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Pentium II Xeon Processor

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The most important component of any personal computer is its microprocessor. This element largely determines the capabilities of the computing system and, figuratively speaking, is its heart. To date, Intel remains the undisputed leader in the creation of modern processors [1].

Since the beginning of July 1998, a series of events dedicated to the presentation of the most powerful processor architecture of Intel Corporation's h86 have been held around the world. Long before that, the information posted on Intel Web-sites became known for its name and purpose. It was emphasized that the word Xeon should be pronounced gently as *Zeon*, but the Russian mission decided to subordinate this name to the norms of the Russian (and Greek) language.

The new processor, by the way, was a gift to the manufacturing company itself on the occasion of the thirtieth anniversary.

The first thing that catches the eye – an unusually large size of the processor cartridge which is *Packed* Xeon. It is designed to fit into the connector new design of Slot 2. According to the developers, this is due to the increase in cache memory capacity of the second level. At the moment the Xeon processors with a common clock frequency supplied in two versions: 512 KB and 1 MB L2 cache. But this year it is planned to increase the capacity of the second level cache to 2 Mbytes and increase the clock frequency to 450 MHz. Let me

remind you that the old Pentium II was completed with only 512 Kbytes.

The high frequency of the cache caused an increase in the heat transfer of the processor unit, so it took the use of a massive heat-absorbing plate, which, in turn, led to an increase in the weight and dimensions of the module.

In each Slot 2 module, there are three special data areas: a read-only area, a read/write area, and dynamic temperature information inside the processor module. The first type contains information about the processor version, information about step-by-step debugging, and the maximum allowed temperature. In the second area of memory, users can enter their information. Access to dynamic temperature data allows control programs to notify the administrator about dangerous system events.

Increasing the capacity of the second-tier cache increases system throughput by allowing processors to instantly access frequently used data and instructions stored in fast cache memory. According to Intel, the increase in cache capacity from 512 KB to 1 MB sometimes leads to a 20% increase in the overall performance of the system.

To explain this phenomenon, it is appropriate to draw an analogy with the refrigerators used by Intel: storing food in the refrigerator eliminates the need for restaurant chefs to go shopping, buying provisions. The larger the refrigerator, the better, especially at peak times, when the number of customers in the restaurant increases sharply. So, in the case of the server *refrigerator* – a cache memory of the second level, and *store* (where the same products are available) – in principle, slower system memory.

A large L2 cache significantly improves the overall performance of multiprocessor configurations on systems that run large arrays of incomparable data. According to Intel, the Corporation carried out the ZD Server Bench tests showed a

nearly proportional increase of system performance as installation of additional processors with MB cache.

The advanced Xeon architecture, which allows 36-bit addressing of physical memory, theoretically allows the processor to access system memory up to 64 GB. The new mechanism of page-to-Page exchange Page Size Extension-36 will remain almost invisible to the eyes of the user and application developers. Currently PSE-36 support operating systems Windows NT, SCO UnixWare and Sun Solaris. For other operating systems, you will need to update the memory management unit driver.

The Intel 450NX PCIset has become the first chip set that is optimized for Pentium II Xeon processors. It is available in two versions, Basic and Full, respectively for hi-end server and midrange systems. They have the same core structure, but differ in performance and price.

Basic PCIset supports up to two 32-bit PCI slots, one 64 - bit and up to 4 GB of EDO-type system memory. It is more advanced *relative* Full PCIset supports up to four EDO type slots. These chipsets combine the 100-megahertz frequency operation of the system bus and the ability to support multiprocessor (up to four Xeon) configurations. 64-bit PCI bus is able to significantly improve the overall performance of the system including fibre optic technology of data exchange with disk arrays, the use of high performance network backbones based on ATM, Gigabit Ethernet, and others. The synchronization of processor power and I/O subsystem performance is essentially increasing.

Another feature of the chipset 440GX was the ability to access memory capacity of up to 2 GB, which is twice more than its receiver.

Despite the fact that currently the concept of multi-processor associated with Intel only four devices on the same Board, work is underway on the creation of a symmetrical

multiprocessor system, supporting up to eight *Seonow*. The development of the eight-channel chipset for Xeon is conducted by Corollary, a subsidiary of Intel. And, of course, possible cluster solutions, for example, based on the architecture of distributed memory (NUMA). In both cases, as a rule, you do not need to rewrite application programs (however, the operating system requires some optimization). The processor bus chipset Intel 450NX PCIset provides a so-called cluster connection connector, which makes it easy to build a cluster connection based on standard four-processor nodes.

Another promising direction is to cluster with message passing. The essence of it is the lack of separation of resources. Stand-alone cluster nodes exchange data, such as clock pulses, indicating the normal state of the system. Although the LAN connection remains functional, there is a need for a new type of network – the so called SAN (System area Network) [2].

In conclusion, I would like to note that some leading Western manufacturers (IBM, NCR, Dell) have already started supplying systems based on Xeon, and at the presentation of the processor in Russia Kraftway and Vist also presented their new server solutions. Approximate prices on Pentium Xeon will be $ 1124 (L2 512 KB) and 2836 $ (L2 1MB) in the supply of thousands of pieces.

References:

1. Mode of access: https://en.m.wikipedia.org/wiki/Pentium_ II. – Date of access: 24.02.2018.
2. Mode of access: https://books.google.by/books?id=2ogntwEACAAJ&dq=System+area+Network&hl=ru&sa=X&ved=0ahUKEwjI47_XmajbAhXkK5oKHdU9C9AQ6AEIJjAA. – Date of access: 27.02.2018.