Extending the Capabilities and Value of SAP ECC in the Modern Enterprise

How Oracle Engineered Systems Provide an Optimal Platform to Get More from SAP

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For Many Enterprises, SAP ECC Is Essential to Their Business

SAP is an acknowledged leader in ERP packaged software with more than 320,000 customers in 190 countries. SAP ERP Central Component (ECC) is the core component of SAP’s Business Suite. ECC includes a variety of modules including Financials (FI), Material Management (MM), Sales and Distribution (SD), and Human Capital Management (HCM) which is why SAP ECC is one of the preferred choices for many organizations. Millions of SAP users rely on SAP services every hour of every day. The continuous availability and extraordinarily high reliability of SAP services is not just a strategic objective, it is an absolute mission-critical requirement for most SAP customers. This means that SAP customers must be equally focused on managing their SAP install as well as the underlying database and infrastructure that does the heavy lifting. The importance of a stable and performant SAP environment is a key reason why many SAP customers have elected not to upgrade to S/4 HANA but continue to consider Oracle’s engineered systems a way to deliver much higher levels of performance, reliability, and cost-effectiveness.

The Challenge of Application Upgrades

Most enterprises do not attach a high priority to application upgrades. This was illustrated in ESG’s 2016 IT Spending Intentions Survey where only one out of five IT decision makers on average in the US, Europe, and Asia Pacific indicated that this is one of their most important priorities over the next 12 months.1 The reason for this is the risk of service disruptions that accompany changes to complex systems. Frequently, the incremental benefits that come from an upgrade do not outweigh the added risk of outages or downstream customer incidents.

While more than 60% of enterprises expect some YoY increase in 2016 to their IT budget, a significant portion of existing budgets are dedicated to ongoing operations.2 What incremental budget remains will generally be spent to address key priorities, which include cybersecurity, real-time data analytics, and data center modernization. This leaves essentially no budget, staff, or justification to upgrade or replace existing applications, and indicates that enterprises are intensely focused on securing, leveraging, and improving the capabilities of legacy infrastructure they have already invested in. By extension, this suggests that most enterprises that use SAP ECC are intensely focused on maximizing the utilization of the technology they already have and less interested in upgrading. This is also reflected in the relatively slow rate at which customers have been migrating to S/4 HANA.

There are also a variety of reasons why enterprises are not in a rush to upgrade from SAP ECC:

- When SAP ECC and the SAP NetWeaver platform are working, there is often no immediate pressure to change.
- The disruption and challenge in upgrading to a new ERP suite, including SAP S/4HANA, create an unacceptable cost and risk for many large enterprises.
- Addressing performance and scalability concerns is more important than moving to a new software platform, and can be accomplished through infrastructure too.
- SAP ECC and NetWeaver will be supported for close to another decade, until 2025.

Then how can businesses safely extend the lifespan and value of their current SAP implementation?

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2 Source: Ibid.
Overcoming Infrastructural Complexity

When it comes to decisions regarding what infrastructure to purchase in support of production applications, there is a strong emphasis on solutions that are much simpler to manage, more powerful, and less costly. An ESG survey of over 300 IT professionals (split nearly equally between midmarket and large enterprises) conducted at the end of 2015 showed that more highly integrated infrastructure is gaining traction. While the majority of infrastructure in data centers today comes from a variety of vendors, Figure 1 shows a trend toward converged and hyperconverged systems. The appeal of hyperconverged systems, which could factor into near term plans for more than two-thirds of enterprises, is the higher level of integration that is provided by a vendor across infrastructural components. Oracle is the only vendor with engineered systems that move beyond hyperconverged systems by sole-sourcing all of the infrastructural components, integrating these components, and building in a high level of application awareness for specific Oracle and third-party database, middleware, and applications.

![Figure 1. Organizations’ Usage of or Plans for Converged and Hyperconverged Infrastructure](image)

Converged infrastructure solutions do provide added benefits in the areas of performance, management, and cost, but are missing key capabilities that are intrinsic to engineered systems. Oracle’s engineered systems are optimized for mission-critical workloads, architected from application to storage by a single team, and application-aware; contain security that is engineered in; include a high quotient of unique capabilities; and provide a single integrated experience. With engineered systems designed to support SAP, Oracle reaches well beyond hyperconverged systems in providing Software in Silicon (SWiS) that is based in part on the Oracle-SAP technology relationship initiated in 1988. This partnership has ensured that Oracle products for SAP are thoroughly tested, certified, optimized, supported, and enhanced in close cooperation/development with SAP. The Oracle/SAP technology partnership has been instrumental in shaping current products, including Oracle’s SuperCluster M7, Oracle Database 12c, Oracle’s Exadata Database Machine, Oracle Exalogic, and Oracle Private Cloud Appliance.

The desire to simplify the sprawl and complexity of IT infrastructure while enabling much higher levels of performance and reliability has been a top priority for enterprises for the last several years. While virtualization, converged systems, and containerization provide ways to improve system granularity and integration, these gains are incremental and work against the tenet of simplicity because the scope of improvements is narrow in comparison to the added layers of software complexity needed to implement these changes. Oracle’s engineered systems have a far more extensive agenda that enables them to not only resolve the most demanding performance and reliability needs but do so with a single integrated experience from evaluation through implementation through operations and support. The tight integration of Oracle’s components drive performance to extraordinary levels. Redundancy across the system maximizes reliability, and this is all accomplished through the delivery of highly integrated hardware/software that significantly reduces complexity.

SAP Service Delivery and Enterprise Operational Requirements

Today’s production workloads are focused around packaged applications. Recent ESG research shows that packaged applications accounted for 57% of the average organization’s total workload in 2016. In terms of the key application management capabilities needed to support these workloads in the eyes of IT decision makers (as opposed to application developers), more than half (55%) consider security to be a critical component of PaaS solutions (see Figure 2).

Figure 2. Applications Management Services Considered to Be Critical to Application Platforms

Security has consistently been a key consideration for technology decisions across multiple ESG research surveys. In an ERP setting, role-based security is paramount to control access to sensitive business data and processes over public networks. Proven reliability and scalability rank second only to security and illustrate the importance of non-stop operations.

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Enterprise worthiness, which is focused on disaster recovery and high availability, is effectively ranked the same as proven reliability/scalability. Application performance optimization completes the list of most important platform capabilities.

We believe that these capabilities, which are the responsibility of the underlying platform that supports applications including SAP, are short-listed requirements that must be supported without compromise. Oracle engineered systems provide the highest level of these capabilities as well as others which we will discuss collectively, all of which factor into why we believe Oracle is the best infrastructural choice for supporting SAP ECC.

The Right Platform Can Make All the Difference

The emphasis that enterprises place on security, reliability, performance, and simplicity is unmistakable. The industry trend toward the adoption of converged, hyperconverged, and engineered systems is a result of the significance that enterprises place on these four criteria and the difficulty in addressing these criteria any other way. Additionally, enterprises are interested in saving time, consolidating systems/workloads, and reducing risk. SAP system performance depends primarily on two key infrastructural components: the database and application servers. The amount and speed of CPU, memory, and network connection bandwidth are the primary drivers of how SAP applications and databases perform. All of these objectives drove Oracle to develop their portfolio of engineered systems.

Oracle’s Engineered System Portfolio for SAP

**Oracle SuperCluster M7** is essentially an all-in-one turnkey integrated system that combines Exadata storage with Exalogic. SAP applications run much faster on an integrated system that combines the database and application tier. SuperCluster M7 is the only architecture for SAP that uniquely provides Oracle’s secure private cloud infrastructure optimized for databases and applications with integrated computer storage and networking. SuperCluster M7 combines what is believed to be the industry’s most advanced security with the highest speed of any engineered system. All of this allows Oracle’s SuperCluster to drive high performance for any workload ranging from traditional ERP, through data warehousing, to ecommerce and real-time analytics. SuperCluster was co-engineered with SAP and includes a number of SAP enhancements in the areas of security, high availability, support, and certifications.

**Oracle Exadata Database Machine** is perhaps the best known of these engineered systems. Exadata combines storage, networking, operating systems, and database into a single system that is managed as a single unified system. Exadata provides an integrated database platform that features extreme bandwidth and massive parallelization to drive extremely high performance with raw data throughput of up to 100 GB/second and 1.5 million IOPS of storage performance. Exadata also brings high levels of reliability and availability as well as support for SAP central services. Additional Oracle features such as Real Application Clusters, IT Service Continuity Management, Oracle Data Guard, and Oracle Recovery Manager ensure that enterprise high availability (HA) and disaster recovery (DR) strategies are easily met or exceeded.

**Oracle Exalogic** is an engineered system for running middleware and packaged applications. The design point for Exalogic is unlimited scale, unmatched performance, and simplicity of management. Exalogic is an ideal environment for hosting SAP ECC and NetWeaver 7.x or higher. Exalogic brings the same level of reliability, availability, and performance as other Oracle engineered systems but has the additional advantage of integrating directly with Exadata through its InfiniBand fabric. This also means that in Exalogic, like Exadata, all servers, networking components, and power distribution units are fully redundant and designed to support a wide variety of HA and DR configurations.

**Oracle Private Cloud Appliance (PCA)** is the “user choice” approach to infrastructure for mixed workloads. While still a well-defined hardware environment, the platform can be used to support any number of specific applications. With virtualization enabling the encapsulation of various operating systems and even different database editions, PCA resources can be allocated to various functions as needed. As such, it offers greater flexibility without any sacrifice of performance or
quality. SAP has been certified with the PCA, and therefore could easily be converged to run alongside other relevant databases and applications in the same general-purpose chassis.

Not least, the **Oracle Database Appliance** is also qualified for use with SAP. Customers who aren’t keen to switch to SAP HANA for any reason can continue to build on a robust and powerful infrastructure with the Oracle Database 12c at the heart of their deployment.

**Key Features of Oracle Engineered Systems**

Oracle engineered systems share a number of important design points. These design points collectively escalate what Oracle describes as an engineered system well beyond the hyperconverged solutions provided by competing vendors.

- **Optimized for critical workloads.** Many workloads, especially those associated with SAP, are mission-critical. Oracle configures its engineered systems to deliver reliability, availability, flexibility, and performance that is usually between one and two orders of magnitude higher than what the customer is currently experiencing.

- **A product – not an assembly project.** While hyperconverged systems offer a degree of integration, virtualization, and management that sets them apart from downstream converged systems, none of these alternatives compare with Oracle’s solutions. Oracle provides a level of hardware integration (storage, compute, and networking) that is extremely performant and then configures this hardware with its operating system and Oracle-specific application platforms to deliver a remarkable solution.

- **Architected from application to storage by a single engineering team.** Oracle is the only vendor to deliver full stack solutions where it owns all of the IP in the stack. This allows Oracle engineers and their partners (such as SAP) to optimize each of the interfaces between components. One example of this is the way that Oracle database and storage engineers worked together to optimize the storage controller firmware interface with the database to deliver extremely high levels of throughput but not at the expense of reliability, availability, and management. Another example of integration with SAP is the way NetWeaver application server nodes are handled through a single fabric for networking and storage, once again improving performance and reliability.

- **Application-aware.** Oracle engineered infrastructure is aware of Oracle software and vice versa. In the case of the Oracle Database, where database tables are compressed, they are also stored in the same format. This yields a 10-50x improvement in storage savings while providing higher performance due to reduced I/O traffic. This level of integration is virtually unheard of outside the engineered systems domain.

- **Security is engineered in.** Because security is consistently the most important concern in the industry, it is not surprising that Oracle devotes considerable effort to ensuring that its engineered systems have some of the most advanced and comprehensive security available. Security is provided at all levels of the stack. Dedicated SuperCluster security features protect memory, data, virtual machines, access, compliance, and audit. For SAP, Oracle’s SuperCluster provides tier isolation using a combination of Oracle’s VM server, Solaris Zones, network partitioning, and role-based administration.

- **Enterprise cloud is designed in.** Oracle engineered systems use the same operational model that drives Oracle’s own cloud. This eliminates the complexity around hybrid operations and provides complete flexibility when it comes to the right consumption model for cloud resources. If your enterprise is interested in a private cloud delivery model due to the tight control you need for mission-critical workloads, security concerns, and data governance/sovereignty issues, then Oracle’s engineered systems are highly effective solutions.
• **Capabilities unique to Oracle.** Oracle invests heavily in R&D and continues to pioneer capabilities designed to help drive higher operational efficiency. Oracle’s compelling capabilities include Smart Scan, Oracle Exabux, VM templates, Hybrid Columnar Compression, Oracle Intelligent Storage Protocol, and Oracle Enterprise Manager.

• **One integrated experience.** Adopting Oracle’s engineered systems means that there is a single point of contact for support of Oracle applications, database, middleware, operating systems, and server & storage hardware. This ensures a streamlined approach to IT decision making, implementation, operations, and support. While there are some aspects of competing converged system approaches that seek to emulate specific Oracle capabilities, Oracle’s ability to provide one integrated experience is unique in the industry.

**Oracle Offers an Optimal Environment for SAP ECC**

The Oracle and SAP development partnership, which dates back to 1988, has been instrumental in improving both Oracle and SAP products, as well as how SAP products run on Oracle. This partnership has been so successful that Oracle Database underpins more than 60% of SAP ECC customer implementations. Oracle Database has been the database of choice for SAP for over 25 years. The Oracle and SAP development partnership also means that Oracle platforms and software are certified for use with SAP at virtually the same time it becomes generally available. This development commitment by Oracle and SAP has helped to make the products of these vendors successful for hundreds of thousands of customers.

The alignment of enterprise needs and Oracle’s enterprise systems capabilities is remarkable. As we saw above, more than 90% of enterprises view security, proven reliability/scalability, enterprise worthiness (high availability and disaster recovery), and performance optimization as either critical or very important capabilities to have in an application platform. For this reason, let’s look at how Oracle’s engineered systems meet these criteria for SAP ECC.

• **Security.** As the most important concern across enterprises, it is not surprising that Oracle claims to have the industry’s most advanced security built into their engineered systems. Security is addressed across every tier of the full stack. Oracle uses Silicon Secured Memory (SSM), for example, in their SuperCluster engineered systems. SSM protects data in memory from unauthorized access as well as detection of buffer overflows. Another feature of SuperCluster processors is cryptographic acceleration, which provides near-zero-overhead of end-to-end data encryption. Oracle Database is also well known for having the most advanced database security, which includes a key vault, database fire wall, audit vault, data encryption, database vault, label security, and data masking. These features are part of Oracle Database regardless of whether it is sold independently or as part of an Exadata engineered system. Added security is also available up the stack in the form of Oracle Identity Management, Cloud Security Services, Enterprise Management, and Oracle Fusion Governance, Risk, and Compliance. We are not aware of any other vendor that provides as comprehensive a portfolio of security solutions across the stack. From the standpoint of business benefits, Oracle’s advanced security provides significantly higher levels of protection from internal usage through external attacks that could render systems inoperable.

• **Reliability and scalability.** Reliability is largely a function of redundancy. All Oracle engineered systems provide hardware redundancy across servers, storage, networking components, and power distribution. Redundancy is addressed in several ways including full redundancy (for database data) and clustering (for parallel operations and failover). Oracle Real Application Clusters (RAC) and Data Guard further protect Oracle Databases against the failure of an entire data center site. Redundancy also contributes to scalability, which can be configured and controlled through a single console (Oracle Enterprise Manager). Oracle is also willing to work with engineered system customers to install quarter- or half-racks in anticipation of expanding workloads at no cost to the customer until they are actually needed. In the case of Oracle Private Cloud Appliance, customers can scale one compute node at a time. Scalability is further managed through the use of operating system features that
optimize VM size to workloads, ensuring the most efficient use of resources. The net is a level of reliability and scalability that is typically well beyond what any enterprise has been accustomed to.

- **Enterprise worthiness (high availability and disaster recovery).** The same approach that Oracle uses to address reliability and scalability also drives support for high availability and disaster recovery. High availability in Oracle’s engineered systems begins with the hardware whose design provides for greater reliability. SAP relies on Central Services to coordinate ECC activities and SAP cannot run without it. This represents a single point of failure that can be remediated by using Oracle Clusterware that runs on Oracle engineered systems. Customers that use Oracle’s engineered systems to address reliability and high availability requirements are well positioned to extend this approach to their disaster recovery planning. A combination of fully redundant SAP instances that are geographically distinct combined with Oracle Data Guard and Oracle Geographic Edition clustering provides load balancing, automatic fault detection, and failover to keep mission-critical SAP applications highly available.

- **Performance.** Oracle customers are often surprised at the performance improvements that are delivered by Oracle’s engineered systems. Most case studies show improvements in the range of one to two orders of magnitude. That’s between 10 and 100 times faster than what they were experiencing before. This is due to the collective contributions of Oracle servers, networking, and software innovation. One look at the list of SPARC benchmarks will show many world records over the last 5 years. This extreme performance is due to a combination of the following: faster processing, higher throughput, faster data loading, faster queries, better data compression, faster deployments, faster transaction processing, and more storage capacity. All of these capabilities carry over to SAP ECC applications and data.

These descriptions indicate that Oracle is not only well aligned with the capabilities that enterprises value most in an application platform, but also attuned to the operational characteristics and needs of SAP ECC. However, there are two other areas where Oracle engineered systems deliver that are important distinguishing characteristics.

- **Simplicity.** The impact that simplicity has on IT procurement and operations cannot be underestimated. Oracle delivers simplicity in two primary ways. The first is a full stack that is highly integrated from the purpose-built infrastructure up through the operating systems to the database and applications. The second is the efficiency that comes from simplicity in procurement, implementation, operations, and support. While the purchase price of Oracle engineered systems is not inexpensive, when one factors in the efficiencies that accrue as a consequence of how Oracle simplifies an IT environment, combined with the advanced security, reliability, scalability, enterprise worthiness, and performance that are delivered, it is easy to see how Oracle drives a TCO that is far more beneficial than competing alternatives.

- **TCO.** While we have said that Oracle engineered systems are not inexpensive when you look at the price sheet, system cost is just one component of the overall TCO, just like it is for other converged systems. The vertical integration of Oracle’s engineered systems adds value at each tier. This is primarily because each tier is pre-integrated with the other tiers of the stack out of the box. This eliminates virtually all of the time and resources that must be procured and spent on integration in competing alternatives. This means that Oracle’s message of “engineered to work together” extends way beyond security, reliability, enterprise worthiness, and scalability—and saves enormous time and resources associated with procurement, implementation, operations, and support. Support is also a crucial area and here the singular focus on Oracle speeds time-to-resolution because every component of the stack is pre-integrated, with the exception of third-party applications running on top. This single point of accountability generates significant savings across the entire application lifecycle because it simplifies every developmental and operational activity. This is why, from an ROI and TCO standpoint, Oracle’s engineered solutions deliver significant financial savings and benefits.
The Bigger Truth

Oracle stands alone in the engineered systems market segment. The reasons for this are simple—no other vendor has products that span the stack from hardware up through database, middleware, and ultimately applications. This provides Oracle with a unique opportunity, and one that they are currently exploiting. While software is still the primary engine of growth for Oracle, engineered systems account for close to 50% of Oracle’s hardware revenue and are growing well compared to the declines seen elsewhere in hardware revenues across the IT industry. Oracle spends about 13% of revenue on research and development. While this is considered quite high for an IT vendor, it shows Oracle’s commitment to innovation and intent to deliver strongly differentiated products and services. Accordingly, Oracle engineered systems offer a range of options for SAP environments, perfectly designed to fit each customer’s specific needs and desired approach.

While the cloud continues to garner quite a bit of attention, ESG surveys show that when it comes to mission-critical activities, private cloud is still the preferred deployment model. The reasons for this originate from the concerns about security, reliability, and performance that were cited above. Add to this data governance and sovereignty requirements, and it is obvious why enterprises are very interested in evaluating hyperconverged and, by association, engineered systems.

For the last 5 years or so, Larry Ellison has been hammering the point at every Oracle OpenWorld that if you want higher performance, you have to be willing to spend less. While this statement has been focused around clustering as of late, it also applies equally well to Oracle’s portfolio of engineered systems. If you look carefully at the various case studies and quotes from SAP on Oracle engineered system customers, you’ll see impressive cost savings combined with remarkable performance gains. Most of the savings are driven by a combination of lower software maintenance costs, hardware maintenance costs, and storage costs. Performance improvements were likewise 10-20 times faster for workloads that included batch processing, accounting queries, and logistics management.

At this point, you might ask yourself if your perspectives on the most important features for an application platform are shared with the 90% of ESG research respondents shown in Figure 2—meaning security, reliability, scalability, enterprise worthiness (high availability and disaster recovery), and performance. If that’s the case and you are also engaged in a process to better understand the utility of converged systems for improving the performance and cutting the cost of your SAP ECC environment, then Oracle’s portfolio of engineered systems should be a great choice.

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