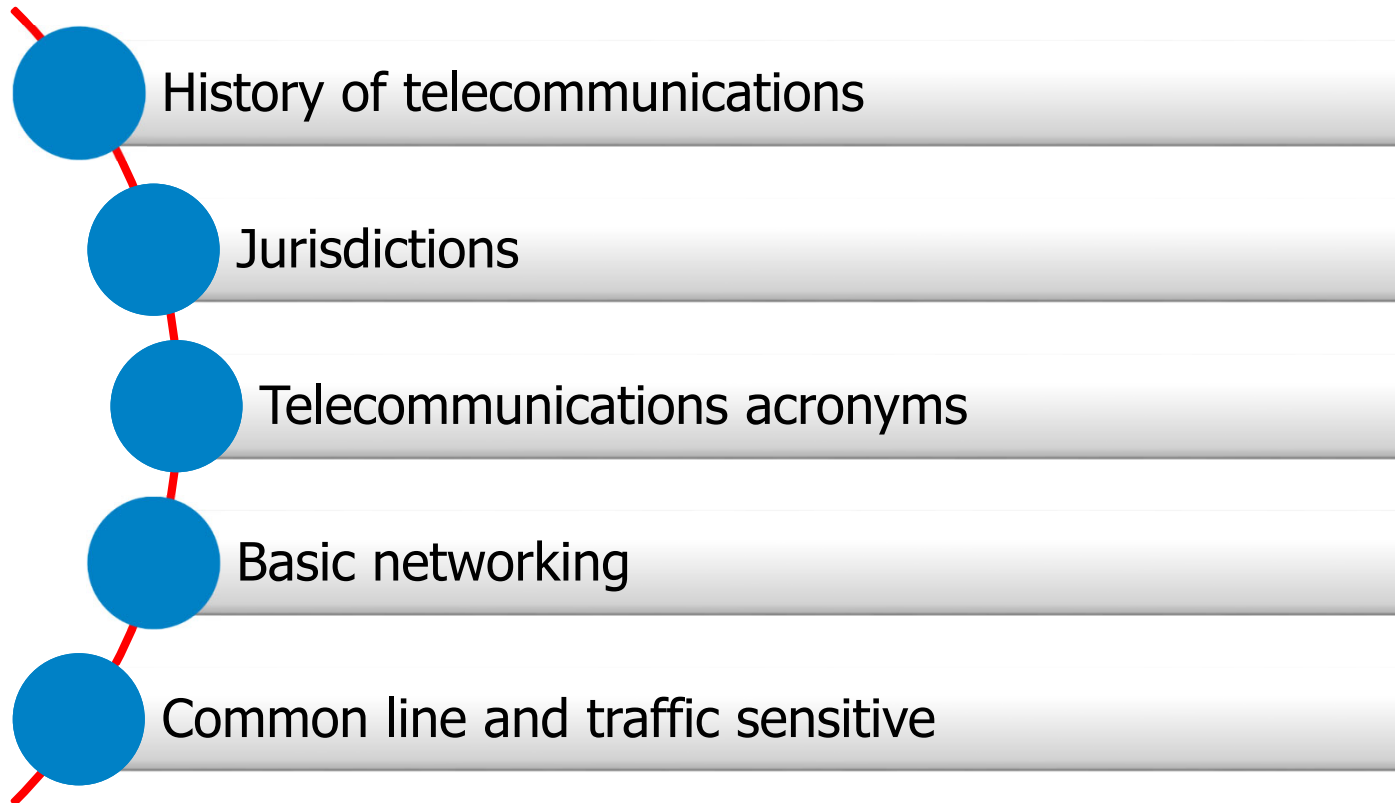




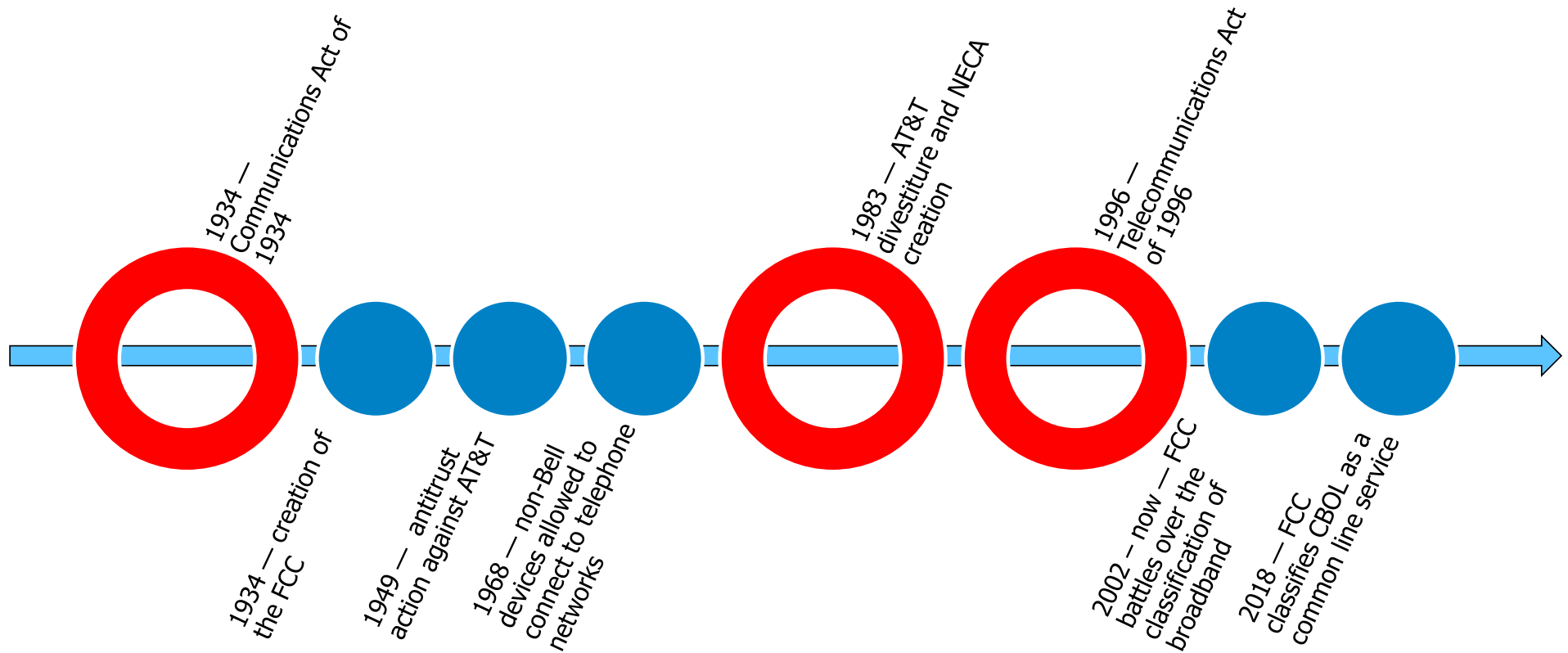
Basics of Telecommunications

Presented by:
Doug Stine
Manager – Tariffs and Training
North Central Region
dstine@neca.org

Agenda



History of telecommunications

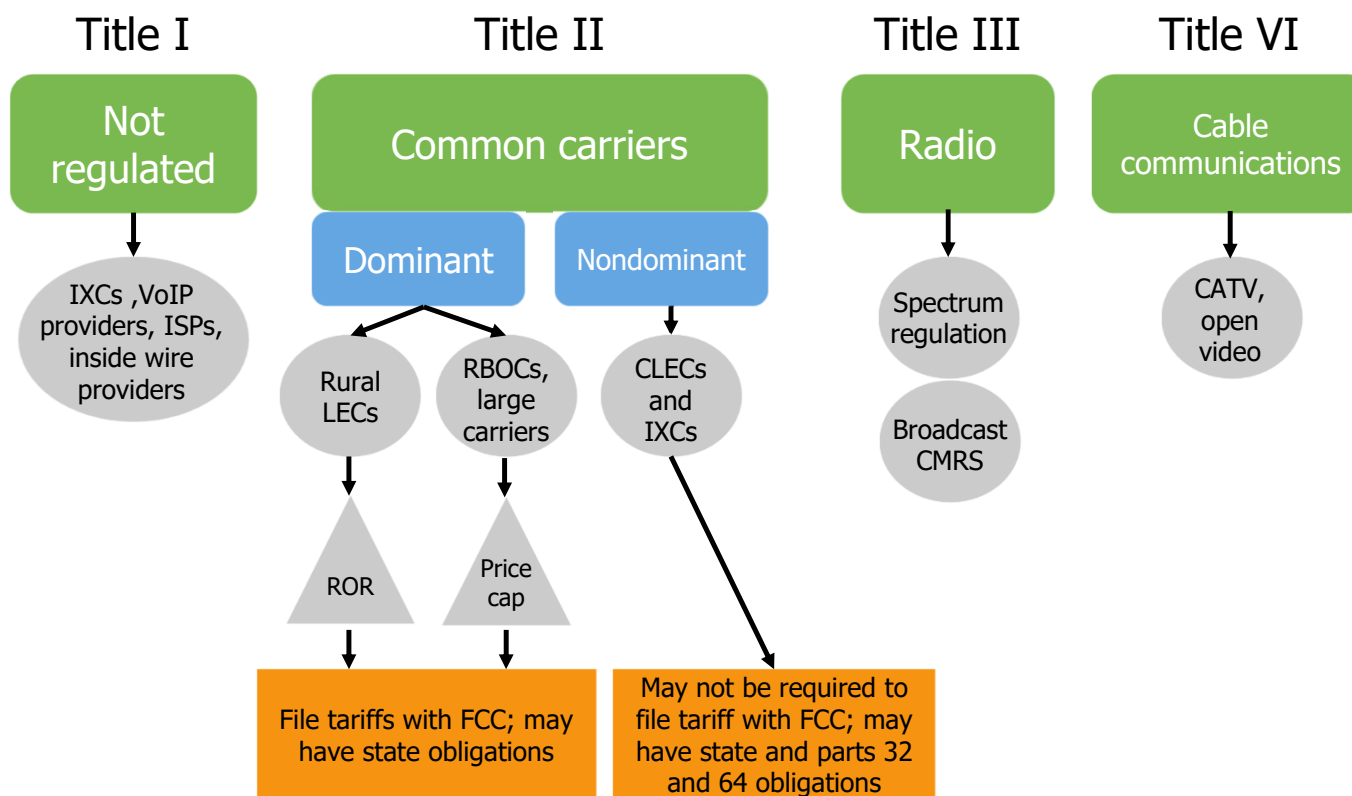


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History of telecommunications

FCC title categories



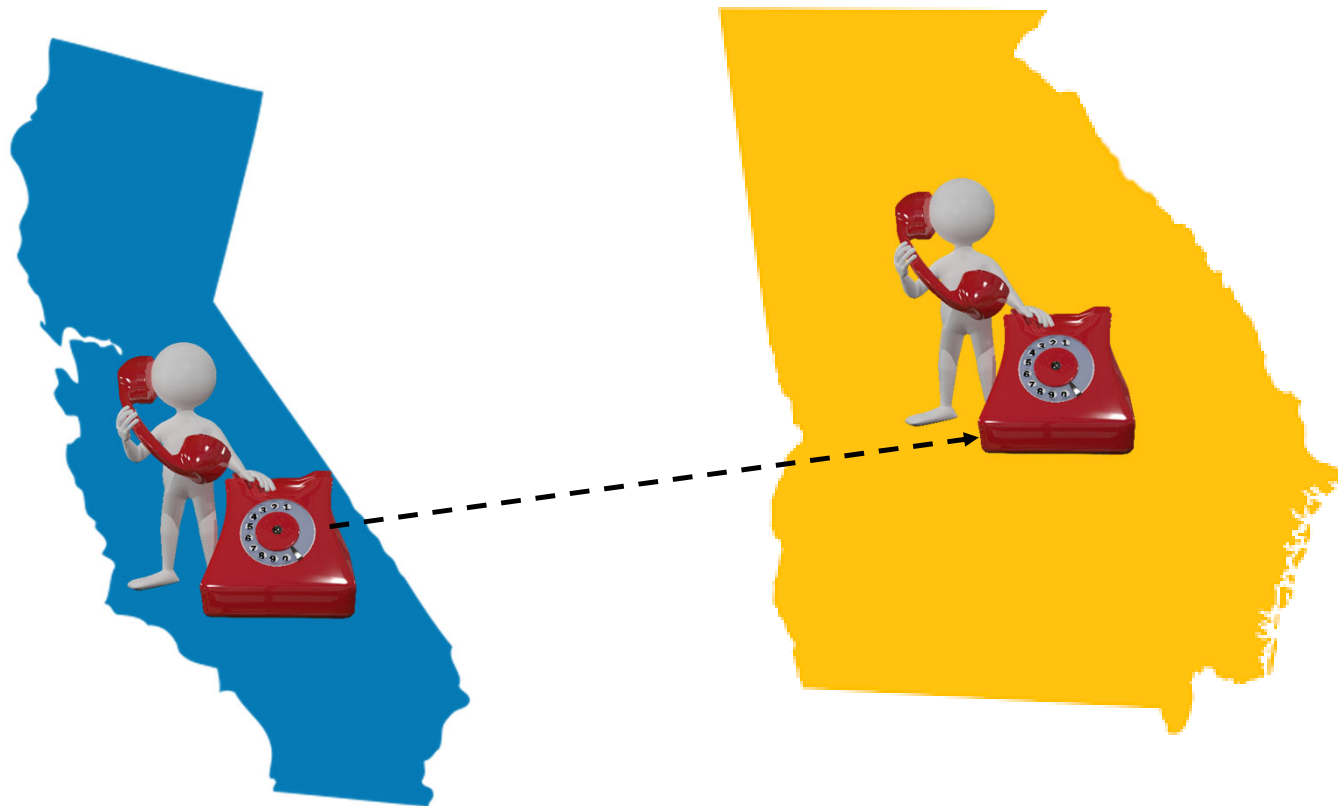
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Jurisdictions

- A **geographic boundary** established to define the following:
 - Regulatory oversight
 - Network provisioning
 - Billing of intercarrier compensation (e.g., access charges and reciprocal compensation)
 - Billing of local service
 - Cost recovery and rate setting
 - Universal service support (federal and state)

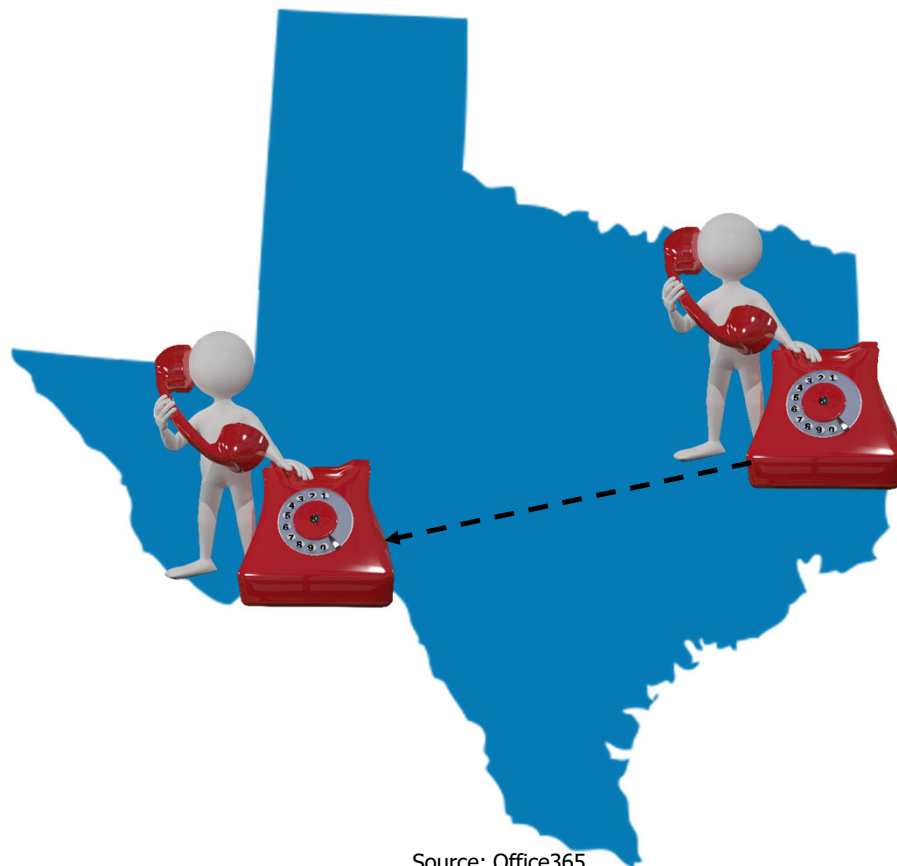
Jurisdictions Interstate



Source: Office365

Jurisdictions

Intrastate



Source: Office365

Jurisdictions

Local

- A **geographic area** established for the administration and pricing of local exchange services
 - Often includes a city, town or village
 - May consist of one or more central offices and their associated facilities
- Telecommunications services and their associated network allow subscribers within an established local calling area to contact other subscribers in the same local calling area
 - Residential
 - Business
- Regulated at the state level

Source: Newton's Telecom Dictionary, 25th edition, copyright © 2009

Jurisdictions

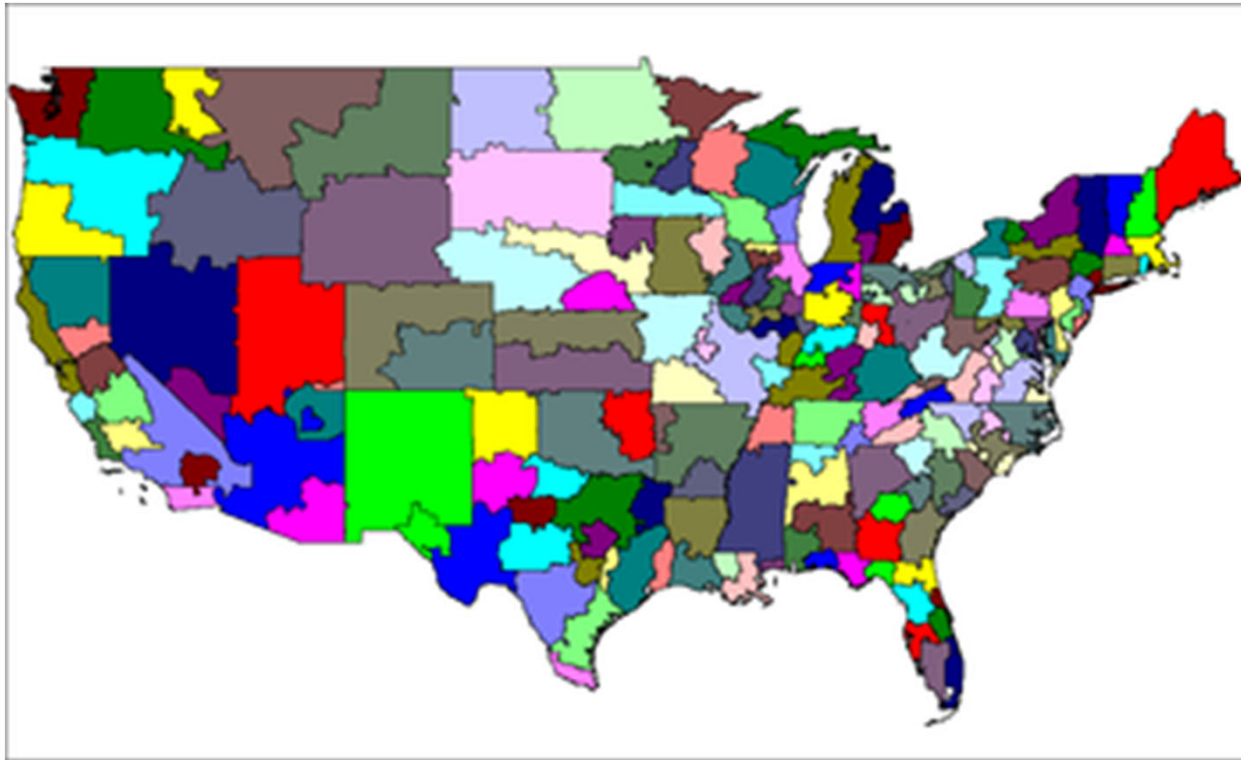
Study area

- A **geographic area** within a state in which a regulated ILEC operates
 - This geographic area **normally** does not cross state lines
- Established by FCC where an ILEC had exclusive right to serve (until 1996 Telecommunications Act)

The National Exchange Carrier Association, Inc. (NECA) Access Service Tariff F.C.C. No. 5, Section 2.6

Jurisdictions

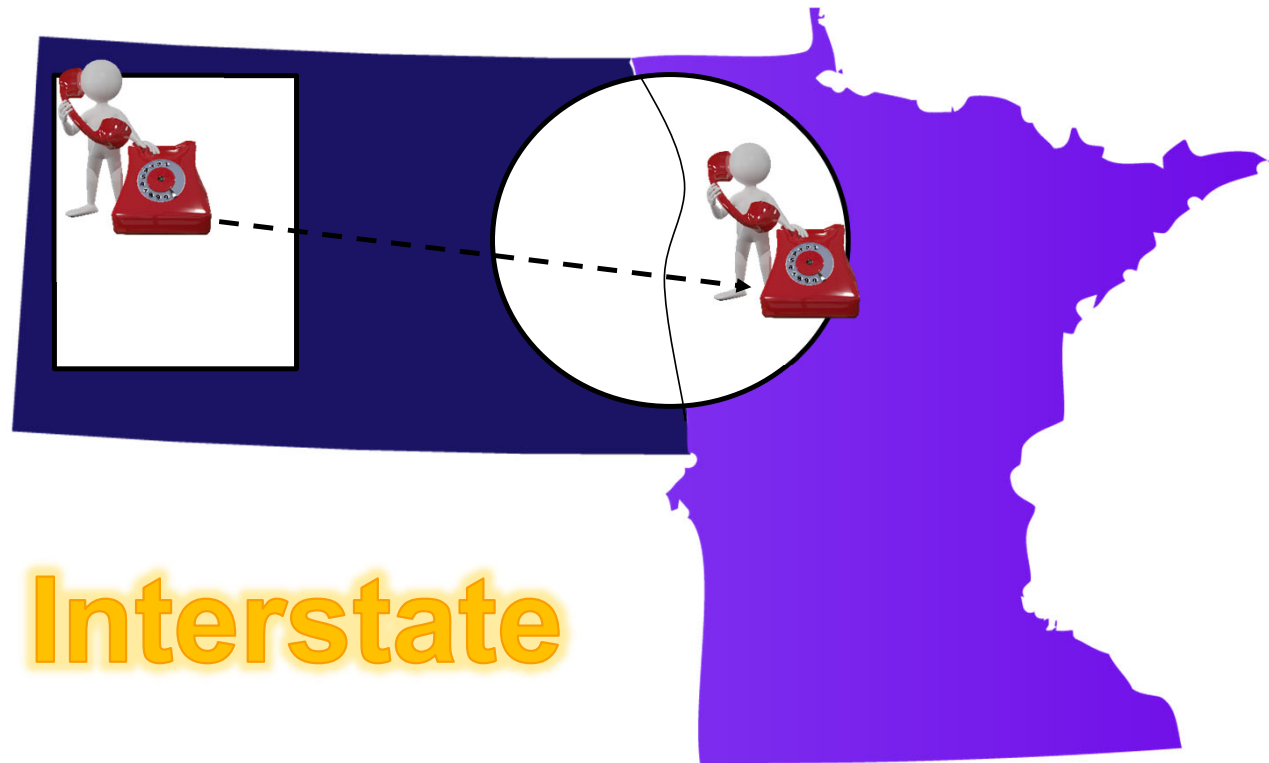
LATA



Source: Wikipedia.org

Jurisdictions

InterLATA

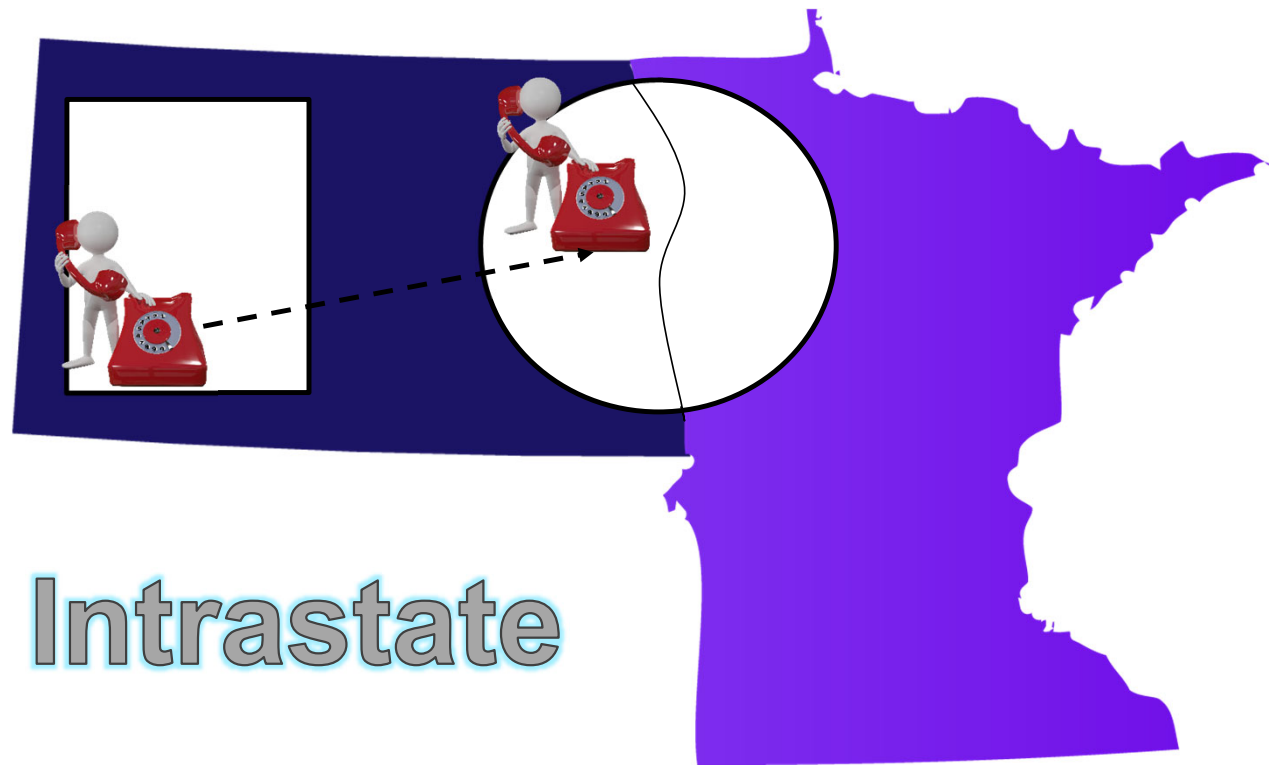


Interstate

Source: Office365

Jurisdictions

InterLATA

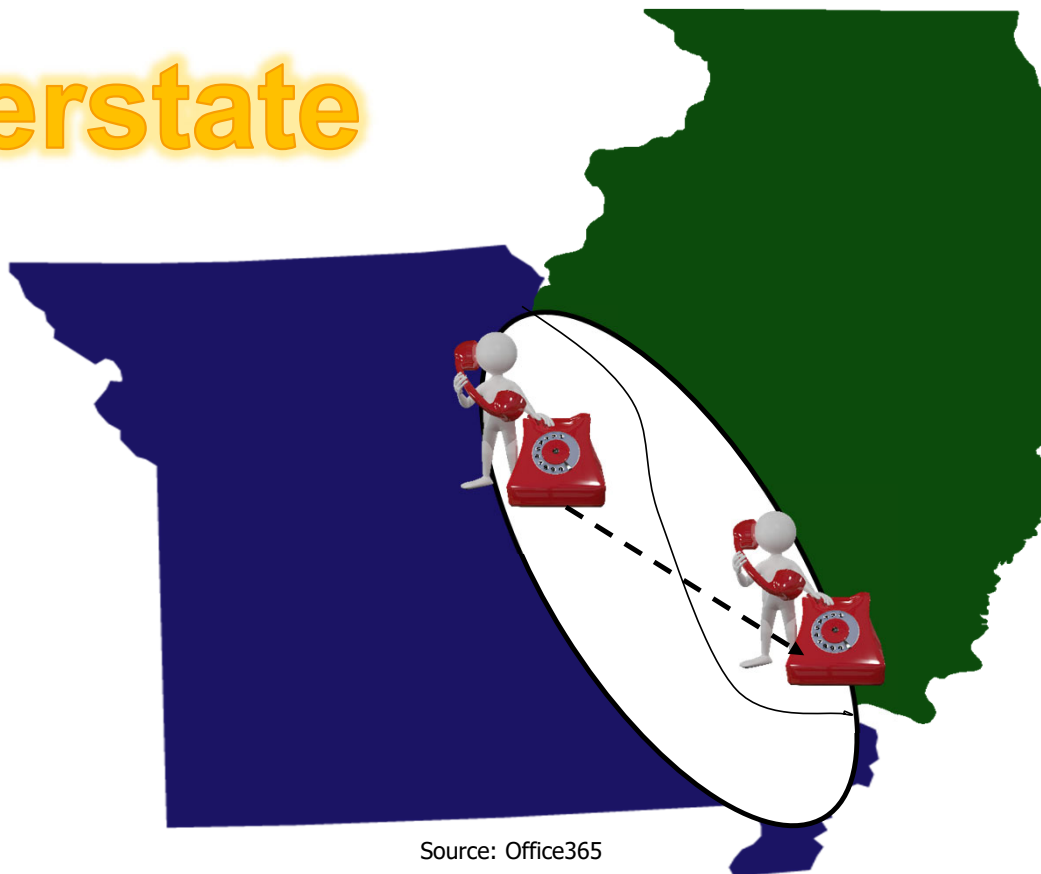


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Jurisdictions

IntraLATA

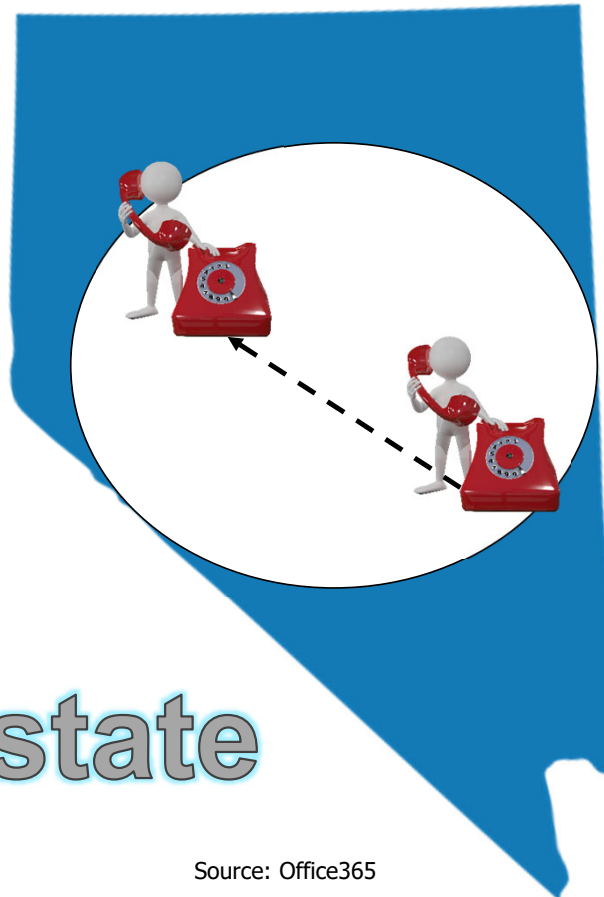
Interstate



Source: Office365

Jurisdictions

IntraLATA



Intrastate

Source: Office365

Telecommunications acronyms



Source: Office365

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Telecommunications acronyms

Who is who?

- FCC – Federal Communications Commission
 - Independent U.S. government agency established by the Communications Act of 1934
 - Regulates interstate and international communications by radio, television, wire, satellite and cable
- USAC – Universal Service Administrative Company
 - Nonprofit organization designated by the FCC to administer the Universal Service Fund
 - Collects and distributes funds to support affordable telecommunications and broadband in rural and underserved areas

Telecommunications acronyms

Other entities

- NECA – National Exchange Carrier Association
 - Files interstate tariffs with the FCC on behalf of participating member companies and develops interstate access rates
 - Administers the monthly settlement process to distribute NECA pool funds
 - Works with USAC to distribute USF support funds (e.g., CAF ICC and HCLS)
 - Provides regulatory support and training to its pool members
- PSC or PUC – public service commission or public utility commission
 - Intrastate and local regulators (the name will depend on your state)
 - Sets intrastate and local policies and regulations within their jurisdiction

Telecommunications acronyms

Funding mechanisms

- USF – Universal Service Fund
 - Federal funding system managed by USAC under the oversight of the FCC
 - The goal is to ensure all Americans, including those in rural and high-cost areas, have access to affordable telecommunications and broadband services
 - USF programs include High Cost (Connect America Fund), Lifeline, E-rate, Rural Health Care, CAF BLS, CAF ICC, ACAM and Alaska Plan
- CAF ICC – Connect America Fund intercarrier compensation
 - Mechanism under the Connect America Fund designed to transition carriers away from traditional intercarrier compensation
 - Provides funding to rural carriers to offset revenue losses as these rates are phased down

Telecommunications acronyms

Funding mechanisms

- CAF BLS – Connect America Fund broadband loop support
 - Replaced the former ICLS in 2016
 - Designed to provide ILECs financial support to help close the gap between the costs of providing voice and broadband services and the revenue they receive from consumers
- State and local funds
 - Some states still have state and local cost recovery funding mechanisms as well

Telecommunications acronyms

Which one is it?

- ILEC versus CLEC versus IXC versus LEC
- Cost versus AS
- CL versus TS
- SWA versus SPA
- CBOL versus VD DSL
- T5 versus T4

Telecommunications acronyms

ILEC versus CLEC versus...

■ ILEC

- Incumbent local exchange carrier
- Legacy telephone company that provided local service as of divestiture in 1983
- Owns the local infrastructure and was a local monopoly prior to 1996
- Required to provide access to competitors by selling access to their network

■ CLEC

- Competitive local exchange carrier
- Company that entered the local telephone market after Telecommunications Act of 1996
- May lease infrastructure from ILECs or build their own networks
- Often more common in areas that are urban or suburban
- Many ILECs have CLECs that sell service outside their study areas or on a nonregulated basis

Telecommunications acronyms

... IXC versus LEC

■ IXC

- Interexchange carrier
- Originally mostly long-distance providers
- Carries calls between LATAs
- Frequently used now to refer to both long-distance and cellular companies such as AT&T, Verizon and T-Mobile

■ LEC

- Local exchange carrier
- A generic term for company that provides local service
- Frequently used interchangeably with EC and ILEC

Telecommunications acronyms

Cost versus AS

■ Cost

- Cost company
- Telecom provider that files actual cost data
- Support and settlements are based on actual costs and the rate of return authorized by the FCC
- Required to submit more regular filings to the FCC and USAC

■ AS

- Average schedule company
- Telecom provider that does not file actual cost data
- Receives support and settlements based on predetermined formulas
- Formulas are created by NECA and are used industrywide

Telecommunications acronyms

CL versus TS

■ CL

- Common line
- The dedicated connection between your customer's location and your wire center
- Traditional voice or CBOL
- Typically billed a flat rate on a monthly basis
- CL is recovered through both subscriber charges and CAF BLS and ARC charges or model support

■ TS

- Traffic sensitive
- A service that is typically charged based on either minutes of use (SWA) or mileage and bandwidth (SPA)
- Some recovery still exists for SWA through CAF ICC
- Further delineated between SWA or SPA

Telecommunications acronyms

SWA versus SPA

■ SWA

- Switched access
- The system that transports traffic through the public switched telephone network
- Traffic is measured in minutes of use and is typically billed in arrears (after the fact)
- Recovery is through that billing and from a decreasing CAF ICC

■ SPA

- Special access
- Dedicated circuits that connect a customer-designated premise to another customer-designated premise
- Traffic is measured in mileage for traditional SPA and bandwidth for ETS or DSL
- There is no specific cost recovery for SPA outside of typical CABS/end user billing

Telecommunications acronyms

CBOL versus VD DSL

■ CBOL

- Consumer broadband-only loop
- Formerly called data-only DSL
- Common line element as of 2019
- Internet-only circuit that runs from a customer location to the local serving wire center

■ VD DSL

- Voice-data DSL
- Internet paired with a voice line
- Considered SPA
- Requires a paired voice line to be considered voice-data DSL

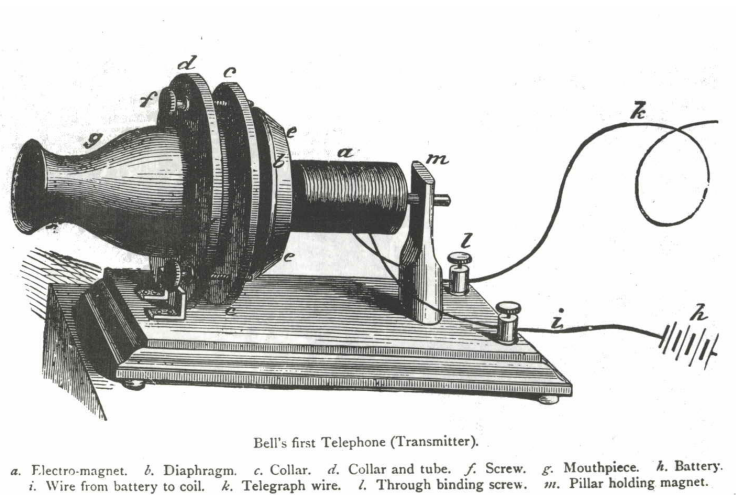
Telecommunications acronyms

Tariffs

- NECA FCC Tariff No. 5
 - Rates and regulations
 - Descriptions of all services
- NECA FCC Tariff No. 4
 - Large database of switch information
 - Office type codes
 - V&H coordinates
 - Routes
 - Billing percentages

Basic networking

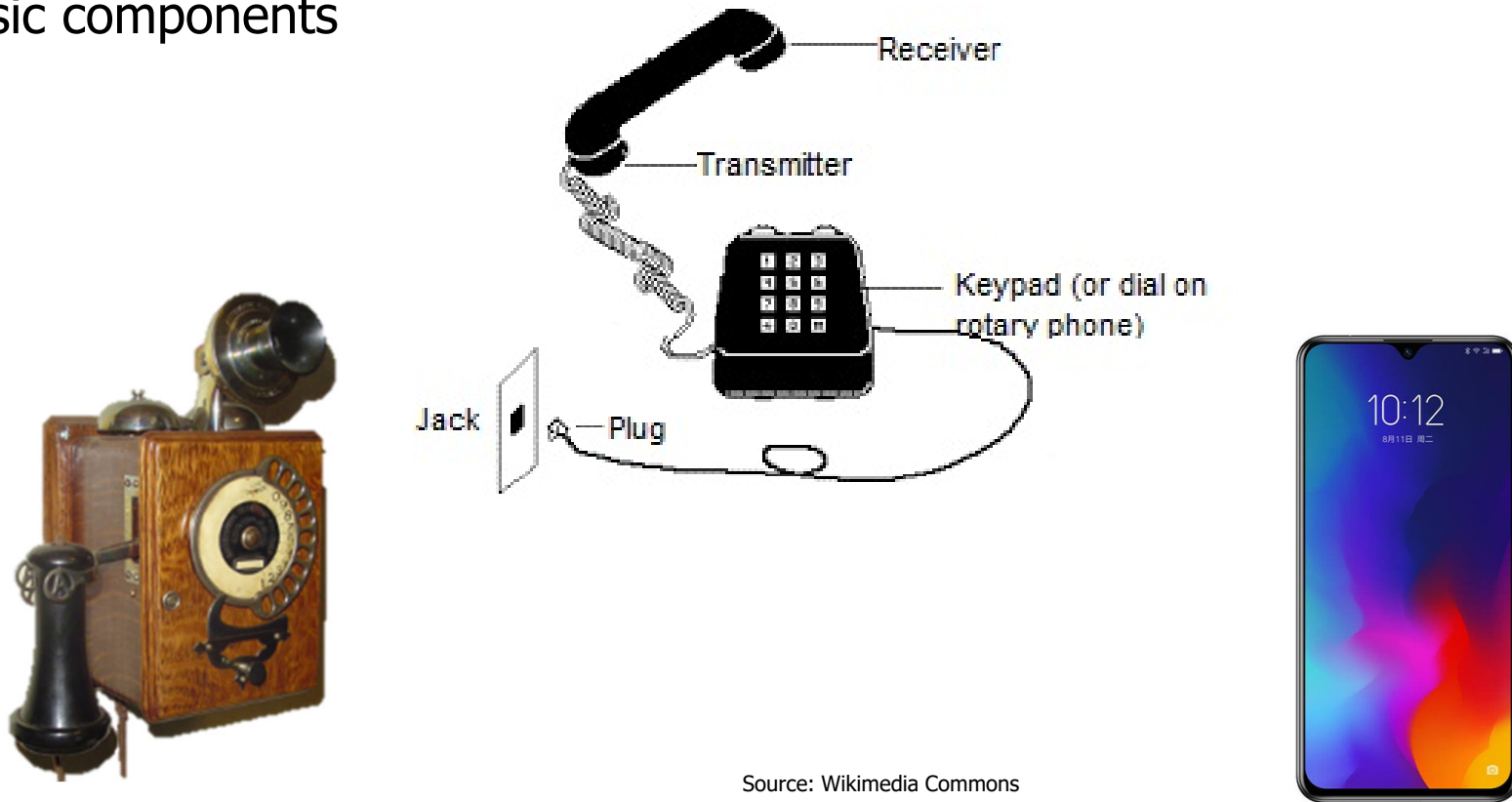
- How did we get from here...  to here?



Source: Wikimedia Commons

Basic networking

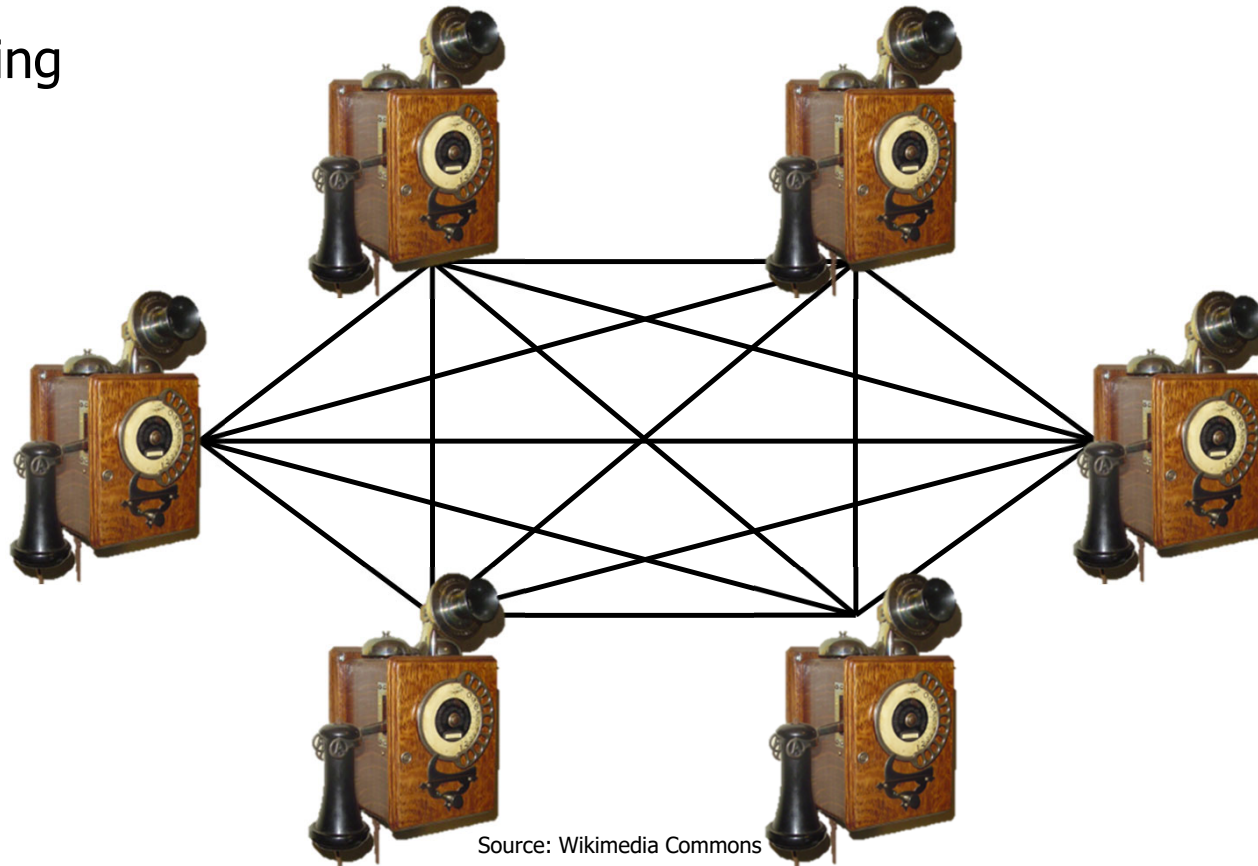
- Basic components



Source: Wikimedia Commons

Basic networking

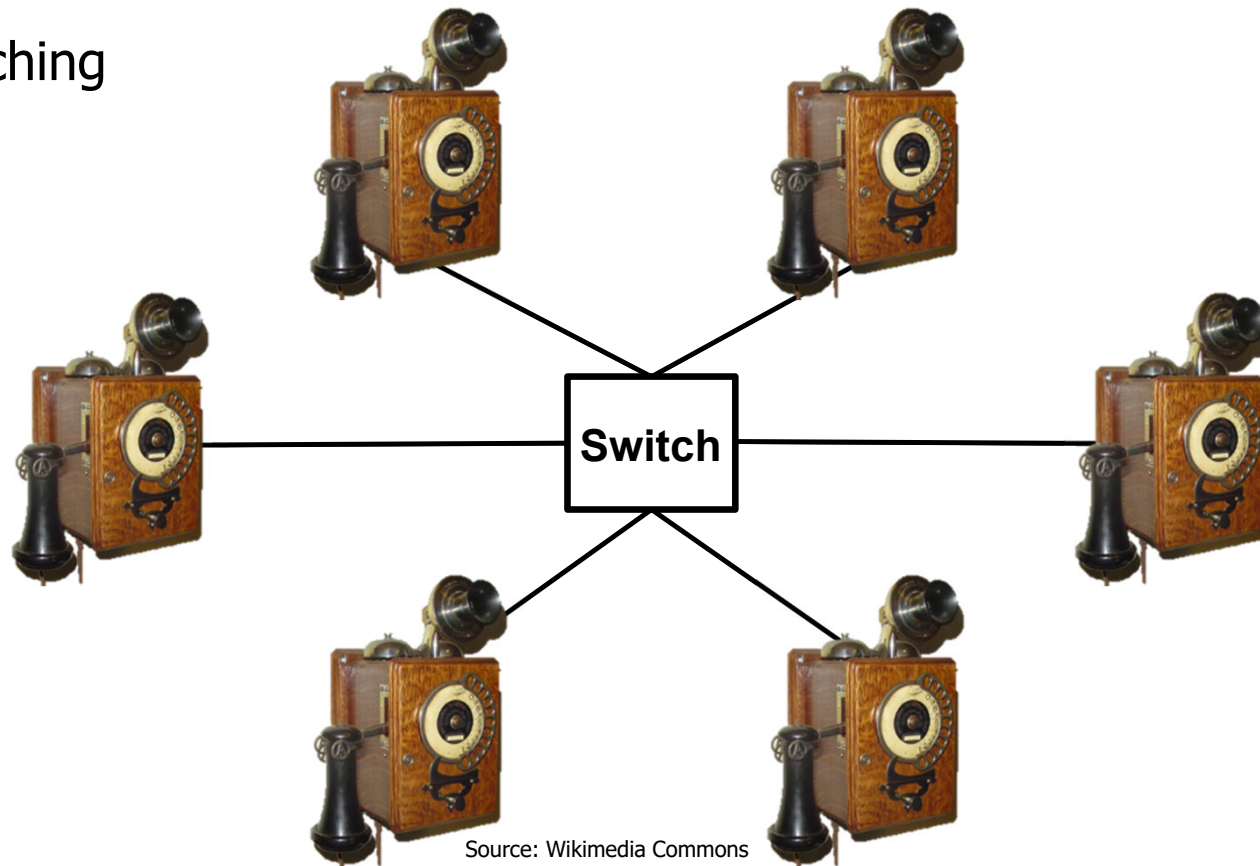
- Preswitching



Source: Wikimedia Commons

Basic networking

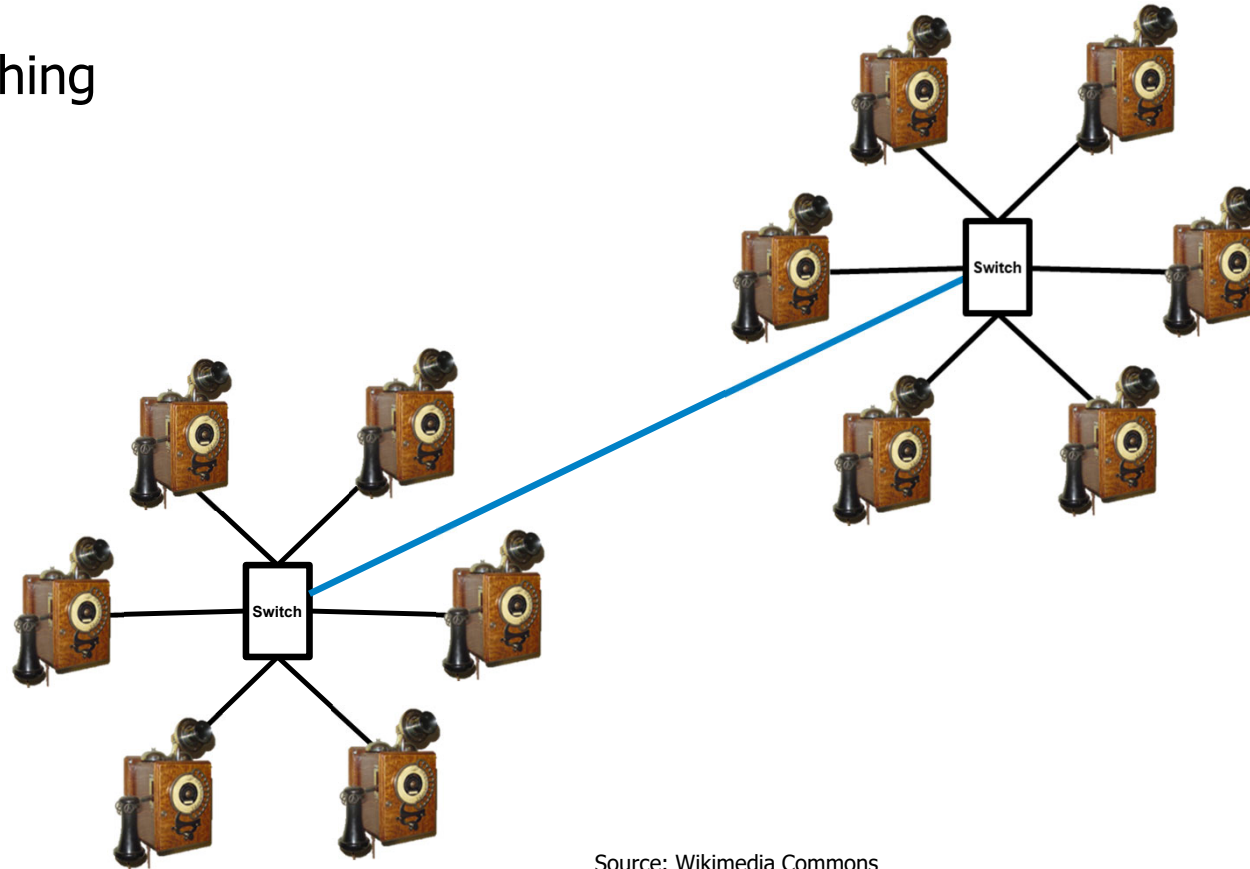
- Post-switching



Source: Wikimedia Commons

Basic networking

- Post-switching



Source: Wikimedia Commons

Basic networking

- The first switch (manual)



How may I help you, please?

Source: Wikimedia Commons

Basic networking

- Today's switches
 - Digital

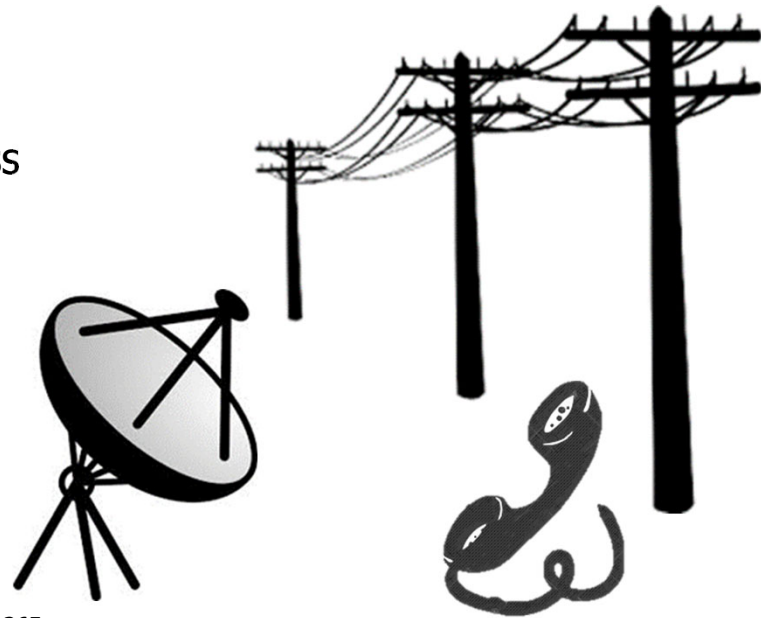


Source: Wikimedia Commons

Basic networking

■ The loop

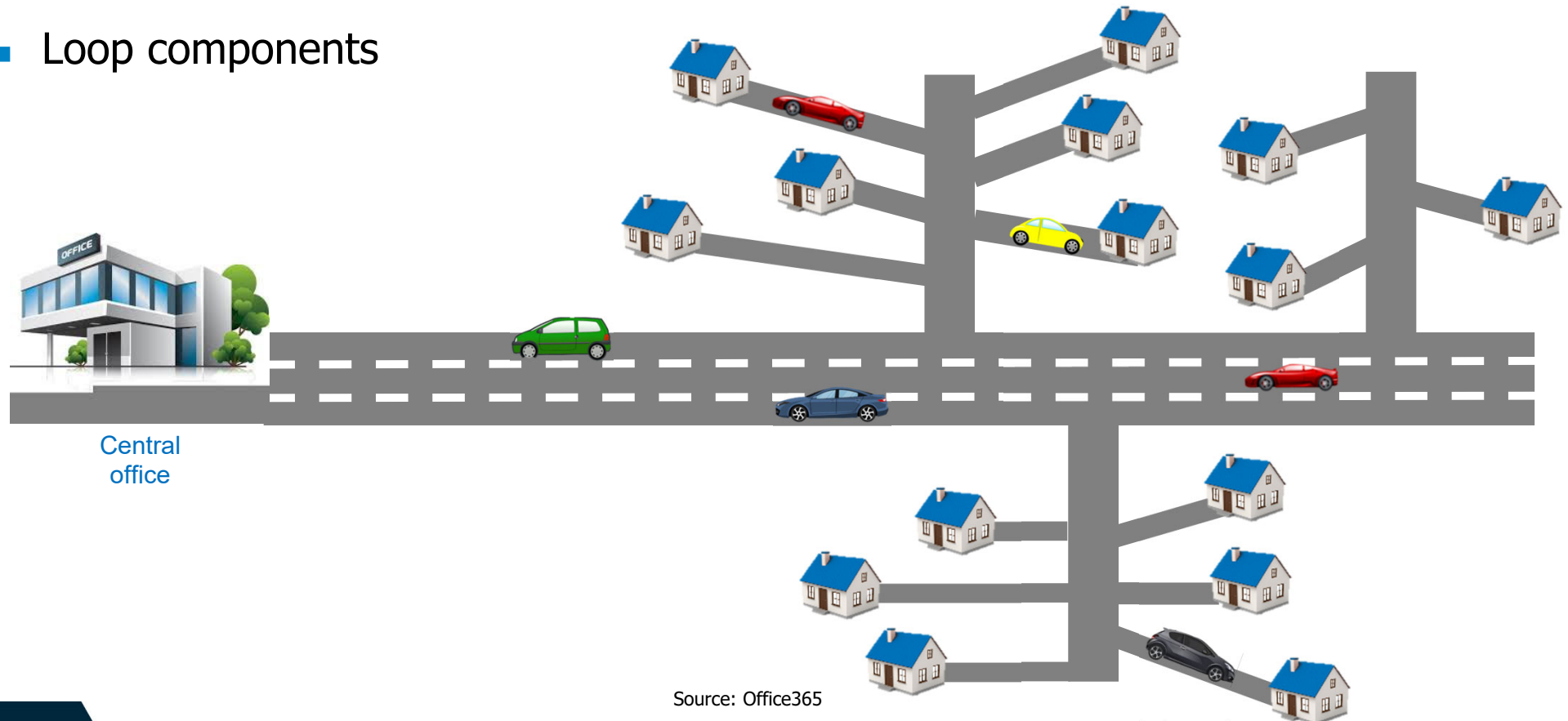
- A pair of wires, or its equivalent, that connects a subscriber's premises to the first point of switching
 - Buried or aerial
 - Twisted pair, coax, fiber or fixed wireless
 - Owned or leased
 - Loop concentration or dedicated loop



Source: Office365

Basic networking

- Loop components



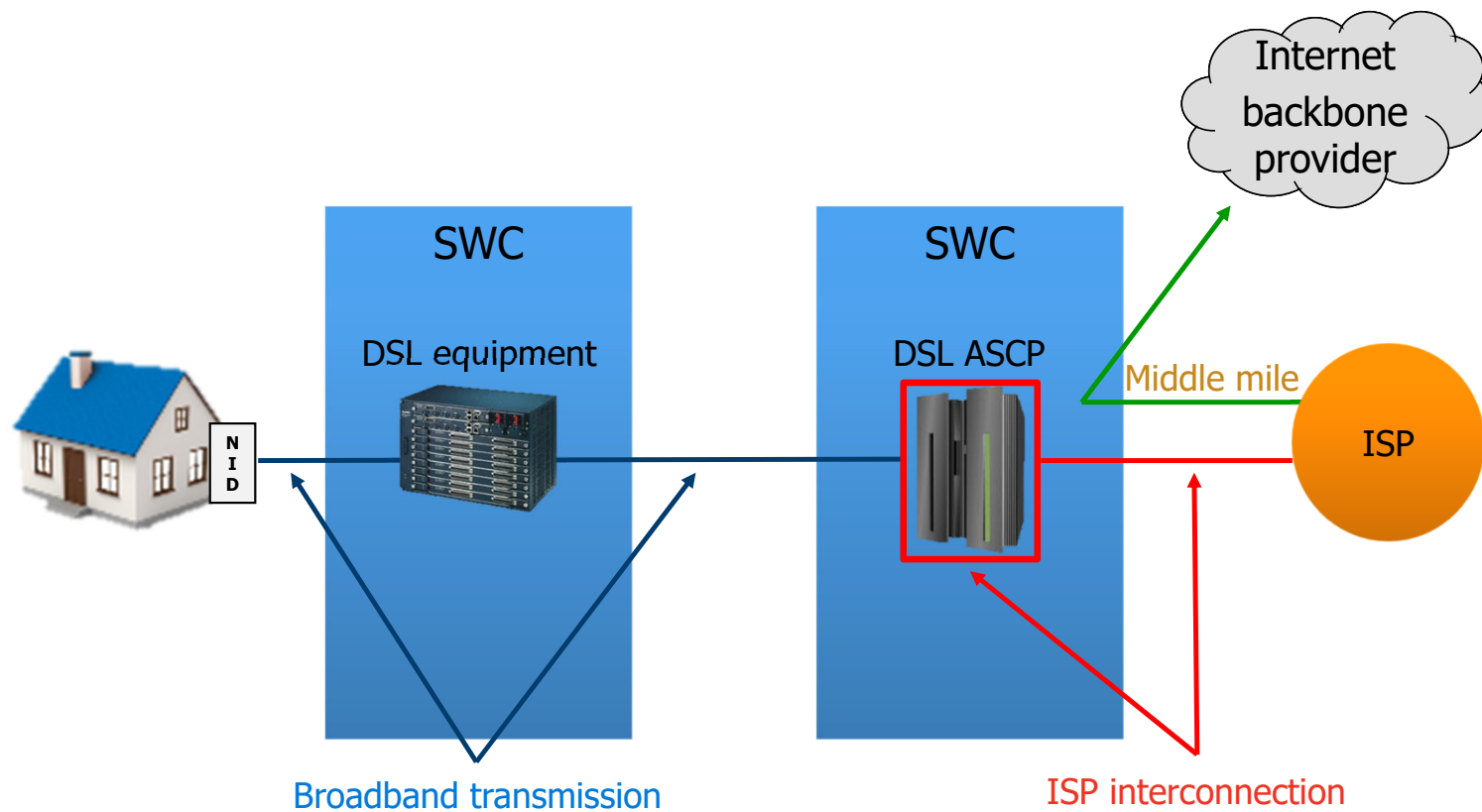
Basic networking

Broadband

- High-speed data transmission from the end user to a service provider
 - Our member companies will often connect to an internet service provider
- Always connected
- Data speeds are not guaranteed
- FCC speed definition is constantly changing
- Several broadband technologies available

Basic networking

Broadband

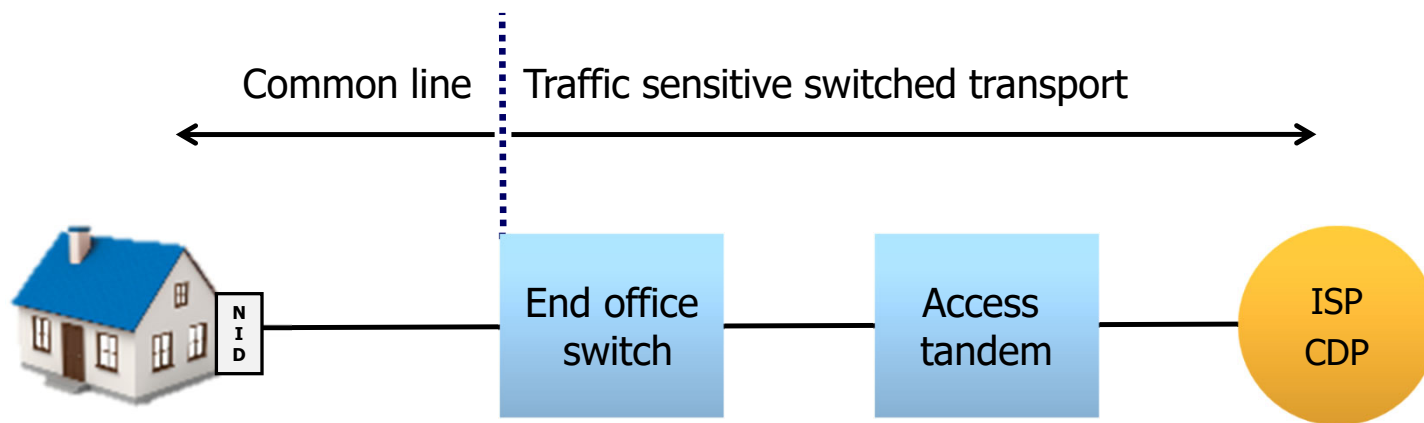


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Common line and traffic sensitive

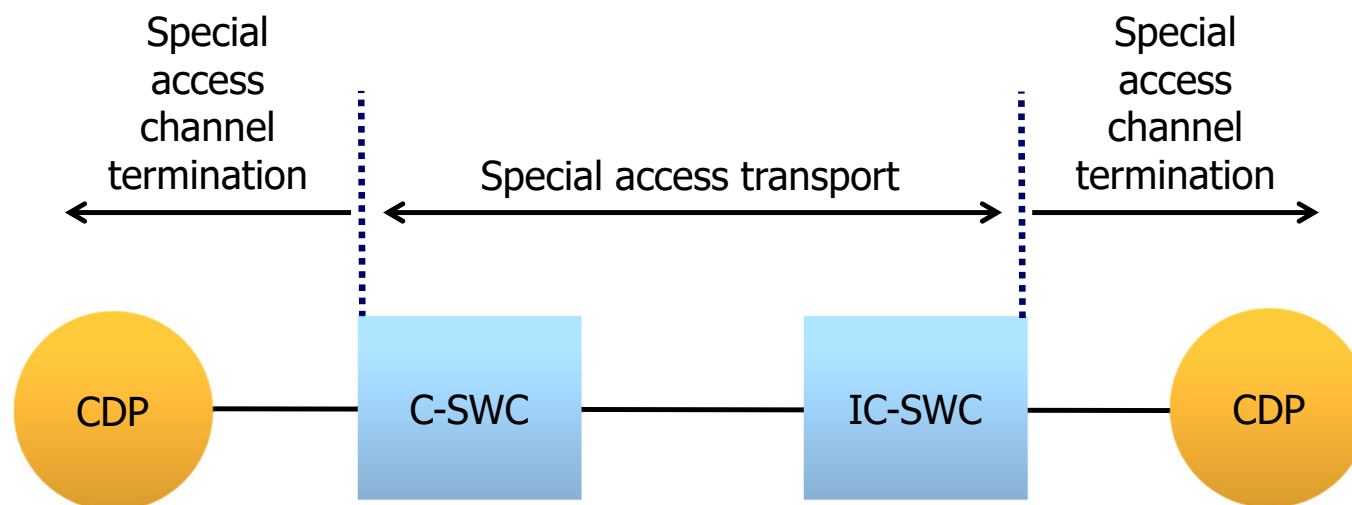
Where is each part in the network?



Source: Office365

Common line and traffic sensitive

Traffic sensitive special access circuits



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Conclusion

- Whenever you have questions, your member service manager or regional tariffs and training manager at NECA can help
- Additionally, NECA offers many opportunities for training, such as webcasts scheduled monthly, webcasts on demand and regional trainings brought to member companies' locations
- Keep an eye out for training in your area. If you are interested, contact your MSM or regional tariffs and training manager about hosting training in your area

thank you!



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Acronyms

■ AS	Average Schedule Company
■ CAF BLS	Connect America Fund Broadband Loop Support
■ CAF ICC	Connect America Fund Intercarrier Compensation
■ CBOL	Consumer Broadband Only Line
■ CDP	Customer Designated Premises
■ CL	Common Line
■ CLEC	Competitive Local Exchange Carrier
■ DSL ASCP	Digital Signal Line Access Service Connection Point
■ EC	Cost Company
■ FCC	Federal Communications Commission
■ ILEC	Incumbent Local Exchange Carrier
■ ISP	Internet Service Provider
■ IXC	Interexchange Carrier
■ LATA	Local Access Transport Area

Acronyms

■ LEC	Local Exchange Carrier
■ MSM	Member Service Manager
■ NECA	National Exchange Carrier Association
■ NID	Network Interface Device
■ PSC	Public Service Commission
■ PUC	Public Utility Commission
■ SPA	Special Access
■ SWA	Switched Access
■ SWC	Serving Wire Center
■ T4	NECA FCC Tariff No. 4
■ T5	NECA FCC Tariff No. 5
■ TS	Traffic Sensitive
■ USAC	Universal Service Administrative Company
■ USF	Universal Service Fund

Acronyms

- VD DSL Voice Data Digital Signal Line