PROCESS IMPROVEMENT FOR IT DATA CENTRE MIGRATION BY IT INFRASTRUCTURE LIBRARY (ITIL) GUIDELINE

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A Thesis Submitted in Partial Fulfillment of the Requirements

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The Regional Centre for Manufacturing System Engineering

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การปรับปรุงการทำงานเพื่อรองรับการขยายตัวของศูนย์ข้อมูลเทคโนโลยีสารสนเทศด้วยแนวทางการทำงาน ITIL

นางสาว วรลักษณ์ ยุทธวานิชกุล

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วรลักษณ์ ยุทธวานิชกุล: การปรับปรุงกระบวนการทำงานเพื่อรองรับการขยายตัวของศูนย์ข้อมูลเทคโนโลยีสารสนเทศด้วยแนวทางการทำงาน ITIL (PROCESS IMPROVEMENT FOR IT DATA CENTRE MIGRATION BY IT INFRASTRUCTURE LIBRARY (ITIL) GUIDELINE) อ.ที่ปรึกษาวิทยานิพนธ์หลัก: รศ. ดร. ปารเมศ ชุติมา, 122 หน้า

เอกสารวิทยานิพนธ์ฉบับนี้เกี่ยวข้องกับการ ศึกษาการปรับปรุงกระบวนการโยกย้ายศูนย์ข้อมูล IT Data Centre โดยมีวัตถุประสงค์เพื่อแนะแนวกระบวนการปรับปรุงการย้าย IT Data Centre ตามมาตรฐาน ITIL ซึ่งคิดค้นโดยสถาบันมาตรฐานแห่งประเทศอังกฤษ หรือที่เรียกกันสั้นๆว่า British Standard ซึ่งปัจจุบันกลายเป็นมาตรฐานที่เป็นที่ยอมรับกันโดยทั่วไปในกลุ่มการใช้เทคโนโลยีขั้นสูงอย่างกว้างขวางและถูกกำหนดให้เป็นกระบวนการที่หน่วยงานทางด้านสารสนเทศและรวมถึงองค์กรใหญ่ๆหลายๆองค์กรต่างๆนำไปประยุกต์ใช้กับกระบวนการทำงานในปัจจุบัน

วิยานิพนธ์ฉบับนี้ จะกล่าวเกี่ยวกับการใช้มาตรฐาน ITIL ในการลำดับความสำคัญและการดำเนินการแก้ไขปัญหาต่างๆที่พบในการทำงานที่ด้าน IT ที่ไม่เป็นระเบียบแบบแผน และ จะช่วยให้หน่วยงาน IT พัฒนามาตรฐานการให้บริการให้สูงขึ้นในสภาวะที่มีการจำกัดงบประมาณด้าน IT ลง อย่างไรก็ดี การวางแผนการให้บริการด้าน IT อย่างเป็นมาตรฐานนั้น ย่อมดีกว่าการให้บริการที่ไร้ทิศทาง

โดยหน่วยงานทางด้านสารสนเทศซึ่งต้องการพัฒนาศักยภาพการบริการของตนเอง ได้เลือกใช้มาตรฐาน ITIL ในการพัฒนากระบวนการย้าย Data centre นี้ เพราะคาดหวังจะยกระดับ Data Centre ให้เทียบชั้นกับมาตรฐานสากล โดยผลลัพธ์ที่ได้ จากการนำกระบวนการนี้มาปรับใช้กับองค์กร จะก่อให้เกิดผลเสียและช่วยลดปัญหาที่จะเกิดขึ้นตามมา ให้เหลือจำนวนน้อยกว่าที่คาดว่าจะเป็น

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This thesis studies the process improvement for IT data centre migration by IT infrastructure (ITIL) guideline. The objective of this study is to create process guideline for improving IT data centre migration – new data centre allocation by using ITIL guideline.

The Information Technology Infrastructure Library (ITIL) is a framework of best practices, which forms the basis of the British Standard for IT Service Management. It has been selected as it is rapidly becoming the internationally accepted standard, and provides a clear set of processes into which the IT Department and the prevailing internal service culture will integrate.

The proposed thesis for implementation of this framework will prioritize and progressively address the outstanding issues experienced with inconsistent levels of service provided by IT and will enable the IT Department to provide a higher quality customer service given the current budgetary constrains.

The primary and important objective of this work is trying to find and analyze common and typical incidents and problems of IT service especially in data centre application management field. Find and create process to be improved the service management. It is coming from the Service management perspective and approach. All major topics are covered within Service Management mindset. The problems will be examined and analyzed by application management part of ITIL. The conclusion of this study is to create a guideline for IT data centre migration.

The Regional Centre for Manufacturing Systems Engineering   Student's signature……………………..

Field of Study   Engineering Management   Advisor's signature…………………….

Academic Year   2009

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CHAPTER 1

INTRODUCTION

This chapter discusses the background and addresses problem area. Later discussion problem and objective will be presented. From the objective, the specific research questions are opened for this work and also structure and limitation are presented.

1.1   Background

The change management process is required to ensure that installation or modification of computing, communications, procedural or facility resources are implemented in an orderly and controlled fashion. The benefits of implementing a controlled change management process are to optimize system and resource availability and avoid outages related to unsuccessful change activities. The change management process covers all operating environments and is used to control all change activity in the data centre environment from definition, through implementation and review.

This research describes the Change Management Process Flow, Process Activities and Work Instructions for the Operations department. It describes from start to finish the procedures and steps that are required to implement a Change successfully.

The Change Management process comprises of seven stages. The high level diagram shows the inputs and outputs from the other ITIL processes. (Release Management, Capacity Management and Problem Management)

1.2   Statement of the problem.

IT Operation department lacks of the knowledge for change management in data center allocation for creating new data center. To reduce incidents and problems while moving the old data center to a new data center or migrate to the new environment, IT Operation department is absolutely required guideline and knowledge coaching for global, regional and local operation support consultants.

The table as below shows the record of forward schedule of change, they had been requested and scheduled when operation support consultants required implementing the changes in IT data centre. Each record is a ticket created by change requesters, defined and addresses the details of change including change requestor, change approver, date of request, date of schedule, date of implement, change builder, change implementer, risk and impact, notification, etc all needs to be recorded and known before implementation phase to avoid and reduce problem that will come to be occurred.

Table 1: Example forward schedule of change

RFC	Risk	Impact	Emergency Change	RFC Change Type	Title
CH0000019320	Low	Low	N	Local	SON: IDN Core VMS Systems GPS Audit - Systems at STC for IDN Core systems
CH0000019320	Low	Low	N	Local	SON: IDN Core VMS Systems GPS Audit - Systems at STC for Collection systems
CH0000015654	Medium	Medium	Y	Local	VAPRIG709.01 Migrate-VAPC-2ndPair-to-StandardBuild-on-DL585G2-Hardware
CH0000022244	Low	Medium	N	Local	VAPRIG712.06-DE6701-NDALink1-Remove-EPS-DPS-for-China-Shares
CH0000022244	Low	Medium	N	Local	VAPRIG712.27-SE-VAP-CORE-Adding-New-Logical-Channel.ACR
CH0000022244	Low	Medium	N	Local	VAPRIG712.28-SE-TWFixing-Bug-Fixing
CH0000022244	Low	Medium	N	Local	VAPRIG712.29-SE-DEVASIA-Use-PED-in-History-PP-Array
CH0000022980	Low	Medium	N	Local	DEC 786 (TGEFIX)
CH0000022980	Low	Medium	N	Local	DEC 786 (TGEFIX)
CH0000021794	Medium	Low	N	Local Complex Child	New STC-POC RTDS Server Configuration (POC)
CH0000021794	Medium	Low	N	Local Complex Child	New STC-POC RTDS Server Build & Configuration (POC)
CH0000019318	Low	Low	N	Local	SON: IDN Core VMS Systems GPS Audit - Systems at POC
CH0000019318	Low	Low	N	Local	SON: IDN Core VMS Systems GPS Audit (POC) - SDFC9
CH0000019318	Low	Low	N	Local	SON: IDN Core VMS Systems GPS Audit (POC) - SDMC8
CH0000019318	Low	Low	N	Local	SON: IDN Core VMS Systems GPS Audit (POC) - SLMN8A / SLMN9A
CH0000019319	Low	Low	N	Local	SON: IDN Core VMS Systems GPS Audit - Systems at SDC & Phase 1 datacenters
CH0000004754	Low	Medium	N	Local	Upgrade SDFCE/F/G 'B' system memory to 4GB (PCN088)
CH0000004754	Low	Medium	N	Local	Upgrade SDFCE/F/G 'B' system memory to 4GB (PCN088)
CH0000016958	Medium	Low	Y	Local	WDT Cable Replacement - SRDX2B
CH0000004345	Low	Low	N	Local	Generators sets on-load testing
CH0000022977	Medium	Low	N	Local	IDN SHDFR for SSX2 on STQS1 - relates to OCN Number 25030 (24DEC 0030 GMT)

1.3   Objective of the study

The objective of this research is to create process guideline for improving IT data centre migration – new data centre allocation by using ITIL guideline. To reduce the incidents and changes are the main purpose. Moreover, in the long term, it should be a standard procedure and bring to set as a method of working for operation staff.

1.4   Scope and Limitation

This research has the scope of the study due to the limitation amount of time available for this work and attempt has been made narrow the focus. Therefore, this study will concentrate on the implementation of the ITIL framework following a series of incidents of miscommunications and misunderstanding which led to a reduced level of service provides to some users. It was recognized that standardization of internal processes may lead to a more consistent and higher quality service provision, and also that more control over internal change management processes was required.

1.5   Study procedure

This thesis will be carried out by the following steps:

1. Academic study and understand ITIL framework.
2. Collect all necessary data and all information related about process between technical data centre and related department over organization.
3. Evaluate of the risks associated with the failures and prioritizing them according to importance.
4. Define the method and process to identify potential improvement opportunity.
5. Measure the performance of interesting data by using the descriptive data analysis to understand the baseline.

6.   Analyze the process to be determined whether the process can be improved or should be redesigned.

7.   Improve the process by using expert validation and brainstorming to create the implementation guideline.

8.   Summarize the result of study and recommend further study.

9.   Thesis write-up and submission.

CHAPTER 2

LITERATURE REVIEW

In this chapter, a review of literature which related to a research, give a theoretical framework presents. The overview of the ITIL framework will be shown.

2.1   ITIL Framework

Many IT Business Organizations attempts to increase service levels, decrease costs and improve security look to the ITIL framework for guidance. ITIL or the IT Infrastructure Library is widely accepted as the world's leading compilation of IT best practices.

A large an increasing number of organizations rely on ITIL. In the U.S. organization such as Procter & Gamble, Caterpillar, State Farm and Boeing have shared how they have incorporated aspects of ITIL into their IT management strategies. However many misconceptions still exist about ITIL, which sometimes confound even long-time IT practitioners.

One of the first shocks IT practitioners may receive when researching ITIL is just how big it is. They will discover that ITIL spans lot volumes and if they continue to dig, they will find more volumes. Understandably, many find this overwhelming and abandon their ITIL investigation.

Of those who do become proficient in the ITIL framework, may remain very frustrates about where to start implement ITIL. We recall working with an IT director who embarrassedly admitted that after more than 50 presentations on ITIL implementations, it still was at a loss at where to start. Worse, it wasn't sure whether bringing in an external consultant for a risk assessment would achieve IT process improvement objectives.

Kevin Behr, chief technology officer of IP Services, said, "if someone in hearing voices in their head, hopefully you can do more than just pointing them to the library and telling them to read lots of books. Because ITIL is not prescriptive, many find themselves asking what they are supposed to do first."

Happily, you do not need to know all of ITIL to get benefits from it, nor do you need to understand it all to get value. To get started with ITIL, many IT practitioners will start with existing process areas that they already have and want to improve. Most commonly, these will be the key process areas at the core of almost any IT operations: incident, change and configuration management.

The chief benefit to IT organizations of adopting service-oriented best practices is to work smarter and more efficiently, says Mart Rovers, president of InterProm USA (http://www.interpromusa.com/), a business service management consultancy. Forsythe's Tainter concurs, noting that because ITSM aligns IT processes to overall business goals, companies gain "higher productivity from both business and IT staff." He also notes a tangential, but potentially significant, advantage of an ITSM approach, namely that it "allows IT staff to be more innovative in their work" because it reduces the amount of unplanned, reactionary "firefighting." Rovers adds that the streamlined operations resulting from ITIL-proscribed processes improves customer satisfaction and that more structured IT processes also serve to reduce hardware and licensing costs because they lead to tighter management of IT assets.

According to Rovers, perhaps the biggest barrier to the adoption of ITIL processes is a lack of visibility; many of his potential customers "have no clue" of these service-oriented best practices: "It's a big unknown," he says. Once this awareness hurdle has been vaulted, he contends the stiffest challenge facing IT management pursuing an ITSM approach is resistance to change. Because ITSM "involves peoples' jobs," managers can't implement it merely as a process change. He points out that while the most successful implementations "institutionalize

responsibilities as low as possible in the organization," this empowerment comes with accountability, a "dirty word" to some. He suggests that businesses inculcate accountability without people feeling their jobs are on the line.

Another area of possible staff resistance comes when it's time to document processes. Forsythe's Tainter points out that most IT staff is not skilled in documentation and may see it as unnecessary overhead. He notes that this issue may be especially acute for small companies (for example, those with less than 30 IT staff) because they may find there just aren't enough people available to manage the ITIL processes.   .

Both Rovers and Tainter agree that a successful ITSM implementation requires strong leadership and management sponsorship. Rovers stresses that ITIL only deals with one-third of the who/what/how trinity of questions IT departments must answer in transforming their organization—namely "the what," for example, processes and best practices that should be adopted. He says the tough work of an IT leader is mapping these processes to the people within an organization charged with implementing each process ("the who") and to the tools required for implementation ("the how"). According to Tainter, one of the primary tasks of an ITSM champion is justifying an effort that features benefits that aren't easily quantifiable (for example, improving "soft costs" such as productivity or customer satisfaction that can't easily be translated into a hard ROI figure).

Any IT manager contemplating introducing ITSM concepts to his organization should start with some introductory training. Rovers suggests several options from reading a primer such as the "Introduction to ITIL" or attending an onsite executive summary from a qualified consultant to sponsoring an in-depth workshop where an expert conducts a company-specific review of IT processes. He also suggests managers attend local user-group meetings of the ITSM Forum (itSMF International; www .itsmf.org) to pick up tips and network with others utilizing ITIL best practices.

Forsythe's Tainter points out those initial steps should also include performing an assessment of an IT department's existing processes to gain an understanding of how they can be aligned with ITIL best practices. Subsequent to the assessment phase, he recommends developing a roadmap that identifies specific projects to implement ITIL practices. He recommends incident management as the best starting point because it is one of the most critical IT processes and can demonstrate a "quick win" for any new service management initiative.

Rovers' notes that a good ITIL implementation should produce benefits within three to six months—much longer than that, and "you're doing something wrong," he says. Rovers recommends defining a process manager position to focus transition efforts independent of day-to-day operations—as, he says, "a process manager manages work; a line manager manages people." Both Rovers and Tainter agree that consultants can provide needed ITIL expertise and assistance in workshops, tool selection, project management, organizational change, ISO 20000 certification, and interim.

Standard IT best practices can enhance an organization's effectiveness, but, according to Forsythe's Tainter, the critical aspect of any IT service management effort is to ensure that "services, processes, organization, and tools are all aligned." He also stresses that "ITIL is not an end game; it's a journey for the rest of the organization's life." It's not a single project but a series of projects spread over time. It's part of a "culture change" that aligns IT with business direction—a change that, while often painful, can significantly enhance IT's value to the company as a whole.

2.2 ABOUT ITIL

Information Technology Infrastructure Library (ITIL) was developed in England in the 1980s for the Central Computer and Telecommunications Agency (CCTA), an agency of the British Government. By collecting the best practices from top companies, the CCTA established a best practice process framework called ITIL. All the companies who contributed their best practices then adopted this guide.

This is a public domain framework and can be used within any department of any sized company. The best practice framework for service management contains a description on how to organize service management within your organization.

ITIL's quality approach to service management focuses on:

- Services to meet business, customer and user demands
- Improved quality service provision
- Cost justifiable service quality
- Integrated centralized processes
- Clear roles and responsibilities
- Knowledge base approach
- Performance indicators

2.2.1 Information Technology Service Management

Traditional hierarchical business companies and many organizations often have hard jobs in responding to the rapid changes, and it has led to current trends for business units to become flatter and more flexible. The focus in this decade is pointed to horizontal processes and decision making powers, which are increased in many employees. It is against this background that the work processes of IT Service Management have arisen.

The important advantage of process-oriented organizations is that processes can be designed to support a customer oriented approach. It made the alignment between the IT organization and the customer increasingly significant. Over the last couple years, this trend has attracted attention under the title of Business-IT Alignment.

As organizations gained more experience with the process-oriented approach of IT Service Management, it became clear that the process must be managed properly. Moreover, it was obvious that the introduction of a process-oriented work method meant a big change for the primarily line and project-oriented organizations. Culture and change management proved to be crucial elements for a successful organizational design.

With the more and more deeply influence of IT in social life, more and more non-IT person started to know it, currently it is not mystery for them who would eager to know and use it. Nowadays, people do not have questioned 'What can I do for IT?' but in the opposite side it is 'What can IT do for me?' The result or output that comes from this question is tools and services.

The appearance of IT Service Management has a close relationship with enterprise such as 3 stages:

2.2.2 Technology driven stage

Most enterprise are undergone this stage. In this stage, the information technology was not mature and the enterprise did not have a deeply understand of IT, it with the high speed of IT development, most enterprise knew that IT would have great influence of business. If do not invest with IT, they will lost in the market. So the enterprise always tried the new IT approaches and traced the trend of IT to gain the advanced in business competition complete between market units. The IT

department has more rights of hardware purchasing or software development and etc that it should have. The header layer never thinks about the efficiency and effect of IT investment. This was a kind of strategy investment which does not consider the reward.

1.   Business driven stage

Current most of enterprise is in this stage. After collection of experiences in the first stage, people started to discovery how to combine IT and organization business, how to improve the efficiency of IT, how to low the cost. Different departments had developed different systems and network for the specific business goal.

2.   Strategy driven stage

This is the best stage, enterprise makes business processes based on their goal, then make a clearly demand of IT Service for their goals. After that, make an implementation plan for their goals, this plan includes IT service management plan and execute the plan. Due to implement the service management, the plan also improves the enterprise business goal. This is an interactive process.

The appearance of IT service also has relation with IT management. The development of IT management has also 3 stages:

1.   **Devices Management stage:** IT management already started from the first day of computer appearance, the most actions in this stage are devices management with manual management.

2.   **System and Network management stage:** the system management and network management have melted together in enterprise today.

3.   **Service Management stage**: the first stage is focused on device, the second stage is pointed to technology and the third stage should move the focus to service.
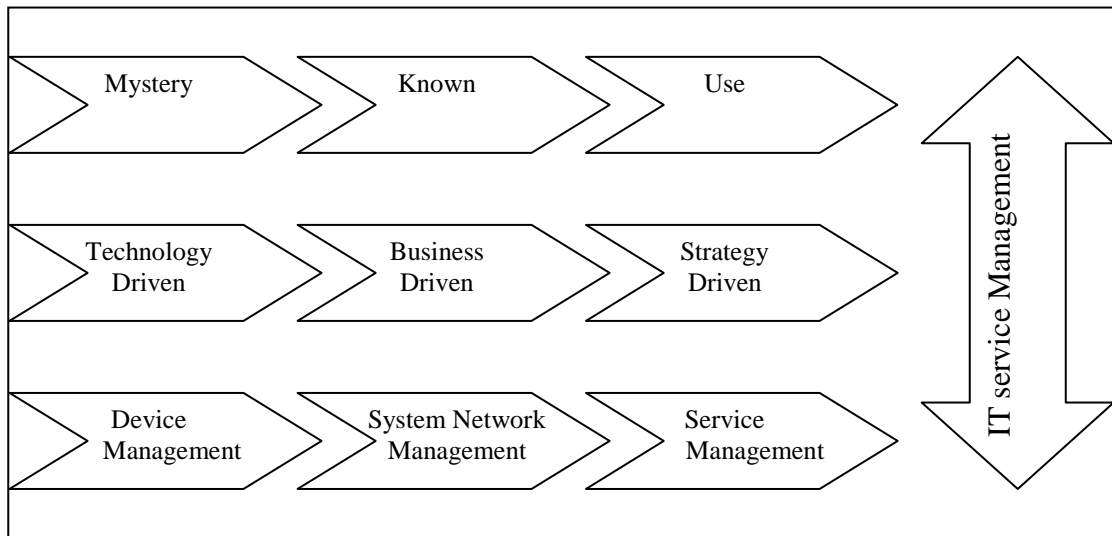
Background of Appearance of IT Service Management

2.2.3   Information Technology Service Management

As it is described that the Development of Information Technology Service Management has 3 stages

1.   **The Initial stage:** In the initial period of IT service, IT Service Management is just a concept. Nobody pay much attention to it. From the mid of 80's of the last century, Central Computer & Telecommunications Agency started to develop ITIL v 1.0 the best management practice of IT Service Management which based on process organized.

2.   **The Development stage:** In 90's of 20th century, more and more companies started to develop their own method of IT Service Management and ITIL V 2.0 is came up.

3.   **The Mature stage:** until now, we could not say that the IT Service Management is in a mature stage. It is still in a developing process.

2.2.4 The overview of Information Technology Infrastructure Library

Information Technology Infrastructure Library (ITIL) started in 1980s when the Office of Government Commerce (OGC) made a decision need to have a better way for Information Technology Business Organization to function. ITIL becomes to the big thing for Information Technology, it talks about new certification, new conference, and new ideas for IT Business Organization's need. ITIL is a framework of process for the management of IT, was developed and released in 2001.

Service Support and Service Delivery are the heart of ITIL and the focus of the present drive for ITIL adoption. Because ITIL started in the British government, and it was quickly spread to non-government organizations from Britain to Europe and Canada and it was adopt to the United States and Asia at last.

ITIL is named as a Best Practice, what is it?

A simple definition of best practice is "An industry accepted way of doing something that works (Aidan Lawes, CEO itSMF).

Best practice is the best identified approach to a situation base upon observation from effective organizations in similar business circumstances. It seeks out ideas and experiences those who have undertaken similar activities in the past, then determining which of these practices are relevant to your situation. Test them out and see if they work, before incorporative the proven practice in our own document processes.

Best practice is all about not "re-inventing the wheel", but learning from others and implementing what has been shown to work. Its techniques can be applied in all walks of life. We focus on those relating to the provision and management of IT Services – though in reality, the principle apply anywhere.

CHAPTER 3

METHODOLOGY

3.1   RT Change Management Process (RCMP)

The purpose of Change Management is to:

Ensure that standardized methods and procedures are used for efficient and prompt handling of all changes, in order to meet agreed service levels and to prevent the occurrence of any change-related incidents.

The core objectives of the RT Change Management Process (RCMP) are to:

- Implement changes in adherence with company policy and standards.

- Reduce, or eliminate, disruptions due to change activities.

- Co-ordinate and implement changes on schedule.

- Eliminate, or reduce, the number of change fallbacks caused by ineffective change planning or implementation.

- Avoid the proliferation of non standard and unsupportable components within the networks.

- Ensure that changes made to the production environment are successfully:

  - Defined

  - Assessed

  - Prioritized

  - Approved

  - Communicated

  - Planned

- Managed

- Tested

- Resourced

- Scheduled

- Tracked

- Implemented

- Validated

- Reviewed

3.1.1 Benefits to the IT Department

- Increased insight in the objective of the Change Management process and how to engage the process

- Better streamlined process and information for initiating Changes

- Increased visibility and communication of Changes to IT staff

- Better assessment of cost of proposed Changes before they are incurred

- Better use of resources, prioritization of effort and planning of Changes

- Fewer Changes that have to be backed-out, along with an increased ability to do this more easily when necessary

- Improved information and reporting for management steering, continuously improving the Change Management process and providing integration with related processes

- Increased productivity of IT staff through less need for implementing urgent Changes or back-out activities

- Greater ability to absorb a large volume of Changes

- ▪ Better control over Change related contractor, vendor or project activities

- ▪ Better business perception of the IT department through an improved quality of service and a professional approach

3.1.2 Benefits to Business and User Organization

- ▪ Increased insight in the objective of the Change Management process and how to engage the process

- ▪ Better alignment of Global Operations IT services to the actual business and user requirements

  - • Better streamlined process and information for initiating Changes

  - • Increased visibility and communication of Changes to business and users affected

- • By undertaking impact and risk assessment, there is a reduced adverse impact of Changes on the IT services and Service Levels as agreed by the business.

- • Increased productivity of users through less disruption (higher service availability) and higher-quality services

3.2 Scope of Change Management

The scope of the Change Management process covers changes to the following resources in all RT facilities. It covers lightweight Changes as well as Low, Medium and High risk Changes.

3.2.1 Hardware

The installation, removal or modification to any hardware component within the RT operational environment or external component. This includes Mainframe Systems, Distribution Systems, sub-system or component upgrades, etc.

3.2.2 System Software

The installation, removal or modification to any software component within the RT operational environment or external component. This includes Operating Systems, Sub-Systems, Patches, Bug Fixes, Data Bases, Vendor Products, Firewall configuration, etc.

3.2.3 Communications Network

The installation, removal or modification to any communication component within the RT or BTR operational environment, or external component, that can have an impact on our service stability, where the changes are to be carried out by RT employees or contractors managed by RT. This includes Software, Filter Tables, Communications Controllers, Terminals, etc.

Note: This excludes any changes carried out by BTR staff on BTR communications assets, but includes any changes carried out by RT staff on BTR communications assets acting on BTR's behalf.

3.2.4 Environment

The installation, removal or modification to any Environment component within the operational environment or external component or organisation that can have an impact on our service stability of data centre where RT is responsible for the physical environment. This includes Electrical, Heating, Ventilation, Air Conditioning; etc. This includes all data centre where RT is the owner or lease holder of the facility, and excludes all data centre where BTR or any other third party is the owner of leaseholder.

3.2.5 Procedures

The installation, removal or modification to any Procedural component within the RT operational environment or external organisation. This includes Documentation used to support systems, applications and processes.

3.2.6 Data

Key or high volume RIC or 'Category A' changes that could potentially affect RT services to its customers. Normal routine data changes are considered out of scope of the Change Management Process.

3.3   Departments Involved in Change Management

To streamline the process and avoid unnecessary delays the responsibility to review and authorise change will be distributed across the organization. This will provide flexibility and allow the individual data centre to introduce change within their specific domain in a timely manner whilst adhering to a globally defined standard.   These standards will allow decisions to be made on a local basis and provide the guidelines for changes that require regional or global approval.

A large number of IT departments are involved in the Change Management Process, the details of which can be found in the ChM001 Change Management Roles and Resourcing document.

3.4   Risk Management

3.4.1 Risk and Impact Levels

The risk and impact of the change should be determined in the initial stages of opening a change record. Risk and Impact are defined as follows:-

- Risk - the likelihood of a change failing and affecting service

- Impact - the business impact should the risk materialize

The RFC tool calculates a score for the change based on the answers to the various risk and impact questions. The level of risk and impact will be documented in the Change Record.

The Change Manager has the responsibility for reviewing the risk and impact levels following review of the initial assessment raised by the RFC Originator. The CM or Change Forums can over-ride the level where necessary.

Change Risk/Impact Evaluation Tables

The following matrix will assist the RFC Initiator in determining the risk and the impact of the proposed change.

Table 2: Change Risk

RISK				
Question		**Answers**		**Weighting**
1. How many times has this type of change been implemented successfully within the last six months?	Never	Less than 5	More than 5	
Scores	3	2	1	4
2. Has testing been carried out and delivered positive results?	Yes	Don't Know	No	
Scores	1	3	3	5
3. Have the test results been signed off?	Yes	Don't Know	No	
Scores	1	2	3	2
4. Is on-site support required?	Yes	Don't Know	No	
Scores	3	3	1	6
5. Is on-call support required for implementation time?	Yes	Don't Know	No	
Scores	3	3	1	3
6. For changes being applied to multiple centre/regions requiring co-ordination, has it been planned?	Yes	Don't Know	No	
Scores	1	3	3	3
7. What level of complexity is involved in implementing the change?	High	Medium	Low	
Scores	3	2	1	10
8. Is there a detailed deployment plan with actions to mitigate risk?	Yes	Don't Know	No	
Scores	1	3	3	5

Table 3: Change Impact

IMPACT				
Question		Answers		Weighting
1. Is the change being implemented during service hours?	Yes	Don't Know	No	
Scores	3	3	1	11
1a). If the answer to 1. is "yes", what is the service downtime associated with this change?	Less than 5 mins	5 mins to 2 hours	More than 2 hours	
Scores	1	2	3	3
1b). If the answer to 1. is "yes", will the change be visible to the customer	Yes	Don't Know	No	
Scores	3	3	1	10
2. Is the change affecting live and standby systems simultaneously?	Yes	Don't Know	No	
Scores	3	3	1	5
3. Should the change fail, is the business impact understood?	Yes	Don't Know	No	
Scores	1	3	3	2
4. Is there a backout plan which has been tested?	Yes	Don't Know	No	
Scores	1	3	3	10
5. What is the fallback duration if it is invoked?	Less than 5 mins	5 mins to 2 hours	No	
Scores	1	2	3	4
6. Should the change fail, what is the anticipated time to recover service?	Less than 5 mins	5 mins to 2 hours	More than 2 hours	
Scores	1	2	3	7
7. Does the change have local, regional or global customer impact?	Global	Regional	Local	
Scores	3	2	1	12
8. How many users are affected by this implementation?	Local centre:			
Scores	0-75	76-150	151 plus	
	1	2	3	
	Regional / Global centre:			9
	0-499	500-999	1000+	
	1	2	3	
9. Does the change affect category "A" data, or databases containing such data?	Yes	Don't Know	No	
Scores	3	3	1	10

IMPACT				
Question		Answers		Weighting
10. In your experience what is the business impact of the change failing?	High	Medium	Low	
	3	2	1	25

Based on the score, the following levels of risk/impact will be defined.

Table 4: Risk/Impact Scorings

Risk/Impact Scorings	*Low*	*Medium*	*High*
Risk	18-49	50-83	84-115
Impact	98-152	153-271	272-324

Based upon the levels of risk/impact, the following approval levels will be used.

Table 5: Approval Levels

Approval Levels	*Low Risk*	*Medium Risk*	*High Risk*
Low Impact	Change Mgt.	Change Mgt.	CAB
Medium Impact	Change Mgt.	CAB	CAB & Head of Ops
High Impact	CAB	CAB & Head of Ops	CAB & Head of Ops

3.5 Reference Terminology

The planned works change window is defined as the specific time agreed between BTR and RT when scheduled and approved changes may be implemented. The planned works window will vary to allow changes to be implemented at the most

appropriate time for each specific change. When determining the appropriate change window the following types of considerations will be taken in to account;

- potential service disruption or diversity disruption

- resource availability

- roll-back times

- pre and post change test requirements

- product live times

- the risk and impact of each change

- global & local market open times

The maintenance window stated in the NSA contract is as follows and it is this window that the above constraints may force tasks to be scheduled outside of;

"Maintenance Window"	means:	
	(i)	22:00 Saturday to 06:00 Sunday local time (or the local equivalent of a weekend) in respect of customer Facilities only; and
	(ii)	in all other cases, 22:00 GMT Saturday to 06:00 GMT Sunday.

It should be noted that RT management have stated that the primary goal of specifying this maintenance window was to control when service affecting BT core network changes could be implemented and not to restrict the times when changes could be implemented to devices/systems that are directly related to or connected to RT infrastructure, such as equipment located in RT Data Centre.

RT will manage a list of services and the appropriate maintenance windows for each service. These will be made available on a RT website that will be available to all relevant BT and BTR staff. BT and BTR will bear these in mind when scheduling work that may cause service disruption.

It should be noted that changes related to client edge service provisioning do not fall under the category of planned works and are not listed on the planned works change schedule. These changes and any necessary customer notifications are coordinated by the customer service and provisioning teams.

3.5.1 Risk Assessment

Risk assessment of a network change is an evaluation of change related factors that allows a comparative assessment to be made of the probability of the change being unsuccessful, the manageability of the impact of the change being unsuccessful, and thus allows informed decision making as to whether a change should be made, and to some extent, when (i.e. to mitigate the impact of the failure).

Risk assessment is determined both for the change itself and for a set of changes in combination, for example during a specific change window, across a specific network etc.

The risk, as determined, must be weighed against the business importance of making the change for RT and for BT/BTR.

3.5.2 Impact

Impact assessment of a network change is an evaluation of change related factors, principally the scope and severity of the impact that allows a comparative assessment to be made of the inevitable consequences service impact of a change

being made and thus allows a decision as to when a change should be made i.e. which change window.

Scope is usually taken as a quantative measure of the size of impact, such as the number of users affected.

Severity is usually taken as a quantative measure of the length of time the impact is felt.

Impact assessment is determined both for the change itself and for a set of changes in combination, for example during a specific change window, across a specific network etc.

3.5.3 Break Fix

Break fix is a change that must be implemented in order to restore a service that has been interrupted, or is at severe risk of being disrupted if action is not taken quickly. Break fix activities must be identified and traced via appropriate fault tickets.

Break fix work is, by it's nature, not planned and scheduled, however BTR will endeavor to provide as much notice as possible of break fix associated disruptive work, and it will be included in the weekly update detailing the outcome of planned changes.

3.5.4 Emergency Change

An emergency change is defined as a change that has not been scheduled within the standard lead times and by it's inclusion could affect the notified schedule, for example by altering the cumulative risk and impact, or by replacing another activity, but which is of sufficient business criticality to justify the potential disruption and departure from the scheduled change process.

Below is an example list of RT contacts that have been empowered to provide quick approvals to Emergency Change Requests.

Table 6: Emergency Change Control Contact List

RT CONTACTS FOR EMERGENCY CHANGE CONTROL		
Primary:		
Regional Change Manager	**Name**	**Tel. No.**
Secondary:		
Local Change Manager	Name	Tel. No.

3.5.5 Change Advisory Board

A Change Advisory Board (CAB) is a regular meeting at which planned changes are notified and reviewed, and which take place at global and local or regional level.

In particular, changes identified as medium or high risk are reviewed, and changes that are mutually exclusive are identified and rescheduled accordingly.

3.5.6 Notification

Notification is the advice of an impending change, the notice period being consistent with the risk and impact of that change

3.5.7 Standard Change

Tasks which are well understood and proven to be low risk and impact when implemented correctly are defined as Standard Changes as outlined by ITIL Service

Support best practice. The nature of these changes allows notification of their implementation within specific time boundaries to be minimized, notwithstanding cumulative risk and impact considerations. As such, Standard changes can be scheduled at short notice, with the result that they do not usually fall within the scope of a CAB, and notification is effected outside of the CAB.

3.5.8 Global Change

In the context of this document, global change is defined as any network change that can have an impact on the network beyond the local data centre where it is effected, and as such should be included in the cumulative risk and impact assessment, is effected in whole or in part via remote access, and requires a global management system update.

3.5.9 Local Change

In the context of this document, local change is defined as any change where the impact on the network is limited to the local data centre, is effected wholly by local resource, and requires a local management system update only.

3.5.10 Activity Schedule

The Activity Schedule shows all planned activity and includes all BTR activity, global and local, within the core networks and Data Centre. Client edge provisioning changes are not considered as planned works and are therefore not listed on the activity schedule.

The activity schedule is published in a format suitable for querying and similar manipulation, and details all activities that may cause risk or impact to RT services in a way that allows meaningful risk and impact assessment.

3.5.11 Change Window

A Change Window defines the start and end time of change opportunities, consistent with the risk and impact of the change.

There are three change windows:

- In Hours (IH), which equates to normal business hours in local terms (i.e. these are minimal risk and minimal impact tasks that can be performed at any time).

- Out of Regional Hours (OORH), which equates to times outside of normal business hours in local terms? These are tasks that can be performed after local business hours (i.e. after 6:00pm local time).

- Out of Hours (OOH), which equates to times that are globally out of business hours, Monday to Friday morning inclusive, and which is measured in GMT (i.e. GMT Friday 23:00 to Sunday 08:00).

3.5.12 Policies & Standards

BTR have defined procedures for pre and post changes testing and relevant fall back procedures. There are documented in the "BTR Implementation Guide for Network Changes" and similar procedures will be produced for all MPLS related changes.

3.5.13 Service Testing

There are times when BTR will not be able to test whether RT services have been disrupted by planned changes. In these circumstances RT must make appropriate staff available and provide the BTR CAB with the contact details of these staff. The BTR engineer will not proceed with these planned changes until they have confirmed that the relevant RT service test contact is available and able to perform

the required tests. The service tests contacts appointed by RT must be able to conduct whatever tests are necessary to verify that the potentially impacted service(s) are fully operational or verify that the required new services are working correctly. If RT do not complete these tests accurately and inform BTR that the RT services are working correctly when in fact they are not, then BTR will not be held responsible for any resultant service disruption.

CHAPTER 4

IMPLEMENTATION

4.1 Change Management Mission Statement

Change Management at aims to provide the overall co-ordination of changes supported by CAB Members in all IT departments to ensure the balance between the stability requirements of the Global Operations IT infrastructure and the flexibility requirements to meet changing business and user requests.

4.2 Explanation of the Numbering System Used

Each of the 'boxes' in the flowchart has a number associated with it. The numbering is used to help explain the flowchart in more detail. The numbering system that is used for the process environment is as follows:

The 300 number ranges are reserved for the Change Management process. Following the first figure (300) is a dot and one number behind this (e.g. 300.1). This second number is used to distinguish between the various boxes in the Change Management process flow. These numbers also help to refer to specific procedures. For example, 300.1 is one of the boxes in the process flowchart. At the same time it refers to a procedural flowchart (see Process Flow section). The procedural flowchart for 300.1 consists of a number of steps, indicated by another number (e.g. 300.1.3). So the figure 300.1.5 is the fifth step of the 1st procedure of the Change Management process.
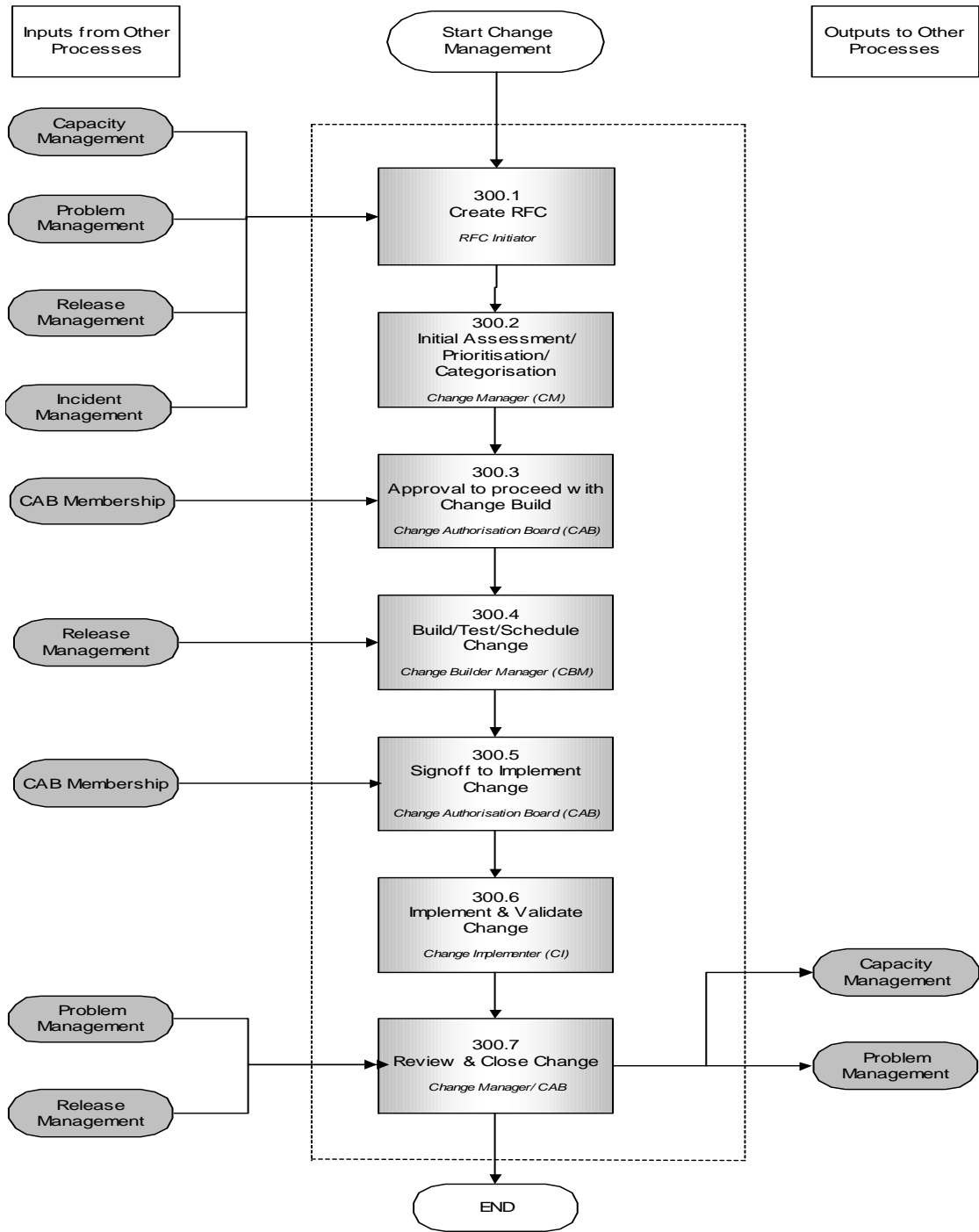
Figure 1: Change Management Process Flow Chart

4.3   Change Management Process Flow Explanations

There are several steps associated with the Change Management Process beginning with the creation and submission of the change request to the initial assessment, approval, build, test, schedule, sign off, implementation of the change, review and closure.

The process includes the procedural steps listed below. The process for a data centre that works alongside BTR will use the same process.

Table 7: Change Management Process Flow Explanations

No.	Activity	Description
300.1	Create a Request For Change (RFC)	• This step begins with a request for change. The RFC can be raised by any Development or Business managed resource, or for large projects the Operations Project Manager. • The change request is entered into the Change Management system by the RFC Initiator and sent to the appropriate Change Manager (CM) (local, regional, global). • All mandatory fields must be completed before the form can be submitted.
300.2	Initial Assessment, Prioritization and Categorization	• This step involves a validation by the Change Manager of the technical completeness of the change plans, a review of the risk/impact level and prioritization

		based on business impact of the change requirement and the urgency of the remedy.
300.3	Approval to Proceed with Change Build	• This step is the process of obtaining support from the Change Authorizers and approval from the DC, Regional or Global change management forum (CAB), to proceed with the building and scheduling of the change. • Before approval is requested the change record must have all necessary fields completed, with the relevant documentation accompanying and posted to the change repository ready for approval.
300.4	Build / Test / Schedule Change	• The change is then passed onto a Change Builder Manager (CBM) via Change Manager. • The Change Builder Manager reviews & accepts the change, recommends implementation date and assigns to the relevant resource - Change Builder (CB) to build. • The Change Builder builds the change, raises a Change Instruction Form (CIF) with work details, schedules, instructions, etc. and informs the RFC Initiator of progress.

		• The Change Builder selects the Change Implementer (CI) and together with the Change Implementer, schedules possible date for implementation of the change.
300.5	Sign-off to implement Change	• The Change Builder sends implementation dates and schedules to the CAB/CM for Signoff to implement.
		• Once approved, the Change Instruction Form (CIF) is forwarded to the Change Implementer.
300.6	Implement and Validate Change	• The step is the process of implementing approved changes into the Operations environment as defined by the change record.
		• It includes, implementing the change, monitoring the implementation, tracking progress, documenting, and communicating the implementation progress and results, along with identification of problems or concerns.
		• Validation of the success of the change implemented is a very important step in this process. Operations or the customer has the responsibility to verify change results.

			• This process ensures results are consistent with what was communicated prior to the change being approved.
300.7		Review and Closure of the Request for Change (RFC)	• In this step, the Change Builder Manager notifies the Change Manager of completed changes, who then checks with the RFC Initiator that the requirement has been met. • Review of the effectiveness of an implementation is conducted as part of a post project review meeting. This meeting could potentially cover a number of issues, not all of which may involve change management. • If the entire requirement has been met, the Change Manager closes the RFC and notifies the CAB accordingly.

4.4   Timeline for Change Management Process

Change notification time is the advance notification Operations will expect to allow them time to evaluate the possible impact a change will have on their environment and the resources they will require to evaluate, feedback requirements and schedule training, etc.

This is different from Lead Time for deployment as the time and resources required to evaluate a change can be much greater than the resource required to carry out the actual implementation. It is strongly recommended that the RFC Initiator notifies and involves Operations at the earliest possible time to ensure that all Operations issues are addressed at the earliest phases of the change definition process.

The earlier a change is entered into the system, the more time it has to be reviewed and communicated through the Change Management process. This can be achieved by raising a Preliminary RFC which requires minimal information to register the change. The RFC record should evolve as information on the change grows.

The Change Manager is responsible for notification and communication with affected users and departments. Change Lead time refers to when the change must be in a fully approved status and is only awaiting scheduling and implementation. The section below details accepted notification periods for communicating to operations that a change is being considered.

Table 8: Lead Time Policy – Regional or Global RFC's

Level	Low Risk	Medium Risk	High Risk
Low Impact	4 business days	10 business days	10 business days
Medium Impact	10 business days	10 business days	18 business days
High Impact	10 business days	18 business days	18 business days

Table 9: Lead Time Policy - Local Data Centre RFC's

Level	Lightweight	Low Risk	Medium Risk	High Risk
Lightweight	24 hours*	-	-	-
Low Impact	-	24 hours*	24 hours*	10 business days
Medium Impact	-	24 hours*	10 business days	18 business days
High Impact	-	10 business days	18 business days	18 business days

OPS GLOBAL CHANGE APPROVAL PROCESS TIMELINE

Development

Q & A
Release
ex-dev

Assignment
of Change
Authoriser(s)
(optional)

Approval
to Proceed

Approval
to Implement

CHG

| FSR | Preliminary RFC | Finalise RFC -10 days | -8 days | -5 days | -4 days | -3 days | -2 days | 0 day | +3 days |

Tue   Thu   Fri   Mon   Tue   Wed   Thu   Sat/Sun

Operations

Local

Regional

Global

| Area Coordinators Roll-out Planning Technical Review | GCM/CAB RFC Approval & allocation to Regions | Area Coordinator RFC Data Centre Allocation | LCM RFC Approval | CBM/CB Create CIF & add to schedule | LCM/CAB CIF Approval | RCM/CAB Regional Schedules Review | Global CAB Area Schedules Review | CAB's Post Change Review |

Ops Global Change Approval Process Timeline

Figure 2: Ops Global Change Approval Process Timeline

Operations Global Change Approval & Review Process

	DAY -n	DAY -11 TUE	DAY -10 WED	DAY -9 THU	DAY -8 FRI	DAY -7 SAT	DAY -6 SUN	DAY -5 MON	DAY -4 TUE	DAY -3 WEDS	DAY -2 THU	DAY -1 FRI	DAY 0 SAT/SUN	DAY +3 WED
RFC Initiator	2 Notify Change Mgmt of forthcoming change via *preliminary* RFC tool		6 Finalise RFC and attach supporting documentation											
Ops Chg Mgr	3 Assignment of Change Authoriser(s)		7 RFC categorisation & approval to proceed. (FSR review, RFC sanity check & process integration)					10 Change approval. Notify & get feedback from change builder. Schedule	12 Consolidate all change info for review. Hightlight those for in-depth review.	14 In-depth change review (CAB) & post chg review 15 Regional schedules review	18 Final global review of area schedules to implement this weekend			20 Post change review
Chg Builder								11 Assign someone to own change	13 Start buiding CIF		17 CIF complete, ready for review	19 Brief change implementor if necessary		
Change Authoriser										16 Approval to implement				
Area Coordinator	4 Roll-out Planning with Data Centres	5 Detailed Technical Review			8 Regional allocation of RFC to Data Centres									
ODM	1 Produce Forward Schedule of Release													

(the word "CHANGE" appears vertically in the DAY 0 SAT/SUN column)
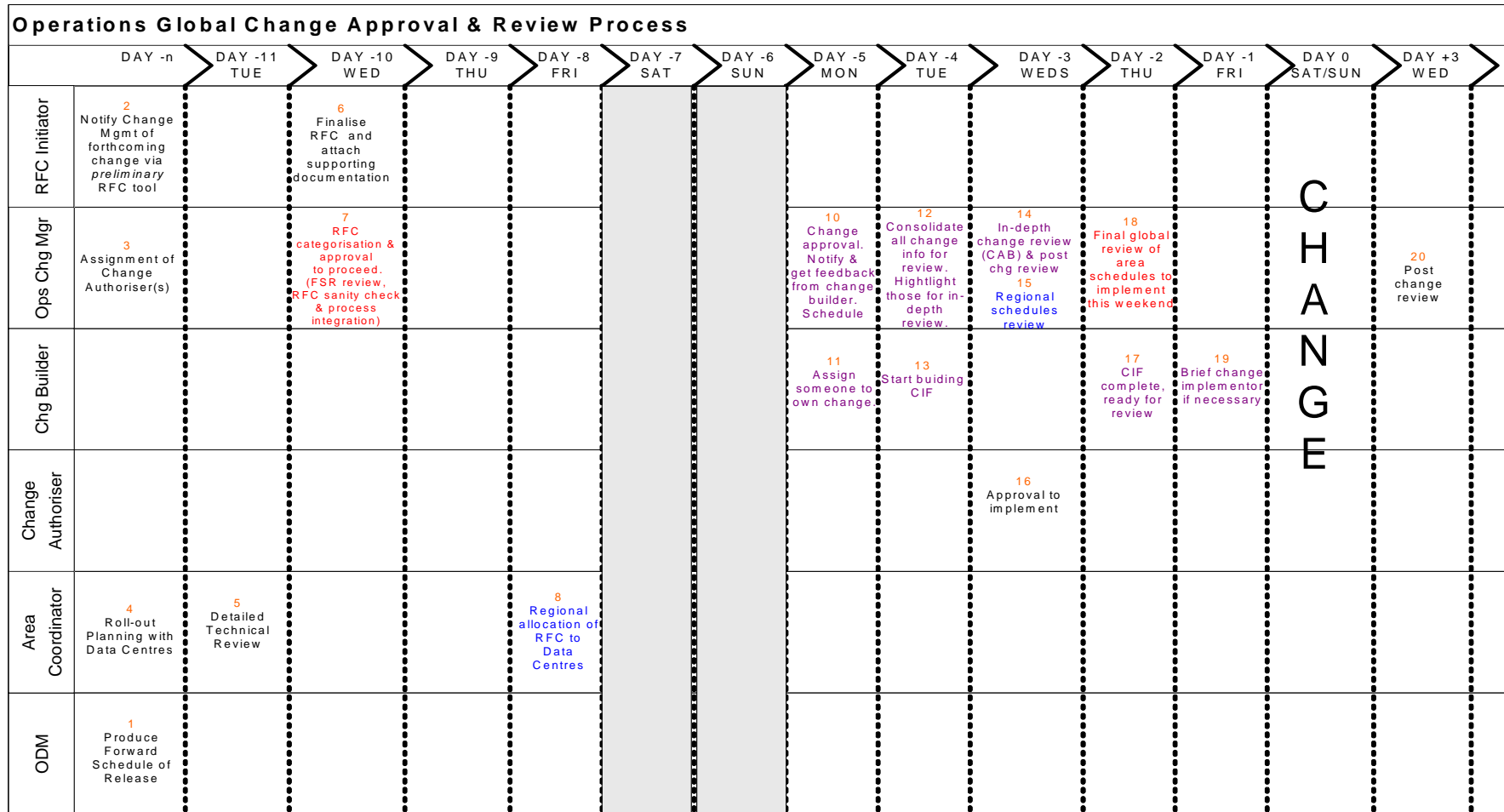
Figure 3: Operations Global Change Approval & Review Process

4.5   Create a Request for Change (RFC) – 300.1

4.5.1   Goal

A change request is the actual notification of a requirement to introduce any change to the current environment and this could range from a major to a minor component configuration, new version of code, software patch, and bug fix to a new product launch.

The purpose of this procedure is to ensure that the RFC Initiator understands the basic operational information, supporting procedures and documentation required before engaging operations in the initial Change Review process.

4.5.2   Start

This procedure starts when a change request is entered into the Change Management system by the RFC Initiator.   The group or person requesting the introduction of a change will work with his assigned operations representative to produce a change request.

4.5.3   Key Inputs

The following section details the information required to raise an RFC. This is an information gathering stage and will streamline the process as RFC Initiators will have a clearly defined set of standard deliverables to allow them to produce a change record for the specific types and risk/impact levels attributed to the change.
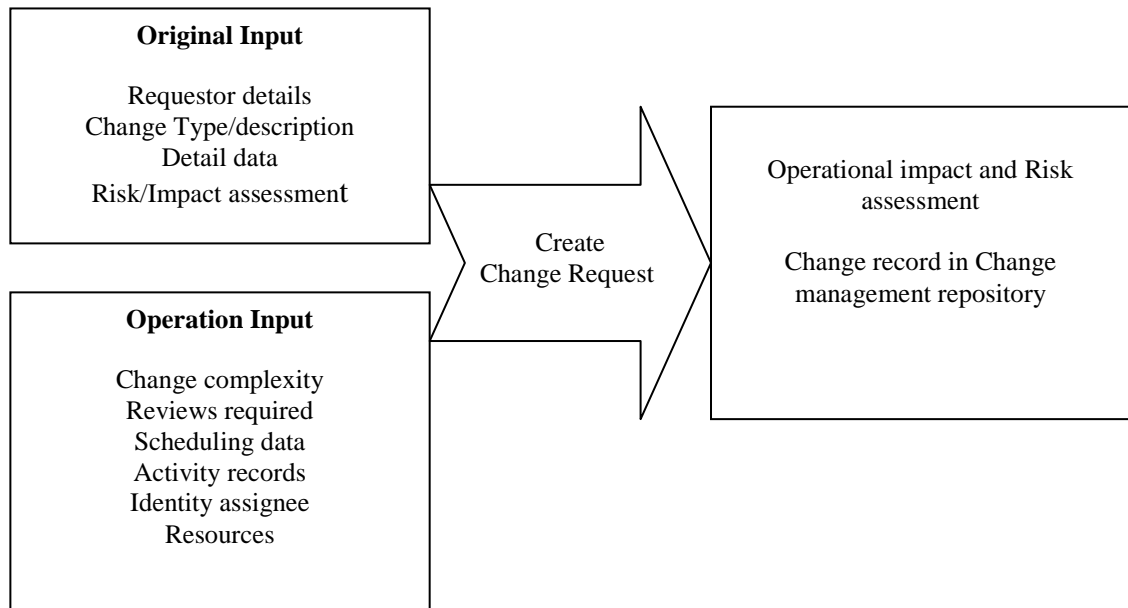
Figure 4: Change Request Process Inputs and Outputs

Originator Details

Documented requester personal information for identification and communication.

- *Name*

- *Location*

- *Email Address*

- *Organisation / Group*

- *Telephone No*

- *Planview project code/work description. This should also be included in the CIF.*

Change Type/Description

Documented business or operational reason, why the change is required, and/or benefit to the company. Description of the customer and/or Operations support goals

that would be realized upon implementation of the change (i.e., increased performance, capacity increase, bug fix, isolation of a known problem, addition of a new function, installation of new equipment, etc.).

The category of the change request:

- Hardware
- Software
- Communication change
- Decommission
- Data
- Environmental
- Other

Detail Data

Detailed documentation of the change and all associated activity for analysis purposes.

- SON – System Operations Notice
- TON – Technical Operations Notice
- I&M Guide- Installation and Maintenance Guide
- Operations Manual
- Implementation and Configuration Guide
- Equipment Lists
- Escalation Lists
- Trouble Shooting Guides
- Project Plans
- Test Results
- Fall back plans
- Deployment Plans

Change Risk/Impact

The impact and the degree of risk associated with the change type. The RFC Initiator will answer a number of questions to determine the level of risk and impact.

Reviews Required

Business and Operational impact consideration.

- Security

- Operations

- Engineering

- Network and System Management

- Capacity Management

- Compliance and Assets Management

- Architecture

- Business

- Change Control Forums – Data Centre, Regional or Global.

- Implementation

- Environmental

Scheduling Data

Current target date/time duration.

- Ex-Development

- Alpha

- Beta

- SOU

- Dependencies

Activity Record(s)

- Identification of milestones that must be performed to implement change, such as a form that must be completed, or an approval, etc

Identify Assignee

- Change implementer -- the person who has ownership and accountability for ensuring that the change is implemented per change record.

Resource(s)

- Identification of specific components affected by the implementation of the change.

The Preliminary RFC only requires a small subset of the above information.

4.5.4 Key Outputs

The Output from this process will be:

- The production of a change record

- Depending on the type of RFC raised, i.e. the Lightweight RFC will be progressed immediately into the implementation stage.

- In the case of a Full RFC, it will be assigned to an operations resource to have the operations initial assessment and review stage completed depending on the risk/impact of the change.
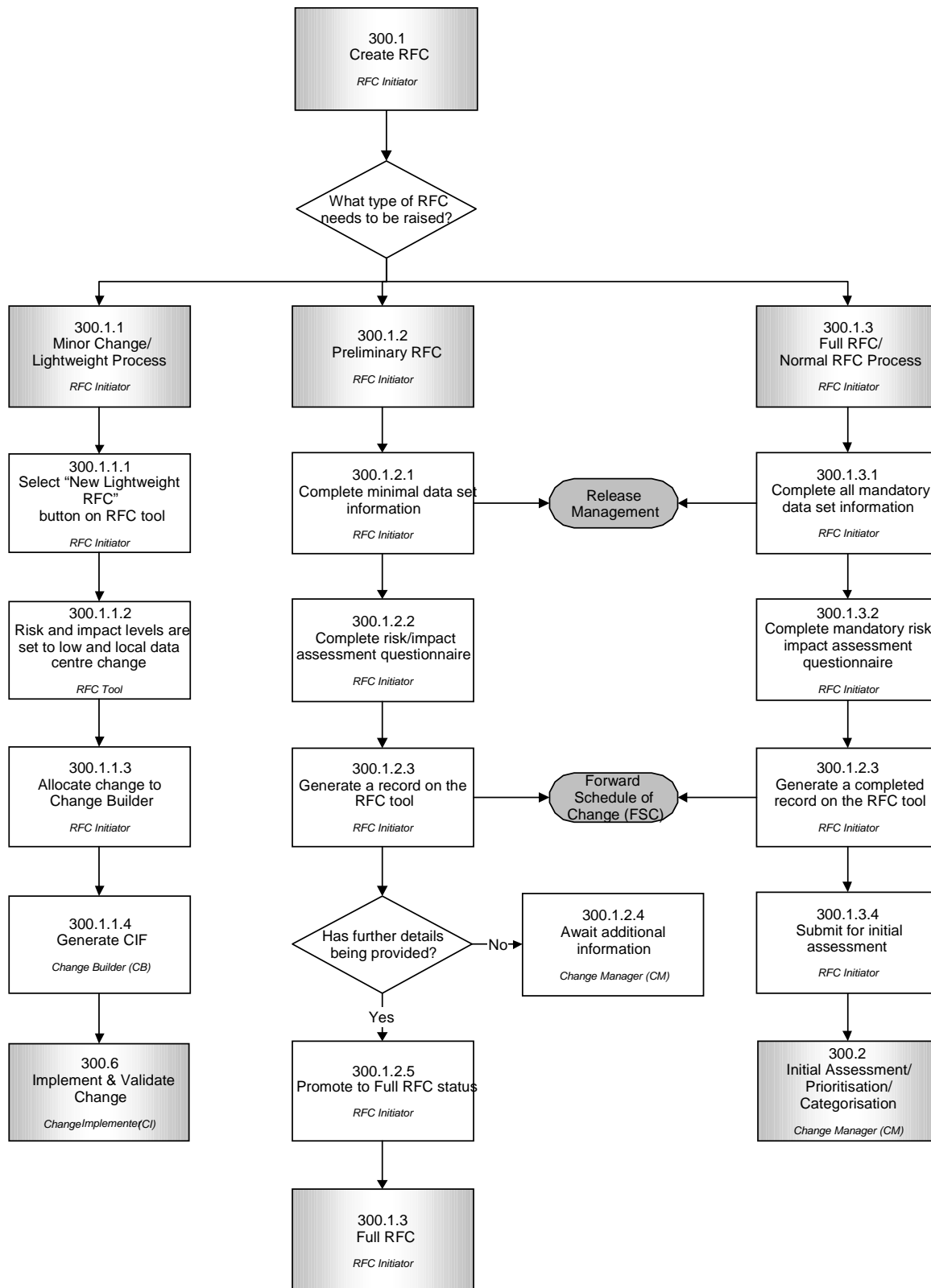
Figure 5: Create a Request for Change Flow Chart – 300.1

Table 10: Create a RFC Flow Chart Explanation

No.	Activity	Process Responsibility
300.1	*Create a Request For Change (RFC)* *What type of RFC needs to be raised?* *300.1.1 - Minor Change / Lightweight Process* *300.1.2 – Preliminary RFC* *300.1.3 – Full RFC* • The group or person requesting the introduction of a change will work with his assigned operations representative to produce a change request. • This is a simple process required to gather all standard information pertaining to the change request to allow operations to assess and assign the change record for further review or straight into implementation scheduling and planning depending on the complexity of the change. • The RFC Initiator will fill out the change request form. This form will be made available on a Share point web interface, to provide ease of use. • This stage must be completed by all RFC Initiators regardless of the complexity of the change although the process is scalable and the smaller the change the smaller the input required.	• RFC Initiator • Release Management • Problem Management • Capacity Management

300.1.1	*300.1.1 - Minor Change / Lightweight Process*	• RFC Initiator

	• The need for a lightweight process to manage small, churn or support type change has become evident.
	
	• The lightweight process effectively provides authority for change in advance of implementation; and is managed outside the CAB with approval of the Change Instruction Form within 24 hours on condition the Change Builder is contactable in the event that follow up is required.
	
	• The definition of minor change is:
	
	    • Local to the data centre
	    • A small routine change less than 1 man-days effort and 1,000 GBP.
	    • Low risk and Impact
	
	• In small data centre for example, the role of the Change Builder Manager and Change Builder are likely to be the same staff, which means the additional process is unnecessary and adds no value for small routine change.
	
	• Conversely in large data centre, the role of the Change Builder Manager and Change Builder are also likely to be the same staff under the second level support structure when managing churn or support changes.	

300.1.1.1	*Select "New Lightweight RFC" button on RFC tool* • The Requester may use the lightweight process when completing the RFC, by clicking on the New Lightweight RFC button	• RFC Initiator

300.1.1.2	*Risk/Impact level and data centre* • The RFC will default the risk and impact levels to low and the change will apply only within a local data centre.	• RFC Tool
300.1.1.3	*Allocate change to Change Builder* • This is then allocated to the local Change Builder, thereby bypassing the functions of the Change Manager's initial review and acceptance of the change, and Change Builder Manager's allocation to the Change Builder.	• RFC Initiator
300.1.1.4	*Generate Change Instruction form (CIF)* • The Change Builder goes on to generate a Change Instruction Form (CIF) that provides the implementation details for the RFC.	• Change Builder
300.6	*Implement & Validate Change* • This progresses to Implementation & Validation of the Change (See Process Step 300.6) • The use of a symbol in views and reports will provide visibility that the lightweight process has been used, and the local CAB will continue to review the scheduling of the change as in the normal change process.	• Change Implementer
300.1.2	*300.1.2 – Preliminary RFC* • The RFC tool has the facility to raise either a Preliminary RFC or Full RFC. • A preliminary RFC is the ability to raise an RFC in part and partially complete the fields required	

	for a full RFC. This should be used to give an early warning of a planned change and will contain minimal information about the change because appropriate documentation is not yet available.	
300.1.2.1	*Complete minimal data set information* • Should information about the change be limited, there is an option to raise a Preliminary change request form which only requires minimal information about the change. • This provides the RFC Initiator with a vehicle to engage with the Change Management process and evolve the change record as information about the change grows.	• RFC Initiator
300.1.2.2	*Complete the risk/impact assessment questionnaire* • The RFC Initiator may complete a Risk & Impact Assessment questionnaire to determine the level risk/impact associated with the change. This is optional at this stage, but becomes mandatory when promoting the RFC from a Preliminary to Full RFC. • Refer to Change Risk / Impact Evaluation tables. This matrix will assist the RFC Initiator to determine the risk and impact of the proposed change.	• RFC Initiator
300.1.2.3	*Generate a record on the RFC tool* • This generates a Change record on the RFC tool and feeds into the Forward Schedule of Change as an early warning of the change. • The compilation of such a schedule in the early stages will be fed initially by a Forward	• RFC Initiator

	Schedule of Release being created through the Release Management process.	
300.1.2.4	*Has further details being provided?* *No* *Await additional information* • If no further details has been provided, the RFC is left in the Preliminary state and the Change Manager awaits further information.	• Change Manager
300.1.2.5 300.1.3	*Has further details being provided?* *Yes* *Promote to Full RFC status* • Once all relevant information is available and the form is updated, the RFC is promoted to Full RFC Status. • Once an RFC progresses to "full" status, it cannot be demoted back to "preliminary" status.	• Change Manager • RFC Initiator
300.1.3	*300.1.3 – Full RFC* • The RFC tool has the facility to raise either a Preliminary RFC or Full RFC. • The full RFC should provide sufficient information for Operations groups to fully understand the requirement for change and how the change could potentially impact on services.	
300.1.3.1	*Complete all mandatory data set information* • The change request is entered into the Change Management system by the RFC Initiator and sent to the appropriate Change Manager (local,	• RFC Initiator

	regional, global). All mandatory fields must be completed before the form can be submitted.	
300.1.3.2	*Complete mandatory risk/impact assessment questionnaire* • The RFC Initiator must then complete a Risk & Impact Assessment questionnaire to determine the level risk/impact associated with the change. • Refer to appendix 1 for Change Risk / Impact Evaluation tables. This matrix will assist the RFC Initiator to determine the risk and impact of the proposed change.	• RFC Initiator
300.1.3.3	*Generate a completed record on the RFC tool* • This generates a completed Change record on the RFC tool. *Change Status* Throughout the lifecycle of the change, the change record will go through several status changes. These status changes must be clearly defined and communicated across the organisation. As the change passes through the process it will have one of the following statuses assigned: ➢ *Received* The change record has been received and resources will be allocated to carry out the review, including Change Authorizers (covered in further detail under 300.2.6). ➢ *Under Review* The change record is currently in the review	• RFC Initiator

	process.	
	➢ Approved	
	The change record has been approved at this phase and passed to the next phase of the process. An example could be that the record has passed through the "Technical Review" phase and passed on for Scheduling and deployment.	
	➢ Closure	
	The change record can be closed out either successfully or not. This should be reflected in the change record status whether the change was implemented successfully via the CIF or if deficiencies or service impact was experienced during any phase of the review process.	
300.1.3.4 300.2	*Submit for initial assessment* • More complex changes will necessitate additional documentation such as Operations manual, Product Requirement Specification/Product Functional Specification/System Functional Specification and project plans • Once all relevant information is available, the form is submitted for initial assessment. (See Process Step 300.2)	• RFC Initiator

4.6   Initial Assessment/ Prioritization & Categorization – 300.2

4.6.1   Goal

The purpose of this procedure is to validate the technical completeness of the change plans and evaluate the aggregate effect of the change to the production environment. This stage ends with technical approval of the change request, based on the evaluation of the change and the updating of the change record in the central repository.

4.6.2   Start

This procedure begins with the Change Manager (CM) validating the technical completeness of the change plans, checking the form to ensure it has sufficient information to be acted upon. Where information is insufficient, the CM goes back to the Requestor for additional information. The CM will redirect to another CM if necessary.

4.6.3   Key Inputs

The following figure represents the required inputs to the Perform Technical Assessment stage and the outputs derived from successfully completing this procedural stage.
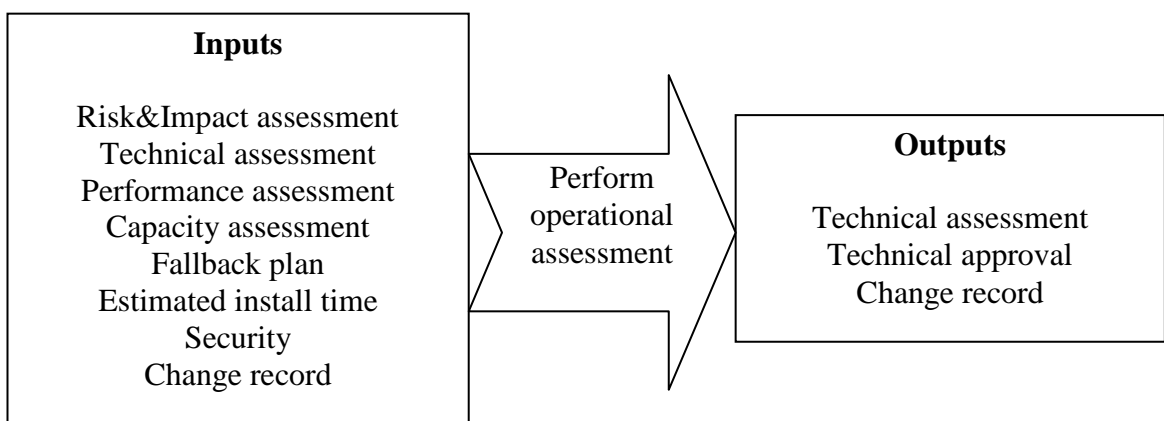
```
┌─────────────────────────────┐
│           Inputs            │
│                             │
│     Risk&Impact assessment  │        Perform           ┌────────────────────────┐
│     Technical assessment    │       operational        │        Outputs         │
│   Performance assessment    │───▶   assessment   ───▶  │                        │
│     Capacity assessment     │                          │  Technical assessment  │
│        Fallback plan        │                          │  Technical approval    │
│     Estimated install time  │                          │     Change record      │
│          Security           │                          └────────────────────────┘
│        Change record        │
└─────────────────────────────┘
```

Figure 6: Initial Assessment /Prioritisation & Categorisation Inputs and Outputs

The process includes a review of the change request to cover the following areas as required:

- Risk and Impact Assessment

    o Evaluation of the impact and risk of the change to the environment.

- Technical Assessment.

    o Ensure the technical deliverables adhere to RT technical standards and policies and can be integrated into existing support process and procedures. Determine the overall impact of the integration of the change and identify any impacts on existing components.

- Performance Assessment

    o Assessment of the overall impact to system performance of the entire production environment.

- Capacity Assessment

    o Assessment of the overall impact to production environment and system and communications capacity. Ensure that the deliverables can be integrated into existing capacity management, forecasting and reporting processes and procedures.

- Fallback Plan

    o The plan should be of sufficient detail and include when and how it will be determined if a fallback is needed to be performed. Assessment of the overall impact to customer and/or Technology Operations services if implementation of the change fails. The assessment should be of sufficient detail and include the steps needed to return the system to its original state prior to the change.

- Estimated Install Time

    o The amount of time (window) required implementing the change into production by all affected parties.

- Security

- o All System Owners have the responsibility to ensure their system is adequately protected. The decision about the level of protection required must be based on the data classification as well as the value of the service the system provides.

- Change Record

- Composite of all data and information associated with the change.

4.6.4   Key Outputs

- Technical Assessment

  - o This is a formal evaluation of the technical feasibility, associated risk/impact and the overall technical effect of the change.

- Technical Approval

  - o Approval or rejection of the change will be based in part on the merits of the Technical Assessment. In addition, it may be determined that the change be rescheduled for a later date/time when any risks and/or negative impacts associated with the change could be minimized. Approval can only be provided by the right level of authority for the change.

- Change Record

  - o Composite of all data and information associated with the change.
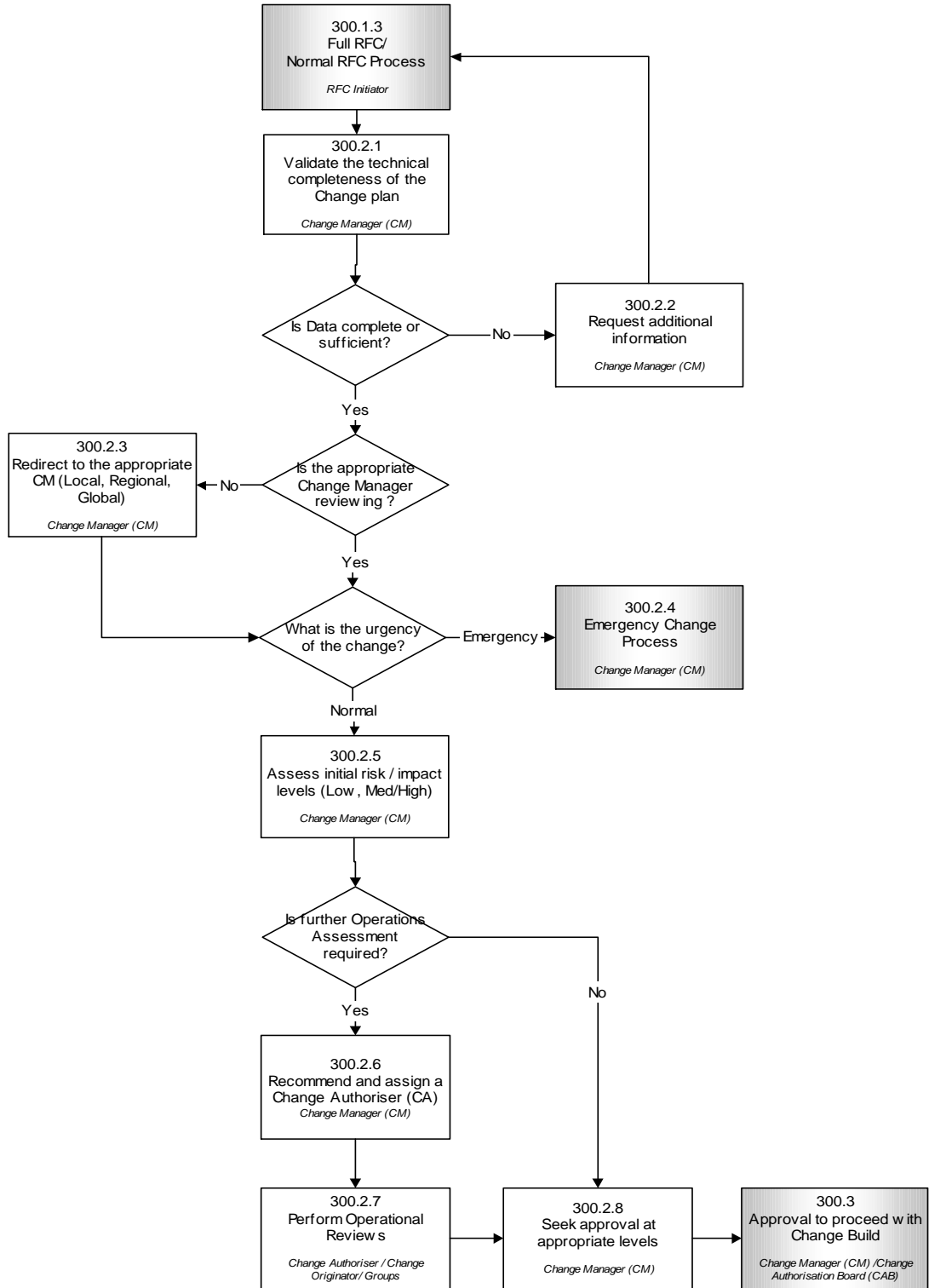
Figure 7: Initial Assessment /Prioritisation & Categorisation Flow Chart

Table 11: Initial Assessment/ Prioritisation & Categorisation Explanation

No.	Activity	Process Responsibility
300.2.1	*Validate the technical completeness of the Change plan* ▪ This procedure begins with the Change Manager (CM) validating the technical completeness of the change plans and evaluates the aggregate effect of the change to the production environment. ▪ The process includes a review of the change request to cover the following areas as required: • Specific aspects promoting the risk and/or impact • Operations Procedures and Training • Security Review • Network and System Management • Capacity Management • Assets and Compliance Management • Technical completeness and accuracy of change plans • Levels of testing required and test plans • Pre/post implementation verification tests • Pre/post service verification tests for RFC's requiring CAB approval (300.3.1) • Fallback /recovery plans • Disaster Recovery and Technical Recovery Plan (TRP) • Dependencies and/or conflicts (activity records can be utilized to perform this function)	• Change Manager

	• Aggregate effect of the change • Compliance with existing procedures • Notification of assessment meeting to appropriate parties • Facilities	
300.2.2	*Is Data Complete or sufficient?* *No* *Request additional information* • The Change Manager will check the form to ensure it has sufficient information to be acted upon. Where information is insufficient, the CM goes back to the Requestor for additional information.	• RFC Initiator
300.2.3	*Is Data Complete or sufficient?* *Yes* *Is the appropriate Change Manager reviewing?* *No* *Redirect to the appropriate CM (Local, Regional, Global)* • RFCs are classed as global, regional or local, depending on the impact of where the work is carried out for the change. • Upon initial assessment of the RFC, the Change Manager will redirect to another Change Manager if necessary as the Change Manager (CM) role will be implemented at these three levels: Global Change Manager, Regional Change Manager and Local Change Manager.	• Change Manager

	➢ Global Changes that will require local installation work in data centre in more than one region - i.e. to exclude central downloads. ➢ Regional Changes that will require local installation work in more than one data centre ➢ Local Changes that will require local installation work in one data centre only • Once an RFC is raised, the regional Change Manager will pass it to the local Change manager for tracking. • The escalation chain for Process issues is to the Local Change Manager, Regional Change Manager and Global Change Manager. • The Global Change Manager, as the nominated Global Process Owner, has overall ownership for the change management process.	
300.2.4	*Is the appropriate Change Manager reviewing?* *Yes* *What is the urgency of the Change?* *Emergency* • The relevant CM assesses urgency. For changes which are prioritized as emergency, the Emergency Change Process (300.2.4) is invoked. ➢ Emergency: Causing loss of service or severe usability problems to a larger number of users, a mission-critical system, or some equally serious problem. This includes break fix	• Change Manager

	activity and in these cases a retrospective change may follow if insufficient time is available due to the urgency to restore service. Emergencies may also include Business Day One requirements or where a Client commitment has been given where immediate action is required. Urgent CAB or CAB/Emergency CAB meetings may need to be convened. Resources may need to be allocated immediately to build such authorized changes.	

300.2.5	*What is the urgency of the Change?*
	
	Normal
	
	Assess initial risk / impact levels (Low, Med/High)
	
	• Refer to appendix 1 for Change Risk / Impact Evaluation tables. The matrix will assist the RFC Initiator to determine the risk and impact of the proposed change.
	
	• The CM checks risk and impact levels and notification period from target implementation date and assigns relevant Change Authorizers to High and Medium Risk/Impact changes.
	
	• In prioritizing changes, RT will adopt the standard ITIL definitions for priority levels, which are:
	
	  ➢ High: Severely affecting some users, or impacting upon a large number of users. To be given highest priority for change building, testing and implementation resources.
	
	  ➢ Medium: No severe impact, but rectification cannot be deferred until the next scheduled release or upgrade. To be allocated medium priority for resources.
	
	  ➢ Low: A change is justified and necessary, but
		• Change Manager

	can wait until the next scheduled release or upgrade. To be allocated resources accordingly.	
300.2.6	*Is further Operations Assessment required?* *Yes* *Recommend and assign a Change Authorizer* • If the change request process determines that the change requires an Operational assessment due to the risk/impact attributed to the change, the change record will be addressed by this procedure. • Formal Operational technical assessments are recommended by the Change Manager when a change complexity is High Risk/Impact using the Change Authority role as appropriate. The CM may also assign Change Authorizers to Low Risk/Impact changes for information, where it is deemed appropriate. Change Authorizers are selected for their in-depth technical, business or financial RT knowledge. They can authorize, question or reject changes based on the evaluation of risk/impact, using their specialist knowledge.	• Change Manager
300.2.7	*Perform Operational Reviews* • All areas required to review must be formally notified and those areas affected must perform assessments. • The operational review will include a technical assessment to evaluate the technical feasibility, risk, and the singular effect of a change, as well as, the global effect of the change on the entire environment. The Technical Assessment is the	• Change Authorizer / RFC Initiator / Groups

	responsibility of the person(s) engineering or installing the change. • These reviews may be carried out by the initiator groups with operations before the change is submitted to the change manager or CAB.	
300.2.8 300.3	*Seek approval at appropriate levels* • These reviews must be carried out before "change approval" is requested from the Data centre, Global or Regional Forum and should involve assigned Change Authorizers. • This procedure ends with technical approval of the change request, based on the evaluation of the change and the updating of the change record in the central repository.	• Change Manager
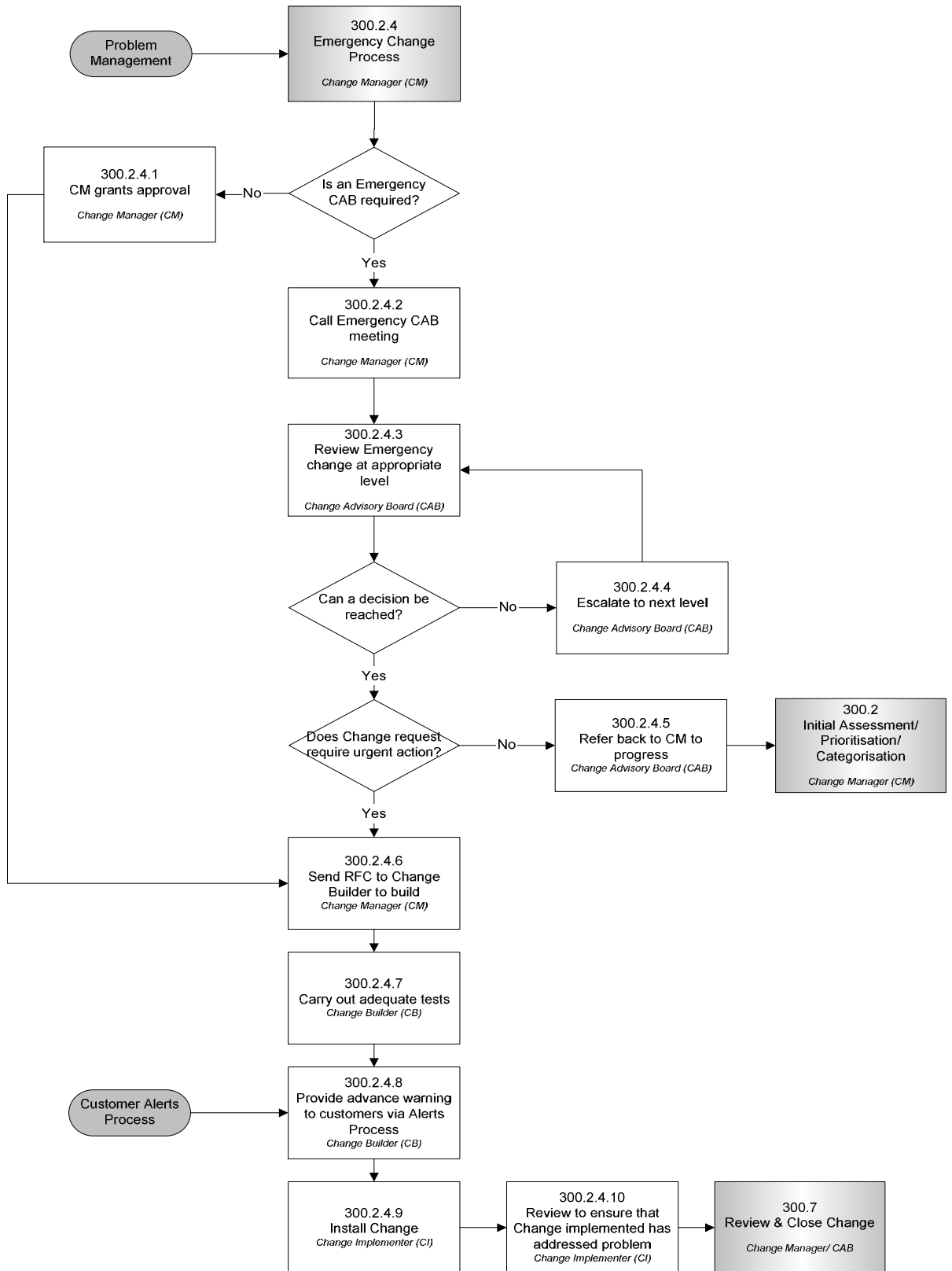
Figure 8: Emergency Change Process Flow Chart

Table 12:   Emergency Change Process Explanation

No.	Activity	Process Responsibility
300.2.4	▪ An Emergency Change is a change that is vital to recover or sustain service stability, meet a committed service level agreement or very strong business drivers. For a change to be classified as an Emergency Change, there must be an open problem record, causing service disruption, that implementation of the change will correct, or evidence of Client commitment. ▪ An Emergency Change will follow the same process as a normal change, defined above and must be authorized by both a senior Development Manager (if appropriate) and Senior Operations Manager. *An emergency change must have the following:* • The Implementers Data Centre Management approval • Technology approval • An open service-disrupting problem • Evidence of Client commitment • Implementation of change to recover service or prevent potential service disruption	• Change Manager
300.2.4.2	*Is an Emergency CAB required?* *Yes* *Call Emergency CAB meeting* • When the Change Manager (CM) assesses that the priority of an RFC warrants	• Change Manager

	emergency status, the CM considers calling an emergency CAB meeting, depending upon the level of risk/impact of the change.	
	• The members of the CAB will depend on the strategic level. (Refer to the ChM001 Roles and Resourcing document for CAB Membership requirements.) Not all members will need to be present at each meeting. Consideration should also be given as to whether the customers and suppliers of change and deliverables should also attend.	
	• In order that representation is assured, each CAB member should nominate a deputy who can review change and make decisions in his/her absence. Should an emergency CAB be required to review an urgent unforeseen change, attendees or their deputies will be called upon.	
	• CAB members must come to meetings equipped with their views on submitted changes such that the CAB can make informed decisions, from both a business and technical viewpoint, on whether to approve, reject or request further information.	
	• It is recognized that much effort goes into planning and assuring changes before they reach CAB and therefore members should not await the meeting before raising concerns or questions with Change Initiators.	
300.2.4.1	*Is an Emergency CAB required?* *No* *CM grants approval*	• Change Manager

	• Should an Emergency CAB not be required, the CM is empowered to grant approval.	
300.2.4.3	*Review Emergency change at appropriate level* • The CAB immediately assesses the urgency, impact and resource implications and decides whether to grant emergency approval.	• CAB
300.2.4.4	*Can a decision be reached?* *No* *Escalate to next level* • The Emergency CAB can be convened at anytime to review an emergency change at the appropriate level within the organisation (Global or Regional). If a decision cannot be taken at this level the appropriate escalation procedures should be invoked.	• CAB
300.2.4.5	*Can a decision be reached?* *Yes* *Does Change request require urgent action?* *No* *Refer back to CM to progress* • If however, the CAB decides the change should not be urgent and does not require emergency action, the RFC is reverted back to the CM who then progresses it through the appropriate channel.	• CAB
300.2.4.6	*Does Change request require urgent action?* *Yes*	• Change Manager

	Send RFC to Change Builder to build • If change is approved, RFC is sent to Change Builder (CB) to prepare change for implementation. Where timescales demand it, the Change Manager, in collaboration with the appropriate Change Builder Manager, should ensure sufficient staff and resources are available to do this work, even if this means calling staff in from home. Procedures and agreements approved and supported by management should be in place to allow for this.	
300.2.4.7	*Carry out adequate tests* • As much testing of the emergency change as is possible should be carried out and completely untested changes should not be implemented if at all avoidable.	• Change Builder
300.2.4.8	*Provide advance warning to customers via Alerts Process* • The Change Builder should provide as much advance warning as possible to Customers and Users about any imminent change. This should be done via the first level Operations Customer Alerts process.	• Change Builder
300.2.4.9	*Provide advance warning to customers via Alerts Process* • Emergency Changes may be installed at anytime with appropriate Data Centre management review and approval. The Implementer is responsible for meeting all change requirements following the	• Change Implementer

	implementation of the Emergency change.	
300.2.4.10	*Review to ensure that Change implemented has addressed problem* • This essentially is part of the Review & Close Change Procedure. As part of the emergency process, the Change Implementer needs to ensure that the implementation of the change has addressed the open service-disrupting problem, and that all services has been recovered and further potential service disruptions have been prevented.	• Change Implementer

4.7 Approval to proceed with Change Build - 300.3

4.7.1 Goal

The purpose of this procedure is to obtain support from the Change Authorizers and approval from the DC, Regional or Global change management forum, to proceed with building and scheduling the change. Before approval is requested the change record must have been through the required stages of the change management process and have all documents available for review and posted to the change repository ready for approval.

4.7.2 Start

This procedure begins once the initial technical and Operational assessments have been carried out and approval is being sought to allow development of the change.

4.7.3 Key Inputs

The following are required inputs to this Approval stage and the outputs derived from successfully completing this stage.

• A completed Change Record

• Relevant documentations e.g. Technical assessments, performance assessments, fallback plans, estimated install time etc.

4.7.4 Key Outputs

• Approval to proceed or not with Change Build

Approval or rejection of the change will be based in part on the merits of the Technical Assessment. In addition, it may be determined that the change be rescheduled for a later date/time when any risks and/or negative impacts associated with the change could be minimized. Approval can only be provided by the right level of authority for the change.
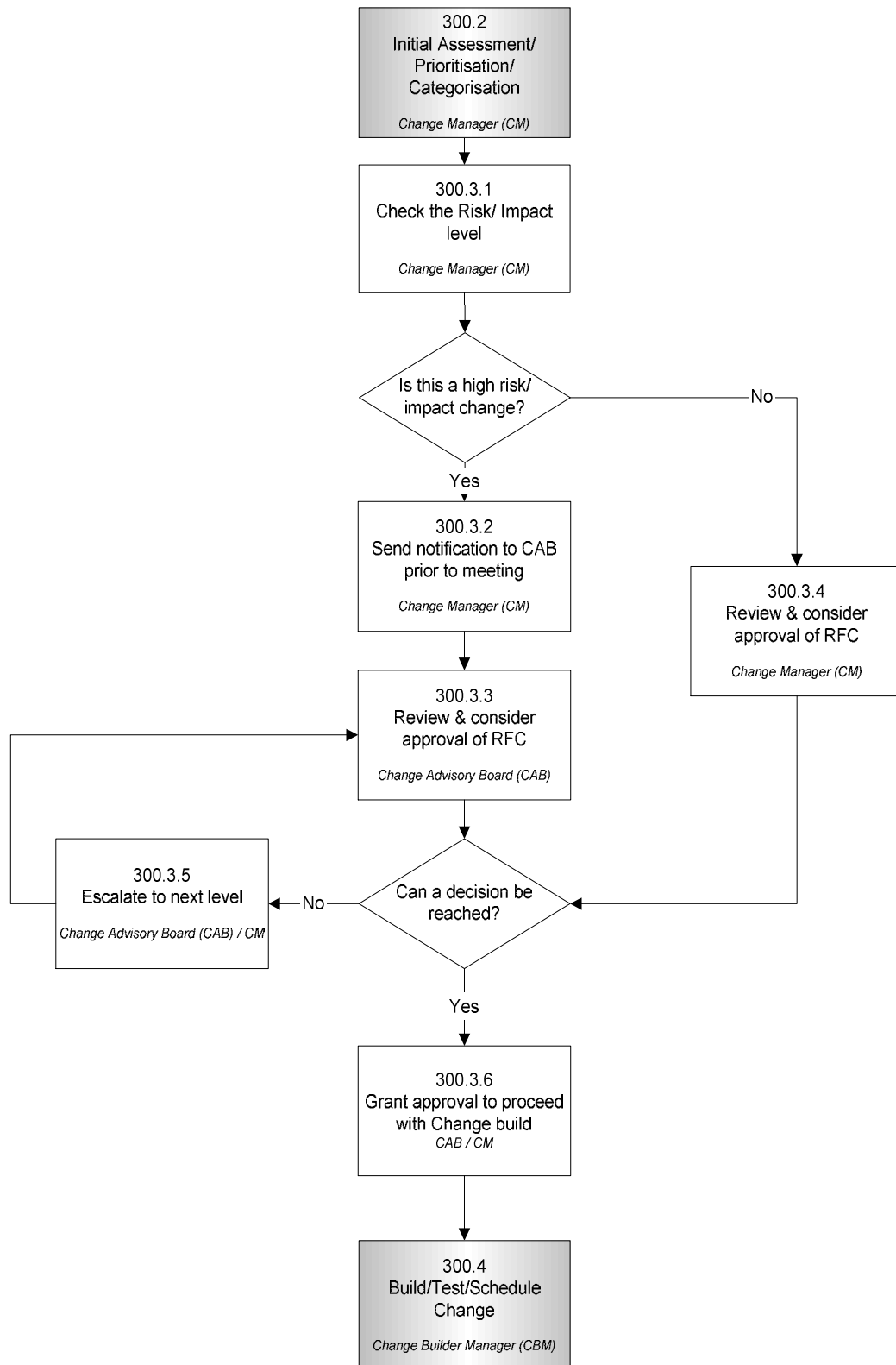
Figure 9: Approval to proceed with Change Build Flow Chart

Table 13: Approval to proceed with Change Build Process Explanation – 300.3

No.	Activity	Process Responsibility
300.3.1	*Check the Risk/ Impact level* • The Change Manager will check to see the risk/impact level and channel that to the appropriate approval body. • CABs are responsible for reviewing any change that has the following combination of risk/impact as defined by the risk/impact assessment. <table><tr><td>Approval Levels</td><td>*Low Risk*</td><td>*Medium Risk*</td><td>*High Risk*</td></tr><tr><td>Low Impact</td><td>Change Mgt.</td><td>Change Mgt.</td><td>CAB</td></tr><tr><td>Medium Impact</td><td>Change Mgt.</td><td>CAB</td><td>CAB & Head of Ops</td></tr><tr><td>High Impact</td><td>CAB</td><td>CAB & Head of Ops</td><td>CAB & Head of Ops</td></tr></table>	• Change Manager
300.3.2	*High and Medium risk/impact changes* *Send notification to CAB prior to meeting* • Where a change is high or medium risk/impact it is considered for approval by the CAB. The CAB should receive a notification of the change request prior to the meeting. • Other changes are considered for approval by the Change Manager. • In order to make best use of time and to ensure attendance, all RFCs together with the Schedule and documents relevant to changes should be circulated in advance, and flexibility allowed to CAB members on whether to attend in person, to send a deputy, or to send any comments	• Change Manager

	electronically.	
	• As much as possible work should be done in advance of the CAB meeting, including collation of feedback from Change Authorizers.	

300.3.3	*Review & consider approval of RFC*
	
	 • The CAB is an approvals body, although it may refer particularly high risk changes to senior management for approval.
	
	 • They will review, and consider approval of, RFCs scheduled for at least the next 10 days
	
	 • CAB will take as input to their review the views of Change Authorizers assigned to each change.
	
	 • Global, Regional and Local CABs will be held on a weekly basis as defined in the chart in section 3.3.2.
	
	 • Detailed discussion should not be necessary for the majority of changes; much of the assessment referral process can be handled electronically via support tools, email and offline discussion prior to the meetings.
	
	 • The agenda for the CAB will be as follows:
	
	   ➢ Failed and backed out changes
	
	   ➢ Problems as a result of change
	
	   ➢ Review of RFC's/CIF's to be assessed – risk/impact/resources/priority
	
	   ➢ Review of RFC's that have been assessed prior to meeting(electronically) – risk/impact/resources/priority
	
	   ➢ Change reviews to ensure a change met the business needs
	
	   ➢ Review of the forward schedule (maximum 6 month view)
	
	   ➢ System Operations Notice (SON) tracking
	
	   ➢ RFC's to closure
		• CAB

300.3.4	*Review & consider approval of RFC* • The low risk/impact changes will be handled through normal Change Management channels by Change Managers.	• Change Manager
300.3.5	*Can a decision be reached?* *No* *Escalate to next level* • If the CAB cannot agree to a recommendation, the final decision on whether to authorize changes will be escalated to the next level of CAB above or in the case of the Global CAB to the senior management level above. See diagram below for the Organizational CAB structure. ▪ At each level a Change Manager, will be established. This person will have the responsibility of ensuring that the change process is followed and the CABs are convened and run according to the terms of reference. **Figure 10 : CAB organisational structure**	• CAB / CM

300.3.6	*Can a decision be reached?* *Yes* *Grant approval to proceed with Change Build* • If the Change record and all relevant documentation has been provided and reviewed and met all requirements, then the CAB or CM grants approval to proceed with the development of the Change. • An approved change may be unapproved at any time with due justification. The Change Manager will select the unapproved button and add the justification. The Local Change Manager will also inform other affected local parties that the change will not take place.	• CAB / CM

4.8 Build / Test / Schedule Change - 300.4

4.8.1 Goal

This stage of the Change Management Process interfaces heavily with the Release Management Process, and a detailed description of all procedures can be found within the Release Management documentation.

The goal at this stage is to ensure that the change is passed onto a Change Builder Manager (CBM) via Change Manager. The CBM reviews & accepts the change, recommends implementation date and assigns to the relevant resource (Change Builder) to build.

The Test Change element of this procedure is responsible for testing the change to the resource(s) to ensure that it functions as intended. Testing reduces the risk of failure and must be considered when approving changes. After reviewing all elements, the intent of the Change Process is to minimize impacts and maximize productivity of all resources involved.

4.8.2 Start

This procedure begins once a Change Instruction Form (CIF) is raised by the Change Builder to provide implementation details on a Request for Change.

4.8.3 Key Inputs

The following are required inputs to this Build / Test / Schedule Change stage and the outputs derived from successfully completing this stage.

Inputs	Build/Test/ Schedule/ Change	Outputs
Change builder details Change instruction form Test requirements System/integration tests Performance tests Change record		Completed CIF User acceptance tests Test results Recommend implementation
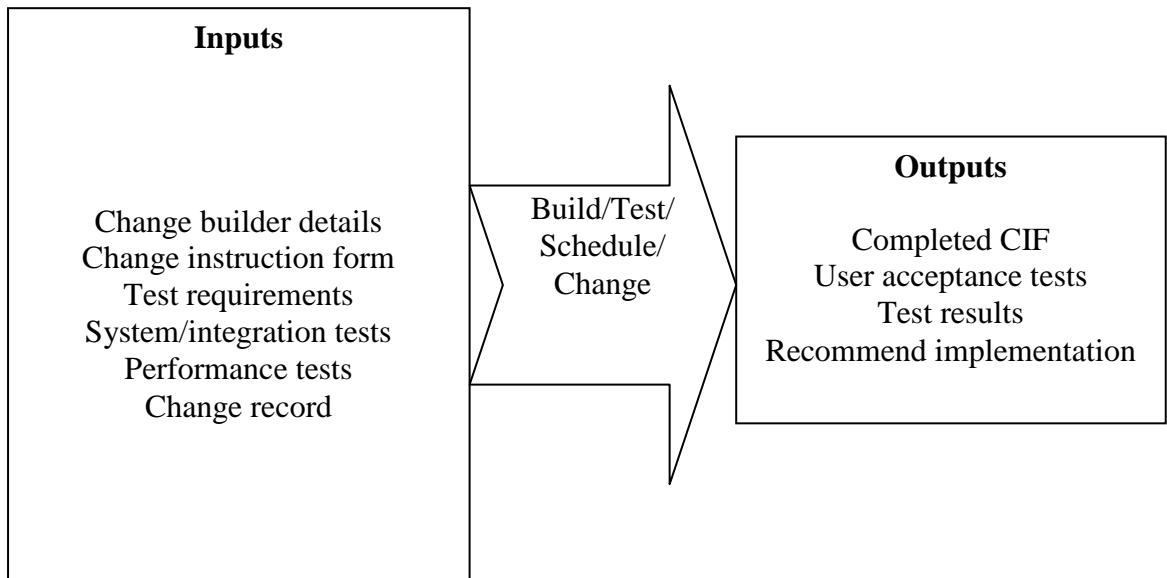
Figure 11: Build / Test/ Schedule Change Inputs and Outputs

- Change Builder Details

  Select Systems:
  - Change type as per RFC input

  - Multiple systems (checkbox input)

    o Quotes RFC's (enter multiple RFC's consolidated to a single CIF)

  - Enter the (Assets+) system name(s)

Complete the Change Instruction Form (CIF) with instructions for the build

- Select the system components this applies to (N/A, first, second, cluster, third, both or all)

  - Current status

  - Implementer (drop down menu with names)

  - Previous software versions

  - New software versions

  - Scheduled date

- Title

- Summary of change

- Live/standby requirements

- What should be backed up (N/A, already available, system disk, database, database and rules or configuration file)

- Primary backup method (CD, tape, extobyte, disk, floppy, network TX, N/A, mgt sys)

- Select each of the installation media supplied for this release (options as above)

- Select each of the support Groups involved in performing this release, the first group selected will control the process

- Details of data centre which require co-ordination with.   Business Continuity partners or a local change with global/regional impact for example.

- Change Test Requirement
  - Definition of the scope of the tests to be carried out in the operational environment
  - What should occur to prove the success of the change and specifically what should NOT occur
  - Level of testing and results from (integration, system, performance, user acceptance)
    - Function(s) NOT tested
    - Exception conditions to be tested (if any)
  - Resource(s) required
  - Dependencies
  - Acceptance criteria
- Change Record

Composite of all data and information associated with the change.

4.8.4　　Key Outputs

▪ Change Builder Details

Scheduling the Change
- Informs the Change Management

Following Change Management approval
- Forwards the build form to the Change Implementer

- Arranges requirements for authorized access to systems via Control desks

Post Successful Implementation
- Arranges for updates to the Assets+ database to reflect the new change status.

- Informs Change Management of any change in status post implementation resulting from the Change. This is for quality reporting and root cause analysis.

▪ User Acceptance Tests

Documented User Acceptance Tests (UAT)

▪ Change Record

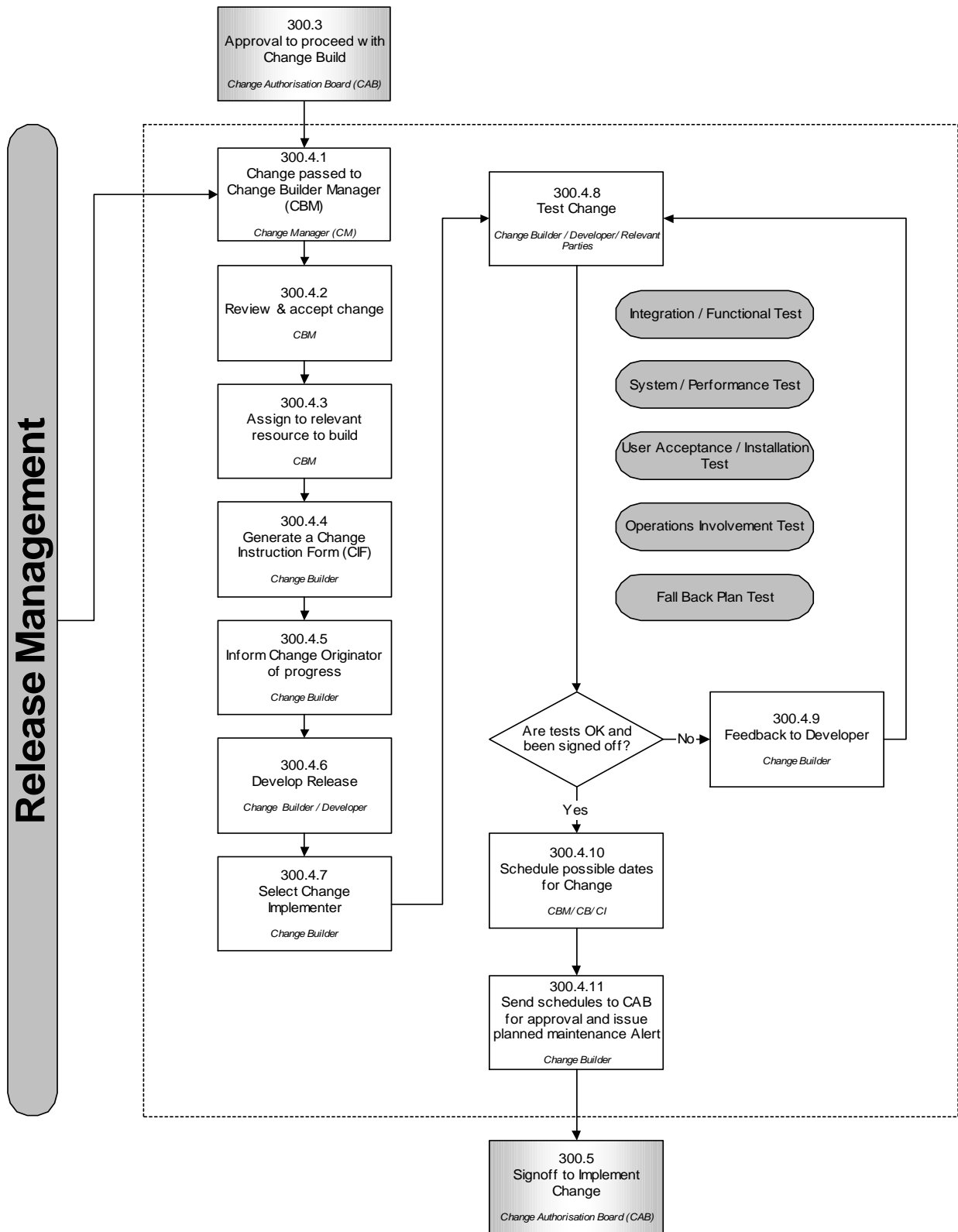Composite of all data and information associated with the change

Figure 12: Build/ Test/ Schedule Change Flow Chart

Table 14: Build / Test / Schedule Change Process Explanation – 300.4

No.	Activity	Process Responsibility
300.4.1	*Change passed to Change Builder Manager (CBM)* ▪ Following the approval to proceed with the change build, the change Manager passes all the change details to the Change Builder Manager.	• Change Manager
300.4.2	*Review & accept change* ▪ The Change Builder Manager (CBM) reviews & accepts the change. ▪ The Change Builder Manager (CBM) is responsible for ensuring that a change request is built into a detailed work package, named a Change Instruction Form (CIF), that can be implemented. The CBM may choose to do this directly or delegate the activity to one or more Change Builders. ▪ However, the Change Builder Manager is accountable for the work and can only delegate work to the Change Builder (if a different person), but NOT accountability.	• Change Builder Manager
300.4.3	*Assign to relevant resource to build* • In the case where they are different individuals, the Change Builder Manager will assign the change to the relevant resource (Change Builder) to build and produce a detailed work package named a Change Instruction Form (CIF).	• Change Builder Manager

300.4.4	*Generate a Change Instruction Form (CIF)*	• Change Builder
	• A Change Instruction Form (CIF) is raised by the Change Builder to provide implementation details on a Request for Change. The following types of CIF are used.	
	➤ Multiple RFCs to a Single CIF	
	— Most users will raise a single Request For Change from which a number of Change Instruction Forms will be "born" to enable a change to be carried out. In some cases, however, it is necessary that the tool works in the reverse. That is, one CIF can be attributed to a number of RFCs. For example, Development projects may raise a number of changes on the same system for the same weekend, and a single consolidated release package is produced by Development for the implementation.	
	— Change Builders will perform the linking of RFCs and attach these documents to the CIF in accordance with the release documentation. To carry out their function, the Change Builder builds the CIF by using the {Multiple RFC} button rather than the "Select Systems" that would usually be used. This will build a specific based CIF, which has the many to one relationship specified above.	
	➤ Single Change Instruction Form; Multiple Systems	
	— The Change Instruction Form can be raised to support one, or multiple systems depending on the requirements	

		defined by the Request For Change. This reduces the administration overhead for the Change Builder when generating multiple changes planned during the same period for a series of systems. A patch rollout or PCN are examples where this can be used. — The Change statistics measurement in the case of multiple systems defined on a single CIF, will quantify each system defined as a change.	
300.4.5	*Inform RFC Initiator of progress* • The Change Builder will inform the RFC Initiator of the progress of work that it is being developed / built.	• Change Builder
300.4.6	*Develop Release* • As part of the Release Management process, procedures should be planned and documented for building software Releases, reusing standard procedures where possible. A configuration of a particular Release of software and hardware may be based upon a set of available components, some of which may be developed in-house and others bought in. ▪ Conducting the actual build involves, at a minimum, compiling and linking application modules produced in-house and any bought-in software that is held in source form. ▪ The following output should be provided in this Design, build and configure Release	• Change Builder/ Developer

		Management process stage: ➢ Detailed Release assembly and build instructions, including the exact sequence of operations ➢ Purchase orders, licenses and warranties for third-party software and hardware ➢ Automated installation scripts and associated test plans ➢ Master copies of the installation media and installation instructions, to be stored in the DSL. ➢ Back-out procedures.	
300.4.7	*Select Change Implementer* ▪ The Change Builder will select the Change Implementer who will compile the change and prepare the items needed to implement the change. ▪ In some locations, the Change Implementer role is combined with that of the Change Builder. It is also possible to have one person perform the role of Change Builder Manager, Change Builder and Change Implementer.	• Change Builder
300.4.8	*Test Change* • The testing of the Release should be performed by independent business staff and involve IT staff to verify any changed support procedures. Any back-out procedures should be tested as part of this activity, which should prove that the built Release can be installed and run as required. This includes testing both the installation	• Change Builder / Developer / Relevant Parties

	procedures and the function of the final system.	
	• The types of tests that must be conducted before the change is delivered for operational use are detailed below. The degree of testing is also in direct proportion to the type and complexity level of the change.	
	➢ Integration or Functional Test	
	— This testing assures that the program, procedure or system performs as it was designed and specified in the PRS, PFS, and SFS, operational requirements specification or change request documentation. This testing must be carried out by the development organisation, RFC Initiator organisation or engineering group introducing the change.	
	— Test results must be documented and executed successfully before gaining approval as part of the test process. Operations may select tests from these to be executed as part of the implementation and User Acceptance Tests (UAT).	
	— Integration test environments must contain, or have access to, all tools deemed necessary to accomplish the replication of the operational environment.	
	— The results of these tests must be reviewed and signed off by the	

organisation delivering the change and can be the basis for the operations acceptance test plan. This is an essential deliverable of the change management process, as it will identify deficiencies in the test process, which will require heightened focus during the implementation test phase.

➢ System/Performance Test

— The performance test process must test under a working load to assure the operability, reliability, stability and performance of the system and define capacity thresholds for the application or components. It must also assure that there are no impacts to any existing Service Level Definitions by the introduction of these changes.

— The system test environment must be closely configured in all aspects to the production environment. This testing must be carried out by the development or RFC Initiator organisation and test results documented and executed successfully before gaining approval as part of the test process. Operations may select tests from these to be executed as part of the implementation and User Acceptance Tests (UAT).

— A set of system Key Resource Parameters (KRP) and Key Produce Quality Parameters (KPQP) must be defined and tested as part of this process.

➢ User Acceptance/Installation Test

— Ensuring the procedures are accurate for

| | | installing, operating and supporting the change and verifying that the implementation is what the user expects and that it is operationally acceptable. Operations will work with the RFC Initiator to define the UAT, which usually will be a sub set of the Integration, Functional and Performance test carried out by the originator organisation.

— Operations must also as part of this process test and verify completeness of all documentation, procedures and ensure that all compliance and security standards have been adhered to.

➢ Operations Involvement Testing

— This phase begins with the decision that testing is required and includes the performance of testing in the test or integration test environment. This phase ends with test results and user acceptance criteria and results defined.

➢ Test Fall Back Plan

— Fall Back procedures should be prepared, documented and tested in advance for each authorized change, so that if an error occurs after implementation, these procedures can be quickly activated with minimum impact on service quality.

— Change Managers have an overseeing role to ensure that all changes that can be, are thoroughly tested. | |

300.4.9	*Are tests OK and been signed off?* *No* *Feedback to Developer* • Testing should cover the installation procedures and the functional integrity of the resultant system. There should be a sign-off for each stage of testing. The final acceptance and sign-off for the Release to go into the live environment should be an agreed stage of the Change Management process. • If this is not the case, details should be fed back to the Developer	• Change Builder
300.4.10	*Are tests OK and been signed off?* *Yes* *Schedule possible dates for change* • The Change Builder will schedule the date of the change following consultation with the Change Builder Manager, Change Implementer and other key stakeholders.	• CBM/CB/ CI
300.4.11	*Send schedules to CAB for approval* ▪ The CIF is then sent for approval to proceed and the RFC originator is informed the change has been built. ▪ CBM/CB sends implementation dates, the CIF and schedules to the Change Manager, using the CAB as required, for approval to implement.	• Change Builder

4.9   Signoff to Implement Change - 300.5

4.9.1   Goal

The Signoff and Schedule Change stage is the process of obtaining support from the Change Authorizers and approval from Change Management or the DC, Regional or Global change management forum.   Before this approval is requested the change record must have completed all other required phases of the change management process and have all documents available for review and posted to the change repository in an approvable condition.

This is the only stage where approval for the implementation of change can be granted.

4.9.2   Start

This procedure begins with changes ready for installation, pending approval and ends with an approval (updated Change Record) from relevant Operations Change management forum, and other affected areas, if applicable.

4.9.3   Key Inputs

The following are required inputs to this Signoff to Implement Change stage and the outputs derived from successfully completing this procedural stage.
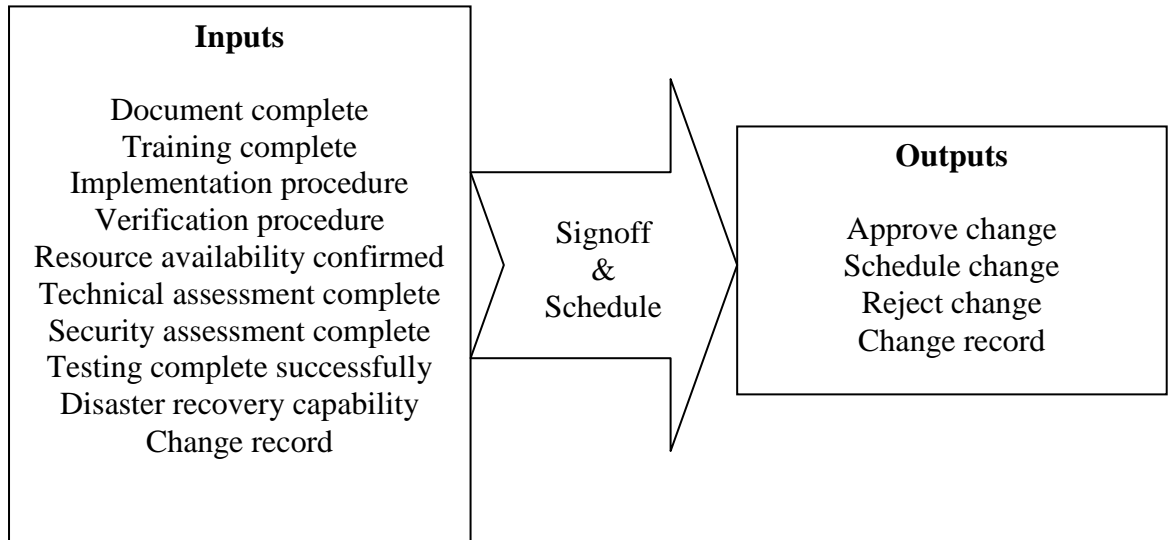
```
┌─────────────────────────────┐
│           Inputs            │
│                             │                          ┌──────────────────────┐
│     Document complete       │                          │       Outputs         │
│     Training complete       │      ╱──────────╲         │                       │
│  Implementation procedure   │     ╱  Signoff   ╲        │   Approve change      │
│   Verification procedure    │    ⟨      &        ⟩      │   Schedule change     │
│ Resource availability confirmed│   ╲  Schedule   ╱       │   Reject change       │
│ Technical assessment complete│     ╲──────────╱         │   Change record       │
│ Security assessment complete │                          └──────────────────────┘
│ Testing complete successfully│
│ Disaster recovery capability │
│       Change record          │
└─────────────────────────────┘
```

Figure 13: Signoff to Implement Change Inputs and Outputs

- Risk and Impact Assessment complete and levels reduced as appropriate

- Documentation complete

- Training complete

- Implementation scheduled

- Implementation Procedures have been reviewed

- Implementation Verification procedures delivered

- Service Verification procedures delivered

- Resource availability confirmed

- Technical assessment complete

- Security assessment complete

- Testing completed successfully

- Disaster recovery capability delivered

4.9.4   Key Outputs

- Approved Change

- No outstanding issues or concerns exist. All affected parties approve the change. Implementation of the change will proceed.
- Scheduled Change

- Change Record

- Composite of all data and information associated with the change.

- Rejected Change

- Outstanding issues or concerns exists preventing approval of the change by all affected parties.   Implementation of the change will NOT proceed until all issues and/or concerns are resolved.   Escalation points may be identified if an impasse is reached amongst the approvers.
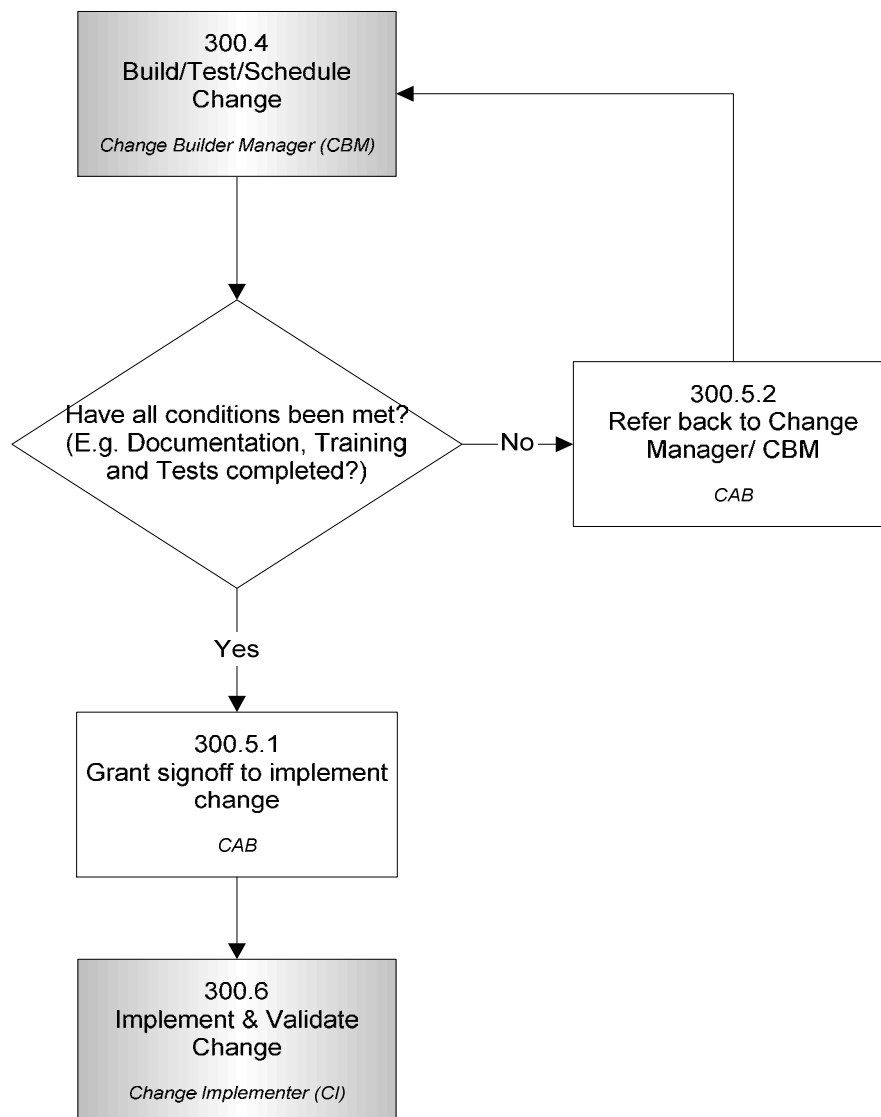

Figure 14: Signoff to Implement Change Flow chart

Table 15:   Signoff to implement Change Process Explanation – 300.5

No.	Activity	Process Responsibility

300.5.1	*Have all conditions been met? (E.g. Documentation, training and tests completed?)*
	
	Yes
	
	Grant Signoff to implement Change
	
	▪ Approvals constitute acceptance of the following conditions, if applicable:
	
	  • Risk and Impact Assessment complete and plans to reduce level where appropriate
	  • Documentation complete
	  • Training complete
	  • Implementation scheduled
	  • Implementation Procedures have been reviewed
	  • Implementation Verification procedures delivered
	  • Service Verification procedures delivered
	  • Resource availability confirmed
	  • Technical assessment complete
	  • Security assessment complete
	  • Testing completed successfully
	
	▪ Disaster recovery capability delivered will proceed.
		• CAB

300.5.2	*Have all conditions been met? (E.g. Documentation, training and tests completed?)*	• CAB
	No	
	Refer back to Change Manager /CBM	
	As long as outstanding issues or concerns exists preventing approval of the change by all affected parties. Implementation of the change will NOT proceed until all issues and/or concerns are resolved. Escalation points may be identified if an impasse is reached amongst the approvers.	

4.10   Implement & Validate Change – 300.6

4.10.1   Goal

The Implement & Validate Change stage is the process of installing approved changes into the Operations environment as defined by the change record. The procedure includes, installing the change, monitoring the installation, tracking progress, documenting, and communicating the installation progress and results, along with identification of problems or concerns.

Validation of successful installation is a very important step in the installation process. Operations or the customer has the responsibility to verify change results. This process ensures results are consistent with what was communicated prior to the change being approved.

4.10.2   Start

This procedure begins once signoff has been granted for implementation if the change and it ends with install and service verification, updated change record close out and/or an open problem record, if applicable.

4.10.3   Key Inputs

The following are required inputs to this Implement & Validate Change stage and the outputs derived from successfully completing this procedural stage.
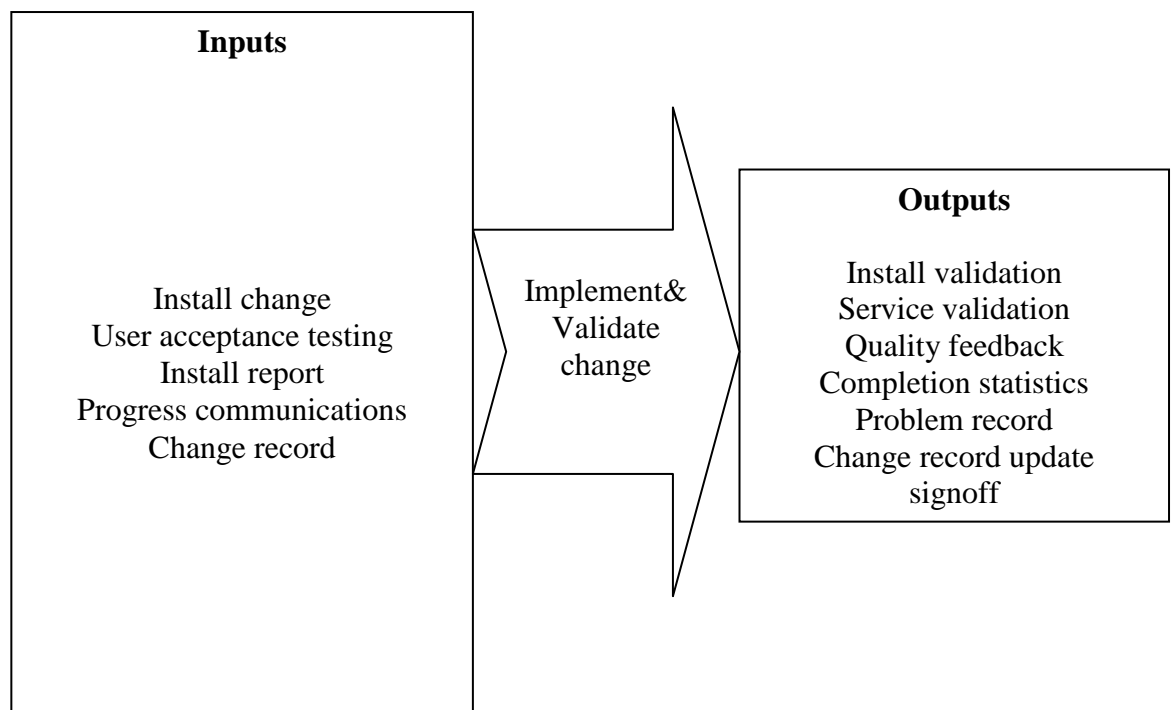
```
┌─────────────────────────────────┐
│            Inputs               │
│                                 │
│                                 │
│      Install change             │
│   User acceptance testing       │
│      Install report             │
│   Progress communications       │
│      Change record              │
│                                 │
│                                 │
└─────────────────────────────────┘
```

Implement&
Validate
change

Outputs

Install validation
Service validation
Quality feedback
Completion statistics
Problem record
Change record update
signoff

Figure 15: Implement & Validate Change Inputs and Outputs

- User acceptance Testing

    o Documented verification that the change (as tested) meets the customer requirements and expectations.
- Approved Change

    o No outstanding issues or concerns exist. The change is approved by all.
- Change Record

    Composite of all data and information associated with the change.

4.10.4   Key Outputs

- The outputs from this process will be the Operations acceptance tests and operations sign off to ensure that all deliverables are implemented to the highest standards and that operations have full capability to manage the service. Confirmation of completion.

- Report on issues during implementation

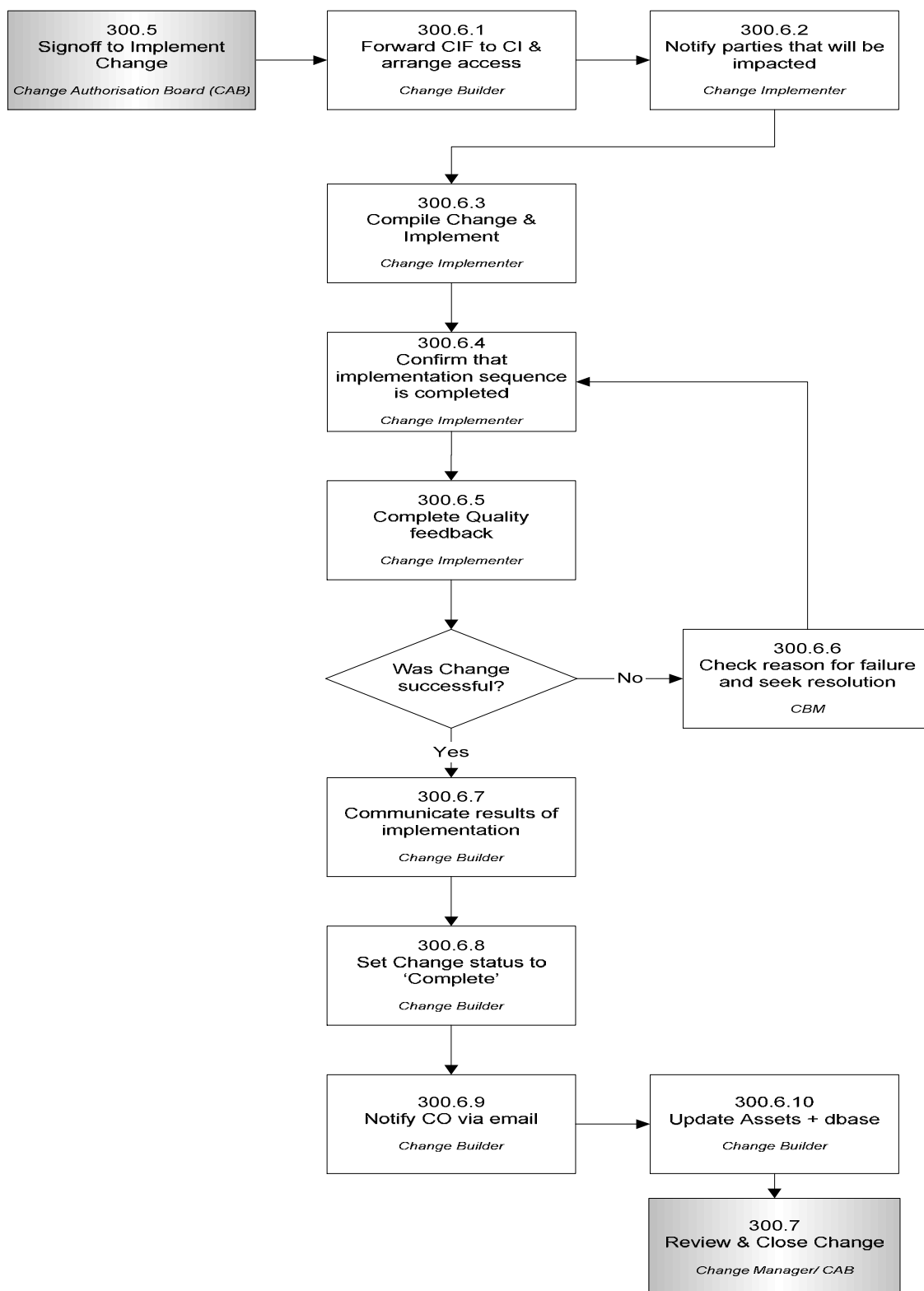- Change Record updated to reflect the new status with all data and information associated with the change.

Figure 16: Implement & Validate Change Flow Chart

Table 16: Implement & Validate Change Process Explanation – 300.6

No.	Activity	Process Responsibility
300.6.1	*Forward CIF to CI & arrange access* • Once the implementation schedule has been approved, the Change Builder forwards the build form (CIF) to the Change Implementer and arranges for approval for authorized access to systems via Control desks.	• Change Builder
300.6.2	*Notify parties that will be impacted* • The Change Builder is responsible for notifying any parties to be impacted by the implementation.	• Change Builder
300.6.3	*Compile Change & Implement* • The Change Implementer compiles the change and prepares the items needed to implement the change. • CI then carries out the implementation on the date specified according to build instructions.	• Change Implementer
300.6.4	*Confirm that implementation sequence is completed* • Following implementation, CI confirms that implementation sequence was completed • Implementation verification and service verification tests are executed to validate the success of the implementation. Service verification tests only apply to changes requiring CAB approval (300.3.1)	• Change Implementer

300.6.5	*Complete Quality feedback* • CI must also complete the quality feedback. • If the implementation is incomplete, the quality feedback should still be completed and referred back to the CBM, CM or CO.	• Change Implementer
300.6.6	*Was Change successful?* *No* *Check reason for failure and seek resolution* • The CBM then checks the quality feedback for reasons behind the implementation failure and seeks to resolve. • A new CIF may need to be completed and passed through the process.	• Change Builder manager
300.6.7	*Was Change successful?* *Yes* *Communicate results of implementation* • Groups affected by the change are notified when the change is submitted and the Change Builder is responsible for communicating the result of the implementation to the relevant parties • The Change Manager is also informed of any change in status post implementation resulting from the Change. This could be where the system has been fallen back or failed.	• Change Builder
300.6.8	*Set Change status to 'Complete'* • If change is successful, the change status is set to 'Complete'.	• Change Builder

300.6.9	*Notify RFC Initiator via email* • The Change Builder then notifies the RFC Initiator via email of the change in the status to 'Complete'.	• Change Builder
300.6.10	*Update Assets + dbase* • The CB updates the Assets+ database to reflect the new change status. • The CIF status should remain as complete for 1 month, after which it should automatically be closed and archived. • If change is unsuccessful, or an issue is identified during the 1-month complete period, then the change should be backed out accordingly.	• Change Builder

4.11   Review & Close Change – 300.7

4.11.1   Goal

The goal of this procedure is to review the effectiveness of the Change implementation and is conducted as part of a post project review.

4.11.2   Start

This procedure begins once the Change implementation has been validated.

4.11.3   Key Inputs

The following are required inputs to this Review & Close Change stage and the outputs derived from successfully completing this procedural stage.

- Quality feedback form

- Change Record

- Change Instruction Form

- Problem Record

- Release Note

4.11.4   Key Outputs

- Follow up actions
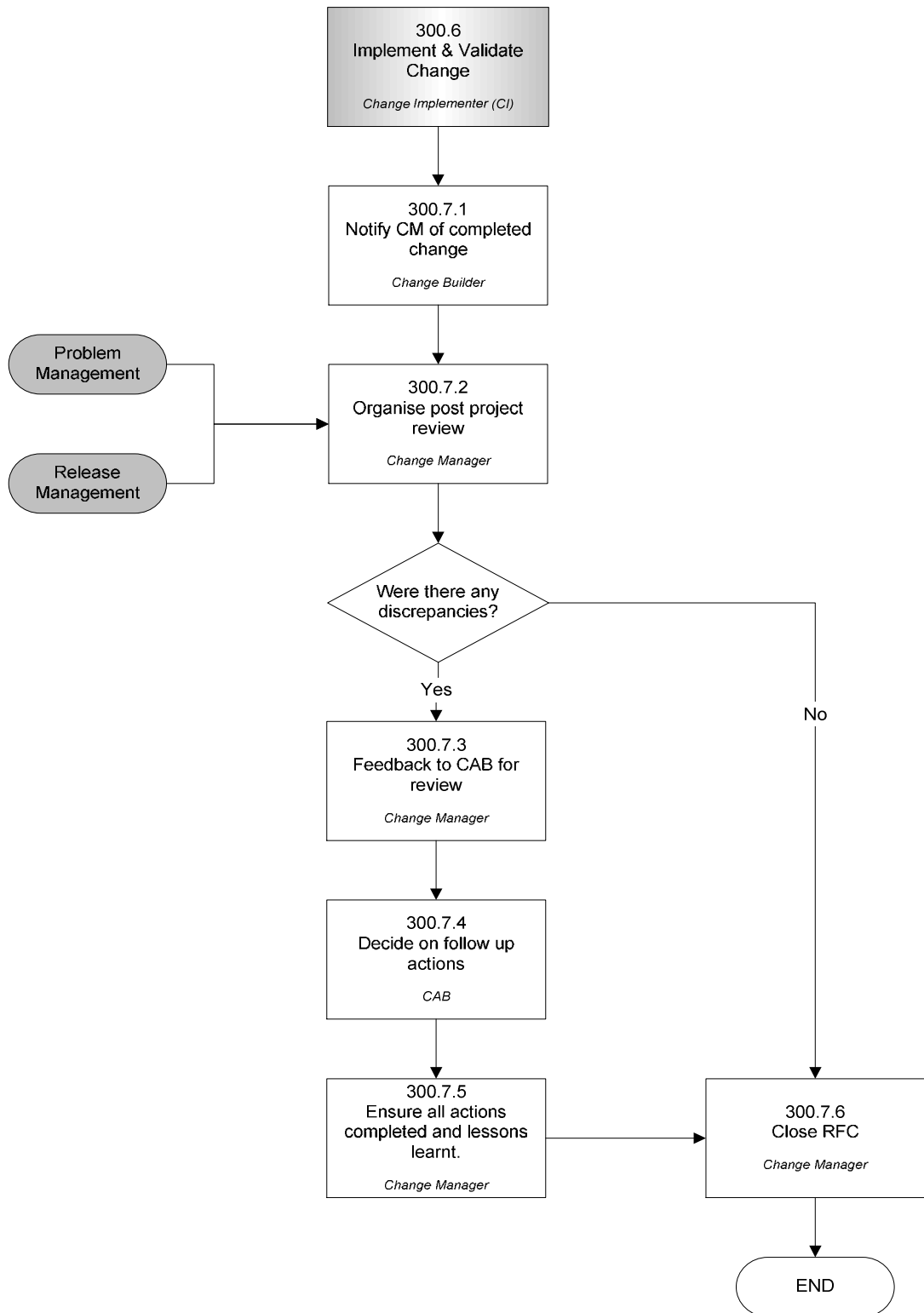
- Completed actions

- Lessons learnt report

Figure 17: Review & Close Change Flow Chart

Table 17:   Review & Close Change Process Explanation – 300.7

No.	Activity	Process Responsibility
300.7.1	*Notify CM of completed change* • The Change Manager is informed of any change in status post implementation resulting from the Change. This could be where the system has been fallen back or failed.	• Change Builder

300.7.2	*Organize Post project review*
	
	▪ The Change Manager will organize a review meeting as appropriate to review the effectiveness of the Change implemented.
	
	▪ This meeting could potentially cover a number of issues, not all of which may involve change management.
	
	▪ The purpose of such reviews is to establish that:
	
	    • The change has had the desired effect and met its objectives.
	
	    • Users and Customers are content with the results, or to identify any shortcomings.
	
	    • There have been no unexpected or undesirable side effects to functionality, availability, security capacity/performance, maintainability etc.
	
	    • The resources used to implement the Change were as planned.
	
	    • The implementation plan worked correctly (so include comments from the implementers).
		• Change Manager

	- The Change was implemented on time and to cost. - The fallback plan functioned correctly, if needed. ▪ Conduct Failed Change Trend Analysis (300.7.2.1)	
300.7.3	*Was there any discrepancies?* *Yes* *Feedback to CAB for review* • Any problems and discrepancies found during the change review should be fed back to CAB members, implementation managers, development managers and product managers, so as to improve the estimating processes for the future.	• Change Manager
300.7.4	*Decide on follow-up actions* • Where a change has not achieved its objectives, the CAB should decide what follow-up action is required.	• CAB
300.7.5	*Ensure all actions are completed and lessons learnt* • The Change Manager should ensure that all actions are completed and all lessons learnt.	• Change Manager
300.7.6	*Close RFC* • The Change Manager closes the RFC and notifies the CAB accordingly.	• Change Manager

4.12   Failed Change Analysis procedure – 300.7.2.1

4.12.1   Goal

The goal of this procedure is to review failed changes and feed the statistics into a review group for route cause analysis and trending, the effectiveness of this process can be measured against the RFC tool.

4.12.2   Start

This procedure begins once the Change implementation has been completed and deemed as a failure.

4.12.3   Key Inputs

The following inputs are required to the failed change analysis procedure. Change management review of failed changes via the CIF quality feedback form, and recorded for analysis through the change trend review meeting.

- Statistical data
- Failure Record
- Change trend review meeting

4.12.4   Key Outputs

- Problem trend analysis
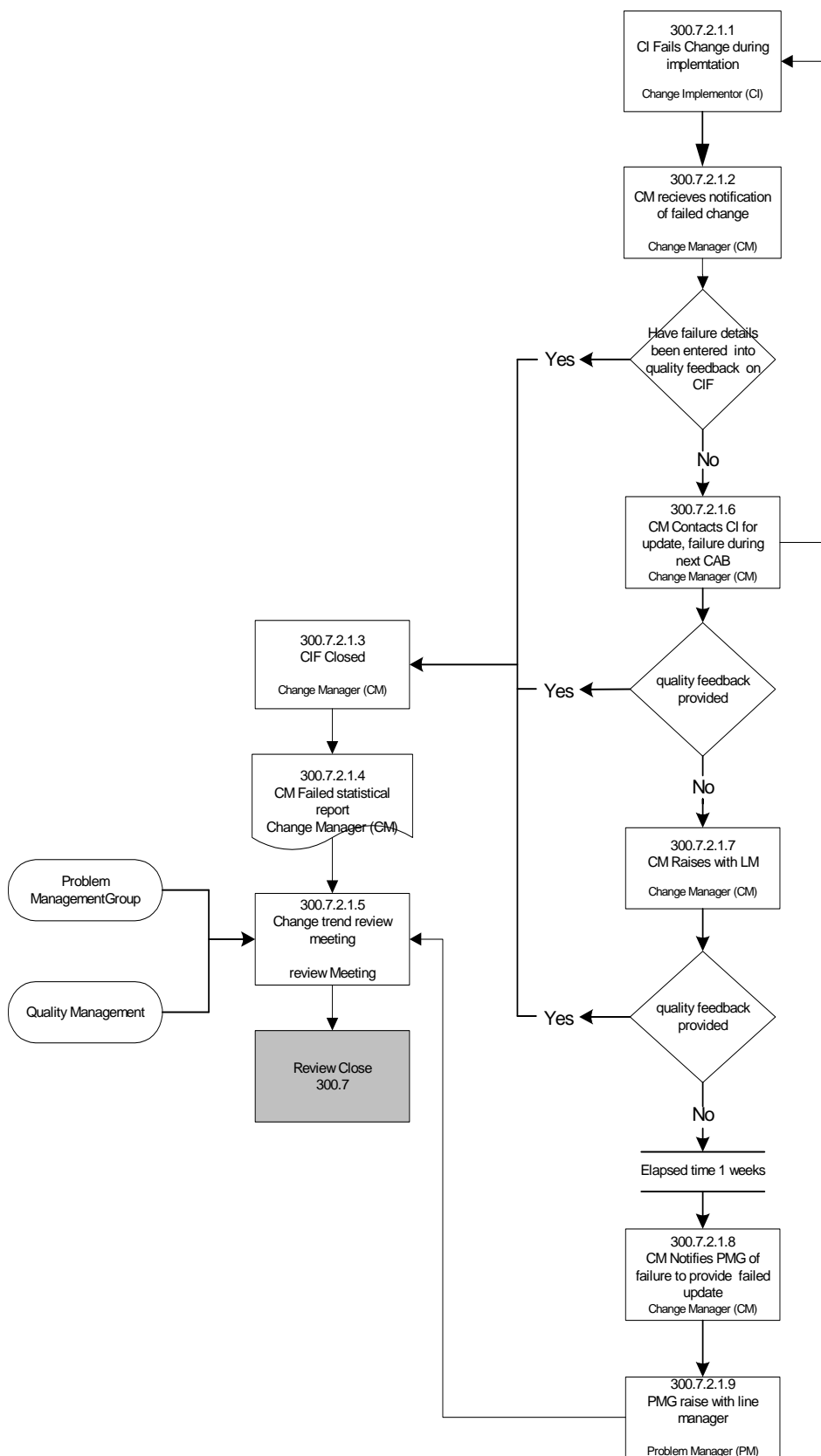- Quality review and recommendations

Figure 18: Failed Change Analysis Process Flow Chart

Table 18:   Failed Change Analysis Procedure – 300.7.2.1

No.	Activity	Process Responsibility
300.7.2.1.1	*Change Implementer fails change* • The Change Implementer fails the change during the release/implementation stage.	• Change Implementer
300.7.2.1.2	*CM receives notification of Failed Change* • The Change Manager Receives notification of the failed change via RFC.	• Change Manager
300.7.2.1.3	*Have Failure Details Been Entered into Quality Feedback on CIF* *Yes* *Close CIF* • CIF status set to closed and updated on Failed Change trend Review report.	• Change Manager
300.7.2.1.4	*Change Management Failed Statistical report* • Updates added to the Change Management Failed Statistical Report to be reviewed at the Change trend review Meeting. • Report distributed to Problem Management group each week including updates.	• Change Manager

300.7.2.1.5	*Change trend review Meeting* • Failed changes reviewed and updated during the regional Change Trend Review Meeting. • Feedback updates on actions arising from the Trend Review Meeting. *Responsibilities* ➢ Review of failed changes covering the current month and any past updates available. ➢ Problem Management will investigate root cause analysis and the shared service OSM will drive through service improvement based on trending. ➢ Quality management updates and recommendations provided to Change Management and Problem Management under review & Close Change Process 300.7	• Change Manager • Problem Management • Quality Management (Problem Mgmt) • Operations Service Manager
300.7	*Review Close* • Reviewed and close under process 300.7, feedback and recommendations provided to Change Management and Problem Management.	• Quality Management (Problem Mgmt)
300.7.1.1.6	*Have Failure Details Been Entered into Quality Feedback on CIF* *No* *Close CIF* • Change manager contacts the change implementer for an update of the failure.	• Change Manager

	• Failure raised at the next available CAB meeting.	
300.7.1.1.7	*Have Failure Details Been Entered into Quality Feedback on CIF* *No* *Change manager raises with Line manager* • Change management raise with the line manager responsible for the product or group.	• Change Manager
3.00.7.2.1.8	*Has Quality Feedback Been provided* *No* *CM Notifies PMG of failure to provide update* • The Change manager will send the details onto the problem Manager to be raised as a problem issue	• Change Manager
300.7.2.1.9	*PMG Raise With Line manager* • Problem raise issue with the Line Manager • PMG report back via the Change trend review Meeting • Review Close 300.7	• Problem Manager

CHAPTER 5

CONCLUSION & FUTURE RESEARCH

The advancement and easy availability of new and useful technologies today have enabled thousands of organizations worldwide to implement and become heavily dependent on technology for their business needs. Information technology (IT) has invaded and proved its immense benefits even in the smallest of organizations. Nowadays it is not possible to run any organization, small or big, without the use of some computer or telecom related technology. Today many organizations can easily afford to buy the necessary computers, software, telecommunications, etc, for running their businesses. But they do not understand the need for managing their IT implementation or ongoing maintenance properly due to numerous reasons, including lack of appropriate knowledge. For example, a small industry's business owner may buy a single computer initially for general use. After seeing the benefits of using computers, he may immediately decide to buy 25 more for his staff.

Within a short time his business will be computerized, and very soon IT support headaches will enter the business. Using a computer may be easy, but maintaining a computer system is a complicated task. Users may suddenly experience crippling virus attacks, equipment failures, software licensing issues, data corruption, data loss, backup issues, upgrade issues, and so on. They may not be in a position to support and maintain a computer network for its smooth functioning. Overnight, a smart purchasing assistant may undergo a crash course in computer maintenance, or buy a book called 'Computer Maintenance for Laymen,' and soon will be given the responsibility for technical support of the business along with his other responsibilities. This is how IT departments start in thousands of organizations. However, this sort of approach will lead to major and uncontrollable issues later.

As mentioned earlier, no modern organization can run its operations or survive without using one or more computers, software, telecommunications, Internet and so on. In view of the technical complexities involved there will be several IT

related issues and risks that can cause minor to major irritations, or even bring an organization to halt abruptly. If an important computer system stops working then businesses have to virtually close down as it is not possible to switch over to alternative manual processes for any length of time. Secondly, today's computer systems and networks are extremely complicated for any business people to maintain or support them on their own. Using information technology is a Catch-22 situation. You cannot live with IT, nor can you live without IT. Hence a specialized technical support team having knowledge of IT service management is required to understand how the systems work and how to baby sit them. Today a professional technology support department is as essential as a qualified finance department or a senior management to any organization. From a nuts and bolts perspective, IT service management means the 'techies' (employed or outsourced) in the organization professionally managing and maintaining the computers, networks, telecommunications, data storage, retrieval, e-mail systems, databases, etc, owned or used by your business. Unless the technology you use for your business is managed in a proper way your organization can get into serious trouble. The following examples show the pinpricks and hair rising issues organizations can face without a professional IT service management.

1.   Your end-users don't know whom to contact when their computers and other IT equipment become sick.

2.   Your techies attend end-user calls occasionally if they can, when they can.

3.   Business managers do not understand why their IT infrastructure is always having disruptions of a similar nature.

4.   Monday morning chaos, all computer systems down for some reason. Your techies probably performed some maintenance activities over the weekend.

5.   Businesses cannot commit about their products and services to their external customers.

6.   Your end-users do not know if all IT services will be available for them every day to complete their activities.

7.   Viruses, crippling and lengthy IT shutdowns, etc, are common.

8.   End-users always face shortage of computers, disk space, data corruption, data loss, etc.

9.   Business managers do not know why they need to shell out another bag of cash for some software the IT department needs.

Though organizations are free to have their own proprietary flavors of technical support suiting their needs, it is always better to adopt some international best practices as they prevent organizations from reinventing the wheel. This is where ITIL or the IT Infrastructure Library will help. However, as soon as the word ITIL is mentioned, many overloaded and overburdened IT departments and businessmen start imagining all sorts of scary views like it is a bureaucratic process, it is very complex, it must be highly theoretical, etc., which can only add to their woes rather than reduce it. The fear is understandable because ITIL was created by a government organization (Office of Government Commerce, British Government, UK), unlike something like six sigma that was created by a fortune 500 organization led by a glamorous CEO.

After all governments worldwide are known for their lethargic, obscure and bureaucratic processes that only delay and make things complex. However as you can never judge a book by its cover, you should not judge ITIL by who created it. Also many businessmen, IT departments and managements of small and medium organizations live in the misconception that ITIL is beyond their expertise or affordability, and perhaps applicable only to large organizations. But ITIL is not the scary stuff as most businesses imagine. Actually ITIL is a lot of practical IT management common sense and not just some impractical theories. And nor is it some costly and complex rocket science that can only be handled by specialists and magicians. ITIL can be implemented by practically any modern organization (small, medium or big) to bring some law and order to their IT infrastructure. By implementing ITIL you can avoid or eliminate all the troublesome issues mentioned above and bring a very high degree of stability and predictability to your IT infrastructure. ITIL offers value and return on investment to every business owner, service provider, CIOs, CTOs and a CEO as mentioned below.

1. Proven and tested processes. No need for businesses to re-invent the wheel for implementing IT services in their organizations. Covers end-to-end.

2. Non-proprietary practices. ITIL is owned by the Office of Government Commerce, but does not require a license to practice and it is independent of any commercial solution or platform.

3. Improved quality of IT service for business functions. Reduced downtime, improved customer and end-user satisfaction.

4. Measurable, controllable, recoverable.

5. ITIL is scalable. It can be adapted for any size of organization.

6. Proactive rather than reactive. Clearly-defined roles, responsibilities and activities.

7. Greater understanding of IT and its limitations by the business. Business will understand IT better and vice versa.

8. There is also a range of accredited ITIL training and education courses. This means there are plenty of support services, training institutes, tools and consultancy services that can help your organization's IT departments.

9. Return on Investment (ROI). ITIL helps IT organizations demonstrate their return on investment and measurable value to the business, and also cut IT costs. This helps establish a business case for new or continuing investment in IT.

10. ITIL also helps in outsourcing. ITIL is widely practiced among many industry service providers and they can easily help your organization's IT departments.

11. Continuous improvement, stability, and trouble prevention.

12. Improved business image. Businesses will also learn what to commit (and what not to commit) to their external customers.

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