



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

# **Technology Standards Directory**

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# Table of Contents

Introduction .....	3	Security Technology Standards .....	40
Standards .....	3	36. Authentication .....	40
Exception to Standards .....	3	37. Encryption .....	40
Standard Classification .....	5	38. Patch Management .....	41
Support Model .....	5	39. Remote Network Access .....	41
Energy Efficiency .....	8	40. Storage Services and Devices .....	41
BTS Standard Owner .....	8	41. Virus Protection .....	41
BTS Standards Setting Process .....	9		
ADA Assistive Technologies .....	10	Commodity Hardware and Software... 43	
Hardware Standards .....	11	General USB Device Guidance .....	43
1. Workstation Hardware .....	11	General Bluetooth Device Guidance .....	43
2. Laptop Hardware .....	12	Computer Speakers .....	43
3. Tablet Hardware .....	13	Digital Cameras .....	43
4. Server Hardware .....	15	Fax Machines .....	43
5. Data Center Infrastructure .....	15	Flash / Compact Media cards .....	43
6. Network Protocols .....	15	Headphones .....	43
7. Network Connectivity .....	16	Keyboards .....	43
8. Network Routers .....	17	Laser Printer Toner Cartridges .....	43
9. Network Switches .....	18	Locally connected USB Printers .....	43
10. Plotters .....	18	Mouses / Track-balls .....	44
11. Printers (Network) .....	19	Removable Media (USB Storage devices, CDs, DVDs) .....	44
12. Scanners .....	20	Technology Specifications .....	45
13. Search Appliance .....	20	Workstation Standard Criteria .....	45
14. Storage Area Network .....	20	Mobile Data Computers (MDC) .....	47
15. Telecommunications .....	21	Network Printer Standard Criteria .....	48
16. Video .....	23	Network Printer Specifications (B/W) .....	49
Software and Application Development		Network Printer Specifications (B/W Multi- Function) .....	49
Standards .....	24	Network Printer Specifications (Color) .....	50
17. Database Development Tools .....	24	Network Printer Specifications (Color, Multi- Function) .....	50
18. Application Development Tools – Windows-based .....	24	Scanner Standard Criteria .....	51
19. Application Server .....	26	Cabling Specification .....	52
20. Backup / Recovery Software .....	26	Video Projector Criteria .....	53
21. Collaboration Tools .....	26	Update Log .....	54
22. Database Standards .....	27	Index .....	56
23. Directory Services .....	28		
24. eMail .....	28		
25. Fonts .....	29		
26. Geographical Application Tools .....	30		
27. Graphic Design Software .....	30		
28. Internet Domain Naming .....	31		
29. Miscellaneous Tools .....	32		
30. Operational Support Tools .....	33		
31. Project Management Tools .....	35		
32. Server Base Software .....	35		
33. Source Code Control System .....	36		
34. Web Tools .....	36		
35. Workstation Software .....	37		

# 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 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.

Support Model Code (used in the tables)	BTS Support Model				
	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	BTS	BTS
<b>Install the product</b> (hardware and software) – Install the product on a server or workstation.	BTS	BTS	Bureau	Bureau	Bureau
			Billable		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 of the product</b> – 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	Bureau	Bureau	Bureau
			Billable		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 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	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 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 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 criteria 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**

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



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

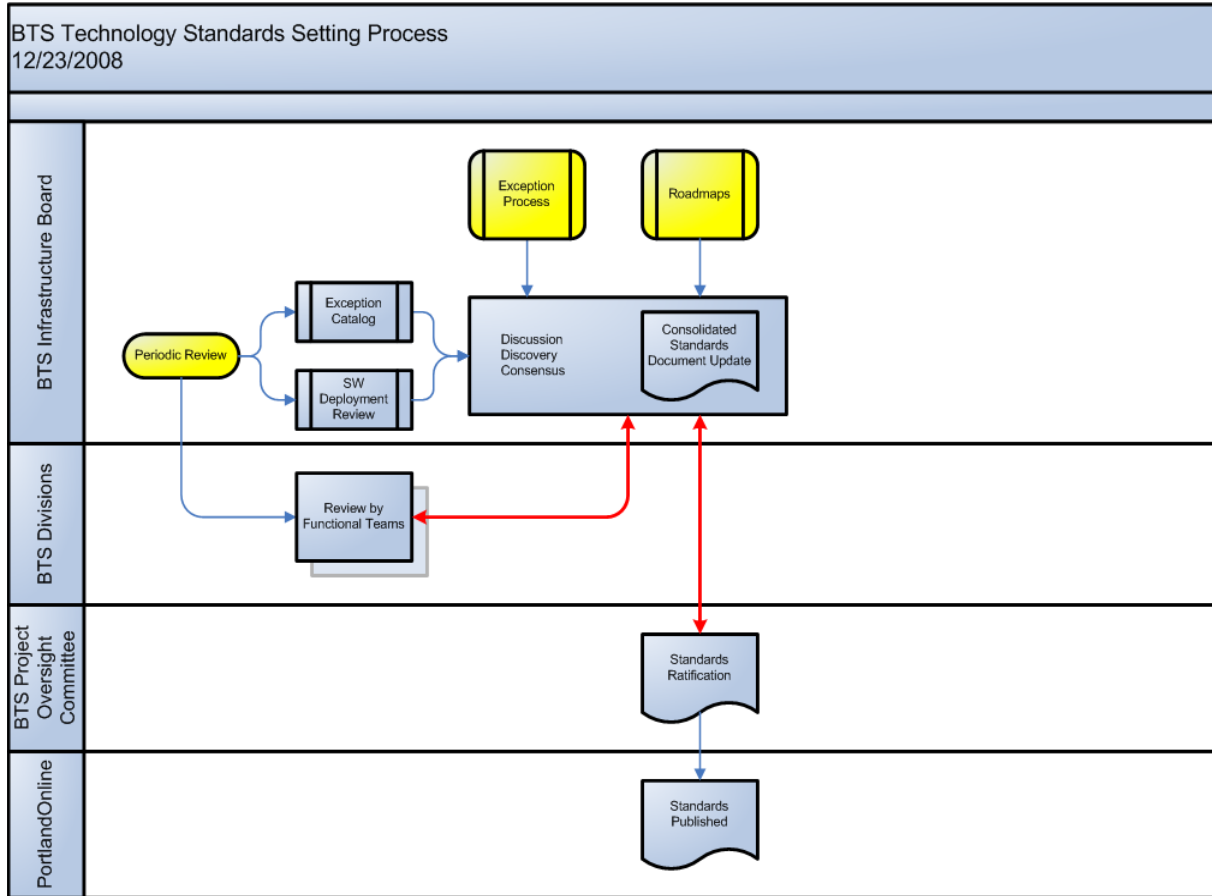
- evaluating the products supporting a standard
- monitoring for patches, updates and end-of-life (EOL) model changes
- bringing patch and update projects forward to the IB and BTS management for action and scheduling
- alerting IB to EOL model changes in order to update this standards document
- working 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 Assistive Technologies







Several products have been included for use as ADA assistive 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 7060 	Standard	Full	Support Center / Hardware Standards Panel
	Dell Optiplex 755, 960, 780, 790, 7010, 7020, 7040, 7050	Legacy	Full	
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	
	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	
1.3. Keyboard	USB, 104-key	Standard	Full	
1.4. Mouse	USB, optical wheel	Standard	Full	
1.5. <span style="color: red;">[ADA]</span> Braille Display / Terminal	Freedom Scientific (Focus Blue) HumanWare (Brailiant)	Allowed	Limited	

### 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 Classification	Support Model	BTS Owner
2.1. Laptop	Dell Latitude 5490 (w/WebCam) 	Standard	Full	Support Center / Hardware Standards Panel
	Dell Latitude 5480, D6xx, E5440, E5450, E5470, E64xx, E65xx	Legacy	Full	
Police	Dell Latitude 7490 	Standard	Full	
	Dell Latitude 7480, E7440, E7450, E7470	Legacy	Full	
2.2. Laptop – “Lite	Dell Latitude 7390 	Standard	Full	
	Dell Latitude D4xx, 7280, 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	GETAC V110  GETAC S410 	Standard	Full	
	Panasonic Toughbook PDRC (dash mounted monitor and wired keyboard)			
	Motorola MW520, Panasonic Toughbook 19, 31, 53)	Legacy	Full	
2.4. Mobile Data Computer – Fire	Panasonic Toughbook GETAC B300 	Standard	Full	
	Data 911 M6, M6 II, PM2, PM1, ETX-PM1, 19	Legacy	Full	

### 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	Limited	Communications / Telecom 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	
3.2. Windows 10	Microsoft Surface Pro 4 ✓ (WiFi only)	Standard	Limited	Support Center / Hardware Standards 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 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.

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

5. 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	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	
4.2. Red Hat based	Dell PowerEdge R630, R730, R740	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 7	Legacy	Full	

#### Server Hardware Notes:

1. 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	
5.2. Infrastructure Management Software	Raritan Sunbird PowerIQ, Sunbird DCIM Raritan Command Console (KVM)	Standard	Full	
	APC StruXureware	Legacy	Full	
5.3. Rack Power Distribution Unit (PDU)	Raritan	Standard	Full	
	APC	Legacy	Full	
5.4. Remote Keyboard, Video, Mouse (KVM)	Raritan KVM over IP	Standard	Full	
5.5. Uninterruptible Power Supply (UPS)	APC	Standard	Full	

#### 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	
6.3. Line Negotiation – Workstation	Auto / Auto	Standard	Full	
6.4. Monitoring	SNMP V2c, SNMPv3, WMI	Standard	Full	
6.5. Power Over Ethernet (POE)	802.3af, 802.3at	Standard	Full	
6.6. Routing	OSPF, BGP4, EIGRP	Standard	Full	
6.7. Transport	TCP / IP (IPv4, IPv6)	Standard	Full	
6.8. Wide Area Network (WAN)	TDM, ISDN, DSL, IEEE802.3, Licensed wireless	Standard	Full	
6.9. WiFi Radio	802.11ac 802.11n (2.4 GHz / 5 GHz)	Standard	Full	
	802.11b/g	Legacy	Full	

### 7. Network Connectivity

Item	Standard Description	Standard Classification	Support Model	BTS Owner
7.1. Cabling	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.  Office or Cubicle See additional notes in the Specifications section on page 52.  New construction: – two Cat 6A or better cables per cubicle. May be used for either voice or data as needed.  Remodel: Will be evaluated case by case due to other constraints.	Standard	Full	Communications / Network Engineering and Support
	Horizontal: UTP Cat 5e	Legacy	Full	



Item	Standard Description	Standard Classification	Support Model	BTS Owner
	Patch: UTP Cat 5e			
7.2. Optical Network	SONET (STS), DWDM (ITU-T, G.709 & G.975), Cisco 15454, 15310	Standard	Full	

**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	
8.2. Components	Cisco T1 DSU/CSU WICS	Standard	Full	
	4-port Ethernet card	Legacy	Full	

### 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	
9.2. Components	SFP connectors, SFP+, QSFP	Standard	Full	

### 10. 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.

### 11. Printers (Network)

Item	Standard Description	Standard Classification	Support Model	BTS Owner
11.1. 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	
11.2. Large Format Laser – 11 x 17	Monochrome: HP M712dn  Color: HP M750dn  HP M855xh  HP CP5225dn 	Standard	Full	
	CP6015, 9050	Legacy	Full	
11.3. Small Multi-function Laser	Monochrome: HP M227fdn  HP M426fdn  HP M725dn  Color: HP M477fdn 	Standard	Full	
	HP M225, M425, M475, M476, CM1312, M1522, M1536, CM2320, M2727	Legacy	Full	

#### Printer Support Note

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 Standards Panel
	HP 8390, HP 8350, HP N8420, HP N8460	Legacy	Full	
12.2. Workstation – sheet-fed, color	Canon DR-225C Canon DR-M160ii	Standard	Full	
	Canon DR-125C, DR-160, DR-2050C, DR-3080CII, DR-2010C, DR-4010C, DR-6010C	Legacy	Full	
12.3. Workgroup – flatbed, color, network attached	HP ScanJet Pro 4500	Standard	Full	
	HP N6350, 7650n	Legacy	Full	
12.4. Large Format – 11 x 17	Canon DR-6030C	Standard	Full	
	HP N9120 Canon DR-7090C	Legacy	Full	

## 13. Search Appliance

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

## 14. Storage Area Network

Item	Standard Description	Standard Classification	Support Model	BTS Owner
14.1. Storage Array	Hitachi Gx00	Standard	Full	Production Services / Storage Administration
14.2. SAN Fabric Network	Fiber Channel Switch: <ul style="list-style-type: none"> <li>Brocade DCX8510</li> <li>Brocade 6520</li> </ul>	Standard	Full	
	14.3. NAS Gateway	Hitachi HNAS	Standard	
14.4. NAS file System Support	CIFS, NFSv3	Standard	Full	
14.5. SAN Replication	FCIP IPEX	Standard	Full	

Item	Standard Description	Standard Classification	Support Model	BTS Owner
14.6. SAN Routing Protocol	FSPF	Standard	Full	
14.7. SAN Transport Protocol	Fiber Channel	Standard	Full	
14.8. 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	
14.9. NAS Replication Switch	Brocade 7840	Standard	Full	

**15. Telecommunications**

Item	Standard Description	Standard Classification	Support Model	BTS Owner
15.1. [ADA] Compliant Handset	CapTel 840i	Standard	Full	Communications / Telecom Engineering and Support
15.2. Broadband Wireless	Dell 5600 Gobi Mobile Broadband mini-card Verizon JetPack MiFi 8800L	Standard	Full	
	Verizon USB 760 Verizon Aircard (EVDO) Verizon MiFi 4620LE Verizon MiFi MHS291L Verizon MiFi 620L Verizon MiFi 7730L	Legacy	Full	
Broadband Wireless Police	Panasonic Sierra Wireless MC 7750 Panasonic Sierra Wireless EM 7355	Standard	Full	
15.3. Cellular Micro Cell	Verizon Network Extender Appliance	Standard	Full	
15.4. Pagers: Emergency	1-WayUSA/Mobility, Cook	Standard	Full	
15.5. Pagers: Non-Emergency	1-Way: USA/Mobility, Cook 2-Way: USA/Mobility	Standard	Full	
15.6. 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	

Item	Standard Description	Standard Classification	Support Model	BTS Owner
15.7. Smartphone <sup>3</sup>	iPhone 6s, 6s Plus, SE, 7, 7 Plus, 8, 8 Plus	Standard	Limited	Communications / Telecom Engineering and Support
	Samsung Galaxy S7	Exception Required	Limited	
	Motorola Droid 3, 4 Motorola Droid X2 Motorola Droid RAZR M Motorola Galaxy S5 iPhone 4s, 5, 5c, 5s, 6, 6 Plus  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.	Legacy	Limited	
15.8. Smartphone Operating System	Android 7.0, 8.0, 9.0	Exception Required	Limited	
	iOS 12.3.1	Standard		
	Android 2.3, 4, 5 iOS 4, 5, 6, 7, 8, 9, 10, 11, 12.0-12.3.0 Windows Mobile 5, 6.0, 6.1, 6.5 Blackberry	Legacy	Limited	
15.9. Basic Cellular Phone	Kyocera Dura LTE	Standard	Full	
	LG VN150s Samsung Convoy 3 (Ruggedized) Samsung Intensity III (basic w/slide out keyboard)	Legacy	Full	
15.10. USB Wireless Cellular Data Modem	Verizon 730L	Standard	Full	
	Pantech 290, 295, 620L	Legacy	Full	
15.11. Tablet		See Tablet Hardware on page 13.		

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

**16. Video**

Item	Standard Description	Standard Classification	Support Model	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 53.	N/A		Communications / Radio and Video Shop  Police (for Police items)
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	
Digital Video Recorder Control Software Police	Interview Tracker	Standard	Full	

# Software and Application Development Standards

## 17. Database Development Tools

Item	Standard Description	Standard Classification	Support Model	BTS Owner
17.1. Editing/Compilingg	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	
	Toad 9.1	Legacy	Full	
17.3. SQL Server Utilities	Redgate SQL Compare Utilities 9.0 SQL Server Management Studio 2016	Standard	Full	
	SQL Server Management Studio 2008, 2012, 2014	Legacy	Full	

## 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	
18.2. Mobile	Microsoft PowerApps Objective C Swift Visual Studio 2017 (Xamarin) Xcode	Standard	Full	



Item	Standard Description	Standard Classification	Support Model	BTS Owner
18.3. Client / Server	Visual Studio 2017	Standard	Full	
	Access XP Developer PowerBuilder Visual Studio 6.0 VS.NET 2003, 2005, 2008, 2010, 2012	Legacy	Full	
18.4. Workstation Based	Access 2016	Legacy	Full	
Workstation Based Police	Access 2013	Standard	Full	
18.5. Reporting Tools	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	Enterprise Business Solutions
	Crystal Reports 8, 9, 10, 11, 2008, 2011	Legacy	Full	
	Tableau Creator which includes Tableau Desktop and Tableau Prep Tableau Explorer Tableau Viewer Tableau Reader – note that Reader cannot access information on Tableau Server, Online or Public. Tableau Online	Allowed	Limited	
	Tableau Public	Exception Required	No Support	
18.6. OLAP	Cognos SAP BW 7.40 SQL Server OLAP Service	Standard	Full	Business Solutions
18.7. Installer	InstallAware InstallShield Windows Installer	Standard	Full	
18.8. Application Testing	Azure DevOps CircleCI	Standard	Full	

Item	Standard Description	Standard Classification	Support Model	BTS Owner
	Composer JMeter JUnit New Relic LoadUI Resharper SOAPUI			

**19. Application Server**

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

**20. Backup / Recovery Software**

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

**21. Collaboration Tools**

Item	Standard Description	Standard Classification	Support Model	BTS Owner
21.1. Online Conferencing	Skype for Business with Microsoft Audio connectivity to the public telephone system	Standard	Full	Support Center / Software Standards Panel

Item	Standard Description	Standard Classification	Support Model	BTS Owner
	Optionally may use a Meet-Me bridge provided by BTS for audio.			
	WebEx Go-To-Meeting (as a participant only)	Allowed	No Support	
	[ADA] Zoom Conferencing	Allowed	Bureau	
<b>21.2.</b> Conference Recording Playback	WebEx Player (ARF format) WebEx Player (WRF format)	Allowed	No Support	
	Office 365 Groups	Standard	Full	
<b>21.3.</b> Group Collaboration	Figma Jira Slack (by exception only)	Allowed	No Support	

**22. Database Standards**

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>22.1.</b> Enterprise Database	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
	SQL Server 2008 SQL Server 2008 R2 Oracle 11g	Legacy	Full	
	<b>22.2.</b> Enterprise Database Client	Oracle 12c Client Oracle 11g client	Standard Legacy	
<b>22.3.</b> Workstation Based	Access 2016 SQL Server Express SQL Lite	Standard	Full	Business Solutions
	Access 97, XP, 2000, 2013	Legacy	Full	
Workstation Based - Police	Access 2013	Standard	Full	
<b>22.4.</b> Database Connector Protocol	ODBC OLE DB	Standard	Full	

Item	Standard Description	Standard Classification	Support Model	BTS Owner
	XML JDBC ADO			

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.</b> Directory Services	Microsoft Active Directory	Standard	Full	Production Services / Server Support

### 24. eMail

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>24.1.</b> Server Software	Microsoft Office 365 Exchange Online Exchange Server 2013 (Police)	Standard	Full	Production Services / Server Support
<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	
<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 MyEmma	Allowed	No Support	
<b>24.7.</b> eMail Filing Tool	SimplyFile	Allowed	No Support	

## 25. Fonts

Item	Standard Description	Standard Classification	Support Model	BTS Owner
25.1. Standard Fonts	Windows 7 built-in Windows 10 built-in Microsoft Office and Office 365 built-in Open Sans	Standard	Full	Support Center
25.2. Allowed Fonts	Adobe Creative Cloud built-in	Allowed	Limited	
25.3. Non-Standard Fonts	Any font not included in 24.1 or 24.2.	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
26.1. GIS Application Development	Visual Studio 2010, 2015, 2017 ArcObjects 10.1, 10.2, 10.3 ArcEngine 10.1, 10.2, 10.3 ArcGIS Runtime 100.2 Eclipse XCode ESRI Java Script API	Standard	Full	Business Solutions
	Visual Studio .NET 2003, 2005, 2008 MapObjects Visual Basic 6 Visual Basic for Applications	Legacy	Full	
26.2. GIS Desktop Applications	ArcGIS 10.3.1 MapWorks 10.3.1	Standard	Full	
	ArcView 3.3/3.4 Microstation (MGE) MapInfo GeoOutlook	Legacy	Full	
26.3. GIS Internet Map Server	ArcGIS Server 10.5.1	Standard	Full	
26.4. Mapping Software	Google Earth Pro (free version)	Standard	Limited	Support Center

## 27. Graphic Design Software

Item	Standard Description	Standard Classification	Support Model	BTS Owner
27.1. 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	
27.2. PDF Creation	Adobe Acrobat Standard or Professional DC Adobe LiveCycle Designer Office 2013 built-in	Standard	Full	

Item	Standard Description	Standard Classification	Support Model	BTS Owner
	Adobe Acrobat Standard or Professional 9, 10, XI PDFCreator	Legacy	Full	
<b>27.3.</b> Graphic Design	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	
	Adobe Creative Suite 1, 2, 3, 4, 5, 5.5, 6 Publisher 2003, 2007, 2010, 2013	Legacy	Limited	
Graphic Design police	Microsoft Publisher 2013 Sony Vegas 15 Pro (Police)	?		Public Safety Technology
<b>27.4.</b> Screen Capture	Camtasia Greenshot Snagit	Allowed	Limited	Support Center / Software Standards Panel
<b>27.5.</b> Computer Aided Design	Sketchup Pro Sketchup Viewer	Allowed	No Support	

**28. 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.

**29. Miscellaneous Tools**

Item	Standard Description	Standard Classification	Support Model	BTS Owner
29.1. Clipboard Manager	Ditto	Allowed	No Support	Business Solutions
29.2. Enterprise Fax	AccuRoute FAX	Standard	Full	Production Services / Server Support
29.3. Enterprise Paging	OmniTrend PageMaster	Standard	Full	Production Services / Server Support
29.4. FTP Client	FileZilla ( <a href="http://filezilla-project.org">http://filezilla-project.org</a> ) Internet Explorer  Note: See Storage Services and Devices on page 41.	Standard	Full	Support Center / Software Standards Panel
29.5. Log Viewer	Baretail Pro Glogg LogFusion Pro Note the free version <b>IS NOT</b> licensed for government use. LogJoint	Allowed	No Support	Business Solutions
29.6. Online Training Content Editor  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. [ADA] Screen Magnifier	ZoomText MAGic	Allowed	Limited	Enterprise Architecture
29.9. [ADA] Speech to Text	Dragon Naturally Speaking	Standard	Limited	Business Solutions
29.10. Statistical Analysis	R R Studio	Allowed	No Support	Support Center / Software Standards Panel
29.11. Survey Application	Survey Monkey (web application)	Allowed	Limited	Support Center / Software Standards Panel
29.12. Terminal Emulation (3270)	Micro Focus Reflection Desktop 2016 OpenText HostExplorer OpenText Exceed	Allowed	No Support	Production Services / Data Center
	Reflection 2011	Legacy	No Support	



Item	Standard Description	Standard Classification	Support Model	BTS Owner
	Attachmate Extra Extreme			
<b>29.13.</b> 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
<b>29.14.</b> [ADA] Text to Speech	Screen Readers JAWS NVDA  Text Only TextHelp	Allowed	Limited	Enterprise Architecture
<b>29.15.</b> [ADA] Video Remote (Language) Interpreting	LanguageLine	Allowed	No Support	Enterprise Architecture
<b>29.16.</b> [ADA] Video Relay Service	Convo ZVRS	Allowed	Limited	Enterprise Architecture
<b>29.17.</b> Wiki	ScrewTurn Wiki TikiWiki	Standard	Full	Business Solutions Production Services
<b>29.18.</b> XML Editor	Notepad++ 7.x XML Notepad 2007 Oxygen	Standard	Full	Business Solutions / Vertical Applications
<b>29.19.</b> Meeting Scheduler	FindTime plug-in for Outlook	Allowed	No Support	Support Center / SET

### 30. Operational Support Tools

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>30.1.</b> Asset Inventory	Altiris Asset Management	Standard	Full	Support Center / SET
<b>30.2.</b> Automated Inventory	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.</b> Monitoring	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
Police	PAESSLER PRTG Network Monitoring 18.3	Standard	Full	Public Safety Technology
<b>30.4.</b> Software Distribution	Altiris Client Management Suite	Standard	Full	Support Center / SET
<b>30.5.</b> Work Order Ticketing	Cherwell Redmine (software development issue tracking)	Standard	Full	Support Center / SET
<b>30.6.</b> Workstation Remote Control	Bomgar	Standard	Full	Support Center / SET
<b>30.7.</b> Server Remote Control	Microsoft Remote Desktop Services (RDS)	Standard	Full	Production Services / Server Support
<b>30.8.</b> Printer Management	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 2016  Note: With Office 365 2016, Microsoft blocks installation of Office 365 2016 simultaneous with the perpetual version of Project 2016. If Project 2016 is to be used, the subscription version must be installed. Perpetual licensed versions of Project 2013 or 2010 may be installed simultaneously.	Standard	Full	Project Management Office
	Microsoft Project 2010, 2013  Note: <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	
31.2. Project Portfolio Management (PPM) Software	Plainview PPM Pro (formerly Innotas)	Standard	Full	

### 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	Standard	Full	Production Services / Server Support
	Windows Server 2008, 2008R2, 2012, 2012 R2	Legacy	Full	
	Red Hat Enterprise 7.x	Standard	Full	
	Red Hat Enterprise 6.x	Legacy	Full	
	AIX 7.x, 8.x	Legacy	Full	
	MS IE 11	Standard	Full	

Item	Standard Description	Standard Classification	Support Model	BTS Owner
32.2. Base Software (Windows)	Windows Remote Desktop McAfee SNOW			
	MS IE 8, 9, 10	Legacy		
32.3. Virtualization Hypervisor	VMWare VSphere 6 IBM VIO 2.2	Standard	Full	

### 33. Source Code Control System

Item	Standard Description	Standard Classification	Support Model	BTS Owner
33.1. Source Control	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	

### 34. Web Tools

Item	Standard Description	Standard Classification	Support Model	BTS Owner
34.1. Content Management and Page Development Tools	DreamWeaver City Site / Content Management Tool Eclipse Drupal	Standard	Full	Business Solutions
	Cold Fusion Studio	Legacy	Full	
34.2. Site Management Tools	DreamWeaver	Standard	Full	
34.3. Runtime Environment Tools	ColdFusion Server MX Java 1.8.x .NET Core .NET Framework Bootstrap	Standard	Full	
34.4. Web Application Development	Visual Studio 2017 Cold Fusion Studio Docker / Lando	Standard	Full	

Item	Standard Description	Standard Classification	Support Model	BTS Owner
	Eclipse Figma Oracle J Developer WAVE [ADA] Web Accessibility tool			
<b>34.5.</b> HTML Version	HTML 5.x	Standard	Full	
<b>34.6.</b> HTTP Inspectors	Fiddler Postman	Standard	Full	
<b>34.7.</b> Scripting Languages	.NET ColdFusion JavaScript PERL PHP Powershell Python VBScript	Standard	Full	
<b>34.8.</b> Video Encoding	Real Producer	Legacy	Full	
<b>34.9.</b> Web Server	Microsoft IIS 10.x Apache/Tomcat 9.x	Standard	Full	
	Microsoft IIS 5.0, 6.0, 7.x, 8.x, Apache 7.x, 8.x	Legacy	Full	
<b>34.10.</b> Web Browser	Microsoft Internet Explorer 11, Edge	Standard	Full	Support Center
	Chrome (with current update)	Allowed	Limited	
	Firefox Safari	Exception Required	No Support	

**35. Workstation Software**

Item	Standard Description	Standard Classification	Support Model	BTS Owner
<b>35.1.</b> Operating System	Windows 7 SP1 Windows 10 Version 1809	Standard	Full	Support Center / Software Standards Panel
<b>35.2.</b> Base Software	Adobe Reader DC Windows Media Player 11 McAfee Endpoint Security 10 (with current update) Adobe Flash Player 12 (with current update) Microsoft DirectX 11	Standard	Full	

Item	Standard Description	Standard Classification	Support Model	BTS Owner
	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			
	Adobe Reader X, XI Cyberlink Power DVD (OEM) Internet Explorer 9 Java 6, 7 Nero Express (OEM)	Legacy	Full	
<b>35.3.</b> Microsoft Office Suite	MS Office 365 ProPlus 2016 / 32-bit via Office 365 subscription (Word, Excel, PowerPoint, Access, OneNote, Publisher, Skype for Business [ADA], OneDrive for Business)	Standard	Full	
	MS Office 365 ProPlus 2016 / 64-bit via Office 365 subscription (Note that the 32-bit Office suite is the default standard)	Allowed	Full	
	MS Office 2007, 2013	Legacy	Full	
Police	MS Office 2013 / 64-bit	Standard	Full	
<b>35.4.</b> eMail Client	MS Outlook 2016	Standard	Full	
	MS Outlook 2007, 2013	Legacy	Full	
Police	MS Outlook 2013	Standard	Full	
<b>35.5.</b> Media Player	Windows Media Player 11	Allowed	Full	
	VLC Client			
<b>35.6.</b> CD/DVD Creation	Windows built-in	Standard	Full	
	Roxio Creator (OEM)	Legacy	Full	
<b>35.7.</b> Workstation Database	See Database Standards, page 27.			
<b>35.8.</b> Firewall	Windows Firewall	Standard	Full	Information Security
<b>35.9.</b> Password Safe	KeepPass	Allowed	No Support	Information Security
<b>35.10.</b> ZIP File Compression	Windows 7 built-in Zip utility 7-Zip	Allowed	No Support	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. Two-Factor	RSA Secure ID, Digital Certificate	Standard	Full	
36.3. Single Sign On (Police)	Imprivata OneSign	Standard	Full	
36.4. WiFi	Authentication Protocols EAP-TLS , PEAP Certificate provisioning: Autoenrollment via AD	Standard	Full	
36.5. RADIUS	Cisco ISE	Standard	Full	Communications / Network Engineering and Support

## 37. Encryption

Item	Standard Description	Standard Classification	Support Model	BTS Owner
37.1. Data Storage	AES	Standard	Full	Information Security
	3DES	Legacy	Full	
37.2. Web Traffic	TLS 1.2, 1.3	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	
37.3. Secure FTP	SFTP (FTP over SSH)	Standard	Full	
37.4. WiFi Networks (transport)	WPA2 802.11i	Standard	Full	



### 38. Patch Management

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

### 39. Remote Network Access

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

### 40. 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.

### 41. Virus Protection

Item	Standard Description	Standard Classification	Support Model	BTS Owner
41.1. Workstation	McAfee Endpoint Security 10 (with current update)	Standard	Full	Support Center
41.2. Server	McAfee	Standard	Full	Production Services
41.3. Internal Mail	McAfee	Standard	Full	
41.4. Console	McAfee ePO	Standard	Full	

<b>Item</b>	<b>Standard Description</b>	<b>Standard Classification</b>	<b>Support Model</b>	<b>BTS Owner</b>
<b>41.5.</b> Web Filtering	McAfee (via 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. 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. See General USB Device Guidance above.
- Support from BTS is not part of the SLA and will be billable. **Note: Installations on Windows 7 or 10 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. See General USB Device Guidance above.

### ***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 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 at SanDisk's web site. See [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).
- 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> generations processor, 64-bit (i5).
- 8 GB RAM memory.
- 256 GB Solid-State Drive (SSD)
  - Police: 500GB HD with 16GB Optane memory (Workstation only)
- 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:  
<https://www.portlandoregon.gov/bts/60679>.

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

- Standard
  - 14" 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 standard laptop with the following modification.
  - 13.3" LED display.
- Police – same as standard laptop with the following modifications.
  - Built-in LTE
  - Keyboard with integrated fingerprint reader and smartcard reader
- Ruggedized
  - weather proof, shock resistant.

- 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, 64-bit (i5).
- 8 GB DDR3 RAM memory.
- Intel® HD Graphics 4600
- 256 GB Solid-State Drive (SSD)
- DVD +/- RW Optical single layer drive.
- 13" 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/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	M607dn	M608dn/x	M712dn High Volume Large Format
Print Speed-Black (ppm: pages / minute)	40	45	55	65	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	250,000	275,000	100,000
Recommended monthly duty cycle	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
11 x 17 (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 (B/W Multi-Function)**

Feature	M227fdn	M426fdn	M725dn Large Format
Print Speed-Black (ppm: pages / minute)	30	40	40
Print Resolution (dpi: dots per inch)	1200 x 1200	600 x 600	1200 x 1200
Monthly duty cycle (pages)	30,000	80,000	200,000
Recommended monthly duty cycle	250-2,500	750-4,000	5,000-20,000
Memory: Standard	256 MB	256 MB	1 GB
Memory: Max	256 MB	256 MB	1.5 GB
Paper Trays: Std	2	2	3
Paper Trays: Max	2	3	6
Duplex Printing	Auto/Std	Auto/Std	Auto/Std
11 x 17 (Large Format)	No	No	Yes
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
Max Scan Resolution (dpi)	1,200	1,200	600
Scan Speed (ppm)	12	21 ppm / 30 ipm color 26 ppm / 47 ipm B/W	30 ppm / 14 ipm color 49 ppm / 19 ipm B/W
Scan size	8.5x11.7 flat 8.5x14 doc feed	8.5x11.7 flat 8.5x14 doc feed	11 x 17
Copy Speed (cpm)	30	40	
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	300 x 300

**Network Printer Specifications (Color)**

Feature	M452dn	CP5225dn Large Format	M553dn/x	M653dn	M750dn Large Format	M855xh Large Format
Print Speed-Black / color (ppm:pages / minute, normal quality)	28 / 28	20 / 20	40 / 40	60 / 60	30 / 30	45 / 45
Resolution (dots per inch)	600 x 600	HP ImageREt 3600	HP ImageREt 3600	HP ImageREt 3600	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	2,000-6,000	2,000-17,000	2,500-13,000	4,000-17,000
Memory: Standard	256 MB	192 MB	1 GB	1 GB	1 GB	1 GB
Memory: Max	256 MB	448 MB	2 GB	2 GB	1 GB	1 GB
Paper Trays: Std	2	2	dn:2 x:3	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 / Silver	Yes / Silver	Yes / Silver	Yes / Silver	Yes / Silver	Yes
HP ePrint	Yes	No	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 HP ImageREt 3600
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 / No
HP ePrint	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: 8.5 x 11.7 ADF: 8.5 x 14
Copy Speed	28 copies/minute
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.

Type	Native Resolution	Speed (BW)	Max scan size	Connectivity	Type	Doc Feed
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.

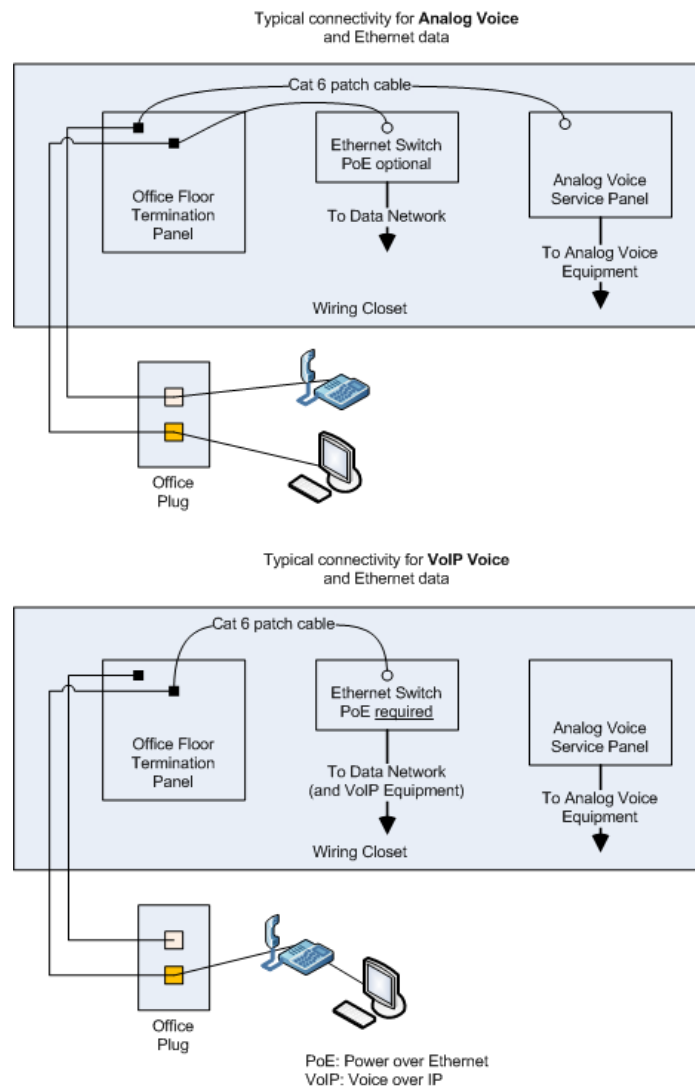
## Cabling Specification

### 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**

<b>Attribute</b>	<b>Ultra Portable</b>	<b>Portable</b>	<b>Ceiling Mounted</b>
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	Standard Classification / Support Model
2/11/19	14.8 Smartphone Operating System	iOS 12.1.4 iOS 12.1.1 – 12.1.3	Standard / Limited Legacy / Limited
2/19/19	1.1 Desktop Hardware	Dell Optiplex 7060 Dell Optiplex 7050	Standard / Full Legacy / Full
	20.1 Online Collaboration	Skype for Business Audio  Microsoft Audio BTS Meet-Me Bridge British Telecom	Standard / Full Standard / Full Removed
3/5/19	24. Fonts	Section Added	As shown
	13.9 NAS Replication Switch (Item added)	Brocade 7840	Standard / Full
3/19/19	31.1 Server Operating System	Windows Server 2019 64-bit	Standard
	28.19 Meeting Scheduler	FindTime plug-in for Outlook	Allowed / No Support
	14.2 Broadband Wireless	Verizon JetPack MiFi 7730L	Standard / Full
		Verizon JetPack MiFi 8800L	Legacy / Full
	24. Fonts	Adopted this section	
24.1 Standard Fonts	Open Sans	Standard / Full	
4/16/19	29.8 Printer Management	PaperCut Pro	Standard / Full
5/14/19	34.1 Workstation Operating System	Windows 10 Version 1809	Standard / Full
	3.1 iOS Tablet hardware	iPad Mini 5 iPad Air 3	Standard / Limited
		iPad Mini 3, 4 iPad 6 iPad Pro 11	Legacy / Limited
	New Section 5 Data Center Infrastructure	As listed	Standard / Full Legacy / Full
	Support Model	Updated as shown	
6/4/19	15.8 Smartphone Operating System	12.3.1 12.1.4	Standard / Full Legacy / Full

<b>Date</b>	<b>Item</b>	<b>Standard Description</b>	<b>Standard Classification / Support Model</b>
7/9/19	MDC Technology Specifications	Updated as shown per GETAC B300 specs at the time of adoption	
	EPEAT Rating	Updated as shown per EPEAT database	

# Index

.NET .....	37	Ansible .....	41
.NET Core .....	36	Apache .....	37
.NET Framework .....	36	APC	
.NET Framework .....	37	environmental monitors .....	15
7-Zip .....	38	PDU .....	15
802.11 .....	16	StruXureware .....	15
802.3 .....	16	UPS .....	15
Active Directory .....	28	Apple	
Actuate .....	25	Air .....	13
<b>ADA</b>		dictation feature .....	13
<b>ADA</b> Assistive Technologies .....	10	iOS .....	13, 22
Braille Display / Terminal .....	11	iPad .....	13
language interpreting .....	33	iPhone .....	22
phone handset .....	21	Mini .....	13
screen magnifier .....	32	Application Development Tools	
Skype for Business .....	26, 38	mobile apps .....	24
speech to text .....	32	Windows based .....	24
text to speech .....	33	Application Server .....	26
video relay service .....	33	Application Testing Tools .....	25
video remote interpreting (VRI) .....	33	ArcEngine .....	30
voice recognition .....	32	ArcGIS .....	30
WAVE .....	36	ArcObjects .....	30
Web accessibility tool .....	36	Arista	
Zoom Conferencing .....	27	router .....	17
Adobe		switch .....	18
Acrobat .....	30	Aruba switch .....	18
Captivate .....	32	Asset Inventory .....	33
Creative Cloud .....	31	Attachmate	
DreamWeaver .....	31, 36	Extra Extreme .....	32
Fireworks .....	31	Reflection .....	32
Flash .....	31, 37	Authentication	
Illustrator .....	31	single sign-on .....	40
InDesign .....	31	WiFi .....	40
LiveCycle Designer .....	30	Windows .....	40
Photoshop .....	31	Azure DevOps .....	25
Premier / Premier Pro .....	31	Backup .....	26
Reader .....	37	Baretail .....	32
AIX .....	35	BGP4 .....	16
AIX Server .....	15	Blank Media .....	44
Altiris .....	33, 34	Bluetooth general guidance .....	43
patch management .....	41	Bomgar .....	34
Android .....	22	Bootstrap .....	36
AnkhSVN .....	36	Braille Display / Terminal <b>[ADA]</b> .....	11



Broadband Wireless .....	21	Cognos .....	25
Brocade .....	20, 21	ColdFusion .....	24, 36, 37
Brocade Network Advisor .....	34	Collaboration .....	26
Bulk eMail Service .....	28	CommVault .....	26
Business Objects Enterprise .....	25	Composer .....	25
Cabling .....	16	Computer	
Cacti .....	34	desktop .....	11
CAD..... See Computer Aided Design		laptop .....	12
Calendar Publishing .....	32	Computer Aided Design .....	31
Camera		Conferencing .....	26
desktop .....	23	ControlPoint .....	23
digital .....	43	Convo [ADA] .....	33
Logitech .....	23	Cook pager .....	21
Microsoft .....	23	Creative Suite .....	31
Camtasia .....	31	Crystal Reports .....	25
Canon scanner .....	20	Data Center Infrastructure .....	15
CapTel phone [ADA] .....	21	Database	
Captivate .....	32	client .....	27
CATTools .....	41	connector protocol .....	27
CD .....	44	enterprise .....	27
CD Creation .....	38	Microsoft Access .....	27
Cellular		workstation .....	27
micro cell .....	21	Database Development Tools .....	24
MiFi .....	21	DCNM .....	34
phone .....	22	Dell	
USB cellular data modem .....	22	desktop .....	11
wireless .....	21	laptop .....	12
Cherwell .....	34	Latitude .....	12
Chrome .....	37	monitor .....	11
CIFS .....	20	Optiplex .....	11
CircleCI .....	25	PowerEdge .....	15
Cisco		XFR .....	12
DSU/CSU .....	17	Desktop	
fabric switch .....	20	computer .....	11
Nexus .....	17	firewall .....	38
RADIUS .....	40	Developer Tools	
router .....	17	applications .....	24
SFP connector .....	18	database .....	24
SONET .....	17	Dictation .....	13
switch .....	18	Digital Certificate .....	40
Client		Digital Video Recorder .....	23
eMail .....	38	Directory Services .....	28
FTP .....	32	Display Monitor .....	11
NetMotion .....	41	Ditto .....	32
VPN .....	41	Docker .....	36
Clipboard Manager .....	32	Dragon Naturally Speaking [ADA] .....	32

DreamWeaver .....	31, 36	Fonts .....	29
Drupal.....	36	Freedom Scientific Focus Blue [ADA] .....	11
DSU/CSU .....	17	FTP client.....	32
DVD.....	44	Galaxy S7.....	22
DVD Creation .....	38	General Guidance	
DVR.....	23	Bluetooth .....	43
Eclipse.....	30, 36	USB .....	43
Edge.....	37	GETAC.....	12
EIGRP .....	16	GIS	
eMail		application development .....	30
bulk service.....	28	ArcEngine .....	30
client .....	28, 38	ArcGIS .....	30
filing tool .....	28	ArcObjects .....	30
server.....	28	desktop applications .....	30
synchronization.....	28	mapping server.....	30
Encryption .....	44	MapWorks .....	30
Encryption protocols		Git / GitHub .....	36
AES .....	40	Glogg.....	32
FTP.....	40	Gobi.....	21
SSL.....	40	Golden.....	24
TLS.....	40	Google	
WiFi .....	40	Chrome.....	37
Energy Efficiency		Earth Pro .....	30
Energy Star®.....	8	Go-To-Meeting .....	27
EPEAT.....	8	Grafana .....	34
Environmental Monitors.....	15	Graphic Design Software .....	30
ESRI		GrayLog .....	34
Insights .....	25	Greenshot .....	31
Java Script API .....	30	Grid Control.....	34
EWS .....	See eMail Synchronization	Groups .....	27
Exceptions.....	3	Hardware	
Extra Extreme .....	32	standards.....	11
FAX .....	32	HCP Anywhere.....	21
Fax Machine.....	43	Headphones.....	43
Fiber Channel.....	21	Hitachi .....	20
Fiddler .....	37	HCP Anywhere .....	21
Figma .....	27, 36	NAS .....	20
File Sharing .....	21	SAN .....	20
FileZilla.....	32	Hitachi Tuning Manager .....	34
FindTime .....	33	HP	
Firefox .....	37	printer .....	19
Firewall desktop .....	38	scanner.....	20
Fireworks.....	31	Universal Print Driver (UPD).....	48
Flash .....	31	HPE Aruba switch .....	18
Flash Media cards.....	43	HTML .....	37
Flat Panel Monitor .....	11	HumanWare Brailiant [ADA] .....	11

HVSR .....	34	Laptop Computer .....	12
IBM		Latitude .....	12
server.....	15	LCD Monitor .....	11
VIO .....	36	LCR.....	11
IE37		Learning Management System Content	
IIS.....	37	Editor .....	32
Illustrator .....	31	Lifecycle	
Imprivata .....	40	desktop computer .....	11
InDesign .....	31	laptop computer .....	11
INET .....	16	server.....	15
InFocus		tablet device .....	13
projector.....	23	Linux.....	35
Informix .....	27	Linux Server .....	15
Infrastructure Management Software .	15	LiveCycle Designer .....	30
Innotas .....	35	LMS Content Editor .....	32
InstallAware.....	25	LoadUI.....	25
Installers.....	25	Locally connected printer .....	43
InstallShield.....	25	Log viewer.....	32
Internet Domain Naming .....	31	LogFusion .....	32
Internet Explorer.....	32, 37	Logitech camera.....	23
iOS .....	13, 22	LogJoint.....	32
dictation feature .....	13	Macroplant iExplorer .....	33
iPad .....	13	MAGic [ADA].....	32
iPhone .....	22	Manage Engine OpManager .....	34
Iridium .....	21	MapWorks .....	30
IRNE.....	16	McAfee.....	35, 37, 41, 42
J Developer .....	36	MDC .....	12, 47
Java.....	36, 37	Meeting Scheduler .....	33
application server.....	26	Micro Cell .....	21
JavaScript .....	37	Micro Focus Reflection.....	32
JAWS [ADA].....	33	Microsoft	
Jira .....	27	.NET Framework.....	37
JMeter .....	25	Access .....	25, 27
Juniper		Active Directory.....	28
Pulse.....	41	camera.....	23
switch.....	18	DirectX.....	37
VPN .....	41	Edge .....	37
KeePass.....	38	Groups.....	27
Kerberos.....	40	IIS .....	37
Keyboard.....	11, 43	Internet Explorer .....	32, 35, 37
KVM .....	15	Office .....	38
Raritan Command Console .....	15	Office 365 .....	38
Kyocera .....	22	Outlook .....	28, 38
Lando .....	36	Outlook Web App.....	28
Language Interpretation [ADA].....	33	Power BI .....	25
LanguageLine [ADA].....	33	Project .....	35

Publisher.....	31	Office 365.....	38
RDS.....	34	Groups.....	27
Remote Desktop Services .....	34	OLAP.....	25
SCCM.....	41	Online Conferencing.....	26
SCOM.....	34	Online Training Content Editor .....	32
Silverlight.....	37	OpenNMS .....	34
SQL Server.....	27	OpenText	
Surface Pro.....	13	Exceed.....	32
Team Foundation Server .....	36	HostExplorer.....	32
TFS.....	36	Operating System	
Visio.....	30	AIX.....	35
Visual Studio.....	24, 30, 36	Android .....	22
Windows .....	37	iOS.....	22
Windows Media Player .....	38	Linux.....	35
Windows Server.....	35	Red Hat .....	35
Windows Update for Business .....	41	server.....	35
MiFi .....	21	smartphone.....	22
Mobile Data Computer .....	12, 47	VMWare.....	36
Monitor .....	11	Windows .....	37
Monitoring .....	34	Windows Server.....	35
Mouse .....	11, 44	workstation .....	37
MySQL .....	27	Operational Support Tools .....	33
NAS		OpManager .....	34
gateway .....	20	Oracle	
replication .....	21	application server.....	26
NetDisco.....	34	client .....	27
NetMotion.....	41	database.....	27
Network		Grid Control .....	34
cabling .....	16	J Developer .....	36
connectivity.....	16	SQL Developer .....	24
DSU/CSU .....	17	WebLogic.....	26
INET .....	16	OSPF .....	16
IRNE.....	16	Outlook.....	28
optical .....	17	Outlook Web Access .....	28
protocols.....	15	Oxygen.....	33
routers .....	17	PAESSLER PRTG Network Monitoring	
SONET .....	17	.....	34
switch.....	18	PageMaster.....	32
T1 .....	16	Pager.....	21
Network Advisor .....	34	server.....	32
Network Attached Storage .....	20, 21	Panasonic	
New Relic .....	25	Toughbook.....	12
Nexus .....	17	Toughpad .....	13
NFS .....	20	PaperCut Pro .....	34
Notepad++ .....	33	Password safe.....	38
NVDA [ADA].....	33	Patch Management .....	41

PDF Creation .....	30	SAN transport .....	21
PDFCreator .....	30	SMTP.....	16
PDU.....	15	SNMP .....	16
PELCO .....	23	TCP / IP .....	16
PERL.....	37	transport .....	16
Phones		WAN .....	16
[ADA] compliant.....	21	Wide Area Network.....	16
basic cellular phone .....	22	WiFi .....	16
satellite .....	21	WMI .....	16
smartphone.....	22	p-Series server.....	15
Photoshop .....	31	Python .....	37
PHP.....	37	R 32	
PL/SQL.....	24	R Studio .....	32
PLEdit.....	24	Rack PDU .....	15
Plotly .....	25	RadiolP .....	41
Plotter.....	18	Raritan.....	15
PostgreSQL.....	27	Command Console .....	15
Postman.....	37	KVM.....	15
Power Distrubution Unit.....	15	RazorSQL .....	24
Power over Ethernet (PoE) .....	16	Real Producer .....	37
PowerEdge.....	15	Red Hat Linux .....	35
PowerShell .....	37	Redgate.....	24, 34
Premier / Premier Pro.....	31	Redmine.....	34
Printer.....	19	Reflection .....	32
11 x 17.....	19	Remote Control	
color.....	19	server.....	34
large format .....	19	workstation .....	34
laser.....	19	Remote KVM.....	15
locally connected .....	43	Remote Network Access.....	41
multi-function laser.....	19	Removable Media .....	44
printer management.....	34	Reporting Tools.....	25
Project Management Tools .....	35	OLAP .....	25
Projector.....	23	Resharper .....	25
Protocols		Router .....	17
802.11.....	16	components .....	17
802.3.....	16	Roxio .....	38
BGP4 .....	16	RSA.....	40
database connector .....	27	Safari.....	37
EIGRP .....	16	Samsung	
eMail.....	16	Galaxy .....	22
monitoring.....	16	SAN.....	See Storage Area Network
network .....	15	SAP BW .....	25
OSPF.....	16	SAP GUI.....	37
power over ethernet (PoE).....	16	Satellite Phone .....	21
routing.....	16	Scanner.....	20
SAN routing .....	21	11 x 17.....	20

flatbed.....	20	SONET.....	17
large format .....	20	Sony Vegas.....	31
network attached .....	20	Sophos.....	42
sheetfed.....	20	Source Code Control System.....	36
workgroup.....	20	Speakers.....	43
SCCM.....	41	Specifications	
SCOM .....	34	cabling .....	52
Screen Capture .....	31	MDC .....	47
ScrewTurn Wiki.....	33	printers.....	48
Search Appliance.....	20	scanners .....	51
Security certificates .....	40	video projector .....	53
Server		workstation .....	45
AIX.....	15	Speech to Text.....	32
application .....	26	SQL Server .....	27
base software .....	35	SQL Server Management Studio .....	24
Dell .....	15	SQL Server OLAP Service .....	25
eMail.....	28	SQL utilities.....	24
GIS mapping.....	30	SSRS .....	25
IBM .....	15	Standards	
linux .....	15	classifications defined.....	5
paging.....	32	exceptions to .....	3
p-Series .....	15	fonts.....	29
web .....	37	owner.....	8
wiki.....	33	process .....	9
Windows .....	15	rationale.....	3
Server Hardware .....	15	support models .....	5
Server Studio .....	34	Statistical Analysis Tools.....	32
SFP connectors.....	18	Storage Area Network	
Silverlight.....	37	NAS gateway .....	20
SimplyFile.....	28	NAS replication.....	21
Single sign-on .....	40	routing protocol.....	21
Sitescope .....	34	SAN fabric .....	20
Sketchup .....	31	SAN replication.....	20
Skype for Business.....	26	storage array .....	20
Skype for Business <b>[ADA]</b> .....	26, 38	transport protocol.....	21
Slack .....	27	Subversion/Visual SVN .....	36
SMARSH.....	33	Support Models .....	5
Smartphone.....	22	Surface Pro .....	13
SMTP .....	16	Survey Monkey .....	32
Snagit.....	31	Surveys .....	32
SNMP.....	16	SwiftType .....	20
SNOW.....	33, 35	Switch	
SOAPUI.....	25	Arista .....	17, 18
Software Distribution .....	34	Aruba.....	18
SolarWinds.....	34	Cisco.....	17, 18
SOLR .....	20	components.....	18

HPE Aruba.....	18	Video Relay Service [ADA].....	33
Juniper.....	18	Video Remote Interpreting (VRI) [ADA]	
layer 2.....	18	.....	33
layer 3.....	17	Virus Protection.....	41
Symantec Backup Exec.....	26	Visio.....	30
Syslog.....	34	Visual SourceSafe.....	36
T1.....	16	Visual Studio.....	24, 36
Tableau.....	25	VLC Client.....	38
Tablet.....	13	VMWare.....	36
TCP / IP.....	16	vROPs.....	34
Team Foundation Server.....	36	Voice Recognition.....	32
Terminal Emulation.....	32	VPN.....	41
Text Message Capture.....	33	vROPs.....	34
TextHelp [ADA].....	33	WAVE [ADA].....	36
TFS.....	36	Web	
Thumb Drive.....	44	browser.....	37
TikiWiki.....	33	content management.....	36
Toad.....	24, 34	tools.....	36
Tomcat.....	26, 37	Web accessibility tool [ADA].....	36
Toner Cartridges.....	43	WebEx.....	27
TortoiseSVN.....	36	player.....	27
Toughbook.....	12	WebLogic.....	26
Track-ball.....	44	Webroot.....	42
Training Content Editor.....	32	WebSphere.....	26
Tuning Manager.....	34	Widescreen Monitor.....	11
Two Factor Authentication.....	40	Wiki.....	33
Uninterruptible Power Supply.....	15	WinCalendar.....	32
uPerform.....	32	Windows.....	37
UPS.....	15	Remote Desktop.....	35
USA/Mobility pager.....	21	Server.....	15, 35
USB		Windows Installer.....	25
camera.....	23	Wireless	
cellular data modem.....	22	broadband data.....	21
general guidance.....	43	pager.....	21
printer.....	43	USB cellular data modem.....	22
storage device.....	44	WMI.....	16, 34
VBScript.....	37	Work Order Ticketing.....	34
Verizon.....	13	Workstation hardware.....	11
USB cellular data modem.....	22	Workstation Remote Control.....	34
Video.....	53	XCode.....	30
desktop camera.....	23	XFR.....	12
digital video recorder (DVR).....	23	XML Editor.....	33
DVR control software.....	23	XnView.....	31
encoding.....	37	ZIP Files.....	38
projector.....	23	Zoom Conferencing [ADA].....	27
USB camera.....	23	ZoomText [ADA].....	32

ZVRS [ADA] ..... 33