



Improve IT Operations for Your Database Platforms

Oracle Database and RAC on Cisco UCS and Cisco HyperFlex

Imagine that you could see into and simplify your application and database interaction, migration, management, and monitoring processes. It's possible with better-together tools from Cisco.

If your enterprise applications rely on Oracle Database, perhaps with Oracle Real Application Clusters (RAC), your IT staff likely finds the complexity hard to manage and the costs difficult to contain. That's because managing these environments is often a manual, time-consuming, and error-prone process. Add the difficult, if not impossible, process of determining dependencies, and patching, upgrading, scaling, or migrating to the cloud can be risky.

Without visibility into your IT infrastructure, your administrators probably spend too much time trying to analyze application and database availability and performance. This time-consuming process, together with the need to support spikes in demand and the inability to easily match IT resources to user, application, and database requirements, becomes a limiting factor. As your database grows or moves, keeping track of what is happening and where can frustrate your operations. You need to be able to automatically detect unauthorized actions (patches, updates, and access) and license threshold violations if you are to reduce compliance concerns.



We offer both hardware and software solutions that make deployment and ongoing management of your Oracle Database and RAC solutions fast, easy, secure, and automated



Monitor your Oracle licenses, alert when workloads are out of license, and move the workload back to comply with funded licenses



Understand the impact your Oracle and non-oracle workloads have in your datacenter



Keep your data and applications running at optimal levels and raise the security levels to keep your data secure

“We have a very large Oracle environment using both Oracle Database and RAC and the entire Oracle E-Business Suite. It is one of the biggest in the world, running on over 1200 Cisco UCS blade servers. The combination of Tetration, Cisco Workload Optimization Manager, and AppDynamics running on Cisco UCS helps us make our Oracle environment the best it can possibly be. These tools are better together.”

Sidney Morgan
Distinguished Engineer, Cisco IT

A move to flexible infrastructure

Organizations are rethinking traditional approaches. The inflexible islands of computing created by siloed platforms, such as Oracle Exadata and RISC-based servers, are falling out of favor. Converged and hyperconverged architectures are growing in popularity as IT staff experience the benefits of these modern platforms for applications and databases.

Modernizing IT infrastructure can raise questions.

- Are new technologies such as cloud and flash-based storage right for your applications?
- Can you model how your applications will perform with new technologies?
- Is increased performance the only goal?
- How much IT flexibility is needed?
- What effect will a new solution have on total cost of ownership?

Better together: Industry-leading Cisco hardware and software solutions

Cisco provides exceptional, high-performance hardware and software solutions that can help. Our solutions—Cisco Tetration Analytics™, Cisco® Workload Optimization Manager, and Cisco AppDynamics® running on Cisco UCS® and Cisco HyperFlex™ systems—deliver powerful capabilities to your Oracle Database and Oracle RAC deployments. With these innovative tools, you can answer your questions and get the most out of your IT resources to improve efficiency, protect data, and reduce costs.

Ease your Oracle audit risk

Using Cisco Tetration and Workload Optimization Manager, you define policies that build application dependency maps in real time to support application operation and enforcement. For example, you can track your Oracle Database licenses against quotas, build policy fences, and receive alerts when conditions exist. The data collected by Cisco Tetration allows you to automatically move fenced workloads onto appropriate systems with Workload Optimization Manager.

“When we first loaded and ran Tetration across our enterprise, we noticed several of our workloads were out of compliance. We were able to quickly get those workloads back into compliance, which saved us paying additional licensing costs. Now, with Tetration and Cisco Workload Optimization Manager, we stay in compliance.”

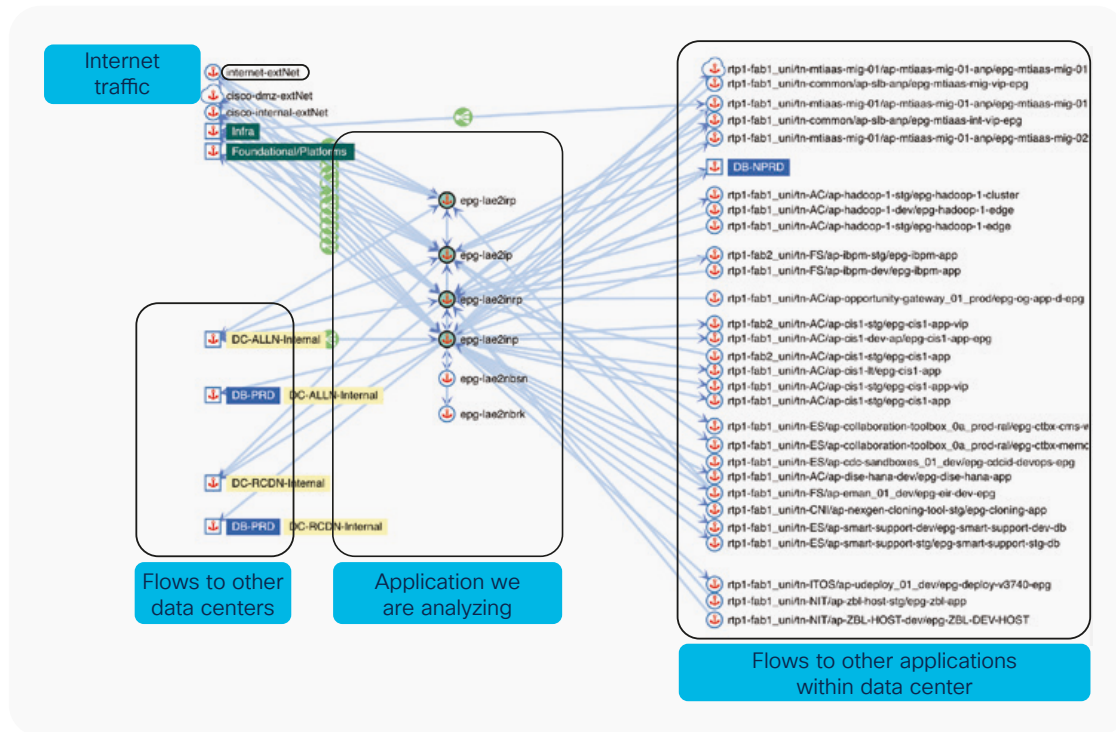
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Secure your Oracle data and applications

Cisco Tetration monitors, manages, and automates policy-based security across data centers to protect your enterprise. It alerts your IT staff to out-of-policy application workloads so that you remain compliant and don't inadvertently overextend your Oracle software licenses.

Dependency mapping gives you exceptional visibility. With this insight, you can better understand which applications use which databases and the network routes your data takes (Figure 1). As growth occurs, you can maintain security and immediately close unexpected gaps.

Figure 1. Cisco Tetration creates a dependency map across geographically dispersed data centers to provide visibility into application and database interdependency on IT services.



“We had a data center build-out planned because we thought we didn’t have room for all the resources we needed. When we deployed Cisco Workload Optimization Manager, it created such an efficient environment, we didn’t need to do the build-out, saving us \$20 million. We cut the number of virtual machines roughly in half, and now have 80% less contention for resources among our virtual clusters. It has saved us both capital expenditures and operational costs.”

Sidney Morgan
Distinguished Engineer, Cisco IT

Cisco Tetration lets you:

- Create an automated whitelist policy: Real-time telemetry data delivers an automated whitelist policy for segmentation and allows you to track behavior changes to stay within policies and protect the valuable corporate data housed in your Oracle Databases and RAC.
- Use a zero-trust model: The capability to enforce policies across on-premises and public clouds lets you establish zero-trust policies using application segmentation, monitor for compliance deviations, and identify problems in minutes on production systems to continuously protect your data.
- Identify deviations in process behavior: You can baseline server processes, identify behavior deviations that match malware-style execution, and detect the latest events, such as processor performance issues. This can limit your exposure to license audits, especially in a virtual environment, by flagging workloads that have migrated outside your license agreement so these workloads can quickly be brought back into compliance.
- Detect software vulnerabilities: Protect your business data by performing an inventory of installed software packages, with each version scanned for known vulnerabilities (Common Vulnerabilities and Exposures [CVEs] published daily by NIST), with specific remediation actions recommended to your IT staff.
- Control user access: Your business data is one of your greatest assets and needs to be protected, both within the Oracle database and as the data moves through the network and is accessed by multilevel applications. Telemetry data is collected from endpoints to enhance your segmentation policies and restrict application access.
- Know how safe your data is—get a composite security score: Various parameters, including policy compliance events, known vulnerabilities, and process behavior inconsistencies by workload, provide insight into the safety of your Oracle data and deployment.
- Gain insight into how your network performance is affecting your Oracle database access: Your IT staff can analyze per-flow performance, including hop-by-hop views, to quickly determine if a bottleneck is located on the network or a server.

Cisco Tetration uses lightweight agents that can run in a hypervisor (virtual server deployment) or in the operating system (bare-metal deployment). Data collection can run in a private or public cloud or on a scale-as-you-grow Cisco UCS server, Cisco UCS S-Series Storage Server, or Cisco HyperFlex system.

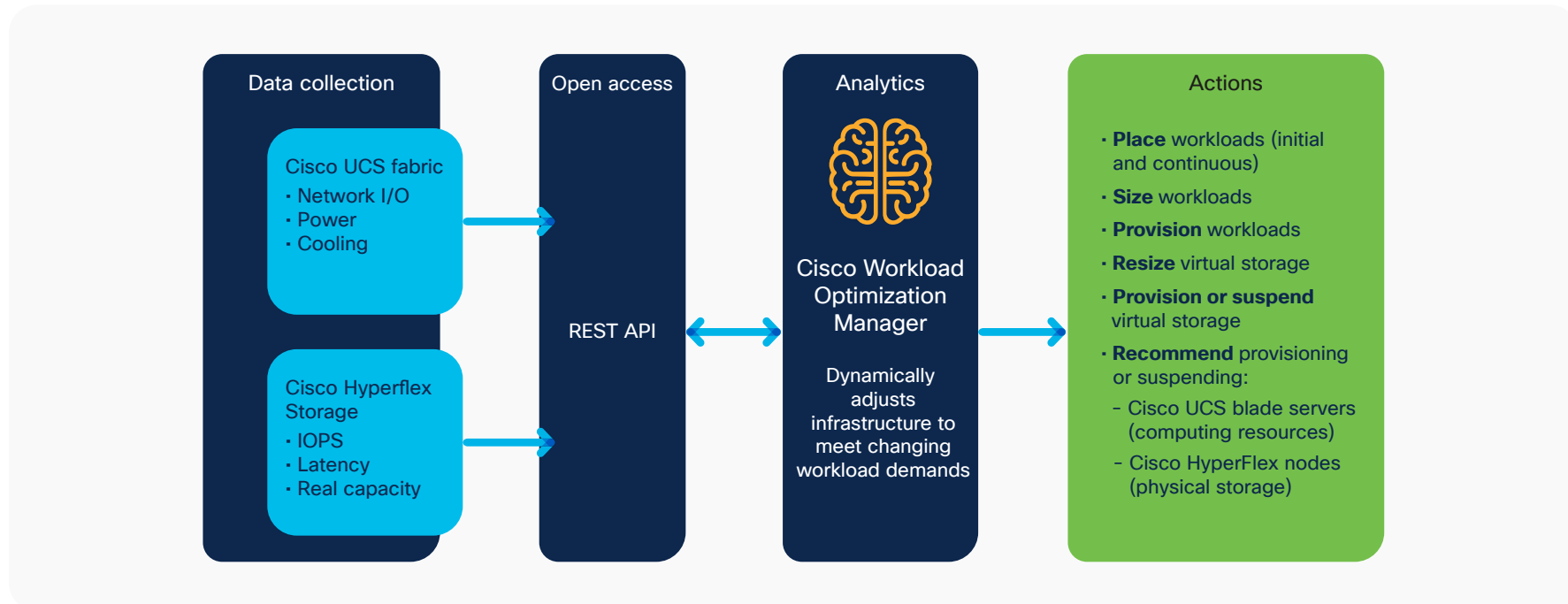
Automate management workloads with policies

Many organizations are realizing the benefits of a multicloud world, with Software-as-a-Service (SaaS) providers and private, public, and hybrid clouds a fundamental part of the business, often with an Oracle Database or RAC deployment at its heart. Remove the time-consuming and manual monitoring and adjusting of your environment using smart decision-automation capabilities, where resources and infrastructure are dynamically adjusted based on real-time workload demand.

Making real-time decisions is difficult at scale. The performance demands of database and application workloads require timely access to the right amount of resources. All of this must be done while containing costs, adhering to licensing and data sovereignty requirements, and maintaining compliance. These tradeoffs must be analyzed in real time, all the time. The right approach uses self-managing workloads that make decisions about workload placement, scaling, and capacity without your staff having to be involved.

Cisco Workload Optimization Manager allocates database and associated application resources in real time based on policies that you define (Figure 2). With these policies, preventive decision automation is supported by continuous analysis of your Oracle Database and RAC workload consumption, costs, and compliance constraints. Your database workloads get the resources they need when they need them so that your users get results in less time.

Figure 2. Cisco Workload Optimization Manager dynamically adjusts IT infrastructure to meet changing workload demands.



Gain optimal business performance from applications and databases

The transaction is one of the best measures of user experience and business impact (Figure 3). The Cisco AppDynamics suite of application and business performance monitoring solutions gives you visibility into every transaction and helps ensure that every part of the application ecosystem—infrastructure, individual services, and business outcomes—is optimized for performance, cost efficiency, and quality of service.

Figure 3. Be able to map your user-application-database transactions. These transactions are one of the best measures of user experience and business impact.

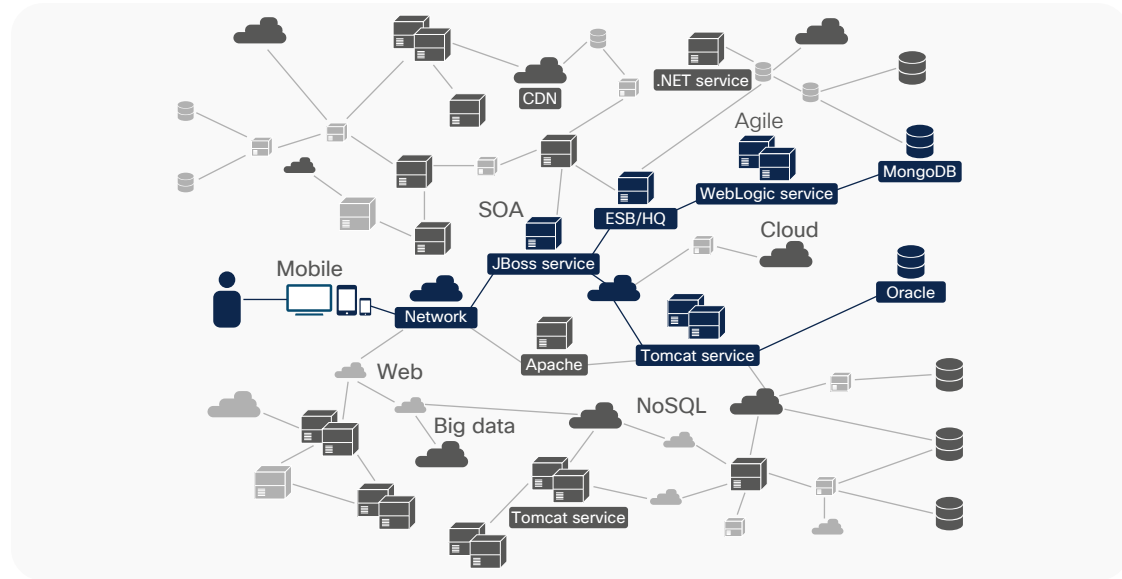
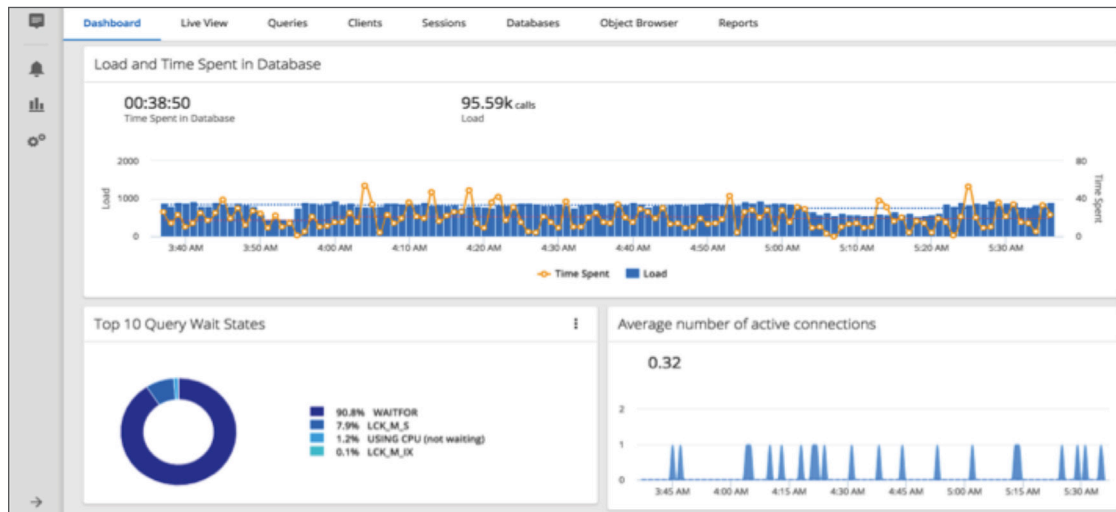


Figure 4 Monitoring your Oracle databases with AppDynamics can assure optimal performance of your databases and associated applications.

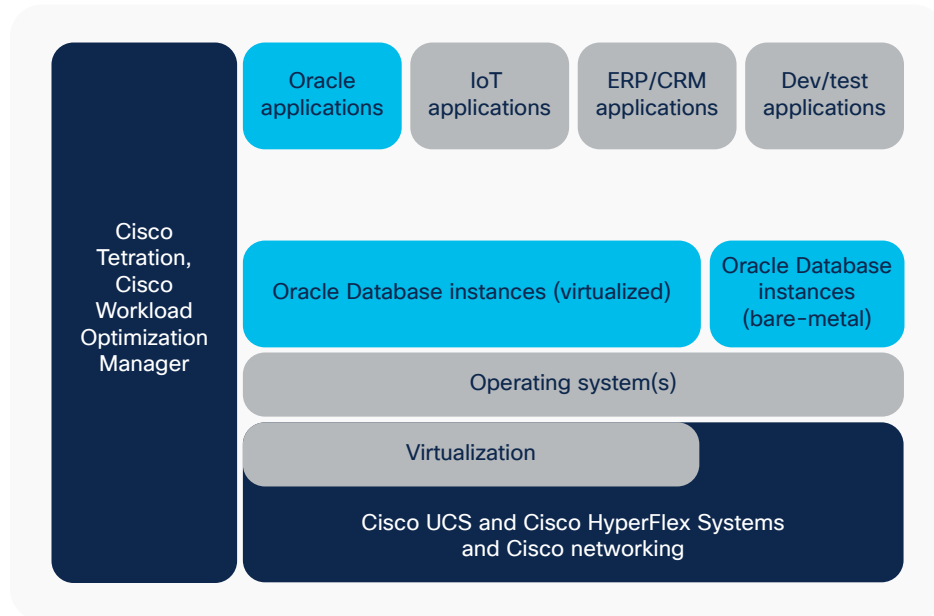


AppDynamics gives your Oracle Database, Oracle RAC, application, and IT infrastructure teams the skills and knowledge needed to deliver visibility across your network, data center, security, and applications (Figure 4). This superior level of insight allows them to watch every line of code and understand its impact on user experience and application performance, while providing real-time insight into your digital business.

Industry-leading engineering efforts with Oracle

Cisco is an industry leader, delivering converged and hyperconverged infrastructure for your data center, cloud, and edge needs. Our solutions are built to support Oracle databases and applications (Figure 5) so that you can build a competitive, efficient, and cost-effective business.

Figure 5. Cisco solutions for Oracle provide comprehensive management and radically simplified deployment of Cisco's migration to Cisco UCS and HyperFlex systems.



Engineering leadership

We use our solutions in our business. For example, Cisco IT is one of the largest Oracle E-Business Suite environments worldwide. This gives us a unique perspective on deploying, configuring, running, managing, and migrating Oracle environments. If we run into problems with the Oracle environments in our IT department, we can proactively work to rectify issues in your environment.

Cisco UCS

Cisco Unified Computing System™ (Cisco UCS) has delivers best-in-class performance spanning 6 server generations. The new UCS X-Series Modular System is a cloud-operated, adoptable, future-ready modular system managed exclusively by Cisco Intersight. Up to 8 energy efficient Compute Nodes can fit into a Cisco UCS X9508 Chassis.

Cisco UCS X210c M6 Compute Node offers flexibility to host Oracle instances using in node disk drives, or as part of a converged Infrastructure. Future nodes will expand capabilities to meet additional challenges.

Cisco HyperFlex systems

Cisco HyperFlex systems deliver hyperconvergence with power and simplicity for any application, on any cloud, anywhere. Engineered on Cisco UCS, Cisco HyperFlex systems deliver the agility, scalability, and pay-as-you-grow economics of the cloud with the benefits of multisite, distributed computing at global scale. The latest innovations in HyperFlex with Cisco Intersight™ management are engineered to meet the unique requirements for deploying hyperconverged infrastructure at the edge at global scale.

Built-in management

Cisco UCS and HyperFlex systems were designed with embedded management, giving you unprecedented control over your IT resources. Because we designed our systems to be deployed, provisioned, and managed through an API, our products are simpler, and so are our tools. Your choices include the following:

- Cisco Intersight is a cloud- based lifecycle management platform for your infrastructure, regardless of where it resides. You can manage your traditional, hyperconverged, edge, and remote and branch offices through a single cloud-based GUI. It is through Intersight that the new UCS X9508 chassis and Computer Nodes are managed.
- Cisco HyperFlex Connect integrates with Cisco Intersight to deliver unified, intuitive, robust, and secure management and monitoring of your clusters from anywhere and at any time. A smart, insightful dashboard with metrics and trends supports your entire cluster management lifecycle.

- [Cisco UCS Manager](#) supports Cisco B-series and C-series servers and HyperFlex infrastructure portfolios. It enables server, fabric, and storage provisioning, as well as device discovery, inventory, configuration, diagnostics, monitoring, fault detection, auditing, and statistics collection. Third-party management plug-ins provide a seamless experience for those already using other monitoring, analysis, configuration, deployment, and orchestration tools. For example, the Cisco UCS Manager plug-in for Oracle Enterprise Manager 13c allows you to manage your Cisco UCS infrastructure with Oracle Enterprise Manager.

Reduced risk

Cisco Validated Designs and technical white papers help you simplify and accelerate your deployment or migration of Oracle environments to Cisco UCS and HyperFlex systems. Our verified, lab-tested architectures provide detailed design and implementation guidance that reduces guesswork by giving your IT architects and administrators a guidebook for implementation. By following the guidelines in Cisco Validated Designs, you can quickly and reliably create the right IT infrastructure for your Oracle applications and databases.

Lower capital and operations costs

The first step in saving money is to reduce your capital expenditures for hardware and software. This can be accomplished in a number of ways.

- **Right-size your configuration:** There's no need to overprovision your hardware and software. We can help you evaluate your needs today and discuss scaling for the future. These planning assessments help reduce the amount of hardware, software licenses, and support you purchase up front. You can expand as your business and workloads expand.
- **Use frequency-optimized processors:** Oracle is very often licensed by the number and type of cores you deploy. Cisco UCS and HyperFlex

systems with frequency-optimized processors let you retain performance while lowering your total core count. You can save hundreds of thousands or even millions of dollars in software and support costs for large deployments.

- **Consolidate workloads:** Virtualization helps you use more of your IT infrastructure. It also reduces the number of software licenses you need. In fact, you can run multiple hypervisors side by side on Cisco UCS platforms. For example, you can run Oracle KVM and VMware vSphere within the same blade server chassis (not the same physical server). This way, you can run Oracle Database on Oracle KVM as a hard partition that assures that software licenses are limited to assigned processors. Other workloads can be run within the same chassis on VMware vSphere to increase the use of your system resources.
- **Migrate from expensive RISC platforms:** New x86- architecture processors lead the market and deliver higher levels of performance over RISC processors in your data center. You can move from expensive systems to high-performance platforms that cost less to acquire and maintain. And you can choose workhorse processors with lower core counts and higher frequencies to help reduce software license costs.

The second step in saving money is to reduce operating expenses. Moving to solutions based on Cisco UCS and Cisco HyperFlex systems can:

- Improve IT efficiency with service profiles that help reduce manual and time-consuming tasks
- Deliver uniform server configurations to Oracle applications and databases
- Lower ongoing support costs with fewer Oracle licenses required
- Reduce power consumption
- Regain data center floor space
- Reduce operating costs with solutions built for high reliability, availability, and serviceability

For more information

[Cisco Tetration](#)

[Cisco Workload Optimization Manager](#)

[Cisco AppDynamics](#)

[Cisco UCS](#)

[Cisco HyperFlex Systems](#)

[Cisco's Oracle solutions](#)

Get more business done

If you run Oracle applications and databases, consider Cisco solutions. Our server, converged, and hyperconverged systems are designed to help you simplify deployment and accelerate data processing. By combining these systems with Cisco Tetration, Workload Optimization Manager, and AppDynamics tools, you can better monitor, manage, and orchestrate your workloads to help your business be more effective, competitive, and profitable.

Figure 6. Cisco UCS X9508 Chassis

