An Accenture Point of View

The Eureka Moment

How the agile data center brings agility and growth
Inspired infrastructures

Although the historical path from packet switching to a world-wide network is well known, it took the creative thinking of Tim Berners-Lee before technology could be harnessed to realize the power of the Internet. For executives seeking business agility and growth, Accenture believes it is the combination of a technological tipping point and innovative ideas that will lead to organizations' own eureka moment. Indeed, recent technology advances have opened up a window of opportunity that will transform an organization's infrastructure. By employing an end-to-end solution, with the accent on interconnectivity and optimization, executives can achieve strategic business outcomes that not only potentially reduce non-discretionary spend by up to 40 percent but also lead to high performance.

Database demands

The prevalence of data could inspire a similar sentiment to that expressed by Coleridge's ancient mariner "water, water, everywhere, nor any drop to drink" since data volume in itself is not the path to better decision making. Indeed, businesses are struggling to realize the benefits of information assets due to reactive database constraints. What is more, organizations are beset by challenges such as high costs through decentralized architectures, poor service availability, scalability, flexibility, and recovery and ineffective application upgrades and migrations. They may be suffering from a lack of data security or absence of data management strategies around storage and archiving. And they may have issues in consolidating skills or difficulty consolidating versions.

Perhaps one of the most dramatic influences in the market today is the focus on cloud computing. In the past, the most you could see was the Amazon Elastic Compute Cloud (EC2); virtual machines. Now, executives can see their way to a private cloud of Oracle Databases with the service characteristics that might be expected from a cloud-based solution; suddenly, it is a different game.

Three major questions CIOs face today – how to: optimize costs, return increasing value of IT back to the business and keep up with demand and new agendas. All of these factors drive the need for a different, more holistic infrastructure. Cost reduction drivers should focus on non-discretionary components of IT spend to provide maximum potential savings. If organizations leverage cost reducing drivers to shift the spend ratio in favor of discretionary spend, the average budget transformation for non-discretionary spend on elements such as facilities, technology and operations, is a reduction of up to 40 percent.

Based on our experience managing complex IT transformation projects, Accenture has defined three phases to achieve greater data center agility:

- **Phase I:** Consolidation and standardization. Taking place over 12-18 months, organizations focus on consolidating their data center locations and footprints through pooling of resources and standardizing their data center technologies and tools.

- **Phase II:** Fully integrated, on-demand environment. Within 18-24 months, organizations can expect to optimize and automate both technology and data center support processes.

- **Phase III:** Seamless services. After a period of 24-36 months, organizations will be able to link their data center to business services which will be virtualized between multiple sources (internal and external) and provisioned from the cloud.

---

1 The Rime of the Ancient Mariner, Samuel Taylor Coleridge
Beating a path to high performance

We believe the orientation towards infrastructure and operations as services that has taken place in recent times will continue to drive technology trends over the next five years, with technological elements such as Service-oriented Architecture, Software-as-a-Service (SaaS), commoditization and cloud computing. To ease the transition to these environments, agile IT structures help to organize IT activities and infrastructure so that they can more rapidly meet the growing need to scale up or down according to market circumstances. At the same time, agile IT enables IT operations to shift from a fixed to a variable cost model. As such, and in a climate of prudence with progress, agile IT can help to position IT leaders as key contributors to corporate success and growth.

Beyond consolidation and standardization, continued progress towards service-oriented database architectures and capabilities requires automation and self-service provisioning. In our view, to demystify the notion of cloud-based computing with respect to service-oriented database architectures and capabilities, an organization will aim towards implementation of architectures which support the Database Platform as a Service model. This model promises to move much of the operational burden of provisioning, configuration, scaling, and access control from the database administrators (DBAs) to an automated solution, offering lower overall costs to users and allowing consumers to focus their time and energy on higher priority initiatives. To make a legitimate claim to operating the Database Platform as a Service model, progress must be made towards tightly mating IT governance with specific enabling technologies such as virtualization. As Figure 1 shows, a holistic view to shared services must be embraced through business service and IT governance beyond the traditional IT Infrastructure.
Why Oracle Exadata Database Machine?

A key enabling technology in the core enterprise is the Oracle Database deployed using Real Application Clusters (RAC) on the Oracle Exadata Database Machine. Oracle Exadata is hardware and software engineered and optimized for data warehousing, transaction processing (OLTP), and mixed workloads.

Enterprises should consider Oracle Exadata if they are seeking to employ business intelligence, analytics or data warehouse implementations. Or they may wish to reduce non-discretionary expenditures through database consolidation, reduced power costs and reduced floor space. Oracle Exadata can improve DBA productivity with Oracle Database 11gR2 while introducing extreme performance for data warehouses, OLTP applications and mixed data workloads.
Eureka! The agile data center

For companies that are serious about cloud computing, the eureka moment has finally arrived. A cloud-enabled infrastructure includes capabilities specifically demanded by cloud computing such as support for elastic, on-demand allocation and deallocation of shared resources (including elastic horizontal scaling), multi-tenant provisioning and self-service administration.

Organizations can exploit the collision of technologies and ideas, such as the Information Technology Infrastructure Library (ITIL), to take advantage of cloud computing and develop better business outcomes. As part of our long-term teaming with Oracle, Accenture has seen the potential of the Oracle Exadata Database Machine in enabling a transformational strategy and roadmap to deliver an agile data center solution. Oracle Exadata fits into a cloud strategy which demands high-performing service offerings and now, having announced its 1,000th installation\(^2\), is recognized as being widely accepted. Public and private cloud solutions have their benefits and challenges. Early public cloud efforts include Amazon RDS and Microsoft SQL Azure, which are promising in terms of establishing the market need for such a service, but which do not address three important challenges: efficient multi-tenancy, elastic scalability, and database privacy. Accenture argues that these three challenges must be overcome before outsourcing database software and management can be heralded as a recommended solution — and a private cloud solution is the best way forward.

IT organizations can develop capabilities which move them towards agile IT solutions such as the agile data center by combining IT governance processes and enabling technologies to better meet the needs of the business. With the emphasis on an overall infrastructure strategy that makes progress towards a service-based model, a Database Platform as a Service solution should be considered.

\(^2\)http://www.oracle.com/us/corporate/press/422468
Businesses need to strive for high performance to remain profitable and continue to drive new opportunities into the marketplace.

What constitutes high performance?

- Adaptive, executable strategies in a changing environment.
- Creating competitive advantage by continual innovation.
- Optimizing the organization to meet the strategy and opportunities.
- Maximizing productivity of a mission-critical workforce.
- Driving a well-defined and executable sustainability agenda.

What does high performance mean for IT?

- The need to continually optimize operational costs.
- Demonstrating value back to the business—speed to market, service availability.
- An infrastructure that can scale up and down against business demand—moving to a flexible and agile environment.
- Moving to a variable cost model rather than a static model.
- Introducing an agenda for greening the IT enterprise.

To prevent IT from being seen as an inhibitor rather than enabler to business innovation, certain technologies are essential to create an IT infrastructure which directly supports the high-performance business rationale. First, service-oriented infrastructure architectures offer new opportunities for organizations to improve operational efficiency and agility at a lower price point. Second, organizations are exploring virtualization and automation technologies such as cloud computing and Infrastructure-as-a-Service (IaaS) as part of a business strategy to improve functionality, reduce costs and enhance operational effectiveness. And finally, agile infrastructures enable organizations to quickly respond to new marketplace opportunities, achieve operational efficiencies, improve employee and workplace performance, and reinvigorate growth.

With the right IT infrastructure, executives can expect to:

- **Better serve the consumer:** by introducing provisioning, processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, and deployed applications.
- **Develop better strategies and processes:** by employing an automated decommissioning and redeployment strategy and processes.
- **Publish standard rates for defined classes of services:** by producing a Service Catalog to provide a central source of information on the IT services delivered by the service provider organization. This helps enable all areas of the business to view an accurate, consistent picture of the IT services, their details and their status.
- **Vary consumer infrastructure abstraction:** by moving consumers from consuming products to services.
- **Move to central delivery of services:** except where latency or legal issues dictate otherwise.
A roadmap to database cloud

As we have mentioned, the agile data center approach is supported by concepts such as Database Platform as a Service. For organizations to run Database Platform as a Service with any significant degree of legitimacy, their operations must meet certain criteria, such as elasticity.

Features and benefits resulting from database cloud include:

- Self-service paradigm for database deployment and management.
- Pre-packaged, pre-configured database configurations.
- One-click provisioning and deployment of databases.
- On-demand scalability of underlying platform.
- Metering and chargeback for IT accountability.
- Extreme “agility” for developers, with “enterprise” control for IT.

The challenge for Oracle Exadata is that it does not alone entirely meet the criteria for being elastic; for example, once a node is added to a RAC configuration it will not likely be removed once current capacity demands are met.

By bringing together business and IT service management to the core enterprise where enabling technologies such as RAC and Oracle Exadata are deployed, these technologies can be integrated into cloud services that enable a flexible and agile IT infrastructure. The roadmap to Database Platform as a Service solution includes five stages (see Figure 2):

- IT silos: understand what is out there, developing the database application portfolio.
- Standardize technology: decide on common database technology platforms.
- Consolidate platforms: migrate database applications to the standardized and consolidated database platforms.
- Shared services: develop the database service catalog.
- Cloud computing: Database Platform as a Service.

Figure 2: The Five-Stage Roadmap to Database Cloud
In our experience, when undertaking the initial phase of any transformation journey, the focus should be on the core enterprise to take key steps towards enabling cloud infrastructures. An agile IT program requires a series of decisions to be made to drive true value realization. The paradigm for Platform as a Service (PaaS) is an architecture that is engineered to run as a scalable, "elastic" service that is available on a cloud infrastructure. These architectures are made available as shared services and offer some degree of self-service. When Database Platform as a Service is provided in a shared, multi-tenant environment, with automatic and elastic scaling, it can be used for simple or complex transactions (Figure 3).

So what is the best way to introduce Database Platform as a Service? We suggest beginning with tiered database services, ranging from commodity virtualized databases to standalone platforms to platforms such as Oracle Exadata Database Machine. Each tier has its own characteristics (see Figure 4) and at these specific tiers, various combinations of servers, software, database service offerings, and disaster recovery approaches can be leveraged. In this way, organizations can gain the support of a cloud-based model that brings service offerings which meet their database platform needs.

Having the right technology configurations to support this tiered approach is also essential (see Figure 5).

Figure 3: The Database Platform as a Service Paradigm
Figure 4: Tiered Characteristics for Database Platform as a Service

<table>
<thead>
<tr>
<th>SOLUTION PATTERN</th>
<th>CHARACTERISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commodity platform</td>
<td>Use virtual servers</td>
</tr>
<tr>
<td></td>
<td>Database may be installed with other applications</td>
</tr>
<tr>
<td></td>
<td>Standard memory installed</td>
</tr>
<tr>
<td></td>
<td>Tier 1 and 2 storage</td>
</tr>
<tr>
<td></td>
<td>No redundancy</td>
</tr>
<tr>
<td></td>
<td>On-site disaster recovery capability via backup and recovery</td>
</tr>
<tr>
<td></td>
<td>Lowest performing</td>
</tr>
<tr>
<td>Standalone platform</td>
<td>Multi-Tenancy</td>
</tr>
<tr>
<td></td>
<td>Memory installed based on mid-range use</td>
</tr>
<tr>
<td></td>
<td>Tier 1 storage for most environments</td>
</tr>
<tr>
<td></td>
<td>Clustered database platform / High Availability Architecture</td>
</tr>
<tr>
<td></td>
<td>On-site disaster recovery capability via backup and recovery</td>
</tr>
<tr>
<td></td>
<td>Better performing</td>
</tr>
<tr>
<td>Oracle Exadata Database Machine</td>
<td>Dedicated physical servers</td>
</tr>
<tr>
<td></td>
<td>Maximum memory installed</td>
</tr>
<tr>
<td></td>
<td>Tier 1 storage (e.g. Oracle Exadata) for production environments</td>
</tr>
<tr>
<td></td>
<td>Clustered database platform / Maximum Availability Architecture</td>
</tr>
<tr>
<td></td>
<td>Offsite disaster recovery capability with replication</td>
</tr>
<tr>
<td></td>
<td>Highest performing</td>
</tr>
</tbody>
</table>

Figure 5: Technology Configurations to Support a Tiered Approach.

<table>
<thead>
<tr>
<th>SERVERS</th>
<th>SOFTWARE</th>
<th>SERVICE</th>
<th>DISASTER RECOVERY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commodity platform</td>
<td>Virtualized</td>
<td>RDBMS Hypervisor</td>
<td>On-Site Public Cloud</td>
</tr>
<tr>
<td>Standalone platform</td>
<td>Multi-node Physical</td>
<td>High Availability RDBMS Clusterware</td>
<td>On-Site</td>
</tr>
<tr>
<td>Oracle Exadata Database Machine</td>
<td>Multi-node Physical</td>
<td>High Availability RDBMS Clusterware</td>
<td>On-Site</td>
</tr>
</tbody>
</table>
With a 20-year relationship with Oracle Corporation, we have experience delivering solutions that are enablers for Database Platform as a Service models. A key technology enabler provided by Oracle is Enterprise Manager 12c that features a cloud management layer providing services for metering, chargeback, capacity planning, policy management, self service provisioning, configuration management and monitoring. Application Programming Interfaces (API’s) provided by these services are often integrated with external Configuration Management Database (CMDB) and billing systems.

Cloud models can be deployed and managed with a range of physical system types. The expectation is that with correctly executed models for multi-tenancy and the right service tier criteria, applications will be distributed across the deployed infrastructure and control and optimization of elasticity can be achieved. While management policies can restrict self-service deployments to lower-end pools of commodity servers using virtual assemblies, resource monitoring and metering can provide predictive capabilities for application promotion to physical regions which provide increasing enterprise value.

The various zones containing server pools can host a range of database server types that meet needs ranging from commodity virtual machines on shared resource pools, to multi-tenant Real Application Cluster (RAC) environments with lower availability and performance requirements, to Oracle Exadata Database Machines to service the highest levels of performance and availability.

With the monitoring and capacity planning available in the IT service management layer, databases can be identified for promotion to more dedicated server pools based on business requirements and/or real performance metrics as monitored by the business and IT service layer. Quality of Service Management dashboards display cluster performance and the state of Service Level Agreements (SLAs) and any resource re-allocation recommendations should a workload not be meeting its objective.

### Checklist for change

To enable Database Platform as a Service or Cloud-based model using Oracle Enterprise Manager 12c, executives should:

**Plan and set up the cloud infrastructure**
- Discover and baseline resources.
- Devise a consolidation strategy.
- Consolidate resources.
- Set up cloud.

**Integrate a service catalogue**
- Build service templates and test them.
- Package the applications.
- Deploy them from a catalog.

**Operate, maintain and chargeback to the business**
- Monitor from end user, application owner and administration perspectives.
- Operate, maintain and patch cloud infrastructure.
- Meter and optionally chargeback.

### A eureka era

Anyone whose career has been kick started in the last thirty years cannot fail to be amazed by how technology has changed our professional and personal lives. But perhaps timing is everything and now organizations must be prepared to take advantage of the latest eureka moment.

Going forward, enterprises will expect to have an ‘end-to-end’ view of operational performance. In a highly competitive landscape, organizations that choose innovative thinking and the latest technology has to offer will attain that eureka moment.
Contact

If you would like to know more about how the agile data center can transform your infrastructure and help your organization achieve high performance, contact:

Patrick Sullivan
T: +1 312 693 3411
E: patrick.sullivan@accenture.com

Dr. Mark A. Gold
T: +1 703 947 3639
E: mark.a.gold@accenture.com

Visit: www.accenture.com/oracle

About Accenture

Accenture is a global management consulting, technology services and outsourcing company, with more than 244,000 people serving clients in more than 120 countries. Combining unparalleled experience, comprehensive capabilities across all industries and business functions, and extensive research on the world’s most successful companies, Accenture collaborates with clients to help them become high-performance businesses and governments. The company generated net revenues of US$25.5 billion for the fiscal year ended Aug. 31, 2011. Its home page is www.accenture.com.

About Oracle

Oracle (NASDAQ: ORCL) engineers hardware and software to work together in the cloud and in your data center. With more than 380,000 customers—including 100 of the Fortune 100—in more than 145 countries around the globe, Oracle is the only vendor able to offer a complete technology stack in which every layer is engineered to work together as a single system. Oracle's industry-leading on-premises and cloud-based solutions give customers complete deployment flexibility and unmatched benefits including unbreakable security, high availability, scalability, energy efficiency, powerful performance, and low total cost of ownership. For more information, visit oracle.com.