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**Plan and
Install
Operations
Manager
2012 SP1**

System Center 2012 Operations Manager

UNLEASHED

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System Center 2012 Operations Manager

UNLEASHED



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System Center 2012 Operations Manager Unleashed

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Dedication

To our readers:

Dedicated to those who have read our previous books and used them to build OpsMgr environments, those who have read their copy to the point where it is falling apart, and those who email words of encouragement.

Writing a book is a tremendous undertaking, but knowing it makes a difference makes it all worthwhile.

Acknowledgments

Writing a book is an all-encompassing and time-consuming project, and this book certainly meets that description. Operations Manager is a far-reaching topic, and this book benefited from the input of many individuals. The authors and contributors would like to offer their sincere appreciation to all those who helped with *System Center 2012 Operations Manager Unleashed*. This long list includes Daniele Muscetta, Neil Harrison, Rob Kuehfus, Daniel Savage, Joseph Chan, and Victor Mushkatin of Microsoft; Chris Dugas and Ambers Ferrara of Transplace; Neale Browne, Graham Davies, Anders Bengtsson, and Paul Johnson; Scott Weisler for his recommendations on cross-platform security; Trevor Langston for his assistance with Exchange and its integration with OpsMgr; and Gary Farris for his assistance with PerformancePoint and Power View. Thank you also to Andreas Zuckerhut, Björn Axell, Walter Chomak, Jonathan Cowan, Matt Hester, Marco Shaw, Simon Skinner, and Pete Zerger, along with thanks to Kevin Garner for his assistance with the Configuration Manager 2012 management pack for Appendix A, and to Kevin Holman for being a great technical editor.

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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.

As an executive editor for Sams Publishing, I welcome your comments. 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 better.

Please note that I cannot help you with technical problems related to the topic of this book. We do have a User Services group, however, where I will forward specific technical questions related to the book.

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

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Foreword

System Center 2012 – Operations Manager: not just a monitoring platform

“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.” This is how our colleague Justin Incarnato began the foreword to *System Center Operations Manager 2007 R2 Unleashed*.

Operations Manager 2007 was certainly a revolutionary release, introducing service modeling and breaking from the previous codebase. Building upon that foundation, Operations Manager 2007 R2 was an evolutionary release, as it expanded its reach cross-platform and added stability and credibility, introducing concepts such as service level tracking while essentially maintaining the same architecture.

Things don't stop at Microsoft: Our products keep changing. This time around, the 2012 release is both evolutionary and revolutionary at the same time. 2012 has also been a transformational moment in the marketplace: the moment that all System Center components started being shipped as a single product, offering integrated scenarios that allow you to create, operate, and monitor your private and hybrid clouds.

When looking at the Operations Manager component (the topic of this book), we redesigned the topology and architecture to reduce your TCO while increasing scalability and high availability through resource pools for load distribution and automatic failover, and bringing to the table phenomenal value with many new features.

Infrastructure monitoring has always been the main focus of Operations Manager, but with the 2012 release the capabilities go well beyond monitoring servers and their operating systems (albeit here the list grew by supporting Windows Server 2012 as well as additional Linux distributions with Service Pack 1!). Operations Manager now supports monitoring thousands of different network devices, and can show the relationships and connections between network devices and servers. As infrastructure more and more evolves from physical hardware into a virtual cloud “fabric,” concepts of “vicinity” on the network are achieved through tight integration with Virtual Machine Manager (another System Center 2012 component).

In addition, Operations Manager provides rich insights into the behavior of your applications: We always envisioned providing 360 degrees of visibility into your environment's health, walking up the stack from the network to the OS and up into the applications, down to code-level visibility. In this release, we think we have reached unprecedented breadth as well as depth in application insights we can provide, both for .NET applications as well as for Java, for the first time. These application performance monitoring (APM) capabilities will be augmented with an attached Software-as-a-Service offering such as Global Service Monitoring, which allows you to extend your monitoring system to run synthetic transactions from Microsoft data centers in the cloud.

As if this wasn't enough, the 2012 release of Operations Manager brings visibility, communication, and collaboration features such as a new dashboard infrastructure that allows you to build a dashboard once and make it available in multiple locations such as the Operations Manager console, the Web console, as well as through Microsoft SharePoint 2010. We also introduced the Team Foundation Server Synchronization management pack that allows you to escalate code-level problems identified by APM quickly to the developers of the application, with rich traces and insights about issues seen in production.

With all of this, it is our hope that System Center will bridge the gap between the Operations and Developer teams in your organization, allowing them to troubleshoot issues in production and quickly narrow down where problems have occurred—was it the network, the operating system, the application's code that caused downtime, or a bad user experience? This will help you reduce mean time to resolution.

Written by a team of experts—many of whom are personally known and who are the best heralds of our vibrant System Center community—this book should be a great help to you for learning and experiencing System Center 2012 Operations Manager.

**System Center 2012 - Operations Manager Program Managers, including
Daniele Muscetta, Daniel Savage, Joseph Chan, and Victor Mushkatin
Microsoft Corporation**

Introduction

In January 2012, Microsoft announced its shift in focus with System Center—no longer a suite of products, but a single product. System Center 2012 is a collection of components designed to help IT Pros configure and manage applications, services, computers, virtual machines (VMs), and the cloud; with each component designed to let you manage more of these than before. System Center provides a degree of interoperability between components through connectors and System Center Orchestrator; this will increase over time. System Center 2012 also includes a unified installer to install all eight components, although the installer currently is rather limited in scope.

Operations Manager (OpsMgr), one of the more popular System Center components and the topic of this book, has been Microsoft's monitoring solution for over a decade. OpsMgr monitors the operation and performance of applications, services, systems, and network devices. Beginning with Operations Manager 2007 R2, monitoring was extended beyond the Windows platform to encompass UNIX and Linux systems. Operations Manager generates alerts when a particular condition occurs, and depending on how that alert was generated, can even auto close the alert when the situation is resolved. Alerts can be viewed in a console, or configured to notify targeted individuals when there is a problem. Built-in data warehousing capability enables you to view historical data and statistics.

Operations Manager has come a long way from its early days after Microsoft's licensing of the technology from NetIQ in 2000. Operations Manager 2007 R2 was in the Gartner Group's "magic quadrant" for IT Event Correlation and Analysis. Each version has seen enhancements in scalability, performance, and capabilities.

Operations Manager is all about monitoring application health. This is defined and measured by the health of the components that make up that application. In today's environment, monitoring health typically includes network devices and the various pieces of a distributed application. Monitoring at the component level means that if a database used by an application has a problem, Operations Manager knows which application is affected. This is more useful than simply knowing that a database is down! New features in OpsMgr 2012 include increased reliability through implementation of management server pools, enhanced monitoring of network devices, improved dashboard capabilities, and deep monitoring of .NET and JEE applications through Microsoft's integration of AVIcode (acquired in 2010). These add to existing capabilities such as end-to-end monitoring encompassing Windows, UNIX, and Linux systems, using

synthetic transactions, managing security and audit data, and defining distributed applications for monitoring.

Successfully implementing Operations Manager requires planning, design, and a thorough understanding of how to utilize its many capabilities. This complete guide for using Operations Manager 2012 from the authors of *System Center Operations Manager 2007 Unleashed* gives system administrators the information they need to know about Operations Manager and what it can do for their operations. This includes an overview of why operations management is important; planning, installing, and implementing Operations Manager 2012; and its integration with System Center. *System Center 2012 Operations Manager Unleashed* provides a comprehensive guide to this newest version of Microsoft's premier management software.

As always, the authors have a disclaimer: Management packs and technical information are constantly evolving. Sometimes it seemed that even before we finished a chapter, the information was changing. This has been particularly challenging as Microsoft is close to releasing its first service pack for System Center 2012 as we complete this book. We have done our best to present the information as it relates to both the released version and the service pack, even as that continues to take shape. The information in the book is current as of the time it was written, and the authors have done their best to keep up with the constant barrage of changing management packs, utilities, URLs, and knowledge base articles.

Fast Track: A Quick Look at What's New

Many of the chapters of this book include a "Fast Track" section. Fast Track is an aid to OpsMgr 2007 administrators that are familiar with *System Center Operations Manager 2007 Unleashed* and the *System Center Operations Manager 2007 R2 Unleashed* supplement. This section provides a quick overview of what has changed from the previous version. Some features have major enhancements, others relatively few, and some are completely new. Chapters covering new features and topics such as installation and upgrade do not include a Fast Track.

Part I: Operations Management Overview and Concepts

System Center 2012 Operations Manager Unleashed begins with an introduction to configuration management including initiatives and methodology. This includes Dynamic System Initiative (DSI), the IT Infrastructure Library (ITIL), and Microsoft Operations Framework (MOF). Although some consider this to be more of an alphabet soup of frameworks than constructive information, these strategies and approaches give structure to managing one's environment—and have special relevance in that the objective of System Center 2012 is to optimize, automate, and provide process agility and maturity in IT operations. More importantly, implementing Operations Manager is a project, and as such, it should include a structured approach with its own deployment. It's more than just running a setup program!

- ▶ Chapter 1, “Operations Management Basics,” starts with the big picture and brings it down to the pain points that system administrators deal with on a daily basis, showing how System Center plans to address these challenges.
- ▶ Chapter 2, “What’s New in System Center 2012 Operations Manager,” appropriately tells you just that. It also covers the history of Operations Manager, compares this version with the previous releases, and introduces terminology and key concepts.
- ▶ In Chapter 3, “Looking Inside OpsMgr,” the book begins to peel back the layers of the onion to discuss the design concepts behind System Center 2012 Operations Manager, the major OpsMgr components, health modeling, management group mechanics, management pack schema, and more.

Part II: Planning and Installation

Before diving into OpsMgr’s setup program, it is best to take a step back to map out the requirements for your management environment and plan your server topology.

- ▶ Chapter 4, “Planning an Operations Manager Deployment,” discusses the steps required for successfully planning an Operations Manager deployment.
- ▶ Once it is time to implement your design, Chapter 5, “Installing System Center 2012 Operations Manager,” discusses installation prerequisites before going through the steps to install the various server components in a management group.
- ▶ Chapter 6, “Upgrading to System Center 2012 Operations Manager,” discusses how to move from an Operations Manager 2007 to 2012 environment.

Part III: Moving Toward Application-Centered Management

With OpsMgr installed, how does one start using it? The third part of this book focuses on Operations Manager operations in your environment, which is where you will spend the bulk of your time, moving beyond setup to post-installation activities and potential adjustments to your initial configuration.

- ▶ Chapter 7, “Configuring and Using System Center 2012 Operations Manager,” discusses what you need to know to get started with OpsMgr. It provides an overview of the Operations console and a drill-down into its functionality.
- ▶ Chapter 8, “Installing and Configuring Agents,” goes through the details of computer discovery, the different techniques for implementing agents, and managing agents.
- ▶ Chapter 9, “Complex Configurations,” discusses high availability, resource pools, the root management server emulator, using gateway servers, multi-homed agents, designing for distributed environments, and more.

- ▶ Chapter 10, “Security and Compliance,” discusses role-based security, Run As profiles and accounts, required accounts, mutual authentication, cross platform security considerations, firewall considerations, and communications security. It also discusses Audit Collection Services, an optional but highly recommended part of your OpsMgr implementation.
- ▶ Chapter 11, “Dashboards, Trending, and Forecasting,” covers the built-in dashboard functionality of Operations Manager 2012. It discusses prebuilt dashboards, creating your own dashboards, and enhancing dashboards using third-party options. The chapter also covers reporting, trending, and capacity planning.

Part IV: Administering System Center 2012 Operations Manager

All applications require administration, and Operations Manager is no exception.

- ▶ Chapter 12, “Backup and Recovery,” discusses the components required for a complete backup and recovery plan, and steps for designing a disaster recovery plan. It also introduces System Center Data Protection Manager as a tool for managing your backups.
- ▶ Chapter 13, “Administering Management Packs,” covers the components of a management pack, how to troubleshoot, deploy, and manage management packs, and the details of importing and exporting management packs into your OpsMgr environment.
- ▶ Chapter 14, “Monitoring with System Center 2012 Operations Manager,” discusses the different monitors and rule types in Operations Manager and their functionality, creating alerts, overrides, and resolution sates, notification workflow, approaches for tuning monitors and rules and managing alerts, and maintenance mode.

Part V: Service-Oriented Monitoring

This section of the book gets into what Operations Manager is really about—using it to ease the pain of monitoring and managing your environment from end-to-end. It discusses using OpsMgr to manage different aspects of your environment.

- ▶ Chapter 15, “Monitoring .NET Applications,” is a deep dive into .NET application monitoring, including information not yet documented by Microsoft. This new feature in OpsMgr 2012 lets you monitor web applications to get details about application performance and reliability. Using the Application Advisor console, you can identify problem areas, and then use the Application Diagnostics console to investigate and troubleshoot specific events.
- ▶ Chapter 16, “Network Monitoring,” discusses the new network monitoring capabilities that provide the long-awaited pieces required for effective end-to-end monitoring. You can get detailed port, interface, and peripheral monitoring of your network

devices, as well as virtual local area networks (vLANs), and hot standby router protocol (HSRP) groups. OpsMgr 2012 now includes monitoring of all types of devices, including firewalls and load balancers.

- ▶ Chapter 17, “Using Synthetic Transactions,” talks about simulating connections into applications to verify their performance.
- ▶ Chapter 18, “Distributed Applications,” discusses OpsMgr’s capability to monitor the various pieces and components that make up the distributed applications commonly used in today’s multi-system computing environment.
- ▶ Chapter 19, “Client Monitoring,” covers the capabilities in OpsMgr for client monitoring, and managing crash errors using the Agentless Exception Monitoring functionality.

These chapters talk about the issues faced by administrators in each of these areas, and show how Operations Manager 2012 helps to monitor operational issues and maintain application health and stability.

Part VI: Beyond Operations Manager

The book now looks at extending one’s use of Operations Manager through cross platform monitoring, authoring management packs and reports, and PowerShell. It also discusses integration with System Center and provides a glimpse of using OpsMgr as a hosted service and as a tool to deliver other managed services by leveraging multi-tenant cloud implementations of OpsMgr.

- ▶ Chapter 20, “Interoperability and Cross Platform,” provides an update to the cross platform extensions first introduced in OpsMgr 2007 R2. This capability enables you not only to monitor UNIX/Linux platforms but also application workloads on non-Windows operating systems such as Java enterprise applications.
- ▶ Chapter 21, “System Center 2012 Integration,” discusses Operations Manager’s integration with other System Center components. These integration capabilities enable you to support private and hybrid cloud scenarios in enterprise environments.
- ▶ Chapter 22, “Authoring Management Packs and Reports,” includes best practices around authoring and building custom management packs. It provides the means for you to design your own management pack complete with classes, monitors, rules, views, and reports, using the tools provided by Microsoft.
- ▶ Chapter 23, “PowerShell and Operations Manager,” includes an introduction to PowerShell and then dives into practical examples of using PowerShell to administer your Operations Manager environment.
- ▶ Chapter 24, “Operations Manager for the Service Provider,” explores various ways to deliver hosted and managed services, including an introduction to the new service provider foundation in Service Pack 1.

Part VII: Appendixes

By this time, you should have at your disposal all the tools necessary to unleash yourself as an Operations Manager expert. The last part of the book includes five appendixes:

- ▶ Appendix A, “OpsMgr By Example: Configuring and Tuning Management Packs,” is a compilation of the authors’ experiences with implementing some of the management packs available for Operations Manager 2012.
- ▶ Appendix B, “Performance Counters,” discusses the performance counters specific to Operations Manager.
- ▶ Appendix C, “Registry Settings,” discusses some of the more significant registry settings used by Operations Manager 2012.
- ▶ Appendix D, “Reference URLs,” incorporates useful references you can access for further information about Operations Manager and System Center. The references are also included as live links available for download under the Downloads tab at Pearson’s InformIT website at <http://www.informit.com/store/system-center-2012-operations-manager-unleashed-9780672335914>.
- ▶ Appendix E, “Available Online,” discusses value-added content also available at the InformIT page.

Throughout, this book provides in-depth reference and technical information about System Center 2012 Operations Manager, as well as information about the other products and technologies on which OpsMgr features depend.

Disclaimers and Fine Print

There are several disclaimers. Microsoft is continually improving and enhancing its products. This means the information provided is probably outdated the moment the book goes to print.

In addition, the moment Microsoft considers code development on any product complete, it begins working on a service pack or future release; as the authors continue to work with the product, it is likely yet another one or two wrinkles will be discovered! The authors and contributors of *System Center 2012 Operations Manager Unleashed* have made every attempt to present information that is accurate and current as known at the time. Updates and corrections will be provided as errata on the InformIT website.

Thank you for purchasing *System Center 2012 Operations Manager Unleashed*. The authors hope it is worth your while (and their effort). Enjoy the ride!

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CHAPTER 2

What's New in System Center 2012 Operations Manager

The newest version of Operations Manager (OpsMgr), System Center 2012 Operations Manager, builds on the capabilities introduced in OpsMgr 2007. In its fourth major release by Microsoft, the product team takes the best of OpsMgr 2007 and adds a number of enhancements, including resource pools for redundancy and high availability, significant changes in network and application monitoring, and new dashboard capabilities. This chapter takes a brief look at the history of Operations Manager and then highlights the changes in this release.

The History of Operations Manager

Let's spend a moment reviewing the history of Microsoft's presence in the server monitoring space. Microsoft first included server health and monitoring functionality with applications such as Application Center 2000, Systems Management Server (SMS) 2.0, and BackOffice Server 2000. The monitoring capability in these products enabled a system administrator to have a centralized view of information pertaining to functional health, performance, and the event log data of servers within that specific application environment; monitoring was limited to the servers used by the application.

The Early Years: MOM 2000 and MOM 2005

Beginning with its very first version, Operations Manager went beyond examining the health of servers in a single application to examine one's entire environment. The product was originally based on technology developed by Mission Critical Software for its OnePoint Operations Manager product, which Microsoft licensed in 2000 from

IN THIS CHAPTER

- ▶ The History of Operations Manager
- ▶ Introducing System Center 2012 Operations Manager
- ▶ Terminology and Concepts

NetIQ shortly after that company acquired Mission Critical. Microsoft's first release, Microsoft Operations Manager (MOM) 2000, addressed scalability and performance issues in the OnePoint product, and added significant improvements to management packs for monitoring Microsoft applications software. Microsoft positioned MOM 2000 as an enterprise monitoring solution with comprehensive event management, monitoring and alerting, reporting, a built-in knowledge base, and trend analysis capabilities. However, the architecture remained largely unchanged from the Mission Critical product.

Microsoft released one service pack (SP) for MOM 2000. SP 1 included globalization, failover cluster support for the MOM database, performance improvements to the event management infrastructure, enhancements to most of its management packs with particular emphasis on those for Microsoft Exchange Server and Active Directory, and several new management packs.

In 2003, Microsoft began work on the next version of MOM. Microsoft Operations Manager 2005 was released in August 2004. It sported an improved user interface, additional management packs, enhanced reporting, and improved performance and scalability. SP 1 released in July 2005 with support for Windows 2003 SP 1 and SQL Server 2000 SP 4. SP 1 was also required to support SQL Server 2005 for the operational and reporting database components after that product's release later that year.

Operations Manager 2007

Development for the next version, code named "MOM V3," began in 2005. In 2006, Microsoft officially announced the product's rebranding as System Center Operations Manager 2007. Microsoft completed work on Operations Manager 2007, which was a total rewrite of the product, in March 2007—a list of what was new would be longer than listing what was unchanged! OpsMgr 2007 provided best-of-breed end-to-end service management for the Microsoft Windows platform, helping you to increase efficiency and achieve greater control over your Information Technology (IT) environment. The focus moved from monitoring events and generating alerts to monitoring a server's health and holistically monitoring server and client environments.

OpsMgr 2007 uses model-based management, where an IT environment is defined as a model. Using models allows granular discovery of service components and presents the ability to monitor not only the server but also the entire end-to-end service as a unique object. These models, represented in eXtensible Markup Language (XML), are stored in management packs; beginning with OpsMgr 2007, Microsoft moved away from the proprietary management pack format used by MOM 2000 and MOM 2005.

OpsMgr 2007 also includes Agentless Exception Monitoring (AEM), which provides information on application crashes; it introduces client monitoring, PowerShell support, role-based security, an Authoring console, the Health Explorer, Active Directory Integration, Audit Collection Services (ACS), changes in capturing and collecting data for the OpsMgr data warehouse, and more. A list of features introduced is available at www.microsoft.com/en-us/download/details.aspx?id=2353. Most importantly, the architecture introduced with Operations Manager 2007 forms the base of the technology and architecture found today in System Center 2012 Operations Manager.

Operations Manager 2007 SP 1 released in February 2008. SP 1 addressed bugs from the original release including a rollup of all hot-fixes, and added enhancements in performance and reliability, setup and recovery, user interface and experience, reporting, the Web console, and more. (A complete list of what was new in the service pack is available at <http://technet.microsoft.com/en-us/library/bb821996.aspx>, and a list of bug fixes is at <http://support.microsoft.com/kb/944443/>.)

Operations Manager 2007 R2 and Beyond

Operations Manager 2007 had an “R2” release in May 2009. Release 2’s most publicized enhancement was cross platform support for UNIX and Linux servers. Here are some of the more notable improvements in this release:

- ▶ Cross platform monitoring
- ▶ Integration with System Center Virtual Machine Manager (VMM) 2008, which enabled maximizing availability of virtual workloads
- ▶ Large scale monitoring of URLs
- ▶ Service level monitoring
- ▶ Performance enhancements
- ▶ Updated Authoring console, which shipped with the installation bits

A full list of features is available at <http://technet.microsoft.com/en-us/library/dd362653.aspx>.

OpsMgr 2007 R2 built upon the base release of the 2007 product, enabling it to be firmly placed in Gartner Group’s challenger’s quadrant for IT Event Correlation and Analysis in July 2009 and then the highly sought “magic” or leader’s quadrant in December 2010, as shown in Figure 2.1. Gartner’s magic quadrant indicates superiority in completeness of vision and ability to execute. (In 2011, Gartner retired the IT Event Correlation and Analysis magic quadrant. For information, see <http://www.gartner.com/id=1749715>.)

Rather than releasing service packs, bug fixes to the product after OpsMgr 2007 R2 were released in the form of cumulative updates (CUs). The most recent CU, released just before this book was printed, is CU7 (January 8, 2013). Meanwhile, Microsoft was working on what was variously code-named MOM V4, OM 10, and most widely known as the “vNext” release of the product, publicly released in April 2012 as System Center 2012 Operations Manager. Figure 2.2 illustrates Operations Manager’s life cycle.

NOTE: CUMULATIVE UPDATES BECOME UPDATE ROLLUPS

With the release of System Center 2012, cumulative updates have been renamed to update rollups (URs), which are released for all System Center components (including Configuration Manager). Microsoft released UR4 January 9, 2013. Beginning with UR3, Operations Manager updates are installable with Windows Update.

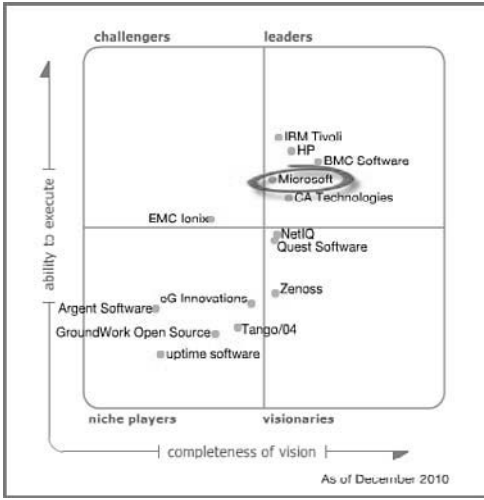


FIGURE 2.1 Operations Manager 2007 R2 in the Gartner magic quadrant (source: <http://www.gartner.com/technology/media-products/reprints/microsoft/vol2/article5/article5.html>).

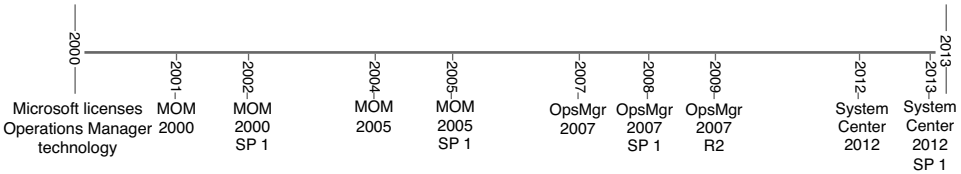


FIGURE 2.2 Operations Manager development timeline.

Introducing System Center 2012 Operations Manager

System Center Operations Manager 2007 Unleashed (Sams, 2008) discussed how the nomenclature change from Microsoft Operations Manager 2005 to System Center Operations Manager 2007 suggested OpsMgr had a facelift with that release. The same is true with System Center 2012 Operations Manager. While the core architecture has not undergone the vast changes introduced with the OpsMgr 2007 product and changes for the most part are evolutionary, the name change emphasizes System Center is the actual product, with the latest release being System Center 2012, with the component of interest being Operations Manager.

Beginning with System Center 2012, Microsoft is releasing System Center as a single product, rather than in waves of individual components. Corresponding with this are significant licensing changes for System Center, discussed in Chapter 4, “Planning an Operations Manager Deployment.” System Center 2012 also includes a higher level of integration and cohesion between its components, along with a common installer, although the first version of the installer is far from the robust installer available in products such as Microsoft Office. This is not to say that System Center 2012 is the ultimate vision of integration between its components. Rather, it is a first release of a single System Center product, first announced at the Microsoft Management Summit (MMS) in 2003, and then consisting of two technically unrelated products: MOM 2000 and SMS 2003. System Center, you’ve come a long way, but the journey isn’t over yet!

The System Center 2012 Operations Manager component includes a number of new features and capabilities; some key improvements being changes in management server architecture to eliminate single points of failure, new capabilities for network monitoring, and application performance monitoring, just to name a few. The next sections discuss the changes in this release, which Microsoft documents at <http://technet.microsoft.com/en-US/library/jj656648.aspx>. Additional information is available at http://www.windows-networking.com/articles_tutorials/Introduction-System-Center-Operations-Manager-2012-Part1.html, although this was written during the beta timeframe.

THE SYSTEM CENTER 2012 SERVICE PACK 1 RELEASE

This book was written while System Center 2012 SP 1 was in development. While the contents of the service pack are subject to change with its final release, here is what is anticipated for Operations Manager with this service pack:

- ▶ **Full support for Windows Server 2012:** Support for the OS on System Center (and OpsMgr) 2012 servers; management packs for Windows Server 2012.
- ▶ **Full support for SQL Server 2012:** Support for the database engine on System Center (and OpsMgr) servers, including support for AlwaysOn; management packs for SQL Server 2012.
- ▶ **Storage functionality enhancements:** SP 1 adds hypervisor support for storage monitoring alerting based on provisioning thresholds as defined by Windows Server 2012.
- ▶ **Virtual network support:** This will be available for Hyper-V systems only. VMware support is unchanged from System Center 2012 RTM.
- ▶ **Enhanced network monitoring:** Additional network device support.
- ▶ **Global Service Monitor (GSM):** This is a new cloud-enabled capability that extends application monitoring, enabling you to add outside-in testing to incorporate your users’ experience of your website or web application.
- ▶ **APM enhancements:** Support for Windows Foundation Classes (WFC), ASP.NET model-view controller (MVC), .NET Windows services, Azure SDK (storage and SQL Azure support), and Internet Information Services (IIS) 8.
- ▶ **Resolution States:** With Service Pack 1 for Operations Manager 2012, Microsoft is adding several new resolution states.

- ▶ **360 dashboards:** The term “360” refers to an out of the box capability. These dashboards are a .NET application that is immediately functional out of the box. A new Applications dashboard will be available under Application Monitoring in the Operations console.
- ▶ **Team Foundation Server (TFS) synchronization:** Two-way communication between OpsMgr and TFS, such that changes a developer makes are communicated to the OpsMgr administrator.

Microsoft also documents the changes to OpsMgr 2012 in SP 1 at <http://technet.microsoft.com/en-US/library/jj656650.aspx>.

Supported Configurations

System Center 2012 Operations Manager continues to build on the robustness of OpsMgr 2007 R2. Table 2.1 lists supported configurations for agents, applications, consoles, and network devices. “Supported” means Microsoft has tested these configurations and will support them; these are not necessarily the outer limits of what will run. In some cases, the load on individual agents may affect what will perform well. For additional information on monitored item capacity, see http://technet.microsoft.com/en-us/library/hh205990.aspx#BKMK_MonitoredItem.

TABLE 2.1 Supported configurations for agents, applications, consoles, and network devices

Monitored Item	Recommended Limit
Open Operations consoles	50
Agent-monitored computers reporting to a management server	3,000
Agent-monitored computers reporting to a gateway server	2,000
Agents in a single management group	15,000
Collective client monitored computers per management server	2,500
Agentless Exception Monitored (AEM) computers per dedicated management server	25,000
AEM computers per management group	100,000
Management servers per agent for multi-homing	4
Agentless-managed computers per management server	10
Agentless-managed computers per management group	60
Agent-managed and UNIX or Linux computers per management group	6,000 (with 50 open consoles); 15,000 (with 25 open consoles)

Monitored Item	Recommended Limit
UNIX or Linux computers per dedicated management server	500
UNIX or Linux computers monitored per dedicated gateway server	100
Network devices managed by a resource pool with three or more management servers	1,000
Network devices managed by two resource pools	2,000
Application performance monitoring (APM) agents	700
APM applications	400
URLs monitored per dedicated management server	3,000
URLs monitored per dedicated management group	12,000
URLs monitored per agent	50

Root Management Server and Root Management Server Emulator

Sometimes an area of angst with the management server architecture introduced in OpsMgr 2007 was the root management server (RMS). The RMS, often referred to as the product's "Achilles' heel," was a single point of failure, as it ran workflows and services that did not run on other management servers. When the RMS was unavailable, these functions would not run. Here's what the RMS was solely responsible for providing:

- ▶ Console access
- ▶ Role based access control
- ▶ Distribution of configurations to agents
- ▶ Connectors to other management systems
- ▶ Alert notifications
- ▶ Health aggregation
- ▶ Group calculations
- ▶ Availability
- ▶ Dependency monitoring
- ▶ Database grooming
- ▶ Enabling model-based management

In addition, there were two Windows services that started only on the RMS and were disabled on other management servers: the SDK and Config services. A third service, the Health Service—renamed in OpsMgr 2007 R2 to System Center Management but often

referred to by its previous name—runs on all management servers (and agent-monitored systems), but had a unique role on the RMS, running workloads for the entire management group.

With all these responsibilities, the RMS often was a performance and scalability bottleneck, in addition to being a single point of failure. Making the RMS highly available required clustering—not necessarily for the faint of heart—or having a secondary management server available to be promoted to the RMS role. If the RMS became unavailable, those functions the RMS was responsible for were also unavailable until another management server could take over that role.

System Center 2012 Operations Manager removes the RMS role. The SDK service (renamed to the System Center Data Access Service or DAS) now starts automatically on every management server, and the Config service (now the System Center Management Configuration service), rewritten and renamed from OMCG to CSHOST, is federated among management servers. Rather than using data stored in memory on the RMS as was the case in OpsMgr 2007, the configuration service uses a new set of tables in the Operations Manager database (known as the Configuration Store and identified as CS.*) to persist the instance space.

NOTE: DEVELOPMENT TRIVIA ON THE CONFIGURATION STORE

During early test releases of System Center 2012 Operations Manager, the Configuration Store was in a separate database. It was later incorporated into the operational database once it was determined that this would not affect performance, giving OpsMgr administrators one less database to maintain and back up.

To distribute the RMS-specific workloads to all management servers, Microsoft developed the concept of resource pools, discussed in depth in the “Resource Pools” section. Three resource pools distribute the RMS-specific workloads:

- ▶ **All Management Servers Resource Pool:** This pool has most RMS-specific instances and workflows. Exceptions are the AD Integration workflows and Alert Subscription Service.
- ▶ **Notifications Resource Pool:** The Alert Subscription Service instance is targeted to this pool. Using a separate pool allows you to easily remove management servers from the pool that should not be participating in notifications.
- ▶ **AD Assignment Resource Pool:** AD Integration workflows are targeted to this pool so you can more easily control the location where the AD assignment workflows are running.

The RMS emulator (RMSE) is a special role added to one of the management servers, by default the first installed management server. The RMS emulator is for backwards compatibility to legacy management packs; it is not actually required for the management group to function correctly. To determine which management server has the role

of RMS emulator, open the OpsMgr Operations console and navigate to **Administration** -> **Management Servers**. Figure 2.3 shows that Helios is currently acting as the RMS emulator in the Odyssey OMGRP management group. Should you need to move the RMS emulator role, Microsoft provides the `Get-SCOMRMSEmulator`, `Set-SCOMRMSEmulator`, and `Remove-SCOMRMSEmulator` PowerShell cmdlets to identify, move, and delete the RMSE; these scripts are discussed in Chapter 23, “PowerShell and Operations Manager.”

TIP: INFORMATION ABOUT RMS EMULATOR

For additional information on the RMS emulator, see these posts:

- ▶ <http://blogs.catapultsystems.com/cfuller/archive/2012/01/11/what-does-the-root-management-server-emulator-rmse-actually-do-in-opsmgr-scom.aspx>
- ▶ <http://scug.be/blogs/christopher/archive/2012/01/09/scom-2012-move-rms-emulator-role.aspx>
- ▶ <http://blogs.technet.com/b/momteam/archive/2011/08/22/topology-changes-in-system-center-2012-operations-manager-overview.aspx>.

Management Servers (5)					
Health State	Name	Domain	Client Monitoring Mode	Version	RMS Emulator
Healthy	Hannibal	ODYSSEY	Disabled	7.0.8560.0	No
Healthy	viceroi	odysseylab	Disabled	7.0.8560.0	No
Healthy	regent	odysseylab	Disabled	7.0.8560.0	No
Healthy	Hector	ODYSSEY	Disabled	7.0.8560.0	No
Healthy	Helios	ODYSSEY	Disabled	7.0.8560.0	Yes

FIGURE 2.3 The Management Servers view identifies the current RMS emulator.

NOTE: GATEWAY SERVERS DISPLAY IN THE MANAGEMENT SERVERS LIST IN OPERATIONS CONSOLE

Figure 2.3 shows three management servers in the ODYSSEY domain and two in odysseylab. The viceroi and regent servers are actually gateway servers.

High Availability with Resource Pools

Resource pools are a collection of management or gateway servers that can take on monitoring workflows if one of the management/gateway servers becomes unavailable. Several resource pools are installed with the OpsMgr 2012, and you can create your own for specific purposes. As an example, you could create a resource pool of management servers located in the same geographic area that provide network device monitoring. Using resource pools helps your management group to be highly available.

The management servers in any given resource pool are treated as having equal capacity; differences in processors and memory are not considered; different workloads are not taken into account and are distributed among available servers in the pool. The authors recommend you plan for all management servers to have similar configurations.

By default, all management servers are members of the resource pools created when OpsMgr is installed, and management servers added to the management group are automatically added to any resource pool with a membership type of Automatic. Removing a management server from a pool changes the membership type of that pool to Manual. Figure 2.4 shows the resource pools created by default. To see the current list of resource pools, navigate in the Operations console to **Administration -> Resource Pools**.

Resource Pools (3)				
Name	Source	Membership	Last Modified	
AD Assignment Resource Pool	Management pack	Automatic	3/24/2012 7:11:32 PM	
All Management Servers Resource Pool	Management pack	Automatic	8/29/2012 6:02:46 AM	
Notifications Resource Pool	Management pack	Automatic	8/8/2012 1:49:45 PM	

FIGURE 2.4 Resource pools created by OpsMgr management group installation.

Here are several caveats to keep in mind:

- ▶ Windows agents do not use resource pools for failover; they continue to function as in OpsMgr 2007. You can implement Active Directory Integration (ADI) as discussed in Chapter 8, “Installing and Configuring Agents.”
- ▶ Resource pools only cover health service functionality. The workflows targeted to the instances are loaded by the health service in the pool that is managing that instance. Should one of the health services in the resource pool fail, the other health services pick up the work the failed member was running. For failover of the SDK service, consider Network Load Balancing, covered in Chapter 9, “Complex Configurations.”

Viewing Resource Pool Health

You can view the health of resource pool members in the Administration pane of the Operations console. Navigate to the Resource Pool node, select the pool you want to work with and then select **View Resource Pool Members** in the Tasks pane to view the health of the members of the selected resource pool.

Resource Pool Events

A number of events provide feedback regarding the state of each member of the pool. These events, listed in Table 2.2, are not collected or stored by Operations Manager; you must connect to each pool member’s event log to view the events. If there is a problem with the health of a pool, start your investigation by looking at the event log. All resource pool events are logged under the Pool Manager category.

TABLE 2.2 Resource pool events

Event ID	Name	Severity	Explanation	Description
15000	Pool Member Initialized Event	Informational	Indicates a member of a pool has received configuration and started the failover process.	The pool member has initialized.
15001	Operations Manager Resource Pool Member Initial Check Ack Quorum	Informational	More than half the pool members must be able to communicate with each other for a pool to perform work. Once the initial check ack quorum is achieved, a lease request can be sent out.	More than half of the members of the pool have acknowledged the most recent initialization check request. The pool member will send a lease request to acquire ownership of managed objects assigned to the pool.
15002	Operations Manager Resource Pool Member Quorum Failure	Error	This is the only event that can occur repeatedly without intermediate events, so it is throttled to once every 10 minutes per pool if no other changes in the pool occur. It indicates a majority of pool members has not acknowledged the initial check request.	The pool member cannot send a lease request to acquire ownership of managed objects because half or fewer members of the pool acknowledged the most recent initialization check request. The pool member will continue to send an initialization check request.
15003	Operations Manager Resource Pool Member Failover	Informational	This event is the result of a check ack message that influenced the logic used to determine if a pool member is available.	Availability of one or more members of the pool has changed. Ownership for all managed objects assigned to the pool will be redistributed between pool members.

Event ID	Name	Severity	Explanation	Description
15004	Operations Manager resource pool member not allowed to perform work	Error	This event is logged if a majority of pool members do not respond to the last lease request before the previous lease expired.	The pool member no longer owns any managed objects assigned to the pool because half or fewer members did not acknowledge the most recent lease request. The pool member has unloaded the workflows for managed objects it previously owned.

Network Monitoring Enhancements

OpsMgr 2012 provides physical network monitoring of routers and switches, extending to their interfaces and ports. This and other functionality is made available by Microsoft's licensing of EMC's SMARTS. The SMARTS technology provides root-cause analysis capability across an enterprise by looking at network connections and interpreting events by looking at the symptoms those events spawn. Here's what is included in networking monitoring:

- ▶ Network device discovery, monitoring and reporting
- ▶ SNMP v3 support; previous versions supported SNMP v1 and v2c
- ▶ IPv4 and IPv6 support
- ▶ Port/interface monitoring; this includes, along other monitors:
 - ▶ Up/down monitoring
 - ▶ Traffic volume
 - ▶ Utilization
 - ▶ Dropped packet rate
 - ▶ Broadcast traffic statistics
- ▶ Virtual Local Area Network (VLAN) health monitoring
- ▶ Overall connection health
- ▶ Hot Standby Router Protocol (HSRP) group health
- ▶ New visualization/dashboards

- ▶ **Overall network summary:** Shows the health of the network.
- ▶ **Network node:** Shows health of a device on the network. Figure 2.5 is an example of this dashboard.
- ▶ **Network interface:** Displays interface-level statistics.
- ▶ **Vicinity:** Shows a device, its neighbors, and connected Windows servers.

See Chapter 16, “Network Monitoring,” for a detailed discussion of network monitoring.

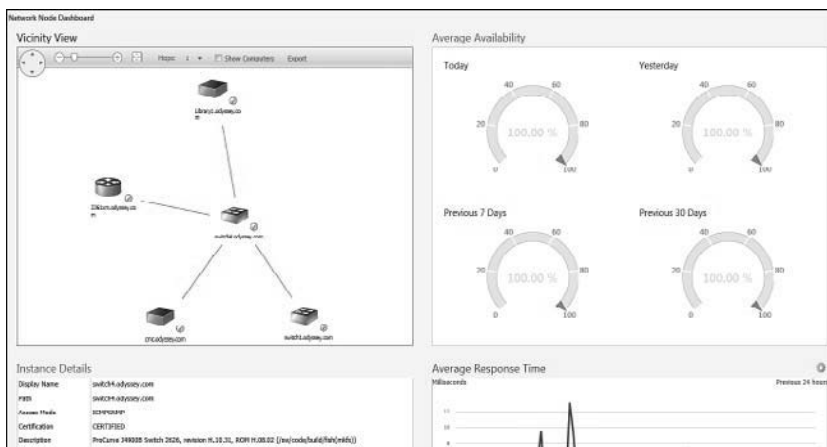


FIGURE 2.5 The Network Node Dashboard.

Monitoring .NET Applications

Also known as application performance monitoring, APM is Microsoft’s integration of AVIcode into OpsMgr. APM has the ability to drill into an application performance alert down to the code level to see exactly what is going on and where the issues are, giving you a single tool to monitor both applications and your infrastructure. As APM is configured using templates, it does not require authoring management packs or code modifications. Interfaces include the Application Advisor (shown in Figure 2.6) and Applications Diagnostics Web consoles, with the Web Application Availability Monitoring Wizard added to the Monitoring space of the Operations console.

This feature, discussed in Chapter 15, “Monitoring .NET Applications,” is available for .NET web applications and web services running IIS 7.x in OpsMgr 2012 RTM; SP 1 adds support for WFC, ASP.NET MVC, .NET Windows Services, Azure SDK, and IIS 8.

APM is the Gartner Group 2012 Challenger’s quadrant for Application Performance monitoring, as discussed at <http://www.gartner.com/technology/reprints.do?ct=120820&id=1-1BRNFO0&st=sg> and <http://innetworktech.com/wp-content/uploads/2012/08/2012-Magic-Quadrant-for-Application-Performance-Monitoring.pdf>.

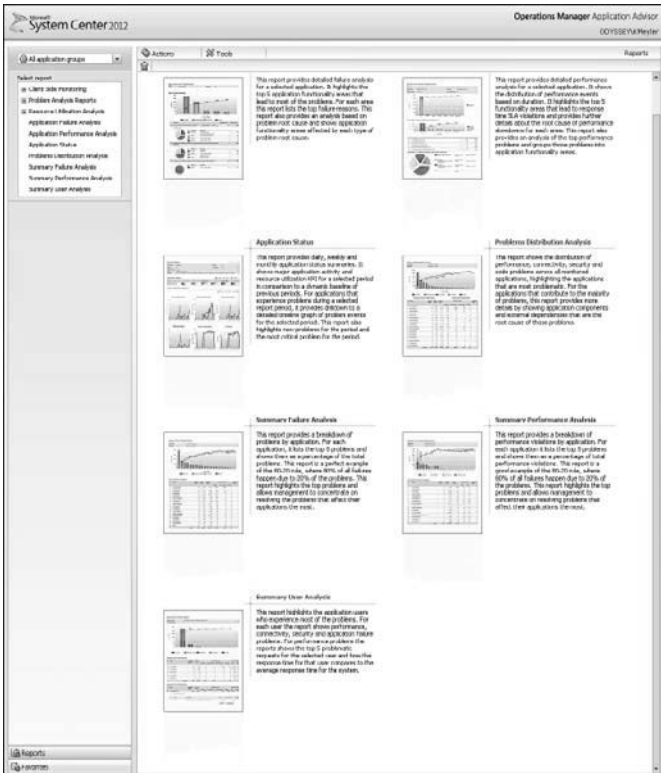


FIGURE 2.6 APM Application Advisor.

Using PowerShell

System Center 2012 Operations Manager incorporates about 30 new PowerShell cmdlets, enabling support of anything performed in the console via a cmdlet. Previous OpsMgr 2007 cmdlets are renamed to have a SCOM prefix in the name and now have new parameters; the OpsMgr 2007 cmdlets, although deprecated, still work in this version by loading the OpsMgr 2007 snap-in. PowerShell capabilities are discussed in Chapter 23.

Saving Overrides

A welcome change is that the Default management pack is no longer the default location for saving overrides or creating new management packs. Figure 2.7 shows where the drop-down now prompts you to select a management pack.

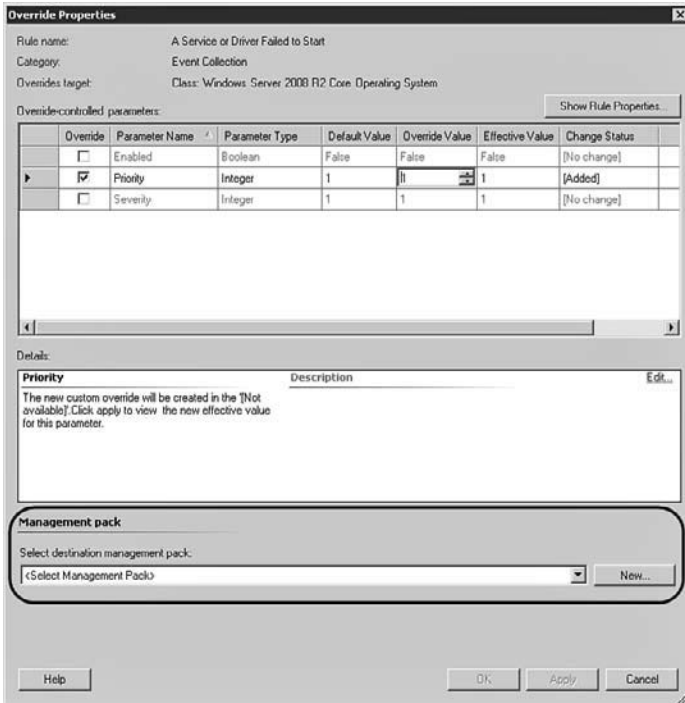


FIGURE 2.7 Overrides are no longer saved in the Default management pack by default.

Using the Console

The Operations Manager “full” console remains largely unchanged in OpsMgr 2012. Unlike consoles in some of the other System Center 2012 components, the Operations console does not include the ribbon bar (some may consider this an advantage). One change is the Actions pane is renamed to the Tasks pane. For an in-depth discussion of the console, see Chapter 7, “Configuring and Using System Center 2012 Operations Manager.” Figure 2.8 shows the Operations console.

Web Console Updates

The OpsMgr 2012 Web console is completely redesigned and based on Silverlight. All monitoring capabilities in the full console are now available in the Web console, along with access to the My Workspace node. Figure 2.9 shows the Monitoring space in the Web console.

Maintenance Mode on Management Servers

Operations Manager does not block placing management servers into maintenance mode. However, the way management servers behave when placed into maintenance mode has changed:

- ▶ When you place a management server in maintenance mode, the System Center Management Configuration Service changes the agent assignment to force the agents to fail over to another management server, ensuring data loss does not occur.
- ▶ In OpsMgr 2007, a management server was unable to take itself out of maintenance mode. This was because maintenance mode unloaded all workflows, including the End Maintenance Mode workflow! This now changes with the assignment of the End Maintenance Mode workflow to the All Management Servers resource pool. By being in the resource pool, the workflow fails over to another management server and reloads to be able to exit maintenance on the management server that is placed in maintenance mode. (By definition, having a resource pool requires at least two management servers, so if you only have a single management server it will never come out of maintenance mode because there is no other management server available for workflow failover.)

Dashboards

OpsMgr contains significant enhancements in its capability to display data through use of dashboard technologies. Discussed in Chapter 11, “Dashboards, Trending, and Forecasting,” here are some of the highlights:

- ▶ Dashboards are distributed in management packs.
- ▶ Authoring dashboards does not require coding.
- ▶ You can access dashboards via the Operations console, the Web console, and a SharePoint Web Part.

What's New in Security

In OpsMgr 2012, the local Administrators group is used to populate the Operations Manager Administrator role. This differs from OpsMgr 2007, where you could configure the group in that role; if you specified an incorrect group, you ran the risk of being unable to start the Operations console to be able to change that group without editing MomAuth.xml.

Operations Manager 2007 R2 simplified the original presentation of Run As accounts and profiles by adding distribution and targeting features. When you associate a Run As account with a particular Run As profile, you can 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.

Connector Functionality Replaced by System Center 2012 Orchestrator

Previous versions of Operations Manager used connectors to connect to other systems. In System Center 2012 Operations Manager, this functionality is replaced by Orchestrator integration packs. For information on Orchestrator, see Chapter 21, “System Center Integration,” and *System Center 2012 Orchestrator Unleashed* (Sams, 2013).

Changes in Capacity

With the most recent version of Operations Manager, Microsoft has increased capacity in several areas to extend the product's monitoring capabilities. Table 2.3 compares management features across the different versions.

TABLE 2.3 Comparison of Operations Manager capabilities across versions

Feature	MOM 2000	MOM 2000 SP 1	MOM 2005	MOM 2005 SP 1	OpsMgr 2007	OpsMgr 2007 SP 1	OpsMgr 2007 R2	OpsMgr 2012
Managed computers per management group	1,000	2,000	3,500	4,000	5,000	6,000	6,000	15,000
Managed computers per management server	700	1,000	1,200	2,000	2,000	2,000	2,000 UNIX/ Linux: 200	3,000 UNIX/ Linux:500
Management servers per management group	4	10	10	10	10	No defined limit	No defined limit	No defined limit
Agentless managed computers per management group	n/a	n/a	60	60	60	60	60	60
Agentless managed computers per management server	n/a	n/a	10	10	10	10	10	10
Agents per gateway server	n/a	n/a	n/a	n/a	200	800	1,500	2,000 UNIX/ Linux: 100

Terminology and Concepts

Microsoft has added some terms in Operations Manager 2012 with which you need to become familiar. Before beginning how to deploy and operate OpsMgr, familiarize yourself with the terminology and concepts that define System Center 2012 Operations Manager, discussed in the following sections. Microsoft provides a glossary of terms for System Center 2012 Operations Manager at <http://technet.microsoft.com/en-us/library/hh710011.aspx>.

AEM: Capturing Application Crash Information

Agentless exception monitoring provides data on application crashes, resulting in information your organization can analyze for patterns. A management server can optionally forward AEM data to Microsoft for analysis rather than having each individual client forward the data.

Operations Manager Agent

An OpsMgr agent is the feature installed on a computer that performs management. Based on the management packs associated with the computer, the agent collects data, compares sampled data to predefined values, creates alerts, and runs responses. Computers can be agent-managed, or agentless. An agentless-monitored computer does not run the OpsMgr agent. The agent feature on a management server (or another OpsMgr agent) gathers data from the agentless managed computer through remote calls to that system.

Audit Collection

ACS is a secure and efficient way to gather Security event logs from systems and consolidate them for analysis and reporting. These events are stored in an audit database. Deploying ACS involves ACS forwarders, the ACS collector, and the ACS audit database. The ACS agent is included in the OpsMgr agent deployment.

Post OpsMgr 2007 R2, Microsoft extended ACS to include cross platform support. ACS capabilities are largely unchanged in System Center 2012 Operations Manager. ACS is discussed further in Chapter 10, "Security and Compliance."

Classes: Templates for Objects

A class is an item that is targeted for all operations. Think of a class as a template defining a set of objects of a certain type and the properties of those objects. Classes can exist in a parent-child relationship where the child class inherits properties from the parent class.

Features Versus Components

Components in OpsMgr 2007 are now called product *features*, as the previous products in the System Center suite are now components of System Center 2012. As an example, the OpsMgr agent is now a feature, rather than a component.

Gateways

The gateway server plays two roles in Operations Manager:

- ▶ Operations Manager requires mutual authentication between the management server and the agent. A gateway server enables monitoring of computers that lie outside the Kerberos trust boundaries (Kerberos realm) of the management group. When an agent belongs to an untrusted domain, is outside the corporate firewall, in a demilitarized zone (DMZ, also known as a *perimeter network*), or in a workgroup, it is not able to use mutual authentication as a secure channel to communicate with a management server. Gateway servers use certificates to communicate with those agents that cannot otherwise communicate with a management server. The gateway acts as a proxy server to take data from these agents and forward it to a management server inside the firewall.
- ▶ An additional use of gateway servers is their implementation in distributed environments where remote sites are located at the end of a long-distance wide area network (WAN) link. The gateway server aggregates communications from agents and minimizes traffic between the remote site and a management server. The data transmitted between the agent and a management server (or gateway server) is both encrypted and compressed. By compressing at the gateway before sending it across the WAN, you can take advantage of a compression ratio ranging from approximately 4:1 to 6:1. More information on using gateways is in Chapter 4.

Heartbeats: Checking the Health of the Agent

A heartbeat is a message sent by an agent to its management server that tells the management server the agent is functioning. The heartbeat also informs Operations Manager of the current rules evaluated by the agent and requests updates if necessary.

Management Group

A management group is the basic functional unit of an Operations Manager implementation that can perform monitoring. It must contain a SQL Server database server, one or more management servers, one or more Operations consoles, and one or more agents. It can also contain a SQL Server reporting server, a gateway server, and an ACS server and database.

Management Pack

The heart of Operations Manager is its management packs, which are collections of objects including monitors, rules, alerts, performance events, and reports for a specific application or product feature set. Management packs use XML. Management packs are the brains of Operations Manager; they provide the logic and reports used for monitoring.

Management Server

Management servers are those components of an Operations Manager management group that are responsible for communication with agents, databases, and the consoles. Each management group must have at least one management server, which is installed during OpsMgr setup.

Models

Models are software representations of hardware, software, services, and other logical components that are in your environment. The model captures the nature of those components and the relationships between them.

Resource Pool

A resource pool is a collection of management or gateway servers that automatically distribute Operations Manager workflows between the management servers in that collection. If one or more servers in the pool become unavailable, the workflows are automatically redistributed.

RMS Emulator

The RMS emulator is a management server designated to run management pack functions specifically targeted to the `Root Management Server` class. These tend to be older (legacy) management packs, as newer management packs do not target this class. The RMS emulator role was created to not break existing management packs that specifically target the RMS. Here are two articles with additional information:

- ▶ <http://blogs.technet.com/b/momteam/archive/2011/08/22/topology-changes-in-system-center-2012-operations-manager-overview.aspx>
- ▶ <http://www.systemcentercentral.com/BlogDetails/tabid/143/IndexID/91085/Default.aspx>

Run As Account

This is a Windows account that can be associated with a Run As profile, and can use Windows Authentication, NTLM, Basic, Digest, Simple, or Binary methods of authentication.

Run As Profile

A Run As profile is a profile that associates a credential with a workflow so it can run using those credentials.

When a workflow requires credentials that cannot be provided by the default action account, it can be written to use a Run As profile. The Run As profile can have multiple Run As accounts associated with it, each specifying the necessary credentials for specific computers. Multiple workflows can use the same Run As profile, as shown in Figure 2.10.

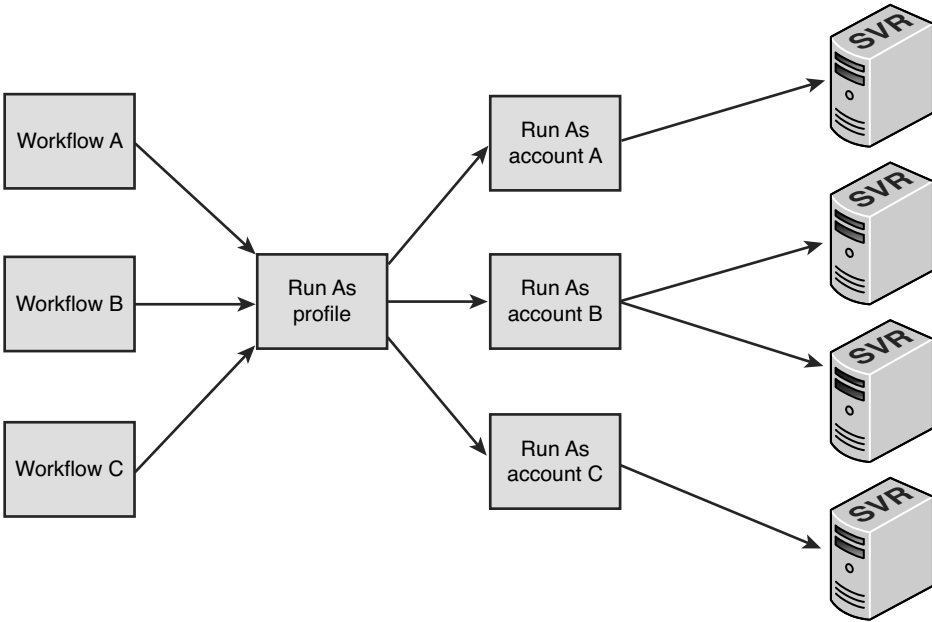


FIGURE 2.10 Using a Run As profile.

User Role

A user role is a combination of a profile that combines actions users can take (such as an OpsMgr Administrator or OpsMgr Operator) and a scope, which are the objects the users can take those actions on, such as all SQL Servers. A user role is also a security boundary. The OpsMgr administrator can utilize user roles to control access to views and tasks to those OpsMgr users assigned to that role.

Summary

This chapter covered the history of Operations Manager and highlighted the changes in the System Center 2012 Operations Manager release. It also discussed Service Pack 1, in prerelease at the time of writing this chapter. The next chapter discusses how OpsMgr actually works, giving you a look at the internals of this System Center component.

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