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| Windows 7  Customer Solution Case Study | |
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|  | |  | | |  | Win Generic HeaderNational Instruments Solidifies Leadership Position with High-Performance Products | |
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| Overview  **Country or Region:** United States  **Industry:** Technical instruments and software  Customer Profile  Customers at more than 30,000 companies in 40 countries worldwide use National Instruments open graphical development software and modular hardware to simplify product development, increase their productivity, and dramatically reduce time to market for NI products.  Business Situation  Company R&D engineers wanted to take advantage of advanced Microsoft® Windows® 7 capabilities to maximize the performance of NI’s virtual instrument products and solidify NI’s leadership role as a developer of cutting-edge measurement equipment.  Solution  Windows 7 high-speed USB support, multiple PCI Express architecture, and other advanced technologies will enable NI engineers to improve PC hardware performance of their virtual instruments.  Benefits   * Annual desktop engineering cost savings of $60 per PC * Annual help desk cost savings of $13 per PC * Annual productivity improvements of 19 hours per user | |  |  | | | “We expect that Windows 7 will give our customers the same benefits of improved performance, more efficient test and measurement operations, and increased user productivity that it provided us.”  Jay Garing, Global IT Manager, National Instruments | |
|  |  | | | National Instruments (NI), a global leader in cross-industry scientific test and measurement instruments and development software, looked for ways to consolidate their position as market leaders and technology trend-setters in the engineering and scientific market.  When the Microsoft® Windows® 7 desktop operating system beta was released,  NI engineers working together with corporate IT quickly identified the performance benefits of the new operating system for NI test and measurement products, as well as the support benefits of migrating NI company desktops to the new platform. Detailed test results clearly confirmed that Windows 7 substantially improved the performance of NI test and measurement products; NI duly published these results on a public portal. This led to an overwhelming surge of interest in Windows 7 among NI’s customers, which generated a staggering 3,700% increase in lead generation activities at the time.  A business value analysis of NI’s IT support operations projects an ROI of 242%, an IRR of 167%, and a payback period within 13 months based upon savings in IT labor, software, and PC power costs. Anticipated benefits include:   * ***A 17% reduction in PC hardware refresh costs.*** These savings  are enabled by improvements in PC hardware performance and a resulting 6-month extension of the company’s PC hardware refresh cycle. * ***IT labor and direct cost savings estimated at $81 per PC*** ***per year,*** made possible by faster access to network resources, PC power savings, and better PC desktop management tools. * ***PC user productivity benefits estimated at 19 hours per user per year.*** Productivity improvement estimates were based on end users spending less time updating software, downloading applications, and responding to desktop and network problems.   National Instruments plans a 3-year rollout, leveraging their normal refresh cycle and user demand. | |
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Situation

“We want our engineers to be able to adopt Windows 7 as quickly as possible, so they can use it and communicate its benefits to our customers.”

Alan Russi  
Director of IT Infrastructure  
National Instruments

National Instruments (NI) scientific measurement and testing equipment transforms the way engineers and scientists around the world design, prototype, and deploy systems for test, control, and embedded design applications. NI uses general-purpose PCs on their own manufactured chassis and turns a customer’s PC into a technical instrument by adding application software and peripherals. The resulting “virtual instruments” can function as many types of specialized apparatus, usually at far lower costs than purpose-built equipment.

Although NI is a world leader in the cross-industry market for these devices, the company must also address competition from smaller, niche competitors, who focus on specific industry sectors. To compete successfully with these niche players, NI must control costs and stay agile, constantly provide innovative solutions to customer problems, and attract and retain the best engineering talent in the business.

NI addresses these challenges in part by investing more than 16% of annual revenues in R&D. The success of this strategy is validated by 10% to 20% annual growth, even during the recent recession. Maintaining their leadership position, in part, requires that NI be viewed by their customers as educators and innovators, the voice of engineers, scientists, and technology thought leaders. Taking advantage of new technologies quickly after their release is an important part of the company’s IT strategy.

**Huge Interest in Test and Measurement Community**

NI performed detailed tests on Windows 7 when it first became available to determine whether the new operating system represented an improvement over their then current platform. When NI first published the results of its performance tests on Windows 7, an avalanche of interest from customers across the world was triggered. In the online technical journal *TechOnline*, the NI article, “Seven-Minute Guide to Windows 7” broke all records for lead generation, a staggering 3,700% increase in leads to NI in the first 2 weeks after publication, compared to the average of 100 leads in the first two weeks for technical articles.[[1]](#footnote-1)

On NI’s own web portal the article generated more than five times the average number of leads and resulted in a flurry of articles on Windows 7 performance benefits in specialized journals such as *TMWorld* (*Test & Measurement World*).[[2]](#footnote-2)

**Two Roles for IT**

The NI corporate IT department plays a dual role in promoting the company’s success. For the Manufacturing division of about 1,500 employees, IT professionals use conventional methods of IT optimization: locking down desktops, standardizing software, and enforcing policies and procedures that reduce IT costs and improve user productivity.

In the R&D, Marketing, and Sales divisions, the economic engine of the company, sales and product design engineers have very high levels of IT literacy. Corporate IT managers take pains to ensure that everything possible is done to keep these high-tech end users productive and satisfied and to distract them from their work as little as possible. Here, corporate IT professionals take an advisory role, communicating to the engineers what approaches would or would not work. The IT staff manages only core or enterprise applications and lets the engineers manage the rest of the desktop infrastructure as they see fit.

**Demanding Software Requirements**

In the high-tech areas of the business, conventional IT management processes are handled differently. Each sales office designates a part-time or full-time assistant engineer as the group’s in-house IT support specialist, who after some IT training helps to deploy PC software and support the group’s network connectivity. The corporate IT staff facilitates on-demand application or operating system upgrades as needed by the engineering professionals.

For this highly technical side of the business, PC performance is by far the most important feature. NI engineers put great effort and ingenuity into constant improvements in PC performance or avoiding performance degradation.

To Alan Russi, NI’s Director of IT Infrastructure, Windows 7 provides a new and important basis for NI test and measurement products. Rapid migration to Windows 7 from the company’s largely Windows XP-based desktops would improve the PC hardware performance that NI engineers wanted internally as well as provide the platform for product innovation that NI customers expect.

National Instruments sought a Windows 7 solution that could:

* Improve PC speed, throughput, and other performance benchmarks.

“[Windows 7] improvements such as the elimination of unnecessary timers, selective hub suspension, and lower enumeration time for USB flash devices, increase the performance of USB test and measurement devices.”

Elijah Kerry

LabVIEW Product Manager

National Instruments

from NI Review of Windows 7

* Enable corporate IT staff members and engineer-IT support providers to complete desktop engineering tasks more quickly and easily.
* Reduce the effort and costs of desktop support.
* Make help desk services throughout the company more efficient.
* Make network operation more cost-effective.
* Reduce PC electrical power costs.
* Help company engineers work more productively.

Solution

Upgrading the NI desktop environment to the Microsoft® Windows® 7 desktop operating system from a largely Windows XP-based infrastructure was a significant part of achieving these goals. When R&D engineers at NI customer companies got an early version of Windows 7, the resulting buzz was immediate and dramatic. Encouraged by the positive response to Windows 7 performance and cutting-edge capabilities, corporate IT decided to deploy Windows 7 in the managed part of the business and to encourage a rapid deployment within the high-tech side of the business. This would ensure that NI capitalized on the performance benefits of Windows 7 internally and also that company engineers gained experience with the solution that could be transferred to NI customers as needed.

**Improved Device Performance**

Windows 7 provided many capabilities that promoted overall PC performance, the highest-priority capability to NI engineers. A very important factor was the greater throughput gained with USB data acquisition, a very important capability in their application designs.

PCI Express is the most common way to extend PCs for add-on adapters. Windows 7 now supports multiple PCI Express and high-speed USB slots that enable faster data transfer.

Elijah Kerry, LabVIEW Product Manager at NI, described these advanced capabilities and their benefits, saying, “Microsoft has invested significantly in USB improvements for Windows 7. These improvements, such as the elimination of unnecessary timers, selective hub suspension, and lower enumeration time for USB flash devices, increase the performance of USB test and measurement devices.”

An online NI review of Windows 7 performance noted that, "Microsoft has publicized their investment in new functionality to improve the performance of their latest operating system. Our tests indicated that system tasks and software algorithms generally benefited from these improvements. The speed improvements we showed have implications for high-performance production test systems and applications that require high throughput.”

“In terms of our proxy for new designs, Windows 7 already passed Windows Vista in January 2010 and by June 2010 appears to have two times more deployments than Windows Vista.”

Armando Valim   
LabVIEW Marketing, Senior Group Manager

National Instruments

**Faster, Lower-Cost Deployment**

In addition to providing product capabilities, NI engineers and IT staff also wanted to determine whether Windows 7 could help make their internal engineering and IT processes more efficient. Windows 7 image management capabilities enabled the corporate IT staff and engineers to deploy software with less effort and cost than was possible with earlier versions of Windows desktop software.

**Accelerated driver testing.** Armando Valim, LabVIEW Marketing Senior Group Manager at NI, recalls that in the past, updating drivers often required much more time than expected. “The requirements for driver updating and signing added to development time and greatly added to our testing burden.  Because we have hundreds of drivers to update and test, we saved a lot of time updating them to Windows 7. Compared to testing in the past, it was a breeze!"

Valim described the difference that Windows 7 can make in deployment tasks. “After experiencing several very difficult weeks developing and deploying an earlier version of Windows into embedded industrial controllers, a team in our R&D test farm deployed Windows 7 in the same products in 3 days versus nearly a month with the older software.”

**Faster Desktop Engineering**

NI operates 44 branch offices; 18 are big enough for their own dedicated IT support staff (an assistant engineer). However, 26 branches are too small and have only part-time IT support. These branches save image maintenance effort by using the same images created by corporate IT.

* **Creating a single image.** In the past, the corporate IT staff had to patch and maintain a desktop image for each local language. The effort of this very time-consuming task was reduced by installing the Windows Multi-Language UI. After installation, when a user changes the operating system UI language, an application’s display name and description appear on a multi-lingual system, which changes dynamically. Using these resources enabled the company’s IT staff to spend 93% less time updating language-specific images.
* **Less re-imaging effort, lower costs.** Windows 7 features such as data hard-linking enabled users to keep files stored on a source PC during re-imaging. This enabled technical users to spend 25% less time unloading and then reloading data during PC desktop refresh and reduced desktop refresh costs by 25%. Data hard-linking also enabled the IT staff at NI branch offices to spend 12% less time unloading and reloading data during PC re-imaging tasks.
* **Faster image maintenance.** With Dynamic Driver Provisioning in Windows 7, corporate IT professionals can reduce the size of their images and reduce the number of images they maintain. Windows 7 Deployment Image Servicing and Management (DISM) is a new tool for Windows 7 and Windows Server 2008 R2. DISM streamlines the creation and servicing of the deployment image and minimizes user startup time by only installing the necessary drivers.

Centralizing these tools enabled a 1% reduction in IT support effort at the branch offices.

**Improved Help Desk Services**

To the NI engineers, delivering a high-performance product to market with the fewest possible delays has the highest priority. Windows 7 provided the tools and capabilities that enabled NI engineers to work with minimum distraction and delays.

* **Faster problem diagnosis and resolution.** Windows 7 provided the rich tools that the corporate IT staff needed to identify and resolve desktop and connectivity problems. The Problem Steps Recorder enabled users to record their interactions with an application and provide the IT staff with a detailed screen-by-screen view of the problem and accompanying information. Collecting event data across all layers of the networking stack provided an integrated view of Windows 7 performance and aided analysis and problem resolution. These and other Windows 7 capabilities enabled the IT staff to spend less time in total support effort.

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| **Windows 7 Business Value** | |
| **Benefit** | **Value** |
| Net present value | $70/PC |
| Return on investment | 242% |
| Internal rate of return | 167% |
| Payback period | 13 months |
| PC hardware costs avoided (one-time) | $205/PC |
| Desktop engineering cost savings | $60/PC\* |
| WAN cost savings | $1/PC\* |
| VPN cost savings | $7/PC\* |
| PC power savings | $1/PC\* |

\* = Annual savings

“Because we have hundreds of drivers to update and test, we save a lot of time updating them to Windows 7. Compared to testing in the past, it was a breeze!”

Armando Valim   
LabVIEW Marketing, Senior Group Manager

National Instruments

* **Faster file search and restore.** WhenNI engineers needed a quick and reliable way to revert to previous versions of their files, they used the advanced capabilities of the Windows 7 Backup and Restore Center to automatically restore their documents and files. The ability of the engineers to find and restore older versions of files quickly, without IT assistance, enabled the help desk staff to reduce file-restore-related support effort by 4%.
* **Self-help reduces calls to help desk.** By enabling technical users to identify issues and respond to problems more quickly without IT staff assistance, Windows 7 Action Center helped to reduce annual help desk support effort by 1%.

**More Cost-Effective Network Connectivity**

Windows 7 capabilities also enabled NI to reduce annual costs of virtual private network (VPN) and wide-access network (WAN) operation.

* **Lower-cost VPN.** NI pays a third-party VPN provider for each current connection. Use of Windows 7 DirectAccess®, when deployed, will enable users to access network resources without initiating a VPN connection, which will enable NI to reduce annual VPN costs by 20%.
* **Lower-cost WAN.** Using BranchCache to locally cache content will enable NI to reduce expensive network bandwidth, resulting in a 1% reduction in total WAN costs.

**Lower-Cost PC Power Management**

Company IT managers gave a high priority to sustainability goals such as PC power savings. By using power management Group Policy® settings and advanced Windows 7 capabilities such as idle resource and device power management, NI expects to reduce annual PC power requirements by 2%.

**Improved User Productivity**

Windows 7 also provided NI engineers with the IT self-help capabilities that kept them productive, satisfied, and able to bring products to market more quickly.

* **Faster software updates.** By using DirectAccess, NI machines at branch offices can be updated any time that an Internet connection is available, without IT support. Seamless network access means that NI engineers do not have to connect to a VPN and manually apply patches, saving 10 minutes per week per user.
* **Faster self-help for IT problems.** Action Center lists important messages about security and maintenance settings that require user attention. By enabling NI engineers to prioritize and respond to important messages before problems arose, Windows 7 Action Center enabled users to reduce time spent performing self-help IT tasks by 10%.
* **Less time waiting for downloads.** BranchCache in the Windows 7 and Windows Server® 2008 R2 operating systems is expected to increase user productivity when downloading files to remote offices, by giving users in those offices the ability to use file copies already downloaded to the local area network. By reducing the time NI engineers spent waiting to download files to branch offices, BranchCache will enable users to save up to 50 minutes per user per week.

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| **Annual IT Cost Savings** | |
| **Task** | **Savings**  ($/PC/year) |
| Desktop engineering | 60 |
| Help desk services | 13 |
| **Total IT Labor Savings** | **73** |
| Network connectivity | 7 |
| PC power savings | 1 |
| **Total other IT costs** | 8 |
| **Total IT Cost Savings** | **$81** |

**NI Customers Step Up to Use Windows 7 in Their Products**

NI engineers and corporate IT staff have already started to reap the benefits of Windows 7 capabilities. Now, as more NI customers are learning about these capabilities, they are considering migrating to Windows 7-based versions of NI products.

In an online review of Windows 7, Elijah Kerry writes, “Instead of adding significantly new or different functionality in Windows, Microsoft improved many features introduced in Windows Vista®, refined the usability of the shell, and increased system responsiveness and performance. These changes, combined with a focus on hardware and software compatibility, make Windows 7 a strong candidate for the latest test and measurement applications.”[[3]](#footnote-3)

In benchmark comparisons with Windows XP, Windows 7 performance shows that:

* File writes were 15% faster than Windows XP, enabled by improved prefetching logic.
* Multi-threading performance was 21% faster than Windows XP, enabled by better system performance, resource utilization, and refactoring locks to improve scalability.
* Startups were 36% faster, and shutdowns were 48% faster than Windows XP, enabled by system services that start when needed; fewer demands on the CPU, disk, and memory; and more efficient use of drivers.
* Windows 7 provided 10% improvement in overall bandwidth utilization and 20% improvement in performance, compared with Windows XP during high-speed or multifunction I/O. These capabilities are enabled by the ability to take advantage of the latest bus technologies, including multiple PCI Express and high-speed USB slots.

**Two Approaches to Deployment**

NI plans a structured 2-year rollout for the Manufacturing division PCs. The rest of the company will upgrade to Windows 7 by request of sales or design engineers. Adoption of Windows 7 in the high-tech parts of the business has been very rapid because engineers were aware of Windows 7 performance benefits. So, most PCs in these areas are likely to have migrated to Windows 7 by the end of Year 3.

Rachel Garcia, Senior Product Marketing Manager at NI, commented, “We were blown away by the response of our customers wanting to know more about creating better, faster measurement applications with Windows 7. The traffic to NI benchmarks on increased data throughput, improved performance, and technology adoption of 64-bit, USB data acquisition (DAQ), and PCI Express was beyond our expectations."

Benefits

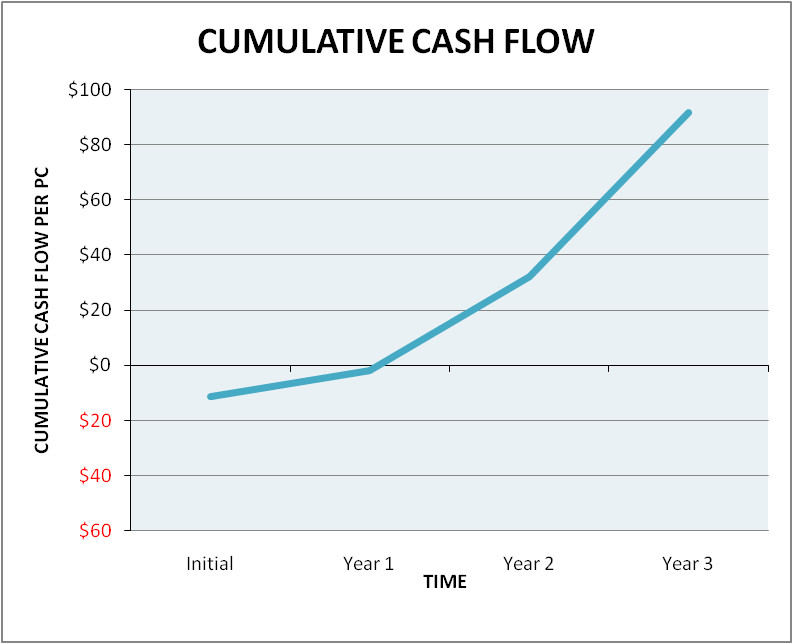
“We were blown away by the response of our customers wanting to know more about creating better, faster measurement applications with Windows 7.”

Rachel Garcia

Senior Product Marketing Manager

National Instruments

Making Windows 7 the foundation of the NI desktop environment will enable company engineers and IT professionals to maximize PC and custom application performance, improve user productivity, and reduce the costs of IT labor, PC power, and network operation.

A business value analysis showed that for IT labor and PC power-related benefits only, migrating to a Windows 7-based desktop environment is expected to help NI achieve:

* A 3-year net present value of $70 per PC.
* Return on Investment (ROI) of 242%.
* An internal rate of return (IRR) of 167%.
* Payback within 13 months.[[4]](#footnote-4)

The cumulative cash flow chart shows the expected break-even point for the 3-year Windows 7 deployment project.

**NI Saves $73 per PC in Annual IT Labor Costs**

By enabling IT staff and engineer support technicians to perform desktop engineering, help desk, and desktop support tasks more quickly and reducing network and PC power costs, Windows 7 enabled NI to save $73 in annual IT labor costs per PC.

The annual IT cost savings table lists the value of annual IT labor and other direct cost savings for the 3-year Windows 7 upgrade project.

* **More cost-effective desktop engineering.** The Windows 7 ability to centralize and expedite re-imaging tasks enabled NI to save $59 per PC in annual deployment costs.

The ability to avoid time-consuming updates of local language UI imagesone at a time enabled NI to reduce annual desktop engineering costs by $1 per PC.

* **Lower-cost help desk service.** Faster responses to desktop and network problems as well as faster file search and restore capabilities enabled NI to reduce annual, per-PC help desk costs by $13.

**NI Saves Significant Non-Labor Costs**

Windows 7 solution also provided NI with non-labor IT cost savings worth $8 per PC annually as well as one-time hardware savings.

* **Lower PC power costs.** By using Windows 7 capabilities that manage PC power consumption and assign power management to specific groups of users, NI expects to save $1 per PC in annual power costs.
* **Hardware refresh cost savings.** Because Windows 7 uses system resources more efficiently, National Instruments has been able to extend the company’s 3-year refresh cycle by 6 months, resulting in a one-time, 17% savings of PC hardware refresh costs valued at $205 per PC.
* **Lower network connectivity costs.** The ability for users to access network resources without a VPN and for NI to reduce network bandwidth will enable the company to save $7 per PC in annual connectivity costs.

**NI Employees Spend 19 Fewer Hours per Year in Self-Support Tasks**

Faster software updates, improved response to desktop problems, and less time spent waiting for downloads to branch offices enabled NI employees to spend an average of 19 fewer hours per year in self-support tasks.

Summary

The business value analysis demonstrates that Windows 7 provides great benefit for NI and its customers.

Jay Garing Global IT Manager for National Instruments notes, “Windows 7 delivers benefits not only for National Instruments as a company, but for the companies that use our products. We want to get Windows 7 out to our engineers as quickly as possible, so that they can use it and communicate its benefits to our customers. Windows 7 capabilities such as 64-bit, multi-core functionality and data acquisition are great for our products, and for our customers, too. We expect that Windows 7 will give our customers the same benefits of improved hardware performance, more efficient test and measurement operations, and increased user productivity that it provided us.”

Windows 7

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For more information about National Instruments products and services, call (503) 241-7431 or visit the Web site at: www.ni.com.

Works the way you want: Windows 7 will help your organization use information technology to gain a competitive advantage in today’s new world of work. Your people will be able to be more productive anywhere. You will be able to support your mobile workforce with better access to shared data and collaboration tools. And your IT staff will have better tools and technologies for enhanced corporate IT security and data protection, and more efficient deployment and management.

For more information about Windows 7, go to [www.mirosoft.com/windows/windows-7](http://www.mirosoft.com/windows/windows-7).

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| Software and Services   * Microsoft® Windows® 7 desktop operating system * Group Policy * Windows Server 2008 * System Center Configuration Manager * Windows 7 tools and technologies * DirectAccess™ * Dynamic Driver Positioning | * Deployment Image Servicing and Management * Hard Link Migration store * Windows Multi-Language UI * Windows 7 Backup and Restore Center * Windows 7 Action Center |

1. To read the article, go to: http://www.techonline.com/showArticle.jhtml?articleID=221800207&queryText=national+ instruments [↑](#footnote-ref-1)
2. To read the article, go to: <http://zone.ni.com/devzone/cda/tut/p/id/8546> [↑](#footnote-ref-2)
3. http://www.ni.com/windows7 [↑](#footnote-ref-3)
4. NI also achieved other benefits, which were omitted for the business value analysis. [↑](#footnote-ref-4)