

# **Commonwealth of Kentucky**

## **INFORMATION TECHNOLOGY ENTERPRISE STANDARDS**

**ENTERPRISE ARCHITECTURE AND STANDARDS COMMITTEE**

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## INTRODUCTION

The premise of adopting standards is to enable innovation of technology within an environment that is well understood and defined. The enterprise standards support the technology vision and principles of the [Strategic Information Technology Plan](#) and the direction in the [Commonwealth Information Technology Enterprise Architecture](#). Most importantly, the standards promote migration to enterprise solutions with reduced complexity and support. The establishment and governance of enterprise standards requires a constant balancing between too much control and not enough control. Standards are both beneficial and detrimental, depending on the perspective of the user. The standards must provide the right amount of flexibility so that the state's business is not constrained.

Today, standards are necessary to promote transparent communications across the many systems operating in state government. State government is not unlike most information technology environments, which are heterogeneous, rather than homogeneous. This means that the environment is made up of hardware, software, and other components that may not be standard and represent a variety of standards, products and vendors, rather than an enterprise view with accepted standards. Standards are important in providing the rules via which information technology products interact with each other. They are essential in ensuring that systems can communicate, which is essential in an evolving network-centric strategy. Standards such as network protocols and interfaces between applications allow systems on a variety of hardware, and even operating system platforms, to share information and even data.

With the Enterprise Standards established, the transition from the current environment to the revised environment will need to be planned and budgeted. The transition to the Enterprise Standards will be exercised over a period of time; the intention of establishing standards is not to enforce compliance on the day that the standards are published. The planned and budgeted transition will take into account the current environment and the priorities and business directions for the agency to move towards the established standards, recognizing the cost of compliance. Transition assistance and interpretation to agencies will be provided through the Governor's Office for Technology and Office of the CIO.

The Enterprise Standards are reviewed and updated on a regular basis under the published revision cycle. It is critical the enterprise standards be maintained in order to accommodate existing technologies as well as emerging ones. The technology in many areas, such as desktop computing, is evolving rapidly and the standards in these areas will need to be updated frequently as the technology changes. The standards in other areas, such as network protocols, may change more slowly but need to be reviewed and evaluated regularly. There is a policy and procedures method developed to support the process of review and updating the standards (see **Appendix C - Updating the Commonwealth IT Enterprise Standards and Products**). This process also allows for an agency to present a business case when there is a need to consider adding a new product or review an exception to the standards.

The procurement of hardware, software, network and computing services is a vital process for the successful implementation of technology initiatives. To be effective, consistent linkages must exist between the standards and supporting elements such as procurement and training. There must be a direct relationship between standards and products on state price contracts in place that support the purchasing process. Standards or products on the list have active price contracts available so that agencies can buy the products and services necessary for operations. The list is dynamic which may necessitate changes in the way contracts are awarded and modified. The standards list and price contracts are synchronized when feasible for the process to work effectively. Review and update cycles to the list are established that allow for changes and modifications to occur to price contracts. The following are examples that need to be considered for purchasing:

- ?? review the cost benefits whether to lease or purchase the product; and
- ?? purchase a maintenance agreement on a product at time of acquisition; purchasing upgrades to a product which are normally part of a maintenance agreement are more expensive.

## DEFINITION

Standards are rules that define the ways in which a product performs. They provide a basis for reuse, inter-networking, cooperation, and portability. Standards are specified by a large number of formal and informal organizations. This can lead to problems with competing standards for the same technology area. This is especially true in emerging technologies. Vendor alliances are formed with the hope of setting a *de facto*, if not actual, standard in the hope of closing the market to competing vendors. Some standards are never formalized but become *de facto* standards due to market dominance of a particular product or service. Standards allow different products from different vendors to interact. This level of interaction may vary from an interface between products to true product integration. The level of specificity of standards varies greatly from standard to standard. Some standards will have very detailed technical specifications while others will be much broader and more general. A standard can be a specification or a specific product used for comparison, either formally or informally, by which the validity of others can be determined. The two types of standards are *de jure* (according to law) and *de facto* (as a matter of fact).

*De jure* standards are generally known as public or industry standards, established by public bodies. These standards are endorsed and disseminated by official standards organizations.

*De facto* standards are generally created by a single vendor with market dominance or a highly specialized niche product. They may be widely used and implemented, but controlled by a single vendor or group.

Standards for the definition and use of data are another important type of standard. These standards are even more important in a large complex environment such as the Commonwealth. Data definition and usage standards are essential to consistent and accurate data reporting and analysis. Data definition standards often encompass standard values for a data field, in addition to a standard definition for that piece of information. In this arena, a significant amount of work remains to be completed to facilitate data sharing, however common data elements that define

the key identifiers for citizens and businesses have been adopted (see Category 4070 and Appendix D).

Support costs are a very significant portion of the cost of ownership in information technology. A well-defined set of standards can provide the needed level of flexibility while, at the same time, providing for reduced support costs and economies of scale. Standards are essential in ensuring that systems can communicate. Standards such as network protocols and interfaces between applications allow systems on a variety of hardware and even operating systems platforms to share information.

As defined by the Gartner Group, a typical total cost of ownership (TCO) model for IT investments include five direct cost elements (hardware and software, IT management, IT support, development and communications) and two indirect cost elements (end-user IT costs and downtime). A significant portion of the five-year cost of ownership of a desktop computer is related to support costs. Use of laptop and mobile computers is growing in state government and experience to date reveals the costs to support these devices and their users is even higher than fixed desktop computers. These costs can be minimized by setting standards for desktop configuration, software, network connections, and backup procedures. Training costs can be reduced substantially by standardizing on certain applications that have widespread utilization.

The Commonwealth has adopted a set of enterprise standards that provides some level of flexibility while at the same time ensuring compatibility across the enterprise. Standards may indicate an architectural direction, a particular vendor or even a specific product from that vendor. The Commonwealth may adopt a specific product standard based on performance in the marketplace and a technical evaluation of the product in a state government setting. In other cases the standard may be more generic such as compliance with an international, national or industry standard.

## **AUTHORITY, GOVERNANCE AND USE OF STANDARDS**

Under state statutes (KRS 11.507), the Commonwealth Chief Information Officer (CIO) and the Governor's Office for Technology (GOT) have authority for "developing, implementing, and managing strategic information technology directions, standards, and enterprise architecture, including implementing necessary management processes to assure full compliance with those directions, standards, and architecture." The Enterprise Architecture and Standards process is governed by the Enterprise Architecture and Standards Committee, chaired by the CIO. The Chief Information Officer has final approval authority for all actions, modifications and exceptions. The Committee is composed of multiple agency representatives and is administered and supported by the Division of Planning and Architecture, Governor's Office for Technology. A governance process is established and policies for the administration of the process are developed and approved as necessary. As a guiding principle and where feasible, the Commonwealth will strive to define the most appropriate set of existing standards and select a single product by category to achieve the stated standard. The Commonwealth will select a single product to minimize total cost of ownership and to optimize:

?? economies of scale in purchasing

- ?? support
- ?? maintenance
- ?? training
- ?? reusability

The rationale for establishing a standard and a justification has been included in each instance to support the decision of selecting a single product for the stated standard category. Where an enterprise solution is required, the Commonwealth is moving toward this goal and that it will take a period of time to achieve the stated direction. Moving to some standards will be easier than others, since some standards will still be evolving in the marketplace. For example, the graphical user interface (GUI) (*see Standard 2900 - Applications Development Methodology & Software*) has not been reduced to a single standard or approved product. It is essential for the architectural direction that a single product is chosen in some categories, for reasons that include reuse and support. A selection of a GUI is a very important step towards realizing the attainment of several of the guiding principles of the [Strategic Information Technology Plan](#) and the principles in the [Commonwealth Enterprise Architecture](#).

There will be no tolerance in the Commonwealth to purchase products outside the accepted and published standards. If products are purchased outside the standards, there will be no support or training available from the Governor's Office for Technology. In addition, the products, which are not standard, may not be used within the enterprise environment, unless an exception has been granted. For example, a desktop computer purchased that does not meet the minimum standard will not be connected to the network for access to enterprise resources.

One of the areas that agencies must monitor closely is the purchase of information technology products outside the purview of the Division of Material and Procurement Services, Finance and Administration Cabinet. Through EMPOWER Kentucky initiatives, more flexibility and responsibility is available to employees to purchase products without going through the regulated purchasing process; therefore the assurance of standard(s) adherence is not guaranteed. Agency heads must assume responsibility to follow the Enterprise Standards during the procurement process and this should be reinforced throughout the agency. Absent a pre-audit process by the Governor's Office for Technology, it is expected that agencies will comply without an onerous review and enforcement process.

## **MEASURING PROGRESS AND MAINTAINING THE STANDARDS**

Measuring progress is an important element of the enterprise standards governance process. From a baseline established in 1998, the formal survey data gathered from executive agencies will measure our progress with the Enterprise Architecture and migration toward an enterprise standards-based organization. The information reported in the survey is tied to key steps in achieving the stated Enterprise Architecture. The intent of the survey, called the Gap Analysis, is to document the gap between the current situation and the architectural vision, and not a precision measurement tool. The gap data also provides information to assist in enterprise-wide impact assessments, national survey response and budget development. Based on the performance metrics gathered in the 1999 Gap Analysis from state agencies, it is apparent

agencies have made significant progress in complying with Enterprise Standards. In many key categories assessed, the compliance exceeded ninety percent on an enterprise basis. As new versions of products (that are identified within standards) are introduced, the standard will be updated to reflect the new versions through due process as laid out in Appendix C. This process will be identified in more detail to handle the different scenarios that will occur. For example, the downward/upward compatibility of products as new releases are introduced can be problematic and must be addressed during the transition. The following is a list of domain architectures for which enterprise standards have been defined or will be defined in the future:

- ?? hardware platforms, e.g. desktop computers, servers, printers
- ?? software, e.g. operating systems, office suite, database management systems, applications development
- ?? network services, e.g. network protocols, network hardware components, network services
- ?? data and information, e.g. common data elements, data definitions, geographic information system (GIS) data standards
- ?? ergonomics
- ?? middleware and messaging services
- ?? security services, e.g. virus scanning, firewall services, secure transport
- ?? voice communications, e.g. telephony, voice mail, interactive voice response (IVR), etc.
- ?? wireless communications

These areas have been further delineated and placed in a **category**, which aligns with the domain architecture. The standards nomenclature is formalized and the following items are defined within each category:

- ?? **Category** - name of the standard
- ?? **Definition** - description of the standard within the context of state government
- ?? **Rationale** - reason for the standard based on the business needs
- ?? **Approved Standard(s)** - international, industry standards that support the category
- ?? **Approved Product(s)** – product(s) selected by the Commonwealth
- ?? **Justification** - justify the choice of product for the standard
- ?? **Technical and Implementation Considerations** - any technical and implementation information that assists in the application of the product in support of the standard
- ?? **Emerging Trends and Architectural Direction** – describes any ongoing research and market analysis, technology forecasts and the direction of the state
- ?? **Review Cycle** - how often the standard is reviewed
- ?? **Timeline** - dates that reflect changes in the standard

A set of domain categories, with a consistent format and taxonomy, has been established by the Enterprise Architecture and Standards Committee to identify the standard and product (if appropriate). Where possible, existing international, national or industry standards that support the category selection are used when a specific product is not named. Since this is an adaptive architectural process, additional categories will be identified as necessary and existing categories refined. Some of these categories are incorporated into the most recent version of the Enterprise Standards, but there are several categories not fully developed and require further research In

some instances, the stated direction of the Commonwealth is provided in the Technical and Implementation Considerations or Emerging Trends and Architectural Directions section to assist agencies in planning and procurement. Any categories identified, but not fully completed, have the phrase *under construction* in the **Definition**.

**NOTE:** All brands and product names mentioned are trademarks or registered trademarks of their respective holders.

## **Enterprise Standards:**

### **1000 TECHNOLOGY - HARDWARE**

#### **Category:**

### **1100 VIDEO CONFERENCING**

#### **Definition:**

Video conferencing allows individual at separate locations to see and hear each other, conduct meetings, and work together using interactive video and audio technology. Images of documents can also be exchanged, and desktop computers can be used to share files or let participants work together on documents or projects. [The Kentucky Tele-Linking Network \(KTLN\)](#) provides an infrastructure of sites utilizing compressed video technology for interactive distance learning and meeting sessions. Satellite conferencing offers the ability to broadcast to many downlink sites with audio response.

#### **Approved Standard(s):**

[ITU-T Standards](#) supported:

H.320, G.711, G.722, G.728, H.221, H.261, T.120 for data collaboration

#### Video Conferencing

Algorithms and resolutions (pixels x lines):

ITU-T H.261 (P x 64)

352 x 288 (FCIF)

Frame rate: 30 frames per second

#### Monitor outputs

Main: S-Video or Composite (Media Max/Media Max LC)

Local view/PC: S-Video

#### Camera inputs

S-Video or Composite

Video format: NTSC

Broadcast standards: NTSC

#### Audio Conferencing

Omnidirectional pickup; push-to-talk (cardoid/super-cardoid) or omindirectional, automatic microphone level adjustment; multimedia AVI playback (VTEL ESA platform only); full duplex audio, full duplex, adaptive acoustic echo canceling.

#### In-band coding rates:

ITU-T G.722:

48/56/64 Kbps, 50 Hz-7 kHz

ITU-T G.728:

16 Kbps, 50 Hz-3.4 kHz

ITU-T G.711:

64 Kbps, 50 Hz-3.4 kHz ( $\mu$ Law/ALaw)

#### Communications Protocols

ITU-T H.221

Interfaces

DDM associated connections; V.35/RS449 Direct Connect

25 mb ATM Direct Connect

Transmission rates

384 Kbps or fractional T-1 is the predominant transmission for KTLN

### **Approved Product(s):**

[VTEL Video Conferencing Models:](#)

LC5000 Leadership Conferencing

TC1000 Team Conferencing

TC2000 Team Conferencing

MCU-II (Multipoint Control Unit)

VTEL SmartLink MCS

See also Category 3450 Desktop Video Conferencing.

### **Justification:**

The KTLN is based on network and product standards deployed statewide for distance learning and government meetings. [Over 200 KTLN rooms exist in Kentucky](#), which ALL utilize VTEL video conferencing technology. Over 200 rooms exist statewide that also utilize the VTEL product suite. A Verizon state price contract and website for product information, pricing and support is available at <http://www.ktln.com>

### **Technical and Implementation Considerations:**

VTEL uses ITU standards for the video/audio transmissions, but the graphics transmission for collaboration and document sharing uses T.120 protocol. VTEL ESA platform uses the ITU T.120 protocol for workgroup collaboration (NetMeeting) for software applications sharing and whiteboard functions. The connection to remote sites that do not utilize the VTEL HDLC algorithm will require operator intervention via an MCU software switch to enable full standards-based communications.

### **Emerging Trends and Architectural Directions:**

The approved product(s) in this category will be expanded within the next six months. The KTLN Technical Committee is testing various non-VTEL products. As these products pass the acceptance criteria developed by the Committee, they will be considered for this category and addition to the existing state price contract for ITV equipment and services.

H.323 is the international standard for video transport over the LAN/WAN infrastructure using Internet Protocol (IP). The primary barriers today for H.323 use in state agencies is infrastructure capacity, bandwidth allocation and quality of service. Early adoption and deployment of H.323 has inherent risks, most importantly interoperability issues because over 95% of the state's video conferencing equipment use the H.320 standard. As technical and business issues are resolved, it is expected that H.320 and H.323 will coexist in state government and education. Because of various technical issues that remain unresolved, agencies should not deploy H.323 video transport without prior approval from the Governor's Office for Technology.

### **Review Cycle:**

6 months

### **Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

## **Enterprise Standards:**

### **1000 Technology - Hardware**

#### **Category:**

### **1200 SCANNERS – DIGITAL IMAGING**

#### **Definition:**

Scanners are input or conversion devices, which are used to create digital raster representations of paper forms, certificates, photographs, maps, charts, and reports. Scanners may be used in conjunction with imaging applications and systems, workflow software or for general graphical input, such as electronic publishing and web site images.

#### **Rationale:**

#### **Approved Standard(s):**

[ITU-T](#), FIPS 147, 148, 149, 150

ANSI/AIM MS 44-1988, revised 1993

ANSI/AIM MS 58-1996 (Implementation of Small Computer System Interface (SCSI) 2

Capable of scanning resolutions between 200 and 600 DPI, depending on application

Use at least 16 levels of gray scale

Compliance with CCITT Group III or IV

#### **Approved Product(s):**

[Hewlett Packard](#)

[Fujitsu](#)

[Bell and Howell](#) (large volume)

#### **Justification:**

None

#### **Technical and Implementation Considerations:**

Scanners are available as flatbed, form feed and drum. Desktop applications must have a SCSI-2 interface.

#### **Emerging Trends and Architectural Directions:**

#### **Review Cycle:**

Annually

#### **Timeline:**

Revision date: July 1, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 1000 Technology - Hardware**

### **Category:**

### **1310 SERVERS - REMOTE ACCESS**

#### **Definition:**

The communication server supports remote access services for dial-up access into the [Kentucky Information Highway \(KIH\)](#). Additional services include fax support and Virtual Private Networking (VPN) for secure tunneling.

#### **Rationale:**

Remote access has become a service that is in high demand. Today there is a mix of agency solutions or internet service provider (ISP) accounts that are used to access the statewide network. A standard, common method of access will reduce costs, enhance security and allow a reliable, robust remote access server.

#### **Approved Standard(s):**

PPP access  
CHAP/PAP Authentication  
Radius Authentication  
Analog/ISDN support

#### **Approved Product(s):**

Nortel Networks product line for the modem/services  
Servers listed in category 1320 and 1330  
NOTE: Agencies should review the shared services dial-up connectivity offered by GOT.

#### **Justification:**

The major internetworking product standard for KIH is Nortel Networks. The statewide infrastructure and central backbone consists of Nortel Networks hardware, software and services for communication services. This infrastructure is managed using [HP Openview](#) and Nortel Networks enterprise tools. This standard will ease use and ensure compatibility for communication services, especially those using enterprise services.

#### **Technical and Implementation Considerations:**

Agencies that require remote dial-up access to the statewide network are strongly encouraged to use the enterprise, dial-up 800 service to the Kentucky Information Highway, offered by the Governor's Office for Technology (see Agency Contact memo <http://www.state.ky.us/ftp/pdf/980503.pdf>). Client access requires TCP/IP loaded on the remote desktop computer.

#### **Emerging Trends and Architectural Directions:**

As the number of mobile and remote employees increase, security of remote dial-up connectivity is becoming critically important for state business. The Governors Office for Technology (GOT) is offering a new service that will allow users to create private connections on the Kentucky Information Highway (KIH) and the Internet. This new service is called VPN and is an acronym for Virtual Private Networking. This new product is ideal for agencies that have mobile or remote employees but are concerned about the potential security risks of confidential information being intercepted. VPN will also allow internal customers the ability to have a secure connection to the mainframe. (see Agency Contact memo [http://www.state.ky.us/ftp/pdf/2000\\_0202.pdf](http://www.state.ky.us/ftp/pdf/2000_0202.pdf))

**Review Cycle:**

Annually

**Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

## Enterprise Standards: 1000 Technology - Hardware

### Category:

### 1320 SERVERS – APPLICATION/DATABASE SERVERS

#### Definition:

An **Application Server** is a server on a LAN that performs data processing. In a two-tier client/server environment, the application server does the database processing (DBMS), and the client machine performs the business logic. In a three-tier client/server environment, an independent application server performs the business logic. An application server can also be used to contain applications (software) shared by network clients. In this case, it functions as a remote disk drive for storing applications.

A **Database Server** is a computer on a LAN dedicated to database storage and retrieval. The database server is usually a critical component in a client/server environment. It holds the database management system (DBMS) and the databases. Upon requests from the client machines, it searches the database for selected records and passes them back over the network. A database server and file server may be one in the same, but database servers are typically dedicated to database use only.

Application servers and database servers can vary in size from small workgroup servers to powerful enterprise servers. Enterprise servers are generally used to provide services for applications or databases shared by several agencies, or to a large number of users in a single agency. The following table contains guidelines for determining the relative size of an application or database server:

	Small	Medium	Large
Concurrent Users	<100	100-500	>500
Transactions/sec.	<1	1-10	>10
Recommended Server Platform	Category 1320 - NT	Category 1320 - S/390, RS/6000	Category 1320 S/390, RS/6000

#### Rationale:

Application and database servers are used to provide specific services that generally should not be provided by typical multi-function servers. These services often include large-scale, high-volume, and/or mission-critical computing tasks, such as transaction processing or database support. Application and database servers are usually significantly more reliable and dependable than smaller, multi-function servers, and are able to minimize support costs by supporting large numbers of users, or clients, on a single hardware configuration.

#### Approved Standard(s):

Must be able to run either the MVS operating system (OS/390), the UNIX operating system, or the Windows NT Server operating system.

#### Approved Product(s):

[IBM S/390 series](#) (for MVS)

[IBM RS/6000 series](#) (for UNIX)

[IBM AS/400 series](#) (approved as upgrade only for agencies designated as Tier I)

[Sun Ultra Enterprise series](#) (for UNIX)

[Hewlett Packard series](#) (for UNIX)

[Compaq AlphaServer series](#) (for UNIX) see CAUTIONARY NOTE below

See *Standard 1330 Servers - Workgroup Servers* (for NT)

**Justification:**

The IBM S/390 series, the Sun Ultra Enterprise series, and the AlphaServer series have all proven themselves capable of supporting a wide range of diverse computing workloads. These platforms span the computing spectrum and are upgradeable from small departmental servers to massive enterprise servers which perform mission critical computing for thousands of users. Compaq servers have proven to be a reliable platform for running the Windows NT server operating system for intensive applications.

**Technical and Implementation Considerations:**

High-end servers are recommended for mission critical services. Fault tolerant, hot swapable, and redundant components should be utilized when application requirements call for high availability. Cautionary Note Regarding AlphaServer NT: On August 23, 1999 Compaq decided it would terminate Alpha support for the current versions of the Windows NT operating systems, effective with the release of Windows NT 4.0 Service Pack 6, scheduled for late 1999. Compaq also decided that it does not plan to support future Alpha versions of Windows® and BackOffice® including Windows 2000. There will be no future releases of Microsoft products for the 32-bit or 64-bit Alpha platform. Compaq confirmed reports that it has decided to stop both 32- and 64-bit Windows NT development activity on Alpha. Microsoft has confirmed there will not be any new 32- or 64-bit Alpha releases for SQL Server, Exchange or BackOffice. Compaq notified customers it will continue to support customers who have deployed 32-bit Windows NT on Alpha systems for as long as they require. They will end development for all 32-bit and 64-bit Windows NT products on Alpha with the delivery of Version 4 SP6 in late 1999. Agencies utilizing Alpha platforms and NT to support applications should begin investigating the available options now. To review this announcement by Compaq, visit their corporate web site at: <http://www5.compaq.com/products/servers/>

**Emerging Trends and Architectural Directions:****Review Cycle:**

6 months

**Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

# Enterprise Standards: 1000 Technology - Hardware

## Category:

### 1330 SERVERS – WORKGROUP SERVERS

1. File & Print
2. Application
3. Database
4. Internet/Intranet
5. Mail/Messaging

#### Definition:

With the arrival of multiple processor servers, network servers perform multiple roles. The following are examples of the services a network server(s) perform in a modern network. Depending on the size and configuration one, several or all of the following may be provided by a single server. In the area of databases, a workgroup server would be used for internal, non-mission critical applications within a cabinet or agency.

1. **File & Print Server** - A high-speed computer in a LAN that stores the programs and data files shared by users on the network. The network server acts like a remote disk drive. The File & Print Server controls one or more printers. It stores the print-image output from all users of the system and feeds it to the printer one job at a time.
2. **Application Server** - A server in a LAN that performs data processing. In a two-tier client/server environment, the application server does the database processing (DBMS), and the client machine performs the business logic. In a three-tier client/server environment, an independent application server performs the business logic. A server in a LAN that contains applications (software) shared by network clients. In this case, it functions as a remote disk drive for storing applications.
3. **Database Server** - A computer in a LAN dedicated to database storage and retrieval. The database server is a key component in a client/server environment. It holds the database management system (DBMS) and the databases. Upon requests from the client machines, it searches the database for selected records and passes them back over the network. A database server and file server may be one in the same, because a file server often provides database services. However, the term implies that the system is dedicated for database use only and not a central storage facility for applications and files.
4. **Inter/Intranet Server** - A high-speed computer in a LAN dedicated to providing Internet services such as a Web Server, News Server, intranet applications, etc.
5. **Mail/Messaging Server** - A server in a LAN that provides electronic mail services such as Microsoft Exchange.

#### Rationale:

To allow all of the enterprise to share data and communicate, the underlying WAN must offer the ability for LANs to connect and communicate. All of the services above can be provided by a single platform Microsoft NT operating system.

#### Approved Standard(s):

SMP NT Server

##### Minimum Configuration Options:

Two (2) Pentium Pro 200 MHz processors installed  
128 MB RAM

Pentium II Xeon processor  
128 MB RAM

Alpha processor

128 MB RAM

Fault tolerant hardware RAID 5 disk storage with hot swap drives

Digital Audio Tape (DAT) tape backup, Digital Linear Tape (DLT) backup, 8 mm tape device – see Category 1800 (or Storage Area Network )

Redundant power supplies

### **Approved Product(s):**

[Compaq](#)

[Compaq AlphaServer](#) CAUTION: Compaq terminated Alpha support for the current versions of the Windows NT operating systems. See Standards Advisory Statement at [http://www.state.ky.us/kirm/alpha\\_nt.htm](http://www.state.ky.us/kirm/alpha_nt.htm)

[Dell](#)

[Hewlett Packard](#)

[IBM](#)

### **Justification:**

Servers offered by Tier I providers that are found on the current Microsoft NT Hardware Compatibility List.

### **Technical and Implementation Considerations:**

The scope of the application(s) supported by the workgroup server must be carefully considered by the agency in terms of architecture, scalability, availability and reliability features, database selection, concurrent users supported, printing, and web interface. As multiple services are offered on the same server, additional memory and processors should be added to support them. The Alpha architecture offers a high-performance platform, however agencies are cautioned against a long-term investment in the AlphaServer line because of limited support and future development announced by Compaq. On August 23, 1999 Compaq decided it would terminate Alpha support for the current versions of the Windows NT operating systems, effective with the release of Windows NT 4.0 Service Pack 6, scheduled for late 1999. Compaq also decided that it does not plan to support future Alpha versions of Windows® and BackOffice® including Windows 2000. There will be no future releases of Microsoft products for the 32-bit or 64-bit Alpha platform. Compaq confirmed reports that it has decided to stop both 32- and 64-bit Windows NT development activity on Alpha. Microsoft has confirmed there will not be any new 32- or 64-bit Alpha releases for SQL Server, Exchange or BackOffice. Compaq notified customers it will continue to support customers who have deployed 32-bit Windows NT on Alpha systems for as long as they require. They will end development for all 32-bit and 64-bit Windows NT products on Alpha with the delivery of Version 4 SP6 in late 1999. Agencies utilizing Alpha platforms and NT to support applications should begin investigating the available options now.

### **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

6 months

### **Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 1000 Technology - Hardware**

### **Category:**

### **1350 SERVERS - INTERNET/INTRANET**

#### **Definition:**

A server platform used to house Internet/Intranet services (primarily Web server) although other software such as news servers or domain name services may be housed occasionally on the same platform.

#### **Rationale:**

Standard hardware platforms ensure that support is available and that hardware is suitable for Internet/Intranet applications. These platforms best designed to deliver Internet services with standard operating systems and Web server software.

#### **Approved Standard(s):**

RISC chip or Intel multiple processor platform.

Intel Platform

RISC Platform

#### **Approved Product(s):**

*See Standard 1330 Servers - Workgroup Servers*

#### **Justification:**

These platforms are chosen, as they seem to be supported by many Internet software vendors. Support is available for these platforms and there is more experience with these platforms within the Governor's Office for Technology (formerly the Department of Information Systems-DIS) and state agencies.

#### **Technical and Implementation Considerations:**

Internet/Intranet technology is still rapidly evolving with several vendor strategies competing with one another. Primarily Internet/Intranet server hardware should be chosen to coordinate with the Operating System and type of Internet software which is to be used. Microsoft NT operating systems should be placed on an Intel based server as Microsoft releases of products (including NT) are released first for the Intel platform. UNIX operating systems should be placed on a RISC-based server and the vendor supported version of UNIX used. For the approved product listed, that would be Sun Solaris and Compaq AlphaServer UNIX.

When considering the platform, the location of the application should also be considered as the Gartner Group predicts that the majority of Intranet applications will be hosted on NT based servers while Internet applications will reside on UNIX based hosts. This is in part due to the role of UNIX in the history of the Internet. The other part is due the scalability issues involved in many Internet-based applications. Many Internet applications must provide for greater scalability than that of Intranet where the size of the application and the number of users can primarily be determined in advance. Many UNIX Internet products are more mature than NT products. The platform (Intel or RISC) should be chosen based upon the Operating System used for the server. The Gartner Group recommends that the following criteria be used in determining the OS to be used for an Internet or Intranet server. **Note: Sometimes Internet/Intranet software availability is dependent upon both operating system and hardware platform.**

1. Existing Expertise - the knowledge base in the support structure should be used in determining the server OS/platform. Most agencies have or will have support for NT in place to support other applications, networks, etc.

2. Web server software dependencies - if an agency requires MS Internet Information Server, NT is the only choice for the OS and therefore the platform.
3. Overall architectural fit.
4. Scalability - UNIX provides more scalability than NT at the present time and for the next several years.

## **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

Annually

### **Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 1000 Technology - Hardware**

### **Category:**

### **1370 SERVER - CD-ROM**

#### **Definition:**

A CD-ROM server consists of a controlling computer (attached to a local area network) with an attached array of CD-ROM drives. The configuration may also be a self-contained server/CD-ROM tower platform. CD-ROM server arrays are generally available in two sizes: from 1 to 7 CD-ROM drives, and from 15 to 56 CD-ROM drives (requirements for 8 to 14 drives are usually satisfied with two seven-drive configurations). The smaller CD-ROM server configurations are generally housed in a small desk-side tower enclosure with an attached desktop computer; the larger servers are generally housed in a refrigerator-sized commercial "relay rack" with an attached or integrated computer. Both platforms provide access to CD-ROM-based data via LAN/WAN - one user can access multiple CD-ROM's at the same time, and multiple users can access the same CD-ROM at the same time.

#### **Rationale:**

Individual users in the enterprise need access to a common set of data that is available on CD-ROM media. Typically these CD-ROM's are licensed, commercially available products that are used by technical staff for reference. However, with the advent of relatively inexpensive CD-ROM writers coupled with inexpensive media and authoring software indicates the use of CD-ROM servers to disseminate agency-specific data.

#### **Approved Standard(s):**

Intel-based server configured for Windows NT 4.0, from 64MB to 256MB main storage (populating not more than half the available memory slots, with main storage size a function of the number of CD-ROM's controlled by the server and the expected access activity), a fast-SCSI-controlled disk subsystem with a minimum of 4GB disk storage (this may be much more, depending upon any CD-ROM cache requirements), A SCSI-controlled CD-ROM drive built-in the server (for loading software), 10/100 PCI twisted pair Ethernet adapter, Intel Pentium II processor with X86 compatibility, PCI local-bus graphics accelerator with a minimum of 2MB VRAM, mouse, a standard 104-key keyboard, and an attached array of hot-swappable CD-ROM drives, with their required controllers (usually fast-SCSI). In addition to the hardware and operating system requirements, special software is required to index the CD-ROM's, manage any cache used to accelerate access to the CD-ROM's, and manage changes to the CD-ROM configuration.

#### **Approved Product(s):**

*See Standard 1330 Servers – Workgroup Servers*

#### **Justification:**

The "Smart-CD" software product for Windows NT 4.0 has been implemented successfully in a 35-CD-ROM-station configuration in the Governor's Office for Technology (formerly the Department of Information Systems-DIS). No other such large-scale product has been evaluated in state government. Published comparative benchmark data are not available.

#### **Technical and Implementation Considerations:**

Currently available state-of-the-art CD-ROM decks that are controlled by fast-SCSI controllers meet the requirements of a large CD-ROM server. However, with the release of DVD (Digital Video Disk or Digital Versatile Disc), the capacity of the DVD-ROM format increases the capacity from 0.7 GB to about 17GB per DVD-ROM Read-only 2 sides, 2 layer platter.

## **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

6 months

### **Timeline:**

Revision Date: November 10, 2000

Effective Date: July 1, 1997

## **Enterprise Standards: 1000 Technology - Hardware**

### **Category:**

### **1410 DESKTOP - POWER USER**

#### **Definition:**

Computer workstation for simultaneous execution of four or five complex 32-bit applications and/or developing/maintaining a large database application.

#### **Rationale:**

Need a common platform for (1) economies-of-scale with respect to hardware and software procurement, (2) skills transferability required by a mobile workforce, (3) data interchange between state government agencies. New desktop software for power users requires substantial main memory and mass storage to support the applications.

#### **Approved Minimum Standard(s):**

Intel-based system, a minimum of 64MB main storage (populating not more than half the available memory slots), a fast-SCSI-controlled disk subsystem with a minimum of 4GB disk storage (this may be much more, depending upon any database requirements), SCSI-controlled CD-ROM drive, sound card with speakers (or headphones if appropriate), 10/100 PCI twisted pair Ethernet adapter, the fastest generally-available Intel processor with X86 compatibility, PCI local-bus graphics accelerator with a minimum of 4MB video RAM, 17" SVGA color monitor with .28 dot pitch, mouse, and either a standard 104-key keyboard or an ergonomic keyboard (MS Natural keyboard recommended). System must be configured with approved virus protection client software (*see Standard 3530*). Vendor and product selections are characterized in Gartner Group's Commercial Desktop Tiering Model as Enterprise-tier vendors. Enterprise-tier vendors offer strong technology options, global support and distribution. These vendors generally represent the lowest levels of risk and economies of scale for high-volume purchases.

#### **New Procurement Standard(s):**

**Effective November 2000.** The approved new purchasing standard for the power user desktop category recognizes the functional needs of users, new network applications, the dynamic marketplace and the price/performance ratio of new devices. This approach represents a long-term investment strategy for desktop computers. The following is a minimum configuration for this category: Intel 700 MHz Pentium III processor w/256k cache, 128 MB RDRAM (expandable to 384 MB), AGP 4X Graphics with 16 MB RAM, 10 GB + ATA/66 EIDE hard drive, 17" Super VGA Color Monitor with .28 Dot Pitch, 3.5" 1.44 MB diskette drive, 17 X min/40 max CD-ROM drive (or DVD), two (2) universal serial bus (USB) ports, 104 keyboard, mouse, 3COM PCI 10/100 twisted pair Ethernet w/WOL, standard requires multimedia computers with a soundcard (SoundBlaster or equivalent) and speakers (or headphones if appropriate). System must be configured with approved operating systems and virus protection client software (*see Standard 3530*).

#### **Approved Product(s):**

[Compaq](#)  
[Dell](#)  
[Gateway](#)  
[IBM](#)

*See Standard 2100, O/S-Desktop.*

#### **Justification:**

The synergy enabled by being able to execute multiple complex applications provides a skilled power user with significant leverage in problem solving. An under-powered hardware platform will thwart these efforts and result in little productivity gain and user frustration. However, it is noted that true power users are an exception in the workforce, and that the vast majority of users will be served well by the "General Workstation" configuration.

### **Technical and Implementation Considerations:**

This platform should be a true “state of the art” platform. Expected useful life for a power user should be 18-24 months - upgrades will be necessitated by software upgrades and/or introduction of additional complexity in the working environment (i.e., simultaneous use of additional software tools). Typically, displaced power user desktop computers are prime candidates as “general workstations.” Agencies seeking to refresh large volumes of desktop technology should seriously consider leasing as an option for acquisition.

The new procurement standard includes the Universal Serial Bus (USB), a new external bus standard that supports data transfer rates of 12 Mbps (12 million bits per second). A single USB port can be used to connect up to 127 peripheral devices, such as monitors, printers, mice, modems, keyboards, speakers and input devices like scanners and digital cameras. USB also supports Plug-and-Play installation and hot plugging. USB uses a "tiered star topology" which means that some USB devices--called USB "hubs"--can serve as connection ports for other USB peripherals. Only one device needs to be plugged into the PC. Other devices can then be plugged into the hub. Since desktop systems being manufactured today include one or more USB ports, it is expected to eventually completely replace serial and parallel ports.

### **Emerging Trends and Architectural Directions:**

#### **Review Cycle:**

6 months

#### **Timeline:**

Revision Date: November 10, 2000

Effective Date: July 1, 1997

## **Enterprise Standards: 1000 Technology - Hardware**

### **Category:**

### **1420 DESKTOP – GENERAL WORKSTATION**

#### **Definition:**

Computer workstation for simultaneous execution of two or three complex 32-bit applications: a normal office workload.

#### **Rationale:**

Need a common platform for (1) economies-of-scale with respect to hardware and software procurement, (2) skills transferability required by a mobile workforce, (3) data interchange between state government agencies.

#### **Approved Minimum Standard(s):**

Intel-based system, a minimum of 32MB main storage (populating not more than half the available memory slots), an EIDE-controlled disk subsystem with a minimum of 2GB disk storage, 3.5" diskette drive, an IDE-controlled CD-ROM drive, sound card with speakers, 10/100 PCI twisted pair Ethernet adapter, fastest class generally-available Intel processor, but not less than 200 MHz, with X86 compatibility, PCI local-bus graphics accelerator with a minimum of 2MB VRAM, 15 inch SVGA color monitor with .28 dot pitch, mouse, and either a standard 104-key keyboard or an ergonomic keyboard (MS Natural keyboard recommended). System must be configured with approved virus protection client software (*see Standard 3530*). Selections are characterized in Gartner Group's Commercial Desktop Tiering Model as Enterprise-tier vendors. Enterprise-tier vendors offer strong technology options, global support and distribution. These vendors generally represent the lowest levels of risk and economies of scale for high-volume purchases.

#### **New Procurement Standard(s):**

**Effective November 2000.** The approved new purchasing standard for the power user desktop category recognizes the functional needs of users, new network applications, the dynamic marketplace and the price/performance ratio of new devices. This approach represents a long-term investment strategy for desktop computers. Intel 500 MHz Pentium III processor w/256k cache, 128 MB RDRAM (expandable to 384 MB), AGP 4X Graphics- 4 MB RAM, 6 GB + ATA/66 EIDE hard drive, 17" Super VGA color monitor with .28 Dot Pitch, 3.5" 1.44 MB diskette drive, 17 X min/40 max CD-ROM drive (or DVD) 2 – USB ports, 104 keyboard, Mouse, 3COM PCI 10/100 twisted pair Ethernet w/WOL, standard requires multimedia computers with a soundcard (SoundBlaster or equivalent) and speakers System must be configured with approved operating system and virus protection client software (*see Standard 3530*).

#### **Approved Product(s):**

[Compaq](#)  
[Dell](#)  
[Gateway](#)  
[IBM](#)

*See Standard 2100, O/S-Desktop.*

#### **Justification:**

The synergy enabled by rapid execution of office suite applications provide typical knowledge workers user with significant leverage in problem solving and presentation. An underpowered hardware platform will thwart these efforts and result in little productivity gain.

## **Technical and Implementation Considerations:**

This platform should be a true “state of the art” platform. Expected useful life for user of a general workstation should be about 24-36 months - upgrades will be necessitated by software upgrades and/or introduction of additional complexity in the working environment (i.e., simultaneous use of additional software tools). The new procurement standard is expected to minimize the necessity for memory upgrades during the life cycle of the hardware. Agencies seeking to refresh large volumes of desktop technology should seriously consider leasing as an option for acquisition.

The new procurement standard includes the Universal Serial Bus (USB), a new external bus standard that supports data transfer rates of 12 Mbps (12 million bits per second). A single USB port can be used to connect up to 127 peripheral devices, such as monitors, printers, mice, modems, keyboards, speakers and input devices like scanners and digital cameras. USB also supports Plug-and-Play installation and hot plugging. USB uses a "tiered star topology" which means that some USB devices--called USB "hubs"--can serve as connection ports for other USB peripherals. Only one device needs to be plugged into the computer. Other devices can then be plugged into the hub. Since desktop systems being manufactured today include one or more USB ports, it is expected to eventually completely replace serial and parallel ports.

## **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

6 months

### **Timeline:**

Revision Date: November 10, 2000

Effective Date: July 1, 1997

## **Enterprise Standards: 1000 Technology - Hardware**

### **Category:**

## **1450 NETWORK COMPUTERS**

### **Definition:**

A network computer (NC) is a new, easy-to-use end-user computing device that boots off the network and the network serves as the storage device. A NC environment centralizes applications, data and services on the network and downloads bytes as requested. An NC is generally a thin client computer for minimum workstation functions: accessing legacy systems, communicating through email, using internet/intranet, conducting electronic commerce, and running small software applications such as Java-enabled applications.

### **Rationale:**

In the near future, there may exist the need for a NC to replace dumb terminal devices where simple transactions are completed and minimum workstation functions are required. NC devices are more than diskless workstations - the use of Java programming allows network applications to become optimized and more complex.

### **Approved Standard(s):**

None

### **Approved Product(s):**

None

### **Justification:**

### **Technical and Implementation Considerations:**

Agencies considering NC deployment at this time must be cautious. Deciding what applications should operate on network computers and who should be using network computers is determined by the business processes and functions of the employees. Since the network is the storage, network computers will impact network design, network performance and server performance. Agencies considering NC devices will have to make major investments in a NC administration server, the LAN, including bandwidth and support staff to manage the network. Furthermore, it is expected WAN capacity will likely need to be substantially increased.

### **Emerging Trends and Architectural Directions:**

NC is an emerging standard and in its infancy. There is an evolving Network Computer Reference Profile (NCRP) to provide a common set of guidelines created to promote compatibility. Several major hardware vendors that originally committed to produce NC devices have since abandoned the concept or delayed the introduction of the devices.

### **Review Cycle:**

6 months

### **Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 1000 Technology - Hardware**

### **Category:**

## **1460 NOTEBOOK/LAPTOP COMPUTERS**

### **Definition:**

A portable, enterprise-class computer workstation for simultaneous execution of two or three complex 32-bit applications and the ability to handle a normal office workload in both a fixed or mobile environment.

### **Rationale:**

Need a common platform for (1) economies-of-scale with respect to hardware and software procurement, (2) skills transferability required by a mobile workforce, (3) data interchange between state government agencies. With the increasing need of state employees to accomplish work in a non-traditional setting, notebook/laptop computers with remote communications capability is critical.

### **Approved Minimum Standard(s):**

Intel-based system, a minimum of 32MB main storage (populating not more than half the available memory slots), an SCSI or Enhanced IDE-controlled disk subsystem with a minimum of 2GB disk storage, 3.5" diskette drive, an IDE-controlled CD-ROM drive (or floppy/CD combo), sound card with speakers (or headphones), two PCMCIA card slots for 10/100 PCI twisted pair Ethernet adapter and 33.6 kbs modem, fastest class (but not necessarily fastest clock speed) generally-available Intel processor with X86 compatibility, PCI local-bus graphics accelerator with a minimum of 2MB WRAM. An SVGA active-matrix color display with a minimum 12.1" viewing area (at 800 dpi x 600 dpi). External mouse and standard keyboard, with a connector for external keyboard (MS Natural keyboard recommended). System must be configured with approved virus protection client software (*see Standard 3530*). Product selections are characterized in Gartner Group's Commercial Desktop Tiering Model as Enterprise-tier vendors. Enterprise-tier vendors offer strong technology options, global support and distribution. These vendors generally represent the lowest levels of risk and economies of scale for high-volume purchases.

### **New Procurement Standard(s):**

**Effective November 2000.** The approved new purchasing minimum standard for the mobile computer user recognizes the functional needs of users, new network and remote applications, the dynamic marketplace and the price/performance ratio of new devices. Many notebook computers are used with a docking station as the primary computer for state employees. This approach represents a long-term investment strategy for notebook/laptop computers. Pentium III 366 MHz w/14.1" TFT XGA Display, 128 MB SDRAM, AGP Graphics, 4 MB, 8.0 GB hard drive enhanced/fast IDE, 3.5" diskette drive and IDE Controlled CD ROM (dual compartment drive or floppy/CD combination), 24x max/10x min CD-ROM, 3 COM 56k v 90 modem, 3 COM 10/100 Cardbus LAN card, 1 USB port, soundcard and speaker, external mouse, connector for external keyboard and Lithium-Ion battery. Optional docking station for fixed workstation users. System must be configured with approved virus protection client software (*see Standard 3530*).

### **Approved Product(s):**

[Compaq](#)

[Dell](#)

[Gateway](#)

[IBM](#)

### **Justification:**

Notebook and laptop computers from Tier I vendors, consistent with the desktop product standards, provides for a less diverse environment and a lower total cost of ownership.

### **Technical and Implementation Considerations:**

If the notebook/laptop computer is to be used as a replacement for a desktop computer, support for a full docking station is required. Recognizing the increased power and performance of notebook/laptop computers available to state agencies, many users will need only one mobile device to support all their business needs. Agencies procuring notebook/laptop computers must consider the size and weight for true portability, modem communications (a PCMCIA V.90 56Kbps standard) and power requirements (generally two lithium ion batteries and AC power pack). Notebook computers result in a higher total cost of ownership in light of certain operational and management considerations such as remote access utilization, battery life, LCD panel damage and theft.

The new procurement standard includes the Universal Serial Bus (USB), a new external bus standard that supports data transfer rates of 12 Mbps (12 million bits per second). A single USB port can be used to connect up to 127 peripheral devices, such as monitors, printers, mice, modems, keyboards, speakers and input devices like scanners and digital cameras. USB also supports Plug-and-Play installation and hot plugging. USB uses a "tiered star topology" which means that some USB devices--called USB "hubs"--can serve as connection ports for other USB peripherals. Only one device needs to be plugged into the computer. Other devices can then be plugged into the hub. Since desktop systems being manufactured today include one or more USB ports, it is expected to eventually completely replace serial and parallel ports.

### **Emerging Trends and Architectural Directions:**

#### **Review Cycle:**

6 months

#### **Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 1000 Technology - Hardware**

### **Category:**

## **1500 COMPUTER TELEPHONY INTEGRATION**

### **Definition:**

*Under construction* - Computer and Telephone Integration (CTI) is a term for connecting a computer to a telephone switch and having the computer perform various functions based upon predefined instructions. For example, as a call is received the computer gets the phone number from Caller ID, locates the customer in a database and presents the call to a call center attendant with information regarding the last call that was received from this phone number. These systems are usually highly customized to perform specific functions utilizing data and/or databases in an organization. Data that is gathered can be passed along with the call, to another agent if a transfer is required.

### **Approved Standard(s):**

### **Approved Product(s):**

### **Technical and Implementation Considerations:**

Agencies must carefully consider the selection of CTI solutions for citizen services. The use of voice and fax interface must take into account the number of existing technology platforms used by the agency: the PBX, the database and format utilized, and the ability of the system to populate the legacy database. The system selected must be scalable to grow with the needs of the agency. Advanced speech processing (ASP) solutions now make it possible to automate significant numbers of citizen transactions using spoken input. The agency must consider the available vendor software tools for application development, vocabulary creation/editing and systems management.

### **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

6 months

### **Timeline:**

Revision date: November 10, 1999

Effective date: July 1, 1997

## **Enterprise Standards: 1000 Technology - Hardware**

### **Category:**

### **1600 PRINTERS**

#### **Definition:**

Output devices that provide users with hard copy media of letters, presentations, technical drawings and other printable materials. This standard includes inkjet, workgroup laser, enterprise laser and plotter printing devices. Network laser printing functions are now included in multi-function devices, with the ability to handle memory-resident forms, faxes, document scanning and copying services.

#### **Rationale:**

Shared network printing resources will continue to be a need in most office environments. Standardization reduces the number of different device drivers and minimizes troubleshooting efforts. A network printer, available in a workgroup setting, is the stated architectural direction.

#### **Approved Standard(s):**

Network printers must be Ethernet ready  
SNMP Support  
Support Postscript 2 functionality  
Support PCL Level 5 or higher  
Minimum of 8 MB RAM

#### **Approved Product(s):**

[Hewlett Packard](#)  
[Lexmark](#)

#### **Justification:**

Hewlett Packard and Lexmark provide industry standard network printers with all the functions and features required, including support for both Postscript and Printer Control Language PCL print output.

#### **Technical and Implementation Considerations:**

The total cost of printing should always be examined in detail - consumables and supplies will be the highest cost of operation for the life cycle of the product. There will continue to be a need for both cut sheet and continuous feed printers, however cut sheet laser printers are the predominant devices procured in state government today. Color print will be a requirement in some environments. While color costs will decrease, agencies should carefully evaluate their need for color due to the higher operating costs. Agencies should consider increasing memory requirements if graphics intensive output is required.

#### **Emerging Trends and Architectural Directions:**

Network laser printing functions are now included in multi-function devices, however agencies must carefully review the output speed and quality of these devices. Both approved product vendors offer multi-function products (print, fax, scan, copy) that provide a solution for a multi-function standalone device in a small office setting (see category 1610). These products are printer-centric, meaning a print engine controls the device. Therefore, copy, scan and fax functions may not be as acceptable as single purpose devices. Agencies need to carefully consider these MFP products, including the integration of functions and their total cost of ownership.

#### **Review Cycle:**

Annually

**Timeline:**

Revision date November 10, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 1000 Technology – Hardware**

### **Category:**

## **1610 MULTIFUNCTION PRODUCTS**

### **Definition:**

A Multifunction Product (MFP) is a digital, networkable office product that combines two or more of the copy, print, fax and scan functions into a single device. The MFP market is segmented into three main groups by function:

?? Copier based: Digital copiers that can also print, scan and/or fax

?? Printer based: Printers that can also copy, scan and/or fax

?? Fax based: Fax machines with computer ports for printing and/or scanning.

### **Rationale:**

The primary focus of this standard is copier-based MFPs. These devices are driven by a copier engine and are network appliances and must interoperate within the state's technical environment. Therefore, the functional use of the MFP determines the standards that apply to the device. In this instance, a network copier used as a printer must conform to both the printer standards and the network standards set forth in the relevant sections of the Enterprise Architecture and Standards.

Traditionally, the management of, and acquisition processes surrounding copiers has resided in the administrative offices of agencies, with little involvement from IT staff. However, as digital technology drives convergence between hard-copy production devices, the enterprise will need to realign its management strategy for purchasing such devices and for evaluating and determining functional requirements by device type. Since MFPs cross-organizational boundaries, control of, and evaluation or acquisition activities associated with them, must include all related organizational areas, including IT staff.

### **Approved Standard(s):**

#### **Minimum acceptable configuration:**

3200 Network Protocol - TCP/IP

3200 Network Protocol - Ethernet

3600 Network Management - SNMP capable

1600 Printers - Must support Postscript Level 2 and include PCL Level 5 or higher support.

Fax Modem - 33.3 Kbps

### **Approved Products(s):**

None.

*NOTE:* Two State Price Contracts for copiers exists today (rental and purchase). Some of the vendors on contract do provide a multifunction product line, however, agencies are cautioned to insure that any purchase of an MFP conforms to the Enterprise Architecture and Standards and fits the business need of the agency.

### **Justification:**

MFPs provide one device that can perform two or more functions eliminating the need to purchase several devices to perform similar functions. Productivity is improved by combining copy and print functions and by scanning hard copy documents directly into E-mail. Other potential advantages of these devices include: 1) improved asset management by reducing the number of devices being managed and the supplies required; 2) reduction in required office space for agencies; 3) improved reliability since these devices are digital requiring shorter paper paths and fewer parts; 4) enhanced quality by printing copies digitally; 5) fewer network connections; and 6) reduced network

traffic. However, while MFPs may provide both hard and soft dollar benefits to enterprises, a tradeoff may exist in performance or functionality in a given mode. Staff should evaluate the specific business needs of the organization by thoroughly testing the product before making a selection.

### **Technical and Implementation Considerations:**

Not all MFPs provide print, scan, fax and copy functionality or function equally as well as separate devices. Many specifications of MFPs may appear similar, but the actual performance of machines varies widely. Agency IT staff are cautioned to thoroughly test all applicable functions of the MFP, including network, printing, faxing and scanning, and specifically driver installation. If agencies will be using scanned or faxed documents for legal or archival purposes, the document should be thoroughly tested for image quality. Furthermore, documents faxed across the local area network to MFPs may cause network congestion due to the file size of digital images.

In selecting MFPs, agencies are cautioned to carefully review the applicable standards since many MFPs use a variety of CPUs and operating systems. Because MFPs converge several functions into one device and they are network appliances, they must be managed by IT staff. Additionally, MFPs are inherently more complex and will require more end user training.

### **Emerging Trends and Architectural Directions:**

MFPs are becoming a dominant force in the document output industry. According to an industry analyst, by 2002 all midrange, networked-attached, hard copy document production devices will be digital multifunction-capable devices. Industry analysts expect most, if not all copiers to be configured with MFP capability. Agencies should carefully evaluate their document production needs and the MFP features before purchase.

### **Review Cycle:**

6 months

### **Timeline:**

Revision date: July 1, 2000

Effective date: December 20, 1999

## **Enterprise Standards: 1000 Technology - Hardware**

### **Category:**

### **1700 SOUND CARDS**

#### **Definition:**

An internal sound card or peripheral device that produces high-quality audio output (sound) from a desktop computer, usually through small external speakers or headphones. A standard feature for desktop workstations, the audio component consists of a sound card or chip set, software drivers and bundled software applications that enable desktop computers to produce high quality audio.

#### **Rationale:**

The need for sound has increased greatly due to the need to deliver high-quality audio and the proliferation of multimedia applications. Multimedia training, as well as Internet and Intranet applications will continue to drive the need for sound. It is expected that digital audio, stored and delivered over the network, will enable agencies to enhance workflow and improve customer service.

#### **Approved Standard(s):**

16-bit or greater audio card with Sound Blaster® (CreativeTechnology, Inc) compatibility. Ability to handle multiple digital audio formats such as WAV and MIDI files.

#### **Approved Product(s):**

[SoundBlaster 16®](#) or equivalent

#### **Justification:**

SoundBlaster® compatibility is the industry standard. Many applications use drivers and processes that will only work with SoundBlaster® compatible cards.

#### **Technical and Implementation Considerations:**

As required, all new desktop and notebook computers must have a sound card as part of the minimum configuration. Multimedia applications will continue to increase in prevalence, thus driving the need for high-quality audio output. External speakers and/or headphones are required as defined by the business need of the agency.

#### **Emerging Trends and Architectural Directions:**

#### **Review Cycle:**

Annually

#### **Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 1000 Technology - Hardware**

### **Category:**

### **1800 TAPE BACK-UP UNITS**

#### **Definition:**

Hardware used to backup and restore critical data that resides on file servers.

#### **Rationale:**

It is recommended that all critical data be stored on file servers rather than individual workstations. In order to keep critical data safe, backup hardware and software are installed to keep copies of all critical data in the event of a disaster. A formal backup routine and tape rotation is critical to the successful use of tape backup technology.

#### **Approved Standard(s):**

Any server compatible hardware, which supports either Direct Audio Tape (DAT), Digital Linear Tape (DLT) or SCSI devices.

#### **Approved Product(s):**

Compatible with approved operating systems: Windows NT and Unix

Must support approved tape backup software in Category 2010

Direct Audio Tape (DAT) or Digital Linear Tape (DLT): Any server compatible peripheral hardware which supports SCSI devices. These units may be internal, external, single or tape library configuration depending on the backup requirements.

[Exabyte](#) M2– 8mm tape format

#### **Justification:**

The use of DAT, r DLT or 8mm backup devices allows for fast, reliable backup and recovery of data. The 8mm Exabyte M2 tape device provides a higher capacity tape format and generally faster backup speeds depending on the server platform.

#### **Technical and Implementation Considerations:**

DAT and DLT are SCSI devices. Drive compression and auto-loader capabilities should be taken into consideration. DAT is the most popular solution for low-end systems or non-mission critical file servers, with less demanding backup requirements. The prime advantages DLT offers are higher storage capacity, higher data transfer rates, and higher reliability, mainly because the media does not physically touch the head in the drive. Tape drives based on the new Super DLT technology are expected to be capable of storing up to 100GB (uncompressed) on a single cartridge, at transfer speeds up to 40 Mbps.

The Exabyte 8-mm format removable cartridge tape provides the highest capacity and fast performance for demanding backup environments. For backing up and restoring mission-critical data as quickly as possible, the 8-mm format may be an alternative because it offers the most data storage per cartridge at 60GB native capacity or 150GB compressed. Rack mounted tape libraries are available and each tape also features a self-cleaning function.

#### **Emerging Trends and Architectural Directions:**

In the near future, agencies may have the need to use a storage area network (SAN) of shared storage devices instead of a discrete tape backup unit at each server. A SAN is a network that contains nothing but a disk, disk array or SAN-ready automated tape library for storing data and serves as a high-speed sub-network of shared storage

devices. These generally utilize a high bandwidth fibre channel connection for transfer of data, but may use a SCSI interface. Using fiber optic cable to connect storage devices, fibre channel supports full-duplex data transfer rates of 100MBps. This architecture makes all storage devices available to all servers on a LAN or WAN.

**Review Cycle:**

Annually

**Timeline:**

Revision date: July 1, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 1000 Technology - Hardware**

### **Category:**

### **1900 HANDHELD COMPUTER**

#### **Definition:**

A handheld computer is a small computer that provides basic connectivity and provides specialized applications. These units are lightweight, portable and battery-operated. They are designed for mobile users that require the ability to collect, retrieve, analyze and use data while in the field. This computer class may use a keyboard, keypad, touch, pen or stylus input. Many handheld computers are ruggedized to operate in all kinds of conditions and environments. Common descriptions of handheld computers include palm, clamshell, tablet and pen-based units.

#### **Rationale:**

The handheld computer is a category of mobile companion devices developed for the Microsoft Windows CE and Palm operating system platforms. Handheld computers are designed to provide mobile professionals using Windows-based desktop computers an affordable, easy-to-use mobile companion to keep their most important information up-to-date and close at hand. The handheld computer is easy to learn and use, with a user interface incorporating many elements of the familiar Windows OS interface. Windows CE also comes equipped with companions to familiar icons, and applications, including personal organizers, Microsoft Word, Microsoft Excel and Microsoft Internet Explorer. Personal Information Management (PIM) software compatible with Microsoft Outlook for managing contacts, calendars and tasks is also included in Windows CE devices. Some handhelds have standard communications support built in, enabling access to the Internet for sending and receiving e-mail or browsing the Web. However, the greatest benefit may be its ability to simply synchronize information between the handheld computer and the desktop, keeping PIM information up-to-date and enabling easy exchange of files and Microsoft Office documents.

#### **Approved Standard(s):**

Devices running the Windows CE version 2.X operating system and Palm OS.

#### **Approved Product(s):**

No specific products at this time.

Recommendations (for handheld and clamshell units with Windows CE OS):

[Hewlett Packard Jornada](#) series 680, 820

[NEC MobilePro](#) 770, 800

[Sharp](#) Tripad 6000, Mobilon Pro 5000

[Recommendations](#) (for palm units with Windows CE OS and Pocket PC):

[Hewlett Packard](#) Pocket PC 545, 548

[Hewlett Packard](#) Jornada 420

[Phillips](#) Nino

[Casio](#) Cassiopeia

[Compaq](#) Aero

Recommendations (for palm units with Palm OS):

[Palm Pilot](#) series

#### **Justification:**

The Windows CE OS standard will ensure compatibility and connectivity to enterprise resources regardless of the

hardware platform that is used, although state experience with the recommended devices has been positive. Independent software vendors continue to produce a wide-range of software for use both the Windows CE and Palm OS devices.

### **Technical and Implementation Considerations:**

The handheld category contains a number of products from palm size personal digital assistants (PDAs) for content access such as calendars to full-featured clamshell computers. Several devices suffer from poor screens, keyboard layout or immaturity of ergonomic design. These hardware platforms support several different features, including backlit screens, input devices, built-in modems, and special memory options. The clamshell and Pocket PC devices are expandable, allowing users to upgrade systems with PC cards and/or Compact Flash (CF) cards. Add-on products include memory cards, wireless and wired modems, local area network (LAN) connections, and Global Positioning Systems (GPS) transceivers. Users should consider the intended use in the field and the mobile connectivity requirements via a dialup network. An infrared interface may be necessary if users wish to synchronize data, such as calendars, between the handheld device and a desktop computer.

Application design, input methodology, desktop synchronization utilities and third-party application support rise in importance when PDAs are under consideration. Most users must use Windows CE to find an acceptable keyboard-based product. A top priority for selecting all products in this category is tight integration with Microsoft Outlook and Exchange. Synchronization with the users calendar may require purchase of utility software and interface cables especially when palm-type PDA computers are deployed. . Most of these devices require a cradle with a serial adapter connection to the desktop computer. Users should evaluate their needs and pick the platform that offers them the most functionality and expandability. Internal state agency and GOT support for both handheld operating systems is limited at this time.

### **Emerging Trends and Architectural Directions:**

#### **Review Cycle:**

6 months

#### **Timeline:**

Revision date: July 1,2000

Effective date: July 1, 1997

## **Enterprise Standards: 2000 TECHNOLOGY - SOFTWARE**

### **Category:**

### **2010 TAPE BACKUP SOFTWARE**

#### **Definition:**

Software used to backup and restore critical data found on file servers to either internal or external tape backup units (see category 1800) The backup software provides both the utility and automated functions necessary to support a reliable and complete recovery of business information in the event of a server failure or primary data loss.

#### **Rationale:**

It is recommended that all critical data be stored on file servers rather than individual workstations. In order to keep this critical data safe, backup software and hardware are installed to keep copies of all critical data in the event of server failure. If a server fails, then the backup copy can be restored to the server with little or no loss of data.

#### **Approved Standard(s):**

#### **Approved Product(s):**

[ARCserveIT Enterprise and Workgroup editions](#)  
[Seagate Backup Exec](#)

#### **Justification:**

All critical data needs to be backed up in case of any catastrophic event such as hard disk failure, server failure, theft or fire. By using this software, the data is kept safe and can be restored in a timely fashion. Backups can be automated to occur at a time, such as during the night, when the system has very light use so that productivity is not degraded during business hours. ARCserveIT is available in versions which will meet the needs of the various IT server platforms in state government, particularly for Windows NT and Unix. Seagate Backup Exec is available in a version designed for Alpha Windows NT workgroup platform.

#### **Technical and Implementation Considerations:**

The software should be used in conjunction with either a DAT (Direct Access Tape) or DLT (Digital Linear Tape) unit for fastest backup and restore capabilities. Additional optional ARCserveIT software is needed for Autoloader devices. Also, software from ARCserveIT is needed for backing up open databases such as Microsoft Exchange.

#### **Emerging Trends and Architectural Directions:**

#### **Review Cycle:**

6 months

#### **Timeline:**

Revision date: July 1, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

### **2100 OPERATING SYSTEM (O/S) - DESKTOP AND LAPTOP/NOTEBOOK**

#### **Definition:**

The desktop operating system is the master control software that controls all internal operations on a desktop computer. This includes controlling video display actions, reading and writing from both memory and storage devices, transfer of information to attached printers, communications with other networked devices, and both keyboard and mouse input.

#### **Rationale:**

In a client/server environment, speed, memory and a stable operating platform become increasingly important. Migration from 16-bit operating systems to 32-bit operating system will support faster processing, access to more memory, and better memory management. Support of desktop operating systems constitutes a large portion of Kentucky's cost for supporting its technology infrastructure. The more desktop operating systems supported, the higher the state's costs for technology infrastructure support. Standardizing on fewer desktop operating systems greatly simplifies technical support requirements and contributes directly to significantly lower support expenses.

#### **Approved Standard(s):**

32-bit operating system with graphical user interface for Intel compatible platform (Categories 1410, 1420 and 1460).

NOTE: Agencies were directed to discontinue the use of 16-bit Windows 3.1x operating systems by June 30, 1999.

#### **Approved Product(s):**

Latest service pack release of the following:

[Microsoft Windows 95](#) (NOTE: Agencies should not install Windows 95 on new computers and eliminate its use on existing computers where practical and feasible.)

[Microsoft Windows 98](#) (latest service pack release)

[Microsoft Windows NT Workstation 4.0](#) (latest service pack release)

#### **Justification:**

32-bit operating systems are capable of managing more simultaneous tasks than previous-generation 16-bit operating systems. 32-bit operating systems also provide superior system performance and support the latest hardware configurations. Graphical user interfaces offer significant advantages in ease of use, reduced training requirements, and improved user productivity. While Windows 95, Windows 98 and Windows NT Workstation are all proprietary operating systems, they dominate the desktop computer operating system market and have become de facto standards. Other competing operating systems command much smaller shares of the desktop operating systems market, and are expected by the Gartner Group to continue to lose market share to Microsoft's products in the future.

#### **Technical and Implementation Considerations:**

For the desktop workstation OS, Windows NT workstation is the stated long-term architectural direction as the enterprise standard for state agencies. For large enterprises purchasing new desktop or notebook computers, Microsoft recommends deploying Windows NT 4.0 workstation operating system. However, with the release of Windows 98 by Microsoft, the decision to migrate the state government to a single desktop operating system (Windows NT) is now more complex. Because of Advanced Configuration and Power Interface (ACPI) features,

USB support and streamlined applications loading, Windows 98 is the best operating system for mobile users. Windows 98 and NT require more powerful desktop hardware to operate, but will run most of the complex and demanding applications at the desktop. Because of OS limitations, stability, security and Microsoft's intention to limit support, agencies are advised against installing Windows 95 on new computers and should begin to sunset Windows 95 on existing computers. In August 2000, Microsoft announced their intent to limit quick fix engineering (QFE) to Windows 95 and eventually cease bug fixes and application support for this operating system. Agencies should begin migration planning now to move existing desktops to Windows NT and notebook/laptop computers to Windows 98. Linux OS is not an approved OS for the desktop and laptop computer categories. Until a formal adoption is announced, Windows 2000 is not approved for deployment except by business case exception.

### **Emerging Trends and Architectural Directions:**

The introduction of Windows 2000 Professional for desktop and notebook computers further complicates the acquisition strategy and technical support for the desktop environment in state government. The adoption and use of Windows 2000 OS should not present major problems to state agencies, particularly if the predominant desktop OS is Windows NT. However, based on initial testing to date, a number of state-specific applications do not function properly or necessitate custom modifications to the installation procedures to operate under Windows 2000. The move to Windows 2000 requires carefully planning, testing and a formal transition strategy.

### **Review Cycle:**

6 months

### **Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

## **2110 OPERATING SYSTEM - SERVER**

### **Definition:**

The server operating system is the master control software that controls all internal operations on a network server. This includes communications with other networked servers and clients, managing security authorizations, reading and writing from both memory and storage devices, transfer of information to attached printers, and accepting management commands from both keyboard and mouse input.

### **Rationale:**

Support of server operating systems constitutes a significant portion of Kentucky's cost for supporting its technology infrastructure. The more server operating systems supported, the higher the state's costs for technology infrastructure support. Standardizing on fewer server operating systems greatly simplifies technical support requirements and contributes directly to significantly lower support expenses.

### **Approved Standard(s):**

For S/390 enterprise servers: POSIX compliant 32-bit operating system. For RISC platforms: POSIX compliant 64-bit operating system. For Intel platforms: 32-bit operating system.

### **Approved Product(s):**

[MVS \(OS/390\)](#), UNIX (see *Standard 1320 Servers - Application/Database Servers*)  
[Microsoft Windows NT Server 4.0](#), Windows NT for Alpha

### **Justification:**

Both MVS and the UNIX operating system have proven themselves in support of large-scale, high-volume client/server applications. They provide a scaleable, stable, high-performance environment to support mission-critical business applications on S/390 and RISC computing platforms. While Windows NT Server is a proprietary operating system, it is beginning to dominate the Intel server operating system market and is quickly becoming a defacto standard. Other competing operating systems command smaller shares of the server operating systems market, and are expected by the Gartner Group to continue to lose market share to Microsoft's NT product in the future.

### **Technical and Implementation Considerations:**

MVS (OS/390) is recommended for S/390 enterprise servers operating as high-volume transaction servers or database servers. The Unix operating system is recommended for large-scale database, file, internet, and gateway servers which use a RISC hardware platform. The Microsoft Windows NT Server operating system is recommended for small-to-medium sized departmental applications, database, file and print servers. Windows NT Alpha operating system is the choice for the AlphaServer line of servers, however agencies are cautioned about minimal support for Alpha NT.

Several major vendors have introduced Linux versions of their server platforms. Linux OS is not an approved OS for this category, however a technical group in GOT is evaluating Linux and its potential for limited use within state government. Linux offers a number of attractive features, including total cost of ownership and a stable OS, but must be examined in more detail before an enterprise recommendation is considered. Linux OS may be feasible for internal agency applications and agency web servers.

### **Emerging Trends and Architectural Directions:**

**Review Cycle:**

Annually

**Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

## **2200 REMOTE CONTROL SOFTWARE**

### **Definition:**

Remote control is the ability to run applications on a desktop computer, laptop/notebook computer or server across a network connection or external link.

### **Rationale:**

There are some specific applications for the use of remote control access to network resources instead of the standard remote node type of access. The remote control method used could be to take control of a single remote computer or run an application on a remote server.

### **Approved Standard(s):**

Requires a PPP TCP/IP based connection.

### **Approved Product(s):**

[Symantec PCAnywhere](#)

[Citrix WinFrame](#)

[Intel LANDesk](#)

### **Justification:**

These vendors provide industry-leading solutions for desktop computer and server access for remote control sessions.

### **Technical and Implementation Considerations:**

Both products require a host and remote client software component be installed

### **Emerging Trends and Architectural Directions:**

Future versions of operating systems may contain these remote session functions.

### **Review Cycle:**

Annually

### **Timeline:**

Revision date: July 1, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

### **2210 HOST PRINT**

#### **Definition:**

Printing from the Commonwealth's mainframe to LAN attached devices across a TCP/IP network requires special software.

#### **Rationale:**

Most agency users have moved from fixed function terminals to intelligent desktop workstations. However, these users still require printing from the Commonwealth's mainframe enterprise server. There must continue to be support for printing from these legacy systems.

#### **Approved Standard(s):**

TCP/IP host printing

#### **Approved Product(s):**

[Brooks Internet Software's Remote Print Manager \(RPM\)](#)

#### **Justification:**

This is the only product that has been able to support the various print needs determined by agencies and the Governor's Office for Technology (formerly the Department of Information Systems-DIS) staff.

#### **Technical and Implementation Considerations:**

None

#### **Emerging Trends and Architectural Directions:**

#### **Review Cycle:**

Annually

#### **Timeline:**

Revision date: July 1, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

**2300 STATISTICAL**

### **Definition:**

Software to perform statistical analysis on data, providing output in the form of summary calculations, tables, graphics, and/or database updates.

### **Rationale:**

Any non-trivial set of numeric values requires automated statistical analysis to test assumptions, compute regressions and trends, and categorize observations.

### **Approved Standard(s):**

Software that operates across the range of platforms used by applications in the commonwealth (desktop, midrange, mainframe) that can extract data, store in various formats, can group data, and can perform all required statistical processes and tests.

### **Approved Product(s):**

[Statistical Analysis System](#) (SAS), available for a number of platforms, including desktop, midrange, and mainframe.

### **Justification:**

SAS has long been a standard in Kentucky state government. A critical mass of Commonwealth staff is trained in this software, and SAS training is part of GOT's Division of Information Technology Training ongoing offerings.

### **Technical and Implementation Considerations:**

A basic understanding of statistics is an absolute requirement for the use of this software, and to the interpretation of calculations provided by this software. In addition, specialized training, available from the Governor's Office for Technology's, Division of Information Technology Training is required. Advanced analysis requires an advanced understanding of data analysis and statistics, usually available only through university study. Warning: use of this software without an understanding of underlying statistical principals will lead to erroneous conclusions.

### **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

Annually

### **Timeline:**

Revision Date: July 1, 2000

Effective Date: July 1, 1997

# **Enterprise Standards: 2000 Technology - Software**

## **Category:**

### **2330 ELECTRONIC DOCUMENTS: NON-ALTERABLE**

#### **Definition:**

Document creation and exchange software for the conversion of documents to a read and print format for dissemination via the Internet, intranet, electronic mail or other transport. The creation of electronic documents such as reports, bids, forms, graphs and others formats that are not meant to be altered by the user.

#### **Rationale:**

The file format standard for non-editable documents must offer a freely available and easy-to-use client software for viewing documents distributed electronically. The file format must be cross-platform and work with most operating systems on the client side. The format must be capable of easy viewing and download from state government websites. The file creation software must provide for the creation of a read-only format that may be secured and rendered non-alterable by end users.

#### **Approved Standard(s):**

Portable Document Format (PDF)

#### **Approved Product(s):**

[Adobe Acrobat Exchange](#) for creation of non-alterable and non-editable file formats  
[Adobe Acrobat Reader](#) 4.0 (for PDF files)

#### **Justification:**

Certain electronic documents need to be created and distributed in a read-only format for protection of the content. Acrobat Exchange lets you view, print, annotate and collate electronic documents. It includes the PDF Writer driver for creating PDF files from most applications and also lets users add bookmarks and hypertext links to their documents. Acrobat Distiller is used to convert PostScript files into the PDF Format and allows for the creation of thumbnails. Acrobat Reader is the free client software for reading PDF files. It may operate as a plug-in for the web browser and is easily available and installed.

#### **Technical and Implementation Considerations:**

The Adobe Acrobat reader software is a free download from the vendor and must be installed on the client computer. Agencies should keep the reader software upgraded to the latest version because of new features found in the Adobe PDF Writer file conversion software. Users should review best practices for file conversion and be aware of the size of PDF files, use of fonts, graphics size and orientation. PDF documents are not truly read-only and secure unless the security features of PDF Writer are invoked during file creation.

#### **Emerging Trends and Architectural Directions:**

#### **Review Cycle:**

Annually

#### **Timeline:**

Revision date: May 1, 2000

Effective date: March 5, 1999

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

### **2340 ELECTRONIC FORMS**

#### **Definition:**

Electronic forms software is an element of a broader electronic document management strategy under consideration by state government. This software is used to generate, design and fill-in electronic versions of existing paper forms or create new business forms. This definition also includes client software or browser plug-in necessary for end users to fill-in electronic forms. Typical software features include form design, generation from scanned originals, application development tools for defining how data is linked to a database, web-enabled forms development, revisions and maintenance, distribution, printing, workflow and e-mail routing and tracking of the resulting electronic documents. The forms are generally designed with visual programming tools that allow fields, buttons and graphics to be drawn directly on screen. If necessary, the electronic forms will also support data validation, field calculations and secure authentication using digital signature technology.

#### **Rationale:**

The continued use of paper-based forms represents a significant enterprise cost to state government. A guiding principle in the Strategic Information Technology Plan outlines the need for agencies to conduct business electronically, including the use of electronic forms where appropriate. The most important reasons to use electronic forms records are simple and compelling: to reduce internal costs, to enable electronic transactions, to minimize the legal and audit risk, and to improve customer service. The architectural direction of the Commonwealth is toward the open exchange of electronic documents and other information products using common tools and platforms. Content exchange is a critical data infrastructure component and the approach selected must enable exchange of electronic information and data between individual users and groups without being burdensome and costly. This software category includes the tools to create and distribute editable forms for access, distribution and user completion.

#### **Approved Standard(s):**

Various trade and industry associations provide guidelines for the development and design of forms, however no de facto standards exist for electronic forms. Standards do exist for the interface with other applications and these must be followed:

- OBDC compliant for links to approved databases
- MAPI compliant for use with Microsoft Exchange messaging system
- TCP/IP compliant for Internet distribution
- Netscape Navigator 4.0 and Microsoft Internet Explorer 4.0

#### **Approved Product(s):**

Recommended product: [OneForm, Amgraf Corporation](#)

This product and category is under technical review. The Division of Printing is providing forms design, development and maintenance of a forms library for accessing forms as requested by participating agencies. OneForm is the product selected to support MARS. Agencies should review the technical considerations section below and note the cautionary statements regarding electronic forms acquisition and distribution.

#### **Justification:**

State government requires electronic solutions for conducting both internal business and citizen transactions less burdensome, convenient and more cost effective. A myriad of electronic forms software are currently available in the marketplace, but many address specific market needs or niche areas and cannot be considered general-purpose

forms software. OneForm is currently being used to create a range of specific agency and enterprise-level electronic forms accessed by agencies via a web-based electronic forms library. Agencies may freely distribute and use electronic forms (E-Forms) and internet forms (I-Forms) because a filler software license is not required.

### **Technical and Implementation Considerations:**

OneForm software is considered an interim solution for selected applications. Several technical and management issues still need to be resolved before a final enterprise solution is adopted. OneForm Designer operates on Windows 95, Windows 98, and Windows NT 4.0 workstation. The product features include an import filter and ability to use scanned forms for creation templates. Visual Basic Professional Edition V6.0 must be installed before using OneForm to design and generate electronic form files, which are distributed as Visual Basic executables. Visual Basic Professional Edition V6.0 is in use as an approved product in state government. To maintain forms consistency, Visual Basic Professional Edition V6.0 should be used and all upgrades for all OneForm design users in state government should be done simultaneously. For client end-users, OneForm requires the download of executable files (a prep software package) to access electronic form templates and filler functions. For workflow applications, completed electronic forms may be routed via email and exported as PDF using PDF-Writer print driver. Amgraf provides no explicit development tools for workflow or document management. For populating a database with forms data, Microsoft Access is the default database format for which Visual Basic code is created automatically. Microsoft Access is not required on the client workstation. ODBC interface software to connect the form application to database servers must be provided by the database vendor.

For form designers, a knowledge of Visual Basic programming is helpful for most forms and required for creating complex and interactive E-forms. Common Gateway Interface (CGI) scripting knowledge is required for E-forms and I-forms linking to databases. Internet forms are generated by OneForm as Java applets (as opposed to Visual Basic executables) and I-forms data validation and database linking are done at the internet server using CGI scripting.

Agencies with a secure Windows NT workstation environment may need to consider a revised authority level for end-user permission or an intranet distribution scheme to allow internal use. OneForm internet-based forms are generated as Java files and are compatible with or any Java-enabled browser such as Netscape Navigator 4.0 or higher and Microsoft Internet Explorer 4.0 or higher. For users of Netscape Navigator, I-forms cannot be printed successfully; Amgraf is working toward a resolution.

The information and considerations specified in this standard are preliminary based on the review of available data. At this time, agencies should consult with the Division of Printing and utilize the Division's OneForm electronic forms design services and forms library. Some agencies that maintain a large volume of electronic forms may best be served through the use of OneForm Designer at the agency level. These agencies should first contact the Division of Printing before making that decision. Most agencies, however, would benefit from the services of the Division's OneForm services without the purchase and maintenance of the OneForm Designer package.

### **Emerging Trends and Architectural Directions:**

The standards direction and product selection for electronic forms is still under investigation, therefore agencies should be cautious in the deployment of this technology. An internet electronic forms solution using an open development platform and minimal end user client software is the recommended direction for the Commonwealth.

### **Review Cycle:**

Ongoing

### **Timeline:**

Revision date: July 1, 2000

Effective date: March 5, 1999

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

### **2350 ELECTRONIC COMMERCE - ELECTRONIC DATA INTERCHANGE (EDI)**

#### **Definition:**

Electronic data interchange (EDI) is the secure electronic communication of business transactions, such as purchase orders, confirmations, invoices, and other data between organizations. EDI may be used to submit data to a state agency in a standard, prescribed format, with translation software required to complete the communication. Value added networks (VANs) act as third parties to provide EDI services that enable organizations with different equipment to connect.

#### **Rationale:**

#### **Approved Standard(s):**

Applicable [ANSI](#) X.12 standards for the EDI transaction set. EDIFACT (Electronic Data Interchange For Administration Commerce and Transport) is an ISO standard for EDI that is proposed to supersede both X12 and Tradacoms standards to become the worldwide standard.

#### **Approved Product(s):**

#### **Justification:**

#### **Technical and Implementation Considerations:**

Agencies considering the deployment of an EDI solution should monitor developments with Internet-EDI applications. Interoperability and security standards are issues not yet fully resolved with Internet-based EDI transactions. The Internet Engineering Task Force created the EDI Internet Working Group to investigate the issues and is gathering together EDI companies to develop interoperability and security standards.

#### **Emerging Trends and Architectural Directions:**

CommerceNet is conducting tests of the standard between several EDI companies' software products to ensure interoperability. CommerceNet is the secretariat for the Open Buying over Internet (OBI) Consortium, an alliance to promote business-to-business commerce over Internet. A consortium of states have implemented the eMall pilot project for purchasing using the OBI model. EMall is the first government-to-business multi-state electronic procurement system in the nation. EMall is testing the business, technical and legal viability of conducting routine commodity procurement over the internet. Kentucky is an observer state for this pilot project.

In support of the statewide architecture, an open network approach for conducting business over the Internet is preferred over proprietary networks. The forecasted direction for EDI-applications is an internet-based solution utilizing cXML (extensible markup language) to EDI translation.

#### **Review Cycle:**

6 months

**Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

## **2360 ELECTRONIC COMMERCE - MAGNETIC STRIPE CARD AND READER**

### **Definition:**

Magnetic stripe (or swipe) cards are standard "credit card"-sized devices using international standards (ISO) for the encoding of digital data on a machine readable magnetic strip embedded on the card. The magnetic stripe may be stamped or laminated on any flat surface, such as a credit card, access control or a security identification badge. The information is written on and read from the stripe by a number of types of readers at the time of transaction. Data is then transmitted to a source for validation and to complete the transaction.

### **Rationale:**

### **Approved Standard(s):**

[ISO](#) approved standard for encoding magnetic stripe data is required to interface with standard readers and the bankcard network for online transaction processing.  
ISO compliant stripe card readers are required

### **Approved Product(s):**

None

### **Justification:**

### **Technical and Implementation Considerations:**

State agencies are either using or considering the use of magnetic stripe cards for several applications: digital drivers license, electronic benefits transfer (EBT) and building access control. Proposed card use and deployment must be coordinated between agencies to avoid duplication and minimize citizen confusion.

### **Emerging Trends and Architectural Directions:**

The use of hybrid smart cards with a combination of magnetic stripe and embedded chip are being deployed in a limited fashion.

### **Review Cycle:**

Annual

### **Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

# Enterprise Standards: 2000 Technology - Software

## Category:

## 2370 ELECTRONIC COMMERCE - ELECTRONIC SIGNATURE

### Definition:

Electronic signature has a variety of definitions, but in the Commonwealth the technology-neutral definition as adopted in the Uniform Electronic Transactions Act, KRS 369.101, refers to the legal intent of signing, not a specific technology solution. UETA provides for the legal recognition of electronic records, electronic signatures, and electronic contracts, as specified in KRS 369.107

*(1) A record or signature may not be denied legal effect or enforceability solely because it is in electronic form.*

*(2) A contract may not be denied legal effect or enforceability solely because an electronic record was used in its formation.*

*(3) If a law requires a record to be in writing, an electronic record satisfies the law.*

*(4) If a law requires a signature, an electronic signature satisfies the law.*

This legislation is permissive and under this definition, an electronic signature may be the intent of signing, a personal identification number (PIN), a digital signature, biometric identifier or other method that meets the definition and is agreed to by both parties in the transaction. The Governor's Office for Technology is responsible for developing standards and promulgating any necessary administrative regulations to advance the implementation of electronic signatures.

### Rationale:

Many forms of electronic commerce transactions will require enabling technology and policy changes. The ability to utilize an electronic signature or identifier, capable of verification, as an option to a written signature is necessary. Authentication is often a key requirement to conduct an electronic transaction, therefore the nature of the transaction and need for security must be considered. The use of digital signature technology (PKI) offers authentication, however requires the development of certificate management practices, security policies and the infrastructure to support the policies and applications. The purpose of a public-key infrastructure (PKI) is to manage digital keys and certificates issued to end users. A managed PKI is a cost-effective and easy-to-use solution that transparently automates all security-related processes in an organization.

### Approved Standard(s):

[KRS 369.101 to 369.120](#) - Uniform Electronic Transactions Act (UETA as enacted by the 2000 General Assembly). ITEF X.509 Public Key Infrastructure (PKI latest version for digital certificates)

Interoperates and fully supports critical enterprise infrastructure services and applications such as network protocols, desktop operating systems, e-mail, web servers, database management software, firewalls and directory services.

### Approved Product(s):

[Entrust](#) suite of PKI enabled products (under a pilot evaluation by the Governor's Office for Technology and pilot agencies in FY 2001).

### Justification:

Entrust/PKI™ software enables the use of digital signature, digital receipt, encryption and permissions management services across a wide variety of applications currently used by state agencies. Entrust provides client software for email encryption and authentication necessary for secure transactions.

### Technical and Implementation Considerations:

In support of the statewide architectural direction, a technology-neutral solution that utilizes the most appropriate electronic signature solution for the business needs of the agency must be paramount. Under UETA, the need for attributions to authenticate the parties to the transactions is not required for legal standing. However, the use of an electronic signature, such as a personal identification number (PIN), may be preferred and adequate to conduct business in a secure environment.

Agencies considering the use of public key infrastructure (PKI) for digital signatures must consult the Internet Engineering Task Force (IETF) PKIX 4 framework and X.509 PKI certificate requirements. The [IETF](#) has several proposed standards under consideration related to certificate interoperability and web-accessible revocation lists. In addition, agencies should refer to the most recent version of a NACHA Internet Council document: *CARAT Guidelines for Constructing Policies Governing the Use of Identity-Based Public Key Certificates* at <http://internetcouncil.nacha.org/Projects/default.html>

### **Emerging Trends and Architectural Directions:**

The use of fully encrypted digital signatures is inherently complex, requires an underlying infrastructure, directory services solution, a Registration Authority (RA), a trusted certificate authority (CA) and will require a substantial investment in software for state agencies and their customers. The stated direction of state government is to deploy an integrated PKI platform with enterprise-class services which provides seamless integration with the state's email messaging system and other legacy applications.

### **Review Cycle:**

6 months

### **Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

### **2400 DATABASE MANAGEMENT SOFTWARE**

#### **Definition:**

A relational database is a computer database that is organized and accessed according to relationships between data items. In a relational database, files are referred to as “tables,” records are called “rows,” and fields or data elements are called “columns.” In its simplest form, a relational database is a collection of data files or tables that “relate” to each other through at least one common field, such as “social security number.” Relational databases are typically packaged and sold by software vendors as relational database management systems (RDBMS). Relational database technology has several inherent advantages over the previous hierarchical and proprietary platforms.

#### **Rationale:**

Need a limited product set for: economies-of-scale with respect to procurement, skills transferability required by a mobile workforce, data interchange between state government agencies, and to limit the skills requirements for a competency team development approach.

#### **Approved Standard(s):**

[ANSI SQL-92](#)

#### **Approved Product(s):**

Enterprise Database Servers

[IBM DB2 for OS/390 only](#)

[Oracle8 Enterprise Edition](#) (see Enterprise Network Licensing Agreement at

<http://www.state.ky.us/ftp/pdf/980701.pdf>)

Workgroup Database Servers

[Microsoft SQL Server 7.0, 7.5](#)

[Oracle8 NT for Workgroups](#)

Desktop Databases

[Microsoft Access 7.0](#)

[Microsoft Access 2000](#) (see Technical Considerations)

[Oracle8 Personal Edition](#)

#### **Justification:**

The ability to access, analyze and transfer information quickly across a variety of networks and protocols is becoming increasingly important in today’s government environment. The information system industry’s traditional hierarchical, proprietary database products lack the necessary underlying technology to meet these new demands.

#### **Technical and Implementation Considerations:**

Agencies are recommended to buy a database engine that will scale to application growth and hardware upgrades. The database applications should be portable as hardware or operating systems change. For instance, some databases will only work with a particular operating system. Databases require constant support. Staff will need to be allocated to maintain the database engine. The more functional the engine, the more technical training the support staff will need, and the more dedicated they will need to be to this function. The development and use of desktop databases is discouraged because of the stated architectural direction to share data on common server platforms. The use of Microsoft Access should be restricted to supporting single desktop computer applications and not extended to the workgroup setting without serious examination. Conversion and compatibility issues

currently exist with Microsoft Access 2000. When using Access 2000 to open a database that was created in Access 97 conversion issues and problems may occur. There are circumstances when objects and code in the older database may conflict with new features in Access 2000. Access 2000 allows you to convert an Access 2000 database back to Access 97 (but not version 2.0 or 95). However, any Access 2000-specific functionality is lost when you convert to Access 97. For example, when you convert a secured Microsoft Access 2000 database to Microsoft Access 97 format, the newly created Microsoft Access 97 database is unsecured. Before converting a database to Microsoft Access 2000, agencies should review the available information about conversion and compatibility.

### **Emerging Trends and Architectural Directions:**

IBM released a DB2 Universal Database (UDB) product family with versions for Unix and Windows NT platforms. The state is examining both the technical viability of DB2 UDB on Unix platforms as a potential for future applications that may need to eventually migrate to the OS/390 platform.

### **Review Cycle:**

6 months

### **Timeline:**

Revision date: November 1, 2000

Effective date: July 1, 1997

# **Enterprise Standards: 2000 Technology - Software**

## **Category:**

### **2500 OFFICE SUITE – DESKTOP AND NOTEBOOK/LAPTOP**

#### **Definition:**

Software to perform ordinary office functions, including word processing, spreadsheet analysis, and presentation graphics support, all in an integrated environment.

#### **Rationale:**

Compatible linked office software suites present the same “look-and-feel” to the user, maximize productivity, and minimize training expense. Integration allows formatted data to be transferred easily from one forum to another. Synergistic opportunities abound with integration; lack of integration results in (1) shifting of editing and presentation environments and (2) lack of full compatibility with data and/or presentation. Computer-assisted word processing has developed significantly in the past 30 years, to the point where word processing with a full graphics user interface supported by multiple fonts, graphics, spelling and grammar checkers and a thesaurus, with programmable macro languages, are the norm for office work. During this same period, spreadsheets have been extended from the basic 13-column accounting sheet to multi-dimensional models of business processes that permit simulation and graphical analysis. Graphics in office suites were initially limited to simple enhancements of verbal presentations using basic drawing tools: these have been extended to include data tabulation and basic graphing. Also, presentation graphics have become essential elements in office suites, with the ability to author and present “slide” presentations with varied animation effects.

#### **Approved Standard(s):**

Supported by the approved operating systems for desktop and notebook computers  
Graphical User Interface functionality and compatibility among all tools in the office suite. Integrated import and export support.

#### **Approved Product(s):**

Microsoft Office 97 (latest service pack release) which includes:

<a href="#">Word 97</a>	<a href="#">PowerPoint 97</a>
<a href="#">Excel 97</a>	<a href="#">PhotoDraw 2000</a>
Binder 97	

[Microsoft Office 2000](#) (latest service pack release) which includes:

<a href="#">Word 2000</a>	<a href="#">PowerPoint 2000</a>
<a href="#">Excel 2000</a>	<a href="#">PhotoDraw 2000</a>
Binder	

#### **Justification:**

MS Office 97 is the predominant state product for desktop productivity. Office 2000 is now shipped with most new desktop computers, and within two years will be included on the majority of all desktop computers in state government. These products provide the full scope of required functions, and are fully compatible Microsoft Exchange and Microsoft Outlook. A common office suite throughout state government allows for transparent data interchange and lower cost per user.

#### **Technical and Implementation Considerations:**

The approved desktop products for General User, Power User and Notebook/Laptop computers will execute the approved product with acceptable performance levels. It is noted that these products represent a large installed base

in state government, and significant change is very costly when acquisition, training, and conversion are considered. Office 97 will continue as the predominant standard office suite product in state government. Agencies should carefully weigh the productivity benefits versus the cost of migration and may wish to install Office 2000 during technology refresh cycle as new computers are purchased. The Office Suite represents a powerful software product with a host of features and functions that many users will not use without proper training. In a mixed environment (Office 97 and Office 2000), Word documents should be saved with the Revised Text Format (rtf). In addition, Microsoft has add-on utilities available for Word to assist in the document conversion to Word 97.

### **Emerging Trends and Architectural Directions:**

The newest version of Microsoft Office is Office 10 and is expected to be released in the 1<sup>st</sup> quarter of 2001.

### **Review Cycle:**

Annually

### **Timeline:**

Revision Date: July 1, 2000

Effective Date: July 1, 1997

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

## **2600 ELECTRONIC MAIL - MESSAGING**

### **Definition:**

Software that manages and facilitates the sending and receiving of electronic messages, correspondence, calendaring and associated file attachments.

### **Rationale:**

Electronic mail has become the most common component of both public and private office automation efforts. In order for employees from different state agencies to communicate electronically, it is desirable to share the same electronic mail and calendaring software. This simplifies the communication process and eliminates the need for costly and often undependable e-mail gateways. This also allows the state to benefit from economies of scale in software licenses, user training and technical support.

### **Approved Standard(s):**

[Messaging Application Programming Interface \(MAPI\)](#)

### **Approved Product(s):**

Client: [Microsoft Outlook 98](#)

[Microsoft Outlook 2000](#)

Server: [Microsoft Exchange](#)

### **Justification:**

The Microsoft electronic mail products offer greater functionality than standards-based email products which utilize the Internet's POP mail protocol. One example is the global address book which contains the names and addresses of all registered users. This increased functionality provides for simplified ease-of-use which leads directly to higher employee productivity. The Microsoft electronic mail products are proprietary in nature, but support the Internet's POP mail protocol to allow electronic communication with Internet users all over the world. Under a shared services model, the Governor's Office for Technology supports an estimated 30,000 Exchange mailboxes for agencies and their employees.

### **Technical and Implementation Considerations:**

Consistent configuration and full completion of the properties for each user in the Exchange database is important in order to provide an easy to use directory function. For ease of use and low cost deployment, agencies may consider using the browser as the web client to Microsoft Exchange mail server. GOT offers this service alternative to agencies.

### **Emerging Trends and Architectural Directions:**

Enterprise shared services for e-mail messaging is part of the rated network services package offered by GOT. An emerging trend is the use of a unified messaging or a common user inbox for e-mail, voice mail and fax services. A unified inbox product allows subscribers to access voice and fax messages from their e-mail program without changing their phone number or e-mail address. Using products that complement Exchange and the Outlook client software, users may play or view, store, delete, and forward voice and fax messages.

### **Review Cycle:**

Annually

**Timeline:**

Revision date: July 1, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

### **2610 FAX SOFTWARE**

#### **Definition:**

Facsimile software provides features and functions available from a stand-alone facsimile machine, but operates as client software on a desktop computer or network server. A fax machine is a device that can send or receive text and graphics over a standard telephone line or communications network. Fax machines digitize content, converting it to raster images before transmission. On the receiving side, a fax machine reads the incoming data, translates the digital content, and prints the output as hardcopy. Fax machines operate under international standards of universal protocols which allow for interoperability among devices. Many of the standard fax functions such as fax broadcast and fax-on-demand are enabled through electronic mail and network-based fax services.

#### **Rationale:**

#### **Approved Standard(s):**

Client/server fax software fully integrated with Microsoft Exchange and Outlook client software.

#### **Approved Product(s):**

[Omtool Fax Sr. 2.6 for Windows NT](#)

#### **Justification:**

State government requires a unified communications solution with client/server fax software in a networked environment. Any fax software solution must interoperate with the desktop OS (category 2100), server OS and automate and integrate fax communication throughout the enterprise

#### **Technical and Implementation Considerations:**

Network fax services are the preferred approach and may be coupled with a multi-functional network laser printer (category 1600) that offers both fax send/receive along with print output. Agencies should consider the total cost of standard fax transmission which is highly labor intensive and use alternatives such as email messaging and the network fax services if feasible.

#### **Emerging Trends and Architectural Directions:**

An emerging trend is the use of a unified messaging or a common user inbox for e-mail, voice mail and fax services. A unified inbox product allows subscribers to access voice and fax messages from their e-mail program without changing their phone number or e-mail address. Using products that complement Exchange and the Outlook client software, users may play or view, store, delete, and forward voice and fax messages.

#### **Review Cycle:**

6 months

#### **Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

### **2700 PUBLISHING - DESKTOP**

#### **Definition:**

Desktop publishing software offers sophisticated features and functions to produce high-quality printed documents or materials for electronic distribution and presentation. A desktop publishing system allows users to create professional quality publications such as newsletters, brochures, manuals, press releases, and other publications. Desktop publishing software offers layout templates, different typefaces, kerning and the ability to embed illustrations and graphs directly into the text. The most powerful desktop publishing software enables users to create illustrations with integrated add-in programs. Many features required in the desktop publishing environment are available in the selected standard for word processing software.

#### **Rationale:**

#### **Approved Standard(s):**

#### **Approved Product(s):**

[Adobe PageMaker 6.5](#)

[Microsoft Publisher 98](#)

[Microsoft Publisher 2000](#)

#### **Justification:**

The products are compatible with the approved office suite for the desktop and laptop/notebook computers (see Category 2500) and provide a full set of publishing tools to support the most advanced requirements for design and output. PageMaker is the preferred electronic format accepted by the state's Division of Printing for prepress production and publication of printed materials.

#### **Technical and Implementation Considerations:**

With the need for sophisticated publishing, software integration is important in order to link to existing word processing and graphics applications. Sharing a common interface and command structure will decrease training requirements and improve productivity of the end user. Agencies should consider the range of content created internally and review the myriad of filters, converters and other tools that enable users to import text, graphics, and charts from the office suite and other applications. Another consideration is the need to prepare print documents for distribution on the web. The approved products provide for automatic reformatting, capabilities to export to HTML, and graphics conversion to JPEG or GIF files.

#### **Emerging Trends and Architectural Directions:**

#### **Review Cycle:**

Annually

#### **Timeline:**

Revision date: July 1, 2000  
Effective date: July 1, 1997

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

### **2705 HTML AUTHORIZING AND WEB PUBLISHING**

#### **Definition:**

Web authoring software creates HyperText Markup Language (HTML) documents for publishing on the World Wide Web. HTML is a subset of the Standard Generalized Markup Language (SGML) standard and the document format used on the web. It is considered a "presentation language," rather than a programming language. It is a non-proprietary format based upon SGML, and can be created and processed by a wide range of tools, from simple plain text editors to sophisticated authoring tools. Full-featured HTML authoring software assists in building web pages and managing links, images and update functions.

#### **Rationale:**

#### **Approved Standard(s):**

[World Wide Web Consortium \(W3C\)](#) standards (HTML 3.2 is an SGML application conforming to International Standard ISO 8879). Full support for HTML 3.2 features as defined by the [Internet Engineering Task Force \(IETF\)](#) and the World Wide Web Consortium (W3C). This is the recommended minimum standard, although HTML 4.0 is the preferred development standard for new applications.

#### **Approved Product(s):**

None - Recommendations:

[Adobe GoLive 5.0 \(PageMill is no longer available from Adobe\)](#)

[Macromedia Dreamweaver 4.0](#)

[Microsoft FrontPage 98](#)

[Microsoft FrontPage 2000](#)

[NetObjects Fusion 4.0](#) or 5.0

[SoftQuad HotMetal Pro](#)

#### **Justification:**

At this time, HTML 3.2 offers more universal access for end users to state agency web resources. HTML 4.0 is W3C's recommendation for the latest version of HTML. In addition to the text, multimedia, and hyperlink features of the previous versions of HTML, HTML 4.0 supports more multimedia options, scripting languages, style sheets, better printing facilities, and documents that are more accessible to users with disabilities. HTML 4.0 also takes great strides towards the internationalization of documents, with the goal of making the Web truly World Wide.

#### **Technical and Implementation Considerations:**

HTML is a very dynamic software environment and many functions are unstable. Agencies should consider web-authoring software that integrates well with existing desktop software applications and does not implement proprietary features used by a specific browser. HTML 4.0 is the current recommendation from the W3C, but agencies are reminded to assess the impact of presenting new features, elements and attributes to citizens using older versions of browsers.

#### **Emerging Trends and Architectural Directions:**

HTML authoring products are becoming more tightly integrated with the Microsoft Office suite product (Category 2500) to provide easy conversion from the office formats to the final HTML output.

**Review Cycle:**

6 months

**Timeline:**

Revision date: May 1, 2000

Effective date: July 1, 1997

## Enterprise Standards: 2000 Technology - Software

### Category:

## 2710 ADVANCED DRAWING - COMPUTER AIDED DRAFTING

### Definition:

Computer Aided Drafting (CAD) allows the representation of two-dimensional (and in advanced environments, three-dimensional) physical objects on the two-dimensional space of a computer screen or paper. Data are entered using a graphical point device (such as a digitizer, mouse, or light pen). Entry-level CAD is limited to two-dimensional representations; however, advanced CAD often supports development of three-dimensional representations from two-dimensional drawings.

The acronym CADD is often used to add “Design”, which adds the ability to perform computations such as static stress analysis, torque computations, or ability to compute the center of gravity. However, the second “D” is often used inappropriately to enhance marketing stature of software that has little if any design capability. Another acronym is CADD/CAM, for Computer Aided Drafting/Design & Computer Aided Manufacturing. This product class adds to CADD the capability to interface with manufacturing systems.

The following is a generalized representation of CAD/CADD product offerings:

Level	Dimensions	File Format	Add-in Components	Design Features	Training Required	Price Range per User
Entry-Level	2D	DWG, DFX	None	Few	5-day tutorial	\$500
Full-CADD	2D and 3D w/rendering	DWG, DFX	Many	Full	2-4 weeks classroom	\$2,000-\$5,000

### Rationale:

Bridges, highways, buildings, office layouts, manufactured goods, and landscaping development projects are all examples of physical object development projects that need CAD representation and are used in planning and procurement. Kentucky has long used CADD software in the design its own bridges and highways. CAD software is often used for office layouts and for specifications for new building construction or building renovation.

### Approved Standard(s):

CAD/CADD software generally comes with component libraries, or has component libraries available from third party sources. These component representations must meet the standards applicable to the particular discipline (i.e., IEEE, etc.). In addition, AutoCAD has developed drawing file formats (DXF and DWG) that have become the de facto standards for CADD systems.

### Approved Product(s):

?? Entry Level: [AutoCAD LT](#)

?? Full-CADD: [AutoCAD \(latest version released\)](#) or [Microstation 95](#)

### Justification:

?? The specified *Entry-level* CAD product provides these features for basic 2D CAD, and fully supports Object Linking and Embedding, had a familiar “Windows GUI” interface, includes drawing set-up

“wizards” to aid new users.

- ?? The *Full-CADD* systems include the full 2D and 3D drawing capability, solid modeling, and in some cases the ability to scan (and include) drawings and photographs, or the ability to work on projects as a group effort.

### **Technical and Implementation Considerations:**

A high-end power user workstation is a given requirement (see Standard 1410). All products require a basic understanding of mechanical or architectural drawing. Entry-level CAD will require a minimum of one week’s training using the supplied tutorial and several weeks of dedicated use to become fully proficient. Full-CADD systems require several weeks of training (usually only available off-site) and several years of heavy use to become fully proficient. This technology is very stable. AutoCAD uses a downward compatible file format. There are significant performance enhancements in the latest version of AutoCAD which justify the upgrade for frequent users of this software.

### **Emerging Trends and Architectural Directions:**

#### **Review Cycle:**

Annually

#### **Timeline:**

Revision Date: July 1, 2000

Effective Date: July 1, 1997

## Enterprise Standards: 2000 Technology - Software

### Category:

### 2720 ADVANCED DRAWING - DRAWING/ILLUSTRATION/DIAGRAMMING

#### Definition:

There are numerous ways of categorizing graphics. For purposes of these standards, the state standards use the following categories:

Category	Description	Standard
CAD/CADD	Computer-Aided Drafting/Computer-Aided Drafting & Design	2710
Office Graphics	None-technical or low-tech illustration of office documents	2500
Presentation	"Slide-Show" presentations	2500
Drawing/ Illustration	Development of art for Internet/Intranet, brochures, and other publication media	2720
Diagramming	Visual representation of business process flow, flowcharts, organization charts, technical schematics (such as network maps, floorplans) using fixed lines and standard icons.	2720

Software for drawing and illustration are often distinguished by layered construction and custom textures. Both vector-based and bit-mapped-based drawing engines can meet the needs of advanced drawing and illustration - and both have their advantages. Vector-based drawings can be scaled up or down with no loss of detail; however, vector-based systems are not useful for modifying photographs and generally lack ability to airbrush, blur, blend, and add texture. Bit-mapped-based drawings cannot be scaled up without loss of detail.

#### Rationale:

Drawing/Illustration tools need to support importing images from storage media (CD-ROM, etc.), the Windows clipboard, and scanners, and need to support layering. They need to include tools for image modification (blurring, sharpening, embossing, etc.), and have the ability to modify color balance, contrast, and brightness. They also need to adopt its color spectrum to correspond with the output media (64K colors for most printers, 212 colors for the web browser, gray-scale for inclusion in many reports). Diagramming software is necessary to represent a visual image of complex relationships and communicate effectively with easy-to-understand drawings and diagrams.

#### Approved Standard(s):

None

#### Approved Product(s):

[Adobe Illustrator 8.0](#) and [PhotoShop 5.0](#) or 6.0

[CorelDraw 8.0](#)

[Microsoft Visio 2000](#) for Diagramming

#### Justification:

PhotoShop has become the de facto marketplace standard for high-end drawing and illustration. Although Corel has made significant advances with its latest CorelDraw version, an informal survey of webmasters indicates that even when given no financial barriers (cost of ownership), PhotoShop is still the most productive tool for Internet art

development. Visio is a diagramming software product that integrates with Microsoft Office 2000.

**Technical and Implementation Considerations:**

None

**Emerging Trends and Architectural Directions:**

**Review Cycle:**

6 months

**Timeline:**

Revision Date: November 10, 2000

Effective Date: July 1, 1997

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

## **2800 GEOGRAPHIC INFORMATION SYSTEMS (GIS) - SERVER**

### **Definition:**

Geographic Information Systems (GIS) are a combination of hardware, software, data, (both attribute and geographic) and trained personnel, all working together to manage information to help make better decisions. Together, they provide powerful tools for and analysis of spatial information and automated cartography. It is an emerging technology that has a wide range of uses in all sectors of the economy, for natural resources management, transportation planning, inventorying landcover, economic development analysis, customer market analysis, utility siting, and crime tracking to name a few.

### **Rationale:**

The [Environmental Systems Research Institute, Inc. \(ESRI\)](#) is the industry leader of GIS software with a wide range of capabilities. The software provides for enterprise-wide management of digital geospatial data and development of customer applications along with powerful tools for ad-hoc analysis and a wide range of output and presentation capabilities as well as World Wide Web data dissemination possibilities.

The rationale for selection of the ESRI suite of products is based on the following considerations:

1. Most state agencies with analytic GIS capabilities are currently using ARC/INFO the flagship software of ESRI. There is a large, literate installed base of users in the Commonwealth.
2. Data produced using the ARC/INFO software are compatible with desktop mapping GIS software and can be accessed directly by ArcView 3.0 the standard desktop mapping software.
3. ARC/INFO runs on a variety of hardware platforms already in use in the state.
4. ARC/INFO runs on the approved operating systems of the Enterprise IT Standards.
5. Because of the pervasive use of ARC/INFO software in the Commonwealth at the state, local and federal level and private sector, geographic data created is generally accessible. Another strength of the software is that it includes a large number of data conversion modules to facilitate data exchange with other software packages.
6. Due to the complexity of the software training costs are high. However, the state currently has a significant number of staff already trained and highly skilled in the use of this software. The Office of GIS and the Governor's Office for Technology, Division of IT Training have cooperated to establish a series of GIS training classes using ESRI instructors, some State government instructors, and some private sector at the training center in Frankfort. A weeklong introduction to ARC/INFO class is available.

### **Approved Standard(s):**

Compatible with the approved server operating systems

### **Approved Product(s):**

[ARC/INFO rev 7.X](#) and its ancillary modules for UNIX and Windows NT.

### **Justification:**

Given that virtually all of the installed software already is ARC/INFO, no formal migration strategy is recommended. By adopting this as the standard, all future purchases for analytic GIS will be from the ESRI suite of software.

**Technical and Implementation Considerations:**

Agencies should consider ARC/INFO installation on the Windows NT as the platform of choice. Although acceptable, the UNIX operating environment is more complex and supports intensive and should be considered for only the most experienced GIS developers and users. ARC/INFO requires considerable training to become fully proficient in the use of the software and development tools.

**Emerging Trends and Architectural Directions:****Review Cycle:**

Annually

**Timeline:**

Revision date: July 1, 2000

Effective date: July 1, 1997

# **Enterprise Standards: 2000 Technology - Software**

## **Category:**

## **2810 GEOGRAPHIC INFORMATION SYSTEMS (GIS) - DESKTOP**

### **Definition:**

Desktop GIS mapping software can be defined by four major characteristics:

1. Easy to use and access of 'enterprise' geographic and digital geospatial data held by various data custodians across agencies.
2. Functional capacity to support relatively simple custom applications development
3. Capability to conduct ad hoc applications, including relatively simple queries and analysis, and graphic display and output.
4. The user is typically a program manager, policy analyst or a non-GIS user who is interested in using the software for the purpose of analysis, decision-making or understanding a problem that does not require a high-level of GIS expertise.

Geographic Information Systems are a combination of hardware, software, data, (both attribute and geographic) and trained personnel, all working together to manage information to help make better decisions. Together, they provide powerful tools for and analysis of spatial information and automated cartography. It is an emerging technology that has a wide range of uses in all sectors of the economy, for natural resources management, transportation planning, inventorying landcover, economic development analysis, customer market analysis, utility siting, and crime tracking to name a few.

### **Rationale:**

The [Environmental Systems Research Institute, Inc. \(ESRI\)](#) is the industry leader of GIS software with a wide range of capabilities. Their extensive software suite provides for desktop analysis as well as enterprise-wide management of digital geospatial data and development of customer applications along with powerful tools for ad-hoc analysis. A wide range of output and presentation capabilities, World Wide Web data dissemination and third-party modules are available.

The rationale for selection of the ESRI suite of products is based on the following considerations:

1. Most state agencies with desktop mapping analysis needs are currently using ArcView the desktop mapping software of ESRI. There is a large, literate installed base of users in the Commonwealth.
2. Data produced using the ArcView 3.X software are compatible with the ARC/INFO GIS software
3. ARC/INFO supported in the Statewide Enterprise Standards.
4. ArcView runs on a variety of hardware platforms already in use in the state.
5. ArcView runs on the approved operating systems of the Enterprise Standards.
6. Because of the pervasive use of ArcView software in the Commonwealth at the state, local and federal level and private sector, geographic data created is generally accessible.
7. The state currently has a significant number of staff already trained and highly skilled in the use of this software. The Office of GIS and the Governor's Office for Technology, Division of IT Training have cooperated to establish a class schedule which includes ArcView training classes using government and private sector instructors, and is delivered at the training center in Frankfort.

### **Approved Standard(s):**

Compatible with approved desktop operating systems. Windows NT is strongly recommended.

### **Approved Product(s):**

[ArcView version 3.X software](#) and its ancillary modules for [Windows 95/98](#) and [Windows NT](#), including Avenue, the programming language that comes with ArcView. Avenue is the customization and development environment for ArcView (see Category 2900). Windows NT is the recommended desktop platform. [Spatial Metadata Management System \(SMMS\) version 2.X](#), metadata authoring software, from RTSe USA. (see Category 4030 GIS Data Standards)

### **Justification:**

Given that virtually all of the installed software already is ArcView, no formal migration strategy is recommended. By adopting this as the standard, all future purchases for Analytic GIS would be from the ESRI suite of software. In the era of government downsizing and budget restrictions, there is no room for redundant data development. Individual agencies do not have the fiscal or physical resources to develop and maintain all possible data needs. Moreover, decision making is becoming increasingly complex with cuts across multiple agencies. As a result, there is an extreme demand for data sharing. GIS presents an extraordinary opportunity to reduce redundancy and to provide 'one stop shopping' for government information and decision making by using place as an index.

The Metadata Subcommittee of the Geographic Information Advisory Council benchmarked several metadata authoring tools. Spatial Metadata Management System (SMMS) is the approved product for metadata creation. The tool was tailored to Kentucky to include only sections 1 and 7 of the FGDC metadata standard to comply with the accepted Kentucky metadata standard. SMMS is a FGDC compliant tool for managing large amounts of spatial data. It has been designed to not only allow organizations to create FGDC compliant metadata in a highly functional relational database, but also to post files directly to electronic clearinghouse nodes. Other advantages of SMMS include:

- ?? Easily create, manage and distribute Kentucky's section 1 and 7 of FGDC-compliant geospatial metadata
- ?? Maintain a multi-user Microsoft SQL Server or Microsoft Access metadata database
- ?? Minimize data entry with metadata templates
- ?? Rapidly search and retrieve records from your growing metadata database
- ?? Publish internet-ready reports with links to spatial data
- ?? Keep your metadata current with Metadata Management functionality
- ?? Import and export metadata files in ASCII text and SGML
- ?? Share Contacts, Citations and Distribution Methods among metadata sets
- ?? Customize the view to better suit your organization's level of compliance
- ?? Receive extensive online help and technical support
- ?? Convert your entire SMMS 1.0 database with a single command

### **Technical and Implementation Considerations:**

ArcView is a complex desktop software application and end user training is strongly recommended. ArcView requires considerable desktop workstation resources to operate efficiently. Agencies should consider only the Power User Desktop workstation (Category 1410) with the following recommended options: 21" SVGA monitor.

### **Emerging Trends and Architectural Directions:**

#### **Review Cycle:**

Annually

#### **Timeline:**

Revision date: July 1, 2000

Effective date: July 1, 1997

**Enterprise Standards:  
2000 Technology - Software**

**Category:**

**2850 IMAGING SOLUTION - OCR/ICR SOFTWARE**

**Definition:**

*Under construction*

**Rationale:**

**Approved Standard(s):**

**Approved Product(s):**

**Justification:**

**Technical and Implementation Considerations:**

**Emerging Trends and Architectural Directions:**

**Review Cycle:**

6 months

**Timeline:**

Revision date: November 10,1999

Effective date: July 1, 1997

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

## **2860 IMAGING SOLUTION - WORKFLOW SOFTWARE**

### **Definition:**

Workflow software automates the movement, tracking and rules inherent in a typical business process involving document review traditional paperwork processing. Workflow enables imaged products and electronic documents to be intelligently routed through the organization with review and approvals occurring in a non-linear method.

### **Rationale:**

Standards and products selected must meet the minimal functional requirements already established in the statewide price contract for imaging and the Governor's Office for Technology's (formerly KIRM and the Department of Information Systems) Model Requirements Analysis for Imaging. See <http://www.state.ky.us/kirm/docs.htm>

### **Approved Standard(s):**

Workflow software offered by [vendors](#) on the state's imaging price contract

### **Approved Product(s):**

Workflow software offered by [vendors](#) on the state's imaging price contract

### **Justification:**

### **Technical and Implementation Considerations:**

Many imaging/workflow applications will require the vendor to assemble a group of products that must be integrated to provide the solution an agency requires to meet their business need. Agencies considering imaging/workflow solutions must carefully examine the proposed database platform, the scalability of the software selected, document imaging, electronic forms development, web integration, hardware interface and desktop workstation requirements for the client software.

### **Emerging Trends and Architectural Directions:**

The use of component software and Integrated Document and Output Management (IDOM) suites has become dominant trends in the imaging industry. Agencies should consider the use of electronic forms and web-enabled citizen services to capture data at the original source.

### **Review Cycle:**

6 months

### **Timeline:**

Revision date: May 1, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

## **2870 IMAGING SOLUTION - CONTROL SOFTWARE FOR IMAGING**

### **Definition:**

*Under construction.* Standards and products selected must meet the minimal functional requirements already established in the statewide price contract for imaging and the Governor's Office for Technology's (formerly the Department of Information Systems-DIS) Model Requirements Analysis for Imaging. See <http://www.state.ky.us/kirm/docs.htm>

### **Rationale:**

### **Approved Standard(s):**

### **Approved Product(s):**

### **Justification:**

### **Technical and Implementation Considerations:**

Many imaging/workflow applications will require the vendor to assemble a group of products that must be integrated to provide the solution an agency requires to meet their business need. Agencies considering imaging/workflow solutions must carefully examine the proposed database platform, the scalability of the software selected, document imaging, electronic forms development, web integration, hardware interface and desktop workstation requirements for the client software.

### **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

Annual

### **Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

## **2900 APPLICATIONS DEVELOPMENT METHODOLOGY & SOFTWARE**

### **Definition:**

Application Development software tools provide basic features such as: database middleware, database design facility, repository, object-oriented development, GUI designers, high-level programming language, and mechanisms for application distribution. They may also include reporting tools which allow end users and developers to create a range of reports, including invoices, sales records, and portfolio summaries. Most report writers offer an assortment of features and functions including: database connections, view customization, report design, report testing, database query generation, and application generation. These tools should also include the capability to generate applications to a variety of environments, as well as generate Web enabled applications.

### **Rationale:**

Need a limited product set for: economies-of-scale with respect to procurement, skills transferability required by a mobile workforce, data interchange between state government agencies, skills requirements for a competency team development environment.

### **Approved Standard(s):**

Yourdon-DeMarco Structured Analysis & Design  
Structured Analysis & Design-Governor's Office for Technology's Systems Life Cycle (SLC) Methodology  
Rapid Application Development (RAD)-Dynamic Systems Development Methodology (DSDM)

### **Approved Product(s):**

Graphical User Interface:

[Centura Team Developer](#)

[Sybase Powerbuilder](#)

[Oracle Suite - Designer, Developer 2000](#)

[Microsoft Visual Basic](#) (desktop and workgroup applications)

Design/Analysis/Data Modeling:

Sterling Software COOL suite of software products (formally Cayenne Software Products)

[COOL:BusinessTeam](#) (formerly Groundworks)

Shared Work Manager

Reports

[COOL:DBA](#) (formerly Terrain for Oracle & Sybase)

[COOL:DBA](#) (formerly Terrain for DB2)

Library Control Management Software:

[CA-PAN/LCM](#)

Client/Server COBOL/CICS/IMS:

[CA-Realia II Workbench](#)

[CA-Realia/IMS](#)

C Compilers:

[Microsoft Visual C++](#)

Developer Support Tools: (MS Visual Basic only)

[Microsoft Visual SourceSafe](#)

Microsoft Developers Network

[Microsoft Windows Software Development Kit](#)

[Microsoft TechNet](#)

Internet/Intranet Development Software: *under construction*

**Justification:**

Application development software will help agencies to improve their functionality, flexibility, and responsiveness of their business systems. Agencies may also realize improved access to client data, as well as increased employee productivity, as additional benefits to application development software.

**Technical and Implementation Considerations:**

GUI development products is a maturing market. It is predicted that one development product will be selected as the standard once this market matures and the products are evaluated. To implement an application development software environment, agencies must not only have the necessary hardware and software tools in place, but they must also have the necessary infrastructure in place. This infrastructure should include the supporting organizational structure, standards and procedures, and a development methodology. The agencies organizational structure should include: application developers, network administration, database administration, technical support, and help desk support.

**Emerging Trends and Architectural Directions:****Review Cycle:**

6 months

**Timeline:**

Revision date: May 1, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 2000 Technology - Software**

### **Category:**

## **2910 PROJECT MANAGEMENT SOFTWARE**

### **Definition:**

Project Management software is used to establish and control a planned cost profile and schedule for IT development and maintenance projects. This software is used to track the actual cost and schedule, and to compare and contrast, the planned versus actual cost and schedule profiles. Project management software allows users to schedule and allocate resources, adjust schedules, generate extensive reports, as well as keep projects on track by monitoring their progress. Most project management software uses the critical path method (CPM), a project management planning and control technique. With CPM, a critical path is computed, which monitors all tasks that will slow down the entire project if delayed. The critical path is the series of activities and tasks in the project that have no built-in slack time. Any task in the critical path that takes longer than expected will lengthen the total time of the project.

### **Rationale:**

Need an automated, collaborative approach to project management within the Commonwealth. An integrated project management solution will provide the following functions to project managers: consolidate team information, coordinate team activity, and track team progress. Selecting a standard product will result in: economies-of-scale with respect to procurement, ease of data interchange between state government agencies and management, and reduced skills set and training requirements for project management staff.

### **Approved Standard(s):**

Critical Path Method (CPM)

### **Approved Product(s):**

[Microsoft Project 98](#)

[Microsoft Project 2000](#)

### **Justification:**

Project Management software will help application development staff and managers to better plan, coordinate, and track the progress of IT development and maintenance projects. This software will also assist Project Management staff to create better time and cost estimates for new application development, by referencing historical data captured from past projects.

### **Technical and Implementation Considerations:**

Requires a workgroup environment (LAN) with Windows 95, Windows 98 or Windows NT, Microsoft Outlook (see *Standard 2600 - Electronic Mail*).

### **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

Annually

### **Timeline:**

Revision date: May 1, 2000  
Effective date: July 1, 1997

## **Enterprise Standards: 3000 TECHNOLOGY - NETWORK**

### **Category:**

### **3100 CABLE PLANT**

#### **Definition:**

Provides physical connectivity for networking components, including phone systems, desktop computers, servers, hubs, routers and other devices.

#### **Rationale:**

The cable plant is the critical infrastructure that connects networking components. This is the wiring system comprised of punch panels, physical cabling, racks, and wire management.

#### **Approved Standard(s):**

Category 6, unshielded twisted pair (UTP) copper cable; OR  
8.3/125 Single mode fiber cable; OR  
62.5/125 Multimode fiber optic cable

#### **Approved Product(s):**

#### **Justification:**

This cable infrastructure will support high-speed connectivity, like Fast Ethernet and ATM.

#### **Technical and Implementation Considerations:**

Detailed planning is required to ensure that installation of this cabling is in compliance with building and safety codes. Connectivity requirements and system speeds will dictate the type of cabling to be used for a particular application.

#### **Emerging Trends and Architectural Directions:**

#### **Review Cycle:**

Annually

#### **Timeline:**

Revision date: May 1, 2000  
Effective date: July 1, 1997

## **Enterprise Standards: 3000 Technology - Network**

### **Category:**

## **3110 CABLE PLANT INSTALLATION**

### **Definition:**

A standards-based approach to cable plant installation (inside wiring) within a facility or group of buildings is to provide interconnection between communication devices. These devices can be telephones, computer terminals, desktop computers and the devices such as servers, bridges and routers that make up a Local Area Network (LAN) and Wide Area Network (WAN). Installation includes recognized cabling types and maximum backbone distances, telecommunications closet design aspects, horizontal cabling types and distance limitations, work area and component recommendations and means of connection to various application systems.

### **Rationale:**

State government has a broad diversity of information technology devices that need to be connected via a common communications infrastructure. A generic-wiring scheme for all agencies and facilities, whether owned or leased, is critical for support of multi-vendor environment of equipment and services. An industry recognized standards-based installation and management results in uniform wiring at different locations, improved management of building space resources and reduced costs for wiring installation, support and management. With the Governor's Office for Technology (formerly the Department of Information Systems-DIS) managing the WAN, a common wiring system improves network management, trouble shooting and isolation of data transmission problems. A long life cabling system can be expected if these standards are applied properly.

### **Approved Standard(s):**

Cable plant installation based on industry standards. The following are applicable:

EIA/TIA-568 Commercial Building Telecommunications Wiring Standard and its appendix, TSB67 level 2, Testing Standard

EIA/TIA-569 Commercial Building Standard for Telecommunications Pathways and Spaces

EIA/TIA-570 Residential and Light Commercial Telecommunications Wiring Standard

EIA/TIA-606 Administrative Standard for the Telecommunications Infrastructure of Commercial Building

EIA/TSB-36 Technical Systems Bulletin Additional Cable Specifications for Unshielded Twisted Pair Cables

EIA/TSB-40 Additional Transmission Specifications for Unshielded Twisted Pair Connecting Hardware

FCC Docket 88-57 and related rules regarding inside wire and demarcation points.

IEEE 802.3 Specification

IEEE 10BaseT Specification

### **Approved Product(s):**

### **Justification:**

The Electronics Industry Association ([EIA](#)) and Telecommunications Industry Association (TIA) are large industry trade groups with memberships drawn from all facets of the telecommunications industry. Technical committees draft EIA/TIA standards and these standards are reviewed every few years. The wiring standards noted above detail the architecture, engineering, cable specification and management of wiring systems. These standards have also been fully or partially included in the National Electrical Code (NEC), American National Standards Institute (ANSI), the National Electrical Manufacturers Association (NEMA), and Underwriters Laboratories (UL).

**Technical and Implementation Considerations:**

Adequate premise wiring, installed under the standards, is a long-term investment. Network data traffic and application demands continue to drive the need for adequate and reliable bandwidth in facilities. Agencies should require electrical, telecommunications or wiring contractors to adhere to the standards for cable plant installation.

**Emerging Trends and Architectural Directions:****Review Cycle:**

6 months

**Timeline:**

Revision date: May 1, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 3000 Technology - Network**

### **Category:**

## **3200 NETWORK PROTOCOLS**

### **Definition:**

Network protocols are the transport mechanisms used to provide services on LAN/WAN's.

### **Rationale:**

Standard protocols allow networks to operate more effectively. They reduce the amount of overhead on a network, thus increasing throughput. Troubleshooting is significantly less complex when protocols are limited.

### **Approved Standard(s):**

TCP/IP - migration is required since this is the only protocol supported by the Governor's Office for Technology (formerly the Department of Information Systems-DIS) after December 31, 1998. For details, see the Agency Contact Memo at <http://www.state.ky.us/ftp/pdf/970701.pdf>  
Ethernet - LAN topology

### **Approved Product(s):**

TCP/IP is provided in the approved desktop operating system  
[Attachmate](#)

### **Justification:**

[Microsoft desktop operating systems](#) include TCP/IP and Ethernet drivers that are industry standard. Attachmate products may be needed in environments where Windows 95/98/NT is used and 3270 emulation is required.

### **Technical and Implementation Considerations:**

Microsoft drivers should be used in most situations. Ethernet\_II is the frame type that must be used.

### **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

Annually

### **Timeline:**

Revision date: November 10, 2000  
Effective date: July 1, 1997

## **Enterprise Standards: 3000 Technology - Network**

### **Category:**

### **3300 NETWORK HARDWARE COMPONENTS: ROUTERS, HUBS, REMOTE ACCESS, CSU/DSU, NICS, MODEMS**

#### **Definition:**

The communications equipment infrastructure consists of hubs, routers, CSU/DSU's, remote access servers and modems.

#### **Rationale:**

The communications infrastructure is the most important component in the delivery of consistent, high quality services across the enterprise.

#### **Approved Standard(s):**

SNMP compliant

Modems: 56 Kbps v.90, International Telecommunications Union (ITU) data transmission standard

#### **Approved Product(s):**

[Hubs](#)- Nortel Networks - Nortel

[Routers/Switches](#)- –Nortel Networks

[Remote Access](#)- –Nortel Networks

[Wireless LAN](#) - Nortel Networks

[CSU/DSU's](#)- General DataComm

Ethernet [Network Interface Cards](#) (NIC)-3Com

Modems - 56 Kbps V.90

[US Robotics](#) (formerly 3Com)

[Practical Peripherals](#)

[Cardinal](#)

[Simple Technology](#)

#### **Justification:**

The WAN consists of Nortel routers and General DataComm equipment that is managed centrally using HP Openview and Nortel Networks tools. A single vendor LAN/WAN approach ensures compatibility and increases the level of service available to customers.

A single analog modem standard is necessary to support all the remote and mobile computing needs of state agencies. For improving speed and performance, V.90 technology allows modems to receive data at up to 56 Kbps over the standard public switched telephone network (PSTN).

#### **Technical and Implementation Considerations:**

All devices should be SNMP manageable. As of February 1998, the 56Kb V.90 is the official ITU adopted standard for high speed analog modems and provides for the interoperable features necessary for two competing proprietary standards-- K56flex and X2, to interoperate. V.90 is now the universally compatible solution. Modem manufacturers have been shipping upgrades to be certain their 56K and V.90 modems are capable of being updated to enhance compatibility and performance. This requires flash memory and RAM DSP chips.

## **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

Annually

### **Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

**Enterprise Standards:  
3000 Technology - Network**

**Category:**

**3400 PBX - TELEPHONE PUBLIC EXCHANGE**

**Definition:**

*Under construction*

**Rationale:**

**Approved Standard(s):**

**Approved Product(s):**

**Justification:**

**Technical and Implementation Considerations:**

**Emerging Trends and Architectural Directions:**

**Review Cycle:**

6 months

**Timeline:**

Revision date: November 10, 1999

Effective date: July 1, 1997

## **Enterprise Standards: 3000 Technology - Network**

### **Category:**

### **3410 NETWORK SERVICES – VOICE MAIL (VM)**

#### **Definition:**

Voice Mail (VM) consists of an automated answering device for each participating employee within an organization. Features included in this system allow employees to answer, forward, and broadcast phone messages recorded while they were away from their workstations. This standard deals with the implementation and configuration of Voice Mail Systems. In some cases, these systems may be used in conjunction with other voice products to further automate functions.

#### **Rationale:**

The intent of voice mail implementation is to enhance the agency's service delivery by facilitating business communication. As agency VM devices are acquired and configured, an enterprise standard is necessary so that a common "look and feel" is presented to the public. From a customer service perspective, VM may be the first contact a citizen has with a state employee or with a state agency. These systems are implemented independently by various units, so it is important that installation and training is carried out in a similar fashion. Many of the systems, while simple in concept, can become very complicated to implement, especially when used in conjunction with other systems. This standard is intended to highlight some of the appropriate ways to configure and use voice mail so that its benefits can be fully realized. When correctly installed and used, voice mail can substantially reduce expenses, improve employee productivity and provide better services to the public.

#### **Approved Standard(s):**

#### **Approved Product(s):**

None

#### **Justification:**

#### **Technical and Implementation Considerations:**

Agencies must consider the full range of functions and features of advanced voicemail systems. These may include store and forward and interface to existing email messaging systems. Significant crossover now exists with CTI systems and advanced voicemail features for integrated solutions of voicemail, email, fax and voice response. Before acquiring a new voicemail system or upgrade to the installed phone switch, agencies should consider outsourcing as an alternative.

#### **Emerging Trends and Architectural Directions:**

With unified messaging emerging as an option for advanced users, system features will provide for integrated voicemail with email systems allowing users to view voice and fax messages from a desktop computer.

#### **Review Cycle:**

6 months

**Timeline:**

Revision date: May 1, 2000

Effective date: July 1, 1997



- ☞☞ Headsets
- ☞☞ Remote access to voice mail
- ☞☞ Waiting voice mail notification through a stutter dial tone or flashing light.

Additional features available to operators/help desk/call center attendants:

- ☞☞ Headsets
- ☞☞ Direct Station selection (multi-button instrument)
- ☞☞ Busy Display
- ☞☞ Call Management Tools

Standard enterprise features available for all offices:

- ☞☞ Electronic Billing (EDI - FUTURE)
- ☞☞ Public Pay Phones, if needed (all contracts are to be consolidated for state wide bidding with GOT acting as a consultant)
- ☞☞ 800/888 services (part of KIH)
- ☞☞ 900 services (Not available to state employees)
- ☞☞ 911 services
- ☞☞ Analog line for portable PC access, these should be placed in areas that are accessible to traveling staff.
- ☞☞ Access and account codes
- ☞☞ ACD call routing tools
- ☞☞ Auto Attendant
- ☞☞ Lobby and common areas (Local and 800 calls only )
- ☞☞ Elevators (controlled by the elevator company)
- ☞☞ Conference rooms (full access except 900 services)
- ☞☞ Conference speaker phones
- ☞☞ At least one line, dedicated for staff use only, should have unlisted number and Call ID blocking
- ☞☞ Common labels on all phone buttons
  - Link (Transfer a call) = Flash
  - Flash = Flash
  - Tap = Flash
- ☞☞ Music on hold (the only acceptable music would be easy listening - no rock, local radio, country, rap, etc)
- ☞☞ Single number to call for service XXX-XXXX for moves adds or changes (FUTURE)

Guidelines for normal operations:

Purpose:

It is our intent to start establishing goals for measuring our effectiveness in servicing the business and citizen needs of the Commonwealth. Our desire is to establish expectations by publishing standards for service levels that all employees will be asked to strive toward. It is not expected that everyone will be able to comply with these service levels initially. However, it is expected that decisions regarding equipment and staffing must be made with these service levels in mind and steps taken to ensure future compliance. The ultimate objective is to offer improved service to our customers.

- ☞☞ All manually answered phones that are dedicated to customer service should be answered within three rings (i.e. customer agents, etc.), to the extent possible. All employee phones that occasionally accept customer calls should also be answered within three rings, transfer after three rings to another agent, or be answered electronically by voice mail after no more than six rings. All other employee phones should be answered whenever possible within three rings while the employee is in the office, or may be answered by voice mail.
- ☞☞ Electronically answered phone groups (i.e. IVR, ACD, call centers, help desks, etc.), should be monitored to ensure capacity exists so that calls are responded to 80% of the time within 15 seconds. Call wait times are to be monitored on these systems so customers do not wait, on average, over 2 minutes. The callabandoned rate should not average more than 5% of total call volume. Each agency will be allowed to establish their own service levels using the above as the minimum acceptable level of performance.

- ⚡⚡ Traffic studies should be conducted at least annually on major trunk lines to avoid lost calls and busy signals. Studies should be conducted as needed on minor lines or when major changes occur in the environment.
- ⚡⚡ Long distance (LD) use is restricted to government business (employees should use personal calling cards)

### **Approved Product(s):**

None at this time. Effective July 1, 2000, a moratorium on any implementation of new features beyond those mentioned above will be imposed. An effort should be made to adapt to the features described as is reasonably possible. Management responsibility for this effort falls under the Governors Office for Technology.

### **Justification:**

The adoption of standards in this area is necessary to reduce expenses and improve service. The language in House Bill 57, proposed in the 2000 General Assembly, prompted action to implement a consistent implementation of voice services. The current variety of equipment makes it difficult and costly to service the Commonwealth citizens. In some cases citizens find it impossible to reach the correct department to get their issue resolved. It is feared that many may give up in frustration instead of getting the help that they may need. The issue is clear, a better approach must be implemented to help resolve these issues. Long-term expenses are not expected to be any greater than today, however, there may be transitional costs to make the improvements necessary. It will be important to measure our progress toward compliance to these standards.

### **Technical and Implementation Considerations:**

Until such time as the PBX's are standardized the specific digital desk set hardware must match the existing equipment. Features however, are to be programmed (wherever possible) according to the standards. This includes the calling plan and labeling the instrument buttons per the common label plan.

It is not intended that voice mail be acquired for all systems currently in place. Budget allocations, age of the current systems and the future approval of an overall voice strategy should all be taken into consideration. An approved short term alternative is to use the off premise services of ATI (Automated Telecommunications Inc.) contract to get voice mail for a monthly fee for those who need it. Current systems under state price contract and recommended to purchase are Norstar, Octel and KeyVoice from Blackbox (formerly TennMark).

### **Emerging Trends and Architectural Directions:**

Items pending approval or future related:

- ⚡⚡ Common dialing plan (PENDING APPROVAL)
  - Off hook-get teleco dial tone
  - Press intercom key for departmental calls
  - Dial 5 digits X-XXXX for state owned exchanges (564, 573)
  - Dial 8 digits 9-XXX-XXXX for other exchanges
  - Dial 11 digits for long distance 9-XXX-XXX-XXXX
- ⚡⚡ Unified Messaging (email, voice mail, fax in-box)-FUTURE
- ⚡⚡ Local calls (employee to employee, anywhere in the state)-FUTURE

### **Review Cycle:**

Annual

### **Timeline:**

Revision date: July 1, 2000

Effective date: July 1, 2000

## **Enterprise Standards: 3000 Technology – Network**

### **Category:**

## **3420 NETWORK SERVICES – AUTOMATED ATTENDANT SYSTEMS**

### **Definition:**

An Automated Attendant (AA) is a telephony application which answers callers with a digital recording, and allows callers to route themselves to an extension through touch-tone input, in response to a voice prompt. The AA will typically say something like, “Press (1) for hours of operation, (2) for Sales, (3) for Service.” Sometimes the AA may offer other options such as, “Press # for a directory of last names,” etc.

In some cases, automated attendants may share features with, and be used in conjunction with, other voice products to further automate functions.

### **Rationale:**

Auto Attendants were introduced to assist callers in reaching the appropriate person with less difficulty and delay. This not only benefits the caller but also the employee called, since it reduces ‘wrong numbers.’ Unfortunately, if the systems are not installed properly, they can become an impediment to the caller. As agency AA devices are acquired and configured, an enterprise standard is necessary so that a common “look and feel” is presented to the public. From a customer service perspective, an auto attendant may be the first contact a citizen has with a state agency. These systems are implemented independently by various units, so it is important that installation and training are carried out in a similar fashion. Many of the systems, while simple in concept, can become very complicated to implement, especially when used in conjunction with other systems. This standard is intended to highlight some of the appropriate ways to configure and use these systems so that the benefits of the system can be realized. When correctly installed and used, these systems can substantially reduce expenses, improve employee productivity and provide better services to the public.

### **Approved Standard(s):**

### **Justification:**

The adoption of standards in this area is necessary to improve employee productivity, reduce expenses and improve service. However, it must be noted that citizens have expressed dissatisfaction with the VM systems in state agencies and have registered these complaints with their state legislators. In some cases citizens find it very frustrating to negotiate the various automated telephone options to get their issue resolved under this standard. It is feared that many may give up in frustration instead of getting the help that they may need. Long term expenses are not expected to be any greater than today. However, there may be labor costs to reprogram the systems. It will be important to measure our progress toward compliance with these standards.

### **Technical and Implementation Considerations:**

### **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

One year

### **Timeline:**

Revision date:  
Effective date:

## **Enterprise Standards: 3000 Technology - Network**

### **Category:**

### **3450 DESKTOP VIDEO CONFERENCING**

#### **Definition:**

Desktop video conferencing allows individuals at separate locations to see and hear each other, conduct meetings, and work together using interactive video and audio technology using a desktop computer. Images of documents can also be exchanged and users may work together on documents or projects. Desktop conferencing enables many of the functions available for enterprise systems (see 1000), without the sophisticated features. Desktop systems may operate in a LAN environment at the network speed or via data lines and ISDN (128 Kbps or 384 Kbps).

#### **Rationale:**

The selection of the [VTEL](#) product line for desktop video conferencing is consistent with the [KTLN](#) statewide video conferencing network. SmartStation is compatible with other VTEL systems through the H.320 standards for audio and video conferencing.

#### **Approved Standard(s):**

H.320, G.711, G.722, G.728, H221, H261

T.120 standard for data collaboration.

Video Decoding: up to 30 fps (frames per second)

Video Encoding: up to 22 fps

Interfaces: ISDN, 25 mb ATM attached, V.35/RS449 Direct Connect

#### **Approved Product(s):**

[VTEL SmartStation 128](#)

[VTEL SmartStation 384](#)

#### **Justification:**

The desktop video conferencing platform selected is consistent with the KTLN room size distance learning systems to leverage the state's existing investments and minimize the diversity and complexity of this expensive technology. At this time, desktop video conferencing applications use ISDN lines.

#### **Technical and Implementation Considerations:**

Agencies should not consider deploying desktop videoconferencing with LAN transport because of the impact on the LAN and the appropriate WAN bandwidth. The VTEL SmartStation converts any Windows 95/98/NT 4.0 - based desktop computer into a video conferencing system. VTEL uses ITU standards for the video and audio transmissions. The connection to remote sites that do not utilize the VTEL HDLC algorithm will require operator intervention via an MCU software switch to enable full standards-based communications. VTEL uses ITU standards for the video and audio transmissions, but the graphics transmission for collaboration and document sharing employs a proprietary VTEL HDLC transmission. The connection to remote sites that do not utilize the VTEL HDLC algorithm will require operator intervention via an MCU software switch to enable full standards-based communications. ISDN requires an ISDN modem for dialup networking at 384 Kbps.

#### **Emerging Trends and Architectural Directions:**

The approved product(s) in this category will be expanded within the next six months. The KTLN Technical Committee is testing various non-VTEL products. As these products pass the acceptance criteria developed by the

Committee, they will be considered for this category and addition to the existing state price contract for ITV equipment and services. The use of the H.323 protocol for Internet-based (IP) video conferencing is emerging, however network considerations and quality of service issues may limit widespread adoption.

**Review Cycle:**

6 months

**Timeline:**

Revision date: May 1, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 3000 Technology - Network**

### **Category:**

### **3505 NETWORK SERVICES - ELECTRONIC COMMERCE AND PAYMENTS**

#### **Definition:**

Many electronic government services and electronic commerce transactions are conducted via the public switched network and the Internet, more specifically the web. These government services and transactions often provide an immediate payment option for products and services using the credit card payment model. Credit card payment schemes provide a payments mechanism through the existing credit card payment infrastructure. A key feature of card payment systems is that every transaction carries limits of liability in the event of theft and fraud.

#### **Rationale:**

Citizens and businesses that transact business electronically with state government must have the expectation of privacy and security. In order to protect the privacy and security of the customer, the credit card payment approach requires a secure hosting environment. Web servers and browsers such as Netscape Navigator 4.0 and Internet Explorer 4.0 support the secure sockets layer (SSL) protocol (category 3515), and many web sites use the protocol to obtain confidential user information, such as credit card numbers and other personally identifying information. On the web server side, digital server certificates act as electronic credentials to authenticate sites to customers and to enable secure, encrypted transactions and communications using the SSL protocol.

#### **Approved Standard(s):**

KyDirect is the approved enterprise electronic commerce facility for credit card payments via the internet. This full service facility includes account creation, merchant bank services, secure transactions, processing of credit card payments, authorization and settlement. [Agency Contact Memo 9903-03](#) describes the pilot, contract and the e-commerce workflow. See KyDirect at <http://www.kydirect.net>

#### **Approved Product(s):**

Both web browser approved products (Category 3511) support SSL 3.0

#### **Justification:**

Agencies are directed to use KyDirect payment services to avoid the need to implement and manage separate credit card processing contracts and services. KyDirect is an Internet-based facility developed and supported by the Governor's Office for Technology (formerly the Department of Information Systems-DIS), participating agencies and third party business partners. The site is focused on providing citizens and constituents with one interface/location to initiate, access or transact business with the Commonwealth of Kentucky. A key component of the facility is an secure on-line marketplace located at <http://www.kydirect.net>

The enterprise approach and resulting economies of scale offers state agencies the advantage of simple access to a secure e-commerce hosting infrastructure and a facility for managing complex online credit card transactions. For credit card payment processing, the merchant fee and per transaction authorization fee are clear and understandable. The Office of the Controller and the MARS development team are involved in account creation and interface to the accounting system. This facility is available for agency use under a state price contract.

#### **Technical and Implementation Considerations:**

KyDirect operates within certain parameters that minimize the total cost of ownership and discrete costs to each participating agency. The credit card processing fees and authorization charges have been negotiated at the enterprise level, thus offering users very favorable rates. Each agency must appoint a card-processing administrator

to monitor management reports, credit card inquiries, execute payment adjustments and deal with cost allocation issues. State agency users must receive training on the use of the credit card process and card administrator training for the requesting agency prior to system implementation.

## **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

6months

### **Timeline:**

Revision date: July 1, 2000

Effective date: June 1, 1999

## **Enterprise Standards: 3000 Technology - Network**

### **Category:**

### **3510 NETWORK SERVICES - INTERNET/INTRANET WEB SERVER**

#### **Definition:**

Web server software is used to manage and deliver information via internet/intranet web services (http, ftp and others) to employees, citizens and the public.

#### **Rationale:**

Standardization is needed to ensure support availability, feature availability, and for compatibility among servers when needed.

#### **Approved Standard(s):**

[World Wide Web Consortium \(W3C\) standards](#)

#### **Approved Product(s):**

[Netscape Web Server](#)

[Microsoft Internet Information Server \(bundled with Windows NT 4.0 OS\)](#)

#### **Justification:**

These two products are highly competitive and driving the technology forward at a very rapid pace. Each implements features which the other will implement in the next release of their product. Both have standard security features and support electronic commerce.

#### **Technical and Implementation Considerations:**

Microsoft IIS is probably best suited for Intel only platforms as releases for other platforms tend to lag behind. Netscape is suited for Intel or RISC based platforms and seem to keep software available for most versions of UNIX. Web application developers and publishers should take care to ensure features in Web applications are deliverable through standard browsers (Netscape Navigator/Communicator and MS Internet Explorer). Both vendors are adding features, which surpass W3C standards. Some services or features available in server software may not be deliverable through standard browsers. Both products offer considerable modules and extensions to develop electronic commerce solutions for handling web-based business transactions. To authenticate and secure the server during electronic commerce transactions, a server certificates (digital ID), available from several vendors, must installed and assigned to the web server.

#### **Emerging Trends and Architectural Directions:**

#### **Review Cycle:**

6 months

#### **Timeline:**

Revision date: May 1, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 3000 Technology - Network**

### **Category:**

## **3511 NETWORK - INTERNET/INTRANET - WEB BROWSER**

### **Definition:**

Client software interface for World Wide Web sites, services and applications.

### **Rationale:**

Standard is desirable for support and to ensure that all employees have current, standard features available through their browser interface, but a single product recommendation is impractical at this time.

### **Approved Standard(s):**

[World Wide Web Consortium standards](#)

### **Approved Product(s):**

The following minimum versions are the acceptable browser client software. To take advantage of advanced client software and web site functions and features, the latest browser release should be installed and used where feasible.

[Netscape Navigator 4.X](#)

[Microsoft Internet Explorer version 4. X](#)

### **Justification:**

The two competing vendors offer leading edge standard features as well as a few proprietary features. As this technology is moving at such a rapid pace, a standard cannot be limited to one browser at this time. Many users may actually require both browsers to successfully navigate the applications. The industry has not settled many standards issues at this time.

### **Technical and Implementation Considerations:**

Web designers and developers should be cognizant of end users and not implement proprietary browser features especially since many web services are offered to the public and are not limited to state government.

### **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

6 months

### **Timeline:**

Revision date: July 1, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 3000 Technology - Network**

### **Category:**

## **3515 NETWORK SERVICES - SECURE TRANSPORT**

### **Definition:**

Several network services are available that offer transport security. Secure Sockets Layer (SSL) is a protocol for transmitting private data via the Internet. SSL works by using a private key to encrypt data that is transported over the SSL connection. SSL establishes a secure communications channel between the server and the client web browser. Web browsers such as Netscape Navigator and Internet Explorer support SSL, and many web sites use the protocol to obtain confidential user information, such as credit card numbers and other personally identifying information. A virtual private network (VPN) is a private network configured within a public network infrastructure. A VPN uses encryption and other security mechanisms to ensure that only authorized users can access the network and that the data cannot be intercepted. On the server side, digital certificates act as electronic credentials to authenticate sites to customers and to enable secure, encrypted transactions and communications using the SSL protocol.

### **Rationale:**

Many electronic government services and electronic commerce transactions are conducted via the Internet, and specifically the web. When the privacy and security of these transactions is paramount, a secure transmission is critical. With electronic commerce transactions, three components are required for secure online commerce: authentication, message privacy and message integrity. With digital certificates issued to secure the server, users know the server is owned and operated by a legitimate organization, such as state government. Since SSL encrypts all traffic between the web server and customers, the content is secure and private - the information cannot be viewed if it is intercepted by unauthorized parties. With message integrity, both parties involved in the transaction know that the content has not been altered and they are seeing exactly what the other party sent.

### **Approved Standard(s):**

Secure Socket Layer (SSL) 3.0 encryption (minimum 40-bit) is required if data needs to be secured via the Internet.

All electronic payments (credit card, EFT, etc) and the collection of personally identifiable information must be secured during transport (see Category 3505 Network Services - Electronic Commerce and Payments). Strong encryption (128-bit) is recommended and may be required for certain applications, particularly personal and health-related information as prescribed in federal law.

To authenticate and secure the web server, a server certificate (digital ID), available from Entrust, must be assigned to the web server. This includes secure servers operated under contract, although any server certificate software may be used in those instances. See Category 3510 Network Services - Internet/Intranet Web Server.

### **Approved Product(s):**

[Entrust.net](http://Entrust.net) Secure Socket Layer (SSL) server certificates  
Both web browser approved products (Category 3511) support SSL 3.0  
Both web server approved products (Category 3510) support SSL 3.0

### **Justification:**

Secure Socket Layer (SSL) is the recognized and accepted protocol for securing transport on the Internet. Entrust provides a secure and scalable solution and the certificates that are automatically trusted by browsers. These certificates have 128 bit support, multi-year certificates, automatic certificate revocation checking, support for lifecycle monitoring and certificate revocation service and guaranteed notification of web server certificates

expiration.

### **Technical and Implementation Considerations:**

Transport security should match the business need of the agency. Strong encryption (128-bit) may be required for certain applications or instances where highly confidential information such as banking, finance and health data is transmitted.

State government has limited experience with internet-based virtual private networks (VPN) that provide secure communications through a combination of tunneling, encryption, and user authentication. Tunneling links two network devices such that the devices appear to exist on a common, private backbone. Encryption and user authentication provide necessary security services for private traffic being transported on the public network, such as the WAN. Since a VPN physically shares the public network, it uses encryption and other security mechanisms to ensure that only authorized users can access the network and that the data cannot be intercepted.

Regarding client software, the approved browsers have built-in security mechanisms to prevent users from unwittingly submitting their personal information over insecure channels. If a user tries to submit information to an unsecured server the browsers will by default, show an alert warning in a pop-up box. In contrast, if a user submits credit card or other information to a site with a valid server certificate and an SSL connection, the warning does not appear. Another protocol for transmitting data securely over the web is Secure HTTP (S-HTTP). Whereas SSL creates a secure connection between a browser client and server, over which any amount of data can be sent securely, S-HTTP is designed to transmit individual messages securely. SSL and S-HTTP, therefore, can be seen as complementary rather than competing transport security technologies. Both protocols have been submitted to the Internet Engineering Task Force (IETF) for approval as standards.

### **Emerging Trends and Architectural Directions:**

#### **Review Cycle:**

6 months

#### **Timeline:**

Revision date: February 1, 2001

Effective date: June 1, 1999

**Enterprise Standards:  
3000 Technology - Network**

**Category:**

**3520 NETWORK SERVICES - MAINFRAME ACCESS**

**Definition:**

Mainframe connectivity software for terminal emulation and file transfer (FTP)

**Approved Standard(s):**

3270 Emulation Software

**Approved Product(s):**

[Attachmate 3270 Emulation](#)

DOS and Windows workstations - Attachmate 3270 Emulator

Mainframe File Transfer - Attachmate

**Technical and Implementation Considerations:**

As the provider of mainframe services, the Governor's Office for Technology supports the Attachmate products.

**Emerging Trends and Architectural Directions:**

**Review Cycle:**

Annually

**Timeline:**

Revision date: May 10, 2000 Effective date: July 1, 1997

## **Enterprise Standards: 3000 Technology - Network**

### **Category:**

### **3530 NETWORK SERVICES - VIRUS SCANNING**

#### **Definition:**

Virus scanning software is used to detect and remove software viruses at the server and desktop level. A virus is malicious software code that is used to infect a computer and cause disruptions to programs or the computer hardware. A virus may be buried within an existing program or appear as an attachment to an e-mail. Viruses are costly to state government by wasting valuable resources through lost productivity and disruptions to network services.

#### **Approved Standard(s):**

Support for all approved hardware platforms, operating systems software and applications.  
Ability to detect an infected file at the server and desktop level, with regular updates of the virus definition files.

#### **Approved Product(s):**

Windows NT Server- [NetShield by McAfee](#), Network Associates  
Windows 95/98- [VirusScan by McAfee](#), Network Associates  
Windows NT Workstation- [VirusScan by McAfee](#), Network Associates  
NT Server for Microsoft Exchange - [GroupShield](#), Network Associates  
Novell NetWare Server - [NetShield by McAfee](#), Network Associates and [LANDesk from Intel](#)

#### **Technical and Implementation Considerations:**

To provide for effective virus protection, it is imperative that all computers have virus scanning software installed. Because new viruses are created and distributed all the time, a critical management aspect of virus software is the need to maintain the latest version of the approved software and update pattern files. An enterprise licensing agreement and price contract is established with Network Associates to enable state agencies to easily acquire the software. The enterprise licensing agreement will continue to provide the Commonwealth with the opportunity to reduce software costs, provide for standard versions of software, and provide significant price advantages over single purchase prices. For the details, see GOT Agency Contact memo <http://www.state.ky.us/ftp/pdf/990903.pdf>

#### **Emerging Trends and Architectural Directions:**

#### **Review Cycle:**

6 months

#### **Timeline:**

Revision date: November 10, 2000  
Effective date: July 1, 1997

## **Enterprise Standards: 3000 Technology - Network**

### **Category:**

## **3540 NETWORK SERVICES - INVENTORY AND DISTRIBUTION**

### **Definition:**

An application/system that at a minimum is capable of distributing software upgrades/installations to workstations and servers through the WAN and maintains hardware/software inventory information.

### **Rationale:**

The ability to automate distribution is a requirement for managing the labor-intensive process of application software distribution in a large and complex environment such as state government.

### **Approved Standard(s):**

Compatible with existing network protocols, server OS and desktop computer OS.

### **Approved Product(s):**

[Novadigm](#)

[Microsoft Software Management System \(SMS\)](#)

### **Technical and Implementation Considerations:**

### **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

Annually

### **Timeline:**

Revision date: July 1, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 3000 Technology - Network**

### **Category:**

## **3550 NETWORK SERVICES - STORAGE AREA NETWORKS**

### **Definition:**

*Under construction.* A network storage system that contains a disk or disk array for storing data and serves as a high-speed subnetwork of shared storage devices. A storage area network (SAN) handles storage management functions like archive/retrieval, backup/restore and disaster recovery. Generally a SAN utilizes a high-bandwidth fibre channel connection for high-speed transfer of data over longer distances, but may use a SCSI interface. Using fiber optic cable to connect storage devices, fibre channel supports full-duplex data transfer rates of 100 MBps. This storage architecture makes all storage devices available to all servers on a LAN or WAN.

### **Rationale:**

It is recommended that all critical data be stored on storage devices or file servers rather than individual desktop workstations. Emerging applications are more storage-intensive and may require ready access to stored data on the network. Users are demanding increased service levels from their network, including online access to universal data stores. A SAN promotes storage consolidation and offers a modular storage solution that can grow with agency data storage needs. With a SAN network, any host on the network can access any storage device and its stored files without interfering with LAN traffic.

### **Approved Standard(s):**

### **Approved Product(s):**

None

### **Justification:**

Using a SAN for network backup allows for fast, reliable backup and recovery of data. Fibre Channel SAN systems create a pool of RAID or tape storage that can be shared among multiple servers simultaneously. Isolated data sources can be interconnected and made generally available to multiple servers. This storage architecture provides improved availability and performance, while server power is directed to handling critical business applications.

### **Technical and Implementation Considerations:**

In the near future, agencies may have the need to use a storage area network of shared storage devices instead of a discrete tape backup unit at each server. SAN technology is more complex, and is now more expensive in terms of initial acquisition cost, but offers the potential for more flexible and efficient management of enterprise storage resources.

### **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

Annually

### **Timeline:**

Revision date: December 20, 1999

Effective date: December 20, 1999

## **Enterprise Standards: 3000 Technology - Network**

### **Category:**

## **3560 NETWORK SERVICES - ENTERPRISE DIRECTORY SERVICES**

### **Definition:**

Directory services provide an online directory of users and resources under an accepted protocol for ease of managing and sharing directory profile information. These directories represent users, applications and network resources as objects in a hierarchical tree. Enterprise directory services provide a central view of all available resources on the network, as well as facilitating the administration of user rights, profiles and permissions. Directory services provide network users and administrators with transparent access to all network resources, including users, groups, printers, servers, and other physical network devices throughout the network.

### **Rationale:**

An enterprise directory services approach facilitates state government communication, cross-agency workflow and intelligent management of network resources. The scope and business requirements of state government requires a directory services strategy that will operate within a broad architectural framework for administration of resources and users. Internally, the state needs to administer and control access to information, by internal and external users and this demands more efficient control of user rights, profiles and permissions. Enterprise directory services can provide for a single point of administration and single sign-on. Increasingly agencies need to govern network performance based on business rules (i.e., policy-based networking). Security to network resources and applications is strengthened when directory services are used. Multiplication and lack of synchronization of directories creates more log-ons and passwords, reducing privacy in most cases and reducing the level of security controls.

An enterprise directory solution will reduce deployment of common software applications to end users through more efficient administration. The adoption of an enterprise directory solution will support the management and deployment of a personal identification number (PIN) and is necessary for a successful introduction of public key infrastructure (PKI) digital certificates for authentication and security control. Externally, the promotion of an electronic government strategy and the creation of e-commerce applications require recognition and tracking of users and customers.

### **Approved Standard(s):**

Protocol - X.500. International Telecommunications Union (ITU) standard for directory services and the OSI protocol for managing online directories of users and resources.  
Enabled for Lightweight Directory Access Protocol (LDAP); LDAP version 2; read/write support of LDAP version 3.  
IP based Domain Naming System (see Category 4005)  
Support for X.400 messaging protocol  
Compatible with Enterprise Standards product in Category 2600 - Electronic Mail  
Compatible with Enterprise Standards products in Category 3300 - Router and Category 3700 - Firewall  
Multiple platform server support: NT, UNIX, OS/390 and AS/400  
Multiple desktop client operating systems support: Windows 95, Windows 98, and Windows NT  
Support for Secure Socket layer (SSL version 3)  
Support for Public Key Infrastructure (PKI) certificates (X.509)

### **Approved Product(s):**

Microsoft Active Directory  
Effective February 1, 2000, a moratorium on any new implementation of a directory services solution is imposed.

**Justification:****Technical and Implementation Considerations:**

Scalability and cross-platform capabilities are important to a large enterprise like state government because of the diversity of server platforms, applications and users throughout the various agencies. Any enterprise directory service solution must be able to handle a single logical directory and provide synchronization with agency-level directories. High throughput is also important for authentication and access control, particularly as state government investigates the deployment customer driven e-government applications and a managed public key infrastructure solution.

**Emerging Trends and Architectural Directions:****Review Cycle:**

Annually

**Timeline:**

Revision date: December 20, 2000

Effective date: February 1, 2000

## **Enterprise Standards: 3000 Technology - Network**

### **Category:**

## **3600 NETWORK MANAGEMENT**

### **Definition:**

Network management applications provide troubleshooting functionality for network components.

### **Rationale:**

Network management applications are used to monitor and manage network infrastructure components.

### **Approved Standard(s):**

Simple Network Mail Protocol - SNMP

### **Approved Product(s):**

UNIX - [HP OpenView Network Node Mgr.](#)

SNMP - [HP OpenView for Windows v7.2](#) (Windows/DOS)

[HP OpenView Workgroup Node Manager v1.0](#) (Win/DOS)

#### General DataComm

UNIX-	Enmacs
	MegaVIEW, NETCOM NMC-90
	MegaVIEW, MegaMUX TMS

[Nortel \(formerly Bay Networks\)](#): Routers and Network Hubs

UNIX	Optivity
DOS/Windows	Optivity for Windows

### **Justification:**

These products directly support infrastructure components that are standards in other categories.

### **Technical and Implementation Considerations:**

### **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

Annually

### **Timeline:**

Revision date: July 1, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 3000 Technology - Network**

### **Category:**

### **3700 SECURITY - FIREWALL**

#### **Definition:**

A firewall is a system consisting of server hardware and software that monitors data passing between two networks and uses an access control policy to make decisions about what data is shared between the two networks. Firewall services provide the ability to determine who can access resources on a network based on these policies. It also provides monitoring and auditing of network traffic.

#### **Rationale:**

Use of LAN/WAN networking has increased to opportunity of foreign access within the network, as well as unapproved use of network resources by internal staff. An enterprise firewall approach is necessary to monitor, track and restrict access to portions of the network. In addition, any firewall solution must have an open architecture to permit a variety of authentication solutions to be integrated into an enterprise-wide security policy, including passwords, smart cards, token-based products (like SecureID), directory -stored (LDAP) passwords, remote dial-up services (like RADIUS) and X.509 digital certificates.

#### **Approved Standard(s):**

Internet Protocol (IP)

Approved application servers and operating system (OS)

Integration with internetworking hardware and software from Nortel Networks

#### **Approved Product(s):**

[Check Point Firewall-1](#)

NOTE: Agencies are encouraged to review the GOT security offering for firewall services.

#### **Justification:**

The major standard for the [Kentucky Information Highway \(KIH\)](#) is Nortel Networks. The statewide infrastructure and central backbone consists of Nortel Networks hardware, software and services for communication services. This infrastructure is managed using [HP Openview](#) and [Nortel Networks](#) enterprise tools. Nortel Networks has partnered with Check Point to provide an integrated firewall solution using their routing equipment. Check Point's Firewall-1 product is recognized as the industry leader in firewall solutions. This standard will ease use and ensure compatibility for communication services.

#### **Technical and Implementation Considerations:**

The deployment, configuration and management of a firewall is a complex task requiring skilled resources. GOT maintains an enterprise Internet firewall, however state agencies have different networking requirements that do not allow GOT to provide a highly secured network environment. A separate firewall with a much stricter firewall security policy is recommended for agencies that have highly sensitive data. An on-site firewall can provide an agency with an additional level of enhanced network protection that cannot be provided by the GOT Internet firewalls. Checkpoint's Firewall-1 is the platform used for firewall services. For details on GOT firewall services, see Agency Contact memo [http://www.state.ky.us/ftp/pdf/2000\\_0201.pdf](http://www.state.ky.us/ftp/pdf/2000_0201.pdf)

#### **Emerging Trends and Architectural Directions:**

**Review Cycle:**

Annually

**Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 4000 INFORMATION / DATA**

### **Category:**

### **4000 NAMING - DOMAIN NAME SERVICE**

#### **Definition:**

An Internet (TCP/IP network) domain name is an organization's unique name combined with a top-level domain name (TLD). Name resolution software lets users locate computers on a network or the Internet by domain name instead of the corresponding numeric IP address. DNS (Domain Name Service) is a distributed database of information about hosts (domain names) on a network. DNS names are more 'human-friendly' versions of the number-based IP addresses used by the computers themselves. It is possible for a given host machine to have multiple domain names, but normally only one IP address. *Example:*

Commonwealth of Kentucky Web Server

IP Address = 162.114.197.36

Domain Name = state.ky.us

#### **Rationale:**

Blocks of network numbers have been issued to the Commonwealth for use by its Internet customers/employees. The Governor's Office for Technology (formerly the Department of Information Systems) issues these numbers to various entities of state and local government, with an option by those individual agencies to further subdivide as necessary to form individual IP addresses. The format consists of four groups of numbers separated by periods, each group ranging from the number 1 to 255 (*xxx.xxx.xxx.xxx*). The *Classes* assigned to these numbers refer to the way in which they have been divided; the first portion identifying the network, and the remaining number or group of numbers representing the host address.

#### *Example:*

In a 'Class B' address, the first two sets of numbers represents the network number. If the Commonwealth issued the number group 162.114.195 to an agency, the first two sets of numbers (162.114) would represent the Commonwealth's network assignment; the third (195) the primary host number specific to that particular agency, and; whatever final three numbers between 1-255 added by the agency would represent each individual host machine (e.g. desktop computer).

Once domain names have been assigned, there must exist a mechanism to distribute this information across networks. This mechanism is the Domain Name Server. Files must be updated with listings of domain names and their respective IP numbers. This data is entered manually and maintained in data files on one or more DNS servers, and the information automatically transmitted to querying servers, where it may be passed further along, and/or cached for future use.

#### **Approved Standard(s):**

The Governor's Office for Technology (GOT) is responsible for all enterprise administrative tasks and technical support relative to DNS maintenance. These tasks are the responsibility of the Division of Communication Services (formerly the Network Services Division) of GOT unless otherwise approved via official exception as outlined in Appendix C. Technical support will be routed via the GOT Help Desk at (502)564-7576. Logical assignment of domain names and their usage will be as follows:

?? Web assignment: <http://www.state.ky.us/agencies/agencyname>

?? FTP assignment: <ftp://ftp.state.ky.us/data/agencies/agencyname>

?? DNS server entries will be entered and maintained by the Division of Communication Services on the Governor's Office for Technology housed Primary and Secondary servers.

Each local area network administrator is responsible for properly configuring workstations to recognize secondary DNS servers should the primary server fail. This process provides redundancy to ensure the reliable operation of DNS.

### **Exceptions**

**Alternate Domain Names:** Agency web sites focused primarily in the marketing of specific products or services directly targeting the general public or citizens of the Commonwealth may wish to register a shorter, more easily remembered domain name. The two possible name types are:

Domain names based around the basic structure of the state's existing domain (for example *revenue.state.ky.us*) -- These are called aliases, and because they still maintain the basic *state.ky.us* structure, do not require formal registration.

Formal domain names (for example, *revenue.org*) -- These names must be registered with InterNIC (<http://www.internic.net>) and include the following formal designations:

- .com -- Commercial organizations (suggested use)
- .edu -- Educational organizations (restricted to such organizations)
- .gov -- Federal Government organizations (restricted to such organizations)
- .mil -- Military organizations (restricted to such organizations)
- .net -- Networking organizations (suggested use)
- .org -- Noncommercial organizations (suggested use)
- .int -- International organizations (restricted to such organizations)

Detailed information on domain registration is presented at the above site.

Agencies requiring domain names that do not adhere to the basic structure of the state's existing domain must submit a memorandum (outlined in Appendix C) to the GOT Office of Policy and Customer Relations requesting an exception to these naming conventions. If approved, a GOT F-180 should be completed to request the registration of the new domain name along with a copy of the approval by the CIO. The Governor's Office for Technology's DNS staff will register the name, and the fee (\$70-\$100) will be billed to the agency.

Agencies granted domain name exceptions are expected to provide the Division Communication Services with these names and any future domain names or deletion of such names.

### **Approved Product(s):**

None

### **Justification:**

Since 1994, the Commonwealth of Kentucky's Governor's Office for Technology has overseen the registration and maintenance of network numbers to the agencies of the state. Relative to this, the Governor's Office for Technology has also maintained information on any domain names assigned to these numbers. The Governor's Office for Technology maintains Primary and Secondary DNS servers (redundant DNS information resources being a required prerequisite in registering a domain name).

### **Technical and Implementation Considerations:**

Any agency maintaining its own web server or DNS server, or any agency or entity of local government utilizing state-issued IP network numbers on servers other than those maintained directly by the Governor's Office for Technology shall provide a listing of all such numbers and associated Domain Names to the Governor's Office for Technology, Division of Communication Services. While the GOT is not responsible for technical support relative to these addresses other than to the extent the domain name is set up to pass through the state's DNS servers, a complete listing of this nature will expedite forwarding of technical support issues to the proper party.

## **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

Annually

### **Timeline:**

Revision date: May 10, 2000

Effective date: May 10, 1999

## **Enterprise Standards: 4000 Information / Data**

### **Category:**

### **4005 NAMING CONVENTIONS**

#### **Definition:**

*Under construction* A sequence of one or more characters that uniquely identifies a domain, local area network, workstation, printer, file, application program, account or other entity. Computer systems impose various rules about naming objects. To better manage information resources, devices on a network or an entity (employee email) are defined (named) according to a standard naming convention. A name is also a token that identifies a network component. In local area networks, for example, every device has a unique address and name.

#### **Rationale:**

A standard and recognizable naming system is important for managing and supporting both physical and logical information resources.

#### **Approved Standard(s):**

*Under construction*

#### **Approved Product(s):**

#### **Justification:**

The continual expansion of technology services, the additional hardware being added to networked systems, the increasing number of users, and the ability to perform troubleshooting and maintenance over the network, has made it necessary to implement standardized naming. The Governor's Office for Technology (formerly the Department of Information Systems-DIS) has developed the following naming conventions in order to prevent confusion for both users and technical support personnel.

#### **Technical and Implementation Considerations:**

Absent a completed enterprise standard for workstations, servers, networks, printers and other items, agencies should implement a logical, consistent and documented naming structure internally to assist in managing these devices.

#### **Emerging Trends and Architectural Directions:**

#### **Review Cycle:**

6 months

#### **Timeline:**

Revision date: November 10, 1999

Effective date: May 10, 1999

**Enterprise Standards:  
4000 Information / Data**

**Category:**

**4010 BIBLIOGRAPHY**

**Definition:**

*Under construction* - [Kentucky Department for Libraries and Archives \(KDLA\)](#) will define in for any state specific issues, but agencies should use the MARC standard.

**Rationale:**

**Approved Standard(s):**  
US MARC

**Approved Product(s):**

**Justification:**

**Technical and Implementation Considerations:**

**Emerging Trends and Architectural Directions:**

**Review Cycle:**

6 months

**Timeline:**

Revision date: November 10, 1999

Effective date: July 1, 1997

## **Enterprise Standards: 4000 Information / Data**

### **Category:**

## **4020 WEB DESIGN AND PUBLISHING**

### **Definition:**

Web design and publishing is the production of HyperText Markup Language (HTML) documents and sites for dissemination on World Wide Web services via the Internet. The standards present style guidelines for developing web sites that are easy to understand and navigate.

### **Rationale:**

For citizen ease-of-use and navigation, a logical and consistent presentation of web-based materials and services is important. The user, whether a citizen or employee, expects to find information and services quickly.

### **Approved Standard(s):**

Web Publishing Guidelines: GOT-063 (Agency Contact Memo 9708-02) - Internet/Web Publishing Policy, Procedures, Standards and Guidelines developed by the Governor's Office for Technology (formerly the Department of Information Systems-DIS) with input from state agencies. See the Governor's Office for Technology web site at: <http://www.state.ky.us/ftp/pdf/970802.pdf> for the full policy.

Web page Construction: The required template for new web page construction or revision of existing pages may be found at <http://www.state.ky.us/kystandards>.

External Links: GOT Agency Contact Memo 9805-05 - Policy, Procedures and Guidelines for Approving External Internet Links is available at <http://www.state.ky.us/ftp/pdf/980505.pdf>

Web Site Branding: All state government agencies shall place a Commonwealth of Kentucky Brand at the top of all home pages at every organizational level. Agencies may, at their discretion, also place the Brand on any or all other pages. The Brand shall be 20 pixels deep (top to bottom) and shall span the width of the page. The Brand shall consist of the words Commonwealth of Kentucky with a Kentucky-shaped button with the word "click" on it to the left of the wording. Links to the main pages of the Commonwealth of Kentucky Web site will be shown in a drop-down menu when the viewer clicks on the Brand. The Brand is developed in Javascript. The actual script code **should not** be placed within the code of a specific web page but, should conversely be required to be referenced from the GOT server location specified on the branding web site listed below. Maintaining the code centrally will allow GOT to maintain the code, provide updates and to support proper version testing as needed with little or no impact to the agency web pages. Further information, details, definition of terminology, and to view the actual 'Brand' see <http://branding.state.ky.us/>

### **Approved Product(s):**

none

### **Justification:**

Web page construction with consistent presentation and design are key ingredients to improve citizen satisfaction with electronic government. The purpose of Web site branding is to create an enterprise approach by designating state government webpages as official Commonwealth of Kentucky sites and to provide links back to the Commonwealth's core page for ease of navigation.

### **Technical and Implementation Considerations:**

The Governor's Office for Technology developed [web design and publishing guidelines](#) to be followed by agencies

when utilizing the web services provided by the Governor's Office for Technology and developed in-house by the agency. Style and structure, navigational aides, content placement, refresh cycle and use of images must be addressed in a consistent manner by state agencies to maximize citizen use of web site information and services. Access to web resources by the disabled must be considered during the design phase of a website. The World Wide Web Consortium provides Web Content Accessibility Guidelines (at <http://www.w3.org/WAI/>) as recommendations for site design. This is a reference document for accessibility principles and design ideas. The guidelines explain how to make web content accessible to people with disabilities and are intended for all web content developers (page authors and site designers).

## **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

6 months

### **Timeline:**

Revision date: May 1, 2000

Effective date: July 1, 1997

## 4000 Information / Data

### Category:

## 4025 EXTENSIBLE MARKUP LANGUAGE (XML)

### Definition:

EXtensible Markup Language (XML) is an open standard for describing data from the World Wide Web Consortium (W3C) – a meta-language. XML is a simplified version of Standard Generalized Markup Language (SGML). It is used for defining data elements on a Web page and business-to-business documents. It uses a similar tag structure as HTML; however, whereas HTML defines how elements are displayed, XML defines what those elements contain. HTML uses predefined tags, but XML allows tags to be defined by the developer. There are four principle components that enable XML applications to process an XML document: the XML Document, Document Type Definitions (DTD) or Schemas, Processors and Parsers, and Style Sheets

### Rationale:

XML provides a mechanism to label sets of data that can be shared between other systems. The importance of this feature is realized when sharing data between two systems that are operating with different software XML offers state agencies many potential benefits: provide for self-described transactions; enhance workflow and document management functions; interface with legacy systems; reiterate the use of object-based documents and support the implementation of e-government initiatives that must pass data.

### Approved Standard(s):

Recommended: XML version 1.0 standard from the World Wide Web Consortium (W3C)

Recommended: Legal XML standard

### Approved Product(s):

### Justification:

None

### Technical and Implementation Considerations:

By providing a common method for identifying data, XML supports business-to-business transactions and is expected to become the dominant format for electronic data interchange. XML offers two distinct advantages over HTML. First, XML has the ability to inform a user what kind of information is being displayed. Second, XML focuses on content, while HTML focuses on presentation. XML is flexible and allows content creators to easily define new components to the language to better define a document's content. This is all done with "elements", "attributes", and "values", all components of the XML version 1.0 standard.

### Emerging Trends and Architectural Directions:

State government agencies have extensive requirements to share data, however the interoperability in data format and data description has been problematic. Because of the extensive information and data sharing needs, the justice community has already begun the painstaking task of developing shared XML documents. [Legal XML](#), a national non-profit organization founded in 1998, is comprised of volunteer members from private industry, non-profit organizations, government and academia. The mission of Legal XML is to develop open, non-proprietary technical standards for legal documents and related applications.

XML is gaining considerable momentum in the electronic commerce world because of the need to share data during business-to-business (B2B) transactions. The e-business eXtensible Markup Language (ebXML) initiative of the

Organization for the Advancement of Structured Information Standards (OASIS) is including XML-related specifications from the Simple Object Access Protocol (SOAP). The goal of the OASIS ebXML was to standardize e-commerce electronic messaging around XML. The World Wide Web Consortium (W3C) also had a working group to deal with XML messaging protocol based on SOAP, resulting in overlapping and competing OASIS and W3C standards specifications. The combined messaging standard will help companies implementing e-commerce solutions handle lower level interoperability problems.

**Review Cycle:**

Ongoing

**Timeline:**

Revision date: November 10, 2000

Effective date: May 10, 2000

## **Enterprise Standards: 4000 Information / Data**

### **Category:**

## **4030 GEOGRAPHIC INFORMATION SYSTEMS - DATA STANDARDS**

### **Definition:**

The [Geographic Information Advisory Council](#) has custodial responsibility for GIS data standards which include the exchange of geospatial data and metadata elements.

### **Rationale:**

### **Approved Standard(s):**

[Spatial Data Transfer Standard \(SDTS\)](#), known [FIPS 173](#) for exchange of data created by GIS  
Federal Geographic Data Committee (FGDC) Metadata Standard, Sections 1 and 7

### **Approved Product(s):**

Spatial Metadata Management System (SMMS), version 2.X, metadata authoring software, from [RTSe USA](#)

### **Justification:**

The Metadata Subcommittee of the Geographic Information Advisory Council benchmarked several metadata authoring tools. Spatial Metadata Management System (SMMS) is the approved product for metadata creation. The tool was tailored to Kentucky to include only sections 1 and 7 of the FGDC metadata standard to comply with the accepted Kentucky metadata standard. SMMS is a FGDC compliant tool for managing large amounts of spatial data. It has been designed to not only allow organizations to create FGDC compliant metadata in a highly functional relational database, but also to post files directly to electronic clearinghouse nodes. Other advantages of SMMS include:

- ?? Easily create, manage and distribute Kentucky's section 1 and 7 of FGDC-compliant geospatial metadata
- ?? Maintain a multi-user SQL Server 6.5 or MS Access metadata database
- ?? Minimize data entry with metadata templates
- ?? Rapidly search and retrieve records from your growing metadata database
- ?? Publish internet-ready reports with links to spatial data
- ?? Keep your metadata current with Metadata Management functionality
- ?? Import and export metadata files in ASCII text and SGML
- ?? Share Contacts, Citations and Distribution Methods among metadata sets
- ?? Customize the view to better suit your organization's level of compliance
- ?? Receive extensive online help and technical support
- ?? Convert your entire SMMS 1.0 database with a single command

The approved product operates on Windows 95, Windows 98 and Windows NT workstation.

### **Technical and Implementation Considerations:**

### **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

6 months

**Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 4000 Information / Data**

### **Category:**

### **4040 GOVERNMENT INFORMATION LOCATOR SERVICES (GILS)**

**Definition:** A government information locator, in an online environment, is that part of the information infrastructure designed to identify and describe government information resources and to assist searchers in obtaining information. A GILS system involves (1) creation of metadata records which individually describe government databases, records, agency publications, and other information resources in electronic and other formats, and (2) collection of that metadata into searchable databases. In cases in which the information resource exists in electronic form, a direct link to that resource from the GILS record will usually be available.

### **Rationale:**

The enormous growth of the Internet that began in the mid to late 1990s, together with the popularity of web search engines, initially led to a slowdown in GILS initiatives. Government information can obviously be retrieved by using popular web browsers. Additionally, almost every state government home page has a mechanism for searching the contents of their respective agency websites, as well as a structure of hyperlinks that typically are organized by government service, function, and/or government hierarchy. Notable problems with these retrieval mechanisms are that they are not particularly easy for the public to use, they are frequently built with little or no reference to information retrieval standards or methodologies, and they are difficult to maintain.

### **Approved Standard(s):**

[FIPS 192-1 -- GILS Profile](#)  
[Z39.50](#)

[Dublin Core](#): the Dublin Core is a metadata standard which is designed to facilitate discovery of electronic resources. The fifteen data element set originally addressed author-generated description of Web resources, but it is currently being used within formal resource description communities such as museums, libraries, government agencies, and commercial organizations to describe a broader range of information resources.

### **Approved Product(s):**

Proposed for technical review and under product evaluation:

[Netscape Compass Server](#)  
[GrapeVINE](#) (Knowledge management)  
[Microsoft SiteServer](#) and MSFind-It!

### **Justification:**

The Commonwealth will pilot a WAGILS-model GILS implementation to demonstrate the value of a GILS for improving government information resource identification and retrieval. The pilot will demonstrate the efficacy of the above-named software products and clarify the extent to which they integrate with other hardware and software products being used in the enterprise.

Adoption of the Dublin Core descriptive standard will allow agencies to be consistent in describing the origin, nature and use of data, and pilot work should lead to development and adoption of this as an enterprise standard.

### **Technical and Implementation Considerations:**

Use of the Dublin Core metadata standard must be coordinated with the geo-spatial metadata standard adopted in 4030 Geographic Information Systems - Data Standards.

Selection of Microsoft IIS and/or Netscape Compass Server and GrapeVINE must be consistent with other Enterprise Architecture and Standards approved products.

A few state governments (notably North Carolina) have followed the Federal model closely. Other states (e.g., Ohio, Florida, New York, Texas) have developed alternative database structures and metadata standards which aim to provide the same search and retrieval facility of the Federal GILS but which are not interoperable. The following issues must be addressed: implementation impact on state agency originators, impact on GIS metadata efforts and cost and effort for retrospective conversion of existing web pages.

Pilot work will involve use of tools that agency staff who create online resources can use to create descriptive metadata about those resources. A pilot must assess the extent of user intervention required by the tools and the degree of enhanced retrieval which results. It should provide direction for planning retrospective conversion of web pages and online resources.

### **Emerging Trends and Architectural Directions:**

In implementation, government information locators have taken diverse forms. Federal agencies have used the GILS profile (Federal Information Processing Standard Publication ,FIPS 192) since 1995 to create a network of interoperable databases describing federal information resources. The Federal government information locator "service" employs the Z39.50 database interoperability standard in an effort to link information resources (datasets, databases, publications, etc.), with those described in traditional library catalogs.

Currently, the most popular GILS model is one pioneered in Washington state in 1998. The [Washington GILS](#) model (WAGILS) combines Web spidering and knowledge management tools with metadata standards (the Dublin Core) promulgated by the library and information retrieval community. Subsequent to the Washington project's implementation, four additional states (Illinois, New Hampshire, New Mexico, and Oregon) have used the same metadata standards developed in Washington and a common software suite in project funded by the Institute of Museum and Library Services (IMLS). A follow-on IMLS grant is being planned to address interoperability issues associated with this model.

Kentucky state government should implement a GILS to enhance access to information resources and services delivered by state government. State information policy has emphasized that agencies have an obligation to make known and to share government information. Multiple current initiatives (including the GOT Web Standards Committee home page reconstruction, KyDirect, EMPOWER, e-business growth, GIS Clearinghouse, CKVL, and KDLA public records management), are directed at enhanced information and service delivery that either would be facilitated by a GILS implementation or need to be closely coordinated with the latter. The initiative would also represent Kentucky state government's response to the joint NASIRE/COSLA agreement on the need for formal GILS development.

### **Review Cycle:**

Ongoing

### **Timeline:**

Revision date: May 10, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 4000 Information / Data**

### **Category:**

### **4050 RECORDKEEPING, GENERAL**

#### **Definition:**

A public record is recorded information made or received in conjunction with official agency business that is kept as evidence of the organization, functions, policies, decisions, procedures, operations, or other activities of the government.

Statutory definition: "Public record or record" means all books, papers, maps, photographs, cards, tapes, disks, diskettes, recordings, and other documentary materials, regardless of physical form or characteristics, which are prepared, owned, used, in the possession of or retained by a public agency. ([KRS 171.410](#), PDF)

#### **Rationale:**

Agencies should meet recordkeeping requirements as these are established in law, regulation, policy, or best practice.

- ? ? Government records serve operational, administrative, legal, fiscal, and historical purposes.
- ? ? Records protect the rights of citizens.
- ? ? Records make government accountable for its activities and operation.

Information technologies used to enhance government's service delivery should simultaneously enhance its recordkeeping capacity, provided that: (1) recordkeeping requirements are known at the time systems are implemented or developed, and (2) that system implementation/design responds to these requirements.

#### **Approved Standard(s):**

Records schedules approved by the [State Archives and Records Commission](#) reflect known operational, legal, audit, and historical recordkeeping requirements. Agencies must maintain up-to-date and accurate schedules and create and manage records within their framework, in order to fulfill this standard.

#### **Approved Product(s):**

None

#### **Justification:**

None

#### **Technical and Implementation Considerations:**

None

#### **Emerging Trends and Architectural Directions:**

#### **Review Cycle:**

Ongoing

#### **Timeline:**

Revision date: May 10, 2000  
Effective date: July 1, 1997

## **Enterprise Standards: 4000 Information / Data**

### **Category:**

## **4060 RECORDKEEPING - ELECTRONIC MAIL**

### **Definition:**

A public record is recorded information made or received in conjunction with official agency business that is kept as evidence of the organization, functions, policies, decisions, procedures, operations, or other activities of the government.

State agency maintained electronic mail meets the statutory definition of public record, as is noted in a policy statement of the Governor's Office for Technology (formerly KIRM Commission) adopted on March 14, 1996.

### **Rationale:**

None

### **Approved Standard(s):**

Governor's Office for Technology (formerly KIRM Commission) Information Policy Directive – “The Status of Email as a Public Record”, 1996. See <http://www.state.ky.us/kirm/emailpol.htm>

### **Approved Product(s):**

None

### **Justification:**

### **Technical and Implementation Considerations:**

None

### **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

Ongoing

### **Timeline:**

Revision date: November 10, 2000

Effective date: July 1, 1997

## **Enterprise Standards: 4000 Information / Data**

### **Category:**

## **4070 COMMON DATA DEFINITIONS**

### **Definition:**

A core set of common data definitions, formats, type, size and code values for enterprise data elements. A unique identifier for both individuals and individual businesses that associates data to a single entity is a critical element of the data definition.

### **Rationale:**

The fundamental building block of the [Enterprise Architecture and Standards](#) is data – it is a critical state resource and must be managed as such. A core of common data must be managed at the enterprise level so that relational technologies can be used to collect, disseminate, and maintain the integrity of critical data elements across multiple state programs in a manner that is equitable and responsive to all. Adhering to common data standards, Commonwealth agencies will be able to: collect data once and use it often; warehouse data more effectively for various needs; and, better protect the privacy of individuals while improving access to non-restricted information. The data elements essential to the majority of state programs are the data which identify individuals and individual business entities.

### **Approved Standard(s):**

The Enterprise Common Data Definitions related to individual and business identify only, are fully described in [http://www.state.ky.us/kirm/cdd\\_98.pdf](http://www.state.ky.us/kirm/cdd_98.pdf) The policy directing the use of Enterprise Common Data Definitions by state agencies and incorporating the recommendations into the Enterprise Standards by reference: Governor's Office for Technology (formerly KIRM Commission) Policy Directive – “Policy Statement Relating to Enterprise Data Standards” (adopted June 4, 1998). For details, see <http://www.state.ky.us/kirm/edspol.htm>.

### **Approved Product(s):**

None

### **Justification:**

### **Technical and Implementation Considerations:**

There was general consensus that several of the approved data element fields, as originally proposed, were too long and may seriously affect database performance, indexing and data warehousing initiatives. These items were reviewed in 1999 and the recommended changes adopted.

### **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

Ongoing

### **Timeline:**

Revision date: May 10, 1999

Effective date: July 1, 1998

## Enterprise Standards: 5000 ERGONOMICS

### Category:

### 5000 ERGONOMICS: GENERAL REQUIREMENTS

#### Definition:

Repetitive Stress Injury (RSI), Cumulative Trauma Disorder (CTD), and Repetitive Movement Injury (RMI) are all terms to describe those workplace hazards that are caused by workers concentrating activity on a small group of muscles and tendons: when movement occurs, the muscles, tendons, and ligaments rub together. If the action is fast enough, is forceful, and if the motion is repeated for a long period of time, friction and heat build up in the joints. Microscopic damage, called microtrauma, occurs in the joints as a result. Although microtrauma itself is painless and will heal overnight, when it is allowed to build over time, the healing process cannot keep pace with the continued injury. As a result, the tissues eventually become damaged and inflamed, causing pain and limiting function. Cumulative Trauma most commonly occurs in the joints of the hands, elbows, and shoulders. Outside of manufacturing, the most common cause of this is the use of computer workstations. The pain from cumulative trauma stays with the worker full time (even when not performing the repetitive tasks that caused the trauma), and at best can be cured only by a combination of (1) abstinence from the source of the trauma (usually tasks essential to the worker's employment), (2) medication if the patient can tolerate it, (3) physical therapy, and (4) surgery.

#### Rationale:

The growth in Repetitive Stress Injury (RSI) cases has been documented by the US Bureau of Statistics:

Year	# Cases	% of all illnesses
1978	20,200	14%
1979	21,900	15%
1980	23,200	18%
1981	23,000	18%
1982	22,600	21%
1983	26,700	25%
1984	37,700	28%
1985	37,000	30%
1986	45,500	33%
1987	72,900	38%
1988	115,300	48%
1989	146,900	52%
1990	185,400	56%

An average course of physical therapy for a repetitive stress injury costs about \$8,000.

The following computations indicate a somewhat optimistic view of state government's contingent liability for employees injured on the job:

Total State Gvt Employees	35,000
Percent that use a computer (>2 hr/day)	50%
Percent users that get RSI	5%
Number employees with RSI	875
Annual treatment cost	\$8,000
Annual cost to state government	\$7,000,000

All numbers are rough estimates, presented to derive a preliminary quantitative estimate of the RSI problem. These specified costs exclude (1) loss time and (2) loss employee effectiveness. While these injuries are not often reported to employers and most costs are usually passed on to health insurance companies, this practice will not likely be tolerated by the insurance industry for an indefinite period of time. All employers, including state government, should consider RSI injury to be a major contingent liability.

### **Approved Standard(s):**

Standards are emerging, and include computer components (display screens, keyboards, pointing devices), tables/desks, chairs, and room lighting. The following standards are from a workstation monograph produced by Michael Weisberg at the National Library of Medicine, National Institutes of Health (NIH):

- ?? Worksurface depth and width--a minimum depth of 30 inches and width of 48 inches--surface space must allow for efficient organization of documents, papers and other materials relevant to the learning task.
- ?? Worksurface height--if adjustable, between 25.5 and 29.5 inches for effective use of keyboard and mouse--if not adjustable, 28.3 inches as a compromise--option of the keyboard tray below the work surface which places hands and wrists in a wrist neutral position.
- ?? Surfaces should have bullnose edges to avoid sharp corners.
- ?? The keying surface between 23 inches and 28.5 inches from the floor with detachable keyboard--top surface of the "home row" of keys no higher than 2-2.5 inches above worksurface--to allow elbows at 90° and arms and hands parallel to the floor--keyboard where thumb joints are located--wrist rests are helpful.
- ?? A mouse and writing platform that are positioned within the primary reach zone and will give hand/wrist support during use.
- ?? Research findings on carpal tunnel suggest options of- an adjustable keyboard tray below the work surface which places hands and wrists in a "wrist neutral" position or the Tony Keyboard that is hinged in the middle reducing pressure on the median nerve.
- ?? Interactive and multimedia equipment requires additional space for peripherals such as modems; CD-ROM drives; laser videodiscs; second monitor; and printers--a plan for how equipment will be used will determine space requirements--options include stacking on surface or additional adjacent, above or below moveable surfaces.

### **Approved Product(s):**

[Microsoft Natural Keyboard](#)

### **Justification:**

The Microsoft Natural Keyboard has been shown to be helpful in reducing muscular strain in one controlled test. The effectiveness of this product has been underscored by anecdotal testimony. Recommendation of other products must wait for additional in-house research.

### **Technical and Implementation Considerations:**

The conclusions specified in this standard are the result of a very preliminary review of available data. The probable liability for employee lost time and workers' compensation are significantly large to justify a more in-depth study and development of more complete standards to minimize RSI risks to state government employees and full-time contract employees.

### **Emerging Trends and Architectural Directions:**

### **Review Cycle:**

6 months

**Timeline:**

Revision Date: November 10, 2000

Effective Date: July 1, 1997

## APPENDIX A

### PERSONNEL RESOURCE ENVIRONMENT

#### General Overview

With an increased focus on IT within the Commonwealth, the support of that infrastructure becomes a key factor in its success. The Architecture and Standards team have identified organizational issues that have the potential of impacting the successful IT transformation of the Commonwealth. For example:

- ✍✍The Commonwealth is facing a technology support force nearing retirement (over 25% of the Governor's Office for Technology (formerly the Department of Information Systems-DIS) staff is eligible to retire by January 1, 2000).
  
- ✍✍The Commonwealth's legacy mainframe environment required a user-support ratio of 1:1000 in contrast with the ratios found in Appendix B, for example 1:25. This clearly indicates the need for significantly more support.
  
- ✍✍The marketplace for skilled IT professionals continues to become even more competitive. Decisions on which services to outsource and which shall be delivered by Commonwealth staff should be based on a business case analysis. It is anticipated that the continuing rapid rate of change in technology combined with the increased demand for services will result in increased use of external resource and Commonwealth staff.
  
- ✍✍The following four areas are critical to maintaining the personnel resource to support the technology infrastructure:
  - **Retain** individuals following training to make use of the new skill sets.
  - **Recruit** highly-skilled individuals with up-to-date technology comprehension.
  - **Reward** individuals for their respective efforts towards transitioning and maintaining the Commonwealth's IT infrastructure.
  - **Train** individuals in the use of new technologies.

## APPENDIX B

### RATIO OF USER-SUPPORT TO END-USERS

“According to our research, the question of whether an IS organization can effectively support end users depends less on a numerical ratio than it does on user constituencies, complexity of the computing environment, degree of centralized management, level of help desk usage, and the presence of automated tools.”

*In Search of the Elusive End-User Support Ratio* (October 1, 1995). Copyright 1995-1996 by Gartner Group, Inc. All rights reserved.

When determining the ratio of support staff to end-users, here are some key factors to consider:

- ?? technical sophistication of users;
- ?? platform: desktop and server;
- ?? number of applications supported - desktop and server;
- ?? service-level agreements (SLAs) between IS and end-user departments;
- ?? centralized vs. decentralized support organization; and
- ?? level of standardization at the desktop and infrastructure level.

User Type	End-user support full time equivalents	
	>1,000 end-users	<1,000 end-users
Power users (Type A)	1:25-1:50	1:15-1:45
Mainstream users (Type B)	1:60-1:90	1:50-1:80
Conservative users (Type C)	1:125-1:150	1:90-1:125

The end-user support consists of the following personnel:

- ?? help desk (Tier 1)
- ?? experts (Tier 2)
- ?? IS staff members who provide end-user support as part of their job
- ?? outsourcing representatives
- ?? support providers in end-user areas

The user types are defined as follows:

**Power User (Type A)** - The Power user is typically on the leading edge of technology, (e.g. developers, engineers) and who are knowledgeable users but whose support needs are high due

to the complexity of their utilization of technology.

**Mainstream User (Type B)** - The Mainstream user is typically using technology as means to an end to complement and enhance their job. The support requirements are high due to the reliance on technology for the user to perform their job (e.g. decision support analyst, departmental system user).

**Conservative User (Type C)** - The Conservative user is typically a general office worker who has access to the office suite of tools. The initial rollout of technology will cause a high level of support but after the user has become acclimatized to the environment the support needs are reduced.

# APPENDIX C

## INFORMATION TECHNOLOGY ENTERPRISE STANDARDS

### POLICY AND PROCEDURE: MODIFICATIONS AND EXCEPTIONS

**Policy Number:** GOT 97-1

**Effective Date:** 07/01/97

**Revision Date:** 12/20/99

**Subject:** Updating the IT Enterprise Standards: Modifications and Exceptions

**Policy:**

The IT Enterprise Architecture & Standards Committee (EA&S) produces the *Information Technology Enterprise Architecture & Standards* documents. The Committee is responsible for updating the *Enterprise Information Technology Architecture & Standards*, which is used by all executive branch agencies (including Constitutional Offices) for acquiring technology solutions. It is recommended that the legislative and judicial branches, as well as local governments, school districts and other public sector entities consult the *Enterprise Architecture & Standards* when considering the acquisition of technology. This policy relates to the manner in which information technology standards and products are modified and business case exceptions are submitted for the *Information Technology Enterprise Standards* document.

**Policy/Procedure Maintenance Responsibility:**

The EA&S Committee is responsible for maintaining this policy and recommending changes to the Chief Information Officer. Under KRS 11.507 the Chief Information Officer and the Governor's Office for Technology have authority for "developing, implementing, and managing strategic information technology directions, standards, and enterprise architecture, including implementing necessary management processes to assure full compliance with those directions, standards, and architecture." The Chief Information Officer serves as chair of the EA&S Committee and has final approval authority for all actions, modifications and exceptions. Agencies are responsible for recommending updates and changes of the *Standards* to the EA&S Committee. A request to modify a standard or business case exception from a standard must be presented to the EA&S Committee to support the recommendation for the update or change. The EA&S Committee may create technical work groups to review the recommended updates or to research specific standards and/or products. To request an exception to the *Standards*, agencies must submit a business case. The *Standards* will be reviewed on a periodic basis by EA&S Committee. After the EA&S Committee recommendation, the Chief Information Officer is the appropriate authority for final approval of changes to the *Standards*.

**Definitions:**

IT Enterprise Architecture & Standards Committee (EA&SC): Under the Governor's Office for Technology and as an advisory committee to the CIO, the Committee, with cross-agency representation, was formed to define, maintain and implement the Enterprise Architecture and Standards..

IT Enterprise Standards: These are the standards and products (if appropriate) that the Commonwealth of Kentucky state government has stipulated are in compliance with the architectural direction of the Commonwealth and must be adhered to by executive branch agencies.

**Request to Modify and Exception Business Case:**

There are two types of requests described in this policy:

1. **Request to Modify** - The document that is created by members of the EA&SC, technical work groups or the

agencies to request an enterprise modification (additions, updates, deletions) to the *Standards*. This document is submitted to the EA&SC and will be reviewed and considered by the Committee.

2. **Exception Business Case** - The document that is created by the agencies for submission to request an exception to the existing *Standards* for a specific time period and/or a specific procurement basis. Included in this document will be an impact assessment of the exception on the *Standards*.

#### **Procedure for Request to Modify:**

A **Request to Modify** must be directed to the EA&SC. A request must be supported by a demonstrated business need that is not exclusive to the agency, but would benefit the enterprise. If the request is accepted by the EA&SC, a recommendation will be forwarded to the CIO for final approval of the modification and publication of the revision. Agencies may be asked to make presentations to the EA&SC in support of the request to modify.

#### **Procedure for Business Case Exception:**

- Step 1. Agencies will develop and deliver the exception with supporting documentation to the Executive Director of the Office of Policy and Customer Relations (OPCR), Governor's Office for Technology. The template for the business case exception is GOT Agency Contact Memo 9805-01 and may be found on the GOT web site at <http://www.state.ky.us/ftp/pdf/980501.pdf>
- Step 2. The Executive Director of OPCR will review the exception and may approve/disapprove the request, reporting this action to the EA&SC. If necessary, the exception may be forwarded to the A&SC for additional review. Agencies may be asked to make presentations to the EA&SC in support of the business case.
- Step 3. The EA&SC may concur with the Governor's Office for Technology and approve the business case directly or refer the business case to a technical work group for further analysis. The EA&SC will recommend the disposition of the exception business base to the CIO, who has final approval authority.
- Step 4. If the final decision is to reject the exception, the agency may submit an appeal to the EA&SC and request and explanation of the action taken.

This policy references:

*Information Technology Enterprise Architecture* document  
*GOT Agency Contact Memo 9805-01*

## **APPENDIX D**

### **COMMON DATA DEFINITIONS**

#### **DEVELOPING ENTERPRISE DATA ELEMENTS TO IDENTIFY INDIVIDUALS AND BUSINESSES**

Common Data Definitions Committee  
April 14, 1998  
Technical Revisions and Updates  
February 1999

The complete document is available at [http://www.state.ky.us/kirm/cdd\\_98.pdf](http://www.state.ky.us/kirm/cdd_98.pdf)

## APPENDIX E

### STANDARDS ORGANIZATIONS

#### American National Standard Institute

American National Standards Institute (ANSI) is a private, not-for profit membership organization that coordinates the U.S. voluntary consensus standards system and approves American National Standards. ANSI goal is to coordinate and harmonizes private sector standards activities. ANSI had a multitude of subgroups that work to produce standard in different fields. ANSI promotes the use of U.S. standards internationally, advocates U.S. policy and technical positions in international and regional standards organizations, and encourages the adoption of international standards as national standards where these meet the needs of the user community.

ANSI consist of approximately 1,300 national and international companies, 30 government agencies, 20 institutional members, and 250 professional, technical, trade, labor and consumer organizations.

World Wide Web:

<http://www.ansi.org>

#### Federal Information Processing Standards

Federal Information Processing Standards Publications (FIPS PUBS) are developed by the National Institute of Standards and Technology (NIST) Computer Systems Laboratory (CSL) and issued under the provisions of the Federal Property and Administrative Services Act of 1949 as amended by the Computer Security Act of 1987, Public Law 100-235.

FIPS PUBS include standards, guidelines, and program information documents and are currently classified in categories, including computer security, GIS data standards and video conferencing;

World Wide Web:

[http://www.census.gov/~blaplant/fips\\_idx.html](http://www.census.gov/~blaplant/fips_idx.html)

#### Institute of Electrical and Electronics Engineers

A membership organization that includes engineers, scientists and students in electronics and allied fields. Founded in 1963, it has more than 300,000 members and is involved with setting standards for computers and communications.

World Wide Web:

[http:// www.ieee.org](http://www.ieee.org)

#### International Telecommunication Union

The International Telecommunication Union (ITU) is one of the main international standard bodies that sets standards for communications equipment and services. The ITU is a United Nations agency headquartered in Geneva, Switzerland. About 180 countries participate as voting members of the ITU. Each country has one vote. Other organizations may participate in the work of the ITU but do not have voting rights. These types of organizations include telecommunications operating agencies (AT&T, British Telecom, KDD), scientific or vendor organizations (IBM, VTEL, etc) and other international organizations (Intelsat).

The part of the ITU that develops telecommunications standards is known as the International Telecommunication Union Telecommunication Standardization Sector (ITU-T. The ITU-T was formerly known as CCITT but underwent a name change in early 1993. The work of the ITU-T is split into 14 Study Groups. Every four years,

each Study Group (SG) is given approximately 30 areas of study (called Questions) which result in a number of internationally agreed upon standards, called Recommendations.

World Wide Web:  
<http://www.itu.int/>

### **Internet Engineering Task Force**

The Internet Engineering Task Force (IETF) is a large open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. It is open to any interested individual. While they are not technically an official standards organization, they do set the technical and policy rules about how the Internet should operate. The IETF work groups develop draft standards and specifications that are explicitly aimed at recognizing and adopting generally accepted practices.

World Wide Web:  
<http://www.ietf.org>

### **Organization for International Standards**

The International Organization for Standardization (ISO) is a worldwide federation of national standards bodies from some 100 countries, one from each country.

ISO is a non-governmental organization established in 1947. The mission is ISO is to promote the development of standardization and related activities in the worked with a view to facilitating the international exchange of goods and services, and to developing cooperation in the spheres of intellectual, scientific, technological and economic activity.

ISO's work results in international agreements, which are published as International Standards.

World Wide Web:  
<http://www.iso.ch/>