Voice Network Switching System

VOICE NETWORK SWITCHING (VNS) WORKS IN CONJUNCTION WITH CISCO IGX™ 8400 SERIES WIDE-AREA SWITCHES TO PROVIDE SWITCHED VIRTUAL CIRCUITS (SVCS) FOR VOICE AND DATA TRANSMISSION OVER A CISCO WIDE-AREA ASYNCHRONOUS TRANSFER MODE (ATM) OR FRAME RELAY NETWORK. CUSTOMERS WITH TANDEM PRIVATE BRANCH EXCHANGE (PBX) NETWORKS REALIZE SUBSTANTIAL SAVINGS ON FACILITY COSTS, SIMPLIFY NETWORK TOPOLOGY, AND IMPROVE BANDWIDTH EFFICIENCY WITH A VNS/IGX BACKBONE. IN ADDITION, THE VNS SYSTEM ARCHITECTURE IS DESIGNED TO PROVIDE SCALABILITY FOR SMALL TO VERY LARGE IGX NETWORKS.

Key Benefits

- Simplifies management of existing PBX network
- Allows full integration of voice and data across the ATM/Frame Relay network
- Significantly reduces operational costs
- Leverages the powerful voice technologies of the IGX switch

The VNS dynamically handles tandem switching and routing functions and allows the network to assume many of the tandem PBX functions of a transit PBX. This scenario reduces the number of T1/E1 trunks and interface cards required to interconnect PBXs and enables existing tandem PBXs to be eliminated or redeployed. In some configurations, voice switching can reduce facilities and equipment costs by up to 50 percent compared to traditional PBX/time-division multiplexing TDM networks.

When a VNS system is configured with an IGX 8400 series switch in a Cisco WAN network, PBXs using QSIG, Digital Private Network Signaling System (DPNSS), 4ESS, or Q931A (Japanese ISDN) signaling protocols can establish voice or data calls on demand, just as if they are dialing a public switched telephone network. The supported signaling protocols are all variations of the Integrated Services Digital Network (ISDN) signaling protocol. The VNS system also switches calls from PBXs using channel-associated signaling (T1-CAS) when used in conjunction with the IGX Universal voice module (UVM-C). In addition, break-in/break-out functionality to Digital Signaling System 1 (DSS1) Euro ISDN public networks is also supported.

By utilizing voice compression and voice activity detection along with voice switching, the IGX/VNS solution maximizes bandwidth efficiency, maintains PBX feature transparency, and delivers high voice quality across the wide area network.

The VNS system has a semidistributed architecture and is typically connected to one IGX 8400 series node with network connections from numerous other IGX nodes. Additional VNS systems can be added to the network, based on geographic, quantitative, or network load requirements.

Semidistributed systems have several advantages over imbedded systems. Enhancements and improvements to the signaling protocol code and development and deployment of new features can be accomplished quickly, with no impact to the network. Only a few network elements are affected during an upgrade with a semidistributed system, compared to an upgrade with an imbedded system, which affects every node processor.

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The signaling plane for call setup is handled by the VNS system, separate from the voice/data switching plane handled by the IGX switch. Each network element is optimized for specific tasks and does not place a burden on the processor for another unit. For example, the collection of billing information and statistics is a function of the processor of the VNS system; the function of the IGX processor is connection management. The combined VNS/IGX system provides a robust, efficient, and powerful voice-switched network.

VNS System Specifications

The VNS system hardware is fully redundant, consisting of two identical units that are configured to perform as a redundant pair. Multiple levels of additional redundancy are built into the architecture, providing a fully fault-tolerant, high-availability system. The carrier-class reliability of the IGX system provides further resiliency for the network.

The VNS system consists of a 140 mips CPU, 128 MB of RAM, and a 2-GB hard disk. It is available for both AC and DC environments.

Supported Protocols

Protocols	Features Supported						
QSIG	Basic call capability	Calling and called line identification	Bearer capability discrimination for voice and data calls that originate from PBX devices	Channel negotiation	Generic functional procedures—the ability to maintain feature transparency for like PBXs over standards-based QSIG	Enbloc and overlap dialing and receiving	Advice of charge information—the capability to pass billing information from the public network to the user	Interworking DSS1 to QSIG for break-out and break-in functions
DSS1—Euro ISDN	Basic call capability	Calling and called line identification	Bearer capability discrimination for voice and data calls that originate from PBX devices	Channel negotiation	Enbloc and overlap dialing and receiving	Advice of charge information—the capability to pass billing information from the public network to the user	Interworking with DSS1 to DPNSS for break-out and break-in functions	Interworking DSS1 to QSIG for break-out and break-in functions
DPNSS	Basic call capability	Calling and called line identification	Bearer capability discrimination for voice and data calls that originate from PBX devices	Enbloc and overlap dialing and receiving	Full support of supplementary services, as defined in BTNR 188	Interworking with DSS1 to DPNSS for break-out and break-in functions	—	—
Q.931A	Basic call capability	Calling and called line identification	Bearer capability discrimination for voice and data calls that originate from PBX devices	Channel negotiation	Enbloc and overlap dialing and receiving	—	—	—
4ESS	Basic call capability	Calling and called line identification	Bearer capability discrimination for voice and data calls that originate from PBX devices	Channel negotiation	—	—	—	—
CAS	Basic call capability	For North American PBXs that support T1 wink start signaling and dual tone multifrequency (DTMF) digits	—	—	—	—	—	—

Supported Features

- Cause code handling allows modification of cause codes to allow PBXs to alternate route
- Digit translation for incoming and outgoing digits
- Screening to bar unauthorized calls
- Alternate routing
- Multiple E1 support for load balancing, link-failure rerouting
- Support for all compression types supported on the UVM and CVM cards
- Generation of billing information for every call, failed or passed, processed by the VNS
- Config save and restore for database backup
- Full alarm generation and reporting to Cisco StrataView Plus for network management
- Preferred D-channel routing

PBX Interoperability

- Alcatel
- Bosch Telecom
- Ericsson
- GPT
- Lucent Definity
- NEC
- Nortel Meridian
- Oki
- Philips
- Siemens
- Tadiran

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