



# IT Operations and Best Practices

**Gaining a competitive advantage through excellence in IT operations**

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● Businesses can no longer view excellence in IT operations as merely a desirable goal. Properly planned and efficiently run operations are required for simple survival. To prevail in the marketplace, companies must do more: they must implement best practices within IT operations.

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## Executive Summary

Throughout much of IT's history, operations have frequently been viewed as a cost center into which investments should be kept to a minimum. This view was bolstered by years of reliance on mainframes that suggested backup, tape management, disaster planning, and running jobs were the only critical operations—certainly the only ones in need of careful attention. All else could be run only acceptably well without jeopardizing the company's well-being. In this way, operations got by, lumbering along but never really achieving the full measure of contribution to those companies' business success.

The typical business today no longer enjoys the luxury of such a relaxed perspective. Technology is now distributed throughout the enterprise and is a fundamental pinion of all business activities, whether manufacturing, sales, distribution, planning, accounting, or other corporate endeavors. And so, operations must keep numerous technologies such as desktop PCs, servers, networks, printers, and storage running perfectly on a 7x24 basis; operations also must monitor the performance of various key software products such as Web servers, firewalls, intranets, databases, and security tools. Neglect to monitor and manage any of these technologies—hardware, software, backup, or security—and the entire enterprise can come to an immediate halt.

Firms that recognize the central role of IT operations in the success of their enterprises, however, face a daunting challenge in implementing this role. Operations are difficult to improve because so little information is available on how to do it. By comparison, myriad tools and resources are available for designing Web sites, creating effective supply chains, or integrating applications. This book, designed by experts in IT operations at META Group, presents what constitutes best practices in IT operations and how to implement them.

The approach chosen by META Group and tested at hundreds of sites worldwide—including numerous Fortune 500 sites—is the one used here. It involves several steps that center around planning operations properly and then implementing them thoughtfully. It begins by having sites perform an inventory of all operations at the task level. Tasks then are grouped into processes.

When all processes have been inventoried, the organization has a baseline picture of its IT operations. These operations then are compared with industry-validated best practices. Companies then are encouraged to define an inventory of all gaps between their processes and those listed in the best-practices compendium. This gap analysis leads to a generally lengthy inventory of remedial work that needs to be done. Prioritizing this work is the next step.

However, in prioritizing the tasks comes an opportunity for grouping certain changes. Some changes, for example, have side effects that benefit several IT processes: This aspect may confer upon these changes a greater priority than they might otherwise have. Careful study of the changes and the processes suggests that many processes can benefit from being grouped and managed together. These grouped processes are referred to as centers of excellence (COEs)—a term of art in many disciplines that refers to high-quality solution sets targeted at a specific problem and managed together for best effect.

COEs represent a considerable investment and may not be appropriate for all enterprises, especially smaller businesses. Such companies have the option of simply prioritizing the work suggested by their gap analysis and undertaking it in an orderly fashion. Whether they choose this approach or full-blown COEs, IT organizations need to implement metrics with their solutions.

Metrics—or quantifiable measures of quality—are fundamental to any pursuit of best practices. This is due to the requirement imposed by best practices: Quality refinement must be an ongoing activity. As such, it requires metrics to track progress and to diagnose problems.

Through the use of gap analysis of the current baseline, comparison with industry best practices, carefully planned and prioritized remedial work, the consistent use of metrics, installation of an ongoing process of quality refinement, and the optional use of COEs, all IT organizations can achieve enduring excellence in operations. The rest of this paper expands on these steps.

## Making an Inventory of IT Operations

Almost all plans to implement best practices begin with an assessment of the current state of IT operations. The end result of this assessment should be a document that lists all tasks performed under the aegis of IT operations. This document is called a baseline, and it is of remarkable importance. It serves as a diagnostic tool for identifying where quality-enhancement efforts are most needed. In addition, it is a “before” snapshot with which subsequent snapshots will be compared.

Tasks, as mentioned earlier, often are grouped into processes for convenience. A process is simply an activity consisting of related tasks that have a collective aim. Inventorying tasks can frequently be facilitated by working from the top down, starting with a list of processes such as the one in Table 1. After identifying the applicable processes, make a list of all tasks performed under each one.

The list in Table 1 is by no means comprehensive, but it does represent the processes found at most mid-to-large IT organizations.

Tasks are generally of two types: serialized tasks, which must be performed in a specific sequence, and related tasks, which don’t need to be completed in any particular order.

Job scheduling and infrastructure planning are processes composed of serialized tasks. As such, they are easy to document quickly. Participants generally can explain the whole process, what their own role is, and what other participants do. Serialized tasks are a good place to start when creating an inventory.

Disk storage management is a process that consists of related tasks: It includes file placement, archiving, backup and recovery, and numerous other tasks that often are performed independently of each other. Other examples of processes comprising related tasks include contractor management and problem management.

When gathering the information, make sure to collect other data that will be useful later:

- Application optimization
- Asset management
- Budget management
- Business continuity
- Business relationship management
- Capacity management
- Change management
- Configuration management
- Contract management
- Contractor management
- Cost recovery management
- Database administration (Physical)
- Disk storage management
- Facilities management
- Hardware support
- Infrastructure planning
- Inventory management
- Job scheduling
- Middleware management
- Negotiation management
- Network monitoring
- Output management
- Performance management
- Physical database management
- Problem management
- Production acceptance
- Production control
- Quality assurance
- Security management
- Service-level management
- Service-level agreement management
- Service request management
- Software distribution
- Software management
- Systems monitoring
- Tape management
- Test lab management
- Workload monitoring

*Table 1. A catalog of processes typical to IT operations.*

- How automated is the task currently?
- What are the job skills required by the person doing it?
- Is the task/process monitored using metrics? If so, which ones?
- How mature is the process?

The last point, process maturity, is an assessment of how well the process is performed at the firm. Specifically, how disciplined it is and how carefully its results are monitored and improved. Normally, process maturity is graded on a scale of five steps: ad hoc and random, repeatable, defined, managed, and optimized. In a full implementation of best practices, as discussed here, the goal is to bring all

processes to the optimized level and then install a plan for continuous improvement.

Once the task list is sorted and grouped by process, it should be formally documented in catalog form. This baseline catalog will be very important in the subsequent work. As much as possible, the processes should be grouped according to the process list in Table 1. The complete book lists more than 100 processes. Such a comprehensive list covers just about all processes found at IT organizations today. Readers should ensure their catalog includes only processes found in this larger list.

## Disk Storage Management

1 2 3 4 5 6 7 **8** 9 10

The Automation Balance  
1=manual 10=automated

1 2 3 4 5 6 **7** 8 9 10

The Stability Balance  
1=dynamic 10=stable

### Staffing

- Storage-management specialist
- Direct Access Storage Device (DASD) specialist
- Backup and recovery specialist

### Best Practices

- Validate and test backup and recovery concepts
- Make overall storage management approach completely cross-platform
- Prioritize all applications based on business-driven recovery requirements
- List what should be recovered and how long it should take
- Implement an ongoing performance management/optimization process (such as a schedule for the next x days or months):
  - List which databases should be reorganized next
  - List which volumes should be compressed/compacted next
  - Maximize utilization and minimize application failures (space allocation)

### Metrics

- Time to restore, recover, and backup
- Year-to-year improvements in:
  - Utilization
  - \$/GB
  - Staffing/unit capacity (staffing/terabyte)
  - Mean-time-between-failures—how many applications were affected for how long?

### Process Integration

None

### Futures

- Encryption
- Globalization of solution across enterprise (elimination of batch and preventative maintenance windows)
- Technology
- Storage Area Networking (SAN)
- Media Commoditization
- Intelligent Storage Controllers—understanding characteristics of data/usage and making educated decisions on where data is stored
- Electronic Commerce

Figure 1. Best-practices items for gap analysis of IT operations.

## Gap Analysis

To determine what needs to be improved and how, the next step compares each process as performed at the company with its corresponding best practices. To do this, a catalog of best practices needs to be accessible. This book provides the best practices and metrics for more than 100 processes. Figure 1 shows one example of this information. It includes other data of value in the gap analysis.

Many points in Figure 1 will reveal gaps in the current implementation of disk-storage management at enterprises today. Several aspects of the data in Figure 1 bear further examination.

The **automation balance** is useful for subsequent analysis. Processes that are highly automated tend to be mature and should be modified with care. They generally are automated because they work well for the IT organization. Modifications to these processes often take the form of slight enhancements, installation of appropriate metrics, and the like. By comparison, manual processes should be examined in the context of finding means of automation. Similar in concept to automation is **process stability**.

Stable processes tend to be automated and documented, and they are frequently fairly efficient. In prioritizing gaps to address, stable processes are rarely the most urgent items.

**Staffing** is shown for mid-to-large IT organizations. In smaller organizations, the same person might handle two or more roles. If no one at a site performs a role listed in the staffing section, an important gap has been identified. Chances are good that other gaps in the process may be traced back to this gap in personnel.

**Best practices and metrics** are self-evident.

**Process integration** should list integration points to other processes. Knowing the integration points can be significant when grouping processes. Integration points are also important in identifying which processes are affected by changes in other processes.

The **futures** section indicates changes in technology or in the marketplace that are likely to affect the current process. This information enables IT organizations to assess their preparedness for the future and to plan accordingly.

Process	Priority	Level of Automation (1-10)	Enablers (S=staff/skills, P=procedures, T=tools, A=all)				
			PCs	UNIX	OS/390	Network	Other
Missing Tasks							

<b>Points of Integration:</b>	1.	5.
<b>Date of Analysis</b>	2.	6.
	3.	7.
/ /200_	4.	8.

Figure 2. A form for doing gap analysis of IT operations.

When performing gap analysis against the information in Figure 1, IT organizations use a variety of different forms to capture the information. A form that has enjoyed widespread use in gap analysis of IT operations appears in Figure 2. It represents only one of several possibilities. Companies should use a form with which they are comfortable, so long as it captures all the necessary information.

The table in Figure 2 entitled Enablers allows analysts to list what remedial action would close the gap on each of several different platforms. Frequently, a summary examination of the enablers for all gaps will identify a fundamental problem at an IT organization, such as shortage of personnel, a pervasive lack of training, or other similar issues.

## Filling Gaps

Once a prioritized gap list is drawn up and agreed to, the IT organization should develop scenarios for closing the gaps. This step requires thoughtful managers with experience in operations. Depending on the scope of the changes, scenarios can mean very substantial changes to the way processes are performed. When large-scale changes are considered, three possible processes come into play. They are described in Table 2.

Changes on this scale suggest doing more than closing the existing gaps. They favor implementing best practices at the same time. Hence, for the identified processes, a custom gap analysis between the baseline and the best practices is required. This will lead to additional steps in the projects but will avoid decisions that encumber a later move to best practices.

In scenario planning, several traps must be sidestepped, as they are sure to appear:

- 1. Avoid “group think”:** Many IT initiatives have been killed by group think as team members share common but unspoken ideas about what is happening and divergent opinions are consciously or unconsciously discouraged. Scenario planning forces individual team members to consider uncomfortable possibilities. Each member brings something different to the exercise, depending on individual responsibilities, experiences, beliefs, and assumptions. Inconsistent ideas about the gap, the supported vision, and its objectives are uncovered during the scenario-planning exercise.
- 2. Anticipate denial:** Even experienced project managers can fail to see problems until they become fires. Preparing

Process	Description	Benefits	Risks
Forward Engineering	Starting from a clean slate, the gap-filling exercise is done, looking for new best-practice solutions and systems	<ul style="list-style-type: none"> <li>• No legacy limitations</li> <li>• Aligns with the established business vision</li> </ul>	<ul style="list-style-type: none"> <li>• Requires vision and detail</li> <li>• Is costly and has a higher risk</li> <li>• Established rules no longer apply</li> </ul>
Re-engineering in place	The current environment is decomposed and a tailored solution to support the identified gap(s) is developed	<ul style="list-style-type: none"> <li>• Preserves the established rules</li> <li>• Lowers risk and cost of implementation and maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• Straddles both the legacy and future visions</li> <li>• Requires planned systems rework</li> <li>• May still carry over old ways of doing things</li> </ul>
Reverse re-engineering	The current environment is decomposed and existing functions are rebuilt to support the identified gaps	<ul style="list-style-type: none"> <li>• Preserves the established rules</li> <li>• Exploits new technology using existing and understood rules and functions</li> </ul>	<ul style="list-style-type: none"> <li>• The cost and time to find the right solution are greater than that for re-engineering in place</li> </ul>

Table 2. Processes for large-scale gap-filling scenarios.

for the inevitable problems will sensitize team members to seeing problems as they start to happen and before they get out of control.

**3. Accelerate action:** When glitches occur, pressure to respond mounts and opportunities for bad decisions, quick fixes, and inelegant workarounds multiply. Scenario planning enables the emotional reactions that lead to bad decision-making to be played out before a crisis happens.

Many scenarios will not need changes on nearly the scale discussed here. However, they still need to be developed with the same caution. Many times, the scenarios will be smaller, self-contained, and well understood. This may lead to a false sense of security, especially if an unanticipated glitch occurs during implementation. Review traps 2 and 3 from the preceding list with care when developing the scenarios.

Once the scenarios are developed, they should be scheduled and implemented using standard project-management tools and techniques.

## Pushing on to COEs

True end-to-end management of operations requires the elimination of islands of data or processes known as stovepipes, a focus on maximizing efficiency, and a directed effort at long-term unit cost reduction. The goal is to unify the staff, technology, and processes into a seamless organization. The creation of processes and COEs is a key stage in this operations excellence effort.

Processes generally are of minimal interest to end users, who typically want to access the corporate network, Web, or other IT service without thinking about the infrastructure and services that lie beneath. The services define an organization's operations to end users within the company. End users are in essence IT's customers. The services are what these customers "buy."

Because of this relationship of customer and provider, processes and COEs are important parts of attaining excellence in operations. End-to-end, repeatable processes instantiate best practices throughout the operations

organization. Related processes coalesce into COEs. The focus on refining process and COEs does two things:

It generates steady incremental improvements in operations efficiency. Process-centric organizations work continually on doing things "better, faster, cheaper." When measured, these improvements may be only in the single-digit percents on an annualized percentage basis. Over the course of several years, however, the improvements become significant, and they separate best-in-class companies from the also-rans.

It makes it easier to define, develop, price, and market services to users within the organization. Processes and COEs take much of the guesswork out of creating services, and that increased certainty can be reflected back to the end-user constituencies who are IT's customers. And customers generally prefer an integrated, holistic approach.

COEs are the ultimate in the pursuit of best practices, and they are expensive to develop; in counterpoint, they deliver the greatest returns to a corporation on the basis of cost savings and best-of-breed IT operations.

## Aggregating Processes

The COE approach places an increased level of management responsibility on an operations organization. It requires relationship management skills as well as the basic ability to deliver services seamlessly from the customer's perspective.

Process aggregation should tie related processes together as well as define the organizational boundaries for each COE. In addition, it shifts the focus of staff members from processes—a necessary step in the evolutionary process—to "process seams." Most operational failures occur within the seams between processes and organizations—where the handoffs occur.

Viewing each of the processes associated with each domain/platform (desktop, network, distributed computing environment, or host) reveals that several common areas exist. Grouping these based on their logical relationship yields the fabric of each COE. A COE model of IT opera-

tions results in five or six major organizational COEs and fewer units of work—six super processes instead of 30 or more separate processes.

IT organizations typically will have COEs such as the following (shown with their salient attributes):

- Command center
  - Area of expertise: Application and infrastructure health
  - Binding theme: Real-time monitoring
  - Value proposition: Ensuring end-to-end availability and throughput
- Asset center
  - Area of expertise: Procurement and financial management
  - Binding theme: IT asset portfolio
  - Value proposition: Asset utilization and unit-cost reduction
- Data and media center
  - Area of expertise: All forms of data and media management
  - Binding theme: Enterprise storage architecture
  - Value proposition: Providing common storage services across all platforms
- Application center
  - Area of expertise: Communicating application standards and policies through effective management of same on a day-to-day basis
  - Binding theme: Managing enterprise production workloads
  - Value proposition: Timely and quality output with minimal defects
- Customer advocacy center
  - Area of expertise: Effective, full-range customer support
  - Binding theme: Customer satisfaction
  - Value proposition: Ensuring that customer needs are met

- Engineering center
  - Area of expertise: Technical expertise associated with each technology, its relationship to business applications, and the integration of infrastructure and business systems as needed
  - Binding theme: Establish and maintain infrastructure resources in the context of the enterprisewide technical architecture
  - Value proposition: Timely, leverageable, and high-quality technologies to meet business requirements

Like processes, COEs have their own best practices and metrics, which need to be monitored attentively to obtain the maximum benefit.

Once these COEs are in place, managing IT operations—even IT itself—is significantly simplified because common processes are managed together. In this manner, for example, a project to add customer relationship management (CRM) to the enterprise clearly falls under the purview of the customer advocacy center COE. This information allows IT to plan implementation while knowing ahead of time which group of processes and tasks will be affected and where resource analysis and planning should begin. Also, if metrics are applied and tracked properly, having results of specific processes appear in the context of a COE helps managers understand the effects of the performance of one process on the others grouped with it. Again, COEs make management of operations considerably easier.

## Wrapping Up

Once a company has moved IT operations to COEs, IT is in a position to make a more-discernable contribution to business operations. It can do this by more accurately reflecting its role vis-à-vis users: as a vendor of services, with the rest of the company as its customers. Understanding this relationship enables IT to pursue innovative initiatives such as pricing services (in much the way a service provider would do). In addition, development of new products for sale becomes an important function of IT managers (rather than waiting for need to drive action, managers now can anticipate the need and offer the service). Once the company

and the IT department begin to view their relationship in this light, operations are no longer a necessary cost center that must be borne as a necessary burden; instead, the department becomes an integrated provider of services and a revenue center to IT. By use of this newfound relationship and self-view, IT operations at many enterprises are the recipients of constant investment and in return provide a constant competitive advantage through their support of advanced technologies.

## IT Best Practices Series

This white paper is based on the IT Best Practices Series book, *Building Operational Excellence*, authored by Dale Kutnick, CEO and President of META Group, and Bruce Allen, Vice President of META Group's Operations Excellence Infusion. The book series is published through Addison Wesley and Intel Press. META Group is a leading research and consulting firm focusing on information technology and business transformation strategies.

### Intel's TRIAD team leverages best practices in operations

**B**est practices in IT operations are valuable beyond the cost savings and the efficiency they provide to IT. Well-run operations enable companies to handle routinely tasks that at other sites loom as very challenging projects.

A typical example is the rollout of new software. Anytime a new software package is rolled out to users, a period of suspense and concern is inevitable. No matter how long the transition, at some point in the rollout, the users must completely abandon the system they once used. This moment of truth can be a source of great confusion and error at sites with poorly planned operations, or it can be a nearly invisible moment at companies whose best practices enable them to plan the transitions carefully and orchestrate the rollout intelligently.

Large companies that have a deep appreciation of these issues often develop teams that specialize in planning and implementing software rollouts. Their work falls under the operational best practice of change management. Intel has such a group located in Folsom, California, under the leadership of Dan Grove. His team is called TRIAD, an acronym for test, release, implement, and deploy; it is part of Intel's Enterprise Business Computing arm.

When preparing for a rollout, the team starts by testing the software in a variety of possible hardware and software configurations. TRIAD members line up

dozens of Intel servers that they swap in and out until they find a tested configuration that works best for the intended need. They also test the application in the "brickyard," which is a sprawling configuration of hundreds of PCs, many running old versions of operating systems. This allows them to identify exactly which client-side configurations they will need and what must be done to step around problems with older software.

After this step, the TRIAD members do a dry run of the installation. They test the migration plans and the infrastructure and note any anomalies that might arise. They log any changes to plans into an online change manager. Once they have tested the applications, tested the hardware configuration, and processed the feedback from the dry run, the team members lay out their final implementation plan and begin the rollout forthwith. As the rollout proceeds, TRIAD members stay in constant touch through Net Meeting software for ad hoc conferences and status recaps, instant messaging, and other means of broadcasting project progress to all team members. Says Grove, "We always run into snags and hitches, but because we plan our ops carefully, do as much homework as we can, and act as one integrated team, we've been able to do some amazingly tight implementations that to other companies would be very, very challenging. That is the benefit of really good operations, best practices in planning, and knowing how to work as a team."

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