

Government CTO

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Government organizations have a long and rich history of leading explorations into new technologies. From the Manhattan Project to the Space program, government scientists and managers have created some of the largest breakthroughs in technology ever made. Today much of the technology work has been outsourced to commercial industry, but government organizations that oversee this work continue to include world-class scientists, engineers, and mathematicians. These technologists guide the evolution of existing products and press for revolutionary solutions to increasingly complex problems.

Some of these technologists hold the title Chief Technology Officer. This position usually allows them to focus on the technical aspects of problems and solutions, leaving specific management, administrative, and contractual details to others in the organization. These CTOs have a huge impact on the adoption of new technologies and research into new ideas. Given that a great deal of new technology in the last two decades has been in the form of computers and information systems, it is not surprising that for some organizations, the CTO can become nearly synonymous with the CIO. However, from a broader perspective, the CTO has very unique responsibilities that are focused on technology that may include computers, composite materials, rocket motors, medicines, and new forms of energy.

In this article we profile several government CTOs and extract lessons from the work that they are doing to advance the national state-of-technology in defense, city and county government, services to citizens, and administrative oversight. These lessons focus on the government's responsibilities in technology:

- Integration
- Architecture
- Reuse and Duplication,
- Innovation, and
- Technology Policy.

Dawn Meyerriecks, DISA

Dawn Meyerriecks is the CTO for the Defense Information Systems Agency (DISA). This agency is responsible for the command and control computers throughout the military. It develops global networks that allow military personnel worldwide to share information that is essential to conducting their missions. As the CTO, she works with everyone in the 1,200-person organization to insure that they are taking advantage of the right technologies and getting these fielded efficiently. This includes encryption, biometrics, and wireless technology to support classified systems and operations.

After earning a degree in Electrical Engineering at Carnegie Mellon University, she joined defense contractor TRW, then moved to the Jet Propulsion laboratories, and finally to DISA. Her education and career in technology began in the late 1970's when women in engineering and computer science were rare. However, over the years she says this has changed and DISA now has women throughout its ranks.

Though working as a computer programmer was extremely rewarding and enjoyable, Meyerriecks' climb to the CTO position required that she "give up the keyboard" and focus more on working with people. Today her effectiveness is measured by her ability to get large numbers of people working together toward a common goal. This can be extremely difficult within the Department of Defense where individual services - the Army, Navy, Air Force, and Marine Corps - can all behave as fiefdoms that refuse to cooperate. The Defense Information System Agency must create common computing and communications solutions that bridge these service boundaries and enable these groups to work together on the battlefield in spite of their differences. To accomplish this, Meyerriecks models her leadership style on that of her predecessor, former Technical Director Frank Perry, who is now CTO with the Department of Veterans Affairs. "I learned don't ever let anybody know they're getting to you," she says. "If you can maintain calm when everyone around you is angry or frightened, they will look to you." She recognizes that her leverage comes from reason, dependability, and openness to listening to everyone's concerns. A CTO who can do this effectively is much more valuable to the organization than someone who attempts to impose standards by edict, without discussion and consideration. In this respect, Dawn Meyerriecks has made a huge jump in her ability to powerfully influence the development of military information systems.

Meyerriecks wrestles with both technical and cultural challenges within DISA and DoD. Technically she is searching for new techniques to allow DoD to achieve interoperability across many families of communications and computing systems. Achieving this requires bringing service sponsors to standards that are not service-specific or even DoD specific. She must get the military to adopt commercial standards because commercial applications now move forward much faster than do DoD solutions. Therefore, the military finds itself using commercial tools that operate on commercial standards.

Her office is also tackling the issue of managed identity and access control. Tens of thousands of military personnel access thousands of computer systems and networks every day. Each person has approval to access a different set of systems and the need to know limited sets of data. Establishing a practical system of identity verification that can be used in the field by people at all levels of technical expertise is a major challenge. To assist DISA with these issues, Meyerriecks' office has published a list of the major technical challenges that they face and would like industry help with. Providing this type of direction and solicitation is an important part of the partnership that DISA has built with commercial vendors like Microsoft, IBM, Oracle, and Verisign.

DISA's challenges are not just technical - they are also cultural. As described above, they are struggling to get all of the communities within the Department of Defense to accept common solutions to problems, commercial standards, intellectual property from other services, and market forces. This is a very different approach to the tradition of relying on government policy for all decisions. These types of issues must often be tackled hand-in-hand with the technical issues. It is often impossible to separate things like commercial standards from the policies and historical precedents for opposing such standards that have built up within the organization over decades. To some degree "commonality" across the Army, Navy, and Air Force diminishes the independence, unique identity, and tradition of these groups. DISA and Meyerriecks must build cooperation, commonality, and standardization within computer and communication systems without diminishing the spirit of uniqueness that is cherished by each military branch.

Finally, Meyerriecks is trying to implement the IT side of the military's conversion to "Network-centric Warfare". Her office has expressed this as a change from "command and control" to "command and coordination". DoD and DISA recognize that computer systems and modern weapons allow people to operate more independently and to be more effective. Therefore, they are attempting to replace some of the "control" that has been typical of military operations with "coordination". We can no longer control everything that happens in a military operation. Our modern systems allow us to release some of that control to automated systems and empowered leaders. The goal then becomes to coordinate their actions toward the overall mission. This is very different from the traditional doctrine of control and subordination. Groups like the Army Rangers, Navy SEALs, and Marine Expeditionary Forces blazed the trail on coordination of individual initiative and decision-making. The modern political situation calls for the employment of more forces of this type and fewer of the mechanized armies of World War II. Therefore, this culture and the weapons to empower it are propagating throughout the military.

Melody Mayberry-Stewart, City of Cleveland, Ohio

Dr. Melodie Mayberry-Stewart, Chief Technology Officer for the City of Cleveland, is responsible for developing, implementing and supporting Information Technology (IT) strategies to improve government services for the City. Her challenge is to produce an IT-savvy government that uses the latest technology to be "operational, efficient, and effective".

A native Clevelander, Chief Mayberry-Stewart is the founder and CEO of the Black Diamond IT Consulting Group. She has more than 25 years of IT experience and works with CEOs, COOs and CIOs to develop IT strategy and build high-performance IT organizations to improve organizational performance. She was the first African American female General Manager and Vice President of Corporate and Shared Services for worldwide delivery of IT systems and operations for the BP Amoco Corporation, where she had global responsibility for the design and implementation of IT systems and services. Prior to joining BP Amoco, Mayberry-Stewart was the first and only Black female Chief Information Officer (CIO) in the health care industry in the country. She

was the CIO at Beth Israel Medical Center, with headquarters in New York City with more than \$1 billion in revenues annually.

The City of Cleveland relies on Mayberry-Stewart to lead efforts to modernize its information infrastructure. The old infrastructure evolved as a number of disparate and incompatible systems. Through competitive contracting, the city has selected SBS Communications to design and deploy a new system that ties together all of the city services and makes them more accessible to the citizens.

Mayberry-Stewart inherited a city that had very poor technology penetration. Only 25% of city employees had access to email, governmental IT positions were staffed with minimally qualified individuals, and IT positions carried sub-standard pay levels making it difficult to attract highly qualified candidates. She has been working with the city's Director of Finance to access the financial resources needed to fix this situation. However, she recognizes that technology systems must compete with other departments for the same limited pool of resources. They are constantly balancing purchases between new police cars, construction new of water processing plants, and upgrades to the IT infrastructure. She presents cities like Honolulu, Chicago, and Seattle as models for the capabilities she is targeting. One of her most important missions is working with city council to educate them to the economic and social benefits of IT, and hopefully winning their support.

Case Western Reserve University has led the creation the OneCleveland organization to bring together non-profit and government agencies that can build a communications infrastructure within the city. Their goal is to promote education, training, cultural events, and access to government services for the population of Cleveland. This network will support the needs of schools, museums, hospitals, police and fire departments, and government offices to access high-speed networks for better internal operations and service to citizens. Through OneCleveland's efforts, each of these organizations will not have to build or purchase their own backbone infrastructure between their facilities, but will be able to leverage a common backbone supporting all city services. Mayberry-Stewart represents the interests of the City of Cleveland within this group and provides expertise and insight into the needs of the city and the local government's plans to meet those needs.

Mike Macedonia, Army Simulation, Training, and Instrumentation

Mike Macedonia serves as the CTO for the Army's Program Executive Office for Simulation, Training, and Instrumentation (PEO STRI). His organization is responsible for creating everything from 3D immersive tank simulators to advanced laser-tag systems for use in the California desert. STRI uses the latest computers and networking equipment to create realistic training devices and scenarios that can teach soldiers what war is going to be like and prepare them to succeed long before they have to go into harm's way. Macedonia says, "Our soldiers are virtual veterans before they even go into conflict ... we take them to the edge and let them know that they are going to do alright [in combat]."

To assist STRI in building these systems, Dr. Macedonia has to explore new technologies and build partnerships both inside and outside of government. He is constantly exploring the capabilities of new graphics chips, new techniques in artificial intelligence for soldier behavior, and advances in computer games. This latter subject has landed Macedonia and STRI in the popular media a number of times. They have worked with game development companies like There Inc. and Pandemic Studios to create game-like systems that also have the ability to teach soldiers to do their jobs better. Though computer games like Unreal and Quake have many of the same appearances of military simulations, the presence of anti-gravity devices, teleporters, and rail guns are not conducive to teaching soldiers to use their equipment effectively in real combat. But, the raw materials are there to create more realistic environments and military training devices that can accomplish this. Projects like Full Spectrum Warrior for the X-box leverage advances in commercial games to create a realistic training system. Macedonia has also worked with There Inc. to create a massively multiplayer environment that can bring together teams of soldiers from around the globe to training with each other and exchange ideas.

Dr. Macedonia earned his Ph.D. from the Naval Postgraduate School under Mike Zyda, a leader in interactive computer graphics. Prior to that he also served as an Army infantry officer during Desert Storm. Macedonia understands both the real-world and the virtual-world views of Army missions. Looking into the future Macedonia recognizes that all future recruits will have grown up with computer and console games. Therefore, the Army must learn to communicate and teach them through this medium in the same way that the Army of WWII used Disney Animation Studios to create educational movies for the soldiers. Today no one questions the value of educational movies, but the move into computer gaming required moving that perspective into the future, to focus on a medium that future soldiers will have grown up with.

To assist in its quest to create the ultimate training environment, the PEO STRI has created its own research and development organization at the University of Southern California. The Institute for Creative Technology (ICT) was created by a \$50 million grant to the university with the stated objective “to create a liaison between the service and the entertainment industry, for the purpose of enhancing simulation-based training.” The result has been a number of innovative products, to include, the Alternative Leadership Training Simulation, Full Spectrum Warrior, and Flatworld. Each of these products pushes the Army beyond the edge of current technology and creates new solutions that were not previously reachable.

Prior to World War II a little known inventor working in his father’s organ factory had created a very sophisticated flight simulator. However, he was unable to interest the Army Air Corps in the devices, so he sold them to amusement parks and continued to develop the technology. When the war started there was a sudden need to rapidly train hundreds of pilots and the Army was eager to buy the leading edge flight simulators created by Edwin Link in Binghamton, New York. In both the 1940’s and the 2000’s, the newest, advanced simulator technology was available to the public for entertainment before it became a military training product. Today we harvest computer hardware and

software from the gaming industry just as we did from the arcades of the past – and we look to the CTO’s of organizations like PEO STRI to provide the vision to do it.

Frank Perry, Veterans Affairs

Frank Perry, the CTO at the Office of Veterans Affairs, occupies a position that reports directly the CIO of the office. In providing services to the office and to the huge number of veterans around the country, the VA found that it needed someone to focus on the technology behind the IT systems being deployed while the CIO focused on policy decisions and the best serves that the office should provide. Prior to hiring Perry, the VA found that they were falling further and further behind in understanding and deploying the new technologies being offered by industry. They needed someone to remain abreast of these advances and keep the CIO informed on what was available and what was doable.

Free of the political relationships, capital planning, and intra-agency communication required of the CIO, the CTO was able to master the technologies involved and guide the implementation of technology in the most efficient manner possible. “The CIO has become business-driven first and technology-driven second,” said Dawn Meyerriecks, CTO for DISA. “Agencies need a CTO to understand the trends and be the principle technologist who will be around for a long time.”

Tom Berray, executive director at Cabot Consultants Inc., an executive search firm in McLean, Va., said “most CTOs fit into one of two models: those that run an agency’s day-to-day operations and those that figure out how to use technology to change the way the government works with its customers.”

Norman Lorentz, Office of Management and Budget

Lorentz returned to federal government following the incidents of 9/11 because he was “really pissed off” and wanted to work on the problem. He was serving as a Senior VP at recruiting firm Dice.com and had previously served as the CTO of the US Postal Service. The Office of Management and Budget created its own CTO position to allow Lorentz to work on the Federal Enterprise Architecture under the leadership of Mark Forman, OMB CIO.

Lorentz is credited with reinvigorating the Architecture and Infrastructure Committee within the CIO Council. This committee was responsible for creating the widely applied Federal Enterprise Architecture that creates a structure for all IT implementations across OMB and much of other government offices.

One of his goals was to give bring the CTO out of pure technology implementation and into mission-related decision-making. This is a responsibility similar to that of CTOs in industry. Just as Pat Gelsinger, CTO at Intel Corp., is actively involved in directing the company’s strategic use of technology, Lorentz was hoping to allow the leading

technologist within OMB to contribute to the decision-making process for the entire office.

Another of his responsibilities is the reduction of duplication within OMB and across a number of other federal agencies. Such a position is fraught with disagreement and protection of existing programs. Just as he has done at USPS and as his predecessor, Robert Otto is doing now, Lorentz will seek out opportunities to consolidate operations and eliminate waste. Otto has said that, “The most basic element of the consolidation has been the centralization of the Postal Service’s servers. From an IT infrastructure that included 15,000 servers at hundreds of locations across the country, the agency has whittled the number down to 3,000 servers at two IT centers, in Eagan, Minn., and San Mateo, Calif. The move has saved the agency \$30 million a year.”

Likewise, he has reduced the number of staff members’ software tools from 1,500 to 380, the number of vendor partners from 200 to a dozen, and the number of help desks from 119 to four. He said he plans eventually to have just one help desk for the entire operation.

Conclusion

The cases presented above illustrate some of the important responsibilities of a technology executive in government service. These responsibilities are unique from those of the corporate world since the government usually operates in an over-site role for a number of programs being executed by government contractors. The government CTO must be sufficiently technical and current to accurately evaluate the claims and progress of the contractors. But, this person must also provide the technical vision to the government office, which can define where it will go in the future, what it wants to provide to its customers/constituents, and what it can realistically request from industry.

The CTO position is not an industry-only responsibility. Business leaders and academics both agree that there is quickly becoming no company, organization, or endeavor that does not incorporate technology and within which the effective management, application, and adoption of technology cannot improve organizational performance. Increasingly, government offices will encounter their own need for a technology executive and apply this person to their own organizational performance improvements, just as they have aggressively applied information technology over the last decade and created e-government services in recent years.

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