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NEWTON'S TELECOM DICTIONARY

**The Official Dictionary
of Telecommunications
Networking and
the Internet**

**16th
EXPANDED
& UPDATED
EDITION**

BY HARRY NEWTON

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NEWTON's TELECOM DICTIONARY

The Official Dictionary of Telecommunications
Networking and Internet

**16th and a Half Updated, Expanded and Much
Improved Edition**

Breadboard Writes Alex Richardson, "A breadboard is called a breadboard simply because that's what it was. You bought a ten cent wooden breadboard at the dime store, screwed down the tube sockets and heavy components such as transformers, and wired her up. Metal chasses were beyond those of us who had no sheet metal skills or tools. That came later. There were a lot of us."

Break An interruption. As in "Make and Break." Make means contacts which are usually open, but which close during an operation. "Make and Break" accurately describes rotary dialing.

Break In The attendant can interrupt conversations and announce an emergency or an important call.

Break Key A Break Key is found on some PCs. It is usually used to interrupt the current task running on a remote host. Break is not an ASCII character; it is simply a period of start (space) polarity.

Break Optimization A call center term. The automatic adjustment of break start times for schedules in the Daily Workfile so as to more closely match staff to workload in each period of the day. The program can thus improve upon the originally scheduled break arrangement because it now has information about schedule exceptions, newly added schedules, and additional call volume in AHT (Average Handle Time) history. See Break Parameters.

Break Out Box A testing device that permits a user to cross-connect and tie individual leads of an interface cable using jumper wires to monitor, switch, or patch the electrical output of the cable. The most common break out box in our industry is probably the RS-232 box. Some of these boxes have LEDs (Light Emitting Diodes), which allow you to see which lead is "live." See also Breakout Box.

Break Parameters A call center term. A group of scenario assumptions you set to govern the placement of breaks in employee scheduling. These are typically:

- Earliest allowable break start time
- Latest allowable break start time
- Duration of the break
- Whether the break is paid or unpaid

Break Test Access Method of disconnecting a circuit, which has been electrically bridged, to allow testing on either side of the circuit. Devices that provide break test access include: bridge clips, plug-on protection modules, and plug-on patching devices. Break test access also provides a demarcation point.

Breakage When a prepaid phone card is never used, the distributor/manufacturer gets to keep the money.

Breakdown Set A device that attaches to copper telephone pairs and sends current down the pairs. The current causes the wire to heat slightly, thus slowly drying out the cable. The device is used by telephone companies to dry out pairs of cables which have become wet.

Breakdown Voltage The voltage at which the insulation between two conductors breaks down.

Breaking Strength The amount of force needed to break a wire or fiber.

Breakout A wire or group of wires in a multi-conductor configuration which terminates somewhere other than at the end of the configuration.

Breakout Box A device that is plugged in between a computer terminal and its connecting cable to re-configure the way the cable is wired. When hooking up a terminal that is wired as if it were a computer itself (such as a VT-100), a break out box is used to break out, or fan out the 25 connections in the RS-232 cable.

Each wire in the break out box goes through a switch that can be turned off, and a wire jumper is provided to connect each pin on one side to one or the other pin on the other side. This allows you, for example, to switch pins 2 & 3, thus fooling two computer devices into thinking one is talking to a terminal. (Now you have the essence of a null modem cable.) Break out boxes are necessary, because there is no such thing as "standard" pinning on an RS-232 cable. To connect one computer to a printer one minute and to another computer the next minute, usually requires totally different wiring in the RS-232 cable, i.e. two sets of cables. This lack of standardization is why you'll always see dozens of RS-232 cables lying around where computers are used.

BRI Basic Rate Interface. There are two subscriber "interfaces" in ISDN. This one and PRI (Primary Rate Interface). In BRI, you get two bearer B-channels at 64 kilobits per second and a data D-channel at 16 kilobits per second. The bearer B-channels are designed for PCM voice, slow-scan video conferencing, group 4 facsimile machines, or whatever you can squeeze into 64,000 bits per second full duplex. The data (or D) channel is for bringing in information about incoming calls and taking out information about outgoing calls. It is also for access to slow-speed data networks, like videotex, packet switched networks, etc. See Basic Rate Interface and ISDN.

Brick A large hand-held cellular phone or handheld two-way radio. In more technical language, a "brick" is a station in the mobile service consisting of a hand-held radiotelephone unit licensed under a site authorization. Each unit can work while being hand-carried.

Bridge 1. In classic terms, a bridge is a data communications device that connects two or more network segments and forwards packets between them. Such bridges operate at Layer 1 (Physical Layer) of the OSI Reference Model. At this level, a bridge simply serves as a physical connector between segments, also amplifying the carrier signal in order to compensate for the loss of signal strength incurred as the signal is split across the bridged segments. In other words, the bridge is used to connect multiple segments of a single logical circuit. Classic bridges are relatively dumb devices, which are fast and inexpensive; they simply accept data packets, perhaps buffering them during periods of network congestion, and forward them. Bridges are protocol-specific, e.g., Ethernet or Token Ring in the LAN domain. Bridges also are used in the creation of multipoint circuits in the WAN domain, e.g., DDS (Dataphone Digital Service).

Bridges also can operate at Layer 2 (Link Layer) of the OSI Reference Model. At this level, a bridge connects disparate LANs (e.g., Ethernet and Token Ring) at the Medium Access Control (MAC) sub-layer of Layer 2. In order to accomplish this feat, the MAC Bridge may be of two types, encapsulating or translating.

Encapsulating bridges accept a data packet from one network and in its native format; they then encapsulate, or envelope, that entire packet in a format acceptable to the target network. For instance, an Ethernet frame is encapsulated in a Token Ring packet in order that the Token Ring network can deliver it to the target device, which must strip away several layers of overhead information in order to get to the data payload, or content. In order to accomplish this process, a table lookup must take place in order to change basic MAC-level addressing information.

Translating bridges go a step further. Rather than simply encapsulating the original data packet, they actually translate the data packet into the native format of the target network and

attached device. While this level amount of delay to the packet traffic a bridge is slightly greater, the level the workstation level is much reduced. Bridges also can serve to reduce process of filtering. A filtering bridge address of a data packet and perform order to determine whether it is through a port to a particular physical port bridge, for instance, would incoming port and forward it or which the target device is connected other two segments is reduced at those segments is reduced according to either programmed by the LAN self-learning. Self-learning bridges the attached devices on each segment query packets, and then remap addresses of the devices which bridges perform this process at repeat the "learning" process on a physical relocation of devices, (Network Interface Cards), and a dynamically dynamic LAN environment. While bridges are relatively simple scheme of things, they can get quite the bridge food chain. (Please do this stuff!) Bridges also can be Protocol (STP), Source Routing Routing Transparent (SRT).

Spanning Tree Protocol (STP) to 802.1 standard, are self-learning, bridges also have built-in security deny access to certain resources minimal ID. STP bridges can auto select for alternate paths should Source Routing Protocol (SRP) by specific routes for each data packet include physical node location at intermediate bridges) involved. This is for a maximum of 13 hops.

Source Routing Transparent (SRT) 802.1, are a combination of STP act in either mode, as programmed. 2. In the context of either audio conferencing, a bridge connects multiple channels so that they can either case, compensation is maintaining) in order to maintain contact all participants to hear and see a video conferencing, bridges a Multipoint Conferencing Units. bridges is their ability to figure the camera which is on that page be on everyone's screen.

3. Finally, we'll explain bridge: Imagine a phone line. It winds through the streets and over the imagine you want to connect a phone works on two wires, tip and ring. You simply clamp each or cable coming in. That's called a connecting a phone at a right angle made what's known as a "bridge"

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attached device. While this level of translation adds a small amount of delay to the packet traffic and while the cost of such a bridge is slightly greater, the level of processing required at the workstation level is much reduced.

Bridges also can serve to reduce LAN congestion through a process of filtering. A filtering bridge reads the destination address of a data packet and performs a quick table lookup in order to determine whether it should forward that packet through a port to a particular physical LAN segment. A four-port bridge, for instance, would accept a packet from an incoming port and forward it only to the LAN segment on which the target device is connected; thereby, the traffic on the other two segments is reduced and the level of traffic on those segments is reduced accordingly. Filtering bridges may be either programmed by the LAN administrator or may be self-learning. Self-learning bridges "learn" the addresses of the attached devices on each segment by initiating broadcast query packets, and then remembering the originating addresses of the devices which respond. Self-learning bridges perform this process at regular intervals in order to repeat the "learning" process and, thereby, to adjust to the physical relocation of devices, the replacement of NICs (Network Interface Cards), and other changes in the notoriously dynamic LAN environment.

While bridges are relatively simple devices, in the overall scheme of things, they can get quite complex as we move up the bridge food chain. (Please don't blame me. I didn't invent this stuff!) Bridges also can be classified as Spanning Tree Protocol (STP), Source Routing Protocol (SRP), and Source Routing Transparent (SRT).

Spanning Tree Protocol (STP) bridges, defined in the IEEE 802.1 standard, are self-learning, filtering bridges. Some STP bridges also have built-in security mechanisms which can deny access to certain resources on the basis of user and terminal ID. STP bridges can automatically reconfigure themselves for alternate paths should a network segment fail.

Source Routing Protocol (SRP) bridges are programmed with specific routes for each data packet. Routing considerations include physical node location and the number of hops (intermediate bridges) involved. This IBM bridge protocol provides for a maximum of 13 hops.

Source Routing Transparent (SRT) bridges, defined in IEEE 802.1, are a combination of STP and SRP. SRT bridges can act in either mode, as programmed.

2. In the context of either audioconferencing (voice) or videoconferencing, a bridge connects three or more telecommunications channels so that they can all communicate together. In either case, compensation is made for signal loss (called balancing) in order to maintain consistent quality, thus allowing all participants to hear and see each other with equal ease. In video conferencing, bridges are often called MCUs — Multipoint Conferencing Units. One feature of some video bridges is their ability to figure out who's speaking and turn on the camera which is on that person and have that person's face be on everyone's screen.

3. Finally, we'll explain bridge as a verb, as in "to bridge." Imagine a phone line. It winds from your central office through the streets and over the poles to your phone. Now imagine you want to connect another phone to that line. A phone works on two wires, tip and ring (positive and negative). You simply clamp each one of the phone's wires to the cable coming in. That's called bridging. Imagine bridging as connecting a phone at a right angle. When you do that, you've made what's known as a "bridged tap." The first thing to know

about bridging is that bridging causes the electrical current coming down the line to lose power. How much? That typically depends on the distance from the bridged tap to the phone. A few feet, and there's no significant loss. But that bridged tap can also be thousands of feet. For example, the phone company could have a bridged tap on your local loop, which joined to another long-defunct subscriber. The phone company technicians simply saved a little time by not disconnecting that tap. If you want the cleanest, loudest phone line, the local loop to your phone should not be bridged. Instead it should be a direct "home run" from your central office to your phone.

Bridging can be a real problem with digital circuits. Circuits above 1 Mbps (e.g., T-1) should never, ever be bridged. Because of the power loss, they simply won't work or will work so poorly they won't be worth having. ISDN BRI channels are also digital. But they were specifically designed to work with the existing telephone cable plant, which has a huge number of bridged circuits. Telephone companies typically will install ISDN BRI circuits with up to six bridged taps and about 6,000 feet of bridged cabling. But that's a rule of thumb. And frankly, if I were getting an ISDN line, I'd ask for a line that had no taps and no bridges.

4. To conference on another party. For example, when the repair tech says "let me bridge on my Supervisor" or "who's on this bridge?". See Conference and Conference Bridge. See Internetworking, Loading Coil, Routers, Source Routing and Transparent Routing.

Bridge Amplifier An amplifier installed on a CATV trunk cable to feed branching cables.

Bridge Battery A small supplementary battery on a laptop which holds the contents of the memory and the system status for a few minutes while you replace a drained battery. NEC uses the term on its UltraLite Versa laptops.

Bridge Clip A small metal clip that used to electrically connect together two sides of a 50 pair block. Removing the bridging clips breaks the circuit. You might remove the clips when you want to insert a piece of test gear and check to see which side the trouble is on.

Bridge Equipment Equipment which connects different LANs, allowing communication between devices. As in "to bridge" several LANs. Bridges are protocol-independent but hardware-specific. They will connect LANs with different hardware and different protocols. An example would be a device that connects an Ethernet network to a StarLAN network. With this bridge it is possible to send signals between the two networks, and only these two networks.

These signals will be understood only if the protocols used on each LAN are the same, e.g. XNS or TCP/IP, but they don't have to be the same for the bridge to do its job for the signals to move on either LAN. They just won't be understood. This differs from gateways and routers. Routers connect LANs with the same protocols but different hardware. The best examples are the file servers that accommodate different hardware LANs. Gateways connect two LANs with different protocols by translating between them, enabling them to talk to each other. The bridge does no translation. Bridges are best used to keep networks small by connecting many of them rather than making a large one. This reduces the traffic faced by individual computers and improves network performance.

Bridge Group Virtual LAN terminology for a group of switch interfaces assigned to a singular bridge unit and network interface. Each bridge group runs a separate Spanning Tree and is addressable using a unique IP address.