

Welcome to the  
**Eastwood Harris Pty Ltd**

*myPRIMAVERA09  
Peak Project Performance  
presentation*

**Issues and Solutions facing  
Construction Contractors  
Implementing Primavera P6**



## The origins of P6.....

- Press Release, Publication: Software Industry Report  
Date: Monday, May 17 1999
- *Primavera Systems Inc., the Bala Cynwyd, Pa., developer of integrated, scalable, project management solutions, acquired Eagle Ray Software Systems Inc., a developer of integrated, enterprise-class project management software.*
- *Primavera will market and support the product suite to customers who want to make best practices and methodology an integral part of managing their IT and applications development projects.*
- *The buy "further solidifies our position in the enterprise project management arena," says Joel Koppelman, president of Primavera. "We are the dominant player in providing software for managing engineering and construction projects and will leverage our leadership to help companies increase their success rate for completed IT projects which have been notoriously late to market and over budget."*



## Aim of this presentation

- There are some challenges that face construction contractors in using a product that was developed manage multiple IT projects.
- The aim of this presentation will look at these issues in and some solutions to overcome these problems.



# Understanding Database Architecture

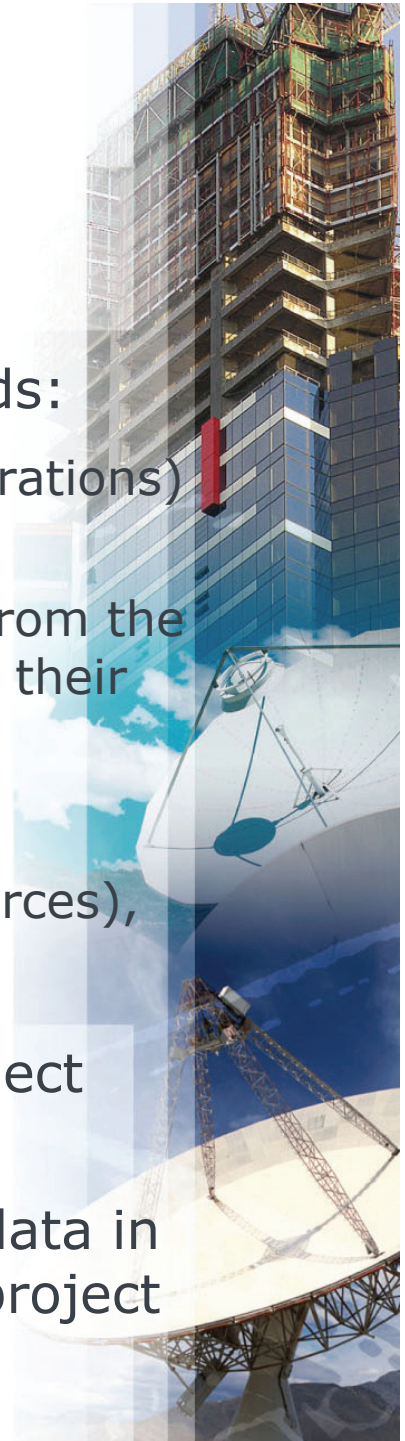
- The P6 architecture is ideal for a customer running multiple projects,
- It is intended to keep all projects in a single Database,
- Many database fields may be shared amongst projects including:
  - Codes, for Activities, Resources, etc,
  - Calendars both Global and Resource,
  - Filters and Layouts,
  - Reports.

Continued....



# Understanding Database Architecture - continued

- All projects MUST share the following database fields:
  - Global Calendar (for calculation banded Summary Durations) and non work periods in all Gantt charts,
  - The calculation of project Activity Durations in Days from the Hours/Days setting. Users, if give the rights, may set their own, but the one value is used for all activities,
  - Periods (for saving Actuals),
  - Resource pool (users may be limited to specific resources),
  - User definable fields.
- It is not possible to create a stand alone single project which does not share these attributes,
- It is sometimes not practicable to keep all project data in one database due to the demands of construction project schedules.



## Database Setup

There are several options for setting up databases:

- Single Database
- Multiple Databases split by Organisation Breakdown say by:
  - State or
  - Department
- Multiple Databases split Business Function:
  - Current Projects,
  - Contractor project import and review,
  - Sandpit and /or schedule development,
  - Site detailed look ahead, and
  - Training,
- Multiple Databases in a matrix.



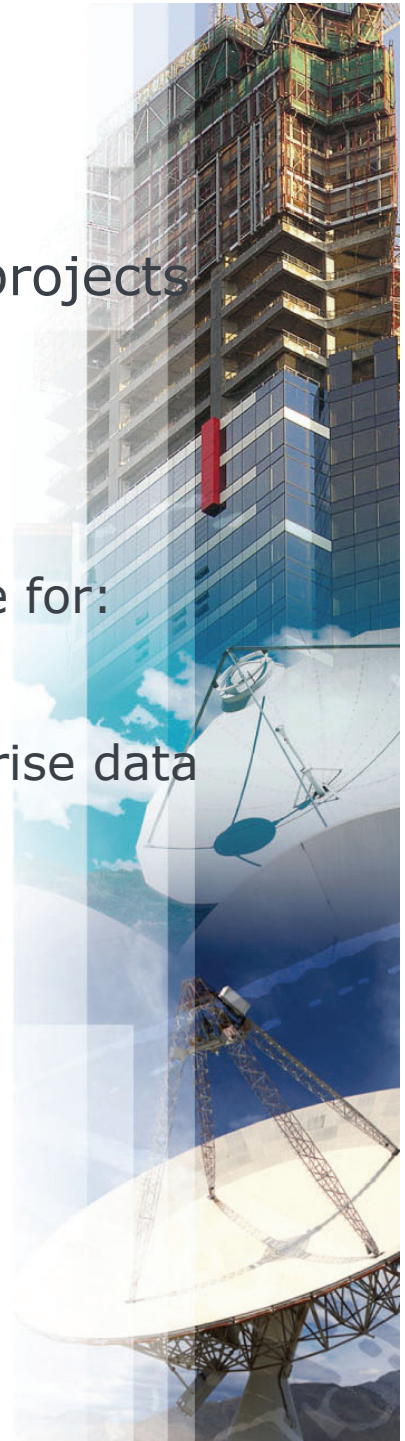
# Large Construction Contractor Database Options

- Many contractors create a separate database for:
  - Tenders and Projects,
  - One for each Alliance,
  - One for each project that has special needs such as non standard hours per day or different reporting periods
  - Training,
  - Schedule development, what if schedules and sand pit,
  - Import and reviewing other external schedules.



# Database Administration

- To operate effectively in a company with multiple projects and users you will require as a minimum:
  - Procedures
  - Trained Users
  - Senior Scheduler/Database Administrator responsible for:
    - Creating Users and projects
    - Managing and maintaining the integrity of enterprise data
    - Importing projects
    - Assisting less experienced users
  - An IT Support Person
    - Installing software
    - Creating databases
    - Backing up databases





## Selection and Training of Users

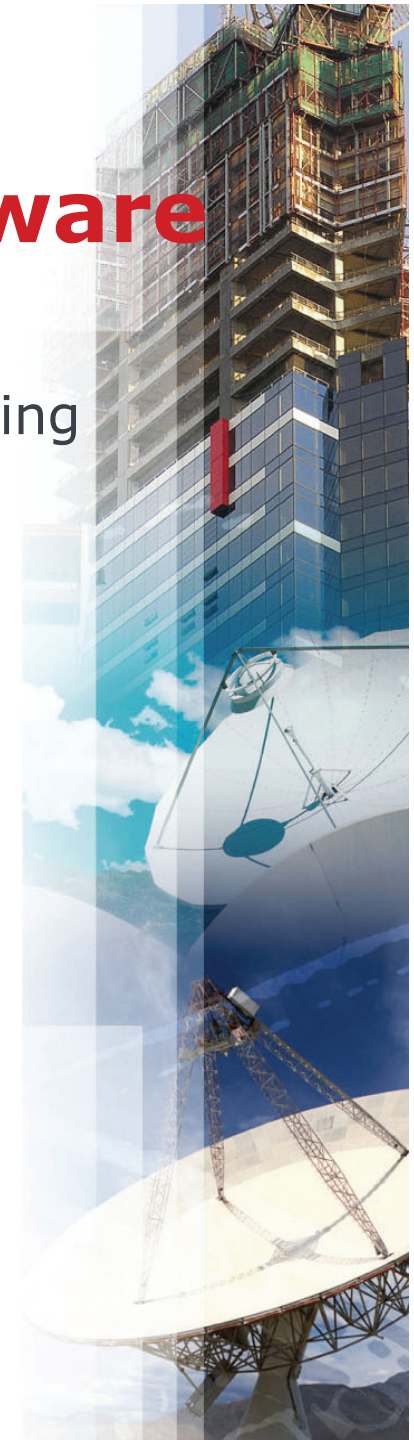
- Potential users may be grouped into the following types of brackets:
  - Project office staff, e.g. professional schedulers,
  - Full time Professional Project Managers who are computer literate and are interested in the software,
  - Full time Professional Project Managers who are NOT computer literate or NOT interested in the software,
  - Technical, Temporary or Part Time Project Managers who are project managing a project because of their expert product or process knowledge that is being delivered by the project,
- The further down the list one goes the list the return on training investment will be lower,
- *It is important that the planning and scheduling organisation structure including roles and responsibilities is designed and is realistic based on peoples abilities.*



# Planning and Scheduling Software Levels of Use

- There are 4 levels of users of planning and scheduling software outlined in all my books
- As the level increases so does the level of skill and experience required of the user.

	<b>Planning</b>	<b>Control</b>
<b>NO Resources</b>	<b>Level 1</b>	<b>Level 2</b>
<b>WITH Resources</b>	<b>Level 3</b>	<b>Level 4 e.g. EVPM</b>



# Who Should be Trained and use the planning and scheduling software and to what level?

	<b>Project Office Staff</b>	<b>Computer Literate PMs</b>	<b>Computer Illiterate or Not Interested PMs</b>	<b>Technical Project Managers</b>
<b>Planning and Control Processes and Theory</b>	Yes	Yes	Yes	Yes
<b>Level 1 – Planning NO Resources</b>	Yes	Yes	Yes	May Be
<b>Level 2 – Control NO Resources</b>	Yes	Yes	May Be	
<b>Level 3 – Planning WITH Resources</b>	Yes	Yes	May Be	
<b>Level 4 – Control WITH Resources</b>	Yes	May Be		



# Creating Primavera OBS and Users

- The OBS decides what access users have to EPS Nodes, Projects and down to WBS Node,
- A good start to your OBS is copying your existing Organisation Breakdown Structure,
- Some companies use the same structure as the EPS and loose the benefits of the OBS,
- Allow minimum access to all users as a default,
- Assign users more access as required,
- Administrators should not schedule with an administrators login. They should have a separate scheduling login so they are not able to delete corporate data while scheduling.



## Setting Up the EPS

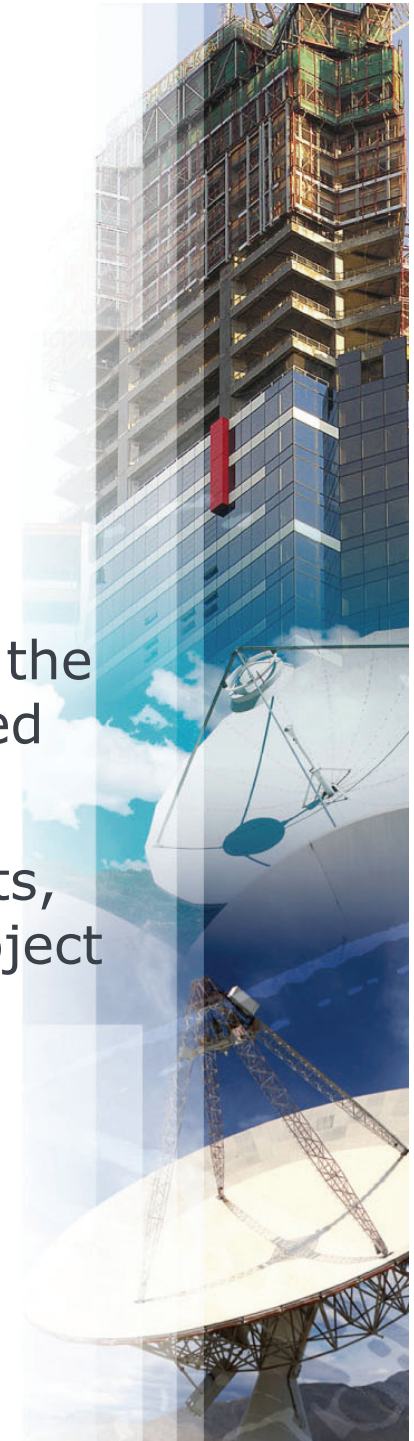
- Use the EPS like a Network Drive with a node for each project, and nodes for Tender Schedules and each update, etc,
  - Create areas for Backing Up Complete Projects
  - You Copy and Paste whole EPS Nodes to backup and select the Baselines to be copied
- Ensure that people know how it is to be used and put it in the procedures:

[-] [▲] CC	Construction Contractors Schedules
[-] [▲] P-8293	Project 8293 - Shopping Centre Upgrade
[▲] TS-1	Tender Schedules
[▲] CU-1	Current Project
[-] [▲] SCA-1	Scope Change Analysis
[▲] SC1001-1	Scope Change 001
[▲] SC1002-1	Scope Change 002
[-] [▲] BUP-1	Backed Up Projects
[▲] 0901-1	Jan 09
[▲] 0902-1	Feb 09



## Creating a New Project

- There are two methods of creating a new project
  - Using the New Project Wizard, or
  - Copying and pasting one or more projects,
- If a EPS Node is selected, copied and pasted then the EPS Node and all the associated projects are copied
- The New Project Wizard does not allow the establishment of standard defaults for new projects, so you may find it is best to create a template project with all the options set and copy and paste this project thus establishing a standard options for all new projects.



## Database Global Calendar

- This is use to display the Non Work time in all views of all projects in a database. A 5 day/week 8 hours/day Global Calendar is probably the best start point,

Jun 08							Jun 15							Jun 22							Jun 29							Jul 06								
S	M	T	W	T	Fri	S	S	M	T	W	T	Fri	S	S	M	T	W	T	Fri	S	S	M	T	W	T	Fri	S	S	M	T	W	T	Fri	S		

- Durations in days of all activities are calculated by dividing by the Hours/Day factor,
- This calendar is used to calculate the Summary Duration of all Summary Nodes such as WBS Nodes,
- Node summary durations are calculate from the earliest activity Start to the latest activity Finish over the Global Calendar.



# Calculation of Activity Summary Duration in Days

- Primavera Enterprise effectively calculates in hours and the Activity Durations in days or weeks are calculated by the factors set up in the **Admin, Admin Preferences..., Time Periods** tab,
- When **Allow users to specify the number of work hours for each time period** is checked then users may set their own time periods in the **Edit, User Preferences..., Time Units** tab.

Hours per Time Period			
Specify the number of work hours for each time period.			
Hours/Day	Hours/Week	Hours/Month	Hours/Year
<input type="text" value="8.0"/>	<input type="text" value="40.0"/>	<input type="text" value="172.0"/>	<input type="text" value="2000.0"/>
<input checked="" type="checkbox"/> Allow users to specify the number of work hours for each time period			





# Calculation of Activity Summary Duration in Days

- Primavera calculates in hours, but Activity Durations may be summarized and displayed in days or weeks or months,
- These options calculate correctly when all database calendars are have the same number of work hours per day and days per week,
- When tasks are scheduled with calendars that do not conform to the **Edit, User Preferences..., Time Units** tab settings (e.g. when settings are set for 8 hours per day but there are tasks scheduled on a 24 hour/day calendar), the Activity durations in days or weeks will be misleading:



Activity Name	Org Dur	Oct 31							Nov 07						
		S	M	T	W	T	F	S	S	M	T	W	T	F	S
Activity on an 8 hour per day 5 days per week calendar	10d														
Activity on a 24 hour per day 7 days per week	10d	[Solid green bar]													

# Database Default Calendar, WBS and Project Durations

- The durations of all bands such as Project, WBS, and Resources are calculated from:
  - The Database **Default Calendar** and
  - The **Hours/Day** setting in the **Edit, User Preferences...**, **Time Units** tab.
- The following picture show the duration of the workshop used in this publication set at firstly 5 days per week, 8 hours per day and a duration of 35 days with an Hours/Day setting of 8 hours, which is correct.

Project ID	At Completion Duration	December 2009			January 2010				February 2010						
		15	22	29	06	13	20	27	03	10	17	24	31	07	
▣ ▾ BIDS	35	07-Dec-09 A ▾ <span style="background-color: yellow;">—————</span> ▾ 25-Jan-10													
▣ ▾ OzBuild	35	07-Dec-09 A ▾ <span style="background-color: yellow;">—————</span> ▾ 25-Jan-10													
▣ ? REF101206	35	07-Dec-09 <span style="background-color: green;">—————</span> 22-Jan-10													



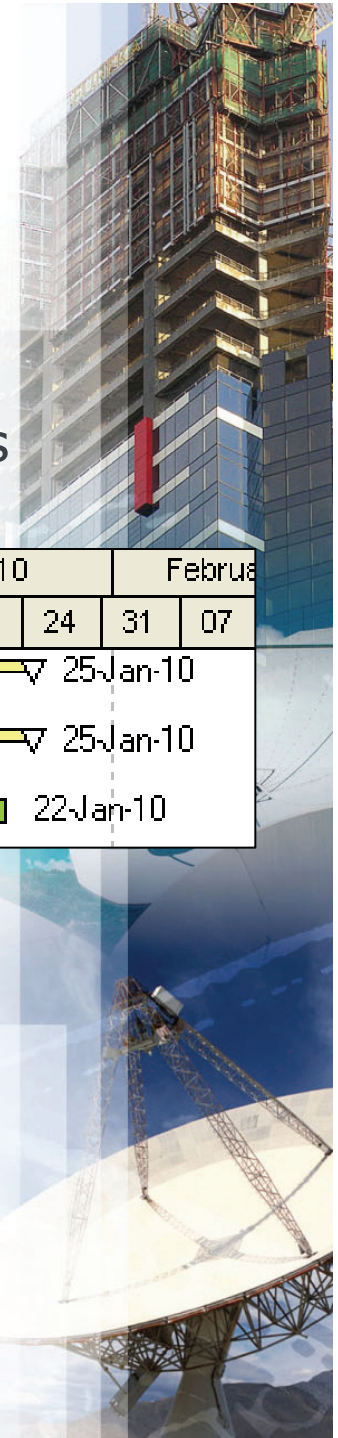
# Database Default Calendar, WBS and Project Durations

- Now with the **Default Calendar** changed to a 7 day/week 24 hour per day the duration of 139 days is clearly misleading,

Project ID	At Completion Duration	December 2009			January 2010			February 2010							
		15	22	29	06	13	20	27	03	10	17	24	31	07	
▣ BIDS	147d	07-Dec-09 A ▾  ▾ 25-Jan-10													
▣ OzBuild	147d	07-Dec-09 A ▾  ▾ 25-Jan-10													
📁 REF101206	139d	07-Dec-09  22-Jan-10													

- The duration of the Project Summary WBS Nodes are also clearly misleading, the Research Node is not 31 days long.

Activity ID	Activity Name	Original Duration	Dec 06							Dec 13						
			S	M	T	W	T	F	S	S	M	T	W	T	F	S
▣ REF101206	Bid for Facility Ext...	139d														
▣ REF101206.1	Research	31d														
OZ1000	Bid Request Documents Received	0d														
OZ1010	Bid Strategy Developed	1d														
OZ1020	Technical Feasibility Study	8d														



## Database Default Calendar, WBS and Project Durations

- There are some issues that need to be carefully considered when planning and controlling multiple projects with different calendars in one database when correct durations in days are important,
- In Primavera it is best if all calendars in all projects are set with the same hours per day, normally 8 hours/day,
- If this is not possible you may consider:
  - Showing durations in hours only,
  - Creating a separate database for projects that require a different hours per day,
  - Not displaying the durations against Project nodes, WBS nodes and any other summary nodes by not checking the **Show Group Totals** in the **Group and Sort** form,
  - Using a Global Change to put the correct duration of activities not on an alternate calendar in a User Defined Text Field so it will not add up into the bands.



## Currencies

- It is possible to have two currencies with the same symbol but different exchange rate,
- A User may select a different currency then all costs displayed by the user will be converted to a different value,
- A user may hide the currency symbol from the User Preferences,
- This option must be carefully monitored and if you do not need multiple currencies then it is suggested that you should delete them all, to avoid any possible problems.
- *If you are using multiple currencies then make sure that all have a different sign for each currency, so there is no confusion and ensure users are trained to ensure they show the currency symbol all the time,*
- *If you are not using multiple currencies delete them all.*



# Project Breakdown Structures

- There are two type of Project Breakdown Structures that may be utilised to programme a project
  - Hierarchical and
  - Matrix
- Either or both may be used in the one programme,
- The predominate method in P3 and SureTrak is the matrix format using Activity Codes,
- The predominate method in Primavera Enterprise is the WBS function and is a Hierarchical structure,
- Users converting from P3 and SureTrak will be used to using Activity Codes and Activity ID Codes,
- *New users may be tempted to ignore the WBS and use Activity Codes instead. They should be trained to use the WBS.*



## Primavera WBS

The main purposes of the Primavera WBS function are:

- **User Access** may be assigned at this level, so two schedulers may open the same project and one only change activities in WBS Nodes assigned to each user ,
- **Earned Value** calculations and Project Performance may be preformed at this level,
- **Progress at the WBS** level may be measured with the use of WBS Milestones,
- **Anticipated Dates** may be assigned at the WBS level to provide a bar when no activities have been added to a WBS Node,
- The **Tracking Workspace** operates down to WBS Node level,
- There are a number **Standard Reports** that function at WBS Node level.

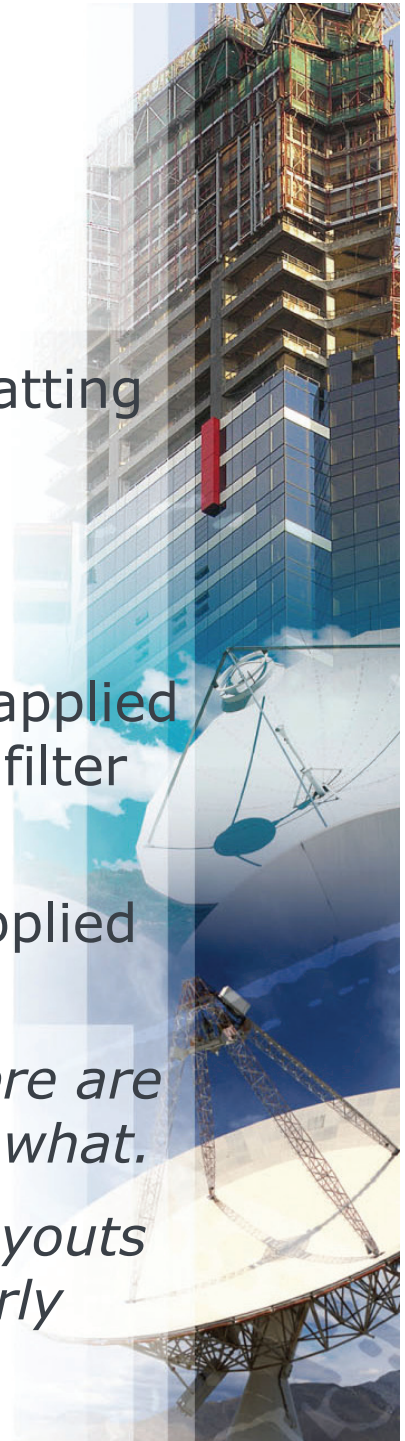
*It is important to encourage schedulers to use the WBS.*



## Group, Sort and Layouts

There are several types of layouts:

- **Default** are part of the system and used in bar formatting and accessible by all project,
- **Global** are created, modified and deleted by an administrator and are accessible by all users ,
- **Project** which are created by the scheduler and are applied to the schedule they are created for and may have a filter associated with it,
- **User** which are created by a schedule and may be applied to any schedule that the user has open.
- *In a large database there may come a time when there are so many layouts that people do not know what is for what.*
- *Organisations should encourage the use of Project Layouts where possible and ensure all Global layouts are clearly identified what project/s they are for.*





# Understanding the Date Fields

There are a number of date fields including:

- Early Start and Early Finish
- Late Start and Late Finish
- Actual Start and Finish
- Start and Finish
- Planned Dates
- Remaining Early Start and Finish, not covered here
- Remaining Late Start and Finish, not covered here
- External Dates

*It is important that all users understand these dates.*



# Early Start and Early Finish

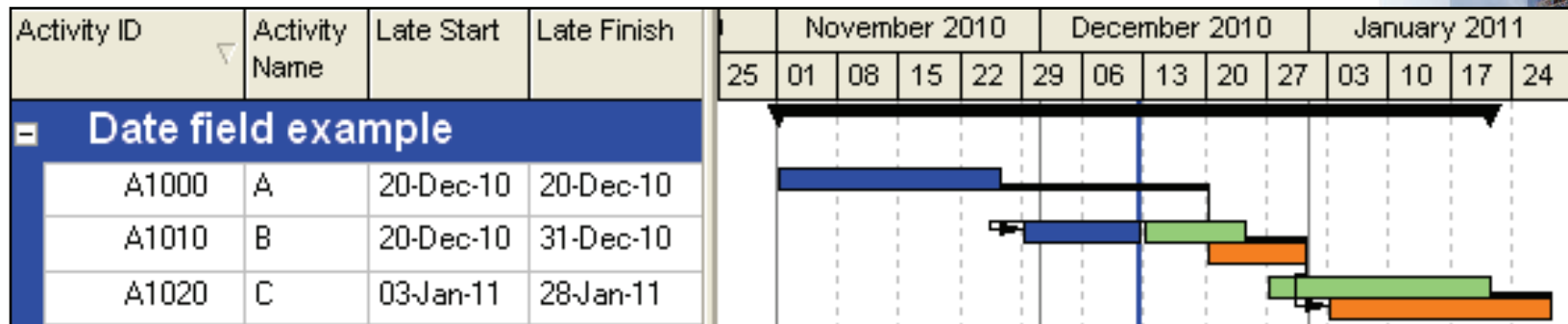
- These are always the earliest dates that unstarted activities or the incomplete portions of in-progress activities may start or finish based on calendars, relationships and constraints,
- The Early Start is set to the Data Date after an activity has commenced, NOT to the Actual Start as in many other products,
- The Early Finish is set to the Data Date when the activity is complete, NOT to the Actual Finish.
- Do not display these dates on an in-progress schedule as they do not display the Actual Start and Finish.*

Activity ID	Activity Name	Early Start	Early Finish	November 2010					December 2010					January 2011					
				25	01	08	15	22	29	06	13	20	27	03	10	17	24		
<b>Date field example</b>																			
A1000	A	12-Dec-10	12-Dec-10																
A1010	B	13-Dec-10	24-Dec-10																
A1020	C	27-Dec-10	21-Jan-11																



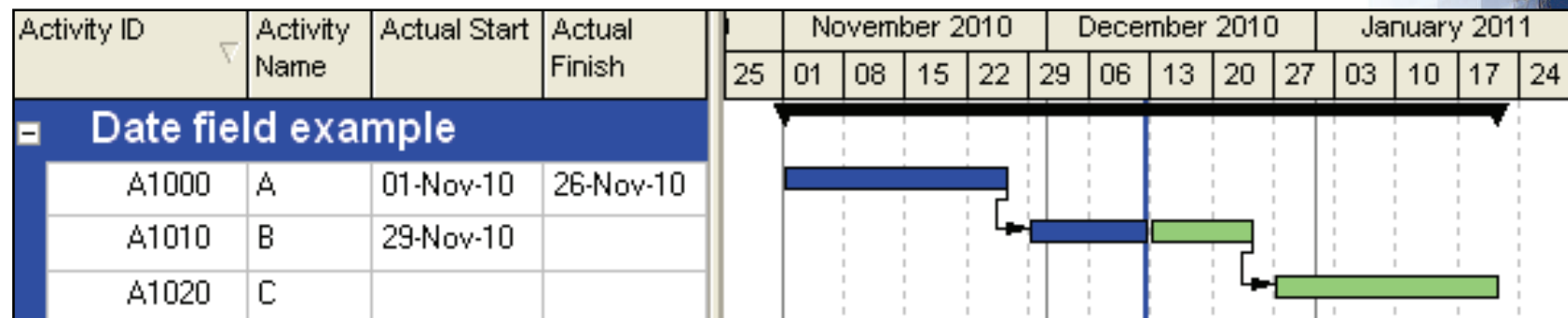
# Late Start and Late Finish

- The latest dates that **Unstarted** activities or the **Incomplete** portions of in-progress activities may start or finish based on calendars, relationships and constraints,
- *Note: The end of the Total Float bar is the same date and time as the Late Finish. It is not normal to show a Float Bar on complete activities and the Total Float bar should have a filter applied to show only in progress or not started activities.*



# Actual Start and Finish

- These dates are manually applied, representing when an activity started or finished, and override constraints and relationships. These dates should be set in the past in relation to the **Data Date**,
- Note:** Actual dates should never change after they are assigned but both the **Apply Actuals** and **Update Progress** functions may change Actual Dates and these functions must be used with extreme caution.



## Start and Finish

- These are set to the **Early Start** when the activity has not started and the **Actual Start** when it has started.
- An "A" is placed after the date when an **Actual Start** has been set, and an "\*" is placed after the date when a start constraint has been applied to the activity.
- These date fields allow the Early and Actual Start and Finish dates to be displayed as expected when the activity has not started, is in progress or complete,
- Note: These dates should normally be displayed.*

Activity ID	Activity Name	Start	Finish	November 2010				December 2010				January 2011			
				01	08	15	22	29	06	13	20	27	03	10	17
<b>Date field example</b>															
A1000	A	05-Nov-10 A	02-Dec-10 A												
A1010	B	23-Nov-10 A	30-Dec-10												
A1020	C	31-Dec-10	27-Jan-11												



# Planned Dates

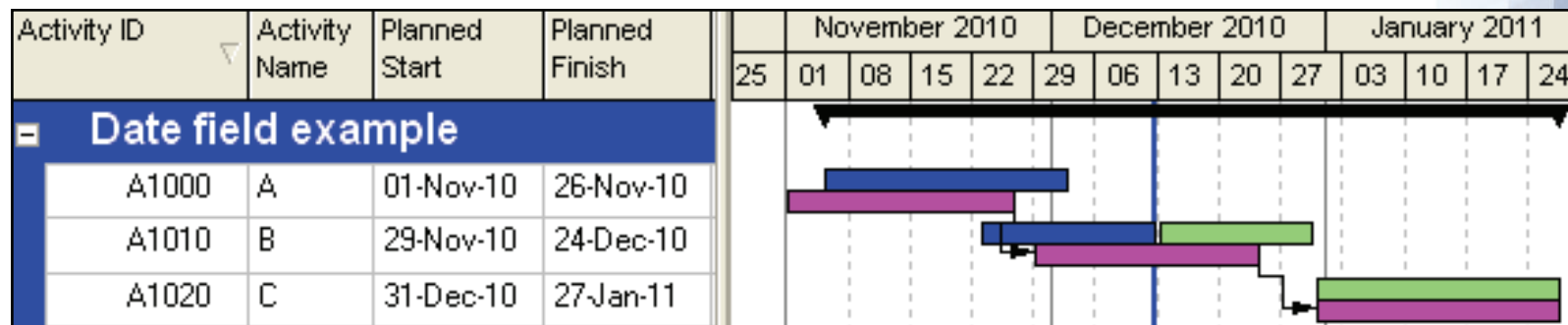
- The Planned Dates are very complex and their calculation method is outlined in my books, in summary:
- When an activity is **Complete** or **In-progress** they match the status of the schedule before the last update,
- When an activity has Not Started they match the Early Start and Early Finish.

Activity ID	Activity Name	Planned Start	Planned Finish	November 2010					December 2010					January 2011					
				25	01	08	15	22	29	06	13	20	27	03	10	17	24		
<b>Date field example</b>																			
A1000	A	01-Nov-10	26-Nov-10	Description of Gantt chart bars															
A1010	B	29-Nov-10	24-Dec-10	Description of Gantt chart bars															
A1020	C	31-Dec-10	27-Jan-11	Description of Gantt chart bars															



# Planned Dates Issues

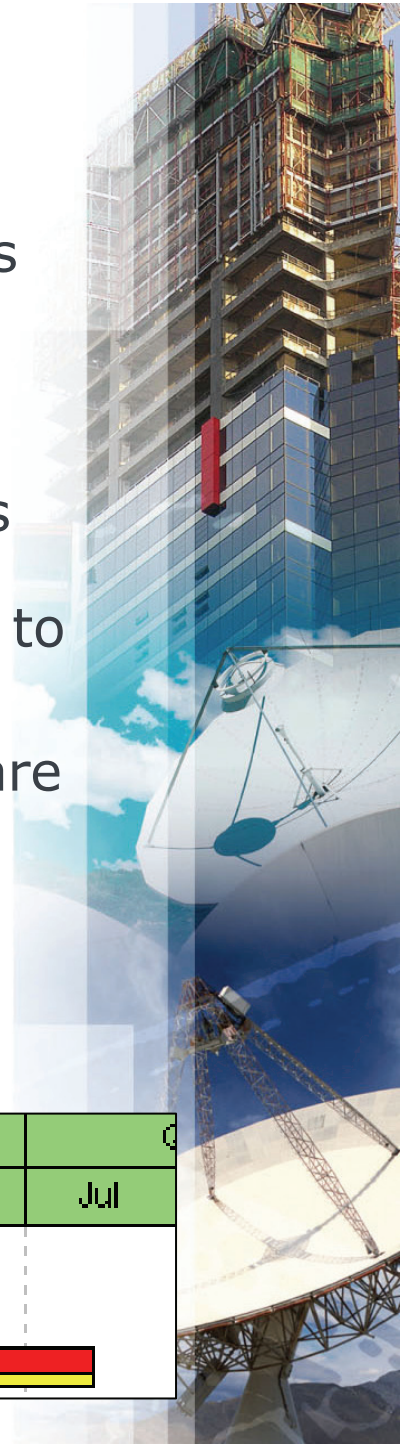
- The Planned Dates are dates that most schedulers would not want displayed,
- These dates displayed as the Project Baseline bars and Primary User Baseline bars when no baseline has been assigned,
- These dates are used by the **Apply Actuals** function, but only when tasks are set to **Auto Compute Actuals**, and **Update Progress** function,
- *Don't use these functions if you not want your Actual Dates changed.*



# External Dates

- External dates are created when a project with links to another project is exported from a P6 database and imported into Primavera Contractor or another database.
- They act like Early Start and Late Finish Constraints and are used to represent the relationships that would provide the Early Start and Late Finish dates to the CPM calculations of the imported schedule.
- These dates can be very confusing if one is not aware of how they operate and the negative float in the picture below is created by these dates after an activities duration was increased by 34 days,
- Check for External Dates when you import a schedule.*

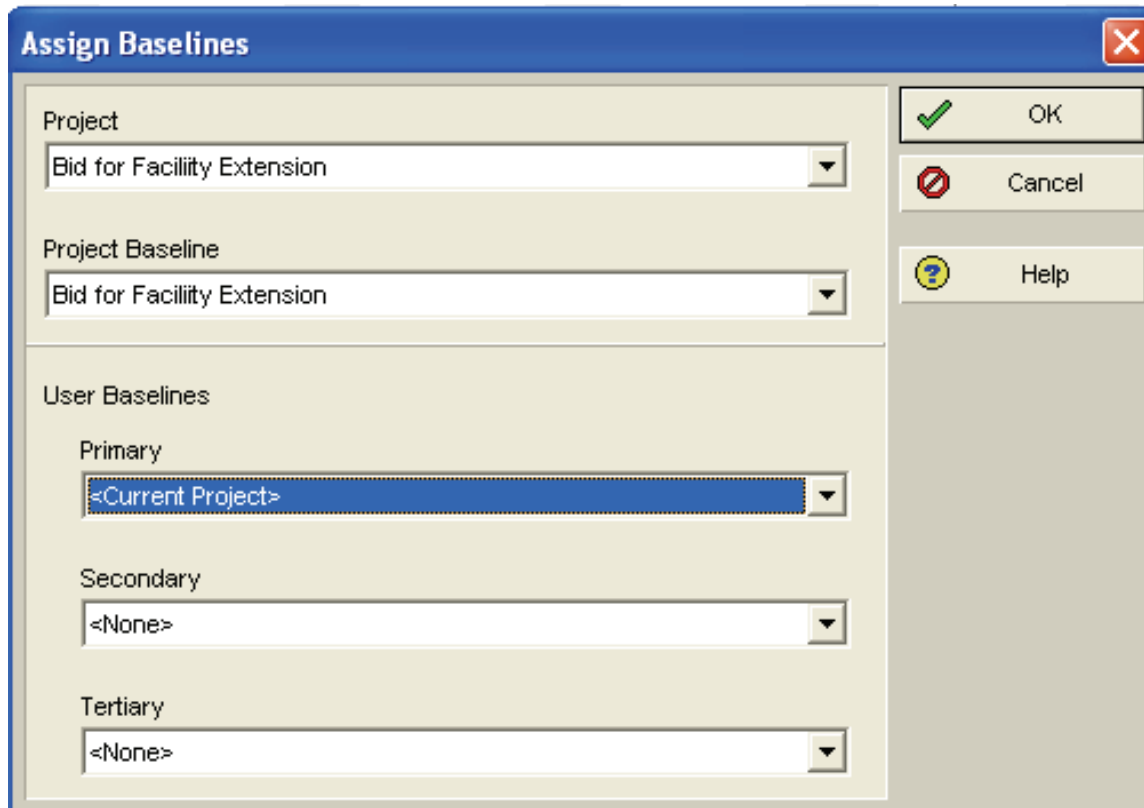
External Early Start	External Late Finish	Total Float	Qtr 1, 2010		Qtr 2, 2010			
			Feb	Mar	Apr	May	Jun	Jul
12-Mar-10 16		-34		[Gantt bar with red and yellow segments]				
		-34			[Gantt bar with red and yellow segments]			
	28-May-10 08	-34			[Gantt bar with red and yellow segments]			





# Setting a Baseline

- Up to 4 baselines may be assigned from the **Project, Assign Baselines...** form:



**Assign Baselines**

Project  
Bid for Facility Extension

Project Baseline  
Bid for Facility Extension

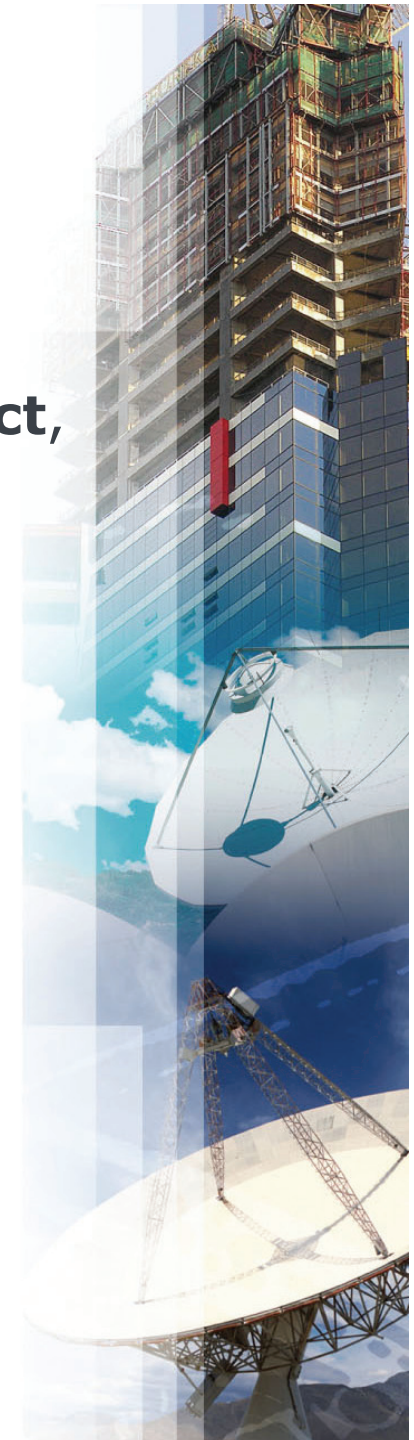
User Baselines

Primary  
<Current Project>

Secondary  
<None>

Tertiary  
<None>

OK  
Cancel  
Help



# Understanding the <Current Schedule> Baseline

- The **Planned Dates** are used by the <Current Schedule> **Baseline**,
- The <Current Schedule> **Baseline** is the default baseline for both the **Project Baseline** and **Primary User Baseline**,
- When **NO** baseline has been set by a user then the <Current Schedule> **Baseline** and therefore the **Planned Dates** are displayed as the **Baseline Bars**,
- The <Current Schedule> **Baseline** is not a true baseline and may change each time a schedule is updated,
- The term **Current Schedule** normally used to describe the activities as they are currently scheduled and the term <Current Schedule> **Baseline** is confusing as it is not the **Current Schedule** but the **Planned Dates** that may be different to the **Current Schedule**.



# Resolving Dates and Baseline Issues

- Procedures and training to ensure that all users are aware of these functions,
- Ensure that users do not use the **Apply Actuals** function and **Update Progress** functions. **Apply Actuals** may be disabled in the Security options but **Update Progress** may not be disabled,
- Ensure that a Baseline is always set for the both the Project and Primary User,
- When a new user is given access to a project ensure they set the Project and Primary User Baseline.



## Understanding and Roles and Resources

- Traditionally, planning and scheduling software defines a **Resource** as something or someone that is required to complete the activity and sometimes has limited availability. This includes people or groups of people, materials, equipment and money,
- Primavera a has a function titled **Roles**,
- A **Role** is normally used at the planning stage of a project and represents a skill or position. Later, and before the activity begins, a Role would be filled by assigning a specific individual who would be defined as a resource,
- **Roles** may be assigned to both Resources and Activities,
- **Roles** may not be levelled using the levelling function.



## Use of Roles

Roles are useful in the following situations:

- A design office for long term planning and resources assigned closer to the time the work needs to be completed,
- In a maintenance environment when Roles are exported from a maintenance management system and resources are assigned to complete the work,
- Traditional construction schedules may not need Roles, so don't feel guilty if you are not using them.



## Multiple Project Scheduling

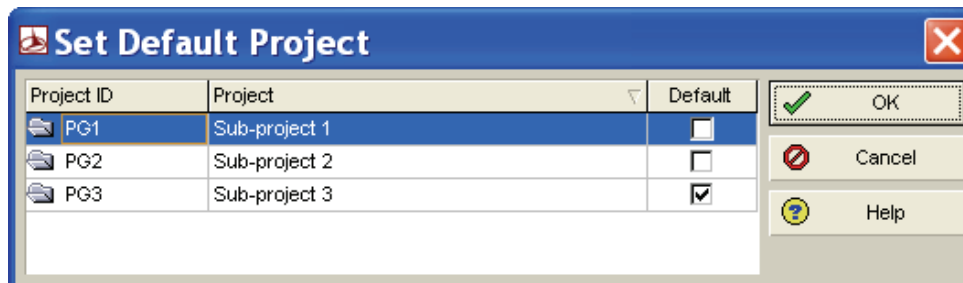
- Primavera V6 does not have sub project functionality,
- There are issues when multiple P6 projects are used to represent a single contract including:
  - Default Project, Schedule Options, Leads and Lags etc
  - Total Float Calculation,
  - Baseline Setting.



## Default Project

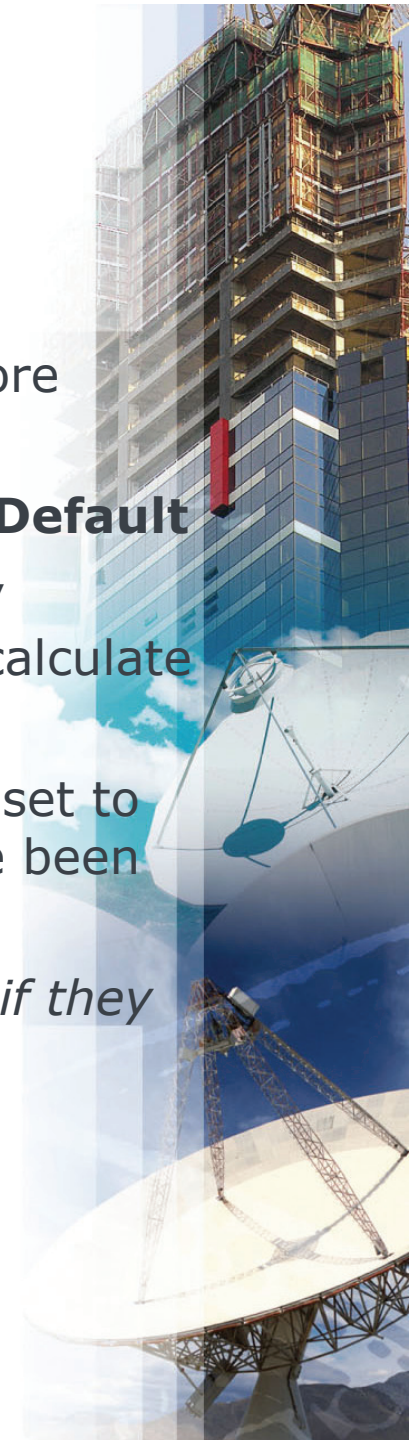
When multiple projects are opened:

- The system selects the **Default Project** when two or more projects have been opened at the same time,
- Select **Project, Set Default Project...** to open the **Set Default Project** form where you may change the default project,
- The **Default Project Scheduling Options** are used to calculate all the open projects,
- All open projects **WILL** have their **Scheduling Options** set to the same as the **Default Project** after the projects have been scheduled,
- *Ensure all projects have the same **Scheduling Options** if they are to be scheduled at the same time.*



Project ID	Project	Default
PG1	Sub-project 1	<input type="checkbox"/>
PG2	Sub-project 2	<input type="checkbox"/>
PG3	Sub-project 3	<input checked="" type="checkbox"/>

OK  
Cancel  
Help



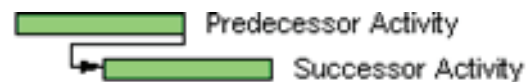
## Leads and Lags

- A Lag is a duration that is applied to a dependency to make the successor start or finish earlier or later,
- The calendar that the lead or lag is calculated on is selected in the **Tools, Schedule, Options** tab,
- This calendar is selected for all activities in a schedule and
- The calendar may be the predecessor's, the successor's, 24 hour or the Project Default calendar.

An example of a **FS** with positive lag



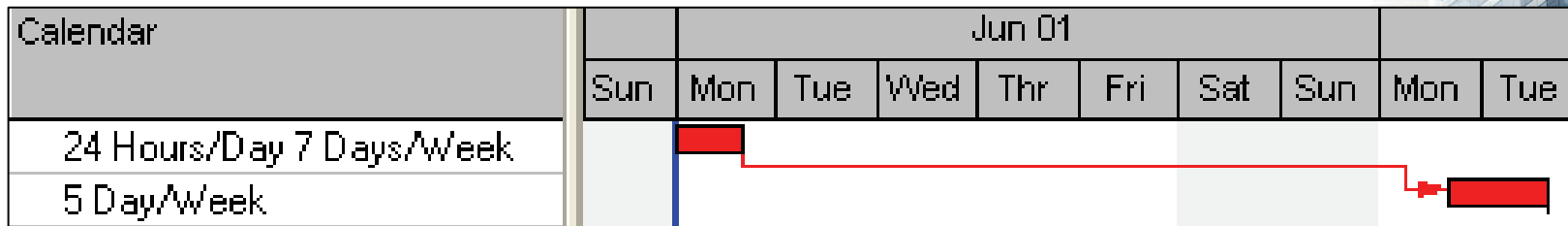
An example of a **FS** with negative lag:



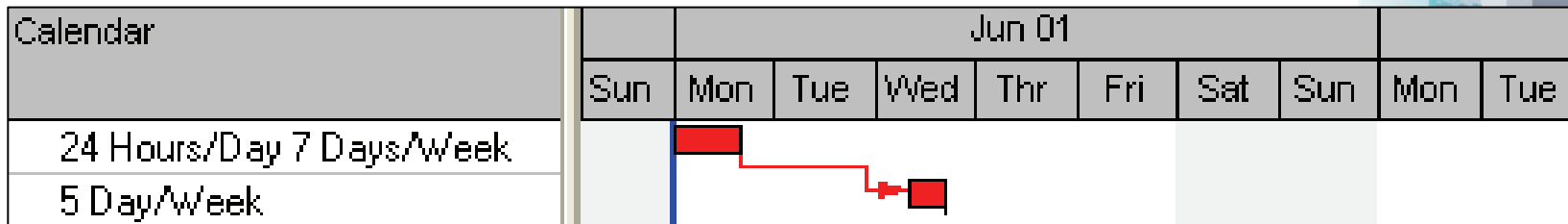


# Leads and Lags

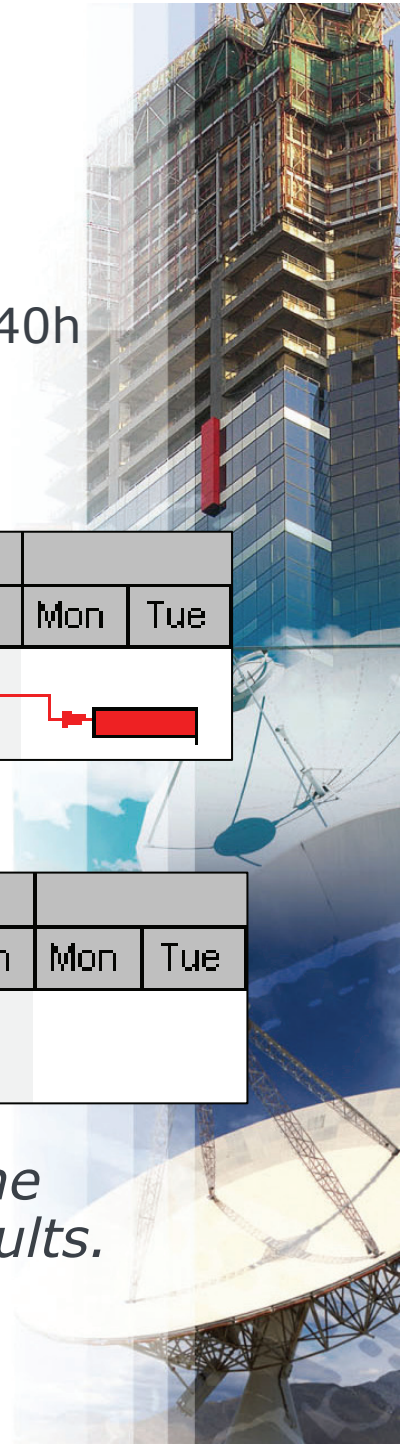
- The pictures below show two activities joined by a FS +40h relationship:
- **Successor Calendar**



- **Predecessor Calendar**



- *Ensure all Scheduling Options in all projects are the same otherwise you will get some unexpected results.*



## Total Float Calculation P6.1 and Earlier

When multiple projects are opened at the same time:

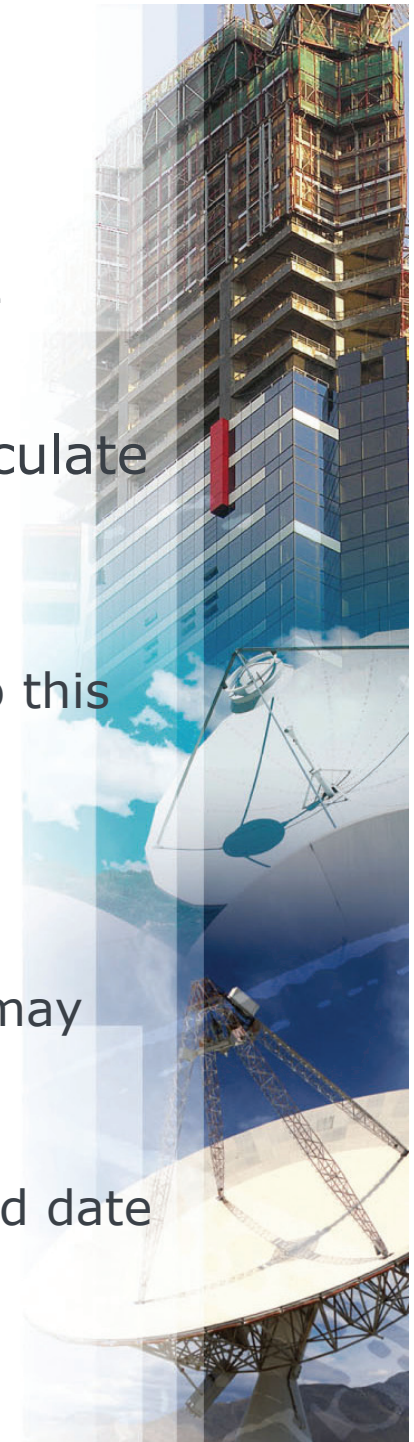
- In P6.1 and earlier versions the Total Float of each project is calculated to the last activity of each individual project schedule, see the next slide.
- There are workarounds to make the Total Float calculate on the latest activity finish date from all the open projects.
- In Primavera 6.2 a new function was create under **Tools, Schedule, Options, Calculate float based on either** which resolves this problem.





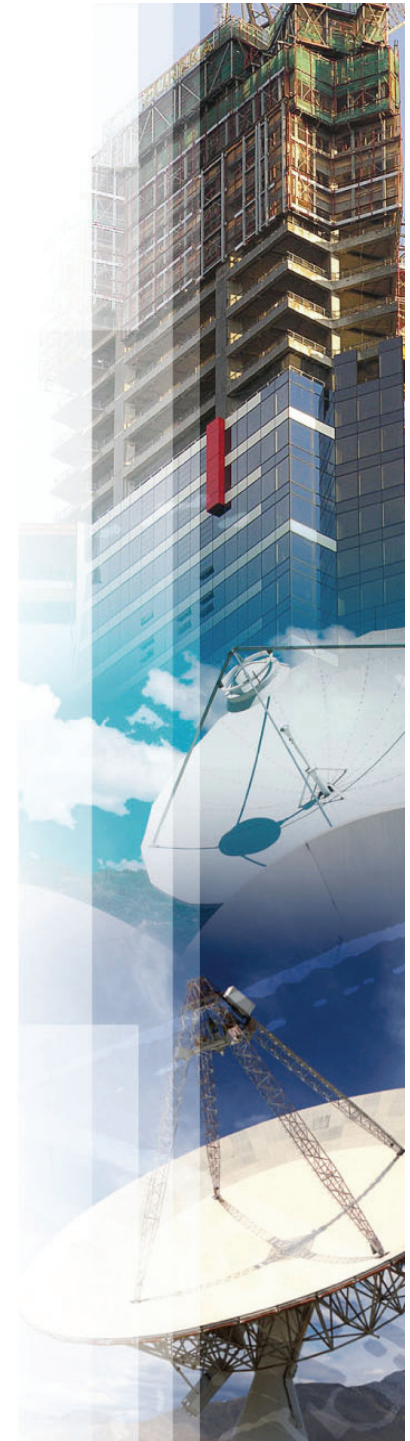
## Total Float Calculation

- This may be resolved by placing a Finish Milestone against each project and linking them,
- Another workaround to force the Total Float to calculate based on the last activity of multiple projects is:
  - Identify the early finish of the last activity,
  - Set a **Project Must Finish By** date in all projects to this date,
  - Recalculate the projects.,
- Both options have weakness:
  - In the first option the links between the Milestones may need to be changed, and
  - The **Project Must Finish By** date may need to be changed in each project on a regular basis as the end date changes,
- Upgrade to Version 6.2 solves most of the issues.



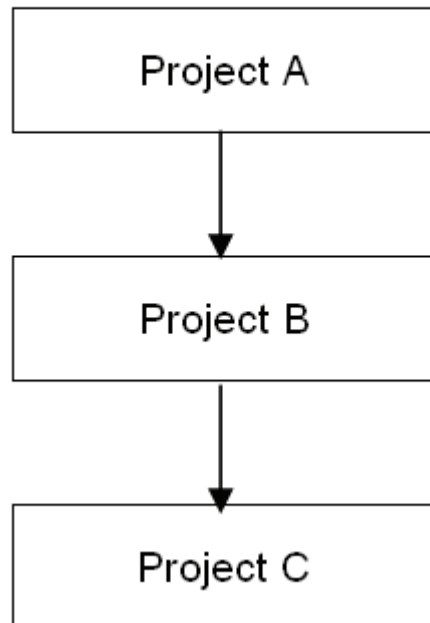
## Multiple Project Baseline

- If you want your baseline projects to have the original relationships you need to copy the projects in the Projects window and use the Baseline option to **Convert another project to a new baseline of the current project,**
- The following slides will show why:



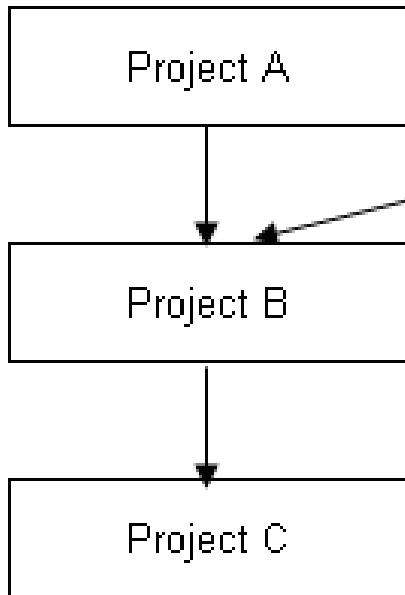
# Multiple Project Baseline

## Original Project Relationships



# Multiple Project Baseline

**Original Project Relationships**

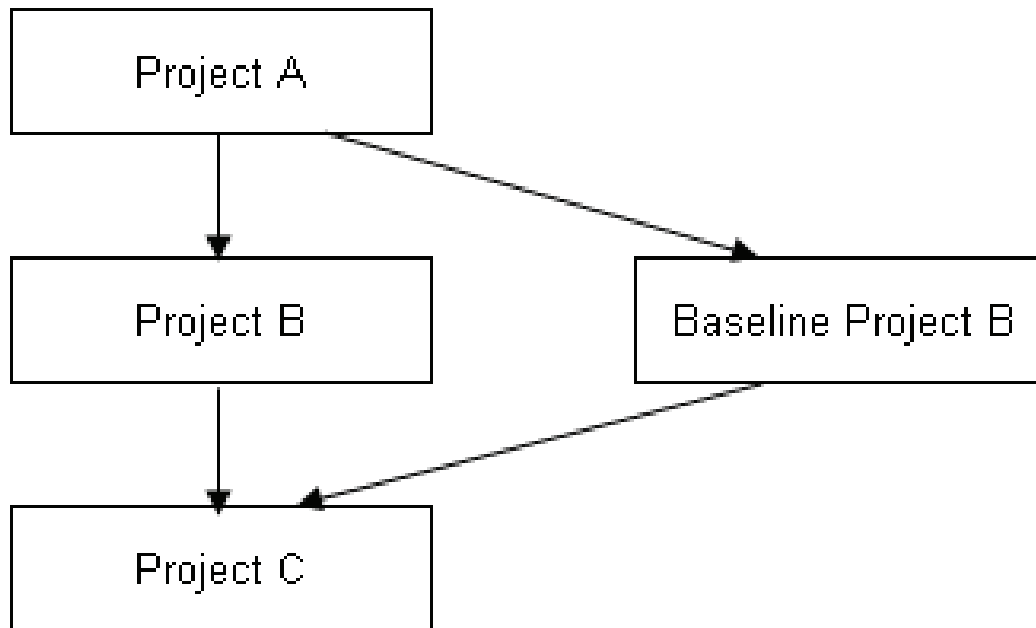


**Relationships amongst projects when Baselined using "Save copy of current project as a new baseline"**

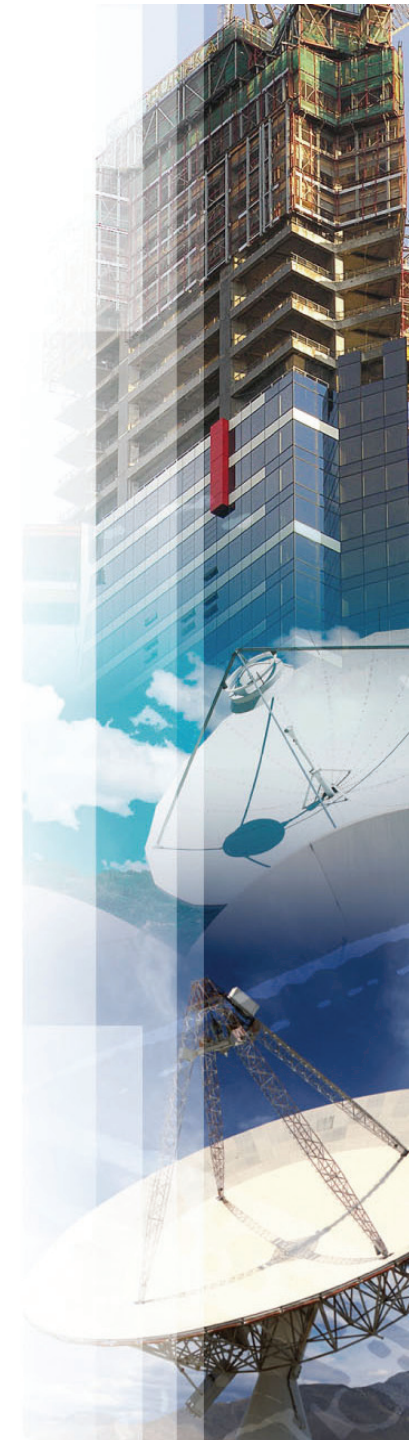


# Multiple Project Baseline

**Original Project Relationships**



**Relationships amongst projects when Baselined using "Save copy of current project as a new baseline"**

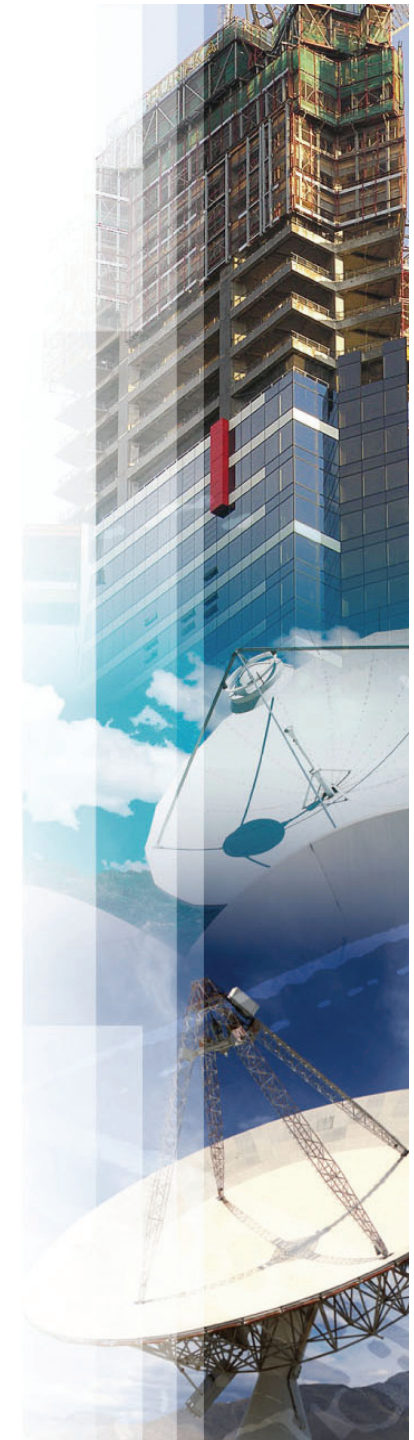
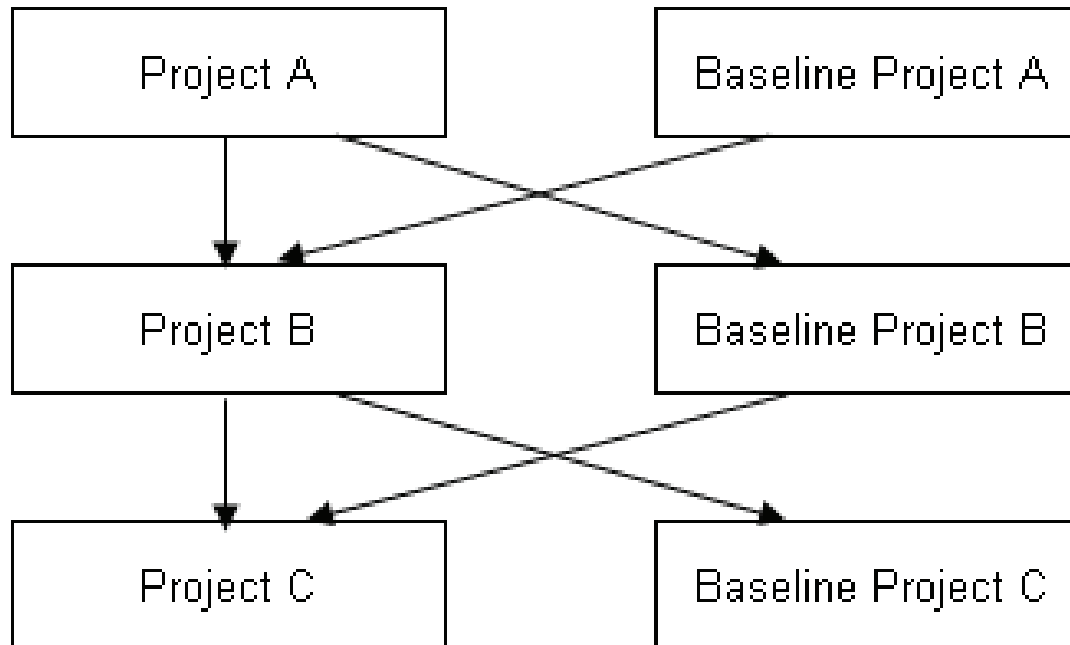




# Multiple Project Baseline

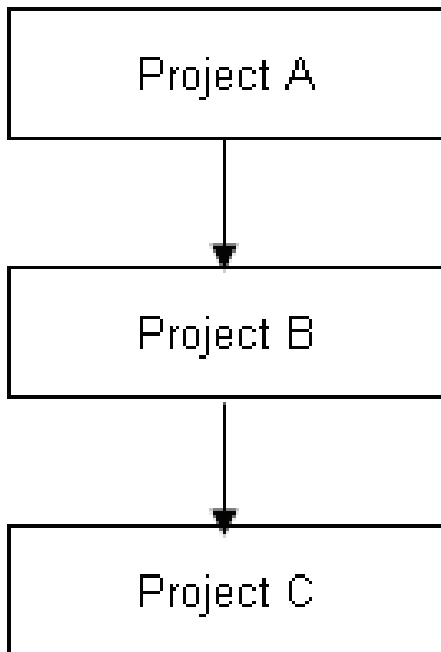
**Original Project Relationships**

**Relationships amongst projects when Baselined using "Save copy of current project as a new baseline"**

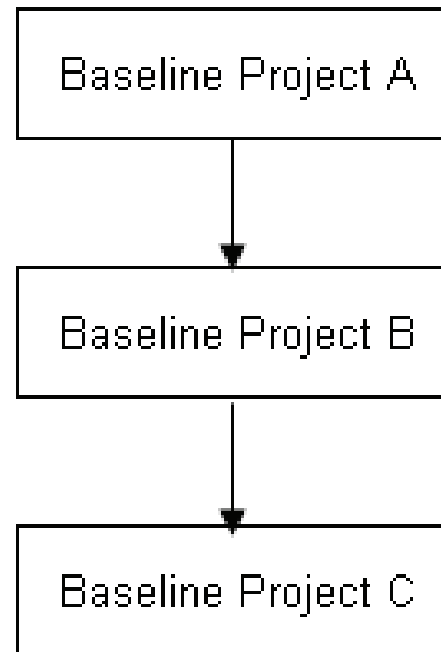


# Multiple Project Baseline

Original Project relationships



Relationships amongst projects when Baselined using "Convert another project to a new baseline of the current project"



**Thank you for attending**

