

Working Overseas: Implementing Technology for a Branch Campus in the Middle East

Establishing IT infrastructure for a branch campus in Qatar offered unique challenges and rewards to a team from Texas A&M University

By **Timothy M. Chester**

On July 5, 2003, I landed in Qatar, a newly minted CIO from College Station, Texas. My charge: to design and implement the required IT infrastructure—including telecommunications, networking, computing, and instructional technology—necessary to support Texas A&M University's newest branch campus, Texas A&M University at Qatar (TAMUQ). With the exception of centralized administrative systems (student information, financial accounting, budget and payroll, and library services), this infrastructure was to be provided locally by a dedicated technology team in Qatar. The next 18 months proved to be challenging and ultimately fulfilling for me, leading the development of infrastructure in a culture with values and expectations that differed significantly from those in the United States regarding work, communication, and schedules.

Texas A&M University at Qatar

Sponsored by the Qatar Foundation, TAMUQ is located on a multi-institution campus known as Education City in Doha, Qatar (see the sidebar "The Qatar Foundation and Education City"). The Qatar Foundation is responsible for providing all funding as well as the facilities for the campus. The undergraduate degree programs offered by TAMUQ—in petroleum, chemical, electrical, and

mechanical engineering—are identical to those offered on the main campus in College Station, and the courses are taught by faculty appointed to the Qatar campus for one- to three-year terms.

Getting Connected

The university assembled a technology planning team in January of 2003 to do the groundwork for launching TAMUQ. Of special concern were questions about network and Internet reliability. This became a crucial issue fac-

ing the TAMUQ planning team.

Weill Cornell Medical College in Qatar began offering courses in Education City in August 2002, and our preliminary plan was to follow its model for connectivity. Cornell's network consisted of two E1 (2MB) lines connecting the college's Doha site to its campus in New York. We intended to lease one E1 line for our operations and expand that to two or more lines a year later. The lines would run from Doha to College Station. Cornell graciously offered

The Qatar Foundation and Education City

The Qatar Foundation for Education, Science, and Community Development is a private, nonprofit organization founded in 1995. Its mission is to develop the human potential of the citizens of Qatar through investments in education, science, research, and the arts. Charles E. Young, former chancellor of UCLA and president of the University of Florida, serves as the president of the foundation.

Education City is a multi-institutional campus supported by the Qatar Foundation. Covering 2,400-acres, Education City hosts programs for K–12 education (Qatar Academy) and postsecondary university preparation (the Academic Bridge Program), as well as branch campuses of Virginia Commonwealth University (arts), Texas A&M University (engineering), Weill Cornell Medical College (medicine), and Carnegie Mellon University (computer science and business). Education City is also home to the RAND–Qatar Policy Institute and the Science and Technology Park.

to let us “piggyback” off their E1 lines until our own links became operational. Cornell’s connectivity had proven to be sometimes problematic, however, and the university was never able to reach the full capacity of the links.

Concerns about reliability were confirmed when an earthquake in Algeria severed undersea fiber in the Mediterranean Sea, including the fiber that provided Qatar’s commodity Internet service. For two weeks, Internet access in Qatar was limited to low-bandwidth, satellite-based service. This incident served as a wake-up call to the Qatar Foundation, which for some time had been looking into developing alternative means of providing connectivity. The earthquake created a sense of urgency for those plans.

In May 2003, several members of the TAMUQ planning team visited Qatar. During our discussions, the Qatar Foundation presented its new plan for meeting Education City’s bandwidth needs. The plan consisted of two STM1 (155MB) lines that would take alternate paths to the United States—one routing over the Atlantic, the other over the Pacific—and terminate in New York City. These lines would be leased by the Qatar Foundation, which would effectively become the network service provider for all of Education City. From there, the Qatar Foundation would lease additional lines running from New York City directly to our home campus in Texas and to the home campuses of other institutions located in Education City. Commodity Internet service would come from a New York City-based telecom. This arrangement would provide us with high-capacity, fully redundant links.

During subsequent discussions, we proposed that the Qatar Foundation sign a peering agreement with Internet2 and connect one of the STM1 lines to the Abilene network at Internet2’s Manhattan Landing (MANLAN) Exchange Point. Institutions within Education City could then connect to their home campuses through Abilene rather than additional leased lines. This plan would provide significantly more bandwidth to the Education City branch campuses at a greatly reduced cost. The Qatar

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Foundation accepted this proposal and soon put it into place.

This network, now known as the Education City Network, became operational in August 2003. The Qatar Foundation has since entered into additional peering agreements at MANLAN, making possible direct access to research networks in Canada, Europe, and Mexico. The links to the Internet and Abilene have proven to be extremely reliable. More importantly, the Education City Network offers an important resource for both Qatar and the entire Middle East region. Other educational institutions in Qatar, including Qatar University, are now part of the network and can take advantage of Abilene. Plans are currently under way to establish an international exchange point in Qatar, and, by early 2005, Baghdad University and other institutions in Iraq should also be connected—making possible new opportunities for collaboration among diverse communities of researchers, faculty, and students.

Purchasing and Procurement

Establishing operations in Qatar required obtaining significant amounts of new equipment. TAMUQ needed hardware to connect to the Education City Network and servers to establish a local area network (LAN), including directory services, e-mail, and space for file storage and Web publishing. The campus also needed several hundred PCs preconfigured with standard productivity applications and specialized software such as AutoCad, Maple, and MatLab.

Although it functions as a branch of

Texas A&M University, TAMUQ could not use existing vendor contracts to order equipment and have it delivered directly to Qatar. Trade in Middle-Eastern countries, particularly Gulf Cooperation Council countries such as Qatar and the United Arab Emirates, is substantially regulated. In general, foreign corporations are only allowed to sell goods directly through partnerships with locally owned firms, which require a controlling interest in the partnership in return for sponsoring the activity. Because of this requirement, most U.S. companies will not sell their goods directly in Qatar, opting instead to sell through value-added resellers. Prices from resellers in Qatar can sometimes be significantly higher than for the same equipment purchased in the United States. Because our early budgets were based on prices from the United States, this forced us to prioritize some spending.

Further complicating matters, the purchasing process for software varies from vendor to vendor. Some are comfortable selling software to TAMUQ in the U.S. and allowing us to export it to the Middle East, while others require TAMUQ to purchase their products from resellers in Qatar, which also provide local maintenance and support. Most U.S.-based sales reps were unaware of these special conditions, and in the beginning precious time was wasted as we placed orders in the United States, only to see them canceled and be told we had to place orders through resellers in Qatar. We determined that one option would be to purchase equipment in the United States, have it delivered to the campus in Texas, and then re-ship it to Qatar ourselves. This would have involved substantial overhead, however, in obtaining permission to export the equipment and clear it through customs—procedures for which we had very little experience.

Ultimately, I made the decision to let the Qatar Foundation handle all of our initial purchases, including networking equipment, PCs and laptops, printers, and software from a number of vendors. The Qatar Foundation was in a far better position to work with local resellers and negotiate the best prices and delivery dates. After an anxious six weeks of won-

dering whether the equipment would arrive in time for us to meet our ambitious timeline, trucks began arriving—on schedule—in mid-July with our equipment. By August, additional members of the implementation team began arriving. In short order, the team established basic LAN operations and configured PCs and laptops for faculty and staff. The team set up a 36-seat computing lab for students and put into operation other basics, such as a Web site, e-mail and directory services, shared printers, open kiosks for the library, and data projectors and other multimedia equipment for classrooms. By September 1, 2003, all the required technology resources were in place for classes to begin.

Enabling Collaboration

Because many of the faculty and staff in Qatar need to communicate regularly with colleagues in Texas, establishing efficient communication between the two campuses was a key challenge. Several Qatar faculty members work closely with other faculty located in College Station, and many of the staff collaborate with counterparts in Texas to facilitate everything from bookkeeping and payroll to the management of student records. For faculty and staff in Qatar, H.323 videoconferencing has become a way of life. Texas A&M University operates one of the largest videoconferencing networks in the United States, the Trans-Texas Televideo Network (TTVN), which we connected to the campus in Qatar using Abilene and the Education City Network. These links have proven to be so reliable and capable that my colleagues in Texas often joke—truthfully—that the quality of our televideo sessions from Qatar to Texas is superior to that of conferences between any two campuses in Texas.

We deployed a variety of videoconferencing equipment on the Qatar campus, connecting our classrooms, conference facilities, and individual offices to other televideo sites on the Internet and Abilene. TAMUQ installed an Access Grid node in its facilities in Qatar, providing faculty with the ability to participate in multi-site conferences simultaneously with colleagues

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throughout the world. TTVN has also made its facilities in Texas available to individuals who want to visit by televideo with friends and family in Qatar.

Many of our faculty and staff need to share documents such as employment contracts, visa and immigration requests, and student records with colleagues in Texas, and this presented another challenge. These documents are typically scanned and converted to PDF for sharing, but e-mail proved to be ineffective in handling these large files. Windows-based file sharing also proved ineffective. The solution was the deployment of a Web-based virtual private network (WEBVPN). In addition to sharing Web-based electronic resources, the WEBVPN provides a Web-based front end to files stored on TAMUQ's LAN. With this solution, faculty and staff in Qatar can save documents to a special location on the LAN, and these files are then available to individuals across the globe that use the WEBVPN interface to download those documents or to upload others.

Communications customs in Qatar led to still another situation we had to accommodate. Voice mail is not particularly widespread throughout the Middle East, causing problems when our admissions team would attempt to contact potential students. Contacting individuals often required multiple telephone calls because individuals typically were not home during the day and would often screen out calls to their mobile phones from unknown telephone numbers. The answer to this dilemma came in the form of short messaging service

(SMS). Similar to a pager service, SMS service allows users to send text messages to mobile phones. Our technology team implemented a custom solution that ties together mobile-phone numbers and distribution groups contained in the campus LDAP directory with the local mobile-phone system. SMS messaging has become a reliable way for faculty, staff, and students to communicate with one another.

Given the reliability of the Education City Network, one would expect that voice over Internet protocol (VoIP) would be an important part of TAMUQ operations. This is not the case, however, primarily due to regulatory issues.

Conclusions

My work in Qatar has been the most challenging and rewarding of my career. Working in a new culture has provided all of us a different perspective, and these experiences have enriched our lives and provided many opportunities for both personal and professional growth. The technology team has overcome early challenges of connectivity, procurement, and collaboration to deliver resources vital to conducting the day-to-day business of TAMUQ.

The next few years will provide additional opportunities for innovation in teaching, research, and administrative computing. Plans are under way for a Middle East regional optical network that would connect regional institutions with other institutions of learning around the world through the Education City Network. Our research computing team is currently building a large computing grid, connecting nodes in Texas with a multi-node cluster of Mac OS X servers in Qatar. We also continue to experiment with innovative televideo solutions, including IP-based DVD and HDTV-quality streaming broadcasts between Qatar and Texas. We will continue to implement collaborative solutions, including imaging and document management systems. We have only begun to scratch the surface of what is possible. *e*

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