



CITY OF ARVADA



TECHNOLOGY ARCHITECTURE
AND STANDARDS
FOR
HARDWARE AND SOFTWARE

“Delivering Value through Information Technology Services”

TECHNOLOGY STANDARDS

REVISED SEPTEMBER 2010



Great Technology Great Service

TABLE OF CONTENTS

<i>Summary</i>	3
Background	3
Purpose	3
Scope	3
Review Schedule	3
Assumptions	3
Principles	3
Adoption, Review and Revision of Standards	4
<i>Networking Standards</i>	4
Topology & Protocol Overviews	4
Telecommunications	5
Wide Area Communications	5
Network Cabling	5
Enterprise Routers	6
Layer 3 Switches	6
Network File Servers	7
Tape Backup Sub-System	8
CD Servers	8
<i>Computer Workstations and Peripherals</i>	9
Work Stations Hardware Standards	9
Printers	10
PDA's	11
<i>Software Standards</i>	11
Workstation software	11
Network Operating System Software	11
Internet/Intranet	11
Middleware web and phone system	12
Enterprise Database	12



SUMMARY

BACKGROUND

The purposes of technology architecture and standards are to ensure that the City of Arvada's limited technology resources are secure, and to promote the highest level of interoperability and value received for the City of Arvada's investment.

This plan augments the Information Technology Strategic Plan. This plan was developed as a tool for the City to use when selecting new technology. It is based on current technology investments, with an eye toward integration and sharing of data across the organization looking at both architecture and infrastructure.

The IT Department supports approximately 550 desktop workstations, approximately 150 laptops and over 300 software titles on its network throughout the City of Arvada. Initial workstation hardware and software standards were implemented in 1996, and are updated as the City's technology environment changes. An Internal Service Fund was created to allow for the standardization and timely replacement of networked workstations, printers, servers, LAN/WAN equipment and software.

PURPOSE

To develop a living document that gives a framework for IT decision making that effectively provides IT customers with information and technology required for successfully achieving the City strategic business goals and objectives.

SCOPE

Identify the necessary resources to support the information needs of the City as established by the Information Technology Task Force based on the City's vision, mission, and goals.

REVIEW SCHEDULE

IT Division Managers and Director will review the standards plan each January prior to any purchases. The hardware aspect will be updated at least once a quarter to reflect changes in models available. This will be done by aligning the information and business needs of the City with the Community Goals.

ASSUMPTIONS

- IT resources are vital to the City's Business Practices
- IT is essential to core business functions
- Business needs will be the driving force for IT architecture requirements
- IT Standards, Policies, and Procedures will be enforced city-wide
- A shift in Business Strategy will affect the IT Strategic Plan, which will also affect required IT resources
- The City and AFPD will change procedures to fit purchased software rather than changing the software to fit existing procedures
- The IT industry is highly volatile and will affect City resource requirements, shared services will be utilized where possible.

PRINCIPLES

Software

- IT will have a "buy" versus "build" philosophy
- IT will "build" software only when mandated by business requirements
- IT will strive to review options for internal, hosted or outsourced services.
- Software applications that fit into pre-existing suites used by the City will get precedence over other best of breed software
- Purchased software will be implemented as "vanilla" as possible – modifications only as required by law, board policy, or IT Council
- IT will strive to keep purchased software systems current and supported
- IT will strive to keep software systems modern and will monitor and manage the Computer Replacement Fund
- IT will maintain current technology trends – be "leading" edge but not "bleeding" edge



Great Technology Great Service

ADOPTION, REVIEW AND REVISION OF STANDARDS

In order to achieve the benefits of a standardization program, all purchases of computers hardware and software that will be used on the City of Arvada network and workstations need to be forwarded to the IT department for final review and approval. This process will assure compliance with technology security policies and will allow for standards and ease of integration with existing technology used by the City of Arvada.

Deviation from these standards may be approved by the IT Director to meet a selected vendor requirement of when a Department's needs clearly demonstrates that conformance to these technology standards will negatively impact their goals.

A formal program for adoption, publication and adherence to a strict set of technology standards will result in the following benefits:

- To the maximum extent possible, simplification and reduction of the numbers, types, brands and operating characteristics of the network devices, components, topologies, protocols, physical cabling media, workstation types, software and operating systems upon which the City of Arvada WAN is built.
- Reduction in the capital investment and cost of acquisition required.
- Reduction in the cost and complexity of technology support.
- Reduction in the cost of technology training.
- Promotion and assurance of interoperability of all technology components at all City sites and departments, for all users and needs.
- Promotion of consistent user satisfaction from site to site.
- Review, testing and approval of all proposed new technology components and standards before deployment to ensure compatibility with the existing technology Infrastructure.
- To the maximum extent possible, assurance of high availability, reliability and performance of all network and workstation components and applications software.

The following pages outline minimum and recommended standards and specifications for components of the City of Arvada's technology infrastructure, including network cabling and facilities network communications, file servers, workstation, peripheral equipment and application software. These standards will be reviewed, changed and published at a minimum annually.

NETWORKING STANDARDS

TOPOLOGY & PROTOCOL OVERVIEWS

The recommended protocol for all City platforms is the Transport Control Protocol and combined Internet Protocol (TCP/IP) . TCP/IP is a wide-area network protocol that provides:

- Routable networking
- Network technology independence
- Scaleable architecture
- Reliable delivery
- Universal interconnectivity
- Proven technology.

Beyond the basic design features of TCP/IP, a network protocol needs to have broad-based support by both end-users and networking vendors. TCP/IP is the default protocol for the Internet environment, and therefore has gained wide acceptance among the Internet community.



Great Technology Great Service

TELECOMMUNICATIONS

The City has centralized the telecommunication (voice) needs into one enterprise networked PBX system

City Standard:

- Nortel PBX
- CallPilot Voicemail

WIDE AREA COMMUNICATIONS

The WAN communications are based on the following objectives:

- Provide sufficient bandwidth to meet the most data-intensive tasks. This will initially include the following:
- Back-ups of remote applications to a site other than the main data center.
- Access to financial system
- Access to the ticketing system for the Arvada Center
- Access to the police CAD/RMS and other police systems
- Allow for inevitable growth in the movement of information between sites. This will include:
- Increased volume and complexity of e-mail messages
- Eventual implementation of electronic forms
- Remote access to other future Enterprise applications.

NETWORK CABLING

To achieve a successful long-term cabling solution, the City of Arvada established the following performance goals based on emerging technology:

- Provide a cable system with adequate bandwidth to deliver the network applications and data while providing an allowance for future growth.
- Provide a cable system that has high integrity, performance, and usability based on the current Commercial Building Telecommunications Cabling standard, BICSI, and future EIA/TIA & IEEE standards technology.
- All cabling must meet the EIA/TIA-568 and ISO/TEC 11801 standards for Category 5E or better wiring as stated. Any deviations from standards from this document will require the prior approval of the IT department. City of Arvada key requirements include the following:
- All network drops will be of Category 5E or greater rated cable. This configuration will support current applications and present an additional growth capability.
- The network drops will be terminated in compliance with Category 5E or greater specifications to a RJ45 jack and labeled with IDF #, Panel # (where applicable) and jack ID numbers.
- All cable that runs back to cable telecom closets will be terminated on a Category 5E or greater rated patch panel, clearly labeled for each jack.
- All fiber strands will be terminated with ST connectors.
- Fiber runs will be protected in plenum rated interducts.



Great Technology Great Service

ENTERPRISE ROUTERS

Routers and switches are the fundamental building blocks of the network infrastructure backbone.

Current Acceptable Models: Nortel 1204, Foundry Layer 3 Switches and Cisco 2600 routers

DESCRIPTION	STANDARDS / SPECIFICATIONS	ACCEPTABLE ITEM
Interface Options	TM; FDDI; Fast-Ethernet; Ethernet; Token Ring All interface options are integrated.	
Protocols Supported	TCP/IP, IPX	
Other	Flash Upgradeable Software	
	VLANs	
	QOS & Prioritization	
	Route-switching	

LAYER 3 SWITCHES

A layer 3 switch is the intermediate component between the file server, router, and the workstations. All 10/100/1000 switches must meet the following criteria:

Current Acceptable Models: Foundry

DESCRIPTION	STANDARDS / SPECIFICATIONS	ACCEPTABLE ITEM
Port Configurations	12 and 24	
SNMP Compliance	Module added when required	
Interface Options	0/100/100BaseT; 10/100/1000BaseF, 10G, Auto sensing	
Other Features	Stackable	



Great Technology Great Service

NETWORK SERVERS

The network servers are intended to support City-wide server needs including the file and print sharing of all departments, financial and police systems. Server procurement is highly specialized and is considered an integral part of the WAN Server Deployment. Therefore, coordination with IT System's Networking Group is mandatory. All requisition and procurement documents must be approved before a server is authorized for procurement.

Current Acceptable Models: HP's Proliant DL Series

DESCRIPTION	STANDARDS / SPECIFICATIONS	ACCEPTABLE ITEM
Processor	≥ 1Gig, 1 installed and Upgradeable to 2 or more processors	Intel's Pentium or higher
External Cache	≥ 512 KB	N/A
BIOS	Flash Upgradeable	HP
Installed RAM	≥ 500 MB Maximum RAM capacity ≥ 16 GB	Not Specified
Hard Drive Controller	Qlogic Fiber Channel for connectivity to SAN	Qlogic
Hard Drive Type & Capacity	Created virtually on SAN	Compellent
Expansion Slots	2 PCI slots minimum	N/A
External Ports	(1) Parallel, (2) 9-pin Serial, (1) Mouse, (1) Keyboard, (1) SCSI	N/A
Network Interface Card	Integrated 10/100/1000BaseT interface Flash Upgradeable Firmware	HP
Operating System	Microsoft Windows /Netware/Linux/VMware	N/A
Standard Software Load	Specified by City of Arvada IT department	As Specified
Input Devices	101/102 English language keyboard & mouse	HP
Warranty	Five-year on-site parts & labor with 4 business-hour response time	



Great Technology Great Service

TAPE BACKUP SUB-SYSTEM

The following specifications must be met when ordering tape backups in order to meet the volume and performance demands of the City of Arvada Network Infrastructure.

Current Acceptable brands: AIT or DLT

DESCRIPTION	STANDARDS / SPECIFICATIONS	ACCEPTABLE ITEM
Minimum Capacity	800 Gigabytes	
Interface	SCSI or Fibre-Channel	
Tape Format	LTO4	
Library Drives	LTO4	DLT
Software	IBM Tivoli storage manger	
Warranty	Three-year minimum, lifetime if possible	
Model	Quantum	

CD SERVERS

The following specifications must be met when ordering CD-ROM Servers in order to meet the volume and performance demands of the City of Arvada Network Infrastructure.

Current Acceptable brands: AXONIX

DESCRIPTION	STANDARDS / SPECIFICATIONS	ACCEPTABLE ITEM
Network Interface	Integrated 10/100/1000BaseT	
CD-ROM Servers	Must work in IP environment and work with Novell NDS and AD	



COMPUTER WORKSTATIONS AND PERIPHERALS

WORK STATIONS HARDWARE STANDARDS

The following workstation specifications are based on a set of industry standards designed to keep pace with technological advances. As standards and prices change, so must the specifications. However, they were developed to meet the following objectives:

- Accommodate foreseeable developments in operating systems application software (e.g., Oracle, Tessitura, CAD system) to ensure maximum life expectancy for the hardware investment.
- Minimize the support workload of City of Arvada personnel by transferring responsibility for maintenance and repair to vendors and manufacturers.
- Ensure excellent performance.

Current Acceptable Models: HP or Virtual Desktop running on servers described above

Workstations:

Standard:

HP dc5800 (with 4 year on-site warranty)
 Dual Core Processor, 2GB RAM, 80 GB Hard Drive,
 DVD Writer with LightScribe

High end:

HP xw4600 (with 4 year on-site warranty)
 Dual Core Processor, 2GB RAM, 80GB Hard Drive,
 DVDWriter with LightScribe

Laptops:

Standard:

HP 8530w (with 4 year on-site warranty)
 Dual Core Processor, 2GB RAM, 160 GB Hard Drive,
 15.4" screen, DVD Writer with LightScribe

Monitors:

17" HP 1750
 20" HP 2045w (wide screen)
 22" HP 2245wg (wide screen)
 Video Card
 NVIDIA 8400GS (supports dual monitors, includes cable)

Miscellaneous:

Mouse (Standard) - HP USB/PS2 Optical 2-Button Scroll Mouse
 Mouse (Wireless) - Microsoft
 Mouse (Remote Mouse for Presentations) - Keyspan Presentation Remote Pro
 APC UPS ES 550 – 8 Outlet 550VA
 Kingston Data Traveler (Secure USB Drive – 4gb)



PRINTERS

The following printer specifications are based on a set of standards designed to work with the current City of Arvada network.

Current Acceptable brands: HP Laser Printers and Plotters

Laser Printers:

Standard:

HP P3005x (with 1 year on-site warranty)
Includes two 8 ½ x 11 inch trays and a duplexer
Note: Extra paper trays or envelope feeders are not available for this model.

Mid-Range:

HP4015x (with 1 year on-site warranty)
Includes two 8 ½ x 11 inch trays and a duplexer

HP P4015x Printer Options:

HP LaserJet 75-sheet envelope feeder
HP LaserJet 500-sheet Feeder/Tray

High end:

HP P4515x (with 1 year on-site warranty)
Includes two 8 ½ x 11 inch trays and a duplexer

HP P4015x Printer Options:

HP LaserJet 500-sheet Feeder/Tray
Note: An envelope feeder is not available for this model.

Color Laser Printers:

Standard:

HP CP3525x (with 1 year on-site warranty)
Includes two 8 ½ x 11 inch trays and a duplexer
Note: Extra paper trays or envelope feeders are not available for this model.

HP CP3525x Consumables:

Black Print Cartridge - HEWCB400A
Cyan Print Cartridge - HEWCB401A
Yellow Print Cartridge - HEWCB402A
Magenta Print Cartridge - HEWCB403A

High end:

HP 5550dn (11x17 capabilities + 1 yr on-site warranty)
HP LaserJet 500-sheet Feeder/Tray
Note: An envelope feeder is not available for this model.

HP 5550dn Consumables:

Black Print Cartridge
Cyan Print Cartridge
Yellow Print Cartridge
Magenta Print Cartridge



Great Technology Great Service

PDA'S

The following PDA specifications are based on a set of standards designed to work with the current City of Arvada network.

Current Acceptable brands: Any Blackberry that works with BES server

DESCRIPTION	STANDARDS / SPECIFICATIONS	ACCEPTABLE ITEM
All BlackBerry models	Must work with GroupWise email system.	BlackBerry

SOFTWARE STANDARDS

WORKSTATION SOFTWARE

The following software specifications are chosen to meet the following objectives:

- Operating system will run 99% of all applications necessary for City of Arvada job functions.
- Operating system must work with the current network.
- The life cycle of the Operating System (OS)
- Training for office applications must be readily available.

The City of Arvada standard software/OS configuration

- The OS will be configured so no software can be installed without first being tested with the current OS.
- The OS will also be locked down so changes to the network configuration cannot be made without IT assistance.
- Only software that has been tested with the current OS and is otherwise needed for City of Arvada business will be installed on the workstation. A software list will be maintained, by the IT department, of what software is and is not compatible with the current OS standard. If necessary software is not compatible with current OS standard exceptions will be made.
- Newly purchased software will be tested by IT to ensure compatibility with current setup before being installed into production environment. "Note: Plan software purchases needs at a minimum of 1 month prior to needing the software. The software will first be tested with AppStream and packaged to see if we can lower installation and service costs. Poor planning on the purchasers part will not be a reason for not having the software tested before it is installed."
- Personally owned and unapproved software is not permitted on City of Arvada workstations.
- To meet these objectives the following support standards will be enforced:
- Any workstation that has been modified and no longer operates properly will be configured back to the City of Arvada's standard software configuration along with all necessary software to perform the employee's job. All other settings and software will not be restored.

NETWORK OPERATING SYSTEM SOFTWARE

- The following Network Software specifications are chosen to meet the following objectives:
- Administration of users must be in some Directory currently Novell's E-directory and Windows Active directory
- Must run on an Intel based processor.
- Must be bootable/configurable to run off of SAN based drives.
- Must be robust and continue to operate if one or more servers are down.
- Current Standards:
- Novell
- Windows
- Redhat Linux
- VMware

INTERNET/INTRANET

Current Standards:

- The City has standardized on LAMP technology, or Linux, Apache, MySQL and PHP for the web and content management system.



Great Technology Great Service

MIDDLEWARE WEB AND PHONE SYSTEM

- The following middleware specifications are chosen to meet the following objectives:
- Provide a central platform for system integration so that various City standard computer systems can be accessed via web and telephone systems.
- Must be secure to the City's requirements and allow for payments via web and telephone
- Must provide ADA compliancy for all communications media

- Current Standard:
- Tele-Works, Inc. eVision

ENTERPRISE DATABASE

The following Database specifications are chosen to meet the following objectives:

- Allow exchange of data between databases and applications, and between different manufacturer's databases in a standard way: JDBC, ODBC, LDAP, SQL, XML.

- Current Standards:
- Oracle
- MS SQL
- My SQL
- Support for Legacy databases such as Universe will continue until applications using these databases are replaced.