



Intelligent Lifecycle Asset Management

Cradle to Grave Data Utilization in
Transportation

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Systems Engineer



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Intelligent → Data

Intelligent Lifecycle

Lifecycle Asset Management Infrastructure

Asset Management → Scalable, extensible
Contextualized



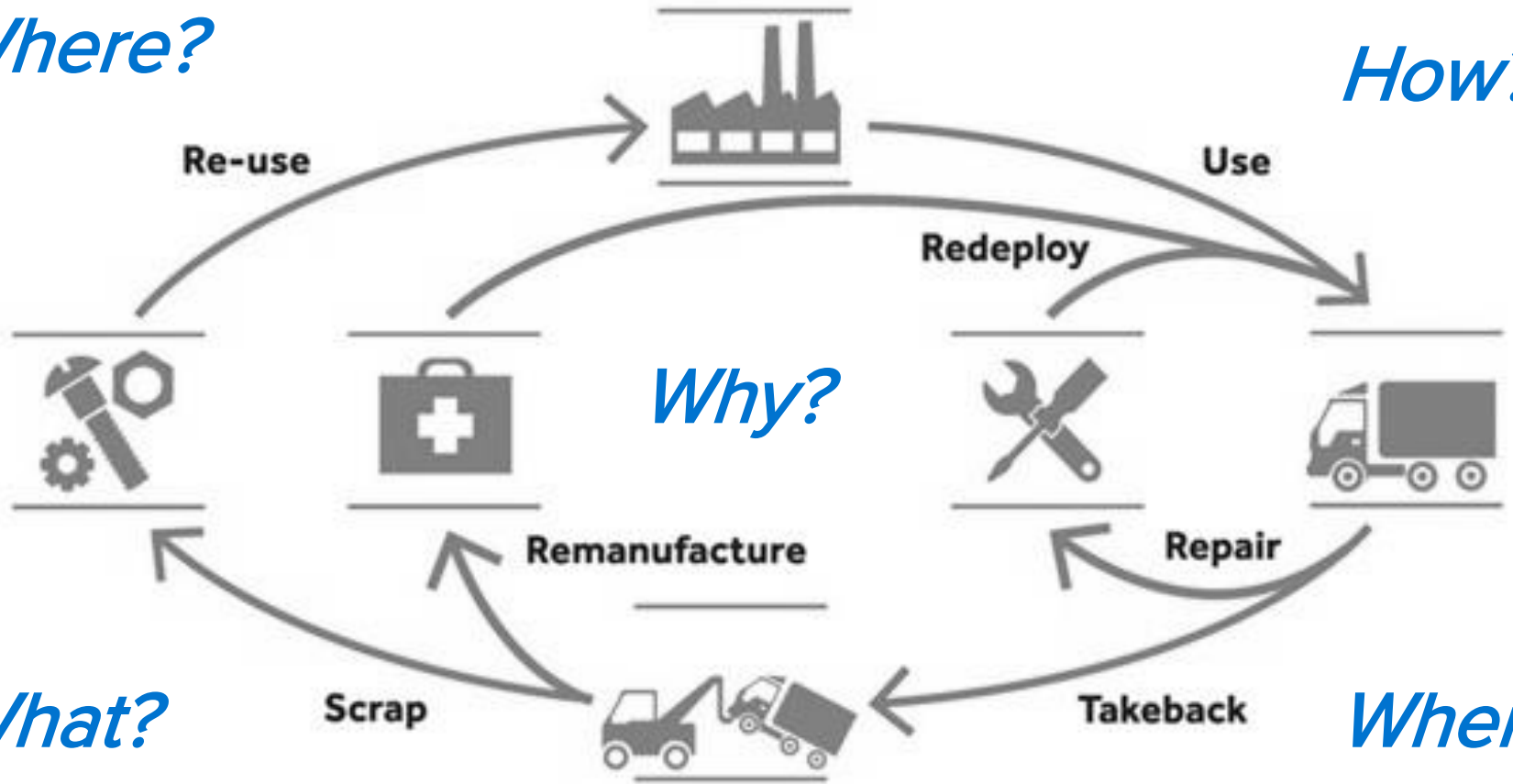
Where?

How?

What?

When?

Why?



<http://www.dllgroup.com/Industries/Transportation>



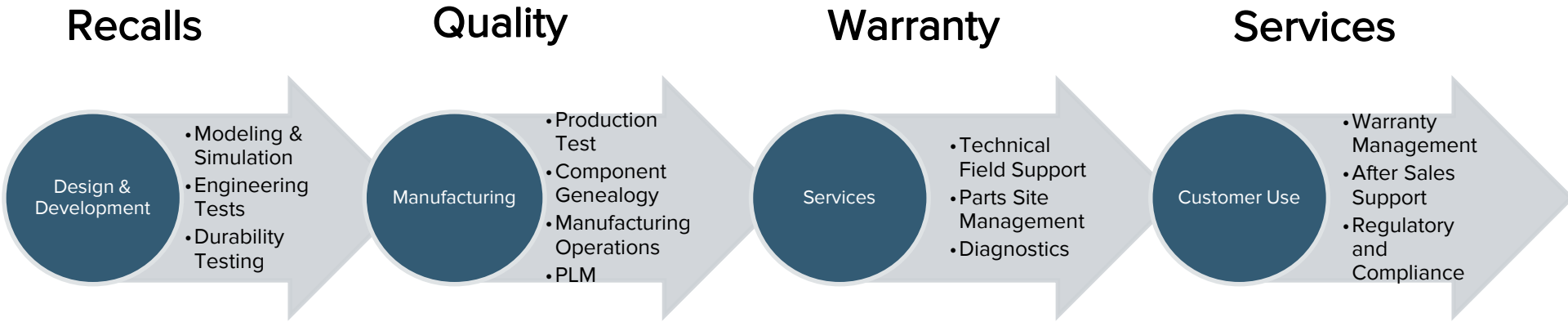
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Intelligent Lifecycle Asset Management

Cradle to Grave Data Utilization



Product Usage Insights

Better Service and Support



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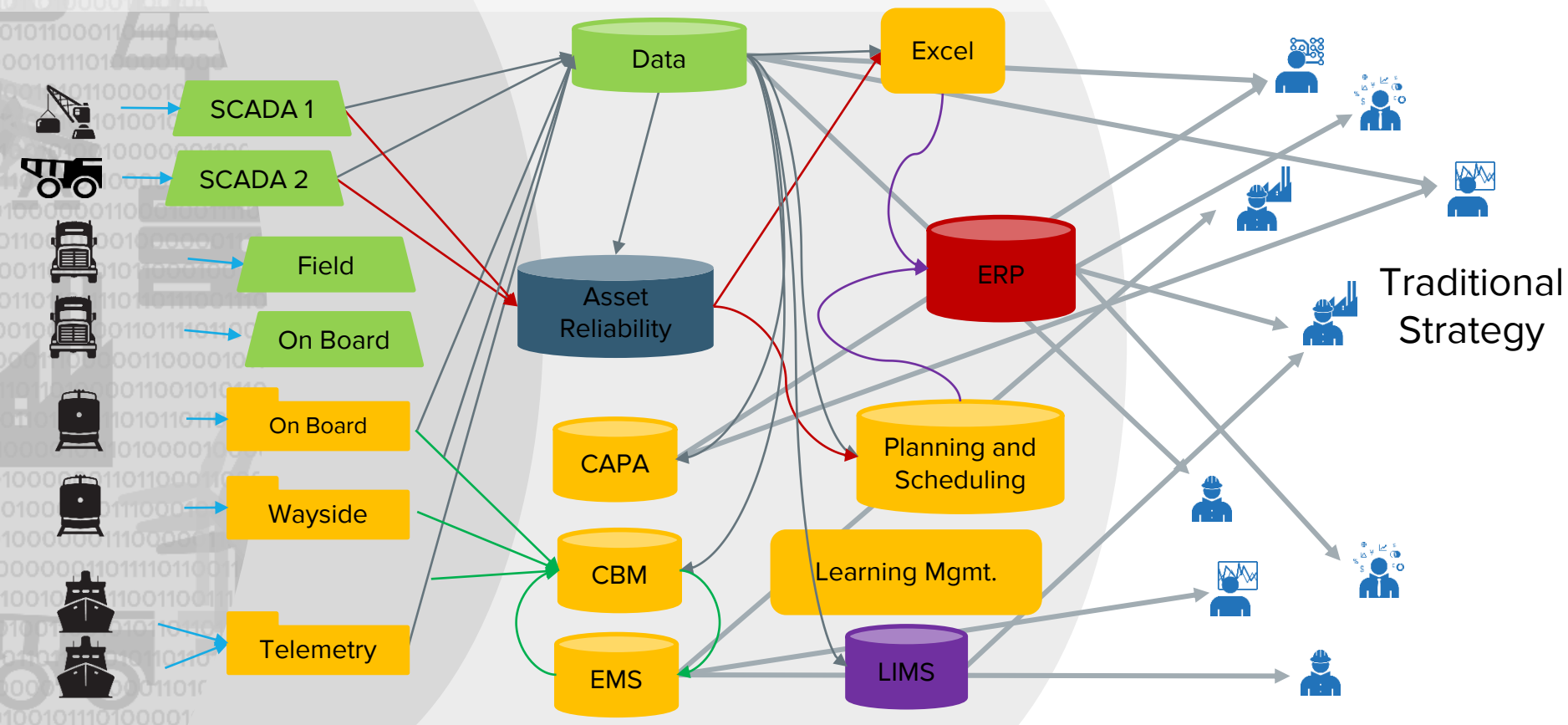
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A Real-Time Data Infrastructure

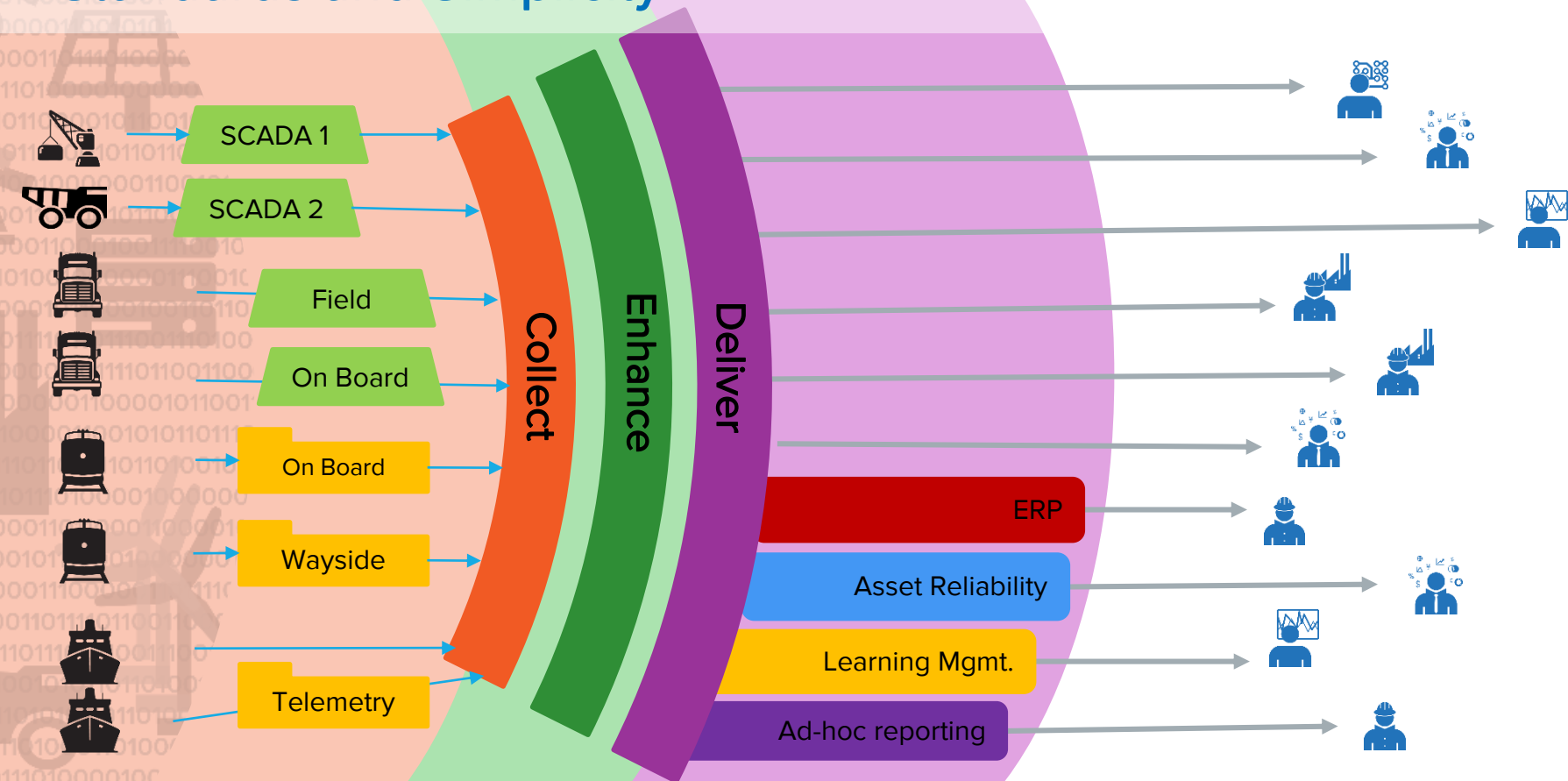


Silos and Complexity

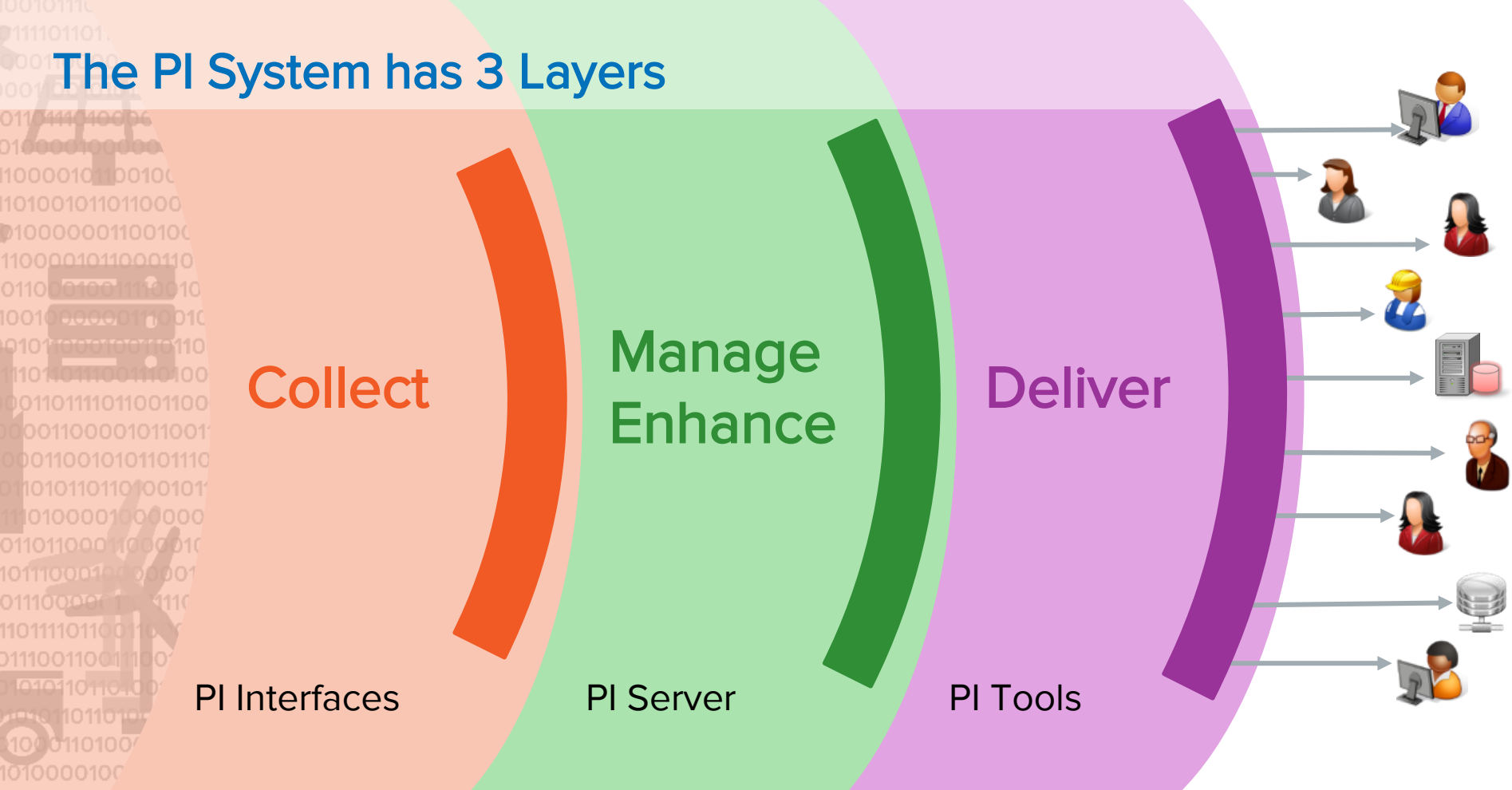


Traditional Strategy

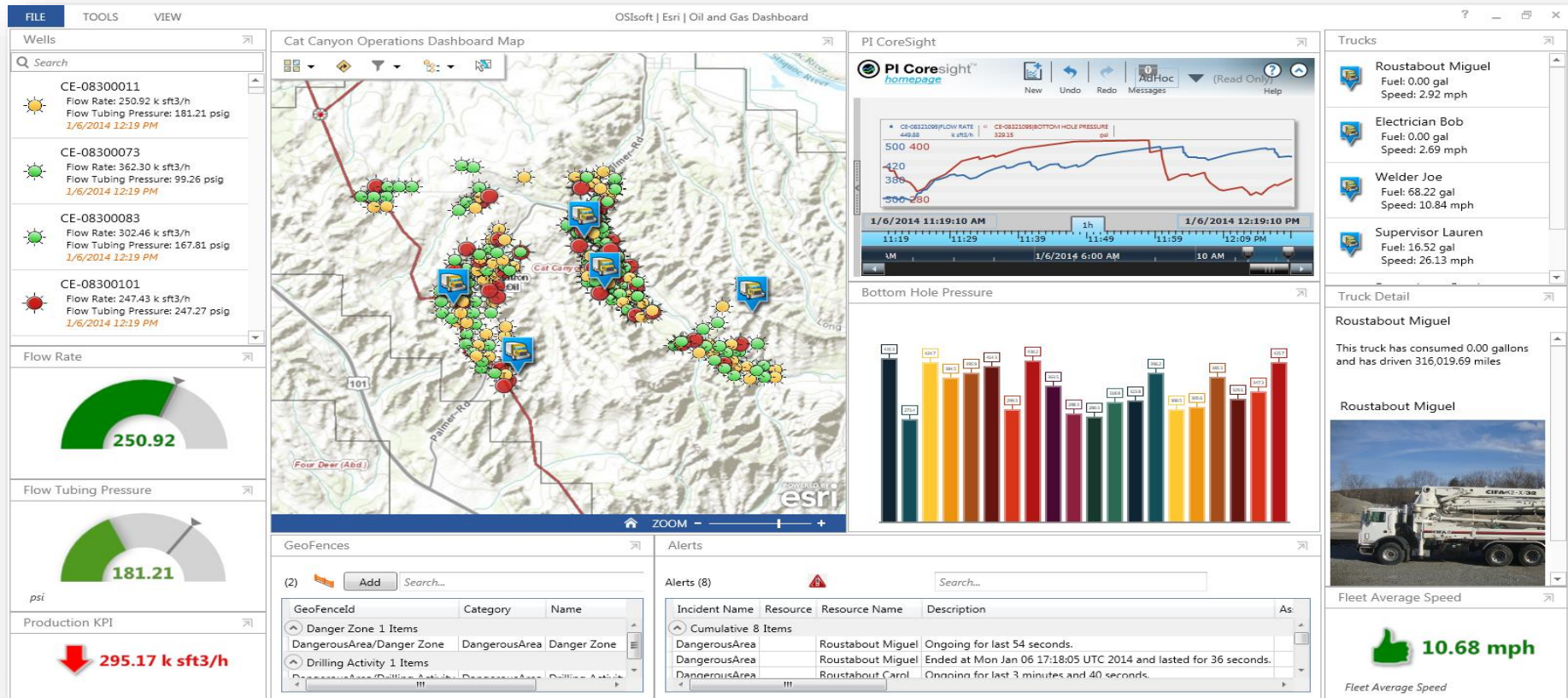
Standards and Simplicity



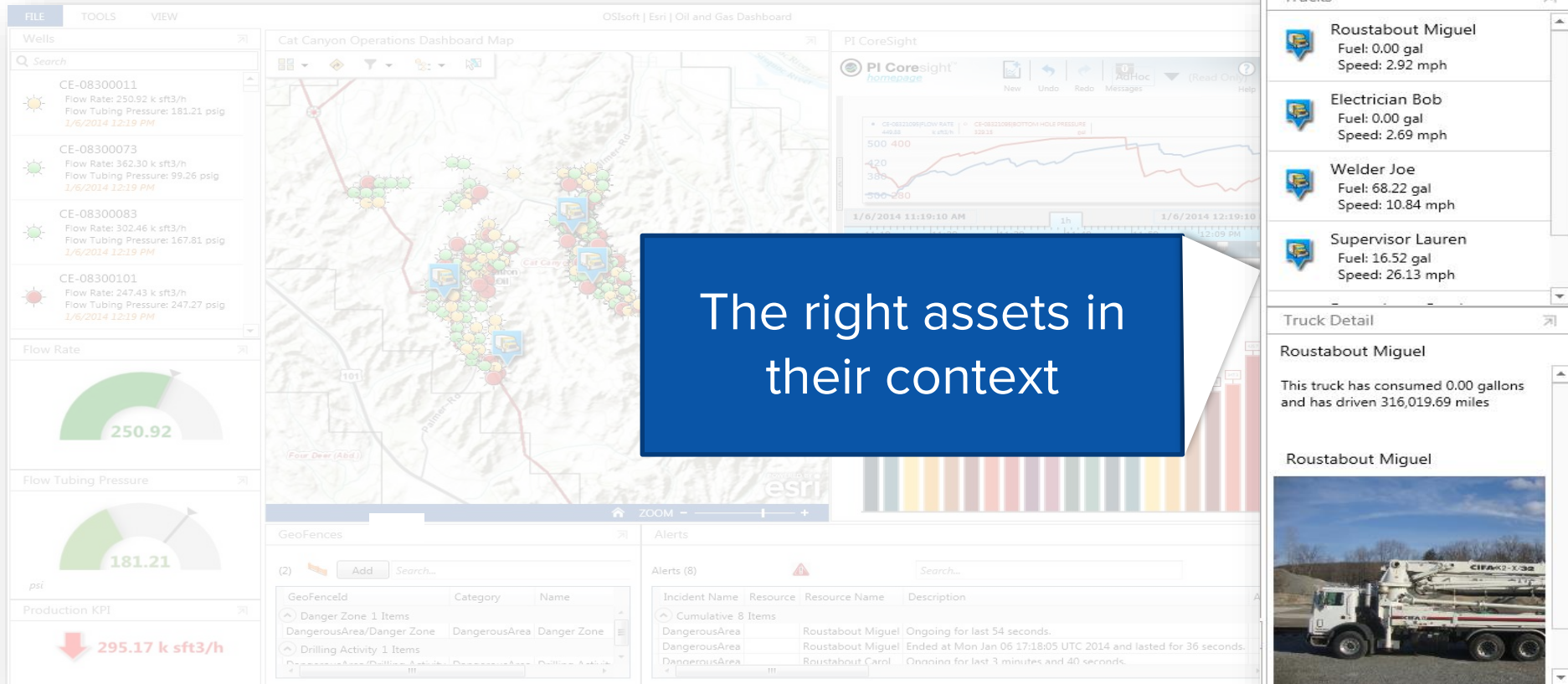
The PI System has 3 Layers



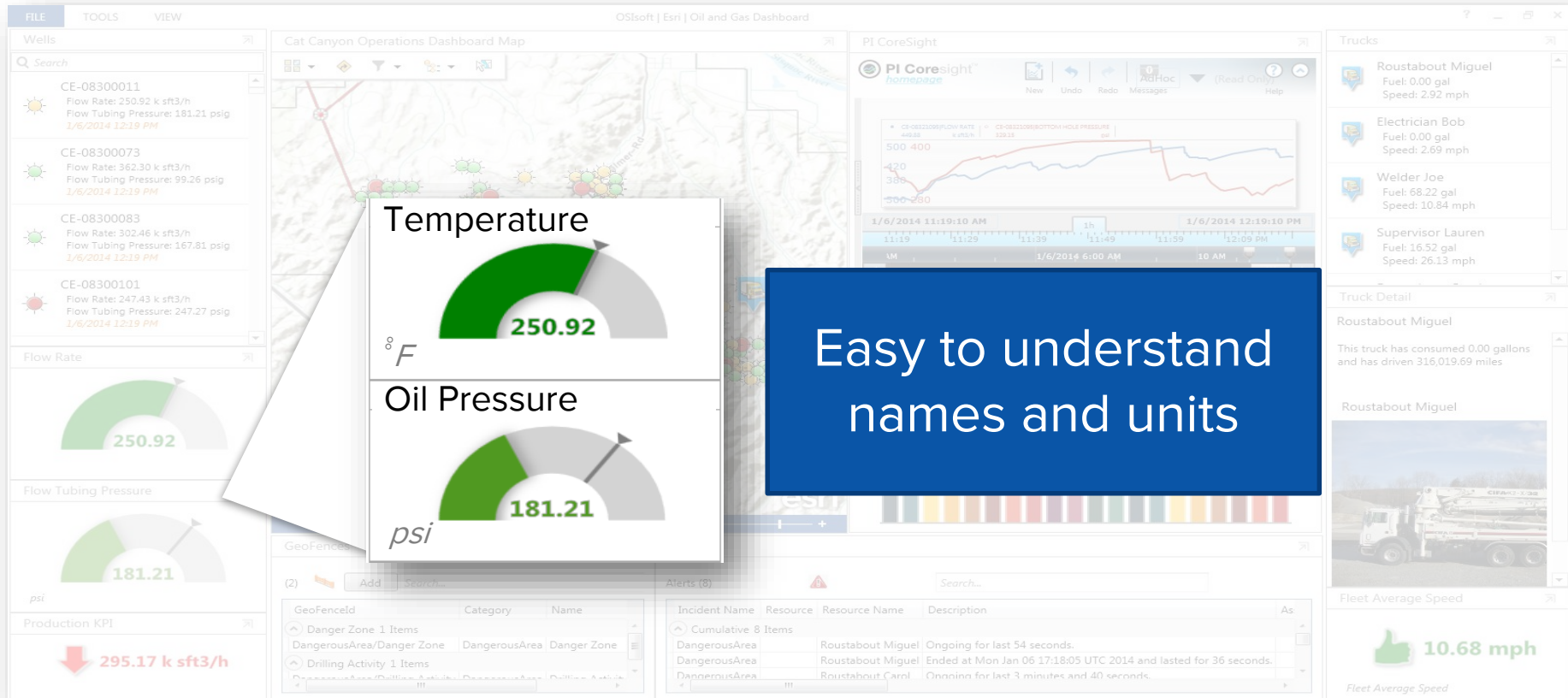
A look at decision-ready information



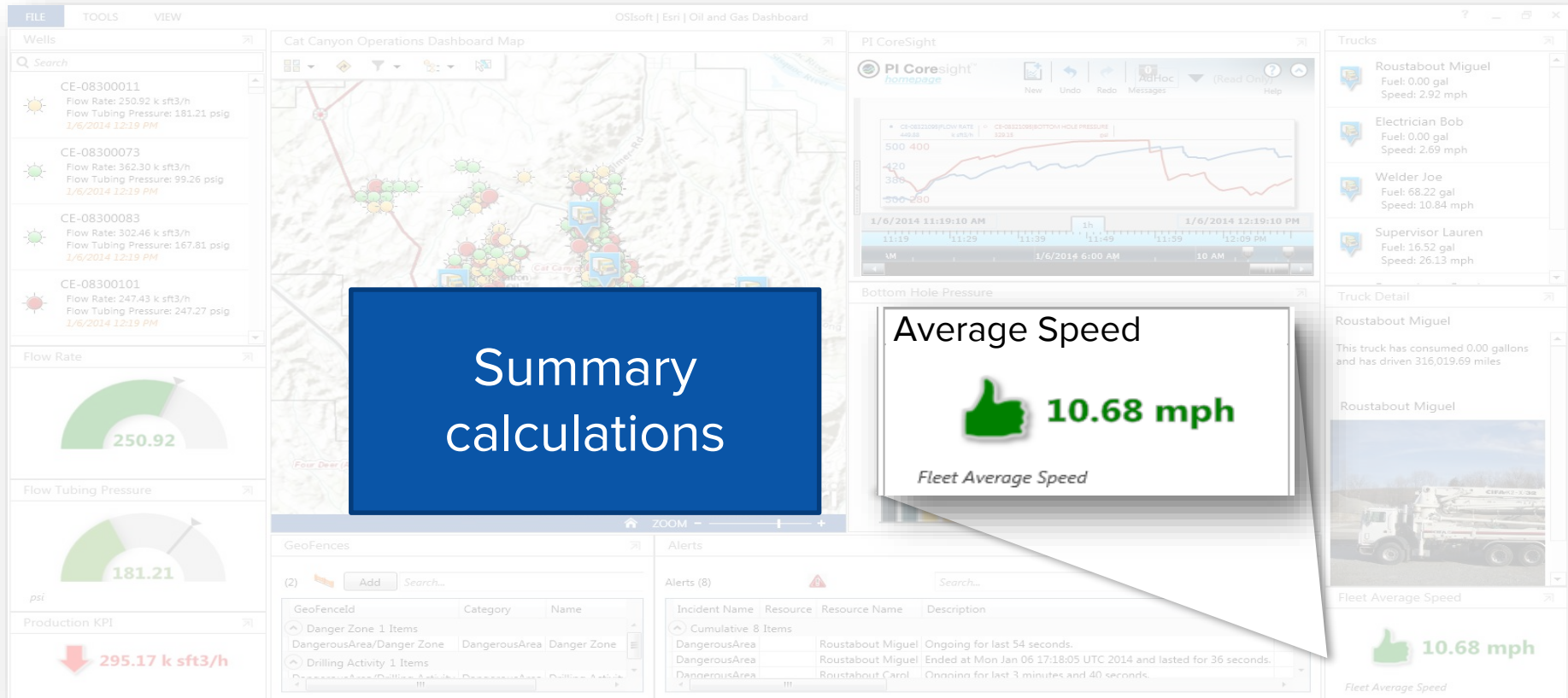
A look at decision-ready information



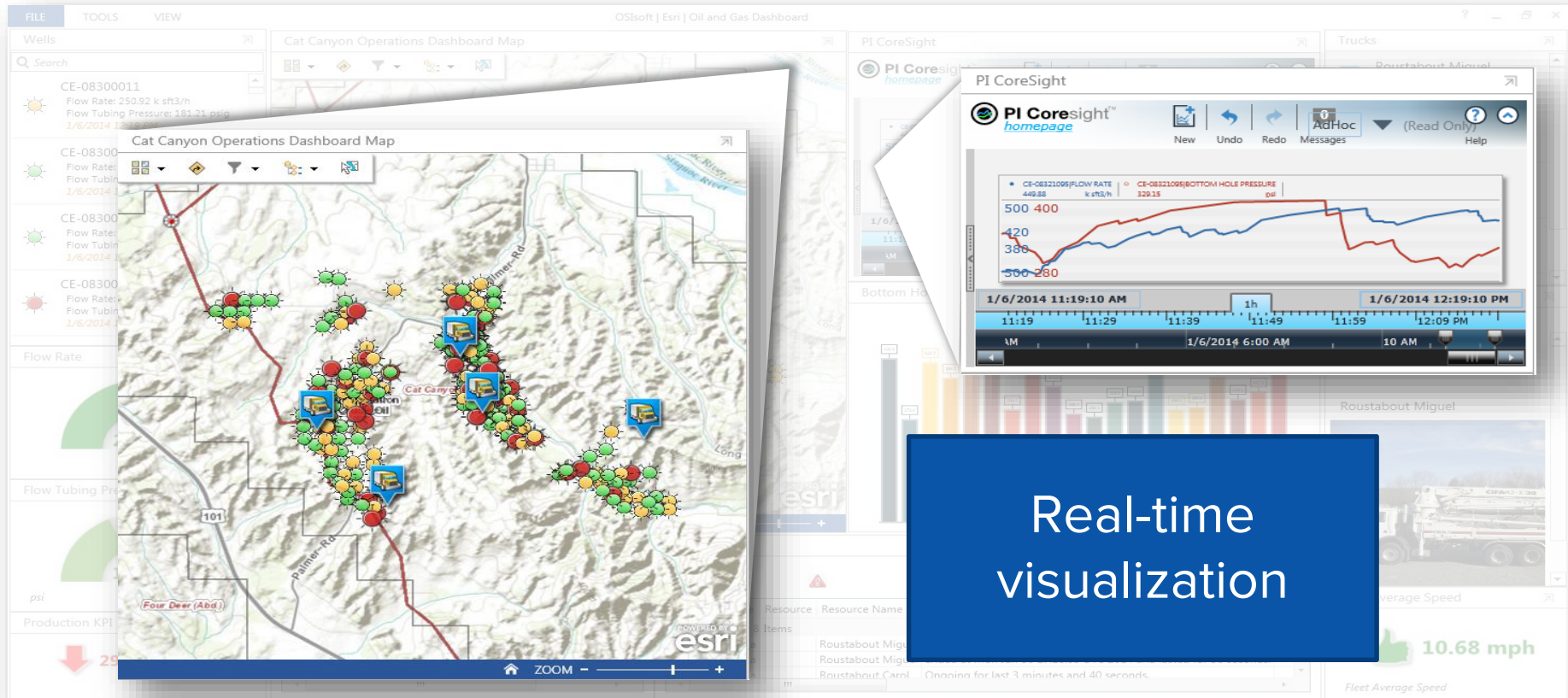
A look at decision-ready information



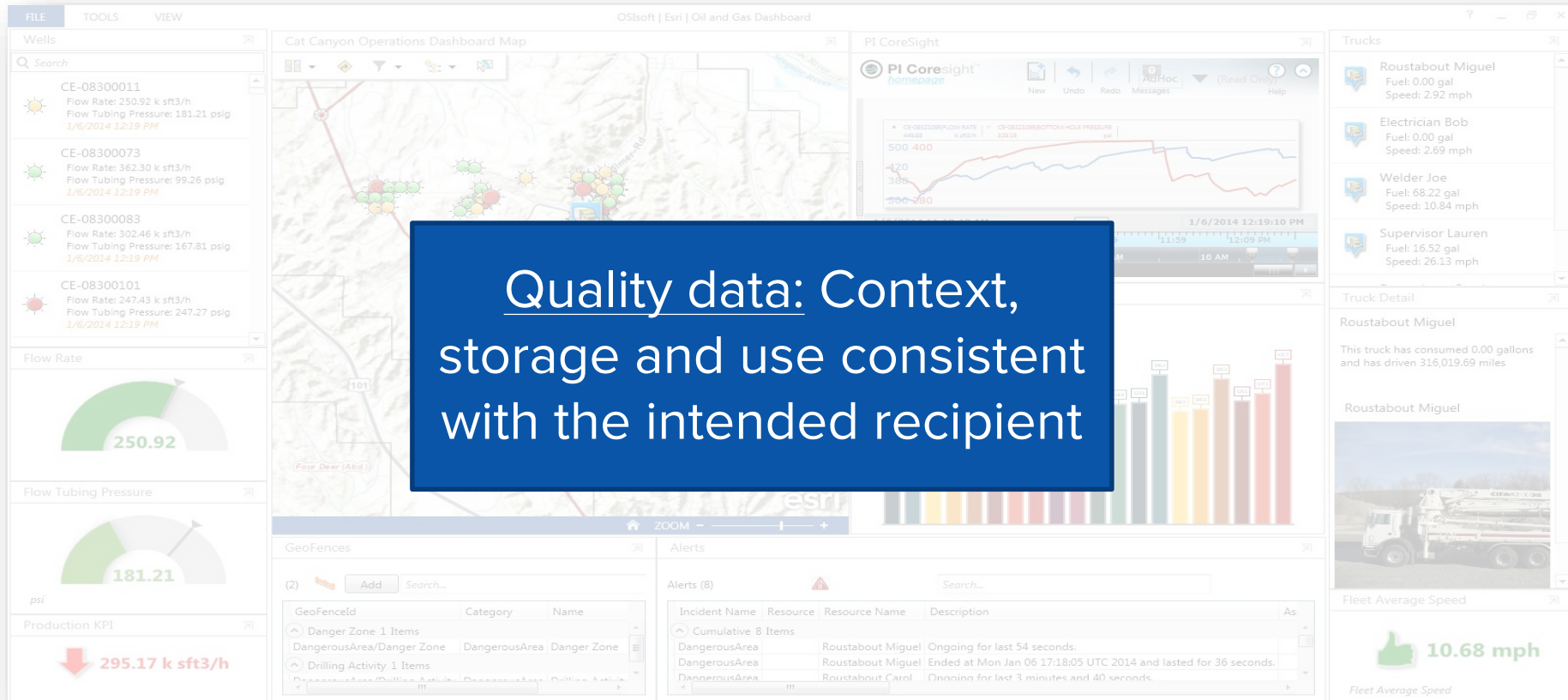
A look at decision-ready information



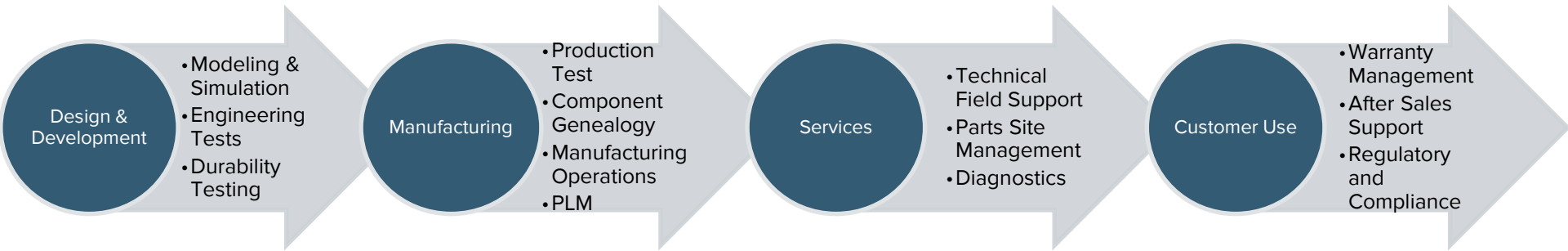
A look at decision-ready information



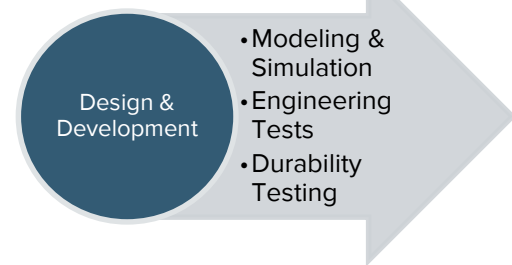
A look at decision-ready information



Design and Development



Design and Development



Key enablers:

- Designed for **intended use**
- Define operational and manufacturing specifications
- **Data driven** decision making
- Optimal iterative approach to design and tests
- Data capture along the process to **report** and **act**

Design and Development

Design & Development

- Modeling & Simulation
- Engineering Tests
- Durability Testing

DR DENIS BOUCHER PHD
LA SCIENCE DES RÉSULTATS

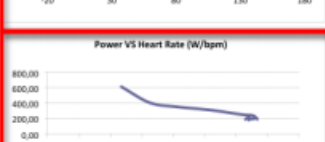
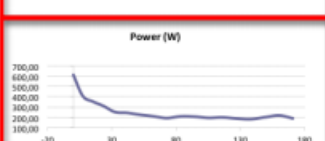
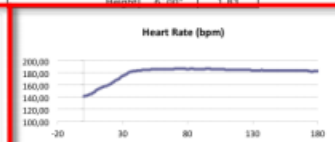
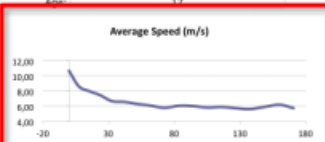
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ON-ICE TESTING



Client: Tigres de Victoriaville
Date: October 26th, 2010
Name: Player 1
Age: 23

	Imperial	SI
Weight (lbs)	173	78.64
With Equipment	195	88.64
Height	6'200"	1.83



DATA

Heart Rate	
Predicted	203
Maximum	187
Reserve	16

Power (W)	
Critical Power	202.82
Ratio Pmax	33.04%
Work (KJ)	40.38
WEP (KJ)	3.67

Speed (m/s)		Time to exhaustion	
Max.	10.65	Speed	Seconds
Avg. CP	5.95	10.65	8.93
		8.60	17.95
		7.45	34.33
		6.06	522.34

Run	Start	End	Duration (s)	Speed	Power	% Max Pwr	HR	BR	Amplitude (m)
1	10:10:27 AM	10:10:32 AM	5.63	10.65	614	100.00%	144	19.2	0.059
2	10:10:34 AM	10:10:41 AM	6.98	8.60	407	66.35%	152	19.1	0.063
3	10:10:42 AM	10:10:49 AM	7.51	7.99	354	57.63%	161	18.2	0.071
4	10:10:50 AM	10:10:58 AM	8.06	7.45	310	50.46%	172	17.6	0.080
5	10:10:59 AM	10:11:08 AM	9.01	6.66	251	40.86%	182	16.9	0.079
6	10:11:09 AM	10:11:18 AM	9.16	6.55	243	39.59%	185	17.1	0.073
7	10:11:19 AM	10:11:28 AM	9.55	6.28	225	36.59%	186	18.1	0.073
8	10:11:29 AM	10:11:39 AM	9.90	6.06	210	34.19%	186	19.0	0.082
9	10:11:39 AM	10:11:50 AM	10.38	5.78	192	31.33%	187	19.7	0.076
10	10:11:50 AM	10:12:00 AM	9.92	6.05	209	34.08%	186	20.5	0.074
11	10:12:01 AM	10:12:11 AM	9.99	6.00	206	33.63%	186	21.2	0.074
12	10:12:12 AM	10:12:22 AM	10.31	5.82	195	31.70%	185	21.5	0.076
13	10:12:23 AM	10:12:33 AM	10.19	5.89	199	32.40%	185	22.0	0.074
14	10:12:34 AM	10:12:44 AM	10.49	5.72	189	30.71%	184	22.8	0.072
15	10:12:45 AM	10:12:55 AM	10.69	5.61	182	29.65%	184	23.6	0.074
16	10:12:56 AM	10:13:06 AM	10.13	5.92	201	32.79%	184	24.6	0.079
17	10:13:07 AM	10:13:17 AM	9.72	6.17	217	35.41%	184	23.8	0.093
18	10:13:17 AM	10:13:28 AM	10.46	5.74	190	30.89%	183	23.6	0.088
19									

RECOMMENDATIONS

High initial power at 614 watts. Fast power degradation.
Normal physiological parameters.
Critical power at 203 watts, 33% of maximum power.
The player exhausted anaerobic energy rapidly.
The training should aim at delaying the critical power.
Training at high intensity intervals is recommended
Explosive player, but exhausting himself rapidly.

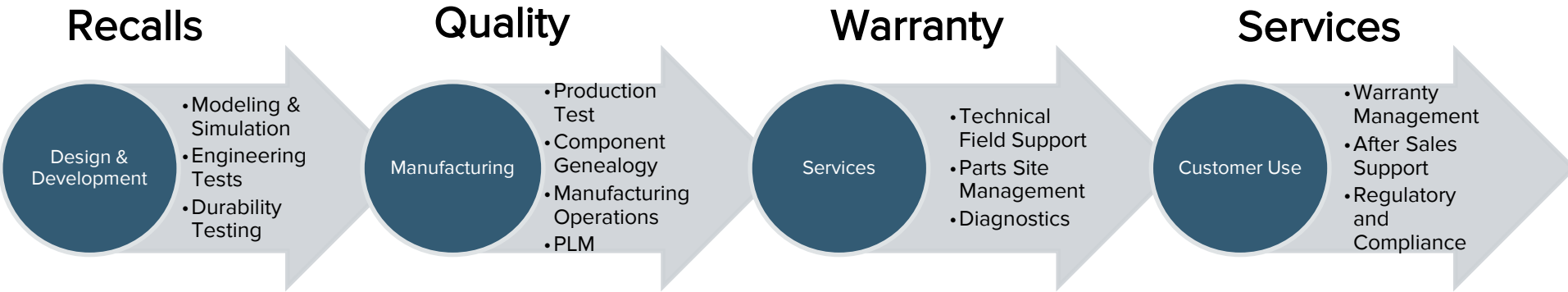
Solution Components

- Mobile sensors
- PI Interfaces
- PI Asset Framework
- Mobile visualization

http://www.osisoft.com/resources/presentations/presentation_abstracts/2011_-_Users_Conference_-_San_Francisco/Elite_Athlete_Monitoring_and_Analysis_Using_PI_System_2010.aspx?terms=hockey

Intelligent Lifecycle Asset Management

Cradle to Grave Data Utilization



Product Usage Insights

Better Service and Support

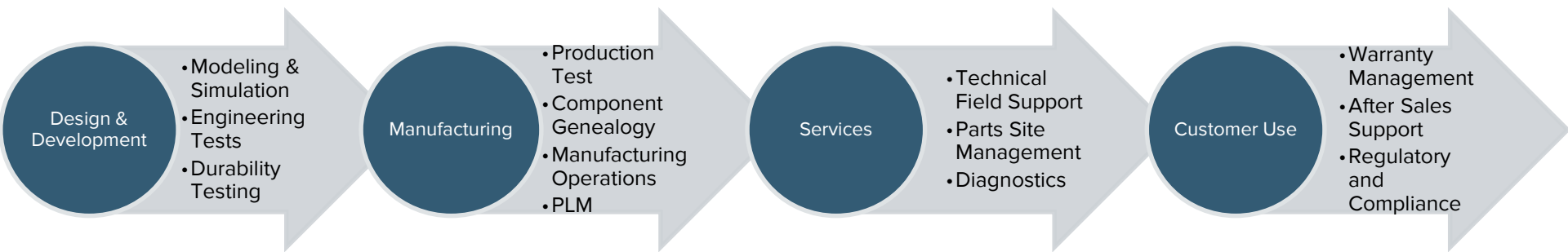


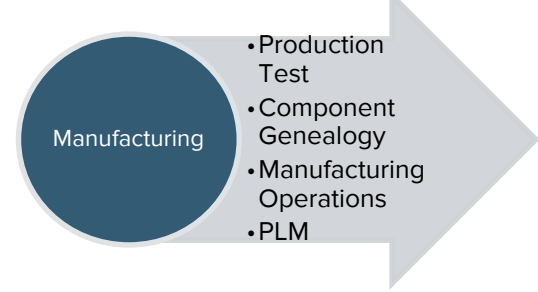
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Manufacturing





Key enablers:

- Manufacture to specifications
- Set **targets** and **track** production
- Identify **defects** and **excursions**
- Track **energy** and **resource** consumption
- Provide **real-time** access to production data allowing timely corrective actions

The PI System at *BlueSolutions*

*“Enter A World That Is
100% Electric”*



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The PI System at BlueSolutions

“Speed up transition to sustainable energy use in transportation while creating new opportunities.”



BUSINESS CHALLENGES

- Develop both the **product** and the industrial manufacturing **processes** for battery production.
 - Track product manufacturing
 - Lower production costs
 - Support R&D

SOLUTION

- **Real-time data** availability is critical in order to **optimize** the process.
 - The PI System captures data
 - PI System Tools used to detect problems and prioritize future investments

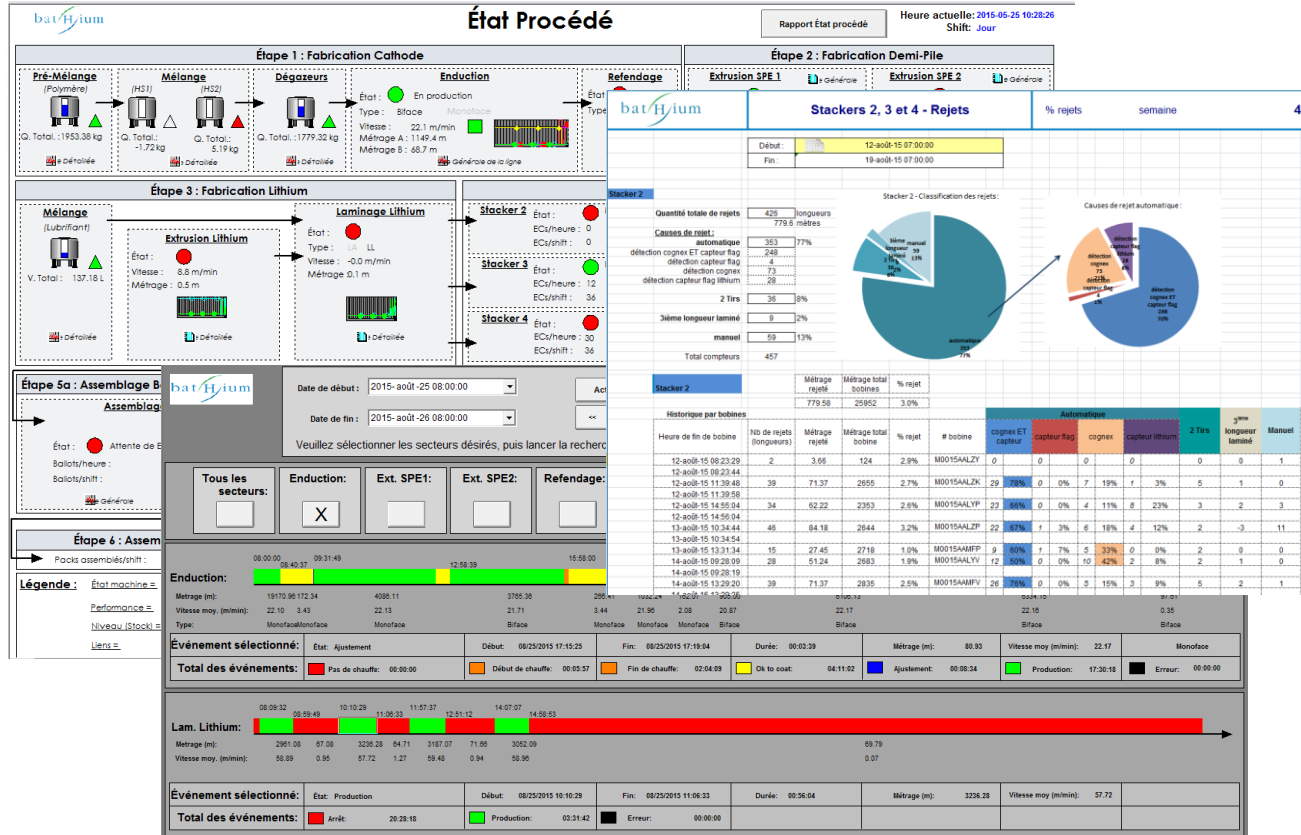
RESULTS AND BENEFITS

- The PI System empowers each division to **improve its performance**
 - Downtime tracking enables enhanced productivity
 - Continuous improvement becomes a reality

The PI System at BlueSolutions

Manufacturing

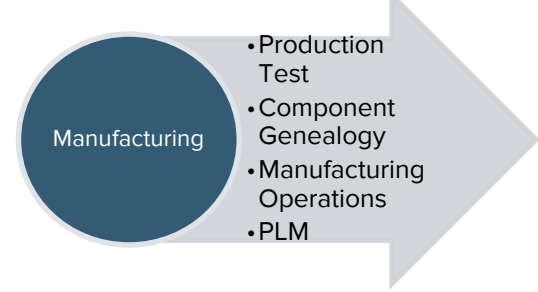
- Production Test
- Component Genealogy
- Manufacturing Operations
- PLM



Solution Components

- PI Interfaces
- PI Data Archive
- PI Asset Framework
- PI Event Frames
- Asset Analytics
- PI Visualization Suite
- PI Developer Technologies

The PI System at *BlueSolutions*

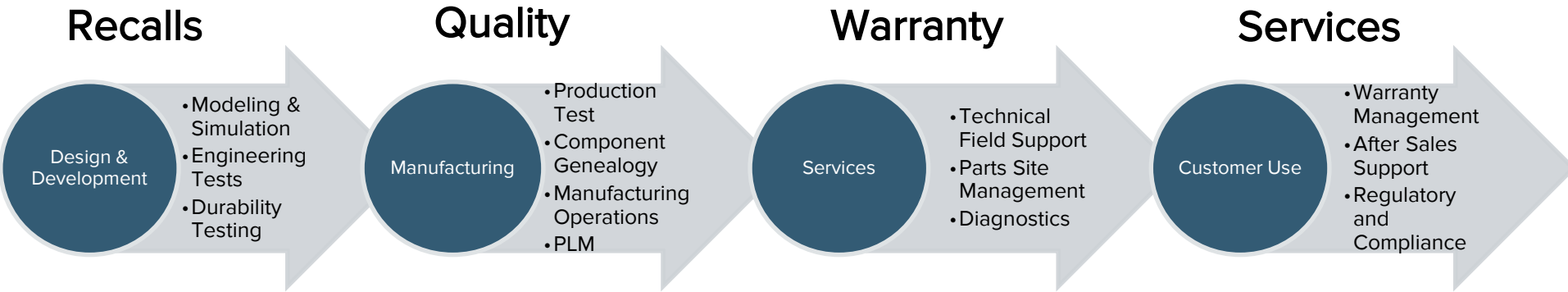


- PI System is used **throughout the production process**
- Each product is **tested** before it leaves the plant
- **End of line** test data is captured and archived
- **Forensics** are performed when problems occur or when overperforming units are identified



Intelligent Lifecycle Asset Management

Cradle to Grave Data Utilization



Product Usage Insights

Better Service and Support

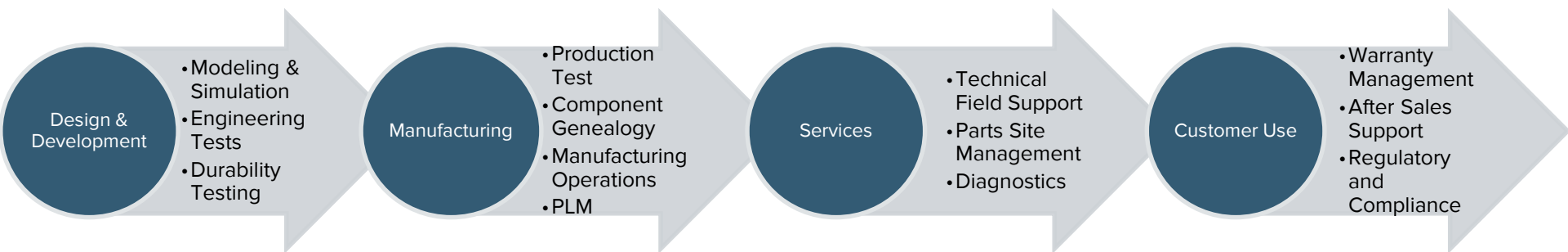


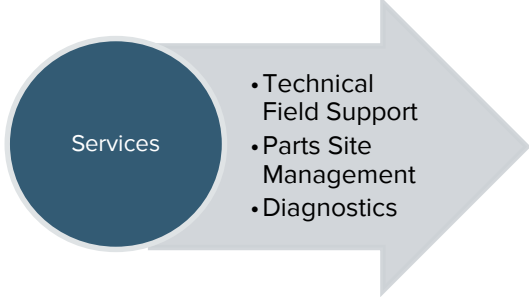
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Services





Key enablers:

- **Exchange data** with Suppliers, Vendors, Partners, and Service Providers
- Open up the capability for partners to provide **data driven services**
- Service based on measured **conditions** and **usage**

The PI System at Kongsberg Maritime

“Kongsberg Maritime has installed dynamic positioning, navigation, subsea survey, safety management and satellite positioning solutions on over **16,000** maritime vessels.”

CHALLENGES

- K-IMS received 300,000 e-mails and 20,000 calls/year
- Service requests were distributed 24/7 across Kongsberg US, Singapore and Norway offices
- The volume and diversity of maritime data sources was hard to integrate

SOLUTION

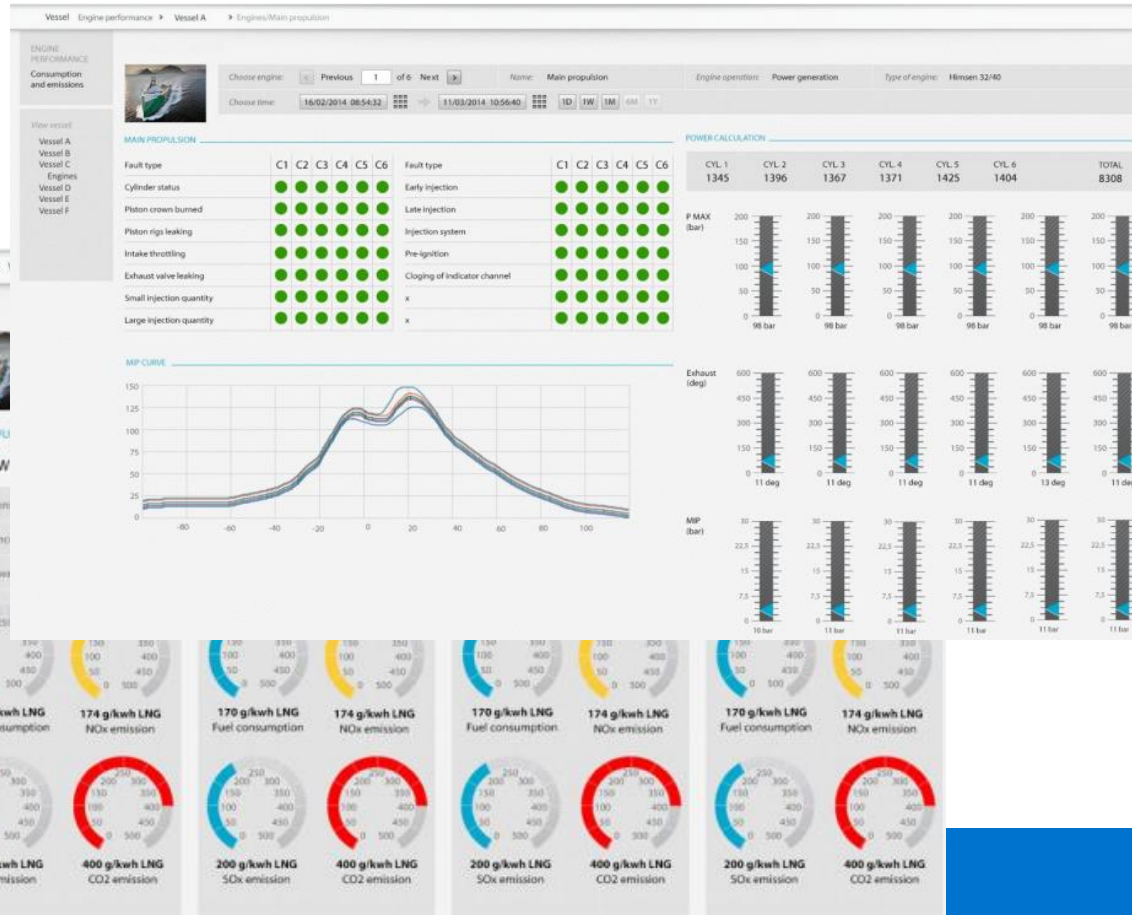
- Implement the PI System to collect vessels data and transmit to central support offices
- Securely exchange identified data streams among trusted partners with PI-Cloud Connect

RESULTS

- Reduced down time and service costs
- Improved predictability optimized logistics and performance
- Improved communication
- Unlock future growth by monitoring additional systems



The PI System at Kongsberg Maritime



Solution Components

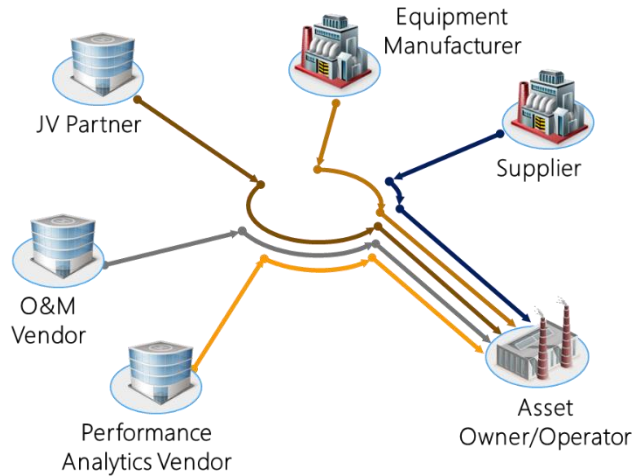
- PI Connectors
- PI Cloud Connect
- PI Developer Technologies

PI Cloud Connect

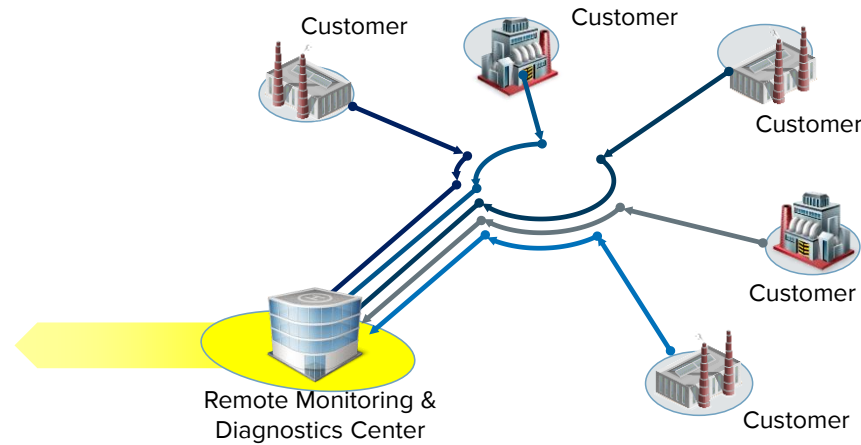
Services

- Technical Field Support
- Parts Site Management
- Diagnostics

Multiple stakeholders...



... a Service Provider perspective



Powered by:



Connected Services is a simple, secure, technical and **commercial framework** for **service providers** to obtain the data they need to drive service excellence

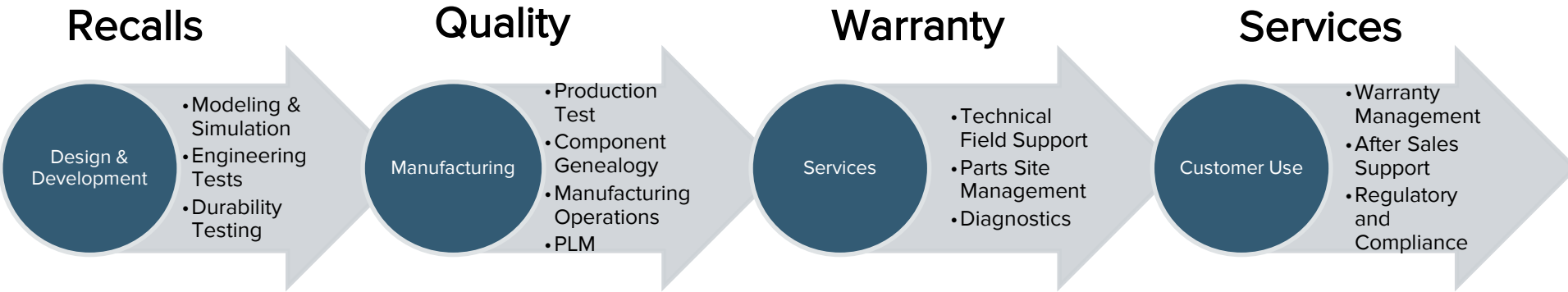


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Intelligent Lifecycle Asset Management

Cradle to Grave Data Utilisation



Product Usage Insights

Better Service and Support

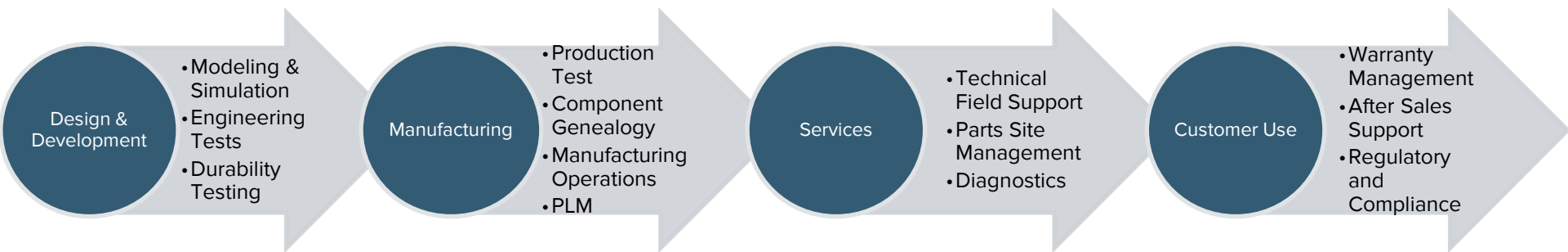


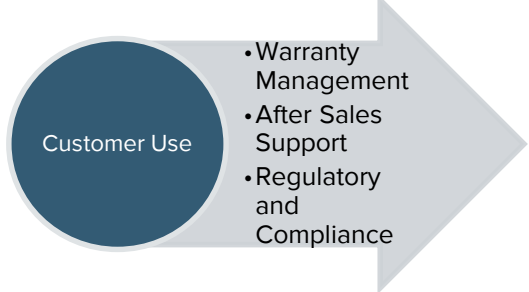
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Customer Use





Key enablers:

- Ensure assets are **used as designed**
- Collect data **remotely** from field assets
- **Centralize** it into a single database for analysis
- Perform advance **analytics** to identify **patterns**
- Provide a **transparent** platform for users to see what data you collect and what you are doing with it

Customer Use

Customer Use

- Warranty Management
- After Sales Support
- Regulatory and Compliance

Statistical
Analytics

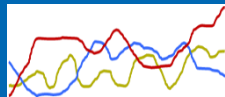


Analytical
Insight



Visual
Analytics

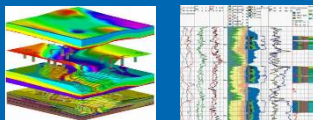
Time Series



Relational



GIS



Unstructured



The PI System let you Leverage Big Data for Insights



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The PI System at **Syncrude**

“Mining equipment uptime is a key factor in **operating efficiency**. Optimized **preventive maintenance** programs and **just-in-time intervention** are key to minimizing major component failures requiring days or weeks to repair.”



CHALLENGES

Transform reactive, time intensive forensic data reviews into automated, near real-time event synthesis and creation

SOLUTION

Implement an operational data-based solution using PI to improve maintenance for the fleet of heavy haulers

OSIsoft workshop to kick-start pilot project

RESULTS

Highly scalable solution with fully validated events generated in a fraction of the time

Step-change in equipment maintenance efficiency – near real-time notification

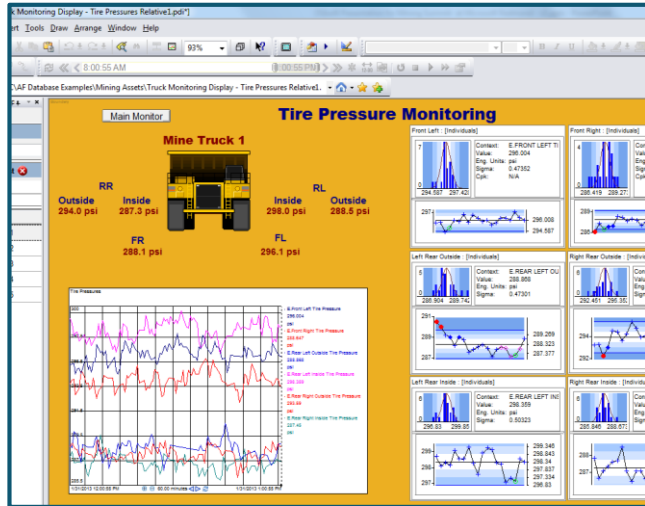


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Fleet Monitoring



- Easy to read KPI's provide visibility into asset health and response
- Trends are quickly identified and addressed

Trip and Utilization Reporting

Event Frame Search 1										
Filter										
	Name	1... [00:29:16] 1...	Start Time	End Time	Template	Primary Element	Duration	Engine Maxim...	Engine RPM	FR Brake
[-]	Truck 1 Roundtrip		1/23/2013 2:3...	1/23/2013 2:3...	Truck RoundTr...	Mine Truck 1	519 s			
	Waiting to Load		1/23/2013 2:3...	1/23/2013 2:3...	Truck Waiting f...	Mine Truck 1	44 s		1761.2230503...	
	Loading		1/23/2013 2:3...	1/23/2013 2:3...	Truck Loading ...	Mine Truck 1	20 s		1801.4734227...	
	Running Loaded		1/23/2013 2:3...	1/23/2013 2:3...	Truck Running ...	Mine Truck 1	323 s	1815.3516845...	1798.6389395...	232.885513
	Dumping Load		1/23/2013 2:3...	1/23/2013 2:3...	Truck Unloadin...	Mine Truck 1	92 s			
[-]	Truck 2 Roundtrip		1/23/2013 2:3...	1/23/2013 2:4...	Truck RoundTr...	Mine Truck 2	580 s		1813.7603304...	231.835464
	Waiting to Load		1/23/2013 2:3...	1/23/2013 2:3...	Truck Waiting f...	Mine Truck 2	42 s		1760.5804567...	
	Loading		1/23/2013 2:3...	1/23/2013 2:3...	Truck Loading ...	Mine Truck 2	24 s		1763.3744758...	
	Running Empty		1/23/2013 2:3...	1/23/2013 2:3...	Truck Running ...	Mine Truck 2	306 s	1843.7952880...	1791.5756828...	236.795410
	Loading		1/23/2013 2:3...	1/23/2013 2:3...	Truck Loading ...	Mine Truck 2	45 s		1800.3216552...	
[-]	Truck 3 Roundtrip		1/23/2013 2:3...	1/23/2013 2:4...	Truck RoundTr...	Mine Truck 3	456 s			
	Running Loaded		1/23/2013 2:3...	1/23/2013 2:3...	Truck Running ...	Mine Truck 2	77 s	1798.4638671...	1789.9742080...	236.556533
	Dumping Load		1/23/2013 2:3...	1/23/2013 2:4...	Truck Unloadin...	Mine Truck 2	23 s			
	Running Empty		1/23/2013 2:4...	1/23/2013 2:4...	Truck Running ...	Mine Truck 2	63 s	1765.6442871...	1763.6586027...	236.708511
	Truck 3 Roundtrip		1/23/2013 2:3...	1/23/2013 2:3...	Truck RoundTr...	Mine Truck 3	456 s			

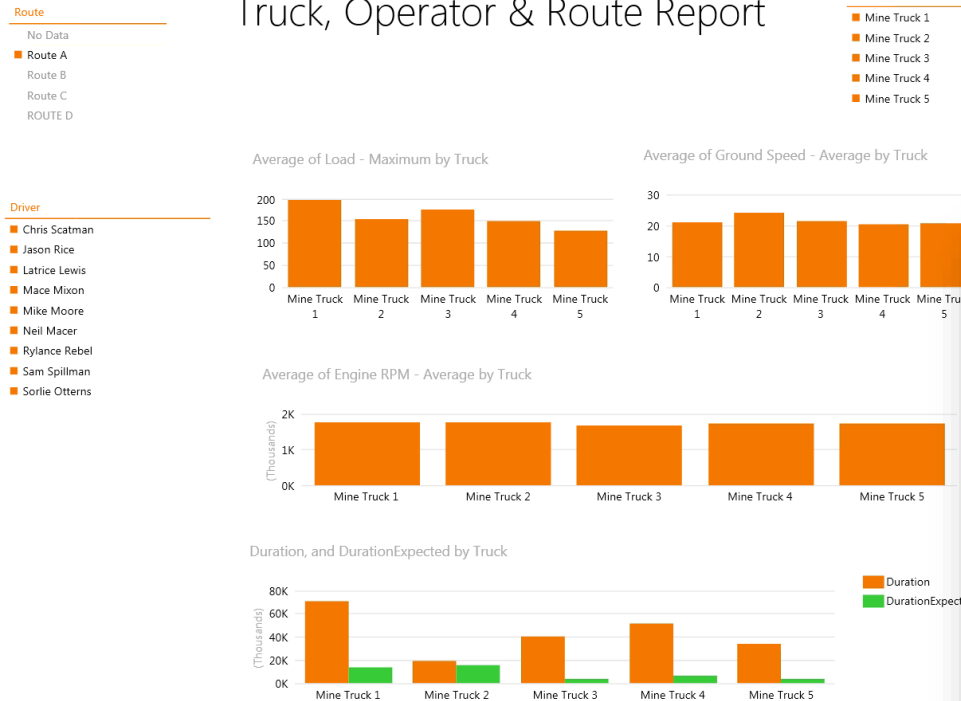
- Data in context delivers insights that can be easily overlooked
- Summaries and outliers can identify ideal behaviors and practices

Reports and Dashboard from Mining Trucks

Customer Use

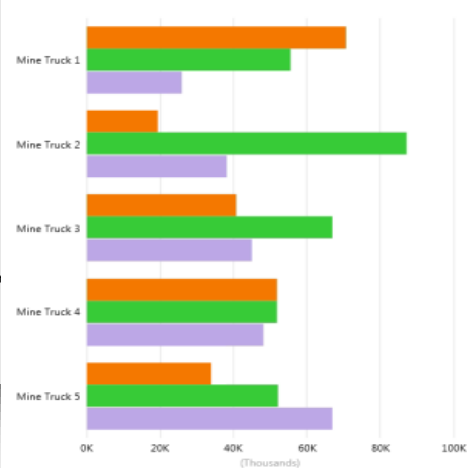
- Warranty Management
- After Sales Support
- Regulatory and Compliance

Truck, Operator & Route Report

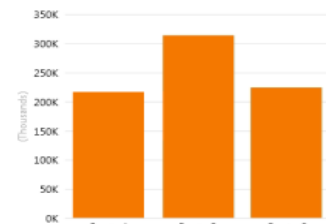


RoundTrip Cumulative Duration by Truck & Route

Duration by Truck, and Route



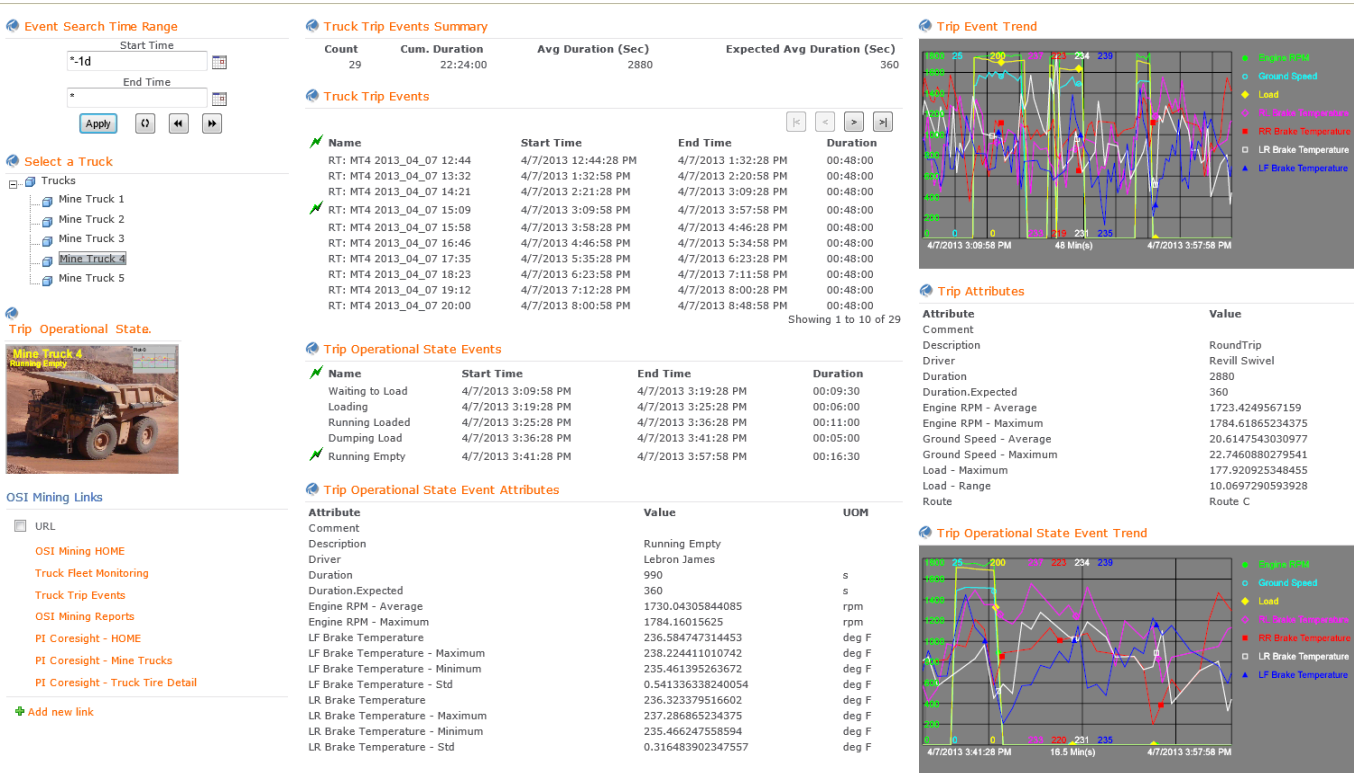
Duration by Route



Reports and Dashboard from Mining Trucks

Customer Use

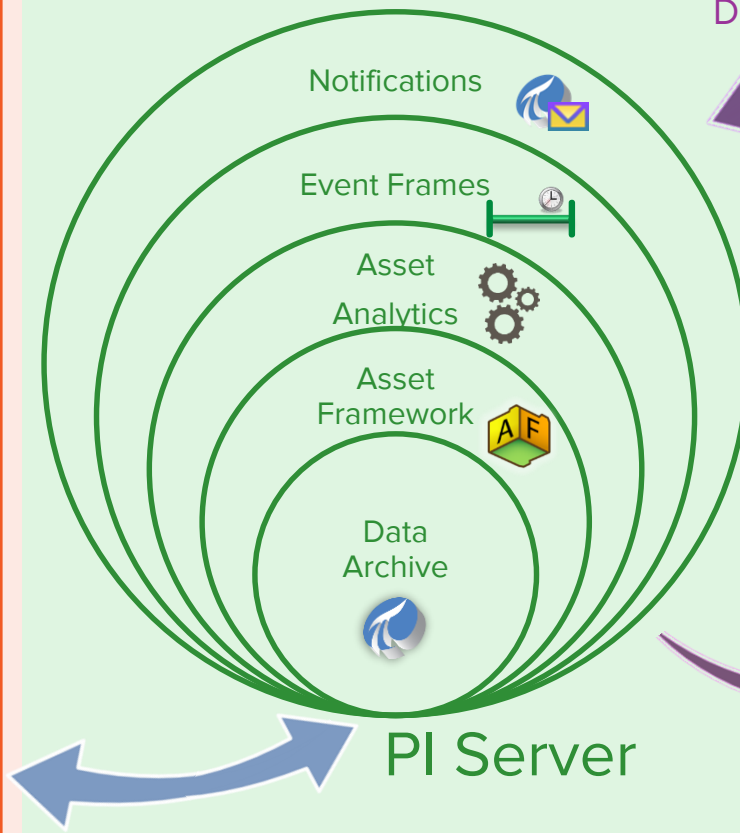
- Warranty Management
- After Sales Support
- Regulatory and Compliance



Solution Components

- PI Event Frames
- PI Coresight
- Microsoft SharePoint and PI WebParts
- Microsoft PowerBI

PI System Infrastructure



Developer technologies



PI Integrators

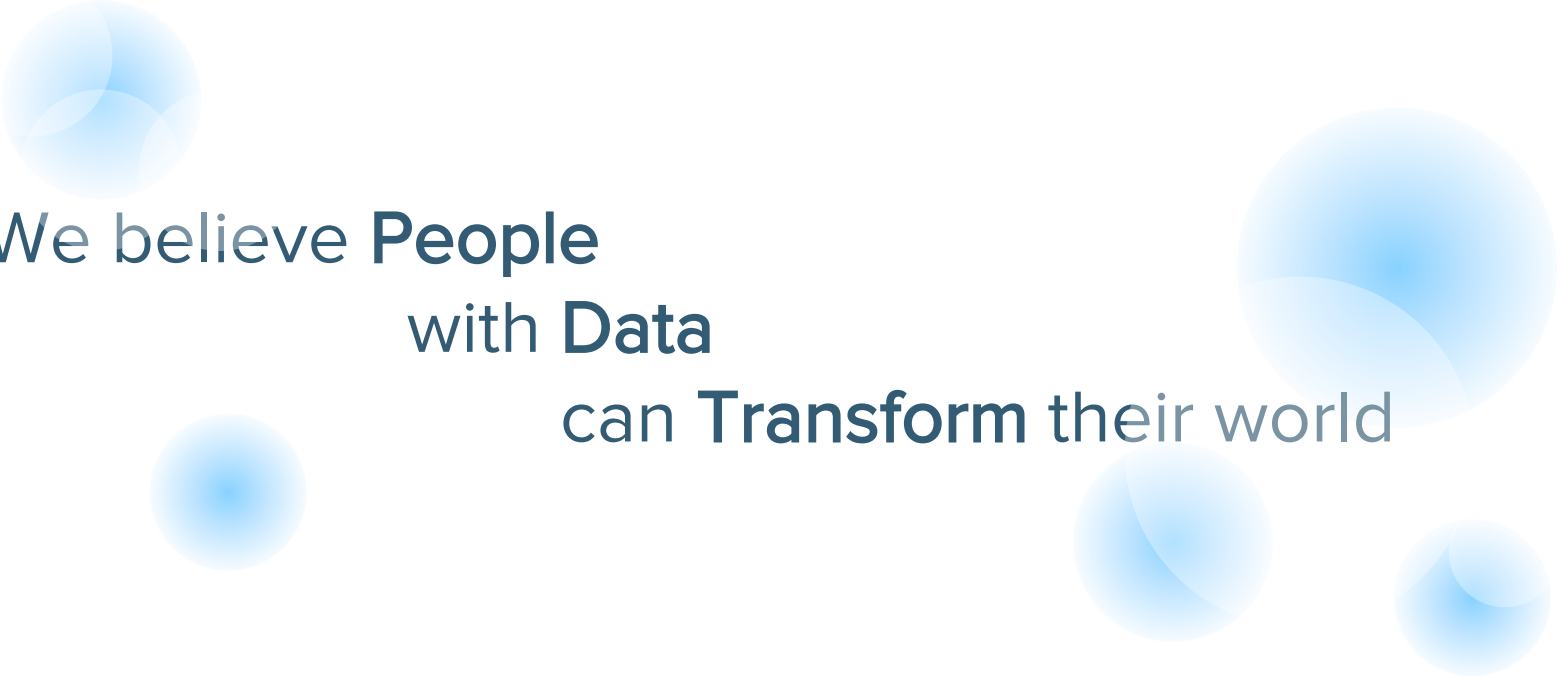


PI Cloud Services



PI Visualization Suite





We believe **People**
with **Data**
can **Transform** their world



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Questions

Please wait for the **microphone**
before asking your questions



State your
name & company



Contact Information

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514-493-8336





감사합니다

谢谢

Danke

Merci

Gracias

Thank You

ありがとう

Спасибо

Obrigado



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