

The following items are guidelines for the use of information technology at StorageTek and are published by Corporate Information Systems. This document helps StorageTek business units know where IS investments will be allocated in the areas of skills, products, support, and infrastructure. Business units who follow these guidelines will benefit from better support and lower costs (to themselves) because of the corporate standards that have been established. Many standards are currently under development.

The scope of this document is expanding to StorageTek's global IT infrastructure. The document does not address applications, the desktop, or "look and feel" although links to some of these topics are included. Standards for these and other related topics can be found at:

Applications - Information Systems Homepage - <http://gandalf.stortek.com/IS/>

Desktop ITSG - Info. Tech. Stds. Group - <http://outpost.stortek.com/ITSG/title.asp>

Web "Look and feel" - Integrated Marketing - <http://imc.stortek.com/imc>

European standards – European Home Page - <http://eur-web00/eissupport/Standards/standards.htm>

Unix Server Implementation Standards - <http://gandalf/unix-nt-stds/unix2.html>

Unix Developer's Guidelines to the Unix Consolidated Environment - http://gandalf/unixops/document/developers/is_environment.html

If you have questions or would like to participate in implementing a standard, please contact Marti Stahlman at x35243.

Information Technology Standards & Guidelines

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I. Introduction

This document contains guidelines for the use of information technology at StorageTek and is published by Corporate Information Systems.

Historically, vendor/product decisions (e.g., IBM S/390) defined an architecture, with the vendor responsible for delivering architecturally consistent and integrated subsystems; today, the burden — both tasks and cost — of creating and integrating enterprise architectural standards has shifted to the users of information technology. This document helps STK business units know where IS investments in skills, products, support and infrastructure will be. Business units who follow these guidelines will benefit from better support and lower costs (to themselves).

This document organizes information technology components into four time related categories: avoid, current, direction, and emerging. The following section, Document Structure, describes the specific structure for each topic. The Criteria for Evaluating IT Components section outlines criteria for component movement through these four categories.

Your questions, input, updates regarding this document are welcomed and should be sent to Marti Stahlman, email marti_stahlman@stortek.com.

Document Structure

Each topic within the *ITS & G* follows a specific structure:

- Introductory material — Explains the specific technology so that readers have a high-level understanding. For some topics, an assessment is included to explain some of the issues that influence Standard decisions.
- Policy – Where applicable, policy concerning the specific technology is stated. Standards are listed where they exist; otherwise, products are listed.
- Recommended implementations — Lists the compliance standards for purchased products or identifies products that may not comply with the standards at this time but are acceptable for one of the following reasons:
 - The suppliers are committed to moving toward standards compliance.
 - STK has an ongoing business relationship with the supplier.
 - Standards do not yet exist.
 - A prevalence for the product or supplier exists in the industry.

The following table depicts the recommended implementation structure. The order in which the entries are listed has no significance.

1.2.1.2.4 Standard Approval: Status: Name:				
	Avoid Avoid selecting any of these products or technologies. Not supported	Current Approved deployment with support.	Direction Movement in this direction, not ready for prime time.	Emerging STK is monitoring these products or technologies as potentially significant.
Standard				
Products				

Table 1 – Recommended implementation structure

- The **Avoid** column specifically identifies certain technologies or products that may significantly deviate from the preferred direction. Avoid selecting technologies or products listed in this column.
- The **Current** column specifies products and standards that are supported. These products and standards may be part of a coexistence strategy because of StorageTek's installed base.
- The **Direction** column provides a time reference for choosing and aligning with StorageTek's technology direction. Products and technologies in this column may be in test labs, but not yet released for wide deployment.

- The **Emerging** column highlights products or technologies that are potentially significant but are not yet convincing enough to appear on the time line. Organizations within StorageTek are monitoring these products and technologies for developments.
- The **Standard** and **Product** rows list the appropriate standards for the specified time period.

Bulleted items that follow the tables provide information related to the recommended implementations.

Criteria for Evaluating IT Products

The following table details guidelines to use when defining standards for policies and products in technology areas.

	Avoid	Current	Direction	Emerging
Number of products	many	2-3	fewer	Many
Actions	Migrate, Not supported	Deploy, Supported	Pilot, Recommend for guideline	Monitor
Probability of future use at STK	.15	1	.8	.3
Gartner Probability	NA	.8	.7	.5
Placement on S Curve	past upper inflection	growth phase	at lower inflection	before lower inflection
Investment models	ROI to migrate	TCO	Options pricing analysis, Crystal Ball	
Media hype		Low	Medium	High
Duration		2-3yrs	1-2yrs	>2yrs

Table 2 – Guidelines for defining standards

To be placed in the Emerging column:

Gartner probability of product adoption > .5

To move from the Emerging to the Direction column:

Gartner probability for product adoption > .7

or stated direction of a product in the current column

To move from the Direction to the Current column:

At least one product must move to the Avoid column (no net adds)

- and market share of product must be one of top 3
- and a successful pilot must have been completed
- and the product must be able to be in place for 2-3yrs
- and a deployment strategy must be developed detailing training, resources required, etc.

To move from the Current to the Avoid column:

A migration strategy must be developed

- and a replacement product must have been identified
- and market share for the product is shrinking
- and the product must have been in the current market for at least two years

Section 1 – General Policy

1.1 Shareware / Freeware

Although shareware/freeware can create intellectual property problems for StorageTek when used in product development, the concern of this policy is focused on internal use only. There are several risks to contend with when considering the internal use of shareware /freeware.

In the event the person or entity who made the freeware available and represented it as freeware may not be the original author and may not have the right to make the freeware available, StorageTek risks;

- Liability for intellectual property infringement
- Having no legal remedy (warranty or support) in the event the freeware does not work as represented
- Having no legal remedy in the event harmful code (a virus) is transmitted with the freeware code

To assist in reducing the risk, a Request for Review of Software License for Freeware / Shareware has been developed. To enter this process, obtain the form from the public folders for Outlook/Exchange: Public Folders/All Public Folders/StorageTek/Purchasing/Freeware-Shareware Form. Then follow the instructions on the form.

Section 2 – Enabling Technologies

2.1 Application Platform Services

This section includes technologies such as hardware platforms, operating systems, network transports and communications protocols, and database management systems.

2.1.1 *Data Interchange Services*

Data Interchange Services provides support for the interchange of information between applications. Though areas specific to vertical industry groups are not mentioned in this document, three areas of general applicability are discussed:

- Document management
- Electronic forms
- File formats

2.1.1.1 Document Management

2.1.1.1.1 Information Creation

2.1.1.1.1 Information Creation <i>Approval:</i> IS Mgmt <i>Status:</i> Under review <i>Name:</i> Barbara Gstalder				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard				
Products	Dynatext (EBT)	Interleaf, FrameMaker, MSWord, RoboHelp, Front Page	FrameMaker, MSWord, Robohelp, Front Page	TBD

2.1.1.1.2 Information Publishing

2.1.1.1.2 Information Publishing <i>Approval:</i> IS Mgmt <i>Status:</i> Under review <i>Name:</i> Barbara Gstalder				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard	Paper, SGML	Paper, HTML, PDF, SGML	TBD: many options including PDF, HTML, Dynamic HTML, XML	XML
Products	Interleaf's Cyberleaf, DynaWeb (EBT) (retired products, still some in use)	Interleaf's Cyberleaf, DynaWeb (EBT), Adobe Acrobat, Adobe Acrobat Exchange, along with PDF files in Livelink, Interwoven, Front Page	TBD	TBD

2.1.1.1.3 Information Management

2.1.1.1.3 Information Management <i>Approval:</i> IS Mgmt <i>Status:</i> Under review <i>Name:</i> Barbara Gstalder				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard	Paper	Online server-based, online web-based	Online web-based	TBD
Products		Interleaf's RDM, OpenText's LiveLink, ProductManager, Interwoven	OpenText's Livelink, Interwoven	TBD

2.1.1.2 Electronic Forms

Policy

The current standard for forms can be found at <http://gandalf.stortek.com/bbs>

2.1.1.3 File Formats

Policy

Select products that support the ability to read (import) and create (export) the ten main file types (Figure 1):

File Type	File Format
Text documents	ASCII
Compound documents	Microsoft Word
Presentations	Microsoft PowerPoint
Spreadsheets	Microsoft Excel
Graphics	Graphic Information Files (GIF), Joint Photographic Experts Group (JPEG), Tagged Interchange File Format (TIFF), or PCX
Audio	Wave (WAV), Audio-Video Interleaved (AVI), or Audio UNIX (AU)
Video	Motion Picture Experts Group (MPEG, MPEG2)
Internet	HyperText Markup Language (HTML 3.0+)
Virtual Reality Models	Virtual Reality Modeling Language (VRML 1.0+)
Compressed	PKZip (ZIP)

Table 3 – File formats

2.1.2 Data Management Services

Data Management Services provide applications with access to structured data in a distributed environment. The International Standards Organization (ISO) structured query language (SQL) standard is the primary interface to relational databases, but the SQL Access standard extends this interface to access databases over a network.

2.1.2.1 Enterprise Database Management Systems (RDBMSs)

2.1.2.1 Enterprise DBMS Approval: IS Mgmt Status: Approved Name: Tim Avis				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard	Flat Hierarchical Network, SQLServer 6.x	RDBMS SQL access, SQLServer 7.2.3 for legacy apps, 7.3.4 for all other version 7 requirements, and 8.04 for apps needing version 8	RDBMS SQL access Pilot SQL*Server 8i	RDBMS+OO extensions
Products	IDMS/R IDMS native VSAM	Oracle	Oracle 7, Oracle8, SQLServer	Oracle8, Oracle8i, SQLServer

2.1.2.2 Mobile/Desktop Database Management Systems

Mobile DBMS must be able to run on a client disconnected from the network.

2.1.2.2 Mobile/Desktop DBMS Approval: IS Mgmt Status: Approved Name: Time Avis				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		RDBMS SQL access	RDBMS SQL access	RDBMS+OO extensions
Products	4th Dimension (Mac) FoxPro (PC/Mac) Focus SAS dataset Clarify ClearSales is MS Access 2.0	Oracle Sequel Anywhere for Siebel MS Access	Personal Oracle Oracle Lite MS Access Sequel Anywhere for Siebel	Oracle8, Oracle8i

2.1.2.3 Object Oriented Database Management Systems

2.1.2.3 Object-Oriented-Database Management Systems Approval: IS Mgmt Status: Needs IT3 for update Name: Tim Avis, Marty Flanders				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard				
Products				

The direction is towards active OODBMS (e.g. Gemstone), passive OODBMS (e.g. Versant) with CORBA (e.g. IONA, Visigenic), or passive OODBMS (e.g. Versant) with Enterprise JavaBeans (e.g. WebLogic).

2.1.2.4 Database Access

Database access middleware sometimes referred to as database gateway middleware, resides between the client application and the vendor DBMS or file system. Database access middleware is intended to provide the client application and end user with a single method and view of accessing data in a heterogeneous database environment. The method can vary from APIs to fourth generation languages (4GLs) or to gateways (point-to-point, SQL, universal).

2.1.2.4 Database Access Approval: IS Mgmt Status: Approved Name: Tim Avis				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard				
Products		SQL*Net Net2.3.4 ODBC	SQL*Net, Net8, ODBC, JDBC	Net8, ODBC, JDBC

2.1.2.5 Data Synchronization

2.1.2.5 Data/Application Synchronization Approval: IS Mgmt Status: Approved Name: Tim Avis				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		Project driven	Architecture driven	
Products	Metropolis	Xcellent in SNBG Synchronize ETI (Data Warehouse)	Oracle Replication Tools, ETI (Data Warehouse) What product does Seibel use?	Oracle Replication-Tools, MQSeries

2.1.3 Distributed Computing Services

Services required to operate in a similar manner across applications that are physically or geographically dispersed constitute Distributed Computing Services. Most of these services can be implemented by using Distributed Computing Environment (DCE), as defined by TOG. The combination of computing platforms and communications networks is the key enabling element for modern information systems. Networks become increasingly important as organizations migrate to distributed processing. Four services are discussed in this section:

- Interprocess communication
- Naming and directory services
- Time services
- File services

2.1.3.1 Interprocess Communication

Interprocess communication (IPC) enables the exchange of data between application programs. Some form of IPC is required to implement a Client /Server application architecture. Using IPC technology, programs can exchange data within a single computer or between computers over a network. Each IPC technology provides an API. The two types of IPC technologies are transport dependent and transport independent.

Transport-dependent IPC technologies are generally based on a single transport protocol or operating platform, providing a low-level API that has transport-dependent syntax and inhibits application portability. Transport-dependent IPC technologies should be avoided when possible. Examples of transport-dependent IPCs include Microsoft's Named Pipes, Novell's transport layer interface, and IBM's advanced program-to-program communication (APPC) and Common Programming Interface-Communication.

Transport-independent IPC technologies generally support several transport protocols and operating platforms. They provide a high-level API with transport-independent syntax, easy use, and application portability. They include remote procedure call (RPC), interprocess messaging, and object request brokers (ORBs).

2.1.3.2 Remote Procedure Call

Remote procedure call (RPC), a language for distributing application program procedures among networked computers, enables a client program to call a serving procedure located on another computer in the network. The client program calls the remote procedure in the same way that it calls a local procedure. The client program then passes parameters to, and receives parameters from, the remote procedure. The client program need not know the location of the server procedure.

RPC technology simplifies the conversion of an existing monolithic application to a distributed architecture. Instead of using an API that requires changes to source code, RPC technology employs a precompiler utility to process Interface Definition Language (IDL) statements, which generate the source code that ensures compatibility between the client and the server.

2.1.3.2 Remote Procedure Call <i>Approval:</i> IS Mgmt <i>Status:</i> Under review <i>Name:</i> Jerry Donza				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
<i>Standard</i>			standards based DCE RPC	
<i>Products</i>		Sockets IBM IPCF	IBM's DCE RPC	DCE RPC

2.1.3.3 Interprocess Messaging

Interprocess messaging is a middleware technology that uses message passing and message queuing to provide peer-to-peer asynchronous communication between

programs. Messaging is a relatively mature technology that has been widely used for distributed applications involving high transaction rates in the banking, stock market, and airline industries. IBM's MQSeries® has a strong presence in the industry as a messaging solution. Few standards exist, however, for portable messaging APIs or interoperable messaging protocols.

2.1.3.3.1 Message Passing/Queuing

In many implementations of messaging middleware, the basic message-passing model is enhanced with a message queue to provide a buffer for storing messages that have been sent and are waiting to be received.

2.1.3.3.1 Message Passing/Queuing Approval: IS Mgmt Status: Under review Name: Jerry Donza				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		Data passing	Perform Pilot	3 tier OO msg passing
Products		batch file xfer, IBM MQSeries	MQ Series	Neon Crossworlds

2.1.3.4 Naming and Directory Services

Naming and directory services are needed to locate resources on the network. These services provide the means for identifying and retrieving information about objects in the network. An object is a specific resource on the network such as computer, application, file, electronic mailbox, printer, and router. Information that can be retrieved about an object varies according to the object and the name or directory service providing the information.

Current standards efforts around LDAP (Lightweight Directory Access Protocol) make it appear to be the future common denominator for global directories and various vendor-specific efforts for enterprise-wide directory services.

Enterprise directory systems offer the promise of allowing administrators to reserve bandwidth and prioritize traffic based on assigned directory services. Enterprise managers will be able to link applications that use such bandwidth-management schemes as Resource Reservation Protocol (RSVP) and ATM Quality of Service (QoS) to a directory service. Managers will be able to use directory services not only to control access to application rights and server access, but also to network bandwidth prioritization via Cisco IOS in the future. As enterprises begin to deploy both videoconferencing and voice-over-IP applications, directory services could play a vital role in controlling and optimizing these resource-intensive network services.

2.1.3.4 Naming and Directory Services Approval: IS Mgmt Status: Under review Name: Jerry Donza				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		DNS, TCP/IP DNS (RFC 1123), DHCP, RADIUS, Microsoft NBT (Net Beui over TCP)	DCE, LDAP, DNS, Active Directory	LDAP
Products	AppleTalk Phase II	Netscape Directory Services, MS Exchange, NT Directory Services, Common people table, QIP, RADIUS	Windows 2000	

2.1.3.5 Time Services

Time services are established to ensure consistency and accuracy of time and dates across distributed systems. Lack of synchronization is a special problem in networks because they consist of multiple hosts. Each host has its own clock and its own time reference. Slower clocks continually drift farther behind faster clocks. Time skew among networked hosts can cause application delivery problems. For example, a stock trading wire service could be in trouble if brokers in London learned of deal making events five minutes after brokers in New York or Hong Kong had already acted.

2.1.3.5 Time Approval: IS Mgmt Status: Approved Name: Jerry Donza				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		NTP	NTP	
Products				

- STK uses a hierarchical distribution system to provide time services to desktops and servers.
- Stratum 1 is NIST1, NCAR, NIST2, and TICK. (Four servers that provide a reference time).
- Stratum 2 is Stortek, Stortek1, and Gateway. (Coordinate time with the stratum 1 servers and make it available to StorageTek wide).
- Stratum 3 is peer groupings of routers and high-level servers. (For Louisville, combination of key servers and routers).
- Stratum 4 are desktop devices and other servers. (For Louisville, most other servers).
- Routers will broadcast time periodically for UNIX workstations
- PC's will request time from a domain controller via the logon script

2.1.3.6 File Services

The file services described in this section provide access to distributed data. Local file access is generally provided by an operating system service.

2.1.3.6.1 Network File Services

2.1.3.6.1 Network File Services <i>Approval:</i> IS Mgmt <i>Status:</i> Under Review <i>Name:</i> Jerry Donza				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
<i>Standard</i>	Divergence		convergence on Windows 2000	
<i>Products</i>	3Com LAN Manager Macintosh	Windows NT 4.0 UNIX/NFS	Windows 2000 UNIX/NFS, Samba	

2.1.3.6.2 File Transfer Services

File transfer services let users copy, replicate, or move whole files across a network. Select file transfer systems that conform to open standards and promote interoperability. The e-mail method of file transfer should only be used for small files. There is a 5 Meg limit imposed with Exchange.

2.1.4 Graphics and Imaging Services

Graphics and imaging services provide functions required for creating, storing, retrieving, and manipulating images. These functions include services such as graphical object management, drawing services, and imaging functions.

2.1.4.1 Imaging Systems

2.1.4.1 Imaging Systems <i>Approval:</i> IS Mgmt <i>Status:</i> Under Review <i>Name:</i> Marti Stahlman				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
<i>Standard</i>				
<i>Products</i>		Eastman Software – Ultimas (in Europe, Australia)		

2.1.5 *Network Services*

2.1.5.1 *Voice Communications*

2.1.5.1.1 *Voice Network Transport*

2.1.5.1.1 Voice Network Transport <i>Approval:</i> IS Mgmt <i>Status:</i> Approved <i>Name:</i> Butch Walb				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
<i>Standard</i>		AT&T	AT&T Sprint/MCI	AT&T, Sprint
<i>Products</i>		SDN	Voice over IP, FR, and ATM	Voice over FR, ATM, and BAMN

2.1.5.1.2 *PBX*

2.1.5.1.2 PBX <i>Approval:</i> IS MGMT <i>Status:</i> Approved <i>Name:</i> Butch Walb				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
<i>Standard</i>		Lucent	Lucent	
<i>Products</i>	Non Lucent purchases	Definity BCS, Sys 25 and G3		

2.1.5.1.3 *ACDs and Call Center*

2.1.5.1.3 Call Center <i>Approval:</i> IS Mgmt <i>Status:</i> Approved <i>Name:</i> Butch Walb				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
<i>Standard</i>	Add ons to PBXs for over 16 agents – use standalone ACD	ASPECT	ASPECT	
<i>Products</i>		Rel 6.X (unix) CTI	Rel 7.X (NT) Task Queueing	CTI, IVRU, Web, email

2.1.5.1.4 *Voice Mail*

2.1.5.1.4 Voice Mail Approval: IS Mgmt Status: Approved Name: Butch Walb				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		VMX/Octell	Octell	
Products			Rel S.3.0.0.2	

2.1.5.2 Data Communications

Selecting the proper transport and network protocols is critical for ensuring a reliable, interoperable, and manageable network.

2.1.5.2.1 Network Protocols

To enable a network computing environment that supports Client/Server computing, various LANs, and other data networks are interconnected seamlessly over a WAN. For optimum supportability, reliability, and performance, the fewer the network protocols supported, the better.

2.1.5.2.1 Network Protocols Approval: IS Mgmt Status: Approved Name: Jim Boehmler				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard	IPX/SPX, Appletalk, Apollo, Transparent Bridging, DECnet	TCP/IP, SNA/DLSW	TCP/IP, SNA/DLSW	TCP/IP
Products	NA	Cisco IOS	Cisco IOS	Cisco IOS

In the past, STK has supported multiple protocols on its LANs and across the enterprise. Presently, in addition to TCP/IP, we still have the presence of IPX, Appletalk, Transparent Bridging, DECnet, and Apollo protocols on the network. This impacts network performance and reliability, and makes the network more difficult to support. The future direction is to convert all network traffic to the TCP/IP protocol. In addition, legacy SNA traffic is carried across TCP/IP networks via the DLSW protocol. This protocol will be supported until all mainframe is converted from SNA to native TCP/IP.

2.1.5.2.2 Campus Network Backbone

The campus backbone is a point of convergence for all data traffic on the STK network. The backbone must be extremely fast and reliable. With many new applications and the growth in data traffic that they bring, the campus backbone must scale up to ever increasing bandwidth levels to support the entire enterprise.

2.1.5.2.2 Campus Network Backbone Approval: IS Mgmt Status: Approved Name: Jim Boehmler				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard	FDDI	ATM OC-12	ATM OC-48	ATM OC-192, Gigabit, Terabit
Products	Synoptics FDDI concentrators, Cisco router FDDI cards	Cisco Catalyst 5500 switches w/ Lightstream ATM modules	Cisco Catalyst Switches	Cisco Catalyst switches

The STK campus backbone is currently undergoing a migration from FDDI to ATM OC-12. FDDI is 100Mb/sec shared technology. Recent statistics have shown where the STK FDDI backbone ring is running at close to 100% capacity. OC-12 runs at 622Mb/sec and is a switched technology, which means that there is dedicated 622Mb/sec between each switch. The Distribution layer in the network is also at 622Mb/sec. Connections to Edge layer closets are at OC-3 (155Mb/sec). The ATM backbone will scale up to the higher speeds of OC-48 (2.4Gb/sec) in 2000. It is anticipated that OC-192 (10Gb/sec) will be available about calendar year 1999. At that point, the distribution layer could be upgraded to OC-48, the edge to OC-12, and the desktops could be upgraded to higher speeds than 10Mb. It is also expected that even higher speeds will be available in the future.

2.1.5.2.3 Remote Office Network Backbone

Depending on the size and function of a remote office, the data network there could be very critical to business operations. Some of the larger remote offices may also have large data bandwidth requirements. A reliable solution for data network backbone must be in place for these offices.

2.1.5.2.3 Remote Office Network Backbone Approval: IS Mgmt Status: Approved Name: Jim Boehmler				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard	FDDI, Shared Ethernet, Switched Ethernet	Switched Fast Ethernet	Switched Fast Ethernet	Gigabit Ethernet
Products	Synoptics hubs	Cisco Catalyst Switches	Cisco Catalyst Switches	Cisco Catalyst Switches

Some of the larger remote STK offices have multiple data closets, subnets, and servers. These offices require a data network backbone solution that ties all data networking equipment and services together reliably. For these offices, the current solution is a switched Fast Ethernet backbone. This should scale reasonably well up to about 500 users at the current time. For future upgrades, Gigabit Ethernet would be a possibility for these offices.

2.1.5.2.4 Desktop Network Connectivity

The desktop is the last step in implementing a successful network design. The type of desktop connectivity is usually dependent on other layers of the network. For large campus network designs, backbone and distribution layers must be considered when implementing a technology to the desktop. For smaller designs, usually a backbone or WAN technology must be considered when deciding on the type of desktop connection.

2.1.5.2.4 Desktop Network Connectivity Approval: IS Mgmt Status: Approved Name: Jim Boehlmer				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard	Token Ring, FDDI, Shared Ethernet	Switched Ethernet (10Mb)	Switched Ethernet (10Mb)	Switched Fast Ethernet (100 Mb)
Products	All hubs including Synoptics, Bytex, and Cabletron	Cisco Catalyst 5500, 5505, 5002, 1924	Cisco Catalyst Switches	Cisco Catalyst Switches

2.1.5.2.5 LAN Hardware Design Guidelines

Network Design Guidelines – used for every network design, new infrastructure, expanding infrastructure project. Gather following requirements, feed into Gary Osburn worksheet and / or Bandwidth Cost Model (both located on ATG homepage).

- # of people
- # of servers, printers
- What applications being used and what kind users of the app (light, medium, heavy)
- What is expected growth? How many ports needed today, how many in two years?
- What is quality of service required?
- What is level of availability required?

Guidelines

- Only use Cisco equipment – Cisco specific management packages have been bought for simplified support.
- Do not install more than one switch per closet. Each switch contributes to management overhead and increased SNMP and RMON traffic.
- All installations should consider a 20% growth when deciding on the capacity of a switch.
- Do not purchase hubs. If needed, remote installations can obtain redeployable managed hubs from Louisville.

Specific Guidelines For Off-Campus

- Use re-deployed managed Synoptic hubs if no servers.
- Cisco Catalyst 2924 and 1924 used for smaller offices, if less than 24
- Cisco Catalyst 5002 used for between 24 and 48 devices.
- Cisco Catalyst 5000 used for between 49 and 192 devices.
- Cisco Catalyst 5500 used for high end installation.

Specific Guidelines For Campus

- Cisco Catalyst 2900 used for less than 144 users.
- Cisco Catalyst 5509 used for between 144 and 288
- Cisco 5500, 4000, 6000, 8500 for high end installation.

Implement capacity planning processes for all important uplinks.

2.1.5.2.6 Campus LAN Optimization Techniques

One of the critical issues facing expanding networks today is finding how to ensure adequate network performance and responsiveness. Routers add overhead to network traffic, and switches are challenged with increasing globalization of individuals within private networks. Various techniques are being developed to address both optimizing the network and ensuring quality of service.

2.1.5.2.6 Campus LAN Optimization Techniques Approval: IS Mgmt Status: Approved Name: Jim Boehmler				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard	Routed LANs	VLAN	Netflow switching, ATM QOS, RSVP, MPOA	Layer 3 Switching, MPLS (Tag Switching)
Products	Traditional Layer 3 Routers in the LAN	Cisco Catalyst Switches, Cisco IOS	Cisco Catalyst switches, Netflow Feature Card, Cisco IOS	Cisco Catalyst switches, Cisco IOS, Cisco RSM

In the past, microsegmented routed subnets at STK were used to solve network performance issues. This method is cumbersome and inexact, and is now obsolete. Currently, STK is undergoing a conversion to switched and Virtual LAN technology (VLAN) to improve performance for servers and end users. Some new network performance technologies available, but not implemented at this time at STK are Netflow Switching, ATM Quality Of Service, Multiprotocol over ATM, and RSVP. These would all be reasonable next steps to improve performance, and to give service guarantees. Some other future technologies to deploy would be Layer 3 switching and MPLS.

2.1.5.2.7 Enterprise WAN Network Techniques

2.1.5.2.7 Enterprise WAN Network Techniques Approval: IS Mgmt Status: Approved Name: Suresh Rankupalli				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard	X.25	Frame Relay	ATM / Frame Relay	ATM
Products		Cisco routers	Cisco switches / routers	

At this time Frame Relay is our standard for our North American WAN and International WAN. It is a MCI Hyperstream service in North America and a Concert Frame Relay service in the International arena. The future direction is to integrate ATM into the existing frame network.

2.1.5.2.8 Small Office/Home Office

These standards pose the greatest challenge. The availability of a given technology will vary greatly based on the user's location. Selection of a technology in an area is first based on availability of the technology and then based on the cost of that technology. The ultimate goal is to develop a VPN technology that will allow the user to use any connection technology in their area. VPN technology includes both a Single Password scheme to prevent userID/password reuse and an encryption technology, such as IPSec, that will allow the user to use a public IP network, such as the Internet. The use of CiscoSecure gives the ability to enhance security by providing Single Sign On (SSO) and providing the ability to limit access based on the user profile and not the device accessed. Compression protocols will increase the bandwidth on a link by compressing data before sending it across the given link.

2.1.5.2.8 Small Office/Home Office Approval: IS Mgmt Status: Approved Name: Jeff Tramel				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard	Async, IPX, ARA, RADIUS	Analog V.34+, ISDN, 56kb Frame Relay, PPP/PAP, RADIUS, TACACS+	Analog V.90, ISDN, DSL, PPP/CHAP, STAC Compression (SDN), MPPC (Analog Dial-In), TACAC+, VPN, Cable modems	Wireless
Products		CompuServe IP Link, IPLink+, Cisco 776 ISDN Router, 3COM modems CiscoSecure NT 2.1	Internet, CompuServe Global IP VPN	

PPP/PAP – Password Authentication Protocol – After the PPP link establishment phase is complete, a username/password pair is repeatedly sent by the remote node across the link until authentication is acknowledged, or the connection is terminated. Currently this is required to allow proxy of the user authentication to the NT domain.

PPP/CHAP – Challenge Handshake Authentication Protocol – CHAP is used to periodically verify the identity of the remote node using a 3-way handshake. This is done upon initial link establishment and can be repeated any time after the link has been established. After the PPP link establishment phase is complete, the host sends a “challenge” message to the remote node. The remote node responds with a value calculated using a one-way hash function (typically message-digest algorithm MD5). The host checks the response against its own calculation of the expected has value. If the values match, the authentication is acknowledged. Otherwise, the connection is

terminated. CHAP cannot be used since the proxy to the NT domain currently requires the user ID and password.

RADIUS - Remote Access Dial-In User Service. This is a protocol designed to communicate authentication, authorization, and accounting (AAA) information between a remote access server and an AAA server. RADIUS is being used to communicate with the Louisville Shiva remote access servers. The problem with RADIUS is that only the password is encrypted when it is sent between the RAS and AAA server.

TACACS+ - Terminal Access Controller Access Control System. TACACS+ is a Cisco proprietary (currently) protocol for communicating between the RAS and AAA server. The advantage is that all other RAS devices are Cisco and the entire packet is encrypted when sending information.

ISDN – Integrated Services Digital Network. ISDN is a high-speed digital telephone service. ISDN is faster and more reliable than analog POTS (plain old telephone service), and lets you make a voice telephone call while simultaneously transmitting or receiving data with you modem. ISDN lets computers communicate up to 128Kb per second, more than double the speed of the fastest analog modems.

If you are interested in pursuing this technology, reference the Remote Access Page for instructions. <http://ra.stortek.com>

2.1.5.2.9 Network Routing Protocols

2.1.5.2.9 Network Routing Protocols Approval: IS Mgmt Status: Approved Name: Jim Boehmler				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard	RIP, IGRP, EIGRP, IPX RIP, RTMP, DRP	OSPF, PNNI	OSPF, PNNI	OSPF, PNNI
Products	Routing Protocols running on servers or user workstations	Cisco IOS	Cisco IOS	Cisco IOS

STK is still using many routing protocols, including OSPF, RIP, IGRP, RTMP, DRP, and IPX RIP. The use of so many of these protocols impacts performance, reliability, and supportability. The routing protocols of choice for STK are OSPF for routers and PNNI for ATM switches. Some progress has been made to eliminate IGRP and RIP from the network, but there is a long way to go. Servers and end-user devices should never run any of these routing protocols, as they add a lot of overhead traffic to the network. Servers and end-user devices should all be running with a default router entry. Some progress has been made in this conversion. Elimination of other routing protocols is dependent on elimination of their parent protocols (e.g. RTMP – Appletalk).

2.1.5.2.10 Campus Server Network Connectivity

A wide range of options is needed for server connectivity in the campus environment. Some servers have extensive traffic requirements, others are servers with very low bandwidth requirements.

2.1.5.2.10 Campus Server Network Connectivity Approval: IS Mgmt Status: Approved Name: Jim Boehmler				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard	FDDI, Fast Ethernet, Shared Ethernet, Token Ring	ATM OC-12, ATM OC-3, Switched Ethernet	OC-12, OC-3, Switched Ethernet	OC-48, OC-12, OC-3
Products	All NIC cards from above technologies	Fore OC-3 ATM NIC cards for PCs and Suns, Sun OC-12 NIC cards, HP OC-12 and OC-3 NIC cards for HP Unix		

Currently, most servers at STK Louisville campus are connected with shared FDDI and Ethernet. A migration is underway to move servers onto ATM connections, both OC-3 and OC-12. Also, legacy servers with smaller bandwidth requirements have been migrated to switched Ethernet. The near future plan should be to move all of these servers to ATM or switched Ethernet. Future ATM technology should enable faster speeds than OC-12 for servers.

2.1.5.2.11 Remote Office Server Network Connectivity

Servers in some of the larger remote offices have increasing bandwidth needs that must be addressed with faster and more reliable technology.

2.1.5.2.11 Remote Office Server Network Connectivity Approval: IS Mgmt Status: Approved Name: Jim Boehmler				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard	FDDI, Shared Ethernet, Token Ring	Switched Fast Ethernet, Switched Ethernet	Switched Fast Ethernet, Switched Ethernet	Gigabit Ethernet, Switched Fast Ethernet
Products	All NIC cards on the above technologies			

Servers in remote offices currently have Ethernet, Token Ring, and Fast Ethernet shared connections. All servers should be moved to either switched Ethernet or Fast Ethernet in the near term. A migration to gigabit Ethernet for servers may make sense at some time in the future.

2.1.5.2.12 Mainframe Internetworking Technology

2.1.5.2.12 Mainframe Internetworking Technology Approval: IS Mgmt Status: Update Required Name: Jeff Tramel				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard				
Products				

2.1.5.2.13 Wireless Networks

Mobility, ease of use in conference rooms around campus, without having to change IP addresses are some of the reasons for the wireless network in the Louisville campus.

2.1.5.2.13 Wireless Networks Approval: IS Mgmt Status: Approved Name: Suresh Rankupalli				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		None	802.11	
Products		Breezecom	Breezecom	

2.1.5.3 Cable and Wiring Closets

Network requirements for bandwidth will require a cable infrastructure that will display category 5 characteristics from input to output across all connectors, cross connect, patch panels and outlets.

Network Cable on Campus

2.1.5.3 Campus Cable Approval: IS Mgmt Status: Approved Name: Sherry Steving				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard	Voice grade cable	Phase out level 3	Level 6, 4 pair or 25 pair cable	Multi mode fiber Level 7 copper cable
Products	Level 1,2,3 4 pair & multi pair cable	Level 3, 4 pair & 25 pair cable	Level 6, AT&T	

Cable Category/levels are listed below:

- Level 1, 2, 3: Legacy cables that is used for voice circuits or low speed data. This cable will not meet future bandwidth requirements for data circuits.
- Level 5: Cable specified as level 5 must meet the stricter requirements for category 5 as spelled out in ISO standard 11801, which allows cables meeting its requirements to be used globally. Category 5 cable supports data speeds up to 155 MBS.
- Level 6: Cable specified as level 6 increases the UTP cable performance by requiring a more stringent four pair (next power sum). This cable is suitable for the newest four pair based network protocols through 100 Mhz.

- Level 7: New generation of cable products that meet at least twice the category 5 bandwidth requirement. Level 7 cable can support multiple applications under one jacket and will support gigabit ethernet at 100 meters.

Guidelines

Home run 4 pair cable standards

- All cable installations must comply with EIA/TIA 568/569 standards and remain current with those standards
- Each Westinghouse cubicle will have 1 drop of 4 Category 5 wires
- 1 data pole will service 4 cubes (2 3/4 inch conduits and 8 wires per conduit)
- Non-standard cubicle configurations will be handled on a case by case basis
- Each hard-walled office will have a minimum of 2 drops of 4 each Category 5 wires depending on size
- Type of jack used - Lucent (formerly AT&T) Category 5
- Jacks in Westinghouse cubicles will be placed below the work surface level with 1-4-plex faceplate.

Zone Cabling Standards

- All cable installations must comply with EIA/TIA 568/569 standards and remain current with those standards
- 25 pair category 5 cable will be pulled from the closet to the zone patch panel
- 2 25 pair cables per 1 inch conduit
- Each Zone panel will be configured for a minimum of 4 drops per cube
- Type of jack used - Lucent (formerly AT&T) Category 5
- Category 5 patch cables will run from the zone patch panel to the desk top
- All testing must be done from the zone patch panel and overall length must not exceed 330 feet
- All station cable will be terminated on Lucent category 5 patch panels

Closet Standards

- The standard rack size is 19"
- Whether the rack is floor-mounted or wall-mounted depends on the size of the closet
- Horizontal and vertical wire management panels will be used in the racks and will be included in the vendor quote
- Ladder rack will be installed around the perimeter of the closet and from the wall to the racks. Racks will be bolted with J-bolts to the ladder rack and will be Bolted to the floor by the vendor
- Jacks will be labeled and documented in accordance with EIA/TIA 606 guidelines
- Closet size will be determined by total usable floor space. Each closet should be designed using the following as a guideline:
 - Space must be allocated for data equipment and growth

- All closets at should be a minimum of 10 x 20
- Walls should be covered with 3/4" fire-rated plywood
- Doors should be a minimum of 3 feet wide and 6'8" high. Doors should also be fire-rated
- Closet should be equipped with 1 30 amp 2 20 amp and 2 15 amp dedicated electrical circuits.
- If a ceiling or hard deck is installed, ventilation and air conditioning must be provided.
- Electrical wiring closets and data closets should be separated
- Closets should be located in a dry area and free from danger of flooding
- Closets should have tile or concrete floors

All Closets (IDF's) will be fit-up with the following:

- Minimum of 72 strands of fiber optic cable 62/125 multi mode
- Minimum of 200 pair copper feed cable Level 4 or higher

Patch cable standards

- Line cords will be RJ-45 and will be cut to fit and terminated by the vendor
- Yellow line cords will be used for voice in the closet
- Silver satin line cords will be used for the station drop (voice) in the cubicle or office.
- Blue line cords will be used for the data drop in the closet and for the station drop in the cubicle or office.

Cross Connect Field Standards

- Jumper wires should be routed through a ring run or around distribution posts when making connection between two blocks
- Ring runs for cross connect wire should be straight on horizontal or vertical and avoid running around corners where two walls meet when ever possible
- Jumper wires should be installed with a "Finger Loop" on at least one end to allow for tracing and removal
- All discontinued service on feed pairs to closets and station cables will be disconnected by physically removing cross connect wires when no longer in service

Terminal Cross Connect Wire

- White red for all data circuits
- Yellow Blue for all single line phones
- White Blue for all frame connection single line
- Red blue red orange for 4 wire digital phones
- White orange for single line digital phones

Tray Capacity

	40%	60%	80%
4x4 Inch Gutter	213 cables	320 cables	426 cables

Station count	50 stations	80 stations	106 stations
6x6 inch Gutter	480 cables	720 cables	960 cables
Station count	120 stations	180 stations	240 stations
8x8 inch Gutter	853 cables	1280 cables	1706 cables
Station count	213 stations	320 stations	426 stations

Documentation Standards

Contractor/Vendor must provide the following at the end of the project.

- Site plan with closet location
- Grid layout or Tray layout
- Current furniture layout
- Cable identification closet number /jack number
- Test results for all cable saved on a 3.5 floppy disk and turned over to the documentation team.

Switch Installation Checklist

- ❑ Available Rack Space in Data Closet, Switch Room, or Data Center for Switch, UPS, and Patch Panels.
- ❑ Available Fiber in Closet, Switch Room, or Data Center (generally two pair necessary for each Edge Switch, more pairs for Core and Distribution Layer Switches).
- ❑ 20 AMP power available in Closet, Switch Room, or Data Center. Emergency power available?
- ❑ 2200 APC UPS with proper back plate in Closets, 3000 APC UPS with proper back plate in Switch Rooms.
- ❑ Ethernet Port Count in a Closet/Switch Room to size Switch accordingly.
- ❑ Order Switch. Include Smart net maintenance contract. Verify cables, patch panels, etc. in stock. Order necessary supplies.
- ❑ Order fiber connections with facilities request.
- ❑ Who in EDS will handle IP address, subnet mask, and other protocol changes on desktop machines? Other protocol changes? Time to complete?
- ❑ Network Engineering/Support to investigate what subnets in use in a closet, meet with EDS to determine what new or existing VLANs to use on switch.
- ❑ Who will do wiring change to the switch in Closets, Switch Rooms? MAC crew, FOTI, or Network Support? Time necessary to complete?
- ❑ Schedule cutover date for the switch with appropriate personnel (wiring personnel, EDS, and Network Engineering/Support) and end-users - most likely off-hours.
- ❑ Place cutover date into Change Control with estimated outage time.
- ❑ Verify no transparent bridging or RIP on new segment. Other protocols to eliminate?
- ❑ Verify DHCP addresses setup to fit in double range (no need for 10.80 addresses).
- ❑ Switch, UPS, and Patch Panels (rack if necessary) installed by MAC crew, FOTI, or Network Support during normal business hours.
- ❑ Switch and Router configured by Network Engineering/Support during normal business hours.

- ❑ Label 48 port Patch Panels appropriately.
- ❑ Tools setup (Tools Group/Network Support) on switch and connections.
- ❑ Subnet addresses assigned for all Ethernet Cabling back to Data Closet/Switch Room.
- ❑ Meeting with all involved personnel (Project management, Network Engineering/Support, EDS, and wiring personnel) a few days prior to cutover for coordination of responsibilities.
- ❑ Cutover performed on assigned date by wiring personnel, EDS, and Network Engineering/Support.
- ❑ Test connectivity and tools operation.
- ❑ Disconnect and reclaim equipment (hubs, fiber jumpers, UPS, etc.) in Data Closet or Switch Room.
- ❑ Document fiber jumpers disconnected.

Port Card Labeling Cisco Switches

The labeling standard created in conjunction with the MAC crew and now implemented is to put the switch slot number (that the patch panel is connected to) on the 48 port patch panels. For example, if a patch panel is punched down to slot 5 on the Catalyst switch, the patch panel is labeled "Slot 5". Since there will only be one switch per closet, this should be sufficient. This is in addition to all of the labeling that the documentation team will do on the switch cards and chassis.

2.1.6 Transaction Processing Services

A key enabler of distributed client/server computing is a Distributed Transaction Processing (DTP) capability. DTP systems provide the services required to manage and process distributed transactions in a heterogeneous computing environment. Services provided may include the following:

- Concurrency control
- Failure isolation
- Dynamic load balancing
- Configuration management
- Message queue management
- Two-phase commit
- Transactional RPC

2.1.6 Transaction Processing Approval: IS Mgmt Status: Under review Name: Tim Avis				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
<i>Standard</i>			3 tier client/server	
<i>Products</i>		CICS Oracle Tuxedo	CICS Oracle	

2.1.7 *Operating Systems Services*

Operating system services provide the basic environment for running applications. These services consist of platforms and peripherals that exist as nodes within a network. This section discusses these topics, as well as issues concerning high availability.

2.1.7.1 *Platforms*

Platforms consist of operating systems and hardware components that provide the essential computing capabilities in an information system's architecture. Platforms generally include desktop computers, workstations, servers, host systems, and operating systems.

This section discusses platforms in the following contexts:

- Network Computers
- Desktop computers and Workstations
- Large-scale servers/computers
- Workgroup and Campus servers
- World Wide Web (WWW) Servers

2.1.7.1.1 *Network Computers*

The use of network computers is discouraged except for special requirements (i.e. factory floor, etc.)

2.1.7.1.2 *Desktop Computers and Workstations*

See IT Standards Group web site: <http://outpost.stortek.com/ITSG/title.asp>

2.1.7.1.3 *Large Scale Servers/Computers*

Guidelines

Select large-scale servers and that support standards-based network protocols.

- Multiple Virtual Storage (MVS) is supported while migrating to an open, standards-based platform. OpenEdition (Open MVS) provides these standards-based tools and capabilities. IBM has issued a directional statement for MVS to become XPG4 and SPEC1170 branded.
- Transaction Processing Facility (TPF) is a proprietary IBM operating system designed to meet the needs of applications that require high transaction rates, quick response time, and high availability, and that support a large terminal base.

2.1.7.1.3a Large Scale Server Operating Systems

2.1.7.1.3a Large Scale Server OS Approval: IS Mgmt Status: Approved Name: Randy Alford				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		Evaluate STK solutions	Evaluate STK solutions Posix compliance	Evaluate STK solutions Posix compliance
Products	VM UTS AIX	MVS OS390/Open Edition VM	OS390/Open edition	

2.1.7.1.3b Large Scale Server Hardware

2.1.7.1.3b Large Scale Server Hdw Approval: IS Mgmt Status: Approved Name: Randy Alford				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		Improve price/performance	Reduce upgrade costs SMP/CISC	MPP
Products	IBM ESxxxx (bipolar) FIPS channel	IBM 9672 (CMOS) ESCON channel	IBM CMOS SMP FICON channel	

2.1.7.1.4 NT Servers

2.1.7.1.4a Operating Systems

2.1.7.1.4a Campus Server OS Approval: IS Mgmt Status: Approved Name: Jerry Donza				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		Microsoft	-Microsoft	-Microsoft
Products		Windows NT4.0	Windows 2000	

2.1.7.1.4b Hardware

2.1.7.1.4b NT Server Hardware Approval: IS Mgmt Status: Update Required Name: Jerry Donza				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		Compaq	Compaq	
Products		Compaq ProLiant 6500 with Xeon processors for high end servers, ProLiant 1600 or 1850 for smaller tasks, less redundancy	Compaq ProLiant	

2.1.7.1.5 UNIX Servers

2.1.7.1.5a Operating Systems

2.1.7.1.5a Unix Server OS Approval: IS Mgmt Status: Approved Name: Jerry Donza				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard				
Products		Solaris 2.6, HP/UX 10.20 are latest versions (depends on application)	Solaris, HP/UX	

2.1.7.1.5b Hardware

1.1.7.1.5b Unix Server Hardware Approval: IS Mgmt Status: Approved Name: Jerry Donza				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard				
Products		SUN, HP	SUN, HP	

2.1.7.1.6 UNIX Server Implementation Standards

Reference this URL <http://gandalf/unix-nt-stds/unix2.html> to view the standards used by system administrators to deploy UNIX servers in a production environment throughout the StorageTek (STK) Boulder Country Campus. It is recommended that these standards be used globally.

2.1.7.1.7 World Wide Web (WWW) Infrastructure

1.1.7.1.7 World Wide Web Infrastructure Approval: IS MGMT Status: Approved 8/12/98 Name: Dick Mallot				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		NetScape	Microsoft	Microsoft
Products		NT 4.0 or greater IIS 3.0 or greater MTS	IIS 4.0 or greater	

2.1.7.2 Peripherals

Peripherals provide data access, storage, and connectivity in an information system. This section discusses three main topics:

- Online
- Nearline
- Storage Solutions

- Storage Management
- Storage Area Network
- Printers

2.1.7.2.1 *Online*

2.1.7.2.1 Online Peripherals <i>Approval:</i> IS Mgmt <i>Status:</i> Approved <i>Name:</i> Randy Alford				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
Standard		Evaluate STK solutions	Evaluate STK solutions	Evaluate STK solutions Network attached SAN storage
Products	DEC DASD SUN DASD RSA/REA Nordique FIPS channel SCSI OS interface	RVA RSA/REA Clarion <40G use commodity dasd but backup using STK solution IXFP / Snapshot ESCON FICON SCSI / Fibre OS interface	SVAA Open systems 9145/9153 FICON channel SCSI / Fibre OS interface	

2.1.7.2.2 *Nearline*

2.1.7.2.2 Nearline Peripherals <i>Approval:</i> IS Mgmt <i>Status:</i> Approved <i>Name:</i> Randy Alford				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
Standard		Demo STK solutions	Demo STK solutions	Demo STK solutions Network attached
Products	Twinpeaks Redwood Lago Wolfcreek FIPS channel SCSI OS interface	Powderhorn/TimberLine Wolfcreek, VSM FICON Fibre OS interface	Powderhorn 450 97XX 9840 VSM FICON Fibre OS interface	SAN storage

2.1.7.2.3 *Storage Solutions / Backup*

2.1.7.2.3 Storage Solutions <i>Approval:</i> IS Mgmt <i>Status:</i> Approved <i>Name:</i> Jerry Donza				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
Standard		Evaluate STK solutions	Evaluate STK solutions Virtualization of storage resources Shared resources	Evaluate STK solutions
Products	NearNet	CAM	Veritas, REEL	

2.1.7.2.4 Storage Management

2.1.7.2.4 Storage Management Approval: IS Mgmt Status: Approved Name: Jerry Donza / Randy Alford				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard			Evaluate STK and partner solutions, Cross platform solutions	Evaluate STK and partner solution, Network attached Outboard storage mgmt
Products		CAM, IXFP, HSC ACSLs, ExLM, ExVM SAMS: DISK, DF/HSM	CAM, IXFP, HSC ACSLs, ExLM, ExVM SAMS: DISK, DF/HSM, VxFS, VxVM	

2.1.7.2.5 Storage Area Network

2.1.7.2.5 Storage Area Network Approval: IS Mgmt Status: Under Review Name: Jerry Donza				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard				Evaluate STK and partner solutions
Products		Access Hub, 9145, Varitas	Access Controller, STK fibre channel disk, Varitas	

2.1.7.2.6 Printers

See IT Standards Group web site: <http://outpost.stortek.com/ITSG/title.asp>

2.1.8 User Interface Services

2.1.8.1 Graphical User Interfaces

Graphical user interfaces (GUIs) are preferred over character-based interfaces and block-mode (3270 type) interfaces because GUIs are more flexible and responsive to user needs. GUIs promote consistent user interaction across a wide range of applications. GUIs mask the complexity of the heterogeneous networked environment and facilitate the user's learning and navigation of the system.

Integrated Marketing has the responsibility for the corporate web "look and feel". The web site for Integrated Marketing is <http://imc.stortek.com/imc>.

2.1.8.1 Graphical User Interface Approval: IS MGMT Status: Approved Name: Linda Bellitt				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
<i>Standard</i>	• black mode • emulators	GUI	GUI Develop style guide	GUI
<i>Products</i>	3270 vt Xceed	Motif Windows MacOS X Emulators	Motif Windows	Motif Windows

2.2 Application Platform Cross-Category Services

Cross-category services extend over the operation of most, or all, of the Application Platform Service categories rather than appearing as a separate, modular service. The Application Platform Cross-Category Services have been consolidated in this section (to provide a coherent perspective of their functions):

- Security
- System and Network Management

2.2.1 Security Services

Security services minimize the vulnerability of information resources by authenticating subjects or users, authorizing access to resources, transporting information securely, and providing assurance that the systems comply with StorageTek security standards. The security function must be able to support and provide all mechanisms required of StorageTek security standards.

The current list of security technologies is divided into two service groups - enforcement and support. Enforcement technologies are those that create the secure environment. Support technologies are parts of background processes that support the secure environment; you need them, but resources are still secured without them.

2.2.1.1 Enforcement

2.2.1.1.1 Confidentiality, Integrity, Non-repudiation

Confidentiality ensures that classified information is not inadvertently accessed by any unauthorized entities or processes. Typical methods of implementation are document classification, manual document procedures, and encryption.

Integrity is assurance that information has been modified only by authorized entities or processes. Any information that has been modified by unauthorized entities or processes will be detected, and the appropriate action can be taken. Typical methods of

implementation are physical message protection (seals and locks), encryption, digital signatures, and virus control.

Non-repudiation provides sufficient proof to the receiver of information that the sender is the originator of the information; the sender cannot deny sending the information.

Encryption is a prerequisite for nonrepudiation. A typical method of implementation is the receipt acknowledgment function within a messaging system. Public key nonrepudiation solutions typically use digital signatures. A more advanced method of implementation is the Public/Private Key.

2.2.1.1.1 Integrity Approval: IS Mgmt Status: Approved Name: Jim Wamsley				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		MD4 , MD5, SHA (encryption algorithms)	Digital signatures	
Products		Borderguard, Microsoft bridgeheads		

2.2.1.1.1.1 Encryption

Encryption services provide the basis for confidentiality, integrity, and nonrepudiation of information. DES and Rivest, Shamir, Adleman (RSA) are industry-recognized standards. While a larger encryption key length reduces the risk of decryption, governmental agencies, particularly in the United States, place limits on key length and method of encryption. Encryption is a governmentally-sensitive technology. Exportation of encryption technologies is also regulated.

2.2.1.1.1.1 Encryption Approval: IS Mgmt Status: Approved Name: Jim Wamsley				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		IDEA, 3DES, DES, NSC1	IDEA, IPSEC	IPV6
Products		Borderguard		

2.2.1.1.1.2 Virus Control

The number of viruses in the world doubles every eight or nine months. Some viruses just replicate; others can cause serious damage or affect program and system performance. A virus should never be assumed harmless and left on a system. Anti-virus programs are the best way to protect against virus infection. Anti-virus software can aid in the removal of an infection, but can neither recognize nor determine the extent of the damage. Therefore, regular system and data backups are vital.

- Exchange servers check before receiving and sending.
- SMTP UNIX, FTP, HTTP does not check at this time.
- Desktop and servers check all files when reading and writing.

2.2.1.1.1.2.a Virus Control for Exchange Approval: IS Mgmt Status: Approved Name: Jim Frew				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard				
Products		ScanMail 2.51, Dr. Solomon for Europe	ScanMail	

2.2.1.1.1.2.b Virus Control for Desktop Approval: IS Mgmt Status: Approved Name: Joe Sobeski				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard			Push virus update files	
Products		McAfee	McAfee	

2.2.1.1.2 Identification

When users log on to a network, they must identify themselves to the security environment, and the security system must verify that the users are valid. The most common form of identification is the password, but new technologies such as tokens, smart cards, and biometrics offer more reliable and secure methods.

2.2.1.1.2 Identification Approval: IS Mgmt Status: Approved Name: Ron Sandstrom				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard	Keyboard usage	Passwords, BSNBG mobile users use smartcards, NT domain	Fingerprint recognition, smart cards, soft tokens, hard tokens	Retina scanning, Biometric, voice recognition, face recognition, signature recognition, hand geometry recognition
Products		Win NT OS		

2.2.1.1.3 Authentication

Authentication is the process of verifying the identification of a user or entity to protect against unauthorized access to a system or to the information it contains. User authentication may be accomplished using various methods such as user ID, password, digital signature, biometrics devices, challenge response devices, or smart cards. The authentication, regardless of the method used, should only be required once and should occur at logon, when signing on to the system or network, for example. The

authentication information should then be kept for the rest of the session and passed as necessary to permit access to other applications and systems. Many of the same technologies apply to authentication, authorization and access control.

2.2.1.1.3 Authentication Approval: IS Mgmt Status: Approved Name: Ron Sandstrom				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		LDAP, Radius, TACACS+	Kerberos, LDAP	PKCS, PKI, LDAP, CA, RSA, DS, DEN, Active Directory
Products		WIN NT OS/4.x, Solaris, HP, MVS		

2.2.1.1.4 Authorization

After a system identifies and authenticates a user, it looks in a table that lists the systems, resources, and projects for which the user is authorized and grants access as appropriate. The table entries are referred to as access control lists (ACLs). Unluckily, each computing system, database system, and application Security Technologies may require its own ACL. Other components, such as firewalls and software distribution tools, also maintain their own ACLs. Many of the same technologies apply to authentication, authorization and access control.

2.2.1.1.4 Authorization Approval: IS Mgmt Status: Approved Name: Ron Sandstrom				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		NIS, NIS+, NT domain	RADIUS/ TACACS, Kerberos, LDAP	Kerberos, LDAP, Active Directory, DEN
Products		ACF2, UNIX, Win NT OS	Cisco Secure, WIN2000	Cisco Assure, WIN2000

2.2.1.1.5 Access Control

Access control is the process of determining, prior to permitting access, whether a user or entity is authorized to use a system, network, or resource. Access control also deters attempts to gain unauthorized access. The scope of access control can be limited to resources within a domain or can be extended to resources that span multiple domains. Many of the same technologies apply to authentication, authorization and access control.

2.2.1.1.5 Access Control Approval: IS Mgmt Status: Approved Name: Ron Sandstrom				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		RADIUS/ TACACS, NT domain	RADIUS/ TACACS, Kerberos, LDAP	Kerberos, LDAP, Active Directory, DEN
Products		ACF2, Win NT OS	Cisco Secure, WIN2000	Cisco Assure, WIN2000

2.2.1.1.5.1 VPN

A Virtual Private Network is a network that operates through a public network, such as the Internet, and is accessed only by individuals or groups who “subscribe” to that VPN. The combination of a private network operating via a larger, public network is analogous to a private “tunnel” that goes through the Internet.

2.2.1.1.5.1 VPN Approval: IS Mgmt Status: Under review Name: Ron Sandstrom				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		IDEA, NSC1		
Products		NetSentry Remote, Borderguard		

2.2.1.2 Security Support Services

2.2.1.2.1 Audit

Audit services provide the authorized control and protection of the audit trail, the recording and dissemination of security-relevant events involving resources, and the management and inspection of the audit trail. Security products that produce audit trails should be built to support continuous availability, configurable audit events, and electronic alarm reporting. Audit services also include tools that analyze and generate reports from the audit trail.

2.2.1.2.1 Audit Approval: IS Mgmt Status: Under review Name: Jim Wamsley				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard				
Products		Log host files from routers		

2.2.1.2.2 Administration

Administration is the process of creating, maintaining, and monitoring security information such as access control policies, authorized user profiles, security parameters, and ownership identification. The resource owner, delegated custodian, or authorized group performs this function.

2.2.1.2.2 Administration Approval: IS Mgmt Status: Approved Name: Ron Sandstrom				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard				
Products		Admin tool for Solaris, User Manager for NT		

2.2.1.2.2.1 Configuration management

Configuration management is the process of controlling change.

2.2.1.2.2.1 Configuration management Approval: IS Mgmt Status: Approved Name: Jim Wamsley				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard				
Products		Ciscoworks	Ciscoworks	

2.2.1.2.2.2 Intrusion Detection

Security intrusion or event detection is a new product category. These tools identify sequences of events, such as failed logins or patterns of error packets, as indicating an attempted break-in. As systems for event and health management have developed, concern for seeing the security environment in real time not from a policy base but from an execution base has increased. As a system is running, security management is concerned with the following questions:

- What is happening in my system right now?
- Is somebody trying to break into my system right now?

The answers to these questions are not easy to find. Detecting events in real time is based on discriminating between appropriate and inappropriate behavior both at domain perimeters and at individual server systems. However, the typical hacker exhibits a pattern of behavior that may be recognizable. The hacker may dial in or connect by some method and try a user ID and password combination that fails.

2.2.1.2.2.2 Intrusion Detection Approval: IS Mgmt Status: Approved Name: Ron Sandstrom				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard				
Products		Event logs from the firewall		

2.2.1.2.3 *Electronic Commerce*

Electronic Commerce is the paperless exchange of business information using EDI, e-mail, or Electronic Funds Transfer (EFT). It encompasses payment systems analogous to traditional credit cards and checks. Recently, the Internet has been used as the platform for electronic commerce. The most prominent protocols developed to provide security within Internet Commerce are Visa-MasterCard Secure Electronic Transaction (SET), Secure HyperText Transport Protocol (S-HTTP), and Netscape's Secure Socket Layer (SSL).

2.2.2 *Systems and Network Management Services*

Systems management supports procedures and tools that maintain the integrity and efficiency of IT resources. The procedures and tools ensure proper planning, configuring, and problem handling of the IT resources. Network management, resource management, systems administration, and security systems all fall within the scope of systems management.

Systems management is also beginning to include support for services delivered across resources. This increased scope reflects the need to manage activities that cross technology domains and enterprises boundaries and to correlate users' perceptions with the status and capabilities of delivery systems.

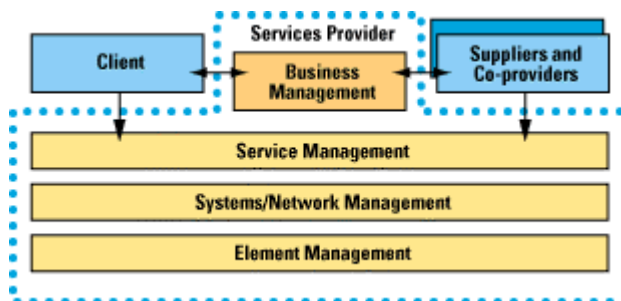


Figure 2

As shown in Figure 2, the Systems Management Model contains a dotted line surrounding four management layers, representing the organizational and infrastructure boundary between the service provider and the client, and other suppliers and co-providers. In this

model, a co-provider may act as a supplier or an outsourcer for the service provider, but also has a direct relationship with the client.

The *Business Management* layer focuses on business issues and relationship, while the *Service Management* layer is concerned with the delivery of the IT services to the client. Service Management also facilitates the day-to-day activities and exchanges with the suppliers and co-providers.

The *Systems/Network Management* layer provides the more traditional means to monitor and manage platforms and networks, while the *Element Management* layer provides technology-specific monitor and control capabilities.

The purpose of this model is to insure that activity within the lower layers support and supplement the activities of the upper layers. By the same token, higher layer processes should dictate the requirements for the lower layer processes. Over time, this promotes management capabilities that are focused on the client rather than the technology.

2.2.2 System / Network Management Approval: IS Mgmt Status: Approved Name: Marti Stahlman				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard	Shareware	Platform specific tools	X/Platform tools	
Products		Network: SUNnet Manager Optivity Cisco Works Netmetrix ISICAD Netview Platform: BMC Patrol Omegamon InfoPac JobTrak RunTrak OPSMVS	Network: HP Openview RMON2 Platform: BMC Patrol Omegamon InfoPac OPSMVS Remedy Autosys CommandPost	Microsoft Management Console, Cisco works

Section 3 - Computer Supported Cooperative Work Technologies

Computer Supported Cooperative Work (CSCW) technologies, or work group computing, take advantage of personal computing and office automation by offering information sharing across an enterprise. With these technologies, personal computing is shifting toward work group computing. Emerging CSCW applications, combined with technology advances, provide an environment that allows business processes to be redesigned regardless of geographic, organizational, or software boundaries.

3.1 Groupware

Groupware addresses the need to facilitate and improve the unstructured communication processes in an organization. These applications include collaborative authoring,

document sharing, and shared databases. The term *groupware* is generally defined as “computer-based systems that support groups of people engaged in a common task (or goal) and that provide an interface to a shared environment.”

3.1 Groupware Approval: IS Mgmt Status: Under review Name: Rob Shepard				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
<i>Standard</i>		Microsoft	Microsoft	Microsoft
<i>Products</i>	Lotus Notes	MS Exchange Outlook 98 Office 98	MS Exchange Outlook Platinum Office 2000	

3.2 Workflow Management

Workflow management applications are designed to handle a document through the stages of processing, presentation, and routing. Normally, documents are routed through an e-mail message handling system to designated people or applications. Typical uses include processes such as purchase orders and sales leads tracking. These applications are often viewed as the best use of technology that makes business processes more productive. The complexity of the business process determines the degree to which workflow automation can be deployed in a cost-effective manner.

3.2 Workflow Management Approval: IS Mgmt Status: Under review Name: Rob Shepard				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 1998-2000</i>	<i>Emerging 2003-2004</i>
<i>Standard</i>		Microsoft	Evaluate workflow	
<i>Products</i>	Interleaf RDM	MS Exchange, SAP	MS Exchange, SAP	

3.3 Application and Data Sharing

Data sharing tools allow two people with the same desktop application to share a document (spreadsheet, graphic, or text) and to collaborate on changing that document. Individuals can annotate or change the document, with the results available to both parties. Low bit-rate standards such as ITU-T H.324 will enable data sharing over low speed (14.4 or 28.8 Kbps) modems. Typically, the initiator of the data sharing session will retain the ability to allow or disallow participants to gain control of the screen to make changes. Multipoint data sharing applications allow more than two people to collaborate on documents.

3.3 Application and Data Sharing Approval: IS Mgmt Status: Approved Name: Rob Shepard				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		Microsoft	Microsoft	Microsoft
Products		Office 97	Office 2000	NetMeeting

3.4 FAX

Outbound fax has been standardized based on pilots run by the Exchange administrators group. The implementation includes server and client standards. Outbound is being used for SAP and is available for the desktop where Exchange administrators have configured the fax service. All the components are capable of supporting inbound although several questions remain concerning the implementation of mapping inbound fax documents to email addresses. When business requirements dictate, an implementation pilot will be required to determine the inbound configuration that will likely involve PBX modifications.

3.4 FAX (outbound, SAP) Approval: IS Mgmt Status: Approved Name: Ron Sandstrom				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		Faxing from the desktop	Faxing to the desktop	
Products		Fax Sr. by Omtool – uses Outlook client	Fax Sr. by Omtool – uses Outlook client	

3.5 Computer Telephony

Computer Telephony is the adding of computer intelligence to the making, receiving, and managing of telephone calls. Computer Telephony can be broken into three broad categories:

- Messaging — voice, fax, e-mail, and unified messaging
- Transaction processing — Interactive Voice Response (IVR), customer access to enterprise data, and processing of call requests without human intervention
- Intelligent phone calls — Inbound and outbound call handling, “Predictive” and “Preview” dialing, information-based call routing, dialog box with customer information, and virtual (geographically distributed) call centers

3.5.1 Computer Telephony Integration (CTI)

CTI is the adding of intelligence to phone calls by combining two of the most commonly used business tools: the computer and the telephone. The integration of computers, networks, and Private Branch Exchange (PBX) switches adds intelligence to incoming calls by routing the call to the best person and delivers information about the caller to the person receiving the call. Additional intelligence is added to outgoing calls by placing the

call without any human intervention and providing automatic call back, initiation of workflow, guaranteed quality of service for customers, and sophisticated tracking of work.

3.6 E-Mail

Electronic mail (e-mail) message handling systems are integral to enterprise computing strategies. Standardizing on one e-mail product for a client maximizes user satisfaction and productivity.

3.6 E-mail Approval: IS Mgmt Status: Approved Name: Jerry Donza				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
<i>Standard</i>		Microsoft SMTP	Microsoft SMTP	Microsoft
<i>Products</i>		Microsoft Exchange 5.5 Outlook 98	MS Exchange Outlook Platinum	

3.7 Calendaring Systems

Suppliers such as Digital and IBM have provided calendaring and scheduling functionality in mainframe products for at least 10 years. In the mid- to late-1980s, as the use of local area networks (LANs) increased, LAN-based calendaring and scheduling systems proliferated. The primary benefits include reducing the time needed to schedule meetings and identifying and reserving all required resources, including people, conference rooms, and equipment.

3.7 Calendaring Systems Approval: IS MGMT Status: Approved Name: Rob Shepard				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
<i>Standard</i>		Microsoft	Microsoft	Microsoft
<i>Products</i>		Schedule + Outlook 98	Outlook Platinum	

3.8 Group Decision Support Systems

Group Decision Support Systems (GDSSs) are designed to increase the effectiveness of meetings. GDSSs are not limited to technologies that support same time-same place interaction. GDSSs support any collaboration. This support includes electronic meetings that can be different time-different place, different time-same place, or same time-different place.

3.8 Group Decision Support Systems Approval: IS Mgmt Status: Approved Name: Rob Shepard				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
<i>Standard</i>				
<i>Products</i>		Team Expert Choice	Team Expert Choice	

3.9 Videoconferencing and Whiteboards

Videoconferencing enables people at different sites to conduct face-to-face meetings in real time. Current videoconferencing equipment options range from stationary systems installed in dedicated videoconferencing rooms to portable units. In addition to voice and video, videoconferencing systems may incorporate equipment to allow sharing of graphics and electronic documents.

3.9 Video Conferencing Approval: IS Mgmt Status: Approved Name: Butch Walb				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
<i>Standard</i>	Non – H.320 compliant systems	ISDN - BRI, H.320	ISDN Tri- BRI, H.320	Desktop, H.323
<i>Products</i>		PictureTel, Latitude NetMeeting Server (internal conferences)	PictureTel, Latitude NetMeeting Server (internal conferences)	

3.10 Query / Reporting Tools

The following standards were derived from the One Source European Team (OSET) to tactically deliver European End-User reporting requirements.

3.10.1 Ad Hoc Query Tools

3.10.1 Ad Hoc Query Tools Approval: IS Mgmt Status: Approved Name: Barb Collum				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
<i>Standard</i>		Brio	Brio	
<i>Products</i>		Brio Query Brio Insight Brio QuickView Brio Enterprise Server (On Demand, Broadcast), Crystal Reports (limited)	Brio Insight Brio QuickView Brio Enterprise Server (On Demand, Broadcast), Crystal Reports (limited)	

3.10.2 Search Engines

3.10.2 Search Engines Approval: IS Mgmt Status: Approved Name: Dick Mallot				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
Standard				
Products	Freeware Verity	Excalibur	Excalibur	

3.11 Applications Development and Management

3.11.1 Methods

3.11.1.1 Methodology

3.11.1.1 Methodology Approval: IS MGMT Status: Approved Name: Ginger Railsback				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
Standard				
Products		Project Engineer 8.6 LBMS – (PPC)	Project Engineer 8.6 LBMS – (PPC)	Project Engineer LBMS – (PPC)

3.11.2 Tools

3.11.2.1 Web Development Tools

3.11.2.1 Web Development Tools Approval: IS Mgmt Status: Approved Name: Dick Mallot				
	Avoid	Current 2000	Direction 2001-2002	Emerging 2003-2004
Standard		COM compliant	COM compliant	
Products		Front Page Visual J++, C++, Visual Basic, InterDev	Front Page Visual J++, C++, Visual Basic, InterDev	

3.11.2.2 Application Profile

The application profile should be a repository for all the profile information about an IS application as it is created and deployed. This information is frequently requested by other IS groups for support and capacity management questions. Due to a lack of an owner, this repository is populated with old information and is only available to the old application support group and the server consolidation team.

Information that would be useful in the repository:

- Network – transactions per week, size of transactions, data distribution information, frequency of updates
- Operations Requirements – coverage hours, reboot instructions
- Server Information – CPU size, memory, O/S version
- Client Requirements – O/S version, disk space, memory
- Application Information and History – implementation architecture, modifications with dates
- Application Customers – location of customers, line of business
- Used to notify customers when servers going down – track which apps on what servers

3.11.2.3 Source Code Repository

After an extensive review of the source code management (SCM) tools currently available, the Advanced Technology Group formally standardized a tool set for high and low end development needs. PVCS Version Manager was chosen and it should be no surprise as it supports IS's previous de facto standards for high-end SCM projects.

Version control and version control software are critical facets of team software development. Version control can prevent users from accidental file loss, add security and encompasses some configuration management functionality among other benefits.

Projects using highly customized, built in SCM tools like SAP should continue to utilize those tools and most projects should continue to use less sophisticated tools including Microsoft's VSS, Unix SCCS, and Unix RCS for low level versioning, to support check-in/check-out, and audit functions.

Projects requiring higher level and more robust functionality should use PVCS Version Manager. PVCS supports sophisticated functionality including parallel development, geographically dispersed development, repeatable builds, and release management.

In-depth discussion about the evaluation of PVCS Version Manager can be read on the following link: <http://reckless/atg/ArchPlan/Techeval/Source Code Repository SCM/ACES Source Code Repository Recommendation.doc>

More information about the Advanced Technology Group is available on the ATG Home Page: <http://reckless/atg/>

3.11.2.3 Source Code Repository <i>Approval:</i> IS Mgmt <i>Status:</i> Approved <i>Name:</i> Steve Reighley				
	<i>Avoid</i>	<i>Current 2000</i>	<i>Direction 2001-2002</i>	<i>Emerging 2003-2004</i>
<i>Standard</i>		SCC interface	SCC interface	
<i>Products</i>		PVCS Version Manager, VSS, RCS, SCSS	PVCS Version Manager, VSS, RCS, SCSS	More robust configuration management tools

