

Boston at a Glance

- ▶ **Founded:** 1630
- ▶ **Population:** 626,000
- ▶ **Size:** 48 square miles
- ▶ **City employees:** 16,173
- ▶ **Education:** 53 institutions of higher education
- ▶ **Firsts:** U.S. public school, subway system

www.cityofboston.gov/

Source: City of Boston

Better Community Connections Through Big Data and Analytics

With in-memory computing and analytics tools, the City of Boston is providing better service to citizens and engaging more with the community.

BY JOE MULLICH

Many government agencies talk about the transformational power of big data and analytics. Bill Oates, chief information officer for the City of Boston, is doing something about it. He says this starts with making better connections—between citizens and the community, multiple government departments and even other cities.

“Business process change is table stakes at this point,” Oates says. “The importance of the technology is its ability to engage and empower our constituents.”

For Boston, a new form of engagement began in 2008 with the launch of Citizens Connect¹, a system that enables citizens to report potholes, graffiti, damaged signs and other issues through the Internet and, later, their smartphones. A unique twist of the technology, then and now, is that citizens do not simply report the problems to the government. Rather, reports and photos are published anonymously online, spreading word of the issues and inviting discussion and participation in Citizen Connect.

Since then, Boston has introduced Street Bump², which enables people to use their smartphone’s accelerometer—a motion detector in the device—to record road conditions and send data to public works employees. Unlike Citizens Connect, the Street Bump app does not require a citizen to take action to report issues. He simply turns on the app and, as he drives, data is automatically collected and sent to the city.

Street Bump was expected to identify the location of potholes—a top concern of Boston residents. Thanks to analytics, the early data has provided some unexpected insights: trouble spots are eight times more likely to be “castings,” those manhole covers, grates and other cast-metal lids that are supposed to be flush with the roadway surface but instead heave up due to the extreme cold of a New England winter. Hundreds of these castings have been repaired as a result.

Citizens Connect: Empowering Constituents with Big Data and Analytics

- ▶ 34% of citizen reports via mobile and online app
- ▶ 89% of citizens would recommend it
- ▶ 21% rise in constituent satisfaction
- ▶ Pothole repair time cut in half

Like many cities, Boston has a growing number of sources of data to analyze. To help it cope, the city is ahead in taking visual analytics to a new level. For example, in 2010 the Boston Police Department opened a “real-time crime center” that receives dozens of feeds from street cameras around the city. The resulting data gives researchers the potential to visually analyze and match videos from incidents to help identify suspects, mobilize resources and even map evacuation routes during emergencies.

Big Data Makes More Satisfied Citizens

Boston’s experience with in-memory computing and big data analytics reveals intriguing insights about the opportunity for collecting and using big data. For example, residents were polled on why they failed to contact the city about maintenance issues before the Citizens Connect app. Their answer: When they call the city, they feel like they are complaining; when they use the app, they feel like they are helping.

The ability to rapidly share data and analytics has had a measurable effect. Today, 20 percent of citizen reports come through the Citizens Connect app and another 14 percent through the city’s Web site. The number of

1. Citizens Connect: Making Boston Beautiful.
<http://tinyurl.com/642ymk3>
2. Street Bump.
<http://tinyurl.com/mjeb4q8>

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—BILL OATES, CHIEF INFORMATION OFFICER, CITY OF BOSTON

citizen reports has doubled, as well, from 40,000 a year prior to the technology to 80,000 a year today. A reason for the greater participation may be the quick results that follow. Since the city implemented Citizens Connect, the response time to fill a pothole has been cut from three days on average to half that amount.

Similarly, the original prototype of Street Bump could not distinguish between potholes, manhole covers, bridge surfaces and other obstacles, so the app generated a lot of false positives in the field.³ A crowdsourcing challenge enabled the city to implement a new algorithm to analyze the big data coming in more accurately.

In Oates' view, big data is all about information sharing in the public sector. He has found that the combination of the right data, timely analysis and visualization is most effective when information and analytics are shared across departments. “In the past, an agency might crunch its own data to get a historical comparison on how quickly it is fixing potholes,” he says. “Now, by combining data, we can see what areas of the city aren't getting phone calls, which may indicate problems no one knows about yet.”

Boston has put significant effort into making data and analytics available to both agencies and the community. Oates points to the Boston Area Research Initiative⁴ as an example. Here, the city confers with the many universities in the area about original urban research on the cutting edge of social science and public policy. For us, “this is a matter of digging a little deeper,” Oates says. “We met with interested researchers, technologists and community members to figure out how we could use data to improve quality of life issues. Being able to connect newly available city data with some of the real big data out there in the world can make city government more proactive—and more effective.”

Planning for Tomorrow

Oates contends that what has been accomplished so far is just the beginning. By using information to interact better with neighborhood leaders and citizens, for example, the city can respond faster and better to local events, enabling it to more efficiently deploy police to ensure public safety. “Our ability to engage in those conversations is a critical part of successfully using technology,” he says.

Boston's IT Challenges

- ▶ Quicken innovation
- ▶ Encourage citizen involvement
- ▶ Share big data across departments
- ▶ Speed repair of potholes and other issues

Boston's IT Solutions

- ▶ Formed the Office of New Urban Mechanics—an incubator that pilots new ideas quickly
- ▶ Partnered with citizen groups, businesses and universities to share data and ideas
- ▶ Developed apps that enable citizens to report issues easily
- ▶ Developed apps that enable citizens to collect data about road conditions automatically as they drive

It also indicates the new thinking that is needed to leverage the power of big data. Oates points to the Office of New Urban Mechanics, an initiative that began in Boston and is now shared with the City of Philadelphia and serves as each city's innovation incubator. The office builds partnerships between city agencies, outside institutions and entrepreneurs to pilot projects in the two cities that address resident and business needs.⁵ Several projects have involved data sharing and analytics, such as the Street Bump initiative.

“Government agencies on the whole aren't great in responding to unsolicited ideas and opportunities, and they are engineered to put tightly prescribed solutions out to bid,” Oates says. But “we have a model that allows us to respond quickly to opportunity.” The city is now collaborating with the Commonwealth of Massachusetts to deliver a Citizens Connect-like mobile app that will engage citizens and produce important performance data.

Boston officials are also talking with cities around the world about similar initiatives. “All of us in city government are looking at ways to our data move valuable,” Oates says, “and to be part of these exciting cross-jurisdictional initiatives.”

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3. Bertolucci, Jeff. “Smartphones, Big Data Help Fix Boston's Potholes.” *InformationWeek*, July 25, 2012. <http://tinyurl.com/a9nfkdp>
 4. Boston Area Research Initiative. <http://tinyurl.com/kgu2q46>
 5. New Urban Mechanics: a city movement focused on civic innovation. <http://tinyurl.com/a3jodpv>

Innovation Bridges Public Sector Goals vs. Performance Gap

The new survey, qualitative interviews and report from Bloomberg Businessweek Research Services clearly shows that most public sector agencies are struggling to deliver better service to their citizens while contending with severe financial constraints. But a host of technology innovations can help ensure safety, further improve quality of life and increase confidence in government. SAP's public sector industry team presents some ideas on how public sector leaders can bridge the gap between what they want to deliver and what their budgets will enable them to do.

What are some leading-edge innovations that can help public sector agencies harness the power of big data?

The public sector is emerging as the single largest producer and consumer of big data and will benefit greatly from the innovations we deliver. We think the SAP HANA platform should play a key role in helping public sector agencies rapidly and easily crunch very large volumes of granular data and take immediate action—which is where traditional relational databases fail.

Modern analytical tools powered by the SAP HANA platform can help agencies exploit the opportunity of big data by empowering users to access information anywhere, adapt to changing conditions, more accurately predict outcomes and, ultimately, make better decisions. Analytics tools are now much more intuitive and powerful, and they are no longer the domain of a select few data analysts and scientists. Instead, real-time analytics presented in easy-to-digest visual form are now available for all stakeholders.

How does a public sector agency get started, given budget constraints?

Agencies should identify and prioritize use cases that could provide value to the public and that big data can address. They should also take into consideration the technical and organizational feasibility, along with the potential value of the identified use cases.

Target the highest value use case(s) first and then consider taking a phased approach to deploying a big data framework that is optimized across devices and delivery options—cloud, on-premises or hybrid. Next, implement an integrated real-time reporting and analytics solution and make it available.

For more information, please visit the SAP public sector technology Web site:
www.sap.com/publicsector

SAP Recipe for Success

- ▶ **SAP HANA** platform to handle your big data challenges
- ▶ **SAP BusinessObjects Business Intelligence and SAP Lumira** enable every individual in the organization to easily visualize big data and get unique insights anytime, anywhere
- ▶ **SAP Predictive Analysis** empowers business users to get predictive insights easily, model alternatives and take action based on advanced analytics

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