ABOUT THE AUTHORS

Malcolm Fry is a recognized IT industry luminary with over 35 years experience in Information Technology in a number of industries, including retail, production, oil and pharmaceuticals, and consulting. This experience, coupled with his impressive technical background, gives Malcolm an unparalleled breadth of knowledge and experience. Malcolm is the author of four best-selling books on IT service and support, has had many other articles and papers published, and is regularly used as a source of information by technology journalists. He is also the solo performer in a highly successful best-selling video series made for the Help Desk Institute. He has Masters level ITIL certification.

Molly Bott has specialized in delivering global network and systems management solutions for more than 15 years. In recent years as a GE IT Solutions Enterprise Consultant and Six Sigma Green Belt, her emphasis has been placed on IT Service Management (ITIL standards coupled with proven best practices like Six Sigma). This allows her to take the next step in process improvement, using statistical tools to break down processes and drive to clear measurable outcomes.

ABOUT REMEDY SOLUTIONS

Remedy delivers Service Management software solutions that enable organizations to align internal and external service and support processes to business goals. More than 10,000 customers worldwide, from small and mid-sized businesses to global enterprises, have chosen Remedy's IT Service Management and Customer Service and Support software to automate their support processes, improve service levels, manage assets, and lower costs. As part of BMC Software, Remedy's highly flexible, best-practice applications enable enterprise-wide Business Service Management, and allow customers to easily adapt to unique and changing requirements. Learn more at www.remedy.com.

ABOUT BMC SOFTWARE

BMC Software, Inc. (NYSE:BMC) is a leading provider of enterprise management solutions that empower companies to manage their IT infrastructure from a business perspective. Delivering Business Service Management, BMC Software solutions span enterprise systems, applications, databases and service management. Founded in 1980, BMC Software has offices worldwide and fiscal 2004 revenues of more than $1.4 billion. For more information about BMC Software, visit www.bmc.com.

ABOUT GE

GE IT Solutions, Inc. is an industry leader in the planning, design, implementation, and management of complete IT infrastructure solutions for businesses throughout North America. Focused on IT Service Management consulting and optimization, as well as infrastructure solutions in the client, network, server, storage, and security environments, IT Solutions utilizes world-class best practices and Six Sigma methodology coupled with the ITIL framework to ensure reliability, cost effectiveness, and quality of each solution. The company's strong financial position ensures that they will continue to provide ongoing services year after year. IT Solutions is a GE business wholly owned by General Electric Company. Tel: 877-443-2487. www.geitsolutions.com

WHITE PAPER

Combining ITIL® and Six Sigma to Improve Information Technology Service Management at General Electric

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EXECUTIVE SUMMARY

There are two approaches that can be used to improve information technology service management (ITSM): the Information Technology Infrastructure Library (ITIL) and Six Sigma.

Many followers of these seemingly mutually exclusive approaches exhibit a nearly religious zeal in defending their way as being the only way to go. Rather than being opposing approaches, however, Six Sigma and ITIL are complementary.

ITIL defines a framework for IT Service Management. It consists of a set of guidelines that specify what an IT organization should do based on industry best practices. It does not, however, define how to do it. For example, ITIL specifies that IT should allocate a priority for each incident that comes into the service desk, but it does not specify how to allocate those priorities. With ITIL, it's up to the IT staff to flesh out the details of process flow and create detailed work instructions, all in a way that makes sense for their organization.

Six Sigma, on the other hand, defines a process improvement approach that is based on statistical measurement, drives quality improvement, and reduces operational costs. It helps in developing detailed work instructions, and it defines a methodology for continually mapping, measuring, and improving the quality process. Six Sigma tells how, but it doesn't tell what to do nor does it specify any best practices specifically for ITSM.

In summary, ITIL defines the "what" of service management and Six Sigma defines the "how" of quality improvement. Together, they make a great combination for improving the quality of IT service delivery and support. This paper presents a description of ITIL and Six Sigma, and discusses how they can be used together to improve IT service through best practices. The paper illustrates the power of the combination of ITIL and Six Sigma, with a real-world example of an ITSM improvement program implemented at General Electric. This program uses the Remedy® IT Service Management Suite for the Enterprise (Remedy ITSM), a product line of BMC Software, to automate service management.

CONCLUSIONS

Figure 6 shows the MGPP. Six Sigma is a continuous improvement program. In the first pass through the methodology, the team addressed the opportunities with the highest potential gain. After the first pass, the team planned to reapply the methodology to address the other opportunities that were identified in the analysis done in the first pass. The MGPP lays out the steps to be performed to continually improve ITSM using the five-phase process improvement methodology iteratively. The MGPP also may illustrate opportunities for translating the proven improvement to other areas of the business or other business units within the organization.

CONCLUSIONS

At first glance, ITIL and Six Sigma appear to be mutually exclusive. However, as this paper discusses and the GE ITSM improvement project validates, these two approaches are highly complementary and can be used in combination effectively to continually improve business processes. The benefits are compelling:

> Reduce costs by helping to minimize potential downtime and the adverse effects of system, network, and application failures and install, move, adds, change and decommission implementations.
> Enhance decision-making ability by facilitating access to information throughout the organization, and by enabling the enterprise wide use of outputs from an integrated framework of processes and tools through such devices as cross functional IT service dashboards.
> Improve IT service levels by creating operational efficiencies and enabling a linked IT Service Management process loop for defining, measuring, analyzing, improving, and controlling service performance.

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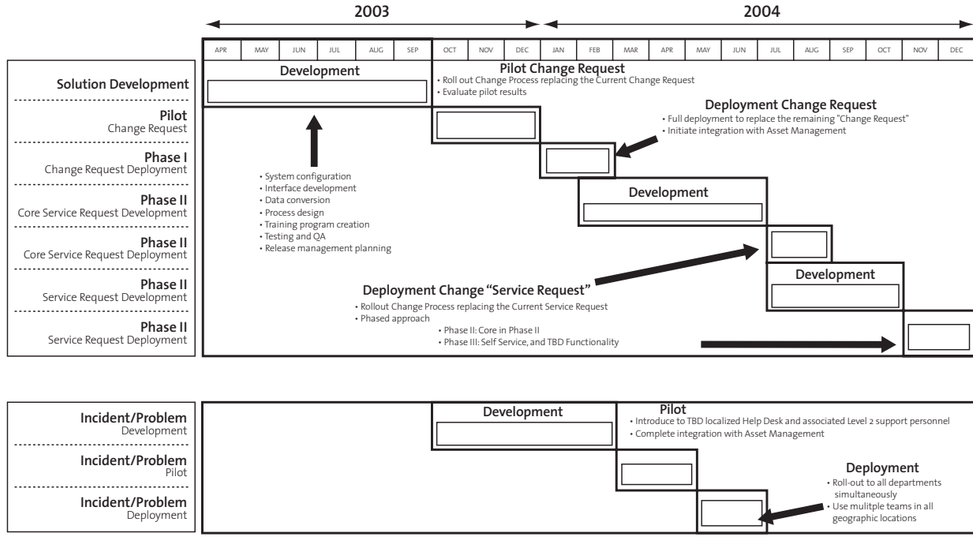

Figure 6. Multi-Generational Product Plan

PHASE 5 – CONTROL PERFORMANCE

The Control phase implements the piloted solution and ensures that the improvements to the process, once implemented, will be sustained to prevent the process from reverting to its prior state. In this phase, the team shares, throughout the organization, the lessons learned in the improvement project to help accelerate improvements in other areas.

The goal of the Control phase is to propose a plan for designing and implementing the ITSM process improvement solution. The desired result is a true life cycle ITSM solution that allows for continuous improvement.

The team produced five deliverables in the Control phase:

> Multi-Generational Product Plan (MGPP)
> Process metrics defined
> Full solution implemented
> Control/Response Plan implemented
> Risk mitigation actions complete

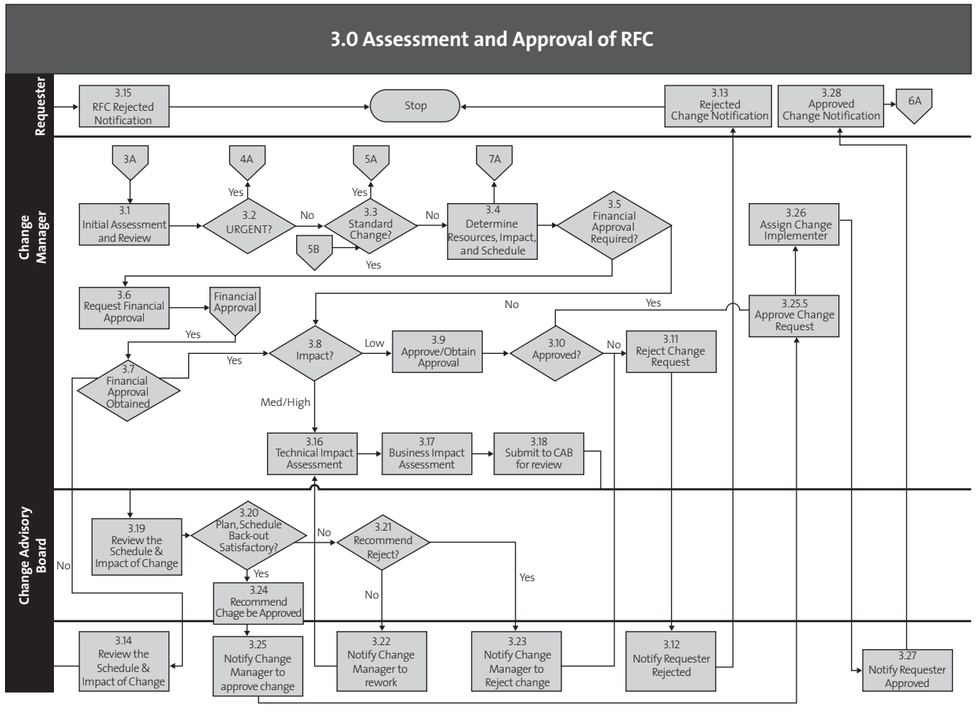

Figure 5. "To-Be" Process Map

ITIL

ITIL is a public domain set of best practice books that outline a comprehensive, consistent, and coherent process-based framework for IT Service Management. The U.K. government's Central Computer and Telecommunication Agency (CCTA) developed it in the late 1980s. The UK's Office of Government Commerce (OGC) now controls its content.

ITIL is a framework of best practices that can be used to assist organizations in developing their ITSM process-driven approaches. It is a guide for establishing common processes, roles, and activities, with appropriate reference to each other and how the communication lines should exist between them. It is not a methodology. Organizations can use ITIL either in whole or in part, depending on their preferences.

ITIL provides guidance on how to link existing processes and activities across IT departments in a structured context, and this linkage is key to quality service delivery. The models provided in ITIL show the goals, general activities, inputs, and outputs of the various processes that can be tailored to the organization's needs. The intent is to establish a common language across functional areas. ITIL complies with requirements for ISO9001 quality standards and is referenced by ISO9000 for IT standards.

ITIL LIBRARY

The ITIL library consists of seven sets of books:

1. Service Support. This set describes:
   > Configuration Management. Shows how assets interrelate.
   > Incident Management. Deals with getting services restored as quickly as possible.
   > Problem Management. Describes root cause analysis of problems.
   > Change Management. Shows how to implement changes that eliminate problems.
   > Release Management. Deals with releasing versions of hardware and software.
   > Service Desk Function. Explores how to manage call types and service requests.

2. Service Delivery. This set describes:
   > Service Level Management. Deals with customers' needs.
   > Availability Management. Helps ensure high service availability.
   > Capacity Management. Describes maintaining performance at the levels that customers require.
   > Financial Management. Covers IT services costs.
   > IT Service Continuity Management. Describes minimizing service disruptions due to natural or man-made disasters.
   > Security Management. Explains how to organize and maintain the management of security of the IT Infrastructure from the IT manager's point of view.

3. Planning to Implement Service Management.
Explains the steps necessary to identify how an organization might expect to benefit from ITIL and how to set about reaping those benefits. It helps organizations identify their strengths and weaknesses, enabling them to develop the former and overcome the latter.

4. ICT (Information and Communications Technology)-Infrastructure Management.
Covers Network Service Management, Operations Management, Management of Local Processors, Computer Installations and Acceptance, and Systems Management.

5. Applications Management.
Deals with software life cycle support, testing of IT services and business change with emphasis placed on clear requirements, definition, and implementation of solutions to meet business user needs.

6. The Business Perspective.
Helps business managers understand IT service provision. Issues covered include Business Relationship Management, partnerships and outsourcing, and continuous improvement and exploitation of ICT for business advantage.

7. Security Management.
Helps the IT Security Officer provide the level of security necessary for the provision of the total service to the organization. The guide focuses on the process of implementing security requirements identified in the IT Service Level Agreement, rather than considering business issues of security policy.

Six Sigma

Six Sigma was created by Motorola and is based on the work of quality guru W. Edwards Deming. Professor Deming observed that 85 percent of the reasons for failure to meet customer expectations are related to deficiencies in systems and process. The Six Sigma process uses data and rigorous statistical analysis to identify defects in a process or product, reduce variability, and achieve as close to zero defects as possible.

Six Sigma is a process improvement methodology that focuses an organization on customer requirements, process alignment, analytical rigor, and timely execution. It is a highly disciplined methodology and practice that provides the tools required to achieve consistent, high-performance results from products and processes. By increasing performance and decreasing variation, Six Sigma allows organizations to make customer-focused, data-driven decisions that ultimately yield a reduction in product defects, increased profits and employee morale, and high-quality products. Six Sigma, according to www.isixsigma.com, "simply means a measure of quality that strives for near perfection." (www.iSixSigma.com)

Six Sigma methodology includes a proven tool set for driving and achieving transformational change within an organization. The tool set provides a variety of templates for measuring, collecting, and summarizing data, as well as for creating process maps. The methodology and tools can be used for mapping, measuring, improving, and managing processes.

Using a universal measurement scale, Six Sigma defines and estimates the opportunities for error and calculates defects in the same way every time, thus offering a means for measuring improvement. The Six Sigma methodology incorporates this data and statistical analysis into a project-based workflow that allows businesses to make intelligent decisions about where and how to incorporate improvements.

At the heart of Six Sigma is a five-phase process improvement methodology—called DMAIC—for analyzing and improving business process. DMAIC is an acronym for the five phases of the model: Define opportunities, Measure performance, Analyze factors impacting performance, Improve performance, and Control performance.

PHASE 4 - IMPROVE PERFORMANCE

The Improve phase confirms that the solution proposed in Phase 3 will meet or exceed the quality improvement goals of the project. In this phase, the team tests the solution on a small scale in a real business environment to help ensure that the causes of variation have been fixed and the solution will work when fully implemented.

The goal of the Improve phase is to define and refine recommended tactical solutions based on information determined in phases 1-3. The desired result is a documented recommendation based on strategic fit, cost, and benefits.

The team produced four deliverables in the Improve phase:
> Risk Assessment/Failure Modes and Effect Analysis (FMEA)/Contingency Plan.
> Prioritized potential solutions
> Solution Pilot
> "To Be" process maps

Figure 4 shows the FMEA chart. The analysis shows the effect of improvements made when the full solution was implemented.

This is the graphical output that is automatically generated once the risk assessment is complete, at least in draft form. Risk Priority Number (RPN) is the product of the numerical severity, occurrence and detection ratings that are assigned to each risk. The highest Risk Priority Number is representing the greatest risk. In the event that time or resource limitations prevent the team from addressing all risks that have been identified, the RPN can be used to prioritize mitigation activities and resources. In some cases, only risks over a certain RPN threshold may be addressed.

Figure 5 shows the "To Be" process map that illustrates the process as it is to be when the improvements have been implemented.

This new process is designed to address the top risks identified in the risk assessment. It includes the solution selected for implementation, and is verified in the solution pilot.

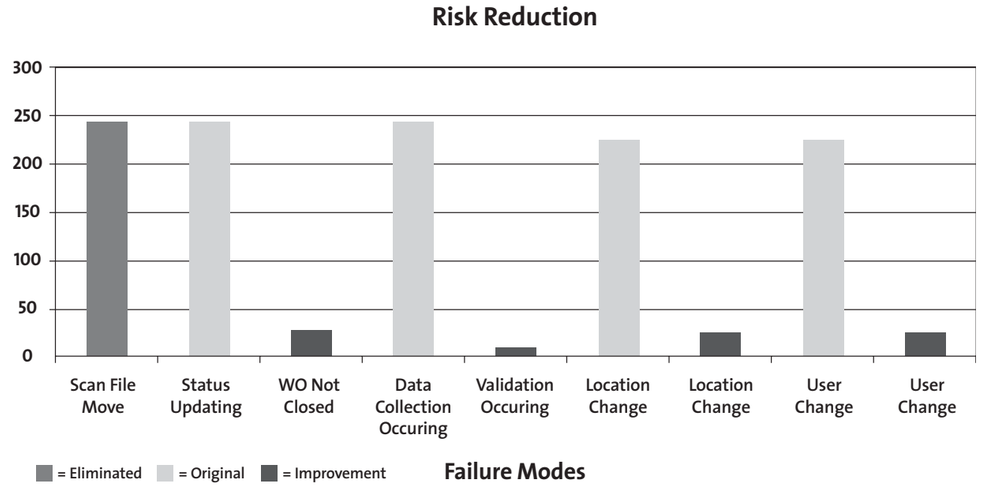

Figure 4. FEMA Chart

PHASE 3 - ANALYZE FACTORS IMPACTING PERFORMANCE

The Analyze phase examines the data collected in the Measure phase to generate a prioritized list of the sources of variation. The Analyze phase focuses improvement efforts by separating the "vital few" variables (those most likely responsible for the variation) from the "trivial many" (those least likely responsible for variation).

The team produced four deliverables in the Analyze phase:
> Opportunities Table: Solutions mapped to process gap
> Critical Success Factors (CTQs) benchmarked against ITIL best practices to identify opportunities for improvement
> Cause and Effect Diagram
> Pareto Chart of Opportunities

Figure 3 shows a portion of the Opportunities table that the team generated. The chart shows how current processes compare to ITIL and enables the team to identify the processes with the greatest opportunities for improvement (the "low-hanging fruit"), so the team can prioritize their improvement actions. This particular example shows a sample of a high-level root cause analysis produced in this phase. The chart is used in creating proposed problem solutions. As the project progresses, root causes and the associated solution options are described in greater detail.

Impact	Process Gap Type	People, Process, or Tool	Gap Description	Business Impact	Underlying Root Cause	Control, Influence, Out of Control	High Level CTQs	Potential Solutions/ Initiatives
SRC01 -High Level Root Cause: Inefficient Approval Process								
MED	ITIL Gap	Process/ People	Initial service request vetting "feasibility" authorization is a manual process performed outside the tool.	Potential for non-compliancy with the process to ensure that proper authorization and approval is granted prior to SR implementation and approval. No audit trail of initial authorization.	Lack of process definition and adherence due to being a manual process and not tracked with a tool.	In our control	Improve Operational Efficiency	Re-define and validate process, and implement the process within the new tool following ITIL RFC guidelines.
MED	Inefficiency	Tool	Lack of automation around approvals at the business and financial level with Capital Acquisition Process.	Risk of not receiving the proper authorization in a timely fashion or not at all. This could impact SLAs.	Tool is only currently designed to track IT approval.	In our sphere of influence	Improve Operational Efficiency	Ensure that the tool will support approval automation beyond IT approvals to business and financial.

Figure 3. Opportunities Table

Combining Six Sigma and ITIL

The IT Solutions Enterprise Planning & Strategy consulting group at GE was enlisted to help improve IT service management practices internally at GE. The group has developed a methodology for process improvement that combines Six Sigma and ITIL.

The goal of the methodology is to transition from the current state to an ITIL-compatible state. Six Sigma provides the engine to help achieve this goal. The approach is to analyze risk, compare current processes to the goal state, and then determine the solution, using a business case to migrate current processes toward usable, measurable, ITIL-compatible processes. The group is using the Remedy ITSM Suite to automate and improve ITSM processes.

The methodology is based on the DMAIC model and has five phases that map directly into the five DMAIC phases. The group applied the methodology to the ITSM process improvement project.

PROJECT OBJECTIVES

The team first set the objectives of the project. Following is a description of each of the objectives, including an indication of how ITIL and Six Sigma are used as enablers in achieving each objective:

Objective 1: Achieve ISO compliance
The team set out to achieve ISO compliance. ISO references ITIL for IT standards, and therefore ITIL defines ISO compliance for ITSM.

ISO requires that processes have documented work instructions, an essential ingredient to augment the best practices defined by ITIL. As noted earlier, an ITIL process may indicate to allocate a priority at a particular point, but it does not indicate how to allocate the priority. The work instructions would indicate how to allocate priority at that point. To achieve objective 2, then, requires not only compliance with ITIL processes, but also documented work instructions for those processes.

Objective 2: Leverage ITIL best practices
Because ISO references ITIL for IT standards, the team selected ITIL to define best practices for ITSM.

Objective 3: Determine the current state of IT service
The objective is to determine the current state of IT service by base-lining current process maturity and capability, and comparing them to ITIL. This would give the team not only an indication of where the greatest problems are, but also a baseline to use in determining performance against those problems.

To achieve this objective, the team used two tools: the Capability Maturity Model (CMM) to determine whether the current processes are maturing in the right direction, and the Capability Assessment Tool (CAT), an interview/ questionnaire-based process used to determine the level of maturity and capabilities of current processes.

Objective 4: Continually improve IT service management processes
This objective is based on Six Sigma and Deming's Total Quality Management (TQM) approach. Meeting it requires continual improvement of the processes that make up IT Service Management. The team used ITIL standards as a yardstick to measure improvement of IT service management processes.

Objective 5: Establish ongoing measurements to ensure improvement/control
In addressing this objective, the team used Six Sigma to help define the metrics to be established, ensuring that the metrics are process-centered, practical, and useable.

IMPLEMENTING THE METHODOLOGY

The team then executed DMAIC, the five-phase process improvement methodology of Six Sigma, to meet the objectives set for the ITSM improvement project.
> Phase 1: Define opportunities
> Phase 2: Measure performance
> Phase 3: Analyze factors impacting performance
> Phase 4: Improve performance
> Phase 5: Control performance

PHASE 1

PHASE 1 - DEFINE OPPORTUNITIES

The Define phase sets the expectations of the improvement project and directs the focus of Six Sigma strategy to the customers' requirements. It identifies the product and/or process to be improved and ensures that resources are in place for the improvement project.

The goal is to align ITSM strategy with the business, organizational, and technological strategies. The desired result is to set a definitive vision, scope, and strategic approach for ITSM operations.

The team produced six deliverables in the Define phase:

> Team charter that describes the purpose, goals, and resources for the project.
> Data collection plan that includes such items as interview schedules and questions.
> Critical to Quality (CTQ) outline that identifies the critical success factors.
> Current situation analysis that was created using the CAT tool.
> Customers/Output—Process—Input/Suppliers (COPIS) "as-is" process map outline that provides an understanding of the current processes to which the solution has to be aligned.

Figure 1 shows the COPIS outline produced by the team.

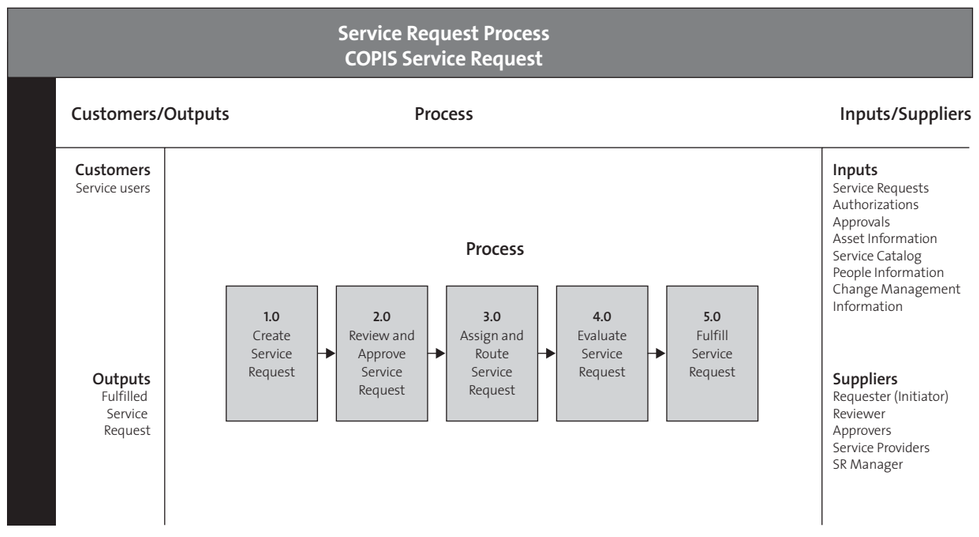

Figure 1. COPIS Outline

PHASE 2

PHASE 2 - MEASURE PERFORMANCE

The Measure phase assesses the current condition of the process before attempting to identify improvements. It defines the defect(s), gathers baseline information about the process, validates the measurement system(s), and establishes more specific improvement goals. Because the Measure phase is based on data, it eliminates assumptions about how well a process is currently working.

The goal of the Measure Phase is to create a current-state assessment of how well the current environment supports the ITSM strategy. The desired result is to determine current processes, issues, and the critical success factors—or Critical To Quality factors (CTQs)—of the desired future state environment.

The team produced three deliverables in the Measure phase:

> An accurate assessment of current process performance.
> Detailed "as-is" process maps derived from the COPIS outline created in Phase 1
> Critical Success Factors (CTQ) summary chart

Figure 2 shows the detailed "as-is" current service request process map produced by the team. The map provides a detailed look at the Review and Approve Services Request process, which is a component of the overall Service Request Process shown in Figure 1, and shows functional roles and responsibilities. (Typically, most of the opportunities for improvement lie in the handoffs among functions.) The map is accompanied by work instructions that indicate how the processes are performed.

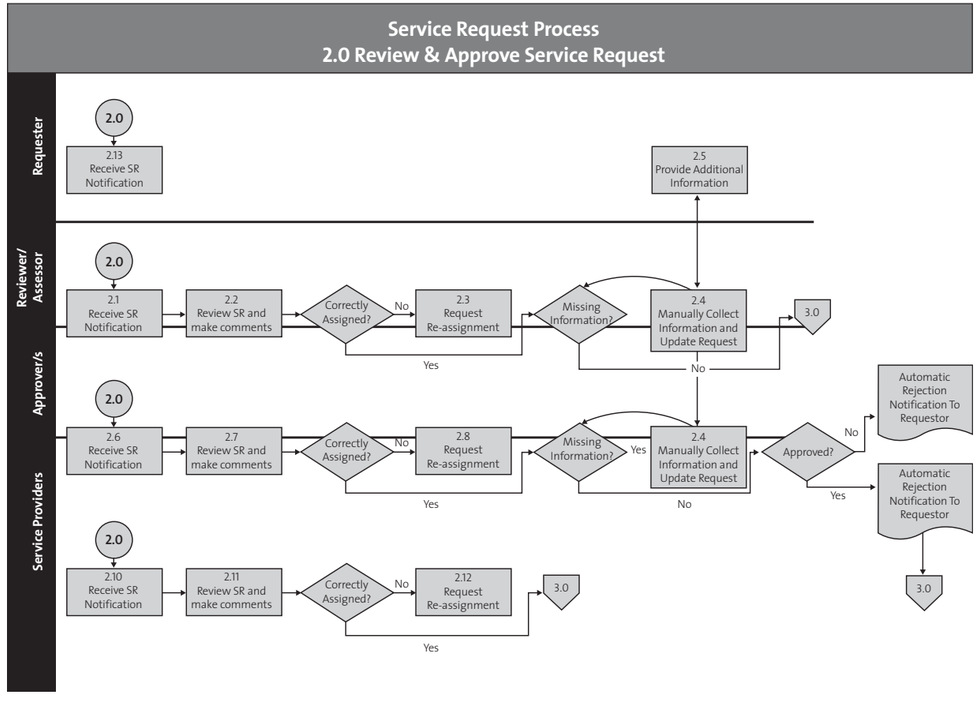

Figure 2. Example Detailed "As-Is" Process Map