



## *Case Study*

### **Qatar's New "Computing Cloud"!**

#### ***Introduction***

To expand my coverage and research purview, I located Clabby Analytics in Dubai (a city/state located in the United Arab Emirates — population 1.6 million) in 2008/2009. From Dubai I can more easily cover information technology usage here in the Middle East — plus being located in Dubai has given me easy access to Middle Eastern, Russian, Indian, Chinese and other “local” markets.

Dubai is known throughout the world for its innovative spirit: This city has built the world's largest manmade island (the Palm Jumeirah). Dubai has the world's largest mall (Dubai Mall). And Dubai can boast the world's tallest building (the Burj Dubai). But, just under an hour away by plane is the country of Qatar. Like Dubai, Qatar will soon open its own majestic manmade island (The Pearl) in Doha. And Qatar has announced its plan to build a taller structure than Dubai's Burj Dubai (the Doha Convention Center Tower). And now, Qatar has another “one better” than Dubai — its own public cloud computing center...

#### ***Qatar's Move Into Cloud Computing: Lead by the Academic Community***

In Doha, Qatar (a city of 400,000), three major universities have banded together — and have partnered with IBM to build the region's first cloud computing environment. Branch campuses of Carnegie Mellon University and Texas A&M, as well as Qatar University have implemented the region's first publicly available cloud computing environment — also known as the Qatar Cloud Computer Center.

For those who don't know what cloud computing is, cloud computing is the next generation of Internet-based computing. In the current generation, users primarily use the Internet to gather information (through Web pages), conduct transactions, play games, or engage in social/collaborative activities. Cloud computing builds on the current implementation of the Internet by enabling users to broaden the types of applications and services that they can access on the Internet (for instance, users could request deep decision support drill-downs, or access to computing pools to conduct scientific research, or access to enterprise resource planning/customer relationship management/supply chain management services). The “cloud” takes on the responsibility for transparently finding the resources that users need to execute their applications, and then returns those resources to a common pool when a job is executed. Using this model, applications execute as services provided to users (incidentally, these services may, or may not be charged for).

So, why did professors in Qatar band together to implement the region's first cloud implementation? Some of the reasons include:

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- *Competitiveness (global)* — On a global basis, cloud computing will help Qatar move more quickly toward its goal of becoming a knowledge-based society (as the U.S. is, and as China and India are striving to become). To become a knowledge-based society, university professors at all three institutions recognize that a new computing architecture will need to be put in place. That architecture will be cloud-based — and will serve public as well as private institutions.
- *Competitiveness (local)* — These professors want to use cloud computing as a means to attract more students to Qatar, and to make Qatar “the place to go” for regional advanced information systems education. These professors want their students to become leaders in designing, deploying, and operating cloud environments. And they want these leaders to filter into local businesses in order to drive economic and business growth in Qatar.
- *To prove the concept* — one of the unfortunate hallmarks of doing business in this region is that consultants and advisors frequently start large projects that sometimes fail — and they fail after big money is spent on design and implementation. These professors wanted to prove the concept to both the business and governmental communities — and by so doing, drive funding for expansion by proving the concept.
- *To take it to the next level* — The universities envision that, once the technology is proven by industries and scientists, the cloud can be taken to the next level and move into the Qatar National Datacenter.
- *To make better use of grant money* — cloud computing is all about efficient use of computing resources, so moving to cloud architecture should help researchers in Qatar get outstanding return-on-investment in their computer systems.
- *To step ahead of Dubai in technology prowess* — this was not mentioned as a reason to drive the Qatar Cloud Computing initiative (but I wonder...).

### ***Why Did They Choose IBM as Their Partner?***

Timing played a big role in the choice of IBM as the triumvirates' business partner. IBM approached these universities at a time when these universities were just starting to explore the cloud computing model. And as these universities and IBM discussed their respective cloud computing goals, they discovered that they all had similar goals for their respective institutions — and for Qatar.

The reasons that the universities started driving their respective cloud computing initiatives are described in the previous section. The reasons IBM started driving its cloud computing initiative in Qatar included:

- *IBM wanted to seed the market for cloud computing* — a well-known marketing approach in the computer industry is for computer vendors to underwrite some of the cost for placing advanced technologies in educational institutions. By doing this, generations of students learn how to build and deploy advanced solutions *on IBM equipment*. This bears fruit for IBM later on down the road as universities increase the size of their environments (leading to additional hardware and software sales) — but especially as students move into the private sector and show a preference for IBM hardware, software, tools and utilities.

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- *IBM needs a test-bed for advanced cloud development* — As IBM and Qatar's universities worked together on designing Qatar's cloud computing environment, both groups realized that Qatar's computing cloud would be an excellent environment for developing next-generation applications (such as Hadoop-based applications that parse applications, split databases, rapidly assemble results — and thus radically speed up database drill-downs). Applications and research to be conducted on Qatar's cloud include Arabic-language search engine development, seismic modeling, production operation solutions for oil and gas, and exploration of Hadoop/MapReduce programming methods. Further, the universities will use their cloud experience to create a curriculum for teaching cloud computing (aspects of which could potentially be replicated throughout the world).
- *IBM could provide the whole environment* — IBM builds hardware. IBM builds integrated software (WebSphere infrastructure and Tivoli Provisioning Manager are particularly relevant to this environment). And IBM offers a broad array of services (including training and access to advanced technical resources). Hewlett-Packard makes some of its own infrastructure software — but relies heavily on infrastructure products from other vendors (Oracle, BEA, et al) to fill in the infrastructure layers. Sun can build clouds, but doesn't have much presence in Qatar.
- *IBM contributions to Open Source* — IBM's contributions to the open source community (Eclipse and the work IBM has been doing with Hadoop) were also contributing factors to the choice of IBM as partner.

A final reason that IBM was chosen was that IBM underwrote much of this cloud deployment. IBM sold the hardware, but gave away software in order to enable these universities to build this cloud. This should prove to be a good move for IBM over time because one of the key focal points in the deployment of this cloud is to prove the concept of cloud computing to the government as well as the business community. If the universities can prove the concept, IBM will clearly benefit as an incumbent supplier as the government and business communities come to embrace cloud computing.

### *Technically, What Was Deployed?*

The Qatar cloud consists of an IBM BladeCenter environment that runs 112 x86-based cores. It provides access to seven terabytes of storage.

Also worth noting is that in a second phase (presently under discussion) Carnegie Mellon may merge its existing cluster environment with the Qatar grid — adding even more computing power to what can be an easily expanded research cloud.

### *Summary Observations*

Qatar's universities "get it". They understand the big picture (moving the country to a knowledge management focus) — and to get there, they understand that their role is to prepare their country to participate in cloud computing. IBM has established several other cloud computing sites throughout the world (in Japan, China, Brazil — and two new sites in Africa — to name a few) — but this is the first in the Middle East. And it is perched in rapidly growing/expanding Qatar.

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These Qatari universities have taken a leadership role in the advancement of cloud computing in this region. Other universities developing countries in other regions throughout the world should pay close attention to how these universities went about structuring their cloud — and should plan on replicating this effort in their respective countries if they are to lead their countries toward a knowledge-based economies.

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