The Case for Virtualizing Your Oracle Database Deployment

Dick Csaplar
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Much has been written about the benefits of virtualization over the last few years. Hypervisor software promises to revolutionize the datacenter by making applications mobile, providing superior disaster recovery capabilities, and allowing IT administrators to allocate computing resources more efficiently. In May 2012, Aberdeen surveyed 137 enterprises to see what applications have been deployed on virtualized servers, and to learn about the challenges they experienced and the benefits they gained.

This report will focus on the virtualization of Oracle databases. Oracle has been virtualized at a much lower rate than other applications, in fact the lowest rate of any application Aberdeen has studied. We will examine the reasons for this difference and provide metrics on the financial and operational benefits others have gained from virtualization.

The advantages described in this report are specific to companies that deployed Oracle on a virtualized server.
Figure 1: Percentage of Applications Deployed on Virtualized Servers

Source: Aberdeen Group May 2012
Analyst Insight

Aberdeen’s Insights provide the analyst perspective of the research as drawn from an aggregated view of the research surveys, interviews, and data analysis.

The PACE Framework
Pressures
Actions
Capabilities
Enablers
Server Virtualization Trends

Aberdeen has conducted three yearly surveys of server virtualization. Deploying applications on hypervisor software for server virtualization continues at a steady pace, with April 2012 data showing just over half (55%) of all applications deployed on virtualized servers.

On average, Tier 2 applications such as test / development, web and light business applications are virtualized at high rates, generally from 50% to 65%. Tier 1 applications, like email, databases, SAP, and other large enterprise apps, have average virtualization rates in the 30% to 40% range.

“Be careful, start slow but realize that almost 100% can be virtualized.”

~ IT Manager, Mid-sized Government Agency, Germany
Only over the last few years have large enterprise applications like Oracle databases even been able to be easily virtualized. Earlier versions of hypervisor software had severe restrictions on the number of CPUs and memory that could be allocated to support a single application. Today, most hypervisor software can support up to 32 CPUs and 1000 GB of memory, enough capacity for the vast majority of business applications. Also, companies report no hit on performance as a result of deploying an application on a hypervisor.

However, the rate of virtualizing Tier 1 applications is only slowly increasing compared to virtualization rates of Tier 2 apps. Oracle is a prime example of a large enterprise application which has lagged behind in deployment to a virtualized server.
Virtualization of Oracle Databases

While the rate of virtualization for all applications is 55%, Oracle is 50% less likely to be virtualized, at 28%. Almost three quarters of all Oracle database deployments are on physical servers, and cannot gain the advantages virtualization brings to applications.

Figure 2: Virtualization Rates

Aberdeen asked the surveyed organizations to tell us why they have not fully virtualized their infrastructure.
Reasons for not Virtualizing Applications
Reasons for not Virtualizing Applications

As highlighted in Figure 3, the reasons for not virtualizing applications fall into two categories – financial and technical.

- **Financial** – Surveyed companies reported they were unsure how to measure the ROI they would gain from spending money and resources to move their applications onto a virtualized environment. All IT investments should include a ROI calculation in the investment analysis to ensure the movement is worthwhile, and to help prioritize it against other IT projects.

- **Technical** – Virtualization can be a challenge particularly if a company has not deployed hypervisor software before. Oracle is a mission application and companies are wary to experiment with this critical tool.

**Figure 3: Top Reasons for Not Virtualizing Applications**

<table>
<thead>
<tr>
<th>Reason</th>
<th>% of Survey Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsure of ROI</td>
<td>34%</td>
</tr>
<tr>
<td>Unsure of Value Proposition</td>
<td>31%</td>
</tr>
<tr>
<td>Lack of Expertise</td>
<td>28%</td>
</tr>
</tbody>
</table>

Source: Aberdeen Group, May 2012
We will now look at how other, more experienced organizations have overcome these challenges. First we will examine the financial and operational benefits of virtualization.
Benefits of Virtualization

The benefits of virtualization can be grouped into two categories:

- **Operational** – Freeing IT from repetitive tasks, or reducing the time dedicated to those tasks, produces an economic benefit for the company. Freed IT resources can be redeployed to more important projects, such as bringing new tools to deployment faster.

- **Reduced expenses** – Eliminated costs contribute to the positive ROI of a project. These reduced expenses can take two forms – Capital (CapEx - the cost of equipment paid for from a Capital Budget) and Operational (OpEx – the savings from reducing or eliminating expensive and time consuming tasks).

“Set up a test platform, talk to your backup vendor and businesses that have already done what you want to do, then go for it.”

~ CIO, Mid-sized Distribution Company, US
Figure 4 identifies benefits of virtualization as reported by those organizations that have deployed software on hypervisor software.

The number one benefit reported by survey respondents contributes to both operational and capital savings: reducing the number of servers in the datacenter. Eighty-four percent (84%) of companies reported this gain.

This benefit will only be accrued by smaller Oracle deployments and may not be valid for the largest Oracle databases. When deployed on a physical (non-virtualized) server the largest database most likely consume an entire server. Adding a layer of virtualization will not shrink the size of that application or reduce the amount of computing resources the database requires. Organizations looking for virtualization benefits with very large Oracle deployments need to look at the other areas of benefit – as highlighted in Figure 4.

**Figure 4: Benefits of Virtualization**

![Bar chart showing benefits of virtualization](image)

- Reduced number of servers: 84%
- Quicker app upgrade: 49%
- Easier disaster recovery: 44%
- Reduced IT expenses: 43%
- Reduced outage/downtime: 39%
- Lower power/cooling: 30%

n = 93

Source: Aberdeen Group, May 2012
The other benefits fall into two primary categories:

- **Application Uptime** – Easier disaster recovery and reduced outage / downtime means that applications are up and available to support business processes more of the time. Virtualization features such as application mobility (moving running apps from one server to another), site recovery (moving suites of applications over the WAN) and automatic resource deployments (adding additional memory or CPUs to stressed applications) contribute to improving application uptime.

- **Reduced costs** – Faster application upgrades / installs and reduced power and cooling expenses help lower the cost of supporting applications.

All these benefits will apply to Oracle database deployment on a virtualized server. Database uptime can be improved by making it portable across servers, and even datacenters, in response to server issues. The cost of supporting Oracle can be reduced by snapshotting and cloning copies for testing upgrades prior to production deployment. Also the ease of deploying more memory or CPUs from virtualized servers during times of stress will make the application management easier.
## Quantification of Benefits

<table>
<thead>
<tr>
<th>Year</th>
<th>Net Income</th>
<th>Current Assets</th>
<th>Total Assets</th>
<th>Current Liabilities</th>
<th>Long-term Liabilities</th>
<th>Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$43,300</td>
<td>$87,900</td>
<td>$77,900</td>
<td>$24,100</td>
<td>$3,000</td>
<td>$5,300</td>
</tr>
<tr>
<td>2</td>
<td>$24,100</td>
<td>$97,900</td>
<td>$87,900</td>
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<td>3</td>
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<td>$87,900</td>
<td>$77,900</td>
<td>$7,000</td>
<td>$3,000</td>
<td>$5,300</td>
</tr>
<tr>
<td>4</td>
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<td>$77,900</td>
<td>$4,000</td>
<td>$3,000</td>
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<td>$6,300</td>
<td>$3,000</td>
<td>$5,300</td>
</tr>
<tr>
<td>6</td>
<td>$7,000</td>
<td>$15,300</td>
<td>$15,300</td>
<td>$5,700</td>
<td>$3,000</td>
<td>$5,300</td>
</tr>
</tbody>
</table>

### Ending Cash Balance

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$14,500</td>
</tr>
<tr>
<td>2</td>
<td>$13,300</td>
</tr>
<tr>
<td>3</td>
<td>$7,000</td>
</tr>
<tr>
<td>4</td>
<td>($6,200)</td>
</tr>
<tr>
<td>5</td>
<td>$13,300</td>
</tr>
<tr>
<td>6</td>
<td>$7,000</td>
</tr>
</tbody>
</table>
Quantification of Benefits

To assist in the ROI calculations we asked survey respondents to share the performance improvements they have achieved with server virtualization. Aberdeen asked survey respondents to tell us what gains they have seen from virtualization, both in infrastructure performance and cost reduction.

Mean Class Performance

The three maturity classes reported the following results in the three key performance metrics:

Average number of business interruptions in the last 12 months:

- **Best-in-Class**: 4
- **Industry Average**: 4.5
- **Laggards**: 5

Average age of each downtime event:

- **Best-in-Class**: 50 minutes
- **Industry Average**: 2 hours
- **Laggards**: 8 hours

The length application downtime was reduced since virtualizing:

- **Best-in-Class**: 50%
- **Industry Average**: 15%
- **Laggards**: 1%
Aberdeen identified the top 20% of IT organizations based on their ability to keep applications up and running. This is the gold standard for IT—application uptime is a measure of the ability to get applications deployed quickly and keep them available for end user productivity. This top 20% of survey respondents is called Best-in-Class.

Table 1 shows the average improvement in the benefits indicated in Figure 3 reported by all organizations that have deployed server virtualization, and compares them to the values achieved by the Best-in-Class.

**Table 1: Virtualization Benefits**

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Average Overall Results</th>
<th>Best-in-Class Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>How long to deploy new applications after deploying server virtualization?</td>
<td>7.6 days</td>
<td>1.1 days</td>
</tr>
<tr>
<td>How has application downtime changed since deploying server virtualization?</td>
<td>- 26%</td>
<td>- 34%</td>
</tr>
<tr>
<td>How has the IT spending for server and application deployment changed over the last 12 months?</td>
<td>- 11%</td>
<td>- 21%</td>
</tr>
<tr>
<td>How has power consumption changed over the last 12 months?</td>
<td>- 4.5%</td>
<td>- 7.5%</td>
</tr>
<tr>
<td>Rate of server concentration (Average number of VMs per server)</td>
<td>11.8</td>
<td>15.5</td>
</tr>
</tbody>
</table>

Source: Aberdeen Group, May 2012

Average organizations, and particularly the Best-in-Class, have been able to reduce their spending on server support and new application deployment. Table 1 summarizes the kind of performance advantages a company new to application virtualization can achieve over time. The Best-in-Class have highly virtualized environments, and virtualizing their Oracle database deployment contributes to these savings.
Training – A Best-in-Class Practice

The final challenge to deploying virtualization to Tier 1 applications, as stated by survey respondents in Figure 2, is a lack of technical expertise.

Server virtualization deployment and management tools are not intuitive to anyone. All organizations struggle with hiring techs experienced in new technologies, or training their own resources. Aberdeen has found that, while a minority of organizations have a formal training program for their IT staff, Best-in-Class organizations are heavy users of technical training.

Only 44% of all surveyed companies reported having a formal education program for virtualization for their IT staff, while 73% of Best-in-Class reported the same. Thirty-five percent (35%) of all organizations reported that they have training and certification programs for virtualization tool administrators; two thirds (68%) of Best-in-Class do.

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Company Size Defined
For the purposes of this document, Aberdeen defines company size as the following:

- Small (less than 100 employees)
- Mid-sized (Between 100 and 1000 employees)
- Large (Greater than 1000 employees)
It is important to note that the Best-in-Class is comprised of organizations of all sizes. Not only large companies with large budgets value technical training. Over 70% of the Best-in-Class in this analysis group are small and mid-sized companies.

Most vendors of hypervisor software offer training on their products. Best-in-Class organizations use that training to create the tech-savvy resources needed to gain the application performance benefits described in this document.

Table 2: Virtualization Benefits - Operational

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Best-in-Class</th>
<th>Average</th>
<th>Laggard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal educational plan for IT staff in implementing virtualization</td>
<td>44%</td>
<td>73%</td>
<td>49%</td>
<td>22%</td>
</tr>
<tr>
<td>IT staff trained in measuring the effectiveness of virtualization processes</td>
<td>39%</td>
<td>73%</td>
<td>42%</td>
<td>17%</td>
</tr>
<tr>
<td>Training and certification provided for virtualization tool administrators</td>
<td>35%</td>
<td>68%</td>
<td>36%</td>
<td>15%</td>
</tr>
</tbody>
</table>

Source: Aberdeen Group, May 2012
Report Summary:
Virtualize your Oracle Database Deployment

While organizations are steadily virtualizing their server environments, the rate of virtualization of Oracle databases is lagging. Oracle is a mission-critical application, and companies should be careful before making major changes. However, virtualization is now a proven technology, and companies should realize there is much to gain from virtualizing their Oracle deployment. Companies who have not virtualized their implementations of Oracle databases should:

- **Recognize that virtualizing your Oracle database deployment brings a variety of benefits.** These include reducing expenses and improving database uptime. Build the ROI case for deploying Oracle on a hypervisor using the metrics discussed in this report.

- **Train your technical resources to take full advantage of the features of the virtualization tools.** Hypervisor software has many features and capabilities. Training your IT staff on the tools will result in higher application uptimes, reduced costs, and better performance.

- **Talk to organizations that have already done it.** Twenty eight percent (28%) of Oracle deployments have already been virtualized. This is not a bleeding edge project. Based on the data from Aberdeen research, even average respondents gained greatly from virtualization technology.

There are many benefits from virtualizing Oracle databases. If done correctly, end-users, finance, and IT operations all stand to share those gains. For more information on this or other research topics, please visit [www.aberdeen.com](http://www.aberdeen.com).
Survey Respondents

Individuals answering this survey came from diverse geographies, industries and corporate roles:

**Industries:**
- IT Services – 21%
- Government – 13%
- Healthcare/Pharm – 13%
- Education – 11%
- Finance/Insurance – 10%
- Telecomm – 9%
- Software – 8%
- Industrial Manuf – 8%
- Others – 7%

**Roles:**
- Director and above – 55%
- Managers – 21%

**Geography:**
- North America: – 62%
- EMEA – 22%
- Rest of World – 16%
Related Research

 Extend your Server Virtualization Program to enable Private Cloud; May, 2012  
 EMEA SMEs are leading their North American Cousins in Server Virtualization; February, 2012  
 The State of Server Virtualization in Small and Mid-Sized Organizations; January, 2012  
 Measuring the Returns from a Desktop Virtualization Program; September 2011  
 Small vs. Large Enterprise Data Backup; Same Concept, Different Process; June 2011  
 High Availability for Virtualized Applications: Protecting Against Unplanned Downtime; June 2011  
 Managing Virtualized Applications: Optimizing Dynamic Infrastructures; April 2011

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