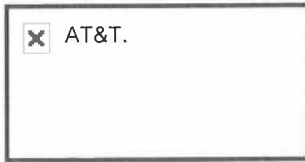


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1885: The American Telephone and Telegraph Company is formed as a subsidiary of then-Bell Telephone Company with a charter to build and operate the original long distance network. By the e AT&T completes its first line, between New York and Philadelphia. The initial capacity of the line was o



1892: AT&T reaches its initial goal, opening a long distance line connecting New York and circuit could handle only one call at a time. The price was \$9 for the first five minutes.



1911: AT&T inaugurates service between New York and Denver, the longest line possible Developed around 1899 by Michael Pupin of Columbia University and George Campbell of AT&T, load the rate at which a traveling telephone signal weakens — making it possible to build longer telephone lin



1914: The headquarters and operations center of the AT&T Long Lines division opens at 2. New York City, the oldest section of what later became AT&T's corporate headquarters at 32 Avenue of Long Lines, a unit of AT&T and the Bell System, builds and operates the interstate long distance network

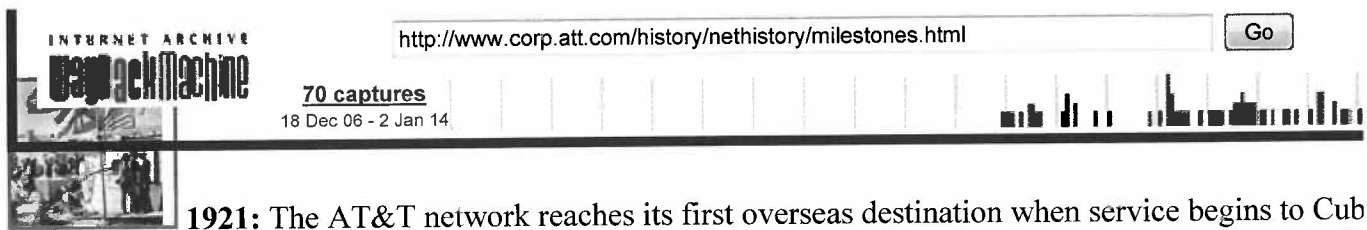


1915: Using the first practical electrical amplifiers, developed by AT&T's Harold Arnold, . first transcontinental telephone line. The new line connects the network that AT&T had been building ou from New York since 1885 with a separate network that had been constructed by AT&T's Pacific Teleph the West Coast. In effect, it connects telephones throughout the continental United States. The ceremonia 25 has four locations: New York City, San Francisco, the White House in Washington, D.C., and Jekyll I AT&T President Theodore Vail is at the time. Service is available to all telephone customers, but at an in for the first three minutes between New York and San Francisco, volume is low.

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1921: The AT&T network reaches its first overseas destination when service begins to Cuba between Key West, Fla., and Havana. U.S. President Warren Harding inaugurates service on April 15. Cuban President Menocal. The capacity of the line is one call. A call between Havana and New York costs first three minutes; a call between Havana and San Francisco costs \$22.35.



1924: AT&T demonstrates long distance telephotography, now known as fax, with the transmission of photos over telephone wires between Cleveland and New York. Commercial service begins in a handful of cities the same year. For many decades, telephotography had one major use — sending photos of distant events for use by the press.



1927: AT&T begins trans-Atlantic telephone service, initially between the United States and Europe. Conversations cross the Atlantic via radio. The initial capacity is one call at a time at a cost of \$75 for the first three minutes.



1927: AT&T presents the first demonstration of television transmission in the United States. President Woodrow Wilson's live moving images are transmitted over wire from Washington, D.C., to New York. The transmission was seen by AT&T President Walter Gifford and a large audience.



1934: AT&T inaugurates trans-Pacific telephone service, initially between the United States and Japan. Travel across the Pacific via radio. The initial capacity is one call at a time at a cost of \$39 for the first three minutes.

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1939-1943: The volume of long distance calls increases by 350 percent due to world war I cannot build additional circuits during the war, we run ads asking consumers not to make long distance c:



1941: The first non-experimental installation of coaxial cable in the network is placed in se Minneapolis, Minn., and Stevens Point, Wis. Compared to such earlier transmission technologies as oper coaxial cable, coaxial cable has higher capacity and lower cost on high-volume routes. It also has sufficie carry television signals.



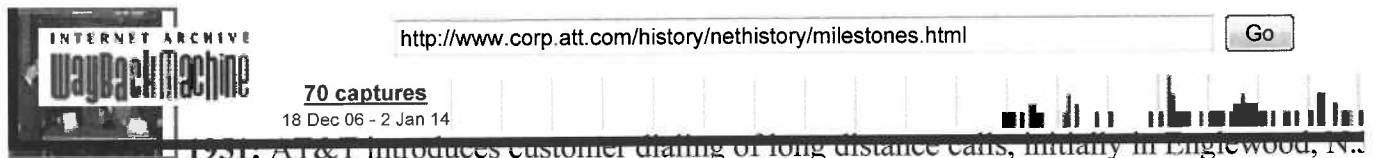
1943: AT&T installs the first automatic long distance telephone switch, the No. 4 crossbar, Operators at a switchboard attached to the switch dial long distance numbers, including area codes, whicl internally for this purpose. Previously, all long distance calls were completed by operators plugging into to other operators in distant cities. The new switch cuts the time needed to complete a call from about 60 20.



1947: The first commercial microwave-relay system goes into operation, providing telephc circuits between New York and Boston. Network traffic for the next 35 years is carried primarily by a mi relay and coaxial cable.



1948: AT&T begins offering networking services for television on facilities connecting ma Northeast and Midwest. The service reaches the West Coast in 1951. Television networks use this service programming to their affiliated stations around the country.



1951: AT&T introduces customer dialing of long distance calls, initially in Englewood, N.J. rollout takes place over the second half of the 1950s. Until this innovation, all long distance calls required assistance.



1956: AT&T opens for service TAT-1, the first trans-Atlantic telephone cable. The initial cost was at a time at a price per call of \$12 for the first three minutes. Since trans-Atlantic service opened in 1927, it was across the ocean via radio waves. But cables provide much higher signal quality, avoid atmospheric interference, greater capacity and security.



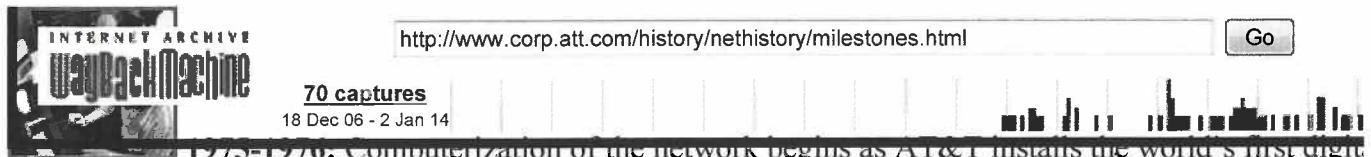
1962: AT&T opens the Network Control Center in New York, its first facility designed to manage the long distance network.



1964: AT&T opens TPC-1, the first submarine telephone cable across the Pacific. It went from the mainland to Hawaii, where it connected to two cables linking Hawaii with the mainland. This brought the same improved Pacific service that TAT-1 had brought to trans-Atlantic service in 1956.



1970: AT&T introduces customer dialing of international long distance calls, initially between New York and London. Up to this time, all overseas telephone calls required an operator.



1975-1976: Computerization of the network begins as AT&T installs the world's first digital switch, the 4ESS[®], in Chicago. This switch could handle a much higher volume of calls (initially 350,000) with greater flexibility and speed than the electromechanical switch it replaced.



1976-1977: AT&T Long Lines headquarters and Network Operations Center moves to Bedminster, New York.



1983: AT&T installs the first fiber-optic cable in its long distance network, between New York and Washington, D.C. Whereas earlier systems transmitted electrical signals over copper wire or radio waves, fiber optics transmit information as rapid light pulses down ultra-pure glass fibers. Fiber optics have much greater capacity and lower costs than the technologies they replaced. Today, 98 percent of all AT&T domestic traffic travels on fiber-optic networks.



1987: AT&T replaces its 10-year-old Network Operations Center with a new center at the Bedminster, N.J. The new center features a two-story-high status wall containing 75 video screens that allow operators a view of the entire network in a glance and "dynamic routing" capabilities to maneuver calls.



1988: AT&T lays and opens TAT-8, the first fiber-optic submarine telephone cable across the Atlantic. It has a capacity equivalent to 40,000 calls, 10 times that of the last copper cable. (Today's cables have capacities over 1 million calls.)

1992: AT&T installs its first FASTAR[®] (fast automatic restoration) system in its network in Florida. FASTAR reduces the restoration of service after a fiber-optic cable cut from hours to minutes.

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installs the last new 4ESS[®] switch in its network, signaling our commitment to evolve from historic circuit switching to packet switching, the wave of the future



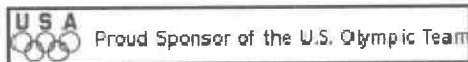
1999: AT&T's new Global Network Operations Center opens in Bedminster, N.J., on December 10. Around the clock, the center manages all aspects of AT&T's network, including domestic and global long distance, and eventually broadband and Internet services. It is three times the size of its predecessor, and features a video wall to provide real-time information to network managers.

2000: The Global Network Operations Center holds its official grand-opening ceremony on Feb. 10.

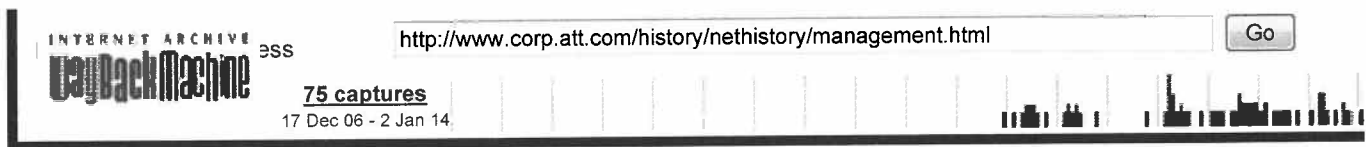
2002: AT&T deploys a new nationwide intelligent optical network which restores service faster in the event of a disaster. This new network also provides the capability to dramatically shorten provisioning time for new services for business customers who have direct access to the network.

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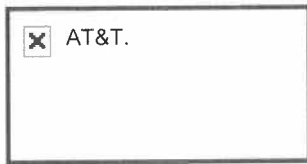
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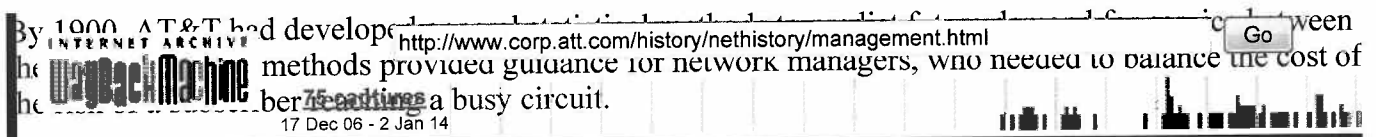
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History of Network Management.

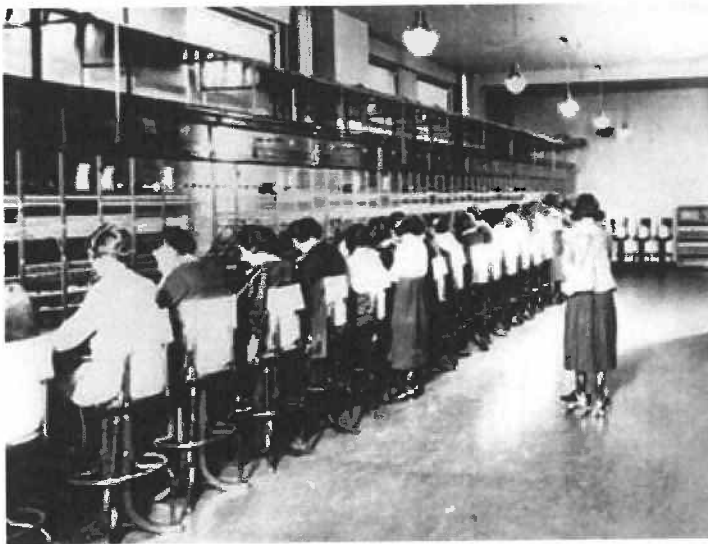
For more than a century, AT&T people have managed the AT&T network to provide superior reliable service. In the early years, as AT&T extended its network, "management" meant deciding which new routes to build and which needed additional circuits.



There was little active day-to-day traffic management, nor was any really needed in an era when subscribers called back by an operator when their distant party was on the line. To an extent, these operators themselves managed the network, one call at a time, as they sought routings through other switchboards that would get the custom

1920s: Network management begins

By the 1920s, AT&T had designed its network to meet the demands for quick, efficient service at the peak of normal business day. But unusual events, such as holidays and natural disasters, could cause delays. Handwritten notes required active, coordinated management of the network as a whole.

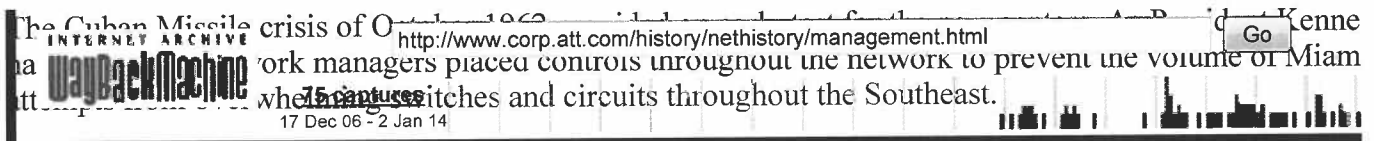


Long Distance operators, Kansas City, Missouri, 1920. The supervisor is on roller skates so she can get a room more quickly to assist the operators.

Active network management began in the mid-1920s with the establishment of regional Traffic Control Bureaus in Cleveland and New York. These bureaus served as clearinghouses for all information affecting traffic over the network. The bureaus stayed in contact with each other and with important switching centers in their respective areas. They used dedicated teletype (printing telegraph) systems. Their staffs implemented plans for coping with unusual conditions, such as bad weather, damaged lines or other emergency situations. Switching centers might be instructed to reroute calls or be temporarily reassigned. Large, manually operated wall displays provided a visual depiction of the current status of the network routes. The bureaus closed in the late 1950s.

1960s: Network Control Center

AT&T opened a Network Control Center in New York in 1962. By now, most customers dialed their own numbers. Switch and route information flowed in real time from the most important toll switches to status boards in New York. Similar data from the rest of the switches flowed into three new regional centers in Chicago, Rockdale, and Galesburg, N.Y. Network managers could respond more quickly to unusual situations, and instruct the relevant switches to take steps, such as heading off calls with little chance of completion, or sending calls over indirect alternate available circuits.



1970s: Network Operations Center



AT&T Network Operations Center, Bedminster, N.J., 1987.

In 1977, AT&T replaced the Control Center with a Network Operations Center (NOC) in Bedminster, N.J. The NOC included domestic and international status boards, which automatically updated every 12 seconds, and could instantly provide managers with the information needed to reroute calls.

Many changes followed over the next decade. Dramatically increased computer intelligence became available to the network itself and in auxiliary functions. Common channel signaling put call-set-up on a digital network circuit that carried the calls. The network moved from analog toward digital technologies. One effect of this was an increased ability to actively manage the network — both automatically and by management intervention.

1980s: Updating the NOC

AT&T revamped and modernized the NOC in 1987, adding a 75-screen video wall where computer-driven graphics provided information on multiple layers and categories of network activity. Managers used computer systems to find detailed information on any switch or route in the network. They then used those same systems to make changes to any place in the network.

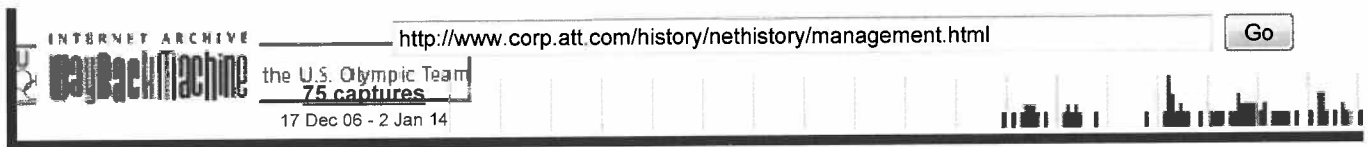
Global Network Operations Center

AT&T's system had become a Worldwide Intelligent Network. Two regional control centers, in Denver and San Francisco, opened in 1991, and assumed the task of monitoring and managing the flow of traffic onto and off of the network.

In 1999, AT&T replaced the NOC with a new Global Network Operations Center, to better to meet the needs of the new century.

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