

# GIS Glossary

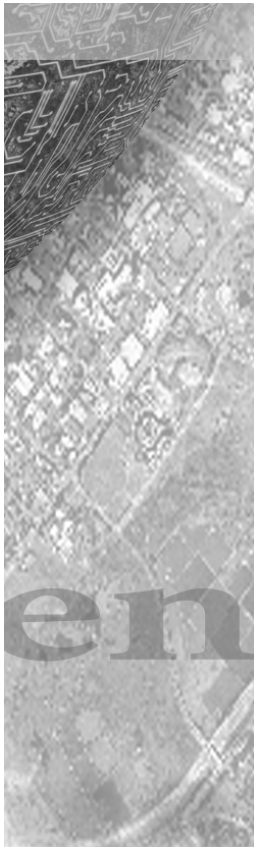
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# GIS GLOSSARY OF TERMS

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Printed in the United States

ISBN #:



# GIS GLOSSARY OF TERMS

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## 56K modem

A connection to the Internet via a 56K modem is used most often for homes and small offices. 56K refers to the modems theoretical ability to transmit data at 56 thousand (56K) bits per second. (Often referred to as 56Kbps.) In reality, owing to FCC regulations, this device never transmits data at more than 53K. Because the performance of this device is affected by distance and the number of digital devices it must pass through between the user and their Internet Service Provider, it usually performs at speeds below the allowed 53K rate.

There are currently three types of 56K-modem technology, only one of which is an international standard. Prior to the V.90 international standard, two competing technologies were available. These were Kflex and V.Fast. Older modems are often not compatible with the other technologies. It is, therefore, usually best to purchase a modem that adheres to the V.90 standard. It should be noted that, since most 56K modems are built on programmable technology, older Kflex and V.Fast modems can usually be upgraded to V.90 by downloading new firmware into the modem's programmable signal processing chip.

## 56K modem shared

Some companies package a 56K modem with a small hub, router and computing device to create a device that can be shared on a network. An example of this is the 3COM Office Connect 56K LANmodem.

## A

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### accuracy

A measure of the closeness or variability of estimates, observations, computations, markings, etc. of spatial features to their true value of position. Compare with **precision**.

- 1) "Absolute accuracy" is the differential between the actual real world location of a point on the surface of the earth and its mathematically assigned geographic coordinate. If a specification calls for the precision to be within one foot, its assigned coordinate value must be within 1 foot of its actual geographic location as mathematically determined according to the project's map projection.
- 2) "Relative accuracy" is the displacement of the actual position of a point compared to its "precise" location.

**address baselines**

Beginning streets (or other readily identifiable physical features) that represent the starting or beginning points for the address or house number intervals. Depends on the orientation of the thoroughfare.

**address components**

The ready identification of individual data elements composing unique parts of the address fields. With the understanding of address components, the idea of addresses being unique identifiers in computing processing is very feasible. Confusion often arises because parts of the address may be assigned by different agencies.

**address grids**

Geographic areas within which certain address rules apply. For enforcement purposes, the grids should be easily identified on a detailed base map. Note that the grid boundaries may or may not be synonymous with the political jurisdiction boundaries. Un-annexed areas located adjacent to built up areas may use the addressing rules of the adjoining municipality. In reality, some address grids may appear to be “interleaved” with no clear-cut boundary line between adjoining grids.

**addressing**

A verb describing the functions of government to assign and maintain the proper posting of addresses in the field.

**addressing interval (or increment)**

A distance gradient that increases the address number for the next adjoining structure, property, or parcel. This interval might be 20 feet (or other interval) for each 2-digit address increase.

**address, mailing**

The address to which mail is sent to a recipient. This may have nothing to do with a **situs** or place specific address (i.e., a post office box or mail city). Note that the mail city may have nothing to do with the jurisdiction city.

**address matching**

A process that compares a table of addresses to the address attributes of a theme to convert textual addresses to locations on a map. Street name and address values are compared to DBMS records to find the street segment with a matching name and address range. The address is then located at a pro-rata distance from the street segments start-point proportional to the addresses value relative to the street’s address range value and on the appropriate side of the street (even-numbered addresses always on the west side of the street, etc.).

**address parity**

The procedure of enforcing odd- and even-numbered addresses on different sides of a street. Helps locate citizens and staff in the field. Odd addresses might be on the north side of streets and avenues that are oriented in an east-west direction. Even addresses would be on the south side of the same thoroughfares. On streets running north/south, odd numbers might be on the west side of the thoroughfares with even addresses on the east side. Note that the universal application of the parity rules exist. Problems may arise when multiple grids exists in a region where address parity is opposite other grids. Provides another logic or edit procedure able to be automated.

**address posting**

The process of displaying the house numbers on a structure (or mailbox) to be visible from the street. Normally handled via code enforcement, although few jurisdictions take address posting seriously.

### **address processing**

An automated process used to determine exact address matching or exact address-to-address range matching. Frequently completed by specialized address processing software. Usually more difficult given the lack of address component standardization. Closely related to **parsing**, which is the processing of a “free-field” address to identify sub-components allowing for matching or merging. Closely related to **geocoding**.

### **address, situs parcel**

A legal, unique identifier for a land parcel. Not to be confused with the Parcel Identification Number (PIN) or the Assessor Identification Number (AIN). Should be composed of editable components, such as **street name**, **street type**, and **street direction**. Compare with **occupancy** and **mailing address**.

### **address system**

The collective view of address as being of a uniform and systematic nature. The goal is to support unique addresses and a user-friendly key.

### **algorithm**

A step-by-step problem-solving procedure, especially an established, recursive computational procedure for solving a problem. A set of ordered procedures, steps, or rules usually applied to mathematical calculations, and assumed to lead to the solution of a problem in a finite number of steps; the logic (and/or formula) that is used to solve a problem.

### **alphanumeric**

A combination of alphabetic letters, numbers, and/or special characters. A mailing address is an alphanumeric listing. The designation ljsdoijwe92393 is an alphanumeric word. Alphabetic characters consist of letters A through Z. Numeric characters consist of the characters 0 through 9... sometimes excludes () and \* / \. A mailing address is an alphanumeric listing, as is the postal code K1N 6N5, which uses a letter-number combination.

### **American National Standard Institute (ANSI)**

An organization that assists committees of computer users and manufacturers in developing and publishing industry standards. ANSI standards are used by U.S. firms as guidelines.

### **American Standard Code for Information Interchange (ASCII)**

A standard way to represent text. ASCII text contains no formatting (fonts, underlines or special characters), so that it can be read by all computers. annotation

Text or labels plotted graphically on a map, or drawing street and place names or dimensions.

### **application**

The use of software, data, procedures, and techniques in a series of steps that are then put into practice to solve a problem or perform a function. A computer program designed for a specific task or use.

### **arc**

A segment of a circle described in degrees and corresponding to the magnitude of the angle at the center of the circle. The term has come to refer to a set of XY coordinates used to represent a linear feature or a polygon boundary in some GIS software.

### **architecture, system**

The design of the database, processes, and technologies that make up an information system.

### **asynchronous transfer mode (ATM)**

A network technology based on transferring data in *cells* or *packets* of a fixed size. The cell used with ATM is relatively small compared to units used with older technologies. The small, constant cell size allows ATM equipment to transmit video, audio, and computer data over the same network, and assure that no single type of data dominates the line.

## **attributes**

Descriptive characteristics of an entity in a database. Location is a mandatory attribute in a GIS as is at least one graphic element (i.e., point, line or polygon). The term is often used in GIS to refer to all non-graphic data.

## **automated mapping/facility management (AM/FM)**

A geographical information system that deals with large-scale spatial databases of buildings and other infrastructure such as utilities and roads.

# **B**

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## **bandwidth**

A term that refers to the amount of data that can be transmitted per second. The larger the bandwidth, the more data that can be transmitted per second and the faster the connection will perform. Bandwidth is measured in kilobits per second or megabits per second. Devices that can transmit data in excess of 56 kilobits per second (56Kbps) are usually referred to as “broadband” devices.

## **base map**

A map containing geographical reference data on which other data can be plotted for comparison and geographic correlation. The reference data will vary according to the map’s purpose (e.g., an urban base map would usually contain at least streets, streams and other major features while a wilderness area map may contain streams, ridges, trails, and natural visual references like mountain peaks).

## **baud**

A variable unit of data transmission speed usually equal to one bit per second. A 56K modem transfers data at 56,000 bits per second. See **modem**.

## **bit map**

A data structure in memory that represents data and instructions in the form of a collection of individual bits. A bit map is used to represent a bit image: a sequential collection of bits that represents in memory an image to be displayed on the screen, particularly in systems having a graphical user interface. Each bit in a bit image corresponds to one pixel (dot) on the screen. Another use of a bit map in some systems is the representation of the blocks of storage on a disk, indicating whether each block is free (0) or in use (1).

## **block group**

U.S. Census Bureau term that refers to a set of U.S. census blocks combined together to provide a small population and housing census area. All selected census blocks are contained within a single census tract boundary containing an average of population of approximately 800, about one fourth to one fifth the population of a census tract.

## **boolean operations**

Named after George Boole. Of or relating to a logical combinatorial system treating variables, such as propositions and computer logic elements, through the operators AND, OR, NOT, IF, THEN, and EXCEPT.

## **browser**

An application that allows users to use and explore the Internet.

## **bulletin board system (BBS)**

A computerized meeting and announcement system that allows people to carry on discussions, upload and download files, and make announcements without the people being connected to the computer at the same time.

# C

## **cable modem**

A cable modem is a modem designed to operate over cable television lines. Because the coaxial cable used by cable television provides much greater bandwidth than telephone lines, a cable modem can be used to achieve extremely fast access to the Internet.

Because this is a “shared” technology vs. a dedicated connection, performance varies depending on the number of users in your area (not just on your own internal system, but the number of users in close proximity to you) as well as the type of information those sharing the service with you are accessing. In addition, capacity concerns on the part of the Internet service Providers means that this technology is usually only available to the home user. The majority of cable providers do not sell service to a business office.

## **CAD**

See **computer-aided dispatch or computer-aided drafting**.

## **cadastre**

A public record, survey, or map of the value, extent, and ownership of land as a basis of taxation. See **multipurpose cadastre**.

## **CAMA**

See **computer-aided mass appraisal**.

## **cartography**

The science and art of making maps and charts.

## **census**

Official enumeration of a population, including the collection of related demographic information. The U.S. constitution requires the U.S. Census Bureau to conduct a decennial census of the U.S. Population to be used as the basis for apportioning representation in the U.S. House of Representatives. It also publishes detailed descriptions of subgroups within the overall population usually in response to legislation requiring the information for appropriation or distribution of funds. The U.S. Census Bureau organizes these data according the following hierarchy of designated census areas.

- **Census Tract:** sub-area of a county or city containing an average of approximately 4000 inhabitants that have statistically comparable population characteristics, economic status, and living conditions.
- **Block Group:** subset of a Census Tract containing a population of approximately 800.
- **Census Block:** subset of a Block Group, the smallest geographic area for which census data is collected.

## **centerline**

Linear feature representing the midpoint along a linear element, such as a road or stream.

## **central processing unit (CPU)**

The portion of a computer that directs and supervises all of its functions and controls the interpretation and execution of instructions assigned by a program called the operating system (OS).

## **centroid**

The geometric center of a polygon. The term is often misused to refer to any point used for attaching annotation to a polygon or linear feature.

**client/server**

1) A computer system architecture in which one computer manages data, programs, and/or communications for other computers.

**computer-aided dispatch (CAD)**

An information system that assists in the dispatching of field personnel. Most often it refers to emergency service provider systems such as police, fire, and ambulance services.

**computer-aided drafting (CAD)**

A computer system that allows a person interactively to create and manipulate graphical data (i.e., points, lines, and polygons).

**computer-aided engineering (CAE)**

A computer system that performs engineering design functions, e.g., stress-strain, cut and fill, pressure distribution

**computer-aided mass appraisal (CAMA)**

A computer system that provides the functions necessary for appraising property values for taxation.

**computer-assisted software (or systems) engineering (CASE)**

CASE, referred to as technique or an enabling technology, consists of automated tools that support the use of structured techniques (programming, design, analysis, and information engineering) in the systems development life cycle. Synonyms include computer-assisted design/computer assisted programming (CAD/CAP).

**continuous map**

A cartographic database that treats the entire mapped area as a single map allowing the user to view any part of the map without opening a new file. This is in contrast to a database that breaks a mapped area into multiple files to minimize file size just as a larger scale paper map of a city is divided into multiple map sheets.

**contour mapping**

Display of contour lines, each of which represents a constant value, typically elevation, throughout its length. Also called an isoline map, it displays linear features that connect all points having the same numeric value (i.e., elevation, rainfall, noise, and concentration level).

**conversion**

Translating data from one format into another. In GIS, most translation is from paper or Mylar maps into a digital spatial database.

**coordinate geometry (COGO)**

A computer program within a CAD system or GIS that can process data such as bearings, distances, and angles to generate precise spatial representation of land features and survey control networks.

**D****data exchange format (DXF)**

A standard spatial data exchange format for CAD systems. DXF files contain ASCII or binary (DXB) records, each of which describes a vector in sufficient detail so that it can be converted into a spatial feature by any spatial database management product able to process these files.

**database design**

The plan for the logical and/or physical structure of a database that identifies data elements and their relationships.

**database management system (DBMS)**

A computer-based program that maintains data and data relationships as the data are used by application systems.

**datum**

The singular of data, a datum is an observation about an entity, such as “the current temperature is 28 degrees”. Temperature data would be the readings for the remainder of the hour, day, etc. In the field of surveying, a datum is a point, line, or surface that is used as a reference.

**digital elevation model (DEM)**

A mathematical model that provides the data necessary to display elevation. The term for the actual visual display itself.

**digital terrain model (DTM)**

A mathematical representation of terrain relief that can be visualized on a computer screen or other output device.

**digitize**

The process of assigning digital coordinates by physically or automatically tracing hard copy documents. Used for converting paper maps, aerial photos, or raster images into digital form.

**distributed geographic information (DGI)**

Refers to the widespread distribution of geographic information to a larger audience than those that have access to traditional desktop GIS.

**distributed processing**

A system architecture that maintains data in a single location and allows processing of those data at multiple locations.

**domain name system (service)**

An Internet service that translates domain names into the numeric addresses used by the Internet (IP addresses). Because domain names are alphabetic, they are easier to remember. The Internet, however, is really based on IP addresses. Each time you use a domain name, therefore, a DNS service must translate the name into the corresponding IP address. For example, the domain name `www.example.com` might translate to `198.105.232.4`.

The DNS system is, in fact, its own network. If one DNS server does not know how to translate a particular domain name, it asks another one, and so on, until the correct IP address is returned.

**DTM**

See **digital terrain model**.

**dual independent map encoding (DIME) file**

A data format used by the U.S. Census Bureau to encode street network and related data for the 1980 Census. See TIGER for details.

**dynamic host configuration protocol (DHCP)**

A method of automatically assigning a unique network address to a computer. In short, it means that computers configured for this protocol can be added to a network without manually configuring it with a unique address. This is useful, for instance, when moving a laptop computer between home and the office.

**dynamic segmentation**

The process of dynamically locating data elements along linear features using distance from a starting point.

## E

### **easting/northing**

From a State Plane coordinate system, easting is the equivalent of the longitude and northing is the equivalent of the latitude of a location described in terms of distance from an origin point defined for each project or state.

### **edge matching**

A map editing function that resolves distortion between adjacent map sheets to produce a visually continuous feature.

### **entity**

In data or information systems, a thing or event about which we collect and store data. The most basic data element.

### **ethernet**

A local area network originally developed by Xerox DEC and Intel that interconnects personal computers via coaxial cable. A type of computer network established using coaxial cable twisted pair cable or fiber optic cable. It has a network protocol defining the physical and data link layers of the Open Systems Interconnect (OSI) model. (See OSI).

## F

### **facility management system**

A computer system used to build and maintain the inventory of physical structures and facilities and maintain their operation. Used most often for utilities, transportation, and building maintenance systems.

### **feature**

Natural and man-made entities represented on a map.

### **file transfer protocol (FTP)**

A standard for transmitting files on the Internet.

### **fire wall**

Combination of hardware and software that separates a communications network into two or more parts for security purposes.

### **font**

A set of characters of the same typeface (such as Times Roman), style (such as *italic*), and weight (such as **bold**). A font consists of all the characters available in a particular style and weight for a particular design; a typeface consists of the design itself. Fonts are used by computers for on-screen displays and by printers for hard-copy output. In both cases, the fonts are stored either as bit maps (patterns of dots) or as outlines (defined by a set of mathematical formulas). See **bit map**.

### **frame relay**

A packet-switching protocol for connecting devices such as a network router to your service provider via existing telephone company circuits. Most companies provide access speeds from 56K to T1 speeds of 1.544 Mbps (mega bits per second).

## G

### **geocoding**

The process of assigning a geographic code to a record, event, or occurrence. Geocoding might be accomplished manually by a map look-up or by address processing software that equates exact address with an address range related to a geographic code such as a zip code, census tract, traffic zone, or municipal jurisdiction. See also **address processing**.

### **geodesy**

The geologic science of measuring the size and shape of the earth.

**geographic data systems (GDS)**

A geographic data system consists of computer hardware, software, and peripherals that acquire, store, retrieve, manipulate, and disseminate geographically referenced data. A GDS is the basis for a GIS.

**geographic index database**

A database consisting of attributes and graphics that describe a single line street map with address ranges, unique street names, and jurisdictional geography. Related to **topology**.

**geographic information system (GIS)**

A geographic information system consists of computer software, hardware, and peripherals that transform geographically referenced spatial data into information on the locations, spatial interactions, and geographic relationships of the fixed and dynamic entities that occupy space in the natural and built environments. *Barry Wellar, "GIS Fundamentals," in Profiting From a Geographic Information System, GIS World, Inc., Fort Collins, CO, 1993 as quoted in Introduction to GIS, URISA 2000.*

**geographic knowledge system (GKS)**

A geographic knowledge system is the next step in the GDS, GIS progression. The basis for the advancement is that, by means of higher-order analyses and syntheses activities, information about spatial relationships is transformed into knowledge about spatial patterns, distributions and interactions involving the entities and processes that comprise the natural and built environments.

**global positioning system (GPS)**

A space-based radio-navigation system, consisting of 24 satellites and ground support that is owned and operated by the U.S. Department of Defense. The system provides users with accurate information about their position and velocity, the time, anywhere in the world as well as weather conditions. GPS started in 1973. It has revolutionized the surveying profession and made small, inexpensive navigational devices possible.

**graphic user interface**

Software standard used to establish the menus, screens, dialog boxes, buttons, edit boxes, pick lists, toggles, radio buttons, command input, and viewing screens used to communicate instructions to the computer and for the computer to communicate findings back to the user.

**ground control**

A known reference point(s) for remote sensing projects such as aerial photography and satellite imaging.

## H

**hierarchical database**

A database in which records are grouped so that their relationships form a branching, treelike structure. This works best in organizing data that breaks down logically into successively greater levels of detail with limited and predictable types of access. Most graphics databases have a hierarchical structure

**house or structure number (address)**

A numeric data element that helps identify a structure, house or other building. This address should be within the permissible address range and address parity for the applicable addressing system. Is usually required to be posted in a position as to be visible from the public right-of-way.

## **hyper text markup language (HTML)**

A coding language used to create Hypertext documents for the World Wide Web.

## **Hypertext**

A computer-based text retrieval system that allows a user to provide access to or gain information related to a particular text directly from the display.

## **image processing**

Computer techniques used to interpret and manipulate raster data and digitally remote sensed images.

## **incident map**

A map that displays the location of an event, e.g., crime, accident, fire, used to identify spatial patterns or relationships with other geocoded data.

## **integrated services digital network (ISDN)**

An international communications standard for sending voice, video and data over digital telephone lines or normal telephone wires. ISDN supports data transfer rates of 64Kbps. Most telephone companies offer you 2 lines or channels at once called *B channels*. You can use one line for voice and one for data or you can use both for data giving you data rates of 128Kbps or about 3 times as fast as a 56K modem.

## **Internet 2**

The existing Internet, as we know it, is rapidly approaching its maximum addressing capacity. A new network, the Internet 2, will support much higher data rates, will offer an addressing scheme that allows for tremendous growth, improved security features and will be able to prioritize data packets to allow for improved audio and video communication.

## **Internet service provider (ISP)**

An institution that provides access to the Internet in some form, and usually charges a fee for the services rendered.

## **interoperability**

Computer system components that can function in different computer system environments. For example, the SCSI standard for disk drives and other peripheral devices that allows them to interoperate with different operating systems.

## **ISDN shared**

Some companies package an ISDN terminal with a small hub, router and computing device to create a device that can be shared on a network. An example of this is the 3COM Office Connect ISDN LANmodem.

## **jurisdiction boundaries**

Lines on a map representing the political boundaries of a corporate entity, such as a City, Town, Township, Village, County, or Borough. Since addressing is normally a local function, these corporate entities may be actively involved with new address assignments, address posting and street signage.

## **land/structure/occupancy (L/S/O) database**

A core reference database containing key identifiers for important entities such as ownership parcels, buildings and individual tenancies within buildings. The database provides for key address cross references among closely related entities. It also provides the essential links among two-dimensional map graphics and many three-dimensional administrative records such as permits or licenses.

**legend**

An explanation of the symbols and scale of a map or drawing.

**line smoothing**

A process that uses a variety of algorithms to reduce file size and refine the graphic image.

**local area network (LAN)**

A system that links together electronic office equipment and forms a network within an office or a building.

**lookup table**

A list of values that are correlated to a range of other values. A database that cross references two sets of values (e.g., address and landmark name, street name and state highway number, land use code A with land use code B).

## M

**machine independent**

The type of computer programming language or operating system software that enables programs to run on a variety of computers without reprogramming.

**MacOS**

Operating system for Macintosh personal computers produced by Apple Computers.

**macro**

A software command that reduces a series of commands for efficiency and ease of use.

**mainframe**

A large computer that serves a variety of functions for an organization and centralizes processing and database storage and maintenance.

**memory**

A unit of a computer that preserves data for retrieval. See **RAM** and **ROM**,

**menu**

A list of commands of options available to a computer user displayed on a monitor.

**metadata**

Data about data (e.g., source, accuracy, type, projection, date of origination and other characteristics of a datum, and a set of data or database).

**millions of instructions per second (MIPS)**

A CPU-related performance measurement.

**modem**

An acronym for MODulator DEModulator. A device that converts digital data into “sound” or tones that can be sent over a standard telephone connection. Since the telephone system was designed to transmit human speech, the rate at which these tones can be sent reliably is limited. By using sophisticated encoding techniques and data compression, currently available modems can transmit data no faster than 56K bits per second. A “K” is equal to 1000 and is an abbreviation for “KILO.”

**multipurpose cadastre**

A comprehensive land information system at the parcel level. Land base includes all parcel boundaries, right-of-ways, and easements with each parcel linked to supporting attribute records such as a survey control network land use, land cover, or political boundaries.

## N

### **NAD 27 / NAD 83**

Abbreviations for the North American Datum of 1927 and 1983, respectively. They serve as the basis for specifying latitude and longitude. NAD 83 is a component of the National Spatial Reference System. For more info: <http://www.ngs.noaa.gov/faq.shtml>

### **national spatial data infrastructure (NSDI)**

Coordinated by the Federal Geographic Data Committee (FGDC), the NSDI encompasses policies, standards, and procedures for organizations to cooperatively produce and share geographic data. The 17 federal agencies that make up the FGDC are developing the NSDI in cooperation with organizations from state, local and tribal governments, the academic community, and the private sector.

### **network address translation (NAT)**

A method of translating the computer addresses on your internal Local Area Network (LAN) to one or more different addresses on the Internet. In the case of “one to one” address translation, each local computer address is translated to a different address that appears on the Internet or Wide Area Network (WAN). This provides some security by hiding the true address of your computer behind a “false” address. A more common use of NAT that provides improved security is to translate each address on an LAN to a single address that is exposed to the Internet or WAN. The Internet Service Provider (ISP), and thus the Internet, sees only the “public” address associated with the LAN. The individual addresses of the computers connected to the LAN are hidden, providing some protection from malicious mischief and some types of attack by hackers. An NAT is usually provided by a router, proxy, or firewall device.

## O

### **open system**

A computer network designed to incorporate all devices— regardless of manufacturer or model— that can use the same communications facilities and protocols. In reference to computer hardware or software, a system that can accept add-ons produced by third-party suppliers.

### **overlay**

Information that is laid over or covers something else.

- 1) In a manual graphic information system, a transparent sheet containing graphical data, such as labels, symbols or colored areas, that is placed over another map to view spatial relationships.
- 2) In an automated spatial information system, same as a manual system except that all overlays are in a digital format for viewing and interpretation on a cathode ray tube (CRT) screen. Each overlay defines a specific aspect of the spatial database.

## P

### **parcel**

A portion of the earth defined by a boundary. In GIS, usually a plot of land inside of which certain assigned rights apply regarding occupancy and/or use of land, air, or water. The most significant is the ownership parcel that serves as the basic land entity for defining responsibilities of the individual and governments regarding land use and occupancy.

### **parsing**

The processing of addresses in order to recognize the various subcomponents. Parsing uses pattern recognition to also identify components based on their juxtaposition (i.e., St. Asaph St. How is St in Saint recognized as being different from St for Street?).

## **photogrammetry**

- 1) The process of making maps or scale drawings from photographs, especially aerial photographs.
- 2) The process of making precise measurements by means of photography.

## **pixel**

Abbreviation for PICTURE ELEMENT, the smallest nondivisible image-forming unit of a plot or video display. Each cell can have assigned attributes, in addition to color. In raster processing, pixels refer to a single cell within a matrix of grid cells.

## **planimetric map**

Depiction of features on a two-dimensional plane without any reference to contours or topographic relief.

## **point**

A single X,Y (optionally Z) location in space. A dimensionless geometric feature having no other spatial properties except location. Many different natural and man-made features are modeled as points in a spatial database including trees, hydrants, poles, intersections, etc.

## **point-in-polygon**

A spatial query that determines which polygon boundary encompasses a specified point.

## **polygon**

A closed plane figure bounded by three or more line segments.

## **polygon processing**

Software manipulation and calculation of polygons that assist in spatial analysis.

## **precision**

The degree of exactness with which a quantity is stated (e.g., the number of decimal places), an entity is visually represented (e.g., the size of dots or thickness of lines), or qualities of entities are expressed (e.g., the expressway and arterial vs. highway, fir and poplar vs. tree, or Lake Michigan vs. body of water). Compare with **accuracy**.

## **projection**

A mathematical method for representing the shape of the earth on a flat plane; a formula that converts latitude-longitude locations on the earth's spherical surface to X,Y locations on a map's flat surface.

## **protocol**

An agreed-upon format for transmitting data between two devices. From a user's point of view, the only interesting aspect about protocols is that the computer or device must support the right ones in order for the user to communicate with other computers. The protocol can be implemented either in the form of hardware or in software.

## **Q**

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## **query**

A request for information from a database.

## **R**

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## **raster**

An image containing individual dots with color values, called cells (or pixels), arranged in a rectangular, evenly spaced array. Aerial photographs and satellite images are examples of raster images used in mapping.

## **rectification**

A set of techniques for removing data errors through calculation or adjustment. In image processing, computer programs that remove distortion within a digital image, aerial photography, or remotely sensed data by removing parallax errors due to relief (high ground being closer to the camera than low lying areas), camera tilt, awkward corners, and other distortions.

## **relational database**

A database or database management system that stores information in tables— rows and columns of data— and conducts searches by using data in specified columns of one table to find additional data in another table. The rows of a table represent records (collections of information about separate items) and the columns represent fields (particular attributes of a record). In conducting searches, a relational database matches data from a field in one table with data in a corresponding field of another table to produce a third table that combines requested data from both tables.

## **remote sensing**

The process of obtaining information about land, water, or an object without any physical contact between the instrument doing the sensing and the subject. Remote sensing most often refers to collecting data using instruments aboard aircraft or satellites.

## **resolution**

Fineness of detail that can be distinguished in an image as on a video display terminal.

## **rubber sheeting**

Spatial database editing software that minimizes distortion by spreading the error in scale evenly based on known reference points.

# **S**

## **scale**

- 1) Relationship between the dimensions of a feature on a map and the geographic features they represent on the earth, commonly expressed as a fraction. For example, a map scale of 1:24000 means that one unit of measure on the map equals 24,000 of the same unit on the earth (1 inch would equal 24,000 inches, or 2000 feet).
- 2) A calibrated line, as on a map or an architectural plan, indicating such a proportion.

## **serial communications**

Digital transmissions in which information is transferred one bit at a time over a single wire or channel. In synchronous communications, blocks or packets of bits containing data are sent according to an established timing sequence. Serial lines are commonly used to connect peripheral devices to computer networks.

## **spatial analysis**

The search for and study of geographic relationships among the entities and processes that comprise the natural and built environments. Compare with GDS, GIS, and GKS. More recently, spatial analysis/synthesis research and applications have been extended to fields such as medicine, biology, etc., in which matters of interest can be represented as points, lines, and polygons, and those representations can be subjected to spatial analysis/synthesis techniques in the search for explanations about patterns, distributions, and interactions.

## **spatial data transfer standard (SDTS)**

Used for transferring data among multiple geographic data management systems. Includes meta-data that addresses internal spatial reference, completeness, positional and attribute accuracy, logical consistency, and data dictionary.

**spatial query**

A software function that allows a user to find and display data using spatial attributes.

**structured query language (SQL)**

A computer industry-standard syntax language for querying, updating, and managing relational databases.

**state plane coordinate system**

System of X,Y coordinates defined by the U.S.G.S. for each state. Locations are based on the distance from an origin point defined for each state.

**survey control network**

- 1) Graphically defined lattice work of precise control points (monuments) and traverse alignments reconciled to those monuments, serving as a framework for referencing the position of all map features in the spatial database, thereby assuring appropriate accuracy standards.
- 2) Points with a given horizontal position and surface elevation.
- 3) Used to determine unknown horizontal positions and elevations of locations elsewhere in the active portion of the spatial database.

**synchronous**

Data transmitted along a communication line in a continuous stream via serial or parallel lines according to an established timing sequence. Typically used in high-speed local area networks (LANs) and mainframe computer configurations.

**T****T-1**

Sometimes called DS1, this is a point to point data communications connection supporting data rates of 1.544Mbps. A T-1 line actually consists of 24 individual channels, each of which supports 64Kbps. Each channel can be configured to carry data or voice. Most telephone companies will let you buy fewer than 24 channels, which is known as *fractional T-1* access.

This type of access is a popular access method for mid to large-sized organizations. It does not suffer from distance limitations and offers consistent and reliable performance as well as the flexibility of mixing the types of information carried on a single line (i.e., data and voice).

**thematic map**

A map that portrays the distribution of features, incidents, or classifications related to a specific topic.

**Topologically Integrated Geographically Encoding Resource (TIGER) file**

A geographic file from the U.S. Census Bureau for management of census data. TIGER files use **topology** to organize various record types and entities describing street names, geographic areas, like Census geography and other physical features, such as railroads or streams. **TIGER** files contain address ranges useful for address processing.

**topographic map**

Graphic representation of the surface features of a place or region on a map, indicating relative positions and elevations.

## **topology**

Based on a branch of mathematics called graph theory, deals with the relationships of simple geometries (i.e. points, lines and polygons). These relationships can be used to automate and edit GIS data relating to both attributes and their graphic representation. Topology is the bases for DIME and TIGER files and is used by key GIS vendors to drive a “smart map”. For additional details, see also **geographic index database**.

## **transmission control protocol/Internet protocol (TCP/IP)**

A suite of communications protocols used to connect hosts on the Internet. In order to use the Internet or share a connection to the Internet, your computers will have to have these communications protocols installed and properly configured.

## **triangulated irregular network (TIN)**

A representation of a plane surface as a grid of triangular polygons. These models are used to represent elevations or other variables as a three-dimensional surface.

# **U**

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## **UNIX**

A computer operating system created at AT&T Bell Laboratories in 1969 for use on minicomputers. Several versions of UNIX have been developed since. Because UNIX is written in the standardized C programming language, it is suited to a broader range of computers than other operating systems.

## **user interface**

The portion of a software program with which a user interacts. Types include command line interfaces, menu-driven interfaces, and graphical user interfaces.

# **V**

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## **very high speed backbone network service (vNBS)**

An experimental wide-area network backbone sponsored by the National Science Foundation (NSF) and implemented by MCI. vNBS has replaced NSFnet and is designed to serve as a platform for testing new, high-speed Internet technologies and protocols. It currently links several Supercomputer Centers (SCCs) and Network Access Points (NAPs) at 2.5 Gbps (gigabits per second). In addition, it supports data, voice, and video traffic.

## **vector**

Any quantity having both amount and direction. Vectors are usually represented by directed line segments; the length of the line segment shows the vector quantity, and its direction is the same as that of the vector. A vector map contains the data about lines that allows the computer to calculate length and direction. This is contrasted with a raster map that displays images but not the data for line calculation.

## **virtual reality**

A computer simulation of a real or imaginary system that enables a user to perform operations on the simulated system and shows the effects in real time.

## **virtual reality modeling language (VRML)**

Used to serve three-dimensional information over the Internet using a VRML browser. In recent years the potential for visualizing urban spaces, elevation information, surface conditions, and other similar applications have found widespread use in planning and community participation process over the Internet.

## W

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### **wide area network (WAN)**

A communications network that connects geographically separated areas. Compare with **Local Area Network**(LAN).

### **world wide web (WWW)**

An information server on the Internet composed of interconnected sites and files, accessible with a browser.

## X

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### **xDSL**

Refers collectively to all types of digital subscriber lines, the two main categories being ADSL and SDSL. Using ADSL (Asymmetrical Digital Subscriber Line), the data is transmitted to your office at a faster rate than it is transmitted from your office to the service provider (i.e., fast incoming data, slower outgoing data). SDSL (Symmetrical Digital Subscriber Line) means that the data are transmitted at the same speed in both directions.

## Z

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### **z-axis**

Third or height axis of a three-dimensional Cartesian coordinate system that crosses the XY axis plane at a 90-degree angle. The z-axis is normally used to represent elevation above sea level.

**If a term is not contained within the URISA GIS Glossary of Terms please visit the Association of Geographic Science web site for a further list of GIS related terms and concepts at:**

**<http://www.geo.ed.ac.uk/agidict/welcome.html>**

