From a Fountain to a Firehose

Today’s environment is overwhelming, technology has increased the amount of information that comes our way exponentially from a fountain to a firehose. Data used to be relegated to computers and laptops, but now with mobile technology, it has become the proverbial firehose. Email is unmanageable, social media is a blur, how we get our information today is from a collection of websites, that we go to when we remember to check them. Specific targeted apps that deliver timely, filtered content to users are more effective and efficient at communicating than any other mechanism in this current environment with the torrent of data flying around us. According to a survey by Qualtrics and Accel, millennials check their phones 150 times per day on average. (Mar 20, 2018)

Why is Mobile so Important in the Connected Ecosystem

Mobile devices have significant impact in today’s connected ecosystem. The features that mobile devices provide are already key components of the university’s technology infrastructure. Consider two-factor authentication, as well as the significant work that goes into campus web efforts to make them mobile friendly. However, native mobile apps can leverage the mobile device impact more directly, considering all the potential that they provide (see figure 1 on page 2 regarding mobile features and their impact).

Mobile Apps let you Create Targeted Experiences

The Zenith App Platform, or ZAP allows department units to design, build and deliver narrated, tailored and curated content woven together in specialized mobile apps without doing any coding. ZAP enables units to quickly and easily create apps at any level, project-based, department or even university level apps that engage prospective students, faculty, staff, Donors and alumni.

Reaching Users where they are – on their phones

The newest feature that ZAP provides is the critical ability to communicate with their users directly, through modern push messaging channels. ZAP Apps are tightly integrated with the UCLA Mobilize Labs (ML) Messaging service, which allows users to deliver custom push messages to ZAP apps with opted-into channels. ML’s Messaging service delivers app specific messaging to enhance user engagement and “pull” users or research subjects into apps for specific purposes, events etc. For example, UCLA Mobile currently allows users to “Opt-in” to seven different targeted channels: Students, Faculty, Staff, Alumni, Friends of UCLA, Prospective Students and Bruin Fans.
Institutional Impact

<table>
<thead>
<tr>
<th>Mobile Device Feature</th>
<th>Human Impact</th>
<th>Unit Impact</th>
<th>Infrastructure Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability</td>
<td>Ubiquitous Connectedness, Millennials check their phones 150 times per day on average</td>
<td>Allows for scheduled/real-time messaging and alerts, event specific</td>
<td>Extends connectedness beyond time reading email</td>
</tr>
<tr>
<td>Location Aware</td>
<td>Navigation capability, location enabled delivery</td>
<td>Way-finding improved, deliver location based information easily</td>
<td>GPS generally good outside, however, Indoor navigation usually requires beacons</td>
</tr>
<tr>
<td>Accessibility</td>
<td>Most advanced accessibility interface: Voiceover, Zoom, Speak Screen, etc…</td>
<td>Excellent additional channel to provide accessible content</td>
<td>Improves reach to disabled population</td>
</tr>
<tr>
<td>Engagement</td>
<td>Interface familiarity, Personalized views, subscription based</td>
<td>Improved sense of community &amp; belonging</td>
<td>Opt-in Data Collected</td>
</tr>
<tr>
<td>Personalized</td>
<td>Subscription based channels, opt-in or fully logged in choice</td>
<td>Either get personalized push messaging channels or audience of one if use SSO</td>
<td>Opt-in Channels unverifiable, Logged in allows for Individualized messaging</td>
</tr>
<tr>
<td>Connection</td>
<td>Access the web and other IOT devices</td>
<td>Real-time refresh of critical information</td>
<td>Sensors require mobile devices as amplifiers/data relays to get data to servers</td>
</tr>
<tr>
<td>Queuing</td>
<td>Messages queue in both direction, nothing gets lost</td>
<td>Messages get delivered when user is next connected</td>
<td>No data loss, when user is offline</td>
</tr>
<tr>
<td>Analytics</td>
<td>Explicit App Analytics including interactions can be tracked</td>
<td>Interaction with messages sent, such as clicked or ignored can be tracked</td>
<td>Understand usage trends</td>
</tr>
<tr>
<td>Security</td>
<td>Enables two factor login</td>
<td>Authentication prevents unauthorized usage, tokens leverage OAuth</td>
<td>Two factor authentication leverages mobile</td>
</tr>
<tr>
<td>Integration</td>
<td>Connecting the campus mobile friendly resources; App to App launch</td>
<td>Can be SSO, Exclusive LDAP login, or just use opt-in channels</td>
<td>Transparency on which apps have been vetted for what aspects.</td>
</tr>
</tbody>
</table>

**The ZAP Backstory: It all started with a collaboration with the UCLA Neurosurgery department:**
In 2014 our client the UCLA Neurosurgery department wanted to create an app to help their patients manage their experiences with their department. They wanted to help them understand their patient care team, get them quickly to understand services available to them, across two different hospitals, as well as give them a filtered set of experiences and resources just pertaining to their patients. Specialized experiences included a Virtual Reality section, for use with Google cardboard, a surgery timeline that they could personalize (created by UCLA NS physicians). The App has been in constant use since its launch in November of 2015. See the figure below to see session data from the Apple App Store Analytics.

**Figure 2: UCLA Neurosurgery App Session Analytics Report**

Being tech savvy, the department wanted us to create an app that they could update the content for, without having to resubmit anything to the app stores. We said, we had been thinking about building something like that, and this project was just the way to give it a try. We built this initial app/server project as a pilot experiment built in Ruby on Rails (ROR) with Cordova and successfully compiled our apps.
Once the UCLA Neurosurgery app launched, we began to get contacted by several other units on campus reaching out to ask if they could also have a similar app. Unfortunately, the original system was a prototype and was not built to be multi-tenant. So we attempted to expand it into a multi-tenant system, but unfortunately, as is often the case, it had to be rebuilt from the ground up.

Our effort to rebuild the initial ROR platform into a scalable system (hosted at AWS) has evolved into our current Zenith App Platform (ZAP). It is fully hosted on AWS, and the Neurosurgery app has migrated to source its content from ZAP in September of 2018. The current version of ZAP is architected using newer technologies and is built with REACT Native, React JS and uses a NoSql backend.

**Figure 3: The iOS and Android versions of UCLA Neurosurgery**

*The Innovation: How ZAP with ML Messaging Solves the problem:* ZAP is scalable because it is a cloud-based multi-tenant system that allows different organizations to utilize the same web client interface to create, store and refresh or ‘publish’ their data which is then pushed in real-time to their unique mobile apps. ZAP provides department units with the ability to create, customize and deliver mobile apps without doing any coding. The ML messaging platform, allows the ZAP clients to communicate on-demand with their ZAP app users, sending push messages that can open either links or views in their app.

ZAP provides a low-cost, non-profit solution to allow every UC campus the ability to create a mobile experience that works for them, with messaging channels that fit their audiences. ZAP allows distributed mobile content management, so different users can communicate on channels specific to them reaching our audiences where they are, in the moment of needing a resource.

**Current and Future ZAP Partners**
ZAP Client: Neurosurgery Department, Alpha Client – Diana Babayan
ZAP Client: The Resnick Neuropsychiatric Hospital – Steve Cohen, Monica
UCLA Mobile – Campus-wide collaboration, migrating content to ZAP for distributed management spring 2019
ZAP Client: The Office of Information Technology, OIT at UCLA
The following units have expressed interest in ZAP: The Arthur Ashe Student Health Center, CESMII, UCLA Risk Management, The Anderson School, The UCLA Lab School, UCSF departments, General Surgery, The UCLA English Department, Strategic Communications, Film & TV Archive, The UCSB Engineering School, etc…

**Timeframe: Journey to ZAP with Push Messaging**

**Figure 4: Timeline of significant milestones in the ZAP Timeline**

- Original Apps - Server Prototype launched 2015
- Several other Departments wanted similar capabilities
- ZAP Rebuilt again mPaaS with NoSql + React launched in 2018
- Push Messaging Added Late Fall 2018
Success Measured:
The ZAP system has been getting great feedback from our clients. Custom features for these apps include the ability for users to customize timelines, checklists and notes for surgery (only stored on user’s own devices). Other custom features include embedding videos, adaptive and branching surveys, even featuring distribution of 3D Virtual Reality experiences.

The ZAP Client Interface is a shared Mobile Platform
ZAP allows the users to design, organize, edit and manage their mobile content with ease with drag and drop functionality.

Figures 5.A & 5.B show examples of The NS Department content in ZAP
**Technology Utilized:**
ZAP is a real-time dynamic web to app data platform. It is architected, to allow users to dynamically post new content and data on the web and have it update mobile native apps (iOS and Android) in real-time via the web-based ZAP Platform. Data that gets updated in the web ZAP platform is dynamically deployed to the apps when they are opened on a native device. ZAP leverages open source JavaScript frameworks to simultaneously construct both iOS and Android native apps that can be maintained more easily than coding directly in native code. Libraries leveraged in this project include React Native, React JS, OAuth token and SSO, Push Messaging Engines, Couch DB.

*Figure 6: The ZAP and ML Messaging architecture is described in the diagram below*

**ZAP Demo App – How about an App for the Sautter Award?**
To demonstrate the power of ZAP, we have put together an app demo of what a Sautter Award app would look like. If you would like to login to ZAP to try out its capabilities, please contact Yvonne Tevis and she will email you credentials to login. Once you login, you will be able to edit the ZAP Demo Apps live. The Apps will be in the App Store under UCLA ZAP Demo* (Available as of 5/10/2019). Have fun!

*Amendment: The App is named “ZAP Showcase”, available as of 5/17. Apple did not want us to use the word “Demo” in the app name.*