



IT SERVICE OPTIMIZATION SERVICE INVENTORY

By Ron Potter

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Summary

This white paper explains the easy-to-use process known as IT Service Optimization (ITSO), aimed at optimizing the planning and delivery of IT services. TeamQuest explains how this process can help you consistently meet IT service levels while minimizing infrastructure costs.

THE TEAMQUEST ITSO SOLUTION

TeamQuest ITSO processes can be classified into four core areas:

- **Event Monitoring**
- **Performance Management**
- **Capacity Planning**
- **Performance Reporting**

EVENT MONITORING

Event monitoring allows IT to react to performance problems before the damage is extensive. At a more advanced level, event monitoring identifies adverse trends in performance and notifies IT before service levels are impacted, allowing IT to be more proactive.

Solutions such as TeamQuest Alert allow IT organizations to manage multiple systems via events and rules-of-thumb.

PERFORMANCE MANAGEMENT

Reactive and proactive performance analysis are the two principal activities behind performance management.

TeamQuest IT Service Analyzer allows IT organizations to detect bottlenecks, investigate causes and uncover trends.

CAPACITY PLANNING

The key to an efficient, smooth-running data center is capacity planning. Without it, IT organizations cannot accurately predict performance, allowing services to be provisioned with just the right hardware configuration to accommodate forecasted changes or spikes in business workloads.

TeamQuest Model provides the analytic and simulation modeling capabilities to ensure accurate predictions while TeamQuest IT Service Analyzer can help with trending.

PERFORMANCE REPORTING

Tracking performance against service levels is one important aspect for measuring the effectiveness of an IT organization. It is important to provide timely reports with the appropriate level of detail to various levels in the organization. Financial reports can demonstrate IT's contribution to organization goals and IT resources consumed by various departments.

TeamQuest IT Service Reporter provides in-depth web-based reporting to help IT leaders make effective decisions regarding goals and resources.

INTRODUCTION

Over the past several years, businesses have been rapidly deploying new applications and IT organizations have been busy building the infrastructure to support them. Many of the new applications take advantage of the Internet or leverage new technologies, such as customer self service, to reduce business expenses. Many companies have been building and installing as many as 3 to 5 servers a week, doing so in most cases with no changes in staffing levels. In order to accomplish this Herculean task, there has been little time for IT organizations to accurately size applications or business units to accurately describe business goals and supporting requirement goals. As a result, IT support infrastructure has been oversized and put in place quickly in order to meet business-driven timeframes. Businesses have prospered as a result of the quick actions of IT and the application teams; however cost points may be higher than desired long term.

After this period of rapid business expansion, IT organizations are starting to feel the pains of the growth. Business units are starting to realize that the initial, rushed application designs are not completely satisfying their needs and/or business needs have evolved, requiring significant change.

Infrastructure management is becoming increasingly more difficult. Data center space is rapidly dwindling, power and cooling systems are pushed to their limits, and remote disaster recovery site costs are skyrocketing.

Escalating costs and declining service quality are starting to impact business operations and margins. The time has come to pause for a moment, survey the IT services, determine the gaps, and find better ways to manage the infrastructure.

IT Service Optimization (ITSO) is focused on optimizing the planning and delivery of IT services. It is not as all-encompassing as other best practice disciplines such as ITIL, so there is less impact on the organization as a whole to implement.

ITSO IS

PREVENTIVE

ELIMINATES PROBLEMS BEFORE THEY IMPACT BUSINESS PROCESSES.

PROACTIVE

ANALYZES APPLICATIONS AND SERVICES TO DETERMINE PROBLEMS AND BOTTLENECKS WELL IN ADVANCE OF ANY NEGATIVE BUSINESS IMPACT.

REACTIVE

FOR CASES WHERE PROACTIVE PROCESSES FAIL TO PREVENT A PROBLEM, QUICKLY REACTS TO UNFORESEEN CIRCUMSTANCES.

CONTINUOUS

CALLS FOR REGULAR REVIEWS TO ENSURE SERVICES AND PROCESSES STILL PROVIDE EXPECTED BUSINESS VALUE. MODIFY OR SUNSET THOSE THAT DO NOT.

COST EFFECTIVE

OPTIMIZES USE OF IT INFRASTRUCTURE RESOURCES, PERMITTING YOU TO GET MORE OUT OF YOUR EXISTING IT ASSETS.

Where ITIL is focused on provisioning services, ITSO is more about optimizing existing IT infrastructure usage.

ITSO observes many of the same common sense best practices as ITIL. ITSO's goal is to consistently meet IT service levels while minimizing infrastructure costs and mitigating risks. This increased efficiency makes it easier to manage IT resources, adapt to business changes, and align with business objectives.

As with any worthwhile endeavor, implementing ITSO best practices takes a certain amount of time and effort. The amount depends upon the detail level the organization chooses to implement. Most of the work comes at the beginning to assess the environment and put the best practices into place and operational. Much research and analysis is needed to understand the IT infrastructure along with the relationships and dependencies of its components.

Workflows need to be defined, documented and communicated. Process training needs to be performed across all affected IT and business units. Service level agreements, either formal or informal, need to be defined and agreed upon. Reporting and service quality reviews need to be put in place. Even after all this work and effort, a sampling of IT organizations implementing ITSO best practices has revealed substantial return on their investment.

This paper discusses the strategies and detailed steps to successfully implement ITSO best practices.

THE BASIC ITSO APPROACH

The basic ITSO approach takes an IT-centric focus on service delivery. Pieces of similar IT work and support are identified into a unit called a service. This work is a stand-alone piece that can be sourced internally as easily as externally. The service is measurable and has meaningful metrics. Business units and/or staff using the service can be identified and costs associated with the service equitably applied across the user base.

EXAMPLES OF IT-ORIENTED SERVICES:

EMAIL

ONLINE TRANSACTION SYSTEMS

DATABASE SYSTEMS

ONLINE DATA STORAGE

VOICE TELECOMMUNICATIONS

PRINTING

DESKTOP SUPPORT

IT is responsible for determining the best balance of cost and performance that satisfies the business needs and establishing or maintaining (if already in place) initial infrastructure to source the services. Processes are put in place for adding or adjusting capacity positions when needed. Reporting processes are put in place to measure the success of the services.

Tools are acquired or put in place to automate performance data collection and reporting. Performance management processes review application and

service performance and use continuous improvement methodologies to fine tune infrastructure usage. Predictive modeling is used to validate the business plan from inception to production implementation. Capacity planning efforts accommodate long term business plans through effective resource planning and leverage consolidation opportunities such as developing shared services (multiple applications on a single server) environments to source services.

Capacity Planning also is accountable for the IT infrastructure budget. Availability management teams analyze service outages for chronic issues and when found, commission corrective actions. The team also looks for disconnects between availability requirements and disaster recovery timeframes in order to ensure service recovery plans meet business needs.

The goal of the basic ITSO implementation is to optimize the IT infrastructure so the best performance can be derived from the IT assets at the lowest cost. Remember that this is an IT-centric view so decisions are made more from balance or technology and costs rather than a business point of view.

TAKING THE BASIC APPROACH A STEP FURTHER

One may choose to take the basic ITSO approach a step further and take a business-centric point of view. Doing so will require considerably more time and effort but we have seen results that show the work was well worth the effort. Much of the extra time spent is in building relationships with the other departments in the organization and the work that they perform in support of the organization as a whole. This approach requires one to look over shoulders, see the business processes in action, inventory the applications and infrastructure components (transactions/processes/jobs, servers, bandwidths, timelines) supporting them, and provide the business service options – permitting them to weigh costs against potential productivity, revenue, and profit gains.

EXAMPLES OF BUSINESS-CENTRIC SERVICES:

EMAIL

ORDER ENTRY

ORDER PROCESSING

GENERAL LEDGER

ACCOUNT MANAGEMENT

SALES

CUSTOMER SERVICE

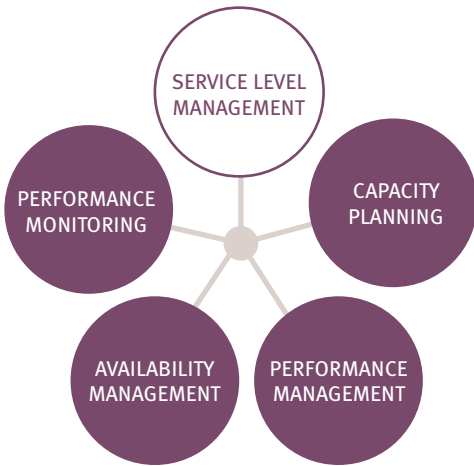
The more extensive dialogues with business permit a better understanding of the various business processes. Service delivery metrics are more business-oriented than with the basic approach. Chargeback is more business oriented with billing in business units such as orders processed, claims paid, loans originated, and customer calls answered. Business units are given choices in levels of service – commonly identified as bronze, silver, gold, and platinum levels. In doing so, the business determines the appropriate services based upon productivity, profitability or customer satisfaction criteria rather than IT defending a service based upon technology requirements.

As a result, the IT budget becomes the business purchasing a series of IT services rather than “The IT Budget.” By changing technology decisions into business decisions, this process fosters a true IT – Business partnership.



THE UNDERLYING DISCIPLINES

Service Level management



This is probably the most important set of processes in ITSO. Without Service Level Management (SLM) processes, there will be no clear goals for service delivery to attain, so no success factors can be established, measured and reported against. The major workflow elements within SLM are:

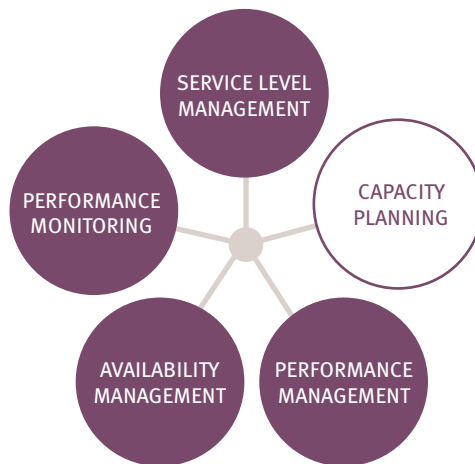
- **Service Catalog development and maintenance. The Service Catalog defines each service provided by the IT organization, defining the deliverables, limits of service, how much services cost, and how service delivery performance is measured. The bulk of this work is accomplished during initial implementation. Normally new services are added or old services retired on an infrequent basis. There should be an annual process to review services to ensure they continue to satisfy business needs and to adjust price points based upon market forces such as Cost of Living Adjustments (COLA), economies of scale, performance improvement activities and lower cost of new technologies.**
- **SLAs (Service Level Agreements) and OLAs (Operational Level Agreements) SLM development and maintenance. Guiding the way service levels are defined, this workflow ensures the levels of service required to support business processes are agreed upon. SLAs and OLAs can be formal**

or informal agreements and specify the details of the services to be provided. Without a Service Catalog, SLAs and OLAs, there can be no firm foundation on which to build the infrastructure services. Defining and maintaining service levels is an iterative process but the bulk of the work is in the initial definition, as balances must be struck between levels of service delivered and the business' ability to pay for them.

So where does SLM fit in the organizational structure? We have seen many different options that were successful. Some place it in the Capacity Planning organization, some in Applications, and some in Finance. Avoid placing it in operational areas. Business users tend to believe SLM rubber stamps whatever IT wants to serve up in the way of services; and the focus is more technological than business. Placing it in more strategic oriented areas lends to the perception that SLM is business oriented, thus more acceptable to non-IT departments.

From a staffing perspective, ideal candidates should have a breadth of experience in technology, applications and business. Generally, applications programming people – especially experienced systems analysts – make the best trainees if experienced SLM people are not available.

Capacity planning



Capacity Planning is responsible for ensuring that the appropriate IT infrastructure resources are in place to satisfy planned business events and needs. Using input from business

plans, technology directions, and Corporate Finance, to name a few, this discipline is responsible for building the annual infrastructure growth plan. In many organizations, capacity planning is accountable for managing the IT infrastructure hardware and software budget. Capacity Planning gets involved very early in the application life cycle to assist in determining the implementation and ongoing support costs of new applications or releases. Activities in this service area are proactive rather than reactive. The discipline is strategic as well as tactical

- **Strategic – looks at understanding future business and technology requirements, their impact and business growth on SLAs and infrastructure resources. View is annual and beyond.**
- **Tactical – looks at resources from an individual infrastructure component perspective, building and maintaining the infrastructure capacity plan.**

Capacity planners take business plans, translate them into infrastructure capacity requirements and then apply the growth estimates to the existing capacity positions. They use the data to determine when and what increment of capacity is needed to satisfy the business needs. This work can be done with simple tools such as spreadsheets, however there is risk in doing so because spreadsheets deal in straight-line trending.

In real life, computer systems exhibit exponential increases in service times as capacity limits are approached. In computer parlance it is known as “the knee of the curve.” Service times are quickly degraded, leaving little time to react. As a result, organizations must leave a capacity “buffer” in place to minimize the impact. In order to make more precise estimates and better utilize infrastructure capacity, it is necessary to use modeling (simulation) tools to better predict future infrastructure behavior.



Modeling tools use proven mathematical formulas to simulate the additional workloads and more accurately predict future usage. Beside traditional capacity planning uses, the tools can be used in a variety of ways to benefit the business. New applications or major application renovations can be prototyped using modeling tools to get a better idea of IT infrastructure resources needed to provide levels of service required by the business, permitting more informed decisions on whether to proceed with a costly project.

Modeling tools can also be leveraged in application testing. Most companies cannot afford large testing infrastructures to simulate actual production environments. Modeling tools permit testers to run off much smaller infrastructure and simulate production volumes with the tools, discovering poor performing applications before they are introduced into the production environment.

The capacity planning organization can fit in a number of different organizational structures. Because of the importance of the work to the business, many organizations have it reporting directly to the CIO or IT director. Some include it in the Finance organization. Limited success has been achieved when placing it within the operational teams as the resources generally are consumed by day-to-day issues and have no time to address long term solutions that would prevent them.

If building a new capacity planning group, it is advantageous to have a single organization to permit single focus and good communications.

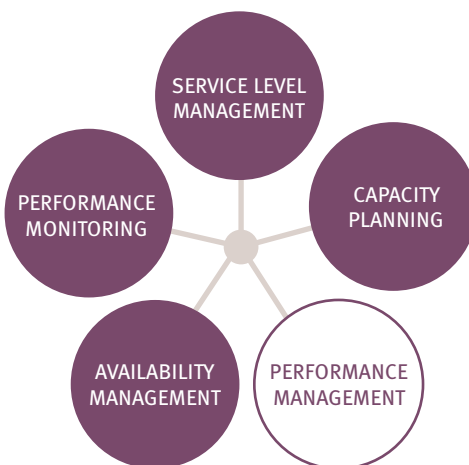
If portions of the capacity planning workflow currently exist, one may choose to implement a dotted line approach. Dotted line organizations can succeed but one must ensure all parties have the same goals and rewards, and that there are clear lines of communication between them. If not, we have seen events where one group adds capacity without informing others, causing severe problems in those areas.

One case in point, a network upgrade relieved a bottleneck, but resulted in

a substantial increase in transaction rates, overrunning web servers. With better communications, the web servers would have been upgraded at the same time and the application performance problems avoided.

As far as staffing, trained and experienced capacity planners are always the best choice, however they are difficult to find. Other companies recognize their contributions and usually compensate them in a variety of ways to incent retention. If experienced people are unavailable, generally system engineers are the best candidates. It will take time to convert them from very detailed work to a higher level, but they understand how systems operate and are better positioned to understand the reasonableness of the results. Some say mathematicians are best suited for these positions since capacity planning is based upon a series of mathematical formula. They do understand the inner workings of the capacity models, however without the operational experience of working with IT systems, they cannot accurately gauge the feasibility of the results.

Performance management



This is a tactical discipline with far-reaching consequences. Performance management looks at applications and the business processes they support from an enterprise perspective, understanding resource consumption patterns and cycles to ensure services can meet SLAs. Using the information, the PM team identifies performance improvement opportunities and commissions corrective actions. The performance management team finds application and infrastructure bottlenecks

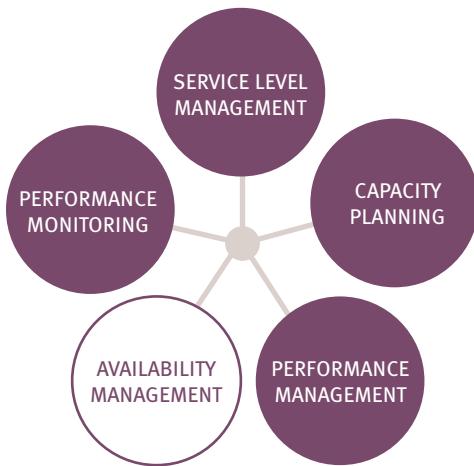
well in advance of any adverse affects and permits corrective actions to be completed before bottlenecks impact business processes. A successful team can delay expensive infrastructure upgrades for a substantial period of time, providing budgetary relief. For example, changing the way an application reads a large database can improve response times to the end user and reclaim capacity by using fewer resources to do the same work.

Performance management teams require real-time and historical performance data to identify poor performing applications and infrastructure bottlenecks. Simple data gathering techniques can be employed, however these rudimentary tools require substantial time and effort on the part of the technician to perform the work. There are a number of tools available in the marketplace that provide automation and reporting, reducing the time a technician spends gathering the data and analyzing it. In most cases the productivity gains and capacity position reductions far outweigh the cost of these tools.

The most successful performance management teams are co-located with capacity planning in the organizational structure. Doing so permits leveraging unique expertise between the teams. For example a database performance expert can not only do performance analyses on database systems, he/she can also assist capacity planners in understanding long term growth implications for servers on which database systems operate.

Good performance management people almost always come from IT engineering roles, both applications and operating systems. These should be your best and brightest because of the financial gains and performance improvement opportunities they can bring to the organization as a whole. Leveraging them across the organization when difficult problems occur can alleviate management concerns that the diagnosis skills will be lost to the operational areas from which they came. Using these people in a performance management role usually results in the elimination of the day-to-day operational problems that require that type of expertise in the first place. Eliminating the problems permits them to focus on more productive work.

Availability management



This service reviews business requirements for availability of business systems, catalogues them and ensures the proper contingency plans are in place and tested on a regular basis to ensure business services are restored as quickly as needed in the event of an IT infrastructure component failure.

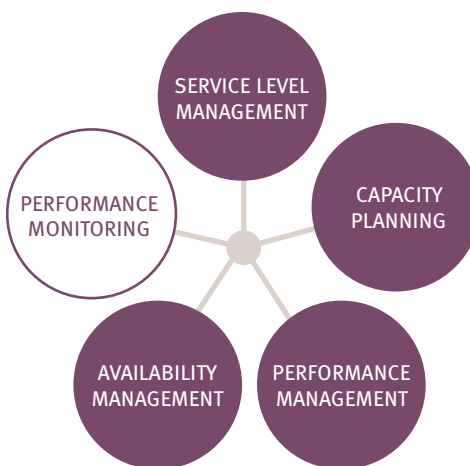
This service ensures that mission critical applications are provisioned in infrastructure configurations that ensure services are available to the customer during the required timeframes and that less critical applications are provisioned on less costly infrastructure that satisfy the lower requirements.

For example, Internet connections supporting online customer ordering systems with one hour recovery requirements may be provisioned with several levels of redundancy to ensure systems are available so customers can purchase products and services, whereas a less critical non-customer facing application used by few users in a small office with a 5-day recovery period may be provisioned with a single communications connection.

In most organizations this discipline is not a standalone team, rather the activities are performed by someone within the capacity planning, performance management, problem management or operations command center team.

This work requires report generation and data analysis skills. A person with operational experience is better suited to the job as they are better able to determine chronic behavior of applications and infrastructure components.

Performance monitoring



One aspect of this important discipline is to provide all the real-time and historical performance data that the other disciplines require to successfully accomplish their work. Real-time system performance data is collected, archived to data stores and analyzed against predefined thresholds. When a threshold is reached or trend identified, the appropriate alert is sent to the monitoring team for action. In this way actions can be taken before system users start reporting poor application performance and business impacts lessened because of more rapid response and mitigation. In medium to large organizations, tooling and automation is necessary to manage the large number of infrastructure components. Working closely with the other disciplines, the monitoring team determines the appropriate thresholds and configures the monitoring tools appropriately.

From our experience, this discipline almost always reports to the enterprise command center or computer operations console operations team. Close integration with network and computer operators is required to obtain the quickest reaction to a problem or potential problem.

This discipline is best staffed by someone with considerable computer or network operations skills.

Before You Start

When building any important structure, it is important that it be built upon a firm foundation. Implementing ITSO best

practices is no different. To prevent rework during the implementation process, the following items should be verified or completed. Doing so will ensure that people, processes and tools are put in place quickly to reduce implementation costs and start reaping the benefits sooner.

Before implementing ITSO, there are a number of pre-work activities that must be completed to ensure a firm foundation upon which to build the ITSO best practices.

- **Determine which approach of ITSO you wish to implement – basic (IT view), business (business view). The basic approach requires minimal business involvement and makes most of the decisions based upon business volumetrics. The Business approach requires substantial business involvement, provides choices to the business units, and transfers the accountability for use of IT services to the business units.**
- **Obtain senior management commitment from both IT and the business. Without it, you cannot obtain all the information you need nor drive the needed changes. They need to be committed to staying the course for a specified period of time – minimum of one year depending upon size of the organization – to permit the processes to settle in and the benefits to be realized.**
- **Ensure the underlying disciplines are in place and operational. These are the people and processes that will perform the work necessary to implement and sustain ITSO.**
- **Ensure infrastructure components are instrumented and that performance and utilization data is being collected and archived. If tooling is not in place, it will be necessary to obtain or build collection and archiving tools and put them in place. Modeling tools that simulate future growth based upon current utilizations are a plus. At a minimum, one month's historical data should be available for review and analysis. This data will provide the baseline that drives discussions with the service users.**

- **Determine whether a complete or staged implementation will be employed. Staged implementations can usually be accomplished without a formal project. Larger scale endeavors usually require a dedicated project team and an experienced project manager to guide the initial implementation. This person will guide the effort, ensuring that processes are documented and that work tracks to project timelines. In addition, this individual will perform the post-mortem to measure the extent of ITSO success.**

Once these items are completed and/or in place, sufficient information should be available to proceed with the project. The next step is to determine the business view of IT services and determine any gaps. We recommend a pilot phase in the implementation process, taking a single application or business process through the ITSO processes. In this way, any shortcomings or unforeseen gaps can be addressed and ITSO processes changed without impacting a large number of works in progress.

STEP 1 - UNDERSTANDING BUSINESS OBJECTIVES



Process Inputs –
Initial implementation – None, Ongoing maintenance – existing application and service, new requests

Process Outputs –
Application and Service inventories, business-stated requirements and estimated priorities which are input to Steps 2 and 3.

Work performed by –
Service Management team in concert with the Capacity Planning team

Assess current capabilities and quality of services

Perform intelligence gathering tasks before initiating conversations with business unit leaders. Since getting a business leader’s time is difficult, it is necessary to assess the current environment before discussion so you can direct attention to those areas for which you have questions or where service needs are not readily determined. Having a good idea of the services provided and the customer’s perception of the service quality will go a long way to fuel a productive conversation with the business unit leader.

The following is a list of data points to consider. It should not be construed as a complete list, but more as a guide to help you determine all the data points needed to support your particular organization and IT infrastructure. The best method seen to compile this information into format for future use is to employ a series of spreadsheets. The data can easily be manipulated in later implementation steps to permit ease of classification and prioritization of specific services and business unit needs.

- **Inventory of applications, infrastructure services (i.e. email, VOIP) and the infrastructure components upon which they run. This information will be needed when defining services in ITSO Step 3.**
- **Inventory the discreet business units and/or business processes utilizing IT services and identify the leaders. These will be the people with whom you start a dialogue to determine business needs and affordability.**

- **Inventory any service level agreements, formal and informal, in place and review recent service status reports. These agreements will form the basis of initial conversations with business unit leaders.**
- **Obtain detailed copy of the infrastructure budget. Costs of service are an important factor in determining the level of service a particular business unit receives. Those costs cannot be determined without this information. This information will be used by all the follow-on ITSO steps.**
- **If chargeback systems are employed, obtain reports for each business unit/process for the last several months. This data will be used to determine usage patterns and cyclic peak or valleys in usage.**
- **Obtain copies of any IT/Business planning documents, both tactical and strategic. Future infrastructure component capacity positions cannot be accurately determined without this information.**
- **Review service problem reports for at least the past six months. Determine if there are chronic performance or availability problems with existing applications. Determine if problems are the result of new implementations, user perceptions, application functionality, end user training issues or particular time periods. Obtain sufficient data to determine if negative impacts to the business exist or if perception problems by the end users are more likely. If possible, determine if senior management perceptions of services delivered are different from the ones using the service. This information will be used to determine gaps in ITSO Steps 2, 4, and 5.**

- **Obtain copies of audit reports (internal, external and regulatory) from the prior year. Determine if any shortcomings, risks uncovered are related to poor service delivery or lack of needed services. This information will be used to determine gaps in ITSO Steps 2, 4, and 5.**

After gathering and reviewing the data, the implementation team should determine which business units should be addressed first. Generally, those business units most impacting the organization's success should be addressed first. However, if there is a particular business process or application where substantial performance improvement opportunities are known to exist, that area or areas could be given priority. The goal with the initial undertaking is to demonstrate the value of ITSO, making it easier for senior management to stay the course on this long term project.

At this point, work on ITSO Step 3 -- initial definition of the Service Catalog -- can begin.

Engage individual business units to understand expectations and priorities

Keep in mind that the ITSO process is a journey with the business. Sometimes having an immediate answer is not the right way to proceed. An immediate solution may be perceived as an "IT Solution" rather than the desired "Our Solution." Sometimes it is necessary to evolve with the business units to arrive at a common point of understanding and meaningful metrics by which to measure service performance. Doing so builds good, lasting working relationships and ensures the evolutionary solution is "Our Solution." The value of this process is that IT understands business complexity and business understands IT complexity. Working together they design IT services that perform well, best satisfy business unit needs and at a price the business can afford.

This first step requires a lot of listening skills to be successful. It is necessary to clearly understand the business pieces of work accomplished by IT, how they fit into business processes as a whole and how they contribute to the business' success.

Establish a Dialogue

Using the prioritized list, start a dialogue with business units. We stress dialogue rather than interview as a dialogue tends to build stronger relationships and transform "my" or "theirs" to "ours." The goal here is to understand their processes, where they fit in the overall business scheme of things, and how they measure their success. Depending upon the results of the previous research, you may not need to go into every aspect in detail. Some of the aspects you should consider discussing are:

- **Understand the major processes within the business unit, how they interact, and how they contribute to the business' success. Some will be self-evident such as sales.**
- **Understand the transaction components of each process.**
- **Are there any cyclic events such as Christmas rush, quarter-end, inventory, etc.?**
- **Determine who shares applications, to what extent, and when. Determine their overall satisfaction with the current services.**
- **Determine which processes are administrative, supervisory, or day-to-day production work and determine how growth affects each.**
- **Is there latent demand?**
- **Determine satisfaction of services and where they are dissatisfied, determine the barriers to improvement – e.g., dollars, resistant to change, slow application improvement progress, etc.**
- **Are there contradictions between business unit requirements – especially between availability requirements and recovery requirements – e.g., needs 7x24 application availability yet only needs 5 business days recovery capabilities?**
- **Identify the metrics by which they measure success. These are valuable as you may be able to express IT results in similar terms.**

- **What are the long term goals of the organization? Where are they headed and do they see new applications or new functions within existing applications?**

During the discussions, it is important to avoid going too much into detail regarding current service problems. From experience, these discussions turn into "gripe" sessions rather than information gathering. Make business leaders understand this work is not a tactical solution but a longer term effort to put proactive processes in place that will resolve most, if not all, of the current problems and prevent most from recurring. From a service issue perspective, our goal here is to understand the basic issues so we may ensure our processes will detect them sufficiently in advance and corrective actions can be taken before they impact the business.

STEP 2 - PRIORITIZE SERVICES AND ASSESS RISK LEVELS



Process Inputs – Application and Service inventories, business-stated requirements and estimated priorities from Step 1.

Process Outputs –

List of prioritized applications and services which are input to Steps 3 and 4.

Work performed by –

Service Management Team in concert with the Capacity Planning team

Prioritizing IT services helps IT focus attention and resources where it is most needed in order to generate business value. This step will determine which services are aligned with critical business objectives and as so, receive more attention and more planning to minimize risks and ensure consistent delivery of those services. The result of this work will be used to update the service catalog in Step 3 and provision the services in Step 4.

Map the business processes or applications

It is necessary to take the information gathered in Step 1 and map the applications and their relationships to better understand the operating environment. The goal of this work is to build an inventory of applications and services, identifying their relationships and dependencies. Doing so permits us to visualize the work flows and better prioritize the work processes. This work also identifies which infrastructure components are used by a particular application and/or service.

One of the best ways we have seen to accomplish this task for large scale implementations is through the use of different colored cards, yarn, string, and tape, and arranging them on a white board, bulletin board or wall. There is a colored card for every application and the color signifies priority as expressed by the business unit. The colored yarn is used to show dependencies, prerequisites, and process/data flows. This method is extremely good at finding hidden requirements, service gaps and anomalies in application priorities. For example, an inventory system may have a much lower priority than a sales system but the inventory system must be up and operational for the sales system to take orders. Therefore the inventory system priority would be raised closer to that of sales.

Identify IT services

This task is dependent upon the completion of the initial service catalog definition in Step 3. This task maps services to the applications. They are recorded on the application cards. Applications may employ several services. If there are gaps, where applications or business requirements have no services, it is necessary to document them and forward them to the Service Catalog team for action.

Build profiles

This important step documents the profiles that will be used by all ITSO processes. The profiles contain basic information to assist in performance management, capacity planning and service definition processes.

- **Application profiles – contain basic information on the services used, the application priorities, prerequisites and co-requisites, inputs and outputs, servers on which they operate, business locations operating the application, network utilization profiles and business process information.**
- **Service profiles – contain information about the applications using the service, the SLAs in place, the infrastructure components upon which the service relies, business locations operating on the server, and the network footprint of the service.**
- **Infrastructure component (server, router, printer, etc.) profiles – contain information about the service and application operating on or through it, business user contact information, and configuration information to sufficient detail for capacity planning and performance management work.**

Examples of profiles can be obtained on the TeamQuest web site in the customer area.

Determine service gaps

This task is dependent upon the completion of the initial service catalog definition in Step 3 and the availability

of application and service profiles in the previous task. The goal here is to compare the requirements to the existing services rendered to determine where improvements and/or changes need to be made. Some of the items to review are:

- **Identify any over or under provisioned applications. These will be applications that received much better service than required or have service requirements more stringent than levels currently delivered.**
- **Identify any business cases that require services not yet rendered.**
- **Review past and current problem reports and identify any service-related issues that need to be addressed in order to meet service levels.**
- **Identify any service requirements that are outliers which are so different from the norm that they may be more equitably addressed through use of special services at an additional cost.**

The result of this work will be an exception list that will be addressed by the provisioning team in Step 4.

Set priorities

This task deals with the final prioritizing of applications and services, and working with management to obtain agreement, whether formal or informal. You start by sorting the application profiles into the three different priorities – high, regular, and low. Then within each category, you sort the services and applications by relative priority from high to low. Record each final priority on each profile. The profiles are now ready for processing in Step 4.

STEP 3 - ESTABLISH SERVICE LEVELS



Process Inputs – Application and Service Inventories and Profiles

Process Outputs - Service Catalog, Service Level Agreements (SLAs), Wish List

Work Performed By – Service Management Team

The service catalog contains definitions for every service provided for the business by the IT organization. Sometimes Service Level Agreements (SLAs) are also negotiated and agreed upon by both the IT organization and the business unit. Formal SLAs are not necessary but some set of standards or measures needs to be put in place so the extent of each service’s success can be measured and the value to the business quantified. Service levels should be achievable and not so detailed as to introduce unnecessary overhead and complexity to the management of the IT service. Ideally, service levels are expressed in business terms meaningful to clients.

Definition of a service

People find that defining the word “service” in an IT connotation is more difficult than it appears on the surface. The business has one perspective on what an IT service is comprised and IT has another. The business views a “service” as an IT application or set of applications required to support a business process. However there are other infrastructure applications that support business processes. Email is a good example.

A good service definition aids communication with business unit clients and ensures that expectations are in line with reality. The service’s success and value to the business must be able to be evaluated through the use of meaningful and measurable metrics. In many companies, a service is also a piece of IT work that can be uplifted intact and set to a third party for processing. Bottom line is that there are services, such as email or telephone support, that will be standard across most companies. Other applications and services will be defined in ways that the business understands and where results can be easily measured.

Initial build

This task runs concurrently with Step 1. The catalog will identify each service, describe the functions provided and the terms of service (e.g., hours of operation, customer support options), any service tiers, and the unit costs of the service. The service owner should be identified along with any pertinent support contact information and any required escalation time frames. Identify the support included with the service such as database definition and/or indexing, job scheduling or application tuning support.

The suggested items contained in a service catalog are:

- **Service Name – name of the service provided. Should be descriptive to the average person**
- **Service description – description of the service(s) provided. If tiers of**

service, they would be described here

- **Hours of operation – times services are available**
- **Service owner – who is the service owner and contact information**
- **Service cost and billing information**
- **Service responsibilities – what service owner and service providers are responsible for and duties they perform**
- **User responsibilities – what users and customers are responsible for and the duties they perform in support of the service**
- **Metrics – meaningful performance measurements used to ascertain the success of service**
- **Service Levels provided – what levels of service are committed**
- **Reporting frequency – how often are service levels and metrics reported**
- **Service reviews – frequency of service content and performance reviews and what is covered**
- **Change request process – how changes to service content and/or performance are requested, approved and implemented**
- **Customer and Technical Support information and options**
- **Service term commitments – minimum length of time user must maintain service**
- **Early termination costs. The costs required to recover the initial investments in provisioning the service(s)**
- **Termination assistance information. Information on the assistance provided to move or decommission the service(s). Usually information of final back-ups and terms of storage for archival purposes**

There will be an entry in the catalog for each service delivered. In the front of

the catalog should be an index plus information on how to engage the process to request changes or new services. The service catalog should be made easily accessible to everyone in the organization. It should be protected from change. Many organizations choose to publish in PDF format on the organization's Intranet. An example to a service catalogue entry is available on the TeamQuest web site in the customer area.

The SLA process

Once services have been defined and the details documented, it is necessary to define what levels of service will be provided for the individual services. The first step should be to determine if services are changing for current levels and if so, assess the impact to the IT infrastructure.

Predictive modeling can be valuable at this point as the new usage patterns can be simulated to run on current capacity positions to determine if they can be sustained. If they cannot, it will be necessary to determine requirements and work with Finance to develop Total Cost of Ownership analysis to determine incremental costs. The TCO goes back to the customer for approval. The process continues until the best balance of performance and cost that satisfies the business need is determined.

The steps in defining a Service Level Agreements (SLAs) are:

- **Identifying business requirements**
- **Perform gap analysis**
- **Sizing and costing**
- **Definition and negotiations**
- **Implement the SLA**
- **Measure SLA performance and report results**
- **Review and refine**

More extensive explanation of the service level management processes and sample SLAs can be obtained on the TeamQuest web site in the customer area.

A word about metrics

One of the questions we are most often asked is "What metrics should I use." There is no easy answer. In many cases the "right" metrics are very unique to the organization. Metrics need to be:

- **Attainable – the metric must be realistic and attainable on a consistent basis. Unrealistic metrics are counterproductive as they adversely impact productivity and morale.**
- **Meaningful – they must articulate the performance of the service in terms of business value. Response time can be a valid metric in an online Internet order service. Response time probably is not a valid metric for a back end billing system.**
- **Measureable – Business and service performance data must be easily attainable for analysis and reporting purposes. Without the hard facts, any measure of service performance is speculation.**

We have found that determining the right metrics is a journey. The metrics evolve from a "laundry list" of measures. Some really measure service performance. Others measure staff productivity. Some metrics are of limited value because they are arbitrary and easily manipulated. It takes time for management and business to determine the difference between productivity measures and service performance measures. Over time, the productivity measures are removed and metrics that better report service performance, usually in business terms, are defined. At the end of the evolution, you have a set of "Our" metrics, not a set of "Their" metrics.

Ongoing service catalog maintenance

Once the initial build has been completed, it is necessary to perform occasional work to keep the catalog current and ensure that services continue to satisfy business requirements. The work accomplished in the ongoing task is:

- **Annual review process to ensure existing services still satisfy business needs.**
- **Establishing new services. In the event a business unit or units require a technology function not currently performed by IT, it will be necessary to scope out, define, determine costs, and provision the new service. The same process to do so as the initial build is accomplished, only in most cases at a much smaller scale.**
- **Apply adjustments to services as business needs change. Business needs change in order to maintain or increase position against the competition. Services need to be flexible to permit reaction to these needs. The process should permit changes outside the annual reviews to accommodate such changes as an East Coast firm opening a West Coast facility, requiring extended online hours, and impacting nightly batch windows.**
- **Sunsetting outdated services. As technology solutions improve and change direction older services may become outdated and unsupported. The annual review process identifies candidate services and works with the business unit and IT departments or migrate any existing work to the new services and decommission the old services.**



STEP 4 - PLAN AND PROVISION SERVICES



Process Inputs – Service Catalog, Service Level Agreements (SLAs), Wish List, Prioritized Application and Service List

Process Outputs – Provisioning Plan, TCOs

Work performed by – Capacity Planning and IT Finance Teams

Applications must do more than simply fulfill functional requirements. They must also perform well and scale to meet future business requirements. Such requirements should be taken into account as early as possible during the product evaluation or development process. A variety of development techniques, tools and profilers can be used to tune applications during the development process, mitigating the risk that new applications will not perform well when production-level workloads are attained.

The provisioning process, introducing services and applications into the production environment, should include steps for determining the optimal configuration for systems that

will host the new applications and take data center architectural policies into account. When rolling out new applications, a load-testing tool to simulate transactions coming from end users or other systems can be used to benchmark applications on test systems to be certain they can support required service levels.

The TCO Process

The Total Cost of Ownership (TCO) analysis process has been used by financial analysts for some time. It is designed to analyze the impact of a project or purchase by identifying all cost components over a specified period of time. This permits business leaders to compare the costs to expected business productivity, profitability or customer satisfaction gains and make informed decisions on whether to proceed. All endeavors over a pre-determined cost should be analyzed. Generally a five-year review is performed as it better represents a cross-section of the lifespan of hardware, software and service acquisitions.

Examples of some of the elements of costs analyzed in a TCO are:

- **Hardware acquisition costs**
- **Ongoing hardware maintenance**
- **Hardware lease costs**
- **Software acquisition costs**
- **Ongoing software maintenance**
- **Software rental/lease costs**
- **Telecommunications costs**
- **Personnel support costs**
- **Employee related expenses such as telephone, office, pager, etc.**
- **Consulting services**
- **Environmental costs (power, cooling, floor space, UPS, cabling, etc.)**
- **Tapes and Supplies costs**

- **Printing costs**
- **Postage and mailing/shipping costs**
- **Training costs**
- **Disaster Recovery and Contingency Planning costs**
- **Non-cash expenses such as corporate overhead allocations and desktop support**

An example of a TCO spreadsheet is available on the TeamQuest web site in the customer area.

Provisioning existing services and applications

The process is fairly simple for existing applications. One merely needs to review performance statistics from the existing infrastructure components and compare it to the business requirements. Where differences appear, the change process is engaged. Where performance is substantially better than business requirements, the capacity optimization process should be engaged to determine if infrastructure capacity can be recovered and used to provision other services.

Changes to existing services and applications

The change process remains the same whether used in support of an initial ITSO implementation or as part of an ongoing process. Changes generally affect infrastructure capacity positions, therefore impacting costs of service. The change process should have the following steps:

- **Requirements definition and prioritization – determining the needs and priorities by passing through ITSO Steps 1 and 2.**
- **Costing – performing a TCO analysis to identify the implementation and ongoing support costs associated with the change.**
- **Simulate Results – use modeling tools to simulate results of the change to validate costing assumptions.**

- **Management approval** – agreement that the proposed change provides expected business value.
- **Implementation and provisioning** – adjustments to the Service catalog and the project work necessary to put the change in place.

Provisioning new services and applications

New services and applications require a process with more rigor to ensure a successful implementation. Generally less information is known about new initiatives so organizations must work with approximations that become more refined as work progresses. The Provisioning process for new services and applications should have the following steps:

- **Requirements definition** – determining the business requirements using the process identified in ITSO Step 1.
- **Prototyping the new services or application** - use modeling and/ or simulation tools to estimate IT infrastructure resources needed to provision the new service or application.
- **Costing** – performing a TCO analysis based upon simulation results to identify the implementation and ongoing support costs associated with the change.
- **Management approval** – an iterative process to determine the best balance between business requirements and incremental costs so as to maximize expected business value. This process also has several checkpoints as work progresses and more operational information becomes available. The checkpoints compare the then-current result to what was estimated so Go/No-Go decisions can be made regarding project continuation.
- **Service Catalog addition** – execute the Service Catalog process in ITSO Step 3 to add the new service or application to the service catalog, determine costs of the service and the levels of service provided.

Support details will also be documented.

- **Provisioning** – the project work necessary to implement the new service or application and put ongoing support processes in place.
- **Post Implementation Review** – ensure work performed satisfied the original request at the expected cost.

Capacity Optimization

Over the years, probably the more popular capacity planning methodology is to “just throw hardware at it.” Capacity planning tools and the staffing to use them was perceived as more expensive with results considered suspect. As a result, data centers continued to grow until decisions over data center expansion needed to be made. In parallel, many organizations adopted a policy where each business initiative had to stand on its own merits. This resulted in many “one application, one server” situations with the same data center capacity ramifications. As a result, capacity planning is now perceived as necessary to optimize current capacity positions to reduce costs and provision future growth and new initiatives with existing inventory.

An effective capacity optimization process will have the following steps:

- **Review current infrastructure component capacity positions**
- **Determine best candidates for shared services environments.** Examples are servers, telecommunications lines/bandwidth, storage devices, network appliances, Disaster Recovery solutions.
- **Identify chargeback requirements to equitably allocate costs of service across the participants in a shared environment.**
- **Identify candidates for consolidation** One should consider a wide range of items when determining candidates such as maintenance, support (people and systems), component age, software tiers, recovery and environmental costs.

- **Prioritize the opportunities.** Determine which require the least work to implement yet provide the greatest benefit to the business.
- **Simulate results.** Employ capacity modeling tools to simulate the new infrastructure to ensure services and application coexist peaceably and that resources are sufficient to provide expected levels of service
- **Commission consolidation work.** Obtain the necessary approvals to initiate a project and perform the work.
- **Post Implementation Review.** Ensure that the expected results and business benefits were attained. Where deficiencies in the processes are identified, commission work to correct them.

STEP 5 – MANAGE SERVICE PERFORMANCE



Process Inputs – Provisioning Plans, Service Catalog, Performance Reports, Performance data

Process Outputs – Management reporting, capacity plans, continuous service improvement initiatives, historical records

Work performed by - the identified teams

Performance management

The major work of the Performance Management team is the continuous performance improvement of applications, performance trend analysis and analysis of chronic application performance problems. The performance management team uses monitoring tools and historical performance data to identify performance improvement opportunities. Once identified, they commission the work needed to correct the deficiencies. The team also monitors the work's progress and determines ultimate affects of the corrective actions, both in infrastructure capacity and cost saving terms. An effective performance management process will find application and service bottlenecks prior to their impacting business processes, buying time to fix them before they become problematic.

From a testing perspective, time and cost considerations usually make it prohibitive to conduct performance-related tests on the actual hardware using production-level workloads. Full-sized machines and software are too costly to dedicate for testing purposes, and finding the optimal configuration through empirical testing can take a long time. Instead, smaller, but representative loads can be applied to a scaled-down set of test servers and software while performance analysis software takes a baseline reading of performance. Performance management specialists can then employ analytical modeling to rapidly predict how various configurations will perform under a scaled-up production-level workload, all without the need to purchase the actual configurations under consideration. Employing this technique, performance management can identify possible performance problems with new or modified applications before being introduced into the production environment, permitting corrective actions to take place before the business is adversely impacted.

Capacity planning

Once the initial ITSO implementation is completed and all services provisioned, Capacity Planning evolves into an ongoing support process. New requirements and substantial business process changes are driven through the first four ITSO steps, then managed on an ongoing basis by the Step 5 processes. Capacity Planning monitors infrastructure utilization progress and ensures that any corrective actions take place before capacity is needed and business processes disrupted by less than optimal service performance.

The major capacity planning processes are:

- **Annual plan development.** The team works with the business units and IT departments to understand future growth requirements. The requirements are translated into infrastructure capacity increments and working with IT Finance, costs are determined. Costs are reviewed with management and an iterative process usually occurs to balance requirements, costs, and business's ability to pay for them. When balance is determined and agreements reached, the plan, usually covering a 12-month period coinciding with the business fiscal year, is finalized.
- **Tracking actual usage to the plan.** On a regular basis, usage data should be reviewed and progress compared to original plan assumptions. At this point deviations from the plan need to be addressed, either by extending out planned purchases in the case where usage is below plan, or engaging an Out of Plan provisioning process to add capacity in advance of the plan.
- **Out of Plan provisioning.** A process similar to the annual planning process that validates usage requirements, develops TCO to determine business benefit, obtains management approvals to proceed and commissions work to add capacity. Generally this is a fast paced process as service levels and business processes are at risk if the work is not completed in a timely manner.

- **Execution of Capacity Optimization process defined in Step 4.** In order to continue to provide benefits to the business, it is necessary to execute the Capacity Optimization process on a regular basis.
- **Prototyping new applications and major application/service changes.** Since capacity planning also provides modeling services, the team must get involved in estimating future infrastructure capacity usage by new, yet undeveloped applications and services. Capacity modeling approximates usage based upon vendor supplied performance data and the performance of similarly designed applications currently in use. The value of this service is that estimated costs have higher confidence levels and more closely approximate the end results than guesstimates.
- **Reviewing new technology trends.** Capacity planning needs to be aware of technology changes and advancements that may impact the organization in the future. The result of the research is used as input into the organizations enterprise architecture process to determine future technology steps. Once technology directions and plans have been finalized, the capacity planning organization can determine the most cost effective steps to reach the new goals.
- **Ongoing work to support SLM, Availability Management processes.** Information is required to measure service results and determine the causes of any service anomalies. Capacity Planning is the owner and keeper of all historical performance data and provides the information to other groups to assist them in performing their duties.

Management reporting

Someone once said that a business process is not complete without the paperwork. ITSO is no different. Reporting must be put in place in order to help quantify results and measure the effectiveness of services. It is desirable to be able to automate the reporting

process, leaving more time for the capacity planning staff to address more productive tasks.

Reporting takes a number of forms. Although reporting is usually very specific to each individual organization, some common reporting requirements are:

- **Senior management reporting.** It is necessary, and desirable, for executives to be aware of the status of services provided as there is usually a direct correlation to the effectiveness of the business. Executives are busy people so the use of dashboards and charts is recommended. Web based reporting makes it easy for them to access the information and since web browsers are commonly used in all business functions, a lesser amount of training is required. Where dashboards are employed, it is recommended that pairs of indicators be used, current status and trend. Current status is a meaningless measure if the executive doesn't know if the trend is getting better or worse. Using the two measure approach makes the indicators much more meaningful. This reporting is always at the service or application level.
- **Service Level Management – regular reporting is required to measure service performance and determine those services not meeting service objectives and those whose trends indicate service objectives will not be met in the near future. This reporting is in most cases at the service or application level.**
- **Capacity Planning.** Regular reporting that assists the capacity planning team is measuring utilization progress so it can be tracked and compared to the annual infrastructure plan. This reporting could be performed at an application, service or infrastructure component level.
- **Performance Management.** A variety of reporting is necessary to support this team's effort to ensure application performance. It is necessary to have sufficient information to recognize service anomalies and have sufficient data to determine causes so problems

can be corrected. In many cases this reporting is performed at an individual infrastructure component level.

- **Availability Management. Chronic service disruptions must be identified, causes determined and corrective actions taken if consistent services are to be provided. This reporting provides the information and raw data required for the Availability Management team to efficiently and effectively execute their processes. This reporting is in most cases at the infrastructure component level.**
- **Ad-hoc. Unplanned and irregular reporting performed in support of management requests for information and technician requests for raw performance data.**

Continuous service review and improvement

In order to judge IT's success in delivering services at agreed upon levels, it is necessary to monitor and report results. Monitoring allows IT to react when problems are threatening to impact the business, and also for client business units to know whether they are getting their money's worth from IT services. Ideally, proactive performance management practices such as capacity planning are used to ensure problems are addressed before service level requirements are jeopardized. Performance issues can never be avoided completely because circumstances are constantly changing. Business plans, forecasts and technologies change, and unpredicted events occur. That is why IT Service Optimization, like Total Quality Management, Six Sigma, or the Service Level Management sub-process of ITIL, calls for continuous analysis and adjustment. Problems are continually detected and remedied by making adjustments or changes to correct those problems.

As applications and services age, their value to the business may decline. As part of the annual review process, applications and services should be assessed and candidates for sunseting identified. Alternative/Replacement services should be identified and

decommissioning costs determined. Upon management approval, projects are commissioned to migrate existing work to the new services or applications and the old ones removed.

Develop a regular review process as well as a procedure to address planned business changes that will impact existing SLAs. For example an East Coast business may grow to the point it needs a West Coast branch to service business 3,000 miles and three time zones away. Many IT services will be impacted by changes in hours of operation. Those changes need to be researched, incremental costs identified and new service levels agreed upon. More information on the SLA processes is available on the TeamQuest web site under white papers.

Historical recordkeeping

In order to effectively measure the success of IT as a result of this work and other accomplishments, it is necessary to maintain a high-level historical record. Information included in this record would be the results of the performance improvement and capacity optimization activities. In addition, we need to capture the trade-offs accomplished by increasing IT expenditures to gain business unit savings – i.e., automating process that increases IT costs by \$2 million a year but saves the business \$12 million a year in data entry costs. These activities have an impact, many of them substantial, on IT infrastructure costs. Facts of life are that business memories are short lived and during ensuing budget cycles, senior management may only see the IT budget increasing year over year, not remembering the saves that IT garnered the organization as a result of the work. Having a historical record helps remind the CIO or IT Director of the reasons for the costs and the value of IT accomplishments.

TEAMQUEST CORPORATION

WWW.TEAMQUEST.COM

AMERICAS

ONE TEAMQUEST WAY
CLEAR LAKE, IOWA 50428
USA

+1 641 357-2700

+1 800 551-8326

INFO@TEAMQUEST.COM

EUROPE, MIDDLE EAST AND AFRICA

BOX 1125
405 23 GOTHENBURG
SWEDEN

+46 (0)31 80 95 00

UNITED KINGDOM

+44 (0)1865 338031

EMEA@TEAMQUEST.COM

ASIA PACIFIC

LEVEL 6, 170 QUEEN STREET
MELBOURNE, VIC 3000

AUSTRALIA

+61 3 9641 2288

ASIAPACIFIC@TEAMQUEST.COM

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