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APPLIANCE

How Oracle Private Cloud Appliance Helps Secure-24 Power Its Enterprise Cloud Growth

Case Study: Leading Service Provider in North America Cut
Acquisition Costs by 50% and Deployment Costs by 90%

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INDUSTRY: ENTERPRISE DATACENTER HOSTING AND CLOUD SERVICES

Deploying the Oracle Private Cloud Appliance (formerly named the Virtual Compute Appliance) has greatly improved Secure-24's bottom line and enhanced the company's competitiveness in both new and existing markets.

Based in Southfield, Michigan, Secure-24 (<http://www.secure-24.com>) delivers managed cloud services, managed IT operations, and hosted applications to business enterprises worldwide. Over the past 15 years, Secure-24 has gained high ratings for its superior service and customer support resulting from comprehensive service level agreements and a focus on providing a superior customer service experience. An Oracle Platinum Partner, Secure-24 is a Hosting and Cloud partner and delivers infrastructure to support a range of cloud-based applications, including Oracle E-Business Suite, PeopleSoft, JD Edwards, SAP, and Hyperion for businesses of all sizes across various industries.

Secure-24 provides customers with individual private cloud infrastructures to run business-critical applications. Replacing its legacy VCE Vblock-equivalent environment (Cisco UCS servers, EMC VMAX with Cisco switching, VMware virtualization, and Red Hat Enterprise Linux) with the Oracle Private Cloud Appliance greatly increased agility and responsiveness, allowing the company to rapidly address customer needs while reducing system and management complexity.

Along with a zero tolerance for downtime, the company's core focus is maximum data security. Secure-24 employs two interconnected data centers in Michigan and Nevada that work interchangeably, with one data center acting as a backup recovery/failover for the other to create a secure and reliable disaster recovery solution.

Secure-24 faces many of the same challenges that corporate IT organizations experience today: reliability, availability, security, agility, and tight budgets—concerns not limited to just cloud and hosting providers alone. As a Managed Service Provider, Secure-24 must meet incredibly higher SLAs than most organizations deliver to their internal customers. Secure-24 uses the Private Cloud Appliance to meet those challenges, which improved their bottom line and customer satisfaction.

The Challenges

As the needs of its customers changed and expanded over time, Secure-24 needed to meet its own growth challenges with respect to its legacy VCE Vblock environment, which was based on Cisco UCS systems, EMC VMAX with Cisco switching, VMware virtual servers, Red Hat Linux, and a proprietary customized workflow automation layer built on VMware orchestrator. Here are some of the business challenges that Secure-24 faced in delivering private cloud services to its customers:

» **Increasing Operational Efficiency**

Secure-24 needed to ensure seamless deployment of customer applications and ongoing operations in spite of increasing resource demands from new and existing customers. The company's infrastructure needed to grow without any degradation in services. Deploying private clouds for customer applications had to be fast and efficient, taking hours and not days to get new customers and user groups up and running.

» **Reducing Operational Costs**

To remain competitive, the company had to reduce costs. Non-revenue-generating operating and maintenance expenses were constraining resources, making it difficult to meet variable and somewhat unpredictable demands without increasing cost to customers.

» **Flexible Application Licensing**

Like most cloud service providers, Secure-24 allows customers to bring their own software licenses. The company's customers wanted greater flexibility in licensing models beyond traditional licensing policies.

» **Ensuring High Availability**

High availability, reliable disaster recovery, and full data security are why customers choose an experienced Infrastructure as a Service (IaaS) provider such as Secure-24. Secure-24 maintains two datacenters, one in Michigan and one in Nevada. Immediate and flawless failover and data migration strategies keep business-critical applications running. Offering cost-effective availability options could help deliver needed reliability for smaller customers within budget constraints.

» **Reducing Complexity and Improving Agility**

Over time, Secure-24's datacenters grew to house hundreds of servers, networks, and storage components from various vendors, creating a complex maze of physical connections between hardware assets. No integration or maintenance task seemed simple anymore. Attempts to contact different vendors to identify and resolve problems led to unnecessary and expensive delays. As infrastructure complexity grew, upgrading and reconfiguring system components became a time-consuming engineering challenge that affected the company's ability to quickly and efficiently respond to customer needs. Reducing overall complexity could make the company more agile and responsive.

The Solution

With these challenges in mind, Secure-24 chose to deploy a fully loaded [Private Cloud Appliance from Oracle](#) (Figure 1) with an additional [Oracle ZFS Storage rack](#) at each of its Michigan and Nevada data centers. The solution immediately allowed Secure-24 to deliver private cloud services using Oracle Enterprise Manager 12c with full control over provisioning and management.

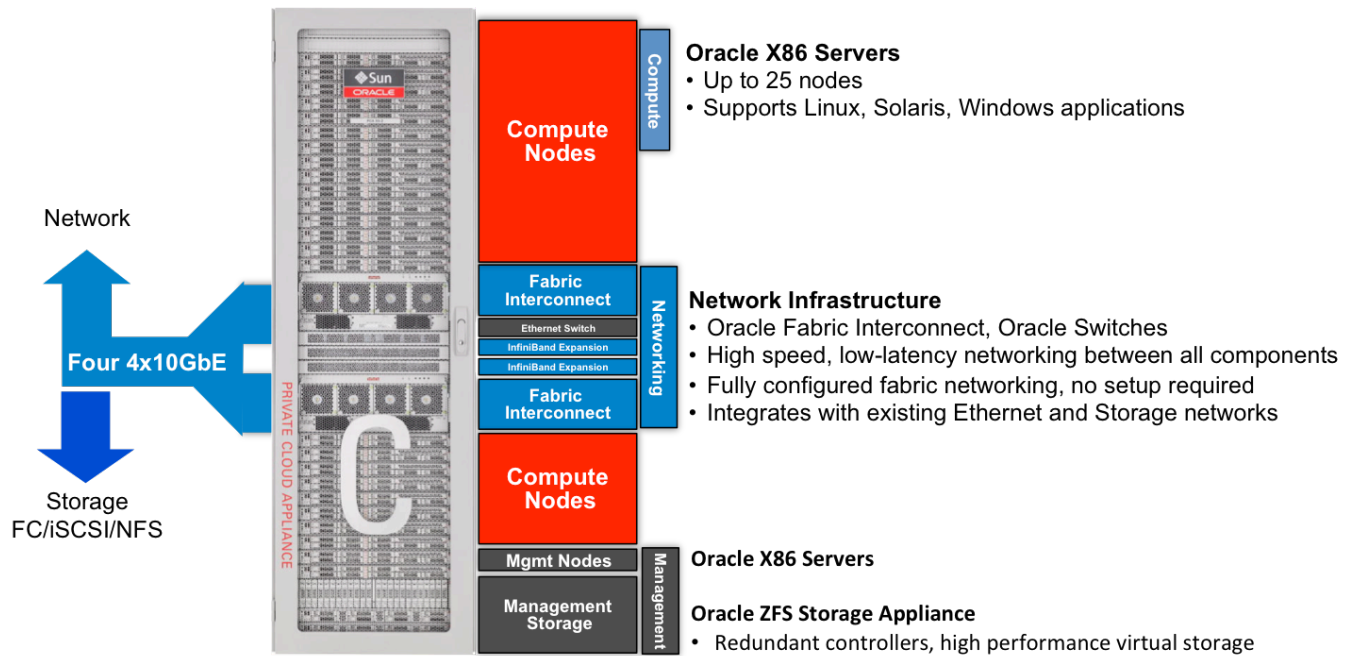


Figure 1. Oracle Private Cloud Appliance delivers a converged infrastructure for fast application deployment.


Oracle Private Cloud Appliance

The Private Cloud Appliance is engineered for rapid application and cloud deployment, combining the flexibility of a general-purpose machine with the elasticity of cloud computing in one integrated system. The appliance provides a large pool of resources that scales linearly from two to twenty-five compute nodes. Compute nodes contain Intel™ Xeon™ CPUs, high-speed dual inline memory modules (DIMM), redundant 40 Gb/sec InfiniBand host channel adapters (HCAs), and redundant disk storage. Compute nodes can be added or removed from the Private Cloud Appliance and reconfigured automatically without any downtime. The embedded Private Cloud Appliance controller software manages the system hardware and virtual resources (virtual servers, virtual networks, and storage), and monitors the utilization of all system resources in real time.

To allocate system resources, administrators need only define basic configuration parameters and then create virtual machines (VMs) with the appropriate system resources. By using pre-configured and packaged Oracle VM Templates, applications, middleware, and databases can be deployed as ready-to-run and fully provisioned virtual machines on the Private Cloud Appliance. Provisioning can be fully automated to give administrators a way to get applications up and running quickly and reliably.

Software defined networking (SDN) allows I/O paths to be dynamically configured without touching physical cables. This greatly reduces the operational complexity and simplifies cloud management. The Private Cloud Appliance controller automates the installation, configuration, and management of all infrastructure components, making it possible to perform many administrative tasks with minimal operator interaction.

For internal storage, the Private Cloud Appliance includes a built-in Oracle ZFS Storage Appliance, while any Oracle or third party Fibre Channel, NFS, or iSCSI storage system can also be connected to the appliance as external storage. Secure-24 chose to implement an additional external [Oracle ZFS Storage rack](#) for a complete, end-to-end Oracle solution.



The ultimate benefit of the Private Cloud Appliance solution is that Oracle serves as a single point of contact supporting the entire hardware and software stack. This means that support issues get identified and resolved quickly and comprehensively, which is often a major challenge for IT departments that must otherwise deal with multiple vendors.

Cloud Management with Oracle Enterprise Manager 12c

A major part of the solution for Secure-24 is in Oracle Enterprise Manager 12c, which enables administrators to quickly set up, manage, and support enterprise clouds and traditional Oracle IT datacenter environments. Oracle Enterprise Manager 12c provides complete control of the cloud lifecycle—from planning, building, and deployment, to management, monitoring, and optimization.

Now, running Oracle Enterprise Manager 12c on the Private Cloud Appliance, Secure-24's teams can quickly build and easily manage all cloud resources from one console. Oracle Enterprise Manager 12c gives administrators a single integrated view of the entire cloud infrastructure that they can use to provision and manage all appliance hardware and software components, without needing to switch back and forth between different monitoring and management tools.

To achieve the full benefits of cloud computing, Oracle Enterprise Manager 12c offers a framework that makes it possible for IT organizations and cloud providers to deliver cloud service models such as Infrastructure-as-a-Service (IaaS) or Database-as-a-Service (DBaaS). For example, with Oracle Enterprise Manager 12c, administrators can build a self-service interface that gives users the flexibility to provision their own instances of pre-configured IT services. The framework enables fine-grained metering of database and application usage as well as charge-back and show-back reporting and billing, making it easier to assess charges to end users. And, the software gives administrators the ability to create pre-defined categories of VMs as well as managing VM deployment in the cloud infrastructure.

Oracle VM Virtualization

Oracle has engineered Oracle VM explicitly for enterprise application deployments. Oracle VM server virtualization technology supports most [guest operating systems](#), including Oracle Linux (and other Linux distributions), Oracle Solaris, and Microsoft Windows.

Oracle has extensively tested Oracle VM for scalability and performance. The proven scalability of Oracle VM gives customers a peace of mind since they know that enterprise applications can scale with the headroom that might be needed to meet future requirements.

Oracle VM virtualization makes provisioning a new VM or group of VMs fast and easy. Administrators can configure VMs using either the Oracle VM Manager graphical interface or using Oracle Enterprise Manager. Oracle VM Templates offer pre-configured packages for applications, middleware, and databases on ready-to-run VMs that can be dynamically configured as they are deployed. Oracle's pre-tested Oracle VM Templates reduce risk by supplying configurations that comply with best practices and security guidelines.

Oracle has shown that deployment times using these templates can be as much as 83 percent faster¹ than traditional installation procedures. And, Oracle VM enables Oracle Trusted Partitions, which allow Oracle licensing fees to be based on the number of virtual CPUs allocated to a VM rather than on the maximum number of vCPUs in a system.

¹ See <http://www.oracle.com/us/technologies/virtualization/wp-converged-infrastructure-2405387.pdf>

Oracle Virtual Networking

The physical cabling and switch topology in traditional data center networks poses rigid constraints on server, storage, and network connectivity, adding to system complexity. Oracle Virtual Networking simplifies the infrastructure and simplifies reconfiguring and tuning. Software-defined networking in the Private Cloud Appliance produces a factory-configured cloud infrastructure that is cost-effective to manage and easy to provision for dynamic workload requirements.

With Oracle Virtual Networking, all traffic types, including Ethernet and Fibre Channel, traverse a converged infrastructure, resulting in a simpler, more efficient, flexible, wire-once environment. The physical cabling between servers, storage, and management nodes as well as to the external Ethernet is factory-installed by Oracle. Administrators can use Oracle VM virtualization to provision I/O and networking for guest domains using vNICs and vHBAs, which are recognized as physical resources.

Compared with conventional Ethernet connections, Oracle Virtual Networking provides an 8-times faster² link between application servers. Virtual machine migration is a highly I/O-intensive process. The high bandwidth of Oracle Virtual Networking allows fast VM migrations. Database queries get done faster thanks to the low-latency and high throughput of the Oracle Fabric Interconnect.

Oracle ZFS Storage

In the appliance, an integrated Oracle ZFS Storage ZS3-ES subsystem provides centralized data storage for VMs as well as for the management environment. Built using Oracle's enterprise-class storage products and technology, it is designed to be fully redundant for maximum fault tolerance and in-production serviceability. The Oracle ZFS storage subsystem is loaded with high-performance DIMM and flash memory for optimal read/write performance under the most demanding file storage workloads.

The Results


After migrating to the Private Cloud Appliance, Secure-24 achieved a number of strategic gains, making the company more competitive in existing markets and opening new markets. Today, the company reports that it has ample room for growth, and that the Private Cloud Appliance exceeds expectations as it deploys new customers. As individual production schedules allow, Secure-24 is migrating existing customer workloads to the appliance to take advantage of its performance, reliability, and simplified management. After implementing the Oracle Private Cloud Appliance, Secure-24 and its customers report significant benefits.

Single Point of Contact

"What we found from hosting multiple applications is that there are challenges when you have a particular storage vendor, server vendor, and an application vendor in situations where they are simply pointing fingers at each other. With Oracle Private Cloud Appliance we bring together storage, network, virtualization, operating systems, and applications on a fully supported fully certified stack with, as Oracle likes to say, 'one hand to shake'." – Sean Donaldson, Chief Technology Officer, Secure-24

The Private Cloud Appliance provided the company a turnkey converged solution with automated hardware and software deployment and simplified cloud management. The company was able to reduce the number of specialized

² See <http://www.oracle.com/us/technologies/virtualization/wp-converged-infrastructure-2405387.pdf>



engineering and support teams down to a single, smaller, unified team to manage and cohesively troubleshoot the entire environment. The single stack, single vendor solution has broadened the expertise of the company's engineering team and made them more responsive to overall customer needs.

According to Sean Donaldson, Secure-24's CTO, Oracle proved to be a great partner by providing training in both formal and informal settings, and making their senior staff resources available to answer deeper technical questions. For Secure-24, this was one of the biggest differentiators during the evaluation process.

Big Savings with Licensing Flexibility

Oracle Trusted Partitions, a licensing policy available to Oracle Private Cloud Appliance customers, reduces customer software licensing costs by allowing customers to license based on what they use, not on the system's total capacity. Flexible licensing makes it easier for Secure-24's customers to use its platform for additional cloud services. Sean Donaldson, Secure-24 CTO, noted that one customer experienced a \$150K annual savings in licensing alone. Oracle Trusted Partitions also opened new business opportunities where excessive licensing fees had previously limited Secure-24's ability to be competitive.

With Oracle Trusted Partitions on Oracle Private Cloud Appliance, customers now can create VMs in their private cloud with a smaller number of virtual CPUs (a number sufficient to run the application efficiently), which can greatly reduce licensing fees. This potential for cost savings has opened up 50% of the Hyperion market to Secure-24, creating new revenue opportunities.

Cost-Effective Disaster Recovery and Improved Uptime

Large organizations typically configure Oracle Real Application Clusters (Oracle RAC) as a part of a disaster recovery solution. For small to medium size companies, Oracle Private Cloud Appliance offers a cost-effective alternative to meet disaster recovery requirements, and Secure-24 takes advantage of this alternate approach for customers who prefer this method. Administrators use Oracle VM Live Migration to move VMs easily across repositories, and ZFS snapshots for recovery, to support application availability in the event a server goes down or offline.


To maintain uninterrupted service, Secure-24's administrators can set up virtual servers to be highly available so that when an Oracle VM server is restarted or shut down, its VMs are restarted or migrated to another Oracle VM server in the pool. As long as there are adequate resources for all VMs to run concurrently, application services can be restarted and continue in spite of a server failure. For many of Secure-24's customers, this capability significantly shortens an otherwise long recovery process by eliminating the need to acquire or rebuild a new physical server and then reinstall the software stack.

Available to [Oracle Linux](#) customers with [Oracle Linux Premier Support](#), Oracle Ksplice³ updates the Oracle Linux kernel with **all** important security patches *without needing to reboot*. For Oracle Linux virtual machines running on Private Cloud Appliance, Secure-24 can take advantage of Ksplice to eliminate the need to take those virtual machines off-line when applying a debugging kernel for troubleshooting or to implement errata.

Reduced Time to Deploy, Setup, Tune, and Update

The company reports that with the Private Cloud Appliance they have reduced deployment costs by 90%. What once took 6-8 weeks to plan and hand-configure hardware and software from scratch to create a customer environment, apply settings for best practices, enable high availability and security measures, configure storage and

³ See <http://www.oracle.com/us/technologies/linux/linux-max-value-min-cost-wp-2209610.pdf>



networking, can now be done in as little as two hours using application templates. The Secure-24 engineering team can set up a customer's private cloud and application services as soon as an engagement begins. Customer setup is automated and as hands-off as possible, reducing the risk of human error. For example, configuring a new [JD Edwards EnterpriseOne](#) environment now takes two to three hours rather than a full week.

The company found that it was able to deploy virtual machines and Oracle Linux from Oracle VM templates and then run scripts to install and set up [Oracle Database](#) with full monitoring, backup, patching, DNS, LDAP, etc., in as little as 10 minutes. The templates, which can be freely downloaded from the Oracle Software Delivery Cloud, include all the bits and pieces needed for a complete and optimized Oracle Database environment.

In the legacy VCE Vblock environment of Cisco servers, Red Hat Linux, and VMware, administrators had to provision VMs as well as configure settings for best practices on all components manually. Now, running the Oracle Private Cloud Appliance, provisioning optimized VM environments is easy. Using Oracle Enterprise Manager and templates, an administrator can quickly provision VMs with Oracle Linux and the Unbreakable Enterprise Kernel (UEK), which is tuned and optimized for Oracle applications. In addition to the optimized UEK, Oracle Linux can be deployed with innovative tools such as Ksplice for zero downtime kernel patching and DTrace for troubleshooting and performance tuning.

While many Secure-24 customers take advantage of the latest releases of Oracle Database and Oracle applications, some customers are running older OS releases and patch levels with various Oracle Database and application versions. With the Private Cloud Appliance and a combination of VM templates and customized scripts, Secure-24 can automatically provision a customer's specific application requirements quickly and precisely.

Improved Performance

While the Private Cloud Appliance has radically shortened application provisioning times, the company is also experiencing up to a 30% overall performance gain compared to its legacy infrastructure. This is the result of a combination of factors, both hardware and software related. With every compute node connected by dual 40GB InfiniBand, application workloads benefit from tremendous low latency/high bandwidth throughput. This means that I/O operations (as well as backups, snapshots, and VM migration tasks) run much faster than they did previously using conventional data transport links. In addition, optimizations, such as those in the pre-optimized Oracle Linux with Unbreakable Enterprise Kernel, help to enhance application performance.

Simplified Management and Reduced Complexity

With the Oracle Private Cloud Appliance, customers can run not only different versions of Oracle Database (Oracle Database 9, 10g, 11g, and 12c, and Oracle RAC), but also Microsoft Windows and other operating systems. Secure-24 can also run Hyperion applications for both Microsoft Windows and Linux environments on the Oracle Private Cloud Appliance, a major differentiation compared to other competitive solutions. Had they not used the Oracle Private Cloud Appliance, Secure-24 would need to run Hyperion on Microsoft Windows in one system AND Hyperion on Linux in another system, resulting in more complexity, more operational and management costs. The ability to run the same application in a mixed environment is one distinct advantage that separates the Oracle Private Cloud Appliance from other competitive converged infrastructure solutions.

The Oracle Private Cloud Appliance unifies infrastructure components into a converged system that can be supported by a single Unified Management team with higher level of expertise rather than separate system, network, and virtualization teams. Reduced system complexity means that patches come as one fully tested patch set for the Private Cloud Appliance rather than single patches from different vendors for each different component. Applying updates now goes faster and, with pre-testing and certification, the risk of errors and conflicts due to patch incompatibilities is minimized. Secure-24's administrators can take advantage of advanced and fully integrated

technologies through an easy management interface and simplified updates without concern about misconfigurations or incompatibilities.

“Applying patches from different vendors requires a lot of work, especially when it comes to compatibility. At the same time, verification and certification opens the door for several mistakes. It was beneficial to be able to download a single image from Oracle—one Private Cloud Appliance patch that’s been pre-tested and verified for everything.”

– Sean Donaldson, Chief Technology Officer, Secure-24

The Oracle Private Cloud Appliance provides a dashboard to monitor and manage all aspects of the solution. The Hardware View provides a graphical representation of the hardware components as they are installed within the rack (Figure 2). The Network View (Figure 3) represents the networking hardware within the rack. Specifically, the view depicts the I/O modules and network ports for InfiniBand, FibreChannel, and Ethernet on the back panel of the Fabric Interconnect.

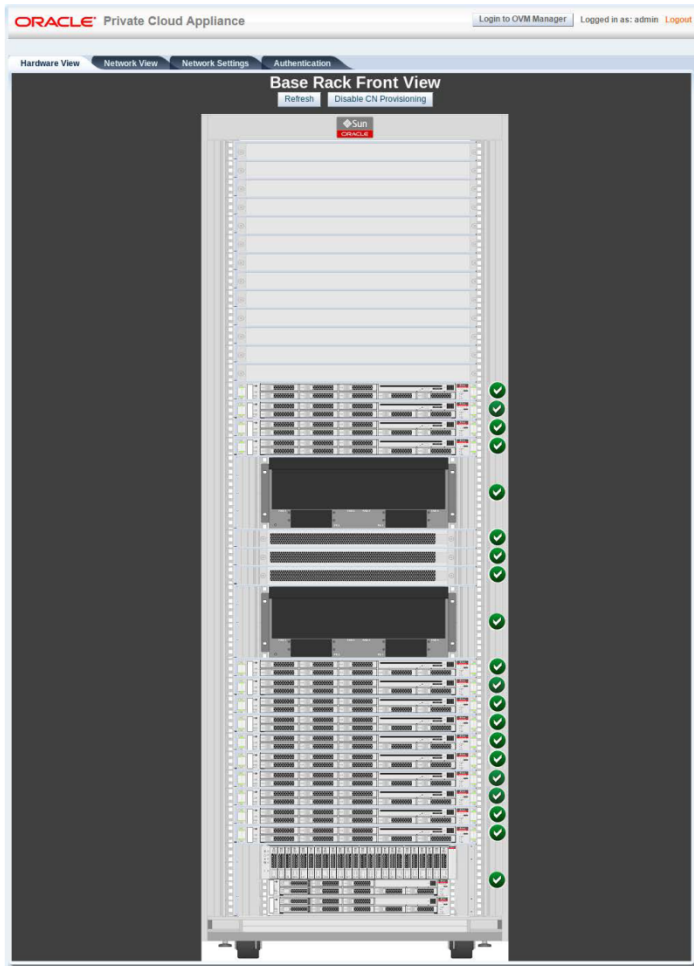


Figure 2. Dashboard View of Hardware Components

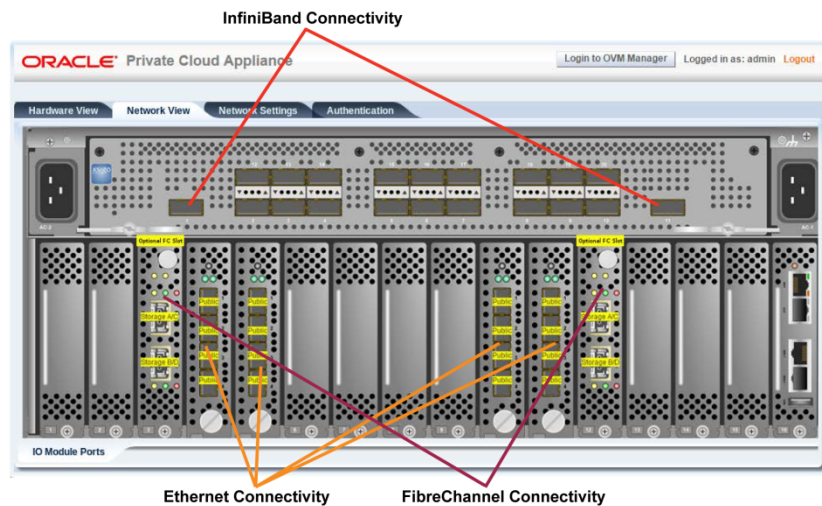


Figure 3. Dashboard Network View

The Bottom Line

Secure-24 and its customers' challenges related to growth, reliability, availability, and agility have been met by migrating to the Oracle Private Cloud Appliance. The cost savings from reduced infrastructure and management complexity have resulted in higher profits for Secure-24 while also allowing the company to be more competitive.

By simplifying system patching, updating, deployment, and overall management, the Private Cloud Appliance has improved the company's ability to respond quickly and effectively to customer needs, greatly enhancing customer satisfaction and expanding business potential.

The Private Cloud Appliance helps Secure-24 deliver mission-critical infrastructure services more cost-effectively, more quickly, and with optimal performance. Sean Donaldson, CTO for Secure-24, sums it up this way: "Choosing the Oracle Private Cloud Appliance decreased our deployment costs by 90%, reduced deployment time from weeks to hours, and gave us up to 30% overall application performance improvement, allowing us to be in a very agile and rapid response environment for meeting our customers' ever-changing needs."

Learn More

For more information about how the Oracle Private Cloud Appliance can help accelerate deployments, reduce IT complexity, and provide the foundation for your private cloud services, visit oracle.com/pca or call +1.800.ORACLE1 to speak to an Oracle representative, or visit the web resources below.

RESOURCES





Oracle Private Cloud Appliance Website	https://www.oracle.com/servers/private-cloud-appliance/index.html
Oracle Private Cloud Appliance DataSheet	http://www.oracle.com/us/products/servers/private-cloud-appliance/oracle-private-cloud-appliance-ds-2595915.pdf
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