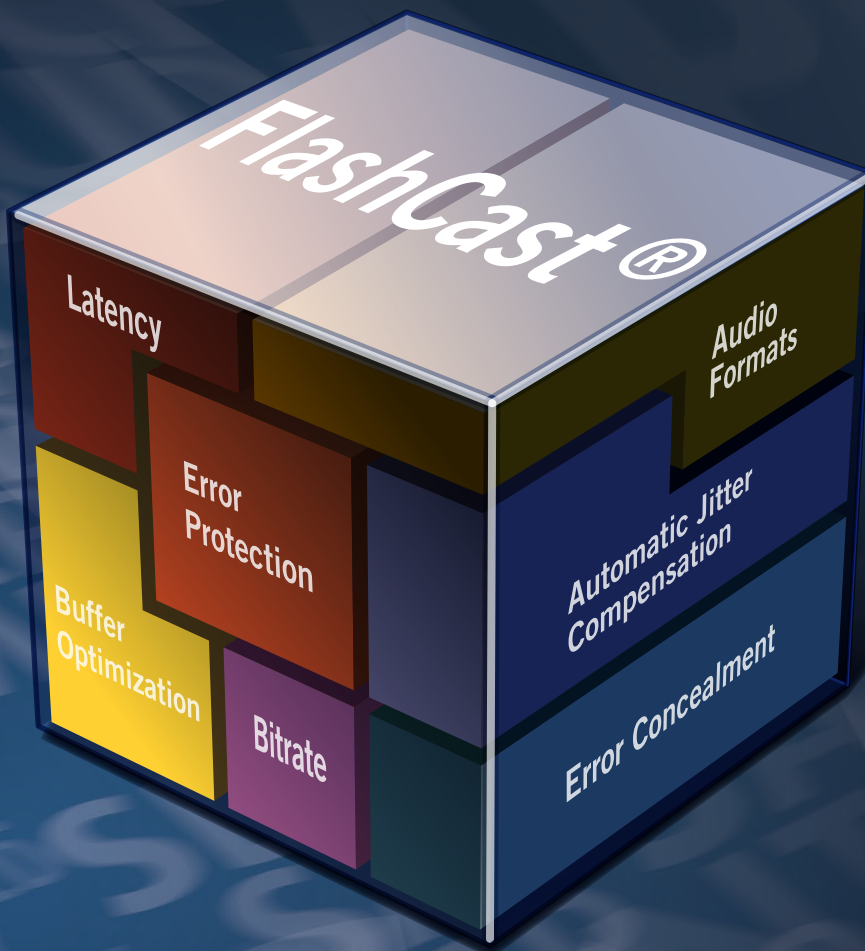
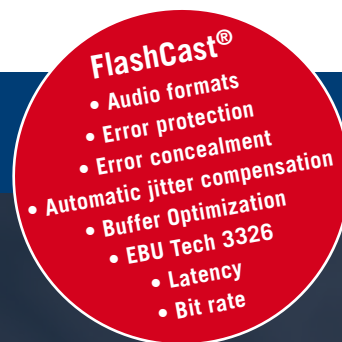


FlashCast®

Audio-via-IP: standardized, efficient,
economic and capable



MAYAH has developed IP Codecs since 1998.

Based on more than ten years experience, MAYAH has designed a multidimensional audio-via-ip model to optimize transmission for broadcasters and studios. This means all users, e.g. operating engineers, reporters or musicians, will benefit from a noticeable improvement in live transmission. The technique developed is based on several standard components, e.g. the for broadcasting particularly recommended standard applications, EBU Tech 3326 for SIP and RTP. Moreover, when using the latter components in combination, a substantial, positive impact can be achieved; www.audio-via-ip.com

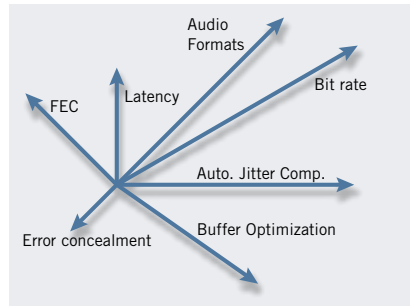


Fig. Multidimensional functional model for Audio-over-IP

Interoperability with FlashCast®

While preparing the EBU Tech 3326 a variety of tests were undertaken and MAYAH published the results of all connection tests between MAYAH codecs and those of other manufacturers, conducted during the last 12 months. The cooperation of the various manufacturers was very comprehensive and the current state is highly convincing. MAYAH is the most compatible audio codec in the world:

	MAYAH	AS	urban	Tieline	AEQ	AVT	Digigram	Prodyss
G.711	•	•	•	•	•	•	•	•
G.722	•	•	•	•	•	•	•	•
MPEG Layer-2	•	•	•	•	•	•	•	•
MPEG Layer-3	•	•	•	•	•	•	•	•
Linear Audio	•	•	•	•	•	•	•	•
AAC MPEG2	•	•	•	•	•	•	•	•
AAC MPEG4	•	•	•	•	•	•	•	•
HE-AACv2	•	•	•	•	•	•	•	•
AAC ELD	•	•	•	•	•	•	•	•
apt-X	•	•	•	•	•	•	•	•

Fig. The codec manufacturers above may have further audio algorithms in their products that have either not yet been tested or are not yet compatible to EBU Tech 3326.

FlashCast®

Audio-via-IP: standardized, open, efficient, economic and capable

FlashCast® refers to an algorithmic process that has been continually developed by MAYAH due to broadcasting related requirements. It is based on FlashCast® for ISDN which MAYAH designed in the late 90s. Through its early software audio codec SendIt, MAYAH was the first manufacturer on the market offering compatibility to multiple hardware codecs from other vendors. MAYAH products could detect other codecs automatically and support IP.

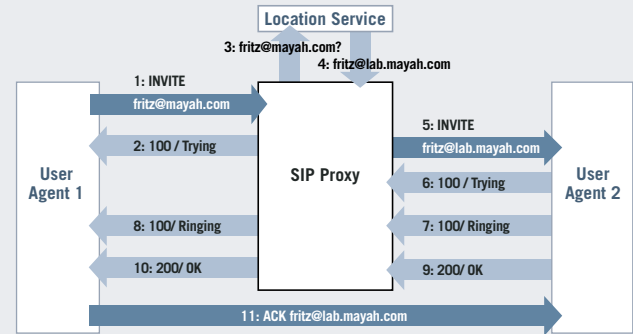
Today, the development of FlashCast® focuses entirely on modern IP technology and contains the following elements which are essential for audio-via-IP:

- Low latency en / decoding
- Package optimization
- Error concealment
- Error protection
- Adaptation of buffer and bit rate

Thanks to FlashCast® Plus, the full extent of the EBU Tech 3326 will be available, i.e. as a user you will benefit from the high interoperability as well as from the high quality and low latency of MAYAH products. The Plus version also contains additional audio formats implemented in MAYAH codecs.

Last but not least, FlashCast® Plus includes the connection setup for SIP protocol. So all mechanisms for using SIP servers are already integrated.

SIP – Call Flow



FlashCast Plus supports the following SIP servers:

- Siemens HiPath-4000 series (<http://www.siemens-enterprise.com>)
- Siemens OpenScope UC Server series (<http://www.siemens-enterprise.com>)
- Alcatel-Lucent OmniPCX (<http://enterprise.alcatel-lucent.com>)
- Brekeke SIP Server (<http://www.brekeke.com>)
- 3CX PBX (<http://www.3cx.com>)
- Free Switch (<http://www.freeswitch.org>)
- Kamailio (<http://www.kamailio.org>)
- OpenSIPS (<http://www.opensips.org>)
- Juniper (<http://www.juniper.net>)

FlashCast® audio coding formats: quality, latency and bit rates

FlashCast®	FlashCast®*	
	Latency	Bit rate
EBU TECH 3326 (mandatory)	G.711	> 2.5 ms, variable, up to 20 kHz, 48 56 64 96 128 kBit/s
	G.722	v. low < 4 kHz,64 kBit/s
	MPEG 1/2 Layer 2	very low < 8 kHz,64 kBit/s
	Linear Audio	> 90 ms, variable, up to 20 kHz,64.....128.....256.....384 kBit/s
EBU TECH 3326 (recommended)	MPEG 1/2 Layer 3	> 160 ms, variable, up to 20 kHz,64.....128 160 kBit/s
	MPEG 2/4 AAC	> 110 ms, variable, up to 20 kHz,64.....128.....256.....320 kBit/s
	MPEG 2/4 AAC LD	> 45 ms, variable, up to 20 kHz,64.....128.....256.....320 kBit/s
EBU (optional)	Eapt-X	very low, variable, > 20 kHz possible,128.....384.....576 kBit/s
	MPEG 4 AAC HEv2	> 110 ms, variable, up to 20 kHz, 8..24.....48.....64..... kBit/s
Additional Audio Formats	apt-X	very low, variable, > 20 kHz possible,64.....128.....384..... kBit/s
	MPEG 2.5** Layer 3	> 300 ms, variable, up to 20 kHz, 8..24.....48.....64..... kBit/s
	AES/EBU Transparent Audio	very low, > 20 kHz possible, 2268 kBit/s
	AES/EBU Transparent All	very low, > 20 kHz possible, 3072 kBit/s
	5.1/7.1 AAC and AAC HEv2	> 110 ms, variable, up to 20 kHz,80.....128.....256.....320 kBit/s
	8 channel linear Audio	very low, variable, > 20 kHz possible, 512.....18432 kBit/s
	8 channel apt-X / Eapt-X	very low, variable, > 20 kHz possible, 256.....384.....576...4480 kBit/s

Buffer Optimization, AJC, FEC, Error concealment, IP-Protocols, Stun, SIP, RTP, UDP

FlashCast® Plus - Business Case

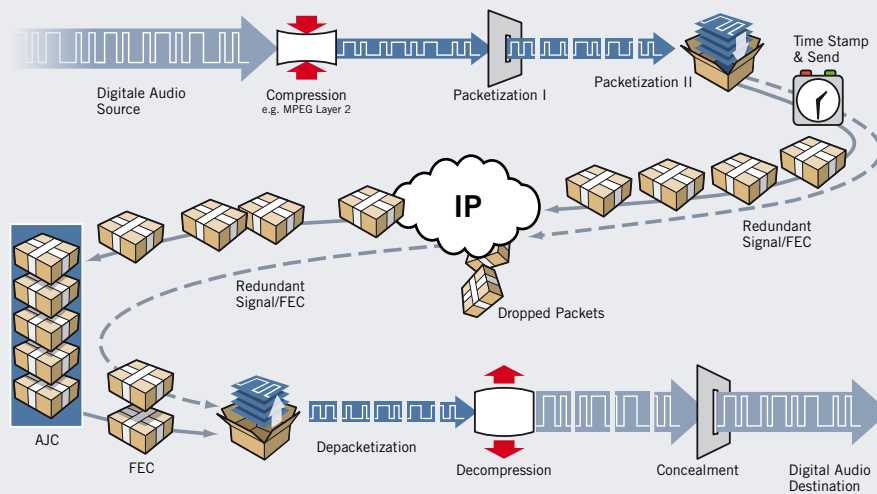
MAYAH offers FlashCast® technology also to interested companies that want to be quickly compatible to EBU Tech 3326, while profiting at the same time by the added value of FlashCast® technology. FlashCast® technology is available as pure object code, as well as in combination with hardware, depending on customer needs.

FlashCast® Plus - Products

FlashCast® Plus will shortly be integrated in MAYAH products. The first of these products benefiting from the new technology will be the Centauri III and the C11. Thanks to this efficient and compatible technology also SendIt4 will be the standard software for high-quality communication on the go.

For more information please contact: flashcast@mayah.com or call +49 (0)811 55170 and just ask for an appointment.

Mayah Flashcast® in the Audio over-IP signal processing chain



The FlashCast technology contains the complete signal chain, from sender to receiver

* FlashCast® Algorithm consists of all mentioned blocks: actually CELT audio coding, Error Concealment, Error Correction, Buffer Optimization, Automatic Jitter Compensation, Latency and Bitrate Optimization.

**proprietary development from Fraunhofer

© Copyright MAYAH Communications GmbH, 2010. All rights reserved. MAYAH and FlashCast are registered trademarks. Patents pending. Product information and technical specifications are subject to change without notice.