Request for Technology Fee Funds: FY21

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):***	**HPC-O-RAMA**	
Amount of Request *(formula from detailed budget below):*		**$223,080**
Type of Proposal: Atlanta or Dist Lrng/Non-Atl	**Dist Lrng**	
Is this request similar to one funded in FY19 or FY20?	**No**	**(Yes or No)**
Are there installation/renovation costs associated with this request?	**No**	**(Yes or 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):

Georgia Tech lacks a resource to teach how to best build an HPC system; we focus, rather, on optimizing systems built by others. The HPC-O-RAMA system allows students to make decisions on all aspects of the HPC stack from Operating System to compilers to networking optimization.

Specific class and/or lab initiative(s) if applicable:	
Contact person for this request (incl. phone #):	**Will Powell (4-9301)**
Responsible faculty for this request (incl. phone #)	**Rich Vuduc, Edmund Chow, Milos Privlovic**
Indicate priority per department if applicable:	**Number** ____ **of** ____
Indicate priority per college or unit:	**Number** 3 **of** 3

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

Titles/Numbers of Course(s): **CS 6290, CSE 6220**

Anticipated Enrollments

Graduate:	*1,090*	*(per* yr	) sem or yr
Undergraduate:		(per	) sem or yr
Total:	1,090		

The estimated percent use of the resources in the item by:

Students	90%
Faculty	10%
Other	
Total:	100%

Brief explanation of how estimate was achieved.

This resource would expand the existing Cisco UCS equipment within the College of Computing. During semesters where these courses need this resource, it will be made available exclusively to the associated students.

NOTE: Other impacts on students should be described in narrative to include benefits to the students affected.

III. 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. Software or data license proposals should indicate how many years the item has been funded through student tech fees in narrative.*

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 ($)
Cisco UCS Solution	**1**	**$223,080**	**$223,080**
			$0
			$0
			$0
			$0
Total *(linked to the total amount of request line above)*			**$223,080**

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

IV. 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. To include curricular, co-curricular, and extracurricular benefits expected to accrue to students through provision of this resource, including students outside the unit. Briefly state how information regarding similar technology use elsewhere on campus to benefit from lessons learned, to standardize, or differentiate, and to avoid duplication. Also include how the request aligns with the Strategic Plan of Georgia Tech.

Beyond expertise in how to optimize the use of high-performance-computing (HPC) technologies, a gap exists in higher education with regards to training students on how to build HPC systems. This is chiefly a resource problem as not everyone has the computers, networking, and storage available for students to use as a "sandbox" to hone their respective skills at building HPC systems.

The proposed HPC-O-RAMA would be driven by a master console that would orchestrate the building of HPC systems through push-key setups. Choices for Operating Systems and network setups would be automated via a set of scripts and various automation technologies. Once initial choices are implemented, further customization can begin with the team seeking to earn the highest Linpack Benchmark. Options used are documented and the master server will host a "leaderboard" of teams and their "secret sauce". What variables make the most impact? What choices don't make much at all? Is ClearLinux faster than Ubuntu? What compiler is the fastest? What other tunable variables can impact performance?

The HPC-O-RAMA will be a testbed for students seeking to build their HPC skills beyond using a system built by other, IT professionals.

Critical to the system will be a "reset" function that will remove all setups back to a clean slate.

It is also important that the system be a dedicated resource as opposed to a shared virtual machine or cloud infrastructure. Part of maintaining an HPC system is system management using service processors and cluster management tools. The HPC-O-RAMA will encourage students to explore the functionality of these tools to understand their importance in the HPC "stack".

Can your team top the HPC-O-RAMA leaderboard?

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