

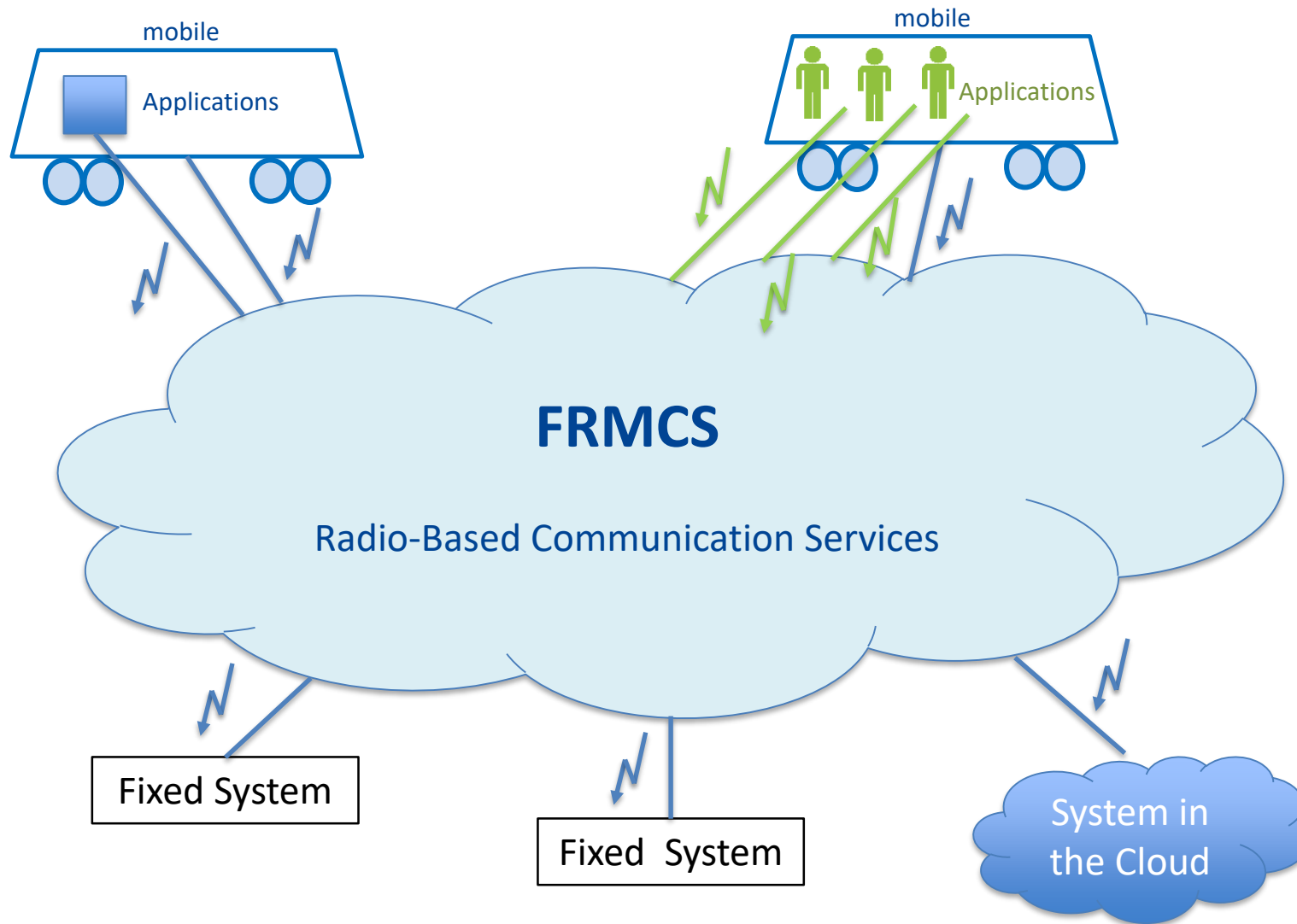
# The ERA View on The Future Rail System

CCRCC 2019, Valenciennes

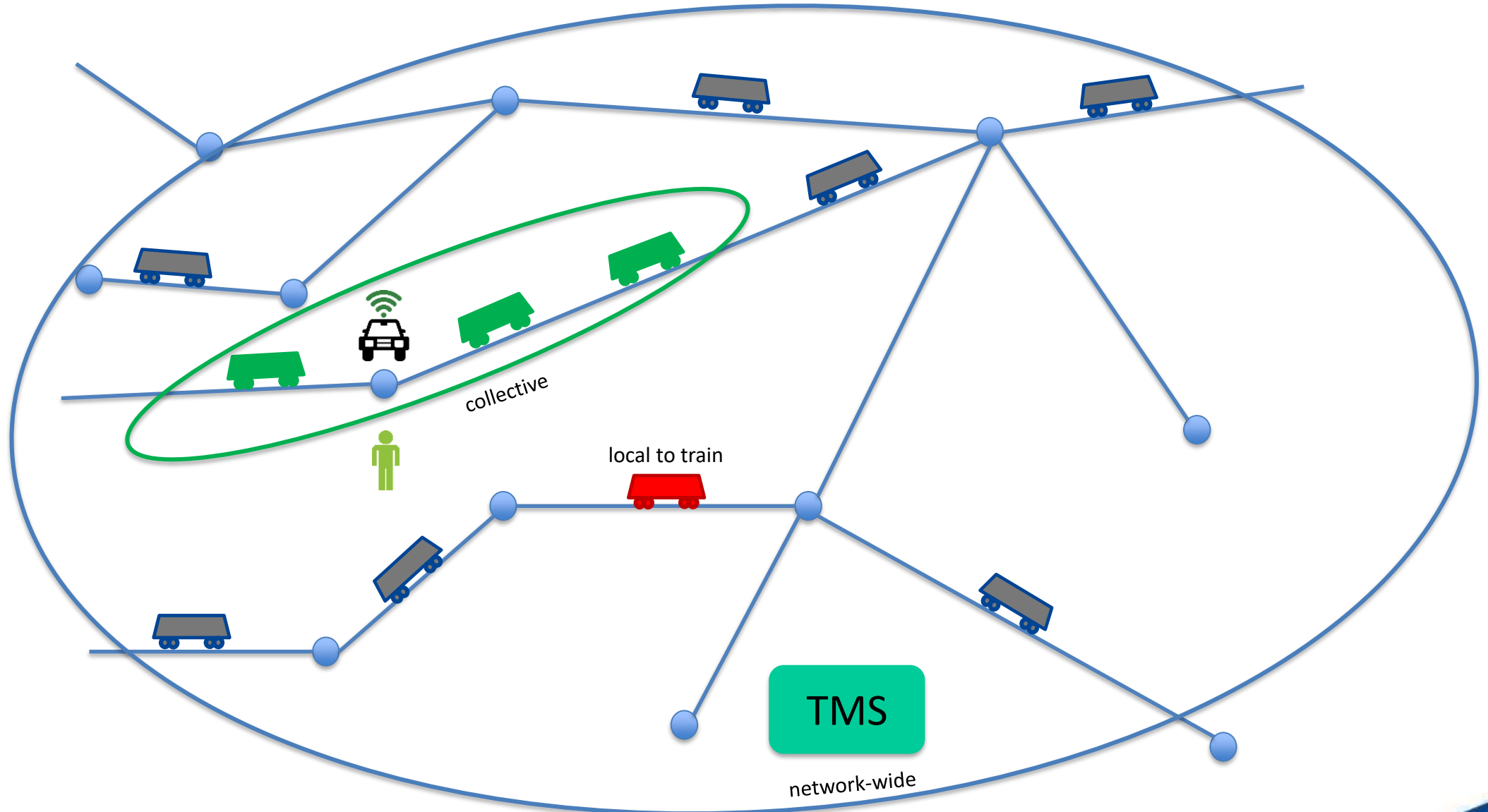
Josef Doppelbauer, Executive Director



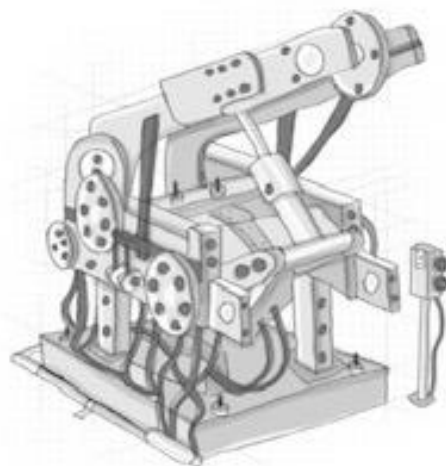
# The Structure of the Future Digital Railways



# The Future of CCS - Loops of Control



From fully customized solutions ...

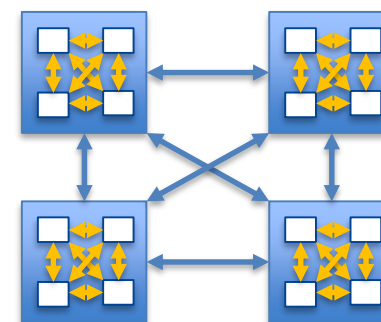


- Starting point is the copy of an old reference machine
- High number of options without clear customer benefit
- Missing defined interfaces lead to high engineering effort
- Firefighting to solve issues on customer sites
- High uncertainty in project scope at contract signing

... to customized yet modularized smart platforms



- New offers are configured using ready-to-use building blocks
- Projects tailored to customer needs with higher margins
- Engineering focuses on innovation, rather than reinventing existing solutions
- Efficient and stable processes based on proven modules
- Basic design 100% clear at contract signing

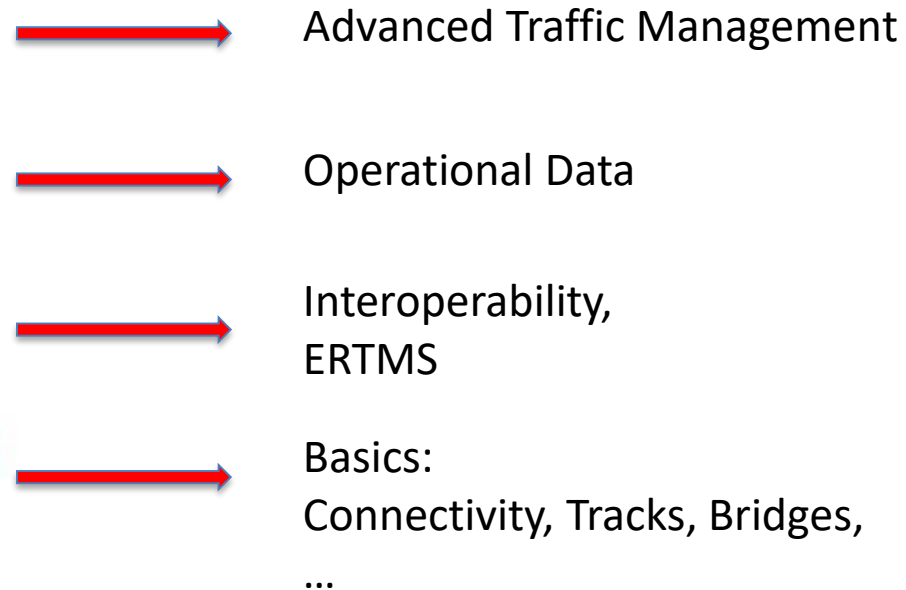


# From "One Size Fits All" to Managed Diversity

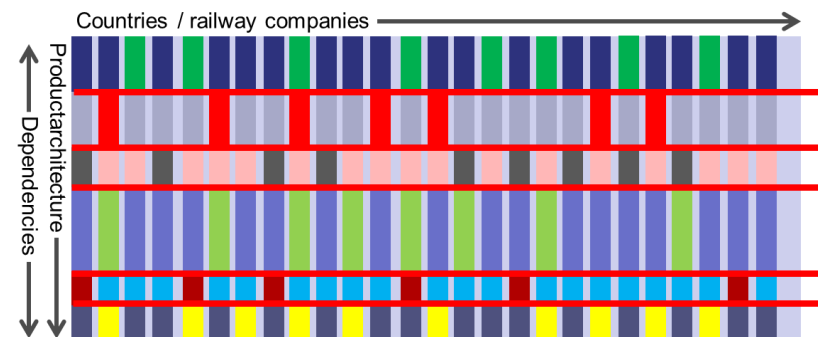
## Maslow's Hierarchy of Needs



## Rail



- Any operator shall be free to select his degree of sophistication
- Consistency of solutions is needed („One European CCS System“)
- The System Authority needs to define and to supervise adequate rules





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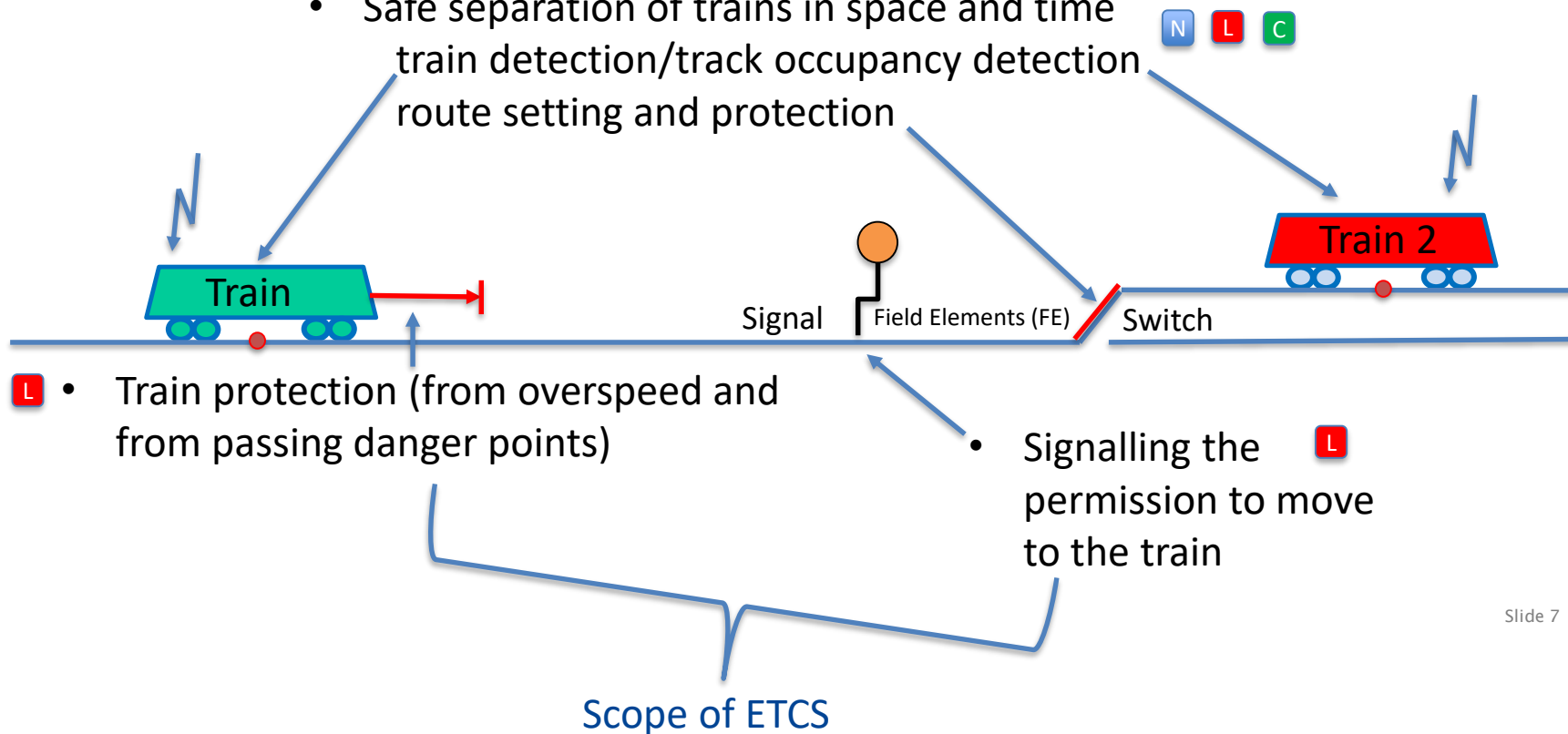
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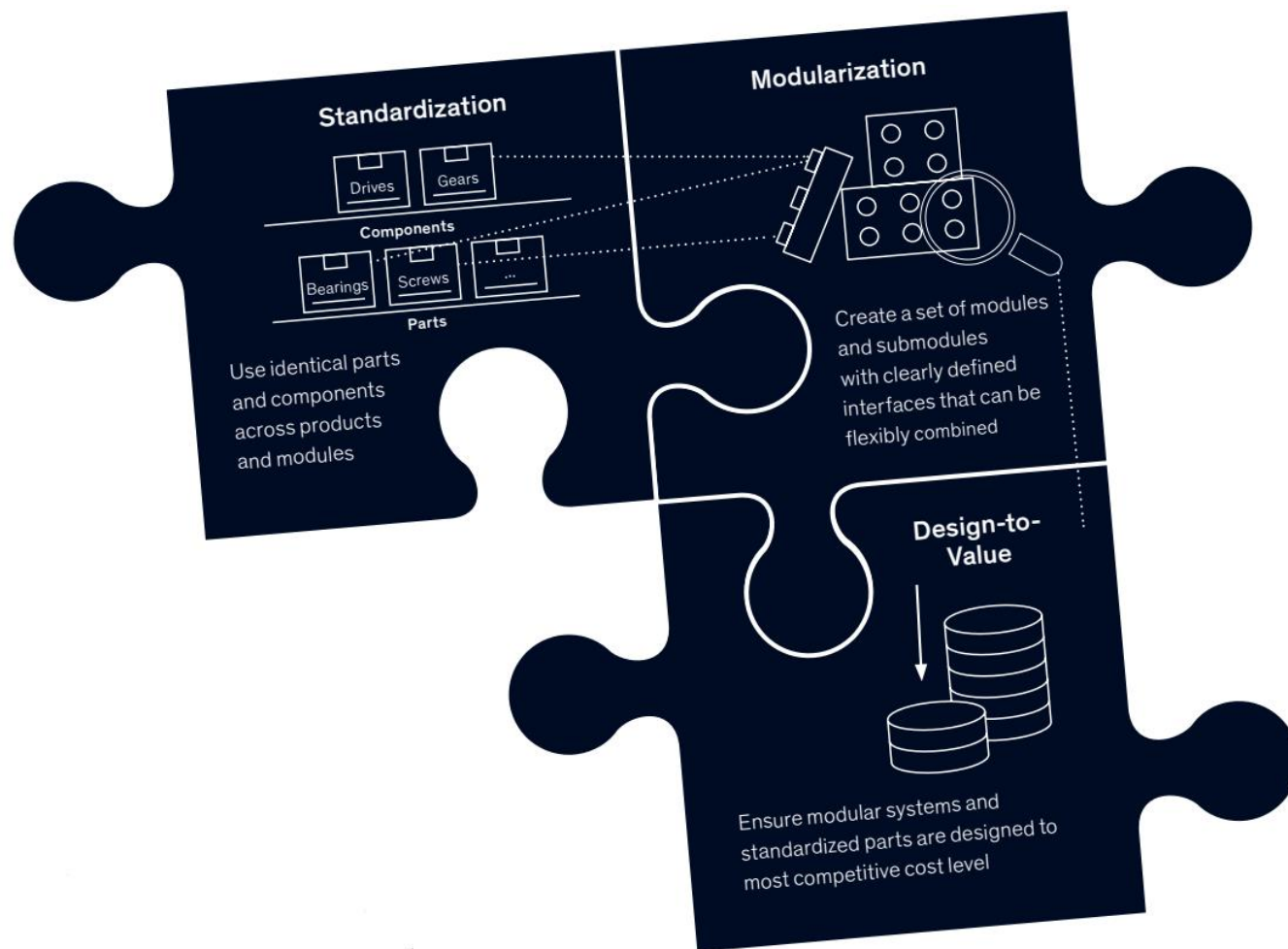


# The Scope of Control Command and Signalling

- Traffic management (TMS) N

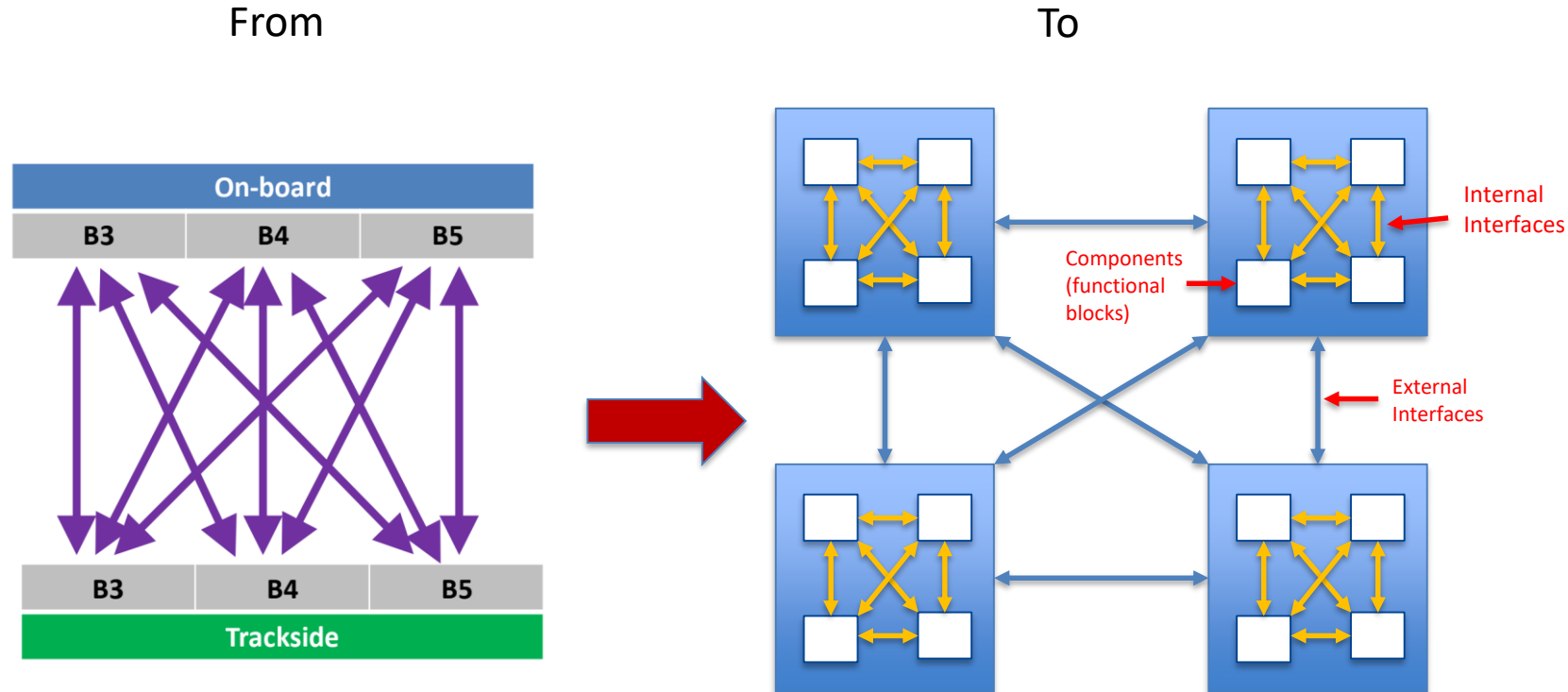
- Safe separation of trains in space and time  
train detection/track occupancy detection  
route setting and protection







# Evolution of the CCS System Framework – Consequences of Modularity in ERTMS



Currently, there is essentially one interface determining compatibility – the airgap

Future: Building-block architecture, modular and upgradable (decomposition in functions/services)  
Loose coupling, flexible message parameters  
Modular safety

