Glossary of Network Terms

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Introduction

This document is a glossary of networking terms. The terms listed below cover the networking field generally and the UTnet system in particular.

address

> A group of numbers that uniquely identifies a host computer on a local area network, for instance. Digital logic on the host's network interface can be set to ignore all messages sent to other addresses, and to accept only messages sent to the host's address. In addition, all Ethernet interfaces are programmed to accept every packet sent to the special broadcast address of all ones.

ARP

> The Address Resolution Protocol. Used to dynamically discover the low-level physical network hardware address that corresponds to the high level IP address for a given host. ARP is limited to physical network systems that support broadcast packets that can be heard by all hosts on the network. See also ‘‘proxy ARP.’’

ARPANET

> Long distance network funded by Department of Defense Advanced Research Projects Agency (DARPA, commonly referred to by its old acronym, ARPA) that served as the testbed for early networking research. The ARPANET nurtured the development of the TCP/IP networking protocols, based on the concept of the Internet. The ARPANET has recently reverted to its original goal of supporting only DOD-funded research. A new network system, NSFnet, is now the primary nationwide backbone network linking campuses, research centers, corporations and other sites together with TCP/IP protocols.

baseband

A baseband system transmits signals without converting them to another frequency. A baseband system is characterized by its support of one frequency of signals. Ethernet networks inside campus buildings are transmitted via baseband coaxial cable, with Ethernet being the only service supported by the coaxial cable. Between buildings the Ethernet signals are translated to different frequencies and carried over a broadband system.

broadband cable network (BCN)

The UTnet broadband cable system that delivers signals to all buildings on the UT Austin campus. The broadband system supports an Ethernet channel as well as several other services. The Ethernet channel is the primary high speed data internet on campus as of this writing.

broadband

A broadband system is capable of transmitting many different signals at the same time. Each set of signals is translated into frequencies that do not interfere with one another. For local area networks, a broadband system is one that handles multiple channels of local area network signals distributed over cable TV hardware.

broadcast

A packet whose special address results in its being heard by all hosts on a computer network.

datagram

See IP datagram.

dotted decimal notation

The convention for writing 32 bit Internet Addresses as a set of four 8-bit numbers written in base 10 with periods separating them.

Ethernet

A local area network system invented in 1973 at Xerox Palo Alto Research Center. The Ethernet system moves data between computers in Ethernet packets. Ethernet transmits packets between hosts at a speed of 10 million bits per second over a variety of physical media systems.

Ethernet meltdown

A transient packet overload causing saturation or near saturation on the Ethernet system. Usually caused by a mis-configured host sending an IP datagram to an incorrect IP broadcast address. This packet will reach all hosts on the system, and their simultaneous attempts to use ARP to discover the physical address of the incorrect IP address will jam the network. Packets causing such events have been called ‘‘Chernobyl packets,’’ for obvious reasons.

gateway

A gateway is the term used in the TCP/IP community to describe a store and forward packet switch operating at the OSI network layer that is also known as a level 3 router. A gateway is a dedicated computer system attached to two or more networks that uses routing tables to route datagrams from one network to the other. Gateways are capable of routing packets from several different protocol suites so that a single gateway can handle TCP/IP and DECnet protocols, for instance. Gateways exchange routing tables among themselves and use these tables to discover where a datagram must be sent to arrive at its final destination.

header

The first portion of an IP datagram. It contains the destination address, the source address, and other control information.

host

A computer system attached to the network.

internet

An internet is a collection of computer networks based on the same network protocols and linked with gateways which allow them to function as though the entire collection was one large, virtual network. When written in upper case, Internet refers specifically to the ARPANET and other national backbone networks based on the TCP/IP protocol suite.

Internet

The collection of networks linked with gateways that includes the ARPANET and the more recent NSFnet. These networks are based on TCP/IP protocols that are designed to make them function as though they constituted a single, virtual network system.

Internet Address

A 32-bit address assigned to host computers that may communicate with the Internet system and that use TCP/IP protocols. An Internet address is partitioned into a pair of identifiers consisting of a network identifier and a host identifier. This was done to increase routing efficiency by making it easier for routing software to determine a network address.

IP

Internet Protocol. This protocol defines the IP datagram as the basic unit of information sent over the Internet. The IP datagram consists of an IP header followed by a message.

IP datagram

The basic unit of information transmitted between hosts attached to the Internet. An IP datagram has the same relationship to the virtual Internet, for example, as a hardware packet has to the Ethernet system. The IP datagram contains source and destination addresses.

message

A collection of data that is ordered according to the rules of a given protocol suite, such that it is intelligible to the sending and receiving software.

LAN

Any data communications network that spans a physically limited area (usually less than a mile or two), and that provides high speed communication over relatively low cost physical media such as coaxial cable or twisted pair wiring.

LAN Bridge 100

A packet switch built by Digital Equipment Corp. that links two Ethernets. On UTnet the LAN Bridge is used to link intra-building networks to the campus backbone network. Bridges are capable of limiting network traffic on the backbone by not forwarding packets destined for local intra-building hosts onto the backbone network.

NSFnet

National Science Foundation network. Refers to the U.S. government agency (NSF) that has funded the development of a cross country backbone network along with a set of regional networks. These networks provide access to computer resources and services such as electronic mail, file transfer programs, etc.

packet

A group of bits formed up in a specified manner that are transmitted together over the physical network system. The specification typically includes control fields along with source and destination address. The term is not strictly defined with the result that IP datagrams are sometimes referred to as packets as well.

protocol

A formal description of message formats and the rules that two or more machines must follow to exchange those messages. Protocols are used to describe the low level details for transmitting packets between machine interfaces such as the order in which bits may be transmitted. Protocols also define the high level behavior for application programs that are used to transfer files across the Internet, for example.

proxy ARP

A technique in which one machine, usually a gateway, answers ARP requests in proxy for another machine. By pretending to be the physical network location of another machine, the gateway takes over the responsibility of routing packets destined for the other machine. For instance, a gateway can proxy ARP for addresses that the gateway identifies as being off the local network and that the gateway has a route for. The originating computer receives the gateway’s proxy ARP reply and sends the datagram on to the gateway, which routes the datagram to its actual destination network.

RIP

Routing Information Protocol used by Berkeley UNIX systems to exchange routing information among a set of computers attached to a network. RIP packets are sent and received by a program called *routed.*

router

Any machine used to make decisions about which path network traffic is going to take. A bridge is a primitive form of router that chooses whether or not it will pass packets from one physical network to another. On the Internet system gateways perform routing functions by using the IP destination address to choose a route for the datagram.

standalone status monitor (SSM)

The standalone status monitor is part of the UTnet broadband cable system. The status monitor makes it possible for each building equipped with same to be monitored from a network operations center. Every building that wishes to attach to the Ethernet network system via the broadband system must have a standalone status monitor.

subnet address

An extension of the Internet addressing system that allows a site to subdivide a single Internet address to cover multiple physical networks. This is done by dividing up the host address part of an IP address into a local network number and host address number.

TCP

Transmission Control Protocol. This is a transport layer protocol that establishes a reliable, full duplex, data delivery service used by many TCP/IP application programs. The TCP software uses the IP protocol to transmit information across the Internet.

THEnet

Texas Higher Education network. This is the wide area network (WAN) that links the University of Texas system campuses together via a DECnet and TCP/IP network system. THEnet is operated by the Office of Telecommunications Services located at the Balcones Research Center of the University of Texas, Austin.