

Installation and Administrators Guide of the openBIS and ETL Server 8.04



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This manual is addressed to the administrators of openBIS and ETL Server. It is not a documentation for user, they should consult the available user manual.

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openBIS 8.04

System Requirements

The requirements of the system on which the server should run are the following

- OS: Linux / MacOS X with
 - bash
 - unzip
 - awk
 - sed
- Java VM: JRE 1.5.0 or higher
- PostgreSQL 8.2 or higher
- SMTP server configured if you want to obtain notifications (note that you can also change the configuration to use another SMTP server if you don't have one configured on the server)

Because [Crowd](#) is used as authentication service the IP of the system and the openBIS application has to be registered at the Crowd server. On the other hand the openBIS server should be allowed to access Crowd via HTTPS (host: `source.systemsx.ch`, port: 8443)

Installation

The server distribution is a zip file named `openBIS-server-<version>-r<revision>.zip`. It contains:

- `openBIS-server/apache-tomcat.zip`: Tomcat 5.5 distribution.
- `openBIS-server/tomcat-version.txt`: Complete version number of the Tomcat distribution (needed by the `install.sh` script).
- `openBIS-server/server.xml`: Tomcat configuration file. The openBIS server uses the HTTPS connector at port 8443.
- `openBIS-server/axis2.xml`: Axis2 configuration file.
- `openBIS-server/openBIS.war`: openBIS Web Application.
- `openBIS-server/roles.conf`: Default role definitions.
- `openBIS-server/server.keystore`: Keystore with key for SSL connection between openBIS server and client.
- `openBIS-server/source-systemsx.ethz.ch.keystore`: Keystore with key for SSL connection between openBIS server and Crowd.
- `openBIS-server/install.sh`: Installation script.

In addition the properties file `service.properties` should be created from the following template:

service.properties

```
#####
# Template of service.properties for openBIS server
#####
# Supported: 'file-authentication-service' and 'crowd-authentication-service'
authentication-service = file-authentication-service

script-folder = .

# Supported: currently only 'postgresql' is supported
database.engine = postgresql
database.create-from-scratch = false
database.script-single-step-mode = false
# Leave empty to get the default for the db engine
database.url-host-part =
database.kind = demo
# Credentials of the database user which should own the database. Leave empty to use the OS user
database.owner =
database.owner-password =
# Credentials of a database user which is able to create a new database. Leave empty to use the
db engines default
database.admin-user =
database.admin-password =

# The URL that the Crowd service can be found at
crowd.service.url = some.url
# The port that the Crowd service can be found at
crowd.service.port = 443
# Name of the application when logging in into Crowd
crowd.application.name = openbis
# Password for which the openBIS service is registered at Crowd
crowd.application.password = <application password>

# SMTP properties
# Default values are 'localhost' for 'mail.smtp.host' and 'openbis@localhost' for 'mail.from'
mail.smtp.host = localhost
mail.from = openbis@localhost
mail.smtp.user =
mail.smtp.password =

# Properties for ProcessingPathValidator:
# path prefixes for each procedure type
processing-instruction.DATA_ACQUISITION.prefix-for-absolute-paths =
processing-instruction.DATA_ACQUISITION.prefix-for-relative-paths =
processing-instruction.IMAGE_ANALYSIS.prefix-for-absolute-paths =
processing-instruction.IMAGE_ANALYSIS.prefix-for-relative-paths =

# Group identifier (mandatory).
group-code = DEFAULT

# Workflow code name (mandatory; available values: strict, plates-on-demand)
workflow-code = strict

# The time after which an inactive session is expired by the service (in minutes).
session-timeout = 30
```

For <application password> ask the administrator of the Crowd service. The credentials for the database user with the privilege to create a new database depends on the installation and configuration of the PostgreSQL database. The credentials for Axis2 administration console can be chosen freely.

The path prefixes have to be the same as for the ETL Server.

For adaption of the roles, look at the file `webapps/openBIS/WEB-INF/classes/roles.conf`. A typical role configuration file looks like

roles.conf

```
[DefaultRoles]
observer

[Roles]
etlserver = etlserver
admin = userA, userC
user = userB
```

```
observer = someVisitorUser
```

The section [DefaultRoles] defines the role(s) that a user should be assigned that is not listed explicitly in the [Roles] section. It contains one role in one line with no additions.

The section [Roles] has entries <role> = <userlist> which gives the users on the right hand side the role on the left hand side. A user can be in multiple user lists in which case he or she gets multiple roles.

You do not have to restart the *openBIS* server if you change the roles configuration file. After a certain amount of time the server will reload the configuration file.

Installation steps

1. Unzip the distribution on the server machine into some temporary folder.
2. Copy an appropriated `service.properties` file into the same folder.
3. Change to the temporary folder.
4. Run the installation script as follows:

```
prompt> openBIS-server/install.sh <server folder> <service properties  
file> [<role config file>]
```

where:

- <server folder> needs to be specified as an absolute path
- <service properties file> specifies a file containing key-value pairs as service properties (usually called `service.properties`)
- [<role config file>], which is optional, specifies a file containing role definitions (usually `roles.conf`)

It does the following:

1. Unzips Tomcat (i.e. `apache-tomcat.zip`) into <server folder>.
2. Copies keystores to <server folder>/apache-tomcat.
3. Copies `server.xml` to <server folder>/apache-tomcat/config.
4. Modifies <server folder>/apache-tomcat/bin/startup.sh.
5. Unzips openBIS Web application (i.e. `openBIS.war`) into <server folder>/apache-tomcat/webapps.
6. Copies <service properties file> to <server folder>/apache-tomcat/webapps/openBIS/WEB-INF/classes/service.properties.
7. Copies <role config file> to <server folder>/apache-tomcat/webapps/openBIS/WEB-INF/classes/roles.conf.
8. Copies `axis2.xml` to <server folder>/apache-tomcat/webapps/openBIS/WEB-INF/conf where `@axis2.admin-user@` and `@axis2.admin-password@` are replaced by the appropriated values from `service.properties`.
9. Finally starts Tomcat.

As a first check for a successful installation open your Web browser at `https://<host name>:8443/openbis/services/lms/getVersion`. It should show the following XML document:

```
<ns:getVersionResponse>  
  <ns:return>3</ns:return>  
</ns:getVersionResponse>
```

On startup the openBIS service checks the connection with Crowd and creates the database on

PostgreSQL. If something went wrong the administrator of the server machine will get an e-mail.

Update

In order to update an openBIS server do the following:

1. Stop the currently running server as described in section [Stop Server](#)
2. Keep `service.properties` and `roles.conf` from `<server folder>/apache-tomcat/webapps/openBIS/WEB-INF/classes` and delete `<server folder>/apache-tomcat*`.
3. Adapt the kept `service.properties` file in accordance to the corresponding file in the new openBIS distribution. Note that `webclient.organization` has been replaced by `group-code`.
4. Install the new openBIS server as described in section [Installation steps](#). Uses the adapted `service.properties` file.

Start Server

The server is started as follows:

```
prompt> cd <server folder>/apache-tomcat
prompt> bin/startup.sh
```

Stop Server

The server is stopped as follows:

```
prompt> cd <server folder>/apache-tomcat
prompt> bin/shutdown.sh
```

Authentication systems

openBIS currently supports two authentication systems: a self-contained system based on a UNIX-like `passwd` file and a system based on Crowd (see <http://www.atlassian.com/software/crowd>), an authentication middle ware sold by Atlassian.

The file based authentication system

By default, `authentication-service = file-authentication-service` is set. This authentication schema uses the file `<server folder>/apache-tomcat/etc/passwd` to determine whether an authentication to the system is successful or not.

The script `{{<server folder>/apache-tomcat/bin/passwd.sh}` can be used to maintain this file. This script supports the options:

```
passwd list | [remove|show|test] <user> | [add|change] <user> [option [...]]
--help                               : Prints out a description of the options.
[-P,--change-password]               : Read the new password from the console,
[-e,--email] VAL                     : Email address of the user.
[-f,--first-name] VAL                : First name of the user.
[-l,--last-name] VAL                : Last name of the user.
[-p,--password] VAL                 : The password.
```

A new user can be added with

```
prompt> passwd.sh add [-f <first name>] [-l <last name>] [-e <email>] [-p  
<password>] <username>
```

If no password is provided with the `-p` option, the system will ask for a password of the new user on the console. Please note that providing a password on the command line can be a security risk, because the password can be found in the shell history, and, for a short time, in the `ps` table. Thus `-p` is not recommended in normal operation.

The password of a user can be tested with

```
prompt> passwd.sh test <username>
```

The system will ask for the current password on the console and then print whether the user was authenticated successfully or not.

An account can be changed with

```
prompt> passwd.sh change [-f <first name>] [-l <last name>] [-e <email>] [-P]  
<username>
```

An account can be removed with

```
prompt> passwd.sh remove <username>
```

The details of an account can be queried with

```
prompt> passwd.sh show <username>
```

All accounts can be listed with

```
prompt> passwd.sh list
```

The authentication interface to Crowd

When setting `authentication-service = crowd-authentication-service` in `service.properties`, the `passwd` file has no effect. Instead, the following properties need to be configured via the following properties.

The URL (without port information):

```
crowd.service.url = https://crowd.your.org
```

The Port of the URL:

```
crowd.service.port = 443
```

The name of the application account in Crowd:

```
crowd.application.name = openbis
```

The password of the application account in Crowd:

```
crowd.application.password = <application password>
```


ETL Server

Introduction

ETL stands for *Extract*, *Transform* and *Load*. ETL is a process in data management that involves

- extracting data from outside sources,
- transforming it to fit business needs, and ultimately
- loading it into the data base.

See also http://en.wikipedia.org/wiki/Extract,_transform,_load for further information.

Functionality

In an ETL server several independent ETL threads run in parallel. Each thread

1. takes file-based raw data from a central storage,
2. checks with the openBIS server what experiment the raw data belong to and
3. makes sure the raw data are getting associated as external tables with the database of the openBIS application.

If any of the above steps fail, the ETL thread produces logs and assures that the raw data don't get lost by either moving them to a directory called `invalid`, `error`, or `unidentified`. If considered `invalid`, an notification email is sent to the user who has registered the experiment the data belong to.

How data sets get identified in the system

There are 2 ways to link data sets to unique identifiers ('data set codes').

1. The openBIS server generates the data set code once the data set gets registered. The openBIS server will create the code if the Data Set Info Extractor does not set the data set code in the `DataSetInformation` and will ensure that the data set codes are unique. This is the recommended way to identify data sets.
1. The Data Set Info Extractor sets the data set code in the `DataSetInformation`. In this case the creator of the codes needs to ensure that the codes are unique.

How data sets get linked to each other

Data sets can be in a parent-child relationship which means that the child data set is produced by processing the parent data set. In order to allow tracking this relationship information, an Data Set Info Extractor can specify a parent data set code in the `DataSetInformation`.

Placeholders

If the parent data set identified by the parent data set code is not yet known to the openBIS server (which can happen), the data set code is set to a placeholder.

Data Flow

An ETL thread requires 2 directories, to be specified in the `service.properties` file, see also [Configuration](#) section:

1. The `<incoming-dir>` is a directory on a central file system to watch for incoming data. Each thread has different folder.
2. The `<storeroor-dir>` is the root directory of the data store. It is the same for all threads.

Note that both directories must reside in the same file system.

The ETL thread creates the following directories:

1. `<storeroor-dir>/Instance_<instance code>/Group_<group code>/Project_<project code>/Experiment_<experiment code>/ObservableType_<observable type code>/Barcode_<barcode>` is the target directory of all data sets belonging to a certain sample (specified barcode), experiment, project, and group. The instance is defined in the configuration file (`service.properties`) of the ETL server. For each of these data sets a numbered subdirectory is created. The first one is 1, the second 2, etc.
2. `<storeroor-dir>/invalid` is the target directory for all data which can be associated with an experiment, but come from a plate with an invalid bar code. This can happen only in the plates-on-demand workflow.
3. `<storeroor-dir>/unidentified` is the target directory for all data which can not be associated with an experiment.
4. `<storeroor-dir>/error` is the target directory for all data which causing an error when been extracted and/or transformed.

The workflow is as follows:

1. The *Data Mover* moves data sets (files or directories) from the microscope acquisition PC to `<incoming-dir>` of one of the ETL threads (see documentation on the [Data Mover](#)).
2. An ETL thread checks `<incoming-dir>` every `check-interval` seconds for marker files assoicated with these data sets. A marker file is an empty with the name `.MARKER_is_finished_<data set file name>`.
3. `DataSetInformation` is extracted from the incoming data set by using one of the various configurable Data Set Info Extractors. Currently all extractors only need the data set file name.
4. Next the *openBIS server* is asked for the experiment to which this data set can be associated. This step depends on the kind of workflow:
 - *strict* workflow: Only sample code (i.e. bar code) is needed. It has to denote a sample registered for an experiment.
 - *plates-on-demand* workflow: In addition project code and experiment code has to be specified. In accordance to some rule the code of the master plate can be derived from the sample code.
5. If the data set
 - can be associated with a registered experiment and bar code, it is moved from `<incoming-dir>` to `<storeroor-dir>` and registered with at the *openBIS server*.
 - can be associated neither with a registered experiment nor with a registered bar code, it is moved from `<incoming-dir>` to `<storeroor-dir>/unidentified`.

- No registration with the openBIS service takes place.
 - can be associated with a registered experiment, but refers to a bar code not associated with this particular experiment, it is moved from `<incoming-dir>` to `<storeroot-dir>/invalid`. No registration with the openBIS service takes place. An email notification is sent to the person who registered the experiment the data set could be associated with.
 - can be associated with a registered experiment, but refers to an invalid bar code, a file `.faulty-paths` is created in `<incoming-dir>` listing the file name of the data set. No registration with the openBIS service takes place.
 - can be associated with a registered experiment and bar code, but couldn't be extracted and/or transformed, new entry is moved to `<storeroot-dir>/error/ObservableType_<observable type code>`. In addition a file `<new entry>.exception` is created in this directory. No registration with the openBIS service takes place.
6. If transformation/extraction and registration are performed successfully the ETL thread is asking *openBIS server* for processing instruction. If there is a processing instruction for the registered experiment and the procedure type the ETL thread does the following:
- Copies the data set to the directory specified by the path attribute processing instruction. If possible hard links are created for file. Only the directory structure is copied.
 - Writes the processing parameters (if any) to a file in that directory.
 - Optional a marker file is created.

Data Set Codes and Data Provenence

The ETL server will ensure that the data set code is used as a prefix for the processing directory. The Data S later on to identify the parent data set of the incoming data set.

File and Directory Naming Convention

The following Data Set Info Extractors

- `ch.systemsx.cisd.etlserver.DefaultDataSetInfoExtractor`
 - `ch.systemsx.cisd.etlserver.DataSetInfoExtractorForPlatesOnDemand`
 - `ch.systemsx.cisd.etlserver.threev.DataSetInfoExtractorForDataAcquisition`
 - `ch.systemsx.cisd.etlserver.threev.DataSetInfoExtractorForImageAnalysis`
- assume that the name of a data set file or directory contains all necessary data set information. The name has to be a concatenation of entities with an entity separator specified in the `service.properties` file.

Examples

Successful ETL Thread

We assume the *Data Mover* has moved the following data to `PATH/incoming`:

```
PATH/incoming/EXP4::CP001-1AI> ls
A10.tif A11.tif A12.tif
```

When the process has been completed, the *Data Mover* creates the file:

```
PATH/incoming> ls -a
. . . .MARKER_is_finished_EXP4::CP001-1AI
```

The *ETL server* is searching in PATH/incoming for the file .MARKER_is_finished_EXP4::CP001-1AI. After less than check-interval seconds, the *ETL server* will find the file .MARKER_is_finished_EXP4::CP001-1AI and will start to recursively move the directory EXP4::CP001-1AI and all files underneath to

```
PATH/storerooot/Group_MY-GROUP/Project_NEW/Experiment_EXP4/ObservableType_IMAGE/Barcode_CP001-1AI/1/1EXP4::CP001-1AI> ls
A10.tif A11.tif A12.tif
```

In addition the *ETL server* will register all the data sets with the openBIS service call the method register-data-set.

Installation and Administration

System Requirements

The requirements of the system on which the server should run identical to [openBIS Server](#) system requirements.

Installation

The ETL server distribution is a zip file named etl-server-<version>-r<revision>.zip. It contains:

- etlserver/etlserver.sh: Script to start the server in a Unix shell.
- etlserver/etlserver.bat: Script to start the server in a Windows Command shell.
- etlserver/lib: Folder containing all necessary Java libraries to run the server.
- etlserver/data/store: Default root directory of the data to be stored.
- etlserver/data/incoming: Default directory of incoming data
- etlserver/etc/openBIS.keystore: Key store needed for an HTTPS connection with openBIS WebService.
- etlserver/etc/log.xml: Log4J logging properties.
- etlserver/etc/service.properties: ETL Server configuration file.

Configuration

The ETL Server is completely configured by the configuration file service.properties. Here is an example:

service.properties

```
# Code of openBIS instance
instance-code = Lab42

# The root directory of the data store
storerooot-dir = targets/store

# The check interval (in seconds)
check-interval = 5

# The URL of the openBIS server
server-url = http://localhost:8080/openbis
```

```

# The username to use when contacting the openBIS server
username = etlserver

# The password to use when contacting the openBIS server
password = doesnotmatter

# SMTP properties (must start with 'mail' to be considered).
# mail.smtp.host = localhost
# mail.from = etlserver@localhost

# Maximum number of retries if renaming failed.
# renaming.failure.max-retries = 12

# The number of milliseconds to wait before retrying to execute the renaming process.
# renaming.failure.millis-to-sleep = 5000

# Globally used separator character which separates entities in a data set file name
date-set-file-name-entity-separator = _

# Prefixes for processing paths for all procedure types.
# default-prefix-for-absolute-paths is the key for paths starting with '/'.
# default-prefix-for-relative-paths is the key for paths not starting with '/'.
#
default-prefix-for-absolute-paths =

# Processors of processing instructions.
#
# processors: comma separated list of procedure type codes
# processor.<procedure type code>.prefix-for-absolute-paths: Key for a processing path starting
with '/'.
# processor.<procedure type code>.prefix-for-relative-paths: Key for a processing path not
starting with '/'.
# processor.<procedure type code>.parameters-file: Name of the file containing the processing
parameters.
# processor.<procedure type code>.finished-file-template: Name of the marker file which finishes
processing.

processors = DATA_ACQUISITION
processor.DATA_ACQUISITION.prefix-for-absolute-paths = ${default-prefix-for-absolute-paths}
processor.DATA_ACQUISITION.prefix-for-relative-paths = targets/processing
processor.DATA_ACQUISITION.parameters-file = parameters
processor.DATA_ACQUISITION.data-set-code-prefix-glue = ${date-set-file-name-entity-separator}
processor.DATA_ACQUISITION.finished-file-template = .MARKER_is_finished_{0}
processor.DATA_ACQUISITION.input-storage-format = BDS_DIRECTORY
# time after which the copy of a single file for processing should complete.
# If that will not happen, operation will be terminated and relaunched.
#processor.DATA_ACQUISITION.data-copy-timeout = 2

# Comma separated names of processing threads. Each thread should have configuration properties
prefixed with its name.
# E.g. 'code-extractor' property for the thread 'my-etl' should be specified as 'my-etl.code-
extractor'
inputs=main-thread

# -----
# 'main-thread' thread configuration
# -----

# The directory to watch for incoming data.
main-thread.incoming-dir = targets/incoming

# The store format that should be applied in the incoming directory.
main-thread.incoming-dir.format =

# ----- Plugin properties -----

# The extractor plugin class to use for code extraction
main-thread.data-set-info-extractor = ch.systemsx.cisd.etlserver.DefaultDataSetInfoExtractor
# Separator used to extract the barcode in the data set file name
main-thread.data-set-info-extractor.entity-separator = ${date-set-file-name-entity-separator}

main-thread.type-extractor = ch.systemsx.cisd.etlserver.SimpleTypeExtractor
main-thread.type-extractor.file-format-type = TIFF
main-thread.type-extractor.locator-type = RELATIVE_LOCATION

```

```

main-thread.type-extractor.observable-type = IMAGE
main-thread.type-extractor.procedure-type = DATA_ACQUISITION

# The storage processor (IStorageProcessor implementation)
#main-thread.storage-processor = ch.systemsx.cisd.etlserver.DefaultStorageProcessor
main-thread.storage-processor = ch.systemsx.cisd.etlserver.BDSStorageProcessor
main-thread.storage-processor.version = 1.0
main-thread.storage-processor.sampleTypeCode = CELL_PLATE
main-thread.storage-processor.sampleTypeDescription = Screening Plate
main-thread.storage-processor.format = HCS_IMAGE V1.0
main-thread.storage-processor.number_of_channels = 2
main-thread.storage-processor.contains_original_data = TRUE
main-thread.storage-processor.well_geometry = 3x3
main-thread.storage-processor.file-extractor =
ch.systemsx.cisd.etlserver.imsb.HCSImageFileExtractor

```

Structure of `service.properties`

- The section above property `inputs` contains configuration parameters common for all ETL threads.
- The property `inputs` is a comma-separated list of the names of the ETL threads. Note, that log entries show the name of the ETL thread causing the entry.
- The name of all configuration parameters for a certain ETL thread starts with `<thread name>..`

Common configuration parameters

Most of the common parameters are explained by short commons in the example above.

The common part also contains optional configuration parameters for the processors for each procedure type. These processors initiating processing specified by the processing instruction registered in openBIS Server.

- `processors`: Comma-separated list of procedure type codes.
- `processor.<procedure type code>.hard-link-instead-of-copy`: If `false` the incoming new data set entry will not be copied to the folder specified by the processing path (a part of the processing instruction). Otherwise a hard link will be created. Default: `true`
- `processor.<procedure type code>.prefix-for-absolute-paths`: Prefix of processing paths starting with `'/'`. Default: Empty string.
- `processor.<procedure type code>.prefix-for-relative-paths`: Prefix of processing paths not starting with `'/'`. Default: Empty string.
- `processor.<procedure type code>.data-set-code-prefix-glue`: Character which will be used to concatenate the data set code with the data set name in order to create the data set name for processing.
- `processor.<procedure type code>.parameters-file`: Name of the file created in the folder specified by the processing path which will contain the processing parameters (an optional part of the processing instruction). This file will not be created if this configuration parameter is not present or if there are no processing parameters.
- `processor.<procedure type code>.finished-file-template`: Template for the name of the marker file (empty file) created in the folder specified by the processing path. A `{0}` in this template will be replaced by the name of incoming new data set entry. This marker file will not be created if this parameter is not present.

Note, that

- Path prefixes which are non empty-string have to specify existing and accessible directories. This is check on server start up.
- The processors are used by all ETL threads.

ETL thread configuration parameters

Beside of the simple configuration parameters which are explained in the example above the configuration parameters for an ETL thread contains three sections: Code extractor, type extractor, and storage processor.

Data Set Information Extractor

The data set information extractor can extract the following informations from an incoming new data set entry:

- Sample Code: Code of the sample to which this data set belongs.
- Experiment Identifier: Project code and experiment code together to which the sample belongs.
- Data Set Code: Unique code of the data set.
- Parent Data Set Code: Code of the data set from which this data set is derived from.
- Data Producer Code: Code of the producer (e.g. instrument, analyser) of the data set.
- Data Production Date: Timestamp of data production.

The property `<thread name>.data-set-info-extractor` is the fully-qualified name of the Java class which implements

`ch.systemsx.cisd.etlserver.IDateSetInfoExtractor`. Currently there are three implementations which all extract the informations from the name of the incoming new data set entry.

`ch.systemsx.cisd.etlserver.DefaultDataSetInfoExtractor`

This is the default extractor for the case that data set code is created by the openBIS server. It extracts the following data:

- Sample Code
- Parent Data Set Code
- Data Producer Code
- Data Production Date

It has the following configuration parameters:

- `<thread name>.data-set-info-extractor.entity-separator`: Character which separates entities in the file name. Whitespace characters are not allowed. Default: '.'
- `<thread name>.data-set-info-extractor.index-of-sample-code`: Index of the entity which is interpreted as the sample code. Default: -1
- `<thread name>.data-set-info-extractor.index-of-parent-data-set-code`: Index of the entity which is interpreted as the parent data set code. If not specified no parent data set code will be extracted.
- `<thread name>.data-set-info-extractor.index-of-data-producer-code`: Index of the entity which is interpreted as the data producer code. If not specified no data producer code will be extracted.
- `<thread name>.data-set-info-extractor.index-of-data-`

production-date: Index of the entity which is interpreted as the data production date.

If not specified no data production date will be extracted.

- `<thread name>.data-set-info-extractor.data-production-date-format`: Format of the data production date. For the correct syntax see [SimpleDateFormat](#). Default: 'yyyyMMddHHmmss'

Note: Indices can be positive (0 first entity from left, 1 second entity from left, etc.) or negative (-1 first entity from right, -2 second entity from right, etc.).

ch.systemsx.cisd.etlserver.DataSetInfoExtractorForPlatesOnDemand

This is the extractor for *plates-on-demand* workflow. It extracts the following data:

- Sample Code
- Parent Data Set Code
- Data Producer Code
- Data Production Date
- Project Code
- Experiment Code
- `<thread name>.data-set-info-extractor.entity-separator`: Character which separates entities in the file name. Whitespace characters are not allowed. Default: '.'
- `<thread name>.data-set-info-extractor.index-of-project-code`: Index of the entity which is interpreted as the project code. Default: -3
- `<thread name>.data-set-info-extractor.index-of-experiment-code`: Index of the entity which is interpreted as the experiment code. Default: -2
- `<thread name>.data-set-info-extractor.index-of-sample-code`: Index of the entity which is interpreted as the sample code. Default: -1
- `<thread name>.data-set-info-extractor.index-of-parent-data-set-code`: Index of the entity which is interpreted as the parent data set code. If not specified no parent data set code will be extracted.
- `<thread name>.data-set-info-extractor.index-of-data-producer-code`: Index of the entity which is interpreted as the data producer code. If not specified no data producer code will be extracted.
- `<thread name>.data-set-info-extractor.index-of-data-production-date`: Index of the entity which is interpreted as the data production date. If not specified no data production date will be extracted.
- `<thread name>.data-set-info-extractor.data-production-date-format`: Format of the data production date. For the correct syntax see [SimpleDateFormat](#). Default: 'yyyyMMddHHmmss'

ch.systemsx.cisd.etlserver.threev.DataSetInfoExtractorForDataAcquisition

This is the extractor which assumes that the data set code is created by the data set producer. It extracts the following data:

- Sample Code
- Data Set Code
- Parent Data Set Code
- Data Producer Code

- Data Production Date

It has the following configuration parameters:

- `<thread name>.data-set-info-extractor.entity-separator`: Character which separates entities in the file name. Whitespace characters are not allowed. Default: '.'
- `<thread name>.data-set-info-extractor.index-of-sample-code`: Index of the entity which is interpreted as the sample code. Default: -1
- `<thread name>.data-set-info-extractor.index-of-parent-data-set-code`: Index of the entity which is interpreted as the parent data set code. If not specified no parent data set code will be extracted.
- `<thread name>.data-set-info-extractor.index-of-data-producer-code`: Index of the entity which is interpreted as the data producer code. If not specified no data producer code will be extracted.
- `<thread name>.data-set-info-extractor.index-of-data-production-date`: Index of the entity which is interpreted as the data production date. If not specified no data production date will be extracted.
- `<thread name>.data-set-info-extractor.data-production-date-format`: Format of the data production date. For the correct syntax see [SimpleDateFormat](#). Default: 'yyyyMMddHHmmss'
- `<thread name>.data-set-info-extractor.indices-of-data-set-code-entities`: Space or comma separated list of entity indices which define the data set code uniquely. This is a mandatory property.
- `<thread name>.data-set-info-extractor.data-set-code-entities-glue`: Symbol used to concatenate entities defining the data set code. Default: '.'

ch.systemsx.cisd.etlserver.threev.DataSetInfoExtractorForImageAnalysis

This is a variant of

`ch.systemsx.cisd.etlserver.DefaultDataSetInfoExtractor`. The difference is that the parent data set code can be defined more than one entity of the data set name.

It has the following configuration parameters:

- `<thread name>.data-set-info-extractor.entity-separator`: Character which separates entities in the file name. Whitespace characters are not allowed. Default: '.'
- `<thread name>.data-set-info-extractor.index-of-sample-code`: Index of the entity which is interpreted as the sample code. Default: -1
- `<thread name>.data-set-info-extractor.indices-of-parent-data-set-code-entities`: Space or comma separated list of entity indices which define the parent data set code uniquely. This is a mandatory property.
- `<thread name>.data-set-info-extractor.data-set-code-entities-glue`: Symbol used to concatenate entities defining the parent data set code. Default: '.'
- `<thread name>.data-set-info-extractor.index-of-data-producer-code`: Index of the entity which is interpreted as the data producer code. If not specified no data producer code will be extracted.
- `<thread name>.data-set-info-extractor.index-of-data-production-date`: Index of the entity which is interpreted as the data production date. If not specified no data production date will be extracted.
- `<thread name>.data-set-info-extractor.data-production-date-`

format: Format of the data production date. For the correct syntax see [SimpleDateFormat](#).
Default: 'yyyyMMddHHmmss'

Type Extractor

Extractor for

- procedure type code
- observable type code
- file format type code
- locator type code

from the incoming new data set entry.

The property `<thread name>.type-extractor` is the fully-qualified name of the Java class which implements

`ch.systemsx.cisd.etlserver.IProcedureAndDataTypeExtractor`. Currently there is only one implementation:

- `ch.systemsx.cisd.etlserver.SimpleTypeExtractor`: It does not extract these codes from the incoming new data set entry. These codes always the codes provided by the following configuration parameters:
 - `<thread name>.type-extractor.procedure-type`: Allowed values: `DATA_ACQUISITION` and `IMAGE_ANALYSIS`
 - `<thread name>.type-extractor.observable-type`: Allowed values: `IMAGE` and `IMAGE_ANALYSIS_DATA`
 - `<thread name>.type-extractor.file-format-type`: Allowed values: `TIFF`, `3VPROPRIETARY`, and `PLKPROPRIETARY`
 - `<thread name>.type-extractor.locator-type`: Allowed value: `RELATIVE_LOCATION`

Storage Processor

A storage processor handles incoming new data set entries which can be identified by the code extractor and which can be registered in the openBIS Server.

The property `<thread name>.storage-processor` is the fully-qualified name of the Java class which implements `ch.systemsx.cisd.etlserver.IStorageProcessor`.

Currently there are only two implementations:

- `ch.systemsx.cisd.etlserver.DefaultStorageProcessor`: The incoming new data set is just moved into the storage at place described above.
- `ch.systemsx.cisd.etlserver.BDSStorageProcessor`: It is responsible for processing the incoming data in accordance to the rules defined in [CISD Biological Data Standards](#). For the configuration parameters of the `BDSStorageProcessor` see ETL Server and BDS.

Installation steps

1. Unzip the distribution on the server machine into some temporary folder.
2. Edit `etc/service.properties` file if necessary.

Start Server

The ETL jar file can be run by executing a shell command `etlserver.sh` (for Unix) or `etlserver.bat` (for Windows). Several properties of the configuration file `service.properties` can be overridden by command line options:

```
prompt> ./etlserver.sh --help
etlserver <required options> [option [...]]
--help                : Prints out a description of the options.
--version              : Prints out the version information.
--test-notify          : Tests the notify log (i.e. that an email is sent
                        out).
[-c,--check-interval] N : The interval to wait between two checks (in
                        seconds) [default: 120]
[-i,--incoming-dir] DIR : The directory where data to be processed by the
                        ETL server become available.
[-p,--password] VAL    : User login password
[-r,--storeroot-dir] DIR : The root directory of the data store.
[-s,--server-url] URL   : URL of the server
[-u,--username] VAL     : User login name

Example: etlserver -c N -i DIR -o VAL -p VAL -r DIR -s URL -u VAL
```