INTEL IT PERFORMANCE REPORT 2010-2011

Delivering Competitive Advantage through IT

IT@Intel

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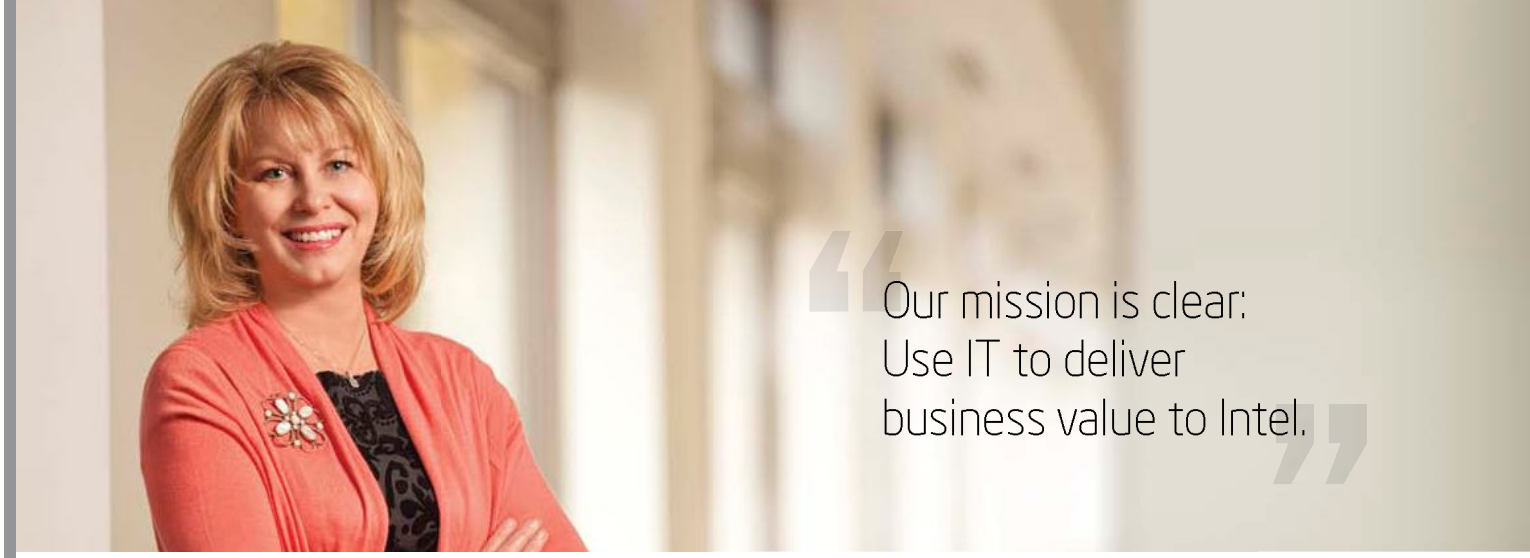
Cover Photo: Xiang Zhou, Engineering Computing Service Line Manager; Meng Xu, Engineering Computing Program Manager



Delivering Competitive Advantage

Welcome to the tenth edition of the Intel IT Performance Report. As IT professionals, we play critical roles in our respective companies. When we as IT organizations excel, our companies are positioned to excel. Within Intel IT, our mission is clear: Use IT to deliver business value to Intel.

We deliver business value in numerous ways. We use IT to enhance employee productivity, to facilitate business growth and top-line value, and to drive business efficiency and bottom line results. We also deploy next-generation IT capabilities to improve the efficiency of our own IT operations—and in so doing, deliver value back to Intel. In this report, you will see several examples of programs that have positively impacted our company across manufacturing, supply chain, product design, human resources, marketing, and sales.

Like our industry peers, we face technology trends that are reshaping IT. One example is the "consumerization of IT"—a phenomenon that cannot be ignored. Employees want the flexibility to use their personal devices and solutions in the workplace. Personal and professional environments are converging, and IT needs to respond.

Cloud computing is another key trend that delivers both operational efficiency and business agility. Within Intel IT, we are building an internal cloud solution. As the pace of Intel's business increases, the pace of IT must also increase.

Finally, as with most IT organizations, enterprise security remains one of our highest priorities. The requirements are changing rapidly due to an increasingly complex threat landscape and the emergence of new usage models like cloud computing and consumerization.

In 2010, Intel IT made significant contributions to Intel's business results, from increasing supply chain responsiveness to delivering employee collaboration solutions to reducing the amount of time it takes to design our next-generation products. I hope that you find this publication helpful as you embark on your plans for 2011. As always, we invite you to learn more about Intel IT best practices on our Web site at www.intel.com/IT.

Diane Bryant
Intel Vice President and Chief Information Officer

Our IT Environment

Who We Are:

Intel IT Employees:
6,300

Global IT Sites:
56

Who We Support:

Intel Employees:
80,100

Intel Sites:
143 in 62 countries

Data Centers:
91 (458,694 square feet)

Delivering Business Value	2009	2010	CHANGE
Order-Fulfillment Lead Time (% reduction from 2008)	15%	65%	59%
Delivery Performance (% improvement from 2008)	10%	25%	14%
Savings from Improvements in Batch Job Scheduling	USD 6.2M	USD 7.0M	13%
Travel Avoidance Due to Videoconferencing	USD 14M	USD 26M	86%

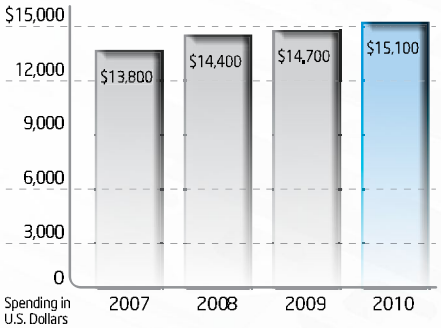
Data Center Environment	2009	2010	CHANGE
Storage Capacity (Petabytes)	18.6	24.9	34%
Internet Network Bandwidth (Gigabits per second)	3.0	4.8	61%
Compute Capacity for Silicon Design (Growth from 2008)	24%	84%	48%
Time to Deploy Infrastructure Services	14 Days	3 hours	112x

Client Environment	2009	2010	CHANGE
Average Age of PCs (Months)	22	23	5%
Laptops with Solid-State Drives	8%	63%	8x

Intel IT Sustainability	2009	2010	CHANGE
IT Carbon Dioxide Footprint (Metric tons)	253,000	249,000	– 2%

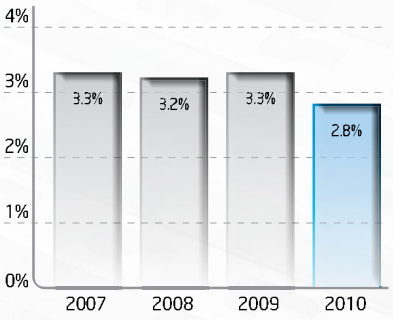
IT Spending per Employee[1]

Goal: USD 12,000 to 15,000



IT Spending Against Intel Revenue[1]

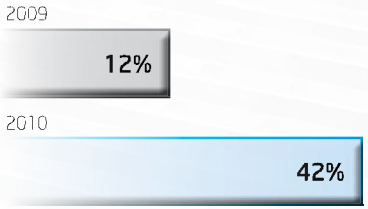
Goal: Less than 2.5%



Note: Some 2010 data estimated at time of publishing.
[1] IT spending history restated to include stock-based compensation and does not include IT factory automation spending.
[2] Percentage of applications virtualized in our Office and Enterprise environments.

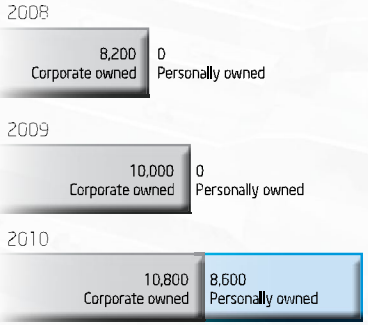
Increase in Virtualization[2]

3.5x



Increase in Handheld Devices in the Enterprise

94%



Service Desk Statistics

Total Service Tickets:
764,000 (Growth of 6.9%)

Customer Satisfaction:
93.5% (Goal of 95%)

First-level Resolution Rate:
83.2% (Goal of 84%)

BUSINESS SOLUTIONS

Delivering Business Value

IT organizations share a common mission to optimize IT investments and streamline operations to create value for our companies. Intel IT delivers business value through proactive investment, innovation, and implementation of IT best practices. Our key initiatives in 2010 provided value across Intel's business functions, from design and manufacturing to supply chain and sales. We contributed to a 65 percent reduction in manufacturing cycle time, expediting time to market and reducing costs. We also worked closely with silicon design teams to accelerate product development cycles, and we deployed an online Sales Center to scale our sales and marketing presence, supporting Intel's significant growth in new customers.

Factory Automation

As the world's largest chip maker, Intel's success depends on the performance of its factories, and these factories rely on IT. In early 2010, Intel IT assumed responsibility for running Intel's factory automation systems to facilitate tighter integration of IT systems.

Infrastructure reliability is critical to keeping Intel's factories running 24/7. Major initiatives include a joint effort by Intel IT and factory stakeholders to standardize factory automation systems on a single architecture to increase system reliability, reduce support costs, and accelerate deployment of new capabilities. We also eliminated several legacy control systems. Intel's wafer fabrication facilities are experiencing the benefits of these enhancements. For example, a key software component for process control can now be deployed in three months instead of six to nine months, providing smoother transitions to new process technologies.

65%
Decrease in Manufacturing Cycle Time

65%
Reduction in Order-Fulfillment Lead Time

Mike Strassmaier, IT Factory Automation Manager

In parallel with this effort, we implemented significant new automation capabilities across seven factories. This contributed to capital avoidance totaling approximately 18 percent of the 2010 factory process tool budget. We also completed a separate initiative to automate factory-floor materials movement and scheduling, substantially reducing human intervention and increasing efficiency.

Supply Chain Transformation

Over the past three years, Intel's efforts to create supply-chain efficiencies have resulted in business improvements such as a 32 percent reduction in inventory, a 65 percent reduction in order-fulfillment lead times, and a threefold increase in responsiveness to customers—being able to commit to delivery times and customer change requests more often and more quickly. Intel IT played a key role in these accomplishments by helping to re-engineer business processes and delivering more efficient information systems.

Another success factor is the continued adoption and enhancement of vendor-managed inventory (VMI) hubs. These worldwide hubs are located close to Intel's large customers, providing better inventory management and faster product shipment. Enabled by our enterprise resource planning (ERP) system, VMI hubs helped reduce order-fulfillment lead times by 2.3 days and contributed to a 26 percent improvement in responsiveness in 2010. Moving forward, we plan to extend hubs to more customers and include a broader selection of Intel's expanding product line.

Capital Equipment Optimization

Together with business group partners, we applied Lean Six Sigma* methodology to re-engineer the business processes that support planning and procurement of capital equipment for Intel's factories. To increase efficiency, we analyzed 280 discrete business processes and reduced the number of major process variants by nearly 90 percent.

This project was a major part of our broad initiative to replace highly customized ERP applications with a standard platform. The result is a single system for forecasting, planning, and procurement of approximately USD 3.8 billion in annual capital equipment purchases that also improves management of equipment reuse and retirement. The system includes new budget controls that provide increased visibility and help us manage overspends, enabling faster placement of orders.

> "Intel has 'launched an extremely ambitious effort to remake itself as a customer-centric supply chain.'"
>
> **—AMR Research Supply Chain Top 25**

AMR Research SUPPLY CHAIN TOP25

As a result of two and a half years of planning and development, we completed conversion to the new system in two weeks with no impact to Intel's supply chain for capital equipment.

Accelerating Product Development

Intel IT works closely with internal silicon design engineering teams to provide the extensive computing resources necessary to develop new Intel products. We apply business intelligence and predictive analytical techniques to increase throughput, enable greater design productivity, and avoid unnecessary costs.

Design engineers run nearly 20 to 30 million compute-intensive batch design jobs every week, and each job can potentially take several hours to complete. We determined that several million of these jobs were terminated due to a variety of reasons including mismatches between server memory capacity and actual job memory requirements. We developed and began using an algorithm that accurately matches jobs to the right servers. We also developed tools to provide more visibility into which data centers are least loaded, so engineers can submit design jobs to locations with shorter wait times and better plan their work.

Together, our improvements enhanced engineering productivity by cutting wait times by 61 percent and reducing job failure rates, enabling engineers to run 25 percent more jobs without adding new capacity. This resulted in a net cost avoidance of USD 7 million in 2010.

Future plans include extending the benefits of high-performance computing to our smaller design sites by implementing workstation-centered computing. With this new approach, we place workstations in office cubicles and interconnect them to form a virtual rack. This provides design engineers with faster application response times so they can explore more design options in less time. We also plan

Judy Schuh, ERP System Analyst; Vijay S. Kunjir, ERP Application Developer

Related Content at www.intel.com/IT

- "Enabling Business Growth and Productivity with Online Solutions"
- "High-Performance Computing for Silicon Design"
- "Optimizing Engineering Productivity with Workstation-centered Computing"

to deploy business intelligence tools to optimize design computing capacity forecasts and planning, further minimizing job wait times and reducing capital investment.

Reducing Product Return Costs

Intel's worldwide customer contact centers handle close to a million interactions with consumers and resellers each year. In 2010, we implemented a new system based on our standard ERP platform that enables us to effectively track product warranties and eliminate fraud. Coupled with other supply chain initiatives, this helped reduce return volumes by 15 percent and total return costs by 25 percent year over year.

Reaching New Customers

Intel's business strategy is based on growth, especially in key market segments such as consumer electronics and embedded devices. We need low-cost ways to attract and support a variety of new customers in an environment of shifting expectations. The Web is now the first information source for product development engineers and is a growing channel for collaboration with peers, partners, and suppliers.

Together with Intel's worldwide sales organization, Intel IT developed an online Sales Center, designed to augment the ability of Intel's sales force to reach and support the growing number of Intel customers. One of the first initiatives was the Embedded Design Center, which provides technical resources, online support, and step-by-step guidance for customers designing solutions using Intel® embedded processors and chipsets. Launched in April 2009, the site has already received 2 million page views and registered 65,000 customers.

The Sales Center uses intelligent collaboration technologies to deliver customers a personal and seamless interactive online experience. Customers can view instructional videos, drill down into technical content, participate in knowledge-sharing communities, and chat with dedicated sales and engineering teams. It also automates aspects of the sales process and provides near-real-time customer information management—enabling sales and engineering teams to share the latest account information. For example, intelligent lead management enables Intel teams to quickly assess where customers are in the design process and identify specific customer needs. We plan to further automate account intelligence and opportunity management in 2011.

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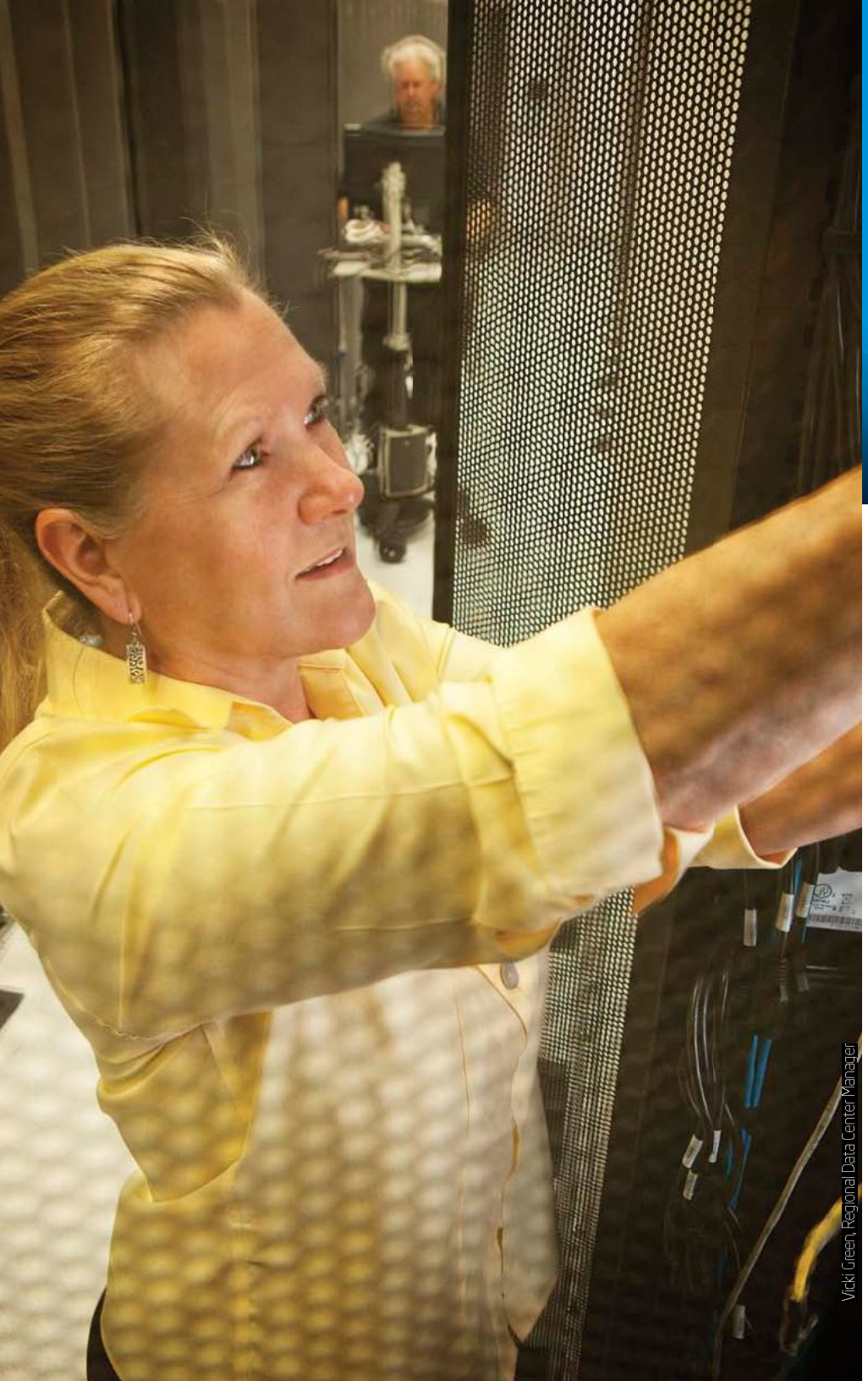

Vicki Green, Regional Data Center Manager

IT EFFICIENCY

Driving Maximum Value on a Fixed Budget

Intel IT continually seeks ways to increase the efficiency of Intel's infrastructure and systems to support business requirements while minimizing cost and capital expenditures. This allows us to direct more of the IT budget toward projects that grow Intel's business. We implemented a new operations framework that enables us to maximize IT efficiency while enhancing the quality, capacity, and velocity of IT services. Using a Lean Six Sigma* (LSS) approach, in 2010 we focused on key efficiency initiatives including transforming service management, replatforming our enterprise resource planning (ERP) system, and optimizing network and data center infrastructure.

Service Management Transformation

We are transforming the way we provide IT services and support, using an approach based on the Information Technology Infrastructure Library* (ITIL) framework. This involves a shift away from supporting individual IT products to a strategy that delivers and supports end-to-end IT services such as e-mail and connectivity.

In 2010, we began to see measurable benefits. For example, by adopting the new strategy for problem management, we achieved a 50 percent reduction in major incidents affecting our supply chain as well as a significant reduction in incidents affecting internal operations. When we applied this strategy to enterprise connectivity, we were able to resolve issues more quickly—improving compliance with service-level agreements and achieving a 40 percent reduction in the calls that required escalation beyond first-level support. We also automated provisioning of specific directory services, reducing average throughput time from five days to one hour, and increased employee efficiency by reducing rework by 50 percent.

Top 2010 Intel IT Efficiency Initiatives

40% — **ERP Applications Replatform**
Reduction in servers while increasing capacity by 260 percent

USD 0.6M — **Data Center Retrofits**
Savings and power load reduction of 7.35 million kWh

USD 47.6M — **Server Refresh**
Savings from eliminating all servers based on single-core processors from our design infrastructure

USD 15.8M — **Storage Optimization**
Savings from reclaiming storage and moving to lower-cost tiers

50% — **Service Management Transformation**
Reduction in major incidents affecting our supply chain

USD 1.5M — **IT Tools and Application Reduction**
Savings from reducing licenses and retiring tools and applications

USD 6M — **Supplier Savings**
Savings from reducing consumption, renegotiating contracts, and optimizing maintenance and warranty processes

Infrastructure Upgrades

By upgrading older infrastructure on a regular basis, we take advantage of newer technology to increase business capacity, quality, and velocity at lower cost. We continue to drive infrastructure efficiency through our ongoing server refresh program, and in 2010 we also focused on areas such as networking, data center facilities, and telecom, as described in the table below.

Replatforming ERP

We are achieving significant benefits from our multi-year program to replatform the ERP applications that underpin Intel's business. This program is expected to deliver return on investment of approximately USD 124 million through reduced support costs, improved data quality, and greater scalability.

In the past, our ERP applications were highly customized to support the needs of different business groups. Transitioning to a standard ERP application platform across Intel has increased our agility and enabled us to add new functionality more quickly while reducing the cost of implementing maintenance releases by up to 90 percent compared to our previous solution. Using LSS methodology, we reduced the amount of ERP software customization by 92 percent. At the same time, we are consolidating ERP applications onto servers based on the latest Intel® Xeon® processors, achieving a 40 percent reduction in the number of servers while increasing capacity by 260 percent. We plan to complete the replatform initiative in 2011.

IT Employees Drive Efficiencies

Intel IT is home to the business process engineering group responsible for proliferating LSS across Intel. IT LSS projects are part of an overarching initiative, called Embedding Efficiency and Effectiveness (Triple E), designed to embed a culture of efficiency into our organization. IT employees have submitted more than 470 Triple E ideas, and 325 projects based on these ideas have been completed or are in progress, resulting in USD 17 million in cost savings and more than 40,000 work hours saved during 2010 alone. Current projects focus on optimizing project life cycle workflow, data storage, and asset management.

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INFRASTRUCTURE UPGRADE	BENEFIT	VALUE
Wireless Network To 802.11n	▪ Improved coverage with fewer access points; enhanced the user experience	▪ 2x increase in network performance; lower IT operational cost
WAN Infrastructure To 10 Gigabit Ethernet (GbE)	▪ Improved capacity and efficiency	▪ 13x increase in bandwidth; ability to carry high-definition video without increasing IT costs
LAN Infrastructure To 10 GbE	▪ Improved capacity to support server virtualization and a high-performance, low-latency network for silicon design	▪ 65% reduction in network cost; removed 20,000 LAN ports, saving 1.94 million kilowatt-hours (kWh)
Data Center Facility Retrofits	▪ Identified and corrected hotspots and air leakages; isolated hot aisles; increased air-conditioning unit set points	▪ 4.1% reduction in power load, saving 7.35 million kWh and USD 600,000
Telecom To Voice over Internet Protocol	▪ Improved quality and capacity	▪ 37% reduction in monthly costs

Steve Collins, Director, IT Engagement Group

Developing IT Best Practices

Intel IT's strategic importance within Intel continues to grow. To fulfill our broad and growing charter, we focus on strengthening partnerships with business groups, financial and operational management, and industry outreach to share our IT best practices.

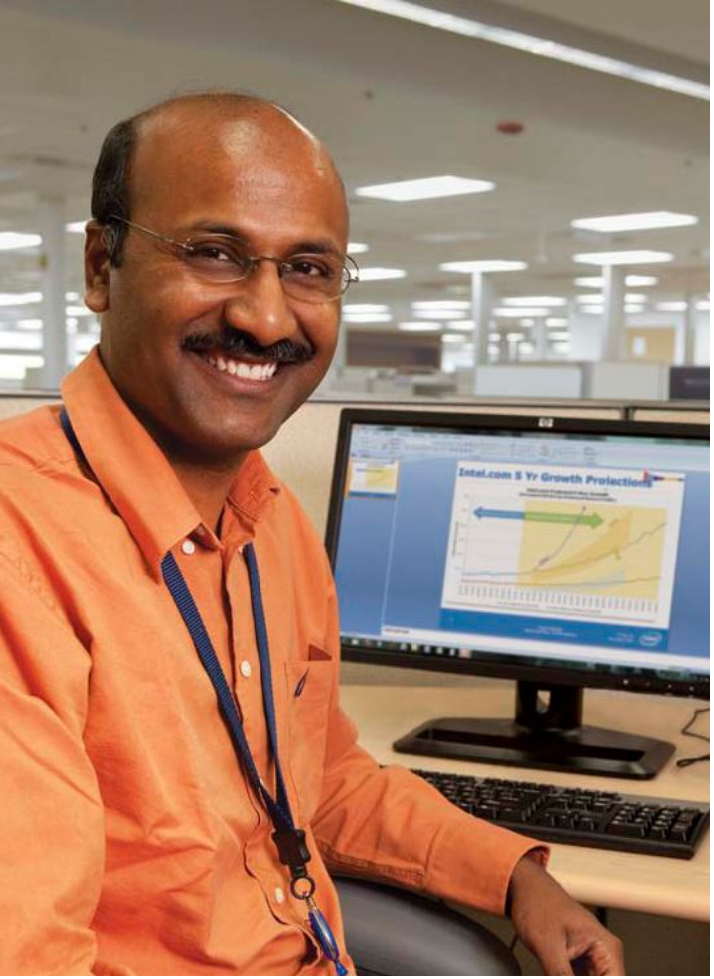
A Strategic Partner to Business Groups

Intel IT must be ready to respond to a rapidly shifting business climate and deliver solutions tuned to the needs of business units as well as the corporation as a whole—all while operating within budget. We achieve this by engaging in an annual strategic planning cycle, working with business groups to align IT with business priorities and allocate resources to derive the greatest benefit from every dollar invested.

Our strategic planning activities help us develop a long-term view of business goals and challenges, technology trends, and environmental factors. We translate these considerations into IT roadmaps and investment decisions. We use a set of Intel IT Business Capability Frameworks to identify gaps between our existing IT capabilities and Intel's business needs as well as areas in which we might be over-invested.

To further align with business group priorities and enable new business initiatives, we participate in a variety of engagement forums, including:

- Annual summits with Intel's business groups to agree on priorities and synchronize funding submissions.
- Strategic discussions with Intel's product groups, sharing expertise on technology and industry trends to help shape Intel's products, solutions, and overall strategy.
- Working meetings with Intel product planning, design, and marketing teams, focused on IT technology proof points, proofs of concept, and architectural assessments related to Intel's product roadmap.



Sridhar Mahankali, Staff Network Engineer

Related Content at www.intel.com/IT

- "Optimizing the Value of Technology Investments with IT Strategic Planning"

Providing further evidence of how Intel IT is playing a strategic role within Intel, several of the Intel-wide employee bonus program goals now have a significant IT component, such as developing an online Sales Center, reducing data center power consumption, and enhancing the supply chain.

We administer surveys and interviews to gauge how well we deliver IT services and identify areas for improvement. For eight years, we have conducted annual reviews with senior business group representatives through our IT Partnership Excellence Program, assessing areas such as strategic alignment and tactical performance. In 2010, we added a Voice of the User survey, designed to comprehend Intel employee satisfaction levels with IT services and solutions. With feedback from almost 2,000 employees across organizations and geographies, the results of this first survey provided a comprehensive understanding of where to invest in new IT services and capabilities for greater employee satisfaction and productivity. Future versions will reach out to a larger number of employees and include interviews targeting areas highlighted in the initial survey.

Financial and Operational Management

Clearly quantifying and communicating the business value of IT initiatives are key requirements for becoming a trusted partner to Intel business groups. We implemented a new financial management process that includes a prioritized list of every major IT project, describing the business benefit, projected cost, risks, and the metrics used to determine success. This provides a consistent reference framework and a baseline we can use to demonstrate business value, plan budgets, and track performance.

Developing and integrating this process has been challenging, but it is delivering significant benefits. We have moved resources from lower-value to higher-value projects, resulting in greater business value to Intel while containing overall cost. This supports our goal of shifting more of our budget from projects that keep the business running to projects that help propel the growth of Intel's existing businesses or expansion into new markets.

Developing and Retaining Talent

Enriching the careers of our IT employees helps them make greater contributions to Intel IT and Intel's business growth while helping IT retain talent.

In 2010, we invested more than USD 4 million in IT training. Other key initiatives included workshops, rotations, and mentorships. Ninety-five percent of all IT employees have taken a career development workshop, which provides them with skills, tools, and a framework for career building at Intel. Our job rotation program enables employees to move between different IT functions and groups, providing valuable broad experience and facilitating career development opportunities. Participation in our mentoring program, which has matched 853 employees with senior IT leaders, increased by more than 30 percent in 2010.

Each year, we host a global technical leadership conference that enables IT employees to share ideas from hundreds of technical papers and establish cross-organizational relationships; in 2010, about 500 employees attended.

Sharing Our IT Best Practices with the World

To help IT organizations deliver enhanced business value, Intel IT leaders and subject matter experts share our best practices in topic areas such as data centers, employee productivity, managing IT, and business solutions. Through the IT@Intel program, we encourage industry collaboration by sponsoring and participating in meetings, seminars, and conferences. In 2010, we participated in more than 350 peer-to-peer meetings and 190 industry events. Our IT experts also create a variety of content—from white papers to videos to blogs. Visit us at www.intel.com/IT and engage with our social media community at http://communities.intel.com/community/openportit.

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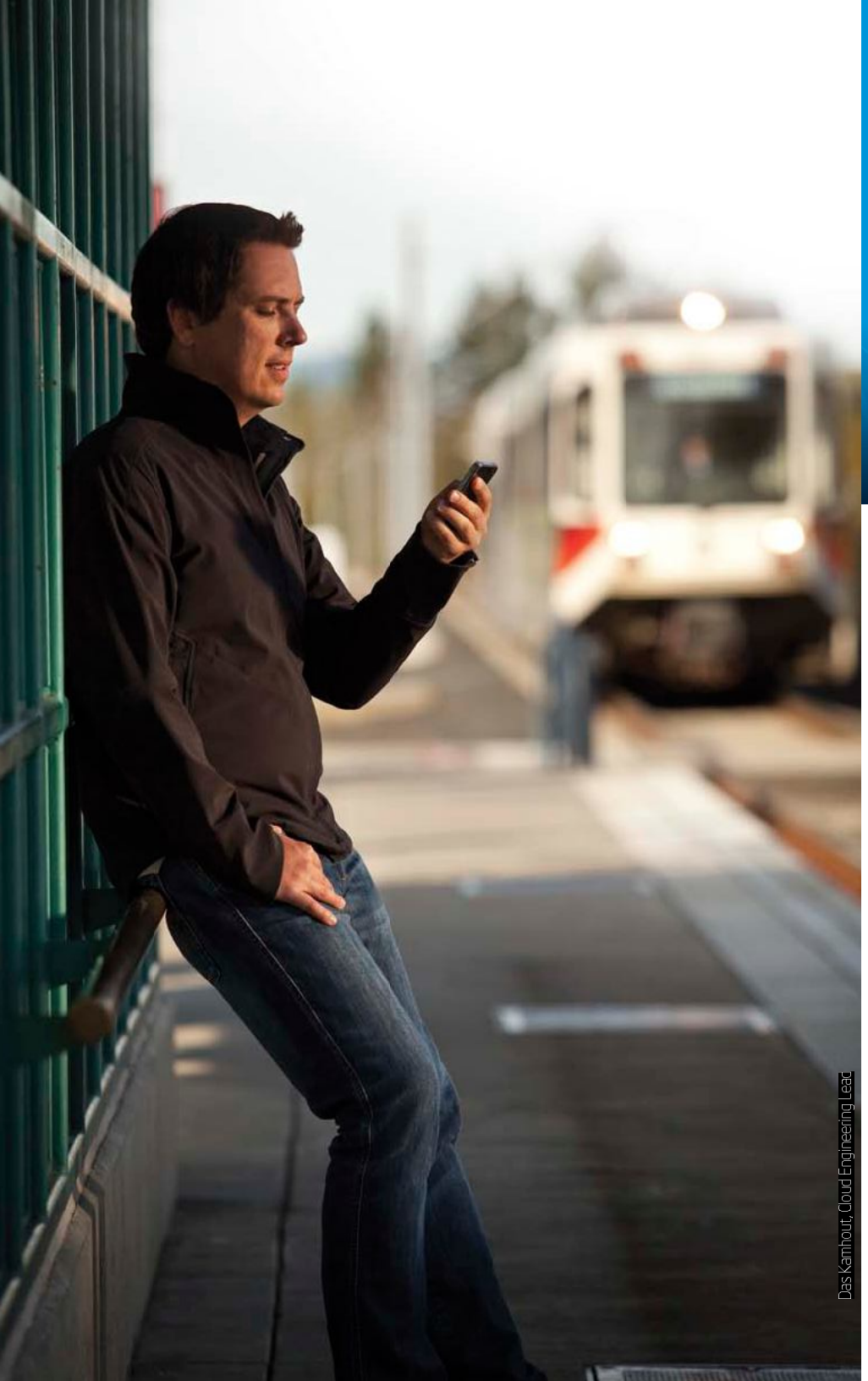


Das Kamhout, Cloud Engineering Lead

EMPLOYEE PRODUCTIVITY

Embracing Consumerization and Global Collaboration

In an environment of accelerating business cycles and geographically dispersed teams, Intel's employees have greater demands for collaboration and seamless connectivity—and they want the freedom to choose the devices that best suit their work styles. Intel IT is facilitating this "consumerization of IT" with an innovative approach, letting employees use their own smartphones and tablets as companion devices to access corporate data. At the same time, we are enabling greater productivity and collaboration by providing employees with higher-performing mobile business PCs and new tools.

Bring-your-own Devices

Many of Intel's highly mobile employees want the flexibility to use their own smartphones and tablets as companion devices to their corporate mobile business PCs to collaborate with global teams, business partners, and customers from home or on the road.

We recognized that letting employees use their personal devices would enhance employee satisfaction and productivity. However, it also presented significant security, privacy, and technical challenges. We worked closely with Intel Legal and Human Resources groups to define security and usage policies that enabled us to begin allowing access to corporate e-mail and calendars from employee-owned smartphones in early 2010.

The initiative has been highly successful, with an overwhelmingly positive response from employees. By the end of the year, about 8,600 employees were using their own smartphones to access corporate information. Our groundwork in establishing policies and technical solutions has enabled us to quickly broaden access to new smartphone models as well as employee-owned tablets as they become available on the market.

Mobile Business PC Strategy

We continue to refresh PCs every two to four years, based on user segmentation, providing employees with higher-performing mobile business PCs to enhance their productivity and reduce our total cost of ownership (TCO). To maximize productivity benefits, we are deploying PCs with Intel® Core™ vPro™ processors and Intel® Solid-State Drives (SSDs). Intel SSDs are now standard for all refreshed laptops because our tests have shown that they provide 4x faster I/O performance compared with hard disk drives and can reduce TCO due to lower failure rates. At the end of 2010, more than 63 percent of employees had systems with Intel SSDs.

We are coupling PC refresh with a major initiative to deploy Microsoft Windows 7* enterprise-wide. We delivered the OS to about 43,000 employees in 2010, and our goal is to complete deployment to more than 90 percent of employees by the end of 2011.

Videoconferencing

Intel IT continues to make a substantial investment in video-conferencing to facilitate collaboration among geographically dispersed teams—enhancing employee productivity while reducing travel costs. In 2010, we more than tripled the number of meeting rooms with videoconferencing capabilities, including the introduction of videoconferencing rooms in eleven additional countries.

We are integrating PC-based webcams into our environment, so that employees can participate in videoconferences from their workspaces even if they cannot get to a meeting room. We've expanded business-to-business videoconferencing capabilities that can be accessed from all existing videoconferencing rooms, making it easier for Intel executives and business groups to meet with key business partners, customers, and suppliers.

We estimate that videoconferencing saved employees 57,000 travel hours in 2010—a 27 percent increase over the previous year—and avoided more than USD 26 million in travel expenses. In addition, the reduction in travel contributed to Intel's sustainability goals by avoiding more than 22,500 metric tons of carbon dioxide emissions.

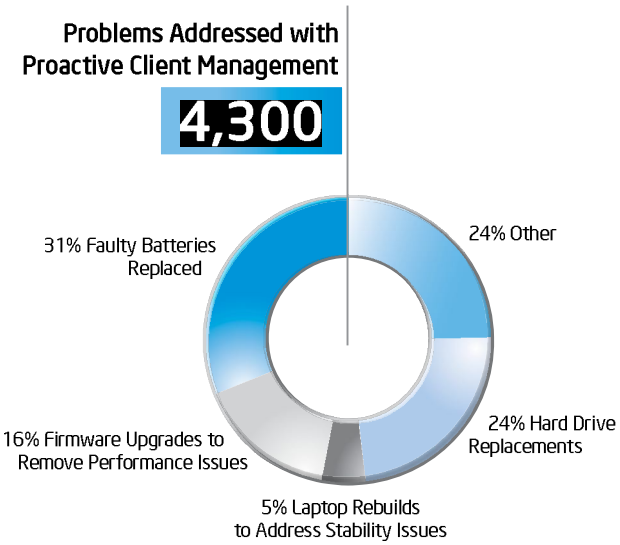
> "IT's focus on enabling personal handhelds this year has brought a smile to the faces of many employees."
>
> **—Richard Taylor**
> **Intel Vice President and Director of Human Resources**

Proactive Client Management

Traditionally, PC support has been reactive: Users report problems, and IT fixes them. We realized that we could increase employee productivity, enhance the user experience, and reduce support costs by adopting a more proactive approach.

We monitor the health of employees' PCs to identify problems so that we can fix them before catastrophic failures occur. In 2010, we proactively addressed more than 4,300 of these problems. For example, we proactively identified and replaced more than 1,000

Janet Gluck, Marketing Program Manager; Stephanie Wilson, Enterprise Video Program Manager; Brian Martin, IT Operations Manager; Traci Bringgold, Project Manager; John Walcott, Conferencing Engineering Manager



hard drives before failure, avoiding potential data loss and saving time for both support staff and users, with estimated savings of more than USD 400,000. An additional benefit is increased user satisfaction; employees typically are both surprised and appreciative that Intel IT has identified problems with their PCs and contacted them before they are even aware that a problem exists.

We developed tools that move resource-intensive maintenance tasks, such as anti-virus scans, to off-peak times. This enhances user productivity because employees no longer experience performance degradation during working hours. The impact is significant; we estimate that about 85,000 hours per week of degraded PC performance is currently being shifted to off-peak hours or user-scheduled times, and the benefit is expected to increase as we make more maintenance tasks mandatory.

2011 Priorities

We are planning new initiatives for IT consumerization such as allowing network access from a broad range of employee-owned devices and enabling more applications and capabilities. We are also planning additional proof-of-concept testing of client virtualization, which we see as a way to decouple our OS and applications from the underlying hardware to deliver IT services across the expanding continuum of computing devices.

We are implementing a secure integrated collaboration solution for our design engineers, with the goal of protecting Intel's intellectual property while helping to accelerate silicon design. The new solution protects information at all times during creation, storage, and transmission, using encrypted files and content repositories with enterprise rights management. This helps engineers be more productive by eliminating the need to secure data using manual methods. We began piloting the solution in 2010 in preparation for widespread deployment in 2011.

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Related Content at www.intel.com/IT

- "Maintaining Information Security While Allowing Personal Hand-Held Devices in the Enterprise"
- "Achieving Long-term Business Value with Intel® vPro™ Technology"
- "Increasing Productivity with Mobile Business PCs"
- "Best Practices for Migrating a Large Enterprise to Microsoft Windows 7*"

Implementing Intel® vPro™ Technology Across Our Environment

To help us meet our most critical challenges—boosting employee productivity, enhancing information security, and improving IT efficiency and business continuity—Intel IT has standardized our client computing platform on Intel® Core™ vPro™ processors.

We see Intel® vPro™ technology as a core capability for improving system defense, asset discovery, remote builds, virtualized client usages, and device-independent computing. By provisioning Intel vPro technology across our enterprise, we are on track to roll out remote PC management and repair using Intel® Active Management Technology (Intel® AMT) to 95 percent of our user base by early 2011. We anticipate that this will enhance the user experience, increase productivity, and decrease IT costs by an estimated USD 500,000 per year due to fewer service calls and faster response times. Our Service Desk technicians are already using Intel AMT to reduce the time it takes to reset disk encryption passwords from 45 to 6 minutes—a solution applicable to 60 percent of our encryption-related service calls. Additionally, some user segments are gaining added flexibility by employing Intel® Virtualization Technology to enhance high-performance client computing support of multiple OS environments.

Andrea Soto, IT Support Specialist

DATA CENTERS

Our Cloud Computing Journey

Intel runs on a global schedule. Intel IT keeps the business running by supporting silicon design teams, factories, and data centers. We adopted cloud computing as part of our data center strategy to provide cost-effective, highly agile back-end services that boost both employee and business productivity.

Cloud Strategy

We began our journey in 2006, with the successful creation and deployment of a global computing grid to support mission-critical silicon design processes. We are now applying this experience to the development of an office and enterprise private cloud. We also see opportunities to expand cloud computing to support manufacturing computing needs.

Accelerating Virtualization and On-Demand Self Service

We are building our office and enterprise cloud on a highly virtualized, flexible, and energy-efficient infrastructure. As a first step to creating this infrastructure, we are accelerating the pace of server virtualization within our environment.

We began 2010 with about 12 percent of the environment virtualized; by year's end this rate had more than tripled to 42 percent, and we remain on track to virtualize 75 percent of our environment over the next few years. We are achieving this in part by identifying and removing technical obstacles to virtualizing externally facing applications and business-critical internal applications.

Server virtualization enables us to reduce data center cost and power consumption by consolidating the workloads of older, less-efficient servers onto a smaller number of new, more power-efficient servers. We are achieving virtualization consolidation ratios of up to 20:1 and reducing power consumption by 90 percent, using servers based on the latest Intel® Xeon®

3 hours
Time to Provision Infrastructure Services

USD 15.8M
Storage Savings in 2010

Paul Vaccaro, Global Data Center Capacity Planning Manager

processors. An unexpected benefit of server refresh is energy rebates from local organizations or utilities looking to encourage IT sustainability. In 2010, Intel received energy rebates from multiple organizations in the United States and Europe.

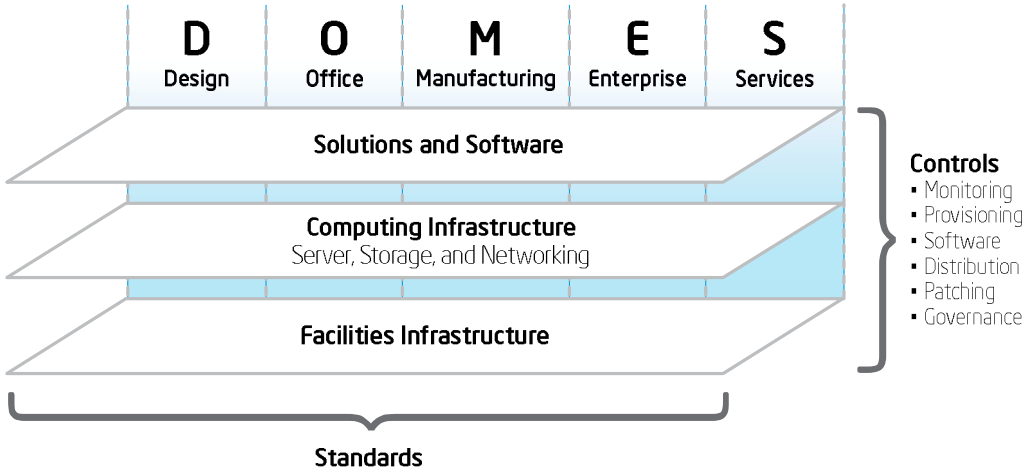
The private cloud is already increasing our agility. Using virtualization, on-demand self-service provisioning, and automation, we have reduced the time to provision infrastructure services from 90 days to three hours. On-demand self-service is a critical aspect of cloud computing that enables automatic provisioning of computing capabilities, such as server, network, and storage capacity, without requiring human interaction. We have developed a self-service portal, based on approaches used in our design grid, that provides this capability. By making sure that IT processes are not an obstacle to meeting business requirements, our internal customers increasingly see Intel IT as a strategic partner.

Optimizing Data Center Infrastructure to Meet Business Needs

Cloud computing is only one facet of our comprehensive, evolving data center strategy. In recent years, initiatives such as accelerated server refresh and data center facilities consolidation have reduced the number of data centers by one-third and enabled a 2.5x increase in data center compute performance. By implementing these initiatives, we continue to be on track to create an estimated USD 650 million in business value by 2014.

While standardization and consolidation are tools for reducing IT cost, we are also creating business efficiencies by vertically integrating and optimizing our data center infrastructure to align with the different requirements of Intel's primary business environments: Design, Office, Manufacturing, Enterprise, and Services. We are also adding infrastructure to support Intel's new external service businesses such as the online Intel AppUp℠ center for netbook applications.

Data Center Vertical Integration



Intel IT Wins Industry Recognition

Cloud Architecture

To establish the overall direction of our private cloud and provide a foundation for further development and innovation, Intel IT defined a private cloud architecture. Our architecture was an iCMG Architecture Excellence Awards 2010 winner in the Future IT category. The architecture addresses business needs by increasing agility and efficiency, achieving higher availability and improving capacity management.

Sustainability Initiatives

Intel IT developed an innovative application that analyzes server utilization within our design computing environment, enabling us to substantially reduce the number of servers. This cut energy consumption by more than 8 million kilowatt-hours, saving USD 645,000 in energy costs. This achievement won an InfoWorld 2010 Green 15 award for Intel.

We're also on Computerworld's 2010 list of Top Green-IT Organizations. This list identifies IT users and vendors that have demonstrated a commitment to implementing smart, efficient strategies to achieve "green IT."

Doug McLaughlin, Network Systems Engineer

> While increasing IT efficiency is a core motivator to embrace cloud computing, the biggest benefit to Intel's business is the improved agility that on-demand self-service provisioning and automation provide. We now have the ability to provision new IT infrastructure services to users in three hours.
>
> **—Das Kamhout**
> **Cloud Engineering Lead, Intel IT**

Related Content at www.intel.com/IT

- "An Enterprise Private Cloud Architecture and Implementation Roadmap"
- "Implementing On-Demand Services Inside Intel IT's Private Cloud"
- "Cloud Computing: How Client Devices Affect the User Experience"

This verticalization strategy involves viewing the entire data center—software, servers, storage, networking, and facilities—as a system that is optimized for specific business needs. This provides benefits that are not possible with a one-size-fits-all approach. For example, silicon design teams need to run millions of highly compute-intensive jobs each week; we met these unique requirements with a high-performance computing grid optimized for design.

In addition, we apply operational principles to our data centers that we learned from Intel's experience as a world-class manufacturing company. We are analyzing the performance of our data centers based on four key metrics: efficiency, quality, capacity, and velocity. For example, we are improving capacity by driving up utilization and increasing velocity through rapid self-service provisioning. Our goal is to further improve service levels, while achieving annual gains in operating efficiency and business value. In 2011, we plan to implement business intelligence tools that will enable us to apply supply-chain concepts to our private cloud, helping us better understand demand signals to improve capacity planning.

Addressing Storage Challenges

Like other organizations, Intel IT faces the challenge of rapid growth in storage demand, which results in higher storage cost. In 2010, we undertook several initiatives that enabled us to reduce cost and curb storage infrastructure growth by utilizing capacity more efficiently, saving a total of USD 15.8 million.

Through refreshing our storage environment on a regular cadence and implementing tiering and pooling approaches such as thin provisioning, we improved storage utilization of existing resources—reducing the number of new purchases required to meet growing demands.

By strategically partnering with silicon design groups and other users with significant storage demands on information life cycle management practices, we identified further opportunities to archive data or reclaim unused disk storage, freeing additional capacity for re-use. Together, we found ways to share storage and backup infrastructure across different projects and to move less-used data to lower-cost storage tiers.

In 2011, we plan to further contain growth through a full-scale deployment of thin provisioning and reduce cost by automating the movement of data to lower-cost storage tiers.

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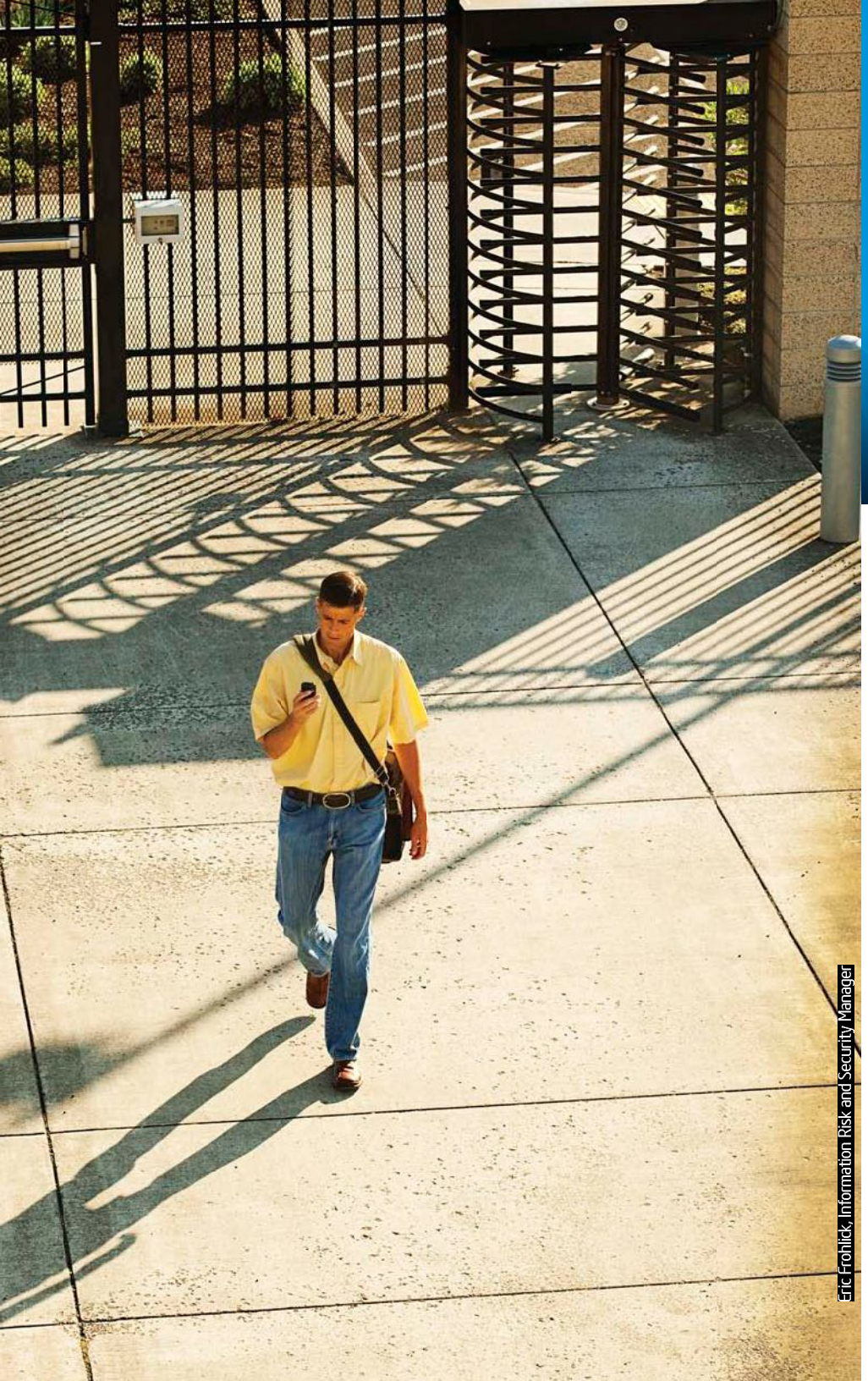

Eric Frohlick, Information Risk and Security Manager

IT SECURITY

Securing the Enterprise

With an increasingly complex threat landscape and new usage models such as cloud computing and IT consumerization, security remains one of Intel's highest priorities. We are enabling a model that supports the flow of business information and the adoption of new technologies while managing information security risks. We take a broad view of security that includes privacy, protection of Intel's intellectual property, systems availability, and other compliance requirements. We are also helping to ensure a strong security foundation for Intel products and relationships with third-party suppliers.

New Security Architecture

To enable rapid adoption of new technologies and usage models—while providing protection in an evolving threat landscape—we have embarked on a radical five-year redesign of Intel's IT security architecture. We believe this model represents a novel approach to enterprise security. It greatly increases flexibility and focuses on survivability, with the implicit assumption that compromise is inevitable. It is based on four pillars:

- A dynamic trust calculation that adjusts users' access privileges as their level of risk changes. For example, users are allowed access to more information from corporate laptops than from personal smartphones.
- Segmenting the environment into multiple trust zones with different levels of security.
- A balance of preventative, detective, and corrective controls.
- Recognition that users and data must be treated as security perimeters and protected as such.

Although not all the security technologies required for full implementation of this model exist today, investing in new technology is foundational to our ability to better secure our environment.

Use of this model is helping us deliver innovative solutions to challenging use cases while reducing risk. For example, we used balanced controls

Intel IT's Security Practices Garner Industry Recognition

Intel IT was one of the first IT organizations to embrace social media while mitigating its risk. We realized it was critical to deal with this issue proactively, so we investigated social media risk and determined the impact to Intel, educated employees on potential threats, and architected an environment that provided additional layers of protection.

For the last several years, we've made information security a way of life at Intel, developing an internal global marketing and communications plan—including local and regional messaging—to make security relevant, engaging, and effective for all Intel employees.

Because of these bold moves, Intel IT accepted the RSA Conference 2010 Award for Excellence in the Field of Security Practices, which recognizes outstanding achievement in the practice of security within an organization.

Related Content at www.intel.com/IT

- "Maintaining Information Security While Allowing Personal Hand-Held Devices in the Enterprise"
- "Developing an Enterprise Social Computing Strategy"

and trust zones to enable network access from employee-owned devices. In some cases, projects have seen their security overhead decrease by adopting this model.

Securing Intel's External Presence

Securing Intel's external presence is vital to enable Intel's online growth and reach into new markets. To achieve this, we provide a diverse and dynamic set of controls, including active vulnerability scanning of all externally facing Web sites and hardening our demilitarized zone.

We also drive privacy and security requirements for external suppliers, who play key roles in Intel's business strategy. Our secure outsourcing program works diligently to integrate privacy and security requirements throughout the procurement life cycle, including triggers to instigate detailed security analysis where required.

Working with Product Groups

Increasingly, Intel IT's security organization works closely with Intel's product and design teams to enable trust in Intel products. We partner with product groups to influence, drive, and create product direction and functionality, helping to guide development of new security features for Intel's next-generation products. As an IT organization, we provide real-world use cases and product feedback; we also participate in security design reviews and provide expertise in threat and risk analysis.

We led a multi-day innovation session—involving product designers, architects, and researchers across the company—to devise new features and methods for improving infrastructure survivability and resiliency. This fostered tighter working relationships within Intel's security community and resulted in more than two dozen ideas, some of which are in further development.

> "Consumerization of IT brings with it security risks and concerns. You may slow things or temporarily reduce risk by attempting to block the use, but you will miss the opportunity to shape the risk by engaging it."
>
> **—Malcolm Harkins**
> **Intel Chief Information Security Officer and General Manager, Information Risk and Security**

Intercepting Malware

We have continued to drive more robust detection and prevention processes, including continuously improving our process to identify and intercept new malware before it reaches Intel employees. This process monitors and interprets security events on our network in real time and takes immediate action against any identified threats. It includes strategically placed network intrusion sensors, traffic alerts, rapid intrusion analysis, and continual system updates based on new discoveries. We have also significantly expanded botnet detection capabilities across our network infrastructure. Because of our initiatives, we continue to observe very low single-digit malware infection rates, despite experiencing up to 50,000 malware encounters per week.

Protecting Data with Disk Encryption

We are applying full disk encryption to all data that resides on laptops provided to employees, so that if a system is lost or stolen, malicious individuals cannot access the data. We have installed disk encryption on about 80 percent of laptops corporate-wide and have substantially reduced the risk of exposure of Intel's intellectual property.

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If IT is mediocre, Intel is mediocre.
If IT excels, Intel has a foundation for excellence.

—Andy Bryant
Intel Executive Vice President and Chief Administrative Officer

Moving Forward

In 2010, Intel IT made significant contributions to Intel's business results—from increasing supply chain responsiveness to delivering employee collaboration solutions to reducing the amount of time it takes to design Intel's next-generation products. In 2011, we will continue to deliver business value to Intel while focusing on three technology trends that are reshaping the IT industry: consumerization, cloud computing, and security.

We cannot ignore the consumerization of IT. In 2010, we enabled more than 8,600 employees to use their own smartphones to access corporate information, increasing job satisfaction and productivity. In 2011, we will build on these efforts with initiatives allowing network access from a broader range of employee-owned devices and enabling additional capabilities and applications. We also plan further testing of client virtualization, which we see as a way to decouple our OS and applications from the underlying hardware to deliver IT services across the expanding continuum of computing devices.

Cloud computing enables us to rapidly deploy new solutions in response to changing business needs and delivers greater efficiency. We more than tripled the number of virtualized servers in our environment in 2010, ending the year at 42 percent, and we are on track to meet our goal of 75 percent. Through on-demand self-service provisioning, we reduced the time to deploy new infrastructure services from 90 days to just three hours. We will continue to enhance and extend this solution across the enterprise, allowing for complex provisioning of infrastructure services with a single click and reducing the time for provisioning to less than an hour. In 2011, we also plan to institute metering to show actual usage metrics across all IT infrastructure services in order to further increase utilization and help internal customers better manage their service requests.

Enterprise security remains one of our highest priorities, with requirements changing rapidly due to an increasingly complex threat landscape and new usage models such as IT consumerization and cloud computing. In 2010, to enable rapid adoption of new technologies and usage models, we embarked on a radical five-year redesign of Intel's IT security architecture. We believe this model, which greatly increases flexibility and survivability, represents an innovative approach to enterprise security. Over the next year, our focus will be on improving core capabilities for infrastructure protection, detection, and recovery, coupled with security business intelligence.

Intel IT provides a strong foundation for Intel's business success. Our imperative for 2011 and beyond is to continue delivering business value—and competitive advantage—for Intel.

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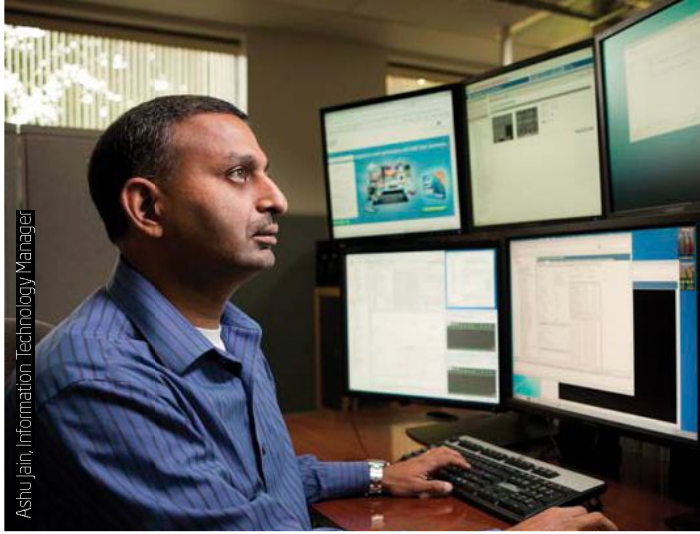
Ashu Jain, Information Technology Manager


Nancy Cox, Global Online Operations Manager
Davesh Patel, Information Security Specialist


Matt Bodin, Systems Engineer

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