

IBM's Smarter Cities Challenge

Providence

Report





Contents

3	1. Executive summary
3	A. Introduction
3	B. The challenge
4	C. The approach
4	D. The assessment
5	2. Introduction
5	A. The Smarter Cities Challenge
6	B. The challenge: efficient land use management
7	C. The approach
8	D. Summary of findings
10	3. Overall findings and themes
10	A. Organization
10	Description of the current situation
11	Research around best practices and benchmarking
11	Recommendations
13	B. Process
13	Description of the current situation
15	Research around best practices and benchmarking
17	Recommendations
19	C. Technology
19	Description of the current situation
23	Research around best practices and benchmarking
24	Recommendations
27	D. Performance indicators
27	Description of the current situation
28	Research around best practices and benchmarking
31	Recommendations
33	4. Summary of recommendations
35	5. Conclusion
37	6. References
40	7. Appendix
40	A. Acknowledgements
43	B. Team profile
46	C. Listing of performance measures – ProvStat

1. Executive summary

A. Introduction

IBM's Smarter Cities Challenge (SCC) aims to create partnerships with 100 cities over a period of three years, to help them become smarter – using instrumentation, interconnection and intelligence to provide a coordinated response to events in their cities. With around a quarter of the SCC initiatives already completed, the IBM project teams involved have identified common trends and issues in cities around the world. Global economic challenges have forced cities to trim personnel, cut investments and seek to do more with less – much like Providence. Providence hopes that by engaging IBM through the SCC program, it will be able to take advantage of the ongoing transformation in the city, its strong links with the entrepreneurial, arts, business and academic community, and the closeness of city and state to accelerate change that will make the City of Providence even greater.

B. The challenge

Bordered by the Atlantic and at the confluence of two rivers and highways, Providence is the capital and most populous city of Rhode Island. It was one of the first cities established in the United States. Located in Providence County, it is the third largest city in the New England region, and is home to 176,365 citizens. Centrally located along the Eastern Seaboard, Rhode Island is the only state completely surrounded by other New England states.

Currently, the City is faced with a once-in-a-generation opportunity to reclaim 19.5 acres of land as a result of the rerouting of Interstate 195. Previously, the interstate had cut through the Jewelry district, creating an artificial barrier separating the Jewelry district from downtown Providence. It was also an impediment to the wave of revitalization extending from downtown Providence.

Specifically, the reassigned land has been earmarked to boost the development of a revitalized 'Knowledge District' in downtown Providence, whose goal is to attract new businesses and create high-paying jobs in growth sectors such as healthcare and bioscience, boosting the City's economy.

The regeneration project is a substantial initiative which will be rolled out over a number of years. Many strands of activity will ultimately inform how this prime piece of land is developed. Parties involved include a legislative commission, developers, non-profit organizations and City agencies, all of whom are eager to transform the newly reclaimed land.

A number of qualities combine to make Providence special, which Mayor Angel Taveras now wants to exploit more proactively for the City's benefit. These include the City's size and location, its universities and hospitals, its arts, its cultural diversity, creativity and innovation, and its vibrant downtown area. Providence is also known for its excellent restaurants, its unique *WaterFire* event, its 'walkability', and its openness to new ideas.

Seizing the opportunity to revitalize the City and attract new investment, the mayor challenged the IBM Smarter Cities Challenge (Providence) team to create actionable recommendations for a new data-driven land-use management system. The aim was to create a system that would efficiently and effectively promote the robust development of the City within and beyond the Knowledge District.

To this end, the IBM team set about identifying some of the potential barriers to progress, to enable the City of Providence to plan for transformational change and fully exploit its new potential.

It should be noted that many of the issues the IBM team has identified are not unique to Providence. Indeed, many recurring themes have emerged across the cities where IBM SCC engagements have been completed – across the US, Latin America and Europe. It is not uncommon for city departments to work in silos, for example, or for cities to have systems that are disconnected in ways that make it difficult to apply the best technological solutions to the most pressing problems.

Yet Providence has a huge advantage. The winds of change are blowing through the city; Mayor Taveras is a major catalyst for and driver of that change, with the backing of city and state leaders. If Providence gets this right, it will have taken full advantage of the once-in-a-generation opportunity provided by the rerouting of Interstate 195 – to improve the city's business-friendliness, and its services to citizens, creating value for its residents today and in the future.

C. The approach

The IBM Smarter Cities Challenge Team connected with a cross-section of constituents and community groups across the City of Providence, all with a vested interest in making the city 'smarter'. Between August 1 and August 19, the IBM team conducted more than 85 interviews with representatives from more than 25 organizations. Just over half were from government, the remainder from the community. In addition to conducting and analyzing the results from these interviews, the IBM team conducted their own best-practice research in the area of land-use management in order to formulate its recommendations.

D. The assessment

The IBM Smarter Cities Challenge Team identified four areas to focus on: organization; processes; technology; and performance. Individually and combined, the recommendations are designed to facilitate greater efficiency, greater alignment, better collaboration, more transparency and clear measurements for the City as it moves closer to its goal of building a more effective land-use management system – one with more predictable review and approval times – to foster economic development.

All of the recommendations are actionable and have identified owners within the city. Some require no new spending and can be implemented immediately. Others require collaboration with other municipalities to spread the cost across several cities. Although the IBM team has not conducted a detailed cost analysis of the recommendations, the team estimates that they are affordable.

2. Introduction

A. The Smarter Cities Challenge

By 2050, cities will be home to more than two thirds of the world's population. They already wield more economic power and have access to more advanced technological capabilities than ever before. Simultaneously, cities are struggling with a wide range of challenges and threats to sustainability in their core support and governance systems, including transport, water, energy, communications, healthcare and social services.

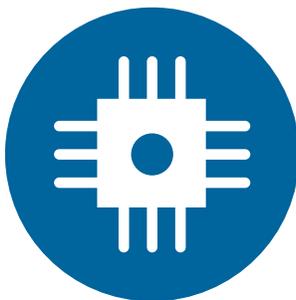
Meanwhile, trillions of digital devices, connected through the Internet, are producing a vast ocean of data. All of this information – from the flow of markets to the pulse of societies – can be turned into knowledge because the computational power and advanced analytics now exist to make sense of it. With this knowledge, cities could potentially reduce costs, cut waste, and improve efficiency, productivity and the quality of life for their citizens. In the face of the mammoth challenges of economic crisis and increased demand for services, ample opportunities still exist for the development of innovative solutions.

In November 2008, IBM initiated a discussion about a 'smarter' planet, noting that intelligence is becoming increasingly infused into the systems and processes that make the world work – whether cars, appliances, roadways, power grids, clothes or even natural systems such as agriculture and waterways.

By creating more instrumented, interconnected and intelligent systems, citizens and policymakers have an opportunity to harvest new trends and insights from data, providing the basis for more informed decisions. A 'Smarter City' is defined as one that uses technology to transform its core systems and optimize finite resources.

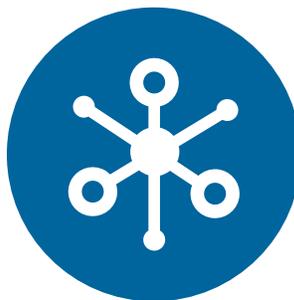
Because cities grapple on a daily basis with the interaction of water, transportation, energy, public safety and many other systems, IBM is committed to a vision of Smarter Cities as a vital component of building a 'Smarter Planet'. At the highest levels of maturity, a Smarter City is a sophisticated knowledge-based system that provides real-time insights to stakeholders and enables decision-makers to manage a city's subsystems proactively. Effective information management is at the heart of this capability, and integration and analytics are the key enablers.

As IBM aligns its citizenship efforts with the goal of building a Smarter Planet, it recognizes that city leaders around the world face increasing economic and societal pressures. Given the increased demand for services, they must deliver new solutions not only affordably but ever more rapidly. With this in mind, IBM Corporate Citizenship launched the Smarter Cities Challenge to help 100 cities around the world become smarter by providing grants in the form of IBM talent, over a period of three years.



Instrumented

We can measure, sense and see the condition of practically everything.



Interconnected

People, systems and objects can communicate and interact with each other in entirely new ways.



Intelligent

We can analyze and derive insight from large and diverse sources of information, to predict and respond better to change.

Figure 1
Intelligence is being infused into the way the world works

The City of Providence was selected through a competitive process as one of 24 cities to be awarded a Smarter Cities Challenge grant in 2011. Over a period of three weeks in August 2011, a team of six IBM experts worked in Providence to deliver recommendations around key issues to the City's mayor, Angel Taveras.

B. The challenge: efficient land use management

The City of Providence has a lot to offer, both to existing citizens and businesses, to visitors including tourists and students, and to businesses looking to expand into the area. The mayor of the City is keenly aware of the City's potential, and wants to bolster the City's fortunes by playing to its strengths. Among the jewels in its crown are its strong university and hospital institutions, and a diverse and vibrant cultural scene.

Currently, Providence faces a unique opportunity to redevelop a significant piece of land in the midst of its bustling downtown region following the relocation of a major interstate, the I-195. Specifically, the reassigned land will boost the development of a revitalized 'Knowledge District' in the City center. State and city officials hope this will pave the way for high-paying jobs in growth sectors such as healthcare and bioscience, boosting the local economy.

To take advantage of this once-in-a-generation opportunity, the City recognizes that it must make some difficult decisions and major changes to the way its various organizations, departments and public services work, and to the supporting IT systems which determine the extent to which the relative parties are able to collaborate and harness Providence's new potential.

Not only would a more agile and dynamic environment encourage greater inter-connection, information flow and innovation across the City, improving services to the public and to local and incoming businesses, it would also achieve a critical goal of enabling Providence and its various organizations to do more with less. In the current economic climate, this would be a major win for the City.

To this end, Mayor Angel Taveras challenged the IBM Smarter Cities Challenge (Providence) team to set out clear and actionable recommendations for a new data-driven land-use management system for the planning, coordination and management of this important city project.

This data-driven system will need to accommodate the unique character of Providence, and leverage its rich base of stakeholders and community groups. To be able to build and exploit such a system, the city understands that there are a number of organizational, cultural, process and technological challenges that will have to be overcome. These are set out as follows:

- Currently, knowledge is captured by individuals and shared through ad-hoc collaboration and personal networks. Things get done often because, in the words of many interviewees, "I know a guy who knows a guy who can answer your question". This makes it difficult for those without connections.
- Prospective developers, businesses and constituents cannot gain access to key information about the status of permitting applications online. This makes the system appear opaque to the constituents who now have to rely on personal contacts and experience to get things done.
- City departments largely work in silos. To address the many challenges the city faces, a more open culture will be needed. This requires a 'system of systems' view, with stronger and clearer links between organizations, and recognition of the impact of decisions in one department on others. Currently, the silos act as constraints, causing confusion and making it difficult to do business with the city.
- Existing processes are not consistently well defined or documented at an adequate level of detail, and so do not provide the level of transparency required to engender confidence in the system. Additionally, system performance is affected by staff absence or retirement.
- The current land-use management systems are archaic, manual and paper-based, leading to duplication of data, lack of transparency, and data integrity problems.
- The skills and capabilities of employees have not kept pace with the changing requirements of a smarter, leaner city.

- The city has few performance indicators within or across departments, making it difficult to measure end-to-end cycle times, to hold departments accountable for their contribution to performance, and to let developers know when they can expect to get a decision on their applications.

Addressing these challenges now will increase transparency, improve efficiency and effectiveness, make Providence a better city in which to live, work, play and generate economic growth. A smarter Providence needs a modern, accessible, transparent, automated data-driven land-use management system.

C. The approach

The IBM Smarter Cities Challenge (Providence) team was established with six members from differing perspectives – a research scientist, an information technology architect, an assistant treasurer, a client unit executive and former city deputy director, a territory manager with New England and municipal experience, and a change consultant. The Director of Planning hosted the team and ensured it had access to the required individuals within the city to facilitate the work.

A large number of interviews were carried out with various stakeholders, including city executives, the Ocean State Consortium of Advanced Resources (OSCAR), and other groups and individuals. The IBM team interviewed representatives from more than 25 organizations and more than 85 individuals (see Appendix B).

The Greater Providence Chamber of Commerce welcomed the IBM team early on its first day in Providence whereupon the first stakeholder meeting was conducted with Mayor Angel Taveras and his administration. This was followed by a tour of the reclaimed land.

The stakeholder meeting groups and interviewees included representatives from:

- City departments relevant to land-use management
- The Lt. Governor's office, State planning and policy
- Real estate, property developers and non-profit housing developers
- Science, technology and entrepreneurs groups
- Institutions of higher learning
- Healthcare organizations
- The Senate Majority Leader and the Majority Whip for the State legislature.

Groups and individuals shared their background, objectives around land-use, and their challenges with the current permitting, inspections and land-use agencies with the IBM team. The university, healthcare organizations and entrepreneur groups also discussed their land-use challenges, stressing in particular the positive impact that improved processes would have on economic growth in Providence. During these meetings and interviews, a small set of recurring themes quickly emerged around permitting, inspections, compliance and other aspects of land-use and development. The discussions also revealed a broad land-use management ecosystem of inter-dependent agencies that needs to cooperate to ensure timely application approvals.

In addition to the stakeholder meetings, the team visited several arts venues in Providence. Bert Crenca at AS220, a non-profit community arts space in downtown Providence, gave an invigorating stimulating talk and tour of three gentrified downtown buildings. These are now home to street-level businesses that subsidize the cost of other community-based programs that occupy the other spaces. The themes of these initiatives include youth, arts, environment, education, sustainability, social responsibility and technology.

The team also took a guided walking tour of the city (rounded off with participation in a scavenger hunt), and of AS220's FooFest 2011 and WaterFire, a local creation which involves floating platforms fed with logs being set alight to mood-setting music. This provided valuable first-hand experience of the honey-pot effect of the arts, culture and history in Providence. This diversity attracts creativity, innovation, businesses, restaurants and tourism, all of which contribute to economic development.

These experiences of Providence provided a good backdrop against which to frame the team's findings. The access to government officials, managers and openness to providing information was instrumental in helping the IBM team piece together the data and draw some all-encompassing conclusions. Discussions with the different constituencies highlighted the impact of the land-use management process from a business and quality-of-life perspective. Breakdowns in communication and information flow inhibit and frustrate the users of the system. Some of these users then go on to abandon their projects, and some go elsewhere.

Having reviewed and documented issues with the existing system, the IBM team conducted research around organization, process, technology and performance indicators to determine an optimum solution for Providence. Case-study reviews of other peer cities were also conducted, including interviews with key executives in those cities. Finally, the body of knowledge and experience from other SCC engagements was considered in drawing up the recommendations for Providence.

Having already completed a quarter of the intended 100 Smarter Cities Challenges internationally, the IBM team has identified a number of common trends and issues faced by major municipalities. Many of the issues identified in Providence and their causes are echoed elsewhere – for example the existence of activity and knowledge silos. It is not uncommon for cities to have systems that are not interconnected, making it difficult to apply the best technological solutions to solve the most pressing problems.

The importance of addressing these issues cannot be over-emphasized. The challenges facing cities around the globe are becoming ever more complex and will require sophisticated processes that span departments and functional boundaries. Agility is becoming increasingly critical and, although not easy to achieve, is well worth the perseverance. With application and a common vision which is centered around the needs of citizens, cities can develop new approaches and strategies that integrate processes across functional silos. Importantly, the recommendations around organization, process, technology and performance measurements provide an integrated and measurable approach that the City of Providence can follow to address future as well as current challenges.

Although Providence shares a number of key issues with other cities around the world, the City's situation differs in one critical way. Providence has a huge advantage over many other cities, because of its current access to redistributed land and the able and willing network of businesses and non-profit organizations which are prepared to support and work with the City on these issues. This once-in-a-generation opportunity, combined with the leadership of a Mayor who embraces change and innovation, offer the City a head start in transforming services to citizens and local businesses.

D. Summary of findings

As with any ambitious initiative, the transformative changes envisioned for the City are beyond the scope of technology alone. Long-lasting, wide-reaching benefits will depend on the coincidence of inter-related changes that must take place on a number of levels.

The IBM team identified four main areas of focus, with specific recommendations relating to the organization, its processes, its use of information technology, and associated performance indicators. For each focus area, the IBM team highlighted specific actions the city's leadership could take to arrive at a more transparent, more predictable, and more consistent land-use management system.

Organization

At an organizational level, the need to consolidate individuals with similar roles into the same team is highlighted. This will encourage teamwork as well as closer collaboration between inter-dependent teams. In some cases, there will need to be a re-evaluation of job descriptions to more accurately reflect roles, skills and qualifications. Improved exploitation of existing partnerships is recommended, too.

Processes

Process-related recommendations focus on the effectiveness of the City's permitting procedures, looking at how these can be made more consistent, predictable and transparent. A number of changes are proposed, including triage of applications; track and trace; and a single point of contact for complex applications; as well as a regular operations meeting between inter-dependent departments to review performance indicators and perform pre-submission reviews.

Information Technology

The recommendations around information technology include the creation of an inventory of existing applications, and rationalization where possible; the development of a strategic technology plan, architecture and standards; and finally the development of an integrated electronic land-use management system to serve as a basis for a state-wide system.

Performance indicators

Further proposals include the use of performance indicators. A standard set of these important measures should be developed, beginning with the permitting process, and made central to the management system. These can then be used to feed management dashboards at a departmental level all the way up to the mayor. In time, data analytics could be used to make the dashboards more forward-looking (i.e., predictive).

All the recommendations are actionable and have an identified owner within the City. Some recommendations require no new financial investment and can be implemented immediately. Others require a modest amount of new spending and can be considered during the next budget cycle. Others would require substantially new spending; here it is recommended that the City collaborates with the state and with other municipalities to share the costs. In any case, the investment necessary to implement fully the recommendations is affordable. The recommendations improve efficiency, alignment, collaboration and transparency and should help ensure Providence is easier to do business with – while taking the City nearer its goal of becoming 'smarter'.

3. Overall findings and themes

A. Organization

Description of the current situation

The IBM team's investigations revealed a fiercely independent streak in City departments which often leads them to work and think in silos – with internal considerations apparently more important and given more weight than the needs of the citizen. In such a set-up, although the different departments may be able to report good results, the 'customer' – whose experience is likely to depend on internal cooperation, may be terrible. This is not unusual where departments do not take an end-to-end view of their activities.

It isn't just the public that suffers from such a situation, either. Where there is too much autonomy, departments can no longer rely on each other for support, instead building additional and unnecessary structure to ensure self-sufficiency.

This culture was in evidence across the City of Providence. Take IT, for example. The City of Providence's technology budget, at \$2.6m, is relatively small as a percentage of total spend compared to other cities of a similar size. But, instead of sharing systems as much as possible, the City's various departments have acquired their own technology and applications without considering the broader impact of this strategy. Although the reasons given seemed legitimate, these didn't take into account the inevitable costs and constraints associated with duplication and separation.

Silos slow down the flow of information, making it more difficult for customers (citizens and businesses) to access City services. It is no surprise that under these circumstances, many developers expressed the view that the City is not easy to do business with.

A small team within the City's administration, known as ProvStat, is tasked with gathering and reporting quantitative data on Providence. Its data collection activities focus primarily on City Services including Police, Fire, DPW, Parks and Recreation and the like.). In July 2011, the ProvStat function and resources were aligned to the Planning and Development Department, but taking business direction from the Director of Administration. The IBM team formed the view that the expertise of the team could be better used through a realignment within the organization. This would provide a win for the individuals and a win for the City who would be able to leverage its knowledge and expertise more broadly.

Other opportunities for greater inter-organization collaboration were evidence elsewhere, too. The City enjoys an abundance of advanced educational, innovative and creative resources, for example, which it was felt could be leveraged to help address current challenges.

To help pinpoint these broader opportunities, the IBM team interviewed representatives from various organizations within Providence, including Ocean State Consortium of Advanced Resources (OSCAR), Rhode Island Center for Innovation & Entrepreneurship (RI-CIE), Alternative Space 220 (AS 220), Ocean State Higher Economic Development, Administrative Network (OSHEAN), Brown University, Johnson & Wales, University of Rhode Island, the Greater Providence Chamber of Commerce, EDC, as well as representatives at a state level.

Together, these complementary organizations form a huge and unique network that Providence could do more to exploit, if the City was better able to foster collaboration between the various parties through stronger, more formal partnerships that could feed into government decision-making.

On numerous occasions, it emerged that the City's residents – and in particular its students – do not always have access to learning- or workrelated opportunities within the City. Leveraging students to access City challenges would not only foster a sense of shared responsibility, but also potentially result in more young people choosing Providence as their permanent residence.

Research around best practices and benchmarking

Research conducted by the IBM team into best practices in organizational design, supported by studies of other, comparable municipal structures and community engagement models, helped to highlight the opportunity and ways this could be realized.

This work focused on organizational alignment, design principles, and how these support the strategy of the organization.

Best practices in organizational design suggest the following:

- The optimal span of control is no more than six of the most senior people. Organizational levels should be kept to a minimum, too, to maintain proximity to constituents or users [URWI1956].
- The organizational structure should provide optimum support to the strategy.
- Optimal designs improve clarity, remove ambiguities around ownership of key issues, and increase end-to-end process accountability.

For community engagement, the IBM team reviewed white papers from the Center for Advances in Public Engagement [CAPE1] and implementations of community engagement in various cities including Denver [Den1] and Newcastle UK [NEWC1].

Recommendations

With these best practices in mind, the IBM team recommends the following organizational improvements:

1. Strengthen the Information Technology/Chief Information Officer function

Owner: Director of Administration

The IT/CIO function within the City needs to be strengthened. This can be done in stages. The IBM team recommends identifying and transferring all IT positions from other departments (headcount and budget) to the CIO. Next, in order to ensure that the CIO and all key departments have input and visibility into IT purchases and systems, an IT Governance Committee should be established, chaired by the CIO, with representatives from each department including the Mayor's office. The responsibilities of this governance committee should include the creation of an IT strategic plan, the creation and maintenance of an IT asset inventory, the creation and enforcement of IT standards and interoperability, and prioritization of new IT investments for the city as a whole.

2. Align the data analytics team with Finance (within the Department of Administration)

Owner: Director of Administration and Director of Economic Development

In order to strategically position and leverage the potential of the data analytics team, ProvStat services, resources and functions from the Planning and Development Department should be reallocated to the Finance Department. This alignment would correctly position ProvStat to provide more strategic and forward-looking performance measurement services to all City departments. Their analysis could also include a combination of operational and financial data, increasing the value of the analysis and information. If and when the City transitions to using performance indicators more systematically, it is the IBM team's recommendation that the ProvStat team be leveraged to provide its services in support of that effort. A further proposal is the formation of a Performance Indicator Team to guide this effort. The size and structure of this group could model the approach used in launching the State of Rhode Island Performance Measures effort (see Appendix C).

3. Co-locate departments to facilitate teamwork

Owner: Director of Administration

The co-location of departments is recommended to facilitate and encourage teamwork. The Department of Inspections and Standards (DIS) is already co-located with Planning and Development, and further benefits could be realized if the Fire Prevention Division was co-located with DIS. This would facilitate cross-training and improved customer service, with both code compliance personnel being available at the time of submission to ensure completeness. The co-location should also extend to the Recorder of Deeds, Tax Assessment and Licensing, and be adopted as an organization design principle for the City.

At the moment, building inspectors work almost independently of tax assessors so it is proposed that building inspectors coordinate site visits with the Tax Assessor, especially early in the building/renovation phase to ensure building specifications are identical. This will improve productivity, data integrity with the Geographic Information Systems (GIS) application, and have a potentially positive impact on collections.

4. Develop and grow skills

Owner: Director of Administration

City-wide recommendations

Many of these recommendations are intended to be transformational and will require a change in the way the City administration will work and collaborate. Because of this, the IBM team is recommending a tiered approach to the transition. To start with, the City should develop a management educational curriculum for current and future City leaders to promote and explain the strategy and make clear what is involved and why.

Components of this education could include the following:

- Effective management in a unionized environment;
- Creating a customer-centric workforce;
- A toolkit for developing meaningful performance indicators.

A second recommendation is that management and the unions come together in a collaborative effort to review and update all job descriptions. This effort will require diligent work and a high degree of cooperation with the unions. The purpose would be to update job descriptions (starting with Federally-funded roles which require updated job descriptions) to ensure that they reflect their existing roles and include the qualifications or skills required to do the job. The job description review will expose skills gaps which will in turn drive the development of appropriate training to address them.

Finally, the IBM team proposes the development and implementation of an annual performance review process for all employees – including performance indicators where available. Although this would be a complex undertaking, the City could start by running a small pilot to understand the likely impact before full deployment.

Inspection and code compliance specific recommendations

With the importance of permitting on economic development, the IBM team recommends an increased focus on developing skills and cross-training within the Inspection and Standards Department and the Fire Prevention Division. First, the hiring and promotion criteria should be strengthened for building inspectors, plan examiners and fire inspectors. In the case of the Fire Prevention Division, there should be a stipulation that one position has a Fire Protection Engineering certification or equivalent post secondary degree. Additionally, it should be a requirement that all positions within the Fire Protection division have dual Fire Alarm and Life Safety certifications. To support this recommendation, the team proposes moving Fire Prevention Plan Examiners/Inspectors to the City Union (1033) so that there is consistency within these positions reporting to the Fire Marshal. Second, continuity education should be provided to all employees in both departments on a schedule, but not less than once every two years. Third, the team recommends the formalization of third-party professionals for code compliance. This currently applies in special cases but should become more systematic. This change would increase the capacity of both departments to enable them to handle complex requests more efficiently in collaboration with the business community.

5. Invigorate partnerships with external community involvement

Owner: Director of Economic Development

It is recommended that Mayor Taveras uses the new Economic Development Department to launch a sustainable engagement model, which leverages the City's rich and creative resource base from the arts, life sciences, healthcare, entrepreneurship, education, technology, and non-profit associations.

This program should focus on the land-use management system, building awareness and momentum for change, and involving these resources to help resolve challenges. For example, the City could create a list of opportunities that professors could use as project ideas, or which students could use for research projects. The students studying within an environmental sciences program might be assigned to look at the City's energy usage and recommend ways of reducing energy consumption, resulting in savings to the City and taxpayers. Similarly, students in a computer science program might help to build extensions to existing software packages to facilitate IT consolidation.

This requires a formal integration point between the City and the talent, but would be a substantial win for both the City and the students.

6. Provide education and outreach

Owner: All Directors

As a starting point, the Department of Inspection and Standards should develop an education and outreach program to educate land-use stakeholders such as developers, realtors, contractors, or residents, on the permitting process. This program should highlight key aspects including tips, frequently-asked questions, checklists and pointers to other relevant processes and personnel. Electronic communication should also be provided.

This will help make the permitting process more transparent and encourage economic growth, as Providence is more likely to be viewed as a city of choice for construction by out-of-town developers. Education and outreach can help clarify the process and make it easier for developers.

This recommendation applies to all departments that offer services to the public.

B. Processes

Permitting makes up a significant portion of the land-use management process as it exists today, and was the focus of the IBM team's investigation and efforts.

Description of the current situation

This section outlines the Providence permitting process at a high level. The aim is to set out the process as it exists today because many of the IBM team's findings deal with improvements to the land-use management process and a significant proportion of this involves permitting. Details on the existing system come from the Providence Guide to Permitting [PROV2010] as well as discussions with staff.

1. Overview of the existing process

The permitting process can be broken down into three main phases – zoning, planning and construction.

During the zoning stage, any approvals from special boards or commissions, such as the Historic District Commission or the Downcity Design Review Committee, are determined. In the cases where a project fails to meet the requirements of the Ordinance, the owner can either change the plans to fit the Ordinance or apply for a variance from the Zoning Board of Review. Once a zoning permit is issued, the process moves into the plan review stage.

The Department of Inspections and Standards (DIS) is the entry point to the plan review process. DIS reviews all plans to ensure compliance with building codes and to guide property owners through the building permitting process.

During the plan review process, applicants submit the correct number of copies of their plans to the clerk at DIS, who then distributes the copies to other departments so that departmental reviews can be conducted concurrently. The Providence Guide to Permitting contains a matrix [PROV2010] to help applicants determine what will be required with each submission. It details the category of applications (demolition and moving, foundation, roofing, exterior work, temporary structure, site work, outdoor seating, daycare facility, hospital, etc) and the different documents that will need to be filed with each, indicating which are mandatory and which are not. It also details the number of copies of each document that is required.

The statutory turnaround time (TAT) for the plan review is 30 business days (six calendar weeks). There is an expedited process for renovations and other limited-scope projects with a TAT of 15 business days (three calendar weeks) for those projects which meet specific requirements. For complex projects, the Guide recommends a pre-application meeting.

Following the review, a building permit is issued, allowing the owners to start the building process and to request necessary permits for construction. Inspection continues throughout the building phase. A building inspector inspects the use of the land, foundation and framing of the project. Two inspectors from the Fire Department inspect the fire-related systems, one focused on prevention and the other on protection. Mechanical, electrical and plumbing inspectors are also required. At the end of the project, the permit holder must schedule appointments for final inspections, after which a certificate of occupancy is then issued and a tax revaluation is performed, as appropriate.

2. Observations from interviews

Although some stakeholders commented that there has been recent improvement in the permitting and inspection process, the improvements are not sufficient to deem the processes satisfactory.

One-stop shopping

The one-stop process has improved filing convenience but has created new challenges. Clerks have not been trained to screen applications to detect basic flaws in the application and flag these to the applicants immediately. This lack of immediate feedback delays the process by at least two days, often longer, as the application must first be sent to fire inspection and then returned to DIS to be rejected and returned to the applicant for additional information. A process that allowed for immediate review of the acceptability of the application materials would improve the timeliness of the review process.

Lack of automation

Feedback by the stakeholders pointed to the lack of automation and the use of archaic processes. We found the use of 3x5 index cards; the use of software systems that are not integrated and which are used only for a single, distinct purpose; and the re-keying of information between multiple systems wasted time and introduced data-quality errors. When automation was discussed with process owners, concerns were raised that automation could prove disruptive to staff.

Timeliness

Timeliness of the applications is a critical issue and one that often has severe economic consequences. It was not clear to the applicant whether permits were triaged or being assigned in an efficient manner. As a result, several of the stakeholders used third-party experts and consultants to support their large, complex projects. These consultants hold professional certifications and are experts in code compliance. They help the project owners plan, design and propose solutions to minimize compliance issues. It was further suggested that these third-party professionals might complement the City permitting and inspection staff to perform tasks and duties with final approval by the City.

Unpredictability and opacity

The dissatisfaction with the permitting and inspection process appears to stem from a lack of transparency and a lack of predictability. Once an application has been submitted, the applicant is unable to track the status of their application as it progresses through the process, except by making phone calls to City employees or by escalating their query to the Mayor's administration. In addition, applicants cannot anticipate the amount of time it will take to receive a permit; sometimes the process is relatively efficient while at others it is felt to be excessively slow, resulting in lost time and money and hampering economic development.

Inconsistent interpretation

Stakeholders also cited inconsistencies in the permitting processes. For example, they cite inconsistencies in the interpretation of fire code. The varied interpretation has sometimes meant significant costs in terms of time and money for the proposed project as well as conflicting requests that duplicate effort, such as moving a door from one location to another and later moving it back to the original location. Stakeholders also cited that, although the City has published a guide to permitting, this is very long, and the documented process does not always appear to be followed.

Pre-review meetings

Stakeholders believe the process of holding a pre-project meeting with the property owner, developers, and building and fire inspectors – to preview a project prior to the formal application – to be helpful. Stakeholders felt that this initial feedback provided by the inspection team helped them submit a stronger application package and possibly reduced review times of that package. However, such meetings were not found to rectify the status, predictability or timeliness of the application to any significant degree. In addition, the meetings were being approached and managed inconsistently. In some cases, developers would meet individually with the inspectors; in others, joint meetings were being scheduled.

Research into best practices and benchmarking

The IBM team reviewed the permitting process in a number of US cities for examples of best practices – in terms of enabling quicker and more efficient permitting, improved predictability and ease of use, and overall customer satisfaction. Although there was not any one City that was deemed strong in all areas, the team identified several features that were found to enhance the process. These recommended practices include:

Expedited reviews in special cases

Some cities provide an expedited route for applications that do not require a review of planning, which means the applications can be approved on the spot. These cities include Chicago [*Chic7*] as well as the County of Mecklenburg in North Carolina [*Mec4*]. Others provide an expedited process for applications that meet specific requirements. For example, Chicago [*Chic7*] and Washington, DC [*DC1*] use this expedited review process to encourage specific types of construction.

The City of Chicago triages applications into Simple, Standard and Complex (Developer Services), each with different turnaround times. Simple jobs have a rapid turnaround – cleared in days or even over the counter (OTC). The standard review time is 45 days, which is about same as in Providence.

Meanwhile, Mecklenburg County, NC [*Mec4*] provides an express channel for straightforward applications. Providence allows for this as well, although 15 business days (three calendar weeks) is viewed as too long. Mecklenburg County also grades the plans submitted and expedites those from developers with high-quality submissions [*Mec6*]. This also gives them the option to rate developers according to past submissions, allowing them to favor those with a strong track record, reducing turnaround time and increasing the approval rate. Additionally, Mecklenburg County has an expedited process that supports master plans – plans that have been previously approved, for example those relating to the construction of a similar building on a different plot. Once approved, master plans are fast-tracked with minimal future review.

Appointing a 'facilitator'

Ocean City, MD [*Oce1*] provides a single point of contact who works with a developer to guide them through the process, ensuring that the right departments review the application. This designated facilitator hides the complexities of the process and eases the application process. This approach is widely used in large cities such as Boston, Chicago and New York City.

ePermitting

Some cities now provide electronic submission and tracking of applications as well as inspection scheduling. Good examples of this are Chicago [*Chic2*, *Chic3*] as well as numerous cities in the State of Oregon [*Ore1*] and Mecklenburg County, NC [*Mec1*]. Many more cities, including Boston [*Bos1*], Fort Worth [*For*], and Washington, DC [*DC1*], offer limited online application submission, but not a full electronic permitting system for complex projects. New York City [*NYC2*] supports electronic filing of all permitting applications. In Chicago, ePermitting is standard for all complex applications. From January 2012, this will become compulsory for all applications. With this in mind, the City will set up kiosks in reception centers to help small businesses and home-owner applicants scan their documents into the ePermitting system. This is identical to what the IBM team has recommended for the City of Providence.

Providence recently implemented an ePermitting system but the IBM team's research revealed that the deployment is not widely used, for a variety of reasons. Some users found it complex; others felt it did not ensure an improved service, noting that they still had to follow up with administrators to determine the status of their applications.

Manual tracking

Some cities, such as Chicago [*Chic6*], Columbus [*Col2*] Fort Worth [*For1*], and Mecklenburg County [*Mec1*], and New York City [*NYCdashboard*], monitor application volumes and progress internally through periodic management review of key performance indicators. This allows them to see the approval and rejection rate, and the length of the queue at any time – giving them the opportunity to shift resources to tackle backlogs.

Current review delays

Some cities, such as Chicago [*Chic5*] and Washington, DC [*DC3*], provide current statistics regarding the amount of time the permitting process will take. Making such statistics publicly available improves accountability and increases predictability, framing the applicant's expectations.

Permitting guides

Many cities have easily accessible and detailed online guides covering the permitting process, including all relevant contacts and forms. Good examples are Boston [*Bos2*], Chicago [*Chic4*], Columbus [*Col1*], New York City [*NYC3*], and Washington, DC [*DC2*]. Although Providence has also published such a guide, prospective applicants indicated that the City has not been following the process documented, and that the guide is too long to be of any real value. In addition, the IBM team was directed to search for the document via the Internet at large, rather than look for it on the City's website.

Training

Mecklenburg County [*Mec2*], Oregon State [*Ore2*], and Seattle [*Sea1*] are good examples of organizations that hold regular seminars and training sessions for developers. In these sessions, they take the developers through the process, the forms and the contacts within the relevant departments to ensure their familiarity with the process. Crucially, resources are coordinated internally to ensure that all relevant departments are represented at the sessions, resulting in a one-stop shop for developers – where all of their questions can be answered.

The City of Chicago Department of Business Affairs and Consumer Protection [*ChicP1*] runs some 400 community outreach sessions each year. These include seminars and workshops, supplemented by online education and FAQ brochures. In some cases, retired company executives are used for some of the sessions, covering topics such as the permitting process, company registration, and micro-financing. A business center then works with entrepreneurs throughout the process. A new entrepreneur is assigned a consultant who will go on to work with them for a period of years, working with them as they grow. All of this is funded through the permitting fees.

Pre-submission reviews

Mecklenburg County [Mec3] allows for a pre-submission review whereby the developer and key personnel from the different departments discuss the transaction and plans before formal submission. This valuable exercise can help by highlighting potential issues or gaps in the applications so that these can be addressed at the outset, accelerating the progress of the transaction once formally submitted (30% of submissions are typically incomplete, [Phil2010]).

External partners

Some cities use skilled resource from the private sector to assist with complex transactions. Chicago [Chic1] and New York City [NYC1] allow technical review of complex plans to be performed by private contractors who hold appropriate professional certifications. Chicago relies heavily on the use of external reviewers. The City has a pool of around ten companies that are certified to do this. The fee for this is covered by the applicant who benefits from an improved turnaround time for applications. Chicago is unionized and there is a detailed process that has to be followed to get access to skills that fall outside of what the Union can provide. The City followed that process here and was successful because these skills were not available internally. Chicago and New York also allow self-certification of routine construction jobs – such as plumbing – to speed up the approvals process. In Providence, Fire Marshals are allowed to engage an external skilled contractor to review and certify plans which are then approved on the basis of the certification.

Regional technology

Some municipalities have entered into collaborative arrangements to build technology to support electronic permitting. Good examples of such collaborative arrangements include the State of Oregon [Ore1] and Mecklenburg County [Mec1]. These collaborative arrangements allow the cost of development and maintenance to be shared between multiple parties. It also helps ensure consistency across the region, reducing overall developer costs.

Consistency meetings

Mecklenburg County, NC [Mec5] holds 'consistency' meetings monthly, by trade, to review policies and procedures to ensure that the inspections department 'speaks with one voice'. This meeting is open to customers.

The IBM team's recommendations incorporate many of the best practices cited above.

Recommendations

1. Institute a management system to monitor land-use management processes

Owner: Director, Department of Inspections and Standards

The City of Providence should monitor the efficiency and effectiveness of its processes on a regular basis. As an example, the team considered the permitting process, concluding that the various steps involved should be measured using the key performance indicators identified in recommendation #2 outlined in the Performance Indicators Section. These performance indicators should be reviewed regularly in a team meeting. It is recommended that the head of the DIS should chair a Permitting Operations Meeting (POM), attended by the department heads of the various permitting entities, such as zoning, planning, construction and fire.

During this meeting the team would have internal discussions, reviewing the current statistics related to the efficiency of the permitting process as well as examining any permit application that is approaching or has exceeded its TAT deadline. Other topics relevant to the entire permitting operations could also be discussed as appropriate, such as upcoming changes in regulations or process improvements. Once the internal discussions have concluded, the team would then hold plan reviews. Individual developers would be able to schedule an appointment with the committee to present an overview of a complex project, or to preview an upcoming project with the entire team.

Department heads might hold similar meetings with their inspections teams to review departmental statistics, regulatory changes and the like. Individual inspectors would be able to summarize their recent inspections, highlighting the more challenging applications for peer review and consensus. This peer interaction would help experienced inspectors mentor other inspectors, building skills and reducing risk associated with absences or the retirement of key staff. The meetings would also keep inspectors abreast of complex projects, ensuring continuity in situations where a different inspector performs a follow-up inspection or where a given inspector is unavailable due to vacation, illness, or retirement.

2. Triage incoming applications into *express, standard and complex*

Owner: Director, Department of Inspection and Standards

Different applications require different levels of resources for review and approval. Applications that do not require a plan review are fundamentally different from those that do. They are more straightforward and, as a result, should take less time.

The IBM team recommends that the City should set service levels according to the nature of the applications. Projects could be classified into three categories:

- **Express:** Those that do not require a plan review could be logged and approved OTC;
- **Standard:** Projects with a scope between 5,000-10,000 square feet, requiring a reasonable but not excessive level of review, would be logged and placed into the queue for review by entry-level or mid-level specialists;
- **Complex:** Projects greater than 10,000 square feet, requiring a significant review, would be logged and assigned subject-matter specialists who would serve as the single point of contact (SPOC) for the project through the entire approvals process.

The TAT for applications should be set based on the level of complexity and the hours required to review them, with express applications completed in the shortest timeframe.

The SPOCs would liaise with the different departments and track the status of the application, reporting to the developers as necessary and logging details of the progress in a database. Active tracking would enable the DIS to give progress on the status of the projects, and help the applicants make building plans. In time, this information could also be made available online.

3. Institute tracking and reporting

Owner: Director, Department of Inspection and Standards

The City's customers need to be able to determine the status of and expected lead times for permitting and inspection applications. The City should formalize a process of tracking status information of all building permit applications from the point of submission to the end of the construction phase where final inspections are scheduled and approved.

When an application is submitted to the DIS, a tracking number is assigned to the submission before the associated documentation is distributed to the required parties involved (such as Inspectors, Fire Marshals, and the Department of Public Works). When the required parties receive the associated documents, they should track and report the status of all applications in their own queues within the management system using the tracking number.

The City should then provide a way for applicants to access the status of their applications and – at a minimum – receive information about an estimated completion date. One way to accomplish this is to use the new electronic permitting system to track all new building permit applications, including those not submitted electronically. To speed up implementation, the City could start by implementing this outside of the e-Permit system.

The ability to provide a status update (automatically or on request) about the status of applications would resolve one of the biggest issues identified in the developer community – *uncertainty*.

4. Formalize the pre-submission review process

Owner: Director, Department of Inspection and Standards

The Department of Inspection and Standards should formalize the pre-submission review process, ensuring that all relevant departments attend such meetings. The purpose would be to provide feedback on a proposed project before plans are finalized. This feedback will ensure the right input into the design of the project – thereby building compliance into the process, rather than simply inspecting at the end. Issues and challenges uncovered by this early review process will help make the Department of Inspection and Standards a partner in the development process.

5. Establish the Guide to Permitting as a living document

Owner: Director, Department of Inspections and Standards

The permitting and inspections process requires a comprehensive document that is reviewed, revised, and published by the City on a scheduled basis. The status and schedule of the current release of the documentation will be a regular feature on the POM agenda. This documentation is critical to communicating with residents and business. In addition, it will form the basis on which to train existing and future employees involved in the delivery of this service.

6. Require electronic submission of all applications

Owner: Director, Department of Inspections and Standards

The continued development of the ePermitting system is recommended, and the City should require that all permits and all plans submitted by professionals such as architects and contractors are submitted electronically. Home-owners and small business owners should be allowed to submit their plans electronically from the home or office, but there should also be a facility enabling applicants to submit plans on a walk-in basis – including the ability to scan paper-based plans. Employees in the permit office should be trained to provide support to customers who need help scanning and submitting their applications and plans.

By moving entirely to the ePermitting system, the City would simplify its process because it would no longer need to manage paper-based submissions. Adopting an electronic system would also facilitate a track and trace capability, allowing applicants to see the status of their applications online.

C. Technology

Description of the current situation

Current IT infrastructure

Decisions about IT infrastructure within the City are generally made autonomously within each department. In some cases city-wide stakeholders are consulted after a procurement decision has been made and proof-of-concept is already functional. As a result, the software application's fit and applicability to other departments may be less than optimal. Systems selected or created in a silo fashion may not meet requirements for other departments and may not integrate data and information well with existing departmental systems.

The City owns or licenses numerous software systems to support its operations. Some of these systems may have extensions that allow them to support functions performed by other systems. Even though the City owns some of these extensions, departments have often chosen to purchase an entirely new package rather than adopt the existing technology. For example, Govern has a module that would support deeds management, but the decision was made not to use this extension and to purchase ACS instead. Such behavior creates interoperability challenges and leads to silos of information, inhibiting collaboration, efficiency and a positive customer experience.

Duplication is commonplace, too. In some instances, the City owns multiple software systems that perform the same function. For example, it currently supports three different email systems. In addition to the additional license costs, IT staff must maintain each of these systems, driving up the total cost of ownership.

Case study: IQ9 and the new ePermitting system

In trying to improve the City's permitting process, the DIS undertook an aggressive plan to build an electronic permitting system – one that would be transparent to applicants and make the department more efficient. The Department conducted an investigation to find appropriate software packages and chose InQuest's IQ9 system. Since that purchase, the Department has prototyped and released its first electronic permitting system.

The initial release of the system was intended to be used by developers. Several developers experienced challenges in using the system for even the simplest of permits. Consequently, the system is experiencing low application volumes. The current system also does not support status queries online and does not appear to have drastically shortened permitting completion times.

The City was expecting to release a new version of the system in late August. This release is much improved and allows applicants to view the status of their applications, and to respond to requests for more information, or for plan changes, online. This new system should improve consistency, increase transparency, and assist in improving efficiency.

One approach the City might consider as it approaches this second release is to use the electronic permitting system internally before releasing it to City customers. The basic idea is to have someone in the department who scans the paper plans and submits them via the tool, initially under the watchful eye of one of the developers. Although this process will initially create additional work for the City staff, it will ensure they are comfortable with the new tool and allow the developers to observe any user issues. By taking this approach, the City will be able to address any such issues before releasing the system to the City's customers.

In the future, the City also plans to acquire and implement portable tablet devices to allow inspectors to enter data from the field, and to integrate pictures into plan review and inspections. It appears that several key process changes being proposed will help both current and future iterations of the paper-based and electronic permitting process. The IBM team would encourage the City to continue moving toward an electronic permitting system.

Current land-use management system

The existing land-use management employed by the City of Providence consists of a broad set of activities, all of which contribute to the economic development of land within the City. Figure 2 shows many of these diverse activities which range from zoning to building plans, permitting, construction, inspection, tax assessment, and tax collection.

Although each activity appears initially to be self-contained, these are highly inter-related and inter-dependent; information from one system is often required to complete an approval for another system. For example, licenses cannot be issued unless tax payments are current, and building permits cannot be issued unless fire plans are acceptable.

Table 1 shows a survey of the software applications used for various purposes across the City. Again, little integration exists across these software packages. For example, approximately 20% of the data needed for permitting and licensing is common and must be entered repetitively by applicants. Each department then stores this duplicate data independently, and data integrity is hard to verify. To receive a license, an applicant must walk to many different departments so that different individuals can check their system and stamp a piece of paper showing that, for example, the property taxes for the applicant are current. Software interoperability would reduce data errors and frustration among citizens as well as City employees.

Table 1 – Survey of current IT Applications relating to land-use management

Functions	Product
Financial management	Lawson
Deeds management	ACS, DG Universe
Property tax assessment and collection	Govern
Building permit management	InQuest
Personal property	FoxPro
Property assessment	CAMA
GIS	ESRI
Payment service	Cash, electronic
Building inspections	InQuest
Street drawing (DPW)	AutoCAD

Improved integration and interoperability could also help the City operate more efficiently. For example, the fact that the DIS has issued a Certificate of Occupancy (COO) for a new deck or for an extra bathroom is not automatically shared with the Tax Assessor's office automatically. Consequently, the increase in property value is not noted until the next scheduled re-valuation. If the issuance of a COO could be shared with the Tax Assessor's office, a re-evaluation of the property could be performed sooner and the City could realize increased tax revenues. Because this inter-dependency between departments is not recognized, the City suffers financially in terms of lost revenue.

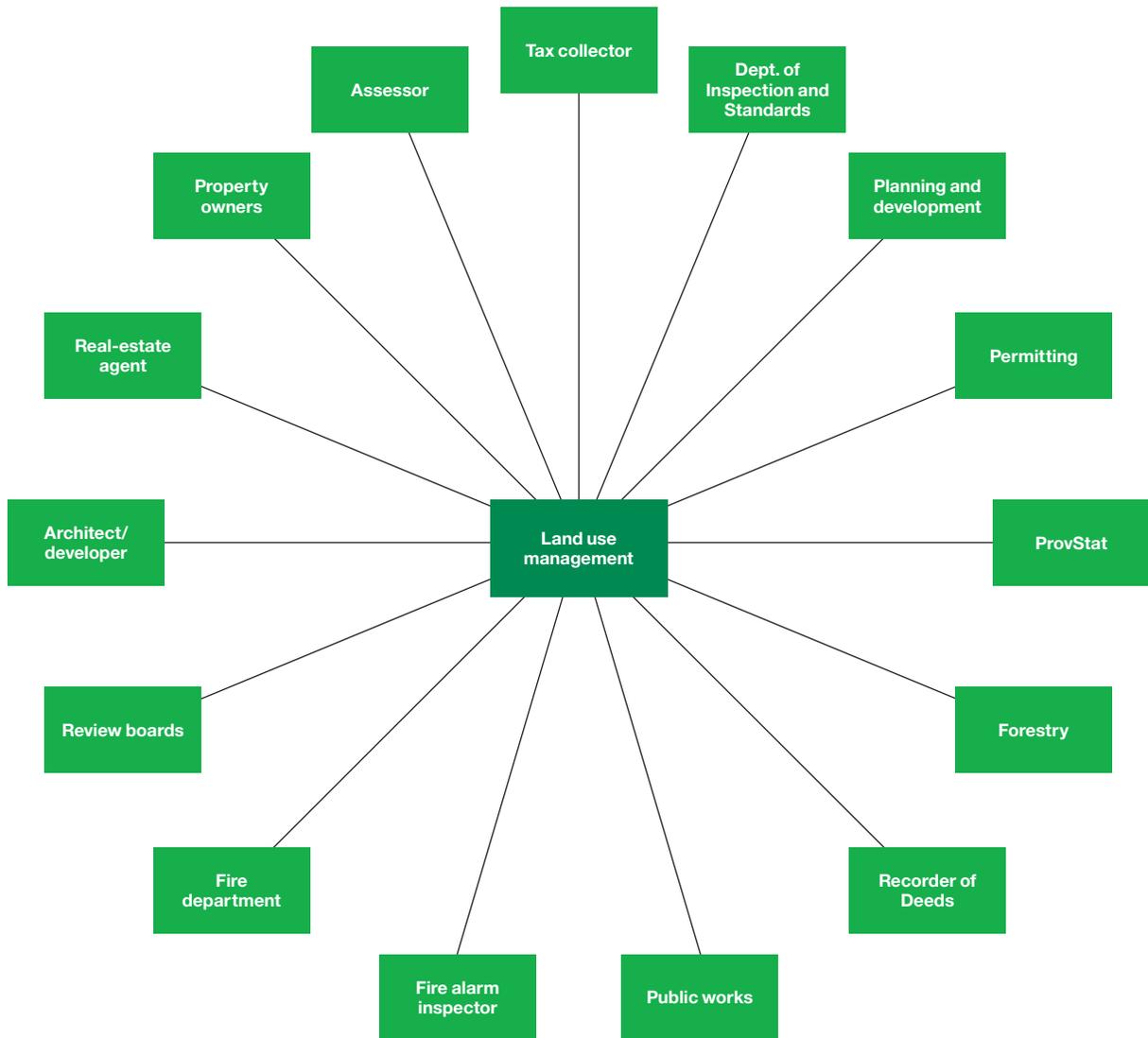


Figure 2
Land-use management ecosystem

Research around best practices and benchmarking

State of Oregon

Oregon provides an electronic permitting service to its cities and municipalities, following the request of contractors – initially so that they could determine which municipality a property belonged to for permitting purposes. The first version of the system, called QuickPermit, was deployed in 2001 and allowed customers to enter an address and apply for simple trade permits (ones that required no planning review). The portal sent the applications to the appropriate municipality. The system was highly popular and, in 2007, the contractors returned to the State to ask for additional functionality. The current system allows any type of plan to be submitted, supports inspection scheduling, and tracks permit status.

The initial system, and a template that supports 14 base permits, took nine months to implement. A new city or municipality can be brought on line and customized in around three months if they conform to the template. Full customization can require up to one year. The system is supported by a staff of eight people. Together, QuickPermit and ePermit have processed approximately 80,000 permits since inception. Last year, ePermit processed approximately 21,000 permits. The system also supports reporting tools, including quick reports that give basic information for one jurisdiction, as well as custom reports that provide more information.

The system is supported by a surcharge on the permit fees paid to all municipalities across the state. The State initially imposed a 1 or 2% surcharge to support the QuickPermit system and now imposes a 4% surcharge to support the more comprehensive ePermit system. Cities and municipalities can choose whether or not to use the ePermit system, although they are still required to collect the surcharge whether or not they take advantage of the state-supplied system.

Mecklenburg County, NC

The city and county building permits and inspections function in Mecklenburg County, NC is a consolidated department operated by Mecklenburg County Code Enforcement in the Land Use and Environmental Services Agency (LUESA), which provides electronic permitting services to the county and six cities. Mecklenburg County began the journey to modernize its building permit processing solutions in the early 2000s – with a view to providing an improved service to clients, both residential (home owners and contractors) and commercial.

Residential clients can submit applications online.

Home-owners submit their application using the Home Internet Permit (HIP) system, whereas contractors submit their application through the Trade Internet Permit (TIP). A client can also visit a LUESA office and submit applications in person. In all cases, the clients can access the status of their application online at any time.

For commercial projects, architects, engineers or project managers submit their applications online via an Electronic Plan Management (EPM) system. This gives clients a dashboard view of their project's status, and provides a communication platform between the users and assigned inspectors to schedule face-to-face plan reviews. The first-time approval rate is about 80% using this system. Currently, the plan review process is still conducted manually. Average turnaround time for a small to medium project is about five days and the first-time approval rate is around 60%. By 2012, a new electronic plan review module will be rolled out and the whole process will be paperless.

Mecklenburg County currently processes some 280 plans a month and issues about 36,000 permits a year. Table 2 shows a rough estimate of the average turnaround time to process a building permit application:

Table 2 – Average Turnaround Time in Mecklenburg

Estimated Plan review time	Average turnaround time
1 – 2 hours	5 days or fewer
< 5 hours	10 days or fewer
< 8 hours	20 days or fewer

For very large projects with an estimated plan review time of over eight hours, dedicated resources are assigned to work with the clients. For example, a large-scale project that was recently approved took just 42 hours in plan review using the new system. The same projects would have taken 60 days prior to 2003.

LUESA is a highly customer-focused organization with clearly-defined metrics and a strong team culture. It holds regularly scheduled meetings with key stakeholders to revise its service offerings and system capabilities to meet the client's need. There are approximately 38 technical staff, 12 administration staff and 130 inspectors. The LUESA staff do not belong to any unions. LUESA is funded entirely from revenues generated by the permitting process. Their systems are integrated to provide clients with real-time project status information.

Recommendations

1. Develop strategic IT plan

Owner: IT Governance Committee

The IT Governance committee should work with the CIO to develop and maintain a City-wide strategic IT plan. The committee should establish goals and strategy that satisfy the City's short-, medium-, and long-term business needs. Plans should be developed to maximize the leverage of existing technologies and applications to meet the City's short-term needs. In the longer term, a path should be developed to migrate to strategic technologies and applications. These plans should also be communicated to and reviewed with all relevant stakeholders.

Without a strategic IT plan, the IT landscape for the City will remain archaic, and IT assets will be acquired to fulfill short-term departmental needs and may not align with the City's long-term objectives.

2. Institute enterprise IT architecture and standards

Owner: CIO with IT Governance Committee

The IT Governance committee should develop and document its own enterprise architecture (EA) [OpenGroup, TOGAF9] and IT standards, to serve as the source of information which will guide any IT-related initiatives across the City. This should be an integral part of the City's IT governance, providing guidelines and criteria that any IT-related initiatives must comply with, including projects already in place and those now under development.

As part of this effort, the committee should create a baseline inventory of all hardware and software assets. Obsolete assets should be identified and decommissioned and non-strategic assets should be consolidated onto strategic platforms.

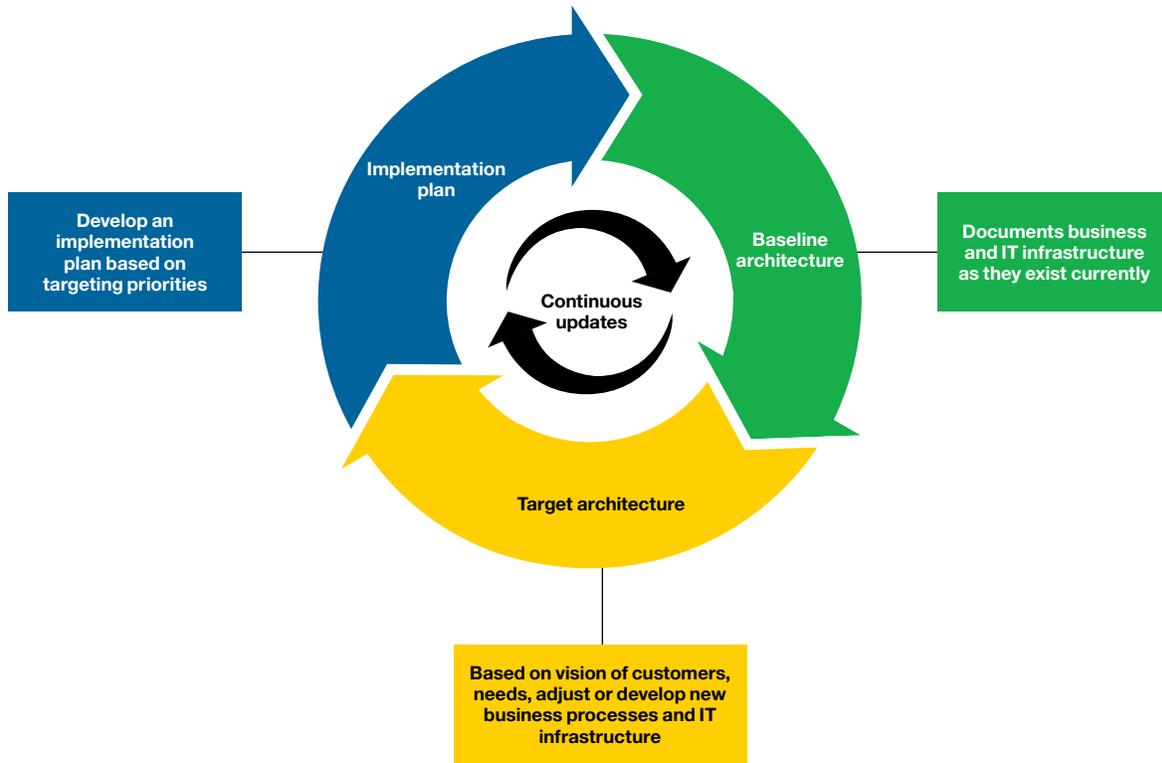


Figure 3
The three steps in building an Enterprise Architecture

The committee should also conduct an IT rationalization process to:

- Identify common functionality;
- Understand the dependencies across software applications and departments; and
- Consolidate overlapping functionality where possible.

Identifying common functionality shared across departments will allow the City to create common services, amortizing the cost of these services across the departments and reducing IT expenses. Understanding the inter-dependencies between software applications and departments will allow better interoperability among overlapping city functions, streamlining operations and reducing software maintenance costs and licensing fees.

The IT Governance Committee should also develop and enforce IT standards that will enable and facilitate interoperability between applications. These standards should include identification of a common operating platform and a common look and feel for both customer-facing and internal applications. A common look and feel will increase the systems' user-friendliness, encouraging adoption.

The enterprise architecture and standards will provide guidance to the IT Governance Committee as future purchasing and license renewal decisions are considered.

3. Create an integrated electronic land-use management system

Owners: Director of Administration/Director of Economic Development

The City should work with the IT Governance Committee to define the roadmap for a comprehensive land-use management system (LUMS). A project team should be formed to look across the entire ecosystem for land-use management and take a holistic, end-to-end view to creating an architecture, which defines the components and their business relationships. This can be then be used as a guideline for future IT development and software acquisitions.

For example, as the ePermitting initiative continues to move forward and develop additional functionality, the project team can work together to produce a pilot project – under the guidance of the enterprise architecture and standards. Once the pilot is rolled out, the experiences of using the new software can be shared with the LUMS stakeholders before a broader purchasing decision is made.

By adopting an integrated electronic land-use management system, the City will create and foster an interoperable, properly governed and managed ecosystem. This will raise the level of efficiency across all aspects of land-use management. For example, efficiencies in obtaining tax compliance information will shorten approval time for all licenses. Efficiencies in zoning, deeds and permitting will shorten the update time on tax assessments, and shorten approval times. Combined, these changes will increase incremental revenue collections, while also improving economic development. Overall, an efficient land-use management system will increase satisfaction for all applicants and put the City on course for stronger economic development.

Figure 4 shows a rough sketch of such a system.

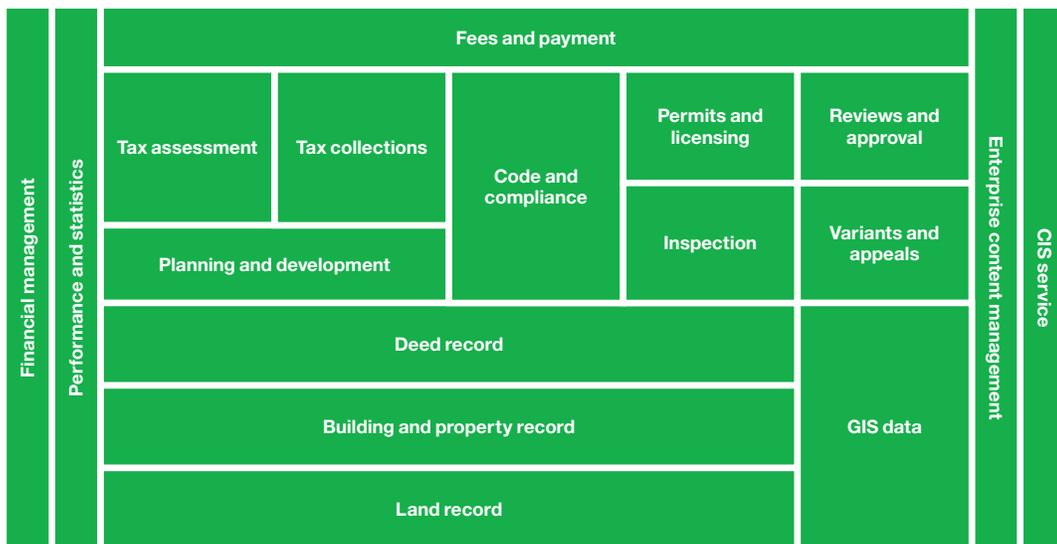


Figure 4
Land use management architecture

We recommend that the City creates a repository to provide a Single View of Land Information Database to support a range of applications. One recommendation is to create an operational data-warehouse to support the current land-use management applications. This operational data store will integrate essential data, such as deeds, land and property data from across various disparate applications. It will provide a central data repository and provide a consistent view of land-use management information that can be leveraged across departments. Integration techniques and tools such as a data-cleansing utility and an enterprise service bus can be applied to normalize data to a common data model and to maintain the integrity of the data in an automated way.

In addition, several of the stakeholders interviewed as part of the IBM team's research are in the process of digitizing their current paper-based property information. It is recommended that the City creates an enterprise content management system to store all property records – initially as scanned copies of the existing paper records from all relevant agencies, such as the records from Public Works, Deeds, and Permitting.

The City should also consider collaborating with the State of Rhode Island and other municipalities across the state to design, build, and manage a comprehensive land-use management system. This approach will amortize the costs associated with building and maintaining this system.

D. Performance indicators

Description of the current situation

Currently the City of Providence reports performance measures within departmental boundaries. The City has a data collection team called ProvStat, consisting of two employees. Their primary responsibility is to gather and report data related to the City of Providence's operations and services. The City has no explicit requirement to provide and report key performance indicators (KPIs) [KPI] – either at a city level or at the division/department level. Consequently, the ProvStat team has developed reports in cooperation with several departments that are *interested* in measuring their data (eg. Police, Parks and Recreation). However, these measures are not always designed strategically, or in a way that assists in departmental decision-making and investment.

Table 3 provides a summary of existing measures, though not all are being actively reported. A detailed list of the actual ProvStat measures can be found in Appendix C.

The data used by ProvStat is derived from a variety of sources and arrives in different formats, including manual data entry. Often these reports are assembled using spreadsheets with equations that cannot be verified for accuracy or quality. This complexity, coupled with the manual approach of the data entry, is time-consuming. As noted in Table 3, some of the existing measures are no longer being reported or monitored on a regular basis. In addition, with the effort required to obtain and format the data, there is little time for detailed analysis. The result is that critical issues or trends requiring corrective action are often missed. As a result, City leadership does not have access to the necessary performance indicators to help them make informed, data-driven decisions.

Because ProvStat was designed to support individual departments, it is currently not possible for employees or departments to understand how their performance affects other departments, or customers, or even how it fits into the overall goals of the City. This lack of an end-to-end view reinforces organizational silos. The City would benefit from a formalized performance measurement program that provides KPIs to gauge the success of the City and its employees in meeting the needs of constituents.

Table 3 – Current Performance Indicators

Department	Number of Items Measures*	Frequency	Actively Reporting
Fire	9 Measures	Quarterly	Y
Police	5 Measures	Weekly	Y
Telecommunications	3 Measures	N/A	N/A
Public Works	8 Measures	Quarterly	Y
Inspections & Standards	6 Measures	Quarterly	N
Parks	5 Measures	Quarterly	N
Vital Statistics	4 Measures	Annual	N
Recorder of Deeds	5 Measures	Annual	N
Tax Collector and Assessor	10 Measures	Semi-Annual	N

*See Appendix C for list of ProvStat measures

Research around best practices and benchmarking

Routine and visible KPIs are widely used in the public and private sector as a technique to improve performance, both internally and externally. From an internal perspective, KPIs help manage expectations across departments, and hold personnel accountable for their performance. From an external perspective, KPIs are a primary means of developing public accountability because they provide a mechanism for the public to review government performance. By establishing a uniform approach to capturing and monitoring performance measures, and by making those measures visible to the public, the City will improve accountability, predictability, and transparency.

Creating a city-wide performance-based culture would ensure the sustainability of programs despite turnover of elected leaders. This is important because a Mayor’s tenure is short, relative to the life of a City. Developing a performance-based culture must be an integral part of the City’s core values and should be engrained in the minds of its employees. Developing and implementing this program would be an important component of the Mayor’s legacy for future generations.

At the time of writing, the State of Rhode Island is in the process of pursuing a similar performance-based effort. It has developed and is currently deploying a performance management approach designed to “shift Rhode Island State government’s efforts toward producing meaningful results, rather than completing processes”. The State is pursuing an in-depth form of data analysis within and between departments and agencies, “creating a more informed process for resource allocation so that they best meet the needs of the citizens” [RIperf]. The core team leading this effort is comprised of individuals from the Governor’s Office, the Department of Administration, and the Budget Office.

The chosen performance management approach is outlined in three distinct steps:

1. Utilize a performance management reporting template to collect and report data;
2. Submittal of data through the intranet;
3. Review of data in performance management forums.

For consistency, the aim is for material developed by the State to be leveraged to provide integration between the City and State’s performance measurement effort.

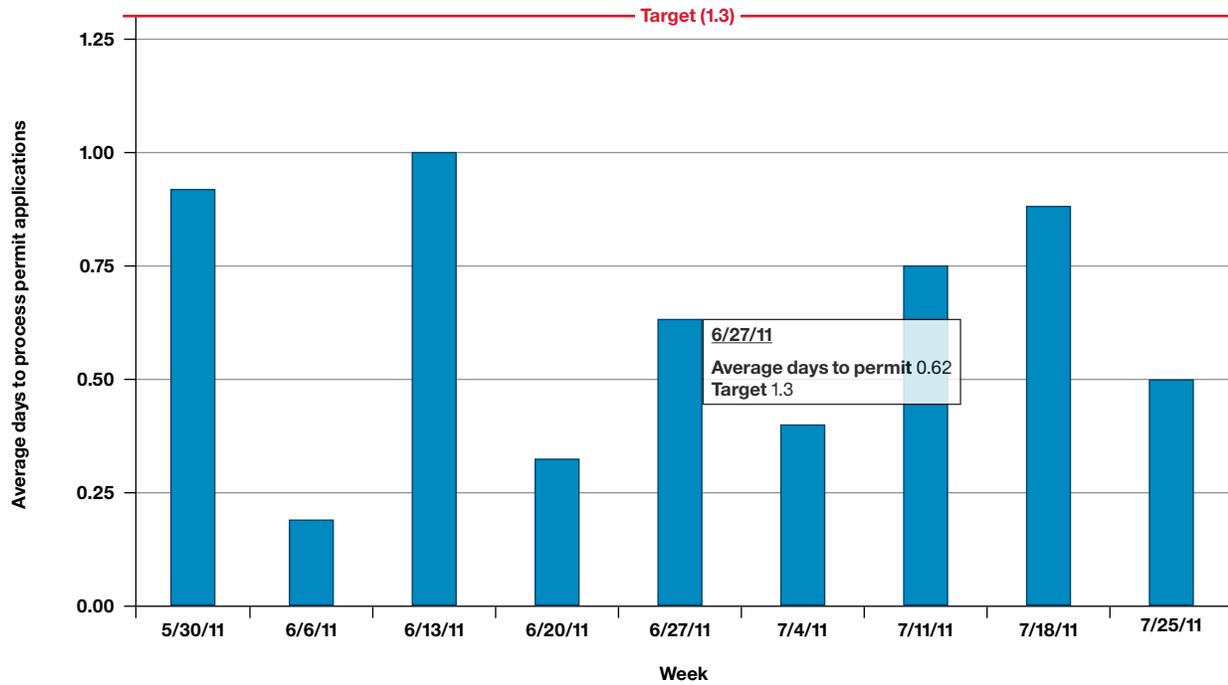
City of Chicago

The City of Chicago reports its performance metrics to the public via a website [*ChicagoKPIs*]. One of the many performance metrics reported on this website focuses on the number of days to process an 'Easy Permit'. An Easy Permit is one that allows a home-owner or building owner to make a repair or upgrade to a building that does not require structural changes to that building. The report clearly defines the process being measured (Easy Permit reviews) and the target goal (1.3 days). It then shows the value of this metric each week, for a period of time, in the form of a histogram. This is visible to anyone with web access.

This example highlights a number of key design points for KPI development:

- The focus of the KPIs (permit review);
- The frequency of updates (weekly);
- The actual performance and targets (1.3 days);
- The design of the report (histogram);
- The delivery mechanism (city website).

City of Chicago Performance Metric – Department of Buildings – time to issue easy permits



Average days to permit
■ Weeks target was achieved
■ Weeks target was not achieved

Figure 5
 Example of 'Easy Permits' performance metric from the City of Chicago

The City of Worcester, MA

The City of Worcester, in Massachusetts, presents statistics in its annual budget. For example, in its Fiscal 2012 Annual Budget document [Worc2011], the City documents that the Fire Prevention Division of the Fire Department issued 6600 fire safety permits and reviewed 850 plans in fiscal year 2010 (p. 152). Similarly, the Department of Inspection Services issued 2,498 building permits during that same timeframe (p. 168). The transparency, in showing the total numbers of inspections and permits, documents the value provided by these teams to the residents of the City of Worcester.

The City of Durham, NC

The City of Durham, in North Carolina, documents its mission, goals, and performance measures for each department in its annual budget and then reports progress against those measures [Durh2011]. For example, the inspections department measures the number of quality control inspections per inspector per month; the percentage of inspections found to be accurate; as well as the percentage of residential plans that are reviewed in five days; and the average number of inspections per inspector per day.

City of New York, NY

The City of New York has developed city-wide performance reporting and has developed an online dashboard for the Mayor, to provide him with the ability to monitor key performance across the City [NYCdashboard]. This dashboard is also available for public consumption and understanding in order to provide transparency.

From the dashboard, anyone can view the current performance metrics in many departments across New York City. The high-level view shows the number of performance metrics that are improving, declining, and remaining the same. It then goes into further detail, showing individual metrics, including the current value as well as previous values for comparison purposes.

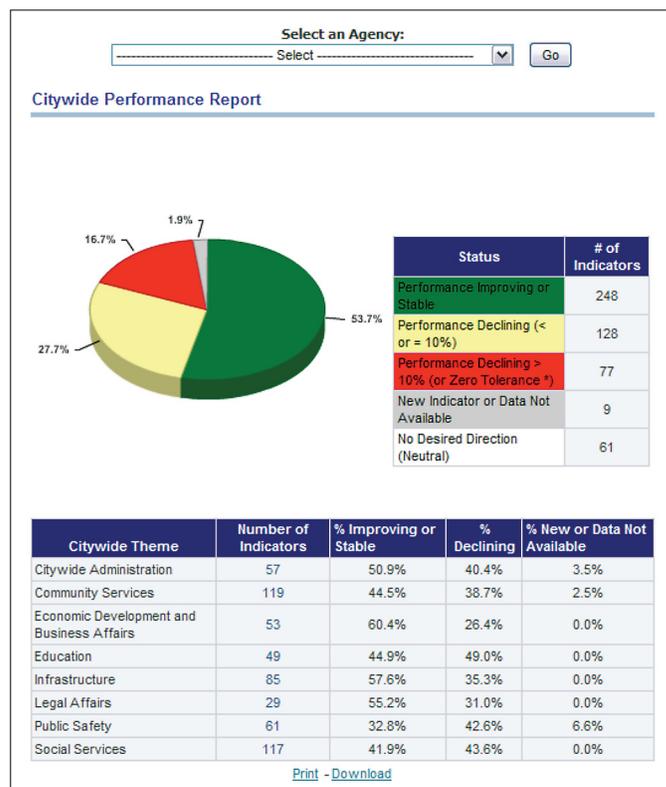


Figure 6
NYC Dashboard

Recommendations

1. Establish leadership commitment to a performance culture

Owner: Mayor

Expressed commitment to develop a performance-based culture across the City should be established from the Mayor's office. A commitment at this level of leadership would demonstrate the importance of the effort, and attract others to the process. It would give permission to employees to devote the necessary time and resources required to develop a sustainable KPI program. This commitment should include:

- Sharing the vision for the use of KPIs;
- Promoting its value and potential for the City;
- Providing visibility of the initiative across City functions;
- Appointing a core team to lead the performance improvement effort; and
- Empowering a Performance Improvement team to execute against the strategy.

It is also advised that one or more senior City executives are assigned to serve as 'sustaining sponsors', to provide guidance, address issues, monitor progress and report progress to the Mayor.

2. Develop a core set of KPIs

Owner: Director of Administration

The Performance Improvement team should lead the development of a performance measurement strategy and approach for the City. This strategy and approach will serve as a guide in developing, reporting and monitoring of the KPIs. To expedite the development of this strategy and approach, it is recommended that the City reviews and leverages the performance measurement material recently developed by the State of Rhode Island. This will provide collaboration and continuity of execution across both the State and local government. To demonstrate the value and impact of KPIs, it is recommended that the City of Providence's permitting process is used as a pilot. This will address an immediate pain point for City customers and demonstrate real benefits from a deployed KPI program.

Under the guidance of the Performance Improvement team, each department involved in the permitting process would review their existing KPIs and confirm that these not only match their department's major responsibilities, but are also aligned to the City strategy. This review and refinement effort will confirm that the KPIs address and focus on the things a permitting customer considers to be important. As part of this process, it will be important to establish performance targets for the selected KPIs. Table 4 shows some example metrics that could be considered for the Department of Inspection and Standards.

The Performance Improvement team, together with the IT team and the various departments involved, will need to develop a reliable process that leverages existing data sources, such as Lawson, Govern, and IQ9, to collect the data needed to maintain accurate views of the chosen KPIs. Once reliable data sources are identified, the data must be formatted in such a way that is easy to understand to facilitate decision-making and continuous improvement. Establishing periodic checkpoints with the State performance measurement team will ensure alignment and continuity across the development process.

3. Use new KPIs to improve decision-making and increase civic transparency

Owner: Mayor and All Directors

The KPIs should be used to report operational performance on a regular basis. Each department should incorporate KPIs into its departmental meetings, thereby improving transparency and performance improvement opportunities for employees. Until the pilot is complete, the sponsors should establish a periodic review to assess the program progress and evaluate the end-to-end efficiency of the permitting process. The City should incorporate these KPIs into the recommended POM described in process recommendation #1 above.

Table 4 – Example metrics

Type of metric	Example of metrics
Time/Speed	<ul style="list-style-type: none"> • Average number of business days a permit spends in a department • Average amount of time spent in queue
Output/Volume	<ul style="list-style-type: none"> • Total number of permits per month • Number of permits that require plan review • Number of permits that don't require plan review • Total number of permits in backlog
Cost Metric	<ul style="list-style-type: none"> • Average cost per permit
Quality	<ul style="list-style-type: none"> • Number of permits that receive approval the first time • Amount of time spent on permits that are approved the first time • Number of permits that require correction • Amount of time spent on permits that require data/updates for approval • End-user satisfaction rating

The City leadership team should demonstrate the use of existing KPIs in its decision-making processes, proving to employees the information being collected is relevant, useful, and worthwhile. Once the KPIs are being used and trends are established (at least three months' worth of data), the City's KPIs should be posted publicly on the City website in a visible location. The City should expand the KPI program to other departments following the strategy, approach and lessons learned during the permitting process pilot. Until fully deployed and established, an annual review of the success of the KPIs and the program is recommended at a City Level. The City's performance should be included in the annual report/budget, and used to help the City Council make budget decisions. Over time, the City should benchmark its performance relative to that of local and national peers.

Lastly, as part of the performance improvement effort, the IBM team also recommends the development of a performance 'dashboard' for the Mayor. The Mayor needs data and facts to assist him in leading the City. A dashboard will help him clearly and concisely communicate goals to all city employees on a personal basis. It should measure performance, and align efforts so that workers in every department and division are moving together toward the same destination.

The performance dashboard would allow the current Mayor as well as future holders of the title to:

- Monitor critical processes and activities using metrics that trigger alerts when potential problems arise;
- Analyze the root cause of problems by exploring relevant and timely information; and
- Manage people and processes to improve decisions, optimize performance, and steer the City in the right direction.

4. Summary of recommendations

During the three-week engagement, the IBM Smarter Cities Challenge (Providence) team has identified a total of 18 recommendations around four key areas: organization; permitting process; information technology; and performance indicators. These recommendations are all actionable with an identified owner within the City.

Some of these recommendations require no new spending, with the result that the City could start immediately. Others require a modest amount of new spending and could be considered during the next budget cycle. For recommendations that require substantial spending, the IBM team recommends that the City collaborates with the State and other municipalities to amortize costs across multiple parties.

This chapter draws together all of the recommendations, identifying the likely timeframe for implementation, the owner, and the expected impact for each.

Three broad timeframes are used:

1. **Short term** – identified as action items that can be accomplished within the first six months after this report is available, with no financial investment;
2. **Medium term** – identified as action items that could take up to 12 months to implement and that may require a financial investment;
3. **Long term** – identified as action items that will take more than a year to implement.

The potential impact is also rated according to three levels:

1. Low
2. Medium
3. High.

Table 5 summarizes the recommendations, and is ordered by the proposed owner of the action.

Table 5 – Summary of Recommendations

Theme	Page #	Owner	Recommendation	Term	Impact
Pro	19	Director of Inspections and Standards	Formalize pre-submission reviews process	Short	Medium
Pro	18	Director of Inspections and Standards	Triage incoming applications into express, standard and complex	Short	High
Pro	18	Director of Inspections and Standards	Institute tracking and reporting	Short	High
Pro	17	Director of Inspections and Standards	Institute a management system to monitor land-use management processes.	Short	High
Pro	19	Director of Inspections and Standards	Establish the <i>Guide to Permitting</i> as a living document	Short	Medium
Perf	31	Mayor	Establish leadership commitment for a performance culture	Short	High
Org	11	Director of Administration/Director of Economic Development	Align the data analytics team to Finance (part of Department of Administration)	Short	High
Org	13	Director of Economic Development	Invigorate partnerships with external community	Short	High
Perf	31	Mayor	Develop a core set of KPIs	Medium	High
Org	11	Director of Administration	Strengthen the IT/Chief Information Officer function	Medium	Medium
Org	12	Director of Administration	Co-locate departments to facilitate teamwork	Medium	Medium
Org	13	All Directors	Provide education and outreach	Medium	Medium
IT	24	Chief Information Officer	Develop strategic IT plan	Medium	High
Pro	19	Director of Inspections and Standards	ePermitting – Require electronic submission of all applications	Medium to Long	High
Perf	31	Mayor	Use new KPIs to improve decision-making and increasing civic transparency	Long	High
Org	12	Director of Administration	Develop and grow skills	Long	High
IT	24	Director of Inspections and Standards	Institute enterprise IT architecture and standards	Long	High
IT	26	Director of Administration/Director of Economic Development	Create an integrated electronic land-use management system	Long	High

5. Conclusion

A Smarter City is one that is collaborative and customer focused. Once established, Smarter Cities will possess a clear understanding of their internal and external customers, including their respective needs and expectations. We are confident this customer-centric behavior will come about as a result of implementing many of the recommendations found in this report.

Becoming a Smarter City requires fundamental changes. Challenges and resistance will occur. Figure 7 shows the results of an IBM Global CEO study on making change work. It shows the top 11 barriers to change. These barriers can, and must, be managed to ensure the realization of stated goals – such as cost reduction, process efficiency, accurate data, innovation, and job creation.

The chart shows that the major challenges to implementing successful change involve people. These challenges can be addressed in pragmatic ways [*BetterChange*]. For example, leaders should:

1. Clearly describe the vision for the change and the reasons behind it;
2. Actively involve the relevant stakeholders in owning the change;

3. Assess and manage the impact of the change;
4. Engage and prepare employees to adopt the new way(s) of working;
5. Align the organization to enable and reinforce the desired behaviors; and
6. Monitor the adoption to ensure that the desired outcomes are realized.

If these elements are actively managed throughout the duration of this initiative, the likelihood of success improves substantially.

The City of Providence is moving to use this catalyst of change to develop an environment where current and future development both within and outside of the City is transparent, efficient and predictable. The future economic development of Providence depends on the execution of this plan – a plan the IBM Smarter Cities Challenge team believes Providence is ready and well positioned for. In so doing, the City of Providence will have attained its full potential in keeping with the desire of its founder, Roger Williams, who famously claimed that “The greatest crime in the world is not developing your potential. When you do what you do best, you are helping not only yourself, but the world.”

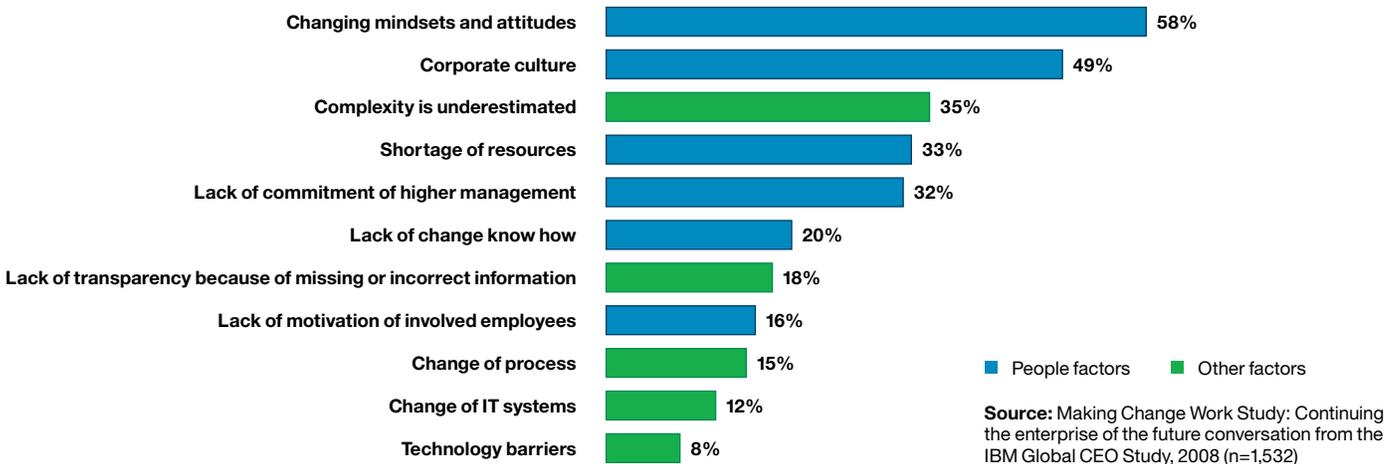


Figure 7
Major change challenges



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7. Appendix

A. Acknowledgements

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B. Team Profile



Maria Ebling is a Research Staff Member and Senior Manager at the IBM T. J. Watson Research Center. She manages a team responsible for building systems that are capable of supporting a Smarter Planet. She received a BS from Harvey Mudd College and an MS and a

PhD in computer science from Carnegie Mellon University. Her specific areas of interest are distributed systems supporting mobile and pervasive computing, privacy, and human-computer interaction. Maria joined IBM in 1998. Until recently, she led the Artemis Project, studying online healthcare analytics, which has been applied in a research study at The Hospital for Sick Children in collaboration with the University of Ontario Institute of Technology in Toronto. In 2011, Maria joined the Services Innovation Lab, a new organization within IBM Research which addresses the challenges faced by IBM's Services business. Maria's focus in this role is on cloud enablement. She is also active in IBM Research's Smarter Cities Big Bet, where she led an analysis examining Smarter Cities engagements to look for commonalities and gaps. In May 2011, Maria received an IBM Outstanding Technical Achievement Award for her contributions to Context-Aware Computing.



Hung Tack Kwan is a Senior Architect with the Global Solution Center at IBM where he provides architectural, project management and end-to-end solution design for Industry Solutions. Hung Tack brings to the role more than 20 years' experience in systems integration design

and development in Fortune 500 companies – including IBM, Bank of America and Federal Express. His professional experiences include the creation of service-oriented architectural (SOA) design and development, as well as information management. Hung Tack's experience also spans a wide variety of industries including various levels of Government (federal, state and local), Retail and Distribution, Banking, Insurance, Telecommunication, as well as Aerospace and Defense.



Evaristus Mainsah is IBM Assistant Treasurer, responsible for Global Treasury Centers and Risk Management. He is also responsible for the IBM's International Treasury Centre in Dublin. Prior to this role, he was Executive Assistant to the Senior Vice-President & Chief Financial

Officer of IBM. From July 2007 to 2008, he was Director of Commercial Financing for IBM Global Financing (IGF), responsible for all Commercial Financing operations across Europe including Russia, the Middle East and Africa. Before joining IBM Global Financing, Evaristus worked in the IBM Software Group in the UK, in a number of technical and sales roles. Evaristus holds an MBA in Finance from Columbia Business School, a PhD in Physics/Engineering, an MSc in Manufacturing Technology and a BSc in Computer Science & Electronic Engineering – all from the University of Birmingham, UK. He is the author of more than 40 papers and three books.



Tracy McNairn is the Integrated Technology Services Sales Executive for the Public Sector across Canada. As a member of IBM's Public Sector team, Tracy manages a team of sales professionals focused on selling infrastructure solutions to all Public

Sector Entities (Federal Government, Provincial Governments, Municipalities, Hospitals, Universities and Colleges). Tracy joined IBM in 1997 and spent two years working with the Ontario Government before moving to the Federal Government in 1999. As a Certified Client Executive from 1999 to 2004, her role on the Federal team was to recommend, develop and provide a single point of contact to client departments, ensuring overall customer satisfaction. Tracy has held the role of Integrated Technology Services Executive since 2005. Prior to joining IBM, she worked for a large municipal government for 13 years where she held a variety of positions. Tracy is a Certified Management Accountant and holds an Honors Bachelor of Commerce degree from the University of Windsor.



Steven S. Sakata is the Territory Manager for IBM in Hawaii and Guam. During a 10-year assignment outside of Hawaii – comprising three years in Los Angeles and seven years in Boston – he worked with leading research universities including Harvard, MIT and Boston

University. In addition to his strong interest in technology and business, Steve has a passion for economic development and workforce development. In Boston and Hawaii, Steve facilitated discussions with industry and groups in IBM around a technology and business collaboration whereby public-private projects could harness technology and ideas to launch new opportunities. He is currently working with Kuakini Health Systems in Hawaii on a clinical research data warehouse that will leverage 50 years of heart study data to expand research on longevity. Steve is also President of the Association for Information Technology Professionals, Hawaii Chapter and a board member of the Hawaii Technology Institute (workforce development for people with native Hawaiian ancestry) and Good Beginning Alliance (early childhood education advocacy group).



Jonathan Walkup is an Executive Consultant in IBM's Organizational Change Management Centre of Excellence and has extensive expertise in leading large-scale transformational change programs. For over 18 years, he has been a strategic consultant and has

successfully led numerous client/IBM organizational change programs on global implementations (SAP and Oracle) across North America, Australia and Europe. Jonathan is an IBM Certified Professional Consultant with an MBA in Finance from Baylor University and a Bachelor of Science degree in Liberal Arts from University of Iowa. He also has an Executive Education certificate in Advanced Organizational Change from Harvard Business School and is the Global Leader for Change Leadership. Jonathan has lived/worked in the US, Europe and Australia.

C. Listing of performance measures – ProvStat

Fire

- Total number of incidents by type (for example: structure fires, false alarms, EMS runs)
- Percentage change in number of incidents over a certain period of time
- Incidents by type and by neighborhood
- Number of calls for service by neighborhood
- Percentage of fire runs that meet national standard of four minute response time
- Percentage of EMS runs that meet national standard of eight minute response time
- Mutual aid given and mutual aid received
- Calls for service (fire) by time of day
- Calls for service (EMS) by time of day
- Total number of arson investigations city-wide and by neighborhood.

Police

- Crime rates city-wide, by type and by neighborhood
- Crime clearance rates by type
- Gun crimes, calls for service and arrests
- Complaints against police – number, nature and resolution
- Calls for service (Police) – by type and by location.

Inspections and standards

- Buildings
 - Plan review timeliness (target: X business days)
 - Number, type of inspections
 - Number, type of notice of violations (NOVs) issued
 - Collection rate – fines issued
- Construction activity
 - Location and value of permits, fees
- Minimum housing (code enforcement)
 - Number and type of complaints received
 - Inspections made per inspector, per day and per month
 - Number and type of violations (NOVs) issued
 - Re-inspection fees collected
- Zoning board
 - Number of applications and average number of days to be heard
 - Number of variances/special use permits granted vs. denied, by type
- Plumbing, electrical, mechanical
 - Inspections, number per day, per inspector
 - Number, type of permits issued and fees
- Prosecution
 - Total number of cases, number of days for case to be heard, resolved.

Parks

- Number of neighborhood parks serviced
- Frequency of service
- Number of requests for tree service, by type and location
- Percentage of tree service requests completed (abated)
- Percentage of requests un-abated, by age
- Number of burials, requests for grave maintenance (N. Burial ground)
- Number of events booked at casino, botanical center.

Vital statistics

- Requests for service by type (applications processed in-person, by mail or by telephone)
- Fees collected for all documents issued, by type
- Customer volume
- Document volume, by type.

Telecommunications

- Number of complaints received by dispatch
- Number of requests for repair, installation services by other city department
- Number of inspections done per month and per year.

Public works

- Road repair/potholes activity
- Sewer division – number of catch basins cleaned per month
- Traffic engineering – number and location of requests for service
- Percentage of parking meters in operation (not broken, vandalized or full) and time to repair any broken meters
- Engineering – percentage of city projects completed on-time and on-budget
- Projects by type, estimated vs. actual
- Number of permits issued for road-work
- Rodent abatement – geo-coded map of baiting activity and locations
- Snow removal – complaints received and resolved.

Recorder of deeds

- Number of recorded documents, by type
- Number of documents recorded by month
- Documents recorded by city, state and federal government
- Fees collected by month
- Real estate conveyance taxes collected, by month

Assessor

- Appeals – total number of first appeals
- Total number of second appeals
- BTR (Board of Tax Assessment Review) – number of cases reviewed, timeliness of review
- Percentage of appeals heard within two weeks.

Tax collector

- Collection rate
- Total of dollars projected, collected current tax
- Total of dollars projected, collected back tax
- Collection activity by main-in, lock box
- Total delinquent notices mailed
- Tax sale – total number of properties sold, total dollars collected at tax sale.



Springfield
MASS.

Worcester

Westfield

Holyoke
Chicopee

Torrington

Bristol

Hartford

New Britain

Waterbury

Middletown

Meriden

Norwich

New London

New Haven

Bridgeport

Norwalk
Stamford

LONG ISLAND

Long Island Sound



BOSTON

Providence

New Bedford

Cape Cod Bay

CAPE COD

CAPE COD NATIONAL SEASHORE

Nantucket

NANTUCKET ISLAND

Rhode Island Sound

Vineyard Sound

GREAT POINT

MARTHA'S VINEYARD

Block Island



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October 2011
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