cloud applications: emergency response

Overview
New innovations in cloud technologies are powering new opportunities. jStart has been exploring these new technologies, their impact on existing applications, the impact on how business is conducted today, and how applications will be developed as these technologies become widely adopted and mature. By creating low-friction, agile, and rapid time-to-value applications, the promise of the cloud is in providing a degree of flexibility and extended capabilities which previously would have been difficult (if not impossible) to implement in the time, scope, and functionality in the creation of applications and services for IT organizations.

The technology
A number of developments have recently occurred with cloud technologies: the rise of new cloud platforms, the evolution of cloud workloads (including scalable web applications, analytics of real-time big data, etc.), and the convergence of three key technologies (big data, social media, and mobile technologies) has lead to new ways in which businesses are considering the cloud.

As with any new technology, applications often involve determining how existing applications can be enhanced, extended, or even enabled using the new capabilities. For the cloud, this often is expressed in how existing applications can take advantage of some of the unique characteristics of the cloud by moving existing workloads into the cloud. While much research has been conducted into determining which workloads are best suited for the cloud environment, the practical challenge of implementing this transition has, until now, been largely left up to IT groups to resolve on their own.

But what has driven the desire to move workloads into the cloud? In essence, the drive can be directly tied to the need to handle, analyze, and store big data. And what’s generating all of that data? While there are numerous sources, user-generated social data and mobile platforms have been the most significant driver to date, although the impending explosion of the Internet of Things will likely contribute significantly to the amount of data that will be available.

The final piece of the technology puzzle which has enabled the next generation of cloud-based applications has been the platform: systems tying

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Key Points:
- Mobile technologies and social media have lead to a boom in the amount of data as well as opportunities to leverage that data.
- Big data and sophisticated analytics technologies now allow us to do useful things with the massive amount of data being generated.
- A challenge has been to understand what workloads and applications could most benefit from a cloud environment.
- Applications that need to leverage big data, analytics (especially real-time data), as well as user engagement, are ideally suited for cloud applications.
- New cloud platforms deliver agile, rapid time-to-value, ease of assembly, and reduced IT needs that are accelerating adoption of the cloud for those kinds of apps in IT environments.

See how IBM using analytics to create Smarter Cloud
together a variety of big data technologies (Apache Hadoop, analytics tooling, data sources such as Twitter and Facebook, graph databases, HBase, data visualization technologies), has made the creation of sophisticated, rapid/quick time-to-value applications a reality.

**Using the cloud to solve real problems**

What might some of these applications look like? jStart has been involved in developing some early concepts of these applications, starting first with the Annenberg Innovation Lab's Film Forecasting (predicting box office openings of movies based on social sentiment), as well as aiding law enforcement enhance public safety. Another example of how these technologies can provide immediate (and critical need capabilities) is the application of cloud technologies in aiding emergency response.

**Building a next-generation emergency response platform**

When disaster strikes, how fast, effectively, and efficiently emergency personnel are able to respond can be literally be the difference between life or death. jStart began exploring how new technologies—specifically mobile, social, big data, and cloud technologies—might be leveraged to provide an enhanced and extensible platform for emergency response after realizing that this combination of technologies had the potential to be uniquely capable of doing just that.

With the proliferation of mobile technologies and platforms, awareness of natural disasters (including events and needs as they occur in real-time) has
become increasingly available: videos, pictures, texts, and tweets of what’s occurring has the potential to provide real-time observational awareness for those attempting to coordinate emergency response.

jStart initially looked at how municipal, state, federal agencies, disaster relief organizations, and commercial entities (insurance companies, utility companies, etc.) might benefit from real-time disaster related data. First, the team looked at how it could leverage social media to feed information to emergency responders in Chile during the devastating 2010 earthquake. Using big data analytics technologies, a tool was initially developed to analyze tweets sent while the event was occurring and within a week of the last major aftershock, and to apply that data to map compromised infrastructure (impassable roads, damaged bridges, etc.), needs in remote areas (medical supplies, infant formula, etc.). Learning from this experiment, the team rapidly realized that mobile, social, and big data analytics could provide a level of operational awareness previously unavailable.

Next, the team applied that knowledge when Hurricane Sandy impacted the Northeast Corridor of the United States. Again, the team analyzed social media information within a day of the event, looking for patterns of tweets for needs for assets—including police, fire, and medical responders, and understanding how systems of record (leveraging the team’s experience with law enforcement) could be used to enhance the depth of understanding (i.e. tweets from the Langdon Medical Center, if monitored in real time, would have given emergency management officials immediate knowledge of the failure of generators, allowing them to task immediate help to the facility).

These insights lead the team to create a version of the system as a cloud application, creating an interactive map which could show events as they occurred in real-time. As an enhancement, the team created Cloud Foundry business level services using IBM’s Maximo Asset Management system APIs to enable emergency responders to understand the status of their critical assets—in real time. For instance, medical providers, could understand the number of spinal collars available to paramedics—and if they were running low at any given time. Conceptually, the system could provide an overview of activity within a disaster zone and be shared and used by numerous other agencies involved in disaster recovery: governmental agencies (local, state, and federal, including military/national guard aid), humanitarian organizations, utility companies, healthcare providers, law enforcement/public safety agencies, fire and rescue teams, telecom/communications companies, water & sewer repair crews, and the general public which may have loved ones in the affected areas. The advantage of the cloud?

From an operational perspective, the availability of this aggregated information to each agency could be beneficial in a myriad of ways: utility companies, for instance, could tie into the system to scan for tweets noting power loss or downed lines in order to facilitate the deployment of repair crews. Disaster relief organizations could understand the demands for supplies at
Technologies discussed:

- **IBM Bluemix**  
  IBM’s next generation cloud platform, Bluemix allows the rapid development of cloud applications by simplifying how applications can be built by leveraging existing systems of records back-ends, data services, and capabilities of other applications.

- **Big Data Analytics**  
  Leveraging structured and unstructured data, big data analytics allows for the parsing of massive amounts of data to discover subtle or non-apparent patterns, trends, or insights. This can include natural language processing/text analytics, predictive analytics, and the Internet of Things.

- **Social Data Analytics**  
  A subset of Big Data analytics, social data analytics concentrates on analyzing high volume, user generated, and in most cases, real-time data.

- **Mobile Technologies**  
  Providing a source of big data and social data, mobile platforms (phones, tablets, etc.) also provide passive or active engagement opportunities.

various relief centers, and reallocate resources as those needs shift. Public safety could use social media data to understand where roads were impassible (due to being washed out, power lines being down, or other blockage), in order to most effectively route the public to the safest/most efficient evacuation routes. Looking at mobile technologies, efforts to enable emergency notifications to mobile devices has already been implemented. However, using these technologies, a more active user engagement model could be employed, allowing, for instance, emergency management to pass to first responders GPS locations of individuals trapped in collapsed buildings. These are only a few of the applications which could significant aid emergency response efforts...in speaking with emergency management professionals, the applications of cloud technologies to address the challenges they face are numerous.

From an application development perspective, cloud platforms enable the easy assembly of new applications from existing code, as well as plugging into data services, simplifying the development process. Rather than having to worry about creating, configuring, and maintaining the infrastructure and environment for each application, developers can jump right in and start writing code, confident that the back-end system is capable of scaling to their needs, while providing the flexibility and rapid deployment of applications that DevOps offers. These capabilities will help transition existing workloads which leverage systems of record into hybrid and/or cloud applications.

The promise of cloud technologies

We’ve looked at some applications in emergency response. We’ve seen how the unique characteristics of the cloud, big data, social, and mobile technologies all lend themselves to provide a new class of applications enabling a high degree of user engagement. And we’ve seen how these technologies also address real challenges facing IT organizations, all while being applicable to virtually any industry or market vertical. If you’d like to discuss with jStart how your organization can start to take advantage of the promise of the cloud, contact us.

Who is jStart?

jStart is a highly skilled team focused on providing fast, smart, and valuable business solutions leveraging the latest technologies. The team typically works on emerging technologies which have commercial potential within 12-18 months. This allows the team to keep ahead of the adoption curve, while being prepared for client engagements and partnerships. The team’s current focus includes: cloud technologies, big data, text analytics, social data analytics, and mobile platforms.