CITY OF ALBUQUERQUE INFORMATION TECHNOLOGY STRATEGY PLAYBOOK 2012

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Executive Summary

This is the first Information Technology (IT) Strategy Enterprise Architecture Program for the City of Albuquerque which emanated from the management assessment program spearheaded by the Information Technology Services Department (ITSD) of Albuquerque. This document is envisaged to be user friendly and deals with key IT requirements that will support the City of Albuquerque to function better, effectively and competent. This strategic document will emphasize the importance of moving from the traditional approach of treating IT as the separate tools that are not linked to the City of Albuquerque's goals. It will also focus on ensuring that business processes of the City of Albuquerque are supported by information technology.

As this is the first of its kind for the City of Albuquerque, it will endeavor to outline the principles of using the Enterprise Architecture Program information processes to ensure accurate decision making in the City of Albuquerque. Also it is vital for the City of Albuquerque to first assess its existing IT solution to establish whether business vision can be achieved with existing IT infrastructure. Secondly the new or additional IT infrastructure and solutions will be determined so that the City of Albuquerque achieves its vision.

The successful Enterprise Architecture Program will result in:

- A lasting framework for IT planning and investments so they are in alignment with business needs and goals.
- IT efforts, investments, and processes are consolidated and simplified.
- Identified cost savings will be reinvested for future IT deliverables.

Benefit to stakeholders:

IT efforts are matched to Stakeholders' requirements. The EA Program is a foundation for meeting the present and future business technology needs for the City of Albuquerque.

Stakeholders

- Constituents:
    - Albuquerque Progress Report
- Mayor:
    - Performance Plan and Priorities
- Albuquerque City Council:
    - Plans and Priorities
- Albuquerque City Departments:
    - Top initiatives, plans, and budget

Scope of the EA Program: ASSESS ➡ ALIGN ➡ TRANSFORM

- **Assess** the current IT environment and stakeholder requirements for the City of Albuquerque with Key Stakeholders who will engage in a discovery process with IT support.
- **Align** future IT efforts to stakeholder requirements. Key Stakeholders will provide content, solutions, and outcomes that will provide the technology roadmap to achieve business success.
- **Transform** IT by facilitating the advancement of each City Department's strategic plans with a technology roadmap that will increase constituency value, and transparency.

City of Albuquerque's IT Strategies

The City of Albuquerque has to ensure that it has viable IT strategies to meet both goals and challenges faced by the City of Albuquerque to conduct its business effectively, efficient and quickly. The IT Strategies must also provide the capability to increase constituency value through Gov. 2.0 and transparency. These strategies may be classified as short-term, medium-term and long- term to ensure continuity of the City of Albuquerque. This simple means the City of Albuquerque has to list possible projects that will support the day-to-day activities of the City of Albuquerque for the betterment of the municipal service delivery. It is essential that the IT strategies are directly linked to stakeholders' needs and goals and are reviewed after two years or annually if needed.

Information Technology Vision

The vision statement of the City of Albuquerque is to promote the efficient and cost effective use of information technology to provide speedy service delivery to the City of Albuquerque's consumers, sharing of information within and with other stakeholders in promotion of co-operative and responsive government.

Information Technology Strategic Goals

To achieve this vision the City of Albuquerque will:
- Improve provision and accessibility of municipal services to our communities through information technology.
- Bring services to the customer's doorsteps or to their vicinity.
- Make information easily and broadly available.
- Promote interdepartmental relations within all of the city departments.
- Promote community participation and active involvement.
- Play a leadership role in utilizing technology to enable service delivery.
- Leverage investments to improve quality of service.
- Ensure alignment of IT solution to the city's business needs.

Information Technology Strategic Values

The City of Albuquerque's IT strategic values focus on municipal staff and stakeholders and are outlined to ensure that the City's IT Team are providing the following:

➤ Customer services are listening and delivering what is needed by the stakeholder community, business partners, sector departments, etc… and staff.
➤ Providing quality deliverables that are providing technology solutions that offer stakeholders and staff the ability to be more efficient, effective and responsive.
➤ Communicating and exchanging information openly, respectfully to our stakeholders and staff.
➤ Are treating stakeholders and staff with integrity, honesty, and are fair and equitable at all times.
➤ Are creating a vehicle for transparency, by providing meaningful information to our stakeholders that creates the opportunity for them to make informed choices and decisions.
➤ Are needs focused by prioritizing projects based on the need of our stakeholders and staff.

External Stakeholder Challenges
For the City of Albuquerque to succeed in its goals and mission a variety of challenges must be addressed in the next few years:

1. Illiteracy of its community regarding the use of information technology.
2. Shortage of computer skills within the municipal area of operation.
3. Keeping pace with the changes in technology maintain a secure and stable computing environment.
4. Maintaining a balance between privacy and security as an ongoing process.
5. Ongoing and improved remote support to municipal employees from service providers or IT consultants.

Internal Stakeholder Challenges
1. Legacy management system does not provide opportunity for open communication or transparency thus creating disconnected interdepartmental/agency communication.
2. Technology Department team feels like they are working in silos within a fractured IT system, with ad-hoc systems and processes.
3. High level of frustration is experienced due to breakdown of high level oversight from former IT leadership.
4. Current infrastructure is technology centric not people centric
5. Absence of the following business and program management processes:
   o asset liability management plan
   o general city wide IT plan
   o general IT investment plan
   o performance metrics
   o process to manage or educate human capital
6. Budget is static or will decrease and is dependent upon:
   o bond election
   o general fund outlay

Overview of Enterprise Architecture Program

The following content represent guidelines and the work plan for the building and implementation of the City of Albuquerque's enterprise architecture plan program. The City of Albuquerque's enterprise Architecture Plan, developed in 2011, formalizes an enterprise architecture strategy that addresses performance, business, technology, data and information services as well as related management components. Specifically, the plan addresses eight enterprise architecture domains: enterprise business architecture (EBA), enterprise application architecture (EAA) to include an assessment of the process for requirements for a service oriented Architecture (SOA), enterprise end-user architecture (EEA), enterprise information architecture (EIA), enterprise network architecture (ENA), enterprise platform architecture (EPA), enterprise radio architecture (ERA), and enterprise security architecture (ESA).

The Enterprise Architecture Program will be integrated with the City of Albuquerque's IT annual strategy plans and city department services plans.

EA Program Plan Guideline Highlights

The guideline materials consist of three EA components, (1) a description of the EA process, (2) an EA framework and, (3) the City of Albuquerque EA work plan.

- **EA Process:** A description of the process model, eight process activities and coordination and integration requirements.
- **EA Architecture Framework:** Assessment of current state, alignment requirements for desired state, and a technology roadmap.
- **EA Work Plan:** Architecture management for future state: deployment, accountability, and success scorecard factors.

Enterprise Architecture Program to align IT Strategy for the City of Albuquerque.

Deliverables	Summary of Deliverables
Current State	Description of eight domain architectures
	As-Is Discussion of identified domains
	Business strategies and initiatives
Future State	Technology standards: including patterns, trends, services and domain models
	Solution models: including guiding standards, leading practices, and change management process
	Recommended Technology Roadmap
	Governing, managing, and accountability
Integrated Solution Road Map	Candidate projects required
	Migration plan of projects to include implications
	High-Level support requirements
	On-going concern

Description:

Business Architecture provides the high-level representation of the business strategies, intentions, functions, processes, information and assets critical to providing services to citizens, businesses, governments and the like. The Business Architecture Framework provides the structure for the collection of detail regarding the motivations, organization, location, events, functions and assets that define the direction of the enterprise from the business perspective. The detail captured within the Business Architecture supports business decision-making by providing documentation of where the enterprise is today and where the enterprise wants to be at a specified time in the future.

Business Architecture can be viewed as the foundation or driver for the other components of an Enterprise Architecture. For enterprise architecture to be successful, it must be linked to the business direction of the enterprise. Business architecture must also consider interaction with other governments, as well as delivery of services to citizens of other governments. Business Architecture includes this aspect as business interactions.

Trends/Leading Practices (Research current and emerging technologies and practices)

1. Powerful search tools such as Google are becoming the way in which users find and locate information. Users rely less on the traditional online model of visiting the home page and navigating the whole site to answer questions. Instead, search tools filter information to allow users to go directly to the information they need. Computational search engines such as Wolfram Alpha are becoming better at not only locating information, but also in interpreting and representing data.

2. Best practice information repositories (such as websites) are easy to navigate and easy to use. Legislation such as the Americans with Disabilities Act and best design practices makes the user the focus of the interaction as opposed to the system. Good design practices seek to understand the goal of the user (e.g. looking for bus information is an intermediate step to the goal of making a journey downtown) and, where possible, facilitate and meet the goal.

3. Users expect the same level of access to information regardless of their actual geographical location. Devices such as tablets and smart phones are becoming powerful tools that no longer require users to be constrained by physical location (e.g. a desk with Ethernet connectivity located in City Hall).

4. Users are expected to collaborate and share information with more people over a wider geographic range. Such collaboration promotes greater governmental efficiency and effectiveness and is considered a best practice.

5. Initiatives and movements such as Open Government and Transparency are encouraging citizens to become more engaged in the democratic process. To achieve this goal, governmental entities are being required to provide more information to citizens as data feeds using open standards such as XML. Citizens are then free to use this information as they see fit, whether directly or integrated into another application ("mashup").

Technical Discussion of Current Situation (As-Is Assessment - identify and collect existing products that describe the environment as it exists today).

Multiple Data Silos.

Because information is stored in separate applications and storage devices, information can be considered to be stored in "silos" making it difficult to share inside and outside the organization in a standardized, meaningful manner. Storage silos do not communicate between each other resulting information is difficult to consolidate and share. Examples include Access databases developed in-house by a particular department with no thought to standardization of data across different business units. Overall, a description of the storage of information in the City includes the words "splintered" and "fragmented".

Current processes within the City focus on getting data into the system. There is little thought or consideration as to how to get information out of the system (the "digital trashcan").

There is also overlap between solutions. As an example, ITSD was recently asked by two business units within the same department to develop separate client intake systems.

No Centralized Information Strategy

Business units must develop their own way to understand and collect data in isolation of each other, with no universal definition of that data. There is limited accountability and ownership of data. There is little or no information sharing or collaboration across departments (exceptions being Cognos, SharePoint and FileNet). The result is that collaboration across organizational boundaries is the exception as opposed to the norm. City organizational boundaries do not encourage collaborative approaches across boundaries (either as ad hoc or long term collaborations).

Business units are often not engaged in the development of reports. This leaves the technologists to make decisions as to what information and assumptions should be used for the report.

Rolled up or accumulated budget information is difficult to evaluate for quality because it usually starts off in a spreadsheet on a C:\ drive. Even if the spreadsheet is available, there is no context, metadata, assumptions or audit trail to assist understanding and reuse.

Devices and Applications Discourage Sharing

Applications are usually considered as stop-gap solutions to a problem at a particular point in time. There is often little or no thought as to how the data will be used (other than a generic "for reporting purposes"). This leads to:

- Critical information often stored on devices that cannot be easily shared over a longer period of time– e.g. c:\

- Data often stored in proprietary formats meaning that data extraction is difficult

- Data schemas not be provided by the vendor. Where they are provided, they are often subject to change without notice.

Public vs. Private Requirements and Document Lifecycle Management

In order to meet the needs and expectations of its citizens, the City must store private as well as public data. There is often a conflict between public and private information. Both are necessary, but may have different storage and retention expectations and compliancy requirements. Internal process and documentation is often lacking in clarity regarding exact requirements.

Some data has long retention requirements (e.g. legal dept, APD, transit videos and GovTV, sewage videos) that may be complicated by legal holds. The public often makes requests for old documents (e.g. accident reports, GovTV programming etc.). The City spends considerable time and effort servicing these requests instead of empowering the public to retrieve information.

Data is not treated as an Asset

Data is not considered as a valuable asset within the City. Although data might be used as an input into a system, there is little or no thought to information retrieval. This is due to:

- Lack of basic technical knowledge and skills within the City

- Lack of analytical and skills within the City

- Underestimation of the quality (freshness, accuracy and assumptions) of the data

- Underestimation of the potential usage and therefore value of data

- Misunderstanding of the needs and expectations of citizens

Desired State (To-Be - describe the target architecture with strategic objectives based on the needs of the City.)

- Integration of the City of Albuquerque IT Strategic Plan with identified business process needs.

- Reporting measures in place that allow for access to business intelligence data to easily perform budgeting analysis that provides a high level view of total cost of ownership (TCO) for city wide IT services.
- The EA supports and reflects the business drivers and strategies of the enterprise. For the City of Albuquerque this means that EA, while dependent on business strategy, is also an enabler of business strategy as it evolves into a more mature process and set of deliverables.

Technology Roadmap (Identify the roadmap to transition to the Desired State.)

1. Provide education and opportunity to allow users to reassess their information needs.
2. Develop the use of "centers" of expertise – forums and user groups responsible for the needs and direction of a particular technology.
3. Develop a set of models that depict the state of business, information and technology architecture in the enterprise, making it easier to conduct impact and scenario analysis.
4. Identify technology and services required to achieve targeted business enterprise needs.

   Such as:

   - Develop Cloud Services
   - Asset Lifecycle Plan (ALM)
   - Strengthen Security Model
   - Develop Virtual Desktop (VDI)
   - Web Enabling Constituent Services
   - Mobile Apps
   - Enterprise Architecture Program
   - ITIL
   - Project Management Program
   - Online Bill Pay
   - Online Pay Slips
   - online Vacation/Sick Leave Request Approval
   - Online Complaints (311)
   - Online Work Orders (Internal & External)
   - Work Order Visibility and Tracking
   - Telecommuting
   - HR Self Service (Change benefits, change direct deposit)
   - Team Registrations/Scheduling
   - Park/Facility Reservations
   - Online Ticket Sales
   - Online Collaboration/Meeting Tools
   - Online approval for supply ordering (at desktop)
   - Eliminate computers being configured for specific department
   - Online help desk
   - Kiosks for public use at all City Facilities

- Online Noise/Party/Barricading Current Status
- Automatic Qualification of Job Applicants
- Online Hiring/Staffing Process
- Enterprise Wide Project Management and Project Visibility
- Performance Monitoring

Standards (Review any existing standards associated with this domain and recommend an updated standard if necessary.)

1. Digital Media Standard – new standard to cover acceptable formats and approaches to sharing, publishing and storing video and audio

2. Identify obsolete language in current standards and update with modern language.

3. Identify standards assessment timeline and expiration dates.

Over-Arching Principles

Principle 1: Consolidate and Simplify

To the greatest extent possible, seek to consolidate and simplify the delivery of IT services. Reduce redundancy of IT resources and services. Simplify the design of complex systems and reduce the impact on support models that complexity brings.

Rationale

To optimize the overall IT spend within the City and increase reliability and performance of systems. Systems must be designed, acquired, developed, or enhanced such that data and processes can be shared and integrated across the enterprise and with the City's business partners.

Implications

- Increase integration capability.

- Rationalize the products, configurations, and vendors into strategic platforms.

- Determination of "the greatest extent possible" includes consideration of how reducing complexity can negatively impact providing critical client services.

Principle 2: Cloud, SaaS, IaaS first mentality

First look to Cloud, Software as a Service (SaaS), and Infrastructure as a Service (IaaS) offerings when implementing new IT services. Determine the business case for cloud vs. on-premise hosted solutions.

Rationale

Will require business case analysis to determine the best hosting platform in terms of cost, support required, and benefit delivered to the City.

Principle 3: Provide for Gov 2.0 and Transparency

IT systems and services should be considered as an open platform that is transparent and meets best practices for Government 2.0.

Rationale

- Enhances stewardship and integrity of public information.
- Increases citizen access to information and services.
- Develop dialog and engagement between government and citizens.

Principle 4: Disaster Recovery / Business Continuity

An assessment of business recovery requirements is mandatory when acquiring, developing, enhancing or outsourcing systems. Based on that assessment, appropriate disaster recovery and business continuity planning, design and testing will take place.

Rationale

- The pressure to maintain availability will increase in importance.
- Continuation of business activities with IT is necessary.
- Application systems and data are valuable City assets that must be protected.

Implications

- Systems will need to be categorized according to business recovery needs (e.g. business critical, non-critical, not required).
- Alternate computing capabilities need to be in place.
- Systems should be designed with fault tolerance and recovery in mind.

Domain Specific Guiding Principles

Principle 1: Structural Design of Shared Information Environments

Shared information environments must have a design that is well understood and well defined by all stakeholders.

Rationale

- A well-articulated, rational design helps stakeholders leverage information

- It is easier to promote and ensure data quality over the long-term when using a well-designed environment

- A design that is well crafted, defined and understood can be expanded, used and repurposed beyond the vision of the designers.

Implications

- Shared information environments cannot use proprietary data formats and layouts

- Stakeholders must work together to provide a common body of knowledge and expertise for an environment

- Data is a valuable asset to the organization and should be treated and protected as such.

- Avoid closed, proprietary formats and systems where possible

- Use industry standards for data sharing

Principle 2: Organization and Search

Information presented to users must be well organized and searchable using an underlying structure that is meaningful and relevant to the audience

Rationale

- Information that is well organized and searchable has more intrinsic value.

- Information that is well organized and searchable has a greater chance of being proved correct.

Implications

- Information must be made searchable

- Information must be organized

- Use best practices in organization, presentation and search

- The "digital trashcan" approach to information architecture is no longer valid or desirable

Principle 3: Usability

The design of information presentation layers must promote user-centered designs that are intuitive and easy for the user to understand and use.

Rationale

- Information that is easy to understand is more likely to be used and understood

- Clear, intuitive designs that take the needs of the audience into consideration are easier to use because they lower the cognitive workload of the user.

Implications

- More attention needs to be paid to usability during evaluation and procurement

- The needs and abilities of the intended audience must be taken into consideration

- The design and implementation of user-facing systems should follow best practices in usability design and architecture.

Application Architecture Domain

Enterprise Application Architecture Domain

Application Architecture is a process within the Enterprise Architecture that focuses on the development and implementation of a solution or service being created for the enterprise.

The Application Architecture framework is a combination of structured processes and templates that utilize existing architecture documents (such as business, information, and technology components as well as models and patterns) to design a desired business solution. The Application Architecture, by allowing the development of a Solution Set, facilitates the rapid development and delivery of a solution in a systematic and well-disciplined manner.

The EAP deals directly with arguably the single most important and challenging architectural issue: combining and reconciling the loosely coupled and often conflicting viewpoints of the primary stakeholders into a unified architecture for an enterprise solution that actually solves a business problem without creating other, even larger, problems. It is the "architecture of the architectures".

Service Oriented Architecture (SOA)

Among the most powerful changes driving the future of architecture are the demands for improved business and service performance, including overcoming the disadvantages and shortcomings of IT that have hindered its potential. A popular IT term currently is "service-oriented architecture" because it promises to make a breakthrough in the ability to develop applications quickly, and to enable those applications to be agile. The term "SOA" is being widely adopted and used in many ways by both users and vendors, yet it is centered on architecture, which is central to its potential.

SOA appeals to organizations because of the image of creating an application by merely assembling a series of pre-defined component services to perform the task at hand. It is particularly appealing when the components are not typical software functions, but rather, individual business tasks or services — thus tailoring the process to the direct needs of the business — also known as a service-oriented business application (SOBA). SOA promises capabilities for rapid development and quick updates to applications in response to business needs, thus overcoming the complaint that IT inhibits the business.

Trends/Leading Practices

1. Business units desire an increasingly can obtain software solutions specific to their needs.

2. Software solutions are increasingly available as services that are hosted and managed external to the organization.

3. End-users increasingly expect access through devices including and beyond their current desktop (e.g. Smartphones, tablets, etc…).

4. Externally hosted and business specific software solutions are often quicker and less expensive to implement.

5. Total of Cost Ownership of these point solutions may be more expensive than for larger comprehensive solutions, Total Benefit of Ownership is generally higher.

6. Decreasing resources require business units to work more collaboratively, meaning that their applications must work collaboratively as well.

7. Comprehensive visibility to data is increasingly important and the increased number of applications complicates but does not negate this importance.

Technical Discussion of Current Situation (As-Is)

1. The City of ABQ utilizes a mix of internally developed, internally hosted commercial off the shelf, and externally hosted commercial off the shelve applications to meet business needs.

2. Numerous business units would like to utilize applications to improve their functions. But do not have capability to research, select and implement appropriate solutions.

3. The City of ABQ utilizes a number of monolithic software solutions primarily for ubiquitous communication or central service functions.

- Microsoft Exchange for e-mail
- PeopleSoft ERP
- Cognos Business Intelligence

- Filenet Image Management
- Plone Web Content Management
- SharePoint

4. Numerous business units utilize point solutions to meet their specific business needs.

- Trapeze for Transit routing
- Route Smart for SWMD routing
- iNovah for Treasury Cashiering
- Chameleon for Animal Welfare
- Innovative Interfaces for Library

These are just a few examples, there are over 200 applications being utilized for business purposes in the City of ABQ.

5. The City utilizes a few software solutions to meet multiple department needs, but recognizes that these current solutions do not meet all departments' needs'.

For example:

- CRM
- Siriusware for point of sale

Desired State (To-Be)

1. Enable Government by providing effective, efficient, necessary and secure applications to meet the needs of citizens, businesses and government.

2. Provide delivery mechanisms that allow customers to serve themselves.

3. Provide applications that deliver efficient and effective services.

4. Provide (utilize) a framework for application governance, planning and management.

5. Provide secure, confidential, trusted and reliable applications.

Technology Road-Map

1. Identify and engage providers of Smartphone and Tablet Apps to improve public access to City information and services.

2. Evaluate and recommend the Service Oriented Architecture (SOA) tools suite to assist with the integration of applications data and processes.

3. Identify the relevant factors for comparing internally versus externally sourced and hosted applications.

Standards

The following standards need to be reviewed for currency, applicability, and alignment to meet City business needs.

- Enterprise Applications Standard
- Enterprise System Software Standard
- Library Automation Hardware and Software
- End-User Device Hardware and Software
- Police Automation Hardware and Software
- Information Technology Commodities
- Transit Automation Hardware and Software

Strategic objectives

1. IT to offer a range of services that will allow for the opportunity to customize a comprehensive strategy. ITs goal is to work with each department to make sure that they receive the right services to optimize City business.
2. IT is leveraged in order to achieve corporate objectives, and to not miss the opportunity to achieve significant competitive advantage.
3. IT to partner with departments and assess whether to upgrade what they own currently or move on to a new application.
4. An assessment of your current technology can help you understand its untapped potential and limitations.
5. IT offers a range of oversight and project management services for deployment of new or upgraded solutions.

Over-Arching Guiding Principles

Principle 1: Simplify

To the greatest extent possible, seek to consolidate and simplify the delivery of IT services. Reduce duplication and redundancy of IT resources and services. Simplify the design complexity of systems and the associated support models that complexity brings.

Rationale

To optimize the overall IT spend within the City and increase reliability and performance of systems. Systems must be designed, acquired, developed, or enhanced such that data and processes can be shared and integrated across the enterprise and with the City's business partners.

Implications

- Improvement of integration efficacy and efficiency for the business purposes.
- Maximizes the benefits of the vendors, products, and configurations in the City's environment.
- Determination of "the greatest extent possible" includes consideration of how reducing complexity can negatively impact providing critical client services.

Principle 2:   Cloud, SaaS, IaaS first mentality

First look to Cloud, Software as a Service (SaaS), and Infrastructure as a Service (IaaS), offerings when implementing new IT services. Determine the business case for cloud vs. on-premise hosting options.

Rationale

To realize the benefits of hosted solutions while reducing the impact on ITSD support resources.

Implications

- Business oriented solutions are more readily available, when in-house expertise does not constrain the choice.
- Point solutions become more readily available for line of business strategic goals and needs.

Principle 3:   Provide for Gov 2.0 and Transparency

IT systems should be implemented in adherence with all transparency, security, confidentiality and privacy policies and applicable statutes.

Rationale

- Enhances the proper stewardship over public information and helps to ensure the integrity of the information

Implications

- Data in IT systems are more readily accessed and presented for public purposes and redacted when required.
- Those accessing data in IT systems can do so with confidence in the accuracy and integrity of data.

Principle 4:   Disaster Recovery / Business Continuity

An assessment of business recovery requirements is mandatory when acquiring, developing, enhancing or outsourcing systems. Based on that assessment, appropriate disaster recovery and business continuity planning, design and testing will take place.

Rationale

- The pressure to maintain availability will increase in importance.

- Continuation of business activities without IT is expensive.

- Application systems and data are valuable City assets that must be protected.

Implications

- Business Recovery needs will need to be assessed for each system (e.g. business critical, non-critical, not required).

- Alternate computing capabilities need to be in place to meet the assessed business continuity/recovery needs.

- Systems should be designed with fault tolerance and continuity/recovery in mind in accordance with the business needs.

- Systems should be designed with appropriate data replication for the business continuity need and appropriate data backup for the business recovery need.

End User Domain

Devices Identified:

Personal Computing Devices
Personal computing devices include a variety of hardware and software components for desktop computers, notebooks, and handhelds. The following definition and discussion provide specific examples of which components and topics may be included and which are excluded from discussions in the end-user domain document.

Desktops
Desktops include all non-mobile personal computer hardware, software, and peripherals that might be provided to most City of Albuquerque employees as networked desktops. Desktops may include versions of various operating systems. Productivity software is considered to be an integral part of the government worker's desktop computer. Productivity software discussed may include operating system, office suite, browser, plug-ins, and related software. Hardware includes the CPU, I/O ports, network interfaces, communications buses, memory, storage, power supply, graphics, audio/visual, communications devices and controller components. Peripherals include monitors and media read/write devices. Removable media is also discussed. Other peripherals are considered to be of lesser enterprise importance at this time.

Laptops
Notebooks include all computing devices that provide desktop functionality to a mobile worker in or out of the office. Pen tablets and convertible laptops are included in this category but not specifically covered. Notebook discussions may cover any of the components in desktops when differences should be noted or mobile computing options that are not relevant to desktops (e.g., specially designed mobile chipsets that conserve battery power).

Smart Mobile Devices

Smart mobile devices include all computing devices typically used by City government personnel that provide less functionality than a laptop or specialized functionality. Typical devices include smart phones and limited function devices (e.g., iPad/Android tablet Devices). Specifically excluded from consideration in this category are voice-only devices including single purpose telephones, cell phones, and communication radios.

Trends/Leading Practices (Research current and emerging technologies and practices)

Future of Desktop Personal Computers Technology Component Standard
Strategic:
Desktop personal computers with tower case, keyboard, mouse, and monitor connected to it. The desktop PC will continue to be a strategic part of the computing environment for the next five or more years.
Emerging:
Thin client and zero client technologies. Replacing traditional desktop computers with thin or zero clients where all or the majority of computing power is performed on a server in the data center and only a terminal is located on the user's desktop. Some areas of the city may be well suited for the emerging technology of thin and zero client computing. These areas may be where local technical support is not readily available or where a small footprint is desired to conserve space.
Transitional/Contained:
Obsolescent/Rejected:

Comments:

The future of desktop computers has some uncertainty due to new form factors of computers; such as notebooks, tablets, and client machines. However, it seems the traditional desktop computer will continue to be a valuable piece of hardware for the foreseeable future. There are situations where a portable computer, whether in the form of a notebook/laptop, tablet, or smart device are not practical or desired still exist. Personnel that perform their job duties in a fixed location do not currently have much need for a portable device. Portable devices may also be more expensive to purchase or maintain over time. Hardware service for a portable device can also be more complicated due to proprietary components and smaller pieces that can be harder to work with. There is also the factor of theft and loss that can make notebook/laptop computers less appealing in certain professional settings. Due to the physical size of a desktop computer, it may be less likely to be stolen or misplaced.

Technical Discussion of Current Situation (As-Is Assessment - identify and collect existing products that describe the environment as it exists today).

The City of Albuquerque ITSD's report that they have approximately 6,000 personal computing devices. Most departments within City Government report using Microsoft operating systems and bundled Microsoft office suite software on nearly every desktop and notebook. Microsoft Office products are not available through the same vendor that is used to acquire desktops and notebooks and must be ordered and procured separately.

The standard configuration as of August of 2011 includes Internet Explorer, Trend Micro Anti-Virus, and Adobe Acrobat Reader as commonly deployed software on new desktop or notebook setups. Desktops and notebooks used as a primary computer also usually have network and systems management client software (Novel, Zen). Notebooks used mainly as mobile devices will usually contain at least anti-virus and virtual private network software allowing remote (user's access behind the firewall.

Versions and makers of commonly used software

Insert table of commonly used software.

Database	Version	Production Count (instances)	To-be action
Microsoft SQL Server	2000	18	Upgrade
	2005	133	Maintain
	2008	1	Maintain
Oracle Server	9i	9	Upgrade
	10g	10	Maintain
	11g	14	Maintain
Adabas	7.1.2	1	Retire
Domino	6.5	4	Retire

Hardware Replacement

The City of Albuquerque generally employs one of two methods for addressing desktop needs. The first method is fund 730 used on few occasions to make volume purchases of desktop replacements. Fund 730 monies have not been available for several years as of 2011. The second method is each department uses operating funds to procure desktops on an as needed basis.

The procurement of hardware and software is guided by City Standards and requires confirmation of minimum City standards and approval for each purchase. There is concern about not taking advantage of savings that may occur from a volume purchase agreement with select vendors. The

procurement process is cumbersome and requires many levels of approval and staff time to complete as outlined below.

1. **Procurement**
   a. User need/request
   b. Department IT Staff
      i. Research and list specifications for at least a minimum standard end user device
      ii. Obtains a quote from an approved vendor.
   c. Department Finance Staff
      i. Ensures funding is available and identifies combo codes
      ii. Completes a requisition form / CRO
      iii. Requisition form signed by Manager/Director
   d. Department IT Staff
      i. Scans and submits for on-line approval from the Technical Review Committee
         1. Description
         2. Cost
         3. Business Case Justification
   e. Technical Review Committee
      i. Provides specialist review
      ii. ISD Officer Approval
   f. Department Finance Staff
      i. Print TRC form attach to signed requisition
      ii. Route to Budget for signature
      iii. Budget Route to Purchasing for PO
      iv. Purchasing Mails PO to vendor
   g. Vendor
      i. Orders hardware
      ii. Performs setup
      iii. Ships invoice
   h. Department Staff
      i. Verify equipment
      ii. Release payment

Desired State:

The desired state for personal computing devices includes: procurement, lifecycle management, inventory and standard configuration. The aim for the City of Albuquerque is to promote transparency and openness and to drive administrative efficiency and effectiveness.

The procurement of end-user hardware devices should promote the acquisition of end-user devices at competitive cost and with the least business and technology risk. The desired state is a menu list of options that provides the ability for departments to easily place on-line orders and receive timely (3 day) setup and delivery of end-user hardware devices that include MS Office Suite as part of the order and that are pre-determined as standard devices. Inventory and lifecycle management should track

via the network to reduce pad & paper inventory inspection. The City should work with select vendors to collaborate on and update standard configurations based on pre-determined criteria.

Procurement Principles:

1. Ensure that all end-user procurements are conducted in a fair, timely and impartial manner with avoidance of any impropriety or the appearance of impropriety;

2. Ensure that competition is sought to the maximum feasible degree and that the City is the beneficiary of the competitive process to the maximum degree;

3. Guard against favoritism, improvidence, extravagance, fraud and corruption;

4. Ensure that the results meet the needs of the City and department;

5. Protect the interests of the City and its citizens;

6. Support the City's short- and long-term strategic IT objectives.

Technology Roadmap (Identify the roadmap to transition to the Desired state.)

With the expectation of simplifying and streamlining the procurement process currently in place for acquiring standard IT hardware, it is understood that CABQ should:

1. Define system categories per device type

2. Choose "best-fit" from supplier standard systems.

3. Negotiate purchasing

4. Establish simple user friendly procurement process.

Defining device specific system categories that match supplier standard models will ultimately minimize the effort it takes to spec-out new systems and expedite the time it takes to ship systems to end users. As an example of defining system categories, some departments define desktop PC's categories as "Admin", "Power User" and "Workstation" models. Laptops may follow a categorization of "Admin", "Management", and "Ruggedized Field Operations". Mobile devices may be categorized completely differently depending on the functional requirements.

Once the system categories have been defined, it will be very important to compare standard system models offered by supplier(s) to find a "Best-fit" between CABQ specifications and Supplier standard models. This effort will substantially decrease the time it takes to deliver systems. In addition it will also emphasize customer and industry partner involvement.

Ordering standard equipment from suppliers will enable the City to consolidate and leverage its purchasing power for technology products and services while maximizing savings per unit. Negotiating supplier contracts based on standard supplier models which in turn meet our categorized specifications will not only optimize the cost per unit but also expedite the delivery cycle. It will also reduce the risk of dynamic changes in IT markets

The final stage of this process will be to develop best practice procurement methodologies and processes for effective and timely IT procurements. Optimizing the procurement processes requires a

complete review of the current business practice to determine what is absolutely necessary in terms of purchase requisition workflow, ink signatures and any other bureaucratic hurdles required to procure IT hardware. This review process should provide the framework by which to leverage existing technology contracts held by other government agencies within the State of New Mexico. In the end, any authorized agent should be able to quickly and securely order these units in bulk or limited numbers with ease.

CABQ is committed to embracing and implementing innovative logistical solutions to meet the City's technology and business need.

Standards (Review any existing standards associated with this domain and recommend an updated standard if necessary.)

1. Minimum Desktop requirements (hardware)

• <u>Current Standard[1]</u>: • 1 GHz 32-bit (x86) or 64-bit (x64), or better, dual-core processor, for business-use (not those manufactured for the home user) • 2 GB RAM Minimum • 100 GB Hard Drive • Windows XP Professional Operating System (purchase license to Windows Vista Enterprise, but run Windows XP Professional until Vista-compatible City standard security software is available) • 17" or larger flat panel monitor • DVD-ROM Drive • 10/100/1000 Base-T/TX PCI Network Interface Card • Video card with Windows Aero capable DirectX 9-class graphics processing unit (GPU) that supports a Windows Driver Display Model (WDDM) driver and Pixel Shader 2.0 and with 128 MB or more of memory. • MUST include three (3) year on-site service maintenance agreement • Optional: Speakers, Headphones and Sound cards • Optional: 56k Fax/Modem • Optional: DVD-RW drive • Optional: 3.5" Floppy Drive • [1] Source: http://alameda.cabq.gov/cityapps/policy.nsf/449da152733ba22587256f0c006a8c	• <u>Proposed Standard</u>: • Hewlett-Packard 6005 Pro Product Line Dell OptiPlex 780 Product Line Lenovo ThinkCentre M71e/M75e Product Line • 2.93 GHz or higher 64-bit, dual-core or better processor. • 4 GB RAM Minimum • 160 GB Hard Drive Minimum • Windows 7 Professional 64-bit Operating System. (Windows XP Professional Operating System downgrade allowed.[2]) • 19" or larger LCD monitor. • DVD-RW Drive • 10/100/1000 Base-T/TX Network Interface Card (built-in) • Manufacturer-supplied Graphics Processor Unit capable of fully supporting Windows 7 Professional. • Include three (3) year on-site service maintenance agreement. • Optional: 56k Fax/Modem • Optional: 3.5" Floppy Drive (internal or external) • [2] Source: http://www.microsoft.com/oem/en/licensing/sblicensing/pages/downgrade_rights.aspx

ad/a95dad50c130cdf4872578bc006d4322?OpenDocument	

Establish minimum standard once and then allow manufacturer / vendor to nurture and update the standard as technology progresses and more powerful hardware is available at the same cost.

2. Minimum desktop requirements (software)
    a. Establish enterprise agreement for office software to include
        i. Word processing
        ii. Spreadsheet
        iii. Presentation
3. Review and refine purchasing mechanisms (this would take changing a city ordinance to exclude these governing bodies-or an ordinance) Maybe using this language would be more appropriate at this time.

    a. Exclude TRC

    b. Exclude ISC

    c. Review and refine signature requirements

Over-Arching Principles

Principle 1: Consolidate and Simplify

To the greatest extent possible, seek to consolidate and simplify the delivery of IT services. Reduce redundancy of IT resources and services. Simplify the design of complex systems and reduce the impact on support models that complexity brings.

Rationale

To optimize the overall IT spend within the City and increase reliability and performance of systems. Systems must be designed, acquired, developed, or enhanced such that data and processes can be shared and integrated across the enterprise and with the City's business partners.

The City of Albuquerque should support a procurement process that allows departments to purchase approved hardware directly from a vendor and facilitate rapid deployment and setup of requested hardware.

The City should support hardware and software compatibility amongst devices and network standards across the City.

Implications

- Increase integration capability.
- Rationalize the products, configurations, and vendors into strategic platforms.

- Determination of "the greatest extent possible" includes consideration of how reducing complexity can negatively impact providing critical client services.

Principle 2: Cloud, SaaS, IaaS first mentality

First look to Cloud, Software as a Service (SaaS), and Infrastructure as a Service (IaaS) offerings when implementing new IT services. Determine the business case for cloud vs. on-premise hosted solutions.

Rationale

Will require business case analysis to determine the best hosting platform in terms of cost, support required, and benefit delivered to the City.

Principle 3: Provide for Gov 2.0 and Transparency

IT systems and services should be considered as an open platform that is transparent and meets best practices for Government 2.0.

Rationale

- Enhances stewardship and integrity of public information.
- Increases citizen access to information and services.
- Develop dialog and engagement between government and citizens.

Principle 4: Disaster Recovery / Business Continuity

An assessment of business recovery requirements is mandatory when acquiring, developing, enhancing or outsourcing systems. Based on that assessment, appropriate disaster recovery and business continuity planning, design and testing will take place.

Rationale

- The pressure to maintain availability will increase in importance.
- Continuation of business activities with IT is necessary.
- Application systems and data are valuable City assets that must be protected.

Implications

- Systems will need to be categorized according to business recovery needs (e.g. business critical, non-critical, not required).
- Alternate computing capabilities need to be in place.
- Systems should be designed with fault tolerance and recovery in mind.

Domain Specific Guiding Principles

- Invite, promote and sustain positive customer and supplier relationships;

- Strive for *solution-* not *product-* oriented procurements;
- Develop business driven and managed acquisitions;
- Think "enterprise-wise" to effectively leverage the City's buying power;
- Negotiate *performance-based* contract vehicles that are fair and effective;
- Make best-value award decisions based on total cost of ownership throughout the technology life-cycle;
- Invite and promote participation and relationships with small businesses;
- Take advantage of suppliers' expert IT knowledge to drive creative solutions and innovation;
- Use procurement processes and contract vehicles to cultivate a common enterprise architecture;
- Maintain and honor the integrity of the City and the public procurement profession in every procurement

Information Domain

Information Architecture
Description:

Information Architecture is the compilation of the business requirements of the enterprise, the information, process entities and integration that drive the business and rules for selecting, building and maintaining that information. Information Architecture addresses the informational needs of the enterprise. The information architecture aligns business processes to information systems that support these processes. Using the set of business processes that provides a view of the functions of the enterprise, the Information Architecture will give the organization a high level representation of its critical data. It also promotes information sharing and exchanges across agencies and boundaries.

The detail captured within the Information Architecture clarifies business relationships and enhances understanding of the business rules the enterprise has adopted. This understanding forms a baseline for exploring and implementing changes in how business is done, and what business rules the enterprise will adopt.

Selected City of Albuquerque Activities and Building Blocks:

- Data sharing and integration initiative component of the seven enterprise solutions
  - Data Warehouse Framework
  - K – 20 Tracking System
  - Fusion Intelligence Center
  - Other
- Selected cross-boundary initiatives
  - Health Information Network

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- E-Procurement
- Local government portal development, coordination
- Other
- City of Albuquerque.gov portal refinement
- Emphasis on the role of information in the Infusion Strategies

Trends/Leading Practices (Research current and emerging technologies and practices)

Powerful search tools such as Google are becoming the way in which users find and locate information. Users rely less on the traditional online model of visiting the home page and navigating the whole site to answer questions. Instead, search tools filter information to allow users to go directly to the information they need. Computational search engines such as Wolfram Alpha are becoming better at not only locating information, but also in interpreting and representing data.

Best practice information repositories (such as websites, wikis) are easy to navigate and easy to use. Legislation such as the Americans with Disabilities Act and best design practices makes the user the focus of the interaction as opposed to the system. Good design practices seek to understand the goal of the user (e.g. looking for bus information is an intermediate step to the goal of making a journey downtown) and, where possible, facilitate and meet the goal.

Users expect the same level of access to information regardless of their actual geographical location. Devices such as tablets and smart phones are becoming powerful tools that no longer require users to be constrained by physical location (e.g. a desk with Ethernet connectivity located in City Hall).

Emerging technologies link the mobility of devices such as tablets with the power of desktop applications.

- Users are expected to collaborate and share information with more people over a wider geographic range. Such collaboration promotes greater governmental efficiency and effectiveness and is considered a best practice.

- Initiatives and movements such as Open Government and Transparency are encouraging citizens to become more engaged in the democratic process. To achieve this goal, governmental entities are being required to provide more information to citizens as data feeds using open standards such as XML. Citizens are then free to use this information as they see fit, whether directly or integrated into another application ("mashup").

Technical Discussion of Current Situation (As-Is Assessment - identify and collect existing products that describe the environment as it exists today).

1. Multiple Data Silos.
    a. Because information is stored in separate applications and storage devices, information can be considered to be stored in "silos" making it difficult to share inside and outside the organization in a standardized, meaningful manner. Storage silos do not communicate between each other resulting information is difficult to consolidate and share. Examples include Access databases developed in-house by a

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particular department with no thought to standardization of data across different business units. Overall, a description of the storage of information in the City includes the words "splintered" and "fragmented".

2. Current processes within the City focus on getting data into the system. There is little thought or consideration as to how to get information out of the system (the "digital trashcan").

3. There is also overlap between solutions. As an example, ITSD was recently asked by two business units within the same department to develop separate client intake systems.

4. No Centralized Information Strategy

5. Business units must develop their own way to understand and collect data in isolation of each other, with no universal definition of that data. There is limited accountability and ownership of data. There is little or no information sharing or collaboration across departments (exceptions being Cognos, SharePoint and FileNet). The result is that collaboration across organizational boundaries is the exception as opposed to the norm. City organizational boundaries do not encourage collaborative approaches across boundaries (either as ad hoc or long term collaborations).

6. Business units are often not engaged in the development of reports. This leaves the technologists to make decisions as to what information and assumptions should be used for the report.

7. Rolled up or accumulated budget information is difficult to evaluate for quality because it usually starts off in a spreadsheet on a C:\ drive. Even if the spreadsheet is available, there is no context, metadata, assumptions or audit trail to assist understanding and reuse.

8. Devices and Applications Discourage Sharing

9. Applications are usually considered as stop-gap solutions to a problem at a particular point in time. There is often little or no thought as to how the data will be used (other than a generic "for reporting purposes").

This leads to:

- Critical information often stored on devices that cannot be easily shared over a longer period of time– e.g. c:\
- Data often stored in proprietary formats meaning that data extraction is difficult
- Data schemas not be provided by the vendor. Where they are provided, they are often subject to change without notice.

Public vs. Private Requirements and Document Lifecycle Management

In order to meet the needs and expectations of its citizens, the City must store private as well as public data.

1. There is often a conflict between public and private information.
2. Both are necessary, but may have different storage and retention expectations and compliancy requirements.
3. Internal process and documentation is often lacking in clarity regarding exact requirements.
4. Some data has long retention requirements (e.g. legal dept, APD, transit videos and GovTV, sewage videos) that may be complicated by legal holds.
5. The public often makes requests for old documents (e.g. accident reports, GovTV programming etc.).

6. The City spends considerable time and effort servicing these requests instead of empowering the public to retrieve information.
7. Data is not Treated as an Asset
8. Data is not considered as a valuable asset within the City. Although data might be used as an input into a system, there is little or no thought to information retrieval.

    This is due to:

- Lack of basic technical knowledge and skills within the City
- Lack of analytical and skills within the City
- Underestimation of the quality (freshness, accuracy and assumptions) of the data
- Underestimation of the potential usage and therefore value of data
- Misunderstanding of the needs and expectations of citizens

Desired State (To-Be - describe the target architecture with strategic objectives based on the needs of the City.)

1. Information is treated as a valuable asset. The City of Albuquerque will be the best steward of information.
2. Public information is open and accessible to all users regardless of physical location.
3. Non-public information is open and accessible to users provided that they have a right to access that information.
4. Accessibility in this instance includes:
   a. Section 508 accessibility
   b. Education
   c. Permissions
   d. Availability
5. Information is no longer siloed in proprietary systems
6. Information has a purpose, reason and value
7. Information is searchable, adaptable, easy to share, taggable and updated automatically (i.e. don't have to recreate each time data changes)
8. Information is credible. It is timely, consistent, complete and reliable both within a system and across different systems and agencies.
9. Information may atomic or it may be aggregated into larger information blocks (letters, words, sentences, paragraphs).
10. Business Intelligence (BI) is the catalyst for making good management decisions. BI enables "knowledge workers" to convert raw data first to information and then to actionable knowledge that management can use to make the right decisions. BI includes not just reporting and ad–hoc queries, but also data analysis (including dashboards, scorecards, forecasting, etc.) and data management. City of ABQ BI Initiative focuses on reporting and data analysis.
11. All current or future channels of information are translated into focused, concentric, and meaningful information.

Technology Roadmap (Identify the roadmap to transition to the Desired State.)

1. Provide education and opportunity to allow users to reassess their information needs
2. Develop the use of "centers" of expertise – forums and user groups responsible for the needs and direction of a particular Information Architecture technology.
3. Centers of expertise assess their toolsets and determine whether the tools are adequate and implemented correctly.
4. Centers of expertise determine implementation priority

Standards (Review any existing standards associated with this domain and recommend an updated standard if necessary.)

1. Digital Media Standard – new standard to cover acceptable formats and approaches to sharing, publishing and storing video and audio
2. Revise Electronic Media Retention (http://mesa.cabq.gov/policy.nsf/WebPoliciesX?OpenForm&Start=1&Count=20&Expand=1.1 &Seq=2)
3. Revise/deprecate Instant Messaging (http://mesa.cabq.gov/policy.nsf/afd45bea1bbf393187256c8a006cf29a/e0df1320f26421fc87 25719a0053ab77?OpenDocument)
4. Revise Enterprise Applications (http://mesa.cabq.gov/policy.nsf/afd45bea1bbf393187256c8a006cf29a/86588d233b827c718 72574d500719e4e?OpenDocument)

Over-Arching Principles

Principle 1: Consolidate and Simplify

To the greatest extent possible, seek to consolidate and simplify the delivery of IT services. Reduce redundancy of IT resources and services. Simplify the design of complex systems and reduce the impact on support models that complexity brings.

Rationale

To optimize the overall IT spend within the City and increase reliability and performance of systems. Systems must be designed, acquired, developed, or enhanced such that data and processes can be shared and integrated across the enterprise and with the City's business partners.

Implications

- Increase integration capability.
- Rationalize the products, configurations, and vendors into strategic platforms.
- Determination of "the greatest extent possible" includes consideration of how reducing complexity can negatively impact providing critical client services.

Principle 2: Cloud, SaaS, IaaS first mentality

First look to Cloud, Software as a Service (SaaS), and Infrastructure as a Service (IaaS) offerings when implementing new IT services. Determine the business case for cloud vs. on-premise hosted solutions.

Rationale

Will require business case analysis to determine the best hosting platform in terms of cost, support required, and benefit delivered to the City.

Principle 3: Provide for Gov 2.0 and Transparency

IT systems and services should be considered as an open platform that is transparent and meets best practices for Government 2.0.

Rationale

- Enhances stewardship and integrity of public information.
- Increases citizen access to information and services.
- Develop dialog and engagement between government and citizens.

Principle 4: Disaster Recovery / Business Continuity

An assessment of business recovery requirements is mandatory when acquiring, developing, enhancing or outsourcing systems. Based on that assessment, appropriate disaster recovery and business continuity planning, design and testing will take place.

Rationale

- The pressure to maintain availability will increase in importance.
- Continuation of business activities with IT is necessary.
- Application systems and data are valuable City assets that must be protected.

Implications

- Systems will need to be categorized according to business recovery needs (e.g. business critical, non-critical, not required).
- Alternate computing capabilities need to be in place.
- Systems should be designed with fault tolerance and recovery in mind.

Principle 5: Emerging Technology

Emerging technologies should be able to adapt to any number of existing applications whether they may be mobile, tablet, or desktop.

Rationale

To provide consistency and assurance that technology does not create a technological or financial burden to city resources while allowing for the opportunity to improve efficiency in end-user tools and provide quality mechanisms for customers to be able to better serve themselves.

Implications

- Awareness of new technologies to determine what is appropriate and necessary.
- Requirement of assessment prior to decision process.

Domain Specific Guiding Principles

Principle 1: Structural Design of Shared Information Environments

Shared information environments must have a design that is well understood and well defined by all stakeholders.

Rationale

- A well-articulated, rational design helps stakeholders leverage information.
- It is easier to promote and ensure data quality over the long-term when using a well-designed environment.
- A design that is well crafted, defined and understood can be expanded, used and repurposed beyond the vision of the designers.

Implications

- Shared information environments cannot use proprietary data formats and layouts.
- Stakeholders must work together to provide a common body of knowledge and expertise for an environment.
- Data is a valuable asset to the organization and should be treated and protected as such.
- Avoid closed, proprietary formats and systems where possible.
- Use industry standards for data sharing.

Principle 2: Organization and Search

Information presented to users must be well organized and searchable using an underlying structure that is meaningful and relevant to the audience

Rationale

- Information that is well organized and searchable has more intrinsic value.
- Information that is well organized and searchable has a greater chance of being proved correct.

Implications

- Information must be made searchable
- Information must be organized
- Use best practices in organization, presentation and search
- The "digital trashcan" approach to information architecture is no longer valid or desirable

<u>Principle 3: Usability</u>

The design of information presentation layers must promote user-centered designs that are intuitive and easy for the user to understand and use.

Rationale

- Information that is easy to understand is more likely to be used and understood
- Clear, intuitive designs that take the needs of the audience into consideration are easier to use because they lower the cognitive workload of the user.

Implications

- More attention needs to be paid to usability during evaluation and procurement
- The needs and abilities of the intended audience must be taken into consideration
- The design and implementation of user-facing systems should follow best practices in usability design and architecture.

Network Domain

Trends/Leading Practices (Research current and emerging technologies and practices)

1. Enterprise Unified Communications
2. Cloud Computing
3. Workforce Mobility

Technical Discussion of Current Situation (As-Is Assessment - identify and collect existing products that describe the environment as it exists today).

1. No annual Department or ITSD technology plans or equipment replacement plans.
2. *Much of the Cities network equipment is End of Life or within 3 years of being End of Life and running old IOS versions.*
3. Complex network utilizing multiple network vendors, multiple types of dedicated circuits and multiple types of data transport technologies.
4. Outdated PBX and Centrex telecommunications network.
5. Sparse, low bandwidth, unsecure wireless network running on antiquated wireless equipment.

Desired State (To-Be - describe the target architecture with strategic objectives based on the needs of the City.)

1. Annual Department and ITSD Technology plans including equipment replacement plans.
2. Consolidated, up to date industry standard network equipment running current IOS versions. (Principle 1)

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3. Consolidated network design utilizing fiber data circuits to Ethernet handoff primarily managed by ITSD Networking. (Principle 1)
4. Converged telecommunications network with data network utilizing VoIP technology. (Principle 1)
5. Robust, secure employee and public wireless network. (Principle 3)

Technology Roadmap (Identify the roadmap to transition to the Desired state.)

1. Annual technology plans including equipment replacement plan submitted to ITSD. Annual Network Assessment with 3 year EoL report. Report shared with departments so information can be used to populate technology and budget plans.
   a. The reports need to be used with an equipment replacement plan that is part of an overall technology plan that will enable ITSD and the Departments to budget for replacement equipment.
2. Cisco Systems completed a network assessment in November 2010 that identified EoL equipment in City Hall and many departments. The assessment in November 2010 identified EoL equipment in 1, 2 and 3 year categories.
3. Implement an annual network assessment with the 3 year EoL equipment report. The report should be shared with departments so information can be used to populate technology and budget plans.
4. Current combination of fiber, copper and wireless technologies include FrameRelay, QMOE, NLAN and Point to Point. Provisioned by CentruyLink, TWTelecom, Comcast, CityNet and ITSD Networking.
5. Consolidate as many data circuits to fiber utilizing franchise agreements and dark fiber. Upgrade FrameRelay sites to QMOE or NLAN. Principle 1 and 4.
6. PBX, Centrex, Verizon Wireless and limited VoIP provisioned and managed by CenturyLink, Verizon, ITSD Networking, TWTelecom, Blackbox and Pyramid Communications. Blackbox contract runs through 2017 and all PBX systems will be EoL.
   a. Start the transition from PBX and Centrex to VoIP using the Cisco platform managed by ITSD Networking.
7. Employee and Public wireless networks are available in a too few areas. Most devices are old technology and the data transport medium is not adequate for the required bandwidth and lacks security.
   a. Follow technology plans, equipment replacement plans and network assessments to get wireless network equipment and software current and remain current. Upgrade data circuit infrastructure to provide required bandwidth to operate a robust, secure wireless network.

Standards (Review any existing standards associated with this domain and recommend an updated standard if necessary.)

1. Network Cabling Standard (needs revision)
2. Network Equipment Standard (needs revision)

3. Network Access/Connectivity Policy (needs revision)
4. Wireless Standard (needs to be created)

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- Application systems and data are valuable City assets that must be protected.

Implications

- Systems will need to be categorized according to business recovery needs (e.g. business critical, non-critical, not required).

- Alternate computing capabilities need to be in place.

- Systems should be designed with fault tolerance and recovery in mind.

Platform Domain

Trends/Leading Practices (Research current and emerging technologies and practices)

1. There is a strong movement towards server virtualization this allows;
   a. the ability to run multiple operating systems on a single server,
   b. reduced capital costs by increasing energy efficiency and requiring less hardware while increasing your server to admin ratio,
   c. the increased business continuity through improved disaster recovery solutions and deliver high availability throughout the datacenter.
2. There is becoming a large emphasis in the current environments for high availability

Technical Discussion of Current Situation (As-Is Assessment - identify and collect existing products that describe the environment as it exists today).

1. Current employee skill sets are in silos.
2. Storage silos
3. Complex state of OS to Hardware to Database.
4. Multiple domains across multiple platforms.
5. Limited virtualization infrastructure with low complexity.
6. Only one TRC standard.

Desired State (To-Be - describe the target architecture with strategic objectives based on the needs of the City.)

1. Employees need to be cross trained in other areas of technology as defined by the job requirements so that resources (domain specific principle1) can be used more efficiently. For example an employee that has a main focus in Oracle DBA may need to know SQL Server DBA and relevant OS level administration.

2. Migrate transitional databases to strategic databases, this will consolidate and simplify (overarching principle 1) and allow for better use of resources (domain specific principle1).

3. Increase the virtualization presence which will allow for a cloud first mentality for resources. This is one of the overarching principles.

4. Consolidate to a single strategic authentication domain.

5. Migrate current physical servers to virtual solutions. A virtual solution should be considered first when deploying new servers.

6. When installing middleware, consider using the same vendor when possible per enterprise service as there will be a single point of contact for any support.

7. Migrate transitional server operating systems (OS) to strategic OS, this will consolidate and simplify (overarching principle 1) and allow for better use of resources (domain specific principle1).

8. There is only one TRC standard (Servers and Storage). This needs to be split into multiple standards, as there is anti-virus, SAN, OS (without any versions), Configurations, Backup, Power, Maintenance, Preferred vendors. This was not addressed in the scope as this will take a lot of effort, more than what is in this first phase. Also there is no database standard.

Technology Roadmap (Identify the roadmap to transition to the desired state.)

1. Create a hardware end of life guideline. Look at the replacement plan with regard to the five year end of life, with the plan of replacement to be looked at before the budget cycle. The cost of maintenance versus replacement cost should not exceed 20%, this indicates that it is financially prudent to replace rather than maintain, by doing this 9-20 months in advance of the end of life it will allow a project plan to be created based on the desired state. For example a server is going to become five years old in May 2013, then the replacement for this server should be looked at in the budget planning in November-June, 2011 so correct appropriation is allocated.

2. Communication needs to take place with the applicable business unit(s) when initially investigation a plan for migration or upgrade.

3. Create a firmware upgrade policy for strategic hardware – quarterly review should take place on firmware upgrades with an implementation plan for upgrades deemed necessary. When negotiating hardware purchases the notification of firmware upgrades should be addressed.

4. Create a server software patch policy. A patching cycle based on the vendor release schedule that encompasses all aspects of deployment, such as reboot windows, communication, and testing.

5. Create a server software upgrade/migration guideline. When new versions of server software (OS, Database, Middleware etc…) is released it should be evaluated at least every six months, this will determine if there is a need to move to this release.

6. A configuration management database (CMDB) needs to be implemented along with a procedure and policy for change management. A survey in 2010 Evan Marcus and Hal Stern found that the top factor for unavailability is a lack of best practice in change control. A CMDB will be able to provide a list of all items that need support and will be able to be used during the budget cycle to create a total IT spend.

7. Technology implementation should include a training component.

8. Create a pricing model for some IT services.

These may include:

- virtual server costing model

- consultation rates

Standards (Review any existing standards associated with this domain and recommend an updated standard if necessary.)

1.   SQL query language.

2.   LDAP

3.   There is only one TRC standard (Servers and Storage).

Over-Arching Principles

Principle 1: Consolidate and Simplify

To the greatest extent possible, seek to consolidate and simplify the delivery of IT services. Reduce redundancy of IT resources and services. Simplify the design of complex systems and reduce the impact on support models that complexity brings.

Rationale

To optimize the overall IT spend within the City and increase reliability and performance of systems. Systems must be designed, acquired, developed, or enhanced such that data and processes can be shared and integrated across the enterprise and with the City's business partners.

Implications

- Increase integration capability.
- Rationalize the products, configurations, and vendors into strategic platforms.
- Determination of "the greatest extent possible" includes consideration of how reducing complexity can negatively impact providing critical client services.

Principle 2: Cloud, SaaS, IaaS first mentality

First look to Cloud, Software as a Service (SaaS), and Infrastructure as a Service (IaaS) offerings when implementing new IT services.   Determine the business case for cloud vs. on-premise hosted solutions.

Rationale

Will require business case analysis to determine the best hosting platform in terms of cost, support required, and benefit delivered to the City.

Principle 3: Provide for Gov 2.0 and Transparency

IT systems and services should be considered as an open platform that is transparent and meets best practices for Government 2.0.

Rationale

- Enhances stewardship and integrity of public information.
- Increases citizen access to information and services.
- Develop dialog and engagement between government and citizens.

Principle 4: Disaster Recovery / Business Continuity

An assessment of business recovery requirements is mandatory when acquiring, developing, enhancing or outsourcing systems. Based on that assessment, appropriate disaster recovery and business continuity planning, design and testing will take place.

Rationale

- The pressure to maintain availability will increase in importance.
- Continuation of business activities with IT is necessary.
- Application systems and data are valuable City assets that must be protected.

Implications

- Systems will need to be categorized according to business recovery needs (e.g. business critical, non-critical, not required).
- Alternate computing capabilities need to be in place.
- Systems should be designed with fault tolerance and recovery in mind.

Domain Specific Guiding Principles

Principle 1: Resource Driven Approach

IT works with resources in every aspect of the business so that the business services' determine the needs of IT.

Rationale

There are five types of resources; financial, infrastructure, applications, people, and capital.

Implications

 By managing the resources IT will become more efficient and be able to focus on the business.

<mark>Radio Domain</mark>

Trends/Leading Practices (Research current and emerging technologies and practices)

1. Land Mobile Radio systems are being manufactured to meet the P-25 set of standards.
2. Data radio systems are being manufactured to meet the 700MHz #GPP standards.
3. United States is moving toward an interoperable communications environment.

Technical Discussion of Current Situation (As-Is Assessment - identify and collect existing products that describe the environment as it exists today).

1. The City of Albuquerque owns two separate Land Mobile Radio systems.
2. The County of Bernalillo owns one Land Mobile Radio system.
3. The City and County's radio systems isolate them from surrounding municipalities.

Desired State (To-Be - describe the target architecture with strategic objectives based on the needs of the City.)

1. Combine the three radio systems into a single radio system.
2. Move to a nationally adopted radio communication protocol such as P-25
3. Create a hybrid radio system consisting of 800MHz along with some UHF and VHF.

Technology Roadmap (Identify the roadmap to transition to the Desired state.)

1. Obtain an MOU between the City of Albuquerque and Bernalillo County agreeing to pursue a single radio system.
2. Identify technologies that will meet the needs of the City and County.
3. Obtain funding for planning, installation, and transition to the new system.

Standards (Review any existing standards associated with this domain and recommend an updated standard if necessary.)

1. FCC standards for equipment licensing
2. APCO Project 25 standards
3. State of New Mexico radio equipment standards

Over-Arching Principles

Principle 1: Consolidate and Simplify

To the greatest extent possible, seek to consolidate and simplify the delivery of IT services. Reduce redundancy of IT resources and services. Simplify the design of complex systems and reduce the impact on support models that complexity brings.

Rationale

- To optimize the overall IT spend within the City and increase reliability and performance of systems. Systems must be designed, acquired, developed, or enhanced such that data and processes can be shared and integrated across the enterprise and with the City's business partners.

Implications

- Increase integration capability.

- Rationalize the products, configurations, and vendors into strategic platforms.

- Determination of "the greatest extent possible" includes consideration of how reducing complexity can negatively impact providing critical client services.

Principle 2: Cloud, SaaS, IaaS first mentality

First look to Cloud, Software as a Service (SaaS), and Infrastructure as a Service (IaaS) offerings when implementing new IT services. Determine the business case for cloud vs. on-premise hosted solutions.

Rationale

- Will require business case analysis to determine the best hosting platform in terms of cost, support required, and benefit delivered to the City.

Principle 3: Provide for Gov 2.0 and Transparency

IT systems and services should be considered as an open platform that is transparent and meets best practices for Government 2.0.

Rationale

- Enhances stewardship and integrity of public information.
- Increases citizen access to information and services.
- Develop dialog and engagement between government and citizens.

Principle 4: Disaster Recovery / Business Continuity

An assessment of business recovery requirements is mandatory when acquiring, developing, enhancing or outsourcing systems. Based on that assessment, appropriate disaster recovery and business continuity planning, design and testing will take place.

Rationale

- The pressure to maintain availability will increase in importance.

- Continuation of business activities with IT is necessary.

- Application systems and data are valuable City assets that must be protected.

Implications

- Systems will need to be categorized according to business recovery needs (e.g. business critical, non-critical, not required).

- Alternate computing capabilities need to be in place.

- Systems should be designed with fault tolerance and recovery in mind.

Domain Specific Guiding Principles

Principle

Identify and obtain radio communications equipment that meets the operational needs and budgetary constraints of the City of Albuquerque and the County of Bernalillo.

Rationale

- Utilizing equipment that meets the needs of multiple departments increases the communications interoperability between those departments.

- Reduces the number of different types of equipment that require training, maintenance/service and eventually replacement.

- Departments are inherently aware of each other's radio communication capability/restrictions due to equipment familiarity.

Implications

- Inventory tracking becomes tedious due to multiple departments utilizing the same equipment type.

- Tends to lengthen the equipment's life expectancy. If a single equipment type is purchased in large quantities over a several year period it becomes difficult to replace when the equipment becomes unsupported by the manufacturer.

- Different disciplines (Law Enforcement, Fire, EMS) must work together to establish core requirements for equipment and agree on an equipment type.

Definition

The risks of security breaches demand a robust technology security program. Security is critical to ensure the protection of the public, to ensure the effective operation of the City of Albuquerque's enterprise and to provide a trusted and reliable technical environment.

Scope

Presently, the City of Albuquerque does not have a comprehensive security plan, Security standards and policies are either end of life or needing updates to reflect existing technologies or a security awareness program. It is the intent of this workgroup to review the existing security documentation and As-Is security practices being implemented.   The workgroup will review and follow industry best practices to define a To – Be desired state of a Security Program.

The following outline identifies specific areas the Security Workgroup will be assessing and making recommendation as necessary to address the current and future security requirements to best protect the resources within the City of Albuquerque.   The Security Domain group will identify technology trends that are specific to the Security Domain and the Enterprise environment.

Phase one of the Enterprise Architecture Security Domain Group will consist of:

- Reviewing and addressing existing City security policies and procedures
- Reviewing existing security devices, Iron Port, Cameras,
- Identify security awareness best practices
- Identifies opportunities to leverage expertise resources across agencies
- Identifies opportunities to leverage purchasing power in maintenance, consulting contracts, and upgrades,

Methodology

Stakeholders from city departments will provide their leadership and time to organize and implement EA Domain Workgroup Teams. Each team will be responsible to work collectively by brainstorming and strategizing to formulate solutions and desired outcomes.

The basic principles of a Security Program are:

1. The integrity, confidentiality and security of constituent data to be protected. All appropriate policies, standards and legislation will be observed.
2. Protect against loss of, or damage to financial or physical assets, to the City's reputation through misuse of systems or data, or to customer, partner relationships.
3. Authorized access control to systems and data.

The methods by which these principles are to be met take into consideration a variety of areas. These areas include: physical security, data security, compliance/regulatory requirements, Security Awareness, Disaster Recovery/Business continuity (BC/DR) and The human resources.

Each Workgroup Domain Team Member's work will be to populate the following components:

Approach
When analyzing the data four categories were identified.

Strategic
This technology is considered a strategic component of the ITSD Enterprise Technical Architecture. It is acceptable for current deployments and shall be used for all future deployments.

Emerging
This technology requires additional evaluation in government and university settings. This technology may be used for evaluative or pilot testing deployments or in a higher education research environment. Any use, deployment or procurement of this technology beyond higher education research environments requires an approved exception. The results of an evaluation or pilot test deployment should be submitted to the TRC for consideration in the next review

Transitional/Contained
This technology is not consistent with the ITSD Architecture strategic direction. Agencies may use this technology only as a transitional strategy for moving to a strategic technology. Agencies currently using this technology should migrate to a strategic technology as soon as practical. A migration or replacement plan should be included as part of the Agency's IT Strategic Plan. New deployments or procurements of this technology require approval

Obsolescent/Rejected
This technology may be waning in use and support, and/or has been evaluated and found not to meet current ITSD Architecture needs. Agencies shall not make any procurements or additional deployments of this technology. Agencies currently using this technology should plan for its replacement with strategic technology to avoid substantial risk. The migration or replacement plan should be included as part of the Agency's IT Strategic Plan.

Technical Discussion of Current Security Situation

The Current situation identifies what security process, standards, equipment or devices are in the existing environment. The current situation will include existing technologies, security practices being implemented and staffing. The Current situation; existing practices and methods being implemented for the security of City of Albuquerque networked resources.

Trends/Leading Practices

Trend technology requires an evaluation in government environment. This technology may be used for evaluative or pilot testing purposes. Any use, deployment or procurement of this technology requires an approved exception. The results of an evaluation or pilot test deployment should be approved by the appropriate committees within City of Albuquerque.

Desired State (To-Be – By using industry trends and leading practices, describe the target architecture with strategic objectives based on the needs of the City.)

Technology Roadmap: The workgroup will create a technology roadmap following industry standards and guiding principles to achieve the To-Be Desired State of the Enterprise Security program with the goal of meeting City and Department strategic objectives.

Reviewing and addressing existing City security policies and procedures

Description

As-is

Security Policy/procedures and Standards
Technology Component Standard
Strategic:
Existing Policy/Procedures/Standards
Policy
Access Revocation
Access to Financial Systems
Computer Abuse Incident Reporting and Response
E-Mail Encryption/Digital Signature
Employee IT Security Certification
Information Technology Protection
Peer-to-Peer (P2P Internet-based Applications
User ID Security
Procedures
Computer Abuse Incident Reporting
Computer Abuse Incident Response
Employee IT Security Certification - Testing Methods
Failure to Comply with Virus Protection
Microsoft Windows Update
User ID Security Policy Exceptions
Standard
Approved Exceptions to User ID Security Policy
Computer Abuse Incident Reporting and Response - Prohibited Titles
Electronic file and Document Storage
Microsoft Windows Update
Novell NetWare Login Passwords
Passwords
Peer- to-Peer (P2P) Internet-based applications - Prohibited Titles
User IDs

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User IDs - Legacy Systems   Virus Protection

Emerging:
Identify and write policy addressing current and future technologies.
Transitional/Contained:
Update existing policy/procedures/standards
Obsolescent/Rejected:
Waiver History:

To-be

Security Policy/procedures and Standards Technology Component Standard
Strategic:
Create a committee for quarterly meeting to review and edit policy/procedures and standards.
Emerging:
Using industry best practices, update existing policies/procedures and standards to fit existing technologies and environment being or to be utilized with the COA environment.
Transitional/Contained:
Security policies/procedures and standards shall be written for the following areas: Network Access controls (auditing capabilities) Wireless Firewall (in/out) Video Etc.
Obsolescent/Rejected:

Description:
Reviewing existing security devices, Iron Port, Cameras,

As-IS

Reviewing existing security devices, Iron Port, Cameras
Strategic:
Identify and Review existing security device configurations for: ASA Iron Port MARS CiscoWorks

Emerging:
Update existing security technologies and devices to be utilized with the COA environment. ASA/VPN solution VLan's separation of Voice/data/video.

Transitional/Contained:
Training in MARS/CiscoWorks Latest version of CiscoWorks

Obsolescent/Rejected:

To-be

Reviewing existing security devices, Iron Port, Cameras, Description
Strategic:
• To upgrade all existing devices to the latest versions. • Incorporate Traffic analyzers Sniffer technology to discover and eliminate suspicious traffic. • Technology to lock down mobile devices to prevent data theft from lost/stolen devices • Develop auditing capabilities for access controls to networked resources, i.e. AD, databases etc... This will provide the reporting capabilities to determine who gains access to resources, what time, login attempts, unauthorized access attempts etc.. • Implementation of Intrusion Detection /Prevention Device (IDP) • Regular scans/auditing of networked resources for vulnerabilities • Training of staff in the use and configuration of Security devices

Description:
Identify security awareness best practices

As-IS

Identify security awareness best practices
Strategic:
Not currently being addressed
Emerging:

Transitional/Contained:
Obsolescent/Rejected:

To-Be

Identify security awareness best practices
Strategic:
Within the next 12 months, create and implement a security awareness program throughout the COA. Send out monthly bulletins which inform staff concerning security issues. Training of staff in Security Awareness best practices. Dedicate staff to Security awareness and all security related issues Within the next 12 months, Develop a Security Plan for the COA.
Emerging:
Transitional/Contained:
Obsolescent/Rejected:

Description:
Identifies opportunities to leverage expertise resources across agencies

As-IS

Strategic:
Not currently being addressed within COA.   Currently many departments are acting on their own in regards to security. Physical security is the most shared security measure amongst the agencies. IT Security is not currently being practiced.
Emerging:
Transitional/Contained:
Obsolescent/Rejected:

To-Be

Strategic:
Within the next 24 months, work to consolidate all security components (physical, data, disaster recovery) into one department to work as a single unit in the delivery of security best practices to the entire City.
Emerging:
Transitional/Contained:
Obsolescent/Rejected:

Governing, Managing and Accountability

EA is and must be treated as a program. Projects have defined start and end dates, and are measured on the effectiveness of a specific implementation (e.g. deliverable effectiveness, on-time delivery, delivery within budget, etc.) EA is an ongoing effort. Once developed, the architecture is kept vital through on-going reviews and updates, allowing the organization to prepare technology plans based on business and technology drivers.

Using program management principles to administer EA assures:

- Creation of a viable EA Framework (structural elements such as Architecture Governance, lifecycle processes, integration with procurement, communications, IT strategic planning and other core management activities)
- Documentation of architecture blueprints (content) that provides value to decision-making authorities
- Design of enterprise solutions that leverage existing assets, knowledge, configurations and infrastructure
- Evolution of the program through continuous improvement and refinement of the EA program and content.
- Establishment of sound performance provisions such as the federal Performance Reference Model (PRM)

Enterprise architecture governance addresses the governance roles and processes required for maintaining Enterprise Architecture. Architecture governance is used to create a sound governance model to support implementation and management of the architecture as necessary to ensure the enterprise achieves its objectives. Architecture governance must be resilient enough to allow for

those in primary governance roles to learn and adapt, manage the risks, and appropriately recognize opportunities and act upon them.

Work Plan: Enterprise Architecture Management Best Practice Guidelines and Activities

The following work plan guidelines and activities are based on Gartner and Forrester research and advisory services best practices, NASCIO guidelines. These will be incorporated in a formal work plan and integrated with the EA Program process activities described in the Enterprise Architecture Work Plan (see attachment).

- **Value Proposition:** Refine the City of Albuquerque EA Value Proposition to agencies and the cross-boundary IT community.
- **Change Management:** Establish a change management process and calendar.
- **Communications Strategy:** Develop and implement an initial communications strategy and plan, communicating the role of EA and setting expectations of individuals participating in the process.
- **Stakeholders and Governance Provisions:** Identify the full range of stakeholders, including potential cross-boundary partners and refine governance provisions. Establish a plan for setting up a governance mechanism.
- **EA Leadership:** Identifying the EA leader or chief architect.
- **EA Team:** Build and charter the "EA team," which will own and facilitate the EA process and establishing clear roles and responsibilities.
- **Align EA with Core Planning and Management Processes and Priority Projects:** Align EA program with strategic planning, project and portfolio management, procurement, other core management processes and priority projects.
- **Performance and Accountability:** Align with the IT Strategic Plan and City Department's goals and strategies. Define EA related measures of success to articulate value delivered.