A glimpse of the 5G-VICTORI facilities in support of the Vertical use cases
- Berlin facility -

Presenter (s): Jesús Gutiérrez (IHP GmbH)
5G-VICTORI Key Objectives

- Design and prototype an open 5G infrastructure capable of instantiating and co-hosting various vertical sectors

- Integration of commercially relevant, operational environments required for the demonstration of the large variety of 5G-VICTORI vertical and cross-vertical use cases

- Transform current closed, purposely developed and dedicated infrastructures into open environments where resources and functions are exposed to the telecom and the vertical industries through common repositories

5G-VICTORI deliverable D2.1, “5G VICTORI Use case and requirements definition and reference architecture for vertical services”, March 2020 (link)
5G-VICTORI deliverable D2.2, “Preliminary individual site facility planning”, July 2020 (link)
5G-VICTORI Use Cases and sites

- “Enhanced Mobile broadband under high speed mobility”, **Vertical: Transportation – Rail**
- “Digital Mobility”, **Cross-Vertical - Transportation and Media**
- “Critical services for railway systems”, **Vertical: Rail**
- “Smart Energy Metering”, **Cross-Vertical: Energy and Rail**
- “Digitization of Power Plants”, **Vertical: Smart Factory**
- “CDN services in dense, static and mobile environments”, **Cross-Vertical: Media and Transportation**

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test environment consisting of a test track and test vehicles with the aim of testing operational processes
Use Cases’ components

Use Cases:
- UC # 1.2 Digital Mobility
- UC # 1.3 Rail Critical Services
- UC # 3 CDN services in dense, static and mobile environments

• Network deployment
  • Office: C&S+Apps, GPU cloud, Content Prefetcher, Media Cache, Dispatcher terminal
  • Wayside: Edge computing, 5G NR RAN, mmWave solution
  • Onboard: 5G NR UE, mmWave solution attached to a train, Media Cache, Sensors, Camera, GW, Terminal, Handset
  • Platform: User Handset (5G NR UE)
Digital Mobility UC (UC # 1.2)

Description and Services:
- Common framework for innovative mobility applications and advanced guiding services
- Passengers will arrive at the station by train with the front-end app pre-installed on their 5G UE
- 3D-Plan capturing tool – the train station and travel hubs will be digitized – a 3D model will be captured with a special camera

Main KPIs:
- RDFu01 – Latency (download spatial dataset) and bandwidth
- RDFu02 – Resources required at the edge computing nodes
- Geospatial error, location error

Novelties and key innovations:
- Station guidance and multi-modal transport journey planning
- Live recommendations for the next journey

5G NR Back-end with user sessions
Digital Mobility SW
Rail Critical Services UC (UC # 1.3)

Description and Services:

- **Train Control Signalling** based on emulated train signalling like CBTC, ETCS or FRMCS by Rail Signaling Traffic Generator between the train and Berlin Office endpoints.
- **Real-time High-Definition CCTV** transmission from train to the Berlin Office, from a train-mounted HD camera.
- **Mission-Critical (MC) Railway Telephony** like emergency group communication, operational private and group communication between driver,
- **Wayside point machine signaling** between an Interlocking and an Object Controller with its objects like Point Machine or a Signal.

Main KPIs:

- **RCSg01**
  - Round-trip-time less than 100 ms
  - Packet loss reation lower than 0.5 %
- **RCSg02**
  - Rail signaling traffic can use 200 kbps, regardless of background traffic

Novelties and key innovations

- Common platform for MC voice and video and other MC rail-related data and signalling services
- Onboard vertical services can be shown sharing the same 5G air interface without impact
- Softwarized solutions for mission critical systems
**Description and Services:**

- System to improve video streaming services for train passengers
- Makes delivery of video streams independent of the coverage of public mobile networks
- Passengers stream video via the on-board WiFi via a media cache on the train
- Media cache is filled with content via mmWave data shower positioned at strategic locations along the train track (in our trials: train stations >> Berlin Hauptbahnhof)
- In trials media playback metric will be collected based on reporting mechanisms standardised in MPEG SAND, which will allow validation of smooth media playback

**Main KPIs:**

- Very high data rate
- RAN latency

**Novelties and key innovations**

- eMBB services efficiently provisioned under static and high mobility scenarios
Inter-facility trials – 5G-VIOS

5G-VICTORI deliverable D2.5, “5G-VICTORI Infrastructure Operating System”, July 2020 (link)
5G-VICTORI deliverable D4.1, “Field trials methodology and guidelines”, September 2020 (link)
Thanks for your attention!

5G-VICTORI Project
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