



FlexPod for High-Performance Oracle Real Application Clusters (RAC)

Improve response
time for business-
critical applications

The FlexPod data center solution is built on a NetApp and Cisco partnership that spans 20 years. Cisco and NetApp have teamed for more than 9 years to develop the FlexPod converged infrastructure solution portfolio. A proven converged infrastructure market leader, FlexPod has generated billions in revenue since its entry into the market. FlexPod is tailored to meet the specific needs of your business and your database challenges, supported by validated designs that encompass more than 170 deployment scenarios and delivery models.

FlexPod powers your applications with the latest platform innovations and industry-leading performance. New applications include artificial intelligence (AI) and machine learning (ML), new VDI FlexPod CVDs (Citrix and VMware), Oracle 12cR2 RAC, SAP vHANA, and SQL Server 2017.

The unmatched versatility of FlexPod enables you to embrace the cloud with confidence. New technologies include next-generation fabric interconnect, cloud-connection, all-flash arrays, NetApp AFF A800 storage arrays, support for 100GbE and 32GB FC, and end-to-end NVMe over Fibre Channel. New technologies and leading-edge applications are constantly being added to the vast FlexPod workload portfolio. Customers are assured that FlexPod is a trusted platform worldwide and that their converged infrastructure investment is protected.

Do More Business, Faster

Your applications running on Oracle databases demand extreme performance. The FlexPod integrated infrastructure, developed jointly by NetApp and Cisco, delivers a unique combination of power, flexibility, scalability, and availability to help you handle all your business-critical Oracle workloads.

Business Benefits

Enhanced Performance

- Deliver faster services and improve application availability
- Improve performance when moving disk to flash and to Cisco Unified Computing Service™ (Cisco UCS®) M5 CPUs
- Process more transactions and accelerate time to value

Balanced Scalability

- Scale performance linearly up and out as you grow
- Use prevalidated and pretested configurations to speed application development
- Redeploy single-server databases into a cluster for combined memory and processing power
- FlexPod® from NetApp and Cisco is a pioneering file-based architecture that is aligned to how Oracle is architected

Greater Availability

- Respond to changing business needs with minimal disruption.
- Improve application uptime to help meet SLAs
- Improve end-user and application response times
- Avoid lock-in and leverage an evolving, open ecosystem

Better Economics

- Lower license costs when moving disk to flash and to Cisco UCS M5 faster CPUs
- Improved power and cooling when moving disk to flash and to UCS M5 CPUs

FlexPod solutions are designed for dedicated, high-performance workloads, including databases, ERP/SCM, AI/ML, big data, HPC, and video analytics. The preconfigured, validated solutions combine NetApp storage and Cisco UCS integrated infrastructure (Cisco® networking and Cisco UCS servers). FlexPod configurations accelerate time to value from your data, reduce risk, and increase your business flexibility.

FlexPod for High-Performance Oracle RAC encompasses all the benefits of FlexPod, including prevalidated, preconfigured, pretested configurations; balanced performance; simplified management; high availability and resilience; improved efficiency; and easy scaling, as well as:

- Up to 1.4 million IOPS (for 100% read workloads)
- Consistent submillisecond latency
- The ability to scale the infrastructure linearly for performance
- Balanced configuration across networking, servers, and storage
- Easy addition, replacement or update of Oracle RAC blades or rack servers in minutes, not days or weeks

FlexPod is architected as a file-based design, in contrast to other converged infrastructures on the market that are block-file designed. Oracle has a file-based architecture, and its performance is enhanced by running on a system infrastructure that is also file based.

Boost Transaction Processing, Services Delivery, and Competitiveness

FlexPod for High-Performance Oracle RAC handles your most demanding Oracle workloads and data storage needs by taking advantage of NetApp AFF A-Series all-flash arrays. The standard FlexPod for High-Performance Oracle RAC configuration delivers more than 1.4 million IOPS, and it can be scaled down by half, or scaled higher if your production Oracle Database workloads demand it.

NetApp's industry-leading flash portfolio—including hybrid and all-flash solutions—accelerates your Oracle Database transactions. In this case, the solution leverages the all-flash NetApp AFF enterprise storage arrays, which are designed for performance-driven applications that have submillisecond latency requirements. FlexPod offers a unique combination of performance benefits:

- FlexPod can significantly improve Oracle Database response times.
- FlexPod end-to-end AFF A-Series all-flash arrays deliver blazing fast performance.
- FlexPod Cisco UCS servers have set more than 150 world records¹ to date.

FlexPod for High-Performance Oracle RAC enables you to process more transactions and deliver faster services, while keeping your database applications available for your end users. It helps your business to be more competitive by enabling your customers to have a reliably fast experience with the applications that you develop.

Implement your New Oracle Features on the Premises or in the Cloud

FlexPod is tailor made with unique abilities to address the Oracle Multitenant Architecture, a key feature of Oracle 12c R2, where one or more databases are encapsulated in a single container. Each database in a container is called a pluggable database; it can be plugged into and unplugged from a container as

¹ <https://www.cisco.com/c/dam/en/us/products/collateral/servers-unified-computing/ucs-solution-overview.pdf>

needed. In essence, FlexPod conveys the same benefit to provision and deploy new Oracle servers in minutes. The ability to scale both compute and storage granularly, quickly, and accurately lays the perfect foundation for your Oracle pluggable databases.

FlexPod for High-Performance Oracle RAC delivers innovative, cutting-edge benefits to databases as a service (DBaaS) as well. Whether it's faster provisioning, on-demand access, agile resource scheduling based on policies, or chargeback rules to ensure business accountability and greater control over the environment, IT must move from a reactive to a proactive and predictive approach for data center management. Oracle 12c, Enterprise Manager 12c, NetApp AFF arrays, and UCS-based resource pooling together offer a unique and practical DBaaS solution. In addition, FlexPod AFF storage arrays are built with innovative inline data reduction technologies, including inline compression, inline deduplication, and inline data compaction, providing space savings of 5 to 10 times, on average, for a typical use case. Some customers have reported actual space savings of much higher than 10 times.

Respond to Changing Business Needs Fast, with Little or No Disruption

FlexPod solutions include validated configurations and reference designs. These end-to-end, comprehensive engineering documents help you get your FlexPod Oracle infrastructure up and running fast—which means that you can develop applications faster and with less risk.

FlexPod for High-Performance Oracle RAC helps you to handle the inevitable but unpredictable performance increases from fast-growing business-critical applications built on top of your Oracle Database. FlexPod for Oracle RAC lets you scale up or out without changing your IT architecture. Or start smaller now,

with a half configuration that delivers 500,000 IOPS, and scale with ease to a larger configuration in increments of 500,000 IOPS. Customers may see higher numbers, because the FlexPod AFF array is the first end-to-end NVMe-based enterprise all-flash array that delivers up to 11.4 million IOPS and more than 700PB effective capacity on other applications.

Accelerate Your Business and Reduce Risk by Keeping Your Applications Available

FlexPod for High-Performance Oracle RAC enables frequent database backups. It also enables restores in seconds for data consistency—twice as fast as recovery times with traditional solutions.

Individually and in concert, the components of the FlexPod solution work to keep your applications available. Integrated high-availability and disaster recovery capabilities enable you to achieve “always-on” database performance. The FlexPod AFF storage arrays ensure that your business-critical applications stay online with up to greater than 99.999 availability. The AFF arrays offer:

- Synchronous mirroring up to 300km
- RAID technologies for up to three simultaneous drive failures
- Active-active storage controller failover for high availability
- Multipath I/O for data-path redundancy and superior I/O performance
- NetApp MetroCluster™ technology for active-active geographically dispersed failover

In addition, NetApp's secure multitenancy and data isolation are industry certified to keep applications securely isolated in a shared infrastructure.

FlexPod Support

FlexPod solutions are sold through our solution partners, and you can choose to receive support from your solution partner, from NetApp, or from Cisco. NetApp also

has multiple support offerings for FlexPod, FlexPod third-party products, and other parts of the solution stack, such as networking. NetApp offers a cooperative support model with Cisco as part of our SupportEdge Premium support package, as well as a full solution support offering. NetApp Solution Support for FlexPod is an add-on service offering.

Cooperative Support. Cooperative Support is an engagement model and a support delivery partnership between NetApp, Cisco, Microsoft, VMware, Citrix, and Red Hat. You can choose which vendor to call based on your initial assessment of the problem. This joint support partnership includes cross-training, shared communications, coordinated response, and a formal escalation process. Cooperative Support is not something you buy; it's included with the premium support offerings from all of the vendors involved.

Solution Support. NetApp offers single-point-of-contact support for FlexPod solutions. The NetApp Solution Support team has expertise in all the products in each solution stack. The NetApp Solution Support team has support-to-support access to the product or component vendor's support organizations and works with the vendors on your behalf. Cases are handled from end-to-end, with no hand-off or finger-pointing. NetApp Solution Support for FlexPod is a separate, optional offering on top of SupportEdge Premium.

Configuration Validation Software for FlexPod

FlexPod has optional configuration validation software, called Converged Systems Advisor, which ensures that FlexPod is always configured to best practices for optimal performance and availability. An on-premises agent combines with cloud analytics to monitor and validate the deployment of your FlexPod infrastructure. This FlexPod tool

simplifies key tasks for administrative support with an automated review of more than 100 best practices, component support updates, and resilient design requirements. With continual remote monitoring and notifications, this software helps administrators prevent gaps in system supportability and protect their investment in mission-critical data center infrastructure. These capabilities simplify lifecycle management and improve productivity with infrastructure support. Converged Systems Advisor comes standard as part of NetApp Solution Support services.

Get Started Today

Find out how FlexPod for High-Performance Oracle RAC can enable you to run your business-critical Oracle workloads faster—to get more done, respond to changing business needs, and be more competitive. Contact your local NetApp or Cisco representative or partner. Get more detailed information on our website, or read our technical design guide.

About NetApp

NetApp is the data authority for hybrid cloud. We provide a full range of hybrid cloud data services that simplify management of applications and data across cloud and on-premises environments to accelerate digital transformation. Together with our partners, we empower global organizations to unleash the full potential of their data to expand customer touchpoints, foster greater innovation, and optimize their operations. For more information, visit www.netapp.com. #DataDriven