

COMMONWEALTH OF VIRGINIA



Information Technology Resource Management Standard

NETWORKING, TELECOMMUNICATIONS, AND CABLING STANDARD

Department of Technology Planning

Preface

Publication Designation

COV ITRM Standard NET2001-01.1

Subject

Networking, Telecommunications, and Cabling

Effective Date:

December 7, 2001

Supersedes

COV ITRM Standard 96-1, Telecommunications
Cabling, dated January 26, 1996

Scheduled DTP Review

One (1) year from effective date

Authority

Code of Virginia, § 2.2-226
(Powers and Duties of the Secretary of
Technology)

Code of Virginia, § 2.2-2651
(Powers and Duties of the Council on
Technology Services)

Code of Virginia, § 2.2-1701
(Powers and Duties of the Department of
Technology Planning)

Code of Virginia, § 2.2-1303
(Powers and Duties of the Department of
Information Technology)

Scope

This standard is applicable to all state agencies and institutions of higher education (hereinafter collectively referred to as "agencies") that are responsible for local and wide-area networking, telecommunications, or related cabling between or within state-owned or state-leased buildings. This standard is offered as guidance-only to local government entities.

Purpose

Effective telecommunications and networking cannot be accomplished without adherence to standards. Infrastructure costs cannot be contained without adherence to sound installation and management practices. To ensure that future

communications and connectivity needs of agencies are met in a cost-effective manner, this document confirms the Commonwealth of Virginia's support for ANSI TIA/EIA and IEEE (Institute of Electrical and Electronics Engineers) standards for telecommunications and delineates required practices. The Telecommunications Industry Association (TIA) develops standards for cables. The Electronics Industry Association (EIA) focuses on physical device standards such as RS232D. ANSI is the American National Standards Institute. This group approves standards as having been properly developed.

Objectives

To explain the interplay of industry-supported standards, Virginia laws, Governor's Executive Orders, and sound enterprise business practices in providing an architectural foundation for telecommunications and networking in Virginia's agencies.

To provide agency requirements related to networking and telecommunications infrastructure development, maintenance and administration.

To provide agency requirements related to local and wide area network services provision.

General Responsibilities

In accordance with the *Code of Virginia*, the following provisions apply:

Secretary of Technology

Responsible for:

- Directing the formulation and promulgation of policies, standards, specifications, and guidelines for information technology in the Commonwealth, including, but not limited to, those (i) required to support state and local government exchange, acquisition, storage, use, sharing, and distribution of geographic or base map data and related technologies and (ii) concerning the development of electronic transactions including the use of electronic signatures as provided in § [59.1-496](#).
- Directing the establishment of statewide standards for the efficient exchange of electronic information and technology,

including infrastructure, between the public and private sectors in the Commonwealth.

Council on Technology Services (COTS)

Responsible for :

- Advising and assisting the Secretary of Technology in exercising the powers and performing the duties conferred.

Department of Technology Planning (DTP)

Responsible for:

- Assisting the Secretary of Technology in the development of statewide policies affecting technology at all levels of government, in the business sector, and among the general citizenry.
- Developing and promulgating policies, standards, and guidelines for managing information technology in the Commonwealth.
- Developing statewide standards for the efficient exchange of electronic information and technology, including infrastructure, between the public and private sectors in the Commonwealth.

Department of Information Technology (DIT)

The Department shall have the following powers and duties concerning the planning, budgeting, acquiring, using and disposing of communications equipment and services:

- To formulate specifications for telecommunications, automated data and word processing, and management information systems.
- To analyze and approve all procurements of interconnective telecommunications facilities, telephones, automated data and word processing, and other communications equipment and goods.
- To review and approve all agreements and contracts for communications services prior to execution between a state agency and another public or private agency.

- To develop and administer a system to monitor and evaluate executed contracts and billing and collection systems.
- To exempt from review requirements, but not from the state's competitive procurement process, any state agency which establishes, to the satisfaction of the Department, (i) its ability and willingness to administer efficiently and effectively the procurement of communications services or (ii) that it has been subjected to another review process coordinated through or approved by the Department.

All State Agencies

Responsible for:

- Cooperating with the Secretary of Technology, the Department of Information Technology, and the Department of Technology Planning in the performance of their powers and duties; and
- Complying with the Department of Technology Planning's policies, standards, and guidelines for information technology resources in the Commonwealth.

Definitions

Networking means any local, wide-area, metropolitan-area or campus network established for use by agencies of the Commonwealth.

Telecommunications means any transmission, emission, or reception of signs, signals, writings, images, and sounds, or information of any nature by wire, radio, visual, optical, or other electromagnetic systems.

Cabling means physical transmission medium and related equipment including wire, optical, or other physical cable that supports the physical network layer.

Related COV ITRM Policies, Standards, and Guidelines

COV ITRM Policy NET2001-01.1, Networking and Telecommunications

COV ITRM Guideline NET2001-01.1, Networking, Telecommunications, and Cabling

Table of Contents

Background.....	1
Approach.....	1
Reviews.....	1
Statement of ITRM Requirements for Networking, Telecommunications and Cabling	1
Physical Network Layer Requirements (Cabling).....	1
Data Link Layer Requirements (Media Access and Data Link).....	5
Network and Transport Layer Standards (network addressing protocols and transport protocols)	5
Network Related Requirements Involving “Application Layers” (Session, Presentation, and Application Layers).....	6
Other Related Administrative Procedures	6
Resources	6
Requesting Waivers to Requirements.....	9
Glossary	11
Appendix A: Waiver.....	12
Appendix B: Assignment of Uniform Alphanumeric Publication Designations for all Policies, Standards, and Guidelines	13

Background

Earlier Commonwealth telecommunications standards and guidelines focused on building wiring. The COV ITRM Standard NET2001-1.1 addresses expanded requirements in all areas of networking and telecommunications. These expanded requirements emanated from the work of the Enterprise Architecture Network Domain team. This team had state agency, local government, and higher education members.

Approach

This document will provide: 1) a listing of the telecommunications, networking, cabling and administration requirements adopted by the Commonwealth; 2) reference materials and Web sites related to the requirements; and 3) a general discussion of how state agencies would typically address the requirements. ANSI TIA/EIA standards and IEEE standards referenced herein are adopted in both their present state and as amended or replaced unless otherwise indicated in the statement of Information Technology Resource Management (ITRM) requirements provided below. Every effort will be made to ensure that these requirements are reviewed annually. Whenever TIA/EIA or IEEE introduce major modifications, this will trigger a midyear review of requirements by the Department of Technology Planning. As reviews are conducted, the review dates and recommended modifications will be added to this document.

Reviews

Revisions are anticipated within six months of the release date to accommodate the adoption of Category 6 cabling standards by TIA/EIA. Also, towards the end of 2001, TIA/EIA is expected to release new cable administration standards. A full review of the COV ITRM Standard NET 2001-1.1 is anticipated within one year of the release date.

Statement of ITRM Requirements for Networking, Telecommunications and Cabling

The following ITRM requirements for state agencies address various aspects of providing and managing the infrastructure needed to ensure effective voice, data, and video telecommunications services in the Commonwealth. This infrastructure is a critical resource needed to conduct the business of the Commonwealth. Requirements are discussed using the telecommunications and networking reference layers of the Open Systems Interconnect Seven Layer Model, also called the OSI model and the TCP/IP stack layers.

Physical Network Layer Requirements (Cabling)

The physical network layer addresses signal transmission media, connectors, and related devices. The Commonwealth of Virginia bases its physical layer cabling standards on the

2000 and 2001 releases of TIA/EIA 568-B.1, B.2, and B.3 (i.e., the second release of ETIA/EIA 568 divided into parts 1, 2, and 3).¹

Requirement 1) Agencies must install standards-based structured cabling systems for telecommunications. Agencies must employ standards-based designs, topologies, components, distances, installation methods, cable testing, and cable administration whether for cabling in new construction, for cabling plant additions or modifications, or for building renovations and additions. Also, agencies must require standards-based infrastructure installations in leased space. All minimum requirements or mandatory criteria addressed in TIA/EIA 568-B.1, 2 and 3 must be met unless exceptions are noted in this document.

The three TIA/EIA standards are discussed in more detail below:

- TIA/EIA-568-B.1, Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements. This TIA/EIA standard addresses cabling infrastructure design, installation and field testing for horizontal cabling, backbone cabling, and work areas. It also covers requirements for telecommunications rooms, equipment rooms, and entrance facilities. The TIA/EIA standard is used in conjunction with local electrical codes and standards to provide an appropriate cabling plant.
- TIA/EIA-568-B.2, Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted Pair Cabling Components, addresses specifications for horizontal 4-pair cables and backbone multi-pair cables and components. Both Category 5e and Category 3 cable specifications and laboratory testing are addressed. Field tester specifications and additional field testing requirements are incorporated into this document.
- TIA/EIA-568-B.3, Commercial Building Telecommunications Cabling Standard, Part 3: Optical Fiber Cabling Components Standard, addresses multi-mode (50/125 μm and 62.5/125 μm) and single-mode fiber optic cabling components, transmission standards, and field testers.

The Commonwealth of Virginia requires one major modification to the TIA/EIA cabling standards. In the TIA/EIA standards, category 3 cable is permitted (see EIA/TIA 568-B.1). However, Virginia does not permit new installations of Category 3 horizontal cable without a waiver. For new installations, Virginia allows only tested, category 5e cabling and parts. Using category 5e horizontal cable as a base standard will enable a consistent

¹ These standards are also called TIA/EIA 568-1, 568-2, and 568-3. These standards are not to be confused with T568A and T568B, which address eight position jack pin pair assignments and appear as Figures 1 and 2 in the revised TIA/EIA-568-B.2. TIA/EIA 568-B standards supersede the following: EIA/TIA 568-A, 568-A Addenda 568 A-1 through 568 A-5, TSB67, TSB72, TSB75, TSB95, and TIA/EIA/IS729.

upward migration path for agencies, ensure high bandwidth transmission capabilities over copper, and provide progress towards viable gigabit connections to meet future needs.²

Requirement 2) Agencies are to provide a minimum of certified Category 5e cable when installing new or replacement telecommunications cabling. In a typical office, two or more outlets would be provided with the first outlet having a Category 5e connection and the second, Category 5e or fiber.

Categories 6 and higher cabling practices are not recognized by the Commonwealth at this time. These cabling options will receive additional consideration by the Commonwealth when TIA/EIA standards have been adopted and when cost effective vendor solutions have been provided. Agencies that have installed a version of category 6 cabling prior to the promulgation of NET 2001-01.1 standard are to notify DTP of the scope of their installation and the vendors used if the installation is not fully backwards compatible with category 5e cabling and fully compliant with category 5e performance tests.

Regarding eight position jack pin/pair assignments, Virginia chose to adopt the T568A standard in its 1996 publication of cabling standards for the Commonwealth. T568A is the pin/pair standard followed by the federal government and recommended by TIA/EIA. The T568B standard is widely used by commercial enterprises and in education. T568B is only called for by the standards “if necessary to accommodate certain 8-pin cabling systems”. Virginia agencies are cautioned to be aware of this difference and to continue the pin/pair assignment that is in place within their facilities. If using the T568B standard, agencies should apply for a waiver. (See Appendix A.)

Requirement 3) Virginia agencies are required to implement the eight-position jack pin/pair assignment designated as T568A.

EIA/TIA 568-B also addresses fiber optic cabling. The revised TIA/EIA-568-B.3 standard adds the 50/125 micron fiber type, permits all connector types that are designed to organize and manage the fiber in pairs and that are the subject of a FOCIS document³, incorporates performance standards for connectors, and specifies connecting hardware requirements. The changes follow *de facto* standards. Virginia standards do not presently address fiber.

The cabling requirements noted above are not intended to hasten the replacement of existing cabling plants that do not meet referenced standards. Agency business requirements should drive replacement decisions. Requirements are also not intended to

² Category 6 cabling standards are presently anticipated by the end of 2001. The Category 6 standard has been referenced both as TIA/EIA 854 and as addendum TIA/EIA 568-B1.1. Category 7 standards are expected in late 2001 also. Presently, complete standards are available only for Category 5e. Currently available Category 6 implementations are based on proprietary protocols. The costs and benefits of Category 6 versus Category 5e cannot be determined at this time. The costs of fiber are decreasing rapidly.

³ FOCIS means Fiber Optic Connector Intermateability Standard.

thwart research in telecommunications and distance learning by institutions of higher education.

Also related to the physical layer is the TIA/EIA standard that specifies requirements for pathways and spaces traversed by telecommunications cabling. TIA/EIA 569-A-1998, Commercial Building Telecommunications Pathways and Spaces, provides requirements geared to the average office situation. This information is to be used by state agencies for the design and implementation of appropriate telecommunications system pathways and telecommunications rooms for both state owned facilities and leased space. TIA/EIA 569-A deals with floor, ceiling, and perimeter pathways, conduit, pull boxes, tray sizes, closet sizes, and other aspects of routing cable throughout and between buildings. Areas discussed in this TIA/EIA standard include work areas, horizontal pathways, backbone pathways, wiring closets, equipment rooms, and entrance facilities. Specifications ensure that proper pathways and minimum space requirements support cable protection and cable maintenance activities.

Requirement 4) Virginia agencies are expected to provide appropriate pathways and spaces for telecommunications cabling and equipment by implementing the recommended minimum requirements in standard TIA/EIA 569-A, Commercial Building Telecommunications Pathways and Spaces, and all related addenda for state offices that have an average office density (one office per 100 square feet). Pathway and room size requirements must be adjusted for higher and lower densities of telecommunications outlets or equipment than is expected in the average situation.

Virginia agencies are required to meet more stringent floor loading specifications than those provided in TIA/EIA 569-A. The following is substituted for TIA/EIA 569-A floor loading requirements:

Requirement 5) Floor loading capacity in the equipment room shall be sufficient to bear both the distributed and concentrated load of the installed equipment. The capacity for distributed loading shall be greater than 1220 kilograms per square meter (813 pounds per square foot). The capacity for a concentrated load shall be greater than 450 kilograms per square meter (300 pounds per square foot).

The final physical layer requirement for Virginia agencies deals with grounding and bonding. Again, Virginia agencies are to follow TIA/EIA standards.

Requirement 6) All Virginia agencies must follow grounding and bonding requirements specified in TIA/EIA 607-1994, Commercial Building Grounding and Bonding Requirements for Telecommunications.

TIA/EIA 607 provides grounding and bonding specifications for telecommunications circuits and equipment. A ground provides conduction from each circuit or piece of equipment to the earth. Proper grounding reduces shocks and damage to equipment. Bonding refers to the connections between or bridging of two parts of a ground.

Note: TIA/EIA physical layer standards are generally used in conjunction with local building code.

Data Link Layer Requirements (Media Access and Data Link)

The data link layer deals with the methods used to access the physical media. Most agencies use some combination of Ethernet and switched Ethernet to access their media to transmit data and perhaps voice or video over their telecommunications networks. A small number of agencies use token ring methods. The standards that address Ethernet and Token Ring are the IEEE 802 series of standards⁴. Virginia requires that agencies standardize on access methods.

Requirement 7) Agencies changing their LAN services must migrate to a minimum Virginia standard of IEEE 802.3 Fast Ethernet (100 Mbps Switched Ethernet) or to a higher bandwidth Ethernet service (802.3 Full duplex Fast Ethernet, 802.3ab Gigabit Ethernet over copper, Fast EtherChannel (a transitional proprietary Cisco solution providing up to 400Mbps of service), or 802.3z Gigabit Ethernet over fiber).

What is required of agencies is the use of an access method within the above specified migration path depending on their particular bandwidth needs. Agencies are not required to know the details in the IEEE 802.3 standard.

Requirement 8) Agencies acquiring new Data Link Layer (e.g., Layer 2) switches must ensure that the switches are manageable with SNMP⁵.

Network and Transport Layer Standards (network addressing protocols and transport protocols)

OSI layers 3 and 4 are the network and transport layers. These layers are required to connect to the outside world (e.g., beyond the LAN or metropolitan area network). The network layer is involved with the address of the outside computer, and the transport layer is involved with setting up the type of connection requested. Virginia requirements specify that the protocols to be used by agencies for addressing and transporting must be IP and TCP/UDP (i.e., the middle layers of the TCP/IP protocol stack).

Requirement 9) All agencies must ensure that each agency local area network (LAN) node and LAN segment may be accessed using IP addressing no later than December of 2003. Agencies that do not currently provide IP addressing must develop plans to ensure this accessibility.

Requirement 10) Agencies must employ TCP/IP as standard transport and addressing protocols for all routed transmissions. Agencies establishing new and replacement

⁴ IEEE 802 standards may be downloaded free of charge at: <http://standards.ieee.org/getieee802/>. Knowledge of these standards is not required of agencies. These standards define how the access methods works. Click terms and conditions at the aforementioned site to begin the download process.

⁵ SNMP is Simple Network Management Protocol. See Requirement 12.

connections to external business partners, local governments, and state agencies must employ TCP/IP. If other protocols are used as a transitional strategy, when routed, these protocols must be tunneled through TCP/IP.

Network Related Requirements Involving “Application Layers” (Session, Presentation, and Application Layers)

Management and administration of telecommunications infrastructure is a critical part of providing telecommunications services. Both ANSI TIA/EIA and the TCP/IP protocol stack come into play in addressing administration standards.

Requirement 11) All agencies must employ Simple Network Management Protocol (SNMP) compliant device management. SNMP is a protocol that enables management information for a network element such as a switch to be inspected by a remote user.

SNMP is defined by RFC 1157⁶. SNMP provides a set of rules for automated device management. Many vendors provided administration tools that use these methods and protocols. The device must also be able to communicate with the tools. SNMP is generally considered to be in the TCP/IP protocol suite.

Other Related Administrative Procedures

TIA/EIA 606 addresses the labeling of the cabling infrastructure using a uniform administration scheme that can be adopted by vendors. This enables the scheme to remain constant even though the user may change vendors, cable installation contractors, or cable management personnel. The standard addresses such requirements as cable labels must be legible, labels must be attached at appropriate points, splices, and intervals, labels must be well attached, and labels must be protected from the environment.

Requirement 12) All agencies must employ methods for administering telecommunications infrastructure that are compliant with ANSI TIA/EIA 606-1993, Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.

Resources

Virginia agency personnel involved in IT procurement, facilities management, or IT administration may wish to acquire ANSI standard documentation. These documents may be purchased from Global Engineering Documents. Often, several related standards are available as a topic set (e.g., the cabling set). Website and other contact information for Global Engineering are provided below:

⁶ RFC 1157 may be read at <http://www.ietf.org/rfc/rfc1157.txt?number=1157>. This memo defines a simple protocol by which management information for a network element may be inspected or altered by logically remote users.

Global Engineering Documents: <http://global.ihs.com/>
15 Inverness Way East
Englewood, CO 80112
800-854-7179 or 303-397-7956.

IEEE 802 standards are available for free download and may be obtained at the following link: <http://standards.ieee.org/getieee802/>.

Information available from vendors may be of considerable use to those agencies that are involved in telecommunications infrastructure upgrades, new systems, or replacement systems. Those who are implementing standards for an agency may wish to examine white papers, RFP specifications, update news, and interpretations available from the following sites. Also, many vendors whose products implement standards are interested in sharing standards-related information with their customers.

BICSI⁷ telecommunications association at <http://bisci.org> provides resources including current topic presentations, standards updates, and manuals (e.g., Telecommunications Distribution Methods Manual (TDMM)). The TDMM manual is a how to guide for designers and installer that interprets the TIA/EIA standards. BICSI was previously the Building Industry Consulting Services, International. BICSI also provides RCDD⁸ certification to designers and installers.

CableTesting.Com at <http://www.cabletesting.com/> offers a wealth of free information about cabling standards.

The National Electrical Contractors Association at <http://www.necanet.org/> provides [NECA/FOA 301-1997 - Standard for Installing and Testing Fiber Optic Cables](#) and other useful information.

Note: Please note that Virginia telecommunications infrastructure requirements no longer reference the now rescinded federal government FIPS PUB modifications of ANSI TIA/EIA standards. Information regarding the rescinding of related FIPS standards may be found at <http://www.itl.nist.gov/fipspubs/33fips.doc>. Also, please note that most agencies will implement the referenced ANSI and IEEE standards by acquiring products, services, administration tools and protocol stacks that implement the standards. Very few IT managers have detailed knowledge of the actual standards. Those state agency

⁷ *BICSI* is a non-profit telecommunications trade association, originally US-based but now also with an office in Colchester, UK. The association covers data, voice and video cabling. It aims to manage the quality and reliability of design and cabling away from network equipment vendors and put it with the installers.

⁸ *RCDD* is Registered Communications and Distribution Designer, issued by BICSI.

individuals wishing to view rather than purchase the standards may do so by visiting the Department of Technology Planning in the Richmond Plaza Building at 110 South 7th Street, Richmond, VA.

The following is a brief description of old and current telecommunications standards and sets.

Current Standards

ANSI TIA/EIA-568-Set (06-2001) is composed of three parts.

TIA/EIA 568-B.1, Commercial Building Telecommunications Cabling Standard - Part 1 General Requirements, is a major new standard release that replaces the all of the following standards and bulletins:

TSB67, TSB72, TSB75, TSB95, TIA568A, TIA568A addendum's 1,2,3,4, and 5, and TIA ScTP (PN-3193 Interim standard).

Key additions include Category 5e performance levels, 50/125 μ m fiber and allowance for alternate fiber connectors other than the SC. This standard, which was released in 2001, eliminates support for Category 5 in horizontal cabling. Category 5e becomes the minimum accepted performance level for data transmission. Category 3 remains in the standard for a second phone only jack in an office but is not acceptable for new cabling in Virginia offices.

TIA/EIA 568-B.2, Commercial Building Telecommunications Cabling Standard - Part 2, Balanced Twisted-Pair Cabling Components. This section provides technical content and component requirements for 100 ohm twisted-pair cabling that is referenced by TIA/EIA 568-B.1. This information was covered previously in TIA/EIA 568-A, and addendum A-5.

TIA/EIA 568-B.3, Commercial Building Telecommunication Cabling Standard - Part 3, Optical Fiber Cabling Components Standard. This section provides technical content on optical fiber cabling that is referenced by TIA 568-B.1. This information was covered previously in TIA/EIA 568-A.

ANSI/TIA/EIA-569A-1998, *Commercial Building Telecommunications Pathways and Spaces*, specifies minimum requirements for telecommunications pathways and spaces within a State office building and between office buildings in a campus environment. Standards are given for rooms, areas and pathways into and through which telecommunications equipment and media are to be installed.

ANSI/TIA/EIA-570-1991, *Residential and Light Commercial Telecommunications Wiring Standard*, gives an overview of premises wiring requirements for residential and light commercial installations that are lesser requirements than the Virginia minimum requirement of Category 5e. Basically, TIA/EIA 570 requires quality Category 3 premises wiring for voice connections. In today's Internet environment, there are very few instances where TIA/EIA 570 standards would be appropriate for new or replacement wiring in state office buildings or education facilities.

ANSI/TIA/EIA-606-1993, *Administration Standard for the Telecommunications Infrastructure of Commercial Buildings*, addresses the labeling and administration of the cabling infrastructure.

Labels must be legible, attached at appropriate points, splices, and intervals, well attached, and protected from the environment.

ANSI/TIA/EIA-607-1994, *Commercial Building Grounding and Bonding Requirements for Telecommunications*. This standard addresses how telecommunications cabling and equipment should be grounded and how bonds between ground conductor components should be made.

T568A/T568B, reference the two RJ45 pin assignment specifications that form part of 568-A and 568-B. When four-pair cable is terminated to a connector (jack or plug), there are eight color-coded wires (four twisted pairs). The standards define two different pin/pair assignment combinations. They are called T568A and T568B (not to be confused with TIA/EIA 568-A and TIA/EIA 568-B). The main difference between the two standards is the juxtaposition of the orange and green pairs. A cable that is wired T568A at one end and T568B at the other end will not work. Most commercial and school installations are going with the pin/pair assignment designated T568B.

Old Standards

ANSI/TIA/EIA-568-A-1995, *Commercial Building Telecommunications Cabling Standard*, has now been replaced by TIA/EIA-568-B.1, B.2, and B.3. TIA/EIA 568 A along with its numerous addenda has been incorporated into the TIA/EIA 568-B Wiring Set.

TSB 67 - Technical Service Bulletin (TSB), which was originally amended to incorporate the TIA/EIA 568A specifications for Category 5 testing procedures and minimum test result values. This standard provided for four cable parameters to be tested: Length, Wire Map (Pin Out), Attenuation, and Near End Cross Talk (NEXT). Cables or infrastructure which is to be considered 'Category 5' or 'Category 5 Compliant' must adhere to these specifications. Category 5e specifications include more tests, which are delineated in TIA/EIA-568B.1 and B.2.

Requesting Waivers to Requirements

Under certain circumstances, waivers from the provisions of this standard may be granted to state building owners or state agencies that lease space in non-state owned buildings if compliance with the provisions of this standard would:

- adversely affect the accomplishment of an agency's mission or an operator of a State computer system or telecommunications system;
- cause a major adverse financial impact on an agency which is not offset by Government wide savings; or
- cause damage to an existing building that has been identified and classified by a federal, state or local government authority as an historic building.

Written waiver requests shall be submitted to:

Director
Department of Technology Planning
Richmond Plaza, 110 S. 7th Street
Richmond, VA 23219

The Departments of General Services, Information Technology, or Historic Resources shall provide information and technical expertise to assist the Director in making decisions on waiver requests.

State agencies shall not procure telecommunications related equipment and/or services that do not meet all the provisions of this standard until a written waiver has been received from the Department of Technology Planning.

Glossary

Council on Technology Services (COTS) – COTS is an advisory group for Virginia’s Secretary of Technology.

DIT – Department of Information Technology

Ethernet – 1. A local-area network (LAN) protocol that is specified in IEEE 802.3 and that uses CSMA-CD to provide 10 Mbps service over copper; 2. any of various enhancements to Ethernet service providing greater bandwidth (e.g., Fast Ethernet or Gigabit Ethernet).

Fast EtherChannel – A Cisco proprietary method for increasing bandwidth by aggregating ports. The following link provides Fast EtherChannel literature:
<http://www.cisco.com/warp/public/cc/techno/media/lan/ether/channel/prodlit/index.shtml>.

Internet Protocol (IP) - A communications protocol which is instrumental in routing packets of data from one node on the Internet to another. IPv4 routes each packet based on a 32 bit destination address called an IP address (e.g., 123.122.211.111).

IPv4 – IPv4 is a four octet 32 bit IP address in the form 255.255.255.255.

IPv6 – Ipv6 is a sixteen octet 128 bit IP address. IPv6 identifies interfaces, not nodes. These addresses are of 3 types, unicast, multicast, and anycast. For a discussion and comparison with IPv4 see the following NCS literature:
http://www.ncs.gov/n6/content/tibs/html/tib97_1/sec5_0.htm.

Local Area Network (LAN) - A private computer network generally on a user's premises and operated within a limited geographical area.
network - 1. A configuration of data processing devices and software connected for information interchange. 2. A group of two or more computer systems linked together.

Segment - 1. vt., to isolate traffic on a LAN; 2. n., the LAN devices and media isolated.

Simple Network Management Protocol (SNMP) - A set of network communication specifications that cover all the basics of network management. It is a simple and expandable protocol designed to give the capability to remotely manage a computer network by polling, setting terminal values, and monitoring network events. It is comprised of three elements, an MIB, a manager, and the agents. The manager is located on the host computer on the network. Its role is to poll the agents and request information concerning the networks status. Agents run off each network node and collect network and terminal information as specified in the MIB.

Switch - 1. n., a circuit switching hub. 2. vt., A communications paradigm in which a dedicated communication path is established between the sender and receiver along which all packets travel. The telephone system is an example of a circuit switched network. Also called connection-oriented.

Information provided in this Glossary was developed using several excellent Internet sources including the following:

O’Reilly’s (search box at the bottom of the page) <http://www.oreilly.com/reference/dictionary/tsearch.cgi>
What Is? <http://whatis.techtarget.com/>

Cisco’s Glossary of LAN terms <http://www.cisco.com/univercd/cc/td/doc/product/lan/trsr/b/glossary.htm>

MobilInfo.Com Glossary <http://www.mobileinfo.com/Glossary/>

Free Online Dictionary Of Computing <http://foldoc.doc.ic.ac.uk/foldoc/index.html>

North Carolina ITS Glossary <http://www.its.state.nc.us/Information/Glossary/GlossMain.asp>

U. of Colorado Computing Standards with Links http://itp-www.colorado.edu/~scig/std_glossary.html

Appendix A: Waiver

Waiver from ANSI/TIA/EIA-568-A-1995, Commercial Building Telecommunications Cabling Standard

University of Virginia

Indefinite Waiver from Selective Provisions for Preexisting Category 5 UTP Wiring

The University of Virginia operates an integrated data, voice and video cable plant consisting of well in excess of 15,000 outlets in more than 120 buildings. The University officially adopted a single wiring standard for use in all buildings in May of 1993 and has been rewiring buildings to meet this standard since that time.

The UVA wiring standard specifies the installation of two Category 5 UTP cables to each outlet location. All four pairs of one cable are terminated as specified in the ANSI/TIA/EIA-568-A-1995, *Commercial Building Telecommunications Cabling Standard* for the T568B eight position connector. Three pairs of the second cable are terminated on a second Category 5 eight position jack while the fourth pair is terminated using an RJ-11 jack. The pair connected to the RJ-11 jack is always used for voice applications. The physical splitting of the four pair of UTP cable allows the University to operate both voice and Ethernet or Token Ring services over a single standard four pair Category 5 cable without using any external adapters. This configuration also precludes the introduction of telephone ring voltage into Token Ring or Ethernet equipment as it is physically impossible to plug a data connector into a telephone jack.

The UVA standard differs from the ANSI/TIA/EIA-568-A-1995, *Commercial Building Telecommunications Cabling Standard*, in that the second Category 5 cable is not terminated with the exact pin configuration stipulated by the ANSI standard. If future applications require the use of all four pairs of the second Category 5 cable, all campus outlets can be restored to be fully compliant with the ANSI standard by simply moving the displaced cable pair off the RJ-11 jack to the eight position connector on which the other three cable pairs are terminated.

The University of Virginia is hereby granted a wavier exception to continue using its telecommunications standard practice for terminating four-pair UTP cable as described above.

Appendix B: Assignment of Uniform Alphanumeric Publication Designations for all Policies, Standards, and Guidelines

The Department of Technology Planning is responsible for assigning a uniform alphanumeric Publication Designation (PD) to all Commonwealth of Virginia (COV) Information Technology Resource Management (ITRM) Policies, Standards, and Guidelines (PSG). The PD is derived, in part, from components of the Commonwealth Enterprise Architecture (EA) known as “Infrastructure Domains.” The “Infrastructure Domains” and Governance are defined in the [Commonwealth EA Glossary](#). The Governance code is used to identify those PSG that are not uniquely related to a specific infrastructure domain, e.g. “IT Project Management” or “IT Project Oversight.”

The following alpha codes will be used to identify each PSG:

Infrastructure Domains + Governance

Code

Governance and Transitional Processes	GOV
Platform Architecture	PLA
Database Architecture	DAT
Network Architecture	NET
Security Architecture	SEC
Systems Management Architecture	SYS
Information Architecture	INF
Application Architecture	APP
Middleware Architecture	MID

Publication Designations are constructed as follows:

COV ITRM (“Policy,” “Standard,” or “Guideline”) XXXYYYY-ZZZ

Where: XXX is the assigned Infrastructure Domain + Governance code;
 YYYY is the year of initial issue; and
 ZZZ is the sequential number assigned to link related PSG.

Example: COV ITRM Standard GOV2000-01.1 is a standard that implements
 COV ITRM Policy GOV2000-01.1.