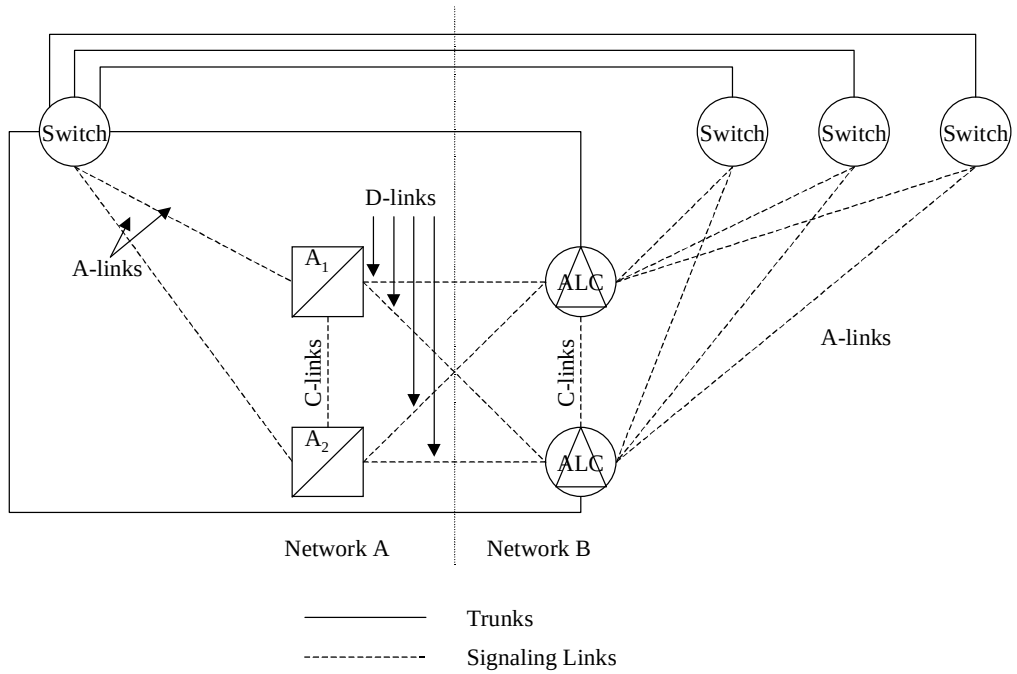

Figure 6-85. Interconnection of an ALC

6.26.3 CCS Network to Voice Over Packet (VOP) Network Interconnection

A conceptual view of the VOP Network and its interconnection to the Public Switch Telephone Network (PSTN) is shown in Figure 6-86. There are various VOP network architectures being developed, but one constant in these architectures is that signaling interconnection to the PSTN shall be based on the SS7 protocol. The architecture discussed in this section is general and is not intended to address all specific VOP network implementations.

The VOP architecture can be broken down by the generic Functional Elements (FEs) contained with the VOP network. Note that the relevant interfaces to the PSTN for these FEs are still under development within the industry. The discussion of these FEs does not imply any specific vendor implementation, but is used to convey the functional composition of the VOP network and how it may interact with the PSTN. The FEs of the VOP as shown in Figure 6-86 are as follows:

- Access Gateway
- Trunk Gateway
- Signaling Gateway
- Call Connection Agent
- Service Agent
- Core Network.

Each of these FEs is discussed in Section 6.26.3.1.

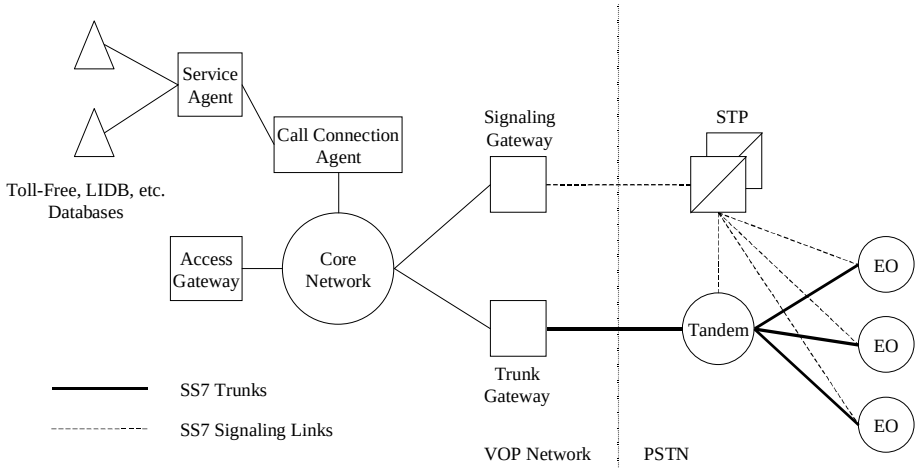

Figure 6-86. CCS Network to VOP Network Interconnection

6.26.3.1 Functional Elements of the VOP Network

6.26.3.1.1 Access Gateway (AG)

This FE supports the line side interface to the VOP network. Traditional phone lines and PBXs currently used for the PSTN can access the VOP network through this FE. As such, this FE provides functions such as packetization, echo control, etc. It may be associated with a specific Call Connection Agent (CCA) that provides it with the necessary call control instructions. On receiving the appropriate commands from the CCA, this FE also provides functions such as audible ringing, power ringing, miscellaneous tones, etc. It is assumed that the AG has the functionality to set up a transport connection through the core network when instructed by the CCA. Thus, when a VOP network offers local phone services, it will have this FE. An end-to-end call initiated by a VOP local phone customer could originate at this FE and terminate at an end office in the CCS/SS7 network.

6.26.3.1.2 Trunk Gateway (TG)

This FE supports a trunk side interface to the PSTN. It terminates circuit-switched trunks in the PSTN and virtual circuits in the packet network (core network) and, as such, provides functions such as packetization of voice. Even though it terminates trunks in the PSTN, it is assumed that this FE does not provide the resource management functions for trunks that it terminates. However, it is assumed that the TG has the capability to set up and manage transport connections

through the core network when instructed by the CCA. It may be associated with a specific CCA or multiple CCAs which provide it with the necessary call control instructions.

6.26.3.1.3 Signaling Gateway (SG)

This FE is used to interconnect the VOP network to the PSTN signaling network. It terminates SS7 links from the PSTN CCS/SS7 networks and thus provides, at a minimum, MTP Level 1 and 2 functionality. It subsequently communicates with one or more CCAs to support the end-to-end signaling for calls and services within the PSTN.

6.26.3.1.4 Call Connection Agent (CCA)

This FE provides much of the necessary call processing functionality to support voice on the packet network. It processes messages received from various other FEs to manage call states. It communicates with other CCAs to set up and manage end-to-end calls. CCAs interact with AGs and TGs using call control commands. For an end-to-end call between the VOP network and the PSTN, the call processing application in the CCA will interact with the PSTN end offices using ISUP that is transported through the SG and the PSTN STPs.

6.26.3.1.5 Service Agent (SA)

This FE generates Transaction Capabilities Application Part (TCAP) messages to interact with SCPs for vertical services (Intelligent Network services) such as Toll-Free and Local Number Portability (LNP). The SA also has the capability to launch TCAP queries to SCPs in the traditional PSTN via the SG.

6.26.3.1.6 Core Network

The core network provides transport for the VOP network. The core network could utilize various technical alternatives such as ATM, IP over ATM, or even pure IP without ATM. The concept behind the signaling and control in the core network is that the signaling for the call control is bearer technology independent and that a separate bearer signaling (e.g., Private Network Node Interface [PNNI] for Asynchronous Transfer Mode [ATM]) is used for establishing a bearer connection across the core network.

6.26.3.2 Interconnection of the SG and TG to the PSTN

As stated in Section 6.26.3, Figure 6-86 shows the interconnection of a VOP network to the PSTN. Interconnection between the VOP network and the PSTN uses the SG and TG of the VOP network and the STP and tandem switch of the PSTN. Specifically, the TG in the VOP network has SS7 trunking to the tandem switch of the PSTN. The SG has SS7 signaling links to the mated STP pair of the PSTN.

The SS7 signaling links between the SG and mated STP pair may be A-links, D-links, or Bridge Links (B-links). The type of link set chosen is influenced by the method used to identify the VOP network from the view of the PSTN. For example, if A-links are used as the method of interconnection, the entire VOP network including all network elements can be viewed as one SEP by the PSTN (i.e., the VOP network is identified by one Point Code [PC]). However, if the mated STP pair in the PSTN can be interconnected to the VOP network by a pair of SGs, B/D-links may be used. In the B/D-link interconnection scenario, the PCs of the SG pair will be different from the PC of the TG. This is the same interconnection architecture used when interconnecting two mated STP pairs in the PSTN. There are also other considerations (e.g., capacity, reliability, SS7 message routing, network management) that must be examined when choosing an interconnection architecture.