Offer

For
University of Ljubljana
Mechanical Engineering

Linux Clustersystem

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1000 Ljubljana, Slovenia

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Chemnitz-Röhrsdorf, den 29.01.2010

Tender for Invitation Linux Clustersystem

Dear Dr. Kos,

Thank you for sending us your request for proposal concerning your future investment project. I am pleased to present the tender of MEGWARE Computer Sales and Service GmbH.

Especially for your requirements in mechanical engineering we developed a tender that will enable you to solve your tasks in the area of high performance computing faster, more efficient and more successful. At the same time we would like to offer our cooperation for installing a perfectly executed and powerful overall system. Our colleagues will work with all their strength, with their heart and in one team in order to accomplish a project that completely meets your expectations.

We look forward to a successful partnership.

Yours sincerely

MEGWARE Computer GmbH
HPC and Cluster

Silke Lerche
HPC Sales

List of Contents

1. Details and Basics concerning our Tender

Prices	All prices are quoted in Euro exclusive of VAT. Payment is due within 14 days net from consignment of goods.
Validity Period	This tender is valid until 14 days.
Delivery	Delivery is executed by our central logistics in Chemnitz in agreement with the desired destination.
Service Concept	Coordination in case of service (failure or breakdown of equipment) is executed by our central service centre in Chemnitz. From there the service application will be arranged with the site calling and executed thoroughly. Our team of technicians guarantees the reaction time and is the base for high quality service.
Certificates	MEGWARE Computer GmbH is an enterprise certified in accordance with DIN EN ISO 9001:2008. All operative procedures are in accord with this certification. Particularly the technical equipment offered meets the requirements of the energy and radiation standards.
Guarantee	We issue a guarantee for the offered systems of 36 months. For individual stipulations concerning reaction time and place of performance please consult the detailed tender.

2. Company profile

The MEGWARE Computer Company, with its headquarters in Chemnitz, has worked on the production and installation of networked computer systems for more than 15 years. Starting off with a chain of computer shops, we adjusted our company to changing market conditions during the mid-nineties, and concentrated on the distribution to small and medium-sized enterprises, public authorities, universities and research establishments.

Since 2000 we have focused on the area of supercomputing, especially the PC Clusters. On the basis of our long experience in the field of PC and server production as well as our sophisticated logistics, including our own vehicle fleet and for instance more than 1,000 m² (1,196 square yards) of high rack storage as well as a manufacturing capacity of 500 servers per day, we have been able to realise even large cluster projects to perfect consumer satisfaction right from the beginning. The installation of the 528 node cluster CLIC at the Technical University of Chemnitz marked the beginning of many more system installations at many universities, research establishments and enterprises in Germany, Europe and beyond. You will find the most important installations in our list of references for PC Linux cluster systems. In Europe, we are one of the market leaders in this area.

One of our most important aims is to constantly strike for the further development of our solutions. Both, continuously rising standards concerning the computing power of the systems and increasing efficiency of all the implemented components, demand new ways of assembling such systems. Our customers' experience led to many new product developments in the area of supercomputing. An example are our case systems SlashFive®, SlashTwo® and CoolNode®, which were designed in order to ensure optimal cooling while using the full performance capacity of the computer system. They have been tested by well-known manufacturers, e.g. AMD, and were rated highly reliable and useful. Another development by MEGWARE is the ClustSafe® power switch, which makes a remote controlled turning-off and turning-on of all or single nodes possible and ensures that the electric circuit will not be overloaded during the process of centrally starting or restarting a big cluster system. The management of a cluster system demands comfortable and centrally-controlled software. Our management software ClustWare® rounds off the range of our own solutions in the area of clusters. You find datasheets for each of our developments attached to the tender.

We attach great importance to long-time, mutual-benefit partnerships with our customers and aim to cultivate these relationships. These partnerships enable both partners to access knowledge and technical establishments, which will lead to a further development of scientific research and cluster solutions. Our close cooperation with leading manufacturers in the IT trade, such as INTEL, AMD and Mellanox, enables us to test new technology and systems at an early stage and lets us provide our partners with these items to be evaluated. We always have different systems at our disposal, which you could test either in your premises or through remote access.

3. Qualifications

We set great store by the reliability and durability of the systems installed by us. We select the assembled components according to strict acceptance tests, which leave only the most reliable and highest performance components for our use. This strictness is reflected in the low failure rate of the cluster systems.

Our centrally located service, with high-rack storage area, line production, repair service and cluster production premises, is the core of our company. Here, we preinstall the clusters turnkey ready before delivery and test them intensely. A 7-day burn-in test process ensures that all implemented components withstand the demanding requirements of a sustained operation. A documentation of the systems, including network maps, overviews of cabling and identification certificates will be composed. Then the system will be disassembled and delivered to the customer. At your location, a final assembly and ready-to-operate installation of the software takes place, which will be completed by a comprehensive introduction for the end-users. In addition to the installation, we provide fast support in the unlikely event that the cluster needs guarantee service and will, abiding maintenance and support agreements, back up our customers in word and deed concerning all questions regarding the use of their cluster system.

Our highly qualified system engineers, graduated academics in the area of informatics, place their services concerning the cluster systems at your disposal. In addition to this, MEGWARE employs 10 specialists in our customer service department who will take care of the assemblage and the cabling up to the connection to the electricity mains. Parts of this personnel work together as a project team under one of our two project coordinators on the realisation of your cluster system.

Technical prerequisites like sufficient footprint and connections for sustained tests are available in our premises. Heidelberg's HELICS Cluster, for instance, which we installed at the Ruprecht Karls University two years ago and which contains 20 network cabinets with 256 nodes. We assembled this cluster in our premises, and for one week the personnel of the university was given the opportunity to execute pre-tests. Also logistics are taken on by MEGWARE. This ensures that the systems arrive at the scheduled time and in the optimal state at the customer's premises.

The experience and expertise of our system engineers is extensive and comprises a multitude of state-of-the-art and future technology. We installed on of the first InfiniBand cluster systems in Germany at the Technical University of Munich in 2002. Since then we delivered many turnkey cluster solutions to our customers in Europe and Middle East.

We are looking forward a good partnership with you.

4. References

Since 2000 MEGWARE is working in the field of High Performance Computing. Many years of good partnership with our customers from Research and Universities as well as industrial customers lead to the following installations of cluster systems in the past years.

(Extract from our list of references)

Max Planck Institut Golm Albert-Einstein Institut
Different clustersystems installed between 2003 and 2007
sum: 1,800,000.00 Euro

University Frankfurt am Main
Several cluster systems installed between 2003 and 2006
sum: 1,600,000.00 Euro

Leibniz Rechenzentrum Munich
Several cluster systems installed between 2003 and 2005
sum: 600,000.00 Euro

AMTC Dresden
Several cluster systems installed between 2003 and 2004
sum: 400,000.00 Euro

TU Chemnitz
Lustre storagesolution with partner Xiranet in 2006
Sum: 240,000.00 Euro
By order of IBM Clustersystem, installed in 2006
Sum: 2,300,000.00 Euro

GFZ Potsdam
Clustersystem with Panasas storage solution installed in 2006
Sum: 1,150,000.00 Euro

5. Offer

No.	Quant.	Title Preformance Techn. Description	Unit Price net in EURO	Total Price net in EURO
1	*2*	*3*	*4*	*5*
1	**36**	**MEGWARE MiriQuid® X5500 Dual Xeon node IB** in a 2U Twin Chassis This chassis includes heat sinks, especially developed for servers, so critical heat hot spots will be avoided. integrated Hardware per node: - sufficient dimensioned power supply - Supermicro mainboard X8DTT-IBQF which supports up to two Intel Xeon CPUs of the 5500 series - two 64 bit Intel Xeon X5550 quad core CPUs with 8 MB cache and 6,4 GT/ sec. clock rate: 2,66 GHz incl. the needed CPU-cooler - 24 GB main memory (3 GB per core), which will be realized with 6 tested and certified DDR3 ECC registered 1333 MHz memory modules 4 GB each - 1 SATAII hard disk of RAID Edition series by a branded manufacturer with 250 GB capacity, 7.200 rpm and 16 MB cache, it is 24 h x 7 d certified and perfectly suitable for clusters - 2 gigabit ethernet LAN interfaces onboard available - Mellanox ConnectX QDR Infiniband 40Gbps Controller w/ QSFP connector onboard available - integrated IPMI 2.0 with KVM and dedicated LAN - graphics controller with 32 MB cache is available - incl. 36 months hardware warranty	**3.806,00**	**137.016,00**
2	**20**	**MEGWARE MiriQuid® X5500 Dual Xeon node** in a 2U Twin Chassis This chassis includedes heat sinks, especially developed for servers, so critical heat hot spots will be avoided. intigrated Hardware per node: - sufficient dimensioned power supply *position 2 will continue*	**3.459,00**	**69.180,00**
			batch total:	206.196,00

add carry: 206.196,00

No.	Quant.	Title Preformance Techn. Description	Unit Price net in EURO	Total Price net in EURO
1	*2*	*3*	*4*	*5*
		continuation position 2 - Supermicro mainboard X8DTT-F which supports up to two Intel Xeon CPUs of the 5500 series - two 64 bit Intel Xeon X5550 quad core CPUs with 8 MB cache and 6,4 GT/ sec. clock rate: 2,66 GHz incl. the needed CPU-cooler - 24 GB main memory (3 GB per core), which will be realized with 6 tested and zertified DDR3 ECC registered 1333 MHz memory modules 4 GB each - 1 SATAII hard disk of RAID Edition series by a branded manufacturer with 250 GB capacity, 7.200 rpm and 16 MB cache, it is 24 h x 7 d certified and perfectly suitable for clusters - 2 gigabit ethernet LAN interfaces onboard available - integrated IPMI 2.0 with KVM and dedicated LAN - graphics controller with 32 MB cache is available - incl. 36 months hardware warranty		
3	**1**	**MEGWARE MiriQuid® X5500 Dual Xeon Master** in 19" 2U chassis branded by Supermicro with 8 hot-swappable SATA-hdd-trays. The airflow is optimized, whereby critical warmth hot spots will be avoided. The chassis and mainboard are produced by the same manufacturer and therefore ideal suiteable for each other. Beyond that it is possible to remove the chassis without any tools. *position 3 will continue*	**6.041,00**	**6.041,00**

batch total: 212.237,00

add carry: 212.237,00

No.	Quant.	Title Preformance Techn. Description	Unit Price net in EURO	Total Price net in EURO
1	*2*	*3*	*4*	*5*
		continuation position 3 integrated hardware: - sufficient dimensioned and redundant power supply - Supermicro mainboard X8DTi-F which supports up to two Intel Xeon CPUs of the 5500 series - two 64 bit Intel Xeon X5550 quad core CPUs with 8 MB cache and 6,4 GT/ sec. clock rate: 2,66 GHz incl. the needed CPU-cooler - 24 GB main memory (3 GB per core), which will be realized with 6 tested and zertified DDR3 ECC registered 1333 MHz memory modules 4 GB each - 6 SATAII hard disks of RAID Edition series by a branded manufacturer with 2 TB capacity, 5.400 rpm and 64 MB cache, it is perfectly suitable for clusters and 24 h x 7 d certified - 2 SATAII hard disks of RAID Edition series by a branded manufacturer with 500 GB capacity, 7.200 rpm and 32 MB cache, it is perfectly suitable for clusters and 24 h x 7 d certified - 1 hardware RAID controller with 8 ports for mounting the 6 hard disks and configuration into RAID level 5 out of 6 x 2 TB, and the 2 hard disks into RAID level 1 out of 2 x 500 GB (for system software) - 2 gigabit ethernet LAN interfaces onboard available - incl. 36 months hardware warranty		
4	**1**	**High performance low latency network Infiniband QDR** for fast internal communication of the compute nodes with full bisectional bandwidth. The network consists of the managed Infiniband switch Voltaire 4036 with InfiniScale IV technology and is optimized for the high demands of a cluster interconnect. The switch is accommodated in a 1U rackmount chassis and will be integrated in the network rack. *position 4 will continue*	**8.960,00**	**8.960,00**

batch total: 221.197,00

add carry: 221.197,00

No.	Quant.	Title Preformance Techn. Description	Unit Price net in EURO	Total Price net in EURO
1	*2*	*3*	*4*	*5*
		continuation position 4 All required cables in optimal lenghts are included in our offer. 3 year hardware warranty is included.		
5	**1**	**Service network Gigabit Ethernet** for the Service- and Managementapplications, realized by two supermicro switches, which are connected by a dual-port 10 GE CX-4 interface module for each switch. 72 10/100/1000 Gigabit Ethernet ports are available in total. - one SSE-G48-TG4 with 48 ports Switching Capacity: 184Gbps - one SSE-G24-TG4 with 24 ports Switching Capacity: 136Gbps All required cables in optimal lenghts are included in our offer. 3 year hardware warranty is included.	**3.782,00**	**3.782,00**
6	**1**	**IPMI-Network Fast Ethernet** for remote management, administration and monitoring of important parameters realized by two Hewlett Packard Pro Curve switches,the 2510-48 with 48 ports and the 2510-24 with 24 ports. All required cables in optimal lenghts are included in our offer. 3 year hardware warranty is included.	**998,00**	**998,00**
7	**1**	**Cluster Software** Operating system openSUSE MPI for Infiniband Batchsystem SunGridEngine GNU Compiler C, C++, Fortran NX Server Remote Desktop Software for Linux	**0,00**	**0,00**

batch total: 225.977,00

add carry: 225.977,00

No.	Quant.	Title Preformance Techn. Description	Unit Price net in EURO	Total Price net in EURO
1	*2*	*3*	*4*	*5*
opt.	***1***	***Clustermanagement solution*** MEGWARE ClustWare® Appliance Academic Version The Clustermanagement solution is a combination of hardware- and software components. Hardware: dedicated node with SSD hard disk for high reliability and high performance Management- und Monitoringsoftware: characteristics: - simplyfied cluster-administration - automated computer installation and configuration - displays load of node, CPU, network, memory and storage - central information about systems wich need reparing - configuration and parameter changes at all nodes - supports the relief of the frontend from administration task and helps to concentrate on tasks like debugging and compiling, as well as pre- and postprocessing - very easy updates of system configurations for the nodes - executing parallel commands - monitoring of the power consumption - monitoring of jobs with intervention in the queuing system - monitoring and controlling of IPMI cards, ClustSafes and other PDUs - user-based registration - multi-lingual webbased user interface - remote power on and power off and restart of each node - incl. 36 months hardware warranty	***6.156,00***	***optional***
opt.	***1***	***MEGWARE ClustSafe® Power-Switch*** two MEGWARE ClustSafes PDU power distribution unit 19" 1U intelligent multiport power switch for the power connection of all nodes, with 18 Ports per switch. A sophisticated control logic securely distributes the main voltage to the requested node. Several ClustSafe® can be cascaded so that switching operations for several hundred consumers can be initiated. *position opt.will continue*	***2.682,00***	***optional***

batch total: 225.977,00

add carry: 225.977,00

No.	Quant.	Title Preformance Techn. Description	Unit Price net in EURO	Total Price net in EURO
1	*2*	*3*	*4*	*5*
		continuation position opt. Dependent on criteria such as turning-on load the cluster nodes can be linked or cut from the voltage. With it ClustSafe® contributes a considerable part to the cluster reliability and controllability. Cumulative Power load up to 16 A for three 230V wire (European power connector) 36 months hardware warranty		
8	**1**	**Cluster optimized MEGWARE rack system** technical main features: MEGWARE ClustRack® 2010 42U 19", w x h x d: 800 x 2.000 x 1.000 mm incl. socket, The safety module MEGWARE RackSecure® for the current sub-distribution of the rack provides efficient protection for the high-grade appliances and componenets of the entire cabinet system.	**1.808,00**	**1.808,00**
opt.	***1***	***MEGWARE RackView®*** Rackbased colour TFT-display with a touchscreen function that guides the operator intuitively and easily. You are able to control and supervise the cluster rack with management and monitoring functions, especially power consumption, temperature and humidity or start-up and run-down of cluster nodes.	***800,00***	***optional***

batch total: 227.785,00

add carry: 227.758,00

No.	Quant.	Title Preformance Techn. Description	Unit Price net in EURO	Total Price net in EURO
1	*2*	*3*	*4*	*5*
9	**1**	**Installation of the cluster "ready for operation"** Preinstallation and delivery to University of Ljubljana. The installation of hardware and software will executed in our facility incl. burn-In-test for all components. The rack will be equiped with all cables for network and power incl. all materials (rails, connecting blocks, etc.). After the installation and testing phase the system will dismantled, boxed, delivered to the University of Ljubljana. Onsite installation of the cluster system will be executed by our HPC engineer and technician, the cluster is ready to operate, the onsite installation includes a short briefing of the administrators in the usage of the clustersystem and clustermangement.	**14.536,00**	**14.536,00**
10	**1**	**Documentation** You get a particular written and digital documentation about your MEGWARE Clustersystem. It contains details about specifications of the system conclusively about software configuration. For the most important components you get the serial numbers. Also we will give you an overview about the installations, networking and IP addresses. Summary about current (project plan). A contact list with persons, who are responsible for installation and configuration. You get a CD for installation all the drivers, tools and sripts. Before preinstallation in our house, we will contact you about the host numbers. You will get the complete manuals and a book about clustersystems by delivery.	**0,00**	**0,00**

batch total: 242.321,00

add carry: 242.321,00

No.	Quant.	Title Preformance Techn. Description	Unit Price net in EURO	Total Price net in EURO
1	*2*	*3*	*4*	*5*
11	**1**	**36 months hardware warranty incl. Pick-Up service** beginning from the acceptance of the cluster system. After incoming fault message at our qualified supporting team we will pick up the defective part or node and send it back, when it is in function again. Fault messages can be reported from monday till friday (except statutory holidays) within 08.00 am and 06.00 pm.	**23.502,00**	**23.502,00**
		delivery within 4 - 6 weeks payment within 14 days		
		net sum in EURO		**265.823,00**
		plus 19% VAT		**50.506,37**
		total sum in EURO incl. VAT		**316.329,37**