

IP Centrex Creates New Opportunities for Equipment Manufacturers

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What is IP Centrex?

IP Centrex refers to a number of IP telephony solutions that are aimed at the needs of business users. In all Centrex services—analogue, ISDN, and IP—the service provider owns and maintains the network equipment which provides call control, switching, and service logic. In contrast, PBX and Key System customers own and operate the Customer Premises Equipment (CPE) which provides call control and service logic. Centrex is often more appealing than PBX solutions because of lower capital investment, better scalability, better reliability, and simpler operation and maintenance. IP Centrex builds on the traditional benefits of Centrex by combining them with the benefits of IP telephony. In IP Centrex, a single broadband access facility is used to carry the packetized voice streams for many simultaneous calls.

A major cost component in traditional Centrex service is the outside plant. At one copper pair per station, there are many miles of wire to maintain. In contrast, IP Centrex uses a shared access facility, which should result in lower transport costs. However, cost reductions are only one of the reasons customers and carriers are excited by IP Centrex. IP Centrex will allow multiple locations to be combined into a single Centrex group. Regardless of geographic location, branch offices, telecommuters, and road warriors can be part of the same Centrex group. This allows cheaper and easier intra-office communication (e.g., abbreviated dialing) and simplifies the responsibilities of the corporate telecom manager. Other benefits of IP Centrex include elimination of certain Move, Add, and Change (MAC) activities and the promotion of Computer Telephony Integration (CTI).

Equipment suppliers are developing IP Centrex solutions on a variety of architectures—including Class 5 switch platforms and softswitch platforms. Because Class 5 switches have full market penetration and support an extensive set of business-oriented features, Class 5 switch-based IP Centrex is poised for quickest deployment and market acceptance. Softswitches are in their infancy and currently do not provide comparable calling features. Consequently, it will be some time until they are ready to replace Class 5 switches.

How does IP Centrex work?

In this platform, existing Class 5 switches (without any special upgrades!) support IP Centrex service in addition to traditional Plain Old Telephone Service (POTS) and ISDN lines. This is accomplished through the introduction of a new network element—the Network Gateway—and a new type of CPE—the Customer Gateway. These two devices signal each other over a packet network using an IP telephony protocol, such as H.323 or SIP. They also each support traditional interfaces to communicate with existing equipment. The Network Gateway connects to the switch as if it were a digital loop carrier system. (Digital loop carriers use protocols like GR-303 to deliver POTS and ISDN signaling information to switches for longer-than-average loops.) The Network Gateway translates any signaling information it receives from the Customer Gateway into a protocol that the switch understands; it also depacketizes the voice stream for delivery to the switch. Similarly, it translates signaling messages from the switch into the IP telephony protocol and packetizes the voice stream for transmission to the Customer Gateway. The Customer Gateway performs comparable functions for the standard telephone sets that it supports. As a result, the Network Gateway, Customer Gateway, and packet network connecting them appear to the Class 5 switch as an ordinary digital loop carrier system, and the telephone sets connected to the Customer Gateway appear to the switch as ordinary phone lines. (See callout box *How can a circuit switch offer a packet service?*)

What new types of CPE are required?

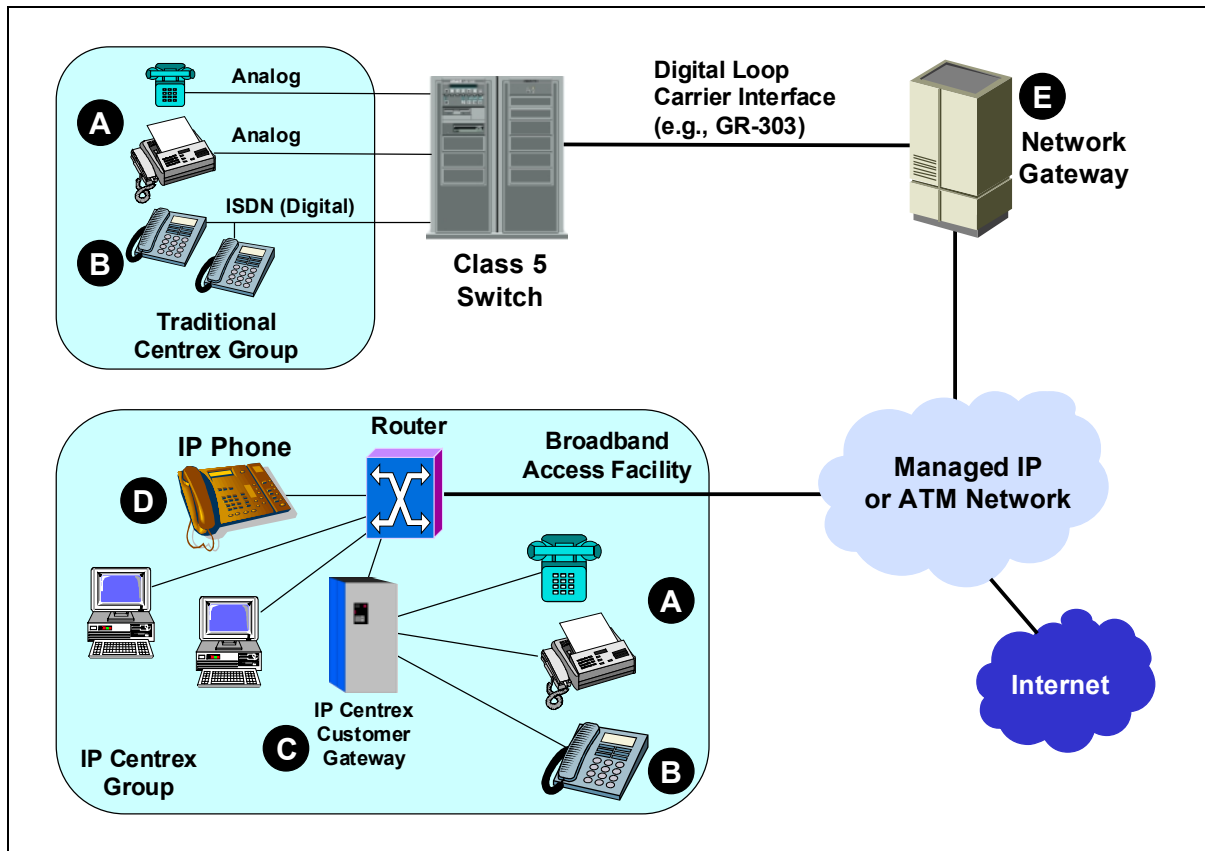
There are two categories of CPE that can be used with IP Centrex. The first category is known as Customer Gateways or Integrated Access Devices (IADs). These devices allow customers to use their existing analogue or ISDN station equipment. The legacy phone is plugged into the Customer Gateway, which in turn is connected to the customer's LAN. With Customer Gateways, the user can enjoy some, but not all, of the benefits of IP Centrex. In order for customers to receive all the benefits IP Centrex can offer, they will need to install the second category of IP Centrex CPE—IP Phone station equipment. An IP Phone has the Customer Gateway functionality

built directly into the telephone set. The phone has an Ethernet adapter (that is plugged into the customer's LAN) and uses an IP telephony protocol for signaling the network. Voice digitization and packetization is completed in the IP Phone. The phone may be built to work with the analog call model or ISDN call model. (The call model determines which features the phone receives from the Class 5 switch.) IP Phones can be readily moved from office to office without reconfiguring any equipment; this makes office relocations a simple process. The phones promote CTI as well as other locally defined capabilities.

Why are CPE manufacturers excited about IP Centrex?

The most compelling marketing message for IP Centrex emphasizes the new features and capabilities that the platform promotes. In order for customers to use these features, they will need new station equipment. (Customers using existing station equipment served by Customer Gateways will be able to use only existing features.) Consequently, IP Phones represent a new and exciting market segment. The convergence of voice and data services offers CPE manufacturers the creative freedom currently enjoyed by PC software developers. The ability to create new voice features which rely on data connectivity will give manufacturers new opportunities to differentiate their products. In such a marketplace, manufacturers with ingenuity and imagination will set the pace for the rest of their competitors to follow.

How can a circuit switch offer a packet service?



- A** Ordinary analog telephone sets and fax machines may be directly served by a Class 5 switch or may be served through a customer gateway. On behalf of the analog devices, the customer gateway performs voice digitization and packetization. It also converts analog signaling into IP telephony messages.
- B** Digital telephone sets, using ISDN's Q.931 signaling messages, may be directly served by a Class 5 switch or may be served through a customer gateway. On behalf of the digital telephone set, the customer gateway performs voice packetization and converts Q.931 messages into IP telephony messages.
- C** The customer gateway has an Ethernet interface for connecting to the LAN. It also provides jacks to connect analog devices (telephones, fax machines) and/or ISDN telephone sets. The customer gateway sends packetized voice and IP telephony messages across the LAN, over the broadband access facility, and through the managed backbone network to the network gateway.
- D** The IP Phone combines the customer gateway functionality and telephone set functionality into one device. The IP Phone has an Ethernet interface to the LAN. The IP Phone may use the analog call model or ISDN call model when formulating IP telephony messages. Based on the call model used, the Class 5 switch offers analog-like or ISDN-like features.
- E** The network gateway converts between the IP telephony messages and packetized voice traffic (that the customer gateway and IP Phone use) and the GR-303 messages and circuit-switch voice traffic (that the Class 5 switch uses). The GR-303 message set accommodates ISDN as well as POTS signals.