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| ITU Logo | INTERNATIONAL TELECOMMUNICATION UNION  **TELECOMMUNICATION STANDARDIZATION SECTOR**  STUDY PERIOD 2017-2020 | | TSAG-C.6 | | |
| **TSAG** | | |
| **Original: English** | | |
| **Question(s):** | | N/A | | Geneva, 1-4 May 2017 | |
| **CONTRIBUTION** | | | | | |
| **Source:** | | Huawei Technologies Co., Ltd | | | |
| **Title:** | | Request for ITU to consider some actions in promoting video industry | | | |
| **Purpose:** | | Proposal | | | |
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| **Keywords:** | TSAG, Standardization Strategy Rapporteur Group |
| **Abstract:** | Video industry promotion is of critical importance to the whole of ICT industry which is an area where ITU can do some useful work. ITU has the advantage of being a leading international organization in standardization and regional development. Some actions are proposed for ITU to consider including joint strategic considerations and actions between ITU-T and ITU-D, accelerate the development of NG video codec standards and initiate the study of future CDN technologies and systems, etc. |

1. **General consideration**

Video will be the most important driving force for the sustainable development of the whole of ICT industry, which will underpin the continuous growth of the telecom industry in particular in the next decade.

However, from an industry-wide perspective, there isn’t very well planned and synergized video industry development work being carried out in major organizations like ITU.

ITU, as a whole, has the potential of playing an irreplaceable role in video industry development. It has many advantages which are unique.

For example, it has been playing a well proven role in the development of a succession of generations of video codec like H.261, H.263, H.264, H.265, etc. and video-based services and applications standards like IPTV, video-conferencing and tele-presence.

Also, ITU has some unique combination of standardization and regional development being h

ITU should keep leading some trends that will combine video and networking, CDN can be a very good area to use the power of such combination to breed very valuable standards for the industry.

1. **Standardization and regional development**

Through a collaboration between ITU-T and ITU-D, it may be possible to take the video industry development a big step further. Many video technologies and standards can be much more useful in driving regional ICT economy if there is a stronger awareness and a higher priority for video.

We are in an era when video is of the same importance which voice enjoyed decades ago in the early history of telecommunications until several years ago.

Voice used to be a fundamental telecom service. All other services at that time, were complementary or value-added services on top of voice as non-fundamental categories of services.

Today, video deserve the status of fundamental services. To accommodate such profound change, something needed to be done. No organization is more appropriate than ITU.

ITU-T and ITU-D can play joint role on this subject. Definition of video as fundamental telecom services and promotion of such definition in regions to let video enjoy higher priority in regional ICT economy development.

Some detailed discussion can be found below:

Human access to external information 70% is from the eyes, the efficiency of video transmission of information is the geometric multiples of voice and text. With the development of video processing technology terminals and networks, video services will connect billions of users and tens of billions of terminals, becoming one of the most important services in ICT applications, thus changing the way people live and work. It is estimated that by 2020, 85% of the data traffic will come from video.

The convergence of video services with people's daily lives, production and public affairs will be an important means for global well-being, development, innovation, growth and productivity improvement. ICT applications will further impact the country's economic development and wider field of social life, all countries will benefit. It also helps to bridge the digital divide.

The wide range of ICT applications for video services covers Video streaming, Communications video and Industry video:

Video streaming: is now the basis for operators to carry out video services and mainstream business. Most operators already have made video as their future business strategy. Fixed streaming video and mobile video, will be multi-screen, interactive, real-time, high-definition and other aspects of development to meet the user experience of information, education, science and technology applications. Let 5 billion people can watch the video content in any screen as they need at any time, any place.

Communication video: is the operator of streaming media based on the development of new blue ocean market. Including personal video communications and home video communications will help people connect with family and friends via video. Especially in remote areas of these applications is particularly important.

Industry video: I is a huge emerging field. Currently more than 50% of the city's security applications are based on the completion of the video, it can be sure that the prediction, 2~3 years after the 80%-90% is based on video detection. Video services can be used for smart city, public safety, environment protection and so on, to enhance the level of social security and effective protection of the environment. Video applications for remote education, telemedicine and other applications to enhance the level of public education and health; video applications and enterprise ICT applications combined for remote office, production control and so on, will help to enhance the productivity of the manufacturing sector , enhance the manufacturing industry's core competitiveness and sustainable development capacity. It can be expected that the video will be through a variety of industry applications, penetrated into all aspects of life and production.

The wide application of video service is more and more important for ICT applications, but many countries, especially developing countries, still face many challenges in the convergence of video services and ICT technologies. For example,

- Lack of information, education, science and technology video application suitable for the local language and economic and cultural status;

- Lack of ICT network capacity capable of carrying video services and guaranteeing the quality of video communications;

- Lack of experience in using video services to increase manufacturing productivity;

- Lack of mature application environment of video service to enhance the level of social security, education, medical and other aspects of the livelihood;

- Lack of experience in using video services to increase manufacturing productivity and so on

Cannot effectively play the role of video applications, and thus give full play to the potential of ICT capability and value.

We note that WTDC has adopted a number of specific resolutions and issues to study ICT applications such as e-government, e-health, and the electronic environment. We believe that video services, as one of the most important area of ICT applications, can effectively promote economic and social development, strengthen research in this area will promote countries to enhance the ICT application development level by experience sharing.

Therefore, it is recommended that ITU-D take action as soon as possible, in accordance with the trend of ICT application technology development. Set " Access to Video service: challenges and opportunities for developing countries " as a special subject to be studied in SG1 of ITU-D. From different countries and regions, different types of successful cases summarized in the extraction of universal best practices to help more countries through the effective use of video services to enhance the level of development of ICT applications for the benefit of the people.

1. **Development of NG codec (H.266)**

NG codec is a very important area for standardization under ITU-T by SG16 in collaboration with MPEG.

Maintaining smooth and constructive collaboration with MPEG is of top importance for ITU-T.

NG codec ‘s time-line should be perfect synchronization with other important industry changes like the deployment of 5G mobile communications networks and future fixed broadband networks, etc.

With the fast growth of robotics, industry automation, V2X and other vertical industrial areas which may potentially rely heavily on video, we need to be aware of the profound changes: NG codec will not only serve human beings ,but also machines, cars, robots, in one word, IoT.

In the development of NG codec, requirements collection and analysis from vertical industries should be encouraged and facilitated.

1. **Future CDN technologies and standards**

**CDN market demands and values**

Contradiction between exponential growth of traffic and linear growth of network infrastructure determines the long-term lifecycle for CDN. From Cisco Visual Networking Index we expect CDN will carry 103,996PB traffic per month by 2020, for instance, even roughly calculated with a very low price like AliCDN ￥0.26/GB, the CDN market size will exceed $50B by 2020. The CDN value chain range from the basic low-profitable live streaming and caching, to the more sophisticated high-value-attached services such as RAN optimization and edge security. Currently, the widely available CDN services as video streaming and caching is in low margins and once CDN reaches a global massive scale, it will become a hard business to profit from.

**Challenge and NG-CDN Requirements**

Emerging of the new tech/service like VR/AR, IoT, Holographic interaction demands the next generation of CDN with ultra-low latency from second to ms level, high throughput from K/Mbps to Gbps, high efficiency reliable transmission, and bi-direction delivery like everybody could be the source in mesh. Taking VR as an example, the network requirements in bandwidth and latency will be as the followings:

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| VR Resolution | | Equivalent TV resolution | BW | Latency |
| Early stage VR (current) | 1K\*1K@visual field  2D\_30fps\_8bit\_4K | 240P | 25 Mbps | 40 ms |
| Entry-Level VR | 2K\*2K@visual field  2D\_30fps\_8bit\_8K | SD | 100 Mbps | 30 ms |
| Advanced VR | 4K\*4K@visual field  2D\_60fps\_10bit\_12K | HD | 400 Mbps | 20 ms |
| Extreme VR | 8K\*8K@visual field  3D\_120fps\_12bit\_24K | 4K | 1Gbps (smooth play)  2.35Gbps (interactive) | 10 ms |

CDN faces issues such as 1) Traditional storage and forwarding model has few considerations for dynamic routing to guarantee high bandwidth and low latency experience and topology reference. 2) Single node is too far away from user covering high-rate/high burst mobile traffic and strong interactive services. 3) Lack of data sharing and CDN interworking between CDN/OTT and network operators, which makes access network advantage doesn’t play an important role in CDN value chain.

1. **Strategy proposals:**

* ***Definition of video as fundament telecom services*** 
  + ITU-T and ITU-D initiate collaboration in defining video as fundament telecom services;
  + Study an appropriate method for defining video as fundament telecom services;
  + Identification of relevant standardization work and regional promotion work in support of the definition of video as fundament telecom services;
  + Joint actions planning between ITU-T and ITU-D, such as a joint strategic whitepaper in 2017 or 2018.
* ***NG video codec standardization with emphasis on 5G and vertical industries***
  + Maintenance good synchronization between NG video codec and 5G and fixed broadband networking technologies;
  + Insurance of successful collaboration between SG16 and MPEG in NG video codec standardization;
  + Encouragement of requirements collection and analysis for NG video codec to cope with requirements from various video-reliant vertical industries;
* ***Future CDN technologies and standards***
  + Initiate future CDN requirements and technologies study;
  + Understanding of the combination of video ,cloud and networking technologies;
  + Identification relevant standardization areas and development of a work plan;

**Recommendation and conclusion:**

It is recommended that TSAG RG-SS (Rapporteur Group on Standardization Strategy) consider the proposals above.

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