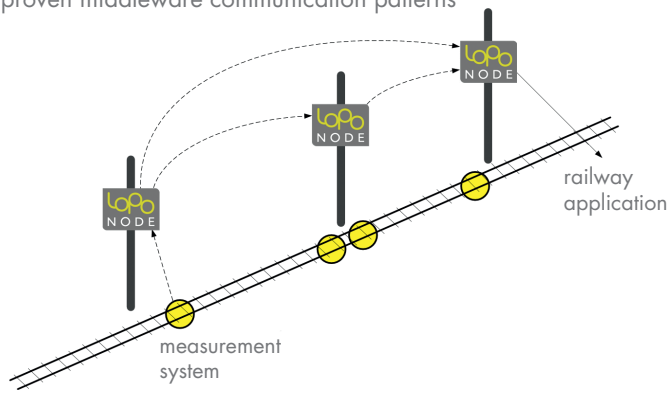
LOW POWER NODE MIDDLEWARE

Secure and Trustworthy Middleware to Substitute Cabling in RAILWAY Applications

www.loponode.org

CHALLENGES

- Low power consumption vs. computational power
- Modular hardware conception
- Energy supply
- Secure communication vs. low energy (sleeping mode scenarios)
- Hacking attacks on the communication channels
- Small sizes of nodes
- Easy to be installed and maintained
- Useable at railway infrastructure and other field installations
- More than pure substitution of cable connection:
  support of advanced and proven middleware communication patterns



SELECTED USE CASES

- Level crossing:
  Notice of train approach and control of further signals
- Pre-arrival advice:
  Information about actual time of arrival of train at terminal
- Track occupancy:
  Checking and reporting the occupancy of railway tracks
- Environmental threat warning:
  Warning about flooding, landslides, avalanches

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GOALS

- Substitution of cables by low-power radio nodes
- Trustworthy information available at all nodes
- Substitutable hardware platforms
- Implementation of embedded, secured „spaces“
- Development of new communication concepts
- Flexible communication channels (lan/wan/radio)
- Distances between nodes should be ca. 1–10 km
- Miniaturization of equipment

APPROACH

- Adaptation of space-based middleware (XVSM) for embedded platforms
- Extension of XVSM middleware by new modules
- Use of very low (zero) power architectures
- Development of alternative energy supplies
- Implementation of radio communication channels based on new concepts
- Analysis of related work (embedded hardware & development frameworks)

BENEFITS

- Avoidance of cabling along the rail side
- Reduction of installation costs
- Dense grid of sensor components possible
- Approved against fraud
- Easy replacement of modules

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computer languages

ÖBB INFRA

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