the target database;
4. Copies the data from the source to the target;
5. Compares the source and target databases, and then reports any differences in an HTML file.

The tool is available on the download page of the IUCLID website, in the package named:

`iuclid6-data-transfer-<version>.zip`

The tool is a Java executable, so Java must be accessible. The tool has command line options that can be set by entering them into a configuration file, and then running the tool from a script appropriate for the operating system.

Windows:

`iuclid6-data-transfer.bat`

Linux:

`iuclid6-data-transfer.sh`

The configuration file is `connections.config`, which contains the parameters described below.

Table 6: Parameters of the Data Transfer Tool

<code>-h, --help</code>	show help file and exit.
<code>-q</code>	quiet, output only errors
<code>--report-file</code>	the file to write the report to
<code>--source-jdbc-url</code>	the jdbc url to the source database
<code>--source-password</code>	the password for the source database, mutually exclusive with <code>source-passwordfile</code>

<code>--source-passwordfile</code>	the file containing the password for the source database, mutually exclusive with <code>source-password</code>
<code>--source-user</code>	the user for the source database
<code>--target-jdbc-url</code>	the jdbc url to the target database
<code>--target-password</code>	the password for the target database, mutually exclusive with <code>target-passwordfile</code>
<code>--target-passwordfile</code>	the file containing the password for the target database, mutually exclusive with <code>target-password</code>
<code>--target-user</code>	the user for the target database
<code>-v</code>	output debug messages
<code>-V, --version</code>	Print version information and exit.

Example configuration: Oracle source

```
# url for source database
--source-jdbc-url=jdbc:oracle:thin:@//oracle.my-company.com:1521:XE
# username for connecting to the source database
--source-user=ora_iuclid6
# password for connecting to the source database
--source-password=ora_iuclid6

# url for target database, for oracle and postgres the schema must exist
--target-jdbc-url=jdbc:postgresql://postgres.my-company.com:5432/iuclid6
# username for connecting to the source database
--target-user=IUCLID6
# password for connecting to the source database
--target-password=IUCLID6

# the file to write the verification report
--report-file=./report.html
```

Example configuration: Embedded Derby source

```
# url for source database
--source-jdbc-url=jdbc:derby:C:/iuclid6-server-6.27.2/payara5/glassfish/domains/domain1/database/iuclid6
# username for connecting to the source database
--source-user=IUCLID6
# password for connecting to the source database
--source-password=IUCLID6
```

```
# url for target database, for oracle and postgres the schema must exist
--target-jdbc-url=jdbc:postgresql://postgres.my-company.com:5432/iuclid6
# username for connecting to the source database
--target-user=IUCLID6
# password for connecting to the source database
--target-password=IUCLID6

# the file to write the verification report
--report-file=./report.html
```

The database connection details for the source database are in the installation of IUCLID in the following settings file:

```
<payara_installation>\glassfish\domains\domain1\config\domain.xml
```

Example database settings in domain.xml for Oracle

Note the attribute/value pair below of name="IUCLID6_OraclePool".

```
<jdbc-connection-pool max-pool-size="96" driver-classname="" datasource-
classname="oracle.jdbc.xa.client.OracleXADataSource"
name="IUCLID6_OraclePool" description="" res-type="javax.sql.XADataSource">
  <property name="URL"
value="jdbc:oracle:thin:@127.0.0.1:1521:XE"></property>
  <property name="networkProtocol" value="tcp"></property>
  <property name="serverName" value="127.0.0.1"></property>
  <property name="user" value="ora_iuclid6"></property>
  <property name="password" value="ora_iuclid6"></property>
</jdbc-connection-pool>
```

5.3. Set temporary directory

This feature allows a directory to be set to which attachments and imports are stored temporarily before they are added to the database. If the addition to the database is successful, the file is deleted from the directory. If the addition to the database fails for some reason, the file remains in this directory. Such files are not automatically deleted by *IUCLID 6 Server*. Therefore, it is recommended that this folder is emptied on a regular basis.

The directory is indicated by the value of the parameter:

```
environments.attachments.temp.dir:
```

in the following settings file:

```
<payara_installation>\glassfish\domains\domain1\config\server.settings
.properties
```

The directory must be writeable by the server. Ensure that the value of the path conforms to the formatting requirements of the operating system. Under Microsoft Windows, use escaped backslash (\\) delimiters between the nodes in the path, for example:

```
<machine>\\temp\\iuclid6
```

5.4. Set JVM memory options

The memory settings for the server can be set in the file:

```
<payara_installation>\glassfish\domains\domain1\config\domain.xml
```

Within the section:

```
<configs>/<config name="server-config">/<java-config>;
```

in the line:

```
<jvm-options>-Xmx4096m</jvm-options>
```

An example showing the context is given below:

```
<java-config classpath-suffix="" system-classpath="">
  <jvm-options>-XX:PermSize=64m</jvm-options>
  <jvm-options>-XX:MaxPermSize=192m</jvm-options>
  <jvm-options>-Xmx4096m</jvm-options>
```

Be aware that a value of less than 4096m can cause problems during the importation of data.

In the file `domain.xml` there is an alternative instance of the parameter `Xmx` to the one shown above, but it is in a different context, and has no effect. Its context is:

```
<jvm-options>-XX:NewRatio=2</jvm-options>
<jvm-options>-Xmx512m</jvm-options>
```

5.5. Configuring SSL on the application server

IUCLID 6 Server is delivered such that SSL can be used for the connection between the server and the interface without the need for additional configuration. However, it is supplied with a self-signed certificate that causes browsers to give security warnings. To avoid such warnings, an appropriate certificate must be installed, as described below. It is recommended that SSL be used because, for example, without it, user authentication details are not encrypted during transit when a User logs in.

By default, Payara handles both secure (HTTPS) and unsecure connections (HTTP). The ports are 8181 and 8080 respectively. If unsecure HTTP is not allowed, the relevant listener on port 8080 may be disabled.

The self-signed certificate that is delivered with *IUCLID 6 Server* is generated by Payara, and installed in the following file:

```
<payara_installation>\glassfish\domains\domain1\config\keystore.jks
```

To install a trusted certificate that does not cause browsers to issue security warnings, follow the procedure described below.

Handling the keystore can be done either via the command line using the command `keytool`, which is part of the JDK, or via a graphical tool such as Portecle.

Detailed instructions for the command `keytool` can be found on the Oracle documentation page at the link below:

<http://docs.oracle.com/javase/8/docs/technotes/tools/windows/keytool.html>

The graphical tool, Portecle, is described at the following link:

<http://portecle.sourceforge.net>

It is important to note the following:

1. The password of the certificate, and the password of the keystore, must be the same as each other. The default values for both are "changeit".
2. The password of the keystore, and the master password of the domain, must be the same as each other. If you need to change the master password of the domain (by default "changeit") use the command, `asadmin`, that is supplied with Payara. An example is shown below:
`asadmin change-master-password --savemasterpassword=true domain1`
The option `savemasterpassword=true` saves the master password in a file in the filesystem, so that the server may be rebooted using an automated process. The OS user associated with the server must have access to this file.

Some example commands are shown below in which a certificate named `MyCertificate.pfx` is installed in a keystore named `keystore.jks`, and then given an alias `iuclid-cert`.

1. List the certificates that are installed in the keystore.
`keytool -list -keystore keystore.jks`
2. Uninstall from the keystore the certificate that was created by Glassfish.
`keytool -delete -alias s1as -keystore keystore.jks`
3. Install your own certificate into the keystore.
`keytool -importkeystore -destkeystore keystore.jks -srckeystore MyCertificate.pfx -srcstoretype PKCS12`
4. List the certificates that are in the keystore to verify that your certificate is present.
`keytool -keystore keystore.jks -list`
Make a note of the alias of the certificate you want to use. This is referred to below as `<my certificate>`.
5. Give your certificate an alias that identifies it as being use for IUCLID.
`keytool -changealias -alias <my certificate> -destalias iuclid-cert -keystore keystore.jks`
6. If necessary, change the password of your certificate.
`keytool -keystore keystore.jks -keypasswd -alias iuclid-cert`

Finally, configure Payara to use your certificate. This can be done by editing the file `domain.xml`, replacing the default value `s1as` with `iuclid-cert` or alternatively, use the web console to configure the SSL tab of the relevant listener.

5.6. Configure Background Jobs

The following option may be of use in large installations of IUCLID with many concurrent Users. To ensure that enough resources are available in the server, it is possible to limit the number of

background jobs that can operate concurrently. This affects how many import/export/print operations that can occur in the background at once, so a balance must be found between the needs of users, and the availability of server resources.

The configuration of the background jobs is done by configuring the number of Message-Driven Beans (MDBs) that listen to the background jobs queues.

This configuration is controlled by a deployment descriptor found in a file in the following archive:

```
<payara_installation>\glassfish\domains\domain1\iuclid6\iuclid6-ejb-
<version>-medium.jar
```

The path inside the archive to the file is:

```
META-INF\glassfish-ejb-jar.xml
```

The file contains an explanation of what each of the parameters does and which block affects which business procedure. A template sample is given below for reference:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE glassfish-ejb-jar PUBLIC "-//GlassFish.org//DTD GlassFish
Application Server 3.1 EJB 3.1//EN" ">
<glassfish-ejb-jar>
  <!-- The configuration below allows up to 6, 9 and 72 background jobs to
  be run in parallel in small, medium and large env respectively-->
  <enterprise-beans>
    <ejb>
      <!-- Handles bulk import of archives containing raw data only -->
      <ejb-name>MDBBulkDataJobHandler</ejb-name>
      <bean-pool>
        <steady-pool-size>${mdbmultiraw.min}</steady-pool-size><!--
initial and minimum pool size -->
        <resize-quantity>${mdbmultiraw.resize}</resize-quantity><!--
when more MDBs are needed, how many to create each time up to the maximum
below -->
        <max-pool-size>${mdbmultiraw.max}</max-pool-size><!-- maximum
number of MDBs allowed -->
      </bean-pool>
    </ejb>
    <ejb>
      <!-- Handles single import/export and bulk export for both raw
data/dossiers as well as bulk import of dossiers -->
      <!-- Considering this queue is used for almost all background
jobs in the system we should probably configure it at a higher number than
the other queue -->
      <ejb-name>MDBSingleDataJobHandler</ejb-name>
      <bean-pool>
        <steady-pool-size>${mdbsingledata.min}</steady-pool-size>
        <resize-quantity>${mdbsingledata.resize}</resize-quantity>
        <max-pool-size>${mdbsingledata.max}</max-pool-size>
      </bean-pool>
```

```

    </ejb>
    <ejb>
        <!-- Handles print jobs -->
        <ejb-name>MDBPrintDataJobHandler</ejb-name>
        <bean-pool>
            <steady-pool-size>${mdbprintdata.min}</steady-pool-size><!--
initial and minimum pool size -->
            <resize-quantity>${mdbprintdata.resize}</resize-quantity><!--
when more MDBs are needed, how many to create each time up to the maximum
below -->
            <max-pool-size>${mdbprintdata.max}</max-pool-size><!--
maximum number of MDBs allowed -->
        </bean-pool>
    </ejb>
</enterprise-beans>
</glassfish-ear-jar>

```

5.7. Configuring logging

LOGBack has been selected as the next version of the well-known Log4j. It is a logging system built with performance in mind, directly implementing SLF4j APIs and deployable as an OSGi bundle.

Logback has extensive configuration options all of which are described in the manual available at: <http://logback.qos.ch/manual/index.html>

In IUCLID 6 the current configuration is as follows:

Table 7: Current configuration of IUCLID 6

The configuration is checked every minute.	
The JMXConfigurator (configuration at runtime via JMX, e.g. jConsole) is activated.	
A servlet that displays the status of the logging system can be found at <code>http://<server>/iucld6/loggingSystemStatus</code>	
The root logger has been configured to level WARN (so all external libraries display warnings/errors)	
The "eu.echa.iucld6" logger (i.e. all the application's code) should be set to INFO (developers may lower this to TRACE)	
A separate "performanceLogger" is used to write performance and timing measurements on a separate log file (this logger's output is not present in the other log files)	
The following appenders have been setup:	
	Console appender that displays everything (except the requests from the polling component) - currently disabled
	Main log file (accepts everything - except polling component, rolls daily to archive)
	Error log file (accepts everything from level WARN and ERROR, rolls daily to archive)
	Poller log file (accepts only the logs from the polling component (not from executing background jobs or from direct user requests), rolls daily to archive) - this is separate because of high frequency of logs just in case
	User actions log file (accepts the logs from direct user requests (not from executing background jobs or from the polling component), rolls daily to archive)

	Jobs log file (accepts the logs for all executing background jobs (not from direct user requests or from the polling component), rolls daily to archive)
	Client Communication Layer Cache log file (accepts only the logs from this component, rolls daily to archive) and outputs statistical information on cache usage
	One log file per user per day for poller requests (rolls daily to archive)
	One log file per user per day for errors (rolls daily to archive)
	One log file per user per day for jobs (rolls daily to archive)
	One log file per user per day for user actions (rolls daily to archive)
	One log file per request (does NOT roll daily - logback limitation - must be archived externally)
	One log file per job (does NOT roll daily - logback limitation - must be archived externally)
All logging statements include Mapped Diagnostic Context (MDC) information as needed and as available:	
	username
	HTTP request identifier (an up to 10 digits number)
	source component (currently one of "user", "poller", "job", "clientCommCache")
	job identifier (UUID) when running in a background job context

As an example, one can go through the master error log file. For each exception/warning, there will be relevant information from MDC on which request/job/user was involved in the issue. These values can then be used to find relevant entries in the log files that are specific to a particular request, job and/or user involved. The default archival policy is to maintain records for 180 days.

The following figure gives an example of how the structure of the log output could look in the folder:

```
<payara_installation>\glassfish\domains\domain1\logs
```

The directories `commClientCache_iuclid6.log` and `perf_iuclid6.log` are missing from the top level of this screenshot.

Figure 21: Logs for domain in Payara

```

C:.\
├── server.log
└── iuclid6
    ├── all_iuclid6.log
    ├── error_iuclid6.log
    ├── jobs_iuclid6.log
    ├── poller_iuclid6.log
    └── user_actions_iuclid6.log
        ├── archive
        │   └── 20140205
        │       ├── all_iuclid6.log.zip
        │       ├── error_iuclid6.log.zip
        │       ├── jobs_iuclid6.log.zip
        │       ├── poller_iuclid6.log.zip
        │       └── user_actions_iuclid6.log.zip
        │           └── users
        │               ├── SuperUser_error_iuclid6.log.zip
        │               ├── SuperUser_jobs_iuclid6.log.zip
        │               ├── SuperUser_poller_iuclid6.log.zip
        │               ├── SuperUser_user_actions_iuclid6.log.zip
        │               └── unknown_error_iuclid6.log.zip
        ├── requests
        │   ├── 12441571_iuclid6.log
        │   ├── 2125370756_iuclid6.log
        │   ├── 425061461_iuclid6.log
        │   ├── 451195716_iuclid6.log
        │   ├── 9587270_iuclid6.log
        │   └── unknown_iuclid6.log
        └── users
            ├── FullAccess_error_iuclid6.log
            ├── FullAccess_poller_iuclid6.log
            ├── FullAccess_user_actions_iuclid6.log
            ├── SuperUser_error_iuclid6.log
            ├── SuperUser_poller_iuclid6.log
            ├── SuperUser_user_actions_iuclid6.log
            └── unknown_error_iuclid6.log
    
```

On the top-level there is the file `server.log` that contains only the server's output to which deployment or configuration errors from OSGi are written. The directory `iuclid6` contains the following logs:

Table 8: Log files in directory named iuclid6

Log file	Content
<code>all_iuclid6.log</code>	contains every log output coming from IUCLID 6
<code>error_iuclid6.log</code>	contains only errors/warnings

Log file	Content
<code>jobs_iuclid6.log</code>	contains logging output from background jobs running on the server
<code>poller_iuclid6.log</code>	contains logging output from the polling component
<code>user_actions_iuclid6.log</code>	contains logging output corresponding to actual user originated requests
<code>perf_iuclid6.log</code>	missing from the screenshot above - contains logging output with performance and timing measurements
<code>commClientCache_iuclid6.log</code>	missing from the screenshot above - contains logging output with statistics on the client communication layer cache usage

Subdirectories

`requests` contains one log per request sent to the server using a request ID.

`users` contains logs of actions grouped by user. The unknown user is everything that comes from a thread in the application that is not directly bound to a specific user, e.g. a system timer thread.

`jobs` contains log files for individual background jobs, for example an import of a dossier.

`archive` contains zip archives of logs in directories divided by date.

5.7.1. Installations using an external log indexing solution such as Splunk

Not all files and loggers need to be active at all times. Therefore, for all externally indexed environments it is suggested to:

1. Disable all appenders except `server.log`
2. Turn off `performanceLogger` by simply commenting it out
3. Make sure logger `eu.echa.iuclid6` is set to INFO
4. Monitor and index two files:
 - a. `logs\iuclid6\all_iuclid6.log` (application logs)
 - b. `logs\server.log` (glassfish server and OSGi engine related logs, deployment errors, anything that happens outside the application)

In case of a problem, use the external indexing system to search through and identify what happened.

A configuration file to set up LOGBack XML for this configuration is provided in:

```
<payara_installation>\glassfish\domains\domain1\config\logback-large.xml
```

To use this configuration, copy the file to:

```
<payara_installation>\glassfish\domains\domain1\config\logback.xml
```

5.7.2. Installations not using an external indexing solution

In such an environment, more extensive logging is required. Using all the appenders incurs a performance penalty, but it is a necessary tool for debugging problems. It is therefore suggested to:

1. Turn off the `performanceLogger`, by simply commenting it out;
2. Make sure `eu.echa.iuclid6` logger is set to INFO;
3. Enable the following appenders:

MAIN_FILE

ERROR_FILE

USER_ACTIONS_FILE

JOBS_FILE

SIFT_BY_USER_USER_ACTIONS

SIFT_BY_USER_ERROR

SIFT_BY_USER_JOBS

SIFT_BY_JOB

SIFT_BY_REQUEST

A configuration file to set up LOGBack XML for this configuration is provided in:

```
<payara_installation>\glassfish\domains\domain1\config\logback-medium.xml
```

This is the default file supplied with IUCLID 6. To use this configuration, copy the file to:

```
<payara_installation>\glassfish\domains\domain1\config\logback.xml
```

It is important to notice that the above configuration is about the *IUCLID 6 Server* application log files. Payara server's own logging system is configured from:

```
<payara_installation>\glassfish\domains\domain1\config\logging.properties
```

Normally no changes are needed from the default settings.

It is also important to notice that occasionally for troubleshooting deployment and startup issues you may need to increase the logging level of the subcomponent *Declarative Services OSGi GlassFish*. This is used internally in *IUCLID 6 Server* to bind together the different submodules. This setting is controlled from the file:

```
<payara_installation>\glassfish\config\osgi.properties
```

5.8. User password and log in policies

To over-ride the default policies for the User password and log in, add one or more of the properties given below to the setting file, change the value, then restart *IUCLID 6 Server*.

Settings file:

```
<payara_installation>\glassfish\domains\domain1\config\  
server.settings.properties
```

Properties:

```
# User password policy settings  
# The following properties define the password policy enforced by the  
server.  
# If any property is missing then the default value is used.  
# If a property is present but the value is invalid then the following  
apply:  
# - In the case of boolean values ( containsCapital, containsNumber )  
'false' is the default value  
# - In the case of integer values the default value is assigned  
# Indicates that the passwords must contain at least one capital letter.  
Default value 'true'  
user.password.policy.containsCapital=true  
# Indicates that the passwords must contain at least one number. Default  
value 'true'  
user.password.policy.containsNumber=true  
# Indicates that the password must be at least 'x' characters long.  
Default value 4.  
user.password.policy.minimumLength=4  
# Indicates that each new password must be compared against the last 'x'  
passwords. Default value is 3.  
user.password.policy.passwordUniqueness=3  
# Indicates that 'x' failed login attempts are allowed before the account  
is locked. Default value is 3.  
user.password.policy.allowedFailedLoginsNumber=3  
# Indicates the number of days before the account expires. Set -1 to  
indicate that the passwords never expire. Default value 60.  
user.password.policy.automaticExpiryDays=60  
# Indicates the number of days before the account must be changed. Set -1  
to indicate that the passwords should never be changed. Default value  
180.  
user.password.policy.changeAfterDays=180
```

5.9. Locking / Unlocking of the User SuperUser

By default, the User *SuperUser* can be locked. To prevent this, set the property as below, and then restart the instance of *IUCLID 6 Server*. Logging in and out of a User is not enough to effect the change.

Settings file:

```
<payara_installation>\glassfish\domains\domain1\config\  
server.settings.properties
```

Property:

```
environments.lock.superUser.enabled=false
```

If the User SuperUser is locked, it can be unlocked using the following SQL command, which requires direct access to the database.

```
update IUCLID_USER set FAILED_LOGIN_ATTEMPTS=0 where username =  
'SuperUser' ;
```

Connectivity to the database is described in section 5.2 *Database installation and initialisation*. An example for the embedded database is provided in the next section.

5.10. Reset the password of SuperUser to its default

To reset the password of SuperUser back to its default value of “root”, the hash for that value can be entered directly into the database. The SQL command is

```
update iuclid_user set passwd='$shiro1$SHA-  
512$1024$y1BkYmWV3kCCkJw9NsqrKg==$TF1afftqRreyJ6BjUnu5dSKnFBdZ1bRRUD1nD6F  
rexucyyhd1Mq8rSgJedYwNVNigeGLZFpRtObar7Gvfp/4HA==' where  
username='SuperUser' ;
```

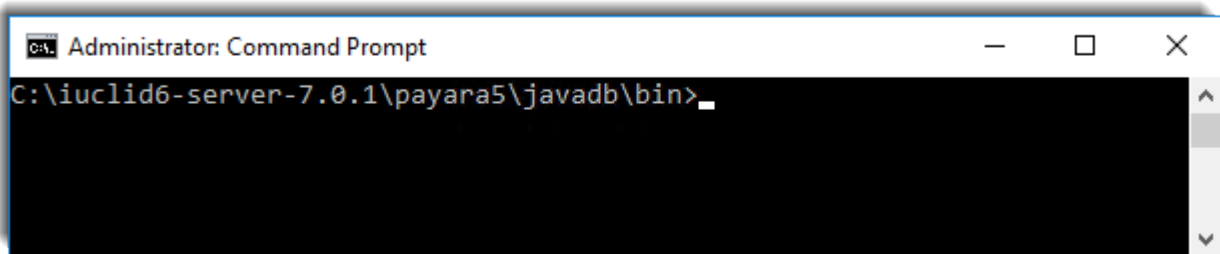
Note that there are no spaces in the hash.

Connectivity to the database is described in section 5.2 *Database installation and initialisation*.

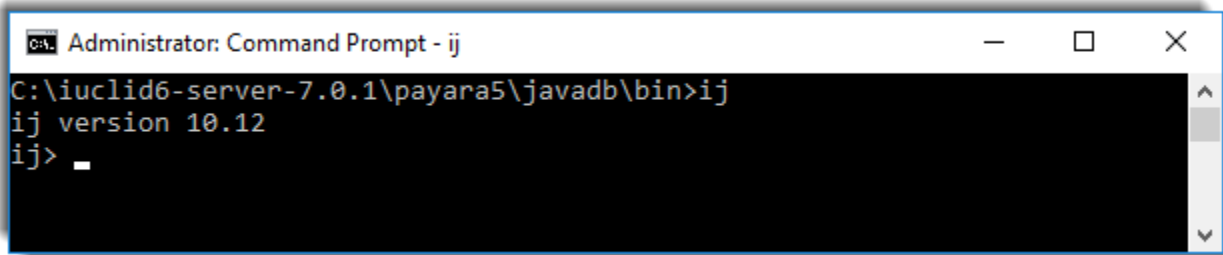
An example of how to perform the SQL command above for the default database, *Embedded Derby*, is given below. It uses the database tool `ij` which is delivered with *IUCLID 6 Server*.

Example

1. Shutdown IUCLID 6 Server;
2. Open a command terminal in Windows (CMD), and then navigate to the folder `payara5\javadb\bin` which is inside the IUCLID installation:



3. Start the tool `ij` by entering the command `ij`:



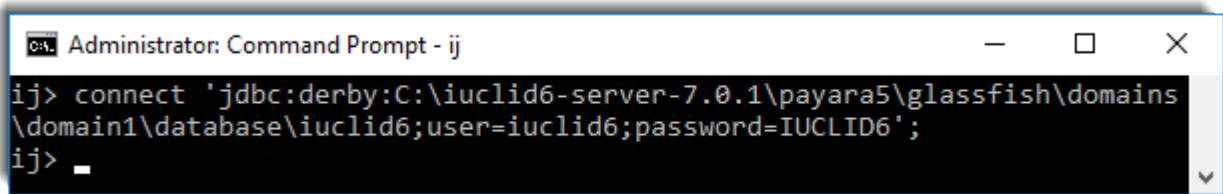
```
Administrator: Command Prompt - ij
C:\iuclid6-server-7.0.1\payara5\javadb\bin>ij
ij version 10.12
ij> _
```

4. Connect to the database using the `connect` command in the form below. Commands in `ij` must end in a semicolon character ;

`connect`

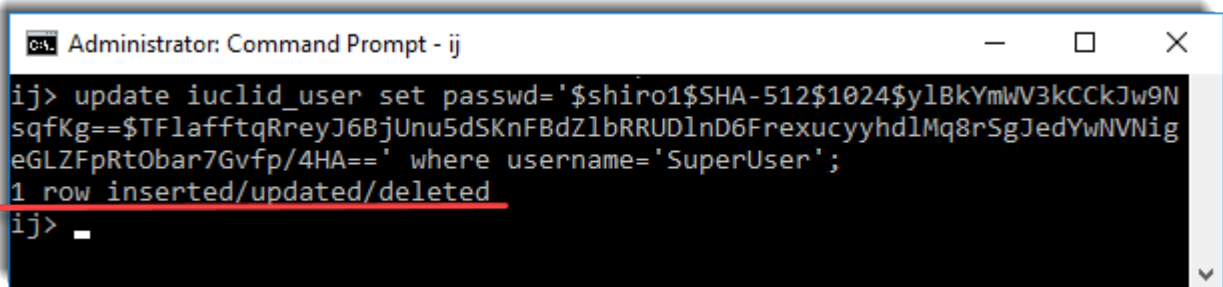
```
'jdbc:derby:<payara_installation>\glassfish\domains\domain1\database\
iuclid6;user=<db user>;password=<db password>';
```

The defaults are shown in the screenshot below:



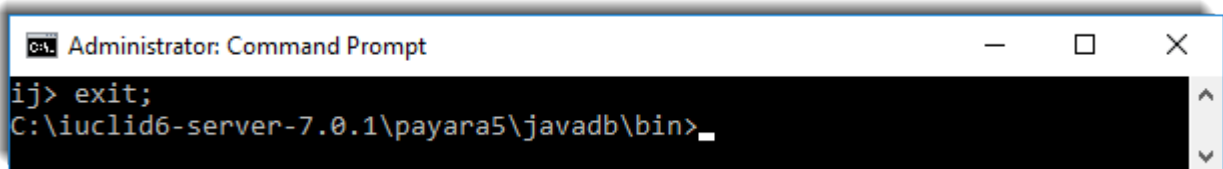
```
Administrator: Command Prompt - ij
ij> connect 'jdbc:derby:C:\iuclid6-server-7.0.1\payara5\glassfish\domains
\domain1\database\iuclid6;user=iuclid6;password=IUCLID6';
ij> _
```

5. Enter the SQL command given above which sets the hash of the password for *SuperUser*. Check that it returns *1 row inserted/updated/deleted*.



```
Administrator: Command Prompt - ij
ij> update iuclid_user set passwd='$shiro1$SHA-512$1024$y1BkYmWV3kCCKJw9N
sqfKg==\$TFlafftqRreyJ6BjUnu5dSKnFBdZ1bRRUDlnD6FrexucyyhdlMq8rSgJedYwNVNig
eGLZFpRtObar7Gvfp/4HA==' where username='SuperUser';
1 row inserted/updated/deleted
ij> _
```

6. Close `ij` using the command `exit`.



```
Administrator: Command Prompt
ij> exit;
C:\iuclid6-server-7.0.1\payara5\javadb\bin> _
```

7. Start *IUCLID 6 Server*;
8. Check that you can log in as *SuperUser* with the password *root*.

5.11. Configuring Single Sign On (SSO)

Configuring IUCLID for Single Sign On (SSO) is described for Azure Active Directory in a separate document named *IUCLID Configuration for SAML-Based SSO with Azure Active Directory*, which is available on the IUCLID website [here](#).

5.12. Instance Based Security (IBS)

Instance Based Security (IBS) is described in the IUCLID 6 Help System. By default, IBS is turned off. Before turning IBS on, be sure that the system and its users are ready for it. Turning IBS off and then back on again, may have unpredictable results. Such actions are not supported by the ECHA Helpdesk.

To turn IBS on, set the parameter shown below, and then restart the instance of *IUCLID 6 Server*.

Settings file:

```
<payara_installation>\glassfish\domains\domain1\config\
server.settings.properties
```

Parameter:

```
environments.instance.based.security=true
```

As with all changes made to the configuration of IUCLID 6 Server, it is recommended to clear the browser cache before logging back in again. IBS cannot be switched on and off via the graphical user interface of IUCLID 6.

5.13. Backup/Restore of the database

It is essential that the database is backed up. This should be done regularly, and before performing updates and any large migrations or imports of data.

5.13.1. Oracle

The backup and restore of an Oracle database are not covered by this document. Please refer to the vendor's documentation.

5.13.2. Derby

The default database with which *IUCLID 6 Server* is supplied is contained completely within the folder named `iuclid6` with the following path:

```
<payara_installation>\glassfish\domains\domain1\database\iuclid6
```

For instructions on making backups, see the vendor's documentation at the following address:

<https://db.apache.org/derby/docs/10.11/adminguide/cadminbckupdb.html>

5.14. Customisation of the top bar of the web user-interface

The content shown in the bar at the top of the web interface can be customised. This is done by adding configuration files into the installation of IUCLID 6 Server, as described below. Changes take effect when the interface is refreshed. There is no need to restart the server.

5.14.1. Logo in the top bar

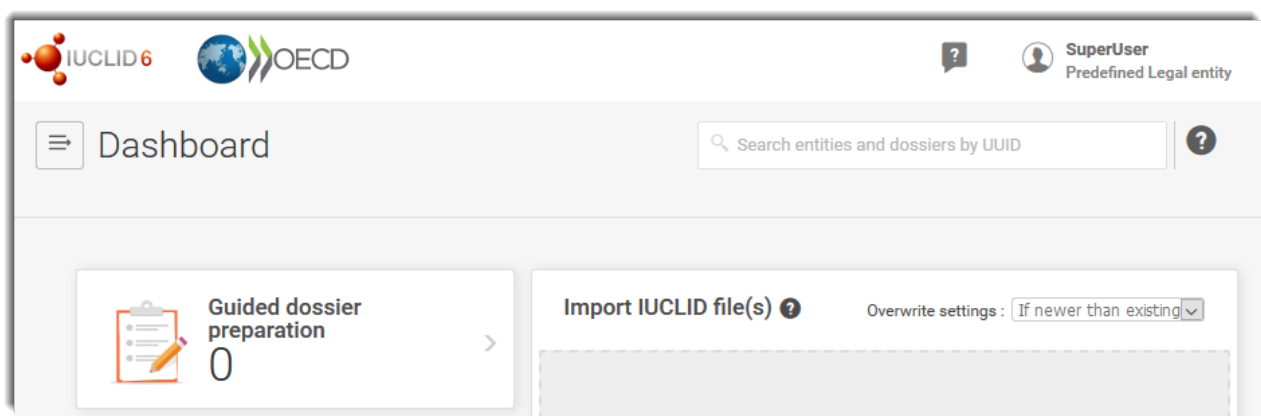
By default, there is a logo for IUCLID 6 at the top left of the web interface. This is an image named, `logo_iuclid.png`, which has a link to the dashboard. The default image is over-riden by any file of the same name placed in the following folder:

```
<installation_dir>\payara5\glassfish\domains\domain1\docroot\  
iuclid6-web-config\assets\img
```

The folders `iuclid6-web-config\assets\img` are not supplied with IUCLID 6 Server, and so they may need to be created under `docroot`.

There is an important rule about the customised image file. The IUCLID logo can be used only as it is. For example, it must not be scaled or cut or overlaid in any way. Customised image content, such as a logo, can be added only to the right of the IUCLID logo within the same image file. The height of the file is 40 px which must not be changed. The width of the default file is 143 px which can be extended to allow space for the custom content. The default file can be downloaded using *right-click / Save image as ...* in a web browser, and then edited accordingly. An example is shown below.

Figure 22: Customised logo in the top bar of the web interface



5.14.2. Links to external content in the top bar

The links to external sources in the top bar can be customised by setting parameters in the file:

```
<installation_dir>\payara5\glassfish\domains\domain1\docroot\  
iuclid6-web-config\assets\shell.config.json
```

The folders `iuclid6-web-config` and `assets` are not supplied with IUCLID 6 Server, and so they may need to be created under `docroot`. Create a text file named `shell.config.json` in the folder `assets`. To reproduce the default behaviour of IUCLID 6 Server, enter the text shown below:

```
{
  "dossierUserManuals": {
    "title": "Dossier preparation manuals",
    "url": "https://echa.europa.eu/manuals"
  },
  "faq": {
    "title": "Q&A",
    "url": "https://iuclid6.echa.europa.eu/faq"
  },
  "request": {
    "title": "Create support request",
    "url": "https://echa.europa.eu/contact/"
  },
  "userCommunity": {
    "title": "IUCLID user community",
    "url": "https://www.linkedin.com/groups/12043483/"
  },
  "additional": {
    "title": "Additional information",
    "url": "https://iuclid6.echa.europa.eu/"
  },
  "tutorials": {
    "title": "Video tutorials",
    "url":
"https://www.youtube.com/channel/UCYpcZKod97aYXv8U7WaLxxg"
  }
}
```

The changes permitted are:

1. Removal of an item from the menu by deleting the text bounded by a comma, and close brace, e.g. to remove "tutorials" delete the following;

```
,
  "tutorials": {
    "title": "Video tutorials",
    "url":
"https://www.youtube.com/channel/UCYpcZKod97aYXv8U7WaLxxg"
  }
}
```

2. Changing the title of a menu item;
3. Changing the URL of a menu item.

The names of the menu items cannot be changed, but their titles can be changed. New menu items cannot be added. Incorrect syntax prevents the menu from being displayed, and an HTTP error 500 may also be displayed in the browser. To safely remove the whole menu, set the configuration file to:

```
{
}
```

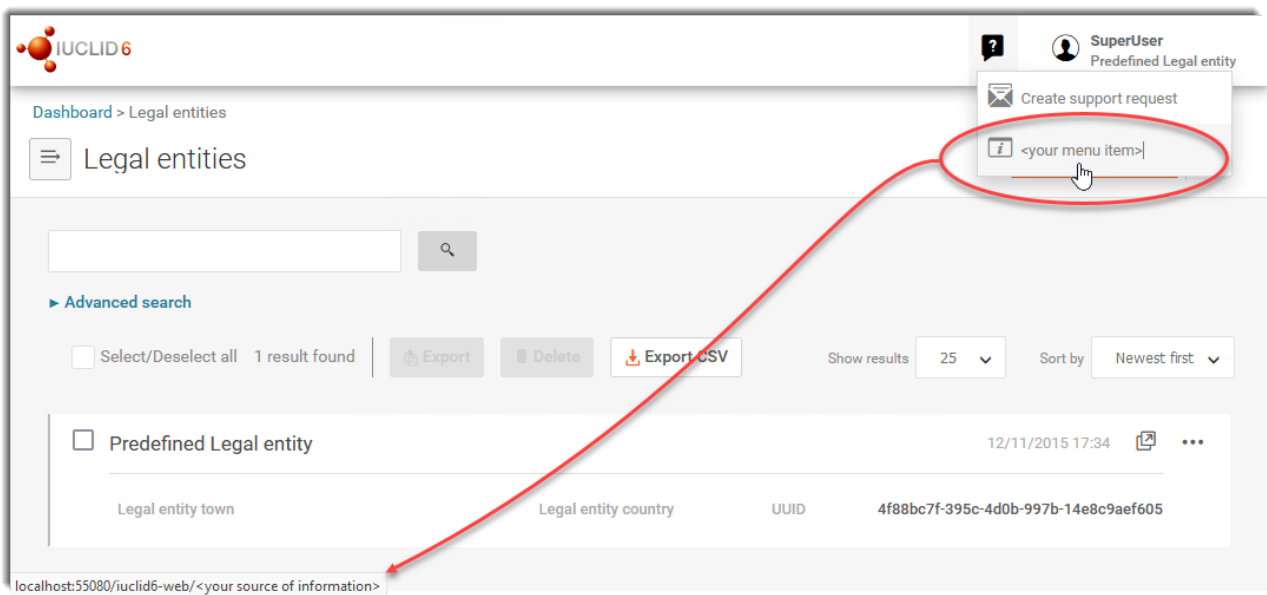
Example

There are only two options required: *Create a support request*, and your own custom source of additional information.

```
{
  "request": {
    "title": "Create support request",
    "url":
    "https://comments.echa.europa.eu/comments_cms/Contact_IUCLID6.aspx"
  },
  "additional": {
    "title": "<your menu item>",
    "url": "<your source of information>"
  }
}
```

In the figure below, the URL is being checked in the browser.

Figure 23: Checking a custom URL in the external links



5.15. Preventing Open Redirect

Allowing IUCLID 6 Server to perform an HTTP *Open Redirect* is a security risk. This section explains how to set IUCLID 6 Server to prevent an *Open Redirect* by allowing IUCLID 6 Server to make an HTTP redirect to only its own server.

The redirect mechanism can be limited to use only the host of IUCLID 6 Server, by setting the following parameter in `domain.xml`.

```
<jvm-options>-Deu.echa.iuclid6.idp.relay.verify=true</jvm-options>
```

To make a change take effect, restart IUCLID 6 Server.

5.16. Server domains allowed by Cross Origin Resource Sharing (CORS)

Allowing *Cross Origin Resource Sharing (CORS)* for IUCLID 6 Server with no limitation placed on the originating domain, is a security risk. This section explains how to set IUCLID 6 Server to apply limits such that only pre-configured domains are allowed. The originating domain can be limited by setting the following parameter in the file `domain.xml`.

```
<jvm-options>-Deu.echa.iuclid6.idp.cors.allowed.origin.patterns
```

The value is a comma delimited list of one or more regular expressions. Thus, wild cards can be used to match multiple values, for example ranges of ports. The default line in `domain.xml` is:

```
<system-property-name="eu.echa.iuclid6.idp.cors.allowed.origin.patterns" value="http://localhost:${HTTP_LISTENER_PORT},https://localhost:${HTTPS_LISTENER_PORT},http://127.0.0.1:${HTTP_LISTENER_PORT}"</system-property>
```

To make any change take effect, restart IUCLID 6 Server.

Example:

The setting for CORS is relevant for IUCLID tools that authenticate their users via the installation of IUCLID 6 Server to which they are connected. Examples include *IUCLID Data Extractor* and *Text Analytics*. If *IUCLID Data Extractor* were accessed at the URL:

```
http://10.90.1.24:28080/iuclidde
```

The value to add to the parameter is:

```
http://10.90.1.24:28080
```

Therefore, the line in `domain.xml` would be:

```
<system-property-name="eu.echa.iuclid6.idp.cors.allowed.origin.patterns" value="http://localhost:${HTTP_LISTENER_PORT},https://localhost:${H
```

```
TTPS_LISTENER_PORT},http://127.0.0.1:${HTTP_LISTENER_PORT},http://10.90.1.24:28080"</system-property>
```

5.17. IUCLID Drive

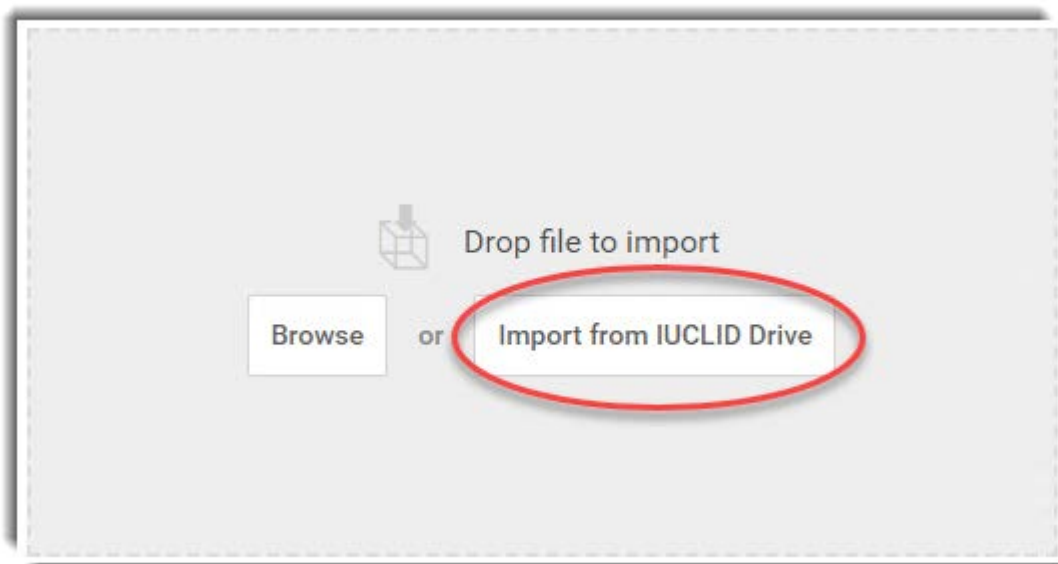
IUCLID Drive is an optional feature provided for use in specific cases where users are experiencing unacceptable delays in the import and export of *i6z* files of GB size and up. It helps in cases where the speed of the import/export process is limited by the web browser used to view the interface. *IUCLID Drive* works by transferring files via a file system and/or a network instead of via the web browser. To do that, a shared drive is employed that is accessible from both the *IUCLID 6 Server*, and the computer that runs the browser. *IUCLID Drive* applies only to files of type *i6z*, so for example, it does not apply to exports from the list page; or to reports.

IUCLID Drive is not shown in the IUCLID interface by default. Before attempting to configure it, it is recommended to read the description of the functionality in the next two sections. The actual configuration is described in the next section. The final section is an example of what could be communicated to users. This information is not in the IUCLID user manual that is delivered with IUCLID. The system administrator must also provide information on how users can access the shared drive used in *IUCLID Drive*.

5.17.1. Import from IUCLID Drive

For import, *IUCLID Drive* is presented as an extra button to the right of the import button in the web browser, as shown below.

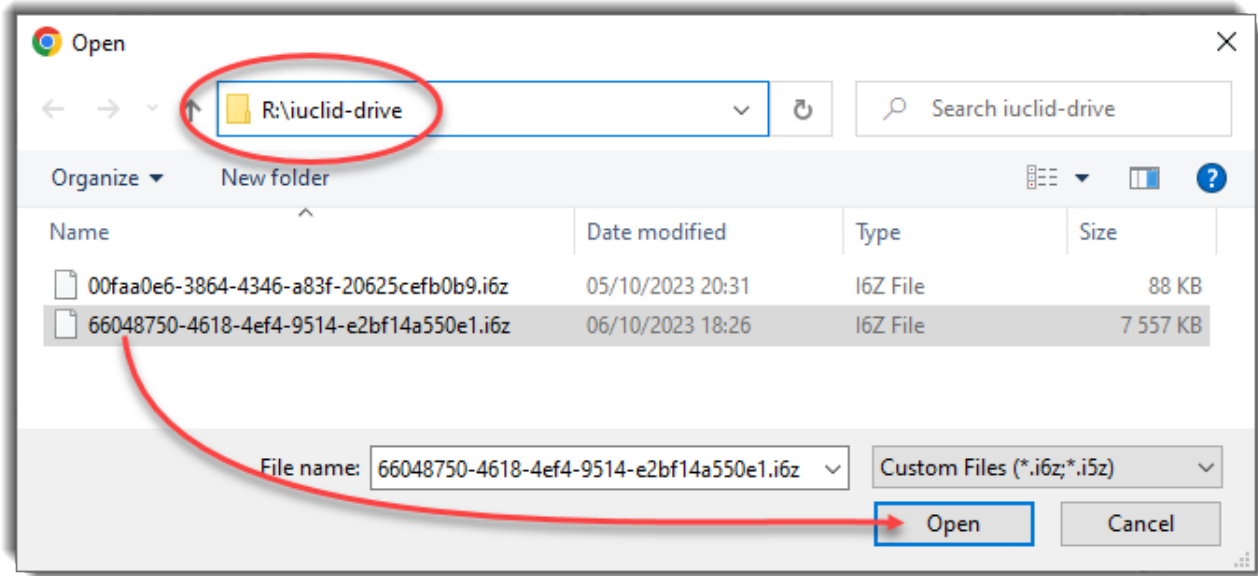
Figure 24: Import from IUCLID Drive



Clicking on the button *Import from IUCLID Drive* opens the file browser of the operating system; typically, at the most recently opened folder. The users must then navigate to the *IUCLID Drive*. They can do this because the administrator has set up the drive and informed them of its address.

How to do that is described in a following section. In the example below, two i6z files are shown listed in a folder that has the address R:\iuclid-drive.

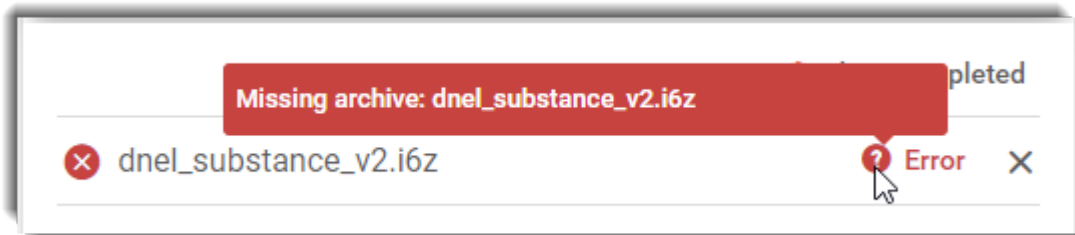
Figure 25: Import from the IUCLID Drive



The user selects the file to import, then clicks on the button *Open*. If the folder is not the *IUCLID Drive* that was configured by the administrator in `domain.xml`, the following error message is given:

Missing archive: <filename>.

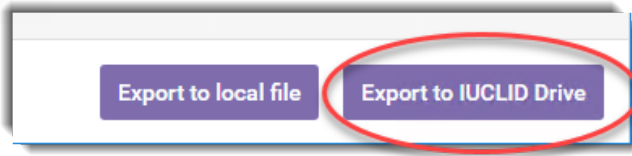
Figure 26: Error message when the import folder is not the IUCLID Drive



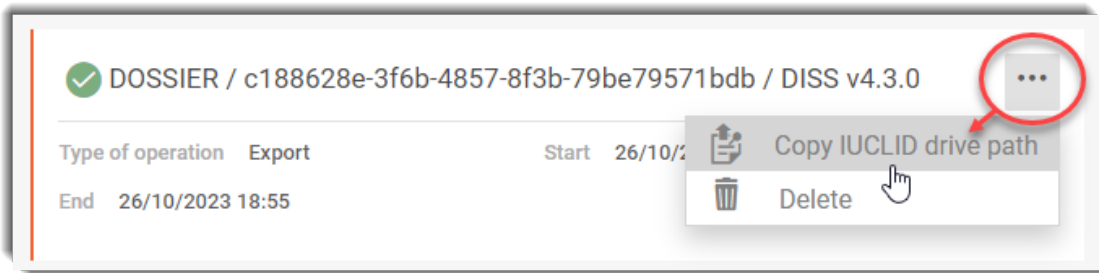
In the example above, the error message has been displayed by hovering the cursor over the question mark icon.

5.17.2. Export to IUCLID Drive

The option *Export to IUCLID Drive* is presented as an extra button to the right of the default button, as shown below.

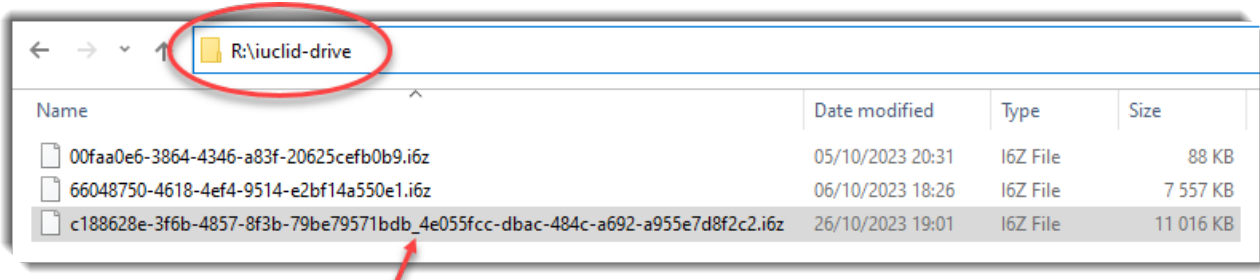
Figure 27: Export to the IUCLID Drive

Clicking on the button *Export to IUCLID Drive* starts the export as a background task. If the user does not already know where the *IUCLID Drive* is located, the user can obtain the path to it by navigating to the background task, and then selecting the option *Copy IUCLID drive path* from the three-dot menu. This copies the path to the clipboard.

Figure 28: Copy the path of the IUCLID Drive to the clipboard

The user must know how to use the path to get to the *IUCLID Drive*.

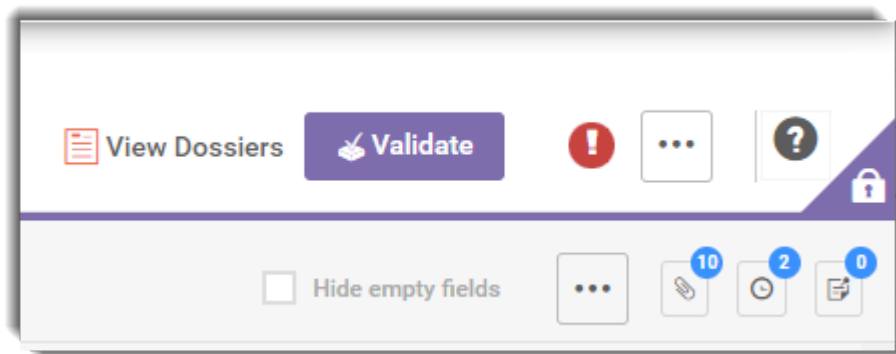
For example, the computer used to access IUCLID 6 Server is running Windows and has a network drive mapped such that when the user pastes the path into the file browser, it opens the *IUCLID Drive*. The administrator of *IUCLID 6 Server* must communicate with the end users and/or their administrator to ensure that the access works as required. A detailed example is given in a later section. In the example shown below, the path is `R:\iuclid-drive`.

Figure 29: Accessing an exported file in the IUCLID Drive

Above, the exported file is shown selected, with an arrow pointing to the separator in the filename. The format of the filename is:

```
<UUID of exported entity>_<UUID of background job for export process>.i6z
```

If the *IUCLID 6 Server* cannot find the *IUCLID Drive* at the address configured by the administrator, an attempt to export ends in an error in IUCLID, as shown below.

Figure 30: Error message on export, when IUCLID 6 Server cannot find the IUCLID Drive

The error message is:

```
<date> - Export to iuclid drive process failed.
```

Before informing users that *IUCLID Drive* is available, test that *IUCLID Drive* is accessible from their accounts, so that this error is not shown. *IUCLID Drive IUCLID Drive*

5.17.3. IUCLID Drive: Configuration instructions for administrators

The set-up of *IUCLID Drive* consists of the following basic steps, which each have their own section below:

1. Configure a shared drive to act as the IUCLID Drive;
2. Configure IUCLID 6 Server for the IUCLID Drive;
3. Configure the IUCLID users that need access to the IUCLID Drive;
4. Inform the users about IUCLID Drive. They can be provided with information specific to the installation of IUCLID, and the content of section 5.17.4 *IUCLID Drive: Instructions for end-users*.

5.17.3.1. Configure a shared drive to act as the IUCLID Drive

IUCLID Drive requires that the IUCLID 6 Server and the end users have shared access to a folder. The access rights for end-users can be tailored to allow import and/or export as is required. The server would normally have full access. The sharing can be done over a network. For example, a network share can be set up in Windows, and in Linux to have an address of the form:

```
\\<server>\<name of share>
```

For example:

```
\\my-machine.local\chem-data
```

In Windows this can be set up using its built-in file sharing options. In Linux, a shared drive with that format of address can be set up using the software *Samba*, which is out of the scope of this document.

5.17.3.2. Configure IUCLID 6 Server for the IUCLID Drive

IUCLID Drive is configured in the settings file:

```
<payara_installation>\glassfish\domains\domain1\config\domain.xml
```

After editing this file, IUCLID 6 Server must be restarted. To see the changes in the interface, it may be necessary to clear the browser cache, and then reload the interface.

IUCLID Drive has four system properties:

```
eu.echa.iuclid6.iuclid.drive.server.folder
```

This is the path from the IUCLID 6 Server itself, to the shared folder that was defined in the earlier subsection. It works across platforms, so long as the operating system on which IUCLID 6 Server is running can find the shared folder.

```
eu.echa.iuclid6.iuclid.drive.client.folder.win
```

This is the path to the shared drive for a machine that is running in Windows to view the interface of IUCLID 6 Server. The option under Export, to copy the path of the IUCLID Drive, copies this value to the clipboard. Its value must be defined taking into consideration the configuration of the end-user's machine, for example where a mapping to a network drive has been set up.

```
eu.echa.iuclid6.iuclid.drive.client.folder.linux
```

This is the path to the shared drive for a machine that is running Linux to view the interface of IUCLID 6 Server. The option under Export, to copy the path of the IUCLID Drive, copies this value to the clipboard. Its value must be defined taking into consideration the configuration of the end-user's machine, for example where the shared drive has been given a specific mount point.

```
eu.echa.iuclid6.iuclid.drive.disable.isolation
```

If this is set to **true**, the files in the shared folder of ID are shared across all IUCLID users. If it is set to **false**, the files of IUCLID users are kept separate from each other, or *isolated*. This is achieved by sub-dividing the shared drive into a sub-folder per user. Each subfolder has the same name as the IUCLID user, e.g. *SuperUser*, *User_1*, *User_2*. These sub-folders must be created in the shared drive by an administrator. A user can import or export files from only its subfolder. This also applies to *SuperUser*. If isolation is used, its consequences for the values of the user experience must be taken into consideration. For example, the values of the properties **client.folder** are the same for all users, but it is possible to set up, per user, custom mappings in Windows or custom mount points in Linux.

If values are not set for the **server.folder** and a **client.folder**, the IUCLID Drive functionality is not shown in the interface, even if users have been granted permission for it in a role. Thus, setting the parameters or not acts as a global on/off switch for the functionality.

IUCLID Drive - Example configuration for IUCLID 6 Server run in Windows

```
<system-property name="eu.echa.iuclid6.iuclid.drive.server.folder"
value="\\my-machine.local\chem-data\iuclid-drive"></system-property>
<system-property name="eu.echa.iuclid6.iuclid.drive.client.folder.win"
value="R:\iuclid-drive"></system-property>
<system-property name="eu.echa.iuclid6.iuclid.drive.disable.isolation"
value="true"></system-property>
```

The shared folder is a network drive running on a Windows server. IUCLID 6 Server runs in Windows, so the syntax to access the shared folder is:

```
\\my-machine.local\chem-data\iuclid-drive
```

The interface of IUCLID 6 Server is accessed from Windows where there is a mapping of:

```
R:\
->
\\my-machine.local\chem-data
```

The option under *Export*, to copy the path of the *IUCLID Drive*, copies the following value to the clipboard:

```
R:\iuclid-drive
```

When a user pastes this into the file browser of the client machine in Windows, it opens the folder to which IUCLID 6 Server points:

```
\\my-machine.local\chem-data\iuclid-drive
```

Thus, the client and the server are accessing the same folder.

IUCLID Drive - Example configuration for IUCLID 6 Server run in Linux

```
<system-property name="eu.echa.iuclid6.iuclid.drive.server.folder"
value="/run/user/1000/gvfs/smb-share:server=my-machine.local,share=iuclid-
drive"></system-property>
<system-property name="eu.echa.iuclid6.iuclid.drive.client.folder.win"
value="Q:\"></system-property>
<system-property name="eu.echa.iuclid6.iuclid.drive.disable.isolation"
value="true"></system-property>
```

The shared folder is a network drive running on a Linux server. IUCLID 6 Server runs in Linux. A *Samba* server is used with a default mount point, so the syntax to access the shared folder is:

```
/run/user/1000/gvfs/smb-share:server=my-machine.local,share=iuclid-drive
```

The interface of IUCLID 6 Server is accessed from Windows where there is a mapping of:

```
Q:\
->
\\my-machine.local\iuclid-drive
```

The option under *Export*, to copy the path of the *IUCLID Drive*, copies the following value to the clipboard:

```
Q:\
```

When a user pastes this into the file browser of the client Windows machine, it opens the folder to which IUCLID 6 Server points:

```
\\my-machine.local\iuclid-drive
```

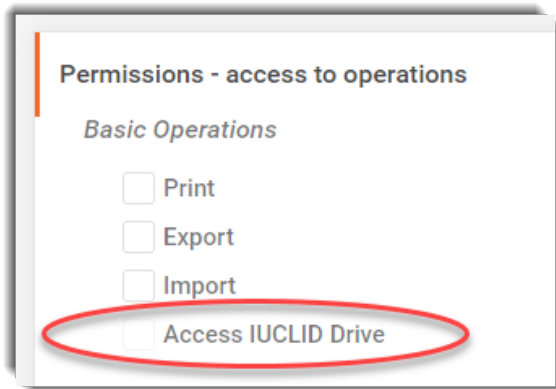
Thus, the client and the server are accessing the same folder.

5.17.3.3. Configure the IUCLID users that need access to the IUCLID Drive

Access to *IUCLID Drive* is configured per IUCLID user via an access right within a role. For a full description of user management in IUCLID, refer to the user manual which is accessible from the interface.

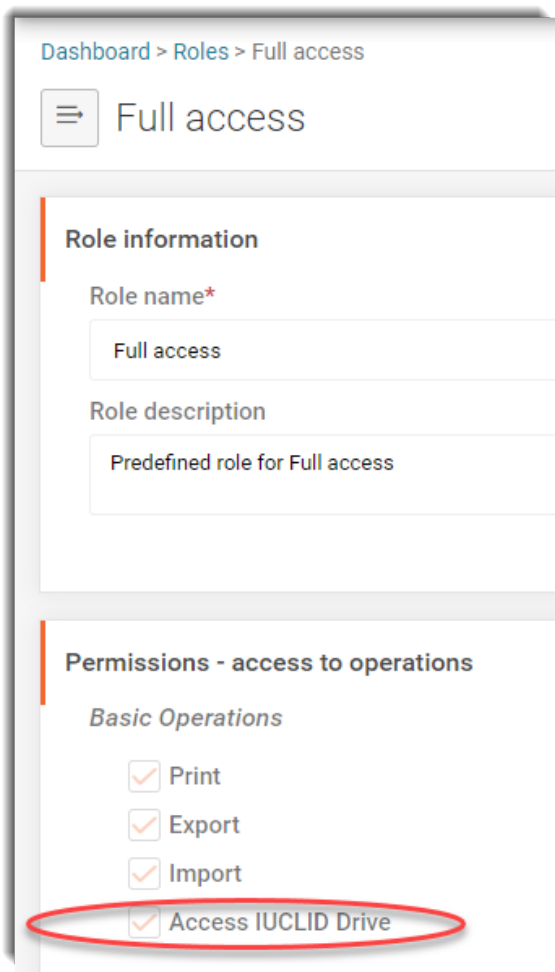
The permission for accessing *IUCLID Drive* is provided in the definition of a role under *Basic Operations*. A newly created role looks like the example shown below. Note that it is greyed out because it requires at least *Import* or *Export*, which in turn have their own dependencies.

Figure 31: The permission Access IUCLID Drive in the definition of a Role



It is possible to create roles that permit *Access IUCLID Drive* and *Export* or *Import*, or both.

If a user is to have permission for *Export*, *Import* and *Print*, it is simplest to use the role *Full access* which is delivered built-in to *IUCLID 6 Server*. It comes with all the basic operations ticked, as shown below.

Figure 32 The built-in role Full access provides full access to IUCLID Drive

When enabling *IUCLID Drive*, consider the consequences of *Access to IUCLID Drive* being provided by the role *Full access*.

5.17.4. IUCLID Drive: Instructions for end-users

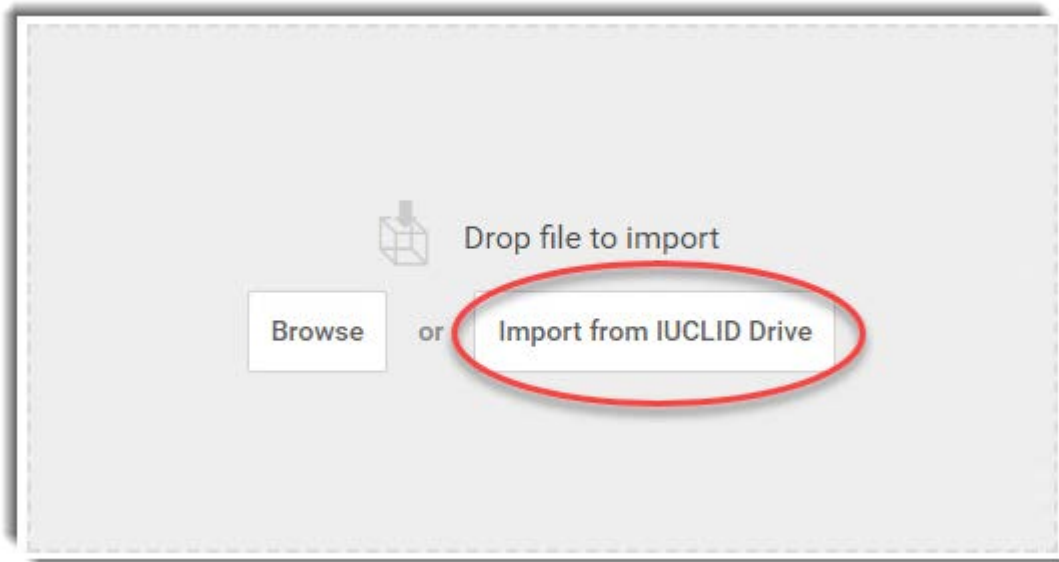
IUCLID Drive is an optional feature provided for use in specific cases where users are experiencing unacceptable delays in the import and export of *i6z* files of gigabyte size and up. It helps in cases where the speed of the import/export process is limited by the web browser used to view the interface. *IUCLID Drive* works by transferring files via a file system and/or a network instead of via the web browser. To do that, a shared drive is employed that is accessible from both the *IUCLID 6 Server*, and the computer that runs the browser. *IUCLID Drive* applies only to files of type *i6z*, so for example, it does not apply to exports from the list page; or to reports.

For more information about the setup, file locations, and any error messages generating whilst using *IUCLID Drive*, contact the system administrator of *IUCLID 6 Server*.

5.17.4.1. Import from IUCLID Drive

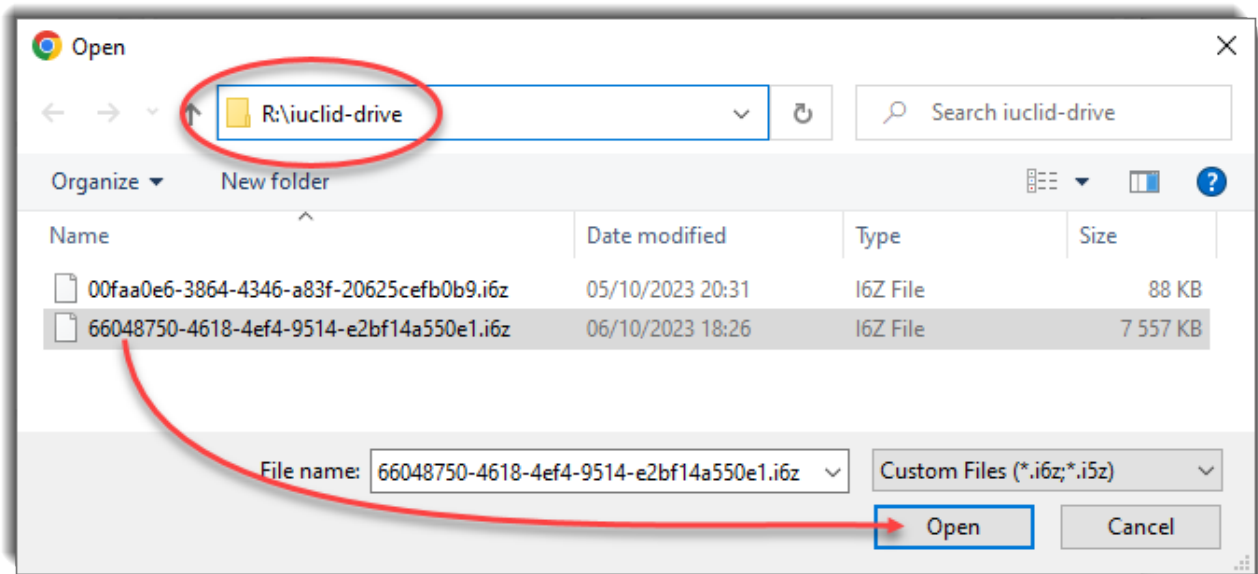
For import, *IUCLID Drive* is presented as an extra button in addition to import via the web browser, as shown below.

Figure 33: Import from IUCLID Drive



Clicking on the button *Import from IUCLID Drive* opens the file browser of the operating system; typically, at the most recently opened folder. You must then navigate to the *IUCLID Drive* which is at the location provided to you by the system administrator. In the example below, the address is R:\iuclid-drive.

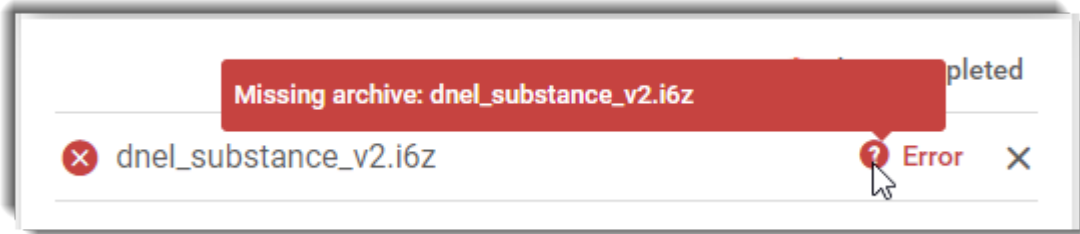
Figure 34: Import from the IUCLID Drive



Select the file to import, then click on the button *Open*. If the folder is not the *IUCLID Drive* that was configured by the administrator, an error message is given:

Missing archive: <filename>.

Figure 35: Error message when the import folder is not the IUCLID Drive

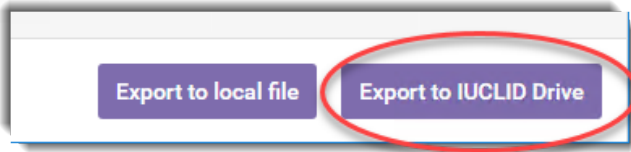


In the example above, the error message is displayed by hovering the mouse over the question mark icon.

5.17.4.2. Export to IUCLID Drive

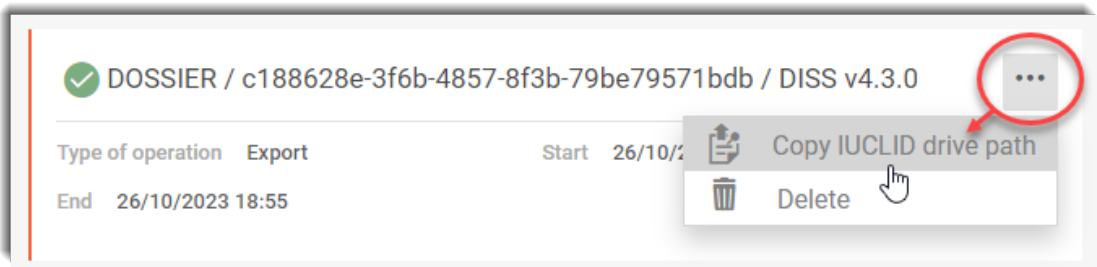
For export, *IUCLID Drive* is presented as an extra button in addition to export via the web browser, as shown below.

Figure 36: Export to the IUCLID Drive



Clicking on the button *Export to IUCLID Drive* starts the export as a background task. If you do not already know where the *IUCLID Drive* is located, you can obtain the path to it by navigating to the background task, and then selecting the option *Copy IUCLID drive path* from the three-dot menu. This copies the path to the clipboard.

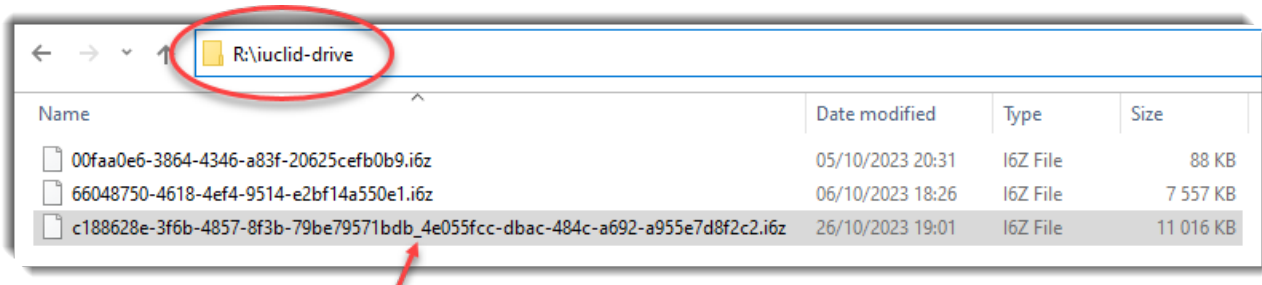
Figure 37: Copy the path of the IUCLID Drive to the clipboard



This path may then be used to navigate to the *IUCLID Drive*, as per the instructions provided by the system administrator. For example, the computer used to access IUCLID 6 Server is running Windows and has a network drive mapped such that it opens the *IUCLID Drive*. The path can be

pasted into the address bar of the Windows file browser. In the example shown below, the path is R:\iuclid-drive.

Figure 38: Accessing an exported file in the IUCLID Drive

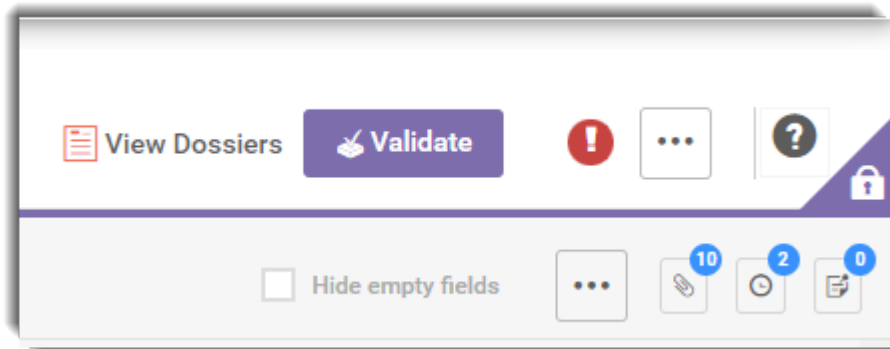


Above, the exported file is shown selected with an arrow pointing out the separator in the filename. The format of the filename is:

<UUID of exported entity>_<UUID of background job for export process>.i6z

If the *IUCLID 6 Server* cannot find the *IUCLID Drive* at the address configured by the administrator, an attempt to export ends in an error in IUCLID, as shown below.

Figure 39: Error message on export, when IUCLID 6 Server cannot find the IUCLID Drive



The error message is:

<date> - Export to iuclid drive process failed.

6. Monitoring

6.1. Application log files

The application log files as defined in `domain.xml` are:

```
<payara_installation>\glassfish\domains\domain1\logs\server.log  
<payara_installation>\glassfish\domains\domain1\logs\*\*.log
```

6.2. Database location (Derby/Javadb)

For the *IUCLID 6 Server*, the default location of the database is:

```
<payara_installation>\glassfish\domains\domain1\database\iuclid6
```

The database connection details are held in:

```
<payara_installation>\glassfish\domains\domain1\config\domain.xml
```

Please see section Database installation and initialisation

The default location of the derby log file is:

```
<payara_installation>\glassfish\domains\domain1\database\derby.log
```

6.3. Working directories

When Payara starts, the *IUCLID 6 Server* application is deployed to:

```
<payara_installation>\glassfish\domains\domain1\osgi-  
cache\felix\bundle300\data\applications\bundle375-????????????????
```

7. IUCLID 6 trouble-shooting

In this section, some potential errors and their resolution are given.

7.1. No free port within range / Port already in use

```
SEVERE|glassfish3.1.2|grizzly|_ThreadID=??;_ThreadName=Thread-??;|doSelect IOException  
java.net.BindException: No free port within range:
```

```
SEVERE|glassfish3.1.2|javax.enterprise.system.std.com.sun.enterprise.server.logging|_ThreadID=  
16;_ThreadName=Thread-2;|java.rmi.server.ExportException: Port already in use: 8686; nested  
exception is:
```

Solution

There may be another instance of glassfish running. Stop the process and try again.

If the OS is Linux, the process using the port can be found using the following command:

```
$ sudo netstat -lptu|grep <port>
```

7.2. Unsupported major.minor version 51.0

```
SEVERE|glassfish3.1.2|javax.enterprise.system.std.com.sun.enterprise.server.logging|_ThreadID=  
19;_ThreadName=Thread-2;|java.lang.UnsupportedClassVersionError:  
eu\echa\iuclid6\presentationdefinition\registry\impl\PresentationDefinitionRegistryImpl :  
Unsupported major.minor version 51.0
```

Solution

Java 6 is being used. Change the PATH to include java 8.

7.3. http:<host>/webstart gives 404 Not found

Solution

Check the server log file in:

```
<payara_installation>\glassfish\domains\domain1\logs\server.log
```

7.4. JMS resource not created

The server does not start and the file `server.log` shows:

```
SEVERE|glassfish3.1.2|javax.enterprise.system.container.ejb.mdb.com.sun.ejb.containers|_Threa  
dID=*;_ThreadName=Thread-  
*;|com.sun.appserv.connectors.internal.api.ConnectorRuntimeException  
com.sun.appserv.connectors.internal.api.ConnectorRuntimeException: JMS resource not created :  
jms/BulkBackgroundJobs
```

Solution:

Please re-install the server.

7.5. Out of Memory

Whilst carrying out an action in IUCLID 6, an error is given that includes the text:

`OutOfMemory`

Solution:

Increase the amount of JVM memory allocated to IUCLID 6, as described in section 5.5 *Set JVM memory options*.

7.6. Error messages in server.log that can safely be ignored

```
SEVERE|oracle-  
glassfish3.1.2|javax.enterprise.system.std.com.sun.enterprise.server.logging|_ThreadID=60;_Thre  
adName=Thread-2;|java.lang.IllegalArgumentException: Illegal character in opaque part at index  
65: embeddedjar:bundle://302.0:0/fop-1.0.jar!/org/apache/fop/pdf/sRGB Color Space Profile.icm  
    at java.net.URI.create(URI.java:859)
```

The issue is also reported on GlassFish and Felix JIRAs

<https://java.net/jira/browse/GLASSFISH-20986>

<https://issues.apache.org/jira/browse/FELIX-4429>

```
SEVERE|oracle-  
glassfish3.1.2|javax.enterprise.system.std.com.sun.enterprise.server.logging|_ThreadID=60;_Thre  
adName=Thread-2;|INFO 28/05/15 12:58:liquibase: Successfully acquired change log lock|#]
```

```
SEVERE|oracle-  
glassfish3.1.2|javax.enterprise.system.std.com.sun.enterprise.server.logging|_ThreadID=60;_Thre  
adName=Thread-2;|INFO 28/05/15 12:58:liquibase: Reading from DATABASECHANGELOG|#]
```

```
SEVERE|oracle-  
glassfish3.1.2|javax.enterprise.system.tools.deployment.org.glassfish.deployment.common|_Threa  
dID=63;_ThreadName=Thread-2;|Exception while visiting  
com/sun/gjc/common/DataSourceSpec.class of size 3267  
java.lang.NullPointerException
```

```
SEVERE|oracle-  
glassfish3.1.2|javax.enterprise.system.std.com.sun.enterprise.server.logging|_ThreadID=60;_Thre  
adName=Thread-2;|INFO 28/05/15 12:58:liquibase: dropSequence is not supported on derby but  
will continue|#]
```

7.7. Other errors in server.log file

7.7.1. Exception in thread ...

```
SEVERE|oracle-  
glassfish3.1.2|javax.enterprise.system.std.com.sun.enterprise.server.logging|_ThreadID=61;_Thre  
adName=Thread-2;|Exception in thread "Thread-29" [#]
```

```
SEVERE|oracle-  
glassfish3.1.2|javax.enterprise.system.std.com.sun.enterprise.server.logging|_ThreadID=61;_Thre  
adName=Thread-2;|java.lang.NullPointerException
```

```
    at  
eu.echa.iuclid6.osgi.launcher.OsgiOrderLauncher.stageFiles(OsgiOrderLauncher.java:158)  
    at eu.echa.iuclid6.osgi.launcher.OsgiOrderLauncher.init(OsgiOrderLauncher.java:121)  
    at eu.echa.iuclid6.osgi.launcher.OsgiOrderLauncher.run(OsgiOrderLauncher.java:106)  
    at java.lang.Thread.run(Thread.java:745)
```

```
[#]
```

Solution:

Check that the iuclid6 bundles are deployed in the directory:

```
<payara_installation>\glassfish\domains\domain1\iuclid6
```

See section 3 Installation of *IUCLID 6 Server*.

7.7.2. Waiting for changelog lock...

```
SEVERE|oracle-  
glassfish3.1.2|javax.enterprise.system.std.com.sun.enterprise.server.logging|_ThreadID=60;_Thre  
adName=Thread-2;|INFO 28/05/15 12:47:liquibase: Waiting for changelog lock...[#]
```

Solution:

If the application has not yet been used, delete and re-create the database.

Please see section 5.3 for database location:

Otherwise, run the following SQL commands on the database:

Derby:

```
$ update databasechangeloglock set locked=false
```

Oracle:

```
$ update databasechangeloglock set locked=0
```

8. Migration of data to IUCLID 6 Server from IUCLID 5 Server or earlier

To migrate data to *IUCLID 6 Server* from a server installation prior to IUCLID 6, follow the instructions provided on the IUCLID website at:

<https://iuclid6.echa.europa.eu/archive-iuclid-5>

9. Checklist for updating IUCLID 6 Server

This section contains a brief checklist of the steps required to update IUCLID 6 Server. It includes suggestions on how to check that the process was a success. For more detailed instructions, see the main section *10 Complete guide to updating IUCLID 6 Server*.

1. Ensure that a back-up exists of both the IUCLID application, and its database. If an automatic backup procedure is in place, check that it has provided a recent backup from which IUCLID and its database can be fully recovered. The database can be of two different classes: embedded or external. For an embedded database, which is the default, the *IUCLID Updater Tool* makes an automatic backup of the database and the application. For an external database, only the application is backed-up, so the database must be backed up using the third-party tools that are appropriate for the database. The types of external database supported are:

- a. Derby Network Server
- b. Oracle
- c. PostgreSQL

If you are unsure of the type of database in use, it can be seen from the settings file.

```
<payara_installation>\glassfish\domains\domain1\config\domain.xml
```

Check the value of the parameter named `jdbc-resource pool-name`. For more information see section *5.2 Database installation and initialisation*.

2. An update of IUCLID **does not** require an increase in the system resources or changes to settings files, unless otherwise stated in a communication from ECHA. For comparison with the situation after the update, you can do the following now:
 - a. Check that the graphical user interface (GUI) gives adequate response times. To provide a benchmark for future reference, record the response time of an example process that involves specific data;
 - b. If the update is to be across major versions of IUCLID, it involves a change in the data format of IUCLID. In that case, if you have data that you know will be affected by the data format change, make a note of an example document UUID, and take a screenshot of the data;
 - c. Make a note of the version of the IUCLID application. This is visible under *About* which is accessible from the *Dashboard*.
 - d. From the browser, make a note of the URL used to access *IUCLID 6 Server*, paying particular attention to the values of the host and port.
3. Shut down *IUCLID 6 Server*. If the default embedded database is in use, this also shuts down the database. If the database is external, **do not** shut down the database.

4. Download the *IUCLID Updater Tool* from the [IUCLID website](#). Verify the integrity of the download by calculating the checksum, and then comparing it with the value provided [here](#).
5. Place the *IUCLID Updater Tool* into a folder that is above the installation folder of IUCLID in the filesystem hierarchy. The *IUCLID Updater Tool* must be able to access the IUCLID application and its database.
6. Run the *IUCLID Updater Tool*. It has a graphical wizard, but for systems that do not have a graphical environment, it is possible to use only the command line, as described in section 10.2 *Running Updater tool without a graphical wizard*. Follow the step-by-step instructions displayed by the *IUCLID Updater Tool*. Ensure that the backup archive, as defined in the second step, is **not** inside the installation folder of IUCLID. The backup is an archive file that has the extension `i6fb`. After the final step, the tool reports either a success or a failure. In either case, check the log of the tool to see what happened. The log file is:
< IUCLID Updater Tool>\logs\updater.log.
Keep the log file safe for future reference.
7. If the update was not a success, try to work out what happened from the log file and the information provided in the rest of this manual. If you cannot solve it yourself, you can create a ticket with the [IUCLID helpdesk](#).
8. If the update was a success, start *IUCLID 6 Server*. If IUCLID is run as a service in Microsoft Windows, see section 10.1.9.1 *IUCLID as a Windows Service after running IUCLID 6 Update Tool*.
The start up process can be followed from the log file:
< IUCLID Updater Tool>\logs\server.log.
The GUI of IUCLID is ready to be accessed when the entry below appears in the log file.
deployed bundle eu.echa.iuclid6.war
9. Before trying to access the GUI, clear the browser cache. Entering **Ctrl F5** or **Shift F5** may be enough.
10. Log in to the GUI using the address noted in step (2). For comparison with the situation before the update, you can do the following:
 - a. Check that the version of the software has changed to the new one expected. The version is displayed in the window *About* which is accessible from the *Dashboard*;
 - b. Check that the expected data are present;
 - c. Check that the GUI gives adequate response times. If relevant, repeat the benchmark measurement made in section (2a);
 - d. If the update was across major versions of IUCLID, it involved changes in the data format of IUCLID. In that case, if you have data that you know should have been affected by the format change, check that the changes are as expected for the example taken in step (2b). Also, check the entries relating to data migration in the log of the *IUCLID Updater Tool*.
 - e. Try out any of the new features that are described in the [release notes](#).

10. Complete guide to updating IUCLID 6 Server

Before updating *IUCLID 6 Server*, shut down the server, and then create a back-up of the database. For external databases such as *Oracle* and *PostgreSQL*, create a backup

independently. Refer to the vendor's documentation for how best to create the backup. If the type of database used is the default *Derby Embedded*, or *Derby Network Server* installed within the installation of IUCLID, a backup will be created automatically during the update process, but it is still safest to ensure that the database is backed-up independently, and that the restore process has been checked.

IUCLID 6 Server can be updated to the latest version by running a java software application, the *Updater tool*. The tool is available on the IUCLID 6 website in archives named:

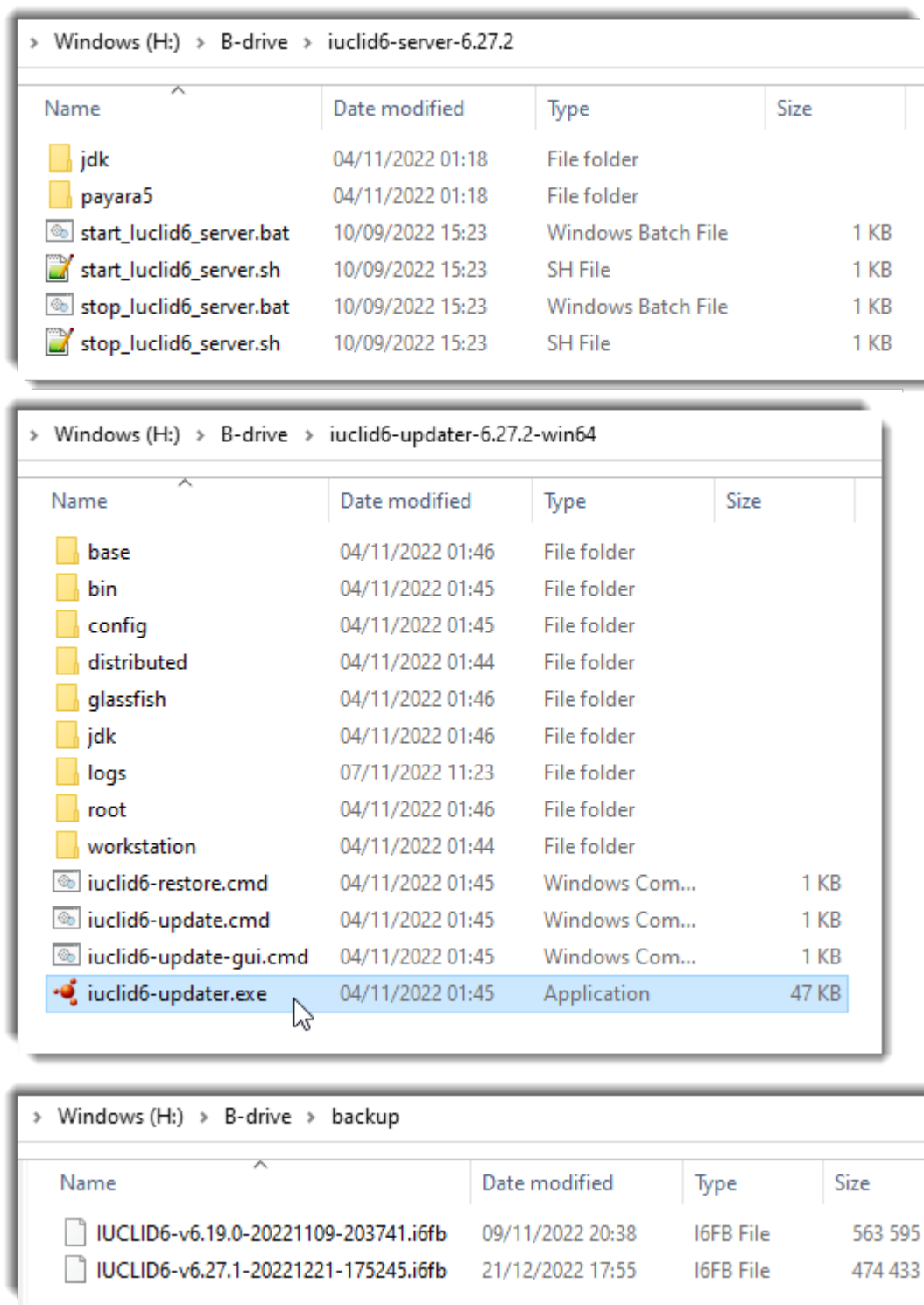
Windows: `iuclid6-updater-<version>.zip`

Linux: `iuclid6-updater-linux-<version>.tar.gz`

To install the *Updater tool*, unzip the archive to a directory that is accessible by the computer that contains the installation of IUCLID 6.

The *Updater tool* comes with its own Java JDK in the directory `jdk`, so it does not need access to the one in the IUCLID installation folder, or a JDK installed elsewhere. Therefore, the *Updater tool* can be treated as a standalone application. Do not install the *Updater tool* inside the installation directory of IUCLID 6. Do not define the location of the automatic backup to be inside the installation directory of IUCLID 6. The reason for this is that the whole content of the IUCLID 6 installation directory is automatically backed-up. If the *Updater tool* tries to back up the backup archive or itself, a feedback loop can be created that results in the backup archive growing uncontrollably.

It is recommended to maintain *IUCLID 6 Server*, *IUCLID Updater tool*, and the automatic backup it creates in different independent directories. For example, there could be three directories on the same level in the file system as shown in the figures below.

Figure 40: Example of separate directories for IUCLID, the Updater tool, and its automatic backup

The *Updater tool* can be run either with or without a graphical user interface. Running *Updater tool* without a graphical wizard is designed for environments where it is preferable, or essential, to use only the command line. For instructions see section 9.2 *Running Updater tool without a graphical wizard*.

The *Updater tool* can be used to update IUCLID 6 Desktop in Windows using the supplied executable:

```
iuclid-updater.exe
```

The graphical interface is designed to be self-documenting so there is no dedicated manual for updating IUCLID 6 Desktop.

When the *Updater tool* is used to update from a previous major version of IUCLID, it migrates the database applying the changes that have occurred to the data format. Any new version of IUCLID, either major or minor, can contain changes to the database that are necessary for changes to the functionality of IUCLID. These changes do not affect the data format. An example of an update in major version is from IUCLID 6 Server v6.27.7 to IUCLID 6 Server v7.0.1.

Do not use *Updater tool* with an unofficial release of IUCLID 6, such as a beta version.

10.1. Running Updater tool with a graphical wizard

Windows:

Run one of the following.

```
iuclid-updater.exe
```

```
iuclid6-update-gui.cmd
```

The second option is supplied in case the default amount of memory allocated to the *Updater Tool* is insufficient, resulting in an error. It allows the allocation to be increased, as described on the IUCLID website in [FAQ 52](#).

Linux:

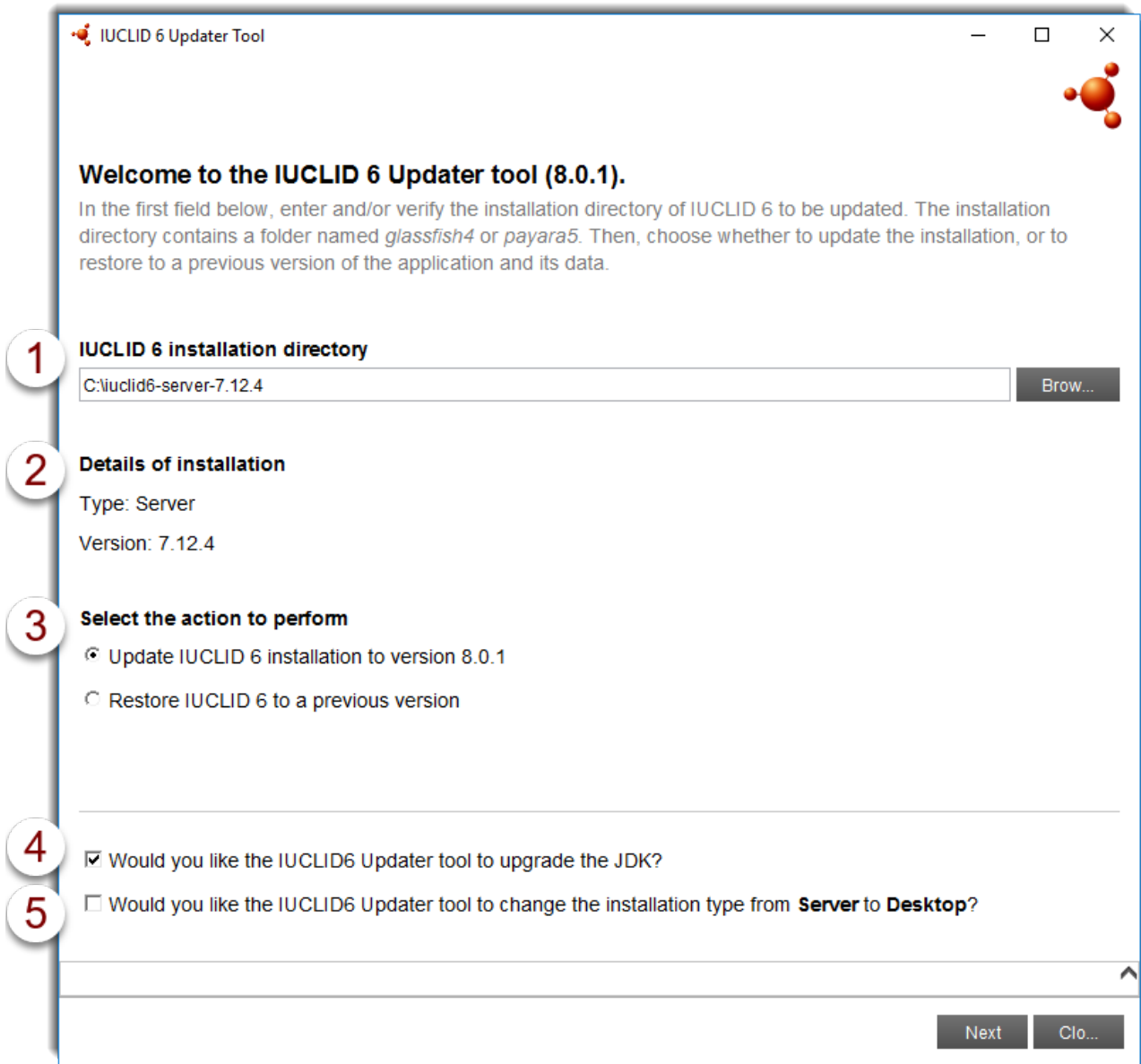
Run the following.

```
iuclid6-update-gui.sh
```

If the default amount of memory allocated to the *Updater Tool* is insufficient resulting in an error, it can be increased as described on the IUCLID website in [FAQ 52](#).

10.1.1. Select the installation of IUCLID 6 Server and options that depend on it

The first page of the graphical wizard of the *Updater tool* is shown in an example below.

Figure 41: The first page of the graphical interface of the Updater tool**Legend for Figure 21**

1. The path of the installation to be updated. The *Updater tool* takes its default values from a file in the home directory of the user that runs the tool. For example, in Windows the file is:
`C:\Users\\.iuclid6\iuclid6_install.properties`
 This file is created when the IUCLID 6 Desktop installer is run. If the file does not exist, which is usually the case for IUCLID 6 Server, the default is a folder named `.iuclid6` in the home directory of the user;
2. This indicates the *type*, *Server/Desktop*, and the *version* of the installation which will be updated. If there is no value for *version*, the path entered in step (1) does not point to a valid installation of IUCLID;
3. Select *Update*. This checks whether the installation can be updated;

4. When *Update* is selected in (3), there is an option *Would you like the IUCLID6 Updater tool to upgrade the JDK?* If this box is ticked, the Java JDK that was delivered with *IUCLID* will be written over by *Azul Zulu Open JDK 8*.
5. When *Update* is selected in (3), there is an option *Would you like the IUCLID6 Updater tool to change the installation type ...?* This box should be ticked only if there is a difference between the type of installation that is being updated, and the type indicated in (2). In previous updates there were some circumstances in which the type of installation could be changed to the incorrect one. This option is used to correct that. For example, if when updating an installation of type *IUCLID 6 Desktop*, the type indicated in (2) is *Server*, tick the box. This will result in an updated installation that behaves as the type *Desktop*.

When the installation directory is correct, *Update* has been selected, and the correct options are set, click on *Next*.

10.1.1.1. Past updates via versions 7.0.1 or 7.0.2

This section is relevant only for *IUCLID 6* versions 7.0.1, 7.0.2, 7.0.4 and 7.0.7.

In the update to *IUCLID 6* to versions 7.0.1 or 7.0.2, data was lost from some specific fields. This section describes how to recover that data.

These instructions apply to instances of *IUCLID* that were updated directly from a previous major version of *IUCLID 6* to either version 7.0.1 or 7.0.2. These instances may have been subsequently updated to versions 7.0.4 or 7.0.7. However, instances updated directly from a previous major version to 7.0.4, 7.0.7, and later, are not affected.

Instructions on how to recover the data were emailed to users who downloaded versions 7.0.1 or 7.0.2. However, to cover as many cases as possible, the instructions are repeated here.

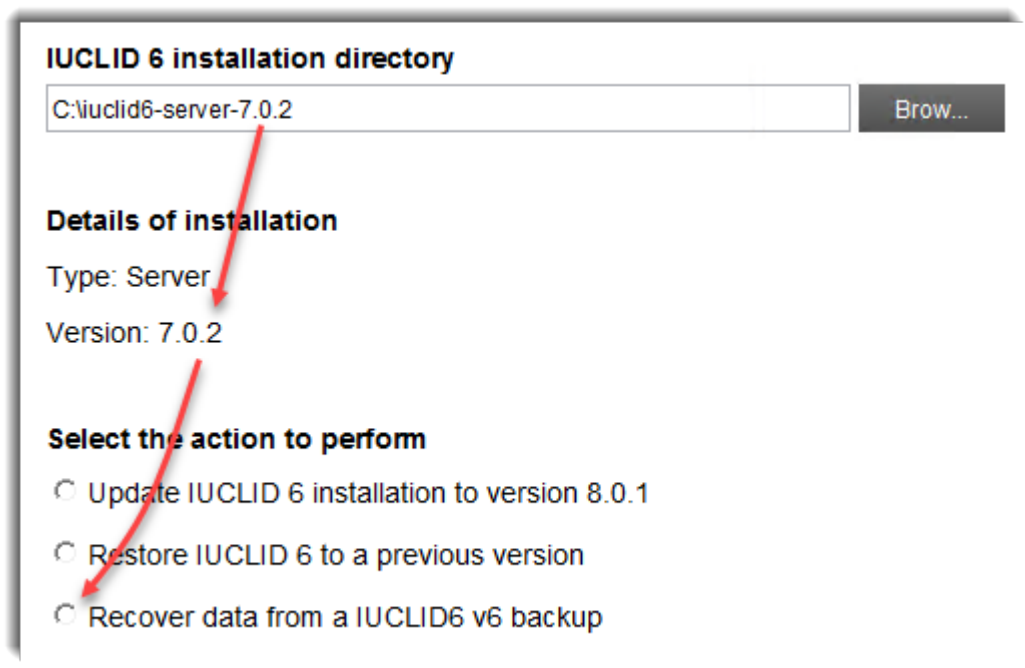
The affected data is in the fields *Description of key information (KeyInformation)* for the following endpoint summaries:

- Acute toxicity
- Repeated dose toxicity
- Carcinogenicity
- Neurotoxicity
- Immunotoxicity

Endpoint summaries are the documents used to store the outcome of the assessment of the information available in relevant studies. This part of the format has been subject to changes in *IUCLID 6 v7* as part of a harmonisation effort.

Data are recovered by running a specially created software tool on a backup of a database that contains the lost data. How that tool is run depends upon the class of database. If the database is external, for example *PostgreSQL* or *Oracle*, a standalone java application is provided: named the *IUCLID Data Recovery Tool*. It is available to download from the *IUCLID* website [here](#). It is provided with its own documentation.

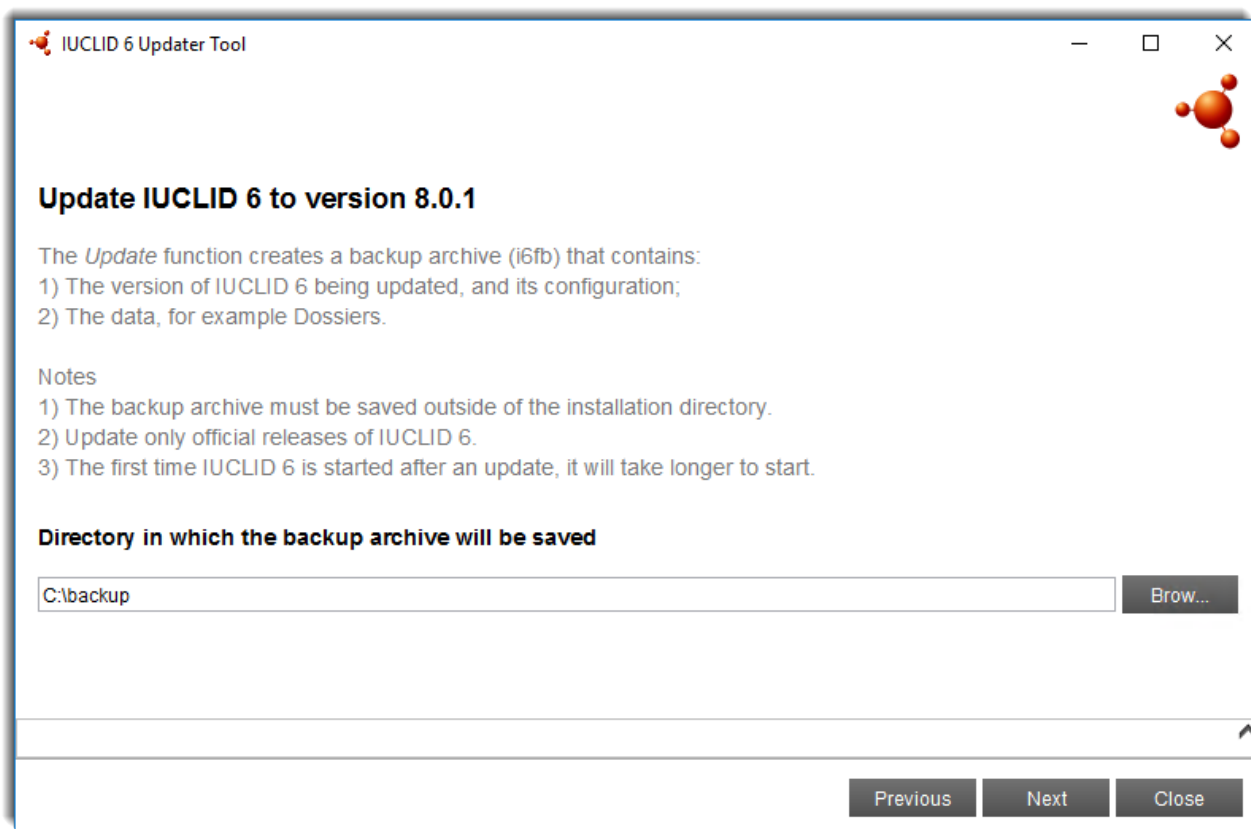
If the database is an embedded Java database, which is the default, the functionality of the *IUCLID Data Recovery Tool* is provided within the *IUCLID 6 Updater Tool*, which automatically detects whether the database of *IUCLID* is one of the affected versions, and if so, presents an option *Recover data from a IUCLID6 v6 backup*. See below for an example.

Figure 42: Restore IUCLID 6 to a previous version

Selecting that option invokes the functionality of the *IUCLID Data Recovery Tool*. For more detail on the subsequent actions, see the separate document [here](#), which applies to versions 7.0.8 and later of the *IUCLID6 Updater Tool*.

10.1.2. Set the location of the back-up archive

The *Update tool* creates a back-up archive of all the files and directories that are in the installation directory of IUCLID 6. For example, this includes the directory `jdk`. The location of this archive is set on the second page of the wizard, as shown in the example below.

Figure 43: Set the path to the automatic backup

Do not use a directory that is inside the installation directory of IUCLID 6. In the example shown above, a dedicated folder has been created.

On clicking *Next*, the *Updater tool* does not yet start to write the backup archive. That happens after step four of the wizard. The archive is named:

```
IUCLID6-v<version>-<datetime>.i6fb.
```

If the default option for the database is used, *Derby Embedded*, the database is fully contained within the archive because it is in a directory within the installation of Payara. The path to the directory that contains the database is:

```
<payara_installation>\glassfish\domains\domain1\database\iuclid6
```

Note that in IUCLID 6 v6.27.x and later, the path includes the directory named `database`, whereas in earlier versions it was the plural `databases`.

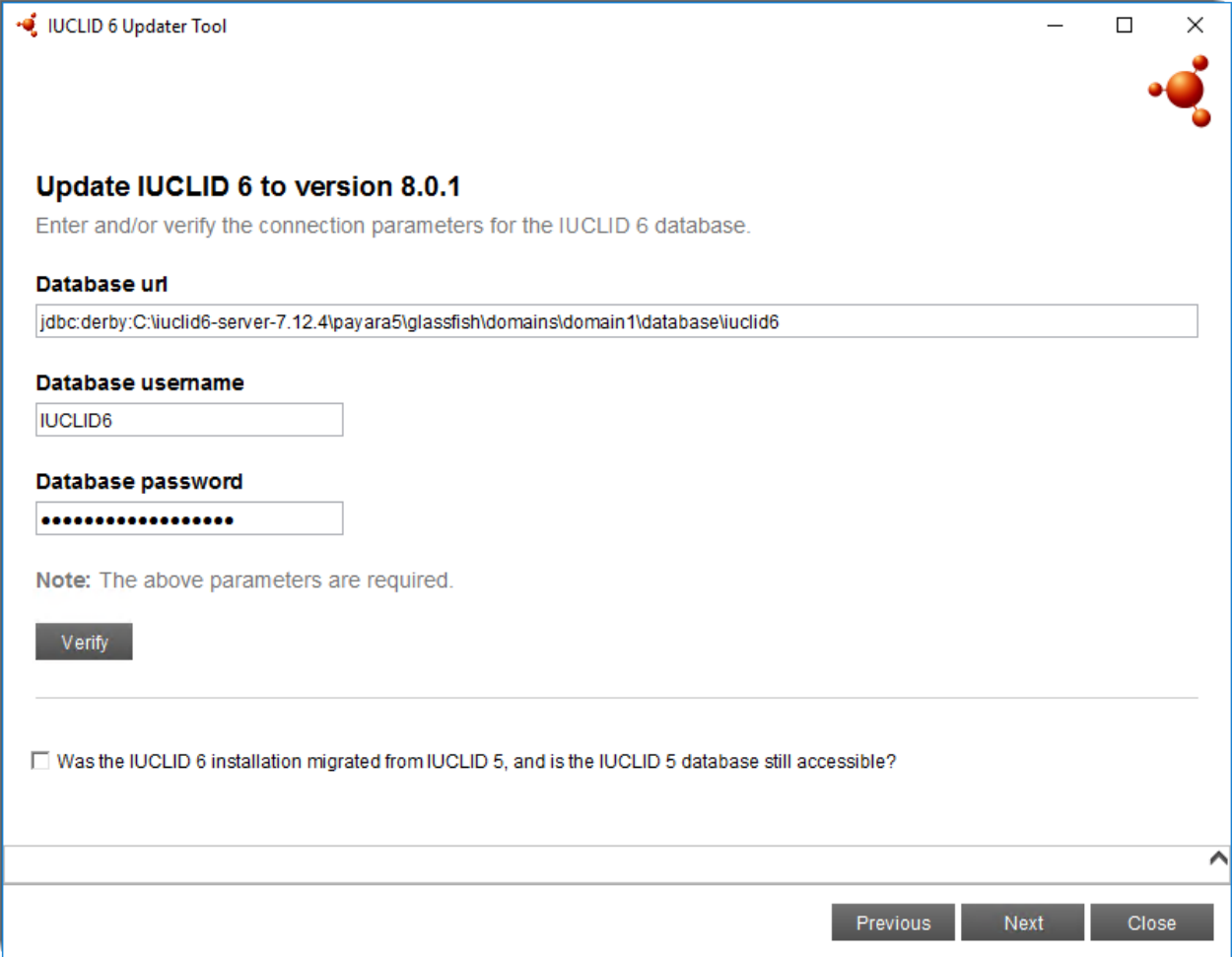
For the default database, the backup archive contains a copy of the application files **and** the database, which includes data such as Substances and Dossiers. For other database configurations, the database may not be in the archive, and must therefore be backed up separately. A backup archive created by the *Updater tool* may be used by its *Restore* feature, as described in the next section.

Once the path to the automatic backup is set correctly, click on *Next*.

10.1.3. Set the database connection parameters

On the third page of the wizard parameters for connections to database(s) are set. An example is given below.

Figure 44: Database connection parameters



The screenshot shows a window titled "IUCLID 6 Updater Tool" with a standard Windows title bar. The main content area is titled "Update IUCLID 6 to version 8.0.1" and contains the instruction "Enter and/or verify the connection parameters for the IUCLID 6 database." Below this, there are three input fields: "Database url" containing "jdbc:derby:C:\iuclid6-server-7.12.4\payara5\glassfish\domains\domain1\database\iuclid6", "Database username" containing "IUCLID6", and "Database password" which is masked with dots. A "Note" states "The above parameters are required." Below the note is a "Verify" button. At the bottom of the form, there is a checkbox labeled "Was the IUCLID 6 installation migrated from IUCLID 5, and is the IUCLID 5 database still accessible?". At the very bottom of the window, there are three buttons: "Previous", "Next", and "Close".

10.1.3.1. Database connection parameters for IUCLID 6 Server

In the example shown above, the *Updater tool* has found a previous installation of *IUCLID 6 Server* and has copied its database connection details into the wizard.

To test whether the connection details are correct, click on *Verify (Ver...)*. If the *Updater tool* can connect to the database, a confirmation message is shown at the bottom left of the interface.

If an error message is shown stating that the *Updater tool* cannot connect to the IUCLID 6 database, check the details carefully, and then try again.

Tip: When using the embedded derby database with *IUCLID 6 Server*, if you see the error message, "Cannot connect to the IUCLID 6 database", but you know the connection details are correct, check whether there is something else already connected to the database, for example, because either IUCLID 6 or another instance of the Updater tool are running. The command line

window that opened on starting the *IUCLID 6 Server* must be closed before the Updater tool can connect.

The *Updater tool* reads the parameters of the database connection from the following configuration file:

```
<payara_installation>\glassfish\domains\domain1\config\domain.xml
```

The way in which the connection details are entered into the file `domain.xml` are described in section 5.3 *Database installation and initialisation*.

If the *Updater tool* gives an error message that it cannot read the connection details from the file `domain.xml`, check that the installation of *IUCLID 6 Server* is valid and configured correctly.

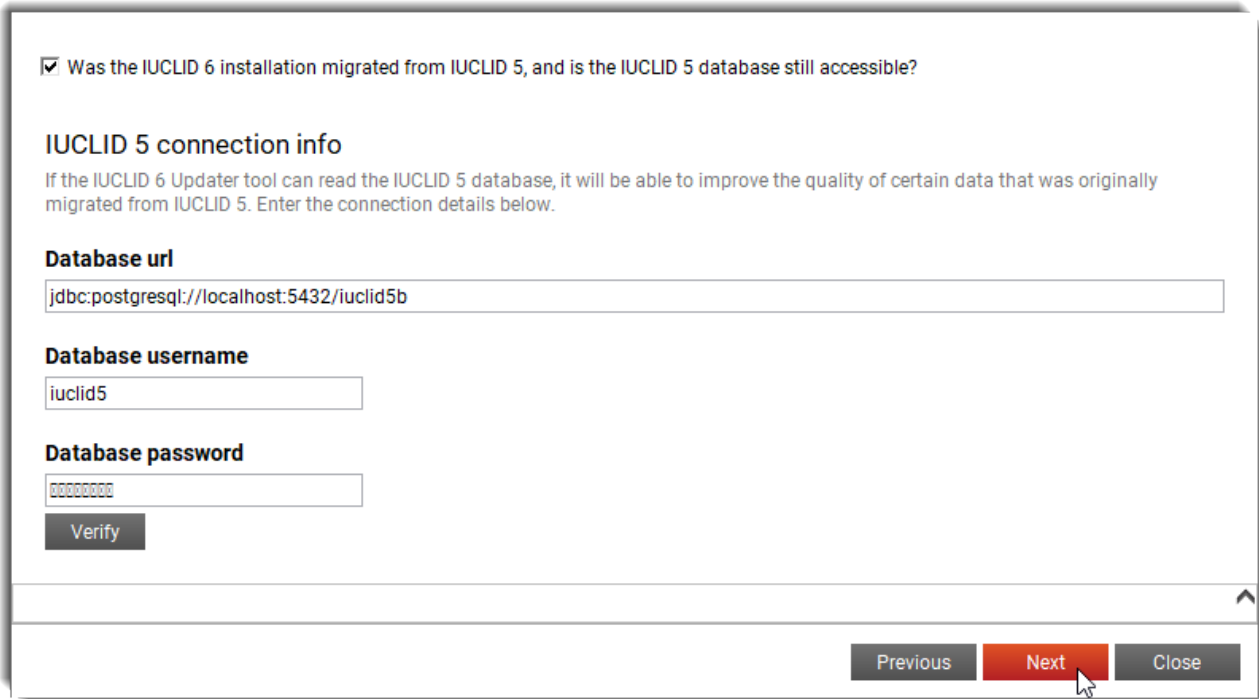
If the connection parameters for the IUCLID 6 database are correct, before proceeding, consider whether the option described in the next section is relevant. If it is not, click on *Next*.

10.1.4. Was the IUCLID 6 installation migrated from IUCLID 5, and is the IUCLID 5 database still accessible?

This option is relevant only if the data in the IUCLID 6 database originally came from IUCLID 5, and the *IUCLID 6 database patch tool* has not already been run on it. It can be ignored if the original IUCLID 5 database and its associated software, PostgreSQL, are no longer accessible. For more information, see below.

In the past, in some cases, the migration process from IUCLID 5 to IUCLID 6 did not migrate all data perfectly. This was addressed by running a separate software tool known as the *IUCLID 6 database patch tool*. This tool required access to both the original source IUCLID 5 database, and the IUCLID 6 database to which data had been migrated. An option to run the *IUCLID 6 database patch tool* is integrated into the *Updater tool*. Ticking the box for this field turns that option on. The IUCLID 5 database must be accessible, so PostgreSQL must be running. The *Updater tool* looks for an installation of IUCLID 5 on the machine on which it is run. An example of the connection parameters is shown in the figure below.

Figure 45: Database connection parameters for IUCLID 5



The location of the parameters is described in the subsection below. If the IUCLID 5 database is running on a different host than the *Updater tool*, it is necessary to configure PostgreSQL to accept the connection. See the vendor’s documentation for [more information](#).

If the connection parameters for the IUCLID 5 database are correct, click on *Next*.

10.1.4.1. Database connection parameters for IUCLID 5

For IUCLID 5, the required values are in the following properties files:

Desktop: <iuclid5 installation directory>\conf\workstation.properties

Server: \webapps\i5server\WEB-INF\classes\server.properties

The parameters in the properties files correspond to the fields in the migration application as follows.

Table 9: The location of the database for IUCLID 5

Field in migration application	Field in properties file
Database url	hibernate.connection.url
Database username	hibernate.connection.username
Database password	hibernate.connection.password

In the example shown in the screen shot above, the values are the defaults for IUCLID 5 with a PostgreSQL database, as shown below:

Database url = *jdbc:postgresql://localhost:5432/iuclid5b*

Database username = *iuclid5*

Database password = *iuclid5*

10.1.5. Summary page

The fourth page of the wizard presents a summary of the overall update process, and states what is about to be changed. Read it through carefully.

Figure 46: Summary of the update process before it is carried out



Clicking *Close* at this point stops the update process before the automatic backup has been created, and before the current installation of *IUCLID 6 Server* has been changed.

When the update process begins, it first checks whether the *IUCLID 6 Server* is running, and if it is, shuts it down.

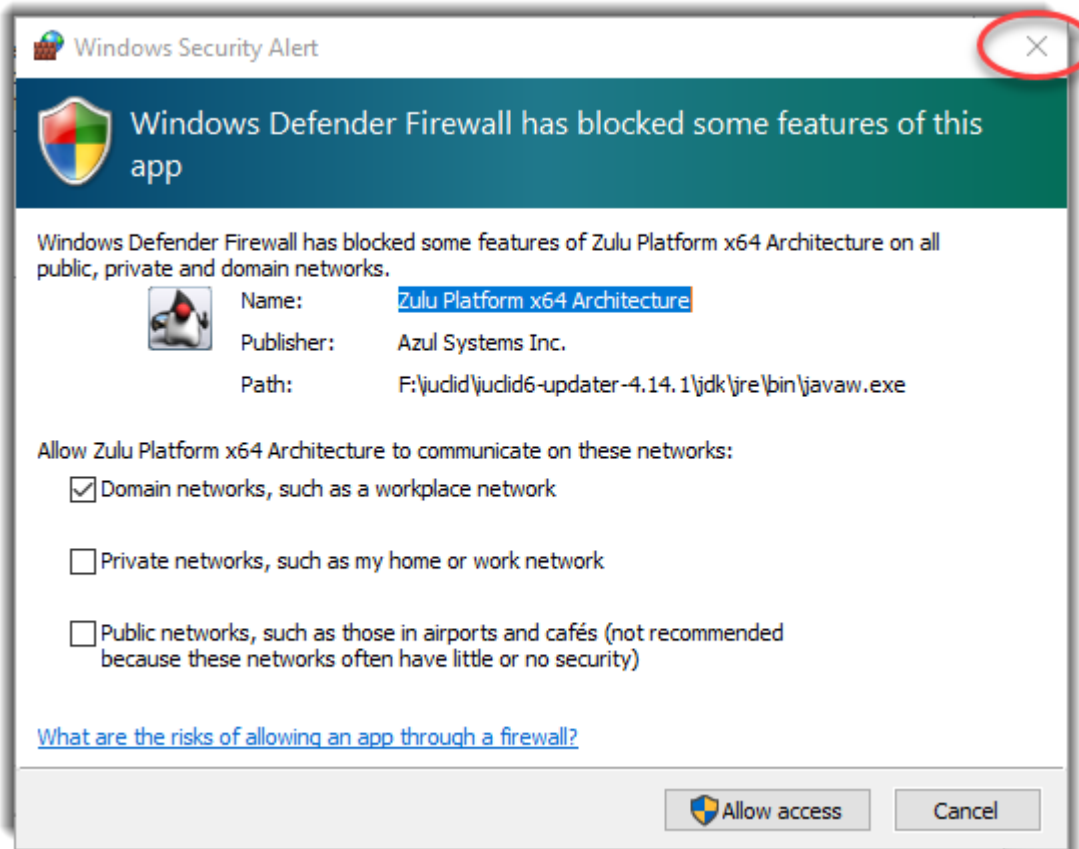
If all the details are correct, and the IUCLID 6 database has been or will be backed up, click *Next*.

10.1.6. Follow the update process

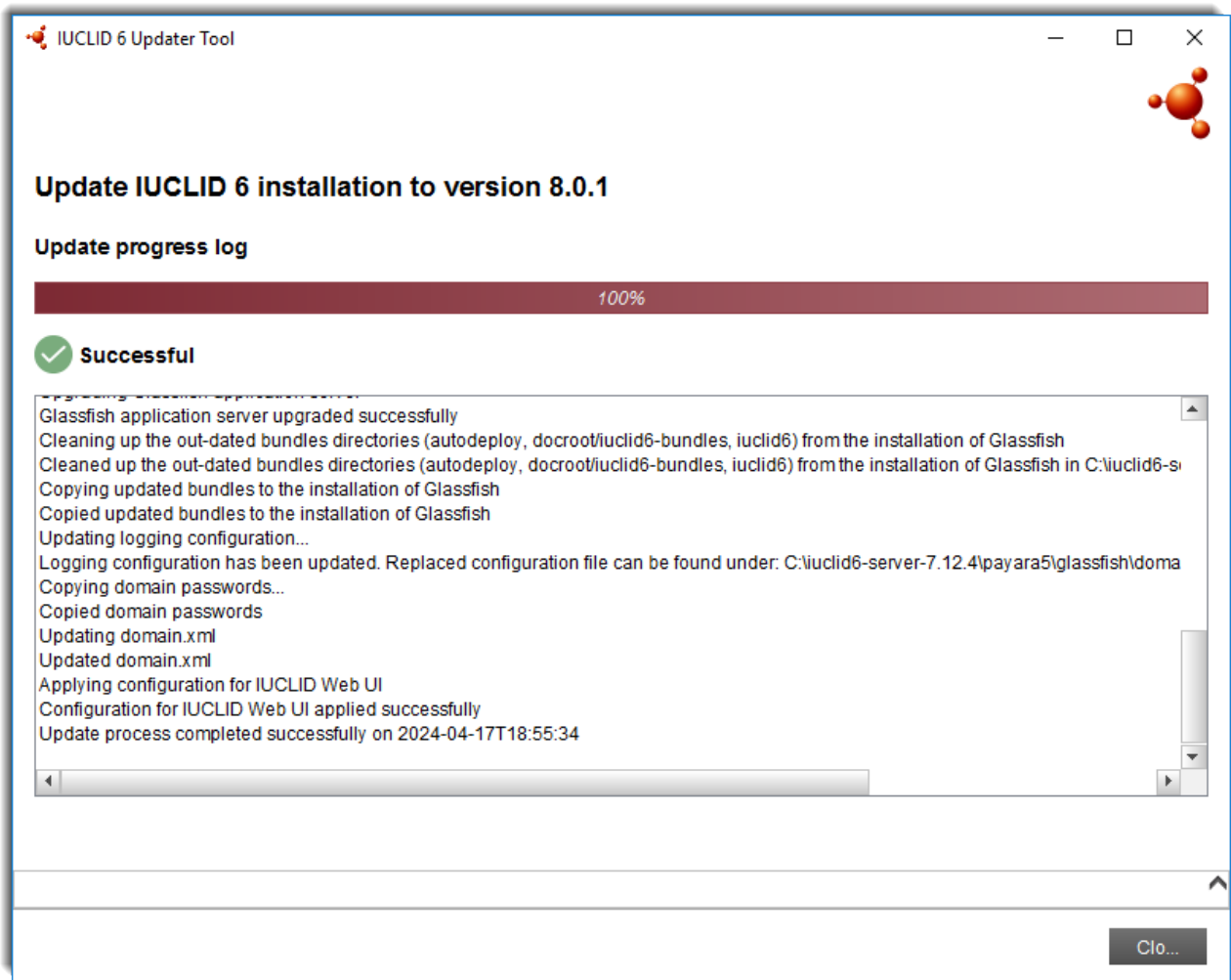
The update process can be followed from the log files and from the interface.

Under Windows if a dialog box like that below is shown, and the default value suits the needs of the installation, it can be dismissed by clicking on the cross at the top right. Note that the version of JDK being used to run the *Updater tool* is shown.

Figure 47: Windows security alert for the Updater tool



An example of the report at the end of a successful update is shown below.

Figure 48: Successful update

After an update, the installation of *IUCLID 6 Server* contains updated versions of the following directories:

```
<installation_dir>\payara5\glassfish\domains\domain1\autodeploy
```

```
<installation_dir>\ payara5\glassfish\domains\domain1\config
```

```
<installation_dir>\ payara5\glassfish\domains\domain1\database
```

```
<installation_dir>\ payara5\glassfish\domains\domain1\docroot
```

```
<installation_dir>\ payara5\glassfish\domains\domain1\endpoints
```

```
<installation_dir>\ payara5\glassfish\domains\domain1\iuclid6
```

```
<installation_dir>\ payara5\glassfish\domains\domain1\lib
```

When *IUCLID 6 Server* is first run after an update, various other folders are created, for example, one for logging.

```
<installation_dir>\ payara5\glassfish\domains\domain1\logs
```

The *Updater tool* writes a record for the new version into the configuration file `domain.xml`. These records are transferred across updates, so they form an historical record of multiple updates. An example of a record is shown below.

```
<application deployment-time="9022" context-root="/iuclid6-web" object-
type="user" name="iuclid6-ui-nx-8.0.1-industry"
location="${com.sun.aas.instanceRootURI}/applications/iuclid6-ui-nx-8.0.1-
industry/" time-deployed="1713369483160">
  <property name="archiveType" value="war"></property>
  <property name="cdiDevModeEnabled" value="false"></property>
  <property name="appLocation"
value="${com.sun.aas.instanceRootURI}/applications/__internal/iuclid6-ui-nx-
8.0.1-industry/iuclid6-ui-nx-8.0.1-industry.war"></property>
  <property name="org.glassfish.ejb.container.application_unique_id"
value="0"></property>
  <property name="defaultAppName" value="iuclid6-ui-nx-8.0.1-
industry"></property>
  <module name="iuclid6-ui-nx-8.0.1-industry">
    <engine sniffer="cdi"></engine>
    <engine sniffer="config"></engine>
    <engine sniffer="security"></engine>
    <engine sniffer="web"></engine>
  </module>
</application>
```

10.1.6.1. Logging of the Updater tool

The *Updater tool* writes the following log files.

Table 10: Logging of the Updater tool

Name of log file	Content of log file
migration-report.log	Information on the migration of data from the old to the new version of the database of <i>IUCLID 6 Server</i> .
patch-report.log	Actions carried out by the <i>IUCLID 6 database patch tool</i> .
updater.log	Details of what happened during the update process.

10.1.7. Increasing the memory for the graphical Updater tool

If the *Updater tool*, gives the following error message, it needs to be run again with more memory allocated to it, as described below.

```
java.lang.OutOfMemoryError: Java heap space
```

If the error message is shown whilst the *Updater tool* is creating a backup, the existing installation of *IUCLID 6 Server* has not yet been touched, so the *Updater tool* can just be run again, this time with more memory. If the error message is shown after the *Updater tool* has created a backup and

whilst it is updating *IUCLID 6 Server*, the installation must first be restored, before running the *Updater tool* with more memory. Restoration is described in section 9.1.10.

To run the *Updater tool* with more memory, first edit a script in the directory `bin`, and then run the tool again. Set the maximum amount of memory that the *Updater tool* may use by editing the value of the parameter **Xmx** in the file:

Windows: `bin/updater.cmd`

Linux: `bin/updater.sh`

For example, to double the maximum amount of memory from the default value of 4096 MB to 8192 MB, change `-Xmx4096m` to `-Xmx8192m`.

A detailed guide to memory management for IUCLID 6 and its tools, aimed at non-IT specialists, is provided in the document [Java and Memory in IUCLID 6](#).

10.1.8. Custom ports and the Updater tool

This section is relevant only where custom ports have been set.

In versions of IUCLID 6 Server after 6.2.0 and before 6.27.1, the ports were set in one of the following configuration files:

Windows

```
<payara_installation>\glassfish\config\asenv.bat
```

Linux

```
<payara_installation>\glassfish\config\asenv.conf
```

Where required, the *Updater Tool* transfers the values of ports from the files above to `domain.xml` where they are set as described in section 5.2 *Setting ports to custom values*.

10.1.9. Starting IUCLID 6 Server after an update

After the *Updater tool* has finished an update, it does not attempt to restart *IUCLID 6 Server*. This must be done using the method appropriate for the system. The first time *IUCLID 6 Server* is started after *Updater tool* has been run, it will take longer to start.

In the update process, the configuration file `asenv.bat/asenv.conf` that points Payara to JDK is set to the default setting that is used in a fresh installation of IUCLID. Therefore, any change that was made in that file must be done again. For details see, section 3.1 *IUCLID 6 Server started and stopped from a script*.

10.1.9.1. IUCLID as a Windows Service after running IUCLID 6 Update Tool

The *IUCLID Updater Tool* v6.27.1 or later deletes the *Windows service* files from the IUCLID installation. However, it does not delete the *Windows service* itself. A simple method to obtain a working *Windows service* is to delete the *Windows service*, and to then recreate it, as described in

section 3.2 *IUCLID 6 Server as a Windows service*. The *IUCLID Updater Tool* resets the values in the settings file `asenv.bat` to the defaults, so that step must also be carried out.

10.1.10. Restore IUCLID 6 to a previous version

In the *Updater tool* the option *Restore IUCLID 6 to a previous version* is intended to be used only when there is a need to recover an installation of IUCLID 6 because something went wrong during the update process.

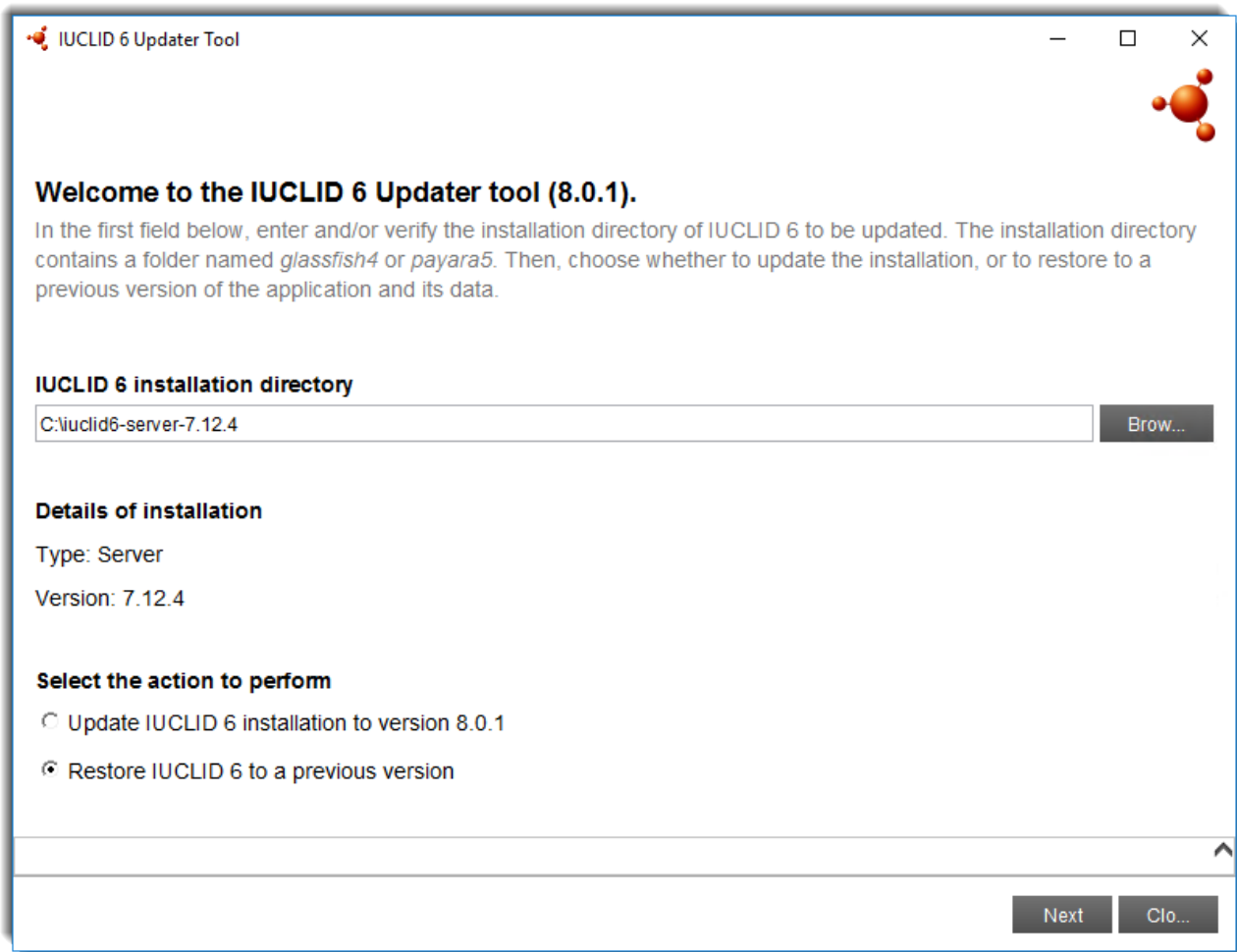
Note that the IUCLID database and the IUCLID application files are separate entities. The *Updater tool* can back-up and restore application files no matter what type of database is used. However, for the database, the backup and restore work only with the default type of database, which is *Derby Embedded*. Other types of databases must be restored from backups created separately from the *Updater tool*. For information on backing up and restoring databases, see the documentation provided by the vendor of the database.

Note that *Restore IUCLID 6 to a previous version* does not restore a Java JDK that was updated by the *Updater tool*.

Before running *Updater tool* to perform a restore process, ensure that *IUCLID 6 Server* is not running.

On the first page of the wizard, in the field *IUCLID 6 Installation Directory*, select the installation of IUCLID into which the application will be restored. This installation will be backed up, and then written over.

Then, select *Restore IUCLID 6 to a previous version* as shown below.

Figure 49: In the Updater tool, choose to restore an installation of *IUCLID 6 Server*

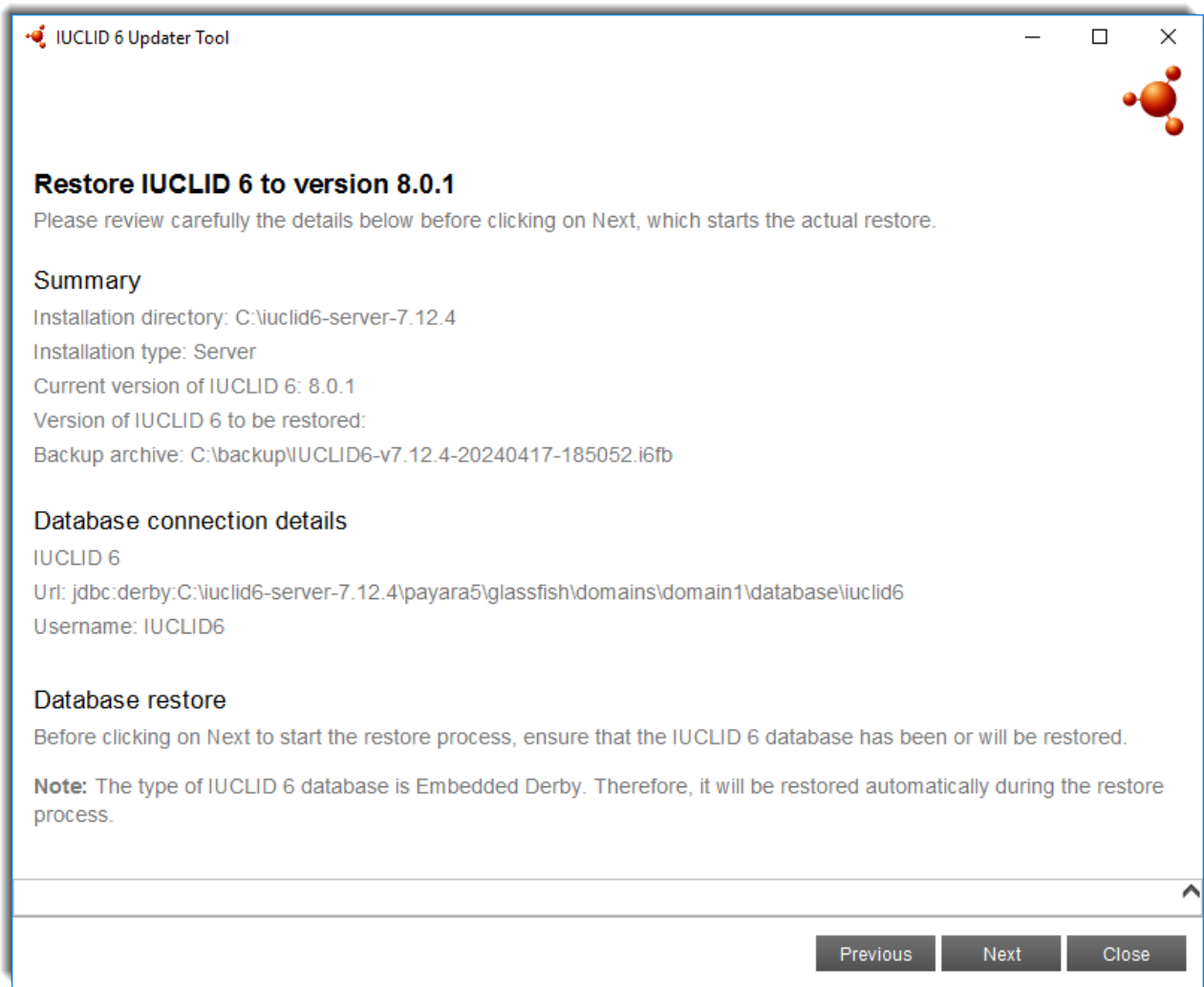
Click on *Next*.

On the second page of the wizard, select the archive file for the installation of *IUCLID 6 Server* that is to be restored. The selected file must have the extension `i6fb`. An example is shown below.

Figure 50: Select a backup archive from which to restore an installation of IUCLID 6 Server

Click on *Next*.

The third page of the wizard presents a summary of the overall restoration process, and states what is about to be changed. Read through it, checking the values.

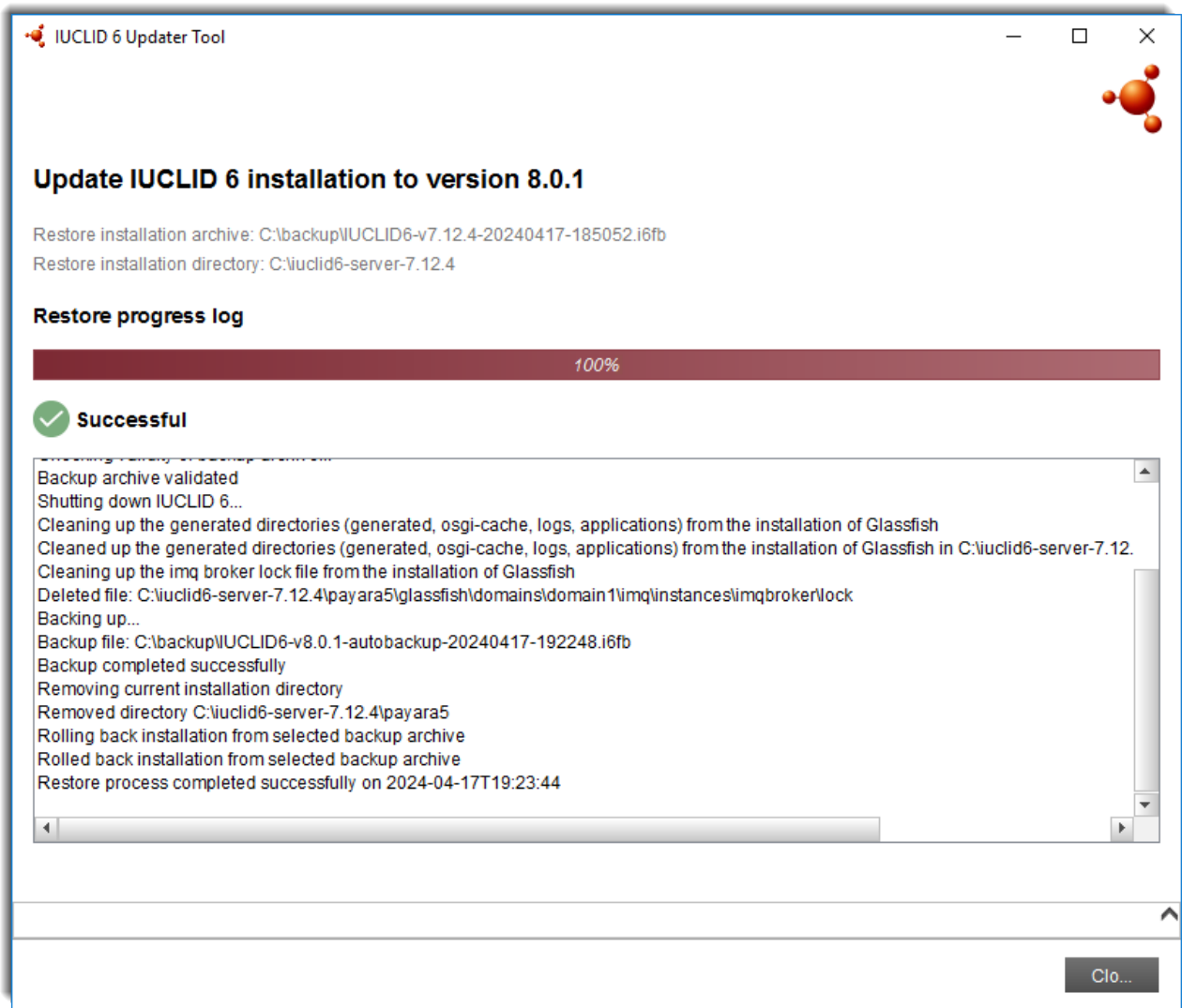
Figure 51: Summary of the restore process before it is carried out

Clicking *Close* at this point stops the restoration process before the automatic backup has been created, and before the selected installation of *IUCLID 6 Server* has been changed.

Click on *Next*.

When the restoration process begins, it first tries to automatically shut down the *IUCLID 6 Server* that it is about to act upon, but best practice is to have shut it down before running the *Updater tool*. The next step is to automatically create a backup archive of the instance of *IUCLID 6 Server* into which the restore process is being done. This archive is saved into the same folder as the archive selected in step 2 of the wizard. Note that only the default type of database will be restored automatically. If all the details are correct, click *Next*. The restoration process can be followed from the interface, as shown in the example below, and from the log file:

`\logs\updater.log`.

Figure 52: Log of the restoration process viewed in the graphical interface

If no more actions are required, the *Updater tool* may be closed.

10.2. Running Updater tool without a graphical wizard

Updater tool can be run without a graphical wizard from the command line, in which case the values of the parameters must be entered into a settings file. The functionality is the same as that for the graphical version described in previous sections. For more information about the scripts and their installation, see the start of this chapter in the manual, *9 Updating IUCLID 6 Server*.

The settings file is in a directory named `config` and has the name:

```
updaterConfig.properties
```

The settings file contains the same parameters that are set in the graphical wizard, plus one extra to determine what happens if an error occurs.

An example of the settings file is given below, in which the OS is Windows, and the type of database is the default Embedded Derby. Note the comment on the different path separators for Windows and Linux.

```
# In properties that contain a file path, please note that
# in windows, the path separator should be (\\) while in unix it is (/)

# The directory where the glassfish installation resides
# This property is required for both update and restore actions
installation.directory= C:\\iuclid6-server

# The directory where the backup file will be stored in case of update or
# loaded in case of restore operation
backup.directory= C:\\backup

# The name of the backed-up archive to be restored, including the i6fb suffix
# This property is needed only for restore action
backup.archive= IUCLID6-v7.12.4-20240417-185052.i6fb

# Oracle connection url
# connection.url=jdbc:oracle:thin:@172.17.52.75:1521:iucliddev

# External derby connection url
# connection.url=jdbc:derby://localhost:1527/iuclid6

# Embedded derby connection url
connection.url=jdbc:derby:C:\\iuclid6-
server\\payara5\\glassfish\\domains\\domain1\\database\\iuclid6

# Connections details for IUCLID5 DB to be used by db patch/migration tools
(OPTIONAL)
# iuclid5.connection.url=jdbc:postgresql://localhost:5432/iuclid5
# iuclid5.connection.user=iuclid5
# iuclid5.connection.password=iuclid5

# Connections details for IUCLID6 DB to be used by db patch/migration tools
(REQUIRED)
iuclid6.connection.url= jdbc:derby:C:\\iuclid6-
server\\payara5\\glassfish\\domains\\domain1\\database\\iuclid6
iuclid6.connection.user=IUCLID6
iuclid6.connection.password=IUCLID6

# For cli-based execution, in case db migration failures are identified
specify the action to perform.
# Eligible values are: [update, restore, prompt]. Default value is prompt
on.dbmigration.errors=prompt
```

```
# For TESTING purposes only to simulate the scenarios where db migration
failures occurred
simulate.dbmigration.errors=false
```

Start the update or restore by running one of the appropriate scripts below:

Windows

```
iuclid6-update.cmd
```

```
iuclid6-restore.cmd
```

Linux

```
iuclid6-update.sh
```

```
iuclid6-restore.sh
```

On Linux, if required, the scripts above can be set to be executable using the following command:

```
$ chmod +x *.sh
```

Whilst the creation of a backup archive and the update or restore is running, do not interrupt the associated process(es) in any way. The progress can be followed from the command window, and from the log file(s).

10.2.1. Increasing the memory for the Updater tool when run with no graphical interface

If the *Updater tool*, gives the following error message, it needs to be run again with more memory allocated to it, as described below.

```
java.lang.OutOfMemoryError: Java heap space
```

If the error message is shown whilst the *Updater tool* is creating a backup, the existing installation of *IUCLID 6 Server* has not yet been touched, so the *Updater tool* can just be run again, this time with more memory. If the error message is shown after the *Updater tool* has created a backup and whilst it is updating *IUCLID 6 Server*, the installation must first be restored, before running the *Updater tool* with more memory. Restoration is described in section 9.1.10.

To run the *Updater tool* with more memory, first edit a script in the directory `bin`, and then run the tool again. Set the maximum amount of memory that the *Updater tool* may use by editing the value of the parameter **Xmx** in the file:

Windows: `bin\updater.cmd`

Linux: `bin/updater.sh`

For example, to double the maximum amount of memory from the default value of 4096 MB to 8192 MB, change **-Xmx4096m** to **-Xmx8192m**.

A detailed guide to memory management for IUCLID 6 and its tools, aimed at non-IT specialists, is provided in the document [Java and Memory in IUCLID 6](#).