Application Management Systems and Software: Overview

Summary

Application management software comes in numerous configurations and for various operating systems. The vendors' challenge is to develop more effective alternatives that work across a variety of products.

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Technology Basics

In the increasingly complex multivendor environment of distributed networks, maintaining the overall integrity of an organization's IT systems is critical. It is equally important to ensure that applications are running efficiently across the networks and to confirm that necessary enhancements are taking place. This is accomplished through the process of managing changes as well as automatically delivering, installing, configuring and registering programs integrated with help desk, software delivery, remote control and asset management software. Application management also entails protecting the integrity of the application and its data with policy-based backup, antivirus, security policies and better recovery mechanisms from outages. It allows minimal planned downtime by enabling backup operations to proceed with no service disruption and no performance degradation.

Among the most frequent causes of unplanned downtime is the wasted time of detecting problems with distributed applications. Other common faults that may be identified and resolved, saving much application downtime, include the following:

- Improperly configured networks
- Excessive network traffic
- Overloaded devices and servers
- Improperly configured applications
- Defective applications
- Older operating systems
- Older hardware

For some large enterprises, IT management personnel generally define application management in the context of monitoring runtime systems. On the other hand, development staff considers application management to be the process of managing and controlling the development life cycle. The trend is toward application management that connects all separate components to enable application managers to get a full view of what is happening in an environment. A single component, such as resource monitoring, does not complete the entire picture.

Each component involves one or more of the following application management disciplines:

- Fault management
- Problem management; help desk
- Performance management; capacity planning
- Asset management
- Change management and software distribution
- Configuration management
- Job scheduling
- Backup and recovery
- Security management

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- Automated operations
- Service-level measurement and quality management
- Chargeback

Application management consists of the following:

- Application element management—This applies the management disciplines to the individual physical components (modules, data and workflow) that make up the application.
- Application topology management—This applies the management disciplines to the logical application architecture. The logical architecture is made up of the interrelationships of the physical architecture elements on which the application components reside. Effective application topology management allows IS operations to focus on the logical application architecture, shielding them from the physical application's complexity and technical underpinnings. For example, for the management disciplines of fault and problem management, it would enable enterprises to understand the logical application or infrastructure component failure. In the area of performance management, it would enable the measurement and trending of end-to-end application times.
- Service-level management—This part includes defining and measuring logical application-level service metrics, such as scheduled uptime, application availability and application performance (response time and throughput). Regardless of whether an enterprise sets formal service-level agreements (SLAs) between IS and the business units, service goals should be defined between IS and business units, with measurements baselined and monitored as an indication of service quality and its direction.
- Application clustering management—This is concerned with the management of distributed applications as a whole when application components and processing are distributed across different servers. Directory services are needed to find the location of different available server objects.
- Application infrastructure management—This component includes the mapping of application clusters to middleware, operating systems and server networks in both runtime and production test environments. It is particularly important in determining the impacts of new loads on the infrastructures.

The order of importance of element, topology, service-level, clustering and infrastructure depends on what phase an application is in during a life cycle:

- Development and Testing—In this stage, business requirements get translated into user applications. Most work is done in a local area network environment, and most conventional quality assurance (QA) effort relates to functional and system testing rather than performance testing on production-like networks.
- Deployment—In this phase, the project team installs the new application in a laboratory environment, and its network impact is determined. Often, a pilot deployment is made to establish SLAs for key business transactions and to plan WAN capacity for a certain number of new application users. Early problems can be caught, making possible any changes to the code and other fine-tuning.
- Production—In this stage, the application is fully deployed and serving the needs of the business. The major task for the network or application manager is to ensure availability, to respond to slowdowns, and to find and fix performance problems in an efficient manner.

Operating Requirements

All setup programs offer built-in and optional components after checking for adequate disk space and other system requirements. They must include network support files and a utility that automatically moves data to an offline storage system or an off-site backup facility. Another important requirement is that the network experiences little or no downtime while the components are installed.

Technology Analysis

Market Outlook

The era of application management adolescence has arrived. It has been driven by the management of packaged applications running on a wide array of operating systems for the small and midsize market and large organizations. With the rise in e-commerce as a more popular way of conducting business between buyers and vendors, the demand for application management tools will increase in the coming years—both for leading-edge and mainstream industries.

The market for these tools will reach its maturity when many products take the integrated approach to the management of applications in all phases of a life cycle—from design and development to operation and monitoring. What remains to be seen is whether this approach will apply all disciplines to each phase.

Business Use

Prior to application management days, the standard model was that when a problem occurred with an application over a network, a call was placed to the data center and an experienced technician would come with a bag of tools used to ascertain the problem. If the technician found no problem, another call would be placed to bring in an application expert with a different set of tools. The disadvantages to this model were the cost of two people and the delays in getting the tools and the personnel to the problem.

A more likely scenario in the past would be running an application on the network at all times to monitor for potential problems, and the technician gained access to it remotely from the data center when a threshold was reached. The less-skilled technician might do the alerting. This made better use of technician skills, although making sure the products were installed in the appropriate places was the main issue.

As technology evolves, monitoring applications have moved from “let me know if something is not working” to “let me know if performance falls below a certain level.” This means application managers need to perform baselines to know what a normal “certain level” is. Once this is done, the managers (and possibly network administrators) can act more proactively in cases of application problems on the network.

The major network and systems management (NSM) vendors have traditionally invested in the management of packaged applications, such as offerings from SAP, Siebel Systems and Microsoft, with some limited emphasis on vertical industry offerings. These vendors, however, have largely ignored the homegrown application management area. However, many do provide toolkits for in-house application management integration, but these are rarely exploited by users.

With the increasing adoption of e-business applications, a need emerged for management of the end-to-end application platform stack, which includes not only the application but also the related database, middleware and even operating-system components. Because of the increasing complexity in this area, there is an even-greater need for more management depth in some key application areas, particularly in application servers based on Java 2 Platform, Enterprise Edition and .NET. Another set of vendors has

been focusing on managing application response time and availability by monitoring end-user response time and availability.

Due to the broadness of the audience, application management products are most widely available for Windows and Unix operating systems, though some are available for mainframe products as well. Most of the standards and new development tend to be most focused on the Unix and Windows markets as well.

Benefits and Risks

Monitoring applications lets application administrators know how the applications are performing and what kinds of information are being transmitted across the network. This offers the benefit of making sure network resources are adequately used and optimized when installing, upgrading, loading, launching and running applications from the servers.

In the hands of unskilled persons, however, monitoring applications can cause problems if changes to be made are based on performance data without a clear idea of what ramifications these changes might have. In addition, installing application management software can be an expensive proposition if the projected installation costs will far exceed the benefits in the near future.

Standards

Standards are relevant in managing applications in the context of which application-specific standards are managed, rather than what standards are used by products. The management market is still heavily dependent on 1980s technology through Simple Network Management Protocol (SNMP). However, the increasing complexity of today's environment is crying out for better management foundations to deliver on needs, such as root cause and predictive analysis. The problem is that most of the supposed successors to SNMP have failed because of proprietary vendor conflicts, egregious implementation requirements or consumer apathy. Consequently, several standards specific to application management have arisen. Thus far, there are several major standards, each of which has a major vendor as a proponent. Some of the standards that application-specific management products work with include AIC, AMS, ARM, ART and WMI.

AIC

Application Instrumentation and Control v.1.1 (AIC) is an open standard API for application management. It allows applications to expose management objects, such as business data, control points or alert events, to management software under a controlled environment and offers support for add-on security options. In addition, it integrates applications into Unicenter TNG Management Enterprise Framework and is multithreaded and thread-safe for cross-platform applications. In 1999, the Open Group's Enterprise Management Program approved the AIC standard. A committee of vendors, such as Computer Associates International, J.P. Morgan Investment Management Inc. and other industrial vendors, including BMC Software and IBM/Tivoli originally developed it.

AMS

The Application Management Specification (AMS) standard was initiated by Tivoli Systems and is predominantly a schema for defining management data about the interactions of applications composing a business system. The AMS schema is based on the Management Information File (MIF) format of the Desktop Management Interface (DMI) initiative and extends this format. While AMS does not define methods to allow the gathering of data remotely, it enables management of the application throughout its life cycle, including the following tasks:

- Application distribution

- Application installation
- Application monitoring
- Application configuration
- Operational control
- Deploying updates and new releases
- Application component relationships
- Security management
- Application response time management

At this time, there doesn't appear to be any planned relationship between AMS and Web-Based Enterprise Management (WBEM).

ARM

The Application Response Measurement (ARM) open standard, initially developed by HP and IBM/Tivoli, is focused on software instrumentation for performance and response-time measurement. Applications call the API when transactions begin and end, allowing these transactions to be measured and monitored. ARM lacks standard schemas and access methods, thus limiting its generality. Another problem is that ARM lacks support for multiple ARM agents consuming ARM data. Its exposure of key data makes ARM a candidate for providing data to WBEM. It is owned by The Open Group, and much of the ARM Working Group responsibility has transferred to the Distributed Management Task Force's (DMTF's) Distributed Application Performance (DAP) Working Group, now called the Metric Working Group. The purpose of the ARM application programming interface (API) is to enable applications to provide information to measure business transactions from an end-user perspective and the contributing components of response time in distributed applications. This information can be used to support SLAs and to analyze response time across distributed systems. The standard is currently on version 3.0.

ART

NetScout's Application Response Time Management Information Base (ART MIB) is an extension to Remote Monitoring 2 (RMON2), which provides a standards base for identifying and classifying application traffic in the form of the protocol directory structure. The ART MIB measures how network performance supports the flows of specific applications. The first version of the ART MIB agent supports all applications running on TCP, including enterprise class applications (SAP R/3, Baan and PeopleSoft), database, Web, Internet, e-mail and file-transfer applications. It also supports Network File System (NFS) and SNMP running on User Datagram Protocol (UDP). The ART MIB's most important characteristic is a request-response structure within the application, such as the ongoing acknowledgement of data transferred within TCP conversations. This feature allows an ART MIB-enabled agent to determine the associated response time by matching up two packets.

WMI

Microsoft's Windows Management Instrumentation (WMI) standard is a method of instrumenting hardware components based on Windows Driver Model (WDM) to expose real-time management data to Windows. It is also an implementation of WBEM. WMI does not offer a standard schema or any access methods to extract the data remotely. WMI makes data available for Windows 98 and Windows 2000. Its goal is to reduce the cost of ownership to more reasonable levels. Due to its presence in Windows, it is becoming

more widely supported, from vendors such as Marimba and Proxima. Microsoft has also included WMI support in its Microsoft Operations Manager software, which is based on technology it licensed from NetIQ. In addition, Microsoft is extending WMI to Windows CE 3.0 and to Windows Server 2003.

Price vs. Performance

Application management pricing has been going down in three ways:

- Vendors are moving from network-based products to application management products that can be run locally and remotely on standard PCs and laptops.
- Vendors are offering volume discounts and licensing fees, particularly for large enterprises.
- Products are becoming easier to use for less technical people, reducing the total cost of ownership.

Selection Guidelines

Application management software comes in different configurations, services a wide range of specific functions and covers a huge price range. The user's choice of a particular type of application management software depends on a number of factors:

- Fault detection and notification—Most IT managers monitor applications for availability rather than for performance. Availability is closely tied with the software's ability to quickly detect and correct faults with no or very little downtime.
- Performance information—The single most important characteristic of good application management software is its ability to provide performance information. IT managers need accurate performance data so they can deliver timely service to their customers.
- Ease of use—The costliest factor in any high-technology enterprise is skilled labor. Automation of application management is less expensive by orders of magnitude.
- Ease of installation. How easy it is to install a product can influence a purchasing decision. The individuals installing it may be needed to perform other important tasks.
- Price and licensing-fee levels—The size of an organization and the number of concurrent users determine what price and licensing fees the IT organization will pay. It is not as important as availability and performance.
- Support for specific applications—Some vendors require maintenance contracts, while others offer free online support for specific applications. Slow response time in getting the support can be costly.
- Ease of customization—Some vendors offer a software development kit (SDK) to allow developers to build customized modules for a specific situation. Others require in-house consultants or service to develop extensibility functions for the product.
- Predevelopment application performance analysis—Performance analysis is useful in understanding the impact of applications on the enterprise environment. It is also helpful in estimating capacity requirements of the product.

Technology Leaders

Aprisma Management Technologies

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Aprisma offers SPECTRUM Application Manager, a family of management tools for Solaris and Windows that monitor application response times, application availability and network traffic levels. It provides a view of an organization's IT services environment from a customer's point of view. This allows collection of data from a customer's desktop or server and measures response time from an end-user perspective. Root-cause analysis helps the user determine whether the application, server, network or a combination of factors is the cause behind an IT service degradation.

BMC Software

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Patrol for Application Management Unix, Linux and Windows products provides automated monitoring and management support for applications, databases, middleware and underlying resources across heterogeneous, multitier environments. A common interface is provided for this suite of administrative products, including database administration, enterprisewide backup and recovery management, and Internet server management. Patrol for Application Management looks for conditions that can affect data and application availability, either correcting the problem or alerting the user to it. Patrol maintains a dynamic SNMP Management Information Base (MIB) and passes events as SNMP traps.

Patrol modules are available for:

- mySAP applications
- Siebel eBusiness Applications
- Oracle eBusiness Suite
- PeopleSoft applications
- Tuxedo
- MS Exchange
- Lotus Notes/Domino
- Documentum

Computer Associates

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Computer Associates' Unicenter TNG provides Enterprise Management products which include delivering, installing, configuring and registering programs with integrated software delivery, remote control, asset management, backup, security, scheduling and performance management. An AIC gateway integrates applications into Unicenter TNG Management Enterprise. The company gained in applications management expertise with the 1999 acquisition of Platinum, which produced the ProVision application management suite; CA has since re-released it under the name ManageIT. CA has Unicenter Application Management products for SAP/R3, Peoplesoft, Microsoft Exchange and Lotus Notes/Domino. Each of these products monitors the performance and availability of the target application. They also provide monitoring and control of specific application metrics and features, including cross-application job scheduling, reporting, alerting, and historical performance analysis and threshold and service-level definition.

Compuware

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Vantage is Compuware's integrated suite of application performance management products for Unix and Windows, formerly known as EcoSystem. Each product deals with a different aspect of the application's performance across the network infrastructure. The Vantage line is composed of:

- ClientVantage—end-user experience monitoring
- NetworkVantage—network application monitoring
- ServerVantage—server application and database monitoring
- Application Vantage—performance troubleshooting
- Application Expert—transaction profiling
- Predictor—WAN provisioning
- VantageView—visualization and reporting

However, it lacks support for some management functions, such as storage management and software metering, and for certain systems, such as Unix (without Windows emulation) and Lotus Notes/Domino.

Concord Communications

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Concord's *e*Health product contains a number of features to manage applications. The Application Insight portion is made up of several modules designed to manage the availability and performance of core applications. Each module distributes SystemEDGE agents to the application servers where they monitor

transactions, detect faults and bottlenecks and respond to problems by notifying the administrator or executing corrective actions.

The modules are named Application Insight for "*product*" and include modules for the following:

- Apache
- Microsoft Exchange
- Microsoft IIS
- Microsoft SQL Server
- Oracle
- Check Point FireWall-1
- Network Services (Unix)—for example, Sendmail, NFS, load point (LP), Dynamic Host Configuration Protocol (DHCP), DNS
- Network Services (Windows)—for example, Active Directory, DHCP, DNS WINS

*e*Health's Application Response module uses observational monitoring to collect application response time data, monitor the results and add them to the *e*Health database. This lets the user analyze application, system and network data simultaneously. Application response-time monitoring is done by agents residing on the client side (user workstations). However, this cannot be used in an Internet e-business or e-commerce environment where the desktops are outside the user's domain of control.

Hewlett-Packard

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Hewlett-Packard provides integrated management products running on Unix and Windows for applications, systems, networks, software, desktops, security, storage and IT services. Together with offerings from more than 200 partners, HP OpenView offers services and management products on all major platforms, focusing on the Internet and the proliferation of electronic services. HP OpenView Performance provides active intelligence in enterprise-management products, including performance metrics as business measures. This is seen as a control over application management (as well as servers and systems) across the distributed networks.

NetIQ Corporation

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NetIQ's AppManager suite delivers monitoring and reporting capabilities for Windows- and Unix-related applications, servers, database systems and hardware servers. The suite includes the AppManager

product and the AppManager Response Time modules. The suite's inherent integration with manufacturing operations management (MOM) is enhanced through the XMP for Microsoft Operations Manager. The AppManager products provide detailed monitoring and measuring capabilities that give network managers analytical information on various network elements, including problems and optimization areas.

AppManager can identify performance problems and potential problems for Windows- and Unix-related systems and initiate the resolution process. The system can reduce application-related downtime and can be used to discover which networked applications are in need of optimization by providing performance information, reports and analysis that network managers need to enhance their systems and respond to changing user needs.

Microsoft bundles AppManager's WMI Agent with Windows 2000. In May 2000, NetIQ merged with Ganymede Software (through the latter's acquisition by Mission Control), which produces network performance management software. Pegasus groups response downtime into client, network, and server components and solves performance problems. Pegasus, which is now called End2End Performance Monitor, also manages SLAs and addresses policy-based management and quality of service (QOS). NetIQ sold off Ganymede's Chariot product in 2003.

NetScout Systems

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NetScout re-engineered its *nGenius* product line, which runs on Windows NT and Unix, in 2002 to provide a range of features from one product. The *nGenius* Performance Manager combines NetScout's *nGenius* Real-Time Monitoring and *nGenius* Capacity Planner products. The *nGenius* Performance Management System includes features to help IT managers detect, analyze and resolve application and network traffic issues before they affect end users.

The current version of *nGenius* Performance Manager offers real-time monitoring, troubleshooting, protocol analysis, Voice over IP (VoIP) monitoring and historical reporting united under a single user interface. This approach is designed to deliver a range of performance, application and service management capabilities that monitor network activity on LANs, WANs, storage area networks (SANs) and e-business systems.

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Tivoli has combined its monitoring products, which run on Unix, Windows and mainframes, by the type of system monitored rather than by individual system products. For example, the vendor has done away with

selling products to monitor specific databases (Tivoli Manager for SQL, Tivoli Manager for Sybase and so on) in favor of the Tivoli Monitoring for Databases product, which supports all of the databases previously supported by the individual products. Tivoli also combined its former Tivoli Application Performance Manager and Tivoli Web Services Manager products into the Tivoli Monitoring for Transaction Performance product. The new product lets the user measure transaction response times, application response times and end-user experiences with transactions and deploy synthetic transactions for testing purposes for both client/server and Web environments.

The products in the system and application monitoring group follow the "**Tivoli Monitoring for xx**" naming convention and include:

- Databases
- Applications
- Messaging and Collaboration
- Business Integration
- Web Infrastructure
- Content and Personalization
- Security and Edge Services
- Transaction Performance
- Network Performance

Technology Alternatives

Application management products, in a few cases, are used to monitor both network and application performance to locate the source of network problems, such as bandwidth, and retransmissions due to packet latency. However, a substitute for application management really does not exist.

Insight

Organizations should examine their level of in-house technical expertise in applications and the criticality of network uptime when installing and launching applications. It isn't a good idea to buy extremely sophisticated application management software if the technical expertise is insufficient to run and understand it. It is also inefficient for the company to set up management software for each functional network area, as not all networks handle mission-critical applications.