

CIO 2.0: Reshaping the CIO Role in an Enterprise 2.0 Environment

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ABSTRACT

The role of the Chief Information Officer (CIO) is in the midst of a transformation as the perfect storm of economic, political, organizational and technological factors are coming together to shape the business focus of organizations as well as the technology solutions used to manage and govern that business. In this volatile and uncertain environment, today's CIO is facing many challenges: being agile and responsive, reducing resource requirements for operations and growth, providing the best service to support the mission, reducing the operating cost structure of the IT enterprise, achieving scale operations in the enterprise, enhancing performance of people products and services, improving transparency, enhancing reporting chains and benefit realization, and balancing the competing demands of many stakeholders. In this paper, we discuss our efforts to help our sponsoring Government CIO successfully define the vision, strategy and resources to build the future IT enterprise for a very large Department of Defense community. In particular, we describe our experience in implementing an Enterprise 2.0 interactive portal and tools set, "CIOweb", that is being developed by the CIO to shape and manage the information enterprise, provide a strategic business planning process that supports governance and visualization, develop a Web 2.0 technical forecast and roadmap, influence long term objectives of the CIO and establish a governance structure to manage this environment. Our goal is to help the CIO make the decisions that shape IT resources and results. We highlight some of the capabilities provided, techniques used, challenges faced, lessons learned and how this approach impacted the user.

Keywords: CIO, Agile Engineering, Information Management, Enterprise 2.0, Web 2.0, Wikinomics, Governance

1. INTRODUCTION

In previous papers, we introduced a methodology where MITRE is helping a United States Department of Defense

(DoD) organization to adopt the use of agile engineering processes for building key components of their information enterprise [3,4].

These techniques rely on using a distributed innovation lab (iLab) environment in conjunction with a series of warfighter workshops focused on themes and challenge problems identified by users. These workshops leverage FFRDC, Government, Industry and Academia resources and net-centric distributed capabilities to facilitate agile capability assessment and transition opportunities in an end-to-end fashion. They are designed to provide hands-on warfighter immersion into emerging processes, concepts and capabilities combined with facilitated discussions to develop and/or refine Concept of Operations (CONOPS) and Tactics, Techniques and Procedures (TTPs).

In this paper, we extend that work to show how MITRE is currently working with the Chief Information Officer (CIO) to help effectively harness Enterprise 2.0 technologies across the organization as part of the CIO's Information Technology (IT) governance process.

The mission of the CIO for this organization is to establish command-wide information management policy and processes to ensure information technology (IT) capabilities and on-demand information is available to successfully execute missions in garrison and deployed environments.

In particular, we discuss our efforts to help our sponsoring Government CIO successfully define the vision, strategy and resources to build the future IT enterprise. We highlight our experience in implementing an Enterprise 2.0 interactive portal and tools set, CIOweb. This capability is being developed by the CIO to shape and manage the information enterprise, provide a strategic business planning process that supports governance and visualization, develop a Web 2.0 technical forecast and roadmap, influence long term objectives of the CIO and establish a governance structure to manage this environment. Our goal is to help the CIO make the decisions that shape IT resources and produce measurable results.

There is a goal across the DoD to find new and better ways of managing information and providing capabilities in response to quickly changing needs. Net centric operations for the DoD represents a shift from traditional system-based interactions toward information-based web transactions, adding the requirement for highly secure, reliable, and dynamic "on-demand" capabilities [1]. Managing an enterprise of such systems can be considered an unbounded, unpredictable engineering activity. As such there is a need to go beyond traditional systems engineering approaches [5].

2. CIO CHALLENGES

The primary role of the CIO is to tie corporate strategy to IT investment in order to improve business capabilities and efficiencies. There has been much work published in the literature on the role and challenges of the Chief Information Officer as the Information Technology leader for a given organization [10, 11]. Our CIO faces the same sorts of challenges that commercial CIO's see.

For the CIO in a web 2.0 enterprise, there are several key challenges worth exploring further. This first pertains to social computing adoption across the enterprise. This challenge can be further refined by the following observations:

- Not a technology problem ... it is a culture change
- Adoption of multiple communication channels, not just email
- Lack of industry standards and APIs
- Tools need to evolve further and faster
- Digital natives expect to use Web 2.0 technology they have at home

A second challenge pertains to effectively leveraging information in support of both operating and governing the business of the organization. The following questions help to understand this challenge further:

- How do the people in my organization find information faster?
- How do we efficiently share information across our enterprise?
- How do we identify experts in the organization to help me solve my problems?

A third challenge pertains to driving business growth and success as characterized by reducing cost, improving productivity and increasing technology adoption.

A fourth challenge is the sheer size of the Enterprise which leads to complex adaptive systems having unpredictable behavior, fluid requirements, multiple competing stakeholders, and are susceptible to external pressures that can cause change across the entire system. Previous research has been accomplished to show that traditional systems engineering approaches do not work well when applied to complex adaptive systems [5].

3. TRENDS INFLUENCING CIOs

Enterprise 2.0 is driving demand and innovation in the enterprise. James Staten (Forrester) has noted that "...you can't manage IT the same way you've always managed it and empower new flexibility."

We see the following trends influencing CIOs:

Enablement: IT is trending toward becoming an enabler more than just an asset provider. There is more focus on the consumer. Thus expectations around usability are increasing. End-users are getting involved in technology selection; it's not just the IT department's decision anymore.

Transformation: New technologies and viewpoints (e.g., Generation-Y) transforming the workplace:

- Traditional means of communication are being replaced by newer tools that focus on increased collaboration.
- Information sharing and openness are necessary to increased collaboration. However, this can result in putting proprietary business information in generally accessible locations such as the searchable web.

Policy and governance: IT management is shifting from controlling assets to defining policies to support business processes. This allows stakeholders to exercise control over IT requirements and provides more alignment to stakeholders needs.

Virtualization: IT is shifting from fixed assets to supplying and managing on-demand services and interfaces.

The major gains of tomorrow are much more likely to be found in [12]:

- Spanning and interconnecting processes across internal and external organizational boundaries.
- Focusing on the people in a process and enabling them to make better decisions rather than automating them out of the process.
- Enabling the business to change things quickly, inexpensively and with minimal IT involvement.

4. WHAT IS ENTERPRISE 2.0?

We view Enterprise 2.0 as the adoption of web 2.0 technologies within the enterprise. These include the use of lightweight client/server communication tools such as web logs (blogs), wikis, on-line communities, and profiles of expert practitioners. These tools enable user controlled content and communications.

A typical toolset consists of:

- Blogs - easy content publishing, one to many
- Wiki's - interactive, iterative, group publishing and information sharing
- On-line communities - discussions, many-to-many and integrated with email
- Knowledge experts – searchable catalogs of gray beards for expert advice

Enterprise 2.0 capabilities provide increased value and return on investment (ROI) through employee collaboration, increased efficiency, connection to all members of an organization, and democratized information.

5. SHAPING THE CIO ROLE WITH CIOweb

Our work continues to show that agile development best practices can scale to the enterprise-level, and could be used as an alternative to traditional systems engineering and acquisition approaches when applied to large system-of-system environments.

Our customer, the CIO has established traditional policy and guidance in many areas of enterprise IT development and operation. However, this guidance is not part of a published and overarching strategic plan for the IT enterprise. In an effort to help mitigate these shortfalls, MITRE is developing for the CIO, a *Strategic Enterprise Plan (SEP)*. The SEP is divided into three strategic focus areas; the *Business Plan*, the *Management Plan*, and the *Technical Plan*, and addresses the following areas:

- Enterprise Planning
- Business Mission areas
- CONOPS development
- Enterprise Business Objectives
- Business Processes Management
- Portfolio and project management
- Policy and Governance
- Service Level Agreements & Metrics
- Enterprise Architectures

The SEP and its components are to be hosted on a WIKI based environment called the *CIOweb*. Presenting the SEP in this Web 2.0 environment is intended to empower the CIO with the benefits of “*social networking*” in the area of enterprise governance.

The current focus of the SEP is the generation of a Strategic Technical Plan (STP) that provides the technical foundation for the SEP. At its highest level, the STP comprises a set of CIO-provided engineering strategies for IT systems to be employed across the enterprise through which to deliver the promises of Net-Centric capabilities – *increased interoperability* and *support for composable capabilities*. The Enterprise is considered to include all systems developed, maintained, fielded, and sustained by CIO’s portfolio.

Achieving this Net-Centric transformation requires an *enterprise* cultural perspective. The CIO’s STP provides guidance to stakeholders to better meet enterprise goals. The STP summarizes the key attributes of the organization’s Enterprise, reviews how a layered, modular reference model can help systems enable that enterprise, and describes **nine** fundamental strategies and goals that programs should pursue to make the Enterprise a reality.

The **nine** Systems Engineering strategies include the CIO’s [9]:

- *Architecture* Strategy
- *Data* Strategy
- *Services* Strategy
- *Process* Strategy
- *Network* Strategy
- *Infrastructure* Strategy
- *NetOps Management* Strategy
- *Information Assurance (IA)* Strategy
- *Net-Centric Technology Portfolio Management* Strategy

Figure 1 (adapted from [9]) shows the layered application of some of these strategies (indicated by the yellow callouts on the right) to several important business

(mission) areas supported by the CIO. The yellow connectors indicated the use of the hour glass architectural model discussed in [5].

These STP technical strategies are founded in the expression of an *enterprise architecture* and additional sub-architectural components. The architectural framework captures business processes and rules, information exchange requirements, business services and interfaces and the underlying IT systems and technology. This enterprise architecture is *implemented* through guidance documents that include direction in areas such as development, migration, design, and acquisition procedures. Implementation guidance includes the use of enterprise *standards*, e.g., IPv6, XML, WSDL, PKI and SOA.

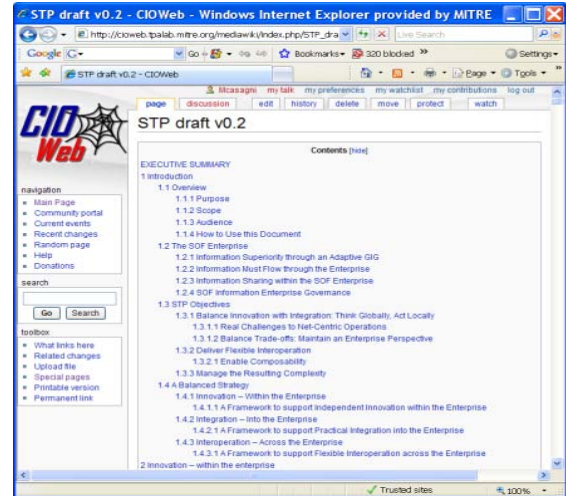


Figure 2 CIOweb WIKI

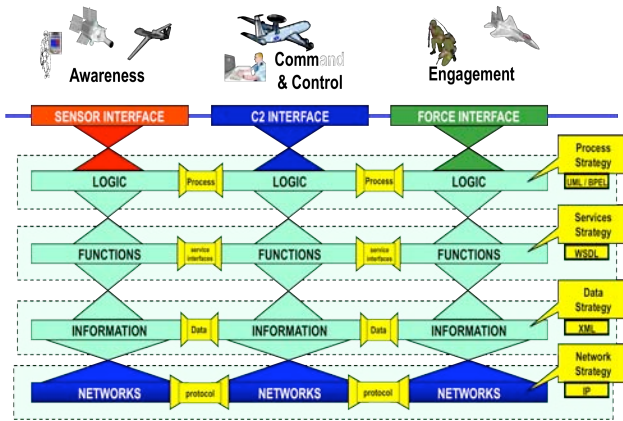


Figure 1 STP Engineering Strategies

This guidance is *executed* through an infrastructure composed of policy directives, toolkits, checklists, and management forms. The Policy and Guidance covers requirements generation, risk analysis, configuration management, integration testing and validation, quality assurance, and logistical support.

Pulling this all together, the CIOweb provides the collaboration capability to support the *on-line community* of IT developers and consumers supported by the CIO. This community uses CIOweb as a knowledge base, information sharing site, and idea clearing house to evolve and manage the IT infrastructure. Figure 2 shows a screen shot from a portion of the CIOweb WIKI.

The CIOweb will be used to shape and manage the information enterprise by hosting technical forecasts and roadmaps, influencing long term objectives, establishing governance structures, and providing implementation and execution guidance through the SEP. The CIOweb will enable enterprise level management through an interactive Enterprise 2.0 environment with tools to support collaboration and the strategic planning processes that embrace governance and visualization techniques.

6. CIOweb HARNESSSES ENTERPRISE 2.0

Enterprise 2.0 represents the technologies and business practices that will liberate the traditional workforce from the constraints of legacy communication and productivity tools. It provides commanders and their staff with access to the right information at the right time through a web of inter-connected applications, services and devices. Enterprise 2.0 makes accessible the collective intelligence of many; translating to a huge competitive advantage in the form of increased innovation, productivity and agility.

CIOweb will harness the power of Enterprise 2.0 techniques to support Information Enterprise governance structures and visualizations. This will allow the creation of a more agile, responsive and cost-effective IT environment, embracing and empowering the user community as opposed to restricting it.

The new CIOweb environment creates a full-featured social computing platform, where stakeholders will find new methods of collaboration and communication, which in turn will facilitate improved decision-making through better understanding and user involvement. Stakeholders

will enjoy increased situational awareness through techniques such as dashboard analytics utilizing tools to measure and identify value.

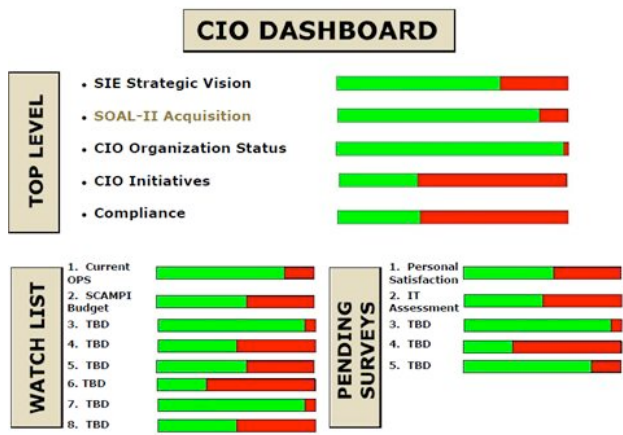


Figure 3 CIOweb Dashboard

Visualizations in this environment will be empowered by user selectable dashboards (see Figure 3). These dashboards will employ automated statistical roll-ups utilizing data through survey generation, analysis, and pre-existing database content. All aspects of the CIOweb environment can be visualized as web parts during the creation of personalized dashboards.

CIOweb will be used by the CIO to shape and manage the information enterprise. It will support a strategic business planning process that allows visualization of the real state of the IT enterprise and bring the necessary governance and direction to bear to achieve the desired outcome. Technical forecasts and roadmaps will influence long term objectives. Figure 4 depicts the use of CIOweb to manage the CIO's IT portfolio.

In order to determine the Enterprise 2.0 return on investment (ROI), CIOweb provides a metrics and benchmarking strategy implemented through flexible survey generation toolset and dashboard capability.

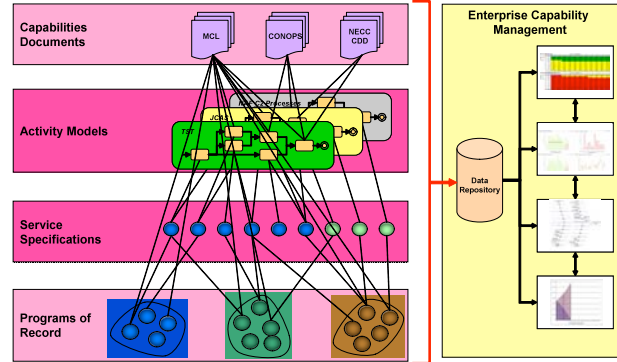


Figure 4 Portfolio Management Process

In summary, CIOweb harnesses the value of Enterprise 2.0 and provides the following benefits:

- Creates a more agile, responsive and cost-effective IT department
- Embraces and empowers users, doesn't restrict innovation
- Provides new ways of collaboration and communicating
- Supports better decisions made through understanding and involvement
- Creates full-featured social computing platform
- Utilizes tools to measure and identify value
- Emphasizes the importance of measurement and analytics and brings them to the forefront of awareness and decision making
- Identifies stakeholders and helps understand/evaluate stakeholder behavior
- Encourages education, understanding and adoption of IT guidelines and policy

7. CONCLUSIONS

The CIO plays a crucial role in leading the enterprise to accomplishing or exceeding its business goals. To maximize business success given limited resources it is important that the CIO clarify enterprise business objectives, and define an enterprise strategy for the organization to meet those objectives. The Strategic Enterprise Plan that we discuss in this paper provided a good way to document those objectives and highlight a strategy for the organization to make progress toward meeting them. Putting the plan in a wiki provided an easy way to share the plan across the organization and offer everyone a mechanism to take part in building and realizing it. Enterprise 2.0 technologies, such as the wiki and the dynamic services for the dashboard capability became enablers to helping the CIO execute the IT

governance necessary. Having the CIO embrace those technologies facilitated the social adoption by the entire organization, which ultimately helps to increase the credibility and influence of the CIO role.

The key takeaways from this work thus far include:

- CIOs are in the midst of a collaboration transformation
- Successful communities collaborate and work interactively
- Generation-Y's are driving much of this transformation
- Develop a Strategic Enterprise Plan that allows the CIO to think globally while acting locally.
- Think globally, act locally (loose coupling)
- Applications should be built to share data
- Measurement is key

As part of measurement, there is a need to rethink traditional analytics to accommodate social networking. Social analytics are based on different values, such as Peer review and recognition, stake holder voting, and techniques to capture corporate knowledge and discussions. The goal is to identify a business sponsor who has a vested interest in driving value, and agree to a simple set of value measures between business and IT. Once agreed on, track them!

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