

IT Modernization: The Prerelational DBMS Dilemma

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Prerelational database management system (DBMS) technology is aging, and the number of applications using this technology as a platform is decreasing. IT management, from the CIO to the technical staff, should be concerned about the increasing total cost of ownership (TCO) diminishing resources with this knowledge and about the lack of flexibility for new applications.

Key Findings

- Revenues for prerelational DBMSs are not increasing — in local currency, they are actually dropping.
- The costs of supporting legacy applications are increasing, causing more organizations to examine the possibilities of migration to a newer, more modern platform.
- The skill base available for prerelational technology is diminishing.
- Few commercial off-the-shelf (COTS) applications are available for prerelational DBMSs, meaning that few, if any, new applications support prerelational technology.

Recommendations

- Examine your portfolio of applications using prerelational technology to find applications that can be replatformed to new COTS applications (because they have reached "end of life" or for competitive business reasons) using relational technology, thus reducing your prerelational DBMS requirements.
- Prepare for difficult negotiations with vendors as maintenance and support costs increase, and budget for this.
- Budget for increasing internal costs as staff leave and are replaced with outsourcing agreements.
- Outsource the entire prerelational environment to an organization that can offer services for less by leveraging resources.

WHAT YOU NEED TO KNOW

Organizations running applications on prerelational technology must begin to create migration plans, now. IT management — including the CIO, chief technology officer (CTO), application managers and technical management, especially those involved with DBMS technology — must become aware of the pending issues concerning this technology and the impact on costs, staffing and the application portfolio. Without a definitive migration plan in place, the organization will be in a perilous position, as support declines, while costs increase and it is more difficult to replace retiring resources.

ANALYSIS

During almost 40 years, a huge body of applications has been created on database engines. Before the inception and maturity of the current relational DBMS (RDBMS) technology, prerelational DBMSs were valuable tools for applications running primarily on mainframe-class computers (see Table 1). Organizations are migrating from these older DBMSs for many reasons, thus affecting market revenue.

Table 1. Prerelational DBMS Technology

DBMS	Vendor Name
Adabas	Software AG
CA Datacom	CA
CA IDMS	CA
IMS DB	IBM
Model 204	Computer Corporation of America (CCA)
Supra PDM	Cincom
DBMS = database management system	

Source: Gartner (September 2009)

In August 2005, we published a report on prerelational DBMS, "Pre-Relational Mainframe DBMS Market Continues to Decline." In it, we suggested that a five-year plan for migration be developed for many reasons, such as the diminishing skill base, increasing maintenance fees and less frequent or no enhancement releases. Many organizations have chosen to ignore our advice only to find their problems increasing. In the past five years, Gartner has received an increasing number of inquiries reflecting these issues and indicating that a growing number of organizations is considering or implementing migration plans. Many of those making the inquiries were unhappy with maintenance cost increases. Several from state and federal government agencies simply wanted to retire the entire prerelational environment. The recent "wild card" that has arisen is the current worldwide economic environment, temporarily slowing the migration from the prerelational system to a more modern DBMS, as funding is more difficult to obtain for migration projects (see "The Cost Optimization Reality of DBMS Consolidation").

In terms of the total DBMS market share, the prerelational DBMS segment has been declining for years (see Table 2), primarily because of a shrinking installed base, as organizations migrate applications onto modern relational DBMS technology. The positive revenue growth the segment continues to see is due mainly to three factors: (1) Increasing prices from vendors, primarily for maintenance and support; (2) The impact on revenue caused by currency fluctuations (see Note 1); and (3) Upgrades to existing hardware environments resulting in an increase in the number of

millions of instructions per second (MIPS) and millions of service units (MSUs), the units of measure used to price software in this environment. However, because the number of organizations moving from prerelational DBMSs significantly outweighs any positive impact of these three factors, the share of prerelational DBMSs as a percentage of the total DBMS market continues to decline.

Table 2. DBMS Market Share, 2006-2008

Subsector	Total Revenue (Millions of Dollars)			Market Share			Growth	
	2006	2007	2008	2006	2007	2008	2006-2007	2007-2008
Prerelational	2,448.8	2,524.1	2,589.6	14.2%	13.1%	12.1%	3.1%	2.6%
Relational	14,743.5	16,785.0	18,788.8	85.8%	86.9%	87.9%	13.8%	11.9%
Total	17,192.3	19,309.1	21,378.4	100.0%	100.0%	100.0%	12.3%	10.7%
DBMS = database management system								

Source: Gartner (June 2009)

In addition, increasing numbers of organizations are beginning the transition to modern DBMS engines because of the diminishing availability of skills, increasing support costs with a corresponding decrease in enhancements, lack of independent software vendor (ISV) support and lack of flexibility of the prerelational DBMS, among other reasons. Most of these issues are worsening. Based on our discussions with clients, the most imminent applications to be dropped are using CA Datacom, CA IDMS, Model 204 and Supra PDM as a DBMS platform. Finally, there is an increasing number of software and consulting companies with products and support for migration (see Note 2).

Factors Resulting in a Decline in Prerelational Usage

Platform Support: All the prerelational DBMSs listed in Table 1 run only on "the mainframe," except for Software AG's Adabas. Few organizations wish to continue new application development on this class of hardware unless it is using relational technology on z/OS or zLinux. As approximately half of those using Gartner's inquiry service on this subject are interested in changing only the DBMS from prerelational to relational using z/OS (DB2) or zLinux (DB2 or Oracle), this replatforming is by no means a condemnation of this class of hardware. Either way, this will lead to continued reductions in the use of these prerelational DBMS engines. The notable exception is Adabas, labeled a transactional DBMS, available on Linux/Unix/Windows (LUW), giving organizations an alternative for applications they wish to migrate. This should extend the life of Adabas over that of other prerelational engines.

Aging Applications: Most applications using prerelational DBMS technology are 10 to 30 years old and are reaching end of life. To replace them, most organizations are now moving to COTS applications. Thirty years ago, there were few COTS applications available or they used prerelational DBMSs, but that situation has changed. Today, most of the applications created in-house, as well as the COTS applications on prerelational technology, are available as COTS applications on RDBMSs. As fewer applications make use of these DBMSs, the total cost to replatform the remaining few applications becomes lower than the cost of supporting the prerelational DBMS, leading to a more rapid return on investment (ROI) for the migration and eventual removal of the prerelational technology.

Lack of ISV Applications and Tools: Most modern COTS applications available are created using RDBMS technology. ISVs are not creating new applications for prerelational technology, and most ISVs with existing applications on prerelational technology are either supporting both or are migrating customers to relational technology. As existing applications are replaced with newer COTS applications, there will be an increasing reduction of prerelational DBMS usage. In the DBMS tools market for prerelational DBMS support, there have been few new tools in the past several years. Most of the major tools vendors have been acquired (for example, IBM acquired Candle in 2004) or now have a complete tool suite for LUW and RDBMS (for example, BMC Software and CA). As prerelational DBMS usage declines, this will leave fewer customers for these tools, leading to a decreased level of enhancements and support, as well as higher maintenance costs.

Diminishing Skills Base: The skills base for prerelational technology continues to diminish. Organizations report that it is increasingly difficult to hire experienced staff or to train staff in prerelational technologies. We believe there are five reasons for this. First, the pool of staff experienced in prerelational technology is decreasing as these people are aging and retiring, thus reducing the experience base. Second, most universities are teaching this technology only in history of IT classes. Few graduates have any knowledge of, or experience with, a prerelational DBMS. Third, many current staff are moving from internal IT departments to outside consultancies, leading to higher costs as organizations replace these staff with more expensive consulting contracts. Fourth, many of the current staff are moving to new technologies, wanting to

learn and work with RDBMS technology. Finally, it is increasingly difficult to attract new talent to be trained in this aging technology. For all these reasons, we believe the problem will worsen, and organizations remaining on prerelational DBMS platforms will find it increasingly difficult to find and hire staff.

Increased Support and Maintenance Costs: Generally, the cost of maintenance and support is an industrywide issue (see "Optimize Software Licensing Costs With Software Asset Management"), especially in the mainframe environment (see "More Ways to Save Money in Your IBM Mainframe Environment"). With aging technologies such as prerelational technology, this problem is more profound. As we have seen in the past several years, as the installed base drops, vendors must increase maintenance and support costs to make up for the smaller base. This is further exacerbated by the growth of a hardware environment in which many of the current applications require larger numbers of MIPS or MSUs, causing the remaining customers increases for multiple reasons. This can lead to a downward spiral with costs increasing, and more applications removed resulting in less revenue. This forces vendors to make additional price increases, resulting in more organizations migrating applications. We believe this will continue, making it impossible for vendors to provide cost-effective support to customers.

Reduced Levels of Enhancements: As the user base diminishes, there will be a corresponding reduction in new releases of prerelational DBMSs from vendors. We have begun to see this already from several vendors — their new releases are primarily to support new versions of associated software, such as new releases of IBM's z/OS. Because of the diminishing customer base and associated maintenance revenue, vendors are not able to support new enhancements beyond keeping up with associated software. The exception to this is IBM's IMS DB, for which the estimated number of clients is more than for the other DBMSs combined, and we believe it will continue to see new enhancements for many years.

Lack of Flexibility: The data model and subsequent databases using older prerelational DBMS engines are more structured and rigid, with a high degree of dependency on "key values" to drive the order of the data. Changing the structure of the files often requires an unload/load operation. Record sizes are basically fixed and linked through keys that are networked or are in "parent/child"-type relationships. Some vendors have tried to become "relational" by adding Structured Query Language (SQL) interfaces — for example, an Open Database Connectivity (ODBC) interface. Although the DBMS becomes "SQL accessible," this is not a true RDBMS and does not exhibit the same level of flexibility as true RDBMS engines. Finally, the relational DBMS model has shown, over the years, a level of flexibility to embrace new technologies and functionality, such as support for large objects (LOBs), XML and, more recently, even the functionality of MapReduce. Further, relational DBMSs support a wide variety of optimization models, such as multidimensional models and columnar storage. All these are difficult, if not impossible, to incorporate into a prerelational model.

Competitive Business Environment: An often overlooked side effect of the prerelational environment is its complexity when changes are required with respect to the business and its ability to address competitive issues rapidly. Not only is the database model more difficult to change, but the layers of integration with the newer relational applications create a very complex environment. The current economic environment has escalated this issue to senior management and business leadership within the organization. The new technologies afford more rapid changes to help the organization become or remain competitive in its business environment. High-level awareness will facilitate acceptance of a business case to move more quickly to reduce reliance on prerelational technology.

Increased Functionality, Flexibility and Performance of the RDBMS Engines: In addition to the flexibility of the RDBMS engines, they have matured in performance and manageability. Twenty years ago, RDBMS technology was slow and clumsy. This has changed drastically in the

past 10 years. Today, these DBMS engines (for example, those from IBM, Microsoft, Oracle and Sybase) support multiterabyte online transaction processing applications with thousands of concurrent users. In fact, many of these applications are far larger than the current applications supported by many prerelational applications. Simply put, today's RDBMS engines generally can do everything the prerelational DBMS can but with added flexibility and functionality.

Lack of Native Support for Business Intelligence (BI) Tools and Platforms: One of the major uses of a DBMS is to build and support a data warehouse environment, and support BI and analytics (see "Magic Quadrant for Data Warehouse Database Management Systems"). With several exceptions (for example, technology from SAS and SPSS), there are virtually no BI tools (other than several report writers) that support native access to prerelational DBMS engines. If the DBMS supports an ODBC interface, the tools can access data from the DBMS with the appropriate data definitions. However, the prerelational DBMS lacks the native flexibility of the RDBMS in the schema of the database. The other choice for access is virtual data federation, which may raise performance issues, depending on the environment and workload. The normal approach is to copy the data using extraction, transformation and loading tools to the data warehouse, which is typically in an RDBMS.

Bottom Line

Resources are becoming critical, an increasing number of applications is moving off the prerelational DBMSs, modern RDBMS technology is maturing faster and adding new functionality, and support and maintenance are growing in cost — all leading to an increase in TCO, with a decrease in flexibility and new functionality. Additionally, the competitive business environment is driving organizations to create more flexible infrastructure, and the legacy prerelational environment is hindering the ability to address these issues quickly. Organizations must plan now for this and begin to implement these plans to remove prerelational technologies from the infrastructure.

Tactical Guidelines

- Due to increasing costs, decreasing resources and decreasing availability of COTS applications, develop a three- to five-year plan for the migration of prerelational-based applications to alternative DBMS engines, on or off the mainframe.
- Migrate applications to other DBMS engines as prerelational applications reach the end of their useful life, especially when the ROI, including application migration costs, shows significant cost savings in an acceptable time frame.
- Continuously measure TCO for the prerelational portfolio (yearly if necessary) and, when the cost to migrate brings an ROI in three years or less, migrate the remainder of the portfolio and remove the prerelational technology.

RECOMMENDED READING

"Market Share: Database Management System Software, Worldwide, 2008"

"The Cost Optimization Reality of DBMS Consolidation"

"Overview of a Project to Rationalize Your Database Management Systems, 2009"

"How Many Database Management Systems Should You Have?"

"Magic Quadrant for Data Warehouse Database Management Systems"

"More Ways to Save Money in Your IBM Mainframe Environment"

"Optimize Software Licensing Costs With Software Asset Management"

Note 1

Notes on Exchange Rates and Currency Impact

By convention, Gartner reports market share and forecast data in U.S. dollars. However, software vendors sell their licenses in a variety of currencies around the world. Movements in the dollar relative to other currencies expose dollar-valued revenue to the effects of currency distortion. Consequently, software companies' reported 2007 and 2008 dollar-valued revenue growth should be interpreted with caution, especially when compared with that of other years. Indeed, because movements in the dollar (up and down) relative to other currencies affect dollar-valued revenue growth, dollar-valued revenue in general should be converted to constant-currency equivalents for the sake of analyzing software market trends.

In 2005 and 2006, the dollar held its value against most major currencies, so there was little difference between dollar-valued and local-currency-valued growth in most regions. In 2007 and 2008, the dollar's sharp depreciation against most of the world's currencies boosted global software companies' worldwide reported dollar-valued revenue growth by approximately three to four percentage points, on average. This was because the dollar's decline generally raised dollar-valued growth relative to local-currency-valued growth outside the U.S. where software purchases are transacted in currencies other than the dollar. The effect of depreciation was especially marked in Europe, where the dollar's sharp decline against the euro raised dollar-valued European software growth by approximately 10 percentage points relative to euro-valued growth.

As far as the yen is concerned, in the past three years, we have seen a gradual appreciation against the dollar. The net effect is that global software companies' reported dollar-valued revenue growth in Japan has been significantly higher than the reported yen-valued revenue growth. The difference is estimated to be about 12 percentage points, on average (for example, revenue in Japan grew in yen by 6.5% in 2008, while it grew in dollars by 18%).

For more details on the effects of currency fluctuations on software markets, see "Dataquest Insight: Dollar Fluctuations Impact Software Companies' Growth Rates in 2007 and 2008."

Note 2

Partial List of Software and Consulting Companies With Products and Support for Migration

This list does not represent recommendations from Gartner.

Anubex, www.anubex.com

Ateras, www.ateras.com

BluePhoenix Solutions, www.bphx.com

Circle, www.circle-group.com

Clerity, www.clerity.com

Forecross, www.forecross.com

HP, www.hp.com

IBM, www.ibm.com

Independent Systems Integrators, www.isi.com.au

Software AG, www.softwareag.com

SwisSQL, www.swissql.com

Tresco, www.tresco.nl

This research is part of a set of related research pieces. See "Roundup of Business Intelligence and Information Management Research, 3Q09" for an overview.

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