

Providing effective endpoint management at the lowest total cost



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Executive summary

The total cost of ownership, or TCO, of software investments is often difficult to gauge before the technology is actually implemented. It is therefore critical to evaluate as many aspects of a prospective investment with an eye toward actual business requirements, today and into the future.

Endpoints, otherwise known as servers, workstations, laptops, mobile devices, and virtually any other network-connected device, are critical components that enable business to be transacted. Workers depend on their machines to deliver business applications, and if the workstations or the servers that deliver those applications and data to them are not functioning correctly, the business suffers. Endpoint management technologies ensure that these machines are kept up-to-date and configured correctly, applying operating system and application patches, or updates, resulting in increased security, stability and worker productivity. Endpoint management can also simplify the overall troubleshooting and maintenance burden on these machines by providing remote control, operating system upgrades, software distribution, asset management, and a host of other capabilities.

Endpoint management technologies can also provide incredibly useful information, such as which applications are installed and used by which users, proving that machines are in compliance with certain governmental or legal regulations, and which machines are potentially affected by the latest security threat. Properly implemented, endpoint management ensures continuous compliance with IT policies, regardless of where the machines are located and what type of network they are connected to.

While the business advantages of endpoint management are clear, the solution costs must be kept to a minimum in order to maximize the return on investment. In practice, endpoint management costs vary widely, making a thorough evaluation of the TCO for each vendor under consideration very important. IBM Tivoli® Endpoint Manager, built on BigFix® technology, provides a full set of endpoint management functionality at one of the lowest TCOs in the industry, delivering superior business value at a fraction of the cost of competitive offerings.

Introduction

A well known catch phrase from the Great Depression of the 1920s and 1930s is “There Ain’t No Such Thing as a Free Lunch.” The implication is that there is always a hidden cost to anything perceived as free—and technology is clearly no exception.

The interest in low cost software is at an all time high, driven by economic conditions that have placed a laser focus on IT cost containment. The IT management market is comprised of a wide variety of “free” software options, including open source operating systems and applications, as well as commercial offerings from virtually every major software vendor.

Commercial software that is included as a part of a large software bundle, via an enterprise agreement or a master license agreement, can easily be perceived as free—or at least free of incremental licensing costs—when a department is looking at making use of that software vs. purchasing a competing product. However, additional license, hardware and services revenues required to make the product work can easily eclipse lost license revenue by orders of magnitude. Relative administrative costs must also be evaluated, as a free product that requires significantly greater labor for “care and feeding” may also eclipse the cost of another solution.

Open source software is an excellent example of “free” software. Freely available for download, open source software features low acquisition costs, but all enterprise-class software solutions, including open source, require investments to make them “enterprise ready” in terms of required hardware, supporting software, services and labor to install, deploy, support and maintain production-quality systems.

With any business investment, it is of course critical to compare the total cost of ownership (TCO) of a prospective investment against alternate investments. In the case of open source, many solutions do often cost less than commercial equivalents due to low or nonexistent license costs, and in some cases, abundant, low-cost support. It is important to evaluate the entire TCO equation, taking into account all possible costs, particularly for solutions that will be deployed at scale. As an example, an open source alternative that requires ten times the amount of hardware, customization and support than an equivalent commercial offering may indeed wind up costing the organization more.

Of course, no enterprise-class software, open source or otherwise, is free. Properly implemented and managed, the TCO of a certain software solution can be considerably lower than other comparable solutions, regardless of how it is licensed and supported. It all boils down to evaluating a given solution’s fit to purpose and TCO against the other options on the market, and using common business sense to select the best solution for your particular use case(s).

This white paper outlines a methodology for comparing the TCO of endpoint management technologies including IBM Tivoli Endpoint Manager, built on BigFix technology. IBM is committed to delivering high quality, cost effective

solutions to its customers, and this white paper will demonstrate why the TCO of Tivoli Endpoint Manager is considerably lower than other solutions on the market, delivering superior functionality at a fraction of the cost of competitive offerings.

Calculating the TCO of endpoint management solutions

The process of properly selecting, deploying, and maintaining enterprise-class software solutions is critical. Not only are these investments substantial, often running into millions of dollars, once the investment is made and a solution deployed, it is incredibly difficult to rip out a solution and replace it with something else. In that spirit, this section provides some tips on how to analyze the true TCO of enterprise software investments, including scalability, software, hardware, services, ongoing management, and maintenance.

Scalability: Now and in the future

Before attempting to calculate a TCO for a potential management software investment, it is critical to conduct a thorough design exercise with the vendor(s) being considered. The goal should be to create a realistic system architecture that will deliver the required functionality and performance at scale. Additionally, it is important to consider not only current but also future needs and growth.

Certain management software products on the market were designed for smaller organizations, such as small-to-medium sized businesses, and vendors try to “shoe horn” those

solutions into solving problems for much larger organizations. Architectures that perform well and are cost effective at smaller scales often spiral out of control when scaled up, requiring tens or even hundreds of servers and legions of administrators in order to deliver acceptable levels of functionality and performance. Large deployments of this nature drive up hardware, software, implementation, and maintenance costs by orders of magnitude.

Also consider all potential use cases for the technology. A given technology may be initially purchased to solve one business need, and if the solution has “headroom” in its feature set, the investment can be leveraged in the future to satisfy even more use cases, increasing ROI without requiring an entirely new deployment. For example, endpoint management solutions may be initially purchased to manage patches and updates, and can be leveraged later to manage power utilization, software distribution and usage, assets, and compliance reporting. Be sure you carefully examine the upgrade process, however—some products still require major software and/or hardware investments in order to add functionality.

It is worthwhile to insist that every vendor being considered complete a detailed architectural design that can be used to calculate an estimated TCO. Insist on independent validation through customer references, peers, industry analysts, and other sources of unbiased third-party information. Proofs of concept are also valuable tools that will ensure that a vendor can deliver what they claim before any money changes hands.

Software

Even if base software licenses are free (or bundled into other license agreements), associated software expenses must also be taken into account, including:

- **Management server operating system license and support:** what type of operating system does the solution require, and what are the costs? Be sure to include ongoing maintenance, training and support costs.
- **Database licenses:** relational databases can be very expensive to license and resource intensive to maintain. Be sure to consider which databases are required, and the license and support costs. Also do not forget to factor in hardware and other associated costs for the database servers.
- **Antimalware, management, backup and other software required to ensure enterprise-class performance and reliability:** the management and database servers discussed above also require additional components to ensure that they are managed properly, which add to the overall costs.
- **Storage:** what type and quantity of storage does the system require? Does it require expensive RAID drives or storage area network (SAN) technologies? Be sure to consider connectivity to the storage; SANs, for example, can require expensive switches and network transports to work properly.
- **Network:** what are the bandwidth and connectivity requirements for the system? Does it need high-end connectivity like Fiber Channel or converged Ethernet? How well does it function over highly latent, bandwidth-challenged networks like satellite links? Also consider what is required in order to provide service to machines outside of the conventional organizational network, such as VPN or Internet-only connections.
- **Backup and load balancing:** how much hardware is required for load balancing, backup, redundancy, disaster recovery and business continuity purposes?

Hardware

Naturally, all software products must run on hardware, and unless the solution is 100 percent Cloud-based, hardware represents a significant hard cost for any production rollout. Key costs to consider include:

- **Servers:** how many servers are required to operate the system at scale, and what type and configuration is required? Are there any specific hardware dependencies that must be taken into account? In the endpoint management domain, many solutions require servers distributed out to remote locations in order to manage local machines without saturating network links.
- **Design and customization services and internal labor:** many systems today require a substantial amount of design, planning and customization services and internal labor investments before deployment. The rate for vendor-provided services can run over \$200 an hour, and even independent consultants routinely charge over \$100 an hour plus travel expenses. Also consider the “fully burdened” cost of internal IT labor required for the project, including salary and benefits, which varies depending on geographical area (average is \$91,385 annually, or \$44 per hour in the U.S.)¹

Services and internal labor

The cost of designing and deploying enterprise-class software solutions often eclipses hardware and software costs many times over. Items to consider include:

- **Hardware and software deployment costs:** once designed, all components of the solution must be installed, configured and tested. This includes the cost of vendor services plus internal labor to deploy the hardware and software across the organization. This is the point where the cost of certain vendor solutions that initially appear to be “free” can spiral out of control due to a lack of scalability that translates into large quantities of server installations. Do not forget to factor in the cost of installing software on user machines, plus travel costs as applicable.
- **Staff training and travel expenses:** the more complex the system, the more staff required, and the more training (and retraining) that is required. If training is delivered off-site, travel expenses must also be considered in addition to tuition costs. Training costs can add up to several thousand dollars per administrator.
- **Ongoing service, support, updates and upgrades:** in addition to the basic server software and hardware maintenance, also consider the cost of updates and upgrades, both in terms of software maintenance costs plus labor required to patch and upgrade the systems. For systems that require software installation on both servers as well as user machines, this can represent a substantial cost every year.
- **Effort required to identify, test and deploy patches and updates:** some vendors provide no prepackaged patch policies, while others only supply content for a limited set of platforms and applications. Vendors that provide policies that are ready to implement, for a wide variety of operating systems and third-party applications, save their customers money by streamlining the entire patch and update process. The ability to precisely target patches, both in terms of testing and full-scale deployment, is also key from a time efficiency perspective. Ideally, the time required to identify, test, and deploy patches and updates should be measured in hours—not weeks.

Ongoing management and maintenance

Once a system is placed into production, costs to maintain server and user software and hardware, plus ongoing support, must be considered.

- **Physical space, power, heating, and cooling:** in addition to the cost of the physical hardware, space must be provided, plus power, heating and cooling. Studies have shown that for every dollar expended to power equipment, an additional dollar is expended on heating and cooling.
- **Software and hardware maintenance:** the larger the hardware deployment, the higher the overhead required to keep all of those machines running and up-to-date.

Once a model for quantifying TCO for various alternatives, it is possible to construct a true side-by-side comparison to aid in the decision making process. The next section drills down into the TCO of endpoint management, using IBM Tivoli Endpoint Manager as an example and contrasting it with a competitive product, Microsoft® System Center Configuration Manager.

The TCO of Tivoli Endpoint Manager compared to Microsoft SCCM

This section compares and contrasts the TCO of Tivoli Endpoint Manager from a number of perspectives including requirements and architecture; servers; network; managed endpoints; deployment and licensing. Tivoli Endpoint Manager

TCO will be compared with Microsoft System Center Configuration Manager (SCCM), an endpoint management solution commonly found in organizations heavily invested in Microsoft technologies (and one that, not coincidentally, is often considered a free product).

Identifying endpoint management requirements and architecture

Most endpoint management suites advertise that they can provide most or all of these capabilities:

- Asset discovery and inventory
- Compliance reporting
- Configuration management
- Endpoint protection and self quarantine
- Operating system deployment and migration
- Patch management
- Power management
- Remote control
- Security configuration and vulnerability management
- Software usage analysis
- Software distribution
- Zero-day remediation

One of the first points for consideration should be to determine exactly which of these capabilities are required in your specific environment, both in terms of current and anticipated future needs. Once specific required capabilities are determined, the next step in the TCO quantification process must be to examine the actual architecture for a fully deployed solution set for your specific environment and requirements—at the proper scale.

Due to the complexity involved in large endpoint management deployments, it is highly recommended that you engage with each vendor to design a system architecture that will meet the capability, performance and scalability requirements for your environment. Once vendors being considered have provided detailed architectural recommendations, the next step is to quantify the TCO of each solution. The following sections split this process into manageable sections, including server, network, and endpoint TCO.

Endpoint management servers

A large percentage of the overall cost of an endpoint management solution is the server infrastructure required to deploy and maintain the architecture outlined in the previous section. As you examine the vendor's endpoint management architectural recommendations, build a spreadsheet that contains server hardware, software and connectivity requirements.

Many endpoint management solutions on the market today require highly complicated server infrastructures, including multiple server tiers, roles, and interdependencies. Ensure that the vendor recommendations take into account exactly which servers are required, where they are to be located, how they must be interconnected, and the hardware and software requirements for each, including required “enabling” software such as PKI, directory services, and relational database servers. Also pay close attention to whether the servers can run on shared hardware, such as virtual machines, or if they required dedicated resources. Also be sure to consider what is required in order to scale the solution to accommodate future growth plans.

As an example, the Microsoft System Center Configuration Manager (SCCM) 2007 documentation library defines eight different server roles and three different “site types,” all of which vary considerably depending on individual deployment requirements. Since SCCM client endpoint agents do not compress network traffic or perform network bandwidth throttling, a large quantity of secondary SCCM site servers, distribution points and branch distribution points are often required in order to scale out to large deployments with many secondary and tertiary site locations,² and only the lowest tier machines, known as Branch Distribution Points, are typically capable of running on shared commodity hardware. SCCM also cannot function in remote locations that do not have an Active Directory infrastructure. Some organizations, in an attempt to force SCCM to scale into the hundreds of thousands of endpoints, have resorted to implementing other third-party products to supplement SCCM including Tivoli Endpoint Manager, further driving up license, deployment, maintenance and support costs and complexity.

Microsoft SCCM also requires deployment of a Microsoft PKI infrastructure in order to enable secure communications between SCCM servers and clients. For organizations concerned about security, and in all cases when Internet-connected devices need to be managed, PKI is a requirement, further driving up the TCO. This includes deploying certificates to each and every endpoint that participates in SCCM “native” mode.³

Network considerations

Network requirements are another key consideration. Another architectural analysis must be performed on the network impact created by the endpoint management solution. Pay particular

attention to the granularity and availability of bandwidth controls, how the system determines the actual amount of available bandwidth, and how easy it is to define and enforce bandwidth management policies. Many systems use the physical speed of the network link (such as the endpoint network card) rather than measuring actual available bandwidth, making effective bandwidth management difficult. Ideally, the servers should be capable of “trickling” updates down to the endpoints during periods of high network demand, ensuring that critical business users are not affected.

Another network consideration is the architecture required to support Internet-connected endpoints. The most common approaches include either opening ports in the corporate firewall for these endpoints to communicate through, or placing management resources outside of the firewall (typically in the DMZ). Pay close attention to the number of ports that must be opened in the firewall and the security of the communications passing through the firewall. In cases where Internet-connected (non-VPN) endpoints are to participate, a portion of the SCCM architecture must also be deployed outside of the firewall in the DMZ (along with several open ports in the firewall). Microsoft SCCM is well known for overloading network links, and can require over 20 open ports in order to support all of the various components in the system.⁴ Be sure to take into account the amount of time and effort required to configure all of these ports and to ensure that the communications crossing through them are secure. Attention must also be paid to the security of this hardware and the quantity of hardware required to support these devices.

Managed endpoints

The impact on the individual endpoint is also a key consideration. As discussed previously, many endpoint management products on the market today are the result of multiple acquisitions, with multiple disparate products integrated into a combined “solution suite.” The ugly truth, however, is that under the covers, separate discrete products may continue to exist. Multiple endpoint agents are often required to deliver the full set of desired functionality, or in some cases, multiple agents are combined into a fat “super agent” that saves nothing in terms of resource usage, only allowing the vendor to claim they have a single agent. These agents often require substantial amounts of RAM and compute power, causing a severe drain on endpoint performance.

It is critical to pay particular attention to the overall amount of resources utilized by agents, both in idle states as well as when actively performing tasks. The endpoint management system should allow policies to be defined that precisely control the amount and timing of endpoint resource utilization—ideally less than two percent of endpoint CPU and 10MB RAM on average. A proof of concept trial provides an excellent way to compare overall endpoint overhead of various solutions in your own environment.

Also consider what is required in order to support heterogeneous endpoint environments. Many organizations today require management of Windows®, Macintosh, UNIX® and Linux® endpoints, preferably using the same toolset. Be sure to consider what is required to support all use cases, across all endpoint platforms. In the case of Microsoft SCCM, which only supports Microsoft platforms and applications, it is necessary to deploy third-party products in order to support additional operating systems and applications, further increasing SCCM TCO and complexity.

Licensing

Licensing is another key consideration. Microsoft bundles System Center client access licenses (CALs) into most of its CAL suites, including the Microsoft Core and Enterprise CAL suites, which must be purchased in order to license users to access Microsoft products like Windows Server, Active Directory, Exchange and SharePoint.⁵ Since many organizations receive SCCM client licenses with a client CAL suite, they perceive that the product is free (or low cost) to deploy. What are often overlooked are the server licenses that must be purchased, and since SCCM deployments tend to require a lot of management servers, this can drive the TCO up considerably. SCCM CALs are also required for managed servers (that is, servers that are managed by the product).

In addition, while the first year of client licenses may appear to be free, implementing the bundled product may trigger changes in the next year’s license or technical support fees. Be sure and ask vendors about annual maintenance fees, price increase policies, and the like for years 2+.

IBM Tivoli Endpoint Manager licensing is similar to SCCM: licenses are purchased for management servers, managed servers, and managed endpoints. Where the TCO diverges substantially between the two products, however, is in the quantity of licenses required. Tivoli Endpoint Manager can manage up to 250,000 endpoints with a single server, a fraction of the number of servers required by SCCM, resulting in much lower server license counts.

Upgrades

To determine TCO, you must decide on a time horizon. Most organizations evaluate TCO over a 3-5 year period, figuring there will be enough change after that point that the assumptions are no longer valid. Depending on the time horizon chosen, you may want to also factor in major product upgrades, often referred to as “.0” releases (because software vendors will typically version these releases as something like 8.0). For SCCM, and many other vendors, these major upgrades can be very disruptive and take 9 - 18 months to plan and implement—it is not unusual for companies to take a “rip and replace” approach to implementing the next major release of an endpoint management product, making upgrades very difficult and expensive to implement.

IBM Tivoli Endpoint Manager, on the other hand, is designed to be upgraded from one version to another in a matter of hours, at any time of day—even for major version upgrades. This is possible because Tivoli Endpoint Manager is backward compatible with previous versions, enabling the console and server to be upgraded separately from relays (remote servers) and endpoint agents. This means that, in cases where customers are running very old versions of operating systems not supported by the OS vendor or the current Tivoli Endpoint Manager agent, they can keep older versions of the agent running on certain endpoints while upgrading the rest of the infrastructure, including servers, consoles, relays and compatible endpoints.

Conclusion

IBM Tivoli Endpoint Manager provides a full set of endpoint management functions, across multiple platforms, at a TCO that is typically a fraction of the cost of competitive offerings. This is the result of a unique approach that combines a single management server and console that communicate with a single, multi-purpose endpoint agent to provide all management functionality across multiple platforms, applications, and use cases, for hundreds of thousands of endpoints. It works for endpoints that are located in traditional office environments, remote offices, home offices, coffee shops, and even aircraft—even if they are not connected to a network or not managed by Active Directory.

From a total cost of ownership perspective, the unique Tivoli Endpoint Manager architecture translates directly into lower TCO and rapid time-to-value, particularly in terms of reduced management servers, lower endpoint agent overhead, rapid deployment, and streamlined management and maintenance, regardless of which competitor you compare it against. Thorough TCO analyses conducted with real Tivoli customers have proven these cost advantages over and over again—it is not uncommon for Tivoli Endpoint Manager customers to experience over 50 percent reductions in endpoint management costs using the product while increasing compliance and agility.^{6,7}

For more information

Contact IBM today to arrange a demonstration, schedule a proof of concept, and evaluate the advantages of IBM Tivoli Endpoint Manager for yourself. For more information, please contact your IBM marketing representative or IBM Business Partner, or visit: ibm.com/tivoli/endpoint



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¹ U.S. Census Bureau, Annual Total Compensation and Wages and Salary Accruals per Full-Time Equivalent Employee by Industry: 2000 to 2008, Table 642 (Professional, scientific and technical services 2008 total compensation) <http://www.census.gov/compendia/statab/2011/tables/11s0642.pdf>

² “Configuration Manager Multiple Site Planning and Deployment,” Microsoft TechNet System Center Configuration Manager 2007 Documentation Library (<http://www.census.gov/compendia/statab/2011/tables/11s0642.pdf>)

³ “Configuration Manager Site Modes,” Microsoft TechNet System Center Configuration Manager 2007 Documentation Library (<http://technet.microsoft.com/en-us/library/bb680658.aspx>)

⁴ “Ports Used by Configuration Manager,” Microsoft TechNet System Center Configuration Manager 2007 Documentation Library (<http://technet.microsoft.com/en-us/library/bb632618.aspx>)

⁵ Microsoft CAL Suite Overview, Microsoft Volume Licensing website (<http://www.microsoft.com/calsuites/en/us/products/default.aspx>)

⁶ “Western Federal Credit Union achieves cost reduction with improved endpoint management,” IBM customer case study, http://www.ibm.com/common/ssi/cgi-bin/ssialias?infotype=PM&subtype=AB&appname=SWGE_TI_SE_USEN&htmlfid=TIC14163USEN&attachment=TIC14163USEN.PDF

⁷ “Edmonton Public School Board: putting education first with efficient endpoint management,” IBM customer case study, http://www.ibm.com/common/ssi/cgi-bin/ssialias?infotype=PM&subtype=AB&appname=SWGE_TI_SE_CAEN&htmlfid=TIC14159CAEN&attachment=TIC14159CAEN.PDF