H.323 Protocol Toolkit
for developing all types of H.323 entities

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The award-winning Softil H.323 Protocol Toolkit implements all mandatory H.323 features and offers the most extensive implementation of optional capabilities. The current release of the Softil H.323 Toolkit is ITU-T H.323 version 7 compliant, supports the latest standards, and is fully backward compatible.

Products developed with the H.323 Protocol Toolkit include:

- Softswitches
- Gateways
- IP-PBXs
- Desktop endpoints
- Gatekeepers
- Web-based VoIP solutions
- Multipoint Conferencing Units (MCUs)
- IP phones/terminals/IADs
- Multiservice application servers
- VoIP-enabled chipsets
- Call Center systems
- Voice over Packet Processors
- Videoconferencing systems
- Communication boards
- Voice-enabled e-Commerce
- VoIP management systems
- Residential gateways
- Interactive Voice Response (IVR) systems
- Session Border Controllers (SBCs)

H.323 Protocol Basics

ITU-T Recommendation H.323 is the most mature and widely-deployed IP communications protocol suite for real-time voice and/or video communication. It is implemented in products ranging from infrastructure videoconferencing systems to IP phone chipsets. H.323 relies on additional protocols and annexes to provide a broad range of functionality for multimedia communication, add-on managed services, and smooth circuit-switch network integration.

H.323 defines four primary entities, which can be co-located:

- Terminals—Provide user interface for real-time, two-way communication.
- Gateways—Interface between H.323 networks and other networks.
- Multipoint Conferencing Units (MCUs)—Allow three or more endpoints to participate in a multipoint conference.
- Gatekeeper—Provides call control functionality in an H.323 zone by managing the other entities as well as their authentication and usage of network resources and services.

For more information, refer to www.h323forum.org.

Basic Functionality of the H.323 Toolkit

Conference Manager API

The Conference Manager is a high-level API that simplifies the use of the various H.323 subprotocols (Q.931, RAS, H.245, and the bundled H.323 annexes). The Conference Manager API directs all conferencing activities, hides protocol complexity, assures proper initiation of call and channel setup, and manages resources.

Registration Admission and Status (RAS)

RAS enables well-managed service solutions for H.323 endpoints via the gatekeeper. The gatekeeper can monitor or control endpoint authentication, service authorization, network resource usage control, endpoint status queries, and call initiation and termination.

Q.931

Q.931 enables call setup (ringing, accept, reject) and teardown signaling, similar to the ISDN Q.931 signaling procedure. The functions can be performed either directly between endpoints or through a gatekeeper. The H.323 Toolkit supports the latest ratified Q.931 timers, including the overlap sending timer, overlap receiving timer, incoming call proceeding timer, and status timer.

H.245

H.245 is a call control protocol for the initiation and management of multimedia sessions. Services such as capabilities exchange (for example, codecs supported by each endpoint), RTP/RTCP channel opening, mixing and closing, multi-party and multimedia session management and control are provided.

Enhanced Functionality Bundled with the H.323 Toolkit

Real-Time Fax (Annex D)

Annex D provides the capability to switch to fax (T.38) exchange in real time during an active session.

UDP Signaling (Annex E)

Annex E allows Q.931 signaling over connectionless UDP channels.

HTTP-Based Service Control for H.323 Devices (Annex K)

Annex K provides a generic and application-independent service control channel using HTTP to support a combined suite of H.323 and HTTP-based services, such as user-friendly interfaces and personalized services.

Stimulus Signaling, Tunneled Megaco Messages (Annex L)

Annex L allows an H.323 endpoint to operate as a Media Gateway where services can be defined, and, through external feature server rules, as a Media Gateway Controller. Megaco messages are transmitted through H.225.0 call signaling.

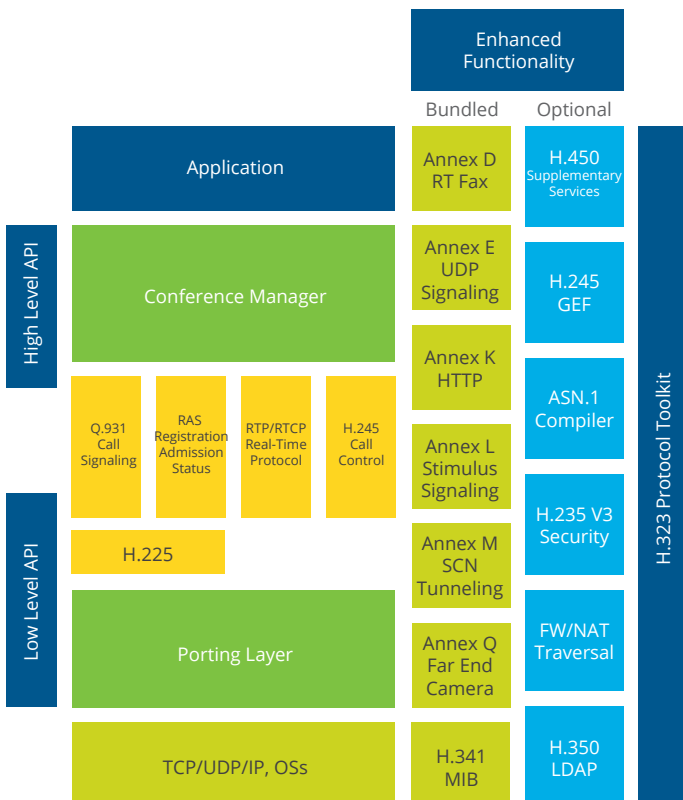### Telephony Signaling Tunneling through H.323 (Annex M)

Annex M addresses an evolving need of hybrid circuit switch (CS) and H.323 networks to transport CS signaling through H.323 by defining a transport mechanism for QSIG, ISUP, and DSS1 via H.323.

DNS Support for H.323 (Annex O)

Annex O allows an H.323 endpoint to search for its gatekeeper using a DNS name instead of an IP address. It also allows an H.323 gatekeeper to search for other gatekeepers and endpoints using a DNS name. DNS allows the use of a URL scheme, which is especially important in large deployments.

Denial of Service (DOS) Protection

DOS attacks attempt to cause buffer overrun scenarios that can lead to server failure. By providing increased protection against DOS attacks, the H.323 Protocol Toolkit enables customers to develop solutions that recognize them and implement safeguards to maintain system integrity. The H.323 Toolkit has successfully passed the NISCC/PROTOS tests published in January 2004.

	Enhanced Functionality	
	Bundled	Optional
Application	Annex D RT Fax	H.450 Supplementary Services
Conference Manager (High Level API)	Annex E UDP Signaling	H.245 GEF
Q.931 Call Signaling / RAS Registration Admission Status / RTP/RTCP Real-Time Protocol / H.245 Call Control	Annex K HTTP	ASN.1 Compiler
H.225	Annex L Stimulus Signaling	H.235 V3 Security
Porting Layer (Low Level API)	Annex M SCN Tunneling	FW/NAT Traversal
	Annex Q Far End Camera	
TCP/UDP/IP, OSs	H.341 MIB	H.350 LDAP

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Optional Add-On Modules

H.450 Supplementary Services

The H.450 module supports the full suite of H.450.1-12 Supplementary Services, such as FORWARD to forward incoming calls to another endpoint, and TRANSFER to transfer calls to the first available terminal in a group of terminals. New H.450 Supplementary Services include CALL PARK AND PICKUP, CALL COMPLETION ON BUSY, CALL OFFER, and CALL INTRUSION. H.450 Supplementary Services are based on QSIG for smoother integration with PSTN networks. The module also enables function callback registrations in manual RAS operation mode.

H.245 GEF API

The H.245 General Extensibility Framework (GEF) API simplifies the setup of H.245 generic capabilities, such as AMR, MPEG-4, and H.264. This unique module enables developers to avoid the burden and risks of handling complex ASN.1 definitions and settings.

ASN.1 Compiler (SDK)

The ASN.1 Compiler provides efficient message encoding/decoding for additional ASN.1 definitions used by the H.323 Toolkit APIs. It is available on Windows platforms.

H.235 V3 Security

The H.235 V3 module supports H.235 V3 Annexes D, E, and F.

Annex D support includes:

- Advanced user authentication during the signaling phase of Q.931 and RAS with a gatekeeper.
- Advanced user privacy using media encryption with a key negotiated during the signaling phase. This prevents a third party from auditing the multimedia session. Softil's Advanced RTP/RTCP Toolkit enables advanced user privacy.

Annex E is used for RAS/Q.931 signaling to authenticate the endpoint using a digital signature and Public Key Infrastructure (PKI). Annex F is a hybrid of the Annex D and E procedures.

Additionally, the H.323 Toolkit addresses the threat of Trojan horse objects in an H.323 message by blocking abnormal message sizes.

H.350

The Lightweight Directory Access Protocol specifies a directory service framework that supports registration, admission, and security protocols. LDAP enables different systems to access a central directory data source.

H.460.17-19 NAT/FW Traversal

H.460.17, H.460.18, and H.460.19 enable standard NAT/FW traversal. This add-on fully supports all three of these standards, giving applications the most comprehensive and flexible solution available today for the development of endpoints, gatekeepers, and border elements that are NAT/FW aware.

The H.323 Protocol Toolkit is delivered with:

- Source code
- Sample application: H.323 endpoint
- Release notes
- Complete documentation

General enhanced protocol capabilities included with the H.323 Toolkit

High Capacity Call Setups (Q.931 Multiplexing)

Q.931 Multiplexing supports carrying multiple concurrent calls through the same call signaling channel. This provides better performance and reduces resource consumption by reusing the same call signaling channel resources.

Alternate Gatekeeper Procedure Support

The Alternate Gatekeeper Procedure allows for handling several alternate gatekeeper options when the primary gatekeeper becomes unresponsive. The H.323 Stack automatically switches to the alternate gatekeeper when the current gatekeeper connection is lost.

Advanced Call Control-H.245 V15

The H.323 Toolkit contains enhanced H.245 service support, such as broadcasting, conference chair control, flow control, terminal join and leave services, and terminal visibility to other participants. H.245 V15 support enables developing H.239 support (multiple channels, applying operational roles) for high-end video conferencing systems.

Call Credit-related Capabilities

Call credit-related capabilities allow users to dial a gateway for charging the call to a pre-paid calling card or user account. The gatekeeper manages call credit-related events, such as usage countdown.

Multi-homed IP

Multi-homed IP enables sending and receiving requests from different local IP addresses from various network cards in the same hardware device.

Operating Systems*

- Windows
- Solaris SPARC
- Red Hat Linux
- VxWorks
- Nucleus
- Embedded Linux (MonteVista)
- Android
- iOS

Inquire about support for other available operating systems

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H.323 Protocol Toolkit Features

- High-level API
- RTP/RTCP support
- IPv4/IPv6 support
- Real-Time Fax (Annex D)
- UDP Signaling (Annex E)
- HTTP-based Service Control for H.323 Devices (Annex K)
- Stimulus Signaling, Tunneled Megaco Messages (Annex L)
- Telephony Signaling Tunneling through H.323 (Annex M)
- Remote Camera Control (Annex Q)
- H.341 MIB Support
- Q.931 Multiplexing
- High Capacity Registration (Additive Registration)
- H.245 V11 Advanced Call Control
- Call credit-related capabilities
- Multi-homed IP
- H.235V3 Security
- Full H.450 Supplementary Services
- H.245 GEF API
- H.350 LDAP support
- H.460.17-19 NAT/FW Traversal
- DNS support (Annex O)
- Support for AES encryption
- Alternate endpoints

Standards Supported

- H.323 version 7
- H.225.0 version 7
- H.245 version 15
- H.235 version 3 – With Annex D, E and F security procedures
- H.239 (HMAC)
- H.350 - LDAP support
- H.450.1 - Generic functional protocol for the support of supplementary services in H.323
- H.450.2 - Call transfer supplementary service for H.323
- H.450.3 - Call diversion supplementary service for H.323
- H.450.4 - Call hold supplementary service for H.323
- H.450.5 - Call park and call pickup supplementary services for H.323
- H.450.6 - Call waiting supplementary service for H.323
- H.450.7 - Message waiting indication supplementary service for H.323
- H.450.8 - Name identification supplementary service for H.323
- H.450.9 - Call completion supplementary services for H.323
- H.450.10 - Call offering supplementary services for H.323
- H.450.11 - Call intrusion supplementary services
- H.450.12 - Common information additional network feature for H.323
- H.460.6 - Extended Fast Connect
- H.460.17 - RAS over TCP
- H.460.18 - Traversal of H.323 signaling across NAT and FW
- H.460.19 - Traversal of H.323 media across NAT and FW
- H.323/Annex D - Real-time fax over H.323
- H.323/Annex E - Multiplexed call signaling over UDP
- H.323/Annex K - HTTP-based service control
- H.323/Annex L - Stimulus Control Protocol using MEGACO
- H.323/Annex M1 - Tunneling of signaling protocols (QSIG) in H.323
- H.323/Annex M2 - Tunneling of signaling protocols (ISUP) in H.323
- H.323/Annex M3 - Tunneling of DSS1 through H.323
- H.323/Annex O - Usage of URLs and DNS
- H.323/Annex Q - Far End Camera Control
- IETF RFC 2833 (DTMF)

The Softil H.323 Family also includes:

- BEEHD Client Framework—A complete set of building blocks for developing SIP or H.323-based IP/Video phone applications for multiple operating systems.
- RTP/RTCP Toolkit—A standalone RTP/RTCP Stack providing IPv4/IPv6, security, and advanced functionality.
- Professional Services—A full range of design, integration, and deployment consulting services.

For more information, contact Softil at info@softil.com