

Brilliant Video – Efficient Coding with International Standards

Frequently Asked Questions

What exactly does H.264 mean?

H.264 is the short name of a standardized method for compressing the data volume of videos for transmission on the internet. Its full name is H.264/MPEG4-AVC

Why is video compression in the internet so important?

Because without efficient video compression, the worldwide internet would collapse.

What's so special about H.264? How does it work?

Like all its predecessor standards, H.264 is a hybrid format consisting of:

- block-based prediction of picture elements from information already held by the decoder
- block-based transform coding of the type used for still image (JPEG) coding

The unique feature of H.264 is the high adaptability of its algorithms. The method is capable of adapting itself to meet changes and its algorithms almost “learn by seeing”.

The end result is that a HD video of 600 Mbit/s raw data can be compressed to a transmission rate of 10 Mbit/s with no perceptible loss of quality.

Why has H.264 succeeded so well in establishing itself?

The key criteria for establishing H.264 as a standard which has led to its worldwide acceptance were that:

- H.264 is a universal format that is not tailored to any specific applications
- H.264 is the most efficient coding method now available
- H.264 is licensed under ‘fair’ terms and conditions

This all means that H.264 now features in well over one billion end devices.

Are there any other standards and how important are they?

Windows Media Video (WMV) or VC-1 is a proprietary standard of the Microsoft Corporation which is primarily used in Blu-ray players.

When did work first begin on H.264 or video coding in general?

Basic research on video coding started back in the 1970s. In the 1980s international standards for video coding were established. In 1998 the International Telecommunication Union (ITU) in Geneva started work on H.264 which was called H.26L at that time. From 2001 to 2008 work on H.264 progressed in partnership with the Moving Picture Experts Group (MPEG).

Fraunhofer HHI first began to investigate H.264 some 15 years ago with the aim of reducing the bit rate by a factor of two with no loss of picture quality.

Can one single standard be used for all kinds of applications?

The basic H.264 standard can be used for all kinds of videos. Extensions to H.264 also cover novel applications like HD TV, scalable video and 3D.

Where do you now find H.264 in use?

H.264 now figures commonly in video cameras, Blu-ray players, PCs, tablets, smartphones and televisions. But H.264 is also used in applications like video conferencing, telemedicine and telelearning where it ensures efficient high-quality broadcasting of video streams.

How is H.264 now being developed?

The basic version and various extensions to H.264 were developed over a ten year period. At present work is going ahead on a successor standard to H.264 but this is still in an early phase.

The basic version of the successor standard was once again mainly engineered by the team from Fraunhofer HHI working together with industry. The team's proposal for the testing of the 3D extension to the successor standard was likewise also accepted.

How is a standard like H.264 actually produced?

A standardization organization publishes a call-for-proposals for a basic model. Generally speaking, one single proposal is then selected from the many submitted and this offers the blueprint from which a technical description is made. This basic model is then refined and enhanced over the further course of standard development.

The team from Fraunhofer HHI delivered the basic model for each of the three extensions to H.264. With their contributions to the basic version of H.264, the team achieved a substantial increase in its coding efficiency.

What kind of work does the Fraunhofer HHI H.264 team actually do?

The work of the Fraunhofer HHI teams involves mathematics, signal processing, the design and implementation of algorithms and a great deal of experiments. But creativity is the decisive element in their team work: only with new ideas can you create something that goes beyond what others have already done.

Why was the Fraunhofer Heinrich Hertz Institute largely instrumental in developing H.264?

The Fraunhofer Heinrich Hertz Institute first began building expertise in video coding at a very early point in time. The early pioneers at Fraunhofer HHI have now turned into a group of over 20 experts backing up the team.

Can you compare H.264 with MP3?

A comparison between H.264 and MP3 is only possible to a certain extent. Both standards enable the efficient transmission or storage of audio and video data.

But the main difference in the use of these standards is that H.264 can be deployed for a markedly broader spectrum of applications.

Will H.264 continue to be important in the years to come?

All studies agree that the volume of video traffic on the internet will continue to increase over the coming period. This increase will be driven by higher use of existing applications, and by use of new video-based applications. No leveling off of this growth rate is expected in the foreseeable future.

What's the proper name of the standard?

Experts and professional users in the internet call it H.264 for simplicity's sake. The correct name is H.264/MPEG4-AVC which is frequently abbreviated to H.264/AVC.

What is H.265 or HEVC?

H.265 is an advanced development of H.264 which offers a further 50 percent reduction in the bit rate with the same high picture quality as H.264. This advanced development – for which the team at Fraunhofer HHI was largely instrumental – is still being worked on.