

# Manufacturer Accelerates Business Cycle Times



## Executive Summary

### Avago Technologies

Manufacturing  
San Jose, California  
3500 Employees

### Challenge

- Build operationally efficient data center
- Accelerate business cycle times
- Help ensure business continuity

### Solution

- Migrated complete Oracle solution stack to Cisco Unified Computing System powered by Intel® Xeon® processors, including Oracle Linux, Oracle Real Application Clusters (RAC), and Oracle E-Business Suite
- Virtualized environment with VMware 4 on Cisco Unified Computing System
- Connected to core Cisco Nexus 7000 Switches over 10 Gigabit Ethernet

### Results

- Accelerated long-running batch processes by 30-40 percent
- Increased business flexibility with wire-once architecture and virtualization
- Decreased operational costs by 40 percent, despite adding third data center

## Avago Technologies migrated Oracle application stack to Unified Computing System, without disruption.

### Challenge

Headquartered in San Jose, California, Avago Technologies is a leading global manufacturer of optoelectronics and analog interface components. Approximately 3500 employees in 13 countries serve 40,000 customers worldwide.

Avago uses Oracle Real Application Clusters (RAC) and Oracle E-Business Suite for major business processes, including order management, finance, procurement, planning, manufacturing, reporting, and business intelligence. "Ninety percent of our business operates on a single instance of Oracle E-Business, so the reliability and performance of the underlying platform are critically important," says Shreyas Shah, senior director of global IT for Avago Technologies.

Previously, Avago housed its Oracle application stack on an Intel-based platform operating Oracle Linux 5.2. When the compute infrastructure in Avago's Singapore test/development and production data centers needed a refresh, the IT team decided to evaluate computing systems based on reliability, support, operational efficiency, performance, and integration with the existing EMC storage area network. During the migration, Avago would be upgrading to Oracle Linux 5.4 and Oracle Real Application Clusters (RAC) 11g R1. "The challenge would be accomplishing all this with no more than 48 hours downtime," Shah says.

To complicate the challenge, the company had only seven months to refresh the two Singapore data centers and build a new disaster recovery facility in Colorado.



“Although the Cisco Unified Computing System minimizes costs, its primary value is helping the business operate better, faster, or more efficiently. Reducing cycle times for shipping, reporting, and order management increases customer satisfaction and accelerates revenue realization.”

**Bob Rudy**  
Chief Information Officer  
Avago Technologies



## Solution

Avago met its goals with the Cisco Unified Computing System™ (UCS) powered by Intel Xeon processors, which combines compute, networking, storage access, and virtualization in a single system managed as a cohesive entity. “The Cisco Unified Computing System is certified to work with Oracle E-Business Suite and EMC storage, which gave us confidence that the architecture would be fully supported,” Shah says. “It provides tremendous value in terms of initial as well as ongoing costs. Cisco Services offered the expert resources we needed to have all three data centers operational in less than seven months.”

Before making its decision, Avago engaged Cisco Services to conduct a four-week proof of concept in the Colorado data center. Cisco Services and the Avago team collaborated to develop test cases. “The Cisco Unified Computing System met our requirements for all 150 test cases, and we saw remarkable performance gains for Oracle E-Business Suite,” Shah says. (See Results.) In addition, the proof of concept took only two weeks to build, giving the company confidence that it could meet the aggressive timeline.

Cisco provided the UCS Migration and Transition Service to help move the Oracle stack from the existing Intel-based platform to the Cisco® UCS and to optimize performance. The Oracle production environment includes Oracle Linux, Oracle RAC 11g, and Oracle E-Business Suite. The Oracle solution stack resides on 24 Cisco UCS B200 Blade Servers with 2 Intel Xeon 5000 series processors per node distributed across four chassis, all configured with 48 GB of memory. Four other blades with 96 GB of memory house virtualized instances of Avago’s boundary and infrastructure servers.

Two months after completing the migration to the Cisco Unified Computing System in Singapore, Avago launched its new disaster recovery data center in Colorado, using the same configuration and setups as the production data center.

## Results

### Rapid Migration of Oracle Stack with No Business Disruption

Avago implemented the Cisco Unified Computing System in just 10 days, an achievement possible because all servers connect to the Cisco Nexus® 7000 Switches and EMC storage through a single pair of Cisco UCS 6100 Fabric Connects. Cisco Services and HCL Technologies, a Cisco partner, helped to create Cisco UCS Manager service profiles for Linux and VMware servers. “Cisco Services helped build the right standards for SAN and network configuration, and recommended defaults that matched our current and future needs,” says Shah. An administrator applied the service profiles to Cisco UCS blade servers in just minutes, with a few clicks. Spending less time setting up the system gave the team more time to set up application layers and upgrade Oracle.

“We moved our Oracle environment to the Cisco Unified Computing System with no interruption to the business and no critical issues,” Shah says. “That’s a testament to the platform as well as the Cisco Services team’s expertise and meticulous cutover plans.” Later, HCL Technologies set up the disaster recovery data center, working alongside the Avago IT team to give them the confidence to manage the environments with internal resources.

Shah continues, “The Cisco Services team was extremely knowledgeable about the platform as well as Oracle, and applied their expertise rapidly to resolve any issues.

“We moved our Oracle environment to the Cisco Unified Computing System with no interruption to the business and no critical issues. That’s a testament to the platform as well as the Cisco Services team’s expertise and meticulous cutover plans.”

**Shreyas Shah**  
Senior Director,  
Global Information Technology  
Avago Technologies

We were very satisfied with the engagement, which included educating our team on the intricacies of managing and optimizing the Cisco Unified Computing System. Cisco Services provided the foundation for Avago to build its future.”

#### **Oracle Application Performance Gains**

The high memory capacity combined with the Xeon CPU performance of the Cisco UCS Blade Servers improved Oracle application performance in Avago’s environment. “On our previous platform, memory utilization averaged 60 to 80 percent and peaked at 100 percent,” Shah says. “Now it’s just 15 percent. Performance is so good that we might reduce the number of servers configured for Oracle ERP when we upgrade to release 12.”

#### **Business Continuity and Reduced IT Workload**

With the latest Xeon processors innovations, processing is also more efficient on the Cisco Unified Computing System. On the previous platform, average processor utilization was 50–60 percent, peaking at 80–90 percent. Now average utilization is 10 percent, peaking at just 20 percent. “Ample processing and memory capacity in the Cisco Unified Computing System lessens the likelihood of outages that could threaten the business,” Shah says.

A bonus of more efficient computing is that the IT team no longer needs to respond to hundreds of automatically generated tickets each month. The system used to generate the tickets when processors reached capacity, alerting staff to terminate or redirect processes. Since moving the Oracle stack to the Cisco Unified Computing System, tickets have disappeared entirely, freeing IT staff to focus on optimizing the environment. High-priority, service-interrupting calls decreased by more than half.

#### **More Timely Business Intelligence**

Oracle users notice the biggest performance gains on long-running batch processes. “Hours-long Oracle processes now tend to be 30–40 percent faster, which we attribute partly to the high memory capacity of the Cisco Unified Computing System,” Shah says. For example, the time to extract Oracle data for the data warehouse decreased from four hours to two. Faster cycle times give Avago confidence that data extraction will not impede performance as the data warehouse grows. Faster cycle times also give Avago the option to extract data more frequently in the future, making sure managers and executives can base their decisions on up-to-date information.

Similarly, the time to create a daily copy of the reporting environment from the online transaction processing (OLTP) system decreased from 30–40 minutes to 8 minutes.

#### **Lower Data Center Total Cost of Ownership**

Ordinarily, expanding from two to three data centers would be expected to increase operational costs by 50 percent. “Our operational costs will actually decrease by 40 percent when we expand from two to three data centers,” Shah says. A major reason is the space, power, and cooling savings from consolidating from 84 to 30 racks.

#### **Support for Business Continuity**

Finally, the fully redundant architecture of the Cisco Unified Computing System minimizes the risk of outages that could interrupt the business. Even if a production server fails, Avago can provision another available server in minutes and then move the applications virtually. In Singapore, the IT team can even swap blade servers between data centers if necessary.

## Product List

### Data Center

- Cisco Unified Computing System
  - Cisco UCS B200 Blade Servers
  - Cisco UCS 6104 Fabric Interconnects 6140 for Production and Test/Dev, 6120 for DR
- Cisco Nexus 7000 Switches
- Intel Xeon 5500 Series processors

## Services

- Cisco Proof of Concept Service
- Cisco UCS Migration and Transition Service

Ease of provisioning also positions Avago to respond rapidly to new business opportunities. The company no longer needs to wait days or weeks to procure, configure, and cable new servers.

“Before, we adapted our business processes to the constraints of the computing system,” says Bob Rudy, chief information officer of Avago. “Now the Cisco Unified Computing System is lifting that barrier.”

## Next Steps

Avago plans to move the applications that remain on the previous server platform to the Cisco Unified Computing System, increasing return on investment. “Although the Cisco Unified Computing System minimizes costs, its primary value is helping the business operate better, faster, or more efficiently,” says Rudy. “Reducing cycle times for shipping, reporting, and order management increases customer satisfaction and accelerates revenue realization.”

## Technical Implementation

All Cisco UCS Blade Servers in the system connect to the data network and SAN through a pair of Cisco UCS 6100 Series Fabric Interconnects. Each fabric interconnect connects to redundant Cisco Nexus 7000 Switches over one pair of cables, and to EMC storage over three pairs of cables. Nexus IS, a Cisco Certified Gold Partner, implemented the Cisco Nexus 7000 Switches.

Avago has so far consolidated 70 servers to 28 Cisco UCS B200 Blade Servers powered by Intel Xeon 5500 series processors distributed across four chassis. The Oracle production environment includes Oracle Linux 5.4 and 5.3, Oracle RAC 11g, and Oracle E-Business Suite. The four servers used for Oracle RAC 11g and the 20 used for Oracle applications have 48 GB of memory. Another four servers comprise a VMware virtual high-availability cluster, used for Avago’s boundary and infrastructure services. These servers have 96 GB of memory and host 20 virtual servers on Linux and Windows. Each chassis contains a mix of virtualized and native blade servers.

## For More Information

To find out more about Cisco and Oracle Data center Solutions, visit: [www.cisco.com/go/oracle](http://www.cisco.com/go/oracle).

To find out more about Cisco Unified Computing System, visit: [www.cisco.com/go/ucs](http://www.cisco.com/go/ucs).

To find out more about Cisco Data Center Business Advantage solutions, visit: [www.cisco.com/go/dc](http://www.cisco.com/go/dc).

To find out more about Cisco Services, visit: [www.cisco.com/go/advancedservices](http://www.cisco.com/go/advancedservices).

To find out more about Avago Technologies, visit: [www.avagotech.com](http://www.avagotech.com).

To find out more about Intel, visit: [www.intel.com/itcenter](http://www.intel.com/itcenter).



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