

UNIVERSITY OF WISCONSIN – MILWAUKEE LIGO SCIENTIFIC  
COLLABORATION GROUP  
– UWMLSC –

Technical Note	UWMLSC – T000001-02	January 31, 2008
<h1>Hardware Upgrade Recommendation for <a href="http://gravity.phys.uwm.edu">gravity.phys.uwm.edu</a></h1>		
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*Distribution of this document:*

UWMLSC Group

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## **Motivation**

For over a year now, the server hosting the gravity.phys.uwm.edu domain has been taxed to nearly the breaking point. This is the result of continually increasing demand for services hosted by this server due to the rapid growth of the community it serves, to wit, the LIGO Scientific Collaboration (LSC). While the hardware for this server may have been considered server class years ago when it was first commissioned, Moore's law has seen this configuration become exponentially obsolete. If the UWMLSC group is to continue to provide a fast and robust services to the LSC, it is inevitable that this hardware be upgraded.

## **Services**

Currently, gravity.phys.uwm.edu (lately, in concert with it's backup server, antigravity.phys.uwm.edu) provides the following services to the LSC:

- LSC and UWMLSC web services including:
  - o Static pages
  - o Mason generated pages (perl)
  - o MoinMoin wikis (python)
  - o enotebooks (perl)
  - o gnats trouble ticket systems (python)
  - o mailman mailing list administration and archive pages
  - o viewCVS service
- CVS via pserver and ext (ssh)
- UWMLSC mail services including
  - o sendmail
  - o bogofilter
  - o imap
  - o pop
- mailman mail list services for LSC
- gnats trouble ticket system for LSC and UWMLSC
- rsync service
- MatLab license service

## **Suggested Configuration**

It is our recommendation that the load of gravity be divided amongst three identical modern server class systems. The first of these will be given the hostname gravity.phys.uwm.edu. It will act as a gateway to the other two servers, thus insuring that current practices, which are based on having all services on a single system with that hostname, will be preserved. Two other systems will be connected to gravity.phys.uwm.edu via an internal network. These will be named ligo-cvs.phys.uwm.edu and antigravity.phys.uwm.edu. Routing of packets to the appropriate server on the internal network can be handled by balance, or if necessary (or preferred)

via iptables. As well as the internal network connection, all three boxes will have dual network cards allowing for WAN connections as needed/appropriate.

We suggest the following breakout of services:

- gravity.phys.uwm.edu:
  - UWMLSC mail services
  - LSC mailman services
  - LSC and UWMLSC gnats service
  - balance service
- antigravity.phys.uwm.edu
  - LSC and UWMLSC web services
  - rsync service
  - MatLab license service
- uwm-cvs.phys.uwm.edu
  - CVS service

We believe that this will provide a reasonable balance of services. However, if this proves not to be the case, it should be fairly easy to re-rationalize the services given the identical configuration of the servers.

Finally, we recommend two backup servers. This should provide adequate redundancy for any reasonable failure modes, as well as providing a platform for experimentation without compromising a hot-swappable spare. We recommend keeping the hot-swappable spare at an offsite location to mitigate against power failures in the Physics Building. Figure 1 provides a summary of the suggested configuration.

## **Proposed Hardware**

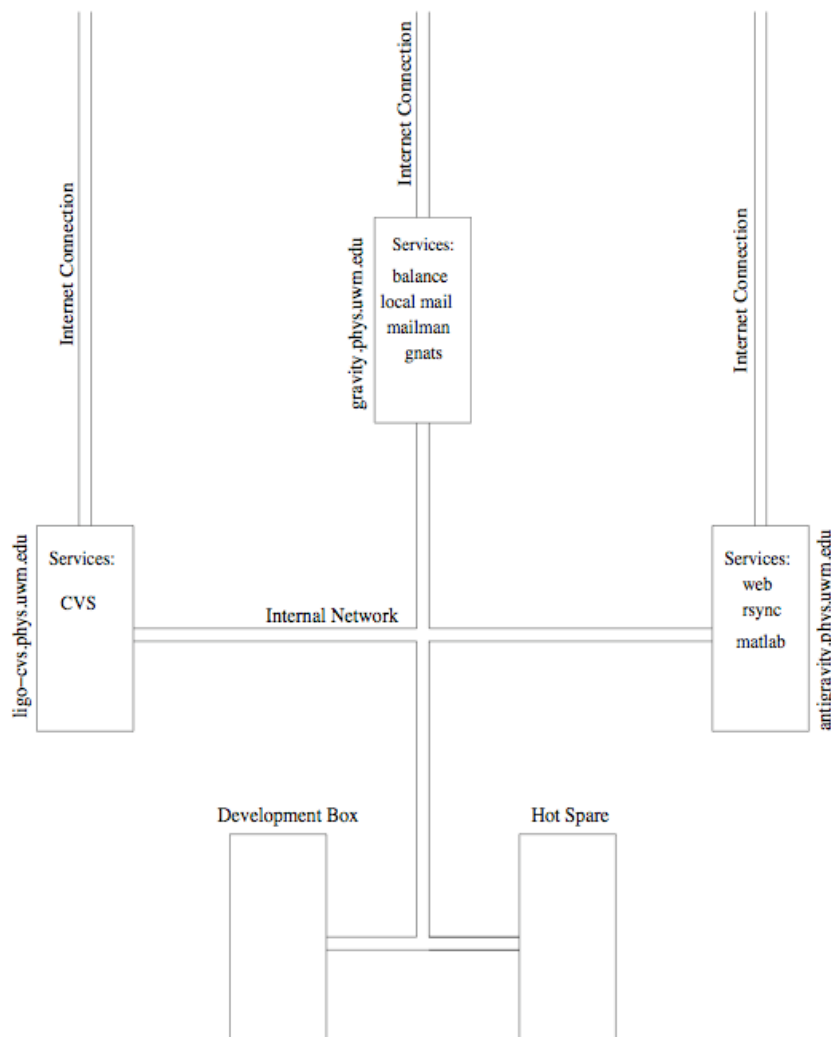
Our preferred hardware configuration for each system (identical for all five systems) is:

- Two quad-core cpus
- Minimum 1GHz clock speed
- Minimum 4MB L2 cache
- Minimum 8 GB RAM
- Hardware SATA RAID controller
- Two minimum 80 GB hard drives
- Dual copper Gigabit Ethernet controllers
- 700W power supply

A secondary configuration which is less expensive is:

- Single quad-core CPU
- Minimum 1 GHz clock speed
- Minimum 4MB L2 cache
- Minimum 8 GB RAM
- Hardware SATA RAID controller
- Two minimum 80 GB hard drives
- Dual copper Gigabit Ethernet controllers
- 300W power supply

See appendices for hardware quotes from Reason and Dell.






**Figure 1: Proposed architecture for replacement of gravity.phys.uwm.edu.**

## **Concluding Remarks**





The gravity.phys.uwm.edu server hardware needs to be replaced. We feel that this proposal will meet the increasing LSC demand for some time to come. It possesses a high level of redundancy for fail-over safety and a moderate level of expandability. While the preferred hardware is more expensive, we feel that the increased viability lifetime of this configuration justifies the cost. With this server cloud, we are confident that UWMLSC can continue in its place as a premier provider of LSC cyberservices.

# Appendix A: Reason Quote for Preferred Hardware

 <p>301 Old Road 1 - Sunnyside, NY 10527          T: 800-801-5381 or 914-226-2269 or Fax: 914-226-2361          Contact: Tom Marston</p>				Quoted To: University of Wisconsin - Milwaukee Paul Armor UW CONTRACT: #05-2308 January 31, 2008		Quote# 2-3891N11232b	
Cluster							
							
<b>Web Servers</b>							
Platform	Supermicro 6015P-TB Single Motherboard Platform 1U with rails	5	\$ 3,140.00	\$ 15,700.00			
Power Supplies	700W Power Supply	5					
Processors	Intel Quad-Core Xeon E5335 / 2 GHz ( 1333 MHz ) - LGA771 Socket - L2 4 MB ( 2 x 2 MB )	10					
RAM	2Gb ECC FB DIMM DDR2-667 HPC Memory Modules	20					
Hard Drive	Western Digital WD1600YS 160GB Raid Edition SATA Hard Drive	10					
RAID	3Ware 9650SE-2LP SATA2 PCI-Express Hardware RAID Controller	5					
Network Card	Integrated Dual-port Gigabit Ethernet Controller	10					
Management	IPMI 2.0 Management Card	5					
Warranty	3-Year Parts & Labor Warranty	5					
Warranty	5-Year Warranty on Hard Drives	5					
<b>TOTAL</b>							<b>\$ 15,700.00</b>
<b>Options</b>							
RAM	2Gb ECC FB DIMM DDR2-667 HPC Memory Modules	16 Gb Ram per Server	20	\$ 115.00	\$ 2,300.00		
<small>(Confidential Information - Prices and specifications subject to change without notice / Not Responsible For Typographic Errors)</small>							
Authorized Signature <small>(Quote is void without signature)</small>							

Reason confidential

# Appendix B: Reason Quote for Alternative Hardware

 <p>REASON HPC Cluster Solutions 901 Cliff Road E -- Burnsville, MN 55337 1-800-801-5391 or 953-229-2999 or Fax: 953-229-2061 Contact: Tom Morton</p>		<p>Quoted To: University of Wisconsin - Milwaukee Paul Armor UW CONTRACT: #05-2308 January 31, 2008</p>	<p>Quote# Z-3691N11232c</p>																														
			Cluster																														
																																	
<b>Web Servers</b>																																	
<p>Platform Power Supplies Processors RAM Hard Drive RAID Network Card Management Warranty Warranty</p>	<p>Supermicro 5015S-MTB Single Motherboard / Single CPU Socket Platform 1U with rails 300W Power Supply Intel Quad-Core Xeon X3210 / 2.13 GHz ( 1066 MHz ) - LGA775 Socket - L2 8 MB ( 2 x 4MB ) 2Gb ECC Unbuffered DDR2-667 HPC Memory Modules Western Digital WD1600YS 160GB Raid Edition SATA Hard Drive 3Ware 9650SE-3LP SATA2 PCI-Express Hardware RAID Controller Integrated Dual-port Gigabit Ethernet Controller IPMI 2.0 Management Card 3-Year Parts &amp; Labor Warranty 5-Year Warranty on Hard Drives</p>	8Gb Ram per Server	<table border="1"> <tr> <td style="text-align: right;">5</td> <td style="text-align: right;">\$ 2,240.00</td> <td style="text-align: right;">\$ 11,200.00</td> </tr> <tr> <td style="text-align: right;">5</td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">5</td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">20</td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">10</td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">5</td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">10</td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">5</td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">5</td> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">5</td> <td></td> <td></td> </tr> </table> 	5	\$ 2,240.00	\$ 11,200.00	5			5			20			10			5			10			5			5			5		
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			<p>Authorized Signature <small>(Quote is invalid without signature)</small></p>																														

Reason confidential

# Appendix C: Dell Quote for Preferred Hardware



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## Print Summary



### PowerEdge 1900

Price \$4,782.00  
 Instant Savings \$292.50

**Price \$4,489.50**


Preliminary Ship Date: 2/6/2008<sup>1</sup>

**My Selections** [All Options](#)

• **PowerEdge 1900**

<b>Date</b>	2/1/2008 11:06:40 AM Central Standard Time		
<b>Catalog Number</b>	25 Retail rc956904		
<b>Catalog Number / Description</b>	<b>Product Code</b>	<b>SKU</b>	<b>Id</b>
<b>PowerEdge 1900:</b> Quad Core Intel® Xeon® E5310, 2x4MB Cache, 1.60GHz, 1066MHz FSB	19C16	[222-6792]	1
<b>Additional Processor:</b> Quad Core Intel® Xeon® E5310, 2x4MB Cache, 1.60GHz, 1066MHz FSB	2PC16	[311-6842]	2
<b>Operating System:</b> No Operating System	NOOS	[420-6320]	11
<b>Memory:</b> 8GB 667MHz (4x2GB), Dual Ranked Fully Buffered DIMMs	8G4D6D	[311-6197]	3
<b>Hard Drive Configuration:</b> Add-in SAS/SATA RAID 1, SAS 5/iR Adapter	ASR1C	[341-4017]	27
<b>Primary Controller:</b> SAS5/iR, PCI-Express, Add-In RAID Card	SAS5iR	[341-4022]	9
<b>Primary Hard Drive:</b> 80GB 7.2K RPM Serial ATA 3Gbps 3.5-in Cabled Hard Drive	80S2	[341-4203]	8
<b>2nd Hard Drive:</b> 80GB 7.2K RPM Serial ATA 3Gbps 3.5-in Cabled Hard Drive	80S2	[341-4203]	23
<b>Removable Disk and Tape Drives:</b> No Internal Tape Drive	NOTBU	[341-4205]	15
<b>Network Card:</b> Intel® PRO 1000PT Dual Port Server Adapter, Gb NIC, Cu, PCIe x4	1000PD	[430-0959]	13
<b>TCP/IP Offload Engine Enablement:</b> Broadcom TCP/IP Offload Engine Not Enabled	NTOEKEY	[430-1765]	6

<b>Documentation:</b> Electronic Documentation and OpenManage CD Kit	EDOCS	[310-8292]	21
<b>CD/DVD Drive:</b> 48X IDE CD-RW/DVD ROM Drive	CDRWDVD	[313-4571]	16
<b>Floppy Drive:</b> No Floppy Drive	NOFD	[341-3052]	10
<b>Mouse:</b> No Mouse Option	NOMSE	[310-0024]	12
<b>Keyboard:</b> No Keyboard Option	NOKYB	[310-5017]	4
<b>Remote Management:</b> Dell Remote Access Card, 5th Generation for PowerEdge Remote Management	DRAC5	[313-3915]	81
<b>Hardware Support Services:</b> 3Yr GOLD ENTERPRISE SUPPORT: 7x24 HW/SW, Escalation Mgmt, 4hr 7x24 Onsite	GOLD4U	[310-3785][980-0492][980-0682][980-7120][985-3298][985-3307]	29
<b>Installation Services:</b> No Installation Assessment	NOINSTL	[900-9997]	32

 [Print](#)

<sup>1</sup> The Preliminary Ship Date represents the estimated time it takes to process your order and custom build your computer based on approved credit card purchase. The Preliminary Ship Date is not intended to provide you with an actual estimated ship date. Your estimated ship date may vary based upon the payment method you choose and other factors. You will receive your Estimated Ship Date in your e-mail confirmation. Customers using E-Check as their method of payment should add 3 days to their Preliminary Ship Date.