

Road to the Future

A Vision for IT in Utah

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In the October 24, 2002 Information Technology Commission (ITC) meeting, the commission asked the CIO to present a vision for IT in the State of Utah that includes the potential for converged networks, managed desktops, and other computing facilities. This document sets forth that vision.

The Governor has set forth his objectives for IT in his recent letter of 4 August:

1. Utah residents will be able to access most state services online, 24 hours a day, 7 days a week.
2. We will implement systems that are integrated across the state enterprise, and in time will be integrated with local governments, other states and key federal agencies.
3. Our new vision will provide improved customer service and taxpayer savings.

These objectives provide a broad outline of the direction the Governor would like for IT. Historically, the ITC has shared the first objective, but the others may require some introspection by the commission. If the ITC supports these same objectives, then the commission can provide significant guidance in helping to determine the details of how these objectives are met.

As we review the Governor's objectives, I believe that we must outline a roadmap that accomplishes the objectives in a way that is efficient and effective. That requires a vision for IT in the state that is clear and sets direction. This document:

1. Describes a vision for IT in the State that I call "Road to the Future."
2. Discusses some of the barriers we face.
3. Suggests specific things that the ITC might do to remove those barriers.

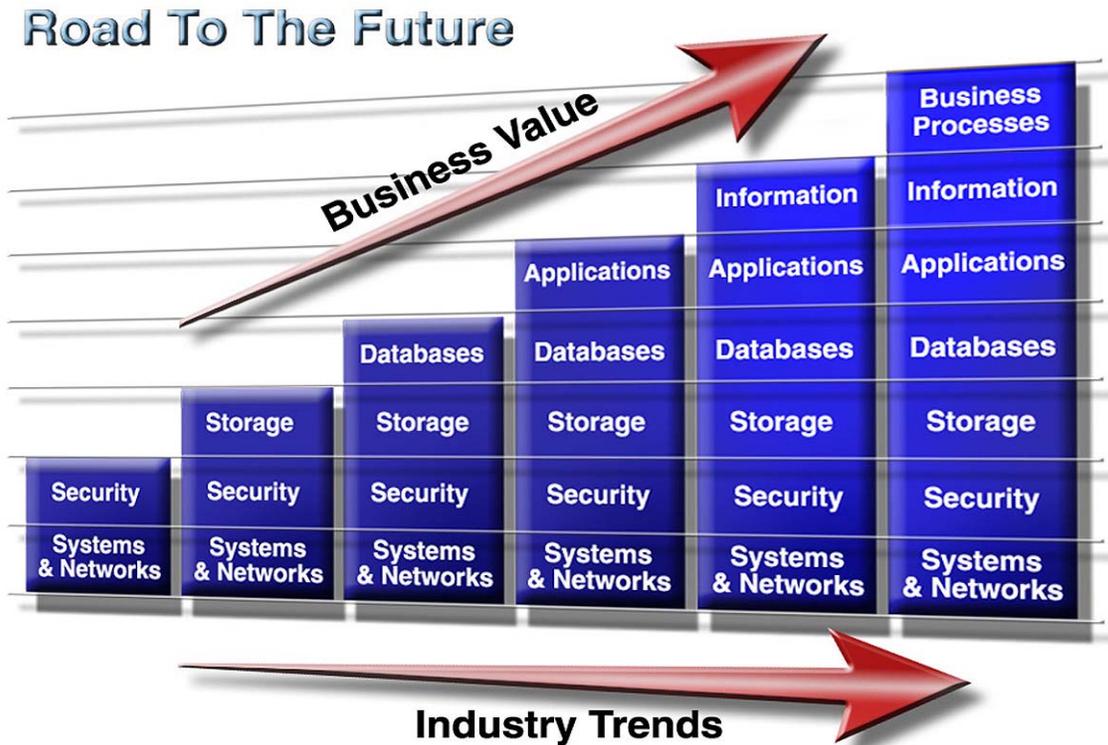
Road to the Future

The Governor has proposed a plan for prioritizing and managing cross agency projects. The ITC should regularly review those projects and give their guidance and direction. However, I believe the ITC can play a much more important role in establishing a vision for IT in the state that supports digital government and effective government.

In short, our vision for IT should include more than a collection of projects or applications that we want online. While those are certainly worthwhile efforts, alone

they do not provide the kind of systematic improvement necessary to conduct eGovernment.

The following diagram¹ shows how the business value of IT increased with technology maturity and suggested some specific steps in gaining technology maturity.



The diagram describes a "road to the future," a road paved with enormous opportunity and enormous challenges. As technology matures, so does the value that it provides to the organization. Nevertheless, this maturity brings with it increasing complexity and greater requirements for interoperability of IT systems, security, storage, databases, and applications. Alignment of each of these IT components with agency information practices and business processes is essential to managing complexity as information technologies become more mature. Where our newer state-of-the-art-systems are but islands in a sea of legacy systems that picture must change as legacy systems are retired and replaced. Our challenge in looking forward will be to make informed choices about the scope of our future projects. Will they be built in ways the reflect the processes of the past or will they take advantage of the latest advances in the theory and best practices of enterprise computing models as they exist today?

¹ Source: Department of Family and Community Services in the Australian National Government.

Clearly, our belief is that new tools and models require new thinking and adaptability by the organization. If we are to move to true 24x7 availability of service, integration across the enterprise, improved customer service and taxpayer savings, then we must create an enterprise architecture and build in key components that are not presently available to meet the Governor's objectives. The remainder of this document will offer in more detail a description of what we have accomplished thus far and what remains to be done to accomplish these goals.

Systems and Networks

The first place an organization must begin if it wants to create more business value through IT, is to look at their base systems and network, what we call "infrastructure." These include: desktop systems, servers, data centers, and mainframes. The network includes not only the wiring and routers, but also the standard network applications that we have agreed to use across the state enterprise i.e. email, directory services, and file services.

Networks

Starting almost a decade ago, Utah set off to create a statewide network and we agreed we would all use some common applications that would run on our network. Through volume purchasing and economies of scale the State was able to add value while reducing costs through the purchase of GroupWise for email and Novell file servers for our LANs. What we have now is one of the best statewide networks in the country and a firm foundation for future progress.

Recently we took another giant step in maturing our network infrastructure with the development of our statewide directory, the Utah Master Directory (UMD). UMD provides an important infrastructure for authenticating and authorizing users on the network as well as systems that will follow. In the future, instead of having to recall multiple logins and passwords and have them stored in multiple directories and applications, one login and password stored in a single place will be enough for employees to do their work. Single sign-on becomes a reality for employees of state government. In addition to ease of use the creation of UMD also has as an immediate by-product, improved security.

Still, much remains to be done to improve our networks. New technologies frequently cause us to rethink how we deliver IT services. One good example of this is a technology known as Voice over IP. VOIP systems deliver telephone services over the same network that computers use to transfer data. They are becoming more and more mainstream and provide the opportunity for savings in both initial building costs (fewer wires need to be strung) and operational costs. But, in order for VOIP systems to work, we must have a single network. The current method of letting each organization manage its own local area network (LAN) will not work if we want to deploy VOIP. This is just a single example of the kinds of technology changes that are driving organizational changes. Another way to say this is that consolidation initiatives in information technology are not being driven by the arbitrary preferences of technology leaders. They are being driven by the changes in the technology itself. It is the role of government leaders with the assistance of technologists to both understand and to take advantage of these changes. Those

who do not, risk falling behind and ignoring the economic engines that stimulate the state's prosperity and the future prosperity of our citizens.

Systems

We have made progress in the systems area as well. The state has two primary data centers: one in Salt Lake and one in Richfield. These data centers are key assets for business continuity planning should a disaster occur. They also serve as home to the State's mainframe computers. They are, however, under utilized resources. As processes surrounding their operation are improved, these assets become even more valuable to the state if they are utilized to their full capacity.

We have had significant discussions regarding desktop and server consolidation at the state, but they are still managed individually by each agency and, in some agencies, individual divisions. This will become an even greater barrier to progress in adding value in later stages of technology maturity (see application and data normalization below) since there is no standard environment to deploy applications. Without a standard deployment environment, costs and delays will invariably result. For example, deploying the UMD directory required more than eight months to complete because of non-standard server environments that had to be upgraded and normalized. Ideally this change could have taken a month.

Security

Security is shown in the diagram as happening simultaneously with systems and networks. This is the ideal situation that many organizations do not follow. It is difficult to imagine deploying a network infrastructure without planning for its security at the same time. Utah has spent a great deal of time and effort working on both the policy and implementation sides of security. There is still much to do as security is a process rather than a destination.

Storage

Utah has recognized the importance of enterprise storage in enterprise infrastructure. Enterprise storage is a comprehensive and costs-effective solution to reliable and secure data storage. For example, Gartner reports that the cost of managing storage is eight times more than the cost of the storage itself. So, from a total cost of ownership perspective, enterprise storage solutions can reduce storage costs substantially.

An enterprise storage solution is comprised of what is known as a storage array network (SAN) and is composed of network attached storage (NAS) devices, tape backup devices, and storage management software that reside in multiple locations. This infrastructure should be invisible to users of the services and all they will see is a "place" where they go to store and recall data at will. A correctly priced enterprise storage product will be less costly than what could be provided through individual direct attached storage solutions and it will also provide data protection and business continuity protection in addition to raw storage.

Utah has an enterprise storage solution and to encourage its use, ITS is working hard to get the rates in line with similar services and solutions that can be bought

outside the state system. Our enterprise storage solution should provide reliable, secure storage that automatically backs data up in both the primary data center in Salt Lake City and the alternate data center in Richfield at or below market prices.

Databases

The next step in building an enterprise infrastructure is we must work very hard to reduce both the types of database software used and the actual number of databases that the enterprise operates.

In this context, we're not only talking about the production level databases but the hundreds of auxiliary collections of data that live in Excel spreadsheets, Word tables, and other places that contain critical information that we absolutely need to have at our fingertips. How did we get ourselves into this predicament? As computing became more ubiquitous in the 80s and 90s, the proliferation of databases was a natural consequence, particularly in a world where networking was patchy or non-existent. With the advent of universal networks, faster machines, and better database software, enterprises now have the tools at their disposal to help them find a way out of this problem. By reducing the number of databases an organization manages, it will not only reduce its costs, but, more importantly, will also improve performance while making the organization more flexible to change.

I recently began wondering how extensive Utah's problem was and asked Jeannie Watanabe in my office to conduct an inventory of the state's databases. The results are nothing less than astounding! A person can exist in over 204 separate databases in the state and a business in over 93. This duplication reduces our capacity to share data, increases the cost of maintaining the data, and hinders our ability to serve citizen needs. For example, having names in so many databases makes it nearly impossible to offer services like a statewide change of address application or alert someone of a service that they might find helpful such as alerting mothers of babies being immunized that their child needs a hearing screening.

Within the bounds of good privacy policies data resources should be created that serve more than one governmental function. My recent paper on "[Enabling Web Services](#)" describes how XML can be used so that data sources built for one purpose can be easily repurposed for another. The most important principles in the paper regard being true to the architecture of the web and using well documented and well described XML as the primary product of data queries.

One area that we are significantly ahead of the curve is in Geographic Information Systems (GIS). GIS provide a convenient method for standardizing and utilizing vast amounts of geospatial data. While there is always more to do, we can take pride in the progress that the State, local governments, and others have made.

Applications

Similarly to databases, we also need to reduce the overall number of applications that the enterprise operates. This process requires even greater cooperation between departments and divisions within the enterprise than any of the earlier steps.

The Governor's plan for IT is squarely aimed at the problems associated with our applications and databases. This plan creates a way to prioritize the many potential projects through the Cabinet and creates a mechanism for formalizing inter-agency cooperation in the form of charters.

Take for example, the eREP project currently being carried out by the Departments of Workforce Services, Health, and Human Services. eREP is a single eligibility application that will serve the needs of all three agencies. The system provides a general infrastructure that contains important modules for determining eligibility and calculating payments. The application makes significant use of a rules engine to ensure it is flexible enough to serve multiple agencies and their programs. The creation of a single application to serve the multiple needs of these three agencies requires significant cooperation between the agencies and some organizational "scaffolding" like a cross agency steering committee, governing board, and project team, not to mention an agreement between those agencies that provides the resources necessary to complete the job.

Another example of a project being considered by the Cabinet is the master licensing application. This application would provide a single licensing infrastructure that would serve the needs of several agencies.

Information

Once common data and applications are available, the state will be ready to start extracting information from its IT infrastructure in a much more efficient way. One of the best examples of a company that uses information from its IT infrastructure to run its day-to-day business operations is Seibel. Seibel, being a relatively young company, didn't have significant legacy systems to integrate so they were able to build this type of infrastructure from the ground up.

Seibel uses its IT infrastructure to tell every manager the important things they need to know about their customers and operations on a real time basis. Managers can constantly ask for more information about every area of interest and drill down to find out the details when necessary.

Utah is able to do some of the same kinds of things that Seibel has been able to accomplish. One good example of this is the finance data warehouse. It is a wellspring of good information on the finances of the State.

What we lack however, is a way of systematically real time information about every important area of the enterprise for the managers who operate the various lines of business in the state. I envision information reports to not only executive directors and deputy directors, but also ones that every manager in the state would be able to see every morning, real time to help give them answers to the ten most important questions they have everyday.

We are still a significant ways away from being able to do this but until we have made greater strides in reducing the number of databases and applications that store the same information, attempting to create such a system at this point would be hopelessly expensive. I believe the day will come when this vision is a reality that is universally true for all managers in the State, and what a benefit that would be. I also believe however that it is not inevitable but only possible if we begin putting the

building blocks in place now. How long it takes us to get there depends on our ability to execute on the Governor's plan for enterprise projects that drive our the transformation of our databases and applications

Business Process

It may seem odd that business process is at the end of the "Road to the Future," rather than at the beginning. After all, isn't the business supposed to drive IT? Putting business process at the end isn't meant to imply that IT drives the business process. Nevertheless, having good information allows business managers to use IT to add value to those business processes.

In fact, I think that once an organization has reached the level of technical infrastructure maturity we've been talking about in this paper the organization would probably not even be debating about what was driving what. The IT infrastructure simply becomes one of the primary means of understanding their business, which in our case is the ongoing execution of integrated 24X7 cost-effective government services. At this point there will be no "IT" projects in our organizations, only "business" projects.

A number of well-managed organizations (note that this is different than organizations with great IT, although they are related) are clearly all the way out on this chain that maximizes IT. Examples include Siebel, Wal-Mart, and Oracle.

Roadblocks

In order to tread this road to the future, there are some significant barriers that we must overcome. This section sets forth, in no particular order, *some* of the barriers I think we face and offers specific suggestions that the ITC might consider.

ITS Customer Dissatisfaction

Since taking the job as State CIO, one theme has been consistent: agencies are not happy with the level of service or the reliability of that service. If we are to make progress in the vision that I've articulated, ITS must be seen by its customers as a preferred place to buy IT services.

ITS management has recently developed a roadmap that describes its plan for becoming a customer-focused organization that is known for offering reliable services at costs that are at or below market. There is much work to do here and the road is not easy, but it is one of the most important tasks before us. I urge the ITC to review the ITS plan and support ITS efforts to improve.

Fragmented Technical Infrastructure

In many places, our technical infrastructure is fragmented. We are making progress in some areas, but we must move more quickly. I've mentioned one example of fragmented infrastructure already: our networks. We also have fragmented the management and operation of our data centers, servers, and desktop infrastructures. This is not simply a matter of setting standards. While setting standards may help ensure interoperability and decrease the time we spend rolling

out new applications, it will not be efficient. The ITC can hasten our progress in these key areas by determining direction and outlining objectives.

Data Policy, Rules, and Statutes

Some of the most vexing issues facing us as we move toward data normalization involve statutes, rules, culture, and attitude. The ITC has done important work in the past in the area of working out statutory issues regarding eGovernment and this would be a profitable area for the ITC to again direct its attention.

A Bias for Single Function Applications

No matter how good people's intentions and the feelings for cooperation, its often easier and faster to build a single purpose application inside an agency than to go through the pain of finding partners, building common requirements, and building an application that serves multiple groups and provides for interoperability and gathering information. The ITC can serve an important role in developing requirements for planning and funding that reward and encourage joint applications development.

What's Next?

I ask the ITC to formally consider the Governor's objectives and to adopt them as the State's objectives or to propose alternatives to these objectives and engage in a dialogue with the Governor on the alternatives. The ITC is the body best positioned to take a leadership role in this area.

Conclusion

I found the picture at the beginning of this document to be intriguing because of the degree to which it paralleled our own experience. Certainly nothing in real life is as nice as a diagram, but it is instructive to step back from the fray and see the bigger picture of what we're trying to do in terms of a natural infrastructure maturation process. I'm confident that recent steps in building governance models for enterprise projects will enable us to move further down this path and create increased value for the citizens of the State through the use of IT.

The ITC can play a pivotal role in Utah's future by adopting objectives and working to accomplish them.