Lanner

White Paper

The 6th Generation of Intel® Core™ Processors To Redefine Serviceability in Video Streaming for Network and Cloud Computing

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Table of Contents

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Overview

According to recent researches, streaming videos have taken up a larger and larger share of the network traffic. It is predicted that videos may occupy almost 80 percent of the traffic at the time of this writing. That means, users of desktops, laptops and mobile devices are demanding higher quality of streaming videos. To address the demand, Intel® has launched the 6th Generation Core™ processors (codenamed "Skylake"), which integrates ultra processing power in graphics and data. The promise of the new processors will save server makers the TCO (Total Cost of Ownership) by delivering improved graphic streaming quality without the space-taking, power-consuming PCI-e based graphic cards. On the other hand, servers powered by the 6th Generation Intel® Core™ improve serviceability at the competitive edge.

Technological Benefits of the 6th Generation Intel® Core™ Processors

The 6th Generation Intel® Core™ processors, formerly codenamed "Skylake", is in the new microarchitecture design using the 14nm manufacturing process. According to Intel®, the launch of the 6th Generation CPU serves as the "Tock" of its "Tick-Tock" roadmap. Some of the major technology break through at a system performance level is the addition of 4K-enabled graphics resolution and the adoption of DDR4 memory for mainstream adoption and power efficiency.

To address the serviceability and competitiveness for cloud-computing and network service providers, the launch of the 6th Generation Intel® Core™ CPU comes with several performance boosting designs. First, taking Intel® Core™ i7-6700TE Processor for example, the CPU model is built with Intel® Turbo Boost Technology 2.0 to increase the clock speed for each active core, whenever the voltage is detected as under the specified maximum. This will drive the clock speed to its optimal level. Secondly, majority of the 6th Generation Intel® Core™ processors are programmed with Intel® Hyper-Threading Technology to enable multi-tasking while remaining at peak performance.

Graphic processing capability is another focus of the 6th Generation Intel® Core™ processors. The processor series all come with powerful graphic processing capabilities, by integrating Intel® HD Graphics 530 or by integrating the Intel® Iris/Iris Pro graphic engines. Taking Intel® Core™ i7-6700TE Processor for example, the CPU features Intel® HD Graphics 530, Intel® Tru-3D Technology, Intel® Clear Video HD Technology, Intel® Quick Sync Video, 4K-enabled, and Intel® Wireless Display, all of which benefit the serviceability for cloud-based, web-based video streaming quality.

Enterprises that provide network convergence and video transcoding services may consider the Xeon® E3-1500 v5 families which integrates GT4e, the highest-end of GFX engine to drive Intel® Iris/Iris Pro graphic capability to the ultimate. For example, a video transcoding card like Lanner's NCS2-VT02A which integrates Intel Iris Pro Graphics GT4e engine and Intel Xeon E3-1515 v5 CPU can be adopted in network appliances can improve graphics streaming and video trancoding capability, saving TCO and servers to boost video streaming quality and processing.

Lanner's NCS2-VT02A Video Transcoding Module

Another major advantage for this platform evolution is the adoption of both DDR4 and DDR3L. Both memory specifications offer lower power consumptions than previous generations. Indeed, power efficiency is extremely important as streaming video through network traffic usually consumes high power.

Benchmark Results

Lanner has conducted benchmark tests for Intel® Core™ i3-6100TE Processor (4M Cache, 2.70 GHz) and Intel® Core™ i7-6700TE Processor (8M Cache, up to 3.40 GHz) based on our NCA-4210. The following will provide benchmark results about our tests.

Test Platform

Tested Product	NCA-4210B
CPU	Intel® Core™ i3-6100TE Processor (4M Cache, 2.70 GHz), Intel® Core™ i7-6700TE Processor (8M Cache, up to 3.40 GHz)
DRAM	Transcend DDR4 16G 2133 ECC X2
Benchmark tool	CPU Mark V2.1
IPMI card	IAC-AST2302
Storage	WD WD20NPVX 2TB/SATA3/8MB
Operating system	Windows 8.1 Professional 64bit
Power supply	FSP FSP220-50LH 220W

CPU Configurations

Configuration 1 – NCA-4210 with Intel® Core™ i3-6100TE Processor

Processor	Intel® Core™ i3-6100TE Processor
CPU speed	2.70 GHz
Bus speed	100 MHz
Bus/Core Ratio	27
L2 Cache	512KB
L3 Cache	4MB
CPU score	2C4T
Package	LGA1151
Manufacturing process	14nm
Thermal design power (TDP)	35W

Configuration 2 – NCA-4210 with Intel® Core™ i7-6700TE Processor

Processor	Intel® Core™ i7-6700TE Processor
CPU speed	2.40 GHz
Bus speed	100 MHz
Bus/Core Ratio	24
L2 Cache	1MB
L3 Cache	8MB
CPU score	4C8T
Package	LGA1151
Manufacturing process	14nm
Thermal design power (TDP)	35W

Configuration 3 – NCA-4210 with Intel® Core™ i7-6700 Processor

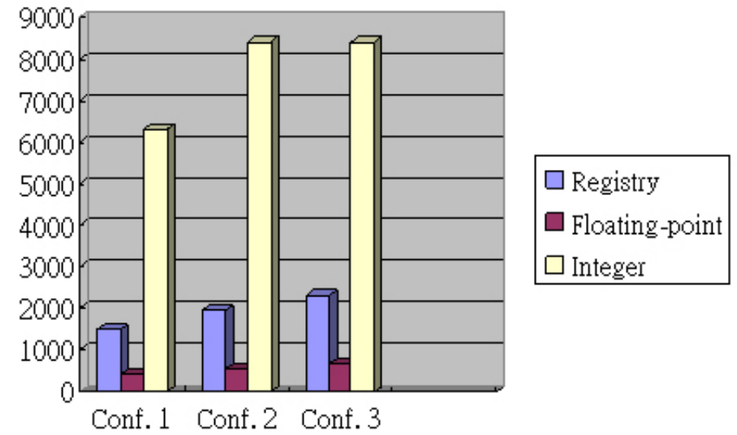
Processor	Intel® Core™ i7-6700 Processor
CPU speed	3.40 GHz
Bus speed	100 MHz
Bus/Core Ratio	34
L2 Cache	1MB
L3 Cache	8MB
CPU score	4C8T
Package	LGA1151
Manufacturing process	14nm
Thermal design power (TDP)	35W

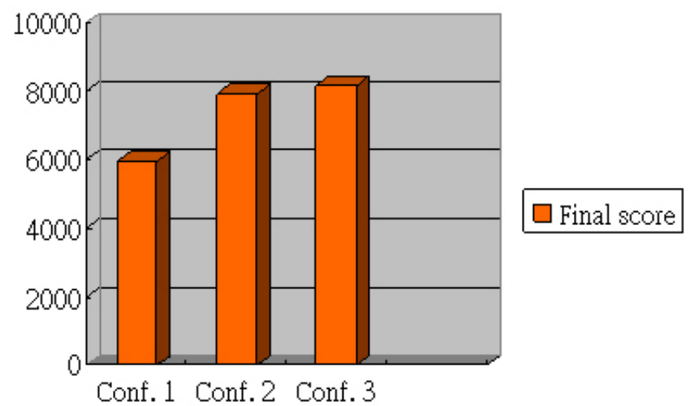
CPU Mark 2.1 Score

Lanner has conducted CPU Mark 2.1 Score tests based on the three CPU configurations and the test platform mentioned above. The results are shown in the following tables and graphs.

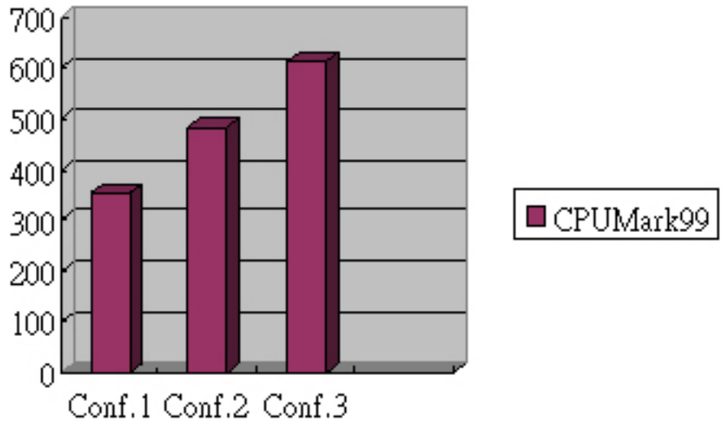
Configuration	Registry	Floating-point	Integer	Final Score*
1	1482.9	400.2	6302.5	5955.3
2	1939.2	525.2	8403.4	7918.6
3	2291.8	646.4	8403.4	8156.5

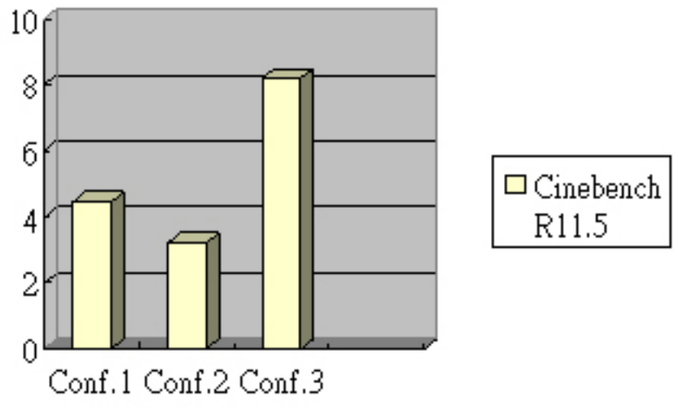
*Final score = 40% Score of Registry score + 80% Score of Floating-point + 80% Score of Integer score. The calculations are schemed to evaluate the performance of data processing in terms of registry operations, floating-point operations, and integer operations within the architecture.





Configuration	CPUMark99	Cinebench R11.5
1	354	4.43 pts
2	484	3.21 pts
3	612	8.20 pts





Ethernet Throughput Benchmark

Test Environment

BIOS version	NCA-4210B Ver.T08
CPU	Intel® Core™ i7-6700TE Processor (8M Cache, up to 3.40 GHz)
DRAM	Transcend DDR4 8G 2133 ECC X2
Traffic Generator	XM12
IPMI card	IAC-AST2302
Storage	WD WD20NPVX 2TB/SATA3/8MB
Operating system	Linux Testbed
Kernel	2.6.35.11

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, and1518 bytes
- Duration: 30 Seconds
- Loss Tolerance: 0%
- Resolution: 0.01%
- Benchmark(Mb/s) = ((Throughput / 100) * 1000(GigaLAN)) * 2 (Bi-Direction)

NCA-4210 with NIC module NCS2-IXM407 LAN Port Allocations

NCA-4210 System			NCS2-IXM407 NIC Module
LAN 5 -7	LAN 1, 7, 8	LAN 3, 4	LAN 1 - 4
eth 4 - 6	eth 0, 1, 7	eth 2, 3	
LAN 9 - 11	LAN 12 - 14	LAN 15, 16	eth 16 - 19
eth 8 - 10	eth 11 - 13	eth 14, 15	

Ethernet Throughput Test Results

Frame Size / Type	64	128	256	512	1024	1280	1518
	Throughput %						
1 pair	Protocol: IP / Cable length: 1.8m						
LAN 1 to LAN 2	75.00	100.00	100.00	100.00	100.00	100.00	100.00
2 pair							
LAN 1 to LAN 4	73.07	100.00	100.00	100.00	100.00	100.00	100.00
LAN 9 to LAN 12	73.06	100.00	100.00	100.00	100.00	100.00	100.00
4 pair							
LAN 1 to LAN 8	68.85	100.00	100.00	100.00	100.00	100.00	100.00
LAN 9 to LAN 16	73.06	100.00	100.00	100.00	100.00	100.00	100.00
8 pair							
LAN 1 to LAN 16	39.62	59.20	84.15	100.00	100.00	100.00	100.00

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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