Benchmarking Methodology Working Group
Internet-Draft
Intended status: Experimental
Expires: January 9, 2020

LM. Contreras
J. Rodriguez
L. Luque
Telefonica

July 8, 2019

5G transport network benchmarking
draft-contreras-bmwg-5g-00

Abstract

New 5G services are starting to be deployed in operational networks, leveraging in a number of novel technologies and architectural concepts. The purpose of this document is to overview the implications of 5G services in transport networks and to provide guidance on bechmarking of the infratructures supporting those services.

Status of This Memo

Copyright Notice

Table of Contents

1. Introduction

5G services are starting to be introduced in real operational networks. The challenges of 5G are multiple, impacting in different technological areas such as radio access, mobile core and transport network. From all those technological areas, the transport network is the focus of this document.

It is important for operators to have a good basis of benchmarking solutions, technologies and architectures before moving them into production. With such aim, this document intends to overview available guidelines to assist on the benchmarking of 5G transport networks, identifying gaps that could require further work and details.

As result, it is expected to provide guidance on benchmarking of 5G transport network infrastructures ready for experimentation in lab environments or real deployment in operational networks.

2. Conventions used in this document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC2119 [RFC2119].

3. 5G services

5G transport networks will need to accommodate different kind of services with very distinct needs and requirements leveraging on the same infrastructure. 5G services can be grouped in three main categories, namely enhanced Mobile Broadband (eMBB), ultra-Reliable and Low Latency Communications (URLLC), and massive Machine Type Communications (mMTC). Each of them presents different inherent characteristics spanning from ultra-low latency to high bandwidth and high reliability. For instance, eMMB services are expected to provide peak bit rates of up to 1 Gbps, uRRLC services will require latencies as lower as below microsecond delays, and mMTC will demand to support up to 100 times the number of current sessions. All these features impose great constraints to the networks deployed today in backhaul and aggregation, in terms of not only network capacity but also in terms of data processing, especially for guaranteeing very low latencies.

The impact in the transport network of those challenges is increased by some other additional challenges introduced by the emergence of two new technological paradigms: the network virtualization and the network programmability.

In one hand, virtualization will introduce uncertainty on the traffic patterns due to the flexibility and scalability in the deployment traffic sources in the transport network. On the other hand, programmability will potentially enable automated reconfiguration of the transport network which requires coordination mechanisms to avoid misconfigurations.

A final consideration is the introduction of the network slicing concept in 5G networks. According to that, the objective is to provide customized and tailored logical networks to different customers, allocating resources for the specific customer service request.

4. Benchmarking aspects of transport networks in 5G

The benchmarking aspects of 5G transport networks can be then structured in the following manner:

Data plane benchmarking: aspects to consider in data plane benchmarking refer to both hardware capabilities as well as to transport encapsulations. Examples of hardware capabilities are recent developments such as IEEE TSN, and example of encapsulation is SRv6 [I-D.ietf-spring-srv6-network-programming].

Control plane benchmarking: aspects to consider for control plane relates to transport infrastructure programmability. In this case some previous works exists such as RFC8456 [RFC8456].

Management plane benchmarking: one specific aspect of management benchmarking in 5G refers to the capability of managing the transport network slice lifecycle.

Architecture benchmarking: new architectural frameworks are being conceived to support advanced services like 5G. An example of these architectures is [I-D.ietf-detnet-architecture].

5. Guidance on 5G transport benchmarking

To be completed.

6. Security Considerations

This draft does not include any security considerations.

7. IANA Considerations

This draft does not include any IANA considerations

8. Acknowledgements

This work has been partly funded by the European Commission through the H2020 project 5G-EVE (Grant Agreement no. 815074).

9. References

9.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

9.2. Informative References

[I-D.ietf-detnet-architecture]
Finn, N., Thubert, P., Varga, B., and J. Farkas, "Deterministic Networking Architecture", draft-ietf-detnet-architecture-13 (work in progress), May 2019.

[I-D.ietf-spring-srv6-network-programming]
Filsfils, C., Camarillo, P., Leddy, J., daniel.voyer@bell.ca, d., Matsushima, S., and Z. Li, "SRv6 Network Programming", draft-ietf-spring-srv6-network-programming-01 (work in progress), July 2019.

[RFC8456] Bhuvaneswaran, V., Basil, A., Tassinari, M., Manral, V., and S. Banks, "Benchmarking Methodology for Software-Defined Networking (SDN) Controller Performance", RFC 8456, DOI 10.17487/RFC8456, October 2018, <https://www.rfc-editor.org/info/rfc8456>.

Authors' Addresses

Luis M. Contreras
Telefonica
Ronda de la Comunicacion, s/n
Sur-3 building, 3rd floor
Madrid 28050
Spain

Email: luismiguel.contrerasmurillo@telefonica.com
URI: http://lmcontreras.com/

Juan Rodriguez
Telefonica
Zurbaran, 12
Madrid 28010
Spain

Email: juan.rodriguezmartinez@telefonica.com

Lourdes Luque
Telefonica
Zurbaran, 12
Madrid 28010
Spain

Email: lourdes.luquecanto@telefonica.com