

Glossary

of Rural Telecommunications Terms



FOUNDATION FOR
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In developing this glossary, it was our intention to provide an overview of widely used terms in the rural telecommunications industry. This is not a comprehensive list of all the highly technical terms that are used in the industry, but an informative reference guide to help those individuals who have a connection to or interest in rural telecommunications.



**FOUNDATION FOR
RURAL SERVICE**

The Foundation for Rural Service (FRS) is a 501©(3) nonprofit that seeks to sustain and enhance quality of life in America by advancing an understanding of rural issues. Established in 1994 by NTCA–The Rural Broadband Association, in addition to offering scholarships and grants, FRS produces educational materials and programming for consumers and policymakers. The foundation’s vision is to harness the power of the rural communications industry to enrich lives in America.

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“Mr. Watson—come here—I want to see you.”

The advances made in the telecommunications industry since the first telephone call was made in 1876 by Alexander Graham Bell to his assistant, Thomas Watson, are extraordinary. Key to understanding terms used by the telecom industry is understanding the context by which they were developed. To help aid in this education, in this publication, we have included an overview of the concept of “universal service” and how it has been and continues to be integral to ensuring rural America is connected.

Connecting Communities Connects America: The Birth and Evolution of Universal Service

I. Universal Service Beginnings

Universal service recognizes that the costs of providing communications services to all corners of the land vary widely, but that the nation benefits from a truly national network—that is, one that connects to as many Americans as possible. In simple terms, universal service can be described as a system that benefits everyone because everyone else has access to a telecommunications network.

The economic, demographic and geographic challenges presented in trying to deploy and operate communications networks in rural areas are obvious. There is little to no business case for investments or operations of costly telecommunications network assets in many rural “markets,” given densities that can often be measured in a few customers per mile and distances that can span dozens, hundreds, or even thousands of square miles. In the absence of an effective and sufficiently supported national universal service policy that makes the business case for rural communications possible, millions of rural Americans would be left disconnected from the rest of America and the world.

The foundation for today’s firmly settled “universal service” policy that presumes America as a whole is better off when all Americans are connected to one another via communications services can be traced back over a century. In 1913, to settle antitrust claims by the U.S. Department of Justice over its monopoly in emerging telephone markets, AT&T entered into the “Kingsbury Commitment,” agreeing to interconnect with small local independent telephone operators rather than denying their customers the ability to place and receive long-distance telephone calls.

Building upon this original commitment, the official statutory beginnings of federal policy focused on connecting all Americans can be found in the Communications Act of 1934. In this law, Congress established the Federal Communications Commission (“FCC”) and directed federal policy to ensure that communities across the nation were connected to America’s newest infrastructure platform. This policy was referred to as “Universal Service,” capitalizing upon the network concept expressed by AT&T President Theodore Vail: “One Policy, One System, Universal

Service.” As part of this policy—and just as important to ensure reasonably affordable service in rural areas—“settlements” paid by AT&T for transmittal of calls across local independent carrier networks help to justify investments in those networks and recover the costs of operating them.

Although AT&T maintained a monopoly in the long-distance market and in many local telephony markets through the Bell system over the next half-century, interconnection with smaller independent providers remained a core tenet of universal service. Moreover, during this period, America further encouraged community-based telecom providers to invest in critical infrastructure, enabling rural customers to have telephone service. Government support, in the form of the Rural Electrification Administration (REA, now Rural Utilities Service), expanded in 1949 to include the REA telephone loan program. The REA programs contributed directly to the development and success of the electrical and telephone networks that serve rural America. These programs helped to fill gaps in coverage in rural communities where either AT&T or pre-existing independent telephone companies were not delivering service.

Even when AT&T’s monopoly was broken up in 1984 and its local telephone properties were divested, ensuring continued seamless interconnection between rural and urban communities—between local telephone companies and the newly competitive long-distance marketplace—remained an essential focus of the policy changes to avoid disrupting the availability of universal service. This included cost recovery for local network operators in the form of “access charges” from all long-distance carriers to ensure that the same kinds of “settlements” that AT&T paid as a long distance monopoly would continue to sustain rural networks and keep rural user rates affordable in the face of a competitive long distance marketplace.

II. The Telecommunications Act of 1996

Near the end of the last century, Congress passed legislation designed to update federal laws governing telecommunications. In particular, the Telecommunications Act of 1996 sought to address technological and marketplace changes that included the early advent of the internet and the interest of many companies in competing in other telecom markets. The Telecom Act sought to open many local telephone markets to competition, while also enabling larger local telephone companies to enter the already competitive long-distance marketplace subject to the status of competition in their local markets.

In rural areas, however, the Telecom Act recognized the special challenge and tension of promoting and advancing universal service—that competition could be contrary to the public interest in high-cost areas where justifying investment in and sustaining even just a single network was a challenge. As a result, the law placed restrictions on the terms and conditions under which competitors could enter local telephone markets and also codified the federal Universal Service Fund (or “USF”) to make more explicit, supplement and reconfigure the rural network support provided through access charges paid to local carriers by long-distance companies. The Telecom Act also expanded the notion of universal service to include new programs for school and library and rural health care provider discounts, and codified the “lifeline” program that subsidized services for low-income consumers.

III. Recent Reforms—Aiming Toward Universal Broadband

After years of discussion and debate, and particularly in recognition of the rise of broadband as the fundamental communications technology of the early 21st century, the FCC undertook reforms of the USF and intercarrier compensation mechanisms starting in early 2010 with the release of the National Broadband Plan. In this plan, the FCC observed that the then “current High-Cost program is not designed to universalize broadband. While some companies receiving High-Cost support have deployed broadband-capable infrastructure to serve most of their customers, others have not.” The FCC also recognized in the plan that its USF program was undersized to tackle the challenges of connecting America and required updating to realize a vision of universal broadband.

In 2011, the FCC adopted a “Transformation Order” that implemented many of the recommendations of the National Broadband Plan. This order reoriented the USF program toward more explicit support of broadband services, and made a number of other structural changes to the High-Cost portion of the USF program. However, rather than attempting to address what had been recognized in the plan as a lack of sufficient funding to overcome the challenges of achieving universal broadband, the FCC adopted a firm fixed budget for the High-Cost USF program set at 2010 funding levels and attempted to redirect some of that funding toward unserved areas by placing caps on USF cost recovery for carriers that had previously invested in broadband-capable rural networks. This transfer and shift toward unserved markets resulted in increased network investment in some rural markets, but also created uncertainty and unpredictability that resulted in decreased broadband investment by many smaller rural operators and put at potential risk investments that had already been made in rural networks.

While the FCC ultimately eliminated some of the 2011 changes that had the most negative impact on investments and enacted some additional USF reforms in 2016, the budget for USF to serve rural areas remains locked at 2010 funding levels, without even an inflationary adjustment that applies to several other USF programs. In summary, while the FCC has taken steps to direct more USF support toward some unserved areas and attempted to stabilize support for such locations, questions persist about the ability to sustain services and networks in other parts of rural America. As a result, the FCC and Congress continue to consider whether and to what degree additional changes or reforms and more sufficient support is required to fulfill the mandate of universal service in a broadband world.

FRS Glossary of Rural Telecommunications Terms

Welcome to the FRS Glossary of Rural Telecommunications Terms. This guide was developed to provide definitions of some of the most widely used terms in the rural telecommunications industry.

4G and 5G: The fourth and fifth generations of mobile communications standards providing high-speed internet and transmissions of text, voice, video and multimedia. 5G is the next generation standard and is expected to be much faster than 4G (also see LTE).

A

A-CAM (Alternative Connect America Cost Model): A voluntary, model-based alternative mechanism that rate-of-return carriers may elect to receiving High-Cost support from the Universal Service Fund. Any rate-of-return carrier not electing model-based support can continue to receive support calculated using prior high-cost support mechanisms according to FCC rules.

Access Charge: A fee for the use of local exchange facilities, especially for access to these facilities to provide long-distance service.

Access Point: A hardware device or a computer's software that acts as a communication hub for users of a wireless device to connect to a wired LAN. Access points are important for providing heightened wireless security and for extending the physical range of service to which a wireless user has access.

ACE (Association of Communication Engineers): A nonprofit organization of registered, professional engineering consulting firms committed to supporting consulting engineers working in the field of telecommunications.

Ad Hoc Network: A short-term wireless network created between two or more wireless network adapters without going through an access point. Ad hoc networks are handy for quickly trading files when there is no other way of connecting two or more computers.

ADS (alternate delivery system): Refers to signals delivered by means other than via cable and over-the-air, such as satellite and telco.

ADSL (asymmetric digital subscriber line): An 'always on' technology designed to increase the bandwidth available over standard copper telephone wires. "Asymmetric" refers to the fact that the downstream speed is greater than the upstream. Thus, ADSL exploits the trend that most homes and businesses consume more data than they generate. This technology is ideal for one-way applications such as video on demand and graphics downloading, but much less suitable for two-way applications, such as videoconferencing (also see DSL).

Adware: Software that automatically downloads or displays advertising information while the program is running. Some types of adware are considered privacy invasive and are termed as spyware.

Air Interface: In cellular telephone communications, the air interface is the radio-frequency portion physical and data link of the circuit between the cellular phone set (or wireless modem) and the base station. Air interface also defines the frequency use, the bandwidth of the individual radio channels, the encoding methods used (e.g., W-CDMA, UMTS-FDD, CDMA Direct Spread) and other quantities used by the radio technology.

Analog Transmission: A signaling technology in which sound waves or other information are converted into electrical impulses of varying strengths. Analog transmission is the traditional telephone technology for voice transmission, but has generally been replaced by digital transmission.

Android: A Linux-based operating system for mobile devices such as smartphones and tablets. Originally created by the Open Handset Alliance, it is now one of the largest smartphone platforms in the world.

Application (app): A computer software program designed to help the user perform specific tasks. Although most commonly applied as software for smartphones, apps also are used on other wired and wireless broadband networks.

ARC (access recovery charge): Allows incumbent local exchange carriers to recover part of the revenues lost through FCC required reductions to access rates.

ARPU (average revenue per unit): The average revenue generated per customer unit per month. ARPU is an indicator of the financial performance of a company.

APT (advanced persistent threat): A network attack in which an unauthorized person gains access to a network and stays there undetected for a long period of time. The intention of an APT attack is to steal data rather than cause damage to the network or organization.

ASP (application service provider): A business that offers software application capabilities to business users via the internet from a centralized data center.

ATM (asynchronous transfer mode): A high-speed multiplexing and switching method utilizing fixed-length cells to transmit voice, data and video.

AWS (advanced wireless service): A term the FCC uses to refer to an array of innovative wireless services, including wireless broadband internet access. Since the early 2000s, the FCC has designated several spectrum bands to support these services. In March 2014, the FCC authorized 65 MHz of spectrum in the 1695–1710 MHz, 1755–1780 MHz, and 2155–2180 MHz bands for AWS-3 licenses.

B

Backhaul: This term was originally used to describe the transmission of a telephone call or data beyond its normal destination point and then back again to utilize available personnel (operators, agents, etc.) or network equipment not available at the destination location. For example, depending on distances and service arrangements, it might be cheaper to send a telephone call on a private line to a location beyond the destination and then call back to the

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Website Addresses of Organizations Referenced in Glossary

ACE (Association of Communication Engineers)—www.ace-engineers.org

FCC (Federal Communications Commission)—www.fcc.gov

FirstNet (First Responder Network Authority)—<https://www.firstnet.gov>

FRS (Foundation for Rural Service)—www.frs.org

IANA (Internet Assigned Numbers Authority)—www.iana.org

ICANN (Internet Corporation for Assigned Names and Numbers)—<https://www.icann.org>

IEEE (Institute of Electrical and Electronics Engineers)—www.ieee.org

IETF (Internet Engineering Task Force)—www.ietf.org

NARUC (National Association of Regulatory Utility Commissioners)—www.naruc.org

NECA (National Exchange Carrier Association)—www.neca.org

NIST (National Institute of Standards and Technology)—www.NIST.gov

NREDA (National Rural Economic Developers Association)—www.nreda.org

NRTC (National Rural Telecommunications Cooperative)—www.nrtc.coop

NTCA (NTCA—The Rural Broadband Association)—www.ntca.org

NTIA (National Telecommunications and Information Administration)—www.ntia.doc.gov

RTFC (Rural Telephone Finance Cooperative)—www.rtfc.coop

RUS (Rural Utilities Service)—www.usda.gov/rus

USDA (U.S. Department of Agriculture)—www.usda.gov



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