TECHNICAL BRIEF

Enabling Technologies for Blade Management

Sponsored by: HP

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Introduction

In June 2006 Hewlett-Packard (HP) announced its next-generation blade chassis, the BladeSystem c-Class. The BladeSystem c-Class portfolio was designed to address some of the key total cost of ownership (TCO) issues facing today's datacenter, including server management costs, utilization, and power and cooling. As part of the BladeSystem c-Class, HP introduced three new technologies:

☑   HP Virtual Connect Architecture

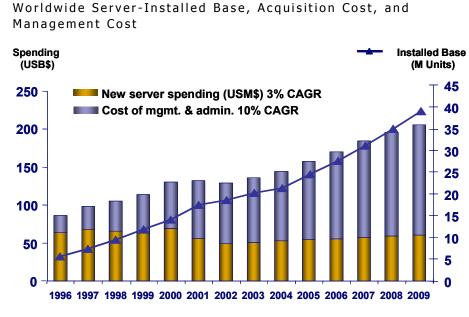☑   HP Insight Control Management

☑   HP Thermal Logic Technology

These technologies play a central role in reducing overall datacenter operating expenses and differentiate the BladeSystem c-Class system, both from competitive blade offerings and from rack-optimized servers.

In this technical brief, IDC examines HP Insight Control and the importance of manageability in the selection of a blade platform. It joins the IDC white paper *Forecasting Total Cost of Ownership for Initial Deployments of Server Blades*, which describes the overall TCO advantages of the BladeSystem c-Class portfolio, as well as the technology briefs *Enabling Technology for Blade I/O Virtualization* and *Enabling Technologies for Power and Cooling* that focus on the operational and cost advantages of HP Virtual Connect technology and HP Thermal Logic, respectively.

Datacenters Look to Streamline Management Complexity and Reduce TCO

In today's datacenter, management and administration costs have grown to eclipse all other cost categories. Driven by an explosion in the installed base of servers (Figure 1), the personnel cost required to manage and maintain them has put a strain on the majority of businesses' datacenter IT budgets. As a result, IT budgets are coming under closer scrutiny, with an eye toward identifying solutions that can demonstrably reduce costs by simplifying IT infrastructures and automating management processes.

Worldwide Server-Installed Base, Acquisition Cost, and
Management Cost

Over the past 15 years, two primary factors have driven the dramatic increase in the worldwide server-installed base:

☐ **Expanding server footprint.** Most core business process applications are supported by multiple servers. Two, three, or even five or more servers per application are not uncommon. And with new processes such as email and Web-based applications coming online every day, these additions only increase the number of servers an organization must support.

☐ **Shift in the server mix.** Twenty years ago an organization might have purchased a handful of mainframes and could have reasonably expected those systems to handle all of its IT needs. However, as pressure grew to reduce initial acquisition costs and new lower-priced technologies continued to be introduced, customer-buying patterns evolved accordingly. With each technology transition, the cost of acquisition came down by an order of magnitude, with today's x86 systems averaging around $4,000 per system. These lower price points allow customers to distribute systems more widely throughout their organizations, to the point where it is not uncommon for datacenters to support 5,000 or more servers, with the majority deployed as a single server per application.

In addition, server sprawl has brought a number of other problems for today's IT organizations:

☑ **Inflexibility.** As currently deployed by most organizations, server configurations are static, hardwired, and difficult to change.

☑ **Manual coordination.** Maintaining and changing applications or server configuration require too many people to perform too many manual steps.

☑ **Underutilization.** With one-to-one application to server deployment ratios, only a fraction of most servers' total capacity is typically utilized.

☑ **Overprovisioning.** Hand in hand with underutilization, over-provisioning results in wasted rack space, power, cooling, bandwidth, and operational costs.

☑ **Unique management requirements.** Many processes and applications supported by servers are unique, requiring IT organizations to maintain individual tools and coordinate inconsistent configurations to handle them all.

In sum, server infrastructures can often consume enormous space, power, and IT administration time. The costs associated with deploying, monitoring, and managing servers has escalated to the point where IT organizations are actively seeking tools to help them manage costs by streamlining management and automating key server management tasks throughout the datacenter.

The Goal: Manage Services, Not Infrastructure

To counterbalance these trends, next-generation management tools for the datacenter will support widespread virtualization and policy-based automation. These tools will introduce abstraction layers to create dynamic pools of IT resources, enabling administrators to directly manage services and proactively address business workloads rather than managing the underlying infrastructure. This is a fundamental building block to making IT service management (ITSM) best practices a reality.

Key manageability attributes should allow users to:

☑ Lower the cost of IT operations by improving asset utilization and reducing the headcount to asset ratio.

☑ Provide necessary tools to ensure that IT services are up, running, and available at all times.

☑ Optimize the IT infrastructure to support the IT organization's service-level objectives.

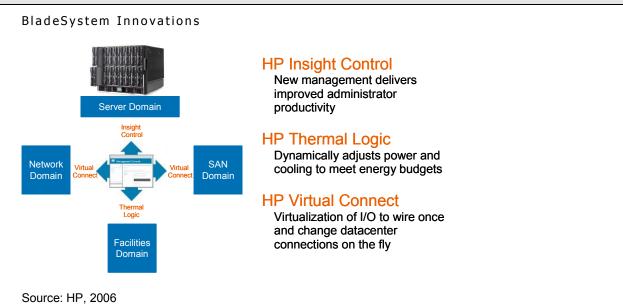### *HP BladeSystem c-Class*

HP has made manageability central to the design of its new HP BladeSystem portfolio. Specifically, HP has taken steps to deliver integrated infrastructure technologies and flexible management software to help customers address today's operational pain points, while putting themselves on a path to creating their own next-generation datacenter (Figure 2).

Core design principles include modularity and choice — enabling customers to adopt key features and integrate them when they are ready. The areas HP is focusing on are systems management with HP Insight Control, virtualization with HP Virtual Connect, and power and cooling with HP Thermal Logic.

This approach enables:

☑ **Just-in-time provisioning.** BladeSystem c-Class servers can be preprovisioned and wired once. And when reconfiguration is required, it can be done quickly and easily.

☑ **Automated change management.** Domains and people are isolated from the upheavals of change.

☑ **Virtualization.** Devices and connections are managed as pools of resources, shielding the administrator from the complexity of managing individual servers.

☑ **Lights-out, "1 to n" administration.** Group management capabilities streamline processes and reduce management overhead.

☑ **Efficiency**. BladeSystem c-Class servers are less expensive to buy and own than conventional IT server infrastructures.

BladeSystem Innovations

HP Insight Control
New management delivers improved administrator productivity

HP Thermal Logic
Dynamically adjusts power and cooling to meet energy budgets

HP Virtual Connect
Virtualization of I/O to wire once and change datacenter connections on the fly

Source: HP, 2006

HP Insight Control Management

HP Insight Control management is designed to address the toughest problems facing today's datacenters — cost, time, energy, and change.

With the introduction of BladeSystem c-Class, HP delivers hardware that is designed to ease installation and provide improvements in power and cooling. Also, Insight Control Data Center Edition is delivered with the HP BladeSystem c7000 enclosure in a variety of licensed options. This software suite installs core HP management software that unifies the management of servers, storage, power and cooling, and networked devices from a single console.

This combination of integrated hardware intelligence and management software is designed to simplify production deployment and infrastructure life-cycle management, which in turn can increase systems availability, create tangible datacenter efficiencies, and provide administrators with greater control.

Intelligent Infrastructure Systems

HP provides multiple levels of manageability ranging from the individual server to the entire organization. For the BladeSystem c-Class HP delivers intelligent infrastructure system components that include:

☐ **Integrated Lights-Out 2 (iLO2).** Each BladeSystem blade contains an iLO2 management processor to enable remote administration. Accessible through a browser or command line interface, iLO2 is designed to allow remote performance of day-to-day server management tasks and to take control in emergency situations. It can be used to automate control of deployments, software updates, virtual media, and power consumption, and data encryption and user authentication are provided to help minimize system vulnerability.

- ☑ **Onboard Administrator.** The Onboard Administrator includes a simple LCD screen on the front for rapid setup and daily maintenance, plus redundant administration modules in the rear for advanced system operations. It enables system administrators to monitor and configure server, storage, and power settings locally through an interactive panel on the BladeSystem chassis or remotely through a Web-based interface. It provides wizards for server setup and configuration; access to the BladeSystem infrastructure; security roles for server, network, and storage administrators; automated power and cooling for BladeSystem infrastructures; device health and status; and Thermal Logic power and cooling information and control. The Onboard Administrator consolidates access to all iLO2 processors, and can be used for remote firmware updates and identification of faulty components.

Insight Control Data Center Edition

This integrated software suite is designed to simplify the provisioning and management of HP BladeSystem infrastructures. IT organizations can use Insight Control Data Center Edition to achieve faster times to production and drive greater datacenter efficiencies.

Delivered on DVD media, Insight Control Data Center Edition builds on HP Systems Insight Manager and ProLiant Essentials software using an integrated installer to deploy, upgrade, and configure core HP management software rapidly and consistently, reducing manual procedures and installation time. Key functionality provided by Insight Control Data Center Edition includes:

- ☑ Unified infrastructure management services from and central console for servers, storage, and network devices including blades and other HP servers and storage.

- ☑ Graphical discovery and administration of the complete HP BladeSystem infrastructure with the Integrated BladeSystem Manager. It enables management of the hardware enclosure, servers, and power management.

- ☑ Rapid server deployment and recovery using predefined and customer-created scripts and system images.

- ☑ Proactive hardware performance and threshold monitoring, system reporting, and bottleneck analysis.

- ☑ Automated server vulnerability scanning and patch management for servers running in Microsoft Windows and Linux environments.

- ☑ Optional additional tools to manage and migrate physical hosts and logical servers in Microsoft and VMWare virtual environments.

Insight Control Data Center Edition is provided with HP BladeSystem c-Class enclosures as free evaluation or fully licensed software. Software-only license options are also available for both HP BladeSystem c-Class and p-Class environments.

Insight Control and HP OpenView

HP OpenView is an enterprise management portfolio that can be used to monitor and manage the entire IT environment regardless of vendor. OpenView can deliver component, application, and IT service management capabilities across multiple sites, regions, and platforms. While HP OpenView is not the focus of this paper it is important to note that Insight Control management can be configured to deliver hardware resource information into core OpenView products through integration modules available free-of-charge from HP.

HP Plans for Insight Control

Looking forward, HP plans to incorporate policy-based infrastructure automation into Insight Control. In addition, HP intends to integrate Insight Control with Virtual Connect and Thermal Logic capabilities to provide additional value to its customers. These proposed capabilities will further streamline the process of deploying BladeSystem infrastructures, enable automated server provisioning and failure recovery, and will dynamically scale resources based on performance requirements and business demands.

HP is also working with leading virtualization partners, such as Microsoft, VMWare, and the open source community, as part of its infrastructure automation initiatives.

IDC Analysis

IT managers can improve TCO by reducing management and administrative costs if given the tools to do so. With Insight Control, HP has delivered a blade administration solution within a single package, one that automates key management functions and reduces key pain points discovered while working with customers. Insight Control can reduce the time required for infrastructure management while increasing overall flexibility. As a result, IT managers can improve their overall productivity and staff satisfaction by shifting resources from performing mundane maintenance operations to focusing on datacenter enhancements and revenue-generating activities.

Key barriers to the widespread adoption of blades still exist, however. Some are at the blade-server level, including the need to prove the general applicability of blades across IT organizational needs and mission-critical applications. The market is just reaching the beginning of the mainstream adopter phase, and IDC believes that HP, along with other blade vendors in the x86 market, is working to overcome the market perception that blades are tailored solutions for large infrastructures. By driving down "break-even" points to less then half a chassis of blades, HP is making blades attractive to the midsize organization.

Other barriers exist at the blade-management level, including integration of modules, providing a common graphical user interface (GUI), and cross-vendor management support.

Integration of Modules

Building a comprehensive management tool for today's complex datacenter IT infrastructure is a daunting task. Insight Control provides a broad range of

management capabilities; however, to drive even greater value to IT administrators, HP can continue to differentiate by providing deeper integration with a broader range of IT management control tools, both from HP and other vendors. HP has made a good start by enabling the HP Systems Insight Manager to launch third-party tools in context from within the Systems Insight Manager menu. Additional third-party integrations could include standard business applications such as Exchange, business activity monitoring (BAM) products, analytics and reporting tools, and service level agreement (SLA) management systems.

Common Graphical User Interface

With the proliferation of management tools and consoles, users must become adept at a variety of different GUIs. The ability to standardize on a common GUI vocabulary across multiple different administrative tools and consoles will prove to be a great step forward in usability for end users. HP has taken steps toward this with the implementation of its "One Voice" GUI standards within the management tools. This initiative provides a consistent look, feel, and flow across multiple different tools. An example of its use can be seen in the integration of the Onboard Administrator GUI into HP Systems Insight Manager. Administrators can move from setting up enclosures, to in-depth drill down on server-blade details, to the management of their broader server and storage environment.

Cross-Vendor Management Support

The perceived lack of standards in cross-functional infrastructure management makes it challenging for Insight Control to provide management capabilities across non-HP products; however, most organizations have a heterogeneous technology infrastructure consisting of products from many disparate vendors. HP Systems Insight Manager supports management of third-party devices through industry standard protocols such as SNMP and WBEM. But some challenges do arise in the management of blade infrastructures where standards continue to evolve. Insight Control, therefore, does not provide the in-depth management and association of competitors' blade infrastructures, although it can manage the blade servers as independent devices. To solve a broader range of IT organizations' needs, HP has an opportunity to continue to evolve Insight Control to interoperate with a broad range of different vendors' infrastructure products.

Conclusion

As the next generation of HP blade server architecture and technology, the BladeSystem c-Class provides a great leap forward in reducing overall server management complexity and TCO. One of the technologies enabling these efficiencies is Insight Control, a suite of management tools designed to enable simple and reliable provisioning, monitoring, and control of the BladeSystem infrastructure.

By incorporating HP Insight Control into future infrastructure deployments, customers will be able to deliver automation for key management processes. This will enable customers to perform more work in less time, ensuring that IT talent is focused on proactively responding to business needs instead of supporting time-consuming manual processes, and, as a result, drive improved TCO metrics.

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