

MAKING IT MODULAR

Dell ProConsult experts help Cadence Design Systems save US\$2.7 million in capital and US\$328,500 in annual energy costs by designing business-ready configured modules (vPOD) for virtualization



Behind the information technology breakthroughs that make headlines are thousands of gifted computer chip designers who rely on powerful, highly specialized software tools created by Cadence Design Systems.

SOLUTIONS

- CONSOLIDATION
- SERVICES
- VIRTUALIZATION

cadence®

CUSTOMER PROFILE

COUNTRY: United States

INDUSTRY: Technology

FOUNDED: 1988

NUMBER OF EMPLOYEES: 4,400

WEB ADDRESS: www.cadence.com

CHALLENGE

The Cadence® IT team decided to virtualize and consolidate its infrastructure to make room for rapid growth, but needed outside expertise to quickly fulfill the company's complex set of requirements.

SOLUTION

Dell ProConsult experts developed an innovative, modular solution for simplifying and accelerating the virtualization build-out using Dell servers and storage along with Intel processors, and helped the Cadence IT team lay the foundation for moving to cloud computing services.

BENEFITS

- Dell ProConsult Services help double the speed of the virtualization project
- Cadence saves approximately US\$2.7 million in infrastructure costs
- Dell-designed building blocks and runbook make virtualization easy to scale
- Dell solution helps speed time to market for Cadence design tools by up to 200 percent
- Standardized Dell building blocks simplify IT management
- Tiered computing concept (vPOD) from Dell enables fast, flexible infrastructure build-out
- Consolidating on Dell™ PowerEdge™ servers with Intel® Xeon® processors saves approximately US\$328,500 in annual energy costs





HOW IT WORKS

HARDWARE

- Dell™ PowerEdge™ M610 and PowerEdge M710 servers with the Intel® Xeon® processor 5500 series
- Dell PowerEdge R900 server with the Intel Xeon processor 7400 series
- Dell PowerEdge M1000e modular blade enclosure
- Dell EqualLogic™ PS5000 Series virtualized Internet SCSI (iSCSI) storage area network (SAN)
- Dell Management Console

SOFTWARE

- VMware® ESXi

SERVICES

- Dell ProConsult
 - Virtualization services

“THE DELL MODULAR STRATEGY ENABLES US TO SOLVE OUR IT CHALLENGES BY GIVING US TOOLS TO HELP OURSELVES RATHER THAN RELYING ON AN EXPENSIVE, LONG-TERM CONSULTANT ENGAGEMENT.”

Kanishka de Lanerolle, director, virtualization program, Cadence Design Systems

Take almost any computer or cell phone on the market today, and chances are good it was created in part using Cadence electronic design automation (EDA) software. The company also has a services division that actually designs chips for many leading equipment makers.

Supporting the company's work is a challenging task for the Cadence IT team. "Between the growth of our business and the increasing complexity of today's integrated circuits, delivering chip designs and design software has become much more resource-intensive," says Kaijun Zhan, IT group director for data center operations at Cadence. "There is a constant demand for more EDA compute cycles."

GROWTH CREATES A RACE FOR SPACE IN THE DATA CENTER

The IT team at Cadence has rapidly expanded the company's data center infrastructure to meet the demand. "The number of servers has increased several times over," says Zhan. "We needed a way to put more computing power into our available data center space and reduce server energy consumption. Otherwise, we would have to spend large sums of money on new facilities."

But even as the Cadence IT team faced constant requests for new servers, they knew that many of the existing servers using up valuable data center space and power were underutilized. "We asked ourselves hard

questions about how we could improve server utilization from an average of 10 or 20 percent to 40 or 50 percent," says Zhan. "We needed to do a better job of sharing the computing resources among business groups."

The Cadence IT team was also concerned about delivering the necessary application platforms quickly enough. Each new deployment could take as long as 30 days from ordering the hardware to completing the installation. The team was having difficulty meeting growing internal demand, and that challenge would only increase as the company's new software-as-a-service (SaaS) offerings added demand from external customers.

“BY FOLLOWING THE RUNBOOK PROCESS THE DELL EXPERTS HELPED US CREATE, AND USING THE TIERED DELL MODULES FOR FUTURE EXPANSION, WE CALCULATE WE’LL BE ABLE TO DOUBLE THE CURRENT SPEED OF OUR VIRTUALIZATION EFFORT.”

Kaijun Zhan, IT group director for data center operations, Cadence Design Systems

THE IT TEAM LOOKS FOR WAYS TO ACCELERATE IN-HOUSE VIRTUALIZATION EFFORTS

To address these challenges, the IT team began virtualizing and consolidating its data center servers using VMware® ESXi. “We virtualized about 20 servers and learned the technology,” says Zhan. “But we didn’t have the staff to quickly build a large and widely varied virtualization environment to support all the various workloads at Cadence. We couldn’t just drop in a stack of identical servers, because the IT environment is complex and many of the workloads are unique.” With thousands of servers involved, the IT team also wanted to develop a repeatable process that would simplify infrastructure build-out and physical-to-virtual server migration, allowing the team to systematically scale its virtualization efforts in the future.

The Cadence team decided to work with a virtualization consultant to help them find the right solution. “We wanted someone who already had extensive experience and positive results implementing virtualization on a large scale,” says Ron Smith, director of IT customer enablement and cloud computing at Cadence. “We narrowed it down to a few leading candidates and talked to them many times before making our selection.”

CADENCE CHOOSES DELL PROCONSULT SERVICES FOR VIRTUALIZATION PLANNING AND DESIGN

After considering multiple options, Cadence selected Dell ProConsult Services. “Previously, we’d had great experience with Dell products like servers and storage, but didn’t have any experience with Dell consultants,” says Smith.

“As we began talking with them, we were very impressed with their knowledge and expertise. Dell was able to provide granular detail on how we could tackle the virtualization challenges that we had run into, and how we could achieve positive return on investment as we extended virtualization across the enterprise.”

TIERED COMPUTING CONCEPT FROM DELL ENABLES FAST, FLEXIBLE BUILD-OUT

Dell ProConsult experts proposed an innovative solution for simplifying the virtualization build-out in the complex Cadence IT environment: tiered computing pods consisting of Dell infrastructure with business-ready configurations for different levels of requirements. “We’ve unified servers, storage, software, and networking elements in modularized building blocks of our virtual infrastructure,” explains Kanishka de Lanerolle, director of the virtualization program at Cadence. “So it’s easy to incrementally increase capacity. The Dell modular strategy enables us to solve our IT challenges by giving us tools to help ourselves rather than relying on an expensive, long-term consultant engagement.”

With Dell’s help, Cadence designed a catalog of modules for different types of workloads. Module components include Dell PowerEdge M1000e blade enclosures, which the IT team can use with a range of Dell PowerEdge blade servers such as the PowerEdge R610 and PowerEdge R710, together with the energy-saving Intel Xeon processor 5500 series, which they chose because of its optimization for virtualization and its performance/cost ratio. The IT team can add more processors, memory, and drive capacity to the servers for larger or more demanding workloads and to maximize the number of virtual machines

per physical server. When Cadence is ready to virtualize its desktop environment, Dell building blocks can be used with VMware View desktop virtualization software.

The modules also provide storage flexibility with either Internet SCSI (iSCSI) or Fibre Channel arrays. The Cadence team plans to use the Dell EqualLogic™ PS5000 iSCSI storage area network (SAN) array to build out the virtual environment. “We’re using the Dell EqualLogic arrays to move from our previous direct attach storage to centralized storage and get the full benefits of virtualization, including flexibility, high availability, and cost savings,” says Jonathan Chu-Yang, IT architect for the virtualization program at Cadence. “The Dell EqualLogic architecture allows us to easily and seamlessly expand our pool of storage as we grow our virtual server environment in the future. So far, we have deployed 76 TB of raw storage across six EqualLogic arrays.”

DELL EXPERTS WORK WITH CADENCE TO CREATE A STANDARDIZED SCALE-OUT PROCESS

As part of the consulting engagement, Dell and the Cadence team developed and documented a standardized process for repeating the solution to scale the virtual infrastructure over time. “We were able to create a runbook, which outlines the repeatable process by which we can bring new workloads into the virtual environment and manage the environment efficiently as we grow,” says Zhan.

While the tiered module designs were developed, the Cadence IT team used Dell PowerEdge R900 rack servers with the Intel Xeon processor 7400 series to consolidate older servers. “The Dell

“DELL HELPED US ADD FLEXIBLE CAPACITY THAT WE CAN USE TO MEET PEAK EDA DEMANDS INTERNALLY TODAY, AND TO OFFER CLOUD COMPUTING SERVICES TO OUR CUSTOMERS TOMORROW.”

Ron Smith, director of IT customer enablement and cloud computing, Cadence Design Systems

PowerEdge R900 gave us the compute power to host a high number of virtual machines on each physical server and get more value out of our existing rack space,” says Smith.

DELL PROCONSULT SERVICES HELP DOUBLE THE SPEED OF THE VIRTUALIZATION PROJECT

Working with Dell ProConsult Services has enabled Cadence to accelerate its virtualization project by a factor of two. “By following the runbook process the Dell experts helped us create, and using the tiered Dell modules for future expansion, we calculate we’ll be able to double the current speed of our virtualization effort,” says Zhan. “Today we have a deployment rate of approximately 100 virtual machines (VMs) per month, which we expect to double to 200 VMs per month when the Dell experts’ work is complete. As a result, we’ll be able to complete the project much quicker than we could have on our own.”

CONSOLIDATING ON DELL SAVES APPROXIMATELY US\$328,500 ANNUALLY IN ENERGY COSTS

The Cadence IT team is consolidating older servers onto newer Dell servers at a ratio of approximately 10:1 or more. With fewer physical machines in the data center and the increased energy efficiency of the new Dell servers and Intel processors, the team calculates that it is currently saving about US\$900 each day, or US\$328,500 annually, on direct operating costs of power and cooling. “We expect that savings to rise as we continue to virtualize and consolidate our servers,” says Zhan.

CADENCE SAVES APPROXIMATELY US\$2.7 MILLION IN INFRASTRUCTURE COSTS

Already, the Cadence IT team calculates it has saved approximately US\$2.7 million in infrastructure costs because the new Dell servers can absorb much of the company’s growth by hosting multiple virtual machines each. “We have more than 1,000 virtual machines in place today,” says Zhan. “In the past, we would have had to purchase approximately 900 physical boxes to add that much processing capacity.”

DELL SOLUTION HELPS SPEED TIME TO MARKET FOR CADENCE DESIGN TOOLS BY UP TO 200 PERCENT

With new product development efforts starting up frequently at Cadence, the IT team was hard-pressed to provide the needed application platforms quickly enough to support internal designers and product development engineers. But since virtualizing on Dell, the IT team can now deploy new virtual servers in a matter of hours instead of the two days it took previously. “That helps our engineering department accelerate the process of developing new customer products, and ultimately reduces our time to market for new offerings by as much as 200 percent,” says Zhan. “That’s a huge business value for our company and our customers.”

VIRTUALIZING ON DELL HELPS REDUCE USER DOWNTIME

The virtualized Dell infrastructure is also helping to ensure that IT services, and ultimately product development, are not impacted in the event of a server failure. Instead, virtual servers fail over to a

different physical machine that is already running. In addition, the tiered building block solution designed by Dell enables the IT team to match the high-availability capabilities of each block to specific workload requirements. “We can build more redundant drives and connectivity into each computing pod as needed,” says Zhan.

DELL-DESIGNED BUILDING BLOCKS AND RUNBOOK MAKE VIRTUALIZATION EASY TO SCALE

The modular building blocks with Dell business-ready configurations make it easy for the Cadence IT team to incrementally increase computing, networking, and storage capacity as it is needed, while maintaining the quality of the virtual environment. The IT team has deployed five of the new modules to date. “The Dell building blocks enable us to look at virtualization in a whole new way,” says Smith. “Traditionally, you continue to build on whatever you have, so any shortcomings become magnified as you build out a massive environment. With the Dell modular computing architecture and the Intel processors, we can build step-by-step and easily make the right changes as we go.”

DELL HELPS CADENCE MOVE TOWARD A CLOUD COMPUTING MODEL

The virtualization project has enabled Cadence to begin moving toward cloud computing, both internally and for external customers. Running multiple virtual machines on each physical server has increased average server utilization to approximately 50 percent. “Dell helped us add flexible capacity that we can use to meet peak

“THE DELL EQUALLOGIC ARCHITECTURE ALLOWS US TO EASILY AND SEAMLESSLY EXPAND OUR POOL OF STORAGE AS WE GROW OUR VIRTUAL SERVER ENVIRONMENT IN THE FUTURE.”

Jonathan Chu-Yang, IT architect, virtualization program, Cadence Design Systems

EDA demands internally today, and to offer cloud computing services to our customers tomorrow,” says Smith. “We have a number of software-as-a-service offerings that will benefit from the flexibility of cloud computing. Dell servers and Intel processors are helping us build the infrastructure and the virtualization layer within the cloud.”

DELL PROCONSULT ADVICE CONTINUES TO PAY DIVIDENDS EVEN AFTER THE ENGAGEMENT

Smith credits Dell ProConsult Services with helping Cadence develop a flexible, scalable, virtualized infrastructure that will give the company the computing capacity to keep delivering innovative software tools and chip

designs well into the future. “The expertise Dell brought to the table was extremely valuable,” says Smith. “They helped us find the best way to move forward with virtualization and also to build on that foundation. We’ll be able to build out a cloud that’s specific to us but can meet a variety of business needs—a generic Cadence cloud, if you will, that will shape the way we approach IT services for years to come.”

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