

# Technology Standards Directory



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

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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 [City of Portland's web site](#), on the [BTS Technology Standards page](#), updated as necessary and reviewed in accordance with the cycles established herein.

## 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 Classification

This document classifies Technology Standards as follows.

<b>Classification</b>	<b>Description</b>
<b>Standard</b>	This classification represents the current accepted technology for general installation within the City technology environment. Technologies in this classification 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 classification 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 classification 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. Some are listed in this document for clarity.

**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 model.

## Support Model

BTS has established five standardized support models:

<b>Support Model</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.

<b>BTS Support Model</b>	<b>Full Support</b>	<b>Vertical Apps Support</b>	<b>Limited Support</b>	<b>Bureau / Vendor Support</b>	<b>No Support</b>
<b>Support Model Code (used in the tables)</b>	<b>Full</b>	<b>V.Apps</b>	<b>Limited</b>	<b>Bureau</b>	<b>No Support</b>
<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	BTS	BTS
<b>Install the product</b> (hardware and software) – Install the product on a server or workstation.	BTS	BTS	BTS	Bureau	Bureau
					No
<b>Security Standards</b> – Evaluate, implement, and periodically review related security standards.	BTS	BTS	BTS	BTS	BTS
<b>Software Install Point</b> – Create a network location to house the software installation package.	BTS	BTS	Negotiated	Negotiated	No
<b>Configure features</b> of the product – Perform standard product configuration steps that are required.	BTS	BTS	Bureau	Bureau	Bureau
			Billable		No
<b>De-install the product</b> – De-install the product, ensuring that remaining interfaces, security, configuration, etc. are intact.	BTS	Bureau	BTS	Bureau	Bureau
					No
<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	Bureau
			Billable		No
<b>Track updates and patches</b> to the product – 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	Bureau
<b>Apply updates and patches</b> – Periodically package, distribute and/or implement updates and patches.	BTS	BTS	Bureau	Bureau	Bureau
			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</b> for in-house SW – 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 Model table entries:**

- BTS** BTS is responsible for the support service. The service is not billable.
- Bureau** The Bureau is responsible or may opt for the support service. Supplemental BTS assistance is billable or not available as indicated.
- 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 criterion considered when selecting standards. As standards are selected, energy efficient products that meet the business needs and integrate with other established standards and infrastructure 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 G](#))

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<sup>1</sup> products registered at the “Bronze” level or higher:

1. Desktop computers
2. Displays (Monitors) – under 60-inch diagonal
3. Laptop computers
4. Tablet computers
5. Servers
6. Mobile Phones
7. Printers
8. Scanners

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.

	Energy Star®
	EPEAT Gold
	EPEAT Silver
	EPEAT Bronze

## 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

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<sup>1</sup> For reference see <https://greenelectronicscouncil.org/epeat/epeat-overview/>.

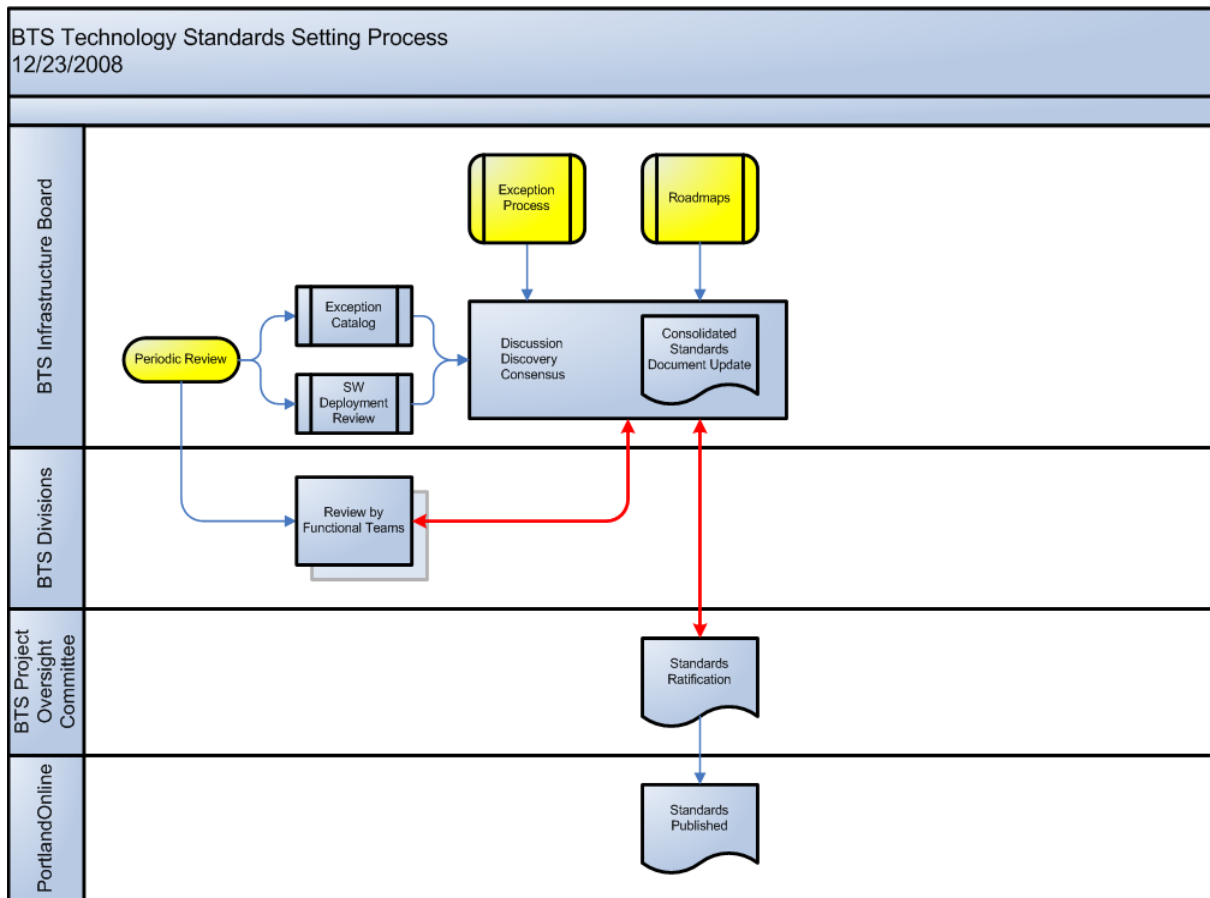
- working collaboratively within BTS to help establish important lifecycle dates and roadmap strategies.
- identifying when items need to be removed from the Legacy status.
- coordinating testing of products unless otherwise designated through a larger project.

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 Assitive Technologies

Several products have been included for use as ADA assitive technologies. These products have been identified in the document with the **[ADA]** tag. These products are also listed under the **ADA** index entry.













BTS worked with BHR to develop the list. The products were identified through discussion with external agencies such as Oregon Commission for the Blind, and review of products currently in use within the City infrastructure. While not an exhaustive list, it represents products thought to be most commonly used.

By including these products in the BTS Standards Directory, the need to submit an exception is eliminated, thereby streamlining the processes for acquisition.



# Hardware Standards

## 1. Workstation Hardware

Item	Standard Description	Standard Classification	Support Model	BTS Owner
1.1. Desktop	Dell OptiPlex 7070  	Standard	Full	Support Center / Hardware Standards Panel
	Dell OptiPlex 755, 960, 780, 790, 7010, 7020, 7040, 7050, 7060	Legacy	Full	Support Center / Hardware Standards Panel
1.2. Monitor	Dell - Flat Panel LCD P1917S 19" standard screen   P2214H 22" widescreen   U2415 24" widescreen   U2717D 27" widescreen   UP3017 30" widescreen  	Standard	Full	Support Center / Hardware Standards Panel
	Dell P190S 19" standard screen P1913S 19" standard screen P1914S 19" standard screen P2210 22" widescreen P2212H 22" widescreen U2410 24" widescreen U2412M 24" widescreen U3014 30" widescreen	Legacy	Full	Support Center / Hardware Standards Panel
1.3. Keyboard	USB, 104-key	Standard	Full	Support Center / Hardware Standards Panel
1.4. Mouse	USB, optical wheel	Standard	Full	Support Center / Hardware Standards Panel
1.5. <b>[ADA]</b> Braille Display / Terminal	Freedom Scientific (Focus Blue) HumanWare (Bralliant)	Allowed	Limited	Enterprise Architecture

### Workstation and Laptop Hardware Notes:













#### Life Cycle Notes:



- 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.
- 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.
- LCD panel monitors have a longer life cycle are typically run until failure.

**Portland Building Expectations:**




- For Portland Building Occupants, please note that there are restrictions on allowed monitors.
- Please submit questions and comments regarding the Portland Building via the [Project's TrackIT form](#).

**2. Laptop Hardware**

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>2.1. Laptop</b>	Dell Latitude 5400 (w/WebCam)  	Standard	Full	Support Center Hardware Standards Panel
	Dell Latitude 5490, 5480, D6xx, E5440, E5450, E5470, E64xx, E65xx	Legacy	Full	Support Center Hardware Standards Panel
<b>Police</b>	Dell Latitude 5400  	Standard	Full	Support Center Hardware Standards Panel
	Dell Latitude 7490, 7480, E7440, E7450, E7470	Legacy	Full	Support Center Hardware Standards Panel
<b>2.2. Laptop – “Lite”</b>	Dell Latitude 5300  	Standard	Full	Support Center Hardware Standards Panel
	Dell Latitude 7390, D4xx, 7280, E4200, E62xx, E7240, E7250, E7270	Legacy	Full	Support Center Hardware Standards Panel
<b>2.3. Laptop – “Rugged”</b>	GETAC B300  	Standard	Full	Support Center Hardware Standards Panel
	Dell Latitude E64xx XFR, 64xx ATG & XFR, D630 ATG, ATR & XFR	Legacy	Full	Support Center Hardware Standards Panel
<b>Police Fire PBEM</b>	GETAC V100   GETAC S400   Panasonic Toughbook PDRC (dash mounted monitor and wired keyboard)	Standard	Full	Support Center Hardware Standards Panel
	Motorola MW520, Panasonic Toughbook (19,32, 53)	Legacy	Full	Support Center Hardware Standards Panel

Item	Standard Description	Standard Classification	Support Model	BTS Owner
2.4. Mobile Data Computer – Fire	Panasonic Toughbook GETAC B300  	Standard	Full	Support Center Hardware Standards Panel
	Data 911 M6, M6 II, PM2, PM1, ETX-PM1, 19	Legacy	Full	Support Center Hardware Standards Panel

### 3. Tablet Hardware

Item	Standard Description	Standard Classification	Support Model	BTS Owner
3.1. iOS <sup>2</sup>	Apple iPad 12.9” Gen 3  , iPad Air 3 (10.5”)  , Mini 5  , with Verizon data plan	Standard	Full	Communications Telcom Engineering and Support
	Apple iPad 2, 3, 4, 6, 10.5”, iPad Pro 11, iPad Pro 12.9” Gen 2, Mini, Mini 2, 3, 4 Air, Air 2	Legacy	Limited	Communications Telcom Engineering and Support
3.2. Windows 10	Microsoft Surface Pro 4 (Wi-Fi only)	Standard	Limited	Support Center Hardware Stds. Panel
Police	Panasonic Toughpad FZ-G1	Legacy	Full	Police

#### Tablet Hardware Notes:



- iPads may be purchased without a data plan, however BTS requires that both Wi-Fi 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

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

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.**

#### 4. Server Hardware

Item	Standard Description	Standard Classification	Support Model	BTS Owner
4.1. Windows based	Dell, PowerEdge R630, R730, R740 	Standard	Full	Production Services / Server Support
	Dell PowerEdge R900, R610, R620 R710, R720, R910, 2950 III, 1950 III, 1950, 2950.	Legacy	Full	Production Services / Server Support
4.2. Red Hat based	Dell PowerEdge R630, R730, R740 	Standard	Full	Production Services / Server Support
	Dell PowerEdge R900, R610, R620, R710, R720, R910, 2950 III, 1950 III, 1950, 2950	Legacy	Full	Production Services / Server Support
4.3. AIX based	IBM p-Series / Power 9	Standard	Full	Production Services / Server Support
	IBM p-Series / Power 8	Legacy	Full	Production Services / Server Support

#### Server Hardware Notes:

- The planned lifecycle for server hardware is 5 years.

#### 5. Data Center Infrastructure

Item	Standard Description	Standard Classification	Support Model	BTS Owner
5.1. Environmental Monitors	Raritan	Standard	Full	Production Support
	APC	Legacy	Full	Production Support

Item	Standard Description	Standard Classification	Support Model	BTS Owner
5.2. Infrastructure Management Software	Raritan Sunbird PowerIQ, DCIM Raritan Command Console (KVM)	Standard	Full	Production Support
	APC StruXureware	Legacy	Full	Production Support
5.3. Rack Power Distribution Unit (PDU)	Raritan	Standard	Full	Production Support
	APC	Legacy	Full	Production Support
5.4. Remote Keyboard Video, Mouse (KVM)	Raritan KVM over IP	Standard	Full	Production Support
5.5. Uninterruptible Power Supply (UPS)	APC	Standard	Full	Production Support

## 6. Network Protocols

Item	Standard Description	Standard Classification	Support Model	BTS Owner
6.1. eMail	SMTP, TLS	Standard	Full	Communications / Network Engineering and Support
6.2. Line Negotiation Server	Auto / Auto	Standard	Full	Communications / Network Engineering and Support
6.3. Line Negotiation Workstations	Auto / Auto	Standard	Full	Communications / Network Engineering and Support
6.4. Monitoring	SNMP V2c, SNMP v3, VMI	Standard	Full	Communications / Network Engineering and Support
6.5. Power Over Ethernet (POE)	802.3af, 802.3at	Standard	Full	Communications / Network Engineering and Support
6.6. Routing	OSPF, BGP4, EIGRP	Standard	Full	Communications / Network Engineering and Support

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>6.7. Transport</b>	TCP / IP (IPv4, IPv6)	Standard	Full	Communications / Network Engineering and Support
<b>6.8. Wide Area Network (WAN)</b>	TDM, ISDN, DSL, IEEE802.3, Licensed wireless	Standard	Full	Communications / Network Engineering and Support
<b>6.9. Wi-Fi Radio</b>	802.11ac 802.11n (2.4 GHz / 5 GHz)	Standard	Full	Communications / Network Engineering and Support
	802.11b/g	Legacy	Full	Communications / Network Engineering and Support

## 7. Network Connectivity

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>7.1. Cabling</b>	<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 <a href="#">Specifications section</a>.</p> <p>New construction: – two Cat 6A or better cables per cubicle. May be used for either voice or data as needed.</p> <p>Remodel – Will be evaluated case by case due to other constraints.</p>	Standard	Full	Communications / Network Engineering and Support
<b>7.2. Optical Network</b>	SONET (STS), DWDM (ITU-T, G.709 & G.975), Cisco 15454, 15310	Standard	Full	Communications / Network Engineering and Support

## 8. Network Routers

Item	Standard Description	Standard Classification	Support Model	BTS Owner
8.1. Router – Layer 3 Switch	Cisco ME-3400eg, ME-3600X, 3850, ISR4321, ISR4331, cat9k, ASR920, ASR1002. Arista 7050, 7280	Standard	Full	Communications / Network Engineering and Support
	Cisco 1841, 1921, 1941, ME-3400e, 3750, 3750-X, 7206	Legacy	Full	Communications / Network Engineering and Support
8.2. Components	Cisco T1 DSU/CSU WICS	Standard	Full	Communications / Network Engineering and Support
	4-port Ethernet Card	Legacy	Full	Communications / Network Engineering and Support

## 9. Network Switches

Item	Standard Description	Standard Classification	Support Model	BTS Owner
9.1. Layer 2 Switch	Arista 7150 Cisco 2960, 3560, 4500-x HPE Aruba 8400, 2530 series Juniper ACX & MX Switch Router	Standard	Full	Communications / Network Engineering and Support
	Cisco 2950 (DC), 2960C, 3750, 3750-X, ME-3400e	Legacy	Full	Communications / Network Engineering and Support
9.2. Components	SFP connectors, SFP+, QSFP	Standard	Full	Communications / Network Engineering and Support

## 10. Plotters

















### Plotter Support 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.

















**Portland Building Expectations:**

- For Portland Building Occupants, Bureau-owned plotters can only be placed in the Large Print Room on a bureau’s floor. Plotter requirements:
  - Inkjet or toner
  - Up to 7 feet long and 3 feet, 2 inches deep
  - Access on front side only
  - Will replace a multi-function device (copier) in the print room
  - Will not be connected to the enterprise print management system
  - Note that no space is available for a separate free-standing paper cutter
- Please submit questions and comments regarding the Portland Building via the [Project’s TrackIT form](#).

**11. Printers (Network)**

Item	Standard Description	Standard Classification	Support Model	BTS Owner
11.1. Laser	<p><u>Monochrome:</u></p> <p>HP M404dn  </p> <p>HP M507dn  </p> <p>HP M607dn  </p> <p>HP M608dn  </p> <p>HP M608x  </p> <p><u>Color:</u></p> <p>HP M454dn  </p> <p>HP M553dn/x  </p> <p>HP M653dn  </p>	Standard	Full	Support Center Hardware Stds. Panel
	HP 700, 1320, 3505, 4350, 9050, CP3525, CP4525, CP6015, M401, M451, M506dn, M551, M601, M602, M604, M605, M651, P2055, P3015, P4015, M452dn, M402dne	Legacy	Full	Support Center Hardware Stds. Panel



Item	Standard Description	Standard Classification	Support Model	BTS Owner
11.2. Large Format Laser – 11x17	<u>Monochrome:</u> HP M712dn   <u>Color:</u> HP M751dn   HP M855xh   HP CP5225dn  	Standard	Full	Support Center Hardware Stds. Panel
	CP6015, 9050, HPM750dn	Legacy	Full	Support Center Hardware Stds. Panel
11.3. Small Multi-Function Laser	<u>Monochrome:</u> HP M227fdn   HP M426fdn   HP M725dn   <u>Color:</u> HP M479fdn  	Standard	Full	Support Center Hardware Stds. Panel
	HP M225, M425, M475, M476, CM1312, M1522, M1536, CM2320, M2727, M477fdn	Legacy	Full	Support Center Hardware Stds. Panel


## Printer Support Notes








### Portland Building Expectations:

- For Portland Building Occupants, please note that desktop printers are not allowed and there are limitations on supported network printers.
- Please submit questions and comments regarding the Portland Building via the [Project's TrackIT form](#).

Printer maintenance support for network laser printers is provided by contract with Pacific Office Automation. The bureau contacts POA directly.

## 12. Scanners

Item	Standard Description	Standard Classification	Support Model	BTS Owner
12.1. Workstation – Flatbed, Color	HP ScanJet 7500 	Standard	Full	Support Center Hardware Stds. Panel
	HP 8390, HP 8350, HP N8420, HP N8460	Legacy	Full	Support Center Hardware Stds. Panel

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>12.2. Workstation – Sheet-fed, Color</b>	Canon DR-225C   Canon DR-M160ii  	Standard	Full	Support Center Hardware Stds. Panel
	Canon DR-125C, DR-160, DR-2050C, DR-3080CII, DR-2010C, DR-4010C, DR-6010C	Legacy	Full	Support Center Hardware Stds. Panel
<b>12.3. Workgroup – Flatbed, Color, Network Attached</b>	HP ScanJet Pro 4500  	Standard	Full	Support Center Hardware Stds. Panel
	HP N6350, 7650n	Legacy	Full	Support Center Hardware Stds. Panel
<b>12.4. Large Format – 11x17</b>	Canon DR-6030C 	Standard	Full	Support Center Hardware Stds. Panel
	HP N9120 Canon DR-7090C	Legacy	Full	Support Center Hardware Stds. Panel

### Scanner Support Notes

**Portland Building Expectations:**

- For Portland Building Occupants, please note that desktop printers are not allowed and there are limitations on supported network printers.
- Please submit questions and comments regarding the Portland Building via the [Project’s TrackIT form](#).

### 13. Search Appliance

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>13.1. Search Appliance</b>	SwiftType SOLR	Standard	Full	Business Solutions / Web Development

### 14. Storage Area Network

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>14.1. Storage Array</b>	Hitachi Gx00 Hitachi HCP for Object Storage	Standard	Full	Production Services / Storage Administration
<b>14.2. SAN Fabric Network</b>	Fiber Channel Switch: Brocade DCX8510 Brocade 6520	Standard	Full	Production Services / Storage Administration

Item	Standard Description	Standard Classification	Support Model	BTS Owner
14.3. NAS Gateway	Hitachi HNAS	Standard	Full	Production Services / Storage Administration
14.4. NAS file System	CIFS, NFSv3	Standard	Full	Production Services / Storage Administration
14.5. SAN Replication	FCIP IPEX	Standard	Full	Production Services / Storage Administration
14.6. SAN Routing Protocol	FSPF	Standard	Full	Production Services / Storage Administration
14.7. SAN Transport Protocol	Fiber Channel	Standard	Full	Production Services / Storage Administration
14.8. File Sharing	HCP Anywhere – for two specific use cases Files larger than 15 GB Elevated security protocols	Standard	Full	Production Services / Storage Administration
14.9. NAS Replication Switch	Brocade 7840	Standard	Full	Production Services / Storage Administration

## 15. Telecommunications

Item	Standard Description	Standard Classification	Support Model	BTS Owner
15.1. <b>[ADA]</b> Compliant Handset	Cap Tel 840i	Standard	Full	Communication / Telecom Engineering and Support
15.2. Broadband Wireless	Del 5600 Gobi Mobile Broadband mini-card Verizon JetPack MiFi 8800L	Standard	Full	Communication / Telecom Engineering and Support
	Verizon USB 760 Verizon Aircard (EVDO) Verizon MiFi 4620LE Verizon MiFi MHS291L Verizon MiFi 620L Verizon MiFi 7730L	Legacy	Full	Communication / Telecom Engineering and Support
Police	Panasonic Sierra Wireless MC 7750 Panasonic Sierra Wireless EM 7355	Standard	Full	Communication / Telecom Engineering and Support

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>15.3. Cellular Micro Cell</b>	Verizon Network Extender Application	Standard	Full	Communication / Telecom Engineering and Support
<b>15.4. Pagers: Emergency</b>	1-Way: USA/Mobility, Cook	Standard	Full	Communication / Telecom Engineering and Support
<b>15.5. Pagers: Non-Emergency</b>	1-Way: USA/Mobility, Cook 2-Way: USA/Mobility	Standard	Full	Communication / Telecom Engineering and Support
<b>15.6. Satellite Phones</b>	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	Communication / Telecom Engineering and Support
<b>15.7. Smartphone <sup>3</sup></b>	iPhone 6s 📱, 6s Plus 📱, SE 📱, 7 📱, 7 Plus 📱, 8 📱, 8 Plus 📱	Standard	Full	Communication / Telecom Engineering and Support
	Samsung Galaxy S7	Exception Required	Limited	Communication / Telecom Engineering and Support
	Motorola Droid 3, 4 Motorola Droid X2 Motorola Droid RAZR M Motorola Galaxy S5 iPhone 4s, 5, 5c, 5s, 6, 6 Plus  <b>Note: Please see the document <a href="#">Apple Device Support Dates on PortlandOregon.gov</a> for iPhone and iPad devices that are no longer able to receive iOS updates</b>	Legacy	Limited	Communication / Telecom Engineering and Support
<b>15.8. Smartphone Operating System</b>	iOS 13.1.2	Standard	Limited	Communication / Telecom Engineering and Support

<sup>3</sup> Smartphone and Operating System Limited Support: Ordering, initial provisioning, setup of synchronization with Exchange, Verizon data and voice service

Item	Standard Description	Standard Classification	Support Model	BTS Owner
	Android 7.0, 8.0, 9.0	Exception Required	Limited	Communication / Telecom Engineering and Support
	Android 2.3, 4, 5 iOS 4, 5, 6, 7, 8, 9, 10, 11, 12.0-12.3.0, 2.3.1, 12.4.1 Windows Mobile 5, 6.0, 6.1, 6.5 Blackberry	Legacy	Limited	Communication / Telecom Engineering and Support
<b>15.9. Basic Cellular Phone</b>	Kyocera Dura LTE	Standard	Full	Communication / Telecom Engineering and Support
	LG VN150s Samsung Convoy 3 (Ruggedized) Samsung Intensity III (basic w/slide out keyboard)	Legacy	Full	Communication / Telecom Engineering and Support
<b>15.10. USB Wireless Cellular Data Modem</b>	Verizon 730L	Standard	Full	Communication / Telecom Engineering and Support
	Pantech 290, 295, 620L	Legacy	Full	Communication / Telecom Engineering and Support
<b>15.11. Tablet</b>	See Section 3, <a href="#">Tablet Hardware</a>			

## 16. Video

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>16.1. Desktop USB Camera</b>	Logitech c925-e Microsoft LifeCam Studio 1080p HD	Standard	Full	Support Center / Hardware Standards Panel
	Logitech QuickCam Pro9000, c910, c920	Legacy	Full	Support Center / Hardware Standards Panel
<b>16.2. Projector: Portable</b>	InFocus IN116xa, IN2128HDx	Standard	Full	Support Center / Hardware Standards Panel
	Dell M209X, M210X, 1510X, 2400mp InFocus IN116, IN116a, IN116x, IN3118HD, HD3138HD, IN3138HDa	Legacy	Full	Support Center / Hardware Standards Panel

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>16.3. Projector: Ceiling Mount</b>	No standard specified  <i>Note: 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 the <a href="#">Video Projector Criteria</a></i>	N/A		Communications / Radio and Video Shop  Police (for all Police Systems)
<b>16.4. Digital Video Recorder (DVR)</b>	PELCO ControlPoint	Standard	Full	Communications / Radio and Video Shop
	PELCO DX8100s, DSSRV-005-US Custom built "white" box supported by BTS Radio and Video Shop.	Legacy	Full	Communications / Radio and Video Shop
<b>Police</b>	HIKVision DVR	Standard	Full	Police
<b>16.5. Digital Video Recorder Control Software</b>	PELCO ControlPoint	Standard	Full	Communications / Radio and Video Shop
<b>Police</b>	Interview Tracker	Standard	Full	Police


### Projector Support Notes

**Portland Building Expectations:**

- For Portland Building Occupants, please note that there are restrictions on allowed projectors.
- Please submit questions and comments regarding the Portland Building via the [Project's TrackIT form](#).

# Software and Application Development Standards

## 17. Database Development Tools

Item	Standard Description	Standard Classification	Support Model	BTS Owner
17.1. Editing/Compiling	Oracle SQL Developer PgAdmin (PostGres Mgt Tools) PLEdit 5.7 PL/SQL Developer 7.1 RazorSQL SQL Server Management Studio 2014, 2016, 2017	Standard	Full	Business Solutions / Vertical Applications
17.2. Query Tool 	Golden 5.7 Toad 12	Standard	Full	Business Solutions / Vertical Applications
	Toad 9.1	Legacy	Full	Business Solutions / Vertical Applications
17.3. SQL Server Utilities	Redgate SQL Compare Utilities 9.0 SQL Server Management Studio 2016	Standard	Full	Business Solutions / Vertical Applications
	SQL Server Management Studio 2008, 2012, 2014	Legacy	Full	Business Solutions / Vertical Applications

## 18. Application Development Tools – Windows Based

Item	Standard Description	Standard Classification	Support Model	BTS Owner
18.1. Multi-platform	Eclipse IntelliJ Idea Oracle J Developer Visual Studio 2017 Visual Studio Code Visual Studio for Mac	Standard	Full	Business Solutions
	Visual Studio .NET 2003, 2005 Visual Studio 2008/2010/2012	Legacy	Full	Business Solutions

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>18.2. Mobile</b>	Microsoft PowerApps Objective C Swift Visual Studio 2017 (Xamarin) Xcode	Standard	Full	Business Solutions
<b>18.3. Client / Server</b>	Visual Studio 2017	Standard	Full	Business Solutions
	Access XP Developer PowerBuilder Visual Studio 6.0 VS.NET 2003, 2005, 2008, 2010, 2012	Legacy	Full	Business Solutions
<b>18.4. Workstation Based</b>	Access 2016	Legacy	Full	Business Solutions
<b>Police</b>	Access 2013	Standard	Full	Business Solutions
<b>18.5. Reporting Tools</b>	Actuate Business Objects Enterprise 4.3 Cognos Impromptu Crystal Reports 2013, 2016 ESRI Insights Microsoft Power BI Plotly SQL Server Reporting Services 2008, 2008 R2, 2012, 2014, 2016	Standard	Full	Business Solutions
	Crystal Reports 8, 9, 10, 11, 2008, 2011	Legacy	Full	Business Solutions
	Tableau Creator which includes Tableau Desktop and Tableau Prep Tableau Explorer Tableau Viewer Tableau Reader – Note: Reader cannot access information on Tableau Server, Online or Public. Tableau Online	Allowed	Limited	Enterprise Business Solutions
	Tableau Public	Exception Required	No Support	Enterprise Business Solutions
<b>18.6. OLAP</b>	Cognos SAP BW 7.40 SQL Server OLAP Service	Standard	Full	Business Solutions



Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>18.7. Installer</b>	InstallAware InstallShield Windows Installer	Standard	Full	Business Solutions
<b>18.8. Application Testing</b>	Azure DevOps CircleCI Composer JMeter JUnit New Relic LoadUI Resharper SOAPUI	Standard	Full	Business Solutions

### 19. Application Server

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>19.1. Application Server (Java)</b>	ColdFusion Oracle WebLogic 12c Tomcat 8.x, 9x WebSphere	Standard	Full	Production Services / Business Solutions
	Oracle WebLogic 11g Oracle 10g AS	Legacy	Full	Production Services / Business Solutions

### 20. Backup / Recovery Software

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>20.1. Backup Software</b>	CommVault – Windows / Red Hat Linux / AIX	Standard	Full	Production Services / Server Support
<b>Police</b>	Symantec Backup Exec 2016	Standard	Full	Public Safety Technology

## 21. Collaboration Tools

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>21.1. Online Conferencing</b>	Skype for Business with Microsoft Audio connectivity to the public telephone system  Optionally may use a Meet-Me bridge provided by BTS for audio.	Standard	Full	Support Center / Software Standards Panel
	WebEx Go-To-Meeting (only as a participant)	Allowed	Limited	Support Center / Software Standards Panel
	[ADA] Zoom Conferencing	Allowed	Bureau	Support Center / Software Standards Panel
<b>21.2. Conference Recording Playback</b>	WebEx Player (ARF format) WebEx Player (WRF format)	Allowed	Limited	Support Center / Software Standards Panel
<b>21.3. Group Collaboration</b>	Office 365 Groups Microsoft Teams	Standard	Full	Support Center / Software Standards Panel
	Figma Jira Slack	Allowed	Limited	Support Center / Software Standards Panel
<b>21.4. Wireless Audience Polling</b>	KeyPoint Interactive (PowerPoint plug-in)	Allowed	Limited	Support Center / Software Standards Panel

## 22. Database Standards

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>22.1. Enterprise Database</b>	Informix 12 Oracle 12c SQL Server 2012 SQL Server 2014 SQL Server 2016 PostgreSQL MySQL	Standard	Full	<b>Oracle</b> Production Services  <b>SQL</b> Production Services / Business Solutions  <b>MySQL</b> Business Solutions

Item	Standard Description	Standard Classification	Support Model	BTS Owner
	SQL Server 2008 SQL Server 2008 R2 Oracle 11g	Legacy	Full	Oracle Production Services  SQL Production Services / Business Solutions
<b>22.2. Enterprise Database Client</b>	Oracle 12c Client	Standard	Full	Production Services
	Oracle 11g client	Legacy	Full	Production Services
<b>22.3. Workstation Based</b>	Access 2016 SQL Server Express SQL Lite	Standard	Full	Business Solutions
<b>Police</b>	Access 2013	Standard	Full	Business Solutions
<b>22.4. Database Connector Protocol</b>	ODBC OLE DB XML JDBC ADO	Standard	Full	Business Solutions

**Database Operation Notes:**

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 Classification	Support Model	BTS Owner
<b>23.1. Directory Services</b>	Microsoft Active Directory	Standard	Full	Production Services / Server Support

## 24. eMail

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>24.1. Server Software</b>	Microsoft Office 365 Exchange Online	Standard	Full	Production Services / Server Support
<b>Police</b>	Microsoft Exchange Server 2013	Standard	Full	Production Services / Server Support
<b>24.2. Web Client</b>	Microsoft Office 365 Outlook Web App	Standard	Full	Production Services / Server Support
<b>24.3. eMail: Synchronization</b>	Microsoft Office 365 Exchange Online built-in	Standard	Full	Production Services / Server Support
<b>24.4. eMail Client</b>	See Section 35.4, <a href="#">eMail Client</a>			
<b>24.5. Address Book</b>	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	Support Center / System Engineering
<b>24.6. Bulk eMail Service</b>	MailChimp MyEmma	Allowed	No Support	Support Center / System Engineering
<b>24.7. eMail Filing Tool</b>	SimplyFile	Allowed	Limited	Support Center / System Engineering

## 25. Fonts

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>25.1. Standard Fonts</b>	Windows 7 built-in Windows 10 built-in Microsoft Office and Office 365 built-in Open Sans	Standard	Full	Support Center
<b>25.2. Allowed Fonts</b>	Adobe Creative Cloud built in	Allowed	Limited	Support Center
<b>25.3. Non-Standard Fonts</b>	Any font not included in Sub-sections 25.1 or 25.2	Exception Required	No Support	

### Non-Standard Font Guidance:

- All non-standard fonts require an exception.
- **Discuss any non-standard font use case with your BTS Technology Business Consultant.**

- Restrict contractors performing graphic design work to the City standard fonts if possible.
- Check for font availability with publishing services such as the City’s PnD or external publishing services.

**Non-Standard Font Impact:**

- Using non-standard fonts can affect the printed or viewed content depending on the availability of the font on the viewers workstation, and how the font is used in the content.
- Non-Standard font use as native text in documents or email will not display correctly if the viewer does not also have the font installed. It is possible that some applications, such as Microsoft Word, can embed the font in the document making it available for the viewer **of that document only**.
- Non-Standard font use in documents converted to PDF documents will generally appear as intended to the viewer.
- Non-Standard font use in a graphic image, such as a JPG file, will generally appear as intended to the viewer.
- Non-Standard font use on web pages requires the font to be “known” to the web server.
  - Creating native text content using the web content editor requires the font to be installed on the web server.
  - Files attached to web pages will behave as native documents or PDF files accordingly.
- Fonts may be free or may have a licensing fee. Fonts may be licensed by individual user, or site licensed. There may also be specific licensing rules for the use of the font. Check the licensing terms and allowable uses for any font being considered.
- Fonts may not be automatically installed during a life-cycle replacement of the workstation.

**26. Geographical Application Tools**

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>26.1. GIS Application Development</b>	Visual Studio 2010, 2015, 2017 ArcObjects 10.1, 10.2, 10.3 ArcEngine 10.1, 10.2, 10.3 ArcGIS Runtime 10.2 Eclipse XCode ESRI JavaScript API	Standard	Full	Business Solutions
	Visual Studio .NET 2003, 2005, 2008 MapObjects Visual Basic 6 Visual Basic for Applications	Legacy	Full	Business Solutions
<b>26.2. GIS Desktop Applications</b>	ArcGIS 10.3.1 MapWorks 10.3.1	Standard	Full	Business Solutions

Item	Standard Description	Standard Classification	Support Model	BTS Owner
	ArcView 3.3/3.4 Microstation (MGE) MapInfo GeoOutlook	Legacy	Full	Business Solutions
<b>26.3. GIS Internet Map Server</b>	ArcGIS Server 10.5.1	Standard	Full	Business Solutions
<b>26.4. Mapping Software</b>	Google Earth Pro (free version)	Standard	Limited	Support Center

## 27. Graphic Design Software

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>27.1. Visual Diagramming</b>	Microsoft Visio 2019 Click-to-Run and Perpetual License	Standard	Full	Support Center / Software Standards Panel
	Microsoft Visio 2010, 2013 Microsoft Visio 2016 Click-to-Run and Perpetual License  Note: As of 6/11/2013, BTS adopted a policy to allow owners of 2007 or 2010 software versions to install and use those versions through their lifecycle	Legacy	Full	Support Center / Software Standards Panel
<b>27.2. PDF Creation</b>	Adobe Acrobat Standard or Professional DC Adobe LiveCycle Designer Microsoft Print to PDF	Standard	Full	Support Center / Software Standards Panel
	Adobe Acrobat Standard or Professional 9, 10, XI PDFCreator	Legacy	Full	Support Center / Software Standards Panel
<b>27.3. Graphic Design</b>	Adobe Creative Cloud (InDesign, Photoshop, Illustrator, Flash, DreamWeaver, Fireworks, Premier Pro, and more) Adobe Photoshop Elements Adobe Premier, Premier Elements Microsoft Publisher 2016 XnView	Allowed	Limited	Support Center / Software Standards Panel

Item	Standard Description	Standard Classification	Support Model	BTS Owner
	Adobe Creative Suite 1, 2, 3, 4, 5, 5.5, 6 Publisher 2003, 2007, 2010, 2013	Legacy	Full	Support Center / Software Standards Panel
<b>Police</b>	Microsoft Publisher 2013 Sony Vegas 15 Pro	?	?	Public Safety Technology
<b>27.4. Screen Capture</b>	Camtasia Greenshot Snagit	Allowed	Limited	Support Center / Software Standards Panel
<b>27.5. Computer Aided Design</b>	BluBeam Revu	Standard	Limited	Support Center / Software Standards Panel
	Sketchup Pro Sketchup Viewer	Allowed	Limited	Support Center / Software Standards Panel

## 28. Internet Domain Naming

BTS recommends bureaus use the format **www.portlandoregon.gov/function** when creating internet domain names for specific functions to be exposed to the public. This format 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 format **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.

## 29. Miscellaneous Tools

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>29.1. Clipboard Manager</b>	Ditto	Allowed	No Support	Business Solutions
<b>29.2. Enterprise Fax</b>	AccuRoute Fax  <b>Note: Current capability does not encrypt/decrypt Fax transmissions</b>	Standard	Full	Production Services / Server Support
<b>29.3. Enterprise Paging</b>	OmniTrend PageMaster	Standard	Full	Production Services / Server Support

Item	Standard Description	Standard Classification	Support Model	BTS Owner
29.4. FTP Client	<a href="#">FileZilla</a> Microsoft Internet Explorer  Note: See Section 40, <a href="#">Storage Services and Devices</a>	Standard	Full	Support Center / Software Standards Panel
29.5. Log Viewers	Baretail Pro Glogg LogFusion Pro Note the free version <b>IS NOT</b> licensed for government use. <a href="#">LogJoint</a>	Allowed	No Support	Business Solutions
29.6. Online Training Content Editors  Learning Management System Content Editor	Adobe Captivate uPerform	Standard	Full	Support Center / Software Standards Panel / Enterprise Business Solutions
29.7. Outlook Calendar Publishing	WinCalendar Standard	Allowed	Limited	Support Center / Software Standards Panel
29.8. <b>[ADA]</b> Screen Magnifier	ZoomText MAGic	Allowed	Limited	Enterprise Architecture
29.9. <b>[ADA]</b> Speech-to-Text	Dragon Naturally Speaking	Standard	Limited	Business Solutions
29.10. Statistical Analysis	R R Studio	Allowed	Limited	Support Center / Software Standards Panel
29.11. Survey Applications	Survey Monkey (web application)	Allowed	Limited	Support Center / Software Standards Panel
29.12. Terminal Emulation	Micro Focus Reflection Desktop 2016 OpenText HostExplorer OpenText Exceed	Allowed	No Support	Production Services / Data Center
	Reflection 2011 Attachmate Extra Extreme	Legacy	No Support	Production Services / Data Center



Item	Standard Description	Standard Classification	Support Model	BTS Owner
29.13. <b>Text Message Capture</b>	Macropant iExplorer SMARSH  <i>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.</i>	Allowed	Limited	Enterprise Architecture
29.14. <b>[ADA] Text-to-Speech</b>	Screen Readers JAWS NVDA	Allowed	Limited	Enterprise Architecture
29.15. <b>[ADA] Video Remote (Language) Interpreter</b>	LanguageLine	Allowed	No Support	Enterprise Architecture
29.16. <b>[ADA] Video Relay Service</b>	Convo ZVRS	Allowed	Limited	Enterprise Architecture
29.17. <b>Wiki</b>	ScrewTurn Wiki TikiWiki	Standard	Full	Business Solutions / Production Services
29.18. <b>XML Editor</b>	NotePad++ 7.x XML Notepad 2007 Oxygen	Standard	Full	Business Solutions / Vertical Applications
29.19. <b>Meeting Scheduler</b>	FindTime plug-in for Outlook	Allowed	Limited	Support Center / SET
29.20. <b>[ADA] Video Caption</b>	Caption and Description Editing Tool (CADET)	Standard	Limited	Support Center / Software Standards Panel

### 30. Operational Support Tools

Item	Standard Description	Standard Classification	Support Model	BTS Owner
30.1. <b>Asset Inventory</b>	Altiris Asset Management	Standard	Full	Support Center / SET
30.2. <b>Automated Inventory</b>	Altiris Client Management Suite (desktop) SNOW License Manager 7 (server)	Standard	Full	Support Center / SET

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>30.3. Monitoring</b>	Toad for Oracle DBA V11	Standard	Full	Production Services / Database Administration
	Microsoft SCOM Oracle OEM/Grid Control ManageEngine OpManager Redgate SQL Monitor Server Studio SQL Server Management Studio 2008, 2008 R2, 2012, 2014, 2016 VMware vROPs	Standard	Full	Production Services / Server Support / Database Administration
	Brocade Network Advisor Hitachi Tuning Manager HVSR	Standard	Full	Production Services / Storage Administration
	Grafana NetDisco OpenNMS Riverbed SteelCentral Sitescope SolarWinds GrayLog (syslog)	Standard	Full	Communications / Network Engineering and Support
<b>Police</b>	PAESSLER PRTG Network Monitoring 18.3	Standard	Full	Public Safety Technology
<b>30.4. Software Distribution</b>	Altiris Client Management Suite	Standard	Full	Support Center / SET
<b>30.5. Work Order Ticketing</b>	Cherwell Redmine (software development issue tracking)	Standard	Full	Support Center / SET
<b>30.6. Workstation Remote Control</b>	Bomgar	Standard	Full	Support Center / SET
<b>30.7. Server Remote Control</b>	Microsoft Remote Desktop Service (RDP)	Standard	Full	Production Services / Server Support
<b>30.8. Printer Management</b>	PaperCut Pro	Standard	Full	Production Services / Server Support / Database Administration

### 31. Project Management Tools

Item	Standard Description	Standard Classification	Support Model	BTS Owner
31.1. Project Management Software	Microsoft Project 2019  <i>Note: With Office 365 2016, Microsoft blocks installation of Office 365 2016 simultaneous with the perpetual version of Project 2016 and 2019. If Project 2019 is to be used, the subscription version must be installed. Perpetual licensed versions of Project 2013 or 2010 may be installed simultaneously.</i>	Standard	Full	Project Management Office
	SmartSheet	Standard	Limited	System Engineering
	Microsoft Project 2010, 2013, 2016  <i>Note: 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.</i>	Legacy	Full	Project Management Office
31.2. Project Portfolio Management (PPM) Software	Plainview PPM Pro (formerly Innotas)	Standard	Full	Project Management Office

### 32. Server Base Software

Item	Standard Description	Standard Classification	Support Model	BTS Owner
32.1. Operating System	Windows Server 2016 64-bit Windows Server 2019 64-bit Red Hat Enterprise 7.x	Standard	Full	Production Services / Server Support
	Windows Server 2008, 2008R2, 2012, 2012 R2 Red Hat Enterprise 6.x AIX 7.x, 8.x	Legacy	Full	Production Services / Server Support

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>32.2. Base Software (Windows)</b>	MS IE 11 Windows Remote Desktop McAfee SNOW	Standard	Full	Production Services / Server Support
	MS IE 8, 9, 10	Legacy	?	Production Services / Server Support
<b>32.3. Vizualization Hypervision</b>	VMWare VSphere 6 IBM VIO 2.2	Standard	Full	Production Services / Server Support

### 33. Source Code Control System

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>33.1. Source Control</b>	Subversion/VisualSVN 2.1.10 TortoiseSVN 1.6.16 AnkhSVN 2.1 Visual SourceSafe Git / GitHub Microsoft Team Foundation Server (TFS)	Standard	Full	Business Solutions
	Visual SourceSafe 6.0	Legacy	No Support	Business Solutions

### 34. Web Tools

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>34.1. Content Management and Page Development Tools</b>	DreamWeaver City Site / Content Management Tool Eclipse Drupal	Standard	Full	Business Solutions
	Cold Fusion Studio	Legacy	Full	Business Solutions
<b>34.2. Site Management Tools</b>	DreamWeaver	Standard	Full	Business Solutions

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>34.3. Runtime Environment Tools</b>	ColdFusion Server MX .NET Core .NET Framework Bootstrap	Standard	Full	Business Solutions
<b>34.4. Web Application Development</b>	Visual Studio 2017 Cold Fusion Studio Docker / Lando Eclipse Figma Oracle J Developer	Standard	Full	Business Solutions
	WAVE <a href="#">[ADA]</a> Web Accessibility tool	Standard	Limited	Business Solutions
<b>34.5. HTML Version</b>	HTL 5.x	Standard	Full	Business Solutions
<b>34.6. HTTP Inspectors</b>	Fiddler Postman	Standard	Full	Business Solutions
<b>34.7. Scripting Language</b>	.NET ColdFusion JavaScript Perl PHP PowerShell Python VBScript	Standard	Full	Business Solutions
<b>34.8. Video Encoding</b>	Real Producer	Legacy	Full	Business Solutions
<b>34.9. Web Server</b>	Microsoft IIS 10.x Apache/Tomcat 9.x	Standard	Full	Business Solutions
	Microsoft IIS 5.0, 6.0, 7.x, 8.x Apache 7.x, 8.x	Legacy	Full	Business Solutions
<b>34.10. Web Browser</b>	Microsoft Internet Explorer 11 Legacy Edge Modern Edge	Standard	Full	Support Center
	Chrome (with current updates)	Allowed	Limited	Support Center
	Firefox Safari	Exception Required	Limited	Support Center

### 35. Workstation Software

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>35.1. Operating System</b>	Windows 7 SP1 Windows 10 Version 1903 Windows 10 Long-Term Servicing Branch (LTSM) version 1809 – vCAD computers only	Standard	Full	Support Center / Software Standards Panel
<b>35.2. Base Software</b>	Adobe Reader DC Windows Media Player McAfee Endpoint Security 10 (with current update) Adobe Flash Player 12 (with current update) Microsoft DirectX Internet Explorer 11 .NET Framework 3.5 SP1, 4.5.2 or greater depending on the Windows Operating System. Java 8 (with current update) SAP GUI 7.4 Silverlight	Standard	Full	Support Center / Software Standards Panel
	Adobe Reader X, XI Cyberlink Power DVD (OEM) Java 7	Legacy	Full	Support Center / Software Standards Panel
	Java 6	Exception Required	No Support	Support Center / Software Standards Panel
<b>35.3. Microsoft Office Suite</b>	MS Office 365 ProPlus / 32-bit via Office 365 subscription (Word, Excel, PowerPoint, Access, OneNote, Publisher, Skype for Business <a href="#">[ADA]</a> , OneDrive for Business)	Standard	Full	Support Center / Software Standards Panel
	MS Office 365 ProPlus / 64-bit via Office 365 subscription (Note that the 32-bit Office suite is the default standard)	Allowed	Full	Support Center / Software Standards Panel
	MS Office 2013	Legacy	Full	Support Center / Software Standards Panel
<b>Police</b>	MS Office 2013 / 64 bit	Standard	Full	Support Center / Software Standards Panel
<b>35.4. eMail Client</b>	MS Outlook 2016	Standard	Full	Support / Software Standards Panel

Item	Standard Description	Standard Classification	Support Model	BTS Owner
	MS Outlook 2013	Legacy	Full	Support Center / Software Standards Panel
<b>Police</b>	MS Outlook 2013	Standard	Full	Support Center / Software Standards Panel
<b>35.5. Media Player</b>	Windows Media Player	Standard	Full	Support Center / Software Standards Panel
	VLC Client	Allowed	Full	Support Center / Software Standards Panel
<b>35.6. CD/DVD Creation</b>	Windows built-in	Standard	Full	Support Center / Software Standards Panel
<b>35.7. Workstation Database</b>	See Section 22, <a href="#">Database Standards</a>			
<b>35.8. Firewall</b>	Windows Firewall	Standard	Full	Information Security
<b>35.9. Password Safe</b>	KeePass	Allowed	No Support	Information Security
<b>35.10. Zip File Compression</b>	Built-in Windows Zip Utility 7-Zip	Allowed	Limited	Support Center / Software Standards Panel

# Security Technology Standards

## 36. Authentication

Item	Standard Description	Standard Classification	Support Model	BTS Owner
36.1. Windows	Kerberos	Standard	Full	Information Security
36.2. Multi-Factor	RSA Secure ID Digital Certificate Azure MFA	Standard	Full	Information Security
36.3. Single Sign-On	Active Directory Federated Services (ADFS) Azure Active Directory	Standard	Full	Information Security
Police	Impivata OneSign	Standard	Full	Information Security
36.4. Wi-Fi	Authentication Protocols EAP-TLS , PEAP Certificate provisioning: Autoenrollment via AD	Standard	Full	Information Security
36.5. RADIUS	Cisco ISE	Standard	Full	Communications / Network Engineering and Support
36.6. Firewall Rules Management	FortiClient – Workstation deployment	Standard	Full	Networking

## 37. Encryption

Item	Standard Description	Standard Classification	Support Model	BTS Owner
37.1. Data Storage	AES	Standard	Full	Information Security
	3DES	Legacy	Full	Information Security
37.2. Web Traffic	TLS 1.2, 1.3 External facing certificates: Verisign, Secure Site, Secure Site Pro Internal facing certificates: Internal Certificate Authority, Verisign	Standard	Full	Information Security




Item	Standard Description	Standard Classification	Support Model	BTS Owner
37.3. <b>Secure FTP</b>	SFTP (FTP over SSH)	Standard	Full	Information Security
37.4. <b>Wi-Fi Networks (transport)</b>	WPA2 802.11	Standard	Full	Information Security
37.5. <b>Endpoint Device Storage</b>	BitLocker	Standard	Full	Information Security

### 38. Patch Management

Item	Standard Description	Standard Classification	Support Model	BTS Owner
38.1. <b>Workstation</b>	Altiris Patch Management Windows Update for Business	Standard	Full	Support Center / SET
38.2. <b>Server</b>	Ivanti Protect	Standard	Full	Production Services / Server Support
	Microsoft System Center Configuration Manager (SCCM)	Standard	Full	Public Safety Technology
38.3. <b>Network</b>	Ansible CATTools	Standard	Full	Communications / Network Engineering and Support

### 39. Remote Network Access

Item	Standard Description	Standard Classification	Support Model	BTS Owner
39.1. <b>VPN Appliance</b>	Pulse SA (PSA) RadiolP (Fire, Comm)	Standard	Full	Information Security
<b>Police BOEC</b>	NetMotion	Standard	Full	Public Safety Technology
39.2. <b>Client VPN Software (IPSec)</b>	Pulse Secure Client	Standard	Full	Information Security

 Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>Police BOEC</b>	NetMotion Client	Standard	Full	Public Safety Technology

## 40. Storage Services and Devices

### Storage Service 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

## 41. Virus Protection

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>41.1. Workstation</b>	McAfee Endpoint Security 10 (with current update)	Standard	Full	Support Center
<b>41.2. Server</b>	McAfee Security for Email Servers	Standard	Full	Production Services
<b>41.3. Internal Mail</b>	McAfee SonicWall Email Security	Standard	Full	Production Services
<b>41.4. Console</b>	McAfee ePO	Standard	Full	Production Services
<b>41.5. Web Filtering</b>	Web Security Appliance (WSA) Sophos Webroot	Standard	Full	Communications / Network Engineering and Support

# 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.

## General USB Device Guidance

- Minimum USB 2.0
- USB cables may not be provided by the vendor and need to be purchased separately.

## General Bluetooth Device Guidance

- Bluetooth devices should use native Windows device drivers.

## Computer Speakers

## Digital Cameras

- Minimal technical support is provided by BTS.
- USB interface required. See General USB Device Guidance above.
- Support from BTS is not part of the SLA and will be billable.
- Any bundled software must be Windows 7 and 10 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. See [General USB Device Guidance](#) above.

## 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:
  - OfficeJet 7000 series – Offers color, large format (11x17) capability.
  - OfficeJet Pro 8100 series offers color, standard format (letter / legal) capability, is expandable for scanning, copying, and faxing, and is supported by the City's standard Universal Print Driver from HP.
- USB Interface required. See [General USB Device Guidance](#) above.

- Support from BTS is not part of the service level agreement (SLA) and will be billable. **Note: Installations on Windows 7 or Windows 10 requires BTS assistance and is billable.**
- This is for locally attached use to a single computer only. BTS will not network these devices.
- **Portland Building Expectations:**
  - Please note that desktop printers are not allowed and there are limitations on supported network printers.
  - Please submit questions and comments regarding the Portland Building via the [Project's TrackIT form](#).

## Mice / Track-balls

- This includes optical, multi-button with scroll wheels, and track balls.
- USB interface required. See [General USB Device Guidance](#) above.

## Removeable 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. See [ADM-8.12 - Management, Preservation and Storage of Electronic Records and Electronic Mail Correspondence \(E-Mail\)](#).
- This category is generally 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](#).
  - Encryption on USB storage devices, small “thumb” or “jump” drives in particular, is allowed and accomplished using the SanDisk SecureAccess encrypted vault. Additional information is available on [SanDisk's web site](#).
- Devices chosen should operate with standard built-in operating system (Windows) drivers and not require customized drivers.
- USB Interface required. See [General USB Device Guidance](#) above.
- 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.

Standard Desktop Workstation:

- Intel® 8<sup>th</sup> generation processors(i5), 64-bit
- Memory
  - Police Bureau: 16 GB Optane memory
  - All other bureaus: 8 GB RAM memory
- Local storage
  - Police Bureau: 500 GB HD
  - All other bureaus: 256 GB Solid-State Drive (SSD)
- 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 Bronze compliant
- Intel Standard Management with Active Management Technology (AMT)
- 3 year warranty
- See [current desktop hardware specification](#) on the City website

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

- Standard:
  - 14-inch LED HD display
  - WiFi 802.11 ac/a/b/g/n 2x2 Wireless LAN + Bluetooth 4.2, supporting EAP-TLS and WAP2
  - Docking bay
  - Built-in camera and microphone
  - Backlit keyboard
- Lite – Same as the standard laptop with the following modifications:
  - 13.3-inch LED display
- Police Bureau – Same as standard laptop with the following modifications:
  - Built-in LTE
  - Keyboard with integrated fingerprint reader and smartcard reader
- Ruggedized:
  - Weatherproof and shock resistant casing
- Options:
  - Touch screen
  - Built-in 4G LTE
  - Intel i7 processor
  - Additional RAM memory



- Larger hard drive

## **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:

- Intel ® processor (i5) 64-bit
- 8 GB DDR3 RAM memory
- Intel ® HD graphics 4600
- 256 GB solid-state drive (SSD)
- DVD +/- RW optical single layer drive
- 13-inch LED display (1024 x 768 minimum) with touch screen
- Fingerprint reader
- Intel ® dual-band AC 7260+ Bluetooth
- Energy Star 6.0 and EPEAT Bronze compliant
- 5-year warranty

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/sec	Internal 10/100 MB/sec	Internal 10/100 MB/sec
Network address	IPv4	IPv4	IPv4
Page size	Letter 8.5 x 11 Legal 8.5 x 14 #10 Envelope	Letter 8.5 x 11 Legal 8.5 x 14 #10 Envelope	Letter 8.5 x 11 Legal 8.5 x 14 Tabloid 11 x 17 #10 Envelope
Page definition language	PCL 5 / Postscript	PCL 5 / Postscript	PCL 5 / Postscript
Memory	32 MB	96 MB	128 MB
Display	LCD for on-site config	LCD for on-site config	LCD for on-site config
Duplexing	Yes	Yes	Yes
Trays	1 tray 1 Multi-purpose tray	2 trays 1 Multi-purpose tray	2 trays 1 Multi-purpose tray
Envelope Feeder	Optional	Optional	
Compatible with 100% recycled paper	Yes	Yes	Yes
Black and White	Default	Default	Default
Color	Optional	Optional	Optional
Energy Star	Yes	Yes	Yes

**Universal print driver** All printers must be certified to operate with the HP universal print driver. Microsoft certified for installation on Windows 2008 Server are found on the [Windows Server Certification Catalog](#).

## Network Printer Specifications (Black and White)

Feature	M404dn	M507dn	M607dn	M608dn/x	M712dn High volume Large Format
Print Speed Black (ppm pages / min)	40	45	55	65	40
Resolution (dpi: dots per inch)	1200 x 1200	1200 x 1200	1200 x 1200	1200 x 1200	1200 x 1200
Monthly duty cycle (pages)	80,000	150,000	250,000	275,000	100,000
Recommended monthly duty cycle (pages)	750-4,000	2,000-7,500	5,000-20,000	5,000-25,000	5,000-20,000
Memory: Standard	256 MB	512 MB	512 MB	512 MB	512 MB
Memory: Max	256 MB	1.5 GB	1.5 GB	1.5 GB	1 GB
Paper trays: Std	2	2	2	dn:2 x:3	3
Paper trays: Max	3	5	6	6	6
Duplex printing	Auto / Std	Auto / Std	Auto / Std	Auto / Std	Auto / Std
11x17 (Large Format)	No	No	No	No	Yes
Energy Star / EPEAT	Yes / Silver	Yes / Silver	Yes / Silver	Yes / Silver	Yes / Silver
HP ePrint	Yes	Yes	Yes	Yes	Yes

## Network Printer Specifications (Black and White Multi-Function)

Feature	M227fdn	M426fdn	M725dn Large Format		
Print Speed Black (ppm pages / min)	40	45	55		
Resolution (dpi: dots per inch)	1200 x 1200	1200 x 1200	1200 x 1200		
Monthly duty cycle (pages)	80,000	150,000	250,000		
Recommended monthly duty cycle (pages)	750-4,000	2,000-7,500	5,000-20,000		
Memory: Standard	256 MB	512 MB	512 MB		
Memory: Max	256 MB	1.5 GB	1.5 GB		
Paper trays: Std	2	2	2		
Paper trays: Max	3	5	6		
Duplex printing	Auto / Std	Auto / Std	Auto / Std		
11x17 (Large Format)	No	No	No		
Energy Star / EPEAT	Yes / Silver	Yes / Silver	Yes / Silver		
HP ePrint	Yes	Yes	Yes		
Scanner Type	Flatbed with auto doc feed	Flatbed with auto doc feed	Flatbed with auto doc feed		
Scan Resolution (dpi): Max	1,200	1,200	600		
Scan speed: black and white (ppm)	12	26 ppm / 47 ipmr	49 ppm / 19 ipm		
Scan speed: color (ppm)	n/a	21 ppm / 30 ipm	30 ppm / 14 ipm		
Scan size	8.5 x 11.7 flat 8.5 x 14 ADF	8.5 x 11.7 flat 8.5 x 14 ADF	11 x 17		
Copy speed (cpm)	30	40			
Copy resolution	600 x 600	600 x 600	600 x 600		
Copy reduction / enlargement	25 – 400%	25 – 400%	25 – 400%		
Fax resolution	300 x 300	300 x 300	300 x 300		



## Network Printer Specifications (Color)

Feature	M454dn	CP5225dn Large Format	M553dn/x	M653dn	M751dn Large Format
Print Speed Black / color (ppm pages / min normal quality)	28 / 28	20 / 20	40 / 40	60 / 60	30 / 30
Resolution (dpi: dots per inch)	600 x 600	HP ImageREt – 3600	HP ImageREt – 3600	HP ImageREt – 3600	600 x 600
Monthly duty cycle (pages)	50,000	75,000	80,000	120,000	120,000
Recommended monthly duty cycle (pages)	750 – 4,000	1,500 – 5,000	2,000 – 6,000	2,000 – 17,000	2,500 – 13,000
Memory: Standard	256 MB	192 MB	1 GB	1 GB	1 GB
Memory: Max	512 MB	448 MB	2 GB	2 GB	1 GB
Paper trays: Std	2	2	dn: 22 x:3	2	3
Paper trays: Max	3	3	5	5	6
Duplex printing	Auto / Std	Auto / Std	Auto / Std	Auto / Std	Auto / Std
11x17 (Large Format)	No	Yes	No	No	Yes
Energy Star / EPEAT	Yes / Silver	Yes / Silver	Yes / Silver	Yes / Silver	Yes / Silver
HP ePrint	Yes	No	Yes	Yes	Yes

Feature	M855xh Large Format				
Print Speed Black / color (ppm pages / min normal quality)	45 / 45				
Resolution (dpi: dots per inch)	1200 x 1200				
Monthly duty cycle (pages)	175,000				
Recommended monthly duty cycle (pages)	4,000 – 17,000				
Memory: Standard	1 GB				
Memory: Max	1 GB				
Paper trays: Std	5				
Paper trays: Max	5				
Duplex printing	Auto / Std				
11x17 (Large Format)	Yes				
Energy Star / EPEAT	Yes /				
HP ePrint					

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

Feature	M479fdn				
Print Speed Black / color (ppm pages / min normal quality)	28 / 28				
Resolution (dpi: dots per inch)	600 / 600 HP ImageREt – 3600				
Monthly duty cycle (pages)	50,000				
Recommended monthly duty cycle (pages)	750-4,000				
Memory: Standard	512 MB				
Memory: Max	512 MB				
Paper trays: Std	2				
Paper trays: Max	3				
Duplex printing	Auto / Std				
11x17 (Large Format)	No				
Energy Star / EPEAT	Yes / No				
HP ePrint	Yes				
Scanner Type	Flatbed with auto doc feed				
Scan Resolution (dpi): Max	1,200				
Scan speed: black and white (ppm)	26 ppm / 47 ipm				
Scan speed: color (ppm)	21 ppm / 30 ipm				
Scan size	8.5 x 11.7 flat 8.5 x 14 ADF				
Copy speed (cpm)	28				
Copy resolution	600 x 600				
Copy reduction / enlargement	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.

Type	Native Resolution	Speed (B & W)	Max Scan Size	Connectivity	Type	Doc Feed
Low Volume	300 x 300 dpi	10 ppm	8.5 x 14	USB 2.0	Flatbed or ADF	Std 50 sheet
Medium Volume	300 x 300 dpi	20 ppm 40 ipm duplex	8.5 x 14	USB 2.0	Flatbed or ADF	Std 50 sheet

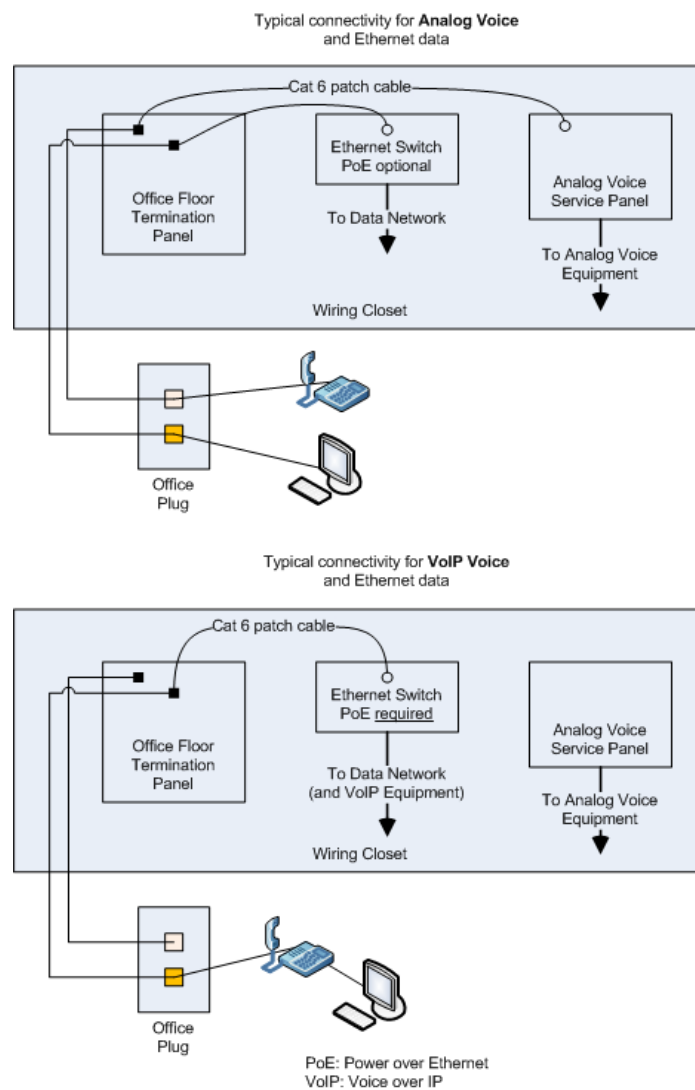
## Cabling Specification

### 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 Mount
Resolution	1024 x 768 (XGA / HDMI)	1024 x 768 (XGA / HDMI)	1024 x 768 (XGA / HDMI)
Brightness	2,500 lumens minimum	2,500 lumens minimum	100 lumens / sq. foot of screen minimum
Remote Control	Optional	Optional	Required
Zoom Lens	Yes	Yes	Yes
Focus Control	Manual	Manual	Remote Control
Video Input	VGA	VGA	VGA
Color Spread	16.7 million	16.7 million	16.7 million
Weight	4 pounds or less (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.

# Appendix A

## Web Site References

City of Portland web site

<https://PortlandOregon.gov>

BTS Technology Standards page

<http://www.portlandonline.com/omf/index.cfm?c=46940>

BTS Technology Business Consultant

<https://www.portlandoregon.gov/bts/index.cfm?&a=53999>

Portland Building Project's TrackIT form

<https://www.portlandoregon.gov/omf/index.cfm?&c=70798>

State and City Rules Related to Public Recordkeeping Requirements

<https://www.portlandoregon.gov/archives/70031>

Apple Device Support Dates

<https://www.portlandoregon.gov/bts/article/660950>

ADM-8.12 - Management, Preservation and Storage of Electronic Records and Electronic Mail Correspondence (E-Mail)

<https://www.portlandoregon.gov/citycode/article/262374>

SanDisk's web site

[https://kb.sandisk.com/app/answers/detail/a\\_id/2399/~/~sandisk-secureaccess-3.02-support-information-and-download-page](https://kb.sandisk.com/app/answers/detail/a_id/2399/~/~sandisk-secureaccess-3.02-support-information-and-download-page)

Current desktop hardware specification

<https://www.portlandoregon.gov/bts/60679>

Windows Server Certification Catalog

<http://www.windowsservercatalog.com/ready.aspx>

City Code 5.33.080 Environmentally Preferable Procurement

<https://www.portlandoregon.gov/citycode/article/552961>

# Appendix B

## Change Log

Changes to the document since last adoption.

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