QUEST SOFTWARE®

Simplify and Standardize Systems Management

Introduction to Heterogeneous Systems Management with Quest Management Xtensions—Configuration Manager 2007 Edition

Written by
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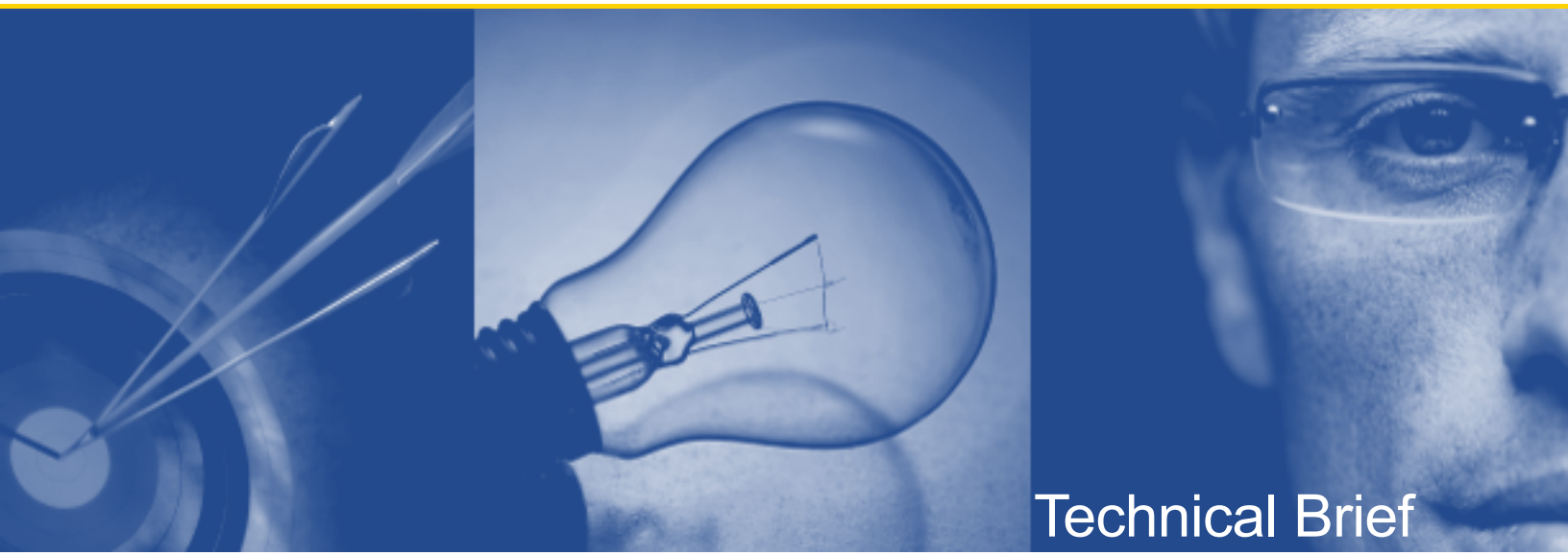

Technical Brief

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CONTENTS

EXECUTIVE BRIEF

Centralize and standardize systems management

Microsoft System Center Configuration Manager 2007 is the next version of Systems Management Server (SMS) 2003. Configuration Manager 2007 contributes to a more effective IT department by enabling secure and scalable operating system, application, and patch distribution; software metering; remote troubleshooting; configuration management; and comprehensive asset management of Windows-based servers, desktops, and mobile devices.

Quest® Management Xtensions—Configuration Manager 2007 Edition (QMX—Configuration Manager 2007) extends the power of Configuration Manager to the heterogeneous IT organization by providing asset management, software and patch distribution, software metering, and remote tools for the non-Windows world. QMX—Configuration Manager 2007 is built around an agent-based approach that is similar in experience to the native Configuration Manager client, so existing skills in Configuration Manager can be utilized. In addition, an agent-less option enables organizations to manage assets like routers, switches, and other devices via Configuration Manager, as well as additional operating systems or versions that are not supported with the agent-based solution. No additional infrastructure is required for QMX—Configuration Manager. This makes distribution easy and extends the investment already made in Configuration Manager.

Reduce the cost and complexity of managing systems and applications

INTRODUCTION

The Challenge

Modern organizations often rely on a wide range of dispersed and diverse systems to provide applications and operations. For example, desktop and e-mail might be provided by Microsoft, but a CRM system might run on Oracle on Solaris. UNIX and Linux may provide file, print, or web services, while VMware ESX might be deployed to rationalize server and power costs. Mac OS X desktops may have become more prevalent.

Supporting change and configuration management on a wide range of devices and operating systems presents a real challenge to IT organizations. Moreover, it can prove significantly expensive because a separate set of management costs often has to be carried for each operating system. Key costs include:

- Duplication of training costs
- Longer time to resolution
- Duplication of management teams with different methodologies and processes
- Disparate servers and systems for management infrastructure and software
- Keeping patch and security levels up to date across diverse systems

Systems management in the Windows space can successfully be handled by Microsoft's System Center solutions, with change and configuration management being conducted by Configuration Manager. But how can we think beyond the Windows space? How can we leverage the existing investment and skills in Configuration Manager?

Solution: Quest Management Xtensions

Quest® Management Xtensions—Configuration Manager 2007 Edition is the next release of Quest Software's previous and successful offering for heterogeneous management, Quest Management Xtensions for System Management Server 2003. Quest acquired Vintela in 2005, and QMX— Configuration Manager 2007 builds upon the well-regarded Vintela Management Extensions (VMX). The product has matured into a stable, robust, and feature-rich solution for extending heterogeneous system management using Microsoft's core systems management technology. In addition, Quest's 2007 acquisition of eXc Software brings agent-less capability for managing a wider range of devices.

This document introduces QMX—Configuration Manager and explains how it extends Microsoft's System Center Configuration Manager to provide a heterogeneous management solution that can:

- Reduce support costs
- Reduce patching and software distribution costs
- Lower mean time to resolution for IT issues
- Provide asset tracking
- Reduce the cost of license compliance
- Minimize the cost of implementation

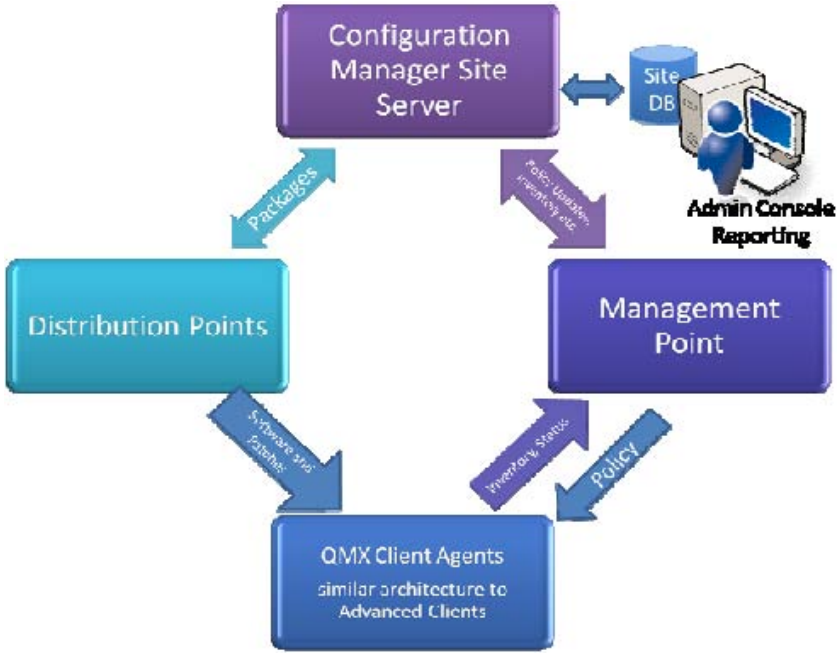
Supported clients for the QMX — Configuration Manager 2007 Agent include:

- Apple Mac OS X
- Hewlett Packard HP-UX
- IBM AIX
- RedHat Enterprise Linux
- SUSE Linux Enterprise Server
- SUSE Linux Standard Server
- SUSE Novell Linux Desktop
- SUSE Linux Enterprise Desktop
- Sun Solaris
- Asian UX
- VMware ESX
- CentOS

QMX for Device Management significantly extends this list. For a complete list of supported devices, visit www.quest.com/system-center.

ARCHITECTURE

QMX—Configuration Manager 2007 requires the deployment of Configuration Manager. The QMX agents behave much like the native Configuration Manager 2007 client, as illustrated below.



For Mixed mode installations, no extensions are required to the Configuration Manager database, the site servers (beyond a console extension), management points, reporting points, or distribution points (DPs) beyond what would already be in place for Configuration Manager (i.e., BITS and WebDAV).

The QMX agent does not utilize SLPs, branch DPs, or fallback status points. There is no **additional infrastructure cost** to manage all of your heterogeneous systems through Configuration Manager. This represents a rapid and increasing return on your investment.

QMX – Configuration Manager 2007 also supports running in Native Mode environments which provide SSL-based security using certificates. For this mode, a Management Point Proxy (MPP) needs to be installed to all Management Points used by QMX agents. The QMX agents communicate through the MPP which acts as a proxy to both Management Points and Distribution Points. The MPP handles the certificate exchange. The MPP architecture provides secure communication for non-Windows clients within a Native Mode environment, without requiring non-Windows certificates for every client, which can be a challenge to manage.

A management console extension is required and is provided as a Microsoft installer (.msi) file. This seamless snap-in extension supports MMC v3.0. It provides a seamless snap-in extension to the existing Configuration Manager operator experience by extending the native Configuration Manager 2007 console. Non-Windows client operations can be invoked from context menus, and QMX—

Configuration Manager 2007 actions appear in the actions pane depending on what is selected in the central details pane. For example, right-clicking a collection displays the shortcut to invoke the non-Windows Software Distribution Wizard. Selecting a client machine in the details pane displays the shortcut in the Actions pane that initiates remote tools to that non-Windows host.

In addition to the console extension, QMX—Configuration Manager 2007 includes a wide range of pre-built collections and queries to help administrators organize non-Windows resources beyond discovery and client installation. Administrators can customize these collections and queries as well as create their own.

Client Agent Architecture

The client architecture for QMX—Configuration Manager 2007 is based on Universal Management Instrumentation (UMI). UMI is a non-Windows version of Windows Management Instrumentation (WMI), a core part of Windows-based operating systems that helps provide all the useful information (principally inventory) that the Configuration Manager client agent then passes to Configuration Manager for storage in the database. The definitions in the UMI layer in the QMX client are the same as the definitions in WMI, so the data committed to the Configuration Manager database is similarly formatted and uses the same database tables and classes used by regular Windows clients.

Managing Network Devices

[extending the reach of QMX]

Many organizations not only have a mix of non-Windows computers that they would love to manage centrally, but they also have network devices they want to expose inside Configuration Manager. To facilitate this, Quest provides QMX for Device Management, an agent-less solution that can collect inventory data from a wide variety of devices (via SNMP or CLI) and commit that data to the Configuration Manager database so it can be viewed centrally. In other words, Configuration Manager can be thought of as a central asset information repository that contains information not only about Windows clients, but also about non-Windows clients like Linux and AIX and devices like printers, routers, and switches from a long list of vendors including RIM Blackberry, Cisco, Juniper, Nokia and Xerox. Please see www.quest.com/system-center for a complete list.

This means that there is no requirement to extend the Configuration Manager database schema and no need to extend management points. In fact, there's no need to install anything on your Configuration Manager site systems: the QMX console extensions can be installed on an administrator's workstation along with the QMX—Configuration Manager 2007 administration console. The QMX console extensions do need to be installed on the central site server for the purpose of tracking licenses. As was previously mentioned, for more secure communications in Native Mode, a Management Point Proxy needs to be installed on the Management Points and certificates created and configured.

Once installed, the client agent obeys the rules and inventory schedule defined in the Configuration Manager console. After installation, the QMX agent automatically communicates with the site server to identify, or "discover," it. At this point, client-initiated manual operations such as forcing a policy update or a hardware inventory cycle can be invoked using a command-line utility.

Configuration Manager treats QMX non-Windows clients as if they were native Configuration Manager clients:

- The data stored in the Configuration Manager 2007 database obeys the rules for the Configuration Manager 2007 site hierarchy, so all the inventory taken from non-Windows clients flows to a central site, giving you a centralized view across all your operating systems. For example, you can easily see all installations of Mozilla Firefox or iTunes across your entire Windows and Mac OS X organization. You can also see all servers with less than 1GB of free disk space, whether they run Solaris, Linux, or Windows.
- All the queries, reports, collection membership rules, status queries, and summarization rules that you can define for your Windows clients can also be applied to the non-Windows world. Your support staff can easily identify what services are running on RedHat clients, or where a certain brand of graphics card is installed across Solaris servers.
- Maintenance Windows allow you to define a 'window' of opportunity during which software and patch distribution can occur. The QMX - Configuration Manager 2007 Agent supports Maintenance Windows. You define maintenance windows by collection with an effective start date, start and end times, and a set recurrence pattern.

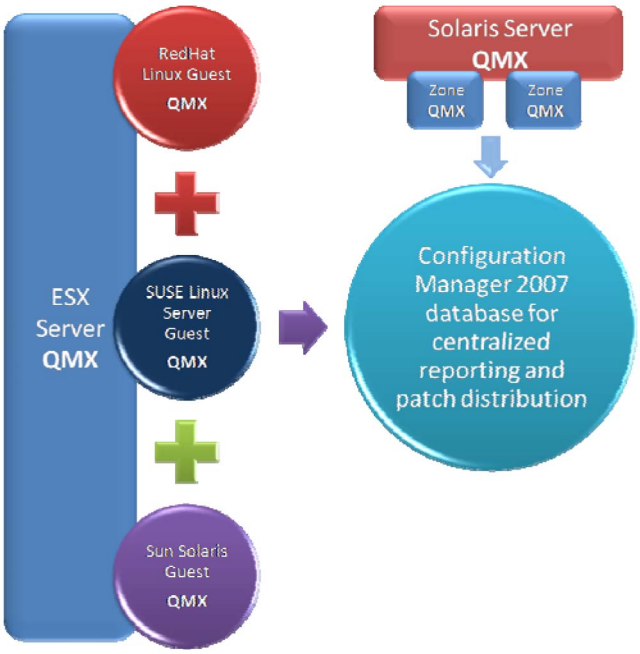
Integrating Unix Systems with Microsoft Active Directory

Non-Windows clients can be joined to the Active Directory domain using Quest Software's Vintela Authentication Services (VAS) technology. VAS allows users to log on to non-Windows computers using their Active Directory user accounts via LDAP and Kerberos, allowing centralized user account, group, and password policy management. VAS provides a new Active Directory-based Group policy manager to manage the hundreds of Mac OS X desktop settings. The same infrastructure, processes, and personnel that manage your Windows resources can be extended to non-Windows operating systems and applications.

QMX – Configuration Manager 2007 provides integration with Vintela Authentication Services (VAS). The VAS agent is installed with each QMX agent and can optionally be used during the QMX agent client installation process to join non-Windows systems into an Active Directory Domain. Once joined, VAS integration provides additional security by using Management Point certificates from Active Directory. Domain information can also be collected and placed in the Resource Explorer fields and shown in several reports. Only the Active Directory joining feature is provided with QMX – Configuration Manager 2007. The rest of the VAS functionality can be enabled by purchasing VAS and getting a license key upgrade. If the full VAS solution was previously installed and the non-Windows systems were joined to Active Directory, the QMX agent installer could discover computers in Active Directory. For more details on VAS, please visit http://www.quest.com/vintela-authentication-services/.

Supporting Virtualization

Virtualization involves having a number of separate operating systems with applications running on one physical device at the same time. The virtual servers using the resources of the physical hardware are referred to as *guests*, and the underlying physical server is called the *host*. Virtualization can reduce power consumption, enable the consolidation of servers, and generally reduce the total cost of IT ownership.



QMX—Configuration Manager 2007 extends Configuration Manager to VMware ESX, Solaris Zones (a Sun-specific virtualization technology), and guest non-Windows operating systems. The QMX—Configuration Manager agent collects data from the physical machine if it is installed on the physical host or from the virtual machine if it is installed on the virtual guest. The relationship between the virtual and physical host can be collected through custom inventory.

Keeping Non-Windows Data Secure

Configuration Manager treats data about QMX clients exactly the same as that of native Windows clients. For this reason, the records for non-Windows clients can be secured the same way as those of Windows clients.

The Configuration Manager 2007 security model allows permissions granted to Active Directory users and groups to be applied to individual classes (e.g., collections) and instances (e.g., the 'All AIX Systems' collection) in the Configuration Manager database. For example, you can allow only the "Unix guys" to see and query non-Windows resources, deploy Unix software, start remote tools, and so on. You can group teams more logically: you might have a team responsible for compliance report generation across the entire heterogeneous business and a team responsible for patch distribution across the organization. With Configuration Manager and the QMX plug-in, you can do all this through a single administration console.

Configuration Manager mixed mode and native mode security is supported, and QMX security features reflect much of what is available in Configuration Manager today, including the following:

- Optional inventory encryption
- Package verification
- Policy authentication and verification through Trusted Root Keys
- Management Point Certificates
- Using SSL to communicate with a Management Point Proxy
- If the host client is added to Active Directory via VAS, then the QMX agent will take advantage of AD authentication and access control for client operations

The client agent itself employs least privilege access, so all possible processes run under the context of a non-privileged user account.

QMX—CONFIGURATION MANAGER 2007 IN OPERATION

QMX—Configuration Manager 2007 provides a Configuration Manager client for use on non-Windows operating systems. Nearly all the same features found in the native Configuration Manager client are provided in the areas of discovery, client installation, hardware inventory, software inventory, software and patch distribution, software metering, remote control, querying, and reporting.

Asset Discovery

The first step in any asset management solution is identifying exactly what systems are present in the organization. In QMX—Configuration Manager 2007, *discovery* is the act of creating (or updating) a discovery data record (DDR) for a given host in the Configuration Manager 2007 database. A DDR can be created either prior to or as part of client installation.

Natively, Configuration Manager performs discovery for Windows host systems in a number of ways:

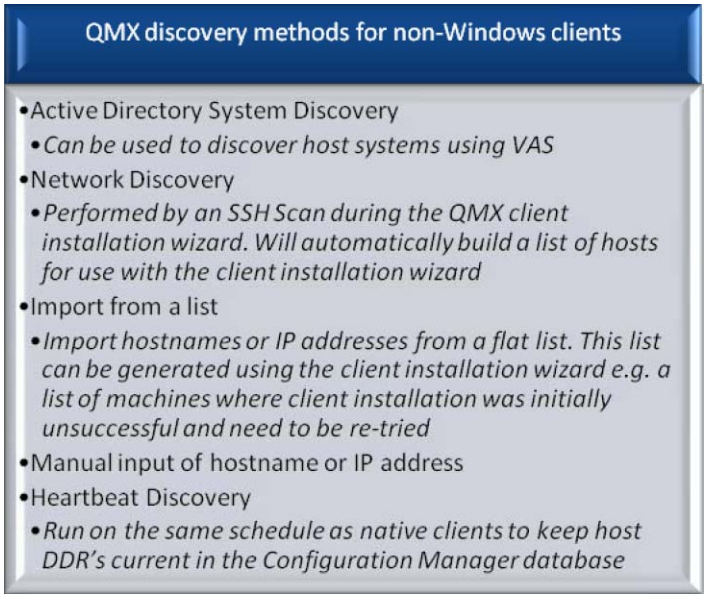
- Active Directory System Group discovery
- Active Directory Security Group discovery
- Active Directory System discovery
- Active Directory User discovery
- Network discovery
- Heartbeat discovery

QMX—Configuration Manager 2007 performs discovery for non-Windows systems that need to have a DDR created for them in the Configuration

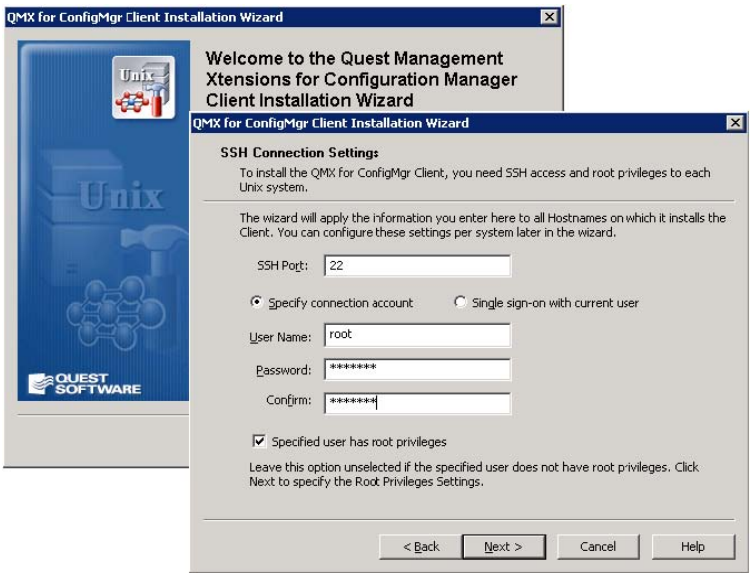
Manager 2007 database. QMX discovery is used to create the list of target systems for QMX—Configuration Manager 2007 agent installation.

Client Installation

Once the list of clients targeted for QMX installation is compiled, the QMX—Configuration Manager 2007 Client Installation Wizard can be run. The client push takes place over SSH on the port specified by the operator (typically TCP 22).



The Client Installation Wizard is similar to the native Configuration Manager client push wizard. You can centrally specify the parameters required for client installation, including the Configuration Manager site code, the management point (MP) name and port (you can include MPs listening on a port other than TCP 80), the Management Point HTTP Port (443) for SSL communications, number of concurrent installations, and bandwidth throttling. In addition, you can specify client parameters specific to Unix-based operating systems. The installation can be run under a Root context, or you can allow another account to connect to the target box using SSH. You can then run the installation using su or sudo rights. The non-Windows client can also be joined to the Active Directory domain using VAS.



The target clients can be selected based on the results of the SSH scan, the clients found in AD, imported from a text file, or input manually [see the *QMX Discovery Methods* sidebar]. After the client list has been assembled, the parameters for each targeted client can be modified individually, allowing a great deal of flexibility in client deployment. Once the client installation process has been initiated, you can check client status using a summary view

that enables you to drill down to an individual client's installation log. Logging is performed on the client itself.

For cases in which the client agent cannot be pushed over SSH or client push is not desired, QMX—Configuration Manager 2007 also supports manual client installation, as well as RedHat Linux Kickstart and SUSE AutoYast. QMX—Configuration Manager 2007 also provides a "no startup" option that enables you to create and clone an O/S build; the QMX client agent will start and uniquely register itself with Configuration Manager at a later time.

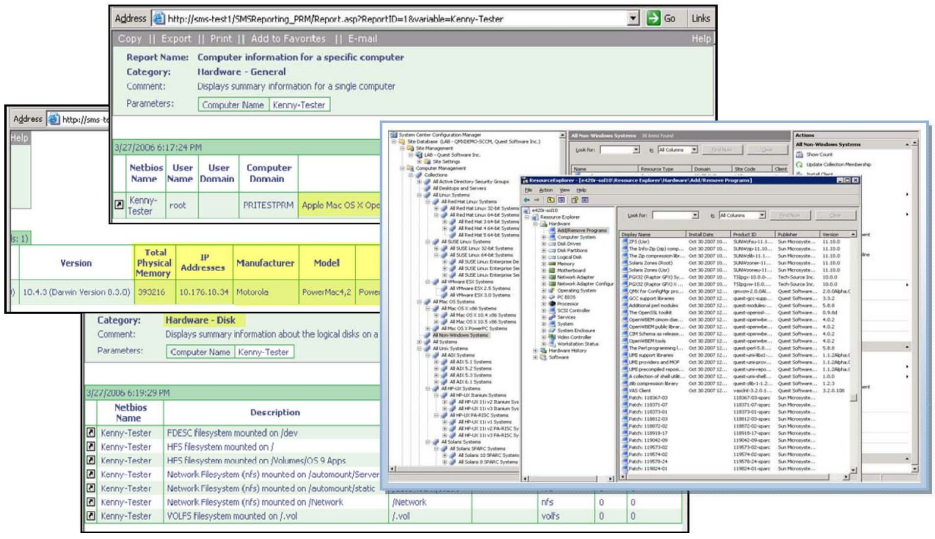
The ability to automatically discover target hosts and then rapidly deploy the QMX client agent to many hosts at one time minimizes the cost of establishing a unified management system. Comprehensive logging with a centralized view makes diagnosis of the client installation process easy.

Asset Inventory

Configuration Manager 2007 gives organizations better control over their IT infrastructure and assets. It allows IT administrators visibility into what hardware and software assets they have, who is using them, and where they are. QMX extends the power of hardware inventory, software inventory, and software metering into the heterogeneous space. In addition, Configuration Manager 2007 can feed other asset management databases to offer a truly holistic view over the entire estate.

Hardware Inventory

Hardware inventory for QMX agents follows the same schedule you set for Windows clients. It is enabled as part of the site-wide setting for hardware inventory in the Configuration Manager console. QMX hardware inventory uses the same architecture and classes in the CIM schema as Windows clients (including useful fields like serial number, OS version, and processor architecture). Inventory data is also collected for disk partitions, logical disks, network adapters, memory, etc., just as is done with Windows inventory collection. For this reason, non-Windows inventory can appear in the Configuration Manager database beside Windows inventory. It can also be displayed and filtered in Resource Explorer and be used to generate reports via a reporting point.



Hardware and software history is maintained in the Configuration Manager database to assist with change management. You can collect additional information, such as the physical location of a server or an asset label stuck on the outside of the box. This customization works similarly as it does for Windows clients: .mof format files containing the relevant information can be collected as part of the hardware inventory cycle and committed centrally to the Configuration Manager database.

Software Inventory

Keeping Track of Installed Applications

On Windows operating systems, installed applications are registered in Add/Remove Programs, and Configuration Manager collects that list as part of its hardware inventory cycle. The list of installed programs on a non-Windows host is generally held in a package management database on that machine. Native package managers such as Red Hat Package Manager, Solaris Package Manager, HP Depot, AIX Installp are supported and scanned. QMX reads that list during its

> The Common Information Model (CIM) provides a common definition model that enables vendors to exchange semantically rich management information between systems throughout the network. See www.dmtf.org for more information.

hardware inventory cycle and populates the data into Add/Remove Programs in the Configuration Manager database. The experience of reporting on installed applications is the same for both Windows and non-Windows clients.

QMX also inventories the existence and status of daemons (installed services). Installed software programs that are not part of the non-Windows native package management database, such as tarballs, can also be inventoried and stored in the Configuration Manager database.

With Configuration Manager and QMX—Configuration Manager 2007 it is possible to get a complete view of installed programs in a diverse enterprise.

This makes support and troubleshooting easier while providing greater control over licensed and unlicensed applications.

Software Inventory of All Other Files

With Configuration Manager, all other files that are not installed applications can be recorded using the software inventory client agent. Software inventory allows administrators to collect information about files stored on client hard drives and store that information in the site database. In addition, Configuration Manager can be configured to collect the actual files themselves, although attention should be paid to the size of the Configuration Manager database in larger environments. Having those files on hand can speed problem resolution; for example, if application's configuration file was updated incorrectly, a previous version can be restored quickly.

Non-Windows operating systems treat files and directories differently than Windows operating systems. QMX—Configuration Manager 2007 reflects this by adding tabs for non-Windows Inventory and non-Windows File Collection to the Software Inventory Client Agent settings in the Configuration Manager console. These tabs allow you to inventory specific paths and files. Wildcards are supported. File versions are also inventoried.

Metering Application Usage

Hardware and software inventory can provide a list of files or applications on any given Configuration Manager client. Software metering, on the other hand, is designed to provide data on how applications are being used in your environment, including who uses them and when. For example, you can see how often users actually run that expensive application that the design department told you they just had to have.

Non-Windows software metering data is collected on the QMX client agent when the Software Metering Client Agent is enabled in the Configuration Manager administrator console. It then examines each program running on the client to determine if the

program matches a specified rule for the client's assigned Configuration Manage site. Data about application usage is stored in the Configuration Manager site database and is replicated up the Configuration Manager hierarchy.

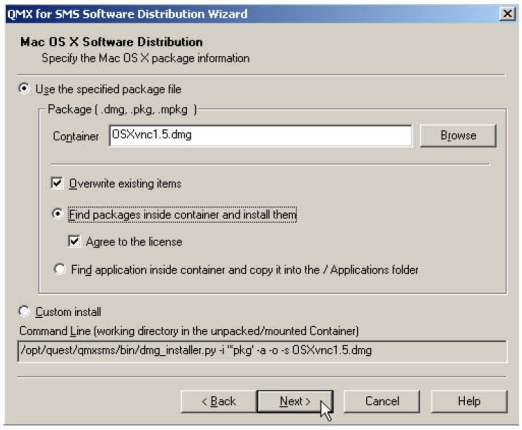
Software metering gives intelligence about the cost of ownership of individual applications, so you can better evaluate whether to retire a given application and eliminate the licensing, maintenance, and training costs associated with it.

Because metering data is collected in the same fields as is the Windows metering data, standard metering Web reports can be run to display the cross platform data.

Lowering Software and Patch Distribution Costs in the Heterogeneous Enterprise

The QMX—Configuration Manager software distribution wizard grants great flexibility over how packages should be deployed to non-Windows hosts, such as package type selection...

...and specific program properties, in this case for Mac OS/X



Configuration Manager helps eliminate the inefficient, error-prone, and expensive process of manually installing applications and software updates. IT administrators can centrally define and configure how and when applications run on client computers, eliminating the need for user intervention. Explicit targeting, scheduling, and reporting allow for more effective and automated software deployments.

QMX—Configuration Manager 2007 enables you to leverage the power of Configuration Manager to distribute software and patches across the heterogeneous enterprise. It provides a wizard for deploying software to non-Windows systems that is similar in look and feel to the Windows- based software distribution wizard but accounts for the different components and options that need to be configured. This ensures that non-Windows software or patch distribution is successful.

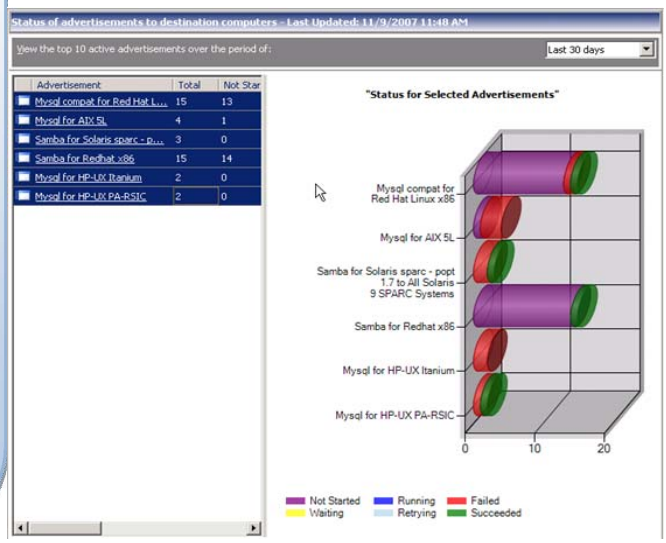
Options are provided that are unique to each package type. For example, distribution to RedHat machines includes specific .rpm options, and distribution to Mac OS X provides options for .dmg, .pkg, .mpkg, and .app files. Mac software distribution also offers the option to agree to any license request that an installing application may make, so software distribution is smooth and costs less.

Multiple files can be included in a package for distribution, which means dependencies may automatically be resolved for systems such as RedHat. Custom software distribution options allow virtually any command or script to be deployed and run on non-Windows hosts. In addition, administrators can create the non-Windows Configuration Manager 2007 package and program separately from the 'go button' of the advertisement.

This allows finer control over the software distribution process.

QMX—Configuration Manager 2007 includes a pre-configured list of tools for immediate productivity:

- Gnome System Monitor
- HP-UX sam and stm
- PuTTy SSH shell
- RHEL
- Network Configuration
- Package Manager
- Printer Manager
- Samba Configuration
- User and Group Manager
- Solaris
- admintool
- sdtprocess
- smc
- SUSE yast2
- Top System Monitor
- VNC Viewer over SSH



In Configuration Manager, targeting for software distribution is done through the use of collections. Collections are groups of machines with something in common, such as an operating system or patch level, an IP subnet, a particular hardware specification, or software files already in place. Collection membership is typically dynamic: if a host changes in such a way that it meets the criteria for a given collection, it is added to that collection automatically and will receive any programs advertised to the collection. QMX—Configuration Manager 2007 includes a range of pre-defined collections that can be customized using inventory data to ensure that software and patch targeting to non-Windows systems is accurate. Maintenance Windows are also supported for collections for non-Windows systems

Key to any software or patch distribution mechanism is status reporting. QMX—Configuration Manager 2007 provides both summary and granular reporting at all stages of the software distribution process. Administrators can track the creation of packages, programs, and advertisements. They can also track packages being deployed to distribution points, advertisements received at the target host, and programs started and completed. These vital statistics enable you to accurately track software or patch distribution and aid in troubleshooting. Status messages from QMX agents are handled in the same way as those from native Windows clients, so status summarization and status message queries are supported.

Reducing the Cost of Support Calls with Remote Tools

Remote tools allow an organizations support staff to connect to a host from within the Configuration Manager console and provide remote support, troubleshooting, and training. QMX—Configuration Manager 2007 enables support staff to launch non-Windows tools from within the Configuration Manager 2007 console. For example, you can start common Unix-based tools like PuTTy, Top system monitor, AIX smit, and Solaris admintool. The list of tools that can be contextually invoked is extensive, and can be customized or extended to meet your needs. Especially noteworthy is support for Virtual Network Computing (VNC), a graphical desktop sharing system that allows remote control of other machines, including Mac OS X. VNC enables the consolidation of support functions for the heterogeneous organization in one place.

QMX support for Configuration Manager 2007 security enables you to delegate specific support functions to a particular team and to define for the relevant collections of systems. For example, a support team could be granted access to only RedHat Package Manager and Top system monitor on RedHat Enterprise Linux systems running Apache.

A typical scenario might be as follows:

1. A user calls support because of a problem with an application running on the Mac OS X 10.5 desktop.
2. The support team uses Configuration Manager 2007 reports to view diagnostic and inventory information; identify the application version on that computer; and list other installed applications and hardware that could be the root of the problem.
3. The support team starts a remote VNC session by right-clicking the target host in the Configuration Manager 2007 console and resolves the problem.
4. If the support team determines that a patch update is required, QMX software distribution can be used to ensure that the host in question, along with any other machines that have the same application, receive the required update in a scheduled, secure, and auditable fashion. This proactive update prevents support calls from other users.

By centralizing and automating these support functions, Configuration Manager extended by QMX reduces mean time to resolution for problems across the organization. This reduces the cost of ownership and maximizes the return on the investment made in Configuration Manager.

CONCLUSION

System Center Configuration Manager offers organizations a comprehensive and flexible solution for change and configuration management on Windows operating systems. QMX – Configuration Manager 2007 extends the power of Configuration Manager to non-Windows platforms, including asset discovery, hardware and software inventory, and software metering. QMX – Configuration Manager 2007 gives you visibility into and control over your heterogeneous environment, enabling you to reduce administrative, licensing, maintenance, and support costs.

But QMX – Configuration Manager 2007 is just part of a wider Quest management solution: Quest offers a comprehensive set of solutions that extend the powerful capabilities of the Microsoft System Center family to heterogeneous environments. Quest offers extensions for Operations Manager, enterprise single sign-on through Active Directory, and solutions that extend Data Protection Manager. Quest products enable System Center to be the single, end-to-end platform for managing desktops, servers, and devices in both physical and virtual environments. With Configuration Manager as the 'single pane of glass,' organizations can centralize and standardize systems management, ultimately reducing the cost and complexity of managing systems and applications. For more details, visit www.quest.com.

ABOUT THE AUTHOR

Charles Clarke is a Senior Systems Consultant for Quest Software, where he specializes in Windows Management solutions to help extend and enhance native Microsoft infrastructure. He has over ten years experience with Microsoft systems management software and held a Microsoft Most Valued Professional (MVP) award in Systems Management Server from 2002–2006. Prior to Quest he worked in the IT industry as a consultant and trainer.

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