# ClockWork Enterprise 5
# Data Sync Overview rev 5.1

# Overview

The ClockWork Data Sync module allows automatic accessing of student data from an external system.  The module can be configured to connect to a variety of data sources and retrieve data. When a student first comes to your department, ClockWork will pull in their data from the existing system.  Each night a sync runs that will update any information that has changed in the external system for all active students in ClockWork.  Currently the data sync is a one-way operation; ClockWork will not attempt to change data in the external system.  All data fields that are being pulled into ClockWork will become read-only fields in ClockWork, since the nightly sync will always revert the data back to what is in the external system.

# Step-based

The ClockWork Data Sync module is configured as a series of steps.  Each step can call on any one of the many built-in functions.  There can be any number of steps in an import operation.

Typically the first step will involve connecting to an external data source and the second step will involve retrieving data from that external data source.  One of the available functions allows creating an ODBC connection directly to another database.  Some other available functions include querying web services, accessing a data file directly (.csv, .txt, .xml, .xls, .mdb), and calling on an external command-line software.  Each function takes it's own specific parameters; these could include access credentials, SQL code, command line arguments, etc.  New functions can be created and added as needs arise, and they can be incorporated into the ClockWork update system.

Other functions are available that manipulate retrieved data.  For example, the student course registration data that is coming from the external system may store the subject and course codes together as a single database field.  The ClockWork import function requires them to be separate, so the function that splits string data into multiple columns could be used to re-shape the retrieved data before it is passed to the ClockWork import function.  Filtering can also be performed.

Once configured, the Data Sync operation is called directly from within the ClockWork software.  It can also be called from the command line and scheduled using Windows Task Scheduler.

# Import Function

Once the data has been retrieved from the external system, it gets passed to the ClockWork import function.  This function treats all incoming data as string values and will automatically convert it to the appropriate data types to match the ClockWork fields.  Configuration involves a simple mapping between external field names and internal ClockWork field names.

# Security

Data being imported into ClockWork is encrypted as part of the normal ClockWork system.  This means that once the data has been imported into ClockWork it remains encrypted on the database machine, and travels over the network to and from the database machine in encrypted state.

The security of the operation that involves ClockWork retrieving the data from the external system will vary depending on the methods used.  It will typically follow the same procedures that other systems in the school use to access the same data.
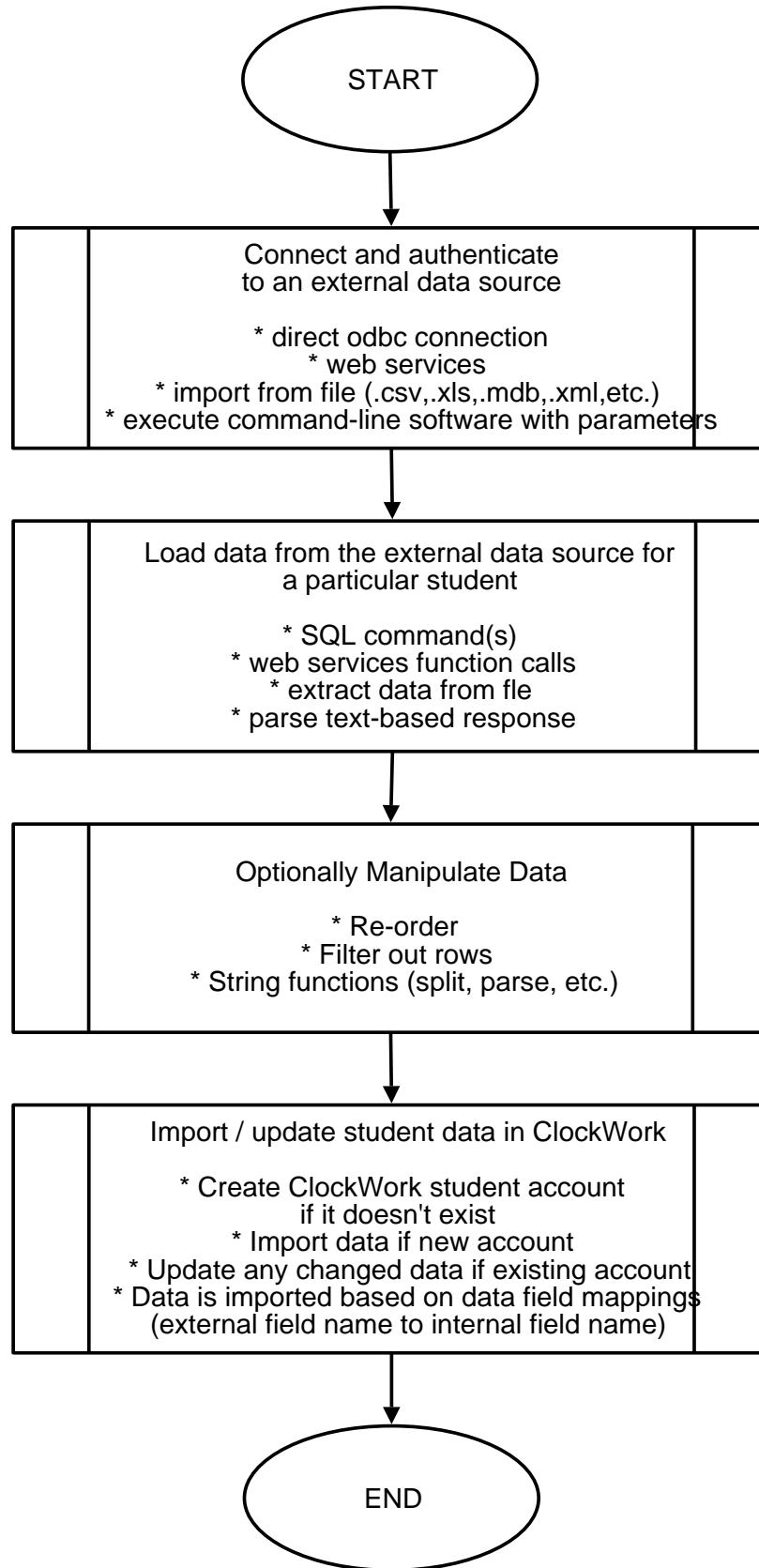
START

Connect and authenticate
to an external data source

* direct odbc connection
* web services
* import from file (.csv,.xls,.mdb,.xml,etc.)
* execute command-line software with parameters

Load data from the external data source for
a particular student

* SQL command(s)
* web services function calls
* extract data from fle
* parse text-based response

Optionally Manipulate Data

* Re-order
* Filter out rows
* String functions (split, parse, etc.)

Import / update student data in ClockWork

* Create ClockWork student account
if it doesn't exist
* Import data if new account
* Update any changed data if existing account
* Data is imported based on data field mappings
(external field name to internal field name)

END

Figure 1.1: ClockWork Data Sync Top-Level Overview
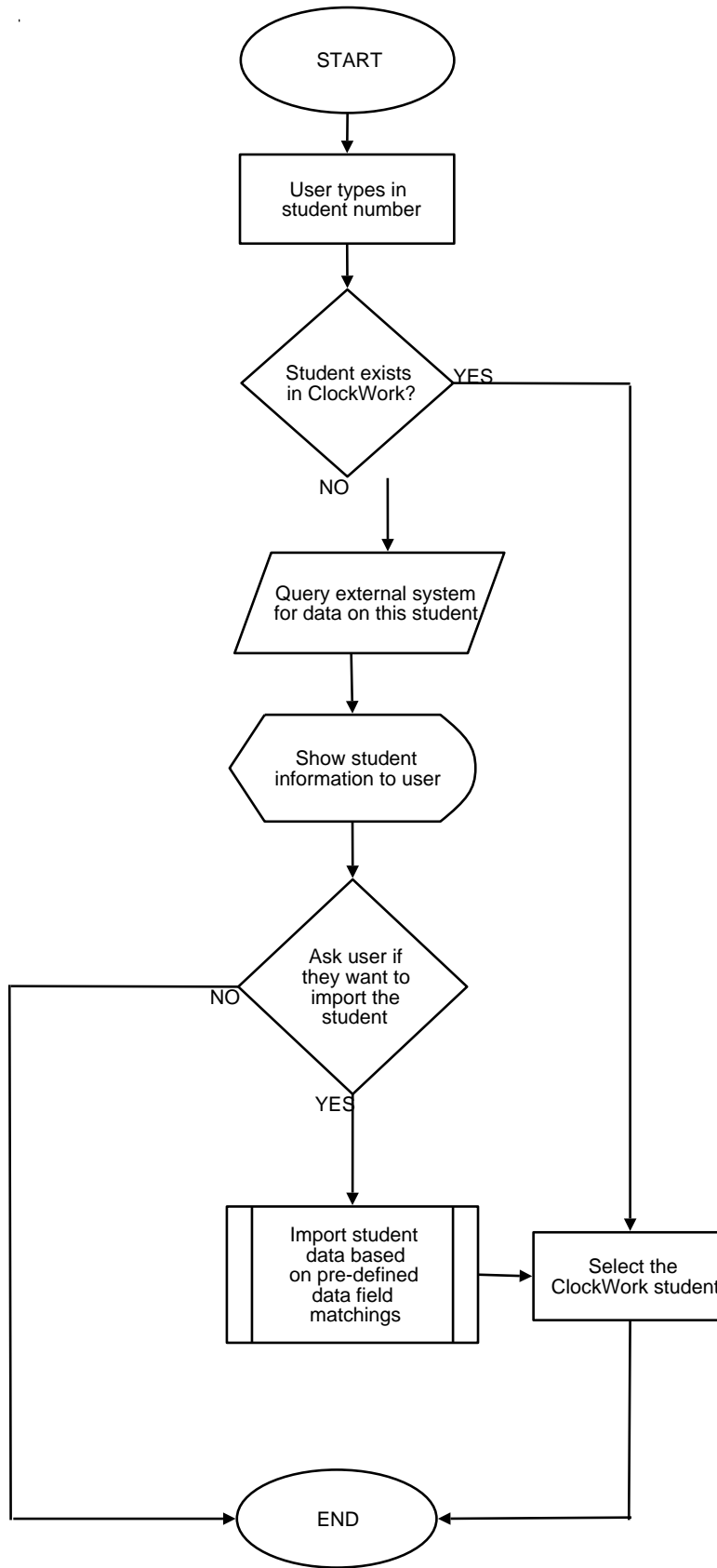
Figure 1.2: ClockWork Data Sync New Student Overview

START

Any active
ClockWork students?

NO

YES

Retrieve next active ClockWork
student number

Retrieve data from external
data source for this student

Is any ClockWork data
out of sync for this student?

YES

Update ClockWork
data for this student

NO

Any more active
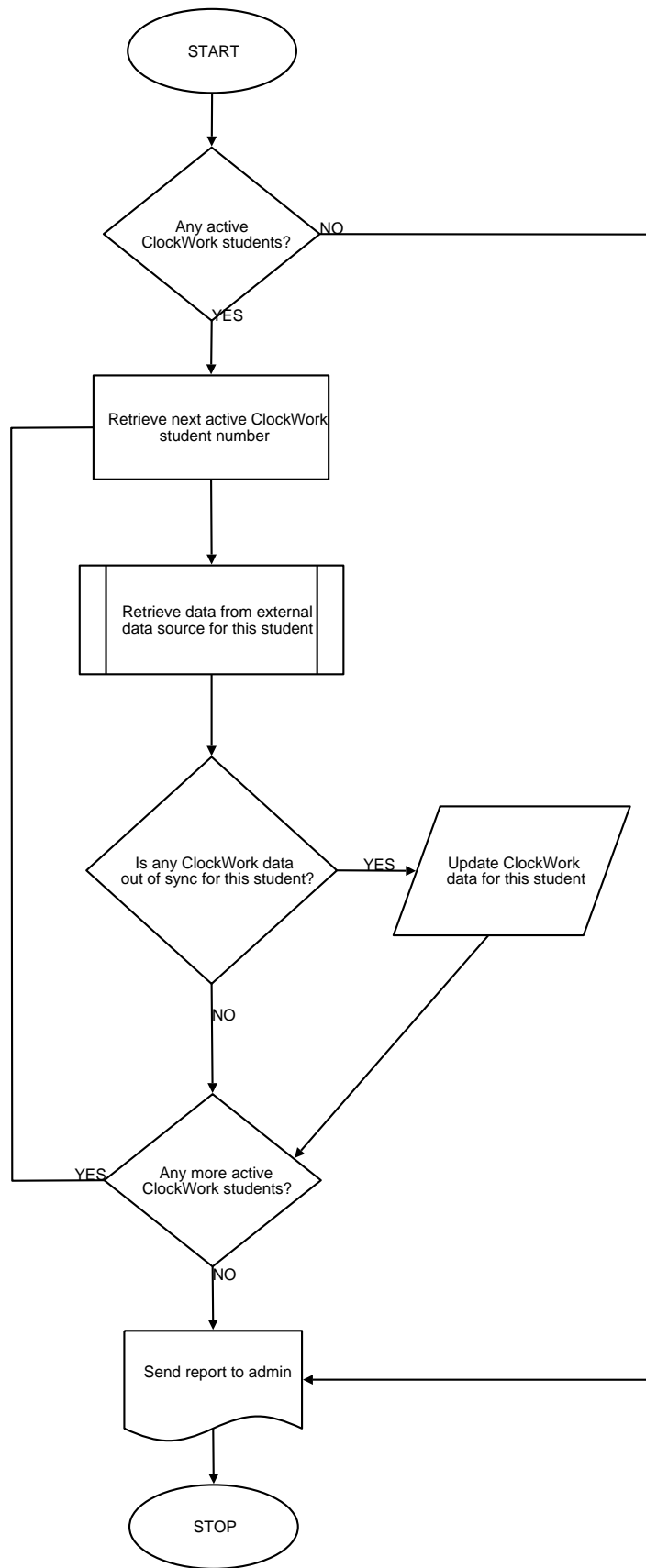ClockWork students?

YES

NO

Send report to admin

STOP

Figure 1.3: ClockWork nightly sync

## Data Sync Fields

The list of fields required by each department is specific to the department and should be communicated to IT and agreed upon before the data sync is setup.  ClockWork is capable of syncing any number of fields, not just the fields listed below.  Fields below marked with an asterisk are a minimum requirement and not optional, other fields are optional and are included in the list based on the fact that they are commonly used by other ClockWork clients in their systems.

* means required

Student number *
first name *
middle name
last name *
school username for logging into web/portal systems * (if using web modules)
birthdate
gender
phone number (home)
phone number (cell)
email address
permanent address (address, city, postal, province/state, country)
local address (address, city, postal, province/state)
Emergency contact name
Emergency contact phone
Emergency contact relationship
GPA
Expected graduation date
Academic information
- Session
- Program
- Faculty
- Level
- full-time/part-time)

Courses registrations (current and future course registrations only at any given time).  Course registrations should include any courses the student is registered in, including continuing education courses.
- Course start and end dates *
- Term *
- Subject *
- Course code *
- Section *
- Class type (lecture, lab, tutorial)
- Campus (* mandatory if multiple campuses are using the same ClockWork)
- Instructor name *
- Instructor email address *
- Instructor school username for logging into the web * (if using web modules)
- Instructor phone number
- Timetable; list of:
  - Day of week
  - start time and end time
  - location (campus, building, and room number)

# Questions and assistance

If you have any questions about the ClockWork Data Sync process, or would like to discuss the possible setup details for a particular system, please contact us for more information.  Setup of this system is part of the ClockWork implementation process and we would be happy to discuss specific requirements and possible setups with you.  The ClockWork Data Sync Module is flexible and able to adapt to many different scenarios.

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