Core ERP

Even as growth returns, challenges facing midsize businesses are not abating. Margin pressures remain pervasive. Businesses must cut cycle times, increase operational efficiency and build customer relationships. They must deal with more diverse, faster-changing product mixes, the emergence of new channels and changing customer expectations.

Internet commerce continues to expand. There has been rapid growth in new front-end applications that leverage cloud and mobile technologies. Customer relationship management (CRM) systems are becoming the norm in midsize organizations. More complex business environments and operational structures require new tools to collect, analyze and communicate information.

The bedrock of organizational competitiveness remains, however, core enterprise resource planning (ERP) systems. These no longer simply handle back-end processes, but typically are linked to dozens of other applications. The databases they maintain have become a critical source of information for planning, forecasting and supply chain optimization, along with customer-facing and analytics tools.

For almost 20 years, Oracle’s JD Edwards EnterpriseOne has been one of the industry’s leading ERP systems. Successive owners – most recently Oracle – have maintained a steady pace of functional as well as technological enhancement. Demand has accelerated for several years. JD Edwards solutions have become one of Oracle’s fastest-growing businesses.

Business-critical systems require business-critical platforms. These must be able to deliver sufficient online transaction processing (OLTP) performance for core business operations, while scaling simply to support workload growth. They must also be stable, and must maintain round-the-clock uptime, enable rapid and effective recovery in the event of a severe outage and meet progressively more exacting security standards.

And they must do all of this in a cost-effective manner.

How to choose? That is the subject of this report, which compares capabilities and costs for three platform options for JD Edwards EnterpriseOne deployment: (1) the IBM i 7.2 operating system on IBM Power Systems servers running the POWER8 processor, models S814 and S824, (2) x86 servers with Windows Server 2012 and SQL Server 2014, and (3) Oracle Database Appliance with Oracle Linux and the Oracle Database 12c-based software stack normally employed on this platform.
Comparing Costs

This report compares two sets of costs: IT Costs, meaning costs of hardware, maintenance, systems software licenses and support, system and database administrators and facilities (energy and data center occupancy); and Costs of Downtime, meaning business costs incurred due to planned as well as unplanned outages.

In addition, this report quantifies risk exposure to severe unplanned outages lasting 12 hours or more, for the platforms covered in this report.

In terms of IT costs, use of IBM i on IBM Power Systems results in three-year costs that average 54 percent less than for use of Windows servers with SQL Server, and 62 percent less than for use of the Oracle Database Appliance.

Figure 1 summarizes these results.

![Figure 1: Average Three-year IT Costs by Platform](image)

Calculations are based on input from 28 companies employing comparable JD Edwards EnterpriseOne 8.x or 9.x suites deployed on these platforms. Users included discrete and process manufacturers, distributors as well as engineering and construction, and energy and utilities companies. Companies ranged from $120 million to over $3 billion in annual sales, 300 to 7,000 employees and 80 to more than 1,500 JD Edwards EnterpriseOne users.

Cost variations reflect differences between platforms. These may be characterized as follows:

- **Windows servers** account for most new JD Edwards EnterpriseOne deployments. The advantages of employing these – low-cost hardware and easily available skills – are widely known. Their cost structures, particularly when supporting business-critical systems, are less well understood.

  In terms of IT costs, the major variable is that full time equivalent (FTE) staffing for system administration and related tasks is typically higher than for competitive platforms. Windows environments tend to be more fragmented than those of competitors, and administrative procedures tend to be labor-intensive.

  Microsoft’s per core pricing model has tended to escalate costs for SQL Server 2012 and 2014. Denser multi-core processors compound the effects. For example, where two-processor, eight-core servers might have hosted core databases a few years ago, the norm for latest-generation Intel engines is now likely to be 12 to 18 cores.

  Oracle also supports its Oracle Database 12c, including the new In-Memory option, for use on x86 Windows as well as Oracle Linux servers. Although increases of orders of magnitude and thousands of times in performance have been claimed for this feature, the reality is more prosaic. The in-memory option is primarily a caching technology designed to accelerate high-performance analytics workloads. For these, a two times increase in performance appears to be the norm. There is little OLTP impact.
Although it has been available since 2013, Oracle 12c has not been widely adopted by JD Edwards EnterpriseOne users. Migration costs and difficulties, as well as complexity and requirements for Oracle Database administrators (DBA) have deterred most organizations that do not already have major investments in Oracle Database software and skill sets.

• **Oracle Database Appliance**, Oracle’s entry-level Engineered Systems platform, has been promoted by the company for JD Edwards EnterpriseOne users since its introduction in 2011. It does not, however, appear to have gained much traction among these. It is primarily a low-end to midrange analytics system designed to execute Oracle Database query workloads.

Oracle has conducted extensive tuning and testing of this platform to support JD Edwards EnterpriseOne, but it cannot realistically be described as optimized for the OLTP workloads that are characteristic of JD Edwards EnterpriseOne environments.

Oracle’s pricing model is distinctive, and users must pay licenses and support fees for a large, complex stack of databases and middleware. Even when software is heavily discounted, license and support costs remain higher than for Windows and IBM i platforms.

Organizations require skilled Oracle DBAs – who are among the highest-paid DBAs for any major platform – as well as system administration personnel.

Oracle has promoted its larger Engineered Systems platforms, such as Exadata Database Machine and Exalogic Elastic Cloud, for JD Edwards EnterpriseOne. These are significantly more complex and expensive than Oracle Database Appliance, and their capabilities exceed – by wide margins – the transactional requirements of most JD Edwards EnterpriseOne users.

High-end Oracle Engineered Systems have been adopted by some very large JD Edwards EnterpriseOne users, but these platforms have no obvious presence among or appeal to midsize organizations.

• **IBM i and IBM Power Systems** have had a longstanding reputation for comparatively expensive hardware and software. This situation has, however, changed over time. Models based on Power Systems servers with POWER8 processors, introduced in 2014, provide sufficient processing power to run JD Edwards EnterpriseOne workloads on one to four cores, and software pricing has become more aggressive.

This is particularly the case for the entry-level Power Systems model S814, which also benefits from IBM i Solution Edition pricing. IBM i Solution Edition for JD Edwards offers discounted hardware and software, along with no-charge service vouchers.

More granular partitioning and workload management mean that, on IBM i systems, more and/or larger instances may be deployed than on competitive platforms. The industry norm is that one POWER processor equates to two or more x86 equivalents; and for some workloads, the ratio is higher. Comparable disparities apply to Oracle Database Appliance, which is Intel-based.

In contrast, IBM i users typically employed a single core JD Edwards EnterpriseOne system, or two systems duplexed for failover and recovery. In smaller installations, test and development instances were often run on logical partitions (LPARs) on the production system.

Personnel account for the largest disparity between IBM i costs and those for competitive systems. Users have reported that Windows servers require two to three times more FTE system administrators for equivalent ERP workloads. SQL Server DBA skills are also required.

Differences in FTE staffing were reported to be lower for Oracle Database Appliance. However, greater dependence on Oracle DBAs, and the higher remuneration of these, tend to cancel out this effect.
IBM i is the simplest, most automated, most tightly integrated operating system available today. It incorporates unique features such as object-based architecture, integrated SQL database (DB2 for i), single-level storage and embedded management tools that minimize administrative overhead.

Similarly, because of the tight integration of DB2 for i, the same individual can typically handle database as well as system administration; i.e., DBAs may not be required.

Lower costs, however, are only part of the picture. IBM i enjoys a longstanding reputation for stability, availability and security. IBM i users routinely characterize it as highly stable...extremely robust...completely dependable...rock-solid. These characteristics have significant bottom-line impact.

**Costs of Downtime**

It is a truism that downtime costs money. In supply chain-intensive industries, decades of experience have demonstrated the bottom-line impact of outages. Sales may be lost or delayed, production schedules missed, delivery schedules disrupted, and other activities affected. Customers may be alienated, and penalties incurred.

Industry trends have magnified these effects. Among businesses that employ tightly integrated, lean models for example, there is growing evidence that disruptions at any point may cascade rapidly through the entire supply chain. The effects may continue to be felt long after service has been restored.

Globalization, as well as Internet and mobile commerce, have further increased vulnerabilities. Increasingly, customers expect 24/7 access and timely response. They are only a few clicks away from competitors. If they divert to these, because an order cannot be processed or a query cannot be answered, they may not return.

These differences are reflected in lower costs of downtime; i.e., bottom-line business costs due to outages. In the same companies that form the basis of IT cost calculations, costs of downtime averaged 87 percent less for use of IBM i on IBM Power Systems servers with POWER8 processors than for Windows servers and 64 percent less than for use of Oracle Database Appliance. Figure 2 summarizes these disparities.

**Figure 2: Average Three-year Costs of Downtime by Platform**

Calculations include costs of idle and underutilized capacity and personnel; handling of delivery delays (including distribution center and transportation costs); additional inventory carrying costs; costs of customer billing delays; customer penalties; and remedial costs such as buyback rebates. For manufacturing companies, calculations allow for production disruption, including costs of supplier order, production scheduling, setup and other changes.

A further implication should be noted. Core ERP systems do not simply process transactions. They supply data for sales, marketing and customer systems; planning, forecasting and supply chain optimization tools; and a growing range of analytics solutions. If the core ERP system is down, users will at best be working with stale information. In industries operating in real time, effects may be more disruptive.
Businesses are increasingly preoccupied not only with risks of unplanned outages, but also with the frequency and duration of planned outages for tasks such as software updates, scheduled maintenance and patching. In both areas, there are significant differences between platforms.

The availability strengths of IBM i and Power Systems have been widely demonstrated. Industry surveys, as well as user experiences, have consistently shown higher levels of uptime than for any other platform employed by midsize businesses. Planned outages are shorter and less frequent, and unplanned outages less common.

Severe Unplanned Outages

There is a great deal of evidence that, when severe unplanned outages occur, the bottom-line impact increases in a manner that is as much exponential as arithmetic. A 24-hour outage, for example, may not have four times the impact of a 6-hour outage. It may have 20 times more.

Like costs of downtime, risk exposure varies between platforms. For the same set of companies employed for IT costs and costs of downtime comparisons, three-year exposure to the effects of a 12-hour unplanned outage averages 68 percent less for use of IBM i on IBM Power Systems servers with POWER8 processors than for Windows servers, and 36 percent less than for Oracle Database Appliance. Figure 3 illustrates these disparities.

Figure 3: Average Three-year Risk Exposure to Severe Unplanned Outages by Platform

Risk exposure values were calculated using a standard probability/impact methodology. Probabilities were calculated based on user input as well as general industry data for the frequency and severity of outages for the three platforms. Cost impact includes the same components as for costs of downtime, although the proportions of different components varied. Allowance was made for cascading effects for manufacturers and distributors.

The probability of severe unplanned outages was multiplied by projected business impact; e.g., if the probability of a six-hour outage was 0.12, and the cost of such an outage was $5.6 million, the calculation was 0.12 x $5.6 million = $672,000.

In these comparisons, Oracle Database Appliances are configured with Real Application Clusters (RAC) One Node, an entry-level version of the company’s RAC clustering solution. Windows Servers are equipped with Microsoft AlwaysOn Availability Groups, a high availability and disaster recovery feature of SQL Server 2014, while IBM i systems employ independent auxiliary storage pool (IASP) technology.

Microsoft SQL Server 2014 AlwaysOn is a comparatively new offering. User experiences have shown that it is complex, requires a great deal of administrator intervention and is limited in scalability. Failover and recovery processes may effectively handle simple, low-volume environments, but tend to be slower and less reliable for larger workloads and databases.

Faster recovery may be realized using the full version of RAC on Oracle Database Appliance, high-end third-party and/or customized solutions on Windows servers, or IBM PowerHA SystemMirror on IBM i systems. These tend, however, to significantly increase costs for all platforms.
Security and Malware Resistance

In this area, differences between IBM i, Windows Server and Oracle Linux systems are not merely significant – they are dramatic. IBM i security incidents are rare, and malware infection is virtually unknown. This reflects the system’s object-based architecture. Objects are encapsulated in a manner that places strict controls on data as well as system code, making it extremely difficult for unauthorized instructions to execute.

Capability differences are reflected in data from Secunia, one of the industry’s leading security and malware authorities. Figure 4 for the most recent versions of IBM i, Windows Server and Red Hat Enterprise Linux (RHEL).

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<th>Operating System</th>
<th>Windows Server 2012</th>
<th>Windows Server 2008</th>
<th>RHEL Server 7</th>
<th>RHEL Server 6</th>
<th>IBM i 7.x</th>
<th>IBM i 6.x</th>
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Source: Secunia

Figure 4: Comparative Advisory Data – January 2008 through May 2015

Secunia does not break out statistics for Oracle Linux separately – they are included in totals for RHEL, upon which Oracle Linux is based.

IBM i strengths have two main implications. The most obvious is that risk exposure is reduced. Businesses are less likely to experience data breaches that may alienate customers and incur remedial costs.

The second implication is that costs of protecting data are lower. Less time and effort must be spent on routine security and malware protection, and in patching, auditing, investigating and fixing security violations. At a time when escalating threats are pressuring businesses to spend more on security, this is not a minor advantage.

Conclusions

IBM i originated with the OS/400 operating system in 1988. It was designed to provide a simple, reliable, secure and easy-to-administer platform for core business systems, and it has retained these characteristics. At a time when JD Edwards EnterpriseOne environments trend toward greater complexity, IBM i and IBM Power Systems offer a resilient and cost-effective anchor for these.

At the same time, Oracle and IBM have maintained the currency of this platform with latest-generation technologies in JD Edwards EnterpriseOne, and in the IT industry as a whole. There is no expectation that this will change in the foreseeable future.

The challenges that face JD Edwards EnterpriseOne users are already daunting. There is no reason to make the process of meeting them more difficult, expensive or risky than it needs to be.
Additional Information

This ITG Executive Brief is based upon the results and methodology contained in a Management Report released by the International Technology Group. For copies of this Management Report, please email requests to Contact@ITGforInfo.com.