The Disciplines of Systems Management

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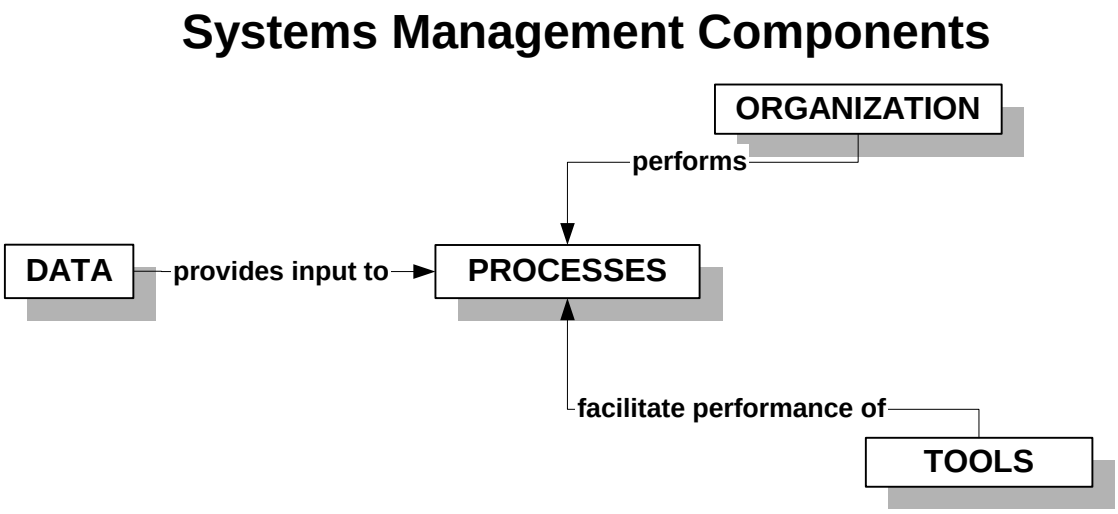
One of the problems bought about by the proliferation of advanced user computing platforms (desktop PCs, notebook PCs, PDAs, and even smart phones) is that it makes the task of maintaining the entire corporate information system much more complex and difficult. Bear in mind that even these end-user systems need to be treated as part of the whole IT setup since it is by and through these devices that corporate data is stored, processed, and transferred.

Systems Management is the combination of processes, data, tools, and organization needed to manage a system efficiently and effectively. *Processes* deal with how to perform the systems management task. *Data* refers to the information required to perform the task. *Tools* are the equipment needed to perform the processes. Lastly, *Organization* refers to the people that support the process and how they are grouped together to do so.

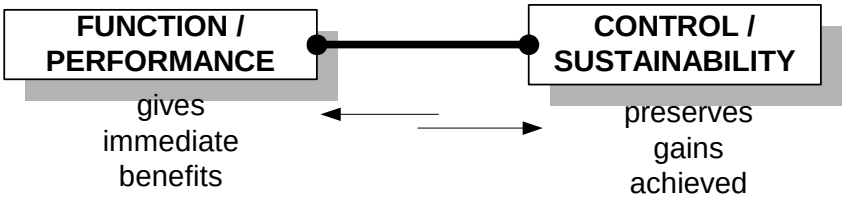


Effective implementation requires attention to all these components.

Systems management is not merely a set of procedures for running a system; rather, it integrates all four elements mentioned above. We have seen too many IT organizations come up with exhaustively detailed procedures, yet fail because they have not tackled all four key elements.

Effective implementation also requires a balance between planning and performance to ensure that the processes laid-out are not too detailed at the expense of flexibility, but also not too vague that it is subject to individual interpretation. As the diagram below illustrates, it is a continuing "tug-of-war" between the two objectives of implementation and control.

Systems Management Objectives



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Understanding the Systems To Manage

To deploy the optimal systems management infrastructure, you must first thoroughly understand the systems you intend to manage. Knowing the technical aspects of your system is not enough. To design a cost-effective, practical systems management infrastructure, consider the following points:

How critical the system is to the business — Greater criticality requires better systems management. Consider how much of the business will be affected if the system is not available, in terms of lost productivity, increased expenses, lost business opportunities, and erosion of customer satisfaction.

Size of the system to manage — Expect your systems management infrastructure to be increasingly complex as system size increases. Size can be gauged in terms of the amount of resources (hardware, software, people, etc.) being utilized, the amount of data being processed, or the number of users being served.

Complexity of the system — The more complex a system, the more difficult it is to manage. Complexity is a measure of the number of different resources interacting and working with each other. A system can be complex for many reasons. For example, it may be complex because multiple operating systems are in use, or because many types of users are sharing the same set of applications (e.g., customers, suppliers, managers, and staff). When multiple components are shared, there is greater risk of reduced performance due to competition for shared resources.

Distribution of system components across different locations — Increasingly, components are distributed across servers and workstations in different buildings, cities, or even countries. Components that are widely dispersed are more difficult to manage effectively. System management processes associated with dispersed components are likely to be slower and more prone to failures.

Ownership of resources — It becomes more difficult to coordinate systems if many different owners have the final say as to what is done, simply because you must get permission from many different people and coordinate all their decisions and actions. In a highly distributed computing environment, it is common to have different owners for the workstations, servers, communication facilities (often owned by a telecommunications company or service provider), and many others.

Security requirements — Systems and information assets that must be protected introduce new complexities, such as access control and authentication, making them more difficult to manage.

Skill sets — When devising a systems management infrastructure, consider not only the skills of the IT organization, but also those of users. As systems become increasingly distributed, management

responsibilities may also be distributed, and everyone involved is likely to need new skills and training.

New technologies — Consider forthcoming technologies and your organization's long term IT goals, so the systems management infrastructure you design will not be made obsolete by rapid changes in the industry.

Environmental dependencies — It may be difficult or impossible to control the external environment in which your systems operate, but you can limit the impact of changes in the external environment on the operations of your systems. For example, if the power supplied to your equipment is prone to outages, you can deploy backup power generation facilities and establish procedures for switching to them.

Standards — You cannot deploy the right tools without considering corporate hardware and software standardization policies. Also consider company operations rules, such as security guidelines and employee management standards.

The Basics of Management: Five Phases

The traditional formula for effective systems management of any system, process, or activity comprises five phases. These phases were identified based upon close examination of the key issues faced by managers:

What activities must be performed everyday?
How do we know these get done when they're supposed to?
Who is responsible for performing each activity?
How do we know if it's being done effectively and efficiently?
Who tells management how it's going?
Who gets blamed if things don't go right?
How can you improve what you're doing?

The five phases of management activity related to systems management are described in the following sections.

Phase 1: Setting Objectives

The first and most important phase is setting objectives. Here, we determine the requirements of the business and end users. Without properly determining what needs to be achieved, it is nearly impossible to execute the other phases effectively. You must understand user objectives, so your plans and activities support them.

Alice in Wonderland provides a wonderful lesson. Lost in the forest, Alice came upon a fork in the road and asked the Cheshire Cat which road to take. The Cheshire Cat's answer, in paraphrase:

"It does not matter which road you take if you don't know where you are going."

In mature IT organizations, setting objectives often takes the form of defining Service Level Agreements — enumerating the different services to be provided to the users, and corresponding attributes such as performance, availability, and features.

Phase 2: Planning

In the planning phase, based on the objectives determined above, you define a plan to meet those objectives. This plan usually covers the resources to be deployed, the activities to be done, the measurements to be tracked, the tools to be used, and how the people are to be organized. Again, we cannot overemphasize the need to address the four elements of systems management: *process, data, tools,* and *organization.*

Phase 3: Execution

In the execution phase, we actually perform the steps that were planned in Phase 2.

Phase 4: Measurement

In this phase, we record relevant data regarding the execution of the plan. Many different measures can be tracked, falling into categories such as *performance* (speed of execution of a task), *capacity* (number of concurrent tasks executed), *failures* (number of problems, frequency of problems, areas affected by problems, number of repeat problems, number of detected problems, etc.), and *recovery* (problem resolution time).

Phase 5: Control

The control phase gives the manager a means to correct the first four phases on an ongoing basis. In this phase, you can verify whether the measurements meet your objectives. Here, you can reexamine and refine your plans to more effectively support achievement of your objectives, and eliminate execution problems. You can review how you execute your plans, to ensure that the execution has not, itself, caused availability problems. Finally, you can reevaluate your objectives to determine whether they should be upgraded or downgraded, to more effectively balance user requirements against what can actually be achieved.

Phase 5 never ends. Rather, it circles back to Phase 1, giving the manager necessary information for revisiting phases one through four, and creating a closed-loop process. If you skip any of these phases, your management system is likely to become obsolete quickly.

The control phase is crucial to ensuring that the system is consistently managed well. Many IT shops develop excellent plans and objectives, and perform extremely well when they first implement their plans. Since they fail to check on what is happening, however, changing technology, environment, and user requirements leave their management systems behind.

All five phases are interdependent. If you fail to get an accurate picture of user requirements in Phase 1, your plans will be misdirected and insufficient. If you skip planning in favor of early execution, your

activities will lead to resource conflicts and poor performance measurements. If managers fail to monitor the process, they cannot determine its ongoing effectiveness.

Identifying the Systems Management Disciplines

If we apply the fundamentals of management to information systems management, we can tabulate the systems management disciplines necessary in any system, big or small. The only difference is how extensively the disciplines are implemented.

Phase	Discipline	Description
1. Setting Objectives	Service-Level Management	Identify, negotiate, and agree to services to be provided, quality measurements, and IT performance targets to be provided to users.
2. Planning	Application & Systems Design	Plan and design IT infrastructure to meet service levels committed to user.
	Capacity Planning	Plan for system growth requirements.
	Configuration Management	Create and maintain system configuration information.
	Asset Management	Create and maintain asset inventory; track and monitor use of such assets.
3. Execution	Problem Management	Detect, record, and resolve problems.
	Backup and Recovery	Design alternative systems and resources to immediately restore IT services when problems occur.
4. Measurement	Performance Management	Monitor system performance data; tune system for optimal achievement of service levels committed to users.
5. Control	Change Management	Control all changes to the system to ensure that change does not degrade system performance.
	Security Management	Control and administer access to the system to minimize threats to system integrity.
	Availability Management	Monitor and control system resources and IT operation to maintain system availability.

The nitty-gritty of procedures, data, tools, and organization to support these systems management disciplines can differ dramatically for each organization. This is due to the fact that each has its own unique set of systems to manage, business objectives, organizational setup, people and skills, and so forth and so on.

It can also never be overstated that good systems management requires attention to the people issues more that any other technology concerns. At the end of the day, systems management is more than anything a discipline - a routinely practiced way of doing things by all concerned parties. No matter how much money is thrown into the task of system management, if the IT personnel, users, and even vendors and suppliers do not fulfill their role in the entire process it simply becomes useless.