

SurfGate™

Media Gateway Framework for Development of Advanced Cross-Network Gateway Applications

Overview

As a result of the tremendous evolution undergone by media gateways during the past few years, requirements for enhanced services and superior converged capabilities are becoming more widespread. Telecom equipment manufacturers have discovered that in order to offer competitive products for the service provider's ever-growing needs, they must support new emerging standards and advanced capabilities such as conferencing in addition to the typical transcoding and media adaptation requirements for audio, video, fax or modem data.

The SurfGate media gateway framework offers an advanced, carrier-grade solution for the development of scalable media gateways that bridge between IP, mobile and PSTN networks. Media gateway developers looking to design and implement reliable platforms that support converged networks will find that SurfGate provides a comprehensive framework that enables the development of robust applications including audio/video gateways, mobile IWF gateways, and 3G-to-IP gateways.

The SurfGate framework has been designed to integrate with a variety of field-proven hardware platforms, such as PCI, cPCI, and ATCA form factors, allowing customers to develop their chosen product with the shortest time-to-market. Providing simultaneous support for audio, video, fax and modem processing, SurfGate integrates with existing SIP, H.323, and PRI gateways, IMS CSCF & MTFC, gatekeepers, softswitches and endpoints.

The SurfGate media processing framework is supplied with an extensive support package that includes sample applications, complete and comprehensive documentation, and host OS-optimized drivers for Linux, Windows, and VxWorks. Consequently, your development efforts will be optimized, your deployment cycles shortened and your time-to-market reduced significantly.

Main Features

- Simultaneous media processing of various types (audio, video and fax/modem) on a single DSP
- DSP-based media processing and transport protocols for converged networks (IP, mobile and PSTN)
- Provided on variety of form factors (AMC, PTMC, PCI) and integrated with leading ATCA, μ TCA and cPCI carriers
- Feature-rich transcoding subsystems
- Flexible DSP Open Framework™
- Built-in real-time remote diagnostics capabilities for easy field deployment and support

Target Applications

- IP/PSTN/Mobile Media Gateways
- Media/Content/Messaging Servers for PSTN, IP & Mobile
- IWF Modules for NGN
- Remote Access Servers (RAS)
- Test Equipment



Key Elements

Advantages

General

- Audio, video, fax and modem data processing on the same DSP, including streaming, recording and conferencing
- Media processing and transport protocols for IP, mobile and PSTN networks implemented on the DSP
- C-callable API
- Built-in real-time remote diagnostics
- Runtime selection between any media processing functionality provides ultimate gateway flexibility
- Migration from audio, fax and modem to video with no hardware changes in system
- Easy audio/video sync (low system delay and bottleneck-free)
- Low end-to-end delay resulting in unmatched quality

Hardware Platforms

- AMC, PTMC and PCI form factors
- Integrated with leading ATCA, μ TCA and cPCI hardware providers
- Ready for next-generation standards
- Same application for all form factors
- Minimizes development efforts and risks
- Easy field deployment and support

Transcoding Subsystems

Voice

- PSTN, IP and mobile vocoder conversion
- Tone generation, detection and relay support
- Advanced adaptive jitter buffer and echo canceller
- Dynamic voice activity detection
- RTP/RTCP encapsulation
- Easy integration for SIP, H.323 and Megaco IP signaling
- Enhanced built-in functionalities allows easy application customization and reduced time to market

Video

- Codec conversion (H.263 \leftrightarrow MPEG-4), H.264¹
- Resizing
- Bit rate and frame rate conversion
- Dynamic addition of graphic overlay, text, and logos
- Background and foreground manipulation
- Enables easy connection between various types of IP video phones and 3G mobile phones that support different capabilities
- Enables video optimization according to terminal capabilities
- Allows addition of advertisements, messages or any other dynamic change of the video stream

Fax

- T.38 implementation in the DSP
- Includes mobile fax relay
- Field-proven with hundreds of G3 and mobile fax servers

Modem

- Modem termination up to V.92
- Modem relay: Modem-over-IP (V.150.1)
- Both modem termination and modem relay support for building gateways and RAS applications

IWF

- Mobile and PSTN support for modem, fax and ISDN
- Surf's modem, fax and ISDN interworking technology is adopted worldwide by the leading TEMs

3G-324M

- H.223 multiplexing/de-multiplexing runs on DSP
- The Surf 3G-324M™ interface manages complete call setup and control
- Low delay resulting in higher overall quality
- Signaling integrated in high-level API greatly reduces development time

¹ Roadmap feature

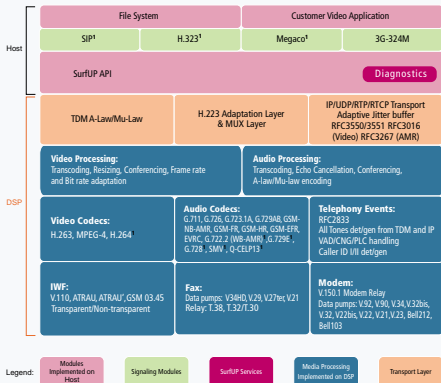
SurfGate APIs

The SurfGate API is based on the SurfUP API which is the generic interface to Surf's chip-level and board-level products. This interface enables application developers to perform all media transcoding functions, as well as hardware-related functions such as reset, download, and hardware control. The SurfGate API is also responsible for the advanced media channel processing configurations. This set of high-level APIs can be used to implement various applications, such as:

- An audio/video gateway that connects mobile, IP or PSTN terminals
- An Audio-, Fax- and Modem-over-IP gateway that transcodes media from terminals located on the mobile network, IP network, or legacy phones and modems on the PSTN network
- A Remote Access Server (RAS)
- Lawful Interception applications

Support for 3G Mobile Network²

SurfGate can be integrated with the Surf 3G-324M interface, which provides high-level APIs for performing call setup and call control in the 3G mobile network.



¹ Roadmap feature

² Optional

Product Specifications

Voice Transcoding

- Any-to-any conversion from the following vocoders: G.711, G.726, G.723.1A, G.729AB, GSM-NB-AMR, GSM-FR, GSM-HR, GSM-EFR, EVRC, G.722.2 (WB-AMR)¹, G.729E¹, G.728¹, SMV¹, Q-CELP13¹
- RFC2833 conversion/generation
- G.711-compliant VAD/CNG/PLC

Tones and Telephony Features

- DTMF detection/generation/suppression
- DTMF/tonal events relay using RFC2833
- CID types 1 & 2 detection/generation
- MF-R1 & MF-R2 tone detection/generation
- Pre-defined and user-defined tonal event detection/generation
- IP-side tonal event detection/generation

Echo Canceller

- G.168-2000-compliant with configurable tail length of 8, 16, 32, 64 and 128ms
- Automatic switch to transparent channel mode upon detection of fax or modem

Video Transcoding

- H.263 baseline, H.264¹
- MPEG-4 simple profile
- Any-to-any resolution change, up to full D1
- Any-to-any frame rate adaptation up to 30 FPS
- Any-to-any bit rate adaptation

Fax-Relay

- T.38 (2.4-14.4Kbps) and fax over G.711
- Data pumps: V.34HD, V.17, V.29, V.27ter, V.21
- FEC/Redundancy

Fax Termination

- T.30/T.32 (2.4-14.4Kbps)
- Data pumps: V.34HD, V.17, V.29, V.27ter, V.21

Modem Relay

- Modem-over-IP using V.150.1 up to V.92 (V.8 gateway, MR1)
- Voice-band data (modem over G.711, MR0)

Modem Termination

- Data pumps: V.92, V.90, V.34, V.32bis, V.32, V.22bis, V.22, V.23, V.21, Bell212, Bell103
- Error correction: V.42, MNP2-4
- Data compression: V.44, V.42bis, MNPS
- HDLC for PPP (RFC 1662)
- Synchronous V.34 for H.324

ISDN

- V.110, V.120

Network Support

- RTP, RTCP: RFC 3550/3551
- Adaptive and programmable jitter buffer (up to 300msec)
- Variable RTP packet duration (5 to 120 ms)
- Variable processing block size (5ms to 30ms)

IWF Support²

Mobile Side:

- 2G (GSM) and 3G (UMTS) support
- Modified ITU V.110, ATRAU, ATRAU¹, with HSCSD support for bearer and fax services
- GSM 03.45 for G3 fax support
- Transparent/non-transparent modes (RLP versions 0,1,2)

PSTN side:

- GSM 03.45 for G3 fax support
- PSTN, fax, modem and ISDN

Voice Conferencing²

- Full support for voice conferencing of IP, PSTN and mobile participants
- Dominant speaker energy detection and configurable number of dominant speakers

Voice Streaming²

- Full support for voice streaming and recording towards/from IP, PSTN or mobile
- Standard.WAV file format

Video Conferencing²

- Full support for video conferencing of IP and mobile participants
- Multiple user-defined layouts, each can be changed on-the-fly
- Dynamic addition or removal of participants during the video conference
- Up to 100 conference participants with distributed DSP architecture
- Multiple conference layouts and media capabilities
- Configurable background and foreground

3G-324M Interface³

- H.223 adaptation layers 1 and 2
- H.223 Mux levels: 0, 1 and 2
- H.245 version 11
- E1/T1 interface

¹ Roadmap feature

² Optional upgrade to SurfStream™

SurfGate Approach

The convergence trend that has been developing in the telecommunications market over the past few years is the foundation for the approach of providing multiple functionalities on a single platform. Surf API functions inherent in the SurfGate framework enable the application developer to achieve rapid implementation and flexible control. The API is delivered on various operating systems, along with sample application code for diverse scenarios (e.g., transcoding of AMR to G.729, streaming/recording files from/to disk, conferencing between several participants, etc.) to facilitate fast time-to-market.

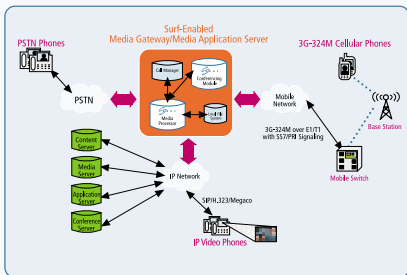
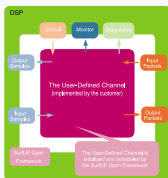


Diagram of typical network topology with SurfGate media gateway.

Open Framework

The SurfUP Open Framework² add-on module allows application developers to activate their own proprietary algorithm that can run either independently or alongside the existing DSP capabilities that are provided as part of the SurfGate media processing subsystem. The proprietary user implementation is compiled and linked with the existing DSP framework to create a single DSP executable.

Block diagram illustrating the relationship between SurfUP Open Framework and a single user-defined channel created by the application developer.



² Optional

SurfGate Platforms

Choose from one of two configurations:

Board-level Configuration

- Provided in three different form factors: AMC, PTMC, PCI and comprising a complete hardware and software solution
- Pre-integrated with leading ATCA and cPCI carrier boards
- See SurfRider/AMC, SurfRider-812/PTMC and SurfAce-112/PCI brochures for details

Chip-level Configuration

- Surf STP-xx comprising fully-loaded TI C64xx DSP with Surf software
- Customer designs board using Surf's STP-xx chip-level solution
- See Surf STP-10/12/14/55™ brochure for details

The SurfGate media gateway framework software includes the following components:

SurfGate Package

- Audio and video transcoding
- Flexible telephony events support
- Fax and modem relay and termination

SurfGate Add-ons²

- Audio streaming/conferencing
- Video streaming/conferencing
- SurfIWF (mobile and PSTN sides)
- Surf Open Framework user-defined channel
- Surf ISDN
- Surf 3G-324M interface - refer to SurfGate 3G-324M Video Gateway Framework data sheet for details

² Optional

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Reduced Time-to-Market

The SurfGate media processing framework is supplied with an extensive support package that includes:

- Sample applications
- Complete and comprehensive documentation
- Host OS-optimized drivers for Linux, Windows, and VxWorks

The result:

- Optimized development efforts
- Shortened deployment cycles
- Significantly reduced time-to-market

About Surf

Surf Communication Solutions®, established in 1996, designs, develops, and markets high-capacity, general-purpose, multimedia processing boards. In the telecommunication infrastructure field, Surf's customers use these boards in their Media Gateway and Media Server products. Using their comprehensive transcoding capabilities, Surf's products greatly shorten time to market, are cost effective, and enable true convergence of all major media types-Audio, Video, and Data (Fax/Modem)-over IP, Mobile, Wireline, and Wireless networks. These solutions are provided at various integration levels: PTMC/AMC DSP farm boards; PCI cards; and DSP hardware/software.

Surf Communication Solutions is a member of TI's TMS320™ third party program, the most extensive collection of global DSP development support in the industry. With more than 650 independent companies and consultants, TI's customers have easy access to a broad range of application software, development hardware and software and consulting services. For more information on the TI third party program, please visit www.ti.com/3p.

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BR-SC-200604