A key component of the Michelin DataInfrastructure

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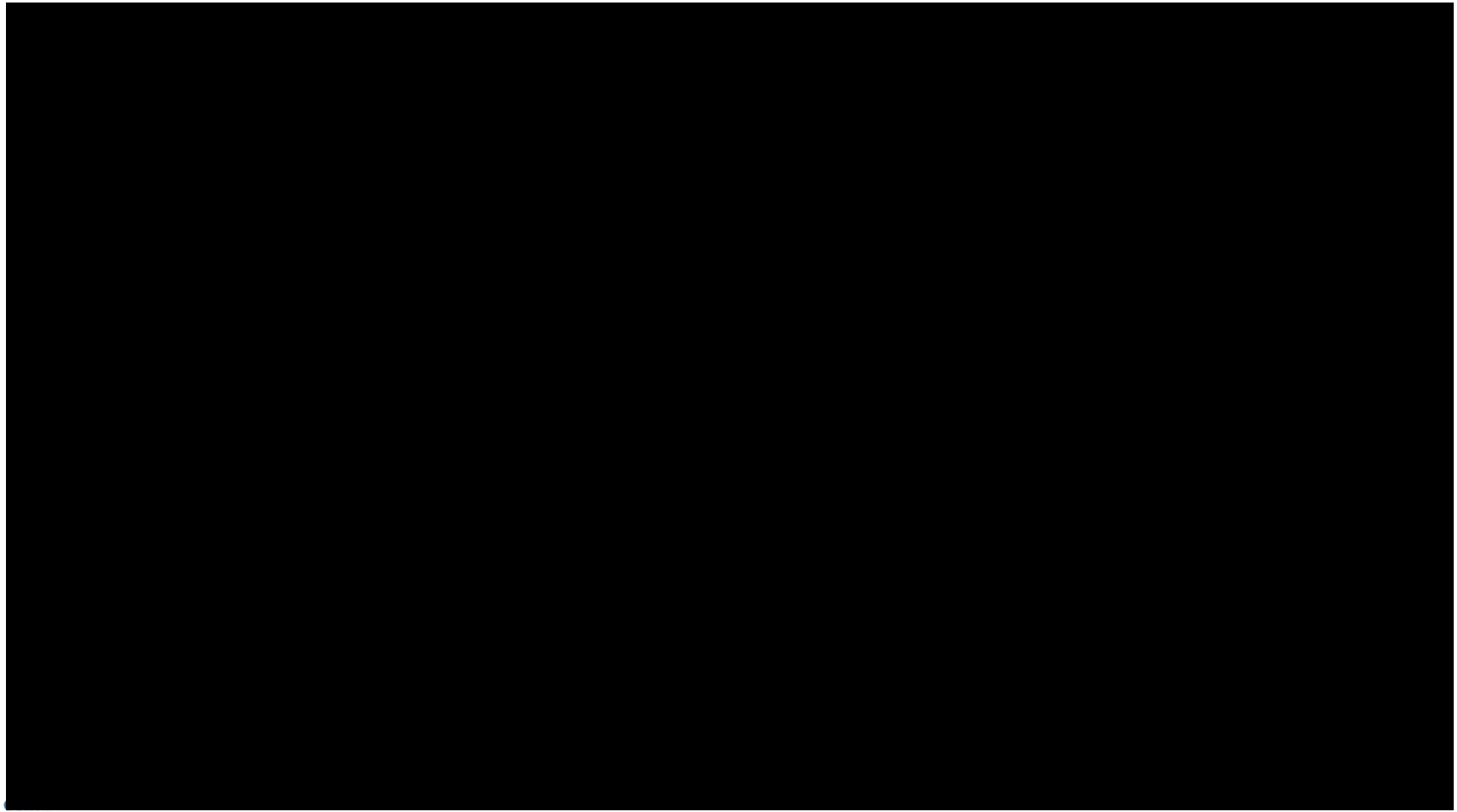
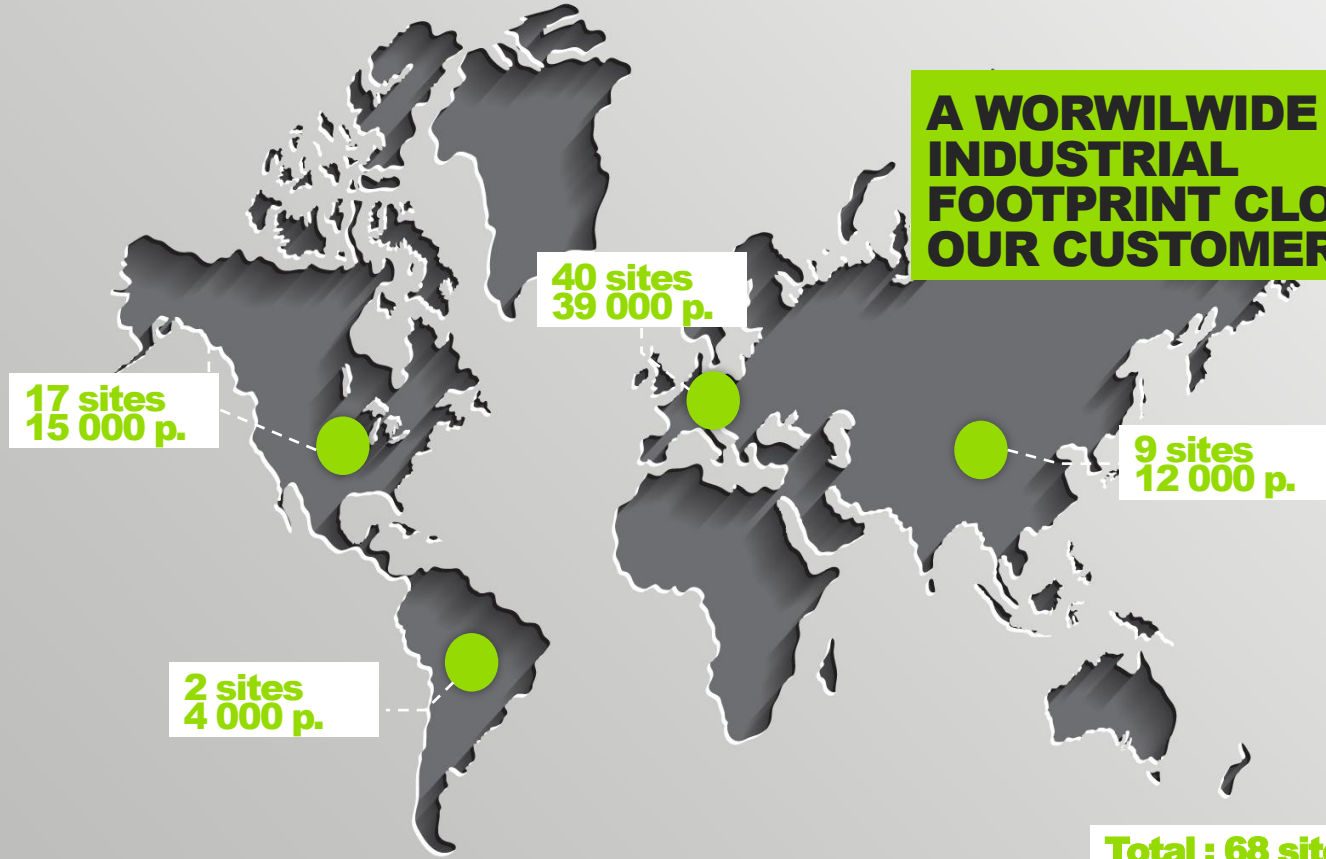
Agenda

- Michelin’s at a glance
- Architecture supporting our Digital Journey
- Leverage PI system in our context
  - Asset Management
  - Discrete manufacturing contextualization
- Results and Business impact

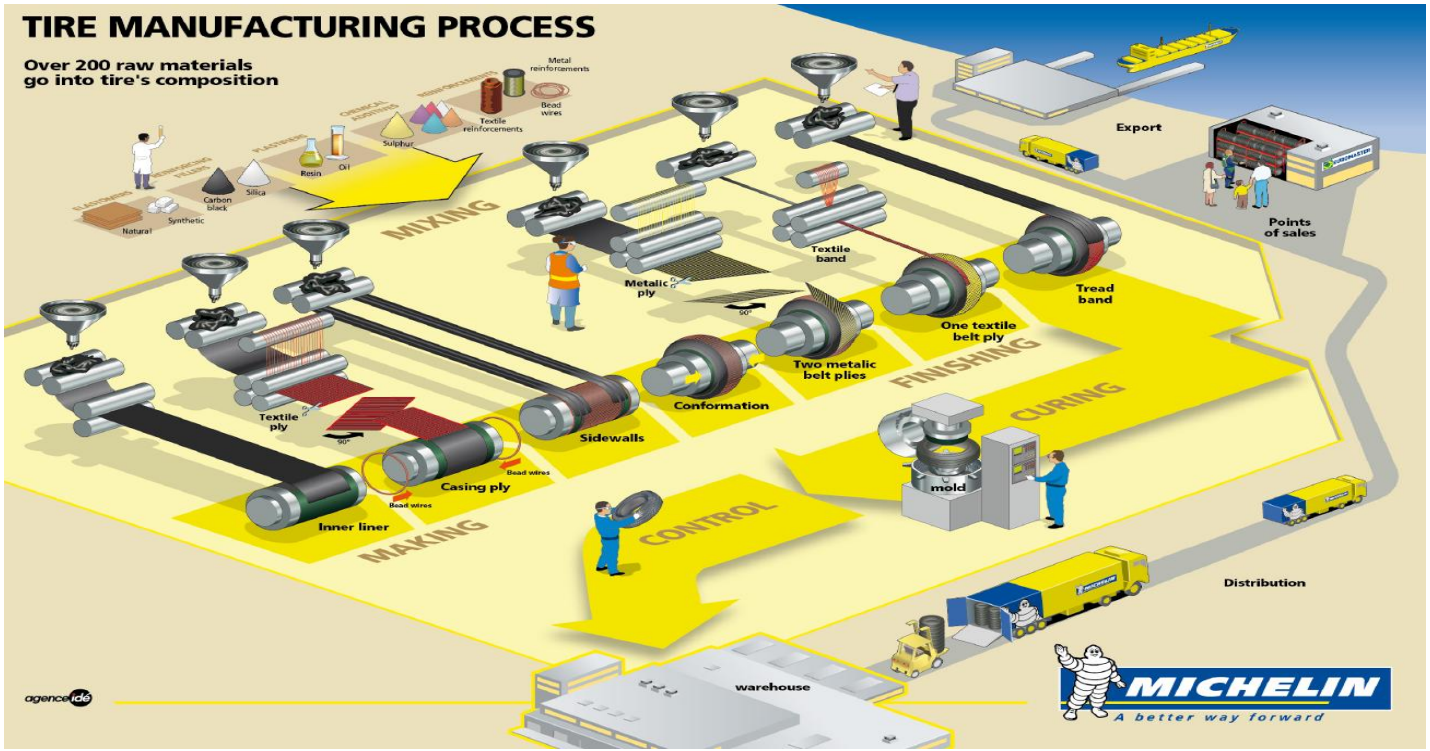


A WORWILWIDE INDUSTRIAL FOOTPRINT CLOSE TO OUR CUSTOMERS



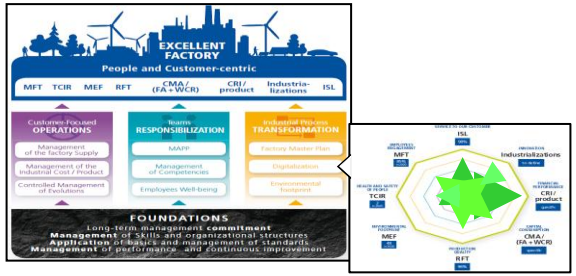
Total : 68 sites, 70 000 p.

A complex Manufacturing process achieved in about 150 units



Michelin's Industry has started its digitalization journey

Digitalisation as a lever to the Excellent Factory



- **Digital Tour Team** workshops and analysis with consulting
- **Digital diagnostic** in 3 activities (**UMO SF&GC, BKR TC**)
- **Landscaping** survey in 16 activities
- **External visits** (benchmarks) and meetings with **experts**

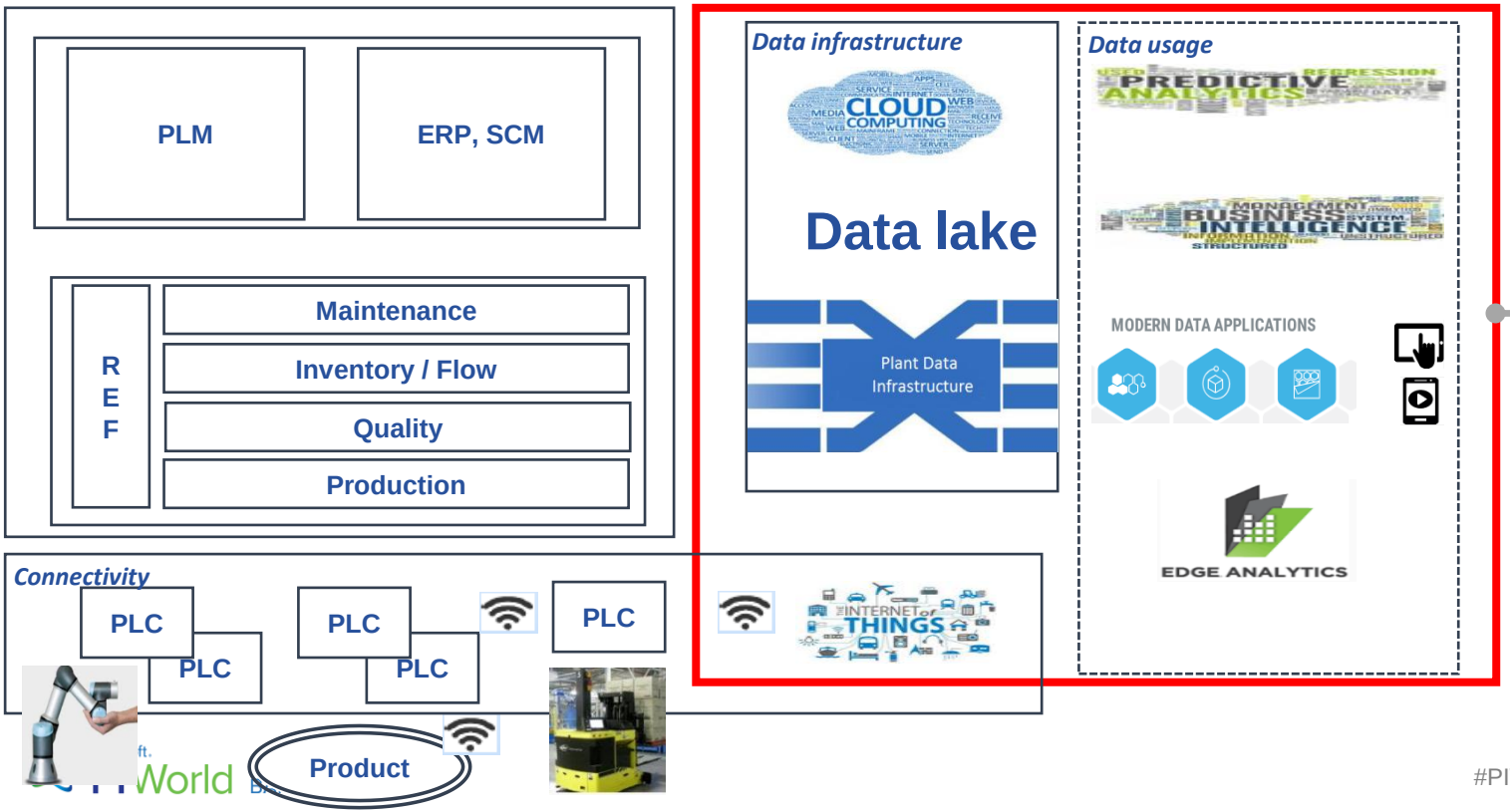
Criteria

- Applicability to Michelin
- Impact and value creation
- Investment needed
- Technical maturity
- Implementation complexity

A 6 months Digital Tour to define the roadmap

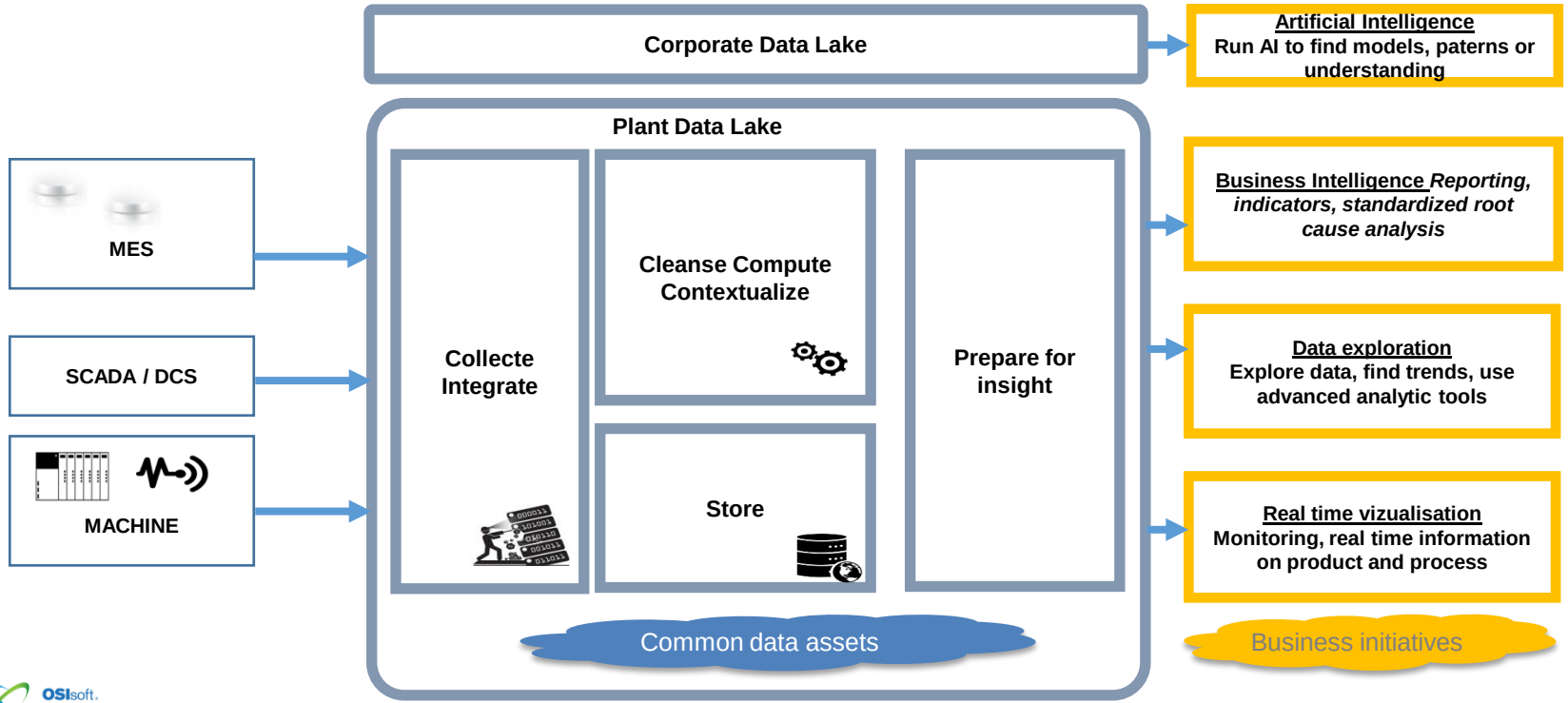
"Think big, start small, roll out fast"

The architecture strategy is adapted to accelerate value creation



Creation of a Digital Platform to support business case around Data

The Digital Platform V1 provide a set of capabilities to support Top Down and Bottom Up approach



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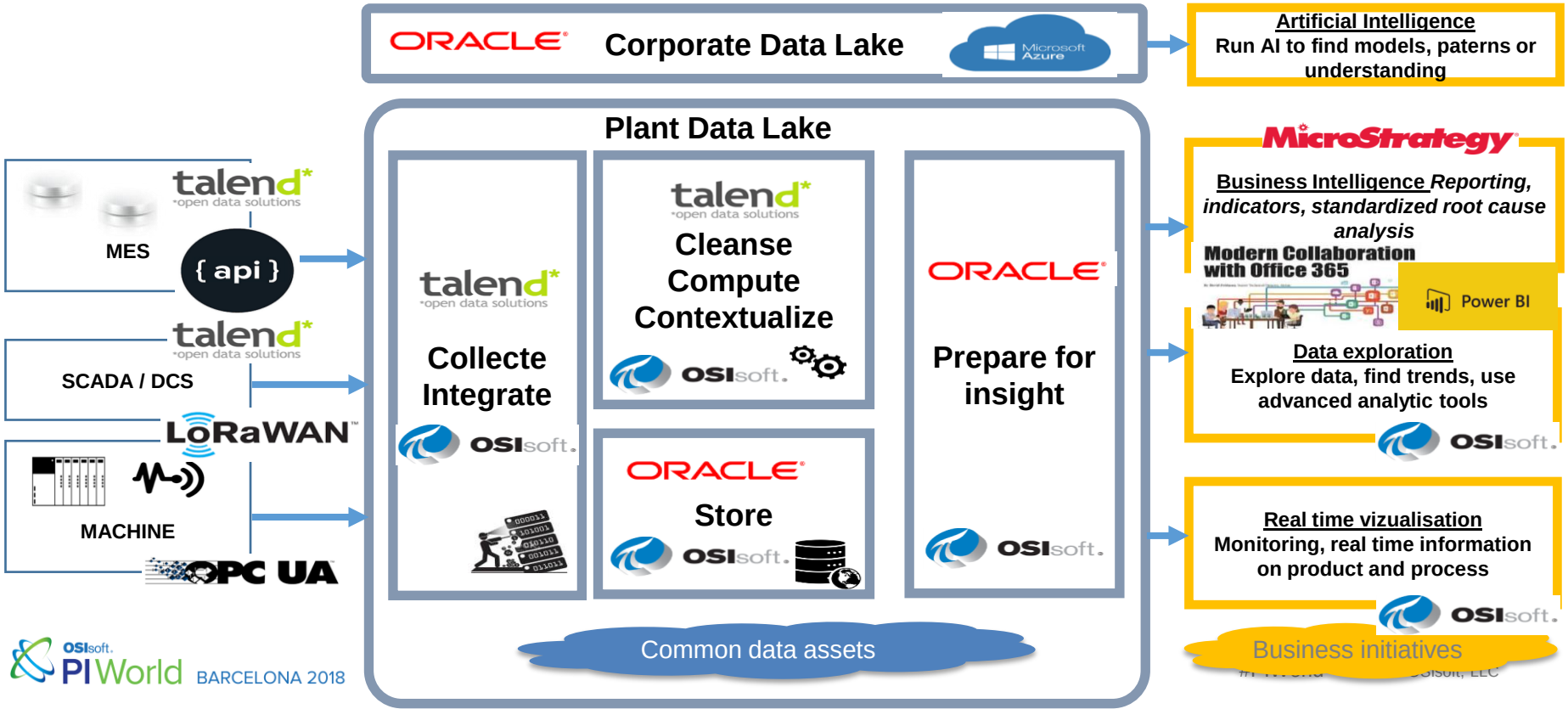
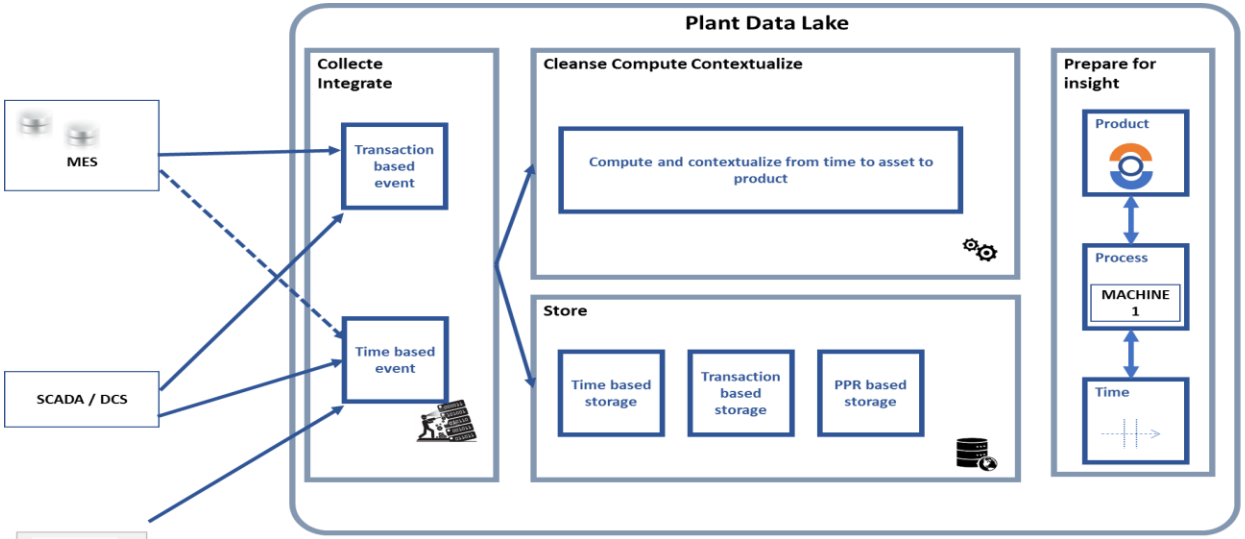


Data storage is adapted to technical constraints (Write/Access decoupling) and business requirements (History / Product-Process Navigation)

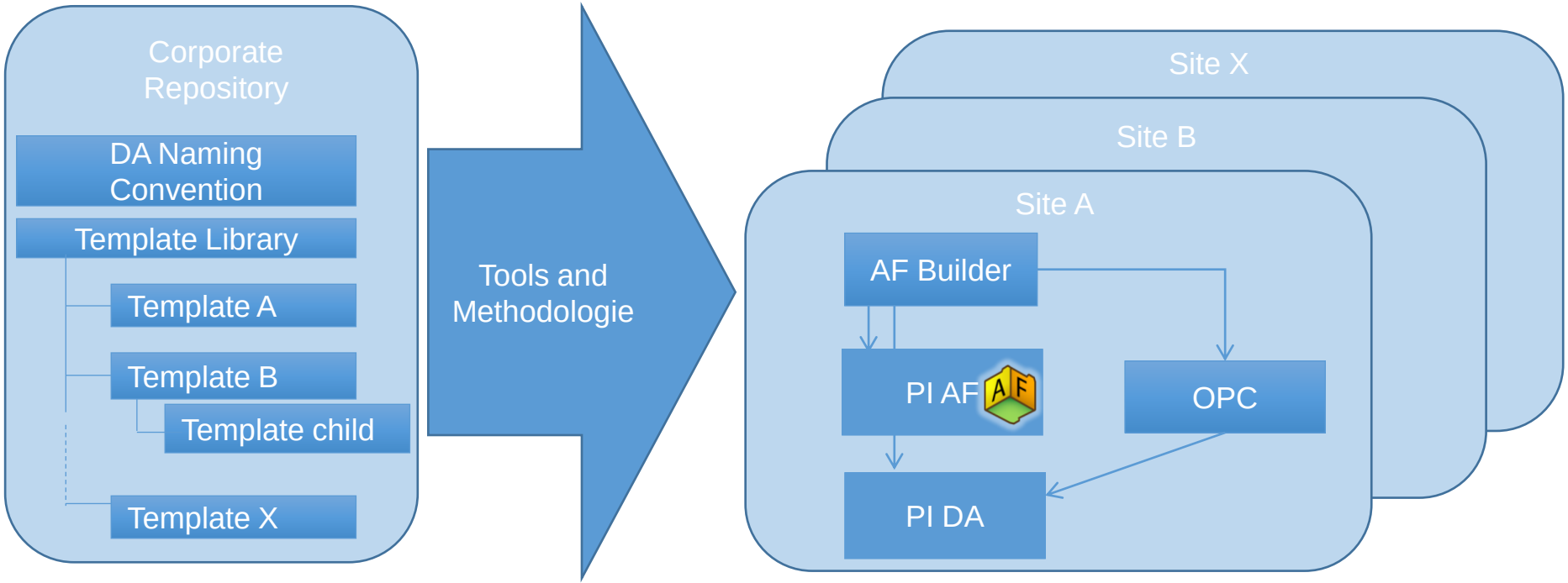


Business Intelligence
Reporting, indicators, standardized root cause analysis

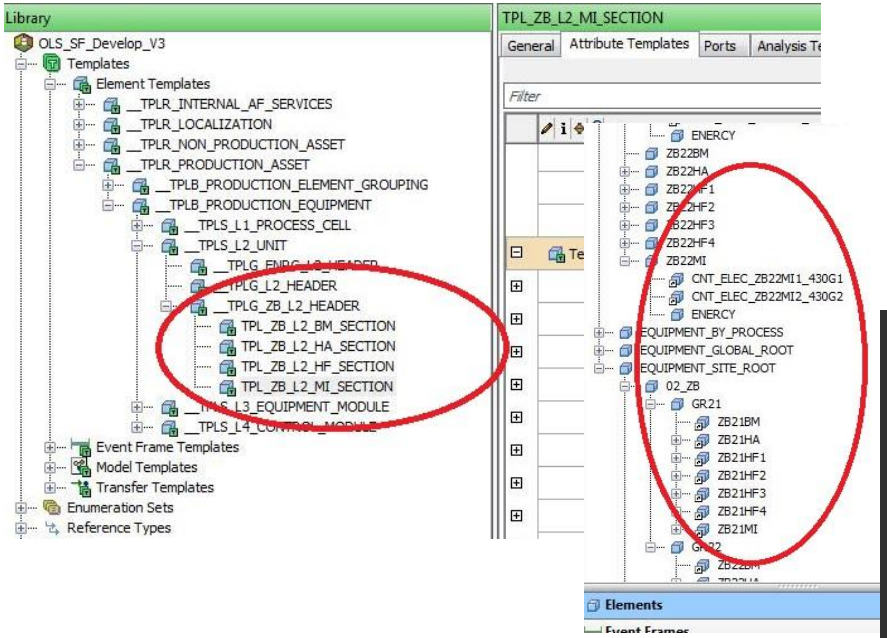
Data exploration
Explore data, find trends, use advanced analytic tools

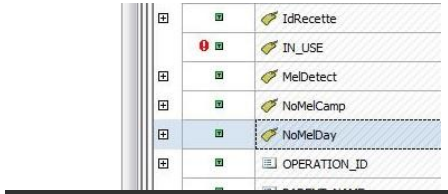
Real time vizualisation
Monitoring, real time information on product and process

A central Asset Template repository

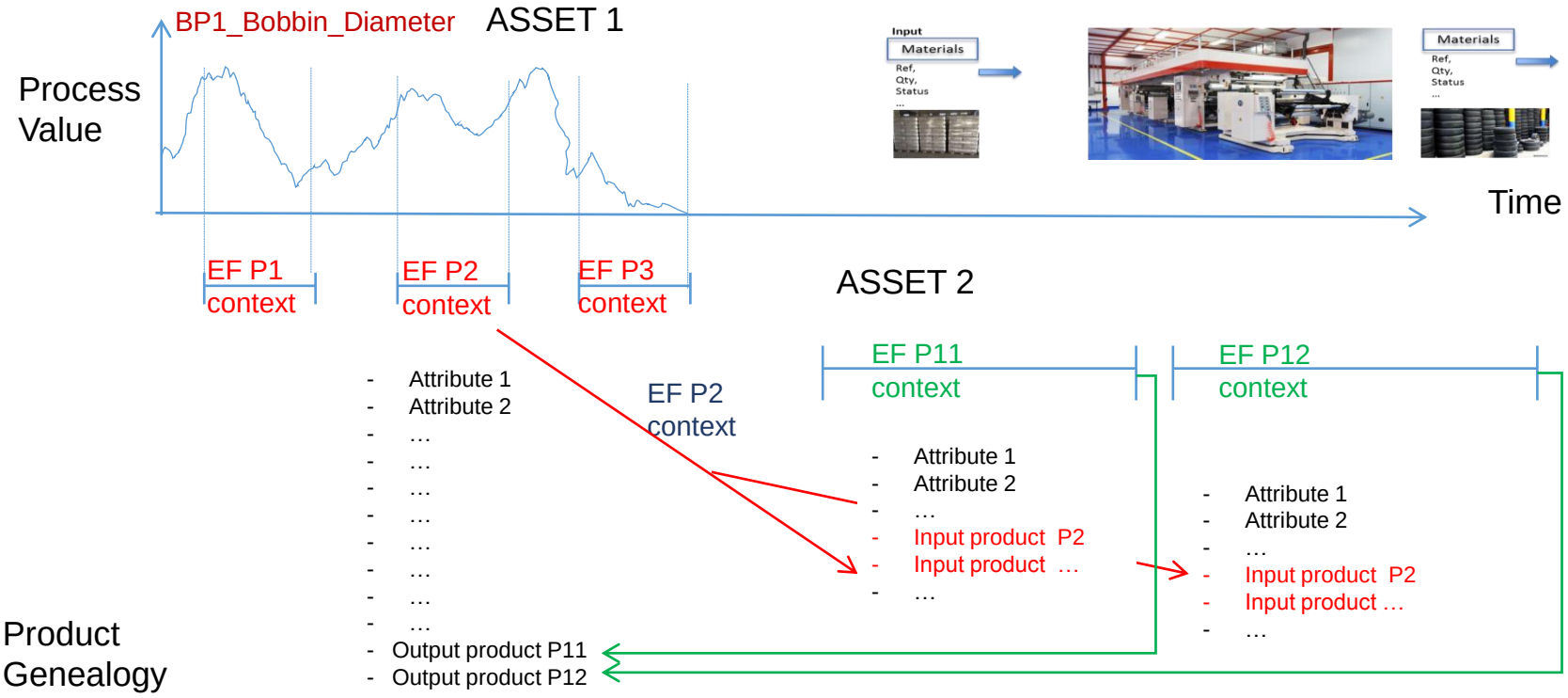


Leverage AF for asset management





Leverage EF for contextualization



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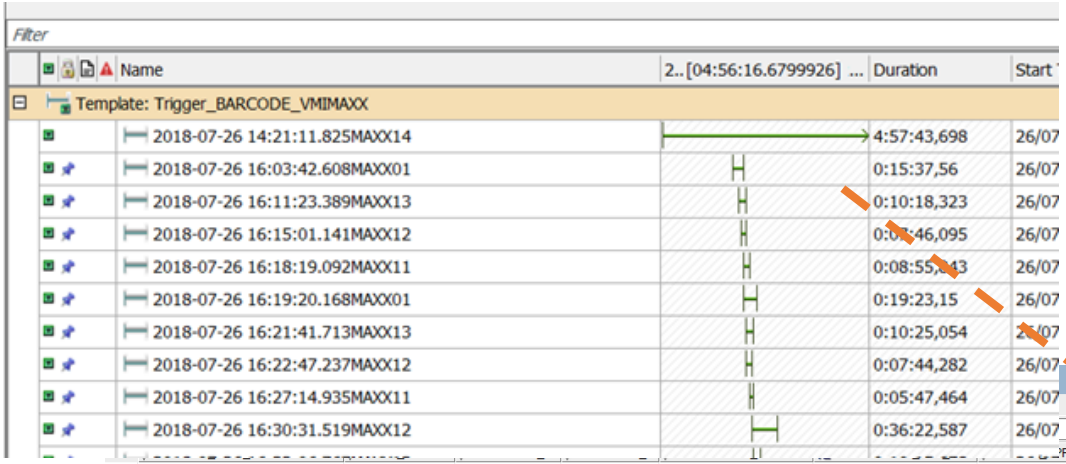
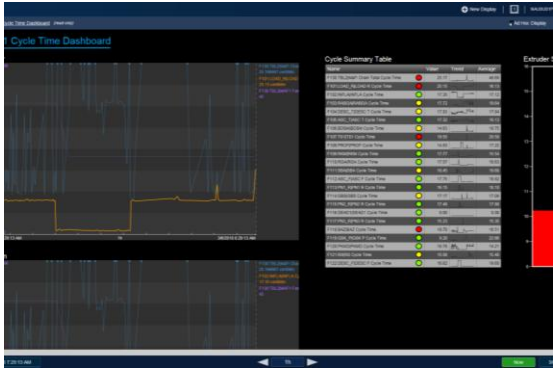


Production Step captured by EventFrame and Push to our dataware

33	ARD-18207-9BAB-9B092134	ARD05.01.11	BDG	(null)	26/07/18 17:40:36	26/07/18 17:43:31	Osisoft	26/07/18 17:50:35	PI_2_FDW_EVT_FRAME + EventFrame_After_insert trigger	N/A	N/A
34	ARD-18207-9FAB-9F005228	ARD05.01.13	BDG	(null)	26/07/18 17:34:06	26/07/18 17:41:53	Osisoft	26/07/18 17:50:34	PI_2_FDW_EVT_FRAME + EventFrame_After_insert trigger	N/A	N/A
35	ARD-18207-V7AB-V7024753	ARD05.01.12	BDG	(null)	26/07/18 17:35:32	26/07/18 17:40:48	Osisoft	26/07/18 17:50:35	PI_2_FDW_EVT_FRAME + EventFrame_After_insert trigger	N/A	N/A
36	ARD-18207-9BAB-9B092131	ARD05.01.11	BDG	(null)	26/07/18 17:34:43	26/07/18 17:40:36	Osisoft	26/07/18 17:50:35	PI_2_FDW_EVT_FRAME + EventFrame_After_insert trigger	N/A	N/A
37	ARD-18207-V7AB-V7024752	ARD05.01.12	BDG	(null)	26/07/18 17:32:54	26/07/18 17:35:32	Osisoft	26/07/18 17:40:37	PI_2_FDW_EVT_FRAME + EventFrame_After_insert trigger	N/A	N/A
38	ARD-18207-9BAB-9B092129	ARD05.01.11	BDG	(null)	26/07/18 17:31:46	26/07/18 17:34:43	Osisoft	26/07/18 17:40:37	PI_2_FDW_EVT_FRAME + EventFrame_After_insert trigger	N/A	N/A
39	ARD-18207-611505-45128112	0515	CURING	N/A	(null)	26/07/18 17:33:46	PDO	26/07/18 14:19:00	PRODUCTION_OPERATION_MATRI_Thu Jul 26 17:34:56 CDT 2018	ARD-TCAR	ARD
40	ARD-18207-611505-45128113	0516	CURING	N/A	(null)	26/07/18 17:33:46	PDO	26/07/18 14:23:41	PRODUCTION_OPERATION_MATRI_Thu Jul 26 17:34:56 CDT 2018	ARD-TCAR	ARD
41	ARD-18207-325573-3H825219	0520	CURING	N/A	(null)	26/07/18 17:33:41	PDO	26/07/18 14:16:40	PRODUCTION_OPERATION_MATRI_Thu Jul 26 17:34:56 CDT 2018	ARD-TCAR	ARD
42	ARD-18207-325573-3H816694	0519	CURING	N/A	(null)	26/07/18 17:33:41	PDO	26/07/18 14:19:00	PRODUCTION_OPERATION_MATRI_Thu Jul 26 17:34:56 CDT 2018	ARD-TCAR	ARD
43	ARD-18207-551735-4Z180422	0632	CURING	N/A	(null)	26/07/18 17:33:38	PDO	26/07/18 11:56:29	PRODUCTION_OPERATION_MATRI_Thu Jul 26 17:34:56 CDT 2018	ARD-TCAR	ARD
44	ARD-18207-551735-4Z181376	0631	CURING	N/A	(null)	26/07/18 17:33:38	PDO	26/07/18 11:56:29	PRODUCTION_OPERATION_MATRI_Thu Jul 26 17:34:56 CDT 2018	ARD-TCAR	ARD
45	ARD-18207-325573-3H821512	0517	CURING	N/A	(null)	26/07/18 17:33:38	PDO	26/07/18 14:28:16	PRODUCTION_OPERATION_MATRI_Thu Jul 26 17:34:56 CDT 2018	ARD-TCAR	ARD

Greenville SC - USA - US1

Tire Building - Cycle Time Monitoring



CHALLENGE

Multi-post tire building machine with known cycle time drift

- Trends or shifts in performance are often not recognized until the previous day's data can be analyzed.
- Retrieval of historical cycle time data is tedious and slow

SOLUTION

PI AF for Equipment Model
PI Vision for real time visualization

- PI allows us to monitor this data in real time and retrieve historical data almost instantaneously
- This will allow operators to recognize and correct cycle time issues in real time.

RESULTS

- On 2 out of every 11 cycles we were losing 4cmin or an average of 0.72cmin per cycle. Roughly a 3.5% degradation in performance.
- A 3.5% loss in cycle time on this type of machine means approximately 75 tires less per shift

Valladolid - Spain - VLD

Quality Monitoring

CHALLENGE

Understand multifactor correlation on a discrete multistep process

- Upstream process paramaters impact downstream results
- Finish product characteristics are not aggregated with upstream context

SOLUTION

PI AF for Equipment Model
PI EF for Product/Operation contact

- PI allows us to monitor process parameter in real times
- We push the data in the datalake using PI Integrator
- We identify correlations applying Advanced Analytics tools on a dataset in dataware

RESULTS

- 1500 product and process characteristics collected along the production line
- Multi-variable correlation analysis available in real timefor the quality technician

Take Away

- Data driven approach first
- The magic tool does not exist, use software for its capabilities
- Start with a toolset mastered by the teams
- Empower each contributor through a shared single source of true : the data
- It’s a journey, and we’re just at the beginning

Questions?

Please wait for the **microphone**

State your **name & company**

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