



Overview

Country or Region: United States

Industry: Healthcare Services

Customer Profile

Stamford Health System (SHS) provides a comprehensive range of health services to residents of Stamford, Connecticut, and the surrounding area.

Business Situation

SHS sought a server monitoring and management solution that would help it achieve high availability among its core servers that provide critical infrastructure services.

Solution

The Henson Group exceeded SHS's objectives for designing and deploying a comprehensive server monitoring solution based on MOM 2005.

Results & Benefits

- Centralized management across entire network
- Replaced a number of limited disparate solutions
- Standardized on single product designed specifically for monitoring the Wintel platform
- Solution accommodates project growth (capable of supporting approximately 4,000 managed systems)
- Higher level of fault tolerance achieved with agent failover

MAJOR HOSPITAL SYSTEMS DEPLOYS MICROSOFT-BASED SERVER MONITORING SOLUTION TO IMPROVE SYSTEMS AVAILABILITY

STAMFORD HEALTHCARE SYSTEM

Microsoft Operations Manager 2005

“We showed them how MOM 2005 could help make the most of their limited resources so they could respond more effectively to their daily challenges.”

Mike Baiano, Principal Consultant, The Henson Group

Award-winning Microsoft Gold Certified Partner The Henson Group, Inc. (THG) architected and implemented a highly customized server monitoring solution based on Microsoft Operations Manager 2005 (MOM) for Stamford Health System (SHS).

BUSINESS SITUATION

Stamford Health System (SHS) provides a comprehensive range of health services to residents of Stamford, Connecticut, and the surrounding area.

The hub of the system is Stamford Hospital, a not-for-profit, 305-bed community medical center. SHS maintains an educational partnership with Columbia University College of Physicians and Surgeons for teaching programs in internal medicine, family practice, psychiatry, obstetrics/gynecology, and surgery.

The system also provides a variety of outpatient services, including diagnostics, surgery, and specialty treatments for cancer and heart ailments, pediatrics, and behavioral medicine. And, SHS also operates nursing facilities and a home health agency.

Supporting this enterprise is the corporate infrastructure of the privately held SHS, responsible for managing resources and operations for the various entities that comprise the system.

Previously, SHS did not have a solution in place for comprehensive server monitoring and was therefore perpetually in a reactive mode in response to issues when they arose.

SHS sought a server monitoring and management solution that would help it achieve high availability among its core





“Stamford Health was really stretched thin from a support perspective... They had mission-critical services and applications to monitor with scant resources available to manage these essential infrastructure components.”

servers that provide critical infrastructure services. This would enable it to become more proactive in addressing emerging issues before they escalate into major obstacles.

Like most organizations managing medical facilities today, at SHS IT resources to support corporate functions are not unlimited. SHS sought to better utilize existing internal IT resources by implementing a solution to better manage the overall environment with effective monitoring.

“Stamford Health was really stretched thin from a support perspective,” says Mike Baiano, THG Principal Consultant for this project. “They had mission-critical services and applications to monitor with scant resources available to manage these essential infrastructure components. We showed them how MOM 2005 could help make the most of their limited resources so they could respond more effectively to their daily challenges.”

Therefore, SHS approached Microsoft to explore the possibility of leveraging Microsoft Operations Manager 2005 (MOM).

MOM 2005 provides the expert knowledge SHS sought to avoid the avoidable — reducing the complexity associated with managing its IT infrastructure environment and lowering the cost of operations.

MOM 2005, a key component of the Dynamic Systems Initiative, provides manageability as part of the design and implementation of Windows Server System technologies. By delivering operational knowledge and subject expertise directly from the application developers, MOM 2005 held the potential to enable SHS to simplify identification of issues, streamlines the process for determining the root cause of the problem, and facilitates quick resolution to restore services and to prevent potential IT problems.

To design and deploy a MOM 2005 solution to monitor SHS’s unique server environment, Microsoft tapped The Henson Group. A Microsoft Gold Certified Partner founded by former Microsoft engineers from the product groups in Redmond and Microsoft Consulting Services, the consultancy is officially designated as an exclusive “Go To” partner for MOM 2005 engagements.

The Henson Group offers a full-service Systems Management unit staffed by experienced Microsoft Certified consultants, usually specializing in multiple technologies.

The Henson Group is consistently ranked at or near the top of Microsoft’s official Resource Directory for Microsoft Certified Partners for Systems Management Projects for both MOM and Systems Management Server 2003 (<http://directory.microsoft.com>).

By delivering operational knowledge and subject expertise directly from the application developers, MOM 2005 held the potential to enable SHS to simplify identification of issues, streamlines the process for determining the root cause of the problem

The Henson Group achieved Microsoft's official Advanced Infrastructure Solutions competency for proven experience deploying the Microsoft systems management software family of products, including MOM, SMS, Data Protection Manager, and others.

To help spur interest at SHS, Microsoft invested in this project by providing subsidies to be applied against services to offset the overall cost of deployment. The Henson Group responded by substantially discounting its rate to make this project a reality.

SOLUTION

Microsoft Operations Manager (MOM) 2005 is comprised of a number of components, including the MOM database, one or more MOM Management Servers, MOM Agents, and optionally the MOM Reporting and Web Console that can be installed on either a single computer or multiple computers configured to host specific MOM roles.

The configuration chosen depends upon a number of factors, such as the number of systems to be monitored, the number of deployed management packs, the length of data retention for future analysis, and whether a higher level of fault tolerance and redundancy are required.

Multiple Server Solution

During the Discovery Phase of SHS's MOM 2005 Deployment project, the existing network and server environment was investigated in order to determine the optimum configuration to support the current and future monitoring demands of Stamford Hospital. Consideration was also given to SHS fault-tolerance requirements, as well as anticipated growth over the next several years.

Based upon this discovery, it was determined that MOM components would be hosted on multiple servers appropriately sized and configured to support the designated role; a database server running SQL Server 2000 to host both the MOM and Reporting Server databases; and two MOM Management Servers to provide automated failover for Agent-managed systems. MOM 2005 consists of three logical layers that work together to provide a comprehensive systems monitoring and management platform for the Windows environment; the Presentation Layer, the Business Logic Layer, and the Data Layer.

Presentation Layer

The presentation layer includes the following parts:

- The MOM Administrator console provides rules editing and component configuration capabilities.

The configuration chosen depends upon a number of factors, such as the number of systems to be monitored, the number of deployed management packs, the length of data retention for future analysis, and whether a higher level of fault tolerance and redundancy are required.

- The MOM Operator console provides complete monitoring capabilities.
- The Web console, hosted by Microsoft Internet Information Services (IIS), provides a subset of monitoring capabilities available through a standard web browser.
- The optional MOM Reporting console uses SQL Server 2000 Reporting Services to generate reports from the data in the MOM Reporting Database. Users can modify existing reports and create new reports.

In general, the components found in the presentation layer are not programmatically customizable.

Business Logic Layer

The business logic layer includes the following parts:

- The Management Servers collect alerts, events, and performance data from managed computers and then pass data to the Data Access Service.
- The Data Access Service processes database requests to update the MOM database.
- The Agent Managers can automatically install agents and install and collect attributes on monitored computers.
- The agents installed on managed systems gather performance data and logged events, apply rules, generate alerts, then respond to issues by running scripts.

Most of the programmable MOM components are found in the business logic layer. They include:

- The COM-based scripting class library. These objects allow response scripts to interact with alerts, events, and performance data.
- The managed code response class library, a .NET Framework class library is equivalent to the COM-based scripting objects.
- The MOM Connector Framework (MCF) assembly and Web service. The MCF provides business logic to support the development of custom connectors between MOM and other management applications.
- The MOM Management Server Class library. The MCL is a .NET Framework class library that exposes MOM operations data, configuration information, and information about the rule hierarchy. This class library is only available on MOM Management Servers.

Data Layer

The data layer includes the following parts:

- The MOM Operations Database, named OnePoint, running on SQL Server 2000 or 2005.



A Management Pack consists of a collection of rules, product and/or company knowledge, and public views. The Management Pack makes it possible to collect a wide range of information from different sources.

All configuration data and operations data is contained in the OnePoint database.

The configuration data includes:

- Rules and overrides
- Computer group hierarchy
- Scripts
- Views
- Server configuration
- Agent configuration
- Discovery schema

The operations data includes:

- Events
- Alerts
- Performance data
- Discovery data

The MOM SDK Views expose a limited part of the operations data for developing reports and custom applications.

- The optional MOM Reporting Database, named SystemCenterReporting. Data from the OnePoint (MOM Operations) database is archived in the SystemCenterReporting database for use in long-term reporting and trend analysis. The MOM Reporting Console uses SQL Server Reporting Services to generate reports from the SystemCenterReporting database. You can use the data in this database to create custom reports and applications.

Following the Discovery Phase of the project, The Henson Group deployed MOM Reporting Server with SQL Reporting Services in addition to a MOM Database Server. The Henson Group subsequently installed and configured multiple Management Servers in several locations to facilitate agent failover.

The Henson group then implemented a series of Management Packs. Management packs serve as a container and distribution vehicle that MOM uses to deploy the configuration information required for managing computers and applications.

A Management Pack consists of a collection of rules, product and/or company knowledge, and public views. The Management Pack makes it possible to collect a wide range of information from different sources. Management Packs are used to determine how a MOM management server collects, handles, and responds to data. Management Packs should ideally be adjusted or “tuned” to better suit the Stamford Hospital environment.

The Management Packs The Henson Group implemented included: Windows Server Base OS, HP Proliant Servers, DHCP, DNS, WINS, Active Directory, Print Server, Windows



“Since Stamford Health had somewhat limited storage space available for use by the MOM Reporting database, we recommended deploying the Summary Reporting Management Pack...This is a great tool for organizations like SHS, that can best use aggregated data for reporting purposes.”

Server Clusters, Internet Security and Acceleration (ISA) Server, Windows MP Notifier, Internet Information Services, SQL 2000, Exchange 2000/2003 and Exchange 5.5. THG then deployed MOM Agents to an initial group of production servers.

“Since Stamford Health had somewhat limited storage space available for use by the MOM Reporting database, we recommended deploying the Summary Reporting Management Pack,” THG’s Baiano says. “This is a great tool for organizations like SHS, that can best use aggregated data for reporting purposes.

“The use of aggregated data instead of the raw operational data typically stored in the MOM reporting database allows for the retention of essential reporting information much longer than would usually be the case,” Baiano adds. “With the Summary Reporting Management Pack, we were able to cut their long term storage requirements to perhaps a tenth of what it might normally be.”

Because of the unique architecture of SHS’s Exchange environment, a combination of both Exchange 2000 and Exchange 5.5 infrastructure components, the Exchange management pack rules needed to be modified. THG was able to help SHS adapt these rules to better suit its own corporate standards for monitoring the health of the Exchange infrastructure.

“Since they had a somewhat unique mixture of Exchange 2000 and 5.5 servers in place, we were confronted with a bit of a challenge when it came to effectively monitoring the Exchange infrastructure,” Baiano says. “Using a combination of management packs carefully tuned to their unique architecture, we were able to cost-effectively overcome this challenge and provide them with the kind of proactive monitoring and management solution they had been looking for.”

SHS also needed help limiting access to the information in the MOM console through the use of console scopes. THG was able to provide guidance on the use of this security feature and thereby limit who could see what within the MOM console, limiting the risk that the wrong admins would have access to irrelevant state information.

To achieve SHS’s objectives, THG provided in-depth knowledge transfer on how to customize MOM Rules and Thresholds, per SHS’s Specifications, as well as instruction on MOM Admin, Operator, Web, Reporting Consoles, and creating rules, adding operators/users, and creating scopes.

Lastly, THG provided extensive knowledge transfer and custom documentation on the use, administration and customization of MOM 2005.



“Since they had a somewhat unique mixture of Exchange 2000 and 5.5 servers in place, we were confronted with a bit of a challenge when it came to effectively monitoring the Exchange infrastructure.”

RESULTS & BENEFITS

The Henson Group exceeded SHS’s objectives for designing and deploying a comprehensive server monitoring solution based on MOM 2005.

“After extensive discussions with both SHS management and lead technical personnel, including a tour of the hospital facility, we came to an intimate understanding of their unique requirements,” Baiano says. “This enabled us to work closely with their team to give them the kind of proactive monitoring solution they had long been seeking. We did this both on time and within budget. At the end of the day, SHS has a scalable systems management solution that can take them to the next level of operating efficiency.”

Installing MOM 2005 components on multiple computers created a single management group, consisting of a MOM Database, one MOM Management Server, the MOM Administrator console, the MOM Operator console, and the network of managed computers. In addition, the optional reporting server and web console was also installed.

Since Stamford Hospital currently manages less than 200 computers, all MOM 2005 components could have been hosted on a single computer. However, the chosen multiple computer configuration is a best-practices implementation. It is designed to offer optimum database performance with enhanced availability and fault tolerance to provide overall monitoring performance well-suited to both present and future SHS monitoring requirements.

The current single MOM management group is capable of supporting approximately 4,000 managed systems and will likely never require modification for purposes of scale. One limitation to be aware of is the maximum number of simultaneous console connections, currently fifteen per management server. If the number of active MOM operators was to exceed thirty, the management group can be readily expanded by installing additional Management Servers on separate computers or leveraging the MOM Web Console.

Planning for Future Growth

The initial deployment of MOM 2005 at Stamford Hospital is comprised of a three servers hosting all required MOM components, including the MOM database, MOM management server, the MOM Administrator and Operator consoles. In addition, the database server also hosts the standalone MOM Reporting Server and the MOM Web console for web-based operations management.

MOM 2005 represents an extremely flexible and scalable solution for systems monitoring. Should Stamford Hospital monitoring needs grow significantly beyond current levels,

“After extensive discussions with both SHS management and lead technical personnel, including a tour of the hospital facility, we came to an intimate understanding of their unique requirement.”

several options are available to scale the solution to better fit more demanding business requirements.

Should enhanced MOM reporting performance be required or the data retention requirements go beyond the available disk space storage, THG recommends first moving the MOM Reporting server role to a standalone SQL Server. In addition to SQL Server 2000, this server should also host SQL Reporting Services to host all required MOM Reporting server components.

If the SHS monitoring load were to exceed the capacity of the currently implemented solution, THG recommends that the MOM database be moved to a separate SQL server. Since the overall performance of MOM is closely tied to the efficiency of the OnePoint database, this change will result in enhanced overall performance and reduced alert latency.

Should business needs require a high-availability solution, SQL Server may be installed on a cluster to host the MOM OnePoint database for enhanced fault tolerance.

To improve monitoring availability, additional management servers may be deployed to facilitate agent failover. With agent failover, agents on managed computers can report to another Management Server in the same management group if their primary Management Server becomes unavailable. Currently two management servers have been deployed to support agent failover.

Consoles are currently deployed on both management servers and can be accessed through remote desktop sessions by any operators with suitable permissions. In addition, the MOM Administrator and Operator Consoles have been deployed to several workstations operated by key SHS personnel. Any workstation can host the MOM consoles and instructions for installation are found later in this document.

The current MOM configuration of two management servers will host up to thirty simultaneous Operator sessions. Additional management servers can be deployed if needed to support additional Operator Consoles, however this limitation is unlikely to become a bottleneck. In addition, the Web Console is also available from any workstation and can perform most of the tasks of the Operator Console.

The current MOM 2005 deployment at Stamford Hospital consists of a single management group. The capacity of a single MOM management group (a single MOM OnePoint database, Management servers, Agents, and Reporting and Web Consoles) is approximately 4000 managed systems. Each Management server can handle up to 2000 agents individually.

There are several possible reasons to consider deployment of additional management groups. For example, security needs

may dictate a standalone management group may be deployed in a DMZ to isolate monitoring in the area of the network most prone to outside attack. Organizational demands, such as the need to separate out monitoring of key infrastructure such as Active Directory and Exchange, may also drive the requirement to deploy an additional management group for dedicated monitoring and management of critical resources.

Based upon both current and projected business requirements, it is unlikely that Stamford Hospital will grow beyond the need for a single management group.

Meanwhile, as part of SHS's business requirements, the client requested statistics on availability of certain servers. To address this need, The Henson Group implemented the Availability Reporting Management Pack.

The Availability Reporting Management Pack collects and analyzes data from the event logs of servers and generates reports you can study to improve server availability and reliability. SHS can now identify the causes for planned and unplanned downtime and take preemptive actions to decrease downtime in the future.

Availability Reporting uses a number of metrics to provide data that you can view and customize to suit the needs of your IT organization. Each type of report includes tables or graphs with information about the availability and reliability of servers in the SHS environment. SHS can input parameters, such as specific periods of time, to filter the data presented in the reports.

Availability Reports provide detailed and specific availability and reliability information for several Microsoft applications. For applications not currently supported, Availability Reporting provides basic availability and reliability statistics at the operating system level. In such cases, Availability Reporting measures whether the operating system is running but does not measure whether applications are running.

© 2006 The Henson Group, Inc. All rights reserved. This case study is for informational purposes only. THE HENSON GROUP MAKES NO WARRANTIES, EXPRESS OR IMPLIED, IN THIS SUMMARY. All technologies described herein are either registered trademarks or trademarks of their respective owners in the United States and/or other countries.

Document published June 2006.