CCI proves better for users, IT administrators, HP bottom line

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– Rob Weinand, technical specialist
HP Corporate Real Estate

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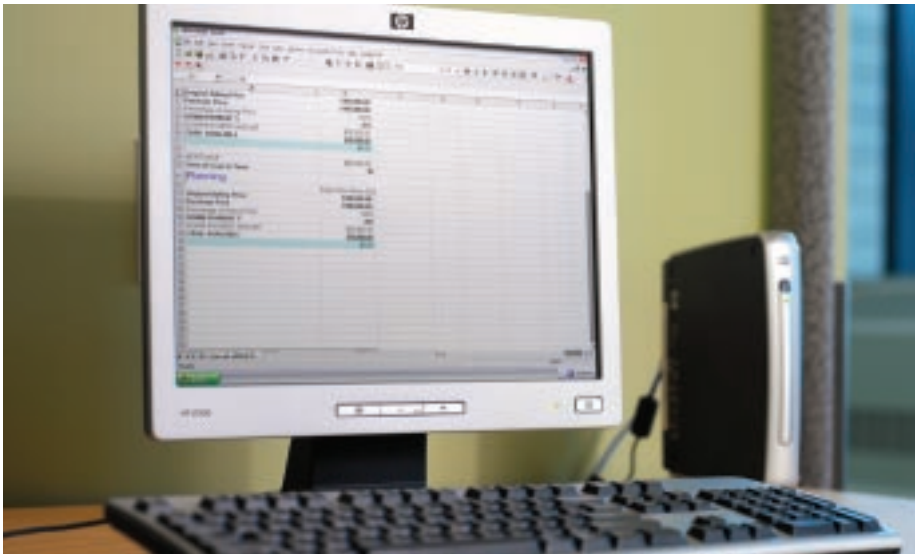


Like many of its enterprise customers, HP has long relied on distributed computing to meet the needs of the majority of its users. Yet inside many computing environments – including HP's – there are departments and functions that face security, privacy, manageability and other issues that can benefit from a different computing foundation.

HP developed Consolidated Client Infrastructure (CCI) to be that foundation. CCI centralizes most resources in a data center, providing end-user access via a thin client that connects to a dedicated PC blade in the data center. This eliminates many of the limitations and complexities of shared processing architectures such as server-based computing.

To verify CCI's capabilities and address specific business issues at HP, the CCI team engaged HP Services to deploy the solution to a minimum of 1,000 users. Prospective organizations were chosen after completing a group profile assessment and follow-up interviews with business unit managers. Ultimately, CCI was deployed to more than 1,300 users across 11 different HP business units and functions. In addition to evaluation by the business units, in-depth measurements were taken on network performance, storage utilization and concurrency throughout the deployment.

End users included a full range of participants: power-PC users to office task workers, full-time and contingent shift employees, office-based workers and telecommuters in the United States and international locations. Some of the users were provided with HP thin clients with which to access the blade PCs. Others used their existing desktop or notebook PCs to access the blade PCs.

Implementations included both dynamic and static blade PC allocations. Dynamic allocations assign blade PCs as users log onto a network. Static blade PC environments provide a dedicated blade to each user.

As of November 2005, CCI had been deployed at HP for 11 months.

Real-world challenges

CCI candidates were chosen for their varying business requirements, unique staffing/computing challenges and existing issues with their current PC solutions. Among those candidates, five are profiled for their similarities to the challenges and computing conditions that HP hears about frequently from its customers.

- **Challenge #1: Standardizing application deployment and access**
  To help HP meet cost-cutting goals following the merger with Compaq, HP Corporate Real Estate needed to consolidate several systems onto one while also providing 150 users with much faster access to key applications and data.

- **Challenge #2: Maintaining shared PCs for shift workers**
  More than 450 manufacturing shift workers sharing 16 PCs in a common area needed better, more reliable access to the HP intranet and Internet. IT staff needed a long-term solution to frequent system crashes, virus infections and excessive support responsibilities.

- **Challenge #3: Simplifying management at IT training facility**
  An instructor and customer support specialist at the Houston data center training lab who was also responsible for maintaining PCs in the lab needed to focus more on HP customers and teaching and less on rebuilding PCs between classes.

- **Challenge #4: Providing off-site employee access to applications**
  IT staff equipped with 40 PCs in an emergency "warm room" operations center for off-site monitoring of the HP data center needed faster access to applications. IT staff needed a way to reduce IT management headaches.

- **Challenge #5: Improving access for security receptionists**
  E-mail for security receptionists on the HP Houston campus is based on location of the desk where the person is stationed, not on the employee's name. To enable secure personal information and provide employees with access to HR and time-card information, Security needed a better solution than that offered by a shared computing environment.

CCI solution at HP

To meet these challenges and others, HP designed, implemented and managed a CCI solution that included a complete package of computing hardware and software management tools.

Hardware

The HP internal implementation of CCI consists of five racks of equipment housed within HP's data center in Houston, Texas. Four racks contain a total of 800 HP blade PCs (200 blades per rack). A fifth rack, dedicated to support hardware, includes:

- 1 KVM Management Console
- 2 F5 Big IP Load Balancers (active/passive)
- 1 Deployment Server
- 1 DHCP Server
- 1 SQL Server
- 2 NAS Servers (active/passive)

Each rack is connected to the HP corporate network via HP ProCurve network switches. SAN storage consists of one terabyte of storage accessible via NAS.

Although thin clients are recommended, several types of client devices were used to better assess alternative deployment scenarios a customer might face. Clients included:

- HP t5700 Thin Clients (Windows® XPe)
- HP t5725 Thin Clients (Windows CE)
- HP Commercial Notebooks
- HP Commercial Desktops running Windows XP and Windows 2000

Management Tools

CCI uses industry-standard tools to manage solution elements both inside and outside the data center from a single console. In the HP deployment, initial software installation and image deployment were accomplished through Altiris and HP's Rapid Deployment Pack (RDP). RDP and HP Systems Insight Manager are both part of the HP BladeSystem portfolio included in each CCI solution. All PC blades received a standard base image built on Windows XP Professional SP2 and subsequent security updates.

The majority of users are in a dynamic architecture. Blade pools were created and maintained by using F5 Networks' Big IP Load Balancing application. This software manages and directs traffic for all IP-based applications running on the PC blades. A small number of users in the static model have a dedicated IP address and connect directly to their blade rather than through the load-balancing application.

A mix of blade pools, security groups and organizational units was used to enable end-user access to blade PCs. Active Directory policies using Security Groups were leveraged to limit or grant access to applications installed on the blade PCs. By accessing a unique blade pool, groups requiring specialized applications with per-seat licensing were able to prohibit unauthorized access.

Image management and blade reimaging were done with Altiris Deployment Solution (ADS). Altiris was used in conjunction with HP's PC COE application to package

HP's deployment of CCI in Corporate Real Estate was profiled in the September 2005 issue of Leader magazine. Read the article at www.hp.com/go/cci. See "success stories."

and push out updates to the PC blades under predefined jobs. Software updates and patches are automatically deployed every Saturday at 3 a.m.

Deployment results

Participant groups and business unit managers alike endorsed CCI as a viable desktop computing alternative. More specifically, CCI went a long way toward addressing specific challenges faced by the various HP groups.

Challenge #1: Standardizing application deployment and access

Consolidating four systems into one was an easy TCO decision for HP Corporate Real Estate. The challenge was meeting users' needs for fast access to an Archibus database through the AutoCAD application, says Rob Weinand, technical specialist. At stake was the ability of vendors to get the information they needed to support HP personnel moves in a timely and cost-effective manner.

"We had a huge latency issue with transferring data over the network," says Rob. "A lot of the users are vendors, and it was taking them about two minutes per transaction to receive something that should have taken seconds." HP incurred the cost of vendors waiting for data to transfer before their real work could even begin. That cost was exacerbated by high support costs associated with keeping PCs updated with software.

"Consolidating on CCI in North America enabled us to meet our TCO goals and provide users with a major improvement in system performance," says Weinand. "It's also made it much easier for our support team to deploy changes rapidly. Instead of having to manually update every PC every time we have an update, we can make and test the change on one blade PC, then replicate it to all of the blade PCs overnight."

Users who traveled benefited by being able to access needed data even using dial-up modems in hotels. That simplified traveling and left data stored in the secure data center as opposed to having it on a portable computer that could be lost or stolen.

Benefits Summary:

- TCO goals met
- Data transfers reduced from two minutes to two seconds
- Users able to quickly get data needed to do their jobs
- 40 percent reduction in IT support costs

Challenge #2: Maintaining shared PCs for shift workers

Approximately 450 manufacturing employees and IT staff were equally unhappy about the 16 common-area PCs that employees used during breaks to check e-mail, input time card data and check on HR information. Not only were there long wait times for the limited number of PCs, but inappropriate behavior by some employees sent some PCs crashing to a halt.

"The area was wide open," says Albert Cariaga, IT manager for the Factory Operations Team. "Users were logging in, changing their own access and downloading music and photos against company policy. It was hard to maintain the right settings and keep the systems clean. Hard drives were filling up and systems were locking up all the time. Because the PCs were right on the desk, they'd have food and drinks spilled into them, making a bad situation even worse.

"CCI has meant a huge improvement in availability," Cariaga states. "Users are happier. They can customize their desktops the way they want. The thin clients are mounted under the desks, and we've been able to fit 60 thin clients where 16 PCs used to be. Now the majority of maintenance calls we get are to replace ink cartridges in printers."

Benefits Summary:
- 95 percent reduction in IT support calls
- Redeployment of support technician to handling customer shipping issues
- Employees able to access information they need quickly
- Elimination of PC theft threat

Challenge #3: Simplifying management at IT training facility

Allan Mossbarger wears lots of hats at HP. In addition to teaching classes at the Houston data center lab, he provides support for customers' HP-based infrastructures, whether those are at the customer's location or inside the HP data center. The last thing Mossbarger needs to be doing is working overtime to maintain PCs in the training room.

Yet far too often Mossbarger found himself spending up to eight hours before a scheduled class manually reformatting hard drives and reinstalling software on the classroom PCs. "It was a horror show in terms of virus infections," Mossbarger says. "If someone left on a system, it could get infected. Then the HP virus support teams and security teams would knock the PC off the network. There were times when I'd have to rebuild the image on every PC in the room.

"With the blade PCs in the data center and thin clients in the classroom, I spend zero time with classroom management issues. I can concentrate on teaching the class." Sometimes students use their systems to learn how to build PC images. When a blade PC in the data center needs to brought back to its baseline image, it can happen quickly and easily.

Benefits Summary:
- More time for Mossbarger to focus on customer issues and training
- More productive training time for students, thanks to less time dealing with system problems
- Less costly system maintenance

Challenge #4: Providing off-site employee access to applications

HP has a very secure data center on its Houston main campus. Still, contingency plans call for HP to be able to manage that data center off-site in an emergency. That's the role of HP's "warm room." To make administrators just as effective from the warm room, blade PCs were added to the data center to run selected applications, bolstering the overall computing capability for IT administrators.

"The desktops in the warm room were highly strengthened because we could run some applications on the blade PCs and some on the desktops," says Allan Mossbarger. Beyond that, CCI will be contributing on a daily basis to productivity in the data center.

"The blade PCs are helping to solve latency issues in our IT ticketing system," Mossbarger explains. "A lot of our administrators have a crucial application set to refresh every four minutes. Sometimes that refresh takes a full minute, which means administrators may be unproductive one minute out of every four. Now we can run our ticketing application on the CCI, and the refresh rate will not affect their productivity."

Benefits Summary:
- Improved ability to manage data center remotely in an emergency
- Increased data center application performance, making system users more productive by at least 25 percent
- Less maintenance on data center PCs now that some applications can run on blade PCs

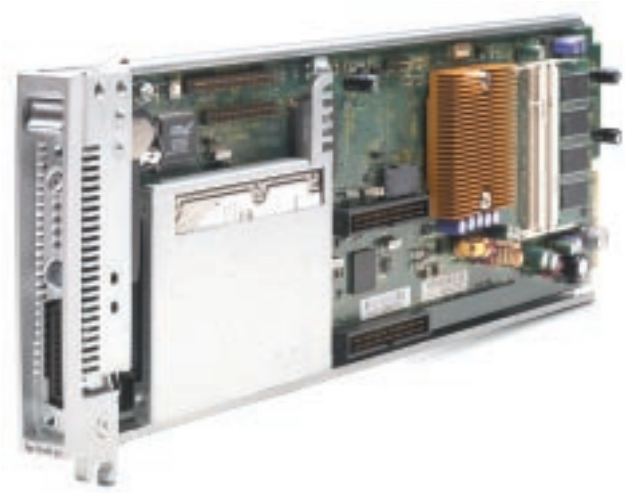
Challenge #5: Improving access for security receptionists
Security policy at HP in Houston requires that security receptionists change stations frequently. That's why e-mail is based on the location of the desk where the person is stationed, not on the person's name. To enable this location-based e-mail but to eliminate issues with Roaming Profiles, older Windows 95 PCs were used.

That created a different set of headaches. The PC virus protection software HP used no longer supported Windows 95, and the systems didn't comply with HP security standards. Plus, the shared computing environment prevented employees from saving or accessing their time card and HR information. To make it worse, employees could see each other's personal information.

"With CCI we were able to deploy a more secure, dependable computing solution that allows greater flexibility to our dynamic staffing needs," says Albert Moreno, Securitas Security Services serving HP.

Benefits Summary:

- Operating system upgraded to Windows XP SP2, enabling e-mail to still be based on location, not personal address
- Security staff have personal My Documents folders with weekly backup
- PC virus protection automatically deployed without user intervention
- Systems fully compliant with HP security strategy



CCI lowers TCO

Based on 11 months of CCI deployment, HP conducted an analysis of the anticipated savings of a large-scale deployment. Estimated CCI savings align with what has been projected by industry-leading TCO consultants, IDC and multiple customer deployments.

Category	Est. HP CCI Savings	Advantages
Installs/Moves/ Adds/Changes	**37%**	• Centralizes PCs, user data and profile in data center • Thin client is personality-free – no need to move • End-user can easily deploy thin client • Centralized changes and updates from data center
Help Desk including Break/Fix Support	**90%**	• Automatic blade PC fail-over capability • Blade PCs can be transparently replaced within minutes • Thin clients are all end-user replaceable • Rarely need to dispatch deskside support to end-user location • Fewer variables results in simplified Help Desk triage
Protection and Security	**69%**	• Centralized, controlled environment in data center protects against hardware theft • Locked-down hard drive reduces virus vulnerability • Guarantees end-user data backup • Ensures software licensing compliance

What HP learned about CCI

Throughout the implementation at HP, the CCI team worked with business unit managers, HP IT, Managed Services and Consulting & Integration specialists to document key experiences and metrics. In-depth measurements taken on network performance, storage utilization and concurrency throughout the deployment matched expectations. Best practices developed from that process were subsequently integrated into the final CCI design available to customers today.

The primary CCI advantages uncovered in that internal post-deployment assessment:

Category	Advantages
Installs/Moves/Adds/Changes	• Centralizes PCs, user data and profile in data center • Thin client is personality-free – no need to move • End-user can easily deploy thin client unassisted • Centralized changes and updates originate from data center
SW Management	• Homogenous architecture requires less HW/SW testing • OS and application deployment simplified • Security patching and virus scanning are easier and require less staff • User administration issues are reduced
IT Asset Management	• Long life cycles simplify standardization of client equipment • Thin client annual failure rate is far below that of desktops • Thin clients require less storage space for inventory warehousing • Eliminates need for software asset tracking on end-user access device
Protection and Security	• Centralized, controlled environment in data center protects against hardware theft • Locked-down hard drive reduces virus vulnerability • Guarantees end-user data backup • Ensures software licensing compliance
Procurement and Provisioning	• Thin clients are less expensive to purchase but include 3-year warranty • Long life cycles simplify standardization of client equipment • Smaller, lighter thin clients less expensive to ship • Thin clients shipped with HP image-reducing staging activities
Deskside Support	• Automatic PC blade fail-over capability • PC blades can be transparently replaced within minutes • Thin clients are all end-user replaceable • Rarely need to dispatch desk side support to end-user location • Fewer variables results in simplified Help Desk triage
CCI Value Add	• No need for end-user data migration as all data is centrally stored in data center • Easier to qualify images on new hardware since it is standardized • No more lost productivity time due to failed OS or patches rollout • Power cost savings due to reduced power consumption/heat output • Increased productivity from multiple locations – home, hotel, etc. • No lost productivity time waiting to log on and POST – almost "instant on" responsiveness

Additional TCO Opportunities

The assessment also revealed the potential for CCI to foster additional TCO-reduction opportunities at HP. Those include:

- Opportunity to comply with emerging data security regulations
- Dramatic savings by using one pool of blade PCs for multiple call centers in a follow-the-sun model
- Elimination of significant line-of-business and end-user shadow IT functions
- Cost-effective reprovisioning of blade PCs due to organizational changes
- Less user downtime associated with patch management and virus scanning
- Dramatic additional savings by converting "work-day extender" notebook users to CCI

Recommendations

Based on nearly a year of success of CCI at HP, several user groups are expanding existing implementations, while other groups are examining the role CCI can play. CCI implementations seem best suited to the following situations:

- Workers who need basic office applications
- Workers who need controlled access to sensitive data
- Shift workers who share PCs
- Large business units with common image requirements

While CCI can be deployed with both dynamic and static blade PCs, dynamically allocated blade PCs are more cost efficient. Labor studies have shown that less than 70 percent of employees are actively using their PCs at any one point in time. With CCI's Dynamic Allocation model, there is no need to purchase and support a PC blade for every possible user. Instead, a CCI implementation needs only enough hardware to support the maximum concurrent usage (MCU). HP has concluded that a maximum concurrency rating of 70 percent is a typical baseline for large CCI implementations.

Deploying CCI with an HP thin client is preferred, where possible. Fewer moving parts make them more reliable than PCs, while they are simpler to manage and more secure.

"CCI is ideal for a lot of office applications users, and the administration is so much simpler for IT staffs," says HP's Allan Mossbarger. "I think you'll see an expansion of blade PCs and thin clients even among old-school technogeeks like me who have always wanted ultimate control over everything. The advantages of CCI are just too overwhelming for it not to be the standard in a lot of computing environments."

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4AA0-3047ENW, 11/2005

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