EMEA

RAIL INTEGRATION Workshop

11 October 2019

Agenda

0930 – 0950 Introduction

0950 – 1020 Background Presentations

1020 – 1040 Problem Definition

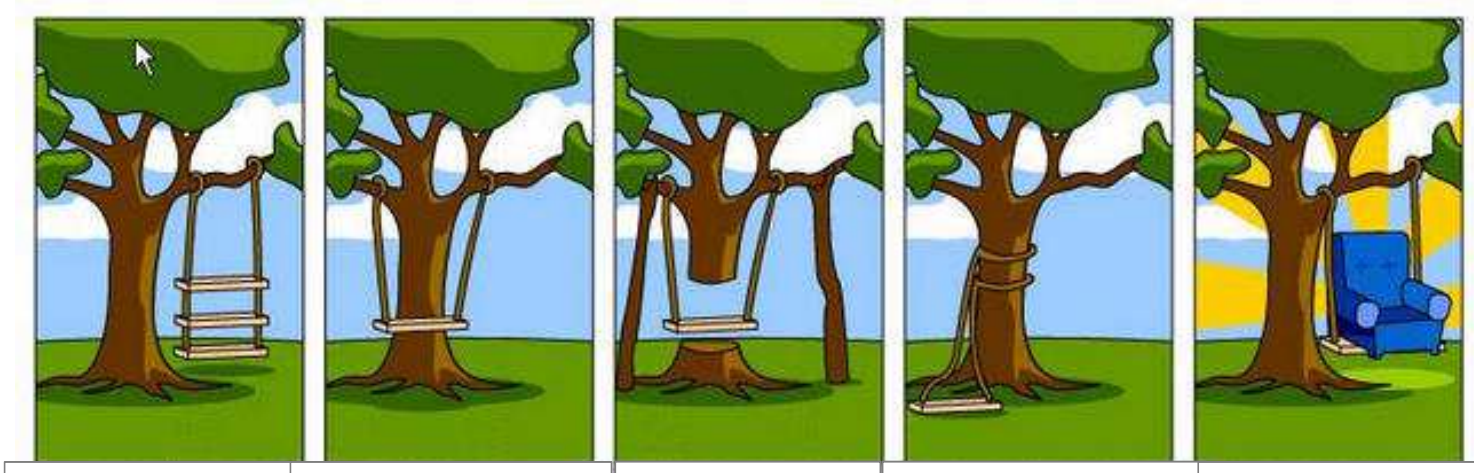
1040 – 1110 Small Group Sessions

1110 – 1145 Group Presentations

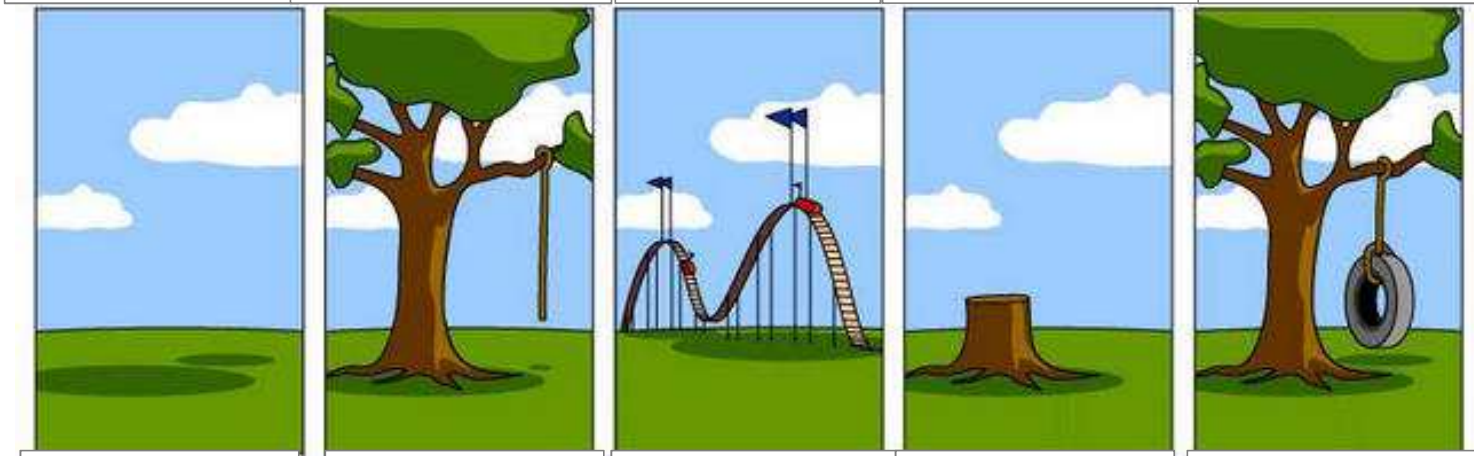
1145 – 1200 Summary

Introduction (0930 – 0950)

Why this is important!



How the customer explained it	How the Project Leader understood it	How the Analyst designed it	How the Programmer wrote it	How the Business Consultant described it



How the project was documented	What operations were installed	How the customer was billed	How it was supported	What the customer really wanted

Introduction

- **Purpose: Conduct a Rail Integration Workshop to:**
  - Provide unity and cooperation amongst the participants – Key to any integration work!
  - Inform the Dutch Railways and other metropolitan railways on new ideas
  - Define and Develop a reusable Generic System Integration Framework
  - Have Fun!

Introduction

- **Administrative items**
  - Emergency Exits
  - Feedback and Comments
  - Facilitator Comments

Introduction

- **What we will be doing:**
  - Meet and Greet – Meet someone new and say “hi” ☺
  - Insights and Trends (Mike and Jan)
  - Shaping the Workshop – Your inputs and ideas
  - Small Group discussions
  - Group Presentations
  - Summary

Mike Morua – My Journey

- **Born in California (San Francisco Bay Area) 1959**
- **Grandparents worked for the railroad – They came from Mexico in the 1920s**
- **Saw the beginning of BART (Bay Area Rapid Transit) in 1970s**
- **Graduated High School 1978, University of California, Berkeley 1982 BS EECS**

- **US Naval Officer – 1982 to 2002, lived in Norfolk, VA, served on 2 aircraft carriers, 2 cruisers, 1 frigate, taught at US Naval Academy, MSEE from Naval Post Graduate School**
- **Boeing Employee – 2002 to 2006, worked as Systems Engineer on F/A-22 and US Army's Future Combat System**
- **Atkins Employee – 2007 to 2014, Moved to the UK, worked as Systems Engineer for MoD projects and London Underground, Thameslink and RAILCORP (Australia) rail projects**
- **Frazer Nash Employee – 2014 to Present, worked on UK Digital Rail Programme, MoD projects, Digitalisation projects for HM Govt and Nuclear infrastructure management projects**

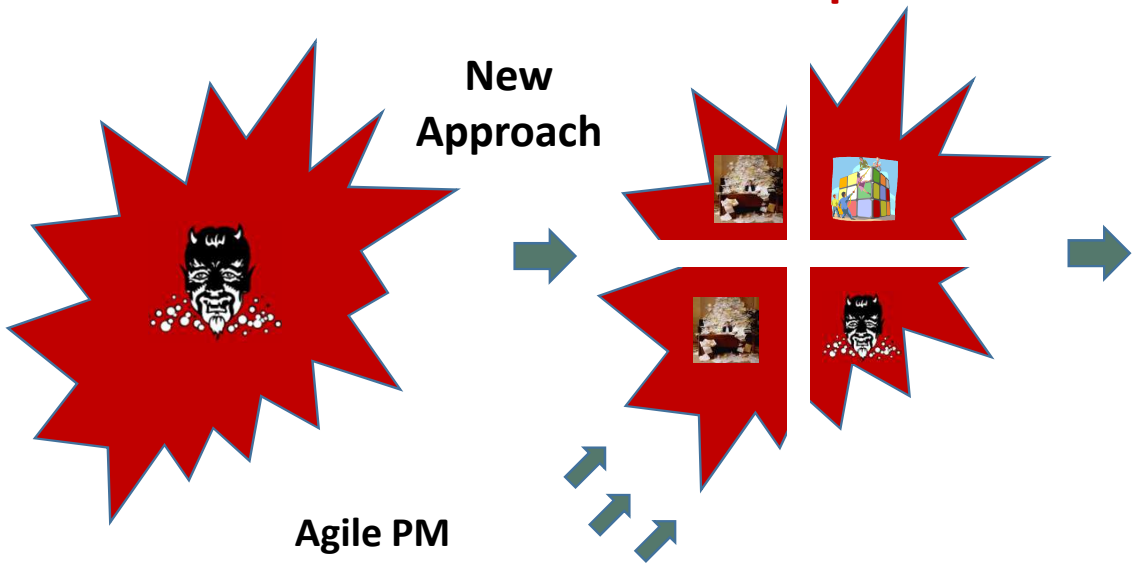
I am still on my Journey!

Framework: Decision Making & Governance

Use combined
Programme Management, Enterprise Arch, Sys Eng Methods

The Wicked Problem

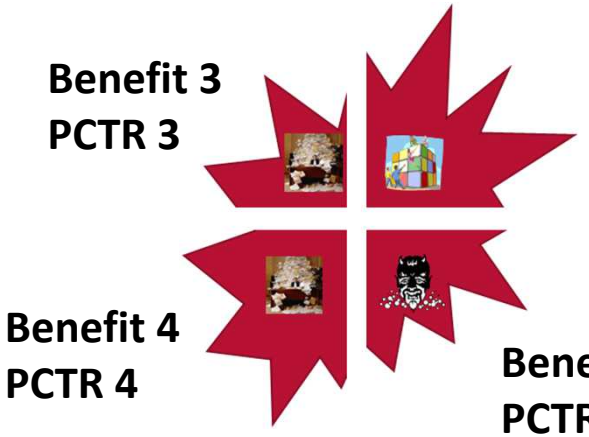
Break up problem into smaller problems



New Approach

Agile PM
Open Architectures
Incremental and Evolutionary Development
Time Phasing

Benefits Realisation



Benefit 1
PCTR 1

Benefit 3
PCTR 3

Benefit 4
PCTR 4

Benefit 2
PCTR 2

Performance (P)

Cost (C)

Time (T)

Risk (R)

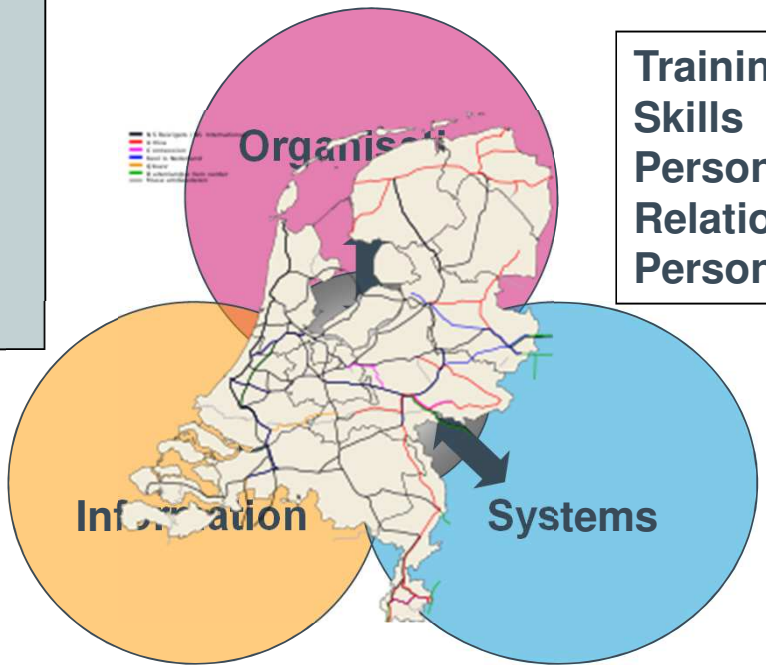
Framework: Use of Architecture

Operational Scenarios

- Passenger Service
- Train Control Operations
- Logistics & Maintenance
- Training
- Planning
- …

- Operating Processes
- Organisational Structure
- Policies

All Capability consists of a combination of:
- People
- Organisation
- Technology
- Information



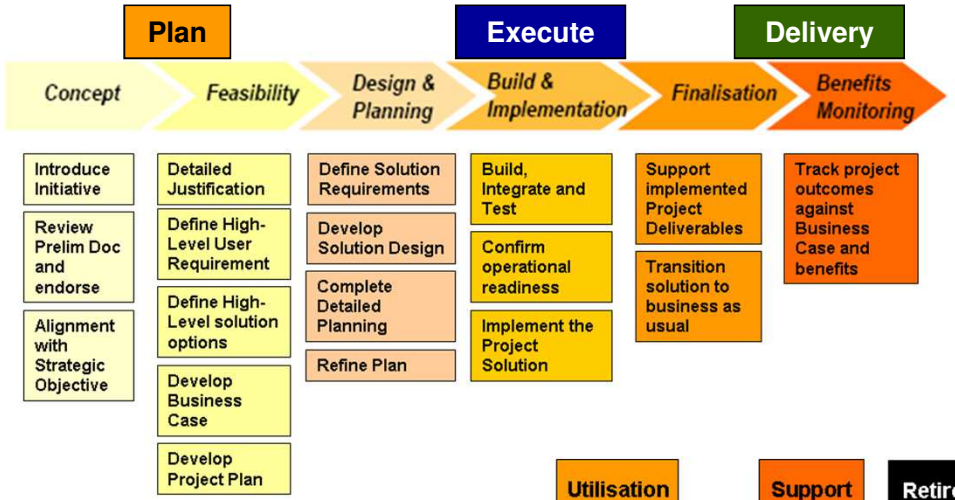
Training
Skills
Personal
Relationships
Personalities

- Networks and Communications
- Data

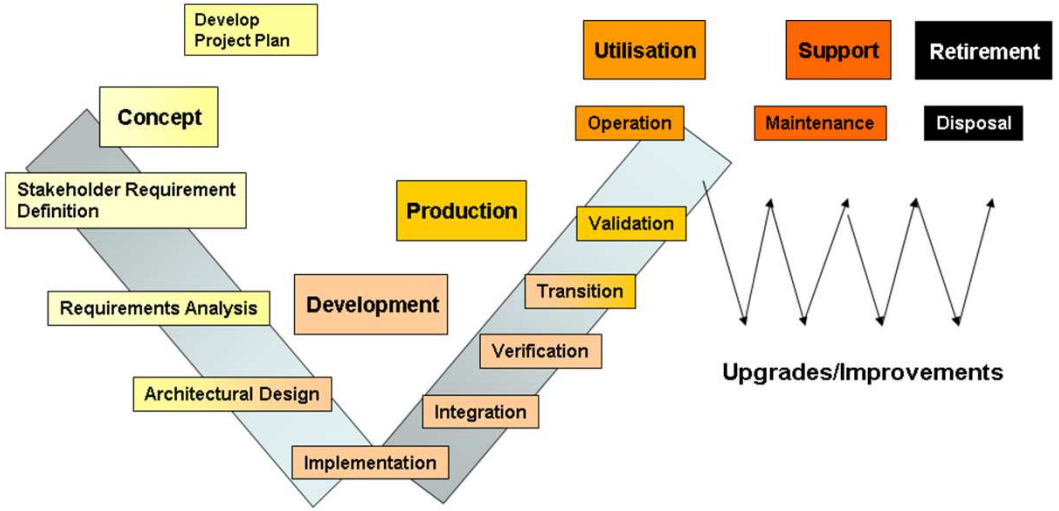
- Trackside Infrastructure
- Train
- Train Control
- Training systems
- Other Infrastructure

Framework: Align Lifecycles

Project Lifecycle

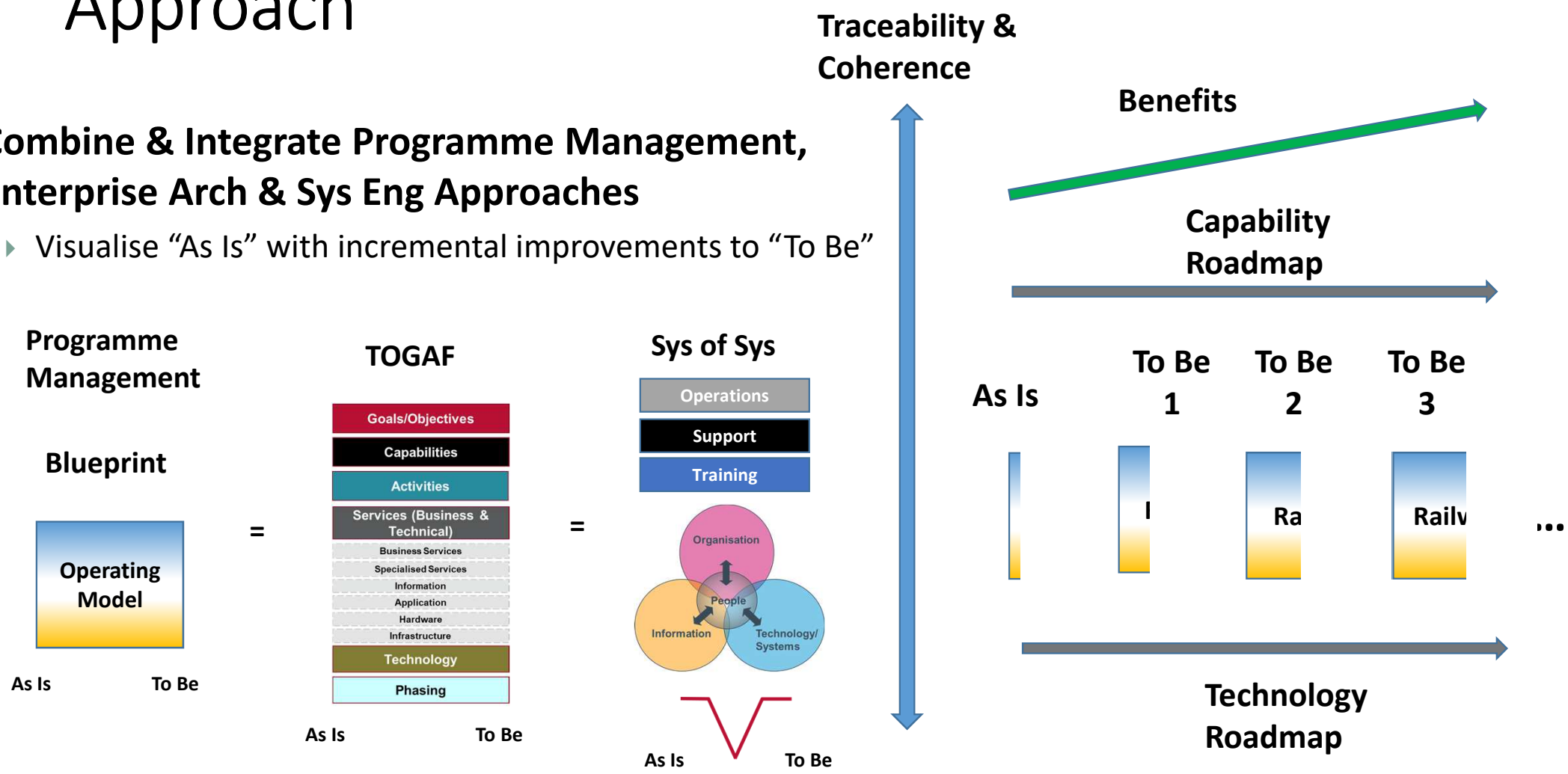


Technical Lifecycle



Framework: Multi-disciplinary & Incremental Approach

- **Combine & Integrate Programme Management, Enterprise Arch & Sys Eng Approaches**
  - Visualise “As Is” with incremental improvements to “To Be”



Generic System Integration Framework

- **Need to include:**
  - Decision Making and Governance
  - Architecture
  - Alignment
  - Migration Strategy (Capability and Technology)

- **The Framework represents an agreed way to proceed and deliver**

- **Bring Order out of Chaos!**

Jan Verbeek– background

- **Born in Haaften, the Netherlands in 1959**
- **Studied at TU Delft - Aerospace Engineering**
- **Started at Fokker Aircraft in 1985**
  - **Final assembly operations at start of series production F50 and F100;**
  - **Combining design for assembly with industrial engineering to reduce lead times, manhours and “go down the learning curve”**
  - **Participated in the introduction of Systems Engineering at Fokker to achieve First time right developments including concurrent engineering and complex supply chain alignment**
- **One of founding partners of ADSE consulting and engineering in 1996**
  - **Responsible for aerospace business, industrial engineering consultancy, knowledge management**
  - **Worked a.o. for Bombardier Aerospace, Airbus, NS/Nedtrain, Damen Shipbuilding and many others**
  - **Technical project manager for NS to introduce Stadler Flirt sprinter trains in a fast track approach**
  - **Consultant to introduce/improve SE practices at NS in rolling stock modernisation and acquisition programs**
- **Part time lecturer TU Delft – Production and Life Cycle Analysis – 1998-now**

Still learning what SE is all about!

Insights & Trends

- Rail transportation systems have been developed over many years
  - These developments have lead to a highly complex systems, from state of the art to long living legacy
  - Rolling stock fleets and infrastructure designed for 40-50 years – not easy to change
  - In general, public transport services performs pretty well, but can always be improved
  - Competition from other transport modalities is high
- Society however expect even more from us
  - Higher demand, higher frequencies, new services (MaaS)
  - Shorter time to market of innovations (as set by mobile devices market)
  - No disturbance when implementing new services, new rolling stock and new/modified infrastructure,
  - New or changed systems have to work right the first time out of the box
- Boundary conditions
  - Industry is still scattered by local standards and policies, notwithstanding efforts to standardise
  - Developments can be characterised as large scale (system of systems) and a mix of brownfield/greenfield
  - Decision making in the public domain / many stakeholders, creating an additional challenge

Introduction

- Questions?

Background Presentations (0950 – 1020)

Meet and Greet

- Please take 30 second to meet the and greet the people around you.

- Please introduce yourself and state:
  - Name
  - Company/organisation
  - What they want out of this
  - What you would change about Rail Sys Integration?

- Write on Post-it note provide (will post on the boards)

Background Presentations

- Discussion on Dutch Railway and Transit network
  - Key issues, layout, goals, challenges, etc.

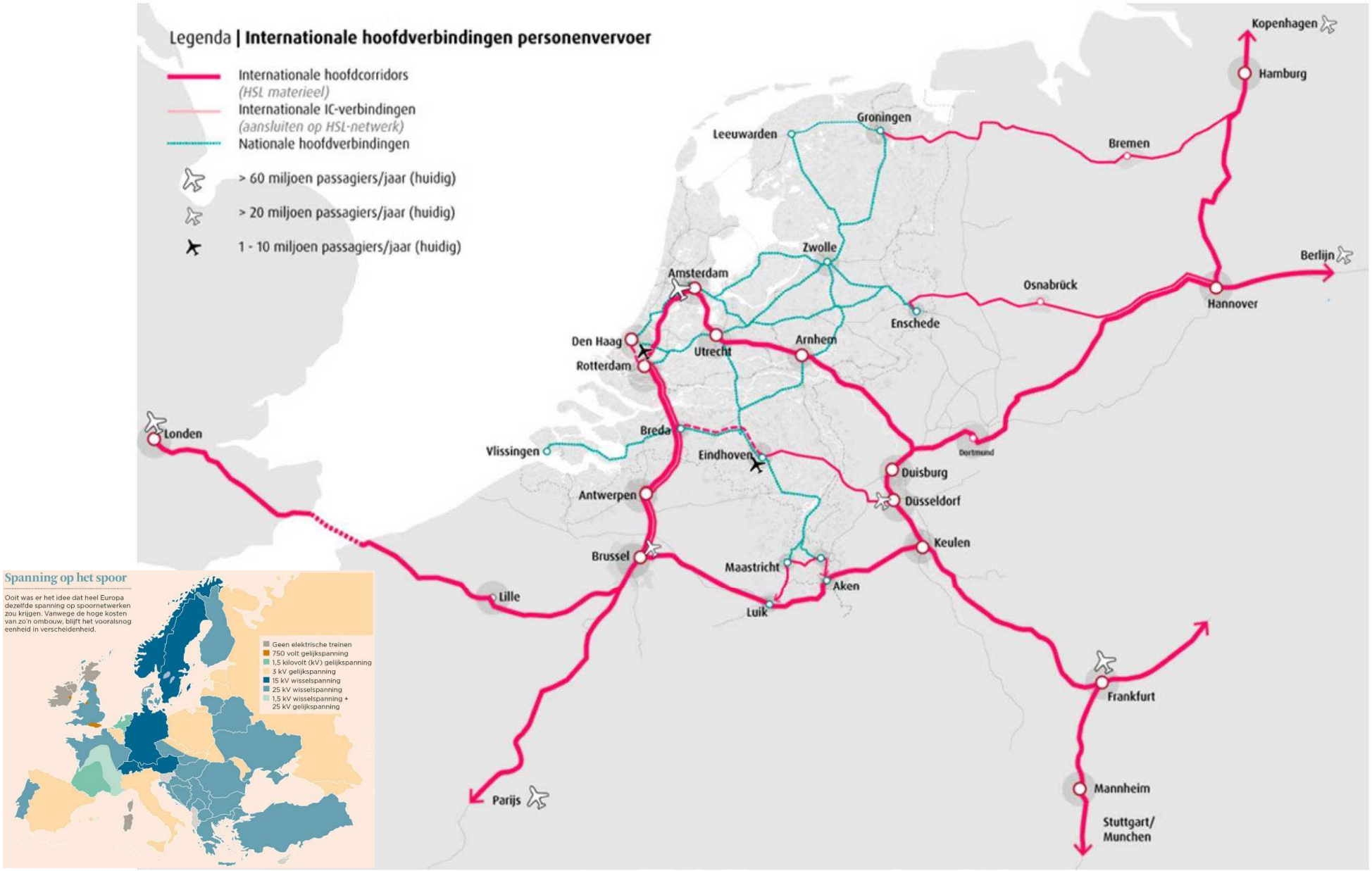
  - Focus for the workshop:
    - Connecting key urban, suburban and rural areas and links to our countries
      - Time, Distance, Frequency of services, Potential revenue opportunities

    - Physical layout that includes geography and signalling, electrical power interfaces and changes in standards, and station platform size and configurations and

    - Stakeholder map needed to address collaboration and organisational boundaries for different transit authorities, suppliers and operators.


Spoorkaart 2019


Eemshaven
Delfzijl
Weener (D)
Harlingen Haven
Leeuwarden
Sauwerd
Groningen
Veendam
Den Helder
Stavoren
Emmen
Enkhuizen
Heerhugowaard
Hoorn
Meppel
Laarwald (D)
Kampen
Zwolle
Marienberg
Uitgeest
Lelystad Centrum
Zaandam
Haarlem
Amsterdam Centraal
Wierden
Almelo
Bad Bentheim (D)
Zandvoort aan Zee
Schiphol Airport
Deventer
Hengelo
Enschede
Hilversum
Apeldoorn
Gronau (D)
Leiden Centraal
Alphen a/d Rijn
Amersfoort
Zutphen
Den Haag Centraal
Utrecht Centraal
Woerden
Ede Wageningen
Winterswijk
Gouda
Arnhem
Maasvlakte
Rotterdam Centraal
Rhenen
Zevenaar
Kijfhoek Noord
Dordrecht
Geldermalsen
Nijmegen
Emmerich (D)
Lage Zwaluwe
's-Hertogenbosch
Breda
Roosendaal
Boxtel
Tilburg
Vlissingen
Sloehaven empl.
Essen (B)
Eindhoven
Noorderkempen (B)
Venlo
Kaldenkirchen (D)
Terneuzen
Weert
Neerpelt (B)
Roermond
Zelzate (B)
Sittard
Heerlen
Lanaken (B)
Herzogenrath (D)
Maastricht
Kerkrade Centrum
Vise (B)
Legenda
1 sporig
2 sporig
3 sporig of meer
75 Afstand in kilometers
Hoofdspoorwegnet
ProRail
Situatie januari 2020
Inzicht oktober 2018
Bron: Infra Atlas


Legenda | Internationale hoofdverbindingen personenvervoer
Internationale hoofdcorridors
(HSL materieel)
Internationale IC-verbindingen
(aansluiten op HSL-netwerk)
Nationale hoofdverbindingen
> 60 miljoen passagiers/jaar (huidig)
> 20 miljoen passagiers/jaar (huidig)
1 - 10 miljoen passagiers/jaar (huidig)
Kopenhagen
Hamburg
Leeuwarden
Groningen
Bremen
Zwolle
Berlijn
Amsterdam
Osnabrück
Hannover
Enschede
Den Haag
Utrecht
Arnhem
Rotterdam
Londen
Breda
Vlissingen
Eindhoven
Dortmund
Duisburg
Antwerpen
Düsseldorf
Keulen
Brussel
Maastricht
Aken
Lille
Luik
Frankfurt
Parijs
Mannheim
Stuttgart/
Munchen
Spanning op het spoor
Ooit was er het idee dat heel Europa dezelfde spanning op spoornetwerken zou krijgen. Vanwege de hoge kosten van zo'n ombouw, blijft het vooralsnog eenheid in verscheidenheid.
Geen elektrische treinen
750 volt gelijkspanning
1,5 kilovolt (kV) gelijkspanning
3 kV gelijkspanning
15 kV wisselspanning
25 kV wisselspanning
1,5 kV wisselspanning +
25 kV gelijkspanning


Eemshaven
Delfzijl
Sauwerd
Weener (D)
Harlingen Haven
Leeuwarden
Groningen
Veendam
Den Helder
Stavoren
Emmen
Enkhuizen
Heerhugowaard
Meppel
Laarwald (D)
Hoorn
Kampen
Uitgeest
Lelystad Centrum
Zwolle
Marienberg
Haarlem
Zaandam
Wierden
Almelo
Bad Bentheim (D)
Zandvoort aan Zee
Amsterdam Centraal
Schiphol Airport
Deventer
Hengelo
Enschede
Hilversum
Apeldoorn
Gronau (D)
Leiden Centraal
Alphen a/d Rijn
Amersfoort
Zutphen
Den Haag Centraal
Utrecht Centraal
Woerden
Ede Wageningen
Winterswijk
Gouda
Arnhem
Maasvlakte
Rotterdam Centraal
Rhenen
Zevenaar
Emmerich (D)
Kijfhoek Noord
Geldermalsen
Nijmegen
Dordrecht
Lage Zwaluwe
's-Hertogenbosch
Breda
Roosendaal
Boxtel
Tilburg
Vlissingen
Sloehaven empl.
Essen (B)
Eindhoven
Venlo
Noorderkempen (B)
Kaldenkirchen (D)
Terneuzen
Weert
Zelzate (B)
Neerpelt (B)
Roermond
Sittard
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Maastricht
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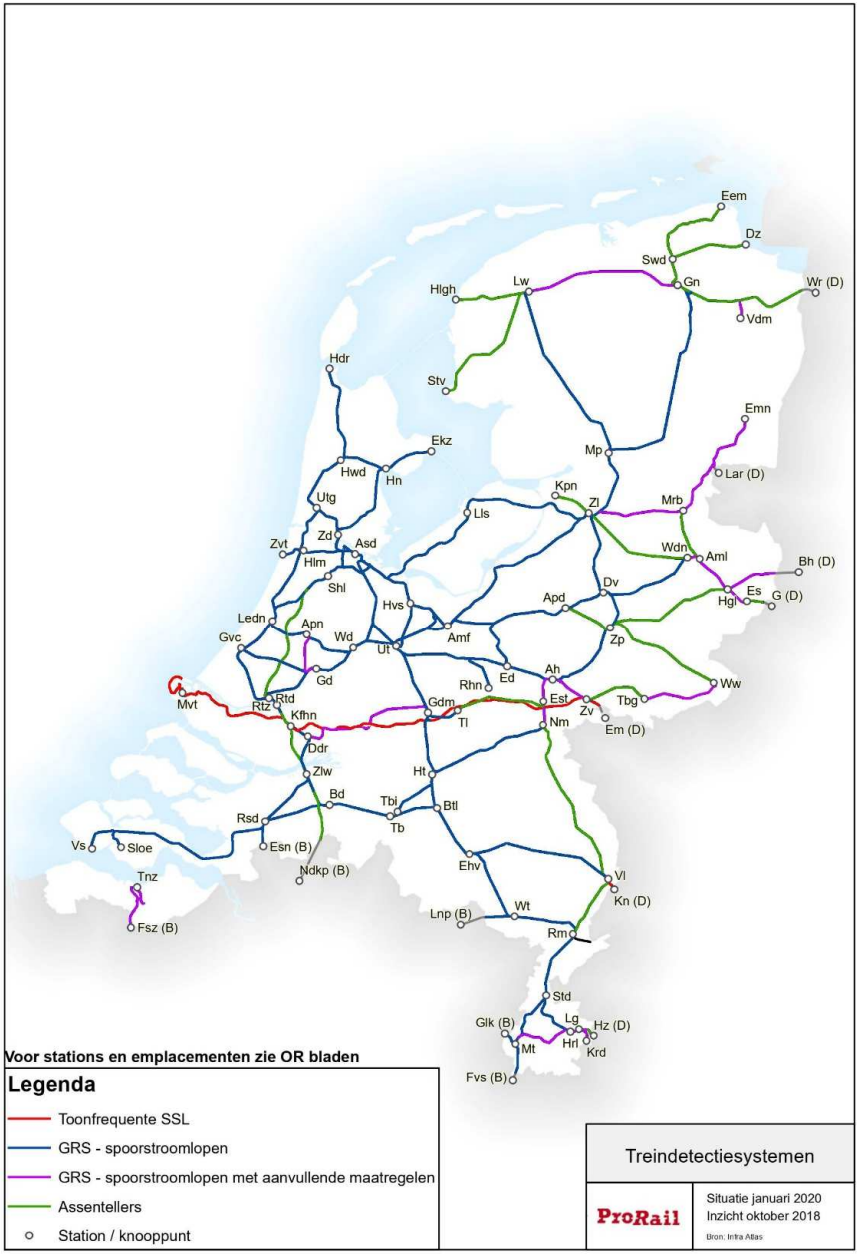
1 sporig
2 sporig
3 sporig of meer
75 Afstand in kilometers
Hoofdspoorwegnet
ProRail
Situatie januari 2020
Inzicht oktober 2018
Bron: Infra Atlas


Eem
Dz
Swd
Wr (D)
Hlgh
Lw
Gn
Vdm
Hdr
Stv
Emn
Ekz
Mp
Hwd
Hn
Lar (D)
Kpn
Utg
Llsoa
Lls
Zl
Mrb
Zd
Zvt
Asd
Wdn
Aml
Bh (D)
Hlm
Dv
Shl
Es
G (D)
Hgl
Hvs
Apd
Ledn
Apn
Amf
Gvc
Wd
Zp
Ut
Ah
Gd
Ed
Ww
Rhn
Mvt
Rtd
Kfhn
Gdm
Tl
Nm
Zv
Em (D)
Ddr
Zlw
Ht
Bd
Tbi
Btl
Rsd
Tb
Sloe
Vs
Esn (B)
Ndkp (B)
Ehv
Vl
Kn (D)
Tnz
Lnp (B)
Wt
Rm
Fsz (B)
Std
Glk (B)
Hz (D)
Mt
Hrl
Krd
Fvs (B)
Legenda
ATBEG
ATBNG
ERTMS
ATBEG / ERTMS
Indusi/PZB
Memor/Krokodil
Geen Treinbeïnvloeding
Station / knooppunt
ProRail
Situatie januari 2020
Inzicht oktober 2018
Bron: Infra Atlas



Voor stations en emplacementen zie OR bladen

Legenda

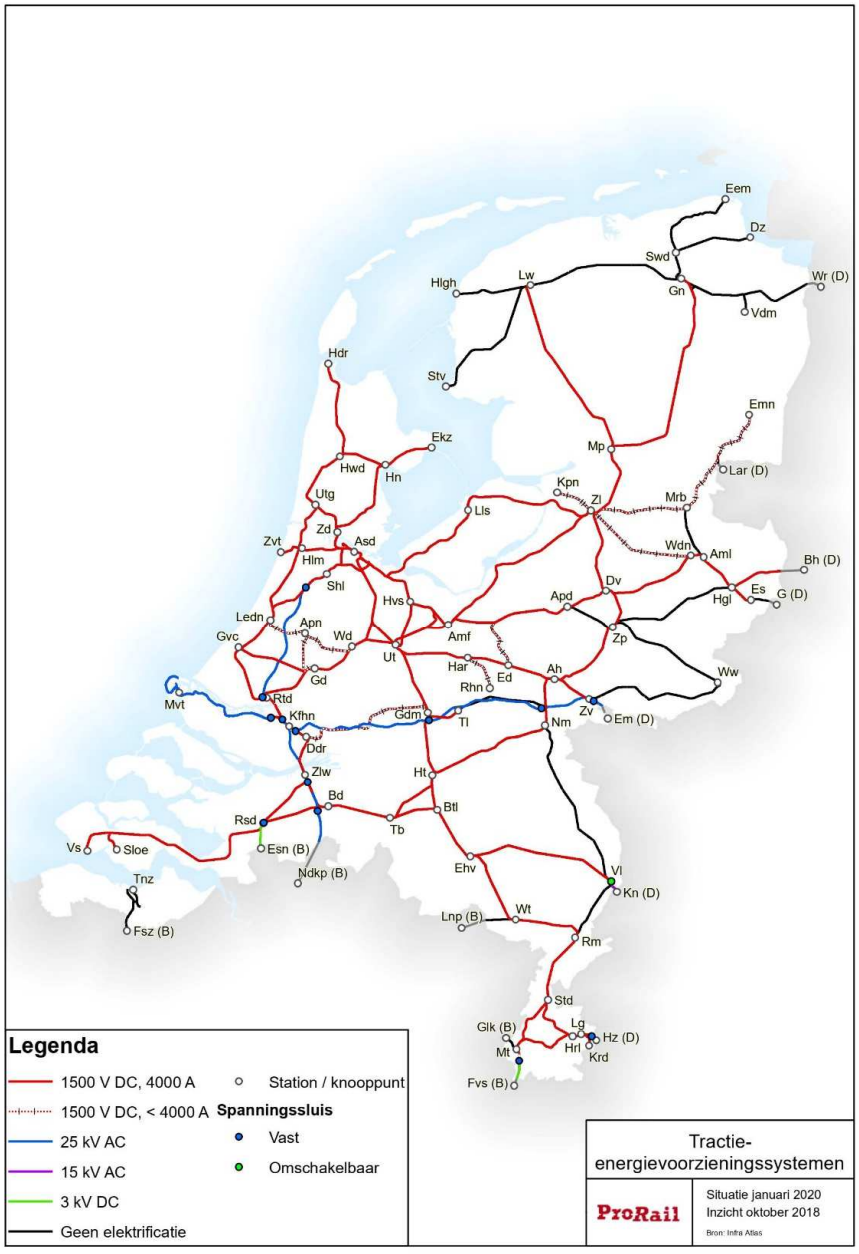
- Toonfrequente SSL
- GRS - spoorstroomlopen
- GRS - spoorstroomlopen met aanvullende maatregelen
- Assentellers
- Station / knooppunt

Treindetectiesystemen

ProRail

Situatie januari 2020
Inzicht oktober 2018

Bron: Infra Atlas



Legenda

- 1500 V DC, 4000 A
- 1500 V DC, < 4000 A
- 25 kV AC
- 15 kV AC
- 3 kV DC
- Geen elektrificatie
- Station / knooppunt

Spanningssluis

- Vast
- Omschakelbaar

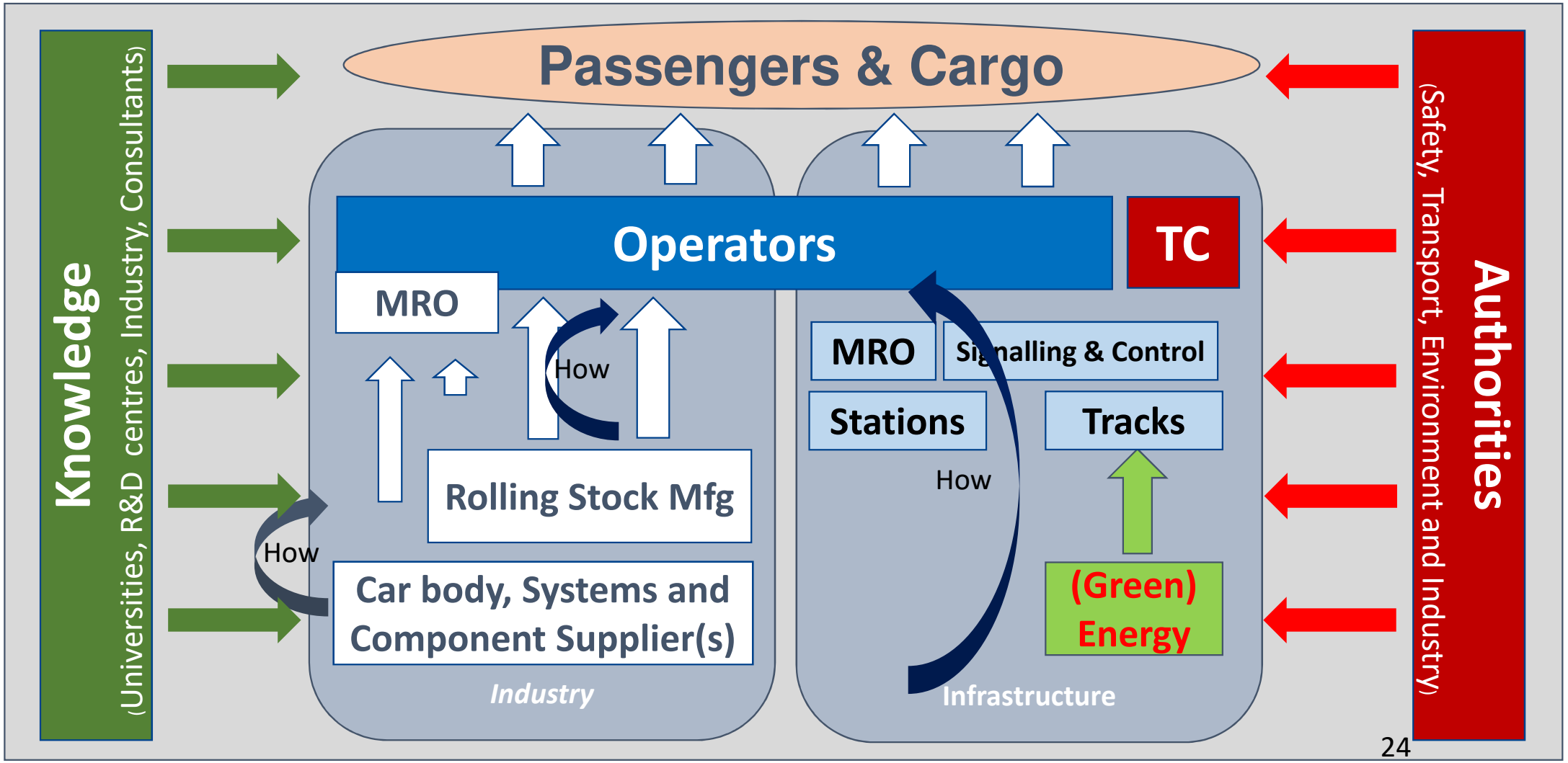
Tractie-energievoorzieningssystemen

ProRail

Situatie januari 2020
Inzicht oktober 2018

Bron: Infra Atlas

Rail transport value chain



Problem Definition (1020 – 1040)

Problem Definition

- Using the wall charts, Identify a problem and a desired end state (one point per Postit Note)
- Place on the As Is and To Be chart.

- The Journey chart will be filled in later. The Journey will also capture activities or enablers to allow the Journey to connect the As Is with the To Be
- The Journey is also an opportunity to learn something along the way

Problem Definition

- Consider other railways and transit areas
- Want to know where we can learn from others or add innovation
- Put comments on Postit
- Place in Journey chart

Small Group Sessions (1040 – 1110)

Small Group Sessions

- Join Groups (based on sections of a Generic Rail System Framework)

- Select groups or use the following:
  - Governance & Decision Making
  - Architecture
  - Alignment of Processes, Management and Contracts
  - Migration Strategy and Phases – Capability and Technology Roadmaps

- 4-5 people per group
- Each Group address and consider the problems posted earlier (As Is and To Be).

- Determine the Journey that is needed to address your area. Provide additional insights, principles and guidance that is needed in your section of the Generic Rail System Integration Framework

Small Group Sessions

- Each group has 30 minutes to generate they slides, key points, findings and recommendations.

- Select speakers (can be more than one).

- Groups will also make sure that everyone participates. ☺

Small Group Sessions

- Break - 5 minutes

Group Presentations (1110 – 1145)

Group Presentations

- Each Group is given 7 minutes to present and answer questions

Summary (1145 – 1200)

Summary

- Summarise findings.
- Put ideas and key points together (outputs from the 5 groups which address key elements to the Generic Rail Sys Integration Framework)
- Review findings. Answer questions and allow people to fill our feedback forms
- Bedankt!!