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# The Benefits of Risk Assessment for Projects, Portfolios, and Businesses

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## Executive Overview

Assessing risk at the project, portfolio, and business levels helps you understand risk, make better decisions, negotiate fair contracts, create risk mitigation scenarios, and improve teamwork. This white paper shows how risk assessments lead to accurate plans that are less likely to lead to budget overruns or delays.

## Introduction

Some argue that optimistic planning is the main—or only—reason for project failure. After all, disappointment is usually the result of an inaccurate expectation. For projects, failure takes the form of budget overruns and missed deadlines. Using risk assessment techniques to obtain more-realistic estimates will result in a more attainable plan. Your project will then be more likely to meet its forecasts and avoid disappointment.

Risk assessment fully discloses the sensitivity of the project to its participants to ensure that all threats are fully understood. As a result, targets and contingencies can be set at correct levels, contracts can be negotiated with an accurate understanding of potential challenges, and risk mitigation strategies can also be created in advance. Risk assessment also improves teamwork by increasing openness, honesty, and understanding within the project team.

The benefits of risk assessment extend beyond a single project. Projects within a portfolio can be understood in terms of their interdependencies, shared resources, and ultimate goals. Projects can also be prioritized according to their risk level so risk can be balanced and managed across the portfolio.

By understanding risk to both individual projects and portfolios, management will be able to make better strategic decisions. Cost commitments, revenue pipelines, and profit

forecasts will be accurately stated for each level of risk. The sensitivity of the forecasts will be better understood. When informed by the risk assessment, the entire business will be more profitable.

“You tend to find that people will carry on compressing work, because they are afraid of failing. No one wants to say, ‘I can’t do it’. You can make anything fit on paper—it’s only when you come to do it that you realize it can’t be done.”

—Project Manager, Network Rail

## Why Do Projects Fail?

A project fails when the plan is not met. Failure means that a project exceeds the timeline, overspends the budget, or underperforms expectations. There are only two reasons why the plan is not met:

- **The plan is too optimistic.** Overly optimistic plans are very common. They arise when actions and costs are forced to meet predetermined targets. Underbidding, scale-to-fit, and political spin are also common causes.
- **External events have an impact on the plan.** Scope creep, insufficient resources, unanticipated work, and extraordinary events are some examples.

The two reasons are not entirely distinct. Indeed, it can be argued that optimistic plans are really the only reason for project failure. After all, external events should be considered in any plan; only optimistic plans ignore them.

## The Effects of Optimism and Parallelism

The simplest reason for overly optimistic plans is that the underlying assumptions are too positive. Optimism bias is a natural phenomenon, and it is often present when an individual or a group of people gives the estimate.

Parallelism in projects compounds risk, because parallel tasks exaggerate estimate optimism. This phenomenon is called “merge bias” or “nodal bias.” Merge bias is common when the project is deliberately scheduled with minimal float, a common planning technique. For example, the project in Figure 1 will be delayed if either one of the parallel tasks is delayed. The more parallelism, the more ways the project can slip. Even when there is no significant optimism—or significant parallelism to compound it—the most likely outcome of the project is rarely the scenario based on the most likely estimates. Using the most likely estimates in a plan usually gives a projected outcome that has a very low level of confidence. Using ranges actually gives a plan a higher chance of success.

## The Importance of Ranges

Estimates are expressed as ranges every day. For example, a person might say that he'll arrive in 5 to 10 minutes. Or someone might say she needs two to four items. Ranges reflect the speaker's best knowledge of reality.

A realistic plan also recognizes uncertainty and risk by expressing estimates as ranges. A deterministic plan gives single point estimates for task completion. Using ranges that provide two- or three-point estimates reflects the actual uncertainty and risk inherent in the plan. Range estimates can be provided for any element of the project—including durations, costs, resource rates, resource allocations, and even calendars. You can also add specific risk events to your plan. However, ranges should always be developed with the best knowledge available to the team. A lack of knowledge is reflected by a wide range.

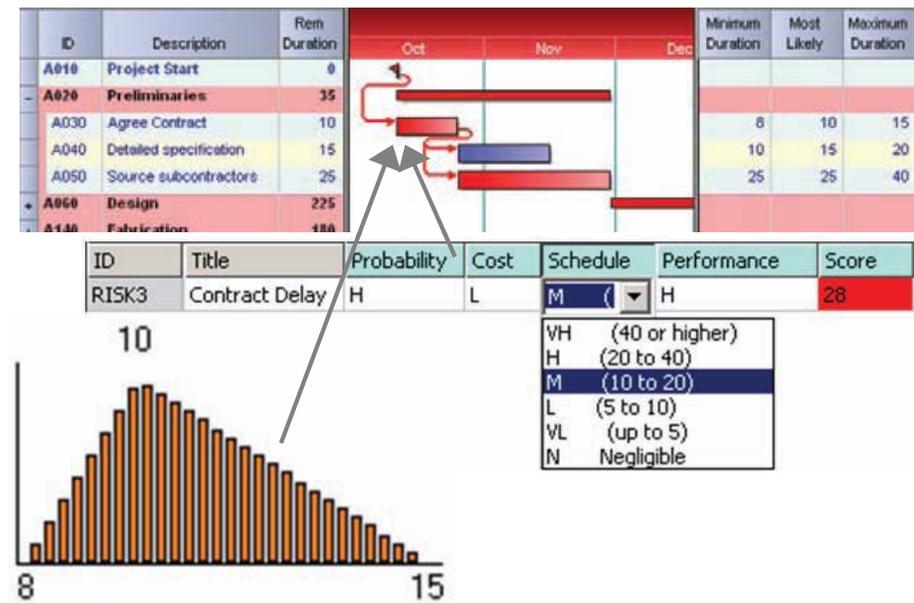


Figure 2. Give a range for each estimate in a plan, and add specific risk events where appropriate.

When the estimates for specific tasks within the project have ranges (two- or three-point estimates with some specific risk events), the projected outcomes also become ranges. For example, the project finish date is no longer a single date. Instead, it is now a range.

Seeing the ranges on the outcome enables you to understand the effect that risk has on your project estimates. In this way, every outcome of the project has a distribution—milestone dates, total costs, breakdown costs, and even resource overloads. You can provide forecasts honestly with an appropriate degree of confidence.

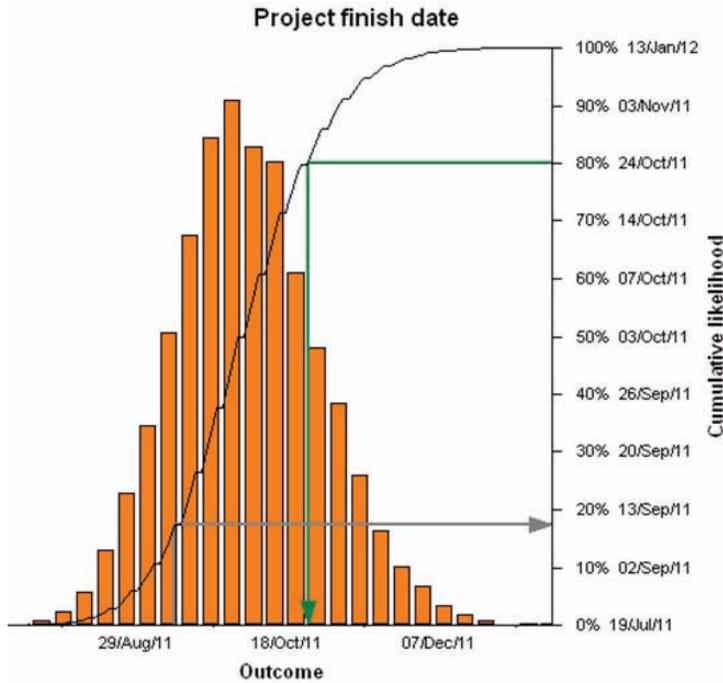


Figure 4. The outcome that is based on the most likely estimates usually has a very low confidence level.

The use of ranges can cascade through the company. Every element and outcome in the business as a whole also has a distribution—management reserve, performance targets, break-even points, long-term budgets, yields, and even shareholder value. Understanding the risk ranges helps improve overall business management.

## The Use of Sensitivity Calculations

The ability to understand the project’s sensitivity to estimates is a by-product of expressing estimates as ranges. Such sensitivity calculations are illustrated in tornado charts that show the sensitivity of the overall project to estimates on particular tasks as well as to specific risk events.

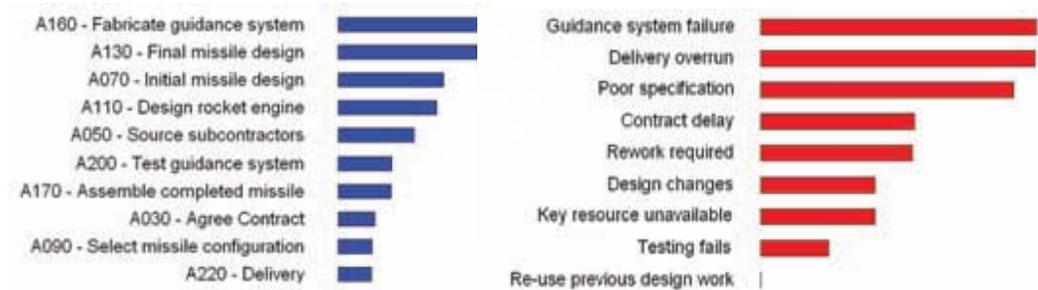


Figure 5. Some tasks contribute to the project uncertainty more than others. Similarly, some specific risk events contribute to project uncertainty more than others.

## The Impact of Risk Assessment on Projects, Portfolios, and Businesses

The preceding sections illustrated how assessing risk is as simple as expressing estimates as ranges. Using ranges leads to honest and realistic forecasts that can be given with a preferred level of confidence. The ranges you give as estimates reflect your best knowledge of the uncertainty of (or risk to) those estimates, and you can use them to understand the effect of that uncertainty on your forecasts. The following sections look at the benefits of risk assessment for a project, portfolio, and business.

### Benefits for a Project

Project contingency can make or break a project. Having too much contingency is uncompetitive; having too little contingency increases the chance of failure. Risk assessment—or allowing for uncertainty within estimates—helps set contingency levels, with a preferred level of risk, and gives the confidence level of outcome targets.

Contingency is often set at the task level, and it is common to add some contingency to every estimate. The amount of contingency added may even be a fixed amount—10 percent, for example. However, it is much better to set contingency at the project level. In other words, use the ranges on the task estimates to understand what contingency should be set for the project as a whole. Setting contingency at the project level reflects the reality that some tasks may be delayed whereas others may be completed on time or be finished early. The amount of management reserve can be set by the same principle—allowing drawdown against risks that were identified at the start of the project.

In addition to setting the right level of contingency, risk assessment also benefits the project team by giving it a forum for expressing concerns and for challenging or defending assumptions. Removing the restriction of having to work with deterministic (single-point) estimates allows team members to give open and honest opinions of what is likely to happen. A risk assessment workshop is an important—but often ignored—occasion for the project team to come together. It can lead to discussion and clarification of the scope of project tasks, and missing work is often identified. As a result of the workshop, the project team reaches an improved awareness and understanding of the status of the whole project. Although the cost and schedule disciplines for a project are often separate, it is important for these groups to confer with each other. A risk assessment workshop can bring these disciplines together.

ID	Title	Current Position (TimeNow = 12/Oct/06)					Target Position (Post-Mitigation)					Mitigation Cost
		Probability	Cost	Schedule	Performance	Score	Probability	Cost	Schedule	Performance	Score	
RISK2	Guidance System Failure	VL	VH	VH	VH	8	N	VH	VH	VH	0	£1,000,000
RISK3	Contract Delay	H	L	M	H	28	L	L	M	H	12	£1,500,000
RISK4	Key resource unavailable	H	L	L	VH	56	VL	L	L	L	1	£300,000
RISK5	Delivery overrun	M	N	H	N	20	L	N	L	N	3	£50,000
RISK6	Fabrication contractor goes...	N	M	M	M	0	N	M	M	M	0	£0
RISK7	Rework required for assem...	M	M	M	L	10	N	M	M	L	0	£200,000
RISK8	Missile testing fails	L	L	L	N	3	L	L	L	N	3	£0
RISK9	Position changes	M	M	M	N	14	M	M	M	N	14	£0

Figure 7. Risk mitigation strategies express where you are now, where you want to be, and the cost of getting there.

Risk assessments also enable risk response and mitigation strategies to be expressed. Cost/benefit analysis can be used to compare risk mitigation strategies and understand how effectively the money would be spent. When the cost of implementing the response is included in the comparison, it can show the net effect of the response on the project cost. The response can then be judged in terms of whether its net effect is to increase cost and whether that increase can be justified by the time it saves. Assessing risk mitigation strategies makes it possible to fully understand their effects.

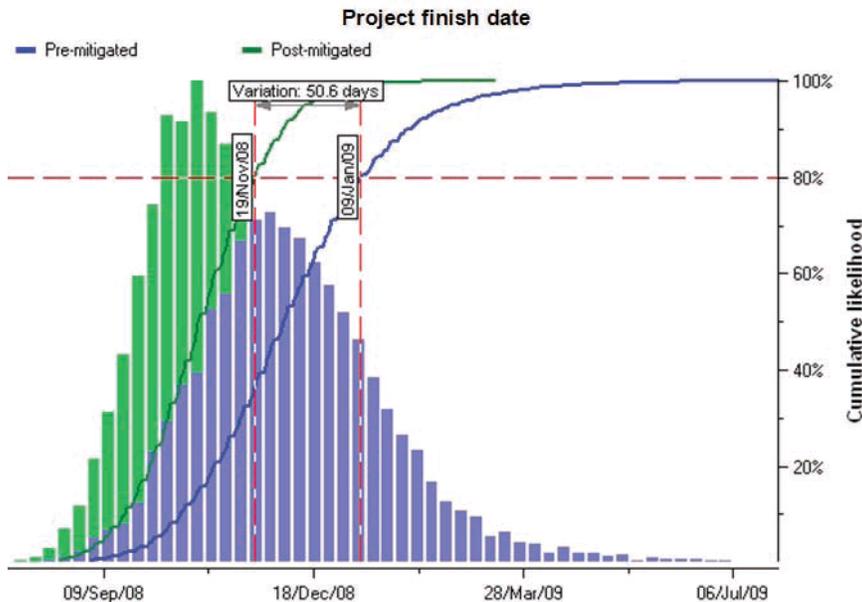


Figure 8. The proposed risk response illustrated in this graph appears to shorten the whole project by two months. However, this savings is not guaranteed.

Risk assessment enables contracts to be fairly negotiated, bids to be submitted at the right price, and sensitivity to be appreciated. In summary, risk assessment means that the project is better understood, can be better planned and managed, and can be more profitable.

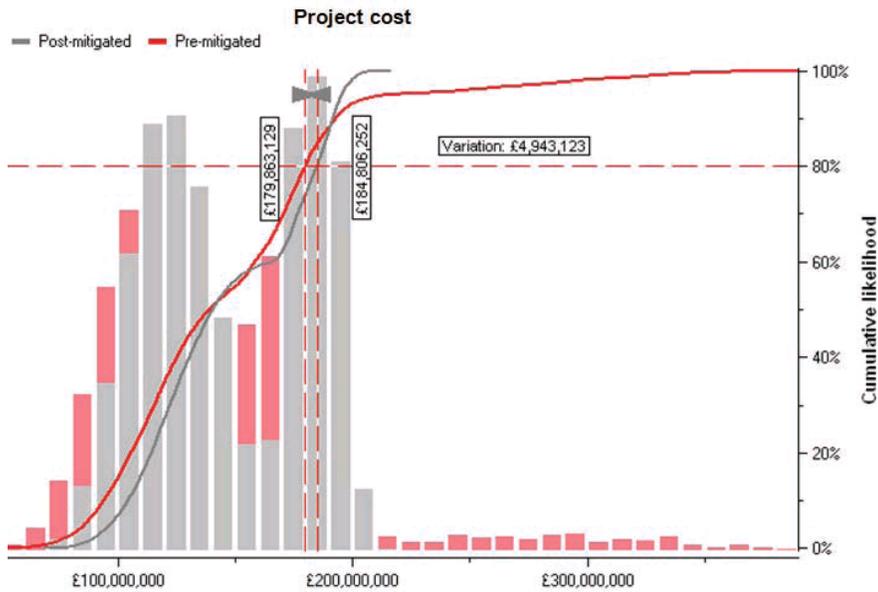


Figure 9. The target (postmitigation) curve includes the cost of implementing the response. The net effect may be to increase or reduce the project cost.

### Benefits for a Portfolio

Assessing the risk facing a group of projects leads to a better overall view of risk to the portfolio. Looking at the entire portfolio enables individual projects to be compared and understood in terms of their risk. This helps in selection of projects and focusing of management attention on the projects that most need it.



Figure 10. The extra colored bars show the individual project outcomes at various levels of confidence.

Contingency is best set at a portfolio level. Although not every project will suffer from risk, you know that some will, but you don't know which ones. Management reserves for the portfolio can be set and drawn down by adherence to the same principles as those discussed in the previous section.

Projects in a portfolio often have interdependencies, shared resources, and shared goals. In risk assessment, they need not be considered in isolation. At the portfolio level, it is important to express risk arising from project interdependency. Risk at the portfolio level can be shared and balanced across projects as a way of mitigating it.

In summary, risk assessment enables you to better understand and manage the portfolio as a whole. You can use the whole weight of the portfolio to manage the risk.

### Benefits for the Business

Risk assessment increases profitability. Contracts can be selected and priced at the right level of risk, and the business can be managed with risk fully understood. Specific risks can be negotiated, it can be made clear who bears them, and they can be built in to contracts.

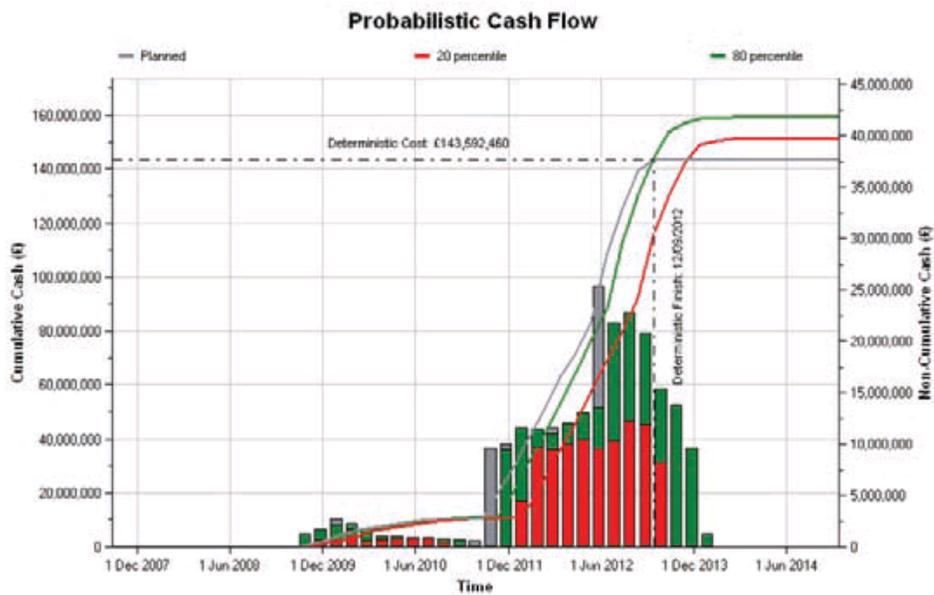


Figure 11. In some months, the deterministic (planned) budget may actually be significantly higher than what is realistically needed.

Cost commitments can also be understood and budgeted—with risk taken into account. Risk assessment can give cost commitment curves at preferred levels of confidence.

In addition, revenue estimates can be expressed as ranges, so revenue pipelines—as well as profit forecasts—can be understood. Investment decisions can be made at preferred levels of risk while taking into account all the best knowledge available.

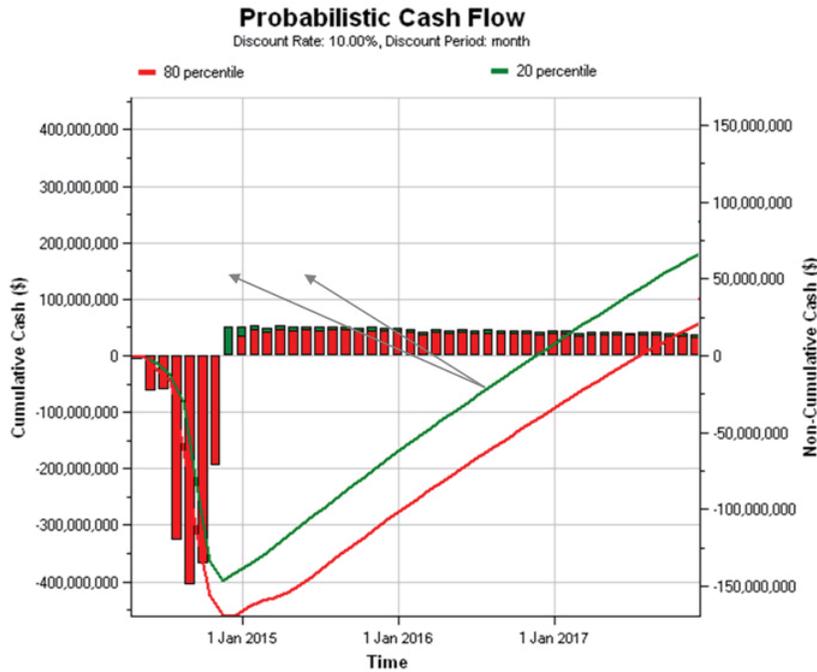


Figure 12. Using risk assessment on revenue as well as costs gives probabilistic break-even points. Also, note the use of a discount rate.

Besides an understanding of cost and revenue pipelines, business decisions also require an understanding of risk sensitivity. Risk assessments deliver such an understanding.



Figure 13. The sensitivity of a business can be understood at a very high level.

Your business can benefit from risk assessment by making better decisions based on accurate information. You benefit from realistic forecasting and an understanding of sensitivity, and you can make management decisions by taking into account the best current knowledge of the future.

In short, you can use the whole weight of the business to manage risk. You can choose where to share it and where to isolate it.

## Conclusion

In itself, the process of performing a risk assessment can give your project a greater chance of success. Assessments lead to the expression of outcomes as ranges, the development of risk mitigation plans, and the ability to set contingency. Oracle's Primavera Risk Analysis—a full-lifecycle risk analytics solution integrating cost and schedule risk management—is the tool that can deliver these results.

Primavera Risk Analysis provides a comprehensive means of determining confidence levels for project success, together with quick and easy techniques for determining contingency and risk response plans. It provides an objective view of required contingency to account for cost and schedule uncertainty. In addition, it can analyze the cost effectiveness of risk response plans. Combined, these form the basis of a risk-adjusted schedule, which is becoming the norm within the planning and scheduling process. With Primavera Risk Analysis, your projects, portfolio, and business can reap the benefits of risk assessments.

## About Oracle's Primavera Solutions

Oracle is the leading enterprise provider of project portfolio management solutions for project-intensive industries. Its Primavera project portfolio management software helps companies propose, prioritize, and select project investments and plan, manage, and control the most-complex projects and project portfolios.



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