

MINUTES OF THE SENATE COMMERCE COMMITTEE.

The meeting was called to order by Chairperson Karin Brownlee at 8:30 a.m. on January 30, 2003 in Room 123-S of the Capitol.

All members were present except: Sen. Steineger, absent

Committee staff present: April Holman, Legislative Research
Norman Furse, Revisor of Statutes
Mitch Rice, Revisor of Statutes
Jodie Anspaugh, Secretary

Conferees appearing before the committee: Janet Buchanan, Kansas Corporation Commission

Others attending: See attached list.

Senator Jordan moved to introduce a bill on tourism funding, similar to HB 2083. Senator Kerr seconded. The motion carried. Chairperson Brownlee introduced her two pages for the day.

Chairperson Brownlee welcomed Janet Buchanan, Chief of Telecommunications from the Kansas Corporation Commission, to the committee. Ms. Buchanan presented the committee with a review of some of the dockets filed at the Commission (Attachment 1). From July 2001 - June 2002, there were 821 telecommunications dockets filed, which is 80% of the total dockets filed at the Commission in that time period. Ms. Buchanan reviewed some of the dockets:

Audits of Independent Rural Telephone Companies

- 12 dockets were reviewed, with a report on whether the KUSF support was increased or decreased as a result of the audit.
- To date, the audits of the independent rural telephone companies have led to a \$6,877,099 reduction in the level of the KUSF.
- Ms. Buchanan answered questions about the audit reports. Method of settlement and retroactive rate making were discussed.

Other KUSF Related Issues

- 3 more dockets were reviewed. Ms. Buchanan answered questions about the Lifeline program.

Unbundled Network Elements

- Broadband was discussed. Ms. Buchanan recommended that each committee member read Order 19 of Docket Number 01-GIMT-032-GIT, which relates to HB 2019. Ms. Buchanan passed out a booklet titled "Evolving Telecommunications Competition in Kansas," which is an overview prepared by the Telecommunications Section of the Kansas Corporation Commission. (Attachment 2)

Price Cap Regulation

- The one docket in this category discusses free 800 service. Southwestern Bell and Sprint agreed to continue to provide free 800 service to public schools and county governmental entities where 10% or more of the constituents are required to make long distance calls to reach the school or county seat.

The committee also discussed "slamming," "win-back offers," and caller-id service.

The meeting was adjourned at 9:30 a.m.

The next meeting is scheduled for January 31, 2003 at 8:30 a.m.

SENATE COMMERCE COMMITTEE

GUEST LIST

DATE: Thursday, Jan. 30, 2003

NAME	REPRESENTING
TOM DAY	KCC
JANET BUCHANAN	KCC
RANDY STOUT	KANISANS
Bill SNEED	SBC
Dennis KOCH	SBC
Tim Burgess	Wester
John Pinger	State Independent Tele. Assn.



Kansas Corporation Commission

Kathleen Sebelius, Governor John Wine, Chair Cynthia L. Claus, Commissioner Brian J. Moline, Commissioner

Presentation on behalf of the Kansas Corporation Commission
By Janet Buchanan, Chief of Telecommunications
Regarding Major Telecommunications Proceedings Before the Commission
Before the Senate Commerce Committee

Chairperson Brownlee and members of the Senate Commerce Committee:

Thank you for the opportunity to appear before you today on behalf of the Kansas Corporation Commission to present you with information regarding telecommunications proceeding before the Commission. My name is Janet Buchanan. I am the Commission's Chief of Telecommunications.

Summary of Major Telecommunications Proceedings Before the Kansas Corporation Commission

From July 2001 to June 2002, 821 dockets were opened at the Commission concerning telecommunications. This accounts for approximately 80% of the dockets opened at the Commission during this timeframe.

Audits of Independent Rural Telephone Companies

Docket Number 02-GIMT-068-KSF: On July 31, 2001, the Commission issued an order opening this docket for the purpose of establishing cost based KUSF support for independent rural telephone companies. On December 4, 2001, parties to this proceeding filed direct testimony. This testimony addressed what type of mechanism should be used to determine cost based KUSF support (such as a forward looking cost model or embedded costs) and what method could be used to determine an affordable rate for local service in rural independent company territories. The parties negotiated a stipulation and agreement in this proceeding. The agreement states that KUSF support for independent rural telephone companies will be based on embedded cost determined through rate case proceedings. Additionally, the agreement provides for a formula for reaching a target rate for all independent rural telephone companies to move their rates for residential and business services toward. The current target rate for residential service is \$12.00 and for business services the target rate is \$15.00. A new target rate will be calculated and applied again in March 2007. Rates may be increased in increments of up to \$2.00 per year beginning March 1, 2003. All KUSF support will be based on the target rate whether the company actually moves to that rate. The Commission approved this stipulation and agreement on March 11, 2002. This stipulation and agreement was codified in Substitute for HB 2754 during the 2002 Legislative Session.

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Docket Number 01-RRLT-083-AUD: In this docket the Commission determined that Rural Telephone Service Company, Inc., had over-earnings of \$733,614. The Commission determined that \$10,000 per year of that excess revenue should be utilized by the company for advertisement of Lifeline service options. The Commission then reduced the company's KUSF support by \$723,614. This decision was reached prior to the approval of the agreement in Docket Number 02-GIMT-068-GIT, which states that KUSF support would be based on the outcome of the audit proceedings. Thus, the use of excess revenue for Lifeline advertisement will not occur in future proceedings.

Docket Number 01-SNKT-544-AUD: The Commission found that Southern Kansas Telephone Company, Inc., had over-earnings of \$2,771,763. The Commission determined that \$10,000 per year of that excess revenue should be utilized by the company for advertisement of Lifeline service options. The Commission then reduced the company's KUSF support by \$2,671,763. This decision was reached prior to the approval of the agreement in Docket Number 02-GIMT-068-GIT, which states that KUSF support would be based on the outcome of the audit proceedings. Thus, the use of excess revenue for Lifeline advertisement will not occur in future proceedings.

Docket Number 01-CRKT-743-AUD: In this docket, the Commission approved a Stipulation and Agreement that stated that Craw-Kan Telephone Cooperative, Inc. had over-earnings of \$500,000. The company's KUSF support was reduced by that amount.

Docket Number 01-BSTT-878-AUD: The Commission reached a tentative decision that Bluestem Telephone Company had over-earnings of \$202,200. However, there are still issues related to corporate cost allocations and management services agreement pending before Commission. Resolution of these issues may cause the calculation of over-earnings to be revised. At this time, the company's KUSF support has been reduced by \$202,200.

Docket Number 01-SFLT-879-AUD: The Commission reached a tentative decision that Sunflower Telephone Company, Inc had over-earnings of \$1,456,550. However, there are still issues related to corporate cost allocations and management services agreement pending before Commission. Resolution of these issues may cause the calculation of over-earnings to be revised. At this time, the company's KUSF support has been reduced by \$1,456,550.

Docket Number 01-PNRT-929-AUD: In this Docket, the Commission approved a Stipulation and Agreement stating that Pioneer Communications had under-earnings of \$1,083,000. The company's KUSF support was increased by this amount.

Docket Number 02-HOMT-209-AUD: The Commission reached a tentative determination that Home Telephone Company, Inc. had over-earnings of \$106,552. There is a tax issue pending for which the Commission requested additional information. Resolution of this issue may alter the level of over-earnings. The Company has appealed the Commission's determination of rate case expense. Resolution of the appeal may also

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alter the level of over-earnings. At this time, the company's KUSF support has been reduced by \$106,552.

Docket Number 02-WLST-210-AUD: The Commission approved a Stipulation and Agreement finding that Wilson Telephone Company, Inc. had over-earnings of \$137,351 once adjusted for additional rate case expense. The company has appealed the Commission's determination of rate case expense. Resolution of this appeal may alter the level of over-earnings. At this time, the company's KUSF support has been reduced by \$137,351.

Docket Number 02-BLVT-377-AUD: The Commission determined that Blue Valley Telephone Company had over-earnings of \$564,945. The company's KUSF support has been reduced correspondingly.

Docket Number 02-S&TT-390-AUD: The Commission determined that S&T Telephone Cooperative Association, Inc. had over-earnings of \$817,124. The company's KUSF support was reduced by this amount.

Docket Number 02-JBNT-846-AUD: The Commission approved a Stipulation and Agreement finding that JBN Telephone Company, Inc. had over-earnings of \$690,000. The company's KUSF support was reduced by this amount.

To date, the audits of independent rural telephone companies have led to a \$6,877,099 reduction in the level of the KUSF.

Other KUSF Related Issues

Docket Number 00-GIMT-910-GIT: The Commission determined that the criteria eligibility for the Lifeline service program should be expanded to include individuals who certify that they have an income level that is 150% of the federal poverty level or less. The eligibility requirements were also expanded to mirror the criteria adopted by the FCC for individuals living on tribal lands, including participation in the Bureau of Indian Affairs general assistance program, the tribally-administered Temporary Assistance for Needy Families program, the Head Start program (if the individual meets its income-qualifying standard), and the National School Lunch Program. The Commission's public information office will implement a link on the Commission's website with detailed information regarding the Lifeline service program and notification will be sent to relevant state and local agencies. Each carrier is required to place information regarding the availability of the Lifeline program on notices to soon-to-be disconnected customers. Finally, the Commission ordered that the Lifeline credit supported through the KUSF will be increased by \$2.00 per month to \$5.50 per month. The federal USF provides \$9.50 per month. Thus, total Lifeline support will increase from \$13.00 per month to \$15.00 per month. The Commission will consider additional comments on further increases in the Lifeline credit.

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Docket Number 03-GIMT-126-GIT: The statute requires that independent rural telephone companies reduce intrastate access rates to the interstate level on March 1, 1997, and every two years thereafter. The independent rural telephone companies are permitted to recover the revenue lost by making these reductions through and increase in KUSF support. The Commission authorized reductions in access rates totaling approximately \$9 million to take effect on March 1, 2003.

Docket Number 03-GIMT-284-GIT: In this docket, the Commission will make its determination of the KUSF support necessary for funding Year 7 and the assessment rate that carriers will be permitted to charge consumers. The Commission determined that the assessment rate will be 4.99% for both wireless and wireline carriers. The Commission has asked for additional comments on the interplay between the Commission's prior decision that support will be provided on a per line basis and the 2002 legislative amendment to K.S.A. 66-2008(e).

Unbundled Network Elements

Docket Number 01-GIMT-032-GIT: In this docket, the Commission determined that the public interest would be served by designating as an unbundled network element the end-to-end broadband-capable loop, over which Southwestern Bell Telephone Company makes its broadband services offering in those locations in Kansas where the company has deployed its fiber-fed, NGDLC equipped Project Pronto architecture. The Commission also determined that SWBT must provide unbundled, non-discriminatory access to packet-switching where Project Pronto architecture has been deployed. Additionally, in central offices where SWBT has installed splitters to provide access to the high frequency portion of the loop through line sharing, the company must provide the splitter functionality on a nondiscriminatory basis to any requesting LEC. The Commission denied the request of CLECs to unbundle four other network elements proposed by CLECs. The Commission also determined that the broadband offering proposed by SWBT was an inadequate alternative to designating the broadband capable loop a UNE.

Price Cap Regulation

Docket Number 02-GIMT-272-MIS: K.S.A. 66-2005(f) requires the Commission to review the price cap formula every five years. The primary components of the price cap formula are an inflation factor, a productivity factor and exogenous adjustments. Currently, only SWBT and Sprint have elected price cap regulation. A Stipulation and Agreement was negotiated among the parties and approved by the Commission. The agreement states that the productivity offset for Basket 1 services will be 3.15% and for Basket 3 services it will be 1.4%. The inflation factor will continue to be calculated by the change in the GDPPI-CW. The exogenous adjustment will continue to be applied as in the past. SWBT and Sprint also agreed to continue to provide free 800 service to public schools and county governmental entities where 10% or more of the constituents are required to make long distance calls to reach the school or county seat.

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Docket Number 02-GIMT-555-GIT: In this proceeding, the Commission will determine what criteria and procedures should be used to evaluate applications for retail price deregulation made by companies under price cap regulation. This proceeding will also address criteria and procedures for consideration of applications for individual customer pricing. Interested parties have filed testimony regarding criteria to be considered and a hearing is being held on the issues as we speak.

Slamming

Increased competition in the interLATA and intraLATA long distance markets and in the local service market has provided consumers with a variety of choices and rate plans for toll calls and local service. An unintended consequence of competition has been "slamming". The FCC defines slamming as "changing a subscriber's (or consumer's) carrier selection without that subscriber's knowledge or explicit authorization." The FCC adopted rules and regulations to curb slamming and impose penalties on carriers who engage in slamming. From July 2001 through June 2002, the Commission received 1,400 slamming complaints. Staff investigated each complaint and found 102 actual violations of the FCC rules.

Other Issues

Docket Number 02-GIMT-678-GIT: The Commission opened this docket to investigate win-back and retention promotions and practices. A "win-back offer" is a discount made available to former local exchange carrier customers who voluntarily terminated their service with the local exchange carrier in favor of a competing provider in an attempt to encourage such a customer to resubscribe. A "retention offer" is a discount available to existing customers of a local exchange carrier who are considering service offers from a competing provider. Two workshops have been held to discuss some pertinent issues. Direct testimony will be filed on February 14, 2003. Rebuttal testimony will be filed on March 12, 2003. A hearing is scheduled for April 8, 9, and 10, 2003.

Evolving Telecommunications Competition in Kansas



A Brief Overview

Kansas Corporation Commission
Telecommunications Section
December 2002

Senate Commerce Committee

Jan. 30, 2003
Attachment 2-1

Forward

This brief overview has been prepared by the Telecommunications Section of the Kansas Corporation Commission.

It is intended to be a primer for use in gaining a generalized background on the developments and current state of the Public Switched Telephone Network (PSTN). It has been broken into two sections; the first providing information on recent regulatory and legislative actions and the second providing descriptions of the network itself.

1984 – Divestiture

The goal of the 1984 divestiture was to separate the monopoly local network from the potentially competitive markets for long distance and customer premises equipment (CPE) services. AT&T was allowed to sell long distance service along with other major carriers, while local service was provided by Regional Bell Operating Companies (RBOCs). The local providers were considered monopolists and barred from selling long distance service.

The road to divestiture was long. During the 1970s, long distance costs dropped sharply while local costs continued to rise. The reduction in long distance costs was due to technological innovations such as direct distance dialing, which reduced the need for operators, and microwave and satellite transmission in place of wires. Regulators sought a way to appropriate what would have been a rising profit from long distance customers in order to subsidize local service customers who would have faced rising prices.

At first, because long distance calls traveled over the lines of several companies, the revenue from the call was distributed by procedures of separations and settlements. Separations was the process of determining how much property is assigned for use in the long distance call and settlements is the process of dividing up the long distance profits to the various companies proportionately to their property invested in the long distance facilities.

Then federal regulators decided calculations should be made in such a way that the long distance caller paid more for use of the local telephone company's facilities than they were worth. Over time, an increasing number of big toll callers either used the Other Common Carriers (OCCs), which gave the local companies a small payment, or developed bypass arrangements that gave the local companies nothing.

In 1984, federal regulators concluded that a new method of payment should be phased in. Rather than make the long distance telephone company pay part of its revenue to the local company for use of its facilities, the telephone subscriber or the interexchange carrier would pay a monthly flat rate access charge that would compensate the local carrier for use of its line and give the customer access to the long distance system. These charges are known as Access Charges.

Long distance and CPE competition accelerated development of technology in:

- Digital transmission and switching
- Stored program controlled switches
- Multiplexing
- Fiber optics networks

By the early 1990s, the industry was relatively stable. With the local monopoly providing equal access to all long distance companies, long distance service became competitive.

1996 – Federal Telecommunications Act

Goals:

- Promote broad entry to local markets by making the existing network available to all providers on nondiscriminatory terms.
- Resulting local competition would free the Regional Bell Operating Companies (RBOCs) to offer long distance services.
- Reform universal service subsidy so that high cost areas obtain support in a competitively sustainable (neutral) manner.

Under the 1996 Act, the RBOCs were permitted to offer retail local exchange service along with their competitors. No divestiture was mandated, such as the AT&T divestiture of 1984, which could have turned the RBOCs into wholesalers of access to network elements. Now the RBOCs are retail providers of service in the local exchange market along with Competitive Local Exchange Carriers (CLECs) while, at the same time, being required to offer a wholesale market to those same CLECs for Unbundled Network Elements.

Unbundled Network Elements (UNEs)

Network elements (in theory) are the generic components of local switching and transmission. The local network is more vast, more expensive and less “fungible” than long distance. Local loop unbundling was viewed by the FCC as a mechanism to encourage entrants into the local market who might later build facilities, rather than rely permanently on the existing telephone company plant.

Some industry trends after passage of the 1996 Act

- RBOC consolidation
- Proliferation of competitive local exchange carriers (CLECs)
- CLEC bankruptcies
- Packet Switch Technology and the Internet

FCC's order on Access Charge Reform – May 2000

Access service refers to the connection between the customer and the long distance network. The connection to the long distance network is provided by a local exchange company (LEC).

An access charge is billed to either end users or interexchange carriers as compensation to the local telephone company for the origination and termination of a telephone call on its telephone lines. Prior to divestiture, long distance revenues contributed a great deal to LECs cost recovery. After divestiture, the system of access charges was developed by the FCC.

Access charges are important to the local exchange carriers since these charges generate approximately 1/3 of the LEC's income. These charges are the second largest revenue source for the LECs after revenues from basic local exchange service. However, the FCC believed those access charges were higher than the actual cost of providing access and opened a docket to reform the system.

The FCC order stated reforms should:

- Lower telephone bills for consumers
- Result in an overall, immediate \$3.2 billion reduction in access charges paid by long distance companies in 2000
- Accelerate competition by removing implicit subsidies found in access charges
- Change the subsidies hidden in interstate access charges into explicit, portable and sufficient universal service support so that affordable service will continue
- Provide regulatory stability for the industry

The FCC plan called for a reduction and restructuring of access charges over five years.

The KCC has jurisdiction over setting access charges for intrastate toll calls (calls that originate and terminate in Kansas). As stated above, a significant portion of the telephone plant used to provide local service (the line or loop that connects the customer to the telephone company's switch) is also used to originate and terminate long distance calls. Under the FCC's jurisdictional separations rules, a portion of these plant costs are assigned to interstate jurisdiction and then a formula is used to generate intrastate rates.

There are two types of costs identified in the FCC separations rules:

Non-traffic sensitive costs include revenue requirements associated with the local loop connecting a customer with the local exchange carrier's central office. A portion of non-traffic sensitive costs is recovered through flat rate charges directly on customers. The other portion of these costs is recovered through carrier common line charges such as the Subscriber Line Charge, the Presubscribed Interexchange Carrier Charge, and the Universal Service Fund charge.

Traffic sensitive costs are affected by the amount of traffic that occurs. As the volume of traffic increases, the need to add more capacity occurs. These costs are recovered from Interexchange carriers via usage-based charges.

Kansas Telecommunications Act 1996

During the 1996 Kansas legislative session, the Kansas Telecommunications Act was enacted and became effective July 1, 1996. The Kansas Act required numerous actions by the Commission.

Kansas Universal Service Fund

Docket No. 94-GIMT-478-GIT: The Commission established the initial Kansas Universal Service Fund (KUSF) mechanism in this proceeding in 1997. Access charge reductions were implemented in this proceeding and corresponding assessments on retail revenues to fund the KUSF distributions were determined for the first three years of the KUSF.

Docket No. 98-SWBT-677-GIT: The primary issue in this proceeding was determining how any change to SWBT's Kansas Universal Service Fund (KUSF) draw would be implemented. In a Stipulation and Agreement adopted by the parties and approved by the Commission, it was decided that SWBT's KUSF draw for high cost areas was to be set in Docket No. 99-GIMT-326-GIT;

SWBT would reduce its annual intrastate access revenues by \$4.7 million and rebalance the entire \$4.7 million to local rates by spreading this amount equally over all of SWBT's access lines; and make Digital Subscriber Line (DSL) services available to Kansas customers ubiquitously in the wire centers located in eight Kansas cities, and where technically feasible, to customers served by wire centers located in 16 additional Kansas cities. Subsequent orders in this docket continued the reduction in KUSF draw and rebalancing by SWBT.

Docket No. 99-GIMT-326-GIT: This proceeding was initiated to investigate the KUSF mechanism to determine what modifications, if any, were necessary to ensure the KUSF to support local service is based upon the cost to provide such service. In a Stipulation and Agreement filed by the parties and approved by the Commission it was decided that for the purposes of implementing the transition of the KUSF to a high-cost support mechanism, a cost benchmark, calculated as 125% of the statewide average cost of universal service at the wire center level would be adopted for price cap companies. The issue of KUSF portability to CLECs was affirmed by Commission order in this docket.

Docket No. 00-UTDT-455-GIT: This docket was opened to determine how any change to Sprint's KUSF draw would be implemented. In a Stipulation and Agreement filed by the parties and approved by the Commission it was decided that Sprint's annual receipts from the KUSF would be reduced by approximately \$4.4 million; reduction of access rates by \$1.7 million over three years and rate rebalancing a total of \$6.1 million; where technically feasible, made Asymmetrical Digital Subscriber Line (ADSL), or technologically comparable services, available by October 1, 2002 in four Kansas communities; and, provided a free 800 line to each public K-12 school or county seat. Subsequent orders in this docket continued the reduction in KUSF draw and rebalancing by Sprint.

Docket No. 02-GIMT-068-KSF: This proceeding was initiated to establish cost-based KUSF support for rural Independent Local Exchange Carriers (ILECs). In a Stipulation and Agreement filed by the parties and approved by the Commission, it was decided it would be appropriate to rely on the rural LECs embedded costs to determine KUSF support. This will be accomplished by conducting cost audits on the rural LECs to determine each company's revenue requirement. The Commission has begun the process of auditing each of the 37 rural LECs operating in Kansas.

Access Charge Reduction

Docket No. 96-LEGT-670-LEG: Issues addressed in this docket include the pass through of access charge reductions to basic toll rates, billing practice standards, price deregulation of telecommunications carriers, and the Kansas Lifeline program.

Docket No. 01-GIMT-082-GIT: This proceeding was initiated to consider whether changes should be made to the design of access charge rates charged by local exchange companies to interexchange carriers for the purpose of completing long distance calls. In a Stipulation and Agreement filed by the parties and approved by the Commission, SWBT's intrastate access rates were reduced, by a total of \$25 million, to match the interstate level, as set by FCC order; Sprint/United's intrastate access rates were reduced by approximately \$8.5 million; and the intrastate revenue lost by these reductions was recovered from increased local rates for residential and single-line business services and miscellaneous or competitive services. In addition, the Stipulation and Agreement specified how the access reductions would flow through to consumers by AT&T and Sprint Long Distance. These companies also agreed to additional reporting and monitoring by KCC staff to ensure these reductions flowed through to consumers.

Docket No. 03-GIMT-126-GIT: K.S.A. 66-2005(c) requires rural local exchange carriers to reduce intrastate access charges on March 1 of each odd-numbered year, as long as amounts equal to such reduction are recovered from the KUSF. This proceeding was initiated to allow the Commission to consider access reductions due to occur on March 1, 2003 so the reductions may be included in the annual KUSF calculation process. Staff has recommended an overall reduction in intrastate access rates charged by rural carriers of \$8.9 million. Staff has also determined that this will result in an approximate 8% reduction in intrastate toll rates to consumers.

Interconnection/Unbundled Network Elements Pricing

Docket No. 97-SCCC-149-GIT: This proceeding was initiated at the request of Sprint to establish SWBT's rates for interconnection, unbundled network elements and resale. A Stipulation and Agreement agreed to by all parties and the Commission in March 2000 set cost based discounts for resale of SWBT services for the next four years.

Southwestern Bell Telephone Company's Ability to Offer Long Distance Service

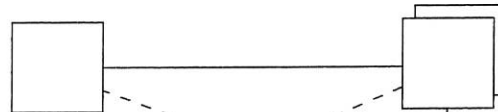
Docket No. 97-SWBT-411-GIT: This proceeding was initiated to investigate SWBT's compliance with section 271 of the Federal Telecommunications Act, which includes a 14 point checklist to determine whether SWBT should be allowed to sell long distance service in Kansas. The K2A was developed in this docket as a master interconnection agreement for Competitive Local Exchange Carriers (CLEC) to connect with the SWBT network and resell local service. CLECS may either opt-in to the K2A or develop unique interconnection agreements with SWBT. Based on staffs' extensive research, the Commission sent a report and recommendation to the FCC regarding SWBT's compliance with the 14-point checklist. The FCC subsequently issued its order approving SWBT's application to offer long distance service, and SWBT began selling long distance service in Kansas in January 2001.

Other dockets have been opened by the Commission in the years following passage of the Federal and State Telecommunication Acts to determine various issues related to competition and company specific matters.

The Public Switched Telephone Network (PSTN)

Prior to 1984

Regional Center
(eg. St. Louis)



10 RCs in the U.S.
+ 2 in Canada

Sectional Center
(eg. Kansas City)



Primary Center
(eg. Mission, Salina,
Wichita, Parsons)



Toll Center
(eg. Topeka, Hays,
Garden City, Pittsburg
+ 24)



End Office



Access Line



Legend:

- = Large (several hundred) 'Final' trunk groups of inter-office trunks.
- - - = Smaller 'high usage' trunk groups sized to carry ~ 80% of the offered traffic.

Key points:

- The Public Switched Telephone Network is a tightly integrated local and long distance (toll) network.
- The network provides an end-to-end analog voice service. Dial up computer/modem traffic is just beginning to emerge. Inter-office facilities are quickly being upgraded from analog to digital systems.
- The network is built on a 5 level hierarchy with clearly defined traffic routing rules and engineered to block not more than 1% of the offered traffic during the Busy Hour.
- Engineering, operations and administrative methods and procedures are developed and maintained by AT&T with close support from Bell Labs and Western Electric.
- Most Regional through Primary Centers are equipped with state of the art electronic and/or digital switching systems.
- Most End Offices and many Toll Centers are still equipped with electromechanical switching systems.
- Signaling occurs 'in band', advancing calls from one office to another until they reach the terminating telephone number.
- The PSTN architecture crosses company and state boundaries.
- Supported by the North American Numbering Plan (NANP).
- Competition is occurring with instruments and within the inside wiring arena (ie. wiring within the customer's premises).

The North American Numbering Plan (NANP)

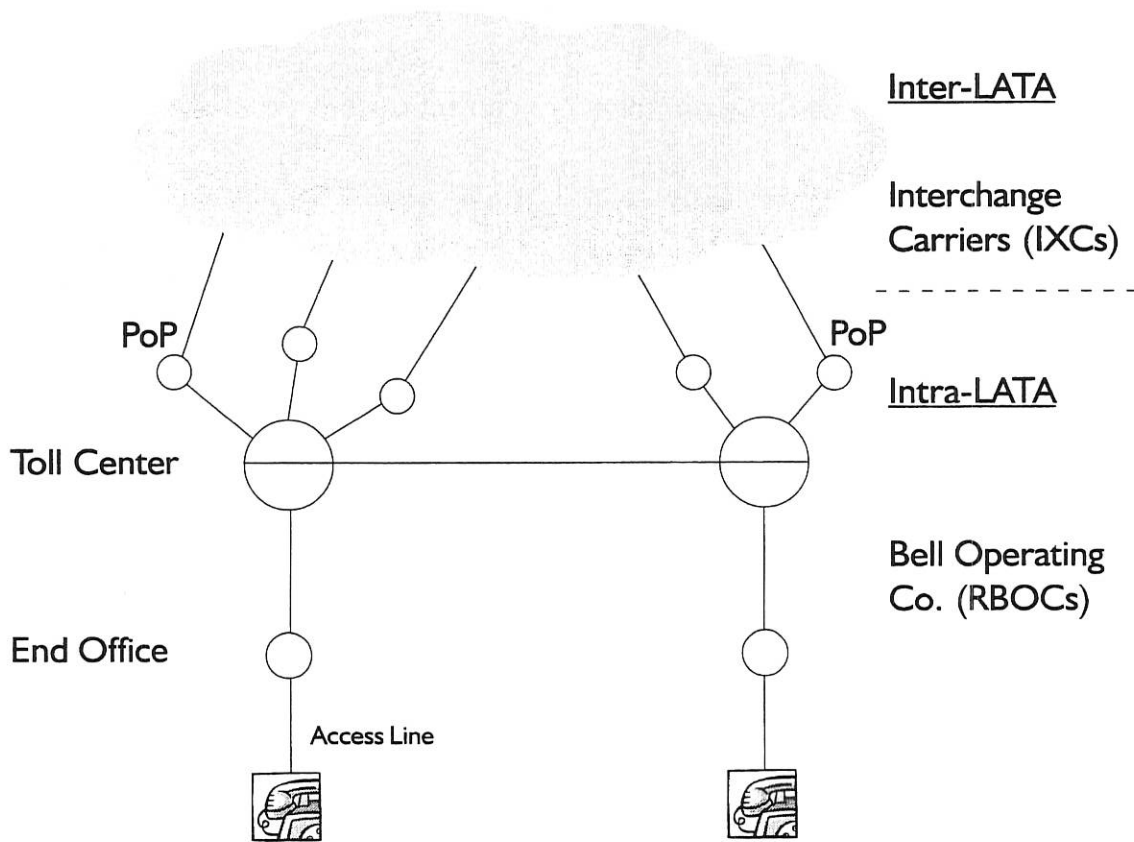
- The numbering plan used in North America is a 10-digit format and conforms to International standards, which allows for a maximum of 15 digits. The numbering plan itself is administered by the North American Numbering Plan Administrator (NANPA), in accordance with FCC regulations and guidelines developed by the Industry Numbering Committee (INC).
- The general format consists of a 3-digit area code, followed by a 3-digit central office code followed by a 4-digit line number (e.g. 785-271-3100).
- This numbering plan supports two critical functions; the routing of calls to a desired destination and the determination of distance between originating and terminating points for the preparation of long distance bills. Each central office code is 'assigned' to a particular central office. Detailed routing information, published within the industry, informs the carriers of how to translate (program) their respective switching systems allowing for an orderly and systematic flow of traffic (calls) on the network. In addition, each central office code is assigned a 'V & H' coordinate (roughly equivalent to Longitude and Latitude coordinates). Using these coordinates for the originating central office code and the terminating central office code carriers can compute the airline distance between the two points and construct a distance sensitive long distance bill.
- Prior to January 1, 1995, the area code portion of the NANP was specifically defined as N 0/1 X. Where N is any digit 2 through 9, a middle digit of either a 0 or a 1 and where X is any digit 0 through 9. This format has the following combinations; $8 \times 2 \times 10 = 160$ possible combinations. 160, less eight 'N11' Service Codes (e.g. 411, 911) combinations, = 152 combinations theoretically available for assignment as area codes. After January 1, 1995, the format was expanded to an NXX format producing $8 \times 10 \times 10 = 800$ combinations. 800, less eight 'N11' combinations, = 792 combinations theoretically available for assignment as area codes.

The North American Numbering Plan (NANP)

- Central office codes also follow a prescribed format. Prior to ~ 1968 central office codes adhered to an NNX format providing $8 \times 8 \times 10 = 640$ combinations. 640 less eight 'N11' combinations = 632 combinations theoretically available for assignment as central office codes. In 1968, this format too was expanded to an NXX format providing 792 combinations theoretically being available for assignment as central office codes.
- The line number portion of the NANP is an XXXX format, yielding 10,000 theoretical line numbers per central office code.
- As the number of working central office codes within an area code approach 792, the NANPA and the industry develop a relief plan for state Commission review and approval resulting the assignment of a new area code.
- There are currently in progress a number of conservation initiatives intended to delay the need for more area codes and to extend the life of the NANP itself.

The Public Switched Telephone Network (PSTN)

January 1, 1984



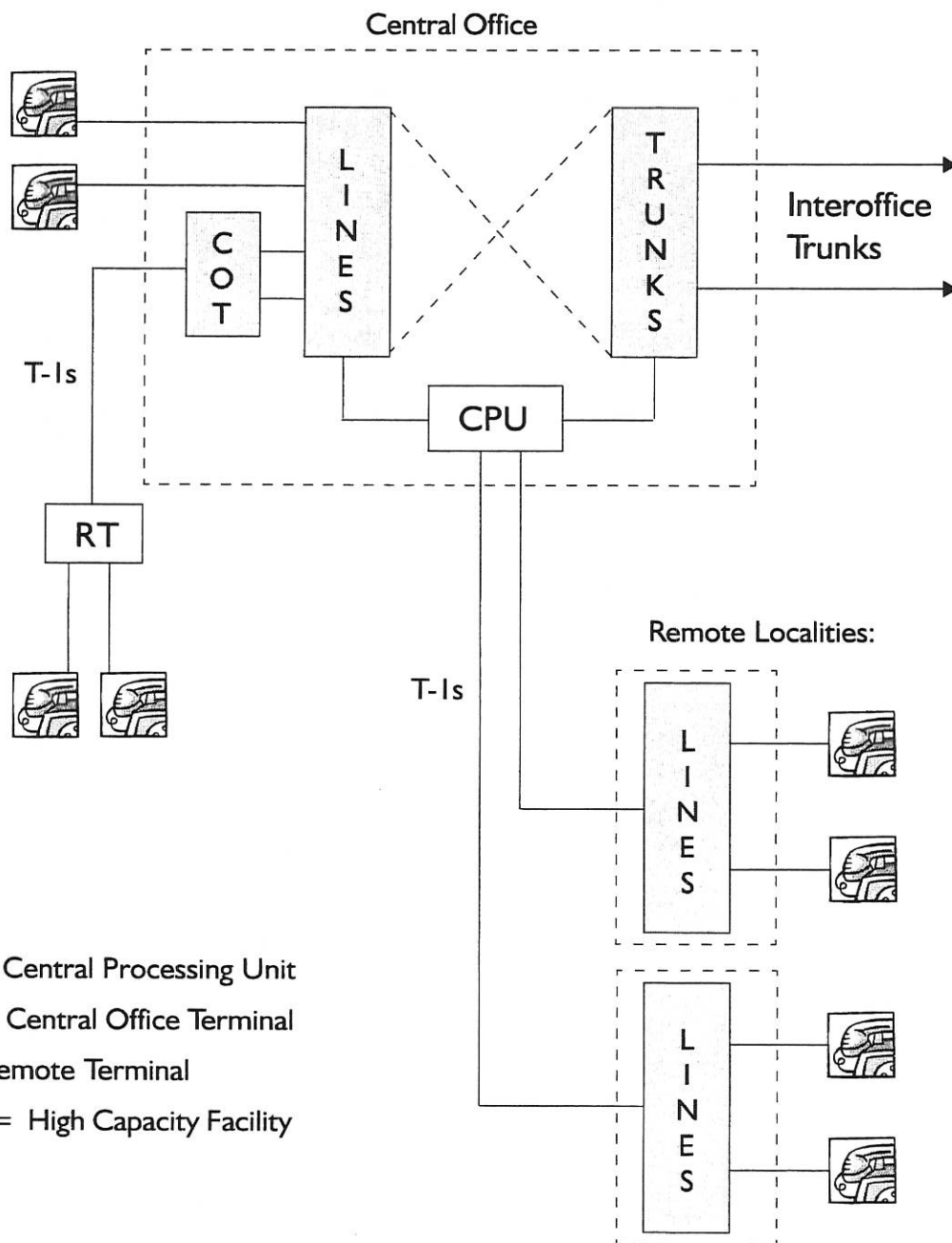
PoP.. Point(s) of Presence. The physical location within a LATA where IXCs and LECs exchange traffic.

Key points:

- The PSTN is separated, but still connected, into an Intra-LATA network and an Inter-LATA network. The split occurs most generally between the Toll Center (class 4) and Primary Center (class 3) functions.
- The term Local Access Transport Area (LATA) is coined by the 1984 AT&T divestiture proceeding. LATAs refer to the service territory in which the newly formed Regional Bell Operating Companies (RBOCs) are authorized to operate. Kansas has three LATAs; Wichita (all of the 316 and 620 NPAs), Topeka (all of the 785 NPA) and Kansas City (all of the 913, 816, and 660 NPAs). LATAs are based on Standard Metropolitan Statistical Areas, as defined by the U.S. Office of Management and Budget.
- Services crossing LATA boundaries are provided by emerging Inter-exchange Carriers (IXCs). IXCs gain access to end-users by purchasing Access Services from the RBOCs and physically exchange traffic at established Points of Presence (POPs) geographically located within the respective LATAs.
- The IXC determines the number and location of their POPs in each LATA.

The Public Switched Telephone Network (PSTN) With Host – Remote Architecture

Mid 80s - Present

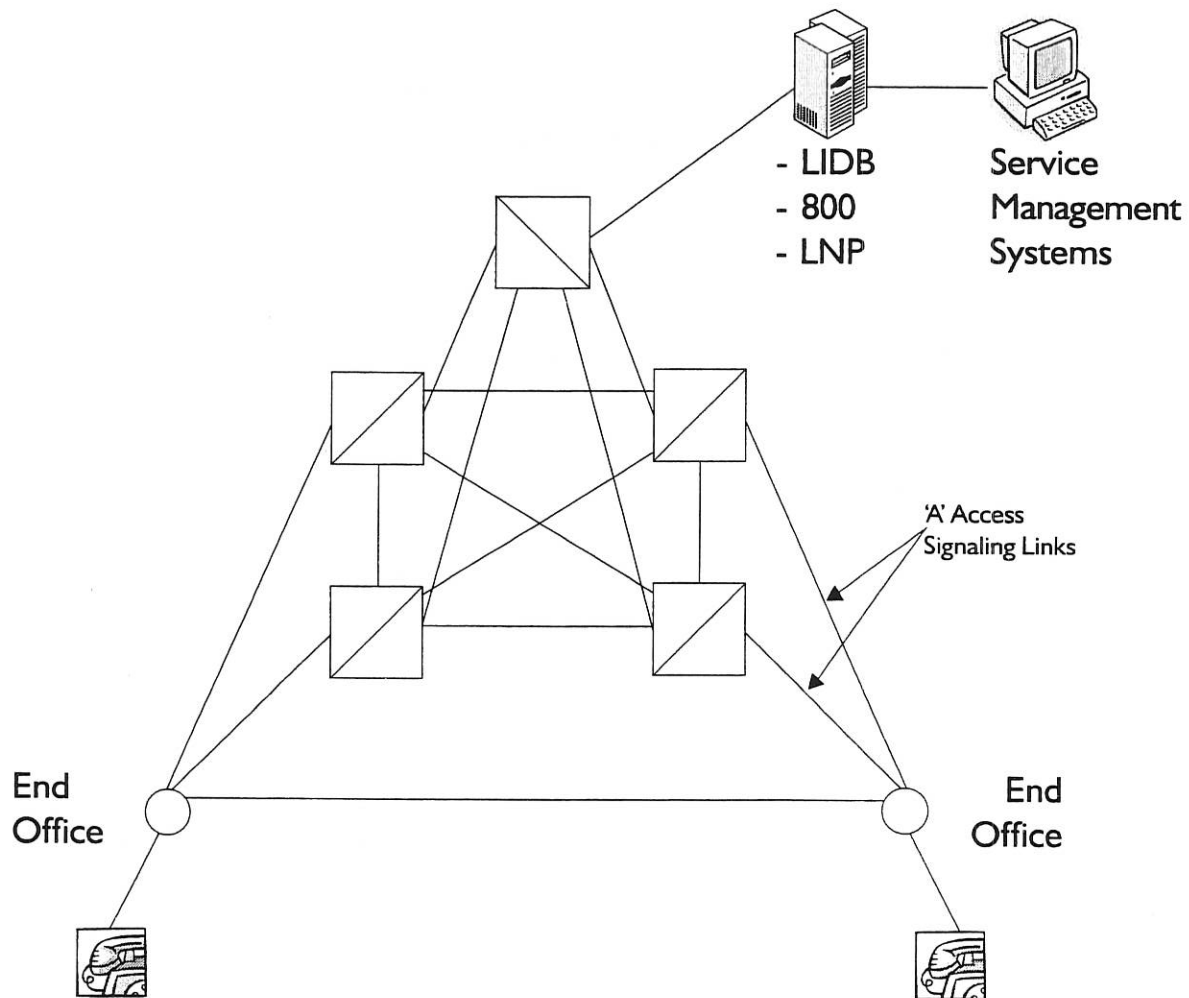




Key points:

- Deployment of Pair Gain systems is continuing. Pair Gain systems involve the placement of specialized electronics, known as remote terminals, between the central office and pockets of customers. The remote terminal and the central office are typically connected by 2-4 pairs of copper wire, or in some cases a fiber facility.
- Rapid deployment of Remote Switching technology is occurring. A Remote Switch is one equipped with minimal intelligence and is connected to a Host where it can access a wide range of call management features.
- Most LECs have deployed Remote Switching with optional Emergency Stand Alone features.
- Typical capacity of Pair Gain systems is from 96 to over a thousand subscriber lines.
- Typical capacity of Remote Switching systems is 512 to 5700 lines, heavily dependent upon traffic mix.
- Virtually all of the features available in the host are extended to the remote customers.
- Not shown are the numerous Operational Support Systems (OSSs) used to administer and maintain the PSTN.

The Public Switched Telephone Network (PSTN) With Common Channel Interoffice Signaling (SS-7)

Late 80s - Present

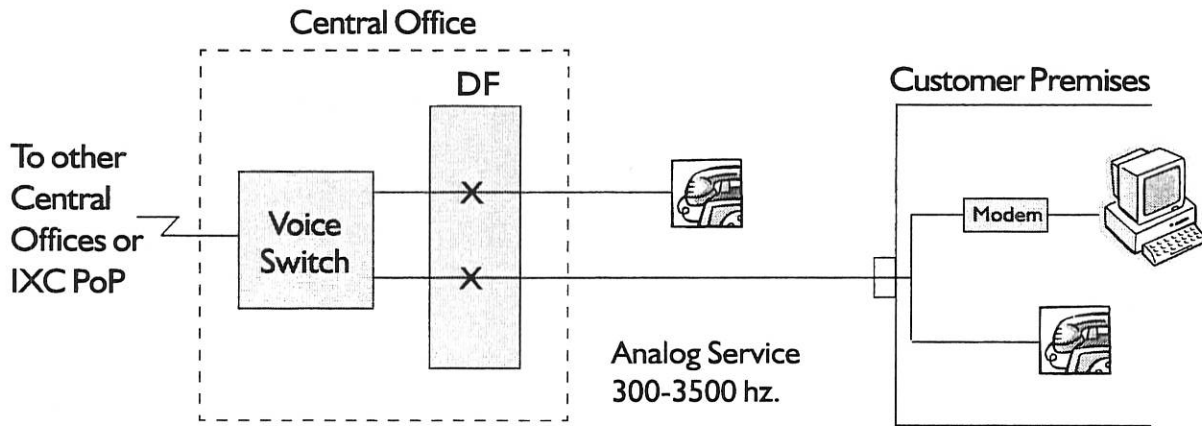


Legend:  Local Signaling Transfer Points (L-STP). 2/LATA
 Regional Signaling Transfer Points (R-STPs).

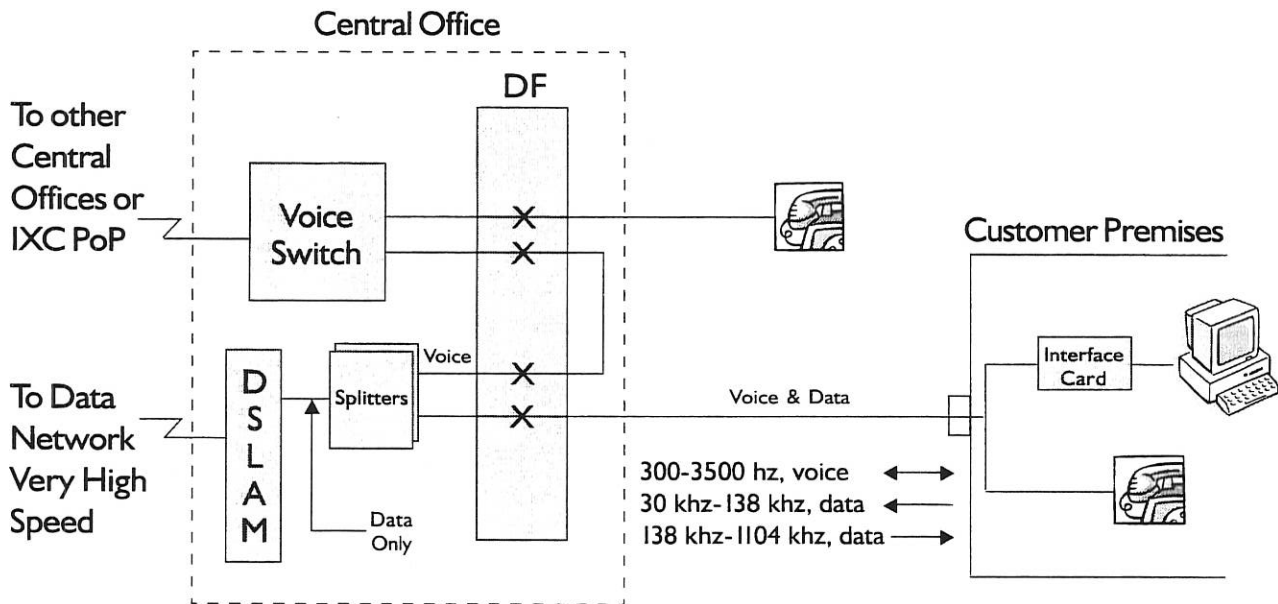
Key Points:

- In band inter-office signaling is no longer utilized. Inter-office signaling is conducted over an external network known as Signaling System #7 (SS-7). The SS-7 network is a highly redundant and reliable network.
- In addition to many other operational benefits, SS-7 can be viewed as an enabling technology that allows companies to offer advanced call management services (e.g. Caller-ID) and number portability services.
- Deployment of Common Channel Signaling System #7 (SS-7) was mandated by the FCC in connection with Divestiture in order to provide IXCs access to AT&T's embedded 800 customer base and to provide dialing/signaling parity.
- SS-7 now supports ubiquitous general call processing, advance Call Management services (e.g. Caller ID, etc.), service provider portability for 800 services and local exchange services, Line Information Data Base (LIDB) and other advanced services.
- Data bases are maintained via specialized Service Management Systems.

Plan Old Telephone Service (PoTs)



PoTs & Broadband (ADSL)*



Legend:

DF = Distributing Frame. The DF is a large central office devices where telephony equipment and subscriber lines are interconnected.

X = Cross Connect. Cross Connects are pieces of wire used to connect various components needed to provide telephony service.

DSLAM = Digital Subscriber Line Access Multiplexer (DSLAM).

* There are several varieties of Broadband Services. Asymmetric Digital Subscriber Line (ADSL) is the most common and shown here.

Key Points:

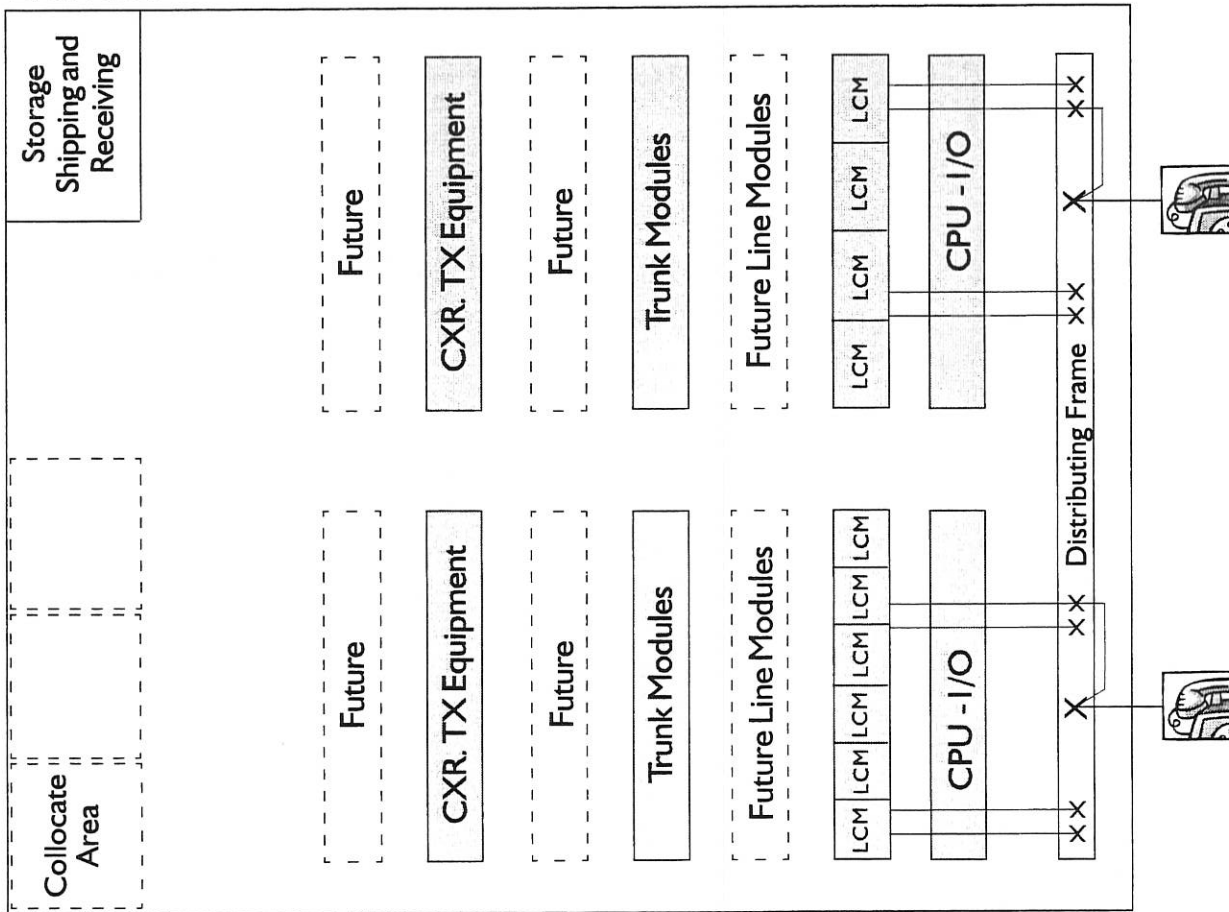
- The PSTN was originally engineered and operated to provide a voice grade (300-3,500Hz) service.
- PC computers are able to use the PSTN by using a modem to interface with the network. Modems take a PC's digital data signal and converts it to an analog signal between 300 and 3,500Hz and performs the reverse process with incoming analog signals.

Broadband service:

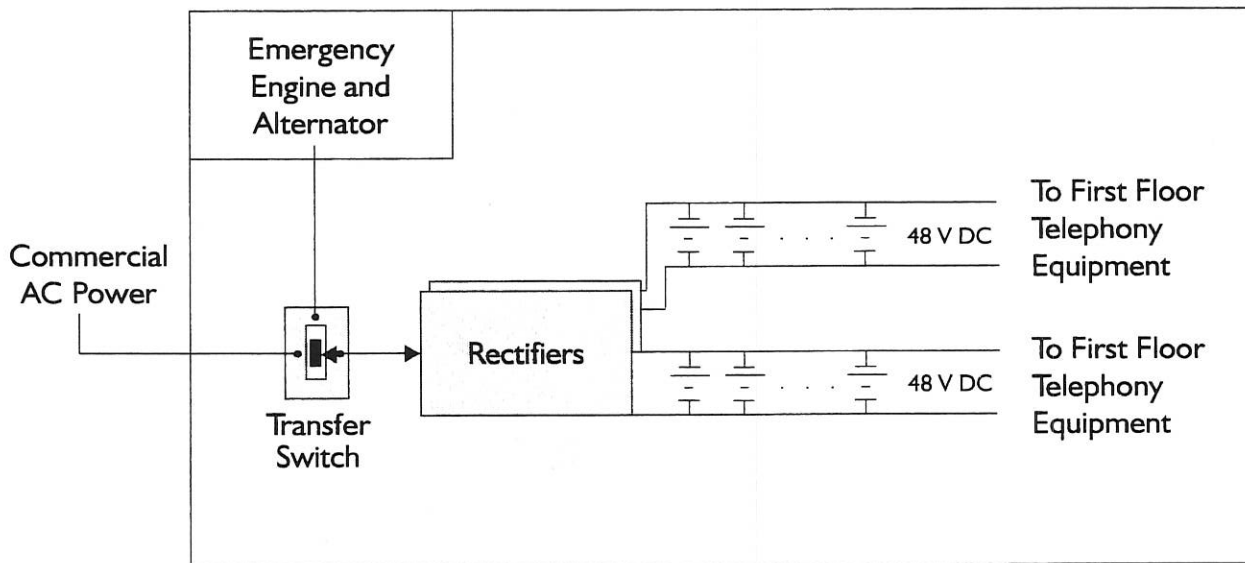
- Supports the simultaneous use of the telephone (voice) and PC (data).
- ADSL makes use of the available higher frequencies to connect an end user to the data network.
- Supports up to 8Mbps from the network to the end user and up to 640Kbps from the end user to the network.
- Service availability is distance sensitive. Data service is generally available up to 15,000 feet from the central office and is not generally available to subscribers served by a pair gain system.

Typical Telephone Central Office

First Floor



Basement



Key Points:

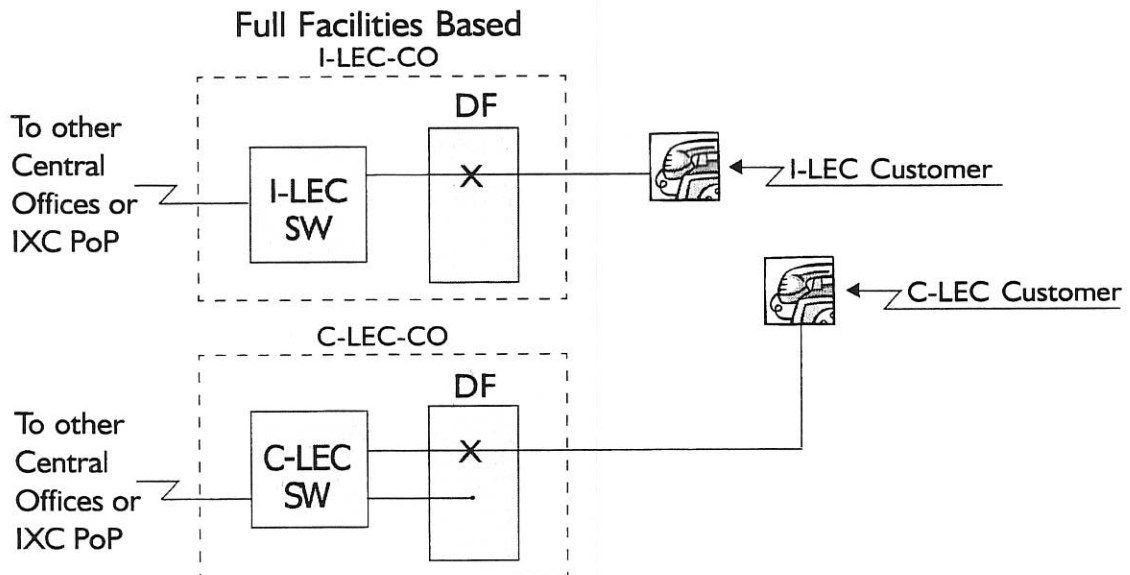
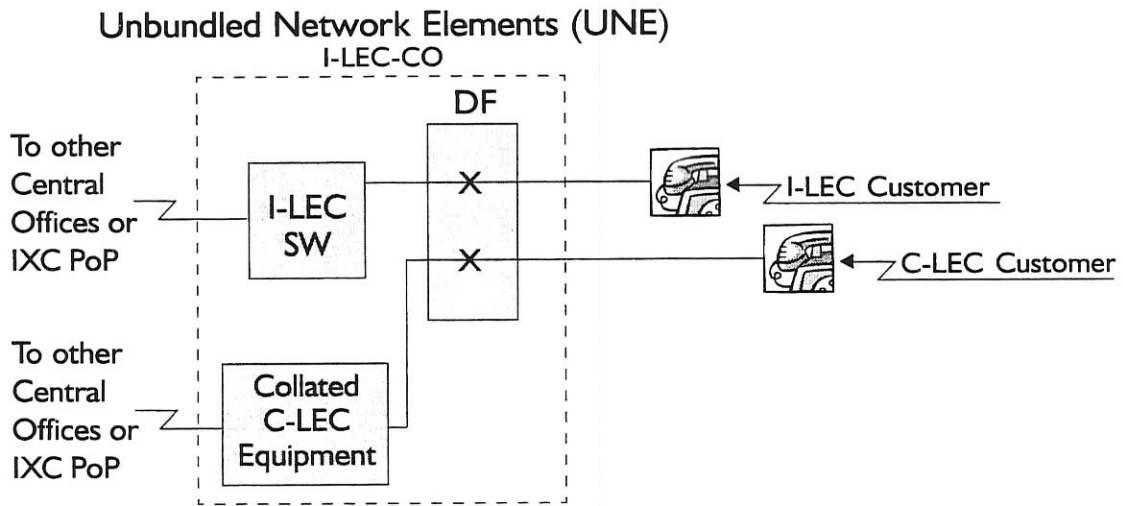
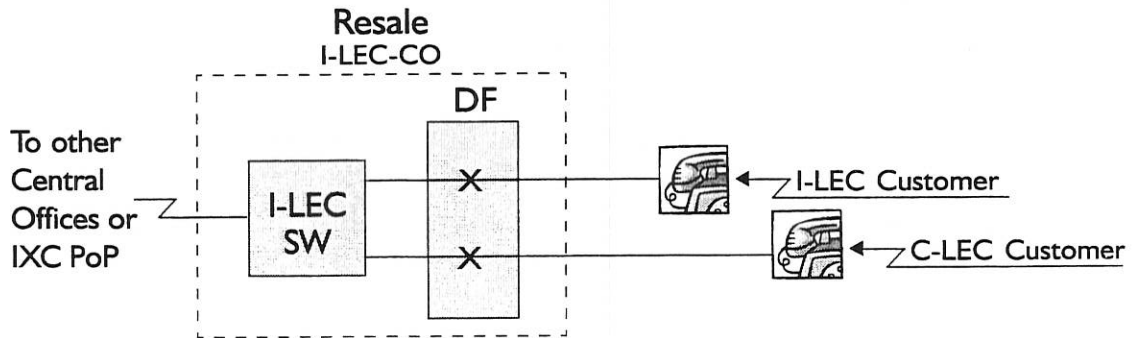
- Buildings housing telephony equipment must maintain temperatures and humidity to within very stringent standards and maintain a dust free environment or risk equipment failures.
- In addition to environmental issues, buildings must have sophisticated grounding arrangements for use in grounding the telephony equipment. If grounding systems are inadequate, or are allowed to deteriorate, equipment failures can occur or noise (static) can be introduced into the network.
- The layout of equipment is important. Space must be reserved for future requirements so that orderly growth of the switching and/or transmission equipment can occur and not violate inter-bay cabling restrictions.

Power Plants:

- Telephony equipment operates on 48 volts, DC.
- Telephone Central Offices are typically powered by commercial AC power, equipped with rectifiers (to convert AC to DC), industrial batteries (to provide service continuity during power interruptions) and standby engines/alternators (to provide power back up of longer durations).
- Central Offices can typically operate for up to 12 hours on batteries alone.
- Emergency engines/alternators can operate indefinitely, limited only by availability of fuel. In addition to installed emergency engines, many companies also utilize small trailer-mounted units that can be shuttled from location to location.
- Emergency engines are generally equipped with an automatic start and transfer feature that triggers with the loss of commercial AC power.

Common Forms of Local Competition

1996 - Present



Resale:

- Certificated Competitive Local Exchange Carriers (C-LECs) purchase the retail service offerings of an Incumbent at a discounted wholesale level.
- C-LECs then add Customer Service and other ancillary services for sale to the general public.
- These C-LECs are generally referred to as resellers.

Facilities Based, With UNEs:

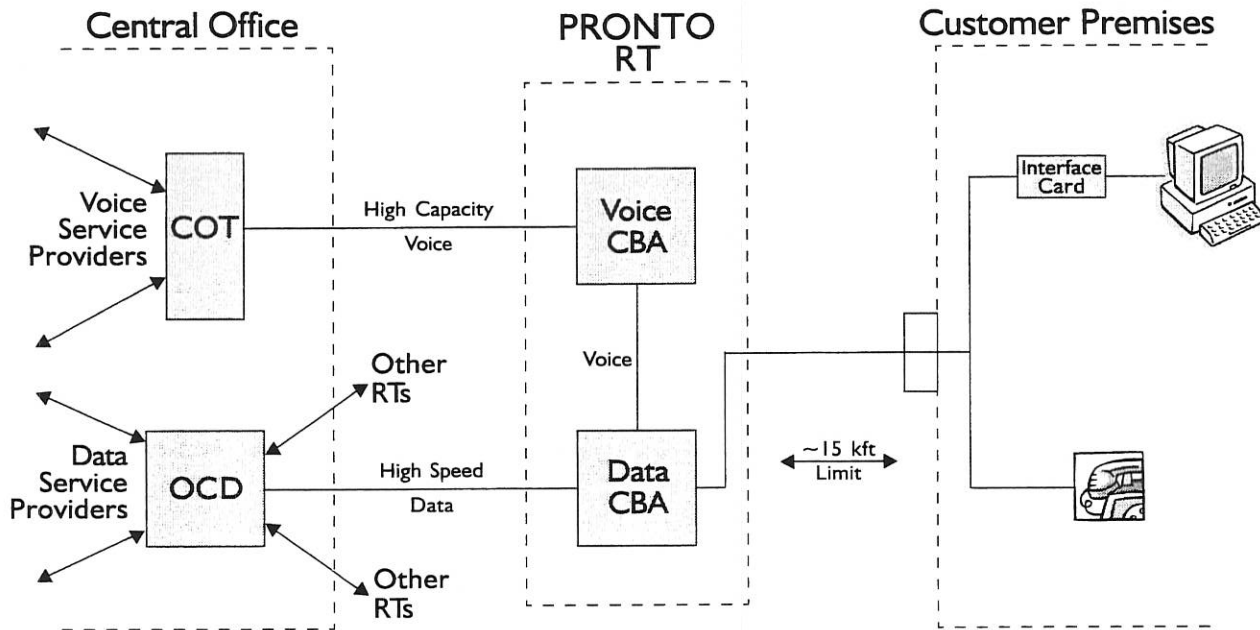
- The incumbent's network has been unbundled into elements, referred to as Unbundled Network Elements (UNEs) for use by C-LECs in building their networks for the provision of services to end users.
- Shown here is a C-LEC purchasing an unbundled loop to a customer and interconnecting that leased loop to their equipment collocated with the I-LEC. This is a very common arrangement for a facilities based C-LEC in Kansas.
- With access to UNEs, C-LECs have more control of their networks and are able to offer their own unique services; thereby differentiating themselves from the I-LEC.

Full Facilities Based, Without UNEs:

- Shown here is a C-LEC completely by-passing the incumbent carrier. They have their own outside plant cable network, in some cases a wireless network, connecting with their own central office switching equipment interconnected to the PSTN.

Southwestern Bell Telephone's Project PRONTO

2000 - Present



Legend:

COT: Central Office Terminal. Central office electronics use to aggregate and dis-aggregate voice grade signals to high capacity signals (eg. DS-O to DS-1).

OCD: Optical Concentration Device. Central office electronics used to combine high speed optical signals from multiple RTs and to recombine data packets to the respective data service providers.

Data CBA: Data Channel Bank Assembly. This state of the art electronics performs splitter functions and high speed data formatting functions at the Remote Terminal (RT).

Key Points:

- SBC's Project Pronto architecture places the splitter function and high-speed electronics in Remote Terminals (RTs), located between the central office and pockets of end users.
- The 15,000 feet distance limitation still applies. However, it is measured from the RT, not the central office.
- By strategically placing these RTs, within a wire center, SBC can reach virtually all of the customers within a wire center.

Standards

The need for standards in the multi vendor, multi service provider environment that has developed in the Public Switched Telephone Network is essential for interoperability and universal connectivity. Numerous standard bodies, industry committees and forums have assumed responsibility for developing and maintaining the engineering and operational standards so essential for operation of the PSTN.

Following is a partial listing of those bodies:

- Asynchronous Transfer Mode (ATM) forum
- Internet Engineering Task Force (IETF)
- Intelligent Network Forum (IN Forum)
- Digital Audio-Visual Council (DAVIC)
- International Telecommunications Union – Telecommunications (ITU-T)
Comprised of 14 Study Groups.
- Telecommunications Industry Association (TIA)
- Alliance for Telecommunications Industry Solutions (ATIS)

ATIS is most likely the largest standards body with more than 2,000 experts in highly technical and operational areas of telephony representing more than 300 companies. ATIS was created as part of the breakup of the Bell System, which had generally established technical interconnection standards for the U.S. Its initial charter was to help establish a new environment for the development of technical network interconnection and interoperability standards. Today ATIS sponsors the following committees:

- *Accredited Standards Committee T1—Telecommunications (T1)*, which is accredited by ANSI to develop interconnection standards for U.S. networks.
- *Carrier Liaison Committee (CLC)*, whose subtending units resolve nationwide problems involving the provision of exchange access and telecommunications network interconnections.
 - *Network Interconnection/Interoperability Forum (NIIF)*
 - *Ordering and Billing Forum (OBF)*
 - *Industry Numbering Committee (INC)*
 - *Toll Fraud Prevention Committee (TFPC)*.

Standards (continued)

- *Telecommunications Industry Forum (TCIF)*, which addresses issues on industry standards supporting the electronic exchange of data between trading partners. This includes the establishment of standard codes and nomenclature, bar coding, Electronic Data Interchange (EDI), electronic transfer of complex documents, and other aspects of electronic commerce.
- *Network Reliability Steering Committee (NRSC)*, which is responsible for ongoing tracking and analysis of nation-wide telecommunications network outages.
- *Electronic Communications Service Provider Committee (ECSPC)*, which discusses technical issues relating to lawfully authorized electronic surveillance.
- *Protection Engineers Group (PEG)*, whose specialists work on electrical protection of telecommunications facilities.
- *Accredited Standards Committee 05 (05)*, which is accredited by ANSI to develop standards for wood poles and wood products in the telecommunications industry.
- *SONET Interoperability Forum (SIF)*, which discusses and resolves interoperability issues to allow widespread deployment of SONET.
- *Interconnection Interoperability Testing Committee (IITC)*, which provides industry funding and mechanisms for test coordination and a test coordination program.