

# Managing Risk and Uncertainty in Technical Projects: The LiquidPlanner Approach



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## SUMMARY

In technical projects uncertainty can be a project killer. Knowing how to find and mitigate risk is the job of every project manager, and when done well can lead to better designed and executed projects. This is especially true if you're a new or accidental project manager. But what is project risk, and how can project managers possibly identify every potential issue when planning a project?

This paper dives deeper into three root causes of project failures, and illustrates why the project and work management industry is in desperate need of a new way to manage projects, reduce risk and deliver on time and on budget. You will also learn how LiquidPlanner enables project teams to find and drive uncertainty from projects through automation, probabilistic planning, and real-time risk modeling.

## What is project risk and why should you care?

Picture this scenario: You are the director of engineering at a technology company. Your role is to be the conduit between the management team and the engineers tasked with turning company strategy into reality. Sounds simple, right?

It can be, if money, time and resources are no object.

But let's be realistic, even the largest, most profitable companies in the world don't have unlimited resources, or time to waste when it comes to delivering new products to market. In fact, for just about every company in the IT, manufacturing or technology space, speed is the new currency. In product terms, this means it's mission critical for a company to deliver great products faster than the competition, reducing the time it takes from concept to execution.

But we all know that projects are hard and fraught with hidden risks. Projects always require something new, be it creating new designs or new technologies or new processes, the very definition of the term project entails tackling the unknown. It's such an important topic that we recently wrote an [entire white paper](#) on the subject of tackling uncertainty in IT projects.

If you've ever managed a complex work project then you know that delivering on time and on-budget is always a challenge, even when the project is properly scoped and appropriately funded. But what are the three main causes of project failures and how can you avoid, mitigate or avoid them altogether?

## Why Projects Fail – Uncertainty and Outdated Methodologies

Research shows that the impact of failed projects cost the U.S. economy \$50B – \$150B<sup>1</sup> per year and projects typically fail between 5 and 15 percent of the time. Why? When we distill the multiple reasons into major categories, a few themes rise to the top:

- **Unclear direction.** The objective of the project was poorly defined, too aggressive or unrealistic.
- **Unexpected work.** The person, or team responsible for completing the project didn't foresee the amount of work necessary at the outset.
- **Unpredictable schedule.** People are bad at predicting the future, and it's not realistic for the project team to know when a project will finish before it starts!

1 <http://www.gallup.com/businessjournal/152429/cost-bad-project-management.aspx>

As we've discussed, project uncertainty is a constant in work today. It's futile to think that one can plan for every scenario at the outset, launch a project and never return to the planning phase. Instead project teams need to embrace agility, flexibility, automation and continual planning.

Instead of scheduling out the project just once, what's really needed to be successful include daily project check-ins, automated project tracking, advanced analytics, resource reporting and communication between the project team and project manager on a consistent basis. This is one reason why agile project management is quickly becoming the dominant way to plan, manage and complete technical projects.

But even if your team has a dedicated Scrum master and uses Agile, having a clear project direction at the start is vital to project success. Setting realistic expectations and project outcomes at the start of a project will also provide the necessary guardrails to deal with ad hoc work and resource changes during the project.

Fortunately new online project management tools make it easier than ever to set goals and track progress, collaborate with colleagues and analyze every facet of the project in real-time. These tools break with traditional project management methods and are re-writing the rules of project and work management.

## A New Way to Manage Projects Is Necessary

Despite an amazing array of technological innovation in every market sector over the past 30 years, little has changed in the world of project management theory since it was created in the early 1970s.

In a 2016 prediction [report](#), the project portfolio management (PPM) team at Gartner echoed this idea, noting that that in the age of digital transformation "many PPM capabilities, standard practices and toolsets are obsolete". Traditional methods of project management developed, taught and certified by professional organizations like the PMI institute, don't align well with the way distributed, digital and highly connected teams work today.

It's a shocking admission from one of the most respected technology research firms and it's one that should be heeded by project teams and business leaders carefully. In order to stay relevant and deliver cutting edge products faster than others, a new way to manage projects is needed.

Fortunately, there's a better way to manage, plan and schedule work that is fluid and representative of the way people want to work.

Unlike traditional project management tools that require project teams to plan work using the rigid and often inaccurate deterministic methodology, a new approach has emerged that helps teams accurately plan and schedule work when they don't know how long the work will take, or when it will be completed.

## A New Way to Work: The LiquidPlanner Approach

LiquidPlanner is unique in the way it develops and presents a schedule. First, the technology was created in 2007 in direct response to the notion that the way project teams manage work was fundamentally flawed.

While traditional methods, like deterministic management, require teams to arbitrarily guess at project duration and completion dates, LiquidPlanner helps teams plan, schedule, adjust and predict when projects will be completed even when duration and completion dates are unknown.

At the core of LiquidPlanner is a unique scheduling engine capable of predicting when an entire portfolio of projects will be completed based on a few key inputs:

- Estimating work effort duration
- Resource leveling across the entire portfolio
- Priority order
- Team availability and existing workload

## Priority Based Scheduling

Identifying and prioritizing project tasks based on the project requirements is the first component for estimating a project schedule. LiquidPlanner provides task prioritization functionality not only for a single project, but across an entire portfolio of projects. To prioritize work, teams simply place projects and tasks in the desired order and LiquidPlanner automatically converts that order into a priority list.

Filter	Owners	Remaining Effort	Timeline
ACTIVE PROJECTS	Nick	[ 1034h - 1162h ]	
Gamespace Pro II Launch for GameCenter Inc.	Zareen	[ 106h - 133h ]	
Build landing page	AlisonM	[ 5h - 15h ]	
Launch landing page	Greg [ Zareen ]	[ 8h - 10h ]	
Create banner ad for paid search	LizR [ Zareen, Nick ]	[ 10.5h - 20.5h ]	
Blog post: exciting new characters	Tatyana	[ 10h - 20h ]	
Obtain and review show requirements	AlisonM	[ 20h - 30h ]	
Vegas trade show submission in ASAP TASKS	Greg [ Zareen ]	[ 0h - 0h ]	
Order premium collateral	AlisonM	[ 4h - 8h ]	
Press Release	LizR, Zareen	[ 12.6h - 24.26h ]	
Payment screen	Adam	[ 2h - 15h ]	
Client Meeting	Zareen, Nick, Greg	[ 12h - 12h ]	

## Ranged Estimation: The Key to Unlocking Uncertainty

Once you have defined project priorities it's time to estimate the effort needed to complete each task and each project in the work stack. Unlike other tools, LiquidPlanner allows each team member assigned to a project to estimate the amount of work necessary to complete each task within the project. This is commonly referred to as best case/worst case planning, and while that is an accurate way of describing the process, each estimation forms the backbone of a set of probability distributions that are used to model change into the project plan.

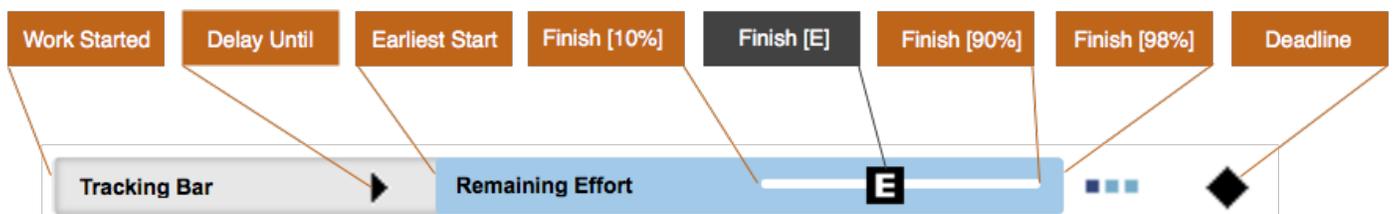
By using multiple point estimates (best case/worst case) to model change into the work schedule, it's much easier for teams to identify the impact of random changes on the plan throughout the duration of the project. In addition, this information, when coupled with priority order, existing workload distributions and resource availability predicts when work will be completed. LiquidPlanner also uses this information to queue up high priority work for everyone on the team.

## LiquidPlanner Schedule Bars

While generating ranges with statistical simulation, the LiquidPlanner scheduling engine tracks the number of occurrences for start and end dates to generate a schedule bar. The schedule bar consists of bars with different colors and symbols to show estimations with actuals for packages, projects, sub-folders and tasks. This schedule bar shows project status with the following symbols:

- **Delay until (Manual input):** Represents that a task will not start until a specific date, which is manually entered into the system.
- **Dependency (Manual input):** If a task has a dependency, the task will not start until the predecessor task is finished.
- **Earliest Start (Automatic calculation):** This represents the earliest date by which the project/task can start; in this example, the probability that the task will start on this date is 10%.
- **Start (not shown in the fig.) (Automatic calculation):** This is the most likely start date of a project/task and in this example the probability of occurrence is 50%. This is shown in the detailed view of the task.
- **Finish (Automatic calculation):** This is the earliest possible date to finish the task considering the best-case scenario, with a probability of occurrence being 10%.
- **Expected Finish – [E] (Automatic calculation):** This is the most likely finish date and the probability of occurrence is 50%.
- **Finish – [90%] (Automatic calculation):** This is the likely finish date considering the worst-case scenario, and probability of occurrence in 90%.

- **Finish – [98%] (Automatic calculation):** This is the date when the task/project is estimated to finish, and the probability of occurrence is 98%. This is the date that takes into consideration inherent uncertainties.
- **Deadline:** This represents the final target date and can be manually entered or inherited from packages in the project or portfolio hierarchy.
- **Interruption:** This example shows a gray shaded portion on the bar, which denotes the addition of an event. Events are automatically visualized in the project schedule.



Schedule based on remaining work estimates, priority, availability and dependencies ([Explain](#))

5h Logged   7h Remaining [E]   12h Total [E]   42% Complete

•	01/14/15	01/19/15	01/19/15	01/19/15	01/21/15
Delay Until	Start [E]	Finish [E]	Finish [90%]	Finish [98%]	Deadline

**Multiple Owners**

2 people assigned to work independently, finishes are 4.88 days apart

[E]xpected E

Marian E

Chris E

Trend: Remaining [E]

[Highlight Critical Path \(CP\)](#)

[Filter to Critical Path \(CP\)](#)

[Clear CP](#)   [Close](#)

Apart from these symbols, there is some significance to the color codes. A Dark Gray bar is for Packages, Dark Blue is for Projects, Light Gray is for sub-folders and Light Blue is for Tasks. A yellow icon flag will appear to the left of the task and in the project edit panel when the deadline is between the 90 and 98 percent deadline. In the case when a project is predicted to finish after the deadline, the entire schedule bar converts to red when the 90% Finish date or 50% Expected Finish date is after the deadline.



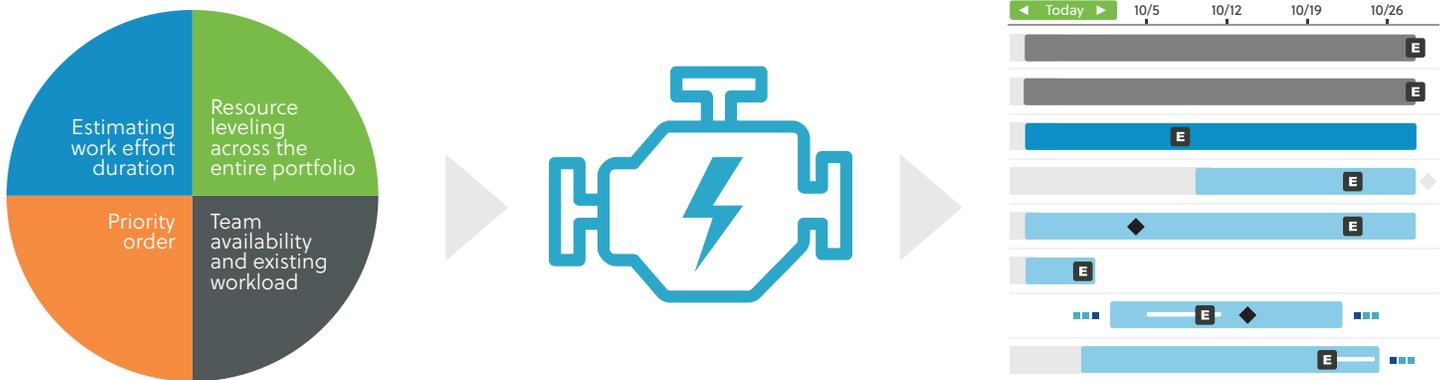
## Resource Leveling

To overcome the most common issues of under- and over-utilized human resources, the LiquidPlanner project scheduling engine creates a realistic view of resources across multiple projects. To prevent people from being over allocated, by default the LiquidPlanner scheduling engine considers the following criteria:

- People can only work a specific number of hours per day.
- Resources have limits on the number of projects they can work on at any one time. As such, LiquidPlanner can model working on more than one task per day via a Daily Limit feature.
- Resource will not work on holidays or any other defined event, like a vacation.

These criteria enable LiquidPlanner to create a work schedule that accurately mirrors the way people and teams work without over scheduling resources.

The resource-leveling feature is inherent within LiquidPlanner, meaning if there is any change in the calendar of a resource or any change in the task prioritization, the schedule is adjusted automatically considering the resource availability.



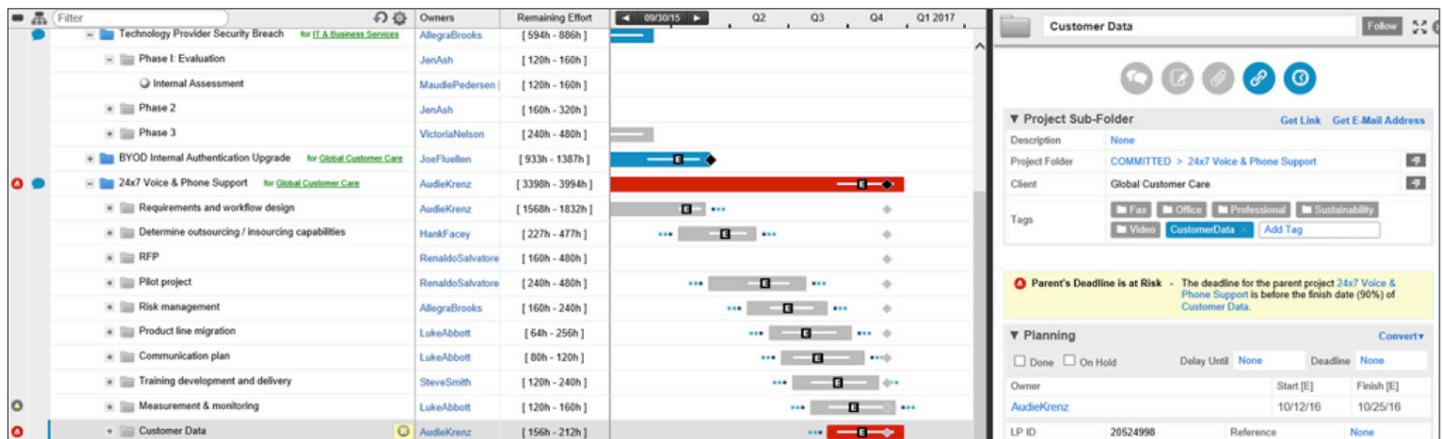
## Cross-Project Prioritization

Each project has its own priorities, so while working across multiple projects, tasks must be linked to many criteria. To overcome these dependencies and override the priorities, LiquidPlanner provides a feature that packages tasks from different projects to re-define the task priorities across projects. For example, if a task in the second project has to be performed before all the tasks in the first project, then you can define a package at the root of the workspace and drag-and-drop the higher priority task into it. This changes the task priority across different projects.



## Deadline Dates and Risk Alerts

A deadline date represents the target target date by which a certain task or project is to be finished. This is represented by a diamond symbol in the graph. This date doesn't have any effect on the task or project dates. This only drives alerts in advance when a certain task or project approaches the date. The alert created is in the form of red or yellow flame, and alerts the team that the project is in danger of finishing after the stated deadline.



## Realistic and Accurate Project Estimations

IT projects are particularly subject to frequent scope changes due to changing requirements. Some projects are also difficult in nature due to complex technologies. These elements introduce added uncertainties, so project managers need a scheduling tool that can plan buffer time and quantify risk management. In traditional project management, changing scope is often a major source of disruption, and typically leads to broken work schedules and lost productivity as the project team works to re-scope the project.

By using advanced statistical calculations to measure the impact of project changes, project managers can deal with changes quickly, see the impact of changes on the full project schedule, and clearly communicate to all stakeholders the impact of the scope change on every project. By automating change analysis, project managers can alter the dynamic between teams and clients, enabling a two-way conversation that helps set and manage expectations.

## Ensure Optimized Resource Utilization with No Overbooking

IT projects vary in nature. Most projects need resources with multiple skills and require effective resource management. Project managers must have clear visibility into resource allocation and availability. When allocating any resource to any task, managers must be able to easily visualize availability, and allocate resources accordingly to avoid overbooking.

LiquidPlanner ensures that project tasks are aligned correctly to the right resources while ensuring that individual teams or people are not overbooked.

When a change in resources does occur, LiquidPlanner automatically updates the project schedule to reflect the impact of any resource change. More importantly, the system helps project teams distribute work evenly among team members in order to maximize efficiency and ensure that everyone has the right amount of work.

## Reduce Manual Effort with Automatic Scheduling

When multiple projects are in play, project managers often have to adjust schedules manually to keep plans updated. This quickly becomes difficult and time consuming when handling multiple tasks over multiple projects. Once the project scheduling is complete, project managers can spend more time on project execution than on adjusting the schedule and keeping track of actuals.

LiquidPlanner's automatic re-scheduling feature keeps project plans up-to-date with very little effort. As the plan is updated by every member on the team, the software automatically re-forecasts the future of the project. Whenever there is any variance between plan and actual, the tool automatically recalculates the project and task dates.

LiquidPlanner is the world's only probabilistic and predictive project and work management software. LiquidPlanner enables anyone responsible for managing complex work to do so quickly and accurately. With LiquidPlanner, technology teams are able to automate project scheduling, collaborate with colleagues, run advanced analytics and reports accomplish great work.

LiquidPlanner is used by more than 2,000 business worldwide, including some of the most advanced technology, manufacturing, engineering, education, marketing and entertainment companies operating today. Companies like Redapt.com, InDinero, Cummins, Honeywell, Limeade, Vulcan, Inc. and others use LiquidPlanner to efficiently plan, track and manage their work.

**LiquidPlanner is available to try, free, for 14 days. To sign up for a trial [click here](#). To schedule a personalized demo with a LiquidPlanner professional, [click here](#).**

**For more information, and to learn more about how your business can benefit from LiquidPlanner visit [www.liquidplanner.com](http://www.liquidplanner.com).**