

Bridging the Gap: Billable ICT Client Service Process Improvement

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Executive Summary

An international company in the Information and Communications Technology (ICT) industry, with headquarters in South Africa, is looking into improving the administration of their billing process for out of contract services.

From a revenue assurance perspective the company believes that currently not all services are correctly billed. As a result the company does not always receive optimal income from all services rendered, especially where it concerns smaller clients who do not have comprehensive service contracts with the company. The company requires investigation to ascertain where the problem originates and possible resolutions to ensure that all clients are billed fully and correctly.

All clients are given the option of purchasing an after sales support contract which determines what level of technical support the client is entitled to on experiencing a problem. Such problems may consist of general software issues as well as faulty equipment. Some problems are outside the company's scope of influence, for instance lightning damage or client negligence. Those are not covered under a maintenance contract. Some smaller clients choose a basic contract. These clients can experience problems where they require assistance that is not covered by their service level agreement contract. Any service rendered above the contract's scope is regarded as billable. The client will be billed for the materials used and for labour, measured by the time taken to complete the service. This billing is done separately from the regular contract billing.

The senior management of the company has determined that even though the billable service calls are returning a profit, this profit is not equivalent to the company's investment in them. One indication is that an existing problem in the regular process results in a large number of service calls not being billed. This is caused by a variety of reasons, incorrect logging being one of them.

The project as described in this paper focuses on determining how the problems as currently experienced can be minimised through change of the process that governs the administration of billable service requests.

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1 Introduction

This project is executed in an international company in the Information and Communications Technology (ICT) industry with headquarters in South Africa. It prides itself on the service it provides to its clients. The company is well established and was formed more than twenty years ago. From simply selling computer networking devices, it has developed into a fully integrated technology partner. It supplies everything from basic office networks to full scale server solutions.

The company offers its clients specialist support at various levels. All clients have the option of purchasing an after sales support contract which will determine which level of technical support they are entitled to on experiencing a problem. These problems consist of general software issues as well as faulty equipment. Some causes of problems, such as lightning damage or client negligence, are not covered under the available maintenance and support contracts. Some smaller clients choose a basic contract. These clients from time to time need assistance that falls outside the scope of their contract.

When a client approaches the company with a request for a service that falls outside of the maintenance and service contract, this service is regarded as billable. The client will thus be billed for the materials used and the time taken to complete the service. This billing is done separately from regular billing in terms of the existing contract.

2 Background

Historically the company has not implemented process management in any structured manner. As a result the process regarding the administration of billable client service calls is not defined clearly. There are also no clear process specific measurements in place that provide an indication for the performance of the process.

The company uses an Information Technology Service Management (ITSM) system in which calls are logged and tracked. This system however only caters for the physical service rendered or to be rendered. The administration and eventual billing of these calls is not included.

The senior management of the company determined that even though the billable service calls are returning a profit, this profit is not as high as it ideally should be compared to the

company's investment of labour and material. As an example, an existing problem in the regular process results in a situation where a large portion of these service calls are either logged erroneously or end up not being billed for other reasons.

3 Project Aim

The aim of this project is to improve the process of the administration of out-of-contract client service requests in order to improve the billing of clients for these services, especially regarding the turnaround time and success rate of the billing process.

The objectives which will form the basis of this aim are:

- To define the process as it is currently being carried out.
- To measure the process performance in order to determine if there truly is a break in this process.
- To develop a new process, proposing a solution for the problems experienced and displaying the expected benefits of this new process.

4 Project Scope

The scope of the project covers the administration of billable after sales services required by a client. The current process will be considered for improvement.

This will exclude any services that originate from maintenance contracts, warranties, service level agreements and IT Outsourcing contracts. Some calls may be regarded as billable for one client but not for another depending on the type of contract. All of the company's Lines of Business (LoBs) will be included in the analysis, with the purpose of replacing the varying LoB processes with a single generic administration process.

Any service calls that are incorrectly logged as billable will be included in the analysis of data. The proposed solution must take this known problem into consideration.

The process of billing for out of contract service calls is currently not managed at all. The individuals responsible for the day to day execution of the process must be provided with guidance in respect of future management of the process.

This project will exclude the physical process followed by the technician to resolve the problem for which the client requested service. The scope will further exclude the management of service calls that fall within a maintenance contract. Any changes that may be requested by the business stakeholders to be made to the Information Technology Service Management system itself are excluded as well.

5 Project Approach

To solve the problem, the project approach will consist of investigation of the current state, accurately defining it and then analysing these data with due consideration of historical data to develop a new standardised process.

The current processes must be accurately defined and mapped for each of the company's lines of business. These different diagrams must then be combined to create a single generic process that would be applicable across all lines of business.

The historical cost and revenue data will be used to determine the correct margins of the calls as well as the extent of the non-billing problem for calls and services. These data must also be analysed in terms of statistical process control charts.

A new process must be proposed that will become standard across the company. The problems experienced in the current process must be addressed in this new process. The data analysis will be used to justify any changes to the current processes or methods used. The cost of any proposed change must be sufficiently covered by the benefits gained from the change.

For 6 months after implementation of the change a new analysis of data must be carried out monthly to ensure that the change has in fact made a positive difference and to decide if further changes are needed and when they will be implemented. Thereafter the measurements must be continued by the business management team.

6 Literature review

BPR has been defined as “*the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed*” (Hammer & Champy, 1993). BPR can be considered to be a combination of principles such as waste elimination, fast throughput and customer-focused operations (Slack, Chambers, Johnston, & Betts, 2006). ‘Operation and Process Management’ further states that the BPR approach is underlined by the belief that the organisation of the business should be organised around the total value adding process rather than a focus on individual activities (Slack, Chambers, Johnston, & Betts, 2006). The principles of BPR are summarised as follows:

- *Rethink business processes in a cross-functional manner that organizes work around the natural flow of information (or materials or customers). This means organizing around outcomes of a process rather than the tasks which go into it.*
- *Strive for dramatic improvements in the performance by radically rethinking and redesigning the process.*
- *Have those who use the output from a process perform the process. Check to see whether all internal customers can be their own supplier rather than depending on another function in the business to supply them (which takes longer and separates out the stages in the process).*
- *Put decision points where the work is performed. Do not separate those who do the work from those who control and manage the work. Control and action are just one more type of supplier-customer relationship that can be merged.*

The following review is aimed at investigating the best method for achieving these principles based on available literature, with the eventual goal of achieving an improvement of the business process being investigated in this project.

Any company that aims to implement a Business Process Re-engineering (BPR) project will need to consider a number of important steps in order to be best positioned to achieve success. These activities are, in chronological order: Prepare for BPR, Map and Analyse As-Is Processes, Design To-Be Processes, Implement Re-engineered processes and Improve

Continuously (Muthu, Whitman, & S, 1999). These functions are used by companies that show large continuous improvement successes (Lock, 2008).

As for Business Process Reengineering (BPR) (also commonly referred to as Business Process Redesign), the main goal is to drastically improve the way in which things are done within a company. The main functions of BPR are the actual analysis of the current process and then using this understanding in order to develop a new and improved system that can replace the current process and cause radical improvements within the company (Muthu, Whitman, & S, 1999).

6.1 Best practices

There is a multitude of best practices available. However it is imperative to carefully consider what the circumstances were for these practices to be considered the best. The methods used for the initiative to be successful are not always easily copied or there are other reasons why the specified way of proceedings is not applicable for a different company.

Due to vastly differing circumstances it is impossible to have one set of prescribed methods that can be followed in all businesses and no one can tell a business owner exactly what needs to be done in their business in particular without thorough investigation being done. There is however a general step by step guide that can be followed in order to improve the chances that BPR initiatives applied to a specific line of business will succeed (Muthu, Whitman, & S, 1999). The five main methodologies are shown in the following table:

Table 1: Summary of re-engineering methodologies (Muthu, Whitman, & S, 1999)

Activity no	Methodology 1	Methodology 2	
1	Develop vision & strategy	Determine customer requirements & goals for the process	
2	Create desired culture	Map & measure the existing process	
3	Integrate & improve enterprise	Analyse and modify existing process	
4	Develop technology solutions	Design a re-engineered process	
5		Implement the re-engineered process	
Activity no	Methodology 3	Methodology 4	Methodology 5
1	Set direction	Motivating re-engineering	Preparation
2	Baseline and benchmark	Justifying re-engineering	Identification
3	Create the vision	Planning re-engineering	Vision

4	Launch problem solving projects	Setting up for re-engineering	Technical & solution design
5	Design improvements	As-is description & analysis	Transformation
6	Implement change	To-be design and validation	
7	Embed continuous improvement	Implementation	

The Industrial and Manufacturing Engineering department of the Wichita State University has published a paper entitled Business Process Reengineering: A Consolidated Methodology (Muthu, Whitman, & S, 1999). For the ease of the reader a summary of the five main activities within a step by step guide to performing a BPR project are reviewed here.

6.1.1 Activity 1: Prepare for BPR

The first thing that is needed is to ask the question why. The answer to this question is usually financial, along the lines of decreasing costs or increasing sales. Therefore it also makes for a useful performance measure later on. From here it must be determined who is going to perform the re-engineering.

It is best to set up a cross-functional team. Such teams are usually made up of a BPM Program Manager and a number of analysts consulting with the senior line of business managers. These managers do not have to be permanent members of a BPR project. They only need to be involved for the period of time that their own area of the company is re-engineered. It is however vital that these managers in turn are directly involved with the ongoing BPM initiative. The same team that is responsible for BPM in general should be used to carry out BPR as they are the ones who would know the inner workings of each process, as well as the software used, better than any other persons in the company (Muthu, Whitman, & S, 1999).

It is further necessary to identify an objective. This objective needs to be in line with the overall objectives of the company as a whole. It is vital that this objective is radical. Some companies have set these objectives to be in the area of a 300% improvement in a specific area. The reason for this is that even if such a massive improvement is not achieved the chances to still achieve a very large improvement are increased. Here aspects like customer satisfaction or overall sales of the company can be chosen. This objective can then also serve

as a yardstick in order to determine how far the company has progressed. It must also be remembered that even when this objective is in fact achieved it does not signify the end of the project. It merely means that the project is performing much better than expected and the objective needs to be increased by a large enough margin as to once again present a measurable yardstick with regard to the performance of the initiative (Miers, ca2005).

6.1.2 Activity 2: Mapping and analysis

Here it is important to remember that all of the processes within the company are to be mapped. Each process needs to be carefully understood before the problems within each process can be eliminated. Although there are some companies that prefer what is known as the 'Hammer and Champy approach', where new processes are designed while totally ignoring the existing processes, (Hammer & Champy, 1993) this is not usually recommended unless there are currently no set processes or the company is in dire straits. Thus in general the recommendation is to map the entire company before a redesign is attempted. Each process must also be given a descriptive name. For example, instead of using Order fulfilment it might be better to name it Order to Payment (Muthu, Whitman, & S, 1999).

Once all the processes have been mapped Activity based costing (ABC) can be used to determine the cost of the current process. It is important to also stipulate the amount of time it would take to carry out each process. These costs and times will then be the baseline for comparison with future processes.

6.1.3 Activity 3: Designing the To-Be Process

There is no specific order in which the redesign must take place but it is still important to note which process follows on which. It would be pointless to redesign a specific process if the predecessor to that process is dysfunctional to the degree that it causes most of the problems in the current process. Therefore it is commonly considered to be a reasonably good practice to commence the re-engineering effort at the first process in a line and then work through to the last process in that specific line. This is also often a much easier approach than a random one as major changes in a process at the beginning of a line of processes can cause specific changes to be required in processes later on. If these processes have already been re-engineered all that work may become redundant and may need to be completely redone.

In order to choose which process to re-engineer first, it is preferred not to look at processes in a specific order or sequence. The following three criteria should be considered:

Dysfunction: Which processes are performing the worst?

Importance: Which are the most critical and, more importantly, which are the most influential?

Feasibility: Which processes are most likely to be successfully re-engineered?

It is also vital to design and look at as many different alternatives for each process as possible, as well as combinations of different parts of these alternatives. It will then be possible to perform a certain level of benchmarking in order to compare the different alternatives. These benchmarks can thus be made up of both the costs of each process and the time each process takes to complete. With the help of process mapping and enterprise architecture software such as Nimbus Control and possibly a simulation tool such as Arena software each alternative can be looked at any number of times in order to see which one would provide the most benefit using a trade-off analysis between cost and time. The cost and time of the chosen process can then serve as a new baseline (Miers, ca2005).

6.1.4 Activity 4: Implementation of re-engineered process

This is by far the most difficult part of the entire project. It is vital that a plan be set up as to how the implementation will be carried out. In this regard it is considered wise to develop such an implementation plan at the same time as the planning and preparation of the new process. In more difficult cases it might be necessary to make use of training programs to teach people what the new processes are, how they need to be used and most importantly, what expected benefit is to be gained from making use of the new process (Miers, ca2005).

Another method of encouraging the implementation and sustainability of a change in a process is to make use of a reward and recognition based incentive scheme. It is suggested to adopt a business policy where remuneration can be used strategically to drive changes that are proposed during the process improvement initiative (van Rensburg, 2009).

6.1.5 Activity 5: Carry out continuous process improvement

The final step is to make a BPR program fit back into a larger BPM framework. Here the use of the new process can be measured against the established baselines periodically in order to keep track of the performance of the new process. Such measurements must preferably be made every time the process is carried out, otherwise a monthly measurement will suffice. These measurements can be analysed once a month initially. Once the process becomes more widely accepted as the norm the time between the analyses can be slowly increased first to a once per quarter basis and eventually to a once per year basis. One can then also continuously look at new ideas in order to improve the process further (Miers, ca2005).

7 Data Analysis

The measurement of processes within the company was not adequately implemented historically and therefore accurate data regarding the amount of time taken to complete the process was not available. However the company uses SAP to keep track of all of its business transactions. For this reason it was chosen to use the data available in SAP to determine the performance of the current process. The measurement to be used is the amount of service calls recorded in the system compared to the amount of these calls that were billed accurately. In order to provide perspective the amount of revenue and profit collected over time will also be analysed.

Also included in the data to be analysed are the current processes used within the company. It will be important to identify the roles and responsibilities of the people who work on these processes on a daily basis.

Further analysis of the common problems experienced during the processes is expected to provide a number of targets to be addressed by the solution that will be developed.

7.1 Basic data

12857 calls were logged during the period of September 2010 until September 2011.

This results in an average of 46.58 calls per day and 1071.42 calls per month.

Out of these calls 4525 had purchase orders; this translates to 35.19% of all calls.

8667 or 67.41% of the calls had actual start dates linked on SAP.

3218 or 25% of all the calls had actual end dates on SAP.

5934 or 46.15% of all the calls had an actual cost linked to it on SAP but no actual revenue.

Each of the calls recorded in the system has a cost allocated. This cost is made up of the time a technician takes to complete work on the call, as well as any materials that were used.

The total cost of all calls was R18283411.17

The total revenue for the calls was R19354231.77

Using these figures the profits were calculated by subtracting the costs from the revenue. The profit margin was then calculated by dividing the calculated profit by the cost and multiplying by 100%.

The total profit (and margin) is R1070820.60 (5.86%)

The average cost, revenue and profit per single call are as follows:

Cost = R1 422.06

Revenue = R1 505.35

Profit = R 83.29

These costs are inclusive of the cost of the time that an engineer or technician would spend on a service call. The global service desk is a central function within the company and can thus be regarded as a fixed cost for this process. Although exact salary averages could not be obtained due to company policy it can be reasonably estimated that each service desk agent has a total cost to company of R 144 000 per year. In addition to this fixed salary each service desk agent is provided with a license to use the ITSM system. This license costs R40000 per

year. Capital costs such as the building in which the agents are housed as well as the physical computers they work on will not be considered for the purposes of this project.

The total amount of service requests made to the company is on average 3500 per day (this number was supplied by the company's business intelligence (BI) team). Based on this number the billable service calls make up 1.33% of the total number of calls. Therefore the portion of the service desk's costs that can be allocated to the billable service requests equates to 15 service desk agents or R 2 760 000.

7.2 Graphing Methodology

A few graphs were created to assist with the analysis of the data. Included on these graphs some six-sigma based analytical operations were performed and are also displayed on the graphs. The important abbreviations and their meanings are:

LCL: Lower control limit; this limit indicates a statistically calculated value and all data needs to be above that for the process to be considered to be in control. Being in control means that the process is statistically stable. Whenever the calculated limit is less than 0 but the value of the data cannot fall below zero (e.g. number of calls per day) the control limit is set as 0.

LSL: Lower Specification Limit; this is a limit chosen to represent the lowest acceptable value that is preferred by the company. It is used to determine the process capability. For all financial measurements this will be set as 0 indicating that the revenue, cost and in turn profit from each call must be greater than 0.

Cp: Process Capability; this is a measurement of the consistency of the process and its ability to conform to the specification limits. Where no specification limits are available the control limit is used. The higher the Process Capability the better the process is performing.

Upper control limit and upper specification limit will not be used unless deemed necessary at a later stage.

7.3 Performance Indicators

For the purpose of brevity the full raw data will not be included in this document. Only the summarised analysis graphs will be displayed.

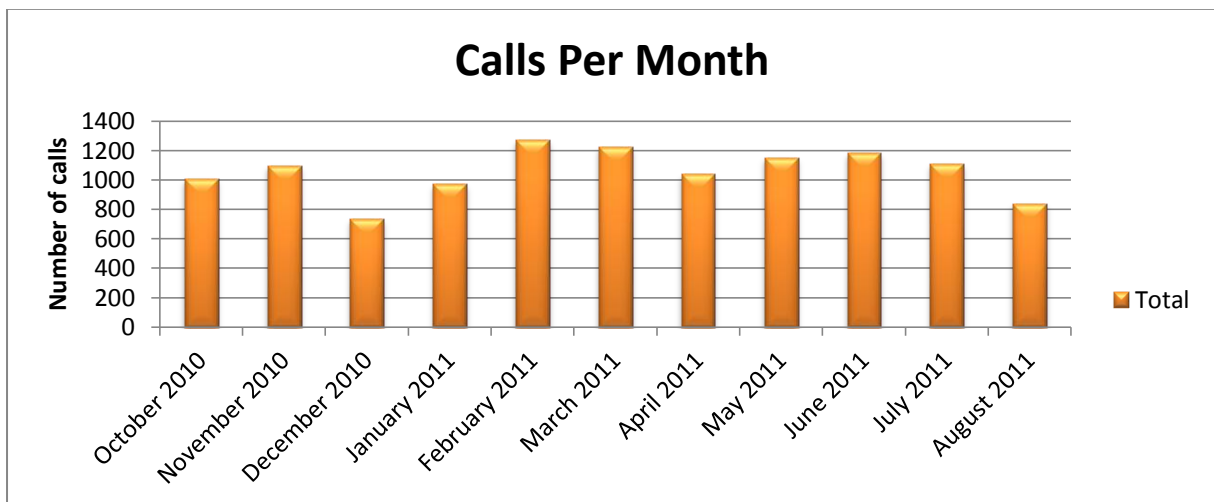


Figure 1: Graphical representation of number of service request calls per month

As can be seen from Figure 1 the amount of service requests received every month has shown a degree of seasonality. The decrease in calls experienced during December can be explained by the fact that a large amount of South African companies close during that month. Cisco, the primary vendor used by the company, states that the higher peaks experienced during February and March can be explained by the high levels of lightning experienced in South Africa. Lightning causes surges in electricity supply that are usually much higher than electrical equipment can handle. According to Cisco this specific and clear effect of the lightning on equipment failure rates is only experienced in South Africa.

Figure 2 serves the purpose of displaying how many of these monthly service requests are billed successfully. For the purpose of comparison these unbilled calls are displayed as part of the total calls.

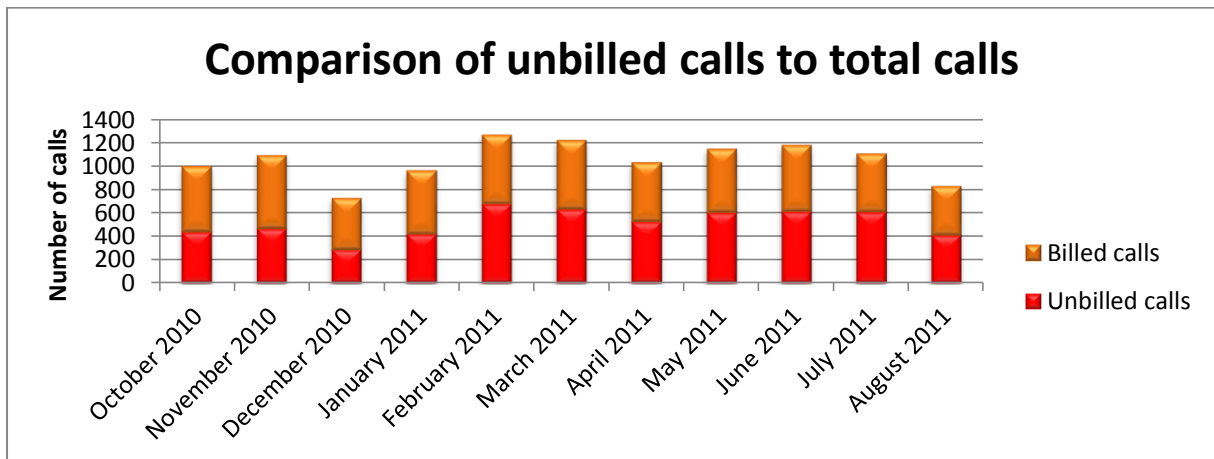


Figure 2: Graphical comparison of unbilled calls as part of total calls

It is important to take note that some calls are billed considerably later than the call was completed. To compensate for this, Figure 2 displays any call recorded in the system under a particular month with an actual cost component but no revenue recorded against it as an unbilled call.

In order to assess the impact of these unbilled calls it is necessary to analyse the financial data available for the service requests. The first financial indicator to be looked at is the total cost involved with the servicing of these calls.

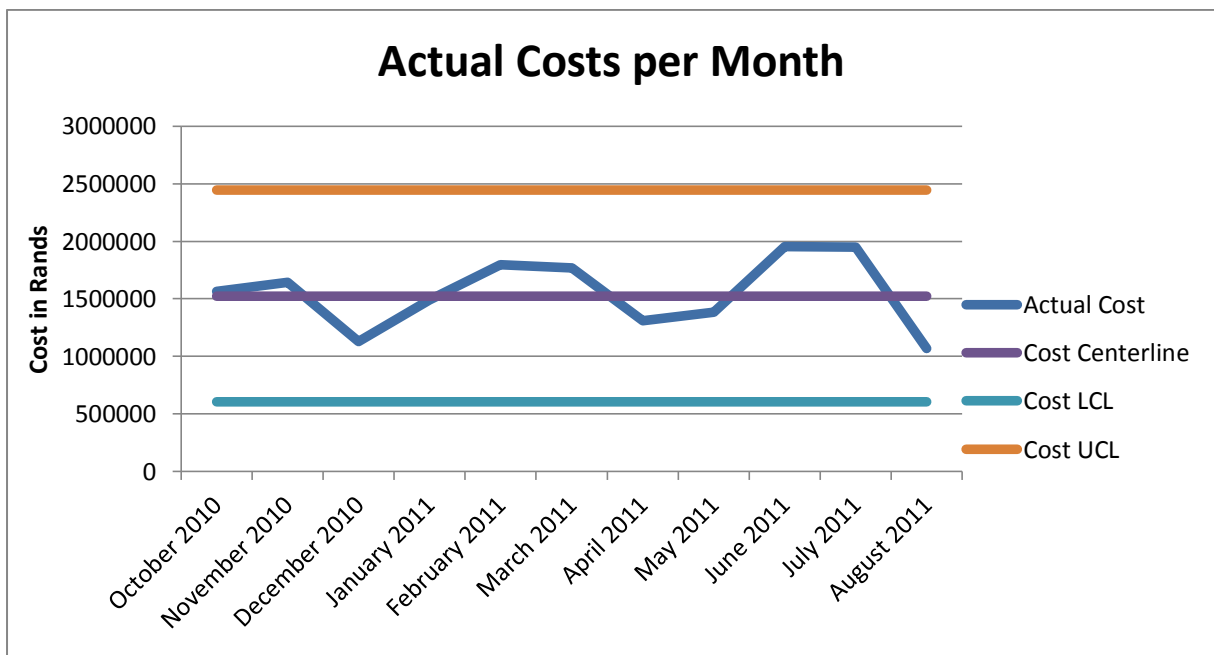


Figure 3: Graphical representation of actual costs experienced from billable calls per month

Figure 3 shows that the costs experienced from month to month falls well within a fairly acceptable range. However the deviation in costs is high. This results in the costs being less predictable than what would be preferred.

The next financial indicator is the total revenue collected from successfully billed calls.

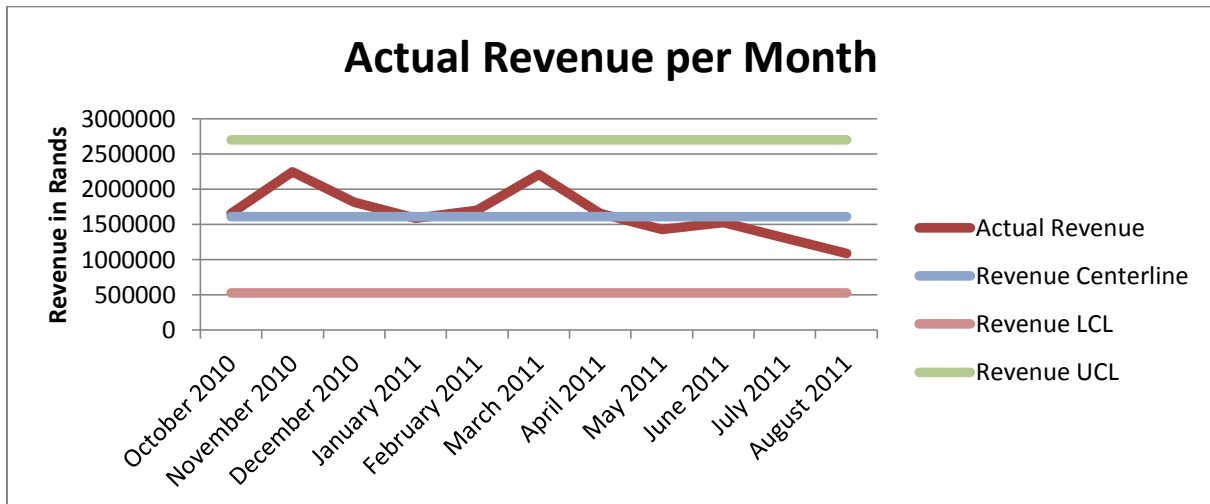


Figure 4: Graphical representation of the revenue generated from billable calls per month

Figure 4 demonstrates that the revenue experienced is steadily decreasing. This demonstrates the need for an improvement in the way the administration of these service requests is processed within the company.

The final financial indicator demonstrates the monthly profits gained from the billed calls.

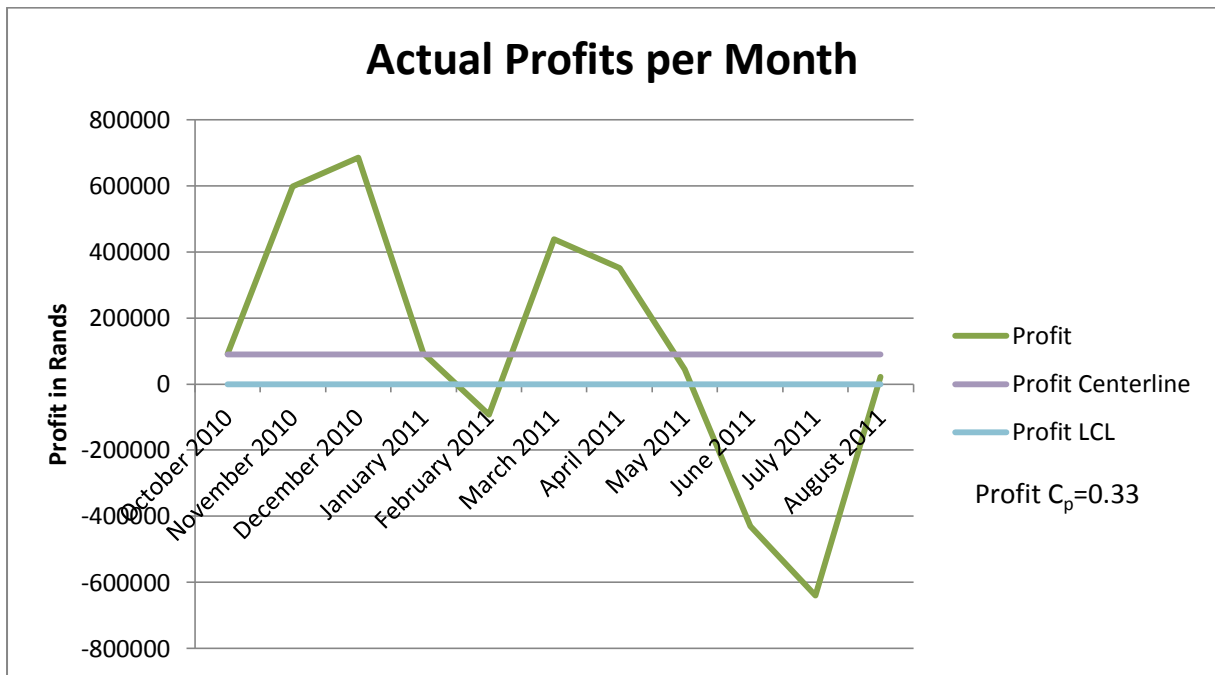


Figure 5: Graphical representation of the profits experienced from billable calls per month

The profits show great fluctuation. This presents a business risk. In chapter 10 of this document a very basic forecasting technique will be used to determine a reasonable target for the profits that may be expected once the process is carried out more effectively.

7.4 Business organogram

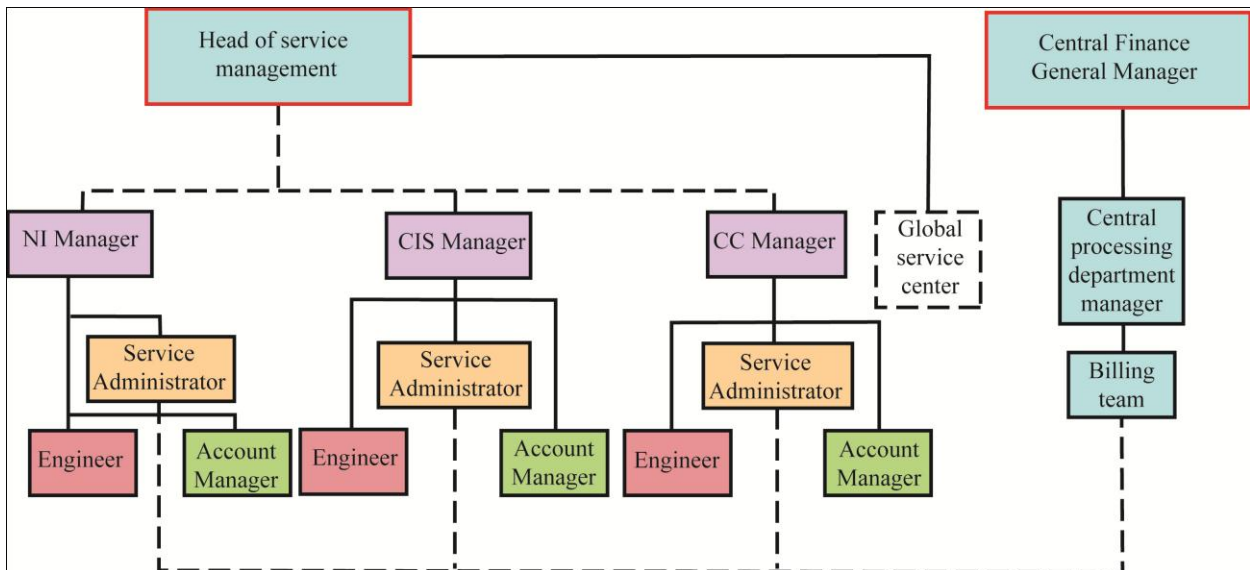


Figure 6: Organogram of roles related to the billable service call process

Figure 6 shows only the roles within the company that are directly involved with the process of the billing of service calls. The roles listed can be explained as follows:

- Head of services management: This person is responsible for overseeing the services provided to the client. This includes relationship management as well as ensuring that all required services are provided timeously and accurately. Services within and outside the client's contract are handled here.
- Central Finance General Manager: All of the company's financial functions are controlled by a central department called Central Finance. It is run by the General Manager for Central Finance.
- LoB Manager: Each Line of Business is run by a separate manager. This manager has full control over the LoB as if it were a stand-alone company. These managers all report to the overall company Financial Director for their day to day business. However, they must report to the Head of Service Management with regard to the support services provided to the client. In figure 6 the LoBs are NI, CIS and CC.
- Central Processing Department manager: The Central Processing Department is responsible for entering data into SAP, placing purchase orders with the vendors used by the company and invoicing the clients.
- Global Service Centre: The Global Service Centre (GSC) is effectively a call centre through which clients can contact the company and request any assistance they may require. The GSC processes the request and routes it to the relevant LoB Service Administrator.
- Service Administrator: The Service Administrator for each LoB has the responsibility of ensuring that the services required are provided to the client timeously and efficiently.
- Engineer: The engineer possesses the technical skills required to fulfil the clients' requests. Engineers are located in the company's head office and use remote desktop technology to enable them to service any problems a client may have with software. This saves both the client and the company the money that would be spent on traveling to the client's offices. For hardware related problems some larger clients opt to have an on call engineer at their own premises. For other clients a number of engineers are assigned to specific geographical areas. They are responsible for service requests that fall within contracts as well as billable calls.

- **Account Manager:** The account managers (AMs) are responsible for making sales as well as dealing directly with the clients. They negotiate and manage service contracts with the clients. They benefit from knowing if a client requests a specific out of contract service on a regular basis so that they can approach the client with an offer to enter into a contract for those services.
- **Billing team:** The billing team has the sole function of creating invoices and sending those to the clients. The team also notifies the account managers which services have been invoiced.

7.5 Current processes

The current situation is that each business area uses its own process. For this report the processes of three separate Lines of Business (LoB) processes will be documented and analysed in order to determine what common process might exist at the highest level. As there were no documented processes at the commencement of this investigation these processes were documented with the assistance of people who work on these processes on a daily basis. These persons were nominated by the company's Head of Service Management. During the definition of the process no guidance was provided to the relevant persons in terms of process mapping methodology. Each person was interviewed individually. This was done to avoid the gathering of inaccurate or inadequate data and also to avoid a possible bias in the definitions created by input from the analyst.

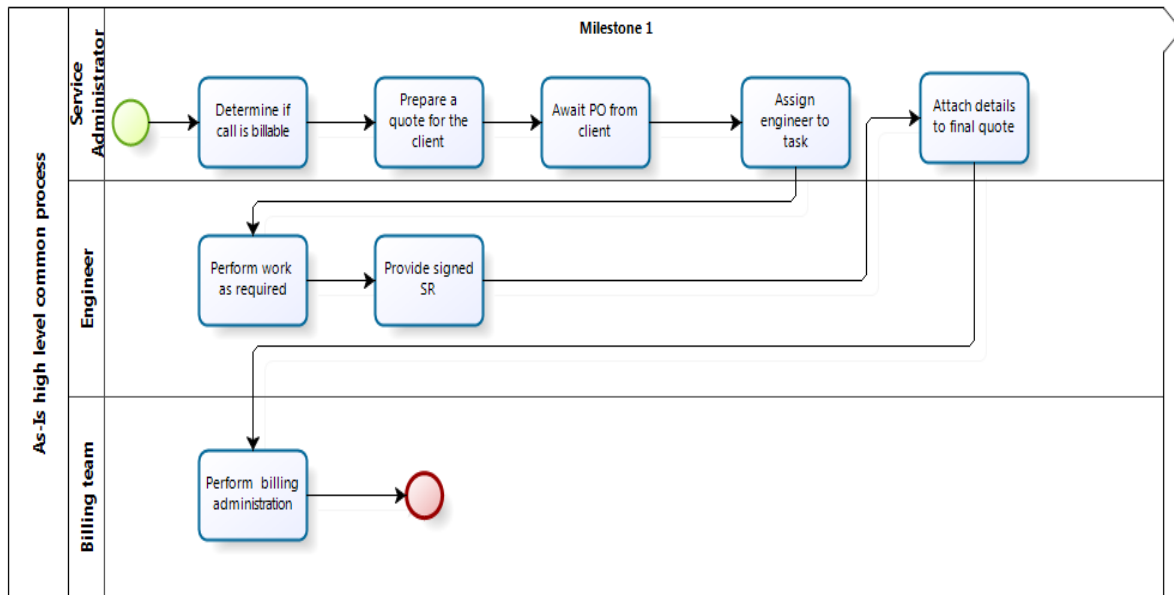


Figure 7: Diagram of current process for administrating billable client service calls

7.6 Analysis of available information

In order to get a better holistic understanding of all of problems experienced with the process as a whole interviews were conducted with a number of business stakeholders. These stakeholders were nominated as specific process owners within each of the LoBs. Additional stakeholders interviewed included the Head of Service Management, Financial Managers for each of the LoBs, and the manager of the Central Finance Billing Department. During these interviews a number of integral problems with the process were discovered. These problems are not immediately evident from a theoretical look at the current process.

The purpose of the interviews was to review the process, critical inputs, the possible root causes for the problems experienced in the process and the experienced effects of these problems. After a short discussion these known problems will be displayed in an Ishikawa/Fishbone diagram.

7.6.1 Critical inputs

- Client call logging
- Client Purchase Order
- Signed Service Report

7.6.2 Possible causes for issues in the billable client request process

- In all but one of the as-is processes the call is logged as a billable call, but the client is not notified of this before the service continues. Notification is a fundamentally important part of the process as it ensures that the client is aware of the fact that the logged call falls outside of the existing contract. There is currently no clearly defined and visible process available for collection of revenue from clients.
- Lack of visibility of progress or current process stage of call/billing
- Some services are routinely being carried out without waiting for a Purchase Order from the client.
- Remote support makes it more difficult to obtain a signed Service Report as no face to face contact is made with the client.

7.6.3 Effects experienced from above issues

- It has been experienced that clients question the invoices for certain types of work. They state not being aware that the performed service did not fall within their existing contract and then refuse to pay.
- The lack of a debtor's process results in poor visibility of what takes place during this particular phase. When combined with poor communication between departments the result is that employees dealing with clients are not aware of what debtors clerks need in order to be able to perform their task.
- The progress of the process is not clearly visible. This causes confusion and a lack of accountability. It also makes it difficult to inform the client as to where in the process their particular service request is.
- Carrying out service requests without a purchase order decreases the accountability of the client as well as the credibility of the bill sent to the client. Without a valid

purchase order there is no way to confirm with the client that they requested the work. A purchase order also makes the client aware of the call being billable.

- Although the usage of remote support makes the servicing of the request easier it also creates the problem of obtaining a signed Service Report from the client. A Service Report makes it easier to keep record of what was done. After the work is finished the SR contains the client's signature to prove the client's acceptance of the work. Only an analogue signature will do for legal reasons and as remote support has no physical handover of the signed SR, extra effort is needed to obtain it (see par. 8.2, step 8).

7.6.4 Ishikawa/ Fishbone diagram

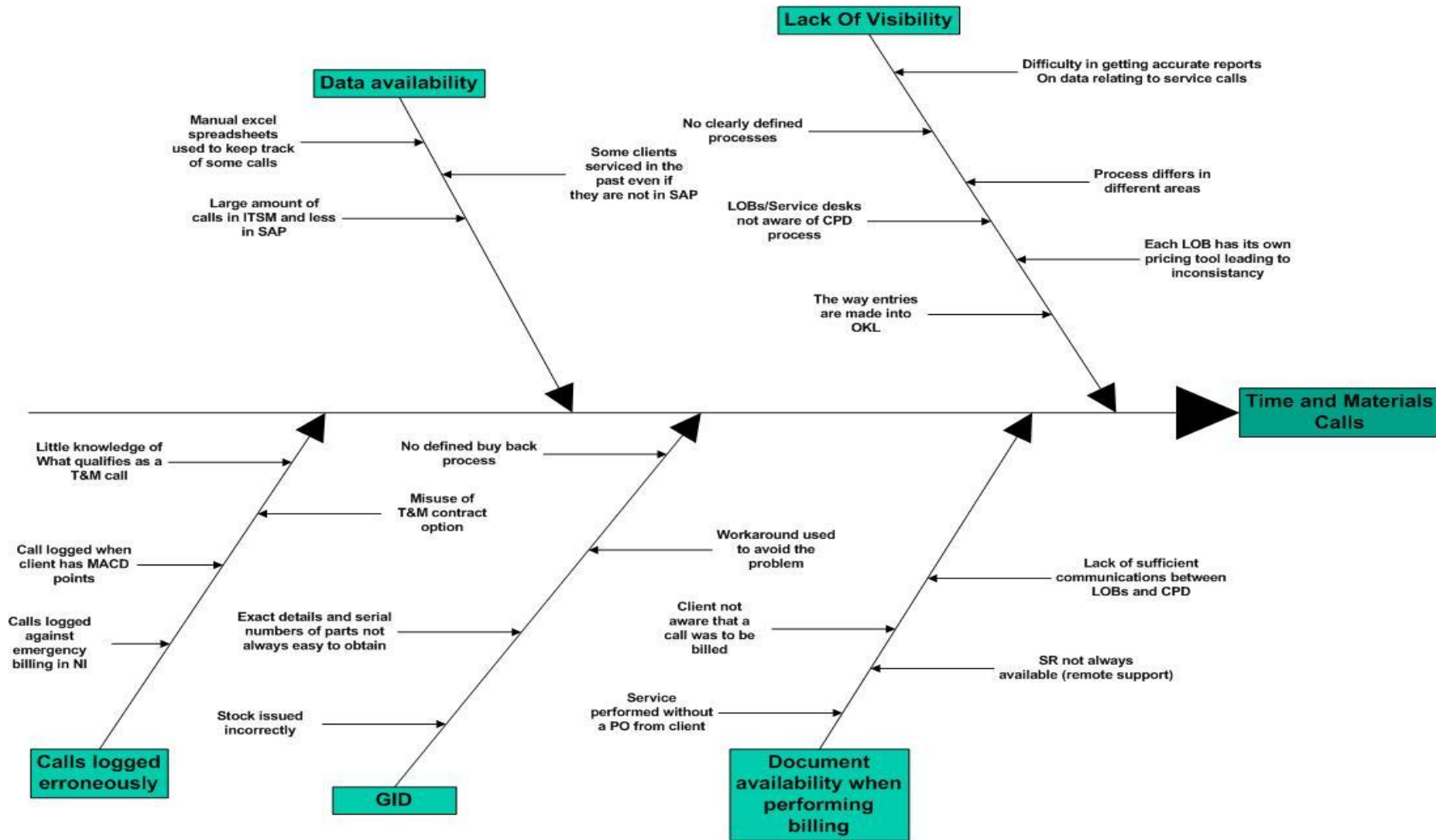


Figure 8: Ishikawa diagram displaying effects experienced and their causes

8 Conceptual solution design

The primary objective of a conceptual solution is to address all of the issues experienced during the current process. Often it is not sufficient to simply suggest a few small changes to the process. It may be required to find enablers to ensure that improvements are accurately managed. Similarly it will be required to demonstrate to the business stakeholders why the suggested changes should be made and what benefits can be expected from these changes.

After continued consultation with the senior management of the company it was determined that the most important output from this process is a satisfied client. The company prides itself on the service it provides to clients. It is important to the company that the client does not become alienated when requesting a minor service from the company.

However these services cannot be carried out without being billed for. Therefore another output of the process must be that the client is invoiced successfully. It is important for this process to ensure an adequate profit.

8.1 Parent diagram

According to the IDEF0 process mapping methodology a parent diagram is used to provide context for the process as a whole. It clearly displays the inputs, outputs, mechanisms and controls that are applicable to the process as a whole. For any process improvement initiative it is vital to maintain a view of the most important aspects of the process. It also provides a high level view of what needs to be achieved with the process and a basic idea of how this will be done.

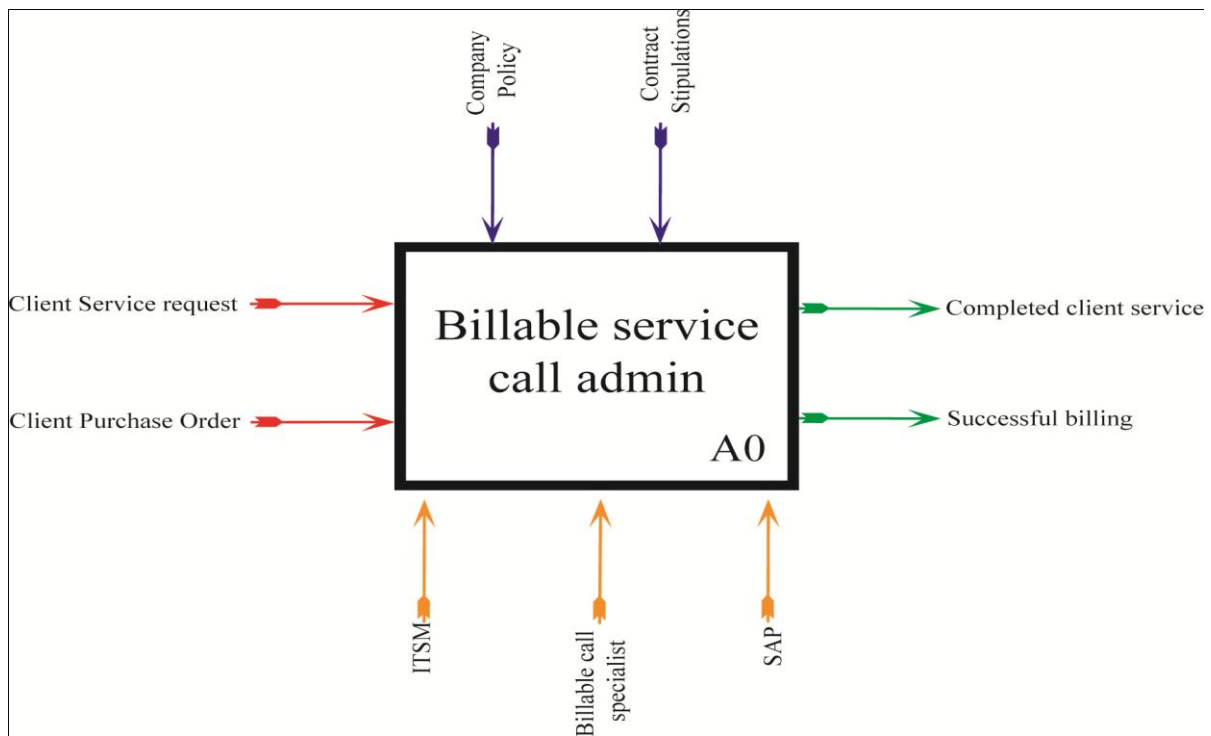


Figure 9: IDEF 0 Parent diagram of high level process

The diagram in figure 9 shows that it is vital to obtain a Purchase Order from the client to confirm the client’s authorisation to perform a service that will be billed separately from their contract. It also shows that the process must be controlled by strict company policy. The client contract must provide a very clear listing of which services will be included within the contract. The mechanism to facilitate this process will be the company’s ITSM system (Information Technology Service Management). This system works by recording the client’s service request followed by tracking the progress of the call. The system allows for the service level agreements to be included in the system; then escalations will take place automatically when requests surpass the applicable Service Level Agreement.

All the information gathered will then be entered into SAP, which is the central database and data management system used by the company.

An additional mechanism for the process is to employ a person in the company who specialises in the administration of the billable client service requests. This person will be responsible for ensuring that all of the required information is obtained from the client. He/she will then keep track of how the call is serviced and where each call is in the process. This person will need to follow up with other resources within the company, such as the

engineers, to obtain all the required documentation. Although billing must still be performed by the central finance department the specialist will remain responsible for accurate billing.

8.2 Development of new process

It is necessary to develop and clearly define a complete process that addresses all of the issues currently experienced. It is particularly important to ensure that all of the documentation required for the successful completion of the process is readily available when needed.

A series of workshops was held with the business stakeholders to determine a specific list of process steps that must be carried out in order to address the issues experienced with the current process. This list of steps and their explanations is shown below, followed by a diagram of these steps as they fit in the process.

Step 1: Perform first line to determine if call is billable

At this point the service call will be logged in the ITSM system as per the standard service process. It is necessary to classify calls more specific than has been done until now. Currently they are only listed as Time & Materials. Further classification will make it easier to determine whether a call is billable and will also make it easier to explain to the customer why they are being invoiced. This action is known as the first line engagement. Using this classification will also enable creating statistics of how many of each type of T&M calls are being logged.

Step 2: Check if MACD points are available

If the client has previously bought MACD points these points may be deducted as payment. If no points are available (or the client opts to not use them), it will be necessary to bill for the service call once it has been completed.

MACD points can be likened to a pre-paid service. Clients have the option of buying these points on obtaining their initial contract with the company. They can then use these points as payment when they require any services that do not fall within their service contract. MACD stands for Moves-Adds-Changes-Deletes

Step 3: Inform client that call will be billable

At this point it is important to inform the client whether the call falls outside of the scope of the contract that the client has with the company. For the purpose of this process check we assume that it does. The client then needs to accept that the call is billable and acknowledge understanding of this. This will ensure that the client is not surprised by the final bill.

Step 4: Attach client response to call in ITSM system

It is necessary to keep proof of the client's response including the name of the person who gave this response. If it was in an email this email must be attached to the call in ITSM. If the response was telephonic the date and time of the call must be written in the comments section of the call. If the call can be recorded the sound file can be attached to the service call file.

Step 5: Create provisional quote for client

A provisional quote will give the client an idea of the cost of the service. Over time quoting will be made a lot easier by using statistics from the classification of calls in step 1 along with what the final bills were for each type of call. Such a history will assist in the creation of a pricing tool.

Step 6: Request PO from client

Service should not continue without a written Purchase Order. Such a PO should also be attached to the call in ITSM. If no PO has been received from the client within two weeks the call will be closed as no service is deemed necessary. If the client does provide a PO later than that a new call is to be logged.

Step 7: Log sub call to assign an engineer

Logging a sub call enables the admin to keep track of the call through increased visibility. The same visibility increases the accountability of the person who performs the required service. Once an assignee has accepted the call in ITSM a record of this is kept. As a result it is determinable how long it takes to assign an engineer and how long it takes to service the different types of calls.

Step 8: Request is serviced

At this point the call is serviced as the client requested. Once the work has been completed the client needs to provide a signed service report.

To acquire a valid signature if the provided support was done from remote the client must sign a document, scan it and send it to the engineer by email before sending the original document to the company. The signed report must be attached to the call. If the call is serviced at the client's premises the engineer must ensure that the report is signed, scanned and attached to the ITSM call. The location of the hard copy must be recorded as well.

Step 9: Engineer closes sub call by attaching paperwork

Once the engineer closes the call it will be returned to the administrator. Only the 'child call' will be closed and work can continue on the parent call. The engineer will not be able to close the call if not all the required documents are attached.

Step 10: Confirm hours of work and travel

The amount of hours recorded within ITSM will not always be accurate as the tool records the time from the point when the call was accepted until the call is closed. Although it is important to record this it cannot be used for billing purposes. Therefore the administrator must check the difference between the recorded time and the engineer's time. The administrator must also confirm the accuracy of the engineer's hours and check whether the attached documents are accurate. A follow-up with the engineer might be required.

If anything is missing or inaccurate it should be picked up at this point and rectified immediately.

Step 11: Prepare final quote

Now the final quotation needs to be made. All the necessary information is attached to the service call.

Step 12: Log sub call to billing team

A sub call is made for the billing team, for the same reasons as mentioned at step 7. The billing team will then have to accept the call.

Step 13: Services billing process

- i. Call assigned to The billing team Services Queue
- ii. Check if all documents are attached
 - It is necessary that all of the documents previously mentioned are attached to the call. If any documents are not attached as required the route of activity 3 and 4 needs to be followed. If all the documents are attached as required the activities from block 5 need to be followed.
- iii. Call is reassigned to the service desk with reasons for reassignment.
 - The call needs to be returned to the admin so that that person can collect the required documents and attach them to the service call as required.
- iv. Once all the required information is corrected and added to the call the call can be returned to the billing team so that the billing process can continue as required.
- v. Debtor's clerk signs off the documents with the Client Account Number
- vi. Load order into SAP system and invoice out to client account provided by debtors clerk
- vii. The billing team services will update the call with SAP Invoice Number

This billing process is identical to what was suggested by the manager of the billing department. It might be required to further investigate this process to determine if it can be improved or whether sufficient similarities exist with other processes that have already been published on the company's central process repository.

Step 14: Close service call

Once the billing process has been completed and the Proof of Payment has been attached to the service call, the call can be closed.

The service call is now completed and the obligations to the client are over. What remains is to gather statistics for further improvements to the system in the near future.

8.3 Diagram of suggested new process

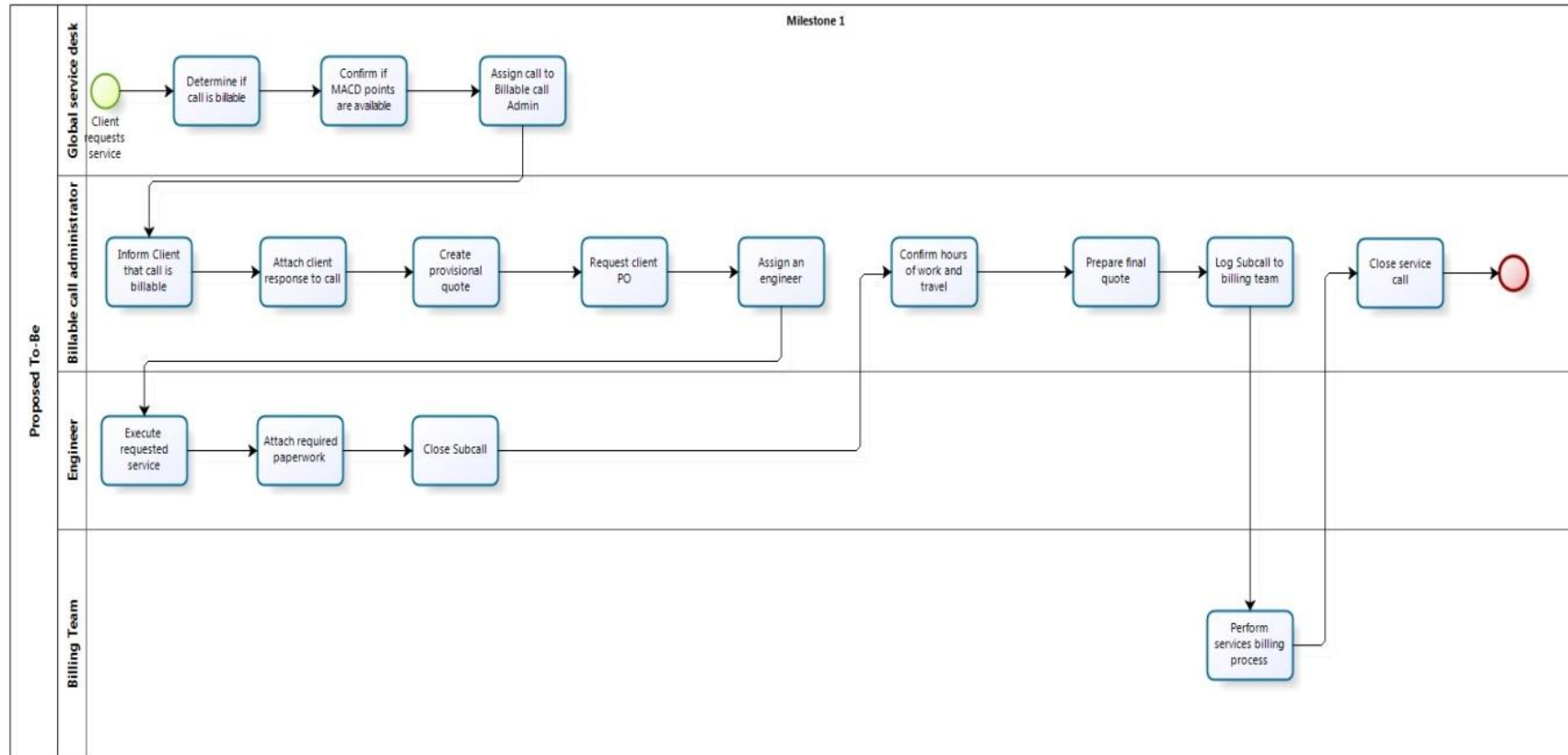







Figure 10: The suggested new process steps in the form of a diagram

8.4 Testing of suggested new process

In order to test the validity of the suggested new process a simulation model has been used. This simulation model was created using a software package called Simul8. Simul8 is one of the world leaders in the development of business process simulation tools.

In Simul8 the different components of the simulation model are represented by the following pictures (for consistency with general process simulation terminology the term “work items” is used. In this simulation this refers to the billable service calls):

Table 2: Description of Simul8 icons

Icon	Description
	Work entry point: This is the point where all work items initiate based on the inter-arrival times specified. The number shown represents the amount of work items that has entered the system at this point
	Queue: This holds work items until a work centre is available. The number shown represents the amount of work items in the queue at that particular point in time.
	Work centre: This is the physical process point where work is performed on the work item. The number shown represents the amount of work items currently in progress in the work centre
	Resource: This represents the number of physical resources such as people available to do work. The number shows the amount of resources currently available
	Work exit point: This is the point where a work item leaves the process. The number shown represents the amount of work items that exited the system at that particular exit point

The complete simulation model of the process looks as follows:

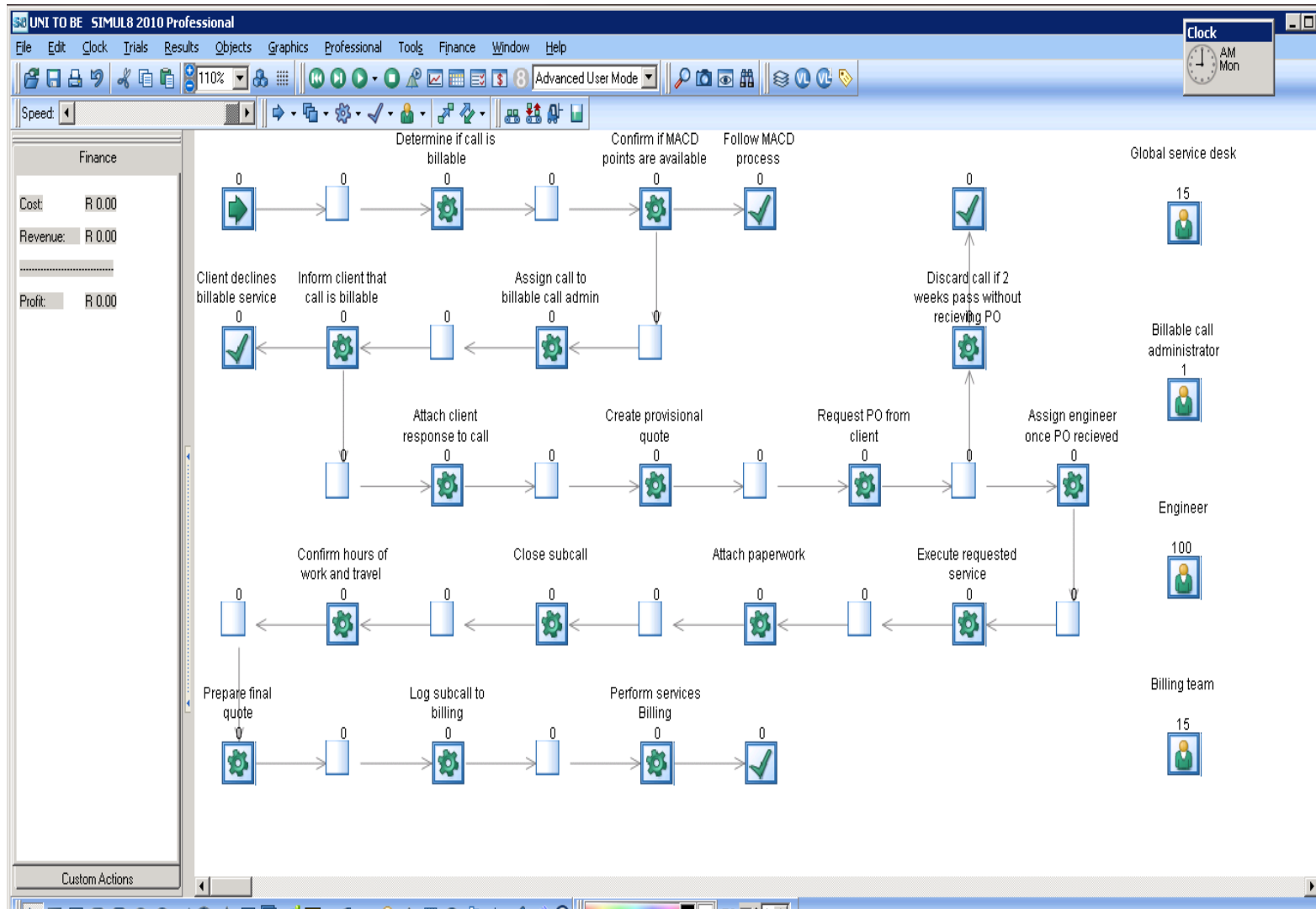


Figure 11: Screenshot of simulation model

The following tables represent the properties of the different components in the simulation model

Table 3: Properties of simulation model

Time unit used	Minutes
Duration of 1 day	480 Minutes (8 Hours)
Days per week	5
Results collection period	124800 Minutes (1 Year)

Table 4: Properties of Order entry point

Distribution used	Simple average
Inter arrival time	9.7 Minutes

Table 5: Properties of work centres

	Resource utilised	Measurement used	Time
Determine if call is billable	Global Service Desk (GSD)	Average time	3 Minutes
Confirm if MACD points are available	GSD	Average time	1 Min
Assign call to billable call admin	GSD	Average time	1 Min
Inform client that call is billable	Billable call admin	Average time	10 Min
Attach client response to call	Billable call admin	Average time	1 Min
Create provisional quote	Billable call admin	Average time	20 Min
Request client Purchase Order	Billable call admin	Average time	2 Min
Assign an engineer once PO is received	Billable call admin	Average time	15 Min

Execute requested service	Engineer	Triangular distribution	Lower: 10 Min Mode: 235 Min Upper: 480 Min
Attach paperwork	Engineer	Rounded Uniform distribution	Lower: 10 Min Upper: 60 Min
Close sub call	Engineer	Fixed time	2 Min
Confirm hours of work and travel	Billable call admin	Rounded Uniform distribution	Lower: 10 Min Upper: 15 Min
Prepare final quote	Billable call admin	Average time	20 Min
Log sub call to billing	Billable call admin	Rounded Uniform Distribution	Lower: 2 Min Upper: 20 Min
Perform services billing	Billing team	Average time	60 Min

The times given in Table 5 were calculated by taking the average time to complete the activity. This average is calculated by taking the amount of time spent working on the billable client service calls divided by the amount of calls completed in that amount of time. For example: the Global Service Desk was able to confirm whether twenty calls were billable or not in a one hour period.

Due to the vastly different nature of the service calls the amount of time taken by an engineer to execute the service requested can vary with the complexity of the service required. For this reason a triangular distribution with a lower and upper limit and a mode was used. For the attachment of paperwork, confirmation of the amount of hours worked and the logging of a sub call to billing the times also varied greatly based on the complexity of a call. Therefore a rounded uniform distribution with a lower and upper limit was used.

The work centre labelled “Discard call if 2 weeks pass without receiving PO” does not have a time or resource assigned to it. The purpose of this work centre is to collect any calls that have spent more than two weeks in the await PO queue and remove them from the system.

Each work item is assigned a label using a normal distribution with an average of 1680 minutes and a standard deviation of 2000 minutes. To obtain these figures studies were conducted by the service administrators in each of the LoBs. This label was then used as a minimum wait time when the work items reached the “await PO” queue.

At the “execute requested service” work centre each call is given a cost. This cost is assigned with an average of R1422.06 as per the average cost per service call incurred by the company.

Table 6: Properties of resources

Resource name	Initial number available	Usage Cost (Including system licenses used)
Global service desk	15	R1.47 per minute (R184000 per year)
Billable call Administrator	To be determined	R2.95 per minute (R368000 per year)
Engineer	100	Included in cost of call
Billing team	15	R1.79 per minute(R224000 per year)

The optimal number of billable call administrators must be determined using the simulation model.

For the final work exit point each work item is given revenue with an average of R3019.78. This amount was calculated by looking at the average revenue across only the billable service calls that did have actual revenue recorded. The percentages of calls initially logged as billable but which are then either classified as MACD still have the cost of the work done by service desk agents or the billable call administrator.

The simulation was run with a number of different scenarios where the amount of billable call administrators was gradually increased in order to find the optimal number of administrators. The following table shows the basic results of these scenarios.

Table 7: Results of differing number of Billable call administrators

Number of admins	Utilisation	Successfully billed calls	Profit
1	100%	1997	R 3 106 803.69
2	100%	3990	R 6 286 268.82
3	100%	5986	R 9 452 767.19
4	99%	7949	R 12 560 865.49
5	90%	9044	R 14 310 367.32
6	75%	9054	R 14 327 883.03
7	65%	9055	R 14 332 988.11
8	57%	9055	R 14 331 851.52

From the results in Table 7 it is recommended that 7 Billable call administrators should be hired. Figure 12 shows the simulation as run with 7 Administrators

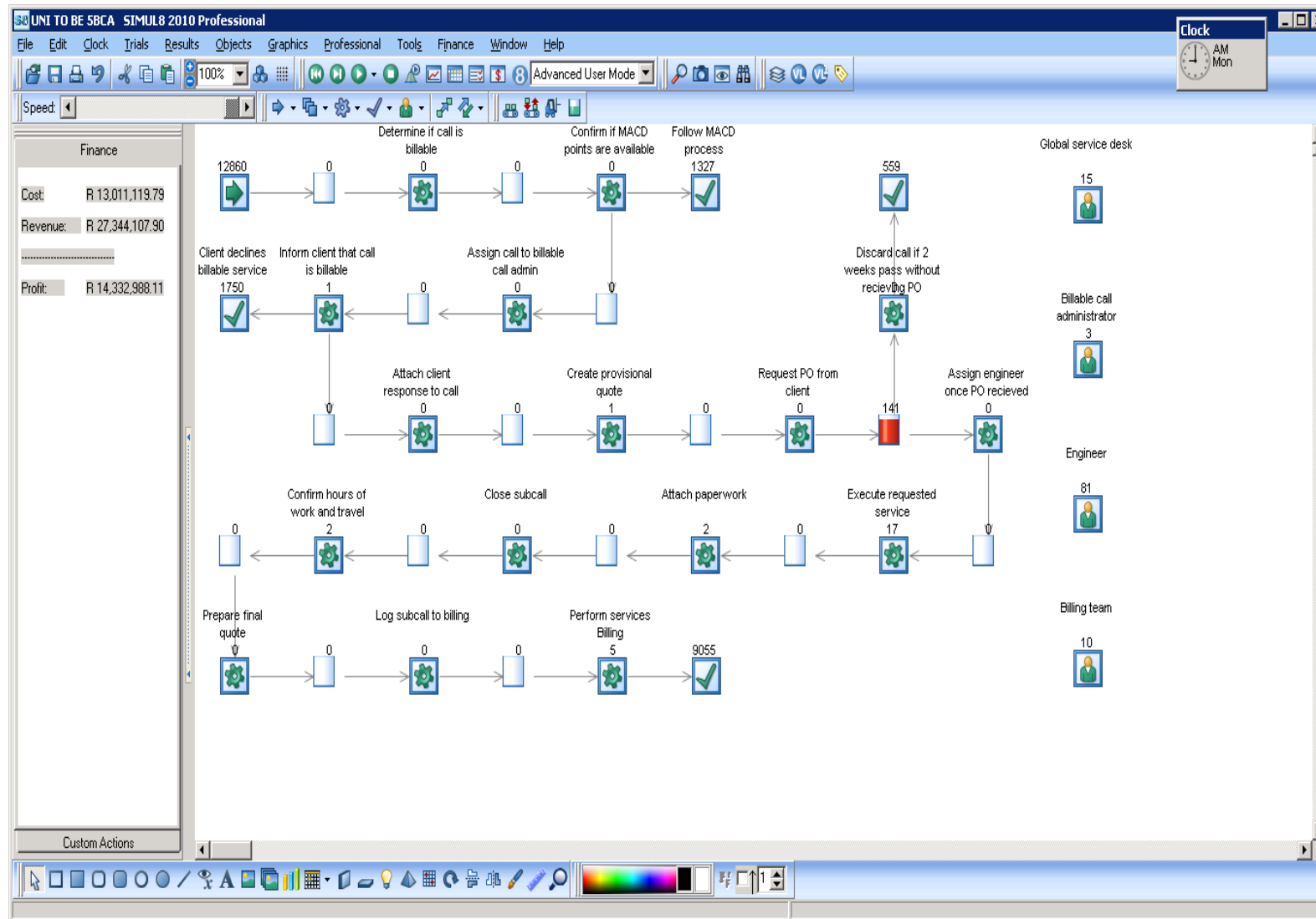


Figure 12: Screenshot of completed simulation using 7 billable call administrators

9 Recommendations

As noted within this project the various discussions on the best way to tackle the process of accurate and successful billing for all service calls have generated the insight that changes to the current procedures are inevitable.

The first of these changes is to employ a specialist whose primary job role will be to manage the administration of billable service calls. This person will also serve as the owner of the business process and will report directly to the Head of Service Management. By employing such a specialist it is ensured that all service calls are taken care of by a specialist in the exact requirements of the business and the process. According to the simulation model the optimal number of such specialists to employ will be seven.

The other required change is that the process suggested in figure 10 is followed. It is especially important to place focus on informing the client that the service request will be billable, as well as collecting all of the documentation required by the billing team.

10 Conclusion

Implementing the recommended changes in the business proceedings will reasonably ensure that a much smaller amount of billable service requests remains unbilled. This will clearly show an improvement on the company's financial bottom line. The potential year on year increase in profit is displayed in table 2 below:

Table 4: Forecasted increase in expected company profits from ensuring that all service requests listed as billable are adequately billed.

Change / Improvement	Profit increase	Percentage increase	New profit margin
Break even on all calls currently listed as having made a loss	R 9 710 950.71	906%	58.97%
Make a 5% profit on all calls currently making a loss	R 10 196 498.25	952%	61.63%

Additionally, if the service requests are logged in the system more accurately it will result in less calls being incorrectly logged as billable. By reducing the number of incorrectly logged calls the cost of those calls will no longer be recorded as an outright loss, thus also improving the company's financial results. These improvements clearly justify the appointment of a dedicated resource to carry out the administration of the billable service requests.

These benefits will not be realised by only employing a full time administrator. It will also be required to ensure that all the other parties involved in the process are aware of both the process itself as their role in it. The process will only work properly if it is continuously measured and managed.

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For additional information on the software used in this project please see:

www.bizagi.com

www.Simul8.com