OpenMRS Neno Manual

Development, Deployment & Operations

### **Overview**

OpenMRS servers

|  |  |  |
| --- | --- | --- |
|  | Neno | Lisungw |
| IP Address | 172.16.1.4  192.168.3.1 | 195.200.93.58  192.168.1.7 |
| EMR URL | http://172.16.1.4:8080/openmrs | http://195.200.03.58:8180/openmrs  http://192.168.1.7:8180/openmrs |
| SSH | emradmin / default password  Port 22 | emradmin / default password  Ports 22, 8999 |
| MySQL | openmrs / default password | openmrs / default password |

### **Server setup**

* Default Ubuntu with Tomcat (version 6 or below!), MySQL, Java
* Install OpenMRS via war
* Checkout https://svn.openmrs.org/openmrs-modules/pihmalawi/ for user emradmin
* Install OpenMRS from below
* Set up cronjobs for scheduled reports, OpenMRS data cleanup, rebuild\_person\_names

### **Scheduled Reports**

Most of the reports from Neno and Lisungwi are automatically scheduled and send out weekly, monthly, or quarterly to the mailing list apzu-emr@apzu.pih.org (Google Apps account for pih.org). This is done via various cronjobs invoking the scripts under pihmalawi/scripts of the pihmalawi module.

### **Automated cleanup of OpenMRS database**

Some data points and settings in the OpenMRS database are automatically saved/updated every night through the script pihmalawi/run\_openmrs\_sql\_cleanup.sh.

### **OpenMRS Versions & Modules**

Currently OpenMRS 1.7.3 runs in Malawi with the following default (non-modified modules):

* Serializtion Xstream 0.2.5
* Logic Module 0.5
* Data Entry Statistics 1.3.1
* Reporting Compatibility 1.5.4.1
* HTML Widgets 1.5.6.2

Additionally these standard modules are deployed:

* Synchronization Module 0.972
* Htmlformflowsheet 1.1.7

To these standard modules minor custom builds are created

* HTML Form Entry 1.7.3.999  
  Removes the default static text for every date input field (dd/mm/yyyy)
* Reporting 0.6.2.DEV  
  Fixes a compile error (?) in https://svn.openmrs.org/openmrs-modules/reporting/trunk/web/src/org/openmrs/module/reporting/web/reports/PeriodIndicatorReportController.java method addColumn() line 97

*https://svn.openmrs.org/openmrs-modules/pihmalawi/*

Contains automated scripts, some customization and reports for Malawi.

*https://svn.openmrs.org/openmrs-modules/pihmalawi-emastercards/*

The eMastercards provide access to and group the various used HTML Forms based on clinical activities.

*https://svn.openmrs.org/openmrs-modules/quickprograms/*

Provides a quick and consistent way to enter the most relevant state program workflow state transitions.

*https://svn.openmrs.org/openmrs-modules/programlocation/*

Adds a location to the program enrollments and fixes a couple of bugs; is part of OpenMRS 1.8

*https://dev.pih-emr.org/svn/repository/projects/openmrs/misc/malawi/sync-module-child-preparation/*

Provides the preparation of the child servers for a remote data entry day.

*https://dev.pih-emr.org/svn/repository/projects/openmrs/htmlforms/Malawi/*

All HTML Form Entry forms for Malawi

*https://github.com/innoq/openmrs-mastercard-export-import*

*https://github.com/innoq/openmrs-soundex-search*

The following modules are deprecated, outdated, decommissioned, or experimental, but have been developed at some point for or within Malawi:

* https://dev.pih-emr.org/svn/repository/projects/openmrs/modules/cross-site-indicators
* https://svn.openmrs.org/openmrs-contrib/csv-concept-importer/trunk
* https://dev.pih-emr.org/svn/repository/projects/openmrs/misc/malawi/malawi-bart2-integration
* https://dev.pih-emr.org/svn/repository/projects/openmrs/birt-reports/Malawi

### **Backup**

* A nightly backup of the Neno database is copied to a server in Boston (dev.pih-emr.org)
* A nightly backup of the Lisungwi database is copied to a server in Neno
* Every child-server has a full dump of the live data for the matching clinics. The databases of Neno and Lisungwi can be re-created through these child servers (if the data isn’t too old)

### **OpenMRS Neno and Lisungwi server setup**

http://172.16.1.20/mediawiki/index.php/Electronic\_Medical\_Record

### **Resolving Synchronization conflicts**

* Sync re-plays every change one by one and stops the whole chain when one error occurs.
* Depending on the configuration between 50 and 500 sync records are handled as one commit block.
* Resolving (some) conflicts can be done through the UI, but with SQL-access to the DB things are easier/faster. To obtain a command shell:
  + mysql -u root -p openmrs
  + mysql> show tables;
  + mysql> describe sync\_record;
* Often only one sync\_record gets stuck. Manually deleting this sync\_record will make the sync process continue:
  + mysql> select state from sync\_record group by state;
  + mysql> select count(\*) from sync\_record where state='FAILED';
  + mysql> delete from sync\_record where state='FAILED';
* Depending on the configuration a sync attempt will be retried between 5 and 10 times.
* If the retry counter is reached, then the whole sync process will be stopped. In this case the retry\_counter needs to be reset in order to invoke the sync again:
  + mysql> select state from sync\_record group by state;
  + mysql> update sync\_record set state='SENT\_AGAIN' where state='FAILED\_AND\_STOPPED';
  + mysql> update sync\_record set retry\_count=1 where state='SENT\_AGAIN';
  + mysql> select state from sync\_record group by state;
* In case the error can not be resolved, all local sync\_records can be removed. Note that this also throws away all local changes since the last synchronization process.

http://172.16.1.20/mediawiki/index.php/MySQL

### **Sync Module & Child server setup for Remote data entry**

*Overview*

Instead of the Remote Form Entry with Infopath in Lisungwi the newly Sync module (http://openmrs.org/wiki/Sync\_Module) is used. This will bring in advantages like

* Pure HTML forms (no need to support Infopath and HTML forms)
* Capable of changing everything (not just form-based data)
* Not tied to Windows
* If needed full bi-directional sync between different OpenMRS installations

Things to keep in mind with the Sync module:

* Quite heavyweight as it used Hibernate as persistent layer
* No more DB changes without going through OpenMRS-API (if you don't know what you are doing)
* With the described process the consistency of the parent server is always ensured. At most, the data collected at the child server can be lost if you fail to follow the process properly.
* Both systems (parent and child) should run in the same timezone. Otherwise it might be, that timestamps are converted according to the local settings when importing back to the parent server.

In Malawi we use the Sync module as a replacement for the RemoteFormEntry to basically achieve a one-way sync from remote servers. This will overcome the problem with Mateme as the touchscreens write straight to the DB. But as this happens only at the central site, and we sync back from the remote server, this is not an issue for now. Basically the remote server is set up a new child server (in Sync terminology) every time it is prepare to go out. Some scripted statements achieve this. The script and tools can be found in the PIH SVN (http://dev.pih-emr.org/svn/repository/projects/openmrs/misc/malawi/sync-module-child-preparation).

*Child server setup*

Windows

* Create user APZU\_EMR with password

MySQL 5.2

* Default installation directory Program Files
* Follow http://wiki.openmrs.org/display/docs/Step+4+-+Install+MySQL; use Latin1 as character set
* Default installation directory Program Files
* Set MySQL config max\_allowed\_packet=128M (<http://wiki.openmrs.org/display/docs/Troubleshooting+MySQL#TroubleshootingMySQL-MySQLhasgoneaway%28Error2006%29> in file \MySQL\my.ini; system restart is required)

Java 6

* Default Installation
* Add global system environment variable JAVA\_HOME like value c:\progra~2\java\jdk1.6.0~1 (note the windows short names as spaces doesn't seem to work, check that this is really the short name on your installation; use dir /x to find out)

Tomcat 5.5

* Don't install Tomcat as Windows startup service, but unzip the ZIP file into c:/Users/<username>/AppData/Roaming/OpenMRS/apache-tomcat-... (Win 7) or c:/Documents and Settings/<username>/OpenMRS/apache-tomcat-... (Win XP)
* Delete everything in apache-tomcat/webapps/\* except ROOT
* Increase memory as indicated by adding "set JAVA\_OPTS=-Xmx1024m –Xms1024m" to bin/startup.bat

Subversion Client

* Make sure the svn command is added to the PATH
* If the system is used behind a web proxy, specify the proxy settings under User/<username>/AppData/Roaming/Subversion (Win 7)

OpenMRS Base installation

* Copy openmrs.war into tomcat/webapps folder
* Setup initial DB through OpenMRS Installation Wizard
* Create MySQL user openmrs
  + CREATE USER openmrs@localhost;
  + SET PASSWORD FOR openmrs@localhost = PASSWORD('<changeme>');
  + GRANT ALL ON openmrs.\* to openmrs@localhost;

OpenMRS DB

Option #1 (using an initial full DB dump):

* After installing everything load a full database dump from the parent server
* Execute these SQL statements:  
  drop table sync\_server\_record; drop table sync\_server\_class; drop table sync\_server; drop table sync\_class; drop table sync\_record; drop table sync\_import; delete from global\_property where property like 'sync.%';
* Start openmrs
  + Stop and uninstall FormEntry module
  + Deploy sync module
  + Configure parent and child server (important: don’t get this wrong!)
  + Change global property concepts.locked=true (just for the case)
* Stop OpenMRS
* Remove all omod files from webapps/\*\*/WEB-INF/coreModules or webapps/\*\*/WEB-INF/bundledModules

Option #2 (setup form scratch without ‘borrowed DB dump’):

* Start openmrs
  + Stop and uninstall FormEntry module
* Stop OpenMRS
  + Remove all omod files from webapps/\*\*/WEB-INF/coreModules or webapps/\*\*/WEB-INF/bundledModules
  + Copy all omod modules from folder 1\_7\_2\_modules into …\AppData\Roaming\OpenMRS\modules folder
* Start OpenMRS
  + Configure parent and child server (important: don’t get this wrong!)
  + Change global property concepts.locked=true (just for the case)
  + Initial configuration of all other relevant OpenMRS Global Properties (god knows which ones…). Try these ones:
    - Concepts.locked = true
    - Concept.reasonExitedCare = 1811
    - dashboard.header.programs\_to\_show = 1
    - dashboard.header.workflows\_to\_show = 1
    - layout.address.format = Malawi
    - patient.identifierRegex = ^0\*@SEARCH@([A-Z]+-[0-9])?$
    - patient.identifierSuffix = %
    - patient\_identifier.importantTypes = ARV Number:Malawi,HCC Number:Malawi
    - use\_patient\_attribute.healthCenter = true
* Stop OpenMRS

Sync preparation

* Check out the sync preparation project from the PIH Subversion (https://dev.pih-emr.org/svn/repository/projects/openmrs/misc/malawi/sync-module-child-preparation) to c:/Application Data/OpenMRS/ (Win 7) or c:/Documents and Settings/<username>/OpenMRS (Win XP)
* Edit prepare\_child\_server.bat and make sure the right parent server details are used (most likely you need to change a bit in the header section)
* Copy private keys for password-less access to EMR server to local system (in folder OpenMRS Sync module Child server private keys on shared drive)
* Install cwRsync from subversion module
  + Add c:\Program Files\cwRsync\bin to system wide environment PATH variable.
  + In case of an error message ‘could not create directory /home/ABC’ create a folder ‘home/ABC’ under ‘Program Files (x86)/cwRsync’

Additional stuff

* Add OpenMRS Parent server and OpenMRS Child (localhost) to Firefox bookmark list
* Create OpenMRS start menu folder and add the following entries
  + Shortcut to OpenMRS folder in file system
  + Shortcut to apache/bin/startup.bat
  + Shortcut to apache/bin/shutdown.bat
  + Shortcut to c:/.../OpenMRS/sync-module-child-preparation/prepare\_child\_server.bat
  + Shortcut to c:/.../OpenMRS/sync-module-child-preparation/remove\_unsynced\_changes.bat
  + Shortcut to c:/.../OpenMRS/sync-module-child-preparation/remove\_changelog\_lock.bat
* Optional: Kaspersky for limited Internet access (e.g. for TNM/airtel Over-the-air sync)
  + Restrict by Kaspersky antihacker if necessary
  + Delete all rules for applications
  + Add rules for packet filtering to allow internal openmrs and infrastructure servers
  + Set firewall to high security (allow only connections covered by existing rules)