

SurfStream™

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

Main Features

- Simultaneous media processing, streaming and conferencing 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

- Audio/Video Mail and Messaging Servers
- Mobile-to-fixed Network Media Streaming Servers
- Multipoint Video Conferencing Servers
- Test Equipment
- Surveillance and Lawful Interception



Overview

In today's rapidly evolving world of advanced telephony, requirements for enhanced services and superior converged capabilities are becoming more widespread. Telecom equipment manufacturers are looking for reliable, scalable products that can integrate into their suite of applications to offer the complex services for the service provider's ever-growing needs. They must support new emerging standards and advanced capabilities such as conferencing, streaming and recording, in addition to the typical transcoding and media adaptation requirements for audio, video, fax or modem data.

The SurfStream media server development framework, a member of the SurfGeneration™ line of products, offers audio and video transcoding functionalities along with a complete set of streaming, recording and conferencing capabilities. SurfStream enables development of high-end media server applications such as audio/video mail servers, media streaming servers and MCUs, which simultaneously support different networks and a variety of end-user devices.

SurfStream integrates with the leading field-proven hardware platforms preferred by telecom carriers, such as ATCA, MicroTCA, PCI and cPCI form factors, enabling customers to develop their chosen product with the shortest time-to-market. Designed to allow media flow with minimal system delays and highest quality, SurfStream hardware and software has been deployed widely and works in the field with existing SIP, H.323, and PRI gateways, IMS, softswitches and endpoints.

Key Elements

Advantages

General

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

Audio

- 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 enable easy application customization and reduced time to market

Video

- Codec conversion: H.263, MPEG-4, H.264
- 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 servers and RAS applications

3G-324M

- H.223 multiplexing/de-multiplexing runs on DSP together with voice and video processing
- 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

Streaming & Conferencing Subsystems

- .WAV audio files and .3GP video files are streamed directly from Host to DSP
- Streaming and recording via various interfaces (PCI, Ethernet, etc.)
- Dynamic change of displayed layout based on dominant participant detection
- Video conference system running on a single or multiple DSPs, with optimized inter-DSP communication
- Multiple layouts for different conferencing participants' terminal capabilities
- Enables local or remote streaming/recording (CALEA support)
- Streaming flow control is performed automatically, without Host intervention
- Enables high number of conference participants, beyond the limitations of a single DSP
- Highly scalable conferences due to optimized display and transcoding

Architecture

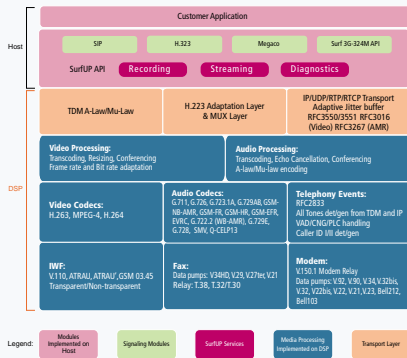
SurfStream APIs

The SurfStream 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 SurfStream API is also responsible for the advanced media channel processing configurations and the connection of the host controller to a file system. This set of high-level APIs can be used to implement various applications, such as:

- An audio/video mail server that connects mobile, IP or PSTN terminals
- A unified messaging server that transcodes media from terminals located on the mobile network, IP network, or legacy phones and modems on the PSTN network
- A mobile video portal
- Lawful Interception applications

Support for 3G Mobile Network¹

SurfStream can be integrated with the Surf3G-324M interface, which provides high-level APIs for performing call setup and call control in the 3G mobile network.



¹ 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), G.729E², G.728², SMV², Q-CELP13²
- 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

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)

Fax Relay

- T.38 (2.4-14.4Kbps) and fax over G.711
- Data pumps: V.17, V.29, V.27ter, V.21, V.34HD²
- FEC/Redundancy

Fax Termination

- T.30/T.32 (2.4-14.4Kbps)
- Data pumps: V.17, V.29, V.27ter, V.21, V.34HD²
- Protocol: T.30, Interface: T.32

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

Voice Conferencing

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

Voice Streaming

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

Video Transcoding

- H.263 baseline, H.264²
- MPEG-4 simple profile
- Any-to-any resolution change, up to full CIF (D1)²
- Any-to-any frame rate adaptation up to 30 FPS
- Any-to-any bit rate adaptation

Video Conferencing

- Full support for video conferencing of IP and mobile participants
- Multiple user-defined layouts, each can be changed on-the-fly
- Advanced resizing algorithm
- Dynamic addition or removal of participants during the video conference
- Up to 100 conference participants with distributed DSP architecture
- Superimposition of movies, with optional transparency levels
- Configurable background and foreground

Video Streaming

- Full support for video streaming/recording towards/from IP or mobile
- Multiple destinations can receive a single stream, enabling higher channel density

3G-324M Interface

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

² Roadmap feature

SurfStream 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 SurfStream 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.

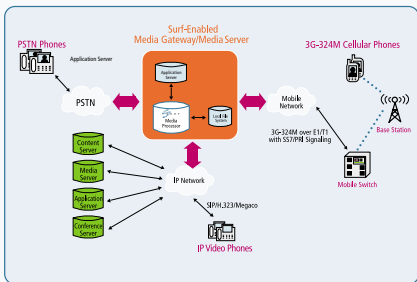
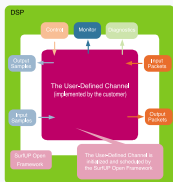


Diagram of typical network topology with SurfStream media server.

SurfUP Open Framework

The SurfUP Open Framework¹ 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 SurfStream 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.



¹ Optional

SurfStream Platforms

Choose from one of two comprehensive integration levels:

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, MicroTCA and cPCI carrier boards
- See SurfRider/AMC, SurfRider-812/PTMC and SurfAce-112/PCI brochures for details

Chip-level Configuration

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

The SurfStream media server framework software includes the following components:

SurfStream Package

- Audio and video transcoding
- Flexible telephony events support
- Fax and modem relay and termination
- Audio streaming/conferencing
- Video streaming/conferencing

SurfStream Add-ons¹

- Surf Open Framework user-defined channel
- Surf3G-324M interface – refer to SurfStream 3G-324M Video Server Framework application note for details

¹ Optional

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Reduced Time-to-Market

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

- Sample applications
- Complete and comprehensive documentation
- Host OS-optimized drivers for leading OS

The result:

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

About Surf

Surf Communication Solutions®, develops

SurfGeneration™, a suite of hardware and software products that drives a wide variety of applications whose common goal is high-capacity distribution of voice and video. These applications are predominantly developed by media gateway, media server and IMS equipment manufacturers in the telecommunication infrastructure field. The

SurfGeneration engine is an off-the-shelf fully converged audio/video media processing subsystem that integrates easily into media gateways and servers. It is available in various integration levels, such as AdvancedMC, PTMC and PCI form factor resource boards or DSP chips, which are pre-integrated with leading AdvancedTCA, MicroTCA and cPCI carrier boards and blades. By utilizing the capabilities and flexibility of SurfGeneration, Surf's customers can significantly reduce time-to-market while supporting market demands for true convergence of all media types: audio/voice, video, and data (fax/modem), over all networks: IP, mobile, wireline, and wireless – all processed simultaneously on a single DSP.

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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