

THALES



ETCS – do more with less

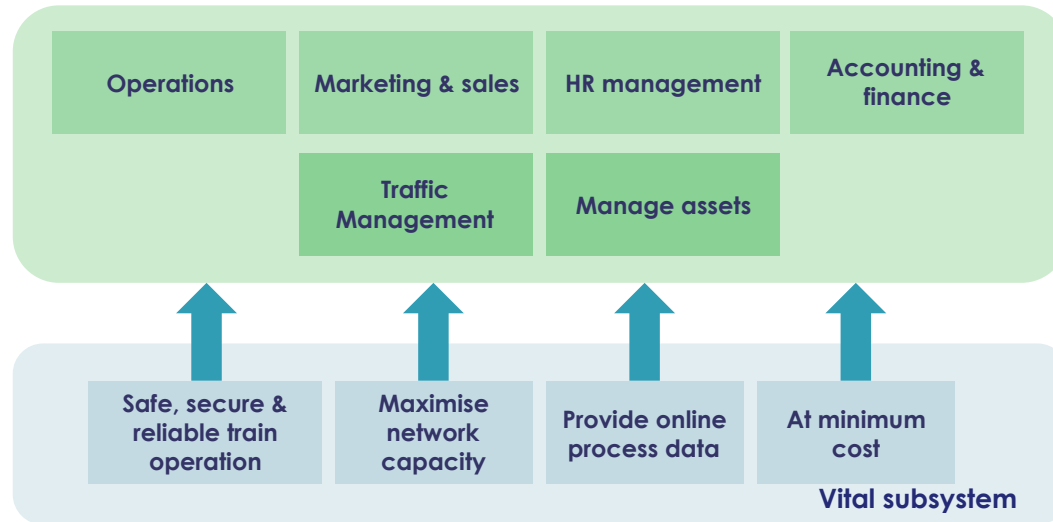
Klaus Mindel



Digital Railways – Vital Train Signalling & Rail Traffic Management



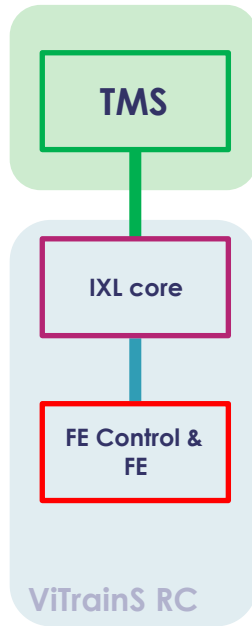
Digital Railway – contribution of vital subsystem



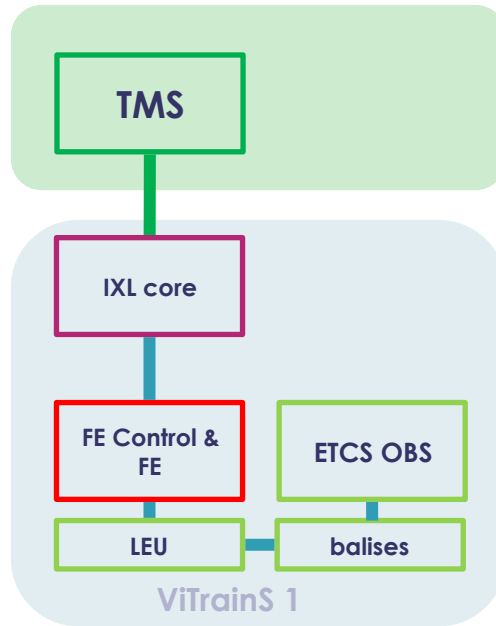
Conclusion:

- Safe, secure, reliable train operation is the fundament
- Network capacity, online process data at minimum cost is the basis for economic success

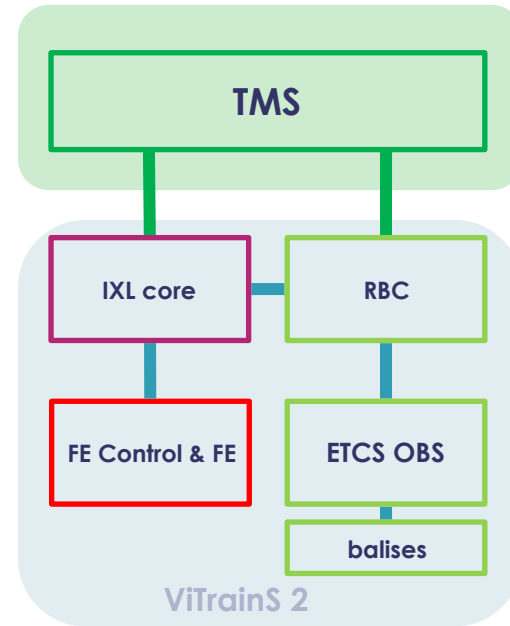
Signalling solutions



- Route control



- Route control
- Continuous train speed supervision (**safety**)



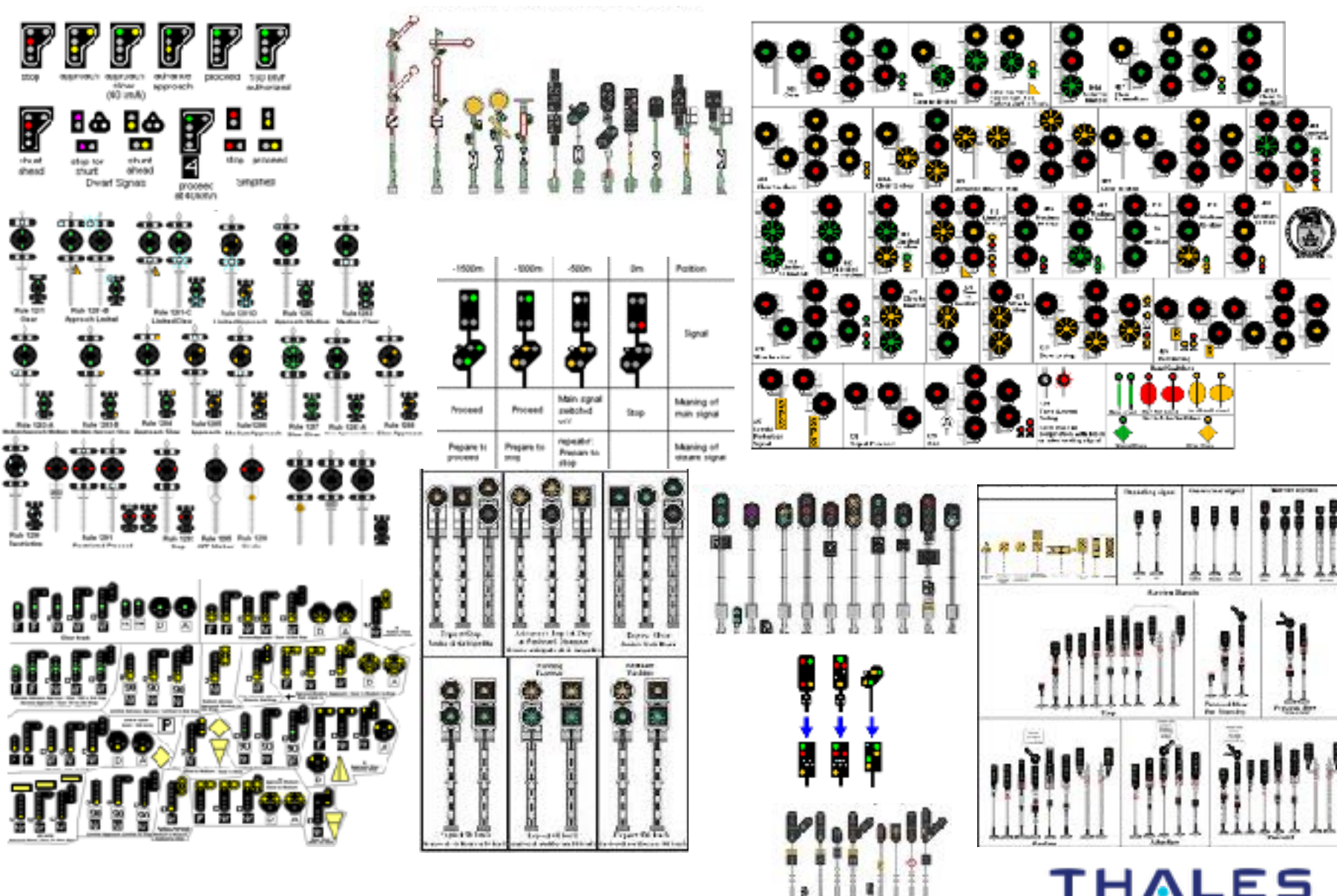
- Route control
- Continuous train speed supervision (**safety**)
- Radio based (**performance**)
- No lineside signals (**LCC, performance**)

Conclusion:

- Stepwise increasing performance with reduced LCC

Lineside signals – a reflection of railway signalling history

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ETCS DMI – one for all

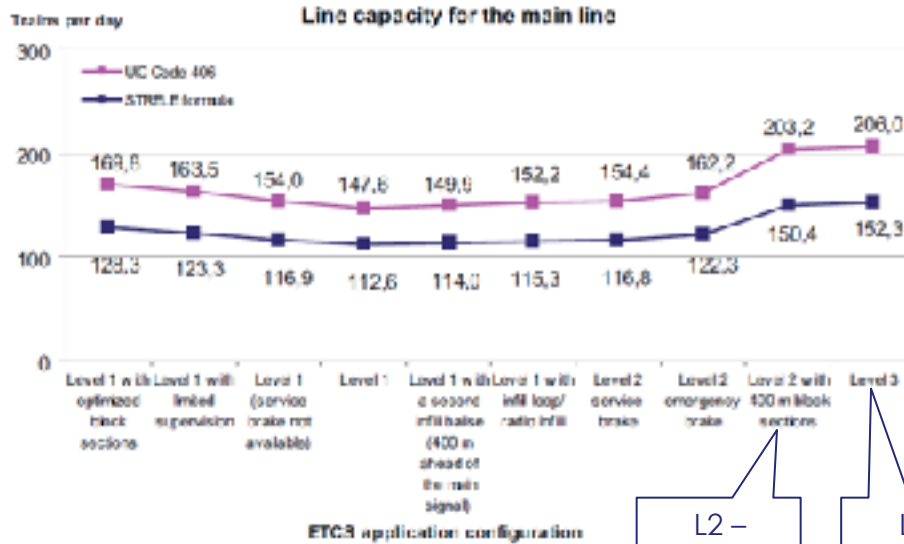


Experience:

- Increased availability without lineside signals

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Line capacity with ETCS L2 and L3



L2 – „short“ block

L3 - Moving block

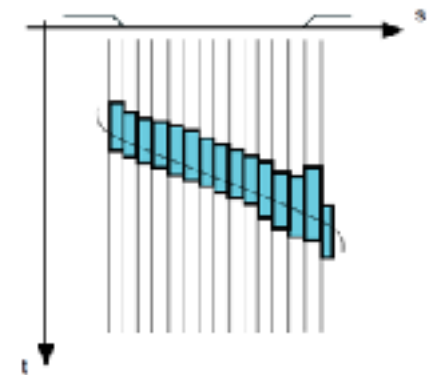


Fig. 7: Graduated blocking-time band

L3 – moving block approximated by 50 m sections

Conclusion:

- Line capacity increased by ETCS L2 and ETCS L3

Source: „Influence of ETCS on line capacity“; Verkehrswissenschaftliches Institut der RWTH Aachen, on behalf of UIC; 2008

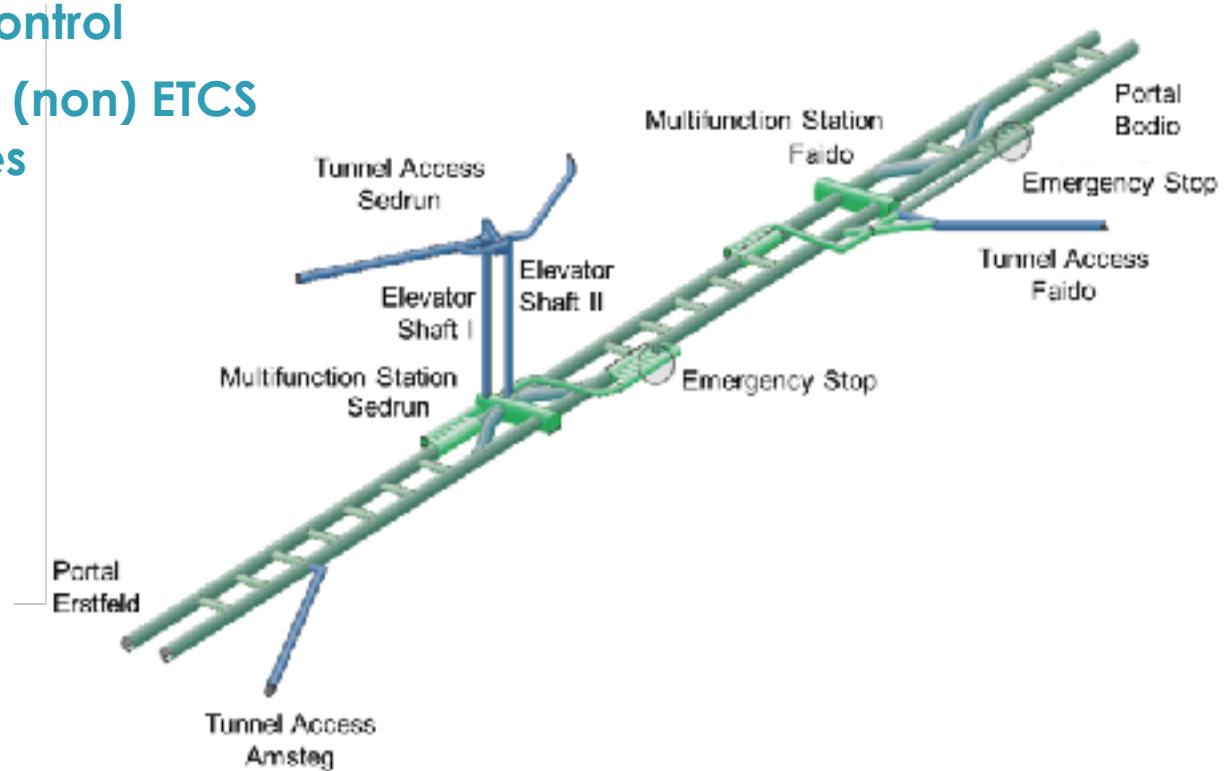
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Improved operation – examples from Thales projects (1)

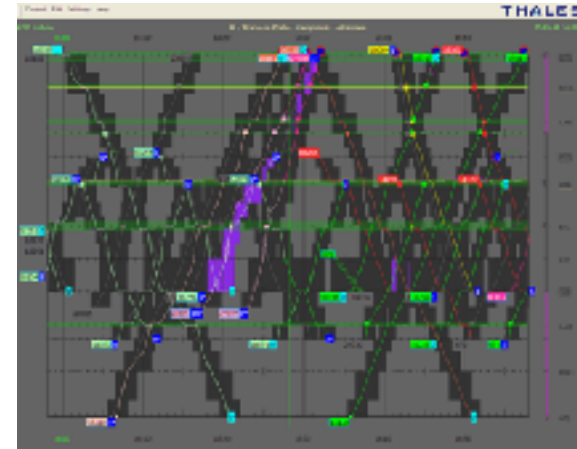
Some special features

- Automated tunnel evacuation procedures
- Mobile terminal for local operation control
- Control access of (non) ETCS equipped vehicles

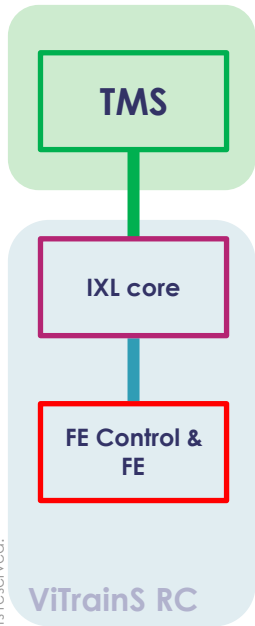


Improved operation – examples from Thales projects (2)

- Time table regulation
- Dispositive speed control to
 - Increase capacity
 - Save energy

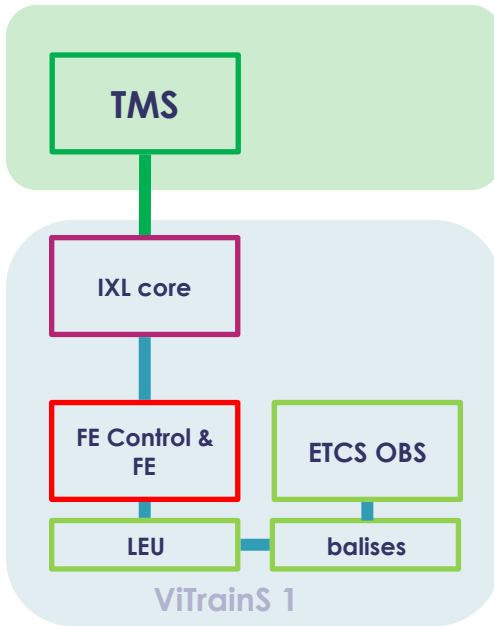


Signalling solutions - complemented



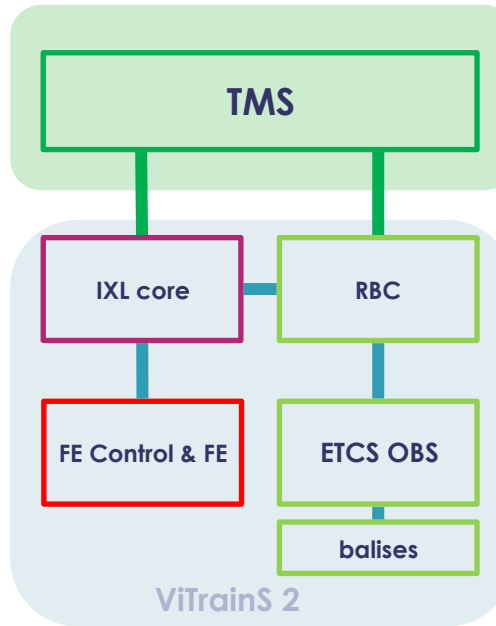
ViTrainS RC

Route control



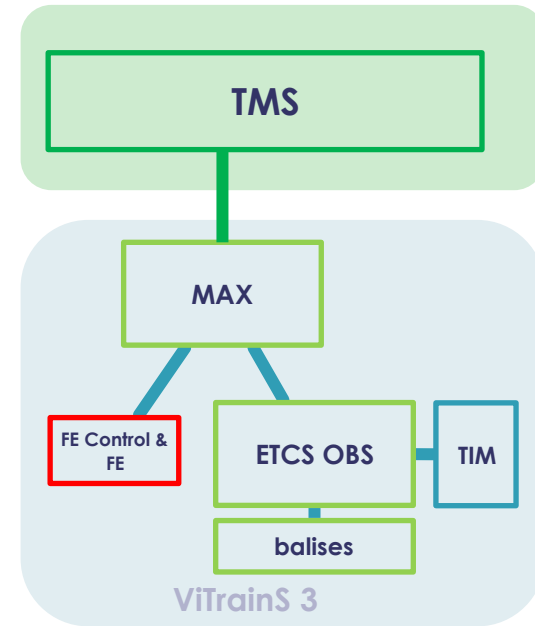
ViTrainS 1

- Route control
- Continuous train speed supervision (**safety**)



ViTrainS 2

- Route control
- Continuous train speed supervision (**safety**)
- Radio based (**performance**)
- No lineside signals (**LCC, performance**)



ViTrainS 3

- Field element control
- Continuous train speed supervision (**safety**)
- Radio based (**performance**)
- No lineside signals (**LCC, performance**)
- No trackside train detection (**LCC, performance**)
- On-board train integrity (**LCC**)

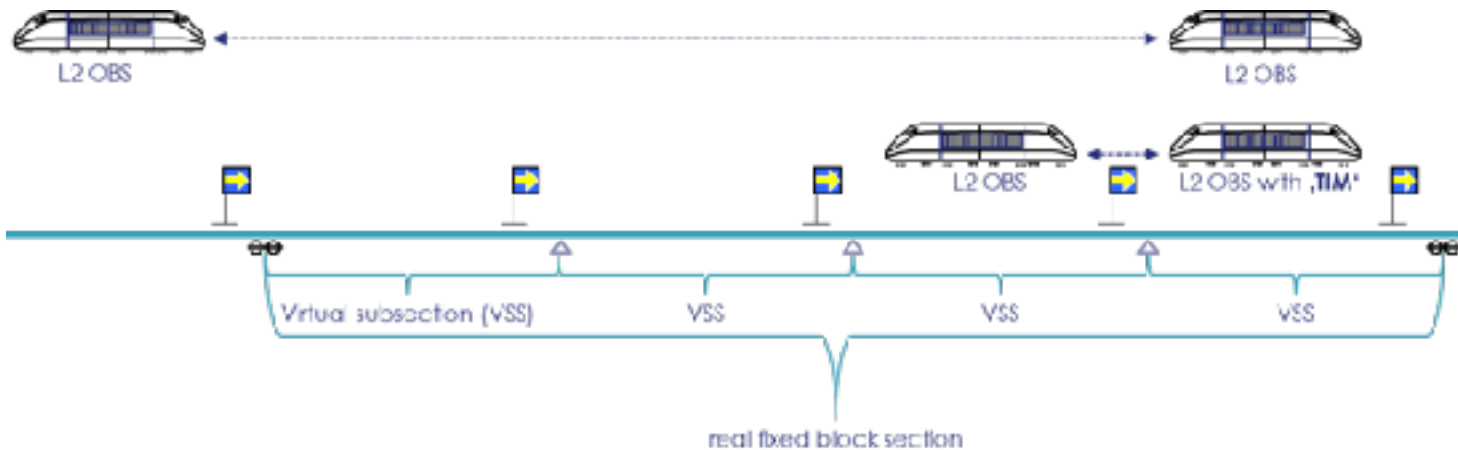
Conclusion:

- Further performance increase with reduced trackside LCC

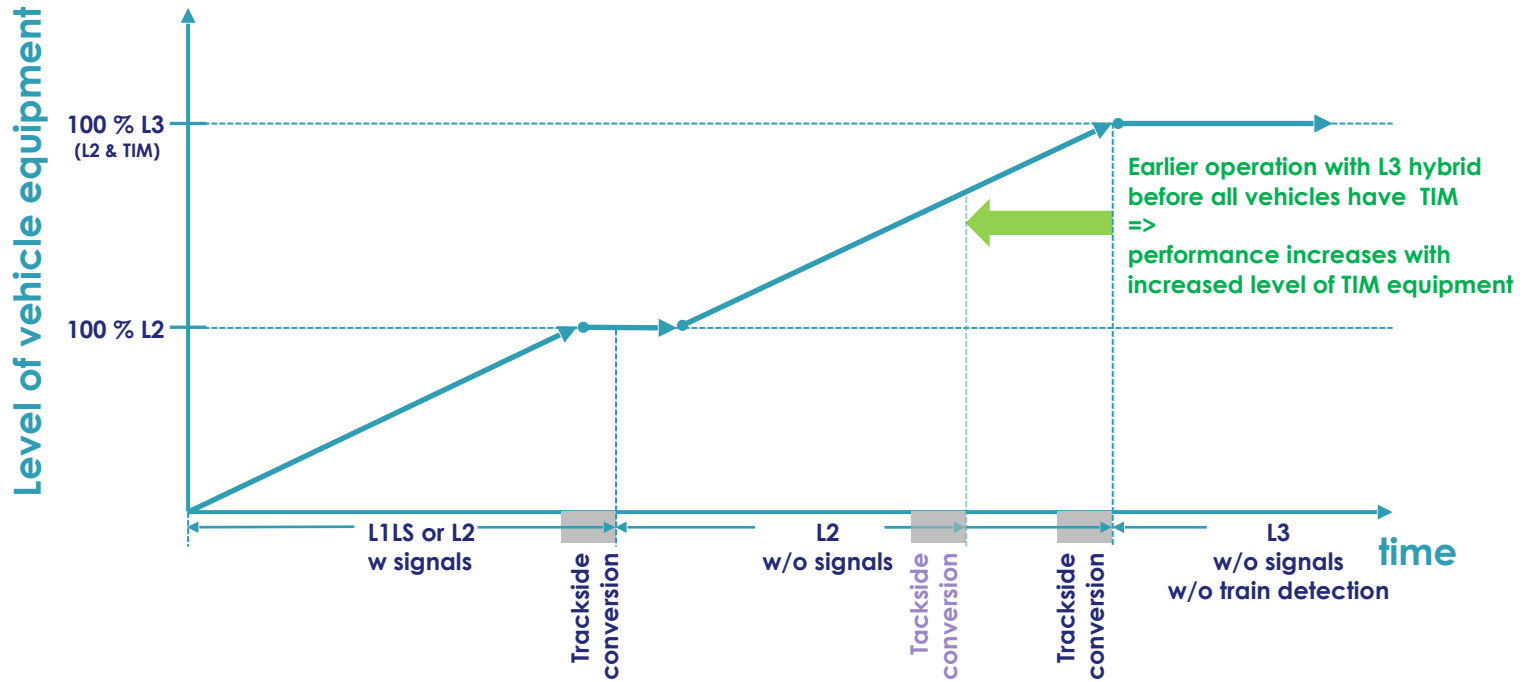
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Essential enablers for concerned network:

- ETCS L2 onboard rolled-out on concerned network
- Safe train integrity and safe train length handling applied for a significant part of fleet
- Ability to adapt the route control system to “Virtual subsections” (L3 hybrid)



Migration of trackside and on-board – brownfield applications



Recommendation:

- All trains with ETCS OBS
 - Trackside without signals
- Before** introducing L3 trackside



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DO MORE Higher capacity for more trains
Ready for digital rail services

WITH LESS Lower LCC by reduced outdoor
Lower migration cost