



EECS Instructional Computing - Review and Plans
Fall 2016 / Spring 2017

CONTENTS :

[Strategic Goals](#)

[Priorities](#)

[Baseline Services](#)

[Recent Improvements](#)

[Mission Statement](#)

[Organizational Scope](#)

[Notable Events](#)

Strategic Goals

Emphasize the support of services that directly affect the instructors and students. Consider virtualization of servers, enable student-owned computers. As instructors develop new ways to use external "baseline" services for communications and grading, we want to support and document it, and share that with other instructors.

Priorities

- 1) 200 SDH: need replacement plan for 30 MacPros (CS10, DeCals) (~\$90K)
- 2) Icluster: need replacement plan for 26 cluster nodes (Dell 1950s); used for CAD tools such as Cadence, Synopsys, MentorGraphics, MarkLogic (EE290C, CS250, EE24*); donation from Google and Intel in 2007 (\$93K), we added new RAM and disk in 2012 (~\$10K). These servers are good candidates for virtualization if we can contain the possible costs.
- 3) Help instructors to integrate the baseline (aka "dialtone") services (as defined by the [CNIL committee](#)) such as bCourses, Piazza, Github, Gradescope and Moss.
- 4) Enable CalNet authentication and authoring tools for course WEB sites. Improve course WEB content and consistency by posting standard course descriptions.
- 5) Look for cost savings, define possible Miscellaneous Student Fees. Establish a funding model for external cloud services.



Baseline Services

In November 2016 we [surveyed instructors](#) about their use of WEB and email services for their courses. The survey asked where course information is managed and how the teaching staff communicates. This was to help us gauge the interest in having a [{class}@berkeley.edu](#) email address and an [http://{class}.berkeley.edu](#) WEB address and for each of our classes.

Conclusions:

These services are not in high demand, so I conclude that we should create the new course email addresses only for the required courses by default, and we should defer the creation of the new course WEB addresses.

- 1) New [course@berkeley.edu](#) email addresses would have these benefits: 1) the department would reserve the related SPA and email aliases so they can be managed in a consistent way; 2) the SPA accounts would also be useful to courses that use the new [UC Berkeley Github](#) server; and 3) we could redirect email that is currently sent to the instructor accounts on the [Instructional email](#) server. The drawback is that it would create ongoing manual tasks for instructors, CalNet and EECS instructional staff to create SPAs and email lists for new courses.
- 2) New [http://course.berkeley.edu](#) WEB addresses would have one benefit: they would make the link more memorable by shortening the standard course URLs and removing the tilde (such as [http://inst.eecs.berkeley.edu/~cs123](#) being aliased to [http://cs123.berkeley.edu/](#)). But they would have these drawbacks: 1) they would not support HTTPS authentication, and 2) they would create ongoing manual tasks for campus IT and EECS instructional support and to create IP redirects and virtual hosts for new courses.

Instructors for 17 courses have responded (CS168, CS169, CS184, CS186, CS188, CS261N, CS61A, CS61C, EE105, EE106A, EE120, EE137A, EE143, EE147, EE16A, EE16B, EE213). The responses:

Function	Summary of the findings
Course Content: public-facing WEB sites	<ul style="list-style-type: none"> • 4 classes use public WEB sites on bCourses • 9 classes use public WEB sites on the instructional inst.eecs server • 6 classes use alternative WEB servers (Fall 2016): http://cs169.saas-class.org http://www.cs186berkeley.net/ http://cs61a.org http://rfic.eecs.berkeley.edu/105/ http://cs168.io https://edge.edx.org/courses/course-v1:BerkeleyX+CS188x-FA16 • 5 instructors would use a standard course.berkeley.edu WEB address if it existed (CS169,EE147,CS184,CS188,EE137A)



Course Content: Site management	<ul style="list-style-type: none"> • CS169 uses Pivotal Tracker and Heroku • EE16B uses AWS for course manager • CS61A uses okpy.org • CS61C uses edge.edx • 3 classes use Jupyter
Communications: how to reach an individual student	<ul style="list-style-type: none"> • Every class uses Piazza • 14 classes email the students' <u>bMail</u> addresses as found on bCourses, etc • 1 class emails to the EECS instructional accounts on <u>imail.eecs</u> • 1 class uses <u>Piazza</u> private messages • 1 class uses <u>bCourses</u> Announcements
Communications: how to reach the instructors	<ul style="list-style-type: none"> • 6 classes send email to the personal addresses of TAs and instructors • 1 class uses a UC Berkeley list server • 1 class sends email to the instructor account on <u>imail.eecs</u> • CS61A has <u>cs61a@berkeley.edu</u> (via an SPA), only to send • 6 instructors would use a standard <u>course@berkeley.edu</u> email address if it existed (CS61A, CS61C, CS184, EE16A, EE120, EE147)
Submissions	<ul style="list-style-type: none"> • 6 classes use <u>github.com</u> (CS61C, EE16A, CS169, EE16B, EE106A, CS186) • 5 classes are interested in the new <u>github.berkeley.edu</u>: private repos, recently enabled organizations (CS61C, CS169, EE16B, CS61A, CS188)
Grading	<ul style="list-style-type: none"> • 10 classes use Gradescope • 2 classes use the grading tools on bCourses • No classes use Nbgrader (Jupyter)

The next survey will ask about best practices for autograding and linking it to submissions on Github.



Recent Improvements

Highlights:

- 1) In summer 2016, 105 Cory was renovated with funding from the new L&S Data Science Education (DS Ed) Program for use primarily by Data Sciences lab classes. The lab has a new projector, but no computers. The students bring their own laptops or borrow Chromebooks from the Moffitt Library. All of their programming assignments are done on a Jupyterhub server cluster that is managed by DS Ed-funded staff. The cluster was donated to EECS by Intel. (105 Cory was formerly a 30-seat Windows computer lab used primarily by the discontinued EE20N).
- 2) We've retired our last Solaris computer in January 2017 (as of March 2017, cory.eecs is still down, being replaced with Linux). We are still debugging the CGI programs that were running on our inst.eecs WEB server, to allow them to run on Linux instead of Solaris.
- 3) We are running numerous virtual machines on our own hypervisors such as HyperV and libvirt. These are serving VMs for course WEB sites and repositories, autograding, WEB, email, print and LDAP servers.
- 4) We are collaborating with SIS Enterprise Integration Services to promote their new Berkeley Github server, by maintaining a discussion forum (<http://inst.eecs.berkeley.edu/~inst/github-forum.html>) about Github usage by classes. We expect that they will enable "organizations" soon for that purpose.
- 5) We have enabled on-line (paperless) computer account distribution and cardkey authorization (<http://inst.eecs.berkeley.edu/webacct>). EE and CS course enrollments now total 13800 students (where a person in 2 courses is counted twice). Concurrent enrollment has increased, and we need to reduce the bureaucracy of processing those students into classes.
- 6) We enabled a Tractor render farm for animation classes. We also evaluated a cloud render service (Zync) and a reseller who can monitor and contain our usage (Onyx). That could be a model for containing the cost of other cloud services.
- 7) We saved \$2000/year by adapting to the new SIS data repository and eliminating our previous customized access to student enrollment data.





Mission Statement

The EECS Instructional Support Group (ISG) installs and maintains networked computers that are used by EECS classes. ISG provides computer accounts for instructors and students in the Instructional labs and on Instructional servers. ISG purchases, installs and maintains application software needed for classes. ISG supports instructional labs in Cory Hall, Soda Hall and Sutardja-Dai Hall.

ISG wishes to anticipate and meet the computing needs of instructors and students in EECS courses and to provide support for new and innovative learning environments. We wish to be accessible and responsive to requests for service. We also wish to learn about new and interesting technologies that may be of value in this service.

Organizational Scope

The major, ongoing responsibilities of ISG are to manage:

- ▶ computer accounts for 13800+ students in 100+ classes each semester on the EECS instructional computers; cardkey access to the labs
- ▶ systems administration of Windows, Linux and MacOSX operating systems and application software, including licensing and security
- ▶ servers for email, WEB, SVN, LDAP, Netshow, autograding
- ▶ 180 desktop computers in 7 CS labs (Soda Hall, Sutardja Dai Hall)
- ▶ 150 desktop computers in 8 EE labs (Cory Hall)
- ▶ 32 Centos compute servers, mainly for CAD tools (Icluster*, Hpse*)
- ▶ 8 Windows compute servers, mainly for EE classes (Wserver*)
- ▶ 12 Ubuntu compute servers, mainly for CS classes (Ashby, etc)
- ▶ dynamic allocation of additional servers as needed for classes
- ▶ customized software support for instructors and student projects
- ▶ physical condition of 10 computer labs

These are functions in which ISG interacts with other UCB support groups:

- ▶ we use EECS department services (IDSG) for Active Directory, disk space, network access and security scans
- ▶ we synchronize our user accounts with the EECS department (IDSG)
- ▶ we obtain enrollments from the Registrar (Student Information Services)
- ▶ we obtain cardkey numbers from the CAL1 office
- ▶ we submit cardkey authorization to our labs in batch uploads to UCPD
- ▶ we bill students' voluntary printer charges to CARS
- ▶ we manage the computers in engineering labs with ESG
- ▶ we manage the licenses for Synopsys/TCAD/HSPICE with the Device Group
- ▶ we manage the licenses for Cadence with the BSAC group
- ▶ we manage the licenses for Maya and Renderman with the BCAM group



Notable Events

See <http://inst.eecs.berkeley.edu/notices.html> for current events.

For additional reports, please see <https://inst.eecs.berkeley.edu/reports>

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