Wachovia Standardizes Datacenters

NEW YORK—To achieve its ultimate goal of cost savings, energy efficiencies and processing power, Wachovia planned to deploy its "datacenters in a box" design; however, after a three-and-a-half-year project to upgrade its global datacenters, the Charlotte, N.C.-headquartered bank has achieved a "pod in a box" environment.

"We haven't quite gotten there," says Tony Bishop, former head of architecture and engineering for Wachovia's corporate and investment bank, who recently left to become CEO of high-speed infrastructure consultancy Adaptivity. He spoke a datacenter conference sponsored by sibling publication *Waters*.

By investing in this strategy, Wachovia was able to realize over $100 million in cost savings from datacenter infrastructure and accelerate time to provision capacity by five times after completing the nine-step upgrading venture, which ended late last year. The bank also introduced 15 new technologies i to its infrastructure software, hardware and network base.

Hardware Technologies

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"We tried a reverse model and took a sort of top-down approach," explains Bishop. "We really felt that this was the way we could effect a lot of change," he adds.

Demand Mapping

To gain a better grasp on the datacenters' energy demand and use and to present it to the business side of the bank, Bishop's team created an economic model, deconstructing the supply and demand sides. Then team identified the who, what and where of power demand and the execution, capacity and allocation of the supply.

"That's how we started this whole thing … a conversation around how you manage and control demand and supply and incorporate it more into a certified utility," says Bishop.

After gathering the power demand and supply data, Wachovia then created a demand map to identify service level breaches, process bottlenecks, resource constraints or other performance issues.

Using Tideway Foundation datacenter optimization software from Tideway Systems, the team was able to "discover applications and their associated dependencies and what they talk to" to better map demand. [*Editor's Note: Private equity firm Apax Partners, which owns* DWT *publisher Incisive Media, is also part-owner of Tideway Systems.*]

Wachovia also created its own mathematical tool to identify capacity, CPU, memory and input/output bandwidth to figure out the best areas to optimize power.

On the supply side, Wachovia implemented supply consumption management, Bishop says, to show his team—based on location, department, and applications—who is using how much power and when, pulling data from all existing network, storage, server, application and event systems, to look for trends and correlations.

The next step was to combine the demand map and supply management to optimize the datacenters' supply footprint, according to Bishop. "Using all these tools with the demand inputs we were able to understand … what's executing … in our app servers, in our complex-event process-

ing (CEP) workflows, and in our Internet services … we actually map that in terms of what the demand was into the supply," explains Bishop.

His team used CoreFirst from IT management software vendor OpTier to show the real-time execution process, its length and lapse time and the end-user experience.

Building a Pod

Once the bank understood its resource supply and demand issues, the IT staff began rolling out new hardware, such as Intel quad-core processors and field programmable gate arrays (FPGAs), to start achieving some of its goals.

By deploying FPGAs, the bank managed to load third-party analytics, the content of which changed once a year,

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onto a card with an Intel processor to run analytics on the physical layer. "The server runs cooler and I ended up using less and getting better performance and manageability," says Bishop.

Bishop also recommends the use of processing appliances to gain efficiency and speed up processes. For example, Wachovia used FabricServer from Data-Synapse to redirect an application server process and cut down execution time.

On the connectivity side, the bank has also piloted technology from hardware-accelerated messaging vendor Tervela to speed up information flow and routing.

Wachovia also leveraged solid state disk to increase processing power and reduce the footprint to improve the user experience, says Bishop. "Because spinning disk has a natural physics limitation, solid state disk allows you to go pump a lot more," he explains.

Bishop's team was then ready to create the "pod in a box" environment for the bank's worldwide datacenters, where everything was self-contained in pods, using high-speed interconnects between each one. The design includes Cisco 7700 series switches from Cisco Systems, Verari Systems' vertically cooled racks, Hewlett-Packard (HP) special cooling units and a sampling of Azul Systems appliances.

"I was able to put two times more into a [Verari] rack compared to my HPs and my IBMs," Bishop says.

The ultimate in datacenter design is a "datacenter in a box" environment, which looks like a shipping container and contains 1,400 servers and 15 PBs of storage, according to Bishop.

To control all the pods, Bishop's team implemented virtual execution management. Once again, using FabricServer from DataSynapse Wachovia was able to create a runtime execution framework to keep track of things like session queues, arrival rates and authentications and then set rules from the infrastructure level.

Then, by implementing virtual resource management, Bishop's team was able to build an orchestration lifecycle management system for building, provisioning, making changes, updating and repurposing datacenters.

"Orchestration lifecycle management around the infrastructure [provides] a lot of automation opportunities," Bishop says. "[There's] the ability to simplify and the ability to make it more dynamic."

The last two steps of the upgrading project involve running datacenters like a utility and managing them like a portfolio. The bank used a performance management application from Netuitive to test environments before going into production to identify possible problems.

"You just have to bring it together. There are classes and assets that can be both types of appliances, types of infrastructure, performance, costs factors … and you start to manage it more and more like a portfolio," Bishop says. "When you think of it as a portfolio, you can start to create infrastructure as a service, software as a service," he adds.

Oksana Poltavets