Uwe Techt

PROJECTS that FLOW

More Projects in Less Time QuiStain®able Business Solutions

BEING

BeingManagement3 *is a project portfolio management software that enables organizations to seamlessly manage all projects, resources and tasks within one enterprise solution.*

BeingManagement3 is certified for the QuiStain®able Business Solution Framework developed by VISTEM.

VISTEM

VISTEM Preface by Uwe Techt

With this publication we aim to help managers in multi project environments to improve processes for planning and managing projects and resources. In my book “Projects that Flow” I have provided a full description of how a multi project environment should be managed. This concept is called “ProjectsFlow®”.

This concept in combination with a suitable CCPM-able software tool offers a holistic approach to dramatically increase the performance of multi-project environments. Projects Flow/CCPM adds closed loop corrective cycles to manage the work-in-progress (WIP) in a way that the constraint is never overloaded. Additionally Projects Flow/CCPM aggregates the buffers in all work packages at the end of the project and/or integration points. Based on this buffer, the execution management focuses on progress to buffer consumption.

As a management consultancy with many years of experience in the field of drastically and sustainably improving business performances we are often asked which Project Management software supports CCPM. This publication includes extracts of the book 'Projects that Flow' describing functionalities which a CPPM software should be able to perform plus an extensive list of additional functionalities which we consider important, nice to have and where we would like to see an optional switch off. We have termed this the *QuiStain®able Business Solution Framework.* Our focus hereby is on whether the software includes the desired functionalities; it does not include information on usability, design, control, cost, support etc.

Whilst we do not recommend any particular software or claim that this publication is a complete guide to choosing a software tool we have aimed for providing a starting base for evaluating CCPM-able Project Management software tools in order to:

- Create project plans
- Stagger project plan to control resource load and to offer reliable due dates
- Manage execution in a way, that the promises are met

By applying the principles described in 'Projects that Flow' in combination with a suitable software tool capable of supporting the *QuiStain®able Business Solution Framework*, the business and its stakeholders will benefit in the following ways:

Business	• Determine reliable due dates • Deliver projects reliable (in time, in budget, in content) • Shorten lead times: deliver faster than any competitor
Top Manager	• Always knows the status of all projects – and the probability of each project meeting its promises • Focus management attention to those projects that really need management support
Project Manager	• Plan and control projects • Minimum planning effort • Always in control • No effort to get the right resources

Team Manager	• Clear priorities for resources • Project Managers do not interfere with priorities

Ultimately this will lead to more projects in less time with the same resources, continuous increase in profits and a sustainable flourishing organisation.

VISTEM Collaboration with Being Co., Ltd.

For this edition we have teamed up with the company Being Co., Ltd. to evaluate their scheduling and planning solution tool BeingManagement3. The book 'Projects that Flow' and our additional list of functionalities builds the *QuiStain®able Business Solution Framework*. Koichi Ujigawa of Being Co., Ltd. has provided information and screenshots on how BeingManagement3 (BM3) supports the processes described in this framework. Only software-tools which include all functionalities and offer the switch off options for unnecessary functionalities are deemed as certified for the *QuiStain®able Business Solution framework* developed by us.

Projects that Flow Introduction

Projects can go over budget, exceed deadlines, or deliver restricted features and quality. This can result in economic damage for companies and their clients.

The difficulties arise at source. Established metrics and management methods slow projects down by creating conflicts in operations and decision-making.

A radically new approach is needed; one that features:

- Simple, constraint-oriented management
- Clear, robust priorities
- Company-wide, rather than locally focused optimization
- A focus on speed, on ProjectsFlow®

Discover in the book 'Projects that Flow' how you can:

- complete more projects with the same amount of resources;
- reliably deliver all projects to specs; and
- significantly shorten project lead times.

For this publication we will go straight into the relevant chapters of 'Projects that Flow' which are part of the fore mentioned *QuiStain®able Business Solution Framework.*

VISTEM Projects that Flow Chapter 12.3: Virtual Drum

In multi-project environments, the organization's ability to manage and implement the integration phases is the constraint. Heightened management attention during this phase speeds up projects considerably, and therefore increases the business's throughput. It has shown to be very useful to have the integration phase (or part of it) set the beat of the project instead of a resource constraint, thus turning it into a virtual constraint. It becomes the "Virtual Drum." To do this, management first decides how many integration phases the business can handle simultaneously. The capacity of the Virtual Drum is set in such a way that:

- any management support required during the integration phases can occur immediately; and
- it actually constitutes the capacity constraint of the organization.

As we have illustrated previously for the example of a resource constraint, the various integration phases are staggered across all projects and this determines the launch dates of the projects. To plan this staggering, three basic parameters are estimated for each new project:

- the duration of the integration phase;
- the duration of the project before it reaches the integration phase; and
- the remaining project run time after the end of the integration phase.

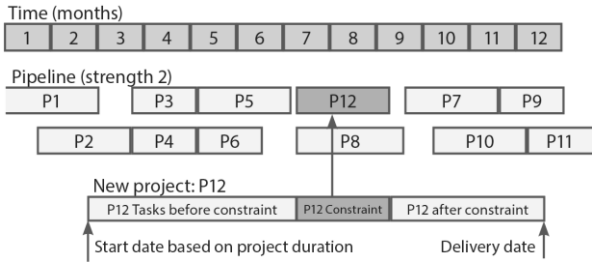
These estimations are based either on a sensible project plan (→ Phase 3: Transforming Planning) or—if the projects are sufficiently similar—on the template for that particular project type. With the help of these estimates the project manager can then determine:

- when there is space for the integration phase in the overall work schedule of the Virtual Drum;
- when the project launch must be scheduled based on this;

and

- when the project will be completed with these dates, i.e., the delivery dates that can be given.

The following diagram illustrates the situation for a multi-project organization that can handle a maximum of two integration phases at a time. Project P12 is planned such that its integration **phase** falls into Months 7 and 8. This determines the project launch in Month 2 and the delivery in Month 12.



The Virtual Drum determines whether the new project finds a place in the pipeline

If the delivery date determined this way (see arrow) does not satisfy the requirements of the client or of management, the multiproject manager can work out the potential effects of inserting the new project with a higher priority (i.e., at the expense of other projects).

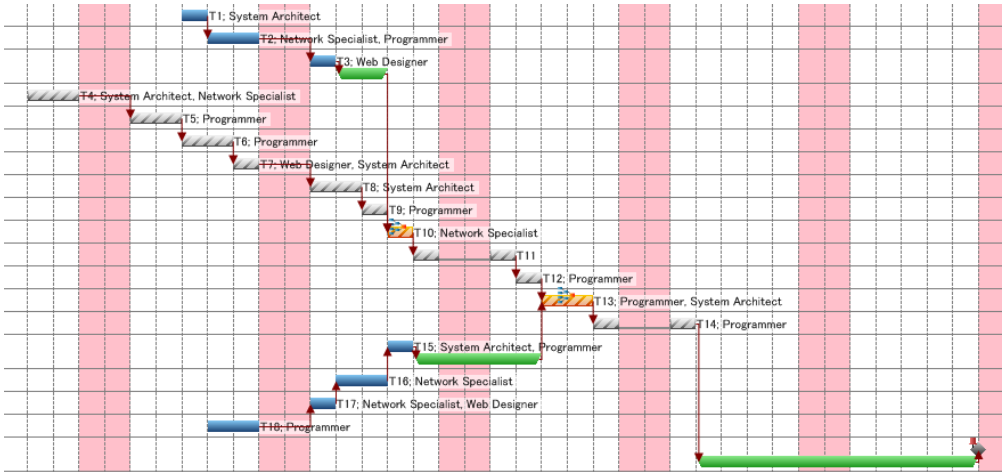
Benefits

Staggering the projects based on the constraint gives the business three distinct advantages:

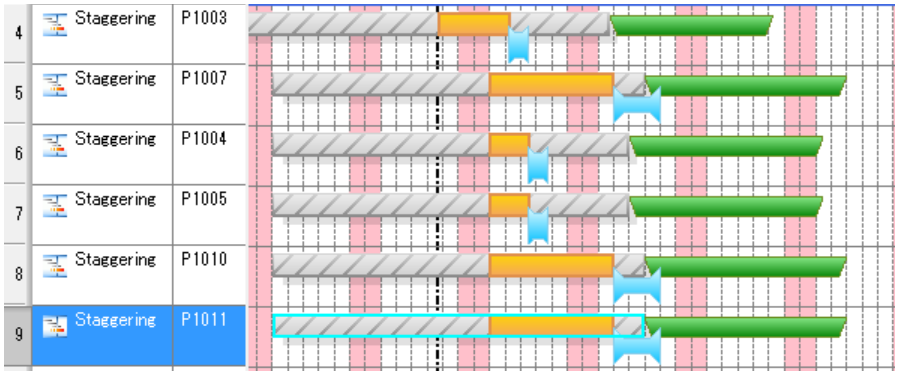
- Projects become faster and more reliable.
- The business knows its "project capacity": planning the portfolio becomes much easier.
- Planning and management of resources also becomes considerably easier.

The working of this process can be compared with Intelligent Access Control, which controls the frequency and amount of additional traffic (e.g. additional projects) entering the main road (e.g. the pipeline), to ensure that traffic on the main road keeps flowing and traffic jams are prevented.

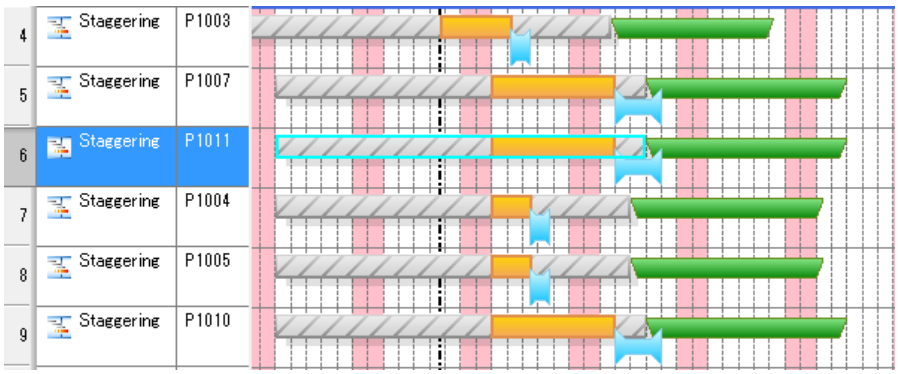
BeingManagement3 - Staggering by Virtual Drum



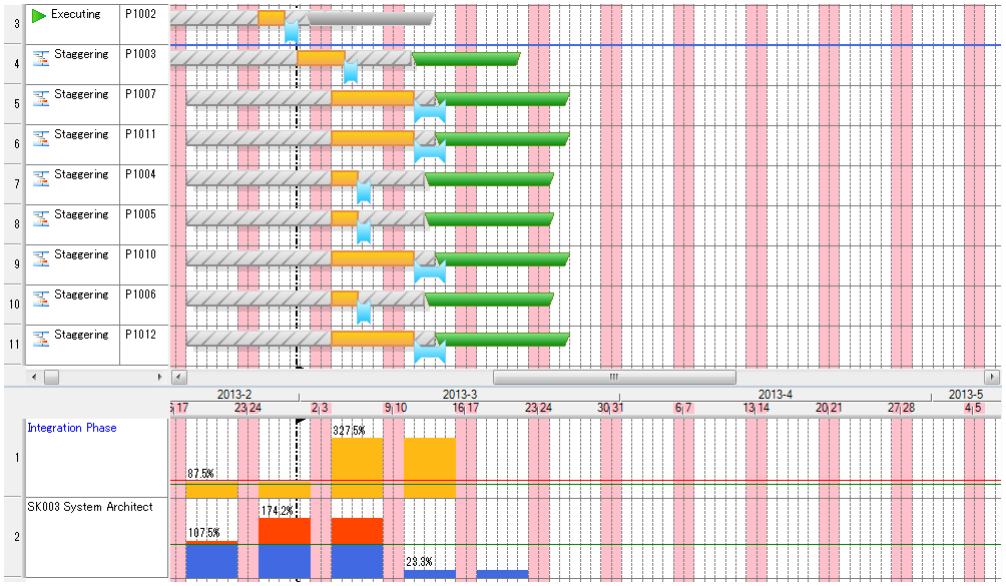
The integration phase can be specified per each project with BM3's Planner. The Planner enables us to specify the integration phase (orange rectangle) by selecting only the earliest and latest integration tasks on the critical chain (diagonally striped gray rectangle). In this case, T10 is the earliest, and T13 is the latest. The path consisting of T10, T11, T12 and T13 represents the integration phase.



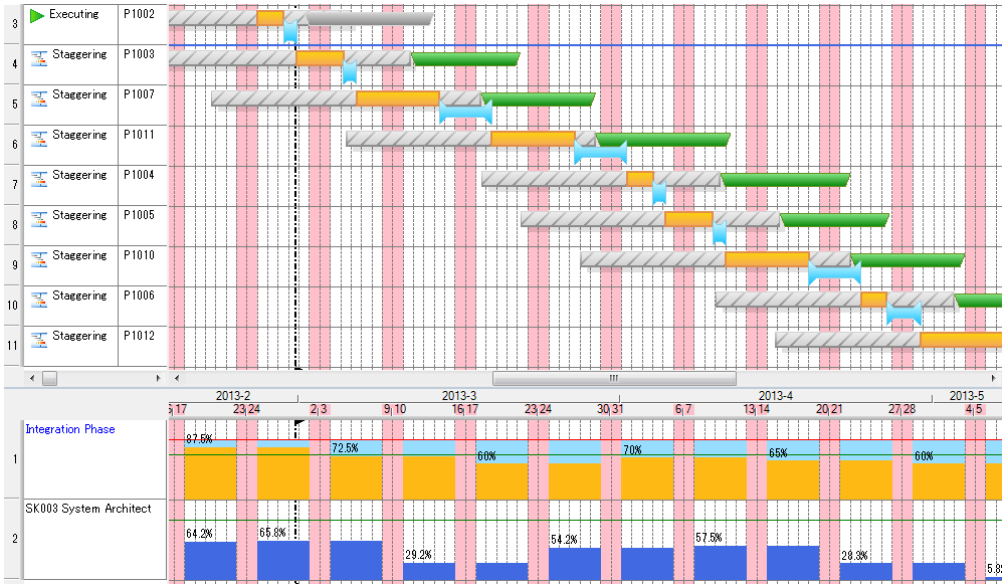
Staggering is accomplished with BM3's FlowPlanner. The FlowPlanner also enables us to set the priority of projects in its Staggering View either by mouse operation or by keyboard operation. This figure shows a scenario prior to the re-prioritization of project "P1011". The symbol resembling a bow tie in light blue represents the capacity buffer in the Staggering View.



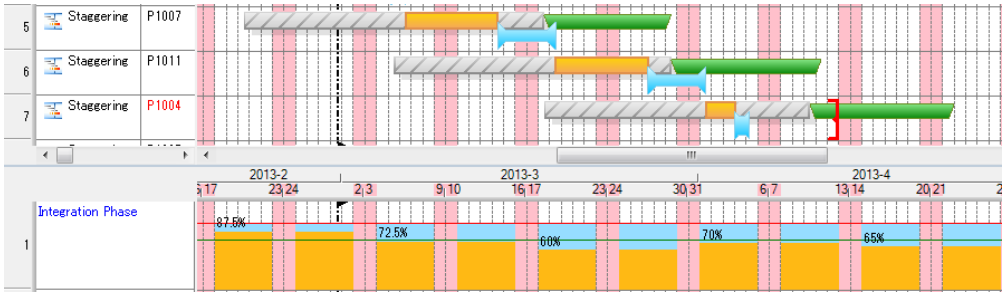
This figure shows the scenario after project “P1011” is moved up to a higher priority.



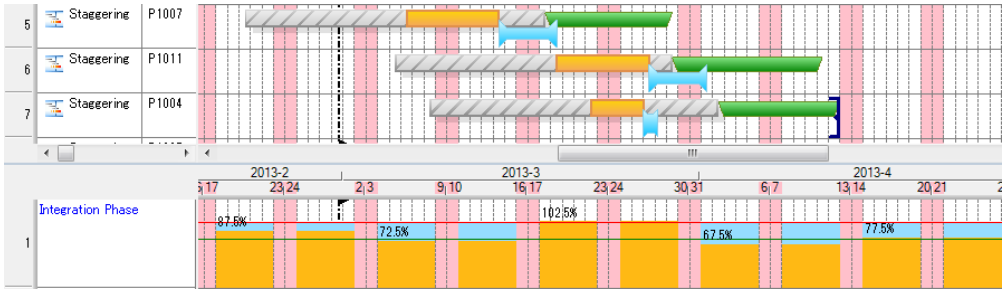
BM3’s FlowPlanner allows us to stagger projects based on their integration phases, in accordance with the concept of the Virtual Drum. This figure shows the Staggering View (upper) and the Drum View (lower) of the FlowPlanner. This is a scenaro before staggering is performed, and an overload is indicated on both the integration phase (yellow histogram) and the key resource (red and blue histogram).



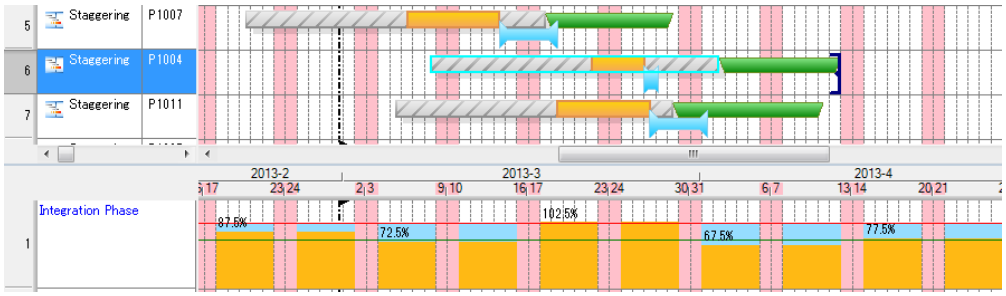
Auto-staggering via the Virtual Drum can be done with just one click. This figure shows the scenario after auto-staggering is done. As you can see, in the integration phase histogram, the load is levelled and the capacity buffer appears at the top of the histogram. The horizontal red line indicates 100% load and the horizontal green line indicates 75% load capacity. The load on the key resource, which is “System Architect” in this case, is levelled as a result of the auto-staggering. You can stagger further as required, for example, when there is unacceptable overload on the key resource.



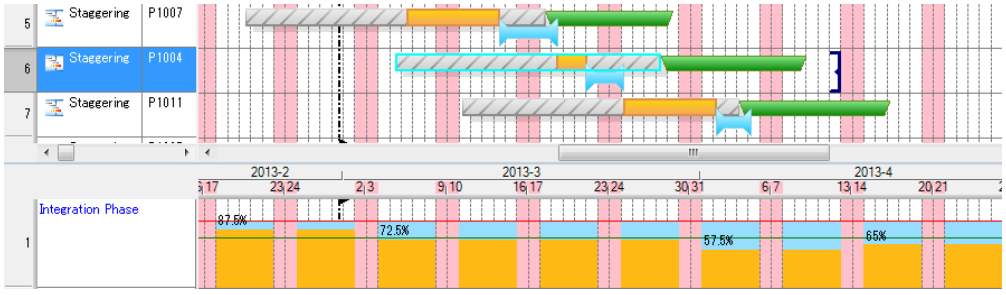
BM3 allows us to set a staggering fence for a project. The fence can be set as a date of "Start No Earlier Than (SNET)" and/or "Finish No Later Than (FNLT)". In this case, the FNLT fence has been set in project "P1004", and the current due date is overrun by the length of the project. When this occurs, the name of the project and the symbol indicating the FNLT staggering fence is displayed in red.



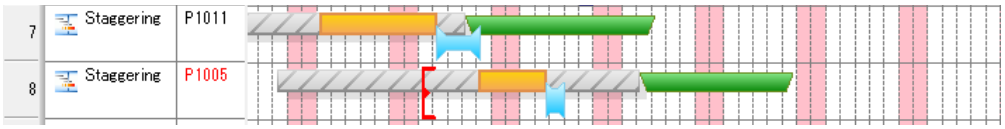
This figure shows a scenario immediately after auto-staggering is performed a second time to ensure that project "P1004"meets its FNLT date. In this case, this action has caused an overload on the integration phase in the middle of the histogram.



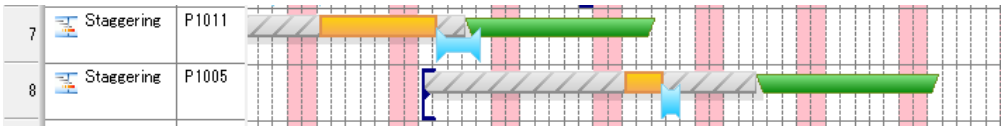
The overload on the integration phase caused by the previous procedure can be eliminated by management decisions such as the following: 1) move the priority of project "P1004" up by one row and stagger again.



As you can see, a gap between the due date and the FNLT date has resulted and both the name of the project and the symbol for the FNLT fence are displayed in blue. 2) Accept the overload and make plans to mitigate it (if necessary) via overtime or similar action.

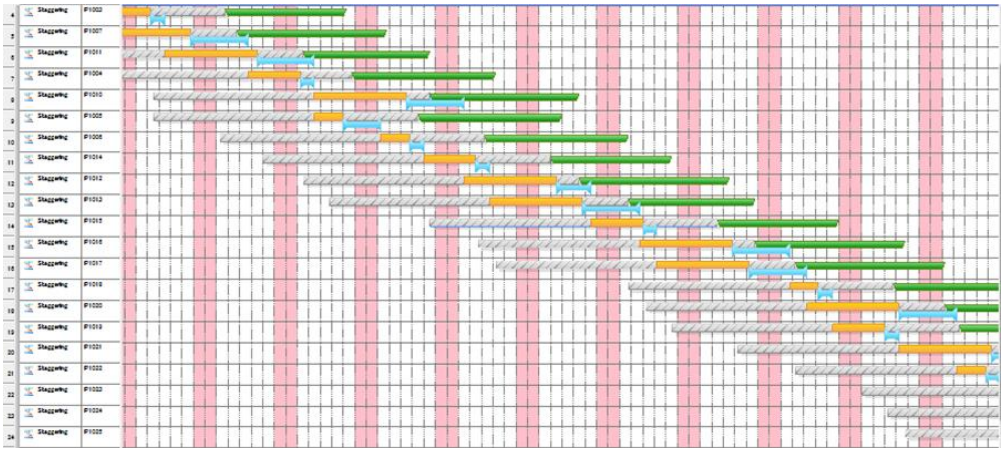


Another staggering fence which is Start No Earlier Than (SNET) can be used in a similar fashion with the FNLT fence. This figure shows a scenario where the start date of the project “P1005” is too early against its SNET.

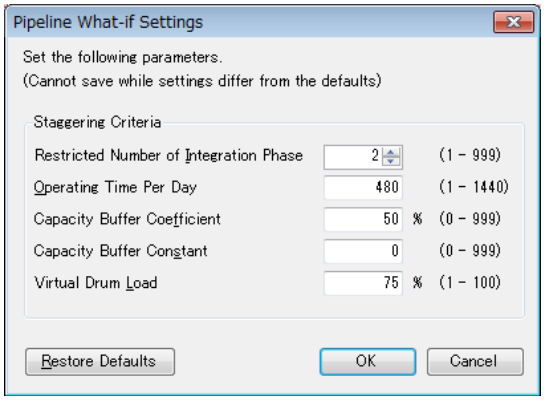


The SNET scenario can be satisfied in the same manner as with operation above.

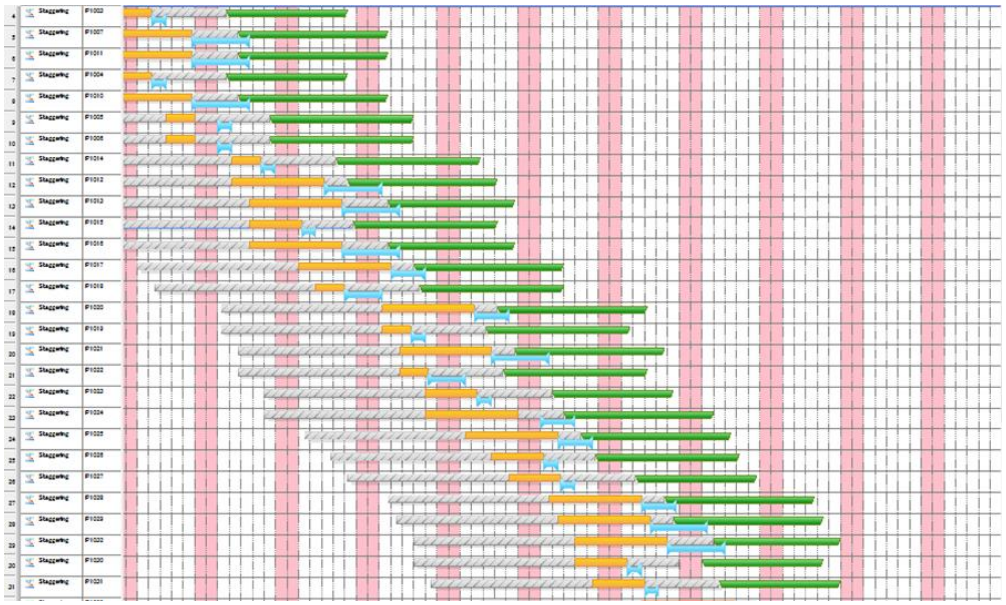
BM3’s FlowPlanner enables you to perform “what-if” analysis in various ways. One of these is by changing the restricted number of projects in the integration phase for staggering. This figure shows a result of staggering when the value is set to “1”.



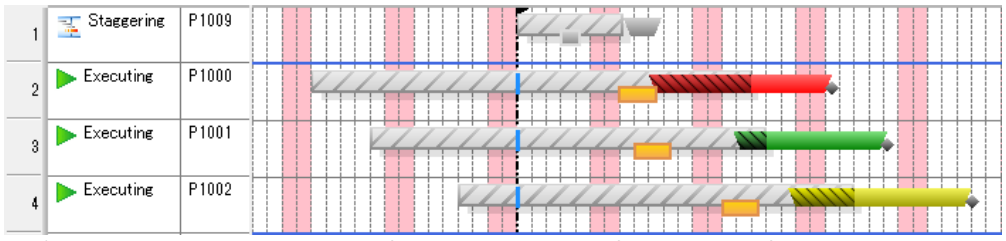
This figure shows the result when the value is set to “2”.



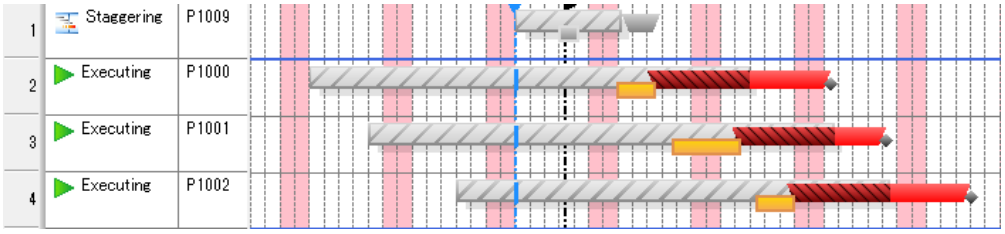
This figure shows the "Pipeline What-if Settings" window of BM3's FlowPlanner. The restricted number of projects in the integration phase and/or other options can be specified for performing "what-if" analysis as required. For example, when the negative impact of a delay caused by a preceding project(s) needs to be mitigated so that reliability of due dates can be maintained, it can be simulated by increasing the value of the "Capacity Buffer Coefficient" which decreases the load on the integration phase.



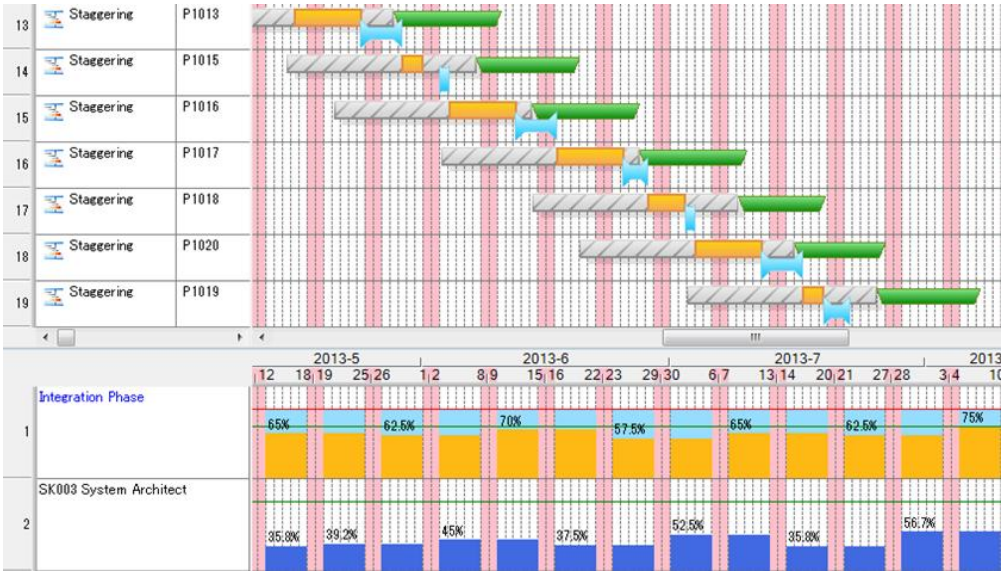
This figure shows the result when the value is set to "5".



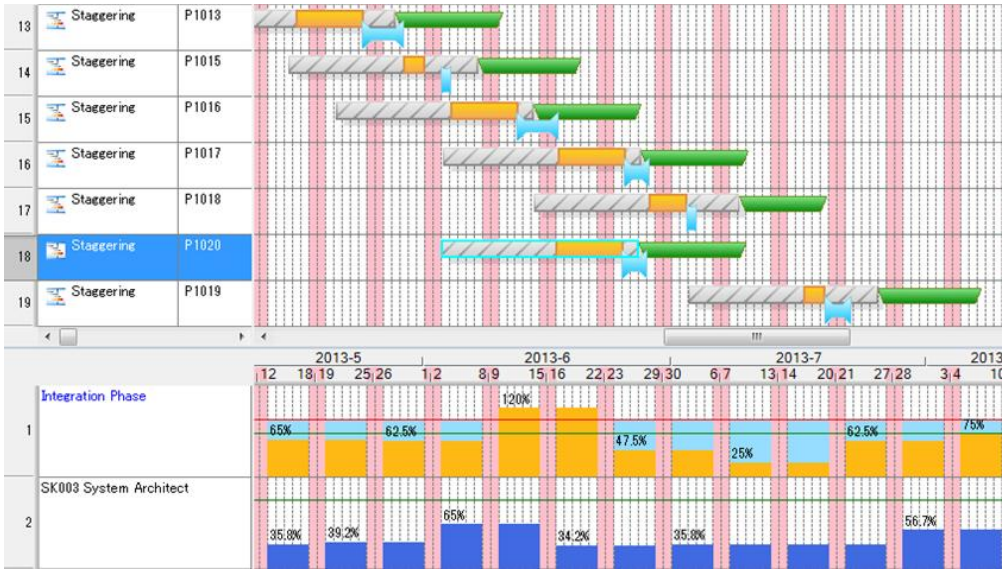
BM3's FlowPlanner also enables you to perform some special what-if analyses. One of these is by utilizing the "project pre-emption" function. This allows us to simulate, for example, what happens if we have to execute an urgent, emergent project right now. This can be done by 1) putting the urgent project "P1009" much higher in priority in the pipeline, and



2) Execute the function. In this case, the result shows that the project buffers of some active projects will be consumed deeply and turned red.



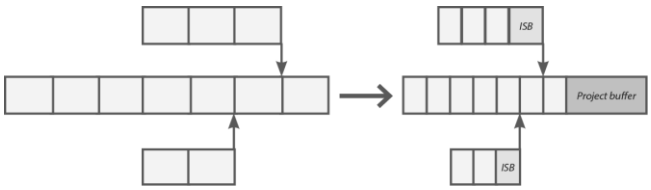
You can also stagger projects manually as required using a trial and error approach. For example, when you want to start project “P1020” a bit earlier, all you have to do is drag it to the left/right by using the mouse in the Staggering View (upper pane).



In this case, project "P1020" is moved to the left by 11 days and we can see in the Drum View (lower pane), the overload on the integration phase resulting from this action.

VISTEM Projects that Flow Chapter 13.4: Project and Integration Buffer

This system of explicit safety buffers will not only be applied to the project as a whole—i.e., the longest chain (longest path) of the project—but also to the shorter, parallel paths:

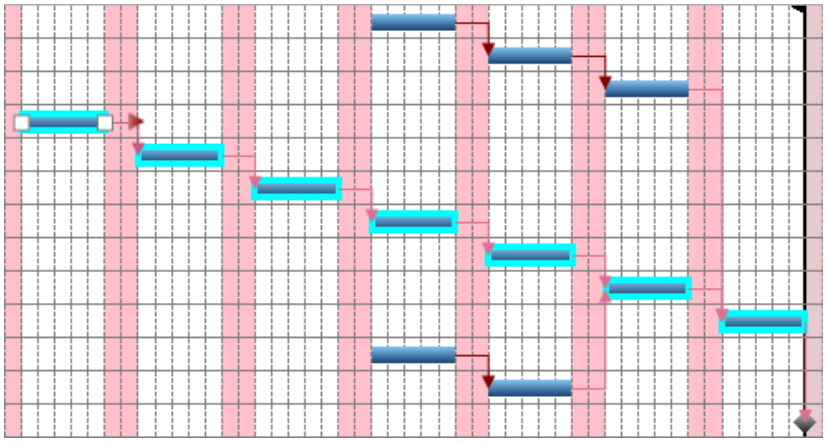


Project and integration buffers

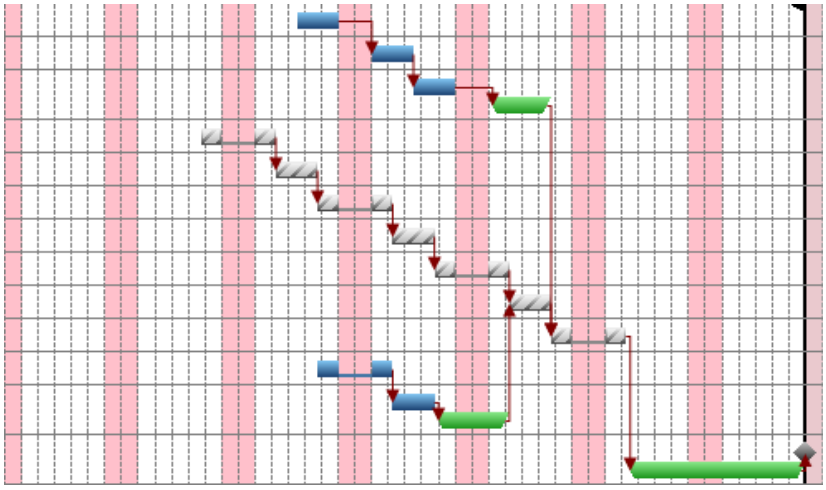
This creates intermediate safety buffers (ISBs) at the project's points of integration; these fulfil two functions:

- Ensuring that a delay on a parallel chain does not automatically lead to a delay on the longest chain.
- In case of early completion of tasks on the longest chain, there is a good chance that the tasks on the parallel chain will be ready as well, so both can be used to shorten the entire project's lead time.

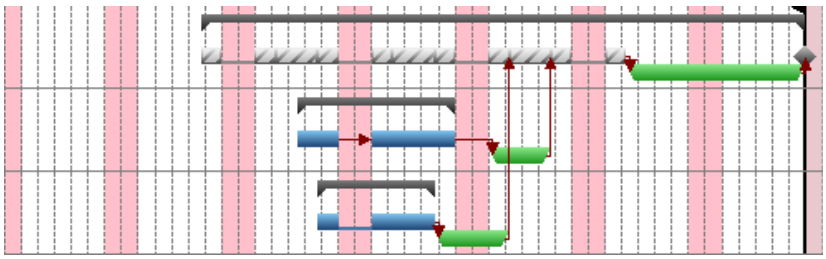
BeingManagement3 - Project and Feeding Buffers



Example project with one longest path and two parallel paths displayed in the Gantt Chart view of BM3's Planner.



By default, BM3's Planner automatically cuts tasks in half, identifies the Critical Chain, and inserts project and feeding buffers (Intermediate Safety Buffers) as required. By default the size of all buffers is 50% of the aggregated safety removed from tasks.

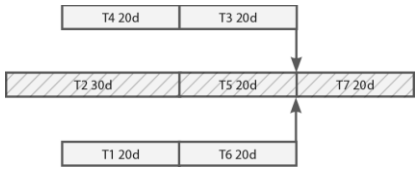


This figure shows the same schedule in the Chain View of BM3's Planner.

VISTEM Projects that Flow Chapter 13.4: Critical Path and Critical Chain

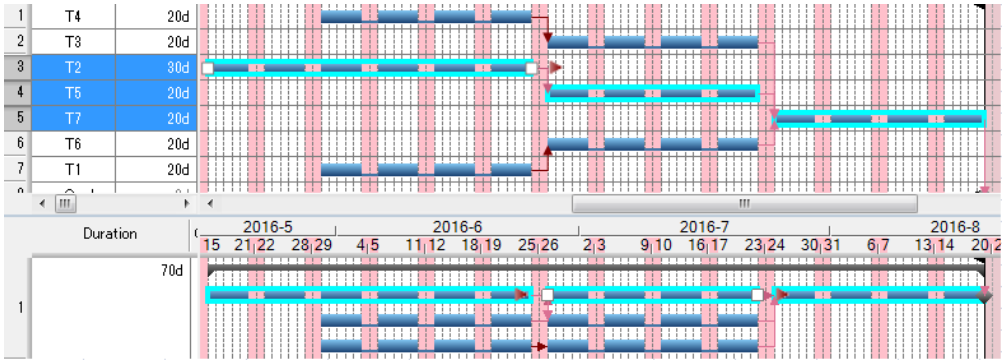
In the above, the term "longest chain" was used for what is generally known as the "critical path." The term "critical chain" was coined by Dr. Eliyahu M. Goldratt to point out that the longest chain in a project is not just determined by how the various tasks are interlinked in terms of their content. Rather, the fact that the same resource cannot process two tasks at the same time is also an important consideration.

For example: The project detailed below consists of seven tasks. The way they are interlinked and their respective durations can be made out in the diagram. The longest chain (the so-called "critical path") consists of the tasks T2 (30 days), T5 (20 days), and T7 (20 days); thus the project can presumably be completed within 70 days.



Critical path

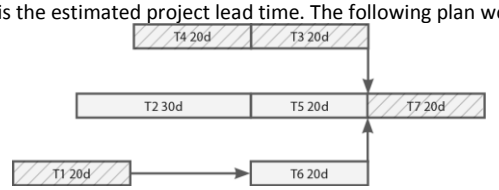
BeingManagement3 - Critical Path



In BM3's Planner, the critical path can be recognized and its length can be obtained automatically. BM3's Planner enables us to see the structure of the schedule in various views, and two views can be displayed in pallarel, e.g. Gantt Chart appears on the upper pane and Chain View appears on the lower pane.

VISTEM Projects that Flow - Critical Chain

If, however, the tasks T4 and T1 have to be completed by one and the same resource, then the above plan is not workable—and neither is the estimated project lead time. The following plan would be workable:

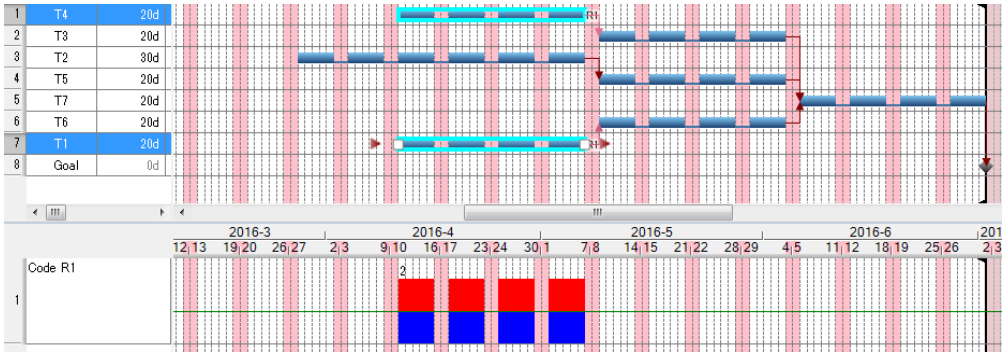


Critical chain

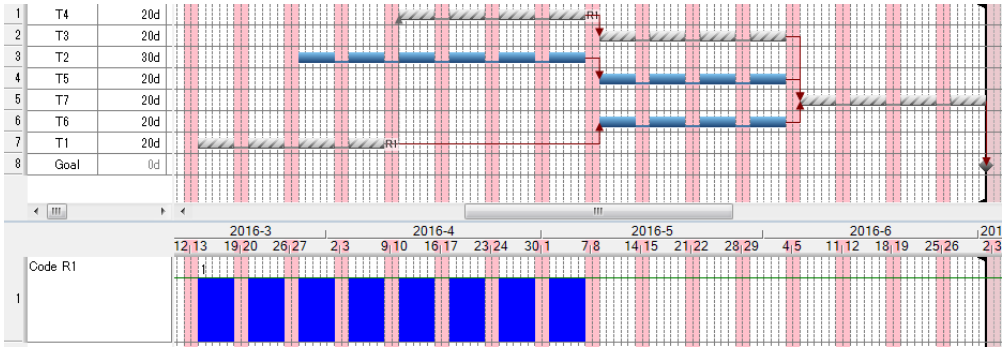
In this case, T1 (20 days), T4 (20 days), T3 (20 days), and T7 (20 days) make up the longest chain (or "critical chain"); the estimated project lead time is 80 days. Project management software should be able to calculate the critical path as well as the critical chain.

VISTEM
Projects that Flow
Chapter 13.4
Critical Path
and Critical Chain

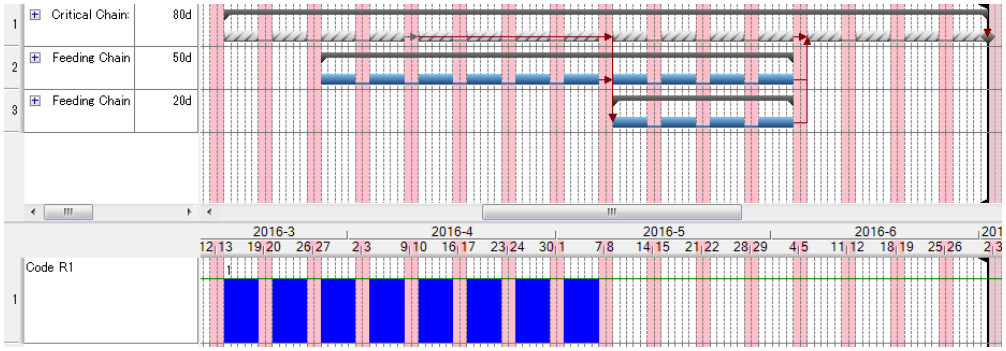
BeingManagement3 - Critical Chain



This figure shows the Gantt Chart in the upper pane and a resource load histogram in the lower pane. In this case, the same resource “R1” is assigned to two tasks, “T4” and “T1” in parallel. The resource overload is shown in the histogram in red.



BM3’s Planner allows you to avoid resource contention with one click. Resources are levelled and the overload disappears as a result. In this case, the task “T1” is moved to the left by leveling.

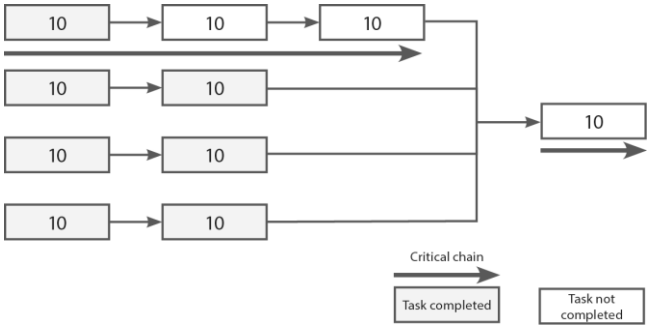


This figure shows the Chain View (upper) and a resource Histogram (lower). The Chain View displays the critical chain on the top and the feeding chains appear in succeeding rows. This helps you to recognize each chain in one simple view.

VISTEM Projects that Flow Chapter 14.3: Identifying Tactical Priorities

Identifying Tactical Priorities
For projects to be reliable, the business has to ensure that each project uses up no more than the planned safety buffer at the end of the critical chain. A project which is progressing well and has not yet used much of its safety buffer is more secure (and therefore has a lower tactical priority) than a project which is progressing slowly and has used up much of its buffer. To define tactical priorities we must, therefore, be aware of **project progress** and **safety buffer consumption** (also called penetration).

Project progress
How do you determine the progress of a project? Often this is done by measuring the resources used or the percentage of tasks completed. Both of these can be misleading. If a project plan has scheduled 1,000 days of labor and 500 days have been used after 3 months, this neither means that half of the work is done, nor that the project will be completed in another 3 months. Measuring the progress of a project by way of the percentage of tasks completed is equally misleading. For example:



Project progress

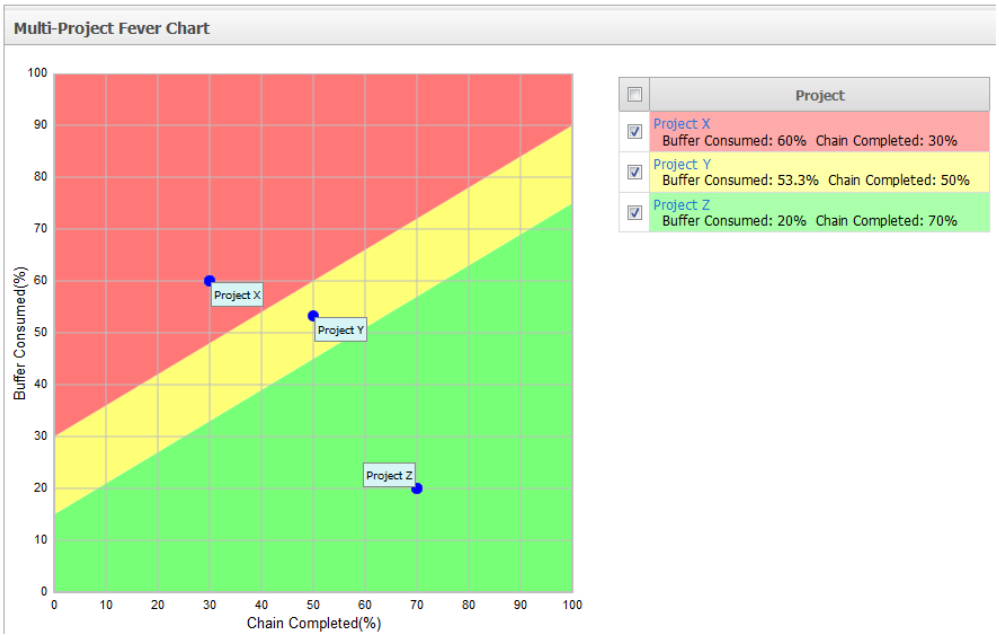
The numbers in the above diagram are working days. The project comprised 10 tasks of 10 working days each. The tasks marked in gray are completed. Is this project 70% done? Or is the progress 25%? If the progress of a project is measured by way of the resources used or the tasks completed, this leads to the well-known phenomenon of the last 10% of a project taking as long as the first 90%. A reasonable and effective metric for project progress is the proportion of tasks completed on the critical chain. Following this calculation, project progress in the above example is 25%. Thus, it becomes clear that the project is likely to take three times as much time as has already elapsed since project launch.

Safety buffer consumption and recovery
The safety buffer is used up when a task takes longer than scheduled in the project plan. It is gained (or recovered) when a task is completed faster than scheduled in the plan.

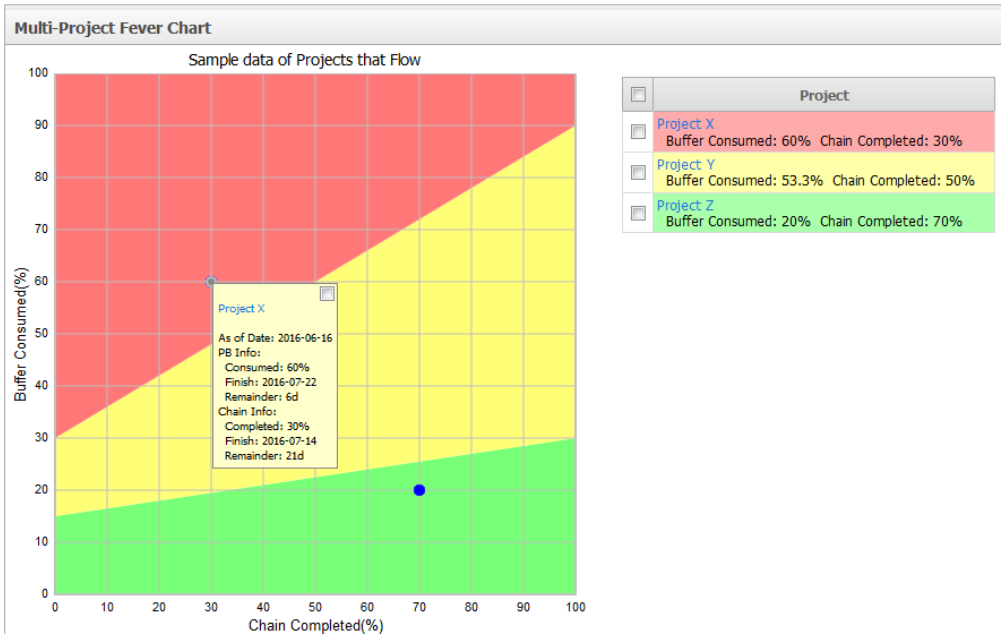
Project status/buffer index
A project which is progressing speedily and has used up very little safety buffer will have a lower tactical priority than a project which is progressing very slowly and has used much of its safety buffer. To clarify: In the following example, two projects compete for a resource (X). Each of the projects comprises six tasks with a planned duration of 5 days each and an explicit safety buffer of 15 days. (Note: In this simplified example, we are showing only the critical chain.) The project which can "claim" resource X can progress further; the other project must pause until it obtains the resource.

The ratio between project progress and safety buffer consumption or penetration—also known as project status or buffer index— determines the priority of the task. The higher the buffer index, the higher the priority. The project status can be easily represented in a diagram, where the *x*-axis shows project progress (progress on the critical chain) and the *y*-axis shows buffer consumption.

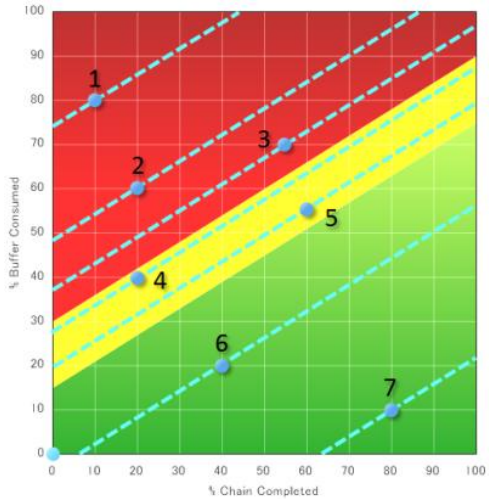
BeingManagement3 - Multi-Project Fever Chart



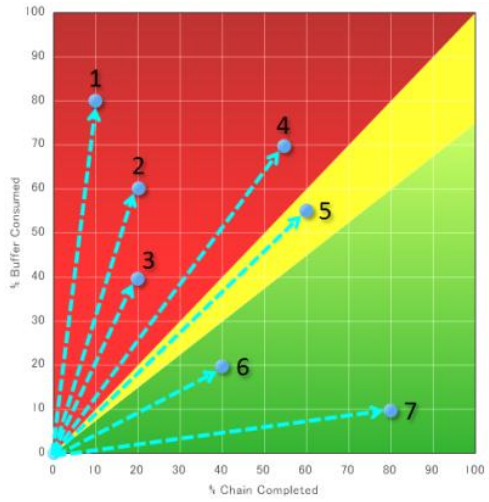
BM3 shows the status of each project on a Multi-Project Fever Chart. There is also a project list next to the chart in which all projects are listed in priority order.



The boundary parameters for priority color can be customized as desired. Detailed information on a project's status will appear by clicking the dot representing the selected project.



BM3 provides two options for prioritization methods: The "BM3 Method" (default method, figure above) and "Critical Ratio" (figure below). The figure above shows the basic concept of the "BM3 Method". It is based on the positional relationship between the plotted position of points and boundaries on the fever chart.



This figure shows the basic concept of "Critical Ratio" and is performed according to the percentage of buffer consumed relative to the percentage of chain completed.

VISTEM Projects that Flow - Task priorities

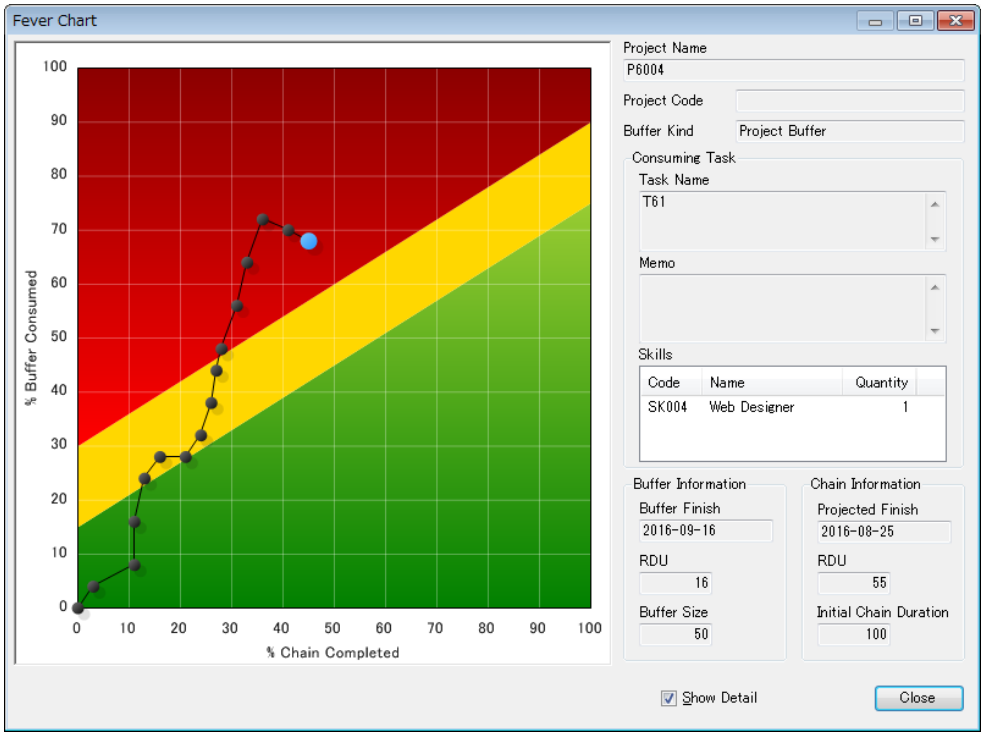
The tactical priority of a project is also automatically the tactical priority of the active (or upcoming) task on the longest chain of the project. This is the task which currently determines when the project will be completed. If this task can be completed one day sooner, the project will be completed one day sooner. If the task is delayed by one day, the project will be delayed by one day.

The tasks on the project's parallel chains (where there is an ISB before their integration into the longest chain) are "safer." Accordingly, their tactical priority will be lower.

BeingManagement3 - Task Priorities

No.	☐	Status	Name		Code	Manager	As of Date (Projected Finish)	% PB Consumed (PB Finish)	% CC Completed (CC Start)
1	☐	Executing	P6004			PM 104	2016-06-10 (2016-08-25)	68.0 (2016-09-16)	45.0 (2016-02-22)
2	☐	Executing	P6001			PM 101	2016-06-10 (2016-07-15)	70.0 (2016-08-05)	70.0 (2016-01-11)
3	☐	Executing	P6002			PM 102	2016-06-10 (2016-07-12)	64.0 (2016-08-05)	77.0 (2016-01-11)
4	☐	Executing	P6006			PM 106	2016-06-10 (2016-10-07)	20.0 (2016-12-02)	14.0 (2016-05-09)
5	☐	Executing	P6005			PM 105	2016-06-10 (2016-09-02)	20.0 (2016-10-28)	39.0 (2016-04-04)
6	☐	Executing	P6003			PM 103	2016-06-10 (2016-07-29)	30.0 (2016-09-16)	64.0 (2016-02-22)

This figure shows the list of active projects in priority order. The priority is determined based on the impact on the project buffer by the most penetrating chain in each project.



This figure shows the Fever Chart view for project “P6004”. In the “Task Name” text area under ”Consuming Task” on the right side of the window, “T61” appears, which is the active task in the most penetrating chain of the project. In other words, the project status and its priority are determined by the most penetrating task and the chain to which it belongs.

No.	ID	Consuming	Task Name	Remainder	Start Date	Skill	Predecessor	Project
1	2	✓	T61	16d	Started	System Architect,Web Designer		P6004
2	3		T62	20d	2016-07-04 09:00	Programmer	T61	P6004

This figure shows the same project in a different view of BM3 which is referred to as the "Task Management Center". As you can see, the same task "T61" appears on the top of the list and the "Consuming" column for the task is checked.

VISTEM Projects that Flow Chapter 14.4: Task Management

Task management

It is the task manager's job to ensure that tasks from the various projects that are to be processed in their area (department, team) are completed as fast as possible according to their priorities. To this end:

- they fully prepare upcoming tasks so that they can be processed
- quickly and without disruption;
- they optimally supply the tasks with resources;
- they shield their employees from interruptions while they

are working on a task; and

- they support their employees' work by assisting them in overcoming any difficulties that may arise and by taking corrective action if necessary. By doing this, task managers can accelerate projects and are utilizing their resources in the best possible manner for the business.

Task lists

To be able to do their jobs, task managers daily receive a task list split into three parts:

IP—In Process

The IP list (In Process) shows the tasks that are currently being worked on. These should not be interrupted and should be completed as fast as possible. Task managers use the IP list to discuss the tasks in process with their employees or teams, to determine if there is any need for action or support, and to estimate how much longer they will take. After these discussions they note the remaining duration and arrange any necessary support activities. This way, task managers can ensure delays do not happen and can catch up any delays that may still have occurred.

NS—Not Started

The NS (Not Started) list shows tasks that fulfil formal launch requirements (all preceding tasks completed), but have not yet been started—either because they cannot be optimally supplied with resources, or because preparations are not yet complete. These tasks can be immediately started as soon as the resources become available; they are in wait status until then. Task managers use the NS list to prepare tasks according to their priority. They do this by ensuring all necessary requirements for the task launch are fulfilled. These include:

- Any necessary preparation (even if not listed as such in the project plan—e.g., necessary approvals).
- Resources that can be optimally allocated and will be available without interruption.

As soon as the necessary resources are available for the task of the next highest priority, and as soon as the preparations for the task are complete, the task manager will hand the task over to their staff, discuss it with them, and establish an initial time estimate with them (regardless of the duration listed in the project plan).

NTBS—Not To Be Started

The NTBS (Not To Be Started) list shows approaching tasks where the launch requirements (tasks that need to be completed first) are currently being worked on, along with their tactical priority and the estimated handover date. Within these three lists, tasks are listed according to their current priority.

BeingManagement3 - Task Management

BM3's Task Management Center enables you to find relevant tasks in various ways: in priority order, based on role, time window and/or other search criteria. When you log in as a task manager, the Task Management Center shows a unique list of tasks for which you are currently responsible.

No.	ID	Consuming	Task Name	PREP Ck.L	Remainder	Start Date	Skill	Project	RTS
1	5	✓	T101		6d	Started	Programmer,System Architect	Project X	
2	4		T102	0/3	5d	2016-06-24 09:00	Programmer	Project X	No
3	4	✓	T201		5d	2016-06-23 09:00	Network Specialist,Programmer	Project Y	
4	3		T202	0/2	5d	2016-06-30 09:00	Programmer	Project Y	No
5	3	✓	T301		4d	2016-06-24 09:00	Programmer,Web Designer	Project Z	
6	2		T302	0/4	5d	2016-06-30 09:00	Programmer	Project Z	No

This figure shows an example of a task list which contains all tasks in a given time window. As you can see, the list shows tasks belonging to three projects: "Project X", "Project Y" and "Project Z", and displays task status/color and other conditions.

No.	ID	Consuming	Task Name	PREP Ck.L	Remainder	Start Date	Skill	Project	RTS
1	5	✓	T101		6d	Started	Programmer,System Architect	Project X	

This figure shows only the "in process" task(s) from the previous task list. This can be obtained by clicking the "TM Tasks (Active)" button.

No.	ID	Consuming	Task Name	PREP Ck.L	Remainder	Start Date	Skill	Project	RTS
1	4	✓	T201		5d	2016-06-23 09:00	Network Specialist,Programmer	Project Y	
2	3	✓	T301		4d	2016-06-24 09:00	Programmer,Web Designer	Project Z	

This figure shows only tasks for which the condition is “Not Started”. Preceding tasks are finished but these tasks have not yet started in this task manager’s area. This can be obtained by clicking the "TM Tasks (Not Started)" button.

No.	ID	Consuming	Task Name	PREP Ck.L	Remainder	Start Date	Skill	Project	RTS
1	4		T102	0/3	5d	2016-06-24 09:00	Programmer	Project X	No
2	3		T202	0/2	5d	2016-06-30 09:00	Programmer	Project Y	No
3	2		T302	0/4	5d	2016-06-30 09:00	Programmer	Project Z	No

This figure shows only tasks which are not to be started. BM3 provides the capability for custom fields, and the condition “Ready To Start (RTS)” can be represented with this capability.

Checklists : TM Tasks (Not Started)

Preparation

Completed	Item	Task	Required Duration	Note
☐	Agree on the required specifications	T102		
☐	Determine detailed specifications	T102	0.5d	
☐	Prepare explanatory materials	T102	1d	
☐	Review the programming style	T202	0.5d	
☐	Review policies for software testing	T202	0.5d	
☐	Select the attendees	T302	10m	
☐	Set the time and venue	T302	10m	
☐	Reserve a meeting room	T302	10m	
☐	Notify the attendees of the meeting	T302	5m	

BM3 provides another function for task management, which is referred to as the “Checklist Management Center”, which consists of two types of checklists: a “Preparation Checklist” and an “Execution Checklist”. The “Preparation Checklist” helps you manage “Not To Be Started” tasks by adding detailed preparation requirements as checklist items (as opposed to creating sub-tasks). In this case, the list shows checklist items for the tasks which appear in the previous figure. The items on the list are grouped by task and sorted in priority order.

VISTEM Projects that Flow Chapter 14.5: Project Management

Project management

One of the essential tasks of a project manager during project implementation so far was to make sure resources were actually working on their project. This now becomes unnecessary. No longer do project managers have to chase resources, as the newly established procedures ensure that the right resources are processing the various projects in the right order.

Project managers use their newly gained free time to concentrate on their actual job: If there are actions to be taken for task acceleration that lie outside the authority of task managers, project managers can often be of assistance, e.g., by communicating with clients or other business areas. Perhaps there are issues that need to be clarified with the respective client contacts, or other areas need to perform support actions. This is where project managers spring into action.
But it is just as important for project managers to know what they should *not* get involved with, as their intervention would be likely to cause **circumvent** disruption How can project managers know which of the project tasks to get involved with and which ones to stay out of?

Task lists
Just like the task managers, and pulled from the same data, project managers receive a daily task list split into three parts.

IP—In Process
The IP list shows which active task is currently determining the project's completion date. This task can be found on the (currently) longest chain of its project and will be at the very top of the list.
Below this the other active tasks are listed in the order of their tactical priority (calculated based on buffer index). These tasks will be on parallel chains of the project. This list helps project managers to work out where their support may currently be needed.
NS—Not Started
The NS list shows which tasks are waiting to be started in the various resource areas. Project managers can assist with the preparation of these tasks so that—once started—they may be processed uninterrupted.
NTBS—Not To Be Started
The NTBS list shows approaching tasks where the launch requirements are currently being worked on—those are tasks found in the IP list. The NTBS list further shows the tactical priorities of the tasks and the estimated handover date. With the help of the NS and NTBS lists, the project manager can support resource and task managers in their efforts to fulfill all requirements necessary for the launch of the task.

Status	Prio	Project	Task	Remaining duration (days)	Expected
IP		KO	Construct enclosure	12	
		KO	Construct framework	5	
		SWE	Design management SW	3	
		SWE	Define interface	4	
NS		...	...		
NTBS					18.03.
					19.03.
					23.03.
					27.03.

Task List for Project Manager

BeingManagement3 - Project Management

Like the Task Manager, BM3's Task Management Center enables the project manager to find relevant tasks in various ways, in priority order, based on role, time window and/or other search criteria. When you log in as a project manager, the Task Management Center shows a unique task list for the project manager's area of responsibility.

No.	ID	Consuming	Task Name	PREP Ck.L	Remainder	Start Date	Skill	Project	RTS
1	5	✓	T101		6d	Started	Programmer,System Architect	Project X	
2	4		T102	0/3	5d	2016-06-24 09:00	Programmer	Project X	No
3	9		T105		4d	2016-06-16 09:00	Programmer	Project X	
4	8		T106		4d	2016-06-16 09:00	Programmer	Project X	

This figure shows an example of a task list which contains all tasks for a project manager ("Project X" in this case) in a given time window. As you can see, the list shows only tasks belonging to "Project X" and represents task status/color and other conditions.

No.	ID	Consuming	Task Name	PREP Ck.L	Remainder	Start Date	Skill	Project	RTS
1	5	✓	T101		6d	Started	Programmer,System Architect	Project X	

This figure shows only the "in process" task(s) from the previous task list. This can be obtained by a search button with specified criteria.

No.	ID	Consuming	Task Name	PREP Ck.L	Remainder	Start Date	Skill	Project	RTS
1	9		T105		4d	2016-06-16 09:00	Programmer	Project X	
2	8		T106		4d	2016-06-16 09:00	Programmer	Project X	

This figure shows only tasks for which the condition is "Not Started". Preceding tasks are finished but these tasks have not yet started. This can be obtained by a search button with specified criteria.

No.	ID	Consuming	Task Name	PREP Ck.L	Remainder	Start Date	Skill	Project	RTS
1	4		T102	0/3	5d	2016-06-24 09:00	Programmer	Project X	No

This figure shows only tasks which are not to be started. BM3 provides the capability for custom fields, and the condition "Ready To Start (RTS)" can be represented with this capability.

Checklists : PM Tasks : Project X

Preparation

Completed	Item	Task	Required Duration	Note
☐	Agree on the required specifications	T102		
☐	Determine detailed specifications	T102	0.5d	
☐	Prepare explanatory materials	T102	1d	

BM3 provides another function, also for Project Managers, which is referred to as the "Checklist Management Center". This function consists of two types of checklists: "Preparation Checklist" and "Execution Checklist". The "Preparation Checklist" helps the Project Manager manage "Not To Be Started" tasks by adding detailed preparation requirements as checklist items (as opposed to creating sub-tasks). In this case, the list shows checklist items for the tasks which appear in the previous figure. The items on the list are grouped by task and sorted in priority order.

VISTEM Projects that Flow - Project manager interventions

With these targeted interventions in issues that cannot be resolved by task management, project managers ensure that the project's safety buffer is not wasted unnecessarily, or even that lost time is recovered. Project managers daily check the list of tasks that are using up most of the buffer and verify if counter measures are necessary or have already been taken to make the project progress as fast as possible.

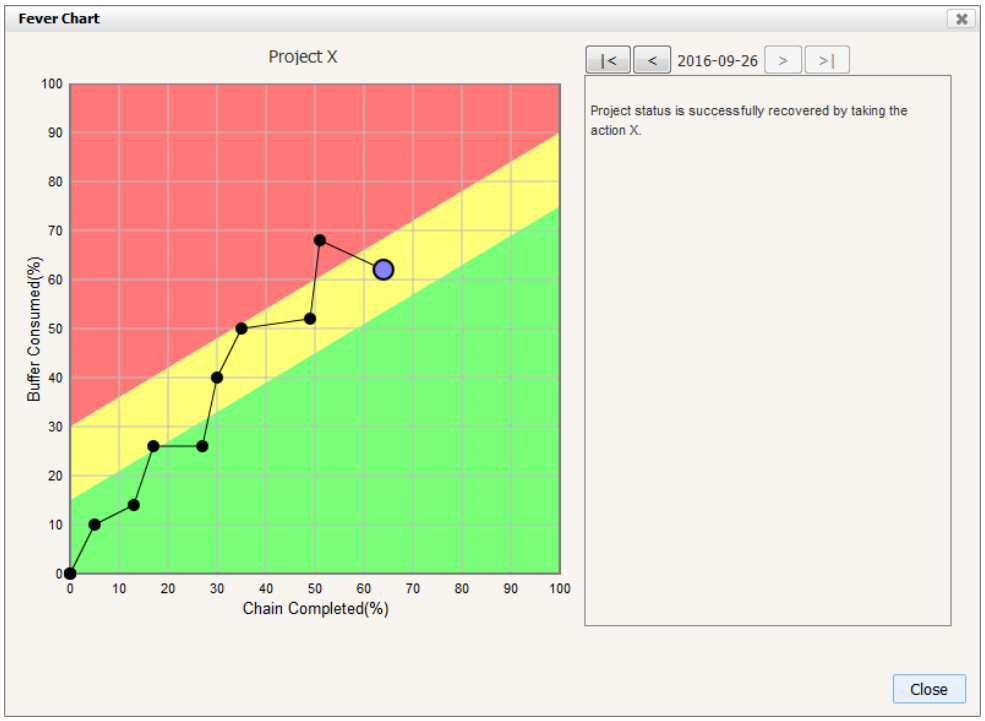
Fever chart

Some project management systems provide a so-called "fever chart."

This chart displays the development of the project in predefined intervals (weeks, months), showing whether the project has used more or less safety buffer in a given time frame than it has progressed:

- If the curve is "steeper" than 45 degrees, the project has used more safety buffer than it has made progress: it has become less secure and its tactical priority has gone up. If the curve is "flatter" than 45 degrees, the project has used up less buffer than it has progressed: it has become more secure and its tactical priority has gone down.
- If the curve is heading down, the project has progressed faster than even the project plan (with task durations cut by half) suggested. The project has actually gained back safety buffer. Using the fever chart, project managers can retrospectively analyze what has proved useful for the project and what has slowed it down. This is helpful for future projects and helps with focused improvement measures.

BeingManagement3 - Fever Chart



This figure shows an example of the Fever Chart of a project. BM3's Fever Chart enables us to record and review descriptions on progress points as required so that you can share information such as what is happening or what recovery action has been taken among stakeholders, and can have a good retrospective after the project completed.

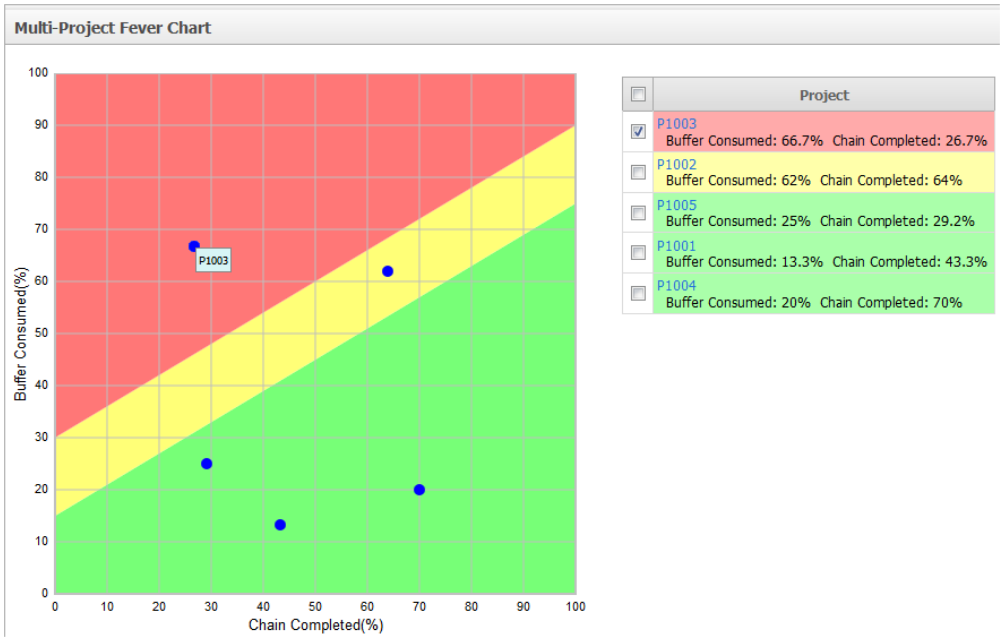
VISTEM Projects that Flow Chapter 14.8: Project Status

Project status

How well a project is getting on (in relation to the project plan) can be inferred from the ratio between project progress and buffer consumption. This ratio is called "project status."An overview of all projects sorted by status, indicating the task which currently drives each project's progress, helps top management concentrate on those tasks (and only those) where a management intervention will have a positive effect on the progress of the project.

It has proven useful for top management to have a weekly meeting where the status of all projects is discussed, focusing on any projects where progress is below expectations. The corresponding project managers can then be asked to suggest potential improvement measures that can be assessed and implemented if considered viable.

BeingManagement3 - Project Status



This figure shows an example of the Multi-Project Fever Chart of a portfolio. BM3's Multi-Project Fever Chart shows also a project list next to the chart in which all projects are listed in priority order. In this case, it can be recognized immediately, both in the chart and the list, that the status of the project "P1003" is the worst and needs top manager's intervention.

VISTEM Projects that Flow Chapter 14.8.2: Flow Trend

Flow Trend

From the same data we can generate a further report—the so-called "Flow Trend." This shows how many tasks are "In Process" in each group of resources, and how many are waiting to be started.

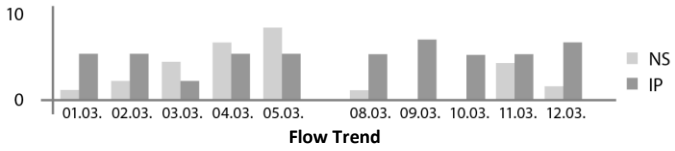
This report can give top management helpful pointers. If the number of NS (Not Started) tasks goes up in a specific area, it can mean one of the following:

- The area (department) has an acute shortage of resources (either temporary or beginning to become chronic).
- There are a few "stuck" tasks in the area which cannot be completed, preventing any further tasks from being started.

If on the other hand the number of IP (In Process) tasks goes up, it can mean one of the following:

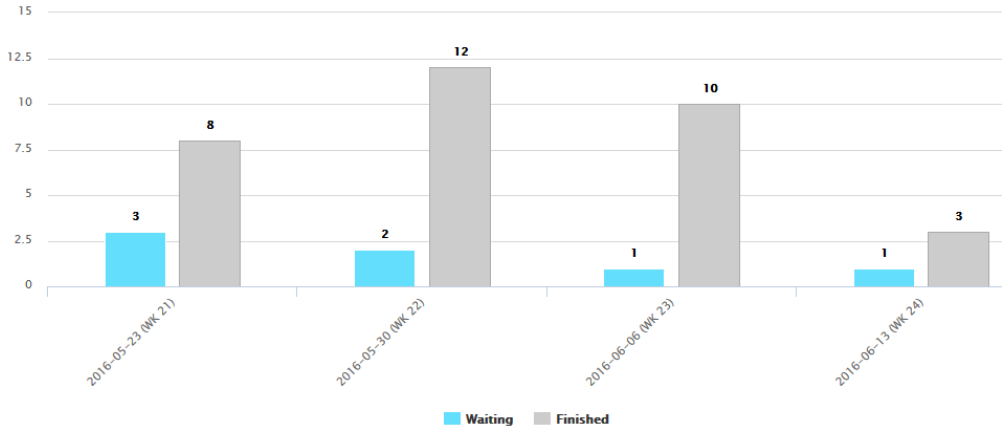
- Employees are resorting more and more to (bad) multitasking.
- Resources are being spread more thinly across tasks.

The top manager will not be able to see the actual cause of events from the Flow Trend, but they will know which resource groups to ask to find the answer. The top manager is highly motivated to ask questions, as they know: If the number of IP or NS tasks in a department goes up, the affected projects will take longer than they need to.

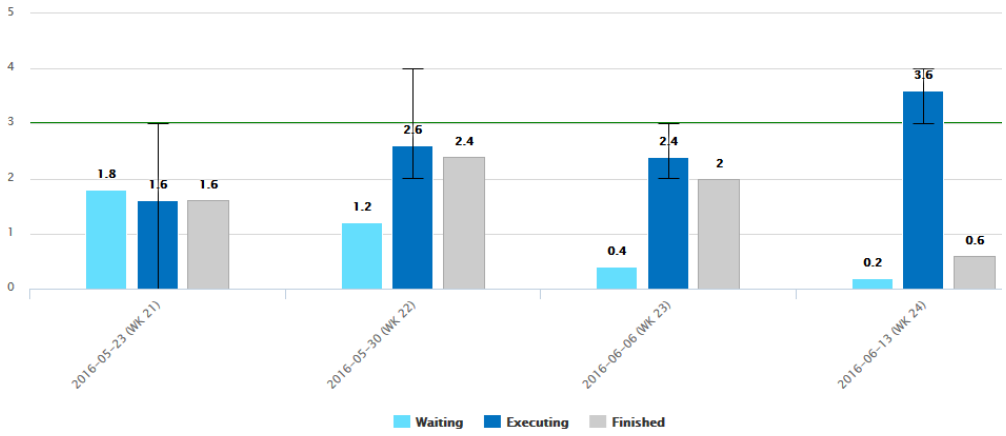


Flow Trend

BeingManagement3 - Resource Load Trend



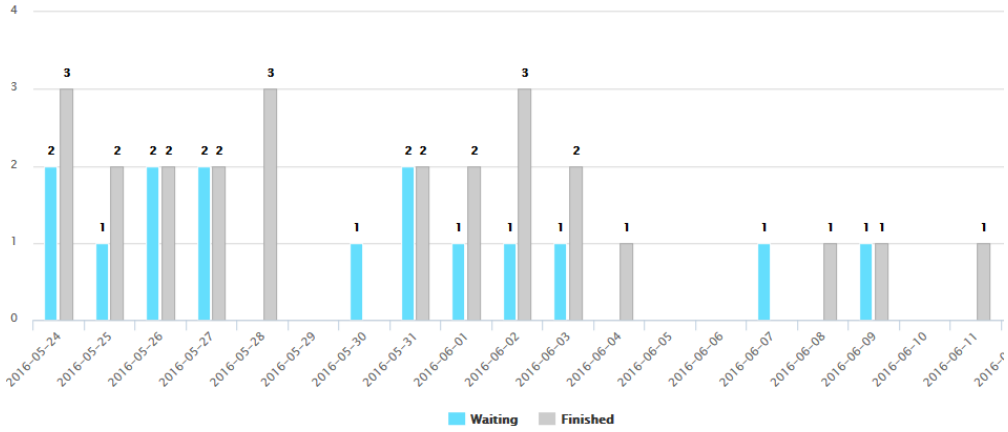
BM3 has a capability of showing trends of resource load per day/week/month among resources during specified period of time. The function is referred to as "Resource Load Trend". This figure shows a scenario that there is a down trend in completion rate of tasks for a certain skill (gray, from "12" down to "3") around the week of May 30 to the week of June 13. In this case, each bar chart represents the load of the resource per week as the total number, and the number on the top of each bar chart shows its value.



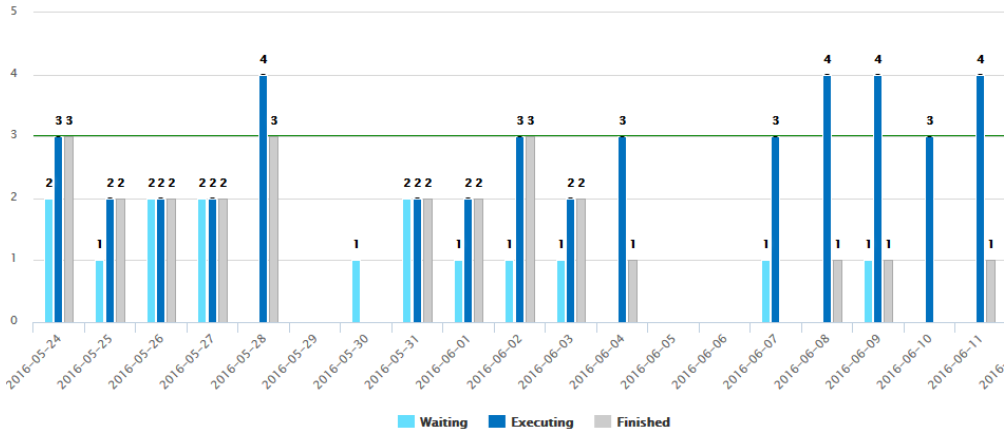
When we see a trend like the above, we have reason to investigate whether this is a genuine warning, and if so, see what is happening by reviewing the same data from some different angles for more details. This figure shows another view of the same data. Each bar chart indicates the average load on the same resource per week. The gray bar represents "Finished" and the light blue bar represents "Waiting". This figure shows another bar which represents tasks in progress (blue). In this case, in addition to the above, it can be recognized that

1. There is a down trend of the number of finished tasks (gray) around the week of May 30 to the week of June 13.

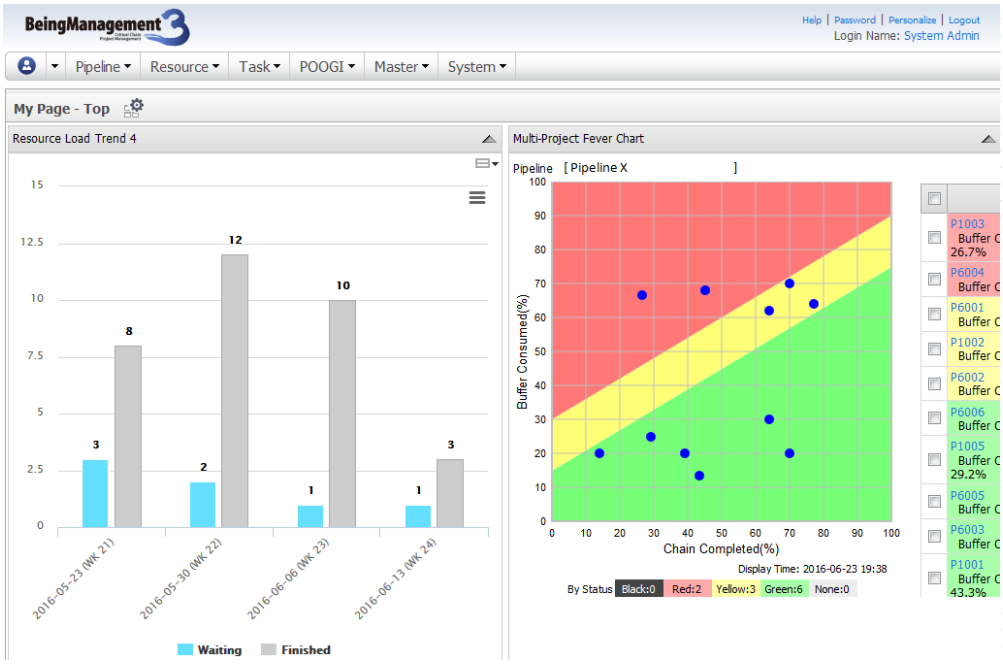
2. The number of tasks in progress has increased accordingly, and it exceeds the capacity of the resource in the week of June 13(horizontal green line).



If we change the time range per each bar chart from "Weeks" to "Days", we can see some more details of the behaviour so that we can review the changes in daily basis.



This figure shows the trend of resource load and capacity on a daily basis. In this case, it can be inferred that the resource trend is likely caused by Bad Multitasking around June 7 to June 11.



BM3 has another capability relating to Flow Trend which shows charts on the Top Page of a manager in panels. This layout and/or panel size can be customized so that managers can recognize warnings like the above immediately after logging into the system, and take required action as necessary. This figure shows an example of such a Top Page. As you can see, in this case, there are a Resource Load Trend panel on the left and a Multi-Project Fever Chart on the right on the Top Page.

VISTEM Projects that Flow Chapter 19: Reducing WIP

Reducing WIP

If too many projects are being processed at the same time, they compete for resources and attention. The consequences are:

- Bad multitasking among employees and management
- Thin spread of resources across projects (alternatively, suboptimal resource allocation to projects)
- Desynchronization
- Defocusing

Each of these effects considerably increases the duration of all projects

Further negative effects of this situation are:

- High stress among employees and management
- Managers compete with each other rather than supporting each other
- More reports and control systems are continually established

Objective

FLOW becomes the overriding principle of the organization. This means: The focus is on completing projects (rather than on beginning projects).

Path (how to reach the objective)

The business reduces the WIP and keeps it at a level that makes sense for the business (The amount of active projects will be reduced to less than 75% of previous WIP).

Predicted effect (the specific effect that will be created by the change)
The remaining duration of currently active projects is reduced. This improves the reliability of those projects. Project throughput increases, i.e., more projects are completed per time unit (month, quarter, year). At the same time, the working climate and level of cooperation in the business is expected to noticeably improve.

Caution
The pressure to start each project ASAP will put the WIP back up. Therefore, there must be a mechanism in place to keep the WIP at the reduced level. The attempt to find a more precise or "more correct" value than 25% for one's organization will only delay implementation (and thus the effects of the change) without producing any benefits.

Path how to reach the objective of reducing WIP (described in detail in the book Projects that Flow, Chapter 19)

Freezing projects
A sufficient number of active project are effectively halted (top manager decides which ones). The executive determines the relative priorities of projects (after discussing it with the employees involved). Within a CCPM Software there need to be options to set **project priorities and halt projects.**

Accelerating projects
Optimal resource numbers: For each task/each project there is an optimal number of resources. CCPM Software -> The freed resources are used to optimally accelerate active tasks (and projects). Tasks that have not started yet are launched with optimal resource allocation. This means, the task manager determines the optimal resource number for each immediately upcoming task and starts the task with that number of resources—even if it means another task will not be able to start because of this. For the currently frozen projects which will soon be resumed, the optimal resource number is determined for all upcoming tasks.

Re-launching frozen projects. The frozen projects will be defrosted at the rate required to maintain the reduced WIP level.

Complete one, defrost one. One simple approach consists of resuming a frozen project every time an active project is completed, as this will keep the WIP at more or less the same level.

This approach is entirely sufficient if we are satisfied with the improvements achieved so far and not interested in shaping and securing the future of the organization. So the question is: What would a mechanism look like that is aimed at further improving performance while maintaining the reduced WIP level?
Integration: For most multi-project organizations, the following is true: It is not a specific resource limiting the rate of project completion, but rather its "integration capacity."

If there are too many projects in the integration phase at the same time, the focus on completing projects according to their priorities is lost. If this happens, resources are withdrawn from one project to assist with resolving another project's urgent problems. The integration phase requires a lot of management support.

Focusing management attention on Vitual Drum (Projects that Flow page 283): If the business defrosts a frozen project every time an active project completes the integration phase, this automatically focuses the attention of top management on the integration phase.
With this increased management attention—this has been shown again and again (not just in the project business)—difficulties and risks are recognized and resolved sooner: For one thing, employees want to be seen in the best possible light and avoid awkward questions. Additionally, top management can intervene at exactly those points in a project where it is most beneficial and where it has a significant accelerating effect.

Conclusion: The integration capacity is what limits the progress of the project portfolio most noticeably. Having more simultaneous integration phases than the business (active resources as well as support and management roles) can handle leads to a loss of focus, multitasking, and a sinking PCR. This manifests itself in

repeated delays during the integration phase while waiting for help or decisions from resources, support, or management roles.

Path of how to reach the objective of re-launching frozen projects at the rate required

Define the virtual drum: The business decides that the project integration phase (or part of it) will determine the beat or pace of the multi-project organization. This is called the "Virtual Drum."

Strength of the Virtual Drum: If the Virtual Drum is to set the pace of the organization, we must determine how many projects can be in that phase at the same time. To obtain a reduction in WIP (and thus an acceleration) even during integration, it is determined that at most 75% of projects can be in the integration phase compared to the number we had in the integration phase before Step 1.1. If necessary, we will freeze further projects (currently in the integration phase) to achieve this WIP reduction.

Defrosting projects: When an active project completes the integration phase, a frozen project is resumed, thus maintaining the amount of projects in the integration phase. An active project will only enter the integration phase once another project has completed it.
Priorities: The order in which the frozen projects are resumed is determined by the **prioritization set initially**.

Management is focused on supporting the integration phases of projects.

As a result of this, integration phases become very much shorter, the PCR increases, and the time until the first new project can be started approaches faster.

Starting new projects: New projects are launched in a way that maintains the reduced level of WIP.

Different path lengths: For most projects, the individual paths are of significantly unequal lengths. Starting work on all these paths at the same time will increase the WIP unnecessarily; starting individual paths too late on the other hand will delay the project. Therefore, their varying lengths must be taken into account when launching the individual project paths. This is not a trivial task, however, as there are a number of big challenges:

Complexity: For most (larger) projects (and even more so in multi-project organizations) it would be too time-consuming to manually calculate the best starting points of the different paths. This is one of the reasons why in many projects, every task is started ASAP.
Resource capacity: One of the things the duration of the different project paths depends on is the capacity of the various resources. The planned duration depends on the planned capacity of resources; the actual duration on their actual capacity. Most project organizations and even most commercially available project management software systems do not take these dependencies into account, or barely do. This is one of the reasons why projects and tasks are started as early as possible and why project managers are expected to estimate and negotiate early on how much they will require of each resource for their project.

Safety buffers: The duration of a project and of the different paths is highly influenced by the way safety buffers are planned. Most project organizations (and most software systems) assume— implicitly or explicitly—that safety buffers are included in individual project tasks and that completing each project step on time will complete the entire project on time. New developments show, however, that safety buffers on the task level draw out project lead times unnecessarily, thus preventing timely project delivery. This requires fewer safety buffers, project lead times can be planned significantly shorter, and projects become far more reliable.

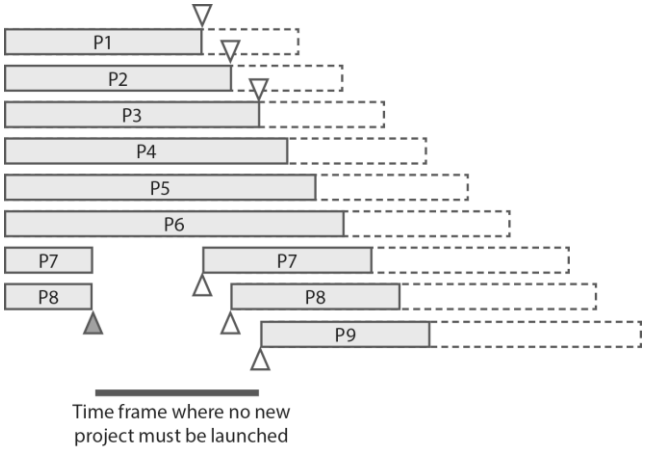
Only a few project management systems currently offer this principle of **bundling and explicitly using safety buffers**, though that number is constantly growing.

These three challenges must be overcome before new projects can be launched; at least if the aim is to realize further performance enhancements for the business, rather than staying at the level already achieved.

Window of time: The steps described above (freezing projects, accelerating projects, resuming projects) put the organization in a great starting position: We have created a time window several weeks long where no new projects are launched.

The project managers of upcoming projects use the time frame where no new projects are launched to carefully prepare (Phase 2) and soundly plan their projects—taking into account the challenges just mentioned.

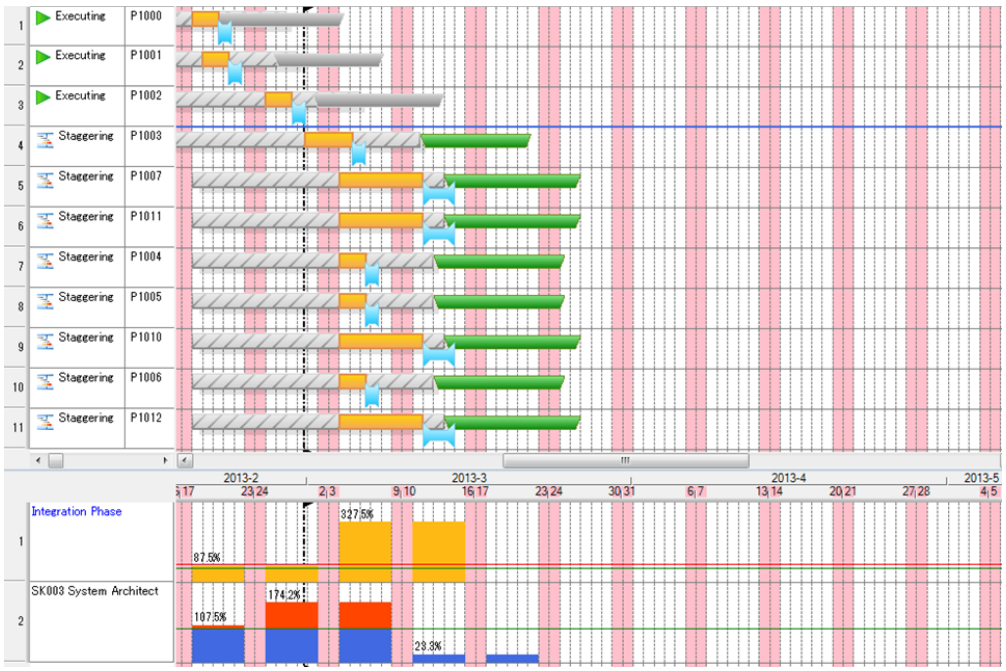
The business as a whole uses this window of time to build the framework for highly improved project and multi-project planning and management.



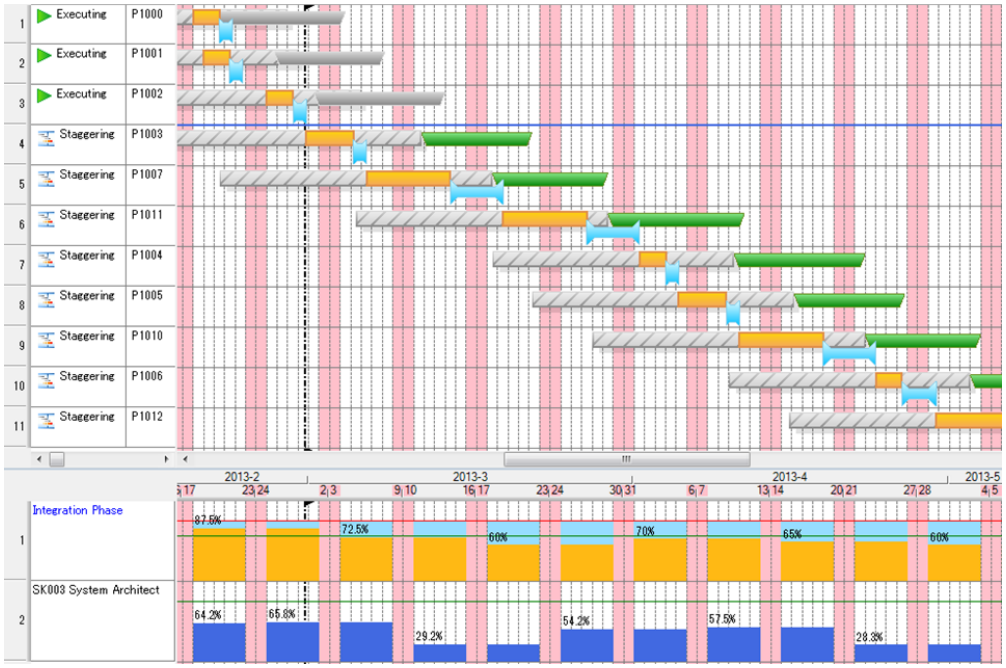
Window of time

FLOW becomes the overriding principle of the organization. This means, the focus is on completing projects (rather than on beginning projects).

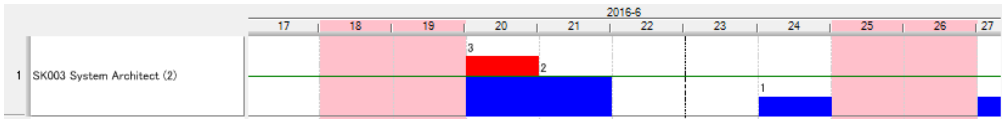
BeingManagement3 - Reducing WIP



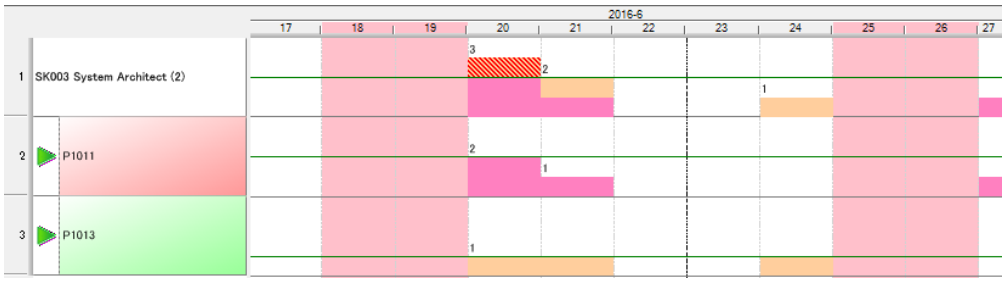
BM3's FlowPlanner enables you to stagger projects so that synchronization between projects in the pipeline can be sustained while the load on the integration phase is leveled at the required threshold, and the capacity buffer is maintained. The load on key resources can be leveled as required and the WIP level can be maintained at an acceptable level. This figure shows the scenario before staggering is done.



This figure shows the scenario after staggering is done. As you can see, the load on the integration phase is leveled and overload on the key resource is totally eliminated.



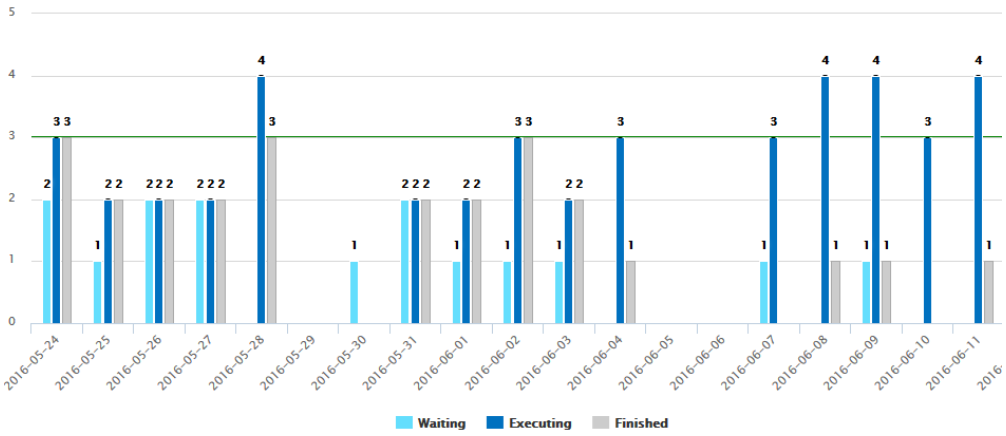
It is important to note that although Critical Chain is a scheduling solution, and not a resource management solution, BM3 has some special resource management features that can be helpful to an organization. One of these is called the "Resource Graph". It allows you to see an overview of resource assignments across projects and to anticipate overloads on specific resources. This figure shows an example of an overload on a resource. The horizontal green line represents the capacity of the resource and the red histogram indicates overload. When you experience a similar situation you can take action as required so that the level of WIP can be maintained appropriately.



The "Resource Graph" supports consideration of actions to take to mitigate resource overloads. The "Resource Graph" has the capability to show resource load per project by color-coding each histogram area. In this case, there are two projects ("P1011" and "P1013") which require the same resource, "System Architect", during the same time window. The resource load from "P1011" is displayed as a pink histogram and the resource load from "P1013" is displayed as pale orange histogram.

The "Resource Graph" also has a capability to display the accumulated resource load with the rule that the higher priority of the project is, the lower on the graph its histogram is located. In this case, there are tree horizontal lanes with histograms which are: the accumulated load on the resource (first lane), the load on the resource for the project "P1011" (second lane) and the load on the same resource for project "P1013" (third lane). In the first lane, the histogram shows the load from both projects. The histogram for "P1011" is located below the histogram for "P1013" since "P1011" has a higher priority. In other words, it is recognized that the overload is caused by tasks of "P1013".

A possible action to be considered in this case would be to postpone or freeze tasks the tasks belonging to "P1013".

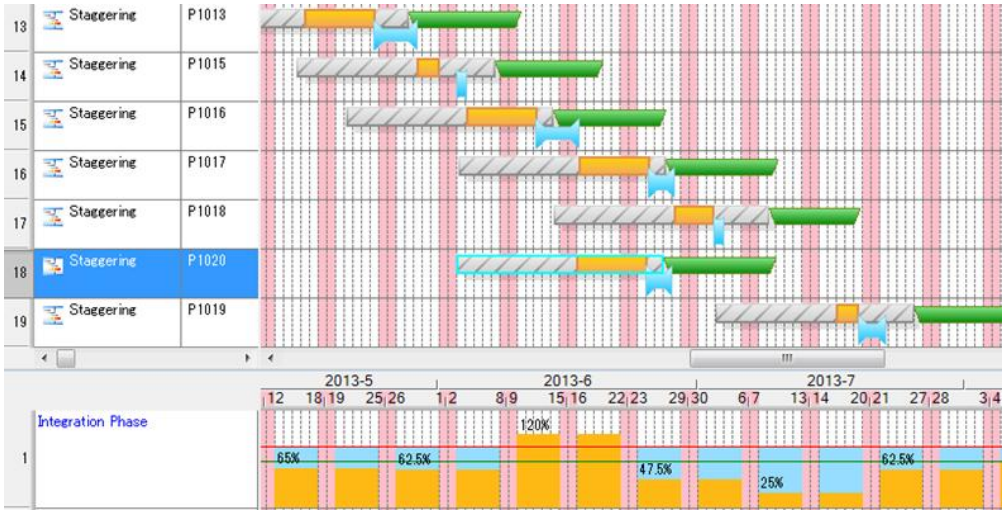


BM3's "Resource Load Trend" function also supports reducing WIP. This figure shows a scenario where the rate of task completion is decreasing (gray bars) because of high WIP caused by bad multi-tasking (blue bars around middle of the chart). In this case, you can take action on multitasking so that the flow will recover to its optimum level.

BeingManagement3

Reducing WIP

BeingManagement3 - Management Attention on Virtual Drum



This figure shows a scenario where the load on the integration phase is increased beyond capacity by the addition or reprioritization of a project. BM3 allows managers to recognize dynamically the impact of their decisions on the flow of the pipeline, and help avert the dilution of valuable management bandwidth (attention).

Being Management3

Focusing

management attention

on Virtual Drum

VISTEM Projects that Flow Chapter 20: Good Preparation

Good preparation is a mandatory prerequisite for fast, smooth, and cost-effective project completion. This is why executive, resource, and project managers fundamentally agree: A project (or project phase) should only begin when it is fully prepared (the "**full kit**" is present). If as project starts before it is sufficiently prepared, there will be delays, processing loops, increased cost, unnecessary interruptions, and other problems.

Short project run times are a mandatory requirement for high throughput in a multi-project organization. Missing or poor preparation leads to longer project run times. Therefore, a healthy multi-project organization must observe the following:

- Only projects where all preparations are complete (to the greatest possible extent) are launched.
- If preparations are incomplete, these are first completed; then the project is allowed to launch.

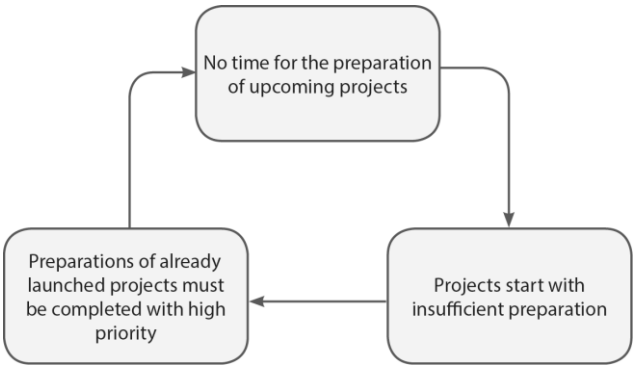
Despite a general consensus that projects should only be launched once they are fully prepared, this rule is violated almost constantly:

Delays and extra work caused by missing or poor preparation are some of the most prevalent undesired effects (negative symptoms) in the project business. Almost every single project in almost every multi-project organization suffers from this. Every manager working in a project environment can name countless examples of negative effects caused by poor preparation. In short, the intention to thoroughly prepare projects is repeatedly proclaimed, but is generally pure lip service.

Objective: Projects are only started once all preparations are complete.

Early start: The prevailing pressure to start projects ASAP often leads to projects being launched before all necessary preparations have been completed.

Race to catch up: Resources involved in project preparation forever seem to be playing catch up. Because projects launch before they are fully prepared, the missing preparations for these—already active—projects have to be completed with the highest priority. As a result, there is no time to make or complete (!) the preparations of upcoming projects—leading to yet more projects needing additional preparation after launch, and so on. A vicious circle:



Missing preparation vicious circle

Time frame where no new project must be launched:

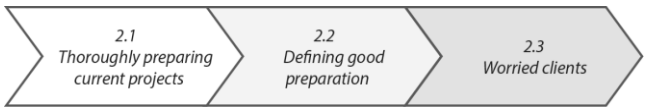
Thanks to the measures already taken, we have created the ideal circumstances:

During a short window of time, we will have free capacities specifically among the resources involved in project preparation.

The business will use this window of time where no new project must be launched to:

- complete the missing preparations for all active, frozen, and upcoming projects; and
- introduce a robust "full kit procedure" which ensures that in future a project will only be launched if it has been fully prepared.

The individual steps are described in detail in the book Projects that Flow:



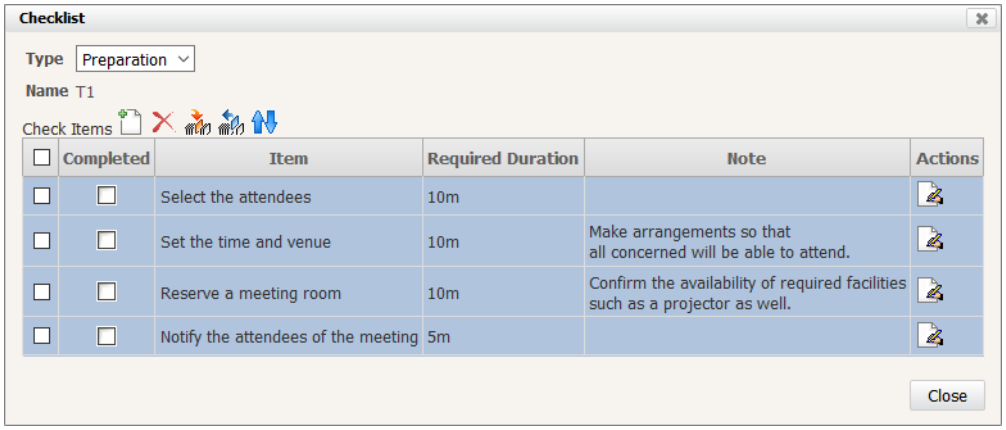
Caution: Good preparation must not be misused to increase WIP.

BeingManagement3 - Full-Kitting

BM3 provides two types of checklists – one for task level-preparations and one for execution. Both can contain detailed sub-steps, as opposed to adding more tasks to a project. The "preparation checklist" helps us manage both task-level and project-level full-kit for the legs in a project. Checklists can be saved in project templates together with other task information, so that required preparations can be secured for future projects.

No.	ID	Consuming	Task Name	Task Manager	Predecessor	Project	Start Date	PREP Ck.L
1	18		T1	Task Manager 01		P1044	2013-02-06 09:00	

In either the planning phase or the execution phase, checklists can be added for tasks as required. This figure showing the Task Management Center indicates that checklist data for execution is available for Task T1. The "PREP Ck.L" column shows the number of completed/total preparation checklist items. A preparation checklist has not yet been added, so the column is blank.



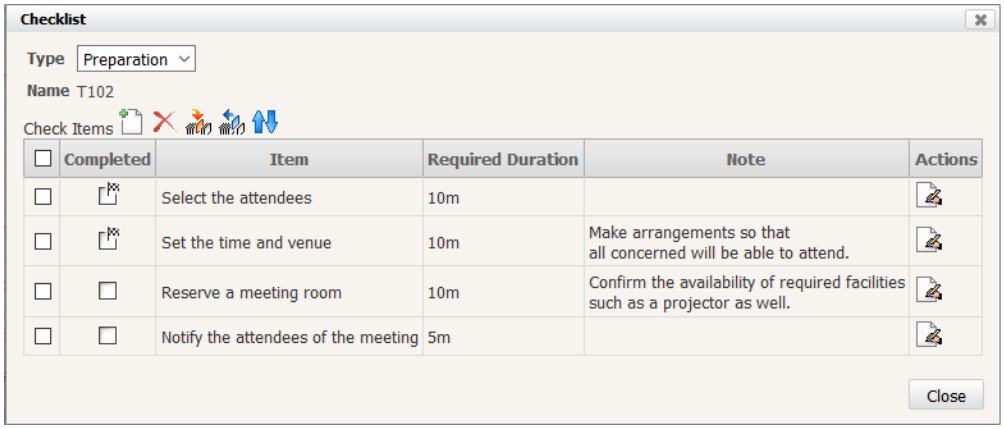
There are two ways for adding checklist items: copying from a template, and creating items from scratch. Checklist templates can be created from existing projects. This figure shows a scenario where four checklist items are added to task "T1" by copying from a template.

No.	ID	Consuming	Task Name	Task Manager	Predecessor	Project	Start Date	PREP Ck.L
1	18		T1	Task Manager 01		P1044	2013-02-06 09:00	0/4

This figure shows the scenario after checklist items are added. The “PREP Ck.L” column now shows “0/4” which represents the number of finished items and total number of items in fractional expression.

No.	ID	Consuming	Task Name	Task Manager	Predecessor	Project	Start Date	PREP Ck.L
1	4		T102	Task Manager 01	T101 T105	P1003	2016-06-27 09:00	0/4
2	2		T302	Task Manager 01	T301	P1004	2016-06-30 09:00	0/3

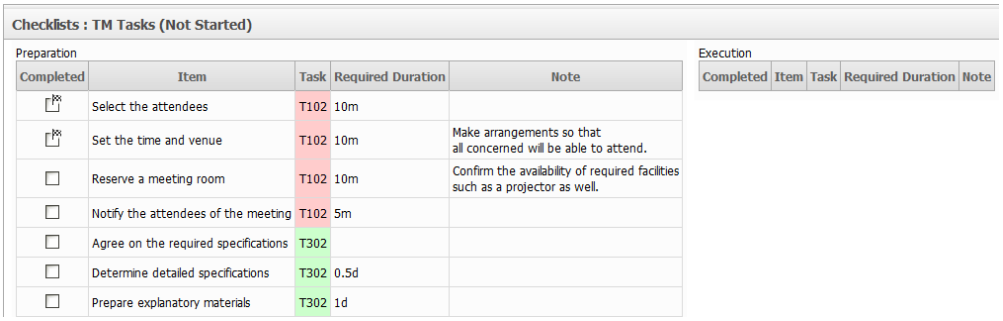
In the execution phase, the Task Management Center shows information for tasks including checklists. Because tasks are displayed in the Task Management Center in priority order, marking checklist items as completed by following the order helps us maintain good preparations for tasks and projects. This figure shows a scenario before checklist items are completed (“PREP Ck.L” column shows “0/4” and “0/3”).



This figure shows checklist detail displaying completed checklist items. In this case, two items are completed (a small symbol of checkered flag represents “completed”).

No.	ID	Consuming	Task Name	Task Manager	Predecessor	Project	Start Date	PREP Ck.L
1	4		T102	Task Manager 01	T101 T105	P1003	2016-06-27 09:00	2/4
2	2		T302	Task Manager 01	T301	P1004	2016-06-30 09:00	0/3

This figure shows the Task Management Center view after two checklist items for “T102” are completed. The “PREP Ck.L” column for the task shows “2/4”, meaning 2 of 4 items are completed.



Checklists : TM Tasks (Not Started)

Preparation

Completed	Item	Task	Required Duration	Note
☒	Select the attendees	T102	10m	
☒	Set the time and venue	T102	10m	Make arrangements so that all concerned will be able to attend.
☐	Reserve a meeting room	T102	10m	Confirm the availability of required facilities such as a projector as well.
☐	Notify the attendees of the meeting	T102	5m	
☐	Agree on the required specifications	T302		
☐	Determine detailed specifications	T302	0.5d	
☐	Prepare explanatory materials	T302	1d	

Execution

Completed	Item	Task	Required Duration	Note

BM3 has a special function for preparations which is referred to as the “Checklist Management Center”. On this page, checklist items appear individually in priority order according to the parent tasks.

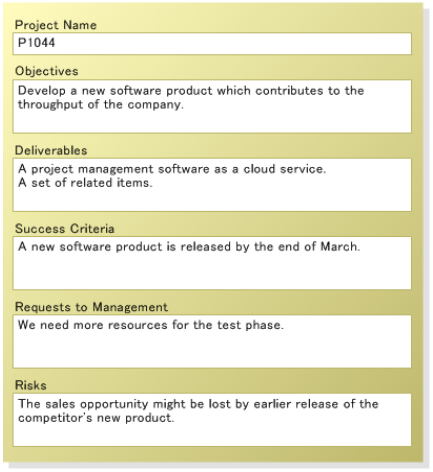
VISTEM Projects that Flow Chapter 21.1: Creating Project Network Plans

Plans are necessary: It is generally acknowledged that managing projects without formal planning is not or hardly doable. Without a project plan you have to improvise; misunderstandings and mistakes abound. No one knows which resource will be needed at what point or what needs to be completed before the next thing can be started. As a result, projects take longer and cost more than necessary. This is why project managers create a plan before the project launches which—based on the project targets—aims to answer the following questions:

- What needs to be done? What tasks and processes are necessary for this?
- What dependencies exist between these processes?
- Which resource is necessary to complete which task?
- How long does each task take? How long will the project take?

Objective: For each currently relevant project, there exists a sensibly detailed network plan suitable for good manageability.

BeingManagement3 - Creating Project Network



Project Name

P1044

Objectives

Develop a new software product which contributes to the throughput of the company.

Deliverables

A project management software as a cloud service.
A set of related items.

Success Criteria

A new software product is released by the end of March.

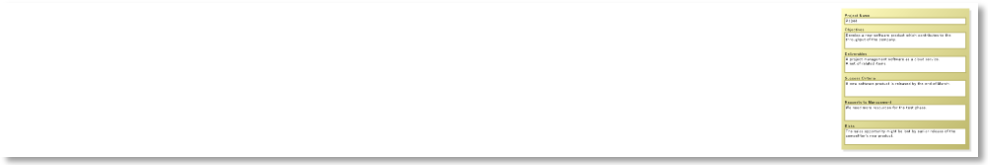
Requests to Management

We need more resources for the test phase.

Risks

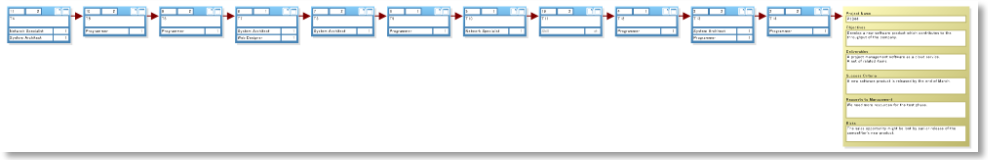
The sales opportunity might be lost by earlier release of the competitor's new product.

BM3's Planner enables the creation of a Project Network consisting of the tasks and dependencies required for a project in a very intuitive way. First, the Planner supports the concept of the "ODSC" which stands for "Objectives", "Deliverables" and "Success Criteria". This represents the goal unit of the project, as well as recording "Requests to Management" and "Risks". Tasks and dependencies can be added very easily by mouse operation and/or by keyboard operation. Project Networks are created backward starting from the ODSC, and preceding tasks including dependencies between succeeding tasks can be added by hitting the Insert key as required. The following figures show the scenario of creating a Project Network backwards using the Insert key.

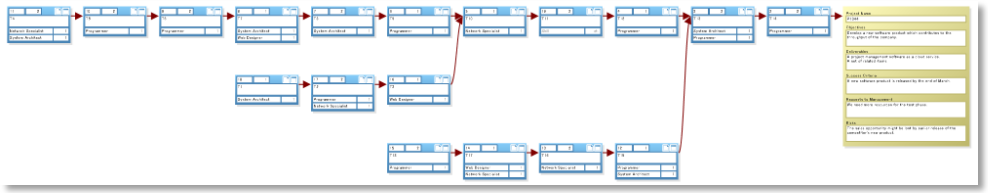


This figure shows the initial state of the Project Network in the Network Diagram (PERT) view. Only the ODSC (yellow box) appears by default.

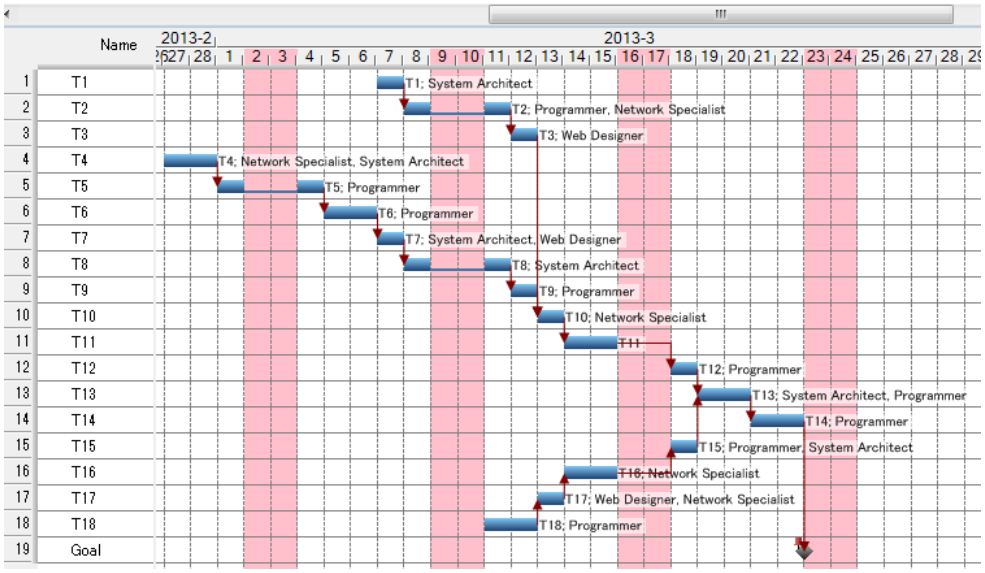
This figure shows the scenario after 3 preceding tasks (blue boxes) are added by hitting the Insert key 3 times.



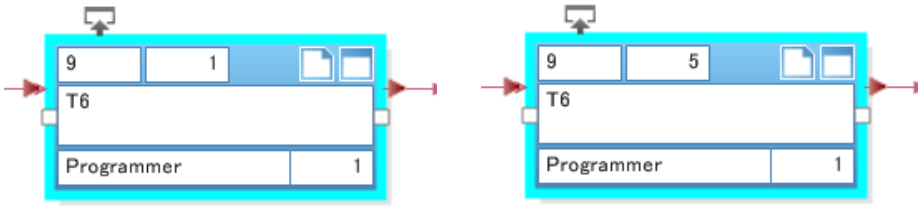
This figure shows the scenario after 8 more preceding tasks are added by hitting the Insert key 8 more times.

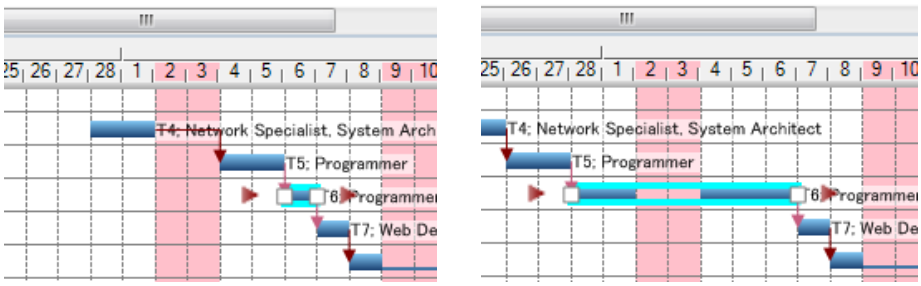


This figure shows the continued construction of a Project Network. BM3's Planner also allows you to add tasks and dependencies among tasks arbitrarily instead of creating them in a backwards manner only. You can also edit project networks in Gantt Chart and Chain Views.



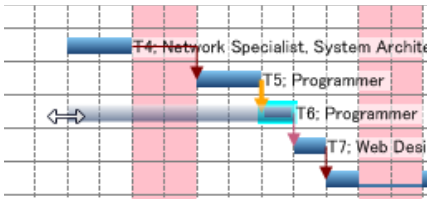
BM3's Planner enables users to review a Project Network in various formats, such as Network Diagram (PERT), Gantt Chart or Chain View. You can also display two different views at the same time. In this example, the upper view is the Network Diagram, and the lower is the Gantt Chart.





Task duration can be set by entering numbers in the textbox of each task shape, or by stretching/shortening the length of task bars by mouse operation. The above left figure shows the scenario before the task duration is updated ("1" day is set for each task by default), and the above right figure shows the scenario after the task

duration is updated to “5”. Both of the above figures show a part of Network Diagram (upper) and a part of Gantt Chart (lower) and the same task is recognized in each view. All changes in one view are reflected in the other view, since all views are synchronized.



This figure shows a scenario where the length of a task is about to be stretched out by mouse operation.

VISTEM Projects that Flow Chapter 21.1. Creating Network Plans

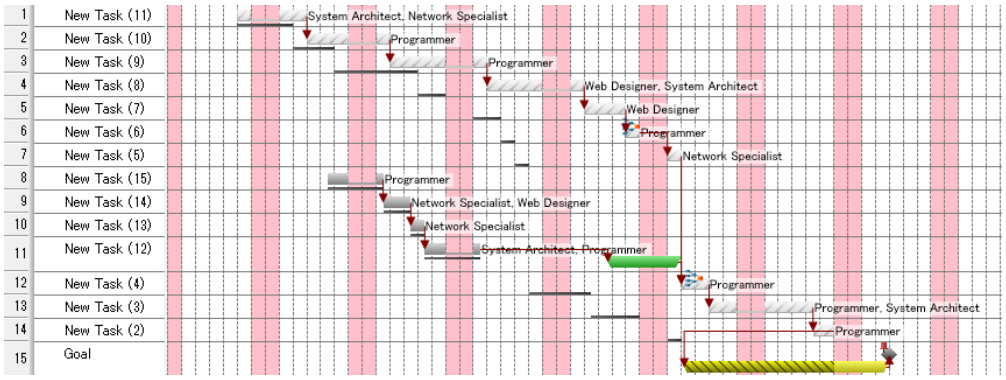
Templates: In most multi-project organizations, many projects tend to be variations of a few, generic projects. In such a case, it makes sense to create templates (generic project plans) and use them as the basis for planning specific projects. This has the following advantages:

- Those involved in project planning save time and can concentrate on the specific needs of the project.
- Different project plans will use the same terms for similar tasks as well as having the same basic structure, making them easier to understand for everyone involved.
- If the templates use a reasonable level of detail—not too much and not too little—this helps avoiding too much detail in specific project plans too.

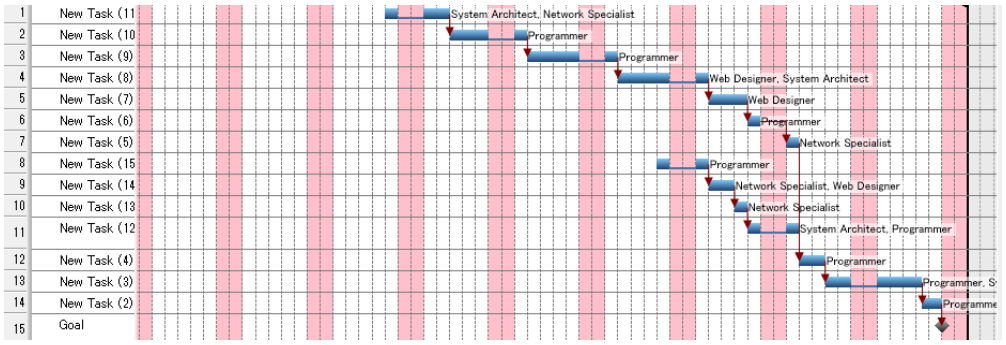
Additionally, project templates allow you to verify if a delivery deadline is feasible before the sales department gets back to the client. To do this, you simply test-input the template into the project pipeline instead of the specific project plan

BeingManagement3 - Using Project Template

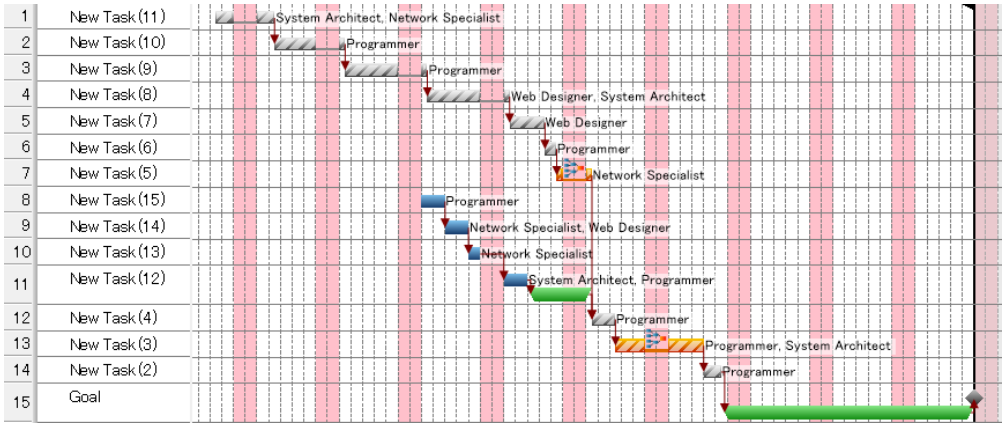
BM3 has the capability to create templates from existing projects and to create new projects from templates. There are also functions for duplicating projects in bulk or using copy-and-paste of legs between projects so that you can create many projects very easily in a short period of time.



This figure shows an example of existing completed project. You can create a new project network like the following figure from this with just a few steps. Settings for the Critical Chain, buffers and integration phase can be cleared automatically.



This figure shows an example of a new project network generated from an existing project. Although you can treat this as a standard template project before converting to a Critical Chain schedule, BM3 allows you to create Critical Chain schedules as complete templates.



This figure shows am example of a project template. All the settings of the Critical Chain, buffers, integration phase, resource assignments and checklists can be saved in a template, and can be generated as a new project created from the template.

VISTEM Projects that Flow Chapter 21.2: Explicit Safety Buffers, Critical Chain

Resources: Most projects will need a specific type of resource (e.g., JAVA developer, electrical engineer) for several different tasks. Not taking the capacity of these resources into account and assuming that the same resource can process several tasks at the same time leads to unrealistic project plans and reinforces bad multitasking.

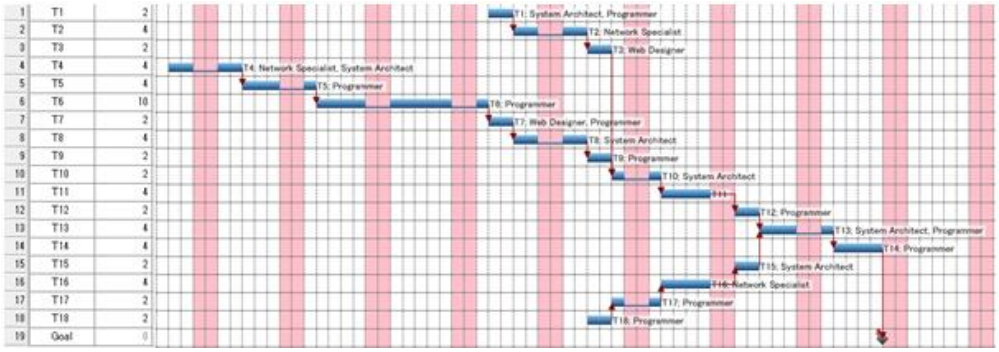
Safety buffers: Including safety buffers in the individual tasks unnecessarily extends the planned duration of a project without guaranteeing that it will be completed on time

Objective: The business uses project plans with explicit safety buffers and
without resource overlap within projects. In the technical jargon, these are called “Critical Chain Plans.”

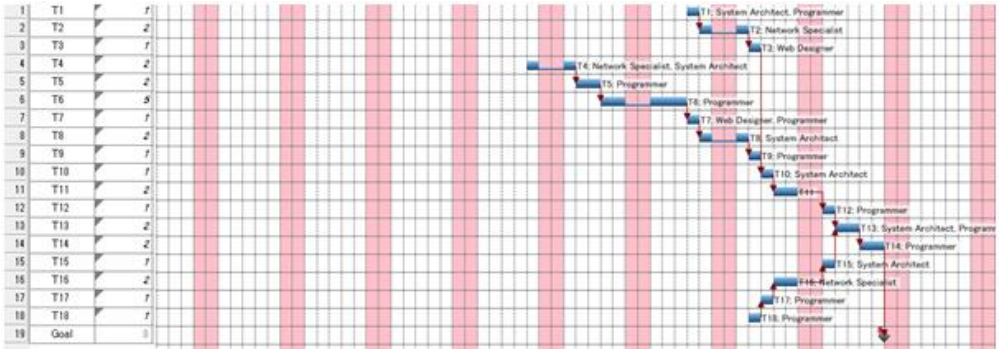
Work process: Extensive experience has shown that the following approach results in realistic project plans:

- All tasks in the plan are allocated the optimal number of employees; time estimates are adjusted accordingly. The upper limit of the optimal number of employees is set by the number of employees the business has in that particular resource group.
- Tasks in the project plan are arranged in such a way that resource conflicts are avoided (balance of resources).
- The Critical Chain (the longest chain, taking resources into account) is identified.
- The tasks on the Critical Chain are analyzed to determine whether a breakdown of tasks may further reduce the project duration. If so, tasks will be split accordingly.
- Steps (c) and (d) are repeated until the Critical Chain has been optimized.
- All time estimates, with no exception, are reduced by half. Using these reductions, project and supply chain buffers are created. (If there is excessive resistance against this 50% cut, it is still not permissible to compromise. Instead, it is preferable to increase the safety buffers.)

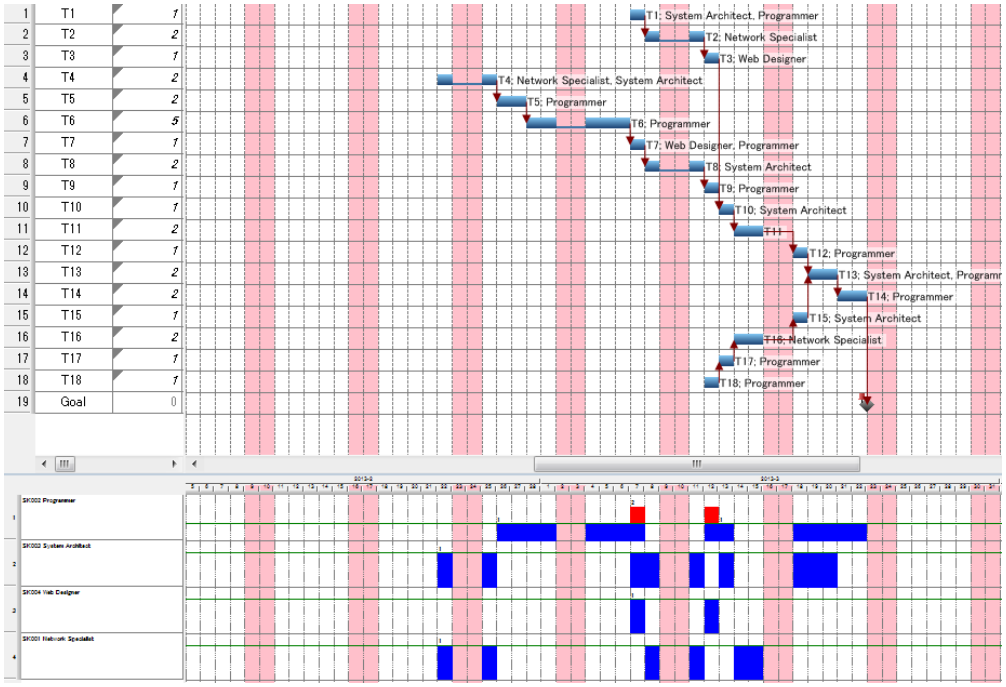
BeingManagement3 - Buffers, Critical Chain and Resource Leveling



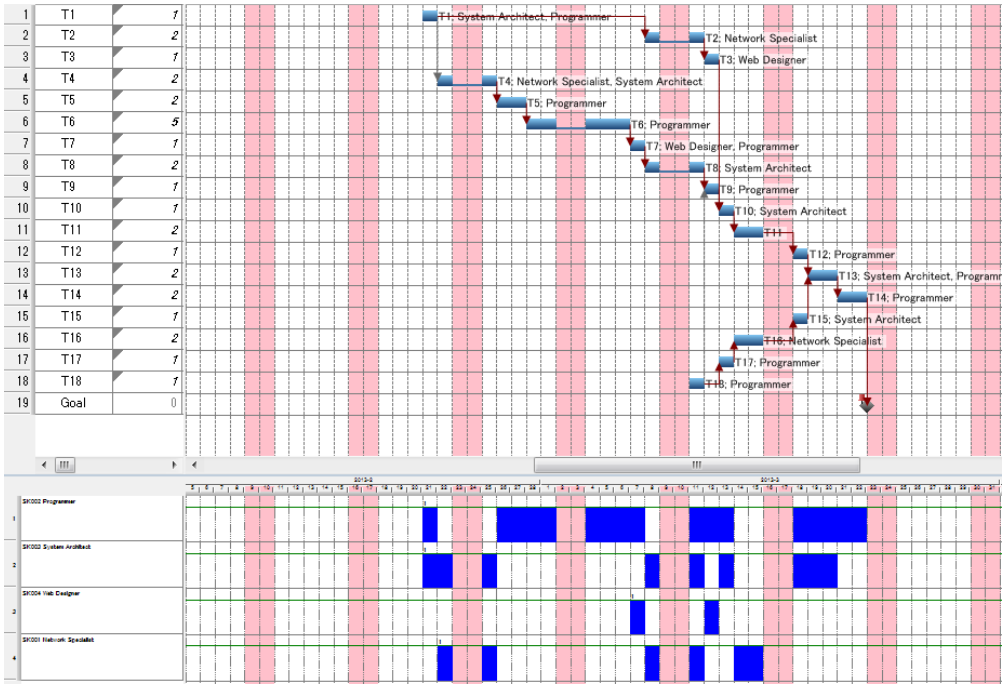
This figure shows a Gantt Chart which consists of tasks estimated with high probability (80-90%) task duration estimates. BM3's Planner enables you to cut tasks in half (by default) automatically, with just one click, so that all tasks are represented as having 50% probability task duration estimates. In BM3, the former estimation is referred to as "Highly Possible (HP)" and the latter estimation is referred to as "Aggressive But Possible (ABP)".



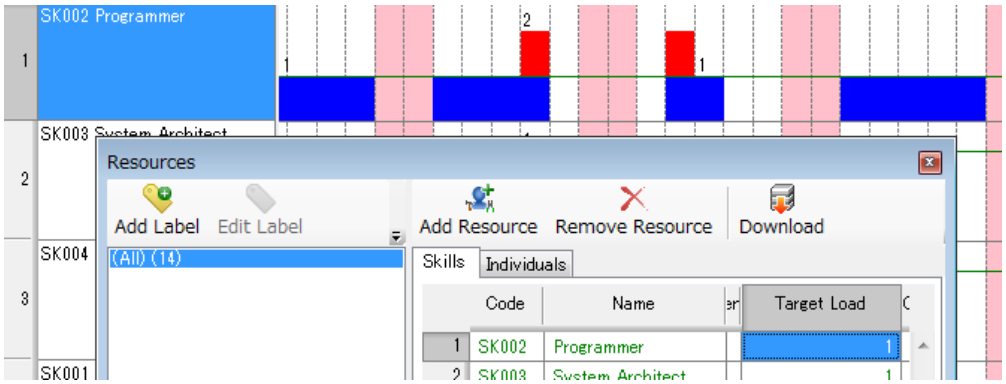
This figure shows the scene after all the tasks are cut in half.



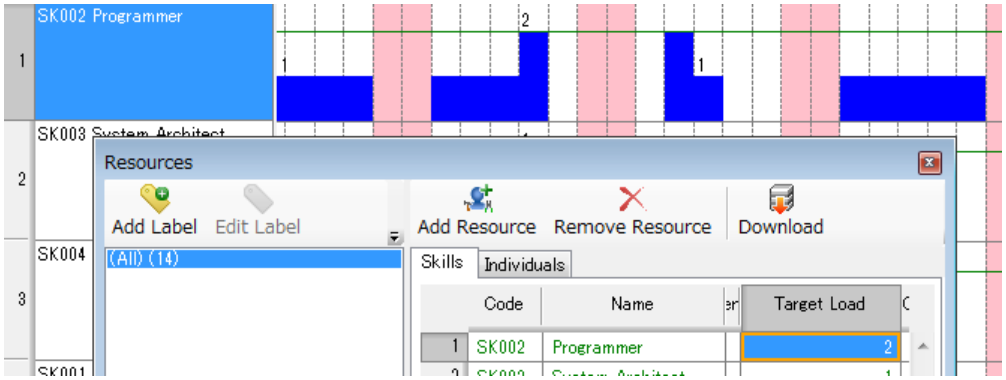
This figure shows a Gantt Chart (upper) and a corresponding Histogram for a resource load (lower). As you can see, the histogram shows two red regions in the first row. These represent resource contention between two tasks in the network. BM3's Planner enables us to eliminate resource contention with an automated resource leveling function.



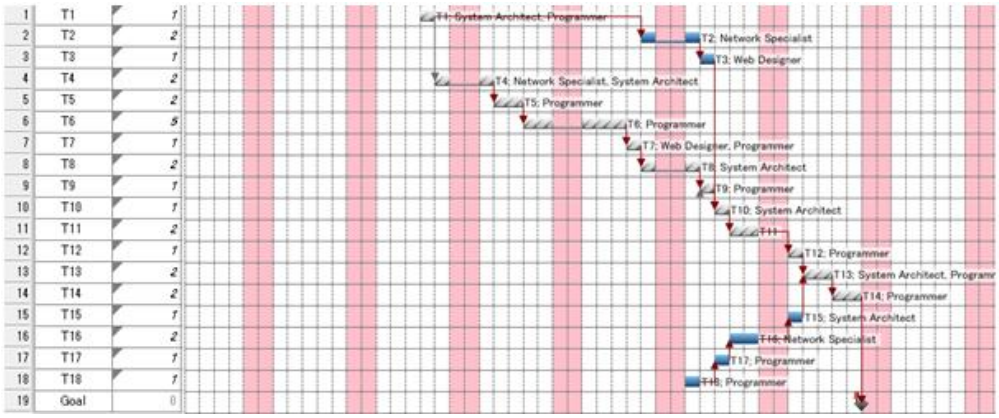
This figure shows the same scenario after the resource contention is eliminated. Two tasks ("T1" on the first row and "T18" on row 18) are moved to the left so that the resource contention with T7 and T9, respectively, is removed. Red regions in the Histogram disappear as a result of this step.



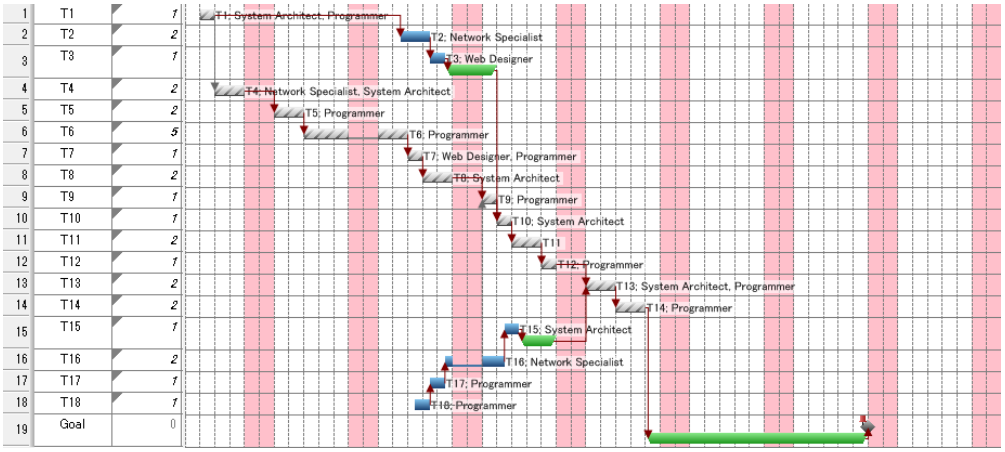
Resource leveling can be done at the proper level per each resource. The resource leveling above is performed according to a setting where the Target Load (capacity) on the resource is set to "1". Load beyond the Target Load is displayed in red.



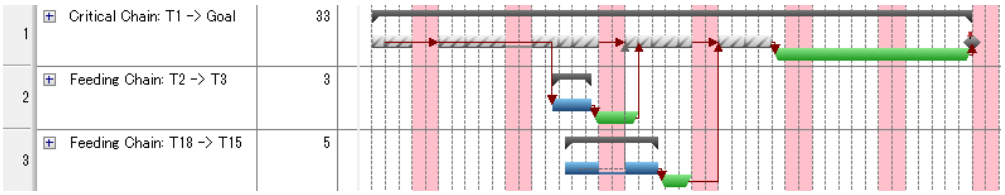
This figure shows the scenario where the Target Load on the same resource is set to "2". No overload (red region) appears in the Histogram.



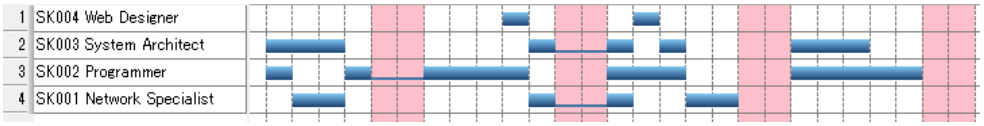
BM3's Planner enables us to indentify the critical chain (diagonally striped gray rectangle) automatically with just one click. This figure shows the scenario after the critical chain is identified.



BM3's Planner allows us to insert buffers of the correct size automatically at the end of each path, according to the concept of the Critical Chain method (default). In this case, a project buffer is located at the end of the project and two feeding buffers are inserted at the locations where each feeding buffer converges with the Critical Chain.



This figure shows an example of the Chain View, which helps you to recognize each chain in one simple view. The numbers in the second column such as "33" or "3" represents the length of each chain in working days.



BM3's Planner helps us to recognize task assignment per resource in the Assignment View so that we can see the overview of resource assignment very easily.

VISTEM Projects that Flow Chapter 22.5: Adjusting Speed

In Projects that Flow chapter 3.3. Staggering projects, the capacity of the virtual constraint (Virtual Drum) is defined, taking into account the already implemented improvements. Projects were then staggered according to the Virtual Drum and project launch dates were determined based on the staggering. Management has been ensuring since then that projects do not launch early.

The additional improvements achieved in Phase 4 (Projects that Flow, Chapter 22: Transforming Management) through

- Progress Reporting
- Task Management
- Project Management
- Top Management control

will soon lead to the Virtual Drum's actual capacity increasing even further. This will become obvious once more projects (per time unit) pass through the Virtual Drum than the schedule allows.

Of course, in the long term it is not possible to complete more projects—per time unit—than are launched. Example: Assuming the capacity of the Virtual Drum was set to an average of six projects/month in Step 3.3. Thanks to the improvements made in Phase 4, the actual completion rate is eight projects/month. But since there are still only six projects being launched per month, the rate will soon drop down to six projects/month. The business would be able to achieve more, but fails to do so by hanging on to the capacity and launch dates determined during Step 3.3. Therefore, unless it adjusts its planned capacity (frequently enough), the business will complete fewer projects than it actually could.

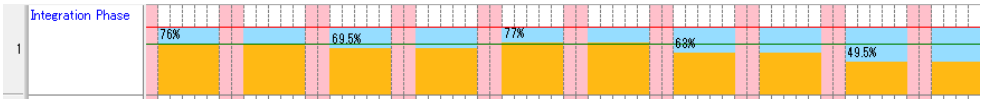
Objective: The Project Completion Rate increases further (reflecting the business's increasing performance).

If the business's performance improves but the rate of project launches is not increased, the number of projects waiting to enter the integration phase will drop. After a while the number of projects that are in the integration phase will (repeatedly) fall below the allowed rate.
Therefore, it is recommended to keep an eye on the number of projects waiting to enter the integration phase and those in the integration phase. If the amount of projects in the Virtual Drum repeatedly sinks below the amount allowed, the scheduled durations of tasks in the integration phase must be shortened accordingly. (Of course, the opposite can also occur.)

The business constantly monitors the number of projects before and in the integration phase and regularly adjusts the rate of the Virtual Drum to reflect this.

BeingManagement3 - Adjusting the Rate of the Virtual Drum

This is an example of the top page of BM3 for a portfolio manager. In this case, it is customized to display three panels, which are "DDP Trend" (DDP stands for Due Date Performance), "No. of Managed Projects" and "No. of Finished Projects". They are arranged from the left in a row so that the trends between them can be grasped at a glance. On the "DDP Trend" panel for example, the flow seems to be getting better in terms of due date performance. But it can be assumed from "No. of Managed Projects" and "No. of Finished Projects" that the system might start losing opportunities by wasting its capacity in a worst-case scenario.



BM3's FlowPlanner helps you check if such a worst-case scenario is threatening by showing the load on the integration phase in the pipeline. In this case, the histogram shows the load on the integration phase (orange) is decreasing while the rate of the capacity buffer (light blue) is increasing. In this case, it can be assumed it is possible that Management Attention is not utilized yet, and there is a room for executing additional projects so that the organization can get more throughput as a result.

VISTEM Projects that Flow Chapter 23.1: Mitigating and reducing harmful client influences
Even if—or especially if—a project is of particular importance for a client, there will always be situations where necessary supplies are not provided on time.

Another frequent reason for delays caused by the client are change requests. The project being very important, the client wants to ensure that it will match their requirements (or those of their own clients) as closely as possible. So it is only natural that there will be change requests.

But with late delivery of supplies as well as with change requests, the client is delaying the project, with negative consequences for all involved. Businesses may no longer be able to deliver within deadline, incurring contractual penalties, and risking their reputation
as an absolutely reliable supplier, while at the same time jeopardizing further projects that receive the necessary supplies too late. The client receives their delivery later than agreed, which may threaten the timely completion of their project—often with nefarious consequences.

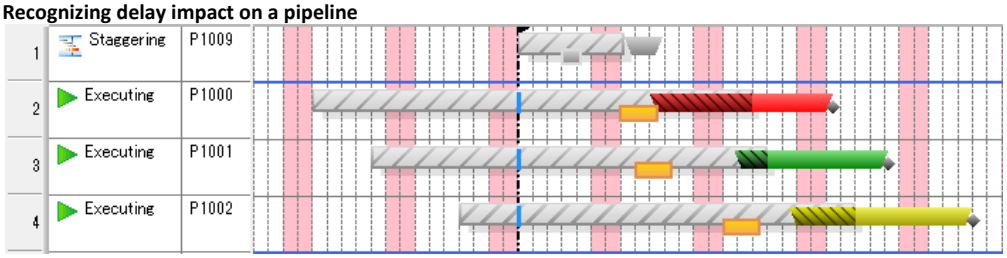
Objective: The business remains exceptionally reliable, even if client input
is necessary or change requests about specifications occur.

By applying ProjectsFlow(R), you can now easily identify which input delays and which change requests are actually causing a project to be late. You will be able to clearly see how the client's action impacts the project's critical chain.

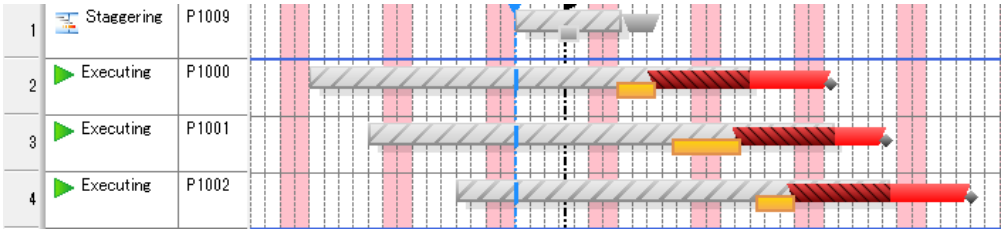
BeingManagement3 - Mitigating and Reducing Harmful Client Influences

BM3 provides analytical functions which enable you to recognize delay impact on a pipeline and on a project. The former can be done by BM3's FlowPlanner which is used for staggering and the latter can be done by BM3's Planner which is used for creating a schedule of a project.

Recognizing delay impact on a pipeline

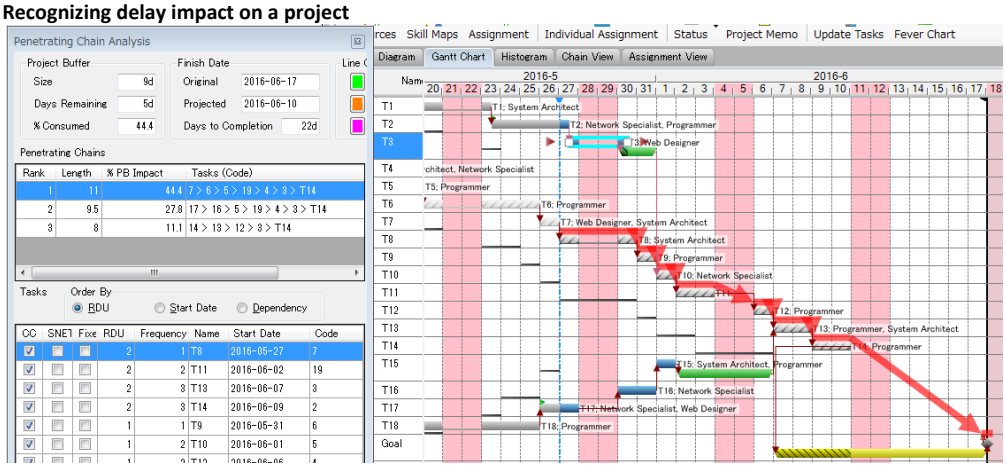


When there is a request for executing an urgent last-minute project by an important client, the impact on the pipeline needs to be understood prior to replying to the client. This can be accomplished through a special what-if analysis in BM3's FlowPlanner, which allows us to simulate what will happen if we execute the project right now. This function is referred to as "project pre-emption". For example, assume that the requested project is "P1009". We begin the analysis by 1) putting the urgent project "P1009" much higher in priority in the pipeline, and

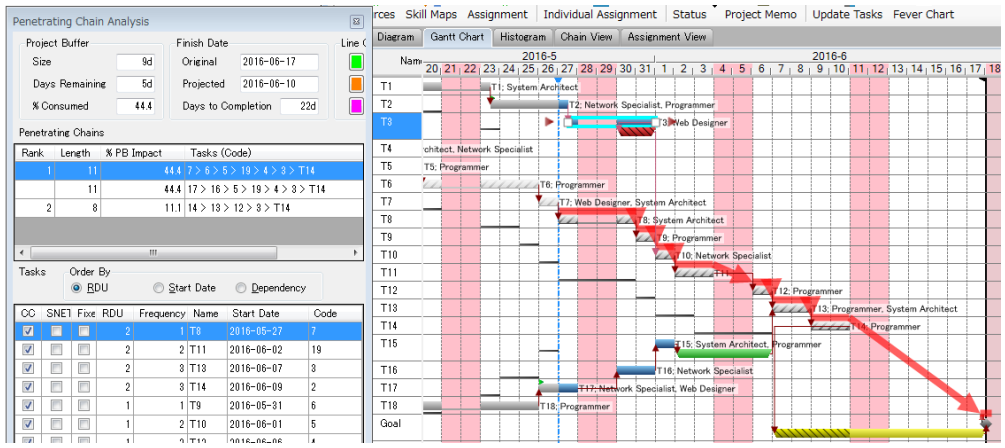


2) Execute the function. In this case, the result shows that the project buffers of some active projects will be consumed deeply and turned red, and we can reply to the client and can take required action according to the result.

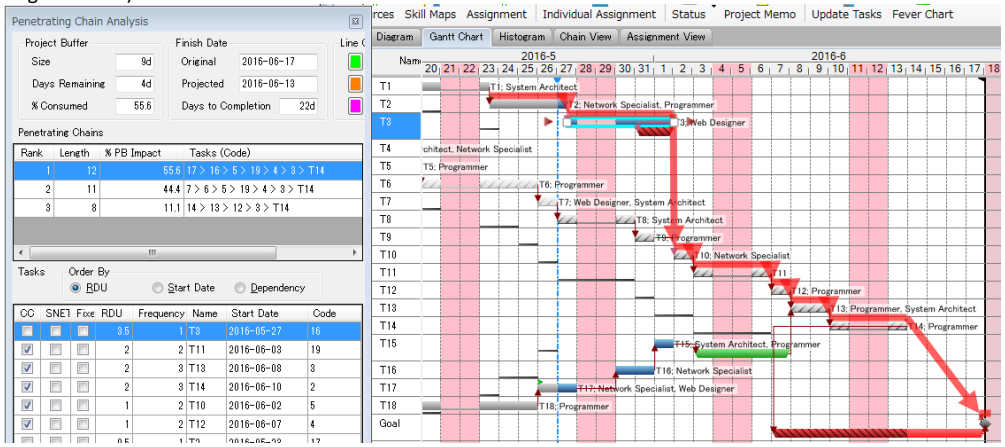
Recognizing delay impact on a project



BM3 also enables you to perform what-if analyses for projects when you need to consider making any changes in schedules. When there is a requirement for changing specifications, the impact on the project caused by the change needs to be recognized prior to replying to the client. BM3's Planner has a special analytical function for showing the longest resulting chain (consuming the project buffer most) which is referred to as "Penetrating Chain Analysis". The function allows you to recognize what happens if you make changes on the schedule by providing relevant numerical information and visual information according to the changes. Assume that you need to expand the duration of the task "T2". You can recognize if such an action will cause an impact on the project, and the magnitude of the impact, so that you might you mitigate the potential damage. This figure shows a scenario before the change is made. The chain which is currently causing the impact on the project buffer is highlighted by bold red allow lines.



This figure shows the scenario immediately after the duration of the task “T2” is expanded by 1.5 days. As you can see, the feeding buffer under the task is totally consumed but it doesn’t cause any impact on the project buffer, and the longest chain is still the same. This means the change would be acceptable in terms of the impact on the project buffer. But, in this case, you need to be careful since the function shows that the chain to which the task “T2” belongs will now be equal in length to the longest chain (this appears in the “Penetrating Chains” area in the dialog window. Now there are two chains ranked as number 1 of with a length of “11”).



This figure shows another scenario when you expand another 1 day after the change above, which means 2.5 days are added to the initial duration of the task. A new longest (most penetrating) chain emerges. In this case, the function displays the length of the new longest chain as “12” (1 day longer than the original one). The project buffer is reduced by 1 day, the percentage of buffer consumption is increased from “44.4” to “55.5”, and the color of the buffer turns from yellow to red. You can make an appropriate decision according to the result.

Part 2

CCPM Software requirements

Part 2 consists of a list of functionalities which VISTEM considers as

(1) important
(2) nice to have
(3) Would be good if there was an option to switch it off

This list has been gathered through our extensive experience in the field of managing projects using CCPM software and improving business performance. It needs to be noted that CCPM is not simply about which software tool is used it is also about focusing management attention as described in the book 'Projects that Flow' by Uwe Techt.

1) Does BeingManagement3 have the following important options/functionalities?

A simple calendar for all. Only hours per day are entered, no individual calendars per person.	Yes
Backward scheduling (alap): processes which are not linked are not moved to the front, they will be moved backwards	Yes
The critical chain is calculated automatically. Parameters such as reduction percentage and buffer percentage can be adjusted individually.	Yes
The project plan clearly indicates project buffers and feeding buffers.	Yes
It is clearly visible who is responsible for a process/task/project	Yes
Delegation of task management is possible, for example during planning phase resource manager	Yes
Tasklists are printable for each division, task team or skill (including the three variants described above in WIP reduction)	Yes
Simple daily feedback of the remaining duration of processes, tasklists and project plan are updated in real time or overnight.	Yes
Feedback is provided per process (task) not per skill within each process.	Yes
Feedback is not provided for processes (tasks) which have not started yet.	Yes
It is possible to simply enter reasons for delays/hold-ups from a pre-defined list including a fully editable text field.	Yes
Operational priorities are calculated automatically based on buffer consumption/project progress (as described above "Identifying tactical priorities")	Yes
The fever chart of the portfolio can display the history as well is able to capture and display the history of the current progress and buffer consumption every day, draw the fever curve based on the history LCC/BC values on weekly base, calculate current progress of feeding chains and feeding buffer consumption similar to LCC/BC but for feeding chains, show the current “most penetrating task” and show the current “most penetrating chain” within a list underneath the diagram of the fever chart.	Yes
Flow trend as well as Continuous Flow trend	Yes
Task completion rate	Yes
Project completion rate	Yes
Average throughput time	
Reliability (measured in flowrate throughput/Euro/days)	
List of processes (tasks) with the least buffer consumption progress during past 7 days	Yes
The Inter-project buffer is shown in % (very important!)	Yes
Automatic pipelining is possible: for example (default) Virtual Drum to the next available position when a delivery date is entered and manual adjusting is possible through pipeline manager.	Yes

The Pipeline manager has the option to explicitly "Start the project"	Yes
Milestone buffer: A buffer before a milestone with a fixed date. This milestone can be part of the critical chain, which means the project is unable to progress before this date. This milestone could also be outside of the critical chain, which means it is crucial that the fixed date of the milestone is met. If the time target is met before it is due the project continues.	Yes
Fast scenario (trade-off) decision preparation, "what if" scenarios and looking at consequences: For example a simulation which demonstrates what happens if user changes the priority of a project by means of a drag-and-drop functionality of moving projects. Option to accept new pipeline or go back to previous one. Further, a what if scenario if capacity of Virtual Drum will increase / decrease by X percent. Software does: Accept Increase / decrease of Virtual Drum Capacity, rearranges the other projects, shows warnings if required due dates cannot be met due to priority-change (part of the buffer which is behind the required due date will turn RED), offers the option to save / accept pipeline or going back to previous one.	Yes

2) Does BeingManagement3 have the following "nice to have" options/functionalities?

Access Management for Users/Roles - each role has its own default view (for example the task manager will see his own tasklist upon launching the software. The roles which would benefit from this: Task-, Project and Resource managers, Admin, each of them have different reading and/or viewing rights.	Yes
Export of all project data in a simple data format including all keys and foreign keys in order to easily import them into other databases or spreadsheets.	Yes
Skills (Virtual Drum as well) can be specified with a simple capacity entry (1, 2, 3 ... %) including person accountable.	Yes
The range of the feverchart colours are editable (red, yellow, green).	Yes
The planning tool has simple standard features, for example relationships/links must not be lost during planning and execution and are always shown visually.	Yes
Allocation of skills is possible, including the skill "Virtual Drum" or an alternative way to highlight the staggering phase for pipelining.	Yes
Error messages are displayed when syntactic errors occur for example when creating a project plan (plan logic errors, missing links, missing Task manager, skills etc.).	Yes
Conditions of Satisfaction (COS) are defined (original condition and terminating condition).	Yes
Each process has a field for notes but notes are not displayed in the tasklist.	Yes
Printable list of issues for each project including status with a ranking according to buffer consumption. With this feature the question is answered: Which three processes have used up the most buffer during the last 7 days.	Yes
Printable list of projects and tasks which are in the Virtual Drum simultaneously and a printable list of active tasks which are currently on the critical chain.	
Providing Feedback and how well this is executed can be analysed.	Yes
During planning the Virtual Drum is displayed in a differentiated way (Pipeline modus).	Yes
Teams and Skills can be selected in order to be displayed next/underneath the pipelining screen.	Yes
Skills are displayed according to workload/capacity in a range from top to bottom, the Virtual Drum is always on top.	Yes
Escalation, if remaining duration is not reported or if RDU trend is in wrong direction: Daily the task manager does the following: for each "in process" Task he has to give an estimation how many more days the task will need to be completed. If he gives "0", the task is completed, if he starts a new task, he has to give an estimation how many days the task will need to be completed, if a task needs more time than expected the task manager has to select a reason from a predefined list of reasons. There should be warning message to a pre-definable email address (the task managers line manager) if he does not report the remaining duration.	Yes

3) Does BeingManagement3 provide the option to switch off the following functionalities?

Individual calendars	Yes
Fixed duration tasks/projects which cannot be shortened will be considered partly in the buffer	Yes
Time recording	Yes

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