

Software that brings together the ideas and techniques of **TameFlow Kanban** and **TameFlow Scrum, Agile/Scrum, Critical Chain Project management, TOC** and **LEAN** in one integrated solution

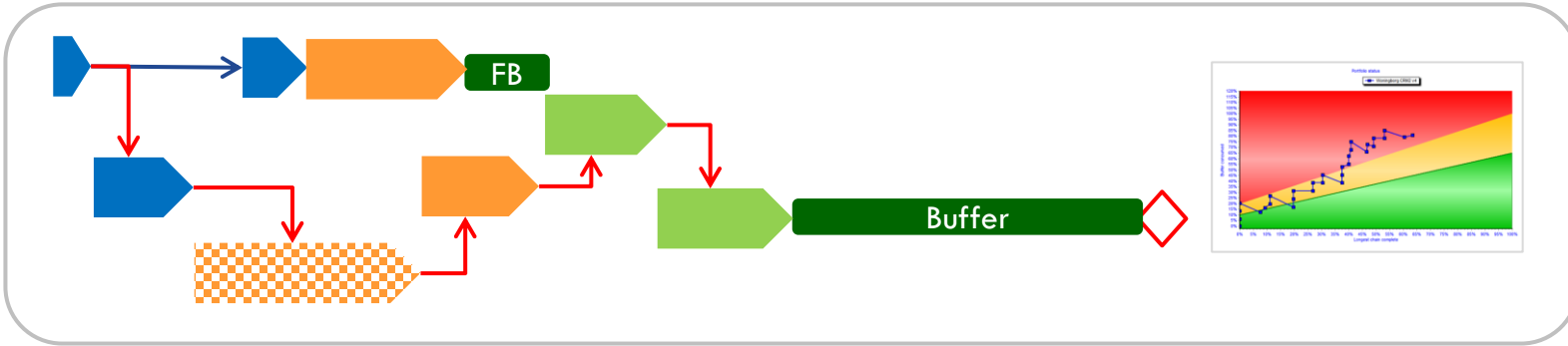
## LYNX LOAD FACTOR SCHEDULING – CRITICAL PATH

Classical Project Management 2.0

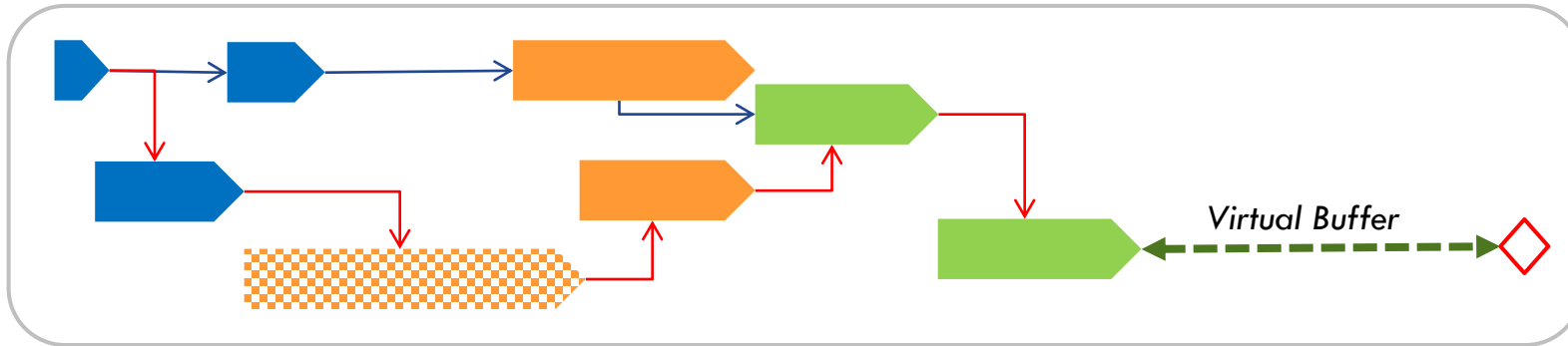


# LYNX Scheduling Engines

(forward and/or backward scheduling options)

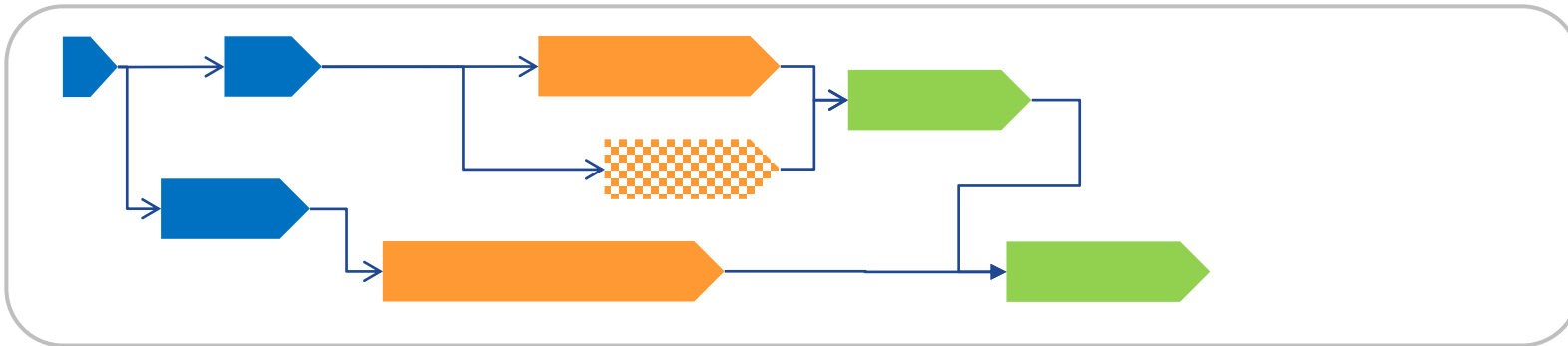


**Critical Chain Scheduling**  
Buffer Management  
Critical Chain Engine



**Classical Project Management 2.0**

**Critical Path / Standard**  
Virtual Buffer Management  
Load Factor Engine



**Manual Scheduling**  
Manual Positioning of Tasks

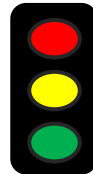
# LYNX Scheduling Engines

## Implementation Options

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### LYNX Critical Chain Engine

- Detection of the critical chain
- Buffer Management
- Task-Time Reduction
- Progress charts



Operational Priorities based on Buffer-Consumption

### LYNX Load-Factor Engine

- Simplified Buffer Management
  - Concept of virtual buffers
- Automatic multi-project scheduling, based on:
  - Business priority (strategic)
  - Operational priority
- Priorities based on 2 dimensions:
  - Available time ("float")
  - Available Capacity given Resource Requirements

Load-Factor© Operational Priorities

Classical Project Management 2.0

A. CCPM Only / B. Load-Factor Scheduling Only / C. Combination of CCPM and LFS

# Combined:

## My activities Task List with both CCPM and Load Factor Projects and tasks

4

A-dato Consulting - 1. A-dato - Engineering Portfolio

My activities Messages (0) Project portfolio Active tasks Assignments Reporting LF01 Load Factor Project - Cr.. LF02 Load Factor Project - Cr..

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ID	Description	c/m	Start date	Domain	TM	Priority	PTS	Resources
T01-T1	<b>Test Prototype</b> T1 Customer Project	<u>cm</u>	ma 18 okt 9:00 [w42]	Mountain	AC SC		Yes	Mechanical Engineer [12 days, not started] Designer [12 days, not started] System Engineer [12 days, not started]
D01-T3	<b>Review</b> D1 Product Development	<u>c</u>	ma 18 okt 9:00 [w42]	Mountain	AC		Yes	System Tester [4 days, not started] Designer [4 days, not started]
D02-T20	<b>Engineering stream 2</b> D2 Product Development		wo 20 okt 9:00 [w42]	Road	AC		Yes	Supplier B [8 days, not started] Mechanical Engineer [8 days, not started]
LF01-T1	<b>Confirm Requirements</b> LF01 Load Factor Project - Critical Path		ma 18 okt 9:00 [w42]	Road	AC		Yes	Project Manager [4 days, not started]
LF02-T1	<b>Confirm Requirements</b> LF02 Load Factor Project - Critical Path		ma 18 okt 9:00 [w42]	Road	AC		Yes	Project Manager [4 days, not started]

# When to consider Load-Factor Scheduling?

## *As alternative to, or next to Critical Chain*

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- Operational profile and Project Characteristics:
  - Many (smaller) projects with a higher due-date tolerance and/or a very dynamic pipeline
  - Project structure(s) typically do not allow to identify a connected critical chain. There are time gaps and phases with “breaks” in between
  - Priority system for regular work and individual tasks (e.g. services, support, maintenance)
  - If you want to apply automatic multi-project scheduling and resource assignments
  
- Implementation Considerations
  - Easier point of entry, for companies who are used to the traditional Microsoft Project world
  - Scope of the implementation is focusing on portfolio Scenario Planning
  
- Can you do both? → YES!
  - Consider to combine CCPM with Load-Factor scheduling

# Load-Factor Scheduling Input

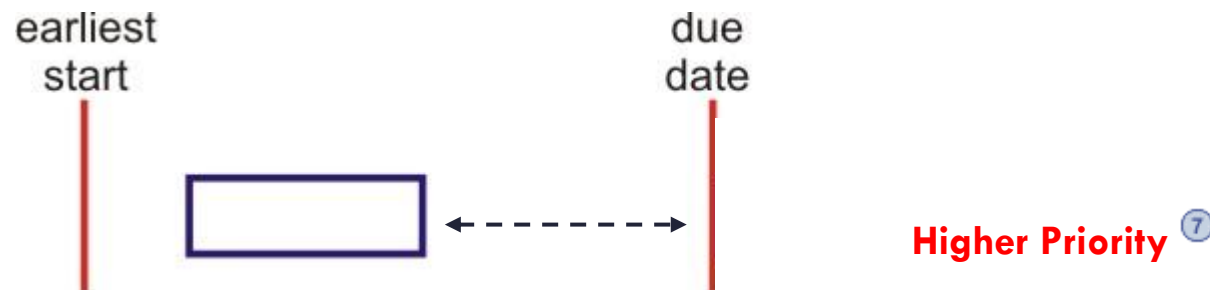
*Available Time offset to a due-date or deadline*

6

- Some tasks have a long timeframe:



- Some tasks have a small timeframe:



# Load-Factor Scheduling Input

## *Considering Skill Availability as well!*

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- Some Skills have a low availability:



Higher Priority <sup>7</sup>

- Other Skills have plenty availability:



Lower Priority <sup>3</sup>

# The power of Buffer Management

## Simulations

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Strategy	Setup	1st project cmpl.	1st project late	#Completed	#Late	hrs. overdue	#Red	%Yellow
Start date	5% +MT	21.14:00	26.15:00	21	15	3410	35	52%
Start date	5% -MT	20.12:00	22.09:00	29	15	2679	27	63%
Due date	5% +MT	21.9:00	21.14:00	20	15	2709	36	53%
Due date	5% -MT	16.14:00	36.11:00	41	12	846	14	83%
<b>LYNX</b>	<b>5% -MT</b>	<b>17.9:00</b>	<b>141.12:00</b>	<b>50</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>97%</b>

*Buffer Management outperforms any other sequencing strategy!*



# Add a Critical Path Project

Load Factor Schedule Engine

# Project Configuration

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The screenshot displays a project management application with a Gantt chart and configuration panels. The Gantt chart shows tasks like 'Confirm Requirements', 'Concept', and 'Electronics' with resource assignments for Project Manager, System Engineer, Electrical Engineer, Mechanical Engineer, and Software Engineer. The configuration panels include 'Project properties' and 'Project statistics'.

**Project statistics**

Released at	zo 17 okt
Project start	Today
Project end	vr 10 dec
Duration	40 days

**Project properties**

General Documents Custom fields Project dates Scheduling Resource availability

How do you want this project to be scheduled?

**Schedule engine**

- Schedule tasks 'as soon as possible'  
'as soon as possible' will schedule tasks forward from the project start date
- Schedule tasks 'just in time'  
'just in time' will schedule tasks backwards from the project end date
- Activate CCPM schedule engine  
CCPM provides a project management solution based on the Theory Of Constraints
  - Schedule feeding chains 'as soon as possible'
  - Schedule feeding chains 'just in time'

**Schedule order**

- Schedule tasks in default order
- Schedule tasks on critical path first

De-select the CXCPM Engine. If deselected Load Factor Scheduling is active by default, if switched on for you space.

Select these parameters

# Skill Settings

## Automatic Load Balancing – Across Projects

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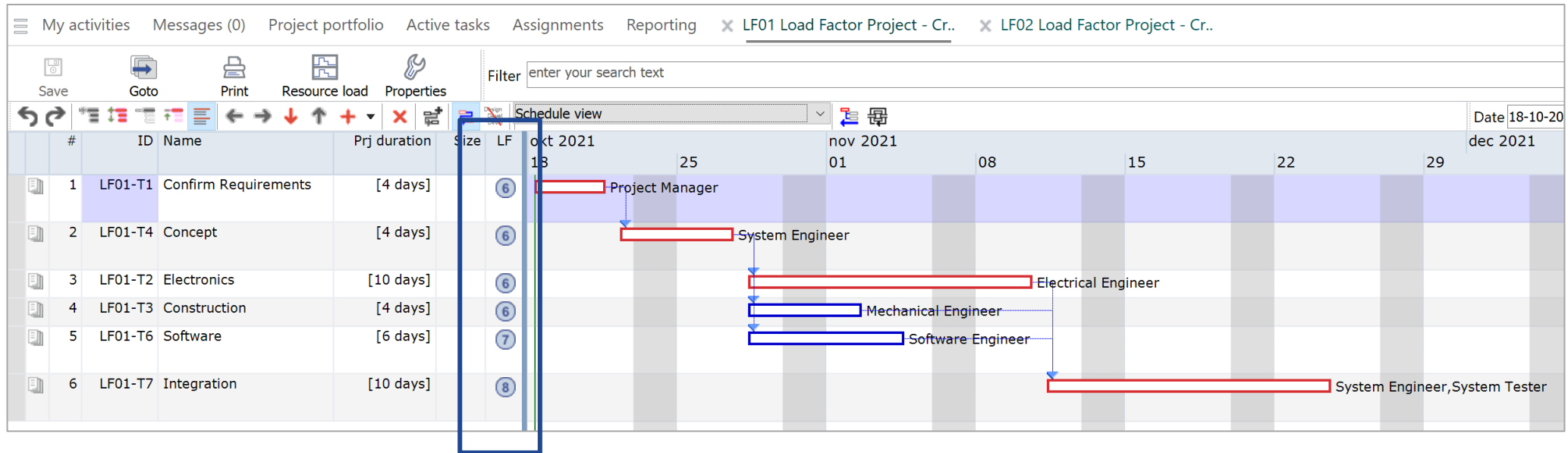
The screenshot shows the 'Skills' configuration page in a software interface. On the left, there is a list of skill categories: Description, System Engineer, System Tester, Team Customer, Team Software, Team System Engineering, Trainer, and Virtual Drum. The 'System Engineer' category is selected. The main area displays the 'Resources' tab for a skill, with the question 'How do you want the scheduler to handle this skill'. Under the 'Multi-project resource leveling' section, there are two radio button options: 'Resolve conflicts across all projects' and 'Resolve conflicts within projects, allow conflicts between projects'. The second option is selected and circled in blue. A blue callout box points to this option with the text 'Select this setting for all Skills (initially), to prevent Automatic Load Balancing.' Below this, the 'Skill type' section has 'Normal' selected. At the bottom, the 'Skill availability' is noted as 1 unit(s).

Select this setting for all Skills (initially), to prevent Automatic Load Balancing.

**Implementation recommendation:**  
→ start first **without** levelling on an any skill, i.e. without automatic scheduling. Understand first what the most critical (capacity constraint) skill groups are

# Check if Load Factor Scheduling is switched on..

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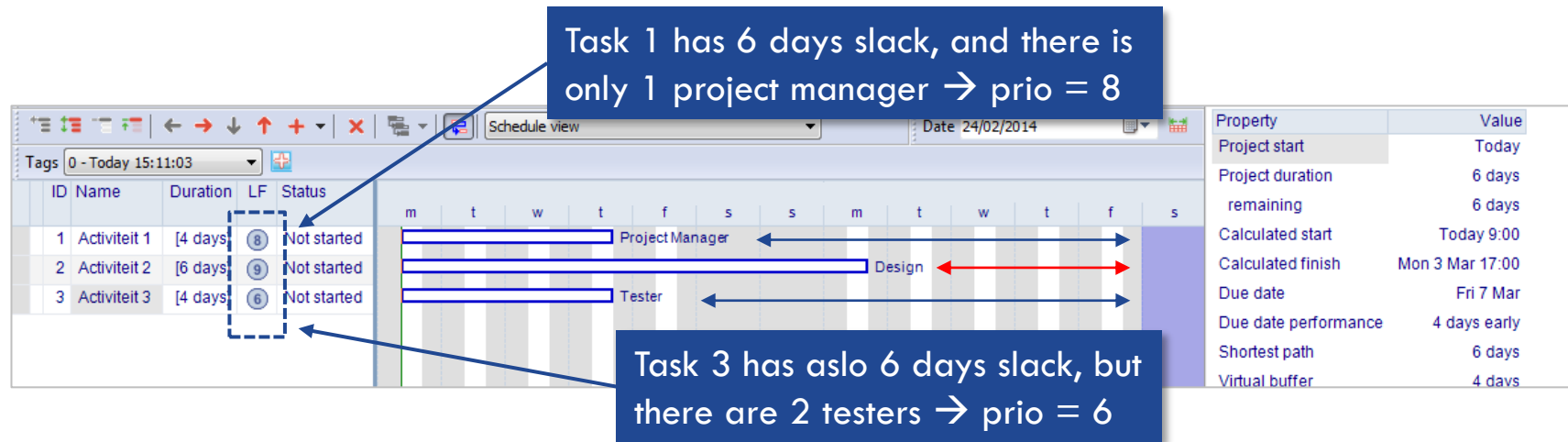
Set the Project Status to released and verify if you see the LF column with the LF priority numbers

# The priority mechanism

Understanding priorities in the Load-Factor mode

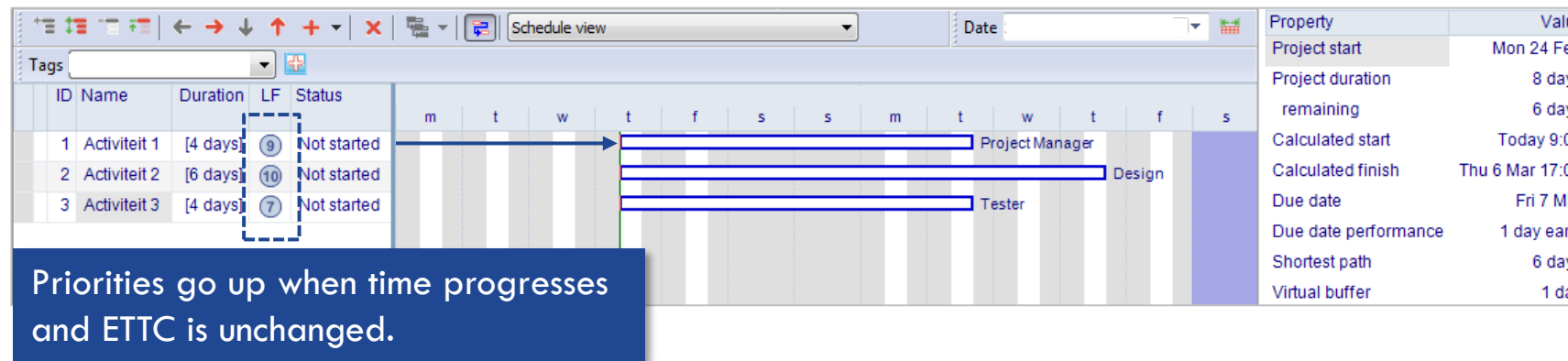
# Priorities driven by timeframe and availability

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In this example there are:

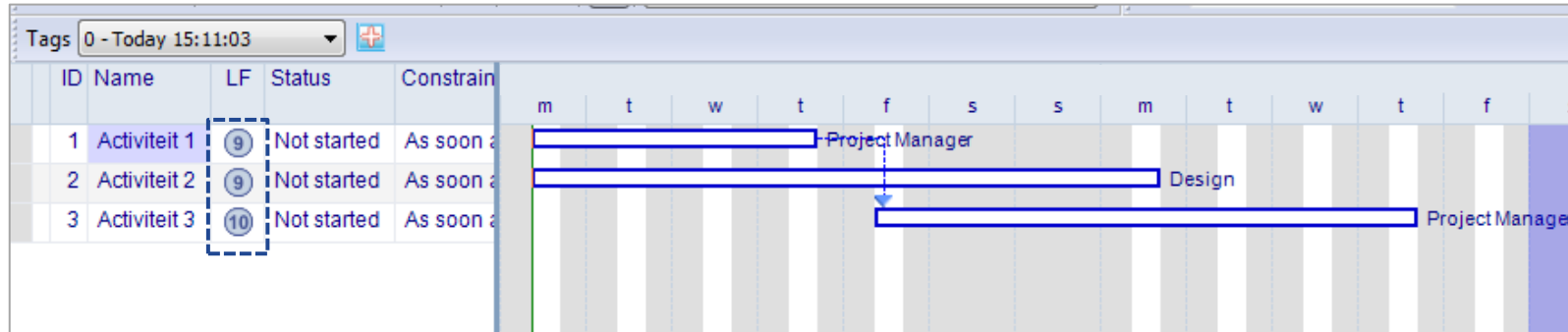
- 2 Testers
- 1 Project Manager



# The highest priority in the chain counts

## *My activities*

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Task 1 is leading to task 3. Task 1 “inherits” priority of task 3.

The screenshot shows the 'My activities' view with a task list and a detailed view for task ID 3.

ID	Description	Start date	Priority	RTS	Resources
1	Activiteit 1 Priorities in LYNX	Mon 24 Feb 9:00	9	Yes	Sven Cramer [4 days, not started]
3	Activiteit 3 Priorities in LYNX	Fri 28 Feb 9:00	10	No	Sven Cramer [5 days, not started]

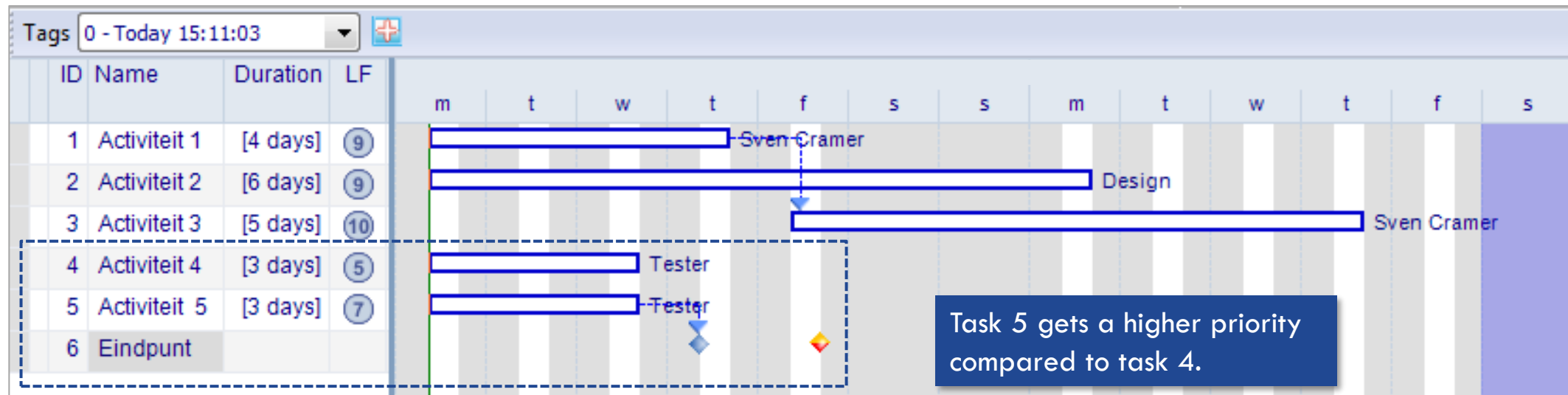
The 'Task details' panel for ID 3 shows:

- ID 3
- Description: Activiteit 3
- Project: Priorities in LYNX
- Project manager: Ad Vermeulen, A-Dato
- Scheduled dates: Fri 28 Feb 9:00 - Thu 6 Mar 17:00
- Task manager
- Your assignment: Project Manager [Sven Cramer]
- Scheduled duration: 5 days (40h)
- Status: Not started
- Expected time to complete: 5 days

A dashed box highlights the priority values (9 and 10) in the 'Priority' column of the task list, with an arrow pointing from task 1 to task 3, illustrating the priority inheritance.

# Effect of an intermediate end-point (milestone)

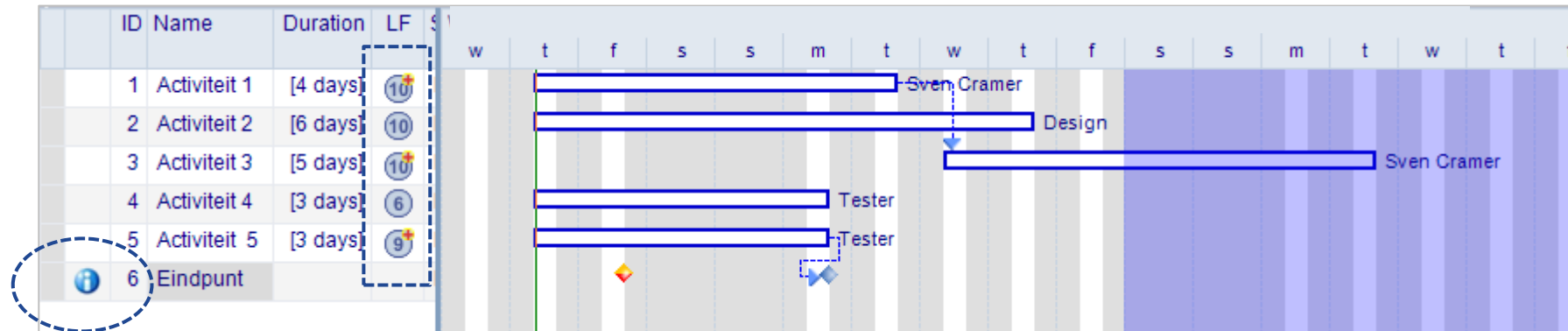
16





# When it doesn't fit anymore

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The red <sup>+</sup> indicators tell the chain doesn't fit anymore.

# Tasks marked + due to deadlines or constraints

*The project has virtual buffer available, but a deadline is not achievable for a sub-chain in the project*

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Tasks 2 priority is marked with + because it doesn't fit anymore between current date/time and the deadline. LYNX is populating a message.

The screenshot displays a project management interface with a Gantt chart and a task list. The task list shows three tasks:

ID	Name	Duration	LF	Status	Constraint
1	Task 1	[5 days]	7	Not started	As soon as possible
2	Task 2	[5 days]	9+	Not started	As soon as possible
3	Task 3	[10 days]	9	Not started	As soon as possible

The Gantt chart shows Task 2 with a red '+' icon on its bar, indicating a deadline issue. The task is assigned to a 'Tester' resource. A message window is open, showing a warning for Task 2:

Task	Severity	Resource	Message
2	Warning		Scheduler could not meet with deadline set on date 27 February

The task properties window shows the constraint set to 'As soon as possible' and the deadline set to 'Thu 27 Feb 17:00'. The project summary on the right indicates a virtual buffer of 5 days and a due date of Fri 14 Mar.

# My activities / Active Tasks

Sequencing of Task based on Load Factor Priorities

# Example Projects

## Sequence by Load-Factor

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The screenshot displays the A-dato software interface. The top window shows a Gantt chart for 'LF01 Load Factor Project - Cr...' with tasks: Confirm Requirements (4 days), Concept (4 days), Electronics (10 days), Construction (4 days), Software (6 days), and Integration (10 days). Resources include Project Manager, System Engineer, Electrical Engineer, Mechanical Engineer, Software Engineer, and System Engineer/System Tester. A 'Project statistics' panel on the right shows a shortest path of 28 days and a virtual buffer of 12 days.

The bottom window shows a list of critical paths:

ID	Prj. Location	Priority	Description	PM	Status	Start	End	Expected finish	CCPM	Performance
LF01		4	<b>LF01 Load Factor Project - Critical Path</b> resource hours: 384h remaining: 384h - 100%	AS	Released	ma 18 okt	vr 10 dec	wo 24 nov		8 Virtual buffer: 12 days Due date performance: 12 days early
LF02		4	<b>LF02 Load Factor Project - Critical Path</b> resource hours: 384h remaining: 384h - 100%	AC	Released	zo 17 okt	vr 31 dec	wo 24 nov		7 Virtual buffer: 27 days Due date performance: 27 days early

# Active Tasks (all tasks)

My activities Messages (0) Project portfolio Active tasks Assignments Reporting X LF01 Load Factor Project - Cr.. X LF02 Load Factor Project - Cr..

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ID	Description	c/m	Start date	Domain	TM	Priority	RTS	Resources
LF01-T1	<b>Confirm Requirements</b> LF01 Load Factor Project - Critical Path		ma 18 okt 9:00 [w42]	Road		6 → 8	Yes	Project Manager [4 days, not started]
LF02-T1	<b>Confirm Requirements</b> LF02 Load Factor Project - Critical Path		ma 18 okt 9:00 [w42]	Road		5 → 7	Yes	Project Manager [4 days, not started]
LF01-T4	<b>Concept</b> LF01 Load Factor Project - Critical Path		vr 22 okt 9:00 [w42]	Road		6 → 8	No	System Engineer [4 days, not started]
LF02-T2	<b>Concept</b> LF02 Load Factor Project - Critical Path		vr 22 okt 9:00 [w42]	Road		5 → 7	No	System Engineer [4 days, not started]
LF01-T2	<b>Electronics</b> LF01 Load Factor Project - Critical Path		do 28 okt 9:00 [w43]	Road		6 → 8	No	Electrical Engineer [10 days, not started]
LF01-T6	<b>Software</b> LF01 Load Factor Project - Critical Path		do 28 okt 9:00 [w43]	Road		7 → 8	No	Software Engineer [6 days, not started]
LF01-T3	<b>Construction</b> LF01 Load Factor Project - Critical Path		do 28 okt 9:00 [w43]	Road		6 → 7	No	Mechanical Engineer [4 days, not started]
LF02-T3	<b>Electronics</b> LF02 Load Factor Project - Critical Path		do 28 okt 9:00 [w43]	Road		5 → 7	No	Electrical Engineer [10 days, not started]
LF02-T5	<b>Software</b> LF02 Load Factor Project - Critical Path		do 28 okt 9:00 [w43]	Road		5 → 6	No	Software Engineer [6 days, not started]
LF02-T4	<b>Construction</b> LF02 Load Factor Project - Critical Path		do 28 okt 9:00 [w43]	Road		4 → 6	No	Mechanical Engineer [4 days, not started]
LF01-T7	<b>Integration</b> LF01 Load Factor Project - Critical Path		do 11 nov 9:00 [w45]	Road		8	No	System Engineer [10 days, not started] System Tester [10 days, not started]
LF02-T6	<b>Integration</b> LF02 Load Factor Project - Critical Path		do 11 nov 9:00 [w45]	Road		7	No	System Tester [10 days, not started] System Engineer [10 days, not started]



# My activities

## Task Manager = A-dato Consulting (AC)

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☰ My activities Messages (0) Project portfolio Active tasks Assignments Reporting X LF01 Load Factor Project - Cr.. X LF02 Load Factor Project - Cr..

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ID	Description	c/m	Start date	Domain	TM	Priority	RTS	Resources
LF01-T1	<b>Confirm Requirements</b> LF01 Load Factor Project - Critical Path		ma 18 okt 9:00 [w42]	Road	AC	6 → 8	Yes	Project Manager [4 days, not started]
LF02-T1	<b>Confirm Requirements</b> LF02 Load Factor Project - Critical Path		ma 18 okt 9:00 [w42]	Road	AC	5 → 7	Yes	Project Manager [4 days, not started]
LF01-T2	<b>Electronics</b> LF01 Load Factor Project - Critical Path		do 28 okt 9:00 [w43]	Road	AC	6 → 8	No	Electrical Engineer [10 days, not started]
LF02-T3	<b>Electronics</b> LF02 Load Factor Project - Critical Path		do 28 okt 9:00 [w43]	Road	AC	5 → 7	No	Electrical Engineer [10 days, not started]

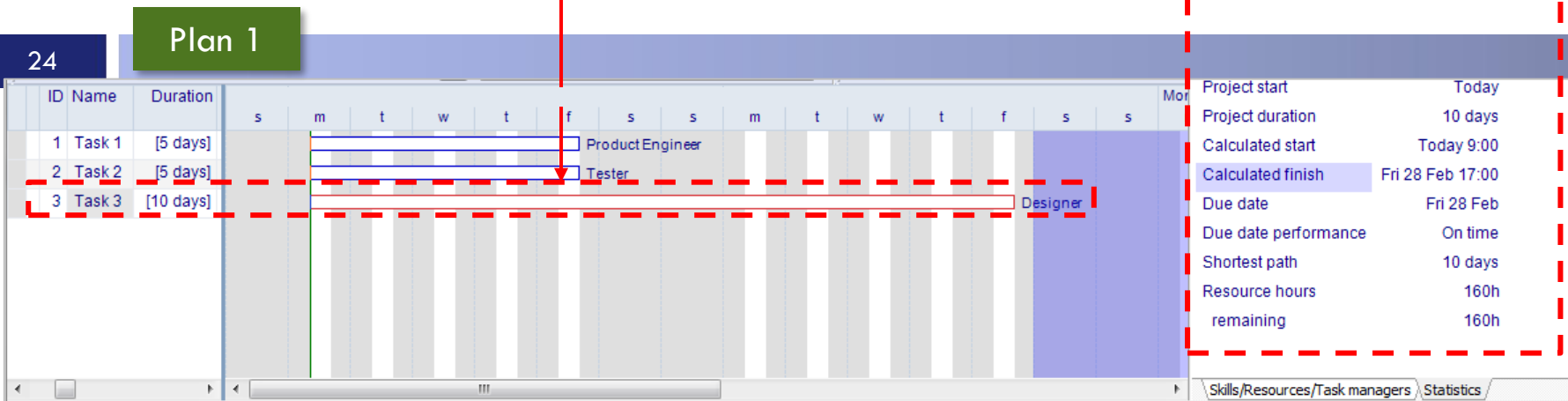
# Buffer Management

With Load Factor Scheduling

Project Duration is the delta between the calculated start and calculated finish.

Task 3 has a duration of 10 days, and determines the project duration. As a result the calculated finish is at 28 February, equal to the Due Date (also 28 February)

Due date performance = On-Time.  
(Calculated Finish Date = Due Date)



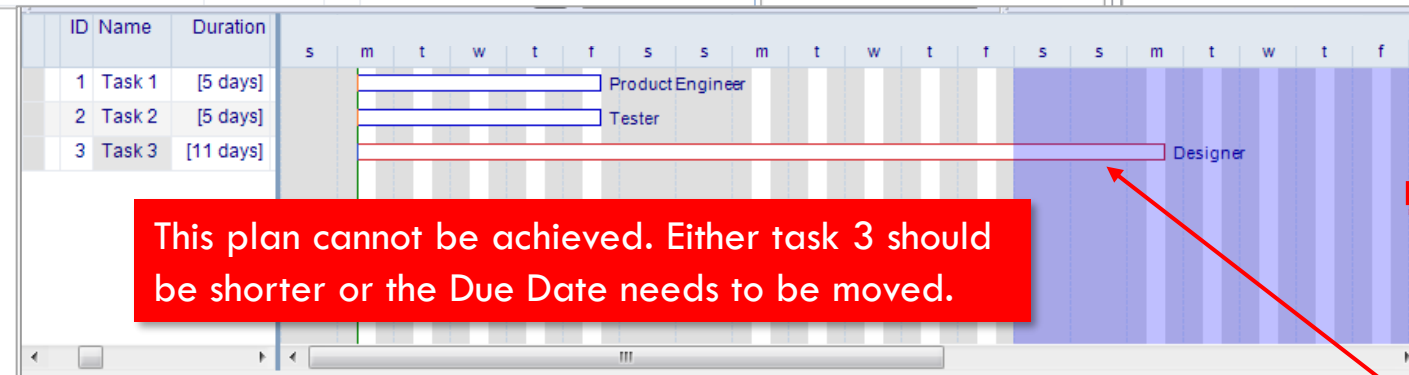
Project start	Today
Project duration	10 days
Calculated start	Today 9:00
Calculated finish	Fri 28 Feb 17:00
Due date	Fri 28 Feb
Due date performance	On time
Shortest path	10 days
Resource hours	160h
remaining	160h

Task properties

Requirements (edit)

Resource/Skill	Estimated time	Units	Status	Estimated time to complete	Total booked
S: Designer [*Mike Dempsey:80h]	10 days	100%	Not started		

Plan 2



This plan cannot be achieved. Either task 3 should be shorter or the Due Date needs to be moved.

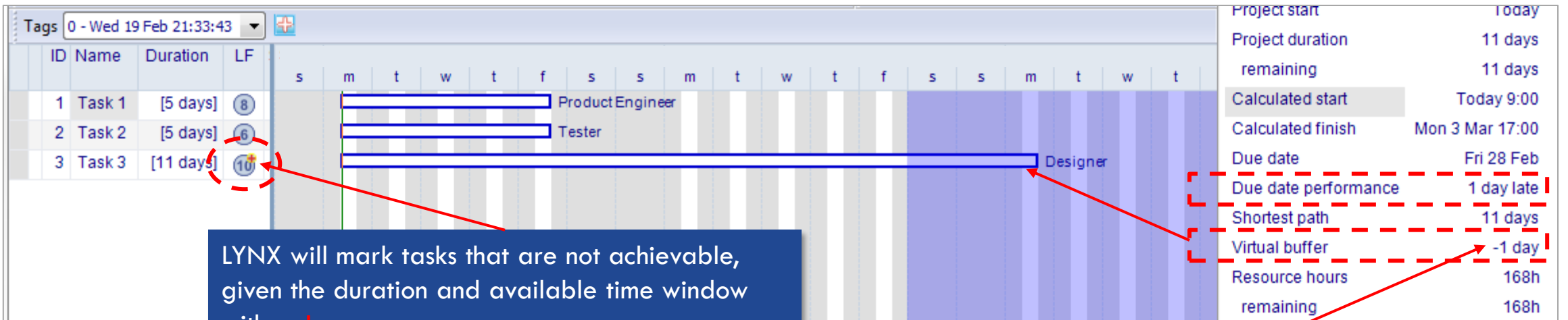
Project start	Today
Project duration	11 days
Calculated start	Today 9:00
Calculated finish	Mon 3 Mar 17:00
Due date	Fri 28 Feb
Due date performance	1 day late
Shortest path	11 days
Resource hours	168h
remaining	168h

LYNX triggers a warning: tasks (= task 3) are scheduled after the project end-date.

Task	Severity	Resource	Message
	Warning		Some tasks (1) are scheduled after the project end date (01 March 2014)

Task 3 has a duration of 11 days → Calculated Finish = 3 March → Due Date Performance = 1 day late.





LYNX will mark tasks that are not achievable, given the duration and available time window with a +.

A + means there is a planning conflict that needs to be resolved.

A negative Virtual Buffer also points to a planning that cannot be achieved | the given project duration between start and due date.

# Virtual buffer in case it exactly fits

Task 3 is reduced to 10 days. It does now exactly fit → virtual buffer is 0 days.

ID	Name	Duration	LF
1	Task 1	[5 days]	8
2	Task 2	[5 days]	6
3	Task 3	[10 days]	10

remaining 10 days  
Calculated start Today 9:00  
Calculated finish Fri 28 Feb 17:00  
Due date Fri 28 Feb  
Due date performance On time  
Shortest path 10 days  
Virtual buffer 0 days  
Resource hours 160h  
remaining 160h

Task properties

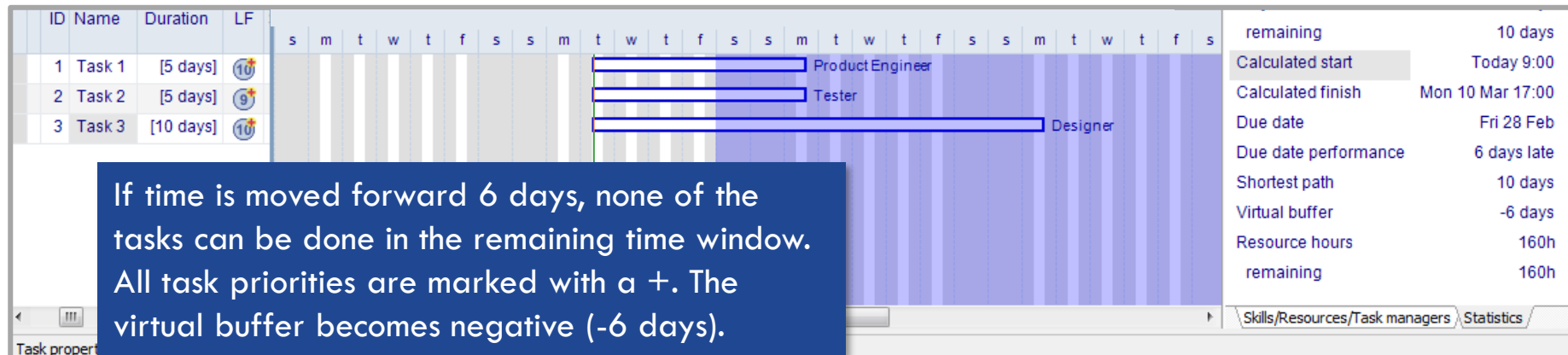
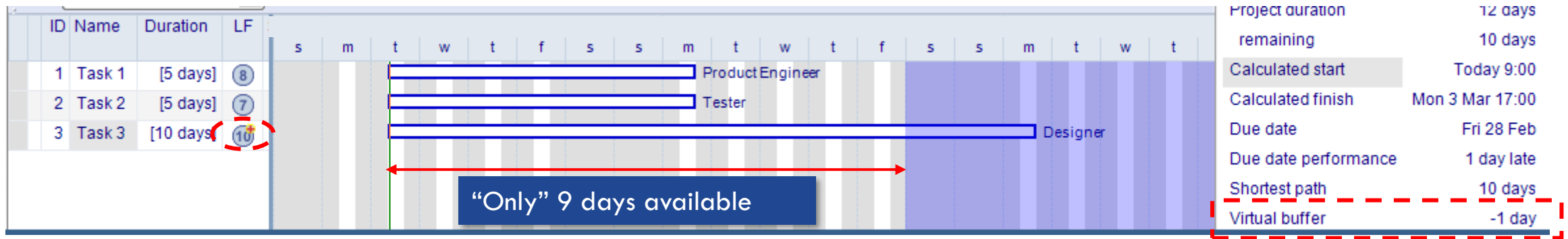
General | Constraint | Progress | Resource requirements | Dependencies | Notes | Comments | Visual | Tracking

Requirements [edit](#)

Resource/Skill	Estimated time	Units	Status	Estimated time to complete	Total booked	Visible on My activities page
S: Designer [*Mike Dempsey:80h]	10 days	100%	Not started			<input checked="" type="checkbox"/>

Updated: Today 9:36:11 by you

If time moved forward 1 day and no progress has been made, the same issue occurs. The plan becomes unachievable and the virtual buffer becomes **negative**.



## Negative Virtual buffers need to be solved. There are 2 solutions:

1. The plan itself needs to be correct. If a project is “Not Started” all tasks must be able to finish before the due date: Either the due-date need to be moved to a later date OR the plan itself needs to be shortened.
2. If a project is released – a negative Virtual buffer is often also the result of **NOT MAKING PROGRESS**. Work can take longer. However a common cause is also that there is **delay** in reporting progress on tasks. This is a responsibility of project managers and resources → frequently updating progress.

Project duration: 11 days  
 remaining: 9 days  
 Calculated start: Today 9:00  
 Calculated finish: Fri 28 Feb 17:00  
 Due date: Fri 28 Feb  
 Due date performance: On time  
 Shortest path: 9 days  
 Virtual buffer: 0 days  
 Resource hours: 160h  
 remaining: 152h

Task properties

General | Constraint | Progress | Resource requirements | Dependencies | Notes | Comments | Visual | Tracking

Requirements (edit)

Resource/Skill	Estimated time	Units	Status	Estimated time to complete	Total booked
S: Designer [Mike Dempsey:72h]	10 days	100%	Started	9 days	

Task 3 does not have a + anymore, because 1 day progress was achieved (ETTC → 9 days).

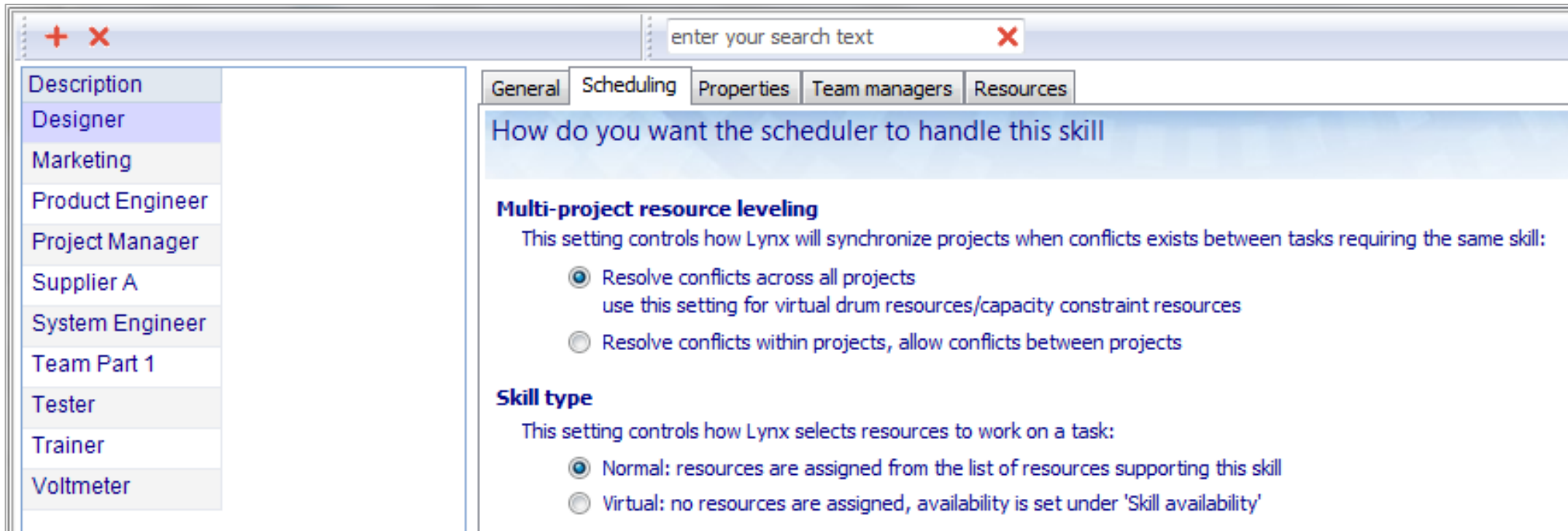
# Automatic Multi-Project Scheduling

Resource Load Balancing across projects by Skill

# Skill Settings for automatic scheduling

Choose “Resolve conflict across all projects” for 1 (or more) skill(s)

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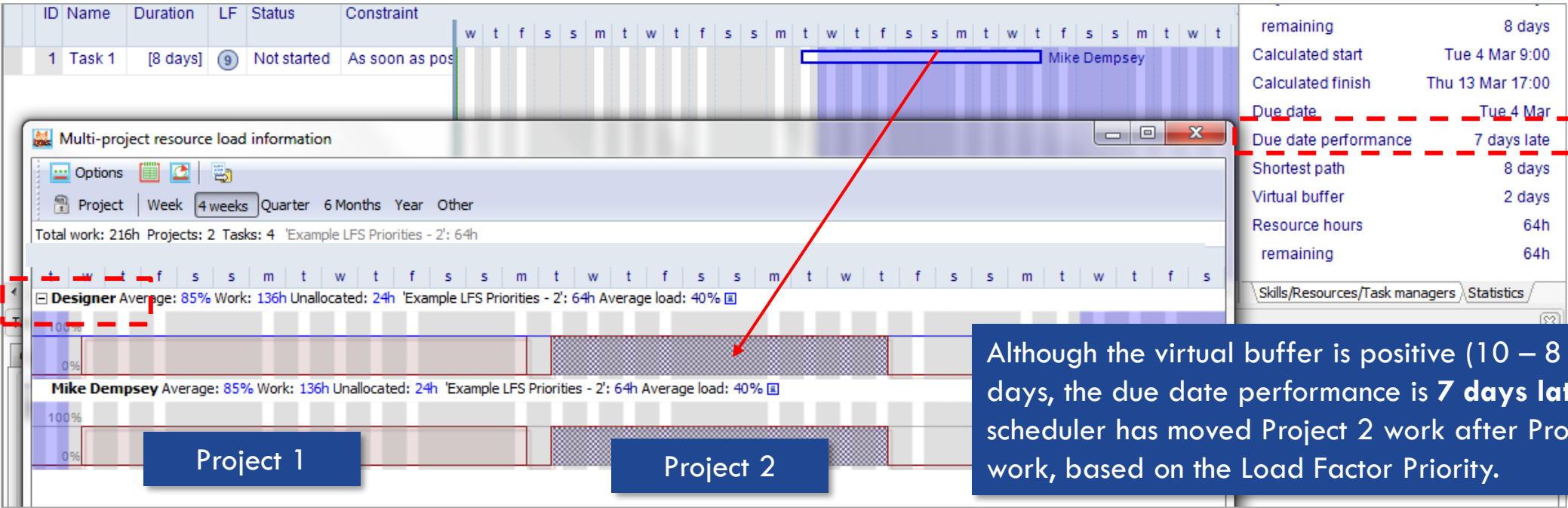
The screenshot shows a software window with a search bar at the top containing the text "enter your search text". Below the search bar is a list of skills: Designer, Marketing, Product Engineer, Project Manager, Supplier A, System Engineer, Team Part 1, Tester, Trainer, and Voltmeter. The "Designer" skill is selected. To the right of the list is a settings panel with tabs for "General", "Scheduling", "Properties", "Team managers", and "Resources". The "Scheduling" tab is active, displaying the heading "How do you want the scheduler to handle this skill". Under the heading "Multi-project resource leveling", there are two radio button options: "Resolve conflicts across all projects" (which is selected) and "Resolve conflicts within projects, allow conflicts between projects". Below this, under the heading "Skill type", there are two radio button options: "Normal: resources are assigned from the list of resources supporting this skill" (which is selected) and "Virtual: no resources are assigned, availability is set under 'Skill availability'".

## Implementation recommendation:

→ start first **without** levelling on any skill, i.e. without automatic scheduling. Understand first what the most critical (capacity constraint) skill groups are

# Automatic Multi Project Scheduling

## *Effect on the Due Date Performance – levelling on Designer Role*



# (Virtual) Buffer guidelines



# Implement a buffer guideline

*Always apply a virtual buffer, for example 20 % to 30 %*

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The screenshot shows a project management tool interface. On the left, a table lists tasks:

ID	Name	Duration	LF
1	Task 1	[5 days]	8
2	Task 2	[5 days]	6
3	Task 3	10 days	9

The Gantt chart below shows Task 1 (Product Engineer) and Task 2 (Tester) as blue bars. Task 3 is a longer bar. A blue callout box with white text says: "Check size of the virtual buffer before release!".

On the right, a task details panel shows the following information:

Project start	Today
Project duration	10 days
remaining	10 days
Calculated start	Today 9:00
Calculated finish	Fri 28 Feb 17:00
Due date	Wed 5 Mar
Due date performance	3 days early
Shortest path	10 days
Virtual buffer	3 days
Resource hours	80h
remaining	80h

# Allow “buffer” before a milestone deadline / constraint

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The screenshot shows a project management tool with a task list on the left and a Gantt chart on the right. The task list includes:

ID	Name	Duration	LF	Status	Constraint
1	Task 1	[5 days]	7	Not started	As soon a
2	Task 2	[5 days]	7	Not started	As soon a
3	Task 3	[10 days]	8	Not started	As soon a

The Gantt chart shows three tasks: Product Engineer (5 days), Tester (5 days), and Designer (10 days). A red arrow points from a milestone diamond to the end of the Tester task. A blue callout box states: "Task 2 has a milestone deadline. There are 2 days “buffer” available."

Task properties:

- Constraint: As soon as possible
- Deadline: Thu 27 Feb 17:00

Check if a tasks before a deadline (milestone) has enough space – also here the 30 % rule may be applied.