



PROCESS MODELLING & SIMULATION WITHIN THE ITIL® FRAMEWORK

CONSULTING HANDBOOK

**Release 1.0.0
April, 2005**

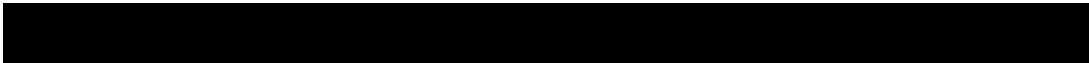
PROCESS MODELLING & SIMULATION WITHIN THE ITIL® FRAMEWORK Release 1.0.0.0

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Author: Bob Lamb, Director, Birchwood Solutions Limited.

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Preface

The *Process Modelling & Simulation within the ITIL® Framework* provides detailed descriptions of the approaches and a tools available to ITIL consultants in delivering successful IS Process Change through a simulated and costed approach. The *Process Modelling & Simulation within the ITIL® Framework* describes a set of organised approaches, which guide consultants through major projects in implementing the ITIL Framework (IT Service Management).

The material in this book includes a description of approaches and tools as well as guidelines for modelling and simulating major IS Service Management change.

This reference is part of Birchwood Solutions integrated approach to solution delivery.

Audience

This *Process Modelling & Simulation within the ITIL® Framework* is written for Lead Consultants, Team Leaders, and Project Managers. Consultants and Team Leaders use this reference in detail to provide approaches to Process Modelling and Simulation. Project Leaders use this reference as an overview to understand the nature of tasks in order to better manage their execution.

How the Manual is Organised

This handbook consists of the following chapters:

Introduction: The introduction presents an overview of what Process Modelling is actually all about, and how it is differentiated from the typical ‘drawing tools’ we tend to use during process redesign.

Pre-Requisites: This chapter looks at the pre-requisites required before you embark on your Process Modelling and Simulation – you simply don’t buy the software, load it onto your PC, and then let your imagination run-riot and start typing. This chapter explains why.

What is Modelling? This chapter highlights the difference between diagrams and models – this is a pivotal chapter in understanding the power of using this approach for initial implementation and continual service improvement.

The Business Perspective: As with any business improvement project, change has to be rooted in the business to help drive business benefits. Most process modelling tools cater for this, and this chapter describes the kinds of things you would expect in a model.

Process Modelling: Process Models provide the most effective way for visualising the ITIL processes performed within the IT Department. They provide a high-level picture of how work is actually performed and who is responsible

Workflow Modelling: Workflow takes the process models to the lowest level of detail into the actual steps performed and the data that flows between them.

Process Simulation: The timings aspect of a process's activities needs to be modelled to identify bottlenecks and reduce the overall cycle time. Service Management processes are not 'set in stone', and can be operationalised in many different ways – which is the best way? This chapter considers the comparison of different scenarios, enabling you to select the best solution for your organisation – effectively 'running' the processes that provides true to life data from a model.

Activity Based Costing: This chapter helps you to identify a truer picture of the costs incurred by an organisation by looking at the expenses of each of the activities that consume resources. We consider the actual points in a process where actual costs are incurred.

The Future: This chapter looks at the future of process modelling tools and explores the ideas behind 'off-the-shelf' ITIL based models currently being made available.

Conclusion: The final chapter discusses practical issues around the use of modelling tools – the benefits and burdens they provide as a tool, and part of an overall ITIL implementation

Appendices: The appendices include other sources of information.

It should be stressed right up front that this handbook provides an approach and a framework for performing Process Modelling and Simulation within the ITIL Framework. For this to be a success, the most important ingredient is missing – YOU!

If **YOU** do not have the experience in managing major programmes, and do not have the depth and experience of real Service Management, process improvement and organisational change, then unfortunately you are heading for a 'bumpy ride', and it is likely you will fail.

A technological solution (i.e. Process Modelling & Simulation) will not conjure up exciting new processes out of 'thin air', you have to have some knowledge of process modelling, a real understanding of where you are today, and a thorough understanding of where you want to be in the future.

How to Use This Manual

This *Process Modelling & Simulation within the ITIL Framework* provides the approach for planning and delivering major change, including guidelines and advice. Use this manual as a reference guide for planning activities and producing deliverables.

Sample deliverables included in this handbook, as well as extensive information, assist in communicating the process and setting expectations within your organisation. Where possible, examples are provided to aid the process.

All users of this reference should read the next section to better understand the conventions used in this manual.

Conventions Used in this Manual

We use several notational conventions to make this handbook easy to read.

Suggestions

We provide you with helpful suggestions throughout the handbook to help you get the most out of the material. We highlight these suggestions with an illuminated light bulb. Here is an example of a suggestion:



Suggestion: Always ensure that you meet/interview all attendees prior to the workshop.

Attention

We sometimes highlight especially important information or considerations to save you time or to simplify the task at hand. We mark such information with an attention graphic, as follows:

	Attention: Since all workshop activities build upon previous activities, all activity deliverables should be mounted on the workshop walls for all attendees to see.
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For More Information

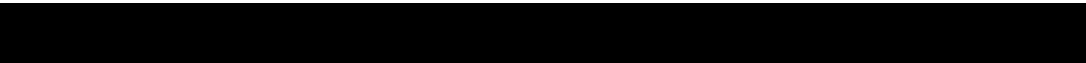
Throughout the handbook we alert you to additional information you may want to review. This may be a task section, appendix, or reference manual. We highlight these references with an easy-to-notice graphic. Here is an example:

	Reference: For more information about High-Level process design, see the Birchwood Solutions Handbook: <i>Process and Organisational redesign for ITIL</i> .
	Web site: You can find further information on Birchwood Solutions Limited Home Web Page http://www.Birchwood-Solutions.com/

References

When we refer to copyright protected material we quote the source as follows:

ITIL®	From page 47, Service Support published by OGC. ISBN 0-11-330015-8
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Introduction

This document is the fourth in a series of Handbooks that focus on the practical implementation of the ITIL Framework. ITIL represents Best Practice for IT Service Management, and a veritable library of documentation exists around ITIL, and they explain in great detail **WHAT** ITIL is all about, and **WHY** ITIL should be adopted.

Unfortunately, little has been written on **HOW** you actually implement ITIL. A multitude of consulting companies exist worldwide that can assist you in implementing the ITIL processes, and they of course use their own proprietary approaches and generally not available for use by anyone else.

As an IT manager wanting to implement Best Practice processes – well how do you actually start? You need some ideas, tools and techniques that you can apply to your specific implementation to give you a structure and an approach.

So, these series of Handbooks have been developed to help fill the gaps, and providing some approaches in order to undertake the **HOW** of ITIL.



Skills

The first things you need are some basic consulting skills – you are going to have to interact with people to gather information, create solutions, gain consensus etc. We know we all have some of these skills, and a number of books can be read to help in this area.

Birchwood Solutions, whenever appropriate used structured workshop approaches – enabling groups of people to work together and produce much better results quickly. Workshop & Consulting Skills Handbook was created to give ideas in this area.

	Reference: For further information on the Workshop & Consulting Skills Handbook, please look on the reference below:
	Web site: http://www.birchwood-solutions.com/handbook1.html

Costs

Before you embark upon implementing Best Practice it is absolutely essential that you understand the benefits it will bring, and if significant effort is required, then some form of quantification may be required in the form of a Cost Justification and a Business Case.

Cost Justifying the ITIL® Framework was published to help fill gaps in this area of Service Management. It gives some ideas on where to look when you are identifying cost-savings, making efficiencies or improving Quality of Service. It provides ways of quantifying these into hard currency. It shows you how to construct the Business Case, and above all has an approach to help you sell it through the system.

	Reference: For further information on the Cost Justifying the ITIL® Framework Handbook, please look on the reference below:
	Web site: http://www.birchwood-solutions.com/handbook2.html

Process Redesign

With your proposal approved, you are ready to begin work. Process and Organisational Redesign for ITIL was developed to describe a number of tools and techniques: techniques to develop 'high-level' approaches to designing processes and overlaying them over a physical organisation; other techniques for driving out the detailed procedures.

The Handbook also covers Organisational Change Management, an essential element of any successful project. It obviously covers Communications Plans, Training needs Analysis and looks at ways of helping employees adopt the new ITIL processes.

This Handbook provides everything necessary to design and agree the implementation of your ITIL implementation.

	Reference: For further information on the Process & Organisational Redesign for the ITIL® Framework Handbook, please look on the reference below:
	Web site: http://www.birchwood-solutions.com/handbook3.html

Model and Simulate

Until quite recently that was all you could do – implement the processes and using your experience, slowly but surely tailor the flows of information a little, adjust resources to fully support the workload, adjusting the processes over time.

Now, this is risky, because you cannot afford service implementation to slip, or for Quality of Service to be impacted. You need more assurance that the end-to-end processes actually work, and that you are convinced that the resources you have in place can cope with the workload, and the organisation you have.

But what if you could simulate the end-to-end processes and try out ‘what if’ scenarios, and perhaps use Activity Based Costing within the model, and identify costs associated to each process, and validate the business case?

Well, you can!

A number of process modelling and simulations tools, at a reasonable cost are now available, and can be used in modelling and simulation the ITIL Framework. An enormous boost to: quality, timeliness and accuracy for these kinds of projects.

This Handbook considers this approach. So a quick overview of what can be achieved with these tools.

One thing to remember throughout this book is that process modelling tools are designed to provide modelling capabilities and simulation options to the process you are looking at. There is a spin-off that the processes are entered into the model and can be used to print out hard copy or HTML as documentation – but their strengths are in the modelling and simulation.

Process modelling tools do not design processes for you – you still have to use your creativity and experience to design them.

The Process & Organisational Redesign for the ITIL® Framework discusses at length the relative merits of approaches to designing processes, and we won’t reiterate the arguments here however, in our opinion groups of people should be working together to initially create and document a process rather than a single person sat in front of a keyboard.

	Attention: Before you key information into a process model, you will have gone through a process of organising your processes and information flows, and have gathered the basic information around timings, activities and costs. You need a methodology to do this. In the absence of a standard methodology in your organisation, we would refer you to <i>The Process & Organisational Redesign for the ITIL® Framework</i>
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So before we move onto modelling, we need some documented processes to work from, and the next section summarises three approaches:

Documentation Tools

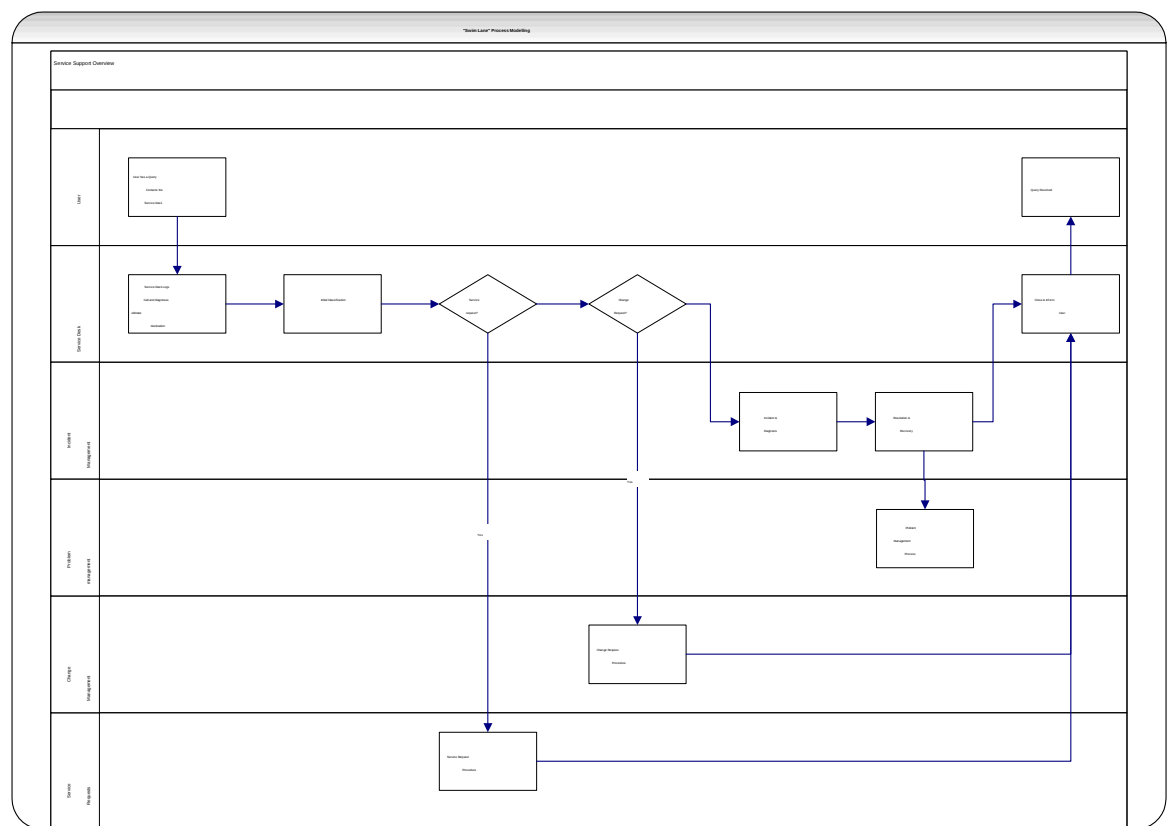
When designing processes we use a variety of different tools to capture our thoughts and our intentions. *The Process & Organisational Redesign for ITIL®* handbook describes a number of techniques for documenting processes:

- Flowcharting
- SeeMap®
- STAR

To refresh your memories, here are some examples:

Flowcharting

Here is an example of a flowchart, in this case a Visio diagram:

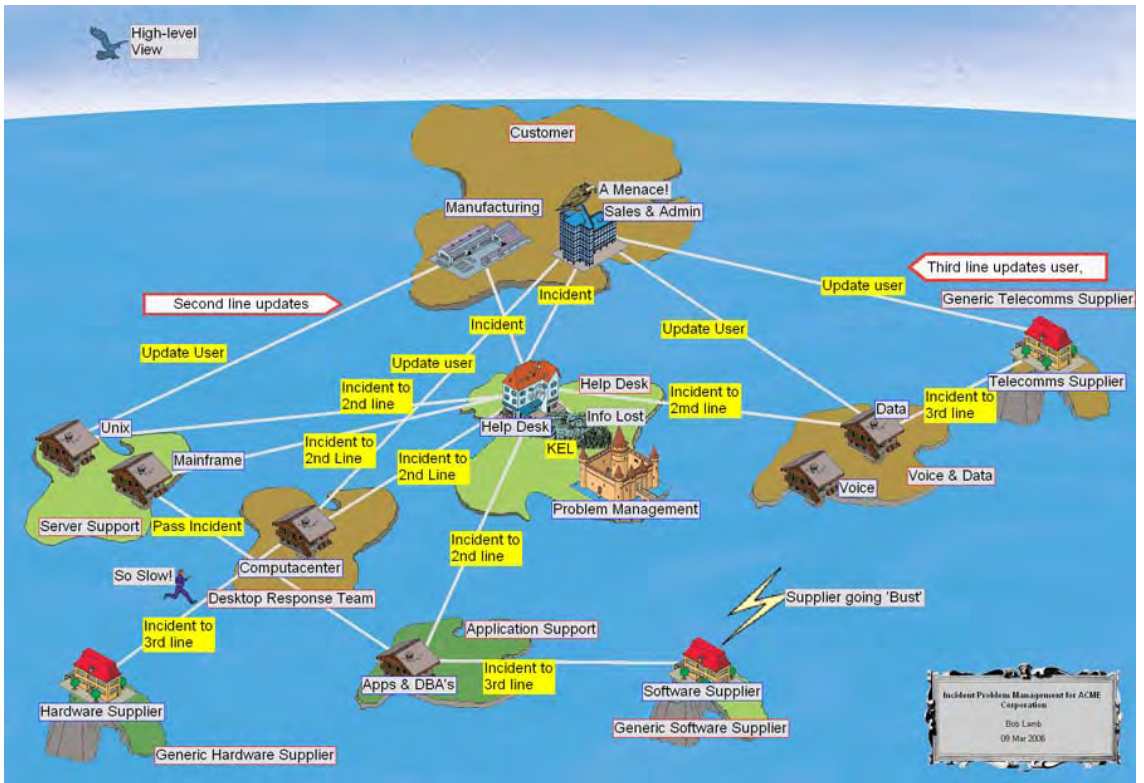


This is a standard computer based technique for showing a typical process, and in this case, we have overlaid them over a physical organisation (swim-lanes). It has its strengths: it enables a user to quickly describe a flowchart, print it, or include it in a report.

Everyone can understand the basic flowchart notation – a universal way of sharing how a process can work.

This is probably the final output having been transposed from some scribbled flip-charts created during a process design session

SeeMap® was designed for groups of people to work together to describe processes or organisations.

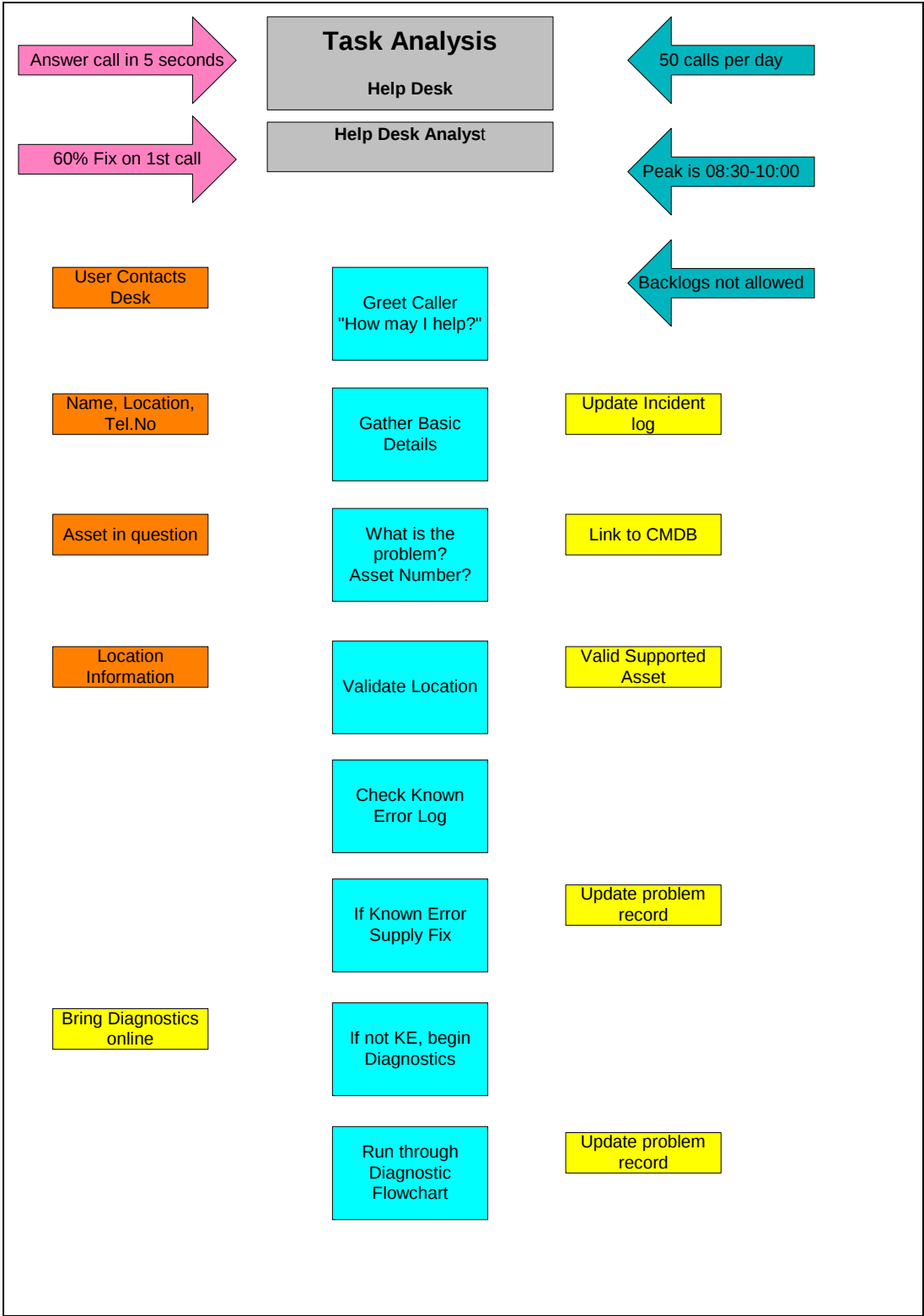


The output is highly visual – but once you understand the notations defined by the ‘map-makers’, again it is easily understandable.

Again, a simple approach to documenting and publishing a process. SeeMap® allows groups of people to work together building processes using pre-printed symbols that enable the rapid construction of processes and/or organisation.

STAR

Within STAR are a whole bunch of techniques, all based around Wall-Charting, the example below is a more detailed Task Analysis Chart of a Help Desk environment.



A group based approach for documenting detailed processes and the flow of information through the process all ready to be input into a modelling tool.

It is usually at this level of detail do we begin to gather information about timings and costs for each activity. This data will be essential when we begin to simulate our ITIL processes.

What is Missing?

Well, the answer to this depends upon what you are trying to achieve.

In the *Process & Organisational Redesign for ITIL®* handbook, it describes in some detail the kinds of approaches that you can use to develop and publish the ITIL processes, all overlaid on your physical organisation.

If your IS environment is simple, then the tools described ought to be enough to get you going, and certainly enough to get the basics in place.

But what if you are in a very complex environment? What if you have a large number of end-users raising significant numbers of Incidents or RFC's? Will your process models actually cope in the real world?

- What if you are introducing some new Service Management tools? How will this impact on resources, and eventually your costs – how will the workload be impacted?
- You have changed the way Problem Management work – will it still be the bottleneck it always was? Have your new processes helped?
- Have your new processes mitigated the documented risks within your IS environment?
- Have your new processes fully support your IS Strategies and Objectives?
- Do you have the correct level of staff to perform the envisaged workload

You see, when you simply document a process, whether it be Visio SeeMap® or STAR, you do not have sufficient detail to be able to answer all of the questions listed above. A document cannot make the relationships between Components, Deliverables, Costs, Goals, Locations, Opportunities and Problems – and then afterwards run a statistically sound simulation to show how it will all actually work, and prove that there are no bottlenecks, and the resources assigned to tasks can cope with the workload.

That is what Process Modelling & Simulation is all about!

Should you forget about *Process & Organisational redesign for ITIL®*? No, certainly not – these are the first activities you undertake in trying to achieve ITIL compliance – getting consensus with all interested parties and agreeing broadly how your processes will interact with your organisation, and this handbook is all about taking it a little further – and drive into much more detail.

So, onto Process Modelling and let us compare and contrast with what we have done so far.

Process Modelling Tools

Optimising Service Management processes requires a model of their business.

This model must represent the composition of Service Management and reflect the issues of timeliness, cost and quality. Its components must be able to be adjusted and the model analysed to examine the effect of changes.

Modelling allows the organisation to experiment with change, and succeed or fail before implementing change. This capability is key for organisations considering significant transformations such as implementing the ITIL Framework.

True IS improvement is driven by optimising the processes that the IS Department performs. A process (for example, Incident Management) represents how work gets done in the IS Department.

Rather than looking at the organisation vertically ('Stove-pipes' like Servers, Desktop, Networks, Development), the correct view of the business is taken horizontally, by analysing the business processes that flow across 'stove-pipe' boundaries.

By nature, a business process is initiated by an event (for example, a call to the Service Desk submitting an RFC), consumes resources, performs activities, and produces a service to the End-User.

The event component of the process allows for the analysis of timeliness issues. The resources consumed allows for the analysis of associated costs.

So, what is the real difference between Process Modelling & Simulation as opposed to simply documenting the processes?

Well, in the next few pages we shall consider the main differences to give you a 'taster' of the subject and the rest of the book delves more deeply into some of the theory and practicalities of these activities.

We shall be covering:

- Workflow Modelling – Process models provide the most effective method for visualising the ITIL processes performed in the IT Department. They provide a picture of how work is accomplished and who is responsible.
- Process Timing – The durational aspects of a process's activities are modelled to identify bottlenecks and reduce the overall duration of a process.
- Activity-based Costing – A truer picture of the costs incurred by an organisation is given by attributing expenses to the activities that consume resources. Activity-Based Costing (ABC) provides an approach for analysing the actual points in a process where costs are incurred.
- Process Scenarios – Business processes by nature do not follow the same path each time they are performed. Differing paths through a process are identified to compare alternatives.
- Simulation – Once a process is modelled, the individual process scenarios can be "run". This dynamic view of a process provides true to life data from a model.
- Process Analysis – Simulation results are examined to identify opportunities to improve productivity, decrease response time, lower costs, etc.

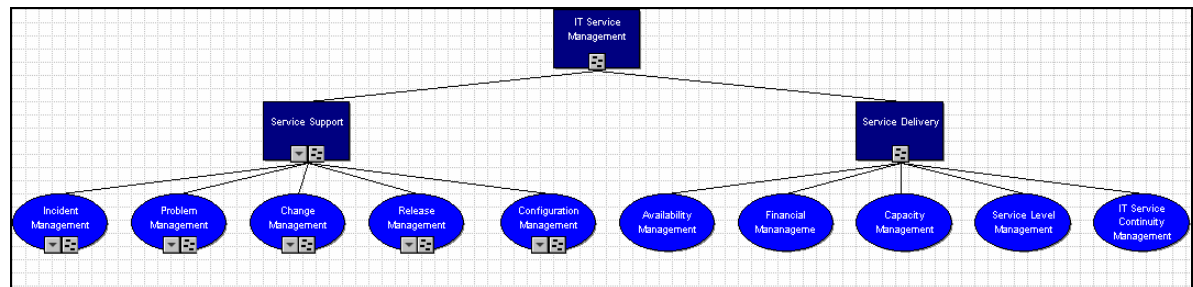
Birchwood Solutions make use of Proforma's process modelling tool: ProVision, and the 'screen-prints' used in this handbook are all taken from ProVision – however, most good modelling tools provide these kinds of capabilities – even though they may look visually different, the approach described here should be common to all.

	Web site: Proforma Corporation and it's Process Modelling Tool: ProVision can be found on the following website: http://www.proformacorp.com
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The appendices of the handbook lists other popular process modelling tools along with links to their respective corporate web-sites.

Workflow Modelling

A process is a series of activities designed to produce a service or major IS deliverable. Business processes are thought of as a customer's view of the business because many of them start and/or end with end-user interaction.



Most modelling tools begin with the creation of a top-down process model that represents the process, sub-process and activities, and how they relate to each other.

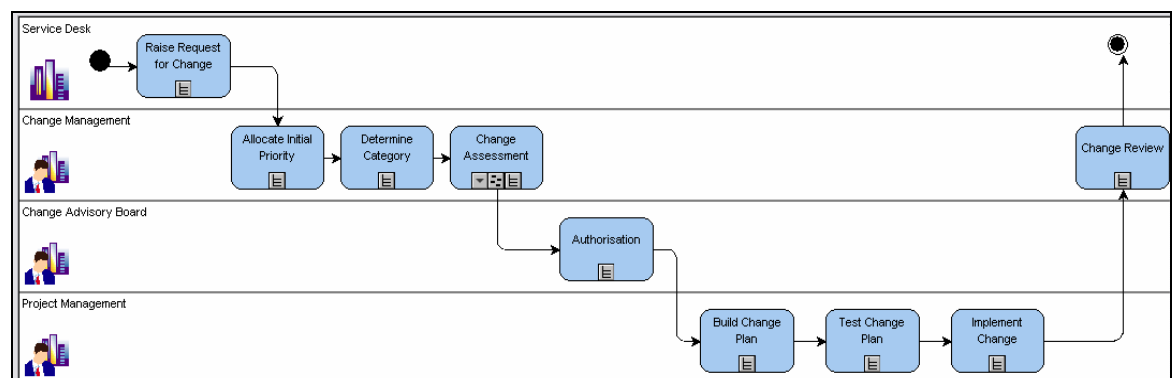
Above is a simple process model called IT Service Management, two sub-processes (Service Support and Service Delivery); along with the ITIL processes we love and know. The relationships between each process are held in the model, along with organisations and physical roles that are involved in this activity.

So, we have a high-level view, but how do we represent the activities performed?

ITIL processes are initiated by a customer or end-user request for services that the IT Department can provide.

In response to the initiating event, work is performed in a series of steps that cross multiple organisational boundaries within the company. So, for example, an end-user raises an RFC – perhaps the implementation of a new application

Business processes are structured into a workflow model to show these details. Workflow models contain a number of different components to reflect the various elements of the process. The major components are shown in the following example:



The most obvious components in a workflow model are the horizontal bands that stretch the length of the model. These are 'swim lanes' that represent the organisations or persons responsible for a portion of the process.

The swim lanes may be customers, suppliers or internal organisational units. In more detailed workflow models the workflow lanes can represent specific roles (i.e. job functions) or systems.

The boxes in the workflow model are the individual activities that are performed to accomplish the business process. They are placed in the workflow lane of the party that is responsible for the activity. Detailed information regarding the cost and duration of the activities are recorded within the boxes for later analysis.

The activities are tied together with a set of links called workflows.

The diagram shown above is the highest level of workflow activity – we could in turn drill into each box and create even more detailed workflows. (For example, what is actually entailed in 'Build Change Plan?')

The workflows represent the sequence in which the activities are performed and the passing of work from one activity to the next. Each workflow may also note an event and/or deliverable associated with the workflow. An event is an arrival or condition that triggers the activity.

A deliverable is a work product, produced by an activity and passed to the next.

With the Process and Workflow models developed, they are now all connected together, and if you make a simple change in one workflow, the same 'object' in other workflows will be automatically updated – try that with 500 different Visio drawings of the same process!

Process Timing

This is where the major departure occurs from previously described documentation approaches.

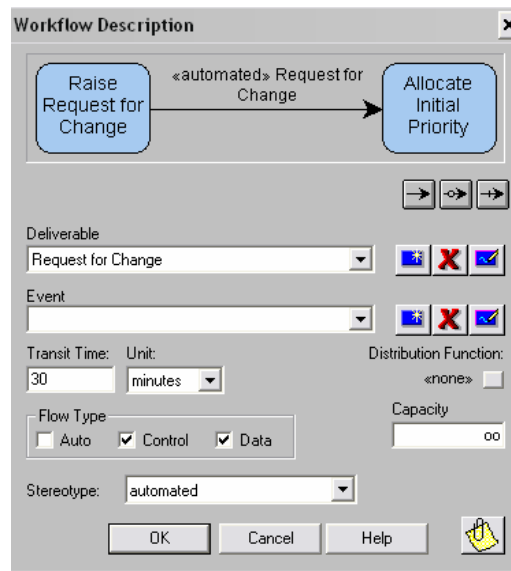
Timing data can be captured and associated with components of the workflow model. By analysing the timing information we can determine the duration between the event that initiated the business process and the delivery of the final result to the customer.

Poor customer responsiveness may result from a number of problems. The current business process may have bottlenecks resulting from workers that have too many responsibilities. Transit times for the work flows may be excessive due to the far-reaching locations the process must cover. Wait times may be too long because of poor coordination of resources.

Business processes accumulate time from two basic components: the time to perform each of the process's activities, and the time to pass work from one activity to the next. The following five time elements should be captured for analysing process duration:

Transit Time

Transit time is the duration for work to be passed from its source to the destination activity. This duration describes a workflow rather than a specific activity. Transit time only includes the time for the transfer, out-queue and in-queue times are captured within the activities. Workflows with a lengthy transit time should be the first to be examined in a process improvement exercise.



In-Queue Time

In-queue time is the period from when an activity's inputs are received until they are acted upon. For example, when an Incident sits in someone's 'In-Basket' or e-mail Inbox waiting to be processed, it is accumulating in-queue time. In-queue time is considered non-productive, and increases the duration of the entire process. Process improvement efforts should seek to minimise in-queue time.

In Process Time

In process time is the period from when work begins until work is completed and the activity's outputs are produced. This is not necessarily continuous work time. Those performing the activity may have to wait for decisions, may be distracted with other work issues, or may go on breaks during the in process time.

Work Time

Work time is the actual amount of time that effort is spent to convert the activity's inputs to its outputs. By definition, work time is equal to or less than the in process time.

Out-Queue Time

Out-queue time is the period from when the activity completes until the outputs begin their transition to the next activity. As with in-queue time, out-queue time is considered non-productive, and increases the duration of the entire process. Process improvement efforts should seek to minimise out-queue time.

The graphic below shows how this can be gathered for a particular activity (in this case Raise RFC)

Activity : Raise Request for Change

Definition | **Timing** | Resources | Cost Elements | Recipe | Operation | Associations

Input Queue Dynamics In-Queue Type: FIFO Capacity: 16777215 ☒ Unlimited Capacity	Delays incurred while working Work Delay Time: 20 Unit: minutes ☐ Distribution: Normal [mean=0.00, stdev=1.50]	Time doing useful work Work Time: 10 Unit: minutes ☐ Distribution: Normal [mean=0.00, stdev=1.50]	Output Queue Dynamics Out-Queue Type: FIFO Capacity: 16777215 ☒ Unlimited Capacity
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Max. Resource Delay: 0 % Max. Premium Time: 0 %

OK Cancel Help

We also may want to consider different distributions of workload 'hitting the process' – below, we have simply selected normal distribution – but we may want to use a different profile that represents your workload (for example, perhaps your Service Desk gets the majority of call in the morning, so you can 'skew' the curve to the left)

Simulation Random Number Distribution

Select the distribution or empirical stream to use for generating timing

☐ Distribution Function

Normal Std Deviation: 1.5

Seed: 32767

Will produce variations based on the entered standard deviation with the model value as the mean

The standard deviation defines the variance. It must be a positive value.

Sample distribution for mean(5.00) with range[0.00 to 10.00]

☐ Empirical Stream

OK Cancel Help

Activity-Based Costing

We now have brought together the processes and activities together, and have linked the workflows. We have modelled the end-to-end process. We have looked at each activity and associated timings to them – hours, minutes or seconds.

Now, what if we could associate costs to the resources consumed in each activity?

The association of costs with specific activities is known as Activity-Based Costing or ABC.

Activity-based costing identifies the costs incurred by a business process's component activities as they are being performed. Activity costs can be examined and optimised individually. Once changed, the model of the business process is re-analysed to determine the effects on the entire process. As a result, a true picture of the cost of doing business is produced.

The uses for activity-based costing are many and varied. The following list provides typical efforts where ABC has been employed successfully:

- Developing a benchmark of current process costs.
- Identifying areas that are not cost-effective in current processes.
- Analysing value-added vs. non-value-added costs.
- Determining the cost impact of outsourcing decisions.
- Supporting redeployment, cost cutting, and right-sizing decisions.
- Determining costs for improved or redesigned business processes.
- Verifying process improvement efforts have been cost effective.
- Determining cost targets and budgets for IS processes.
- Cost justifying the adoption of new Service Management tools

ABC provides a quantitative means for evaluating process change when the objective is meaningful improvement in cost effectiveness. By following a straightforward approach to analysing costs, activity-based costing can provide the essential analysis needed to make key decisions.

Cost Elements

The initial requirement for using the activity-based costing capabilities is to identify the cost elements. A cost element is a type of expense incurred by the organisation while performing its business processes. Cost elements are one of three types:

- Direct Costs
- Indirect Costs
- Resource Costs

We can enter real costs of resources consumed in each activity – in the case below, the costs for Change Management resources:

Activity : Raise Request for Change

Definition | Timing | Resources | Cost Elements | Recipe | Operation | Associations

1

Resources:

Resource	Utilization	Rate	Time Units	Cost	Alternates
Change Management	1	£25.00	hour	£25.00	10

Add Crew Delete Crew Clone Crew Promote Crew Demote Crew

OK Cancel Help

Resource costs are labour expenses incurred when an activity is performed. The most common resource costs are salaries paid to the labour force. Such resource costs typically include salaries, hourly wages, benefit costs and employer taxes. Other resources, such as computer system time, can also be captured as a resource cost. Ultimately, total resource costs will be calculated based on an activity's work time.

Process Scenarios

Once a process is modelled and detailed cost and timing assignments have been entered, variations of the process can be identified using process scenarios. A scenario is all or a portion of a process's workflow that defines a particular way in which the business executes the process. Scenarios are developed for the purpose of analysing these business process variations. Each process can contain any number of scenarios allowing the user to perform an unlimited number of "what if" analyses. By examining each scenario an IS expert can determine the most cost-effective and/or time-efficient version of the process.

Simulation

Simulators in Process Modelling software can "run" a business scenario to explore the possible results of the scenario. The simulator contains of a number of factors to address calendar variables, calculation factors, simulation factors, and animation. When invoked, the simulator performs a Monte Carlo or Discrete Event Simulation to bring the business process to life.

Simulation Factors

Simulation factors are associated with the scenario to affect the behaviour of the simulator. By modifying the simulation factors, the simulator can generate results for an average occurrence of the scenario (by using a high number of trials and a low degree of distribution), or a non-standard occurrence of the scenario (using a low number of trials and a high degree of distribution).

The simulation trials entry specifies the number of scenario executions to be performed by the simulator. A higher number of trials will cause the simulation results to fall closer to their statistical mean (average).

Simulation

Trials 100 Advanced...

The random number distribution determines the distribution approach (e.g. exponential, normal, uniform, etc.) for generating values for the simulation. The specified distribution approach will be applied to all timing variables (in-queue, in process, work and out-queue) specified for the scenario's activities. This eases the burden of introducing randomness into the simulation by requiring only one entry for the entire scenario rather than each timing value individually. The business modeller can introduce various distribution approaches and degrees of distribution, and see the effect on the simulation results.

Animation

Process Modelling tools usually provide the option to visually present the simulation to the user as it steps through the process scenario. When the Animation is activated, the software will trace the scenario's paths through all levels of the open workflow models. This allows the user to visualise the typical paths through the scenario and spot bottlenecks in the process.

Process Analysis

And what you end up with is the following:

- Timing Analysis
- Process Duration
- Activity Staffing Details
- Resource Analysis
- Cost Analysis
- Cost Distribution Information

A whole host of reports that once analysed you can begin to see whether your Best Practice processes are going to actually work when overlaid onto the existing IS Department.

Reports will help identify cost-savings, whether they are from process improvements or introductions of new technologies.

Reports that will identify additional areas for considerations for even further process improvement or resource utilisation.

Reports will give you the confidence that when you implement these changes it will actually work with the resources you have planned for and at a cost you have budgeted for.

There are additional major benefits around using process modelling around the budgeting and forecasting aspects of Service Management – but we will leave this to the chapter on Activity Based Costing.

Conclusion

So this is the difference between Process Design that albeit importantly gains consensus on a way forward towards implementing the ITIL Framework and Process Modelling.

One provides you with a drawing; the other provides a tool that can generate additional value to your Business and the IT Department.

The rest of this handbook considers some of the theory and practice of these new breed of modelling tools.

Are you truly impressed with what can be done nowadays? We at Birchwood Solutions certainly are!

However, a word of warning: before you go out and buy a software license, load it on your PC, and start modelling the first set of processes that come to mind – please read the next chapter as a bit of a warning, and after that, we can move onto the subject matter at hand.

Pre-Requisites

So, you want to model ITIL processes?

As we have mentioned earlier, you do not just buy the software, load it onto your PC and then start inventing new processes and seeing what happens.

Implementing ITIL or a new suite of Service Management tools needs some significant effort before you start modelling workflows and simulating scenarios.

Some Process Modelling Software vendors will say: 'Buy our tools, and it saves a fortune in elapsed time – what can you loose?'

Well, they are partly correct – these tools do give you a kick-start – but they need to be launched on a firm foundation for them to be a success.

Before these tools are unleashed, several things need to happen first:

- Identifying Need
- Sponsorship
- Planning
- High-Level Design
- Detailed Design

Once these things have been considered then Process Modelling & Simulation can begin – if you do not progress these aspects first then the old adage: "A fool with a tool is still a fool" may come to the lips of an observer.

Let us quickly walk through these pre-requisites before we get onto the meat of the subject.

Identifying Need

When you suggest that a Service Management Process Improvement project should be embarked upon, someone will ask: Why?

And that is a good question.

Why should you embark on such a task? What is actually going so wrong in our IT Service Management processes/organisation that we need to make changes?

Well, if you are credible enough within your organisation – or that many people have noticed and articulated their concerns about Service Management, then just the mention of your proposed suggestion may help you win the day – but for the majority of us, well we have to be able to prove it.

We probably need some kind of Review to show that change is necessary.

There are really two kinds of ITIL Review:

- A Functional Review
- A Value/Risk Based Review

Let us consider both approaches.

A Functional Review

Most ITIL Reviews fall into this kind of heading. The objective is to set a Best Practice Standard, and then compare your organisation to this standard and compare/contrast and create a Gap Analysis between the two.

You either get a 'Pass' – a clean bill of health, or you get an 'Improvement Programme': certain areas of your IS Processes are not quite up to scratch, or not considered mature enough. They need work being done on them.

In either case you get an 'Improvement programme' – something to strive for in the twelve months to come – before your next review.

This at the moment is the general trend, and annual reviews are becoming a commonplace occurrence for many companies.

BS1500 is the ultimate test of your Service Management processes, and their compliance to Best Practice.

But so what?

Does this actually drive the need for change? Does this actually want you to make fundamental changes to the way Service Management actually works?

Would the Business be interested in funding some kind of activity for the IT Department to sort out their 'Gap Analysis' between where they are, and where they should be? Probably not.

You see, a Functional Review helps you assess where you are in trying to achieve your target, but it does not help you support a major 'Step in Change' – well no it doesn't. You need to get a bit more radical to do this.

A Value/Risk Based Review

A Value/Risk Based Review is the ultimate approach for understanding why Service Management change should occur, and these are always Business Based.

The IS Department is purely a 'utility' to the business – just like water or electricity, the Business takes it for granted – you switch it on and it is there. If you turn the switch, and nothing happens, then there is a problem.

So, a Value/Risk Based Review begins to look at Service Management through the eyes of the Business and asks the following questions:

1. Can I reduce costs in IT (as they could invest the money elsewhere in the business)?
2. Can I improve the Quality of Service to an extent that the Business and/or the Business's Customer could benefit (as this should increase revenue/profitability)?
3. Can I reduce risks to the service offered to the Business and/or Business's Customer – as this has costs associated to it – mitigating risk always costs money (reduction of 'Insurance Premiums')

It is only when this kind of review occurs can something significant actually happen. You are now going to do something to your IT Service Management processes – you know why, and you have an idea of how it will benefit the Business.

It is only when this activity occurs, then senior people within your organisation become interested in what, in the past, was just an internal issue. Now, with this kind of Review, people are interested in helping you – because they want to help you – as you are going to help them. *Quid-pro-Quo!*

We call them Sponsors.

	Web site: A number of review based services are described on the Birchwood Solutions web-page: http://www.birchwood-solutions.com
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Sponsorship

So who are you? IT Director, CIO? Probably not.

In our experience people of that calibre do not tend to be the initiators of these kinds of projects. They sit above all of the 'madness and mayhem' of the typical IS Department in terms of its day-to-day operations.

They are too busy working on more businesslike issues: budgets, forecasts SLAs and the like. They are in the firing-line when IT fails the business – but to be honest, they leave the mundane problems to the next layer of management down.

This is where you probably sit, or even the next level down. This is where the 'engine room' is actually situated – where new ideas are generated and momentum gained.

However, even though you have the bright ideas, and you suggested the Risk/Value Based Review – you now have a tangible way forward, and a reasonable strategy, how can you win the hearts and minds of those people you need the backing of?

Yes, you need a quantified Business Case.

If you can convince these people in a substantial way – they will throw their support behind you – providing it increases revenue, keeps customers or reduces costs. You have to be able to convince them in financial terms that this can occur, and for them to have confidence in your financial reasoning.

So, the business oriented Risk/Value Based Review identifies a set of activities that will help the overall business – these activities are quantified, turned into a Cost Justification/Business Case and used to gain interest from more senior people who will sponsor you and help direct the project and make headway for you.

It's all just so logical.

Do you actually need a Business Case to gain sponsorship – well, of course not, it happens all of the time. But what sometimes happens is this: He/She is sponsoring you, because He/She thinks it's a splendid idea – what happens when He/She sponsors other projects, and something happens in the Business and it all starts getting a bit hectic..... and suddenly you do not get the attention you need.

Make sure you have the Business Case – that way you can maintaining a longer-term relationship with your Sponsor than you could without one.

	Reference: For further information on the Cost Justifying the ITIL® Framework Handbook, please look on the reference below:
	Web site: http://www.birchwood-solutions.com/handbook2.html

Planning

Now, once you Sponsor has approved the Business Case and sanctioned you to begin progressing the project, then a whole bunch of activities will be kicked off:

- Project Planning
- Readiness Planning
- Communications Campaign
- Team Training

Let us briefly consider these points:

Project Planning

If you are implementing the ITIL Framework, then this will be happening:

- You are changing IS Processes
- You are changing the way people actually work
- You are changing the way organisations actually work together.

You really need to plan this.

Readiness Planning

A cross-functional project such as this will entail cultural change, and you need to begin thinking about this now – even to the point where you are building the team and getting ready to start

Communications Campaign

Most projects fail simply because the main messages are not conveyed to the users of the new approach, and when you are ready to go, they have not heard anything about it, have not bought into it, or just cannot see ‘what is in it for them’. This aspect needs to be considered well in advance

Team Training

A project of this nature will involve a lot of people. Before the project is launched, the core team and even the occasional contributor need to be working towards the same vision, and with the same level of knowledge of ITIL. This element should be in place and ready to roll-out.

This was all detailed in the *Process & Organisational Redesign for the ITIL® Framework*, and so this should be second nature to yourself – however, if you are reading this handbook without referring to experience or other sources of information on how successful process change projects are conducted – well, we suggest you stop reading this handbook immediately, otherwise you are courting disaster.

High-Level Design

Before you start to actually model and simulate processes – well, you have to have an agreed vision of how it is all going to work.

Yes, we know what the processes will actually look like: but how will this be operationalised? In other words, how are you going to layer these new processes onto an existing organisation? This is always the challenge.

You need to begin with a very short element of the overall project. A high-level view that enables people to look at it, nod their heads, and appreciate how it all 'hangs together', see how simple it looks, and they can see how it can be implemented based on the business case priorities. Something you can communicate.

People can begin to have faith in the project, and even if they have not been involved in developing this 'High-Level Vision', they can begin to buy into it. They obviously can disagree – but as it is a short piece of work, well, you can begin to accommodate other ideas from the review you have had, and it won't end up being a massive rewrite – as it would if you went into detail immediately.

The last thing you want is to model and simulate a whole bunch of Service Management processes, perform the modelling, ran a few scenarios, decided on the best approach and finally proved it with a simulation..... Only to discover that two or three people disagreed with your initial processes.

Buy-in is essential before we embark on this activity.

Detailed Design

Taking the high-level design, you have a reasonable view of how your Service Management processes work, but some people (Birchwood Solutions personnel included) may suggest that you really ought to have some ideas and thoughts about the Detailed Design before you start off your Process Modelling exercise. You see, the more consensuses you get up front the easier it is for you.

Of course, you could crank-up your new Process Modelling Software and 'let rip' – You and your laptop against all of the odds. Yes, you will probably fail because of the following reasons:

1. The complexity of what you are trying to achieve is just too huge for one person to comprehend, and keep track of where you are. You have to break this up into manageable pieces.
2. If you are designing the ITIL processes, it is you who are deciding, you are documenting, and you are presenting your work and asking for 'buy-in'. People by and large do not do 'buy-in'. It is far easier to criticise that just accept peoples work. That is just Human Nature. To circumvent this, you need to work collaboratively, and get 'group buy-in'.
3. You will be implementing based on a list of priorities (developed from the cost-justification), and so it makes sense to design each process in the same priority. But as soon as you go into detail, well, all of the "hand-off's" between processes, well they need to understood, documented, and somehow 'put to one side' while you work on one process, and hope you pick them up when you are working on another process.
4. You will also have to think about the organisation as well as the processes – it is easy to document some processes – but how are you going to apply this to a real organisation. Do you know every facet of your physical organisation, and enable you to tailor the processes to fit it perfectly, or are you going to implement a 'vanilla' ITIL Framework. If the answer to the first point is "Yes" then go back to point 2. If your answer to the second point is "Yes (vanilla)". Sorry, that does not exist either.
5. Finally, if you locked yourself in a room for a year, just did it, got it absolutely right, and proved us absolutely wrong..... well, no one would actually read it all, it would be just too complex, and would be left to gather dust – so it would not be accepted anyway.

The advice is always to design the detailed processes through either interactive workshops or through traditional approaches to gain consensus before we use the modelling tool to perform the more quantitative aspects

Summary

We have laboured the point enough! It was only seven pages, but hopefully enough to make you think.

There is no 'Silver Bullet' in this world of process improvement – whether it is ITIL or Supply Chain Improvement. Yes, tools do exist to help you along the way, but they do not replace common-sense, experience, a good foundation to your project and sound Organisational Change Management.

Process Modelling and Simulation is the 'Tool', but you need to bring the other attributes to this project.

Use the modelling tool to do what it is designed for: holding the huge amount of data necessary to a project of this nature and perform the more quantitative activities (simulation, value based costings)

What is Modelling?

The ability to understand the functions of an IT Department - what it does, why it does it and how it does it - may seem fundamental to most people but there are not many that can actually say that they have it. Most IT Departments are set up with three or four physical functions in mind and a pretty clear view of how this can be achieved. However, a couple of years down the road and this initial business structure is no longer relevant - the world has changed and the business has changed with it. That is the reason why business models can be so important.

Business models provide a complete end-to-end view of processes. They document the initial ideas and follow them through to the final implementation. They hold information about the activities, the parameters, time, costs, resources and just about any other variable that you can choose to add. The flow of processes, the business policies and basic functional constraints come in the form of rules. All of this information needs to be stored centrally to ensure consistent application across the entire business.

It would be untrue to say that the development of a complete business model within the IT Department is easy; there are very positive benefits that can result. It is not just the understanding that develops but also a dynamic culture within an organisation. It is most likely that a tactical solution is the best start - handling one or two problem processes - and then building up to strategic use. Once a more complete model is in place, the ability to change the business in response to market variations is enhanced dramatically.

The approach to modelling is seldom a 'once-off' approach. You have designed your processes, documented them, and now you are ready to model and simulate them - and from the results of the model, you will implement tried and tested processes. It does not stop there, as the models allow you to try new scenarios, make additional changes, make new links to other processes, streamline some workflow - and yes, you are into Continual Service Improvement, the holy grail of ITIL.

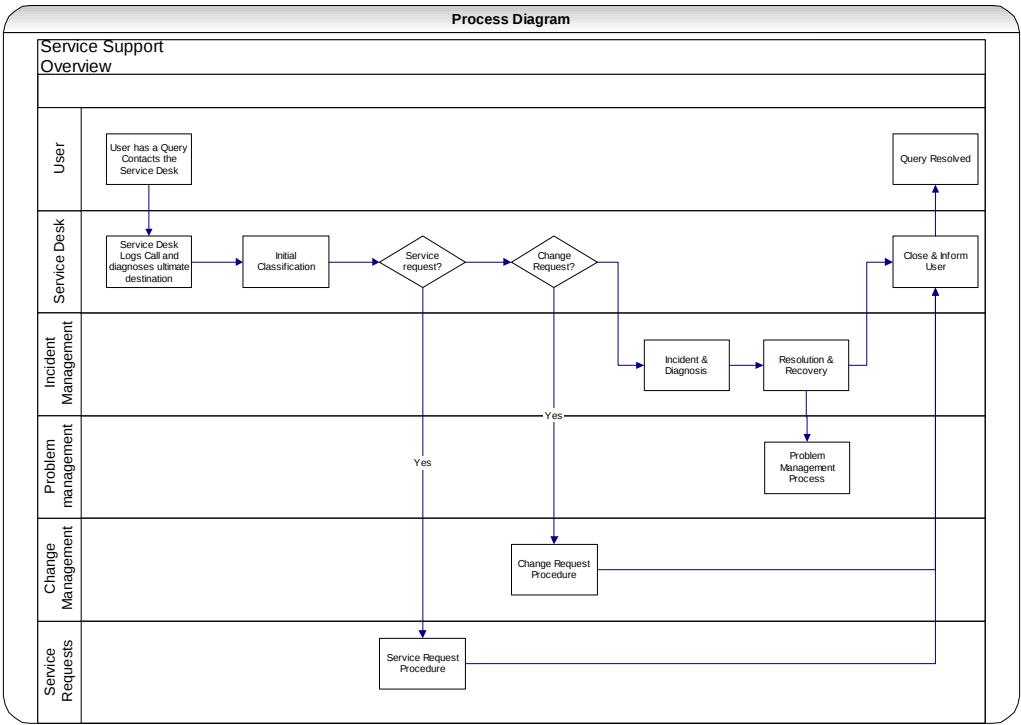
So, briefly, let us explore the differences between a diagram and a model, and then we can get onto the meat of the subject.

Models vs. Diagrams

Let us compare and contrast the difference between the two:

Process Diagram

Below is a process diagram:



This diagram simply shows the high-level process for incidents and change requests flowing through a Service Desk, and how the various decisions made will impact on other physical organisations.

It is simple and effective – you can follow the flow, you can begin to understand who will be involved and the ‘hand-off’s’ between groups. It shows the input, the outputs and the high-level steps in between.

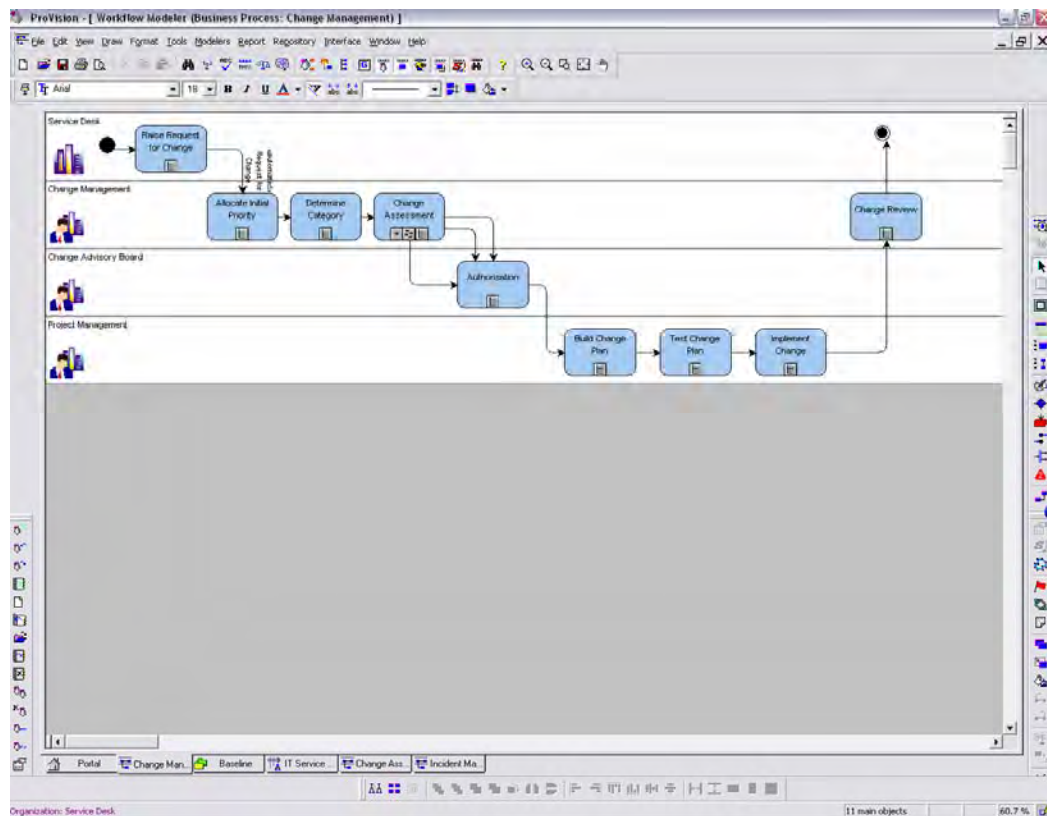
It may have taken a group of people to work on this and agree it (yes, we know the flow is just so simple and logical, but some politics and economics may have entered into its construction), and what can you do with it?

Well, all you can do is to show it to someone else.

You see, it is a diagram – it is just a representation. It does nothing else but represents some thoughts of a group of people. Now, this in its own right is not a bad aim anyway, especially if that is your goal. But let us see what we would be doing in the modelling world.

Process Model

Below is part of a process model, this shows the workflow model:



This represents the high-level Change Management process.

It does not *look* too different from above, just 'swim-lanes' and boxes, but this is so very much different. With this model you can show it to someone else, but a whole host of other things can be done:

- Activity Based Costing
- Map activities to geographic locations
- Map activities to roles or even people
- Show how activities support your business objectives
- Show how activities contribute to solving problems
- Map process to Service Management tools
- Run scenarios to determine the optimal resources to fulfil this process
- How long will on average, take to run this process

Modelling is not about diagrams, it is about Objects – objects that are represented within the tool, but in addition, each object can be linked to other objects it is affiliated to or influenced by.

Objects and Associations

Every component added to a model is an Object. Now, this is not a problem, as during the course of documenting how your high-level and detailed processes should actually work. Each step, each activity is an Object. You have discussed your objectives, discussed your problems and issues, you have identified Service Management tools that can support your potential ITIL services, and these can be described as Objects.

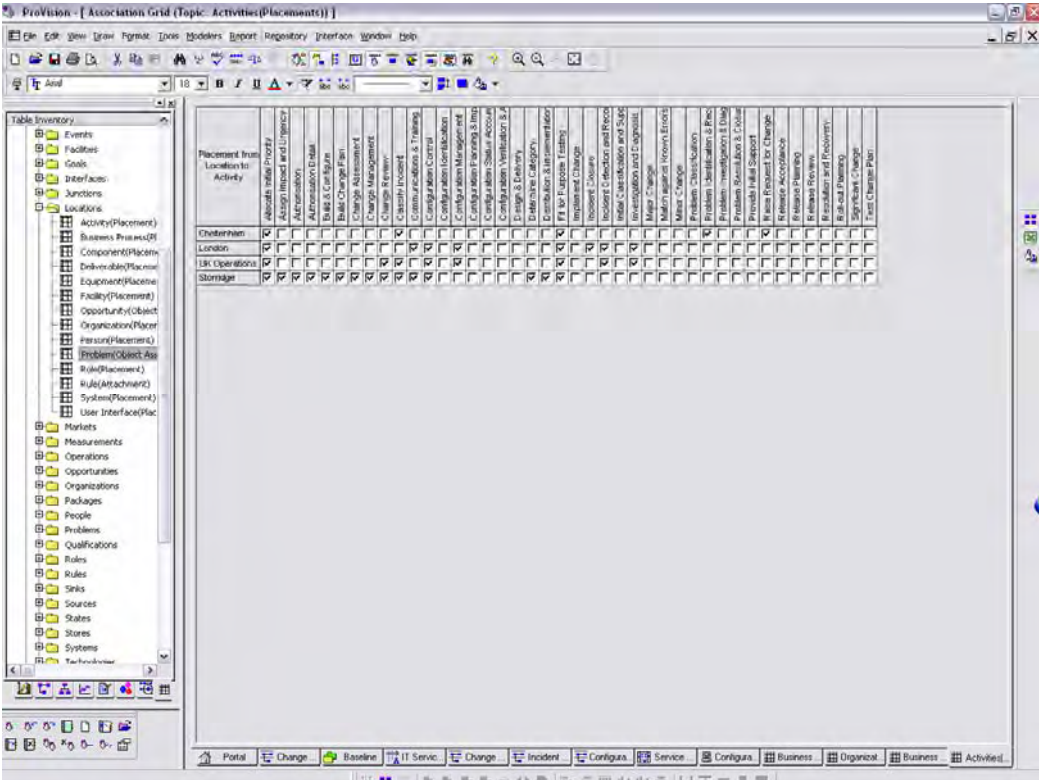
Each Object can be held in a repository and can be reused at any time within the modelling process.

Each Object has a variety of attributes such as cost, value, time, duration, location, deliverables and metrics associated to them. These can be documented, and again, held in the repository.

But the magic occurs when you begin to link all of these Objects together. Let us take an Object called 'Change Assessment':

- Where is it performed? (Location Object)
- Who performs it? (Organisation, Role or Person Object)
- Technology that supports it (Systems Object)
- How it supports the business (Goal Object)
- How it resolves issues (Problem Object)
- Etc.

And everything is held in a repository holding pointers from each object to all others:

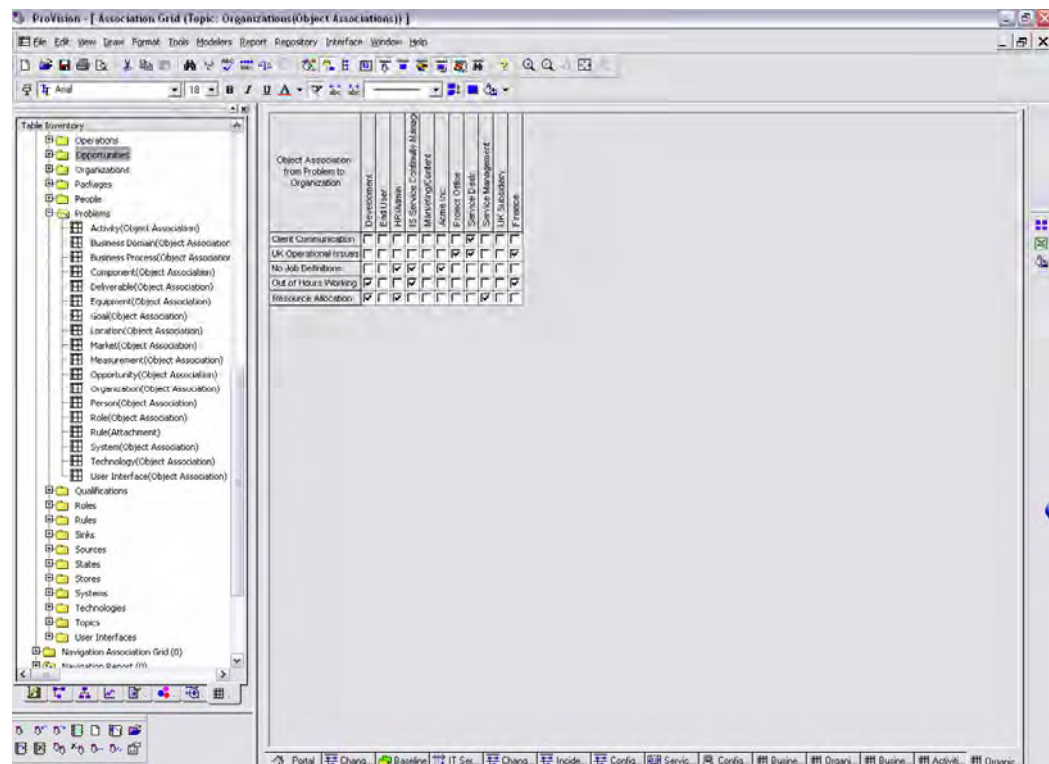


The screenshot displays a software interface titled 'Provision - Association Grid (Topic: Activities(Placements))'. It features a 'Table Inventory' on the left with a tree view of categories like Events, Facilities, Goals, Interfaces, Junctions, Locations, Markers, Measurements, Operations, Opportunities, Organizations, Packages, People, Problems, Qualifications, Rules, Rules, Skills, Sources, Stores, Systems, and Tools. The main area is a large table with columns for 'Placement from Location to Activity' and various activity names. The rows represent different locations: Cheltenham, London, UK Operations, and Storminger. The table cells contain checkmarks indicating associations.

Placement from Location to Activity	Activity	Cheltenham	London	UK Operations	Storminger
Activity(Placement)	Activity(Placement)				
Business Process(2)	Business Process(2)				
Component(Placement)	Component(Placement)				
Device(Placement)	Device(Placement)				
Equipment(Placement)	Equipment(Placement)				
Facility(Placement)	Facility(Placement)				
Opportunity(Placement)	Opportunity(Placement)				
Organization(Placement)	Organization(Placement)				
Person(Placement)	Person(Placement)				
Problem(Placement)	Problem(Placement)				
Rule(Placement)	Rule(Placement)				
System(Placement)	System(Placement)				
User Interface(Placement)	User Interface(Placement)				
Activity	Activity				
Business Process	Business Process				
Component	Component				
Device	Device				
Equipment	Equipment				
Facility	Facility				
Opportunity	Opportunity				
Organization	Organization				
Person	Person				
Problem	Problem				
Rule	Rule				
System	System				
User Interface	User Interface				
Activity	Activity				
Business Process	Business Process				
Component	Component				
Device	Device				
Equipment	Equipment				
Facility	Facility				
Opportunity	Opportunity				
Organization	Organization				
Person	Person				
Problem	Problem				
Rule	Rule				
System	System				
User Interface	User Interface				

The repository holds all of the associations, and a view of process activities against location could produce something like this (above).

Below shows another 'cut' of the repository. This shows how specific problems, if solved would assist certain organisational entities:



As each object contains attributes such as: cost, value, time, duration etc. then you can begin to appreciate things like:

- What if this process was performed in a different place or by a different organisation?
- What if we combined it with another activity?
- What happened if we decided not to do it?
- What if we automate it?

We could make decisions based on cost, value, time or resources required to do the job.

We could add resources to see if it would assist the business further.

We could see if new Service Management tools would help drive down costs

We could compare alternative organisational structures (insource vs. outsource)

We could see who would be the beneficiaries of this process.

..... and a whole bunch of other things!

Welcome to the wonderful world of Process Modelling and Simulation.

Summary

There is an old saying “When you are up to your neck in alligators it is sometimes difficult to remember you are just trying to drain the swamp”.

When you set off on a major project (and implementing ITIL certainly is), as you go through the various process implementations, all of the politics, backstabbing and empire-building activities seem to get in the way, and sometimes you are spending more time fending off new and unexpected issues rather than implementing new processes that can assist your company.

Sometimes you think “Why am I doing this?”

All you are trying to do is introduce a new Change Categorisation approach, and everyone seems to be against you, and if you are implementing ITIL in a more traditional manner (the usual consultative approach), then yes, it is sometimes difficult to defend each minor change you are going to make. However, if you are using a process modelling tool, then the situation is drastically different: every single alteration to the processes, activities, people or organisation can be firmly linked into either supporting business benefits or reducing/resolving their problems.

Process modelling tools assist you in achieving ‘big picture’ initiatives by keeping track of the real detail and quantitative information that supports your overall project.

The rest of the handbook is about how you actually do this, and the benefits it provides.

The Business Perspective

So, the first step in any process modelling activity, you need a firm foundation that is tightly linked to the business and its needs.

When you have produced a simple yet elegant Change Assessment workflow, and you present it to the Steering Committee for acceptance, and once finished you wait for the applause, and of course, you get the exact opposite:

- So who is going to do this?
- Where will Change Assessments be done – at all of our sites?
- How does this resolve our problems?
- Does this actually support our overall requirements?
- Will we need to buy tools to help do this?

Yes, the usual set of questions, which puts you on the back foot, you are no longer in control of the presentation. You should have pre-empted these questions prior to the presentation and raised them as part of the presentation – and if you are a practitioner of PlanIT, you would have avoided this awkward moment.

	Cost Justifying the ITIL Framework published by Birchwood Solutions contains a chapter describing the PlanIT methodology
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In exactly the same way, most modelling tools provide an opportunity to document a process from a ‘top-down’ approach, enabling the business aspects of the change to be documented, and these used to drive the development of processes and workflow, and more importantly, always maintaining links to the drivers of the new processes.

The usual attributes normally include:

- Business Goals
- Opportunities
- Problems
- Organisation
- Etc,

If you have entered these objects into the model, and linked the workflow models to these, then the associations are clear for all to see - you know who is going to use this process, the location in which it is done, the problems it resolves and the specific goals it supports.

Let us consider one area (Business Goals) to see how we could construct this in a model, and then show in a summary format other possible objects.

Business Goals

Below is a screen print of the hierarchy of business goals that is driving this ITIL implementation. These goals have been derived from earlier work: creating a Business Case and developing the ITIL Processes and Workflows.

We are adding them here, so when we want to validate the model, and find a lot of quantitative information about how the processes will work when implemented in our organisation, we will know which processes are assisting us most in enabling us to achieve our goals.

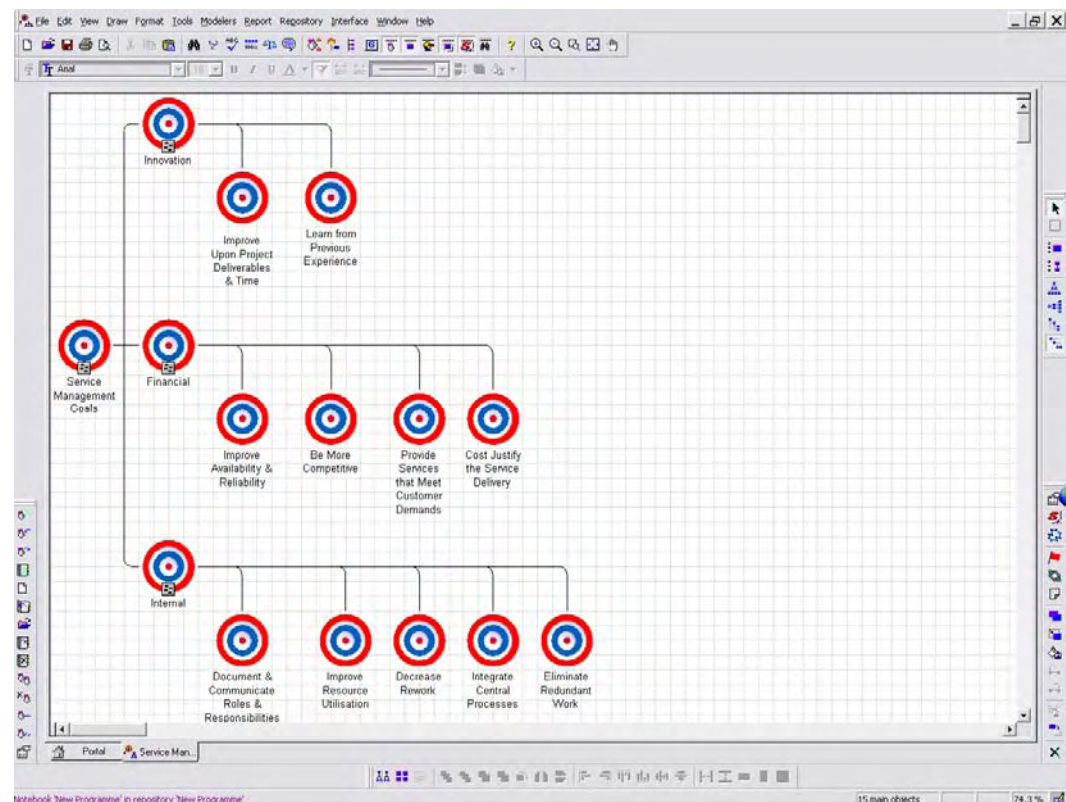
All of the goals are centred on Service Management in our example.

The next level down, we have identified three natural groupings:

- Innovation
- Financial
- Internal

And from there, it breaks down into another level of detail.

We can add as many hierarchies as we want, and would allow as many detailed goals to be documented – however, in this example, to make it readable to the reader, we have limited the hierarchy just to three levels:

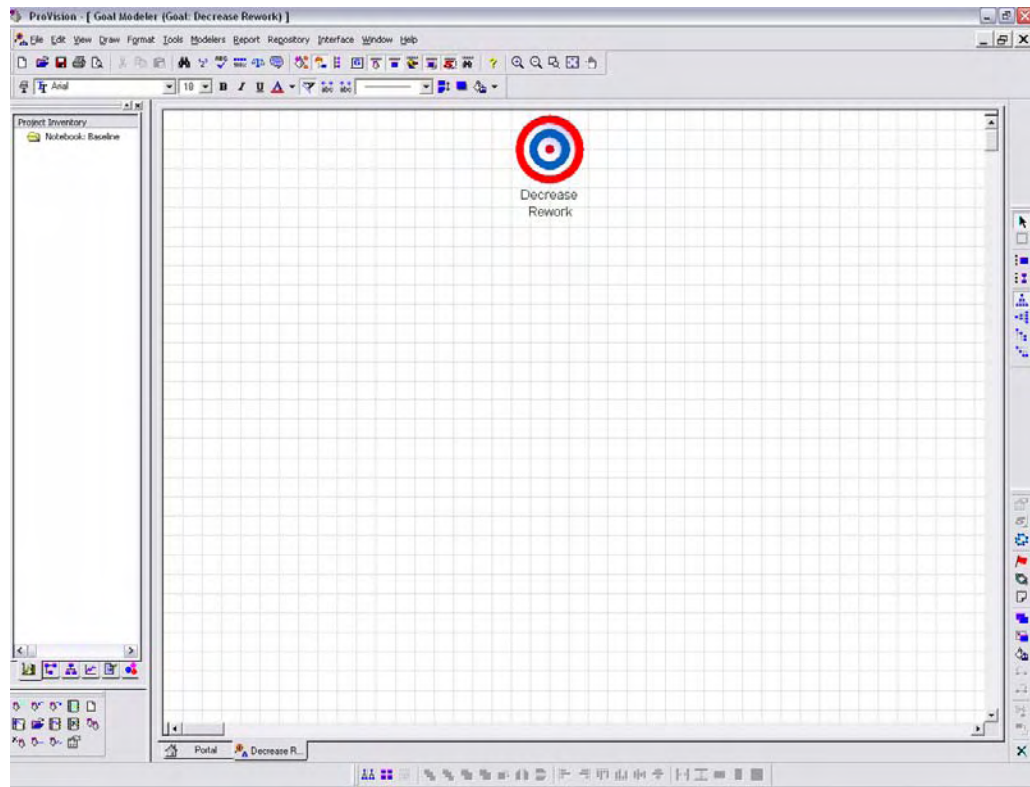


This represents a model of what is driving our project: our individual goals and their relationship to one another.

How do we create them? Well, one at a time!

Create an Object

Within a modelling tool, you simply click the mouse, and a new object appears, and you name it:



In this case we have created a goal called 'Decrease Rework'.

OK, hardly exciting is it! However, the point we want to drive home at this point is this: this goal was not 'invented' whilst sat at a keyboard with a process modelling application all fired up – we have identified this goal earlier on in the project (for example in a Management Requirements Workshop), and we are simply entering them into the model – a brick in our foundation.

Let us do something a bit more exciting to this object.

Adding Detail

We select the object, and now we can begin to define it (overleaf).

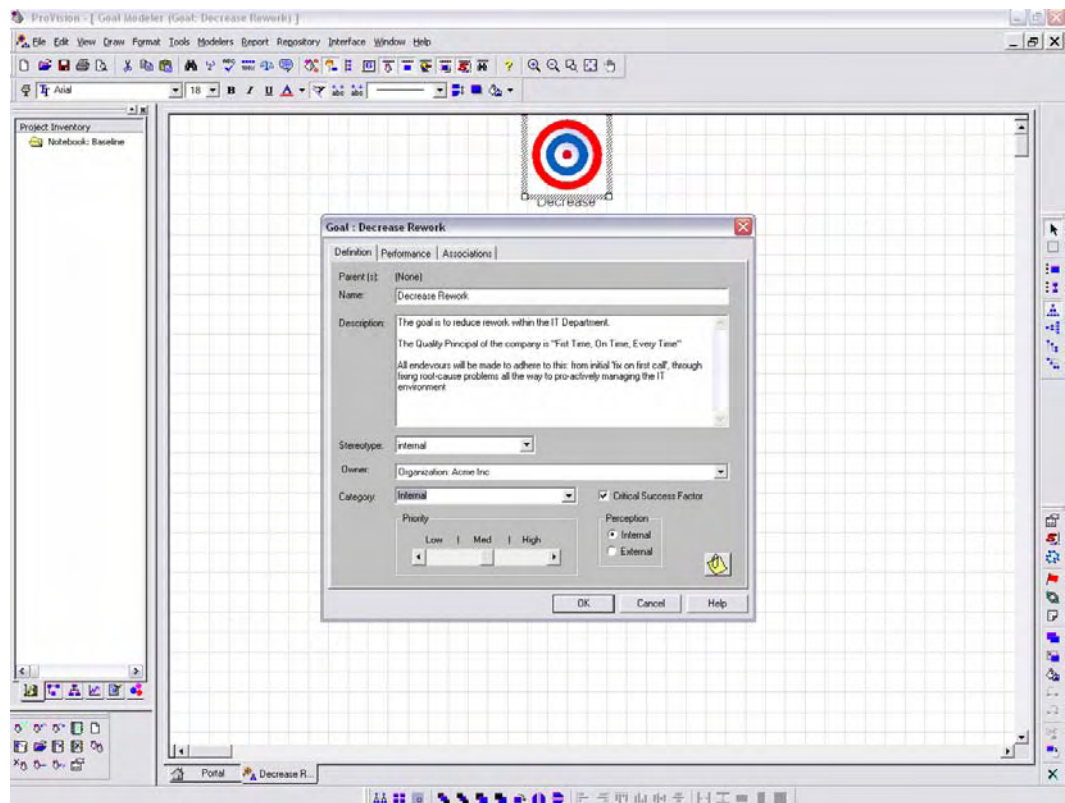
We have added a description, and then began to define the special things about it:

- Who actually owns this goal (and therefore responsible for achieving it)?
- Is it something we can influence, or is an external goal
- What is the priority of this goal (we assigned it Medium)?

Whenever we create a process or an element of workflow that supports this goal, then this information will be carried with it. When we create a number of ITIL processes, we will be linking these to the goals – and finally, when we complete the work, we can query the model and say "What processes will contribute to decreasing rework?" and of course a full list will be generated, and who is responsible for implementing it, and the priority it will have.

This aspect is quite important; when you implement new processes and procedures things get forgotten, or dropped in priority, or just ignored, and this happens for one reason: there is just too much going on, too much work and too little time. They get lost in all of the things you have to do. If you have entered all of this information in a model, it will never get lost, and will always be there for reference.

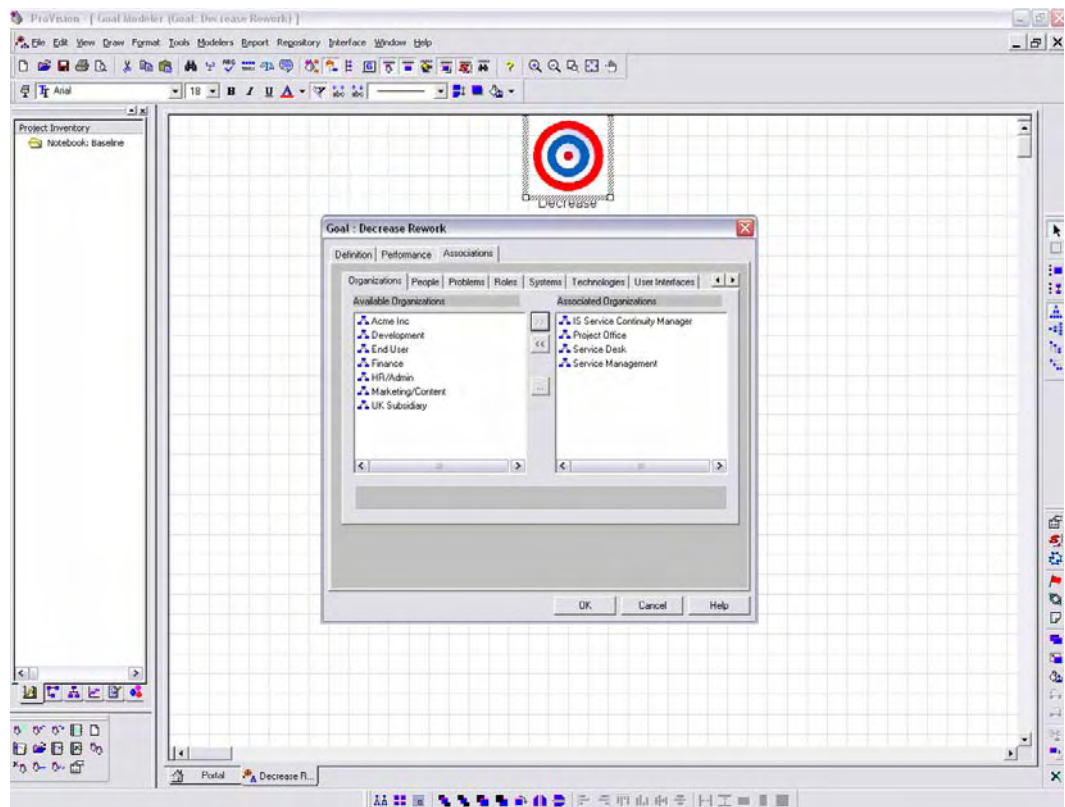
However, this is not really 'rocket science' as we are still just documenting attributes. It is the next step that makes things very different.



Including Associations

We can now begin to document any association this object has with any other object in the model (and results in a matrix shown in the previous chapter).

The diagram below shows four organisations being associated with the goal of Decreasing Rework, and we are expecting these to contribute towards this goal



Not only can we make associations between the organisation and the goal, we can add further associations:

- People
- Processes
- Problems
- Roles
- Systems
- Technologies
- Workflows

We will show some of these in the following sections of this chapter, but the main point to remember that a modelling tool has the ability to capture how each object is related to all of the others, and whenever we use an object within a model, it keeps track of all its associations and how it will influence them.

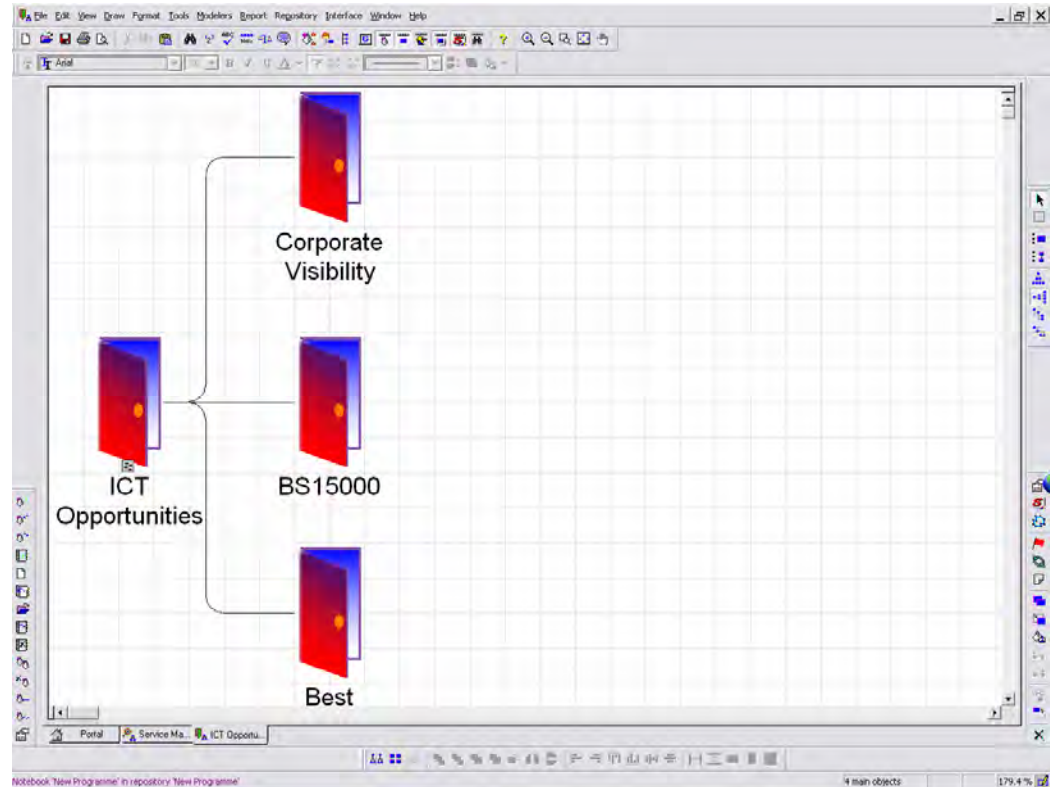
The following sections describe standard business oriented objects you find in modelling tools.

Opportunities

When the Business Case was developed, you took the hard benefits and turned them into quantified values for inclusion.

However, some softer benefits could not be quantified, and although they did not form part of the cost-justification, they were presented as benefits, and not just forgotten.

Good modelling tools will include the ability to bring these into the model. The goals represent the hard, quantifiable benefits, and below are a class of objects called Opportunities, and these represent the soft benefits:



Again, levels of hierarchy are used to show how the opportunities are built up, and we could go into whatever level of detail we want.

As with the Goals section, we will include some narrative, priorities, and the associations between it and other objects within the model. The opportunities will be linked to organisations and problems, as they can be a positive force on them. The opportunities will be linked to processes, technologies and systems as these will probably be the source for supporting these opportunities.

Problems

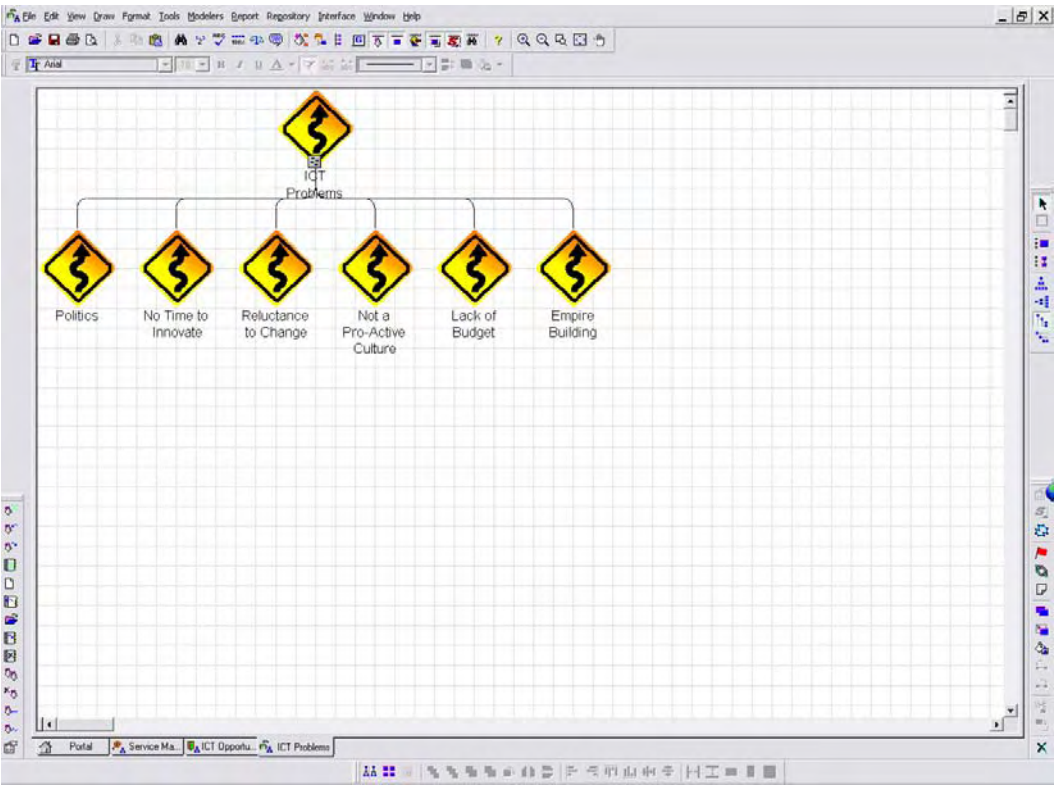
The modelling tool should be able to hold a series of problems that are going to impact on the ITIL project – it has to, otherwise the model is incomplete.

Below is the first level of problems this project has to overcome – the usual list.

Which of these problems will impact us in achieving our goal of Decreasing Rework? We can make the necessary associations. What is causing this problem – is it a person, organisation or a process? Again we make the associations as required.

Now, when it comes to introducing our Change Assessment and someone says “Well, I’m not sure whether we want to implement it at the moment, we are going through quite a lot of change already”. And your model holds all the answers: “So, you don’t want to achieve this goal then? Why is it that the Birmingham office has no problem with this?”

Without a modelling tool you are dependant upon memory and reams of information, and no easy way of conjuring up the impacts one little process step may have on the bigger picture.

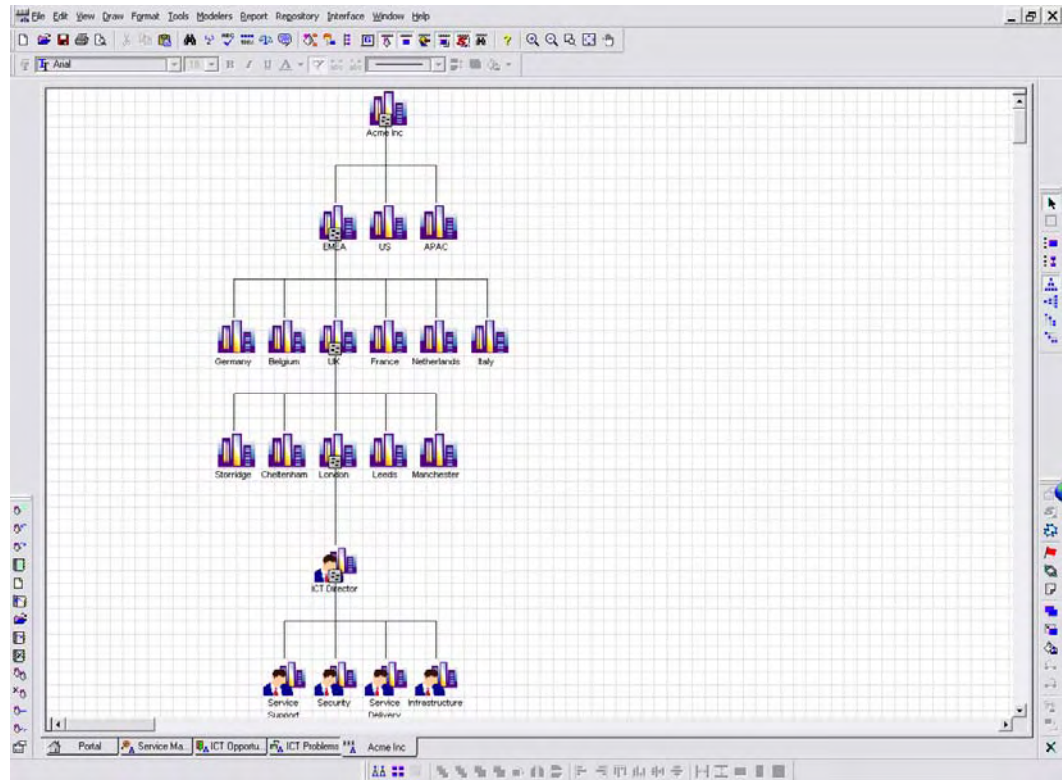


Where did this hierarchy come from? It probably came from a workshop session earlier on in the project a technique like Fishbone Analysis (also known as Ishikawa Analysis) when defining project goals and the direction of the project. Fishbone Analysis really helps in driving into detail, decomposing issues and identifying root-cause-problems – and generates a hierarchy of problems, the exact thing we need here.

	Consulting & Workshop Techniques published by Birchwood Solutions contains a description of the Fishbone Analysis technique.
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Organisations

Obviously the organisation is a vital set of objects for any modelling tool, as this is what the processes and workflows will be overlaid onto. The hierarchy of the company we are working on is shown below:



We have documented part of the structure, from the corporate entity at the top, the regional structures, the expansion of the European region, the countries it trades in, and then an expansion of the UK operations.

This is an example, and so shows a very simple structure. If this were a real model each region and country will be fully populated (now, imagine how big the global IBM organisational structure would be!)

If you look below London, you will see additional objects (but more of them later) as Service Management and Service Support are actually run at the London data centre.

In the next chapter we will see the creation of new processes, and after that the creation of the detailed workflows. Now when we create the object Change Assessment we will be assigning associations to the organisations that are impacted – in this case it will be London, as this is the only place Change Assessments are performed in the UK. When we create some workflow around Raising Change Requests, in that instance, the associations will cover all UK sites (as any user should be able to raise a Change Request). We can begin to produce a picture of the physical world by these set of objects.

We can associate problems with organisations (“Those people in Storrridge are always empire building!”) and goals with organisations (Cost Justifying Service Delivery will be performed in London) maintaining accuracy and simplicity through the use of modelling tools.

Finally, we mentioned earlier some new objects below London on the diagram above. Well, these are roles or people (usually positions as opposed to named people, as people tend to come and go, while positions remain relatively static). So we can associate roles or positions with any object in the model, and allows us to ask: “To attain this goal (and therefore saving) which people are we depending upon?”, and the model can simply spit the answer out.

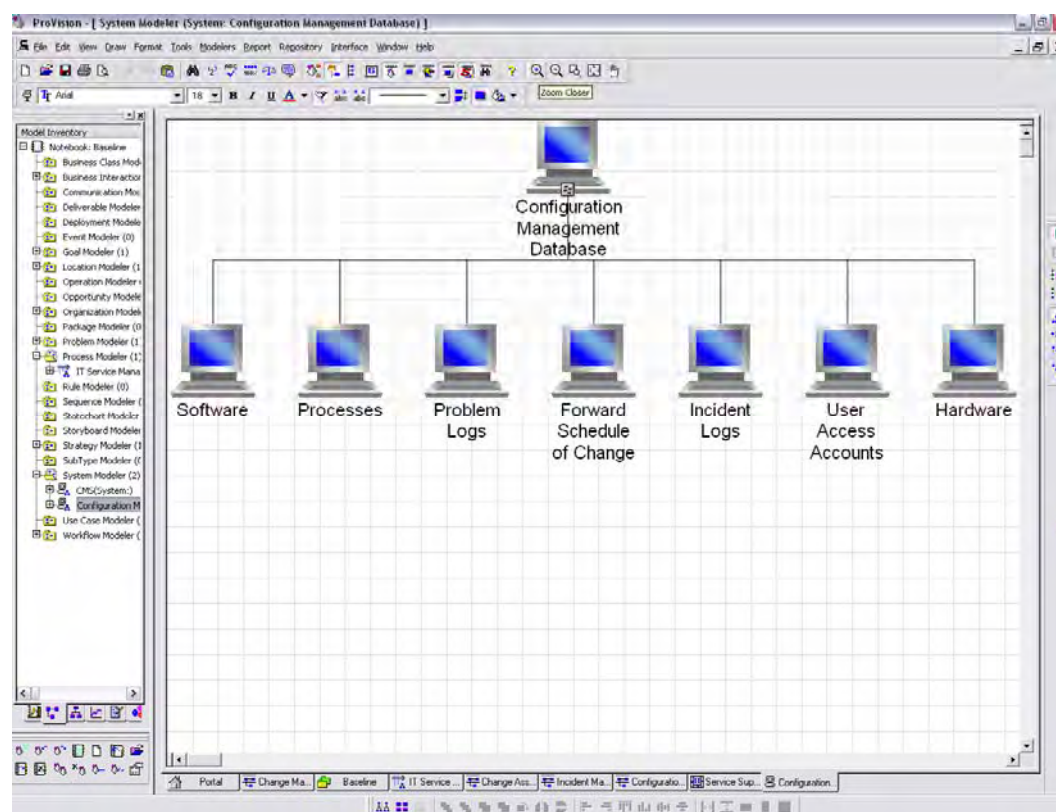
Systems

And the final one we will look at is the systems side. These can be objects, and they can be used and located in certain organisations, support processes, remove problems and support opportunities – just like any other object.

We can play “What-ifs” later on: we can see how long and how much it takes to run the ITIL processes with and without systems (e.g. service management tools) and can assist in driving out a cost-justification for new tools.

Below is our CMDB broken into its element parts. At first glance we don’t know whether it is a sophisticated integrated Configuration Management tool or a bunch of spreadsheets, but this information will be held in the object along with all of the associations it has to other objects will be recorded and built into the model.

When you use systems, it may help you reduce transition time from one part of a process to another; it may provide you a new delivery mechanism of information that significantly reduces in-queue times. All of this information can be included in the models.



Summary

We now have the building blocks in place – a sound foundation for the next work we do. Whatever happens next, we have a framework of objects that our processes and workflows can be associated to.

We would agree that this work is hardly exciting, as all we are doing is populating the model with all of the drivers and business elements required to support the processes.

We started off this chapter with a little scenario about your pride and joy (Change Assessment workflow) being shot down in flames when you present it. The scenario should now be a little different.

This time when you present your model, and when you describe the elegant simplicity of your Change Assessment, then by association you are outlining the following:

- Who owns the process
- Who is going to do it
- The hard and soft benefits of adopting it
- The problems it will resolve
- The systems that will support it
- The priority in which to implement it

Not a bad thing in its own right, that's for sure!

Now, as promised, onto more interesting things, documenting the processes and getting ready to add the detail and begin to simulate these.

Process Modelling

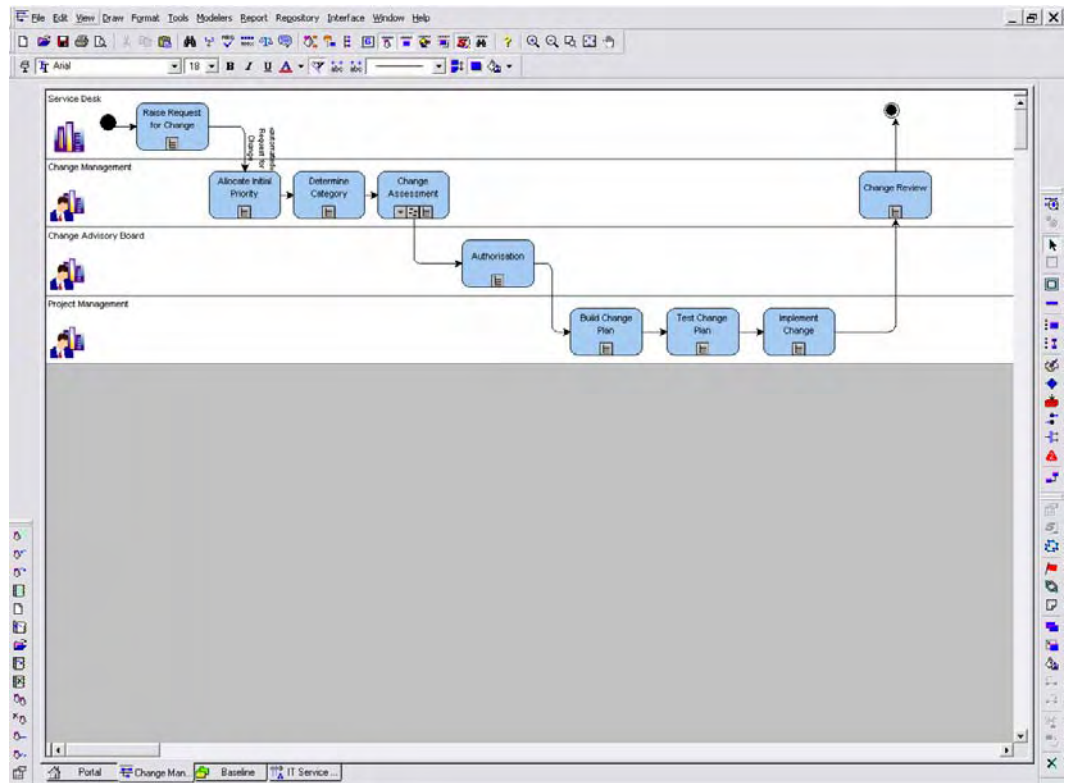
A business process is a series of activities designed to produce a product, service or major business deliverable. Business processes are thought of as a customer or end-users view of service management because many of them start and/or end with customer interaction (for example, a call to the Service desk or a Service Review).

ITIL processes are initiated by a customer or end-users request for services that the IT Department can provide. In response to the initiating event, work is performed in a series of steps that cross multiple organisational boundaries within the IT Department.

Ideally, each of these component activities adds value to what was produced by the previous activities, and directly contributes to the process's ultimate deliverable. These value-adding activities are those tasks which supports the overall business needs of your company.

To model a service management process it must be portrayed in a model that reflects the who, what, when, how, how much and how long aspects of the process.

ITIL processes are structured into a workflow model to show these details. Workflow models contain a number of different components to reflect the various facets of the process. The major components are shown in the following example:



But the trick is, how do you get to this level of detail without making too much of a leap?
You need the modelling equivalent of a high-level design. The process model.

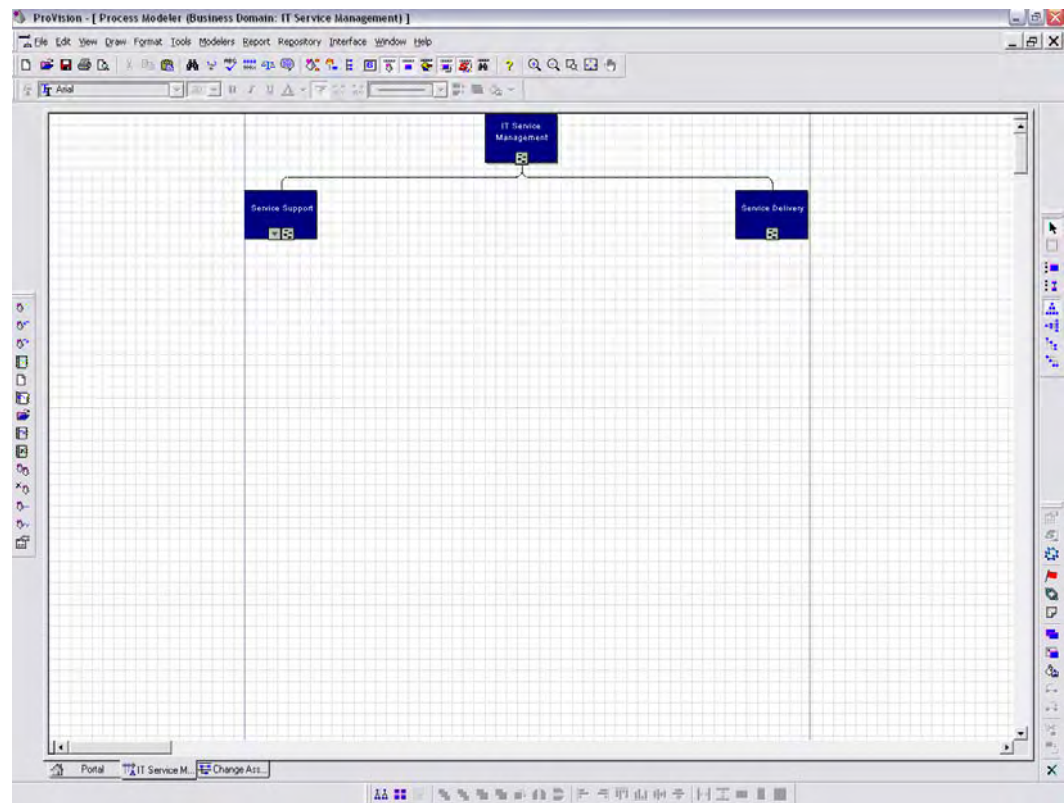
The Process Models

Do you recognise this?

Yes it's the major processes from the ITIL Framework:

- Service Support
- Service Delivery

Of course, we ought to have Infrastructure Management, Security, Application Management and the Business Perspective in there as well, but this is a small example.

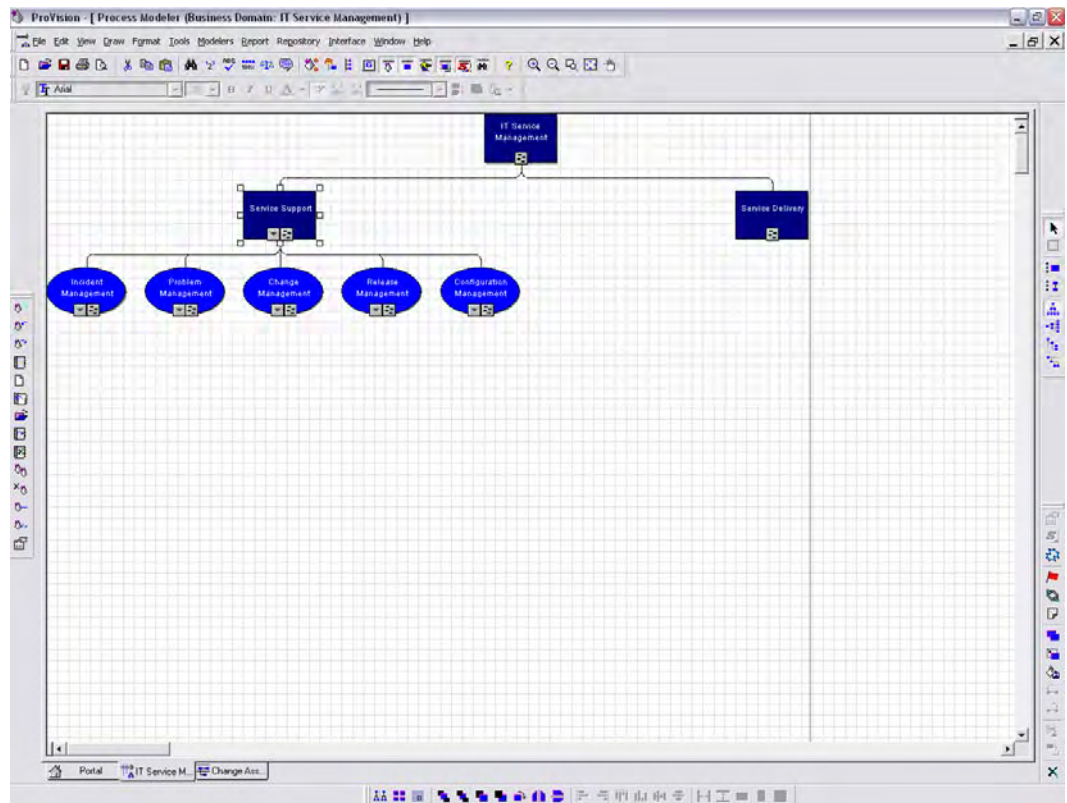


The object at the top is IT Service Management this is what we will deliver to the IS Department. To do this we have two subsets of processes:

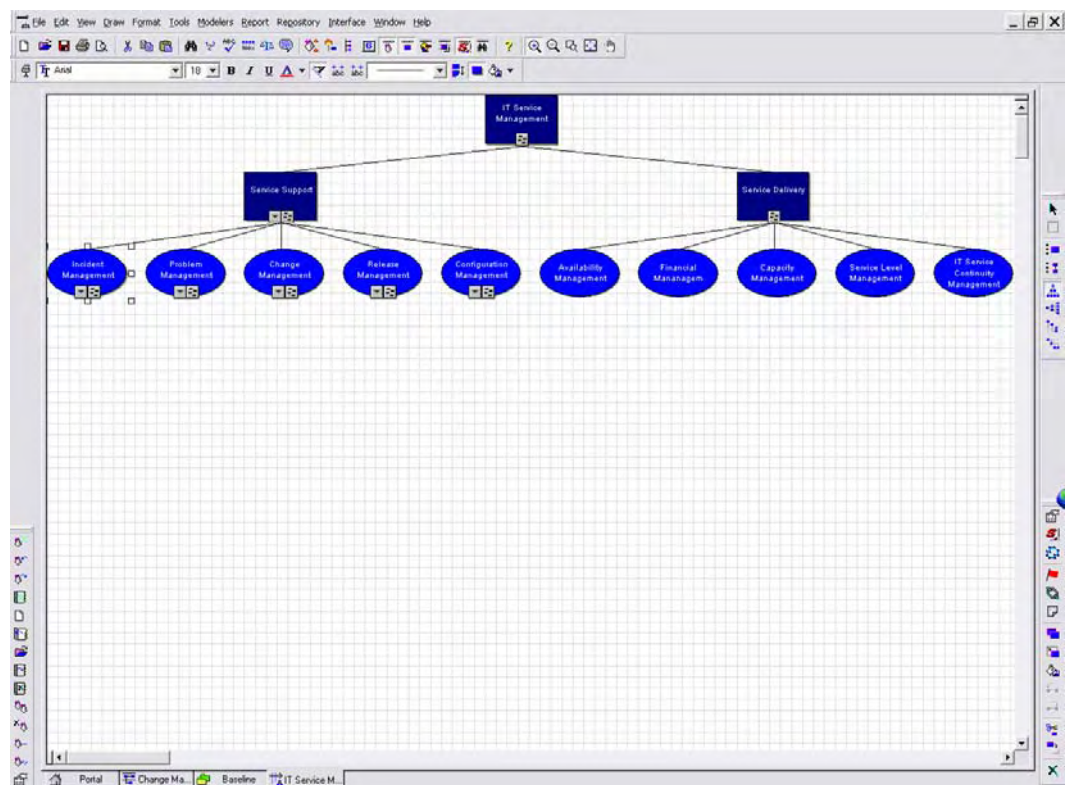
- Service Support
- Service Delivery

We have split these into two for obvious reasons.

We can now begin to pick one process, and introduce the next level of detail. Overleaf, we have populated Service Support with some recognisable processes:

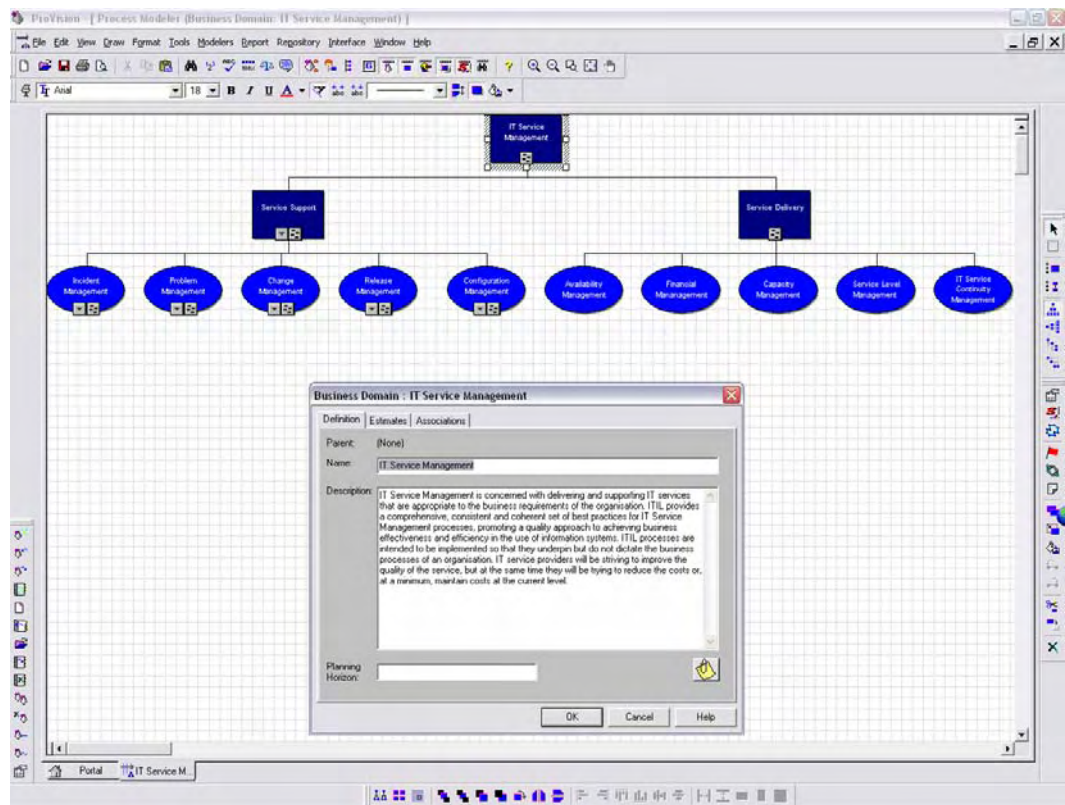


And then, adding in the Service Delivery processes:

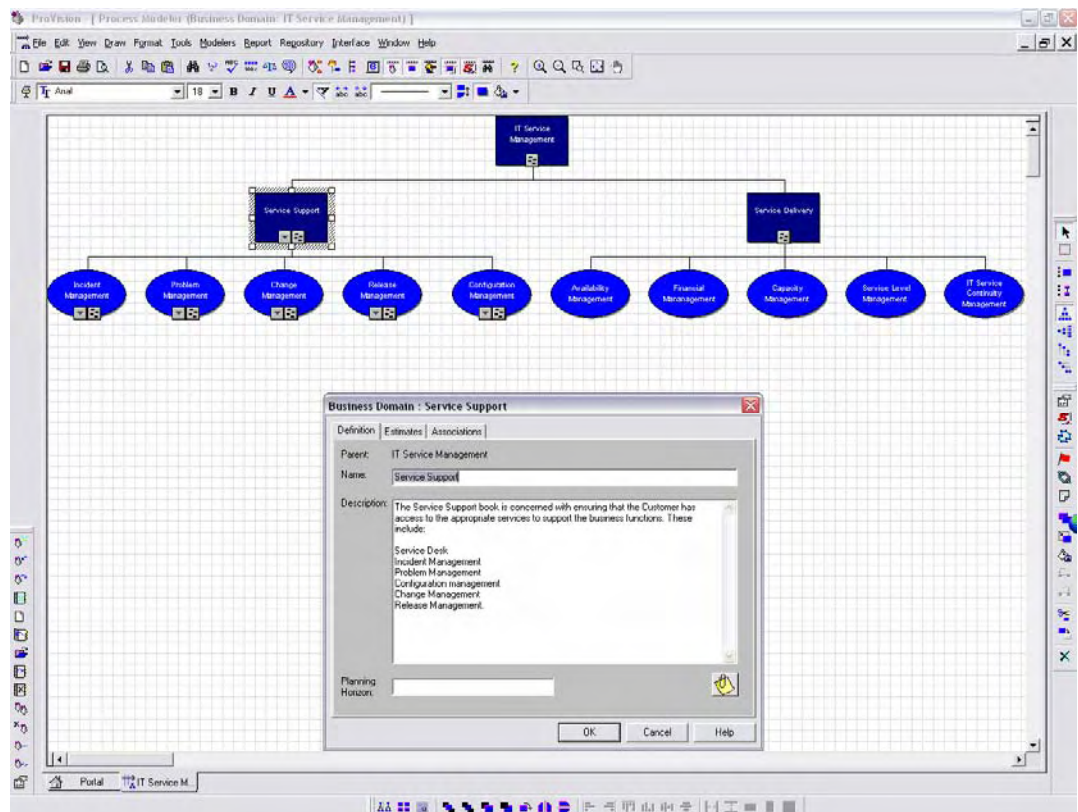


Now, let us look into each of these Objects and see what information has been captured.

Below shows some narrative around IT Service Management:



When we look into the Service Support object we see the narrative around this:

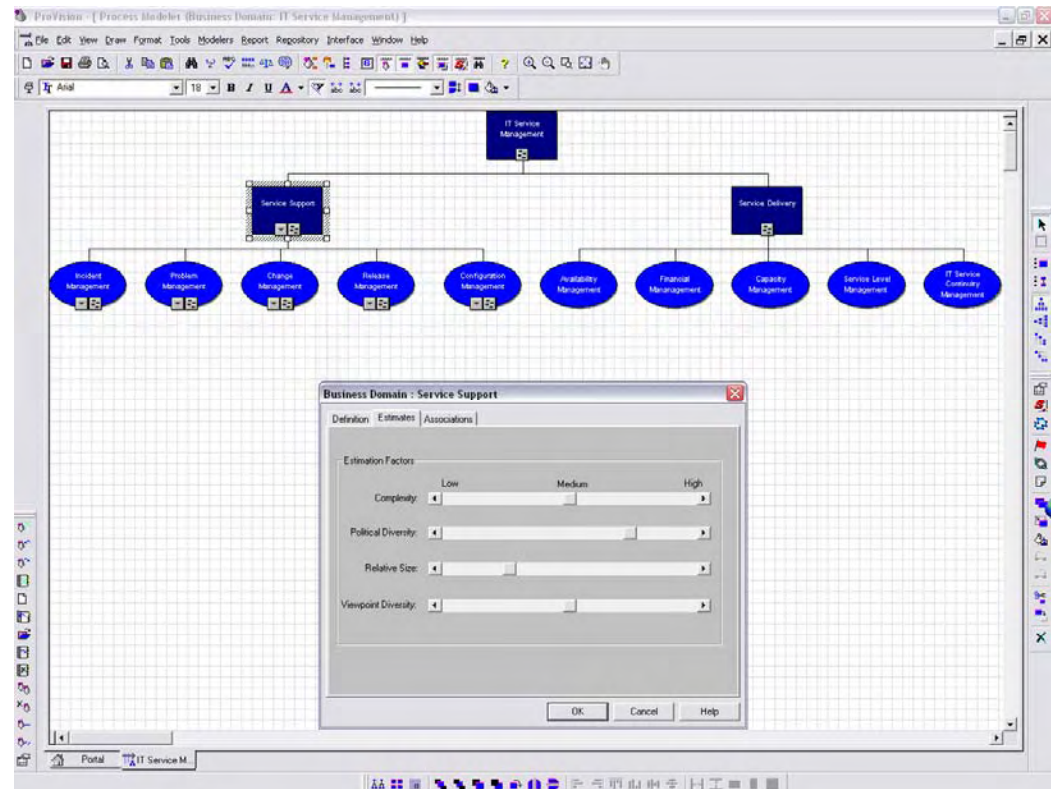


Now, the first question you may ask is "Why are you putting so much effort into documenting descriptions of the object?" Well, the answer is quite simple. The process modeller is used to hold all of the information about this project, model and simulate it, but they also have the ability to create documentation usually in the form of Word.doc files or HTML.

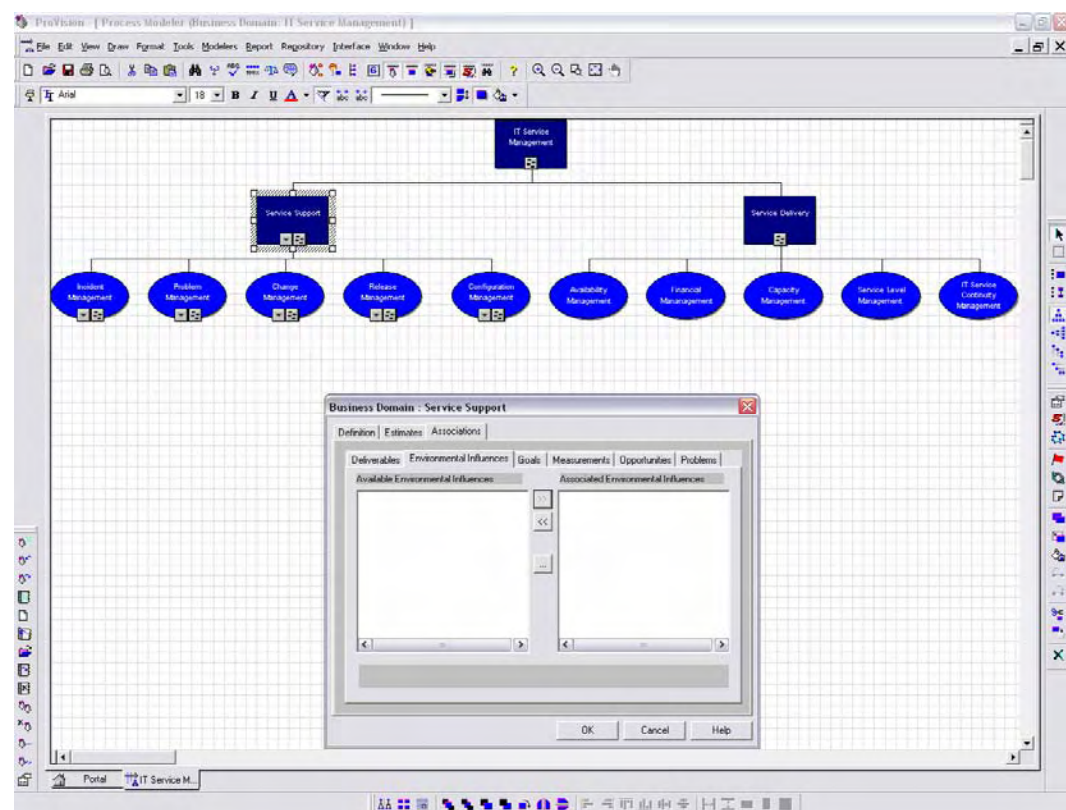
Once you have created the models, and you keep it up-to-date, you have a single 'version of the truth' as to how your Service Management Processes work, and you can distribute them via

printed documentation, or even better, publish onto your intranet. If you fully document objects now, well you will never have to do it again.

The tool we use also has the ability to include some subjective areas around complexity, political sensitivity and size etc. A nice way of gathering these sorts of information.



Finally, we have an opportunity to make associations with other objects such as Problems, Goals, and Organisations.

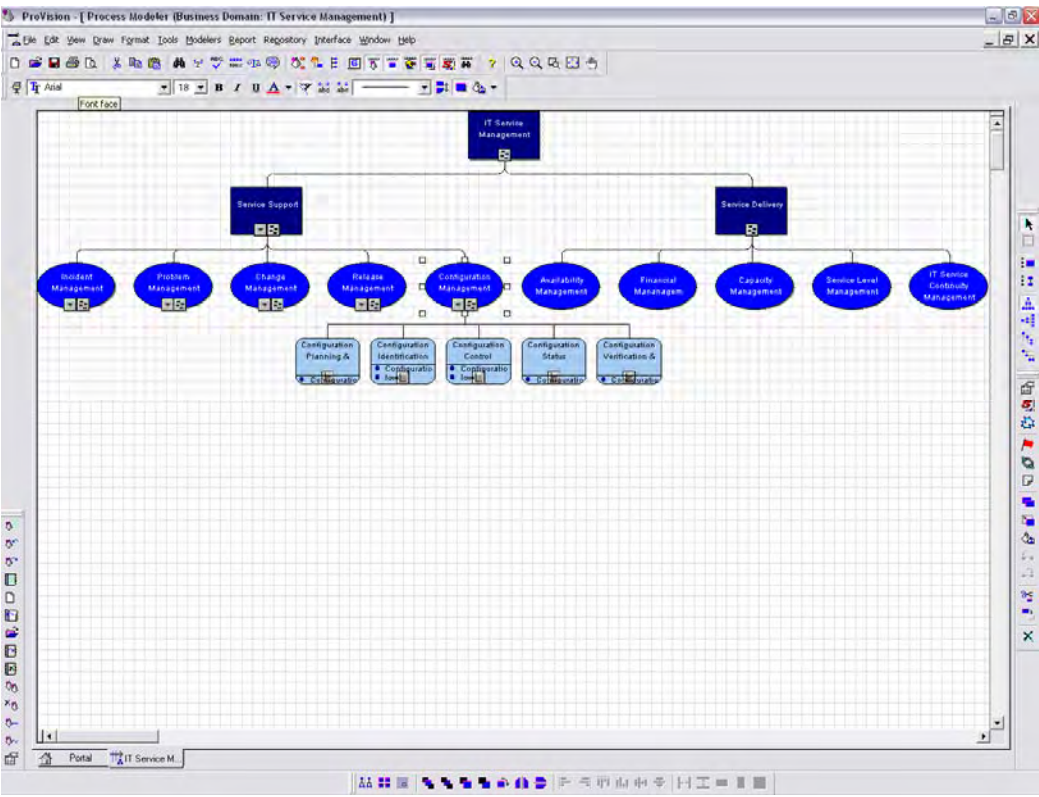


We have created the major processes that we need to model the ITIL Framework. Effectively, all of the chapter headings in the red and blue books. The next step is to drive these into more detail.

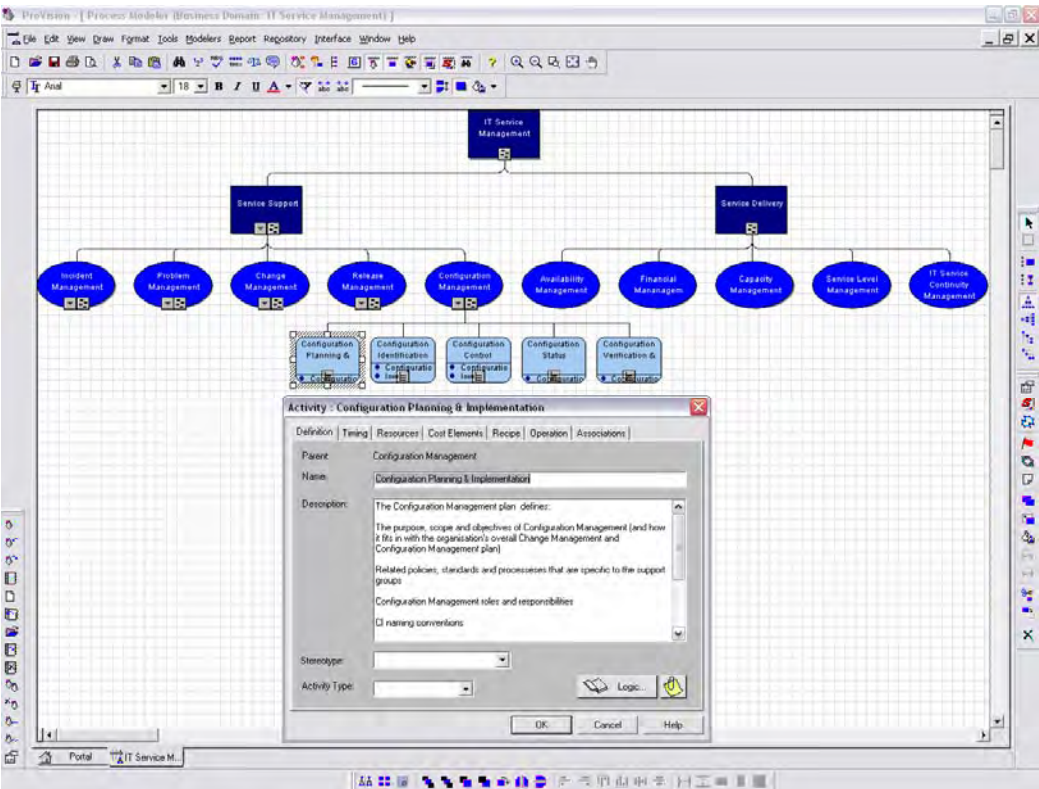
The Next Level of Detail

We need an example of the next level of detail, let us consider Configuration Management.

There are five major logical sub-processes within Configuration Management, and we enter them as objects into the model and link them to Configuration Management. The model now knows this grouping of process and sub-process belong to each other.



Of course, we will add a description to each of these sub-processes and make the usual associations (so for example, Configuration Planning & Implementation will be performed in the London office)



If you look at the diagram, you will see some new ‘Tabs’ we have not seen before, and at this level of detail a modelling tool begins to offer you the opportunity to enter:

- Timing
- Costs
- Resources

At this point we can start including real information that will be used in our modelling and simulation activities: what is the duration during this step, how many resources are applied to it, what are the costs in terms of time and/or materials?

We have come to a point where we really depart from documenting and holding process information. When we start including metrics of how processes perform or cost the value of our work increased exponentially.

For the moment we will ignore timings, costs and resources for the time being. The next chapter goes into the final level of detail, the workflows, and we will return to timings, costs and resources in Chapters 8 and 9 where we go into some detail about simulations and costings around these processes.

If you are using Birchwood Solutions approach to Process and Organisational Redesign for ITIL, the data required to input into modelling tool will have been collected at the High-Level Design phase of the methodology.

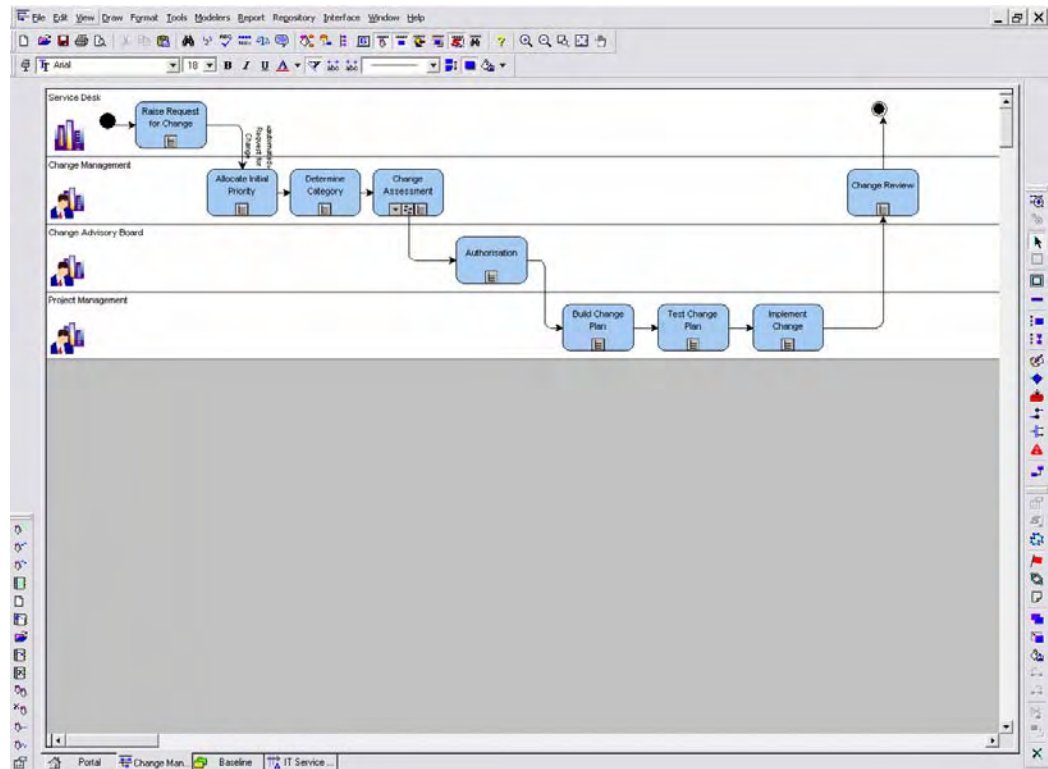
	<i>Process & Organisational Redesign for the ITIL® Framework</i> published by Birchwood Solutions. See Chapter 7: High-Level Process Design
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Workflow Modelling

The Workflow Modeller allows you to create a more detailed model of the activities that comprise your business process.

A workflow is a representation of a business process in terms of its component activities, and the flow of work among the activities. Since the process will cross organisational boundaries, the workflow model depicts the organisations performing the activities and the communication between the activities.

Workflow is the passing of control from one activity to another. A workflow signals the completion of one activity and the initiation of the next.



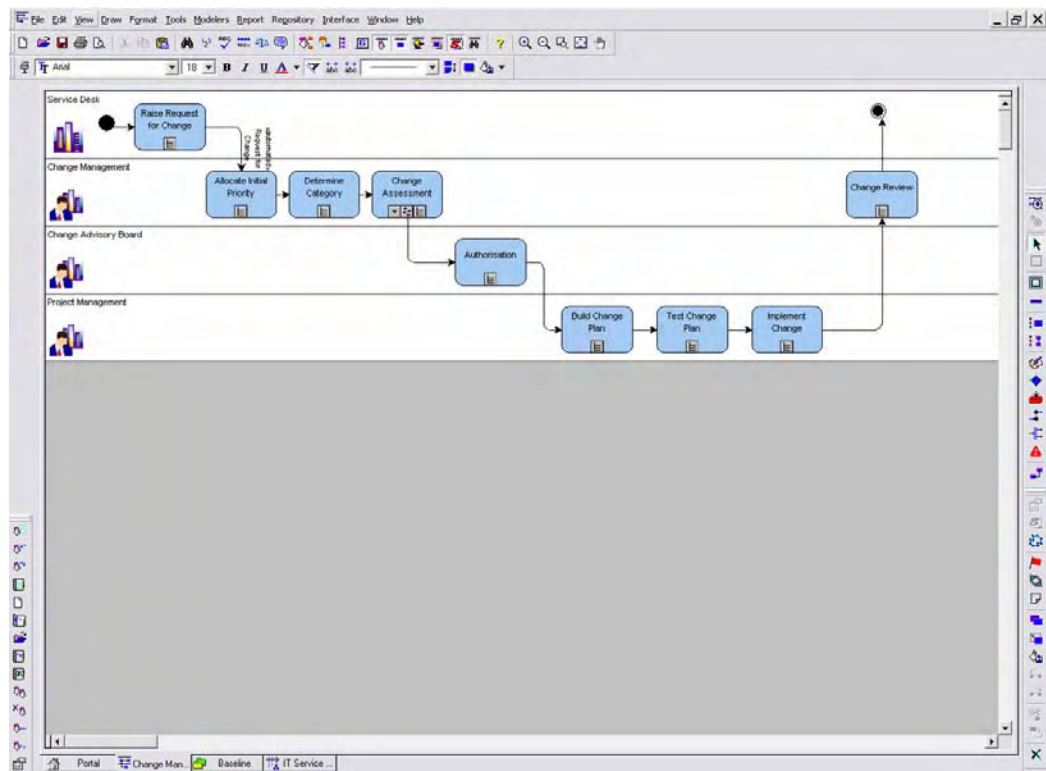
We have now got to the level of detail required to document activities and data flows.

Entering Workflow Objects

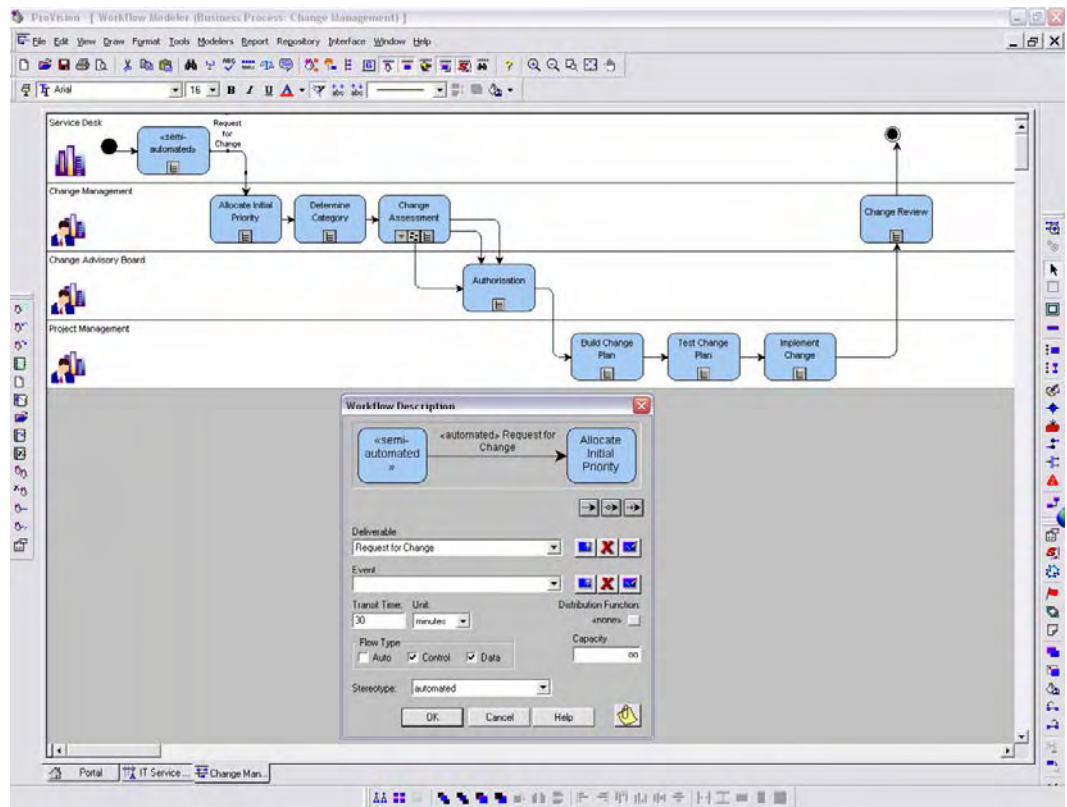
This is where you reap the benefits of the associations you have made. We select the process we want to work with (in this case Change Management), and indicate that you want to create a workflow, and the model knows what organisations are associated to this process, so the 'swim-lanes' are already made available to you.

From your detailed design information you can create a number of activities and move them into the appropriate 'swim lane'. The modelling tool enables you to link the activities together, name the information that flows between activities, and there you have it, a completed workflow.

Creating this workflow is very rapid indeed. Enough information is known about this process already, and so new information is required to populate the model. Additionally, we are not dealing with an application like Visio – the process modeller knows that we are representing processes and acts accordingly. All connections are dynamic, all activities are picked and dropped into the 'swim-lanes', it refits the workflow to make best use of the screen, and automatically makes the model as simple as possible. The workflow model below took just under a minute to create.



We need to be able to apply some information about the data transferred. We can select the line connecting the Raise Request for Change activity to Allocate Initial Priority, and we have some more attributes to enter:

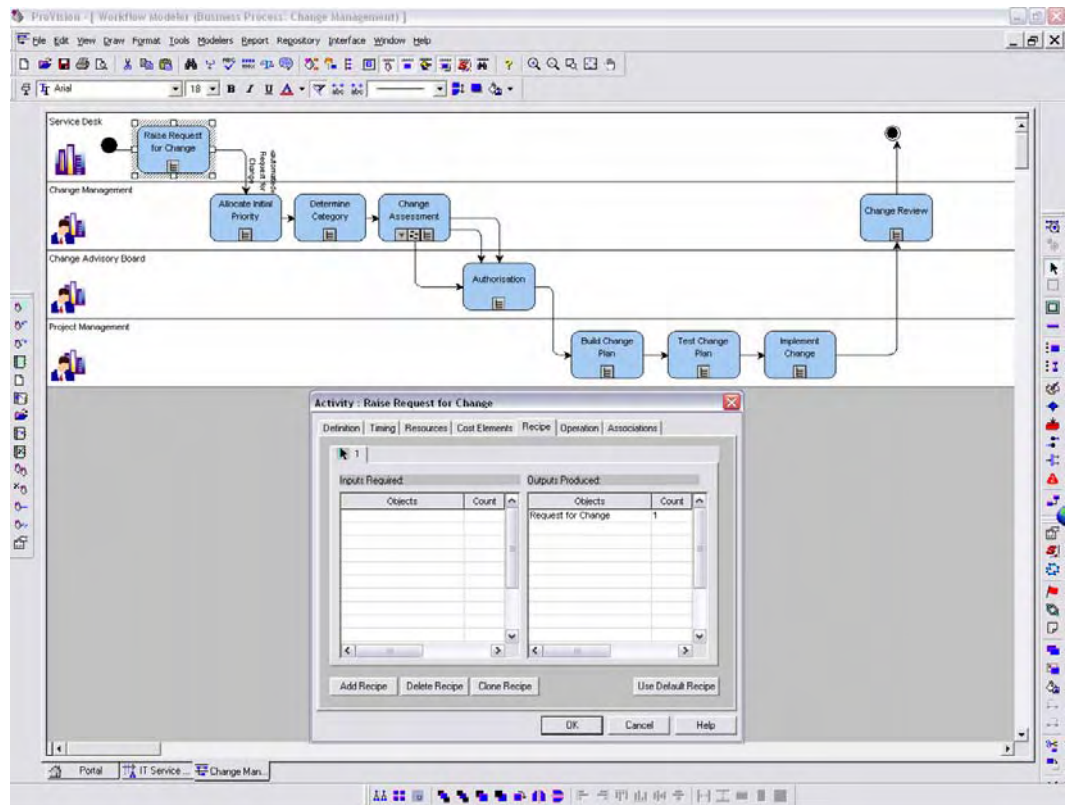


It shows us that the RFC is an automated data feed, and passed to the next activity within 30 minutes. The Request is passed automatically, and the transit time is 30 minutes (the system forwards them every 30 minutes except for Emergency Requests that are forwarded immediately)

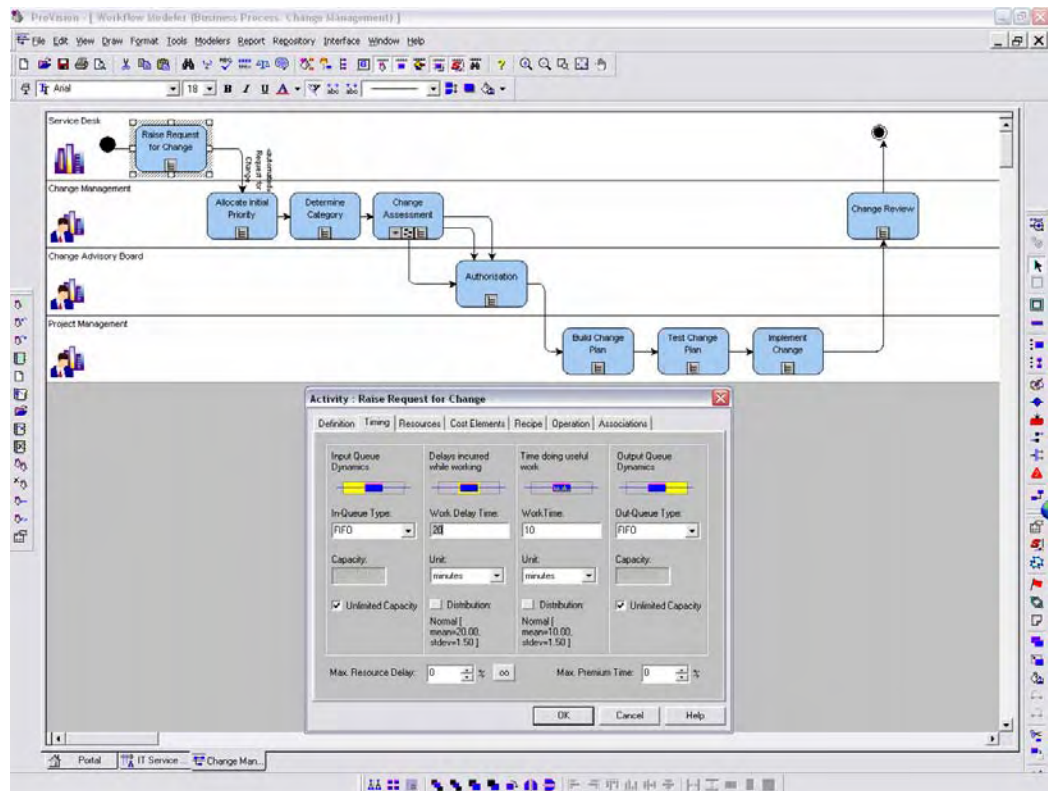
Because we have automatic systems, we can allow an infinite number of RFC's being raised (theoretically), but if the process is manual, we could limit the requests being raised.

The Distribution Function is highly important, but we will cover this in Chapter 8.

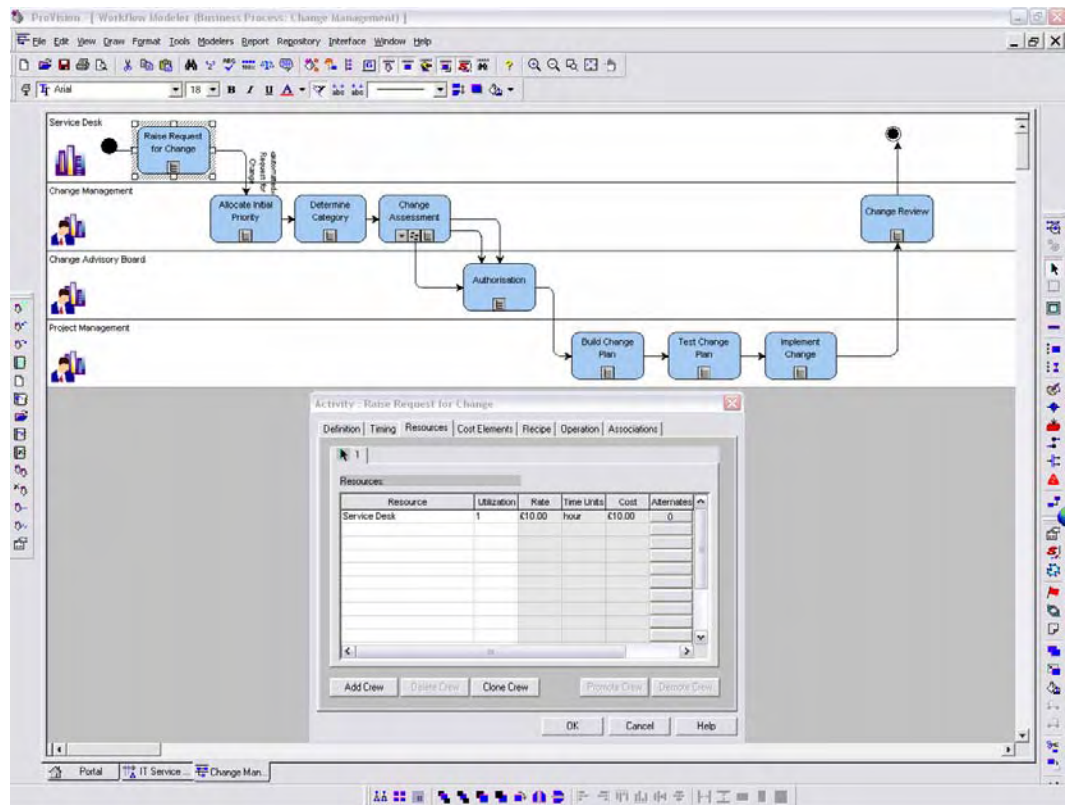
So the activities are defined, and the data transferred between the two, we can begin to think about the attributes we will be setting for each activity. Let us focus on the activity "Raise Request for Change":



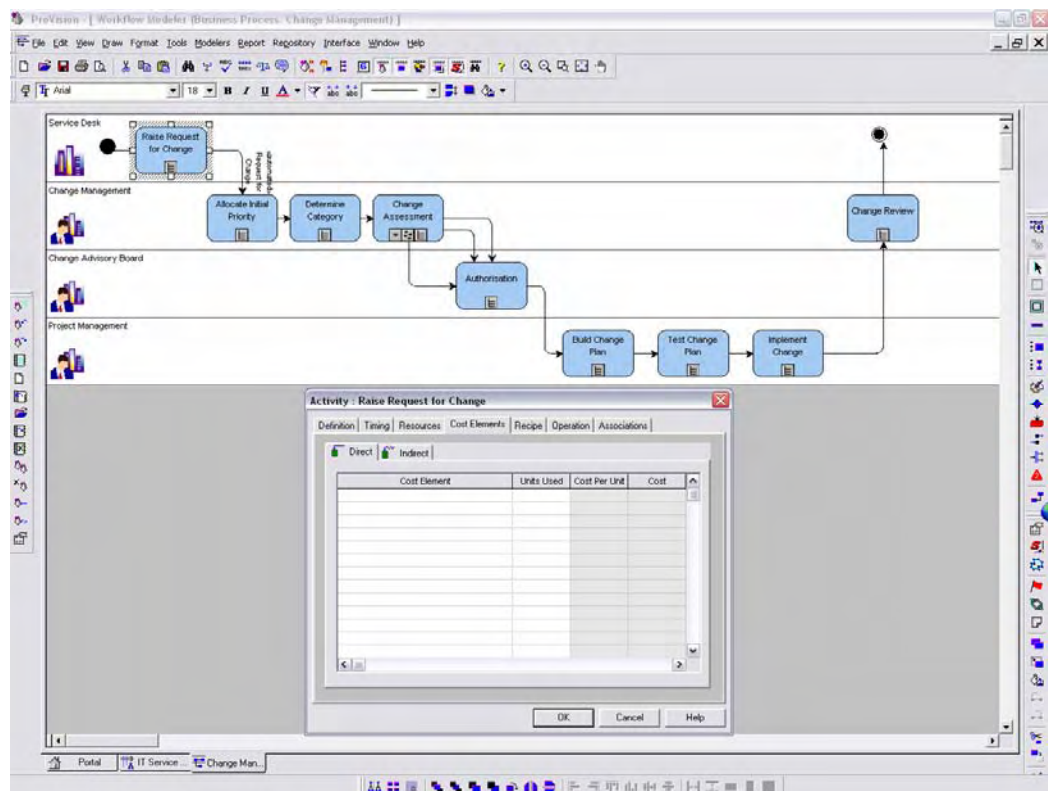
Here we have picked up the Request for Change generated in the last step – we don't have to define this output. If of course it generates another output product we can enter it in here.



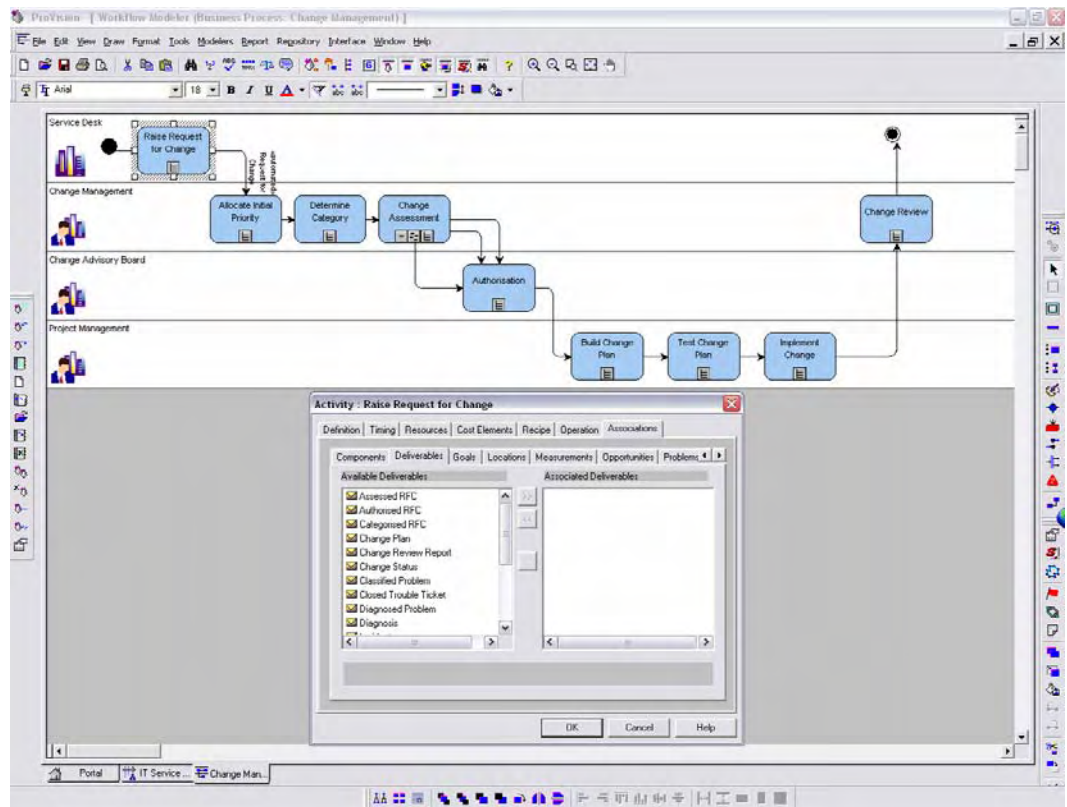
The timing 'Tab' is about the time activities spend processing the incoming data and passing it out as a new output product. This is the heart off the simulation aspects, and covered in Chapter 8.



This attribute is all about the resources required to run this activity. It requires a Service Desk resource. That resource can handle just one Request for Change at a time, and the internal costs are £10 per hour.



We have an opportunity to add additional costs to this process, whether they be direct or indirect costs (for example internal charges for desk space, systems etc.)



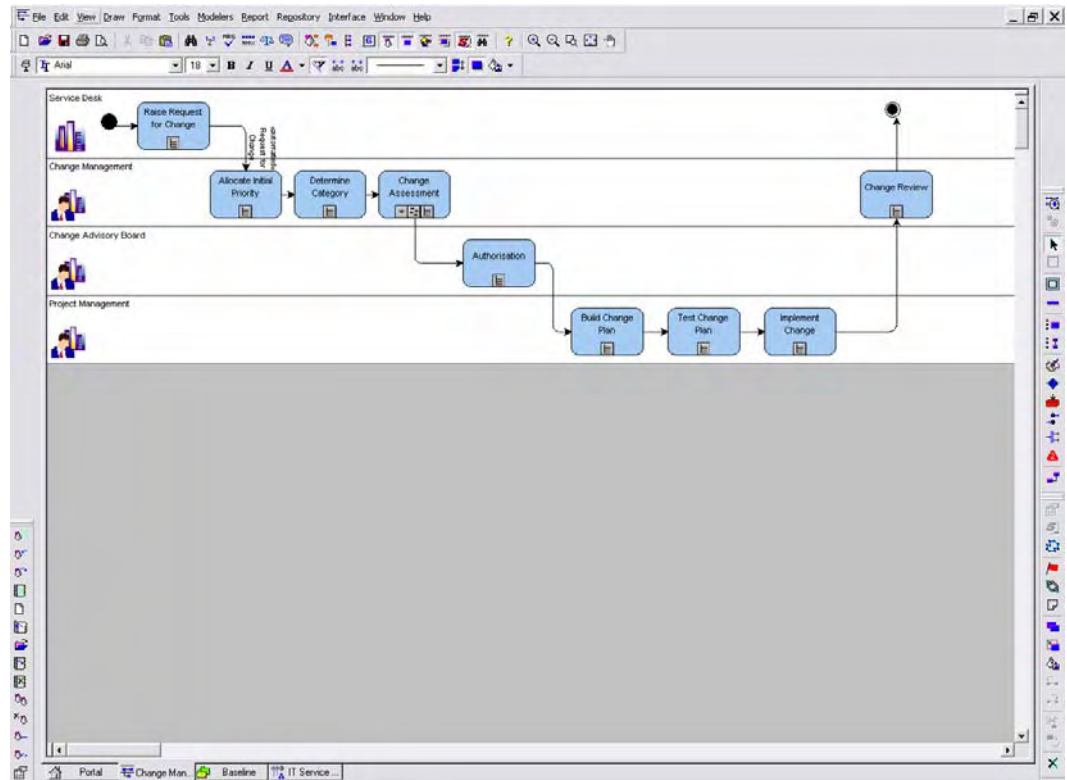
And of course, we can add associations to other objects: for example, associations to other deliverables, goals, organisations, problems etc.

We need to complete the attributes for all activities and data flows within the model.

Of course we are not finished, as each activity (such as Allocate Priority) has a more detailed workflow within it. So, the model has to be able to drill down further.

Additional Workflow Detail

So, the first level of detail complete we can now have a look at the next level down. Let us choose Change Assessment as a good activity to use as an example.

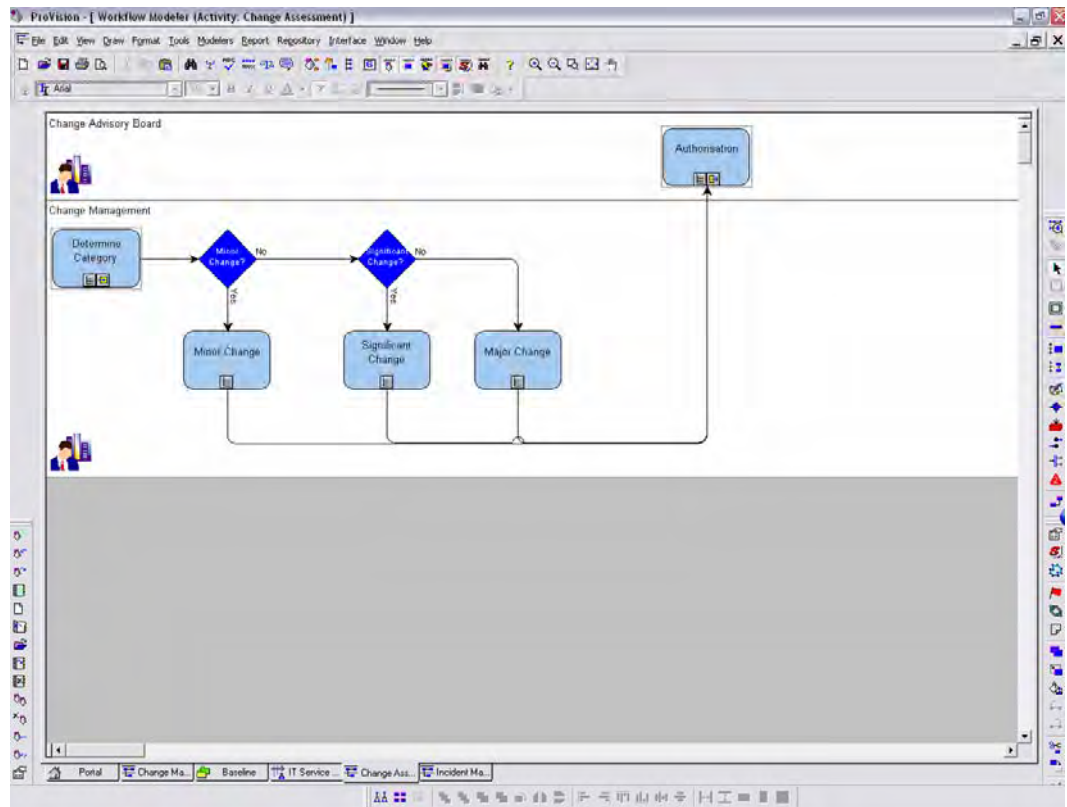


Change Management is quite a simple process, and once you have submitted an RFC, if deemed to be valid, it will be checked, prioritised and categorised before being assessed and sent to CAB for decisions to be made.

Now ITIL suggests that an RFC should be assessed in different ways, depending on the impact it will have on the services you offer. We have chosen three different ways of categorising impact:

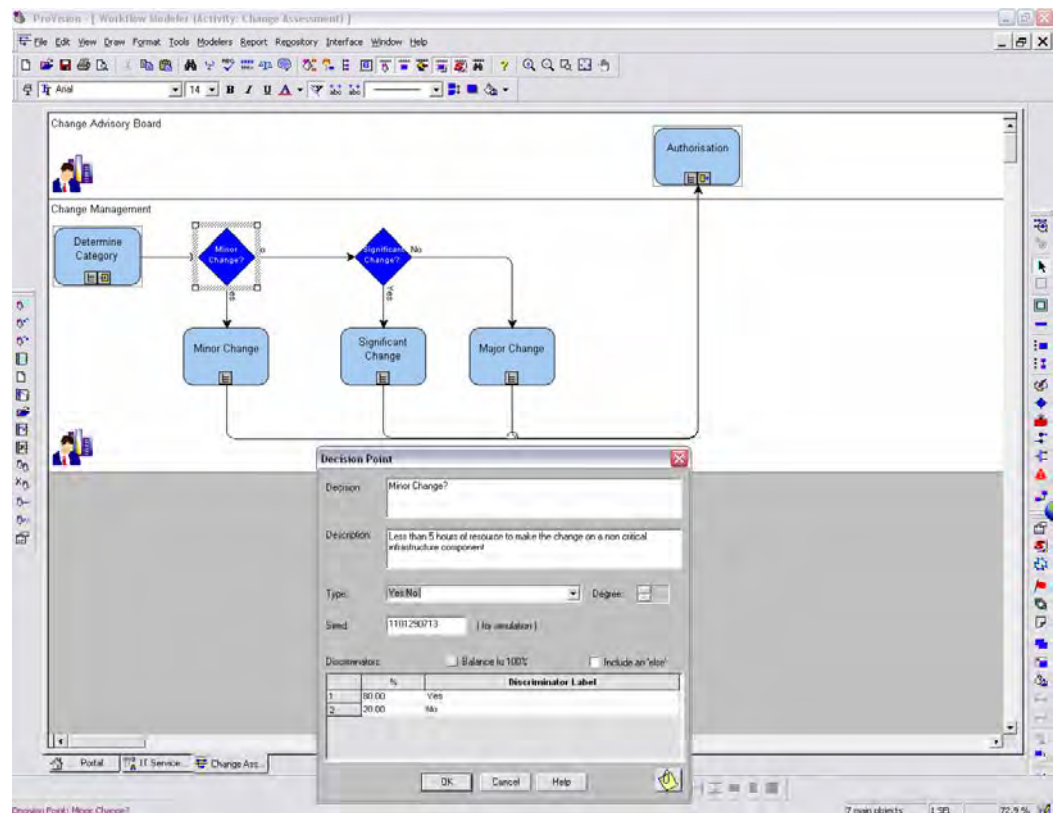
- Minor Change
- Significant Change
- Major Change

We need a workflow to be able to differentiate these. So, we tell the process modeller that Change Assessment requires another level of detail, and so it creates a new workflow model for you to populate. It knows what output it expects, it knows what output to generate, and it knows what associations are involved: all you need to do is 'plumb in' the gaps as follows:



As before, we add attributes to each object, and describe the data output from each activity – just as we have done before. This time we have some decision points (Blue triangles). Now, these are quite interesting – yes, we have seen them in a million Visio diagrams, but in modelling terms, this is very different.

We can see three different categories of change (minor, significant and major) and what the decision boxes consider is about the chances of it being a minor, significant or major change – and this is vital when simulating processes to find a best resource pattern, better service or reduced cost:



We are looking at the Minor Change decision box. We are describing how that decision is being made, and through metrics we have collected, the decision box says that there is an 80% probability of any RFC being submitted is a Minor one. The other 20% will be either significant or major (and the rest will be 15% Significant and 5% Major). From this information, when we run the simulator against it, the random RFC's will be thrown at this process in the proportions of 80:15:5 (and we know that this is correct, as we have analysed all Change Requests over the last year, and we are happy this provides a good representation).

Is this important? Yes, as each Change Category will have another layer of detail below that, and each workflow will have time, resources and costs associated to it:

- 80% takes on average 3 hours
- 15% takes on average 5 days
- 5% takes on average 30 days

Well, how do we know that minor, significant and major changes take this long? Again, we have sampled the changes that have occurred, and this is a reasonable representation)

We will have created a new workflow for each – another level of detail (but we won't describe it here, just another iteration of this section), which describes the steps involved in the type of change assessment along with the time, cost etc.)

Now, you may think this is a lot of work, and unfortunately this is true – but the end result is well worth it.

Two points need to be remembered:

1. If you start guessing numbers, you may as well not have bothered starting all of this.
2. Although we will be spending a lot of time documenting each activity, workflow and process, remember that this will be your final documentation either printed out or published to the web. The clearer you are now, the better the final documentation will be.

If you are using Birchwood Solutions approach to *Process and Organisational Redesign for the ITIL® Framework*, the data required to input into modelling tool will have been collected at the detailed process phase of the methodology.

	Process & Organisational Redesign for the ITIL® Framework published by Birchwood Solutions. See Chapter 8: Detailed Process Design
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Objects & Reuse

We have been using the word *object* to describe organisations, processes, workflows etc. because they really are objects – self contained entities in their own right and can be used anywhere in the model, and this means they are reusable.

An object (for example a workflow) can be used in one process, and reused in another: for example, if within Change Management you need an Assessment, you create one. Now, if Release Management requires an Assessment, you could actually reuse the existing object rather than create a new one.

Additionally, if you have an object such as an Organisation and some attribute changes (for example you have moved the location of the help desk, and you want to update location details), you only have to do this once, as each process or workflow using this object will automatically pick up the new information.

If a data flow object changes (for example, we improve the transmission time), then each workflow using this element of data will pick up the new transmission time and use this new value.

The use of objects in process modelling has revolutionised the way we work today.

As we complete this Chapter, we have finished the real hard work. We have a fully documented process model, and now we can begin the real work, modelling the processes, simulating processes and looking at ways of reducing costs.

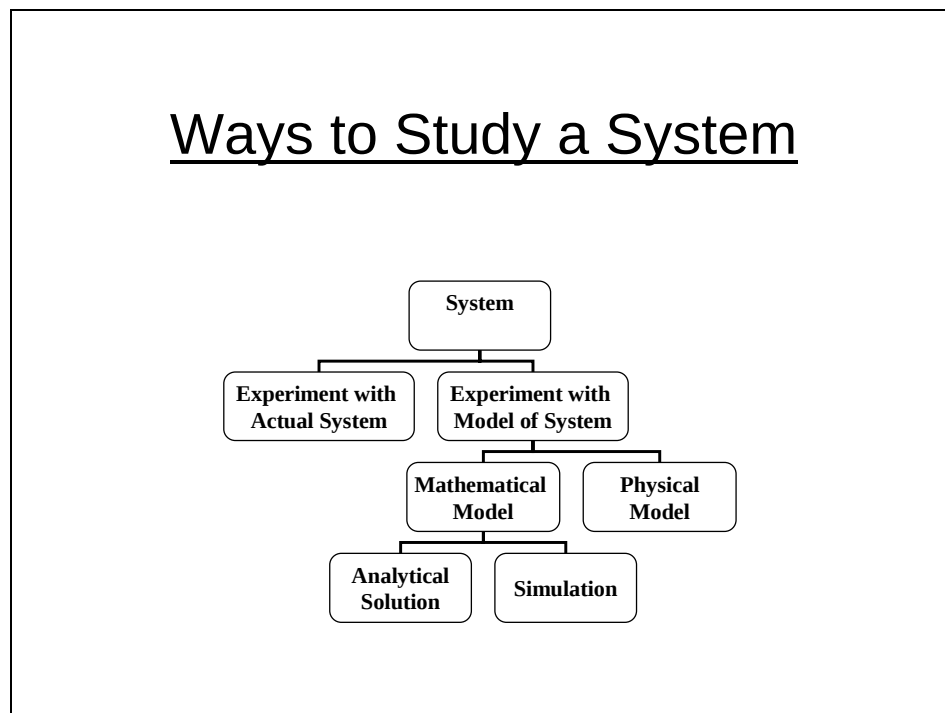
Process Simulation

When we use the word *simulation*, we refer to any analytical method meant to imitate a real-life system, especially when other analyses are too mathematically complex or too difficult to reproduce.

Without the aid of simulation, a model will only reveal a single outcome, generally the most likely an average scenario

Once a business process is modelled and detailed cost and timing assignments have been entered, variations of the process can be identified using process scenarios.

But why should we even consider simulation? What are the alternatives? The diagram below shows the alternatives. Ways to change a system:



Well, let us have a look at your options:

1. Experiment with actual system. Well you have tried this before, it really is not worth the risk, and that is why you are reading this book.

2. OK, so you need to experiment on a model. Can you do a 'Pilot' or a 'Proof of Concept' in a real production environment? Unlikely, the author has had the opportunity to do this once in over 30 years!
3. If you know a way of working with basic information, applying it to a standard formula and out pops and answer..... then tell us all! The mathematics of this approach is quite awesome; these analytical solutions are used in trying to calculate how people behave when evacuating a burning building.

So yes, unless you are going to just experiment on your live Service Management environment, you have to think seriously about simulation.

How do you develop a model? The following steps are shown below:

1. determine the objectives and goals of the model
2. Build the conceptual model
3. Convert into a specification model
4. Enter into a computational model
5. Run
6. Verify
7. Validate

This is usually an iterative process.

Can we reiterate once more, this handbook deals with points 4 and 5 above – a lot of work had been completed before we embark on the simulation, and further work needs to be completed afterwards.

Process Scenarios

A scenario is all or a portion of a process's workflow that defines a particular way in which the business executes the process. Scenarios are developed for the purpose of analysing these business process variations. Each process can contain any number of scenarios allowing the user to perform an unlimited number of "what if" analyses. By examining each scenario you can determine the most cost-effective and/or time-efficient version of the process.

- Different customers or end-users targeted by the process
- A selected set of activities that define a unique sequence through the process
- A version of the process that involves a unique set of organisations or roles
- A version of the process that includes cross-trained resources
- Introducing the use of tools that will remove manual activities (this can be used to determine whether new Service Management tools can provide a Return on Investment)
- Versions that have differing levels of resources attached to them, assisting you in identifying and removing bottlenecks

The point being made here is this: you will not be running just one simulation on a process. Once you see the results of a simulation, you will 'tweak' some parameter or make adjustments to a process and run the simulation again and see the impact it has on the previous run.

Once you have the model set up initially, almost infinite different scenarios can be run to see if it provides an advantage. If you introduce costs to the resources you add to the model, then you use this as the basis of cost-justifying change, which adds significant value to your IT department.

So let us begin with an overview of simulation, move onto two mathematical approaches to simulating, and then we can see how this all works in practice.

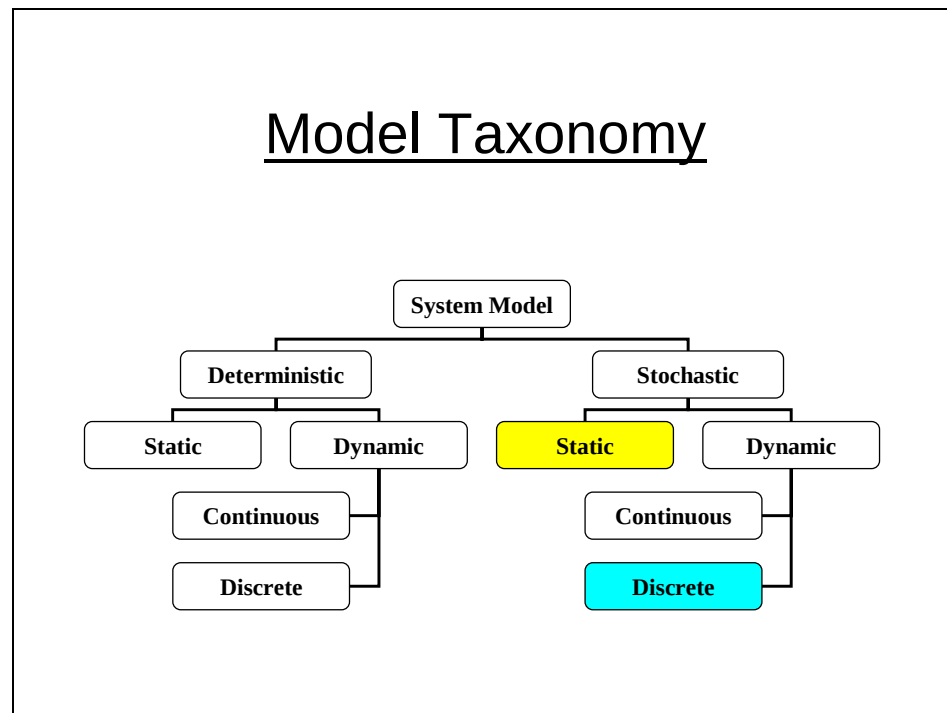
Simulating the Process

Simulation is a powerful tool which is often the best means, short of a pilot implementation, to answer the "What if" questions, to estimate the costs incurred by the alternatives being proposed, to save money and resources when analysing alternatives, and to provide a structured framework capable of being used over and over again.

The drawbacks for simulation includes the time and expense to develop and program a simulated run, and the fact that narrative analytical techniques can suffice-although they may not portray the results as succinctly as the simulation.

Before we start looking at simulations in detail, we have to understand a little about modelling, and the language it uses.

Let us begin with a diagram, and take it from there. Below is a Model Taxonomy:



At the top level of the diagram is the System Model, this is the system we wish to simulate. Later on in this chapter we will be looking at the system called Change Management. The model is the conceptual framework that describes the system.

Stochastic simply means that state variables are random, whilst Deterministic means they are not (a Deterministic model creates the same result every time). If you consider a process such as Change Control, the arrival of change requests is pretty much random, and so stochastic models are generally used for simulating processes.

The next level down shows Static and Dynamic as two possible alternatives: Is time is a significant variable then use Dynamic, otherwise Static is an acceptable approach.

Finally, the lower layer considers whether the process evolves continuously, or at discrete points in time: and when you look at a process such as Change Management, it is very much a linear process, and involves queues, so Discrete would be used in this case.

Now, this leads to two approaches of simulating systems:

- **Monte-Carlo Simulation:** Stochastic, Static – the yellow block in the diagram
- **Discrete-Event Simulation:** Stochastic, Dynamic, Discrete – the blue block in the diagram.

Both Monte-Carlo and Discrete-Event Simulation are used extensively in simulating processes, and most process modelling tools allow for both approaches.

So how are you expected to choose between two modelling approaches, and your process modelling tool allows for both?

Well, some words of advice:

The Discrete Event Simulator (DES) is used to simulate business processes, as they would perform in the real world. The Discrete Event Simulator provides the ability to analyse the dynamics of a (optionally nested) workflow model. It enables the user to create a simulation environment and then "run" the workflow model in this environment. The model's components can be adjusted and the process re-simulated to examine the effect of changes.

As a result, you will be able to see bottlenecks, process durations, costs incurred and net throughput. Simulating process models allows the organisation to experiment with change, and succeed or fail before implementing change.

DES introduces a higher level of precision than Monte Carlo simulation. Indeed, the concepts of Monte Carlo simulation are also valid and expanded upon by Discrete-Event Simulation. DES introduces additional factors into the model to more closely align the simulation with reality. Discrete event simulation can manage multiple events that trigger the process. Resources used by the process scenario can be restricted to simulate a limited resource situation. Discrete-Event Simulation is excellent for identifying bottlenecks in a process scenario based upon too many arrival events or a lack of resource capacity.

Monte-Carlo simulations tend not to take into account the time evolution aspects of the process, and as such we don't have to enter timing details at each step.

So the choice is simple, it is a trade off of accuracy, complexity and ease of entering information into the model. The majority of work undertaken by Birchwood Solutions usually involves the use of DES as opposed to Monte-Carlo

The Maths behind it

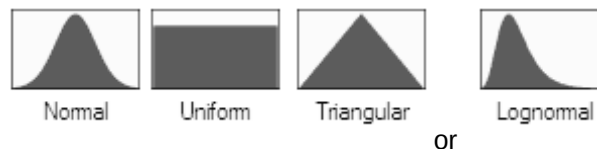
This short section gives a little bit of background understanding of how the mathematics works. If you are not interested in this, then skip to the next section.

Monte-Carlo Simulation

Monte Carlo simulation was named for Monte Carlo, Monaco, where the primary attractions are casinos containing games of chance. Games of chance such as roulette wheels, dice, and slot machines, exhibit random behaviour (As an aside, as this page was being keyed by the author, Prince Ranier of Monaco's death was announced – what are the chances of that!).

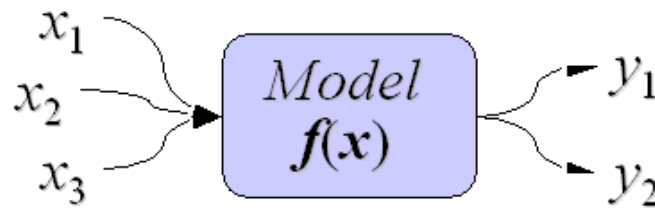
The random behaviour in games of chance is similar to how Monte Carlo simulation selects variable values at random to simulate a model. When you roll a die, you know that either a 1, 2, 3, 4, 5, or 6 will come up, but you don't know which for any particular roll. It's the same with the variables that have a known range of values but an uncertain value for any particular time or event (e.g. Number of Change Requests submitted, staffing needs, phone calls per minute etc.).

For each uncertain variable (one that has a range of possible values), you define the possible values with a probability distribution. The type of distribution you select is based on the conditions surrounding that variable. Distribution types include:



The Monte-Carlo method is a technique that involves using random numbers and probability to solve problems.

Computer simulation has to do with using computer models to imitate real life or make predictions. When you create a model, you have a certain number of input parameters and a few equations that use those inputs to give you a set of outputs (or *response variables*). This type of model is usually deterministic, meaning that you get the same results no matter how many times you re-calculate.

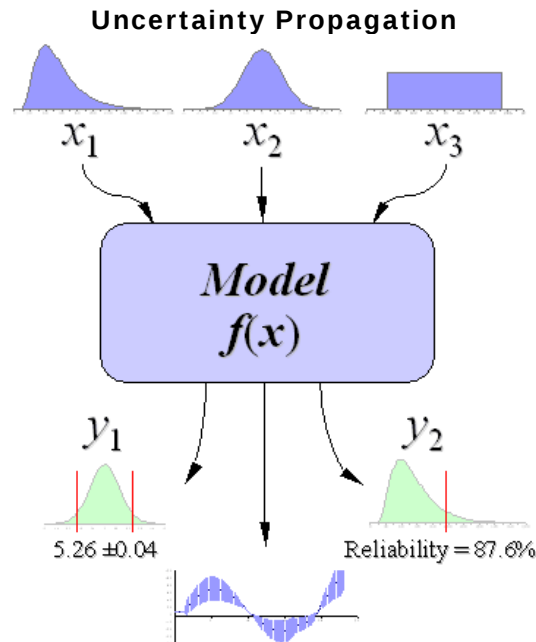


A parametric deterministic model maps a set of input variables to a set of output variables.

Monte Carlo simulation is a method for iteratively evaluating a deterministic model using sets of random numbers as inputs. This method is often used when the model is complex, nonlinear, or involves more than just a couple uncertain parameters. A simulation can typically involve over 10,000 evaluations of the model, and even with today's fast computers, we at Birchwood Solutions tend to run them overnight.

The Monte Carlo method is just one of many methods for analysing uncertainty propagation, where the goal is to determine how random variation, lack of knowledge, or error affects the sensitivity, performance, or reliability of the system that is being modelled.

Monte Carlo simulation is categorised as a sampling method because the inputs are randomly generated from *probability distributions* to simulate the process of sampling from an actual population. So, we try to choose a distribution for the inputs that most closely matches data we already have, or best represents our current state of knowledge. The data generated from the simulation can be represented as probability distributions (or histograms) or converted to error bars, reliability predictions, tolerance zones, and confidence intervals.



Above shows the basic principle behind Monte Carlo simulation

Back to the Change Management process we are considering in this chapter, the model above could have inputs as:

x_1 being the raising of RFC's

x_2 represents assessing change

x_3 represents approval by CAB

y_1 will represent the average transition through this process and standard deviation

y_2 represents the confidence we should have in the model.

If you have made it this far, congratulations! Now for the fun part! The steps in Monte Carlo simulation corresponding to the uncertainty propagation shown in Figure 2 are fairly simple, and can be easily implemented in Excel for simple models. All we need to do is follow the five simple steps shown below:

- **Create a parametric model**, $y = f(x_1, x_2, \dots, x_q)$.
- **Generate a set of random inputs**, $x_{i1}, x_{i2}, \dots, x_{iq}$.
- **Evaluate the model** and store the results as y_i .
- **Repeat** steps 2 and 3 for $i = 1$ to n .
- **Analyse the results** using histograms, summary statistics, confidence intervals, etc.

And that is why we let the modeller do the work!

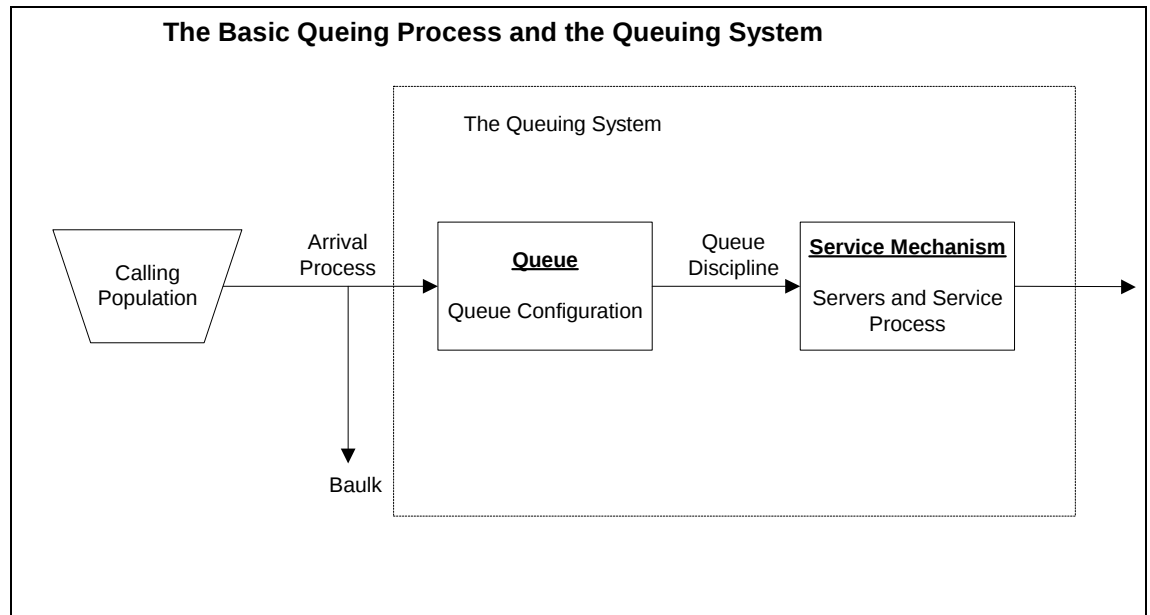
Discrete-Event Simulation

Discrete event simulation involves modelling a system as it progresses through time and is particularly useful for analysing queuing systems. Such systems are common in the ITIL environment and are obvious as Raising Incidents, Requests for Change, Assessing Changes, and Authorising Changes etc.). They are also widespread in everyday life often noticeable at supermarket check outs, road traffic junctions, and the Harrods January sale in London!

A major strength of discrete event simulation is its ability to model random events and to predict the effects of the complex interactions between these events. Experimentation is normally carried

out using the computational model to answer 'what-if?' questions. This is achieved by changing inputs to the model and then comparing the outcomes. This type of simulation is primarily a decision support tool.

In very simple terms, DES uses the model below:



Let us say that this represents a call from an End- User to the Service Desk.

The calling population are your End-Users encountering Incidents, and have access to the company Service Desk telephone number. Then disaster strikes, your Sales Order Processing system goes down, and the users begin to call the Service Desk.

Initially, callers get into the queue to talk to a Service Desk Analyst – the calls will have a specific pattern called the arrival process: in this case it's called 'all in one go!', as 350 sales order processors try to phone the Service Desk at the same time.

Eventually, the analysts are fully occupied, and the telephone system cannot hold any more waiting calls, and so will not place them into the queue (engaged tone, or even worse, a pleasant voice which says "Unfortunately all of our operatives are busy, and although your call is important to us, we ask you to call back later" and you are disconnected. Technically, this is a Baulk – the calling population has not joined the queue (except in this case, enforced)

So, what is actually happening in the queue? Well, people are waiting, and no doubt having soothing music being played to them, and an occasional announcement saying 'You are in a queue, we are experiencing high volumes at the moment, but as soon as an operative is free you will be put through' and more soothing music.

Now, how is this queue configured? Is it a First In – First Out (FIFO)? Are callers answered on a random basis? Do certain telephone numbers who call the Service Desk go straight to the front of the queue (for example, Directors or Senior managers)? Or in the case of the author, he maintains he always joins a FILO queue (First In – Last Out)!

This represents the queue configuration.

Finally, when you reach the analyst, the service mechanism will depend upon the number of Service Desk Analysts, what they actually do when you call. How much real work is spent on logging the call and how much time is spent wasted (for example, while the user is trying to find the asset number on the PC etc.).

Within DES, you document every step in a process with the above information – even to the point where Baulk occurs (is it infinite, or do we only hold a maximum of 20 in a queue?). Every component is documented in each way, and you then run the simulation.

You can then begin to see the bottlenecks and you can try to add a few more resources to the 'Receive Incident' workflow – and see if that assists in balancing the economic trade-off between service capacities and waiting times.

You can begin to play with the processes, shorten them, change them – and again, see what this will look like in real life.

This handbook cannot go into detail behind the mathematics of queuing theory, but for those interested, below is a recommended text on process modelling, design & simulation and indeed covers the necessary mathematics and some nice software to try and get some ideas on how this all works.

	Business Process Modelling, Simulation and Design by M Laguna and J Marklund published by Pearson Prentice Hall. ISBN: 0-13-091519-X (pbk)
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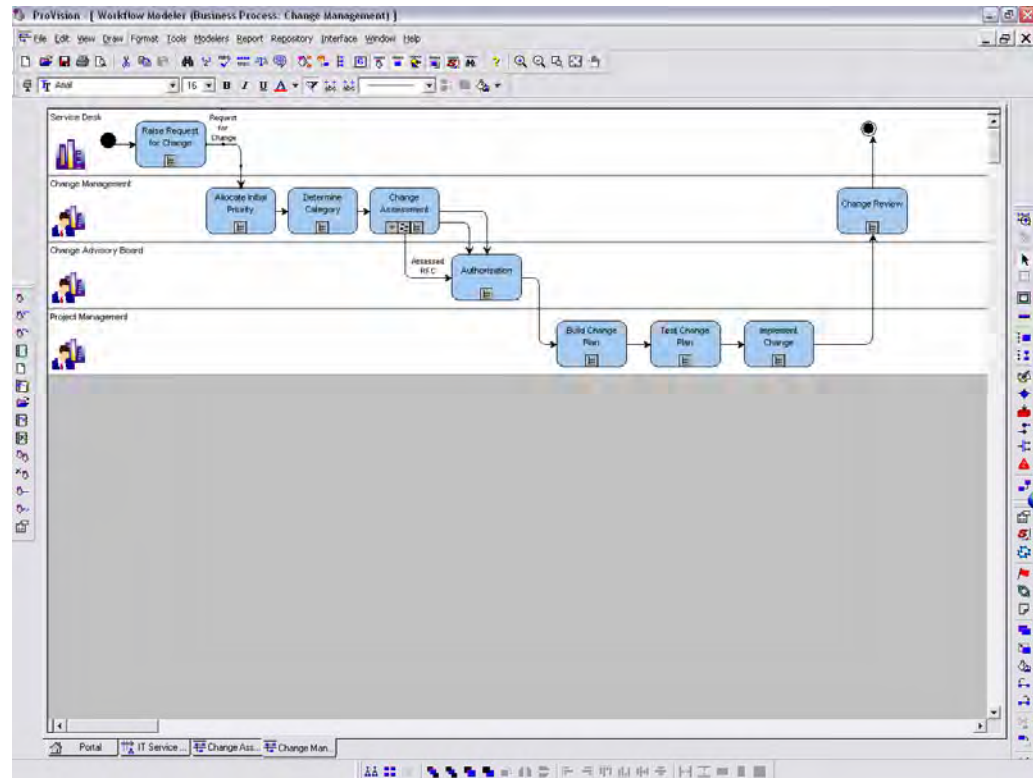
Discrete Event Simulation

So with the theory covered we can now turn to the practicalities of performing this simulation in a process modelling tool.

As we have alluded to, we will be using the Change Management process in this example.

Our objective is to find the balance between throughput of Change Requests to support business needs, and to remove any bottlenecks within the Change Management process

So, below, the process we are concerned with is:



We now want to be able to add specific data into the model as required by the modelling tool. Two types of data are required:

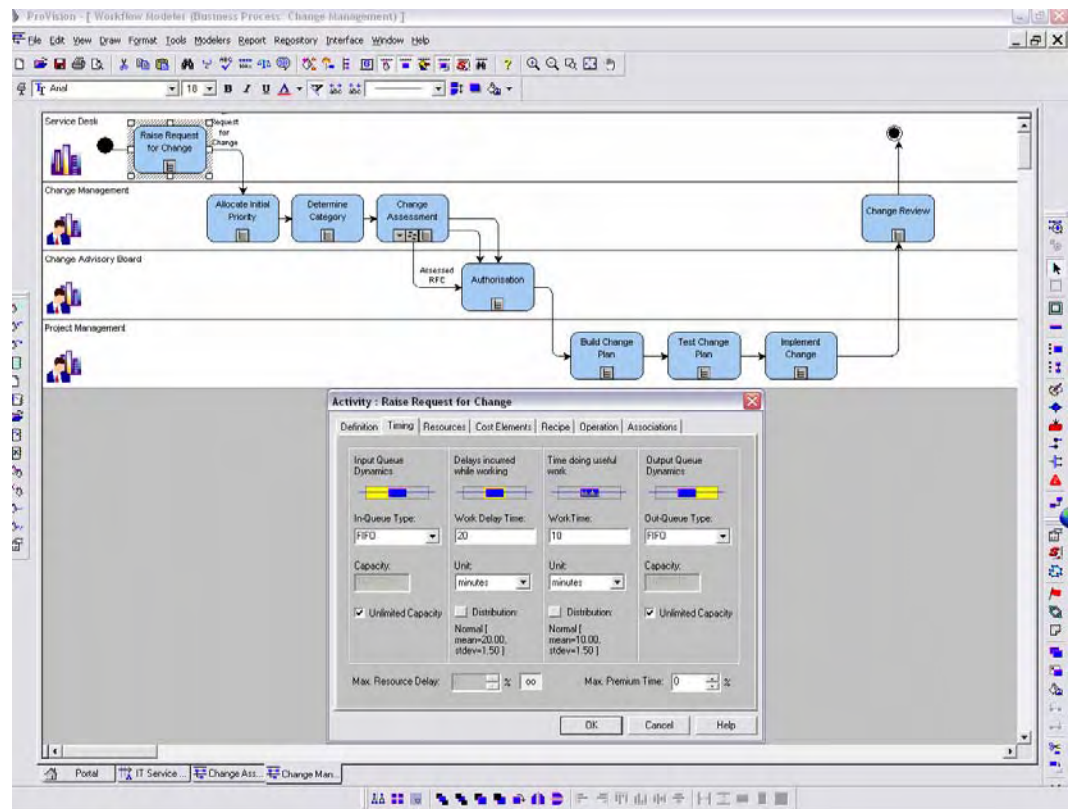
- Timing information
- Costing information (this is actually required by the next Chapter, but as we have the information to hand, we will enter it here)

Let us explore these:

Timing Information

Each and every element of data and associated step in the workflow should be quantified in terms of time. Because timing is important to us, we will be using the Discrete-Event Simulation modeller, and we instruct the process modeller accordingly.

We select the first process step and open it up. We select the Timing attribute of this step, and we see the following:



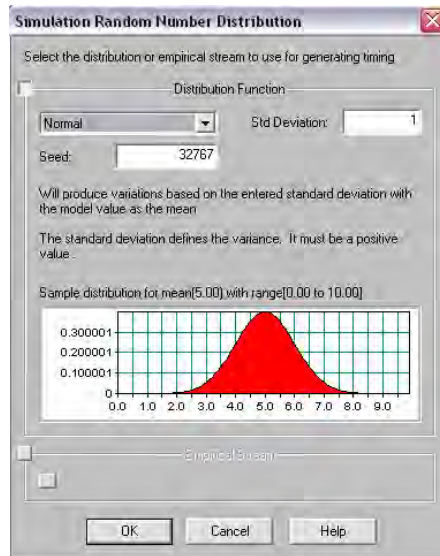
We are looking at the 'Raise Request for Change' activity, and we are going to enter some timing information into this.

The modelling tool Birchwood Solutions use has brought together both Monte-Carlo Simulation and DES into one interface – as shown above. The Input Queue and Output Queue are used for both Monte-Carlo and DES; the two inside sections are purely for DES. These are the ones we will use.

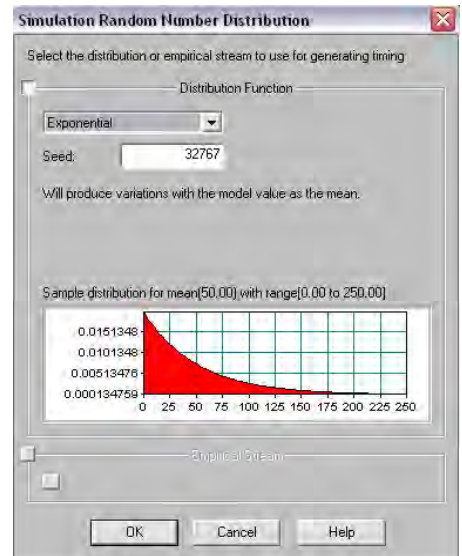
The Input and Output queue dynamics is purely First in-First out (FIFO).

We are asked for Work Delay Time and Work Time - in this case 20 and 10 minutes respectively. We will have used figures that represent the current situation, or will have entered our target goals for this activity. Work Delay Time is when productive work is not being applied to raising the RFC, and the Working Time is the time spent doing useful work in this activity.

Once we have entered the time and units, we are now asked to consider the distribution. This is where we can influence the way tasks are done on average. We are saying that on average, the Work Time for Raise RFC is 10 minutes – but that does not mean that each one will last exactly 10 minutes, it has a distribution: some being quicker, others being longer, and various distribution curves can be applied by the model:



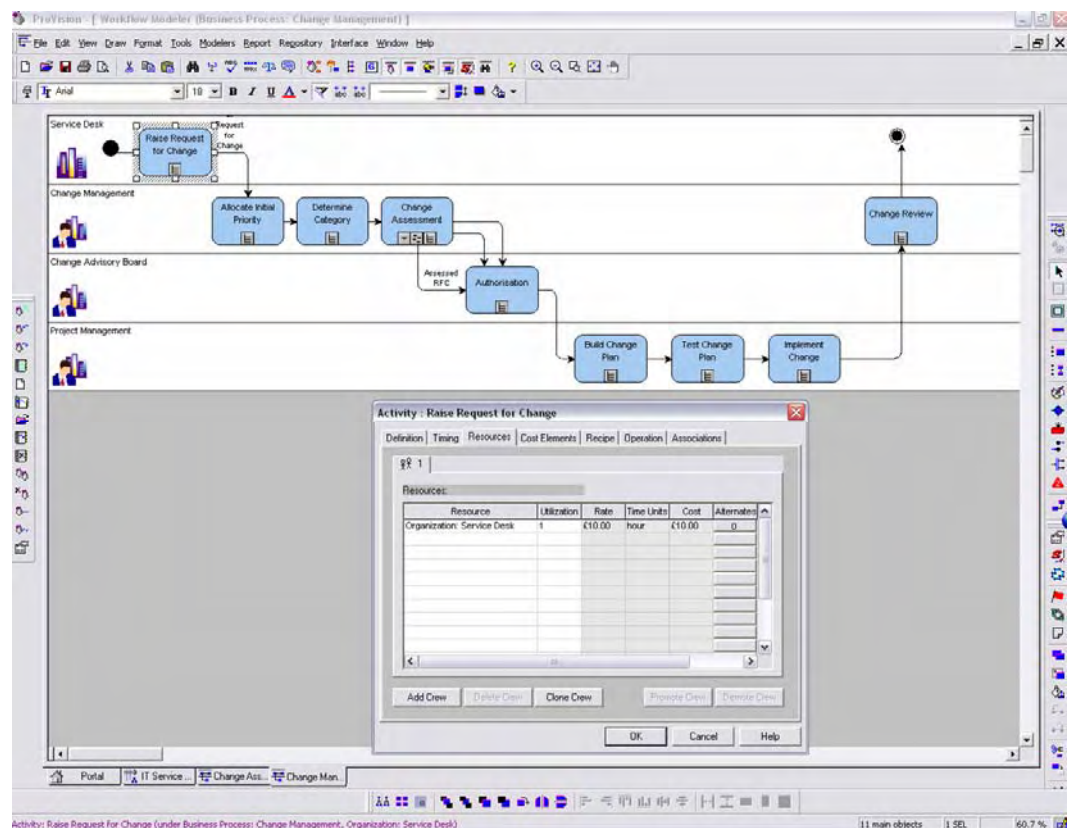
Or



The model offers a whole range of distributions, and two are shown above. We have elected to choose the Normal Distribution – the bell-shaped distribution curve, along with a standard deviation of 1.

These distributions are very important – If we receive an RFC, on average it takes 10 minutes to log on the Service Desk, we could in reality have a range of times from 4 minutes to 16 minutes – a few ‘quickies’ and a few ‘long-winded’ – and the shape of the curve helps the model to accurately model a real-life environment.

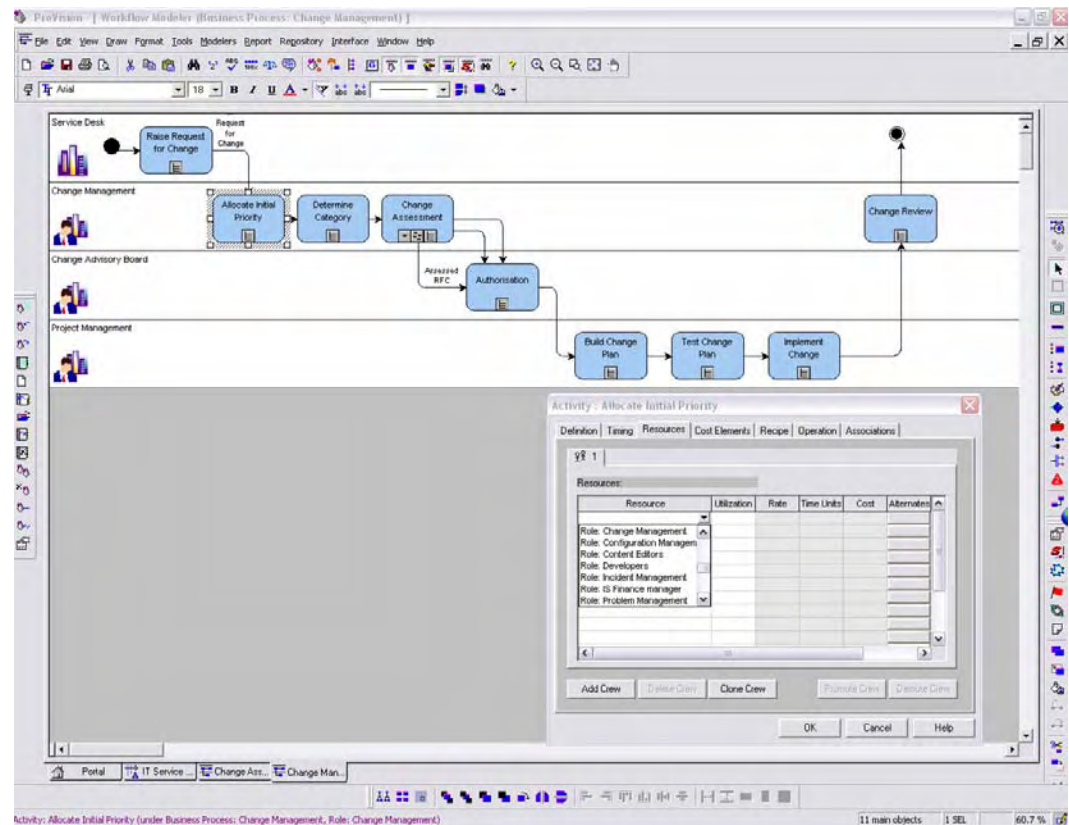
While we are here, we can add a little information about resources and costs for this activity:



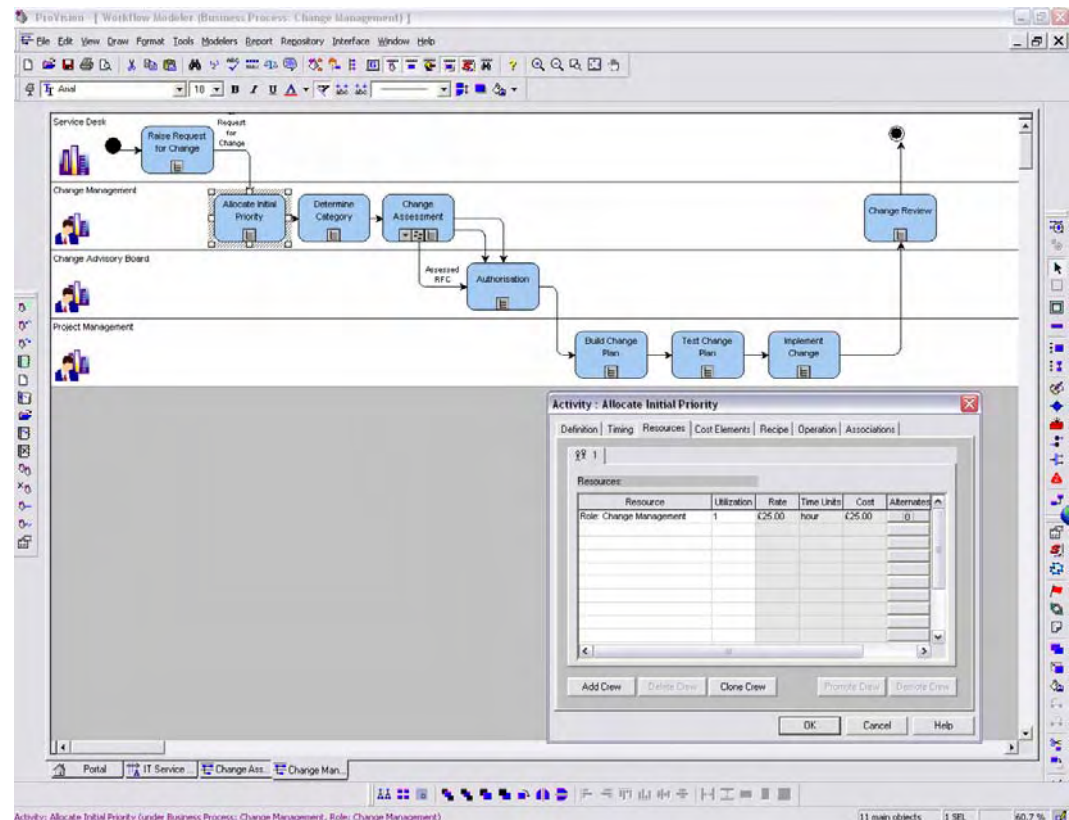
It is the Service Desk that will deal with this activity and we have assigned an hourly rate to represent the cost of the resource – in this case £10 per hour. There is no limit on the amount of time this resource can be used on this activity, so the utilisation is 100%.

We go onto the next activity in the workflow, and we come to Allocate Initial Priority of the RFC. We can do exactly the same as before and add timing information and cost information. However, the interesting thing about the Objects within a process modeller is that the objects and association

have already been set up, and we don't have to create them, just choose a resource we have already identified from a list:



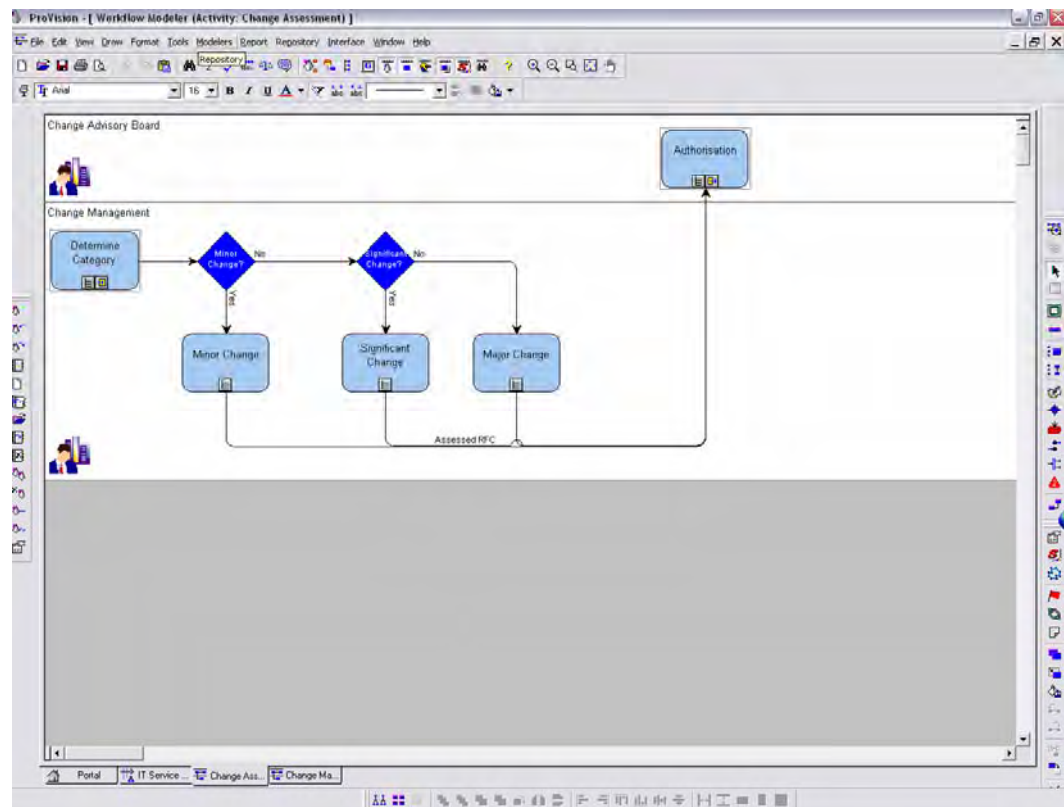
Here is the list, and we can scroll down until we find the role of Change Management – we select it, and it populated the activity in terms of costs:



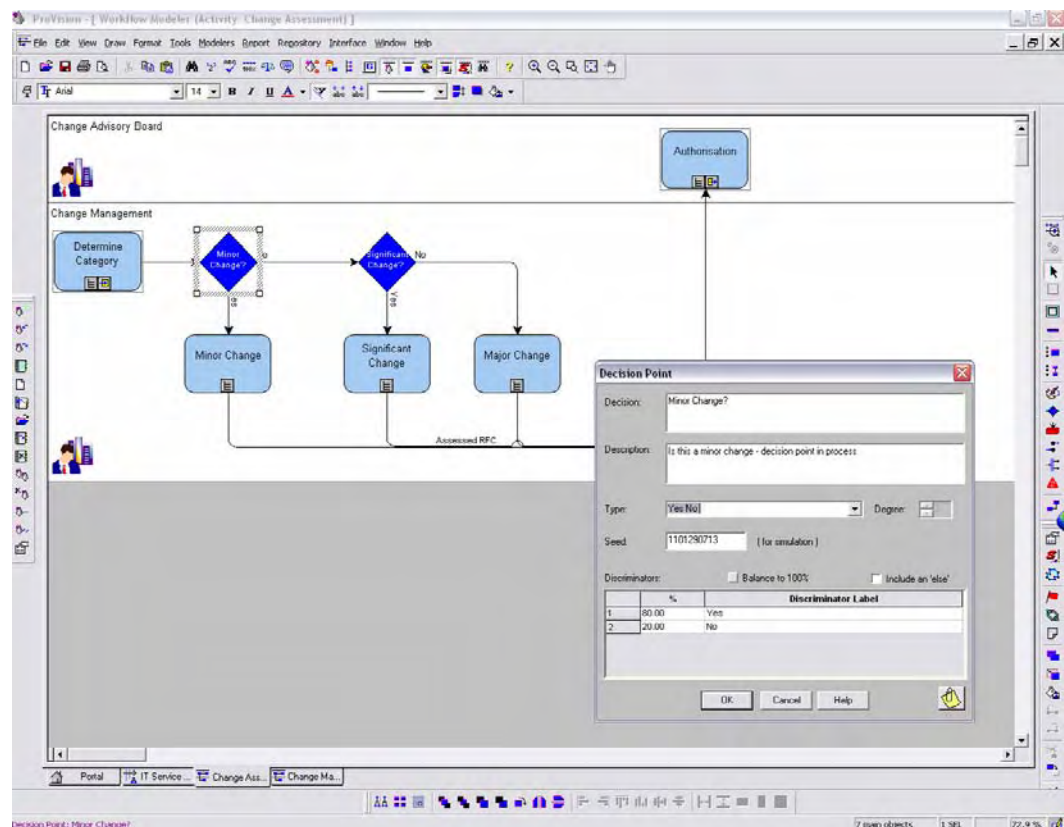
It has automatically picked up the hourly rate for this resource: £25 per hour. If this rate ever changes, you just have to adjust it once in the object called Role: Change Management and the process model will take into account these costs wherever this role is used.

A very clever approach!

Let us quickly dive down to the next level of detail and do exactly the same. We are now going to have a look at Change Assessment:



Now, remember these blue diamonds – they are decision points, and overleaf we can look at some of the attributes it holds:



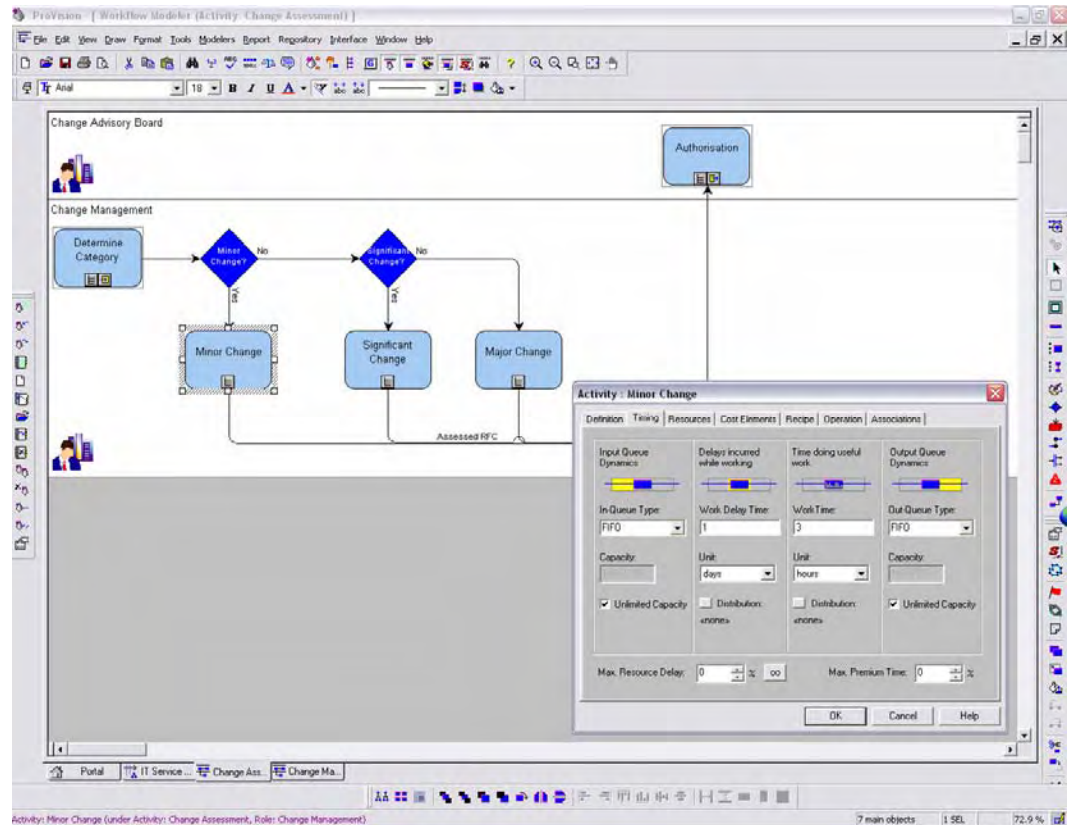
This is a decision point.

A random distribution of Change Requests will be thrown at it to handle. It has to do just two things:

1. Decide whether the decision is true or false, and
2. What is the probability of it being Yes (Minor Change) or No (more complex change)

In the example we are using, 80% of all changes are Minor Changes, and the attributes are set as shown above.

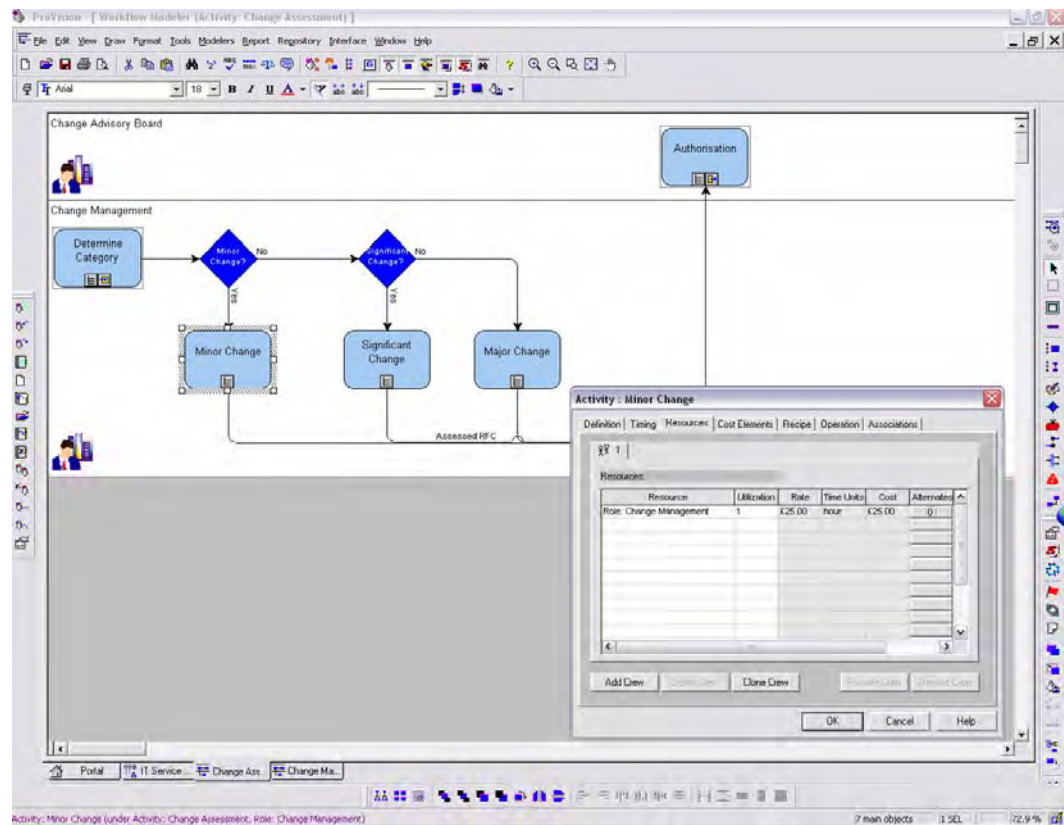
We can then begin to look at what is happening in Minor Change:



When a Minor Change is raised it is assessed by some people in the organisation. The target is to perform the assessment within three hours, but because of their other responsibilities they usually turn-around a Change request within 24 hours. This is shown above.

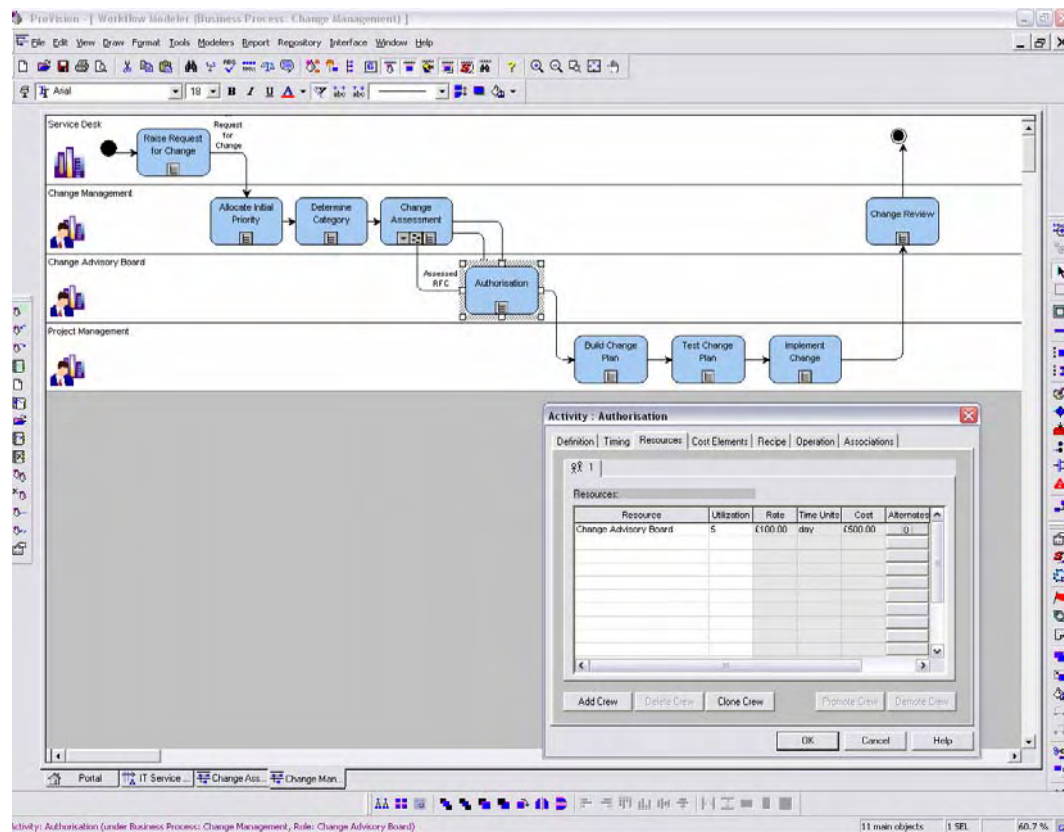
In this case we have also selected a Normal Distribution: the average being 1 day and 3 hours respectively, and a standard deviation of 1.

While we are working on this let us add in the resource costs per hour of the Change Management team:



We simply continue along the workflow until all activities are timed and the resources costed in much the same way as before.

The final diagram is representing the Change Advisory Board – where Changes are authorised. In the screenshot below, we are assuming CAB consists of 5 senior managers (cost £100 per hour) and that there are five of them. The timings underneath will show the time that CAB sits together authorising if possible, the RFC's raised.



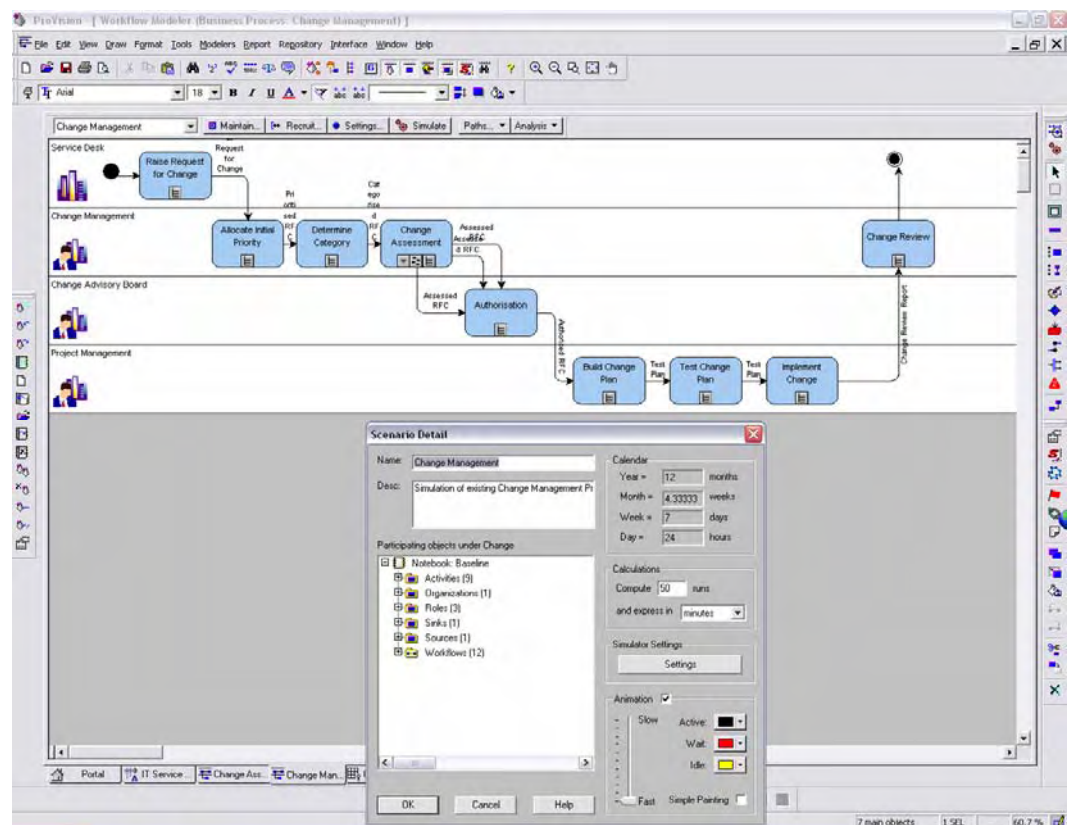
Once all of this detail is included in the models, we can run a few scenarios and see if there are any bottlenecks.

This passage of time is tracked as a series of discrete events rather than as a continuous transformation. That is, events occur that transitions the state of the process. The arrival of an RFC, the committing of a resource, the completion of an activity, etc. all happen at scheduled points in time. For this reason, the modelling tool maintains a simulation clock that advances to the next event, rather than in a continuous fashion.

We have a model to play with. This is our first look at how well the process works. The timing and resource information was based on our experience – actually it uses the existing resources that perform the work at the moment, and some timings which we think are acceptable. So, let us throw a few RFC's at it, and what the model makes of it.

We are going to give it 50 Change Requests to play with. The model will randomly submit a Change Request, and the activities will process them according to the queuing mechanism we have set up and the service model applied.

The model will decide on the split of Minor, Significant and Major changes, as we have supplied the parameters. All it has to do is fire off a random series of Change Requests.



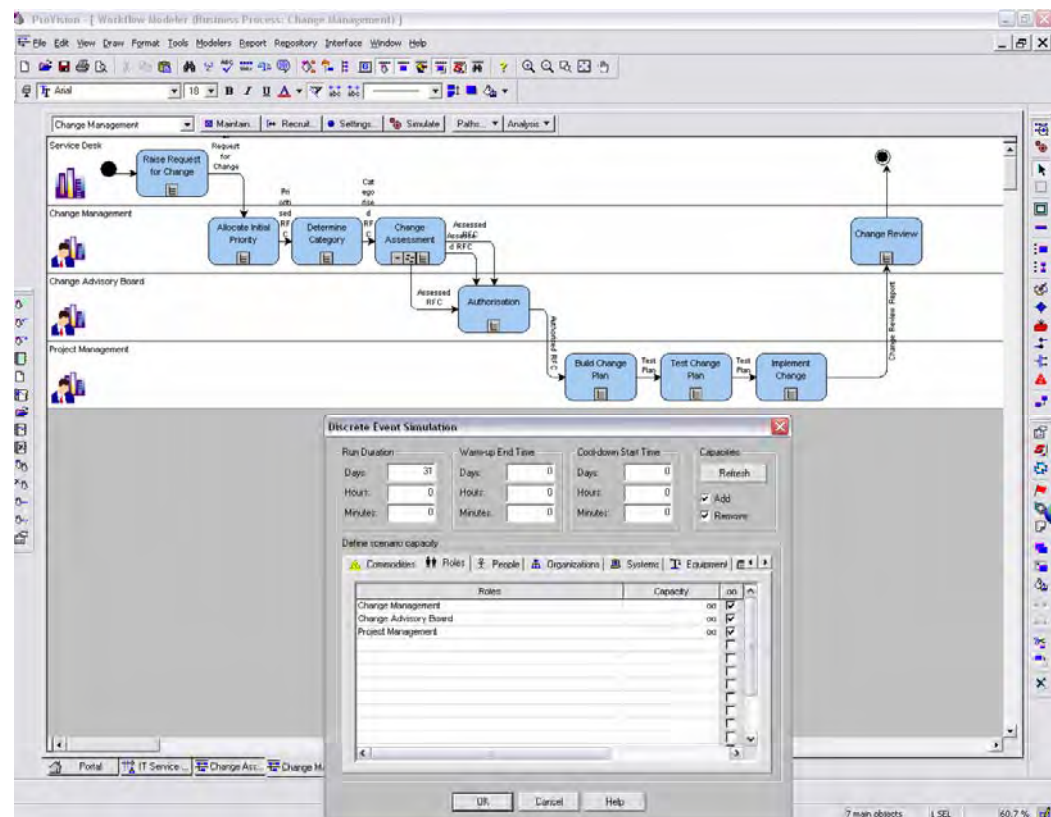
Above we have begun to enter the calling population (50 RFC's). We have additionally asked to produce all its reports in minutes (as opposed to Years, Weeks or Seconds). Behind the scenes we have set up other parameters such as size of queues (for example we could set an inbox level of say 10 RFC's, after 10 RFC's have filled the queue, then after that newly submitted RFC's will be rejected) – but we don't want to cloud the issues too much, so we will skate over the detail.

You will also see the Animation Box (bottom right-hand side of the Scenario Detail dialogue box)

The process modelling tool used allows for on-screen animation of the process as the Change Requests are passed to it. We can have the animation slow or fast enabling you to either run through it slowly to show the detailed interactions between workflows and processes, or you can run through it quickly to get through the number of RFC's as quickly as possible and enable you to get to the results.

The next screen (overleaf) enables us to consider the timescale over which the simulation occurs: in this case we are running the 50 RFC's over a one month period.

As this is a simple example, we have also told the model that our resources have an infinite capacity – in other words when one resource is working flat-out to perform the work, we can call another resource in if more RFC's are submitted. We would normally limit the capacity of our resources to the physical limit of our resources.

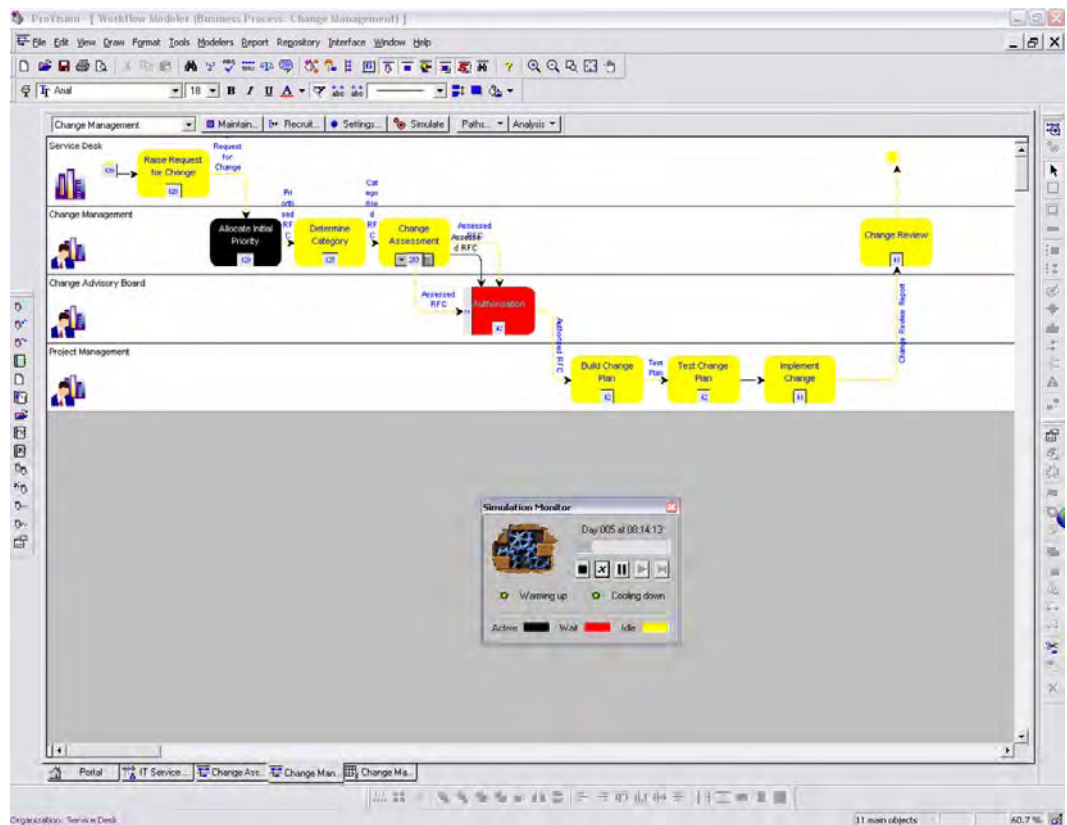
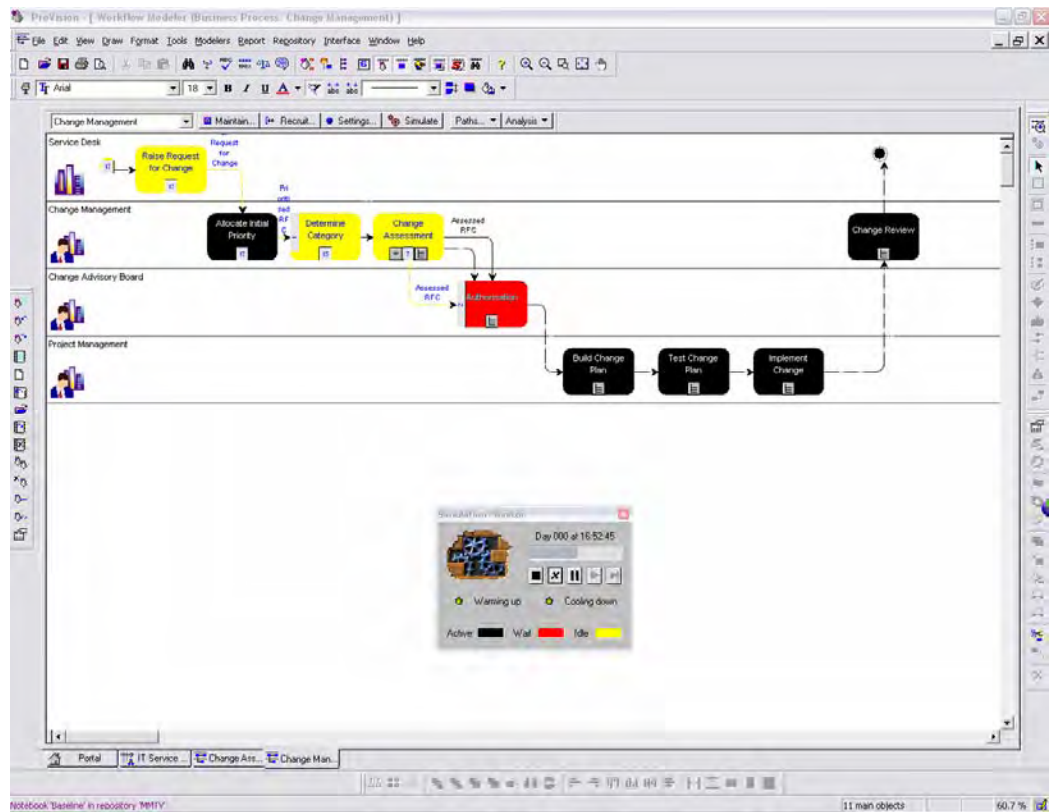


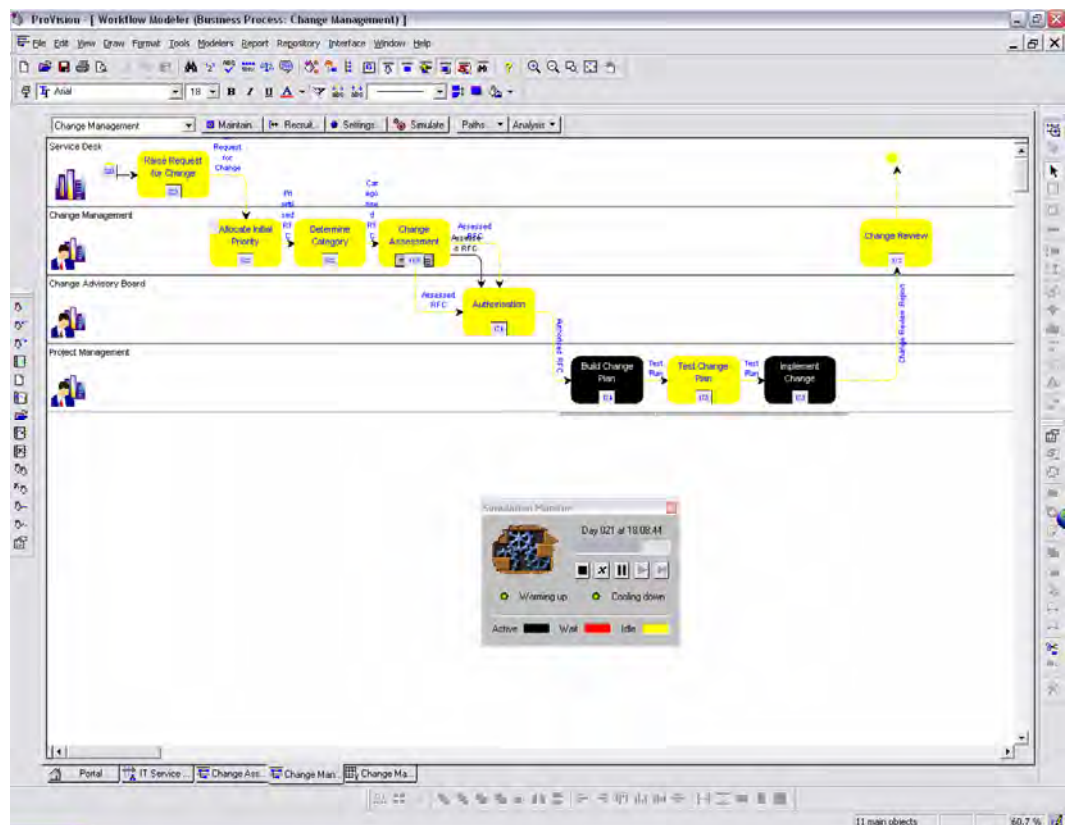
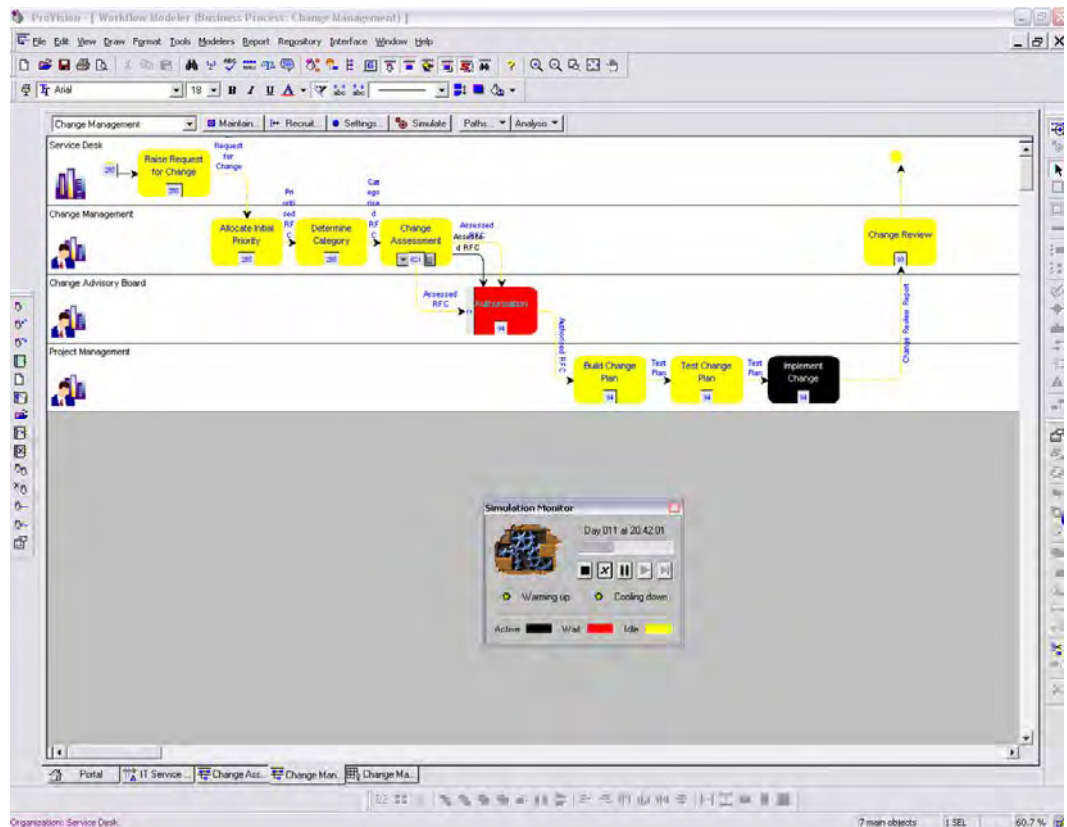
Then we run the simulation

There is a dynamic picture on the screen as the 50 RFC's are processed. I set the animation timing to medium, and the animation took approximately five minutes to complete the simulation. In the interim period we managed to take a few screen prints as it progressed.

Any activity is shown black, and then it is actually processing work. A yellow box shows that it is idle: if no RFC's are being submitted to the Service Desk, then they have no work to do. Red means that the activity is waiting for something: an indication we have a bottleneck.

These are the results:



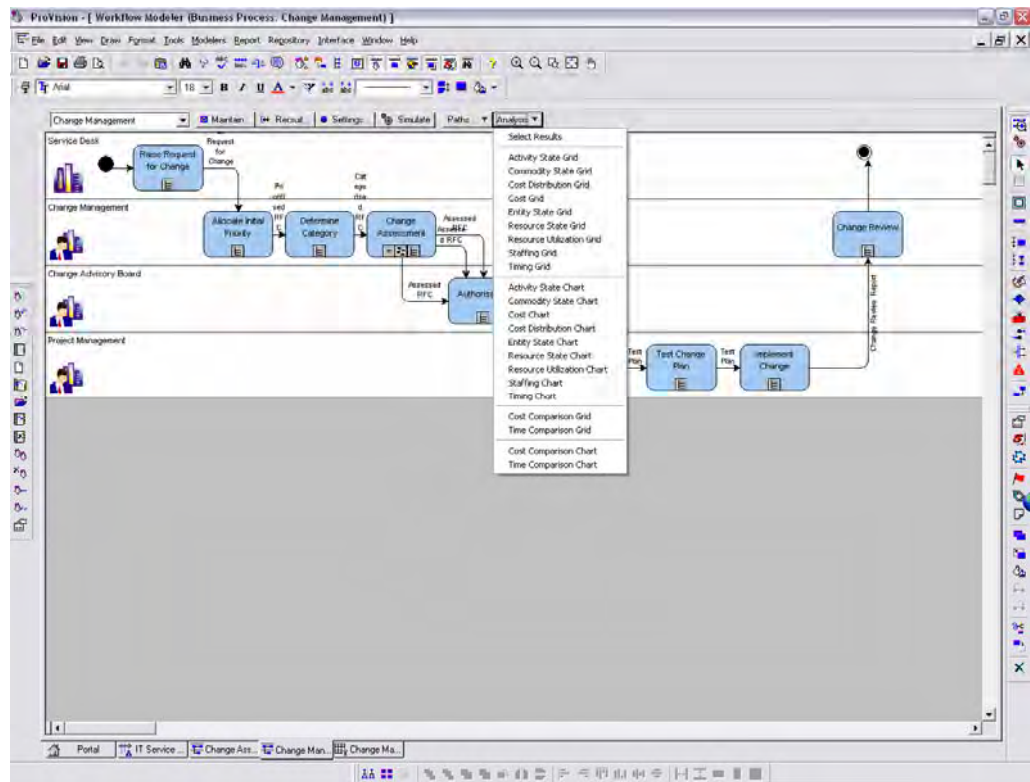


If you look closely at the Simulation Monitor, it is showing a simulated date and time of when these snapshots were taken. The final one being 'snapped' on the 21st Day at 18:08 (again, simulation is a marvellous way of compressing time)

And look – CAB is in trouble, as they are waiting to perform some approvals and they cannot proceed, and no doubt if we were in the real world, the people 'downstream' are probably complaining about them – but it isn't their fault, or is it?

To find out what is happening we need to have a look at some reports.

Process Modelling tools will produce a whole range of reports enabling you to analyse the simulation in more detail. In this case, we are not disappointed:

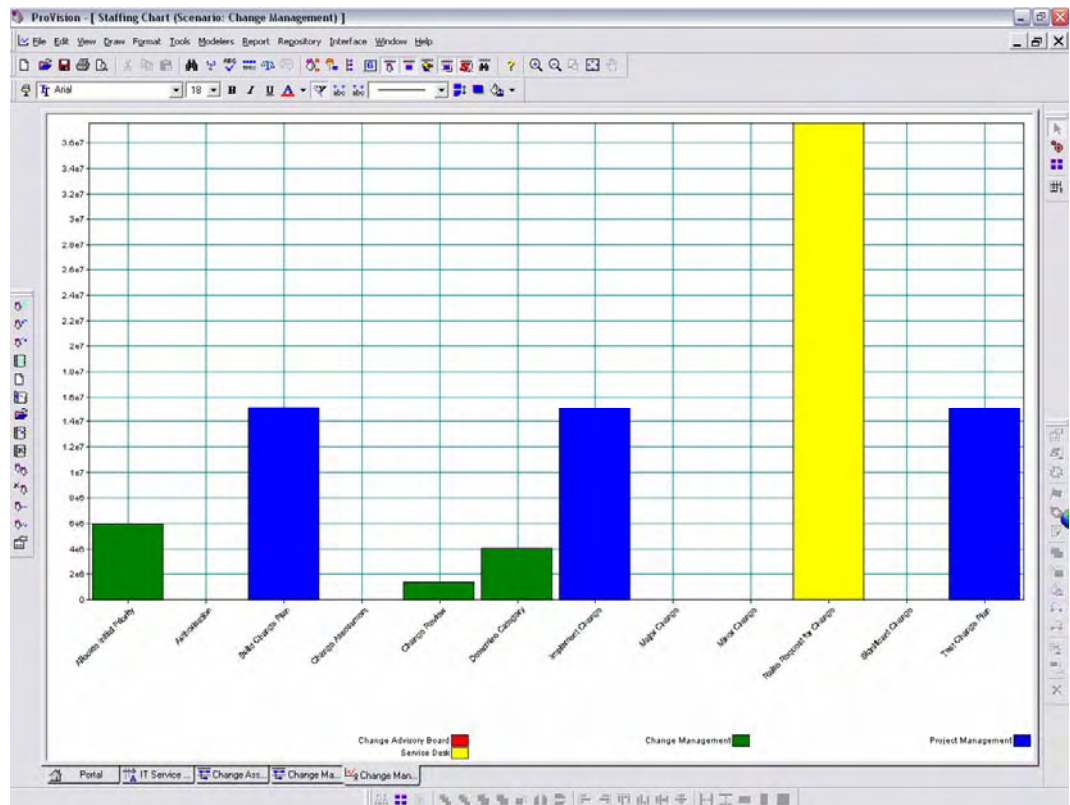


We can select from the drop down list and ask for a specific report on this process:

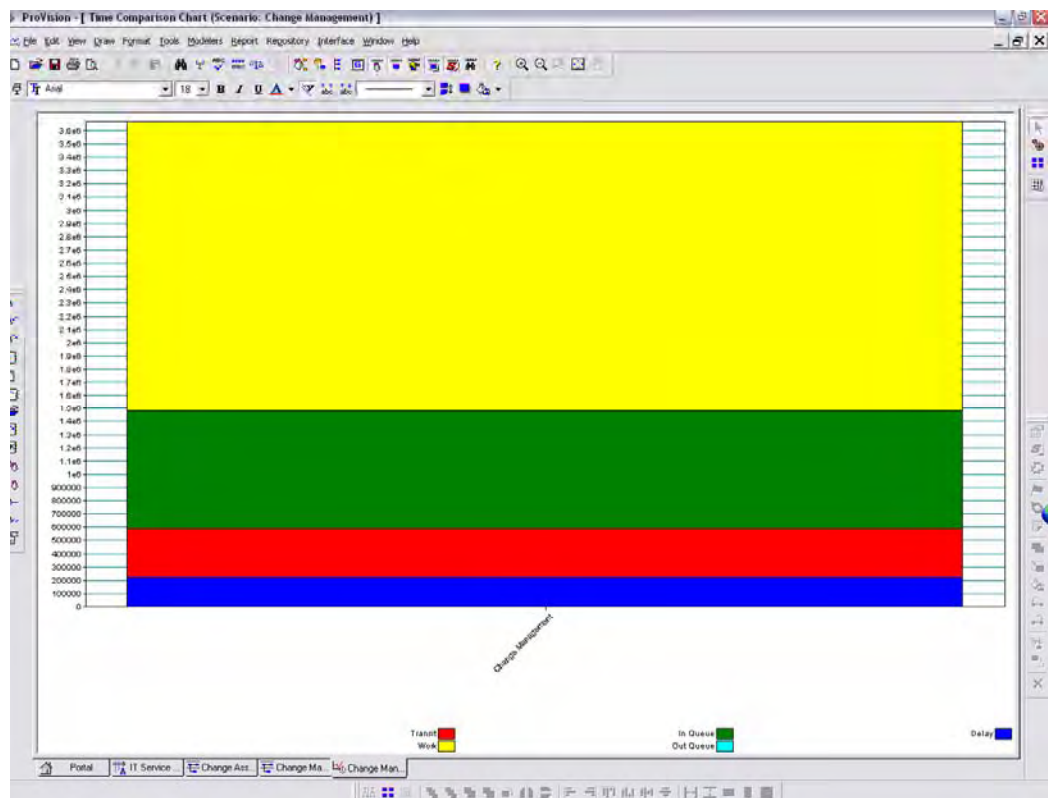
ProVision - [Entity State Grid (Scenario: Change Management)]

	Entity	Capacity	Produced	Total OutQueue Time (minutes)	Avg OutQueue Time (minutes)	Currently InTransit	Completed Transit	Total Transit Time (minutes)	Avg Transit Time (minutes)	Currently InQueue	Consumed	Total InQueue Time (minutes)	Avg InQueue Time (minutes)
1	Change Management	0.00	5,055	0.00	0.00	0	5,055	11,899.35	2.10	(20)	5,681	44,513.85	7.84
2	(...) Raise Request for Change	∞	718	0.00	0.00	0	718	0.00	0.00	0	718	0.00	0.00
3	Allocate Initial Priority (carrying Prioritised RFC) Determine Category	∞	718	0.00	0.00	0	718	116.88	0.16	0	718	0.00	0.00
4	Authorisation (carrying Authorised RFC) Build Change Plan	∞	247	0.00	0.00	0	247	2,462.68	10.00	0	247	0.00	0.00
5	Build Change Plan (carrying Test Plan) Test Change Plan	∞	246	0.00	0.00	0	246	2,470.00	10.04	0	246	0.00	0.00
6	Change Review (..)	∞	245	0.00	0.00	0	245	0.00	0.00	0	245	0.00	0.00
7	Determine Category (carrying Categorized RFC) Minor Change?	∞	710	0.00	0.00	0	710	116.85	0.16	0	710	0.00	0.00
8	Implement Change (carrying Change Review Report) Change Review	∞	240	0.00	0.00	0	240	2,462.00	10.09	0	240	0.00	0.00
9	Major Change (carrying Assessed RFC) Authorisation	∞	20	0.00	0.00	0	20	282.87	11.20	(4)	30	1,688.10	56.27
10	Minor Change (carrying Assessed RFC) Authorisation	∞	601	0.00	0.00	0	601	67.67	0.16	(15)	616	37,363.48	60.66
11	Minor Change? (carrying Categorized RFC) Minor Change?	∞	601	0.00	0.00	0	601	10.27	0.02	0	601	0.00	0.00
12	Minor Change? (carrying Categorized RFC) Significant Change?	∞	117	0.00	0.00	0	117	0.00	0.00	0	117	0.00	0.00
13	Raise Request for Change (carrying Request for Change) Allocate Init	∞	710	0.00	0.00	0	710	364.18	0.51	0	710	0.00	0.00
14	Significant Change (carrying Assessed RFC) Authorisation	∞	91	0.00	0.00	0	91	972.10	10.69	(7)	90	5,462.27	55.74
15	Significant Change? (carrying Categorized RFC) Major Change	∞	20	0.00	0.00	0	20	0.48	0.02	0	20	0.00	0.00
16	Significant Change? (carrying Categorized RFC) Significant Change	∞	91	0.00	0.00	0	91	1.82	0.02	0	91	0.00	0.00
17	Test Change Plan (carrying Test Plan) Implement Change	∞	246	0.00	0.00	0	246	2,462.00	10.00	0	246	0.00	0.00
18													

Some statistics around the entities within the model.



A Staffing Chart for the simulated run



And finally, a timing comparison chart.

And actually we have not done a bad job at first glance. There is a bit of delay, we have spent a lot of time transmitting information (perhaps we could see if an integrated tool set could reduce this).

A good proportion of work is performed compared to the total work utilisation..... but the In-Queue is where the problem lies. Far too much of it. If we look at the previous diagram, we can see the problem.

And yes, the problem is around Authorisation, everything is sat in the In-Queue waiting to be authorised, but nothing is happening. Why?

Easy, we set a physical CAB meeting that sits once a week, so everything spends a lot of time waiting for them.

OK, a very simple problem to solve, and we can try a different approach and for example use daily conference-calls or using 'voting-buttons' via e-mail approvals and see how that would change the overall process. Yes, we know this will be a better solution – but how much? We can actually run another scenario and actually see how much quicker (and in the next chapter, how much money we will save)

But before we declare victory and walk away in triumph, let us look a bit further – we know it only takes five minutes to simulate a whole months worth of work within the Change Management environment, perhaps we should spend a little time seeing if we can smooth out some delays or decrease the transit time making the overall process even slicker. To do this we could consider making changes to:

- New Process
- New Workflow
- Add resources

And run a simulation to see if you can optimise it further.

As you can see DES can be a very precise way of simulating models and getting some results that are exceedingly close to real-world ways of working all in an extremely compressed manner.

Monte-Carlo Simulation

The Discrete Event Simulator (DES) is used to simulate business processes, as they would perform in the real world. The Discrete Event Simulator provides the ability to analyse the dynamics of a (optionally nested) workflow model. It enables the user to create a simulation environment and then "run" the workflow model in this environment. The model's components can be adjusted and the process re-simulated to examine the effect of changes.

As a result, you will be able to see bottlenecks, process durations, costs incurred and net throughput. Simulating process models allows the organisation to experiment with change, and succeed or fail before implementing change.

DES introduces a higher level of precision than Monte Carlo simulation. Indeed, the concepts of Monte Carlo simulation are also valid and expanded upon by Discrete-Event Simulation. DES introduces additional factors into the model to more closely align the simulation with reality. Discrete event simulation can manage multiple events that trigger the process. Resources used by the process scenario can be restricted to simulate a limited resource situation. Discrete-Event Simulation is excellent for identifying bottlenecks in a process scenario based upon too many arrival events or a lack of resource capacity.

Monte-Carlo simulations tend not to take into account the time evolution aspects of the process, and as such we don't have to enter timing details at each step.

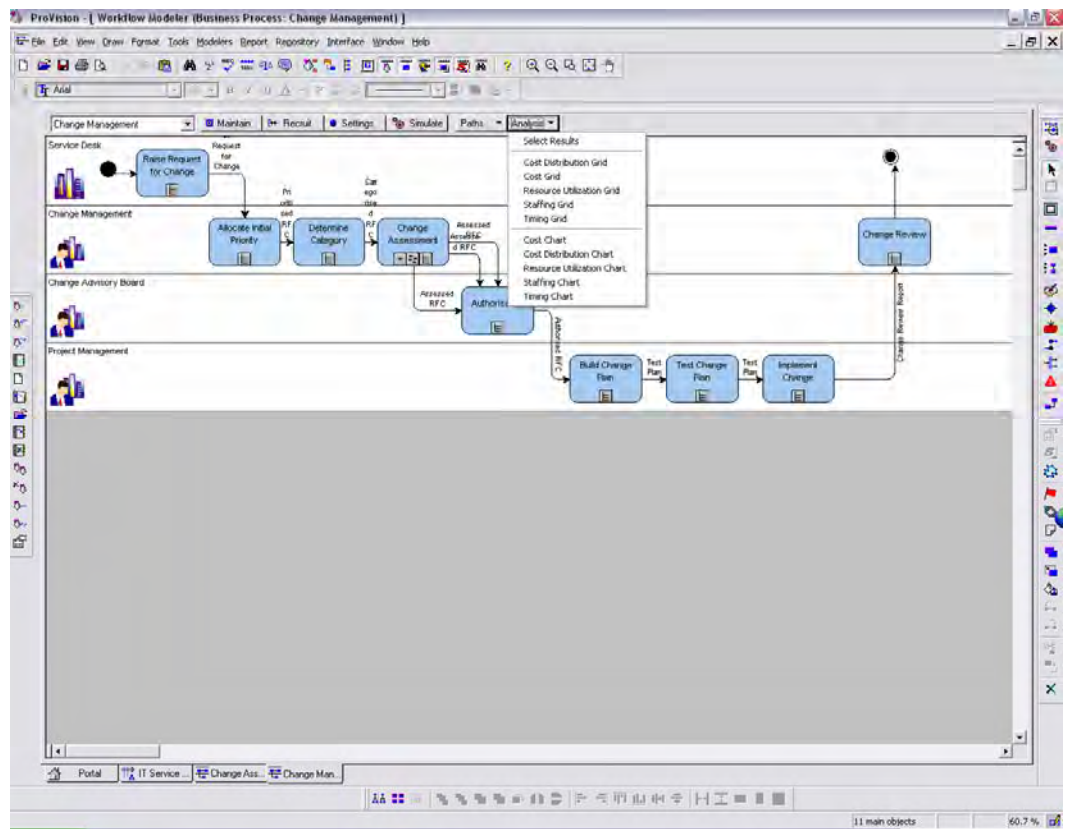
So the choice is simple, it is a trade off of accuracy, complexity and ease of entering information into the model. The majority of work undertaken by Birchwood Solutions usually involves the use of DES as opposed to Monte-Carlo

Do you want to see the difference between DES and Monte-Carlo? Well, maybe you do, but we don't plan to run DES and varying runs of Monte-Carlo, and then comparing the differences between the two through tens of screenshots – this handbook has not been published to go into that debate.

What we will show you is the following screenshot, as this shows you a list of Analysis Reports available after the run of the Monte-Carlo Simulation. They are somewhat limited, but if you don't use DES then at least it is something.

Use Monte-Carlo when you have not got the time to gather the timing data, or the data is just not available – or of course, if you're modelling tool does not support DES.

Yes, Monte-Carlo is a poor relation, but it does have its place in the armoury.



In Summary

This was the pivotal chapter in the handbook.

Everything so far was all about 'promises of a better future' and then a whole bunch of chapters just describing process documentation.

In this chapter, it all changes. Instead of looking at the ITIL models as simply Visio diagrams or PowerPoint Slides or even the OGC Best Practice books; instead of being able to look at a process and see how it **should** work, now we are exploring ways of how it **will** work. More importantly, if the process models don't work as you want, you make changes, optimise the processes, and try another scenario.

A number of ITIL vendors provide 'paper based' ITIL processes – yes, they add value when starting from scratch – but process modelling and simulation is just a million times better, more practical and more business focused.

Can it get any better? You bet!

Have a read of Chapter 9 where we go through Activity Based Costing and enable you to make Best Practice decisions on costs as well! What else do you want in life (well in terms of the IT Department anyway!)

Activity Based Costing

Activity-based costing (ABC) is a costing model that identifies the cost pools, or activity centres, in an organisation and assigns costs to products and services (cost drivers) based on the number of events or transactions involved in the process of providing a product or service.

Let us give you a brief introduction to ABC, and then see what our model can provide you with in terms of costing information.

Costing Organisational Activities

Activity Based Costing (ABC) is an accounting technique that allows an organisation to determine the actual cost associated with each product and service produced by the organisation without necessarily with regard to the organisational structure. This section explains some of the uses and benefits of Activity Based Costing.

In order to achieve the major goals of business process improvement, process simplification and improvement, ITIL process managers need to fully understand the cost, time, and quality of activities performed by employees or systems throughout an entire IT Department.

ABC methods enable managers to cost out measurements to business simplification and IS process improvement.

For many companies there is a need to be more productive with fewer resources. Productivity can be improved when waste is eliminated or reduced through improvements in processes, or the reduction of time required transferring data on which decisions can be made.

Productivity also can be improved when costs, risks, and rewards are shared among organisations - the case when business functions and rules are shared and data are integrated. Productivity is a measurement of the performance of activities.

Activities can be defined as a named process, activity, or workflow that occurs over time and has recognised results (For example, the Change Management process we are using as an example).

Activities use up assigned resources to produce output and deliverables. Inputs are transformed into outputs under the perimeters set by controls performed by the workflow. Activities can be seen as consumers of resources in production of materials, services, events, or information. Activities are the common denominator between business process improvement and information improvement.

Documenting and understanding activities is necessary in order to improve the business process, since activities are the building blocks of business processes. When employees understand the activities they perform, they can better understand costs based on the activities.

Traditional financial information is reorganised by ABC into a form that makes sense to the casual functional user; in addition to the usual information that tells them how they spend money, it also tells them what to do with the money. This ability to place costs on activities and their outputs provides a clear metric for improvement, whether for determining improvement priorities in the long-term or for measuring near-term success. ABC allows functional users to characterise the value of, or need for, each activity, getting rid of the waste before automating (or re-automating) activities.

Components of Activity Based Costing

Before performing ABC, a baseline or a starting point is needed for business process improvement ["AS-IS" model], and a baseline can be expressed in some form of model. A baseline is a documentation of the organisation's policies, practices, methods, measures, costs and their interrelationships at a particular location at a particular point in time. Through baselining, activity inputs and outputs across functional lines of business can be identified. ABC is the only improvement methodology that provides output or unit costs.

An important function of ABC is for the organisation's activities to be defined as value added or non-value added. Value added activities are those for which the customers are usually willing to pay (in some way) for the service. Non-value added are activities that create waste, result in delay of some sort, add costs to the product/s, or for which the customer is not willing to pay.

Resources are assigned to activities to allow them to be conducted; performing the activity results in a cost that can be priced, which can be assigned to the primary output. It is through ABC, that an organisation can begin to see actual dollar costs against individual activities, and find opportunities to streamline or reduce the costs, or eliminate the entire activity, especially if there is no value added.

Financial Analysis Techniques

Techniques of this nature are usually employed in two main areas

Activity Based Costing (ABC)

- Captures the current cost of performing an activity
- Targets High Cost activities
- Provides a context for establishing and monitoring performance measures
- Provides the link between activity modelling and economic analysis
- Is useful for forecasting financial baselines

Business Case Development

- Focuses on "bottom line" results (savings vs. investment)
- Adjusts for future risks
- Identifies performance measures

Steps for Performing ABC

There are five activities that need to occur in order to determine activity costs;

1. Analyse Activities
2. Gather Costs
3. Trace Costs to Activities
4. Establish Output Measures
5. Analyse Costs

These steps should be performed by the core ITIL Team. This process can take anywhere from a few days to a few months, depending on level of detail, complexity of an organisation's processes, and commitment of team resources.

	Process & Organisational Redesign for the ITIL® Framework published by Birchwood Solutions. See Chapter 8: Detailed Process Design, as this helps in identifying the costs and activities required to enter into the modelling tool.
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Steps 1-3 will be done by the core team; we leave the model to perform 4 and 5.

Analyse Activities

First the scope of the activities to be analysed must be identified. The depth and detail of analysis will be determined by activity decomposition, since activity decomposition is complete when one common or homogeneous primary output per activity is reached.

You then decide if an activity is value or non-value added; also if the activity is primary or secondary, and required or not needed. Value added is determined if the output of the activity is directly related to customer requirements, service or deliverable, as opposed to an administrative or logistical outcome that services the providing organisation. For instance, if the output of an activity were a Change Review or an update for the CMDB, the output would be non-value added, but necessary to the IS organisation, i.e., "overhead."

A major goal of reengineering is to reduce non-value added activities and eliminate those that are not necessary. Primary activities directly support the organisation's mission while secondary activities support primary activities. Required activities are those that must always be performed while discretionary activities are performed only when allowed by the operating management.

Gather Costs

In this step costs are gathered for the activity producing the outputs or services provided as the outcome. These costs can be salaries, expenditures for research, systems, office furniture, etc. These costs are used as the baseline activity costs. When documents for the costs incurred are not available, cost assignment formulas may be used.

Trace Costs to Activities

In this step the results of analysing activities and the gathered organisational inputs and costs are brought together, which produces the total input cost for each activity. A simple formula for costs is provided - outputs consume activities that in turn have consumed costs associated with resources. This leads to a simple method to calculate total costs consumed by an activity - multiply

the percent of time expended by an organisational unit, e.g., branch, division, on each activity by the total input cost for that entity. Here we are not calculating costs, just finding where they come from.

Establish Output Measures

In this step the actual activity unit cost is calculated. Even though activities may have multiple outputs, only one is identified as the primary output. Activity unit cost is calculated by dividing the total input cost, including assigned costs from secondary activities, by the primary activity output volume; the primary output must be measurable and its volume or quantity obtainable. From this, a bill of activities can then be calculated which contains or lists a set of activities and the amount of each activity consumed. The amount of each activity consumed is extended by the activity unit cost and is added up as a total cost for the bill of activity.

Analyse Costs

In the final step, the calculated activity unit costs and bills of activity are used to identify candidates for improving the business processes.

. The thing to keep in mind is that the identification of non-value added activities occurs through this process with a clarity that allows us to eliminate them, and at the same time permits the product or service to be provided to the customer with greater efficiency.

So, let us see how this is applied in the model:

ABC and Service Management

We now have brought together the processes and activities together, and have linked the workflows. We have modelled the end-to-end process. We have looked at each activity and associated timings to them – hours, minutes or seconds.

Now, what if we could associate costs to the resources consumed in each activity?

The association of costs with specific activities is known as Activity-Based Costing or ABC.

Activity-based costing identifies the costs incurred by a business process's component activities as they are being performed. Activity costs can be examined and optimised individually. Once changed, the model of the business process is re-analysed to determine the effects on the entire process. As a result, a true picture of the cost of doing business is produced.

The uses for activity-based costing are many and varied. The following list provides typical efforts where ABC has been employed successfully:

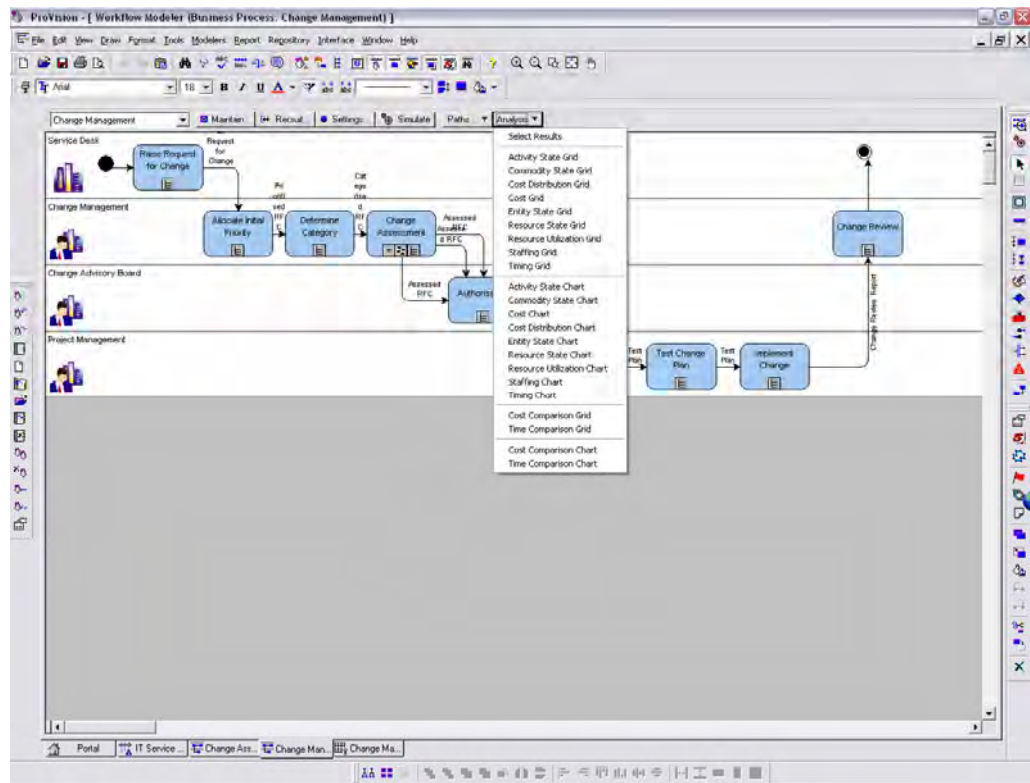
- Developing a benchmark of current process costs.
- Identifying areas that are not cost-effective in current processes.
- Analysing value-added vs. non-value-added costs.
- Determining the cost impact of outsourcing decisions.
- Supporting redeployment, cost cutting, and right-sizing decisions.
- Determining costs for improved or redesigned business processes.
- Verifying process improvement efforts have been cost effective.
- Determining cost targets and budgets for IS processes.
- Cost justifying the adoption of new Service Management tools

ABC provides a quantitative means for evaluating process change when the objective is meaningful improvement in cost effectiveness. By following a straightforward approach to analysing costs, activity-based costing can provide the essential analysis needed to make key decisions.

When we created our model, we have entered our costs associated to each activity, and when we run the simulation, the activities consume resource and calculates the duration that resource has been used – so it is a simple calculation to produce the Activity Costs.

Some reports on the Change Management process we simulated in the previous chapter are shown below, and we can see the level of detail the model has produced...

As before, we ran the simulation, and we had a drop-down list of reports (overleaf)



From here we can select the reports we need:

The screenshot displays the 'Cost Distribution Grid' for the 'Change Management' scenario. The table provides a detailed breakdown of costs across various activities and categories. The columns include 'Cost Distribution', 'Change Management', 'Allocate Initial Priority', 'Authorisation', 'Build Change Plan', 'Change Assessment', 'Major Change', 'Minor Change', 'Significant Change', 'Change Review', 'Determine Category', 'Implement Change', 'Raise Request for Change', and 'Test Change Plan'.

	Cost Distribution	Change Management	Allocate Initial Priority	Authorisation	Build Change Plan	Change Assessment	Major Change	Minor Change	Significant Change	Change Review	Determine Category	Implement Change	Raise Request for Change	Test Change Plan
1	Occurrences	50.00	27,200.00	1,240.00	1,240.00	80,000.00	1,500.00	30,000.00	4,900.00	12,250.00	27,200.00	12,250.00		
2	Total Cost	£451,351.90	£54,189.85	£36.94	£73,669.90	£1,769.39	£86.21	£1,595.43	£104.88	£12,567.42	£37,189.71	£73,363.80	£125,266.10	£73,300.70
3														
4	Change Advisory Board			5.00										
5	Cost	£36.94		£36.94										
6	Cost Percentage	100.00%		100.00%										
7														
8	Change Management		10.00			10.00	1.00	1.00	1.00	10.00	10.00			
9	Cost	£105,713.50	£54,189.85			£1,769.39	£66.21	£1,595.43	£104.88	£12,567.42	£37,189.71			
10	Cost Percentage	100.00%	51.26%			1.87%	0.06%	1.81%	0.10%	11.89%	35.18%			
11														
12	Project Management				20.00							20.00		20.00
13	Cost	£220,334.40			£73,669.90							£73,363.80		£73,300.70
14	Cost Percentage	100.00%			33.41%							33.30%		33.27%
15														
16	Service Desk												100.00	
17	Cost	£125,266.10											£125,266.10	
18	Cost Percentage	100.00%											100.00%	

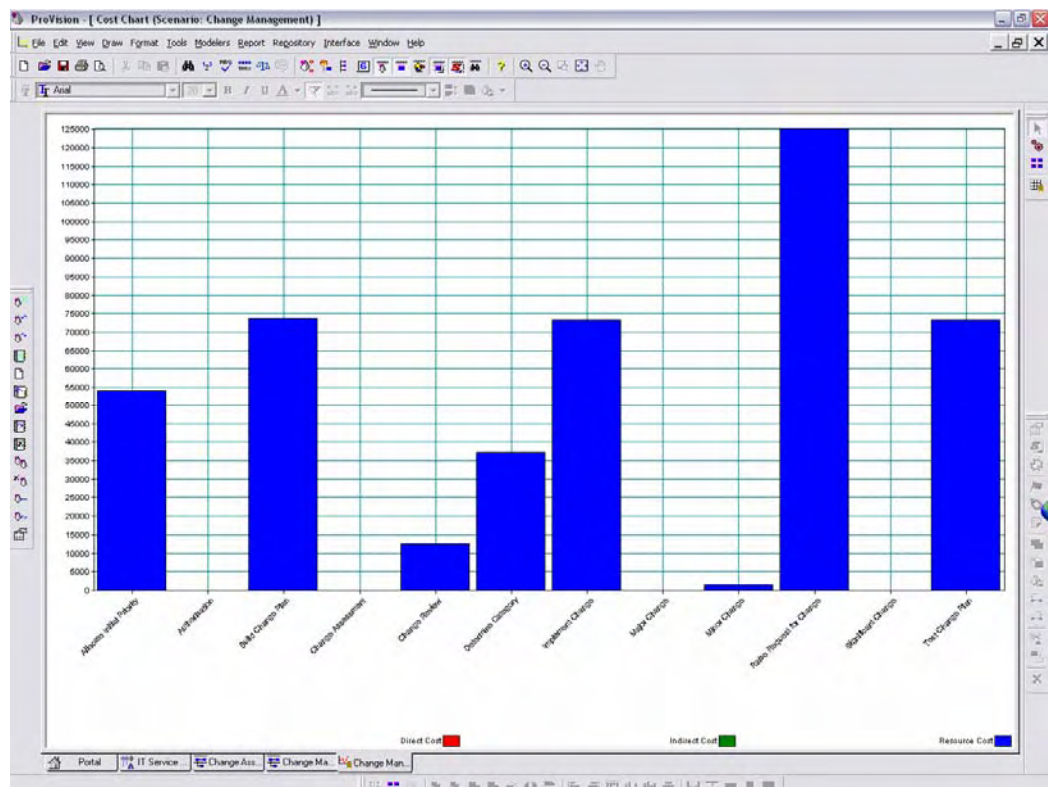
Here is a Cost Distribution Report. Each organisation supplying resources to perform this activity is shown in the left hand column. The row at the top describes each activity.

As the simulation is run, each RFC passing through the process will pick up costs based on resources used within each activity. When the 50 RFC simulation is complete, they are all added together and placed into this report.

ProVision - [Cost Grid (Scenario: Change Management)]

	Cost	Occurs	Total Cost	Total Direct Cost	Total Indirect Cost	Total Resource Cost	Change Advisory Board	Change Management	Project Management	Service Desk
1	Change Management	50.00	£451,351.93	£0.00	£0.00	£451,351.93	£38.94	£105,712.50	£220,334.40	£125,266.10
2										
3	Change Management		£105,712.48	£0.00	£0.00	£105,712.48		£105,712.50		
4	Allocate Initial Priority	37,200.00	£54,100.95	£0.00	£0.00	£54,100.95		£54,100.95		
5	Change Assessment	80,800.00	£1,766.39	£0.00	£0.00	£1,766.39		£1,766.39		
6	Major Change	1,500.00	£86.31	£0.00	£0.00	£86.31		£86.31		
7	Minor Change	30,000.00	£1,595.43	£0.00	£0.00	£1,595.43		£1,595.43		
8	Significant Change	4,900.00	£104.65	£0.00	£0.00	£104.65		£104.65		
9	Change Review	12,350.00	£12,567.42	£0.00	£0.00	£12,567.42		£12,567.42		
10	Determine Category	37,200.00	£37,189.71	£0.00	£0.00	£37,189.71		£37,189.71		
11										
12	Change Advisory Board		£38.94	£0.00	£0.00	£38.94	£38.94			
13	Authorisation	12,400.00	£38.94	£0.00	£0.00	£38.94	£38.94			
14										
15	Project Management		£220,334.41	£0.00	£0.00	£220,334.41			£220,334.40	
16	Build Change Plan	12,400.00	£73,669.90	£0.00	£0.00	£73,669.90			£73,669.90	
17	Implement Change	12,350.00	£73,363.80	£0.00	£0.00	£73,363.80			£73,363.80	
18	Test Change Plan	12,350.00	£73,300.70	£0.00	£0.00	£73,300.70			£73,300.70	
19										
20	Service Desk		£125,266.11	£0.00	£0.00	£125,266.11				£125,266.10
21	Raise Request for Change	37,200.00	£125,266.11	£0.00	£0.00	£125,266.11				£125,266.10
22										
23										

If we added into the model Direct Costs or Indirect Costs (for example the cost of a desk within the Service desk environment) can be used to create more detailed reports that represent true costs within this simulation.



And finally, a Cost Chart allowing you to compare costs across each process. Should the Raise Request for Change activity so expensive? We hope not, and we would begin an investigation as to why this is the case.

The reason when spent time and care about entering cost details into the model in Chapter 8 is because the modelling tool can now accurately calculate the costs of the activities you are planning to implement.

It enables you to do the basic things that previously you would only be able to guess at?

- If we change this process, how will it impact on our costs?
- How many more staff will we have to employ?
- Could we cross-train our Service Desk Analysts and maximise resource use and costs?
- What would be the cost implication of changing the way CAP performs approvals
- How would new Service Management tools help reduce activities and therefore transit times and resources: could we predict the benefits and a cost-justification?
- If our budget is only £X, how many RFC's can we afford to process?
- Can we actually afford all of this?
- Should we proceed?

When you combine Process Modelling, Simulation and Activity Based Costing into one package, you can now make sensible approaches to implementing the ITIL Framework, as you have removed the guesswork when setting budgets or forecasting future costs.

In Summary

Now, let us be crystal clear on all of this. Gathering costs for each activity is not going to be easy. But remember, you are only going to do this one, and when you are happy with all the simulations you have done and selected the solution and implemented it – you put the model into the very heart of your organisation, and keep it up-to-date.

You continually keep the model updated, and forms part of the Continual Service Improvement Process – this makes common sense, and we would expect this to happen as a matter of course.

Additionally, on a regular basis the costs associated to each role or organisations are also updated and the model is kept current, and brought under the wing of Financial Management for IT Services process. The model then becomes the font of all knowledge when it comes to:

- Budgeting
- Forecasting
- Charging

Everything about the IT Departments costs are in the model. We have an opportunity to see what happens on costs and resources when new workloads are thrown at Service Management, this can help us design defensible charging mechanisms to the Customer, have greater accuracy in forecasting future budgets and staff requirements.

The opportunity to move from a 'fire-fighting' ethos to a planned and managed ITIL based Service Management organisation.

Would you be prepared to put a little effort into finding the base costs of individual activities if it could give you this?

We think so!

The Future

We at Birchwood Solutions are not technical visionaries (and indeed, proud to be so!), so there is no great set of ideas around how process modelling tools will develop over the next few years, and what functions and features will appear through new advances in software development.

But we have some thoughts on the general direction.

In the past, process modelling tools were expensive and/or somewhat unfriendly in use. However, over the last few years we have seen considerable activity around process improvement (ERP, CRM and BPM), and trying to manage these extremely complex processes are incredibly difficult to manage and comprehend without some form of tool to support you.

So new tools were released on the market and existing tools improved significantly, and slowly, but surely, they are gaining a toehold in the commodity software marketplace, and this results in the prices coming down and the interface becoming user friendly and more akin to a 'Microsoft interface'

So our only prediction is that this trend will continue, and we hope we are right!

However, if you look at the vendors of process modelling tools, you can begin to see 'off the shelf' models being offered into the market, for example Sarbanes-Oxley, eTOM (telecommunications) and SCOR (supply Chain Council) – these are big markets for the vendors, as their clients can get a huge 'kick-start' by using pre-prepared models.

So what about ITIL? Surely, the market for pre-prepared ITIL models must be huge?

Indeed, some vendors are announcing ITIL based models – all fully populated with the processes and workflows all ready to be tailored and fitted to an existing organisation. With minimum effort, you can get a full set of process models in place, populate it with costs and timings and you are ready to roll.

At the time of writing, Proforma has completed about half of the ITIL Processes and announced their ITIM® models. We have seen the models, and they seem excellent and well integrated, with the rest of the ITIL processes to be completed quite soon.

Some vendors have a 'marketing presence', but little in the way of usable models – but at least they have the intent to do this.

Our advice is: "Watch this space", there could be a lot of 'off the shelf' ITIL models coming to the market very soon.

The downside of these 'off the shelf' models: well, in the next couple of years we will see the release of ITIL 3, and you will want to ensure your existing models will be upgraded to the newer set of processes ITIL 3 could generate.

Should you be waiting for 'off the shelf' models? The answer is no. The ITIL Processes are well documented and show how they interface across Service Support and Service Delivery. We have Best Practice processes that describe Infrastructure or Application or security management

How long would it take for a couple of your ITIL qualified personnel to begin to enter this in a model based on how you would implement it in your organisation. Well, not a lot.

Birchwood Solutions are of the firm belief that this technology will have a major impact on the way Service Management will work in the future, and it will be for the good.

Our recommendation? We recommend that you start evaluating this kind of technology and get a deeper understanding of how it can help your IT Department.

Conclusions

Process modelling tools can be a great boon when dealing with complex Service Management environments that require an understanding of timeliness, resource and cost implications before you go into implementation.

We have seen how easy these tools are used to construct processes and hold all of the associations, links and attributes from one object to all of the others, and how objects can be reused in other processes which speed up construction of models.

We have seen the 'meat in the sandwich' the power of process simulation, and the ability to check end-to-end validity of the process. We can run different scenarios with different steps or across different organisations and enable us to identify the optimal solutions for our Service Management processes laid over our existing organisation.

We have also seen ways of looking at how changes to processes can impact on costs, and again through the ability of generating different scenarios quickly and accurately, we can compare operating costs from one process approach to another. We can take it even one step further, as we can use the same capabilities to see how the impact of new Service Management tools will have on operational costs.

And all of this for less than two thousand pounds sterling (at the time of writing for a single user license)!

Is there a downside? Well sort of.

You have spent time and effort in populating the model, produced a couple of scenarios, selected the optimal process and implemented it onto a real organisation. It all worked as simulated.

You publish the model into HTML, and upload it to your intranet. Now everyone can see how the processes work, see the operational information, see the metrics and measures, and who is responsible for each process. Absolutely marvellous!

You now need to keep this model up-to-date all of the time. If anything changes within the organisation, you have to update the model, if internal targets change; you need to update the model.

Unless you keep the model updated, then errors and problems begin to creep in and you are on the downward spiral again.

Of course, you should be doing this anyway – but who actually does? For those who do, then no problems, for those who don't, well you need to ensure this overhead is covered once the project is over – perhaps linking it into the Continual Service Improvement Programme?

One final word for consultants like ourselves (That is Birchwood Solutions not all of the readers☺). Modelling tools add significant value to client engagements, and the client loves the great documentation you leave – but they cannot use the models and the scenarios you created unless they have the same process modeller as you.

When you engage with a client it is best to inform them that to get long-term benefit from your engagement with them, that they need to adopt the same tool as you use.

So, just a couple of downsides versus a whole raft of benefits, so in our view a massive ‘thumbs-up’ for a technology that could revolutionise the way we implement ITIL.

When you combine Process Modelling, Simulation and Activity Based Costing into one package, you can now make sensible approaches to implementing the ITIL Framework, as you have removed the guesswork when setting budgets or forecasting future costs. You have proven that your processes can work as you predict. And it is the most economically viable solution in terms of efficiency and performance.

If you are implementing wholesale change, we would thoroughly recommend the use of process modelling tools.

If you need a repository of your Service Management processes to help drive your Continual Service Improvement Process or to hold all of your costs for Budgeting, Forecasting and Charging – then again we would thoroughly recommend the use of process modelling tools.

11

Appendices

Some additional reference material is included in this handbook as appendices.

Process Modelling Tools

Birchwood Solutions Limited are independent ITIL consultants and as such is vendor neutral.

As already stated in the handbook, we make use of Proforma's Provision toolset, but other modelling tools are available on the market.

Below is a list of common process modelling tools: the 'marketing blurb' if from their web-sites, so please don't shoot the messenger! However, you may want to review these tools if you are going to get serious on process modelling and simulation. Other tools do exist, but you will have to dig them out yourselves – but at least you have a starter.



Casewise (<http://www.casewise.com>)

Casewise is a recognized leader in the Business Process Analysis (BPA) market. Founded in 1989, Casewise has helped thousands of business analysts, process modellers, and corporate planners to understand the impact of their process improvements and redesigns. Casewise provides enterprise modelling software and services that enable you to visualize, document and optimize your business processes and systems. Our easy-to-use solutions provide a shared workspace for business and IT people to design, simulate (test) and implement major improvements to the enterprise. Casewise is an international company with corporate headquarters in London and New Jersey.



IDS Scheer (<http://www.ids-scheer.com>)

IDS Scheer develops solutions for business process management. With ARIS, the company has a complete portfolio for the development, implementation, operation and evaluation of business processes. IDS Scheer consultants support companies in setting up process organisation and implementing modern application concepts such as E-business, Supply Chain Management, Customer Relationship Management and EAI. ARIS Toolset is the world's best selling process modeling tool and is used by 90% of DAX 30 companies. The company was founded in 1984 by Professor August-Wilhelm Scheer, and now advises some 3,000 clients in more than 50 countries through its network of branches and partners. With 1,400 staff, IDS Scheer achieved a turnover of 161 million Euro in 2001. In Germany, IDS Scheer ranks among the top 25 IT service providers and is included in the Nemax 50 on the Neuer Markt.



MEGA (<http://www.mega.com/en/index.asp>)

MEGA is a global provider of business process modeling and IT mapping solutions. Its offerings improve large organisations' competitiveness by understanding, analysing and designing new and enhanced business processes. MEGA Solutions are targeted at teams of business analysts and IT developers that need to improve organisational efficiency by connecting fast changing business processes with IT development efforts. Unlike traditional development and business process diagramming tools that only focus on the development part of the problem, MEGA Business Process Performance Solutions enable business and IT stakeholders to drive bottom line profits, unlock new customer value, and otherwise minimize the risk involved with changing critical business processes.



Popkin Software (<http://www.popkin.com>)

Popkin Software is a leading provider of powerful, flexible business and application modelling and design tools and services that help companies optimize enterprise and e-business processes. Popkin's flagship product, System Architect, is the first fully integrated enterprise modelling tool to address the full lifecycle of business and systems information management in an enterprise. Clients include ATT,

British Airways, Scholastic, JB Hunt, Siemens, Virgin Mobile, Compaq, GlaxoSmithKline, Samsung, Lockheed Martin and The Institute of Chartered Accountants in England and Wales (ICAEW). Founded in New York City in 1986, privately held Popkin Software has sold more than 60,000 licenses worldwide.



ProActivity (<http://www.proactivityinc.com>)

ProActivity is a leading provider of next-generation Business Process Analysis (BPA) and design solutions. ProActivity develops, sells, and supports, the first and only solution that treats business processes as data, not pictures or models. This patented design automates the detailed capture and validation of "AS IS" business processes, generates all graphical process maps on the fly, provides dynamic multidimensional analysis, and creates a strategic process knowledge base that can be reused and extended across the enterprise. ProActivity customers deliver business requirements and logical design tasks 4X faster for less than 1/2 the cost.



Proforma (<http://www.proformacorp.com>)

Proforma Corporation provides Enterprise-wide modelling and simulation tools and services to successful companies in many industries and government agencies worldwide. General Motors, American Express, EDS, Kmart, J.D. Edwards, State of Michigan, and Pennsylvania DEP are among the many thousands of organisations that rely on Proforma and ProVision to ensure that their corporate strategy and process are aligned with technology. Proforma is recognized for its success and value in improving client performance while ensuring all strategic objectives are attained.