

Lanner

White Paper

Establish Optimal Performance and Power Consumption
Ratio with Intel® Xeon® D-1500 Series Processor

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Overview

The drive to redefine enterprise total cost of ownership (TCO) has contributed to the rise of midrange systems, the type of servers that can process large-scale instructions and applications, though less powerful than mainstream servers. Midrange network servers have been favored by small-and-medium enterprises and regional division and subsidiaries of global corporations due to their affordable TCO, lower power consumption and scalable open architecture mainly by Intel architecture-based platforms.

The Intel® Xeon® Processor D-1500 family, formerly codenamed Broadwell-DE, is primarily launched for midrange network servers by bringing the optimal performance and power consumption ration, while delivering enhanced hardware virtualization, workload optimization and reliability features to meet the networking demands of SMEs and regional divisions/subsidiaries.

Technological Benefits of the Intel® Processors D-1500 Family

The launch of the Intel® Xeon® D-1500 family is basically the combination of both high-performance and low power consumption, clearly set for midrange and entry-level networking servers. Built in 14nm microarchitecture, the Intel® Xeon® D processor family integrates up to 8 processing cores and PCH into one completed BGA SoC with multiple server features.

As the pioneer SoC for Intel® Xeon® family, Intel® Xeon® Processor D-1500 Family is often compared to the widely-adopted Intel® Atom™ SoC family. By leveraging the high-performance design into 14nm SoC architecture, the “Xeon-D” shows 3.4 times higher performance for each node than the Intel® Atom™ SoC processor counterpart. When operating under VPN with IPsec packet transmission, the Intel® Xeon® D Processor delivers 5.4 times higher performance. As a network server, Intel® Xeon® D Processor is tested to run 3.6 times higher efficiency.

Power efficiency wise, Intel® Xeon® D processor is 1.7 times more power efficient per watt from Intel® Atom™ processor family. In addition, the average TDP of Intel® Xeon® D Processors is only 19 to 65W, which greatly assists data centers in lowering power costs due to interconnected services and high volume of traffic.

There is an integrated memory controller in the Intel® Xeon® D Processor family which offers wide compatibility. The memory controller is compatible with both DDR3L and DDR4 memories and supports both U-DIMM (up to 64GB) and R-DIMM (up to 128GB) with ECC and non-ECC. Notably, there is a limitation that each CPU is accompanied by a maximum of four DIMMs.

Networking capability is another major emphasis for the launch of Broadwell-DE. The Intel® Xeon® Processor D-1500 Family supports two 10GbE interfaces, and is downward compatible with 1GbE and 2.5GbE modes. The Ethernet interface also integrates SR-IOV (Single Root I/O Virtualization) as a virtualization optimization feature.

There are reliability, serviceability and availability features incorporated in the Intel® Xeon® D processor family. Regarding encryption engine capability, the CPU family supports AES-NI. To accelerate packet inspection and processing, Intel® Xeon® Processor D-1500 Family is supported by Intel DPDK technology.

Benchmark Results

Lanner has conducted benchmark tests for Intel® Xeon® Processor D-1548 through our NCA-4010 model. The following will provide benchmark results about our tests.

Test Environment

BIOS version	NCA-4010A
CPU	Intel® Xeon® Processor D-1548
DRAM	Transcend 8G DDR4 2133 REG x 2
IPMI card	IAC-AST2302
Storage	WD5000BPVT 500GB
Operating system	Kernel 3.10.0)
Power supply	FSP FSP220-50LH 220W

Test Setting

Test Mode: throughput %

- Application: IXIA Automate 7.40.132.5GA-SP3 (IXIA XM12)
- Test mode: Throughput %
- IP version: IPv4
- Pattern: Backbone (Pair)
- Direction: A < - >B
- Protocol: IP
- Frame size: 64, 128, 256, 512, 1024, 1280, and 1518 bytes
- Duration: 30 Seconds
- Loss Tolerance: 0%
- Resolution: 0.01%
- Benchmark(Mb/s) = ((Throughput / 100) * 1000(GigaLAN)) * 2 (Bi-Direction)

NCA-4010 LAN Port Allocations for Copper and Fiber Ethernet Ports

NCA-4010 System (1GbE copper)				Fiber 10GbE
LAN07-08	LAN 05-06	LAN 03-04	LAN 01-02	LAN17
LAN 15-16	LAN 13-14	LAN 11-12	LAN 09-10	LAN18

Ethernet Throughput Test Results with 1GbE RJ-45 Copper

Frame Size	64	128	256	512	1024	1280	1518
Type							
	Throughput %						
	Protocol: IP / Cable length: 1.8m						
2-port							
LAN14 to LAN15	51.220	87.059	100.00	100.00	100.00	100.00	100.00
LAN07 to LAN08	54.545	92.500	100.00	100.00	100.00	100.00	100.00
4-port							
LAN01 to LAN04	44.681	76.289	100.00	100.00	100.00	100.00	100.00
LAN05 to LAN08	44.681	77.083	100.00	100.00	100.00	100.00	100.00
LAN09 to LAN12	47.191	75.510	95.833	99.625	100.00	100.00	100.00
8-port							
LAN01 to LAN08	38.182	63.248	100.00	100.00	100.00	100.00	100.00

Ethernet Throughput Test Results with 10GbE Fiber

Frame Size	64	128	256	512	1024	1280	1518
Type							
	Throughput %						
	Protocol: IP / Cable length: 1.8m						
2-port							
LAN17to LAN18	5.563	9.466	17.173	30.343	59.025	73.171	90.732

About Lanner Electronics Inc.

Founded in 1986 and publicly listed (TAIEX 6245) since 2003, Lanner Electronics, Inc. is an ISO 9001 certified designer and manufacturer of network application platforms, network video platforms and applied computing hardware for first-tier companies. Lanner's expertise also extends to include driver and firmware support, enabling customers to optimize hardware and software communication to achieve faster time to market. With headquarters in Taipei, Taiwan and branches in the U.S. and China, Lanner is uniquely positioned to deliver custom technical solutions with localized, value-added service.

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