

Section 7. ETA Platform Domain

The Platform Domain addresses personal and business computing hardware systems and related software. The hardware platforms include servers, storage systems, server appliances, personal computing devices (desktops, notebooks, and hand-held computing devices), and peripheral devices (e.g., printers). Software is limited to personal computing software, operating systems and utility system software used to meet basic platform infrastructure needs. Software examples include Windows operating system, word processing software, email server software, storage directors, and server backup software. The Platform Domain addresses the hardware and software issues, requirements and recommended practices under three technical topics: personal computing, servers, and utility services.

In 2003, the General Assembly mandated that the Virginia Information Technologies Agency (VITA) consolidate information technology infrastructure (platforms and networks) and its management across executive branch agencies except higher education agencies. The General Assembly also placed procurement of information technology under VITA. Because of these changes, VITA is referenced here instead of agencies whenever the requirement addresses a consolidation-related strategy or information technology procurement strategies.

Domain-wide Requirements

The following domain-wide requirements pertain to all topics and components in the Platform Domain:

- PLA-R-01 Security as a Platform Decision Factor:** VITA shall consider business security requirements up front when making decisions for all platforms from personal computing devices to enterprise servers.
- PLA-R-02 Remote Administration of Platforms.** Agencies shall acquire platforms designed for ease of remote administration, diagnosis, and systems management.

Personal Computing

Personal computing devices include hardware, operating systems and/or productivity software for desktops, notebooks, handheld devices (e.g., personal digital assistants), and personal peripherals (e.g., personal printers). Productivity software includes common office software (e.g., word processing) and *utility software* (e.g., .pdf file readers).

- PLA-R-03 Centralized Personal Computing Decisions** – For agencies supported by VITA, VITA shall centralize personal computing decisions regarding what shall be procured, how frequently devices may be refreshed, how agency support is to be provided, what security methods are acceptable, and what methods of access (e.g., wireless push email systems for PDAs) may be used.
- PLA-R-04 Personal Computing Security Software** – VITA shall establish the minimum requirements or the starting point for the base image to be used on personal computers that access VITA-controlled networks. Agencies will add

to these images to meet agency-specific security needs. The VITA base image shall contain VITA-approved security software such as antivirus software.

Agencies that operate on networks not controlled by VITA must establish minimum personal computing security software for the business they conduct and the networks they use. This software must be provided as part of the agency's base image.

- PLA-R-05 Location-based Personal Computing Support** – VITA shall provide location-based personal computing support options for geographically dispersed agency groups when central services are inadequate to meet customer needs. Costs and benefits of various location-based service options must be evaluated.
- PLA-R-06 Personal Computing Desktop Displays** – Because desktop displays have a longer lifecycle than the computers they support, their replacement shall not be automatic at the time of a desktop replacement. Display replacement decisions for all agencies including administrative units of higher education must be based on customer business needs, support considerations, cost-of-ownership data, and hardware compatibility considerations. VITA and other agencies that provide for display acquisition shall ensure separate display acquisition pricing that is equivalent to joint display and tower acquisition pricing.
- PLA-R-07 Personal Computing Processors** – When establishing minimum specifications for bids for low-end personal computing acquisitions or seats to be used by the majority of the workforce, executive branch agencies involved in acquisitions and contracts shall require: the lowest of currently available Intel, AMD, or comparable chipsets and components that will cost-effectively meet anticipated processing needs for the proposed productivity software, typical business needs, special needs of the mobile worker, and/or needs related to lifecycle requirements such as future availability of various memory options (e.g., memory is currently changing from DDR SDRAM to DDR2 and these types cannot be used together if users' memory needs increase during the lifecycle of their desktop or notebook).
- PLA-R-08 Personal Computer Output Drives** – When establishing minimum bid specifications for personal computers, executive branch agencies involved in procurements and contracts shall include a CD/DVD reader with CD write capabilities. DVD *writers are discouraged but shall be* permitted. Any acquired DVD reader must read multiple formats. Floppy drives shall remain an option but their acquisition shall be discouraged.
- PLA-R-09 Personal Computer Base Images** – VITA shall develop starting point, typical base images for the most commonly needed desktop and notebook computer configurations to reduce setup decision making and costs for

agencies VITA supports. This shall include standard software setup (e.g., for office products, security, and other software) and system lockdown policies. Typically, agencies will add to these base images to accommodate agency-specific requirements.

PLA-R-10 Productivity Software Needs – VITA shall assess the productivity software needs for agencies it supports (e.g., percentage of the workforce that requires various combinations of the individual office software offerings including word processing, presentation, spreadsheet, and database software based on a workforce sample).

Needs information shall be gathered with the assistance of agencies and shall be used in estimating the costs of state-level personal computing alternatives (e.g., licensing with or without Access). The information shall be available to agencies for use in assessing the costs of modifying the desktop base image for those groups needing additional personal or agency-wide functionality.

PLA-R-11 Minimum Productivity Software for Meeting Knowledge Worker Needs – The Commonwealth’s target personal computing software architecture for new desktops and notebooks for all agencies including administrative units of higher education shall include: Microsoft Office (XP or 2003), Internet Explorer, and Adobe Acrobat Reader. (Note that Access is not to be included in the minimum base image for most workers.)

PLA-R-12 Software Support for PDA Access – VITA shall ensure that personal productivity software calendar information, tasks, contacts, and user files shall be accessible by using Personal Digital Assistant (PDA) capabilities on various communications devices used by employees. VITA shall accommodate standard access methods.

PLA-R-13 Lifecycle for Personal Computers – For replacement of personal computers, agencies including the administrative units of higher education shall use a lifecycle range of four to five years for desktop computers and three and one-half to five years for notebook computers.

PLA-R-14 Software Upgrades – Agencies shall not upgrade operating systems software or office productivity software during the life of the computer unless they document a compelling business reason to do so or a compelling return-on-investment that offsets all hard and soft costs for making the change.

PLA-R-15 Surge Protection for Field Workers – To protect computing equipment used by field workers and to protect the data stored on their equipment, agencies responsible for purchasing these computers and peripheral devices shall provide a surge protector to the employee that protects from surges through all electrical inputs including network, telephone and power lines. Printers and other peripheral devices may also be protected through surge protectors. The

term, “field workers” includes telecommuters, roadway inspectors, park rangers and similar workers who work outside of a networked office building. Workers who are in networked offices have the needed data protection, data backups, and uninterrupted power provided through file server protection.

PLA-R-16 Teleworking Tools – For any teleworking employee whose job requires the use of information technology tools, a minimum toolset, as determined by the agency, must be provided. The agency determines what tool set is necessary to enable the employee to do his or her job. If needed for the specific job and person, and not otherwise available in or near the off-site workplace, the following personal computing tools shall be provided for use in the employee’s home office, a hoteling space, or a mobile office.

- mobile notebook (e.g., wireless connectivity within a notebook designed for mobile use),
- docking station with a separate display,
- keyboard and mouse,
- surge protector (e.g., for mobile use, for docking station, or other computer setup)
- connectivity to agency’s LAN (e.g., VPN; secure, high-speed or other possible requirements as needed),
- file backup,
- output,
- email,
- voice and/or video conferencing,
- training,
- Internet services (e.g., appropriate Internet services when not available in the spaces used; wireless routers when wireless access is not available in the spaces used); and
- local and long distance voice services (e.g., VoIP, Skype, cellular, or other voice services if a needed service is not available in the spaces used).

The following technology component standards tables address the Personal Computing technology topic.

Table PLA-S-01: PC Operating Systems Technology Component Standard <i>Updated October 29, 2007</i>	
Strategic:	Windows XP Pro (with tested Service Packs)
Emerging:	<p>Unix alternatives as a replacement to Windows as a Commonwealth solution could be studied.</p> <p>Linux (kernel 2.6.13 on 9-8-05)¹ (Note: Commonwealth liabilities may be an issue depending on SCO Unix lawsuit outcomes.)</p> <p>Macintosh OS X (Leopard)</p> <p>Solaris</p> <p>Windows Vista (If Windows continues as the OS of choice for the Commonwealth, the target date to move the Vista OS to Strategic would be approximately 5 years and 6 months prior to the termination of all Microsoft support. This would enable a full 5-year lifecycle on Windows XP hardware purchases. Using current Microsoft support discontinuation dates (April 8, 2014 for XP), the last date to purchase hardware that would be appropriate only for XP would be September 8, 2008.)</p>
Transitional/Contained:	<p>Windows 2000 Professional</p> <p>Macintosh OS 9</p>
Obsolescent/Rejected:	<p>Windows earlier than Windows 2000</p> <p>Any home version of Windows</p>
Exception History:	

¹ See www.kernel.org for latest kernel.

Table PLA-S-02: *Displays and Interface Components*
Technology Component Standard
Updated October 29, 2007

Strategic:

Displays

Note: These requirements specify only the smallest display size that is permitted for the standard desktop. High-end needs such as GIS and typical display sizes within agencies (often 19") are not addressed. Only minimums for employee comfort are addressed.

Minimum of a 17" diagonal specification for a CRT when CRTs remain in use for standard desktops. An example shape for a 4:3 aspect ratio, which has about a 17" diagonal measure or slightly smaller, is provided on the left below. (Approximate measurements are 11" high by 14.66" wide.



Minimum of a 17" diagonal specification for a flat panel display when a flat panel is used for standard desktops. An example shape and size is presented on the left above. A typical diagonal measure is exactly 17".

Minimum of a 20" diagonal specification for a widescreen flat panel display with a 16:10 aspect ratio. (Approximate measurements are 11" high by 16.5" wide.) An example shape is provided in the middle above.

Minimum of a 19" diagonal specification for a widescreen flat panel display with a 3:2 or 15:10 aspect ratio. (Approximate measurements are 10" high by 16" wide.) An example shape is provided on the right above.

(Note: A desktop CRT is to be used for 2 refreshes or its full life. A desktop flat panel solution is to be used for its full life which may include backlight replacement.)

A flat panel (not a flat screen) is the standard recommended replacement for desktop displays

A CRT is an optional special use display most often acquired for specialized graphics applications that require true color and high resolution

Optical Mouse

Emerging:

OLED or Active Matrix OLED (AMOLED) displays (e.g., AMOLED in iRiver Clix Gen2)

FOLED displays (roll-up OLEDs for transporting presentations)

Transitional/Contained:

Less than 17" CRT or 17" flat panel for desktops (e.g., may be appropriate for point of sale)

CRT for desktop replacements

Mechanical Mouse

Obsolescent/Rejected:

Exception History:

Table PLA-S-03: Read/Write Devices (Storage)
Technology Component Standard
Updated October 29, 2007

Strategic:

USB Flash Drives (Many names are used including Jump Drives, USB MSC Drives, and USB Keys). These drives typically store from 32 MB to 64 GB and may include security software options. With security, these drives are the preferred choice for transport of sensitive files and information. These drives are recommended over CDs and DVDs for employee use.

A CD RW/ DVD ROM Combo Drive is the preferred device for installation on employee PCs. DVD ROM is recommended but not required. DVD writer installation and use is discouraged for long-term storage due to constantly changing write methods and the lack of agreed upon industry standards. Agencies may use DVD writers for short-term storage of files exceeding 700 MB (the capacity of a CD).

External USB Hard Drives are another option for mobile worker backups when connectivity is not available)

Emerging:

DVDs for long-term optical output for personal computer users.

DVD²: no single standards are agreed to for DVD authoring and no single standard is anticipated.

Examples of the many competing standards are provided below:

Blue and red laser write methods from competing camps are as follows:

DVD Forum camp (current DVD, blue laser)

Recordable: DVD-R; DVD-R(G); DVD-R(A).

Rewritable: DVD-RAM; DVD-RW

DVD+RW Alliance camp (current DVD, blue laser)

Recordable: DVD+R; DVD+R DL.

Rewritable: DVD+RW; DVD+MRW.

Blu-ray camp (Japan and movie industry and future DVD, blue laser)

BD-R, BD-RW

AOD/HD-DVD camp (movie industry and future DVD, red laser)

HD DVD-R, HD DVD-RW

EVD (China) or enhanced versatile disk

FVD (Taiwan) Finalized Versatile Disc has been developed by Taiwanese Opto-electronics & Systems Laboratories

(For enterprise storage use of DVDs, see the utility services technical topic.)

Transitional/Contained:

Floppy Drive (3.5") it is recommended that floppy drives not be installed as a base option for any standard PCs but purchase is not prohibited. *Shared external devices may be of transitional use to agencies.*

² DVD technology explanations and competition commentary: http://en.wikipedia.org/wiki/Comparison_of_high_definition_optical_disc_formats; <http://www-i4.informatik.rwth-aachen.de/~jakobs/Interop/Gauch.pdf> or a news listing such as PC World (see items marked news on the left), <http://www.pcworld.com/resource/browse/0,cat,1114,sortIdx,1,pg,1,00.asp> .

Table PLA-S-03: Read/Write Devices (Storage) Technology Component Standard <i>Updated October 29, 2007</i>	
Obsolescent/Rejected:	
	Zip Drive (Iomega) Jaz Drive (Iomega successor to Zip Drive) 5 ¼ Floppy
Exception History:	

Table PLA-S-04: Desktop Attached Printing Technology Component Standard <i>Updated October 29, 2007</i>	
Strategic:	<p>Laser printing devices are required for non-mobile black and white printing uses in situations where a desktop attached black and white printer must be used</p> <p>(Note: Desktop attached printers are strongly discouraged for most workers. See discussion in Utilities section.)</p>
Emerging:	
Transitional/Contained:	<p>Desktop attached (non-mobile) ink-jet printers for black and white printing are to be phased out</p> <p>(Note: Desktop attached printers are strongly discouraged for most workers. See discussion in Utilities section.)</p>
Obsolescent/Rejected:	
Exception History:	

**Table PLA-S-05: Miscellaneous Mobile Components
Technology Component Standard**
Updated October 29, 2007

Strategic:
<p>Modems (V.90, V.92³)</p> <p>Receivers/transmitters for LAN, PAN and mobile devices</p> <ul style="list-style-type: none"> IrDA—infrared Bluetooth devices (1Mbps, FHSS, 2.4 GHz) may have a short life; version 1.2 or higher PC Cards (also called PCMCIA cards) and internal devices (e.g., embedded in chipsets) <ul style="list-style-type: none"> Bandwidth combination devices for 802.11 (a+b+g) <p>Lithium Ion Battery</p>
Emerging:
<p>Devices supporting new wireless standards and those in development</p> <ul style="list-style-type: none"> 802.11e ratified in September 2005 adds quality of service to 802.11a and b. 802.11i ratified in June 2004 adds security enhancements to wireless a, b and g transmissions 802.11n for next generation wireless with reduced distance degradation and better multimedia streaming at higher speeds; ratification of the standard expected in Spring 2009; (100 Mbs) UWB—high speed PAN solution and synchronization solution WiMAX Mobile⁴ —portable high speed wireless for MAN (or last mile technology) in development (802.16e enables mobile device connections); to be adopted by digital peripheral makers; throughput and battery life are still issues. 802.16a WANs currently provide 70 Mbps over 31 miles using TDM/TDMA, between the 2GHz and 11GHz (licensed and unlicensed) frequency ranges); Testing begins in June 2007; IEEE ratification expected in March 2009; products flooding the market.⁵ <p>1 Gbit WiMAX</p> <p>Micro Fuel Cells⁶ —a new technology to replace batteries</p> <p>NAND Drives (solid state flash drives to replace hard drives)⁷</p> <p>Intel Penryn CPU¹¹</p> <p>AMD Fusion CPU¹¹</p>

³ V.92 supports quick connect, modem on hold, and 48K upstream transmission.

⁴ Uses orthogonal frequency division multiplexing access (OFDMA) with subcarrier spectrum divisions using QAM or QPSK. Several Gartner articles address the place of WiMAX in future mobile networking: WiMAX will Complement Not Kill Wireless Fidelity, Robin Simpson and Ian Keene (addresses throughput and battery life issues); How Vendors are Approaching WiMAX, January 13, 2005, Jouni Foursman, Ian Keene, Jason Chapman, and Bettina Tratz-Ryan; Hype Cycle for Wireless, July 19, 2005, G00127662.

⁵ Update: Testing of next-gen Wi-Fi standard to start in June--Final 802.11n ratification pushed back to March 2009; Computer World, Matt Hamblen, May 16, 2007.

⁶ Have the potential to provide ten times the energy capacity of lithium ion batteries. According to Gartner: Hype Cycle for Wireless, July 19, 2005, G00127622, working prototypes are now available. Commercialization is expected between 2005 and 2007.

⁷The Top Five Computer Technologies You Need to Know About in '07, Computer World, George Jones, March 1, 2007 <http://computerworld.com/action/article.do?command=viewArticleBasic&articleId=9011969&pageNumber=5>

Table PLA-S-05: Miscellaneous Mobile Components Technology Component Standard <i>Updated October 29, 2007</i>	
Transitional/Contained:	
	Modems (V.34 and earlier) PC Cards (PCMCIA) and internal devices (e.g., embedded in chipsets) not receiving 802.11 a, b and g (to maximize wireless network design possibilities) Bluetooth devices, less than version 1.2 (interference issues are greater)
Obsolescent/Rejected:	
Exception History:	

Table PLA-S-06: Miscellaneous PC Components Technology Component Standard <i>Updated October 29, 2007</i>	
Strategic:	Cardbus type PC Cards with parallel interface, DMA, and 32 bit path ExpressCard ⁸ —PCMCIA Cardbus replacement that provides high speed serial access embracing USB 2.0 and PCI-Express
Emerging:	
Transitional/Contained:	PC Card with parallel interface and 16 bit path
Obsolescent/Rejected:	
Exception History:	

⁸ This technology is now implemented throughout the market place. Agencies should its utility for their business uses.

Table PLA-S-07: Productivity/Management Software Technology Component Standard <i>Updated October 29, 2007</i>	
Strategic:	<p>Microsoft Office 2003 (for 4 and 5 year PC images through 9-2008)</p> <p>Internet Explorer (highest evaluated and tested for the environment); encourage exploratory use of a second browser such as Firefox</p> <p>Outlook (2002 with 2004 update or 2003)</p> <p>Adobe Acrobat Reader (and plug in—latest)</p> <p>Microsoft Access 2003</p> <p>Centrally selected antivirus software (presently McAfee) for VITA-served agencies (when initial selection and later changes have been announced)</p>
Emerging:	<p>Office 2007 (note: email client no longer included)</p> <p>Outlook and Outlook Express 2007</p> <p>StarOffice 8 (Currently available free for individuals at pack.google.com); StarSuite 8</p> <p>OpenOffice.org Suite 2.3 (especially for document conversion if security response time is equivalent to that of Office 2003)</p> <p>Mozilla Firefox 2 (Note: Firefox 2 with security updates is pre-approved for pilot projects or research purposes. Exception requests are not required for pilot use.)</p> <p>Open Source Browsers (e.g., Opera, Opera Mini)</p> <p>Centrally managed services clients for VITA when announced</p>
Transitional/Contained:	<p>Microsoft Office 2000 (extended support ends July 14, 2009) Waiver required only on a new PC image</p> <p>Microsoft Office XP (extended support ends July 12, 2011) Waiver required only on a new PC image</p> <p>Access 2000 (expanded support ends July 14, 2009) Waiver required only on a new PC image</p> <p>Access XP (extended support ends July 12, 2011) Waiver required only on a new PC image</p>
Obsolescent/Rejected:	<p>Microsoft Office '95 with Outlook</p> <p>Microsoft Office '97 with Outlook</p> <p>WinZip (compression now in Windows XP)</p> <p>Microsoft Office 2001 with Outlook Express 5; Microsoft Office v.x (Mac)</p>
Exception History:	

Servers

Servers include the full range of computing devices from mainframe computers to small single-processor computers. Servers may provide file and print controls, business applications, databases, Internet presence, voice communications, email and other important functions for the enterprise. Most servers are part of a network. A server solution may include single servers, virtual servers, clusters, farms, frames of server blades (e.g., servers in a blade chassis), server

appliances, or n-tier applications solutions. Server and server solution capabilities, scalability, reliability, management options, and shared use options are important factors in decisions regarding servers. Server hardware and software include operating systems, processors, ports, interfaces, communications buses, memory, storage, power, and controller components.

PLA-R-17 Maintenance Agreements – All agencies shall ensure that servers which support production are under a maintenance agreement for the planned life of the server. For x86 architecture, the planned life shall be a minimum of five years. Operating systems replacement plans and service level agreements for the applications supported by a server are important factors in establishing the server's planned life.

PLA-R-18 File Servers – All agencies shall examine consolidated storage alternatives whenever considering acquisitions of file servers and shall select the consolidation option when it is cost effective.

PLA-R-19 OEM (Original Equipment Manufacturer) Operating Systems – Agencies shall use volume licensing agreements in place of OEM provided options for operating systems acquisitions for X86 server hardware.

Note: OEM operating systems offer no upgrade path, and, in the case of Windows, each OEM license is tied to the hardware with which it was purchased

Servers by Capability

The following Technology Component Standards are presented in Tables. The table heading indicates the particular server type. The terms high-end servers and midrange to low-end servers are used to describe types. High-end servers are defined as servers that may scale to more than 16 processors in size. These servers typically cost more than \$250,000 and have greater capabilities in areas including scalability, reliability, availability, serviceability, security, privacy, business continuity provision, management consistency, and risk reduction. Midrange to low-end servers typically cost \$50,000 or less. These servers would usually have one to four processors, but could scale to 8 or 16 processors. When a midrange computer is a scaled-down version of a high-end server, it may cost substantially more than \$50,000, but it will also have many of the high-end platform capabilities. Over time, the gap between the high-end solutions and the midrange to low end solutions will continue to decrease.

Table PLA-S-08: High-end Servers Technology Component Standard	
Strategic:	<p>Software</p> <ul style="list-style-type: none"> z/OS Solaris HP-UX AIX Windows Linux in virtual partitions Virtual Server OSs (e.g., zVM, VMware, strategic only for: <ul style="list-style-type: none"> supporting OSs that are in the desired future architecture (e.g., Linux, Windows 2003, HP-UX and Solaris) use in building test environments <p>Hardware</p> <p>IBM, Sun, and HP platforms are strategic. Hardware alternatives to these platforms may be considered if they are fully compatible for running applications designed for strategic systems, provide equal or better performance for all application and architectural requirements, and introduce no problems to the Virginia architecture other than those that may be cost-effectively resolved. (Fujitsu, for example, is a proven alternative to Sun for the Solaris OS.)</p>
Emerging:	<p>Software</p> <ul style="list-style-type: none"> Windows Virtual Server R2 (2005)
Transitional/Contained:	<p>Software</p> <ul style="list-style-type: none"> MVS OS 390 Unisys OS2200 VMS OS/400 (library OS) Unix other than Solaris, AIX and HP-UX <p>Hardware</p> <ul style="list-style-type: none"> IBM ES9000 (9221) Virtual Server OSs used to support older versions of a strategic OS in cost-effective consolidation transitional plans
Obsolescent/Rejected:	<p>Software</p> <ul style="list-style-type: none"> MVS XA MPE
Exception History:	

Table PLA-S-09: Midrange/Low-end Servers Technology Component Standard	
Strategic:	<p>Software</p> <ul style="list-style-type: none"> Windows Server 2003 family Unix (Solaris, AIX, HP-UX and Linux) Virtual Server OSs (e.g., VMware and zVM) <p>Software Examples</p> <ul style="list-style-type: none"> Windows Server 2003 family is especially appropriate for utility services including domain controller, file, print, email, etc. Linux may be an alternative for Web, database, and utility services Virtual servers and virtual machines aid in providing test environment setup <p>Hardware</p> <p>Numerous manufacturers compete for low- to midrange-server hardware; narrowing the variety used by the Commonwealth at a point in time is important to reducing acquisition, maintenance and support across agency solutions.</p>
Emerging:	<p>Software</p> <ul style="list-style-type: none"> Windows Server 2008 Windows Server 2003 family (64 bit applications) Xen Virtual Hypervisor
Transitional/Contained:	<p>Software</p> <ul style="list-style-type: none"> Windows 2000 family (by June 2007, agencies should move off this version) Virtual Server OSs (e.g., VMware hypervisor, Integrity Virtual Machines, and in some cases, Windows Virtual Server R2) enable transition strategies for multiple versions of the same OS such as Windows NT through 2003 when used for one application OS10 Server may have use as a transitional OS. OS10 can be used with greater ease by staff who are transitioning from Windows responsibilities to Unix. OS10 has a Windows-like graphical interface instead of a command-line interface, which is typical for Unix servers.
Obsolescent/Rejected:	<p>Software</p> <ul style="list-style-type: none"> NT Novell OSX
Exception History:	

Single Agency and Multi-Agency Consolidation Platforms

Some servers and server solutions are used as consolidation platforms. A consolidation platform is typically a single high-end platform or a large aggregation of midrange or low-end platforms. Consolidation platforms are used to accomplish the following types of work more cost-effectively with improved backup, recovery, security, management, and business solution quality:

- Centralizing a distributed information resource such as GIS data, library digital documents for universities, customer data, library holdings, or other data. The centralized data are often of enterprise significance and/or reusable resources. The data are often duplicated multiple times across the enterprise prior to consolidation.
- Centralizing an application that is implemented in a duplicative rather than in a distributed manner such as centralizing numerous separate instances of email services (e.g., Exchange) and related directories (e.g., Active Directories).
- Centralizing a function that is implemented in many ways (numerous different applications) across agencies such as license provision, federal grant management, or hospital information systems.
- Providing one server that can be partitioned for running many applications for many agencies with limited and definable risk.
- Providing one server that runs many applications for a single large agency.
- Providing a central utility or service that does not require significant knowledge of the business but that can be tailored in checklist fashion to meet each agency's business needs such as storage, mirroring, backup and recovery, sign on, network management, etc.

The tables below address only servers relative to consolidation efforts.

Table PLA-S-10: Consolidate by Aggregation on Midrange to High-end Platforms Technology Component Standard	
Strategic:	
Software	<ul style="list-style-type: none"> Unix (HP-UX, Solaris, AIX and Linux) z/OS Windows 2003 Server Family (Windows 2003 may not scale sufficiently depending on the use.) Consolidation Examples: Appropriate for critical application and database tiers that require exceptional scaling, speed, transaction processing, reliability, etc.
Hardware	<ul style="list-style-type: none"> Exceptional partitioning and workload management are required for the server solution. Example platforms include but are not limited to: IBM Mainframe, IBM POWER5, Sun/Fujitsu SPARC/UltraSPARC, Fujitsu/HP Itanium 2 (64) and AMD Opteron (64).
Emerging:	
Windows Server 2008	
Transitional/Contained:	
Obsolescent/Rejected:	
Software	<ul style="list-style-type: none"> MPE MVS OS 390 Unisys OS2200 VMS OS/400 IBM ES9000 (9221)
Exception History:	

Table PLA-S-11: Consolidate by Scaling Out Technology Component Standard	
Strategic:	
Software	<ul style="list-style-type: none"> Windows Server 2003 Solaris HP-UX AIX Linux
Examples	<p>Clusters are appropriate for MS Exchange Server (e.g., an email farm): clustered low-end to low midrange solution on Windows Server 2003.</p> <p>Appropriate as a tier for single large or mirrored databases—e.g., Oracle real application clusters (RAC) running on HP-UX, AIX, Windows or Linux.</p> <p>Appropriate for Web hosting: (e.g., on Windows Server 2003, HP-UX, Solaris, AIX or Linux)</p>
Hardware	<p>Typical solutions include farms/clusters using blades or servers in racks. Commodity servers are commonly employed. Other options are possible.</p>
Emerging:	
	Windows Server 2008
Transitional/Contained:	
Software	<ul style="list-style-type: none"> Permit Windows 2000 as a transitional strategy through June 2009)
Obsolescent/Rejected:	
Software	<ul style="list-style-type: none"> Windows NT
Exception History:	

Table PLA-S-12: Consolidate using Virtual Tools Technology Component Standard	
Strategic:	
Software	Virtual Servers (via *Hypervisors, or Virtual Machine Software) zVM or VMware Permit virtual Windows, Solaris, AIX, HP-UX, or Linux machines or servers in scale-out solutions provided via zVM or VMware
Hardware	Typical solutions include low-end to high-end servers whose resources are divided and shared among the virtual servers which run natively within the multiple partitions. A *hypervisor is a controlling operating system or virtualization manager for the multiple virtual servers. The hypervisor enables the division of resources for a particular processor architecture. Each server partition may be running identical or different operating systems.
Emerging:	
Software	Windows Virtual Servers (2005 R2, System Center Virtual Machine Manager 2007)
Hardware	Intel and others are working to improve sub-processor partitioning capabilities
Transitional/Contained:	
Software	Permit virtual servers of older versions of supported OSs in transitional efforts (may have some use here)
Obsolescent/Rejected:	
Exception History:	

Utility Services

Utility services are defined to support centralization and common handling of networked services that are currently implemented in many different ways using different practices across the served entities. The requirements and recommended practices are intended to be useful to VITA, VCCS, or individual colleges and universities. The services addressed are those services requiring the least specific knowledge of agency business and providing the greatest opportunity for efficiencies and improved practices. Not all possible utilities are addressed here. The included shared utility services were chosen to be implemented first because they are expected to result in the best cost savings, service improvement and other benefits of possible candidates. Example utilities include: file and print services; email, text, video and voice messaging services; and storage, backup and recovery services.

- PLA-R-20 Utilities Generally** – VITA shall standardize the deployment and management methods used for Local Area Network (LAN) and other utility services (e.g., storage, communications, printing, and copying) across agencies it serves.

PLA-R-21 Microsoft Utilities – Most utility services that have been deployed within VITA-supported agencies are Microsoft Windows services. VITA shall consider Microsoft best practices as guides for standardizing these services across agencies until alternative utility services are studied and alternative methods are put into place. This requirement should not be construed to mean that only Microsoft Windows solutions shall be deployed for utilities, or that only Microsoft best practices should be used. Because Microsoft utility solutions are de facto standards in the Commonwealth, any alternatives considered should be analyzed using Microsoft utilities and Microsoft deployment recommendations as the base service to which alternatives may be compared. For example, the majority of web server deployments may use Windows IIS Servers and may follow Microsoft best practices for their deployment. The uses listed below may have general benefit for agencies, but should be compared in cost and benefit analyses with other in-architecture options before proceeding:

- Linux as a database OS (e.g., ESRI; Oracle RAC clusters on Linux)
- Linux for selected utilities including web hosting running on low-end servers or in soft partitions on midrange or high-end servers
- Linux for selected business applications proven on this platform
- Apache servers on Linux instead of IIS servers on Windows

Storage System Solutions

Two important ways that agencies can meet business needs while reducing IT expenditures are implementing controls to reduce storage escalation and planning for the least costly storage solution for meeting each of several levels of business storage needs. For VITA, providing appropriate storage and backup alternatives is a core element of providing centralized server support. Storage provision must be approached as a utility service designed to decrease costs and reduce risks while maintaining or improving performance and availability. Comparing options requires combining the costs and benefits of changing from the current solution to a new service offering with the costs and benefits of the needed telecommunications, security, storage and backup solutions.

The term “storage system” will be used here to encompass the hardware, software, communications, networking, media, media controllers and management tools required to record data somewhere other than in local memory (e.g., RAM) and to index the data in a manner that allows it to be retrieved at a later time. Storage systems are not platforms, but they are the main user of platform hardware, communications interfaces, and storage media. Much of the opportunity available within the platform domain for cost reduction depends on careful design and deployment of storage systems.

The following requirements are applicable to Storage Systems.

PLA-R-22 Storage and Capacity Planning Data – VITA shall require that agencies it supports provide periodic capacity planning and storage planning data.

Agencies not supported by VITA shall also perform capacity planning and storage planning. The availability of planning data will improve storage, backup, and disaster recovery solutions for the Commonwealth.

- PLA-R-23 Agency Assistance for Capacity and Storage Planning** – VITA shall offer capacity planning and storage planning services to assist agencies in determining their present and future requirements.
- PLA-R-24 Storage and Capacity Planning Scope** – Agencies shall consider all of their applications jointly when conducting capacity planning and when developing a storage plan.
- PLA-R-25 Consolidated Server Storage Planning** – For servers used by multiple applications within an agency, by multiple agencies, or managed as a group across agencies and applications, the agency managing the storage consolidation shall design storage solutions across the servers within adequately networked locations.
- PLA-R-26 Storage Consolidation** – Agencies shall use consolidated, single and multi-agency, networked storage solutions whenever the consolidated solution shows cost-effectiveness across an agency’s applications (i.e., meets business needs at an equal or lower total cost for the agency). For example, if the agency adds a small application that could use dedicated storage more cheaply than consolidated storage, the dedicated storage may not be used unless the agency-wide storage plan shows dedicated storage to be more cost-effective than consolidated storage.
- PLA-R-27 Policy-Based Storage Reduction Focus** – VITA shall work with the Library of Virginia to simplify retention requirements for electronically stored data such that automated, policy-based methods may be used to control storage growth. Specifically, efforts should simplify the deletion of stored files, emails (except emails from agency heads and Governor’s staffs), and other data that are not of historic value. Efforts would specifically enable the creation of VITA services for the deletion of old data, unused data, and data with no owner for agencies.
- PLA-R-28 Storage Reduction Preceding Migration** – When an agency changes its storage from application-based stores to central or consolidated stores, it must first consider what may be deleted prior to moving the remaining stores. This effort must be jointly conducted by the data-owning agencies and the centralization project staff.
- PLA-R-29 Backup Consolidation and Simplification** – VITA shall consider the value of improved backup and recovery management, reduced backup and recovery costs, and improved backup and recovery service levels when developing server management and storage management plans and costs for agencies.

This very important benefit of server and storage consolidation must be included in cost comparisons.

- PLA-R-30 Applications Offering Storage Consolidation Opportunities** – To reduce escalating storage costs, VITA shall consider the cost-effectiveness of alternate storage consolidation and storage reduction (e.g., policy deletion options for stored data) opportunities. When considering new utility services for central handling, VITA shall separately address storage consolidation and reduction for the service. Examples of utility services that would have large storage needs and/or growing storage needs are email services, backup, and Web hosting services.
- PLA-R-31 Connectivity and Consolidated Storage** – When designing consolidated storage solutions, agencies shall include assessments of connectivity needs and options for the customer base. A consolidated solution often requires added connectivity. This connectivity may both increase costs and degrade throughput. For many agencies, the distance to the consolidation system and the costs of connectivity are critical factors. Solutions including iSCSI, MPLS VPNs, WAFS, blade chassis, and SAS are among the tools that may be beneficial in reducing total storage costs.
- PLA-R-32 Storage Location Considerations** – When designing consolidated storage solutions, agencies shall include assessments of storage location. If central remote storage is cost-prohibitive, agencies providing storage must evaluate the cost-effectiveness of locally consolidated storage options for the physically co-located servers under their control.

The following technology component standards address Storage Systems.

Table PLA-S-13: Storage Interfaces Technology Component Standard	
Strategic:	<p>FIBRE Channel -FC, FC-AL (fiber channel arbitrated loop)</p> <p>FICON</p> <p>SCSI</p> <p>10/100/Gb Ethernet; 10/100/2Gb Ethernet</p> <p>iSCSI</p> <p>PCI Express</p> <p>FC-IP</p> <p>10GigE</p> <p>SAS (Serial Attached SCSI)</p>
Emerging:	<p>4x InfiniBand (IB)</p> <p>4Gb/sec FICON</p>
Transitional/Contained:	<p>10/100 Ethernet</p>
Obsolescent/Rejected:	<p>ESCON, 17 Mbps (Mainframe)</p> <p>Block/Parallel (distance limits and speed problems) 4.5 Mbps (Mainframe)</p>
Exception History:	

Table PLA-S-14: Disk Storage Hardware Technology Component Standard <i>Updated October 29, 2007</i>	
Strategic:	<p>External Controller-based RAID</p> <p>ATA Disks; SATA Disks</p> <p>Disks</p> <p>CDs (archive quality)</p>
Emerging:	<p>DVD (awaiting stable write standards) No DVD write option <i>for enterprise storage systems</i> is being recommended for the Commonwealth at this time.</p> <p>MEMS (microelectrico-mechanical system) probe device</p> <p>MAID</p>
Transitional/Contained:	
Obsolescent/Rejected:	
Exception History:	

Table PLA-S-15: Tape Technology Component Standard	
Strategic:	
	LTO (linear tape open) SDLT (super digital linear tape) Virtual Tape (Disk) Magstar (IBM 3590; STK 9x40)
Emerging:	
	Terabyte tapes
Transitional/Contained:	
	36 track DLT (digital linear tape) AIT (advanced intelligent tape)
Obsolescent/Rejected:	
	9 track, 18 track
Exception History:	

Print, Fax, Scan and Copy Devices

In recent years, network print, fax, copy and scan devices have become more capable, more multifunctional, and more cost effective. Color printing is more affordable and presents a great business tool for reaching customers and others with whom agencies communicate. In most offices, sharing workgroup devices is now considered to be common and desirable. For some business units, having access to high-speed printers and copiers that can collate and staple large numbers of documents when necessary is considered to be a necessity.

- PLA-R-33 Print, Fax, Scan and Copy Devices and Managing Servers.** VITA shall deploy and manage all customer-oriented input and output devices that are deployed as networked devices and which serve VITA-supported agencies. These devices include document scanners, fax machines, copiers, and printers along with the servers that support them. These devices shall be deployed in a consistent manner across all VITA-supported agencies.

Email Utilities

The Commonwealth must provide voice, email, push mail, calendaring, contacts, and other services that are necessary to support the workforce and agency business requirements. The best solution is always the de facto solution, unless serious problems exist or costs are prohibitive. However, for the Commonwealth, it is also important that the de facto solutions be challenged

periodically. The Commonwealth needs to have a much more complete understanding of the needs of the workforce for each of the messaging and communications tools. This information will be important for establishing plans and putting a long-range roadmap in place to guide changes.

PLA-R-34 Enterprise-wide vs. Agency-centric Email Solution Analyses. VITA shall examine the feasibility, costs, and benefits of standardizing on Exchange as the future enterprise email solution. The study shall consider whether centralizing email is cost effective and whether standardizing on Microsoft Exchange or other enterprise solutions is cost effective. Until this study is conducted, Microsoft Exchange will be the solution VITA-served agencies shall employ when making changes.

Table PLA-S-16: Email Technology Component Standard	
Strategic:	32 bit Exchange Server 2003
Emerging:	64 bit Exchange Server; All other solutions that are appropriate for Commonwealth-wide services (e.g., solutions that should be evaluated including hosted applications).
Transitional/Contained:	Exchange Server 2000; Unsupported open source implementations.
Obsolescent/Rejected:	Exchange Server 5.5 and earlier
Exception History:	

VITA Network (LAN/WAN) Control Utilities

Most requirements for networks are provided in the network domain. Network utilities, which are addressed here, are those recurring network control services that should be managed as a common service across all agencies served by VITA. Examples of network utility services are secondary Domain Name System (DNS) services, directory services, and Dynamic Host Configuration Protocol (DHCP) servers. As networks are combined across agencies to create one centrally managed network, the centralizing and standardizing of important look up and control services will become increasingly important.

The network domain envisions a unified future network for the Commonwealth. To enable that end, the platform domain establishes Microsoft Windows as the operating system for network control. The network domain also establishes IP as the critical network routing protocol and places VITA in charge of avoiding IP conflicts in routed communications. In addition, the network domain requires that VITA provide a DNS server on a separate network to be referenced when in-network DNS servers fail. Central utilities are viewed as the platform control vehicles that VITA may use to ensure that these central network controls come about.

PLA-R-35 **Operating Systems for LAN/WAN Control Services:** Servers in VITA supported agencies that provide network-wide control services (e.g., domain design, secondary DNS provision, IP (Internet Protocol) addressing, and directory services) must use the same operating system to facilitate central management and central consolidation. Microsoft Windows is the target architecture standard for LAN/WAN control services for all VITA controlled networks.