



AberdeenGroup

Embedded
Infrastructure and
Mass-Deployment
Cost-of-Ownership
Study: 2003 Update

An Executive White Paper

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Executive Summary

This Aberdeen *Executive White Paper* compares the cost of ownership of the following mass-deployment and embedded infrastructure solutions: Progress OpenEdge (Progress Workgroup RDBMS V9.1D and Progress AppServer V9.1D) versus Microsoft SQL Server 2000 and Microsoft Application Server; Progress OpenEdge (Progress Enterprise RDBMS V9.1D and Progress AppServer V9.1D) versus Oracle9i and Oracle9iAS Release 2; and Progress OpenEdge (Progress Enterprise RDBMS V9.1D and Progress AppServer V9.1D) versus IBM DB2 Express and IBM WebSphere. This paper updates and extends the 1998, 1999, 2000, 2001, and 2002 Aberdeen surveys on embedded databases and embedded infrastructure. For reference, all changes in methodology since the 1999 survey are listed in the Appendix. Aberdeen's findings include the following:

- *The lowest "visible" cost of ownership (VCO) for workgroup embedded infrastructure in a mass-deployment architecture belongs to Progress OpenEdge when compared with the Microsoft embedded infrastructure solutions over a five-year period.* Aberdeen defines VCO as the cost of ownership that the IT (information technology) buyer may reasonably anticipate before buying a product, based on its history and not including sales discounts. Aberdeen estimates that the Progress VCO over five years is, on average, at least 40% less expensive than Microsoft's VCO. Although initial costs were higher for Progress in small workgroup environments, ongoing fees and anticipated database administrator (DBA) costs were both lower.
- *The lowest VCO for enterprise embedded infrastructure in a mass-deployment architecture belongs to Progress OpenEdge.* Aberdeen estimates that the Progress VCO over five years is, on average, *one-tenth as expensive as Oracle's VCO and one-half as expensive as IBM's VCO.* Initial costs were usually lower for Progress OpenEdge, and ongoing fees and anticipated DBA costs were clearly lower.
- *Progress's advantage is especially marked in large-scale mass-deployment architectures.* In these architectures, administrative costs dominate, and Progress's superiority in administrative costs makes it especially attractive.
- *Supplier technology continues to offset rising people costs.* Administrator salaries did not increase, while new pricing initiatives drove license costs slightly lower for Microsoft and Oracle, and sharply lower for IBM with IBM's introduction of DB2 Express. Interviewees continued to report that administration of an application server copy can, in some cases, require as many resources as administration of a database copy does. Many Microsoft users had much lower application-server administrative cost be-

cause they were not using the full capabilities of an application server — but Web server load balancing required major administrative expenses. On the other hand, interviewees agreed that the addition of an application server and Web development tool decreased development costs compared with the costs of a Java development environment without an application server. Moreover, addition of Web infrastructure expanded the range of end-users that the application supported.

- *Mass-deployment architectures continue to proliferate.* These types of architectures offer compelling benefits in local-office flexibility and availability of vertical applications, but they require an embedded infrastructure with a high degree of administrative ease-of-use and added data-synchronization technology.
- *Robust, reliable technology and cost-effectiveness are two compelling criteria for choosing a database. A well-integrated, comprehensive Web infrastructure that includes the database is also a key criterion for choosing an embedded infrastructure.*
- *The cost of managing and maintaining the embedded infrastructure is the largest expense of the long-term cost of embedded infrastructure.* However, its importance can vary widely with application type. For example, in some workgroup and most mass-deployment situations, administrative costs may account for a majority of total VCO. Administrative costs continue to increase as a proportion of overall VCO.

These findings are likely to continue over the next year. Although new versions will finally begin to supersede today's Oracle and Microsoft databases in some customer sites, initial indications are that these new versions will not substantially reduce the overall average of Oracle and Microsoft VCO in the next year.

Aberdeen's Embedded Infrastructure Model

Recent Aberdeen research shows that users of packaged or in-house applications are increasingly employing not only an embedded database but also other embedded infrastructure as the "framework" on which the application is built and on which it runs. This embedded infrastructure typically includes the following:

- A database
- A second-tier Web server
- A second-tier application server, typically including load balancing and server-side programming capabilities
- Database and application server management tools, sometimes separate, sometimes integrated

Because the Web server cost is typically negligible and the management tools are typically included with the database and application server, the Aberdeen model focuses on embedded database and embedded application server costs.

Embedded infrastructure may also contain capabilities such as data integration, enterprise portal, or Web services. Aberdeen has chosen to omit these in its calculation of VCO because they are not widely prevalent in workgroup and mass-deployment user implementations surveyed.

Aberdeen’s Mass-Deployment Model

Recent Aberdeen research shows that users of mass-deployment applications, whether they are packaged or in-house, typically use one of two architectures:

1. One central copy of the application and embedded database, invoked by up to hundreds of desktop and mobile client devices
2. Multiple distributed copies of the application and database, each invoked locally by desktop and mobile client devices — Data sharing between copies is typically accomplished by a relatively small amount of synchronization (via replication) with a single central database. The central database is outside of the scope of this study, as it is frequently and primarily used for other data center-type purposes.

To capture the cost of ownership of both architectures, Aberdeen considers costs for one application with 10, 25, and 50 users (Architecture 1) and “50×20” or 50 application/database copies on 50 LANs with 20 end-users each (Architecture 2). To combine this model with the embedded infrastructure model, Aberdeen focuses on “leading-edge” mass-deployment implementations in which the user employs an embedded infrastructure, complete with Web server, application server, and appropriate management tools. Note that our findings apply to all embedded infrastructure situations and all mass-deployment architectures.

Aberdeen’s mass-deployment model assumes that a 50×20-user application runs on 50 servers, representing a typical situation in many mass-deployment solutions. It includes software suppliers and service providers deploying an application to multiple customers, each with a workgroup (e.g., a retail application deployed to individual stores), as well as larger organizations deploying an application to multiple remote branch offices. Therefore, all server-based software license costs are multiplied by 50, unless the supplier explicitly publishes a policy of volume discounts for this situation.

Project Scope

This *White Paper* outlines Aberdeen’s qualitative research findings, which are based on interviews with large user organizations that have deployed one or more of the embedded infrastructures, and on suppliers’ published prices. This updated

report includes a sampling of previous respondents to the Aberdeen embedded database survey in order to verify changes in costs over time. The objective of this document is to aid user organizations' initial planning by providing an understanding of the approximate total cost for deploying embedded infrastructure — including a database engine and application server — as part of an application. Aberdeen examines 10- and 25-user configurations for workgroup embedded infrastructure on Windows 2003 Server, and 50- and 50×20-user configurations for enterprise embedded infrastructure on Unix. The costs cited in this study should be used only as an initial set of guidelines because actual costs incurred by any user organization may differ based on each implementation's unique characteristics.

Aberdeen's research shows that the VCO for implementing a basic 25-concurrent-user Progress workgroup embedded infrastructure in a mass-deployment architecture and maintaining it for five years is approximately \$63,600. The VCO for implementing and maintaining a basic 25-concurrent-user Microsoft embedded infrastructure is approximately \$91,826. The VCO for implementing a 50×20-user Progress enterprise embedded infrastructure in a mass-deployment architecture and maintaining it for five years is approximately \$932,500. The VCO for implementing and maintaining a 50×20-user IBM embedded infrastructure is approximately \$2,103,675, and the VCO for implementing and maintaining a 50×20-user Oracle embedded infrastructure is approximately \$9,316,301.

IT organizations need to be aware of the real costs associated with ownership and deployment of an application — including hidden costs like database maintenance — and weigh those figures against the lifespan of the application and its value to the enterprise. At any level in the organization, Aberdeen has found that cost of ownership can be an important factor in the evaluation process and the purchasing decision. Interviews with users (IT departments and DBAs) continue to confirm that, aside from any specific requirements such as row-level locking or scalability, low cost of ownership and reliability are the features most often required in both embedded infrastructures and mass-deployment architectures.

What Was Included in Each System

In calculating the VCO of an embedded infrastructure, Aberdeen included the following:

- *Database and application server license* — Five database products are examined in this research update: Progress Software's Progress Workgroup RDBMS V9.1D and Microsoft SQL Server 2000 running on an Intel/Windows 2003 Server-based server platform, and Progress Enterprise RDBMS V9.1D, IBM DB2 Express, and Oracle's Oracle9i (enterprise edition) running on Unix platforms. Four application server products are examined: Progress AppServer V9.1D, IBM WebSphere, Microsoft Appli-

ation Server (included in Windows 2003), and Oracle9iAS Release 2. These versions were chosen because meaningful data was available at the time of the research for this study. Figures are presented for 10- and 25-user implementations for the workgroup servers and 50- and 50×20-user implementations for the enterprise servers.

- *Development tools* — This category includes the cost of a single copy of a selected developer tool kit needed to maintain and modify the application. All development tools chosen support both the database and the application server.
- *Deployment* — Aberdeen averaged the fees charged by the independent software vendor (ISV) or an independent professional services firm to deploy the embedded infrastructure and application with the likely cost for sophisticated customers to perform deployment. Because application servers allow more rapid, more comprehensive deployment across the Web, the research indicated significant differences in customer deployment costs between the embedded infrastructure solutions.
- *DBA and application-server administration costs* — To determine the efforts spent by the internal staff in deploying and maintaining the system, Aberdeen calculated that each implementation required some amount of dedicated time from internal systems professionals, each of which costs an average of \$400 per day, \$2,000 per week, or \$80,000 per year — there was no increase from 2000 because of the downturn in demand for database professionals in 2001 through 2003.
- *Training costs* — This number reflects the cost of training developers in how to use, update, and maintain the database and application server. The cost reflects the time spent training developers/administrators how to troubleshoot the application, become familiar with the features and benefits, and generate and interpret reports. One to two weeks of training is generally sufficient, depending on the complexity of the embedded infrastructure. However, users should note that in some cases Oracle administrators require an Oracle 12-week training course. Courses were selected from those available from the suppliers or from third-party training organizations.
- *Upgrades* — The supplier charges for an upgraded version of the database and, typically, of the application server. Based on present trends, Aberdeen conservatively estimates three upgrades over five years. Upgrades can be purchased separately or included with maintenance contracts.

- *Support/license maintenance costs* — The supplier or ISV charges this fee — typically based on a percentage of the software license cost — to provide telephone-based and field service support for its application.

Costs Not Included

The focus of this research was to determine the *incremental* costs of deploying and maintaining an embedded database as part of an application. As a result, several expenses have been omitted in our calculations, including the following:

- *Hardware and operating system acquisition and support costs* — Aberdeen estimates that users will spend approximately \$8,000 for a typical high-end PC server (dual-processor configuration) with a Windows 2003 Server, Linux, or Unix license bundled. If users do not have these servers available, IT buyers should add these costs to the VCO. Because desktop support is almost invariably already part of the budget, it is not included in the cost of ownership, nor is the cost for the client hardware itself.
- *Networking infrastructure* — Most organizations already have local area networks (LANs) in place if they are deploying a database application. As a result, networking equipment expenditures and costs such as wiring a building are not included.
- *Integration and server consolidation cost savings* — Databases used at the enterprise level are not typically shared among applications. Application servers, however, are beginning to be shared between applications, allowing reduction of per-application-copy license, training, and administrative costs. Likewise, new application-server and database functionality allows two “consolidated” servers to do the job of four servers in servicing 100 end-users. Because this integration and server consolidation technology is not yet widely implemented in configurations with “fewer than 51 end-users per server,” it is not considered here.
- *“Soft costs”* — This figure includes the penalties associated with a database or application server not having a particular feature — thus, reducing its effectiveness — and also includes the costs associated with redesigning business processes to take advantage of the database-enabled application. No costs associated with business process reengineering or the purchase of additional products are included in this cost analysis. Soft costs vary considerably based on the type of application being deployed and the environment in which it is deployed, and, therefore, they are not included in this study.
- *Productivity loss* — This cost is a calculation of lost productivity based on the time spent in training and in getting the developers and administrators up-to-speed with the software. Productivity loss should be de-

terminated on a case-by-case basis, depending on the skills of the administrators or developers, and, therefore, it is not included in this study.

Methodology

To gather the data for this study, Aberdeen used the suppliers' published prices — derived from Web sites or printed material — for their software and professional services rates. Discounts were included only where offered as standard — research shows that in some cases additional discounts are provided. In addition, telephone interviews were conducted with each supplier's customers to determine, "post-mortem," their history of administrative and other costs. Customers surveyed are solicited from the suppliers and from Aberdeen's own list of users.

It is important to note that the survey does not take into account the different features and functionality of the various applications built around the database engine, nor those of the database engine itself. A comparison of these elements is beyond the scope of this research project. Suppliers should be contacted directly for the exact capabilities of their products.

Comparison Research Results

The following tables list updated VCO figures for the suppliers' embedded infrastructure solutions in mass-deployment architectures, based on supplier-provided information and Aberdeen research. All calculations are rounded to the nearest dollar. Table 1 outlines the total cost of deployment and five-year lifetime costs for Progress Software's OpenEdge embedded infrastructure solution and compares its VCO with the VCO of Microsoft's solution. This table also identifies the VCO of these solutions' embedded databases. Table 2 shows the comparable embedded database VCOs for 2002. Likewise, Table 3 outlines the total cost of deployment and five-year lifetime costs for Progress Software's OpenEdge, comparing its VCO with the VCO of IBM's and Oracle's embedded infrastructure solutions, as well as these suppliers' embedded database VCOs. Table 4 shows the comparable embedded database VCOs for 2002.

All costs are listed as a total cost for the five-year period, whether they are actually one-time costs (e.g., database licenses, monitoring tools, and server hardware and systems software) or costs that accumulate over five years (e.g., internal maintenance costs). Note that Aberdeen quotes costs for a typical basic deployment, but deployment costs can be much greater in particular situations.

The following tables and figures outline the costs associated with 10, 25, 50, and 50×20 users over the five-year span. They assume that one-time costs are accrued up front, that upgrades are purchased three times over the course of the five-year period, and that maintenance costs accrue every year — increasing with the user count. Annual maintenance costs were assumed not to increase over time.

Table 1: Microsoft and Progress Workgroup RDBMS and Infrastructure Five-Year VCO

	10 Clients	25 Clients
Database License		
Progress V9.1 Workgroup RDBMS	\$2,500	\$6,250
Microsoft SQL Server 2000	\$2,249	\$9,998
Application Server License		
Progress AppServer V9.1	\$2,100	\$5,250
Microsoft Application Server	\$0	\$0
Development Tools (One Copy)		
Progress ProVision Plus V9.1	\$4,500	\$4,500
Visual Studio .NET 2003 Enterprise Architect	\$2,499	\$2,499
Deployment		
Progress OpenEdge	\$8,200	\$11,300
Microsoft — includes \$1,000 application server deployment	\$5,000	\$6,500
DBA Cost		
Progress V9.1 Workgroup RDBMS	\$11,000	\$11,000
Microsoft SQL Server 2000	\$27,000	\$27,000
Application Server and Web Server Administration Cost		
Progress AppServer V9.1	\$12,000	\$17,500
Microsoft Application Server	\$15,000	\$23,000
Training		
Progress OpenEdge	\$2,000	\$2,000
Microsoft	\$7,280	\$7,280
Three Upgrades over Five Years		
Progress — included with support	\$0	\$0
Microsoft SQL Server 2000	\$1,498	\$5,549
Support/Maintenance		
Progress	\$2,600	\$5,800
Microsoft SQL Server 2000	\$10,000	\$10,000
Visible Cost of Database Ownership		
Progress V9.1 RDBMS	\$30,800	\$40,850
Microsoft SQL Server 2000	\$54,526	\$67,826
Visible Cost of Infrastructure Ownership		
Progress OpenEdge	\$44,900	\$63,600
Microsoft	\$70,526	\$91,826

Source: Aberdeen Group, January 2004

Table 2: Microsoft SQL Server 2000 and Progress Workgroup RDBMS V9.1 Five-Year VCO (2002)

	10 Clients	25 Clients
Database License		
Progress Workgroup RDBMS V9.1	\$2,500	\$6,250
Microsoft SQL Server 2000	\$2,249	\$9,998
Application Server License		
Progress AppServer V9.1	\$2,100	\$5,250
Microsoft Application Server	\$0	\$0
Development Tools (One Copy)		
Progress ProVision Plus V9.1	\$4,500	\$4,500
MSDN Universal	\$2,799	\$2,799
Deployment		
Progress OpenEdge	\$8,200	\$11,300
Microsoft — includes \$1,000 application server deployment	\$5,000	\$6,500
DBA Cost		
Progress V9.1	\$11,000	\$11,000
Microsoft SQL Server 2000	\$27,000	\$27,000
Application Server Administration Cost		
Progress AppServer V9.1	\$12,000	\$17,500
Microsoft Application Server	\$15,000	\$23,000
Training		
Progress OpenEdge	\$2,000	\$2,000
Microsoft	\$7,280	\$7,280
Three Upgrades over Five Years		
Progress — included with support	\$0	\$0
Microsoft SQL Server 2000	\$1,498	\$5,549
Support/Maintenance		
Progress	\$2,600	\$5,800
Microsoft SQL Server 2000 — 60 incidents/year	\$10,000	\$10,000
Visible Cost of Database Ownership		
Progress V9.1 RDBMS	\$30,800	\$40,850
Microsoft SQL Server 2000	\$54,826	\$68,126
Visible Cost of Infrastructure Ownership		
Progress OpenEdge	\$44,900	\$63,600
Microsoft	\$70,826	\$92,126

Source: Aberdeen Group, January 2003

Table 3: Oracle9i and Oracle9iAS, IBM DB2 Express and WebSphere, and Progress Enterprise RDBMS and Infrastructure Five-Year VCO

	50 Clients	50x20 Clients
Database License		
Progress V9.1 Enterprise RDBMS	\$36,500	\$325,000
IBM DB2 Express (includes software maintenance)	\$34,120	\$620,000
Oracle9i Standard Edition	\$28,500	\$285,000
Application Server License		
Progress AppServer V9.1	\$10,500	\$262,500
IBM WebSphere Application Server	\$27,500	\$1,125,000
Oracle9iAS Release 2	\$38,000	\$950,000
Development Tools (One Copy on Microsoft Windows)		
Progress ProVision Plus V9.1	\$4,500	\$4,500
IBM WebSphere Application Developer (and one-user WebSphere developer license)	\$23,675	\$23,675
Oracle Internet Development Suite	\$4,750	\$4,750
Deployment		
Progress OpenEdge	\$16,000	\$21,000
IBM (includes \$10,000 for application server deployment)	\$20,000	\$25,000
Oracle (includes \$4,000 for application server deployment)	\$98,999	\$193,998
DBA Cost		
Progress V9.1 Enterprise RDBMS	\$16,000	\$40,000
IBM DB2 Express	\$25,000	\$250,000
Oracle9i Standard Edition	\$150,000	\$7,500,000
Application Server Administration Cost		
Progress AppServer V9.1	\$17,500	\$17,500
IBM WebSphere	\$50,000	\$50,000
Oracle9iAS Release 1	\$50,000	\$50,000
Training		
Progress	\$2,000	\$2,000
IBM	\$10,000	\$10,000
Oracle	\$10,581	\$137,553
Three Upgrades over Five Years		
Progress (included with support)	\$0	\$0
IBM (included with licenses)	\$0	\$0
Oracle	\$2,250	\$112,500
Support/Maintenance		
Progress	\$25,000	\$260,000

	50 Clients	50×20 Clients
IBM (included with licenses)	\$0	\$0
Oracle	\$3,300	\$82,500
Visible Cost of Database Ownership		
Progress V9.1 Enterprise RDBMS	\$100,000	\$652,500
IBM	\$102,795	\$918,675
Oracle9i Standard Edition	\$279,380	\$8,312,301
Visible Cost of Infrastructure Ownership		
Progress OpenEdge	\$128,000	\$932,500
IBM	\$190,295	\$2,103,675
Oracle	\$371,380	\$9,316,301

Source: Aberdeen Group, January 2004

Table 4: Oracle8i and Progress V9.1 Enterprise RDBMS Five-Year VCO (2002)

	50 Clients	50x20 Clients
Database License		
Progress V9.1 Enterprise RDBMS	\$36,500	\$325,000
Oracle9i Standard Edition	\$15,000	\$300,000
Application Server License		
Progress AppServer V9.1	\$10,500	\$262,500
Oracle9iAS Release 2	\$40,000	\$1,000,000
Development Tools (One Copy on Microsoft Windows)		
Progress ProVision Plus V9.1	\$4,500	\$4,500
Oracle Internet Development Suite	\$5,000	\$5,000
Deployment		
Progress OpenEdge	\$16,000	\$21,000
Oracle (includes \$4,000 for application server deployment)	\$98,999	\$193,998
DBA Cost		
Progress V9.1 Enterprise RDBMS	\$16,000	\$40,000
Oracle9i Standard Edition	\$150,000	\$7,500,000
Application Server Administration Cost		
Progress AppServer V9.1	\$17,500	\$17,500
Oracle9iAS Release 1	\$50,000	\$50,000
Training		
Progress	\$2,000	\$2,000
Oracle	\$10,581	\$137,553
Three Upgrades over Five Years		
Progress (included with support)	\$0	\$0
Oracle	\$2,250	\$112,500
Support/Maintenance		
Progress	\$37,000	\$260,000
Oracle	\$3,300	\$82,500
Visible Cost of Database Ownership		
Progress V9.1 Enterprise RDBMS	\$112,000	\$652,500
Oracle9i Standard Edition	\$281,130	\$8,327,551
Visible Cost of Infrastructure Ownership		
Progress OpenEdge	\$140,000	\$932,500
Oracle	\$375,130	\$9,381,551

Source: Aberdeen Group, January 2003

Additional Aberdeen Key Research Findings

Buyers of embedded infrastructure for mass deployment or other solutions should note the following additional conclusions from Aberdeen's ongoing research into the embedded infrastructure market:

- Because administrative costs are a major component of overall VCO and embedded databases and application servers vary widely in administrative costs, performing a realistic analysis of likely administrator costs before purchasing any software or hardware can make a huge difference in life cycle costs.
- Buyers should consider performance/scalability and application downtime stemming from the database or robustness owing to the application server, ability to integrate application servers and administration across applications and databases, data synchronization across database copies, and rapid development support. In each case, Progress OpenEdge has significant strengths.
- Buyers should also consider the possibility of using an ASP (application service provider) to maintain the application using the embedded database. Aberdeen qualitative research shows that an ASP can achieve significant cost savings, especially in administrative costs, for any of the embedded infrastructures examined in this *White Paper*. These cost savings would not significantly change the differences in VCO between the infrastructures.
- Embedded database VCO continues to decrease, often owing to greater supplier and user effectiveness in automating key administrative functions. However, it remains true that tuning a database for optimal functioning is often well worth the added cost.
- Buyers should also note that low database administrative costs allow IT professionals to focus on higher ROI (return on investment) projects and also allow businesses with little or no IT resources to implement and support key applications.

Aberdeen recommends that buyers of workgroup and enterprise embedded infrastructure or mass-deployment solutions consider VCO, real-world TCO experience, and Aberdeen's overall buying criteria in selecting a supplier. Buyers should also consider the supplier's focus on embedded infrastructure and mass-deployment users' needs in both the application server and database areas and support for the ASP model. In all of these areas, Progress Software's OpenEdge infrastructure solution has strong pluses that are worth a closer look.

Projected Effects of Recent Announcements and Future Releases

Upcoming announcements are unlikely to significantly alter Aberdeen's ranking of embedded infrastructure VCOs. Oracle 10g promises to deliver significant savings in administrative costs versus Oracle9i — but primarily in “grid” situations in which multiple distributed copies of Oracle share common storage and administrative software, which is not the case studied here. Microsoft's next Yukon release of SQL Server is not scheduled to arrive until toward the end of 2004, too late to impact users before Aberdeen's next survey. IBM has not announced a major upgrade of its database or infrastructure software over the next three-quarters of a year.

Initial research on Progress's recently released OpenEdge 10 indicates that its VCO will be flat to slightly lower, at a minimum. Initial pricing is similar, and per-CPU pricing may offer discounts in some situations.

Appendix

Changes in Methodology

Over the past six years, Aberdeen has performed extensive research on estimating cost of ownership and return on investment. Aberdeen's key findings relating to databases include the following:

- Estimates of cost of ownership done before implementation can miss the mark by a wide margin. Users report that actual costs can vary widely from even the most fine-grained estimates based on license fees and user-supplied estimates of “typical development and maintenance costs.” The two likeliest reasons include cutting a deal with the supplier that reduces acquisition costs and misestimating administrative or maintenance costs.
- Cost of ownership can vary widely from the average, depending on the type of environment. Typical reasons for this variation among databases are embedded versus custom use and workgroup versus enterprise environments.
- Increasingly, other factors such as quantifiable and intangible benefits, risks, and “negative benefits” — e.g., opportunity costs or avoidance of loss of customers — should be taken into account in the buying decision. Moreover, the user's top buying criterion may be not cost but speed-to-upgrade so that the user's Web application can stay ahead of competitors.

- Costs without context are not so useful to users. In other words, if an IT buyer cannot compare the *average* situation on which the cost-of-ownership estimate is based with the user's own situation, a TCO study is less useful than a case study.

Therefore, Aberdeen continues to update its cost-of-ownership methodology to provide more benefit to users and to avoid tarring suppliers unfairly with a “bad-in-all-situations” brush. Over the last four years, Aberdeen has made the following changes:

- In most cases, license fees are now based on published prices available via the Web or in supplier publications. Aberdeen finds that most suppliers now use a common pricing scheme available over the Web. Administrative cost estimates are based on both qualitative user “ex post” research and Aberdeen's estimates of how new releases will vary from historical precedent. Users should take special care to note the differences between their administrative situations and those in case studies.
- In most cases, Aberdeen's estimates now focus on a particular type of environment — embedded/workgroup, for example, or mass deployment. Estimates for this type of environment should not be taken to apply to other environments that are quite different.
- Aberdeen now tries to note additional factors — potential benefits and/or criteria — that it believes the user should consider in the buying decision.

Aberdeen calls its cost-of-ownership estimate “visible cost of ownership” (VCO). VCO aims to give IT buyers a way of estimating the cost of ownership that the user may reasonably expect before the sales process starts. The IT buyer can then modify this estimate according to the deals that suppliers offer, as well as the user's own experience of using and administering these environments.

This study extends Aberdeen's VCO assessments from hardware and databases to “embedded infrastructure” and mass-deployment architectures. The key difference in methodology is that its surveys now assume multiple copies of an application on multiple servers running multiple copies of the infrastructure.

Additional Caveats and Considerations

This *White Paper* focuses on embedded infrastructure and mass-deployment architectures, which include both workgroup and enterprise situations for which the main purpose of the infrastructure is to support an application. Thus, ISV-supplied embedded infrastructure is included in this area. Based on past research, Aberdeen suggests that this area of focus is both narrow enough to ensure that variations in costs are not too wide and general enough to provide useful information for a broad range of IS buyers.

Note also that the embedded database area includes some, but not all, of the “Low-IT User” area investigated in previous Aberdeen VCO research. Therefore, readers should not try to apply conclusions from one study to the other.

Readers should also note the following assumption: Server hardware and operating system costs are identical across suppliers and at all levels of clients. It should be noted that interviewees indicate significant differences in hardware required for their applications — for example, that Progress requires less hardware power than Oracle for a comparable application. However, these effects vary widely with the type of application, and they do not affect the overall VCO rankings in this study.

Development tools assumed were Progress ProVision Plus for Progress Internet development, Visual Studio .NET 2003 Enterprise Architect for Microsoft Internet development, IBM WebSphere Application Developer for IBM Internet development, and Oracle Internet Development Suite for Oracle Internet development.

To provide us with your feedback on this research, please go to www.aberdeen.com/feedback.

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