2009 Intel IT Performance Report

Creating Business Value

IT@Intel

Diane Bryant, Intel Vice President and Chief Information Officer

Our Vision

IT is a competitive differentiator for Intel

2009 Strategic Imperatives

PEOPLE
Build an engaged and energized IT team

SOLUTIONS
Deliver enterprise solutions to our customers that drive Intel's growth

OPERATIONS
Deliver competitive IT operational services that power Intel's business

INFLUENCE
Impact Intel's product development and share our best practices with the industry

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Cover Photo: Lara Omotola, Network Specialist; Kevin Emery, Data Center Planner; Tauben Tenty, Product Line Manager; John McBride, Network Specialist

CIO Letter

Welcome to our ninth edition of the Intel IT Performance Report. As we closed last year's edition, we identified some of the many challenges IT organizations would face in 2009 given the economic environment, and we also articulated the situation this would create for IT. Because the charter of IT organizations is to apply information technology to deliver improved business results through integration and automation, in 2009, improvements in business efficiency and employee productivity were more important than ever. In this year's report, you'll find compelling examples of how the Intel IT team delivered business value and a competitive advantage for Intel.

Our success begins with our IT professionals, and we continue to focus on building a healthy, vibrant, world-class IT team. Thanks to the team, we delivered on our 2009 priorities of enabling employee productivity, driving business growth and productivity, and delivering efficiencies in running IT.

We enhanced productivity for all Intel employees through continued execution of our PC refresh program, and we made it easier for employees to collaborate by deploying video conferencing solutions—saving Intel USD 14 million in travel expenditures. The remote PC management capabilities that Intel® vPro™ technology provides put us on track to improve employee productivity even further as well as save USD 500,000 per year.

Our organization is recognized for our positive contribution to the enterprise in many ways. Intel received world-class recognition for its supply chain due to advanced use of IT. Through deployment of our high-performance compute environment, we positively impacted the development time of the latest generation of Intel® products.

Despite the worldwide recession and subsequent focus on cost, we continued our server refresh strategy, replacing our servers on a four-year cadence. Through execution of our data center innovation strategy, we are on track to deliver USD 650 million in value by 2014.

Industry-wide, the role of IT has clearly evolved from a "cost center" to a "value center." Intel IT is core to Intel's business success. I hope that you find value in this publication and invite you to learn more about our best practices on our Web site, www.intel.com/IT.

Diane Bryant
Intel Vice President
Chief Information Officer

IT creates value for Intel by:

Facilitating Growth

- Grow top-line business by delivering new or enhanced capabilities that provide the agility to respond to changing business conditions.

Enabling Productivity

- Deliver investments that improve business and employee productivity, helping people to do more with less and to perform existing tasks faster.
- Deliver solutions to accelerate business across design engineering, office, manufacturing, and enterprise environments.

Delivering Efficiency and Continuity

- Improve Intel's bottom line with focus on reducing IT operation costs and total cost of ownership.
- Manage business risk by maintaining information security and regulatory compliance.
- Deliver predictable IT project execution while meeting required service levels.

Jon Wright, Senior Systems Programmer

2009 OPERATIONAL PROFILE

A Look Inside Intel IT

WHO WE ARE

Intel IT Employees: 5,660

IT Sites: 62 in 25 countries

Data Centers: 95Δ

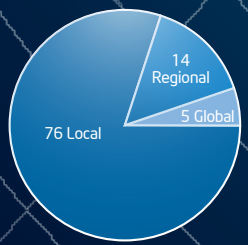
WHO WE SUPPORT

Intel Employees: 78,900

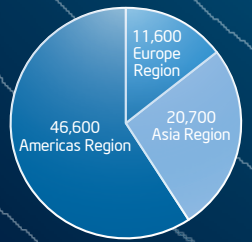
Countries and Regions: 63

Intel Sites: 150

Data Centers



Intel Employees



Intel Sites

Δ Numbers include all Intel data centers: design, office, manufacturing, and enterprise.
Note: Some 2009 data estimated at time of publishing.

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OPERATIONAL PERFORMANCE

INFRASTRUCTURE SERVICES	2008	2009	CHANGE
IT data centers	103^	95	- 7.8%
Data center energy consumption *Kilowatt usage per day*	30,153	28,324	- 6.1%
Power usage effectiveness (PUE) *Average across all data centers*	—	1.8	—

^ Numbers include all Intel data centers: design, office, manufacturing, and enterprise.

SERVICE DESK EMPLOYEE TECHNICAL SUPPORT	2008	2009	CHANGE
Service Desk customer satisfaction	89%	91%	2%
PC Support Center customer satisfaction	96%	97%	1%

PERFORMANCE ON CRITICAL SERVICE-LEVEL AGREEMENTS	2008	2009	CHANGE
Material customer impact	0	0	0%
E-mail uptime	99.99%	99.98%	- 0.01%
WAN availability	99.99%	99.99%	0%

USD 12M

2009 Net Cost Avoidance by Continuing Server Refresh Strategy

USD 29M

2009 Net Cost Avoidance from Data Center Virtualization

Grid Computing

I appreciate the increased attention IT has given our group, especially the targeted plans to deliver capabilities we use to run our business. The working relationship fulfills what we would expect from IT as a business partner.

—Douglas L. Davis
Intel Vice President and General Manager, Embedded and Communications Group

INFORMATION AND DATA TRAFFIC

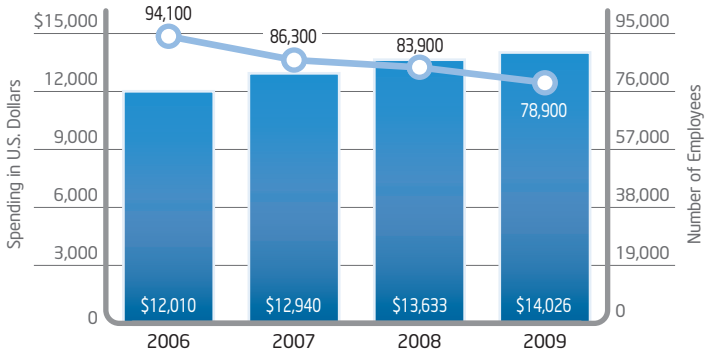
DATA AND MESSAGING TRAFFIC	2008	2009	CHANGE
E-mail messages *Millions per month*	148	177	19.6%
External e-mail messages blocked *Millions per month*	650	772	18.8%
LAN ports	464,124	471,000	1.5%
Backup volume *Terabytes per month*	3,255	3,974	22.1%

REFRESHES AND UPGRADES	2008	2009	CHANGE
Laptop PCs refreshed	14,831	18,905	27.5%
PCs with Intel® vPro™ technology provisioned with Intel® Active Management Technology	31,500	48,500	54.0%

IT SERVICE AND SUPPORT SPENDING[1]

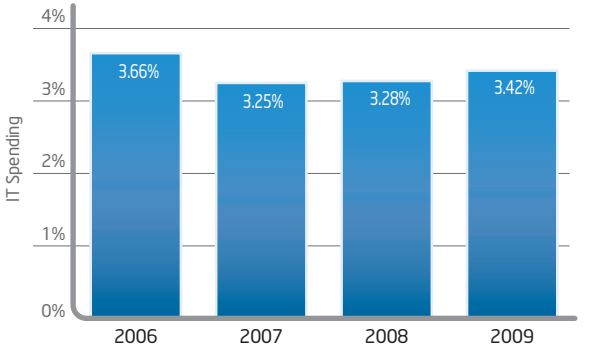
IT Spending per Employee[2]

2009 Goal Range: $12,000 to $15,000



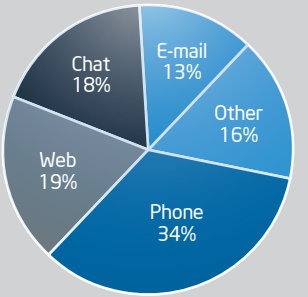
IT Spending Against Intel Revenue[3]

Future Goal: Less than 2.60%

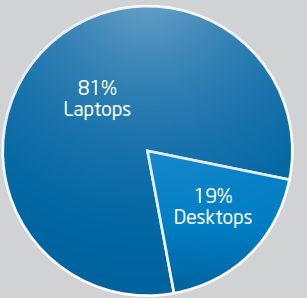


[1] Decreasing revenue and employee base adversely impact metrics; both were offset by reduction in 2009 discretionary spending.
[2] IT spending does not include stock-based compensation or IT spending by non-IT business groups.
[3] IT spending includes IT spending by non-IT groups, but does not include stock-based compensation.

Service Desk Channel Usage



Laptop to Desktop Ratio



Mick Molloy, Business Analyst

EMPLOYEE SOLUTIONS

Enabling Smart Workers with Smart Technology

At Intel, our key competitive advantage is our employees. Intel IT increases productivity by helping employees to do more with less or do existing tasks faster through the use of technology and improved access to information.

USD 14M

Travel Cost Savings Attributed to Video Conferencing

65%

Reduction in Blue Screens

Preventing more than 3,000 PC crashes weekly

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Improving Employee Productivity

Intel IT increases productivity across Intel by understanding how employees work and by providing access to data and applications that help them work smarter and faster.

Working closely with Intel employees, we have deployed social computing technologies, video conferencing technologies, and handheld devices that facilitate company-wide collaboration and improve communication across our global workforce. We have also applied technologies and capabilities that proactively detect and reduce IT hardware and software failures to improve the work experience.

Addressing the Consumerization of IT

As mobile devices and technologies proliferate in the marketplace, an increasing number of employees at Intel want to use their personally owned devices within the enterprise, choosing the platforms, applications, online tools, and services to accomplish their jobs and manage their lives. This trend is often referred to as the "consumerization of IT." Employees want access to information and applications anytime, anywhere, enabling them to work in more flexible and productive ways.

Integrating Handheld Devices

In 2009, we changed Intel policy to allow access to corporate data from employee-owned smartphones. Employees can now access corporate e-mail, calendar, and contacts on handheld devices that pass our security compliance qualification.

Enterprise Social Computing

Intel IT is implementing an enterprise-wide social computing platform that combines professional networking tools with social media such as wikis and blogs. Our goal is to transform collaboration across Intel using enterprise social computing solutions to help employees find relevant information and expertise more quickly inside Intel.

Since the launch of our social computing platform in March 2009, more than 800 communities have formed. Within the first three months, 53 percent of business teams that had formed communities found improvements in global team collaboration,

> Planet Blue, Intel's internal social computing platform, is essential to helping us become a more agile organization. It has changed our communications from one-way, top-down, static messages to lively, multi-directional conversations. This tool has brought employees and corporate leaders together in ways that were not possible before.
>
> **—Jeremy Schultz**
> Communications Specialist, Intel Employee Communications

and 38 percent reported the ability to get information more quickly. Site traffic has tripled since launch. More than 11,000 employees have posted content to the new site, and 12 percent of employees have created their user profiles.

Additionally, we have created many external social media communities where customers, developers, and technology enthusiasts can share, collaborate, and innovate around technology. IT professionals can interact with Intel IT experts inside our Open Port IT Community zone at http://communities.intel.com/community/openportit/it.

Video Conferencing

We increasingly use video conferencing technology to enable Intel IT employees to share ideas and collaborate with peers without leaving the office. This effort eliminated USD 14 million in travel expenses and saved employees 43,156 travel hours in 2009. Internal studies show that 75 percent of meeting attendees report that video meetings are as effective as in-person meetings. Our employees have the ability to video conference from their desks using webcams and can access advanced video conferencing facilities at many sites.

In 2009, we added additional video capabilities so our dispersed teams could collaborate more effectively, reduce travel, and accelerate decision making. We also extended our telepresence capability to support business-to-business communication, making it easier for employees to interact with other companies. Our facilities now include a range of video conferencing options—from rooms that simulate sitting across a table from other people to rooms that enable engineers to collaborate by sharing design documents.

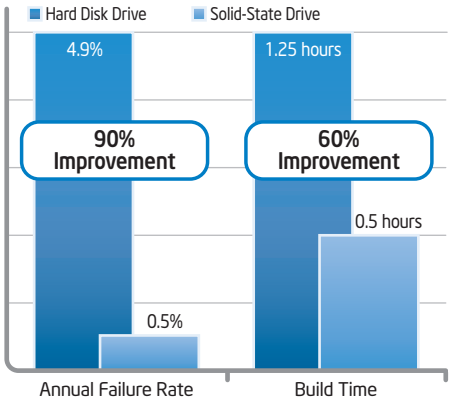
Unified Messaging

In 2009, we deployed Unified Messaging (UM) to increase employee productivity. Employees now use their PC clients for all messaging—voicemail and e-mail—and can also access the system by phone while on the road. We estimate that moving to UM has helped Intel avoid about USD 1 million in costs related to legacy voicemail systems.

Intel® Solid-State Drives

In laptop PCs, solid-state drives (SSDs) are faster and more reliable than traditional hard disk drives. Because of this, we have found that using SSDs can reduce IT support costs and increase performance and employee productivity. We have already deployed more than 6,000 laptops with SSDs to employees, and in 2010, all refreshed laptops will include SSDs as standard.

Improvements of Solid-State Drives over Hard Disk Drives




Tiffanie Kong, Application Developer

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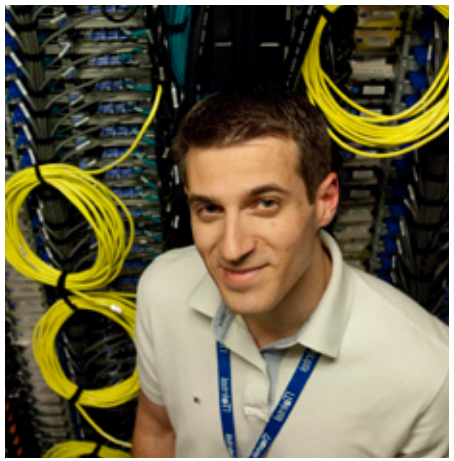
Providing the Right Level of IT Service



Salvatore Dazzo, IT Support Specialist

> When I talk to folks outside Intel about how well the Service Desk supports us, they just look at me in amazement. They are baffled that Intel could offer its employees such a service.
>
> **—James Howland**
> Engineering Technician, Technology Manufacturing Group

Related Content at www.intel.com/IT

- "Improving Client Stability with Proactive Problem Management"
- "Optimizing PC Performance with Simple Benchmarking Processes"

The productivity of Intel's employees depends on IT's ability to support the technology and applications they rely on, minimizing downtime and quickly resolving issues. Our IT Service Desk is working to resolve problems more quickly and improve support by gaining better insights into the root causes of IT issues.

Managing Problems Proactively

Providing round-the-clock support, our Service Desk is the first point of contact for employees, suppliers, and customers experiencing IT issues. In 2009, our customer satisfaction level rose to more than 90 percent, with 80 percent of user issues resolved on the first call. However, we believe it would be even better if we could remove the causes of the problems that our users experience, thus eliminating the need for them to call the Service Desk in the first place.

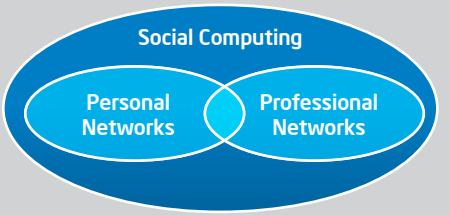
To do this, we are studying the top issues that employees experience in the course of their daily work. For example, we implemented a proactive problem management process based on analysis of system-generated data from client PCs across our worldwide environment. Using this approach, we increased PC stability by reducing the number of blue screen system crashes by more than 65 percent—more than 3,000 per week—and we are beginning to realize benefits in other areas including application crashes.

Understanding the User Experience to Improve Productivity

By gaining a better understanding of the user experience, we provide feedback to the designers of IT services and tools to influence design improvements, which in turn can help reduce the number of calls to the Service Desk and improve employee productivity.

Some of the top issues reported to the Service Desk are not related to technology stability at all. Rather, users simply don't understand how to use a new technology or service, and many times this is because the provider of a product or service is responsible for only one aspect of the user experience. The user needs information from multiple providers.

Our Service Desk helps to close the gaps in users' understanding by providing the additional information they need. To effectively use Voice over IP phones, for example, we found that employees needed more information about Unified Messaging and compatible headsets.



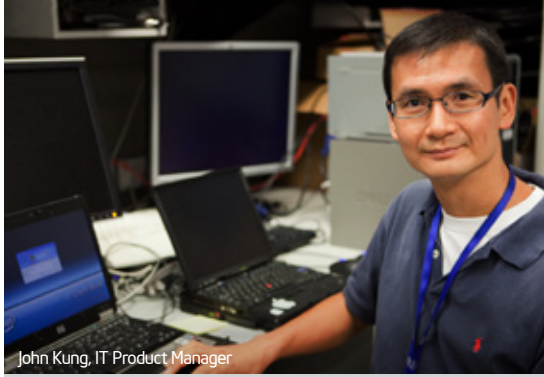
Partnering with Intel Business Groups on the Use of Social Computing

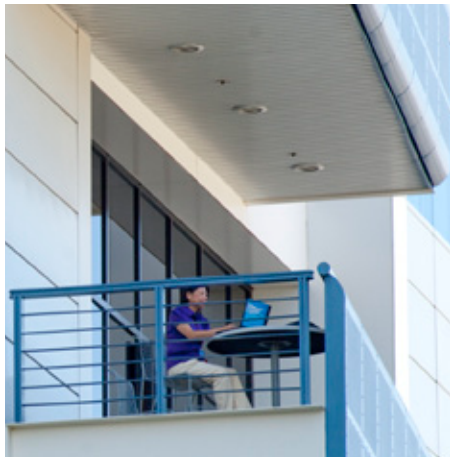
To further our goal of fostering strategic partnerships in 2009, Intel IT launched a communications and collaboration steering committee. This steering committee brings together senior leaders from all of Intel's business groups to identify pain-points and opportunities for improving productivity, and acts as an advisory board for proposed IT solutions.

In 2009, the steering committee focused on a few opportunities including the use of social computing technologies inside Intel. Social computing capabilities have grown over time within Intel and include blogs, wikis, and forums. However, we found that we were missing direct input from business groups regarding collaboration problems.

Once we understood the business groups' problems, we were better able to show how social media could be used to improve collaboration. The steering committee also focused on real-time collaboration tools such as the increasing capabilities of handheld devices.

Managing the Enterprise with Intel® vPro™ Technology


John Kung, IT Product Manager


Sharlene Chu, System Analyst

Intel's worldwide computing environment includes more than 100,000 PCs. To increase our ability to maintain, manage, and protect these PCs while driving down management costs, we are undertaking a multi-year program to implement Intel® vPro™ technology throughout our environment.

Intel vPro Technology Use Cases

Intel vPro technology, a hardware-based capability built into PCs, enables us to remotely perform many functions that previously required on-site support. It is an underlying capability that can be applied to a wide variety of use cases in areas such as incident resolution, asset discovery, and enterprise security.

We developed a use case implementation methodology for Intel vPro technology. This enabled us to identify our highest-priority use cases, develop a use case implementation roadmap, analyze the required changes to support processes, and train support agents.

To increase productivity across Intel, we identified and implemented four high-priority use cases using our methodology: remote configuration, power management, remote diagnosis and remote repair, and remote diagnosis and local repair. We also developed a support tool that enables our Service Desk to identify whether a user's PC is manageable using Intel vPro technology and a dashboard that shows the status of our Intel vPro technology environment.

By the end of 2009, we had deployed and provisioned about 50,000 PCs with Intel vPro technology. We estimate our four use cases will save Intel about USD 500,000 per year once Intel vPro technology is implemented throughout our environment. We expect the benefits to increase as we implement further use cases.

Microsoft Windows 7* and PCs with Intel vPro Technology

We conducted a three-month pilot in 2009 and determined that deploying Microsoft Windows 7* on new PCs with Intel vPro technology provides the best performance and manageability. Microsoft Windows 7 includes manageability and security capabilities that strongly complement Intel vPro technology, which we plan to use to improve PC management across the enterprise starting in 2010.

Related Content at www.intel.com/IT

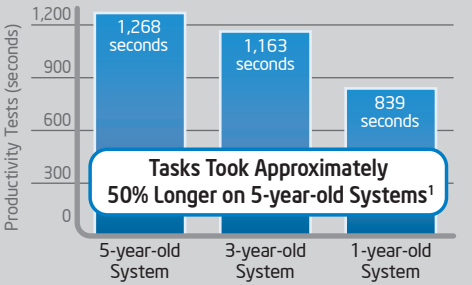
- "PCs as Strategic Assets"
- "Intel® vPro™ Technology: from Provisioning to Use Case Implementation"
- "Implementing Intel® vPro™ Technology to Drive Down Client Management Costs"
- "Intel IT Shows Three Use Cases with Intel® vPro™ Technology" video
- "The Value of PC Refresh with Microsoft Windows 7*"

Managing PCs Strategically

By managing Intel's PC fleet as a strategic asset, we have decreased total cost of ownership (TCO) for PCs, achieving a 67 percent reduction since 1995. In a 2009 pilot, we found that five-year-old PCs performed 50 percent slower than new PCs, and three-year-old PCs required significantly higher support costs. As a result, we adopted a two- to four-year PC refresh cadence based on user segments to achieve the lowest possible TCO.

We have also reduced support costs by limiting the number of PC configurations and standardizing on rich laptops. In addition, we evaluate productivity benefits of new technologies.

Slower Refresh Impacts User Productivity



[1] Intel internal data as of February 2009. Results depend on specific system, configuration, and environment.

Steve Ponting, IT Asset Manager

BUSINESS SOLUTIONS

Unleashing Business Intelligence

One of our core roles as an IT organization is to deliver timely and accurate information to the enterprise. By aligning our IT solutions to support business processes, we enable growth and new business opportunities. Innovative business solutions increase productivity and efficiency inside of Intel while improving our ability to communicate and collaborate with our customers.

300%

Increase in Supply Chain Responsiveness

60%

Time Savings for Design Computing Tapeout Process

Delivered USD 44.72M in value

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Connecting with Customers

To empower our sales force, we delivered interactive online capabilities to help Intel build closer relationships with customers. We provided technology to enable the rollout of the global marketing campaign Intel Sponsors of Tomorrow™ and to enhance other key marketing initiatives.

Supporting Corporate Marketing

We partnered with Intel's corporate marketing group to launch the online components of Intel Sponsors of Tomorrow, a multi-year brand campaign with global reach. We implemented advanced content management capabilities that enabled the simultaneous worldwide launch of the campaign, and reduced cost and effort through reuse of about 90 percent of the digital campaign assets.

Social Media

We increased our focus on delivering interactive online capabilities to support the fast-growing demand for social media. We provide these capabilities using a technology platform that hosts Intel blogs, user communities, and a showcase for customer stories told using video and digital photography. Use has increased rapidly: By the third quarter of 2009, there were more than 25 online user communities, ranging from collaborative customer support forums to discussions of Intel® technologies, inside the Open Port IT Community. Visit at http://communities.intel.com/community/openportit.

Intel Inside®

Since its introduction in 1989, the Intel Inside® program has attracted more than 3,000 OEM customers. In 2009, we delivered online capabilities that help the program forge closer links with Intel's customers and make it easier for them to do business with Intel. We launched a new portal that guides customers through the program engagement process, letting them access key resources more quickly and stay up to date with the latest program communications.

Syndication Resource Center

We designed and delivered a new syndication resource center that provides a scalable, single source for syndicated product information and other content that customers can place on their product Web sites to educate consumers and IT professionals about the value of Intel® microprocessors. It directly links Intel's systems to those of our OEMs, retailers, and other customers by providing code that can be embedded into their product Web sites.

The new My SMG information portal solution is fast and user friendly. Everything I need to do my job is on one page, which is cool.

—Mediha Kayacan
Field Sales Manager

Helping Intel's Sales Force

To help Intel's sales force become more efficient and productive, we redesigned My SMG, a portal for Intel's Sales and Marketing Group (SMG), and integrated it into Intel's corporate employee portal. The combined features provide sales personnel with a single place to access all sales-related and corporate information. The new version of My SMG is faster and more intuitive than the original, and surveys have shown that it can save Intel's field sales representatives up to two hours per week, enabling them to spend more time with customers.

We deployed the original version of My SMG in 2007 as a standalone solution, and it was recognized at the time with an IT Excellence Award. It enabled access to product roadmaps, pricing information, billing data, design wins, customer change notifications, customer feedback, and more.

The new My SMG is based on the same technology as Intel's main employee portal and is directly integrated into it. It recognizes users' job roles and presents them with the tools and information they need to work effectively. The navigation is streamlined, and users can also personalize the interface by simply dragging and dropping the elements they want to use. Another new feature automatically aggregates all content related to a specific topic into a single view—including sales, marketing, and technical product information.

We deployed the full production version, which has been rapidly adopted—about 5,500 users began using it within six weeks of launch. The new My SMG also provides about 30 percent faster performance, which is critical for users in regions with slower Internet connections.

VALUE DRIVER	METRIC	GOAL	ACTUAL RESULT
Performance is as fast or faster than baseline My SMG	▪ Page load time comparison	▪ Page load time is as fast or faster than current My SMG	Better overall ▪ +/- 1% in Americas region ▪ 30% gain in other regions
Improved user productivity and experience compared to baseline platform	▪ Scoring on critical tasks ▪ Measuring time to complete ▪ Ease of use ▪ Overall user experience	▪ As good or better than on the current platform ▪ Improved user satisfaction gains by including human factors engineers on the project.	▪ Routine tasks took less time to perform on average ▪ 76% satisfaction (12% increase) ▪ 76% improved user experience (22% increase)
Increase in user productivity with new My SMG 2.0 capabilities	▪ Productivity-enabling capabilities delivered to increase productivity as measured by scenario analysis to determine time and clicks saved	Deliver: ▪ Simplified setup and maintenance ▪ Role targeting ▪ Preference capture ▪ Single portal experience ▪ Personalization	▪ Delivered all targeted capabilities in baseline evaluation/comparison with new capabilities in progress ▪ Early analysis showed 60% improvement, with three fewer clicks on average for routine tasks


Dawn Tamone, System Analyst

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Partnering with Silicon Design Teams

Vivek Ajjarapu, Engineering Computing Design Applications

Related Content at www.intel.com/IT

- "Increasing Data Center Efficiency through Metering and Monitoring Power Usage"
- "High-Performance Computing for Silicon Design"
- "Accelerating Silicon Design with Multi-Core Expandable Platforms"
- "Increasing Design Productivity with Digital Workbenches"
- "Improving EDA Batch Application Performance"

Intel IT works closely with Intel silicon design teams to support all phases of product design with a highly reliable computing environment. Increasing design complexity, budget pressures, and shorter design cycles present continuing challenges. In 2009, we responded with initiatives that reduced cost, increased energy efficiency of compute environments, and enabled silicon design teams to be more productive.

Increasing Compute Server Efficiency

Intel's design computing environment encompasses the majority of Intel IT servers. Most of these are used to run batch design jobs. Growing design complexity has generated unprecedented load, with average utilization increasing to 85 percent.

By tuning design flows to eliminate bottlenecks and dynamically allocating jobs to servers based on their requirements, we significantly increased the effective throughput of the environment. For the processor family codenamed Sandy Bridge, our tuning accommodated an average 20 percent additional compute demand from existing compute capacity.

We deployed process improvements that helped us analyze batch computing server usage and reduce wasted CPU cycles from canceled simulations. By the end of 2009, we achieved a more than 5 percent reduction, saving more than 30 million CPU hours; each 1 percent reduction generates an estimated USD 1.1 million net present value.

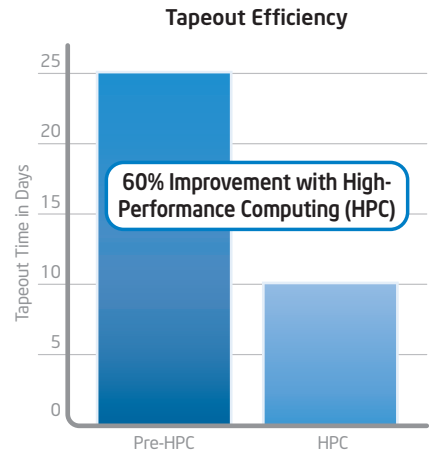
We also use a significant number of servers to run interactive computing applications. We developed a tool that helped analyze utilization of these servers and identify opportunities to reduce the total number. We reduced the number of interactive servers by approximately 4,500, which produced savings of USD 2.5 million in capital cost avoidance and USD 3.5 million in power and cooling cost avoidance.

Tapeout Efficiency

Our high-performance computing (HPC) environment supports tapeout, the highly compute-intensive final stage of silicon design when the description of the circuit is sent for manufacture. This HPC environment enabled us to reduce 45nm Intel® processor tapeout time from 25 days to 10 and delivered USD 44.72 million in value to Intel. We have completed the second generation of this environment, enabling tapeout of 32nm processors, and we look forward to introducing these processors in 2010.

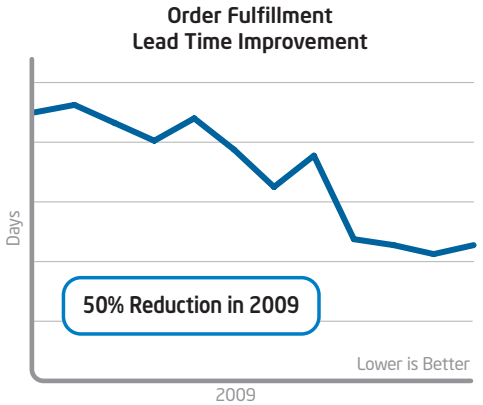
Test Time Reduction

The growing number and complexity of design projects drives an increasing need for automated test equipment (ATE) capacity to support design validation. We created methods to increase the efficiency of ATE use, accelerating test loading by 60 percent and saving about 10 percent of ATE time overall. This translates into cost avoidance by reducing the need to add more equipment.



Managing Intel's Supply Chain


Denise Leader, Manager, Business Operations and Quality Solutions, IT Supply Network; Tiffanie Kong, Application Developer



IT is a critical partner in our supply chain efforts. We work closely with IT on each of our programs to integrate technology with our business practices to deliver the business results.

—Frank Jones
Intel Vice President and General Manager, Customer Fulfillment, Planning, and Logistics

Intel IT provides systems that keep Intel's supply chain running efficiently, helping ensure the critical inflow of goods and information and outflow of products.

Responding Faster to Customers

Intel IT has been instrumental in improving Intel's supply-chain responsiveness by almost 300 percent over two years, providing benefits such as improved on-time delivery and shorter order fulfillment lead time.

In 2009 we continued to help Intel's manufacturing group improve its supply-chain responsiveness, enabling it to quickly say yes to customer orders and deliver to customers' requested dock dates while helping to reduce the product inventory pipeline by one-third. We implemented an enterprise resource planning foundation that included:

- A collaborative business rule application
- Automation and outsourcing of back office transactions
- Transition from static spreadsheets to dynamic available-to-promise (ATP)
- Shrink-and-grow ATP horizons
- Direct ATP visibility to customer points of contact

The rapid introduction of new products, such as Intel® Atom™ processors, resulted in more frequent changes to multiple manufacturing systems. We controlled and validated these changes to help ensure factory output was not affected. We applied quality systems and processes to maintain the high availability of the automation environment.

Supply Planning Decision Support

We introduced new workflow and data staging technology that is transforming Intel's supply planning processes, enabling better customer responsiveness, alignment of supply to demand, and high utilization of manufacturing assets. The new platform integrates all areas of enterprise data required for the planning process to help improve decision making by facilitating trend analysis and forecasting.

The new platform helped drive a 98 percent reduction in data defects for all new product data in 2009. This improvement in data quality is a key requirement for our optimization solver-based planning systems. The technology is also helping us achieve other goals, such as reductions in both inventory and assembly test planning cycle times. We expect to expand use of this technology to all Intel product lines in 2010.

Intel's Supply Chain Receives Industry Recognition

Intel's responsiveness to customers was a key reason behind industry recognition in 2009. In May, AMR Research announced their annual Supply Chain Top 25, and Intel was on the list. The selected companies demonstrate leadership in applying demand-driven principles to their global supply chains. The list is determined by a vote from industry peers. In addition, the Council of Supply Chain Management Professionals awarded Intel the 2009 Supply Chain Innovation Award, recognizing that Intel delivered a more than 300 percent improvement on change order responsiveness and gave customers best-in-class delivery, while simultaneously cutting our product inventory pipeline by 33 percent. Intel IT was a key contributor in these accomplishments.

Recognizes the best and most innovative solutions and ideas in the supply chain profession

Improving Decision Making

Keysha Orphey, Data Analyst

As a field person for 27 years, I understand the complications and frustrations the field goes through to obtain clear numbers on their business. Our new business intelligence solution has enabled our sales team to have unprecedented on-demand access to integrated information to measure and track their business, driving business results.

—Gregory Pearson
Intel Vice President and General Manager, Worldwide Sales and Operations

Dealing with information overload is one of our greatest challenges. The volume and flow of information continues to accelerate. The need for collaboration and interaction across business units is also increasing. To assist in making informed business decisions, we increased our focus and investment to deliver tools that provide access to key business indicators, enabling timely access to information and data analysis.

Reliable Data Source

Improved decision making starts with a trusted and reliable data source. In 2009, we identified the existence of different data sources and multiple definitions of key business performance indicators such as "revenue" and "product cost." Working with our business partners, we have started to establish consistent definitions for these indicators. In 2010, we will focus on consolidating the multiple sources of data that exist today into a single, trusted source. With a single data source and consistent definitions of business indicators, we will be able to deliver a single set of decision making tools across the enterprise.

Executive Workspace

We continued piloting our executive workspace, which provides senior executives with an aggregation of key business indicators in a one-page view. In 2009, we deployed the workspace to a larger number of users and enriched the content available, in preparation for widespread deployment across Intel next year. We determined that product and manufacturing groups have the greatest need for the workspace because they require information from across the enterprise in order to make informed decisions.

Sales and Marketing Dashboards

We developed business intelligence dashboards that help Intel's marketing groups set strategy and make business decisions by providing up-to-date information about the effectiveness of online marketing programs, including the Intel Inside® program. The dashboards, accessible from Intel's employee portal, show key indicators such as click-through rates and utilization of marketing funds.

Raymond Cheung, IT Operations Manager; Jimmy Wai, IT@Intel Program Manager; John Kung, IT Product Manager

IT Tool Helps Employees with Stock Option Exchange Choices

In 2009, Intel shareholders approved a program allowing Intel employees to exchange "underwater" stock options for a smaller number of re-priced, market-value options. Intel's Human Resources (HR) partnered with Intel IT to identify and implement a quick solution for employees to evaluate their choices.

Intel IT developed the software in about 10 weeks and made it available to Intel's approximately 60,000 eligible employees. Accessible through Intel's employee portal, the tool uses the portal's personalization features and supports seven languages.

The tool successfully delivered the following performance:

- 100 percent server uptime with no excursions.
- Peak loads of 37,000 visits and 60,000 transactions in the first 24 hours.
- Optimized to run on existing platforms.

Intel IT's investment in this tool provided the capabilities that HR required to help employees efficiently make informed decisions.

Managing Intel's Risk

John McBride, Network Specialist

The biggest vulnerability we face today, and in the future, is the misperception of risk. Our job is to guide the business to balance risk by being objective, innovative, and agile.

—Malcolm Harkins
Chief Information Security Officer and General Manager, Enterprise Capabilities

Related Content at www.intel.com/IT

- "Data Protection in a Mobile Environment" Webcast replay
- "Security Use Cases" video
- "Strengthening Enterprise Security through Notebook Encryption"
- "Defense In Depth Strategy Optimizes Security" video

We increased our focus on risk and security management in 2009. Regulatory compliance issues mandate installing more robust infrastructure and processes to help Intel manage data. Additionally, as cyber threats proliferate, Intel must stay ahead of these quickly changing risks.

e-Discovery and Data Retention

Since the inception of e-Discovery, we have supported about 150 legal matters and preserved more than 320 terabytes of data, enabling Intel to comply quickly and efficiently with court orders and regulatory matters.

Public-Private Partnership

In 2009, Intel IT played a leadership role in national and international cybersecurity-related organizations by holding board and executive officer positions with the Information Technology Information Sharing and Analysis Center and the Industry Association for the Advancement of Security on the Internet.

Through these activities, Intel played a key role in industry and government efforts to improve critical information infrastructure protection and response globally. Intel IT was also a leading contributor to the *U.S. Information Technology Sector Risk Assessment*, which the U.S. Department of Homeland Security published in the third quarter of 2009. We continue to expand our participation in operation- and technology-related work groups and conferences focused on improving the partnership between industry and governments on these issues.

Threat Intelligence

We use emerging threat analysis (ETA) to identify and monitor emerging external cyber threat trends with the potential to impact Intel. Relying on open-source information, community outreach, and rigorous analysis, ETA has repeatedly identified emerging cybersecurity issues before they become well known across the industry, allowing Intel more time to react effectively. Periodic reports inform security prioritization, roadmap, and education efforts within Intel. Externally, ETA supports critical public and private partnerships, contributing to overall improvement of the cybersecurity ecosystem.

Maverick Chan, IT PC Service Engineer

Maintaining Personal Privacy

With the rapid advancement of technologies such as cloud computing, the consumerization of IT, and social computing, concerns about personal privacy are increasing. We are dealing with this complex issue by taking a proactive approach.

One of our premises is to be clear about how we use personal information. For example, in 2009 we implemented a process to help ensure that our use of personal information was clearly communicated to users downloading applications from an external third-party social networking site.

We are also providing analysis and defining privacy requirements and guidelines that other Intel business groups can apply to Intel's external presence, such as Web sites, blogs, and social media.

We continued to maintain our regulatory compliance program, support outreach activities, and participate in external groups focused on developing privacy standards and other privacy-related projects.

Jennifer Chen, IT Specialist

STRATEGIC PLANNING SOLUTIONS

Managing IT Like a Business

IT strategic planning is the foundation for how we run IT as a business. By understanding business and technology trends, we instill agility into our organization while helping ensure we are positioned to support the overall growth of the company. We create value for Intel by aligning and prioritizing our IT investments and innovation to match business goals while managing risk, enhancing predictability, and maintaining compliance.

AMR Research SUPPLY CHAIN TOP25

Identified Intel as a company that exemplifies the demand-driven ideal for today's supply chain.

USD 2.1M

Savings from Reduced Energy Consumption

Visit www.intel.com/IT for related content

Aligning IT with Business Goals

In 2009, we completed the first cycle through a new strategic planning process.

Our strategic planning process, which relies upon key contributors from various Intel business groups, is comprehensive and focuses on a number of critical activities:

- **Environmental scan.** In January we conduct an overall market analysis, which looks at external and internal business drivers that may influence the goals and direction of IT over the next three to five years. We developed a set of key questions to help us highlight any significant shift or movement that might have an impact on IT; we refer to this as our "sensor network." Based on this environmental scan, we identify the megatrends—the critical areas that will affect our business results.
- **Current-state assessment.** Using our capability frameworks, we analyze our processes, data, and systems to develop a snapshot of the health of our IT capabilities. Three frameworks each give us a unique perspective on IT capabilities:
  - Enterprise Capability Framework holistically describes all of Intel's business capabilities along with corresponding IT capabilities, such as design, supply chain planning, and human resources.
  - Cross-Enterprise Capability Framework describes the non-infrastructure technical capabilities used across many business functions, such as instant messaging or e-mail.
  - Infrastructure Services Framework describes infrastructure capabilities, such as servers, data centers, and laptops.

As an in-house end user of Intel® technology, Intel IT has an ability and an obligation to contribute to the definition and development of Intel® platforms and solutions.

—Diane Bryant
Intel Vice President and Chief Information Officer

Analyzing our organization's current strengths and weaknesses helps us identify any gaps or imbalances so we can shift investments.

- **Strategic long-range plan and deep dives.** Next, we develop a strategic long-range plan. Encompassing the next three to five years, this plan guides our vision of success and identifies what needs to be accomplished to achieve our vision. This step, unconstrained by budgetary concerns, involves discussions with business group leaders to make sure Intel IT understands their requirements. The outcome of this phase, along with the current-state assessment, feeds into our strategic business planning and budget processes.
- **Decisions and business planning—imperatives, roadmaps, and finances.** During this phase, we focus on producing roadmaps and prioritized investment recommendations that are based on corporate business goals and opportunities. We align our business planning and budget processes to help us transform our strategy into prioritized and funded investments.

  In 2009 we focused on:
  - Online presence and sales force automation
  - Employee productivity and product time-to-market performance
  - External collaboration
  - End-to-end IT services
- **IT Leadership Summit.** Our process culminates in January of the following year when top Intel IT managers and thought leaders attend the IT Leadership Summit to focus on plans for executing the strategic direction.

Providing Expertise to Intel Platform Groups

We established a program to help fuel Intel's business growth in enterprise markets by using Intel IT's expertise. "Having a close partner who shares with us the good and the bad means we end up with more opportunity," said Rick Olha, Intel Sales and Marketing Group.

Our partnership program offers a team of Intel IT technical experts who evaluate Intel® products and technologies intended for the enterprise environment. These evaluations, which cover the entire product life cycle, include:

- Usage model assessments and input
- Product requirements definitions
- Technical evaluations
- Proof-of-concept (PoC) testing in a pre-production or production environment
- Capability assessments of Intel products in our environment, which help to improve future versions of the product

The results of our technical evaluations and PoC testing are often turned into IT@Intel white papers shared externally to show how Intel IT is using or plans to use the technology.

In 2009, our IT experts provided more than 100 evaluations in connection with Intel products for the enterprise. More than 30 of these engagements resulted in identifying product improvements, proposing new features, committed change requests, and more.


Alan Gladman, Project Manager

Visit www.intel.com/IT for related content

Managing IT Investments


Alan Sergeant, IT Marketing Programs Specialist


Gonzalo Lopez, Application Developer

Our investment framework acts as a beacon to guide high-level decisions on IT spending prioritization.

—Mike McDonnell
IT Finance Budget Manager

Related Content at www.intel.com/IT

- "Using an IT Business Value Program to Measure Benefits to the Enterprise"
- "Using TCO to Determine PC Upgrade Cycles"

In 2009, we continued to implement and refine tools and methods that emphasize financial discipline, while demonstrating support for Intel's continued growth.

Budget Prioritizing

To help us prioritize the entire IT budget and shift resources to higher value-add projects, we recently integrated multiple department-based budget processes into a single IT-wide process. We score projects based on the following criteria:

- How well does the project help deliver efficiency to Intel?
- How does the project mitigate business risk?
- To what level does the project contribute to top- and bottom-line financial growth?

We consolidated our list of budgetary line items from 500 to 80, achieving two critical benefits: increased operational excellence due to better decision making and results, and improved alignment and responsiveness among Intel business groups.

Investment Framework

We formally adopted an investment framework in 2009 to help us plan, monitor, and control IT spending.

Our investment framework comprises four categories of IT expenditures:

- **Run.** Investments that maintain our business as it is today.
- **Grow.** Investments that improve or grow current business capabilities and operations.
- **Transform.** Investments that help Intel grow revenue by expanding into new markets.
- **Mandatory.** Mandatory spending to comply with legal or regulatory requirements.

Our objective is to make measurable improvements by shifting 5 percentage points per year from Run to Grow/Transform investments.

Spending Categories

To further improve our investment management processes, we categorize all IT spending into one of eight categories, such as data network and application maintenance. Categorizing our expenditures allows us to benchmark to others in the industry.

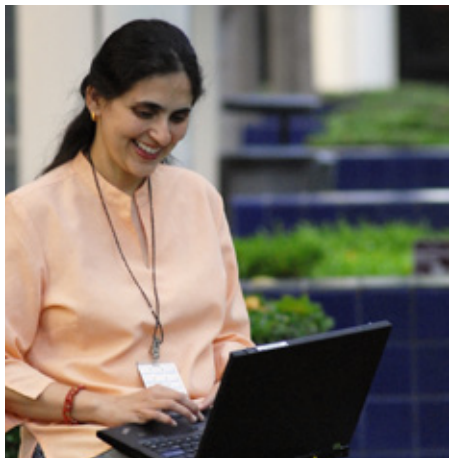
A Tool For IT Governance

One tool we use to govern our strategic planning efforts is the IT Capability Maturity Framework (IT-CMF). IT-CMF is a systematic framework developed by the Innovation Value Institute (IVI), an open innovation consortium that spans academic, industry, public-sector, consulting, analyst, ISV, and professional bodies. The IVI currently has more than 30 members around the world, including Intel, which helped develop it.

The IT-CMF assists CIOs in better managing the integral complexities and tradeoffs required to continuously evolve an organization's IT capability to deliver more value. More than 200 companies around the world currently use it.

It consists of a five-stage maturity model for improving IT capability, identifying and prioritizing opportunities, reducing costs, and optimizing the business value of IT investments. By using the IT-CMF, Intel IT has been able to systematically improve our IT capability year over year.

Contributing to Intel's Sustainability



Malini Prasad, Application Developer

Like many other companies, Intel is committed to reducing waste and consuming fewer resources. Intel IT is playing a key role in these efforts through our IT Sustainability Program.

Intel IT's Sustainability Framework

Developed in 2009, our sustainability framework helps us manage our sustainability programs and projects that impact energy efficiency.

Our goal is to manage the IT environment so that we contribute to the corporate goal of 20 percent carbon dioxide (CO_2) emissions reduction by 2012 from 2007 levels. We developed a tool called the Sustainability Baseline Model to help us calculate and predict the overall environmental impact of IT activities.

Our Sustainability Baseline Model helped us identify our baseline CO_2 emissions and determine our IT CO_2 footprint breakdown: 70 percent from data centers, 24 percent from computing outside of data centers such as storage and networking, and 6 percent from office PC computing.

In 2009, we achieved savings of USD 2.1 million from reduced energy consumption based on our CO_2 footprint reduction and avoidance projects.

Technology and Innovation

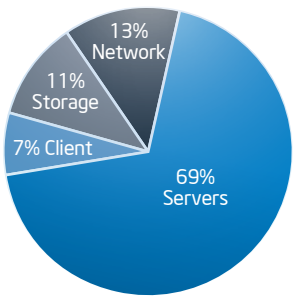
Based on a 2009 proof of concept (PoC) that investigated power usage when servers are in an idle state, we developed an online scheduling capability that powers down lab servers when they are not in use. The reduction in energy consumption amounts to savings of about USD 250,000 for every 1,000 servers.

We also completed a Lean Six Sigma* black belt project that focused on data center energy efficiency, developing a blueprint methodology that can be applied to any data center. Our data-driven approach uncovered a number of hidden issues related to the performance of the chillers. The net result was savings of approximately USD 140,000 in just one data center.

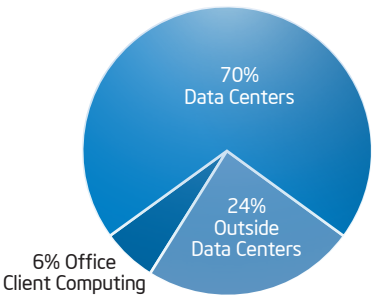
Collaboration

We promote IT sustainability across IT and the industry in a number of ways. Intel and Intel IT helped to develop the European Code of Conduct, an emerging standard of excellence with guidance on best practices in data center efficiency. We also work with the ENERGY STAR* program to proactively address our industry's impact on climate change, and we sit on the board of directors of the Green Grid.

Direct IT Carbon Footprint Estimate by Equipment Type



Direct IT Carbon Footprint Estimate by Equipment Location



Related Content at www.intel.com/IT

- "Building a Long-term Strategy for IT Sustainability"
- "Establishing Baseline Measurements and a Roadmap for IT Sustainability"
- "Reducing Energy Use in Offices to Increase IT Sustainability"
- "Making IT Real" four-part video series
- "Intel Air Economizer Data Center Proof of Concept" video

Building a Strong Global IT Workforce

Lynsey Wilkinson, Network Specialist; Joe Gleeson, Operations Manager

Jaime Murkin, Systems Analyst; Dan Radcliffe, Support Specialist; Natasha Kelly, Business Operations Specialist

Related Content at www.intel.com/IT

- "Using an IT Business Value Program to Measure Benefits to the Enterprise"
- "Intel IT and the Economic Environment" video

Intel IT's success is due to productive and efficient employees who are empowered to create and innovate. Career development opportunities are aligned with IT business priorities so that employees will have the greatest impact for IT as well as for the corporation. Our aggressive approach to employee growth and development includes job rotation, mentoring, and training opportunities for all employees.

Helping Employees Grow

Intel IT models one of Intel's core values—creating a great place to work. Intel IT managers receive high scores in management and leadership feedback surveys, exceeding the corporate goal of 80 percent positive responses. Employees report one common factor that contributes to job satisfaction: effective managers who enable career growth opportunities.

In 2009, we extended our efforts to facilitate employee growth, focusing on several key areas:

- We formalized our IT job rotation program to align with the highest impact programs. This broadens employees' skill sets and expands their future opportunities at Intel.
- We expanded our mentoring and coaching program, which helps IT employees benefit from the experience of other IT employees.
- We supplemented the IT training budget to help employees develop high-priority skills. Employees gained knowledge in business intelligence and analytics, enterprise resource planning technical training, and Web-based service-oriented competency.

We continued to encourage efforts that promote community building. Intel IT employees met a goal of contributing 100,000 hours of service to their local communities.

Effective Program Management

In 2009, IT's Program Management Office (PMO) launched a new service model, providing expert project management consulting to IT's project managers worldwide. Consultants completed more than 190 project support engagements in 2009 on topics such as project schedule creation, process and tool consulting, and root cause analysis. The PMO also enables personal development and peer-support opportunities among Intel IT project managers through regular e-mail communications, active blogs, and phone-in learning forums.

Optimizing Business Performance

The IT Business Process Engineering (BPE) team improves process efficiency, effectiveness, and bottom-line savings for the entire corporation. In 2009, BPE supported the execution of Lean Six Sigma* (LSS) process improvement projects that saved IT USD 41 million.

Examples of LSS projects include:

- **End of Life Application Candidate Selection.** Refined criteria that resulted in removing 14 applications, saving USD 1.1 million net present value.
- **Improving Supply Chain Service Desk Mean Time to Repair (MTTR).** Automated the troubleshooting process for several issues that reduced MTTR from 18 minutes to 12 and raised customer satisfaction scores to greater than 95 percent.
- **Data Center Return Air Set Point Optimization.** Developed a process to control data center return air temperature, resulting in energy savings of 2,400 kilowatt-hours per quarter without negatively affecting performance or productivity.

IT Lean Six Sigma Program

	2007	2008	2009	TOTAL
Certifications	15	35	96	146
Return on Investment	USD 24 million	USD 40 million	USD 41 million	USD 105 million

Sharing Our Experiences: IT@Intel

Joanne Buller, Business Analyst; Tina Schuster, Systems Analyst; Kannan Keeranam, Project Manager

Kimberly Cawthorne, IT@Intel Project Manager

As IT professionals, managers, and executives, we are all on a mission: Optimize IT investments to create value. Our IT@Intel program facilitates open, honest discussions about world-class best practices in current IT topic areas. Launched in 2001, this IT industry outreach program has become an integral part of how we do business.

IT@Intel engages IT professionals and managers around the world with peers inside our organization to share insights, lessons learned, tools, methods, strategies, and best practices with one simple goal: to unleash the value of IT. As the IT department inside Intel, we have a unique perspective on technology—from what's being used today to what will be enabled tomorrow to what's still being conceived.

We encourage industry collaboration by sponsoring and participating in an array of activities. Our IT leaders and subject-matter experts (SMEs) regularly share our experiences—in IT peer customer meetings, seminars, conferences, roundtables, and even impromptu teleconferences. In 2009, we participated in 280 customer meetings and 90 events.

Our IT SMEs also create a variety of content—from white papers to videos to blogs—in topic areas such as:

IT strategic planning. Planning processes and tools, financial valuation techniques, information security practices, IT sustainability strategies, and more to align IT investments to long-term business goals.

Business solutions. Supporting design engineering, office, manufacturing, and enterprise computing environments through enhanced business intelligence solutions.

Employee solutions. Managing PC fleets, boosting mobility, increasing productivity and flexibility, and getting the most out of collaboration and social media solutions.

Data center solutions. Proactive server refresh, virtualization, storage optimization, facility design, cloud computing, and more to reduce costs and meet growing compute and storage demands.

By sharing our IT best practices, we hope our experiences can help IT professionals around the world be successful in our common mission.

Access the IT@Intel Web site for more information at www.intel.com/it.

> Using the IT@Intel program is a must. The ways Intel IT deploys innovative solutions and transforms Intel® architecture into business value helps my customers.
>
> **—Thomas Kellerer**
> Technical Program/Account Manager

IT Supports Intel's Assembly Test Manufacturing Capabilities

In 2009, IT's Manufacturing Computing group, which provides automation support to Intel's factories and Assembly Test Manufacturing (ATM) operations, became the first sustaining organization to win the Intel Quality Award (IQA).

The IQA is Intel's most prestigious honor for groups that demonstrate excellence in quality and model Intel values. The award was based on three key accomplishments that contributed to the ATM group's success:

- Realizing 99.96 percent availability of assembly test manufacturing automation systems.
- Attaining 100 percent performance against schedule for the introduction of new products and automation capabilities.
- Achieving zero downtime impact due to cyber infections.

To further streamline Intel's manufacturing capabilities, in December 2009 we consolidated several diverse groups into an integrated factory automation team. IT Factory Automation is responsible for applying automation and computing technology to Intel's worldwide factory operations to improve the output, quality, cost, and productivity of the factories.

Tauben Tenty, Product Line Manager

DATA CENTER SOLUTIONS

Paving the Way for Efficient Growth

Finding efficient ways to support business growth is vital for IT. Intel IT continues to optimize our worldwide data center infrastructure to respond faster to business needs while enhancing services. Our long-term data center strategy focuses on delivering innovative solutions to optimize server, storage, network, and facilities infrastructure that will help us realize an estimated USD 650 million in savings by 2014.

USD 12M

2009 Net Cost Avoidance from Continuing Server Refresh Strategy

USD 29M

2009 Net Cost Avoidance from Data Center Virtualization in Design Engineering

Visit www.intel.com/IT for related content

Delivering Efficient Data Centers

Data centers are at the heart of Intel's massive worldwide computing environment. With almost 443,000 square feet distributed over 95 data centers, these facilities house approximately 100,000 servers and enable innovation across the enterprise.

We serve four main computing application types (referred to as DOME)—Design (sometimes referred to as engineering computing), Office, Manufacturing, and Enterprise. Design computing requires the most servers—about 70 percent. The other three applications divide the remaining 30 percent of the servers about equally. Most of the office and enterprise computing is housed in three primary data centers.

Data Center Strategy

Since 2005, we have consolidated roughly 150 data centers to 95. However, we found that an across-the-board consolidation strategy was not appropriate for all compute requirements. For example, fail-safe requirements for our 24/7 manufacturing process and highly interactive design engineering workloads require local data centers.

Our long-term approach emphasizes three broad strategies:

- **Optimization.** We analyze the potential benefits of upgrading our existing data centers. We either optimize the various components—including refreshing the servers and the storage and networking capabilities—or the facilities themselves, depending on which achieves the highest return on investment.
- **Utilization.** We focus on increasing the available capacity of our existing data centers through methods such as server virtualization and pooling batch servers into virtualized data centers.
- **Strategic data center investment.** When demand grows beyond existing capacity, we invest in efficient modular facilities and locate these facilities in centralized data center aggregation points when possible. For interactive design and manufacturing sites, we continue to invest in local data center capabilities.

Cost Savings

Our long-term approach allows us to make smart investments that pay for themselves.

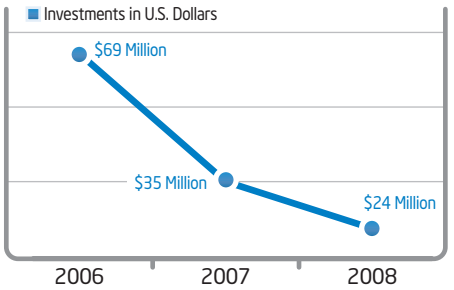
Over the last four years, we increased the performance of our data centers by 2.5x while reducing our capital investments by 65 percent.

—Kim Stevenson
Intel Vice President and General Manager, IT Operations and Services

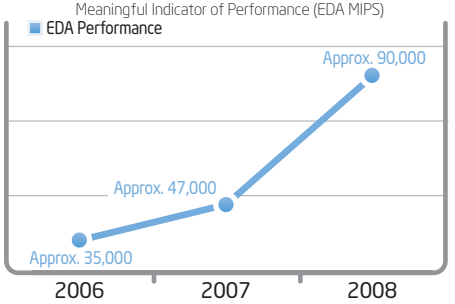
For example, by virtualizing applications and replacing four-year-old servers with new high-performing multi-core systems, we've reduced capital investment in data center facilities by 65 percent in 2008 compared to 2006 while increasing performance by 2.5x.

We estimate our strategy will save up to USD 650 million by 2014; we've already achieved 35 percent savings to date through proactive server refresh, data center virtualization, server virtualization, and storage optimization.

65% Lower Capital Expense



2.5x Higher Performance
Electronic Design Automation
Meaningful Indicator of Performance (EDA MIPS)

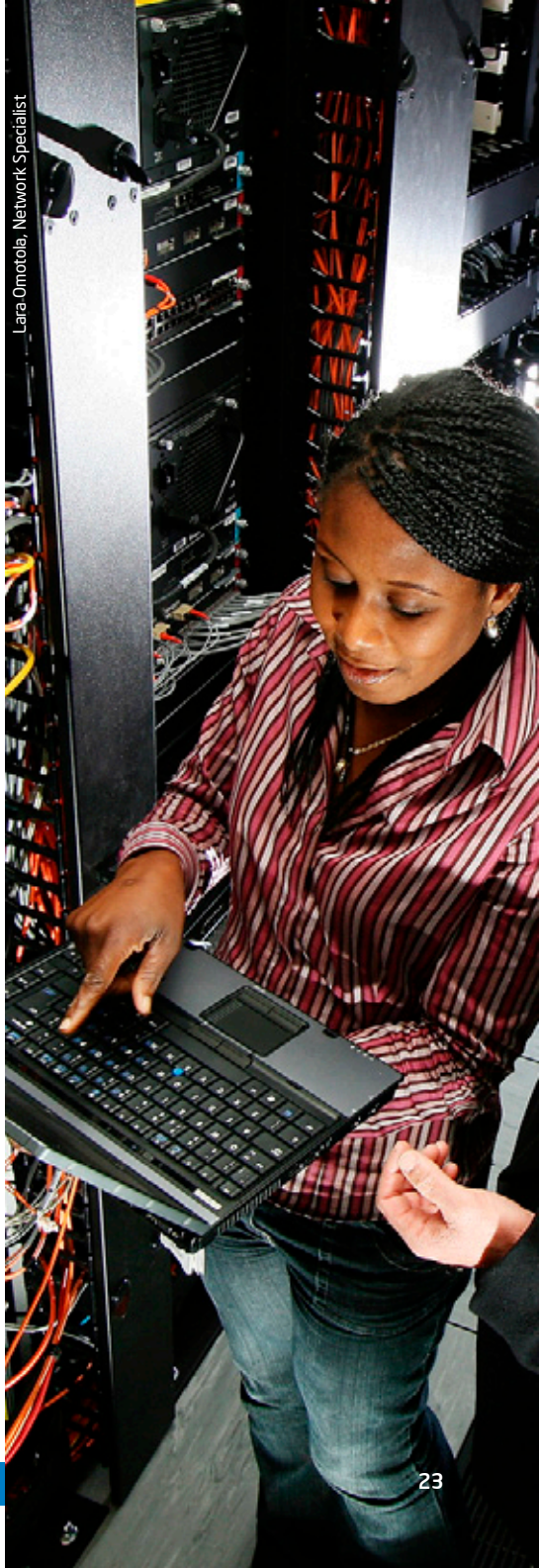


Cloud Computing Strategy

Cloud computing is a significant trend with the potential to increase agility and reduce costs. Intel IT has developed an enterprise cloud computing strategy with a focus on growing the cloud from the inside out. This means investing predominantly in the creation of a private internal cloud computing environment by growing our virtualized computing environment within the enterprise. We also plan to selectively take advantage of cloud services from external suppliers for applications that have low security exposure and are not mission-critical or competitive differentiators for Intel.

Elements of Intel's cloud computing strategy:

- We are expanding internal cloud efforts in our office and enterprise environments to build a more agile, dynamic data center environment through accelerated virtualization.
- We are taking advantage of industry-available software as a service (SaaS) for some baseline business services, such as travel management, expense reporting, hiring, and employee benefits.
- We are using infrastructure as a service (IaaS) for niche applications, such as hosting a portion of Intel's Web site content.
- We are shaping future PC fleet standards and investments through increased use of application streaming and other cloud services; our research has reinforced our decision to continue using a rich mobile PC as our standard for secure, virtualized delivery of streaming applications and other services.


Lara Omotola, Network Specialist

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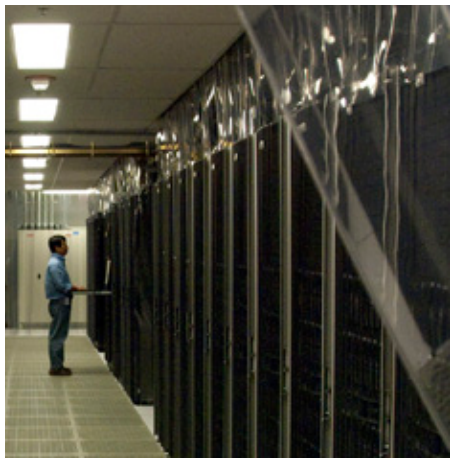
Reducing Power Consumption with Innovative Facilities Design



Franklin Nguyen, Data Center Operations

Intel IT's ongoing efforts to integrate innovative solutions into data center facilities design and management results in increased efficiency, helping to reduce Intel's carbon footprint.

Our techniques for building and operating efficient, high-density data centers maximize computing capacity while reducing cooling costs. From our pioneering design of chimney cabinets in 2006 to our current use of wet-side economizers, we have applied innovative approaches to reduce data center power consumption and improve power usage effectiveness (PUE). A sampling of our data centers indicates an annual average PUE ranging from 1.2 in our newest high-density data centers to greater than 2.0 in older facilities.

To support Intel's silicon design efforts, we have installed thousands of blade servers, based on the Intel® Xeon® processor 5500 series, at very high rack densities of up to 24 kW—several times the typical data center density across the industry. Our highest rack density is even greater, at 31 kW.

By maximizing the capacity of existing data centers, we avoid new data center construction when possible. We reuse existing facilities to add capacity. When new construction is needed, we are building world-class facilities. For example, we expect to open our first LEED*-certified facility and data center in Israel, a key Intel research and development site, in 2010.

We continue to evaluate and identify cost-effective emerging technologies that have the potential to reduce energy consumption and improve data center efficiency even further.

PROJECT	RESULTS
Increasing server input (ambient) air temperature	We have increased the ambient air temperature by three to five degrees Fahrenheit in some data centers, dependent on the risk and the data center design. This significantly reduces cooling requirements, energy consumption, and cost.
Monitoring facilities and power consumption using server sensors	We are using the thousands of sensors already present in installed servers to monitor data centers. These sensors monitor power consumption and temperature, providing highly detailed information that helps improve efficiency. By measuring and analyzing server-level power consumption, we were able to increase computing capacity at one data center.

Related Content at www.intel.com/IT

- "Increasing Data Center Efficiency through Metering and Monitoring Power Usage"
- "Reducing Data Center Cost with an Air Economizer"

Recognizes the 15 most innovative IT initiatives that fall under the umbrella of sustainability.

Air Economizer Receives Green IT Award

*InfoWorld** magazine included Intel in its 2009 Green 15 list, recognizing a groundbreaking Intel IT air economizer project as one of the top 15 IT sustainability initiatives of the year.

In our proof of concept (PoC), we used an air economizer to provide nearly all data center cooling by simply drawing in outside air. Our PoC tested the limits of what is possible with this "free cooling" approach, using 100 percent outside air—at temperatures of up to 90 degrees—to cool servers year-round. This dramatically reduced data center power consumption; we estimate that this approach could reduce annual operating costs by up to USD 2.87 million in a 10-megawatt data center.

In part because of our data center energy efficiency efforts, Intel also was ranked fourth in *Newsweek** magazine's 2009 green rankings. The ranking was based on an evaluation of each company's environmental impact, as well as its green policies and reputation among peers and environmental experts.

CREATING BUSINESS VALUE
DATA CENTER SOLUTIONS

Staying Committed to Server Refresh Reduces Data Center Cost


Raymond Cheung, IT Operations Manager


Kevin Emery, Data Center Planner

Despite a tight corporate capital budget, we found that we could not afford to delay server refresh in 2009.

—Bruce Schuman
Finance Controller, Intel IT

Related Content at www.intel.com/IT

- "Staying Committed to Server Refresh Reduces Cost"
- "Realizing Data Center Savings with an Accelerated Server Refresh Strategy"

By continuing to refresh servers on a regular four-year scheduled cadence during 2009, Intel IT avoided data center costs estimated at approximately USD 12 million.

Our server refresh strategy is one of the most important elements in our efforts to increase data center efficiency while meeting continued growth of compute demand. By replacing aging servers on a regularly scheduled cadence, Intel has realized operational cost savings, avoided data center construction costs, and gained space for additional servers to handle growth in design engineering requirements.

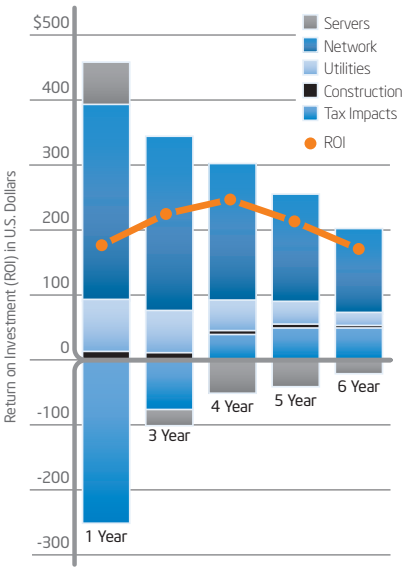
From 2007 to 2014, we expect to deliver USD 250 million net present value by replacing older servers with new servers based on multi-core Intel® Xeon® processors.

In 2009, economic conditions and capital constraints made us question whether to continue our strategy, despite the benefits we had already achieved. After analyzing the performance gains possible with the latest Intel® Xeon® processor 5500 series, it was clear that the most cost-effective approach was to continue refreshing servers during the year. Our analysis showed that deferring capital expenditures for server refresh until 2010 would increase operating and data center capacity costs by USD 12 million.

During 2009, we replaced more than 18,000 servers based on single-core processors with servers based on Intel Xeon processor 5500 series—achieving a 10:1 consolidation ratio.

Based on our assessment process, we created a server refresh return-on-investment estimator that other IT organizations can use. Access the tool at www.intel.com/go/xeonestimator.

Refresh Cadence Evaluation



Accelerating Server Virtualization

In 2010, we plan to accelerate virtualization efforts within our office and enterprise environments, while continuing development of our enterprise private cloud. Our goals are to improve infrastructure efficiency and our ability to rapidly meet changing business demands.

Key focus areas include increasing the ratio of virtual to physical servers, establishing self-service portals for development and simple applications, reducing time to provision services, and providing consumption-level reporting to streamline decisions regarding server capacity.

To date, we have virtualized 15 to 20 percent of servers in our office and enterprise environments. This has improved server utilization, reduced hardware costs and energy consumption, and increased return on investment. We can provision new applications within days, allowing us to respond more quickly to rapidly changing business needs.

As part of our server refresh strategy, we plan to aggressively deploy the latest Intel® Xeon® processor technology to further accelerate virtualization adoption, with a goal of virtualizing 70 to 80 percent of our office and enterprise environments within a couple of years.

Boosting Utilization through Data Center Virtualization

John McBride, Network Specialist

Data center virtualization, or grid computing, is an essential element of our broader data center efficiency strategy. We achieved USD 29 million in net cost avoidance through data center virtualization in 2009.

Finding opportunities to pool batch servers into virtualized data centers has increased utilization of those servers to about 85 percent and resulted in greater engineering productivity and operational efficiency.

Traditionally, Intel silicon design groups have relied mostly on servers in local data centers, adding enough local capacity to meet peak demand.

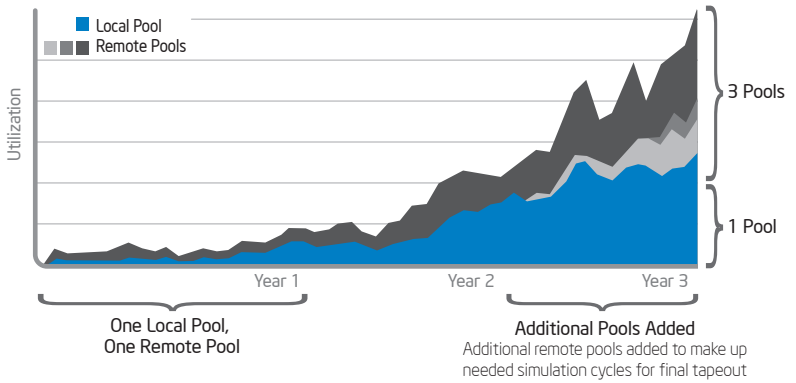
We have addressed the issue of utilization through data center virtualization, which allows silicon design teams to use idle servers at remote data centers. This approach serves the majority of batch simulation design activities, which accounts for nearly 70 percent of the total compute cycles during a silicon design project.

Eliminating site dependencies enables us to consolidate data centers and boost utilization. We have located batch data processing in three major sites. Batch processing software has enabled engineers at geographically dispersed design sites to access large pools of server resources in a cost-efficient manner.

Related Content at www.intel.com/IT

- "Intel IT Data Center Solutions: Strategies to Improve Efficiency"
- "High-Performance Computing for Silicon Design"

Benefit of Data Center Virtualization



Optimizing Storage Using a Parallel Storage Solution

The deployment of our parallel storage solution is an industry milestone: It's the first time such a solution has been deployed in production for specific use in the semiconductor industry.

Replacing our previous storage solution with a parallel storage solution has saved USD 14 million from 2006 to 2009 and has achieved significant results:

- **Scalability.** We were able to replace every 10 conventional storage servers with one parallel server, saving space and energy usage.
- **Performance.** For select applications, we saw a performance improvement of greater than 300 percent from the parallel storage server compared to the previous storage solution.
- **Volume size.** The volume size increased by a factor of 16, from 400 GB to 6,400 GB. We achieved the ability to support 6,400 GB without compromising our backup, archive, and restore service levels.

IT is an essential partner in creating business value for Intel—supporting our growth, enabling productivity, and delivering efficiencies.

—Paul Otellini
Intel President and Chief Executive Officer

Plans for 2010

As an IT organization, our role is to create business value for Intel, and we continue to deliver that value through our people, operations, solutions, and partnerships. Regardless of the economic environment in 2010, we know that the demands for IT services will continue to grow, and we have an immense opportunity to build upon our 2009 results and drive greater value for Intel.

2010 IT Strategic Imperatives

In 2010, we will continue to focus on our strategic imperatives: developing an energized IT team, delivering outstanding operational services, delivering business solutions to drive Intel's growth, and shaping Intel's product lines while showcasing the value of deploying Intel® technology. To be successful, we must continue to have strong partnerships with the business groups we serve, understanding the needs, strategies, and priorities of our customers.

2010 Plans and Trends

We have several initiatives underway to enhance employee productivity, including the continued deployment of improvements for video collaboration, social media, and PC services and performance. We are also committed to delivering a portfolio of business solutions based on Intel's strategic direction. This includes growing our online presence for customer engagement, reducing the cost of the supply chain to enable growth in new markets, and providing an integrated business intelligence platform to accelerate the delivery of the right information to the right people.

The pace of technology continues to accelerate, and we must invest in investigating key trends that are emerging in the industry. The consumerization of IT—the demand for consumer-led technologies for enterprise use—will shape how we deliver services to employees. Cloud computing is another significant trend, with the promise of increased agility and reduced costs.

Intel IT is the engine that enables Intel employees to create and deliver amazing technology. Intel IT's imperative for 2010 is to continue to support Intel's pace of innovation.

Photo: Intel IT Malaysia Team

For related content, visit www.intel.com/IT.

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