Transport as Edge Use Case

Andy Billington, Innovation & Sustainability Specialist
✓ Economic Corridor & New Railway
✓ Rail Infrastructure
  ✓ 1435mm dual track
  ✓ SE-C loading gauge
  ✓ 25kV Electrification
  ✓ 25 tonne axle load
  ✓ 1050m freight train length
  ✓ ERTMS
✓ 870km +
✓ Greenfield!
Digitalisation: Typical vs Greenfield

Traditional Approaches
- Built in stages over time, no unified architecture/approach
- Silo of systems - one sensor = one system; one requirement = one system
- Designed to meet specific targets, not to evolve
- Inflexible, limited interoperability
- Limited number of suppliers

Greenfield Creates Options
- Interconnected systems
- One sensor – multiple systems
- Flexible, design for interoperability
- Open interfaces/standards “building blocks” allow evolution, wider range of suppliers
Design / delivery options

- Wayside sensors should be incorporated in design/delivery
- Small cell (4/5G) – terminal / depot design
- Data networks – services at construction sites?
- Infrastructure synergies – evaluation of higher-performing options
- Fibre / edge locations to support 5G
- Metro / “last mile” access network synergies/support

Long-term Infrastructure

- Sensors & “IoT” – lifecycle asset management for key components from start
- Increase range of suppliers for future procurements
- Increase efficiency of order-delivery-acceptance cycles
- Data space for intermodal (rail, air / maritime / road integration)
Commodity / Commercial Off the Shelf systems:
Swiss-led SmartRail 4.0 project evaluated - potentially significant savings
Similar programmes address SIL and security considerations
For non-safety environments, reliability needs to be greater than typical COTS
Leverage data centre / hyperscaler efforts on more sustainable ICT
COTS - wider pool of potential staff than vendor-specific/railway-only systems

Open Standards / Systems as Opportunity:
Reduces barriers to entry for suppliers
Reduce risk of proprietary lock-in
Increases opportunities for regional / local businesses, including SME & startups
Event-driven systems
Messaging interfaces
Simulated “edge” & DC (on-prem)
“Cloud-native” (container/VM etc)
Sustainable ICT
Circular Economy principles for lab
Open systems & interfaces
Opportunities for non-rail suppliers
Multitenant architecture
Hybrid edge/core/cloud
2021-2022:
“Edge” & core ICT
Private cloud & hybrid connectivity
Locations for field testing – connectivity, sensors, edge ICT
Static testing (mostly) – e.g. weather variation

2023+:
Dynamic testing (sensors, wayside with trains running)
Data integration
Analytics / “big data” systems planning
Aitāh!
Paldies!
Ačiū!
Thank you!