OpenMRS Implementation Overview

The goal of this page is to help you understand what it takes to implement OpenMRS.

This information is taken from the original wiki.

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Staff Requirements

Primary Implementer

- One dedicated IT person for at least two or three months, usually full time.
- They need to know the whole stack (server maintenance, MySQL, Tomcat, Java etc.).
- The level of expertise you need on site depends in part on whether or not you have consistent Internet access to get help from online resources or remote developers.
- Tomcat expertise
  - Install and manage Apache Tomcat
  - Upload and install new WAR files
  - Troubleshoot, read log files
- Database expertise
  - Install and manage MySQL environment
  - Understand the OpenMRS data model
  - Perform SQL queries and run SQL scripts
- Clinical form design
  - Understand how to create meaningful, useful and non-ambiguous questions/answers
    - Medical expertise – to understand what questions/answers make sense, what information is clinically relevant
    - Technical expertise – to understand how questions/answers can be interpreted by a computer
    - Data management expertise – to understand how questions/answers will be used for reporting, research etc.
- Dictionary design
  - Ability to infer dictionary concepts from a form (both coded questions and answers)
  - Modeling expertise – e.g. do you create CHEST PAIN as a Boolean (true/false) or do you create a CARDIAC REVIEW OF SYMPTOMS as a coded concept with CHEST PAIN as a possible answer?
  - Ability to install and configure Apache + SSL (if extending network beyond a single LAN)

Long-term IT support

OpenMRS relies on some basic infrastructure. After this infrastructure is in place, long-term IT support will be needed to ensure it continues working properly. Many organizations lack the internal skills to deal with these issues, so a combination of staff training and external support can be critical.

- Electricity
- Connectivity to the internet and/or a local area network (for implementations with multiple locations)
- Computers, virus protection, and basic computer maintenance (e.g. a mouse stops working)

Data Entry Clerks

Many health facilities have information management staff who can be trained as data entry clerks. Some implementers train cleaners to enter data.

Data Managers

If you have more than 4 data entry clerks, it is often useful to train data managers to oversee the data entry clerks and ensure that they are maintaining high data quality.

Infrastructure Requirements

Power infrastructure
OpenMRS is only as reliable as the power system that supports it. Unless electricity is almost 100% stable in your area, you will probably want a primary power source and a backup. Backup power systems usually involve some kind of battery. Using grid power with a diesel generator as a backup is probably not sufficient because there is a short lag in-between losing grid power and turning on the generator. The sudden loss of power can damage your server or data quality. Hybrid systems are ideal, where you have a primary power source (such as grid power or solar) and a secondary source (such as a generator or solar) both of which feed into short-term backup batteries.

**Machines for entering, storing, and accessing data**

- A server, recommended one or two processors 1.5+ GHz, 2 GB of memory, and 150+ GB of disk space with RAID and appropriate backup. See Field Guide for more info on selecting a server.
- Work stations for retrospective data entry: If you intend for clinicians to enter data on paper forms that are later entered into OpenMRS by data entry clerks, you estimate the number of work stations you will need based on the amount of data you will enter. As a general rule, it will take a data clerk about one day to enter 80-100 forms with 20 observations per form (this may vary greatly from site to site). For retrospective data entry you may use regular computers that range in cost from $300-$1,000.
- Work stations for point of care: If you intend to build a point of care system, you should estimate the number of work stations needed based on the number of clinicians or clinic rooms. You might want to consider using thin clients or touch screens, and may want to use mobile devices if for remote clinics. Such devices range from $100 (for a j2me smart phone capable of running OpenMRS) to $1,000 for some touch screen appliances.
- Mobile devices: If you would like to submit forms from the field and do not need rich access to patient data, you can do so with mobile devices that cost as little as $20. Forms can be sent via SMS, GPRS, or WiFi.

**Connectivity**

You can connect your server (which stores all OpenMRS data) to the work stations where people enter data within your facility using:

- Ethernet cable
- A local area wireless network
- Wireless Internet

**Communications**

If your implementation involves multiple facilities, you may want some means of communicating among sites. Options include:

- Bringing all paper forms to a central location and entering them into the electronic system (requires transportation but no connectivity equipment)
- Setting up a local area network using long range WiFi
- Installing VSAT or otherwise accessing Internet if you wish to communicate with very remote sites (such as a distant office in the country’s capital or in another country)

**Security**

Some projects require significant investment to protect equipment, potentially including installing doors, locks, bars on windows, or metal equipment storage cabinets. At other sites security is less of an issue, so consider the local context. Only local knowledge can guide this decision.

**Implementation Process**

1. Build power infrastructure or strengthen as needed
2. Improve security to support safely storing electronic equipment
3. Build connectivity infrastructure
   a. Ethernet cables, hubs e.t.c. as needed for local area network
   b. Potential install VSAT or other means of accessing Internet for remote support
4. Design paper encounter forms (getting input from clinical and IT teams)
5. Install server
   a. Server w/ power backup – UPS for server and power backup (solar?)
   b. Install Windows Server 2003 on server along with supporting software (e.g., antivirus, firewall)
   c. Install OpenMRS system (MySQL, Apache, Tomcat, etc. — see Setting up an OpenMRS Server)
   d. Configure server to serve OpenMRS web application through Apache over HTTPS
6. Setup OpenMRS core data set
   a. Install core data set (using SQL)
   b. Make user account and define privileges
   c. Define locations
   d. Define tribes
   e. Define encounter types
   f. Build dictionary concepts around forms
7. Design electronic form(s) within OpenMRS
   a. Select a form entry tool from among HTMLFormEntry Module, XForms Module, FormEntry (uses InfoPath), or Remote FormEntry (also uses InfoPath)
   b. Define forms within OpenMRS
   c. Test form(s)
8. Set up client workstations for data entry
   a. Firefox
   b. If using FormEntry or RemoteFormEntry Modules, install InfoPath 2003 with Service Pack 2 or later

**Ongoing Support**
1. Review new concept proposals
2. Make changes to forms over time (both paper and electronic versions)
3. Build reports from data exports
4. Manage user accounts
5. Perform regular server maintenance
6. Perform regular client maintenance
7. Perform VSAT maintenance