

Understanding infrastructure that powers the Cloud

By **MJ Shoer**

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I recently had the opportunity to tour a truly impressive data center called the NAP of the Americas in Miami, Fla. The facility is owned and managed by Terremark Worldwide, a Verizon company. With all the hype around the Cloud, I thought readers may be interested in learning more about just what makes up this "cloud."

Data centers are nothing new, they have been around for years. In the most simple of terms, a data center is a facility where companies may place their servers outside of their offices. The facilities are secure, offer power redundancy and high bandwidth Internet connections. When you access common resources like Google.com or iTunes, you are getting your responses from servers in data centers clear across the globe.

With that very basic foundation, let me share with you some of the impressive details about this facility, the NAP of the Americas. First, the reason I toured this facility was as part of my responsibilities as a board member of the Computing Technology Industry Association. CompTIA is the technology industry trade association and we are constantly keeping up on technological trends and how these developments impact our members, the technology companies that ultimately provide products and services to consumers and businesses throughout the world. With all the hype surrounding cloud computing, we felt it was important to take a deeper look into the infrastructure that powers the Cloud and how that impacts us all.

The NAP of the Americas is far more than a data center. NAP stands for Network Access Point and one of the truly unique elements of this facility is that this is where 160 telecommunication and data service providers interchange traffic, or peer. Peering is the handing off of data between carriers, for example, where AT&T's network intersects the Verizon network. Located within this facility are carriers from all over the world, from South America, Europe and Asia. Miami is one of the most connected cities in the world.

Aside from New York, Miami is the next major connecting point from the Eastern U.S. to the world. Submarine cables that cross the Atlantic and Caribbean terminate in downtown Miami. In fact, this facility is so important to global communications, that it has been deemed critical infrastructure by the Federal Emergency Management Agency. This means that in the event of an emergency and even martial law, Terremark employees are on duty and permitted to travel to and from the facility to ensure global communication.

Taking all this into account, one of the first questions we asked was why a facility of this importance was located right in the middle of Hurricane Alley. It's an obvious question with a very well-defined answer. As I mentioned before, Miami was a connecting point to the rest of the world by virtue of the underwater cables coming in to the city. It was a natural place to build this facility, but it had to be secure and be able to withstand a hurricane. When you approach the facility, it looks like it must be a government facility. The building is ringed with concrete barriers and the entrances are monitored by armed guards. Yes, you read that correctly, armed guards are protecting our Internet and telecommunications infrastructure. On the top of the building are several satellite domes, making it look like a sophisticated listening post, which, who knows, it may serve that purpose as well. Obviously, there were some things we could not be told, like who some of the government users of the facility may or may not be.

The facility itself is like many data centers, in that there are several levels of raised flooring that hold endless rows of server racks and network equipment. In the area we were able to tour, we saw rows of servers that provide the root name services on the Internet. These are the services that translate www.google.com into the IP addresses that are the actual servers that process your Google searches. We watched the name service requests fluctuate from a low of 670,000 to 730,000 requests per second. Yes, that's correct, nearly three quarters of a million requests, per second, to find a Web site on the Internet. The scale of what's happening across our global networks is amazing.

To make this facility secure, there are no servers on the ground level. Actual network services start almost 30 feet above sea level and are backed up by power generation and cooling of more than 24 megawatts. It's a city unto itself. There are more than 174,000 gallons of diesel fuel buried in a secure storage facility underground that will keep the data center running for three days in the event of a power failure. During the last major hurricane to hit Miami, Wilma, the downtown was without power for a week, but the NAP of the Americas never lost power. It did

have a tanker truck sitting in the secured garage, ready to top off the tanks, if necessary. There is even a disaster plan in place to dock a tanker next to the American Airlines Arena in Biscayne Bay and run a fuel line the three blocks to the facility. Remember that part about critical infrastructure? This is it. The roof is reinforced with enough concrete and steel to withstand the wind lift of a Category 5 hurricane. If one hits, this is the place you want to be.

So when you are busy surfing the Internet on your smartphone, tablet or computer, it's facilities like the NAP of the Americas that will be helping to deliver that Web page or file download you are after. As we continue to become even more connected, facilities like this will continue to pop up across the world, all designed to ensure we receive what we're looking for in as little time as possible.

Impressive stuff.

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