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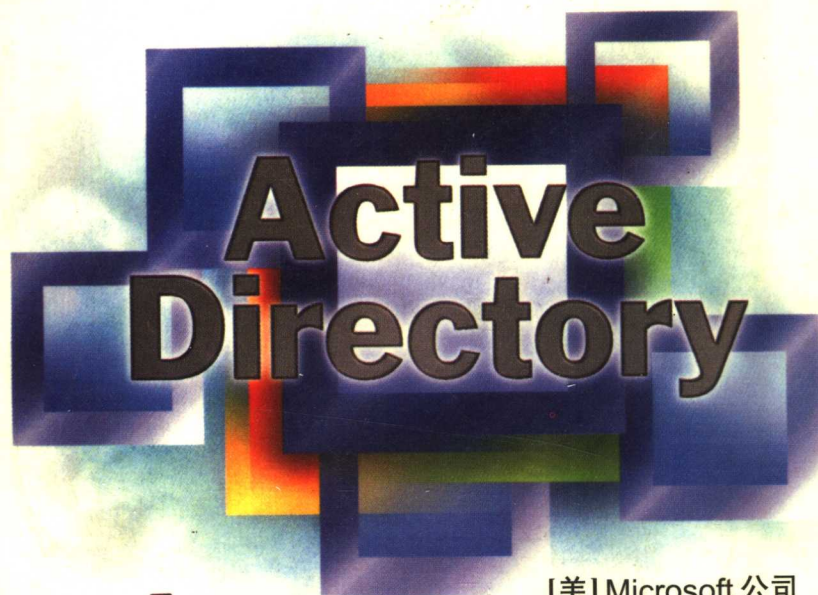
活动目录编程和开发影印丛书

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揭示微软活动目录服务技术内幕  
深入编程与开发  
IT企业 and 专业人员必备

The essential reference set for anyone who develops Active Directory applications in C, C++, Visual C++®, or Visual Basic®

David Iseminger  
Series Editor  
[www.iseminger.com](http://www.iseminger.com)



# Active Directory™ Schema

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## 活动目录架构

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活动目录编程和开发影印丛书

Active Directory Schema

# 活动目录架构

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## 内 容 简 介

本书是 ACTIVE DIRECTORY DEVELOPER'S REFERENCE LIBRARY (活动目录编程和开发影印丛书) 中的一本, 是一本关于活动目录架构 (Active Directory Schema) 的完整参考书, 讲述的是怎样使用架构、规划架构, 以及与架构对象实现接口。活动目录中的每个对象都是活动目录架构中定义的对象类的一个实例。一个对象类代表一类对象 (例如用户、打印机或应用程序), 这些对象具有共同的特征。每个对象类的定义中包含一个属性列表, 用来描述类的实例。

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## 前 言

活动目录 (Active Directory) 是 Windows 2000 网络的基石, 有了它, 很多在企业目录服务出现以前无法实现的解决方案都变成了现实。《活动目录编程和开发影印丛书》就是针对这种全新的开放技术而推出的。

本丛书提供了大量的 Visual Basic、Visual C++ 扩展代码的范例, 可以供网络编程人员参考。丛书中的程序员参考部分主要讲述完全的 Active Directory API 和 Active Directory Service Interface (ADSI) 文档支持, 而这两者提供了一套 COM 接口, 可以用来访问分布式计算环境中由不同的网络提供商提供的目录服务。系统管理员和开发人员可以使用 ADSI 来管理活动目录的资源, 而不必考虑提供资源的网络环境。ADSI 简化了日常的管理工作, 比如添加新用户、管理打印机、查找企业内部的资源等。本丛书构思精巧, 将活动目录和 ADSI 的参考材料有效地组织在一起。此外, 它还包括来自 Microsoft Platform SDK 的重要资料。每一本书都有详尽的索引, 让读者能够轻松地查找所需的内容, 还可以查找其他内容, 例如 Microsoft 的其他书籍及其电子文档。

本丛书的主编 David Iseminger 是 Microsoft 的独立顾问, 作为网络和路由器性能分析师、通信专家和性能工具开发者, 自 Windows NT 3.5 以来, 他就一直从事 Windows NT 和 Windows 2000 的研究与开发工作。最近, 他作为程序员, 正在与开发人员文档组 (Developer Documentation Group) 一道, 创建和维护 MSDN 建立的和新兴的网络技术, 包括服务质量 (Quality of Service)。作为计算机图书作家, David 的著作颇丰, 包括他最新创作、Microsoft 出版的《Active Directory Services for Microsoft Windows 2000 Technical Reference》。David 毕业于华盛顿大学, 现居住在华盛顿州的 Puget Sound 城。欲详细了解 David 的工作以及本丛书的其他作品, 请访问站点: [www.iseminger.com](http://www.iseminger.com)。

本丛书由以下 5 本书组成:

《Active Directory Programmer's Guide》(《活动目录程序员指南》)

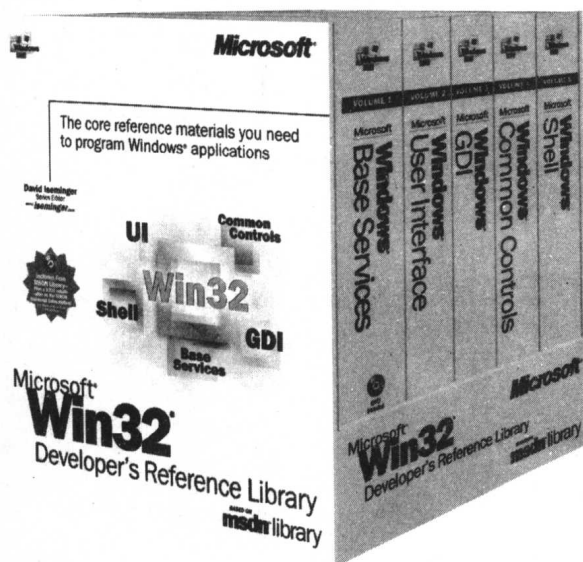
《Active Directory Reference》(《活动目录参考手册》)

《Active Directory Service Interfaces Programmer's Guide》(《活动目录服务接口程序员指南》)

《Active Directory Service Interfaces Reference》(《活动目录服务接口参考手册》)

《Active Directory Schema》(《活动目录架构》)

# The **core** reference books for Microsoft Windows development **success**



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If you're overwhelmed by the volumes of information available from Microsoft about Windows 2000 and the rest of the Windows platforms, you need the MICROSOFT® WIN32® DEVELOPER'S REFERENCE LIBRARY. Developed by a longtime member of Microsoft's Platform SDK team, these five programmer's guides collect and condense the most commonly used Win32 reference materials in one place. Each guide in this essential reference collection focuses on a different area of Win32 development. Intelligently organized, completely indexed, and full of vital information tailored to the needs of Windows programmers, this library is the life raft you need to chart a clear course through the ocean of reference materials about Windows development.

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# Contents

<b>Part 1 .....</b>	<b>1</b>
<b>Chapter 1: Using the Active Directory Library .....</b>	<b>1</b>
How the Active Directory Library Is Structured .....	2
How the Active Directory Library Is Designed .....	3
<b>Chapter 2: What's In This Volume? .....</b>	<b>5</b>
Schema Programmer's Guide .....	6
Schema Reference .....	6
<b>Chapter 3: Using Microsoft Reference Resources .....</b>	<b>7</b>
<b>The Microsoft Developer Network .....</b>	<b>8</b>
Comparing MSDN with MSDN Online .....	9
MSDN Subscriptions .....	11
MSDN Library Subscription .....	11
MSDN Professional Subscription .....	12
MSDN Universal Subscription .....	12
Purchasing an MSDN Subscription .....	12
Using MSDN .....	13
Navigating MSDN .....	14
Quick Tips .....	16
Using MSDN Online .....	18
Navigating MSDN Online .....	20
MSDN Online Features .....	21
MSDN Online Registered Users .....	27
<b>The Windows Programming Reference Series .....</b>	<b>28</b>
<b>Chapter 4: Finding the Developer Resources You Need .....</b>	<b>29</b>
<b>Developer Support .....</b>	<b>30</b>
<b>Online Resources .....</b>	<b>32</b>
<b>Learning Products .....</b>	<b>32</b>
<b>Conferences .....</b>	<b>35</b>
<b>Other Resources .....</b>	<b>35</b>
<b>Chapter 5: Active Directory Schema .....</b>	<b>37</b>
<b>About the Active Directory Schema .....</b>	<b>37</b>

<b>Schema Implementation.....</b>	<b>38</b>
Object Identifiers (OIDs).....	39
<b>Characteristics of Object Classes.....</b>	<b>39</b>
Structural, Abstract, and Auxiliary Classes .....	44
Class Inheritance in the Active Directory Schema .....	44
Object Class and Object Category .....	45
<b>Characteristics of Attributes.....</b>	<b>47</b>
Syntaxes for Active Directory Attributes .....	50
Indexed Attributes .....	56
Attributes Included in the Global Catalog .....	56
Linked Attributes .....	57
<b>The Abstract Schema .....</b>	<b>58</b>
<b>Part 2 .....</b>	<b>61</b>
<b>Chapter 6: Extending the Schema.....</b>	<b>61</b>
<b>Guidelines for Binding to the Schema.....</b>	<b>61</b>
<b>Reading the Abstract Schema .....</b>	<b>62</b>
Example Code for Enumerating Schema Classes, Attributes, and Syntaxes .....	64
<b>Reading attributeSchema and classSchema Objects .....</b>	<b>68</b>
<b>What You Must Know Before Extending the Schema .....</b>	<b>75</b>
Impact of Schema Changes .....	76
When to Extend the Schema.....	77
Restrictions on Schema Extension.....	77
Querying for Category 1 or 2 Schema Objects.....	78
<b>How to Extend the Schema.....</b>	<b>80</b>
Naming Attributes and Classes .....	80
Disabling Existing Classes and Attributes .....	82
Obtaining a Root Object Identifier (OID) .....	83
Obtaining a Root OID from an ISO Name Registration Authority .....	83
Using Generated OIDs .....	83
Integrating Schema Extensions with the User Interface.....	84
Defining a New Attribute.....	84
Example Code for Creating an Attribute .....	86
Example Code for Finding the Next linkID.....	93
Choosing a Syntax.....	95
Defining a New Class.....	97
Example code for Creating a Class .....	98
Installing Schema Extensions .....	106
Documenting Schema Extensions.....	106

---

What the Installation Must Do .....	106
Prerequisites for Installing a Schema Extension .....	107
Recommendations for Schema Extension Programs .....	115
Supported Installation Mechanisms .....	124
<b>Chapter 7: Schema Class Classification .....</b>	<b>153</b>
<b>Schema Class Hierarchy.....</b>	<b>153</b>
<b>Schema Class Categories.....</b>	<b>158</b>
Abstract Classes.....	158
Auxiliary Classes.....	158
Structural Classes.....	158
<b>Chapter 8: Schema Class Reference .....</b>	<b>161</b>
<b>Schema Class Properties .....</b>	<b>161</b>
<b>Schema Class Definitions.....</b>	<b>165</b>
<b>Chapter 9: Schema Attribute Classification .....</b>	<b>315</b>
<b>Schema Attribute Categories .....</b>	<b>315</b>
Global Catalog Attributes .....	315
Indexed Attributes .....	317
Linked Attributes .....	318
<b>Chapter 10: Schema Attribute Reference .....</b>	<b>319</b>
<b>Schema Attributes Properties .....</b>	<b>319</b>
<b>Schema Attribute Definitions .....</b>	<b>323</b>
<b>Chapter 11: Syntax Mapping and Reference.....</b>	<b>923</b>
<b>Syntax Mapping .....</b>	<b>923</b>
<b>Syntax Properties .....</b>	<b>924</b>
Syntax-Name.....	924
attributeSyntax .....	924
oMSyntax .....	924
oObjectClass .....	924
<b>Syntax Reference .....</b>	<b>924</b>
Boolean.....	924
Enumeration.....	926
Enumeration(Delivery-Mechanism).....	926
Enumeration(Export-Information-Level).....	927
Enumeration(Preferred-Delivery-Method).....	927
Integer.....	927
Interval .....	931



LargeInteger .....	933
Object(DN-String) .....	934
Object(DN-Binary) .....	934
Object(DN-String) .....	935
Object(DS-DN) .....	935
Object(OR-Name) .....	938
Object(Presentation-Address) .....	938
Object(Replica-Link) .....	939
String(Generalized-Time) .....	939
String(IA5) .....	940
String(NT-Sec-Desc) .....	940
String(Numeric) .....	941
String(Object-Identifier) .....	941
String(Octet) .....	942
String(Printable) .....	945
String(Sid) .....	946
String(Teletex) .....	947
String(Unicode) .....	947
String(UTC-Time) .....	955
<b>Part 3 – Glossary and Indexes .....</b>	<b>957</b>
<b>Glossary .....</b>	<b>959</b>
<b>Index 1: Active Directory Programmer's Guide Coverage .....</b>	<b>969</b>
<b>Index 2: Active Directory Reference – Alphabetical Listing .....</b>	<b>975</b>
<b>Index 3: ADSI, ADSI Exchange, and Group Policy Programmer's Guides Coverage .....</b>	<b>979</b>
<b>Index 4: ADSI Reference – Alphabetical Listing .....</b>	<b>983</b>
<b>Index 5a: Category 1 Schema Class Objects – Alphabetical Listing .....</b>	<b>987</b>
<b>Index 5b: Category 1 Schema Attribute Objects – Alphabetical Listing .....</b>	<b>989</b>

## CHAPTER 1

# Using the Active Directory Library

A fundamental change in the way Microsoft Windows operates has occurred. With Microsoft Active Directory and Windows 2000, a comprehensive directory service has been developed that enables users, administrators, and application programmers to get more out of the operating system than ever before. My prediction? (I'm an author—I'm supposed to make such predictions.) The advent of Active Directory services in Windows 2000 is going to blur the lines between networks, and will result in a basic but extraordinary change in the way users and applications operate. Just as global e-mail was a basic but extraordinary change only a few years ago (try working without e-mail today), we will reflect on Active Directory in a few years and wonder how we (or our applications) functioned effectively without it.

As a Windows programmer—whether you're writing complex applications in C/C++ or using Microsoft Visual Basic to automate administrative tasks—you need to be familiar with Active Directory and its various programming features. That familiarity (and that multiple programming language coverage) is exactly what the *Active Directory Developer's Reference Library* is geared to provide.

The Active Directory Library is *the* comprehensive reference guide to Active Directory development. This library, like all libraries in the Windows Programming Reference Series (WPRS), is designed to deliver the most complete, authoritative, and accessible reference information available on a given subject of Windows programming—without sacrificing focus. Each book in the library is dedicated to a logical group of technologies or development concerns; I've taken this approach specifically to enable you to find the information you need quickly, efficiently, and intuitively.

In addition to its Active Directory development information, the Active Directory Library contains tips designed to make your programming life easier. For example, a thorough explanation and detailed tour of MSDN Online are included, as is a section that helps you get the most out of your MSDN subscription. Just in case you don't have an MSDN subscription or don't know why you should, I've provided information about that too, including the differences between the three levels of MSDN subscription, what each level offers, and why you'd want a subscription when MSDN Online is available over the Internet.

To ensure you don't get lost in all the information provided in the Active Directory Library, each volume's appendixes provide an all-encompassing programming directory to help you easily find the particular programming element you're looking for. This directory suite, which covers all the functions, structures, enumerations, and other programming elements found in Active Directory and Active Directory Service Interface (ADSI) development, gets you quickly to the volume and page you need, saving you hours of time and bucketsful of frustration.

## How the Active Directory Library Is Structured

The Active Directory Library consists of five volumes, each of which focuses on a particular aspect of Active Directory programming. These guides and programming reference volumes have been divided into the following:

- Volume 1: Active Directory Programmer's Guide
- Volume 2: Active Directory Reference
- Volume 3: ADSI Programmer's Guide
- Volume 4: ADSI Reference
- Volume 5: Active Directory Schema

Dividing the Active Directory Library into these categories enables you, the reader, to quickly identify the Active Directory volume you need based on your task, and facilitates your maintenance of focus for that task. This approach enables you to keep one reference book open and handy, or tucked under your arm while researching that aspect of Windows programming on sandy beaches, without risking back problems (from toting around all 3,200+ pages of the Active Directory Library) and without having to shuffle among multiple, less-focused books.

Within the Active Directory Library—and, in fact, in all WPRS Libraries—each volume has a deliberate structure. This per-volume structure has been created to further focus the reference material in a developer-friendly manner, to maintain consistency within each volume and each Library throughout the series, and to enable you (the developer) to easily gather the information you need. To that end, each volume in the Active Directory Library contains the following parts:

- Part 1: Introduction and Overview
- Part 2: Guides, Examples, and Programmatic Reference
- Part 3: Indexes and Active Directory Glossary

Part 1 provides an introduction to the Active Directory Library and to the Windows Programming Reference Series (what you're reading now), and a handful of chapters designed to help you get the most out of Active Directory, MSDN, and MSDN Online. MSDN and WPRS Libraries are your tools in the development process; knowing how to use them to their fullest will enable you to be more efficient and effective (both of which are generally desirable traits). In certain volumes (where appropriate), I've also provided additional information that you'll need in your Active Directory development efforts and included such information as concluding chapters in Part 1. For example, this volume includes a chapter that introduces crucial concepts about Active Directory—concepts you need to know before you dive into Active Directory programming. Some of the other volumes in the Active Directory Library conclude their Part 1 with chapters that include information crucial to their volume's contents.

Part 2 contains the Active Directory programming guides or reference material particular to its volume. You'll notice that the programmatic reference volumes contain much more than simple collections of function and structure definitions. Because a comprehensive reference resource should include information about how to use a particular technology as well as its definitions of programming elements, the information in Part 2 combines complete programming element definitions as well as instructional and explanatory material for each programming area.

Part 3 is a collection of indexes. One of the biggest challenges of the IT professional is finding information in the sea of available resources, and Active Directory programming is certainly no exception. In order to help you get a handle on Active Directory programming references (and Microsoft technologies in general), Part 3 puts all such information into an understandable, manageable directory (in the form of indexes) that enables you to quickly find the information you need. To enhance your understanding of the content in each volume, I've also included a glossary of Active Directory terms in each volume. This enables you to refresh your knowledge of a given Active Directory term regardless of which volume you're using, without the need to refer to another book (if the glossary were in only one volume).

## How the Active Directory Library Is Designed

The Active Directory Library, like all libraries in the Windows Programming Reference Series, is designed to deliver the most pertinent information in the most accessible way possible. The Active Directory Library is also designed to integrate seamlessly with MSDN and MSDN Online by providing a look and feel consistent with their electronic means of disseminating Microsoft reference information. In other words, the way that a given function reference appears on the pages of this book has been designed specifically to emulate the way that MSDN and MSDN Online present their function reference pages.

The reason for maintaining such integration is simple: to make it easy for you—the developer of Windows applications—to use the tools and get the ongoing information you need to create quality programs. By providing a “common interface” among reference resources, your familiarity with the Active Directory Library reference material can be immediately applied to MSDN or MSDN Online, and vice-versa. In a word, it means *consistency*.

You'll find this philosophy applied throughout Windows Programming Reference Series publications. I've designed the series to go hand-in-hand with MSDN and MSDN Online resources. Such consistency lets you leverage your familiarity with electronic reference material, then apply that familiarity to enable you to get away from your computer if you'd like, take a book with you, and—in the absence of keyboards and e-mail and upright chairs—get your programming reading and research done. Of course, each of the Active Directory Library volumes fits nicely right next to your mouse pad as well, even when opened to a particular reference page.

With any job, the simpler and more consistent your tools are, the more time you can spend doing work rather than figuring out how to use your tools. The structure and design of the Active Directory Library provide you with a comprehensive, presharpended toolset to build compelling Windows applications.



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CHAPTER 2

# What's In This Volume?

This final volume of the *Active Directory Developer's Reference Library* is a complete reference for the Active Directory Schema and provides a programming guide that addresses programming considerations developers need to take into account when working with or (especially) extending the Active Directory Schema. As with other volumes in this library (and all WPRS libraries), Part 1 provides overview information and tips for using developer tools such as MSDN and MSDN Online, as well as some guidance on how to find developer support in the event that your development effort requires it. This developer tools and support information is found in various chapters in Part 1, and is common to all WPRS (each volume in each library has them). By including this information in each library and in each volume, several goals of the WPRS are achieved:

- I don't presume or expect you to have to buy another WPRS Library to gain access to this information. Maybe your primary focus is Active Directory programming and your budget doesn't allow you to purchase the *Microsoft Win32 Developer's Reference Library*. Because I've included this information in this library, you don't have to.
- You can access this important and useful information regardless of which volume you have in your hand. You don't have to (nor *should* you have to) fumble with another physical book to access information about how to get the most out of MSDN or where to get support for questions you have about a particular Windows development problem you're having.
- Each volume becomes more useful, more portable, and more complete in and of itself. This goal of the WPRS makes it easier for you to grab one of its library volumes and take it with you, rather than feeling like you must bring multiple volumes with you to have access to the library's important overview and usability information.

The final chapter in Part 1, Chapter 5, is geared toward getting you the information you need to know before diving into Active Directory Schema. That chapter includes topics such as how to deal with the unique requirements of Object Identifiers (OIDs), characteristics of object classes and attributes, and the abstract schema.

You'll also find a glossary of Active Directory terms in the back of this volume and in each volume in the Active Directory Library. If you've read through the first chapter in any of the WPRS libraries (including this one), you know that my primary objective is to ensure that these volumes provide you with the information you need in as convenient and useful a way as possible (as the previous bulleted points explain). To that end, you might run into unfamiliar Active Directory terms in any of these volumes;

by having a glossary in the back of each volume, you know that the definitions for unfamiliar terms are a few page flips away, rather than a book, or (if you're not near the rest of the volumes) a long walk away.

Part 2 of this volume addresses Schema programming considerations and is broken into two sections:

- Schema Programmer's Guide
- Schema Reference

The distinction between the Schema Programmer's Guide and Schema Reference is achieved by the focus of the chapters rather than by the introduction of additional partitioning (such as dividing it into Part 2 and Part 3, for example). This ensures consistency throughout the volumes in this library and in WPRS libraries in general. I've ensured that the chapter names clearly identify whether the content focuses on *Schema programming* or *general Schema reference*.

## Schema Programmer's Guide

This collection of chapters describes how Schema programming is best approached and provides information for performing the following tasks:

- Reading the Abstract Schema
- Reading `attributeSchema` and `classSchema` Objects
- What You Must Know Before Extending the Schema
- How to Extend the Schema

## Schema Reference

The collection of Schema reference chapters covers the following information:

- Class Hierarchy
- Class Categories
- Attribute Categories
- Syntax ID-Name Mapping
- Classes
- Attributes
- Syntax

---

CHAPTER 3

## Using Microsoft Reference Resources

Keeping current with all the latest information on the latest networking technology is like trying to count the packets going through routers at the MAE-WEST Internet service exchange by watching their blinking activity lights: It's impossible. Often times, application developers feel like those routers might feel at a given day's peak activity; too much information is passing through them, none of which is being absorbed or passed along fast enough for their boss' liking.

For developers, sifting through all the *available* information to get to the *required* information is often a major undertaking, and can impose a significant amount of overhead upon a given project. What's needed is either a collection of information that has been sifted for you, shaking out the information you need the most and putting that pertinent information into a format that's useful and efficient, or direction on how to sift the information yourself. The *Active Directory Developer's Reference Library* does the former, and this chapter and the next provide you with the latter.

This veritable white noise of information hasn't always been a problem for network programmers. Not long ago, getting the information you needed was a challenge because there wasn't enough of it; you had to find out where such information might be located and then actually get access to that location, because it wasn't at your fingertips or on some globally available backbone, and such searching took time. In short, the availability of information was limited.

Today, the volume of information that surrounds us sometimes numbs us; we're overloaded with too much information, and if we don't take measures to filter out what we don't need to meet our goals, soon we become inundated and unable to discern what's "white noise" and what's information that we need to stay on top of our respective fields. In short, the overload of available information makes it more difficult for us to find what we *really* need, and wading through the deluge slows us down.

This fact applies equally to Microsoft's reference material, because there is so much information that finding what *you* need can be as challenging as figuring out what to do with it once you have it. Developers need a way to cut through what isn't pertinent to them and to get what they're looking for. One way to ensure you can get to the information you need is to understand the tools you use; carpenters know how to use nail-guns, and it makes them more efficient. Bankers know how to use ten-keys, and it makes them more adept. If you're a developer of Windows applications, two tools you should know are MSDN and MSDN Online. The third tool for developers—reference books from the WPRS—can help you get the most out of the first two.



Books in the WPRS, such as those found in the *Active Directory Developer's Reference Library*, provide reference material that focuses on a given area of Windows programming. MSDN and MSDN Online, in comparison, contain all of the reference material that all Microsoft programming technologies have amassed over the past few years, and create one large repository of information. Regardless of how well such information is organized, there's a lot of it, and if you don't know your way around, finding what you need (even though it's in there, somewhere) can be frustrating, time-consuming, and just an overall bad experience.

This chapter will give you the insight and tips you need to navigate MSDN and MSDN Online and enable you to use each of them to the fullest of their capabilities. Also, other Microsoft reference resources are investigated, and by the end of the chapter, you'll know where to go for the Microsoft reference information you need (and how to quickly and efficiently get there).

## The Microsoft Developer Network

MSDN stands for Microsoft Developer Network, and its intent is to provide developers with a network of information to enable the development of Windows applications. Many people have either worked with MSDN or have heard of it, and quite a few have one of the three available subscription levels to MSDN, but there are many, many more who don't have subscriptions and could use some concise direction on what MSDN can do for a developer or development group. If you fall into any of these categories, this section is for you.

There is some clarification to be done with MSDN and its offerings; if you've heard of MSDN, or have had experience with MSDN Online, you may have asked yourself one of these questions during the process of getting up to speed with either resource:

- Why do I need a subscription to MSDN if resources such as MSDN Online are accessible for free over the Internet?
- What is the difference between the three levels of MSDN subscriptions?
- Is there a difference between MSDN and MSDN Online, other than the fact that one is on the Internet and the other is on a CD? Do their features overlap, separate, coincide, or what?

If you have asked any of these questions, then lurking somewhere in the back of your thoughts has probably been a sneaking suspicion that maybe you aren't getting the most out of MSDN. Maybe you're wondering whether you're paying too much for too little, or not enough to get the resources you need. Regardless, you want to be in the know and not in the dark. By the end of this chapter, you'll know the answers to all these questions and more, along with some effective tips and hints on how to make the most effective use of MSDN and MSDN Online.