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Oracle's Solutions for Smart Cities:
Delivering 21st Century Services

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Executive Overview

We live in an urban world. As of last year, according to UN statistics, more than 51% of us now reside in urban environments. Since the turn of this century, mega-cities in the developing world have seen a full doubling of their populations and even developed-world cities and towns have seen a 10% increase. By 2050 over two-thirds of us will be urban dwellers[1] – a situation that will pose several challenges and opportunities for us all. Cities are ground-zero for an increasingly strained social-safety net, in fighting communicable diseases that can lead to pandemics, and in combating terrorism, international gangs and crime syndicates. But they also act as the economic engines for new-world economies and are on the forefront of their respective national hopes and desires to compete on the international stage. To seize their moments of glory and squelch instances of trouble, cities will have to become intelligent, more innovative and more integrated across their employees, citizens and businesses to thrive in the age of globalization.

As a result, the old adage "think global act local" has taken on a whole new meaning. The changing local political circumstances, the current global economic downturn, and the resulting fluctuations in tax bases and unfunded mandates, combine to create severe budget constraints on local government decision makers. Consequently, political leaders and constituents alike are demanding changes that will affect all aspects of local government. Since its inception, Oracle has followed the course of change across the entire Public Sector. Oracle has successfully supported critical business and technology challenges, by developing and implementing innovative products that have allowed local government leaders to redefine their objectives, rapidly respond to changing circumstances, and help transform their human and material resources and infrastructure in support of their public services mission.

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[1] United Nations 2010 Population Estimates

Oracle iGovernment represents our vision of where the next decade will take Public Sector with respect to ICT (Information, Computers and Telecommunications)[2]. One manifestation of the Oracle iGovernment vision is Oracle's Solutions for Smart Cities, which will address the ever increasing need to provide businesses and citizens with transparent, efficient and intelligent engagement with their local authority/administration - through any channel - for any purpose, from information requests and government programs enrollment, to incident reporting or scheduling inspections, to complete online start-up of a local business. Development, implementation and refinement of such a multi-channel, single point-of-contact platform to all government organizations lays the foundation for a range of additional capabilities from business recruitment and retention to self-selecting, interest- and knowledge-based communities amongst citizens to improved management of civil contingencies and emergency disaster planning.

In today's economic climate, revenue collections and expenditures, municipal programs and the services delivered are scrutinized more than ever for return on investment (ROI) and outcomes. The problems arise not from the scrutiny but from the lack of understanding how and where these four areas are interconnected and how to bridge the siloed elements within them to produce better outcomes for a given investment. City residents and businesses argue for lower taxes and fees because they do not see direct value back to them - yet in the next breath demand more infrastructure to improve quality of life and promote economic development. Of course government understands that the aggregate of these areas is a complex set of funding mechanisms and programs, but what they don't have is the visibility into where to apply fine or course corrections to the programs and services delivered, where they are interdependent or how to make them efficient and transparent and ultimately transform them.

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[2] For more on Oracle iGovernment see: http://www.oracle.com/us/industries/public-sector/046936.html

But what is the right mix of focused government programs and policies to get from where cities are today towards a vibrant and sustainable future? What are justifiable revenue streams from constituents and central government coffers and expenditures that can be made without resorting to futile demands on those very citizens and businesses being served, for further taxation and a call for wider fiscal support from central funding? The answer to this question also happens to be the solution starting point and is shown in Figure 1[3]: build an integrated, efficient and transparent service delivery platform across all programs covering all services delivered to business, citizens, and municipal employees. A platform with the intelligence embedded in it to provide transparency and accountability, a mapping of the existing and required connection points between operational processes and programs that can support transformation of day-to-day information and transactions into the priorities of tomorrow's focused and integrated programs.

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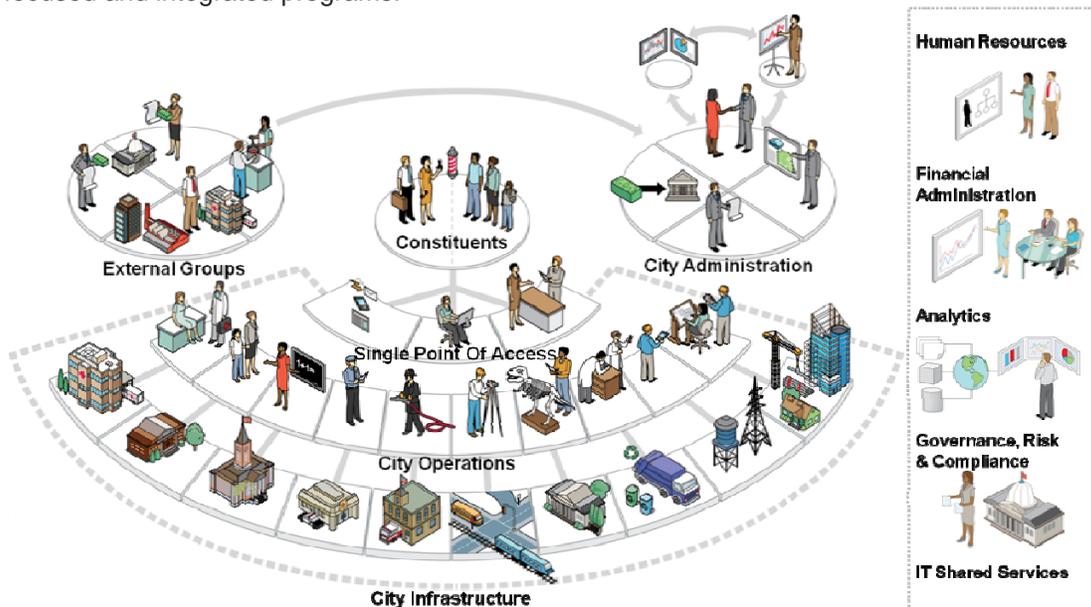
[3] For an interactive version of this map see:
http://www.oracle.com/us/media/interactivemaps/smartcities/smartcitiesmap-198204.html

Oracle's Solutions for Smart Cities is a step-change from the traditional on-line eGovernment sites and the digital community initiatives that fostered them. In a time of unfunded mandates, a flurry of stimulus spending that requires justification by government organization recipients, and fluctuations in property and sales taxes, only Oracle's Solutions for Smart Cities provides a fully integrated, policy-driven, set of automated business processes, which straddle heterogeneous platforms and fragmented protocols, fully supporting modern municipal operations across back-office and front-office operations for all constituent services and city assets along with the tools necessary for you to determine which programs are effective and how to quantitatively justify funding them to your constituents and regional and central government organizations.

Introduction

Communicating with every citizen and business in a city has never been an easy task nor can it be supported through a single channel. Traditionally constituents interfaced with their cities through periodic town hall style meetings typically around elections or major issues and events or on a transactional basis mostly in face to face encounters with clerks at city offices. As cities have grown in size and organizational complexity; it is more often the rule than the exception that citizens are bounced from department to department. One clear cut exception has been the citizen's communication channel for police, ambulance, and fire department emergency services. In most cases, a special emergency phone number has been created for citizens and businesses, 911 in the US, 999 in the UK, 112 in most of the EU, 119 in Japan and equivalent numbers in most countries and specific localities around the world. A recent and growing problem in many areas has been that where there is only one clear cut simple channel of communication with the government it will get used for everything – whether that was the intention or not.

In the case of the initial United States single-number-non-emergency (SNEN) service which originated in the City of Baltimore (1994), it was the cost of inappropriate use of the 911 emergency services that prompted them to consider building an SNEN. While both 311 and

911 are call center based, the higher level of specialization and sophistication for the call center agents and integration with expensive real-time platforms for emergency services could be avoided by offloading calls to a non-emergency service request center to support requests for issues such as pot-hole repair and removal of abandoned cars. The success of this program and other equivalent programs across the US are well documented.

In many of these same local jurisdictions where emergency services are overused and misused, access to and use of eGovernment or "digital community" sites is also a problem because residents tend to be on the wrong side of the digital divide. This is certainly the case in many cities around the world from New York to New Delhi. Yet for poorer, less educated citizens to bounce from department to department through face-to-face meetings with government departments is also a very expensive proposition – for the citizens but also for the government. And, even for those with access to first and second generation eGovernment sites, lack of built-in knowledge, ability to automate policy and orchestrate process within the online government portals along with insufficient integration of back-end systems across multiple siloed departments, has led to an unacceptably high percentage of constituents resorting to calls to several numbers and government contacts, often followed by face-to-face visits to multiple departments after initial attempts to use government portals have failed.

In the case of businesses, the vast majority of local governments do not have an SNEN for business owners or prospects other than their local chamber of commerce or equivalent which acts in an advisory role with respect to local government. Most local governments, particularly in small to medium size cities, falsely believe that simply offering tax incentives is the best approach to business recruitment and very little thought is given to business retention. In larger cities, significant effort is made, targeting specific industries or large companies with tax breaks, partial or full funding of job training, rezoning, long-term low cost contracts on utilities and other incentives again, mostly around recruitment. But even for large cities, programs for retention are rarely established and it is almost unheard of to have sustained, holistic, proactive programs covering multiple industries and the full range of businesses from large corporate to store-front to home-based.

Yet, with so many cities faced with declining property tax bases, larger expenditures on social safety nets (unemployment insurance, job training, child welfare, etc.), and further demands to justify investment in transportation, utilities distribution, education spending and other infrastructure building a better service delivery platform to business is essential. The goal of such a platform is to provide the intelligence required to improve recruitment and retention of the city's economic engine which in turn fuels better quality of life for its citizens, raising their standards of living through higher paying, skilled employment which in turn raises the value of their assets – including their property and the municipal property tax base. This, in turn, with the right government policies, infrastructure investment and programs, attracts more business and the cycle repeats itself as shown in the figure below.
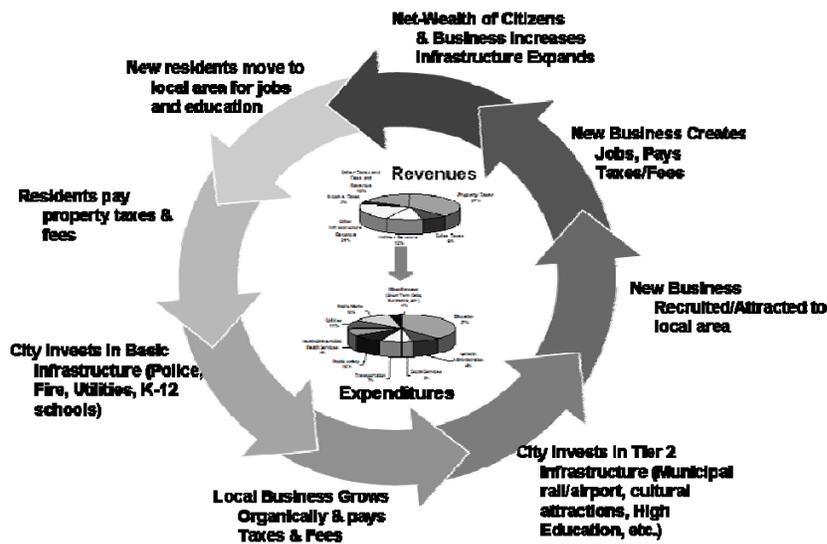
Key Challenges for Municipalities in the 21st Century

Regardless of size or location, cities in the 21st century will have to become leaner, cleaner more responsive operations, incorporating the best practices of commercial enterprises while never losing site of their core missions as public servants or the requirements of open government. While there are clear cases of visionary cities at the mega-city level like New York City or the more modest sized city like Rotterdam where IT has become a central ingredient in the quest for lean, clean, responsive government, the vast majority of cities have followed the more common trickle down scenario with regards to IT adoption: namely, large commercial enterprises and medium sized business followed by central and large provincial governments, followed then by most cities adopting rudimentary forms of eGovernment websites, legacy systems for core ERP functions disconnected and siloed by municipal agency and unplanned proliferation of Microsoft-based desktop systems at the agency departmental level.

Improving Responsiveness to all Constituents at a Lower Cost per Service Delivered

In the 21st century, government will have to find a way to balance between personal face-to-face or voice-to-voice services and the incurred cost with the need to respond immediately and serve a rapidly increasing population. Local governments will need to build service delivery environments that respect the digital divide as well as the budget realities cities face. Each interaction has a price and the potential to impress or infuriate potential voters, investors, and tax payers. Innovative governments will leverage IT in an appropriate integrated fashion, looking to use the least expensive, fastest means of servicing its citizens and businesses with a fully integrated means of providing a fall back to the next level of support – typically incurring greater cost but a smaller number of instances. In tactical implementation terms, the first option would be the web – either on a mobile phone or desktop computer, the second an SNEN and the third face-to-face but all would run on a consistent set of automated procedures and workflow based on a common automated set of policies and regulations, with the same underlying IT infrastructure.

Oracle's Solutions for Smart Cities is focused on designing around the constituent to identify opportunities to achieve efficiencies through cross-agency collaboration and intelligent service delivery. In addition to improving the quality and consistency of information delivered, Oracle's Solutions for Smart Cities provides managers the analytical capability to continuously adjust to policy and resource changes yet enhance service delivery and monitor policy outcomes.

Furthermore, what separates Oracle's Solutions for Smart Cities from other front-end web-portal and call center solutions are its pre-built integration into back-office applications and multi-channel access to maximize citizen self-service. This results in higher efficiencies and cost savings, and must be implemented with a Service-Oriented Architecture (SOA) that facilitates a fully shared environment. Taking a SOA approach for local and city government organizations will require a new way of thinking about IT infrastructure, not only technically but organizationally. SOA can leverage a world of multiple vendors that build systems, which create interoperability and use each other's capabilities. By interoperating and mapping an SOA approach across IT systems, local governments can achieve dramatic results. This shifts the old IT model of proprietary systems that cannot be transformed from

older generations of technology to a flexible, shared model that leaves room for scalable, incremental growth. With flexibility for the future, government organizations are no longer beholden to legacy systems or partners that promote them, nor are they faced with a step-function such as the need to remove large data systems all at once.

Taking a Balanced Approach to Transforming Local Government into an Enterprise

Real, lasting improvements in local government begin and end with changes to cultural and organizational structures in the rank and file government employee roles. An emphasis on front-end self-service and trained generalist in constituent contact centers is meant to free up specialized government workers to focus on more difficult problems where only their knowledge suffices and to manage tuning of the process and alignment of policy in what was formerly performed by them. Providing them with state-of-the-art ERP support, appropriate training and a top down cultural approach to constituent-oriented service is just as critical.

Using IT to Better Manage and Embed Intelligence into City Infrastructure and Assets

Equally important for streamlined operations and improved service delivery, is the need to provide government employees in field operations with mobile devices, embedded intelligence in the city infrastructure (intelligent roads, smart parking meters, energy efficient buildings, etc.) and assets (street sweepers, police patrol cars, etc.) and automated formerly paper-based forms and records, archived in centralized digital repositories.

Analyze Policies, Plans, and Performance – Turning Performance Metrics into Better Performance Management?

As the single unified window into the needs, requests and feedback on municipal services, Oracle's Solutions for Smart Cities provides local government authorities and municipal department executives with new insights into the success of the administration, through securely managed data that is up-to-date and complete.

Identify Inefficiencies and Structural Barriers to Change

Through the use of Oracle's Solutions for Smart Cities, government executives receive unprecedented insights into emerging cyclical trends and structural characteristics of their organization and underlying operational process. With Oracle's Solutions for Smart Cities, all policies can be automated by department and city-wide, underlying process and associated fee schedules, permit guidelines, pre-inspection checklists and so forth can be evaluated and streamlined and all incoming constituent information captured and integrated into a single, secure data hub; officials analyze constituent requests to *identify emerging trends and program needs, as they occur*, not eighteen months after the fact. By utilizing Oracle enterprise policy automation, city laws, regulations, code and guidelines for city services and operations can be tested for implementation efficacy. By leveraging Oracle Business Process Management and SOA governance reusable business processes from best practice government programs and their associated IT resources can be scaled up and reused across all organizations as shared services. And, finally, by utilizing the master data management hub as the first indicator into

emerging trends, government executives can align program planning, employee training and budget allocations to the evolving needs of the city/county.

Analyze and Streamline the Performance of Employees, Programs, Initiatives and Vendors

The definition of "employee" is evolving. Increasingly, governments are relying on part-timers and volunteers, partners, non-profits and contractors to deliver government services. Oracle's Solutions for Smart Cities tracks not only the initial constituent request, but also all assets and resources utilized in resolving that request. Oracle's Solutions for Smart Cities tracks requests all the way through to resolution; as a result, government executives are able to analyze the relative cost of case resolution as delivered by various agencies, channels, contractors and non-profits. The ability to track the cost and relative effectiveness of channels empowers government executives during reviews of cross-departmental operations to determine where process may need modification based on how well prior performance periods delivered against metrics, contract negotiations to negotiate the best contract with those partners capable of meeting the needs of constituents and a host of other areas. Oracle's Solutions for Smart Cities is the only solution capable of tracking the costs of all assets associated with a case, providing executive insights into the overall effectiveness of various service delivery operations.

Oracle's Solutions for Smart Cities takes a SOA approach here as well through use of Oracle's Application Integration Architecture, Oracle provides the Enterprise Resource Planning (ERP) applications and consolidates them where possible, leveraging pre-planned integration modules around these new applications, integrating them with existing legacy applications and interfaces to vendor, contractor, peer local government and regional and national government organizations. In most cases, these existing systems cannot be replaced or rationalized to a single interface type or system – oftentimes, the most critical data required to make decisions or to execute an end to end process is hard-wired into these legacy systems and an SOA approach is the only way to reduce cost and speed incremental enhancements.

Report Administration Successes; Create Transparency

By using Oracle's Solutions for Smart Cities, governments not only monitor the relative success of government programs, assets and channels, but relate individual and program performance measures to larger policy objectives such as reducing operational costs, decreasing crime, measuring the value of infrastructure investments in roads, sewer systems, public education, social safety nets, public healthcare and increasing economic development and developing a sustainable workforce. In other words, proving that tax revenues were well spent and exactly where they were spent. Through executive dashboards, mayors, city and county council members and other government executives identify the key policy objectives they need to track, and post attainment of those objectives on their website for all constituents to see; they can even build community forums to elicit discussion and feedback. With Oracle's powerful EPM suite and scorecards, executives are not only alerted to anomalies, but can drill all the way down into individual cases to identify the source of the problem. Oracle's Solutions for Smart Cities is the only comprehensive solution capable of delivering in-depth real-time analytics as part of its Commercial-Off-The-Shelf (COTS) product. In short, only Oracle's

Solutions for Smart Cities provides the ability to track, analyze and report on the ultimate goal of any administration, concrete proof that their administration's policies and programs are effective.

Turning Digital Communities into Drivers for Open Government

Oracle's Solutions for Smart Cities empowers governments to effectively and rapidly implement policy and identify operational efficiencies and streamline processes, reducing the tax burden on constituents.

Intelligent Single Point-of-Contact – Embedding Knowledge into the System, Agents, and Constituents

Oracle's Solutions for Smart Cities provides out of the box support for the entire spectrum of constituent interactions including web self-service, email, fax, chat, phone/CTI, and in-person. Every problem solved online is one less expensive call or email to support staff; every call, particularly when the problem is solved in the initial phone contact, is one less expensive visit for the citizen or business owner to a government office where scarce government resources are needed in a face-to-face engagement. Oracle's Solutions for Smart Cities allows citizens to initiate service requests (request for tax assessment, apply for building permit, report graffiti) through the web, or as a second line of service, through a contact center, freeing specialized more expensive government employees to focus on their core jobs.

However, multi-channel single point-of-contact is just the starting point, providing a rapid connection regardless of device, location, or time. What makes Oracle's Solutions for Smart Cities unique is that it embeds the knowledge worker's understanding of the rules and regulations into automated self-service procedures for constituents as well as guidance for the constituent care center agents on how to expeditiously satisfy the service request. It also integrates in a robust case management system that takes a SOA approach to collecting and storing all information about a constituent across all service requests, resolutions and complaints; everything that gives a total picture of that constituent. Based on multiple factors: the service requested, the point within that service request, who is handling the request - the requestor themselves, an agent, or the government department employee - the case management system will collect the right information and combine it with the appropriate spatial, temporal, financial, and role-based information to create a resolution or next steps towards one. In other words, the case management system when combined with automated policy and a SOA platform (for access to critical data previously locked in legacy systems), provides artificial intelligence which over time builds a more intimate relationship between the constituent and the government.

Interaction with the platform may begin with a constituent's single instance service request but, in the process of interacting with the government, constituents begin to build a relationship, becoming accustomed to using the system over several occasions. When requests are logged through Oracle's call centers, citizens and business can track the status of the request through event driven notifications, limiting follow up calls from them but teaching them to receive proactive non-emergency alerts through their channel of choice. They will "opt-in" to alerts based on a number of topics from community events, government run program members, event driven alerts, and notices regarding public hearings. By providing proactive, event driven alerts, governments provide citizens with enhanced levels of service (e.g. notification of school cancellation), while creating efficiencies by

avoiding costly calls or the option of last resort, face-to-face interaction yet still, over time, it builds a level of stickiness found in social networking systems Upon initial contact to invoke a service request, the chain of interactions that take a constituent from a single-purpose request to eventual resolution.

Through packaged integration with Oracle Financials, local governments are able to provide constituents the ability to perform electronic payment, enabling local governments to recognize funds faster, while decreasing the internal costs associated with inputting business and citizen payments. In doing so, Oracle's Solutions for Smart Cities provides integrated analysis of service delivery effectiveness against cost accounting and acts as a core shared service across all government departments.

Through Oracle's grid-enabled database and Fusion Middleware and application infrastructure platforms, integration with existing legacy systems and sunk-cost such as SAP ERP and departmental Microsoft systems can be integrated and service-enabled directly from their existing silos across various municipal departments and agencies.

Rebuilding the 21st Century Government Knowledge Worker's Role

Supporting Oracle's Solutions for Smart Cities leads to more efficient allocation of resources by empowering employees to provide information regarding multiple government programs. With Oracle's automated branch scripting and industry leading workflow, employees are provided with the tools they need to resolve and/or route a service request efficiently.

Oracle's Solutions for Smart Cities is the only comprehensive COTS solution to provide packaged integration to Enterprise Human Resources and Financials. Integration into Human Resources enables the city/county to use the Human Resource system as the system of record in recording employee competencies and to utilize that system of record to automatically assign the right person to the right task at the departmental level or call at the front-end constituent contact center. As a result, calls are routed to the agent best able to manage a request, providing faster call resolution rates and increased citizen satisfaction. Knowledge-based improvements originating from unwritten policy or procedures can then be documented and updated so that gains remain regardless of agent or departmental-level employee turnover. The ability to integrate the HR and financial management systems together with an overarching automated workflow enables line-of-business managers in government departments to identify points of inefficiencies and the cost of each interaction and resource allocation by specific workflow stage. Service level agreements are then more likely to be met or adjusted such that performance goals are aggressive yet attainable.

Progressive governments are using the call center to identify barriers to common service requests (e.g. building permits and requests for new electrical, plumbing and sewage lines, the number of permits, their cost and overall time needed to establish a new business), recognize barriers to self-service and redesign ineffective business processes. By utilizing Oracle scripting and workflow as part of Oracle's Solutions for Smart Cities, managers begin to monitor and categorize the types of requests coming into the center. As common requests or those that must be seen as a group even though they target multiple departments begin to appear, processes can be reorchestrated and employees are retrained to cross-reference programs and policies of several departments with overlapping charters and associated

programs ensuring citizens obtain all the services they require. When barriers to self-service emerge (e.g. unclear instructions on a form, confusing portal workflows, an order of submission for multiple permit forms) managers utilize these insights to continually revise automated policy, scripts, and workflows, changing not only citizen self-service workflows, but also ineffective internal business processes. By focusing on the needs of citizens and business, governments have the tools to continually evaluate and refine internal processes to obtain greater efficiencies while delivering quality service to constituents.

Transforming Service Delivery

Oracle recognizes that efficient government does not equate to effective government and a bad manual process automated is simply a bad automated process. Oracle's Solutions for Smart Cities provides the support for real transformation by focusing not only on providing efficient government, but ensuring the services delivered are effective in addressing the current and emerging needs of the jurisdiction from the perspective of the citizens and businesses it serves.

Recognizing that a Smart City solution doesn't stop at the call center, Oracle's Solutions for Smart Cities provides pre-built integration into Oracle's case management and field service. When a call requires onsite service, Oracle's Solutions for Smart Cities synchs with a scheduling engine and sends the right people with the right skill sets to the right place (through GIS and HR integration). Oracle Field Service enables highly effective resource assignment and dispatch, while empowering remote workers with remote access to case history, blue prints, required parts and/or case information necessary to resolve the case effectively or initiate a repair request effectively and deliver optimal levels of citizen satisfaction – whether it's for repair of a pot-hole, checking on reports of an abused child, resetting property taxes value, spot-check and reporting on various business licenses or complaints, or recovery of a stolen bicycle.

Through Oracle's Solutions for Smart Cities, case escalation is automated with configurable service-level notifications; rerouting cases when an employee is unresponsive or on vacation, providing executives and field management greater insight into employee productivity. Because Oracle's Solutions for Smart Cities tracks all assets and resources devoted to resolving a service request and/or managing a case, executives have insight into procurement needs, and the tools necessary for effective cost analysis, budgeting and planning recognizes that efficient government does not equate to effective government. Oracle's Solutions for Smart Cities provides the support for real transformation by focusing not only on providing efficient government, but ensuring the services delivered are effective in addressing the current and emerging needs of the jurisdiction from the perspective of the citizens and businesses it serves.

Empower Employees with Consistent, Accurate Information

As use of Oracle's Solutions for Smart Cities expands to encompass a broad range of services, governments must provide agents the ability to deliver information on an increasingly diverse number of requests in the context of the data associated with the citizen or business making the request. Oracle's Solutions for Smart Cities allows employees and constituents to easily search or browse the online knowledge base for solutions to common requests, providing frequently asked questions,

troubleshooting guides, and up-to-date forms and instructions. Oracle's Solutions for Smart Cities also provides the secure identity management and the search, extraction, aggregation and use of related unstructured and structured data necessary to support holistic response to a set of requests. The knowledge base automatically learns from experience which items are useful to users in solving particular problems, increasing first call resolution rates and contact center productivity, while freeing experienced agency staff to focus on complex cases.

As the volume of content within the knowledge base grows, Oracle's Solutions for Smart Cities, through use of a Universal Content Management (UCM) system provides a way of consolidating that content, reusing it, and leveraging it across the formerly siloed business applications and disparate systems that have been integrated behind the SNEN/federated Government portal. The UCM system consists of a multitude of content types (blueprints, medical, criminal and other complex and confidential records, permits and licenses, etc.) and formats (Word and PDF documents, spreadsheets, standard XML and legacy proprietary files, videos, images and pictures, etc.) and supports retention and management of those documents in various formats. Over time, the conversion of legacy paper-based documents to these formats further strengthens the UCM platform as the one-stop repository. With Oracle's Sun Storage solutions, virtualized repositories can be rapidly and cost-effectively scaled up and used across multiple departments and document classification levels.

But what truly enables it to be a single repository is the combined use of Oracles virtualization and SOA approach where the UCM exposes the content within the knowledge-base as a set of shared services to the various departments within the government on the back-end and out to the SNEN/Federated Government portal on the front-end. Finally, as the UCM shared services platform becomes the single content repository, additional efficiencies in workflow process become apparent because, in most cases, government employees are knowledge workers who spend the vast majority of their time interacting with sets of semi-structured data that reside in the UCM system.

Deliver a Single, Accurate View of the Constituent across All Agencies

In an effort to deliver the right programs to citizens and businesses in the most efficient and least expensive fashion, government employees must have an accurate understanding of their target customer; failure to maintain data accuracy results in decreased reimbursements, wasted government resources, or worse, citizens getting lost in the bureaucracy of government or in rare but highly visible cases private information about them being publicly disclosed, corrupted or even stolen. As part of Oracle's Solutions for Smart Cities, Oracle's Master Data Management can be configured as a data hub of fully integrated citizen, business, or government partner data that centralizes, cleanses, and enriches citizen data, continuously synchronizing with all data sources, to provide a single view of constituency needs. As new data comes in, agencies have a better understanding about all the agencies involved in servicing their client, reporting up to local and central agencies becomes more accurate, analytics become more valuable, employee productivity increases, and day-to-day citizen and business interactions are more effective.

A key benefit of the Oracle's Master Data Management hub is the creation of a single place for all client data, without disrupting existing systems. Oracle's Master Data Management hub reaches into

existing systems (based on existing privacy policies and departmental and peer government organization data stewardship guidelines) and provides a single, authoritative source of truth.

As the master data management hub captures information and provides an accurate view of the citizen, managing a federated access to that data is imperative. Oracle's Solutions for Smart Cities provides role-based security through use of Oracle's Identity Management Suite and Oracle's database security options and centralizes. The solution also provides policy management of entitlements across the SOA environment's underlying the platform and its interfaces to external systems and associated data so while all data captured through Oracle's Solutions for Smart Cities is housed in a single repository, access to that data at any given time in the workflow is restricted based on an individual's role to maintain compliance with agency privacy policies and protocols.

Implementation Benefits
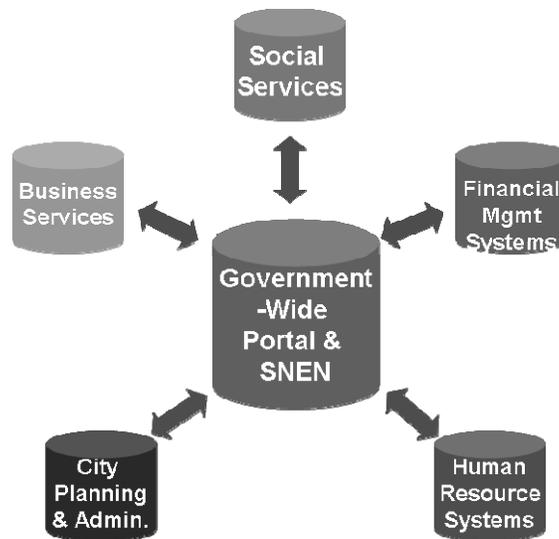
Most existing local government implementations are focused on addressing a single pain point; it's typically post implementation that government executives identify broader potential. Local governments are only required to license those components they need to address immediate pain points (e.g. call center only or modernization of a larger department under direction and often funding by that department). In contrast, Oracle's Solutions for Smart Cities is there to support the existing and future needs of the jurisdiction under direction of a shared services organization that, in turn, coordinates and orchestrates the resources of individual municipal departments (e.g. dashboards, iSupport, case management, field service and integration of additional departments and their associated legacy systems and services as seen through a shared services lens) by simply turning on the license, eliminating future costly integration and maintenance expenditures.

Oracle's Solutions for Smart Cities provides local governments with the benefits of COTS products and accrued business best practices yet the flexibility of custom built solutions. While Oracle's Solutions for Smart Cities leverages industry best practices specific to many of the operational processes described above for local government implementations, the solution is highly configurable and readily tailored to specific variations of city/county service delivery processes. These

configurations are supported through upgrades, dramatically reducing the need for customization while improving the total cost of ownership and overall experience for your government agency.

References

Smart Innovation

Several local and regional governments run Oracle Applications and Social Enterprise Portal environments - including Oracle E-Business Suite Customer Relationship Management (CRM), Oracle's PeopleSoft Enterprise CRM and Oracle's Siebel CRM applications, WebCenter Suite and an underlying SOA based on Oracle Fusion Middleware - to support federated self-service portals and SNEN platforms (call centers) that enhance constituent service and improve government efficiency. With SNEN and single point of entry federated portals, citizens benefit from one easy-to-remember point of contact for government information and services, while government agencies minimize non-emergency calls to emergency-only numbers, leverage visibility into cross-departmental data, enhance service delivery and reduce administrative costs.

Bolton Council – Dramatically Improves Constituent Responsiveness

Bolton is a distinctive and diverse town, just 20 minutes north of Manchester, United Kingdom and is home to over 260,000 people. Bolton Council is one of the best performing local authorities in the UK Every year the authority receives up to one million phone enquiries and 250,000 visitors through its 12 reception points and operational centers.

Bolton Council selected Fujitsu and Oracle to consolidate all its reception points and operational centers into a single shared services platform, inclusive of a "one stop shop" multi-contact CRM center to handle all e-mail and phone enquiries and a single front-end portal, the 'Access Bolton' website to allow citizens and businesses to access services directly from their own homes and business establishments, community facilities, or public kiosks for on-line services. The new platform is based on Oracle's ERP and CRM suites integrated to existing legacy platforms with Oracle's Fusion Middleware and front-ended by the Oracle Portal.

Newport City Council Improves Customer Service with Better Content Management

Newport City Council is largest mid-size unitary authority in Wales, responsible for the administration of all areas of local government. Serving a population of 140,000 residents, the council provides major services such as education, leisure, housing, social services, planning, and highways. Newport City Council implemented Oracle Universal Content Management to enable council staff to contribute Web content quickly and easily and produced a searchable A-Z knowledge base that allows its call center agents to easily search for information about all borough and county council functions and respond quickly to up to 2,000 telephone queries each day with an increased first-time resolution and calls completion within an average of 3.5 minutes. The knowledge base has increased ease-of-use and enabled faster retrieval of relevant information within the 2,800 pages of repository content and supported creation of a central electronic store for all planning applications.

City and County of Denver - Improving Constituent Service and Increasing Accountability County

The Mile High City of Denver is located at the base of the Rocky Mountains and is home to more than 557,000 citizens in a greater metropolitan area of more than 2.5 million residents. Initially promoted by the then mayor and now governor of the State of Colorado, John Hickenlooper in July 2006, Denver's 311 system went live with Oracle's PeopleSoft Enterprise CRM, implemented in partnership with Oracle Consulting Services. Today the city's 311 system handles service requests across the vast majority of municipal departments for the Denver metropolitan region. With Oracle's help, the City and County of Denver are fulfilling their goal to use technology to drive efficiency and reduce costs, while delivering better service and increased accountability to citizens, and improving public safety by diverting non-emergency calls away from 911.

New York City - Government That Never Sleeps

Prior to 2003, when New York City's 8 million citizens wanted to contact city agencies, they needed to leaf through 10 pages in the telephone book in hopes of finding the right number. New York City implemented a 311 Citizen Service Center, leveraging Oracle's Siebel CRM applications and Oracle's Fusion Middleware infrastructure to link the CRM system as a shared service to the 40 departments and their existing IT systems and resources, thereby making the city more accessible to constituents. The city selected Accenture to help integrate and implement the new call center technology, as well as to train employees. The New York City 311 system not only gives citizens access to the city government, but also allows the city government to hear from its citizens. Data provided by Oracle's Siebel applications allows the mayor and government officials to identify and solve problems, as well as improve service processes and target resources. To date, the New York City 311 system has handled over 100 million calls[4] in multiple languages for over 800 services, the most used of any documented SNEN system in the world.

Smart Process

Smart innovation can only be achieved on a solid foundation; continued improvements, that is, real useful innovation can only be achieved though a closed feedback loop based on cross functional organizations coming together to transparently review and address challenges. Oracle provides the core ERP platforms and Business Intelligence and Analytics platforms that support consolidation of siloed municipal departments based on best practices extracted from peer cities as well as more advanced departments within your city.

City of Boston Improves Efficiency and Service with Data-Driven Decision Making

City of Boston, Massachusetts strives to provide its more than 600,000 residents with the highest quality services possible. Like state and local governments across the country, City of Boston has felt the strain of the recent economic downturn, manifested most concretely in a projected US$140 million budget shortfall for 2010. To deliver the same high level of services under constrained budgets the city

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[4] http://www.wired.com/magazine/2010/11/ff_311_new_york/

uses timely, consistent, and meaningful data, collected via its centralized performance data and management system, Boston About Results (BAR)[5]. The city deployed Oracle's Hyperion tools to serve as the backbone of the BAR system. Oracle Hyperion Performance Scorecard and Oracle Hyperion Planning to pull data from various enterprise systems—including Oracle's PeopleSoft Enterprise Financial Management and PeopleSoft Enterprise Human Capital Management. The Hyperion tools enable the delivery of user-friendly reports with built-in charts, trend arrows, and "traffic light indicators," which are color-coded indicators based on how actual performance is tracking in relationship to annual targets. Similarly, with Hyperion Web Analysis, the city makes BAR data available online to citizens, who can view data from the city's 15 largest departments, ranging from police and fire to the library system.

Essex County Council Adopts Cloud Computing for Payroll to Save US$ Millions and Offer Shared Services

Essex County Council is one of the largest county councils in the United Kingdom. The council provides services, such as education, highways and social services, to its population of 1.3 million. As part of its modernization and transformation strategic initiative, Essex County Council has pledged to save US$483 million over three years while maintaining and improving frontline services for residents. To achieve this aggressive target, Essex County Council decided to go with Oracle's On Demand services for remote hosting of their human resources and financial management shared services platform and was up and running within the target 6 month time frame. Essex was able to save more than US$909 thousand in first year payroll expenditure, including consultancy fees and contract costs. Furthermore, Essex has reduced unit costs per pay slip by more than 25%, bringing the council in line with many private sector organizations, complemented the council's green initiatives using Oracle's state-of-the-art data center to reduce energy costs, server costs, and carbon dioxide emissions, while ensuring disaster recovery.

Smart Infrastructure

Smart Innovation that generates real improvements in constituent services and open government is predicated on Smart Process implementation as seen in the previous section. In turn, Smart Process implementation is best achieved by modernization of the underlying IT infrastructure. For smart cities, this is done through erection of Smart Infrastructure. Oracle's vast array of technologies and middleware provide the glue between existing IT and line-of-business asset investments and extended functionality such as embedding intelligence into city assets such as parking meters that alert you as to when a space is open or when your time in that space has expired or the intelligence behind the handheld device used by the parking meter reader and the ERP system that issue a ticket if you ignore the smart meter. Oracle's latest systems such as Oracle Exadata and Oracle Exalogic deliver the entire

[5] Boston About Results can be found here: http://www.cityofboston.gov/BAR/performance.asp

platform to support all the applications and integration of them as shared services platforms required in a modern Smart Infrastructure environment.

Dongcheng District, Beijing – Migrates to an Electronic City Management Platform

The Dongcheng district is in the heart of Beijing, covering an area of around 26 square kilometers inclusive of Tiananmen Square. The Beijing Dongcheng District Government is responsible for overseeing the district's one million residents. Using Oracle Database and Oracle Fusion Middleware, the Dongcheng government built their City Grid Management System featuring a wireless information service system, a geographical code enquiry system, data management capabilities, and safety management features. The system enables data to be transmitted without relying on extensive cabling by using wireless functions in the underlying Oracle technology and supports the development of a high-end geographic information system with Oracle Spatial, enabling the district government to undertake accurate city planning. The success of the City Grid Management System implemented by the district government has led to other cities adopting the system.

Hong Kong Housing Authority Improves Ad Hoc Query Response Time by up to 97%

The Hong Kong Housing Authority (HA) is a statutory body established in April 1973. HA develops and implements a public housing program that seeks to achieve the Hong Kong Special Administrative Region Government's policy objective of meeting the housing needs of people who cannot afford private rental housing. HA manages over 700,000 residential units, which house approximately 30% of Hong Kong's population. HA migrated and consolidated the 14 disparate systems that comprised their Corporate Information System to Oracle Exadata Database Machine running Oracle Database 11g with Oracle Real Application Clusters. As a result, they have seen improved response times for ad hoc queries such as revenue collection (by estate and collection amount) by 80%; and arrears and revenue trend analysis by 97%. They have also achieved average query response times of four to five seconds, ensuring users no longer had to wait minutes or hours for information on the type and location of available housing.

The City of The Hague Maintains Order in Public Spaces Using Mobile Handhelds

In 2009, The Netherlands implemented the Fixed Penalty Notices Act, which specifies a new procedure for local government intended to make enforcement related to environmental offenses such as littering and minor disorders much more efficient. The law applies to the four largest municipalities in The Netherlands, known as the G4 (The Hague, Amsterdam, Rotterdam, and Utrecht). The Hague, the 3rd largest city in the Netherlands with a population of over 480,000, became the first of the four cities to build a paperless, on-the-spot enforcement system and based theirs on Oracle database technologies (Oracle Database Lite Mobile Server, Oracle Spatial, etc.) and Fusion Middleware (Oracle SOA Suite, Universal Content Management, Oracle BPEL Process Manager, etc.). The system is used by special investigating officers of The Hague's Division of Livability and Surveillance within the Department of City Management work directly with the Haaglanden police force. The officers issue tickets on the spot for offenses in public spaces related to, among other things, littering, dogs, advertising, hotel, restaurant and café licenses, traffic, and parking. By using the fixed penalty there is no need for intervention by the courts to get a criminal conviction, and failure to pay the fixed penalty

leads to higher penalties and even imprisonment. The system has resulted in a cleaner city and is now being looked at for other on-the-spot license issuance and infractions applications.

The Oracle Smart Cities Proposition

Oracle's Solutions for Smart Cities provides a complete solution, by bringing together the best practices and processes from around the world into a solution architecture incorporating the breadth and depth of the Oracle portfolio of open server and storage systems, data base and technologies, middleware, and applications.

The Oracle differentiators include Oracle's Portal environments, Siebel Case Management with built-in enterprise policy automation, a fully geo-coded data schema (spatial enabled), and the most robust and fully comprehensive security model, using the designs and principles of the master data management hub, powered by the industry's number one SOA middleware platform to underpin data integration and application interoperability across all existing platforms residing in disperse municipal department IT centers and outsourced 3rd party locations.

Conclusion

As the innovator and leader in building smarter cities, Oracle's Solutions for Smart Cities is uniquely positioned to address key challenges and opportunities, including:

- Integration of shared services contact centers with shared, secure self-service constituent services portals as a single intelligence-driven transactional platform

- Analyzing performance trends and policy outcomes for services delivered through the unified platform

- Automating those policies and directly implementing them as orchestrated process across existing siloed multi-departmental municipal landscapes

- Obtaining operational efficiencies through streamlining workflow/process orchestration inclusive of back-end ERP systems

- Tracking and improving the effectiveness of programs, employees, peer government and service delivery partners

- Contact center consolidation and shared services centers for underlying infrastructure

- Service level improvements

- Release resources from the emergency services

As the world's leading information management company, Oracle understands that local government's most valuable asset is information. Oracle's Solutions for Smart Cities is designed to provide local governments with the tools necessary to empower employees in providing citizens with consistent information, and the ability to leverage legacy systems to analyze customer information to optimize program delivery.

The next generation of Oracle's Solutions for Smart Cities extends contact center functionality to deliver value to constituents, employees and executives. Governments cannot afford to invest in traditional IT solutions that focus solely on capturing non-emergency citizen requests or front-end portal systems that are incapable of handling cross-departmental, multi-transactional operations through self-service mechanisms. They also cannot afford to build next-generation services by an over-reliance on existing services partners and consulting models. Larger benefits are realized by utilizing innovative and robust open platform solutions as the basis for business-oriented and citizen-focused government. Oracle's Solutions for Smart Cities is the solution for managing constituent information to identify program efficiencies and deliver on the priorities of the administration.

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