ISRC *Notes* - March 1998

Enterprise Architectures

Based on a Roundtable Discussion of ISRC Participants

The March 1998 ISRC meeting addressed the topic of "Enterprise Architectures: Developing an Agile and Adaptive Infrastructure." The session featured presentations by Clark McCullough of Exxon Computer and Network Services and Gary Richardson of Star Enterprises, followed by a lively roundtable discussion. Clark and Gary's presentations, and the ensuing discussion, is synopsized below.

Value of an Architecture to the Organization

We began by canvassing the roundtable participants about the value of an enterprise architecture to the organization. The many suggestions can be categorized under the following major headings.

Economic advantage

Primarily through economies of scale and reducing the size of the IT portfolio, organizations can better manage their costs in a dynamic environment and achieve greater returns on both business and human assets.

Organizational Effectiveness

An enterprise architecture that is agile and adaptive can enhance organizational effectiveness in a number of ways.

- Productivity

  Productivity gains can be realized as the architecture enables leveraging resources and knowledge between business units. Business integration and interoperability is facilitated. An adaptive architecture contributes to creativity while allowing for similar processes to be used across different platforms, minimizing the number of different solutions to the same problem. The deployment of new applications throughout the organization is speeded up. The enterprise is better positioned to exploit new technology, and in some cases can function as a virtual organization.

- Communication

  As connectivity between disparate business units is increased, the quality and reliability of data improves, as does the ability to share information. This results in a greater level of communication and collaboration.

- Management

  Rapid changes in business requirements, coupled with quantum leaps in technology, make managing in this turbulent and dynamic environment challenging. An adaptive enterprise

architecture can help managers meet this challenge by reducing some of the complexity in today's organizations and providing an island of relative calm in a sea of chaos.

Strategic Direction

On a higher level, enterprise architectures can sharpen an organization's strategic focus. As the notion of an agile and adaptive architecture is explored, it provides an opportunity for aligning business planning with IT. Long-term thinking is emphasized. A common architecture can help glue together disparate business units and promote agreement with a shared vision. Over the long term this makes an architecture a platform from which to launch new business ventures, enhance revenue and enable business growth. While the lower level benefits of architectures are important, looking at architecture from this strategic perspective and communicating this value to senior management is viewed as critical.

Pragmatically a well developed architecture also goes a long way towards making the IS group responsive to the needs of the organization and thus helps IS to establish essential credibility. It establishes the IS department as a change-enabler instead of a change-inhibitor, particularly through rapid deployment of new technology. This builds IS credibility and allows IT to exert some control over what has, in many cases, become a decentralized function.

An example of developing an overall organizational architecture to integrate a large and diverse set of businesses was provided to us by Clark McCullough of Exxon Computing and Network Services Company.

Delivering Value through Architecture: A Case Example-- Exxon Computing and Network Services Company

As Clark McCullough discussed the formation of ECNS as a new general purpose infrastructure company under the Exxon corporate umbrella, he pointed out that the underlying purpose was to align IT with Exxon's overall strategy by integrating IT with the business units in order to deliver more business value. Exxon has taken the notion of an enterprise architecture one step farther by creating an enterprise infrastructure, defined as the architecture plus processes, procedures, and applications. This allows flexibility and interchangeability of both technical and human assets. For example, an engineer or geoscientists can be redeployed from one location to another and be instantly productive – startup time is eliminated.

In general, the benefits Exxon receives from their global infrastructure are improved efficiency and cost effectiveness from both IT and the business units, as outlined below.

- Reduced cycle time for implementation of new technology
    - focused technology planning and management
    - consolidated technical support and project services
    - common technology and best practices

- Reduced Costs

- reduced costs for new technologies
- improved leverage and efficiencies in vendor relations
- savings in user and applications organizations

The ECNS enterprise infrastructure is not a response to a problem, but rather a response to an opportunity made possible by technological advances. Thus overall, Exxon has taken a strategic view of architecture and from that vision has laid down a ground-work that will provide significant operational benefits to the organization. At the heart of this is a view that technology expenditures must be tightly tied to the cost of finding, producing and selling petroleum and related products.

Inhibitors to Developing an Architecture

While thinking about what an architecture should do and the value it should deliver is straight forward implementing an architecture and realizing those benefits is somewhat more problematic. There are a number of key inhibitors in the way of successful implementation of architecture. Among the key issues identified by groups at our roundtable are:

Developing the business case and getting management buy in, including issues related to:

- Understanding the key business objectives that the infrastructure will support
- Getting management buy-in around that vision and infrastructure
- Developing a shared vision and getting alignment, not just between IT and the business but between business units.
- Knowing and justifying the costs

Once the business case is put in place, **a framework for controlling the implementation** of the architecture must still be put in place. Among the barriers to be overcome are significant organizational hurdles related to:

- Determining who owns the project
- Developing a process for dealing with distributed decisions rights, that is deciding who should ultimately decide on standards, modes of service delivery and which activities should be left to the discretion of the business units.
- Accommodating and overcoming divergent business processes and business unit independence
- Determining how the architecture will accommodate the need for new functionality and the changing business environment

In addition, getting the job done may be hindered by **problems in IS-business relationships**, including:

- Lack of trust between the business units and IT
- Different objectives of business units and IT
- Individual egos and preferences from the business units
- a history of arrogance on the part of IT

- Convincing the user community that their "personal" computer is really an enterprise window and must be managed as a corporate rather than personal resource.

Finally, a host of **technical issues** also cause complications for architectural projects, these include:

- Understanding the metrics
- Integration with legacy systems
- Technological volatility and the need to remain agile in the face of technological uncertainty
- The pursuit of technical purity and technology for its own sake
- Developing excessive technological complexity rather than simple solutions that get the job done

Aligning Architecture with Business Requirements:

A key issue to getting started in the right direction is getting alignment of the architectural plan to the business. Among the advice that our roundtable participants had in this regard was:

- Start with clearly stated and understood **business** goals.
- Clearly define who owns what resources. Also, identify who are the tie-breakers who will make the call on tough decisions and obtain sign-off from appropriate management.
- Form mixed teams from IS and the business units. Identify business unit technology gurus, and co-opt them. In general, develop a community of interest with both IT and business knowledge.
- Encourage **joint** business/IS planning, not business unit planning which then filters down to the IS department. This helps to recognize that IS can drive business strategy as well as enable it.
- Aim for consistency first, then optimization. While there is value in choosing the right approach, there is also the view that much of the value comes from having a standard interoperable platform on which to base the business.
- Be aware that different business units may have different business objectives. For example, a manufacturing department may emphasize cost control, while an engineering department may feel the need for leading edge technology. The architecture needs to support various objectives and viewing the business as a homogeneous entity may be a mistake.

Committing to Standards:

If the key value of an architecture lies in its standards, that provide a common platform from which to do business, setting those standards and getting commitment around them is a key challenge. Some of the suggestions that our group had in this regard include:

- Balance the criticality of the function with the effort required to manage it. For example, in most cases the desktop is not critical, but the effort and resources necessary to manage a variety of desktop configurations can be overwhelming.
- Not withstanding the above, the desktop and associated toolkits are emotional tripwires. One way to overcome resistance based on emotion is with a well thought out cost-benefit analysis that offsets any perceived loss of functionality with cost savings. Another might be to support standardized products, and not support non-standard ones.
- One benefit of a standardized environment is that it replaces non-value added debates (e.g., Mac vs. PC) with debates focused on business issues.
- Gary Richardson of Star Enterprises endorsed a carrot-and-stick approach in which users who adopt a standardized PC and application package can utilize a paperless ordering process and receive a discount on the initial order and subsequent support. Non-standard orders must go through a more elaborate and costly review and approval process. Ongoing support costs, delivered via chargebacks, are also higher for non-standard users.

Measuring the Payoff

Architectures by their nature are enabling platforms. They allow the business to get things done, through IT. At the same time they do not by themselves deliver value in the absence of applications. Thus measuring the value of architecture projects can be challenging and in some cases organizations are required to take it on faith. For those who's beliefs are not as strong, some suggestions for measuring value include:

- Perform an historical trend analysis, mapping IT statistics and costs (e.g., support headcount) against business measures (e.g., volume or productivity levels). This needs to be done over time to track the impact of the architecture which may only be realized as applications evolve to take advantage of the architecture.
- Employ qualitative indicators related to actions that the architecture is designed to enable such as team effectiveness, cross-functional applications and business projects, customer satisfaction, and business process changes.
- Conduct a post-implementation review across the spectrum of new projects over time. Compared to pre-enterprise architecture projects and look at implementation costs and timelines. An architecture should enable shortened cycle times and decreased costs for delivering solutions to the business community.
- Note that all of these methods require a "before" record, so there is something with which to compare the "after" results. Thus, measuring the value of an architecture needs to start with benchmarks that are developed prior to the architecture being put in place.

Sourcing the Components of an Architecture

Finally, the group considered the issue of sourcing components of the architecture. As organizations increasingly centralize and standardize elements of the architecture, sourcing those functions externally may become effective. Getting value from sourcing decisions means looking

at them from a business perspective and considering strategic business issues in addition to simply looking at cost minimization. Among the advice offered by our roundtable participants was the following:

- Differentiate between critical and value-added functions. For example, network management is a critical function, but it may not add value to an organization. Seismic processing, on the other hand, may give an organization a competitive advantage. In this case, network management is a candidate for outsourcing, but not seismic processing.
- Outsourcing may allow an organization to redeploy key resources from non-core to core functions. This may be especially relevant given today's constrained labor market.
- Consider variations of sourcing, such as hiring contractors for certain functions or pieces of work.
- Remember, you can outsource a function, but you can't outsource the strategy, management, and control implications of that function.

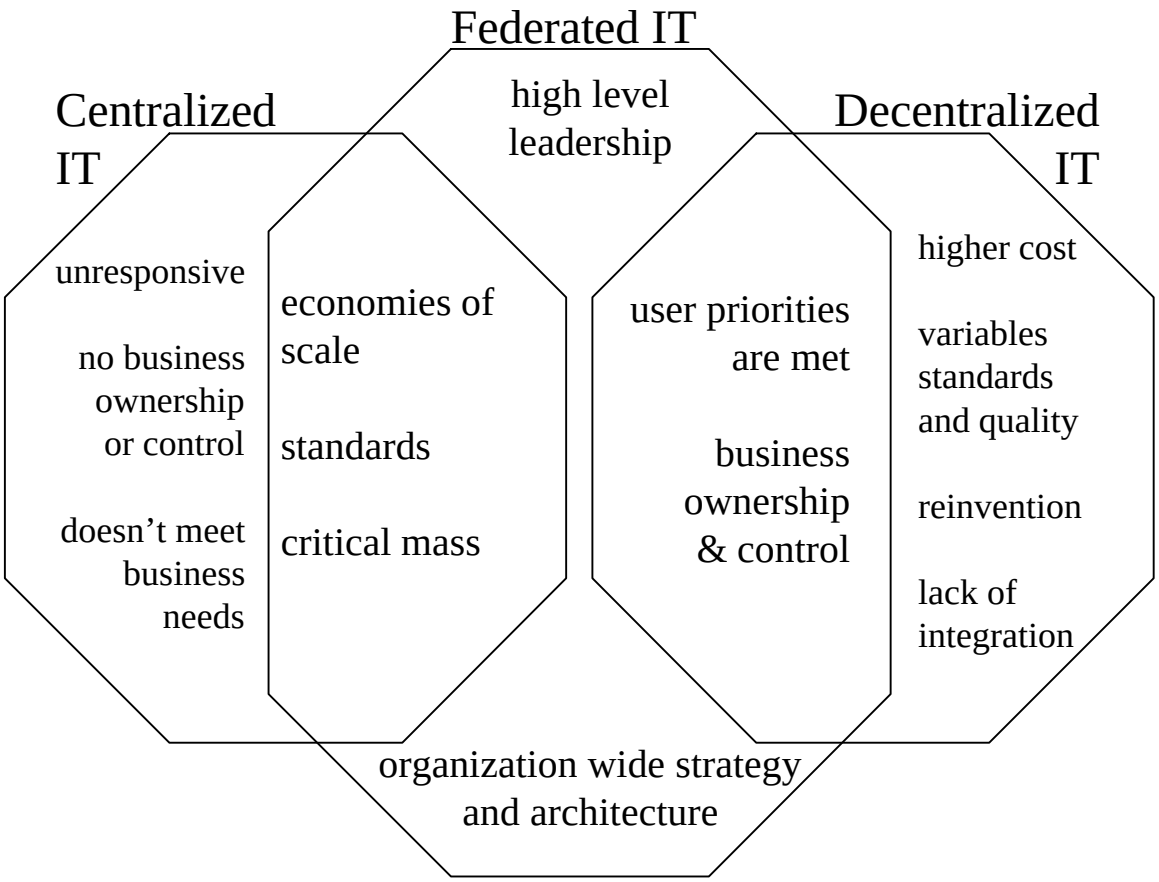
Summary:

Enterprise architecture has become something of a buzzword in the IT business. At the same time recent surveys suggest that there is significant recentralization of many IT functions, particularly as they relate to the management of data and infrastructure. This is occurring not simply because of a desire to control costs, but to deliver greater value to the business. Among the value organizations are seeking from this approach are to:

- improve customer service
- raise business productivity
- support revenue development
- allow for business integration
- speed time to market

Architectures which provide a standard business platform are key to achieving these results. At the same time architectural projects are some of the most challenging faced by organizations. The challenge comes in large part from balancing the tensions related to centralization and decentralization. The evolution of the so-called federated IT architecture is key to getting this balance right. The federal model separates duties and powers between a centralized corporate organization structure and business units. Typically this includes central responsibility for planning, infrastructure, data management and system operations coupled with decentralized applications development. The intent of such an approach is to gain the benefits of both centralization and decentralization while mitigating the disadvantages of either extreme approach. The benefits of this approach are summarized in the figure below.

Figure 1: The Federated IT Structure



For Additional Information:

articles

Cross, John, Michael J. Earl and Jeffrey L. Sampler. Transformation of the IT Function at British Petroleum, *MIS Quarterly*, Volume 21, Number 4, December 1997, pp. 401-423.

Rockhart, J.F. Michael J. Earl, and Jeanne W. Ross. The New IT Organization: Eight Imperatives, Sloan Management Review, Volume 38, Number 1, Fall 1996, pp.31-42.

Web sites

http://www.infoed.com/Open/PAPERS/ *a repository of white papers on architectural issues produced by The Information Architects Cooperative (TiAC)*

http://www-leland.stanford.edu/group/APS/arch/ a look at how they deal with architecture at Stanford University