

COMMUNICATIONS
(FY2023 Revenue: \$118.038B)

The **Communications** segment provides wireless and wireline telecom and broadband services to consumers located in the U.S. and businesses globally. AT&T's business strategies reflect bundled product offerings that cut across product lines and utilize shared assets. This segment contains the following business units: (1) **Mobility** provides nationwide wireless service and equipment, (2) **Business Wireline** provides advanced ethernet-based fiber services, IP Voice and managed professional services, as well as traditional voice and data services and related equipment to business customers, and (3) **Consumer Wireline** provides broadband services, including fiber connections that provide multi-gig services to residential customers in select locations. Consumer Wireline also provides legacy telephony voice communication services. The segments' service and products are marketed under the AT&T Cricket, AT&T PREPAID, and AT&T Fiber brand names.

MOBILITY

Wireless Communications Services



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FIRSTNET
Built with AT&T

Equipment



BUSINESS WIRELINE

Business Services



Equipment

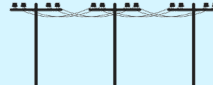


CONSUMER WIRELINE

Broadband Services

AT&T fiber

Legacy Voice and Data Services



Other Services and Equipment

 U-verse

LATIN AMERICA-MEXICO
(FY2023 Revenue: \$3.932B)

The **Larin America** segment provides wireless communications services in Mexico (marketed under the AT&T and Unefon brand names), utilizing its regional and national wireless networks in Mexico. AT&T acquired its Mexican wireline operations in 2015 to establish a seamless, cross-border North American wireless network which now covers an area with over 438 million people and business in the U.S. and Mexico. The company's 4G LTE network in Mexico now covers 104 million people and businesses.

MEXICO

Wireless Communications Services



AT&T



UNE FON

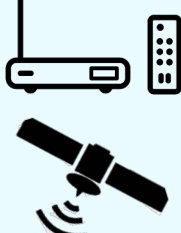
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Equipment



SKY MEXICO





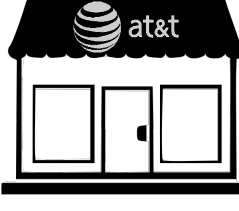


AT&T Inc

208 S. Akard St.
Dallas, TX 75202

AT&T Inc. (a Delaware corporation)

	Regulation Regarding General U.S. Businesses and Communications	
	Bond Financing	→
	Foreign Currency Exchange and Interest Rate Derivatives	→
	Working Capital Financing	→
	Labor Union Representation and Collective Bargaining Services	→
	25-Year First Net Agreement (in 2017, FirstNet selected AT&T to build and manage the first nationwide, interoperable broadband network dedicated to America's first responders; FirstNet provided 20 MHz of valuable telecommunications spectrum and success-based payments of \$6.5 billion to support the buildout, which has been substantially completed; AT&T must make sustainability payments of \$18.0 billion over the contract term)	→
	Sales of (A) Wireless and Wireline Voice, Text and Data Services Via AT&T's Broadband/Internet and Mobile Network and (B) Mobile Devices and Equipment	←
ities and	IT Equipment and Accessories (smartphones, tablets, laptops, watches, headphones, cases, screen protectors, speakers and smart home systems)	←

Company History		Equity Structure	
Corporate Brands 	Equity Capital 2014 Share Repurchase Program Authorized: 300 Million Shares Expiration: None Remaining: 156 Million Shares Preferred Stock (Series A, B and C) Authorized: 10 Million Shares Issued/Outstanding: Series A-48,000, Series B-20,000, Series C-70,000 Record Holders: Not Available Common Stock Authorized: 14 Billion Shares Issued: 7.621 Billion Shares Outstanding: 7.153 Billion Shares Record Holders: 749,207		
Finance and Accounting	Information Technology	Legal	Corporate Matters
Accounting and Financial Reporting Investor Relations Treasury Tax Corporate Real Estate Financial Planning Auditing Strategy and Development Corporate Strategy Corporate Development Venture and Investments Business Development	Technology Organization Oversight (Business, Consumer, Data & Analytics, IT & Cloud, Network Architecture & A1&T Labs, Security, New Product Development) Legacy IT Infrastructure Modernization Cloud Migration (and retiring outdated systems) Data and Security Offices Technology Platforms (Network, Business, Consumer) New Products and Services (Built on A1&T's leading-edge 5G and Fiber Connectivity)	Transactions Legal Operations Corporate Governance Intellectual Property Management Litigation Management Compliance Internal Compliance Customer Privacy Policy Policies for Safeguarding of Employee Information Legal Compliance Regulatory Compliance	Marketing and Growth Advertising Brand Strategy Marketing Strategy and Planning Market Research/Insights Competitive and Customer Intelligence Strategic Partnerships Latin America/Global Marketing Advertising Corporate Communications Events and Sponsorships Operations Network Operations (Mobility, Business Wireline, Consumer Fiber and Copper Wireline, Equipment) Technology Operations Data and Lab Operations Cybersecurity Operations Supply Chain and Procurement
Latin America-Mexico (FY2023 Revenue: \$3.932 Billion) The Larin America segment provides wireless communications services in Mexico (marketed under the AT&T and Unifon brand names), utilizing its regional and national wireless networks in Mexico. AT&T acquired its Mexican wireline operations in 2015 to establish a seamless, cross-border North American wireless network which now covers an area with over 438 million people and business in the U.S. and Mexico. The company's 4G LTE network in Mexico now covers 104 million people and businesses.  			
Mexico Provides post-paid and pre-paid wireless services in Mexico to approximately 22 million subscribers under the AT&T and Unifon brands. Wireless Communications Services Voice Data Text   Equipment Handsets (including smartphones) Distribution Channels (AT&T-owned stores, agents and third-party retail stores) 			
SKY Mexico Televisa (58.7%) and AT&T Mexico (41.3%) jointly own a Corporacion Novavisión, S. de R.L. de C.V. (doing business as "SKY México"), which operates the leading subscription pay-TV provider in Mexico, Central America and the Dominican Republic. SKY México produces TV content and owns several TV channels. 			
Subscription Service (Internet cellular and satellite television service available to individual consumers in Mexico, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama, and Dominican Republic)    SUBSCRIBE 			
Latin America-Mexico Competition   			
Supplier Financing Program (to manage the timing of A1&T's payments to suppliers on at least 90-day terms and thereby optimize A1&T's use of its cash, A1&T provides suppliers access to bank facilities that permit the earlier payment to suppliers at a discounted price)			
Third Party Retail Stores and Agents  Technology Solutions (mobility, voice, security, hybrid IT, security, end-of-life buyback, network, warehouse, repair) 			

Customers	Suppliers	Capital	Regulators
		Significant Shareholders Vanguard Group (8.67%) Vanguard BlackRock Fund Advisors (7.48%) BlackRock State Street Corporation (4.15%) STATE STREET Newport Trust Company (2.79%) NEWPORT Geode Capital Management (1.99%) GEODE Capital Management Co. Institutional Ownership (57.35%)	Securities Regulators U.S. Securities and Exchange Commission (regulation of offers and sales securities, material event disclosure and financial reporting requirements; recordkeeping requirements under anti-bribery laws)  New York Stock Exchange (listing, maintenance and corporate accountability rules) NYSE AN IBOC EXCHANGER
	Professional Service Firms Ernst & Young (audit services) EY Omnicom Group (BBDO; Hearts & Sciences) (creative and media services) Omnicom Group Akin, Gump, AT&T Inc (lobbying services) Akin Gump STRATEGIC ADVISORS & ALLIANCE  AT&T Sullivan & Cromwell (legal services for WarnerMedia transaction) SULLIVAN & CROMWELL LLP Goldman Sachs (financial advisor services for WarnerMedia divestiture) Goldman Sachs		
		Key Company Data as of December 31, 2023 Business Overview: AT&T Inc. is a multinational conglomerate and one of the world's largest telecommunications companies, headquartered in Dallas, Texas. Founded in 1983, AT&T is a prominent player in telecommunications industry sectors, offering a wide range of wireless communication, wireline communication, broadband, and digital television services. AT&T divesting its WarnerMedia business, AT&T now operates through two business segments: (1) Mobility, which includes data services and high-speed internet and (2) Latin America, which includes telecom services and SKY Mexico entertainment. In the U.S., AT&T's network covers all major metropolitan areas and 334+ million people with its LTE technology (and 302+ million people with its 5G technology).	
		Share Data New York Stock Exchange Ticker Symbol: T Share Price: \$16.93 (02/29/2024) Earnings Per Share (Trailing 12 Months): \$1.97 Forward Annual Dividend: \$1.11/share Market Cap: \$12.1TB (02/29/2024)	Financial Highlights Statements of Income Net Revenues: \$122.428B Cost of Revenues: \$50.123B Gross Profit: \$72.305 (59% margin) Other Operating Expenses: \$48.844B Operating Income: \$23.461B Net Income: \$14.192B Balance Sheet Total Assets: \$407.08B Total Liabilities: \$289.618B Long-Term Debt: \$127.854B Total Debt: \$137.331B Equity: \$117.442B Cash Flow From Operations: \$38.314B Used in Investing: \$(19.660)B Used in Financing: \$(15.614)B Financial Returns Return on Equity: 12.08%
Latin America Customers Mexico Post-Paid Consumers (22 million subscribers) Pre-Paid Consumers (these consumers prefer to pay in advance) SKY Mexico Individual Consumers (approximately 7 million subscribers)	BlackRock (one of the world's leading asset managers and providers of investment, advisory and risk management solutions) BlackRock Gigapower (joint venture to build a commercial, wholesale open-access fiber optic network delivering multi-gigabit speeds to (1) an initial 1.5 million customer locations, with AT&T as its anchor tenant; and (2) other business across the U.S. that serve customers outside of AT&T's wireline service area) GIGAPOW TPG (Texas-based private equity firm, formerly known as Texas Pacific Group and TPG Capital)  DirectTV Entertainment Holdings LLC (leading satellite television service provider offering entertainment to U.S. subscribers in the form of hundreds of channels, including sports (such as NFL Sunday Ticket), movies, news, and premium content. DVR capabilities to record and playback shows at the customer's convenience. With flexible package options and a reputation for reliable service, DirectTV remains a popular choice for those seeking comprehensive television entertainment) DIRECTV	Headquarters: Dallas, Texas Founded: 1983 AT&T-Owned Stores: 5,442 (as of 11/29/2023)  Values: Live True. Think Big. Pursue Excellence. Be There. Stand for Equality. Make a Difference.	
		Key Developments Background. AT&T was founded as Bell Telephone Company by inventor Alexander Graham Bell in 1877. It grew to be so dominant in the U.S. telephone service market that in 1982, the Department of Justice ordered AT&T to divest its regional operating companies (the Baby Bells), including Southwestern Bell (or SBC). In 1995, SBC acquired AT&T and adopted its name and brand. The new AT&T subsequently acquired Bell South (another Baby Bell) and an interest in Cingular Wireless. With traditional telephone service in decline, AT&T has shifted to wireless telecommunications.	
		WarnerMedia Separation. In April 2022, AT&T completed the separation of its WarnerMedia business. Upon its separation, WarnerMedia business met the criteria for discontinued operations, as did other dispositions that were part of a single plan, including Vizio, Xandr and Authentic Media.	



AT&T Dedicated Internet: AT&T Dedicated Internet refers to a service provided by AT&T that offers a high-speed, reliable connection for business customers. Unlike standard residential internet connections, which are shared among multiple users and subject to fluctuations in speed and reliability, dedicated internet provides a consistent and guaranteed level of bandwidth exclusively for the customer's use.

Bandwidth: Bandwidth in the context of computer networking and internet connectivity refers to the maximum rate of data transfer across a network connection. It is commonly measured in bits per second (bps), and higher bandwidth indicates a higher capacity for data transfer. Bandwidth affects the speed and quality of data transmission, including internet browsing, streaming, downloading, and uploading.

Broadband Services: Broadband services refer to high-speed internet connections that provide faster and more reliable access to the internet compared to traditional dial-up connections. These services use a wide range of technologies, such as DSL (Digital Subscriber Line), cable, fiber optics, and wireless, to transmit data at high speeds. Broadband enables users to stream videos, download large files, play online games, and browse the web with ease. It has become essential for various activities in our modern digital age, including work, education, entertainment, and communication.

Cloud Native Environment: Refers to the concept of building and running applications to take advantage of distributed computing offered by the cloud delivery model. Cloud native apps are designed and built to exploit the scale, elasticity, resiliency, and flexibility the cloud provides. In a cloud-enabled solution, a company's application is deployed in the public cloud but still requires a physical server of its own for operations. However, with a cloud-native system, the company does not require any computing infrastructure onsite.

Cloud Service Provider (CSP): A Cloud Service Provider or CSP is a company that offers a range of computing services and resources over the internet. These services can include infrastructure-as-a-service (IaaS), platform-as-a-service (PaaS), and software-as-a-service (SaaS). CSPs manage the infrastructure and platforms that run the applications and services, freeing their customers from the need to invest in and maintain their own physical IT infrastructure. Key offerings of CSPs typically include:

Storage: Remote storage solutions that can be scaled up or down as needed.

Computing Power: Virtual machines and processing power for running applications.

Databases: Managed database services.

Networking: Tools and capabilities for managing networks in the cloud. **Software Applications:** Hosted software that users can access and use over the internet.

Popular CSPs include Amazon Web Services (AWS), Alibaba Cloud, Microsoft Azure, and Google Cloud. They cater to a wide range of needs, from small businesses seeking cost-effective IT solutions to large enterprises requiring complex, scalable cloud architectures. Cloud services are known for their flexibility, scalability, and cost-effectiveness, enabling users to pay only for the resources they use.



Copper Wireline Networks. Copper wireline networks are a type of telecommunications infrastructure that uses copper wires, typically made of twisted pairs of copper conductors, to transmit voice and data signals. These networks have been a staple of traditional landline telephone and broadband internet services (see Legacy Voice) below for many decades. Key characteristics of copper wireline networks include:

Analog and Digital Signals: Copper wireline networks can carry both analog and digital signals. In the past, they were primarily used for analog voice calls, but they have been adapted to support digital services like DSL (Digital Subscriber Line) for broadband internet access.

Local Loop: Copper wires connect homes and businesses to the telephone exchange or central office, forming what is known as the "local loop." This connection allows for voice communication and, in the case of DSL, internet access.

Limited Bandwidth: Copper wireline networks have limited bandwidth compared to newer technologies like fiber optics. This limitation can affect the speed and capacity of internet connections, leading to slower data transfer rates over long distances.

Distance Sensitivity: The quality of service on copper wireline networks can degrade with distance from the central office. Users located farther from the exchange may experience slower internet speeds and more signal attenuation.

Legacy Technology: Copper wireline networks are considered a legacy technology, and many telecommunications companies are phasing them out in favor of more advanced options like fiber optics or cable networks, which offer higher data speeds and greater reliability.

Voice and Data Services: While initially designed for voice communication, copper wireline networks have been adapted to support digital data transmission, making them suitable for DSL internet services, even in areas where more modern alternatives are not available.

In recent years, copper wireline networks have faced competition from faster and more robust technologies, but they continue to provide essential connectivity in some areas where upgrading to newer infrastructure is cost-prohibitive or logistically challenging.

DAS: DAS stands for Distributed Antenna System. In the field of telecommunications, a Distributed Antenna System is a network of antennas that are strategically placed throughout a building or area to enhance wireless network coverage and capacity. Here's how a DAS typically works:

Antenna Distribution: The system consists of multiple antennas distributed throughout the coverage area. These antennas are connected to a central hub or base station. **Central Hub/Base Station:** The central hub or base station is responsible for receiving and transmitting signals to and from the antennas in the DAS.

Signal Distribution: The central hub distributes signals to the antennas, which then transmit and receive wireless signals to and from mobile devices within their respective coverage areas.

Coverage Enhancement: DAS is often deployed in areas where traditional wireless network coverage is inadequate or where there is a high demand for wireless services, such as stadiums, airports, large buildings, and urban areas.

Capacity Expansion: DAS helps increase the capacity of wireless networks by offloading traffic from congested cell towers and providing additional channels for communication.

Carrier-Neutral: In many cases, DAS systems are carrier-neutral, meaning they support multiple wireless carriers simultaneously, allowing users from different networks to benefit from improved coverage and capacity.



Data Center. The data center centralizes a business enterprise's shared IT operations for the purpose of storing, backing up and recovering, managing, processing, and analyzing data and applications. It consists of (a) a building or facility large enough to house energy-consuming IT equipment in a climate-controlled environment, (b) equipment and software to run IT operations and store data and applications ("core components") include servers, storage systems, networking infrastructure such as hubs, switches, routers, bridges, gateways, multiplexers, transceivers, and information security elements such as firewalls, VPN gateways, and intrusion detection systems), (c) support infrastructure (i.e., equipment contributed to securely sustaining the highest IT system availability and reliability possible—99.671%-99.995% availability) such as uninterruptible power sources, environmental control systems, and physical security systems, and (d) operations staff to monitor and maintain the IT and infrastructure equipment on a 24/7 basis. Because they house an organization's most critical asset (data), data centers are crucial for daily operations and business continuity of an enterprise and are viewed as top priorities. There are 7+ million data centers worldwide. Due to the public cloud, modern data center infrastructures have evolved from on-premises physical server farms to virtualized platforms that support applications and workloads across multi-cloud environments.

Edge: Refers to the "edge of a network." In a centralized network, client devices are connected to one server whose job is to process the information requested by the users and hand it back to them. While a centralized network is good enough to interact with simpler websites, companies have found that complex projects involving a great bank of customers work better with an edge server. Unlike a centralized network, because an edge server sits at the edge of a network, it improves latency, reduces loading times, and removes the load from the origin server. Instead of sending unprocessed data to the data center, edge servers process it themselves and send it back to the client machines.



DSL: DSL, or Digital Subscriber Line, is a broadband internet technology that uses existing telephone lines to transmit high-speed data. It allows for simultaneous use of voice and data services over the same line and offers faster internet speeds compared to traditional dial-up connections. DSL comes in various forms, such as ADSL (Asymmetric DSL) and VDSL (Very High Bitrate DSL), each with different upload and download speeds to meet the needs of different users.

Ethernet: Ethernet is a widely-used technology for networking computers and electronic devices within a LAN. It facilitates the transmission of data over a network through a system of protocols and cables (typically Cat5, Cat6, or fiber optic). Ethernet defines the way data is transmitted over the network, ensuring that devices can communicate with each other effectively. It is known for its reliability, speed, and ease of installation and is the backbone of most modern wired LANs. Ethernet speeds have evolved over time, from 10 Mbps to modern standards that support up to 100 Gbps and beyond.

Ethernet-Enabled Fiber Services: Ethernet-Enabled Fiber Services refer to high-speed internet connections that use fiber-optic cables for data transmission and Ethernet technology for network connectivity. This combination offers fast and reliable internet access with the capacity to support a wide range of applications, including voice, video, and data services. Ethernet-Enabled Fiber Services are known for their scalability and high bandwidth capabilities, making them a popular choice for businesses and organizations seeking robust and high-performance network connections.

Fiber: Also known as "telecom fiber" and "optical fiber," fiber is a technology used in telecommunications for transmitting light and communications signals. It consists of thin strands of glass or plastic fibers that carry data in the form of light pulses over long distances at extremely high speeds. Fiber-optic networks provide several advantages, including high bandwidth, low signal loss, resistance to electromagnetic interference, and the ability to transmit data over long distances with minimal latency. This technology is widely used for high-speed internet connections, telephone services, and other data transmission needs, making it a crucial component of modern telecommunications.

Gateways/Bridges: A gateway is a hardware device or a software program that acts as a bridge between two different networks, enabling them to communicate with each other. Typically, these devices are subject to fluctuating protocols or operate in different environments, like a local area network (LAN) and the internet. Gateways perform various functions such as:

Protocol Conversion: They translate different network protocols, ensuring that data packets can move between disparate networks. **Data Translation and Encapsulation:** Gateways can modify the data format to be compatible with the receiving network.

Security: Often, they include security features like firewalls to protect internal networks from external threats. **Routing:** They can determine the best path for data to travel between networks.

A common example of a gateway in many home networks is a router, which connects a home LAN to the internet. In enterprise environments, gateways are more complex, handling more sophisticated tasks like VoIP services, emails, and cloud applications. Gateways are crucial for the interconnectedness of different network types and are fundamental components in ensuring smooth, secure network communication.

Internet Services: Internet services refer to the various services and capabilities that the internet provides to users. These services include:

Web Browsing: Accessing websites and web pages using web browsers like Chrome, Firefox, or Safari to gather information, shop online, or connect with others.

Email: Sending and receiving electronic messages and attachments through email services like Gmail, Outlook, or Yahoo Mail.

Search Engines: Using search engines such as Google or Bing to find information, websites, and resources on the internet.

Social Media: Interacting with others, sharing content, and networking on platforms like Facebook, Twitter, Instagram, and LinkedIn.

Online Communication: Utilizing services like Skype, Zoom, or Microsoft Teams for video and voice calls, instant messaging, and video conferencing.

Streaming Media: Watching movies, TV shows, and videos on platforms like Netflix, YouTube, Hulu, or Amazon Prime Video.

Online Shopping: Purchasing products and services from e-commerce websites like Amazon, eBay, or Shopify.

Cloud Storage: Storing and accessing files and data on cloud storage platforms like Dropbox, Google Drive, or iCloud.

Online Gaming: Playing video games with others over the internet on platforms like Steam, Xbox Live, PlayStation Network, or online gaming communities.

Information Sharing: Sharing and accessing user-generated content, articles, blogs, and forums for knowledge exchange.

IP Voice: IP voice services, also known as "Voice over Internet Protocol (VoIP) services," enable voice communication over the internet instead of traditional telephone networks. In IP voice services, analog voice signals are converted into digital data packets and transmitted over IP networks. This technology allows for cost-effective and efficient voice communication, offering features like call forwarding, voicemail, video conferencing, and more. IP voice services have become popular for businesses and individuals alike due to their affordability, flexibility, and the ability to integrate voice communication with other digital services, such as email and messaging. They are commonly used for making phone calls, both locally and internationally, using the internet as the communication medium.

Internet Service Provider (ISP): An Internet Service Provider (ISP) provides individuals and organizations access to the internet (e.g., for streaming, gaming, cloud computing, and web browsing) using various technologies like DSL (Digital Subscriber Line), cable, fiber optics, satellite, and wireless connections and (2) may also offer related services such as web hosting, email hosting, and domain name registration. ISPs play a critical role in the infrastructure of the internet; they maintain the network infrastructure, provide the necessary hardware (like modems and routers), and ensure the transmission of internet data. Depending on the type of ISP and the services offered, they can cater to different customer needs, from residential broadband and personal mobile access to high-speed fiber connections for businesses. The quality and speed of internet service can vary greatly depending on the ISP, the technology used, and the region.

Internet of Things (IoT): The Internet of Things (IoT) refers to the network of interconnected devices, sensors, and everyday objects that collect, exchange, and analyze data over the internet. These devices are embedded with sensors, software, and connectivity capabilities, enabling them to communicate and interact with each other autonomously or with minimal human intervention. IoT technology enables a wide range of applications across various industries, from smart homes and cities to industrial automation and healthcare. By harnessing the power of IoT, organizations can gather valuable insights, optimize processes, enhance decision-making, and create innovative new services and experiences for users.

LAN: Refers to "local area network," which is a network that connects computers and devices in a limited geographical area, such as a home, school, office building, or closely located group of buildings. LANs enable the sharing of resources, like files and printers, among multiple users and typically use Ethernet or Wi-Fi technology for connectivity.

Latency: Latency in networking refers to the time it takes for a data packet to travel from its source to its destination. It is essentially a delay that occurs during data transmission and processing. Measured in milliseconds (ms), latency is influenced by various factors including the distance between the source and destination, the quality and type of the transmission medium (like fiber optics, copper cables or wireless), and the speed and efficiency of the routers and switches the data passes through. Lower latency is desirable, especially in applications where real-time interaction is important, such as video conferencing, online gaming, and high-frequency trading. High latency can lead to noticeable delays in data transmission. In general, low latency networks are faster and more responsive, which is critical for time-sensitive data transmission. Latency is distinct from bandwidth; while bandwidth measures the amount of data that can be transferred at a time, latency measures how quickly it gets there.

Legacy Voice: Legacy voice services refer to traditional telephony systems and communication methods that predate the digital and internet-based technologies commonly used today. These services primarily rely on analog or circuit-switched networks. Key characteristics of legacy voice services include:

Analog Voice Calls: Legacy voice services are based on analog signals, and they use circuit-switched networks to establish voice connections. This is in contrast to digital voice services, which transmit data in packets over the internet.

Plain Old Telephone Service (POTS): POTS is a classic example of legacy voice service, providing basic voice communication using copper wires and analog technology.

Fixed-Line Telephones: Legacy voice services often involve traditional landline phones that are connected to physical telephone lines. Users are assigned a specific phone number tied to their location.

Limited Features: Legacy voice services typically offer basic calling features such as voice calling, call waiting, and call forwarding, and voicemail. Advanced features like video calling and text messaging are usually not supported or are separate services.

Higher Costs: These services are often more expensive than modern VoIP (Voice over Internet Protocol) or IP-based voice services, as they require maintaining a physical infrastructure of telephone lines and switches.

Decreasing Popularity: Legacy voice services have been steadily declining in popularity as more people switch to digital communication methods, such as mobile phones and VoIP services, which offer greater flexibility, features, and cost savings.

While legacy voice services continue to exist in some areas, they are increasingly being replaced by more advanced and efficient digital voice technologies that take advantage of the internet and modern telecommunications infrastructure.

LTE: LTE, or Long-Term Evolution, is a standard for wireless broadband communication, commonly known as 4G LTE. It offers high-speed data transmission for mobile devices, surpassing the capabilities of earlier technologies like 3G. LTE achieves this through advanced radio access technologies, efficient spectrum utilization, and optimized network architecture. With LTE, users experience faster download and upload speeds, reduced latency, and improved overall network performance, making it ideal for activities such as streaming high-definition video, online gaming, and video conferencing. LTE has become the foundation of modern mobile networks, supporting a wide range of services and applications while continually evolving to meet the increasing demands of mobile connectivity.

Multi-Access Edge Computing (MEC): Multi-access edge computing (MEC) is a network architecture concept that brings computational resources closer to the edge of the network, typically at or near the base stations or access points. This approach aims to reduce latency and improve network efficiency by processing data closer to where it's generated, rather than relying solely on centralized data centers, to enable a wide range of latency-sensitive and bandwidth-intensive applications to be delivered with optimal user experience.

Networking: Networking (or enterprise networking) refers to the comprehensive set of hardware, software, security measures, and management practices and policies used to connect computers, devices, and applications in a large organization or business environment to enable communication and data exchanges among users in a way that is reliable, secure, and efficient. It encompasses a broad range of technologies and components, including:

Network Infrastructure: This includes routers, switches, hubs, bridges, wireless access points, and other hardware that facilitate connectivity within and between different locations of an enterprise.

Connectivity: Enterprises may use different methods to connect various parts of the network, such as (1) Local Area Networks (LANs), (2) Wide Area Networks (WANs), (3) software-defined WANs (SD-WANs), (4) the internet, and (5) cloud services.

Security: Network security protects an organization's data and resources from internal and external threats by using firewalls, antivirus software, intrusion detection and prevention systems, and secure network protocols. With the rise of cyber threats, security is a top priority in enterprise networking.

Wireless and Mobile Networking: With the advent of mobile devices and the increasing need for mobility, enterprises are integrating wireless networking (like Wi-Fi) to provide flexibility and support for mobile devices and remote working.

Cloud Networking: Many enterprises are moving towards cloud-based services, requiring networks that can connect reliably and securely to cloud providers and support cloud-based applications and services.

Data Management and Storage: Networking in enterprise technology also involves the management of data flow and storage, ensuring that data is securely and efficiently transmitted, stored, and accessed within the network.

Scalability and Flexibility: Enterprise networks must be scalable to handle increasing data volumes and flexible to adapt to changing business needs. This often involves the use of virtualization technologies and advanced network management tools.

Bandwidth and Performance Optimization: Enterprises need to manage network performance actively, ensuring sufficient bandwidth and minimizing latency, especially for critical applications and data-intensive tasks.

Network Management and Monitoring: The use of tools and processes are necessary to continuously monitor network performance, detect and resolve issues quickly, and plan for upgrades, changes or expansions.

Integration of IoT and AI: The integration of Internet of Things (IoT) devices and AI technologies into enterprise networks is becoming more common, enabling automation, data analytics, and smarter business operations.

Remote Access: Networks must enable secure access to the network for remote and mobile workers.

Performance Management: This involves optimizing network performance to ensure high-speed and reliable connectivity for various applications and services.



NFV: NFV, or Network Functions Virtualization, revolutionizes traditional telecommunications by virtualizing network functions typically performed by dedicated hardware. In NFV, these functions, such as routing, firewalling, and load balancing, are transformed into software-based instances called Virtualized Network Functions (VNFs), running on standard servers. This decoupling of functions from hardware allows for dynamic deployment, scaling, and management of network services, leading to greater flexibility, scalability, and cost efficiency. NFV accelerates service innovation, enabling rapid introduction of new services and applications to meet evolving customer demands. Ultimately, NFV streamlines network operations, fosters innovation, and drives the evolution of modern telecommunications infrastructure.

POTS: POTS, or Plain Old Telephone Service, refers to the traditional analog telephone service that has been in use for decades. It utilizes copper wires to transmit voice signals between users over the Public Switched Telephone Network (PSTN). POTS provides basic telephony services, including voice calls, caller ID, call waiting, and basic features like three-way calling. Despite the rise of digital and internet-based communication technologies, POTS remains prevalent in many areas, especially in rural and remote regions where digital infrastructure may be limited. However, with the advent of digital communication technologies like VoIP (Voice over Internet Protocol), POTS is gradually being replaced by more modern and versatile telecommunications solutions.

Public Cloud: The public cloud is defined as computing resources and services (e.g., servers, consumer and business applications, and storage) offered by a cloud service provider over the public internet to anyone who wants to use or purchase them. Cloud service providers (typically one of the Big Tech companies, such as Amazon Web Services, Alphabet's Google Cloud, and Microsoft Azure) provide their infrastructure (IaaS or Infrastructure as a Service), their cloud-based platforms (PaaS or Platform as a Service), their applications (SaaS or Software as a Service), and/or storage services for free (for a minimal level of service), for a fixed fee, or on an on-demand basis, allowing customers to pay only per usage for the central processing unit (CPU) cycles, storage, or bandwidth they consume. Cloud services give users access to computing tools without the overhead of physical infrastructure. The cloud service provider owns and administers the data centers where customers' workloads run. Cloud service providers assume responsibility for all hardware and infrastructure maintenance and provide high-bandwidth network connectivity to ensure rapid access to applications and data. Public clouds can also be deployed faster than an enterprise's own on-premises infrastructures and with an almost infinitely scalable platform.

Router: A router is a networking device that forwards data packets between computer networks. It connects different networks together, such as linking a home or office network to the internet. Routers perform the essential task of directing internet traffic efficiently, determining the best route for data to travel across the network to reach its destination. They do this by using IP addresses and routing tables to make decisions about data forwarding. In addition to routing, modern routers often provide other functionalities like wireless connectivity (Wi-Fi), network security through firewalls, and network management features. They act as a critical component in both home and enterprise networks, enabling multiple devices to share a single internet connection and communicate with each other.



SDN: Refers to "software-defined network," which is a revolutionary approach to network management that allows network administrators to manage network services through abstraction of lower-level functionality. This is achieved by decoupling the control plane (which makes decisions about where traffic is sent) from the data plane (which forwards traffic to the selected destination). In an SDN setup, a central controller, which is a software-based entity, directs network traffic, rather than relying on the hardware devices (like switches and routers) to decide the traffic flow. This centralization of control enables more efficient resource use, simplified network configuration and management, improved performance, and enhanced security. SDN is particularly valuable in complex, dynamic environments, offering flexibility, scalability, and the ability to programmatically configure, manage, and optimize network resources.

SD WAN: Refers to "software-defined wide area network," which is a specific application of Software-Defined Networking (SDN) technology applied to WAN connections used to connect enterprise networks or large geographic distances. SD-WAN simplifies the management and operation of a WAN by decoupling the networking hardware from its control mechanism. This approach allows companies to build higher-performance WANs using lower-cost and commercially available internet access, enabling businesses to partially or wholly replace more expensive private WAN connection technologies like MPLS. Key features of SD-WAN include centralized control and management, improved network agility and performance, increased bandwidth efficiency, and reduced costs. SD-WAN also offers enhanced security, better scalability, and the ability to easily integrate with cloud services. By prioritizing traffic and choosing the most efficient route, SD-WAN ensures that critical applications receive the bandwidth they need for optimal performance, making it a popular choice for businesses with multiple branches or cloud-based services.

Semiconductors: Also known as chips or processors, semiconductors are made by imprinting a network of electronic circuits/components onto a wafer that partially conducts electricity, which can then perform various functions, including (a) processing, amplifying and selectively filtering electronic signals, (b) controlling electronic system functions and processing, (c) transmitting and storing data, and (d) in the case of graphics processing units, rendering a graphics display. HPE relies on data center processors from Advanced Micro Devices (x86 and EPYC series), Intel (x86 series), and NVIDIA (H100 HXG server platform graphics processing units).



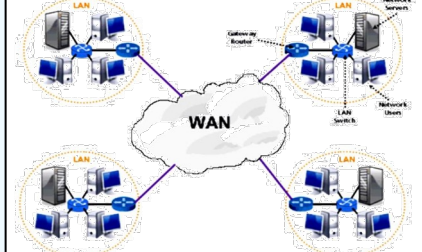
Switch: A networking switch is a hardware device that connects devices within a local area network (LAN), such as computers, servers, and printers. It operates at the data link layer (Layer 2) of the OSI model, and its primary function is to receive incoming data packets and direct them to the specific device on the network to which they are addressed, using MAC addresses. Unlike a hub, which broadcasts the data to all connected devices, a switch efficiently routes data only to the intended recipient, reducing network congestion and improving overall performance. Switches can also operate at the network layer (Layer 3) where they perform routing functions similar to a router. Networking switches are fundamental in creating large, scalable, and efficient networks, especially in organizational and enterprise settings.

VoIP: Voice over Internet Protocol (VoIP) is a technology that allows individuals and businesses to make voice calls using a broadband internet connection instead of a conventional (or analog) phone line. This works by converting voice signals into digital data packets and transmitting them over the internet. VoIP can be used on various devices, including desktop computers, VoIP phones, and traditional phones with adapters. In addition to voice calls, VoIP services can include video calls and text messaging. This technology offers advantages such as lower costs, especially for long-distance and international calls, and the integration of various communication services into a single network.

VPN: Refers to a "Virtual Private Network," which is a technology that creates a safe and encrypted connection over a less secure network, such as the internet. VPNs are used to secure web traffic and ensure online privacy. When a user connects to a VPN server, their internet traffic is routed through that server, making it appear as if it is coming from the server's IP address, not the user's actual location. This provides anonymity and can bypass geographical restrictions on content. VPNs are widely used in both personal and professional contexts. In a business environment, they allow employees to securely access the company's internal network remotely, even when they are outside the corporate environment. For personal use, VPNs help protect personal data from hackers, especially when using public Wi-Fi networks, and maintain privacy from ISPs and websites.



WAN: Refers to "wide area network," which is a telecommunications network that extends over a large geographical area, often spanning cities, regions, or countries. It is used to connect smaller networks, LANs or metro area networks (MANs), enabling computers and devices at multiple locations to communicate with each other. WANs are crucial for businesses and organizations with dispersed locations, facilitating the sharing of resources, data, and applications across long distances. They often rely on leased telecommunication circuits and can include technologies like frame relay, MPLS, and VPN for connectivity.



Wi-Fi: Wi-Fi is a wireless networking technology that uses radio waves to provide high-speed internet and network connections to compatible devices. It allows computers, smartphones, and other devices to communicate with each other and access the internet without physical wired connections. Wi-Fi networks can be found in homes, offices, and public spaces, offering convenient connectivity within a limited range, typically up to a few hundred feet. Wi-Fi standards, governed by the IEEE 802.11 family, have evolved to offer various levels of performance, security, and range, adapting to the increasing demand for wireless access in both personal and professional environments.



Wireless Access Points (WAP or AP): A WAP is a device that allows wireless devices to connect to a wired network using Wi-Fi, Bluetooth, or related standards. The WAP connects to a router (via a wired network) and projects a Wi-Fi signal to a designated area. If you want to enable Wi-Fi access as a part of your home or office, where the Wi-Fi signal is weak or nonexistent, you can install a WAP there to improve the coverage.

Key functions and features of wireless access points include:

Network Bridging: WAPs bridge the gap between wired and wireless networks, allowing wireless devices to join the network.

Signal Range Extension: They extend the wireless coverage of a network, useful in large buildings or areas where a single router's signal can't reach.

Support for Multiple Devices: WAPs enable multiple wireless devices to connect to the network simultaneously without significantly degrading the network performance.

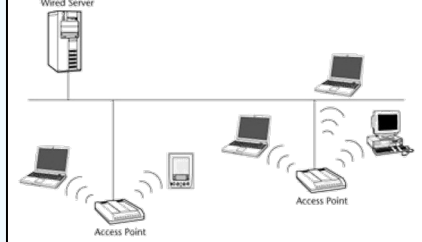
Security Features: WAPs often include security protocols to protect the network, such as WEP, WPA, or WPA2.

Network Management: In larger networks, multiple WAPs can be managed centrally to ensure consistent coverage and security.

Wireless access points are essential in creating a wireless local area network (WLAN), especially in large, densely populated, or obstructed environments where walls and other structures can obstruct wireless signals. They are widely used in public places like airports, hotels, schools, and businesses to provide network access to a large area.



WLAN: Refers to "wireless local area network," which is a wireless distribution method for two or more devices. WLANs use high frequency radio waves and include an access point to the Internet.



5G: 5G, the fifth generation of wireless technology, represents a significant leap forward in mobile communications, offering much-improved speed, capacity, and connectivity. With 5G, users can experience ultra-fast download and upload speeds, extremely low latency, and enhanced reliability, enabling a wide range of innovative applications and services. Beyond faster internet browsing and streaming, 5G enables transformative technologies such as Internet of Things (IoT), autonomous vehicles, augmented reality (AR), and virtual reality (VR). By leveraging advanced technologies like millimeter-wave spectrum, massive MIMO (Multiple Input Multiple Output), and network slicing, 5G networks deliver unparalleled performance and support for a massive number of connected devices.