Request for Technology Fee Funds: FY17

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)*: Federated Cloud Computing Environment

Amount of Request *(formula from detailed budget below)*: $97,475

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 proposes to create a self-service OpenStack cluster, joining similar initiatives at the College of Engineering and College of Sciences, connected to the campus Vapor network.

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

Contact person for this request (incl. phone #): Dan Forsyth (dan@cc)

Indicate priority per department if applicable: Number ____ of ____

Indicate priority per college or unit: Number 6 of 10

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

Titles/Numbers of Course(s) all College of Computing students

Anticipated Enrollments

Graduate:	*3,609*	◉ per sem ○ per year
Undergraduate:	1,877	◉ per sem ○ per year
Total:	5,486	(select one)

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 Georgia Tech Vapor project is a technology framework and governance arrangement to facilitate both the sharing and compartmentalization of cloud-related virtualization technology in research and instructional settings. It exists to facilitate the sharing of knowledge, personnel, and technology among its collaborators. The goal of the Vapor Cloud project is the formation of a geographically distributed infrastructure to facilitate both shared and autonomous clouds. Those clouds will support instruction, research on cloud computing and research using cloud computing. Vapor Cloud will integrate multiple autonomous cloud infrastructures, distributed over several geographic locations on a shared high-performance network fabric. It leverages common identity management (GTED) together with a standard API (OpenStack) as well as virtualization technologies such as Hyper-V, RHEVM, VMWare and EC2 to provide resilient and flexible computing resources to the Georgia Tech academic community. Why not a single cloud? By allowing for a diverse implementation of multiple clouds each meeting differing use cases, experimental risks can be compartmentalized and group autonomy (academic units, research groups) can be preserved. But by federating the cloud, sharing of resources amongst groups can be facilitated as well as further collaboration with PACE for access to high performance computing, big data storage, and other research support areas. Further, federation with other institutions and/or cloud service providers will present even more avenues to collaboration.

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 ($)
Core Servers	10	$7,475	$74,750
Storage Servers	3	$7,575	$22,725
Total *(linked to the total amount of request line above)*			$97,475

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

We propose to purchase the necessary compute servers to join with the Vapor initiative and create a prototype instructional OpenStack private cloud. The required network infrastructure and expertise in configuring OpenStack is being provided by the Vapor initiative. OpenStack is an open source suite of products that will provide students and instructors with self-service virtual machines and network environments, much as they will find in Amazon Web Services or Microsoft Azure clouds. OpenStack is widely supported in the industry by companies such as Cisco, IBM, NetApp, EMC, Dell, and HP. The proposed prototype cloud will allow instructors and students to begin to work in a modern cloud environment without concern about unexpected cost overruns or long-distance network charges as is found in public cloud services. It should be noted that several companies such as Cisco provide internally-hosted self-service OpenStack clouds for their employees' use at lower cost than the use of public cloud services. We expect that same costing experience to apply here.

As the instructional community and the students working on personal projects become familiar with the cloud environment, we believe demand for these resources will increase. To meet the shift in demand, the design of OpenStack will allow us to repurpose existing computing resources and acquire new computing resources to be integrated into the instructional cloud while maintaining the same environment for our students. We envision students in project-based classes or students interested in experimenting with various software packages and operating systems being able to log into the private cloud website, choose the type of virtual machines necessary for their project, specify the network topology for their project, and the cloud will automatically provision the required computing environment in a few seconds. This provides our students with computing environments that they can tailor more directly to their needs, gives them experience comparable to modern public cloud computing environments, allows computing equipment to be shared more effectively, and removes the necessity for more ad hoc solutions that have been resorted to in the past.