Request for Technology Fee Funds

NOTE: A separate request should be made for each initiative.

I. Department Number/Department Name: 360 College of Computing

Title of Request *(please be brief)*: Virtualized Infrastructure for Instruction

Amount of Request *(formula from detailed budget below)*: $72,031

Are there any installation/renovation costs associated with this request? ☐ Yes ☑ No

If "Yes" then indicate the source of approved funding:

(Note: Tech Fees are not allowed for installation/renovation)

Executive Summary of Request (100 words or less):

The College of Computing, on behalf of OIT, GTPE and CoC, proposes collaborative investments in scalability and risk reduction for the new OMS CS degree program and its related technology support needs. This proposal allows the three departments to scale to 2,000-3,000 more students. Of most import, however, is that these funds will reduce risk now for the current OMS enrollment level.

For clarity we separated the portion of the CoC's proposal that applies to the traditional (non-online) program.

Specific class and/or lab initiative(s) if applicable:

Contact person for this request (incl. phone #): Chad Huneycutt, 5-6696

Indicate priority per department if applicable: Number ____ of ____

Indicate priority per college or unit: Number 1 of 11

II. Impact on Students - Provide course title, course number, and anticipated enrollments:

Titles/Numbers of Course(s) all courses offered in College of Computing

Anticipated Enrollments

Graduate:	*977*
Undergraduate:	2,249
Total:	3,226

NOTE: Other impacts on students should be described in narrative.

III. Narrative - *Provide narrative justification for your intended use of the technology fee funds. Include narrative on how the education or research of the students will be enhanced. Also include how the request aligns with the Strategic Plan of Georgia Tech. Continue in the block below if necessary.*

The College of Computing proposes to re-architect its existing instructional infrastructure to a virtualized environment, which will provide many strategic advantages including making it possible to scale the services for the new OMS CS degree. Virtualization will result in significant overall equipment savings by allowing better utilization of a pool of physical servers, and minimizing unused computing cycles. Virtualized server environments are generally easier for technologists to manage, resulting in higher server availability and flexibility to accommodate specialized faculty requests.

IV. Detailed Budget - Requested Items by Category *List separately any equipment, software, and other allowable expenses (see Tech Fee Guidelines). There is a formula in the "total column" that multiplies the number of items times the unit price. You may enter a figure into the total column if the unit pricing is not applicable. If you need additional rows, contact the Budget Office to receive a modified form.*

Supporting documentation is required *- Include price justification in some form, such as quotations, published price lists, etc. as a separate PDF attachment. All supporting information should be in a single PDF.*

	Proposed Number of Items	Estimated Price per Unit	Total ($)
Ace Powerworks Servers	**9**	**$7,545**	**$67,905**
Cables	**1**	**$67**	**$67**
10Gbps Cables	**18**	**$226**	**$4,059**
Total *(linked to the total amount of request line above)*			**$72,031**

Please return form via e-mail in Excel format to: tina.clonts@business.gatech.edu. Supporting information only in a PDF file.

III. Continuation of narrative justification, if necessary

Due to the high visibility and global nature of the OMS CS program, we are proposing a scalable, highly available virtual machine (VM) infrastructure. Our existing server infrastructure lacks these features and is only able to provide limited services to OMS CS students, representing a potentially embarrassing outage in the case of even a single server failure. The proposed system will be fully redundant across 2 buildings with automatic failover allowing for reduced service down time due to power outages, hardware failures and periodic maintenance. In addition, high availability features allow technologists to address problems during normal Georgia Tech working hours. The proposal allows for routine host maintenance with zero down time for the services.

We are requesting server hardware, networking, power, racking and cabling to provide the redundant infrastructure. The majority of the proposal cost can be attributed to the servers, which have a typical life span of 5 years. To start up this effort, we will need 5 years of funding now, however future requests would be for only one fifth of the total, following a life cycle management replacement schedule. Due to the dynamic growth of the College's instructional program, the total number of servers may vary in future years.

Regarding services for our on-premise programs, we will be migrating our web programming and database servers from aging hardware that needs to be replaced this year. We will also be able to provide independent database servers for some classes to help reduce performance problems that can occur during heavy usage. We will migrate our existing SVN/TRAC servers to the new hardware but plan to eventually migrate the service to a proposed OIT GitHub solution when it becomes available (release date unknown). We will also be migrating our general access UNIX login servers to this VM infrastructure. The migrations will replace hardware from previous Techfee grants, which we plan to subsequently merge into the VM infrastructure.

We often get requests from professors involving specialized software needs, such as experimental databases and software development environments, which are difficult to accommodate and support in our current hardware environment. As part of this virtualization infrastructure, we will have available capacity to quickly allocate VMs on which to host these projects. In addition, we will provide VMs to senior design course teams so they can work on more stable, high quality servers for their projects rather than ad hoc solutions.

Regarding services for the OMS CS program, our goal is to provide a scalable, highly available VM infrastructure, which requires us to adjust our server architecture approach to maximize overall performance and resiliency. Specifically, we will be providing a larger number of relatively smaller server instances (VMs) in a load balanced approach to minimize interference caused by crowding. We will be positioned to rapidly respond to increased usage by quickly adding new VMs as needed.

Of course, the future is uncertain; however this architecture lends easily for future capacity scaling. With previous year's funding, we upgraded our instructional data center in the College of Computing Building with state of the art 10 Gigabit networking, modern power infrastructure and racks. We propose to duplicate this infrastructure in our Klaus Advanced Computing Building data center to house half of the VM infrastructure providing redundancy in the case of data center failure.

We are very interested in campus efforts to provide shared, virtual environments, such as the Matrix 2.0 virtualization project. We are discussing the possibility of joining in this campus initiative, but do not yet know whether OMS servers are appropriate for Matrix or if the final product will meet our requirements.