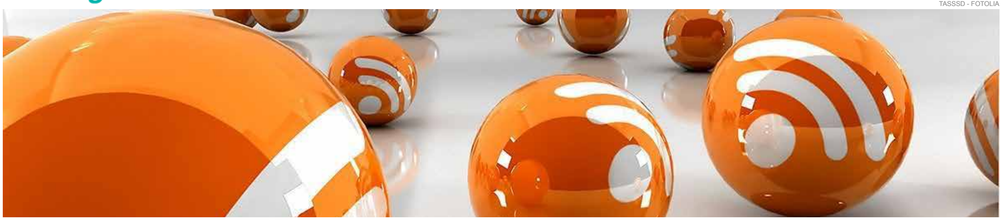

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EVALUATE

How Dartmouth College improved its campus-wide Wi-Fi

Dartmouth College brought 21st-century wireless infrastructure from Mist Systems to its 18th-century architecture in a highly anticipated update to its campus Wi-Fi.

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With a surge of 25,000 devices and counting, Dartmouth College needed its new Wi-Fi to be fast, reliable and as smart as its students.

In response, Dartmouth, based in Hanover, N.H., began deploying new campus-wide Wi-Fi from Mist Systems last summer. It expects to complete the project throughout the campus in three to five years, according to Bryan Ward, a network engineer at Dartmouth.

The IT department manages the Wi-Fi through a cloudbased wireless LAN and can already see the benefits of better coverage and easier management. But the team faced difficulties when embedding the new system with Dartmouth's centuries-old campus architecture, which is less supportive of campus-wide Wi-Fi than modern architecture.

The following interview has been edited for length and clarity.

What were your goals for this deployment?

Bryan Ward: It was time for a holistic upgrade to Dartmouth's campus-wide Wi-Fi system. We hadn't upgraded the Wi-Fi system in a number of years, and with the advent of IoT -- all the home devices, like Chromecast and Alexa -- it was time for an upgrade.

I view Wi-Fi as a utility, and I feel that's what our faculty and students expect: superfast, reliable Wi-Fi everywhere. The incoming student population expects a level of wireless service like they have at home. Incoming freshmen don't know a world without Wi-Fi. If Wi-Fi is not 100% reliable and superfast, students are far from pleased. We evaluated several companies and chose Mist, which offered unique technologies with which we wanted to be on the leading edge.

When do you plan to fully deploy this system?

Ward: We began deployment last summer. We did a proof-of-concept installation in our IT office building to get it up and running. Two buildings were in production this past fall, and we added two more this winter break. We're tackling one building at a time.

We're doing full-scale deployments in the Tuck School of Business and the Thayer School of Engineering. For the engineering school, we'll put around 300 APs [access points] into two buildings, compared to the 50 APs there now. The building is around 200 years old. It's solid brick and concrete, and the architecture is something I consider as we design.

In modern construction with drywall and dropped ceilings, an AP might cover five or six offices. In older buildings, though, we put APs in about every office to provide and guarantee high levels of service. It's a lot of work, but it's an upgrade everyone asked us to provide for years.

We hope to have the whole campus done in about three to five years. We have about 200 buildings to get through, so it's a lot. We are taking this opportunity to improve our workflow, as well as the infrastructure.

If we have any hope of getting 200 buildings upgraded in three to five years, we need to embrace automation. And if we do that from Day One, we can take advantage of those benefits as we move forward. We use a Mist API and automation technology, such as Ansible, which make the install pretty seamless. Our installers can hang and plug in an AP, and the API does the back-end stuff -- it's all automated.

What issues did you face with your previous system?

Ward: It was more of an architecture issue. Like a lot of places -- especially in higher education -- Dartmouth added Wi-Fi as an overlay to the existing infrastructure. We were one of the first campuses to have Wi-Fi technology, so locations where APs were originally installed have gone through several iterations of hardware. We also had issues with our previous vendor's software and hardware. A software update would take months -- from first reporting an issue to having it fixed, deployed and in production.

Until recently, nobody took the time to think about proper heat mapping, design and capacity planning for rooms. As we go through rooms now, we found a lecture hall needs eight APs to serve minimum levels of service to students. Previously, having eight APs in a room was crazy. But that's the way it's going: a small cell technology, high-speed, low-power kind of architecture.

What features did this campus-wide Wi-Fi add to your network?

Ward: The No. 1 criterion for the upgrade was reliable, basic Wi-Fi service. Speed for users will be the No. 1 performance change. Each AP can offer over 200 Mbps. It could be faster, but, as part of building designs, in some areas, we're opting for better coverage over speed. Previously, campus-wide Wi-Fi traffic peaked at about 2 Gbps.

Also, there are talks about using the Mist location system to determine student attendance in classes or events. If a student doesn't show up to an event that counts toward class time, then faculty might want to know about that. We're also able to do location-based security. For example, you can only access certain network resources in a robotics lab if you're actually in the robotics lab. You can't control equipment from your dorm.

Our new network also has no controllers. Having to manage multiple controller appliances to support a Wi-Fi system was a pain point for us. With everything in the cloud and the software as microservices, updates can be pushed and issues can be pulled back in real time. We no longer have to schedule outages and notify the whole campus. It's agile and easy to maintain.

Even if the cloud went down, the APs would still provide basic Wi-Fi. If we lost all internet connections, Wi-Fi would still function on the campus LAN. There's no central controller at the data plane, either. So, if a single AP goes down, we lose some coverage in a small section of a building. With the previous system, if a controller failed, we lost coverage in many buildings.

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