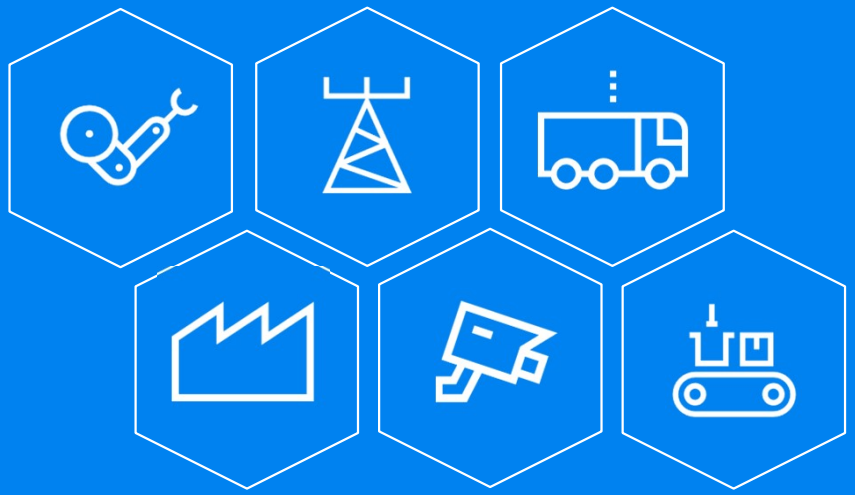
3GPP TSG RAN Rel-18 workshop
Electronic Meeting, June 28 - July 2, 2021

RWS-210380

On Rel-18 URLLC and IIOT enhancements



Agenda item: 4.2
Source: Ericsson
Document for: Discussion

5G for time-critical communication

- One of the 5G objectives is to enable connected industries
  - for digital transformation of industries
  - for improved flexibility
  - for improved productivity and efficiency
  - for improved operational safety

- NR Rel-15 established a solid foundation and Rel-16 and Rel-17 introduce further enhancements for better serving various industry verticals
  - Extreme latency & reliability requirements for industrial use-cases have been the focus so far and relevant enhancements are already supported.

- **URLLC services include also use-cases with moderate bounded latency but at higher data rates**
  - Examples: Industrial automation, remote control, real-time data (XR) [1][2]
- **<u>Therefore, Rel-18 can aim on enhancements focusing on efficiency & capacity to support URLLC use-cases at scale</u>**

- Note that the enhancements may benefit multiple use-cases e.g. XR

[1] 3GPP TS 22.104, Service requirements for cyber-physical control applications in vertical domains
[2] 3GPP RP-210460, (Revised) SID on XR Evaluations for NR.

Rel-18 URLLC & IIoT enhancements

Enhancements for high efficiency & capacity targetting moderate latency bound

Resource scheduling related enhancements

- Multi-slot transmission efficiency enhancements for high data rate traffic
- Configured grant enhancements for traffic with both periodical and non-periodical components
- Enhanced TSC assistance information for variable burst sizes per period
- Dynamic higher layer LCH multiplexing for different reliability targets

Mobility related enhancements, see RWS-210196 [3]

- Consistent latency & data rate during mobility to ensure URLLC QoS with mobility

Leftovers/continuation from Rel-17, if any

Coordination with overlapping areas required (e.g. mobility enhancements [3] and XR [4])

[3] RWS-210196, " NR mobility enhancements considered for Rel-18", Ericsson
[4] RWS-210381, "Discussion on Rel-18 XR", Ericsson

Resource scheduling related enhancements

Motivation

- Future time-critical traffic may have higher and variable data rate requirements with moderate latency, and periodical components
  - Transmissions based on dynamic scheduling alone or configured grant alone are not optimized for such traffic
    - Configured grant scheduling is best suited to serve traffic with fixed periodicity
    - Dynamic scheduling is an efficient tool to accomodate traffic with varying data rate
  - TSC assistance information in previous releases relies on fixed periodicity.

Rel-18 scope

- Efficiency/capacity optimizations by combination of UL Configured Grant and dynamic scheduling e.g. re-scheduling of unused configured resources.
- Flexibility in using features like multi-slot resource allocation with Configured Grant.
- TSC assistance information enhancements e.g. based on burst end time and considering variable burst components.
- Dynamic scheduling of LCHs multiplexes (new eMBB data + replicated URLLC data, if needed)