Trainer Preparation Guide for Course 10961B: Automating Administration with Windows PowerShell

Design of the Course

This course is designed to teach students fundamental knowledge and skills so that they can use Windows PowerShell 3.0 for administration and administrative automation. The course focuses on Microsoft Windows Server 2012 and Microsoft Windows 8, but the course content is applicable to Microsoft Windows 7, Microsoft Windows Server 2008, and Microsoft Windows Server 2008 R2. The course content is also applicable to other products that use Windows PowerShell for administration, including Microsoft Exchange Server, Microsoft SharePoint Server, Microsoft SQL Server, and Microsoft System Center products.

The course is designed for beginners that have little or no previous experience with Windows PowerShell, scripting languages, or command-line interfaces (CLIs). The course is not a scripting course, although it does provide introductory material to Windows PowerShell's scripting language and script execution environment. The course focuses primarily on using Windows PowerShell as a command prompt, with a strong emphasis on core shell skills.

Module 1, *Getting Started with Windows PowerShell*, provides a basic overview of the Windows PowerShell environment. Students are taught to identify the shell version, configure the native host applications, and to start the shell in the correct mode. This module also teaches students how to find, learn, and run commands on their own. These skills will be continually reinforced throughout the course, with a goal of making students as self-sufficient as possible when they return to their production environment.

Module 2, *Working with the Pipeline*, covers the majority of she shell's core commands. Students learn about objects, and about how commands pipe object between themselves in the pipeline. Students are taught to sort objects, select objects, filter objects, and enumerate objects. They also learn to import, export, and convert data to and from other formats. Variables are loosely introduced in the module, although at this stage a full explanation of variables rules and management would be a diversion.

Module 3, *Understanding How the Pipeline Works*, provides students with details on how commands pass objects to each other. Students learn several techniques for providing input to commands, in addition to the pipeline. Students also learn to predict command behavior and how to write complex, multi-command command lines that accomplish specific tasks.

Module 4, *Using PSProviders and PSDrives*, introduces students to the storage adaptation layer of Windows PowerShell. Using the file system, the registry, the certificate store, and other native examples, students learn to manage and manipulate data by means of a provider and drive. These skills are applicable to products like Microsoft Internet Information Server (IIS), Microsoft SQL Server, and so forth.

Module 5, *Formatting Output*, teaches students how to use the shell's primary formatting commands to customize the output of shell commands. Students learn about custom (also called calculated) table columns and list entries, wide lists, and other formats.

Module 6, *Querying Management Information by Using WMI and CIM*, introduces students to Windows Management Instrumentation (WMI) and Common Information Model (CIM). Because both technologies access the same back-end repository, they are taught in parallel. Students are taught which technology is appropriate for various scenarios, and are given opportunities to practice using both. Emphasis is placed on self-discovery, and students learn to find and learn about repository classes on their own.

Module 7, *Preparing for Scripting*, provides students with a formal introduction to variables. Until this module, students have used variables, and have been taught that they are temporary storage containers for objects. In this module, additional details are revealed, including naming rules and management commands. Students also learn about the shell execution policy and other scripting security features.

Instructors are encouraged not to move the variable content to earlier in the course. While variables can absolutely have a purpose earlier in the course, students can get by with a simple explanation like, "variables are storage containers for objects, and they start with a dollar sign ($)." Students can be effective with that explanation early on, and a deeper explanation of variables will be a tangent and possible distraction. Early discussion of variables can also be detrimental to students who dislike scripting or programming, causing those students to become disappointed in the course at an early point. The important design point is that a full explanation of variables is not *necessary* until module 7, and earlier coverage of variables disrupts the intended instructional sequence and learning pattern.

Module 8, *Moving from Command to Script to Module*, starts by providing students with a working command. Students then turn that command into a self-contained script module, through a series of lessons and labs that each build upon the last. Students learn the basics of debugging, error handling, and modularization while working through two continuous examples.

The labs for Module 8 are unique. In any module that has students continually building upon a single piece of work, it is possible for students to get lost and fall behind. For this module, each lab task includes a predefined starting point. Those starting points basically include everything from all prior tasks, giving students an immediate starting point for the current task. Therefore, a student who is falling behind can be directed to the Lab Answer Key, where the instructions will quickly bring them to the current task and help them to complete it.

Module 9, *Administering Remote Computers*, focuses on the Windows PowerShell remoting feature. Students are introduced to basic remoting, advanced techniques, and even taught how to create a custom remoting session configuration for delegated administration. Lab C is somewhat complex, and classes that consist primarily of beginners may find it more challenging. This module is the first place where students make extensive use of variables outside of a script.

Module 10, *Putting it All Together*, serves as a kind of final exam for the course, although it is not the final module. Consisting primarily of a long lab, this module gives students the opportunity to use many of the skills that they have learned up to that point. Using those skills, students will provision a new Server Core instance entirely from a remote computer.

The actual task of provisioning a Server Core instance is not important. The learning objectives consist of the skills and techniques students must use to achieve the task. Those objectives have all been covered in previous modules, and include self-discover and –learning of new commands.

The lab in Module 10 is lengthy and can be complicated. Because of the nature of the task, students will need to revert their virtual machine several times over the course of the lab. In training facilities with older equipment, this may add extra time. Module 10 is deliberately scheduled for the end of the day, so that students can leave at any time once they complete the lab tasks, or if they simply become tired.

Module 11, *Using Background Jobs and Scheduled Jobs,* teaches students to use these two important Windows PowerShell features.

Module 12, *Using Profiles and Advanced Windows PowerShell Techniques*, is a kind of "miscellaneous" module. It includes profile scripts, additional comparison operators, string and date object manipulation, default parameter values, and other useful tasks.

Required Materials to Teach This Course

To teach this course, you need the following materials:

- Course Handbook
- Course Companion Content on http://www.microsoft.com/learning/companionmoc/
- Microsoft PowerPoint® files
- Microsoft Virtual Server Classroom Setup Guide
- Course virtual machines

Important The use of PowerPoint 2013, PowerPoint 2010, or PowerPoint 2007 is recommended to display the slides for this course. If you use PowerPoint Viewer or a version of PowerPoint older than PowerPoint 2007, some of the features of the slides might not display correctly.

Prerequisite Knowledge to Teach This Course

In this section, list the knowledge and skills that are required of the instructor to effectively present this course.

Include all knowledge and skills that ensure a solid understanding of the subject of the course.

To present this course, you must have the following knowledge and skills:

- At least two years of experience working with Windows Server operating systems.
- At least two years of experience working with Windows PowerShell version 2.0 or version 3.0.
- Familiarity with networking, including configuration of network services such as DNS and Dynamic Host Configuration Protocol (DHCP).

Preparation Tasks

Complete the following tasks to prepare for this course.

Technical Preparation Activities

We highly recommend that you complete the following technical preparation activities:

In the following list, change any generic references to be specific to this learning product. Add any activities that you feel are essential. Remove any items that are not applicable.

- Read the additional readings and references that are included in the Course Companion Content on the http://www.microsoft.com/learning/companionmoc site.
- Use the OneNote® Trainer Pack (OTP) on the MCT Download Center to prepare for delivering the course.
    - The OneNote Trainer Packs include the following content for each course on each page in the OTP (and in this order):
        - Slides
        - Instructor Notes
        - Student Handbook Content
    - Also included for each module are the Lab Answer Keys (LAKs).
- Practice setting up the classroom by following the instructions in the Microsoft Hyper-V® Classroom Setup Guide.
- Review the learning product error log, which is available on the MCT Download Center.
- Practice using the Microsoft product(s) and tools that are associated with this learning product.
- Review the Microsoft product error log, which is available in the Microsoft Download Center.

Instructional Preparation Activities

It is recommended highly recommend that you complete the following instructional preparation activities:

In the list below, change any generic references to be specific to this product. Add any activities that you feel are essential. Remove any items that are not applicable.

- Read the About This Course at the beginning of the Course handbook for the learning product.
- Walk through the Module 0 Introduction slide deck for the learning product.
- Review the **10961A** Train the Trainer video on the MCT Readiness web site. Because there were only a few changes between the A and B versions of the class, the 10961A video was not updated. For information on the differences between the A and B versions, review the 10961B Change Log.
- Walk through each module presentation slide deck and read the corresponding Instructor Notes (located in the notes view of the presentation slide deck) for the module. Note that each slide deck has additional hidden slides to accommodate the amount of Instructor Notes information for a given topic.
- Familiarize yourself with the Course Handbook and the Course Companion Content on the http://www.microsoft.com/learning/companionmoc site. Make note of when to direct students' attention to the Course Companion Content for further learning support. More information pertaining to the course components is present in the Introduction slide deck.
- Practice presenting each module:
  - Identify the key points and must-know information for each topic.
  - Perform each demonstration and hands-on lab.
  - Anticipate the questions that students might have.
  - Identify examples, analogies, impromptu demonstrations, and additional delivery tips that will help to clarify module content and provide a more meaningful learning experience for your specific audience.
  - Note any problems that you might encounter during a demonstration or a lab exercise, and determine a course of action for how you will resolve the problems in the classroom. To access the lab answer keys, refer to the appendix in the Course Handbook.
  - Work through the Module Review and Takeaways section at the end of each module and determine how you will use this section to reinforce student learning and promote knowledge transfer to on-the-job performance.
  - Customize and enhance your instructor notes.
- Consult the Born to Learn website for additional tips and strategies—posted by your fellow MCTs—for teaching the learning product.
- Review the updated information about the Microsoft Certification Program on the Microsoft Learning Certifications website.

Instructor Computer Setup

Set up the instructor computer by following the setup instructions in the "Microsoft® Hyper-V® Classroom Setup Guide" document. This document provides hardware requirements for the instructor computer and detailed setup instructions.

Course Timing

The following schedule is an estimate of the course timing. Your timing might vary. Every student might not finish every lab. Use your judgment to set a reasonable time to move on to the next module.

Lab times are estimated to include sufficient time for students to take a break. Students should use lab time to refresh themselves, if needed.

Day 1

Start	End	Module
9:00	9:30	Introduction
9:30	10:00	Module 1: Getting Started with Windows PowerShell (lesson 1)
10:00	10:15	Lab A: Configuring Windows PowerShell
10:15	11:15	Module 1 continues (lessons 2 and 3)
11:15	12:00	Lab B: Finding and Running Commands
12:00	1:00	Lunch
1:00	1:30	Module 2: Working with the Pipeline (lessons 1 and 2)
1:30	2:00	Lab A: Using the Pipeline
2:00	2:30	Module 2 continues (lesson 3)
2:30	3:00	Lab B: Converting, Exporting, and Importing Objects
3:00	3:30	Module 2 continues (lesson 4)
3:30	4:00	Lab C: Filtering Objects out of the Pipeline
4:00	4:30	Module 2 continues (lesson 5)
4:30	5:00	Lab D: Enumerating Objects

Day 2

Start	End	Module
9:00	10:00	Module 3: Understanding How the Pipeline Works (lessons 1 and 2)
10:00	10:45	Lab: Working with Pipeline Parameter Binding
10:45	11:45	Module 4: Using PSProviders and PSDrives
11:45	12:15	Lab: Using PSProviders and PSDrives
12:15	1:15	Lunch
1:15	2:15	Module 5: Formatting Output (lessons 1, 2, and 3)
2:15	3:00	Lab: Formatting Output
3:00	4:30	Module 6: Querying Management Information by Using WMI and CIM (lessons 1, 2, and 3)

Start	End	Module
4:30	5:15	Lab: Working with WMI and CIM

Day 3

Start	End	Module
9:00	9:50	Module 7: Preparing for Scripting (lessons 1 and 2)
9:50	10:00	Lab: Working with Security in Windows PowerShell
10:00	10:45	Module 8: Moving from Command to Script to Module (lesson 1)
10:45	11:15	Lab A: Moving from Command to Script
11:15	11:45	Module 8 continues (lesson 2)
11:45	12:15	Lab B: Moving from Script to Function to Module
12:15	1:15	Lunch
1:15	2:00	Module 8 continues (lesson 3)
2:00	2:30	Lab C: Implementing Basic Error Handling
2:30	3:00	Module 8 continues (lesson 4)
3:00	4:00	Lab D: Creating an Advanced Function
4:00	4:15	Module 8 continues (lesson 5)

Day 4

Start	End	Module
9:00	9:45	Module 9: Administering Remote Computers (lessons 1 and 2)
9:45	10:15	Lab A: Using Basic Remoting
10:15	10:45	Module 9 continues (lesson 3)
10:45	11:15	Lab B: Using Remoting Sessions
11:15	11:45	Module 10: Putting it All Together (lesson 1)
11:45	12:45	Lunch
12:45	4:00	Lab: Provisioning a New Server Core Instance

Day 5

Start	End	Module
9:00	9:30	Module 11: Using Background Jobs and Scheduled Jobs (lesson 1)
9:30	10:00	Lab A: Using Background Jobs

Start	End	Module
10:30	11:00	Module 11 continues (lesson 2)
11:30	12:00	Lab B: Using Scheduled Jobs
12:00	1:00	Lunch
1:00	2:00	Module 12: Using Profiles and Advanced Windows PowerShell Techniques (lessons 1, 2, and 3)
2:00	2:45	Lab: Practicing Advanced Techniques