SM10000-64HD High Density, Low Power Server

Uses 1/4 the Power and Takes 1/6 the Space of Today’s Best in Class Volume Servers with No Changes to Software

The SeaMicro SM10000-64HD is the First Server Purpose Built for Scale Out Workloads
Designed to replace 60 1 RU Dual Socket Quad Core servers, the SM10000-64HD integrates 768 Intel Atom low power cores (384 Dual Core Intel x86-64 processors), top of rack Ethernet switching, server management, and application load balancing in a single 10 RU “plug and play” standards-based server. The SM10000-64HD uses 1/4 the power and takes 1/6 the space of the best in class volume server without requiring any modifications to existing software.

System Highlights:
• Dramatic reductions in TCO: Uses 1/4 the power and takes 1/6 the space of the best in class volume server
• 768 1.66GHz Intel Atom cores (384 Dual Core Intel x86-64 processors)
• Drop in adoption: Runs off the shelf OS and applications
• Reduces capital expense by consolidating layers of expensive networking infrastructure
• Provides the unique ability to guarantee performance and security for cloud deployments
• Provides the first server architecture that can support any CPU instruction set

The Industry’s First “Rack in a Box”
As the industry’s first Rack in a Box”, the SM10000-64HD server brings together in a single system the computational capability of 60 dual socket quad core 1 RU servers, redundant Ethernet rack switches, terminal servers and a load balancer. The SM10000-64HD eliminates both the cost of discreet networking devices and the operational complexity of deploying and managing them.

Redundancy and Reliability
The SeaMicro system implements redundancy in both hardware and software. At the hardware level, all subsystems are redundant and hot swappable, including compute cards, disk, network interface cards, power supplies, and fans. At the software layer, customers can configure the system to run active/standby software on two separate management cards. In the event of a failure, standby software will assume the responsibility of managing the system without any manual intervention. SeaMicro software also manages the internal Terabit fabric and has the intelligence to configure the hardware to route traffic around failure using multiple alternative fabric paths (path redundancy).
SeaMicro’s modular management software provides process isolation and modularity with each major process operating in its own address space – thereby increasing system availability and reliability.

60 1 RU Dual Socket Quad Core Servers + Disk, 4 Gigabit Ethernet Switches, 4 Terminal Servers, and 1 Load Balancer = The SM10000-64HD Server
Benefits

Dramatic reduction in TCO through 75 percent less power usage: Power is the single largest operating expense in the data center, often in excess of 30 percent of total OP EX. Reports from Google show that if current power trends continue, the cost of energy consumed by a server during its lifetime could surpass the initial purchase cost. (Power Provisioning for a Warehouse-sized Computer) The SM10000-64HD reduces power consumption and its associated costs by 75 percent in comparison to the best in class servers available today.

Massive density lowers TCO by reducing server space requirements by 83 percent: The second leading operating expense in the data center is space. Through its revolutionary architecture, SeaMicro is able to pack 768 cores in a 10 RU system (3072 CPUs in a rack). This industry leading density reduces space and the associated costs of space to 1/6 of what is available today.

Consolidates functionality reducing CAP EX: The SM10000-64HD consolidates 768 Atom cores, the top of rack switches, the terminal servers and the load balancer into a single 10 RU system. This dramatically reduces Capital Expense by eliminating the need for expensive discreet devices.

Guarantees secure performance in Cloud Deployments: One of the powerful differentiators that SeaMicro brings to cloud and managed hosting is in the SM10000-64HD’s ability to secure traffic and to guarantee performance. In today’s cloud environment CPUs are shared across multiple users, which can lead to contention and uncertain performance as well as questionable security. SeaMicro’s system provides dedicated, right-sized compute units eliminating the sharing of CPU resources. Further, with the unique vFabric architecture, Ethernet interfaces and disk interfaces can be securely tied to a particular compute unit enabling the cloud provider to guarantee performance and security.

Flexibility in the ratio of compute to IO: The SeaMicro architecture allows customers to choose the ratio of compute to I/O bandwidth allowing systems to be tailored for specific applications. For example, a Web server with backend data store could be configured with zero disk space, while a search system requiring high disk capacity and IOPS could be configured with dedicated high capacity disks and SSDs.

Flexibility – Dynamically modifies the ratio of compute to storage: Any CPU can be configured with multiple virtual disks without requiring any hardware/infrastructure changes. A virtual disk can also be shared across multiple CPUs, providing a large shared data cache amongst 768 cores. Sharing of a virtual disk enables users to store/update common data, such as operating systems, application software, and data cache once for an entire system.

Accelerated Deployment: Tight packaging of CPUs in a 10 RU appliance allows for simple installation. The steps needed to install a SeaMicro system with more than 1200GHz of compute are as follows: 1) Install the SeaMicro hardware into the rack, 2) Connect up to 4 power supply cables to a power supply source, 3) Connect uplink cables from the SeaMicro appliance to the core switch, 4) Connect the management Ethernet cable to a management switch, and 5) Configure the management boot parameters for all servers just one time using the SeaMicro management user interface.

Simplified Operations: All of the 384 Processors in a SeaMicro SM10000-64HD can be managed remotely using SeaMicro’s redundant management infrastructure. CPU reset and power on/off, installation of new operating system and application software, dynamic modification of load balancer capacity, system performance monitoring and troubleshooting can be done using a single management API. The management API is built to be integrated into existing operational service systems with minimal effort.
### Specifications

**Processor**
- Total No. of Cores per system: 768
- Total No. of Processors per system: 384
- Cores per Processor: 2
- No. of Processors per Compute Card: 6

**Advanced Processor Features**
- Intel x86-64, VT-x, HT

**Memory Capacity**
- 4GB

**Memory Type**
- SODIMM DDR3

**Ethernet Uplink**
- Max. No. of Ethernet Interfaces: 64 (8 cards x 8 ports each card)
- Min. No. of Ethernet Interfaces: 8
- Ethernet Interface Type: 10/100/1000BaseT with RJ-45 ports
- Max. No. of Ethernet Cards: 8 Hot-swappable
- No. of 1Gb Ethernet Ports per Card: 8

**Storage**
- Max. No. of Physical Disks: 64
- Min. No. of Physical Disks: 0
- Max. No. of Storage Cards: 8 Hot-swappable
- No. of Physical Disks per Card: 8
- Type of Physical Disks: 2.5" Hot-swappable

**Hard Disk Drive Options**
- Enterprise SATA 500GB, 1TB
- SATA Solid State Disk 80GB, 160GB or 300GB

**Load Balancer**
- Layer 4 connections per second: 500,000
- Max. No. of concurrent connections: 32,000,000
- Layer 4 aggregate throughput: 64 Gbps (Line Rate)
- Maximum number of VIPs: 64

**Physical Characteristics**
- Power Supply (AC): 3+1 Redundant
- 240V Single Phase
- Management Console: Dual Redundant
- Out-of-band Ethernet: 10/100/1000BaseT
- Cooling: Dual Redundant Fan Tray
- Air Flow: Front to Rear
- Dimensions (H x W x D): 17.5 (10RU) x 19 x 30"

**System Software**
- Embedded Management
  - Industry-standard Command Line Interface
  - IPMI 2.0
  - SNMP v1/v2c
  - Telnet
  - SSH v2
  - TFTP, FTP, SCP
  - NTPv3
  - RADIUS/TACACS+ Authentication
  - XML
- Management RFC Compliance
  - RFC768 UDP
  - RFC793 TCP
  - RFC854 Telnet
  - RFC959 FTP
  - RFC1350 TFTP
  - RFC3164 Syslog
- Integrated Terminal Server
  - Telnet/SSH access by TCP port, IP address or server name
- General IPv4 Protocols
  - RFC791 IPv4
  - RFC792 ICMP
  - RFC826 ARP
  - RFC1027 Proxy ARP
  - RFC1035 DNS (Client)
  - RFC1519 CIDR
  - RFC1542 BOOTP (PXE Client and Relay)
  - RFC2131 DHCP (Server and Relay)
  - SNMP MIB Support
    - RFC1213 MIB
    - RFC1215 TRAP-MIB
    - RFC22863 MIB
    - SNMPv2 MIB
    - SEAMICRO Enterprise MIB
    - SEAMICRO TRAP MIB
- Environmental
  - Operating Temperature: 50° to 95°F (10° to 35°C)
  - Non-operating Temperature: -40° to 149°F (–40° to 65°C)
  - Operating Humidity: 5 to 93% non-condensing
  - Non-operating Humidity: 5 to 93% non-condensing
- Warranty Information
  - Hardware: 3 year
- RoHS
  - All SeaMicro components are EU RoHS compliant.