



ADDRESSING ORGANIZATIONAL BEHAVIOR ISSUES TO OPTIMIZE IT AND FACILITIES ENERGY EFFICIENCY

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EXECUTIVE SUMMARY

While new technologies enable IT organizations to significantly increase the delivered computational performance per watt, the effects of expanding demand for growth is being felt in other parts of the organization, especially Facilities departments. According to market analyst Gartner, the growth in power demand is expected to result in 80% of data centers running at the maximum available power and cooling levels by 2010¹.



Technology is not the gating factor to addressing the constraints faced by data centers, rather the intra- and inter-organizational behavior and structure are; especially, the limited interactions between IT and facilities departments. This paper explains how greater cooperation by these departments and an integrated, holistic, collaborative approach to their respective missions can greatly enhance how data centers are designed, built, and operated so as to maximize resources and provide the levels of service needed by IT.

TABLE OF CONTENTS



COLLABORATION TO MEET CORPORATE IT GOALS.....4

ORGANIZATIONAL STRUCTURE.....4

IT AND FACILITIES.....4

COLLABORATING AROUND TRUE TOTAL COST OF OWNERSHIP.....7

FINANCIAL ISSUES AND RISK MANAGEMENT.....8

BARRIERS TO ENERGY EFFICIENCY.....8

RECOMMENDATIONS..... 9

AWARENESS THROUGHOUT THE ORGANIZATION.....9

ORGANIZATIONAL STRUCTURE.....9

METRICS AND INCENTIVES.....10

EXTERNAL INFLUENCERS.....10

SUMMARY.....10

REFERENCES.....11

COLLABORATION TO MEET CORPORATE IT GOALS

Successful CIOs have recognized that information technology (IT) has become a stimulus for business innovation and an enabler of competitive advantage. These CIOs view themselves as key leaders in developing joint business and IT strategies. In this role, they must contend with serious constraints, particularly for key resources—power, cooling, and space—that are required to expand data center deliverables at the rate needed by the enterprise.



Recent studies² on the role of data centers have found that while the constraints on these resources are both real and, in many cases, inflexible, the problem is not entirely external. Rather internal corporate design often works at cross purposes with the solution because IT and Facilities departments operate in silos; maintenance and operations are reactive in nature; and acquisition of new technology is based on TCO calculations that do not include energy, cooling, and real-estate costs. To address some of these internal issues, a reconsideration of how key parts of the enterprise interact needs to be done.

ORGANIZATIONAL STRUCTURE

Historically, organizations have tended to be hierarchical in nature with most of the power, knowledge, and rewards at the top, which often prevented an effective two-way exchange of information between levels in the organization. As a result, decisions were made without the appropriate participation by individuals throughout the organization.

Today's global enterprises have matrixed organizations with multiple reporting structures and formal boundaries that has resulted in these groups being able to be experts in their discipline, while still facing difficulties adapting to a changing environment due to management structures that do not leverage knowledge throughout the organization.

A common difficulty organizations face is the ability to effectively change when new technologies or processes are introduced into the market. To be successful, organizations must be able to reinvent themselves with new knowledge and cross-functional processes, react more rapidly than in the past, and establish environments that support collaborative team.

IT AND FACILITIES

Historically, many companies have placed IT and Facilities in different parts of the organization. In today's dynamic environment with IT refresh cycles in the three to five year range driving higher power and cooling densities, not having strategic representation by Facilities will result in data centers not being properly provisioned and exhaustion of existing energy capacity early in the useful life of the data center.

For example, the introduction of blade servers and massive amounts of storage along with rising energy costs now mandates that IT and Facilities work collaboratively to ensure data centers can be provisioned properly and reduce energy costs. These challenges are compounded when items are outsourced to IT vendors or property-management companies.

These strategic and tactical IT and Facilities issues are summarized in Table 1.

TABLE 1 STRATEGIC AND TACTICAL ISSUES FOR IT AND FACILITIES MANAGERS

	IT	Facilities
STRATEGIC	CIO <ul style="list-style-type: none"> IT as an innovator for the Line of Businesses Business Continuity Plan Computing, storage, and network strategies Data Center Consolidation Regulatory issues 	SVP Corporate Real Estate <ul style="list-style-type: none"> Data Center Consolidation Leasing or purchasing Outsourcing or Insourcing Regulatory issues Corporate sustainability initiatives Availability of electric utilities Energy costs
TACTICAL	Data Center Manager <ul style="list-style-type: none"> Implementing technology IT Service Level Agreements IT operational efficiencies 	Facility Manager <ul style="list-style-type: none"> Providing adequate and reliable power and cooling Facilities Service Level Agreements Facility operational efficiencies



These issues are compounded by the way many organizations are structured, measured, and rewarded at the leadership, managerial, and operator level. Typical organizational structures have IT and Facilities in different parts of the organization with little or no common metrics. The CIO reports to the CEO or the COO. The VP of corporate real estate, who reports to a VP of Operations, typically assumes responsibility for all physical building infrastructure including factory floors, general office space and data centers.

To improve this, Facilities must be viewed by senior management as a close partner of IT and more integral to the enterprise's overall success. Management must change its view of Facilities from Figure 1a to the collaborative model of Figure 1b.

FIGURE 1A. CURRENT STATE OF BUSINESS

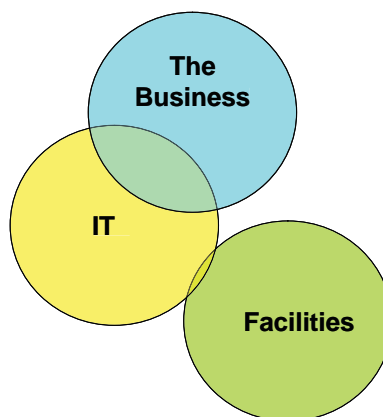
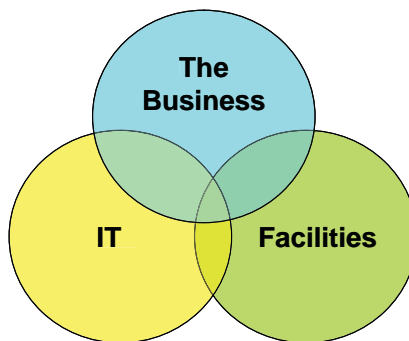


FIGURE 1B. THE DESIRED STATE



Enterprise-class data centers typically consume 10 to 30 times the power of typical office facilities with rapidly rising power and cooling requirements. Such that organizations with facility managers that are not directly linked with the growing demand of IT equipment and systems face unnecessary operational challenges.

Ensuring that adequate funding and resources are available to Facilities to support IT's growth objectives is a vital objective. Having a senior level Facilities executive that understands these issues reporting into the CIO will help ensure that electric, water, and gas utilities along with facilities needs are properly addressed in the strategic planning process. Figure 2 show the correct reporting structure might appear.

FIGURE 2A. TYPICAL IT AND FACILITY ORGANIZATIONS

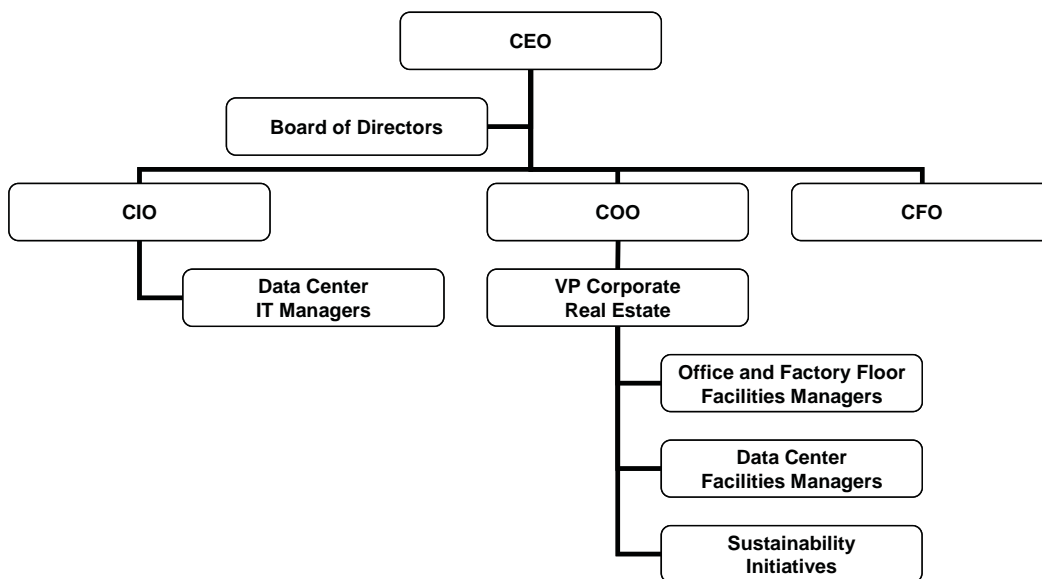
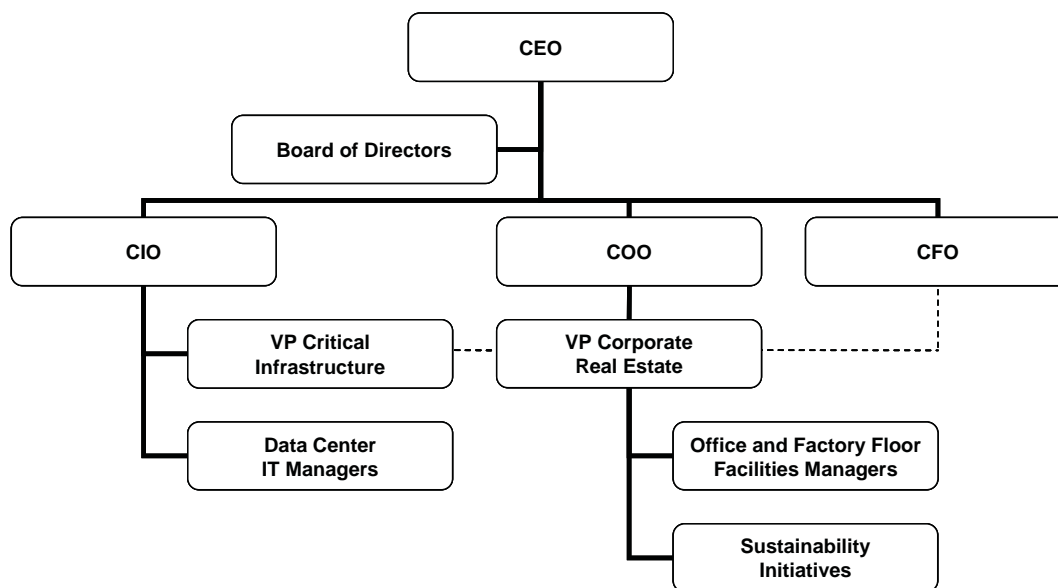


FIGURE 2B. SUGGESTED IT AND FACILITY ORGANIZATIONS



Having the VP of Critical Infrastructure reporting directly to the CIO helps ensure that the IT organization will have adequate knowledge of the critical issues and funding in the strategic plan to support the organization's objectives.

COLLABORATING AROUND TRUE TOTAL COST OF OWNERSHIP

Historically, attention has been focused on the availability of clean and reliable power with little regard to the energy efficiency of the components or overall system efficiency. The result has been quality products with lowest initial costs, but which might not be the most energy efficient choices despite satisfying Service Level Agreements (SLA) requirements.

To reduce capital and operating expenditures, supply chain processes have focused on outsourcing, in-sourcing, or basic shared services. With the major emphasis on initial costs, data center efficiencies have not been optimized. The rising cost of energy along with the increased demand caused by a growing demand for compute, storage and network cycles now has organizations recognizing the need to evaluate data centers on a TCO versus lowest initial costs.

Changing the supply chain from a low initial cost model to an optimized TCO model is no trivial effort. Innovative organizations seek out employees from multiple disciplines and third parties that can add value by combining services and technologies. This holistic approach introduces entirely new ways of doing business enabling all groups in the organization and senior management have meaningful metrics and real-time monitoring support to help meet their objectives.

To address the complex needs of data centers, organizations that work collaboratively with each other may develop solutions that would be difficult for any one organization to offer. In these arrangements, support from senior leadership and agreed upon goals and agendas are essential for continued success. Leaders in these organizations must have traits that include visionary and principled leadership, the ability to empower coworkers to work as one, and the ability to create a high-performance multi-disciplinary culture based on mutual trust both intra- and inter-organizationally.

FINANCIAL ISSUES AND RISK MANAGEMENT

To ensure meaningful financial risk and reward metrics are in place, the Chief Financial Officer (CFO) needs to be engaged. In many organizations, IT procures the compute, storage, and network equipment while the operating expenses are absorbed by other functions in the organization.

Likewise, costs in the organization may be allocated by square footage, line of business revenue, or other methodology that may not necessarily reward the IT organization to reduce energy costs.

Without meaningful reward and compensation plans tied to intelligently chosen metrics, most organizations continue with the *status quo*.



BARRIERS TO ENERGY EFFICIENCY

The first step in understanding how to save energy is to understand how and where energy is consumed in existing and planned facilities including data centers, general office space and factory floors including manufacturing or other production facilities.

As identified by the US Environmental Protection Agency³ there are many issues preventing faster adoption of energy efficient equipment and processes including:

- Defining Efficiency
- High Initial Cost
- Split Incentives (electrical supply, cooling, building space)
- Risk Aversion
- Learning Curve
- Quickly Changing Technology
- Lack of Energy Monitoring

An objective of The Green Grid is to define industry standard metrics and measurements and best practices that can be applied globally to improve energy efficiencies. Many data centers have existing meters and monitoring systems for ad hoc systems including electric power, generators, batteries, cooling, network, storage, and computing systems. These monitoring systems were put in place to optimize each component of the data center with little or no regard to overall system availability or efficiency. Recasting this information into standard efficiency metrics as defined by The Green Grid will help increase the awareness of how energy is consumed in these facilities and may be used by multiple groups to improve efficiency while maintaining or improving SLAs. These metrics must be balanced in use with the total power consumption and netted to the power portfolio (source percentages – renewable, alternative, coal, nuclear, natural gas, etc.) to drive towards overall corporate environmental, CO₂, and/or GHG emission policies to ensure total site power consumption declines on a per unit output basis.

RECOMMENDATIONS

End-users, influencers, vendors, and regulators working collaboratively across multiple disciplines can incorporate new techniques, tools, and processes resulting in data centers that are more efficient while maintaining or increasing their availability. Having senior leaders in these organizations that understand these issues holistically will enable their organizations to develop best practices to address these issues.

Leaders should address the following issues in their organization:

- Organizational structure to enable IT and Facilities to collaborate effectively including sharing risks and rewards
- Senior management needs to increase awareness at all levels in their organization, their suppliers, and influencers about the costs and importance of managing energy
- Vendors should develop collaborative solutions and industry standards for interoperability

Technology alone will not result in new solutions and processes being implemented across multiple disciplines in data centers, but it will require leaders to understand complex scenarios and address the issues holistically and collaboratively.



AWARENESS THROUGHOUT THE ORGANIZATION

To successfully implement enterprise-wide sustainability initiatives, senior leaders of the organization must continually advocate for the importance of sustainability to the organization. Without this passion and focus, a culture of not caring about costs or their impact on the environment will continue in the organization.

Useful tools and techniques include corporate sustainability reports along with tangible efforts such as specifying high-efficiency equipment and systems from servers, power quality and distribution equipment, environmental equipment, and building automation systems.

ORGANIZATIONAL STRUCTURE

Without IT and Facilities being dynamically linked in today's organizations that are implementing data consolidation programs, they risk the possibility of having facilities with inadequate power and cooling.

The strategic planning process will also be benefited with both groups addressing the short- and long-term processes.

METRICS AND INCENTIVES

Traditionally, initial cost has been a primary factor in evaluating how equipment is selected. An organization's supply chain metrics may need to be reviewed and adapted to include the impact of energy costs on the TCO of the item being evaluated.

As The Green Grid and other organizations develop industry standards for performance such as TCO, energy efficiency, and availability, specifications can be written more consistently ensuring the impact on the environment is minimized.

EXTERNAL INFLUENCERS

Having standardized metrics in place to help drive collaborative behavior will help ensure all stakeholders are driving to common goals. The Green Grid is focused on creating awareness across all organizations and the general public to drive organizational change.

SUMMARY

The demand for increased growth in IT continues to drive power and cooling demands globally. Without collaborative, cross-functional engagement by all stakeholders, vendors, and regulators, silo-based solutions will not address these issues effectively.

Understanding and creating awareness of these issues from the executive level through the organization will help drive the desired results.



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