



# Software Project Management

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- **Configuration Management Process**
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- **Project management tools**

# Configuration management process

- Configuration management is carried out through the following two principal activities.
  - Configuration identification
    - Involves deciding which parts of the system should be kept under configuration management
  - Configuration control
    - Used to ensure that changes to a system occur smoothly.

# Configuration identification

- Project managers normally classify the work products associated with a software development process into three main categories
  - Controlled
  - Pre-controlled
  - Uncontrolled
- **Controlled work products** are those that are put under configuration control
  - Team members must follow some formal procedures to change these.
- **Pre-controlled work products** are not yet under configuration control, but will eventually be under configuration control.

# Configuration identification cont ...

- Uncontrolled work products will not be subject to configuration control.
- Controllable work products include both controlled and pre-controlled work products.

# Configuration identification cont ...

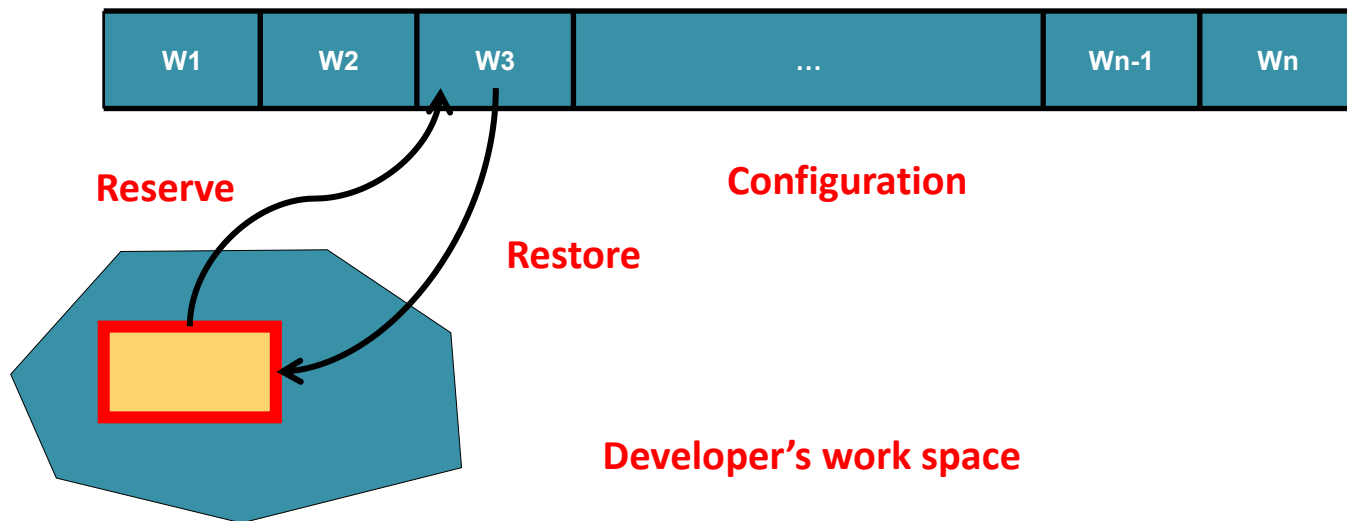
- Typical controllable work products include the following
  - Requirements specification document
  - Design documents
  - Tools used to build the system such as compilers, linkers, lexical analysers, parsers, etc.
  - Source code for each module
  - Test cases
  - Problem reports

# Configuration control

- Configuration control is the part of configuration management system that most directly affects the day-to-day operations of developers.
- Configuration control allows only authorized changes to the controlled objects and prevents unauthorized changes.
- The project manager can give permission to some members to be able to change or access specific work products.
- In order to change a controlled work product such as a code module, a developer can get a private copy of the module through a **reserve** operation.

# Configuration Control cont ...

- Two main operations:
  - Reserve
  - Restore





# Configuration Control cont ...

- Configuration management tools allow only one team member to reserve a module at any time.
- Once a work product is reserved, it does not allow anyone else to reserve this module until the reserved module is restored.
- Thus, by preventing more than one developer to simultaneously reserve a module, the problems associated with concurrent access are taken care of.



# Modifications to a work product under configuration control

- When developers need to change a work product, they first make a **reserve** request.
- A reserve request by a team member is honoured only if appropriate authorization has been given by the project manager to that member for the specific work product.
- After the reserve command successfully executes, a **private copy** of the work product is created in their local directory.
- Then they carry out all necessary changes to the work product on their **private copy**.

## Modifications to a work product under configuration control cont...

- Once they have satisfactorily completed all necessary changes, the changes need to be restored in configuration management repository.
- However, restoring the changed work product to the system configuration requires the permission of a **change control board (CCB)**.
- CCB is usually constituted from among the development team members.
- For every change that needs to be carried out, the CCB reviews the changes made to the controlled work product and certifies certain aspects about the change such as:



## Modifications to a work product under configuration control

cont...

- Change is well-motivated
- Developer has considered and documented the effects of the change
- Changes interact well with the changes made by other developers
- Appropriate people (may be CCB) have validated the change, e.g. someone has tested the changed code, and has verified that the change is consistent with the need.



## Modifications to a work product under configuration control

### cont...

- The change control board (CCB) is seldom a group of people.
- Except for vary large projects, the functions of the change control board are normally discharged solely by the project manager or some senior member of the development team.
- Once the CCB reviews the changes to the module and approves them, the project manager updates the old configuration item through a restore operation.



## Modifications to a work product under configuration control

### cont...

- A configuration control tool does not allow a developer to replace a work product in the configuration with his local copy unless he gets an authorization from the CCB.
- Therefore, incompletely modified or improperly modified work products cannot be updated in the configuration.



# Release Management

- Release Management process systemizes the work carried out by developers to provide a new release of a software and on the part of the users to smoothly obtain and use a new release.
- The release process should involve minimal effort on the part of the developer to upload a new release of a software and on the part of the users to effortlessly download and install it.



# Release Management cont ...

- For example, when a new version of the system is to be released, a tool should automatically determine the changed components, the dependencies, and all interdependent components should be retrievable as a group so that there is no possibility of inconsistency.
- Also retrievals of unnecessary and unchanged components should be avoided.



# Open source configuration management tools

- Two popular configuration management tools on UNIX systems
  - SCCS (Source Code Control System)
  - RCS (Revision Control System)
- SCCS or RCS can be used for controlling and managing different versions of **text files**.
- SCCS and RCS **do not handle binary files** (i.e., executable files, documents, files containing diagrams, etc.).
- SCCS and RCS provide an efficient way of storing versions that minimize the amount of occupied disk space.

## Open source configuration management tools cont...

- Suppose, a module MOD is present in three versions MOD1.1, MOD1.2, and MOD1.3.
- Then SCCS and RCS stores the original module MOD1.1 together with changes needed to transform MOD1.1 into MOD1.2 to MOD1.3.
- The changes needed to transform each baseline file to the next version are stored and are called **deltas**.
- The main reason behind storing the deltas rather than storing the full revision files is to save disk space.



## Open source configuration management tools cont...

- The change control facilities provided by SCCS and RCS include the ability to incorporate restrictions on the set of individuals who can create new versions, and facilities for checking components in and out (i.e., reserve and restore operations).
- Individual developers check out components and modify them.
- After they have made all the necessary changes to a component, and after these changes have been reviewed, they check-in the changed module into SCCS or RCS.

# SCCS (Source Code Control System)

- SCCS is a configuration management tool:
  - available on Unix systems:
  - helps control and manage text files.
  - also implements an efficient way of storing versions:
    - minimizes the amount of occupied disk space.

# SCCS cont ...

- Suppose a module is present in 3 versions:
  - MODI.1, MODI.2, and MODI.3.
- SCCS stores the original module MODI.1
  - together with changes needed to transform it into MODI.2 and MODI.3.
  - the modifications are called deltas.

# SCCS Features

- Access control facilities provided by SCCS include:
  - facilities for checking components in and out.
  - Individual developers check out components and modify them.
    - after they have changed a module as required and the module has been successfully tested,
    - they check in the changed module into SCCS.

# SCCS Features

- Revisions are denoted by numbers in ascending order,
  - e.g, 1.1, 1.2, 1.3 etc.
- It is also possible to create **variants** of a component
  - by creating a **fork** in the development history.



# Some project management tools

- **Ganttproject** is freeware (GPL-Licensed) project management software that runs under the Windows, Linux and Mac operating systems.
- **Microsoft Project** is the basic project management software from Microsoft Corporation. Advanced capabilities are supported through MS-Office Project Server, and MS-Office Project Web Access software.
- **ProjectLibre** is a open source software tool intended as an alternative to commercial software like Microsoft Project.



# project management tools cont...

- Primavera project management software is a widely used suite of project management software. SureTrack is the entry-level software and Primavera 6 is the advanced software.
- Using SureTrack's Project KickStart a project manager can define project phases, establish goals, anticipate obstacles, and delegate assignments.



# Gantt Project

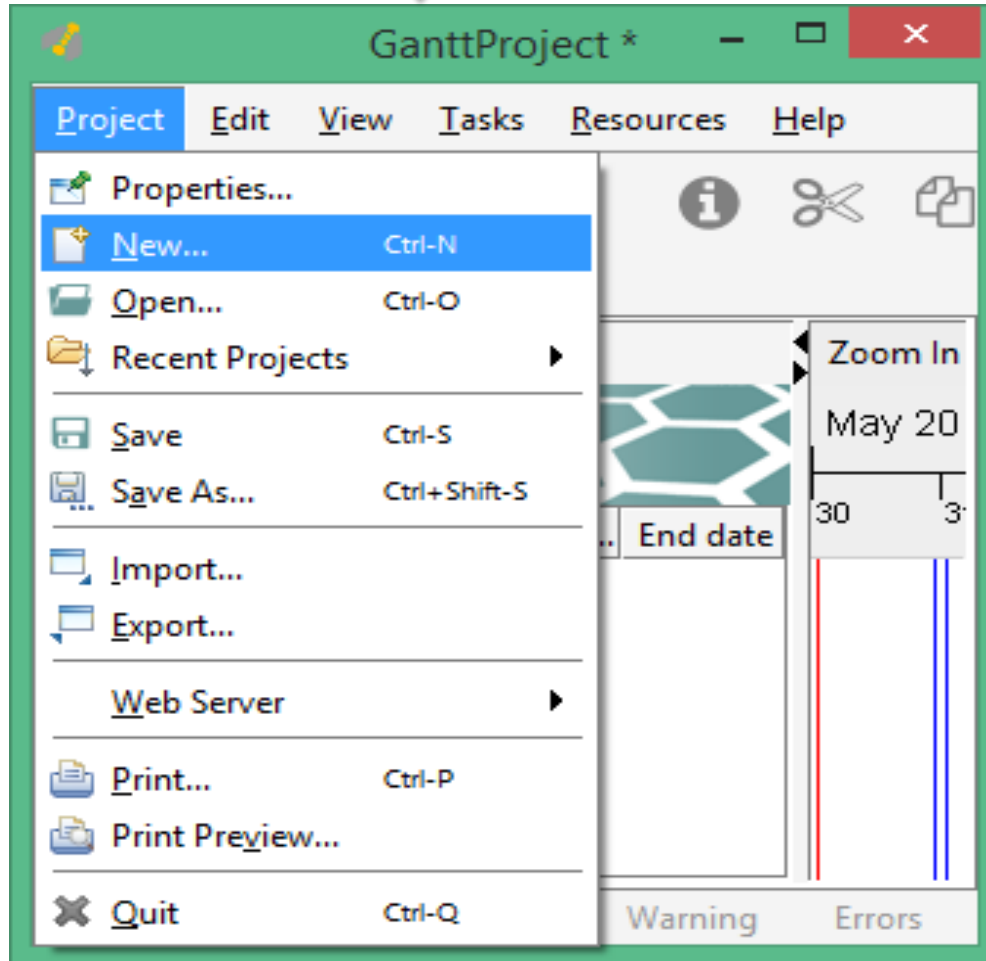
- It is a software package that allows effective, and on-going management of project data.
- The application is particularly suited to the so-called waterfall model of project management, in which tasks must be executed in an inter-related sequence, leading to a final end goal state.
- To install GanttProject, use your web browser to navigate to <http://www.ganttproject.biz>



# Features of Ganttproject

- Create a Gantt chart
- Cost management
- Link (dependency) management
- Display the critical path
- View a PERT chart

# GanttProject



- Launch the program by clicking on the newly installed GanttProject icon on the desktop, which is obtained using the given link.
- Permit Java to update if needed.
- Then, in the menubar, click **Project > New** to open a *Create new project* window.

# GanttProject

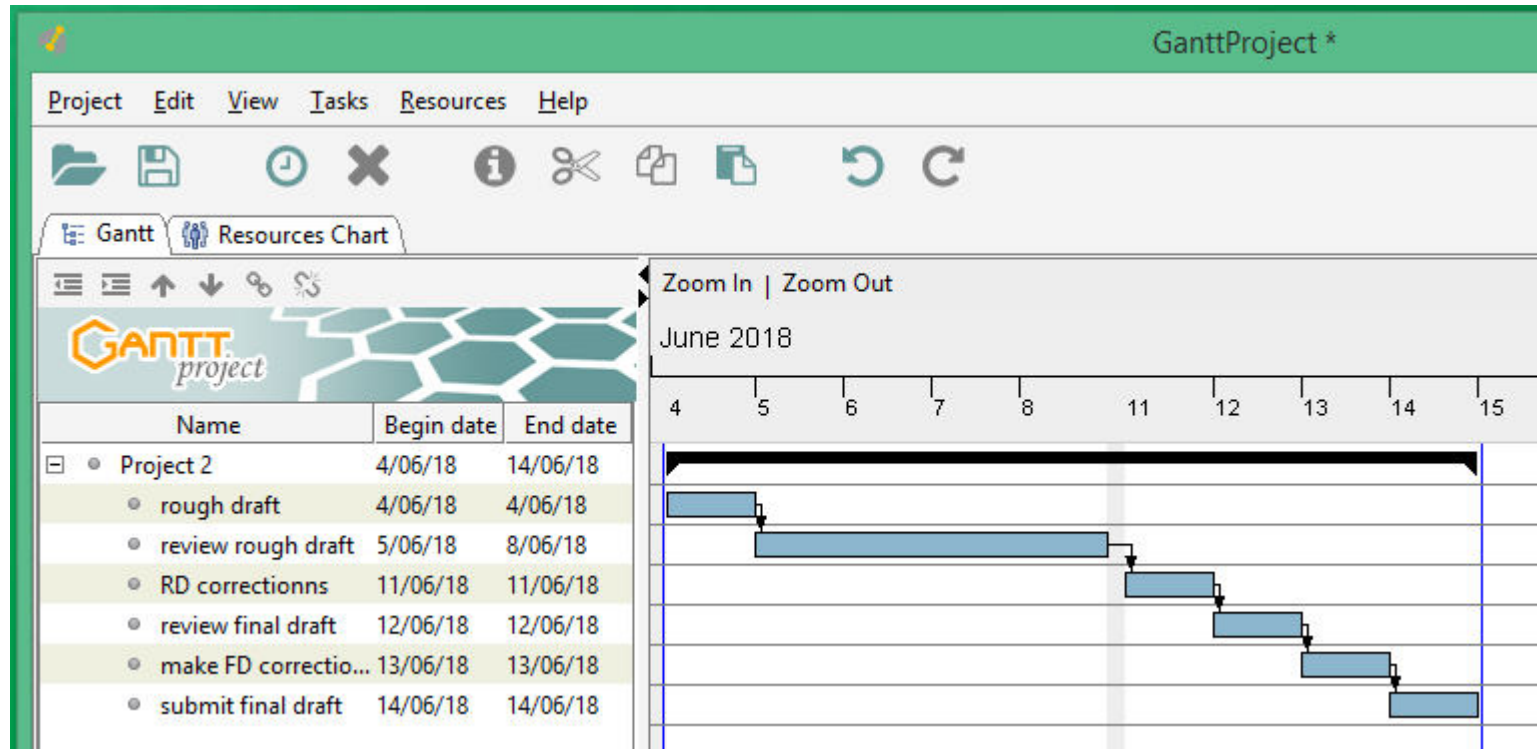


Figure shows a Gantt chart to plan and track the progress of the project



# ProjectLibre

- ProjectLibre is a open source 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.

# ProjectLibre features

The 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.

# Install ProjectLibre

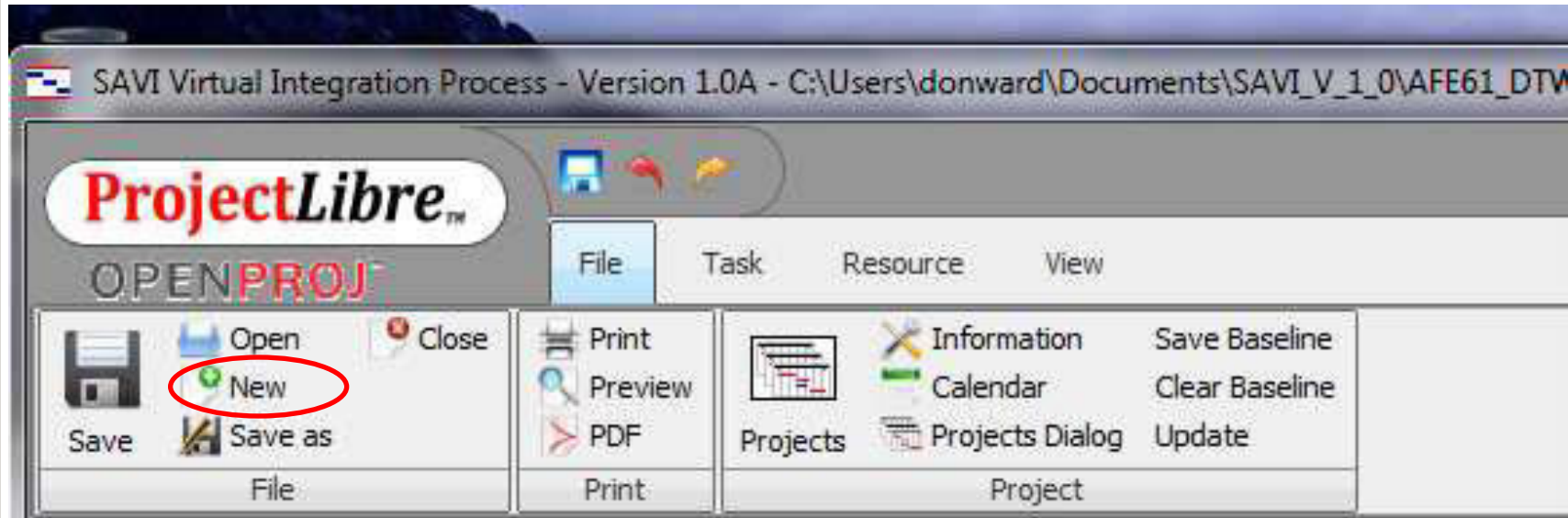
- Installing ProjectLibre on a single computer is quite straightforward.
- go to <http://sourceforge.net/projects/projectlibre/>, and download the Windows.msi file
- When the download is complete, double click on the file to open it, and follow the instructions from the installer that are initiated from the installation wizard.
- Then, simply complete the installation following the directions on the screen.



# Project libre

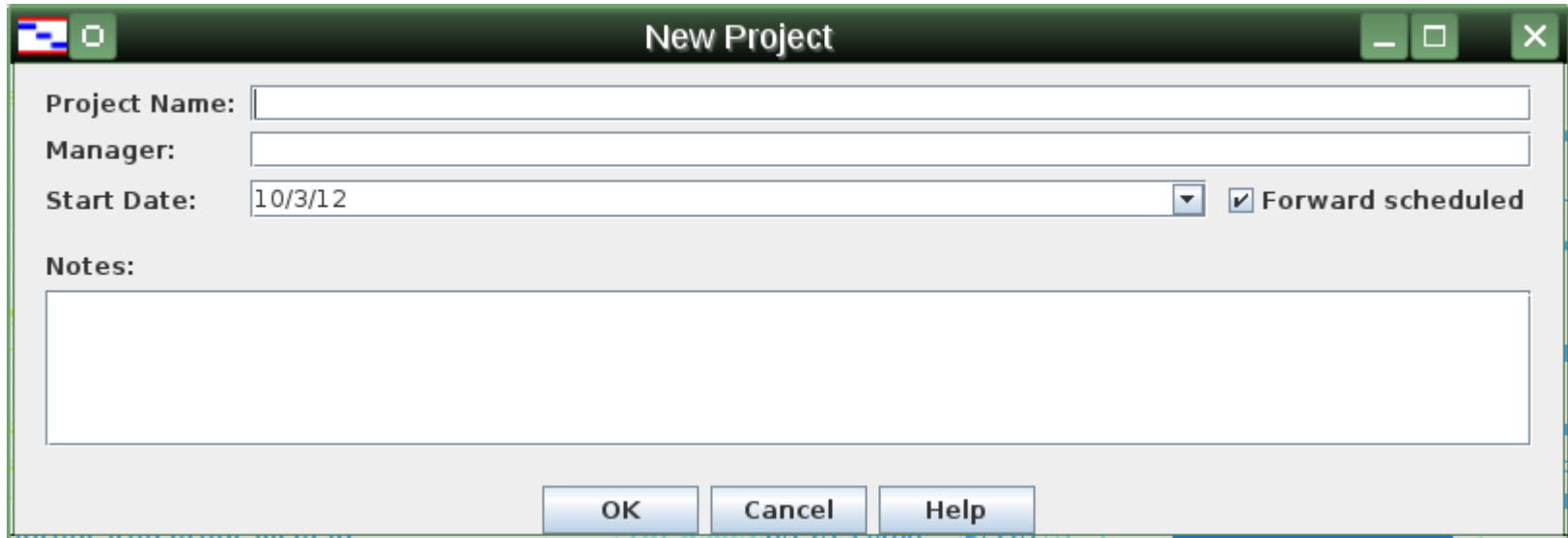
cont...

- click on “New” to start the process.



# ProjectLibre cont...

- If you select “new”, the dialog box shown in Figure 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, 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.



**New Project**

Project Name:

Manager:

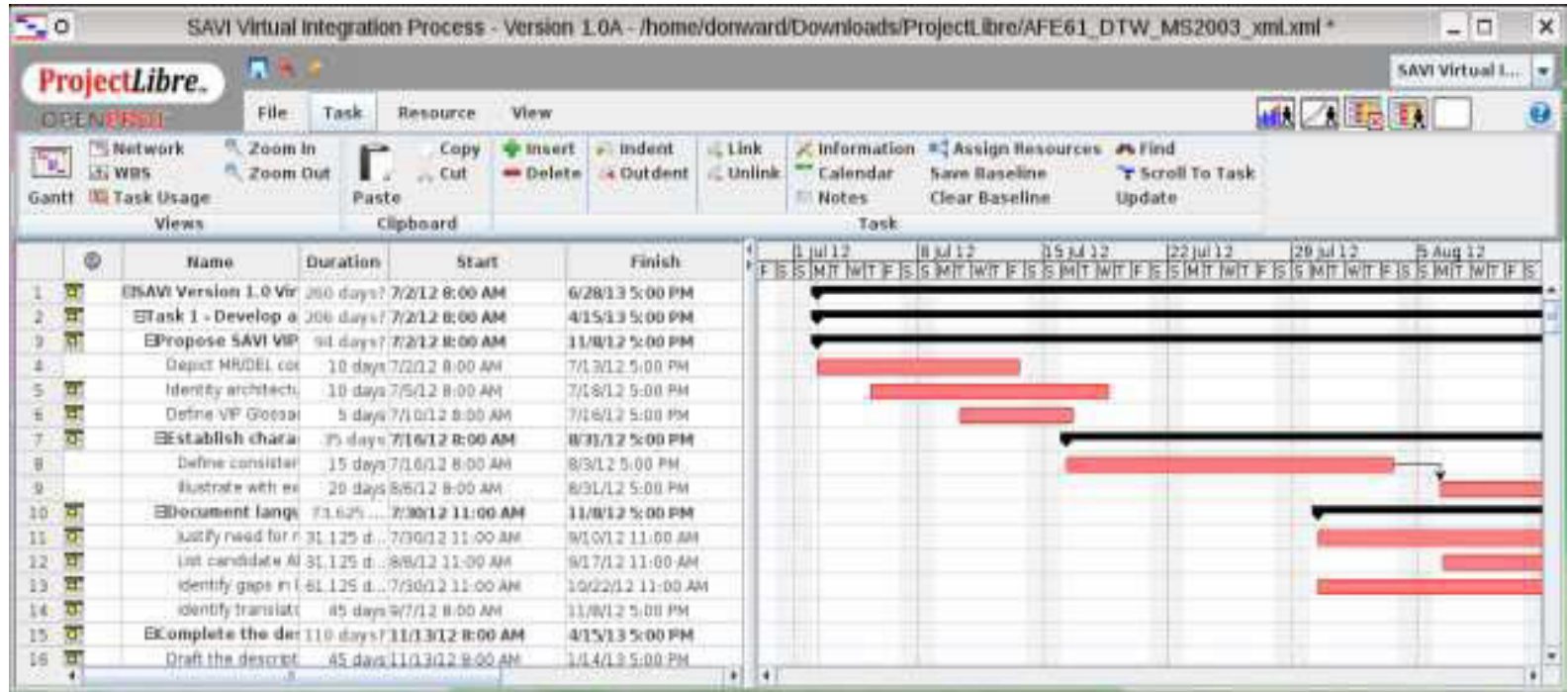
Start Date:   ☒ Forward scheduled

Notes:

# Project libre

cont...

- Screenshot of a sample project



# What is Microsoft Project?

- Microsoft Project (or MSP) is a project management software program.
- It is designed to assist project managers in:
  - developing plans
  - assigning resources to tasks
  - tracking progress
  - managing budgets
  - analyzing workloads



# Feature Description

- Project creates budgets based on assignment work and resource rates
- Resources – people, equipment and materials

# MSP Offers

- Robust management tools with the right blend of:
  - Usability
  - Power
  - Flexibility
- That's why you can manage projects more efficiently and effectively.



# MSP Main Features

- Resource Pooling:
  - Used to share resource definitions.
- Task Linking:
  - Allows interlinking of tasks in a project.
- Support for collaboration:
  - Used with internet allowing faster and easier information dissemination among the team members.
- Portfolio View:
  - Helps the project manager examine multiple projects simultaneously thereby giving an idea to the user on how changes in one project can affect the other projects.



# The Project Map

- The Project Map outlines the three phases of the project life cycle:
  - Build a plan
  - Track and manage a project
  - Close a project





# Activities for building a plan

- Define a project
- Plan project activities
- Plan for procuring resources
- Plan project costs
- Plan for quality and risks
- Plan communication and security
- Optimize a project plan
- Print and distribute project information



# Activities for tracking and managing a project

- Track progress
- Manage a schedule
- Manage resources
- Manage costs
- Manage risks



# Activity for closing a project

- Review final project information

Each one of project phase's activities has it's own goals

# Enhancements

- Microsoft Project's capabilities were extended with the introduction of:
  - Microsoft Office Project Server
  - Microsoft Project Web Access
- Also, newer versions provide for cross-functionality with products like:
  - PowerPoint
  - Visio



# Source for Download

- <https://www.microsoft.com/en-us/evalcenter/evaluate-project-server-2016>
- This provides with a 90 days trial pack
- Other websites like softonic and cnet can also be referred for free download



# Primavera

- Enables the organizations to manage time, tasks, costs, resources, contracts, change and risks to consistently execute profitable projects
- It is an industry leading project and program management solution for projects of any size
- Organizations leverage Primavera to:
  - Effectively collaborate across the entire project team
  - Proactively manage projects to meet success requirements
  - Standardize business processes and best practices



# Offerings include

- ▶ Enterprise Visibility of all Projects
- ▶ Role Based Views
- ▶ Access information in real time and online
- ▶ Standardise reporting formats
- ▶ Collaboration with Stake holders
- ▶ Manage Documents and Submittals
- ▶ Forecast project performance and cost at completion
- ▶ Monitor and Control Contractor's Performance
- ▶ Early warning Indicator
- ▶ Capture and reuse Templates, Streamline Processes
- ▶ Issue Management



# Benefits

- Easy-to-use solution
- Great for simple projects
- Integrated suite of features
- Modern platform



# Features of the project management tools

Software	Portfolio management	Web-based	Scheduling	Cost management	Resource management	Open source
Ganttproject			√		√	√
ProjectLibre			√		√	√
Microsoft Project	√	√	√	√	√	
Primavera	√	√	√	√	√	

# Summary

- Explained briefly the configuration management process.
- Presented some configuration management tools such as SCCS and RCS.
- Also presented some project management tools.

# References :

1. B. Hughes, M. Cotterell, R. Mall, *Software Project Management*, Sixth Edition, McGraw Hill Education (India) Pvt. Ltd., 2018.
2. R. Mall, *Fundamentals of Software Engineering*, Fifth Edition, PHI Learning Pvt. Ltd., 2018.



Thank you