VMAX ALL FLASH
For Mission-Critical Oracle

All Mission Critical Oracle environments require the right people, processes and technology to keep the business running with extreme performance at cloud-scale. Enabling this requires a modern approach between Oracle databases and their underlying storage. A recent IOUG survey of Oracle DBAs identified the top areas where greater modernization could most help Oracle environments:

1. Database performance
2. Database copies & refreshes
3. Backup & recovery management
4. Data protection & recovery
5. Database & hardware provisioning

The VMAX All Flash is engineered for the modern datacenter and helps simplify and automate many of these pain points for both Oracle DBAs and Storage Administrators.

ARCHITECTURE
The powerful VMAX® All Flash arrays are architected to solve the CIO challenge of embracing a modernized flash-centric data center and mission-critical applications while simultaneously simplifying, automating and consolidating IT operations. VMAX All Flash isn’t just bigger, better and faster – which it is – it was engineered for the latest, high density flash technology, but also to specifically exploit the rich set of data services of VMAX All Flash. These data services address the new requirements of the modern data center while continuing to deliver the reliability and mission-critical availability customers have relied on for years.

SCALEABLE PERFORMANCE
- Leverage advanced multi-core / multi-threading algorithms and a flash-optimized design to meet strict SLAs for high-demand online transaction processing (OLTP), virtualized applications, and high growth Oracle and SQL databases
- Scale out performance and scale up capacity to achieve millions of IOPS, PBs of capacity, and predictable performance (350 microsecond response time)
MISSION-CRITICAL AVAILABILITY
• Mission-critical availability architecture with advanced fault isolation, robust data integrity checking, and proven non-disruptive hardware and software upgrades
• Six-nines availability for 24x7x365 operations using SRDF® software, the gold standard for multi-site remote replication.

HYPER CONSOLIDATION
• Achieve massive consolidation with support for mixed mainframe, open systems, IBM i, and file on the same system, simplifying management and significantly lowering overall TCO
• Consolidate multiple concurrent workloads and multi-PBs of capacity both on premise and through tiering to cloud storage.

HIGH PERFORMANCE FOR ORACLE WORKLOADS
The VMAX All Flash architecture has been designed for scale out and scale up performance leveraging flash optimized designs which are ideally suited for Oracle Databases and Oracle Real Application Cluster (RAC) environments. The VMAX All Flash architecture provides the performance necessary to support consolidating Oracle Databases, Applications & Middleware without compromising throughput or response time performance.

VMAX All Flash arrays leverage the latest components and flash technologies to supercharge the most demanding Oracle and mixed workload environments. Each VMAX All Flash model offers advanced 3D NAND flash, latest generation Intel multi-core processors, InfiniBand 56 Gb/s interconnect technology, PCIe Gen 3 I/O, and native 6 or 12 Gb/s SAS drive infrastructure. Consolidate your mission critical Oracle, and other application workloads, to simplify management, reduce costs and guarantee high availability without compromising performance.

CONSOLIDATE 1000s OF WORKLOADS

VMAX All Flash includes a database focused performance analytics tool called Database Storage Analyzer (DSA) that can be used to quickly troubleshoot Oracle performance anomalies and define where new Oracle workloads can be added without affecting performance. DSA bridges the gap between Storage Admins and DBA’s and provides detailed analysis of top wait events, storage devices, table spaces, objects, indexes, and partitions for Oracle. Analysis and design recommendations from Database Storage Analyzer (DSA) can be leveraged by both DBAs and Storage Admins.
VMAX All Flash also has a Plug-In for Oracle Enterprise Manager which allows Oracle DBA’s to view and manage VMAX All Flash arrays from within the tool they use on a daily basis. DBA’s can correlate the data they get from Oracle Enterprise Manager with the data from Database Storage Analyzer to quickly resolve bottlenecks and/or determine where new workloads can be loaded.

MISSION-CRITICAL ORACLE AVAILABILITY

VMAX All Flash continues to be the industry leader in availability, designed from the ground up to provide Mission Critical Oracle environments with the greatest availability possible, including 6 nines availability with full support for VMAX SRDF software, for remote site high availability, now including Active-Active support. Using SRDF-Metro (Active-Active) with Oracle RAC provides a Constantly Available environment when zero down time is a requirement.

VMAX All Flash reliability, availability, and serviceability (RAS) features make it the ideal platform for enterprise application environments, like Oracle, requiring mission-critical availability.

MISSION-CRITICAL AVAILABILITY WITH VMAX ALL FLASH

- No single points of failure—all components are fully redundant to withstand any component failure
- Completely redundant and hot-pluggable field-replaceable units (FRUs) to ensure repair without taking the system offline
- RAID protection levels 5 and 6 to match different data protection requirements, with the RAID members distributed among power zones in disk array enclosures (DAEs) to assure high availability (HA) even if an entire power zone fails
- Mirrored cache, where the copies of cache entries are distributed to maximize availability
- Vault to flash with battery backup to allow for cache de-stage to flash and an orderly shutdown for data protection in the event of a power failure
- Active-active remote replication via SRDF/Metro with read/write access to both Site A and Site B ensures instant data access during a site failure
- RecoverPoint replication support for heterogeneous replication and any point in time restores
- Fully non-disruptive upgrades, including HYPERMAX Operating System, from small updates to major releases
- Data at Rest Encryption with integrated RSA® key manager, FIPS 140-2 compliant to meet stringent regulatory requirements, and support of external third party key managers
- T10 DIF data coding, with extensions for protections against lost writes
- Extensive fault detection and isolation, allowing early wear-out detection and preventing the passing of bad data as good
- All flash cache data vault capable of surviving two key failures, ensuring that the system comes back even when something was broken before the vault and something else fails when returning from the power cycle
- Support for thermal excursions with graceful shutdown if, for example, a data center loses air conditioning
- Integrated data protection via Dell EMC ProtectPoint backup and rapid restore, combining the gold standards in backup with industry leading SRDF replication

**INLINE COMPRESSION**

VMAX has many valuable, enterprise level, data services including Inline Compression. For typical Oracle databases inline compression delivers a 2:1 compression ratio, dramatically reducing the amount of physical storage required. VMAX All Flash delivers a net 4:1 overall data reduction benefit for typical transactional workloads when inline compression is combined with space efficient snapshots and other VMAX All Flash space saving features. VMAX All Flash inline compression minimizes footprint requirements while intelligently optimizing system resources to ensure the system is always delivering the right balance of performance and efficiency. VMAX All Flash inline compression is granular, performance optimized, and flexible.

- **GRANULAR:** VMAX All Flash compression operates at the Storage Group (Application) level so you can target those workloads that would benefit the most from compression. Compression can also be applied to existing data that was not initially compressed
- **PERFORMANCE OPTIMIZED:** VMAX All Flash is smart enough to make sure active “hot” data is not compressed. This allows the system to deliver maximum throughput and ensures that system resources are always available when required.
- **FLEXIBLE:** VMAX All Flash inline compression works with SnapVX (for creation of Database copies), SRDF (remote replication), embedded NAS, and encryption. Something other vendors cannot deliver.

Every VMAX All Flash model is shipped with compression hardware and can take advantage of this new capability by simply upgrading to the latest HYPERMAX OS release.
STREAMLINED PACKAGING

VMAX All Flash arrays are built for simplicity and ease of ordering with appliance-based packaging and pricing that combines both hardware and software elements. VMAX All Flash systems default with the “F” software package. Customers can easily add the FX package to deploy higher value data services as listed below.

VMAX All Flash Software Packages

Enterprise software for the modern data center

**“F” Package**
- HYPERMAX OS
- Thin provisioning
- Inline compression
- Non-disruptive migrations
- Virtual volumes
- QoS / Host IO limits
- Embedded Unisphere, Solutions Enabler, SMI-S
- TimeFinder SnapVX
- AppSync iCDM starter bundle

**“FX” Package**
- All “F” package items plus:
  - Data encryption (D@RE)
  - SRDF/S, SRDF/A, SRDF/Star
  - SRDF 3 & 4-site
  - SRDF/Metro (active/active)
  - Embedded NAS (eNAS)
  - Unisphere 360
  - PowerPath (75 hosts)
  - CloudArray Enabler
  - ViPR Suite (SRM & Controller)

Integrated Copy Data Management for Oracle

Enterprise level Oracle environments generally require many copies of each database for use cases such as testing, development, patching, backups and more. Leveraging VMAX All Flash, and the tools described here, adds immense value to both DBA’s and storage administrators. Integrated copy data management (iCDM) provides exceptional customer value by enabling application-consistent, on-array copy creation and orchestration. VMAX All Flash units use SnapVX for creating and managing copies of databases. SnapVX provides features such as zero-impact snaps/copies, simple user-defined names, faster snapshot creation/expiration, cascading, compatibility with SRDF, and support for legacy VMAX replication capabilities like TimeFinder Clone, VP Snap, and Mirror (emulation mode). SnapVX reduces replication storage costs by up to 10x with its space-efficient snapshot (copy) technology, meaning it is optimized for cloud scale and allows for up to 16 million snaps/copies per VMAX All Flash array. Snaps can now also be protected from accidental or malicious deletion to assure key database copies are always available.

Orchestration of snaps/copies can be done using AppSync, a Dell EMC copy management tool. Appsync is an advanced copy management software application that integrates seamlessly with VMAX All Flash arrays to enable iCDM. It offers a simple way to create and consume local and remote copies on a VMAX All Flash. For example, DBA’s can be given access to Appsync so they can create and delete their own database copies in a self-service model if desired. AppSync delivers application-consistency with critical applications like Oracle and VMware, enabling operational recovery and copy repurposing.
DYNAMIC HOST I/O LIMITS

VMAX All Flash Host I/O Limits (Quality of Service controls) support defining limits to enforce service levels and make application performance even more predictable. Leveraging Host I/O Limits you can set maximum IOPS and/or throughput limits on a per application basis. Leveraging Host I/O limits you can assure that a few extremely busy databases don’t monopolize all resources, known as the ‘noisy neighbor’ affect. VMAX All Flash automatically balances the loads across directors and ports and supports two levels of cascaded limits to simplify performance management in multi-application, multi-tenant, and cloud environments.

NON-DISRUPTIVE MIGRATION

VMAX’s non-disruptive migration enables previous VMAX generations to simply and quickly migrate workloads live to a new VMAX All Flash array without taking the applications offline (including production Oracle databases and applications). This capability is built into the latest HYPERMAX OS (VMAX All Flash OS) and simplifies the migration user experience by dramatically reducing the number of steps required to migrate data.

* Warranties may vary outside the United States. Contact your Dell EMC representative for local warranty and service terms and conditions.