



**City of Portland, Oregon  
Bureau of Technology Services**

# **Technology Standards Directory**

**Fall 2017  
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# Introduction

## ***Standards***

Standards provide a consistent set of tools for the development and efficient maintenance of the City of Portland's Information Technology infrastructure.

A well-defined set of standards can reduce support costs and provide economies of scale while at the same time allowing the needed level of flexibility. Support costs can be minimized by setting standards for hardware, software, networks and backup technologies. Training costs can be reduced substantially by standardizing on certain applications that will have widespread use. Security risks can be reduced by ensuring products remain supported by the manufacturer for security related patches and fixes.

Technology Standards are maintained by the BTS Infrastructure Board with input from content experts in other BTS divisions and City bureaus. These standards reflect industry best practices as applicable to the requirements of the City of Portland. Minimum configurations reflect the hardware requirements necessary to easily use the applications included in the standard productivity suite. Bureaus may exceed the minimum configuration as specific work requirements dictate upon BTS review.

Standards related to certain Information Security services and capabilities are not publicly listed as a precaution against malicious use of, or exploitations against, City systems and networks.

These standards shall be posted on the BTS PortlandOregon.gov web site, updated as necessary and reviewed in accordance with the cycles established herein.

The BTS Technology Standards web page can be found at <http://www.portlandonline.com/omf/index.cfm?c=46940>.

## ***Exception to Standards***

All technology requests that do not conform to the technology standards established in this document will require approval as an exception. BTS customers must work with their BTS Technology Business Consultant to submit an exception request. Business Consultant involvement is important to assist the customer in considering standard alternatives.

The exception review process consists of validation of compatibility with the existing City standard infrastructure. Exception requests are reviewed by the BTS Infrastructure Board. BTS will work to process 80% of the exception requests within 2 weeks of the exception being entered into the exception tracking system. Some exceptions will take longer depending on the complexity and compatibility.

Products allowed via the exception process are generally not supported by BTS. BTS may bill for installation and configuration work on a Time and Materials basis.

## **Standard Categories**

This document lists Technology Standards in categories as follows.

<b>Category</b>	<b>Description</b>
<b>Standard</b>	This category represents the current accepted technology for general installation within the City technology environment. Technologies in this category are supported in the Enterprise and should be adopted at the earliest opportunity.
<b>Allowed</b>	Not a standard, but allowed in the environment without an exception.
<b>Legacy</b>	This category represents technologies that are legacy standards, previous releases or versions. These are typically outdated technologies that are approaching or at end of life, but are still in active use within the City's technology environment. These technologies will be eliminated from the environment through attrition or specific projects. New installation using a technology in this category requires a clear business justification and may require an Exception.
<b>Exception Required</b>	Technology requests that do not conform to the Technology Standards established in the Standards Directory will require approval as an exception.

Note: Definition as a standard does not guarantee that BTS is providing technical support (via rates, time and materials or best effort) for the technology unless specifically noted in the support level.

## **Support Levels**

BTS has established five standardized support levels:

<b>Support Level</b>	<b>Description</b>
<b>Full Support</b>	BTS fully supports the product including ordering, provisioning, installation, information security, configuration, troubleshooting, patching, de-installation and disposal.
<b>Vertical Apps Support</b>	BTS Vertical Applications team supports the product including installation, configuration, troubleshooting, patching (as requested by the customer bureau), bug fixes for in-house developed software, and disposal.
<b>Limited Support</b>	BTS supports the product including ordering, provisioning, installation, information security, de-installation and disposal. All other work is billable.
<b>Bureau / Vendor Support</b>	BTS does not support the product. Support is the responsibility of the customer bureau and/or the vendor. All work by BTS is billable with the exception of disposal.
<b>No Support</b>	BTS will order and/or provision the product, and dispose of it only. Any other BTS activity will be billable.

Support Level Code	BTS Support Level				
	Full Support	Vertical Apps Support	Limited Support	Bureau / Vendor Support	No Support
	Full	V.Apps	Limited	Bureau	No Support
<b>Support Services</b>					
<b>Order / provision product</b> – Order the product. In the case of cellular equipment, perform the initial setup (provisioning) of the device.	BTS	No	BTS	Bureau	BTS
<b>Install the product</b> (hardware and software) – Install the product on a server or workstation.	BTS	BTS	BTS	Bureau	Billable
<b>Security Standards</b> – Evaluate, implement, and periodically review related security standards.	BTS	Bureau	BTS	Billable	Billable
<b>Software Install Point</b> – Create a network location to house the software installation package.	BTS	BTS	Negotiated	Negotiated	No
<b>Configure features of the product</b> – Perform standard product configuration steps that are required.	BTS	BTS	No	Bureau	Billable
<b>De-install the product</b> – De-install the product, ensuring that remaining interfaces, security, configuration, etc. are intact.	BTS	Bureau	BTS	Bureau	Billable
<b>Dispose of the product</b> – Dispose of the product according to approved disposal protocol.	BTS	BTS	BTS	BTS	BTS
<b>Troubleshoot problems</b> – Working with the customer and/or vendor as needed, resolve issues with the product working in the environment.	BTS	BTS	Bureau	Bureau	Billable
			Billable		
<b>Track updates and patches to the product</b> –Periodically check for updates and patches, and alert customers about availability.	BTS	Bureau	Bureau	Bureau	Bureau
<b>Facilitate testing of updates and patches</b> –Manage the testing process of updates and patches.	BTS	BTS	Bureau	Bureau	Billable
<b>Apply updates and patches</b> – Periodically package, distribute and/or implement updates and patches.	BTS	BTS	Bureau	Bureau	Billable
			Billable		
<b>Lifecycle Management</b> –Manage lifecycle upgrades to the product.	BTS	Bureau	Bureau	Bureau	Bureau
<b>Fix bugs for in-house developed software</b> – BTS will track and fix SW bugs.	N/A	BTS	N/A	Bureau	N/A
<b>Develop software enhancements for in-house SW</b> – BTS will develop and implement new functionality as authorized and funded by the customer.	N/A	BTS	N/A	Bureau	N/A

Key to Support Level table entries:

BTS	BTS is responsible for the support service. The service is not billable.
Bureau	The Bureau is responsible for the support service. Supplemental BTS assistance is billable.
Negotiated	The Bureau negotiates with BTS for the support service. The service is billable.
Billable	BTS bills for the support service.
No	BTS does not provide the service.
N/A	Not applicable.

## **Energy Efficiency**

Energy efficiency is a criteria considered when selecting standards. As standards are selected, energy efficient products that meet the business needs and integrate with other established standards are selected when available.

## **Energy Star®**

“As available, the City shall procure products that meet or exceed Energy Star® criteria for energy efficiency.” (City Code 5.33.080)

Energy Star® applicable products that are included in these Technology Standards shall meet the most current version of the Energy Star® program requirements in effect at the time the product is added to these Technology Standards. Those Bureaus that pursue and are granted an exception to these standards shall continue to seek Energy Star® qualified products.

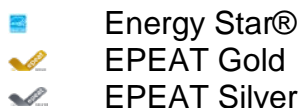
## **EPEAT**

As available, for the following types of technology equipment, the City shall purchase EPEAT products registered at the “Silver” level or higher:

1. Desktop computers
2. Displays (Monitors) – under 60 inch diagonal
3. Laptop computers
4. Tablet computers
5. Printers

Any products from the above list that are included in these Technology Standards shall meet the most current version of the EPEAT standard in effect at the time the product is added to these Technology Standards. Those Bureaus that pursue and are granted an exception to these standards shall continue to seek EPEAT compliant products.

Energy Efficiency certification has been added where the information is available. Certified products are indicated by the following icons next to the product name.



## **BTS Standard Owner**

Each defined standard has an assigned BTS Standard Owner. The owner is responsible for

- evaluating the products supporting a standard
- monitoring for patches, updates and end-of-life (EOL) model changes
- bringing patch and update projects forward to the IB and BTS management for action and scheduling

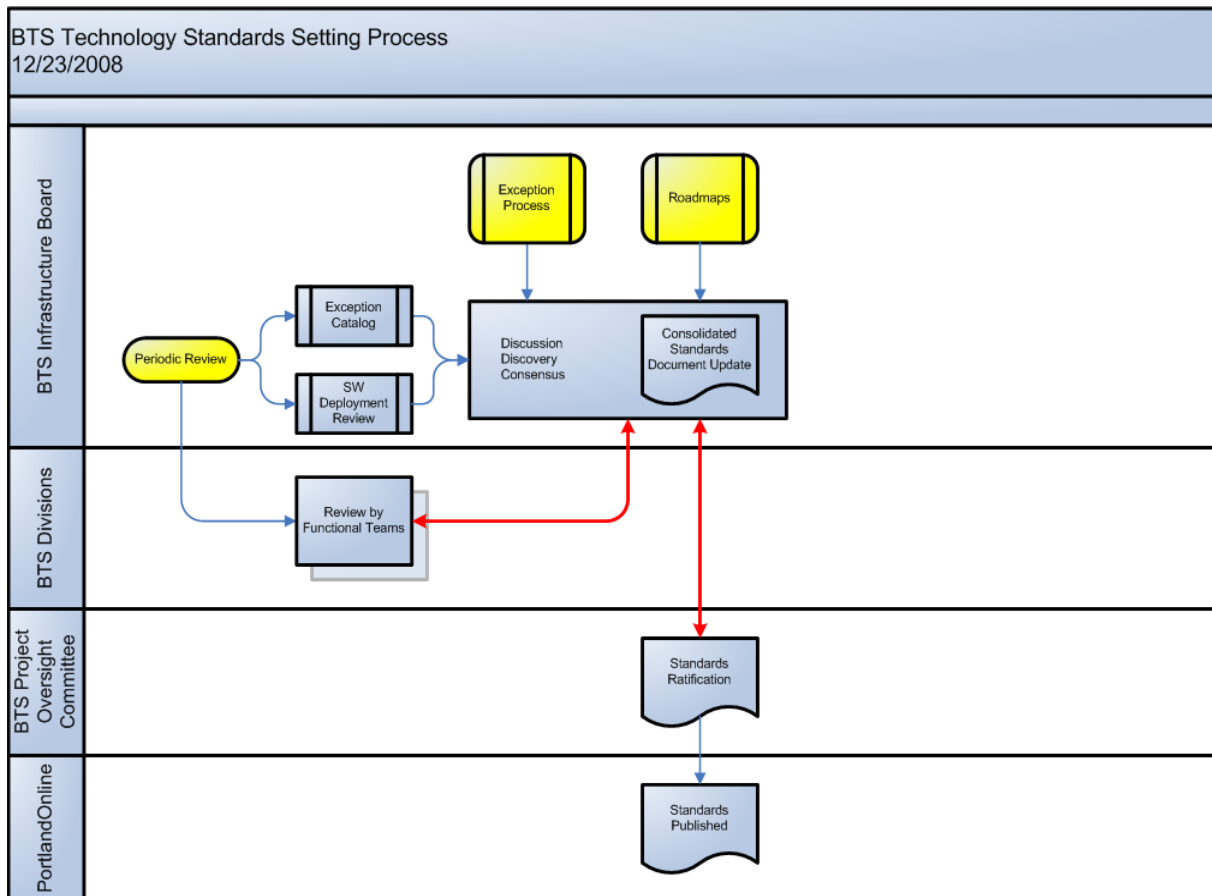
- alerting IB to EOL model changes in order to update this standards document
- working collaboratively within BTS to help establish important lifecycle dates and roadmap strategies.
- identifying when items need to be removed from the Legacy status.
- coordinating testing of products unless otherwise designated through a larger project.

The BTS Owner is not necessarily the group within BTS that provides technical support for the standard.

### ***BTS Standards Setting Process***

The following diagram illustrates the BTS standard setting and review process at a high level.

BTS will conduct a review of the standards 2 times per year in February and August. During the review, the Exception Catalog will be reviewed for any exceptions that should be included as standards; deployments of standard software will be reviewed; and standards that are prescribed from technology roadmaps will also be reviewed and incorporated as appropriate.











### ***ADA Accommodation***

Products that are known to be actively in use as ADA accommodations have been identified in the document with the [ADA] icon. These products are also listed in the index under ADA.

# Hardware Standards









## 1. Workstation Hardware

Item	Standard Description	Standard Category	Support Level	BTS Owner
1.1. Desktop	Dell Optiplex 7050 	Standard	Full	Support Center / Hardware Standards Panel
	Dell Optiplex 755, 960, 780, 790, 7010, 7020, 7040	Legacy	Full	
1.2. Monitor	Dell - Flat Panel LCD P1917S 19" standard screen  , P2214H 22" widescreen  , U2412M 24" widescreen  , U2717D 27" widescreen  , UP3017 30" widescreen 	Standard	Full	
	Dell P190S 19" standard screen P1913S 19" standard screen P1914S 19" standard screen P2210 22" widescreen P2212H 22" widescreen U2410 24" widescreen U3014 30" widescreen	Legacy	Full	
1.3. Keyboard	USB, 104-key	Standard	Full	
1.4. Mouse	USB, optical wheel	Standard	Full	


### Workstation and Laptop Hardware Notes:

1. The planned lifecycle replacement (LCR) for desktop workstations and laptop computers is 5 years effective July 2013 through 2019. The LCR cycle will reduce to 4 years beginning in 2020.
2. BTS does not recommend cascading workstations where a workstation that has been in use for its lifetime is moved to another desktop for continued use beyond the planned lifecycle. Any such request must be submitted as an exception request.
3. LCD panel monitors have a longer life cycle are typically run until failure.

## 2. Laptop Hardware

Item	Standard Description	Standard Category	Support Level	BTS Owner
2.1. Laptop	Dell Latitude 5480 (w/WebCam) 	Standard	Full	Support Center / Hardware Standards Panel
	Dell Latitude E5440, E5450, E5470, E64xx, E65xx, D6xx	Legacy	Full	
Police	Dell Latitude 7480 	Standard	Full	
	Dell Latitude E7440, E7450, E7470	Legacy	Full	
2.2. Laptop – “Lite	Dell Latitude 7280 	Standard	Full	
	Dell Latitude D4xx, E4200, E62xx, E7240, E7250, E7270	Legacy	Full	
2.3. Laptop – Rugged	GETAC B300 	Standard	Full	
	Dell Latitude E64xx XFR, 64xx ATG & XFR, D630 ATG, ATR & XFR	Legacy	Full	
Police, Fire, PBEM  Note: Toughbooks have historically been used by BES and Water also.	Panasonic Toughbook 19  Panasonic Toughbook 31  Panasonic Toughbook 53 	Standard	Full	
	Panasonic Toughbook PDRC (dash mounted monitor and wired keyboard)			
	Motorola MW520			
2.4. Mobile Data Computer – Fire	Panasonic Toughbook GETAC B300 	Standard	Full	
	Data 911 M6, M6 II, PM2, PM1, ETX-PM1, 19	Legacy	Full	
2.5. Laptop – Convertible	Dell Latitude XT	Legacy	Full	

### 3. Tablet Hardware

Item	Standard Description	Standard Category	Support Level	BTS Owner
3.1. iOS <sup>1</sup>	Apple iPad Mini 3, Mini 4, iPad Pro, iPad, iPad with Verizon data plan	Standard	Limited	Communications / Telecom Engineering and Support
	Apple iPad 2, 3, 4, Mini, Mini 2, Air, Air 2	Legacy	Limited	
3.2. Windows 10	Microsoft Surface Pro 4 (WiFi only)	Standard	Limited	Support Center / Hardware Standards panel
Police	Panasonic Toughpad FZ-G1 	Standard	Full	Police

#### Tablet Hardware Notes:

- iPads may be purchased without a data plan, however BTS requires that both WiFi and Cellular radios be purchased in the device. This configuration does not require an exception. If a data plan is added at a future date, it must be through cellular services managed by BTS.
- The End User License Agreement (EULA) for the Dictation feature of the iPad states that all dictation content is sent to Apple for processing to text. This content may be stored as audio files. Additionally your first name and nickname, and similar information including relationship with you (e.g., “my dad”) from your address book contents are also sent to Apple. This information is retained and used by Apple as part of the service and may be retained by Apple even if Dictation is returned to an “Off” setting. This content is subject to Oregon Public Records law and City record retention requirements. See *State and City Rules Related to Public Recordkeeping Requirements* (<https://www.portlandoregon.gov/archives/70031>) on the Auditor’s PortlandOregon.gov website. **BTS STRONGLY ADVISES AGAINST USING THIS FEATURE. DICTATION MUST NOT BE USED AS A DATA ENTRY METHOD FOR CONFIDENTIAL OR SENSITIVE DATA.**
- iPads are provisioned from BTS with the Dictation feature turned Off.
- Tablets are not covered by life cycle replacement funding because of the expectation of a relatively short lifecycle.**
- Please see the document [Apple Device Support Dates](#) on [PortlandOregon.gov](#) for iPhone and iPad devices that are no longer able to receive iOS updates.**

<sup>1</sup> Smartphone and Operating System Limited Support: Ordering, initial device provisioning, setup of synchronization with Exchange, Verizon data and voice service.

#### 4. Server Hardware

Item	Standard Description	Category	Support Level	BTS Owner
4.1. Windows based	Dell, PowerEdge R630, R730	Standard	Full	Production Services / Server Support
	Dell PowerEdge R900, R610, R620, R710, R720, R910, 2950 III, 1950 III, 1950, 2950.	Legacy	Full	
4.2. Red Hat based	Dell PowerEdge R630, R730	Standard	Full	
	Dell PowerEdge R900, R610, R620, R710, R720, R910, 2950 III, 1950 III, 1950, 2950	Legacy	Full	
4.3. AIX based	IBM p-Series/Power 8	Standard	Full	
	IBM p-Series/Power 6, p-Series/Power 7	Legacy	Full	
4.4. Blade Server	IBM Note: Blade servers will be fully retired as part of the 2017 migration of the data center.	Legacy	Full	

#### Server Hardware Notes:

1. The planned lifecycle for server hardware is 5 years.

#### 5. Network Protocols

Item	Standard Description	Standard Category	Support Level	BTS Owner
5.1. Transport	TCP / IP (IPv4, IPv6)	Standard	Full	Communications / Network Engineering and Support
5.2. Routing	OSPF, BGP4, EIGRP	Standard	Full	
5.3. eMail	SMTP, TLS	Standard	Full	
5.4. Monitoring	SNMP V2c, SNMPv3, WMI	Standard	Full	
5.5. WiFi Radio	802.11ac 802.11n (2.4 GHz / 5 GHz)	Standard	Full	
	802.11b/g	Legacy	Full	
5.6. Line Negotiation – Workstation	Auto / Auto	Standard	Full	
5.7. Line Negotiation – Server	Auto / Auto	Standard	Full	

**6. Network Connectivity**

Item	Standard Description	Standard Category	Support Level	BTS Owner
<p><b>6.1.</b> Cabling</p>	<p>Horizontal: UTP Cat 6, Cat 6a, Cat 7                      Vertical: Fiber – Single or Multimode OM3                      Patch: UTP Cat 6, Cat 6a, Cat 7, Fiber                      Copper patch cables should be hoodless.</p> <p>Office or Cubicle                      See additional notes in the Specifications section on page 47.</p> <p>New construction: 2 - Cat 6A. May be used for either voice or data as needed.</p> <p>Remodel: Will be evaluated case by case due to other constraints.</p>	<p>Standard</p>	<p>Full</p>	<p>Communications / Network Engineering and Support</p>
	<p>Horizontal: UTP Cat 5e                      Patch: UTP Cat 5e</p>	<p>Legacy</p>	<p>Full</p>	
<p><b>6.2.</b> WAN</p>	<p>T1, IRNE, INET, Freewire wireless, point-to-point fiber (gigabit), Metro Ethernet, DWDM.</p>	<p>Standard</p>	<p>Full</p>	
<p><b>6.3.</b> SONET</p>	<p>Cisco 15454, 15310</p>	<p>Standard</p>	<p>Full</p>	
<p><b>6.4.</b> 10 Gigabit Ethernet</p>	<p>ONS 15454 GE-XP/XPE CROSSPONDER, M6</p>	<p>Standard</p>	<p>Full</p>	

**7. Network Routers**

Item	Standard Description	Standard Category	Support Level	BTS Owner
7.1. Router	Cisco ME-3400e, ME-3600X, 3850, 4321, 4331, Nexus 7000, ASR. Arista 7280	Standard	Full	Communications / Network Engineering and Support
	Cisco 1841, 1921, 1941, 3750, 3750-X, 7206	Legacy	Full	
7.2. Components	Cisco T1 DSU/CSU WICS	Standard	Full	
	4-port Ethernet card	Legacy	Full	

**8. Network Switches**

Item	Standard Description	Standard Category	Support Level	BTS Owner
8.1. Switch	Cisco 2960C, 2960S, 3560C, ME-3400e, ME-3600X, 3850, 4500-x, Nexus 2000, 5000, 6001. Arista 7050.	Standard	Full	Communications / Network Engineering and Support
	Cisco 2950 (DC), 2960, 3750, 3750-X, 6500	Legacy	Full	
8.2. Components	Cisco SFP connectors	Standard	Full	

**9. Plotters**

**Plotter Notes:**

BTS has not established standard plotter models due to the diverse needs of the individual uses in each bureau. All plotter orders must go through the exception process. Please contact the Technology Business Consultant for the requesting bureau.

**10. Printers (Network)**

Item	Standard Description	Standard Category	Support Level	BTS Owner
10.1. Laser	Monochrome: HP M402dne HP M506dn HP M607dn HP M608dn HP M608x Color: HP M452dn HP M553dn/x HP M653dn	Standard	Full	Support Center / Hardware Standards Panel
	HP 700, 1320, 3505, 4350, 9050, CP3525, CP4525, CP6015, M401, M451, M551, M601, M602, M604, M605, M651, P2055, P3015, P4015	Legacy	Full	
10.2. Large Format Laser – 11 x 17	Monochrome: HP M712dn Color: HP M750dn HP M855xh HP CP5225dn	Standard	Full	
	CP6015, 9050	Legacy	Full	
10.3. Small Multi-function Laser	Monochrome: HP M227dfn HP M426dn HP M725dn Color: HP M47dnf	Standard	Full	
	HP M225, M425, M475, M476, CM1312, M1522, M1536, CM2320, M2727	Legacy	Full	

**11. Scanners**

Item	Standard Description	Standard Category	Support Level	BTS Owner
11.1. Workstation – flatbed, color	HP ScanJet 7500	Standard	Full	Support Center / Hardware Standards Panel
	HP 8390, HP 8350, HP N8420, HP N8460	Legacy	Full	
	Canon DR-225C Canon DR-M160ii	Standard	Full	



Item	Standard Description	Standard Category	Support Level	BTS Owner
11.2. Workstation – sheet-fed, color	Canon DR-125C, DR-160, DR-2050C, DR-3080CII, DR-2010C, DR-4010C, DR-6010C	Legacy	Full	
11.3. Workgroup – flatbed, color, network attached	HP ScanJet Pro 4500	Standard	Full	
	HP N6350, 7650n	Legacy	Full	
11.4. Large Format – 11 x 17	Canon DR-6030C	Standard	Full	
	HP N9120 Canon DR-7090C	Legacy	Full	

## 12. Search Appliance

Item	Standard Description	Standard Category	Support Level	BTS Owner
12.1. Search Appliance	SwiftType	Standard	Full	Business Solutions / Web Development

## 13. Storage Area Network

Item	Standard Description	Standard Category	Support Level	BTS Owner
13.1. Storage Array	Hitachi Gx00	Standard	Full	Production Services / Storage Administration
	Hitachi HUS	Legacy	Full	
13.2. SAN Fabric Network	Fiber Channel Switch: <ul style="list-style-type: none"> <li>• Brocade DCX8510</li> <li>• Brocade 6520</li> </ul>	Standard	Full	
	Wide Area Mux: Cisco CWDM	Legacy	Full	
13.3. NAS Gateway	Hitachi HNAS	Standard	Full	
13.4. NAS file System Support	CIFS, NFSv3	Standard	Full	
13.5. SAN Replication	FCIP	Standard	Full	

Item	Standard Description	Standard Category	Support Level	BTS Owner
<b>13.6.</b> SAN Routing Protocol	FSPF	Standard	Full	
<b>13.7.</b> SAN Transport Protocol	Fiber Channel	Standard	Full	
<b>13.8.</b> File Sharing	HCP Anywhere – for two specific use cases <ul style="list-style-type: none"> <li>Files larger than 15 GB</li> <li>Elevated security protocols</li> </ul>	Standard	Full	

**14. Telecommunications**

Item	Standard Description	Standard Category	Support Level	BTS Owner
<b>14.1.</b> Satellite Phones	Iridium 9555 Associated address book SW will likely be installed on 1 or 2 workstations in a bureau to manage bureau’s sat phone fleet.	Standard	Full	Communications / Telecom Engineering and Support
<b>14.2.</b> Broadband Wireless	Dell 5600 Gobi Mobile Broadband mini-card Verizon JetPack MiFi 7730L	Standard	Full	Communications / Telecom Engineering and Support (except for Police Specific)
	Verizon USB 760 Verizon Aircard (EVDO) Verizon MiFi 4620LE Verizon MiFi MHS291L VeriZon MiFi 620L	Legacy	Full	
Broadband Wireless Police	Panasonic Sierra Wireless MC 7750 Panasonic Sierra Wireless EM 7355	Standard	Full	
<b>14.3.</b> Pagers: Emergency	1-WayUSA/Mobility, Cook	Standard	Full	
<b>14.4.</b> Pagers: Non-Emergency	1-Way: USA/Mobility, Cook 2-Way: USA/Mobility	Standard	Full	
<b>14.5.</b> Smartphone <sup>2</sup>	Motorola Droid 4 Samsung Galaxy S5 Samsung Galaxy S6, S7 (Police)	Exception Required	Limited	

<sup>2</sup> Smartphone and Operating System Limited Support: Ordering, initial device provisioning, setup of synchronization with Exchange, Verizon data and voice service.

Item	Standard Description	Standard Category	Support Level	BTS Owner
	iPhone 5s, 6, 6 Plus, 6s, 6s Plus, SE, 8, 8 Plus	Standard		
	Motorola Droid 3 Motorola Droid X2 Motorola Droid RAZR M iPhone 4s, 5, 5c, 7, 7 Plus  <b>Note: Please see the document <a href="#">Apple Device Support Dates</a> on <a href="#">PortlandOregon.gov</a> for iPhone and iPad devices that are no longer able to receive iOS updates.</b>	Legacy	Limited	
<b>14.6.</b> Smartphone Operating System	Android 4.0, 5.0 (Galaxy S5 only) Android 6.0, 7.0 (Police) iOS 11.3.1	Exception Required	Limited	
	Android 2.3 iOS 4, 5, 6, 7, 8, 9, 10, 11.0, 11.1, 11.2 Windows Mobile 5, 6.0, 6.1, 6.5 Blackberry	Legacy	Limited	
MDC/Cellular Phone (Police Traffic Division)	Trimble Nomad (WIN mobile 6.5 PRO)	Legacy	Full	
<b>14.7.</b> Basic Cellular Phone	LG VN150s Samsung Convoy 3 (Ruggedized) Samsung Intensity III (basic w/slide out keyboard)	Standard	Full	Communications / Telecom Engineering and Support
<b>14.8.</b> USB Wireless Cellular Data Modem	Verizon 730L Pantech 290, 295, 620L	Standard Legacy	Full Full	
<b>14.9.</b> Tablet		See Tablet Hardware on page 12.		
<b>14.10.</b> [ADA] Compliant Handset	CapTel 840i	Standard	Full	Communications / Telecom Engineering and Support
<b>14.11.</b> Cellular Micro Cell	Verizon Network Extender Appliance	Standard	Full	

**15. Tape**

Item	Standard Description	Standard Category	Support Level	BTS Owner
15.1. Tape Format	LTO4	Legacy	Full	Production Services / Server Support
15.2. Tape Library	IBM 3494 Library	Legacy	Full	

**16. Video**

Item	Standard Description	Standard Category	Support Level	BTS Owner
16.1. Desktop USB Camera	Logitech c925-e Microsoft LifeCam Studio 1080p HD	Standard	Full	Support Center / Hardware Standards Panel
	Logitech QuickCam Pro9000, c910, c920	Legacy	Full	
16.2. Projector, Portable	InFocus IN116xa, IN2128HDx	Standard	Full	
	Dell M209X, M210X, 1510X, 2400mp InFocus IN116, IN116a, IN116x, IN3118HD, HD3138HD, IN3138HDa	Legacy	Full	
16.3. Projector, Ceiling mount	<b>No standard specified</b> Specific characteristics of the room must be taken into account. Ambient light, screen size, and projector brightness (lumens) must be matched to provide acceptable image quality. See video specifications on page 48.	N/A		Communications / Radio and Video Shop
16.4. Digital Video Recorder (DVR)	PELCO DSSRV-030-US Note: This is a digital recorder. Additional encoders may be required depending upon the type of cameras used.	Standard	Full	
	PELCO DX8100s, DSSRV-005-US Custom built "white" box supported by BTS Radio and Video Shop.	Legacy	Full	
Digital Video Recorder (DVR) Police	HIKVision DVR	Standard	Full	
16.5. Digital Video Recorder Control Software	PELCO ControlPoint	Standard	Full	

<b>Item</b>	<b>Standard Description</b>	<b>Standard Category</b>	<b>Support Level</b>	<b>BTS Owner</b>
Digital Video Recorder Control Software Police	Interview Tracker	Standard	Full	

# Software and Application Development Standards

## 17. Application Development Tools

Item	Standard Description	Standard Category	Support Level	BTS Owner
17.1. Editing/Compiling	PLEdit 5.7 PL/SQL Developer 7.1 Oracle SQL Developer SQL Server Management Studio	Standard	Full	Business Solutions / Vertical Applications
Editing / Compiling Police	SQL Server Management Studio 2014	Standard	Full	
17.2. HTTP Posting Tool	Fiddler 2	Standard	Full	
17.3. Query Tool	Golden 5.7 Toad 12	Standard	Full	
	Toad 9.1	Legacy	Full	
17.4. SQL Server Utilities	Baretail Pro Redgate SQL Compare Utilities 9.0 SQL Server Management Studio 2016	Standard	Full	
	SQL Server Management Studio 2008, 2012, 2014	Legacy	Full	
17.5. XML Editor	Notepad++ 7.x, XML Notepad 2007	Standard	Full	

## 18. Application Development Tools – Windows-based

Item	Standard Description	Standard Category	Support Level	BTS Owner
18.1. Multi-platform	Visual Studio 2017 ColdFusion Oracle J Developer Eclipse	Standard	Full	Business Solutions
	Visual Studio .NET 2003, 2005 Visual Studio 2008/2010/2012	Legacy	Full	
18.2. Client / Server	Visual Studio 2017	Standard	Full	

Item	Standard Description	Standard Category	Support Level	BTS Owner
	Access XP Developer PowerBuilder Visual Studio 6.0 VS.NET 2003, 2005, 2008, 2010, 2012	Legacy	Full	
<b>18.3.</b> Workstation Based	Access 2016	Standard	Full	
	Access 97, 2000, XP, 2013	Legacy	Full	
Workstation Based Police	Access 2013	Standard	Full	
<b>18.4.</b> Reporting Tool	Cognos Impromptu Actuate Crystal Reports 2013 Business Objects Enterprise 4.3 SQL Server Reporting Services 2008, 2008 R2, 2012, 2014, 2016	Standard	Full	
	Crystal Reports 8, 9, 10, 11, 2008, 2011	Legacy	Full	
<b>18.5.</b> Reporting Tool	Tableau Desktop Tableau Reader Tableau Online	<b>All Tableau product purchases on hold pending product review</b>		
<b>18.6.</b> OLAP	SQL Server OLAP Service SAP BW 7.40 Cognos	Standard	Full	
<b>18.7.</b> Installer	InstallAware InstallShield Windows Installer	Standard	Full	

**19. Application Server**

Item	Standard Description	Standard Category	Support Level	BTS Owner
<b>19.1.</b> Application Server (Java)	Tomcat 8.x Oracle WebLogic 12c WebSphere	Standard	Full	Production Services/Business Solutions
	Oracle WebLogic 11g Oracle 10g AS	Legacy	Full	

**20. Backup / Recovery Software**

Item	Standard Description	Standard Category	Support Level	BTS Owner
20.1. Backup Software	Tivoli – AIX (SAP only) CommVault – Windows / Red Hat Linux / AIXHat/AIX	Standard	Full	Production Services / Server Support
	Quest Litespeed – SQL	Legacy	Full	Business Solutions
Backup Software Police	Symantec Backup Exec 2015	Standard	Full	

**21. Collaboration Tools**

Item	Standard Description	Standard Category	Support Level	BTS Owner
21.1. Online Conferencing	Skype for Business with British Telecom Audio connectivity to the public telephone system	Standard	Full	Support Center / Software Standards Panel
	WebEx Go-To-Meeting (as a participant only)	Allowed	No Support	
21.2. Conference Recording Playback	WebEx Player (ARF format) WebEx Player (WRF format)	Allowed	No Support	

**22. Database Standards**

Item	Standard Description	Standard Category	Support Level	BTS Owner
22.1. Enterprise Database	Informix 12 Oracle 12c SQL Server 2012 SQL Server 2014 SQL Server 2016 PostgreSQL	Standard	Full	<b>Oracle</b> Production Services  <b>SQL:</b> Production Services/Business Solutions
	SQL Server 2008 SQL Server 2008 R2 SQL Server 2005	Legacy	Full	



Item	Standard Description	Standard Category	Support Level	BTS Owner
	SQL Server 2000 Oracle 11g			
<b>22.2.</b> Enterprise Database Client	Oracle 12c Client Oracle 11g client	Standard Legacy	Full Full	
<b>22.3.</b> Workstation Based	Access 2013 Access 97, 2000, XP	Standard Legacy	Full Full	Business Solutions
Workstation Based Police	Access 2010	Standard	Full	
<b>22.4.</b> Database Connector Protocol	ODBC OLE DB XML JDBC ADO	Standard	Full	

The BTS Infrastructure Board recommends that primary and shadow copies of databases in production operate on the same version of the database engine. All copies in the production environment should be updated as part of a planned migration when non-production development and testing validate that the application works correctly in the new database version.

### 23. Directory Services

Item	Standard Description	Standard Category	Support Level	BTS Owner
<b>23.1.</b> Directory Services	Microsoft Active Directory	Standard	Full	Production Services / Server Support

### 24. eMail

Item	Standard Description	Standard Category	Support Level	BTS Owner
<b>24.1.</b> Server Software	Microsoft Office 365 Exchange Online Exchange Server 2013 (Police)	Standard	Full	Production Services / Server Support
	Exchange 2007,	Legacy	Full	
<b>24.2.</b> Web Client	Microsoft Office 365 Outlook Web App	Standard	Full	
<b>24.3.</b> eMail Synchronization	Microsoft Office 365 Exchange Online built-in	Standard	Full	

Item	Standard Description	Standard Category	Support Level	BTS Owner
<b>24.4.</b> Mail Client	Outlook 2016	Standard	Full	Support Center / System Engineering
Mail Client Police	Outlook 2013	Standard	Full	
<b>24.5.</b> Address Book	Global Address Book – Required field: last name, first name, alias, internal and external SMTP address, phone, company, department, office, display name, name (last, first), fax #	Standard	Full	
<b>24.6.</b> Bulk Email Service	MailChimp	Allowed	No Support	
<b>24.7.</b> eMail Filing Tool	SimplyFile	Allowed	No Support	

**25. Geographical Application Tools**

Item	Standard Description	Standard Category	Support Level	BTS Owner
<b>25.1.</b> GIS Desktop Applications	ArcGIS 10.3.1 MapWorks 10.3.1	Standard	Full	Business Solutions
	ArcView 3.3/3.4 Microstation (MGE) MapInfo GeoOutlook	Legacy	Full	
<b>25.2.</b> GIS Internet Map Server	ArcGIS Server 10.2.2	Standard	Full	
	GIS/SQL	Legacy	Full	
<b>25.3.</b> GIS Application Development	Visual Studio 2010, 2015, 2017 ArcObjects 10.1, 10.2, 10.3 ArcEngine 10.1, 10.2, 10.3 Eclipse XCode	Standard	Full	
	Visual Studio .NET 2003, 2005, 2008 MapObjects AML Visual Basic 6 Visual Basic for Applications	Legacy	Full	

Item	Standard Description	Standard Category	Support Level	BTS Owner
<b>25.4.</b> Mapping Software	Google Earth \ Google Earth Pro (free version)	Standard	Limited	Support Center

**26. Graphic Design Software**

Item	Standard Description	Standard Category	Support Level	BTS Owner
<b>26.1.</b> Visual Diagramming	Microsoft Visio 2013, Visio 2016 Click-to-Run Perpetual License	Standard	Full	Support Center / Software Standards Panel
	Microsoft Visio 2007, 2010  Notes: <ul style="list-style-type: none"> <li>as of 6/11/2013 BTS adopted a policy to allow owners of 2007 or 2010 versions to install and use those versions through their lifecycle.</li> </ul>	Legacy	Full	
<b>26.2.</b> PDF Creation	Adobe Acrobat Standard or Professional DC Adobe LiveCycle Designer Office 2013 built-in	Standard	Full	
	Adobe Acrobat Standard or Professional 9, 10, XI PDFCreator	Legacy	Full	
<b>26.3.</b> Graphic Design	Adobe Creative Suite 6 (InDesign, Photoshop, Illustrator, Flash, DreamWeaver, Fireworks, Premier Pro Adobe Photoshop Elements Adobe Premier, Premier Elements Microsoft Publisher 2013 XnView	Allowed	Limited	
	Adobe Creative Suite 1, 2, 3, 4, 5, 5.5, Publisher 2003, 2007, 2010	Legacy	Limited	
Graphic Design police	Microsoft Publisher 2013 Sony Vegas 15 Pro (Police)	?		
<b>26.4.</b> Screen Capture	Camtasia Greenshot Snagit	Allowed	Limited	
<b>26.5.</b> Computer Aided Design	Sketchup Pro Sketchup Make	Allowed	Not Supported	

Item	Standard Description	Standard Category	Support Level	BTS Owner
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**27. Internet Domain Naming**

BTS recommends bureaus use the form *www.portlandoregon.gov/function* when creating internet domain names for specific functions to be exposed to the public. This form maintains city branding (portlandoregon.gov) and does not incur any additional domain registrar costs provided a security certificate is not required.

Bureaus may also use the form *function.org* or *function.com* as business reasons dictate. If this option is chosen, these new domain names must be created, registered, and maintained by BTS. Bureaus must always consult with and acquire domain names through BTS to ensure the domain name is known and cataloged centrally. This reduces the chance that a domain name will expire without the City’s knowledge.

**28. Miscellaneous Tools**

Item	Standard Description	Standard Category	Support Level	BTS Owner
<b>28.1.</b> Enterprise Fax	AccuRoute FAX	Standard	Full	Production Services / Server Support
<b>28.2.</b> Enterprise Paging	OmniTrend PageMaster	Standard	Full	
<b>28.3.</b> FTP Client	FileZilla ( <a href="http://filezilla-project.org">http://filezilla-project.org</a> ) Internet Explorer  Note: See Storage Services and Devices on page 36.	Standard	Full	Support Center / Software Standards Panel
<b>28.4.</b> Kiosk				
<b>28.5.</b> Online Training Content Editing	Adobe Captivate	Standard	Full	
<b>28.6.</b> Outlook Calendar Publishing	WinCalendar Standard	Allowed	Limited	
<b>28.7.</b> [ADA] Speech to Text	Dragon Naturally Speaking	Standard	Limited	Business Solutions
<b>28.8.</b> Survey Application	Survey Monkey (web application)	Allowed	Limited	Support Center / Software Standards Panel
<b>28.9.</b> Terminal Emulation (3270)	Micro Focus Reflection Desktop 2016 OpenText Exceed OpenText HostExplorer	Allowed	Limited	Production Services / Data Center

Item	Standard Description	Standard Category	Support Level	BTS Owner
	Reflection 2011 Attachmate Extra Extreme	Legacy	No Support	
<b>28.10.</b> Wiki	ScrewTurn Wiki TikiWiki	Standard	Full	Business Solutions Production Services
<b>28.11.</b> SMS Text Message Capture	Macroplant iExplorer SMARSH  Note: iMessage must be disabled on iPhones to force text messaging via SMS through the Verizon carrier. Text messaging in iPads via iMessage is not to be used.	Allowed	Limited	Enterprise Architecture

**29. Operational Support Tools**

Item	Standard Description	Standard Category	Support Level	BTS Owner
<b>29.1.</b> Work Order Ticketing	Cherwell	Standard	Full	Support Center / SET
<b>29.2.</b> Software Distribution	Altiris Client Management Suite	Standard	Full	
<b>29.3.</b> Workstation Remote Control	ABomgar	Standard	Full	
<b>29.4.</b> Automated Inventory	Altiris Client Management Suite (desktop) SNOW License Manager 7 (server)	Standard	Full	
<b>29.5.</b> Asset Inventory	Altiris Asset Management	Standard	Full	
<b>29.6.</b> Server Remote Control	Microsoft Remote Desktop Services (RDS)	Standard	Full	Production Services / Server Support
<b>29.7.</b> Monitoring	Toad for Oracle DBA V11	Standard	Full	Production Services / Database Administration
	Microsoft SCOM Oracle OEM/Grid Control OpManager Server Studio SQL Server Management Studio 2008, 2008 R2, 2012, 2014, 2016 VMware vROPs	Standard	Full	Production Services / Server Support & Database Administration

Item	Standard Description	Standard Category	Support Level	BTS Owner
	Brocade Network Advisor Hitachi Tuning Manager HVSR	Standard	Full	Production Services / Storage Administration
	Cacti NetDisco OpenNMS PAESSLER PRTG Network Monitoring (Police) 17.1 Sitescope SolarWinds GrayLog (syslog) WMI	Standard	Full	Communications / Network Engineering and Support

### 30. Project Management Tools

Item	Standard Description	Standard Category	Support Level	BTS Owner
30.1. Project Management Software	Microsoft Project 2016 Project 2016 Click-to-Run Perpetual License  Notes: <ul style="list-style-type: none"> <li>With Office 365 2016, Microsoft blocks installation of Office 365 2016 simultaneous with the shrink-wrap version of Project 2016. If Project 2016 is to be used, the subscription version must be installed. Project 2013 or 2010 may be installed simultaneously.</li> </ul>	Standard	Full	Project Management Office
	Microsoft Project 2010, 2013  Notes: <ul style="list-style-type: none"> <li>as of 6/11/2013 BTS adopted a policy to allow owners of 2010 or 2013 versions to install and use those versions through their lifecycle.</li> </ul>	Legacy	Full	
30.2. Project Portfolio Management (PPM) Software	Innotas PPM	Standard	Full	

### 31. Server Base Software

Item	Standard Description	Standard Category	Support Level	BTS Owner
31.1. Operating System	Windows Server 2012 R2 64-bit Windows Server 2016 64-bit	Standard	Full	Production Services / Server Support
	Windows Server 2008, 2008R2, 2012	Legacy	Full	
	Red Hat Enterprise 7.x	Standard	Full	
	Red Hat Enterprise 6.x;	Legacy	Full	
	AIX 8.x AIX 7.x	Standard	Full	

Item	Standard Description	Standard Category	Support Level	BTS Owner
	AIX 6.x	Legacy	Full	
<b>31.2.</b> Base Software (Windows)	MS IE 11 Windows Remote Desktop McAfee Snow	Standard	Full	
	MS IE 8, 9, 10	Legacy		
<b>31.3.</b> Virtualization Hypervisor	VMWare VSphere 6 IBM VIO	Standard	Full	

**32. Source Code Control System**

Item	Standard Description	Standard Category	Support Level	BTS Owner
<b>32.1.</b> Source Control	Subversion/VisualSVN 2.1.10 TortoiseSVN 1.6.16 AnkhSVN 2.1 Visual SourceSafe 2005 git	Standard	Full	Business Solutions
	Visual SourceSafe 6.0	Legacy	No Support	

**33. Web Tools**

Item	Standard Description	Standard Category	Support Level	BTS Owner
<b>33.1.</b> Content Management and Page Development Tools	DreamWeaver City Site / Content Management Tool (Portland Online) Eclipse	Standard	Full	Business Solutions
	Cold Fusion Studio	Legacy	Full	
<b>33.2.</b> Site Management Tools	DreamWeaver	Standard	Full	
<b>33.3.</b> Runtime Environment Tools	ColdFusion Server MX Java SQL Server Reporting Services 2008, 2008 R2	Standard	Full	



Item	Standard Description	Standard Category	Support Level	BTS Owner
<b>33.4.</b> Web Application Development	Visual Studio 2017 Cold Fusion Studio Oracle J Developer Eclipse	Standard	Full	
<b>33.5.</b> HTML Version	HTML 4.0	Standard	Full	
<b>33.6.</b> Scripting Languages	PERLVBScript.NetJavaScriptColdFusion Python 2.5, 3.x	Standard	Full	
<b>33.7.</b> Video Encoding	Real Producer	Legacy	Full	
<b>33.8.</b> Web Server	Microsoft IIS 7.0Apache 2.2	Standard	Full	
	Microsoft IIS 5.0, 6.0Apache 1.x	Legacy	Full	
<b>33.9.</b> Web Browser	Microsoft Internet Explorer	Standard	Full	Support Center
	Chrome (with current update)	Allowed	Limited	

**34. Workstation Software**

Item	Standard Description	Standard Category	Support Level	BTS Owner
<b>34.1.</b> Operating System	Windows 7 SP1 Windows 10 Versions 1703	Standard	Full	Support Center / Software Standards Panel
<b>34.2.</b> Base Software	Adobe Reader DC Windows Media Player 11 McAfee VirusScan 8 (with current update) Adobe Flash Player 12 (with current update) Microsoft DirectX 11 Internet Explorer 11 .Net framework 1.1, 2.0 SP2, 3.0 SP2, 3.5 SP1, 4.0 Java 8 (with current update) SAP GUI 7.4 Silverlight	Standard	Full	
	Adobe Reader X, XI Cyberlink Power DVD (OEM) Internet Explorer 9 Java 6, 7 Nero Express (OEM)	Legacy	Full	
<b>34.3.</b> MS Office Suite	MS Office 365 ProPlus 2016 / 32-bit via Office 365 subscription (Word, Excel,	Standard	Full	

Item	Standard Description	Standard Category	Support Level	BTS Owner
	PowerPoint, Access, OneNote, Publisher, Skype for Business, OneDrive for Business)			
	MS Office 2007, 2013	Legacy	Full	
Police	MS Office 2013	Standard	Full	
<b>34.4.</b> eMail Client	MS Outlook 2016	Standard	Full	
	MS Outlook 2007, 2013	Legacy	Full	
Police	MS Outlook 2013	Standard	Full	
<b>34.5.</b> Media Player	Windows Media Player 11 VLC Client	Allowed	Full	
<b>34.6.</b> CD/DVD Creation	Windows built-in	Standard	Full	
	Roxio Creator (OEM)	Legacy	Full	
<b>34.7.</b> Workstation Database	See Database Standards, page 24.			
<b>34.8.</b> Firewall	Windows Firewall	Standard	Full	Information Security
<b>34.9.</b> Password Safe	KeepPass	Allowed	No Support	Information Security
<b>34.10.</b> ZIP File Compression	Windows 7 built-in Zip utility 7-Zip	Allowed	No Support	Support Center / Software Standards Panel

# Security Technology Standards

## 35. Authentication

Item	Standard Description	Standard Category	Support Level	BTS Owner
35.1. Windows	Kerberos	Standard	Full	Information Security
35.2. Two-Factor	RSA Secure ID	Standard	Full	
35.3. Single Sign On (Police)	Imprivata OneSign	Standard	Full	
35.4. WiFi	Authentication Protocols EAP-TLS , PEAP Certificate provisioning: Autoenrollment via AD	Standard	Full	
35.5. RADIUS	Cisco ISE	Standard	Full	Communications / Network Engineering and Support

## 36. Encryption

Item	Standard Description	Standard Category	Support Level	BTS Owner
36.1. Data Storage	AES	Standard	Full	Information Security
	3DES	Legacy	Full	
36.2. Web Traffic	TLS 1.2	Standard	Full	
	External facing certificates: Verisign Secure Site, Secure Site Pro	Standard	Full	
	Internal facing certificates only: Internal Certificate Authority, Verisign	Standard	Full	
	Secure Sockets Layer (SSL v3), TLS 1.0	Legacy	Full	
36.3. Secure FTP	SFTP (FTP over SSH)	Standard	Full	
36.4. WiFi Networks (transport)	WPA2 802.11i	Standard	Full	

**37. Patch Management**

Item	Standard Description	Standard Category	Support Level	BTS Owner
37.1. Workstation	Altiris Patch Management Windows Update for Business	Standard	Full	Support Center / SET
37.2. Server	Shavlik Protect	Standard	Full	Production Services / Server Support
	Windows Software Update Service (WSUS, Police)	Standard	Full	Police IT

**38. Remote Network Access**

Item	Standard Description	Standard Category	Support Level	BTS Owner
38.1. VPN Appliance	Pulse SA (PSA) RadiolP (Fire, Comm)	Standard	Full	Information Security
	NetMotion (Police)	Standard	Full	Police IT
38.2. Client VPN Software (IPSec)	NetMotion Client (Police)	Standard	Full	Police IT

**39. Storage Services and Devices**

**Storage Services Note:**

City restricted and confidential information is strictly forbidden from unsecured storage sites. All City confidential information must be encrypted during collection, transfer, distribution, storage and disposal.

**40. Virus Protection**

Item	Standard Description	Standard Category	Support Level	BTS Owner
40.1. Workstation	McAfee VirusScan Enterprise 8 (with current update)	Standard	Full	Support Center
40.2. Server	McAfee	Standard	Full	Production Services
40.3. External Mail				
40.4. Internal Mail	McAfee	Standard	Full	
40.5. Console	McAfee ePO	Standard	Full	



# Commodity Hardware and Software

This section describes hardware and software that may be purchased directly by City staff from the City's recommended suppliers without intervention from BTS.

Some items have conditions attached in order for them to function more effectively within the City's infrastructure. While BTS is not strictly enforcing the conditions, it is highly recommended that the conditions be adhered to.

## ***Computer Speakers***

### ***Digital Cameras***

- Minimal technical support is provided by BTS.
- USB interface required. Minimum USB 2.0. USB cables may not be provided by the vendor and need to be purchased separately.
- Support from BTS is not part of the SLA and will be billable.
- Any bundled software must be Windows 7 compatible. There is no support from BTS for bundled software.
- Be careful about what bundled software is loaded by default. Load only what is needed.

## ***Fax Machines***

### ***Flash / Compact Media cards***

### ***Headphones***

### ***Keyboards***

- USB Interface required. Minimum USB 2.0.

## ***Laser Printer Toner Cartridges***

### ***Locally connected USB Printers***

- **BTS encourages the use of standard network attached printers rather than locally attached InkJet or Laser printers.**
- BTS has evaluated two different USB connected HP OfficeJet printers for different business needs. The OfficeJet 7000 series offers color, large format (11x17) capability. The OfficeJet Pro 8100 series offers color, standard format capability (letter, legal), is expandable for scanning, copying and faxing, and is supported by the City's standard Universal Print Driver from HP.
- USB interface required. Minimum USB 2.0. USB cables may not be provided by the vendor and need to be purchased separately.
- Support from BTS is not part of the SLA and will be billable. **Note: Installations on Windows 7 requiring BTS assistance and will be billable.**

- For locally attached use to a single computer only. BTS will not network these devices.

### ***Mouses / Track-balls***

- This includes Optical, multi-button with scroll wheels, track balls.
- USB interface required. Minimum USB 2.0.

### ***Removable Media (USB Storage devices, CDs, DVDs)***

- USB Storage Devices should be used for temporary storage or file transfer and not for long term offline file storage.
- Removable media are not appropriate for storing record copies of City records.
- Bureaus are responsible to follow established Administrative Rules regarding the use of removable media.
  - [ADM-8.12 - Management, Preservation and Storage of Electronic Records and Electronic Mail Correspondence \(E-Mail\)](#).
- This category is for devices used with non-sensitive data. Encryption strategies for sensitive data requirements must be discussed with BTS Information Security and adhere to Administrative Rule [BTS-2.15 - Encryption](#).
- Devices chosen should operate with standard built-in operating system (Windows) drivers and not require customized drivers.
- Minimum version of USB is 2.0.
- Be aware of potential compatibility problems between CD and DVD media formats.

# Technology Specifications

This section documents the minimum specification used to select the approved standards. Not all standards have associated specifications. This is because some listed standards are documentation of best practice.

## ***Workstation Standard Criteria***

The base component criteria for standard desktop and laptop workstations is as follows.

### Preferred Desktop

- Intel® processor, 64-bit (i5).
- 8 GB RAM memory (Dual DIMM).
- Small to moderately sized hard drive used primarily for Operating System and application programs and associated configuration files. (500 GB)
- DVD +/- RW Optical single layer drive.
- On-board video card, dual monitor capable.
- 104 key keyboard.
- Optical wheel mouse.
- Minimum 100 Mb/s network interface card.
- Mid tower case.
- Energy Star 6.0 and EPEAT Gold compliant.
- Intel Standard Management with Active Management Technology (AMT)
- 3 year warranty.

Laptop criteria match desktop workstation criteria as close as possible with the following additions.

- Preferred
  - 256MB Solid State Drive (SSD)
  - On-board Intel HD Graphics 4400 video.
  - 14" LED HD display.
  - WiFi 802.11 ac/a/b/g/n 2x2 Wireless LAN + Bluetooth 4.0, supporting EAP-TLS and WAP2.
  - Docking bay.
  - Built-in camera and microphone.
  - Fingerprint reader.
  - Backlit Keyboard
- Ruggedized
  - weather proof, shock resistant.
- Ultra-lite
  - Intel® processor, 64-bit
  - 8 GB RAM
  - 256 GB Solid State hard drive.
  - WiFi 802.11 b/g/n supporting EAP-TLS and WAP2.



- WiMax support (optional).
- Bluetooth support (optional).
- Docking bay.

## **Mobile Data Computers (MDC)**

The MDC is a PC that has been physically adapted to a mobile, public safety environment. The recommended minimum hardware specifications are:

Representative Mfg. / Model	Any Intel Pentium-based Windows workstation such as: Panasonic, Data911, L3, etc.
Display	Minimum resolution: 800x600 with 1024x768 preferred
Processor Type / Speed	Intel Pentium / 1 .6 GHz Intel Pentium 2.6 GHz
Main Memory	1 GB recommended 8 GB recommended
Disk Storage	80 GB. Mapping may require more disk space, depending upon the layers.
Operating System Software	Windows 7 Enterprise SP1.

The Versadex MDC application is adapted for touchscreen use, so a touch-sensitive display was suggested, but not required.

It is commonly seen in two primary forms

- A ruggedized notebook
- A component-based, permanently mounted PC.

Network connectivity is achieved through carrier supplied 3G/4G cellular data networks.

**Network Printer Standard Criteria**

Attribute	Small / Medium Workgroup	Larger Workgroup	Large Format
Pages per minute	25 – 30	25 – 50	25 - 50
Minimum duty cycle per Month	3,000	15,000	10,000
Network Interface	Internal, 10/100 Mb/s, IPv4		
Page Size	Letter 8.5 x 11 Legal 8.5 x 14 No 10 Envelope	Letter 8.5 x 11 Legal 8.5 x 14 No. 10 Envelope	Letter 8.5 x 11 Legal 8.5 x 14 Tabloid 11x 17 No. 10 Envelope
Page definition language	PCL 5 Postscript		
Memory	32 MB	96 MB	128 MB
Display	LCD Panel for on-site configuration		
Driver	Microsoft certified for installation on Windows 2008 Server by listing at <a href="http://www.windowsservercatalog.com/ready.aspx">http://www.windowsservercatalog.com/ready.aspx</a> . Supported device for HP Universal Print Driver.		
Duplexing	Yes		
Trays	1 trays plus multipurpose tray.	2 trays plus multipurpose tray.	2 trays plus multipurpose tray.
Envelope Feeder	Optional	Optional	
Compatible with 100% Recycled paper	Yes		
Color	Option for Black and White or Color models		
Energy Star	Yes		

**Network Printer Specifications (B/W)**

Feature	M402dne	M506dn	M604	M605	M712dn High Volume Large Format
Print Speed-Black (ppm: pages / minute)	40	45	52	58	40
Print Resolution (dpi: dots per inch)	1200 x 1200	1200 x 1200	1200 x 1200	1200 x 1200	1,200 x 1,200
Monthly duty cycle (pages)	80,000	150,000	175,000	225,000	200,000
Recommended monthly duty cycle	750-4,000	2,000-7,500	5,000-13,000	5,000-16,000	15,000-50,000
Memory: Standard	256 MB	512 MB	512 MB	512 MB	128 MB
Memory: Max	256 MB	1.5 GB	1.5 GB	1.5 GB	512 MB
Paper Trays: Std	2	2	2	2	3
Paper Trays: Max	2	5	6	6	4
Duplex Printing	Auto/Std	Auto/Std	Auto/Std	Auto/Std	Auto/Opt
11 x 17 (Large Format)	No	No	No	No	Yes
Energy Star	Yes	Yes	Yes	Yes	Yes
HP ePrint	Yes	Yes	Yes	Yes	

**Network Printer Specifications (B/W Multi-Function)**

Feature	M225dn	M426fdn	M725dn Large Format
Print Speed-Black (ppm: pages / minute)	26	40	40
Print Resolution (dpi: dots per inch)	1200 x 1200	600 x 600	1200 x 1200
Monthly duty cycle (pages)	15,000	80,000	200,000
Recommended monthly duty cycle	500 -2,000	750-4,000	5,000-20,000
Memory: Standard	256 MB	256 MB	1 GB
Memory: Max	256 MB	256 MB	1 GB
Paper Trays: Std	2	2	3
Paper Trays: Max	2	3	4
Duplex Printing	Auto/Std	Auto/Std	Auto/Std
11 x 17 (Large Format)	No	No	Yes
Energy Star/EPEAT	Yes/Silver	Yes/Silver	Yes
HP ePrint	Yes	Yes	Yes
Scanner Type	Flatbed with Auto Doc Feed	Flatbed with Auto Doc Feed	Flatbed with Auto Doc Feed
Max Scan Resolution (dpi)	1,200	1,200	600
Scan Speed (ppm)	6 color 15 B/W	21 color 26 B/W	30 color 43 B/W
Scan size	8.5x11 flat 8.5x14 doc feed	8.5x11 flat 8.5x14 doc feed	11 x 17
Copy Resolution	600 x 600	600 x 600	600 x 600
Copy reduce/enlarge	25-400%	25-400%	25-400%
Fax Resolution	300 x 300	300 x 300	600 x 600

**Network Printer Specifications (Color)**

Feature	M452	CP5225 Large Format	M553	M651	M750 Large Format	M855 Large Format
Print Speed-Black / color (ppm:pages / minute, normal quality)	28 / 27	20 / 20	40 / 40	42 / 42	30 / 30	45 / 45
Resolution (dots per inch)	600 x 600	1200 x 1200	HP ImageREt 3600	1200 x 1200	600 x 600	1200 x 1200
Monthly duty cycle (pages)	50,000	75,000	80,000	120,000	120,000	175,000
Recommended monthly duty cycle	750-4,000	1,500-5,000	6,000	2,000-17,000	2,500-10,000	4,000-17,000
Memory: Standard	128 MB	192 MB	1 GB	1.5 GB	1 GB	1 GB
Memory: Max	128 MB	448 MB	2 GB	1.5GB	1 GB	1 GB
Paper Trays: Std	2	2	2	2	3	5
Paper Trays: Max	3	3	5	5	6	5
Duplex Printing	Auto/Std	Auto/Std	Auto/Std	Auto/Std	Auto/Std	Auto/Std
11 x 17 (Large Format)	No	Yes	No	No	Yes	Yes
Energy Star / EPEAT	Yes	Yes	Yes/Silver	Yes	Yes	Yes

**Network Printer Specifications (Color, Multi-Function)**

Feature	M477fdn
Print Speed-Black / color (ppm:pages / minute, normal quality)	28 / 28
Resolution (dots per inch)	600 x 600
Monthly duty cycle (pages)	50,000
Recommended monthly duty cycle	750-4,000
Memory: Standard	256 MB
Memory: Max	256 MB
Paper Trays: Std	2
Paper Trays: Max	3
Duplex Printing	Auto/Std
11 x 17 (Large Format)	No
Energy Star / EPEAT	Yes
Scanner Type	Flatbed with Auto Doc Feed (ADF)
Max Scan Resolution (dpi)	1200 x 1200
Scan Speed (ppm)	B/W: 26 ppm / 47 ipm Color: 21 pm / 30 ipm
Scan size	Flatbed: 8.5x11 ADF: 8.5x14
Copy Resolution	600 x 600
Copy reduce/enlarge	25-400%
Fax Resolution	300 x 300

### **Scanner Standard Criteria**

Scanner criteria are based on the needs of image scanning as specified by the SAP implementation project.

<b>Type</b>	<b>Native Resolution</b>	<b>Speed (BW)</b>	<b>Max scan size</b>	<b>Connectivity</b>	<b>Type</b>	<b>Doc Feed</b>
Low Volume	300 x 300 dpi	10 ppm	8 ½ x 14	USB 2.0	Flatbed or Sheet fed	Std 50 sheet.
Medium Volume	300 x 300 dpi	20 ppm, 40 ipm dup	8 ½ x 14	USB 2.0	Flatbed or Sheet fed	Std 50 sheet.

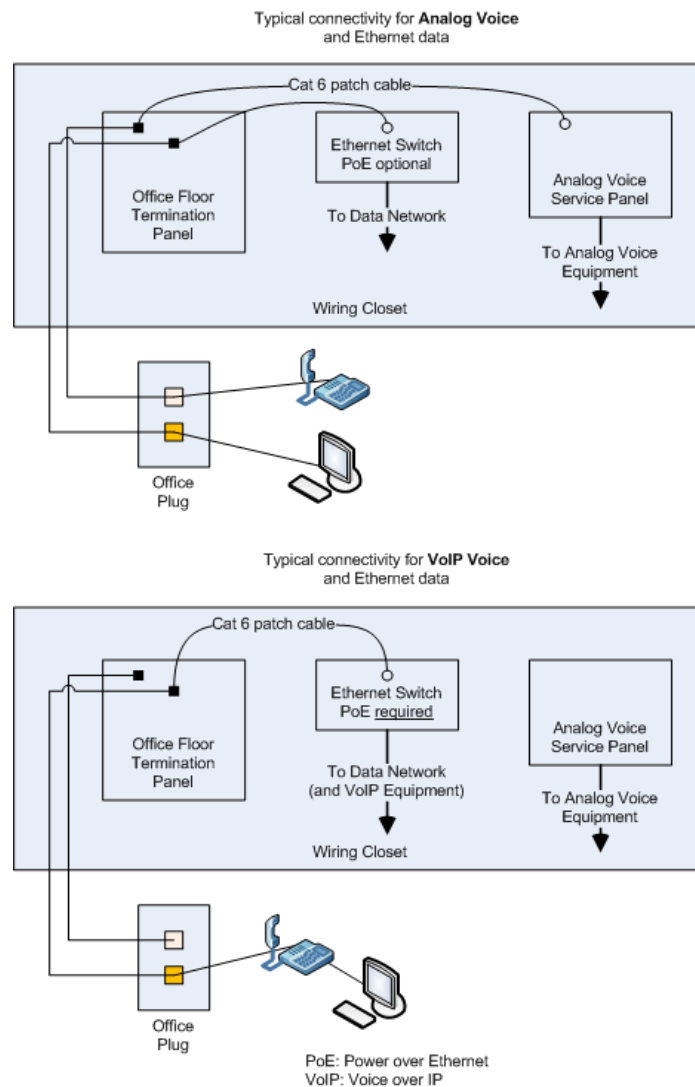
## Cabling Specification

### New Construction

In new construction scenarios, BTS has determined that installing two (2) Category 6 cables are generally sufficient to connect typical computer and telephone equipment found in an office or cubicle. Wiring closet configuration will generally conform to the following block diagram.

### Remodel

In remodel scenarios, BTS will evaluate the existing cabling and wiring closets in order to determine and recommend the most cost effective method of cabling the remodeled space that meets the customer business need while preserving maintainability of the underlying infrastructure in the wiring closet. This may not always result in a reduced cable count to the office or cubicle.



## Video Projector Criteria

Attribute	Ultra Portable	Portable	Ceiling Mounted
Resolution	1024 x 768 (XGA/HDMI)	1024 x 768 (XGA/HDMI)	1024 x 768 (XGA/HDMI)
Brightness	Minimum 2500 Lumens	Minimum 2500 Lumens	Minimum 100 Lumens / sq ft of Screen
Remote Control	Optional	Optional	Yes
Zoom Lens	Yes	Yes	Yes
Focus	Manual	Manual	Powered via Remote Control
Video Input	VGA	VGA	VGA
Color	16.7 million	16.7 million	16.7 million
Weight	≤ 4 lbs ("light as possible")		

### Considerations for Ceiling Mounted Projectors

When mounting a projector to the ceiling, the projector, screen size and ambient room light must be considered together. The Brightness for a Ceiling Mounted projector is expressed as a minimum lumens per square foot of screen area, where lumens is the rated lumen output of the projector. The higher the value, the easier the image will be to see. On a reflective screen, 100 lumens / sq ft will yield an image that is visible in standard windowless conference room lighting. Uncovered windows or projecting on other surfaces such as a wall may require a higher value of lumens per square foot. A value of 125 lumens / sq ft should be considered.

Care must also be taken with the placement of the screen in relationship to ceiling lights and windows. A ceiling light directly over the screen will wash out the image regardless of its brightness. Electrical modifications may be necessary in order to turn "problematic" lights off when projecting. Similarly, window light can also wash out the screen image and blinds may be necessary to achieve acceptable viewing.



# Update Log

Changes to the document since adoption.

Date	Item	Standard Description	Category / Support Level
9/12/17	15.8 USB Wireless Cellular Data Modem	730L 620L	Standard / Full Legacy / Full
10/10/17	14.6 Smartphone Operating System	11.0.3 10.x, 11.0.2	Standard / Full Legacy / Full
	26.5 Computer Aided Design	Sketchup Pro Sketchup Make	Allowed / Not Supported
10/24/17	14.5 Smartphone	iPhone 8, 8 Plus iPhone 5, 5c	Standard / Limited Legacy / Limited
11/1/17	40.3 External Mail Virus Protection	Kaspersky	Removed
	28.4 Kiosk Miscellaneous Tools	Microsoft Steady State	Removed
	14.5 Smartphone	iPhone 7, 7 Plus	Legacy / Limited
11/21/17	10.1 Laser Printers	M607dn, M608dn, M653dn M604dn, M605dn, M651dn	Standard / Full  Legacy / Full
	14.6 Smartphone Operating System	11.1.2 11.0	Standard / Full Legacy / Full
	26.3 Graphic Design	Microsoft Movie Maker	Removed
2/6/18	33.6 Scripting Languages	Python 3.x	Standard / Full
	14.6 Smartphone Operating System	11.2.2 11.1	Standard / Full Legacy / Full
	26.2 PDF Creation	PDFCreator 3.1	Allowed / Limited
	34.1 Workstation Software Operating System	Windows 10 Version 1703 Windows 10 Versions 1511, 1603, 1607	Standard / Full  Removed
3/6/18	16.2 Projector, Portable	Infocus 116xa Infocus 116x	Standard / Full Legacy / Full
4/3/18	26.2 PDF Creation	PDFCreator	Legacy / Limited
	10.1 Laser Printer	HP 608x HP 605x	Standard / Full Legacy / Full
	28.9 Terminal Emulation (3270)	Micro Focus Reflection Desktop 2016	Allowed / Limited

Date	Item	Standard Description	Category / Support Level
		Attachmate Extra Xtreme	Legacy / Not Supported
	13.8 File Sharing	HCP Anywhere	Standard / Full
5/15/18	14.6 Smartphone Operating System	11.3.1 11.2	Standard / Full Legacy / Full
	3.1 Tablet Hardware	iPad 6	Standard / Limited
5/29/18	26.1 Visual Diagramming	Visio 2016 Click-to-Run Perpetual License	Standard / Full
	30.1 Project Management Software	Project 2016 Click-to-Run Perpetual License	Standard / Full
	31.1 Server Operating System	Windows Server 2016 64-bit	Standard / Full
	14.11 Cellular Micro Cell	Verizon Network Extender Appliance	Standard / Full
6/14/18	18.5 Reporting Tool – All Tableau product purchases on hold pending product review.		

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