

Project Confidence User Guide



Version 1.1

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Document Release History

| Date | Version | Description |
|----------------------------------|-------------|--|
| 15 th October 2013 | Version 1.0 | First Release of the document |
| 1 st March 2014 | Version 1.1 | Updates to reflect additional features in Project Confidence 1.1 |

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Introduction

Congratulations! You have started to move from hoping to knowing. This user guide is divided into three parts; Part 1 is a guide installing and setting up **Project Confidence**, Part 2 gives an introduction to using Monte Carlo Methods and task Criticality Analysis with Project Plans and Part Three shows how to use **Project Confidence**.

Project Confidence is a powerful, yet simple to use risk management tool which analyses your project schedules to tell you;

- The possible dates your project plan will complete on
- How likely each of those dates really is
- How critical every task is in the plan

How it does it

Project Confidence^{TM1}, or **Confidence** for short, works by using a technique known as the Monte Carlo method. Monte Carlo techniques operate by generating or simulating a large number of possible outcomes, and for those outcomes calculate the probability of any one of those occurring. In the case of project schedules, Microsoft^{®2} Project[®] (MSP) plans, **Confidence** works by generating thousands of possible outcomes in order to evaluate the probability the outcomes (date on which the project ends) will occur. Combining these outcomes **Confidence** will analyse the results in order to report the possible dates the project will complete on, how likely each of those dates is and for every task tell you how critical that task is.

¹ Project Confidence and Confidence are trademarks of Lainstone Limited

² Microsoft, Project and Microsoft Project are registered trademarks of Microsoft Corporation

Part One – Setup and Installation

Installing

How you will install **Project Confidence** (**Confidence**, for short) depends on whether or not there is a previous version of **Confidence** installed on your computer (this included trial versions). If **Confidence** has never been installed on your computer then you should follow the *First time installation* process that follows. If there has been a previous installation then we recommend you follow the *Upgrade installation* process.

First time installation

This process should be followed for a first time installation. The steps are as follows;

1. Download you software and run the download package, the link to your software will be included with your order confirmation
2. When you run the installation, you may see various security questions depending upon your security settings. Accept these options and proceed.
3. Once you have installed the software you are also required to install a piece of software Microsoft, called the *ASP.NET and Windows Forms Chart Control*. This software is located at the following location: <http://www.microsoft.com/en-us/download/details.aspx?id=14422>³
4. You are good to go!

Upgrade installation

This process should be followed when there is an existing version of **Confidence** installed. The steps are as follows;

1. Remove the previous version of **Confidence**
 - a. In the control panel open
 - b. Select Programmes and Features
 - c. Select confidence
 - d. Select the uninstall button
 - e. Select “Yes” if asked to confirm you wish to uninstall the software.
 - f. Close Programmes and Features
 - g. Close the control panel
2. Download you software and run the download package, the link to your software will be included with your order confirmation
3. When you run the installation, you may see various security questions depending upon your security settings. Accept these options and proceed.
4. You are good to go!

On first starting *Project Confidence*

When you first run Project Confidence you will be prompted to either:

³ Further documentation can be found at

<http://www.microsoft.com/en-us/download/details.aspx?id=11001>

1. Visit www.lainstone.com to purchase an authorization code;
2. Begin a one month trial; or
3. Enter an authorization code, if you have already purchased one.

If you begin the one month trial **Project Confidence** will generate and enter the authorization code for you, this can only happen once.

If you have a code, click on the Enter authorization Code button, you will be prompted to enter the authorization code and then press the OK button.

You should then restart Microsoft Project (MSP).

Normal starting of Project Confidence

Normally, Project Confidence starts when you open MSP Project Confidence will start in the background ready for when you need it.

Microsoft Project 2007

In project 2007 Project confidence appears in the menu bar. Selecting the menu bar will cause you to see a drop down menu with three items;

- Run Simulation – This is the functional part of the Project Confidence Product
- About – Provides information about the version installed on your computer
- Enter Authorization Code – Where you can enter or change the authorisation code

Microsoft Project 2010 & 2013

In MS Project 2010 and MS Project 2013 Project Confidence appears on the Add In ribbon. Select the Add In ribbon by clicking on it. The following three options will appear;

- Run Simulation – This is the functional part of the Project Confidence Product
- About – Provides information about the version installed on your computer
- Enter Authorization Code – Where you can enter or change the authorisation code

Entering an authorization code

If you wish to enter a new, or change your authorisation code, you do this by selecting Enter Authorization Code from the Project Confidence Menu (MS Project 2007) or Project Confidence on the Add In ribbon (MS Project 2010 and 2013).

Part Two – Understanding Risk, Monte Carlo Methods and Criticality Analysis

You can never eliminate risk completely, we all know that. But how you approach project and plan management can be the difference between knowing about what is going to happen and hoping about what is going to happen.

Introduction

Project Confidence is a powerful and easy to use tool which applies the Monte Carlo Method to Microsoft Project Plans. It tells a project team when the project is going to complete and how critical every task is. Understanding the true criticality of every task allows for superior risk management. This paper describes what the Monte Carlo Method is, how it is critical for successful project management and how it should be used.

What is the Monte Carlo Method?

The Monte Carlo Method was developed in the late 1940's by Stanislaw Ulam and John Von Neumann at the world famous Los Alamos Laboratory⁴ in New Mexico and is a by-product of the Manhattan Project.

Monte Carlo Method, or to be more precise Methods are typically used to calculate of risk in business. Their predictions of failures, cost overruns and schedule overruns are routinely better than human intuition or alternative "soft" methods.⁵

Monte Carlo works by producing a very large number of simulations. This works very well for project management as it allows the process to capture the very large number of possible interactions between tasks because of their interdependencies. Something that is hard to do by other methods on all but the simplest plans. This large number of simulations produces a range of outputs. Of Analysing by aggregation of these results shows what the true probability of each outcome. This technique identifies all of the critical paths through the plan, and not just the single path the Microsoft Project will show. By seeing how often a task is on the critical path, every task can have its criticality rated, and therefore likely it is to cause delay. This means more precise fact based prioritisation can be achieved.

How to use the Monte Carlo Method.

Most Monte Carlo tools are both expensive to own and difficult to use. Confidence is different. To run a simulation you need only enter a few simple parameters. These are;

- What distribution to select?

⁴ Anderson, H.L. (1986). "Metropolis, Monte Carlo and the MANIAC". Los Alamos Science 14: 96–108.

⁵ Hubbard, Douglas (2009). The Failure of Risk Management: Why It's Broken and How to Fix It. John Wiley & Sons.

- What range of that distribution should be selected, called the left and right tail?
- How many iterations you wish to simulate, up to 100,000?
- Which task is the end task? You know this already!

Choosing the distribution

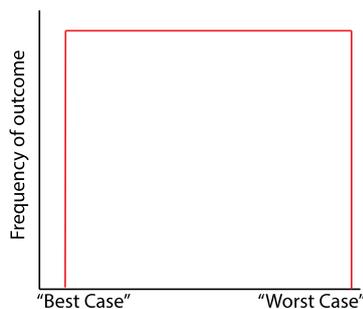
Based on the running of the project to date, on similar projects, or on your own expertise you can identify how individual tasks can vary in duration from their planned duration. Confidence offers four easy to use and easy to understand distributions. You just need to pick the one that you think is best suited to your project plan. The four types are;

- Square
- Normal
- Right sided triangle
- Left sided triangle
- Pyramid
- Double Pyramid

In all cases the range of changes in duration is considered. This is the range of differences between the planned and the actual duration.

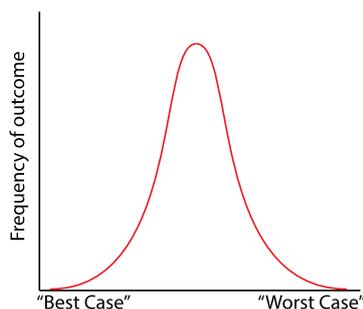
Square

The square distribution used where the outcomes are uniformly distributed. In other words, the duration of any given is as likely to be the “best case” as the “worst case” and any other value in between. The shape of such a distribution is as follows:



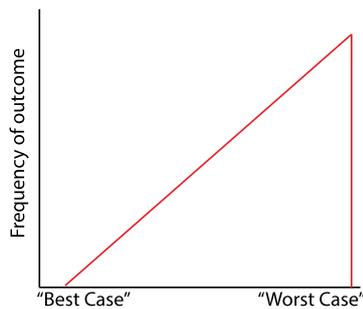
Normal

This type of distribution is used where most tasks will complete in a middle band between the “best” and “worst case” outcomes. This has been shown to often be the case. The shape of the distribution is as follows:



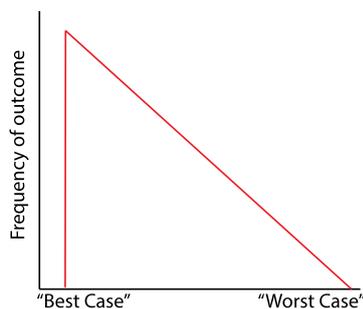
Right sided triangle

This type of distribution is used when activities are more likely to be towards the “worst case” end of the possible range of outcomes than the best case. The shape of this distribution is as follows:



Left handed triangle

This type of distribution is used when activities are more likely to be towards the “worst case” end of the possible range of outcomes than the “best case”. The shape of this distribution is as follows:



Pyramid

This type of outcome distribution is, as the name suggests shaped like a pyramid, with more outcomes in the middle of the range of possible outcomes.

Double Pyramid

This type of distribution is shaped as two pyramids with the mid-point, the best case and the worst case extremes having low frequency of outcomes and the other two areas having high frequency of outcomes. It is shaped like this;

Selecting the range for the distribution

Some tasks run exactly to plan and complete on time, others will complete early and others will complete late. Based on your experience of the plan, previous projects or on the experience of others working on the project it is fairly easy to say how early is any given task likely to complete. This is the left tail. A selection of say, 90, for the left tail says that the best you can realistically expect from a plan is that it will complete 10% early (100-10%). A value of 100 suggests that the best one can realistically hope for is for tasks to complete on time. 110 suggests that the best that can be hoped for is that every task will slip by at least 10%.

It is the same for the realistic worst case, the right tail. A value of 130 says that tasks can realistically be up to 30% late. A value of 145 says that they could be up to 45% late.

By late or early we are talking about a change in the duration of the task from its intended duration to its actual duration.

How many iterations to use

You need to make a simple trade-off decision here. Generally the more iterations the more accurate the results, so that suggests you want to use as many as possible. However, **Confidence** uses an algorithm that is part of a set known as numeric methods, and these are computationally intensive. That is, they can take time to run. If you want a quick, initial indication a number as low as 1000 iterations will give you a fairly good indication of what the true figures are. 10,000 generally gives good results. But sometimes you want to be very accurate and you can use a larger value. The confidence will give an estimation of how long the simulation should take.

Understanding the results of Monte Carlo Analysis

Project Confidence presents two sets of results. The first tells you for various degrees of confidence the date on which the end task will complete. The second is a task by task analysis rating the criticality of each.

Probability

Confidence tells you for each level of probability. Before you run a simulation, you identify the task that you wish to know the likely end dates for this is the *end task*. The end task can be any task in the MSP plan. **Confidence** runs through a series of simulations from which **Confidence** can report for each degree of confidence from 1%-99% and from 99% - 99.9% the date that the end task will finish by. For example, at an 80% confidence level the end task might complete by November 7th. That is to say there is a 4 out of 5 chance that the end task will finish on or before that date, or put another way, there is a 1 in five chance the end task will finish after that date. At a confidence level of 90% the finish date might be November 20th, that is to say there is a 9 out of 10 chance the end task will finish on or before that date.

Criticality

At any given point in time every plan will have a critical path. The critical path is the set of tasks which have the property that if they should extend their duration would impact the end date of the plan. At that moment in time these are the most important task in the project plan because these are the ones which if there is any negative movement they will impact the end task's end date. Knowing the critical path is therefore a key activity in the successful management of project delivery.

But, the critical path is dynamic, it changes. MSP plan shows the current critical path **Confidence** shows you all the critical paths. It does this by showing how often each task is likely to be on the critical path. This is called the *critical index*, it is a score or percentage from 0-100, which is the number of times the task appeared on the critical path divided by the number of times the critical path is calculated. A task with a score of 0 (zero) never appears on the critical path, and thus probably does not warrant much management attention. A task with a score of 100 is always on the critical path, and task with very high scores such as 80 or higher are the task in most need of

management attention. However even lower scoring task should be risk assessed. This criticality scoring is automatically performed by **Confidence** for every plan in the task. Not only that, it will record them right into your project plan so you can see, sort, filter and report them along with all of your other project data.

Part Three – Using *Project Confidence*

Start **Project Confidence** as described in Normal starting of Project Confidence on page 7.

Setting up a simulation

Select **Run Simulation** to set up a simulation run. The *Set up simulation* dialogue will appear. Here you select the parameters you wish to use for the simulation. There are five parameters you need to enter are;

- Distribution Shape
 - o Square distribution
 - o Left handed triangle distribution
 - o Right handed triangle distribution
 - o Normal distribution
- Left tail: the likely best case
- Right tail: the likely worst case
- Iterations: The number of iterations to be used in the simulations
- End task: The task that is the end task in the plan, and therefore the task that will be reported upon in the Probability report

Project Confidence 1.1 - Set up simulation

Distribution: Square

Square Normal Left Sided Triangle Right Sided Triangle Pyramid Double Pyramid

Left tail (Likely Best case) 100

Right tail (Likely worst case) 101

Iterations 1000

End task 1: Start milestone

Estimated simulation duration: 1 minutes

Run Simulation Cancel

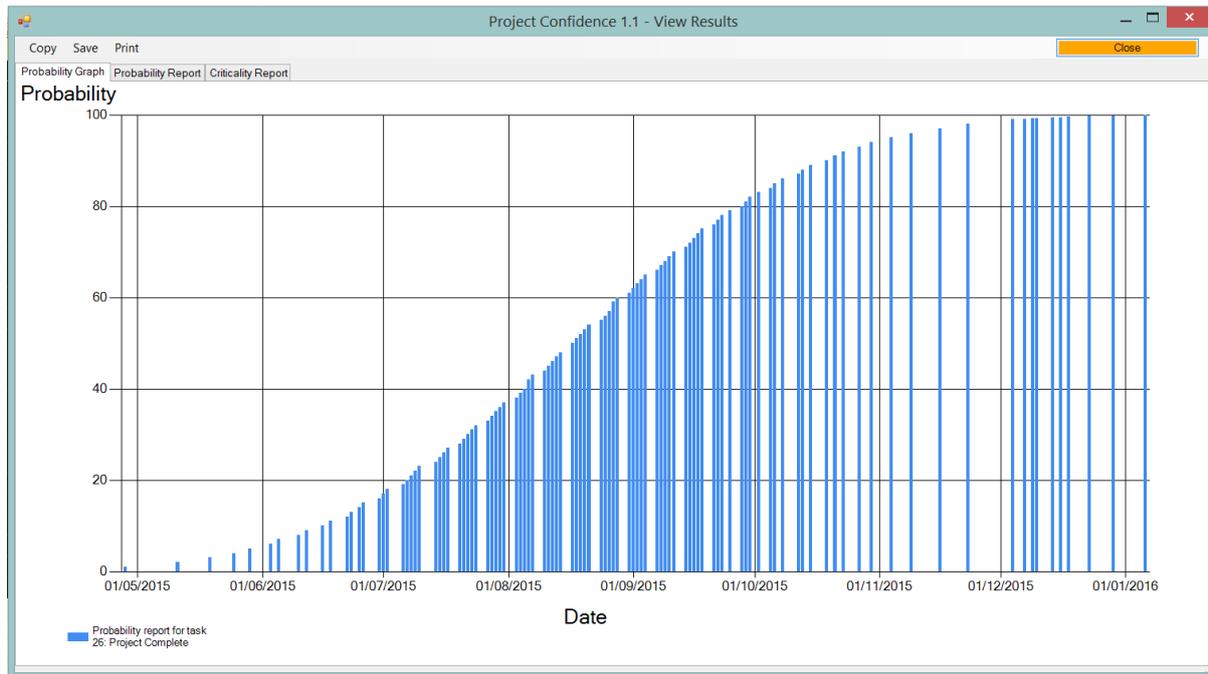
The setup simulation dialogue will update the Estimated simulation duration updates as you enter and change the iteration values. This is to give you an indication of the length of time the simulation will require.

Press the **Run Simulation** button in order to commence the simulation. Once the simulation is complete the View Results dialogue will open.

Using the View Results dialogue

The results of the simulation are presented in the View Results dialogue, which has three reporting tabs. Probability results are for the “end task” which was previously identified when the simulation parameters were entered. These results are presented as a graph and in the Probability Report.

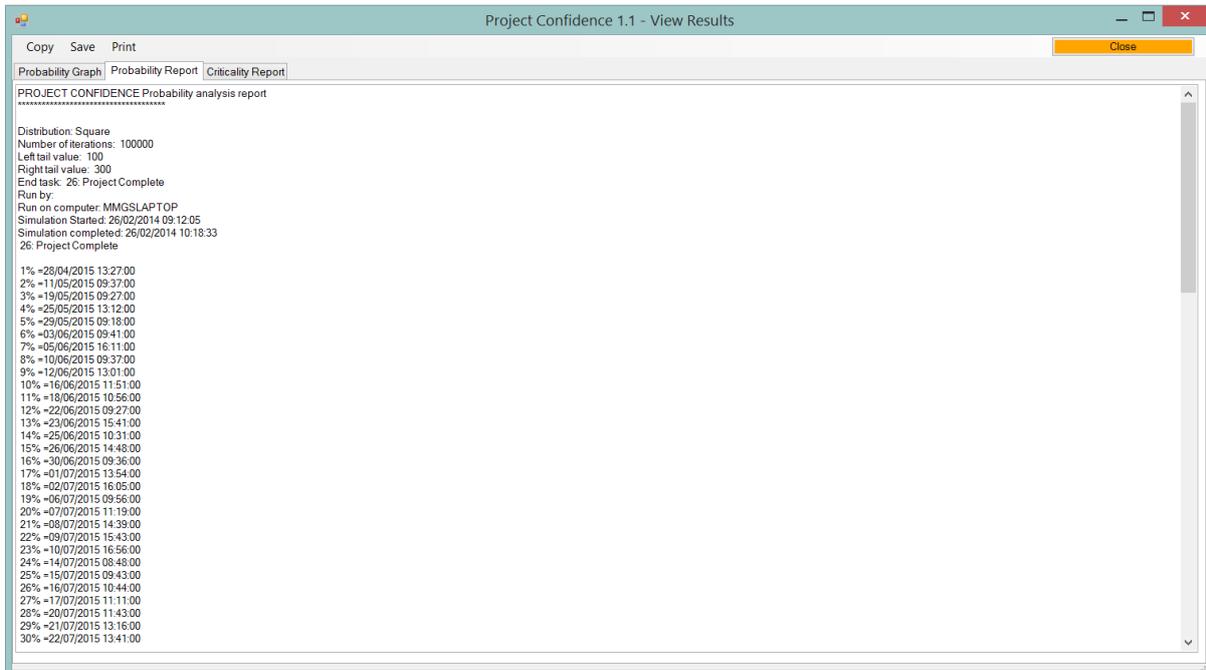
Probability Graph Tab



The graph tab shows for each confidence level 1% to 99% the corresponding date the end task will occur by. The higher the probability the later that date. This information is also shown in tabular form in the Probability Report Tab.

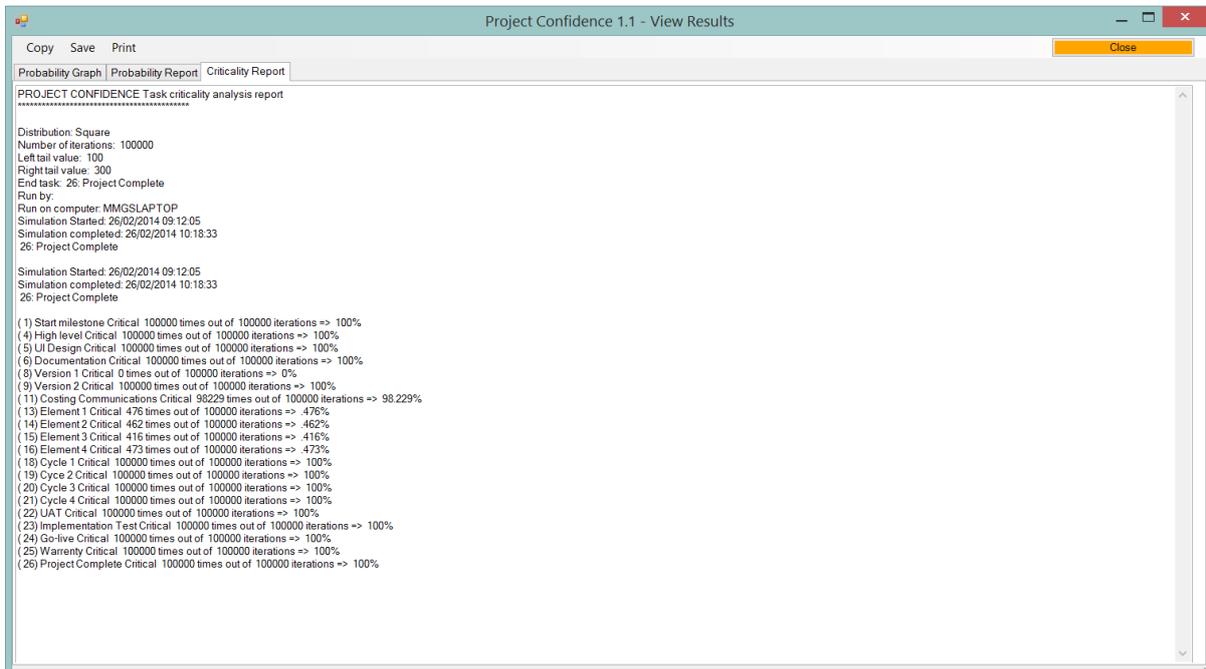
Probability Report Tab

This tab shows the end tasks completion dates for a series of given probabilities. These are 1% to 99% in 1% increments and from 99.1 % to 99.9% in 0.1% probabilities.



The Criticality Reporting Tab

The criticality index for every incomplete task in the plan is reported in the Criticality Report panel of the View Results dialogue. The criticality index is the percentage of times the task is likely to be on the critical path. In addition, every incomplete task has its criticality value written to a field in the plan also. This Number field is field Number 20 and can be shown and filtered in you plan using the **Insert Column** option in the Gant Chart view in MS Project.



Copying, Printing and Saving

The View Results Dialogue has a menu bar. There are three menus on the menu bar;

- Copy; From this menu you can copy the Probability Report or the Criticality report to the clipboard
- Save; From this menu you can save the Probability Chart, Probability Report or the Criticality Report to a file of your choosing; or
- Print; From this menu you can print the Probability Chart, Probability Report or the Criticality Report to a connected printer.

For more information about the *Project Confidence* visit our website www.lainstone.com, email us on info@lainstone.com.

Lainstone (UK) House
Guildford Road
Woking GU22 7UP

M: info@lainstone.com

