

# Citywide Administrative Services Review Information Technology Framework Plan

Prepared by:  
Bureau of Information Technology  
Office of Management & Finance

**NOTES: This document is approximately 60 pages long.**

## *Preface*

*This framework plan document describes how information technology services will be organized and delivered within the City in the Future. The document builds on work done in the fall of 2000 to find ways to reduce administrative service costs within City operations. A team of IT managers was convened and advised the Bureau on Information Technology on how to achieve a 10% reduction in IT costs citywide.*

*The framework plan was developed in early 2001, drawing on the work from the cost reduction phase, and reflects input from a group of IT professionals from outside the City. The framework plan and cost reduction report address the mandates established by the City Council for a citywide review of administrative services and costs. The final recommendations contained in this report are those of the Director of the Bureau of Information Technology.*

*On February 14, 2001, the City Council approved Ordinance No. 175331 which adopted a general service delivery model for administrative services where authority and accountability are centralized and where resources are deployed to best meet the operating needs of City bureaus. This ordinance directed the City's CAO to implement changes in information technology services in accordance with this model.*

*During the spring of 2001, a transition team composed of the City's IT leadership and led by the Bureau of Information Technology will develop a transition plan and strategy to implement the service delivery structural changes described above and plan for the implementation of the recommendations contained in this report.*

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# 1 EXECUTIVE SUMMARY

The IT ASR Framework Plan (Plan) provides a high-level view of what the City of Portland will do to improve IT service delivery to its citizen and business partners. It defines a new partnership between central and bureau IT service providers that will result in strategic and operational efficiencies, increase accountability, enhance reliability and produce cost savings over time. The work plan for how the framework is implemented will be developed in a detailed Transition Plan.

This section summarizes the recommendations of the Bureau of Information Technology (BIT) Director. Recommendations address targeted budget reductions, present an alternative service delivery structure, reorganize citywide IT reporting relationships, address application development and identify future revenue generation possibilities.

Section 2 provides a very brief overview of the Administrative Service Review process, documented extensively in an earlier report.

Section 3 and Appendix B discuss why change is required and how other local units of government are addressing the need for change.

Section 4 documents existing City Code, City Ordinances, standards and policies. Additional required standards development and policy establishment work will be identified in the Transition Plan.

Section 5 presents the alternative service delivery/governance model recommendation in greater detail.

Section 6 presents roles and responsibilities as discussed to date. The evolution of roles and responsibilities under a revised service delivery/governance model will be developed in the Transition Plan.

Section 7 provides a brief summary of the ASR work documented in the Committee report. The ASR Committee work will become a major component of the Transition Plan.

Section 8 provides information regarding the status of the Bureau of Information Technology's current Service Level Agreement (SLA) efforts. Initial SLAs were developed as a result of the bureau's earlier customer-based Cost-of-Service Study project.

Section 9 provides a preliminary plan to address additional IT work that will likely result from other non-IT ASRs. Additional work will be included in the Transition Plan.

Section 10 provides a general review of two potential revenue generation opportunities: GIS marketable services, and becoming our own Internet Service Provider (ISP). A considerable amount of additional work is required in this area.

It is especially important to emphasize that, should Council decide to accept alternative service delivery/governance model, a significant effort will be required to develop the detailed implementation plan (Transition Plan).

## 1.1 Recommendations

The following summary presents the BIT Director's recommendations to the Chief Administrative Officer (CAO).

### Targeted Cost Savings

After Bureau of Water Works credits for prior reductions, the IT Administrative Services Review (ASR) target is \$1,310,902.

Implement \$1,055,019 of the reduction/revenue generation activities identified in the Internal Committee Report (see [Appendix A](#) for detail). The remaining \$255,883 will be achieved through the phased implementation of systemic efficiencies. As additional savings are realized, they will be reinvested in ongoing system migration.

### Service Delivery

Distinguish clearly between enterprise, also referred to as 'core' or 'corporate' IT services, and bureau-specific IT services. For FY 01-02, develop Service Level Agreements between corporate IT service provider (BIT and/or external service provider) and bureaus to clarify responsibilities and define performance measures.

<b>BIT</b>	<b>Bureaus</b>
<ul style="list-style-type: none"><li>• Enterprise IT needs (common to multiple bureaus)</li><li>• Enterprise application development/support</li><li>• Infrastructure development and maintenance</li><li>• Small bureau assistance</li></ul>	<ul style="list-style-type: none"><li>• Bureau-specific systems</li><li>• Bureau-specific application development/support</li></ul>

Centralize specific corporate services (e.g. network management, Email, virus prevention) where advantageous. Distribute IT services where appropriate (e.g. desktop support by building location). Maintain strong bureau-specific service delivery, supported by centralized IT management.

### Re-organize IT Reporting Relationships

Maintain the direct reporting relationship between the BIT Director and CAO. Increase dialog between the BIT Director and the CAO advisory committee(s)/Council as required. All IT personnel will report to the BIT Director through a revised reporting structure (initially through existing IT managers) that may evolve over time. Transfer appropriate IT budgets to the Office of Finance and Management in support of the reorganization. Transition to the new Council/CAO/CIO model and retire the ITSP model.

### Financial Accountability

Plan and track expenditures by service area (Application Development, Network Operations and Support, Desktop Operations and Support, etc.) to establish expenditure baselines. Maintain accurate daily activity reporting. Evaluate IT service areas against As-Is / Outsource / Restructure options in FY 02-03.

### Application Development

Complete standardization of Geographic Information System (GIS) implementation.

Support existing bureau-specific application development in the bureaus via Service Level Agreement in FY 01-02. As of July 2001, evaluate all new application development proposals. Aggressively migrate to web-based (e-Government/e-Commerce) application development and support. Address future application development in the Transition Plan.

Replace, create, upgrade existing corporate applications as required (IBIS, HR, Purchasing, etc.).

### Revenue Generation

Develop new IT revenue generation opportunities where practical, especially in the web-based arena (e.g. Market GIS, become our own Internet Service Provider).

## 1.2 Transition Plan

Successful follow-up will require a detailed Transition Plan. The remainder of Section 1 includes a very high-level Transition Plan proposal, followed by an proposed transition activities. A detailed plan will be developed as a separate document.

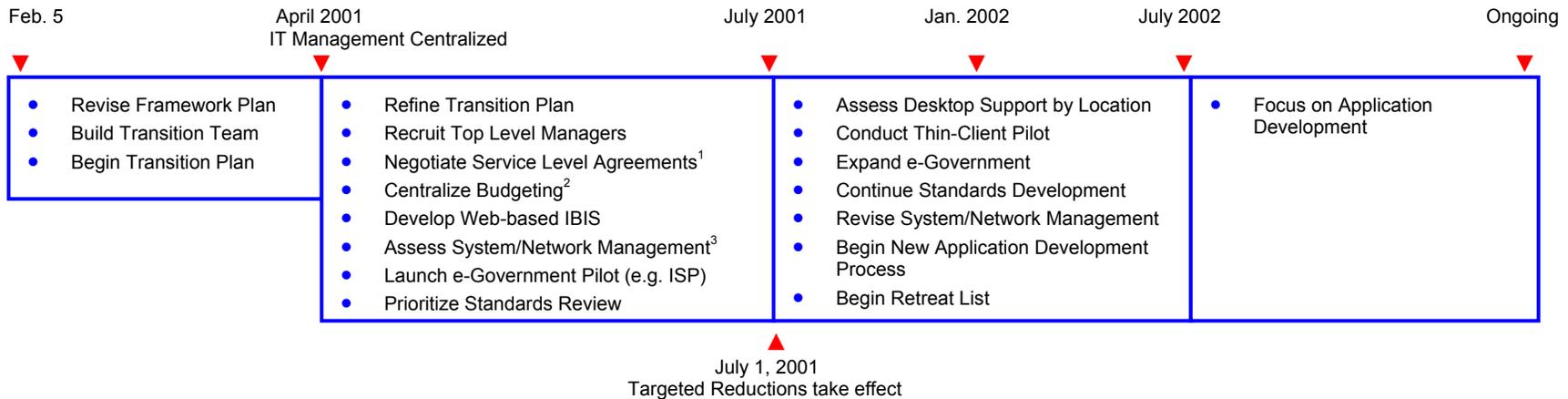
IT ASR analysis was organized by service area as follows:

- Application Development,
- Network Operations and Support,
- Desktop Operations and Support,
- Web/e-Commerce Development and Support,
- Server-based Systems,
- Mainframe and minicomputer Operations, and
- Security Issues (including network system security and Email system security).

Extensive collaborative IT discussion and investigation by service area identified a number of related issues that require additional analysis including:

- Network Consolidation
- Server Consolidation
- Internet Connectivity And Security
- Collocation
- Email Server Administration
- Version Control
- Replace RAS with VPV, and
- Thin Client Technology.

**DRAFT TRANSITION ACTIVITIES**



<sup>1</sup> High Level: What's in/what's out (personal services, vertical applications, engineering IT)

<sup>2</sup> By March 21, work out accounting issues: OMF/bureaus

<sup>3</sup> Network management, Email, system security/virus protection, ISP consolidation

## 2 INTRODUCTION

### 2.1 Service Description

Information Technology refers to the hardware, software, planning, and governance framework required to provide computerized support to City of Portland employees, citizens and business partners. The IT Administrative Services Review (ASR) focused on the following service areas:

- Application Development,
- Network Operations and Support,
- Desktop Operations and Support,
- Web/e-Commerce Development and Support,
- Server-based Systems,
- Mainframe and minicomputer Operations, and
- Security Issues (including network system security and Email system security).

In addition, IT ASR participants identified a number of issues that require additional analysis including:

- Network Consolidation
- Server Consolidation
- Internet Connectivity And Security
- Collocation
- Email Server Administration
- Version Control
- Replace RAS with VPV, and
- Thin Client Technology.

These two lists provide a snapshot of Information Technology diversity and complexity. In addition, the convergence of voice, video and data continues to blur the traditional distinction between Information Technology and Telecommunications. Per the instructions of the Chief Administrative Office, telecommunications issues are beyond the scope of this document and are considered under a separate Administrative Services Review process.

### 2.2 Budget and Service Trends

Based on the ASR data collected by OMF - Financial Planning, the City of Portland spends approximately \$20,639,165 annually on information technology. Of this amount, it is estimated that 62% or \$12,841,347 is spent on IT staffing. Due to the somewhat nefarious nature of IT, IT activities have become integral to most business processes. Staffing expenditures are not always indicative of discrete full-time equivalent requirements as many daily activities contain an IT component.

## 3 VISION

### 3.1 Introduction

A great deal of vision, mission statement, goals and objectives work had been completed under the initial IT Strategic Planning (ITSP, initiated in 1997) effort, including linkage to Council's strategic goals and objectives. The results of this significant effort can be reviewed by visiting <http://www.city/itsp/plan/chapter1.html>. This document focuses on the vision and mission for the next three-year time frame.

The future of IT is exciting. Like the technology itself, the vision must recognize and address an environment of dramatic, continuous change. It must insure:

- Crisp, timely decision making,
- Financial certainty and stability,
- e-Government and e-Commerce everywhere,
- Management of IT as an enterprise asset,
- Pervasive accountability, performance measurement and benchmarking,
- Total quality customer service, and
- Care and ongoing development of a dynamic workforce.

During the next three years, the City will focus its IT efforts to expand access to government. We will simplify interactions between citizens, business partners and City of Portland, shifting a significant level of effort to the customer via e-processes. We will implement IT cost recovery models to finance software/hardware/operating system replacement and establish other required reserves. We will focus on organizational change to improve IT service delivery and gain efficiencies.

### 3.2 IT Drivers

Opportunities for improvement abound. The challenge will be to create an implementation plan that takes into consideration the following IT drivers.

#### The Economy and Ballot Measures

The current economic forecast indicates that the national and local economy is flattening out. Local ballot measures continue to place limitations on declining local revenue. Resources to sustain or improve investment in IT infrastructure and talent compete for other valuable programs. At the same time, Information Technology investments are required to improve service provision and efficiencies in other administrative and functional areas, creating a "do-more-with-less/do-the-same-with-less/do-less-with-less" conundrum.

#### Rate of Change in IT

The last decade saw an exponential explosion of technological advance, creating constant pressure on IT support organizations to keep up. The rate of change is driven by market competition and attendant requirements to constantly improve service. It creates a dynamic pressure on strategies to stabilize the IT environment, control costs, and maximize employee familiarity with standard tool sets. The rate of change will not decrease. The convergence of voice, video and data, wireless communications and on-line video access will continue to be major market drivers during the next 3 years. Adequate replacement funding is required. An investment reserve is required to address long-term IT evolution.

## e-Government

True e-Government (as compared to cosmetic e-government) requires revamped internal business practices and smarter financial management tools. This is a tremendous corporate planning and implementation challenge requiring financial and human resources above and beyond usual day-to-day work.

## Public Expectations

The City of Portland is considered to be one of the 'most-wired' cities in the nation. The arrival of DSL and Cable modems is producing a large segment of the population who will experience "always on" fast access to the Internet. The public will expect the same level of convenience from government as from the private sector. Private sector organizations will have steadily increasing business expectations with regards to transactions with local government (forms, information retrieval, financial transactions with the City via the Internet.)

"Two-thirds of homes in San Francisco, Oakland, the Silicon Valley and other nearby areas had Net access in September, easily making it the most-wired region in the country. San Francisco was followed closely by other West Coast cities -- Seattle, San Diego and Portland -- which registered Internet household usage rates of 64 percent, 62 percent and 60 percent, respectively."

ZDNet News 10/18/00 <http://www.cnn.com/2000/TECH/computing/10/18/wired.cities.west.idg/>

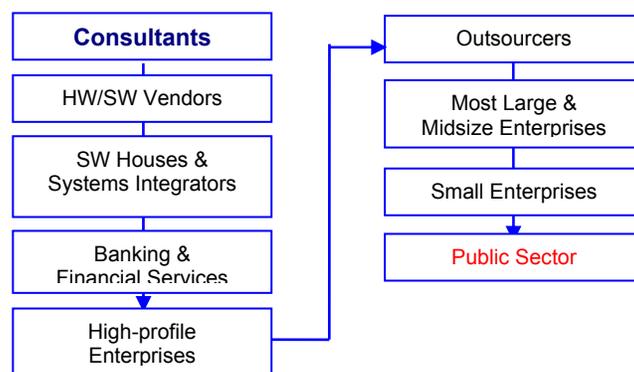
The City of Portland needs to develop a corporate IT strategy to address increased citizen involvement in governance.

## Evaporating Opportunities

Revenue generating potential will be unrealized if the City is too slow to develop e-government/commerce services that other governments might be willing to purchase. The e-marketplace is extremely competitive. It is global. (Portland could provide services to Bend or Gresham, but the State of Oregon or the State of Arizona could do the same.)

## Competition for Talent

Staff availability can be viewed as a food chain. The top of the chain is populated by consulting firms and proceeds to the bottom of the chain, populated by the public sector.<sup>1</sup>



While the post-Y2K effect on enterprise-sized application programming salaries lingers, the demand for web-based programming staff, a new and very different breed of IT professional, continues to outpace demand.

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<sup>1</sup> Gartner Group, The Five Pillars of IS Organizational Effectiveness, 1998.

### **3.3 Challenges**

#### Business Requirements

The organization must balance the frequently conflicting pressures between bureau specific needs/limitations and corporate needs/limitations.

#### Executive Level Interest and Governance

Council level interest and commitment must be sustained. Morale, resources, speed of decision making, level of cooperation and certainty in planning all require confidence that there's support at the top for a particular strategy and business model. Succinct, comprehensive and timely communication is required.

#### Cost Containment

In 1998 the IT Policy and research organization the Gartner Group predicted that by 2003:

“ 75% of IS organizations will refocus their mission toward the brokering of resources and facilitating business-driven demands rather than their traditional role as direct IT service providers.”

There is pressure to outsource and lease while volatility in the marketplace produces risk that Application Service Providers and Developers may be bought out, “refocused”, or fold with little notice.

The need for cost containment also inspires centralization, simplification and automation, organizational frameworks. Centralization is often viewed as a barrier to bureau control and an ability to react quickly when required.

#### HR issues

IT efficiencies can translate to elimination of personnel or a change in job duties. Although challenging, change also offers career opportunity if proper planning takes place. We can demonstrate commitment to our most valued resource, our personnel, through proper transition planning and implementation.

## **4 POLICIES**

Section 4 documents existing City Code, City Ordinances, standards and policies. Modifications will be recommended as required, based on Council action regarding the Chief Administrative Officer's ASR recommendations.

### **4.1 Current City Code and Ordinances**

3.15.060 Bureau of Information Technology: The Bureau of Information Technology shall be supervised by a director and shall include such other employees as the Council may provide. The bureau shall be responsible for providing technical support and strategic planning services for the City's information management systems and infrastructure, including Geographic Information Systems.

City Council Ordinance 174410: Recognized the need for improved oversight and system-wide accountability of all administrative services. Created the Office of Management and Finance and the Chief Administrative Officer position. (May 3, 2000).

## 4.2 Current Corporate IT Resolutions

Resolutions relating to Information Technology are published at <http://www.city/itsp/background/background.html>. They include:

- City Council Resolution 35413: Mayor Katz and Commissioner Mike Lindberg introduce a resolution to recognize IT challenges, responsibilities, and opportunities. (June 28, 1995)
- City Council Resolution 35560: Assigns IT Strategic Planning leadership responsibilities to the IT Executive Committee. (October 30, 1996)
- City Council Resolution 35724: Combines the IT Executive and Corporate GIS Executive Committees. (circa 1998)

## 4.3 Established Standards

A number of policies, standards and guidelines have been established under the IT Strategic Planning program and are published at [http://www.city/itsp/approved\\_policies.html](http://www.city/itsp/approved_policies.html). They include:

- Internet Technologies Policy - defines appropriate/inappropriate use of City IT resources
- Internet Publishing policies - corporate rules and guidelines for the City's Internet presence
- IT Planning Guidelines - a template for drafting an IT plan
- Desktop Hardware Standards - minimum standards for the organization (requires updating)
- Productivity Applications Standards - defines MS Office suite as corporate standard
- Email standards - defines server and desktop application standards (Police still out of compliance)
- Operating System Standards - lists authorized desktop operating systems (requires review)
- TCP/IP Network Addressing standards
- IPX and NDS Addressing standards
- SNMP - standard use of Simple Network Management Protocols device information gathering
- Technology Learning Center (TLC) Routing Standards - allows bureaus to access and train in their respective IT environments
- Intranet/Internet Naming conventions & E-Mail File Transfer format - standardizes external/internal e-mail addressing schemes
- Domain Name Server Policy - assigns responsibility for maintaining primary and secondary DN servers
- City-wide Structured Cable Standards - standards for wiring within City and between City buildings
- Recommendations on the Use of Outlook Public Folders

## 4.4 Standardization Opportunities

As indicated in the Section 1.3, Priority #6, the pursuit of standardization will be ongoing, an activity of unanimous agreement among the IT ASR Committee. Continued efforts in this area will be an important component of the Transition Plan as well as ongoing IT activities.

# 5 SERVICE DELIVERY AND GOVERNANCE MODELS

## 5.1 Introduction

The ASR Committee worked through the end of December to identify 'across-the-board' budget reductions to meet targets established by Council. Specific reductions are recommended in [Appendix A](#). The primary benefit of this approach is that the resulting target reductions are achievable in required timeframe.

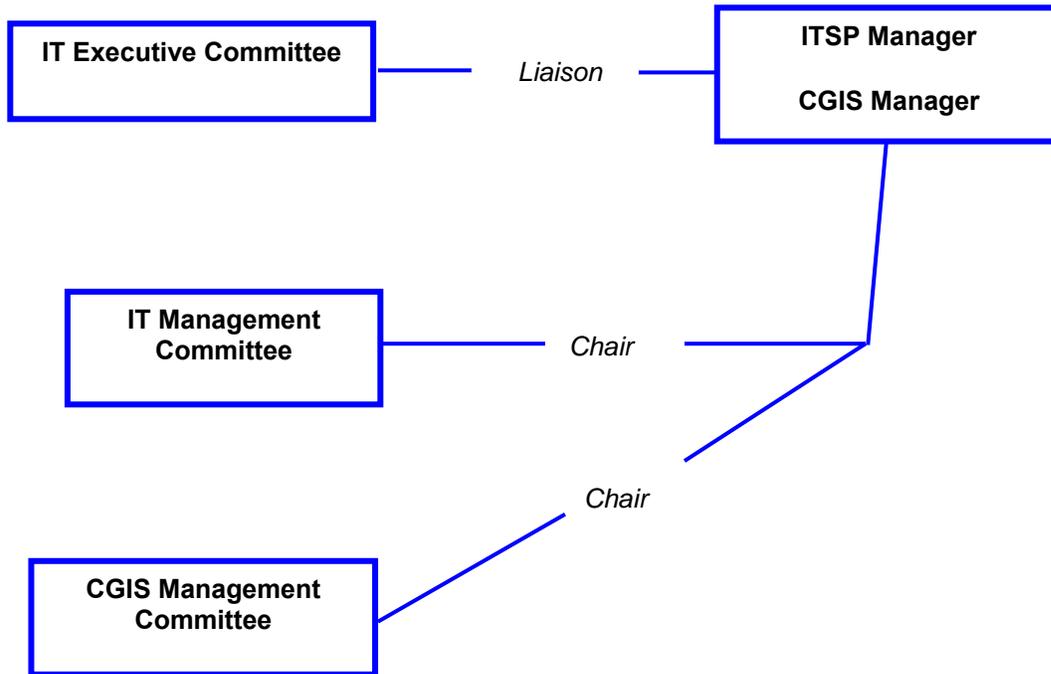
In addition, the ASR Retreat Team proposed a Board of Directors governance model. Section 5.2 presents the current (ITSP/CGIS) governance structure. The Board of Directors governance model is presented in Section 5.3.

The CAO requested the development of an alternative service delivery model that would help gain efficiencies, increase accountability, improve service quality, and enhance reliability as well as produce cost savings over time. The alternative service delivery model received extensive review by the ASR External Advisory Team, and is presented in Section 5.4

## 5.2 Pre-ASR / Existing CGIS/ITSP Governance Structure

The current governance structure for Information Technology Strategic Planning and Corporate Geographic Information System programs involves a single Executive Committee, individual Management Committees, and a standing Technical Committee. There is broad consensus that this model should be retired. I recommend the retirement of this governance structure.

### Information Technology Governance Structure



#### IT Executive Committee<sup>2</sup>

Tim Grewe, Co-chair  
 Margaret Mahoney, Co-chair  
 Mike Rosenberger  
 Vic Rhodes  
 Chief Robert Wall  
 Chief Mark Kroeker  
 Charles Jordan  
 Dean Marriott  
 Jim Wadsworth  
 David Olson  
 Felicia Trader  
 Sherrill Whittemore  
 Ron Bergman  
 Gil Kelley

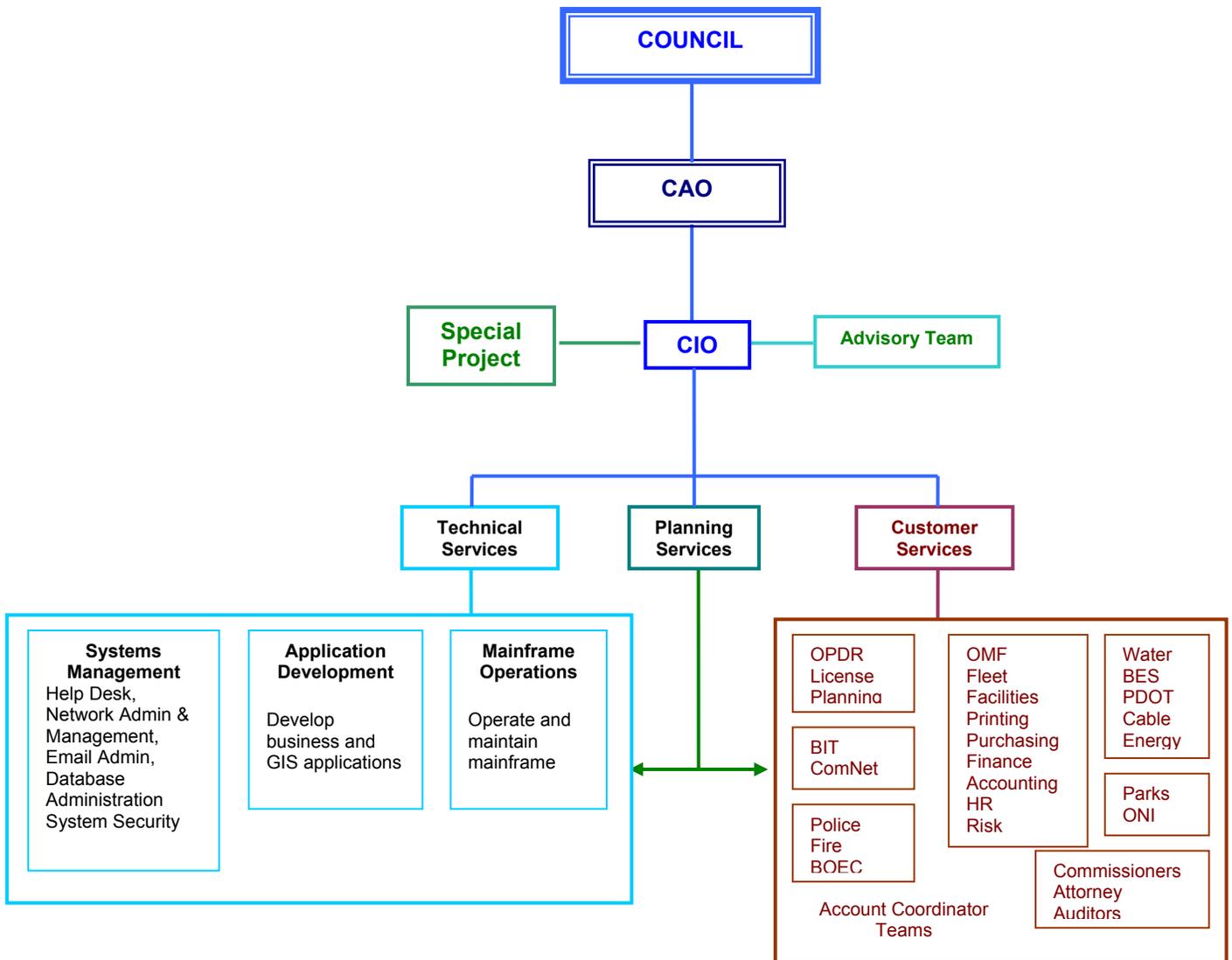
#### Bureau

Office of Management and Finance  
 Office of Planning and Development Review  
 Water  
 Transportation  
 Fire  
 Police  
 Parks  
 Environmental Services  
 Licenses  
 Cable / Franchise  
 Portland Development Commission  
 Emergency Communication  
 General Services  
 Planning

<sup>2</sup> Membership authorized by City Council Resolutions 35560 and 35724.

### 5.3 The Alternative Service Delivery Model – BIT Director Recommendation

The alternative model, recommended for Council approval, provides an expandable, tiered model that yields a strong workflow between three primary service divisions: Planning, Customer Services, and Technical Services. In terms of governance, the model centralizes IT management, while maintaining the distinction between corporate and bureau-specific responsibilities. It will support decentralization or localization of service delivery where applicable. This model was discussed extensively with the IT External Advisory Committee<sup>3</sup>. Similar tiered service delivery models have been successfully implemented in Columbus, OH, Indianapolis, IN, Seattle, WA, and in the States of North Dakota and Ohio.<sup>4</sup> Migration to this model will be addressed in the Transition Plan.



<sup>3</sup> Lisa Yeo, CIO – Multnomah County, Howard Fuhrman – Sr. IT Manager, Port of Portland, Curtis Wolfe – CIO, North Dakota, Don Mazziotti – recently retired CIO, State of Oregon.

<sup>4</sup> Bart Elliott, Convergent Group. For additional comments, please refer to [Appendix B](#).

Roles and responsibilities for Planning Services, Customer Services and Technical Services follow:

### **Planning**

- Plan for the evolution of information systems in the City.
- Explore opportunities to deliver access to public process via Internet: E-Government and E-Commerce.
- Define system architectural standards and operational guidelines.
- Determine future business requirements.
- Produce high-level application designs that adhere to and implement the selected architectural standards.
- Coordinate Bureau requirements to produce an implementation and migration plan.
- Determine requirements, plan and integrate the IT budget.
- Conduct ongoing cost/benefit/outsourced analysis on IT service areas .

### **Customer Services**

- Identify Bureau information systems opportunities.
- Monitor service level agreements and performance in meeting the terms of the agreements.
- Communicate corporate objectives and plans to Bureaus.
- Determine and communicate the impact of corporate objectives and plans on Bureaus.
- Work with Bureaus as needed to develop a response to corporate objectives.
- Process orders for new equipment and software.
- Track software licensing.
- Track warranties.
- Negotiate Service Level Agreements.
- Manage Interagency Agreements.
- Develop and monitor IS related interagency agreements based in requirements and resource commitments.
- Identify and encumber funding sources.
- Assist Planning with developing budgets for IS related projects.

### **Technical Services**

- Implement and manage the technical environment.
  - Coordinate with Planning to define technical standards.
  - Translate business requirements into automated systems.
  - Operate and maintain the hardware and software components comprising the technical environment.
- Technical Services will include the following subdivisions: systems management, application development, mainframe operations, and security. Each subdivision is defined as follows:

#### Systems Management

##### Systems Management - Helpdesk

- Provide a single point of contact for reporting problems.
- Track problem resolution.
- Carry out problem escalation.
- Log new service requests.

##### Systems Management - Desktop Support

- Provide on site support of desktop systems.
- Solve problems up to point of network interface.
- Escalate network related problems to Network Support.

#### Systems Management - Network Administration

- Create, manage domain users accounts.
- Maintain WINS, DHCP, DNS databases and servers.
- Configure network attached devices:
  - Print servers,
  - Routers, and
  - Switches.
- Manage and maintain IP address assignment.

#### Systems Management - Network Management

- Monitor network performance.
- Detect and respond to alarms and problem indicators.
- Dispatch resources to resolve problems.
- Assist in troubleshooting and resolving problems.

#### Systems Management - Network Support

- Carry out hands-on troubleshooting of network related problems.
- Install and configure network attached devices:
  - Print servers,
  - Routers,
  - Switches, and
  - Hubs.
- Coordinate network wiring/wiring closet activities.

#### Systems Management - System Security

- Determine and audit system security measures.
- Develop familiarity with information system security issues that could affect the City's existing and proposed information systems.
- Develop appropriate security architecture which mitigates the threat faced by City information systems including:
  - Policies,
  - Procedures, and
  - Technical implementations.
- Monitor and audit compliance with defined security architecture.
- Prepare, maintain and monitor disaster recovery plans and their implementation.
- Prepare, maintain and monitor security breach response plans.

#### Systems Management - Server Administration

- Email
  - Monitor server(s) server performance and capacity requirements.
  - Manage server backup and recovery.
  - Install and monitor anti-virus measures.

#### Systems Management - Server Administration continued

- Database
  - Monitor server(s) server performance and capacity requirements.
  - Monitor database server backup and recovery.
  - Implement and manage access control mechanisms.
- Proxy/Firewall
  - Implement and manage user access control mechanisms.
  - Monitor server performance and capacity requirements.
  - Implement and manage security policy.

### Application Development

- Coordinate with Planning to define application architecture.
- Translate business requirements into automated systems.
- Implement and maintain a corporate GIS database and GIS applications.
- Organize resources along lines of domain expertise.
- Design appropriate technical solutions to satisfy business requirements.
- Maintain sufficient system and application level documentation so that systems and applications can be maintained over time.

### Mainframe Operations

- Operate and maintain mainframe information systems.
- Implement and manage mainframe security policies.

## **6 ROLES AND RESPONSIBILITIES**

### **6.1 Corporate/Bureau-specific distinction as defined at the ASR Retreat**

The ASR Committee conducted a 2-day Retreat on November 16 and 17, 2000. The Retreat Team identified the following as critical IT functions and services and further identified whether they are most appropriately Bureau Specific functions (BS), Corporate, or more city-wide responsibilities (C) and/or both (B). These definitions will provide a starting for work to be included in the IT Transition Plan.

- Regulatory compliance both internal and external (BS)
- Design work/engineering (BS)
- Modeling (BS)
- Public records/information (B)
- Information integration, both internal and external (B with a slight emphasis on C)
- Response to political mandates (B)
- Infrastructure including desktop, network servers, physical transport (C)
- Automate mechanical operations of city operations and facilities (BS)
- Purchasing (C)
- Efficiency as an output (B)
- Right of way management (BS)
- Data warehousing (C)
- Payroll (C)
- Financial information that is accountable (C)
- Communication systems, including email and calendar scheduling (C)
- Business process automation (vertical operations) No determination made
- Helpdesk support; No determination made
- GIS (B)
- Work Order systems; No determination made
- Inventory tracking (C)
- E-access/E-interface with systems (C)
- Sales and service (B)

## 7 SERVICE PROVISION OPTIONS

### 7.1 Initial Investigation Results

As indicated, a significant effort went towards evaluating the City's seven IT service areas:

- Application Development,
- Network Operations and Support,
- Desktop Operations and Support,
- Web/e-Commerce activities,
- Server-based Systems,
- Mainframe/minicomputer Operations, and
- Security activities.

The IT ASR Committee, in conjunction with the Convergent Group, a Denver-based consulting firm, attempted to benchmark these service areas against six (6) comparable cities<sup>5</sup> of similar size and complexity. The results were mixed. Like the cities used in the comparison, it was difficult to determine Portland's overall expenditures and match them accordingly to other entities. The following table indicates that, depending on the environment, several courses of action may be appropriate.

SERVICE AREAS	As-Is	Restructure	Outsource
Application Development	X	X	X
Network Operations and Support		X	
Desktop Operations and Support		X	X
Web / e-Commerce		X	X
Server-based Systems		X	X
Mainframe/minicomputer Operations	X	X	
Security	X	X	

'As-Is' is defined as service areas that are either at a 'best practice' or where change would not produce a significant return on investment.

'Restructure' indicates that a service area would benefit from centralization, localization (by geographic location), or decentralization.

'Outsource' indicates that an external service provider could provide the service at reduced cost, greater quality, or both.

Further evaluation will be required after initial expenditure baselines are established.

### 7.2 Additional Analysis Required

The IT ASR Retreat participants concluded that several areas required further analysis because:

- Investments required to successfully modify/improve the current environment were either excessive, unknown at this time, or were not worth the effort (lacked obvious significant cost/benefit).
- Significant organizational change would be required.
- It was tried before and failed.
- Change would require a planned migration strategy and involve several years.

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<sup>5</sup> Not all cities in this benchmark analysis provided the same set of services. An attempt to normalize the data was made; however, full normalization was not possible given the scope and timeframe associated with this task.

Systems that offer opportunities for increased efficiency but require further investigation include network consolidation, server consolidation, Internet connectivity and security, collocation, Email server administration, version control, replace RAS with VPV, Thin Client technology, and IBIS replacement.

Application Development staffing requirements require additional analysis. Large application replacements will require financial investment, planning, additional cost/benefit analysis, and migration planning.

Initial high-level review of each appears in [Appendix C](#): Additional Research Areas.

## **8 SERVICE AND PERFORMANCE STANDARDS**

BIT established a set of baseline Service Level Agreements (SLA) for each of its five (5) service areas: 1) Administrative Services, 2) Application Development, 3) Desktop and LAN Support, 4) Data Operations and Technical Services, 5) ITSP and 6) Corporate GIS. Refer to [Appendix D](#): BIT FY 01/02 Service Level Agreements.

SLA's provide customers with an understanding of what services are being provided to them and document realistic performance expectations. Each SLA provides the customer with the following information:

1. General Description of Service Area
2. Detailed Description of Services Provided
3. Hours of Operation
4. Service Level Objectives

Beginning in FY 2000-01, BIT's SLA's have become the basis for the customer interagency negotiation process. The Account Coordinator is responsible for negotiating interagency agreements and ensuring that BIT's SLA's meet the customer's business needs.

BIT is enhancing the SLA process by implementing a database system that will track performance measures. This system will enable BIT to conduct performance trend analysis and continually improve accountability to our customers. As Corporate Services are more clearly defined (i.e., is it Corporate or is it a bureau-specific service) specific service measures will be defined and negotiated.

## **9 TECHNOLOGY**

The IT Transition Plan will include an assessment of the impacts of other ASRs on IT workload. Tasks will include:

- ◆ Compile and organize Administrative Service Review Documents.
- ◆ Inventory other ASR Plans for IT impact.
- ◆ Assess required workload (staff, HW/SW procurement, etc.).
- ◆ Establish a draft implementation sequence.
- ◆ Review with CAO and advisory team(s).

## **10 FINANCIAL ISSUES**

### **10.1 Geographic Information System (GIS) Marketable Services**

#### Background

The City has invested in a system that has the ability to scale to allow access to a large numbers of users as well as distribute the architectures to remote or 3<sup>rd</sup> party locations. This ability should be explored and possible revenue possibilities identified.

Fact Findings

Marketable Corporate GIS services fall under two main categories, client access and system access. Client access is defined as the ability to utilize existing applications to view, query and extract data via web technology from any location. System access is the extension of the Hub architecture to allow system integration and data maintenance.

Non-Hub participants such as PDC, Multnomah County and the Port of Portland have shown interest. Numerous commercial companies such as the Real Estate, Engineering and Consulting could benefit greatly by access to these systems.

Currently CGIS is developing a tiered pricing mechanism to provide these services to non-Hub participants. Pricing will need to be approved by the current Hub participants. Current Hub participants will be responsible for developing revenue reallocation.

Other services such as map and data sales will be available through the CGIS system. However, these services will not likely yield revenue similar to that stated in the above system access.

It is estimated that 40% - 70% of the service cost will be redirected to support the increased user access and system support.

Recommendations

Priority is being given to establish internal capabilities while exploring future opportunities. The Enterprise GIS Hub will be completed year end 2001 and at that time be available for external service.

Between now and that time, CGIS will complete and get approval on service pricing guidelines to be ready to provide service to outside agencies.

Potential Revenue

The following potential service charges are general estimates intended to differentiate typical levels of service. As such, they are very **DRAFT**.

Potential Service Charge –

- Web access - \$50K annual > Where levels of access will be
- Data access - \$150K annual > subject to appropriate levels of
- Full Access - \$225 - \$500K annual > confidentiality and system security.

**10.2 Become our own Internet Service Provider**

Research in this area is under way. Legal issues need resolution before investigating Council's appetite for this type of activity.

## **APPENDIX A: Revised ASR Committee Reduction Detail**

## Information Technology Revised Target

**\$1,310,901**

A phased, comprehensive reorganization of IT services is being recommended. The ASR Team identified several ways to reduce IT costs through system changes and across the board reductions. The target can be met by implementing practical recommendations from the ASR Team report and by implementing an initial phase of systemic changes. \$1,055,019 of the reduction target is met through a combination of ASR Team recommendations and across-the-board reductions. The balance will be achieved through the phased implementation of systemic efficiencies.

### **IT Equipment Purchase, Repair and Maintenance**

**\$191,900**

Savings achieved through several bureaus reducing the purchase, repair and maintenance of equipment.

### **Lights Out Data Center**

**\$194,525**

Savings achieved through the automation of tasks related to the operation of the mainframe. Initial investment of \$240,000 is required for automation equipment. Four positions reduced as a result of automated processing.

### **Professional Services**

**\$83,773**

Savings achieved through reduced outsourcing of IT services in several bureaus.

### **Reduction in Project Management Staff**

**\$28,830**

Reduction in project management capacity in BIT.

### **Reduction in BIT Application Development Support**

**\$74,336**

Savings result from reductions in interagency services related to Application Development Services and results in one position reduction in BIT.

### **Reduction in IT Positions**

**\$268,684**

One IT position in Parks, three in BIT, and 1.5 FTE in the Office of Management and Finance.

### **Police Bureau PPDS Revenue**

**\$ 70,000**

Police Bureau will increase its PPDS revenues by \$70,000 to support an existing Applications Analyst position.

### **Non-IT Program Reductions**

**\$142,971**

Police and Transportation will reduce other administrative costs to meet reductions not taken in IT.

### **Phase Transition Plan Reductions**

**\$255,883**

This reduction will be met through implementation of system changes following development of the transition plan for IT services. Reductions will occur during FY01-02; likely savings to occur in desktop support function.

### **Savings Total**

**\$1,310,902**

Bureau	Financial Planning Across the Board Target Reduction (Revised)	BIT Director Recommendation	Comments
BHCD	(9,314)		
Citywide Systemic Efficiencies		255,883	Will be achieved through a phased Transition Plan.
BIT*	429,447	223,355	Factors in one-time investment for Lights Out Data Center Proposal
Planning	35,101		Planning Bureau is currently reviewing its options and has not identified specific cuts to date.
Commissioner PW			
Commissioner PA	439	439	
Commissioner PS			
Commissioner PU	441	441	
Energy Office			
OMF Administration (2)	73,921	73,921	
Fire	37,448	50,000	
General Services Admin.	4,280	4,280	
Government Relations	525	525	BIT IA Reduction (Custom Application Development).
Licenses (2)	35,783	-	Licenses indicated that they have already made these reductions but were not credited for them in the current fiscal year.
Cable	-	-	
Attorney (2)	6,392	6,392	
ONI	795	795	
Auditor	12,673	12,673	BIT IA Reduction (Custom Application Development).
Office of the Mayor	-		
Police	177,114	177,114	Reflects BIT IA reduction in Custom Application Development of \$61K. Balance of reduction requirement (\$26K) will be taken from a non-IT program area.
Parks	69,755	70,000	
Purchases	7,070	7,070	
Risk Management	8,101	8,101	
BGS- ComNet (2)	19,763	19,763	
BGS - Facilities	7,837	7,837	
BGS - P&D	-		
BGS - Fleet	11,202	11,202	
BOEC	11,709	14,773	
Environmental Services	35,195	70,000	
Hydro		-	
OPD&R	92,013	92,013	
Transportation	186,995	186,995	Transportation has identified \$70,000 in reductions. The Bureau is currently reviewing its options and has indicated they can't go further specifically within the IT category but PDOT will find other ways to meet their remaining IT ASR target.
Water	56,217	17,330	
<b>Total</b>	<b>1,310,902</b>	<b>1,310,902</b>	

\*Factors in One-Time Investment

Table D

Bureau	Type of Reduction											Total
	Phase II Transition Plan	IT Equipment - purchase, repair, and maintenance	Lights Out Data Center	System Consolidation	Professional Services	BIT Corporate Services	ITSP and Account Coordinator	BIT In-Bureau Specific Services	Bureau IT Support Positions	New Revenues	Non-IT Program Area	
Citywide Systemic Efficiencies	(255,883)											(255,883)
BIT*			(194,525)			(28,830)						(223,355)
Planning												-
Com.PA		(439)										(439)
Com. PU		(441)										(441)
OMF Admin.								(73,921)				(73,921)
Fire					(50,000)							(50,000)
BGS Admin.								(4,280)				(4,280)
Govt. Rels.								(525)				(525)
Licenses												-
Attorney		(6,392)										(6,392)
ONI		(795)										(795)
Auditor								(12,673)				(12,673)
Police		(20,000)						(61,138)		(70,000)	(25,976)	(177,114)
Parks		(5,000)							(65,000)			(70,000)
Purchases									(7,070)			(7,070)
Risk									(8,101)			(8,101)
BGS- ComNet									(19,763)			(19,763)
BGS - Facilities									(7,837)			(7,837)
BGS - Fleet									(11,202)			(11,202)
BOEC					(14,773)							(14,773)
BES		(51,000)			(19,000)							(70,000)
CPD&R		(20,503)							(71,510)			(92,013)
PDOT		(70,000)								(116,995)		(186,995)
Water		(17,330)										(17,330)
<b>Total</b>	<b>(255,883)</b>	<b>(191,900)</b>	<b>(194,525)</b>	<b>-</b>	<b>(83,773)</b>	<b>(28,830)</b>	<b>-</b>	<b>(74,336)</b>	<b>(268,684)</b>	<b>(70,000)</b>	<b>(142,971)</b>	<b>(1,310,902)</b>
	20%	15%	15%	0%	6%	2%	0%	6%	20%	5%	11%	100%

## APPENDIX B: Convergent Group Observations Regarding Organizational Issues Experienced by Clients

From: Bart Elliott

The following reflects my assessment and hands on experience in regard to what other Cities and governments are doing in respect to IT organization. My recent experience with other governments the size of Portland or larger is Columbus, OH, Indianapolis, IN, Seattle, WA, State of North Dakota and Ohio.

The main approach has been to develop a "tiered" IT organization where common/core IT functions (i.e. Desktop support, Help desk, Network administration, Security, Mainframe/mini/legacy administration, Applications development etc.) are shared and supported by a single organization while mission critical applications relevant to each bureau remain supported by that bureau. Bureau responsibilities vary according to circumstance and to the extent the core functions above impact the bureau applications.

In the governments listed above, the "central" or shared IT organization has been structured to provide decisive control via a CIO who in almost all cases has been included as a cabinet level executive responsible for the success or failure of the goals provided by the policymakers such as e-Government or security. The CIO serves at the pleasure of the Mayor and Council and can be terminated at will. The CIO directs the core functions administratively and typically serves as an advising partner to the bureau/department. IT operations. In some cases the CIO directs City staff and in other cases an outsourcer where central IT functions have been outsourced. It is dependant on the CIO to produce fiscal accountability and the budgetary program for policymakers.

Reorganization of the IT function has been a controversial issue for each of the governments listed above. The momentum of IT during the last decade or so had been decentralization of IT to the individual bureau/ dept level. This decentralization provided the capability to meet computing needs at the working level and take advantage of the increased power of desktop computing. The decentralization in all cases above had been fueled by an adverse reaction to centralized mainframe computing shops whose competence and understanding did not fit the computing needs of the bureaus/departments and were incapable of meeting the evolving IT needs and support requirements of the front line service providers.

The key motivation for reorganization of IT functions in the governments listed above has been as follows:

#### Fiscal responsibility and accountability

The decade of decentralization has resulted in diverse accounting and budgetary practices with no real central accountability and direction. As a result it is difficult to determine how funds are being spent and what the particular business case is in respect to the expenditures. The lack of fiscal accountability results in IT being hidden or incomprehensible to budget/policymakers who need to make decisions regarding priorities and returns on investment. In many cases the diverse practices and lack of fiscal accountability have made it hard to determine how much is being spent on IT. The goal has been to firm up or employ accounting procedures and to produce budgetary information and understanding that leads to better IT investments. I think this is a major issue for Portland and while the accounting procedures exist they simply have not been enforced. Even after extensive work in Portland by the staff to collect budget numbers for IT, I think it is still foggy how much is actually being spent and on what for what benefits. Regardless of organizational structure this issue needs to be addressed by Portland.

### Capability to perform Citywide or enterprise computing

Most governments want to take advantage of integrated systems, networking and the capabilities provided by the Internet. Policymakers in the governments above are interested in e-Government, e-Commerce, enterprise accounting, networking, Intranet etc. Policymakers have been frustrated by the inability of these organizations to respond to these capabilities. This frustration results from the paradox that bureau based computing does not lend itself to the integrated infrastructure and integrated systems required to provide e-Government etc. Essentially no one is in charge of these initiatives or has the authority to put the parts in an order for enterprise initiatives. Since all of the governments above are heading to e-Government as an important policy direction, it has been necessary to implement organizational changes to provide enterprise program direction and authority. Currently in Portland it looks like each of the bureaus intends to participate in e-Government and other Internet activities individually. Experience in other governments has shown this will result in a diverse e-Government offering that will be less effective and more frustrating for the public. The most notable e-Government sites are those that emphasize the whole versus the parts of services provided. North Dakota recently won recognition for their efforts based on the whole government being available to the public versus divisions and depts.

### Elimination of redundancy and cost proliferation

Bureau based IT has resulted in redundancies in most places. Typically those redundancies are in the core or shared areas. Elimination of these redundancies can provide for short term cost savings as well as overall improvements in the systems via the synergy of sharing. The alternate ASR report you forward addressed directly the streamlining of support in core areas within Portland. My view is that the redundancies in Portland are probably not extensive in terms of what could be changed immediately with the immediate changes being identified in your report. What I think could be a major issue is the proliferation of future costs in these same areas as initiatives such as e-Government evolve at the bureau level. Reorganization will prevent some of this future cost proliferation which I believe could be formidable. In Convergent Groups experience with providing Enterprise GIS (Hub) for the City of Portland we did extensive audits of the rich mix of GIS systems at the bureau level and found the opportunity to have a better system while avoiding planned costs and redundancies. In the case of the GIS we found a window of opportunity to make changes before some of the redundancies became too costly. I believe it is the same for overall IT in Portland as bureaus begin to work towards Internet and other applications where cost sharing potential is large and provides the opportunity to avoid future cost.

### Effective Development and Management Of IT Programs

The increase in IT capabilities over the past five years has made computing more powerful and at the same time more difficult to develop and deploy due to increased complexity. The result of the increased complexity has been that bureau or department-based computing has had problems with developing and managing the deployment of some of these system resulting in failures to implement in a timely fashion or just "disasters" that become money pits with no clear picture of when the system will be finished. Developing and deploying the systems at present requires more complex skills and capabilities as well as training. Qualified resources that can do a good job are difficult for Cities to attract and retain. The reaction of some cities has been to develop a citywide team that can assist in this type of IT development and deployment and is shared to provide for attracting and retaining the best individuals. In most cases teams oversee a consultant or other party and manage them effectively to provide risk

insurance and results for the City. The goal is to do a better job and prevent the project disasters via a better qualified team and risk management. I do not know if "problem" projects are an issue for Portland.

I believe that the jurisdictions who have made the difficult change to a tiered organization have seen or are starting to see the benefits listed above. I also believe that in order to take advantage of modern computing and the benefits and enterprise capabilities that can be performed, a change to a tiered organization is required. My observation is that the effectiveness of the organizational changes are directly related to the capabilities of the CIO and organization as well as the overall authority and accountability delegated. Another important success factor is the capability of this organization to clearly outline goals and milestones with the policymakers and provide for clear evaluation milestones to monitor success or failure. Where these success factors have been in place transition to a CIO and tiered IT structure has done well despite stiff opposition from the individual bureau units. In my opinion, what does not work is to make organization wide changes and to put that organization under the authority of an organization that has not been restructured for the new mission. In some cases the responsibilities for the new mission has been given back to an "old" organization that had a previous history of failure or is structured for historic missions such as mainframe or mini computing. The IT organization needs to be restructured for the new mission as well.

## **APPENDIX C: Additional Research Areas**

The IT ASR Committee Retreat work identified a variety of issues that required additional, thoughtful study. Several of these issues benefited from a bit of initial research. That research follows.

### **Network Consolidation**

The notion of network consolidation refers to grouping some or all of the physical assets and financial and staff resources that make up the City's network under a single management entity. Server consolidation refers to identifying opportunities to achieve a better utilization of physical server assets by combining applications and services and/or by broadening the community of customers that are served by individual servers so as to free up server resources for other needs. This paper limits the consideration of server consolidation to print/file services, because (a) Exchange server consolidation issue is being looked at separately and (b) other application services represent significantly more complexity than can be dealt with in this timeframe.

The City should consider consolidating responsibility for network equipment and support, including vertical integration from desktop through backbone and LAN/WAN equipment. Currently, network administration and management responsibility is spread over 10 bureaus:

BIT	BES
BOEC	BGS
Fire	Licenses
Parks	PDOT
Police	Water

Each of these bureaus has its own network resources to a greater or lesser extent. In addition, there is a stratification of responsibility which places BGS/COMNET largely in charge of the physical layer (workstation cabling, telco closets, and WAN infrastructure), while the logical layer (switches, routers, hubs, and bridges) is the purview of the organization operating the network.

Current network support staff within the City have made significant progress towards establishing consistent and coordinated approaches to managing network resources. The City-wide Email migration and the TCP migration have resulted in many improvements in the level of integration and access across multiple technical environments. Through adopting and adhering to standards for network equipment and tools, and consolidating responsibility for network management and support, several additional benefits are possible:

- Greater stability through coordinated change
- Consistent approach to development of the network
- Stockpiling "hot spares" of network devices
- Greater depth of expertise
- Less FTE effort overall
- Better, more scaleable, more expandable network
- A reduction in WINS and DHCP servers
- Single point of contact for network expansion or change

The network is and will continue to be the foundation upon which the city's strategic use of information technology is built. Consistent standards and a more coordinated approach to developing and supporting the network will better enable us to share information and IT investments and to support key new technologies such as e-government and e-commerce. Significant effort currently is expended in preserving access across City network systems. Firewalls, system changes, processes designed to keep network information in sync all are subject to failures and incompatibilities which require time to resolve and document.

The City also uses network resources to remotely manage a number of critical life/safety functions that are closely aligned with bureau business processes. Examples include Water's SCADA system, BES process control at the WPCF and pump stations, PDOT's Signal Control system. These systems should be reconfigured if needed so as to operate independently with the level of integrity necessary for the responsible bureau to be accountable under operational needs and regulatory requirements. It is not assumed that consolidation of network responsibility must include these pieces.

Savings Analysis

The data collected through the ASR process suggests that 11-13 FTE are allocated to network support currently. This does not include BGS resources responsible for workstation cabling or WAN operation. With consistent equipment and consolidated responsibility, it is believed that the level of FTE could be reduced, but the long-term level is uncertain.

Impacts/Issues

- Significant investments would need to be made in order to reap the benefits of consolidated management.
- Considerable diversity in network equipment already exists, thus savings from standardizing equipment are a longer term prospect.
- Significant job redesign would be required, as staff currently providing network support throughout the City are in many cases performing a number of other functions as well.
- Accountability and performance management for the network management entity are generally considered the single biggest issue in any transition to a consolidated approach.
- Network equipment standards will restrict the ability to take advantage of technical innovations which improve performance and increase throughput.

**Server Consolidation**

The ASR data, while difficult to analyze, suggest that there are some 35-45 file and print servers in operation around the City. A number of these are not dedicated to file and print only, thus consolidating file and print services does not necessarily free up resources. Nevertheless, if some consolidation is achieved, the following benefits are possible:

- Reduction in the number of physical servers needed for print/file services, thus reducing the licensing and replacement costs, as well as the labor involved in upgrades and administration.
- Reallocation of servers to underserved sites.
- Consolidation, simplification, and standardization of backup and recovery activities.
- Increase in the hours of support staff availability.
- Increase depth of expertise in server administration and support.

The data collected for the ASR are difficult to analyze due to inconsistencies in nomenclature and measurement of costs, but an approach to consolidating print/file servers might be:

Site	Who's Affected?	Current #	New #
• City Hall	Mayor & Commissioners Offices, ONI, Attorney Auditor, others?	7?	1
• Portland Building	BIT, BHR	?	1
	Water (5 <sup>th</sup> & 6 <sup>th</sup> )	1	no change
	Transportation (7 <sup>th</sup> , 8 <sup>th</sup> , 9 <sup>th</sup> )	2 (clustered)	no change
	BES (10 <sup>th</sup> & 11 <sup>th</sup> )	1	no change
	OMF/BGS (12 <sup>th</sup> )	?	1

	Parks/Purchasing (13 <sup>th</sup> ) 1		no change
	Other floors?	?	?
• 1900 Building	OPDR, Licenses, P&D? 2		1
• 911 Building	BGS/COMNET, BOEC ?		1

Impacts/Issues

- With larger communities of users supported by the servers, redundancy in case of system failure becomes both more important and more cost effective. Investment would need to be made to address failover for servers.
- Responsibility would need to be clarified with respect to ownership and administration of shared server resources. Support services would need to be provided across bureau lines where geography dictated and appropriate interagency agreements developed. Agreements would also need to address security, confidentiality, capacity planning, and backup/recovery processes.
- Could make upgrades more complex and decrease responsiveness to business units, by having larger and more diverse communities of customers served by a single server.
- The ability to build staff depth and provide career development opportunities for IT staff would be reduced if server administration and support were consolidated.
- Some level of job redesign would be required since these duties are currently blended in with a variety of other responsibilities, and the distribution of responsibilities varies from bureau to bureau.

**Internet Connectivity and Security**

Background

The City of Portland currently maintains at least 4 separate connections to the Internet, BIT, PDOT, BES, Fire and possibly Police. Each of these connections likely has in place separate firewalls, proxies, web servers, routers as well as leased lines and ISP's.

It has been a desire of all the Bureaus to have access to a high speed, redundant connection to the Internet at the lowest possible cost.

City Hall has publicly made statements about the capability to monitor all Internet traffic of its staff. The responsibility of the monitoring and reporting to City Hall has been designated to BIT, however the ability to monitor or report at a City wide level is impossible due to the distributed nature of the current Internet Connections

Distributed connections to the Internet inherently increase the security risk to the entire City. There are no security policies in place and currently no security coordination efforts. Given this risk to the City infrastructure, systems and data, providing a single secure point to the Internet is desired.

## Fact Findings

Technical explanation and justification is contained in the attached white paper prepared for the City by CDSI, an expert security and networking consultant. It basically states that operating this distributed architecture affords less security, higher costs and offers no redundancy.

### Current estimated costs

PDOT - \$3120 annual line and ISP charge 512kb, \$20K annual expense (firewall hardware/software, proxy hardware/software, Web server hardware/software, Content filter license, routers, administration, training, replacement)

Fire - \$7200 annual line and ISP charge 1mb, \$20K annual expense (firewall hardware/software, proxy hardware/software, Web server hardware/software, routers, administration, training, replacement)

BES - \$4020 annual line ISP charge, 1mb, \$20K annual expense (firewall hardware/software, proxy hardware/software, Web server hardware/software, routers, administration, training, replacement)

Police – estimated similar to BES \$24K

Total annual costs for redundant ISP connections is \$98,340

One time migration costs - \$10K - \$20K

Establish redundant connection to Internet – \$10K on time costs, \$4K annual

Net one year gain \$64,340

5 year gain - \$455,700

## Recommendations

In order to cost effectively provide a high speed, redundant connection to the Internet a shared corporate resource is warranted.

Items contained in the CDSI white paper indicate security issues that are most efficiently managed in as a central service. The exposure to possible data loss or system disruption could amount to several hundred thousand to possibly millions of dollars.

The City should pool its resources to establish a redundant high speed connection to the Internet that is secure, and easily managed and monitored to comply with City and Bureau Internet use policies.

## **Collocation**

### Background

Viability of leasing Computer Center space for collocation of servers with connectivity to the Internet. Leveraging investments in connectivity, security and physical elements such as fire suppression, heating/cooling, power and raised floor.

### Fact Findings

Research found that there is tremendous growth in this area. Many major companies are expanding and investing millions and even billions to construct what are referred to as IDC or Internet Data Centers.

These data centers offer state of the art security, fire suppression, monitoring, uninterrupted power supplies and 24/7 staffing.

After further research in our area there are only a few of these high end IDCs. The services and facilities that are currently being offered in and around Portland vary by a large margin. From offices in buildings that let you put locate your PC and plug into a shared T1 to full on data centers with the latest technology and 24/7 staff.

This difference if services are accompanied by a wide range of pricing. At the low end you can collocate a PC for around \$400 per month with 20 gig of bandwidth at one of those fly by night offices to thousands of dollars a month for a private cage or suite in the state of the art IDC.

Pricing for the IDC's is very custom and is specific to the needs of the customer. Pricing seems to be effected by amount and type of space needed, bandwidth used, monitoring and support needs. The overall perception is that it can get very expensive very fast. One moderately complex configuration was priced at over \$11K per month.

Requirements needed to be considered competitive in the IDC market:

- Redundant high-speed connections to Internet.
- Fire Suppression: Includes an Early Warning System that samples air molecules and can detect potential fires up to two days prior; smoke detectors; FM-200 Gas System – a non-toxic, non-water based fire suppression system; and a double pre-action dry pipe sprinkler system that fills up, but won't release water until the tip of the sprinkler is burned.
- Power: A fully redundant system offers a continuous power supply with multiple generators.
- Environmental Monitoring Systems: Air conditioning; water detection; and humidity control.
- Technical staff will be on hand 24/7
- 24/7 security guards at the front door and on the premises; biometric hand scan into a Man Trap for controlled entrance/exit; video cameras throughout the facility; and individual keys for your cabinet, cage or private room.

#### Addition optional services

- Network Availability Monitoring
- Remote Power Cycle
- Bandwidth Utilization Monitoring
- Data Backup and Recovery.

#### City of Portland Data Center Assets

- High speed ATM OC3 connection to the Internet. (Proposed redundant link would put capacity in line with other IDC's. With the IRNE project multiple connections could provide an edge in this area)
- Computer center currently has fire suppression. However, it is unknown if it is up to the above standards. Most likely this would have to be upgraded to provide greater protection without relying solely on water.
- Computer center has fully redundant power capability including backup generators and UPS conditioning. Need to verify currency to standards but it is likely that it is at the IDC level.

- Environmental systems – Computer center has dedicated heating and cooling systems. Need to verify currency to standards but it likely that it is at the IDC level.
- 24/7 security – The Portland Building has 24/7 security guards with video monitoring. Upgrades to equipment to include biometrics would be needed. Defined access polices and rules would need to be strictly enforced.
- 6000 sq ft of raised flooring
- 10,000 additional sq feet available for expansion.

### Recommendations

Due to the varied levels of service and the competitiveness of this industry, establishing a business relationship with on outside provider would increase the viability of this option. There are likely partners in the area that would be good candidates such as Verio, UUNet, Network One and NSI.

A possible proposal would sublease the space and operations including staffing to an outside party. They would be responsible for upgrading systems to IDC levels and maintain them for the duration of the contract.

Benefits of this relationship would be an infuse of capital to upgrade on site systems, security and staffing. A favorable agreement could include a wholesale price for housing City systems including possible systems support while having the space generate offsetting revenue from outside entities.

Operating an IDC that includes additional services such as monitoring and backup would require SLA's. Administering SLA's is a very difficult job and one that would best be administered by an organization familiar with such SLA's. The City would conversely benefit from have it's own SLA as well.

It is possible to go for the lower service business and offer raw space with limited benefits. The existing security, space and power assets would be acceptable to do this. The additional overhead of managing and monitoring access to the center form outside persons would be minimal and easily recovered in fees.

### Revenue

Low end

- \$500 per month per server

High end

- \$1000 - \$2000 per month per server

### Potential revenue

\$500,000+

## Email Servers/Administration

The City's Email system is a hybrid of centralized and distributed provision of services. Most Bureaus use the central "City04" email server, implemented when the City standardized on Exchange for email services. However, several Bureaus, mostly the larger ones, had already implemented Exchange prior to standardization. In some cases, additional servers were and are required due to wide area network considerations (speed, number of links, reliability).

Nevertheless, there are a few opportunities to gain some minor efficiencies by consolidating some email servers and administration. Exchange servers can accommodate 1000-2000 users each, given the proper hardware. Currently, the City has 9 Exchange servers for about 3200 users. (The Police Bureau did not switch to the new standard. Portland Development Commission also runs an Exchange server.) Four of the servers are in the Portland Building, serving approximately 2500 users (including City Hall and some remote Parks sites). Two servers are in the 1900 Building (plus PDC), serving about 300 users (plus PDC, approximately 150 users). Other servers are located at non-downtown sites for Fire, BOEC (which also serves COMNET), and Parks.

## Exchange Consolidation

The most promising candidates for efficiencies through consolidation are the Portland Building and the 1900 Building. Consolidating the Water, Transportation, and BES servers into a single server would reduce annual hardware and software maintenance/replacement and administration requirements without adversely affecting service. However, it is not advisable to consolidate **all** users onto one server in the Portland Building (i.e. City04 plus Enterprise Bureaus) as this would exceed the system's practical capacity and highly degrade service.

Likewise, consolidating the OPDR and Licenses servers would eliminate one server's annual maintenance, replacement, administrative costs. OPDR's server could clearly accommodate License Bureau users without degrading service. Together with the Portland Building, a total of three servers would be eliminated.

### Savings Calculation

- **M&S.** Assuming a four-year server replacement cycle at a cost of approximately \$8,000 each (including software and connectors), eliminating three servers would reduce M&S costs approximately \$6,000 per year.
- **Staff.** Exchange administration requires about .25 FTE per server. Eliminating three servers through consolidation, if FTE costs can be recovered, would save .75 FTE, or approximately \$54,000.
- **Total:** \$60,000.

### Police Email

The second area for efficiencies is via implementation of Exchange in the Police Bureau. This would eliminate the need for a Groupwise-to-Exchange gateway server. It is conceivable that, due to architectural differences between Groupwise and Exchange, that implementing Exchange could enable further consolidation of servers within the Police Bureau and thus could achieve more efficiency.

### Savings Calculation

- **M&S.** Assuming all other costs are equal, eliminating the Groupwise-to-Exchange gateway would eliminate a server and licensing costing about \$6,000. Assuming a four-year replacement cycle, this eliminates about \$1,500 per year. Eliminating the need for backups of this server would save minor additional amounts in tapes.

- **Staff.** Staff support required to maintain the server (backups, upgrades), and its connectivity between the City Exchange system and Groupwise: approx. 0.1 FTE, or about \$7,000 per year.
- **Total: \$8,500 per year.**

#### Impacts/Issues

- There is a high cost of failure associated with consolidation, i.e. if a server fails, 1000+ users suffer rather than 400. To minimize that risk, one of the servers should be redeployed as a failover system for both the City04, 1900 Building, and the Enterprise Bureau servers. This reduces the savings for the consolidation to \$58,000.
- Fewer, larger servers also increases backup time and time required for recovery in case of system failure. Having a hot standby server helps by enabling email service to continue while repair and recovery work proceed, albeit without access to data stores for old email, calendars, etc.

#### **Version Control**

A chronic problem in IT is the constant pressure to continuously upgrade software "to keep up." Vendors release new versions of software for many reasons - fixing known bugs, add features demanded by customers, and most important, to increase sales.

On occasion, the new release directly addresses a problem faced by a City Bureau, and that Bureau's staff begin pushing for implementation of the new version - at least as a "local exception" to the City-wide standard. Other Bureaus worry that this will cause either system incompatibilities or an unjustified push for system-wide implementation.

The team recommends that the City exercise **Corporate Version Control** over core City-wide and Corporate business application deployment. This means that:

- The City will adopt standards pro-actively for its applications. When new releases are announced or expected from a vendor, City IT staff shall be assigned the responsibility by Corporate decision-makers to test the new software for performance (speed, bugs, compatibility), upgrade issues (will new hardware be needed? Will settings be lost? Etc.), and features (does the new software address important business issues required by the City?).
- Deployment will occur according to a Corporately-defined schedule. This schedule must include a funding plan and acknowledge funding constraints.

Specific exceptions can be granted in very limited scope to specific user groups when they meet a business need identified by our managers, don't compromise corporate compatibility, don't cause anybody else additional expense, and adequate funding has been identified to complete the limited implementation.

#### Savings Analysis

##### Desktops

- Among the standard Microsoft desktop applications -- Outlook/Exchange Client, Office, and Windows -- which are on nearly every desktop (4200) in the City, a new version (that costs money) for each is released approximately every 18 months, which translates to two upgrades per year.
- Conservatively, assume that the upgrade takes 1/2 hour of IT staff labor at a loaded rate of about \$36 per hour, or \$18 per desktop. Average cost from the vendor for each application is approximately \$120. Per-desktop cost is therefore \$138 per upgrade. Annual cost is therefore approximately \$1,160,000 City-wide per year, or nearly \$3,500,000 over three years.

- Now assume that the City instead slows the rate of upgrade to one every nine months; over three years, the City performs four upgrades rather than six. Over three years, the City reduces its upgrade spending on desktops by one third, or approximately \$386,000 per year.
- Realistically, some Bureaus already do not implement the releases as fast as other Bureaus due to resource constraints. Estimating more conservatively, assume that about half of City desktops already skip upgrades and implement at the pace suggested above. If the remaining half reduce their upgrade cycle to this level, the City still reduces upgrade costs by \$193,000 per year.
- Note that this does not include savings that could accrue from avoided hardware upgrades, often a requirement of software upgrades.
- **Impact:** Bureaus who currently upgrade on a more rapid basis would need to slow their implementation pace. Certain software required by some users, which require more advanced operating systems, email clients or office suites, would not be available to some City workers as quickly as they would like. Exceptions could be granted in particularly difficult cases, minimizing impact.

#### Servers

- Server software is upgraded less frequently than desktops - probably only every two years or so. Advanced function servers such as database, application, and specialized servers (firewalls, proxy servers, etc.) are upgraded last and may occasionally skip some upgrades to ensure stability, while basic function servers such as network services (DNS, WINS), file/print servers, and intranet servers can withstand more risk of the downtime often required. For the purpose of this analysis, assume that only the latter three types are included, for a count of about 55 servers City-wide. Assume further, for the purpose of analysis, that Novell and NT servers cost equal amounts to upgrade in time and money. (E-mail servers are being analyzed separately.)
- Server upgrades require two license upgrades: one for the server, the other for client access (NT model). Server upgrade licenses are approximately \$210 each; client access licenses are approximately \$11 each. Assume conservatively that servers require about 4 hours on average to upgrade the OS, and that no hardware upgrades are required; CALs do not require labor other than the purchase of the license. Upgrading all of these servers costs approximately \$66,000 per year; since they are upgraded only about biennially, then the City spends about \$33,000 per year on basic function server upgrades.
- If the City slowed its pace to once every three years, the City would save approximately \$11,000 per year.

#### Impact

- Financial benefits are minimal, although City-wide consistency and interoperability from coordinated upgrades would reduce downtime and problems for end-users. Slowing upgrade schedules beyond two years would put the City hopelessly out of sync with vendors' ability to offer technical assistance. Slowing the version control for servers beyond two years is not recommended.

#### **Replace RAS with VPN**

Remote access servers (RAS) enable staff to dial-in to use the City network for email access, telecommuting, and in some cases, as a full-blown substitute for a network connection from a City office where better facilities are not available or affordable. RAS sometimes enables dial-out capacity to the Internet or other information services as well.

RAS is fairly old technology with severe bandwidth limitations. Over the City phone system, maximum bandwidth is 56Kbps (33Kbps if dialing from one City phone line to another) and in practice more frequently ranges from 33Kbps to 45Kbps due to a series of technical limitations of media and equipment.

By contrast, new, inexpensive bandwidth options such as DSL and cable modems have become available, frequently used in households and occasionally offices to secure high-speed Internet connections. Meanwhile, new networking techniques known as Virtual Private Networking (VPN) have emerged which enable connections to be made between any two arbitrary points, using the Internet as the networking medium.

If the City were to replace its dial-in and dial-out lines, modems, and servers with VPN, monthly phone costs would be reduced, and there would be potential for pooling resources for the provision of this connectivity. Each Centrex phone line costs \$325 per year. The City has **XX** dial-in lines. Assume that 90% could be replaced by VPN. The gross reduction of just phone lines would be **XXX** per year. From this we must deduct the cost of providing VPN.

The cost of VPN is largely fixed, meaning that per-user cost drops as the number of users increases. Currently at \$25 per user per month (\$300 per year), with high enough volume usage the cost could drop to \$10 per user per month, or \$120 per year. If we assume **XXX** users, the cost of VPN is **YYY**, for a net annual savings of **ZZZZ**.

In addition, the annual maintenance on Remote Access Servers could be dropped; at about \$300 per year per RAS, this amounts to **XXX** city-wide. Annual modem upgrade costs could also be eliminated; however, this is a minimal cost and would probably be absorbed by maintenance on a smaller number of DSL or cable modems.

### Thin Client

Thin client technologies use simpler, inexpensive end-user computing terminals and highly enabled servers to run traditional PC-based applications in a highly controlled end-user environment. Thin client implementations can save organizations money in the following ways:

- **Reducing the cost of end-user equipment.** Thin clients typically require much less in the way of end-user resources, which reduces per-seat costs. A typical end-user PC costs between \$1200 - \$1500 and must be upgraded every 3-5 years to keep up with software demands. A thin client computer can cost much less: it can be a hand-me-down PC from another user with substantial shelf life, or a \$600 specialized thin-client terminal (or "network PC") with no hard drive.
- **No desktop-to-desktop visits.** All software is installed, stored, and run from a central server. The effort required to upgrade software for users is significantly diminished. As soon as it is upgraded on the server, all users immediately are running the same version of the software. This ensures **compatibility**, too.
- **Tight management.** Since all software is stored and run from the server, network managers can control the end-user's desktop absolutely. The user cannot install non-standard software.
- **Fewer points of failure.** "Network PCs" typically do not have hard drives or local floppy drives, two components with among the highest incidence of failure on a PC. With no floppy or CD, it is also impossible for the user to install unauthorized software, often a source of trouble.

- **Reduced bandwidth demand.** In some implementation such as Citrix Metaframe, the application runs on a fast, central server rather than on the client, and usually is on a high-speed network segment local to requested network services. In database applications, this can reduce bandwidth demand tremendously, and this can help tremendously in a wide-area network situation. Rather than having the remote client send queries and receive large datasets from the database server, the Metaframe server performs the queries and formats the data, and sends only a (much smaller) screen image to the end user workstation.

Downsides Include:

- **Total dependence on the network.** In traditional PC installations, the user can still use Word, Excel, etc. if the network is down. In the Thin-client world, if the network or server is down, the user has no access to applications.
- **Limits flexibility.** End-users do not have as much flexibility to install applications they may need on their desktops. Network support personnel must install it for them, and typically only during off-hours, as many software programs require a computer to reboot to complete installation - something harder to accomplish when many users are sharing a resource (central application server).

Impacts

Thin clients have been implemented in Parks, Auditor's Office, and Corporate GIS. In Parks, old "hand me down" computers no longer capable of running office automation or database applications on their own are used as "thin clients" in remote locations connected to the City network on slow WAN connections. Still, these users are able to run database applications and office automation software. The avoided upgrade costs for these PCs amounts to about \$10,000 to \$20,000 per year. Parks also avoided having to upgrade all of its WAN lines to T1 speed at an annual savings of approximately \$30,000 - \$40,000. Furthermore, to upgrade its vertical business applications, all Parks needs to do for most field users is upgrade the software on the Metaframe server, saving countless hours of field visits.

Applied City-wide, consider only the effort involved in upgrading office suites. If instead of upgrading 4200 desktops individually at 1/2 hour apiece, the City could install it on say 20 application servers placed around the City. The staff time saved is approximately 2100 hours - almost exactly one FTE **per upgrade**, or about \$140,000 per year City-wide. Subtracting the cost of the hardware and software, the City would approximately break even in its second year of use of thin clients.

BWW Thin Client Comments

My experience with thin client has been very positive. My guess is that 85% of BWW's users need little more than email and the Office suite. If thin segments are designed with reasonable care, the bandwidth implications would be isolated from the main networks and we could buy workstations that aren't much more than terminals with hard disks. Gary, please let me know if Gary Williams or I can support your assignment to assess this option.

**IBIS Replacement**

Problem Statement

The IBIS financial system operates as a Citywide warehouse for budgetary and other financial data. Commonly voiced shortcomings include a severe lack of accessible, usable financial reports, a rigid architectural structure that limits applicability, lack of support for a client/server model and it is very expensive to maintain. On the other hand, it is a stable workhorse.

Because the IBIS system does not provide usable information at least 27 applications have been built and are maintained by bureaus seeking to track various budgetary and project related information. This number does not include the payroll applications in use throughout the City. The application architecture is not compatible with the Bureau needs to track individual projects, so a variety of project management tools have been implemented to streamline business practices. Both of these types of efforts are likely duplicative and costly, but further study needs to occur to determine any cost savings that might be realized in a consolidated solution.

Most current applications are developed in a client server environment because it is flexible, runs on mini computer systems and doesn't require the huge maintenance costs associated with the mainframe maintenance.

Replacement of the IBIS system is recommended with acknowledgement that such an undertaking will likely require a 3-4 year planning/implementation process.

#### Impacts/Issues

As other City ASR studies progress, leadership needs to look at the results to determine if an IBIS replacement schedule needs to accommodate a full ERP solution or simply replace an aging financial system. Either way, a current catalogue of business practices must be undertaken as soon as possible. This systemic analysis of how IBIS is used, what accommodations are being made presently to support it's limitations, and any desired features will inform any RFI/RFP process and help to define minimal technical specifications of a new system.

Clear analysis of IBIS capacities related to E Commerce will be critical to any replacement schedule. Analysis of IBIS interface to vertical transactional systems in place will inform the specifications document as well.

#### Fiscal Impacts

Clearly replacing IBIS will have significant investment costs associated with it. What those costs may be depends largely upon whether the decision is to go forward with an ERP solution or a stand alone financial system. The primary cost savings in the long run would come from getting off the mainframe and presumably purchasing a system with excellent reporting features, negating the need to maintain all the applications currently in use to retrieve data from IBIS. Flexible project management tool(s) in any new system would increase project efficiency and reduce the need to maintain other similar applications. Further cost reductions are likely with an increased ability to cross train applications developers on main stream programming technologies. A detailed cost/benefit analysis is required to determine exact long term savings.

## APPENDIX D: FY 00/01 BIT Service Level Agreements

### ADMINISTRATIVE SERVICES

#### General Description of Service Providers

The Administrative Services Division of BIT provides the primary support for bureau functions including budgeting, marketing, human resources, customer service and general staff administrative support.

#### Detailed Description of Services Provided

- Financial Planning: Interagency billings, customer follow-up, virus cost reporting, monitoring quarterly budget reporting, develop and update five year financial plan and manage debt services.
- Human Resources: recruitment, selection, grievances, disciplinary actions and performance review monitoring.
- Quality Customer Service: Facilitate user input on service levels, resource planning and provide primary customer service support, facilitate customer IA negotiations.
- Marketing: Develop and promote new products and services to bureaus.
- Communication: Manage bureau communication plans (newsletter, BIT Web page, internal / external communications), develop ongoing customer interaction related to service quality, costs and problems resolution.
- Administrative Support: Provide administrative support to bureau (reception, account receivable, account payable, TIT monthly meetings) and maintain flexible citywide flexible contracts.
- Training facility: manage training vendor relationship, class scheduling, billings, facility and maintenance and promotions for two technology classrooms.
- Strategic Planning: Develop and maintain a BIT strategic plan with supporting strategies, work plans and results.

## **APPLICATION DEVELOPMENT**

### General Description of Service Areas

Application Development and Maintenance includes BIT services to install, develop, and maintain software applications for City bureaus.

### **DETAILED DESCRIPTION OF SERVICES PROVIDED**

#### Application Development

Application development is completed by BIT development staff to enhance existing applications, develop fixes, test and implement software. Bureau specific application development is done based on available resources and scheduling.

Contract resources may be utilized and managed by BIT in developing software for enterprise and bureau specific applications.

- Estimating: providing an estimate of costs and timelines to complete software development.
- Requirement Development: developing user requirements to solve a business problem.
- Technical Specifications: completing specifications to develop an application based on the user developed requirements.
- Software Development: building an application based on detailed technical specifications.
- Testing: unit integration and system testing of new software.
- Installation and Conversion:
- System Documentation: developing documentation for system users and system maintenance.
- Project Management: providing management of software development from the development of "Scope of Work" document through a "Project Closing" document.

### **SYSTEM MAINTENANCE**

System maintenance is provided by BIT technical support staff to maintain operate and monitor existing enterprise software applications.

- **IBIS:** Integrated Business Information System (IBIS) is the City's Corporate Financial System. It is comprised of General Ledger, Payroll, Accounts Payable, Purchasing, Human Resources, Fixed Assets, and Accounts Receivable. Tasks include planning, testing and installing new or updated versions of software, daily scheduling, and monitoring for computer jobs.
- **EPAN:** Personnel Action Notice (PAN) entry system handles personnel changes electronically including new hires, job status, address changes and terminations.
- **FIRS / VFIRS:** Financial Information Reporting System (FIRS) was developed to augment and/or replace period end reports produced in IBIS.

- **City TARS:** Time and Attendance Reporting System (TARS) is used to capture employee time and attendance data. Data is then uploaded to IBIS for payroll processing.
- **Travel Guidelines:** This system provides meal, lodging and travel expense information online to city employees. Travel advances for employees traveling for city business is based on this information.

## Hours of Operation

<b>Day of the Week</b>	<b>Application Development &amp; Maintenance</b>
Monday	8:00 AM – 5:00 PM
Tuesday	8:00 AM – 5:00 PM
Wednesday	8:00 AM – 5:00 PM
Thursday	8:00 AM – 5:00 PM
Friday	8:00 AM – 5:00 PM
Saturday	
Sunday	

**\*\*\* BIT will respond within 2 hours to all “production down” conditions during non-standard work hours.**

## Additional Services

- Troubleshooting problem solving application failures, functionality errors and user problems.
- Consulting: providing users with system analysis, options, estimates and recommendations.
- Testing: testing system fixes, vendor products and software integration.
- Technical Staff Support: technical development staff to support application change management.
- Planning: architectural design, system integration and product selection planning.
- Project Management: providing management of development and implementation processes.

## **PRIORITIZATION FOR APPLICATION DEVELOPMENT**

1. Enterprise Application Support
2. Interagency Partner Application Development and Maintenance
3. Non Interagency Partner Application Development and Maintenance

## **Target Response Times**

- Estimates – up to 3 working days for an initial assessment

- Production System down - 2 hour response, 24 hours a day, 7 days a week

## Customer Responsibilities

Active customer participation during all phases of the Application Development Cycle: Envisioning, Planning, Developing, and Stabilizing.

Once an Application is in production status, all modifications to the application are performed as a phased release within the Development Cycle.

## DESKTOP AND LAN SUPPORT

### General Description of Service Providers

- **Help Desk.**

Initial point of contact for information technology problems. Help Desk staff will log the call and attempt to troubleshoot and resolve the problem on the phone. If unable to do so, they will escalate the call to the next level.

- **Field Support Team.**

Will make on-site visits to the desktop computers or other devices to troubleshoot and resolve information technology problems.

- **Email Services.**

Provide email accounts and email services for group communication, planning and coordination.

### Detailed Description of Services Provided

#### **Local Area Network Services:**

- Install, configure and maintain Local Area Network (from the desktop computer to the switch)
- Install, configure and maintain network servers.
- Network Operating System only. SQL Server and other network applications are not included in standard services.
- Upgrade operating system and install patches
- Upgrade hardware and install patches
- Troubleshoot and resolve network problems from the desktop to the switch
- Administer the Local Area Network user accounts
- Add and delete user accounts
- Create Groups, folders, print queues
- Create Shared resources and apply security
- Create security profiles
- Create scripts
- Backup data on servers each working day
- Restore data to servers from backups as requested
- Monitor the Network
- Anti-virus alerts and scanning
- Daily check of event logs for errors
- Network protocol monitoring

**Email Services:**

- Provide City Email accounts with minimum of 30MB of storage space.
- Provide Internet Email accounts
- Create Email public folders.
- Create and manage Email distribution lists

**Anti-Virus Services**

- Install, configure, update and maintain anti-virus software on all servers
- Install, configure, update and maintain anti-virus software on all desktop computers
- Maintain a consistent anti-virus strategy that includes both routine and emergency virus updates, and disaster recovery.

**Desktop Computers:**

- Install, configure, and maintain ITSP Standard desktop computers.
- Install, configure and maintain ITSP Standard desktop operating systems:
- Install, configure and maintain ITSP Standard application software.
- Troubleshoot and resolve ITSP Standard computer hardware problems.
- Troubleshoot and resolve ITSP Standard computer software problems.
- Troubleshoot and resolve ITSP Standard computer operating system problems.
- Perform preventive maintenance

**Printers:**

- Install and configure printers
- Troubleshooting and repair will be the responsibility of the vendor.

**PDA (Personal Digital Assistant) Devices:**

- Due to the fact that there exists a wide variety of PDA devices, such as Palm Pilot, Phillips Nino, etc. with no City standard, BIT cannot guarantee support for PDA devices.

**Laptop Computers:**

- Install and configure network and modem devices
- Install ITSP Standard software
- Troubleshoot and resolve ITSP Standard software problems.

**NOTE:** Due to wide variety of highly proprietary laptop computers on the market, hardware and operating system support will have to be provided by the vendor.

**Other Peripheral Devices:**

- Install and configure scanners
- Troubleshooting and repair will be the responsibility of the vendor

**Information Technology Planning**

- Provide assistance and guidance in Information Technology planning
- Provide project management of Information Technology projects.

## Hours of Operation

Day of the Week	Help Desk	Field Support Team	Email Services
Monday	7 AM to 5 PM	8 AM to 5 PM	24 hours
Tuesday	7 AM to 5 PM	8 AM to 5 PM	24 hours
Wednesday	7 AM to 5 PM	8 AM to 5 PM	24 hours
Thursday	7 AM to 5 PM	8 AM to 5 PM	24 hours
Friday	7 AM to 5 PM	8 AM to 5 PM	24 hours
Saturday	None	As needed	24 hours
Sunday	None	As needed	24 hours

## ESCALATION PROCEDURES

### **Level 1 – The Help Desk**

- The initial point of contact when a problem is recognized.
- Assumes “ownership” of the problem.
- Gathers data and documents the problem description using logging procedures.
- Determines problem severity
- Determines the probable problem source.
- Engages other Level 1 resources (Knowledge bases, documentation, etc) when possible using available tools and procedures.
- Documents the resolution

#### **When the problem cannot be resolved at Level 1:**

- Documents the current status and the resolution steps that have been attempted or completed.
- Escalates the problem to level 2
- Retains ownership of the problem
- Continues to monitor the status of the problem until closed

### **Level 2 – Field Support Analysts**

- Acknowledges assignments from Level 1
- Reviews data provided by Level 1
- Gathers additional data as needed
- Engages other Level 2 resources as needed in problem solving activities
- Regularly communicates the problem status to the customer
- Regularly documents the problem status in the logs
- Resolves problems in keeping with their level of severity
- Promptly documents the resolution
- Promptly closes the call

**When the problem cannot be resolved at Level 2:**

- Documents current status and resolution steps attempted or completed.
- Escalates the problem to Level 3

**Level 3 – Principal IS Analyst**

- Acknowledges assignments from Level 2
- Reviews data provided by Level 1 and Level 2
- Gathers additional data as needed
- Engages other Level 3 resources as needed in problem solving activities
- Regularly communicates the problem status to the customer
- Regularly documents the problem status in the logs
- Resolves problems in keeping with their level of severity
- Promptly documents the resolution
- Promptly closes the call

**PRIORITIZATION OF INFORMATION TECHNOLOGY PROBLEMS**

Problems will not necessarily be resolved in the order they are reported. Rather, they will be resolved according to their severity and the priority within that severity. The following system will be used to determine that priority:

- Severity refers to the level of criticality. The level of severity never changes.
- Priority is used to distinguish between problems of the same severity. Priority will increase over time until the problem is resolved.

<b>Severity</b>	<b>Description</b>
1	Critical business impact, no alternative available.
2	Critical business impact, alternative or bypass available.
3	Not critical, circumvention possible with no operational impact.
<b>Priority</b>	<b>Description</b>
1	Target resolution time exceed by 100%, or as directed by management.
2	Target resolution time exceeded by 50%, or as directed by management
3	Initial priority setting for all problems

**Target Response Times**

**Level 1. (Help Desk )**

During operational hours, Help Desk personnel will answer the phone within two rings 95% of the time.

During non-operational hours, calls to the Help Desk will be answered by voice mail. Help Desk personnel will check voice mail immediately upon arrival at 7:00 AM Monday through Friday, and respond to the call accordingly.

### **Level 2 (Field Support Team)**

During operational hours, when a problem is escalated to Level 2, a Field Support Analyst will contact the person within 15 minutes of notification by the Help Desk, and will provide him or her with an approximate time of arrival. The time of arrival will depend on the severity of the problem, using the following guidelines:

Severity 1: Within 15 minutes, 98% of the time

Severity 2: Within four hours, 95% of the time

Severity 3: Within 24 hours, 95% of the time

### **Level 3 (Principal IS Analyst)**

During operational hours, when a problem is escalated to Level 2, a Field Support Analyst will contact the person within 15 minutes of notification by the Help Desk, and will provide him or her with an approximate time of arrival. The time of arrival will depend on the severity of the problem, using the following guidelines:

Severity 1: Within 15 minutes, 98% of the time

Severity 2: Within four hours, 95% of the time

Severity 3: Within 24 hours, 95% of the time

## **Target Resolution Times**

### **Level 1. (Help Desk)**

During operational hours, Help Desk personnel will resolve 50% of calls within 15 minutes.

### **Level 2 (Field Support Analyst)**

Field Support Analysts will resolve 95% of calls within four hours of arrival on site.

### **Level 3 (Principal IS Analyst)**

Resolution times will vary for problems escalated to Level 3, because of the complexity of the problems, possible need to procure new hardware, etc.

## **Customer Responsibilities**

1. Notify the BIT Help Desk (ext. 5199) of all computer-related problems, and provide any information requested to enable the Help Desk personnel to resolve the problem.

2. Provide physical access to and make available any equipment that needs to be worked on.
3. Make computers available to BIT personnel for routine preventive maintenance twice yearly.
4. Purchase required computer replacement parts as needed.
5. Purchase required licenses for all software installed on desktop computers and servers.
6. Train end-users in the use of ITSP standard operating system and Office suite applications.

## **ENTERPRISE NETWORK & DATA CENTER**

### General Description of Service Areas

Bureau of Information Technology (BIT) operates and supports both the enterprise backbone and wide area data network and the enterprise data center. These two facilities perform a number of critical and unique functions for city government agencies.

The enterprise data network provides data connectivity between all city organizations as well as connections to the internet, the Multnomah County network, and the ODOT network. Along with its city agency partners and suppliers, BIT maintains the network infrastructure to a high level of reliability. It also provides a variety of name and address resolution, security, web, file transfer, and other network-related services that add value to the enterprise network.

The enterprise data center provides the central facility for supporting critical corporate and bureau-specific applications. It provides for 24-hour attended operation, large scale data storage capability, high-speed laser printing, completion of back-office IT processes per customer schedules, comprehensive backup and off-site storage of critical data, uninterruptible power with backup generation, planned response to disasters, and rapid technical support response to problems.

### Detailed Description of Services Provided

**Enterprise Backbone Network Support.** For purposes of defining BIT's support responsibility, the enterprise network extends from the core switches and routers to the closest bureau-owned network-connected device. These include switches, routers, copper and fiber media, network software, and technical support staff. BIT monitors all components of the infrastructure, performance problem isolation, maintains the network software, and coordinates maintenance of the equipment, media and communications links with its partners and suppliers. Costs for providing enterprise backbone network support are recovered from the corporate connectivity rate pool.

**Enterprise Name and Address Resolution Support.** Name and address resolution services include providing hardware, software, technical support and maintenance for domain name servers (DNS), Windows internet name servers (WINS), and distributed host control protocol servers (DHCP). BIT also forwards unresolved domain names to external DNS servers on the internet. Costs for providing enterprise name and address resolution support are recovered from the corporate connectivity rate pool.

**Enterprise Network Security.** Network security consists of those resources that control authorization of access to files and directories in the network. Users are assigned an a network logon ID and password that allows them access to information and programs within their authority. Network security also consists of resources assigned to protect the network from intrusion and the spread of malicious code. Resources include the following:

- Internet firewall
- Proxy servers
- Virus protection software
- Content filtering and blocking
- Domain controllers
- Virus clean room

Costs for providing enterprise network security are recovered from the corporate connectivity rate pool.

**Bureau-Specific Network Services.** Often, bureaus require BIT network staff to perform tasks that apply only to one bureau or another. These include, but are not limited to, bureau-required moves and changes, assistance in resolving problems with bureau hardware and software, bureau initiated security investigations, and customized monitoring requirements. Cost for providing these services are recovered by charges for time (using published BIT rates) and materials at BIT's actual cost.

**Enterprise Server Support.** The IBM 2003 Model 125 enterprise server provides a highly reliable, high performance computing platform for mission-critical applications, e.g., IBIS, PPDS, Auditor Liens, and Water Bureau Payroll. It is operator-attended for all but two eight-hour periods each week. Services provided include:

- High speed online access.
- Fault-tolerant RAID disk subsystem (282 GB of storage)
- Automatic off-site storage of data.
- 24 hour processing of scheduled tasks
- Assured scheduled job completion.
- Automated file transfer to other systems.
- High security access control

BIT provides hardware and software maintenance, operations support, and technical support for the enterprise server on a 24x7 basis. Costs for enterprise server support provided to IBIS are recovered from the corporate applications cost pool. Costs for enterprise server support provided to bureau-specific applications are recovered from the enterprise server cost pool.

**Bureau-Specific Server Hotel Facility.** For customers who want a highly reliable facility tailored for supporting mission-critical computer systems, BIT provides cost-effective use of it's enterprise data center facility. It features the following:

- Card key access control supplemented by 24 hour operator presence and other security features.
- Humidity controlled computer system environment.
- Un-interruptible power system (UPS) with backup generator support.
- Backbone network location.
- Optional automated server performance monitoring by network management system combined with pager or telephone notification.
- Optional scheduled backups and off-site distribution of backup media.

- Optional operating system technical support and expedited response to server hardware and software problems.
- Optional support for fault-tolerant dual server systems.
- Optional gigabit ethernet network access.

Costs for providing bureau-specific server hotel facility use are recovered from the bureau-specific enterprise server cost pool.

## Hours of Operation

<b>Day of the Week</b>	<b>Network Center</b>	<b>Data Center</b>
Monday	9:00 am – 6:00 PM	24 hours
Tuesday	9:00 am – 6:00 PM	24 hours
Wednesday	9:00 am – 6:00 PM	24 hours
Thursday	9:00 am – 6:00 PM	24 hours
Friday	9:00 am – 6:00 PM	24 hours
Saturday		12:00 am – 5:00 PM
Sunday		12:00 am – 5:00 PM

## Service Level Objectives

BIT's objective is to keep the enterprise network and data center operational at all times. Although this does not mean these services are completely fault-tolerant or that a failure that affects *some* customers will not occur, it *does* mean that critical facilities will enjoy very high reliability.

**Table 1. Service Level Objectives**

Service	Service Period	Uptime Objective	Disaster Recovery Time Objective*	Disaster Recovery Point Objective*
Inter-Facility Links (redundant)	24x7	99.99%		
Inter-Facility Links (non-redundant)	24x7	99.5%		
Core Switches (redundant)	24x7	99.99%		
Core Switches (non-redundant)	24x7	99.9%		
Edge Switches	24x7	99.9%		
Network Servers (redundant)	24x7	99.9%		
Network Servers (non-redundant)	24x7	99.5%		
Internet Access	24x7	99.5%		
Web Servers	24x7	99.5%		
Extant Service (Mult Co or ODOT)	24x7	99.5%		
IBIS and Lien System Access	8x5	99.9%		
PPDS System Access	24x7	99.5%		
Enterprise Server TSO Access	24x7	99.9%		

\*Disaster recovery standards not yet set.

Table 1 details BIT's enterprise network and data center service level objectives. The service period indicates the hours per day and days per week to which the service level applies. The service objective is the percentage of that time the service is available. The disaster recovery time objective is the time that service must be recovered in the event a

disaster interrupts it. The disaster recovery point objective is the time from creation time of the data restored to the time of the disaster.

**Table 2. Problem Handling Time Standards**

Service Period	Network Monitored by NMS and:	BIT Detects Critical Failures Within	BIT Responds to Customer Call Within	If Required, BIT Arrives On-site Within	BIT Resolves 90% of its Problems Within
Business Day	Network Staff	15 min	15 min	1 hour	4 hours
After Hours	Operations Staff	15 min	1 hour	4 hours	8 hours
Weekends and Holidays	Operations Staff (Except Swing Shift & Holidays)	15 min	1 hour	4 hours	8 hours

Table 2 lists BIT's objectives in restoring services that are interrupted. Again, service period indicates the times for which the service level applies. Business day indicates 8:00 am to 5:00 PM, Monday through Friday, excluding holidays. After hours indicate 5:00 PM, Monday through Friday, to 8:00 am, Tuesday through Saturday, excluding holidays. Weekends and holidays are all other hours. Critical failures include inter-facility network links, major BIT systems, and major bureau systems supported by BIT. On-site response will apply if affected bureau requests it or if BIT determines it is necessary in resolving the problem.

## **INFORMATION TECHNOLOGY PLANNING SERVICES**

### **General Description of Service Providers**

Planning services, working with all City bureaus, coordinates the vision, and direction for enterprise technology development and implementation. The services provided include corporate IT strategic planning, standards development, planning and coordination for enterprise technology projects.

### **Detailed Description of Services Provided**

- IT Strategic Planning: This service component includes the professional and planning support staff for continuing coordination and support for the City's Information Technology Strategic Plan, the Information Technology Executive Committee (ITEC) and the ITSP Management Committee.
- ITSP Implementation: Typical projects include network backbone upgrades, WAN and Internet services development, coordination, citizen access to government services , intranet development, Internet electronic commerce development, standards implementation, corporate data management, research education, training, and any IT projects directed by Council .

# **Corporate Geographic Information System (CGIS)**

## General Description of Service Areas

The Enterprise GIS Hub (Hub) is a large-scale, enterprise-wide spatial data warehouse that uses Relational Database Management Systems and GIS technologies to support the storage, maintenance, and access to corporate data. The Hub serves as a central repository for corporate data that can be shared between all bureaus across multiple GIS platforms. The Corporate GIS (CGIS) successfully developed and implemented the Hub with re-usable and customizable supporting applications and services.

## Detailed Description of Services Provided

The following are descriptions of products and services provided within each of the three basic hub cost centers:

### CGIS Operating Requirements:

- Maintains the essential corporate Hub layers - taxlots, street centerlines, and orthophotography.
- Negotiated and maintains a site license for ESRI software use in the City.
- Provides first line technical support for ESRI products.
- Developed both web and desktop applications that provide access to data in the Corporate Hub.
- Schedules and runs training classes for its own and ESRI software.
- Coordinates GIS activities among the bureaus in the City.
- Positions the City of Portland and acts as the liaison for regional GIS activities involving the City.

### HUB Expansion:

The Hub has been developed to provide a highly efficient mechanism for viewing and querying data. With the addition of new users, a number of Hub components will be evaluated and updated as necessary to maintain an acceptable performance level. Enhancements that may be made to accommodate new users are:

- Purchase of new server hardware.
- Upgrade of existing servers (additional disk space, memory, etc.).
- Procurement of additional access licenses for third party software components.
- Upgrade security components.

### HUB Operation

The Hub provides access to data citywide. Hub operation will include maintaining and enhancing the Hub's functions and maintaining an acceptable performance level. Operational dollars will be spent in the following areas:

- Desktop Data Access
  - Mapworks Application
  - Native ESRI Tools (ArcView, ARCGIS, MapObjects)
  - Custom Applications
  
- Internet Data Access
  - GIS Mapping
  - Metadata posting and distribution
  - Access to tabular data
  - Map Publishing
  - Data Extraction
  
- Server Maintenance
  - Operating System
  - Database Maintenance and Access Licenses
  - Other Software Maintenance and any necessary Access Licenses
  - SW Updates
  - Networking
  - Security
  
- Other
  - User Training
  - User support

## Hours of Operation

<b>Day of the Week</b>	<b>10.2.1.1.1 CGIS</b>	<b>Support</b>
Monday	24 hours	8:00 AM – 5:00 PM
Tuesday	24 hours	8:00 AM – 5:00 PM
Wednesday	24 hours	8:00 AM – 5:00 PM
Thursday	24 hours	8:00 AM – 5:00 PM
Friday	24 hours	8:00 AM – 5:00 PM
Saturday	24 hours	By Appointment Only
Sunday	24 hours	By Appointment Only

### Additional Services:

- Data Publishing and Maintenance:

The Hub is designed to provide a stable data maintenance environment for data users and contributors. The maintenance environment is comprised of applications that have been developed based on a common set of software and use rules. Common rules insure that each time data is posted to the Hub and is consistent with previous updates.

CGIS will accept new Hub customers with new data to be included in the Hub databases. The effort to expand maintenance environment and available data sets will be priced on a

“case by case” basis. The costs will include all software development and hardware<sup>1</sup> / software<sup>2</sup> procurement required.

The basic work flow for expanding the Hub database and maintenance environment includes determining how the data fits into the Hub and providing a mechanism for migrating the current data to the Hub for long term maintenance. CGIS will review the data with the customer and expand the Hub database model to include a location for the new information. Once the new data location is established, CGIS will assist in migrating the data from its current environment to the Hub.

Finally, CGIS will assist the personnel responsible for the maintenance of data in developing an environment that insures consistent rule-based maintenance of the data being posted to the Hub. CGIS will be responsible for maintenance and update of the maintenance applications.

- Local Hub Site

Customers may have special needs making it necessary to have a Hub site local to their computing environment. The customer may need to have Hub data available during natural emergencies and cannot depend on wide area network connections. For these customers, a local hub site can be constructed.

CGIS will develop the local hub site and make it operational within the CGIS Hub environment. The databases on the local site will be structured to receive timely updates from the main Hub site. The local hub will be sized to provide performance similar to the performance of customers accessing the main Hub sites.

The CGIS will procure the hardware<sup>3</sup>, ESRI software<sup>4</sup>, and database software necessary to construct the Hub site. The organization requesting a local Hub site will be responsible for all non-ESRI software licenses and database connect licenses.

- Custom Application Development Services - available from the CGIS

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<sup>1</sup> Hardware provided only includes servers.

<sup>2</sup> Software provided does not include ESRI software for entities external to the City of Portland.

<sup>3</sup> Hardware is intended to mean servers only.

<sup>4</sup> ESRI software is not included for agencies external to the City of Portland.