UC BERKELEY BUILDING DENSITY DASHBOARD

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Project Team Members

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- Jenn Stringer, Associate Vice Chancellor for IT and Chief Information Officer
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SUMMARY

The Building Density Dashboard Project created a web application to streamline the planning process during COVID-19 recovery operations and beyond. It makes creative use of existing tools to present data to campus in a new way, allowing space planners, building managers, and campus safety officials to monitor usage and calculate available space for research, learning, and other campus activities.

CAMPUS NEED AND PROJECT GOALS

Like all organizations, COVID-19 brought significant challenges to operations at UC Berkeley. Rules and recommendations were changing quickly throughout 2020, and campus needed access to data that had never been requested before. Along with significant new technology needs, budgets were stretched thin and making large technology purchases was not possible. Implementation of new technologies also proved challenging, with limited access to campus and increased workloads and home responsibilities. In order to meet a critical campus need, access to space planning and usage data, the project team came up with a novel solution to use existing campus Wi-Fi data, along with planned usage data, to paint an easy to understand picture for campus space planners.

The project team developed a free campus service using a web-based application to simplify the space planning process. Prior to the dashboard, tracking density and space usage was done manually with information quickly becoming static making it not only a difficult and tedious process but left room for inaccuracies. This tool was built for employees who are responsible for planning and managing campus spaces (e.g, buildings, floors, rooms). The goal was to help them make decisions about their space with an accurate, anonymous, real-time people count.

The space usage plan is automatically generated in real time by aggregating data from data sources such as spreadsheets, campus systems, department databases, group calendars, and more. It provides the user with both

a high level and detailed view of their space usage needs. Real-time monitoring of space usage is accomplished through the monitoring of anonymized Wi-Fi client activity.

FEATURES OF THE TOOL:

- Calculates the space availability and density under current COVID-19 guidelines.
- Automates the process of collecting space usage requests from students, faculty, and staff.
- Sends an alert when space usage requests exceed approved capacity.
- Streamlines the approval process by allowing electronic sharing of space planning between
- reviewers.
- Ensures continued compliance with the plan through real-time monitoring of space usage.
- Future phases of the project may include using the tool to help develop policies and practices that lead to cost savings through energy reduction, enhanced student experiences, and increased personal safety.

Haas - Building Density — What's New   About   Contacts

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Haas Business School - Fall 2020 (100% Virtual) ▼ ⚙   Period Start: 12/6/2020   End: 12/12/2020   Apply

Haas Business School - Fall 2020 (100% Virtual)

Summary   Schedule   Attendance Over Time Period

Buildings

Name	Max Capacity	Operational Capacity	Operational Usage	Time of Day	Sun Dec 6th Plan	Actual	Mon Dec 7th Plan	Actual	Tue Dec 8th Plan	Actual	Wed Dec 9th Plan	Actual	Thu Dec 10th Plan	Actual	Fri Dec 11th Plan	Actual	Sat Dec 12th Plan	Actual
+ Cheit	700	188	27%	Morning	4	12	0	14	0	10	0	0	0	0	0	0	0	0
				Afternoon	6	12	0	13	0	0	1	0	11	0	0	0	0	0
				Evening	0	12	0	11	11	0	0	0	11	0	0	0	0	0
+ Chou Hall	1706	368	22%	Morning	8	8	4	8	5	8	4	0	2	0	0	0	2	0
				Afternoon	8	8	3	5	8	0	3	0	8	0	0	0	2	0
				Evening	0	8	1	5	3	0	4	0	5	0	0	0	0	0
+ Faculty Building	1448	37	3%	Morning	28	9	31	13	31	15	31	0	30	0	29	0	29	0
				Afternoon	28	9	32	10	32	0	32	0	33	0	29	0	29	0
				Evening	0	9	0	11	0	0	1	0	1	0	0	0	0	0
+ Student Building	870	141	16%	Morning	0	13	3	13	4	13	4	0	3	0	2	0	3	0
				Afternoon	0	14	3	14	4	0	4	0	3	0	2	0	4	0
				Evening	0	13	2	13	2	0	1	0	1	0	0	0	0	0
Totals:	4724	734	16%	Morning	40	42	38	48	40	46	39	0	35	0	31	0	34	0
				Afternoon	42	43	38	42	44	0	40	0	55	0	31	0	35	0
				Evening	0	42	3	40	16	0	6	0	18	0	0	0	0	0

CUSTOMER IMPACT AND COLLABORATION

The original concept for the dashboard came about as part of the recovery efforts at the Haas School of Business. The Haas facilities, HR, event management, and information technology teams developed a prototype with help from Information Services and Technology to source Wi-Fi traffic data on top of the space planning data as part of the campus-wide COVID-19 IT Recovery efforts.

> *"The vision was to develop a tool that would simplify our workflows and allow us to be operationally ready to quickly adapt to an ever-evolving situation."*
>
> *Courtney Chandler*
> *Senior Assistant Dean and Chief Strategy and Operating Officer, Haas*

Once the dashboard was released to the rest of campus, the feedback from early adopters was very positive.

"The building density dashboard is meeting a huge need in the ASUC Student Union. So much, we would like to explore this as an option for our dining halls."

Michelle White
Strategic Initiatives Manager Student Affairs IT

As the solution continued to gain traction on campus, the decision was made to formally add this project to the list of the One IT community of COVID-19 technology recovery projects and to share the cost for developing and hosting the solution between central IT and the Haas School of Business.

"The density dashboard is such a great example of One IT in action! Since developing our community six years ago, we continue to strengthen our ability to be an incubator for some of the most innovative and cost effective campus-wide IT initiatives. This pandemic has required us to use our collective creativity, enabling us to offer solutions to campus challenges, as they arise."

Jenn Stringer
Associate Vice Chancellor IT and Chief Information Officer

With the success of the dashboard at UC Berkeley, the team has presented the tool to the University of California IT Leadership Council and has begun to help other campuses use the tool or develop something similar across the system. UC Hastings has launched the density dashboard there, and UC Merced and UC Santa Cruz have also begun to investigate using the tool.

"I am very impressed with the swift implementation of this software at UC Hastings. With so many challenges to safely reopening a campus, it was a tremendous relief to be able to quickly deploy this intuitive dashboard. While our implementation was easy, I know that this does not happen without substantial effort and creativity of Pierre and the Haas operations teams. I am grateful UC Hastings was able to partner on another successful UC IT project."

- Camilla Tubbs
Associate Dean for UC Hastings Library and Technology

Project success has been measured by the ability of campus to use the data to maintain appropriate density in campus buildings, leading to continuation of critical services and ability to safely continue research-based activities. The data will help ensure we are meeting recommendations and guidelines moving forward as we begin to return more students to in-person learning. Future phases may include using density data in dining applications to ensure compliance with health guidelines. Although the tool was developed with COVID-19 in mind, it will continue to be a useful tool for determining density of buildings and helping students determine the best times to attain services or to find the best locations on campus to study or interact with their peers.

DEPLOYMENT AND TECHNOLOGY

The dashboard was quickly prototyped over three weeks in summer of 2020 using Wi-Fi logs, scripts, and Google sheets. After a positive response from the campus, the tool has been upgraded with an easy to use web based front end that allows users to quickly move between buildings and floors to see planned and actual data. The new front end was deployed in fall of 2020. From beginning to deployment, the project took about six months. Following agile processes, the tool will continue to be enhanced as new functions are needed or improvements are made.

Plan Data (data about how many people we expect in any space at a given time) is collected through multiple data sources like spreadsheets, calendars, and departmental databases.

Actual data (data about how many people are actually in any space at a given time) is collected through wi-fi usage data. Care is taken to anonymize the data. In general, only mobile devices like cellular phones are counted since many people carry multiple devices, but most people only carry one phone. While there are some missed people in the count (people who are not connected to either authenticated or guest Wi-Fi), accuracy is reasonable for the needs of campus.

Plan and actual data are then rolled up into a simple dashboard that can then be shared for review with team members. Multiple plans can then be combined and rolled up for review by campus leadership.

CURRENT APPLICATION TECHNOLOGY STACK

APPLICATION TIERS

Application Tier	Technology in Use
Web Tier	Angular v2
API Tier	Node.js
Database Tier	GCloud Firestore DB

SERVICES FLOW