

A black and white photograph of a modern, multi-story glass building. The building has a prominent 'EMC²' logo on its upper facade. The building is surrounded by trees and a clear sky. The overall aesthetic is clean and professional.

EMC²

EMC DURHAM CLOUD DATA CENTER

Virtual, Green, Agile, Resilient

Sometimes, the journey to the cloud hits a little turbulence. So it was for EMC when its Westborough, Massachusetts data center began running out of room.

by Mark Schafron
EMC

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JON PEIRCE

VP GLOBAL IT PRIVATE CLOUD INFRASTRUCTURE AND SERVICES

“Like our customers,” says Sanjay Mirchandani, EMC CIO and COO, EMC Global Centers of Excellence, “we were grappling with unrelenting information growth, increasingly complex application environments, and congested, energy-exhausting data centers.”

So EMC took a bold step. Instead of cramming in more capacity to make-do in Westborough, work began on transforming a 450,000-square-foot warehouse in Durham, North Carolina into a super-efficient virtualized showcase. For Jon Peirce, EMC Vice President of Global IT Private Cloud Infrastructure and Services, the massive effort was Extreme Makeover, Cloud Edition.

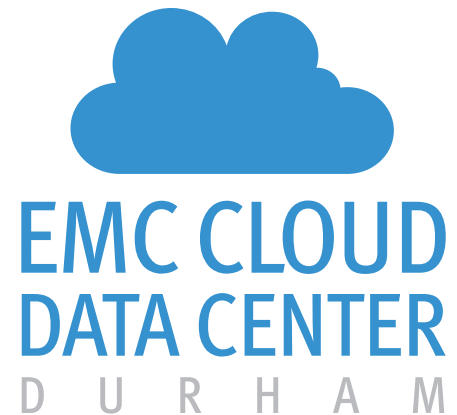
“Designing a multimillion cloud data center from scratch was a huge challenge,” Peirce says. “We were blazing a new trail—we weren’t replicating what we already had. We were designing as the data center was being built.”

Today, the data center project that Peirce describes as a “once-in-a-career opportunity,” is the new home of EMC’s first U.S.-based Center of Excellence, joining six other COEs in Ireland, Russia, Egypt, Israel, India, and China. The Durham COE will consolidate regional EMC research, development, and proof-of-concept labs, and will also offer consulting, development, technical services, and showcase EMC and partner solutions.

“It will extend our global cloud computing capabilities,” Mirchandani explains, “to support EMC and help our customers accelerate their own cloud computing and IT transformations.”

A REAL WORLD VIRTUAL MOVE

A data center move conjures images of big trucks, snarled schedules, and headaches. Not here. No hardware will be relocated from the old data center to Durham. Instead, applications and data are being migrated to the new virtual infrastructure across a redundant 10-gigabit fibre optic Ethernet link, using a combination of data replication and virtual site recovery technologies. About 350 applications and six petabytes of data will be migrated in a series of database grid-centered move events that started in the Spring of 2011 and will continue through the Fall of 2012. Decommissioning and vacating the leased Westborough data center is set for the end of 2012.



RESILIENT DISASTER RECOVERY

Migration to Durham accelerates EMC's transition to a completely virtual data center. All applications will run on a single instance of the VMware VSphere operating system on an x86 enterprise hosting architecture and will provide a live cloud computing showcase for EMC's customers.

Besides running mission-critical applications that support EMC's business and its 50,000 employees across 80 countries, the North Carolina location extends by more than 600 miles the distance between EMC's primary U.S. data center and its secondary DR site in Hopkinton, Massachusetts, increasing resiliency in the event of a regional disaster.

IT AS A SERVICE

The new EMC Durham Cloud Data Center is also a significant milestone in EMC's delivery of IT as a service, offering businesses the convenience of the entire IT stack through a standardized service catalog with on-demand self-service provisioning and metered usage for chargeback. To enable cloud—which in turn facilitates IT as a service—EMC is working toward delivering server, storage, and network infrastructure enterprise applications, database, security services, virtual desktop services, and more as a service from a shared pool of virtual resources in EMC or partner data centers around the world.

"While building out the Durham Data Center to support our global enterprise," Mirchandani notes, "our employees became intimately familiar with architecting and running a highly-virtual cloud data center. These skills will continue to evolve as we continue down the road toward IT as a Service."

DESIGN AND CONSTRUCTION HIGHLIGHTS

The new Durham Data Center is 100% "white space" dedicated to IT infrastructure, with all power, mechanical units, and office space located elsewhere in the building. This approach, along with dramatically reduced power and space requirements due to rationalization, consolidation, and virtualization, provides the flexibility, capacity, and energy to meet EMC data center requirements for years.

Energy analysis studies and life-cycle cost analyses helped shape the main utility infrastructure systems, while energy modeling studies substantiated applications for energy incentive and rebate programs through the local utility provider.

Two new fan deck structures enable custom air-handling units to be stacked above electrical rooms, saving valuable data center floor space on the first floor. Flexible power and data cabling infrastructure is provided from overhead track bus-way systems and cable trays, freeing the raised access floor to be used for cooling air-flow.

COOL GREEN CLOUD

Virtualization and cloud computing are smart energy saving moves. But in Durham, EMC went beyond the obvious and incorporated green design and construction into every facet of the project.

Air-intake plenums at the perimeter of the building and air-side economizers provide free cooling during months of cool weather—approximately 5,000 hours per year—quite an achievement in a warm-weather state like North Carolina. The air plenums also eliminated the need for windows, minimizing light pollution.

Construction materials have a minimum of 10 percent recycled content—including structural steel, door frames, metal studs, concrete, acoustical ceiling tiles, carpet, plywood, and solid surface countertops. Meanwhile, a minimum of 50 percent of the construction waste and demolition debris was diverted from landfills and incineration facilities and recycled back into the manufacturing process.

Mindful of the local economy, EMC ensured that a minimum of 20 percent of construction materials were manufactured locally.

Rainwater is collected from the roof and diverted to a storage tank, reducing the water usage by more than 40 percent—one inch of rain on the 450,000 square foot roof equals 280,000 gallons of water.

The data center's UPS modules use fly-wheel technologies, which store energy kinetically eliminating big racks of batteries and the associated HazMat.

It's big, it's powerful, it's cool, and it's green. It's EMC's new Center of Excellence.

Air cooling takes advantage of air-intake plenums at the perimeter of the building and air-side economizers to provide free cooling during months of cool weather—an estimated 5,000 hours, or more than half the year.

Sophisticated HVAC and electrical monitoring control systems were incorporated into the design as an extension of EMC's current data center control systems, enabling remote monitoring from EMC global Command Centers.

Continuous power to the data center is provided by two 2N redundant uninterruptable power systems. Each system contains three 675 kW UPS modules—expandable to four—with flywheel technology that eliminates the need for battery storage. Multiple generators are on site in case of a power failure.

“The new Durham Data Center gives us a solid foundation for the future,” Peirce says, “and accelerates EMC's own journey to the cloud. It gives us the flexibility to offer IT as a Service to EMC business units in a cost effective way, and puts us in prime position to share what truly are best practices with our customers.”



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SANJAY MIRCHANDANI
EMC CIO

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