Microsoft



# The Windows<sup>®</sup> Powered Enterprise

Pervasive computing for the Agile Business

White Paper

#### Abstract

This white paper discusses Microsoft's strategy around smart Windows Powered devices, based on the Microsoft Windows Embedded family of operating systems, and how these devices create new opportunities for enterprises to empower employees, connect to customers and integrate with partners and suppliers.

This white paper is written for those business decision makers and IT professionals who are evaluating the deployment of smart devices such as PDAs, thin clients, server appliances, POS stations, and smart phones, to extend enterprise's IT environments.

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#### Introduction

When Bill Gates and Paul Allen founded Microsoft Corp. in 1975, they had a simple but powerful vision for the new company: a PC on every desk and in every home. In 1999, Bill redefined Microsoft's vision as empowering people through great software — any time, any place *and on any device*. More than simply the evolution of one company's vision for its business, this statement reflects fundamental changes that are creating new challenges — and opportunities — for the entire technology industry as we enter the 21st Century.

Microsoft has been making significant investments in devices for many years. Microsoft operating system products such as MS-DOS, Windows 95/98, Windows NT, and Windows CE has been in deployment in a wide variety of devices including gaming devices, automatic teller machines ("ATMs"), Retail Point of Sales, and networking equipment. Building further on these efforts, Microsoft created the Embedded and Appliance Platforms Group (EAPG) to focus providing the software building blocks to create next generation of embedded devices.

The Microsoft® Windows® Embedded family of platforms, Windows CE and Windows XP Embedded, provide the foundation for Windows Powered devices. These platforms speed time to market by enabling OEMs to pick and chose different components of the operating system, such as the Internet Explorer browser software, Remote Desktop Protocol, 802.11 wireless support or HTTP Server - to build a targeted and differentiated Windows Powered devices such as thin clients, PDAs, cellular phones, data collection scanners, retail point of sale (POS) stations, web server and storage appliances, advanced set-top boxes and many other smart devices.

In addition, Microsoft is investing in the Server Appliance Kit, which enables OEMs to build robust dedicated functionality appliances for tasks such as web serving or network-attached storage, based on the Windows 2000 platform.

Not only is Microsoft providing the software building blocks to enable our partners, but we as a company are striving to jump-start the marketplace by evangelizing some specific Windows Powered device classes including Pocket PC, "Stinger" (code name for Microsoft's smart phone platform), Car.Net, Microsoft TV, and Ultimate TV® service set top box.

So the result of this is that you can go forward and investigate extending your enterprise with Windows Powered devices with confidence that Microsoft's mission, strategy and technology investments are aligned with your needs.

In this white paper, you will find information relating to Microsoft's strategy around Windows Powered devices, and how these devices create new opportunities for enterprises to empower their employees, connect to their customers and integrate with their partners and suppliers.

# Explosive growth potential for smart devices

The Windows platform enables business computing in enterprises everywhere. For millions of users, the Windows platform has represented the empowerment of employees. Today, in the PC Plus era, the Windows platform goes even further to enable enterprises to extend their IT infrastructure to enable connectivity to customers, better integration with partners and suppliers and end-to-end business solutions.

This shift is being accompanied by an ever-increasing variety of Windows Powered devices:



Figure 1: Sample Windows Powered enterprise devices

Industry analysts are bullish on the growth potential for smart devices:

- Next year, it is forecasted that more than 1 billion phones and nearly 100 million personal digital assistants (PDAs) will be in users' hands. By 2003, more users will be able to connect to the Internet through cell phones than through personal computers.
- In 2000, 57% of US households had PCs, 77.4 million people owned cell phones and nearly 40% of the US population was Internet users.
- Dataquest expects the market for server appliances (dedicated, fixedfunction servers such as web servers and network-attached storage) to grow at 100% CAGR to \$6.3 Billion by 2003.

- According to IDC<sup>1</sup>, the smart handheld device (includes handheld companions, smart phones and vertical application devices) market is expected to triple worldwide from 20M units in 2001 to over 60M units in 2004
- According to IDC<sup>2</sup>, the enterprise thin client market is forecast to be a \$3.2B market with 8.7M shipments worldwide by 2005.
- Each year, more than 2.8 million POS terminals are sold worldwide.

#### Smart devices will transform the way you do business

In addition to the business pressures most businesses are currently facing – time to market acceleration, mergers and acquisitions, increased utilization of outsourcing and partnering, the move towards 24x7 and global businesses – the technology environment in which businesses operate is also undergoing some fundamental transformations.

Ongoing improvements in computing power and connectivity and the proliferation of Internet standards and smart devices will challenge the underlying IT environments of every business. We see four basic undercurrents to this wave of change:

- Moore's Law shows no sign of slowing. We should see continuing exponential improvement in terms of computing power – processor, storage, server capability – over the next decade.
- An amazing variety of device designs. New device designs appear regularly, far beyond the scope of the original palm-sized organizer, which combine in novel ways technologies such as high resolution LCD displays, built-in camera and cell-phone capabilities.
- Ubiquitous connectivity. The ubiquity of the Internet and the onset of wired and wireless standards create amazing opportunities to connect directly with your customers and partners.
- Transition from locally hosted applications to Web-based services. The transition of applications to a Web-based service model is driving the adoption of a computing model with inter-service communications based on Internet standards such as SOAP and XML.

It becomes increasingly important for devices on the edge of the network to have the required intelligence to take advantage of and participate in this distributed infrastructure.

<sup>&</sup>lt;sup>1</sup> IDC, "The Battle at Hand, Smart Handheld Devices Market and Forecast and Analysis

<sup>&</sup>lt;sup>2</sup> IDC, "Thin Is In, Again: Enterprise Thin Client Forecast and Analysis, 2000-2005



Figure 2: The move to distributed computing

Enter Microsoft .NET and the concept of Web services. The Web services model is an Internet-based approach, leveraging the broadest reach and the least expensive communication infrastructure in the world. It uses standard Internet protocols, starting with TCP and UDP to establish connections, HTTP and other protocols to transport data, and XML to describe data.

Web services can be considered the building blocks of the next generation Web sites. Whereas users today can access tens of millions of Web sites from their browsers, it is still difficult to get any of those sites to interoperate. Web sites are generally static and interactions are user driven. In contrast, a Web service is dynamic and programmable, meaning applications and devices can interact directly with one another.

By using these and other open protocols, Microsoft .NET ensures that global investments in the Internet communication fabric are working for you. No longer must you rely on proprietary communications intertwined with a complex integration methodology.

# Smart Devices in the Enterprise

#### Smart device requirements

The potential for enterprise transformation by devices is clear, but how do you prepare for it? It will be important to establish some fundamental requirements. Microsoft sees three basic requirements that are present in successful device designs:

- A robust platform for rich applications and services
- Internet smart and personalized
- Integration with Enterprise IT investments

Successful smart device designs are built around a supportive ecosystem that includes a robust OS and end-to-end development tools that span device creation to the development of rich applications and services. Device manufacturers need to be able to bring a device to market rapidly and at low cost by being able to leverage the wealth of pre-configured reference designs and prototype available for devices today.

Devices need to be smart about "me", in terms of storing or enabling access to personal preferences and data, such as schedule, mail and contacts, and deliver personalized experiences. Devices should also be smart in terms of announcing themselves to other devices across a network. Can they discover other services on the network or solution? Are they able to announce what services they can export? Also, given the variety of networking options that will be available to mobile devices specifically, they will need to be able to move seamlessly from a corporate broadband environment to a narrowband public network and back again.

Acceptance of devices will be dependent on their ability to extend enterprise IT infrastructure investments such as messaging and database systems, and this will be all about support for Internet standards as well as interoperability with existing IT infrastructure. Security for corporate data is critical, especially if devices will be deployed to access Line of Business applications.

## **How Windows Enables Smart Devices**

The capabilities of the underlying Windows Embedded family of operating systems, the Microsoft developer toolset and the capabilities of the actual end devices combine to provide a compelling solution that meets all the requirements for smart devices in the enterprise.

## "Talisker"

"Talisker" is the current code name for the next version of the Windows® CE operating system (OS). It is a robust real-time operating system for rapidly building the next generation of smart mobile devices.



"Talisker" contains everything you need to create custom Windows CE-based devices incluiding Platform Builder, a set of embedded development tools, an integrated development environment (IDE), and a SDK export tool. "Talisker" also provides support for Microsoft run-time libraries, sample code and Embedded Visual C++® development system, as well as Visual Studio .Net, which provides a complete development environment for building XML Web services and applications on the Microsoft .NET Framework.

With this end-to-end toolset, you can rapidly build smart designs that enable rich personalized experiences running rich applications on a broad range of hardware.

#### Windows XP Embedded

Windows XP is the next version of Windows after Microsoft Windows 2000 and Microsoft Windows Millennium Edition. Microsoft Windows XP Embedded is a binary-compatible, fully-componentized Windows XP OS that is designed for the embedded market.

With the Windows XP Embedded tools, you can develop a custom embedded Windows XP OS run-time image that perfectly suits the needs of your device.

For example, you may be developing a kiosk device. Your kiosk may require a touch screen monitor, serial port, CD-ROM, and modem, but may not require certain networking options, or special power options, such as Advanced Configuration and Power Interface (ACPI). You would use the Target Designer tool in Windows XP Embedded to add only the required Windows XP components to create the OS image for your device.

#### Windows 2000 with the Server Appliance Kit

The Server Appliance Kit (SA Kit) is a toolset for an OEM to use to create server appliances such as Web and Network-attached Storage (NAS) servers based on Windows 2000. The SA Kit is used to lock down Windows 2000 and provides a simple, basic and extensible Web-based UI for headless setup and management of the appliance by the end-customer.

OEMs using Windows 2000 with the Server Appliance Kit are able to take advantage of the industry-leading performance and scalability of Windows 2000 as well as the high availability and data protection it provides, while delivering the functionality in an easy to use appliance form factor.

#### Windows Powered Devices and Microsoft .NET

Both Windows CE and Windows XP Embedded incorporate development tools, Platform Builder and Target Designer, respectively, that help OEMs to rapidly prototype new devices and to get them into production. Microsoft Visual Studic® .NET is a comprehensive development tool for delivering rich applications on these devices.

While Microsoft adds significant value to the core operating system by packaging together the applications and services needed for specific devices such as Pocket PCs, the Platform Builder and Target Designer tools can be used by any organization to create highly customized devices as well.

Microsoft Windows Embedded family of operating systems are designed to work together seamlessly in a Microsoft .NET environment. Moving into the Internet-connected future, enterprises, their customers and partners will also find significant benefits from the technologies behind Microsoft's .NET initiative. The Microsoft codename "Hailstorm" services, such as authentication, authorization, and "MyWallet" services, are designed to help solve common problems facing consumer commerce in a dynamically interconnected world.

Enterprises have an increasing need for devices that integrate well across the entire enterprise and connect to Windows-based desktops and servers. Microsoft is unique in its ability to deliver information technologies that scale across a wide range of devices connected via intranets and the Internet.

#### Choosing the Right Windows Embedded OS for your Devices

Windows CE and Windows XP Embedded enable many device categories, and although there are devices that could be built effectively with Windows CE and Windows XP Embedded, each OS has its areas of best applicability.

Windows CE has the following development focus:

- Mobile and personal devices with small footprint
- Real-time and power management
- Support for multiple processor architectures

Examples of devices that are ideal for implementation with Windows CE include PDAs, smart phones, Web pads and other footprint and power-constrained devices.

Windows XP Embedded has the following development focus:

- · Componentizing all the latest and richest Windows technologies
- X86 processor architecture

Examples of devices that are ideal for implementation with Windows XP Embedded include enterprise thin clients, full fledged retail/POS workstations, and advanced digital set top boxes.

# The Windows Powered Enterprise

# Success Factors for Today's Enterprise

Today's (and tomorrow's) successful enterprises are focusing on:

- Empowered employees: Increasing employee efficiency and access to information and applications.
- Connected customers: Directly targeting and selling to their customers.
- Integrated business partners: Increasing the efficiency of their supply chain.

Businesses can drive towards these success factors by extending their enterprise IT investments with smart, Windows Powered devices.

This concept of driving pervasive, edge of the network computing throughout the enterprise is key to creating a more agile business. Why are businesses extending their IT environments now?

- To enhance employee productivity
- To accelerate supply chain effectiveness
- To gain operational efficiencies
- To provide point -of-activity computing
- Lower total cost of ownership for network infrastructure



Figure 3: The Changing Enterprise

# Putting it all together

A complete end-to-end solution that incorporates Windows Powered devices into a Microsoft .NET environment will include some or all of the following components:

- Server hardware and network infrastructure.
- Microsoft Windows 2000 Servers and Microsoft .Net Enterprise servers such as Microsoft SQL Server™ 2000 or Microsoft Exchange Server 2000.
- SQL Server 2000 Windows CE Edition, which integrates with Windows CE with Platform Builder. Embedded device manufacturers and developers can easily build SQL Server CE components as part of a customized Windows CE operating system image, embedded into the device.
- Line of Business (LOB) and/or productivity applications such as Microsoft Office XP or Microsoft Great Plains Business Solutions.



Figure 4: Typical Windows Powered Solution Architecture

To assist customers in making the transition to a Windows Powered Enterprise, Microsoft is partnering with a variety of OEMs and Systems Integrators that can provide off the shelf as well as customized Windows Powered solutions for a variety of industries, including manufacturing, healthcare, hospitality, retail, education, financial services, government and more.

## **Success Stories**



# Customer Success Story: Cookie Crumbles on Old Handheld System at Nabisco



One company, Nabisco, is already baking SQL Server 2000 Windows CE Edition into its handheld device approach. The producer of popular snacks such as Oreo and Chips Ahoy cookies, Nabisco uses handheld computers in its fleet of vehicles that distributes products directly to local supermarkets.

Nabisco recently decided to upgrade its old, DOS-based handheld system, converting to the Pocket PC platform, which is based on Windows CE 3.0, running SQL Server 2000 Windows CE Edition.

Each day at the company's distribution center, the handheld devices communicate to back-end systems, sending information about completed orders and receiving new updates. Remote Data Access (RDA) and merge replication capabilities allow data to be downloaded, updated, and synchronized from back-end SQL Server databases.

Both approaches work over Hypertext Transfer Protocol (HTTP) and support encryption, to ensure that data from enterprise SQL Server databases is reliably delivered, and that the data can be manipulated offline and synchronized later to the server.

Nabisco expects that the combination of Pocket PC and SQL Server 2000 Windows CE Edition will make delivery drivers more productive, in part by helping them save time during the transmission process at the distribution center.

"We researched alternatives and selected Microsoft SQL Server 2000 Windows CE Edition because of the integration of mobile database technology with existing enterprise database investments," says Herb Brian Smith, Nabisco's Lead Technology Advisor.

# Customer Success Story: "Line Busting" at Vail Resorts



Vail Resorts needed to improve its revenue-collection procedures at the most important point of sale - on the slopes.

Vail deployed a ruggedized wireless Windows Powered handheld scanner from Symbol Technologies (the PDT 7420) to accurately record lift ticket information and to provide a better means of renewing lift tickets on site. A custom application for the solution was written in-house.

Vail reduced lift ticket "leakage" by 55% and estimated that the solution saved them over \$150,000 annually. In addition, the solution is enabling Vail to improve their business intelligence through integration with Microsoft SQL Server 7.0 data capture.

"The customer response has been amazing. Instead of complaints, we're getting calls every week from happy customers who can get their tickets renewed in a matter of moments – right at the chair lift – there's no more waiting, they get more skiing in, and they have a better recreational experience," said Casey Parliament, Business Analyst, Vail Resorts, Inc.

# Customer Success Story: Sentillion, Inc. simplifies caregivers' use of computerized patient information

# Sentillion

Sentillion, Inc. is a leader in providing IT infrastructure for hospitals, health care systems and other healthcare-related institutions. Sentillion has pioneered a breakthrough approach to the integration of the numerous specialized applications developed by multiple vendors to meet various clinical, departmental and enterprise needs, the Vergence® Context Management Solution.

Vergence synchronizes applications in accordance with the Health Level Seven (HL7) CCOW Standard for Context Management. In order for applications to share context at the clinical desktop, they must comply with this industry-wide IT standard. To date, many of the industry's leading application vendors are shipping CCOW-compliance applications.

Sentillion ships Dell PowerApp.web 120 Windows Powered web server appliances, hosting the Vergence software, in sets of two for fault tolerance and network load balancing.

According to Robert Seliger, president and CEO of Sentillion, "The health care environment is as mission critical as it gets. Our technology is quickly becoming part of the fabric of how health care information is delivered," he adds. "Our use of the Dell PowerApp.web platform in conjunction with Microsoft Windows Powered platforms is a very exciting, real-world example of how an IT service and play a critical role in patient care."

# Customer Success Story: FedEx rapidly deploys mission critical applications using Windows Powered thin clients



FedEx is the world's largest global express distribution company. Each business day, it handles approximately 58 million electronic transmissions that support the reliable distribution of nearly 3 million packages worldwide.

FedEx has long been known for using advanced technology to support its global customer base. However, a mainframe computing environment and textbased 3270 terminals couldn't support new and innovative approaches to mission-critical solutions.

Windows Powered thin clients from Wyse Technology were the solution for FedEx because they provided fast access to and rapid deployment of the company's applications while at the same time supporting a viable desktop management strategy.

FedEx began its successful installation by upgrading to a high-speed frame relay network. It then set up centralized data centers that house clusters of Windows 2000 Terminal Servers that provide fast access to Windows-based applications.

FedEx has deployed over 15,000 Windows Powered thin clients and plans to continue to expand the rollout.

# For More Information

For the latest information on the Windows Embedded family of operating systems, including Windows CE and Windows XP Embedded, visit: <a href="http://www.microsoft.com/windows/embedded/">http://www.microsoft.com/windows/embedded/</a>

For information about Microsoft Windows Embedded Partners, visit: <u>http://www.mswep.com</u>

For information about Microsoft Windows .NET Enterprise Servers, visit: <a href="http://www.microsoft.com/Servers/">http://www.microsoft.com/Servers/</a>

For information about Microsoft Windows 2000 and Windows .NET Servers, visit: <u>http://www.microsoft.com/windows2000/default.asp</u>

For information about Windows Powered mobile devices, including Pocket PC and "Stinger" (code name for Microsoft's smart phone platform), visit: <u>http://www.microsoft.com/mobile/</u>

For information about Microsoft Windows Powered server appliances, including Web Servers and Network-attached Storage and the Server Appliance Kit, visit: <a href="http://www.microsoft.com/windows/serverappliance/">http://www.microsoft.com/windows/serverappliance/</a>

http://www.microsoft.com/windows/embedded/sak/

For information about Microsoft SQL Server 2000 Windows CE edition, visit: <u>http://www.microsoft.com/sql/evaluation/overview/CE/default.asp</u>