ORACLE DATA SHEET

Netra Modular System

Breakthrough Modular Server Architecture

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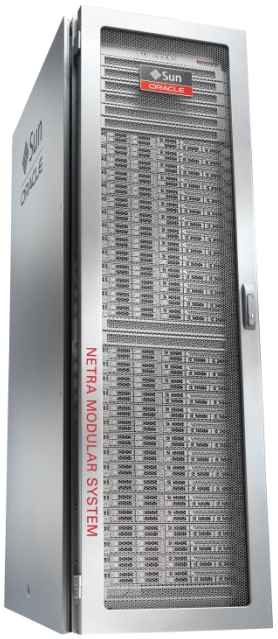
Oracle's Netra Modular System is a transformative platform for customers looking to modernize their data centers. With extreme agility and scale in a platform that can be completely virtualized, customers benefit from accelerated development, rapid bring up, and low-cost maintenance. Netra Modular System takes today's traditional bladed and rackmount architectures and merges them to create a new innovative best-of-breed next-generation platform. This integrated system is designed to handle compute, networking, and storage evolution without forklift upgrades. Netra Modular System provides the service and business agility required in today's fast-paced market.



KEY FEATURES

- Breakthrough modular architecture for customers looking to modernize their data centers
- Plug-and-play blade system type design and management

Time to Services and Low Risk

Oracle's Netra Modular System is a converged, preintegrated and tested platform that delivers unique benefits. Its innovative architecture uses plug-and-play blade system type management, allowing faster time to bring up and scale up new services. Netra Modular System takes the best features of the blade architecture, including ease of use with centralized management, simplified cabling, and plug-and-play servers, yet addresses many of its shortcomings including form-factor constraints and the use of proprietary hardware.

Netra Modular System also takes the best features of rackmount servers including large I/O and disk capacity and rack independence while addressing the shortcomings of complicated system and cable management. It does all this by taking general purpose rackmount servers and adding an adapter, called a frame backplane adapter that aggregates all I/O and power to a known location. The design ensures support for multiple generations and types of rackmount servers. This then mates to a frame backplane segment in which all the networking, management, and power connect. The power is supplied with single- or three-phase power distribution units (PDUs) while networking is accomplished using two to six 10/40 Gb/sec Ethernet switches. The servers are automatically verified and connected to the rack management for bring up.

Further, Netra Modular System minimizes product and vendor complexity with a platform design that includes compute, networking, storage and management, dramatically reducing operational time and expense with a flexible plug-and-play blade-like architecture. It enables lower development and business risk with an integrated and qualified hardware and software platform that supports technology evolution with ease and is designed to support 5+ nines reliable deployments.

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- Integrated system designed to handle compute, networking, and storage evolution without forklift upgrades
- Designed to support 5+ nines reliability
- Uses standard platform components and open hardware and software interfaces
- Supports a choice of operating systems and virtualization technologies

KEY BENEFITS

- Accelerates development and bring up
- Reduces operating time and expense
- Improves service and business agility
- Lowers risk with high availability
- Reduces operational complexity
- Increases flexibility

Standard and Open

Netra Modular System is a general purpose integrated system that uses standard platform components, open hardware and software interfaces, and plug-and-play blade system type management. The system supports a choice of operating systems and virtualization technologies.

NVFI Foundation Platform

Network functions virtualization (NFV) uses traditional IT server and virtualization techniques to implement network functions as software that can run on industry-standard servers. Virtualizing these functions on general purpose hardware, like the Netra Modular System, can help reduce capital and operational expenditures and accelerate product and service introduction. Oracle's Netra Modular System capitalizes on Oracle's ability to engineer hardware and software together to deliver NFV infrastructure (NFVI) with a preintegrated and managed hardware and virtualization layer.

Key Components for Netra Modular System

Compute Nodes: The compute nodes are currently comprised of Oracle Server X5-2M, which is powered by two Intel® Xeon® processor E5-2600 v3 product family CPUs. With up to 18 cores per socket, this server supports the highest-performing processor and delivers extreme compute density in a compact 1U enclosure. Each Oracle Server X5-2M includes the frame backplane adapter to give it the plug-and-play capability and eight small form factor drive bays, four of which can support hot-swappable, high-bandwidth NVM Express-based flash. Each compute node can be added and removed without any downtime. Netra Modular system will automatically bring up and configure each node as it is inserted. Netra Modular System supports from 2 to 30 nodes scaling to 1,080 cores /2,160 threads aggregate. Each compute node can support a choice of operating systems and virtualization technologies.

Networking Fabric: Netra Modular System currently supports up to six Oracle 10/40 Gb/sec Ethernet switches. These next-generation 1U Ethernet switches from Oracle come complete with industry-standard Layer 2 and Layer 3 features. The switches enable high-speed, low-latency networking among all components and interoperate with external Ethernet and storage networks. Netra Modular System can support up to six physically separate networks (can be configured as three redundant) and one pass through.

Storage: Netra Modular System provides large storage capacity using the local storage within the compute node. This takes advantage of the server infrastructure and reduces cost. If additional storage capacity is required, customers can take advantage of Oracle ZFS Storage Appliance.

Management: Netra Modular System provides a unified management system for both in-band and out-of-band communication. The frame monitoring module, included in the rack, is not required at run time. Some of its functions include: environmental monitoring, alarm notification, and reset control. The frame system agent is included on two of the compute nodes to provide redundant runtime management nodes. Its functions include: preactivation, recognition, validation, automatic hardware bring up,

power-on, install and configuration, and a GUI for at-a-glance hardware status monitoring. The management supports multirack deployments with up to eight racks in a single management domain.

Oracle's Netra Modular System is a quick-to-deploy preintegrated platform that can help customers accelerate deployment and reduce risk while lowering the cost of maintenance.

RELATED PRODUCTS

- Oracle Server X5-2M
- Oracle Ethernet Switch ES2-72
- Oracle Ethernet Switch ES2-64
- Oracle Linux
- Oracle OpenStack for Oracle Linux
- Oracle VM
- Oracle Solaris

RELATED SERVICES

The following services are available from Oracle:

- Oracle Premier Support for Systems
- Installation

Netra Modular System Specifications

COMPUTE: Oracle Server X5-2M

Compute Node: 2 to 30

- *Two processors from the Intel® Xeon® processor E5-2600 v3 product family*
- *Twenty-four DIMM slots*
- *Eight 2.5-inch front hot-swappable disk bays and optional DVD-RW drive*
- *All 2.5-inch disk bays can be populated with either HDDs or conventional SSDs*
- *Four of the disk drive bays are predesignated as NVMe enabled and supports up to four small form factor NVMe drives*
- *12 Gb/sec RAID HBA supporting levels: 0, 1, 5, 6, 10, 50, 60, and JBOD with 1 GB of DDR3 onboard memory with flash memory backup via embedded internal SAS3 HBA PCIe Card*
- *Frame backplane adapter I/O: 2x 10 G Base-T (Fabric 1), 4x 10 G Base-SR (Fabric 2 and 3), 1x 10 G Base-T (Fabric 4)*

NETWORKING

Ethernet

- *Fabric 1: redundant 10/40 Gb/sec Ethernet switches*
  - *(2) Oracle Ethernet Switch ES2-64: 40 x 10 G Base-T ports* connected to up to 30 compute nodes; 6x QSFP+ ports for 40 GbE or 10 GbE uplinks (* 10x 10 G Base-T ports can be used as uplinks)*
- *Fabric 2 and 3: redundant 10/40 Gb/sec Ethernet switches (optional)*
  - *(4) Oracle Ethernet Switch ES2-72: 8x QSFP+ ports; internal splitter cables support up to two redundant 10 GbE links per compute node (4x 10 G Base-R ports per node); 10x QSFP+ ports for 40 GbE or 10 GbE uplinks*
- *Fabric 4: Each compute node provides 1x 10 G Base-T port to uplink patch panel*
- *High speed and low latency between all components*
- *Interoperates with external Ethernet and storage components*
- *Supports up to six physically separate networks (can be configured as three redundant) and one pass through*

STORAGE

- *Local storage within the compute node*
- *Oracle ZFS Storage Appliance as a NAS connectivity option for additional storage capacity*

SYSTEMS MANAGEMENT

External Interfaces

- *In-Band: Redundant 10 G Base-T (Fabric 1)*
- *Out-of-Band: 100/1000 Base-T network management port, RJ45 serial management port*

Service Processor in Each Compute Node (Out-of-Band)

Oracle Integrated Lights Out Manager (Oracle ILOM) provides:

- *Remote keyboard, video, mouse redirection*
- *Full remote management through command-line, IPMI, and browser interfaces*
- *Remote media capability (USB, DVD, CD, ISO image)*
- *Advanced power management and monitoring*
- *Active Directory, LDAP, RADIUS support*
- *Dual Oracle ILOM flash*
- *Direct virtual media redirection*
- *FIPS 140-2 mode using OpenSSL FIPS certification (#1747)*

Out-of-Band: Frame Monitoring Module

- *Remote console interface to Oracle ILOM in each compute and network node*

- *Remote lights-out manageability of the compute nodes in the rack*
- *Policy-based compute node's host power control*
- *Functions include: environmental monitoring, alarm notification, reset control*

In-Band: Frame System Agent

- *Dual, redundant management nodes with external switch-over*
- *Automatic hardware bring-up to operating system availability*
- *Single point for external rack management*
- *Compute node hot swap management*
- *GUI for at-a-glance hardware status monitoring*
- *Policy-based preactivation, recognition, and validation*
  - *Point-to-point (P2P) - physical link topology validation*
  - *Node type and configuration validation*
- *Power-on, install, and configure:*
  - *Compute, networking, and storage hardware*
  - *Virtual networking and machines*
- *Multiple rack (up to eight) setup and control*
- *Access to out-of-band operations*

SOFTWARE

OPERATING SYSTEMS

- *Oracle Linux (preinstalled option)*
- *Oracle Solaris*
- *Red Hat Enterprise Linux*
- *SUSE Linux Enterprise Server*
- *Microsoft Windows Server*

VIRTUALIZATION

- *Oracle VM (preinstalled option)*
- *VMware*
- *KVM*
- *Hyper-V*

OTHER

- *Oracle OpenStack for Oracle Linux*

ENVIRONMENT

- *Operating temperature: 5°C to 40°C (41°F to 104°F), 5% to 85% relative humidity, noncondensing*
- *Short term temperature: -5°C to 50°C (23°F to 122°F), 5% to 93% relative humidity, noncondensing*
- *Operating altitude: up to 10,00 feet (3,048 m*) at 30°C and 6,000 feet (1,289 m) at 40°C (*except in China where regulations may limit installations to a maximum altitude of 6,560 feet or 2,000 m)*

THERMAL AND COOLING

	Base Rack	*Full Rack*
Power in Watts	• *Maximum: 4,000* • *Typical: 1,300*	• *Maximum: 24,000* • *Typical: 13,300*
Cooling in BTU/Hr.	• *Maximum: 13,649* • *Typical: 4,436*	• *Maximum: 81,891* • *Typical: 45,381*
Air Flow in CFM Front to Back	• *Maximum: 886* • *Typical: 288*	• *Maximum: 5,313* • *Typical: 2,944*

REGULATIONS[1,2]

- *Product safety: UL/CSA 60950-1, EN 60950-1, IEC 60950-1 CB Scheme with all country differences*
- *EMC*
  - *Emissions: FCC CFR 47 Part 15, ICES-003, EN55032, EN61000-3-11, EN61000-3-12*

[1] All standards and certifications referenced are to the latest official version. For additional detail, please contact your sales representative.

[2] Other country regulations/certifications may apply.

- *Immunity: EN55024*
- *Emissions and Immunity: EN300 386*

CERTIFICATIONS [2]

- *North America (NRTL)*
- *European Union (EU)*
- *International CB Scheme*
- *BIS HSE Exemption (India)*
- *BSMI (Taiwan)*
- *RCM (Australia)*
- *CCC (PRC)*
- *MSIP (Korea)*
- *VCCI (Japan)*
- *EAC (Customs Union – Russia, Belarus, Kazakhstan)*

EUROPEAN UNION DIRECTIVES

- *2006/95/EC Low Voltage Directive*
- *2004/108/EC EMC Directive*
- *2011/65/EU RoHS Directive*
- *2012/19/EU WEEE Directive*

DIMENSIONS AND WEIGHT

- *Height: 42U, 78.66 in. – 1,998 mm*
- *Width: 26.06 in. – 662 mm*
- *Depth: 41.73 in. –1060 mm*
- *Weight: 1,089 kg (2, 400 lb.) fully populated*
- *Weight: 1,207 kg (2, 660 lb.) fully populated with shipping pallet*

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CONTACT US

For more information about Netra Modular System, visit oracle.com or call +1.800.ORACLE1 to speak to an Oracle representative.

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Hardware and Software, Engineered to Work Together

Oracle is committed to developing practices and products that help protect the environment