Restructuring a Large IT Organization: Theory, Model, Process, and Initial Results

by Mark Luker, Jack Duwe, and Tad Pinkerton

Three years ago the University of Wisconsin–Madison merged three existing but disparate technology-related units into a single division, reporting to a chief information officer. The new Division of Information Technology (DoIT) faced many challenges, beginning with the need to restructure the components of the old units into a cohesive new organization. This article describes that restructuring process, based on the structural cybernetics theory of N. Dean Meyer, who was employed as a consultant in the process.

In 1992, the University of Wisconsin–Madison completed the formation of a Division of Information Technology (DoIT) from three existing units that reported to different administrators: Administrative Data Processing (ADP), Madison Academic Computing Center (MACC), and Telecommunications. In addition to continuing the work of these units, DoIT was charged with providing campuswide information technology (IT) planning, expanding student access to information technology, offering better access to institutional data, and merging services to avoid unnecessary duplication. DoIT has about 400 permanent staff plus 200 student and limited-term employees.

The transformation of DoIT into a cohesive unit began with the preparation of a strategic plan, based on a method detailed by John M. Bryson in *Strategic Planning for Public and Nonprofit Organizations.*[1] Top- and middle-level managers created a plan, published in March 1993, that identified the most important issues for the division, in priority order. The top three issues were to improve information technology services

Mark Luker is CIO for the Division of Information Technology at the University of Wisconsin–Madison. He is responsible for strategic planning, leadership, and budgeting for campus information technologies, including academic and administrative computing; data, video, and voice networking; and printing. He advises campus administration on matters of information and information technology.

Jack Duwe is the Deputy Chief Information Officer for Operations for the Division of Information Technology at the University of Wisconsin–Madison. With the CIO, he is responsible for the internal affairs of the division. Previously, he was the Director of Administrative Data Processing for seventeen years and held other administrative posts at the University for the preceding twelve years.

Tad Pinkerton is a Professor of Computer Sciences at the University of Wisconsin–Madison, where he has been on the faculty since 1969. He is Deputy Chief Information Officer for Outreach for the Division of Information Technology, responsible for assisting the CIO in activities external to the division. Previously, he was Director of Academic Computing and Director of the Office of Information Technology.

[1] John M. Bryson, *Strategic Planning for Public and Nonprofit Organizations* (San Francisco: Jossey-Bass, 1988).

to students, facilitate access to University information, and establish a technology architecture.

Making rapid progress on many of these issues, such as improving services to students, required reorganization. (The existing three organizations each provided some IT services to students, but there were overlaps and gaps in these services.) The need for reorganization and integration of campus network services was specifically recognized in the plan. (Both academic and administrative computing units, for example, provided LAN services.)

Some specific goals were developed for the reorganization, such as reducing confusion among users, sharpening focus on customer service and quality, unifying the organization with one mission and one culture, and creating a high performance organization strategically aligned to meet the information technology needs of the future.

As strategic planning neared completion, DoIT also began to implement Total Quality Management. This served as a starting point for merging the cultures of ADP, MACC, and Telecommunications. The first process improvement teams were specifically designed to be cross-functional and include staff from the three organizations.

In the spring of 1993, DoIT adopted a theory, model, and process for designing information technology organizations described by Dean Meyer in his manual, *Structural Cybernetics.*[2] DoIT felt that Meyer's methodology was well suited to a university environment (and specifically to UW–Madison) and needed little adaptation. DoIT hired Meyer as a consultant to assist with several steps in the process. His experience with reorganizing other IT departments was invaluable and saved much time.

Theory

Meyer's philosophy for transforming an organization involves more than just moving to a new structure on the organization chart. It includes five dimensions:

* *organizational structure*—clear boundaries for each unit;
* *internal economy*—the systems of budgeting, priority setting, charges, and tracking;
* *culture and values*—including customer focus and teamwork;
* *feedback loops*—rewards to encourage behavior towards mission; and
* *methods and procedures*—standard processes used throughout the organization for conducting its business.

We saw the need to address all of these dimensions and followed the consultant's recommen-dation to begin with organizational structure.

The design of the restructured DoIT is based on a set of organizational principles that are detailed in *Structural Cybernetics,* some of the most important of which are:

✓ Each individual has a single functional responsibility. This is based on the principle that one person cannot be expert in more than one thing at a time. A person is more effective being an expert in one technology, for example, than being mediocre in a number of technologies.

✓ Only one unit offers a given product or service; that is, there is no internal competition for services. Within DoIT, for example, the structure eliminates having several groups provide LAN design.

✓ Units responsible for daily operations are clearly separate from those working with new technologies. Introducing innovation and maintaining reliable operations should be in different units.

Model

The new DoIT organizational groups are of four major types, based on the *Structural Cybernetics* theory.

Technologists—These units build inventive, state-of-the-art technologies and write articles on leading-edge software or systems design. There are two types of technologists: application technologists, who are responsible for data-specific systems, and base technologists, who are specialists in component technologies and off-the-shelf tools.

Service Bureaus—These units are dedicated to providing reliable and efficient operational services. There are two types of service bureaus: machine-based service bureaus own and operate shared-use systems and sell services that are primarily produced by machines, and people-based service bureaus provide services produced by people rather than machines, such as help-desk support and training.

Architect—The architecture unit is responsible for assembling key decision-makers on campus and defining an information architecture for the campus. This small unit will build a campus consensus for standards, guidelines, and statements of direction that constrain the design of systems for the purpose of eventual integration.

Consultants—The consultants are responsible for understanding the client's business and applying methods of business analysis. There are strategic consultants, who serve key opinion-leaders on campus, and retail consultants, who are available to anyone on campus.

"The first process improvement teams were specifically designed to be cross-functional and include staff from the three organizations."

Dean Meyer calls organizational units that provide more than one of the above functions "rainbows." An example is a unit responsible for design, installation, and day-to-day administration of a LAN. This creates a conflict between innovation and reliable, ongoing operation. "Rainbows" should be limited to the highest level of the organization; lowest level units should be only one of the above types. (This may not be possible in very small organizations, however.)

While an organization following Meyer's theory uses the building blocks described above, the particular design is created by its own staff and is unique to its needs and circumstances. Following the outline of a process Meyer describes, DoIT designed its own organization.

Process

The reorganization began in earnest in the summer of 1993. Several ground rules were established to encourage a healthy transformation:

- No reduction in staff would result from the restructuring.
- Salary reductions would be avoided whenever possible.
- The resulting organizational structure would be "flatter."
- The design would involve the active participation of existing staff.
- Those leading the design of the new organization would work for the best structure for DoIT, not for their personal interests.

The new DoIT was designed from the top down. The chief information officer (CIO) and the directors and assistant/associate directors from the original three organizations designed the first level (Tier 1). The second level (Tier 2) was roughed out by the new Tier 1 leaders chosen by the CIO, and reactions were requested from a larger group of supervisors and high-level technical staff.

Each design step was preceded by a training session with the consultant. Once a design was created for a given organizational level, leaders for the units in that level were selected. After two management levels were thus designed and staffed, remaining staff were assigned to the new units according to where most of their existing job functions had been assigned.

While the leaders of the new organization were spending many hours behind closed doors designing the new organization, there was regular communication with DoIT staff. The CIO presented to staff an overview of the organizational design principles and the design process. Updates about the design and the schedule of events were distributed by electronic mail. Staff

were encouraged to submit questions either directly to DoIT leaders and the personnel department or anonymously via an electronic mail address. Answers were published on the division's internal Gopher server.

In February of 1994, DoIT announced its new organization to all its staff. This all-day event served as an initial orientation for Tier 3, since the new organization has only two levels of management below the CIO office. Presentations were made by the chancellor, the CIO, Dean Meyer, and many of the new Tier 1 and Tier 2 managers.

"Announcement Day" was only the beginning of the reorganization process, and there was much more to do immediately after this event. For example, the strategic consultants spent over a month visiting all key clients to explain the new organization in person. All staff spent five half-days in more detailed training sessions and began building teamwork in their new units. And minor changes were made in staff assignments to balance workloads better between groups and to correct one mistake that had been made in the initial assignments.

The new organization

Tier 1 of the new organization contains the units described below (and shown in Figure 1); Tier 2 units are listed in Table 1.

Applications Technology—Applications Technology acquires, develops, and maintains data-specific application systems. This entails analyzing, designing, and building inventive, state-of-the-art systems; tracking emerging technologies; researching the abilities and uses of new products; writing articles on leading-edge products or systems design; and planning for future systems.

Architecture—The Architecture unit works with the University community to build a consensus on campus standards and guidelines for the design of hardware and software systems. Such systems will then (at least eventually) be able to interoperate effectively, and the University can share training and experience. Agreed-upon standards and guidelines are documented, publicized, and periodically reviewed.

Systems Engineering—The Systems Engineering unit (base technology) acquires, develops, and maintains systems in the platforms, operating systems, database management systems, and networks areas. This entails analyzing, designing, and building inventive, state-of-the-art technologies/systems; tracking emerging technologies; researching the abilities and uses of new products; writing articles on leading-edge products or systems design; and planning for future systems.

Figure 1: DoIT organizational chart
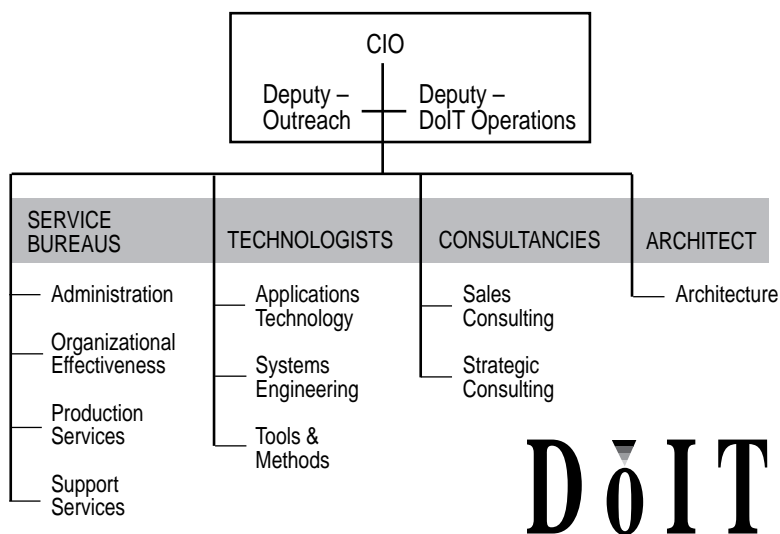
Tools and Methods—The Tools and Methods unit (base technology) acquires, develops, and maintains systems in the end-user computing, instructional technology, software engineering, and discipline areas. This entails analyzing, designing, and building inventive, state-of-the-art technologies/systems; tracking emerging technologies; researching the abilities and uses of new products; writing articles on leading-edge products or systems design; and planning for future systems.

Production Services—Production Services (a machine-based service bureau) owns and operates shared-use systems and provides a stable and secure environment to meet the needs of the customer. Shared-use systems include the computer operations center, telecommunications network operations, applications processing, printing, and computer labs. This unit also provides facilities management for customers who own their equipment.

Organizational Effectiveness—The Organizational Effectiveness unit (a people-based service bureau) helps DoIT staff improve customer satisfaction and provide effective management of projects and daily operations. It helps promote staff awareness of organizational culture, structure, values, and work methods.

Support Services—Support Services (a people-based service bureau) provides cost-effective support for installation and operation of information technology products and systems. It also helps clients and customers to use, develop, and deliver information technology products and

systems. Examples include help desk operations, telephone operator services and voice mail, delivery services, installation and repair services, training, technical writing, and graphic arts.

Sales Consulting—Sales Consulting (retail consultancy) provides on-demand needs assessments for most clients, a showroom for DoIT products and solutions, a sales facility where customers can purchase DoIT products, a newsletter and product information for customers, market research, and promotion services.

Strategic Consulting—Strategic consultants maintain close ties with campus opinion leaders. They help clients identify strategic IT solutions and act as facilitators between the client and other parts of DoIT. Consultants are knowledgeable about DoIT products and services and the client's business, and they alert clients to emerging IT solutions.

Administration—Administration (a people-based service bureau) provides administrative, billing, financial, human resources, and purchasing services for DoIT units in support of their missions. Administration provides the means for the individual units to have integrated business processes while functioning within state and University rules, regulations, and guidelines.

Deputy CIO/Outreach—The Deputy CIO/Outreach shares the duties of the CIO by representing him outside the division. This includes providing campus leadership in in-

formation technology and working with state and national groups.

Deputy CIO/DoIT Operations—The Deputy CIO/DoIT Operations represents the CIO in his role as provider of IT products and services, for example, brokering CIO decisions such as allocation of resources (e.g., budgets, positions, and profit/loss targets).

A new organizational culture

An important aspect of our new organization is its culture, which is based on a formal set of principles described in a five-page document.[3] The starting point for this document was a list of ideas from the consultant, and the end point was a consensus among the Tier 1 and 2 managers on what to include and how to say it. The new culture is unlike any of the cultures of the three predecessor organizations; it is based on customer focus, entrepreneurial spirit, and teamwork.

work. The "Cultural Principles" fall into several categories: customer focus, quality, entrepreneurship, empowerment of staff, contracts with customers, risk-taking, collaboration, incentives, decentralization, human resource policies, meeting management, and organizational structural principles. (See Table 2 for examples of specific cultural principles.)

Internal economy

In the new DoIT, each group is empowered to run a business within our business, which includes breaking even on their profit and loss statements and billing one another for subcontracted work. Clients who formerly received free development services are being converted to "labor shadow budgets" in which they are allocated a specific amount of money that can be spent on DoIT labor for any of their projects. Strategic consultants work with them to help set

> *"The new culture is unlike any of the cultures of the three predecessor organizations; it is based on customer focus, entrepreneurial spirit, and teamwork."*

[3] The DoIT Cultural Principles document is available electronically through the CAUSE Information Resources Library (#CSD1013). It is also part of a larger DoIT organization manual (#CSD 1029, available in print only) that provides many specific details about the reorganization described in this article. For information, call 303-939-0310 or send e-mail to orders@cause.colorado.edu

---

Table 1: The new DoIT structure—Tier 1 and Tier 2

Chief Information Officer
Deputy CIO—Outreach
Deputy CIO—DoIT Operations

Architecture
- Associate Architect
- Assistant Architect

Applications Technology
- Academic Support Applications
- Business Finance Applications
- Business Operation Applications
- Human Resource Applications
- Library & Information Retrieval
- Student Academic Applications
- Student Finance Applications

Systems Engineering
- Data Resource Management Technology
- Network Engineering Technology
- Network Systems Technology
- Platform & Operating Systems Technology
- Systems Management Technology

Tools and Methods
- Instructional Technology
- Media Technology
- Office Information Technology
- Personal Communication Technology
- Software Development Technology

Sales Consulting
- Marketing Communications
- Product Sales
- Showroom & Solutions

Strategic Consulting
- Academic Support
- Enterprise Support
- Institutional Support

Production Services
- Applications Processing
- End User Computing
- Enterprise Data Storage
- Printing and Copying
- System Operations
- Network Operations

Support Services
- Directory Assistance and Messaging
- Distribution
- Help Desk
- Installation and Repair
- Professional & Technical Education
- Publishing

Organizational Effectiveness
- Project Management
- Quality Development

Administration
- Accounting
- Administrative Support
- Billing
- Human Resources
- Purchasing
- Financial Technologist
- Human Resources Technologist

priorities, and the normal University budget process mediates their competing needs for additional resources.

The human dimension

If there was one aspect of reorganization where we were most unprepared, it was that of staff communications. From the date of our first meeting with the consultant, at least some staff assumed that we were talking about their specific jobs, and were very anxious for information. Our earliest communications were vague and sketchy, exacerbating the problem. What worked best in the end was to provide very detailed information about the "what" (agenda, any concrete timetable, etc.) but not the "how" (details of the process and results) or the "who."

Some time after Announcement Day, we discovered material on change management, such as William Bridges' *Managing Transitions*,[4] which greatly helped us understand what we had been experiencing. We offered some change education and stress management classes to staff, but books like *Managing Transitions* offer more detailed advice and more comprehensively define phases of change.

One of the more difficult ideas for our staff to accept was the idea of becoming more specialized—this seemed to them to run counter to good business practice. Shouldn't people be able to step into others' jobs, and be responsible for a full range of duties? Meyer's point is that people should have complete responsibility in a specific area in order to excel in it, and others should have similar opportunities to become "world class" in other areas. A project is completed by teamwork, as these experts collaborate to deliver an integrated product. Many of our staff were not accustomed to depending heavily on the work of other team members—previous cultures had valued individual contributions more highly.

The new culture was defined rather quickly by the Tier 1 and Tier 2 managers, and discussed with the staff in a half-day training session following Announcement Day. More effort was needed for staff to accept these significant changes, which we now depend on to achieve successful day-to-day interactions.

Transforming an organization, and doing it well, is a lengthy process. It is more than merely changing the organization chart. Experts suggest that three to five years is needed if the change involves a culture shift. To be effective, the reorganization must define the roles of each group and how these groups interrelate. It is also important to keep explaining and reinforcing the new organizational culture to support the new organizational structure.

Table 2: Examples of cultural principles

1. The purpose of DoIT is to serve its customers, not control them.

2. Everyone is responsible for his or her own quality. There are no inspectors and no other group to make up for one's lack of quality.

3. DoIT is a "business within a business." Similarly, each department and group within DoIT is its own "business within a business," and each manager is evaluated as an independent business person. This spirit of entrepreneurship will carry through as many levels of the organization as possible.

4. Decision-making authority will be granted to match responsibilities.

5. We form clear contracts with our customers and suppliers. Contracts are not long or legalistic and, for simple projects, they may be oral. They are, however, clear agreements between customers and suppliers.

6. Customers decide on the degree of "technological and business" risk they wish to take in their projects.

7. Performance will be measured against clearly stated, agreed-upon objectives. Recognition will be based on performance. This includes teamwork as well as individual performance.

8. When clients choose to do work themselves, DoIT will support and mentor them whenever possible.

The consultant's business lexicon (entrepreneur, business-within-a-business) was not immediately and universally accepted by our staff. In part, this reflected their background and university experience. It is more difficult to operate in full accordance with a business model, since the public sector reward system and other aspects of the higher education environment operate differently. After education and exposure, however, this language seems to work well to communicate about the organization.

Other lessons learned

Using an organizational theory and model proved to be very worthwhile. The theory gave designers common goals and terminology. The model provided a focus and allowed the designers to look beyond personal interest and view the organization as a whole. Hiring a knowledgeable consultant who gave us a process for reorganization was also very helpful.

During organizational design, all Tier 1 and Tier 2 staff were trained in the theory and the model. Although achieving good understanding of the model took time, this understanding was necessary to design the domain for each group.

Once we worked out a process for doing so, rostering the large majority of DoIT staff into the

[4] William Bridges, *Managing Transitions* (Reading, Mass.: Addison-Wesley, 1991).

new organization was orderly. Many staff were focused on a single major function and could be readily placed with that function in the new organization. Some staff, however, were very "rainbowed" and were more difficult to place. We now realize we should have been more proactive in explaining what we were doing to facilitate this process.

Space is a critical factor. Getting needed remodeling completed in a timely fashion is a major problem, and we are only now completing the bulk of our 350+ staff office moves. Having members of a group scattered over several floors of several buildings has seriously inhibited building the necessary sense of group cohesiveness.

The internal economy and corresponding financial systems needed priority attention by Tier 1 managers immediately after Announcement Day in order to serve as an appropriate guide for staff decisions. Designing a new internal economy has been much more time-consuming than we anticipated.

> "In day-to-day work, communication must follow the shortest and easiest path, not strictly adhere to domains."

We found that support tools such as a contract database, billing system, and a help desk problem-tracking system are required for the new organization, especially after merging several old organizations that were using different tools. Our lack of such tools is hindering us in completing the reorganization and in implementing the new internal economy. However, it seems impossible to begin creating them any sooner because of the necessary knowledge required of participating managers.

Staff have had misunderstandings about new processes, such as contracting, planned for the new organization. Simplification of these processes, supported by appropriate tools, would have made activities after reorganization much smoother for staff. (We responded with designs after the fact, but are still slow in getting tools in place.)

The Meyer design process focuses primarily on assigning responsibility to organizational groups (creating a complete but non-overlapping set of domains). In day-to-day work, communication must follow the shortest and easiest path, not strictly adhere to domains. We feel we provided insufficient training and reinforcement for our staff in communication processes. This, coupled with their lack of experience working in cross-functional teams, has made progress slower than we had hoped.

Designers of the new organization needed regular reinforcement on the theory and model. As new staff join the organization and DoIT adds new products and services, this reinforcement will continue to be critical. We occasionally question whether placement of a function in the new organization fits the model, for example,

and reach an appropriate conclusion only after much discussion. It is important in each such case for all involved to understand the basis for the decision and the tradeoffs that were considered. It is also important to document this for future reference.

Summary

Today, DoIT is not yet the high-performance organization it is designed to be—too many of us are still learning our roles, improving our communications skills, and adopting the new culture. The internal economy and supporting administrative processes are many months from completion. However, the benefits we hoped to achieve are becoming apparent:

- We have created a strategic focus on planning driven by careful needs assessment, as our new consultant group works with key clients on a daily basis.
- These same key clients have assumed ownership and responsibility for their centrally funded IT services through the creation of a labor shadow budget.
- We now have a long-term approach for improving the organization using our Organizational Effectiveness department. This is critical to our goal of institutionalizing quality improvement and a contrast with our struggles to launch the quality program prior to reorganization.
- We have a unified approach to installation and repair of all equipment supported by DoIT.
- We are well along with consolidating five different help desks into a single unit that uses top quality tools and methods.
- We are beginning to work with clients on a consensus-based campus architecture, about which they and we are very enthusiastic.
- Through both our marketing function and Organizational Effectiveness, we are systematically gathering customer feedback to drive product selection and improvement.
- We are creating a unified catalogue of all DoIT products and services, available electronically and in our new showroom.
- Our staff is beginning to develop pride in the new, more effective, integrated organization.

Though more time is needed to be all we can be, we are clearly on the right track.   `C/E`