Introduction to ProjectLibre and Project Management

Overview of ProjectLibre

ProjectLibre is a recently reinvigorated open source project intended to update and revitalize a software tool intended as an alternative to commercial software like Microsoft Project. It is free software, just as the name implies, but it is also compatible with any other project management software that can read and write .xml formatted documents. Obviously, that includes MS Project, as well as several other such projects and most other
open source alternatives like Calligra Plan.

The feature set included in the current (1.5 Beta) version of ProjectLibre is largely the one in Open Project, the predecessor open source program. Current features include: task management, work breakdown structure generation (a list and a graphical representation), resource allocation and tracking, and Gantt charts that provide a clear view of the critical path elements of the schedule. Obviously, this list of features is not intended to be comprehensive and there is nothing remarkably unique about this list. Indeed it is appropriate to carefully define some of the terminology frequently used in project management before further elaborating on the capabilities of ProjectLibre, since the use of these terms is not completely uniform, either in project management software nor in organizational usage.

**Introduction to Project Management terminology**

The following definitions describe how these terms are used in ProjectLibre; your organization may use the terms differently, but at least these definitions provide an unambiguous glossary for usage understanding how this software works. A more complete list of definitions is available for those who need more definitions.

*Account:* An account is used in a Cost Breakdown Structure (CBS) to represent a place where cost from tasks or resources can be aggregated.

*Allocation:* Tasks are allocated to resources during the planning stage of the project. Actual assignments are part of the scheduling process. One important point is that simply making such assignments does not guarantee the needed resource will be available.

*Assignment:* Resources are assigned to complete tasks according to the best estimate of the planners of the project. Assignment is an important part of the scheduling process.

*ACWP:* Actual Cost of Work Performed (ACWP) is the aggregation of all costs necessary to complete the work for the project.

*BCWP:* Budgeted Cost of Work Performed (BCWP) is the aggregation of budgeted costs performed in completing the project.

*BCWS:* Budgeted Cost of Work Scheduled (BCWP) is the aggregation of budgeted costs predicted for work scheduled to complete the project.

*CBS:* The Cost Breakdown Structure is made up of resource accounts broken down to fit
the elemental tasks spelled out in the Work Breakdown Structure (WBS) for the
development. The CBS organizes accounts into a framework that enables costs to be
aggregated independent of the WBS or the RBS.

CPI: The Cost Performance Index (CPI) is equal to the BCWP/ACWP. When this index is
less than 1, the project is over budget. If the CPI > 1 the costs for the project are under
budget.

Estimate: A prediction of the expected amount of effort or time needed to complete a
given task.

Milestone: A milestone is a special task represents an event in your project; it is a task
with an effort of 0.00h. It is typically used to mark a major outcome; for example, the
completion of a deliverable satisfactory to and accepted by the customer.

PERT: The Program Evaluation and Review Technique (PERT) is an enhancement to the
Critical Path Method (CPM). Task effort estimates in CPM are point estimates, while task
effort estimates in PERT are computed by weighting the Optimistic, Most Likely, and
Pessimistic estimates [(O + 4*M + P)/6].

PERT Distribution: This distribution is a simplified way to calculate an Expected estimate
from the Optimistic-, Most Likely-, and Pessimistic estimates.

Resource: A research can be one of three types: Work, Material, or Team. All resources
must belong to a Research Group.

Resource Group: A resource group is a collection of similar resources.

Resource Team: A resource team consists of a number of resources working together for
a common purpose.

RBS: The Resource Breakdown Structure (RBS) organizes resources into resource
groups.

SPI: The Schedule Performance Index (SPI) is equal to the BCWP/BCWS. When this
index is less than 1, the project is over budget. If the CPI > 1 the costs for the project are
under budget.

Summary Task: A summary task has subordinate tasks (sub tasks) and rolls up
information based on these sub tasks.

Task: A task is a unit of work; resources are usually allocated at the task level.
**WBS:** Work Breakdown Structure (WBS) is used to decompose large projects down into manageable chunks to ease planning and management.

**Tasks, Resources, and Costs**

Three of the more important terms in the list above are tasks, resources, and costs; they are the core elements to be manipulated and organized in project management. We will elaborate in later sections on each of these concepts and how to work with them in LibreProject, but for this introductory section the following paragraphs are meant to fix these concepts firmly in the user's mind.

Tasks are the fundamental building blocks for a project schedule. The definition in the previous section was very terse, but meaningful – each task represents a unit of work, a step toward completing a project. As is likely obvious, tasks often need to take a hierarchical form to help in decomposing a complex project down into manageable and understandable chunks. That is exactly what the definition of a WBS states; therefore, the WBS is made up of a hierarchical tree of decomposed tasks. The organizational structure depicted by the WBS is meant to make it easier to understand how the various elements of a complex task fit together and ProjectLibre is a great tool for depicting that structure of tasks and how they interact.

Resources are shared entities; all the people and materials owned by your organization are shared by all projects supported by the organization. People resources have the type “Work” (expressed in hours or days – time) and materials have the type “Material” (expressed in a quantity – bags of cement, for example). ProjectLibre has a spreadsheet depiction for managing resources (Figure 1). These typical spreadsheet headings can tailored to suit the needs of specific projects.

Cost refers to the monetary value or financial pricing of a specific project activity and is the most commonly used way of aggregating resources in a project to be managed. As Figure 1 suggests, it is typical to assign hourly (or weekly or monthly) rates to people resources. Similarly, the amount of money paid to acquire materials, expressed as a dollar cost, gives an indication of the relative value of different materials.
Installing ProjectLibre

Installing ProjectLibre on a single computer is quite straightforward. For Windows systems, go to http://sourceforge.net/projects/projectlibre/, download the Windows .msi file (currently projectlibre-1.5_beta5.msi, and about 12.1 Mb in size. When the download is
complete, double click on the file to open it, and follow the instructions from the installer that are initiated from the installation wizard shown in Figure 2. Then, simply complete the installation following the directions on the screen.

If ProjectLibre is downloaded from the Sourceforce site listed above logged into a Linux machine, projectlibre-1.5_beta5.tar.gz is the downloaded file. This file is a compressed file containing the usable files that must be extracted into a convenient folder on your machine. The notes file in this archive, “readme.html” contains the instructions for installing on both Windows and on Linux:

Running ProjectLibre 1.5_beta5

Requirements:

ProjectLibre uses Java version 6 or later.
To see what version you have, check out this page:
You can download java here: http://www.java.com/en/download/index.jsp

Installation:

Unzip the files to the folder of your choice.

Windows: The installer creates shortcuts for you. Alternatively, click on projectlibre.jar (or projectlibre.bat)

Mac: Click on projectlibre.jar

Linux: Open a terminal, go to the projectlibre folder and run ./projectlibre.sh (assuming you downloaded the tar.gz archive). If you get a permission denied message, do “chmod +x projectlibre.sh” This will let you run the shell script. You can also run with the command “sh projectlibre.sh” projectlibre.sh will report an error if it doesn’t find a valid Java installation on your system.

On some distributions Java Runtime Environment (JRE) isn’t installed by default, but it’s often provided as an optional package.

This sequence of commands might look like this: (You do not need to be root.)
Starting and Saving Projects

To open an existing .pod or .xml file or create a new one, use the commands on the top left of the redesigned ProjectLibre page (circled in magenta below). Left click on either “Open” or “New” to start this process.

If you select “new” the dialog box shown in Figure 5 pops up and its primary purpose is to name the new project to be managed. The only box that must be filled in is the name (if you fail to name the new project, a “nag” box as shown in Figure 5 pops up), but you may also list the manager’s name, change the date or add notes in the provided spaces. Once you have made the desired entries, click “ok” to proceed. The “Forward scheduled” box can be unchecked if you do not wish to use this feature (see page tbd for further explanation). Selecting “Help” in the bottom right box invokes the online help (which is not fully implemented at this writing – October 3, 2012). Once you have completed your entries and chosen “ok”, the program takes you directly to the screen for
starting your work plan (Figure 6). This screen is the one to which you are directed if you choose “Open” (in Figure 4) rather than “New”, except for new projects the task entry lines are blank as suggested in Figure 6.

![New Project](image1)

**Figure 5.** Naming and defining a new project

Notice that this blank file is very similar to most other project planning file templates and is ready for you to begin entering tasks, resources, and schedule information. The right half of the window is the space where the Gantt chart schedule and its various entries will appear as you define the schedule. The calendar is set to the default at this point (more altering the calendar later.)

![Example](image2)

**Figure 6.** A new project ready for the user to make entries

Saving a project in the native format for ProjectLibre is extremely simple. Looking at Figure 6, clicking on the “Save” tag or icon just under the OpenProj name saves this example as a “Example.pod” file. That type of file is native to LibreProject (as well as to OpenProj) and gives the highest reliability for capturing and retaining all the information you have entered.
Alternatively, clicking on “Save as” allows you to save your work in the alternative Microsoft Project .xml format, after popping up a dialog box like the one shown in Figure 7. Of course, you can also change the name of the file by typing in your choice of names in the “File Name” box. If you leave the .pod extension as part of the name, LibreProject appends the .xml suffix to the name typed. For example, selecting “Save” in Figure 7, creates a new file named AFE61_DTW_mini_PRA_subtask_Rev-1_pod.xml.

Finally, “Close” is the last of the choices under this left-hand block of functions. Selecting “Close” does just what the name implies. The file that is open is closed, retaining the name which it is currently carrying. If the file has not been saved with a file name before this closure, a window pops up to remind the user to name the file (Figure 8). If “No” is selected here, the file closes with the name assigned when it was opened, discarding any modifications made after the file was last saved. Choosing “Cancel” simply puts you back into the editing mode and closes the dialog box.

All in all, these “File” opening and saving functions under the primary File button on
the upper command bar are quite intuitive to use; there are no surprises.

**Navigation with the Primary Controls (Top Line)**

The primary navigation through LibreProject files and use of program capabilities starts on the main menu shown in Figure 4. The primary selections for navigation are located just to the right of the “Open”, “New”, “Save as”, and “Close” selections (on the second line of these command bars) described in the preceding section. We will examine each section to the right of these buttons, starting with the upper row of primary choices (Figure 9). These top four controls (“File”, “Task”, “Resource”, and “ “View”) are the subjects of the next four paragraphs.

**Figure 9. Navigational controls – primary choices and File functions**

First, the File selection provides a way to examine and load different files and it controls all the functions listed below them – printing and previewing and then just to the right, another group of selections that allow the analyst to configure the project schedule to suit specific purposes and to update after analysts. Notice that the “File” button in the top row remains light blue, indicating a specific set of controls are available for use. We will come back later to go over what each of these subfunctions allows in terms of manipulating the LibreProject file of interest.

**Figure 10. Primary controls – “Task” functions**

The “Task” control brings up a different set of subfunctions (Figure 10). This particular set of secondary controls is primarily for use with the Gantt chart, as the left-most icon suggests. Selecting this “Gantt” icon switches the display in the main window of LibreProject so that it shows the schedule as it has been entered so far by the analyst
This Gantt chart is the default display if you open a file that was saved in this form, but if you were working on some other aspect of the project (assigning resources, for example), selecting this option will take you back to this familiar display. Notice also that the “Task” primary control block in the first line is now light blue, rather than the “File” control block. Selecting the “Task” control block gives access to this different set of navigation tools. As there was with the “File” control block selected, there are a number of subfunctions to be discussed later; for now, we will stick to the primary control functions and their elementary use. This Gantt window is, however, where much of the useful work is done to lay out the schedule and tailor it to the specific project being analyzed.

Next, we examine the “Resource” block in the primary control layer of the command lines (Figure 12). As you likely now expect, it allows us to manipulate the resources available for project use. Selecting the “Resource” control does not change the Gantt chart display; however, if you click on the “Resources” icon, the main display window opens up to a spreadsheet (Figure 13) that allows you to enter, select, and modify resources and how they are to be used.
As the final step in our initial trip through the primary navigation controls, we select the “View” control box (Figure 14), bringing up a set of secondary controls that gives easy access to views germane to various stages of project work. Now the various views and subviews are named in the bottom section of the secondary control bars (marked with a yellow arrow in Figure 14). In some ways, the “Task views” and “Resource views” groupings are repetitive to the primary control selections in the top bar, but the “View” grouping gives better and immediate access to “Sub-views” and other tools. Again, the goal in this paragraph is not to describe each function in detail, but to overview how to navigate through the menus efficiently. It is however, worth observing at this point, that the main display has now been altered to show four panes, rather than the two that came up when we selected Gantt chart alone earlier. This specific view was obtained by selecting the “Histogram” sub-view (green arrow) with the Gantt chart displayed by itself. You can also return to the Gantt chart panes by clicking on the “No sub window” selection (blue arrow).
shown in the upper row, right hand side of the primary control bars. There (Figure 14), a series of icons (green ellipse) reside and they can be used to select various sub views. If you hover the cursor over each of the icons, it becomes clear that this set of five controls is associated with the five sub views named in the sub view portion of the secondary controls and discussed earlier. A sixth icon, a blue circle surrounding a question mark, allows the analyst go bring up help in three different forms as suggested by Figure 15. The three labels are self-explanatory.

![Help pop-up](image)

**Figure 15. Help pop-up**

**Create a Project**

This initial overview of how to create a new project in LibreProject is largely based on an OpenProj article in 2010 published at [http://www.infobarrel.com](http://www.infobarrel.com) by jayrsmith. We will follow that outline and simply update those parts that are affected by the new interface for LibreProject. As Smith puts it: “The best way to understand how a project plan may be created using OpenProj → LibreProject is to study a realistic example such as the one that follows. This example, while simple, provides a step by step description of typical actions that a project manager might use to establish a viable project plan using (LibreProject).” This example likely will not fit your project perfectly, so you may want to either modify this example or initiate your own to fit your needs more specifically. However, the basic steps are still likely to apply.

A relatively small set of assumptions are given for the example project to be exercised here. They include:

1. LibreProject has been installed and configure as described above and is connected to a usable printer (or at least to a pseudo printer like pdf creator).
2. The example project, called “News Shower” is a marketing effort lasting 6 months.
3. Three full-time people resources, counting the project manager are assigned to
News Shower.

4. There is no budget constrain assigned for News Shower; the organization is fully behind this effort but schedule is very important. It must be completed within 6 months.

5. The required (mandatory) completion date is no more than six months from the start date.

**Step 1: Create the project plan shell**

The first step is to identify the basic parameters of the project. The analyst begins this step with LibreProject as described starting on page 6. We saw how this process is begun in Figures 4 and 5. Now we name the new project “News Shower” and enter it in the top line as indicated above Figure 5. We also add a start date as shown in Figure 16. You could also deselect the “Forward scheduled” box which is the default selection. Doing so will allow you to select a finish date and have LibreProject work backwards after you enter the required tasks. This alternate method is primarily for those projects that have a firm finish date that must be met, one like News Shower which has a mandatory completion date. It is perhaps a bit more common to leave the default checked action as shown in Figure 16, enter the required tasks, and use the software to calculate a completion date. But, for our example we will uncheck “Forward scheduled” to be sure we satisfy that mandatory completion date. This change makes our example slightly different than Smith’s original one. As you develop your own learning example, you will need to interpret your own organizational environment and utilize features of LibreProject that meet your own needs. Setting down the assumptions and constraints is a bit like developing, refining, and validating requirements for a system. The notes on the dialog box used to name the project are a good place to start documenting some of these constraints and assumptions.
Once OK is clicked, a blank Gantt chart like the one shown in Figure 6, but with new project name inserted, is opened.

**Step 2: Identify the project resources**

The next step is to identify and name the available resources. For News Sources all the resources are people resources and we can enter all the necessary information by navigating to the resources spreadsheet in one of the ways we described under the paragraph on navigation within LibreProject. The best way to navigate to this spreadsheet is to select Resource in the top line and click on the Resources icon on the left side of the second line. These two actions bring up the spreadsheet shown in Figure 17.
Figure 18. More categories of information in the Resource spreadsheet

The left portion of the resource spread sheet (Figure 17) is only part of the information that can be stored there. One other way to see more of the possible information that can be maintained here is to simply scroll to the right using the bottom bar in this window, as suggested in Figure 18. This right side of the spreadsheet can hold information like pay rate and calendar as suggested in the titles of the columns.

Figure 19. Assigning resources from the Resource spreadsheet

The values entered in the cells of this spreadsheet must be of a specified format or else an error message of the type shown in Figure 19 comes up to warn of inconsistent entries. So this spreadsheet becomes the central source of information about the available resources – both human and material – available for the project.

Incidentally, you can also reach the Resource spreadsheet by choosing View from the top line of the control bar and clicking on the Resources icon in the second line in the “Resource views” block just on block to the right of the Task views block (containing the Gantt icon).

Additionally, the analyst can also input specific resource characteristics – sometimes more conveniently – by left clicking on a resource name in the Resources spreadsheet and making entries in the dialog box (Figure 20) for that named resource. This entry method may be more efficient and easier to organize than making them directly in the spreadsheet. Clearly, each of these tabs and the large space for notes allow a variety of ways tailor the resource inputs to your project. We need to examine each of the tabs at the top of this dialogue box to elaborate on why this alternative entry method may
be useful for your project.

Figure 20. Alternate means of entering Resource information

First, we look carefully at the General tab (Figure 21) and note that many details can be added about each resource that is part of the project resource data base. You can specify specific work groups, contact information, material descriptions, and even personalized work calendars (think flex time, if you need to do so) and the usual identifiers like RBS identifier.

Figure 21. General tab for alternate dialogue box
The Costs tab allows the analyst to spell out individual labor rates for any given resource on any effective date. In fact, the five subtabs (A-E) even allow the analyst to set five different cost rates for a given person resource. Also, it is possible to give the resource a “raise” by simply stepping up the rate at an appropriate “Effective Date” in the left column of a given tab.

The Resource Availability tab (Figure 23) gives other options for elaborating on the Resource database. The tab also includes an entry set the upper limit on the use of this resource. This limit is usually set in terms of the maximum percentage of time this resource can be used.

The Tasks subtab (Figure 24) presents a list of all the commitments or assignments made for each person in the Resources database. The columns give details about each of these assignments (start and end dates, for example) regarding each of task on each page of the tab for each resource.
Lastly, the Notes subtab is shown in Figure 25. As is obvious, its primary function is to give space for describing any characteristic of the resource that needs to be documented—hence, there is lots of white space for a narrative description or any other notation.

**Step 3: Identify the project's high-level tasks**

For this example, the News Showers example project is similar to an earlier project for the same organization that was completed successfully. That project, like almost all projects, can be described with five generic tasks: initiation, research, contracting, development, and launch. These generic tags are not as unambiguously descriptive as one might like to see, but they do outline a general way to categorize upper level tasks.
So the analyst enters more descriptive task titles, but you will recognize that these tasks fit this generic description (Figure 26).

Observe that all task bars used so far are red. This coloring means that all tasks are part of the critical task, which has no meaning at this point in the analysis. When we finish the critical path will be in red and all non-critical task bars will be blue, but it is way too early to identify a critical path at this stage of developing the project plan.

Figure 26. High level tasks for News Showers example

**Step 4: Identify task dependencies**

Some tasks cannot start until other tasks have completed; that is, the second task is dependent on another task being completed before the second one can be started. In our News Showers example, it is obvious that the application cannot be marketed worldwide until after the beta testing has been completed and the beta testing cannot begin until the app is developed. Finally, of course, the starting approval (implied by the kickoff meeting
having occurred) must occur before any of the other tasks can start. These dependencies show up in Figure 27.

The color code now shows the critical path in read; the logic of the dependencies shows that critical path. Observe that task 3 is blue and is not on the critical path. This critical path has three elements now and the non-critical path does not affect the critical path. There are several other nuances about how do deal with tasks which will be dealt with in the next section. But first we have to assign resources and decompose the upper level tasks where necessary.

**Step 5: Assign project resources to appropriate tasks**

Each task is likely to need one or more resources to complete the task. The column on the Gantt chart may be hidden unless the vertical slider is moved further to the right. The names of the resource elements can be directly typed into the column named “Resource Names”. The default option is to allot 100% of their time on the assigned task, but this option can be changed in the assignment dialogue. The Resource Names field also allows direct entry of multiple resources, along with their % of time assigned to task. Each resource name is separated by a semi-colon as shown in the top part of Figure 28 (yellow rectangle). In this chart, the default value of 100% for percentage of time devoted to the project is accepted. By choosing “Task Usage” from the second line of the command ribbon (magenta circle), the resources allotted, this time in hours, is shown at the bottom left of the display, providing a convenient way to illustrate how each task is covered. You might want to manipulate the hours to relieve the project leader of time for other tasks; try that by changing the hours manually in the appropriate yellow line. Making changes of this nature is likely to alter the total number of days applied to the task; choosing appropriate percentages may be a better way to start this kind of resource leveling. We will come back to that point shortly.
We can also choose the “Resource Usage” option (green ellipse in Figure 29) to see how each person is loaded up for each task. This perspective may be an easier place to start prioritizing workload for each individual. When you start this work prioritization, it is likely that as you adjust percentages of effort, some tasks will be shortened as LibreProject attempts to automatically schedule. It may be necessary to choose manual scheduling to accommodate part-time work on desired tasks, level the workload, and still maintain the desired schedule. We will have more to say about this kind of activity when we discuss the use of the Histogram function and filtering activities.
Step 6: Elaborate and decompose tasks

Being agile in splitting up tasks is an important characteristic for a good manager and ProjectLibre facilitates this kind of activity on the part of the analyst. Decomposing a complex task into simpler ones allows better understanding of interrelationships and gives better insight on estimating resource needs. It brings just-in-utilization of resources (both people and facilities) into the scheduling picture in almost every case. Two such decompositions are shown for our News Showers example in Figure 30. Notice that ProjectLibre uses indentation to indicate the hierarchy for subtasks; this feature also feeds development of the WBS, as we will see later on in the Manual.

Tasks

Now we turn attention to a detailed discussion of tasks and how they are handled in ProjectLibre.