No. 60-3/2018-Trg.
Ministry of Communications
Department of Telecommunications
213, Mahanagar Doorsanchar Bhawan, Jawaharlal Nehru Marg, New Delhi-2
(Training & Capacity Building Division)

Date: 22nd Jan, 2021

Webinar Notice

NTIPRIT is organizing a Webinar on '**Quality of Service in 5G Network**', as part of webinar series on 'Emerging trends in 5G', scheduled to be held on ' 27th January 2021, 1100 Hrs to 1300 Hrs'.

2. Interested officers may join the webinar with the consent of their controlling officers.

3. All the information regarding the webinar is also be available on NTIPRIT website: http://www.ntiprit.gov.in

4. To attend the Webinar, registration can be done by using following link: https://tinyurl.com/y386b7cl

(Please see attached PDF for more details.)

In case of any query regarding the Session, the following Officer may be contacted please:

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22/01/2021
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दूरसंचार विभाग
DEPARTMENT OF
TELECOMMUNICATIONS
सत्यमेव जयते

National Telecommunications Institute
For Policy Research, Innovation and Training
(NTIPRIT)

WEBINAR on "Quality of Service in 5G Network"

As part of webinar series on "EMERGING TRENDS IN 5G"

Webinar Agenda

Session 1: **Inaugural Session**
1100-1115 IST : Welcome Address by Sh. S. K. Bhalla, DDG (Telecom Security), NTIPRIT
: Special address by Sh Raj Sharma, Head End to End Solutions, M/s Nokia
:Keynote Address by Sh. U. K. Srivastava, Sr DDG by Head of NTIPRIT

Session 2: **Technical Session**
1115-1200 IST : Introduction to QoS in 5G by Ashok Kumar, Director , NTIPRIT

Session 3: **Technical Session**
1200-1245 IST : OEM Perspective and Solutions for QoS in 5G Network by Mr Tomi Varonem, Expert M/s Nokia, Espo, Finland and Team from M/s Nokia, India

Session 4: **Q& A and Closing Session**
1245-1300 IST : Questions & Answers
: Closing Remarks by Sh. U. K. Srivastava, Sr DDG by Head of NTIPRIT
: Vote of Thanks by Sh. Atul Sinha DDG(Training) , NTIPRIT

Date: 27 January, 2021
Time: 11:00 Hrs ro 13:00 Hrs
Platform: Microsoft Teams

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Once you register, joining link will be shared on the screen which you can use to join or save it to join on the day of webinar. We will also email you the joining link on the provided email on day of webinar.

Inaugural Session

Keynote Address

Shri U. K. Srivastava, is an officer of Indian Telecom Service of the Govt. of India and presently serving as Head of NTIPRIT, DoT Government of India. He has over 35 years of reach experience in the field of Telecommunications and has led various units of DoT, Govt of India and Telecom Regulator in India, TRAI. He had also worked in ITU at Iraq and its HQ at Geneva.

Special Address

Raj Sharma is Head, E2E Solutions Sales at Nokia India. He has over 25 years of experience and has worked with Major Telecom Vendors & Operators. He has reach experience in mobile domain including Mobile Technologies (2G\3G\4G\5G\ORAN), Virtualization, Cloud, Enterprises Solutions, Fixed Broadband, Sales & Business Development, Planning & Engineering and Deployment & Operations.

Welcome Address

Shri S K Bhalla is an officer of Indian Telecom Service of the Govt. of India and presently serving as DDG (Telecom Security) in NTIPRIT. He has over 27 years of experience in the field of telecommunications.

Vote of Thanks

Atul Sinha is an officer of Indian Telecom Service of the Govt. of India and presently serving as DDG (Training) in NTIPRIT. He has over 27 years of experience in the field of telecommunications

Speakers

Tomi Varonen

Is an Expert in M/s Nokia Esopia, Finland. He has outstanding knowledge on the existing and coming technologies on communications industry including 5G, Cloud and IoT. He is leading a multi-site team of senior product experts with a focus to coaching and setting the right priorities to maximize team's performance.

Ashok Kumar

is an officer of Indian Telecom Service of the Govt. of India and presently serving as Director (Wireless Access), NTIPRIT, DoT, Govt of India. He has over 25 years of experience in the field of telecommunications. He was also part of Aadhaar/UIDAI (World's largest biometric based Identity Program of Govt. of India) team from 2013 to July 2020.

About 5G

5G is the 5th generation mobile network. It is a new global wireless standard after 1G, 2G, 3G, and 4G networks. 5G enables a new kind of network that is designed to connect virtually everyone and everything together including machines, objects, and devices. It is meant to deliver higher multi-Gbps peak data speeds, ultra-low latency, more reliability, massive network capacity, increased availability, and a more uniform user experience to more users. Higher performance and improved efficiency enhanced user experiences and connects new industries. 5G is designed to not only deliver faster, better mobile broadband services compared to 4G LTE, but can also expand into new service areas such as mission-critical communications and connecting the massive IoT.

5G radio is based on OFDM (Orthogonal frequency-division multiplexing), a method of modulating a digital signal across several different channels to reduce interference. 5G also uses wider bandwidth technologies and various bands such as sub-6 GHz and mmWave. The frequency bands for 5G networks come in two sets. Frequency range 1 (FR1) is from 450 MHz to 6 GHz, which includes the LTE frequency range. Frequency range 2 (FR2) is from 24.25 GHz to 52.6 GHz. The sub-6 GHz range is the name for FR1 and the mmWave spectrum is the name for FR2.

5G is not just an evolutionary upgrade of the previous generation of cellular, but it is a revolutionary technology envisioned that will eliminate the bounds of access, bandwidth, performance, and latency limitations and will provide connectivity worldwide. 5G has the potential to enable fundamentally new applications, industries, and business models. These will dramatically improve quality of life around the world via unprecedented use cases that require high data-rate instantaneous communications, low latency, and massive connectivity for new applications for mobile, eHealth, autonomous vehicles, smart cities, smart homes, and the IoT.

The 3GPP has defined Service-Based Architecture (SBA) for 5GC. It specifies a functional architecture and standardized interfaces and hence it is being deployed on software-defined infrastructure. This enables "cloud-native" deployment of 5G that use microservices, containers, centralized orchestration, CI/CD, open APIs, service meshes, and so on.

Quality of Service in 5G

As you may know that 5G system is designed to support various usages scenarios such has Enhanced Mobile Broadband (eMBB) supporting multi Gigabit speed, Ultra Reliable and Low latency Communications (URLLC) such as Self driving car , Remote Surgery etc and Massive Machine type Communications(mMTC) such as IoT used for different use cases in smart city, Agriculture, Industries etc. All these will require different level Quality of Service. 5G System is designed to support Quality of Service requirement for these uses scenarios.

The 5G QoS model is based on QoS Flows. The 5G QoS model supports both QoS Flows that require guaranteed flow bit rate (GBR QoS Flows) and QoS Flows that do not require guaranteed flow bit rate (Non-GBR QoS Flows). The 5G QoS model also supports Reflective QoS. The QoS Flow is the finest granularity of QoS differentiation in the PDU Session in 5G Network. A QoS Flow ID (QFI) is used to identify a QoS Flow in the 5G System. User Plane traffic with the same QFI within a PDU Session receives the same traffic forwarding treatment (e.g. scheduling, admission threshold). The QFI is carried in an encapsulation header on N3 (and N9) i.e. without any changes to the e2e packet header. QFI shall be used for all PDU Session Types. The QFI shall be unique within a PDU Session. The QFI may be dynamically assigned or may be equal to the 5QI.

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