The year 2017 has been a landmark one for India in terms of data usage as the country emerged as the largest consumer of data services in the world. This can be attributed to the rapid expansion of 4G by operators and the introduction of various 4G use cases and applications. These include high quality video streaming, mobile TV, video sharing, over-the-top (OTT) apps and online gaming. The growing 4G penetration has also improved connectivity for the internet of things (IoT) and machine-to-machine (M2M) platforms.

Video dominates data consumption

The growth in annual data consumption is largely on account of video applications. As more content gets delivered through OTT broadcasts, the need for advanced 4G networks has increased. Some of the key video applications are:

• High quality video streaming: The roll-out of 4G services has changed consumer behaviour and enhanced the video viewing scenario in India. It is easier to stream videos in high resolution now as high speed 4G networks have resolved the issue of video buffering. The emergence of video formats such as 360-degree video also impacts data consumption as it consumes four to five times as much bandwidth as a normal video at the same resolution. While conventional streaming services are prone to freezing on the 2G/3G networks during heavy traffic, 4G long term evolution (LTE) networks deliver the same data seamlessly, thus ensuring the efficient use of spectrum. Therefore, it is imperative for operators to invest in upgrading their network systems to 4G/LTE to support the increased demand for mobile video services, without compromising on the quality of service. Taking a step ahead in this direction, Reliance Jio Infocomm Ltd. has collaborated with Cisco to deploy multi-access edge computing to further optimise and enhance the video streaming experience over its LTE network by developing a mobile content delivery network.

• OTT content: OTT content consumption over the 4G network is evolving with long-form content (videos longer than 20 minutes in duration) gaining prominence. The increased popularity of large screen smartphones and investments in content creation are further driving the uptake of OTT services. While sharing online videos on social websites and streaming short videos was the initial trend, viewing long-form content is gaining traction on the back of improved connectivity and lower data costs. Moreover, live streaming has emerged as a key focus area for OTT players, particularly in the sports segment. Mobile TV is another emerging trend as users can now view content on the go and not just on television.

• Voice and video calling: The growing 4G networks have led to greater penetration of app-based voice over internet protocol (VoIP) and video calling services. According to a study, the penetration of video calling services is higher than that of VoIP, though the frequency of usage remains significantly lower for video chats. With the emergence of voice over LTE services, operators can offer better quality of service, shorter call set-up time and faster data sessions without OTT apps.

M2M communication on 4G platforms

M2M communication involves various electronic devices communicating with each other and sharing information through remote servers over cellular networks such as 4G. M2M technologies are considered key enablers for next-generation smart cities and homes, automated factories and other integrated commercial environments. The 4G enhancements for M2M communication include:

• Network support for M2M devices: As 4G LTE networks can provide high bandwidth for data transmission, they reduce congestion in the radio access network caused by a large number of M2M devices operating simultaneously.

• Long battery life of M2M devices: All 4G-enabled devices support extended discontinuous reception technology, which increases the battery life (up to 10 years) of M2M devices. This allows the device to switch off its receiver and transmitter circuitry completely during long periods without any data activity.

• Coverage enhancement: Some machine-type communication devices such as water/gas/electricity meters installed in basements face challenging coverage conditions. The coverage is enhanced mainly through repetition techniques used in advanced 4G LTE networks.

Relevance of 4G network for IoT

The roll-out of 4G LTE and subsequently 5G networks will increase the capabilities of the

connected devices and facilitate faster transmission to reap the benefits of IoT. Going forward, the number of machines sending or receiving information on the cellular 4G LTE network is expected to increase significantly. According to the Ericsson mobility report, IoT devices with cellular connections are projected to reach 1.8 billion by 2023. Currently, the dominant technology in the wide area segment is GSM/GPRS. However, by 2023, IoT cellular connectivity will mainly be provided by LTE and 5G. The majority of these connections will be over LTE networks, while 5G technology will drive IoT applications, especially those requiring critical communication

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