



Good News From Iraq

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Building a data center in a war zone is an extreme challenge requiring creativity, diplomacy, statesmanship, and the can-do spirit. This is the story of an Iraqi and American mixed team that, with uncommon persistence and under extreme duress, built a world class data center and fully functioning office complex.

The rebuilding of Iraq effort, which was funded by the United States Congress in 2003, allocated about \$18 billion for Iraqi reconstruction and aid. Of that, about \$7 million went to funding the building of a data center. In addition to software, the entire system included the buildings, air conditioning, elevators, office furniture, electricity; and the infrastructure for all the sites that needed the information. This was not a typical data center building project like one in the United States; this literally started with nothing.

“It won’t do any good to build facilities if they can’t be managed,” said Dennis Plockmeyer, a retired Navy Construction Battalion Captain, and now, the Chief Information Officer for the Project Contracting Office Iraq, which oversees logistics for all of Iraq’s \$18 billion reconstruction initiatives.

Plockmeyer had been in Iraq since September 2003 and in Baghdad’s green zone, a section of the city from which the coalition forces managed their major reconstruction efforts. I, a Navy Surface Warfare Officer Captain, had been in Iraq since December 2003 and had worked in and around Baghdad and other key cities for the Coalition Provisional Authority before joining Plockmeyer’s team in July of 2004 as his Operations Director. We both served the Department of Defense (DoD) as senior civilians.

At the heart of the data center building plan was an effort to introduce an asset-management system to Iraqi public officials who, in many cases, had never used anything more than pencil and paper to manage vital national assets. “It doesn’t do any good if you build all of these facilities and then walk off without giving the recipients the tools and the wherewithal to manage them,” said Plockmeyer.

Problems and Issues

The Information Technology (IT) team,

which consisted of contractors from the United States, including the native small business association firms, and local Iraqis, could have built an IT system to solely run the coalition’s reconstruction effort. That would have been cheaper and easier, since it would function entirely in English and run on off-the-shelf and DoD-supplied software. Instead, they opted for the complexity of writing additional code that let the system run in parallel with Arabic and Kurdish. This option ensured that the investment in technology and processes needed to manage the reconstruction had ongoing value that could be transferred to the Iraqis, focusing on what happens the day after the contractors leave. The master database built by the combined team was named the Iraq Reconstruction Management System (IRMS).

The major components of the IRMS system included Maximo (owns the requirements/assets); ESRI (defines the location); Oracle e-Business (exhibits cost and performance), Primavera P3ec (develops the schedule), DoD standard procurement system (authors the contracts), DoD Corps of Engineers (ACE) financial management system (manages the finances), DoD requirements management system (captures the construction), Oracle e-Success (delivers the estimates), Expedition (provides project controls), and Oracle Portal (spans the program, gateway to the solution) all running on Unix, Linux, and Microsoft (MS). Net operating systems were accessed via MS Office on the desktop. Connecting the various components that comprise the system was relatively easy compared to the logistics and danger to workers building the data center and offices. Regarding the software *build*, the distance and time zone differences had to be taken into consideration because Iraq as well as Virginia, California, and Washington had to be linked and functioning in real time. Personnel in Iraq often worked 18 hours a day, seven days a week in the software effort. Configuration management was a central issue to ensure success.

Harder to accomplish than building the software was building the data center and its infrastructure. Many of the Iraqis had limited education due to what Iraqis reported as Saddam Hussein’s tendency to restrict education for the males to the sixth grade. This made it difficult because the team had to find qualified locals who turned out to be educated females. This presented a problem in a culture dominated by men where women were not valued for their knowledge or ability to work outside of the home. Overcoming these cultural differences by use of relationship management, statesmanship, diplomacy, and trust building allowed the formation of a world-class team.

By working with the Iraqi Console for Employment, the project received a steady flow of resumés from young Iraqi men and women who wanted to participate in what they called a *privilege to work* environment. There were many technologically literate Iraqis anxious to apply their skills to the rebuilding effort. They understood their skills might not be the most current, but they were ready to learn. While few of the workers had worked with advanced applications such as Maximo, many had basic technology skills and were familiar with Oracle and other common IT environments. The issue of training and mentoring the basics of Software Engineering Institute/Capability Maturity Model® Integration and Computer Society for Software Engineering by the Institute of Electrical and Electronics Engineers, Inc. for the software teams posed little problems in understanding by the Iraqis. However, using Project Management Institute concepts for the teams that were involved with the physical building and plant layout was one of the hardest things to do because most Iraqis and some contractors in the building trades knew very little of how projects needed to be executed using a repeatable method.

For example, the simple idea of grounding the data center and all the sys-

* Capability Maturity Model is registered in the U.S. Patent and Trademark Office by Carnegie Mellon University.

tems was not something understood by all and had to be explained to both contractors and Iraqis alike. Other building and infrastructure issues were getting all the requirements in for electricity, network, phones, televisions, contractor housing, and hospital needs. This was needed because the digging and building of a conduit to accommodate these different needs had to be planned, the correct fiber-optics had to be ordered, and construction had to be carefully timed because of security issues with Iraqi construction contractors. We also encountered problems with the electrical system used in Iraq. The Iraqi system is based on the British electrical system, and American companies shipped a U.S.-based electrically supported system. Because everything had to be flown in, *work-arounds* had to be put into place until the correct equipment was shipped. For one piece of equipment, the system had to be rewired because replacing the equipment would have cost more than the rework. Another issue that had to be overcome was the heat, sand, and dust. In the direct sunlight on top of the building, temperatures reached 160 degrees Fahrenheit and melted the equipment used to communicate with the satellites.

The building that was used to house the data center was originally built by Saddam's sons and called the *Hall of Records and Justice*. This building stored millions of records detailing all the people Saddam's regime had murdered; many were tortured in the main square under it. The data center refurbishment and set-up required that personnel hand-carry every desk, chair, individual computer, phone, light, and other office equipment to fill the seven-story building, and then to build the data center, they had to hand-carry all 110 servers and related hardware up seven floors to make the system work. This was done without the aid of air conditioning or elevators in temperatures of 130 to 140 degrees, but there was a real sense of ownership and no complaints about the unusually harsh working conditions. What made it more difficult than accomplishing anything in the western world was that the Iraqis were constantly being threatened while coming and going to and from their work centers. At times, safe rooms had to be set up so that the workers could stay overnight.

Plockmeyer and I created a work environment that encouraged trust and creative thinking and maintained focus, intensity, and persistence. Even under severe wartime work conditions, we took the teams out to dinner and set up a small

movie theater inside the building where they could stay and be somewhat safe. In turn, the Iraqis brought local food and shared their family cooking.

Security Issues

To help contractors understand that working in Iraq was not like working *back home*, training on cyber security for all users had to be accomplished. The team used computer forensics to track users who tried to violate the rules. For example, a problem that had to be overcome was that contractors tried to send sensitive information back to the United States, which could have put them or the Iraqi workers in grave danger because the information was not encrypted when transmitted. The ability to bind security systems to the physical systems within the main computer center operations area was developed so that all workers could feel safer.

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Another challenge that had to be overcome was that the system interfaced with the State Department, the ACE Gulf Region division (GRD), the coalition, and the Iraqi government. The team was instrumental in resolving the information assurance challenges inherent in migrating from a military to a commercial environment while preserving the warfighters' network and accommodating and developing secure systems (including Top Secret and higher security levels) for the military to be used in the same building as Iraqis. This effort included the development of Voice-over Internet Protocol and wireless (Wi-Fi) systems (both secure and commercial), keeping a defense in-depth philosophy so that data (both voice and computer-generated) would not compromise the organizations that needed the information. The team also supported diverse needs of multiple, direct-support entities and ensured that the IT infrastructure accommodated six different networks without compromising information security or system capability.

Building a System That Would Work for Iraq

Plockmeyer focused on making sure that modules could be added that would monitor the health of oil pipelines and would alert authorities to a drop in pressure caused by mechanical failure or sabotage. The coalition's asset-management system also was able to capture data from remote diagnostic and management technologies being built in some of the newer Iraqi buildings. Plockmeyer said that some of the construction blueprints he had seen called for utility plants to incorporate advanced supervisory control and data acquisition technologies – a first in Iraq.

Coalition officials wanted to introduce the asset-management system to Iraqi administrators in small doses. For example, the system was built to manage the building of the electricity sector around Baghdad and then later to all of Iraq.

After four years, Plockmeyer and I believe the progress the coalition made in Iraq has been largely obscured by news that focuses mostly on the day-to-day violence. The list of projects completed or initiated under the coalition's watch – and managed through the asset-management system – is lengthy. Each week, about \$75 million in new construction work begins on projects ranging from water-treatment and waste-management systems to new schools.

Ever-present in a war zone like Iraq was the threat of attacks on coalition personnel and any Iraqis working with them. Even from the living quarters, personnel could hear and feel the rockets and mortar shells that Iraqi insurgents occasionally fired into the green zone. The violence did not delay the implementation of the core asset-management system. Plockmeyer said the following about my work:

Lucks made sure that the Internet access was widely available so that the modules were fully utilized by some of the more far-flung Iraqi ministry outposts and saved \$2 million in operating expenses.

U.S. Government Makes IRMS the Standard

An interagency Information Technology Working Group (ITWG) was formed in August 2004 with the mandate to consolidate all U.S. government-funded and managed relief and reconstruction project information across all sectors and organizations throughout Iraq into one database for reporting to the U.S. Congress through the U.S. Ambassador to Iraq and the

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Disruptive Technologies Conference
Washington, D.C.
www.ndia.org

September 11-13

MODSIM World Conference and Expo
Virginia Beach, VA
www.modsimworld2007.com/

September 17-20

2nd Annual Software Engineering Institute Team Software Process Symposium
Lake Buena Vista, FL
www.sei.cmu.edu/tsp/symposium.html

September 24-26

Air and Space Conference and Technology Exposition and Global Air Chiefs Conference
Washington D.C.
www.afa.org/events/conference/2007/conference.asp

September 30 – October 5

MODELS 2007 ACM/IEEE 10th International Conference on Model Driven Engineering Languages and Systems
Nashville, TN
www.modelsconference.org/

October 2-3

Department of Homeland Security/Department of Defense Software Assurance Forum
Tysons Corner, VA
<https://buildsecurityin.us-cert.gov/daisy/bsi/events.html>

2008



Systems and Software Technology Conference
www.sstc-online.org

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Commander, Multi-National Force-Iraq. As planned, the U.S.-based team, along with Iraqi citizens, implemented the asset-management system at various Iraqi ministries. "Working shoulder to shoulder on the same system gives you the basis for a successful turnover," Plockmeyer said.

By leveraging the same IT system already in use by the Project and Contracting Office, other U.S. agencies benefit from the enterprise network with little or no capital investment, according to the ACE. The master database built by the joint American and Iraqi team, the IRMS, was the system chosen by the Iraq Reconstruction Management Office (IRMO).

The IRMO chair of the ITWG and the director of the Primary Control Officer/GRD National Reconstruction Operations Center have championed IRMS as the interagency solution not only for reporting the total U.S. government effort but also for providing multinational forces – integrated field commanders with situational awareness of relief and reconstruction efforts in their areas of operation, allowing for greater synchronization of efforts.

According to the ACE, as of May 2007, IRMS will be turned over to the Iraqi government as an archive of the total U.S. government effort, which will help in its budgeting for operations and maintenance of new facilities and future master planning.

Summary

Building the data center system involved many obstacles, some of which hopefully

are not faced during the development of most systems: addressing the requirements of others that would want to access this system in addition to our own requirements, danger of attack on those developing the system, cultural adversity of men and women working together, limited skills with commercial off-the-shelf software used, electrical inconsistencies, and other extreme working conditions. These were overcome with relationship management, statesmanship, diplomacy, trust building, technical training, security, dedication, and perseverance.

The IT effort in Iraq was an Iraqi and American team effort that has benefited contractors, the coalition, and Iraq and has helped facilitate positive development throughout that country. ♦

About the Author



CAPT Steven Lucks (Ret.) served with distinction for 30 years in the Navy Reserves, the latest being in Iraq. He currently is an independent consultant working on issues dealing with Agile software development, service-oriented architecture risks, the Health Insurance Portability and Accountability Act, security, and e-discovery.

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LETTER TO THE EDITOR

Dear CROSSTALK Editor,

I am writing in regards to the Sponsor's Note by Kevin Stamey titled *Lead, Follow, or Get Out of the Way* in the April 2007 issue of CROSSTALK.

I have heard this expression so many times and it drives me crazy to hear it spoken, as I would claim, improperly. I don't know that Lee Iacocca did not actually say *lead or follow*, BUT *get out of the way*, but I am sure that is what he meant.

Too many times people and organizations stand in the middle of the road drawing a crowd, talking the talk, taking the focus, taking the credit, promising the world, and churning out reworked platitudes. Leadership means knowing where the pack should go and having the right stuff to pull them there.

There is nothing wrong with following, of course, because without actually implementing the plans of leaders, we would have no progress. So I would say to the talking heads, lead with insight and wisdom, or follow with respectful allegiance, but do not just stand there. Drawing a crowd causes a distraction.

So, over my desk is MY version of the expression:

Lead or follow, but get out of the way!

– Julian Opificius
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