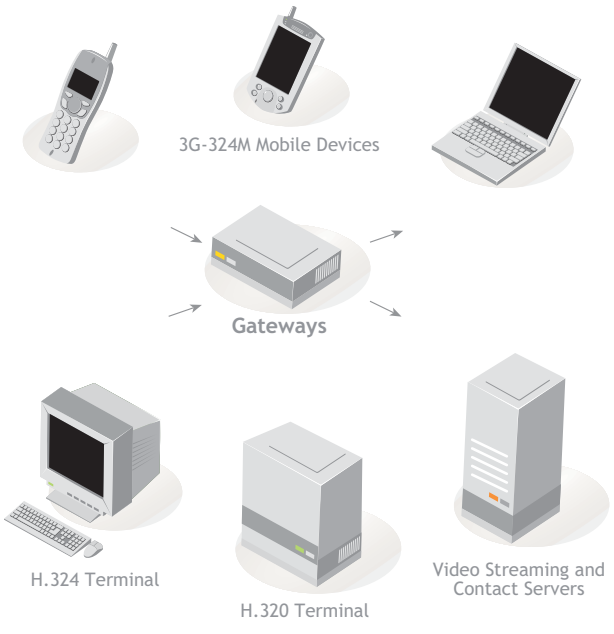
3G-324M Toolkit

For Developing 3G Conversational Multimedia and Streaming Enabled Entities

The 3G-324M Toolkit includes a set of APIs for developing multimedia communication solutions for 3G networks and terminals. It can also be used to develop conversational multimedia-based solutions for UMTS and TD-SCDMA networks. RADVISION's 3G-324M Toolkit is fully compatible with 3G-324M enabled devices and has a small memory footprint while providing high performance. The Toolkit includes a sample test application that uses the 3G-324M Toolkit APIs.

3G Enabled Products



Products which are applicable include:

- 3G Mobile Handsets
- 3G PDAs and Smart Phones
- 3G-324M Gateways supporting SIP, H.323 and RTSP
- Video Streaming Servers
- Announcement Servers
- Video Mail Servers
- Video Contact Centers
- H.324M Multimedia PSTN Phones
- 3G Testing Tools

3G-324M Basics

The 3G-324M protocol operates over an established circuit switched connection between two communicating peers. 3G-324M is an umbrella specification to enable conversational multimedia communication over Circuit Switched (CS) networks and has been adopted by the Third Generation Partnership Project (3GPP) and the 3rd Generation Partnership Project 2 (3GPP2). 3G-324M is based on the International Telecommunications Union's (ITU) H.324M specification for multimedia conferencing over CS networks.

3G-324M is comprised of the following sub-protocols:

- H.245 for call control
- H.223 for bit streams to data packets multiplexer/demultiplexer
- H.223 Annex A and B for error handling of low and medium BER detection, correction and concealment
- H.324 with Annex A and C for operating in wireless environments

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Product Specifications

3G-Powered 3G-324M

There has been a tremendous rush to acquire and roll out 3G broadband wireless services in key markets. Both 3G standards bodies, 3GPP (3rd Generation Partnership Project) for UMTS networks and 3GPP2 for CDMA2000 networks, envision 3G as running entirely over a pure IP-based communications network.

Today's IP network, based on IPv4, is not sufficiently robust for delay sensitive applications and contains limited IP address space. Furthermore, wireless communications have high BER (Bit Error Rate) where entire UDP/IP packets need to be retransmitted after any error occurs, exacerbating delay and using extra bandwidth. The 3G-324M standard was defined to enable delay sensitive multimedia communications over the circuit switch part of the wireless network.

The 3GPP standards body that defines the UMTS/WCDMA specifications defines the structure and implementation requirements of the 3G-324M standard in the Technical Specs TS 26.111 for 3G-324M initiation and operational procedures.

In August 2002, the 3GPP2 standard body, responsible for CDMA2000 specifications, mandated a technical specification for 3G-324M operation requirements over CDMA2000 networks named 3GPP2 C.S0042 for Circuit-Switched Video Conferencing Services.

The Chinese TD-SCDMA variant for 3G also uses 3G-324M for mobile video telephony.

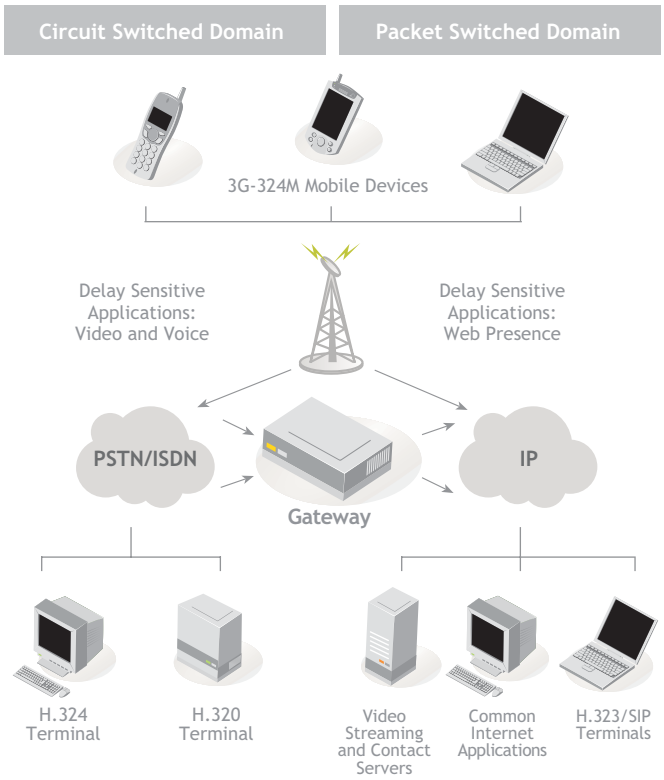
3G-324M components in the network include endpoints such as cell phones or wireless PDAs, base station units that support the opening of a circuit-switched channel for calls, gateways that interwork 3G-324M with SIP or H.323 for IP terminals on the wireline domain, and content servers that provide customized live media and video-on-demand. The wireless packet network can provide a robust suite of delay tolerant IP services such as email, Web, chat, MMS (Multimedia Messaging), MP3 streaming, wireless imaging, presence, GPS/location-based services, multiparty games and e-banking.

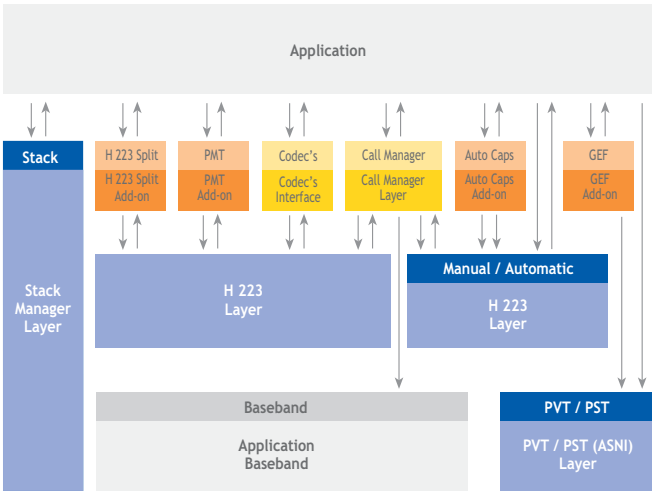
The 3G-324M specification using the circuit-switched network allows delay sensitive conversational multimedia services such as:

- Video conferencing for personal and business use
- Multimedia entertainment services
- Telemedicine
- Surveillance
- Live Video Broadcasting-'D0 Cable TV On-the-Go
- Video-on-demand (movies, news clips)

3G-324M is a proven solution for conversational multimedia based services that packet-based wireless networks cannot deliver because of inherent overhead, BER sensitivity, and variant routing delays. 3G-324M operating over a circuit switched channel between two communication peers guarantees the fixed-delay quality of service for multimedia communications. Combining circuit switch 3G-324M services with packet-based SIP services such as presence can leverage the strength of both networks to enable new types of differentiated and innovative mobile 3G services.

THE 3G-324M NETWORK





3G-324M Toolkit Architecture

Call Manager

The RADVISION Call Manager is a unique layer that simplifies application development of 3G-324M-based applications by hiding the complexity of the underlying 3G-324M sub-protocols. In addition, it provides hooks to lower layers for complete development flexibility. The Call Manager requires a call setup to be established on the wireless network. This module provides the necessary cohesion between the H.245 Control object, the H.223 Multiplexer/Demultiplexer object, and the transport layer (driver adaptor).

H.245

The H.245 Module is a call control protocol for managing voice, video, and data channels between two or more session participants. The Toolkit comes with the most advanced and mature H.245 Version 13 from RADVISION's award winning and industry standard H.245 call control module used by hundreds of OEMs in H.323 products. This module is responsible for opening and closing logical channels for media streams as well as performing H.245 procedures, which include capabilities exchange and master/slave determination. The Toolkit is capable of performing both procedures in both automatic and manual modes. Once both procedures are completed, applications can begin sending and receiving open logical messages using the Toolkit's APIs and callback functions. This module also includes the CCSRL (Control Channel Segmentation and Reassembly) NSRP (Numbered Simple Retransmission Protocol) and WNSRP (Windowed-NSRP) services to enable reliable H.245 channel over the multiplexer bit stream.

"We have worked closely with RADVISION in the past, and the successful integration of their video application on top of our operating system is another milestone in our productive relationship. We believe that together we are providing... an excellent product that will raise the standard in 3G video telephony."
Jason Lim, Microsoft Corp.

H.223

The H.223 Module is the multiplexer/demultiplexer module responsible for communication with a bit stream driver such as WCDMA, TD-SCDMA, CDMA2000 and ISDN. Furthermore, the H.223 Module contains Adaptation Layers for handling error detection according to the traffic content of each logical channel such as voice, video, data and call control. The 3G-324M Toolkit supports the following H.223 annexes:

- Annex A- specifies the protocol that handles a light error prone channel
- Annex B- specifies the protocol that handles a medium error prone channel
- Annex C & D- specifies the protocols that handle highly error prone channels

The Toolkit supports several types of Adaptation Layers (ALs) to serve call control, video, and voice or data channels:

- AL1- Used for mandatory H.245 call control that is initiated immediately after multiplex level synchronization. Multiplexing is synchronized between communicating parties and used for optional data channels. AL1 assumes that the upper layer provides error control
- AL2- Contains speech, error detection and sequence numbering mechanism
- AL3- Contains video, error detection, sequence numbering mechanism and retransmission mechanism
- AL1M, AL2M, AL3M - Contains complex mechanisms for handling higher error-prone networks

Driver Adaptor / Baseband

The Driver Adaptor enables simple integration with any bit stream driver such as a WCDMA/TD-SCDMA/FOMA Air Interface or ISDN. A bit stream driver interface (such as an air interface or a modem) is part of the 3G air interface or ISDN modem and is external to the Toolkit. The Driver Adaptor bridges the H.223 module and the specific driver. The test application included with the Toolkit contains a sample basic driver.

Windows Mobile

Standards Supported

- GPP TS 26.110
- 3GPP TS 26.111
- 3GPP TR 26.911
- 3GPP TS 27.007
- ITU-T H.324
- ITU-T H.324 Annex A
- ITU-T H.324 Annex C (Mobile Requirements)
- ITU-T H.324 Annex K (MONA)
- ITU-T H.245 Version 13 (Advanced call control)
- ITU-T H.223 Annex A (Error handling level 1)
- ITU-T H.223 Annex B (Error handling level 2)
- ITU-T H.223 Annex C&D (Error handling level 3)
- ITU-T H.239 (Role management and additional media channels)
- ITU-T H.249 (Extended user input indications)

The 3G-324M Toolkit is delivered with:

- Source code and build files
- Sample Application with source code
- Release Notes
- Overview Document
- Programmer's Guide Document
- Programmer's Reference Guide Document
- Operating Systems Porting Guide Document
- Integration Tips Document
- GCF Certification and Interoperability Guide

Operating Systems*

- Windows Mobile
- Embedded Linux
- Symbian
- Nucleus
- pSOS
- VxWorks
- Windows
- Linux, Red Hat
- TI DSP/BIOS (C6000)

* Inquire about support for specific operating system availability

3G-324M Toolkit Features

- H.324 Annex K (MONA) support for faster call setup time
- WNSRP support for faster call setup time
- Tested for GCF and IMTC test cases
- Supports H.324 and 3G-324M products, both for server and handset applications
- Fully compatible with leading 3G-324M videophone and gateway products
- Minimal dynamic memory usage
- Small footprint and low memory usage
- High performance bit rate processing
- Thread safe
- Full support of H.223, including Annexes C and D
- Flexible multiplexing of any codec
- Enhanced codec and H.245 capabilities support through the Generic Extensibility Framework (GEF) add-on module
- H.245 AutoCaps add-on module
- H.223 Split add-on module
- Passive Monitor add-on module
- H.223 hardware stuffing
- High availability support
- Real-time statistics collection
- Improved synchronization indications
- Session Reset support
- H.239 Dual Video support
- H.249 Extended Keys support
- H.263, MPEG-4 and H.264 video codecs support
- G.723.1, AMR and AMR-WB audio codecs support

About RADVISION

RADVISION (NASDAQ: RVSN) is the industry's leading provider of market-proven products and technologies for unified visual communications over IP and 3G networks. With its complete set of standards-based video networking infrastructure and developer toolkits for voice, video, data and wireless communications, RADVISION is driving the unified communications evolution by combining the power of video, voice, data and wireless – for high definition video conferencing systems, innovative converged mobile services, and highly scalable video-enabled desktop platforms on IP, 3G and emerging next-generation IMS networks. For more information about RADVISION, visit www.radvision.com

USA/Americas
T +1 201 689 6300
F +1 201 689 6301
infoUSA@radvision.com

APAC
T +852 3472 4388
F +852 2801 4071
infoAPAC@radvision.com

EMEA
T +44 (0) 20 8757 8817
F +44 (0) 20 8757 8818
infoUK@radvision.com

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