



Data Center Consolidation Adds Energy Savings and Agility for Healthcare

Virtualization with the Intel® Xeon® processor E7 family enables 100-to-1 consolidation for California Department of Health Care Services (DHCS)



“We’re enhancing the way we deploy capacity and deliver IT services. We’re delivering IT services on demand, and in a more robust, secure, and timely manner.”

– Barney Gomez,
Chief Technology Officer,
California Department of Health Care Services

Data center consolidation at California’s DHCS has dramatically reduced energy consumption and costs. DHCS’s modernization initiative positions the department—and, ultimately, California’s citizens—to thrive in a new era of healthcare service delivery. Under DHCS CIO Chris Cruz and department leadership, DHCS chose the powerful Intel® Xeon® processor E7-4800 product family as the foundation for server virtualization and data center consolidation, helping DHCS achieve a 100-to-1 consolidation ratio, reduce data center energy consumption by more than 30 percentage points, increase IT efficiency, and advance DHCS toward an agile cloud environment.

Challenges

- **Maxed-out data center.** The DHCS data center was bursting at the seams and running at 95 percent power capacity.
- **Efficiency mandate.** California Assembly Bill (AB) 2408 mandated reductions in floor space and energy consumption for state government data centers.
- **Expanding requirements.** DHCS administers an expanding array of services, including the state’s health insurance marketplace. Agency consolidation has brought additional workloads into the DHCS data center.

Solutions

- **Intel Xeon processor E7 family for data center consolidation.** DHCS chose high-capacity HP ProLiant* DL980 servers based on the Intel Xeon processor E7-4800 product family with Intel® Ethernet Converged Network Adapters. Servers run Microsoft Windows Server* and use VMware ESX* for virtualization.
- **Intel® Advanced Encryption Standard New Instructions (Intel® AES-NI).** DHCS uses Intel AES-NI to accelerate encryption performance and enhance data protection.

Technology Results

- **Savings on space and management.** DHCS replaced 400 physical systems with four ProLiant DL980 servers, freeing space in the previously crowded data center, increasing IT efficiency, and lowering total cost of ownership (TCO).
- **Reduction in data center energy consumption.** DHCS reduced its data center power load from 95 to 65 percent of capacity. The reduction added TCO savings while earning a USD 10,000 award from the Sacramento Municipal Utility District.

Business Value

- **Alignment with state and organizational goals.** DHCS meets the objectives of AB 2408 while increasing operational efficiency, agility, security, and capacity. DHCS can efficiently handle its own growth requirements, support other agencies’ workloads, and take advantage of cloud computing’s agility. Its modernization saves tax dollars and positions the department to enable better healthcare services for Californians.

Data Center Consolidation Drives Savings

DHCS works with healthcare professionals, county governments, and health plans across California to protect and improve the health of all Californians and to provide a healthcare safety net for the state’s low-income citizens and people with disabilities. DHCS finances, administers, and provides oversight for a variety

of healthcare service delivery programs, from the Covered California* health insurance marketplace to an electronic health records (EHR) incentive program for providers that participate in Medi-Cal, California’s Medicaid program.

Preparing for rising demands and dynamic changes in healthcare, DHCS implemented a data center consolidation initiative that replaced 400 physical servers with four high-performance,



Intel Xeon processors helped DHCS reduce data center energy consumption and earn a USD 10,000 award from its utility company

virtualized HP ProLiant DL980 servers powered by the Intel Xeon processor E7-4800 product family. Each ProLiant DL980 runs approximately 100 virtual machines (VMs), according to Barney Gomez, chief technology officer for DHCS. Gomez says the servers are so powerful that he expects to reach 150 VMs per server before they top out.

Under Cruz's leadership, the initiative has delivered energy efficiency, space savings, and consolidation ratios that reflect strategic goals laid out by Carlos Ramos, director and California state CIO, California Department of Technology; Toby Douglas, director of DHCS; and Karen Johnson, chief deputy director of DHCS. The new infrastructure supports a wide range of applications and services. It reduces the department's carbon footprint, and delivers economies of scale that increase IT efficiency and enable Cruz's IT organization to quickly accommodate changing requirements.

Intel® Processors for Capacity, Availability, Security, and Confidence

With a 20-year IT career under his belt, Gomez feels confident with DHCS's choice of Intel® technologies. The Intel Xeon processor E7 family is Intel's top-of-the-line processor family, offering energy-efficient performance, high availability, and increased memory and I/O capacity for high-density virtualization and demanding, mission-critical workloads.

"Intel and its name, its footprint, its ability to produce, and the processors Intel has developed—from an engineering perspective, I have found that the Intel line of chipsets is much better when it comes to performance," Gomez says. "Based on my years of experience in IT, I have found that anything that's Intel-based generally runs better and performs better."

The Intel Xeon processor E7 family also includes Intel AES-NI, which works with supported solutions from McAfee, Microsoft, VMware, and other companies to make encryption software faster and stronger. "We are security conscious," says Gomez. "All our data requires encryption, whether it's in motion or at rest. Intel AES-NI helps us do the encryption and decryption without a slowdown in performance. The encryption is invisible to the user, and our data is protected in the event of an attempted exploit."

Nimble IT for a Healthy Future

By consolidating and virtualizing on the Intel Xeon processor E7 family, DHCS delivered immediate benefits: a greener data center, a more cost-effective infrastructure with outstanding availability and capacity, and a more nimble IT organization. The department also created a platform for ongoing improvements. DHCS IT is evolving its virtualized environment to full cloud computing, adding Intel Xeon processor-based blade servers from HP, and expanding its use of Intel Xeon processor-based storage systems from EMC to provide the intelligence for data deduplication, replication, and other storage capabilities.

DHCS IT leaders work closely across the department and the state to align IT and business strategies and communicate the benefits their IT initiatives are achieving. With the server modernization initiative, they can share clear benefits. "Business programs want to know what you're doing for them," Gomez says. "With these initiatives, we're enhancing the way we deploy capacity and deliver IT services. We're delivering IT services on demand, and in a more robust, secure, and timely manner."

Lessons Learned

Chris Cruz and Barney Gomez share best practices for large-scale IT initiatives:

- **Start with business requirements.** Work closely with your business counterparts to understand organizational objectives and see how IT can deliver the greatest value.
- **Engage vendors early, but do your homework.** Map out your objectives and business plans, and research the key players and technologies before you engage with vendors.
- **Collaborate deeply.** Choose trusted vendors. Make sure they understand your business objectives, and then work together closely to achieve them.
- **Close the loop.** Once you've achieved success, communicate across the organization to let stakeholders know what you've accomplished and what it means to the bottom line.

Find the solution that's right for your organization. Contact your Intel representative, visit Intel's [Business Success Stories for IT Managers](#), or explore the [Intel.com IT Center](#).



Intel® AES-NI requires a computer system with an AES-NI-enabled processor, as well as non-Intel software to execute the instructions in the correct sequence. AES-NI is available on Intel® processors. For availability, consult your reseller or system manufacturer. For more information, see <http://software.intel.com/en-us/articles/intel-advanced-encryption-standard-instructions-aes-ni/>.

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more information go to www.intel.com/performance

Intel does not control or audit the design or implementation of third party benchmark data or Web sites referenced in this document. Intel encourages all of its customers to visit the referenced Web sites or others where similar performance benchmark data are reported and confirm whether the referenced benchmark data are accurate and reflect performance of systems available for purchase.

This document and the information given are for the convenience of Intel's customer base and are provided "AS IS" WITH NO WARRANTIES WHATSOEVER, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND NON-INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. Receipt or possession of this document does not grant any license to any of the intellectual property described, displayed, or contained herein. Intel® products are not intended for use in medical, lifesaving, life-sustaining, critical control, or safety systems, or in nuclear facility applications.

© 2014 Intel Corporation. All rights reserved. Intel, the Intel logo, and Xeon are trademarks of Intel Corporation in the U.S. and/or other countries.

*Other names and brands may be claimed as the property of others.