



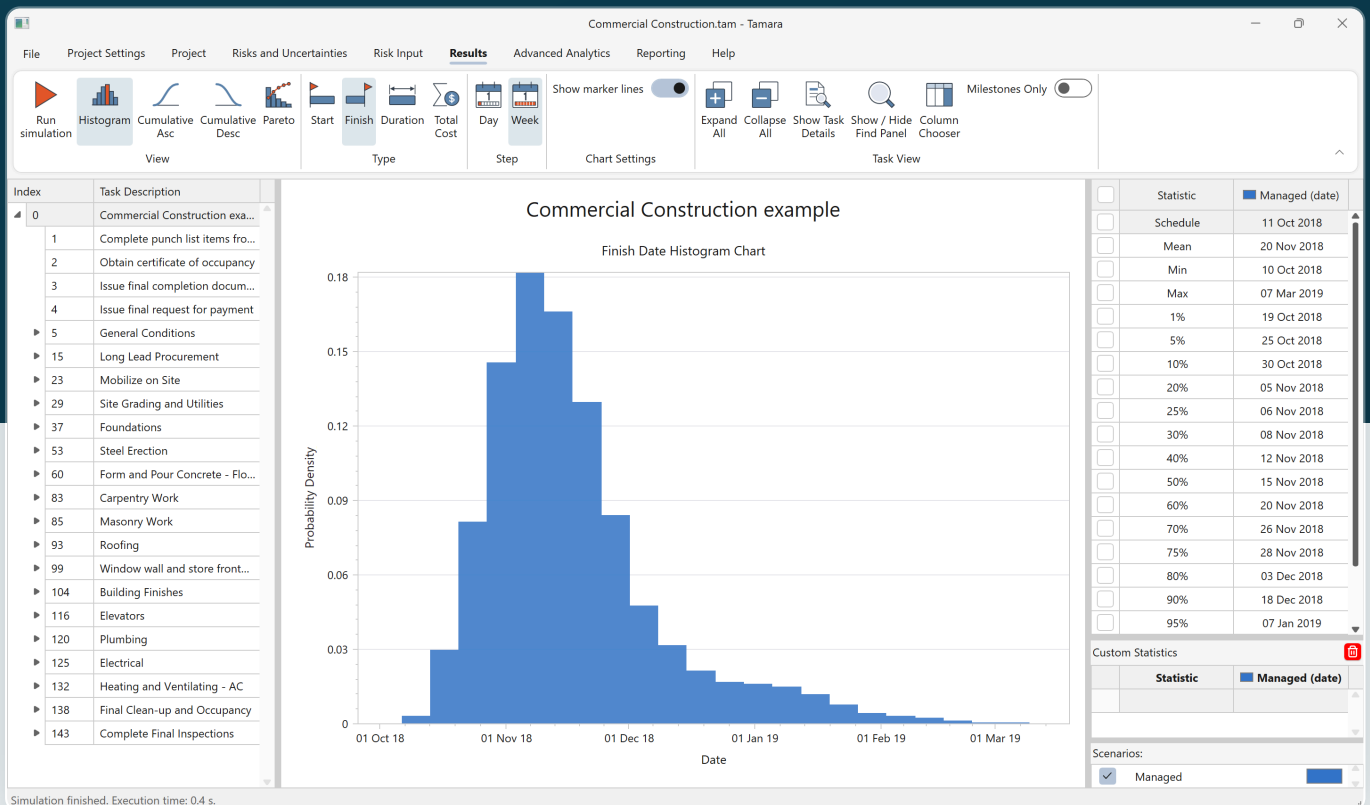
Tamara

Project cost and schedule risk analysis

PRODUCT BROCHURE

Know when your project will really finish

Tamara runs Monte Carlo simulation on the Primavera P6 or Microsoft Project schedule you already have. It shows how likely you are to meet a completion date or a budget, how much contingency you need, and which tasks and risks drive the answer.



Tamara's Commercial Construction example, simulated: fewer than 1 in 100 futures finish by the plan's date of 11 October 2018, and the average finish is 20 November 2018.

80,000

tasks in the largest real plans tested

< 5 min

for 10,000 iterations of a 40,000-task schedule

6 kinds

of risk event, including weather

15 days

free trial of the full product

One finish date hides the risk

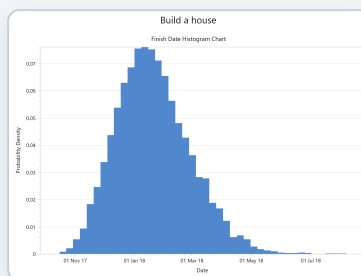
A schedule gives one finish date, and it assumes every task goes to plan and no risk happens. That date is usually too optimistic, and it can't show how likely it is to be missed. Tamara gives the range instead: the chance of making the plan's date, the date you can commit to with 80% confidence, the contingency that takes, and the tasks and risks behind it.

1 Your schedule gives one date

Index	Task Description	Task Start	Task Duration (days)	Task Finish
0	Build a house	11 Apr 16	400	23 Oct 17
1	Start		0	11 Apr 16
2	Purchase land	11 Apr 16	30	20 May 16
3	Complete architecture design	23 May 16	60	12 Aug 16
4	Obtain building permit	15 Aug 16	50	21 Oct 16
5	Select builder	24 Oct 16	10	04 Nov 16
6	Build house	07 Nov 16	250	20 Oct 17
7	Project completion		0	23 Oct 17

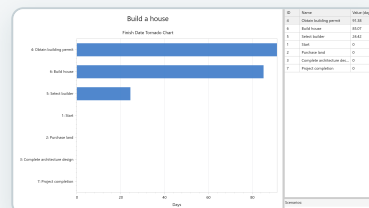
The Build a House example plans seven tasks to finish on **23 October 2017**. Tamara recalculates it thousands of times: in one simulated future the permit takes 67 days instead of 50, the build 268 instead of 250, and the house is ready on 20 December 2017.

2 Thousands of futures give the odds



Fewer than 1 in 100 simulated futures finish by the plan's date. On average the house is ready on 24 January 2018, and **75% of the futures by 16 February 2018**, almost four months after the plan.

3 And show what drives the date



Obtaining the building permit and building the house move the finish date most, then selecting the builder. They are the tasks to manage first.

From Tamara's Build a House example, Managed scenario (with the example's risk responses). The plan, the simulated future, the histogram, the statistics and the tornado are Tamara's own, with the example's dates. The months between the plan and the 75% date are the time contingency that date needs: the team sees the odds, and the tasks behind them, before it commits.

What Tamara gives you



A date you can promise

The chance of making the plan's date, the P50 and P80 dates of the project and every milestone, and the time contingency between the plan and the date you commit to.



Time and cost together

Fixed and variable costs, resource rates and the cost of risk events are simulated with the schedule, so a delay shows up in the budget too.



Effort where it changes the answer

The tornado ranks the tasks and risks behind the delay, so you know which estimates to firm up and which risks to manage first.



Your real plan, untouched

Tamara works on its own copy of the P6 or Microsoft Project schedule and never changes the original. One click brings in each update.



Risk events as well as ranges

Six kinds of risk event, including weather, as threats or opportunities, each with a chance or a frequency and an impact on time and cost.

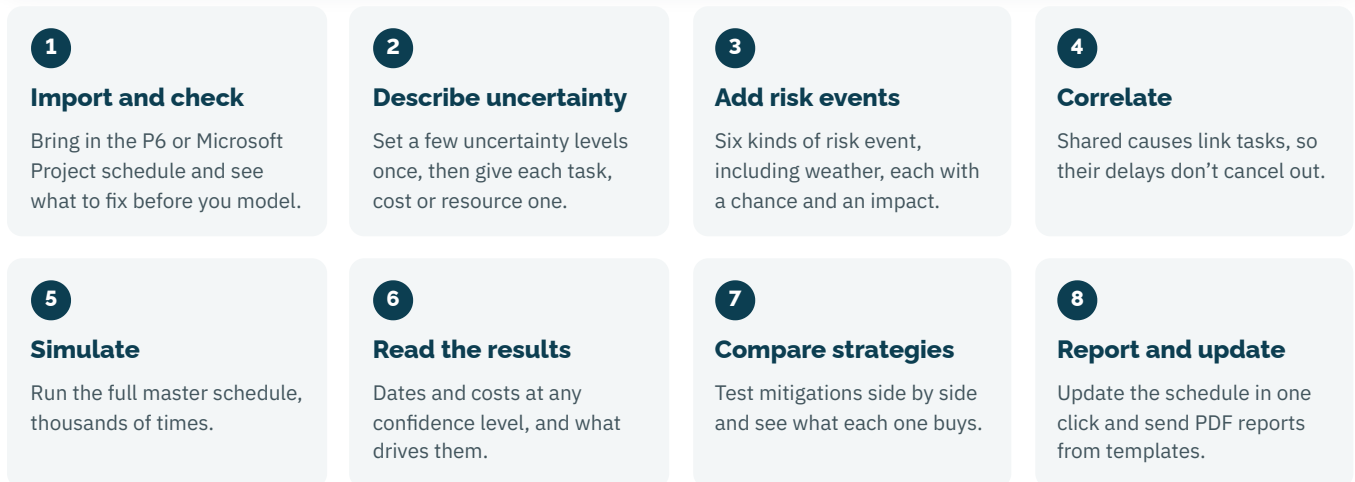
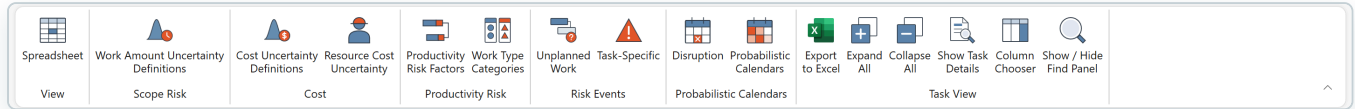


Mitigations you can justify

Compare scenarios on one chart, such as Unmanaged and Managed, to see what each mitigation buys for what it costs.

From your schedule to a date you can promise

Tamara is a desktop application for Windows. It turns the schedule your planners already keep into a risk model, in eight steps from importing the plan to sending the reports. Its Risk Input tab holds the risk tools.



SCHEDULES IN

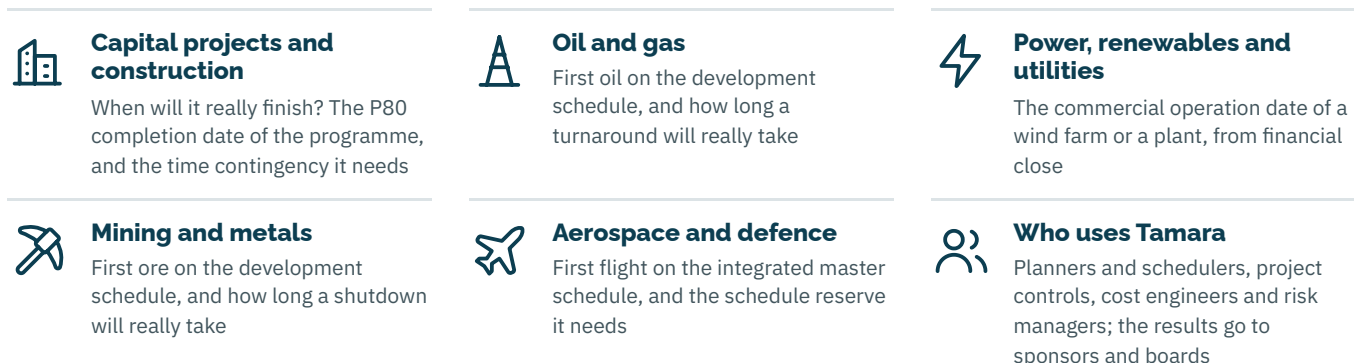


A schedule works out one finish date from one set of durations. Tamara gives each task a range and each risk a chance, recalculates the schedule thousands of times, and shows every finish date and cost the plan can produce, and how likely each one is.

Why the simulated finish comes out later than the plan: real durations tend to overrun by more than they underrun, a milestone that waits for several paths waits for the slowest one, and risk events that may happen are not in the plan at all.

Where teams use Tamara

Wherever a completion date or a budget rests on a project schedule.



The plan, its uncertainty and its risks

IMPORT AND CHECK

Start from the real plan, and check it first

Tamara reads your schedule from Primavera P6, Microsoft Project or Microsoft Planner Premium, including nested and inter-connected projects, so the analysis starts from the real plan. While importing, it runs a Schedule Audit: it checks that the schedule is suitable for Monte Carlo simulation and scores its quality against goals you can edit.

- Your original file is never changed: Tamara works on its own copy
- When the plan changes, one click updates the copy and keeps the risk data
- Primavera custom fields come in too, for filtering and grouping results

Schedule Audit Information

Note: Select File | File Info to review this information again.

Metric	Value	Goal
Monte Carlo suitability		
Number of tasks with hard constraints	0	0
Tasks with dates different from original	1	0
Number of summary tasks with a predecessor	0	0
Quality checks		
Fraction of tasks without at least one predecessor or successor	0%	<5%
Fraction of links with leads	0%	0%
Fraction of links with lags	=0.56%	<5%
Fraction of links that are not Finish-Start	0%	<10%
Fraction of tasks with base duration exceeding 10% of project base duration	=0.79%	0%
Fraction of tasks with less than 4 predecessors	=98.65%	≥90%
Fraction of tasks with float >40 working days	=10.14%	<5%
Fraction of tasks with duration >40 working days	=0.68%	<5%
Total links/total tasks ratio	=1.41	3

The Schedule Audit on import: green values meet the goal and red ones don't. Selecting a metric lists the tasks behind it.

General information										
Item Number	Description	Most Likely Duration (days)	W... H...	Start	Finish	% Compl...	Fixed Cost	Calendar	Probabilistic Calendars	Work Amount Uncertainty
0	Commercial Cons...	344	8	19/06/2017	11/10/2018	0	\$1,504k	Standard		
1	Complete punch...	10	8	25/09/2018	08/10/2018	0		Standard		Optimistic small
2	Obtain certificate...	2	8	09/10/2018	10/10/2018	0		Standard		Optimistic small
3	Issue final compl...	1	8	09/10/2018	09/10/2018	0		Standard		Optimistic small
4	Issue final reques...	1	8	11/10/2018	11/10/2018	0		Standard		Optimistic small
5	General Conditions	17	8	19/06/2017	11/07/2017	8		Standard		
6	Receive notice to...	3	8	19/06/2017	21/06/2017	46		Standard		Optimistic medium
7	Submit bond and...	2	8	22/06/2017	23/06/2017	0		Standard		Optimistic medium
8	Obtain building p...	4	8	22/06/2017	27/06/2017	0		Standard		Optimistic medium
9	Submit monthly r...	1	8	22/06/2017	22/06/2017	0		Standard		Optimistic medium
10	Prepare and sub...	2	8	26/06/2017	27/06/2017	0		Standard		Optimistic medium
11	Prepare and sub...	2	8	28/06/2017	29/06/2017	0		Standard		Optimistic medium

Type	Index	Name	Occurrence	Impact	Tasks	Use
Productivity Risk Factors (7) values of scenario Managed						
Productivity Risk Factor	PRF115	Labour	100%	-5% 0% 15%		X
Productivity Risk Factor	PRF110	Design	100%	-10% 0% 20%		X
Productivity Risk Factor	PRF117	Teamwork	20%	0% 5% 15%		X
Productivity Risk Factor	PRF118	Road site impact	30%	0% 10% 25%		X
Productivity Risk Factor	PRF119	Steel off	5%	0% 10% 20%		X
Productivity Risk Factor	PRF120	Road design	30%	0% 20% 40%		X
Productivity Risk Factor	PRF121	Client reduction	100%	-2% 0% 15%		X

The Risk Input grid gives each task a work amount level, such as Optimistic small; each productivity risk factor moves every task of the work types it affects.

DESCRIBE UNCERTAINTY

A few levels, not thousands of estimates

You don't type a three-point estimate into every task. You answer simple questions instead: how sure are we about the amount of work, how fast will this kind of work go, how firm is this cost or resource rate? Define a few levels once, give each task, cost or resource a level, and Tamara turns them into ranges.

- **Work amount:** how much work a task really holds
- **Productivity:** one factor per work type moves every task of that type
- **Expenses:** levels for the fixed and variable costs linked to tasks
- **Resources:** uncertain cost rates, multiplied by the simulated time each resource works

RISK EVENTS

Six kinds of risk event, including weather

Tamara models risk events separately from everyday uncertainty. Each has a chance or a frequency and a range of impact, and can be a threat or an opportunity. The six kinds were designed with a dozen project risk and planning experts, from real cases on their own projects.

- Delay to a task, repeated identical events, change in productivity, extra work (probabilistic branching), disruption and weather
- One risk can hit several tasks, with a cost as well as a delay
- Bring the risk register in from Pelican instead of re-typing it

Type	Index	Name	Occurrence	Impact	Tasks	Live
Task-Specific (6) values of scenario Managed						
Task-Specific	TSJ316	Archaeological find	10%	20; 30; 70 Cost 3000; 4000; 5000	1	X
Task-Specific	TSJ317	Crane malfunction	0.05	2; 5; 7 Cost 4000; 5000; 12000	2	X
Task-Specific	TSJ318	Roof protection blown away	10%	1; 3; 6 Cost 500; 800; 1500	1	X
Task-Specific	TSJ319	Clean-up delayed	20%	1; 5; 20	1	X
Task-Specific	TSJ320	Temporary water leaks	30%	0; 1; 5 Cost 250; 350; 600	1	X
Task-Specific	TSJ321	Electrician unavailable	10%	0; 1; 3	1	X

The Commercial Construction example's task-specific risks, each with a chance or a frequency, a delay range, a cost range and the tasks it hits.

Shared causes, speed and results

CORRELATION

Shared causes, so delays don't cancel out

Tasks often share causes: the same contractor, the same weather, the same approvals. If a model treats them as independent, their delays cancel out and the finish date looks more certain than it is. Tamara asks for the shared causes instead of correlation coefficients, and the correlation follows from them.

- A risk linked to several tasks delays all of them, or none
- A productivity factor shared by a work type moves all its tasks together
- No correlation matrix to fill in, on schedules of any size

Same fence, two ways to model it

- Ten independent sections
- Sections share a productivity factor

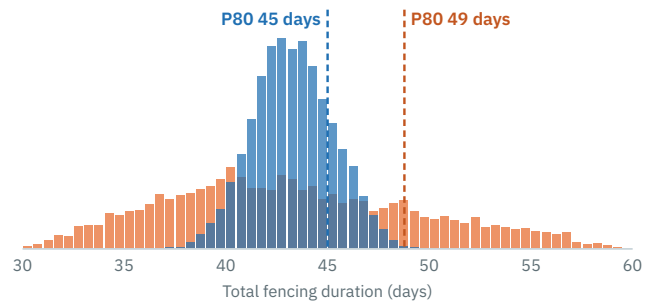


Illustration from the Tamara product page: ten fence sections of 3 to 6 days each, most likely 4, 5,000 iterations. Drawn independently, delays and early finishes cancel out; with one productivity factor for the crew, a slow crew is slow everywhere.

1k–10k

tasks in most
real schedules

< 5 min

10,000
iterations of a
40,000-task
schedule

80,000

tasks in the
largest real plans
tested

Times measured by Vose Software on real project plans.

SIMULATION

Run the master schedule itself

Tamara is fast enough to run the master schedule, so there is no cut-down copy to maintain. Most real schedules have between 1,000 and 10,000 tasks; a 40,000-task schedule runs 10,000 iterations in under five minutes.

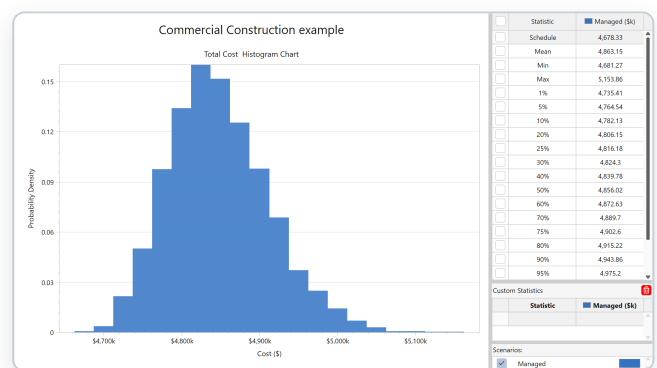
- 64-bit Monte Carlo simulation of the full schedule
- One run gives results for every task, summary and milestone, from a quick check to a full analysis

RESULTS

Dates and costs at any confidence level

Every task, summary and milestone gets results for its start, finish, duration and cost. Charts can show several scenarios at once, with a table of the date or cost at any confidence level.

- Read the P50 or P80 date straight from the statistics table
- Histogram, cumulative, Pareto and tornado charts, and critical path analysis
- Trend charts of spend over time, and of cost against finish date



The example's total cost: never as low as the plan's \$4.68M, and \$4.86M on average.

The Stochastic Gantt: when each task you tick is likely to finish

- Middle half of the futures (25th to 75th percentile), with the median in white
- 5th to 95th percentile
- The plan's finish, 11 Oct 2018

Archaeological excavation
median finish 11 Sep 2017

Foundations
median finish 16 Oct 2017

Whole project
median finish 15 Nov 2018



Drawn to scale from Tamara's chart data for its Commercial Construction example (Managed scenario), with December 2017 to September 2018 cut.

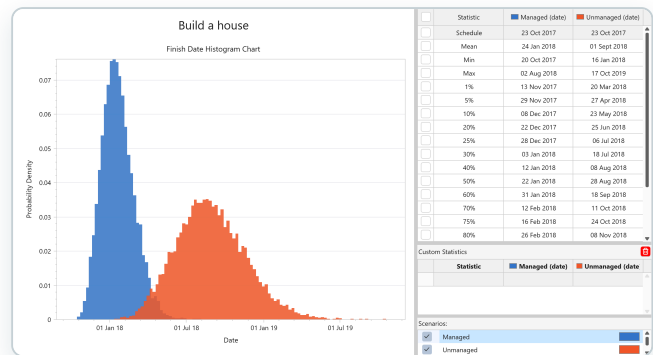
Strategies, reports and the wider picture

SCENARIOS

Compare strategies, and justify the spend

A scenario can switch risks on or off, change their chance or impact, or change a productivity factor. Compare scenarios on one chart to find the mitigations that buy the most certainty for the money, and to show why the others aren't worth it.

- Keep as many scenarios as you need, such as Unmanaged, Managed and Potential
- Results charts and reports can show several scenarios at once
- Each risk's chance, delay and cost can differ by scenario



The Build a House finish date, Managed (blue) against Unmanaged (orange): with the risk responses, 75% of the futures finish by 16 February 2018; without them, by 24 October 2018.

Schedule Audit Information			
Audit results Summary			
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Tasks with dates different from original	1	0	Page 2
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Fraction of links with lags	<0.56%	<5%	Page 3
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Fraction of tasks with base duration exceeding 10% of project base duration	≈0.79%	0%	Page 4
Fraction of tasks with less than 4 predecessors	≈98.65%	≥90%	Page 5
Fraction of tasks with float >40 working days	≈10.14%	<5%	Page 6
Fraction of tasks with duration >40 working days	≈0.68%	<5%	Page 7
Invalid uncertainties rejected during import	0	0	N/A
Total links/total tasks ratio	≈1.41	3	N/A
Additional Data			
Uncertainties imported successfully	0%	100%	N/A
Uncertainties skipped during import	0	0	N/A

A report in Tamara's print preview, ready to print or export to Excel or Word.

REPORTS AND UPDATES

Keep the analysis current

A risk model that must be rebuilt at every schedule update gets done once and then forgotten. Tamara keeps the risk data attached to the schedule, so an update takes one click, and reports come from templates you design once. From an updated schedule to reports in people's inboxes can take as little as a minute.

- Planners update the plan in P6 or Microsoft Project as usual; Tamara re-imports it and carries every risk and assignment across
- Templates for each audience, designed once in the Report Designer
- Reports come out as PDF; charts and data copy into Word, PowerPoint or Excel

BEYOND THE SCHEDULE

Model what the schedule leaves out

Not every cost sits in the master schedule, and not every risk fits a task. Tamara has a built-in spreadsheet with the ModelRisk modelling tools: 136 probability distributions, 34 time series models and 14 copulas.

- Input spreadsheet:** model durations, costs and risk sizes with any logic you need
- Output spreadsheet:** turn simulated dates and costs into delay damages, NPV or IRR
- Send each milestone's likely cost and date to Pelican's dashboards, and results as SID files to a wider ModelRisk model in Excel

OUTPUT SPREADSHEET: DELAY COST AND NPV, INSIDE TAMARA

	A	B	C
1	Contract handover date	19 Sep 2027	← From the plan
2	Simulated handover	12 Oct 2027	← Simulated by Tamara
3	Weeks late	3.3	=MAX(0, (B2-B1)/7)
4	Delay damages per week (€k)	52.4	=VosePERT(40, 50, 80)
5	Lost revenue per week (€k)	310.0	=VoseNormal(310, 40)
6	Cost of delay (€m)	1.20	=B3*(B4+B5)/1000
7	Project NPV (€m)	41.8	=NPV(...)-B6

Illustrative values. Each iteration takes the handover date from the schedule simulation; the ModelRisk functions add the uncertainty outside the plan.

Every Tamara feature

Everything here is included in every Tamara licence: one edition, with every feature. The trial is the full product, free for 15 days: scan the first code on the back page, and import your own P6 or Microsoft Project schedule.

AREA	WHAT'S INCLUDED	WHERE TO FIND IT IN TAMARA
Schedule import	Primavera P6, Microsoft Project and Microsoft Planner Premium, including nested and inter-connected projects and P6 custom fields. The original schedule is never changed.	File › Import Schedule
Schedule check	Schedule Audit on every import: Monte Carlo suitability and quality checks against goals you can edit, with the tasks behind each metric.	Project › Project schedule audit information
Plan updates	One-click update that keeps uncertainty, risks and assignments.	–
Duration uncertainty	Work amount levels, as a percentage or in units; productivity risk factors by work type.	Risk Input › Scope Risk, Productivity Risk
Cost uncertainty	Levels for fixed and variable costs; resource rates multiplied by the simulated working time.	Risk Input › Cost
Risk events	Six kinds, including weather; threats and opportunities; chance or frequency; time and cost impacts; your own categories.	Risk Input › Risk Events, Probabilistic Calendars
Correlation	Through shared risk events and productivity risk factors. No correlation matrix.	Risk Input › Productivity Risk › Work Type Categories
Simulation	64-bit Monte Carlo simulation of the full schedule, tested on real plans of up to 80,000 tasks.	Results › Run simulation
Scenarios	Switch risks on and off, change chances, impacts and productivity factors, and compare on one chart.	Project › Scenario
Results	Histogram, cumulative, Pareto and tornado charts for the start, finish, duration and cost of any task, summary or milestone; critical path analysis.	Results › View, Type; Advanced Analytics › Critical Path
Stochastic Gantt	Likely start and finish dates of the tasks you tick.	Advanced Analytics › Stochastic Gantt
Cost and cash flow	Total cost against finish date, and cumulative spend over time.	Advanced Analytics › Trend
Spreadsheet	Built-in input and output spreadsheets with the ModelRisk distributions, time series and copulas.	Risk Input › Spreadsheet; Reporting › Spreadsheet
Reports	Templates designed once and generated as PDF; charts and data copied into Word, PowerPoint or Excel.	Reporting › Report Designer
Integration	Risks in from Pelican and results back to its dashboards; SID files for ModelRisk.	Reporting › Save SID, Export SID to ModelRisk

Does Tamara change my P6 or Microsoft Project file?

No. Tamara keeps the risk model with its own copy of the imported schedule. Make logic changes in your scheduling tool, then update Tamara in one click, so there is only ever one version of the plan.

Moving from Primavera Risk Analysis?

A step-by-step guide shows how to rebuild a PRA model in Tamara on your current P6 schedule, at vosesoftware.com/Articles/Primavera-Risk-Analysis-Alternative.php

Do I need to know statistics?

No. You describe uncertainty with levels you name yourself, and risks with a chance and a range of impact. Tamara comes with example models, and the help has tutorials on good practice in schedule and cost risk analysis.

GET STARTED

Try Tamara on your own schedule

Import a schedule you are working on and see the date you can promise. Scan a code with your phone's camera to go straight there.



Download the free trial

The full product, free for 15 days.
Import your own P6 or Microsoft
Project schedule and see its P80 date.



Book a live demo

An online demo that a consultant
prepares around your projects and
what you would like to learn.

One price, every feature

Tamara is sold as an annual licence per user, with every feature in this brochure. Time and volume discounts lower the price, network licences for teams are available, and universities and students have an academic offer. Prices: vosesoftware.com/pricing.php.

About Vose Software

Vose Software makes risk analysis software, from Gent, Belgium. Its co-founder, the late David Vose, wrote *Risk Analysis: A Quantitative Guide*. Alongside Tamara, Vose makes ModelRisk for Monte Carlo simulation in Excel, ModelChoice for decision analysis in Excel, and Pelican for risk registers and enterprise risk management.

ORGANISATIONS THAT USE TAMARA



System requirements

WINDOWS

Windows 10 or 11, 64-bit

ALSO NEEDED

.NET 8 Runtime (64-bit)

MEMORY AND DISK

4 GB or more; 10 GB free,
SSD preferred

LICENCES

One computer, or shared
across a network

Tamara doesn't run on Mac OS or Parallels, but can be run on an Intel-based Mac using Boot Camp. Full details: vosesoftware.com/System-Requirements.php



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