

Cyberspace

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"Cyberspace is the 'place' where a telephone conversation appears to occur. Not inside your actual phone, the plastic device on your desk. Not inside the other person's phone, in some other city. *The place between* the phones. The indefinite place *out there*, where the two of you, human beings, actually meet and communicate."

-- Bruce Sterling in *The Hacker Crackdown*

The word "cyberspace" was coined by the science fiction author William Gibson, when he sought a name to describe his vision of a global computer network, linking all people, machines and sources of information in the world, and through which one could move or "navigate" as through a virtual space.

The word "*cyber*", apparently referring to the science of [cybernetics](#), was well-chosen for this purpose, as it derives from the Greek verb "Kubernao", which means "to steer" and which is the root of our present word "to govern". It connotes both the idea of *navigation* through a space of electronic data, and of *control* which is achieved by manipulating those data. For example, in one of his novels Gibson describes how someone, by entering cyberspace, could steer computer-controlled helicopters to a different target. Gibson's cyberspace is thus not a space of passive data, such as a library : its communication channels connect to the real world, and allow cyberspace navigators to interact with that world. The reference to cybernetics is important in a third respect : cybernetics defines itself as a science of information and communication, and cyberspace's substrate is precisely the joint network of all existing communication channels and information stores connecting people and machines.

The word "space", on the other hand, connotes several aspects. First, a space has a virtually infinite *extension*, including so many things that they can never be grasped all at once. This is a good description of the already existing collections of electronic data, on e.g. the Internet. Second, space connotes the idea of *free movement*, of being able to visit a variety of states or places. Third, a space has some kind of a *geometry*, implying concepts such as distance, direction and dimension.

The most direct implementation of the latter idea is the technology of *virtual reality*, where a continuous three-dimensional space is generated by computer, which reacts to the user's movements and manipulations like a real physical space would. In a more metaphorical way, the geometry (or at least topology) of space can be found in the network of links and references characterizing a [hypertext](#) (which can be seen as the most general form for a collection of interlinked data). Nodes in a hypertext can be close or distant, depending on the number of links one must traverse in order to get from the one to the other. Moreover, the set of links in a given node define a number of directions in which one can move. However, a hypertext does not seem to have any determined number of dimensions (except perhaps infinity), it is not continuous but "chunky", and the distance between two points is in general different depending on the point from which one starts to move.

One of the challenges for the researchers who are trying to make present computer networks look more like a Gibsonian cyberspace is to integrate the intuitive geometry of 3-D virtual reality, with the more general, but cognitively confusing, infinite dimensionality of hypertext nets (see e.g. NCSA's project on navigation through information space). A first step in that direction are the extensions to World-Wide Web which allow the user to do hypermedia navigation in a two-dimensional image (e.g. a map of Internet Resources), by associating clicks

in different areas of the image with different hyperlinks. More ambitious proposals to develop a Virtual Reality interface to the World-Wide Web are being discussed.

As a description for what presently exists, the word "cyberspace" is used in a variety of significations, which each emphasize one or more of the meanings sketched above. Some use it as a synonym for virtual reality, others as a synonym for the World-Wide Web hypermedia network, or for the Internet as a whole (sometimes including the telephone, TV, and other communication networks).

None of the uses already seems to incorporate the most intrinsically *cybernetic* aspect of the concept : that of a shared medium through which one can exert *control* over one's environment. Control can apply as well to objects in cyberspace (e.g. when you alter the information in database through a Web form interface), as to objects in the real world (telepresence or teleoperation). As a first example of the control possibilities offered by the World-Wide Web, it is possible to steer a [operated robot arm to do excavations](#). I would venture that it is that last dimension which will turn out to be the most important one in the future, as it may form the substrate for a cybernetic "[superbeing](#)" or "[metabeing](#)"...

See also :

- [Symposium on "Theories and Metaphors of Cyberspace"](#)
- [Links on Cyberspace and the Web](#)