



Train Connectivity: An integral approach

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Köln, November 7, 2007

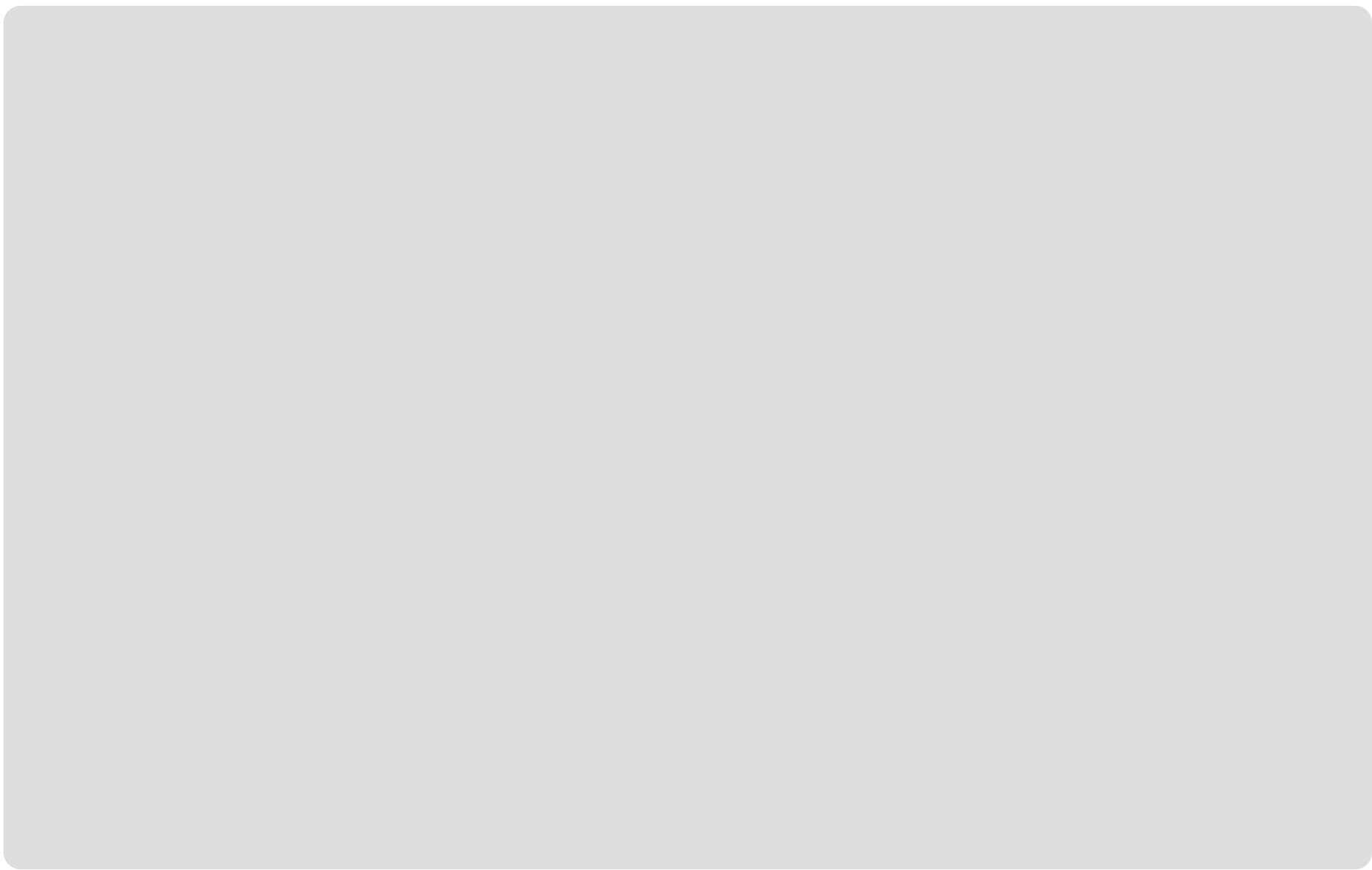
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Introduction to Lloyd's Register Rail Europe

- Used to be part of Dutch Railways, now Lloyd's Register Rail
 - Complete range of services
 - Global presence
 - Safety, functional and business performance of rail systems
- Experience since 1839, Consulting since 1959
- Center of Competence for rail vehicles, Notified Body
- Clients include Dutch Rail, High Speed Alliance, Bombardier
- Complete lifecycle of rolling stock is covered
- ICT enabled rail new focus area



Business rules

- Financially feasible, positive ROI
- Scalable and easy migration to new technology
- Extendable, future-proof, flexible
- Open standards, no vendor lock-in
- Quick roll out: Predictability for customers
- High visibility
- Rolling stock monitoring, CCTV and other internal processes should be facilitated

Typical train context doesn't accommodate this scenario:

- Different lifecycles:
 - Train: 30 – 40 years
 - ICT components: 3 – 5 years
 - ICT services: 6 – 12 months
- Operational standards, safety norms
- Conservatism in the industry
- Not used to design to (business) spec

Services

- Dynamic real-time travel information for passengers
- Internet access in trains
- Entertainment programs
- Extendable for future applications such as intelligent camera surveillance systems and remote train diagnostics



Business case driven design

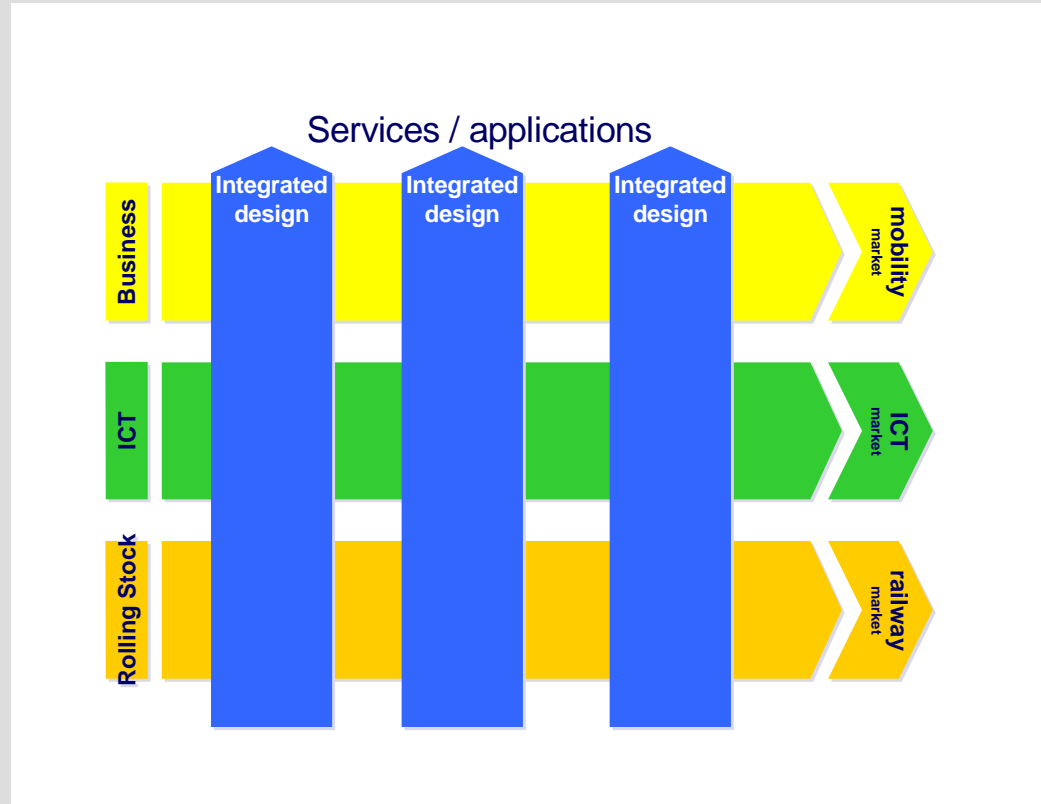
- Lowering break-even point
 - Use of Commercial off the shelf (COTS) equipment where possible
 - Protection for COTS equipment against the train environment must be provided
- Flexibility
 - System must be extendable for future applications
 - Quick exchange of components fulfilling comparable functionality must be possible
 - Modular built functionality and hardware, built for purpose platform
- Operational fit
 - Optimized design for retrofit installation in short time span
 - System is not a primary train system, therefore not all requirements that normally apply to a system in a train are mandatory
 - Interface to trains must comply to all relevant railway standards
 - Remote diagnostics and software upgrade where possible

Working area Lloyd's Register Rail

- Integrating business, ICT and Rolling Stock requirements
- Consultancy: definition, scope, technical implications
- Business casing and negotiating with partners

Technical:

- Interface between COTS ICT equipment and train.
- Ensuring that the train fulfills all train requirements after installation.
- Providing adequate protection for the ICT equipment against the train environment
- Principal design of installation of the housing and cabling in coaches



System in detail

- Total system conforms to all train standards
- Within the system a controlled environment:
 - Clean power, power management, UPS
 - Vibration and shock damping
 - Climate controlled
 - EMC-shielded
- COTS components are used in this controlled environment, giving
 - Flexibility
 - Lower cost
 - Better services
- Nomad Digital connectivity

System housing

HSDPA
PreWimax
TCU

Hotspot & Sensorbox
Powermanager

VGA/UTP

Player/Sync space

Batterypack & UPS



Integrated in interior



Recap

- Keep focus on customer (passenger)
- Short time to market
- Smart trade-off between cost of connectivity and value of functionality
- Maximize impact
- Management buy-in across company, change management
- Integrated design team

Questions?



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