

Transitioning from DOS to Windows[®] in Mobile Data Collection Terminals



Introduction

With many mobile data collection applications still running “green screen” terminal emulation, IT professionals may question the need to move to Windows-based data collection terminals.

This paper examines the advantages of Windows-based mobile data collection and discusses some of the issues involved in transitioning from DOS to Windows.

Background

Mobile data collection has historically been an extension of desktop applications. Since most manufacturing, warehousing and logistics programs were originally designed for “green screen” desktops, many of which were running terminal emulation, it was logical for mobile data collection devices to do so as well.

However, today’s data collection and management processes have become much more complex. The need for more information to be gathered and used in more places requires new thinking and new capabilities.

New generation software applications provide managers with far greater functionality and flexibility than ever before. Extending this functionality to mobile employees and managers is a challenge IT and Operations professionals have to address.

Today’s host system hardware and software provide greater flexibility and capabilities in the design and deployment of applications. The advent of client-server, thin-client and browser-based applications offers IT professionals the ability to update data collection and management routines on all networked desktop and mobile terminals instantly and automatically. DOS-based data collection systems, however, cannot take advantage of these software advances.

While virtually all front office desktop applications have now upgraded from DOS to Windows-based PCs, many companies have not upgraded mobile terminals to Windows.

One factor that is often overlooked when planning new purchases is that, while it is generally accepted in today’s IT environment that laptop computers and desktop units will be obsolete in three to four years, investments in mobile data collection devices tend to offer far greater returns.

Companies may have held off on upgrading mobile terminals because they have no immediate plans to upgrade software applications. However, because mobile data collection terminals usually remain in use for many more years than the average desktop or notebook computer, there is no guarantee that current, near term data collection plans will accurately forecast the demands that will be placed on mobile data collection terminals in the future. Therefore, even if there are no immediate plans to upgrade host systems software, the deployment of Windows-based mobile data collection terminals today is a way to “future proof” mobile data collection and provide a clear pathway to virtually any future application development.

Windows Benefits

From a purely practical perspective, new software applications will require the functionality offered by Windows. Applications are being written to take advantage of, and therefore require, the increased processing power and capabilities available in both desktop and mobile devices. Many of the ERP and WMS applications that have traditionally been simple “green screen” displays now use colors and fonts to provide more intuitive and appealing user interfaces.

The graphical user interface (GUI) of these programs makes it easier for workers to navigate and use more complex data collection routines. The use of different colors, fonts, symbols, graphics, backgrounds and even pictures can shorten learning curves and can provide strong visual cues to alert employees to special circumstances and prompt appropriate action.

On a day-to-day basis, graphical screens provide better ergonomics since workers may not actually have to read what’s on a screen in order to perform a function. When reading is required, prompts or other directions can be easily displayed in large, legible, color-coded characters.

Windows also has enhanced support for touch screens, speech recognition, voice-over-IP (VoIP) and networking options to facilitate job functions.

As data collection technology moves forward, new hardware offerings are almost entirely focused towards Windows support. Radio Frequency Identification (RFID) systems, wireless local area networks (WLANs), bar code scanners, imagers and printers all have Windows drivers or setup procedures. Many of these products do not offer DOS drivers because they require capabilities unavailable in DOS.

For wireless applications, Windows also offers more security features than DOS-based systems. Windows can support WPA, VPN, PEAP and whatever additional security protocols are developed in the next few years.

In the real world, however, IT professionals realize that newer software packages often need to coexist with legacy systems that retain the simple “green screen” displays. Windows, because of its ability to run multiple applications, can run both graphical and “green screen” emulation applications without rebooting.

There are two final benefits that can be significant factors in deploying new data collection routines or complying with the demands of other departments for increased functionality.

Because Windows allows IT professionals to take advantage of platform-independent programming tools such as .NET[®], Java[®], XML and other browser-based solutions, they are better equipped to write one program that will run on desktops as well as mobile terminals.

In addition to the wide range of development tools available for Windows-based applications, there is more available programming expertise in Windows-based applications, particularly among new hires, than there is for any other platform.

Windows Considerations

In general, IT professionals are already well aware of how to deploy applications on Windows desktops. There are however, some differences between desktop (Windows 2000 Professional and Windows XP) and handheld (Windows CE / Pocket PC) versions.

There is some confusion about the difference between these versions of Windows.

Newer mobile data collection terminals, such as those used in lift trucks, typically run full versions of Windows. These terminals have the same Pentium-class processors and memory as many desktop computers and can, therefore, run the same applications.

Handheld industrial data collection terminals – with less than full size screen displays – run smaller, cooler processors to conserve battery life and therefore typically run some version of Windows CE.

Handheld devices such as PDAs also have even less processing power and memory and require smaller operating systems. While some of these devices will run Windows CE, others will run Pocket PC. Pocket PC is a specific version of Windows CE designed for devices that conform to a fairly rigid set of specifications developed by Microsoft. For example, Pocket PC is intended for devices with one-quarter (portrait) size screen displays.

It is important to note that current versions of Windows CE and Pocket PC do not offer the same level of browser support as the desktop versions of Windows. It is anticipated that Pocket PC/ Windows Mobile™ 2003 will address many of these differences.

Developing Windows Applications

While many programs can be ported directly to Windows mobile data collection terminals, or come with development toolkits for this purpose, it is likely that many new applications will be developed to take advantage of Windows functionality.

Developers are advised to avoid some of the more advanced browser features if they are developing applications intended for use on the full range of Windows devices.

Again, because there will be differences in browser support among devices and operating systems, developers should be careful to test their applications to avoid invoking features that are not supported on all devices.

Traditional “green screen” applications can be supported by Windows based emulation software such as LXE’s RFTerm™. Newer graphics based applications can be supported by Windows Terminal Services, Citrix or HTML (browser) clients. These options preserve the device-independence that will be a desirable feature in future system development.

As the enterprise data collection and management function moves outside the four walls and into both supplier and customer databases, web portals that are built on these tools will become an essential component of day-to-day operations. Mobile terminals that cannot access these portals will prove to be a hindrance to operations. Many of these portals do have interfaces based on HTML browsers.

Developing new data collection applications for Windows-based systems is simplified with the use of development tools available from Microsoft and other sources. For example, the Microsoft .NET framework, like Java, is designed to facilitate the development of a wide range of platform-independent applications.

XML, DHTML and SQL provide a tremendous amount of flexibility in developing and, more importantly, maintaining data collection and data management applications in browser-based applications. Visual Basic, Visual C++, Microsoft Visual J#, Microsoft Visual C#, Microsoft ASP.NET and Microsoft Visual Studio Enterprise are other familiar tools available to developers.

While most new applications can be developed in a relatively straightforward manner, applications designed to run on Pocket PC require some additional planning. Developers need to accommodate the quarter-screen display of PDAs and similar devices when designing screens or pages. For optimal performance, text, graphics, menus and other elements of a particular function should fit within the horizontal display space available.

Deploying Windows Applications

One common question about deploying Windows in a WLAN environment is the amount of bandwidth required.

The answer depends somewhat on the design of the program. Many application programs will be designed to take advantage of the display features already enabled in Windows or browser software. In these applications, where text or data make up the majority of the data exchange, most screens can be painted with very little additional bandwidth requirements. Additional graphics would take some bandwidth the first time they are accessed (as with any browser) but could be cached for subsequent uses. In environments running 802.11b WLANs, the deployment of properly designed Windows-based applications should have little or no effect on response time or loading. Real-time graphics will require additional bandwidth but data compression techniques and variable refresh rates can help minimize this.

The other common question is whether Windows deployment will cause disruption of the workflow.

Unlike many other types of software upgrades, Windows can be rolled out in easy increments. There is no requirement for a hard “switch date.” Windows running Windows Terminal Services client software can be deployed with no apparent difference to the employee. Then, as applications are developed and employees are familiarized with it, it can be enabled on an employee-by-employee basis. For example, if a “green screen” application is to get a GUI, it can be accessed either as “green screen” or GUI depending on the employee’s login until such time as all employees are familiarized with it. The familiarization process itself, however, should be relatively painless since more and more employees have home computers and are comfortable with a GUI.

Implementing Windows

Transitioning from DOS to Windows does not require the depth of paradigm shifts nor does it necessarily require the level of forward-looking planning that many other upgrades require.

Whereas the development of a clear migration path is desirable for most types of upgrades in order to determine functional requirements, integration issues, inter-departmental requirements, and future needs, Windows deployment does not require these because Windows mobile data communications terminals are capable of handling both traditional and future software and application requirements.

Thus, there is no specific need to determine if or when a certain feature will need to be implemented. Major training schedules do not have to be established. And there is no white-knuckle “hard switch” date.

In fact, some facilities that have upgraded to Windows have done so more to provide “insurance” against future needs rather than in response to current or planned requirements.

Many Windows terminals continue to run “green screen” applications because host software has not yet been transitioned to newer interfaces. Deploying Windows in advance of any host system changes, however, means that when host applications are upgraded, upgrades to mobile data collection terminals will not require significant effort.

What LXE Offers

Founded in 1970, LXE was the first company to provide wireless data products supporting logistics and material handling applications, and as such, was the first to take wireless data collection into the warehouse. LXE has installed wireless logistics systems in thousands of locations around the world.

With corporate headquarters in Atlanta, Georgia and international headquarters in Mechelen, Belgium, LXE has sales and service subsidiaries in eight countries and international distributors in more than 140 countries worldwide.

LXE has embraced non-proprietary standards in hardware design and communications protocols in order to provide customers with an improved return on investment – now and for years to come.

LXE has earned a reputation for manufacturing rugged, reliable products that are easy to use. Of equal importance is LXE’s award-winning service and support. Above all, LXE gives its customers the peace of mind that comes from partnering with an industry-leading, financially stable company with over 30 years of experience in mobile and wireless data collections equipment.