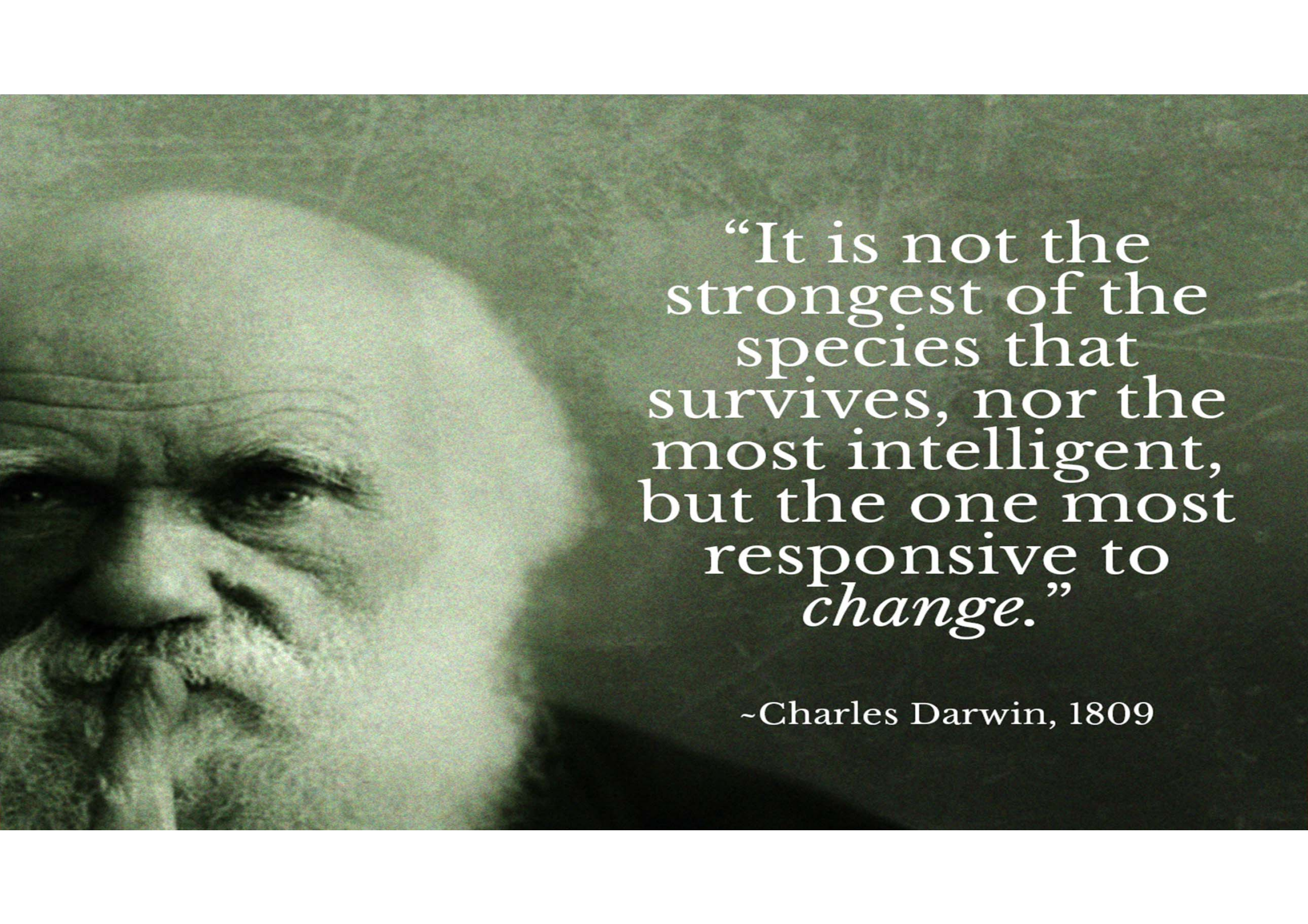


# *Prepare for change and agility*





“It is not the  
strongest of the  
species that  
survives, nor the  
most intelligent,  
but the one most  
responsive to  
*change.*”

~Charles Darwin, 1809



# Perlekette concept: Single piece flow



Design

Production in Perfect Sequence

Sold

Production in Sequence

Material in Sequence

PULL

WoW



# MASTER DATA ENGINE

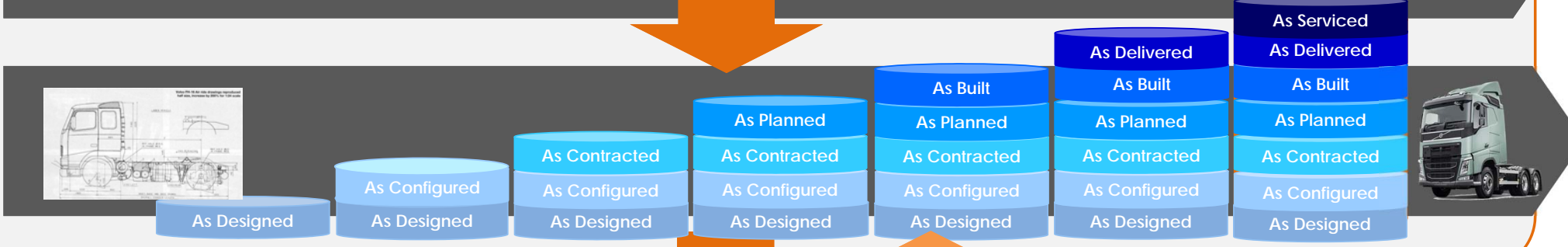
GENERIC  
BREAK-  
DOWN  
RULES



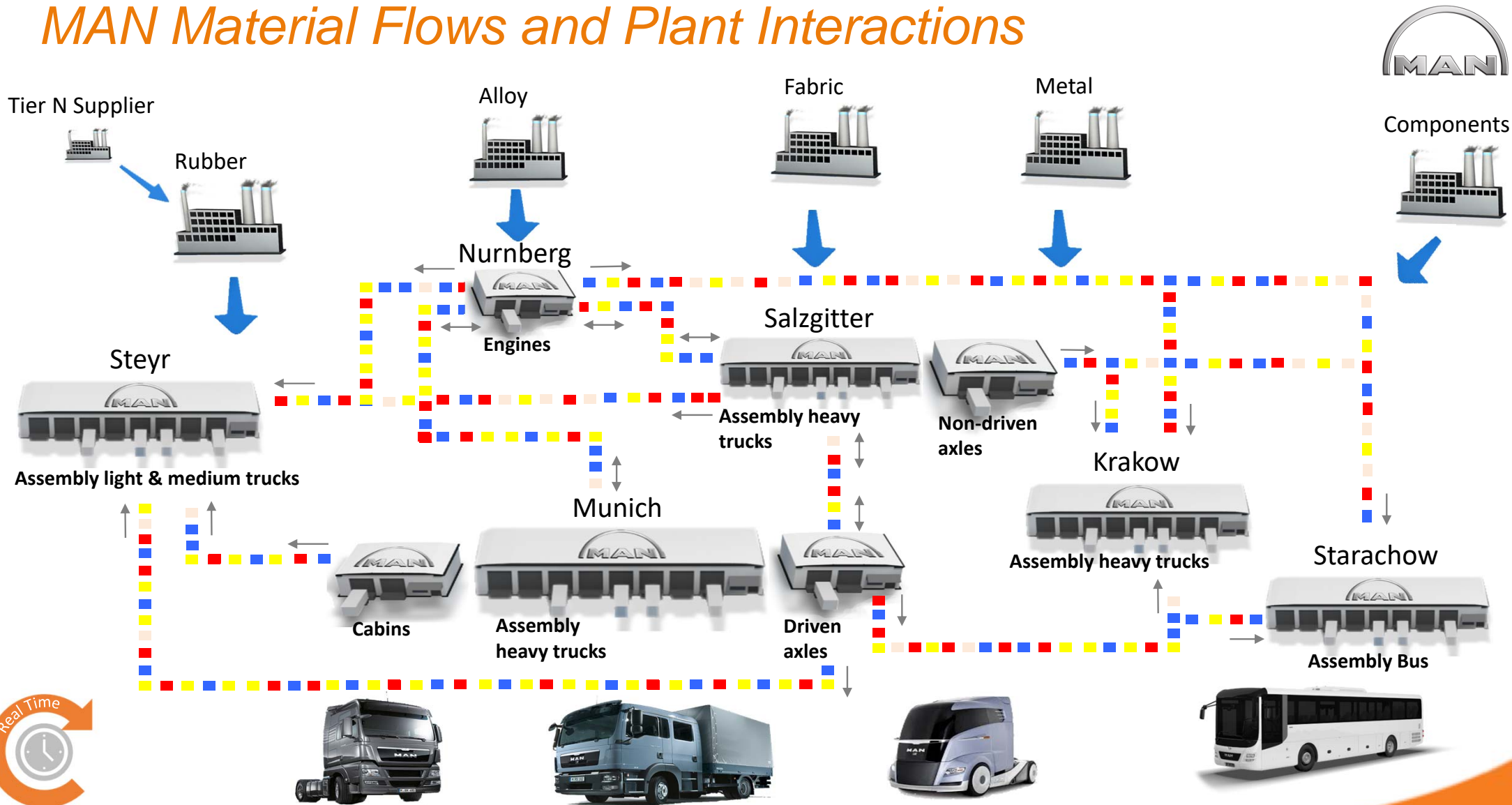
SINGLE  
PIECE  
FLOW



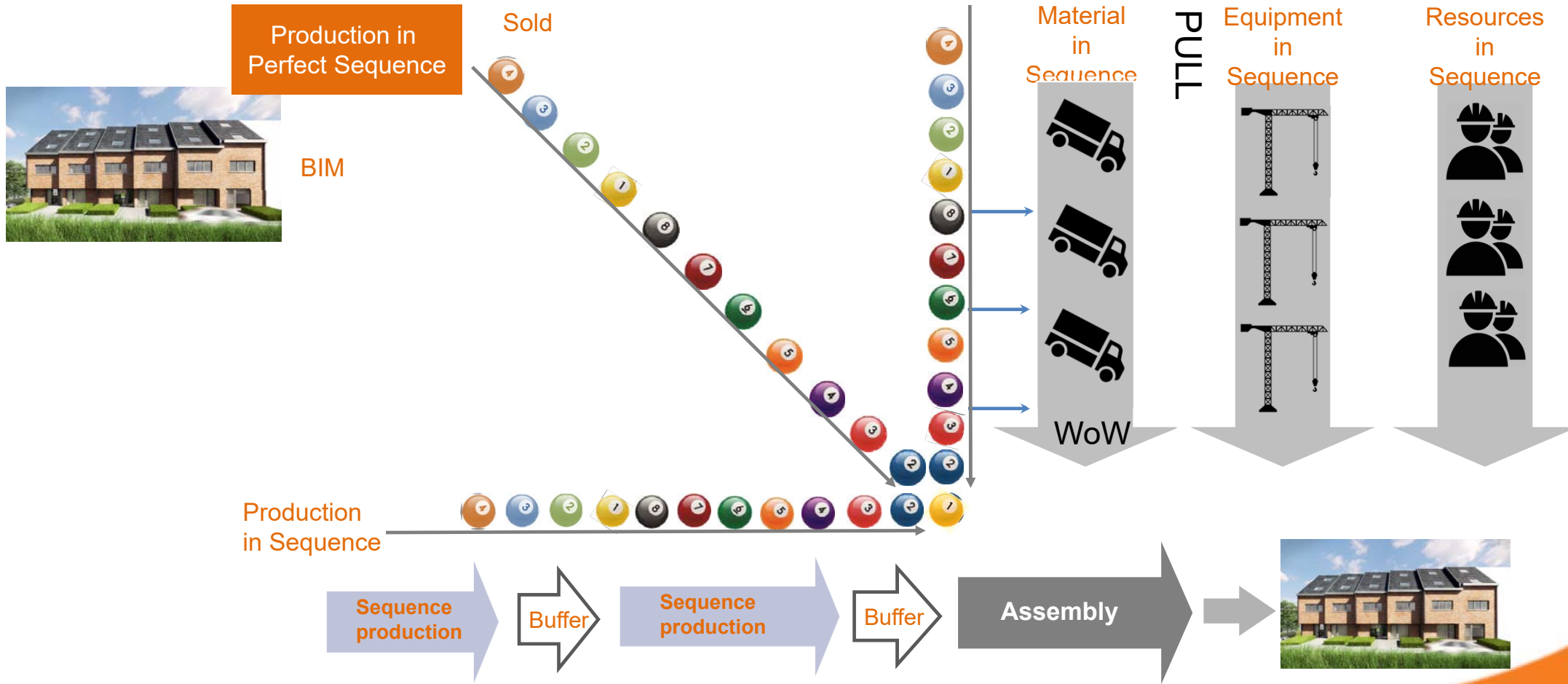
INSTALL  
BASE  
INSTANCE



# MAN Material Flows and Plant Interactions



# Perlekette logistical synchronization by Real Time Management



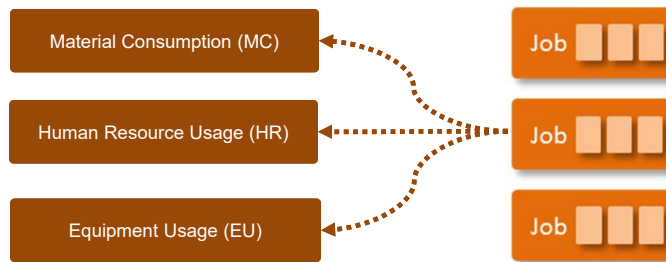
# Perlekette - Theory of Constraints



## 1. Creating Flow



For each process step



## 2. Using Finite Capacities

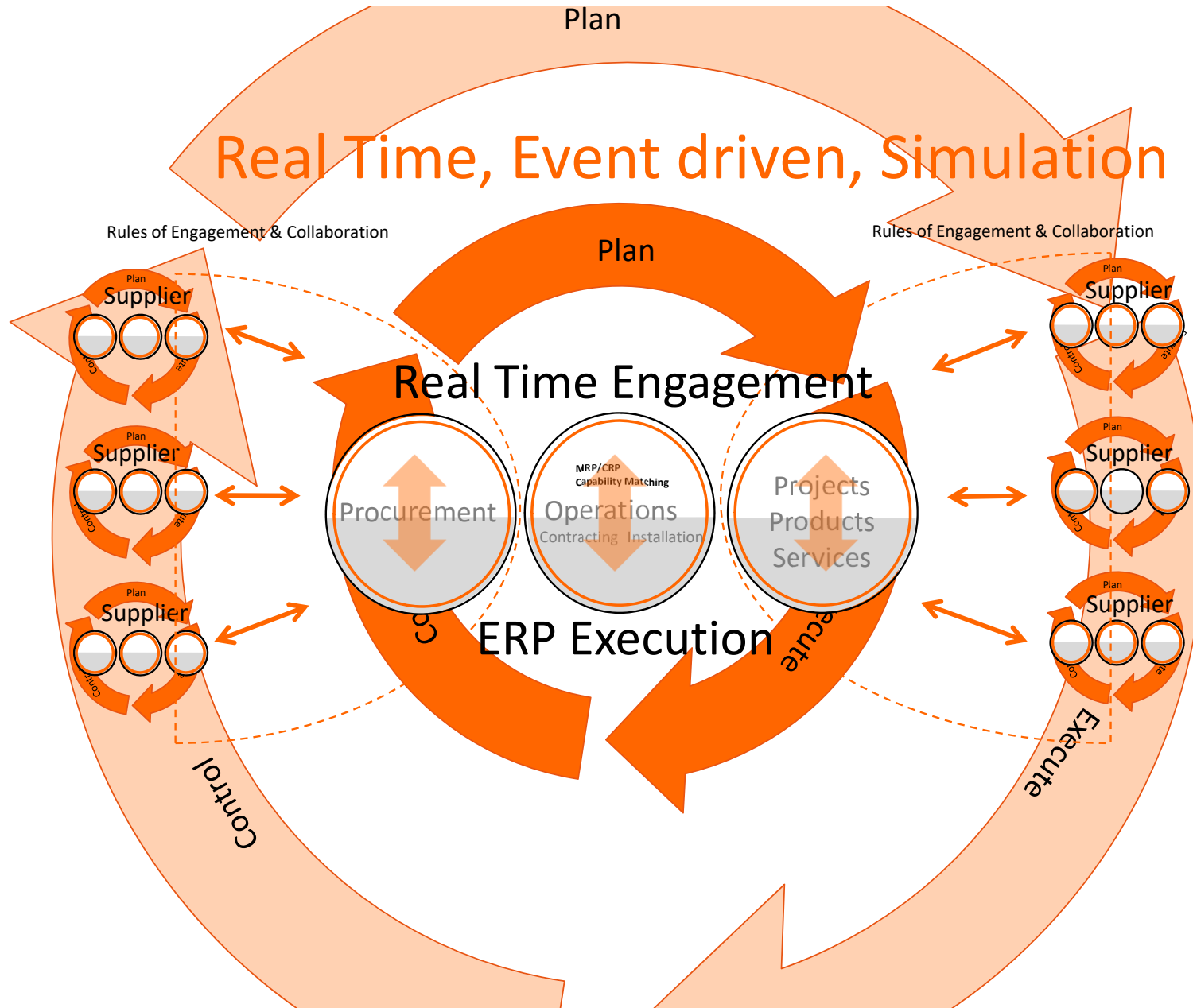


## 3. (re) Planning & Scheduling Real Time





# Real Time, Event driven, Simulation





# Proactive planning and simulation

... Flexible process modeling to support business decisions and **Real Time** situation-based information

The screenshot displays a software interface for transport planning and simulation. The main window shows a Gantt chart with columns for weeks [W14] 31-mrt-2014, [W15] 7-apr-2014, [W16] 14-apr-2014, and [W17] 21-apr-2014. The chart shows various transport lanes with colored bars representing planned and actual activities. A sidebar on the left lists resources like 'MontageAfdeling' and 'Garnierem' with sub-resources like 'monteurMA' through 'monteurME' and 'garnierderOA' through 'garnierderOD'. Below the Gantt chart is a table of transport orders with columns for Order No., Trailer No., Seq., Status, Tr Lane, Transporter, Supplier, Location, Latest pickup, Planned pickup, Latest delivery, Planned delivery, and Recent position. A 'Details' panel at the bottom provides information for a specific order (13743), including order details, trailer details, pickup details, and delivery details. A map window shows the current position of a transport route between Würzburg and Heilberg. The interface includes search filters, a 'Find' button, and a 'Cache van de vertaling herrieuwen' option.

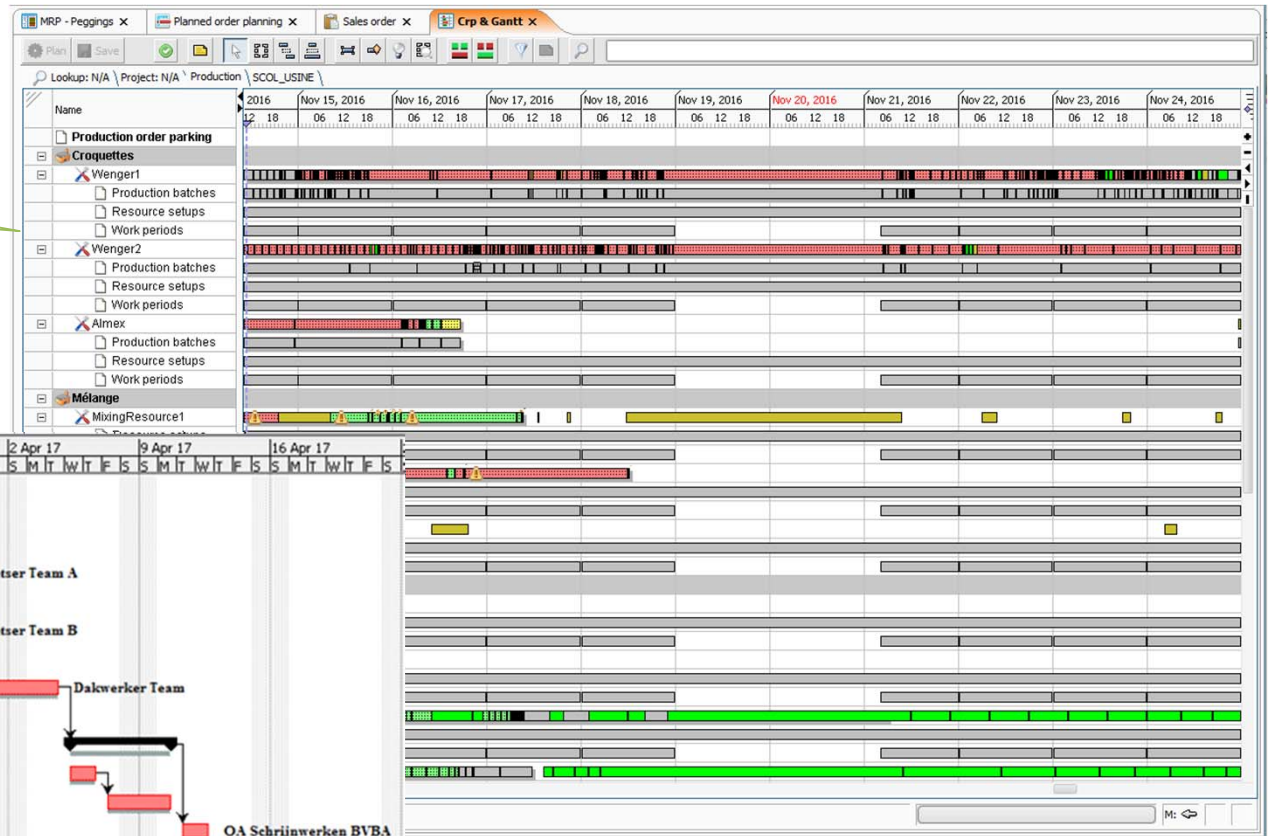
Order No.	Trailer No.	Seq.	Status	Tr Lane	Transporter	Supplier	Location	Latest pickup	Planned pickup	Latest delivery	Planned delivery	Recent position
13678	SC5678		Picking up	12	Nord-Süd Spedition	Joist Werke GmbH	Friedberg (D)	12/2/13 21:10	12/2/13 19:00	13/2/13 09:46	13/2/13 06:36	
13722	SC5677		Shipped	12	Nord-Süd Spedition	Joist Werke GmbH	Friedberg (D)	12/2/13 19:12	12/2/13 15:00	13/2/13 06:00	13/2/13 06:28	
13725	WH567		Yard	16	Nord-Süd Spedition	Diebold	Heilberg (D)	12/2/13 10:00	12/2/13 08:00	12/2/13 21:24	12/2/13 11:05	
13743	SC5945	1	Shipped	45	Nord-Süd Spedition	Sauermann	Würzburg (D)	12/2/13 13:15	12/2/13 12:05	13/2/13 08:34	13/2/13 06:00	
13743	SC5945	2	Picking up	45	Nord-Süd Spedition	Automotive parts	Erlangen (D)	12/2/13 15:15	12/2/13 13:18	13/2/13 08:34	13/2/13 06:00	
13743	SC5945	3	Planned	45	Nord-Süd Spedition	Roth Technik	Nürnberg (D)	12/2/13 16:32	12/2/13 14:30	13/2/13 08:34	13/2/13 06:00	
13721	SC5699		Planned	16	Nord-Süd Spedition	Diebold	Heilberg (D)	12/2/13 20:30	12/2/13 19:02	13/2/13 06:10	13/2/13 06:00	
13677	SC5466		Ordered	12	Nord-Süd Spedition	Joist Werke GmbH	Friedberg (D)	14/2/13 08:10	Not confirmed	14/2/13 17:15	Not confirmed	
13679	568812		Planned	16	Nord-Süd Spedition	Diebold	Heilberg (D)	13/2/13 07:15	13/2/13 09:00	13/2/13 15:00	13/2/13 14:35	



# Real Time Capacities Planning (CRP)

The **Real Time** capacities of resources (materials, people, equipment) must be taken into account at the capacities planning. Always finite capacities

De capacities planning (CRP) of the various resources can be analysed and followed up by a GANTT chart or Project Follow Up

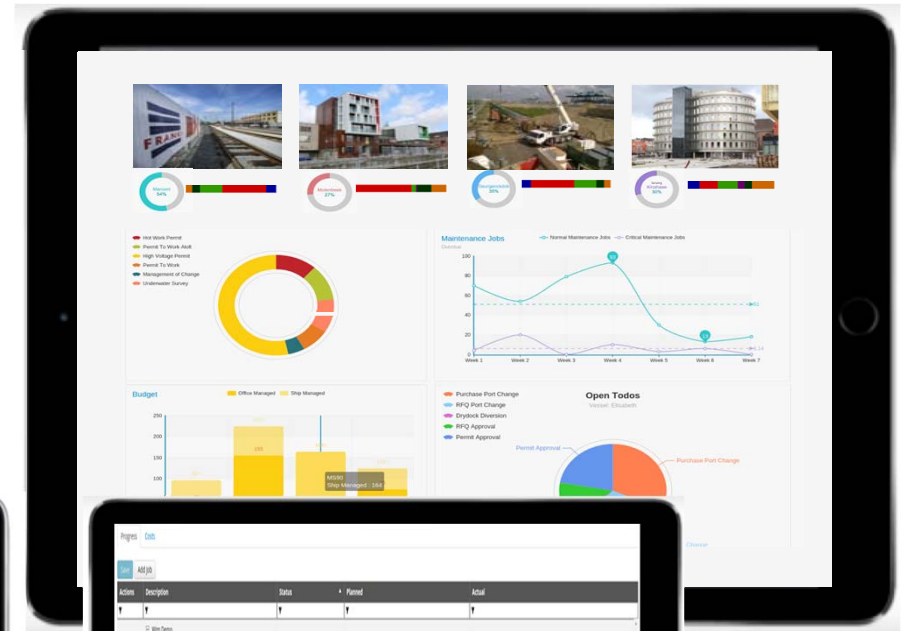
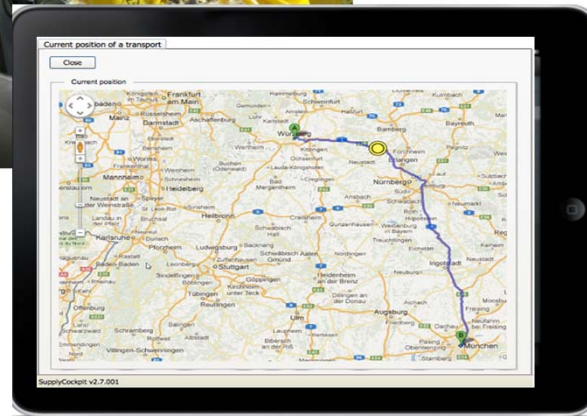


Name	Duration	Start	Finish	Pred...
Grondwerken	4 days	3/20/17 8:00 AM	3/23/17 5:00 PM	
<b>Ruwbouwwerken</b>	5 days	<b>3/24/17 8:00 AM</b>	<b>3/30/17 5:00 PM</b>	<b>1</b>
Onder de grond	3 days	3/24/17 8:00 AM	3/28/17 5:00 PM	
South Wall	2 days	3/29/17 8:00 AM	3/30/17 5:00 PM	3
North Wall	2 days	3/29/17 8:00 AM	3/30/17 5:00 PM	3
Dakwerken plat dak	3 days	3/31/17 8:00 AM	4/4/17 5:00 PM	2
<b>Voorbereiding na ruwbouw</b>	4 days	<b>4/5/17 8:00 AM</b>	<b>4/10/17 5:00 PM</b>	<b>6</b>
Afvoerleidingen	2 days	4/5/17 8:00 AM	4/6/17 5:00 PM	
Electriciteit	2 days	4/7/17 8:00 AM	4/10/17 5:00 PM	8
Buitenschrijnwerken	2 days	4/11/17 8:00 AM	4/12/17 5:00 PM	7
Werfmateriaal	18 days	3/20/17 8:00 AM	4/12/17 5:00 PM	

# Mobile Work Instructions – Real Time Dashboards – Andon Screens

Functional location → How it should be and look like → Real condition

- Follow up of activities



Progress

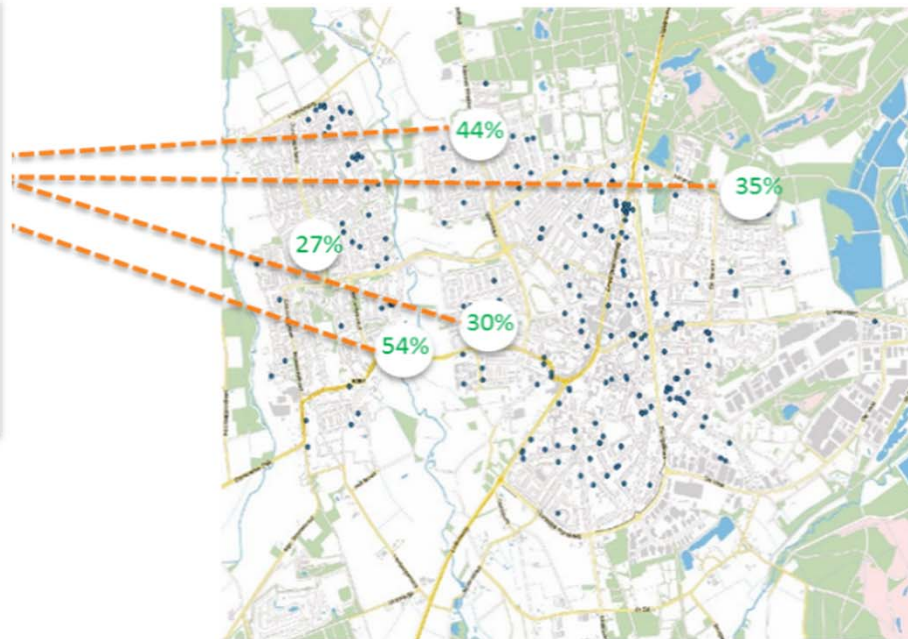
Actions	Description	Status	Planned	Actual
MR42	221 Cargo Tank safety valve testing	Reported		
MR42	Sign-Off Water, AICC water	Reported		
MR20	212 Intermediate spaces safety valve testing	To be planned		
MR20	213 Cargo lines safety valve test	To be planned		
MR20	214 Pressure/vacuum valves of liquid line (safety testing)	To be planned		
MR20	215	Draft Reported		
MR20	216	To be planned		
MR20	217	To be planned		
MR20	218	To be planned		



# GIS Model in PearlChain



The GIS will fully be integrated within the PearlChain Platform. It offers a total and **Real Time** overview of the complete Installed Base, a reference mapping from which you can work



# Execution & Cost Control



During implementation, the various posts and jobs will be closely and **Real Time** monitored; status of the e... etc.

The screenshot shows a detailed cost control dashboard for 'Project 120'. The main table lists various construction items with columns for budget codes, job classifications, personal classifications, and project status. Annotations highlight key features:

- Budget codes:** Points to the 'Budget Code' column in the table.
- Job classifications:** Points to the 'Extra Classificatie' column.
- personal classification:** Points to the 'Indirecte Kosten' column.
- Customers & suppliers:** Points to the 'Markt Type' column.
- Project Status:** Points to the 'Project Status' column, which uses colored dots to indicate status.
- Project reports:** Points to the bottom right section containing various charts and graphs.

The bottom right section includes reports such as 'Status: Actual 5D', 'Status: Real', 'Status: Verbruik', and 'Evolutie Aanneemom', 'Evolutie omzet', and 'Evolutie marge'.

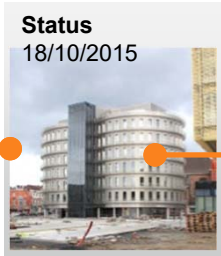
# Drones: 5D Control



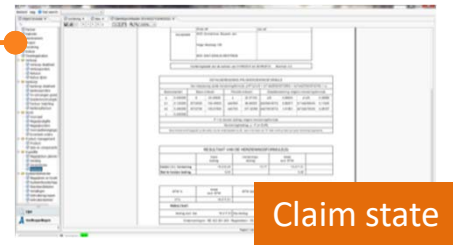
- Mobile work instructions and KPI dashboarding
- IoT with various sensors, like concensor
- Drones with GPS and marker node
- Augmented Reality
- Management in **Real Time**

**Workflow**

Task Name	ID	Assigned User	Status	Start Date	End Date
Task 1	101	John Doe	Completed	2015-10-18	2015-10-18
Task 2	102	Jane Smith	In Progress	2015-10-18	2015-10-19
Task 3	103	Mike Johnson	Not Started	2015-10-19	2015-10-20
Task 4	104	Sarah Lee	Completed	2015-10-17	2015-10-17
Task 5	105	David Kim	In Progress	2015-10-18	2015-10-19
Task 6	106	Emily White	Not Started	2015-10-20	2015-10-21
Task 7	107	James Brown	Completed	2015-10-16	2015-10-16
Task 8	108	Maria Garcia	In Progress	2015-10-18	2015-10-19
Task 9	109	Robert Wilson	Not Started	2015-10-20	2015-10-21
Task 10	110	Lisa Anderson	Completed	2015-10-15	2015-10-15



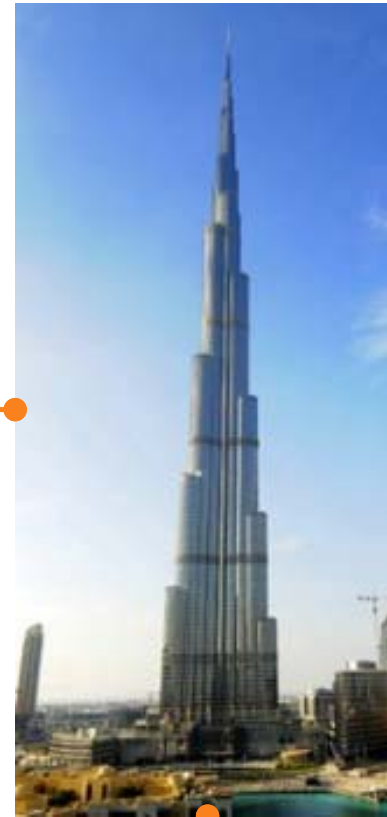
```
client.on('navdata', function(navdata) {
  console.log(navdata.gps.latitude + ', ' + navdata.gps.longitude + ', ' + navdata.gps.elevation);
});
```



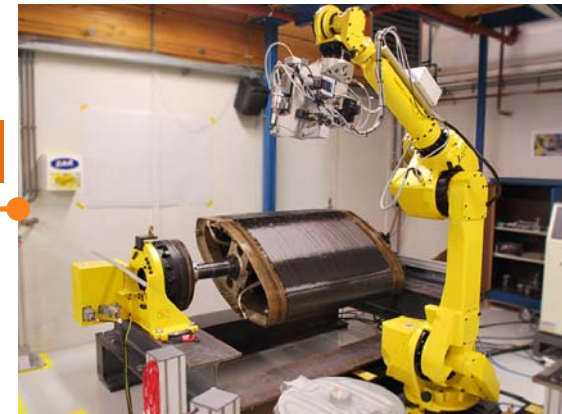
# Smart use of robots

- Perfect treatment of repetitive tasks
- For simple and complex jobs
- Management in **Real Time**

On the yard



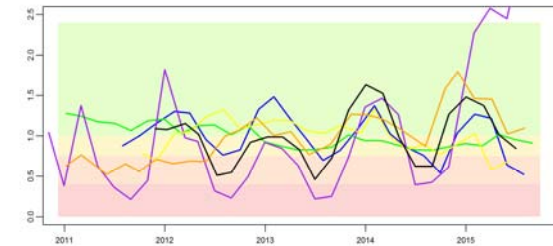
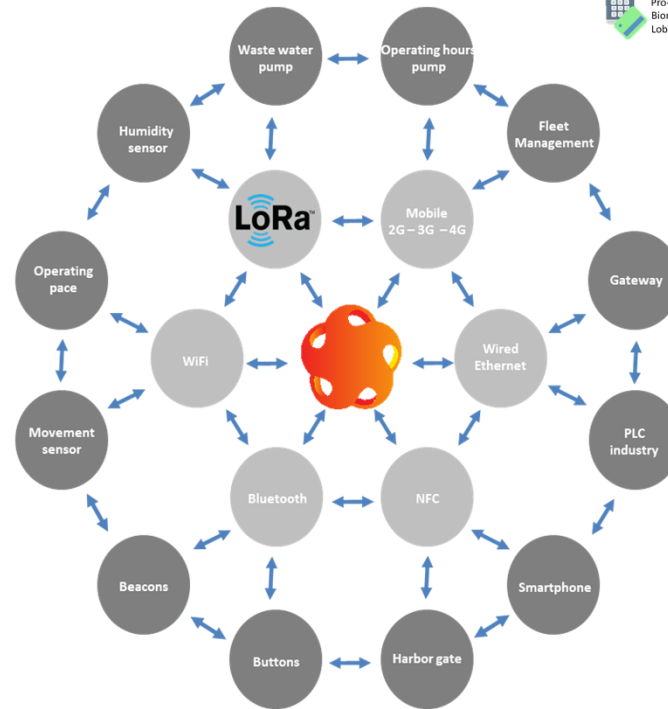
Prefab





# Integration with IoT: Smart Building

Sensors in the building infrastructure capture **Real Time** data on the quality, condition and many other data that apply to this infrastructure and influence it, in order to facilitate preventive inspection / maintenance and to minimize the need for curative procedures.



Questions?

