

Kerrie Meyler
Cameron Fuller
John Joyner
Andy Dominey



System Center Operations Manager 2007 R2

UNLEASHED

Supplement to
*System Center
Operations Manager
2007 Unleashed*



Kerrie Meyler
Cameron Fuller
John Joyner
Andy Dominey

System Center Operations Manager 2007 R2

UNLEASHED

**SUPPLEMENT TO
SYSTEM CENTER
OPERATIONS
MANAGER 2007
UNLEASHED**

System Center Operations Manager 2007 R2 Unleashed

Copyright © 2010 by Pearson Education, Inc.

All rights reserved. No part of this book shall be reproduced, stored in a retrieval system, or transmitted by any means, electronic, mechanical, photocopying, recording, or otherwise, without written permission from the publisher. No patent liability is assumed with respect to the use of the information contained herein. Although every precaution has been taken in the preparation of this book, the publisher and authors assume no responsibility for errors or omissions. Nor is any liability assumed for damages resulting from the use of the information contained herein.

ISBN-13: 978-0-672-33341-5

ISBN-10: 0-672-33341-4

The Library of Congress Cataloging-in-Publication Data is on file.

Printed in the United States of America

Fourth Printing August 2011

Trademarks

All terms mentioned in this book that are known to be trademarks or service marks have been appropriately capitalized. Sams Publishing cannot attest to the accuracy of this information. Use of a term in this book should not be regarded as affecting the validity of any trademark or service mark.

Warning and Disclaimer

Every effort has been made to make this book as complete and as accurate as possible, but no warranty or fitness is implied. The information provided is on an "as is" basis. The authors and the publisher shall have neither liability nor responsibility to any person or entity with respect to any loss or damages arising from the information contained in this book or from the use of it.

Bulk Sales

Sams Publishing offers excellent discounts on this book when ordered in quantity for bulk purchases or special sales. For more information, please contact:

U.S. Corporate and Government Sales

1-800-382-3419

corpsales@pearsontechgroup.com

For sales outside of the U.S., please contact:

International Sales

international@pearson.com

Editor-in-Chief

Karen Gettman

Executive Editor

Neil Rowe

Development Editor

Mark Renfrow

Managing Editor

Kristy Hart

Project Editor

Anne Goebel

Copy Editor

Water Crest
Publishing, Inc.

Indexer

Lisa Stumpf

Technical Editor

Rory McCaw

Publishing Coordinator

Cindy Teeters

Book Designer

Gary Adair

Contents at a Glance

1	Introduction and What's New.....	1
2	Unix/Linux Management: Cross Platform Extensions	23
3	Operations Manager 2007 R2 and Windows Server 2008.....	97
4	Using SQL Server 2008 in OpsMgr 2007 R2	117
5	PowerShell Extensions for Operations Manager 2007	153
6	Management Solutions for Small and Midsize Business.....	193
7	Operations Manager and Virtualization.....	213
8	Management Pack Authoring	247
9	Unleashing Operations Manager 2007	307
A	OpsMgr R2 by Example	391
B	Reference URLs	455
C	Available Online.....	475
	Index.....	479

Table of Contents

Chapter 1	Introduction and What's New	1
	Licensing Updates	2
	Licensing Changes to the System Center Server Management Suite	3
	Licensing of Cross Platform Applications	4
	New in Service Pack 1	4
	SP 1 Highlights	4
	Gateway Enhancements	5
	Clustered RMS Enhancements.....	6
	RMS Encryption Key Backup.....	6
	R2 Highlights and Capabilities.....	7
	Importing Management Packs.....	9
	New and Updated Templates	11
	User Interface.....	13
	Run As	14
	IIS 7 and ASP.NET 64-Bit Apps	14
	Large-Scale Monitoring of URLs	15
	Maintenance Mode.....	15
	32-Bit Performance Counter Support on 64-Bit Systems	15
	Web Console (Health Explorer).....	15
	Notification Subscription Wizard	16
	Service Level Monitoring	17
	Reporting Enhancements	19
	Recalculating and Resetting Monitor States	21
	Power Consumption Monitoring.....	22
	Summary	22
Chapter 2	Unix/Linux Management: Cross Platform Extensions	23
	Supported Platforms and Requirements	23
	Preparing to Discover Unix/Linux Computers	27
	Name Resolution.....	28
	Account Information Gathering	28
	Update WinRM.....	29
	Configuring Accounts and Profiles	30
	Importing the Unix/Linux Management Packs	36
	Discovering and Monitoring Unix/Linux Computers.....	39
	Discovering	39
	Manually Installing the CrossPlat Agent.....	45
	Notes on Unix Commands	48
	Common Agent Deployment Errors	50
	Additional Reference Material on CrossPlat	51
	Monitoring (Where Do You Find Everything?).....	53

Integrating Unix/Linux Computers in OpsMgr	54
OpsMgr Console	54
Health Explorer	56
Reports	57
Tasks	58
Integration with Distributed Applications	59
BridgeWays Management Packs	61
The BridgeWays VMware ESX Management Pack	62
The BridgeWays Apache Management Pack	68
Novell SUSE Management Pack	70
Logical Disk Volume Recovery	72
Cron Service Recovery	73
Performance Collection	76
Custom Scripting in the SUSE Management Pack	77
Management Pack Templates	83
Unix/Linux Log File Template	83
Unix/Linux Service Template	84
Connectors	86
Summary	96
Chapter 3 Operations Manager 2007 R2 and Windows Server 2008.....	97
Installing Operations Manager 2007 R2	97
Hotfixes	98
Prerequisite Changes	99
Roles and Features	99
The Windows 2008 Firewall	103
After Installation	106
Upgrading to Operations Manager 2007 R2	109
Upgrading to OpsMgr 2007 R2—Currently on Windows 2008	109
Upgrading to OpsMgr 2007 R2—Currently on Windows 2003	111
Upgrading to OpsMgr 2007 R2—Known Issues	111
Additional Windows 2008 Considerations	112
Windows Server 2008 SP 2	112
Windows Server 2008 R2	112
Server Core	113
Windows Server 2008 Updated or New Management Packs	114
Summary	116
Chapter 4 Using SQL Server 2008 in OpsMgr 2007 R2	117
Core OpsMgr Component Support	117
High Availability with Standard and Enterprise Editions	119
Database Maintenance with Standard and Enterprise Editions	120
Setup	121
Hardware Best Practices	121

Upgrading Databases from SQL Server 2005 to SQL Server 2008.....	123
SQL 2008 Reporting Services.....	128
Post-Installation Steps for SQL Server	131
Operations Manager 2007 R2 Reporting.....	133
Architecture	133
Enhancements	135
Database Maintenance.....	138
Operational Database Maintenance.....	139
Data Warehouse Maintenance.....	144
Useful SQL Queries	145
Operational Database SQL Queries	146
Data Warehouse Database SQL Queries.....	148
Miscellaneous SQL Queries.....	149
Summary	151
Chapter 5 PowerShell Extensions for Operations Manager 2007	153
Windows PowerShell Basics.....	153
Installing and Accessing PowerShell	154
General PowerShell Concepts	155
Basic Navigation and Functionality	157
Cmdlet Structure	157
Getting Started	159
Special Variable \$.....	161
Comparison Operators	162
Filtering Cmdlets	162
Sorting and Selecting Cmdlets	165
Formatting Cmdlets	166
Conditional Statements	167
Looping Statements	170
Providers	171
Profiles.....	172
Using the Operations Manager PowerShell Shell.....	173
Monitoring:\ Provider	174
Listing OpsMgr Shell Cmdlets.....	175
Commonly Used Cmdlets	175
Get-Alert and Monitoring:\.....	177
Incorporating the Operations Manager SDK.....	179
PowerShell Performance	180
PowerShell and Operations Manager Examples.....	181
General PowerShell Examples.....	181
Operations Manager Examples	184
PowerShell Best Practices	191
Summary	191

Chapter 6	Management Solutions for Small and Midsize Business	193
	Windows Small Business Server 2008	194
	SBS 2008 Native Management Features.....	194
	Remote Operations Manager Scenarios for SBS 2008.....	197
	Windows Essential Business Server 2008	198
	EBS and Essentials	198
	EBS with Remote OpsMgr	200
	Preview of System Center Essentials 2010	202
	Essentials 2010 Setup Experience.....	203
	Using the Essentials 2010 Virtualization Features.....	205
	Other New Essentials 2010 Features.....	208
	Summary	211
Chapter 7	Operations Manager and Virtualization	213
	The Case for VM Management	213
	Virtualization Challenges and Rewards	214
	VM Management Standards: Cloud Computing Enabler.....	215
	Managing VMs without VMM.....	216
	Choosing Not to Deploy Virtual Machine Manager	217
	Monitoring Virtual Server.....	218
	Monitoring Windows Server Hyper-V	219
	Monitoring VMware ESX with OpsMgr	220
	Installing VMM and Connecting It to OpsMgr	221
	Installing Virtual Machine Manager	222
	Integrating Operations Manager with VMM.....	225
	The VMM Management Pack	227
	ESX vCenter Integration	232
	Adding a VMware Virtualization Manager.....	232
	Managing ESX Hosts and Guest VMs	234
	Performance and Resource Optimization	236
	Enabling PRO Tips	236
	VMM Native CPU and Memory PRO Feature	237
	PRO-Enabled Vendor Management Packs.....	239
	Using VMM in DMZs and Untrusted Domains	240
	OpsMgr and VMM Agent Alternate Security Modes	240
	VMM and OpsMgr Agent Architecture Differences.....	243
	Virtualizing OpsMgr 2007 and VMM Components	244
	Summary	246
Chapter 8	Management Pack Authoring.....	247
	What's in a Management Pack?	248
	MP Authoring Tools.....	248
	The Authoring Console.....	249
	The Operations Console.....	249

An XML Editor	249
A Script Editor.....	250
Scripting in OpsMgr 2007	251
Preparing Your Development Workstation.....	251
Types of Scripts in OpsMgr 2007 Management Packs	252
Nuts and Bolts of the OpsMgr Scripting API.....	253
Logging an Event.....	254
Scripting for Health Monitoring and Displaying Performance	255
Using a Script in Discovery	256
Designing Your Management Pack	259
Identifying Application Components (Classes).....	260
How the Components Are Related (Relationships).....	260
Defining the Health Model (Health Rollup).....	261
Design Best Practices.....	262
Design Worst Practices (AKA Good Stuff NOT to Do)	262
Discovering Application Components.....	262
Discovery Best Practices.....	264
Discovery Worst Practices	264
Building Your Management Pack	264
The Point-of-Sale Batch Processing Application.....	265
Naming Conventions	265
Classes and Relationships	267
Service and Health Model in the POS Batch Processing Application.....	268
Using the R2 Authoring Console to Create Object Classes and Relationships .	269
Creating the Object Classes and Relationships	270
Object Discoveries	272
Monitoring	277
Product Knowledge.....	280
Modules: The Building Blocks of Workflows.....	280
Data Source.....	281
Condition Detection.....	281
Write Action	281
Probe Action	281
Workflow Summary.....	282
Advanced Authoring: Creating a Custom Workflow.....	283
Step-by-Step: Creating a Custom Workflow with Cook Down.....	284
Create the Custom Data Source	285
Create the Monitor Type	286
Create the Custom Unit Monitor.....	289
Create the Performance Collection Rule	290
Create a Performance View	292
Verifying Cook Down.....	296

Troubleshooting Cook Down.....	298
Reports	303
Tips for a Successful MP Authoring Experience.....	305
Summary	305
Chapter 9 Unleashing Operations Manager 2007.....	307
Distributed Environments.....	307
Explaining Distributed Environments.....	307
Distributing Management Servers and Gateways	309
Agent Deployment and Management.....	314
Remote Operations.....	317
High Availability.....	320
Clustering the OpsMgr Components.....	321
Root Management Server High Availability.....	323
Advanced Cluster Configurations	325
Clustering Alternatives	326
Business Continuity.....	327
Backup and Recovery	328
SQL Log Shipping and Database Mirroring	332
Visio Add-In for OpsMgr 2007	332
Beyond the Basics of ACS	338
ACS in OpsMgr 2007 R2.....	338
ACS Noise Filtering.....	340
ACS Access Hardening.....	341
Auditing SQL Server 2008	344
Auditing Cross Platform	347
Secure Site Log Replay.....	348
Community Resources	349
Network Monitoring Using Distributed Applications.....	350
Monitoring Redundant LAN Links	350
Using the Distributed Application Designer	351
Targeting	356
Objects in OpsMgr 2007	356
What You Can Target	358
Using Management Pack Templates	366
Using the Authoring Console to Create a Target	371
Summary	389
Appendix A OpsMgr R2 by Example	391
Active Directory MP	391
How to Install the Active Directory MP	391
Tuning/Alerts to Look for in the Active Directory MP.....	394
Active Directory Management Pack Evolution.....	407
Exchange 2007 MP	407

How to Install the Exchange 2007 MP	408
Exchange MP Tuning/Alerts to Look for	409
SQL Server MP	410
How to Install the SQL Server MP	410
SQL MP Optional Configuration	411
SQL MP Tuning/Alerts to Look for	411
SQL Server Management Pack Evolution.....	415
Windows Server MP.....	416
How to Install the Windows Server MP.....	416
Windows Server MP Tuning/Alerts to Look for.....	417
Windows Server Management Pack Evolution.....	420
Operations Manager MP.....	420
How to Install the Operations Manager MP.....	420
Operations Manager MP Tuning/Alerts to Look for	420
DNS MP	427
How to Install the DNS MP	427
DNS MP Tuning/Alerts to Look for	428
DNS Management Pack Evolution	433
Group Policy MP	433
How to Install the Group Policy MP	433
Group Policy MP Tuning/Alerts to Look for	434
Group Policy Management Pack Evolution	436
DHCP MP	436
How to Install the DHCP MP.....	436
DHCP MP Tuning/Alerts to Look for	437
DHCP Management Pack Evolution.....	439
Print Server MP	439
How to Install the Windows Print Server MP	439
Windows Print Server MP Tuning/Alerts to Look for	440
Print Server Management Pack Evolution	440
SharePoint MP.....	441
How to Install the SharePoint MP	441
SharePoint MP Tuning/Alerts to Look for	441
Configuration Manager MP	443
How to Install the Configuration Manager MP	443
How to Configure the Configuration Manager MP	444
Configuration Management MP Tuning/Alerts to Look for	447
TMG MP	447
How to Install the TMG MP	447
How to Configure the TMG MP	448
TMG MP Tuning/Alerts to Look for	453

Appendix B	Reference URLs.....	455
	General Resources.....	455
	Microsoft's OpsMgr Resources.....	464
	Blogs	467
	OpsMgr Shell	469
	PowerShell Information.....	470
	Cross Platform.....	471
	Connectors.....	471
	The System Center Family	472
	Public Forums	473
Appendix C	Available Online	475
	SQL Server Resources.....	475
	Authoring Resources	476
	ACS Resources.....	476
	Reference URLs	477
	Index.....	479

This page intentionally left blank

Foreword

To all of our customers...In 2000, Microsoft acquired a technology license for the software that became Microsoft Operations Manager (MOM) 2000 and later MOM 2005. In ten years, things have changed. Long gone are those days where applications lived on standalone web servers; instead there is a new era of distributed applications, spread across multiple devices including both Windows and non-Windows platforms. This is the reality of the data center, and it is where Microsoft needs to be for our customers.

When designing System Center Operations Manager 2007, we realized we needed to answer some questions on how to tie all this together and create relationships between objects that constructed these applications. Messaging, for example, consists of many parts, like storage, servers, services, and devices. On the same note, we needed to build and enhance native management packs for key workloads such as SharePoint, SQL Server, and Active Directory—applications business critical to the success of our customers.

Operations Manager 2007, the successor to MOM 2005, allowed the server to take a back seat in the monitoring space and brought to light a new notion of monitoring objects. This required some fundamental architectural changes; for example, management packs are no longer in binary format, but rather XML. This required customers to reinvest in management pack authoring and tooling because, architecturally speaking, our design was so different, and most legacy management packs couldn't convert cleanly. Making big investments in performance and scale was paramount, including the number of agents supported per management group and management server. We extended scale for URL monitoring in bulk by adopting the Bulk URL Editor (BUE) tool. We added process monitoring and extended functionality around service monitoring, and provided SLA reports and dashboards—key to enabling our customers to have the “big picture” overview of service management.

We always envisioned monitoring the data center and to achieve this needed to reach our Unix and Linux operators. We had to meet this group in the middle and decided to build our agent on open source technologies, namely OpenPegasus. In non-traditional Microsoft fashion, we open sourced our providers and are working toward submitting our changes to the OpenPegasus group for integration into their code. Today, OpsMgr 2007 R2 supports over 19 non-Windows platforms, including Red Hat and Solaris. We needed to make it easy to find and import management packs from the console—so with the R2 release you can now import and install management packs using the integrated web service that automatically resolves dependencies on the fly. Users missed the MOM 2005 capability to right-click an alert and create a notification subscription—we added it. Users wanted the ability to view the Health Explorer from the Web console—we added that. Users wanted an Override summary to help manage their overrides—we added this as well.

Our Microsoft Management Pack ecosystem continues to thrive with over 100 application and server management packs, including key workloads such as Exchange, SQL, BizTalk, Hyper-V, Windows Server, IIS, and SharePoint. The external ISV partners are steadily growing in numbers. Solutions such as management packs, connectors, and tools help our customers monitor applications like Oracle, SAP, MySQL, VMWare, JBoss, and Apache; devices like Cisco, APC, and Juniper; and hardware from IHWs. These connect to all sorts of other enterprise management products, help desks, and much more. We do this to enable you to have the best monitoring environment possible using the Microsoft platform!

—Justin Incarnato, Microsoft

This page intentionally left blank

Preface

System Center Operations Manager (OpsMgr) 2007, released in March 2007, was a complete rewrite of the Microsoft Operations Manager 2005 product, monitoring Windows operating systems and applications. Unlike MOM 2005, Operations Manager 2007 focuses on the health of applications and components, as opposed to looking at the status of individual servers.

Its first service pack (March 2008; released just as *System Center Operations Manager 2007 Unleashed* was published) smoothed out some of the more glaring problems introduced with the base release. In May 2008, Microsoft announced the Cross Platform Extensions (X-Plat) for OpsMgr 2007 as part of a second service pack anticipated for 2009. The X-Plat capabilities enable monitoring non-Windows platforms (Linux/Unix), incorporated into the OpsMgr interface.

Microsoft later decided to bundle X-Plat with other enhancements and bug fixes into a R2 release, publicly announced at TechEd/ITForum in November 2008, and released on May 22, 2009. These other enhancements include, but are not limited to, the following:

- Windows 2008, IIS 7, and SQL Server 2008 platform
- Updated management packs for monitoring operating systems, services, and applications
- New templates for ease of use
- Improved process monitoring and maintenance mode support
- Additional functionality for the Web console, now able to access the Health Explorer to drill-down into health of individual components
- A more intuitive reporting interface, making it easier to generate reports
- Performance enhancements

This work, a supplement to *System Center Operations Manager 2007 Unleashed*, provides in-depth reference and technical information about Microsoft System Operations Manager 2007 including its R2 release, as well as information on other products and technologies on which its features and components are dependent.

Chapter 1, “Introduction and What’s New,” takes up where the original *System Center Operations Manager 2007* ended, bringing you up to date on changes with SP 1 and introducing the R2 release. Chapter 2, “Unix/Linux Management: Cross Platform Extensions,” jumps into the most publicized change in R2: those cross platform extensions that allow Unix/Linux management. Chapters 3, “Operations Manager 2007 R2 and Windows Server 2008,” and 4, “Using SQL Server 2008 in OpsMgr 2007 R2,” discuss using Windows Server 2008 and SQL Server 2008 in OpsMgr 2007 R2.

The next set of chapters discusses intertwined technologies. Chapter 5, “PowerShell Extensions for Operations Manager 2007,” covers PowerShell and the OpsMgr Shell, Chapter 6, “Management Solutions for Small and Midsize Business,” looks at management approaches for smaller-sized businesses, and Chapter 7, “Operations Manager and Virtualization,” discusses virtualization in the context of Operation Manager and Microsoft.

The last two chapters take a “deep dive” into several areas of Operations Manager 2007. This includes authoring, discussed in Chapter 8, “Management Pack Authoring,” and high availability, business conti

nuity, the new Visio add-in, ACS in-depth, and targeting, covered in Chapter 9, “Unleashing Operations Manager 2007.” These topics are presented by subject-matter experts in each area.

In keeping with being supplemental to *System Center Operations Manager 2007 Unleashed*, Appendix A, “OpsMgr R2 by Example,” is an update of the *OpsMgr by Example* series published with the first book, and Appendix B, “Reference URLs,” updates reference URLs, with nearly 300 useful links. Several chapters reference additional online content, which is described in Appendix C, “Available Online.” You can download the online content from

<http://www.informit.com/store/product.aspx?isbn=0672333414>.

System administrators in both Windows and Linux/Unix platforms should be interested in learning about the cross platform monitoring capabilities. The material will continue to be of interest for those shops that have not yet migrated from MOM 2005 to OpsMgr 2007, and the new material in this book will be of interest to those who previously purchased *System Center Operations Manager 2007 Unleashed*.

About the Authors

Kerrie Meyler, Operations Manager MVP, is an independent consultant and trainer with more than 15 years of Information Technology experience, including work as a senior technical specialist at Microsoft. Kerrie is the lead author of *Microsoft System Center Operations Manager 2007 Unleashed* (Sams, 2008), *System Center Configuration Manager 2007 Unleashed* (Sams, 2009), and *Operations Manager 2005 Unleashed* (Sams, 2006). She participated in the alpha walkthrough for Microsoft Certification Exam 70-400, “Configuring Microsoft System Center Operations Manager 2007.” Kerrie has presented at numerous Microsoft conferences, including TechEd 2007 and MMS 2009.

Cameron Fuller, Operations Manager MVP, is a Principal Consultant for Catapult Systems, an IT consulting company and Microsoft Gold Certified Partner. He focuses on management solutions, with 15 years of infrastructure experience. Cameron is co-author of *System Center Operations Manager 2007 Unleashed* (Sams, 2008) and *Microsoft Operations Manager 2005 Unleashed* (Sams, 2006), and a contributor to *System Center Configuration Manager 2007 Unleashed* (Sams, 2009). Cameron has presented at numerous Microsoft conferences, TechEd 2005/2007/2008, and MMS 2008/2009.

John Joyner, Operations Manager MVP, is a senior architect at ClearPointe, a provider of remote server management and hosted Network Operations Center (NOC) services based on Operations Manager to customers and partners around the world since 2001. John is a co-author of *System Center Operations Manager 2007 Unleashed* (Sams, 2008) and contributing author of *Microsoft Operations Manager 2005 Unleashed* (Sams, 2006). John presented on Microsoft systems management technologies at the Worldwide Partner Conference Denver 2007, ITForum Barcelona 2007, and MMS 2008/2010. He was the Track External Advisor for the Virtualization track at TechEd 2009.

Andy Dominey, Operations Manager MVP from 2006 to 2009, is currently working as a Principal Operations Manager Consultant at 1E, a Microsoft Partner specializing in Windows Management. Andy is a contributing author to *System Center Operations Manager 2007 Unleashed* (Sams, 2008) and co-authored *Microsoft Operations Manager 2005 Field Guide* (Apress, 2006). Andy has written various magazine articles and hosted TechNet webcasts highlighting the technology. He has also worked with Microsoft, making substantial contributions to high-availability aspects of OpsMgr 2007. Andy co-presented with Kerrie at MMS 2009.

This page intentionally left blank

Dedication

*To Justin Incarnato, the heartbeat of the OpsMgr community.
—With deep thanks from Kerrie, Cameron, John, and Andy*

Acknowledgments

This book would not be possible without the help of many individuals. The authors would like to thank (in alphabetical order) Jeremiah Beckett, Justin Incarnato, Cleber Marques, Steve Rachui, Marco Shaw, Alexandre Verkinderen, and Pete Zerger for assisting with content. Thanks also to Raymond Chou, Maarten Goet, Barry Shilmover, Marnix Wolf, and Alexey Zhuravlev for their input, and Rory McCaw for being our technical editor. And of course, thanks to the entire OpsMgr product team at Microsoft and our fellow Operations Manager MVPs!

In addition, we would like to thank ClearPointe Technology for the use of lab equipment supporting the environment used throughout this book, and Roger Myers from Sun Systems both for his loan of Sun equipment and for his assistance with debugging the OpsMgr deployment in Unix/Linux.

Thanks also go to the staff at Pearson, in particular to Neil Rowe, who has worked with us since *Microsoft Operations Manager 2005 Unleashed* (Sams, 2006).

We Want to Hear from You!

As the reader of this book, *you* are our most important critic and commentator. We value your opinion and want to know what we're doing right, what we could do better, what areas you'd like to see us publish in, and any other words of wisdom you're willing to pass our way.

You can email or write me directly to let me know what you did or didn't like about this book—as well as what we can do to make our books stronger.

Please note that I cannot help you with technical problems related to the topic of this book, and that due to the high volume of mail I receive, I might not be able to reply to every message.

When you write, please be sure to include this book's title and author as well as your name and phone or email address. I will carefully review your comments and share them with the author and editors who worked on the book.

Email: feedback@samspublishing.com

Mail: Neil Rowe
Executive Editor
Sams Publishing
800 East 96th Street
Indianapolis, IN 46240 USA

Reader Services

Visit our website and register this book at informit.com/register for convenient access to any updates, downloads, or errata that might be available for this book.

CHAPTER 1

Introduction and What's New

IN THIS CHAPTER

- ▶ Licensing Updates
- ▶ New in Service Pack 1
- ▶ R2 Highlights and Capabilities

In March 2007, Microsoft released System Center Operations Manager (OpsMgr) 2007, developed under the codename Microsoft Operations Manager (MOM) V3. OpsMgr 2007 is completely re-architected and is a total rewrite from its MOM 2005 predecessor. In fact, it is so much of a rewrite that many longtime MOM 2005 administrators and fans feared the worst for the new version in terms of stability and performance—and there were definitely some early issues with the released to manufacturing (RTM) build. However, OpsMgr 2007 has come of age, as evidenced by Gartner Group's July 2009 Magic Quadrant for IT Event Correlation and Analysis report (https://h10078.www1.hp.com/bto/download/Gartner_Magic_Quadran_IT_Event_Corr_Analysis.pdf), which, similar to their December 2007 report (<http://mediaproducts.gartner.com/reprints/microsoft/vol10/article2and3/article2and3.html>), places Operations Manager 2007 R2 firmly in the Challengers quadrant (see Figure 1.1).

The gist of the Gartner report is that OpsMgr 2007 contains some major enhancements in comparison to the functionality in MOM 2005, with a focus in monitoring Windows environments. Gartner notes that the R2 release adds non-Windows management, but suggests it still has a way to go when managing non-Microsoft IT elements. This appears to be at least in part because Microsoft relies on third parties to provide management packs to monitor non-Microsoft applications. Microsoft provides the technology to manage Unix/Linux operating systems, but in terms of application monitoring chooses to focus on its own applications such as Exchange, SQL Server, Active Directory, and Internet Information Services. (See Chapter 2, "Unix/Linux Management: Cross Platform Extensions," for a discussion on Unix/Linux integration.)

System Center Operations Manager 2007 Unleashed, the predecessor to this book, was published in February 2008, just as Microsoft released OpsMgr 2007 Service Pack (SP) 1. Although

that book tried to the best of its ability to cover all the improvements in the service pack by discussing enhancements as of the SP 1 Release Candidate (RC), Microsoft added several changes to the released version that were not in the RC. Therefore, this book takes up where the previous leaves off—with a summary of the SP 1 changes, an in-depth look at the R2 release, and a “deep dive” into some of the key capabilities of OpsMgr 2007 through Cross Platform Cumulative Update 2 (CU2) for R2.

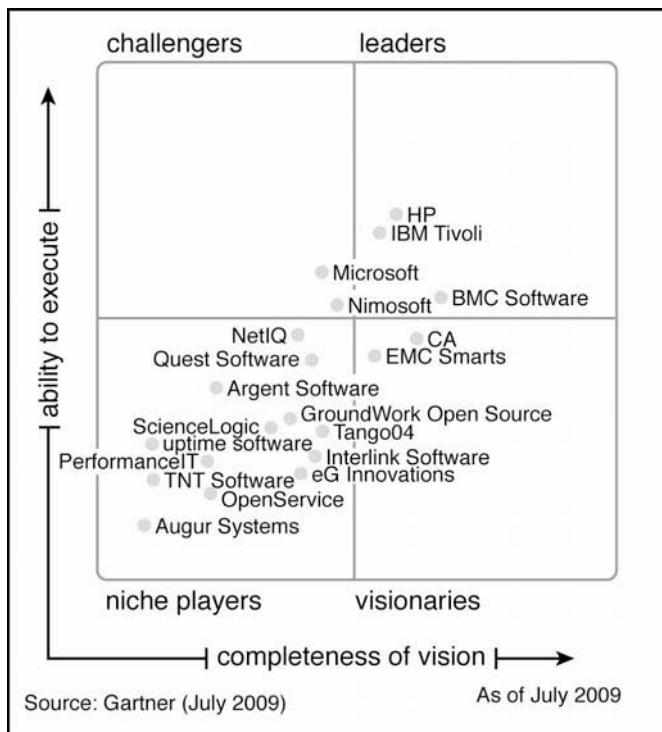


FIGURE 1.1 Gartner’s Magic Quadrants for IT Event Correlation and Analysis, December 2007

This chapter highlights the changes to Operations Manager 2007, beginning with the release of SP 1.

Licensing Updates

There are two areas to be cognizant of regarding licensing and OpsMgr 2007 R2—licensing for the System Center Server Management Suite and licensing of cross platform applications. The next sections discuss this information.

Licensing Changes to the System Center Server Management Suite

In conjunction with the R2 release, Microsoft is changing licensing for the System Center Server Management Suite. Here are the products included in this suite:

- ▶ System Center Operations Manager (SCOM) 2007 and SCOM 2007 R2
- ▶ System Center Data Protection Manager 2007
- ▶ System Center Virtual Machine Manager 2008
- ▶ System Center Virtual Machine Manager 2008 Management Server License
- ▶ System Center Configuration Manager 2007
- ▶ System Center Service Manager 2010

The July 2009 changes to Server Management Suite licensing include the following:

- ▶ The System Center Server Management Suite Enterprise (SMSE) offering changes from an unlimited operating system environment to a four-system operating system environment, limited license, with a corresponding 20 percent price decrease.
- ▶ A new suite offering System Center Server Management Suite Datacenter (SMSD) includes the same products as SMSE, but is licensed per processor and provides for managing an unlimited number of operating system environments.

OpsMgr 2007 will continue to use Standard and Enterprise Server management licenses (MLs). Here is when you do not need a ML:

- ▶ Any Operating System Environments (OSEs) running instances of the server software on your licensed servers
- ▶ Any OSEs in which no instances of software are running
- ▶ System Center Data Protection Manager 2007
- ▶ Any devices functioning only as network infrastructure devices (OSI Layer 3 or below)
- ▶ Any devices for which you are exclusively performing out-of-band management

Microsoft provides the following links with more detailed information. You will want to check them for updates:

- ▶ **Product Licensing Web and Product Use Rights—**
<http://www.microsoftvolumelicensing.com/userights/PUR.aspx>.
- ▶ **Operations Management Licensing—**
<http://www.microsoft.com/systemcenter/operationsmanager/en/us/operations-management-licensing.aspx>.
- ▶ **Pricing and Licensing—**
<http://www.microsoft.com/systemcenter/operationsmanager/en/us/pricing-licensing.aspx>.

Licensing of Cross Platform Applications

The other area of consideration is whether cross-platform monitoring requires a Standard or Enterprise ML. According to Microsoft, if an application is monitored, the license required is Enterprise ML regardless if it is a Microsoft or non-Microsoft application. As an example, if you are just monitoring a Linux server, you need a Standard ML. If that Linux Server is running a Bridgeways MP for MySQL, you must purchase an Enterprise ML to monitor the application. This also means that should you create a monitor that monitors an application process or service (on any operating system), you would need to purchase an Enterprise ML to license it correctly.

New in Service Pack 1

Service Pack 1 is available from Microsoft both as a standalone executable file for upgrading an existing OpsMgr 2007 installation, and a slipstreamed installation enabling you to install both OpsMgr 2007 and the service pack at the same time. Both versions are available for x86 and x64 (32- and 64-bit) computer systems. The link at <http://technet.microsoft.com/en-us/opsmgr/cc280350.aspx> lets you download the slipstreamed evaluation copy of SP 1 and the SP 1 upgrade bits for existing installations.

Those bugs fixed with the SP 1 release are listed in Knowledge Base (KB) article 944443, at <http://support.microsoft.com/default.aspx/kb/944443>. In addition, Microsoft now has an update rollup for SP 1, available at <http://www.microsoft.com/downloads/details.aspx?FamilyID=05d7785d-fe69-48bc-8dfa-72a77c8936bf&displaylang=en>. This combines previous hotfix releases for SP 1 with additional fixes and support of SP 1 roles on Windows 7 and Windows Server 2008 R2. The update also provides database role and SQL Server Reporting Services upgrade support from SQL Server 2005 to SQL Server 2008.

SP 1 Highlights

OpsMgr 2007 SP 1 updates and enhancements include the following:

- ▶ Improved performance and stability for alerts, overrides, and searches:
 - ▶ Improved fetching capabilities have increased the performance of alert views.
 - ▶ Alert row selection is up to three times faster than in the base release.
 - ▶ Search improvements enable the ability to perform advanced searches across monitors and rules by their overrides.
- ▶ Support for Simple Network Management Protocol (SNMP) v1 network devices. The base release supported SNMP v2 only. The discovery wizard allows you to select which SNMP version to use.

- ▶ Capability to export Operations Manager 2007 diagrams to Microsoft Visio XML Diagram (VDX) file format.
- ▶ A Visio button is located on the toolbar in the Diagram view. Diagram layouts can be saved and are remembered when that view is selected again.
- ▶ Support for copy and paste (CTRL C and CTRL V functions) from the Alert details pane.
- ▶ Support for earlier versions of email servers, correcting an issue that could result in malformed data in the subject line of email notifications.
- ▶ Ability to copy views from an existing management pack to an unsealed management pack.
- ▶ Overrides Summary Box enables you to view overrides for an object.
- ▶ Ability to use scripts with diagnostic tasks.
- ▶ Incorporates the OpsMgr VSS Writer Service, enabling you to create shadow copies.
- ▶ Ability to publish reports to multiple locations—for example, Microsoft Windows SharePoint Services websites.
- ▶ Ability to view performance data through the Operations Manager Web console, with filters for desired performance counters to ease searching and navigation.
- ▶ Increase in the number of command notifications that can be handled simultaneously from 5 in OpsMgr 2007 SP 1 to 200 in the R2 release. This is configurable in the Registry by creating a key at HKEY_LOCAL_MACHINE\Software\Microsoft\Microsoft OperationsManager\3.0\Modules\Global\Command Executer\AsyncProcessLimit REG_DWORD:0x0000000a. Note that every command notification triggered will start a monitoringhost.exe process on the root management server (RMS); this can lead to memory and processor issues if you do not have enough memory and processor power to support it.
- ▶ New discoveries and views added to the Audit Collection Services (ACS), along with new monitors and alerts to track the health of ACS collectors.
- ▶ Support for clustering the ACS database.

Gateway Enhancements

With the base release of OpsMgr 2007, gateway servers only supported a maximum of 200 agents, making them unsuitable for any purpose other than monitoring DMZs and small untrusted networks. Beginning with SP 1, gateways have been tested to 800 agents and, depending on the hardware configuration and WAN link specifics, could theoretically support many more. Although management servers are able to support up to 2,000 agents since SP 1, gateways are a welcome alternative in complex, distributed environments, as they forward compressed data from multiple agents to a management server using a sustained connection; the management server then manages the connection to the database. More information on how gateway servers can help in a distributed environment is available in Chapter 9, “Unleashing Operations Manager 2007.”

Clustered RMS Enhancements

With SP 1, Microsoft tried to make the RMS recovery story a bit better. New with the OpsMgr 2007 architecture, the RMS is a single point of failure; one approach to alleviate that is to cluster the RMS. However, if your clustered RMS failed in the RTM release and you then promoted a management server to become the RMS, you were unable to later repromote the failed cluster to the RMS role. This was remedied in SP 1. See Chapter 9 for a discussion on RMS high availability.

RMS Encryption Key Backup

One of the more vocal criticisms of the OpsMgr 2007 RTM was its single point of failure with the RMS. If the RMS fails and there is no backup of the encryption key, you must reinstall the entire management group! SP 1 adds the Secure Storage Backup Wizard at the end of the OpsMgr setup process, displayed in Figure 1.2, providing a backup of the RMS encryption key.

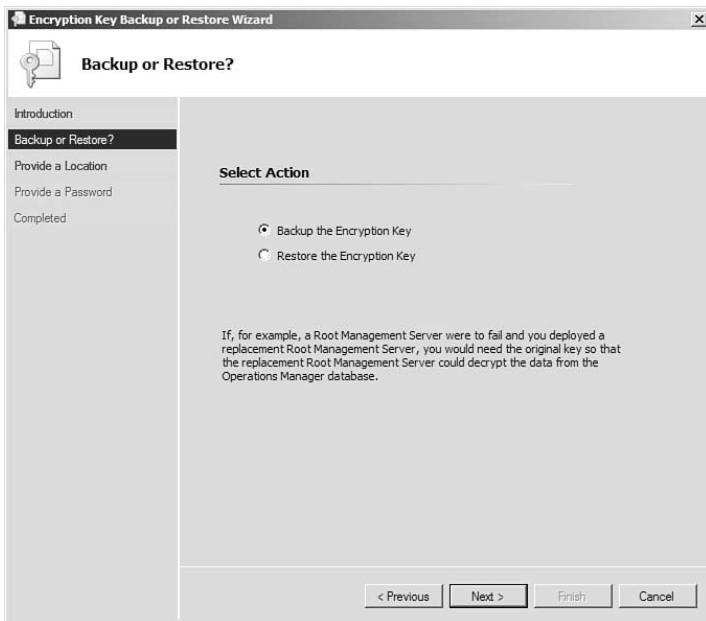


FIGURE 1.2 Option to back up RMS key after OpsMgr installation

You will use this key if you need to recover an Operations Manager management group; without a copy of the key, you cannot recover your Operations Manager environment. Prior to SP 1, there was no automated process to back up the encryption key.

OpsMgr 2007 SP 1 also introduces a CREATE_NEWKEY command switch to make recovery easier. Details on this application are available on the Manageability Team

Blog at <http://blogs.technet.com/smsandmom/archive/2007/12/05/opsmgr-2007-what-if-i-lose-my-rms-encryption-key.aspx>.

The best practice is to back up your RMS key, so accept the default configuration at the completion screen to start the Encryption Key Backup or Restore Wizard. The wizard first displays an introduction screen, and then asks if you want to back up or restore the key, as shown in Figure 1.3.

The wizard continues by asking where to back up the RMS key, asks for a password, and then completes the process. It is highly recommended to store a copy of the backup key on your other management servers so it is local in the event of an emergency. Also, ensure that the password for the key is stored with the key; otherwise, you will not be able to restore the key.



FIGURE 1.3 Encryption Key Backup or Restore Wizard

R2 Highlights and Capabilities

The Gartner Group report on OpsMgr 2007, referenced at the beginning of this chapter, notes the product's greatest weakness to be its lack of monitoring non-Microsoft platforms. Historically, Operations Manager 2007's strength is in monitoring the Windows environment and lessens when managing non-Microsoft IT systems and devices, whether using Microsoft or third-party add-ons to provide management capabilities. Enter the R2 release—which incorporates cross-platform monitoring!

At the Microsoft Management Summit (MMS) in 2008, Microsoft's annual conference on managing the Windows platform, Microsoft announced the upcoming enhancement of cross-platform monitoring, also known as X-Plat. Not only was OpsMgr going to change to encompass monitoring of non-Windows platforms, but the code would be open source. To add some humor to what was a seismic shift in direction by the company (pigs would fly!), Microsoft distributed pigs...with wings, an illustration of which is displayed in Figure 1.4.

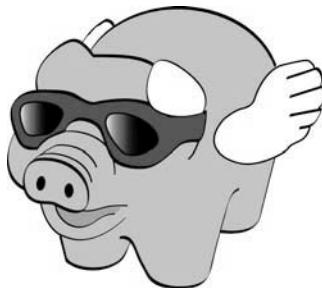


FIGURE 1.4 Pigs flew when Microsoft announced cross-platform monitoring for OpsMgr.

X-Plat was initially going to be part of a service pack; however, at TechEd-Europe in November 2008, Microsoft announced that X-Plat and other changes would be bundled into an R2 release.

In addition to extending OpsMgr 2007 monitoring capabilities to Unix and Linux environments using the familiar Operations Manager console, R2's integration with System Center Virtual Machine Manager (VMM) 2008 enables maximizing availability of virtual workloads. But that's not all—in addition to getting a facelift with new skins (see Figure 1.5), the R2 release includes numerous other performance and functionality enhancements. R2 also resolves quite a few bugs and incorporates a number of hotfixes—see KB article 971410 at <http://support.microsoft.com/kb/971410/> for the list.

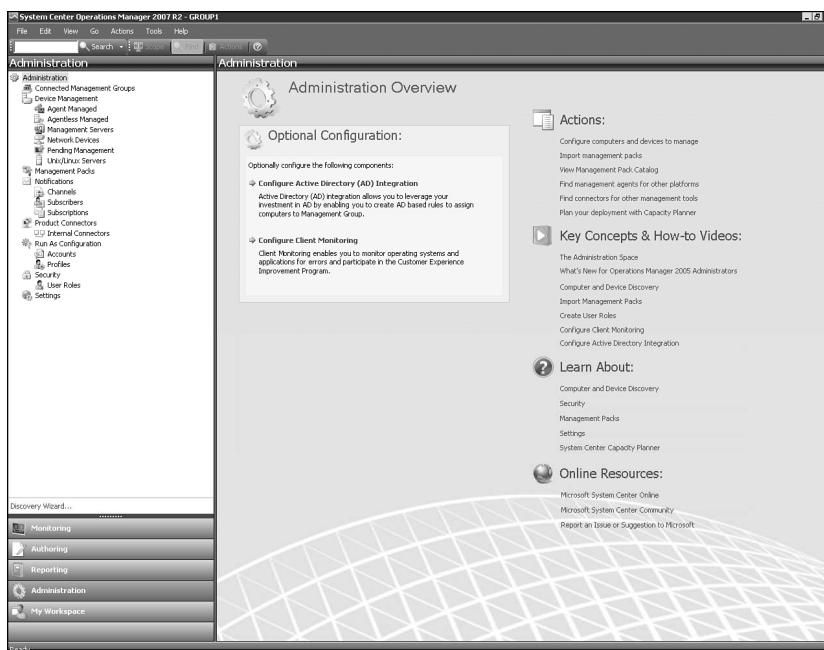


FIGURE 1.5 The new skin of the R2 Operations console

NOTE: RENAMED COMPONENTS AND SERVICES

As part of the OpsMgr R2 release, Microsoft has renamed the Operations Manager Command Shell to Operations Manager Shell. The three Windows services used in OpsMgr deployments are renamed as well:

- ▶ The OpsMgr SDK Service is now System Center Data Access.
 - ▶ The OpsMgr Health Service became System Center Management.
 - ▶ The OpsMgr Config Service is System Center Management Configuration.
-

Successive chapters of this book cover in detail many of the new features in R2, with the remainder of this chapter discussing those topics not discussed elsewhere.

Importing Management Packs

Both MOM 2005 and OpsMgr 2007 support downloading management packs (MPs) from the System Center Management Pack Catalog (<http://pinpoint.microsoft.com/en-US/systemcenter/managementpackcatalog>) using a web browser outside the Operations Manager console. New with R2 is the capability to download MPs within the Administration node in the console. To download management packs from the OpsMgr console, perform the following steps:

1. In the OpsMgr console, navigate to Administration -> Management Packs. From the Actions pane on the right side, select the Download Management Packs task to open the Download Management Packs wizard.
2. The first screen of the wizard asks you to select a local folder in which to store the downloaded management packs. Click on the Browse button to browse to a folder such as c:\Management Packs.
3. Now, click the Add button in Figure 1.6 to find the management packs you want to download.
4. When selecting management packs, the search criterion in the View section of the Select Management Packs from Catalog page enables you to select one of the following search options:
 - ▶ All management packs in the catalog
 - ▶ Updates available for installed management packs
 - ▶ All management packs released within three months
 - ▶ All management packs released within six months

For this example, the search is for updates to installed management packs. Figure 1.7 shows the results.

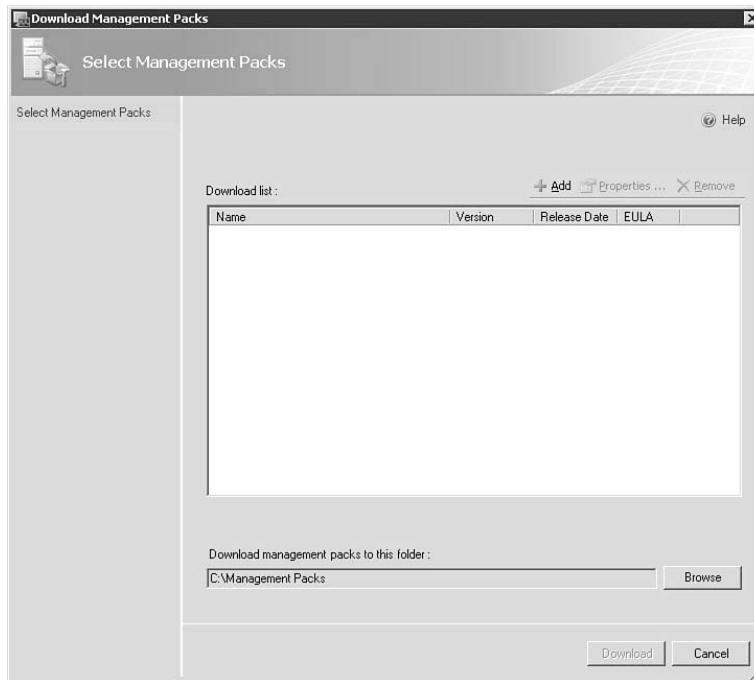


FIGURE 1.6 Select the Add button to add management packs to the download list.

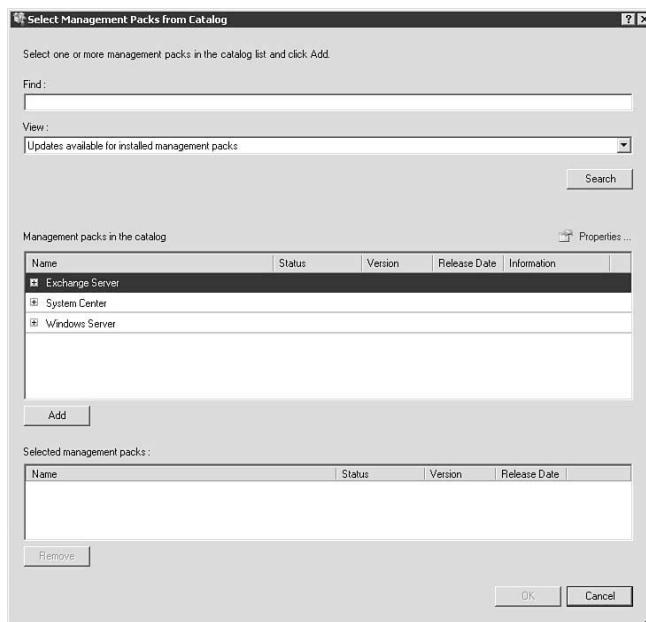


FIGURE 1.7 The list of installed management pack updates shows updates for Exchange, System Center, and Windows.

5. You can expand the categories to see the specific management packs available within each area. Click on the Add button in Figure 1.7 to select specific management packs.
If there are dependencies on other management packs or versions, you will be alerted to this in the download wizard and can select to download those to resolve the issue. Should a management pack contain potentially harmful content, it will alert you to this as well and allow you to view that content.
6. Complete your selection, and then select OK to view the download list and begin the download. Figure 1.8 shows the download list for the Hyper-V 2008 management pack.
7. After downloading the management packs to disk, you can use the Import Management Packs task in the Actions pane to import the management packs into your management group.

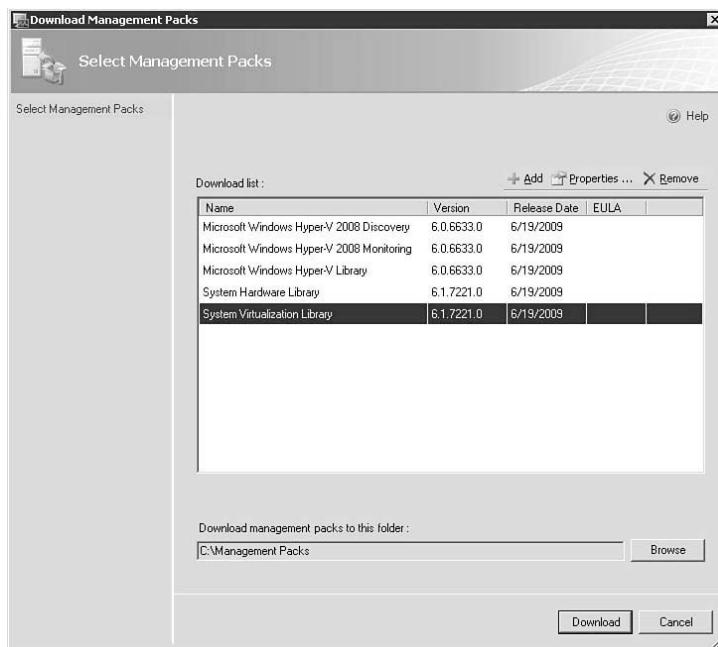


FIGURE 1.8 The list of management packs to download

New and Updated Templates

A *template* serves as a starting point. **OpsMgr 2007** provides **templates** for several object types to help make it easier to create custom objects. R2 brings additions and enhancements to the templates existing in the RTM and SP 1 releases of OpsMgr 2007. The next sections discuss the Process Monitoring Template, Windows Service

Management Pack Template, and OLE DB Management Pack Template. You will find the list of Management Pack templates in the Authoring node of the Operations Manager console. This list will vary based on the management packs loaded into your management group. Other templates new to R2 include Unix/Linux LogFile and Unix/Linux Service. To initiate the wizard for any of the Management Pack templates, right-click on that template, choose Add Monitoring Wizard, and then select the monitoring type.

Process Monitoring Template

Prior to R2, there were ways to monitor processes, but they were a bit clunky and required custom monitors and scripts. The authors of *System Center Operations Manager 2007 Unleashed* have firsthand experience with this, as they wrote a process monitor available with that book! The new Process Monitoring template enables you to specify a number of criteria when monitoring a process, as follows:

- ▶ Defining scenarios both for processes you want and for unwanted processes.
- ▶ Targeting a group; this narrows the scope of the monitor.
- ▶ Specifying the minimum and maximum number of process instances and duration, and choosing to generate an alert if the process runs longer than that duration.
- ▶ Generating an alert if CPU usage or memory usage exceeds a specified threshold, and indicating the number of consecutive samples that should exceed a threshold before generating an alert.

Figure 1.9 shows part of the configuration of a monitor created using this template.

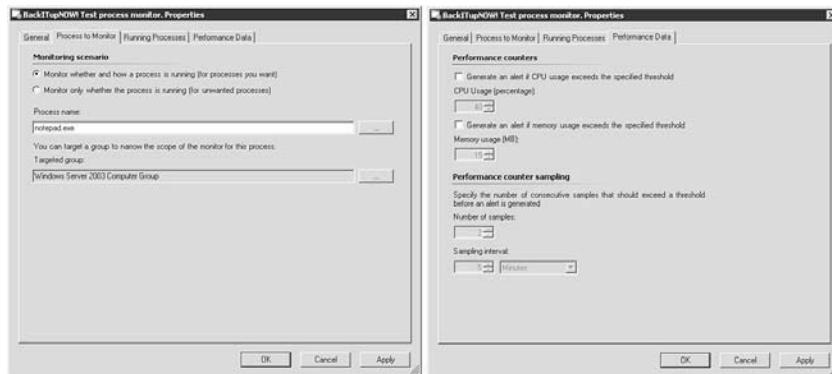


FIGURE 1.9 Using the OpsMgr 2007 R2 Process Monitoring template

Windows Service Management Pack Template

The Windows Service template lets you discover and monitor a Windows service by doing little more than typing in the service name. This template was first available with the RTM version of OpsMgr 2007 and performs the following two functions:

- ▶ Creates a new class (target) for your service

- ▶ Creates a discovery to find instances of that new class

The RTM release had several issues, as follows:

- ▶ There was no support for wildcards, although Brian Wren's article at <http://blogs.technet.com/brianwren/archive/2008/03/07/using-wildcards-with-the-windows-service-template.aspx> presents a solution replacing the discovery with a WMI discovery module providing wildcard support.
- ▶ The template only enabled you to select services created with SERVICE_WIN32_OWN_PROCESS; monitoring other services required creating a unit monitor.

The R2 version enables wildcard entry to select multiple, similarly named services.

OLE DB Management Pack Template

Enhancements to the OLE DB template allow operators to identify the database and set thresholds for connection, query, and fetch times (see Figure 1.10), and to type or paste a custom query to run against the remote OLE DB data source. You can use this template to simulate synthetic transactions from a user perspective.

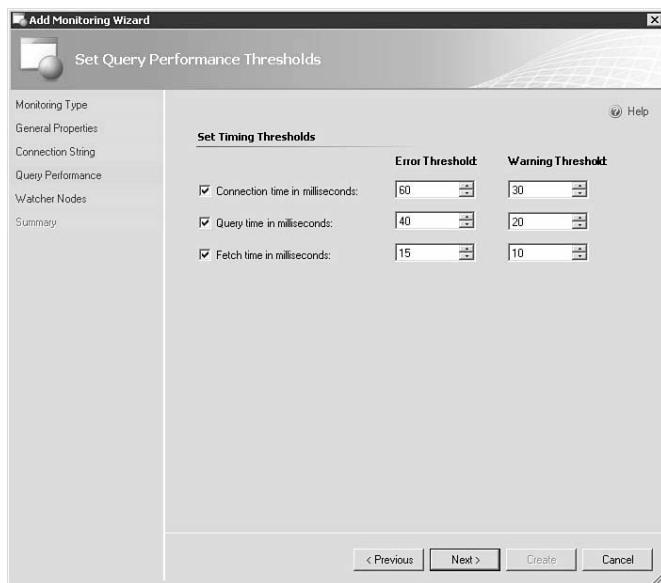


FIGURE 1.10 Setting Timing Thresholds in the OLE DB Management Pack template

Note that if you created an OLE DB monitor using an earlier release of OpsMgr 2007, you must upgrade it to the new template before saving any additional changes to the monitor. Open the Properties page to upgrade the template automatically; then click OK at the end of the upgrade process.

User Interface

Operations console performance is greatly improved in R2. Here are the areas where improvements are most evident:

- ▶ Opening new views in the monitoring space
- ▶ Pivoting between views
- ▶ Selecting multiple items in the Results view and rendering the Details pane more quickly
- ▶ Indicating that a view is in the progress of loading

Other interface enhancements include the Overrides Summary and a search tool to assist in creating dashboard views:

- ▶ The Overrides Summary View enables you to view all rule and monitor overrides for sealed and unsealed management packs, and you can customize it by grouping items by multiple column headers.
- ▶ When you create a dashboard view, you populate the different panes in the dashboard with individual, existing views. The R2 release provides a search tool you can use to find the views you want quickly. The search also includes views that you have created in My Workspace.

Run As

With Operations Manager 2007 R2, Microsoft added distribution and targeting features for Run As Accounts and Run As Profiles. When you associate a Run As Account with a particular Run As Profile, R2 lets you target the profile to any class available in Operations Manager and see the logical relationship between the two. Both Run As Account distribution and Run As Account targeting must be correctly configured for the Run As Profile to work properly.

You can specify which computers will receive the Run As Account credentials. You can choose to distribute the Run As Account credentials to every agent-managed computer (less secure) or only to selected computers (more secure). As an example, say you have a script that runs as a response to a monitor or a script that performs some level of monitoring against a SQL Server database. Rather than associating the profile with the agent, you can choose to associate the profile with a database instance or with the SQL Server Database Engine for that agent. This enables you to target the profile by group, object, or instance class. Chapter 9 discusses how targeting works. For additional information on Run As Profiles and Run As Accounts, see <http://technet.microsoft.com/en-us/library/bb735423.aspx>.

IIS 7 and ASP.NET 64-Bit Apps

R2 adds support for monitoring Internet Information Services (IIS) 7, without having to enable the backward compatibility APIs or legacy management features. Operations

Manager 2007 R2 also discovers and monitors 64-bit ASP.NET applications running on IIS servers.

Large-Scale Monitoring of URLs

R2 now supports up to 2,000 URL monitors per management server. The overall capacity of URL monitors increases commensurately for the management group.

Maintenance Mode

R2 streamlines the process of placing a computer and all its related objects into maintenance mode, as follows:

- ▶ You can put an entire computer into Maintenance mode—This automatically puts the Health Service and the associated Health Service watcher into maintenance mode, which suppresses all alerts on that computer.
- ▶ Management pack authors can specify what should be included in an alert and how it is formed when a monitor comes out of maintenance mode.
- ▶ Alerts are generated on HealthService heartbeat failures after exiting out of maintenance mode.

32-Bit Performance Counter Support on 64-Bit Systems

When running 32-bit applications on a 64-bit operating system (OS), unless the pre-R2 OpsMgr agent is 32-bit, you cannot monitor those applications. However, if you are running the 32-bit agent, you will not be able to monitor 64-bit applications or the OS itself. OpsMgr 2007 R2 incorporates a module change, allowing management packs to query the 32-bit registry hive on a 64-bit Windows installation to perform discoveries successfully. This change is also available in a SP 1 hotfix.

Configuration Manager (ConfigMgr) 2007 is one example of a 32-bit application that has trouble being monitored in a 64-bit environment prior to OpsMgr 2007 R2. The ConfigMgr 2007 management pack for OpsMgr 2007 R2 is updated to take advantage of the new discovery method. ConfigMgr 2007 SP 2 will also have native 64-bit performance counters added.

Web Console (Health Explorer)

R2 adds the Health Explorer to the Web console, giving the Web console operational parity with the Operations Manager console for monitoring capabilities. Figure 1.11 displays the Web Health Explorer for one of the servers in the domain used in this book: Odyssey.com.

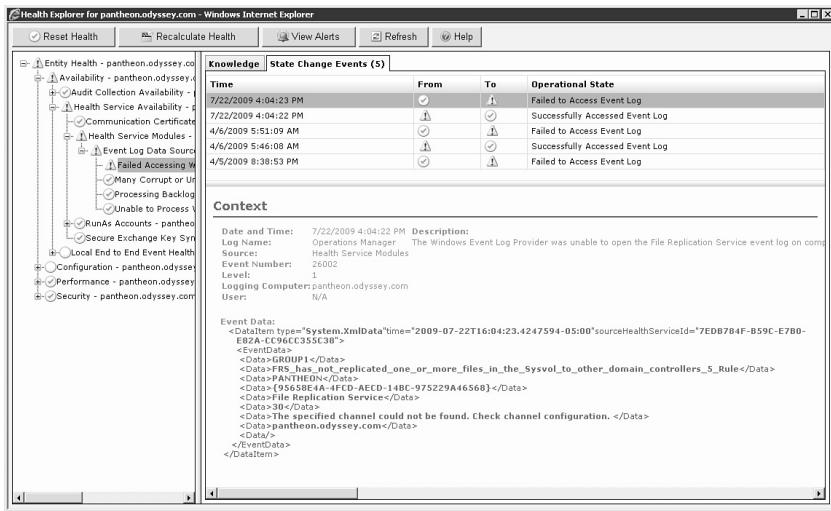


FIGURE 1.11 Viewing the Health Explorer using the R2 Web console

Notification Subscription Wizard

R2 totally restructures the notification feature, making it easier to set up notifications. The Notifications folder in the Administration node contains folders for Channels, Subscribers, and Subscriptions:

- ▶ A notification is sent by channels; examples are SMTP, instant messaging, or command.
- ▶ Subscribers are the entities that receive a notification; an example is user@odyssey.com.
- ▶ Subscriptions describe what the subscriber will be notified of and the schedule for those notifications.

As before, you can create new channels and subscribers prior to configuring a subscription. However, the New Subscription Wizard enables creating new channels and subscribers if the one you want to use does not already exist. Figure 1.12 displays the Notification Subscription Wizard. After specifying the notification criteria, you can create new subscribers or select existing ones.

The next step of the wizard enables you to create a channel.

R2 also provides the capability to create a new subscription directly from an alert and to add the parameters from the selected alert to an existing subscription. This significantly improves efficiency and reduces human error in remembering and incorrectly typing the required string!

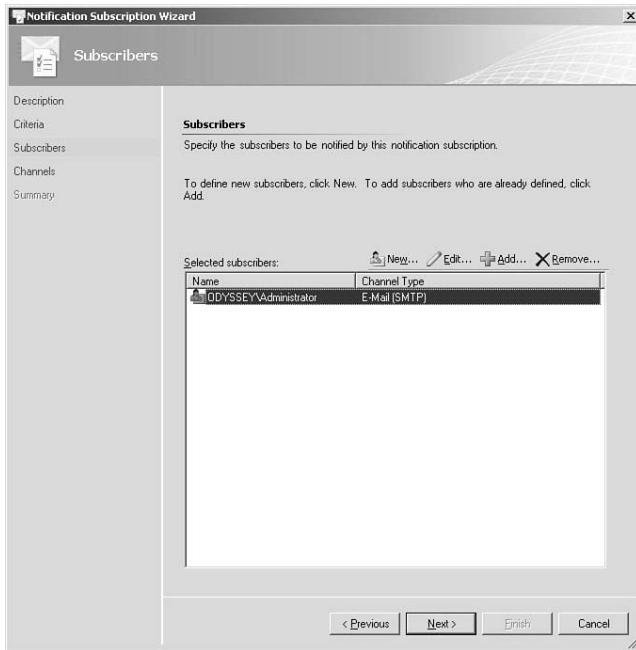


FIGURE 1.12 The R2 Notification Subscription Wizard

Service Level Monitoring

You can use the Service Level Tracking Wizard to define thresholds known as Service Level Objectives (SLOs), enabling you to classify monitors and rules to compare the availability and performance of monitored applications. In the Authoring node of the Operations console, navigate to Management Pack Objects -> Service Level Tracking to define thresholds for a Service Level Agreement (SLA) and create SLOs to represent this SLA. Figure 1.13 displays the Service Level Objectives page of the Service Level Tracking Wizard:

- ▶ The threshold definition for Availability is created using a Monitor State SLO (see Figure 1.14).
- ▶ The Threshold definition for Performance is created with a Collection Rule SLO (see Figure 1.15).

After creating these thresholds, the Service Level Tracking Summary Report will compare SLO thresholds with monitored data from the OpsMgr Reporting database.

NOTE: SERVICE LEVEL TRACKING PREREQUISITES

Using Service Level Tracking requires an OpsMgr 2007 R2 environment implemented with OpsMgr Reporting and defined service levels to ensure proper representation in reports and dashboards.

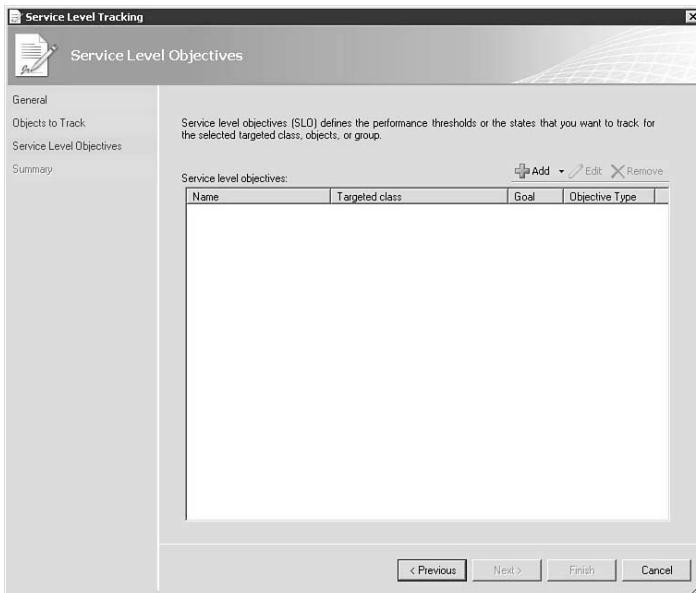


FIGURE 1.13 Adding a Service Level Objective while creating a SLA

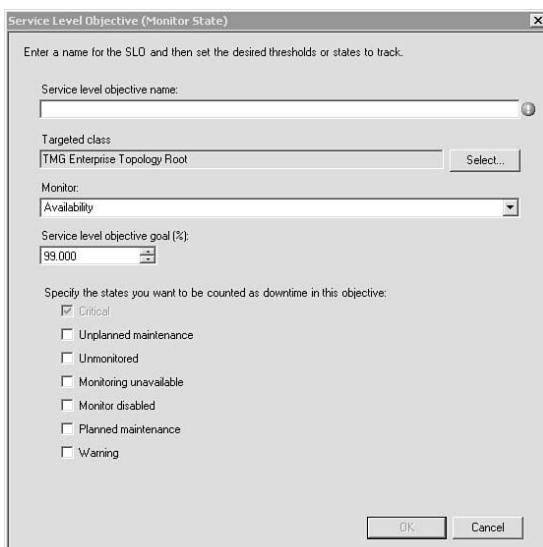


FIGURE 1.14 Define the thresholds to track.

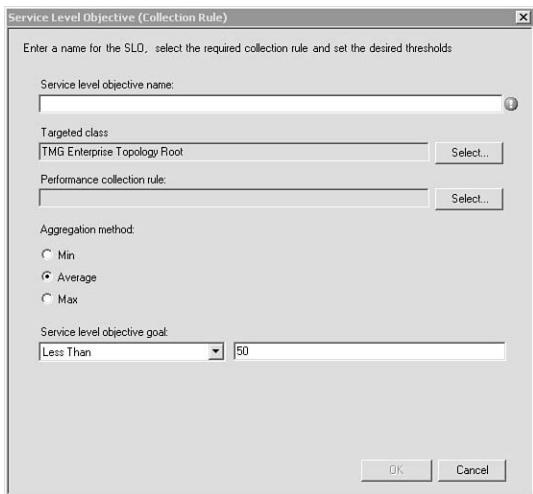


FIGURE 1.15 Define the Collection Rule for the Service Level Objective.

THE SERVICE LEVEL DASHBOARD

Service Level Dashboard (SLD) 2.0 is a Solution Accelerator. Solution Accelerators are tools with best practices used by Microsoft, its customers, and partners that provide prescriptive guidance. The Dashboard was introduced with OpsMgr 2007 SP 1 and is enhanced in R2 with version 2.0. Here are the new features:

- ▶ Monitoring in near real time (2–3 minutes)
- ▶ Integration with Windows SharePoint Services (WSS) 3.0 and Microsoft Office SharePoint Server (MOSS) 2007
- ▶ Utilization of OpsMgr 2007 R2 Service Level Objectives
- ▶ New metrics include Mean Time To Repair (MTTR) and Mean Time Between Failures (MTBF)

Here are the prerequisites to install SLD 2.0:

- ▶ Operations Manager 2007 R2 (with OpsMgr Reporting)
- ▶ WSS 3.0 SP 1 or MOSS 2007 SP 1
- ▶ SQL Server 2005 SP 2 or higher or SQL Server 2008
- ▶ Microsoft .NET Framework 3.5 and Internet Explorer 6.0 or higher

To download a step-by-step guide and the SLD 2.0 installation files, see

<http://www.microsoft.com/downloads/details.aspx?FamilyId=1d9d709f-9628-46a8-952b-a78f5dd2bdd9>.

Reporting Enhancements

R2 adds a number of long-awaited and requested features for reporting users and authors, as follows:

- **Service Level Tracking Reporting**—The “Service Level Monitoring” section discussed how R2 provides Service Level Tracking. After creating thresholds, you can run the tracking reports comparing thresholds with state and performance data collected by the system. To run these reports, navigate to the Microsoft Service Level Report Library under the Reporting node in the OpsMgr console. The Service Level Tracking Report compares SLOs with the monitored data. The Service Level Objective Detail Report is very flashy, and is displayed in Figure 1.16.

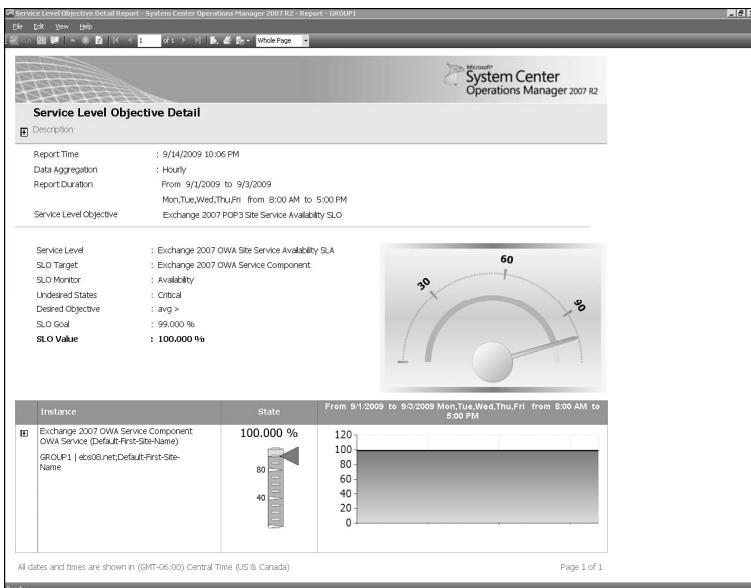


FIGURE 1.16 Service Level Tracking Objective Detail Report

- **Saving Reports to a Management Pack**—You can save reports to an existing management pack, enabling you to share a report using a specific set of parameters. See <http://technet.microsoft.com/en-us/library/dd789017.aspx> for details. As mentioned in this reference, a management pack with a saved report to another management group using a different data warehouse requires you to save the report again for it to function properly.
- **Report Object Picker**—Object picker enhancements allow searching and filtering by name or class of object, making it easier to find the objects needed to retrieve data. Filter settings are applied under the Options button for both the Add Objects and Add Group functions, and the feature enables you to select only certain (meaningful) classes of objects. Figure 1.17 illustrates this using a report in the SQL Server 2008 management pack. The Options button was selected in the previous dialog, bringing up the SQL 2008 DB Engine as the only valid object to select for this report.

This feature has the most value when the list of supported classes is defined in a management pack. However, only newer releases of management packs take advantage of this capability.

- ▶ **Authoring Console Support**—The Authoring console now includes a Reporting space, exposing all available reporting elements.
- ▶ **Enhanced Most Common Events Report**—R2 adds multi-selection parameters to this report.

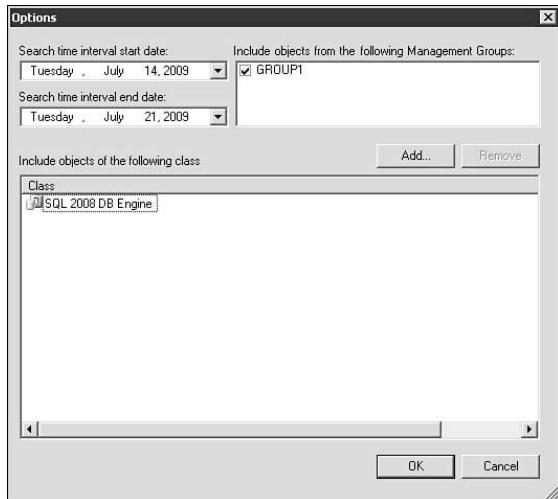


FIGURE 1.17 The R2 Report Object Picker automatically displays the objects of interest for you to select.

Recalculating and Resetting Monitor States

The Health Explorer includes the ability to force the agent to recalculate the health of a particular monitor. One of the most common uses for this is when you want to confirm that the action that you took actually fixed the problem. If the management pack is correctly implemented, all you need to do is select the unit monitor in Health Explorer and click on the “Recalculate Health” button.

Health Explorer also includes a Reset Health button. The behavior of these buttons has varied during the different updates of OpsMgr 2007, and has pretty much been a moving target:

- ▶ At OpsMgr 2007 RTM, the interface only had a Reset button, which actually did a Recalculate, but only if on-demand detection was defined by the management pack. It did not do a Reset (for further information, see Chapter 14, “Monitoring with Operations Manager,” in *System Center Operations Manager 2007 Unleashed*).
- ▶ SP 1 added a Recalculate button. The Recalculate button had a similar issue to the Reset button in RTM, as it actually worked only when there was on-demand detection. The Reset button worked as expected, and changed the monitor state to healthy regardless of its current state (even if it was already in a healthy state).

- ▶ R2 continues to have both the Reset and Recalculate buttons, and Recalculate works more accurately than it did in SP 1.

Power Consumption Monitoring

A new Power Management Library MP enables you to monitor power consumption for each computer or a group of computers. Monitored systems must be running Windows Server 2008 R2 or Windows 7. Additional information is available at <http://technet.microsoft.com/en-us/library/dd789061.aspx>. See <http://www.windowsservercatalog.com/results.aspx?&chtext=&cstext=&csttext=&chbtext=&bCatID=1333&cpID=0&avc=10&ava=0&avq=30&OR=1&PGS=25&ready=0> for the current list of supported hardware.

Summary

Operations Manager 2007 R2 brings “fit and finish” to the 2007 release. The R2 enhancements are quite substantial, perhaps more so than some of the “R2” releases with previous Microsoft server products. This chapter highlighted the changes in OpsMgr 2007 SP 1 and R2. The next chapter discusses one of the most publicized enhancements in R2: Cross Platform Extensions.

Index

Symbols and Numbers

\$_, Windows PowerShell, 161-162
\$profile, 173
32-bit performance counter support on 64-bit systems, Operations Manager 2007 R2, 15

A

abstract class, 375
access hardening, ACS (Audit Collection Services), 341-344
accessing
 historical data for trending analysis, 229
 OpsMgr PowerShell console, 173-174
 Windows PowerShell, 154-155
account information gathering, preparing to discover Unix/Linux computers, 29
accounts, configuring (preparing to discover Unix/Linux computers), 30-36
ACS (Audit Collection Services), 119, 338
 access hardening, 341-344
 auditing
 cross platform, 347-348
 SQL Server 2008, 344-346
 community resources, 349-350
 noise filtering, 340-341
 OpsMgr 2007 R2, 338-339
 security site log replay, 348-349
ACS Master Class Series, 349

- ACS Resource Kit, 349**
- ACS Wiki, 350**
- Active Directory integration, 314-316, 331**
- Active Directory management pack**
 - alerts, 304-408
 - installing, 391-394
- active-active clusters, 322**
- active-passive clusters, 322**
- Add Hosts wizard, 242**
- adding**
 - hosts, VMM, 224
 - OpsMgr accounts to VMM security, 226
 - VMM accounts to OpsMgr security, 226
 - VMware virtualization manager, 232-233
- adjusting monitor intervals, 82**
- agent architecture, VMM versus OpsMgr, 243-244**
- agent information, Operational database SQL queries, 147**
- agent version changes, 107**
- agent-based tasks, 319**
- agents**
 - deployment and management, 314-317
 - monitoring large numbers of agents with agents, 311-312
 - ongoing agent management, 317
 - settings, 185
- aggregate rollup monitors, 261, 278**
- Alert Fields tab, 93**
- alerts**
 - Active Directory management pack, 304-408
 - Configuration Manager management pack, 446-447
 - data warehouse database SQL queries, 148
 - defining, 195-196
 - DHCP management pack, 436-438
 - DNS management pack, 428-433
 - Exchange 2007 management pack, 409-410
- exporting to HTML, 190**
- Group Policy management pack, 433-435**
- Operations Manager and PowerShell, 185-186**
- Operations Manager management pack, 420-427**
- Print Server management pack, 439-440**
- resolving, Operations Manager and PowerShell, 186-187**
- SharePoint management pack, 441-442**
- SQL management pack, 412-415**
- TMG management pack, 452-453**
- Windows Server management pack, 416-419**
- alias, Windows PowerShell, 156**
- Apache HTTP Server, 69**
- application components**
 - discovering, 262-263
 - identifying, 260
- architecture, OpsMgr 2007 R2 reporting, 133-135**
- arrow keys, Windows PowerShell, 157**
- ASP.NET 64-bit apps, Operations Manager 2007 R2, 14-15**
- Audit Collection Services (ACS). See ACS (Audit Collection Services)**
- auditing**
 - cross platform, ACS (Audit Collection Services), 347-348
 - SQL Server 2008, ACS (Audit Collection Services), 344-346
- authoring, custom authoring, 365-366**
- Authoring console, 249**
 - creating targets, 371
 - OpsMgr 2007 R2 reporting, 136-137
- authoring consoles, 21**
- authoring reports, 136-137**
- authoring tools, management packs**
 - Authoring console, 249

- B**
- backing up**
 - operational databases, 328
 - reporting data warehouse, 328
 - BackITupNOW!, 359-362**
 - adding monitors to determine if process is running, 366-370
 - backup and recovery, Business Continuity, 328-331**
 - base classes, 267, 375**
 - best practices**
 - designing management packs, 261
 - discovery, 264
 - views, 296
 - Windows PowerShell, 191
 - blogs, CrossPlat, 52**
 - BridgeWays management packs, 61-62**
 - BridgeWays Apache management pack, 68-70
 - BridgeWays VMware ESX management pack, 62-67
 - built-in help, Windows PowerShell, 157**
 - Business Continuity, 327-328**
 - backup and recovery, 328-331
 - database mirroring, 331-332
 - log shipping, 331-332
- C**
- CALs (Client Access Licenses), 198**
 - case insensitive, Windows PowerShell, 159**
 - certificates, monitoring with, 240-243**
 - choosing not to deploy VMM, 217**
 - CIMOM (Common Information Model Object Manager), 23**
 - Citrix XenApp, 319**
 - classes**
 - abstract class, 375
 - base classes, 267, 375
 - building discoveries to populate, 377-381
 - creating, 376
 - management packs, 248, 267
 - populated, 383-384
 - Product Knowledge tab, 377
 - Properties tab, 376
 - singleton classes, 268, 376
 - Client Access Licenses (CALs), 198**
 - cloud computing, VM management, 215-216**
 - cluster configurations, HA (High Availability), 325-326**
 - clustered RMS enhancements, Service Pack 1 (SP 1), 6**
 - clustering**
 - HA (High Availability), 321-323
 - RMS redundancy alternatives, 327
 - SQL high availability, 327
 - third-party clustering, 325-326
 - Windows Server 2008, 114-115
 - clusters, 321**
 - active-active clusters, 322
 - active-passive clusters, 322
 - multi-node clusters, 326
 - cmdlets**
 - OpsMgr PowerShell snapin, 176-177
 - Windows PowerShell, 156

filtering, 162-165
Format-*, 168
 formatting, 166-168
Get-Alert, 171
Get-Command, 159-160
Get-Help, 160-161
Get-Member, 161
Group-Object, 166
 sorting and selecting, 165-166
Sort-Object, 166
 structure, 158-159

collecting performance data, 252

collection workflow, 134

commands

- CREATE_NEWKEY**, 6
- Unix commands, 48-49

Common Information Model Object Manager (CIMOM), 23

community resources, ACS (Audit Collection Services), 349-350

comparison operators, Windows PowerShell, 162

components

- virtualizing, 244-245
- VMM, installing, 222-225

composite modules, 280

computer groups, targeting, 363-366

condition detection modules, 281

conditional statements, Windows PowerShell, 168-170

- If...Elseif...Else, 168-169
- switch, 169-170

ConfigMgr (Configuration Manager), 15

Configuration Manager (ConfigMgr), 15

Configuration Manager management pack

- alerts, 446-447
- configuring, 443-446
- installing, 443

configuring

- accounts and profiles, CrossPlat, 30-36
- Configuration Manager management pack, 443-446
- firewall rules for reporting services, 106
- log file monitor, 83-84
- OpsMgr database to listen on specific TCP/IP ports, 132-133
- SQL memory limits, 131-132
- TMG management pack, 448-452

connecting VMM to OpsMgr, 221-222

connectors, 86-95

- IBM Tivoli Enterprise Management Console (TEC) connector, implementing, 87
- universal connectors, 87

console tasks, 319-320

consoles, Windows PowerShell, 155

containment, 260

ConvertTo-Html, 190

cook down

- creating custom workflows, 284-285
- creating data source, 285-287
- creating monitor types, 287-289
- creating performance collection rules, 290-292
- creating performance views, 292-297
- creating unit monitors, 289-290
- troubleshooting, 299-303
- verifying, 297-298
- workflows, 283-284

Core OpsMgr component support, SQL Server 2008, 117-119

CREATE_NEWKEY command, 6

CreateDiscoveryData, 253

CreatePropertyBag, 253

CreateTypedPropertyBag, 253

credentials for discovering Unix/Linux systems, 29

Cron service recovery, Novell SUSE management pack, 73-76

cross platform applications, licensing, 4

cross platform, auditing, 347-348

Cross Platform Extensions. *See* **CrossPlat**

cross platform management packs road-map, 62

CrossPlat, 7-8, 23

- discovering Unix/Linux computers, 39-45
- Distributed Applications, 59-61
- management packs, 36
- preparing to discover Unix/Linus computers
 - account information gathering, 29
 - configuring accounts and profiles, 30-36
 - importing management packs, 36-39
 - name resolution, 28
 - updating WinRM, 29-30
- reference material, 51-53
- supported platforms and requirements, 23-27

CrossPlat agent

- deployment errors, 50-51
- installation, 29
- manually installing, 45-48

cross-platform monitoring, X-Plat, 7-8

custom scripting, Novell SUSE management pack, 77-82

custom workflows, 283-284

- creating with cook down, 284-285
- creating data source, 285-287
- creating monitor types, 287-289
- creating performance collection rules, 290-292
- creating performance views, 292-297
- creating unit monitors, 289-290

customer monitors, creating, 81

D

data source modules, 281

data transfer across long-distance WAN links, 311

data warehouse database, SQL queries, 148-149

Data Warehouse maintenance, 144-145

data warehouse, monitoring free space, 140

database maintenance

- SQL Server 2008, 139
 - Data Warehouse maintenance, 144-145
 - Operational database, 139-143
 - SQL Server Standard and Enterprise editions, 120-121
- database mirroring**, 331-332
- database recovery**, 329-330
- database versions, OpsMgr 2007**, 148
- databases, upgrading from SQL Server 2005 to 2008**, 124-125
 - post-upgrade steps, 127
 - SRSUpgradeHelper.msi, 127
 - SRSUpgradetool.exe, 125-126
- DataProvider.conf file**, 69
- DBCC DBREINDEX**, 143
- Dell Servers, PRO-enabled**, 240
- dependency rollup monitors**, 261, 278-279
- deployment of agents**, 314-317
- deployment errors, CrossPlat agent**, 50-51
- design goals, Essentials 2010**, 206-207
- designing management packs**, 259
 - best practices, 261
 - defining health models, 261
 - identifying application components (classes), 260
 - relationships, 260-261
 - worst practices, 261
- development workstations, preparing**, 251

- DHCP management pack**
 - alerts, 436-438
 - installing, 436
 - directories, creating**, 49
 - discoveries**
 - building to populate classes, 377-381
 - management packs, 248
 - script discoveries, 385-389
 - targeting, 377
 - WMI discoveries, 384-385
 - discovering**
 - application components, 262-263
 - Unix/Linux computers, 39-45
 - manually installing CrossPlat agent, 45-48
 - discovery**
 - best practices, 264
 - management packs, 262-263
 - Discovery Data object**, 257
 - discovery scripts**, 252, 256-259
 - displaying performance, scripting for**, 255-256
 - Distributed Application Designer**, 350-355
 - Distributed Applications, integrating Unix/Linux computers with OpsMgr**, 59-61
 - distributed environments**, 307-308
 - agent deployment and management, 314-317
 - following the sun, 309
 - physical location of servers, 308
 - primary user location, 309
 - remote operations, 317
 - Terminal Services, 317-318
 - Terminal Services access issues, 319-320
 - Web console, 320
 - XenApp, 319
 - distributing management servers and gateways**, 309-314
 - distribution security, Unix Action accounts**, 34
 - DMZs (Demilitarized Zones), VMM**, 240
 - DNS management pack**
 - alerts, 428-433
 - installing, 427-428
 - DNS servers, specifying**, 49
 - downloading management packs**, 9-11
 - drive space, saving on virtual servers**, 115
 - dynamic port allocation, SQL Server 2008**, 132-133
- E**
- EBS (Essential Business Server 2008)**, 193, 198
 - essentials, 199-200
 - management packs, importing, 201
 - Remote OpsMgr, 200-202
 - EBSS (Essentials Business Server Solution)**, 193
 - Emulex Host Bus Adapters (HBAs), PRO-enabled**, 240
 - Encryption Key Backup**, 107
 - Restore Wizard, 7
 - RMS Service Pack 1 (SP 1), 6-7
 - Enhanced Most Common Events Report**, 21
 - Enterprise management licenses (MLs)**, 3
 - entities**, 356
 - escape key, Windows PowerShell**, 157
 - Essential Business Server 2008. See EBS (Essential Business Server 2008)**
 - Essentials 2010**
 - design goals, 206-207
 - management packs, 209-210
 - ping monitor, 208-209
 - reporting enhancements, 210-211

- setup experience, 203-205
 - virtualization features, 205-208
 - Essentials Business Server solution (EBSS), 193**
 - Essentials Enable Service Provider Mode features, 200**
 - ESX, 231-232**
 - BridgeWays VMware ESX management pack, 62-67
 - ESX hosts, managing, 234-236**
 - ESX vCenter, 231-232**
 - managing, ESX hosts and guest VMs, 234-236
 - VMware virtualization manager, adding, 232-233
 - event log, Windows PowerShell, 181-183**
 - events**
 - generic events in Operations Manager 2007 R2, 348
 - logging, 252, 254
 - eventschema.xml, 339**
 - Exchange 2007 management pack**
 - alerts, 409-410
 - installing, 408-409
 - existing targets, targeting, 359-363**
 - exporting alerts to HTML, 190**
 - Export-ManagementPack, 177**
-
- F**
 - facades, 260**
 - failover, planning for, 313**
 - features, 100**
 - installing Operations Manager 2007 R2, 99-103
 - filtering cmdlets, Windows PowerShell, 162-165**
-
- finding files, Windows PowerShell, 184**
 - firewall rules, configuring for reporting services, 106**
 - following the sun, 309**
 - for, 171**
 - foreach, 171**
 - ForEach-Object, Windows PowerShell, 162**
 - Format-*, 168**
 - Format-Table, Windows PowerShell, 167**
 - formatting cmdlets, Windows PowerShell, 166-168**
 - fragmentation, 143**
 - free space, maintaining for Operational databases, 139-140**
 - frequency for object discoveries, 275**
 - function keys, Windows PowerShell, 157**
-
- G**
 - gateway servers, 311-312**
 - Service Pack 1 (SP 1), 5
 - gateways**
 - distributing, 309-314
 - monitoring large numbers of agents, 311-312
 - using across WAN links, 311-312
 - geo-clustering, 326**
 - Get-Agent, 176**
 - Get-AgentPendingAction, 176**
 - Get-Alert, 176**
 - OpsMgr PowerShell snapin, 177-179
 - Windows PowerShell, 171
 - Get-AlertHistory, 176**
 - Get-ChildItem, 184**
 - Get-Command, 159-160**
 - Get-Help, 160-161**

Get-MaintenanceWindow, 177
Get-Member, 161
Get-Task, 177
Get-TaskResult, 177
GPO (group policy object), 342-343
Group Policy management pack
 alerts, 433-435
 installing, 433
Group-Object, Windows PowerShell, 166
groups, targeting, 363-366
guest VMs, managing, 234-236
guests, checking for (VMM), 225

H

HA (High Availability), 320-321
 cluster configurations, 325-326
 clustering, 321-323
 RMS redundancy alternatives, 327
 SQL high availability, 327
 root management server, 323-325
 SQL Server 2008, 119-120
hardware best practices, SQL Server 2008, 121-123
Hardware Summary report, 210
Health Explorer
 integrating Unix/Linux computers in OpsMgr, 56-57
 recalculating and resetting monitor states, 21-22
 Server Core, 114
 service monitor, 86
 SUSE management pack, 71-72
 Web Console, Operations Manager 2007 R2, 15-16

health models
 defining, 261
 POS Batch Processing Application, 268-269
health monitoring, scripting for, 255-256
help, Windows PowerShell, 157
High Availability. See HA (High Availability)
historical data, accessing for trending analysis, 229
Holman, Kevin, 145
Host Utilization, 230
Host Utilization Growth, 230
hosting, 260
hosts
 adding (VMM), 224
 ESX hosts, managing, 234-236
Hotfix 951327, 98
Hotfix 952664, 98
Hotfix 953290, 98
hotfixes, installing, Operations Manager 2007 R2, 98-99
HP-UX 11i v2 IA 64, 24
HP-UX 11i v2 PA-RISC, 24
HP-UX 11i v3 IA64, 25
HP-UX 11i v3 PA-RISC, 24-25
HTML, exporting alerts to, 190
Hyper-V, 115
 guests, 235
 monitoring, 219-220
Hyper-V Server Role, 220

I

IBM AIX 5L.5.3, 24
IBM AIX 6.1, 24
IBM Tivoli Enterprise Management Console (TEC) connector, implementing, 87

identifying

- application components (classes), 260
- IP addresses for remote network devices, 353

If...Elseif...Else, 168-169**IIS 7, Operations Manager 2007 R2, 14-15****importing**

- EBS management pack, 201
- management packs, Operations Manager 2007 R2, 9-11
- Unix/Linux management packs, 36-39

incorporating Operations Manager SDK, 179-180**indexes, optimizing Operational databases, 140-143****Install-Agent, 176****Install-AgentByName, 176****installing**

- Active Directory management pack, 391-394
- Configuration Manager management pack, 443
- CrossPlat agent manually, 45-48
- DHCP management pack, 436
- DNS management pack, 427-428
- Exchange 2007 management pack, 408-409
- Group Policy management pack, 433
- Operations Manager 2007 R2, 97-98
 - hotfixes, 98-99
 - prerequisite changes, 99
 - roles and features, 99-103
 - Windows 2008 Firewall, 103-106
- Operations Manager management pack, 419-420
- Print Server management pack, 439
- SharePoint management pack, 440-441
- SQL management pack, 410-411
- SQL-DMO, 139
- SRS 2008, 128-131
- TMG management pack, 447

VMM, 221-225

- Web Server (IIS) server roles, 100-101
- Windows PowerShell, 154-155
- Windows Server management pack, 416

Install-ManagementPack, 176**integrating**

- OpsMgr with VMM, 225-227
- Unix/Linux computers in OpsMgr, 54
 - Distributed Applications, 59-61
 - Health Explorer, 56-57
 - OpsMgr console, 54-56
 - reports, 57-58
 - tasks, 58-59

Internet-facing web servers, 50**IP addresses, identifying for remote network devices, 353****J****JScript, 251****K****Kerberos, VMM, 241****keywords, Windows PowerShell, 164****knowledge, management packs, 248****L****LAN links, monitoring, 350****latency, 311**

licenses, management licenses (ML), 3

licensing

- cross platform applications, 4

- System Center Server Management Suite, Operations Manager 2007 R2, 3

linking VMM with OpsMgr, 226

listing groups, Operational database SQL queries, 146-147

listing management packs and versions, 189

Live Maps, 352-355

Live Migration, 237

local scan fragmentation values, 142

log file monitor, configuring, 83-84

log shipping, 331-332

logging events, 252

- scripting, 254

logical disk volume recovery, SUSE management pack, 72-73

LogScriptEvent, 253

long-distance WAN links, management servers, 310-312

looping statements, Windows PowerShell, 171-172

M

maintenance mode, Operations Manager 2007 R2, 15

management group information, Operational database SQL queries, 148

management licenses (ML), 3

Management Pack Catalog Web Service, 36

management pack templates, 83

- targeting, 366-370

- Unix/Linux Log File template, 83-84

- Unix/Linux Service template, 84-86

management packs

- Active Directory management pack

- alerts, 304-408

- installing, 391-394

- authoring tools

- Authoring console, 249

- Operations console, 249

- script editors, 250

- XML editor, 249-250

BridgeWays, 61-62

- BridgeWays Apache management pack, 68-70

- BridgeWays VMware ESX management pack, 62-67

- classes, 267

Configuration Manager management pack

- alerts, 446-447

- configuring, 443-446

- installing, 443

- creating, 371-374

CrossPlat, 36

- defined, 248

- designing, 259

- best practices, 261

- defining health models, 261

- identifying application components (classes), 260

- relationships, 260-261

- worst practices, 261

DHCP management pack

- alerts, 436-438

- installing, 436

- discovery, 262-263

- discovery scripts, 256-259

DNS management pack

- alerts, 428-433

- installing, 427-428

- downloading, 9-11

- EBS (Essential Business Server 2008),
 - importing, 201
- Essentials 2010, 209-210
- Exchange 2007 management pack
 - alerts, 409-410
 - installing, 408-409
- Group Policy management pack
 - alerts, 433-435
 - installing, 433
- importing
 - with Operations Manager 2007 R2, 9-11
 - Unix/Linux management packs, 36-39
- inserting parameter blocks, 304-305
- monitoring, 277
 - aggregate rollup monitors, 278
 - dependency rollup monitors, 278-279
 - unit monitors, 277
- Multi-Host Ping management pack, 353
- naming conventions, 265-266
- Novell SUSE management pack, 70-72
 - Cron service recovery, 73-76
 - custom scripting, 77-82
 - logical disk volume recovery, 72-73
 - performance collection, 73-76
- nWorks management packs, 220
- object classes, 269-270
 - creating, 270-272
- object discoveries, 272-277
- Operations Manager and PowerShell, 188-189
- Operations Manager management pack
 - alerts, 420-427
 - installing, 419-420
- POS (Point-of-Sale) Batch processing application, 265
 - service and health models, 268-269
- Print Server management pack
 - alerts, 439-440
- installing, 439
- product knowledge, 280
- PRO-enabled, 239-240
- relationships, 267-270
 - creating, 270-272
- reports, 303-305
- rules and monitors, 190
- saving reports to, 20
- saving reports to management packs, 136
- scripts
 - discovery scripts, 252
 - monitoring scripts, 252
- Server Virtualization management pack, 217-218
- SharePoint management pack
 - alerts, 441-442
 - installing, 440-441
- SQL management pack
 - alerts, 412-415
 - installing, 410-411
- tips for success, 306
- TMG management pack
 - alerts, 452-453
 - configuring, 448-452
 - installing, 447
- versions, 189
- VMM, 227-231
- Windows Server Hyper-V Management Pack, 217
- Windows Server management pack
 - alerts, 416-419
 - installing, 416
- workflows. *See workflows*
- management servers**
 - distributing, 309-314
 - long-distance WAN links, 310-312

managing

- ESX hosts, 234-236
- guest VMs, 234-236
- VMs without VMM, 216-217
 - Hyper-V, 219-220
 - monitoring Virtual Server, 218
 - monitoring VMware ESX with OpsMgr, 220-221

manually installing CrossPlat agent, 45-48

Master database, backing up, 328-329

matching property types, 376

memory limits, configuring SQL memory limits, 131-132

Microsoft Critical and Security Updates Status report, 211

Microsoft Management Summit (MMS), 7

Microsoft Operations Manager (MOM) 2005, 356

Microsoft.SystemCenter.Instance Group, 267

Microsoft.Windows.Application.Component, 267

Microsoft.Windows.ComputerRole, 267

Microsoft.Windows.LocalApplication, 267

ML (management licenses), 3

MMS (Microsoft Management Summit), 7

modules, 280-281

- composite modules, 280
- condition detection, 281
- data source, 281
- native modules, 280
- probe actions, 282
- workflows, 282-283
- write actions, 281

MOM (Microsoft Operations Manager) 2005, 356

MOM database, 134

MOMScriptAPI object, 253

monitor intervals, adjusting, 82

monitor states, recalculating and resetting, 21-22

monitor types, creating, 79-81

monitoring

- with certificates, 240-243
- Hyper-V, 219-220
- large numbers of agents with gateways, 311-312
- management packs, 277
 - aggregate rollup monitors, 278
 - dependency rollup monitors, 278-279
 - unit monitors, 277
- redundant LAN links, 350
- scripts, 252-253
- servers in multiple locations, 309-314
- Unix/Linux computers, 53-54
- URLs, Operations Manager 2007 R2, 15
- Virtual Server, 218
- VMware ESX with OpsMgr, 220-221

monitoring scripts, 252

monitoring:/provider, OpsMgr PowerShell snapin, 174-175

monitors

- management packs, 190
- rollup monitors, 261

MP Authoring Guide R2, 356

MS XML Notepad 2007, 250

MSDB database, backing up, 329

Multi-Host Ping management pack, 353

multi-node clusters, 326

multi-selection parameters, OpsMgr 2007 R2 reporting, 138

N

name resolution, preparing to discover Unix/Linux computers, 28
namespaces, 265
naming conventions, management packs, 265-266
native management features, SBS, 194-197
native modules, 280
navigation, Windows PowerShell, 157
.NET framework
 prerequisite for OpsMgr Web console, 101-102
 Windows PowerShell, 184
Network Link, 351
New Subscription Wizard, 16-17
New Virtual Machine wizard, 208
New-MaintenanceWindow, 177
noise filtering, ACS (Audit Collection Services), 340-341
Notepad++, 250
Notification Subscription Wizard, Operations Manager 2007 R2, 16-17
Novell SUSE management pack, 70-72
 Cron service recovery, 73-76
 custom scripting, 77-82
 logical disk volume recovery, 72-73
 performance collection, 73-76
nworks management packs, 220

O

object classes, management packs, 269-270
 creating, 270-272
object discoveries
 frequency for, 275

management packs, 272-277
POS Batch Job Server Role, creating, 273-275
POS Job Distribution Server Class, creating, 275-276
Object Picker, OpsMgr 2007 R2 reporting, 135
objects, targeting, 356-358
OLE DB Management Pack template, 13
online help, Windows PowerShell, 157
Operating System Environments. See **OSEs**, 3
Operational database
 backing up, 328
 maintaining free space, 139-140
 optimizing indexes, 140-143
 SQL queries, 146-148
Operations console, 249
operations database, SQL Server 2008, 120-121
Operations Manager 2007 R2, 7-8
 32-bit performance counter support on 64-bit systems, 15
 ASP.NET 64-bit apps, 14-15
 Health Explorer Web Console, 15-16
 IIS 7, 14-15
 importing management packs, 9-11
 after installation, 106
 agent version changes, 107
 encryption key backup, 107
 service name changes, 107
 User Account Control, 107-109
 installing, 97-98
 hotfixes, 98-99
 prerequisite changes, 99
 roles and features, 99-103
 Windows 2008 Firewall, 103-106
 maintenance mode, 15
 monitoring of URLs, 15

- Notification Subscription Wizard, 16-17
 - power consumption monitoring, 22
 - recalculating and resetting monitor states, 21-22
 - reporting enhancements, 19-21
 - Run As Accounts, 14
 - Run As Profiles, 14
 - service level monitoring, 17-19
 - templates
 - new and updated, 11-13
 - OLE DB Management Pack template, 13
 - Process Monitoring Template, 12
 - Windows Service Management Pack Template, 12-13
 - upgrading to, 109
 - issues with, 112
 - Windows 2003, 111
 - Windows 2008, 109-111
 - user interfaces, 14
- Operations Manager 2007 R2 Reporting.** See **OpsMgr 2007 R2 reporting**
- Operations Manager Command Shell.** See **Operations Manager Shell**
- Operations Manager management pack**
 - alerts, 420-427
 - installing, 419-420
- Operations Manager SDK**
 - incorporating, 179-180
 - Windows PowerShell and
 - general PowerShell examples, 181-184
 - Operations Manager examples, 185-190
- Operations Manager Shell, 9**
- Operations Manager tab, 93**
- OpsMgr 2007, 1**
 - agent architecture, compared to VMM, 243-244
 - connecting to VMM, 221-222
 - database versions, 148
- integrating with VMM, 225-227
- linking with VMM, 226
- virtualizing components, 244-245
- VMM agent alternate security modes, 240-243
- OpsMgr 2007 R2, ACS (Audit Collection Services), 338-339**
- OpsMgr 2007 R2 reporting, 133**
 - architecture, 133-135
 - Authoring console, 136-137
 - multi-selection parameters, 138
 - Object Picker, 135
 - saving reports to management packs, 135-136
 - search interfaces for performance reports, 137
 - securing reports, 138
 - Service Level Tracking reports, 138
- OpsMgr 2007 R2 sizing helper spreadsheet, 123**
- OpsMgr agent, 251**
- OpsMgr console**
 - integrating Unix/Linux computers, 54-56
 - PowerShell, 102-103
- OpsMgr PowerShell console, accessing, 173-174**
- OpsMgr PowerShell snapin, 173-174**
 - cmdlets, 176-177
 - Get-Alert, 177-179
 - monitoring:/provider, 174-175
 - Operations Manager SDK, incorporating, 179-180
 - performance, 180-181
- OpsMgr Scripting API, scripting, 253**
- OpsMgr web console, web server prerequisites, 100-101**
- Optimize Indexes rule, 140-142**
- optimizing indexes, Operational database, 140-143**

OSEs (Operating System Environments), 3

overridable parameters

creating, 299-302

verifying, 302-303

overrides, 82

Overrides Summary View, 14

P

parameter blocks, inserting in management packs, 304-305

parameters

for discovery scripts, 259

Get-Help, 160

overridable parameters

creating, 299-302

verifying, 302-303

script discoveries, 387

Windows PowerShell, 159

performance

data warehouse database SQL queries, 148-149

displaying, scripting for, 255-256

OpsMgr PowerShell snapin, 180-181

Performance and Resource Optimization (PRO). See PRO (Performance and Resource Optimization)

performance collection, Novell SUSE management pack, 73-76

performance collection rule, creating performance views, 294-296

performance counters, Solaris systems, 55-56

performance data, collecting, 252

performance reports, search interfaces for, 137

performance views, 61

creating for performance collection rule, 294-296

performing VM operations remotely, 230-231

ping monitor, Essentials 2010, 208-209

pipelines, Windows PowerShell, 156

planning for failovers, 313

platforms, supported by CrossPlat, 23-27

populated classes, 383-384

ports, VMM, 244

POS (Point-of-Sale) Batch processing application

management packs, 265

service and health models, 268-269

POS Batch Job Server Role, 268

object discoveries, creating, 273-275

POS Batch Processing management pack, verifying cook down, 297-298

POS Job Distribution Server, 265, 269

POS Job Distribution Server Class, object discoveries, creating, 275-276

POS Job Processing Server, 265, 269

object discoveries, creating, 276-277

post installation, SQL Server 2008, 131

configuring SQL memory limits, 131-132

dynamic port allocation and configuring OpsMgr database to listen on specific TCP/IP ports, 132-133

power consumption monitoring, Operations Manager 2007 R2, 22

Power Management Library MP, 22

PowerGUI, 250

PowerShell. See Windows PowerShell

preparing to discover Unix/Linux computers

account information gathering, 29

configuring accounts and profiles, 30-36

importing management packs, 36-39

name resolution, 28

updating WinRM, 29-30

prerequisite changes, installing Operations Manager 2007 R2, 99

prerequisites

- for OpsMgr Web console, .NET framework, 101-102
- web servers, OpsMgr web console, 100-101

PrimalScript 2009 Studio, 250

primary user location, distributed environments, 309

Print Server management pack

- alerts, 439-440
- installing, 439

privileges

- BridgeWays VMware ESX management pack, 64
- Windows PowerShell, 155

PRO (Performance and Resource Optimization), 236

PRO tips

- enabling, 236-237
- VMM management pack, 238
- VMM native, 237-239

probe actions, 282

Process Monitoring Template, Operations Manager 2007 R2, 12

Process Monitoring wizard, 370

product knowledge, management packs, 280

PRO-enabled vendor management packs, 239-240

profiles

- configuring, preparing to discover Unix/Linux computers, 30-36

Windows PowerShell, 173

prompts, changing (Operations Manager and Powershell), 187-188

property types, matching, 376

protocols, VMM, 244

providers, Windows PowerShell, 156, 172-173

Q

queries, SQL Server 2008, 145-146

- data warehouse database, 148-149
- Operational database, 146-148
- reindex the database, 150
- SQL Broker, 150
- truncate and shrink transaction log files, 150-151

R

R2 Authoring console, 365-366

rebooting systems, Unix/Linux computers, 49

recalculating monitor states, 21-22

recovering RMS from failures, 331

Red Hat Enterprise Linux ES Release 4, 25

Red Hat Enterprise Linux Server release 5.1 (Tikanga), 25

redundant LAN links, monitoring, 350

reference material, CrossPlat, 51-53

references, 261

reindex the database, SQL queries, 150

Reject-AgentPendingAction, 176

relationships

- management packs, 248, 267-270

creating, 270-272

designing, 260-261

remote network devices, identifying IP addresses, 353

remote operations, distributed environments, 317

Terminal Services, 317-318

Terminal Services access issues, 319-320

- Web console, 320
- XenApp, 319
- remote operations manager scenarios, SBS 2008, 197-198**
- Remote OpsMgr, EBS (Essential Business Server 2008), 200-202**
- Remote Web Workplace (RWW), 197**
- report object picker, 20**
- reporting data warehouse, backing up, 328**
- reporting enhancements**
 - Essentials 2010, 210-211
 - Operations Manager 2007 R2, 19-21
- reporting server port requirements, 105**
- Reporting Services**
 - configuring firewall rules, 106
 - SQL Server 2008, 128-131
- reports**
 - integrating Unix/Linux computers in OpsMgr, 57-58
 - management packs, 248, 303-305
 - saving to management packs, 20, 135-136
 - securing, 138
 - Service Level Tracking reports, 138
 - sharing, 136
- requirements**
 - for CrossPlat, 23-27
 - server port requirements, reporting enhancements, 105
 - SQL Server port requirements, 103-104
- resetting monitor states, 21-22**
- Resolution State Mapping tab, 94**
- Resolve-Alert, 176**
- restarting SSH, 49**
- Return, 253**
- RMS (root management server), 119-120, 323-325**
 - clustered RMS enhancements, Service Pack 1 (SP 1), 6
- encryption key backup, Service Pack 1 (SP 1), 6-7
- HA (High Availability), 323-325
- recovering from failure, 331
- RMS encryption key, 331**
- RMS redundancy alternatives, 327**
- roles and features, installing Operations Manager 2007 R2, 99-103**
- rollup monitors, 261**
- root command, Unix/Linux computers, 48**
- root discoveries, 263**
- root folders for views, creating, 292-293**
- root management server. See RMS (root management server)**
- rules, management packs, 190, 248**
- Run As Accounts, Operations Manager 2007 R2, 14**
- Run As Profiles, Operations Manager 2007 R2, 14**
- RWW (Remote Web workplace), 197**

S

- SAN replication, geo-clustering, 326**
- saving**
 - drive space on virtual servers, 115
 - reports to management packs, 20, 135-136
- Savision Live Maps, 352-355**
- SBS (Small Business Server 2008), 193-194**
 - Monitoring Data Collection Service, 194
 - native management features, 194-197
 - remote operations manager scenarios, 197-198
- SBS Summary Network Report, 196-197**
- scan density values, 142**
- SCPopulate.js, 315**
- script discoveries, 385-389**

script editors, 251
 authoring management packs, 250

scriptblocks, Windows PowerShell, 157

scripting, 251
 for health monitoring and displaying performance, 255-256
 logging events, 254
 OpsMgr Scripting API, 253
 preparing development workstations, 251

scripts
 discovery scripts, 256-259
 management packs
 discovery scripts, 252
 monitoring scripts, 252
 monitoring, 252-253
 testing, 255

SDK (Software Development Kit), 251

search interfaces for performance reports, 137

seats, 198

Secure Storage Backup Wizard, 6

Secure Vantage Security Auditing, PRO-enabled, 240

securing reports, OpsMgr 2007 R2 reporting, 138

security
 Kerberos, 241-242
 monitoring with certificates, 240-243
 SQL Server 2008, 127-128

Security Event Log (SEL), 347

security events, 348

security site log replay, ACS (Audit Collection Services), 348-349

seed discoveries, 263

SEL (Security Event Log), 347

selecting cmdlets, Windows PowerShell, 165-166

Select-Object, Windows PowerShell, 165

Server Core, 113-114

server port requirements, reporting, 105

server roles, 99

Server Virtualization management pack, 217-218

servers, physical location in distributed environments, 308

Service Level Dashboard (SLD), 19

service level monitoring, Operations Manager 2007 R2, 17-19

Service Level Objectives (SLOs), 17

Service Level Tracking Reporting, 20

Service Level Tracking reports, OpsMgr 2007 R2 reporting, 138

Service Level Tracking Wizard, 17-19

service model, POS Batch Processing Application, 268-269

service monitor, Health Explorer, 86

service name changes, Operations Manager 2007 R2, 107

Service Pack 1 (SP 1), 4
 clustered RMS enhancements, 6
 gateway enhancements, 5
 highlights, 4-5
 RMS encryption key backup, 6-7

Set-MaintenanceWindow, 177

SetSPN utility, 324

setup experience, Essentials 2010, 203-205

Severity Mapping tab, 94

SharePoint management pack
 alerts, 441-442
 installing, 440-441

sharing reports, 136

shrinking transaction log files, SQL Server 2008, 150-151

singleton classes, 268, 376

SLD (Service Level Dashboard), 19

SLOs (Service Level Objectives), 17

small and medium businesses. See **SMB (small and medium businesses)**

Small Business Server 2008. See SBS (Small Business Server 2008)

SMB (small and medium businesses), 193

snapi, Windows PowerShell, 156

Solaris 8 SPARC, 25-26

Solaris 9 SPARC, 26

Solaris 10 SPARC, 26-27

Solaris systems, performance counters, 55-56

Solution Accelerators, 19

sorting cmdlets, Windows PowerShell, 165-166

Sort-Object, 166

spreadsheets, OpsMgr 2007 R2 sizing helper spreadsheet, 123

SQL Broker, 150

SQL management pack

- alerts, 412-415
- installing, 410-411

SQL queries, verifying, 316

SQL Reporting Services (SRS), 124

SQL Server 2005, OpsMgr 2007, 118

SQL Server 2008, 117

- auditing, ACS (Audit Collection Services), 344-346
- Core OpsMgr component support, 117-119
- database maintenance, 139
 - Data Warehouse maintenance, 144-145
 - Operational database, 139-143
- high availability, 119-120, 327
- post-installation steps, 131-133
- queries, 145-146
 - data warehouse database, 148-149
 - Operational databases, 146-148
 - reindex the database, 150
 - SQL Broker, 150
 - truncate and shrink transaction log files, 150-151

Reporting Services, 128-131

security, 127-128

setup, 121

- hardware best practices, 121-123
- targeting, 361-362

SQL Server Enterprise Edition, 119

- database maintenance, 120-121
- high availability, 119-120

SQL Server, port requirements, 103-104

SQL Server Standard Edition, 118

- database maintenance, 120-121
- high availability, 119-120

SQL-DMO, installing, 139

SRS (SQL Reporting Services), 124

- installing, 128-131
- SQL Server 2008, 128-131

SRSSupgradeHelper.msi, 127

SRSSupgradetool.exe, 125-126

SSH, restarting, 49

Standard Data Warehouse Data Set maintenance rule, 144-145

Standard management licenses (MLs), 3

Start-Task, 177

SUSE Linux Enterprise Server 9 (i586), 27

SUSE Linux Enterprise Server 10 SP2 (i586), 27

SUSE Linux Enterprise Server 11 (i586), 27

SUSE management pack, 70-72

- Cron service recovery, 73-76
- custom scripting, 77-82
- logical disk volume recovery, 72-73
- performance collection, 73-76

switch, Windows PowerShell, 169-170

switch trunking, geo-clustering, 326

synchronization workflow, 133

System Center Essentials 2010, 202-203

System Center Operations Manager 2007. See OpsMgr 2007

System Center Server Management Suite, licensing (Operations Manager 2007 R2), 3
System Center Virtual Machine Manager.
 See **VMM**
systems, rebooting Unix/Linux computers, 49
System.Service, 267

T

tab completion, Windows PowerShell, 157
targeting, 356
 creating with Authoring console, 371
 discoveries, 377
 existing targets, 359-363
 with groups, 363-366
 management pack templates, 366-370
 objects, 356-358
 SQL Server 2008, 361-362
 what you can target, 358-359
 Windows Computer, 359-361
task failed alert, VMM, 228
tasks
 integrating Unix/Linux computers in OpsMgr, 58-59
 management packs, 248
TCP Port monitor, 353
TCP/IP ports, configuring OpsMgr database to listen on specific, 132-133
TEC Server tab, 91-92
TempDB, 123, 328
templates
 management pack templates. See management pack templates
 Operations Manager 2007 R2
 new and updated, 11-13
 OLE DB Management Pack template, 13

Process Monitoring Template, 12
 Windows Service Management Pack template, 12-13
 virtual new machines, 207
Terminal Services, 317-318
 access issues, 319-320
testing scripts, 255
third-party clustering, 325-326
Threat Management Gateway (TMG), 199-200
threshold monitors, PRO tips, 238-239
TMG (Threat Management Gateway), 199-200
TMG management pack
 alerts, 452-453
 configuring, 448-452
 installing, 447
transaction log files, truncating and shrinking in SQL Server 2008, 150-151
troubleshooting cook down, 299-303
truncating log files, SQL Server 2008, 150-151
tuning
 Active Directory management pack, 304-408
 Configuration Manager management pack, 446-447
 DHCP management pack, 436-438
 DNS management pack, 428-433
 Exchange 2007 management pack, 409-410
 Group Policy management pack, 433-435
 Operations Manager management pack, 420-427
 Print Server management pack, 439-440
 SharePoint management pack, 441-442
 SQL management pack, 412-415
 TMG management pack, 452-453
 Windows Server management pack, 416-419

U

Uninstall-Agent, 176

Uninstall-ManagementPack, 177

unit monitors, 277

universal connectors, 87

Unix Action accounts, 31-35

Unix commands, 48-49

Unix Privileged accounts, 31

Unix/Linux computers

- discovering, manually installing CrossPlat agent, 45-48

- discovering and monitoring, 39-45

- integrating in OpsMgr, 54

- Distributed Applications, 59-61

- Health Explorer, 56-57

- OpsMgr console, 54-56

- reports, 57-58

- integrating with OpsMgr tasks, 58-59

- monitoring, 53-54

- preparing to discover

 - account information gathering, 29

 - configuring accounts and profiles, 30-36

 - importing management packs, 36-39

 - name resolution, 28

 - updating WinRM, 29-30

Unix/Linux Log File template, 83-84

Unix/Linux Service template, 84-86

untrusted domains, VMM, 240

updated templates, Operations Manager 2007 R2, 11-13

updating WinRM, 29-30

upgrading

- databases from SQL Server 2005 to SQL Server 2008, 124-125

- post-upgrade steps, 127

- SRSUpgradeHelper.msi, 127

- SRSUpgradetool.exe, 125-126

to Operations Manager 2007 R2, 109

issues with, 112

Windows 2003, 111

Windows 2008, 109-111

URLs, monitoring in Operations Manager 2007 R2, 15

User Account Control, 107-109

user interfaces, Operations Manager 2007 R2, 14

user maintenance, Unix, 49

V

variables, `$_`, 161-162

VBScript, 251

verifying

- cook down, 297-298

- overridable parameters, 302-303

- SQL queries, 316

versions, management packs, 189

views

- best practices, 296

- management packs, 248

- root folders, 292-293

- worst practices, 297

Virtual Machine Allocation, 230

Virtual Machine management. See VM management

Virtual Machine Remote Control (VMRC), 205

Virtual Machine Utilization, 230

Virtual Server, monitoring, 218

virtual servers, saving drive space on, 115

virtualization, 213-214

- challenges and rewards, 214-215

- health of infrastructure, 229

- management elements, 215
- VMware. See VMware
- Virtualization Candidates, 229-230**
- virtualization features, Essentials 2010, 205-208**
- virtualizing OpsMgr and VMM components, 244-245
- Visio Add-In, 332-338**
- VM management, 213-214**
 - cloud computing, 215-216
 - virtualization, challenges and rewards, 214-215
- VM operations, performing remotely, 230-231**
- VMM, 8**
 - agent architecture, compared to OpsMgr, 243-244
 - checking for guests, 225
 - choosing not to deploy, 217
 - connecting to OpsMgr, 221-222
 - DMZs (Demilitarized Zones), 240
 - hosts, adding, 224
 - installing, 222-225
 - integrating with OpsMgr, 225-227
 - Kerberos, 241-242
 - linking with OpsMgr, 226
 - ports, 244
 - PRO tips, 237-239
 - protocols, 244
 - task failed alert, 228
 - untrusted domains, 240
 - (Virtual Machine Manager), 213
 - virtualizing components, 244-245
- VMM 2008 R2, 211**
- VMM agent alternate security modes, OpsMgr, 240-243**
- VMM Console, 224**
- VMM database, 223**
- VMM library, 223**
- VMM management pack, 227-231**
- VMM Setup Complete, 225**
- VMM splash screen, 222-223**
- VMM TCP Ports, 223**
- vMotion, 237**
- VMRC (Virtual Machine Remote Control), 205**
- VMs (virtual machines)**
 - managing without VMM, 216-217
 - Hyper-V, 219-220
 - monitoring Virtual Server, 218
 - monitoring VMWARE ESX with OpsMgr, 220-221
 - PRO tips, 237-239
- VMware, 231-232**
 - BridgeWays VMware ESX management pack, 62-67
 - ESX vCenter
 - managing, ESX hosts and guest VMs, 234-236
 - VMware virtualization manager, adding, 232-233
 - VMware ESX, monitoring with OpsMgr, 220-221**
 - VMware virtualization manager, adding, 232-233**

W

- WAN links**
 - gateways, 311-312
 - long-distance WAN links, management servers, 310-312
- Web console, 100, 320**

Health Explorer, Operations manager 2007 R2, 15-16

web downloads, Windows PowerShell, 154

Web Server (IIS) server roles, installing, 100-101

web server prerequisites, OpsMgr web console, 100-101

webcasts, CrossPlat, 52

websites, CrossPlat, 52-53

Where-Object, 183

- Windows PowerShell, 163

While, 171

Windows 2003, upgrading to Operations Manager 2007 R2, 111

Windows 2008 Firewall, installing Operations Manager 2007 R2, 103-106

Windows 2008 SP2, 112

Windows 2008, upgrading to Operations Manager 2007 R2, 109-111

Windows Automated Installation Kit, 224

Windows Computer, targeting, 359-361

Windows PowerShell, 153-154

- \$_, 161-162
- accessing, 154-155
- alias, 156
- best practices, 191
- case insensitive, 159
- cmdlets, 156
 - filtering, 162-165
 - Format-*, 168
 - formatting, 166-168
 - Get-Alert, 171
 - Get-Command, 159-160
 - Get-Help, 160-161
 - Get-Member, 161
 - Group-Object, 166
 - Select-Object, 165
 - sorting and selecting, 165-166
 - Sort-Object, 166
- structure, 158-159
- comparison operators, 162
- conditional statements, 168-170
 - If...Elseif...Else, 168-169
 - switch, 169-170
- console, 155
- event log, 181-183
- finding files, 184
- help, 157
- installing, 154-155
- keywords, 164
- looping statements, 171-172
- navigation, 157
- .NET framework, 184
- Operations Manager and
 - general PowerShell examples, 181-184
 - Operations Manager examples, 185-190
- OpsMgr console, 102-103
- pipelines, 156
- PowerShell v1 installer, 180-181
- privileges, 155
- profiles, 173
- providers, 156, 172-173
- scriptblocks, 157
- snapin, 156
- web downloads, 154
- Windows Services and WMI, 183

Windows SBS 2008 Monitoring Data Collection Service, 194

Windows Server 2008, 97

- clustering, 114-115
- Hyper-V, 115
- management packs, 114
- VMM, 115

Windows Server 2008 R2, 113

Windows Server Core, 121

- Windows Server Hyper-V Management Pack, 217**
- Windows Server management pack**
- alerts, 416-419
 - installing, 416
- Windows Server Updating Service (WSUS), 202-203**
- Windows Service Management Pack Template, 12-13**
- Windows Services, WMI, 183**
- WinRM, updating, 29-30**
- wizards**
- Add Hosts wizard, 242
 - Encryption Key Backup or Restore Wizard, 7
 - New Subscription Wizard, 16-17
 - New Virtual Machine wizard, 208
 - Notification Subscription Wizard, 16-17
 - Process Monitoring wizard, 370
 - Secure Storage Backup Wizard, 6
 - Service Level Tracking Wizard, 17-19
- WMI, Windows Services and, 183**
- WMI discoveries, 384-385**
- workflows**
- collection workflow, 134
 - custom workflow, 283-284
 - creating data source, 285-287
 - creating monitor types, 287-289
 - creating performance collection rules, 290-292
 - creating performance views, 292-297
 - creating unit monitors, 289-290
 - creating with cook down, 284-285
 - defined, 263-264
 - summary, 282-283
 - synchronization workflow, 133
- write actions, 281**
- WSMan (WS-Management), 23**
- X-Y-Z**
- XenApp, 319**
- XML, 250**
- defining alerts, 195-196
- XML editor, 249-250**
- X-Plat. See CrossPlat**

This page intentionally left blank