Introduction

Welcome to the Windows Embedded Standard 7 Exam Preparation Kit (Prep Kit). If you're a developer planning to take the certification exam (number 70-582 in the Microsoft Certified Technology Specialist program), you'll want to pass, and pass well, the first time—which this guide helps you to do. Whatever your current level of product knowledge or understanding of the concepts, prepare to see it increase. If you feel confident and just want a review, you'll get a thorough one. If you think your knowledge could use enhancement, you'll find what you need. To build self-confidence, the book first identifies areas that require strengthening, then addresses them—not merely by conveying necessary information, but with targeted lessons that provide relevant examples and practical exercises.

Audience

While the Exam Preparation Kit is intended for people who have the appropriate practical experience and expect to take the MCTS exam, others will find it valuable as well. It makes an excellent reference for developers in all stages of learning and at every level of expertise. In fact, those in other roles, such as sales or business development, can use the kit to their advantage, too.

For people planning to take the MCTS exam, what qualifies as appropriate practical experience? Well, at least one year of developing devices using Windows Embedded Standard 2009 (or earlier versions) makes a good start. And ideally, you'll already have been using Windows Embedded Standard 7 for at least six months.

You'll need a working knowledge of building and configuring a runtime operating-system image using Windows Embedded Studio tools. Along with that, you should have administered Windows systems, deployed them to a variety of hardware platforms, and done troubleshooting of device-driver installations.

Additionally, experience in the following areas is strongly recommended:

- Windows security
- Windows XP Embedded componentization
- Deployment options and methodologies

- Embedded Enabling Features (EEFs)
- The Image Build Wizard (IBW) and Image Configuration Editor (ICE)
- Servicing deployed systems

Using this Guide

Your best method for using this Prep Kit will depend on many factors—such as your level of experience—and your choice of method may change as you make your way through the content. You don't necessarily have to read every page in order to get the most out of your studies. To achieve your goals, you may find that studying the content according to the particular Examination Objectives covered works better. I would, however, recommend that those intending to take the exam carefully study the "Cross Reference" section at the beginning of each of the product related chapters and complete the work in the "Suggested Practical Exercises" sections.

To assist developers who want to focus on one or more aspects of the technology, a reference at the end of the text lists all lessons and practical exercises according to their related technology or task rather than their associated Examination Objectives.

Preparation Kit Structure

The Preparation Kit comprises an initial chapter containing product concepts, followed by six product related chapters. The selection and ordering of content for the six Product Chapters of this book stems from the defined Exam Objectives (which you'll find in the following list). This arrangement should help as you make your way through the text, since the order of the objectives themselves aligns with the procedures you follow to create and manage a Windows Embedded Standard operating system—analyzing the target hardware, creating a configuration, customizing and building the operating system, and deploying, servicing, and maintaining the OS.

Here are the defined Exam Objectives:

- Building a Base Image
  - Analyze the target environment.
  - Select a distribution share.
  - Select and configure packages.
  - Resolve dependencies.
  - Choose and prepare a boot medium.

- Customizing an Image
  - Customize the operating system.
  - Customize the user experience.
  - Configure Embedded Enabling Features (EEF).
  - Manage custom distribution shares.
  - Add third-party applications.
  - Add third-party drivers.
  - Configure security settings.
  - Add and configure support for remote administration.
- Preparing and Deploying an Image
  - Create a final image by performing an unattended install.
  - Reseal a final image.
  - Capture a final image.
  - Deploy a final image.
  - Configure infrastructure integration.
- Servicing an Image
  - Apply updates offline.
  - Apply updates online.
  - Create recovery media

Product Chapters

Each Product Chapter opens with a list of the Exam Objectives it will cover, as well as a "Before You Begin" section detailing what you need—the knowledge, experience, and system configuration—to successfully make your way through the content. Throughout the Product Chapters, you'll note references to the Exam Objectives, both within the text and in the Practical Exercises.

The beginning of each Product Chapter also contains a Cross Reference section that lets you easily find Exam Objectives, real-world examples, chapter lessons, and Practical Exercises that interrelate. The section also serves as a self-assessment guide for the chapter, by determining how well you can address each of the real-world examples provided.

Each Product Chapter concludes with Practical Exercises and a short summary of the chapter lessons, followed by a list of the key terms discussed and additional "Suggested Practical Exercises" that let you further assess your knowledge and level of competence.

Though Windows Embedded Standard 7 is much different from earlier versions, it employs concepts and technologies common to those used by its predecessors. Thus, where appropriate, these common aspects are noted for the benefit of developers experienced with the previous versions of Windows Embedded Standard.

Practical Exercises

Because the exam ultimately tests professional competence, the Practical Exercises are a focus of this Preparation Kit. As a result, the book takes great care to ensure that they not only support the related Examination Objectives, but also that they are well-tested and clearly documented.

Each Practical Exercise gives you the opportunity to evaluate your understanding of a concept or facility with a skill covered in the chapter lessons. The Exercises include step-by-step procedures, each of which is identified as a numeric item. To help you master the procedures, the companion material for this book includes worksheets with step-by-step instructions for each Exercise. The additional Suggested Practical Exercises provide an objective to accomplish and a brief description.

Note that to complete the Practical Exercises, you must have a development computer and target device that meets the specifications described in the following subsections that detail the hardware and software requirements for working through the exercises in this book.

Requirements

Hardware Needed for Practical Exercises

All components in your development computer must be on the Windows Vista or Windows 7 Hardware Compatibility List, as appropriate. At a minimum, the computer must have the following configuration:

- 1GHz, 32-bit x86 or 64-bit (x64) processor or better
- 1GB of RAM
- A 40GB hard drive with at least 10GB of available disk space for Windows Embedded Studio

- A DVD-ROM drive
- A Microsoft Mouse or compatible pointing device
- A System Page File set to twice the amount of system RAM or more (system-managed page file recommended)
- A VGA-compatible display

All components of your target device must be on the Windows Vista or Windows 7 Hardware Compatibility List, as appropriate. At a minimum, the computer must have the following configuration:

- 1GHz, 32-bit X86 or 64-bit X64 processor with 900 MHz speed or equivalent
- 512 MB of system memory (1GB recommended for X64)
- 1 GB free space on hard disk drive (HDD) or flash-based Solid State Drive (SSD) (4 GB recommended)
- For the Practical Exercises in this Preparation Kit bootable DVD-ROM drive
- BIOS Supporting Windows Preinstallation Environment (Windows PE) 3.0

Virtual Platforms

All Practical Exercises have been tested with Microsoft Virtual PC 2007, which meets the requirements for the target device provided above. In regards to the bootable DVD-ROM, Virtual PC supports booting from both a physical DVD and from an ISO disk image. Refer to the Virtual PC documentation for more information.

Software for Completing Course Procedures

The following software is required to complete the procedures in this course:

- Operating System: Microsoft Windows XP SP3, Windows Vista, or Windows 7
- Microsoft Virtual PC 2007 or later / Microsoft Virtual Server 2005
- Windows Embedded Standard 7 evaluation or licensed product

Conventions

Notational

- Characters or commands that you type appear in **bold lowercase** type.
- Angle brackets < > in syntax statements indicate placeholders for variable information. When typing the statement, substitute the required variable information for the placeholder text, but do not type the brackets themselves.
- *Italic* is used for book titles and Web addresses.
- Names of files and folders appear in Title Caps, except when you're supposed to type the names directly. Unless otherwise indicated, you can use all lowercase letters when you type a filename in a dialog box or at a command prompt.
- Filename extensions appear in all lowercase.
- Acronyms appear in ALL UPPERCASE.
- `Monospace` type represents code samples, examples of screen text, or entries that you might type at a command prompt or in initialization files.
- In syntax statements, square brackets [ ] designate that the enclosed items are optional. For example, [*filename*] in command syntax indicates that you can choose to type a filename with the command. Type only the information indicated within the brackets (such as the actual filename), not the brackets themselves.
- Braces { } are used in syntax statements to enclose required items. Type only the information indicated within the braces, not the braces themselves.

Keyboard

- A plus sign (+) between two key names means you must press those keys at the same time. For example, "Press ALT+TAB" means that you hold down ALT while you press TAB.
- A comma (,) between two or more key names means you must press each of the keys consecutively, not together. For example, "Press ALT, F, X" means that you press and release each key in sequence. "Press ALT+W, L" means that you first press ALT and W together, and then release them and press L.
- You can choose menu commands with the keyboard. Press the ALT key to activate the menu bar, and then sequentially press the keys that correspond to the highlighted or underlined letter of the menu name and the command name. For some commands, you can also press a key combination listed in the menu.

- You can select or clear check boxes or option buttons in dialog boxes with the keyboard. Press the ALT key, and then press the key that corresponds to the underlined letter of the option name. Alternatively, you can press TAB until the option is highlighted, and then press the spacebar to select or clear the check box or option button.
- You can cancel the display of a dialog box by pressing the ESC key.

Notes

Several types of Notes appear throughout the lessons.

- Notes marked **Tip** contain explanations of possible results or alternative methods.
- Notes marked **Important** contain information that is essential to completing a task.
- Notes marked **Note** contain supplemental information.
- Notes marked **Caution** contain warnings about possible loss of data.
- Notes marked **Exam Tip** contain helpful hints about exam specifics and objectives.
- Notes marked **Experienced** contain information in terms familiar to developers experienced with previous versions of Windows Embedded Standard and its predecessors.

About the Companion CD-ROM

The Companion CD contains a variety of informational aids you may use in conjunction with this book. These include worksheets with step-by-step instructions and files used in the practical exercises as well as complementary technical information and articles from Microsoft and third parties.

An electronic version of this book is included and it offers a variety of viewing options. You'll also find a complete set of post-press files that let you produce a self-paced study guide in book format. The files are in Portable Document Format (PDF) and have the crop marks required for professional printing and binding.

Microsoft Certified Professional Program

The Microsoft Certified Professional (MCP) program provides the best vehicle for proving your command of current Microsoft products and technologies. We develop the exams and corresponding certifications to validate your mastery of critical competencies as you design and develop as well as implement and support solutions using Microsoft products and technologies. Computer professionals who become Microsoft-certified are recognized as experts and are sought after throughout the industry. Certification brings a variety of benefits to individuals, employers, and organizations.

Technical Support

Every effort has been made to ensure the accuracy of this book and the contents of the companion CD. If you have comments, questions, or ideas regarding Windows Embedded Standard development, contact a technology specialist through Microsoft Product Support Services (PSS), the Microsoft Developer Network (MSDN), or the following sites:

- **Windows Embedded Standard on MSDN** Access resources and information, including product downloads, blogs and training at http://msdn.microsoft.com/en-us/windowsembedded/standard/default.aspx
- **Windows Embedded Standard Team Blog** Get background information about Windows Embedded Standard directly from the Microsoft developers at http://blogs.msdn.com/embedded/default.aspx
- **ROK Resources** Stay up-to-date with the ongoing training and learning developments from ROK at http://embedded.rok.com.au/learning.html