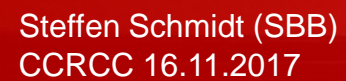
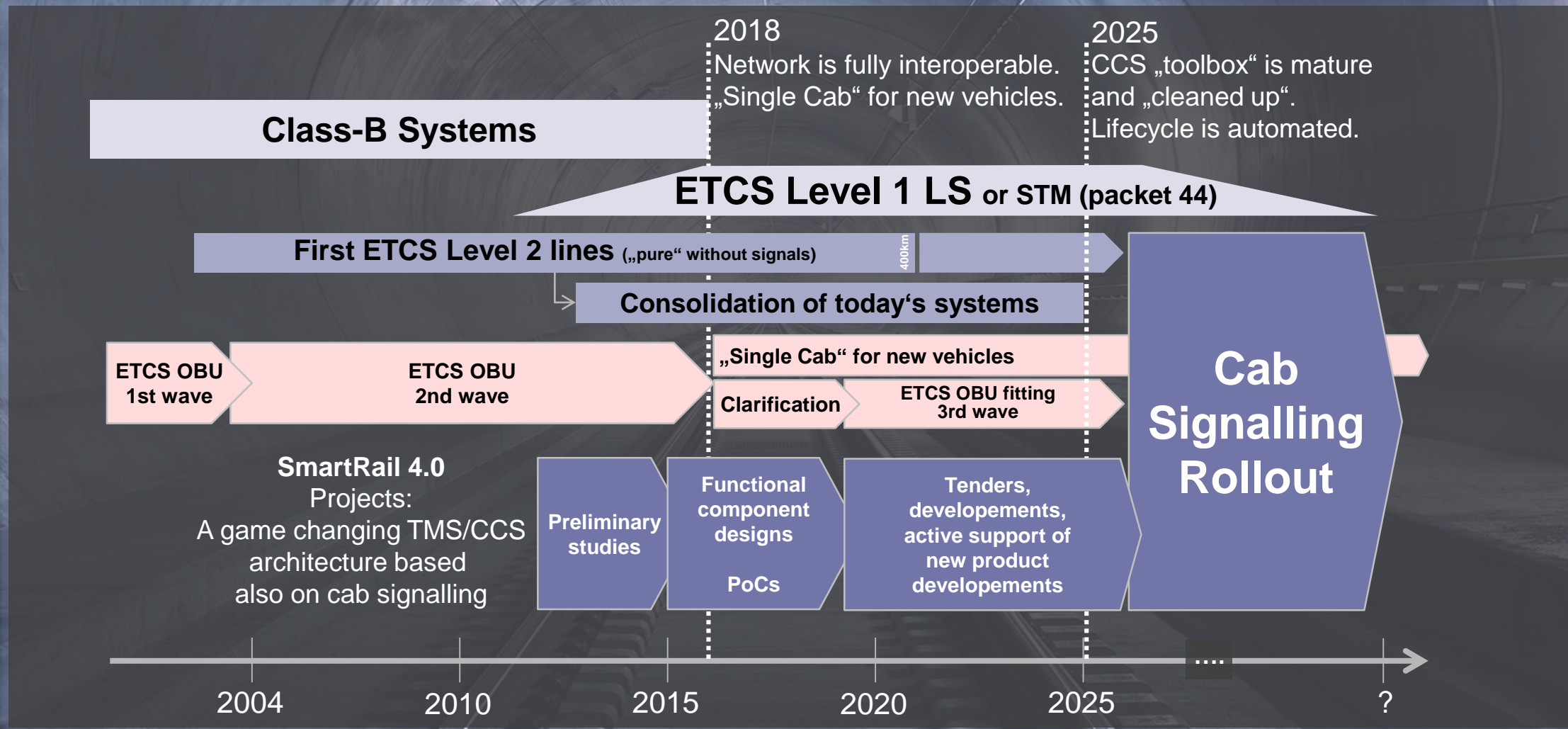


A red rectangular box containing the text "Stepwise approach towards ERTMS deployment." in white, sans-serif font.A red rectangular box containing the text "The swiss strategy." in white, sans-serif font.A red rectangular box containing the text "Steffen Schmidt (SBB) CCRCC 16.11.2017" in white, sans-serif font.

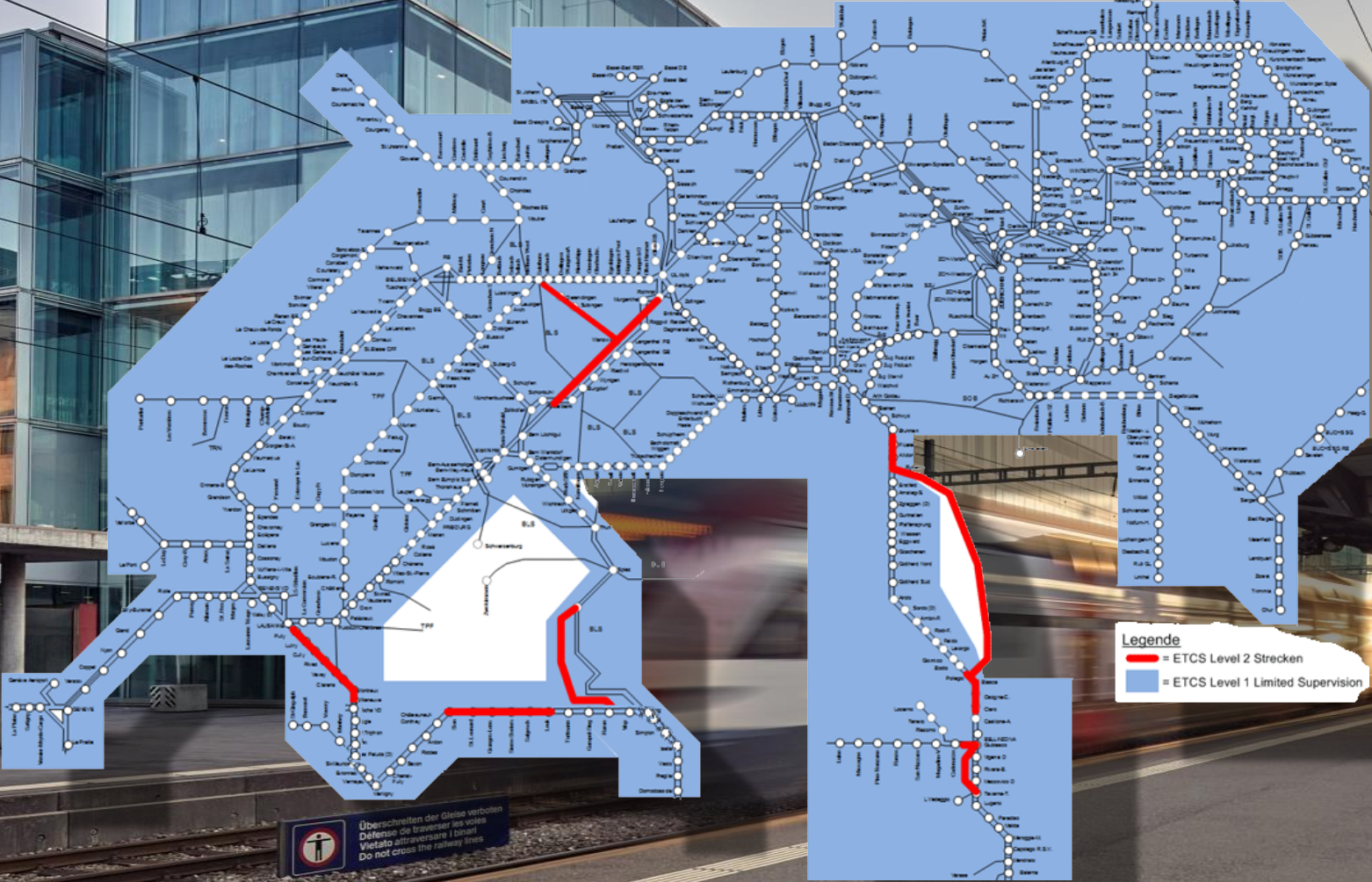


# The stepwise approach to ERTMS





# ERTMS in 2020



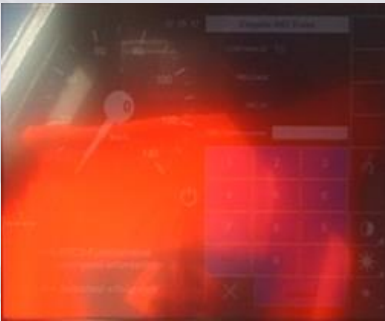
[www.velostation-aarau.ch](http://www.velostation-aarau.ch)

 Überschriften der Gleise verboten  
Defenses de traverser les voies  
Vietato attraversare i binari  
Do not cross the railway lines



# Consolidation - Examples

DMI: bad dearness of display → no safety.  
And new safety requirements multiply the cost.



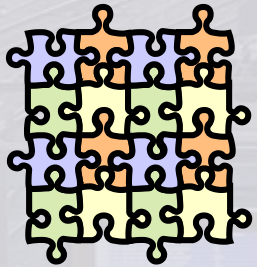
Systematic cryptokey change only when suitable online keymanagement systems are available

Becoming mature means especially being automated.

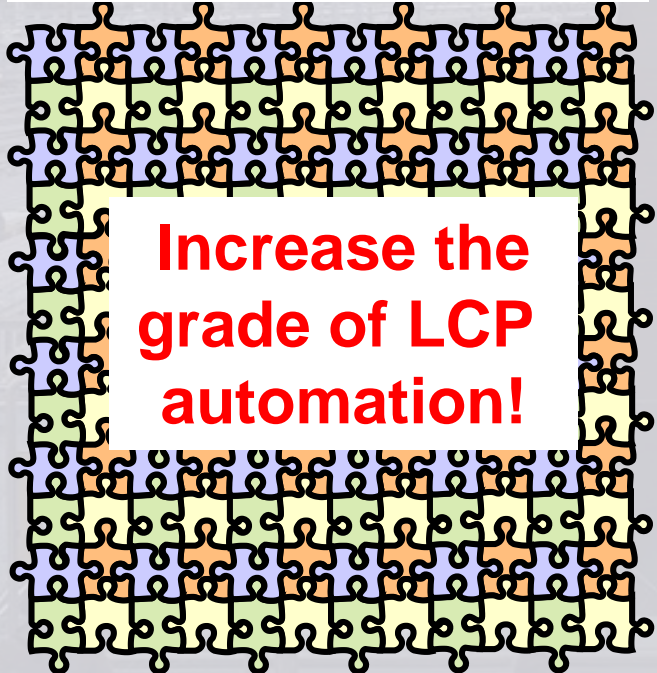
TSI CCS



ERTMS-compatible usable products



Lifecycle processes (LCP)



Increase the grade of LCP automation!



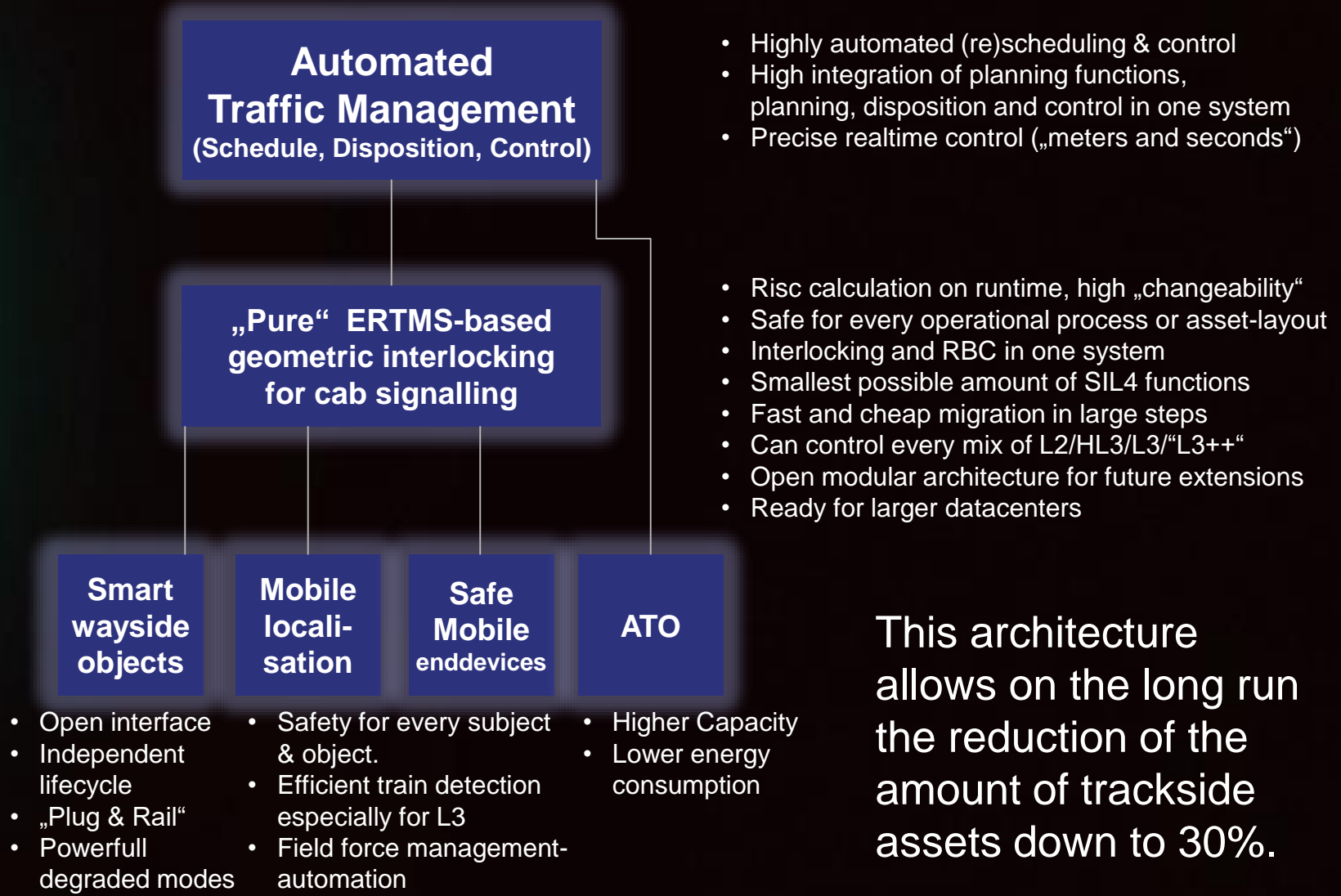
## Clarification of the future onboard architecture (examples)

- **FRMCS**  
(Future Rail Mobile Communication System)
- **TIMS, safe length and train-end-device**  
(Train integrity monitoring systems)
- **Updateability, maintainability, substitutability and exchangeability!**

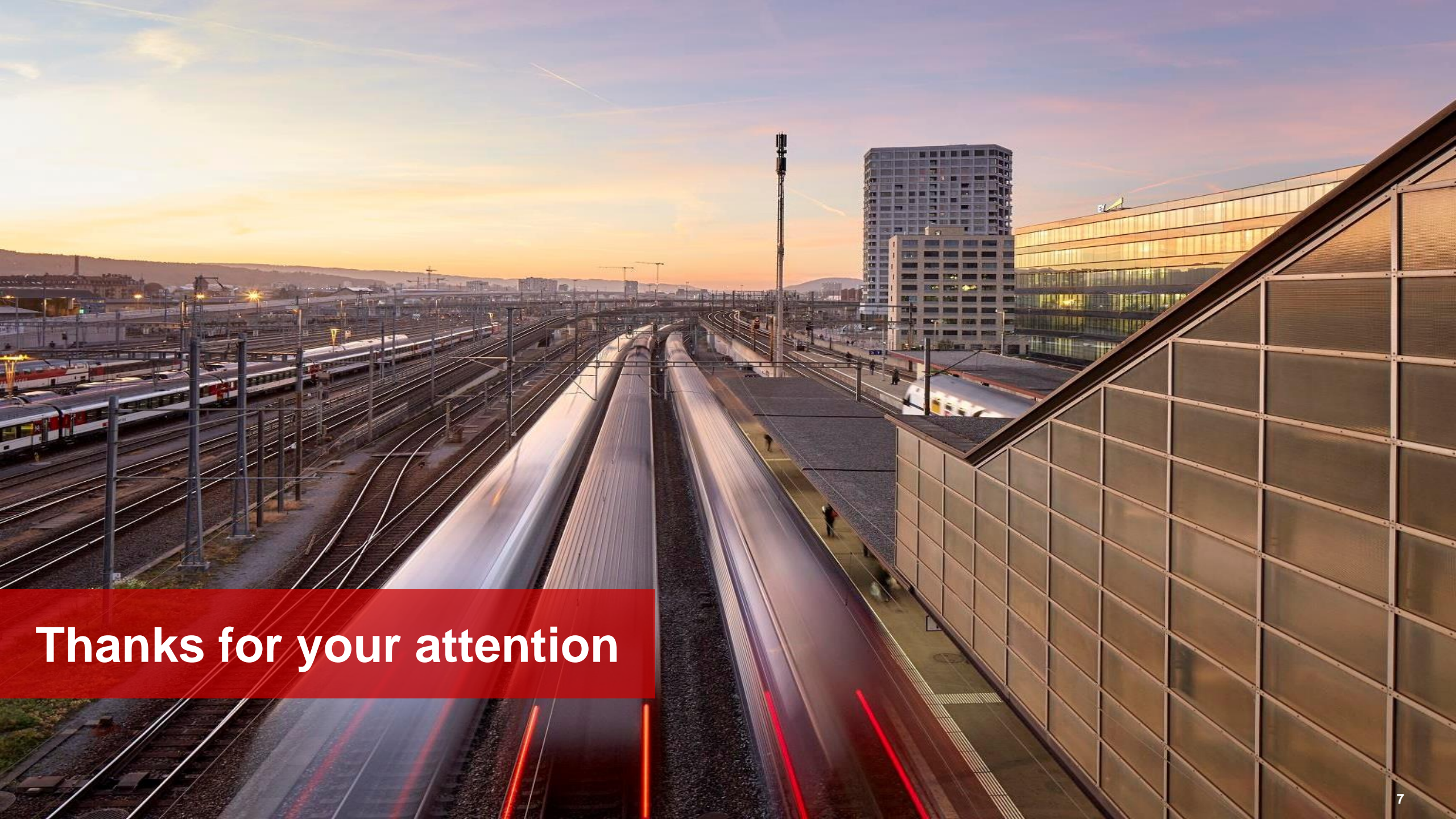


# The Concept of SmartRail 4.0

## A game changing TMS/CCS architecture.







**Thanks for your attention**