Section A, Cover Page for the

Unidata Community Equipment Grants Proposal

Replacement Electronic Maproom Hardware for the Department of Atmospheric and Environmental Sciences, UAlbany

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Section B: Project Summary:

We propose to upgrade the computers that are used in our department's electronic maproom facility. The existing machines will enter their fifth year of service this summer. The current hardware will soon prove insufficient to adequately support the ever-increasing hardware requirements that current and future software programs and data sources place on them. We are confident that a fresh provision of contemporary, 64-bit workstations will ensure that our maproom facility will continue to provide the high level of performance that students, faculty, and staff have come to expect since the facility's inception in 2006.

The planned upgraded facility will allow its users to make better use of current analysis, display, and modeling packages used in the atmospheric sciences. Many of these programs, such as GEMPAK/N-AWIPS, the Integrated Data Viewer (IDV), and the future AWIPS-II release, are developed and supported by the Unidata Program Center (UPC), while others, such as the Weather Research and Forecasting (WRF) model, NCAR-Graphics, and NCL, serve a complementary role. In keeping with the UPC's goal of sharing data with the community, we also plan to make much use of the UPC's newly-developed application for the web-based publication and sharing of data, known as the **R**epository for **A**rchiving, **M**anaging and **A**ccessing **D**iverse **Da**ta (RAMADDA).

The Department of Atmospheric and Environmental Sciences (DAES) at the University at Albany, State University of New York, has always been an active participant in the Unidata program and the proposed upgrade to our maproom will allow us to continue and expand this activity.

Section C: Project Description

1. Details of the equipment requested

Our current electronic maproom facility (web link: http://www.atmos.albany.edu/index.php?d=atmequip) was funded from a 2006 National Science Foundation Major Research Initiative (MRI) grant. Eighteen Dell Optiplex GX620 personal computers (PCs) occupy the maproom. These machines all consist of Intel Pentium D processors, which emulate two CPU cores via hyperthreading. The PCs also have 2GB RAM and a 128 MB ATI Radeon X600 graphics card which can support dual monitors. Nine of the units are used to display a more-or-less constant set of loops of various meteorologically-relevant data, such as satellite and radar imagery, real-time surface and upper-air observations, and output fields from numerical weather prediction (NWP) models. Six of these nine PCs each power two 20-inch Samsung 203B LCD monitors. The remaining three PCs are attached to three Samsung 203B monitors apiece, and thus utilize a second graphics card, using the nVidia chipset. Seven PCs are used as student workstations, each with a single Samsung 203B monitor; another is used at the room's podium, while a final PC sits in the PI's office as a development machine. The original MRI also provided four spare Optiplex GX620s. The output from any of the maproom computers is available for room-wide display on two LCD projectors, using Crestron audio-video routing and annotating equipment. A gigabit Ethernet switch provides a network link to the DAES' servers, with a 100 Mb/sec uplink to the University's network.

In order to meet budgetary targets, and in recognition of the slightly different roles of subgroups of the maproom machines, we propose a multi-tiered upgrade which employs Dell Optiplex 760 workstations. The DAES has used Dell as our main vendor for Intel PC equipment for over a decade. We have found them to be cost-effective, very compatible with the Linux operating system, Unidata and other meteorological software, and both easy and inexpensive to maintain. The vendor and the University have a purchasing agreement which significantly discounts the cost, and we also have access to a campus-based PC Service Center that expedites warranty-based repair services when they are needed.

We have broken down the proposed purchase into four distinct hardware configurations, as follows:

a. Seven (7) minitowers with Intel 9660 Core2 Quad CPUs, 8GB RAM, 256 MB nVidia GeForce 8300 GPU, 250 MB SATA Hard Disk Drive (HDD), one (1) 19" LCD monitor. This block of PCs will be used as student workstations. The extra computing power afforded by the quad-core CPU and 8 GB RAM will ensure that the users will easily be able to run a variety of tasks, such as data analysis and visualization of high-resolution data with the IDV and/or GEMPAK/N-AWIPS, as well as run some simple NWP jobs. The existing Samsung monitors will be used as spares for the displays powered by (c) and (d).

b. One (1) small form-factor desktop, with Intel E8400 Core2 Duo, 4GB RAM, same GPU and HDD as (a). This will be housed in the maproom's podium for the use of the instructor and/or maproom discussion leader.

c. Eight (8) minitowers with Intel E8400 Core2Duo, 4GB RAM, same GPU and HDD as (a). Six of these will be used as more-or-less static maproom display machines, powering two monitors apiece. The seventh machine will serve as a development machine; the eighth as an emergency hot spare for any defective maproom PC.

d. Three (3) minitowers with Intel E8400 Core2Duo, 8GB RAM, one nVidia Quadro NVS 420 GPU with 512 MB RAM, capable of supporting up to four monitors, same HDD as (a). These will drive the three maproom display machines that power three monitors apiece.

2. Overall goals of the project

We are confident that the above-described multi-faceted upgrade will form the basis of a maproom facility that will meet the current and anticipated needs of its users for the next three-to-five years. Given current trends, NWP model data that we receive via Unidata's Internet Data Delivery (IDD) continues to increase in resolution and thus analysis packages which were fine for use with relatively coarse datasets require ever-increasing onboard system memory to work with higher-resolution ones. While 2GB of RAM was an optimum amount four years ago, it is now less than ideal, and will be clearly insufficient in the near term. The Windows 7 operating system requires a minimum of 2 GB to run efficiently, leaving little room for any other memory-intensive applications. The proposed AWIPS-II software will require 2GB simply to run the display part of its application, let alone additional memory demands to run the database server which will house its data. Additionally, with more and more applications taking advantage of multiple threads during runtime, a true multi-core CPU is essential, with quad-core ideal (it is expected that hexacore CPU systems will be released later this year). Finally, while Sun Microsystems recognized several years ago that 64-bit operating systems were the wave of the future, only in the last couple of years have programs and operating systems taken full advantage of a 64-bit CPU. This architecture will natively support systems with more than 4GB of RAM, making memory upgrades beyond the 32-bit CPU 4GB RAM limit not only viable, but essential.

A major goal of this proposal will be to allow a wider adoption of the IDV, and, as will be seen below, the use of RAMADDA repositories. Heretofore, IDV use has been limited in the department due to perceived slowness in loading data and animating displays. While the most recent releases (currently 2.8u1) of the IDV have greatly improved functionality and speed, it is clear that present and future use of the IDV will benefit from an upgraded hardware configuration as we are proposing. The IDV itself now supports multiple threads, so that data loading as well as graphic rendering will occur in a much speedier fashion. Wider adoption of the IDV will naturally support our plans to populate our nascent RAMADDA server, leveraging the IDV's publishing support, via a plugin, to a RAMADDA repository.

3. Benefits to research and education

Currently, the maproom supports a wide array of educational and research programs. In the current (2009-10) academic year, six departmental classes take place in the facility:

i. ATM211: Weather Analysis and Forecasting

ii. ATM311: Severe and Hazardous Weather

iii. ATM350: Meteorological Datasets and Numerical Weather Prediction

iv. ATM400: Synoptic Laboratory I

v. ATM401: Synoptic Laboratory II

vi. ATM510: Synoptic-Dynamic Meteorology I

Additionally, during most weeks in the fall and spring semesters, two weekly discussions take place. One is a current weather discussion, led by our ATM211/311 instructor, Mr. Ross A. Lazear, or an undergraduate. This discussion is pitched mainly to undergraduate juniors and seniors, although all are welcome to attend and participate. The second is a Friday afternoon research map discussion, led by Distinguished Research Professor Dr. Lance F. Bosart, and attended by faculty, staff, grad students, visitors, plus highly-motivated undergraduates. Highlights of the latter discussion are distributed via an email list-serve to nearly 200 individuals worldwide representing the educational, research, and operational communities. Here, we make great use of the data streaming and analysis tools that Unidata provides: as part of preparation for this discussion, data sets, received via the IDD feeds and decoded into GEMPAK format, are analyzed and displayed by applications such as GEMPAK/N-AWIPS and the IDV. Further contributions typically appear as a result of community discussion via the email list, and the resulting questions that arise from the discussion provide ample fodder for funded research projects that support M.S. and Ph.D students. We are very excited about the development of Unidata's RAMADDA data sharing tool, and feel this would be a natural, cutting-edge way to broaden the reach and thus the educational/research benefit of this discussion group.

One of the unique capabilities of our electronic maproom is its ability to display any computer screen in the room on either of the two projectors. This enables truly interactive discussion as the audience can generate graphics that then become part of the presentation. Upgraded computers in the maproom will speed graphics creation, thus further enhancing this interactive capability's role in promoting ideas and discussion.

Besides Dr. Bosart's aforementioned discussion, students in many of the above listed classes also prepare oral presentations in the facility using Unidata software and data sets. The PI's ATM350 class, required of all B.S. majors in Atmospheric Science in the DAES, serves as an introduction to meteorological datasets and the tools used to display them; the techniques thus learned are then further honed in their senior year in the two synoptic labs. We foresee that the use of the department's RAMADDA server (newly commissioned as of February 2010 at http://ramadda.atmos.albany.edu:8080/repository) will be an ideal method for students to upload homework assignments, course projects, and form the basis of a "digital portfolio" of work in the major. The classes also provides "real-world" training experience for those students interested in pursuing a career with the National Centers for Environmental Prediction (NCEP), as we make extensive use of N-AWIPS's product generation capabilities, similar to how one would use them if at NCEP's Hydrometeorological and Storm Prediction Centers. With the expected 2011 release of AWIPS-II, those interested in National Weather Service as well as NCEP careers will reap the benefits, as this software will be used by both branches of NOAA. As mentioned previously, the specs for AWIPS-II indicate that our current computing infrastructure will be insufficient to run the application in a workable fashion.

We also envision that an upgraded facility will support the ability of students to engage in simple NWP modeling experiments. NWP is a focus of the undergraduate ATM350 class, as well as Dr. Ryan Torn's ATM 562 course. While the department has server machines that can support individual runs of, say, the WRF model, it is currently ill-equipped to handle multiple students running an NWP experiment. The planned provision of the seven 4-CPU, 8GB RAM workstations should make a limited NWP exercise viable. Results from such modeling efforts lend themselves naturally to placement on our RAMADDA server.

When classes or formal discussions are not in progress, the room serves as an informal meeting place for students, faculty, and staff. The most frequent such use of the room is for students (typically, but not exclusively, undergrad) to work on homework assignments or projects, prepare for class presentations, and forecast in our local and national weather prediction contests, with Unidata-provided data and applications naturally a big part of the picture.

In 2008, our department, previously known as the Department of Earth and Atmospheric Sciences, changed to its current name, the Department of Atmospheric and Environmental Sciences. While this accentuates the stature and strong reputation of the nearly 50-year old Atmospheric Science Program, it also highlights the growing focus on environmental sciences (ENV), both at UAlbany and the community at-large. Each year more students are joining the ENV program in our department, and given the recent expansion of use of the IDV and RAMADDA into fields other than the atmospheric sciences, we feel that our ENV students should likewise share in the resources that our upgraded facility will afford.

Furthermore, while we continue to plan to support both Linux and Windows operating systems, our upgraded facility will support the increasingly-adopted use of virtual machines (VMs) in computer laboratories. We expect to install a VM on each PC that will allow Windows to run directly under Linux, thus avoiding the need to constantly reboot systems if an OS-specific piece of software is required, therefore allowing longer jobs to run in batch or cron mode. This will relieve computer support staff burden plus demonstrate a new trend in computing to our students, consistent with Unidata's mission of contributing to the advancement of technology.

4. Relationship to existing department and university computing facilities, and to the overall plan for computing capabilities

The DAES computing system presently consists of six Sun and Linux servers, a NetApp network attached storage (NAS) server, over fifty Linux, Mac OS X, and Microsoft Windows workstations, a 96 CPU high performance computing (HPC) cluster, and a multitude of portable notebook computers. A Sun Enterprise 250 (*cypress*- dual CPU, 1.5GB RAM) is our primary NFS, DNS, SMTP and NIS+ server, serving about 156 GB of user home directories and software. A Sun Fire890 (*ginkgo*, 8 CPU, 16GB RAM) serves remote logins, large compute jobs, and will eventually transition to be the department mail server. A Dell Precision 7500 (*ash*, 16 CPU, 24GB RAM) is ramping up as our new remote login server, remote compute job server, and serves as our RAMADDA server via a hostname alias. An Enterprise 450 (*cedar* - 4 CPUs, 4 GB RAM, 720 GB disk) serves remote logins and older research disk storage. The distribution of NLDN lightning data by the IDD to more than 70 other universities is performed by a Sun Fire280R (*striker2*), which is also our department's web server. Our primary IDD server for non-NLDN data is a Dell Precision 690 (*cascade)*, which also generates graphics for our

departmental web page, and, eventually, for our RAMADDA server. The bulk of user disk space (20+ TB) is handled by two NetApp 3020 NAS devices. A smaller NAS serves several TB worth of archived IDD data, via our web server (http://www.atmos.albany.edu/weather/data1-archive). The 96 CPU HPC cluster is owned by one faculty member and is dedicated to his research (i.e. not shared with the rest of the department).

There are over 50 other workstations, mostly running Linux, with some running Mac OSX or Windows. Each client has local disk for swap and scratch space, and between 512 MB and 8 GB of RAM. Internal networking is served by gigabit Ethernet. Our department switches are connected to the University router by dedicated fiber, and the router is connected to the commercial Internet with 200 Mbit/sec speed, along with a 250 Mb/sec Internet2 uplink. Routine backups of servers and user home directories are performed on an 800 GB tape library. The NetApp NAS has dual parity RAID and automatic snapshots for its backup services. The system includes five 4-mm tape drives, one 8-mm tape drives, and many CD/DVD readers, many with writing capability. Six black and white and four color postscript printers provide printing services. Two other computer teaching laboratories in the DAES consist of 17 Pentium 3 and 4 PCs running Windows 2000 or XP. Should this grant be funded, many of the existing maproom machines will replace the aged equipment in these two facilities. All software available on research computers is also available on classroom machines, assuming the software can run efficiently on the computer's hardware. The larger of the two labs includes a high-speed laser printer, and a high-resolution computer projector.

The proposed maproom represents a small, but significant, percentage of the department's computing infrastructure. Outside of our server room, it represents the largest outlay of computing power for the DAES. In terms of the number of users who directly interface with it, though, it is easily the most widely-used computing facility in the department.

Historically our department has always maintained its computing infrastructure with its own personnel. Dr. David Knight and the PI are responsible for computer system management and support. The two of us have been managing a fairly complex, multi-OS network for many years. While we regularly attend university-wide meetings with distributed information technology (IT) personnel on the campus, the design and operation of our facilities are largely planned by department staff. Our department was one of the first on campus to have its own local area network and web server. Our IDD servers represent the most heavily-trafficked internet connections on the campus. We thus like to think of ourselves as a leader and trend-setter in terms of IT use at UAlbany. Much of this has been made possible via our collaborations with Unidata and the community at-large, and we feel strongly that our proposal, particularly with the rollout of RAMADDA, will be another step in the direction of leading the way in computing and data sharing, both at the university and to the community at-large.

Typically, our department engages in major upgrades to its computing infrastructure every seven to ten years, with minor upgrades in between. In the past decade, a 2003 Unidata Equipment Award provided the department with its current National Lightning Detection Network (NLDN) and World Wide Web server, following on a similar award in 1995. The aforementioned NSF MRI grant in 2006 delivered our existing maproom facility, remote access

and compute server *ginkgo*, and the NetApp NAS server. Incremental upgrades in the past four years continued a decade-long trend away from Sun hardware towards more cost-effective Linux OS machines, such as our IDD server, remote login and RAMADDA server, and the tendency for faculty to house their group research efforts on their own multi-CPU server machines. Regular convening with an ad hoc Computing and Data Committee, comprised of departmental personnel, as well as weekly face-to-face meetings with the department chair, Dr. Chris Thorncroft, have ensured that the DAES' IT plans represent the needs of its users, the community-at-large, and will continue to grow to meet both short- and long-term needs.

Section D: Budget and justification

As described in Section B, we propose to purchase nineteen (19) Dell Optiplex 760 workstations, with four distinct configurations. We anticipate that this upgrade will fulfill our maproom computing infrastructure needs for at least three-to-five years. We specifically request Dell hardware because of its reliability, competitive pricing, five-year full replacement warranty, its ability to support the Linux operating system (specifically CentOS), and the on-campus presence of Dell-trained PC repair personnel. Note too that since Dell has a purchasing agreement with UAlbany, per-unit costs are approximately 35 percent lower than an equivalent system configured at Dell's Higher Education purchasing website. As a result, we are able to completely upgrade the computing infrastructure of our maproom while remaining at the $20,000 maximum for this year's Community Equipment Awards program.

While no explicit cost sharing is included in this proposal, we feel that the DAES provides implicit cost sharing. For example, in the past year, DAES funds have gone towards the purchase of a new remote login server which will also serve as our RAMADDA host. We are optimistic that the DAES will be able to fund incremental upgrades to the proposed maproom, such as increasing RAM in all PCs to 8 GB. In addition, we will provide system management, Unidata-provided software, and other relevant scientific programs, for the proposed system. The University at Albany will provide space to house the proposed equipment, and provide required network bandwidth, at no cost to this project.

The total cost of the proposed equipment is $20,000.00. The line-item costs for the four configurations described in Section C.1., with their corresponding Dell quote numbers (DQN), including indirect cost are as follows:

ESTIMATED COSTS: July 1, 2010 through June 30, 2011

			Total Cost
Equipment			
a.	Seven minitowers (DQN 533527278):	$ 9,079	
b.	Eight minitowers (DQN 533527008):	$ 5,176	$14,255
Supplies			
a.	One desktop (DQN 533537300):	$ 672	
b.	Three minitowers (DQN 533374528):	$ 3,771	$ 4,443
Total Direct Costs			$18,698
Indirect Costs (29.3% MTDC on $4,443)			$ 1,302
Total Project Costs			$20,000

The detailed quotes from Dell Computer will follow in the appendix.

Section E: Project milestones

If this proposal is funded we will promptly submit a purchase order for the proposed hardware. When the equipment arrives we will begin configuring it and placing it in service. Setup and deployment should be quite quick, given our experience in configuring these types of systems; the only new wrinkle will be the choice and setup of a suitable virtual machine application. Assuming a mid-July delivery of equipment we expect the new machines to be deployed prior to the start of the 2010-11 academic year's fall semester.

DELL

QUOTATION

QUOTE #: 533527278
Customer #: 102481093
Contract #: 40ABR
CustomerAgreement #: Agg Buy-PT55666
Quote Date: 3/16/10
Customer Name: UNIV @ ALBANY

Date: 3/16/10 3:25:32 PM

TOTAL QUOTE AMOUNT:	$9,079.00		
Product Subtotal:	$9,079.00		
Tax:	$0.00		
Shipping & Handling:	$0.00		
Shipping Method:	Ground	Total Number of System Groups:	1

GROUP: 1	QUANTITY: 7	SYSTEM PRICE: $1,292.00	GROUP TOTAL: $9,044.00
Base Unit:		OptiPlex 760 Minitower Quad Base Up to 88 Percent Efficient Power Supply (224-5181)	
Processor:		OptiPlex 760, Core2 Quad, 9650 with VT/ 3.0GHz, 12M, 1333FSB (317-0590)	
Memory:		8.0GB,Non-ECC,800MHz DDR 4x2GB Dell OptiPlex 960 and 760 (311-7763)	
Keyboard:		Dell QuietKey Keyboard, No Hot Keys, No Palmrest, English, OptiPlex (330-1989)	
Monitor:		CFI,Standard Option Not Selected (365-0354)	
Video Card:		256MB nVidia GeForce 9300 GE Dual DVI/ VGA and TV Out,Full Height,Dell OptiPlex (320-7994)	
Hard Drive:		250GB SATA 3.0Gb/s and 8MB Data Burst Cache,Dell OptiPlex (341-5474)	
Floppy Disk Drive:		No Floppy Drive with Optical Filler Panel,Dell OptiPlex Minitower (341-3909)	
Operating System:		Windows 7 Professional, Media, 64-bit, Optiplex, English (421-1483)	
Operating System:		Windows 7 Label, Optiplex, Fixed Precision, Vostro Desktop (330-6228)	
Mouse:		Dell USB Laser 6-Button Mouse Dell OptiPlex,Precision and Latitude (330-1170)	
NIC:		Intel Standard Manageability Hardware Enabled Systems Management, Dell OptiPlex (330-2902)	
CD-ROM or DVD-ROM Drive:		16X DVD+/-RW SATA,Data Only Dell OptiPlex Desktop or Minitower,Black (313-7104)	
CD-ROM or DVD-ROM Drive:		Cyberlink Power DVD 8.3,with Media, Dell Relationship LOB (421-0536)	
CD-ROM or DVD-ROM Drive:		Roxio Creator Dell Edition 10.3, Media, Dell RLOB (421-1189)	
Sound Card:		Performance Core2Quad Dell OptiPlex 760 Minitower (317-0595)	
Speakers:		Dell AX510 black Sound Bar forUltraSharp Flat Panel DisplaysDell Optiplex/Precision/ Latitude (313-6414)	
Cable:		OptiPlex 760 Minitower Quad Up to 88 Percent Efficient Power Supply (330-3677)	
Cable:		Dell Control Point for OptiPlex,Systems (420-9701)	
Cable:		Enable Low Power Mode for EUP Compliance,Dell OptiPlex (330-7422)	
Documentation Diskette:		Documentation,English,Dell OptiPlex (330-1710)	
Documentation Diskette:		Power Cord,125V,2M,C13,Dell OptiPlex (330-1711)	
Factory Installed Software:		Dell Energy Smart Power Management Settings Enabled Optiplex (330-4817)	
Feature		Resource DVD contains Diagnostics and Drivers for Dell OptiPlex (330-3686)	
Service:		Basic Support: Next Business Day Parts and Labor Onsite Response 4 Year Extended (987-3054)	
Service:		Basic Support: Next Business Day Parts and Labor Onsite Response Initial Year (991-6350)	
Service:		Dell Hardware Limited Warranty Plus Onsite Service Extended Year(s) (992-6508)	
Service:		Dell Hardware Limited Warranty Plus Onsite Service Initial Year (992-6507)	
Dirline:		Keep Your Hard Drive, 5 Year (980-7554)	

Installation:	Standard On-Site Installation Declined (900-9987)
Installation:	Standard On-Site Installation Declined (900-9987)
Misc:	Shipping Material for System Smith Minitower,Dell OptiPlex (330-1186)
	CFI Titan Code for CFI FIDA orBypass SI (364-1846)
	CFI,Information, Validation,Select Any Microsoft OS (364-4107)
	CFI Routing SKU (365-0257)
	CFI,Rollup,Integration ServiceTag or Label,Only - No Other CFI Services (366-1036)
	CFI,Rollup,Asset Report Only (366-1042)
	CFI,Optiplex or Workstation, Only,Factory Install (371-4665)
	CFI,B3RB,Display,Flat Panel Display,19,Black,1909WB,19 Inch,VIS,Factory Install (375-5778)
	CFI,Information,CSRouting,Eligible,Factory Install (375-3088)

SOFTWARE & ACCESSORIES			
Product	**Quantity**	**Unit Price**	**Total**
DELL GOVT GHOST SOLUTION SUITE 2.5 WIN BH DEVICE STD LIC (A2645554)	7	$5.00	$35.00
Number of S & A Items: 1	S&A Total Amount: $35.00		

COMMENTS
GRF010307NYDEL
641179

SALES REP:	Barry Warriner	PHONE:	1-800-274-7799
Email Address:	Barry_Warriner@Dell.Com	Phone Ext:	5139332

Please review this quote carefully. If complete and accurate, you may place your order online at www.dell.com/qto (use quote number above). POs and payments should be made to *Dell Marketing L.P.*

If you do not have a separate agreement with Dell that applies to your order, please refer to www.dell.com/terms as follows:

If purchasing for your internal use, your order will be subject to *Dell's Terms and Conditions of Sale-Direct* including Dell's U.S. Return Policy, at www.dell.com/returnpolicy#total. If purchasing for resale, your order will be subject to *Dell's Terms and Condition of Sale for Persons or Entities Purchasing to Resell*, and other terms of Dell's PartnerDirect program at www.dell.com/partner. If your order includes services, visit www.dell.com/servicecontracts for service descriptions and terms.

Quote information is valid for U.S. customers and U.S. addresses only, and is subject to change. Sales tax on products shipped is based on "Ship To" address, and for downloads is based on

DELL

QUOTATION

QUOTE #: 533537300
Customer #: 102481093
Contract #: 40ABR
CustomerAgreement #: Agg Buy-PT55666
Quote Date: 3/16/10
Customer Name: UNIV @ ALBANY

Date: 3/16/10 4:06:29 PM

TOTAL QUOTE AMOUNT:	$672.00		
Product Subtotal:	$672.00		
Tax:	$0.00		
Shipping & Handling:	$0.00		
Shipping Method:	Ground	Total Number of System Groups:	1

GROUP: 1	QUANTITY: 1	SYSTEM PRICE: $667.00	GROUP TOTAL: $667.00
Base Unit:		OptiPlex 760 Small Form FactorBase Up to 88 Percent Efficient PSU (224-2221)	
Processor:		OptiPlex 760, Core 2 Duo E8400 with VT/3.0GHz,6M,1333FSB (311-9513)	
Memory:		4GB,Non-ECC,800MHz DDR2,2X2GB OptiPlex (311-7444)	
Keyboard:		Dell QuietKey Keyboard, No Hot Keys, No Palmrest, English, OptiPlex (330-1989)	
Monitor:		No Monitor Selected, OptiPlex (320-3704)	
Video Card:		256MB nVidia GeForce 9300 GE Dual DVI/ VGA and TV Out,Low Profile,Dell OptiPlex (320-7996)	
Hard Drive:		250GB SATA 3.0Gb/s and 8MB Data Burst Cache,Dell OptiPlex (341-5474)	
Floppy Disk Drive:		No Floppy Drive with Optical Filler Panel,Dell OptiPlex Small Form Factor (341-4609)	
Operating System:		Windows 7 Professional, Media, 64-bit, Optiplex, English (421-1483)	
Operating System:		Windows 7 Label, Optiplex, Fixed Precision, Vostro Desktop (330-6228)	
Mouse:		Dell USB Laser 6-Button Mouse Dell OptiPlex,Precision and Latitude (330-1170)	
NIC:		Intel Standard Manageability Hardware Enabled Systems Management, Dell OptiPlex (330-2902)	
CD-ROM or DVD-ROM Drive:		8X DVD+/-RW,Slimline,OptiPlex Small Form Factor (313-6092)	
CD-ROM or DVD-ROM Drive:		Cyberlink Power DVD 8.3,with Media, Dell Relationship LOB (421-0536)	
CD-ROM or DVD-ROM Drive:		Roxio Creator Dell Edition 10.3, Media, Dell RLOB (421-1189)	
Sound Card:		Heat Sink, Mainstream, Dell Optiplex Small Form Factor (311-9520)	
Speakers:		Internal Chassis Speaker Option,Dell OptiPlex Small Form Factor (313-3352)	
Cable:		OptiPlex 760 Small Form FactorUp to 88 Percent Efficient Power Supply (330-1985)	
Cable:		Dell Control Point for OptiPlex,Systems (420-9701)	
Cable:		Enable Low Power Mode for EUP Compliance,Dell OptiPlex (330-7422)	
Documentation Diskette:		Documentation,English,Dell OptiPlex (330-1710)	
Documentation Diskette:		Power Cord,125V,2M,C13,Dell OptiPlex (330-1711)	
Factory Installed Software:		Dell Energy Smart Power Management Settings Enabled Optiplex (330-4817)	
Feature		Resource DVD contains Diagnostics and Drivers for Dell OptiPlex (330-3686)	
Service:		Basic Support: Next Business Day Parts and Labor Onsite Response 4 Year Extended (987-3054)	
Service:		Basic Support: Next Business Day Parts and Labor Onsite Response Initial Year (991-6350)	
Service:		Dell Hardware Limited Warranty Plus Onsite Service Extended Year(s) (992-6508)	
Service:		Dell Hardware Limited Warranty Plus Onsite Service Initial Year (992-6507)	
Dirline:		Keep Your Hard Drive, 5 Year (980-7554)	
Installation:		Standard On-Site Installation Declined (900-9987)	

Installation:	Standard On-Site Installation Declined (900-9987)
Misc:	Shipping Material for System Cypher Small Form Factor,Dell OptiPlex (330-2193)
	CFI Titan Code for CFI FIDA orBypass SI (364-1846)
	CFI,Information, Validation,Select Any Microsoft OS (364-4107)
	CFI Routing SKU (365-0257)
	CFI,Rollup,Integration ServiceTag or Label,Only - No Other CFI Services (366-1036)
	CFI,Rollup,Asset Report Only (366-1042)
	CFI,Optiplex or Workstation, Only,Factory Install (371-4665)
	CFI,Information,CSRouting,Eligible,Factory Install (375-3088)

SOFTWARE & ACCESSORIES

Product	Quantity	Unit Price	Total
DELL GOVT GHOST SOLUTION SUITE 2.5 WIN BH DEVICE STD LIC (A2645554)	1	$5.00	$5.00
Number of S & A Items: 1	S&A Total Amount: $5.00		

COMMENTS

GRF010307NYDEL

641179

SALES REP:	Barry Warriner	PHONE:	1-800-274-7799
Email Address:	Barry_Warriner@Dell.Com	Phone Ext:	5139332

Please review this quote carefully. If complete and accurate, you may place your order online at www.dell.com/qto (use quote number above). POs and payments should be made to *Dell Marketing L.P.*

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DELL

QUOTATION

QUOTE #: 533527008
Customer #: 102481093
Contract #: 40ABR
CustomerAgreement #: Agg Buy-PT55666
Quote Date: 3/16/10
Customer Name: UNIV @ ALBANY

Date: 3/16/10 3:25:21 PM

TOTAL QUOTE AMOUNT:	$5,176.00		
Product Subtotal:	$5,176.00		
Tax:	$0.00		
Shipping & Handling:	$0.00		
Shipping Method:	Ground	Total Number of System Groups:	1

GROUP: 1	QUANTITY: 8	SYSTEM PRICE: $642.00	GROUP TOTAL: $5,136.00
Base Unit:		OptiPlex 760 Minitower Base Upto 88 Percent Efficient PSU (224-2212)	
Processor:		OptiPlex 760, Core 2 Duo E8400 with VT/3.0GHz,6M,1333FSB (311-9513)	
Memory:		4GB,Non-ECC,800MHz DDR2,2X2GB OptiPlex (311-7444)	
Keyboard:		Dell QuietKey Keyboard, No Hot Keys, No Palmrest, English, OptiPlex (330-1989)	
Monitor:		No Monitor Selected, OptiPlex (320-3704)	
Video Card:		256MB nVidia GeForce 9300 GE Dual DVI/ VGA and TV Out,Full Height,Dell OptiPlex (320-7994)	
Hard Drive:		250GB SATA 3.0Gb/s and 8MB Data Burst Cache,Dell OptiPlex (341-5474)	
Floppy Disk Drive:		No Floppy Drive with Optical Filler Panel,Dell OptiPlex Minitower (341-3909)	
Operating System:		Windows 7 Professional, Media, 64-bit, Optiplex, English (421-1483)	
Operating System:		Windows 7 Label, Optiplex, Fixed Precision, Vostro Desktop (330-6228)	
Mouse:		Dell USB Laser 6-Button Mouse Dell OptiPlex,Precision and Latitude (330-1170)	
NIC:		Intel Standard Manageability Hardware Enabled Systems Management, Dell OptiPlex (330-2902)	
CD-ROM or DVD-ROM Drive:		16X DVD+/-RW SATA,Data Only Dell OptiPlex Desktop or Minitower,Black (313-7104)	
CD-ROM or DVD-ROM Drive:		Cyberlink Power DVD 8.3,with Media, Dell Relationship LOB (421-0536)	
CD-ROM or DVD-ROM Drive:		Roxio Creator Dell Edition 10.3, Media, Dell RLOB (421-1189)	
Sound Card:		Heat Sink, Mainstream, Dell Optiplex Mini Tower (311-9522)	
Speakers:		Internal Chassis Speaker Option,Dell OptiPlex Minitower (313-3350)	
Cable:		OptiPlex 760 Minitower Up to 88 Percent Efficient Power Supply (330-1981)	
Cable:		Dell Control Point for OptiPlex,Systems (420-9701)	
Cable:		Enable Low Power Mode for EUP Compliance,Dell OptiPlex (330-7422)	
Documentation Diskette:		Documentation,English,Dell OptiPlex (330-1710)	
Documentation Diskette:		Power Cord,125V,2M,C13,Dell OptiPlex (330-1711)	
Factory Installed Software:		Dell Energy Smart Power Management Settings Enabled Optiplex (330-4817)	
Feature		Resource DVD contains Diagnostics and Drivers for Dell OptiPlex (330-3686)	
Service:		Basic Support: Next Business Day Parts and Labor Onsite Response 4 Year Extended (987-3054)	
Service:		Basic Support: Next Business Day Parts and Labor Onsite Response Initial Year (991-6350)	
Service:		Dell Hardware Limited Warranty Plus Onsite Service Extended Year(s) (992-6508)	
Service:		Dell Hardware Limited Warranty Plus Onsite Service Initial Year (992-6507)	
Dirline:		Keep Your Hard Drive, 5 Year (980-7554)	
Installation:		Standard On-Site Installation Declined (900-9987)	

Installation:	Standard On-Site Installation Declined (900-9987)
Misc:	Shipping Material for System Smith Minitower,Dell OptiPlex (330-1186)
	CFI Titan Code for CFI FIDA orBypass SI (364-1846)
	CFI,Information, Validation,Select Any Microsoft OS (364-4107)
	CFI Routing SKU (365-0257)
	CFI,Rollup,Integration ServiceTag or Label,Only - No Other CFI Services (366-1036)
	CFI,Rollup,Asset Report Only (366-1042)
	CFI,Optiplex or Workstation, Only,Factory Install (371-4665)
	CFI,Information,CSRouting,Eligible,Factory Install (375-3088)

SOFTWARE & ACCESSORIES			
Product	Quantity	Unit Price	Total
DELL GOVT GHOST SOLUTION SUITE 2.5 WIN BH DEVICE STD LIC (A2645554)	8	$5.00	$40.00
Number of S & A Items: 1	S&A Total Amount: $40.00		

COMMENTS
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641179

SALES REP:	Barry Warriner	PHONE:	1-800-274-7799
Email Address:	Barry_Warriner@Dell.Com	Phone Ext:	5139332

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DELL

QUOTATION

QUOTE #: 533374528
Customer #: 102481093
Contract #: 40ABR
CustomerAgreement #: Agg Buy-PT55666
Quote Date: 3/15/10
Customer Name: UNIV @ ALBANY

Date: 3/16/10 3:25:24 PM

TOTAL QUOTE AMOUNT:	$3,771.00		
Product Subtotal:	$3,771.00		
Tax:	$0.00		
Shipping & Handling:	$0.00		
Shipping Method:	Ground	Total Number of System Groups:	1

GROUP: 1	QUANTITY: 3	SYSTEM PRICE: $1,252.00	GROUP TOTAL: $3,756.00
Base Unit:		OptiPlex 760 Minitower Base Upto 88 Percent Efficient PSU (224-2212)	
Processor:		OptiPlex 760, Core 2 Duo E8400 with VT/3.0GHz,6M,1333FSB (311-9513)	
Memory:		8.0GB,Non-ECC,800MHz DDR 4x2GB Dell OptiPlex 960 and 760 (311-7763)	
Keyboard:		Dell QuietKey Keyboard, No Hot Keys, No Palmrest, English, OptiPlex (330-1989)	
Monitor:		No Monitor Selected, OptiPlex (320-3704)	
Video Card:		512MB NVIDIA Quadro NVS 420 Quad DVI Adapter, Full Height (320-8174)	
Hard Drive:		250GB SATA 3.0Gb/s and 8MB Data Burst Cache,Dell OptiPlex (341-5474)	
Floppy Disk Drive:		No Floppy Drive with Optical Filler Panel,Dell OptiPlex Minitower (341-3909)	
Operating System:		Windows 7 Professional, Media, 64-bit, Optiplex, English (421-1483)	
Operating System:		Windows 7 Label, Optiplex, Fixed Precision, Vostro Desktop (330-6228)	
Mouse:		Dell USB Laser 6-Button Mouse Dell OptiPlex,Precision and Latitude (330-1170)	
NIC:		Intel Standard Manageability Hardware Enabled Systems Management, Dell OptiPlex (330-2902)	
CD-ROM or DVD-ROM Drive:		16X DVD+/-RW SATA,Data Only Dell OptiPlex Desktop or Minitower,Black (313-7104)	
CD-ROM or DVD-ROM Drive:		Cyberlink Power DVD 8.3,with Media, Dell Relationship LOB (421-0536)	
CD-ROM or DVD-ROM Drive:		Roxio Creator Dell Edition 10.3, Media, Dell RLOB (421-1189)	
Sound Card:		Heat Sink, Mainstream, Dell Optiplex Mini Tower (311-9522)	
Speakers:		Internal Chassis Speaker Option,Dell OptiPlex Minitower (313-3350)	
Cable:		OptiPlex 760 Minitower Up to 88 Percent Efficient Power Supply (330-1981)	
Cable:		Dell Control Point for OptiPlex,Systems (420-9701)	
Cable:		Enable Low Power Mode for EUP Compliance,Dell OptiPlex (330-7422)	
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Documentation Diskette:		Power Cord,125V,2M,C13,Dell OptiPlex (330-1711)	
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Feature		Resource DVD contains Diagnostics and Drivers for Dell OptiPlex (330-3686)	
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	CFI,Rollup,Asset Report Only (366-1042)
	CFI,Optiplex or Workstation, Only,Factory Install (371-4665)
	CFI,Information,CSRouting,Eligible,Factory Install (375-3088)

SOFTWARE & ACCESSORIES

Product	Quantity	Unit Price	Total
DELL GOVT GHOST SOLUTION SUITE 2.5 WIN BH DEVICE STD LIC (A2645554)	3	$5.00	$15.00

Number of S & A Items: 1	S&A Total Amount: $15.00

COMMENTS

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SALES REP:	Barry Warriner	PHONE:	1-800-274-7799
Email Address:	Barry_Warriner@Dell.Com	Phone Ext:	5139332

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