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**Converging Industries Research
Foundation**

Practical Solutions for Communications Policy

**A Snapshot in Time:
LEC Switch Investment and Price Structures
for Connections to the Switch Just before
the Telecommunications Act of 1996**

Executive Summary

May 10, 1996

*Presentation at the July 1996 NARUC Meeting,
Los Angeles, CA*

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A Snapshot in Time: LEC Switch Investment and Price Structures Just before the Telecommunications Act of 1996 *Executive Summary*

Snapshot in Time

The *Telecommunications Act of 1996* requires sweeping changes in interconnection price structures. This paper describes how interconnection issues have been addressed in the U.S., including the current status of interconnection with traditional local telephone company (called local exchange carriers, or LECs) networks. The objective of this paper is to provide a snapshot in time of investments and interconnection pricing structures associated with LEC local switches.

Changes in Market Philosophy and Interconnection Rules

Service definitions and methods for setting prices for connections to the LEC switch have depended on the prevailing market philosophy - monopoly, competition, and regulation - at the time that the service first appeared. With the current move toward competitive markets, it should be recognized that many pricing structures in place today were developed when different philosophies prevailed.

Basic Network Configurations for Connections between Companies

Focus is on the LEC switch because sooner or later traffic has to pass through this switch because it connects to the PSN and currently this is the only way for everyone to reach everyone else. The major network elements covered are loop transmission, transport, and switching. **Figure 1** indicates the types of companies or customers connecting to either the line side or the trunk side of the LEC local switch. **Figure 2** shows the five basic network configurations for connection to the LEC switch.

Variations in Pricing Structures

There are variations in pricing structures for companies and customers with technically similar or equivalent connections.

Modeling Percent of Switch Investment

The model for small and large switches is based on assumptions, as well as averages and samples applied to engineering standards for a current digital switch. Investment reflects purchase price, which is different from "common costs" and "incremental costs," as defined by economists. For simplicity, the investments modeled exclude overheads for engineering, installation startup, and taxes. The model illustrates basic patterns with percentages of total switch investment.

Changes in How Customers Use Networks and Modeling Switch Duration/Capacity

The PSN has been traditionally engineered for voice calls. The explosion of data transmission services (faxes, e-mail messages, telecommuting from home, Internet use, point of sale transactions, and online services) requires dramatic changes in the underlying assumptions on how networks need to be designed and engineered. The model assumes an average of five minutes per call, but actual connections vary in duration and capacity: credit card verifications take only seconds, average voice calls take less than five minutes, and average Internet connections take approximately one hour.

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Modeling Results

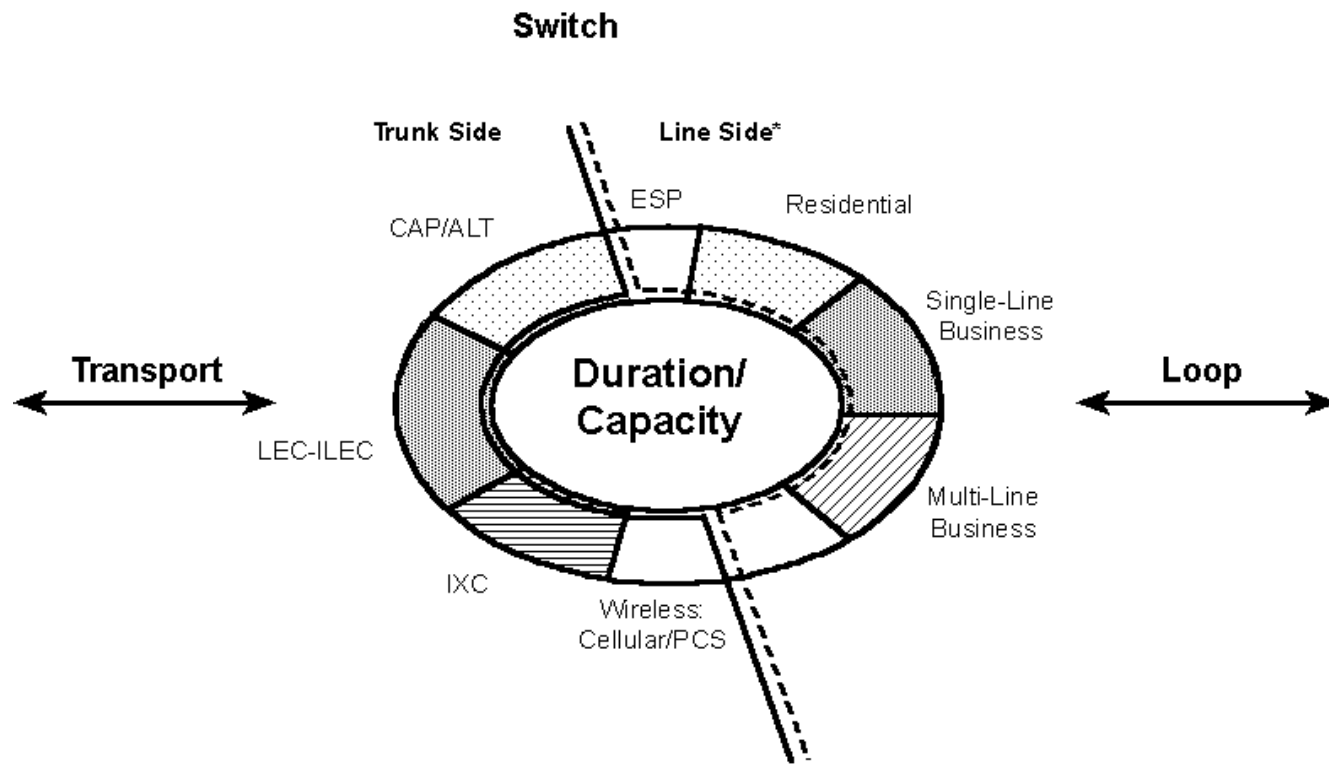
Figure 3 shows the percent of total incumbent LEC (ILEC) switch investment modeled by type of connection:

- *The major difference between the investment for types of interconnection to the ILEC switch depends on whether the connection is on the line side or on the trunk side.*
The percent of investment common to all line side connections is 30% for the small switch and 40% for the large switch. The percent of investment common to all trunk side connections is 35% for the small switch and 23% for the large switch.
- *A significant portion of LEC switch investment is common to all types of connections.*
The percent of investment common to all connections is 25% for the small switch and 12% for the large switch.
- *When taken in total, the sum of the service-specific investments is significant.*
The total of service-specific investment is 10% for the small switch and 25% for the large switch.
- *Currently, the percent of investment for specific services is relatively small, with the exception of Centrex services.*
The range of percent of investment is generally 5% or less for specific services, except for Centrex services which are 10% for the large switch (assumed to have large business customers).

Policy Points to Consider

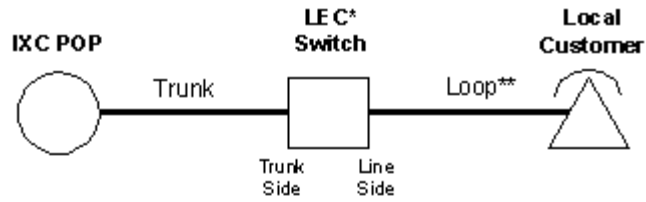
- Today's digital technologies are removing the technical differences between some types of connections, but not all.
- Today's political environment has removed many of the differences between various companies.
- The variation in price structures for different companies connecting to a given side of the LEC switch (line side or trunk side) is far greater than the variation in the investment for connections to that side.
- Even through customer usage patterns and technology have changed, the old price structures have remained. The 1996 legislation requires sweeping changes in these old structures.

Figure 1: Interconnection to ILEC Switch by Type of Company or Customer

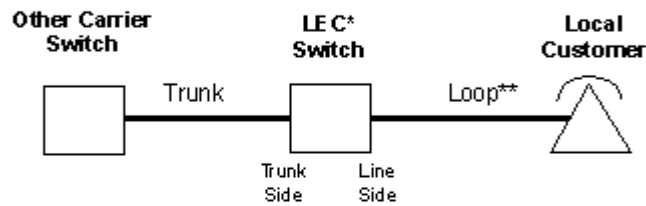


*In some cases, IXCs, new entrants, and others may also use line side connections.

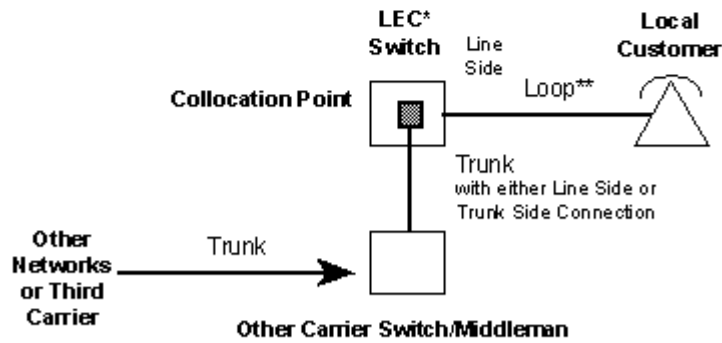
Figure 2: Network Configurations for Connection to the LEC Switch



A. Long Distance Company Access



B. Trunk Side Port

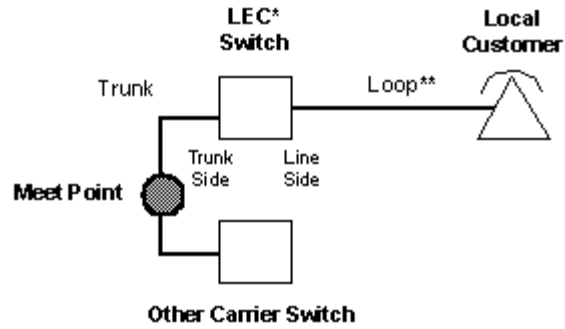


C. Collocation: Trunk Side Port or Line Side Port

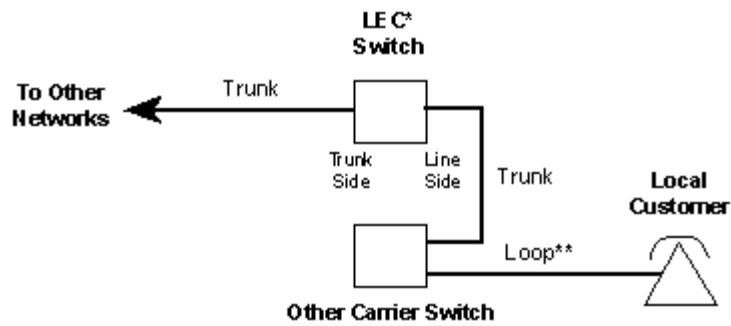
*Either an ILEC or a newmarket entrant.

**Also referred to as access line.

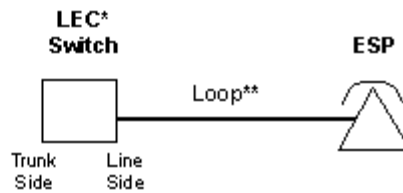
Figure 2: Network Configurations for Connection to the LEC Switch, cont.



D. Meet Point on Trunk



E. Line Side Port

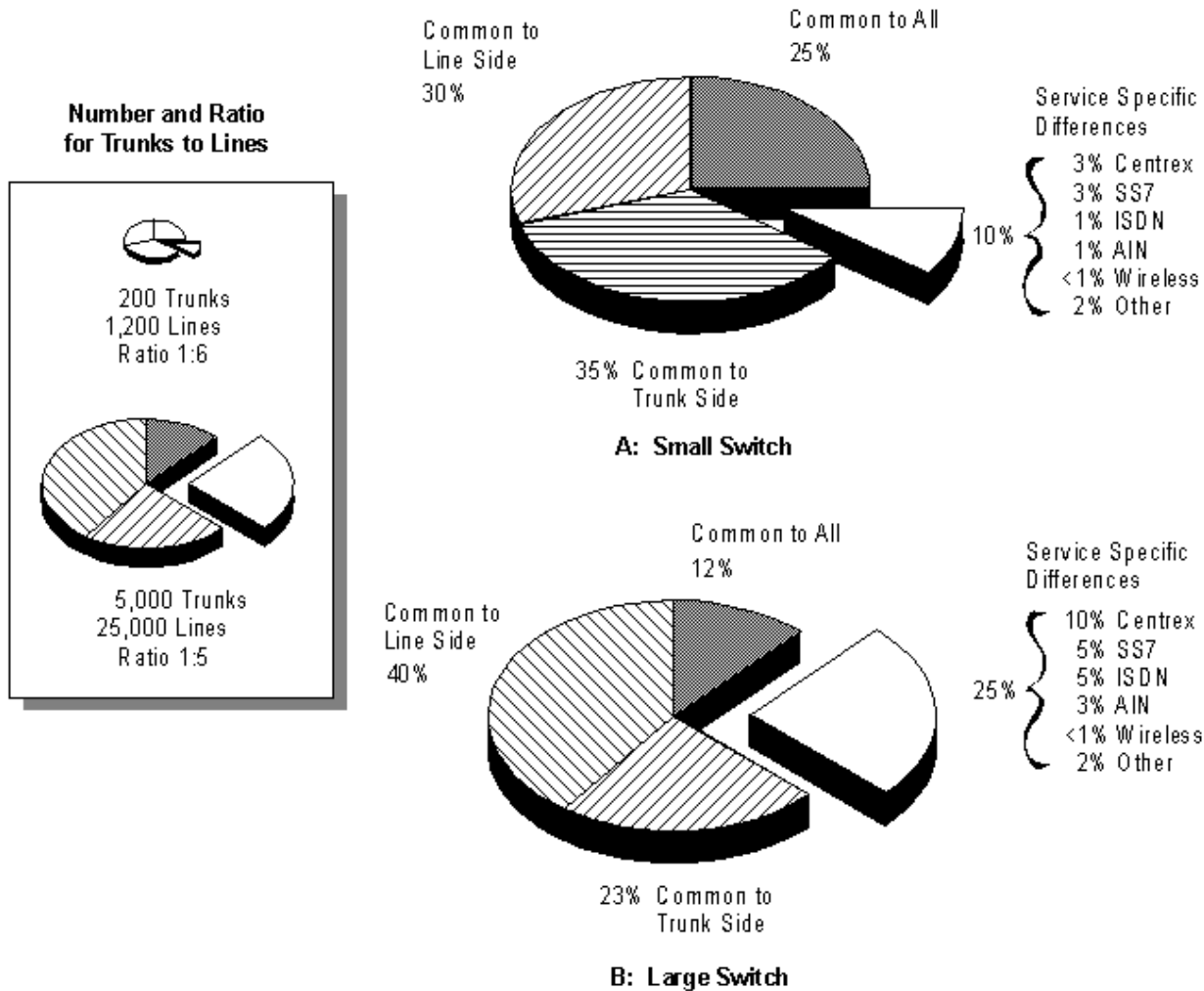


F. ESP by Line Side Port

*Either an ILEC or a newmarket entrant.

** Also referred to as access line.

Figure 3: Percent of Total ILEC Switch Investment by Type of Connection



Note: Percentages are based on modeling assumptions. (See Section IX, Appendix D)

Project Information

List of Participants in the Telecommunications Industries Analysis Project

| | |
|---|---|
| State Regulators | NARUC Representatives from: Florida Public Service Commission Illinois Commerce Commission Iowa Utilities Board Massachusetts Department of Public Utilities New York Public Service Commission Ohio Public Utilities Commission Washington Utilities and Transportation Commission |
| Regional Holding Companies | Bell Atlantic BellSouth NYNEX SBC Communications Inc. U S WEST |
| Independents | GTE Kalona Cooperative Telephone Sprint Local Telecom Division |
| Interexchange Carriers | AT&T Sprint |
| Cellular and Wireless Carriers | 360° Communications |
| Foreign Domestic | InfoCom Research, Inc. NTT America |
| Local, National, and International Services | BT France Telecom North America |
| Materials Manufacturers | Corning |
| Academic | University of Florida |

Sponsors:

Corporation for Public Broadcasting

Assisting with *public* data:

Bellcore
Federal Communications Commission
National Exchange Carrier Association
National Telecommunications and Information Administration

Project Information, cont.

Background on the Telecommunications Industries Analysis Project

The goal of the Telecommunications Industries Analysis Project is to provide information to support the development of alternative communications policies to meet the needs of stakeholders in an environment that includes competitive and non-competitive markets, federal and state regulatory jurisdictions, and a proliferation of new services made possible by technological advances. The purpose of the project is to produce research and analysis which will assist policy makers in making informed decisions.

The project is a neutral forum of communications industry stakeholders exploring multiple viewpoints of selected issues. This forum incorporates the following elements:

- **Broad representation:** The current forum includes foreign and domestic local exchange carriers (LECs), interexchange carriers (IXCs), materials and equipment manufacturers, and federal and state regulators. The project actively seeks expansion of this forum to include other communications industry representatives such as competitive access providers, cable television companies, computer companies, electric power utilities, or publishers.
- **Multiple viewpoints:** Participants are required to play an active role in the research and analysis, to represent their own interests, to understand and to assist in developing others' perspectives, and to work toward the common goal of representing multiple views. Since papers reflect multiple viewpoints and ideas, authors and reviewers may not agree with particular views or approaches expressed in the papers. The objective is to lay out ideas and options to assist policy makers in their decisions.
- **Analysis and results of alternative policies:** Research tools, including a jointly produced data base and computer software models, and data analysis developed by this forum create a common language for examining issues. The common language allows the participants to focus on underlying issues. Appropriate computer software tools, including modifications to existing tools, are developed.
- **All data, analysis methods, and results are public:** Data used by this project must be publicly available on a nationwide basis. Research products become public domain information.
- **Neutral setting:** The project resides in a neutral setting, free of partiality, thereby ensuring objective and independent research.

The views expressed in this paper are those of the Telecommunications Industries Analysis Project. The information in this paper is intended to provide general public information and does not constitute or foretell the official position of any of the parties who contributed to this paper. The opinions expressed in this paper do not necessarily reflect the views of the FCC or of any other agency or institution.