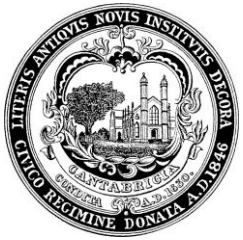
City of Cambridge IT Strategic Plan

Executive Summary
Final Report

April 17, 2013

Prepared for



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Executive Summary

- The City of Cambridge is at a critical juncture as it balances customer and citizen demand for additional and improved services with an IT department developed to support historical user needs.
- The following 25 pages summarize the comparative analysis, the capabilities assessment and recommendations and roadmap.
- Beginning on page 27 is the detailed Final Report.

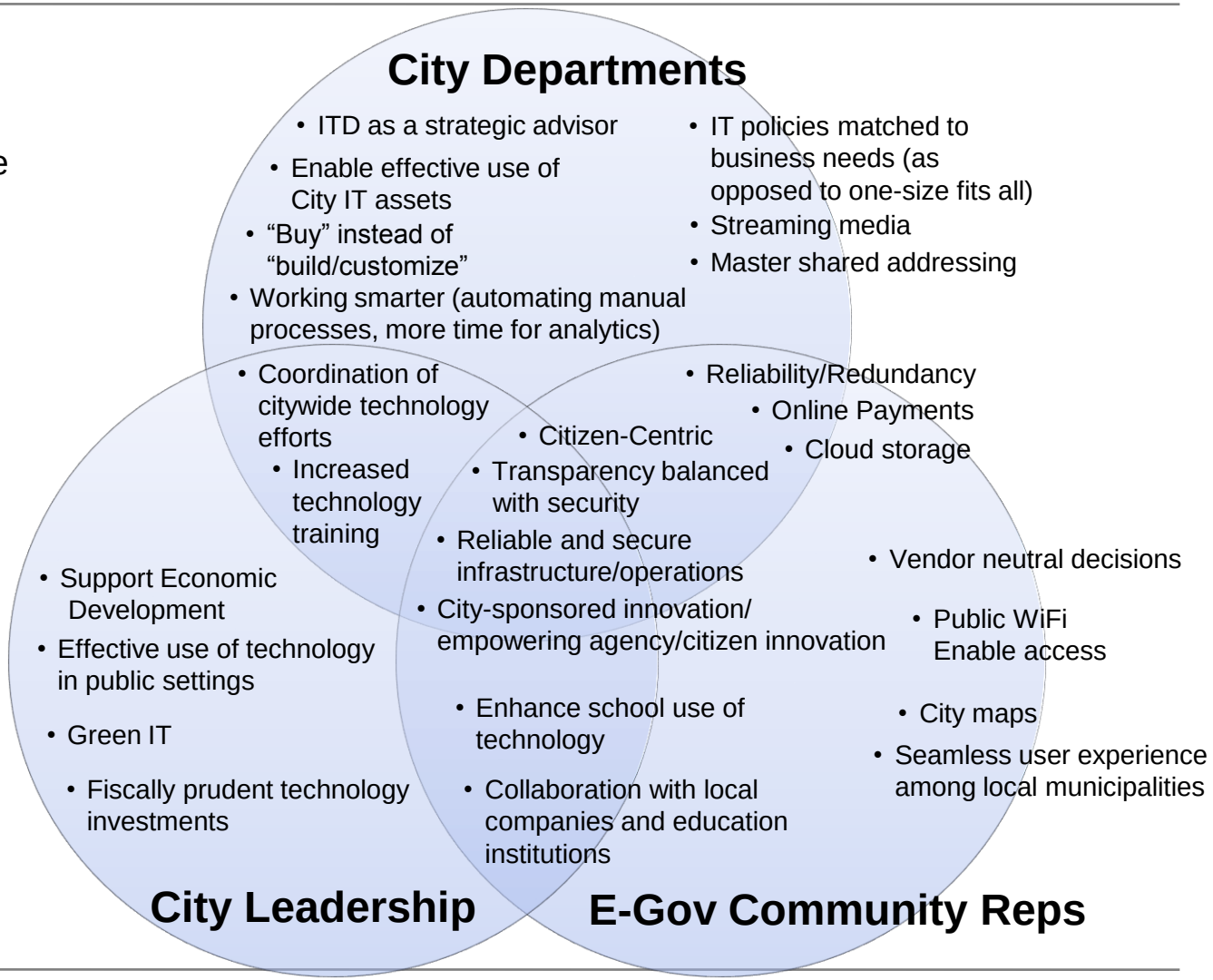
Executive Summary – Project Background

- Innovation, mobility and a number of other key objectives have been at the forefront of City business and IT leadership discussions. This effort led to a decision to develop a formal, actionable IT Strategic Plan.
- With customer demand and expectations growing, the City sought to define an IT strategic plan that governs IT investment decisions in a manner that balances innovation and meeting customer demand with maintaining its historically strong financial standing.
- As such, the City of Cambridge sought to address the objectives below:
  - Document and validate the City's future state business and IT goals, including the related priorities and imperatives
  - Assess the City's capabilities related to achieving its target state
  - Develop an IT Strategic Plan and Roadmap defining the best application of IT investments for the City to achieve its short- and long-term objectives
- The resulting IT Strategic Plan and Roadmap presented in the balance of this report strongly aligns with City stakeholder demand and provides an actionable plan that the City can execute to meet its strategic priorities and imperatives.

Executive Summary – Imperatives and Priorities

Growing demand and expectations of IT in the City of Cambridge require the City to view IT more strategically

- City stakeholders identified citywide needs that informed the IT Imperatives
- In addition, the desire for additional IT services was communicated by all stakeholder groups, indicative of growing demand for IT in the City.



Executive Summary – Imperatives and Priorities

City Priorities drive significant IT Imperatives that require the City to view IT from a strategic perspective, rather than a reactionary approach

City Priorities	City Imperatives	IT Imperatives
Achieve City Council Goals	Deepen and broaden engagement with citizens	Contribute to City and Department leadership as a strategic advisor
Increase Citizen Participation	Provide highest quality municipal services	Co-create innovative technology products/solutions across the City
Maintain Strong Financial Standing	Operate efficiently and cost effectively	Assess requirements from a Citywide perspective to maximize use and investment in technologies
Support Economic Development	Ensure public safety and security	Provide reliable, flexible, integrated and scalable technology platforms
	Provide accessible quality learning environment	Increase automation to reduce paperwork and streamline processes
	Enhance urban environment for sustainable high quality of life	Enable digital channels, social media and new technology for City relevancy and Citizen value
	Provide stability and reinvestment in the community	Provide access to accurate, relevant, timely shared & secure data at point of need
	Increase transparency and accountability across the City	Establish clear operating principles for distributed responsibility and shared decision making
		Consistently and successfully execute projects of varying complexity with Department sponsor(s)
		Effectively partner with vendors and external service providers to complement internal capabilities

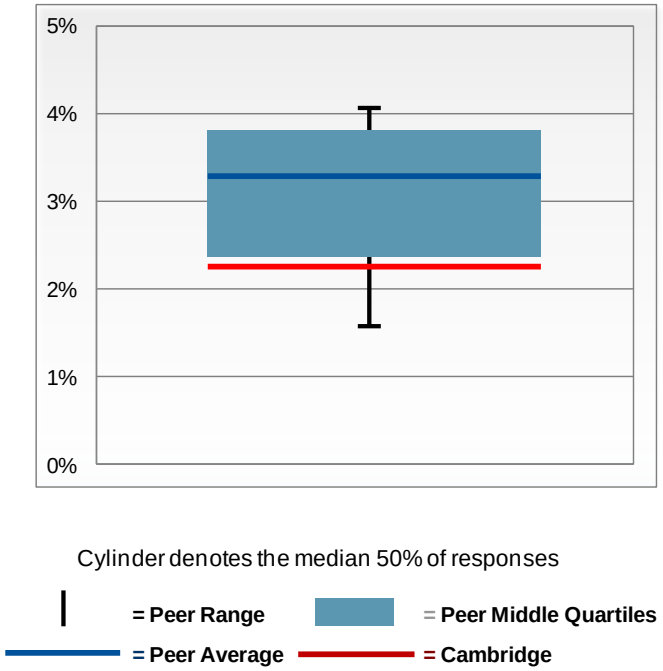
Executive Summary – Comparative Analysis

City of Cambridge spends considerably less on IT compared to peer municipalities*

- Comparative analysis provides foundational IT spending data that can inform decisions made for the IT Strategic plan.

- For Cambridge, 9 municipal government organizations were selected for the budget-based comparisons based on industry, revenue and operational expense. Key attributes include:
  - Industry scope consists of Municipal Government
  - Peer Average Total Operational Budget: **$392 Million**
  - Peer Average Number of Employees: **1,732**

- The City of Cambridge spends 1.96%** of its operating budget on IT, far below the peer average of 2.9%. **peers allocate 48% more of their operating budget to IT.**
- The City of Cambridge percentage of IT staff to total City staff is 2.28%*, significantly trailing the peer average of 3.2%. Consequently, **peers average 40% more IT staff than the City of Cambridge.**
- Based on comparative analysis, the City of Cambridge invests significantly less in IT than its municipal peers. Consequently, the ability of IT to support efforts to grow or transform business functionality are limited, as IT resources must be focused on delivery of basic services, such as user support and network maintenance



[NOTE: *City of Cambridge performed a comparison of MA municipalities' total budgets to total IT spend and Cambridge spends more than the majority of MA municipalities*.]

* Peer municipalities does not include any in Massachusetts
** Based on Cambridge FY2012 Budget - includes IT Staff in other depts.

Executive Summary – Capabilities Assessment

Analysis indicates the current model of IT could be improved, exhibits potential risks and is not positioned to support the growing demands of stakeholders

Strengths

- Adequate operational support services for 'keeping the lights on'
- Reasonably strong relationships between departments and ITD understanding of departmental tactical needs
- Can-do attitude across most of ITD
- Market-leading enterprise applications for primary functions
- Good momentum and interest in technology planning from leadership as well as stakeholders

Weaknesses

- Risks with disaster recovery/business continuity, support and underutilized IT assets
- Inefficient and underdeveloped IT service delivery processes and limited knowledge transfer
- Reactionary 'fire fighting' IT with 'hero/heroine culture' dependent on a few key individuals
- Limited depth and key skill sets to meet future demand (e.g., business relationship management, innovation)

Opportunities

- Leveraging current investments in enterprise applications to address manual processes
- Sourcing improvements to maximize value of contracts and assets, and enable innovation
- Increased transparency and participation for IT investments and governance for prioritization and joint decisions
- By strengthening ITD & department collaboration, ITD should gain a broader understanding of the departments' needs
- City leadership involvement, E-Gov groups and external members provide opportunity for increased collaboration with ITD, understanding of IT implications for the City and expanded network of external IT resources

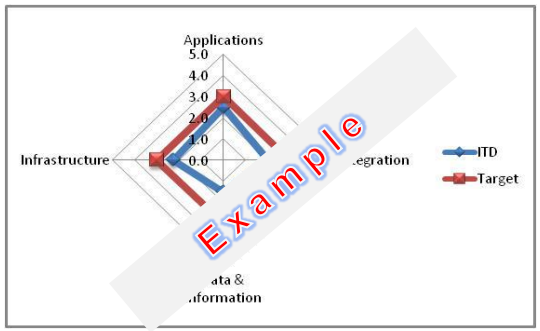
Threats

- Critical knowledge undocumented and residing in individuals' memories
- Single points of failure in network architecture (e.g., network node and data center)
- Ability to attract top talent in light of government compensation constraints
- Limited formal personnel performance management (e.g. goal setting, feedback)

Executive Summary – Capabilities Assessment

Gartner assessed City capabilities from a 360-degree perspective to measure maturity and areas of improvement

- Gartner performed a 360-degree analysis of Cambridge across technology, process and people to gauge the City's ability to meet the current and future demands.
- Utilizing a maturity model, key areas within technology, process and people were assessed and given a current maturity rating as well as a target rating.
- Target states are based on perceived achievability and maturity levels witnessed in other municipal clients, factoring in industry trends.
- Each 'spider chart' shows the current maturity level as well as the target state on a single graphic to illustrate areas of improvement of the City in relation to technology, process and people.

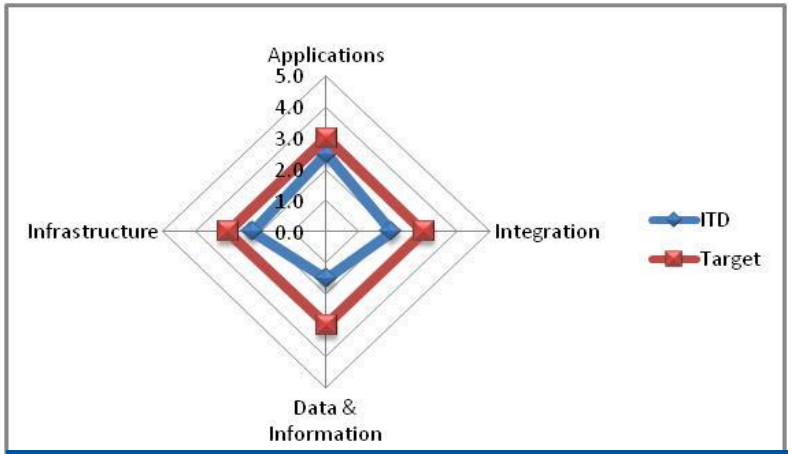


- **Technology**
  - Infrastructure
  - Applications
  - Integration
  - Data and Information
- **Process**
  - IT Service Management
  - Solution Development
  - Enterprise Architecture
  - IT Strategy and Management
  - Program and Portfolio Management
  - IT Project List
- **People**
  - Organization Design
  - Leadership Effectiveness
  - Sourcing
  - Communication
  - Skills
  - Selecting & Assessing Competencies
  - Overall Skill Maturity
  - Overall Competency Maturity

Executive Summary – Capabilities Assessment

An assessment of City technology capabilities identified business continuity and support risks, as well as IT assets that could be better utilized

- Infrastructure equipment is well maintained, but the network architecture requires additional enhancements and Cambridge as a whole does not currently have adequate disaster recovery capability to support known business requirements in the event of a site specific disaster incident.
- Enterprise applications utilize mostly batch processing for data sharing, and the City could benefit from more real-time processes to avoid the need for duplicate data entry that exists today.
- Reporting and analytics are currently underutilized, with business users often tracking data in separate spreadsheets and databases in order to report and utilize information.
- Use of social media is inconsistent across departments and has unknown effectiveness (e.g., small % of population following), which may not be sustainable

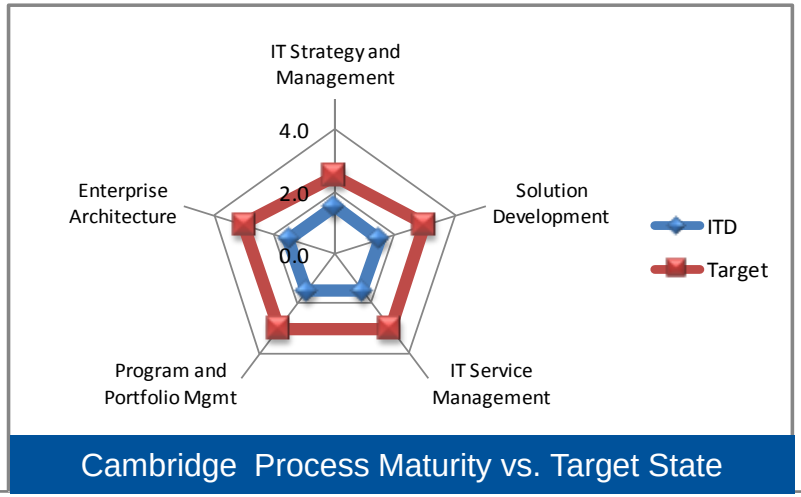


Cambridge Technology Maturity vs. Target State

Executive Summary – Capabilities Assessment

An assessment of ITD process capabilities identified underdeveloped processes that impact efficiency

- Cambridge ITD has been effective in keeping on top of the day-to-day needs of it's business customers, however, underdeveloped processes force ITD to redirect staff to incidents on a reactionary basis as opposed to making those responses more efficient.
- For critical incidents and ongoing operation/availability of services, users are generally pleased with service. There is over dependence on a few key resources
- Some investments and IT projects do not appear to be sufficiently reviewed and reprioritized by Departments with ITD.
- Project and resource prioritization is done ad hoc based on various criteria. Project pipeline is managed as a request list maintained by ITD, and projects are informally managed, with limited communication of status, progress or financial metrics to stakeholders.
- Incident tracking has been reported as only capturing 30-50% of incidents, the remainder are not being tracked. As a result, ITD does not have an accurate picture of where resources are spending their time or how well it is doing at providing services to its customers.

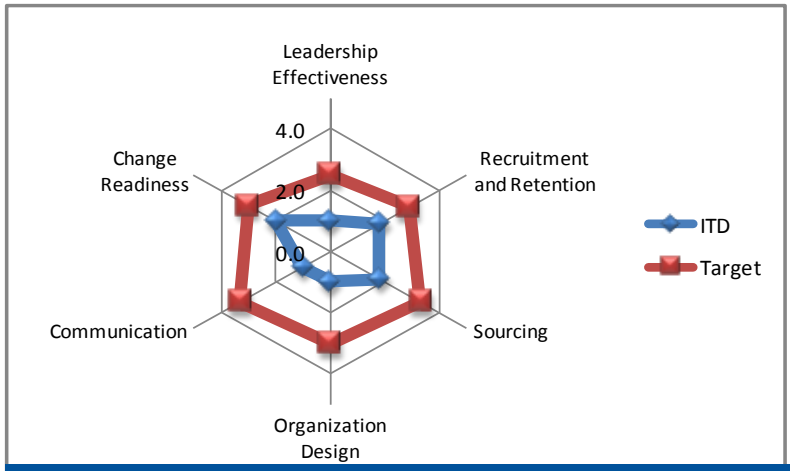


Cambridge Process Maturity vs. Target State

Executive Summary – Capabilities Assessment

An assessment of ITD people capabilities identified a lean team, an overreliance on 'heroes/heroines' and a limited strategic alignment with customers

- ITD operates as a lean organization with ~2.2 staff per every 100 City employees; peers* average 40% more IT staff than the City of Cambridge. The current ITD organization is razor thin in several critical areas.
- Over the years, ITD has been developing capability to both "keep the lights on" as well as support new business demands in a cost effective manner, but over-reliance on single individuals puts continuity of service at risk.
- ITD is effective at meeting the critical technology needs of their business customers. However, ITD is not effectively set up to support growing requirements or transformational needs. There are gaps in key competencies required to support future demand, in particular areas such Initiative, Innovation and Strategic Business.
- A detailed skills inventory showed that there are skills and competency ("soft skills") gaps for the future (e.g., business relationship management) and limited depth in critical operational roles, such as network management and database administration.



Cambridge Organizational Maturity vs. Target State

* Peer municipalities does not include any in Massachusetts

Executive Summary – Capabilities Assessment

A skills inventory and analysis of ITD staff revealed key insights regarding potential organizational changes

- In large part because of the understaffing, ITD has to concentrate on “keeping the lights on” and is not able to play a more strategic role in solving business problems.
- The skills inventory revealed that ITD has above average skill maturity, in key areas, as compared against Gartner’s industry database.
- However, ITD relies on their higher skills maturity to overcome their relatively small number of staff, compounded by underdeveloped processes.
- When the IT organization is not involved in strategic planning, the different Departments tend to produce their own plans independently of each other.
- Based on the skills assessment and current staffing ratios, ITD highest priorities in increasing and/or improving resources are in the following areas:
  - Business Analysis/Business Relationship Management (e.g., defining requirements)
  - Strategic Planning/Architecture and Emerging Technologies (e.g., web, mobility, social media, etc.)
  - Tech Support (currently impacts system administration, DBA, network and enterprise applications)
  - Network Management

Executive Summary – Recommendations

Meeting stakeholder demand requires the City of Cambridge to view IT strategically and elevate the value of IT through five initiatives

- In order to transform the role and value of IT in Cambridge, the City must determine which recommendations to act upon and prioritize resources to execute these essential steps to reach the future state.
- Gartner has developed recommendations and a 180 day action plan that would enable the City to address current weaknesses and opportunities in order to effectively and efficiently support City priorities and imperatives.
- The five initiatives below, described in detail later in the report, comprise the core elements of the recommended City IT Strategic Plan and move ITD from performing in a reactionary mode to acting as a strategic advisor for City stakeholders, providing input and guidance through a close and trusted relationship.

Establish Critical Governance Structure

1. **Implement Citywide Governance Model**

Implement ITD Organizational Improvements

3. **Realign the ITD Organization**
4. **Manage Innovation**

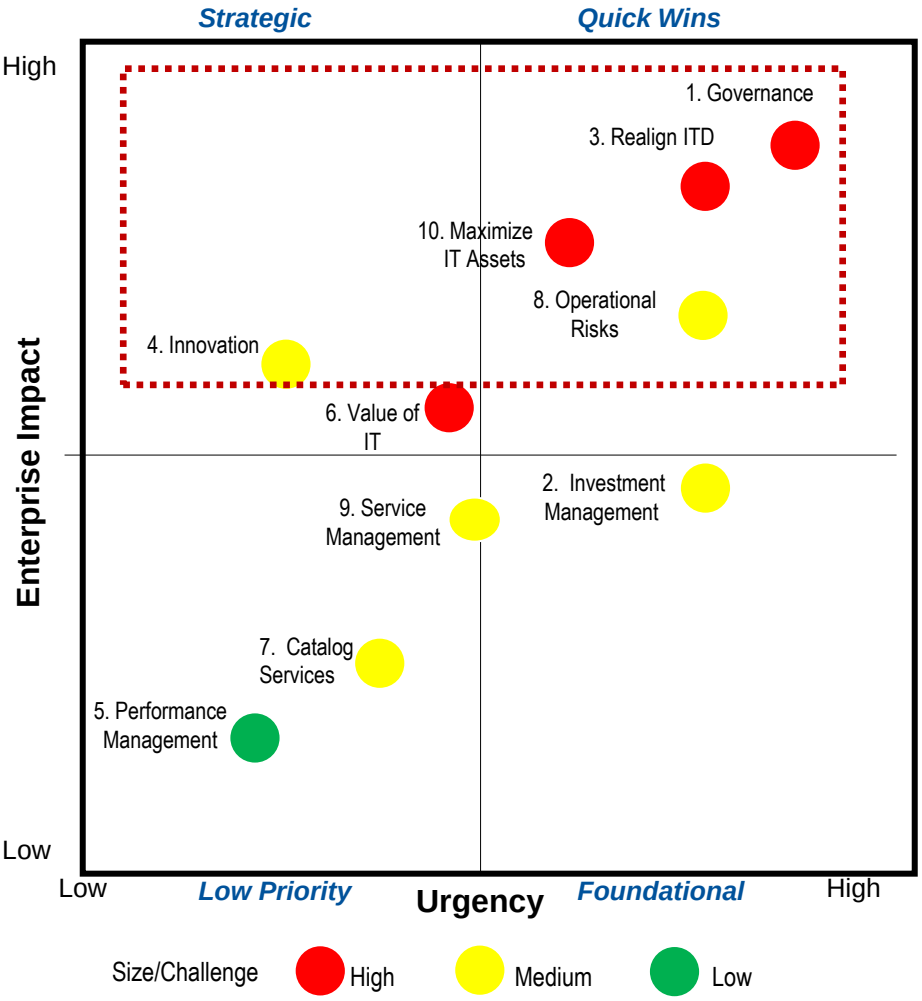
Maximize Effectiveness of IT Operations

8. **Address Critical Operational Risks**
10. **Maximize Value of Current IT Assets**

Executive Summary - Recommendations

Gartner recommends a number of projects for the City to undertake, five of which should be addressed immediately

- **Establish Critical Governance Structure**
  1. Implement Citywide Governance Model
  2. Elevate IT Investment Management
- **Implement ITD Organizational Improvements**
  3. Realign ITD Organization
  4. Manage Innovation
  5. Implement IT Performance Management
- **Improve IT Relationship with Customers**
  6. Elevate Value of IT to Customers
  7. Catalog IT Services
- **Maximize IT Operational Effectiveness**
  8. Address Critical Operational Risks
  9. Improve Service Management
  10. Maximize Value of Current IT Assets



Executive Summary - Recommendations

What is Governance?

- Governance is the set of processes and structures that enable effective decision making.
- It defines decision-making rights and the accountability framework to ensure that decisions are made by the right stakeholders, with the benefit of the right input, and are communicated to the appropriate stakeholders.
- It creates a management process for:
  - Setting goals
  - Establishing policies, practices, procedures and the organizational structure to provide reasonable assurance that enterprise goals will be met
  - Forming and enacting decisions
- Defining and implementing effective governance takes time, effort and focus.
- Effective governance will yield cost savings, innovation, growth, reuse and sharing.

Governance = Decision Making

Governance ≠ Organization Structure

Source: Gartner Research

Executive Summary - Recommendations

Implement Citywide Governance Model

Key Takeaways

- Capitalize on momentum of IT Strategy project and progress of the E-Gov Executive, E-Gov Project and E-Gov Community Representative Committees to define foundational governance elements, and secure long-term buy-in.
- Define the strategic role of ITD in the City and the extent to which the City aims to adapt and invest in the changes required to meet customer demand.
- High governance performers exhibit seven distinctive characteristics*. Focus on those most critical and appropriate for the City of Cambridge, highlighted below:
  - Characteristic 1 – Strongly Differentiated Business Strategies
  - Characteristic 2 – Clear Business Objectives for Investments
  - Characteristic 3 – High-Level Executive Participation in Governance
  - Characteristic 4 – Stable Governance, With Few Changes Year-to-Year
  - Characteristic 5 – Well-functioning, Formal Exception Processes
  - Characteristic 6 – Formal Communication Methods
  - Characteristic 7 – Clear Governance Owner and Metrics

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Executive Summary - Recommendations

Implement Citywide Governance Model

Project Charter to Define the Tactical Plan and Drive Key Activities

Project	1. Implement Citywide Governance Model
Program	Establish Critical Governance Model

Objectives

- Clearly define roles and governance processes among internal and external key stakeholders
- Improve City-wide decision-making and alignment of IT investments to top priorities
- Define processes, deliverables, meetings and other tangible elements of the governance model and gain buy-in from stakeholders
- Increase engagement and leverage of external resources to foster innovation and partnership, and to expand the pool of resources

Critical Success Factors

- Active participation of City leadership and key stakeholders, internal and external to the City
- Identification of key decision points, participants and rules of engagement
- Explicit definition and implementation of governance roles and processes
- Clear focus on and measurement of business outcomes to ensure on-going effectiveness of IT governance

Deliverables

- Governance model, charter, domains
- Governance processes and structures
- Recommend-Agree-Input-Decide (RAID) model and Communication Plan

Scope	City organization and external stakeholders
Project Sponsor	City Manager
Business Owner	City Manager
Critical Team Members	Leader: City Manager Other Participants: CIO, ITD Deputy Director, E-Gov Executive, E-Gov Project and E-Gov Community Representative Committees External Support: consulting support and guidance, as deemed necessary

High-Level Project Plan

1. Assign project manager and core team to lead effort
2. Draft governance charter and confirm City objectives
3. Define Strategic and Operational Governance Domains
4. Define Governance Processes and Structures
5. Establish RAID model
6. Finalize documentation and communication plan and implement model

Estimated Duration	3–4 months

Risks

- Lack of buy-in and participation by critical stakeholders
- Failure to prioritize governance activities on an ongoing basis

Prerequisite Activities

- Identification of all participants, buy-in and commitment from all parties

Benefits

- Lower total cost of ownership via enterprise perspective
- Strengthened relationship of ITD with City Departments
- Increase transparency and accountability of IT in the City

Costs

- **TBD**
- **To be determined based on decisions resulting from Final Report**

Contingency Plan

- Build off of current IT strategy momentum and define task force that will produce key deliverables, extend timeline by 1-2 months.

Follow-Up Actions

- Assess effectiveness of governance model on a periodic basis and adjust
- Move to IT Investment and prioritization frameworks and processes (Project #2)

Executive Summary - Recommendations

Realign ITD Organization

Key Takeaways

- The City must reassess the role of ITD in citywide strategic planning and execution to meet stakeholder needs and maximize return on investment in IT. Governance improvements are foundational to achieving this.
- From an organizational standpoint, based on Gartner research and analysis, ITD would need more staff to reach the nationwide industry average size of its peers* (i.e., to make up for the gap in staff, ITD would need more FTEs to reach the industry average size of their peers)
- However, based on the skills assessment and current staffing ratios, ITD's highest priorities for increasing and/or improving resources are in the following four areas:
  - Business Analysis/Business Relationship Management (e.g., defining requirements)
  - Strategic Planning/Architecture and Innovation/ Emerging Technologies (e.g., mobility, social media, etc.)
  - Technical Support (currently impacts system administration, DBA, network and enterprise applications)
  - Network Management
- Once target state ITD organization is defined, immediately address skills gaps by exploring sourcing, training and other options to obtain critical skills.

* Peer municipalities does not include any in Massachusetts

Executive Summary - Recommendations

Realign ITD Organization

Project Charter to Define the Tactical Plan and Drive Key Activities

Project	3. Realign ITD Organization
Program	Implement ITD Organizational Improvements

Objectives

- Define new ITD roles and responsibilities
- Adjust organizational structure as needed to meet future demand
- Identify sourcing and training needs (i.e., hiring, contractors, etc.)
- Develop action plan that delineates all required actions to move to future state

Critical Success Factors

- Clear roles and responsibilities within ITD
- Fill roles with experienced, pragmatic resources (internal and external)
- Adopt flexibility to address future skills and competencies

Deliverables

- Revised ITD org model, and new roles that require filling
- Job descriptions w/ roles and responsibilities
- Action plan to migrate to future state org model

Scope	ITD
Project Sponsor	CIO
Business Owner	City Manager
Critical Team Members	Leader: CIO Other Participants: Human Resources, Finance, E-Gov Executive, and E-Gov Project Committees External Support: consulting support and guidance, as deemed necessary

High-Level Project Plan

1. Assign project manager and core team to lead effort
2. Define future state roles and org structure to support
3. Define/refine job descriptions as needed
4. Identify and source candidates
5. Address key gaps, develop contingencies
6. Develop action plan
7. Communicate organizational changes to stakeholders

Estimated Duration	3–4 months

Risks

- Sourcing roadblocks (e.g., problems acquiring needed skills)
- Insufficient development of new roles and responsibilities

Prerequisite Activities

- Consult human resources to understand options and obstacles
- Prioritize needs based on future needs and skills inventory results

Benefits

- ITD organization better equipped to meet stakeholder needs
- Added skill sets to meet demand
- Fewer ITD single points of failure

Costs

- **TBD**
- **To be determined based on decisions resulting from Final Report**

Contingency Plan

- Quickly identify needs and sourcing plan for critical needs (e.g., network administration) and address. Then address next level of criticality

Follow-Up Actions

- Ongoing assessment of ITD to adjust to future needs as required
- Implement performance management (Project #5)

Executive Summary - Recommendations

Manage Innovation

Key Takeaways

- Tap into Cambridge ecosystem (e.g. universities, local businesses, neighborhood groups, etc.) to 'source' innovation skills and technologies from outside partners.
- Begin to develop relationships with external parties (e.g. universities, local companies, Community Reps) to foster innovation (e.g. innovation contest) and for greater leverage of external resources.
- Foster a culture that encourages and supports experimentation and an ITD organization that can support and establish clear policies on development of experimental technology projects.
- Explore all technology options for new requirements, including utilization of current IT assets and sharing with partner entities, rather than immediately opting for 'additive' solutions.
- Assess options and feasibility of additional process automation and paperwork reduction initiatives through increased utilization of current software assets.
- Consolidate ("virtually") social media activities under one program and establish measurement mechanisms.
- Establish City guidelines and enterprise content management strategy for digital engagement with citizens, presentation of information and distribution of information.

Executive Summary - Recommendations

Manage Innovation

Key Takeaways

- Successfully managing innovation requires a communication strategy that speaks to each stakeholder group individually. As such, IT innovators should
  - Emphasize leadership and communication skills. If you have to choose, select leadership and communication over technical ability.
  - Deliver innovation as way to achieve more-effective government, not as an IT solution.
  - Communicate deliberately. Use communication to forge bonds between innovators and those managing the status quo. Maintain the optimal level of distance from the status quo to promote change while ensuring innovations will not ultimately be rejected.
  - Evaluate your team from a behavioral point of view, and ensure that obstacles and issues are raised to drive problem solving, rather than naysaying.
  - Avoid assuming the value of innovation is self-evident. Tailor the value to your audience, and be explicit about desired outcomes beyond technological advancement and possible objections to the desired outcomes.

Table 1. Different Mind-Sets of Government Stakeholders

Stakeholder Role	Innovation Outlook	Political Risk Tolerance	Business Risk Tolerance	Language	Time Horizon
Elected Enterprise Leaders	Require	Low to Moderate	Moderate to High	Strategy, Politics	Balance of Elected Term, Future Positioning
Legislative Branch Leaders/ Parliamentarians	Support	Low	Moderate, but without in-depth understanding of implications	Constituency, Politics	Elected Term
Chief Operating/ Administrative Officers	Support	Low to Moderate	Low to Moderate	Strategy/ Operations	Personally Flexible, but Sensitive to Political Terms
Finance Ministers/ Budget Directors	Skeptical/ Pragmatic	Low to Moderate	Low to Moderate	Quantitative Results	Budget Cycle
Heads of Departments/ Ministries/ Agencies/ Programs	Support	Moderate	Moderate	Mainstream Business Operations	Elected Term
Business Process Owners	Resist	Moderate	Low	Business Processes	Flexible
IT Operations	Resist	Low	Low	Technology	Flexible
Innovators	Devoted	High	High	Ideas	Future

Source: Gartner (November 2011)

SOURCE: Critical Success Factors for Promoting Innovation in Government**', Gartner, November 2011**

Executive Summary - Recommendations

Address Critical Operational Risks

Key Takeaways

- To fulfill the fundamental ITD mission of providing core operational services to ‘keep the lights on’ for the City, several critical activities must be immediately addressed.
- Conduct a Business Impact Analysis to assess the direct and indirect financial losses from a disruption, and define the recovery objectives, which will help define where to best invest to address risks.
- Establish a formal business continuity and disaster recovery plan that will ensure the City is prepared for minor events (e.g. power outages) as well as major events (e.g. catastrophic occurrence)
- Perform necessary systems/network upgrades to address points of failure and plan and budget for future needs is critical.
- Critical technical roles will need to be in the forefront of all ITD realignment decisions to ensure that appropriate core and backup resources are in place.

Executive Summary - Recommendations

Address Critical Operational Risks

Project Charter to Define the Tactical Plan and Drive Key Activities

Project	8. Address Infrastructure and Operational Risks	**Program**	Maximize IT Operational Effectiveness

Objectives

- Business continuity and operational consistency for all stakeholders
- Cost-effective and efficient infrastructure, continuously exploring options (e.g., cloud, increased virtualization)

Critical Success Factors

- Forward-looking, long-term view of budgeting to maintain operations
- Shared (e.g., ITD and business) concurrence of application and IT services availability needs

Deliverables

- Documented Recovery Time Objectives (RTOs), Recovery Point Objectives (RPOs) within a structured Business Impact Analysis (BIA) for all applications and services
- Documented Business Continuity and Disaster Recovery (BC/DR) Plan
- Network/Infrastructure upgrade plan
- Execution of integration improvement plans

Scope	■ City infrastructure assets
Project Sponsor	■ CIO
Business Owner	■ City Manager
Critical Team Members	■ Leader: Deputy CIO ■ Other Participants: CIO, Schools and Public Safety IT teams, E-Gov Executive and E-Gov Project Committees ■ External Support: consulting support and guidance, as deemed necessary

High-Level Project Plan

1. Assign project manager and core team to lead and perform infrastructure and operational improvement effort
2. Develop and gain stakeholder concurrence for Recovery Time Objectives (RTOs), Recovery Point Objectives (RPOs) within a structured Business Impact Analysis (BIA) for all applications
3. Establish a formal business continuity and disaster recovery plan as well as periodic refresh timeline
4. Communicate plan to appropriate stakeholders
5. Plan for needed network redundancy and resiliency to meet the needs of the business (e.g., output of BC/DR plan)

Estimated Duration	■ 3 -4 months

Risks/Success Factors

- Stakeholder buy-in to the process, particularly customers
- Planning around existing facility limitations
- Must adopt Citywide perspective, including growth projections

Prerequisite Activities

- Identification of core team, to include Schools and Public Safety
- Prioritization of immediate actions to address operational risks.

Benefits

- Greater availability of key business applications and services
- Defined process with customers for ongoing BC/DR planning

Costs

- **TBD**
- **To be determined based on decisions resulting from Final Report**

Contingency Plan

- Address known risks immediately (e.g., network upgrade), contact neighboring cities and universities to gauge ability to cooperate on BC/DR needs

Follow-Up Actions

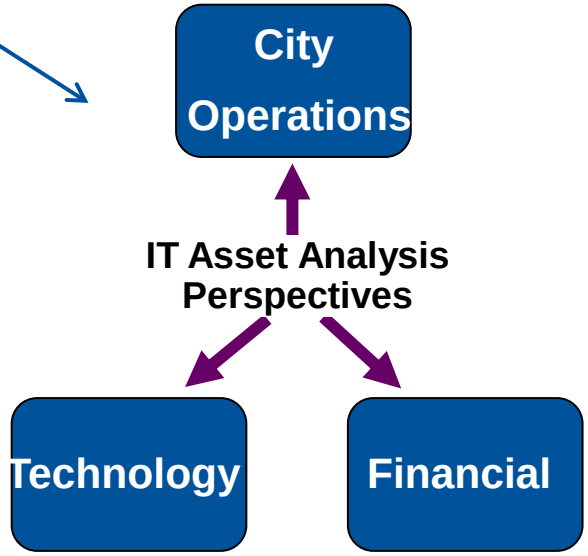
- Identify/secure funding for investment decisions driven by BC/DR plan

Executive Summary - Recommendations

Maximize Value of Current IT Assets

Key Takeaways

- Establish an ongoing model and process for evaluation of major applications to determine when they should be modernized, retired, consolidated, etc. Projects and assets should be evaluated from a multi-dimensional perspective in line with governance structure.
- Develop lightweight enterprise architecture or "technology blueprint" to govern IT investment decisions.
- Conduct survey and analysis of customer requirements to determine opportunities for increased usage of current application investments (e.g., Energov, Oracle).
- Analyze opportunities for automation of key business processes,
- Evaluate appropriateness and value of ongoing Remedy investment.



Executive Summary - Recommendations

Maximize Value of Current IT Assets

Project Charter to Define the Tactical Plan and Drive Key Activities

Project	10. Maximize Value of Current IT Assets	Program	Maximize IT Operational Effectiveness

Objectives

- Define an application strategy
- Develop a plan of action for core systems within the City of Cambridge
- Take an enterprise-level view of applications direction, rather than department-specific
- Develop lightweight enterprise architecture

Critical Success Factors

- Ensure objectivity in assessment and analysis
- Conduct market scan to understand strategic options
- Communicate plan and implications to stakeholders in timely fashion
- External resources (i.e. service provider) to guide and lead initial architecture development

Deliverables

- Documented Application Strategy for the City
- Execution of Initial Rationalization and Business Cases for Replacement/Migration Candidates
- Lightweight enterprise architecture

Scope	■ All City enterprise business applications
Project Sponsor	■ City Manager
Business Owner	■ E-Gov Executive/City Department Heads
Critical Team Members	■ Leader: E-Gov Project Committee Chair ■ Other Participants: E-Gov Executive, and E-Gov Project Committees, Domain subject matter experts from business and ITD as needed ■ External Support: consulting support and guidance, as deemed necessary

High-Level Project Plan

1. Assign project manager and core team to lead and perform applications strategy development effort.
2. Document current-state components of plan
3. Institute an Enterprise Architecture (EA) process to define future-state direction based on business needs – use it to define business-aligned data warehouse architecture, application architecture / integration / web services standards, and analytics / reporting architecture
4. Define future-state alternative scenarios
5. Perform market scan for candidate technologies
6. Analyze and review findings, choose scenario for path forward
7. Develop high-level roadmap/implementation plan

Estimated Duration	■ 4-5 months

Risks/Success Factors

- Stakeholder buy-in to the process, particularly customers
- Agreement on participants, governance and processes for application prioritization
- Quality of business cases and efficacy in driving budgeting decisions

Prerequisite Activities

- Identify internal resources that could manage/participate in the project
- Identify ITD and department SMEs to inform application capabilities and departmental needs
- Gather all policies and other artifacts to inform enterprise architecture

Benefits

- Defined process with customers for ongoing application management

Costs

- **TBD**
- **To be determined based on decisions resulting from Final Report**

Contingency Plan

- Agree on core enterprise architecture principles, address most-pressing application decisions (e.g., Remedy)

Follow-Up Actions

- Identify/secure funding for investment decisions driven by implementation plan
- Refresh application assessment periodically

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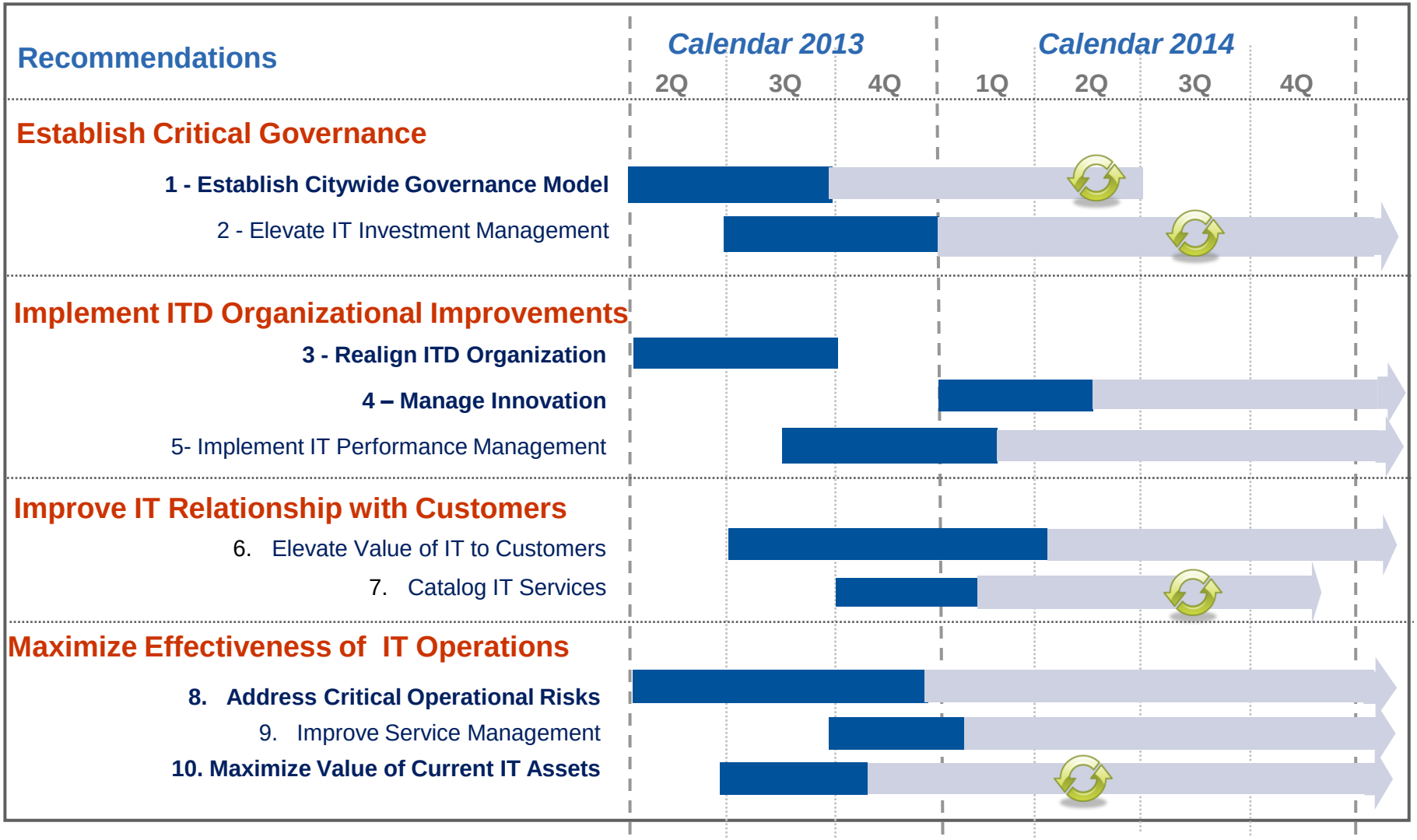
Executive Summary – Roadmap

Overall Cambridge Roadmap Timeline

Implementation | Ongoing | Refresh



Final Report

- Comparative Analysis……
  - Summary
  - Detail
- City of Cambridge Imperatives and Priorities……
- Capabilities Assessment……...
- Recommendations and Roadmap……...
- Cambridge 180-day Action Plan “Playbook”……..

Comparative Analysis

- Overview
- Summary
- Detail

Comparative Analysis Summary

Overview

- Comparative analysis provides foundational IT spending data that can inform decisions made for the IT Strategic plan. It is intended to determine how Cambridge IT spend and staffing allocation compares to similar cities (nationwide/none are in Massachusetts)
- A key indicator of current performance and, more importantly, future IT investment capabilities and opportunities, is an organization's current investment in IT compared to peers
- Often, the results of this type of comparative analysis, coupled with findings from other data gathering activities, provide substantiation and keen insight into issues and opportunities that can inform the strategic plan and future actions and investments
- To provide this comparison, Gartner employs its benchmarking database and a consensus model when measuring the costs of each organization to ensure consistent and comparable data
- Variances in metrics between the City of Cambridge and peers provide insight into opportunities for increased service delivery and reduced risk
- For Cambridge, 9 municipal government organizations were selected for the budget-based comparisons based on industry, revenue and operational expense. Key attributes include:
  - Industry scope consists of Municipal Government
  - Peer Average Total Operational Budget: **$392 Million**
  - Peer Average Number of Employees: **1,732**

[NOTE: *City of Cambridge performed a comparison of MA municipalities' total budgets to total IT spend and Cambridge spends more than the majority of MA municipalities*.]

* Peer municipalities does not include any in Massachusetts

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Comparative Analysis Summary

Assumptions

- All spend and staffing figures for Cambridge are FY2012 and include grant-funded spending.
- Spend and staffing figures for the peer* cities are all technology spending, including public safety and schools.
- In order to provide an accurate and relevant comparison, spend and staffing for the entire City of Cambridge was incorporated into the model. This included:
  - General Government (includes Community Development, Public Works and Human Services)
  - Schools
  - Public Safety
- Public Safety data includes Police, Fire and Emergency Communications.
- Where possible, ITD support and funding allocations were considered separately and presented along with the comparison data to provide additional insight.

* Peer municipalities does not include any in Massachusetts

Comparative Analysis Detail

Highlights of City of Cambridge Spending Details Compared to Peers*

- Based on comparative analysis, the City of Cambridge invests significantly less in IT than its municipal peers. Consequently, the ability of IT to support efforts to grow or transform business functionality are limited, as IT resources must be focused on delivery of basic services, such as user support and network maintenance.
- Several comparative indicators support this observation:
  - The City of Cambridge has significantly more resources focused on support of end-user computing than their peer group – nearly 3 times the peer average
  - Significantly lower per-employee spend on IT –peers spend 142% more per employee. This indicates a lower level of automation and investment in technology across the enterprise and a dependence on manual processes
  - As a result, there is a limited ability for ITD to support transformative programs or provide forward-looking technology strategy to the City's departments. Examples include:
    - Lack of technical resources for high-level projects such as Energov and Remedy
    - Departments need to work with ITD to identify resources and funding to address web development project needs

[NOTE: *City of Cambridge performed a comparison of MA municipalities' total budgets to total IT spend and Cambridge spends more than the majority of MA municipalities*.]

* Peer municipalities does not include any in Massachusetts

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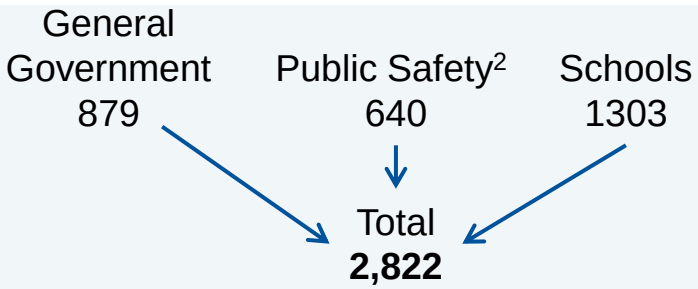
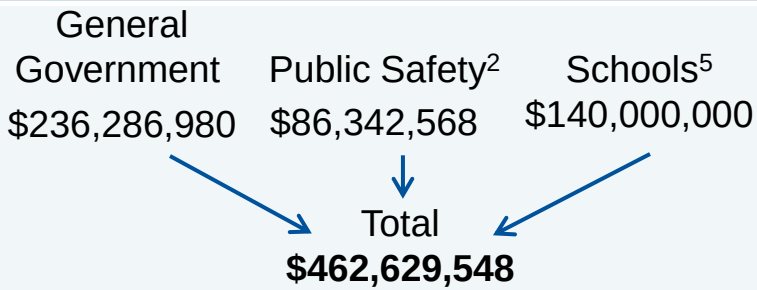
Comparative Analysis Detail

City of Cambridge FY12 Category Totals

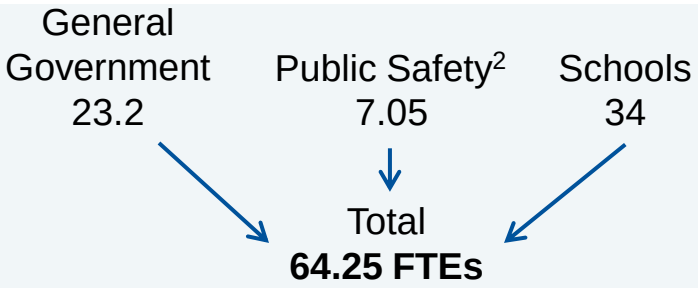
Employees[1]



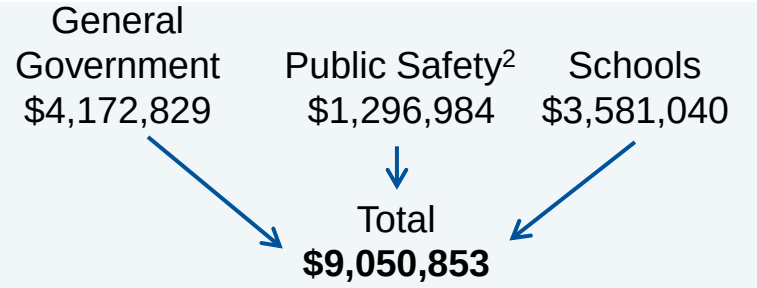
Operational Spending[4]



IT Resources[3]



IT Operational Spending[4]



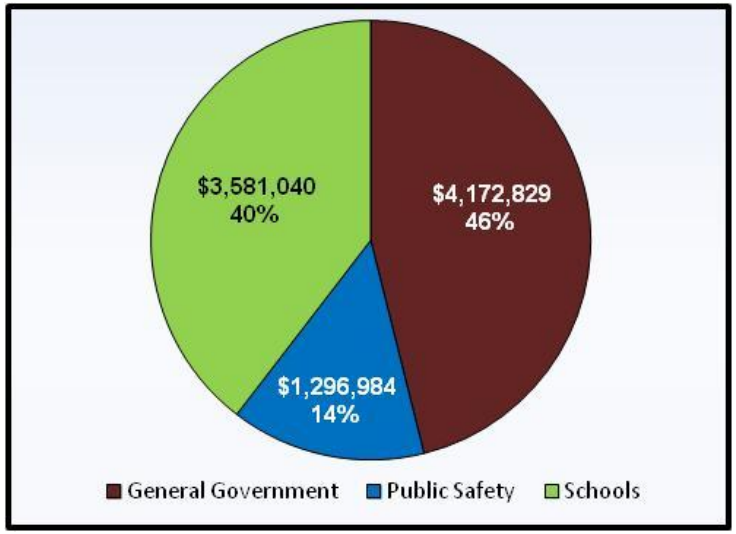
1. Approved City of Cambridge headcount
2. Public Safety = Police, Fire and Emergency Communications
3. Source: Budget Dept and Schools CFO
4. General Government and Public Safety – FY12 actual spend source: Budget Dept . Schools – FY12 actual spend source: Schools CFO
5. Estimate based on budget allocation
6. General Government includes CDD, DPW and DHSP

Comparative Analysis Detail

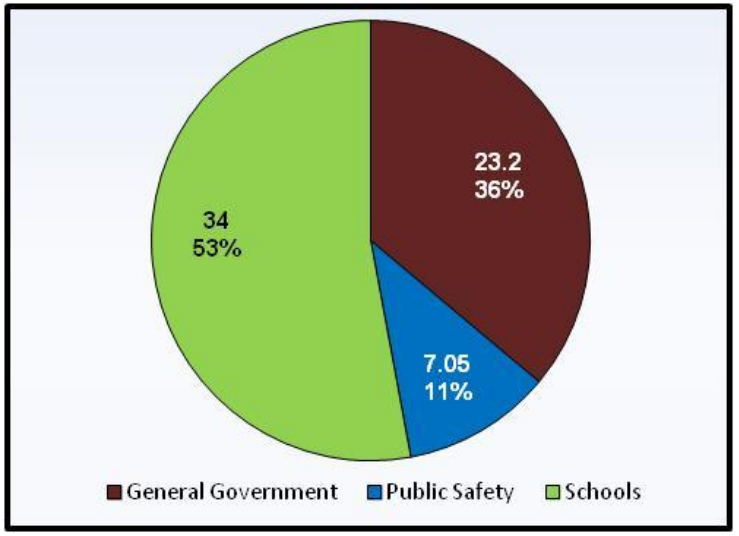
Total Technology Operational Spend and FTE Support

- IT spending in the City of Cambridge is primarily distributed across three organizational entities:
  - Information Technology Department ('General Government' includes ITD, CDD, DPW and DHSP)
  - Cambridge Public School District
  - Public Safety (Police, Fire and Emergency Communications)
- In total, IT spending in the City of Cambridge is $9,050,853 annually, including 64.25 FTEs
- ITD accounts for 46% of technology spending and 36% of total IT staff in the City.

City of Cambridge FY12 IT Spending



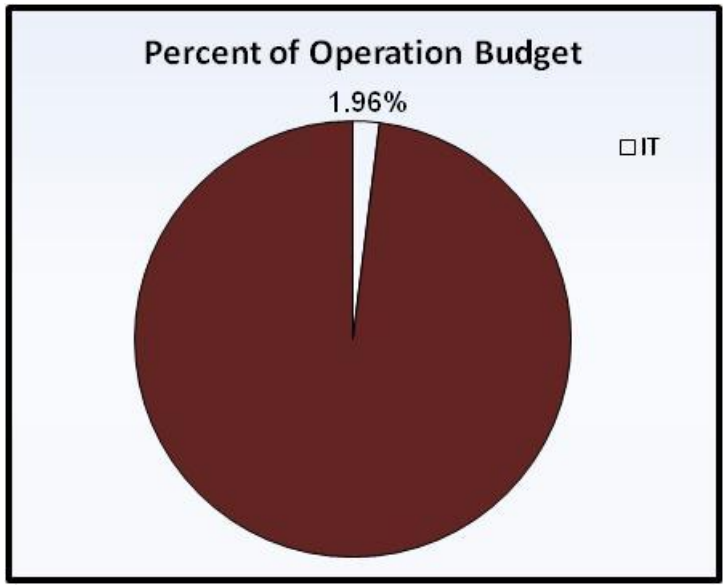
City of Cambridge FY12 IT Staffing



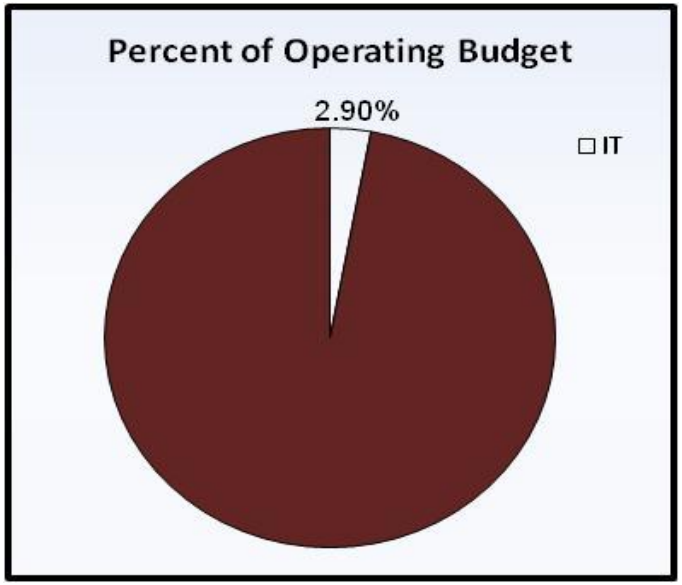
Comparative Analysis Detail

IT Spend as Percentage of Operational Spending

- The City of Cambridge spends 1.96% of its operating budget on IT, far below the peer* average of 2.9%. **Peers allocate 48% more of their operating budget to IT.**



City of Cambridge



Peer Average

* Peer municipalities does not include any in Massachusetts

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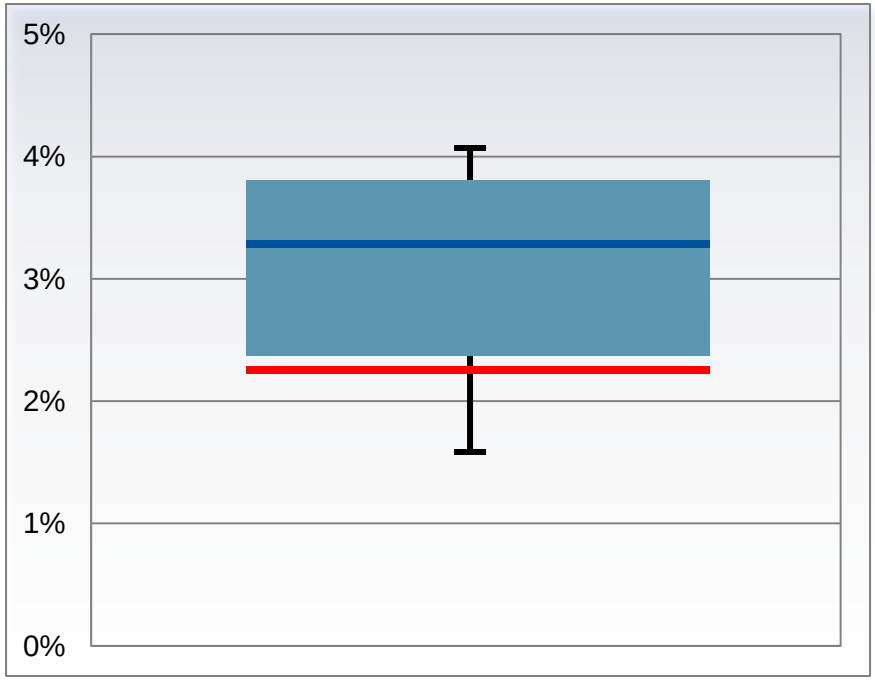
Comparative Analysis Detail

IT Staff as Percentage of Overall City Staff

- The City of Cambridge percentage of IT staff to total City staff is 2.28%, significantly trailing the peer average of 3.2%. Consequently, **peers* average 40% more IT staff than the City of Cambridge.**
- The implication of significantly understaffing IT suggests that IT provides considerably fewer services to the business functions than do peers.
- Significantly fewer IT resources also suggests possibilities such as minimal support levels are maintained, the scope of services provided is narrower in scope than peers or there is greater efficiency and/or automation.



Cylinder denotes the median 50% of responses

= Peer Range = Peer Middle Quartiles

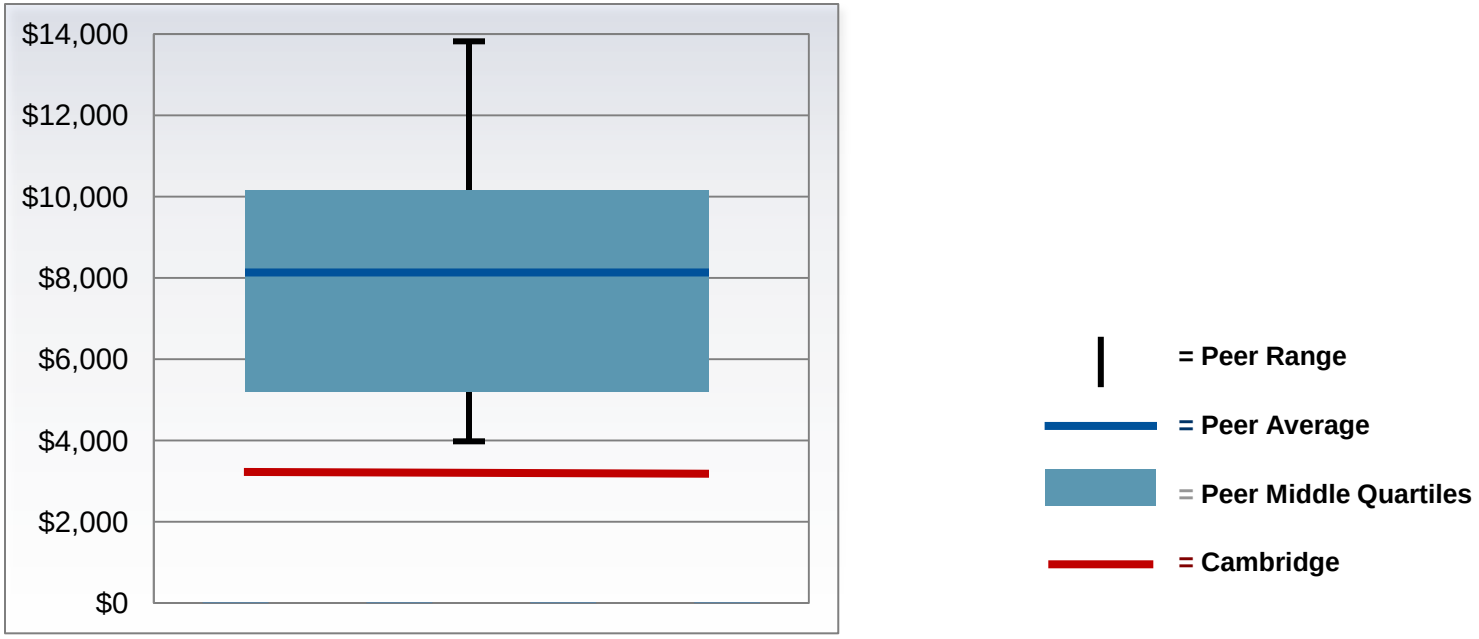
= Peer Average = Cambridge

* Peer municipalities does not include any in Massachusetts

Comparative Analysis Detail

IT Operational Budget per Employee

- A key comparative measure of IT spending is IT budget per City employee. The City of Cambridge spends $3,207 per employee, as compared to the peer* average of $7,768, meaning **peers spend 142% more per employee on IT than the City of Cambridge.**
- Typically, low per-employee IT spend indicates investment in technology that is significantly below peers, or dependence on manual processes, where peers have invested in more automation.



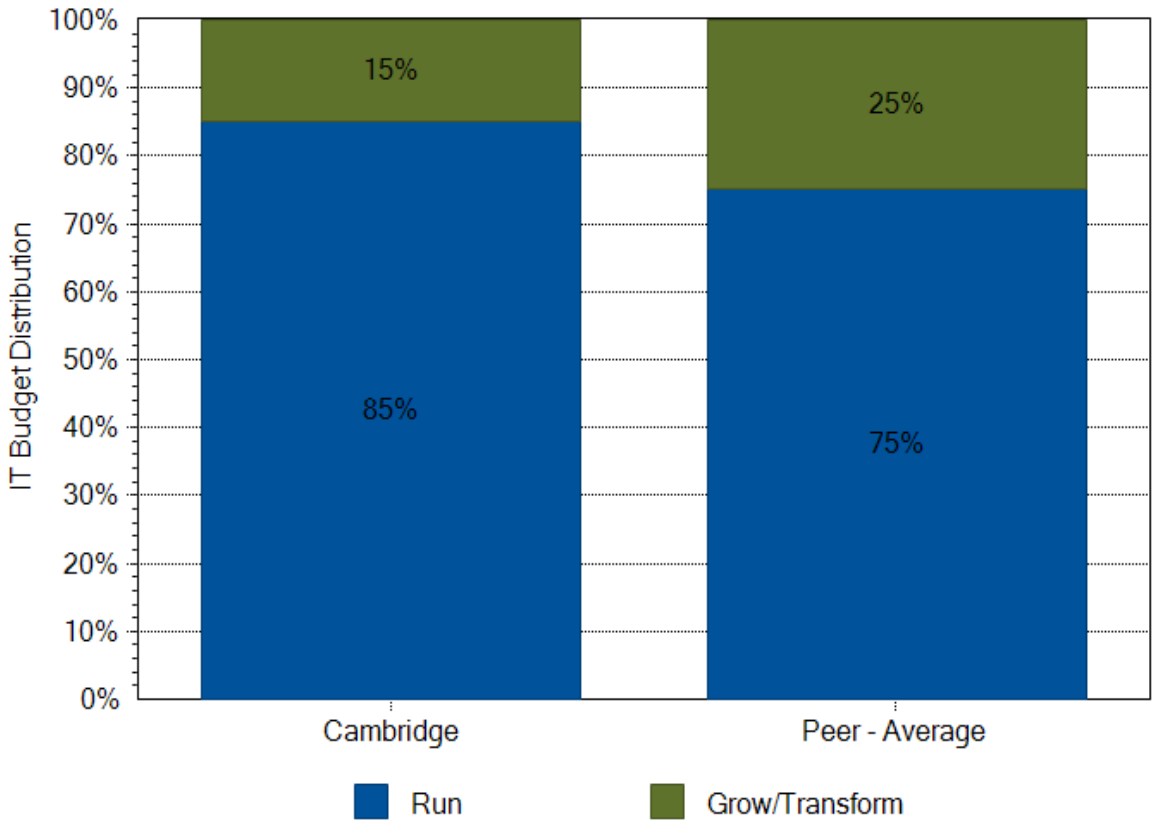
Cylinder denotes the median 50% of responses

* Peer municipalities does not include any in Massachusetts

Comparative Analysis Detail

Spending Distribution – Run the Business vs. Grow/Transform

- The distribution of IT spending on “run,” “grow” and “transform” the business provides a view of the investment profile in business terms.
- The implication is that the role of IT in the City of Cambridge, which is common in State and Local Government, is largely focused on operational and “keeping the lights on” activities, and IT investments to help the City grow or transform have been extremely limited.



City of Cambridge Imperatives and Priorities

City of Cambridge Imperatives and Priorities

Overview

- Gartner held focus groups and interviews, which included nearly all City departments, the School Department, City Council and E-Gov Community Representatives
- From these discussions, links were created between priorities and imperatives to categorize demand
- To further illustrate the meaning and importance of IT imperatives to the strategic plan, definitions and examples of each are provided

City of Cambridge Imperatives and Priorities

Business Demand Findings Detail – City Departments

City Departments

- ITD as a strategic advisor
  - Regular user engagement with ITD (user groups)
  - Understand roles and responsibilities between ITD and departments
- Enable effective use of City assets
  - Search and access shared city assets (e.g., rooms, equipment, media recording studio)
  - Short-term bank of equipment (laptops, etc.) for loan
- More Commercial off the Shelf (COTS) solutions, less custom
- Enable departments to be more innovative and effective
  - Mobile-enabled workforce
  - Document Management – searchable and shareable among departments
  - Bring Your Own Device (BYOD)
  - Remote Access (not just for home, but also when away from office during workday)
  - Accessible/Intuitive apps (able to use with minimal training)
  - Improve payroll processes (time reporting, employee self service)
  - Reduce data entry and paper
  - New permitting system (away from Remedy)
  - New work order system
  - Digitization of paper records
- Citizen-Centric
  - Effective use of Web/Social Media to engage
  - CRM system to track and manage customer interactions
- Coordination of citywide technology efforts
  - Guidance on technology use
  - Simplify web content management for departments (e.g., templates)
  - Technology knowledge collaboration between departments
  - Standard systems to address like needs among departments
  - Guidance/understanding emerging trends
  - Support Economic Development
- Increased technology training
- IT policies matched to business needs (as opposed to one-size fits all)
- Streaming media
- Master shared addressing
- Transparency balanced with information security
- Online Payments – Increasing ability to generate revenue
- Reliability/Redundancy
- Cloud storage

City of Cambridge Imperatives and Priorities

Business Demand Findings Detail – City Leadership & E-Gov Community Representatives

City Leadership

- Coordination of citywide technology efforts
  - Guidance/understanding of emerging trends and how to apply to city
- Transparency balanced with information security
  - Open Data
- Citizen-Centric
  - Effectiveness in Web/Social Media (information the way the citizen wants to receive it)
  - Accessible/Intuitive/Inclusive city services (easy to find information, not forgetting digital divide)
  - Common brand identity among websites and mobile apps
  - Mobile-enabled website
- Support Economic Development
- Effective use of technology in public settings
- Enhance school use of technology
- Green IT
- City-sponsored innovation/ empowering citizen innovation
- Collaboration with local companies and education institutions

E-Gov Community Representatives

- Online Payments – Making payments more convenient
- Reliability/Redundancy
- Cloud storage
- Transparency balanced with information security
  - Ex: Awareness of iReport tickets submitted
- Citizen-Centric
  - Effectiveness in Web/Social Media (information the way the citizen wants to receive it)
  - Accessible/Intuitive/Inclusive city services (easy to find information, not forgetting digital divide)
  - Common brand identity among websites and mobile apps
  - Mobile-enabled website
- Enhance school use of technology
- City-sponsored innovation/ empowering citizen innovation
- Collaboration with local companies and education institutions
- Vendor neutral decisions
- Public WiFi – enabling access
- Use of city maps – layers of city information available
- Seamless user experience among local municipalities (e.g., Cambridge, Boston, Somerville)

City of Cambridge Imperatives and Priorities

Business Demands Drive the Identification of City Imperatives and Priorities

- City stakeholders identified citywide needs that informed the IT Imperatives summarized on the next slides.
- In addition, the desire for additional IT services was communicated by all stakeholder groups, indicative of growing demand for IT in the City.

City of Cambridge Imperatives and Priorities

Link Between Priorities and Imperatives to Categorize Demand

- Overarching priorities are high-level goals that are the backbone to any strategic plan and serve as the basis for the strategy itself
- These goals are derived from high-level city strategies (such as found in the annual report) and define the intended outcomes of the plan
- Based on our analysis and collaboration with the City, the following priorities drive Cambridge business demand

City of Cambridge Priorities

City of Cambridge Imperatives and Priorities

Defining City and IT Imperatives

- City and IT imperatives are fundamental underpinnings of the Strategic Plan that drive future investments and activities to allow the City to achieve its strategic objectives. Definitions of both types of imperatives are provided below.

City of Cambridge Imperatives

- Those things that the City must do to be successful in the execution of its strategy, without regard to how they are accomplished.
- City Imperatives are frequently articulated as a response to external and internal forces:
  - External Forces including:
    - Regulatory changes
    - Marketplace changes
    - Demographic shifts
    - Political changes
  - Internal Forces including:
    - Change in City strategy
    - Organizational changes

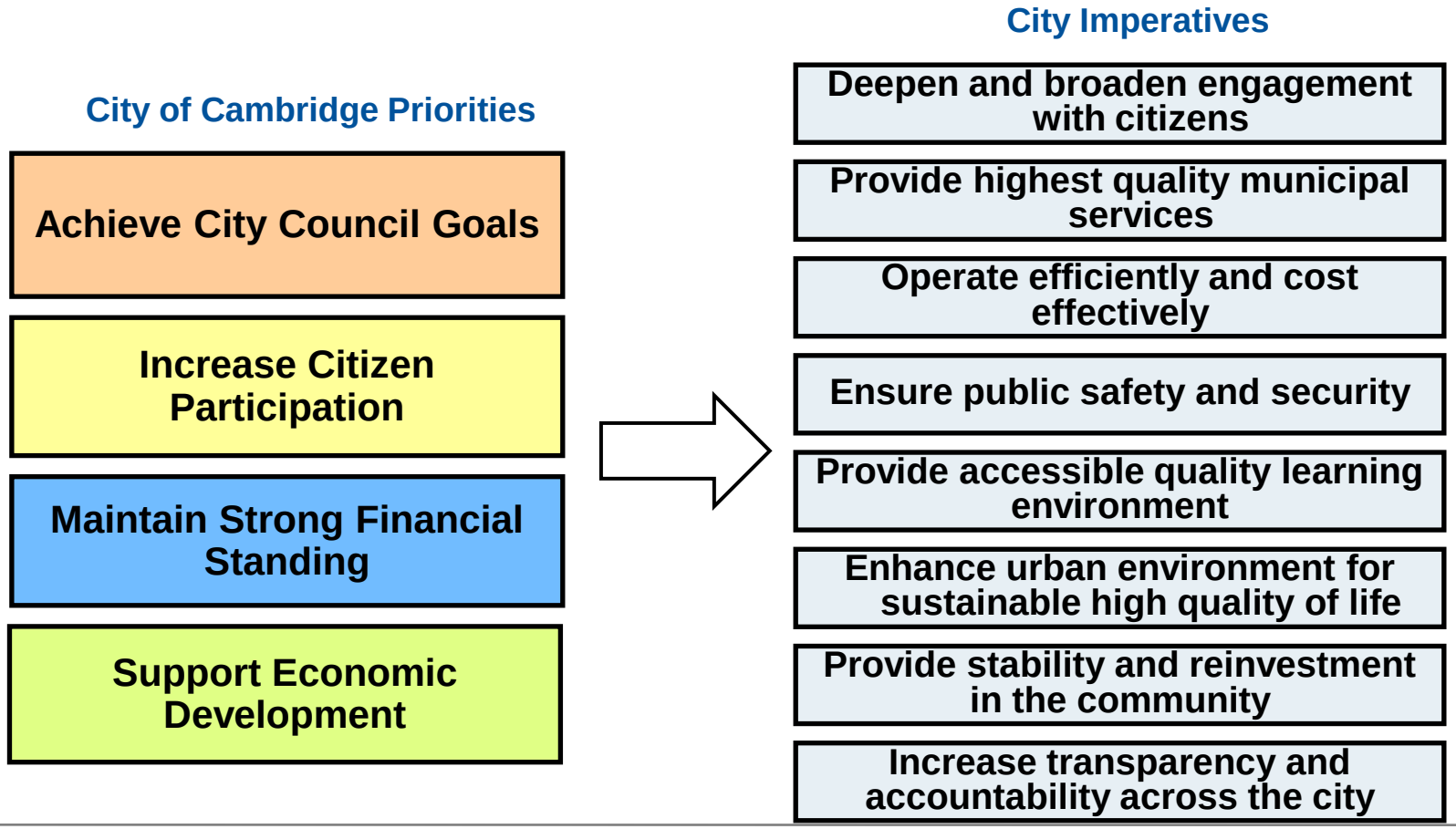
IT Imperatives

- Those things that IT must do to enable the City imperatives.
- IT Imperatives ask:
  - What technology concepts are needed to facilitate this City Imperative?
  - What quality or service level is important in the desired technology service?
- They articulate the requirement regarding "What IT must provide/enable" (information, access, linkage), NOT "How IT will provide it"
- An IT imperative indicates new or continued focus on what IT must provide to City departments

City of Cambridge Imperatives and Priorities

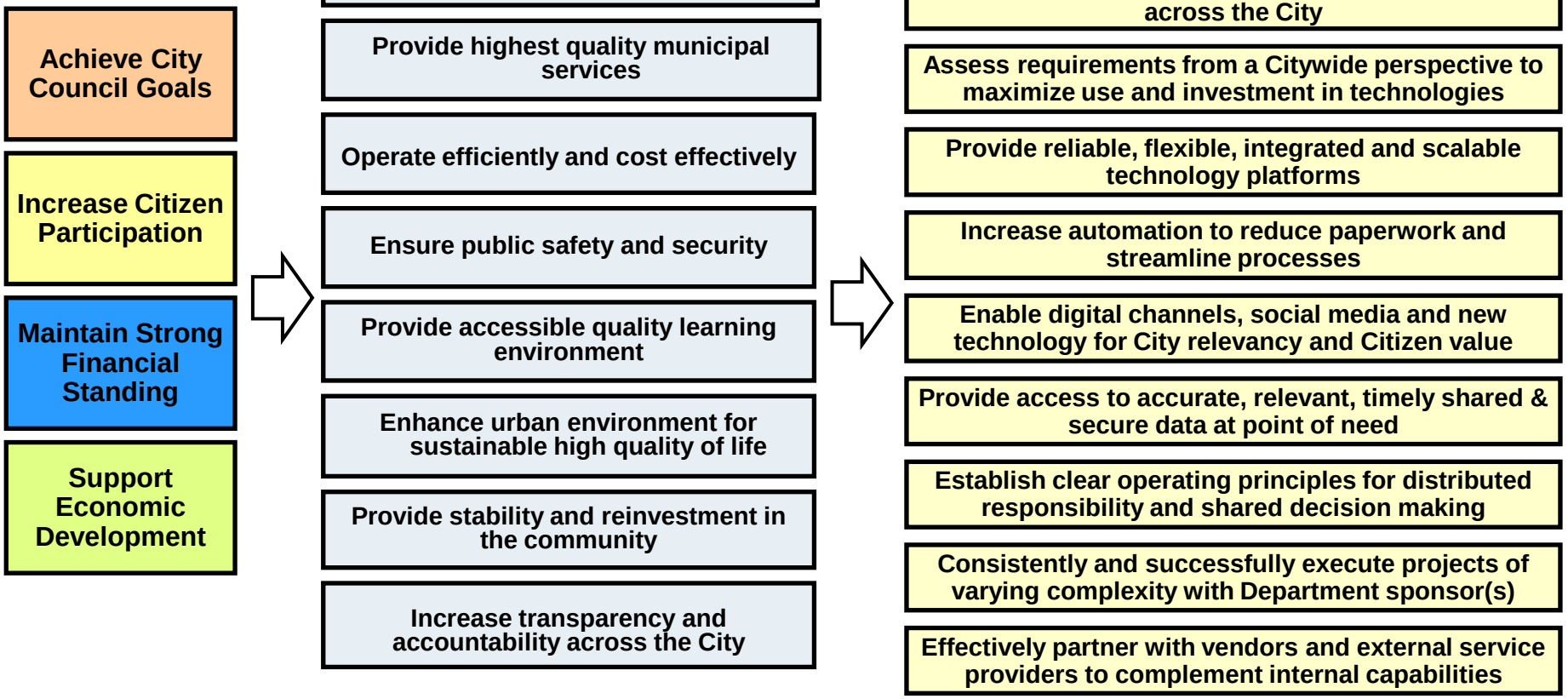
City of Cambridge Priorities and Imperatives

- Using the City's priorities as the basis, eight City imperatives were defined that must be successfully executed in order to realize the City's strategy.



City of Cambridge Imperatives and Priorities

City of Cambridge Priorities and Imperatives (continued)



City of Cambridge IT Imperatives and Priorities

Definitions and Examples

- To further illustrate the meaning and importance of IT imperatives to the strategic plan, definitions and examples of each are provided below.

IT Imperative	Definition and Examples
Contribute to City and Department leadership as a strategic advisor	•Define formal governance structure and roles for IT to contribute knowledge to strategic business decisions •Ex: *IT and business working together to discuss objectives and options before IT investment decisions are made, as opposed to after the fact.*
Co-create innovative technology products/solutions across the City	•Establish a role within IT that departments can rely on for emerging technology advice •Ex: *ITD could identify technology trends in the marketplace and establish guidelines/ recommendations for use and collaboration among City departments.*
Assess requirements from a Citywide perspective to maximize use and investment in technologies	•Ensure that requirements aren't just viewed from a siloed perspective (e.g., functionality, resources to support). Solutions may have features that meet requirements of a larger population. Additionally, ensure that the total cost of ownership (TCO) is incorporated into decisions to track benefits derived from IT investments (including impacts to ITD or business agency staff) •Ex: *When engaging in a new investment, establish a forum for identifying/soliciting requirements across city departments.*
Provide reliable, flexible, integrated and scalable technology platforms	•Ensure that solutions can support changing business needs/decisions. •Ex: *Define an enterprise architecture and incorporate these considerations into future procurements.*
Increase automation to reduce paperwork and streamline processes	•Avoid duplicate data entry and automate manual processes that exist today •Ex: *Evaluate opportunities to implement more real-time integration between enterprise systems and identify existing paper-based processes that could be digitized*

City of Cambridge IT Imperatives and Priorities

Definitions and Examples (Continued)

IT Imperative	Definition and Examples
Enable digital channels, social media and new technology for City relevancy and Citizen value	•Provide consistent messaging to citizens in ways the citizens want to receive it •Ex: *Establish city guidelines and enterprise content management strategy for digital engagement with citizens, presentation of information and distribution of information.*
Provide access to accurate, relevant, timely shared and secure data at point of need	•Authorized business users as well as citizens are able to access the tools and information they need to conduct business, while unnecessary and sensitive information is protected •Ex: *Enabling document/information sharing among like business functions across departments (e.g., financial data, city maps), pushing data sets and online services to the public.*
Establish clear operating principles for distributed responsibility and shared decision making	•Ensure that relevant stakeholders understand how decisions are made and how they participate in that process •Ex: *Document governance and decision-making model, roles and responsibilities between ITD and business leaders as well as communication and escalation plans.*
Consistently and successfully execute projects of varying complexity with Department sponsor(s)	•Each project begins with a business case and is completed with satisfaction, on-time and on-budget ,regardless of staff assigned •Ex: *Establish Project Management Office (PMO) as well as templates and processes that each project must follow (scaling based on complexity)*
Effectively partner with vendors and external service providers to complement internal capabilities	•For capabilities that require outside assistance, ensure that vendor contracts protect the City, adhere to city processes and are seamless to the customer. Clearly articulate roles, responsibilities and deliverables. •Ex: *Stipulate requirements management and change management processes the vendor must comply with.*

Capabilities Assessment Summary

Capabilities Assessment Summary

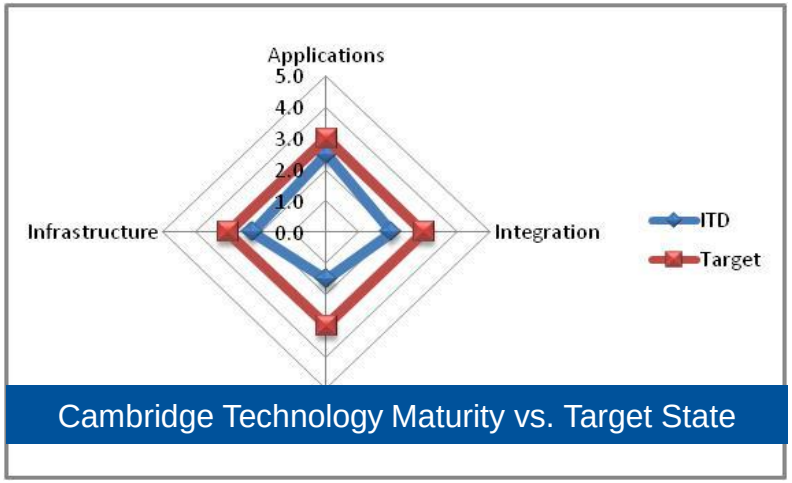
Overview and Approach

- To gauge the City's ability to meet the current and future demands as described in the previous section, Gartner conducted an assessment of ITD capabilities based on People, Process and Technology vs. future state, factoring in industry trends.
- Processes, applications, technical architecture, infrastructure and IT service delivery were among the many areas reviewed to gain an understanding of current capabilities.
- Data was gathered using a number of different methods, including:
  - Reviewing relevant documentation (e.g., process diagrams, architecture schematics, applications assessments)
  - Interviews with City staff to understand current issues and needs
  - Interviews with ITD staff for targeted assessment areas (infrastructure and operations, applications, etc.)
- Subsequently, IT capabilities were assessed using Gartner maturity models to render a current and target maturity rating for all three capability areas – Technology, Process and People – in order to identify the key gaps that must be addressed to meet City priorities and imperatives.

Capabilities Assessment Summary

Technology Summary

- Infrastructure equipment is well maintained, but the network architecture requires additional enhancements and Cambridge as a whole does not currently have adequate disaster recovery capability to support known business requirements in the event of a site specific disaster incident. The City has appropriated funds to develop a plan to mitigate the risks.
- Enterprise applications utilize mostly batch processing for data sharing, and the City could benefit from more real-time processes to avoid the need for duplicate data entry that exists today.
- Reporting and analytics are currently underutilized, with business users often tracking data in separate spreadsheets and databases in order to report and utilize information.
- Use of social media is inconsistent across departments and has unknown effectiveness (e.g., small % of population following), which may not be sustainable

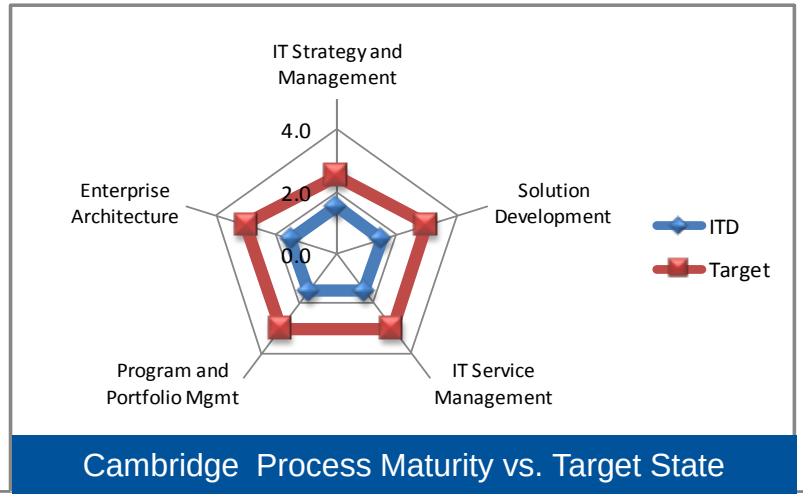


Cambridge Technology Maturity vs. Target State

Capabilities Assessment Summary

Process Summary

- Cambridge ITD has been effective in keeping on top of the day-to-day needs of it's business customers, however, underdeveloped processes force ITD to redirect staff to incidents on a reactionary basis as opposed to making those responses more efficient.
- For critical incidents and ongoing operation/availability of services, users are generally pleased with service. Although, this feedback was dependent on the ITD staff responsible (over dependence on a few key resources)
- Project and resource prioritization is done ad hoc, based on various criteria. Project pipeline is managed as a request list maintained by ITD, and projects are informally managed, with little communication of status, progress or financial metrics to stakeholders.
- Incident tracking has been reported as only capturing 30-50% of incidents, with the remainder not being tracked. As a result, ITD does not have an accurate picture of where resources are spending their time or how well it is doing at providing services to its customers.

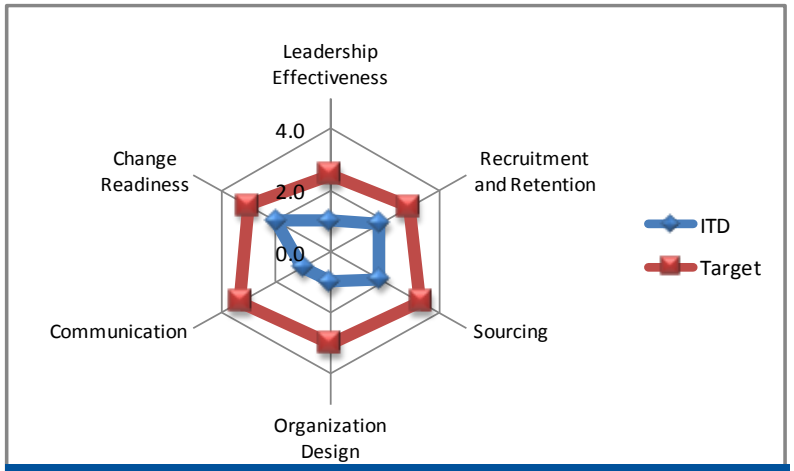


Cambridge Process Maturity vs. Target State

Capabilities Assessment Summary

People Summary

- ITD operates as a lean organization with ~2.2 staff per every 100 City employees; peers* average more IT staff than the City of Cambridge. The current ITD organization is razor thin in several critical areas.
- Over the years, ITD has been developing capability to both “keep the lights on” as well as support new business demands in a cost effective manner, but over-reliance on single individuals puts continuity of service at risk.
- Some ITD decisions, prioritization, resource allocation and assignments are made by key individuals with limited involvement of and communication with departments.
- ITD is effective at meeting the critical technology needs of their business customers. However, ITD is not effectively set up to support growing requirements or transformational needs. There are gaps in key competencies required to support future demand, in particular areas such as Initiative, Innovation and Strategic Business.
- A detailed skills inventory showed that there are skills and competency (“soft skills”) gaps for the future (e.g., business relationship management) and lack of depth in critical operational roles, such as network management and database administration.



Cambridge Organizational Maturity vs. Target State

* Peer municipalities does not include any in Massachusetts

Capabilities Assessment Detail

- Technology
- Process
- People

Technology Detail

Infrastructure: Network

- Network architecture represents a single point of failure without adequate level of network redundancy; component failure can disrupt the City wide services.
- The network speed is capped at 100Mbps which is far lower than the leading practices observed in public sector (1 Gbps). This can limit support of emerging business needs such as safety cameras.
- Cambridge fiber backbone does not support resiliency at physical layer due to not being deployed in either ring topology or over a protected fiber path.
- The City is in the process of replacing 40% of its end-of-life Nortel equipment with Avaya platform, which is schedule to be completed by June 2013.
- Current network architecture requires enhancements toward network availability to support current and future business objectives of the City
  - Future needs could lead to significant investments to upgrade buildings (e.g., high-speed data to desktop)
- Standardization of layer 3 hardware on single market-mainstream technology vendor (Avaya) is consistent with leading practice.
- Convergence of voice and data traffic onto a single network infrastructure is a leading practice that has been adopted by the City
- The network supports VoIP and Voicemail integration services throughout the city; there are adequate levels of redundancy in place to provide voice communications in the event of either VoIP service component or building failure.
- The City has deployed greater level of network availability at the high school to support network availability during emergency and enable high school as shelter.

Technology Detail

Infrastructure: Data Center

- Cambridge has a single primary data center. This data center hosts server, storage and network infrastructure to support city core business applications.
- Points of failure within the infrastructure and lack of data center redundancy are risks that remain unmitigated
  - The main data center location currently has no back-up power capabilities, however, the City has appropriated funds to develop a plan to address this risk.
  - As evidenced during the recent power outage, all city applications and IT services (e.g., email, enterprise applications, shared drives, internet access) were inaccessible.
- The City recently completed a data center review (September 2012) that identified the following positive, non-risk areas:
  - Adequate physical capacity for near term growth (estimated at 5 – 10% YoY growth in physical servers)
  - Adequate fire suppression systems - Inergen gaseous suppression system as primary, Pre-Action (dry pipe) system installed as secondary suppression
- However, several key risk areas were identified as well:
  - The building where Cambridge data center is located needs backup power and additional chiller equipment . The City has appropriated funds to develop a plan to address this risk.
  - Single Power Distribution Unit (PDU) has reached capacity and is a single point of failure risk
  - Cooling configuration is no longer redundant due to data center cooling capacity requirements.

Technology Detail

Infrastructure: Servers

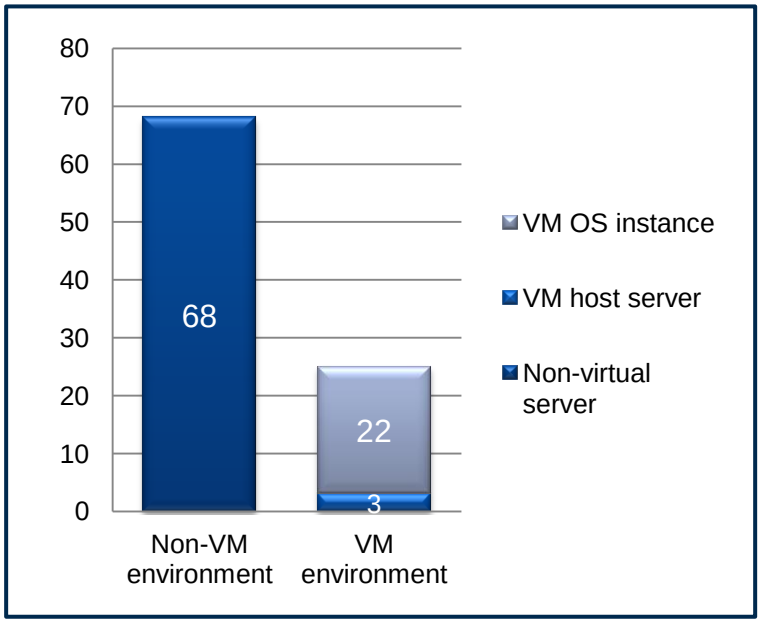
- Overall server environment life cycle management appears to be well maintained from an Operating System and Hypervisor perspective, however virtualization is low and vendor support risk issues exist.
- The City has accomplished a moderate degree of virtualization (~24%) of the x86 OS instances (City standard); many other organizations are in the 50%+ range in terms of virtualization.

x86/Windows Environment

Server hardware standard: DELL

OSI Counts
Win 2000: 1
Win 2003: 36
Win 2008: 53
Win 2012: 0

Server Hardware: > 50% EoL



OSI % virtualization: 24%

Average VM:PM Ratio is: ~7:1

Hypervisor Standard: VMware vSphere 5.x

- OS versions and hypervisor versions are within ISV vendor support timelines.
- However, approximately 50% of the DELL hardware models are at end of life.
- Microsoft Windows 2000 Server represents approximately 1% of the physical environment and is no longer supported by Microsoft
- Microsoft Windows Server 2003 represents approximately 40% of the MS environment, extended support will end July 14th 2015.

Technology Detail

Infrastructure: Storage

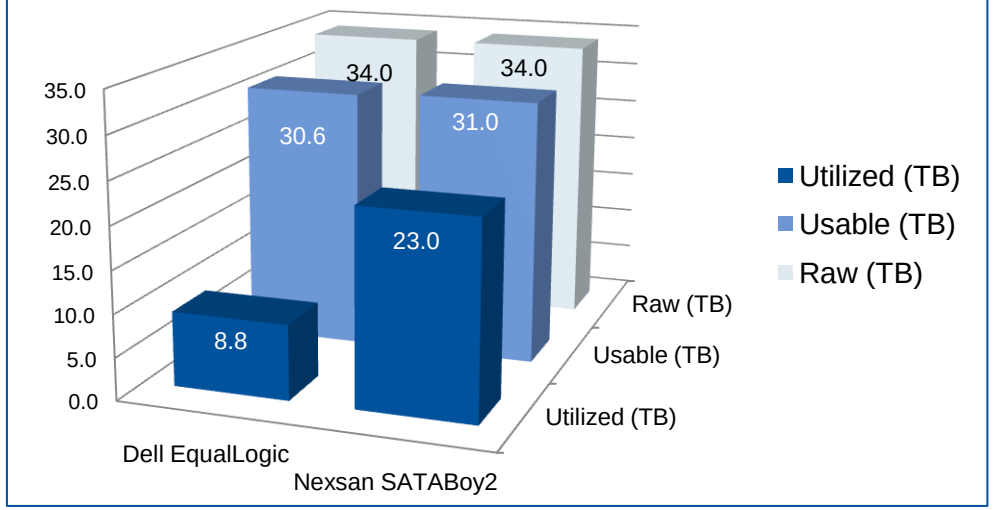
- ITD has selected leading storage technology vendors that are well supported in the marketplace, primarily composed of Dell Equallogic storage devices for the virtual server environment and Nexsan SATABoy2 to support backup services.
- As ITD increases its server virtualization footprint, the complexity of the storage environment will increase from a management and monitoring perspective.
- Upgrades to firmware must be carefully planned to minimize risk of significant operational disruption.

Enterprise Storage Environment

Hardware standards: DELL, Nexsan

Non-Virtual Server Backup NetBackup

Virtual Server Backup Veeam & NetBackup



Backups are primarily tape based. Two sets of tapes: On-site and Off-site

OnSite Tapes: Have a data retention period of 35 days

OffSite Tapes: Have a data retention period of 6 months, 2 years and indefinite

Technology Detail

Infrastructure: Disaster Recovery

- Cambridge as a whole does not currently have adequate disaster recovery capability to support known business requirements in the event of a site specific disaster incident (i.e. extended disruption/outage to the Data Center). The City has appropriated funds to develop a plan to address this risk.
- However, the City has identified the Tier-1 (highest criticality) applications and services in the environment and defined a stated recovery time objective (RTO) for these applications as two days. . Lower tiers are restored using best efforts after the Tier-1 systems are addressed
- Most of Cambridge applications rely on onsite tape based recovery, however if an incident affected the 3rd floor computer room for an extended duration, limited to no formal off site recovery plan exists
- A formal business impact analysis has not been performed by Cambridge and should be considered an essential component of Cambridge Business Continuity / Disaster Recovery planning process

Technology Detail

Infrastructure: Summary of Findings and Implications

Findings	Implications
1. Overall server environment life cycle management appears to be well maintained from an Operating System and Hypervisor perspective. Network equipment updates are planned to replace outdated equipment. However, refresh plans are not formalized nor budgeted.	■ When budget is not allocated on a regular basis (recommended max of 5-6 years refresh), equipment can become aged and harder to support
2. Cambridge has accomplished a moderate degree of virtualization (approximately 24%), many other organizations are in the 50%+ range for virtualization.	■ As ITD increases its server virtualization footprint, the complexity of the storage environment will increase from a management and monitoring perspective
3. ITD has selected leading storage technology vendors that are well supported in the marketplace	■ Support risk is minimal and access to resources should be favorable for the near- and medium-term.
4. Cambridge leverages its own fiber backbone to support interconnectivity among city building facilities; However, the fiber backbone does not support resiliency at the physical layer due to not being deployed in either ring topology or over a protected fiber path	■ The fiber backbone has single points of failure at the key sites which prevents fully automated network recovery; in the event of a network failure, manual intervention is required to restore network services.
5. Convergence of voice and data traffic onto a single network infrastructure is a leading practice that has been adopted by the City; the inclusion of video networking is being addressed as requirements demand	■ Because of on-demand planning, network may not be able to support video needs if they outpace predictions
6. CAT3 cables at many of the older city buildings limits deployment of future business requirements such as safety cameras, industry trend of increased number of devices per end users, and end-to-end VoIP services	■ Significant investments may be needed to upgrade buildings to support future business requirements

Technology Detail

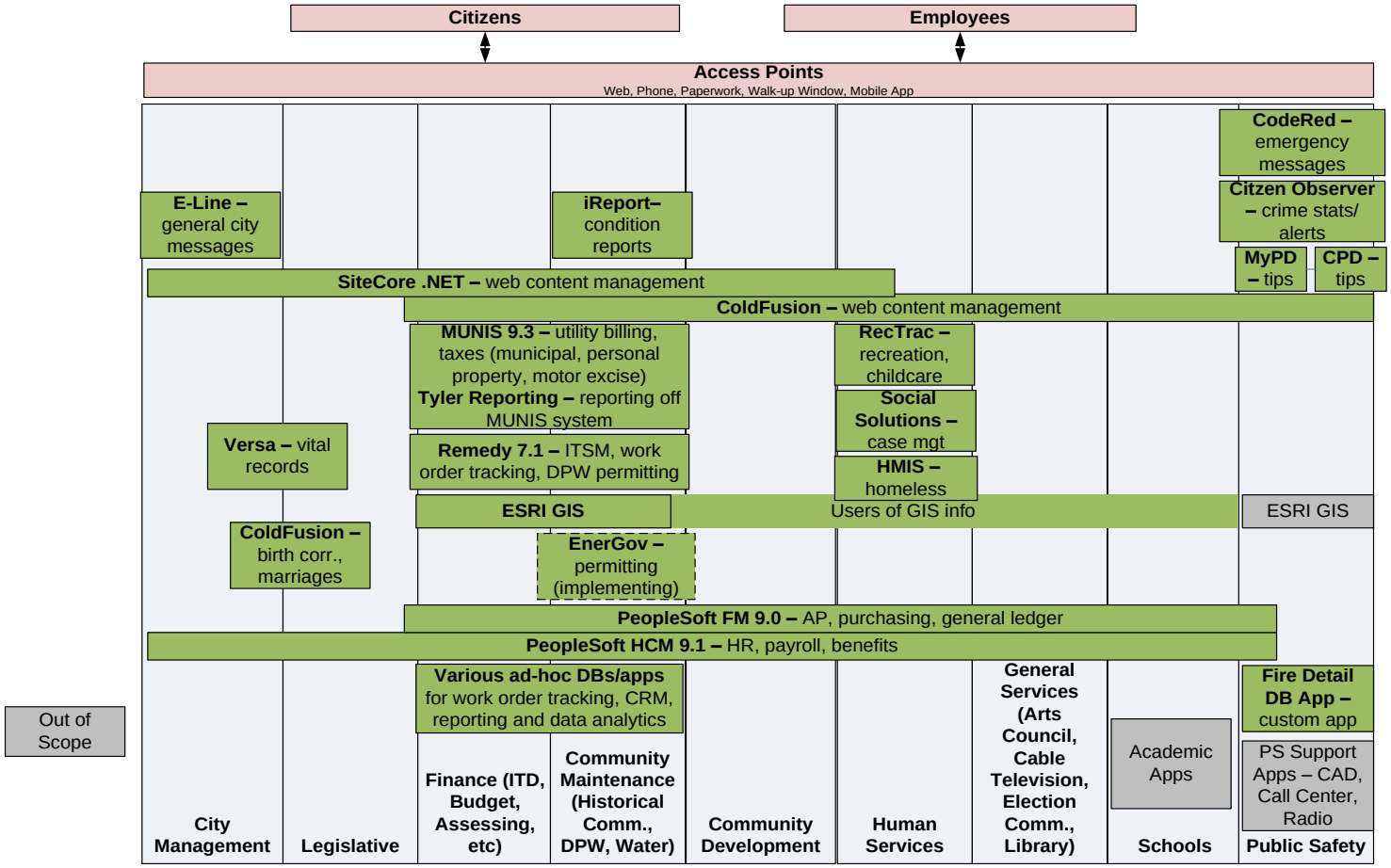
Infrastructure: Summary of Findings and Implications (Continued)

Findings	Implications
7. The failure of the central network node in the City could result in loss of network services citywide	■ Business users will not be able to access network resources or the internet during such outages
8. Data Center location has some inherent risks to existing operations. The City has appropriated funds to develop a plan to address this risk.	■ Without a second data center (or cloud-based services), these risks will continue to threaten operations that rely on the data center
9. Cambridge as a whole does not currently have adequate disaster recovery capability to support known business requirements in the event of a site specific disaster incident (i.e. extended disruption/outage to the Data Center)	■ Without a formal DR plan, services will continue to be provided in a best effort manner for restoration

Technology Detail

Applications: Cambridge Applications Anchor Model

- An analysis of Cambridge primary enterprise systems reveals a number of leading products for their respective domains, mostly in support around Finance and administration functions.

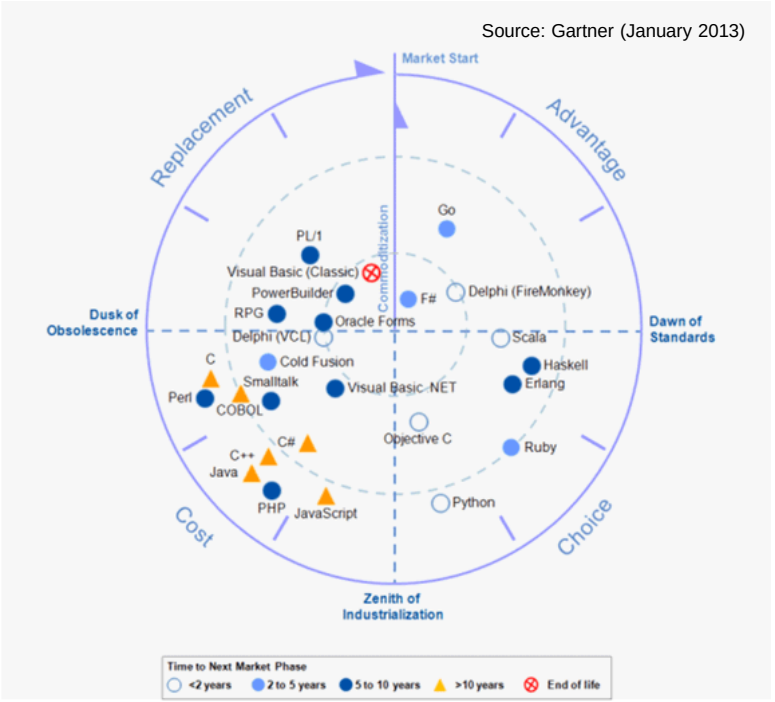


Technology Detail

Applications: Web Content Management

- Sitecore is a leading vendor for web content management and well suited for Cambridge's organization size
- Several key city and department websites have migrated to Sitecore already – However, a number of city websites remain on its legacy ColdFusion platform

Source: Gartner (September 2012)



- ColdFusion is currently well supported by Adobe, however, Gartner is seeing a slow atrophy of its user base (e.g., fewer third-party applications/consultants/trainers supporting the platform each year, users migrating away, attracting fewer new developers)

Technology Detail

Integration Findings and Implications

Findings	Implications
1. Reasonable integration competency at the data layer (e.g., batch processing of information)	■ Baseline data is shared among the enterprise systems
2. However, there is a lack of more real-time integration at business process layer (e.g., web services, messaging)	■ Resulting in a lot of duplicate entry and re-keying of data; data quality issues
3. Information Brokers and Publish/Subscribe methods do not appear to be used	■ IB's facilitate communication among disparate applications by negotiating a variety of native data formats and communication protocols, and help ensure the timely and reliable delivery of messages from one application to another. ■ Publish and Subscribe is a communication pattern in which information sources "publish" (send) information to the middleware, and information consumers "subscribe" by logically specifying what kind of information they want to receive.
4. Some web services are used to facilitate public requests into the work order system (Remedy)	■ This enables real-time information to be used and acted upon

Technology Detail

Data and Information Findings and Implications

Findings	Implications
1. Data warehouse for applications is housed on servers within a single data center	■ Single point of failure for systems relied on by the business
2. Good level of identify and access management	■ User devices gaining access to the network are monitored and actively managed in terms of information access
3. Analytics and reporting is underdeveloped — departments have indicated a desire for greater access to analytics capabilities and much time is spent pulling the data out of ERP systems to manipulate and work with in MS Excel or MS Access	■ Undo overhead associated with inadequate access to information ■ Underdeveloped and inconsistent reporting and business intelligence processes
4. Email is integrated with VOIP voicemail as well as CRS Remedy system for ticket routing	■ VOIP/Email integration benefits are limited to users with the existing deployment of VOIP ■ Utilizing automatic email notifications for ticket updates/escalations could help with keeping users updated
5. Portals are used on the city intranet for employees. Additionally, the main city website is set up as a portal for citizens to access information from various departments	■ Employees and citizens are directed to information they are looking for ■ However, citizens visiting the main city website do not see a consistent look-and-feel when visiting all city department sites—limiting ability to navigate to other city information they could be looking for

Process Detail

IT Service Management Findings and Implications

Findings	Implications
1. ITD does not have their IT services formally documented	■ As a result, business user expectations may not align with what ITD believes is their scope of services
2. Project pipeline is managed as a request list maintained by ITD	■ Incorporating project investment decisions into a governance model would better align these decisions with the future business needs
3. For critical incidents and ongoing operation/availability of services, users are generally pleased with service.	■ Even though service may not be to defined service levels, documenting maintenance, recovery and responsiveness expectations will aid in providing consistency to users
4. Decisions on new application upgrades/changes requires concurrence from lead business representative; however, there is no formal change management process	■ Not having a formally documented audit log of changes can impede troubleshooting if future incidents occur ■ Additionally, having a formal change process ensures that the appropriate technology and business stakeholders are involved in each decision every time
5. Infrastructure change management is decided completely within ITD. No formal process to include business needs	■ ITD's prediction of future business needs could vary from actual and cause infrastructure to under support

Process Detail

IT Service Management Findings and Implications (Continued)

Findings	Implications
6. Remedy in use, but not used for tracking all (has been reported as only capturing 30-50% of incidents). The rest are not being tracked in any manner.	■ There is no accurate understanding of the amount of time spent by ITD staff on incident tickets ■ Time may not be efficiently spent due to direct incident contacts from users (keeping staff away from transformational work)
7. For open incidents, communications back to the user on tickets is not done on a proactive basis (users say they have to initiate to get an update).	■ Additional time is spent by business users tracking down status
8. No continual service improvement measurement in place today (Only basic open/closed ticket status being pulled)	■ ITD is unaware of areas that are in need of improvement
9. Maintenance done on an as needed basis (No formal maintenance windows)	■ Maintenance could seem intrusive by business users if there are no expectations that maintenance will happen on a regular basis ■ Scheduling maintenance takes extra time because there are no defined windows of time.

Process Detail

Solution Development Processes Findings and Implications

Findings	Implications
1. Managing ongoing solution development is done on an inconsistent basis • Staff are doing varying levels of documentation for the areas they are responsible • Process staff follow are not indoctrinated across the organization	■ Inconsistent processes lead to inconsistent results; formal processes for managing development is an area for improvement ■ Quality of relationship with the business user depends solely on the individual ITD staff supporting
2. High-level requirements are collected from the business at the ITD leadership level – The level to which business analysis is conducted at the project level is staff (or contractor, where applicable) dependent	■ Without a formal requirements elaboration process incorporated into the development process, solutions may not operate the way users originally envisioned, causing users to unexpectedly change business processes or additional resources to fix the solution
3. Change management is not managed in a formal manner – Decisions are documented to the level the staff feels is needed at the time. However, the way this is documented is not standardized across projects	■ Key stakeholders could be left out of change decisions ■ Impacts changes have on related systems could go unidentified ■ Not having a formally documented audit log of changes can impede troubleshooting if future incidents occur
4. Guidelines for website development exist, however, city department web presence is not consistent in look and feel across departments	■ City information can become hard to find if citizen needs to learn the organization of each departmental website

Process Detail

Enterprise Architecture (EA) Findings and Implications

Findings	Implications
1. Projects are reviewed for compliance with the current architecture. However, there is no formal process to communicate with stakeholders or internal ITD teams	■ End users or those supporting the projects within ITD may not have a full understanding of why a project decision was made
2. Stakeholders are unclear on EA planning and how their needs can be addressed within the current process	■ Stakeholders may not understand how best to articulate and prioritize their requests
3. City departments are not aware of Enterprise Architecture, or of the criteria used to make solutions decisions	■ A key element in fostering broad-based stakeholder support and involvement in EA is clear communication, tailored to meet the needs of different stakeholder groups.
4. Key team members have a full view into IT architecture, but have not yet documented how that architecture is defined or controlled.	■ Basic definitions and artifacts would ensure continuity in the event key team members were unavailable.
5. Small team and informal processes ensure that architecture is considered when defining projects. However, no process is in place, and no documented decisions are communicated.	■ ITD should create documentation of changes, a reference architecture that guides the changes, the current-state EA, the future-state EA, and most importantly, analysis deliverables that describe the requirements for change and how those changes are implemented.

Process Detail

IT Strategy and Management Processes Findings and Implications

Findings	Implications
1. Activities are underway to create an ITD Strategy for the City with direct involvement from the Departments, City Management, City Counselors and Community Representatives	• Provides an opportunity to clarify City priorities and align with ITD • Gain broader agreement, visibility and understanding across the City of ITD's current state and future direction, plans and resources
2. The E-Gov Steering Committee and E-Gov Project Team were recently established as multi-agency, multi-disciplinary governing bodies for the City to facilitate joint decision making and City-wide communication	• Increases direct involvement of key stakeholders to determine current and future direction of IT priorities and initiatives for the City • Increases visibility of IT activities and performance, and raises expectations among key stakeholders • Effective governing bodies requires clarity of purpose, responsibility and process
3. The annual budget process provides Departments and ITD an opportunity to formally and jointly set City priorities and investments	• Annual budget process ensures periodic alignment and transparency of IT expenditures to City priorities
4. New investments and IT projects do not appear to be sufficiently reviewed and reprioritized by Departments with ITD. Prioritization and investment decisions are led by ITD with periodic involvement & oversight from City management.	• Propagates perception of ITD as a "black box" since the majority of decisions occur at the ITD management level • Potential for misalignment of priorities, expectations and miscommunication with Departments if key stakeholders are not involved. Alternative opportunities, timing and solutions may not be fully explored to identify more cost effective approaches.
5. Allocation and reallocation of IT resources (ITD and outside parties) seem to occur in a reactive and somewhat ad-hoc manner, to address new/changing Department needs. Prioritization and resource assignment decisions are largely made by ITD management .	• Same implications as above • The cost/benefit tradeoff of procuring outside assistance is not systematically evaluated with Department involvement

Process Detail

Program and Portfolio Management (PPM) Findings and Implications

Findings	Implications
1. A formal Project Management Office (PMO) or mature PPM processes do not currently exist within ITD. However, ITD currently does have some aspects of PPM processes in terms of project management around the core dimensions • Projects are currently staffed by knowledgeable staff but project and resource priorities are not widely communicated • Formal PPM processes are not established • Projects costs and benefits are not generally established, tracked or measured. • PPM tools are not in place or are not consistently applied • ITD and business do work together, through the use of monthly system manager meetings	■ ITD appears to have the ability to successfully execute IT projects of varying size and modest complexity. ■ There is a high dependency of key project managers and the approaches and results can be inconsistent and vary widely depending on who's assigned to a project
2. Projects are informally managed, with little communication of status, progress or financial metrics to stakeholders.	■ Key stakeholders have limited visibility of the status and progress of a project. The opportunity to proactively manage, revise and improve an active project with stakeholder input is missed. ■ Project management and reporting should utilize a common tool and allow for visibility into project schedules and resource needs. All associated team should be brought into the project planning process
3. Project teams primarily focus on current activities and issues with limited view and understanding of future constraints, scenarios and expectations.	■ Project teams are limited in their ability to address future needs and manage uncertainties and risk.

Process Detail

Program and Portfolio Management Findings and Implications

Findings	Implications
4. While ITD is a small organization, with established informal process, it would benefit from development of standard practices	■ Basic project management processes (risk, schedule, resource, communication, etc.) should be incorporated into all project work, with a basic level of documentation easily accessible
5. Project and resource prioritization is done ad hoc based on various criteria. The prioritization process is unknown, both internally and externally	■ The project selection, approval, and prioritization process should be transparent, with known criteria
6. Business benefits and value achieved on ITD projects for Departments are not evaluated nor used to establish investment strategy	■ It is unclear if IT investments result in business benefits and if IT projects are successfully executed due to lack of analysis and measurement.
7. Focus of team is on current activities and issues	■ Standard processes will free senior team members to focus on future needs or risk management

Process Detail

ITD Project List (partial as of November 2012)

- PPM is a critical competency for the City of Cambridge, especially given the number of identified projects on the horizon:

Database

- Vax Retirement
- Upgrade Databases to SqlServer 2012

Finance Enterprise Applications

- PeopleSoft HR and Fin upgrade (in 2015/16)
- MUNIS Upgrade (annual)
- Requisition application development
- Crystal report conversion to XMLP (BIP)

GIS

- Master Address Database (final validations, dashboard, and front end tools
- GIS Web Viewer (existing viewer enhancements and mobile GIS)
- Updates to Web Server and GIS File server
- GIS Replication
- GIS Training classes
- Mapping and project work (2017 Flyover, Small projects for CDD, Fire Dept, ECC, Water, Traffic, Assessing, Inspectional, and Historical Dept.)

Infrastructure

- Replace ginger - Server CRS
- Replace barry - DB Server CRS
- Upgrade City and DMZ to SCCM 2007 to 2012
- Upgrade Operations Manager to 2012
- New data center plan
- Network Pen test remediation
- Web application pen test
- VM environment maintenance
- VM hardware upgrade RAM
- VM hardware upgrade Fusion iO

Infrastructure (Cont'd)

- VM software upgrade to 5.1
- VM Anti -Virus upgrade
- Upgrade Anti-virus TrendMicro for city and DMZ
- DMZ- Domain Wide Maintenance
- New closet for eng 5 Upgrade win 7 images on DMZ
- SCCM - Package DMZ software for public use
- Investigate co-location/CS3 Exchange - multiple stores
- Exchange - Database Maintenance
- Stutnex - water dept
- Server High availability project
- Repurpose SAN RAID Streaming media to school
- Update the Audio visual systems in major conference rooms
- Increase # of backup drives and staging space
- MDM for apple and other devices - Active Sync Policies
- New Cameras and servers
- Upgrade domain functional level - 2008/2012
- Active Directory Domain Policy/Settings/Permissions - Audit - City
- Active Directory Domain Policy/Settings/Permissions - Audit – City and DMZ
- Move to MultiLevel Domain

Network/VoIP

- Power outage redundancy project
- Upgrade network switches
- New network closet for ITD
- CRLS redundancy implementation
- Configure firewall reporting app
- Comcast library connection upgrade
- App to monitor all net connections
- New data and VOIP network for 5 Western Ave
- Create a dumb device subnet
- Move City Hall into separate subnet
- Upgrade Exinda Appliance
- New DHCP server for wireless
- Replace older wireless with new Trapeze
- MLK middle school VOIP(Sept. 2015 open)

Web

- New Websites (Inspectional, Water Department, 22 City View,CPAWebsite, Redevelopment Authority Website, Arts Council, Traffic, Fire Department, Common Ground)
- Mobile Websites (City, Police, Library, DPW)
- Streaming Video (Convert to Medicast and Implement mobile device viewing solution)
- iReport Enhancements
- Web Payment (User Interface and Webservices for Integration with Energov)
- Police Detail System upgrade for new Contract and Rates
- CDD Website Solar Radiation Map upgrade

Web (Cont'd)

- Municipal Tickets Web Submission (Tobacco, Animal Commission, Arts Council)
- Cloud computing migration of Website to Amazon EC2 Cloud solution - research feasibility
- Web Penetration Study
- ADA Audit of Website and remediation of findings
- Determine Web Analytics requirements per City and Dept websites
- Migrate all Permits and Apps to Sitecore from Cold Fusion
- CDD implementing Hubspot for Contacts Management on Web
- Improve Google Search capability
- Redesign Purchasing Bids Web application

Work Order Permitting

- Upgrade Remedy to latest version 7.3 - 8.0 with minor enhancements
- Remove Remedy Change Management to reduce license costs
- Install EnerGov to Inspectional and License
- Expansion of iReport to include other request summaries
- Deployment of EnerGov to Fire, Traffic & Parking, Public Works and/or Other Departments
- POTENTIAL - Selection/Deployment of Alternative CRM system
- POTENTIAL - Selection/Deployment of Alternative Work Order Management System
- Additional use of online payment for Remedy Permits
- Integration of Remedy with other Mobile Reporting systems

People Detail

Organization Design Findings and Implications

Findings	Implications
1. ITD is a lean centralized IT organization. The City of Cambridge operates with ~2.16 IT staff per City staff compared to 3.2 as an industry average. • Consequently, peers* average 48% more IT staff than the City of Cambridge.	▪ Limited bench depth ▪ Single points of failure across several competency areas ▪ Limits ability to design and manage strategic initiatives ▪ People are performing multiple roles making it difficult to become an expert in any one area ▪ Limited coverage and/or back up for essential functions ▪ Inability to meet business demands; backlog of projects
2. ITD generally operates with a customer service mindset and in a reactionary mode	▪ ITD may or may not reflect and fully understand business needs, preferences and priorities of the City departments ▪ Conflicting priorities and resource shifts can cause user and IT frustration ▪ Projects can take longer to finish and resources may not always be used effectively
3. The organization is very relationship based – both within ITD and with other departments	▪ ITD can be nimble and effective in fire fighting ▪ Reprioritization and changes can be made for short term benefit and compromise longer term objectives or negatively impact other dependencies ▪ Workloads are uneven across people leading to some resources being stretched thin

* Peer municipalities does not include any in Massachusetts

People Detail

Organization Design Findings and Implications (continued)

Findings	Implications
4. ITD staff focus in and address specific technical and support areas, often simultaneously wearing many different hats	▪ Tendency for siloed and fragmented information and actions ▪ Places additional requirement for effective knowledge sharing and communication
5. The ITD organizational structure is flat, with local decision making contributing to the siloed nature of operations and actions	▪ Limited transparency and end-to-end view and understanding ▪ Places greater demand for effective department-wide communication and collaboration
6. Departmental decisions, prioritization, resource allocation and assignments are made by key individuals with limited involvement of and communication with Departments	▪ Perception of ITD operating as a black box ▪ Priorities, investments and decisions may not fully align with those of Departments ▪ Conflicting priorities and resource shifts can cause user and IT frustration ▪ Projects can take longer to finish and resources may not always be used effectively
7. Policies, standards and processes are not evenly applied	▪ Projects can take longer to finish and consume more resources ▪ Resources may not always be used effectively ▪ A higher risk to production environment regarding quality of work, architecture and security standards, system integration, and customer support

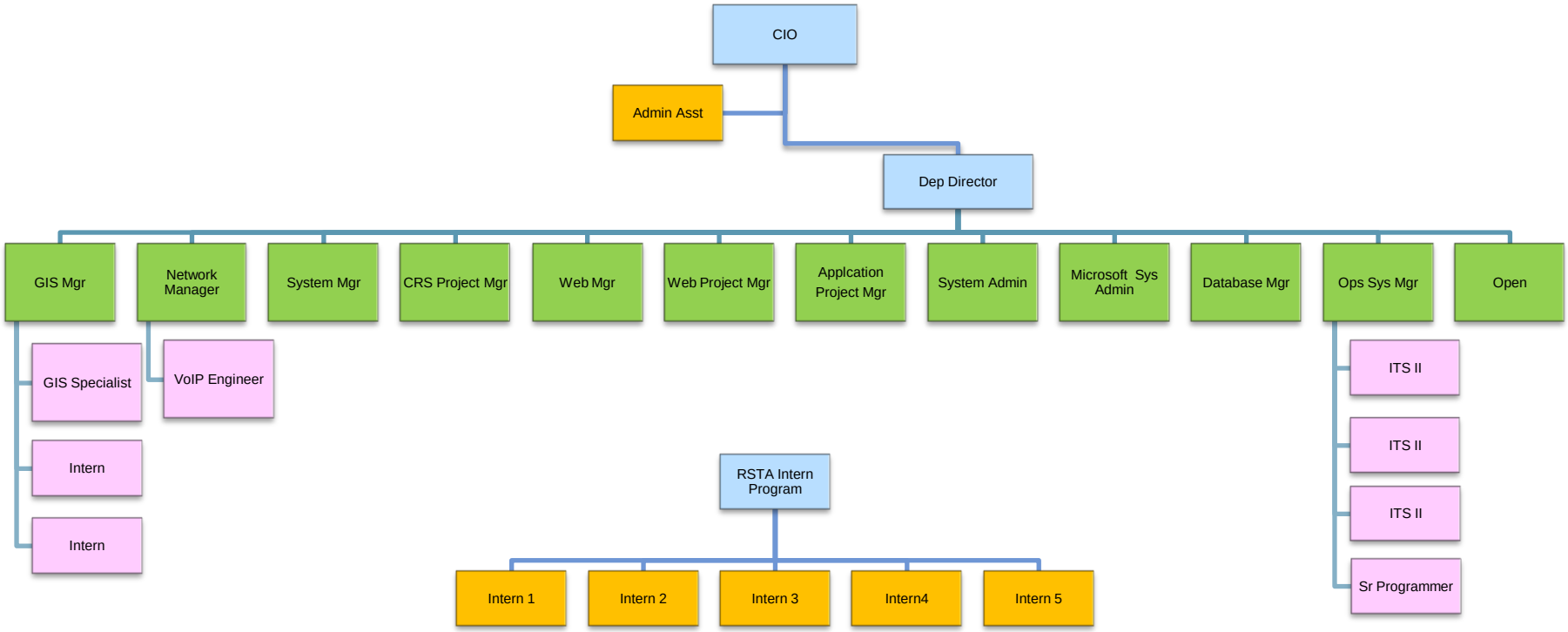
People Detail

Organization Design Findings and Implications (continued)

Findings	Implications
8. Many individuals appear dedicated and capable	▪ Provides ability to get the work done
9. Strong ”can do” attitude and pride in work among core technical team	▪ Core technical staff are self motivated and work together well ▪ Share knowledge freely ▪ Work together to find solutions to problems ▪ Understand each other’s roles and provide backup when staff members are absent
10. Resources are available to get the job done	▪ Pay and benefits are market competitive ▪ Able to attract and retain talented people ▪ Able to purchase hardware and software as required to develop and support systems

People Detail

ITD Organization Chart



- The ITD organization consists of 21 FTEs and is led by a CIO and Deputy Director.
- The formal organizational structure is relatively flat
- Specific capabilities and functions reside across individual groups and employees

People Detail

Sourcing Findings and Implications

Findings	Implications
1. The organization has established relationships with outside service providers to complement in-house capabilities and to quickly scale to increase capacity and capability	▪ There is an opportunity to expand the network of resources by better leveraging local companies, universities and interns.

People Detail

Communication Findings and Implications

Findings	Implications
1. Communications between ITD and City Departments now occurs through the E-Gov Committee structure. Regular meetings do not appear to be in place with City Department leaders and ITD.	▪ Limited shared understanding and decision making among key Department and ITD leaders ▪ Greater potential for misalignment between Department priorities and ITD activities
2. Historically, there has been limited direct interaction with key stakeholders external to the City though the newly formed E-Gov groups have the potential to change that.	▪ Limited leverage of external perspectives and resources ▪ Greater potential for misunderstanding between City and external parties.

People Detail

Skills Findings and Implications

Findings	Implications
1. Weakness in innovation and strategic business planning	▪ ITD is regarded as operations focused and not business focused ▪ ITD less able to provide innovative solutions to business/agency problems ▪ Business/Departments propose their own IT solutions which may be more costly to develop , integrate and support
2. Staff required to support multiple IT functions	▪ Training is more costly as individuals must be trained in several areas
3. Strong IT skills maturity in several key areas	▪ ITD can leverage individuals within group to provide training to other ITD staff

People Detail

Selecting and Assessing Competencies

- Using functional roles provided by City of Cambridge, Gartner selected the functional area associated with the role

Function	Primary Responsibility
Management	Achieves results through the direction and motivation of others. Focus is on managing and developing IT resources
Analyst	Develops requirements for IT system solutions that support a business function, strategy or need. Focus is on the interaction between technology, processes and people
Engineer	Develops and maintains technical platforms and solutions. Focus is on understanding, application and integration of new and emerging technologies
Client Support	Provides point of contact and manages problem resolution associated with various technologies. Focus is on maximizing use of technology through superior training and client support

People Detail

Selecting and Assessing Competencies

- Technical skills are necessary, but not sufficient to predict success in different IT roles. Gartner has developed a competency model for different IT job functions. For each of these 4 functional areas 5 critical competencies were identified by Gartner as having particular importance to predict success in fulfilling the roles:

5 Critical Competencies by Functional Area

Management	Analyst	Engineer	Client Support
Client Partnership	Client Partnership	Analytical Thinking	Adaptability
Change Advocate	Business Function Knowledge	Communications for Results	Communications for Results
Decisiveness	Communications for Results	Teamwork	Customer Service Orientation
Initiative	Teamwork	Information Seeking	Information Seeking
Strategic Business Planning	Information Seeking	Innovation	Planning and Organizing Work

- Expected proficiency levels were assigned based on job grade level

Job Level	Expected Proficiency
Job Grade "A"	Basic
Job Grade "B"	Intermediate
Job Grade "C"	Advanced
Job Grade "D"	Expert

People Detail

Overall skill maturity is above industry average

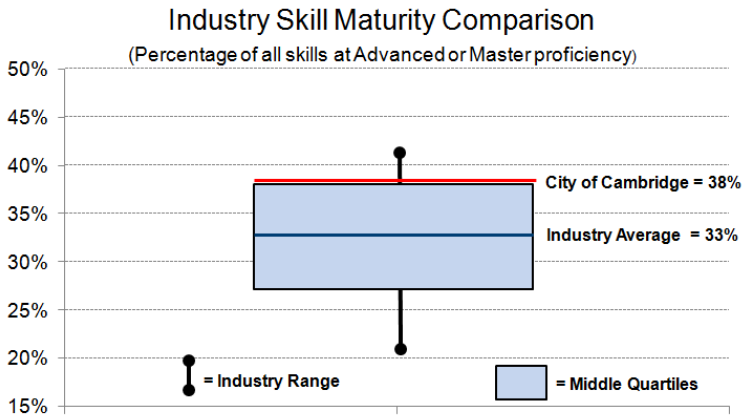
- City of Cambridge IT has 38% of skills at Advanced or Master level proficiency which indicates an above average skill maturity level as compared to our industry benchmark for other private and public sector clients:

Industry Benchmark Skill Proficiency Comparison

% of Skills at Each Proficiency Level

	Limited	Basic	Intermediate	Advanced	Master
City of Cambridge	9%	23%	30%	30%	8%
Private	6%	22%	38%	29%	5%
Public	7%	23%	38%	28%	5%

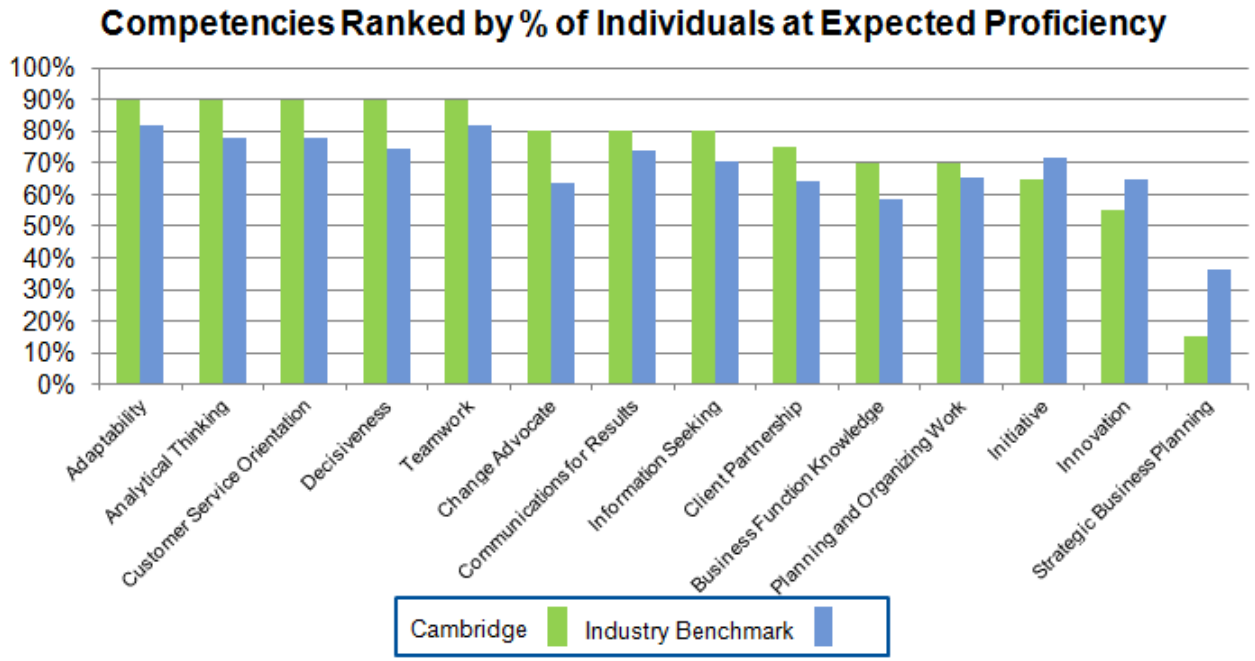
- City of Cambridge skills maturity is at the 75th percentile of the Gartner industry database



People Detail

Overall competency maturity above industry, but below for innovation and strategy

- City of Cambridge averages about 10% higher than our industry benchmark for 11 out of the 14 competencies
- The 3 competencies that the City is below industry benchmarks – Initiative, Innovation and Strategic Business Planning – are associated with IT's ability to proactively help their city agency partner



Recommendations and Roadmap

- Summary of Recommendations
- Roadmap
- Recommendation Descriptions

Summary of Recommendations

- In order to support the City of Cambridge's business needs, Gartner worked with the City to develop a roadmap to:
  - Address infrastructure risks to ensure consistent, high-quality provision of services
  - Improve the ITD organization to better meet stakeholder demands and provide core services
  - Establish Citywide prioritization and investment decisions through improved governance
  - Open channels and establish processes to enable and support customer innovation
  - Increase value of IT in customers' eyes by moving beyond core service and support

Summary of Recommendations

- In order to transform the role and value of IT in Cambridge, the City must determine which recommendations to act upon and prioritize resources to execute these essential steps to reach the future state.
- Gartner has developed recommendations and a 180 day action plan that would enable the City to address current weaknesses and opportunities in order to effectively and efficiently support City priorities and imperatives.
- The five initiatives below, described in detail later in the report, comprise the core elements of the recommended City IT Strategic Plan and move ITD from performing in a reactionary mode to performing as a strategic advisor for City stakeholders, providing input and guidance through a close and trusted relationship.

Establish Critical Governance Structure

1. **Implement Citywide Governance Model**

Implement ITD Organizational Improvements

3. **Realign the ITD Organization**
4. **Manage Innovation**

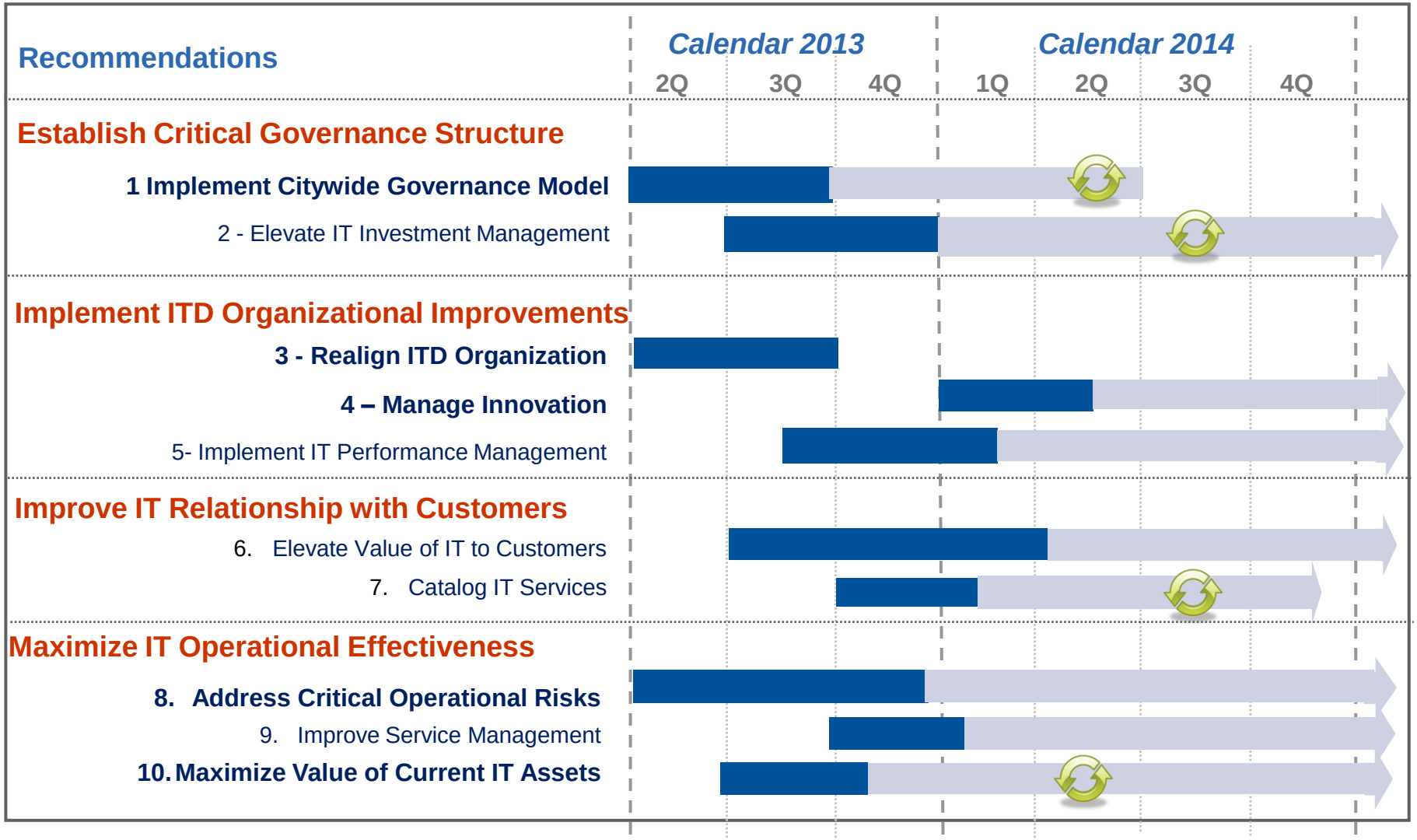
Maximize Effectiveness of IT Operations

8. **Address Critical Operational Risks**
10. **Maximize Value of Current IT Assets**

Recommendations Roadmap

Cambridge Roadmap Preliminary Timeline

Implementation | Ongoing | Refresh



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Recommendation Descriptions

Overview of Recommendation Descriptions

Establish Critical Governance Structure

1. Implement Citywide Governance Model

Implement ITD Organizational Improvements

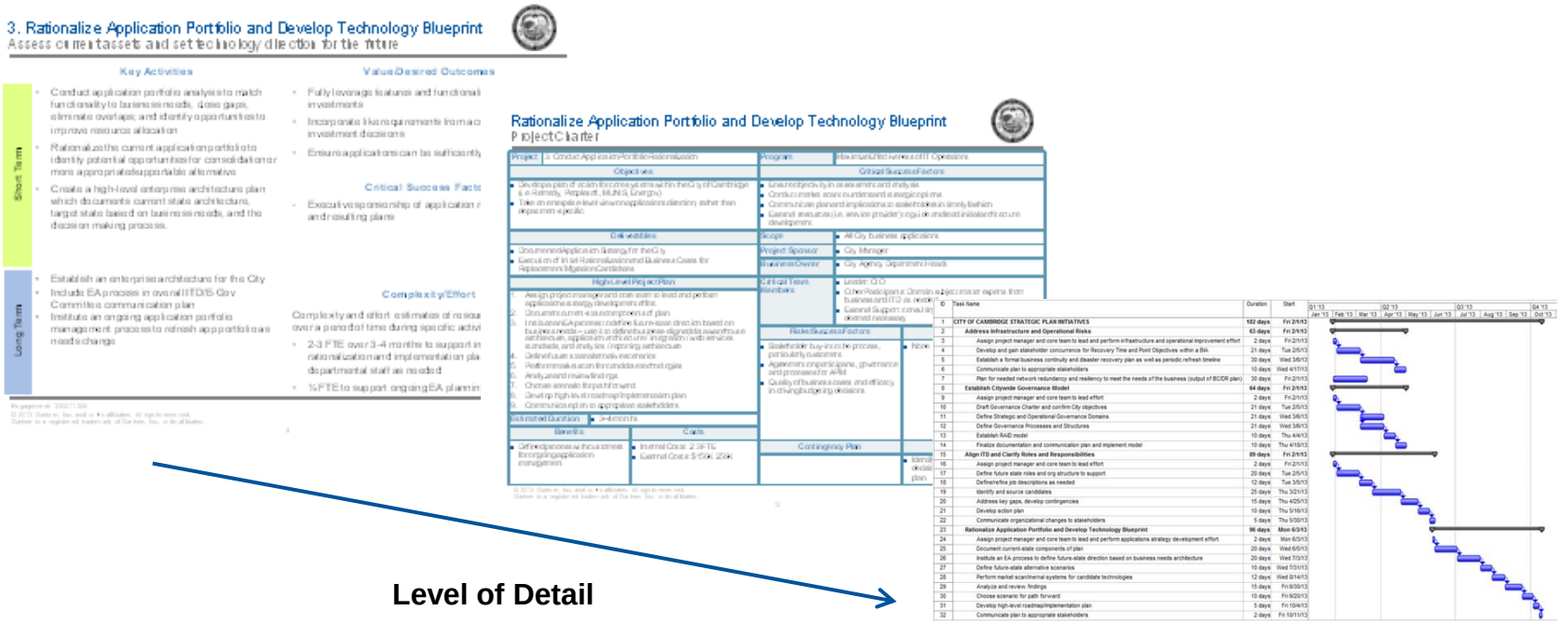
3. Realign the ITD Organization
4. Manage Innovation

Maximize Effectiveness of IT Operations

8. Address Critical Operational Risks
10. Maximize Value of Current IT Assets

Overview of Recommendation Descriptions

- The following pages contain descriptions of each recommended program and project within the program. These materials are intended as a starting point for further analysis, planning and implementation led by the City of Cambridge
- At the beginning of each recommendation section, a one page summary is included to highlight the objectives, key steps and critical success factors
- For the five projects deemed high criticality, a project charter is provided for each to 'hit the ground running' and quickly execute on the recommended actions, as well as a project plan.



Recommendation Description - Establish Critical Governance Structure

1. Implement Citywide Governance Model

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Implement Citywide Governance Model

Project Charter to Define the Tactical Plan and Drive Key Activities

Project	1. Implement Citywide Governance Model	**Program**	Establish Critical Governance Model

Objectives

- Clearly define roles and governance processes among internal and external key stakeholders
- Improve City-wide decision-making and alignment of IT investments to top priorities
- Define processes, deliverables, meetings and other tangible elements of the governance model and gain buy-in from stakeholders
- Increase engagement and leverage of external resources to foster innovation and partnership, and to expand the pool of resources

Critical Success Factors

- Active participation of City leadership and key stakeholders, internal and external to the City
- Identification of key decision points, participants and rules of engagement
- Explicit definition and implementation of governance roles and processes
- Clear focus on and measurement of business outcomes to ensure on-going effectiveness of IT governance

Deliverables

- Governance model, charter, domains
- Governance processes and structures
- Recommend-Agree-Input-Decide (RAID) model and Communication Plan

Scope	■ City organization and external stakeholders
Project Sponsor	■ City Manager
Business Owner	■ City Manager
Critical Team Members	■ Leader: City Manager ■ Other Participants: CIO, ITD Deputy Director, E-Gov Executive, E-Gov Project and E-Gov Community Representative Committees ■ External Support: consulting support and guidance, as deemed necessary

High-Level Project Plan

1. Assign project manager and core team to lead effort
2. Draft governance charter and confirm City objectives
3. Define Strategic and Operational Governance Domains
4. Define Governance Processes and Structures
5. Establish RAID model
6. Finalize documentation and communication plan and implement model

Estimated Duration	■ 3–4 months

Risks

- Lack of buy-in and participation by critical stakeholders
- Failure to prioritize governance activities on an ongoing basis

Prerequisite Activities

- Identification of all participants, buy-in and commitment from all parties

Benefits

- Lower total cost of ownership via enterprise perspective
- Strengthened relationship of ITD with City Departments
- Increase transparency and accountability of IT in the City

Costs

- **TBD**
- **To be determined based on decisions resulting from Final Report**

Contingency Plan

- Build off of current IT strategy momentum and define task force that will produce key deliverables, extend timeline by 1-2 months.

Follow-Up Actions

- Assess effectiveness of governance model on a periodic basis and adjust
- Move to IT Investment and prioritization frameworks and processes (Project #2)

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1. Implement Citywide Governance Model

Achieve commitment from internal and external stakeholders for IT decisions

Key Activities

Short Term

- Clearly define roles and governance processes among internal and external key stakeholders to improve City-wide decision-making and alignment of IT investments to top priorities
- Define processes, deliverables, meetings and other tangible elements of the governance model and gain buy-in from stakeholders
- Increase engagement and leverage of external resources to foster innovation and partnership, and to expand the pool of resources

Long Term

- Begin to systematically measure and track business outcomes and decisions resulting from today's governance
- Reconfirm and communicate roles and responsibilities for City-wide decision-making
- Periodically assess the effectiveness of governance, from a City department and ITD perspective, and make refinements to the governance model

Value/Desired Outcomes

- Strengthen relationship of ITD with City Departments and begin to move toward joint partnership
- Increase efficiencies and cost effectiveness of IT resources by improving alignment and use of IT investments to City's top priorities
- Increase transparency and accountability of IT across the City

Critical Success Factors

- Active participation of City leadership and key stakeholders, internal and external to the City
- Explicit definition and implementation of governance roles and processes
- Clear focus on and measurement of business outcomes to ensure on-going effectiveness of IT governance

Complexity/Effort

- Define and implement organizational structure: 4-8 weeks (.5 FTE)
- Identify/transition/confirm candidates: 4-8 weeks (.5 FTE)
- Key gaps and action plan: 3-4 weeks (.5 FTE)

Source: Gartner

1. Implement Citywide Governance Model

What is Governance?

- Governance is the set of processes and structures that enable effective decision making.
- It defines decision rights and the accountability framework ensures that decisions are made by the right stakeholders, with the benefit of the right input and are communicated to the appropriate stakeholders.
- It creates a management process for:
  - Setting goals.
  - Establishing policies, practices, procedures and the organizational structure to provide reasonable assurance that enterprise goals will be met.
  - Forming and enacting decisions.
- Defining and implementing effective governance takes time, effort and focus.
- Effective governance will yield cost savings, innovation, growth, reuse and sharing.

Governance = Decision Making

Governance ≠ Organization Structure

Source: Gartner Research

1. Implement Citywide Governance Model

Cambridge is currently a 'Grinder', how far does the City want to go?

Business: Market Leader
(Risk-Taker, High Growth)

The Butler

- Anticipate business needs
- Minimized governance
- Service over cost
- Doesn't hinder the business

The Entrepreneur

- Full business-IT integration
- Managed risk
- No distinction between IT and business governance
- What, not how

Expected IT Role: Tactical or Utility

Expected IT Role: Strategic or Transformational

The Grinder

- IT cost containment
- Predictability or reliability
- Governance as self-protection
- Continual unit cost improvement
- Benchmarking for justification

The Team Player

- Works well with others
- IT value over time, not just cost
- Business process focus, but solution-driven
- High business alignment

Business: Market Follower
(Risk-Averse, Mature)

Source: Gartner

1. Implement Citywide Governance Model

Strategic Governance Domains

Decision Domain	Description
IT Principles	High level statements about how IT is used in the business. Decision guidelines to enable consistent decision-making throughout the enterprise.
IT Investment and Prioritization	Decisions about how much and where to invest in IT including project approvals and justification techniques. Includes enterprise level and business/functional unit level.
IT Architecture	An integrated set of technical choices to guide the organization in satisfying business needs. Architecture is a set of policies and rules that govern the use of IT and plot a migration path to the way business will be done.
IT Infrastructure	The base foundational IT capabilities shared throughout the enterprise. May be business unit specific or centrally managed. Included both human capital and technical (e.g., network, help desk, shared data).
External Relationships	Formal and informal relationships with key suppliers, customers, and alliance partners.

Inspired by MIT Sloan Center for Information Systems Research (Weill) and Gartner, Inc.

1. Implement Citywide Governance Model

Governance Mechanisms – Processes and Structures

Processes are the most critical part of governance to get right

- Well defined and repeatable processes promote predictability of decision-making
- Processes should be right-sized to the set of decisions being addressed. Over-engineering processes can cause process delays and lack of adherence
- Processes should be continually refined as the organization matures
- Importantly, it is essential that explicit *exception processes* exist
  - Without exception processes, decisions will be ignored or “end arounds” will develop
  - Equally important, exception processes are a learning mechanism; if the same exception is requested repeatedly, the standard or guideline involved may need to be updated

Structures (e.g., E-Gov committees and City Manager) should adhere to the following guidelines:

- Define a clear scope and purpose for the structure
- Do not use structures as a substitute for good processes
- If the purpose no longer exists, disband the structure; committees have a tendency to find new (not necessarily important) reasons for existing
- Clearly define relationships with other governance structures/mechanisms
- Minimize the number of structures and the membership; try to repurpose existing committees or councils

1. Implement Citywide Governance Model

Governance – Decision Rights

Clarity regarding roles and responsibilities with respect to IT decision-making is essential for effective IT governance.

The RAID Model can be used to create that clarity:

- **R**ecommend
  - Primary responsibility for recommending an action requiring a decision
  - Consistent with overall IT strategy
- **A**gree (or Approve)
  - Sign-off on recommendation
  - Fulfilling legal, financial or policy responsibilities
  - Should be very limited in scope
- **I**nput
  - Provide expertise, information or perspective on proposal
  - No obligation for decision maker to explicitly act on any specific input
- **D**ecide
  - Single decision-maker
  - Clearly understood role by all key stakeholders

Recommendation Description - Implement ITD Organizational Improvements

3. Realign ITD Organization

4. Manage Innovation

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Realign ITD Organization

Project Charter to Define the Tactical Plan and Drive Key Activities

Project	3. Realign ITD Organization	Program	Implement ITD Organizational Improvements

Objectives

- Define new ITD roles and responsibilities
- Adjust organizational structure as needed to meet future demand
- Identify sourcing and training needs (i.e., hiring, contractors, etc.)
- Develop action plan that delineates all required actions to move to future state

Critical Success Factors

- Clear roles and responsibilities within ITD
- Fill roles with experienced, pragmatic resources (internal and external)
- Adopt flexibility to address future skills and competencies

Deliverables

- Revised ITD org model, and new roles that require filling
- Job descriptions w/ roles and responsibilities
- Action plan to migrate to future state org model

Scope	ITD
Project Sponsor	CIO
Business Owner	City Manager
Critical Team Members	Leader: CIO Other Participants: Human Resources, Finance, E-Gov Executive, and E-Gov Project Committees External Support: consulting support and guidance, as deemed necessary

High-Level Project Plan

1. Assign project manager and core team to lead effort
2. Define future state roles and org structure to support
3. Define/refine job descriptions as needed
4. Identify and source candidates
5. Address key gaps, develop contingencies
6. Develop action plan
7. Communicate organizational changes to stakeholders

Estimated Duration	3–4 months

Risks

- Sourcing roadblocks (e.g., problems acquiring needed skills)
- Insufficient development of new roles and responsibilities

Prerequisite Activities

- Consult human resources to understand options and obstacles
- Prioritize needs based on future needs and skills inventory results

Benefits

- ITD organization better equipped to meet stakeholder needs
- Added skill sets to meet demand
- Fewer ITD single points of failure

Costs

- **TBD**
- **To be determined based on decisions resulting from Final Report**

Contingency Plan

- Quickly identify needs and sourcing plan for critical needs (e.g., network administration) and address. Then address next level of criticality

Follow-Up Actions

- Ongoing assessment of ITD to adjust to future needs as required
- Implement performance management (Project #5)

3. Realign ITD Organization

Define new ITD roles and responsibilities and activities to achieve future state

Key Activities

Short Term

- Clarify the role of ITD and align responsibilities and expectations (e.g. strategic partner vs. reactionary mode, clarify services and department expectations)
- Align ITD organization structure and roles to address business needs and to provide the required City-wide IT support in the most effective manner (see the “Next generation organization chart” for discussion) (e.g. restructure, leadership, management processes, partner with IT resources in City departments)

Long Term

- Develop business relationship management discipline, supported by appropriate process documentation and training
- Assess feasibility and value of shared resource pools across ITD, Schools and Police

Value/Desired Outcomes

- Confirm role of ITD with City stakeholders
- Modified ITD organization structure aligned with the priorities of City stakeholders
- Increased business relationship management skills over time

Critical Success Factors

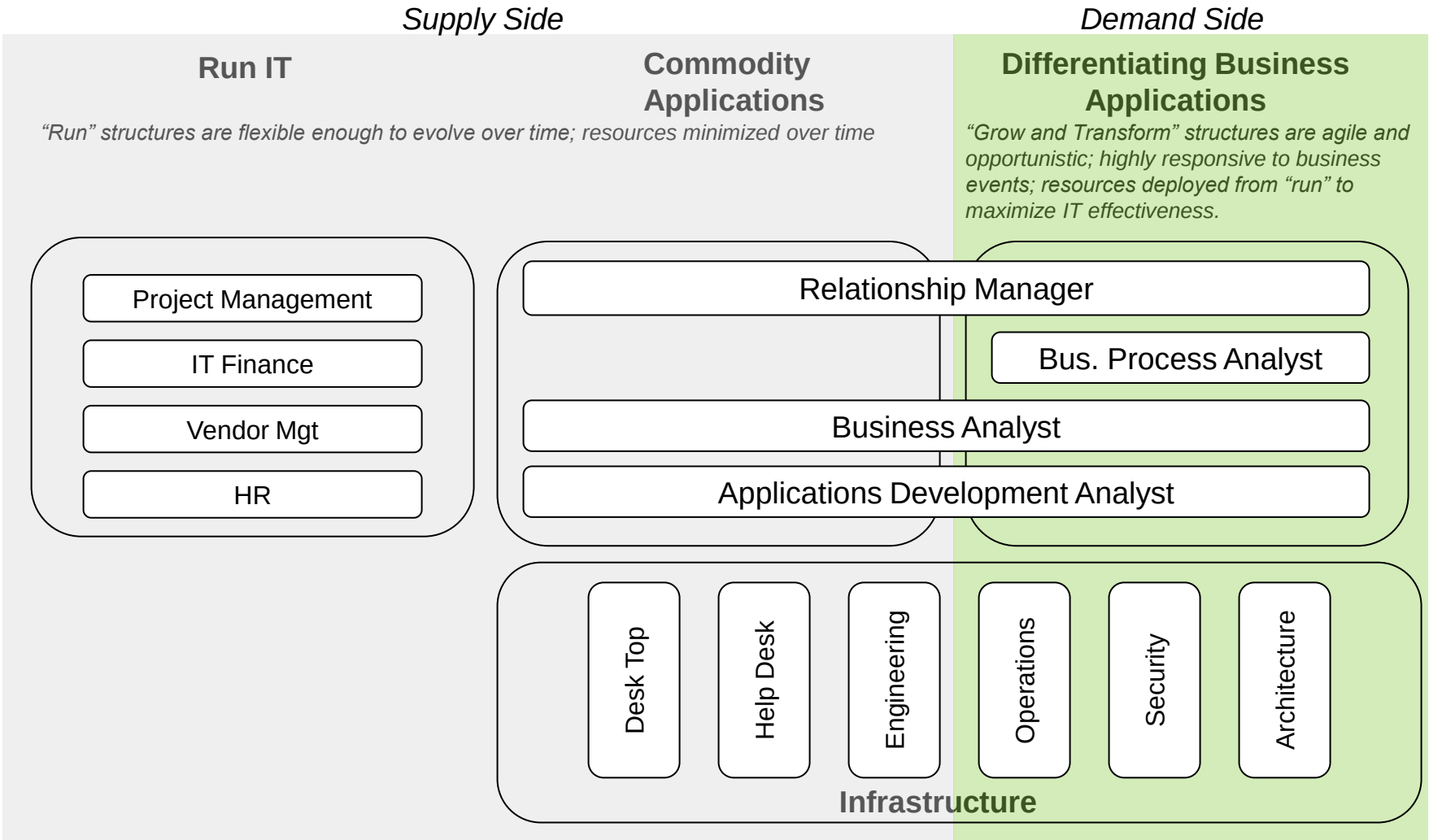
- Clear roles and responsibilities within ITD
- Fill roles with experienced, pragmatic resources (internal and external)
- Adopt flexibility to address future skills and competencies

Complexity/Effort

- Define and implement organizational structure: 4-8 weeks (.5 FTE)
- Identify/transition/confirm candidates: 4-8 weeks
- Key gaps and action plan: 3-4 weeks

3. Realign ITD Organization

The “Next Generation” Organization Chart: Roles may cross between commodity and differentiating functions and applications



Source: Gartner

3. Realign ITD Organization

Over time, develop broader business relationship management competencies

- **Building Relationships:** Builds both formal and informal professional networks. Maintains and extends networks within, across and external to organizational boundaries. Obtains and shares information, ideas and problems. Solicits advice, support, championship, sponsorship and commitment that result in smooth transitions of change and the development of mutually acceptable solutions.
- **Negotiation:** Develops win-win solutions with others. Devises counter-arguments, offers compromises while maintaining company objectives, remains assertive in face of conflict and reaches agreements that promote mutual interests and maximize commitment.
- **Communication for Results**: Expresses technical and business concepts, ideas, feelings, opinions and conclusions orally and in writing. Listens attentively and reinforces words through empathetic body language and tone.
- **Consulting**: Uses professional knowledge, experience and technical expertise to respond to questions, facilitate problem solving, and generally advise, influence and provide guidance to customers and business partners over whom there is no direct authority.
- **Business Enterprise Knowledge:** Solicits information on enterprise direction, goals and industry competitive environment to determine how own function can add value to the organization and to customers. Makes decisions and recommendations clearly linked to the organization's strategy and financial goals, reflecting an awareness of external dynamics. Demonstrates awareness by providing clear explanations for actions taken relative to customer requirements, needs and industry trends.
- **Information Seeking:** Gathers and analyzes information or data on current and future trends of best practice. Seeks information on issues impacting the progress of organizational and process issues. Translates up to date information into continuous improvement activities that enhance performance.
- **Systems Thinking:** Ability to plan and account for impacts of system development efforts across architectural system components, critical business processes, data and applications. Conceptualizes the impact of changes to system platforms as a result of system acquisition, system merger or implementation of enterprise-wide systems.
- **Teamwork**: Collaborates with other members of formal and informal groups in the pursuit of common missions, vision, values and mutual goals. Places team needs and priorities above personal needs. Involves others in making decisions that affect them. Draws on the strengths of colleagues and gives credit to others' contributions and achievements.

Source: Based on Gartner Business Relationship Management Research and Best Practices, 2010

4. Manage Innovation

Seek new methods to obtain needed skills and serve as conduit for innovation

Key Activities

Short Term

- Consolidate ("virtually") social media activities under one program; establish measurement mechanisms
- Begin to develop relationships with external parties (e.g. universities, local companies, Community Reps) to foster innovation (e.g. innovation contest) and for greater leverage of external resources
- Establish City guidelines and enterprise content management strategy for digital engagement with citizens, presentation of information and distribution of information

Long Term

- Improve analytics and business intelligence capabilities available on enterprise applications
- Explore all technology options for new requirements, including utilization of current IT assets and sharing with partner entities
- Establish innovation partnerships between ITD and the departments, as well as between departments, to foster the sharing of ideas and lessons learned

Value/Desired Outcomes

- A culture that encourages and supports experimentation and an ITD organization that can support and establish clear policies on development of experimental technology projects
- Tap into Cambridge ecosystem (e.g. universities, local business, neighborhood groups, etc.) to 'source' innovation skills and technologies from outside partners
- Clear social media policy, flexible enough to accommodate experimentation

Critical Success Factors

- Clear guidelines for stakeholders for known technologies, and a process for addressing new technologies
- Establishment of clear policies on development of experimental technology projects
- Sufficient technology staff to engage with and support department

Complexity/Effort

- 3 months to formally define relationships with external stakeholders for innovation (.5 FTE)
- 3 months for Social media program and measurement processes (.25 FTE)
- 4 months for development of innovation guidelines and processes (.25 FTE)

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4. Manage Innovation

Critical to manage various government stakeholder mindsets towards innovation

- Successfully managing innovation,, requires a communication strategy that speaks to each stakeholder group individually. As such, IT innovators should
  - Emphasize leadership and communication skills. If you have to choose, select leadership and communication over technical ability.
  - Deliver innovation as way to achieve more-effective government, not as an IT solution.
  - Communicate deliberately. Use communication to forge bonds between innovators and those managing the status quo. Maintain the optimal level of distance from the status quo to promote change while ensuring innovations will not ultimately be rejected.
  - Evaluate your team from a behavioral point of view, and ensure that obstacles and issues are raised to drive problem solving, rather than naysaying.
  - Avoid assuming the value of innovation is self-evident. Tailor the value to your audience, and be explicit about desired outcomes beyond technological advancement and possible objections to the desired outcomes.

Table 1. Different Mind-Sets of Government Stakeholders

Stakeholder Role	Innovation Outlook	Political Risk Tolerance	Business Risk Tolerance	Language	Time Horizon
Elected Enterprise Leaders	Require	Low to Moderate	Moderate to High	Strategy, Politics	Balance of Elected Term, Future Positioning
Legislative Branch Leaders/ Parliamentarians	Support	Low	Moderate, but without in-depth understanding of implications	Constituency, Politics	Elected Term
Chief Operating/ Administrative Officers	Support	Low to Moderate	Low to Moderate	Strategy/ Operations	Personally Flexible, but Sensitive to Political Terms
Finance Ministers/ Budget Directors	Skeptical/ Pragmatic	Low to Moderate	Low to Moderate	Quantitative Results	Budget Cycle
Heads of Departments/ Ministries/ Agencies/ Programs	Support	Moderate	Moderate	Mainstream Business Operations	Elected Term
Business Process Owners	Resist	Moderate	Low	Business Processes	Flexible
IT Operations	Resist	Low	Low	Technology	Flexible
Innovators	Devoted	High	High	Ideas	Future

Source: Gartner (November 2011)

SOURCE: Critical Success Factors for Promoting Innovation in Government**', Gartner, November 2011**

Recommendation Description - Maximize Effectiveness of IT Operations

8. Address Critical Operational Risks

10. Maximize Value of Current IT Assets

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Address Critical Operational Risks

Project Charter to Define the Tactical Plan and Drive Key Activities

Project	8. Address Infrastructure and Operational Risks	Program	Maximize IT Operational Effectiveness

Objectives

- Business continuity and operational consistency for all stakeholders
- Cost-effective and efficient infrastructure, continuously exploring options (e.g., cloud, increased virtualization)

Critical Success Factors

- Forward-looking, long-term view of budgeting to maintain operations
- Shared (e.g., ITD and business) concurrence of application and IT services availability needs

Deliverables

- Documented Recovery Time Objectives (RTOs), Recovery Point Objectives (RPOs) within a structured Business Impact Analysis (BIA) for all applications and services
- Documented Business Continuity and Disaster Recovery (BC/DR) Plan
- Network/Infrastructure upgrade plan
- Execution of integration improvement plans

Scope	■ City infrastructure assets
Project Sponsor	■ CIO
Business Owner	■ City Manager
Critical Team Members	■ Leader: Deputy CIO ■ Other Participants: CIO, Schools and Public Safety IT teams, E-Gov Executive,and E-Gov Project Committees ■ External Support: consulting support and guidance, as deemed necessary

High-Level Project Plan

1. Assign project manager and core team to lead and perform infrastructure and operational improvement effort
2. Develop and gain stakeholder concurrence for Recovery Time Objectives (RTOs), Recovery Point Objectives (RPOs) within a structured Business Impact Analysis (BIA) for all applications
3. Establish a formal business continuity and disaster recovery plan as well as periodic refresh timeline
4. Communicate plan to appropriate stakeholders
5. Plan for needed network redundancy and resiliency to meet the needs of the business (e.g., output of BC/DR plan)

Estimated Duration	■ 3 -4 months

Risks/Success Factors

- Stakeholder buy-in to the process, particularly customers
- Planning around existing facility limitations
- Must adopt Citywide perspective, including growth projections

Prerequisite Activities

- Identification of core team, to include Schools and Public Safety
- Prioritization of immediate actions to address operational risks.

Benefits

- Greater availability of key business applications and services
- Defined process with customers for ongoing BC/DR planning

Costs

- **TBD**
- **To be determined based on decisions resulting from Final Report**

Contingency Plan

- Address known risks immediately (e.g., network upgrade), contact neighboring cities and universities to gauge ability to cooperate on BC/DR needs

Follow-Up Actions

- Identify/secure funding for investment decisions driven by BC/DR plan

8. Address Critical Operational Risks

Quickly address business continuity risks and adopt long-term planning perspective

Key Activities

Short Term

- Conduct Business Impact Analysis to assesses the direct and indirect financial losses from a disruption, and define the recovery objectives
- Establish a formal business continuity and disaster recovery plan
- Plan for needed network redundancy and resiliency to meet the needs of the business (e.g., output of Business Continuity planning)

Long Term

- Create a data center strategy and revisit data warehouse architecture to eliminate single points of failure
- Evaluate opportunities for increasing virtualization
- Evaluate opportunities to implement more real-time integration between enterprise systems
- Standardize facility classifications and availability configurations for access to the network

Value/Desired Outcomes

- Business continuity and operational consistency for all stakeholders
- Cost-effective and efficient infrastructure, continuously exploring options (e.g., cloud, increased virtualization)

Critical Success Factors

- Forward-looking, long-term view of budgeting to maintain operations
- Shared (e.g., ITD and business) concurrence of application and IT services availability needs
- Seeking creative sourcing options (e.g., utilizing another City data center as a backup)

Complexity/Effort

- 3 months for short term activities (leveraging external support for guidance as necessary), business staff participation as needed (1-2 FTE)
- 3 months for data center strategy planning and execution (1-2 FTE)
- 3 months to lead evaluations and work around virtualization, integration and facility configuration standardization (.5 FTE)

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8. Address Critical Operational Risks

A Well Defined Business Impact Analysis is Key to Business Continuity Planning

BCP Step	Description
1. Risk assessment	Risk assessment determines and ranks potential threats to normal business operations. Mitigation controls are identified.
2. Business impact analysis	Business impact analysis identifies the critical components of the business process and assesses the direct and indirect financial losses to the business should the business process be disrupted. The recovery objectives are determined in this step.
3. Business continuity strategy	Business continuity strategy determines the processes, options and systems required to recover critical processes from a disruptive event.
4. Business continuity plan	The business continuity plan builds the overall recovery and maintenance plan across the entire organization based on the input from the previous three steps.
5. Plan testing	Plan testing ensures the plan is workable, up-to-date and achieving required objectives.
6. Plan maintenance (ongoing)	Plan maintenance is the ongoing process of monitoring changes in risk and impact and testing results to update the strategy and the plan.

Maximize Value of Current IT Assets

Project Charter to Define the Tactical Plan and Drive Key Activities

Project	10. Maximize Value of Current IT Assets	Program	Maximize IT Operational Effectiveness

Objectives

- Define an application strategy
- Develop a plan of action for core systems within the City of Cambridge
- Take an enterprise-level view on applications direction, rather than department-specific
- Develop lightweight enterprise architecture

Critical Success Factors

- Ensure objectivity in assessment and analysis
- Conduct market scan to understand strategic options
- Communicate plan and implications to stakeholders in timely fashion
- External resources (i.e. service provider) to guide and lead initial architecture development

Deliverables

- Documented Application Strategy for the City
- Execution of Initial Rationalization and Business Cases for Replacement/Migration Candidates
- Lightweight enterprise architecture

Scope	■ All City enterprise business applications
Project Sponsor	■ City Manager
Business Owner	■ E-Gov Executive/City Agency Department Heads
Critical Team Members	■ Leader: E-Gov Project Committee Chair ■ Other Participants: E-Gov Executive and E-Gov Project Committees, Domain subject matter experts from business and ITD as needed ■ External Support: consulting support and guidance, as deemed necessary

High-Level Project Plan

1. Assign project manager and core team to lead and perform applications strategy development effort.
2. Document current-state components of plan
3. Institute an EA process to define future-state direction based on business needs – use it to define business-aligned data warehouse architecture, application architecture / integration / web services standards, and analytics / reporting architecture
4. Define future-state alternative scenarios
5. Perform market scan for candidate technologies
6. Analyze and review findings, choose scenario for path forward
7. Develop high-level roadmap/implementation plan

Estimated Duration	■ 4-5 months

Risks/Success Factors

- Stakeholder buy-in to the process, particularly customers
- Agreement on participants, governance and processes for application prioritization
- Quality of business cases and efficacy in driving budgeting decisions

Prerequisite Activities

- Identify internal resources that could manage/participate in the project
- Identify ITD and department SMEs to inform application capabilities and departmental needs
- Gather all policies and other artifacts to inform enterprise architecture

Benefits

- Defined process with customers for ongoing application management

Costs

- **TBD**
- **To be determined based on decisions resulting from Final Report**

Contingency Plan

- Agree on core enterprise architecture principles, address most-pressing application decisions (e.g., Remedy)

Follow-Up Actions

- Identify/secure funding for investment decisions driven by implementation plan
- Refresh application assessment periodically

10. Maximize Value of Current IT Assets

Assess current assets and set technology direction for the future

Key Activities

Short Term

- Conduct application portfolio analysis to match functionality to business needs, close gaps, eliminate overlaps; and identify opportunities to improve resource allocation
- Rationalize the current application portfolio to identify potential opportunities for consolidation or more appropriate/supportable alternative
- Create a high-level enterprise architecture plan which documents current state architecture, target state based on business needs, and the decision-making process.

Long Term

- Establish an enterprise architecture for the City
- Include EA process in overall ITD/E-Gov Committee communication plan.
- Institute an ongoing application portfolio management process to refresh app portfolio as needs change

Value/Desired Outcomes

- Fully leverage features and functionality of application investments
- Incorporate like requirements from across departments in investment decisions
- Ensure applications can be sufficiently supported

Critical Success Factors

- Clear application strategy and enterprise architecture to govern application decisions for the City
- Executive sponsorship of application rationalization process and resulting plans

Complexity/Effort

- 3-4 months to support initial application rationalization and implementation planning, along with departmental staff as needed (2 FTE)
- 6 weeks to support ongoing EA planning (.5 FTE)

10. Maximize Value of Current IT Assets

Application Strategy

- An application strategy is a plan to achieve a set of objectives while balancing the competing demands of multiple stakeholders
- Cambridge must develop a strategy for its core systems such as PeopleSoft, MUNIS, Remedy and Energov
- Suggested components of the application strategy would include:
  - Statement of Technology Standards and Guidelines
  - Summary Business Strategy, Business and IT Imperatives, Principles
    - Majority of this work has been completed as part of this engagement led by Gartner
  - Application Maturity Model Assessment for the Enterprise
  - Current-State Applications Portfolio
  - Desired Future-State Applications Direction
  - Alternative Scenarios
  - Market Scan of Candidate Technologies
  - Scenario to Pursue
  - High-Level Implementation Plan
- An application strategy for the City's core systems should incorporate all of the above features – and is developed after the enterprise architecture groundwork described later in the document is completed

On the following slide, we have provided descriptions and examples for some of the above components from the Gartner research note "Application Strategy: A Taxonomy".

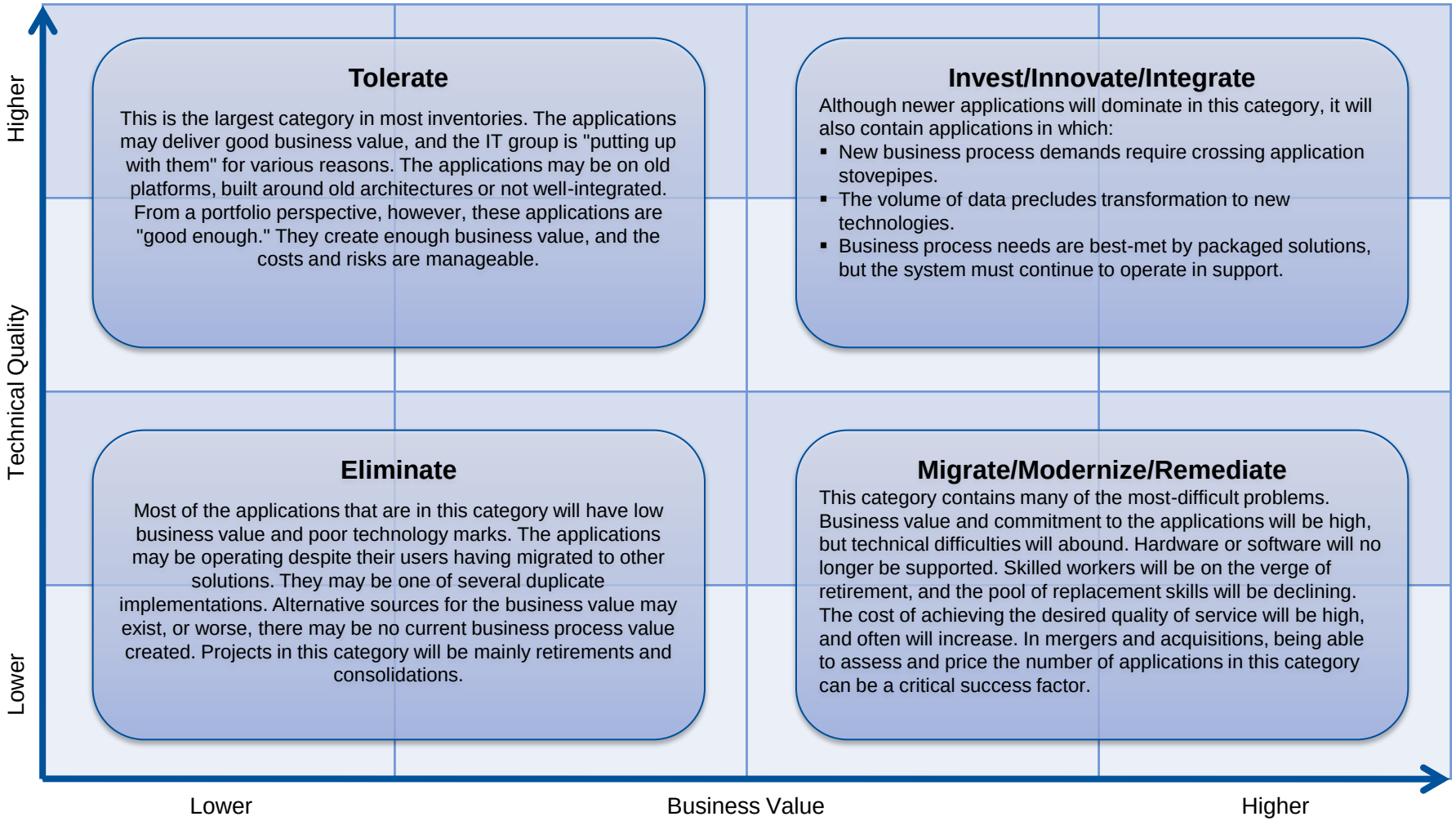
10. Maximize Value of Current IT Assets

Application Strategy Components

Component	Description
Statement of Technology Standards and Guidelines	All the existing standards and key guidelines (a guideline being a strong preference without necessarily being a standard) within the enterprise should be documented here.
Summary Business Strategy, Business and IT Imperatives, Principles	This serves to always remind users of the application strategy document of the macro context for the interpretation and use of this document. It is also a strong reminder that the application strategy has to connect strongly back to the business strategy to be effective.
Application Maturity Model Assessment for the Enterprise	The current maturity level of the enterprise should be assessed, potentially using Gartner's Application Maturity Model (AMM) tool, and documented.
Current-State Applications Portfolio	The current state of the application environment should be detailed here. This would include a high-level inventory of some of the key application assets that the enterprise currently relies on.
Desired Future-State Applications Direction	The desired future state of the application environment is closely linked to supporting the business strategy.
Alternative Scenarios	A scenario-planning process, identifying the critical uncertainties in each option, key milestones and signposts, would be ideal for this section because it is unlikely that information on all the possible paths available to the organization would be known.
Market Scan of Candidate Technologies	Survey or RFI of candidate technologies in the market that align with the scenarios under consideration.
Scenario to Pursue	We highly recommend a SWOT analysis for the selected (or most likely) scenario (if not done for all the candidate scenarios).
High-Level Implementation Plan	The strategy document should include a high-level plan for how the implementation would proceed for the scenario chosen to pursue.

10. Maximize Value of Current IT Assets

The TIME Analysis Construct is a Useful Method for Defining the Future State



Source: Gartner

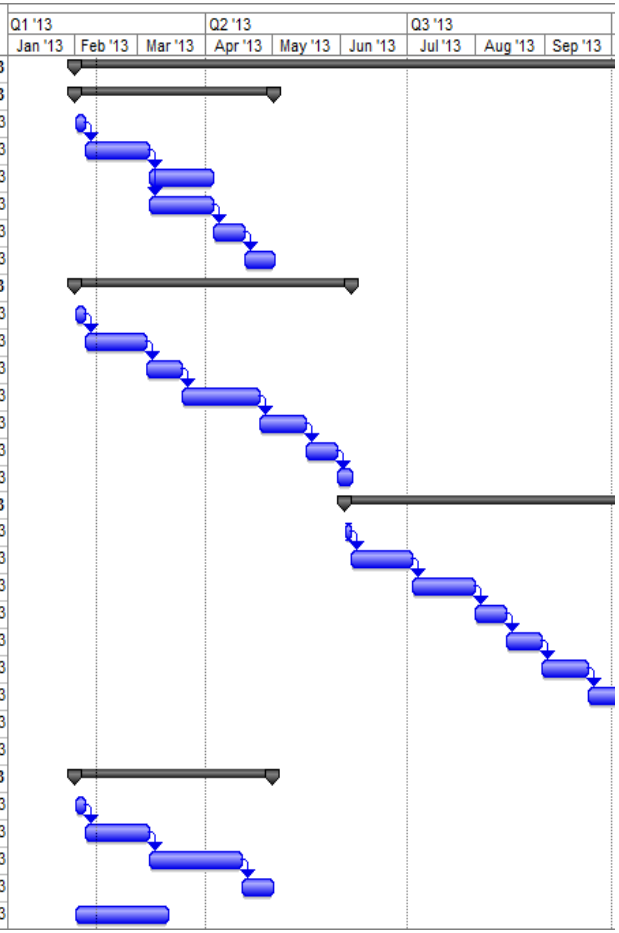
Cambridge 180-day Action Plan “Playbook”

Cambridge 180-day Action Plan

Project Plan to help manage the tasks, resources, deliverables and outcomes for the five highest priority projects

- A snapshot of the plan is below, the .mpp file is provided under separate cover.

ID	Task Name	Duration	Start	Finish
1	**CITY OF CAMBRIDGE STRATEGIC PLAN INITIATIVES**	**182 days**	**Fri 2/1/13**	**Mon 10/14/13**
2	**Establish Critical Governance Structure**	**64 days**	**Fri 2/1/13**	**Wed 5/1/13**
3	Assign project manager and core team to lead effort	2 days	Fri 2/1/13	Mon 2/4/13
4	Draft Governance Charter and confirm City objectives	21 days	Tue 2/5/13	Tue 3/5/13
5	Define Strategic and Operational Governance Domains	21 days	Wed 3/6/13	Wed 4/3/13
6	Define Governance Processes and Structures	21 days	Wed 3/6/13	Wed 4/3/13
7	Establish RAID model	10 days	Thu 4/4/13	Wed 4/17/13
8	Finalize documentation and communication plan and implement model	10 days	Thu 4/18/13	Wed 5/1/13
9	**Implement ITD Organizational Improvements**	**89 days**	**Fri 2/1/13**	**Wed 6/5/13**
10	Assign project manager and core team to lead effort	2 days	Fri 2/1/13	Mon 2/4/13
11	Define future state roles and org structure to support	20 days	Tue 2/5/13	Mon 3/4/13
12	Define/refine job descriptions as needed	12 days	Tue 3/5/13	Wed 3/20/13
13	Identify and source candidates	25 days	Thu 3/21/13	Wed 4/24/13
14	Address key gaps, develop contingencies	15 days	Thu 4/25/13	Wed 5/15/13
15	Develop action plan	10 days	Thu 5/16/13	Wed 5/29/13
16	Communicate organizational changes to stakeholders	5 days	Thu 5/30/13	Wed 6/5/13
17	**Improve IT Relationship with Customers**	**96 days**	**Mon 6/3/13**	**Mon 10/14/13**
18	Assign project manager and core team to lead and perform applications strategy development effort.	2 days	Mon 6/3/13	Tue 6/4/13
19	Document current-state components of plan	20 days	Wed 6/5/13	Tue 7/2/13
20	Institute an EA process to define future-state direction based on business needs architecture	20 days	Wed 7/3/13	Tue 7/30/13
21	Define future-state alternative scenarios	10 days	Wed 7/31/13	Tue 8/13/13
22	Perform market scan/inernal systems for candidate technologies	12 days	Wed 8/14/13	Thu 8/29/13
23	Analyze and review findings	15 days	Fri 8/30/13	Thu 9/19/13
24	Choose scenario for path forward	10 days	Fri 9/20/13	Thu 10/3/13
25	Develop high-level roadmap/implementation plan	5 days	Fri 10/4/13	Thu 10/10/13
26	Communicate plan to appropriate stakeholders	2 days	Fri 10/11/13	Mon 10/14/13
27	**Maximize IT Operational Effectiveness**	**63 days**	**Fri 2/1/13**	**Tue 4/30/13**
28	Assign project manager and core team to lead and perform infrastructure and operational improvement effort	2 days	Fri 2/1/13	Mon 2/4/13
29	Develop and gain stakeholder concurrence for Recovery Time and Point Objectives within a BIA	21 days	Tue 2/5/13	Tue 3/5/13
30	Establish a formal business continuity and disaster recovery plan as well as periodic refresh timeline	30 days	Wed 3/6/13	Tue 4/16/13
31	Communicate plan to appropriate stakeholders	10 days	Wed 4/17/13	Tue 4/30/13
32	Plan for needed network redundancy and resiliency to meet the needs of the business (output of BC/DR plan)	30 days	Fri 2/1/13	Thu 3/14/13



Appendix

- A: Massachusetts Peer Communities Comparison
- B: Maturity Model Details
- C: Glossary of Acronyms

Massachusetts Peer Communities Comparison

- Following Gartner's comparative analysis, City of Cambridge representatives performed a separate budget data collection from Massachusetts peers
- The following is the data Cambridge shared

	Total FY13 Budget	FY13 IT Budget	IT FTE's	IT Budget as a % of Total Budget
Boston	$2,467,010,000	$21,749,449	136	0.53%
Springfield	$551,776,343	$2,909,717	15	0.53%
Worcester	$541,809,392	$2,768,172	23	0.51%
Cambridge	$488,228,565	$3,950,015	21	0.81%
Newton	$312,979,964	$1,008,801	8	0.32%
Brookline	$248,256,570	$1,463,774	11	0.59%
Somerville	$184,891,451	$1,599,653	8	0.87%
Arlington	$124,186,075	$546,895	6	0.44%
Watertown	$102,306,000	$619,924	?	0.61%

Maturity Model Details

Infrastructure and Operations

Level 1

Awareness

- Standards ineffective
- I&O predominantly unshared
- Usage known for key assets
- Prevalent single points-of-failure
- Element monitoring

Level 2

Committed

- Key hardware and software standards
- Failure and performance alarms are monitored and centralized
- 25% consolidated
- N+1 design
- Element mgmt

Level 3

Proactive

- HW and SW standards enforced
- Shared I&O; 75% consolidated,
- Some virtualization
- Pre-emptive management of failure-prone components are in place
- Critical systems: automatic failover
- Ops mgmt. toolset

Level 4

Service Aligned

- Integrated architecture
- 75% virtualized
- Opt asset usage
- Continuous availability
- IT service tools

Level 5

Business Partner

- Highly scalable and elastic architecture
- Pilot biz new tech.
- 90% virtualized
- Holistic I&O mgmt.
- Dynamic resource allocation
- Continuous avail. incl. severe disasters
- Business service tools

Private Cloud

Automation

Virtualization

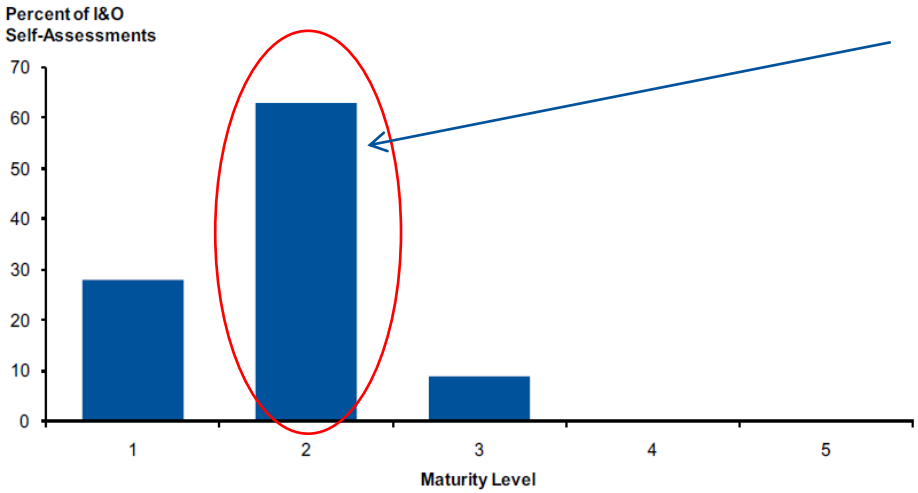
Centralization and Consolidation

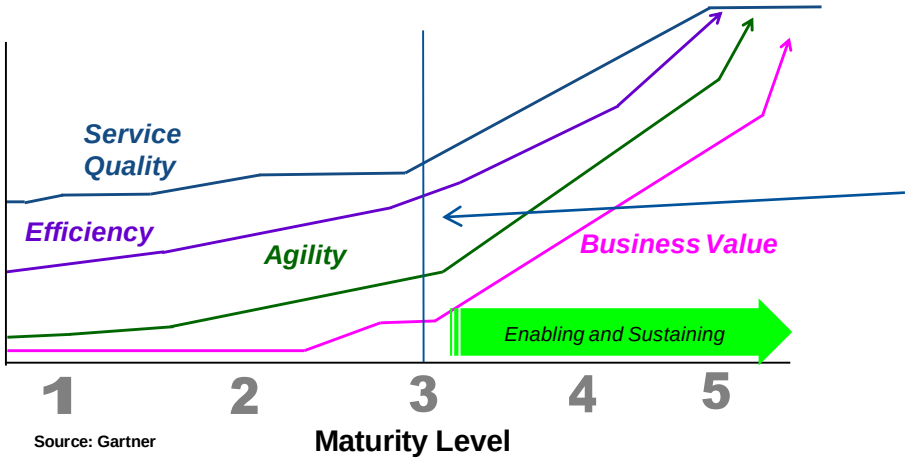
Technology Modernization

Gartner

Maturity Model Details

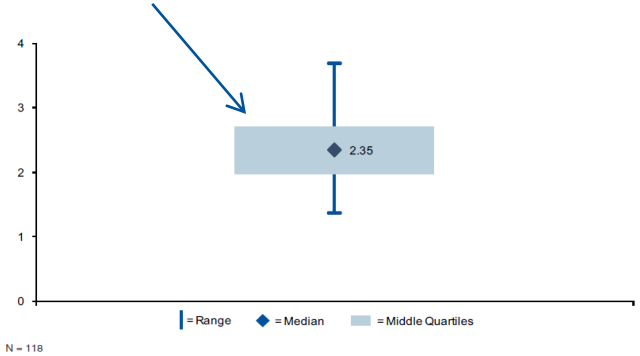
Peer Maturity





Source: Gartner

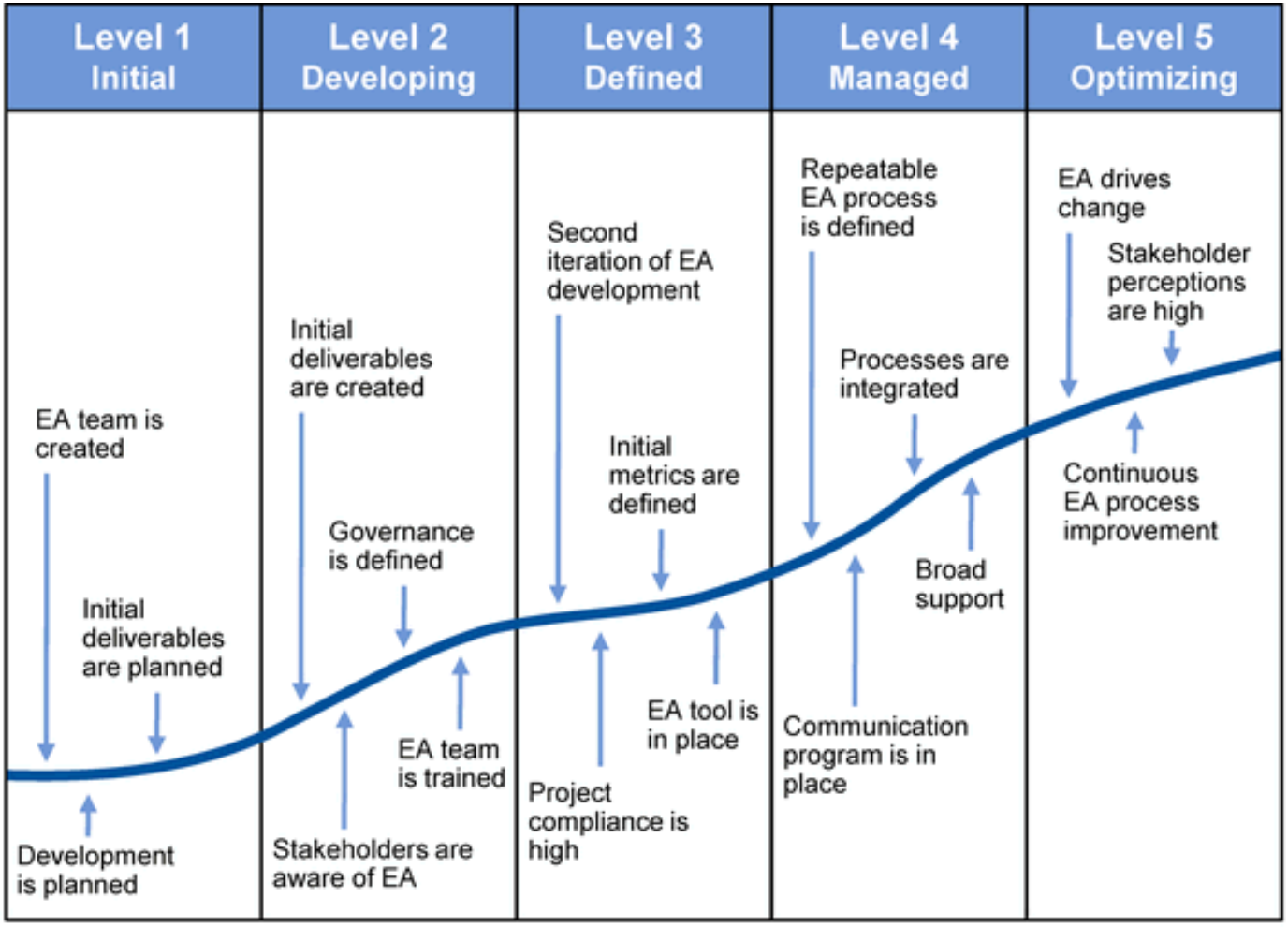
- Almost 91% of organizations rated themselves in Levels 1 and 2 (63% in Level 2)
- Overall ….The infrastructure of the City of Cambridge appears to be in line with the overall I&O maturity average of 2.35



- Gartner sees I&O maturity really beginning at Level 3, where organizations are able to truly enable business value through sustainable in service quality, efficiency, and agility

Appendix B: Maturity Model Details

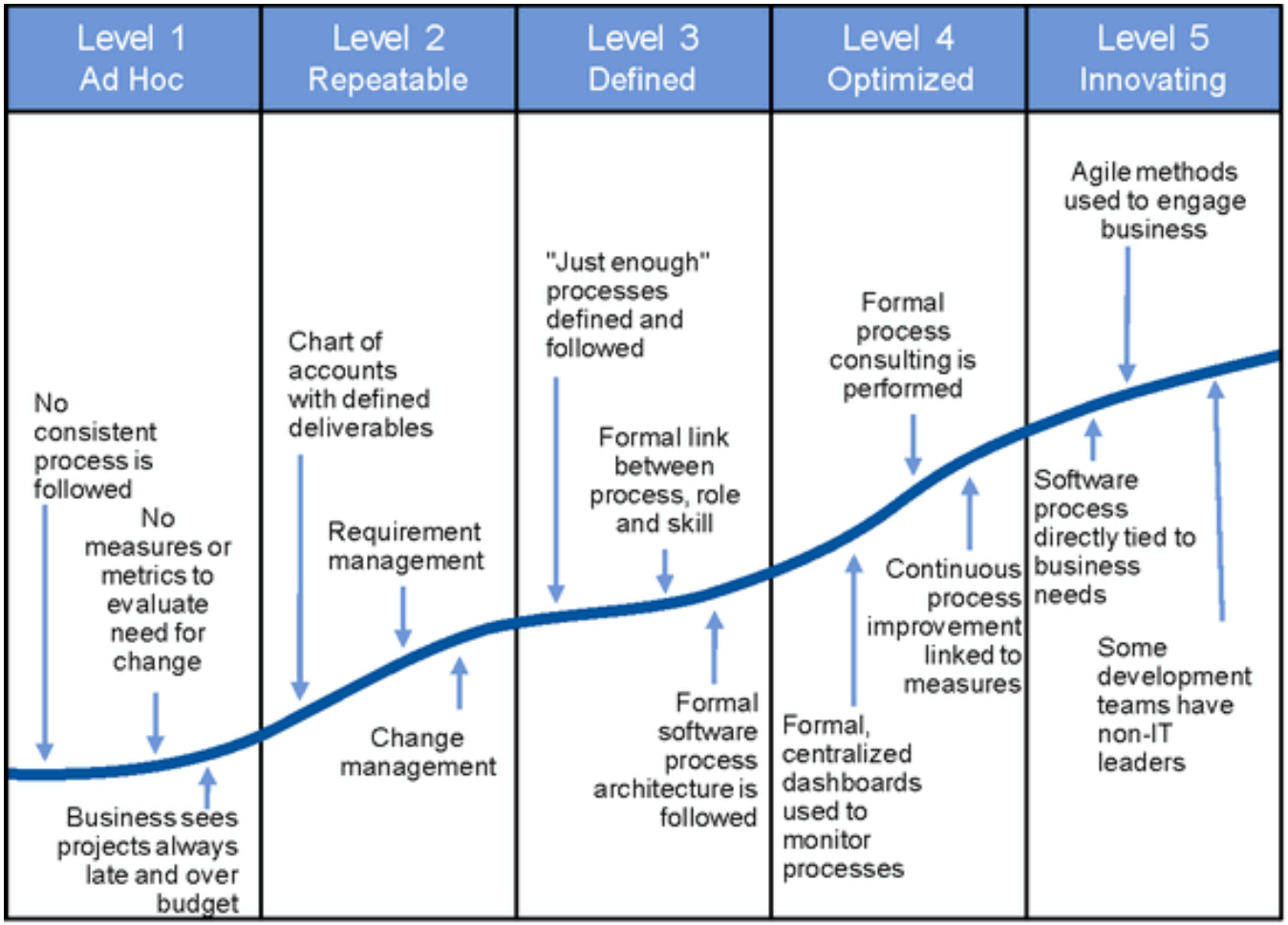
Enterprise Architecture Processes



Source: Gartner (March 2012)

Appendix B: Maturity Model Details

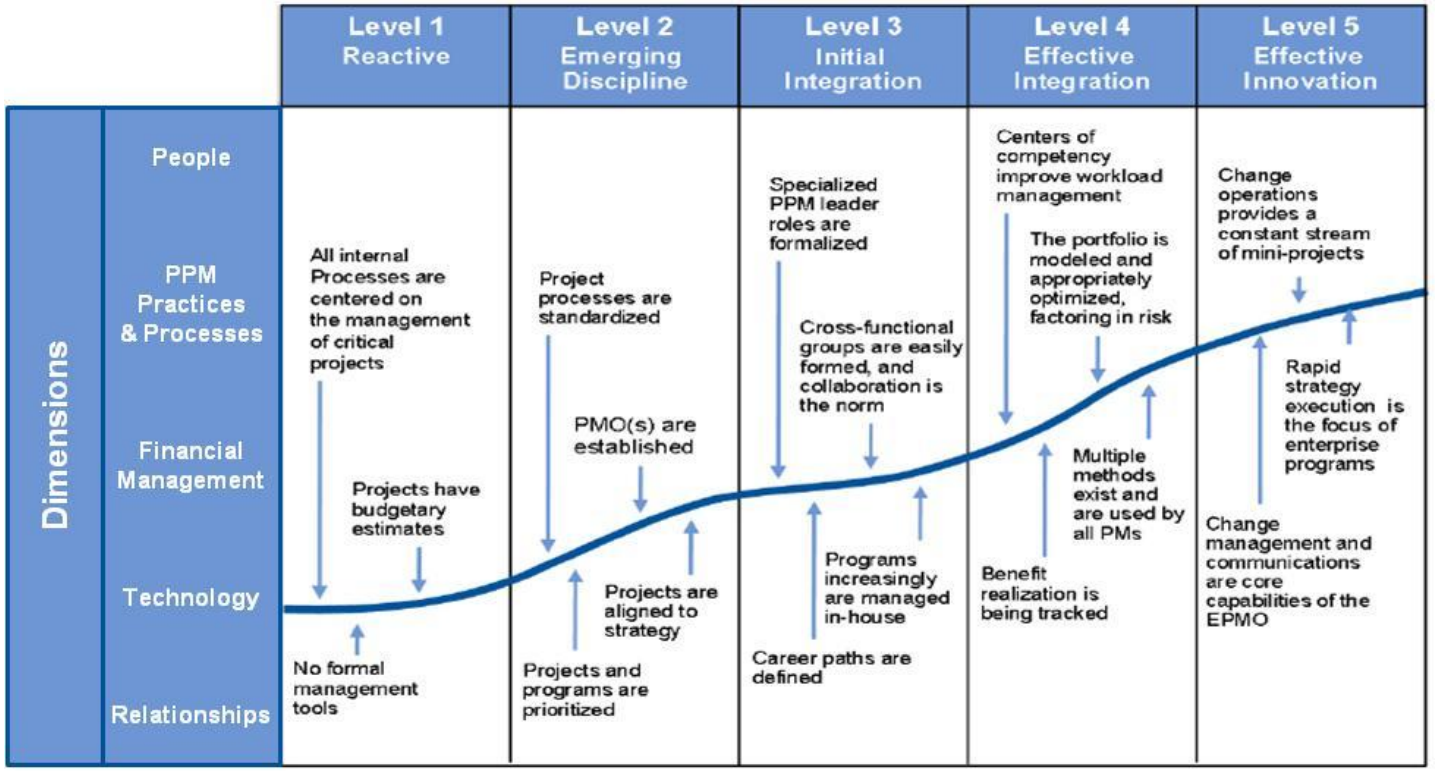
Solution Development Processes



Source: Gartner

Appendix B: Maturity Model Details

PPM Maturity Model



Source: Gartner

- Gartner's Program and Portfolio Management (PPM) Maturity Model
  - Assists Senior Management of project oriented organizations to communicate with executive management
  - Enables leaders to compare their organization's PPM processes to those in the Gartner model, and thus focusing attention on areas where the greatest improvement is needed.

Glossary of Acronyms

BC/DR	Business Continuity/Disaster Recovery
BIA	Business Impact Analysis
COTS	Commercial Off the Shelf
BYOD	Bring Your Own Device
CRM	Customer Relations Management
CRS	Cambridge Request System
DBA	Database Administrator
DR	Disaster Recovery
EA	Enterprise Architecture
ERP	Enterprise Resource Planning
FTE	Full Time Employee
IB	Information Brokers
PMO	Project Management Office
PPM	Program & Portfolio Management
RAID	Recommend – Agree – Input – Decide
RPO	Recovery Point Objectives
RTO	Recovery Time Objectives
SLAs	Service Level Agreement
SME	System Management Entity
SWOT	Strengths – Weaknesses – Opportunities - Threats
TCO	Total Cost of Ownership
VOIP	Voice Over Internet Protocol
WCM	Web Content Management
YoY	Year over Year