Report for: “Rechnerorganisation 1”

Wintersemester 2009/2010

Prof. Gundolf Haase

Group: “Scientific Working Place”

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Task:

The Task was to upgrade the computer “Scientific Working Place”, which has been constructed by a group in the Wintersemester 2007/2008.

The main purpose of building this computer was to do scientific computations, so the components are selected in a way to fulfill these requirements. Graphics and design were rather important. With respect to the workload of this computer, to improve the

speedup of the computation, more RAM and another CPU is needed. In addition – for audio purposes like using “Skype” - a soundcard and a webcam should also be added to the computer. So our task was to buy more RAM, another CPU with a cooler, a soundcard and a webcam. The power consumption of all these new components should also be taken into account and check whether the existing power supply is still adequate.
The primary estimate of the budget is 800 Euros. However, there is no serious limitation in this case.

Scientific Working Place before upgrading

Before upgrading,the configuration of the computer was as follows:

Hardware	Comment
CPU – AMD Opteron 2214WOF 2200 Mhz F Dualcore	Instead of Opteron “Barcelona” Quadcore
Cooler: Noctua NH U 12 F	17 dB, 151.5 x 126 x 94.5 mm
Motherboard – Tyan Thunder nF3600 E	Two Sockets F with 8 RAM Tyan 2932G2NR-E
RAM – 2x Kingston DDR2677 REG ECC 2048 MB	registered ECC; CL5
HDD Samsung 500GB 16MB SATA II	SATA II; 8,9ms
Graphics card ASUS EN8600 GeForce GT Silent	265 MB GDDR3, silent (without fan) 2x DVII Duallink
Power supply – Chieftec 550W ATX2	Chieftec GPS550AB
Case – Chieftec ATX	Chieftec BH01BBB
DVD Burner – LG	
Mouse, Keyboard– Logitec	USB Mouse with PS2 adapter

Upgrading

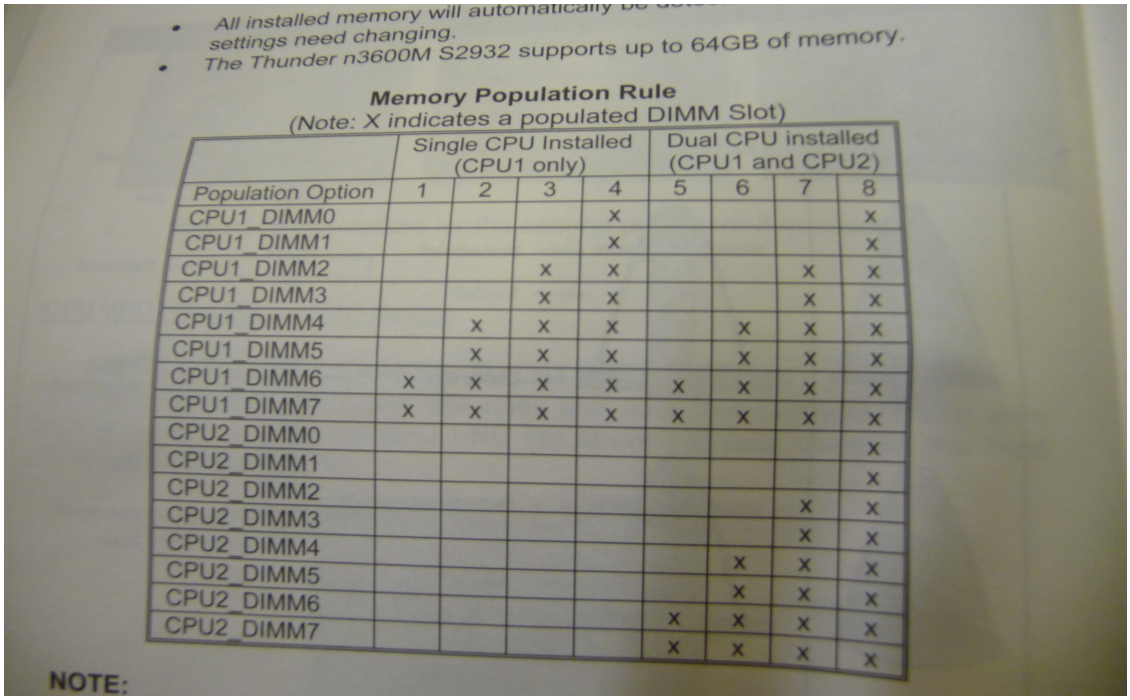
RAM

The first task was to increase the number of RAM-modules in the computer. There were already two modules of 2048 MB available, and in the upgrading procedure it should be increased to 20 GB (another 4 x 4 GB).

In order to avoid any future conflict, the new modules should be the same as the old ones, except in their capacity. For instance, in this case, they should be Kingston, ECC, DDR2. To be ensured here, that the right modules were chosen, the serial number(KVR667D2D4P5) of the previous module was also checked and the modules with the same serial number were bought.

The second point which should be taken into account was, that these new modules should be installed pairwise, otherwise they can not be recognized by the computer.

Before adding the new RAM-modules, the corresponding instructions in the motherboard's manual was also checked. As it can be recognized on the following pictures (pictures 1,2),installing the new modules should be started from DIMM7 and be continued in the same order as follows:



- All installed memory will automatically be
  settings need changing.
- The Thunder n3600M S2932 supports up to 64GB of memory.

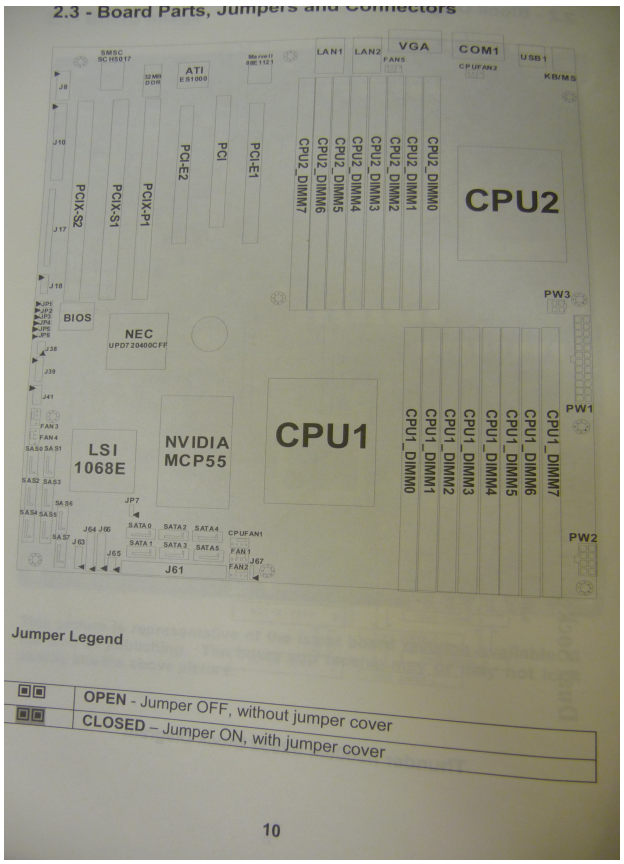
Memory Population Rule

(Note: X indicates a populated DIMM Slot)

	Single CPU Installed (CPU1 only)				Dual CPU installed (CPU1 and CPU2)			
Population Option	1	2	3	4	5	6	7	8
CPU1_DIMM0				X				X
CPU1_DIMM1				X				X
CPU1_DIMM2			X	X			X	X
CPU1_DIMM3			X	X			X	X
CPU1_DIMM4		X	X	X		X	X	X
CPU1_DIMM5		X	X	X		X	X	X
CPU1_DIMM6	X	X	X	X	X	X	X	X
CPU1_DIMM7	X	X	X	X	X	X	X	X
CPU2_DIMM0								X
CPU2_DIMM1								X
CPU2_DIMM2							X	X
CPU2_DIMM3							X	X
CPU2_DIMM4						X	X	X
CPU2_DIMM5						X	X	X
CPU2_DIMM6					X	X	X	X
CPU2_DIMM7					X	X	X	X

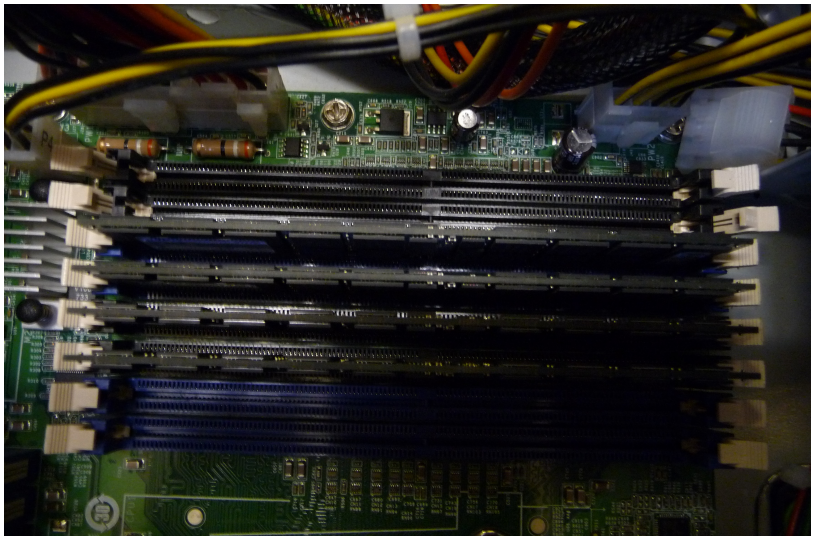
NOTE:

Picture 1: The memory population rule of the motherboard

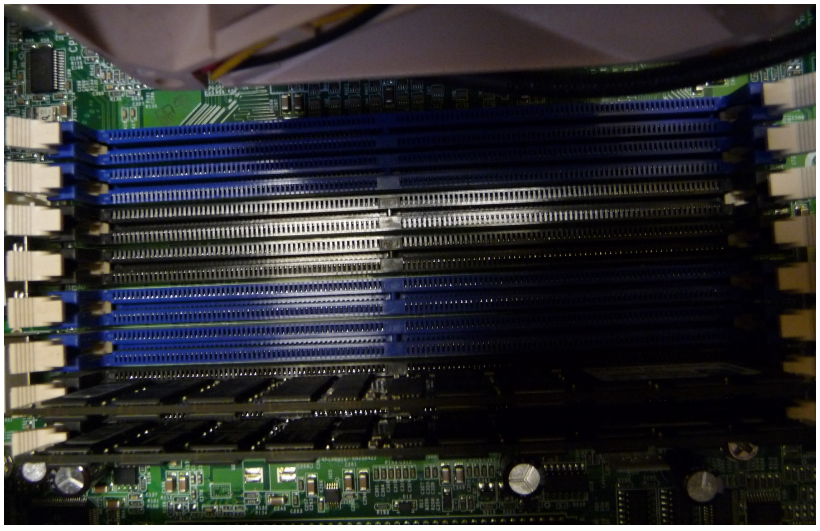


Picture 2: The jumper legend

Since DIMM7 of CPU1 is blocked by the case, the first two DIMMs are not applicable anymore and instead, DIMM5 and DIMM4 were used first. After installing all the RAM-modules, their recognition by the computer was also checked via the BIOS.
On the following pictures, the position of the RAM-modules on the motherboard is shown. The position of the RAM-modules of the CPU1 can be seen on picture 3 and the same information regarding to the second CPU is also depicted on picture 4:



Picture 3: The DIMM slot occupied by the RAM-modules belonging to the CPU1



Picture 4:The DIMM slot occupied by the RAM-modules belonging to the CPU2

First, one pair of 4 GB modules was bought. Then after being insured that the modules were compatible with the existing ones, the rest was also ordered. There was a problem of getting more modules because of the delivery bottleneck, so two vendors (Lammer, Diskontcomputer) couldn't deliver the stuff within a month and the orders were canceled.
The required information corresponding to the new modules is also tabulated in the following table:

Hardware	**Vendor**	**Price**	**Comment**
2x Kingston DDR2 REG ECC, 4GB KVR667D2D4P5	EGW	209,54 €	Pair
2 x Kingston DDR2 REG ECC, 4GB KVR667D2D4P5	Diskontcomputer	197,40 €	Not deliverable
Kingston DDR2 REG ECC, 4GB KVR667D2D4P5	EGW	122,84 €	Single
Kingston DDR2 REG ECC, 4GB KVR667D2D4P5	Lammer	117,88 €	Not deliverable
Kingston DDR2 REG ECC, 4GB KVR667D2D4P5	EGW	117,33 €	Single

CPU and CPU-Cooler

To increase the speedup of the computation on this machine, another CPU was needed. The first CPU is an AMD Opteron 2214, 4 GHz Dualcore-CPU. For the sake of compatibility, the same CPU is bought for the second one.

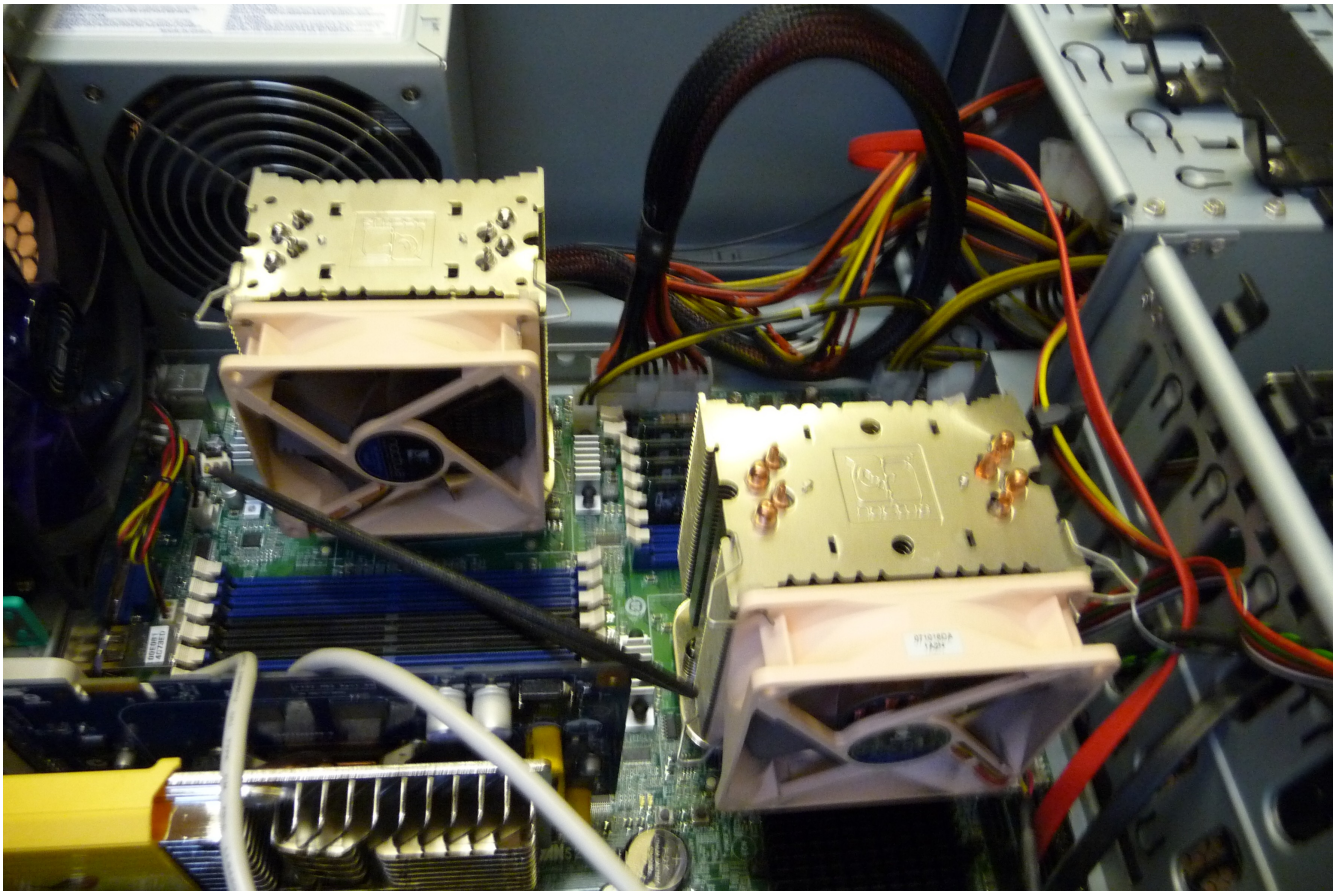
Every CPU needs the cooler. The CPU during its work makes a lot of heat which should be taken away from by the cooler, otherwise the CPU will be burnt. To choose the right cooler, the following points should be kept in mind:

First of all, the cooler's socket should be compatible with the CPU. In this case it should be socket F. The second point is, that the cooler should make a noise less than 20 db, especially if it is going to be used at the office or at home.

The cooler “Noctua NH-U9DO” was chosen, here, since it can satisfy all the above requirements. In addition, it is especially designed for AMD Opteron Dualcore CPU. The last, but not the least, point is, that this cooler is also the cheapest available one.

According to the manual which was available on the package, the cooler was installed. During the installation, it should be considered not to use too much glue, since it can decrease the heat conductivity.

After installing the second CPU, the motherboard looks like as follows:



Picture 5: The motherboard after installing the second CPU

The information regarding to the second CPU and its cooler is also put into the following table:

Hardware	**Vendor**	**Price**	**Comment**
CPU – AMD Opteron 2214WOF, 2.2GHz, Socket F	Yellowcent	260,10 €	As Second CPU
Cooler -Noctua NH-U9DO, Socket F	Rascom	60,70 €	For second CPU

Web cam

The web cam is chosen with respect to its compatibility with the available operating system, which in this case is Opensuse 11.0. Working with Skype was the only demand to choose the webcam, so it was decided to buy a low-end model. The model is Logitech QuickCam E3500.

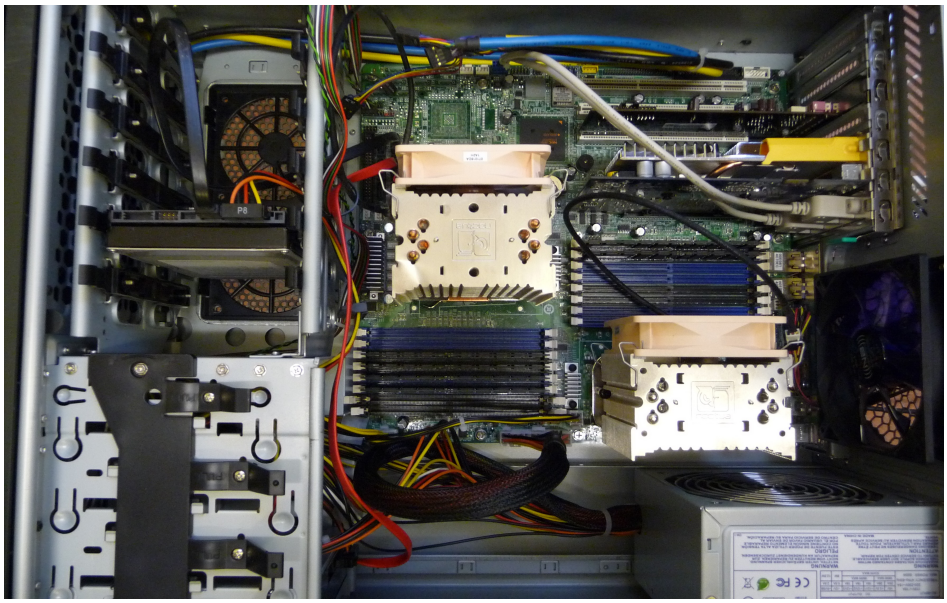
Sound Card

The Sound Card is also chosen with respect to its compatibility with the available operating system, which in this case is Opensuse 11.0. Working with Skype was the only demand to choose the sound card, so it was decided to buy a low-end model. The model is Asus Xonar DS PCI 7.1 Audio Card.
The first sound card (Creative Sound Blaster) didn't work under any available operating systems, Windows XP and Opensuse. It was recognized via the BIOS, but no sound could be heard, so the second sound card (Asus Xonar DS PCI 7.1 Audio Card) was bought. The new sound card is working under the Windows XP. However, the same problem exists with Opensuse. This shows that there is no hardware defect and this problem might be caused by the driver software, as the diver is made for Windows.

Power supply

Since another graphical card has not been added to the computer, the existing power supply (Chieftec 550W ATX2) is still adequate.

Final Configuration:



Hardware	Vendor	Price	Comment
2x Kingston DDR2 REG ECC, 4GB KVR667D2D4P5	EGW	209,54 €	Pair
Kingston DDR2 REG ECC, 4GB KVR667D2D4P5	EGW	122,84 €	Single
Kingston DDR2 REG ECC, 4GB KVR667D2D4P5	EGW	117,33 €	Single
CPU – AMD Opteron 2214WOF, 2.2GHz, Socket F	Yellowcent	260,10 €	As Second CPU
Cooler -Noctua NH-U9DO, Socket F	Rascom	60,70 €	For second CPU
Sound card – Creative Sound Blaster Audigy SE 7.1, PCI	DiTech	22,70 €	broken
Sound card – Asus Xonar, DS PCI 7.1 Audio Card	DiTech	40,90 €	

Web cam – Logitech QuickCam E 3500	Distrelec	22,50 €	

Total Price: 856,61 Euros

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