ESG WHITE PAPER

Beyond the Limitations of HCI: Oracle Private Cloud Appliance X8

Addresses the Unsustainable Cost of DIY IT & Supports the Role of Engineered Private Clouds in Digital Transformation

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Introduction & Solution Overview

IT Can Be a Hard Business

Despite—or perhaps because of—the myriad technological advances in recent decades, "doing IT" today remains very hard. Everyone knows that data is the [pick your favorite analogy: oil, DNA, crown jewels, or whatever] of contemporary business. But being able to do something valuable with that data is a very different thing. In a world where *data services translate to business revenue,* IT is being forced to move from "would like to do" to "must do *now.*" This is a key driver of [pick your favorite term: IT modernization, digital transformation, or whatever]. While popular approaches such as converged infrastructure (CI), hyperconverged infrastructure (HCI), and the public cloud each offer certain advantages, they also come with limitations. CI/HCI is not as thoroughly integrated outside the box—with databases and applications—as many users would like, while other users may not have the "business permission" to use the public cloud, however much they like its flexibility and pricing model. What's needed is a solution that offers faster *and* simpler ways to do both better *and* more economical IT…and to do so *without* compromising other modern IT prerequisites such as reliability, security, automation, and ease-of-use.

The Oracle Private Cloud Appliance Makes IT's "Must Do Now" Possible

Enter the Oracle Private Cloud Appliance, to address this pressing business need. The Oracle Private Cloud Appliance (PCA) is an intelligent Oracle Engineered System that integrates compute, networking, and storage into a single, consolidated on-premises solution that addresses *every one* of those important modernization requirements mentioned earlier. The latest generation Private Cloud Appliance, the X8-2, has significant upgrades and capabilities. It offers financial advantages; being x86-based makes it broadly applicable, and it is also available via the Oracle Private Cloud at Customer subscription model.

PCA is a more thoroughly engineered "whole-stack-integration" when compared to the CI/HCI offerings from VMware, Dell EMC, HPE, Nutanix, NetApp, Cisco, and so on. Conventional CI/HCI stops at the VM layer. Integration up the stack is then up to the IT department and the (likely) cadre of (almost certainly) expensive consultants needed to complete the work. In contrast, PCA expands to the application and database layers, making for a much more comprehensive—and simplified-- user experience. Complexity in managing conventional CI/HCI systems inevitably increases as more use cases are added; more patches will be required and the lack of integration and automation between the application and database layers invariably serves only to cause more headaches and demand more manual intervention. On top of that, conventional CI/HCI systems typically cannot scale storage, compute, and memory separately—all must be expanded concurrently— which drives up costs and creates more hardware sprawl as well as increasing the likelihood of delays in delivering strategic applications that underpin digital transformation.

In contrast, PCA X8-2 can scale independently in any dimension that its users require:

- To scale storage, users can add more disk trays to scale the Oracle ZFS Storage Appliance ZS7 engineered into the PCA. A combination of up to 15 additional high capacity trays and high performance trays can be added to the PCA rack to scale storage all the way from 100TB up to 4.5PB.

- To scale compute, users can purchase more compute server nodes and simply slide them into their PCA rack. These new servers get provisioned and added to capacity automatically by the PCA controller software with no downtime. A single PCA rack can scale from 2 to 25 compute nodes.

- PCA networking is pre-configured with a high speed 100Gb Ethernet backplane. Customers can create up to 8 completely isolated physical networks and then have VLANs on top of these for further workload isolation.

- For PCA X8-2 Compute Node memory, customers can choose between 384GB, 768GB and 1.5TB memory configurations at the time of purchase; Oracle then provides the flexibility to upgrade memory in increments of 64GB DIMMs.

As a fully integrated system, the Oracle Private Cloud Appliance is perfect for organizations that simply lack the patience—as well as perhaps the resources, aptitude, and/or desire and motivation—to struggle with costly, complex, do-it-yourself IT projects….and/or that don't or can't use the public cloud. *For these potential users, Oracle Private Cloud Appliance provides IT simplicity, security, and certainty—not to mention reduced costs—across a wide range of applications and approaches (including such things as Kubernetes, containers, and links to a cloud ecosystem if required) as well as offering unique, valuable, and strongly differentiated capabilities when running Oracle Applications and Oracle Database*

The Oracle Private Cloud Appliance can help IT organizations overcome the complexities of operationalizing their private cloud IT:

- <u>By</u> minimizing or eliminating "do-it-yourself" IT, adding simplicity and using automation wherever possible.

    o   Why? The most-cited response by organizations listing their most important objectives for their digital transformation initiatives is "to become more operationally efficient" (cited by 55% of respondents).[1]

- <u>So that</u> IT can more fully focus on its main job of better enabling the overall organization.

    o   Why? Beyond the increased operational efficiency research data mentioned above, organizations are also seeking a better and more differentiated customer experience (49%), data-centric products that will appeal to consumers (41%), and new products (38%) and business models (28%).

Complexity versus Modernization

Often, complexity holds IT back: 64% of surveyed IT organizations believe IT is more complex than it was just two years ago. But why have IT environments become this complex? Some of the major factors behind increased complexity are an ever-increasing number of things to manage, plus many new technologies and applications to learn, understand, and integrate into the IT environment. Exacerbating all this, there are not enough talented experts to go around: IT architecture and planning specialists are in short supply. In ESG's research it was cited by 32% of respondents. .
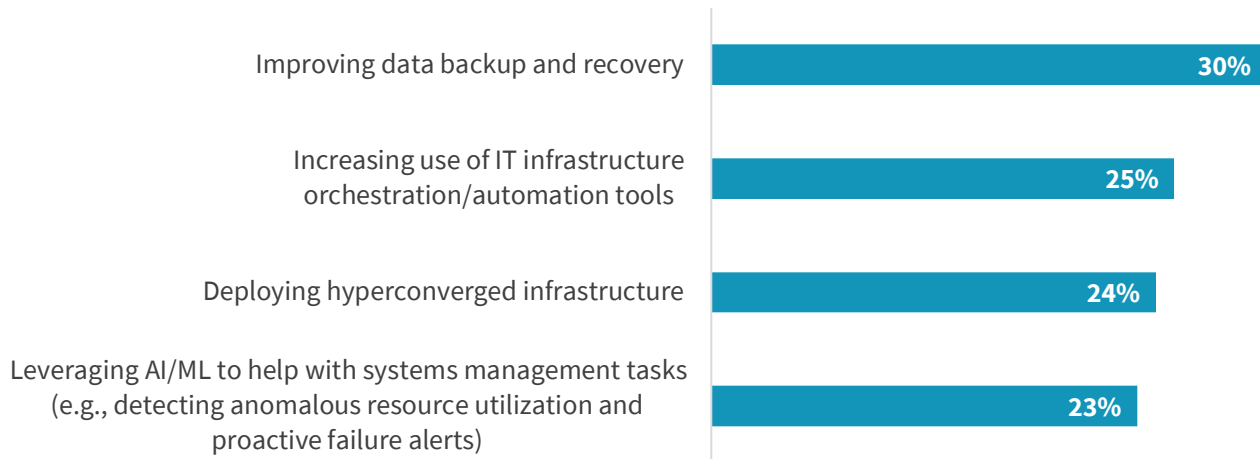
Many organizations can feel that it's futile to even attempt to cobble together a robust, agile, and cost-effective architecture based on inherited, multiple, and disparate pieces. And since many IT teams do not have the time or personnel for a DIY approach, this is where the quest for "data center modernization" often begins.

As the ESG research in Figure 1 shows, IT professionals are looking towards a range of data center modernization "treatments" for their IT complexity "illness."

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[1] Source: ESG Master Survey Results, *2020 Technology Spending Intentions Survey*, January 2020. All ESG research references and charts in this white paper have been taken from this master survey results set, unless otherwise specified

Figure 1. Top Four Areas of Data Center Modernization

In which of the following areas of data center modernization will your organization make the most significant investments over the next 12-18 months? (Percent of respondents, N=658, five responses accepted)

Improving data backup and recovery	**30%**
Increasing use of IT infrastructure orchestration/automation tools	**25%**
Deploying hyperconverged infrastructure	**24%**
Leveraging AI/ML to help with systems management tasks (e.g., detecting anomalous resource utilization and proactive failure alerts)	**23%**

Source: Enterprise Strategy Group

The irony is that introducing multiple new solutions that each promise "simplicity" to address one of these needs will invariably not do as much as expected to reduce overall complexity. For instance, even sophisticated CI/HCI implementations are just that: infrastructures without a full IT stack integration from the OS to containers, to database, and to applications and virtualization. What is needed is a way to address all data center modernization requirements in a fully IT-and-application-stack-integrated fashion. Such an approach would be genuinely simple to deploy and manage and valuable, providing a compelling return on investment. Oracle Private Cloud Appliance is exactly that.

The Oracle Private Cloud Appliance

The Oracle Private Cloud Appliance addresses the complete on-premises need for private cloud deployments with rapid application provisioning. The appliance's latest generation is the X8-2, with significant upgrades over the previous X7 version thanks to its new 100 GbE backbone[2] and Intel Cascade Lake processor. Oracle testing shows the X8-2 now offers 45% more performance and 17x more storage capacity. The X8-2 also features zero-downtime upgrading and can help its users mitigate security risks by patching the entire stack concurrently. The Oracle Private Cloud Appliance is built upon the Oracle VM Server, meaning that IT staff can create VMs manually or automatically (leveraging Ansible and Oracle VM Templates) using a single console to manage the whole underlying infrastructure. And the foundation for all this is Oracle's x86 server technology; proven across Oracle's Engineered Systems (such as Exadata) and the Oracle Cloud, it offers advantages not found in its commodity counterparts, delivering the right innovations for the right workloads and exemplifying the role of compute in the modern digital age: designed for analytics, for resiliency, for performance, and for security.[3]

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[2] Moving from the prior Xsigo networking to 100Gb Ethernet means faster deployment and better outcomes, however they are measured. Examples might be improved time to insight, time to profit, etc.

[3] Paragraph is adapted from another ESG White Paper (*Maximizing the Potential of Modern IT with Oracle x86 Servers*, Feb 2019) where more detail on the advantages of Oracle's x86 approach can be found.

An Appliance that Delivers All the IT Essentials: Security, Resilience, Automation, and Ease-of-use

The underlying hardware and software technology in Oracle Private Cloud Appliance is impressively cutting-edge, and expectedly ultra-high-performing and solid; but it is the broader, and integrated, IT and business capabilities of the Oracle Private Cloud Appliance that deliver differentiated value just as much as winning the specification war. They can be collected into two fundamental themes:

Delivering Advanced Security and Resiliency: The Oracle Private Cloud Appliance includes the infrastructure necessary to achieve these benefits. Here are several of the appliance's key differentiators associated with security and resiliency:

- The Oracle Private Cloud Appliance design has no single point of failure, and leverages Oracle's proven Maximum Availability Architecture (MAA) for five-nines availability.

- Oracle provides end-to-end, single-vendor support and accountability across the entire solution.

- The appliance offers secure multi-tenancy, enabling its users to create isolated tenant groups that separate workloads and resources from each other.

Expediting IT Operations with Optimization and Automation: The PCA's key differentiators related to optimization and automation are also impressive:

- A "wire-once" extreme, next-gen converged infrastructure design that utilizes a software-defined network fabric. This design eliminates the need for IT to physically re-cable when provisioning storage or compute.

- The appliance can scale compute, storage, and memory independently, enabling linear expansion over time to meet users' performance demands and support their business growth.

- The appliance includes "Trusted Partitioning," which supports more efficient database software licensing that can reduce license costs. Organizations pay only for cores they use, not for the full system's capacity.

- Zero-downtime upgrading is combined with Oracle's unified patch bundle for the entire stack, which compares favorably to the piecemeal and labor-intensive hardware and software patches that are endemic when using multiple vendors in DIY environments.

New: The Oracle Private Cloud Appliance as a Subscription Service

Oracle Private Cloud at Customer provides the Oracle Private Cloud Appliance as an on-premises subscription service.[4] In this form, it delivers cloud-like agility *and* subscription pricing as it runs in an organization's data center(s). This approach is perfect for organizations that want to improve their agility in deploying IT resources yet to do so while keeping data on-premises. The general attraction of this type of approach is shown by ESG research; albeit specific to data storage. Nonetheless 58% of storage decision makers state that they would prefer to procure on-premises storage infrastructure via a pay-per-use model.[5]

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[4] The Oracle Private Cloud at Customer offering requires a minimum four-year term. Pricing for all services is subscription-based and is fully managed by Oracle, with single vendor support. One fee covers hardware, software, and all management/support.

[5] Source: ESG Master Survey Results, *2019 Data Storage Trends*, November 2019.

Oracle Private Cloud at Customer enables Oracle *and* non-Oracle applications to run in organizations' data centers. While the infrastructure is managed and optimized by Oracle's cloud experts, each Oracle Private Cloud at Customer installation comes preconfigured according to best practices that have been proven at Oracle Private Cloud Appliance deployments in critical production environments around the world.

Competitive Analysis: Competence versus Components

One of the ironies of the IT business is this: despite being intrinsically sophisticated in a systems sense, we all-too-often want to oversimplify it semantically. We look for easy categorization, and to put what potentially look *enough* like competitive vendors' products (whether hardware, software, or both) into an existing descriptive "box." Thus, the Oracle Private Cloud Appliance can erroneously get lumped in with conventional CI/HCI offerings. To be sure, there's no shortage of competition in this area, with significant offerings from VMware, Nutanix, Dell EMC, NetApp, HPE, Cisco, and others.

So why might a prospective customer cut a check—whether to buy or subscribe—for Oracle Private Cloud Appliance rather than one of the other (H)CI offerings? The answer is surprisingly simple: it's because it's not an apples-to-apples comparison; the Oracle offering is highly differentiated from the pack. As such it should be *contrasted* to the standard converged varieties rather than directly *compared* with them.

And this is not just about Oracle's inevitable, and compelling, co-engineering with either its expansive application stack, including Oracle JD Edwards, Oracle PeopleSoft, Oracle Hyperion, and Oracle E-Business Suite, or its eponymous Database…although certainly that integration allows Oracle to deliver values that simply cannot be achieved using any other platform. Instead, it is also about Oracle's advantages that elevate PCA beyond being just a generic CI/HCI choice. Compared to the vendors in that arena, the Oracle Private Cloud Appliance has differentiated advantage derived from its full IT stack integration, all the way from the VM to the operating system to the application and database, wrapping in end-to-end security and data protection, and serving the users' choice of Windows or Linux, virtualization, Kubernetes, containers, and applications. Add to these already impressive advantages such things as zero-downtime upgrades, rapid and automated deployment and provisioning, simplified management, a unified patch bundle, and single vendor support for the full hardware and software stack, and you have an offering that shows how a complete HCI solution could and should be done.

Quantifying Real-world Benefits

Oracle recently shared details with ESG about its customers' experiences with the Oracle Private Cloud Appliance. The vendor has amassed an impressive selection of public reference customers for this product, and among them, a pattern is evident: Oracle Private Cloud Appliance users are realizing significant cost and operational benefits.

Oracle Private Cloud Appliance Example—Modernization and Simplification

A retail-sector user was encountering serious challenges while running a complex, DIY environment with 350 databases on 70 multi-vendor legacy servers; it was dealing with a lack of standardization and automation, highly manual processes, high maintenance costs, and a complex licensing model.

- Beyond the dramatic TCO reduction, Oracle Private Cloud Appliance also enabled it to cut its acquisition, license, support, and maintenance costs by US $15M, and its operational expenses by US $2.5M, over 3 years.

> **"We slashed our operating expenses by up to US $2.5 million over three years and achieved an 85% lower total cost of ownership."**
>
> — Service Manager Johan Almroth, ICA AB

Oracle Private Cloud Appliance Example—Business Transformation

Another Oracle customer, a cloud services provider, had several goals when deploying the Oracle Public Cloud Appliance, including:

- A desire to implement a private cloud solution capable of differentiating it from other IT cloud suppliers in its country of operation and abroad.

- A need to achieve a greater level of efficiency with its private cloud solution—a step that would allow it to expand its book of clients by offering the cloud-capacity levels that are required by large organizations.

Oracle Private Cloud Appliance Example—Workload Consolidation

Yet another Oracle Public Cloud Appliance customer wanted to consolidate its new Oracle applications with its existing Windows environment.

After deploying the appliance, the organization was able to consolidate all its Oracle Databases, middleware, and workloads on one platform.

- By leveraging Trusted Partitioning, the organization reduced its Oracle licensing costs by about 20%, while actually improving the performance of its overall IT environment by running Oracle applications and Oracle Database on PCA.

"Oracle Private Cloud Appliance has enabled us to double our book of clients … fast tracking our strategy to success by generating return on investment 30% faster than we had planned."

— CEO Gustau Serra Salido, Mediacloud

"We could consolidate all Oracle Databases, Oracle WebLogic, Oracle BI, and other Oracle software into one platform for Windows and Linux…"

— Data Center Infrastructure Manager Armindo Rodrigues, CaixaBI

The Bigger Truth

The Oracle Private Cloud Appliance X8-2 is a highly advanced Oracle Engineered System that is perfect for organizations that simply lack the patience, resources, aptitude and/or desire and motivation, for costly, complex, do-it-yourself multi-vendor hardware/software infrastructures. As its name clearly implies, it is a private cloud appliance rather than just another generic CI/HCI alternative. It combines advanced hardware with optimized software and operational competencies to deliver full IT stack integration, with levels of economy, ease-of-use, and sophistication that are not available elsewhere.

Conventional CI/HCI offerings can be viewed as kit cars requiring assembly while the PCA is more representative of a sports car that is purchased pre-assembled, thoroughly engineered, and track-tested. PCA has been designed with an intense focus on *everything* working together, from the application to the storage, while "regular" CI/HCI offerings can be seen more as an IKEA project, where chunks of the foundational work are already done (drawer runners are pre-assembled, holes are drilled, etc.) but you don't end up with a functional piece of furniture until you have done some considerable manual labor, plus, inevitably, tuning and tweaking to overcome unforeseen obstacles. Users need to ask themselves whether they want to be in the assembly business or not? If you are looking to bathe in the "IKEA Effect,"[6] then the PCA might not be for you! But if you are looking to deploy a highly tuned system that can accelerate your applications and enable you to focus on supporting your organization's core competencies (be they in finance, retail, healthcare, or whatever) and optimizing your business outcomes, then PCA could be an ideal fit for you. You can focus on the business

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[6] The "IKEA Effect" is a cognitive bias in which consumers place a disproportionately high value on products they partially created. It was identified and named by faculty from Harvard Business School, Yale, and Duke in studies published in 2011 (Source: Wikipedia).

and leave the IT systems engineering to Oracle. In this vein, many customers will sleep better knowing that the PCA X8 to which they are entrusting their IT infrastructure stack is powered by the same Oracle X8 design x86 servers that are the data and compute backbone of the Oracle Cloud, an $8B global business that spans IaaS, PaaS, and SaaS. The same cannot be said of Oracle's competitors in this space (HPE, Cisco, Nutanix, NetApp, VMware, and Dell) all of whom have either tried and shuttered their public clouds, or don't have their own (at least not at scale) in which to stress-test their offerings. Having a cloud-proven server architecture is increasingly important to many users in this age of microservices, containerization, and Kubernetes, especially when they add their dynamic desire to run cloud-native workloads on-premises as and when required. For users seeking to go beyond the limitations of traditional CI/HCI product offerings, Oracle PCA offers a distinctly different, thoroughly integrated, and added-value alternative.

Enterprise Strategy Group is an IT analyst, research, validation, and strategy firm that provides market intelligence and actionable insight to the global IT community.

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