Cisco Voice Network Switching System

Product Overview

Voice Network Switching (VNS) system hardware and software works in conjunction with IGX 8400 series wide-area switches to provide switched virtual circuits for voice and data transmission over a Cisco wide-area ATM or Frame Relay network. Customers with tandem 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 Features and Benefits

- Simplifies management of existing PBX network
- Allows fill integration of voice and data across the network
- Significantly reduces operational costs
- Leverages the IGX switch's powerful voice technologies

When a VNS system is configured with an IGX switch in a Cisco WAN Network, private branch exchanges (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, BreakIn/BreakOut functionality to DSSI Euro ISDN public networks is also supported.

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 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 costs by up to 50 percent compared to traditional PBX/TDM networks.

By consolidating traffic over fewer physical interfaces through the use of VAD, ADPCM, and CELP, the VNS/IGX network, reduces bandwidth consumption, improves voice quality, and allows the WAN network's standard voice service features to be applied to switched voice circuits from a variety of PBXs. Cisco VAD and compression services increase network bandwidth by providing a voice compression ratio of up to 10:1.

The VNS system has a semi-distributed architecture and is typically connected to one IGX node with network connections from a number of other IGX nodes. Additional VNS systems can be added to the network, based on geographic, quantitative, or network load requirements. The VNS system can support signaling for up to 30 PBXs and can handle peak call loads of up to 40,000 calls per hour per VNS system.

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

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 another unit's processor. For example, the collection of billing information and statistics is a function of the VNS system's processor, and the IGX processor's function is connection management. The combined VNS/IGX system provides a robust, efficient, and powerful voice-switched network.

Specifications

Hardware

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 also provides resiliency for the network.

Table 8-15: Cisco VNS System Specifications

Specification	Description
System Hardware	140 MIPS CPU 128 MB of RAM 2 GB hard disk Heavy-duty power supply
Models	VNS-AC-E (AC powered) VNS-DC-E (DC powered)
Supported Protocols	
QSIG	Basic Call capability Calling and Called Line Identification Bearer Capability Discrimination for voice and data calls originating from PBX devices Channel Negotiation Generic Functional Procedures - the ability to maintain feature transparency for PBXs over standards-based QSIG Eubloc and Overlap dialing and receiving Advice of Charge Information - the capability to pass billing information from the public network to the user
DPNSS	Full support of supplementary services as defined in BTNR 188 Eubloc and Overlap dialing and receiving
CAS	For North American PBXs that support T1 Wink Start signaling and DTMF digits
Q.931A	Basic Call capability Channel Negotiation Calling and Called Line Identification Eubloc and Overlap dialing and receiving Bearer Capability Discrimination for voice and data calls originating from PBX devices
4ESS	Basic Call capability Calling and Called Line Identification Bearer Capability Discrimination for voice and data calls originating from PBX devices
DSS1 - EuroISDN	Channel Negotiation Interworking with DPNSS for BreakOut and BreakIn functions Eubloc and Overlap dialing and receiving Interworking with QSIG for BreakOut and BreakIn functions

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 SV+ for network management Preferred D-Channel routing
PBX Interoperability	Alcatel Bosch Telecom Ericsson MD110 GPT ISDX Lucent Definity NEC Nortel Meridian OKI Phillips Sophos Siemens Hicom
VNS/IGX Compatibility	QSIG Rel 2.1 with Swith Software 8.2.5 QSIG Rel 3.0 with Swith Software 8.2.5 DPNSS Rel 2.1 with Swith Software 8.4 CAS (T1) with Switch Software 8.5 Q.931A with Swith Software 8.2.5 4ESS with Switch Software 8.2.5 DSS1 - EuroISDN with Swith Software 8.2.5

Software

For software specification information, access Cisco Connection Online at http://www.cisco.com.

Product Numbers

Part Numbers

Description	Part Number
Voice Network Switching–PBX Wide Area Networking	
Voice Network Switching System (redundant) with AC power	VNS-AC-E
Voice Network Switching System (redundant) with DC power	VNS-DC-E
Voice Network Switching Additional Port License	

Description	Part Number
CDP/CVM T1/E1 port software license—additional 10 ports—maximum 30 PRI ports supported per Voice Network Switching System	VNS-LIC-10PRI
Voice Network Switching Feature Software	
Q.SIG protocol feature	VNS-SW-QSIG-2.1
4ESS protocol feature	VNS-SW-Q.SIG-3.0
DPNSS protocol feature	VNS-SW-DPNSS-2.1
Japanese ISDN protocol feature	VNS-SW-Q931A-2.1
CAS protocol feature	VNS-SW-CAS-2.2
Dial Access Switching–ISDN Dial-Up Frame Relay	
Dial access switching system with AC power, nonredundant	DAS-AC-NR
Dial access switching system with AC power, redundant	DAS-AC-R
Dial access switching system with DC power, nonredundant	DAS-DC-NR
Dial access switching system with DC power, redundant	DAS-DC-R
Dial Access Switching Additional Port License	
T1/E1 ISDN/Frame Relay Port software license—additional 5 ports	DAS-LIC-5PRI
Dial Access Switching Software	
Dial-up Frame Relay software (nonredundant)	DAS-SW-1.2
Dial-up Frame Relay software (nonredundant)	DAS-SW-1.4

Description	Part Number
Dial-up Frame Relay software (redundant or nonredundant)	DAS-SW-2.1