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Silent intelligence in manufacturing industry

How Smart Connected Products are Transforming Manufacturing Industry

Digital Technologies for Manufacturing Innovation: Embracing Industry 4.0
The University of Nottingham | 30 November 2015

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Bhoopathi Rapolu

Head of Analytics – EMEA | CYIENT Europe Ltd.

CYIENT – Who we are

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Aerospace



Heavy Equipment



Oil & Gas



Rail Transportation



Medical & Electronics



Utilities & Energy

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CYIENT – What we do

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Engineering design



Network & Operations



Product realization

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Big Data



lot And M2m



Advanced Analytics

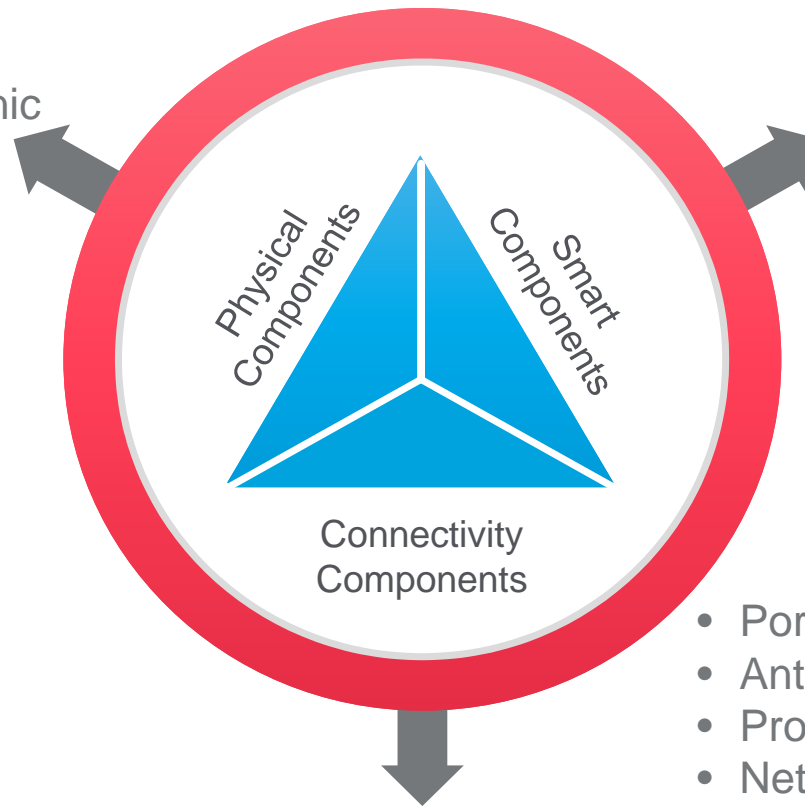
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Silent intelligence in manufacturing industry

How Smart Connected Products are Transforming
Manufacturing Industry

The New Product Anatomy

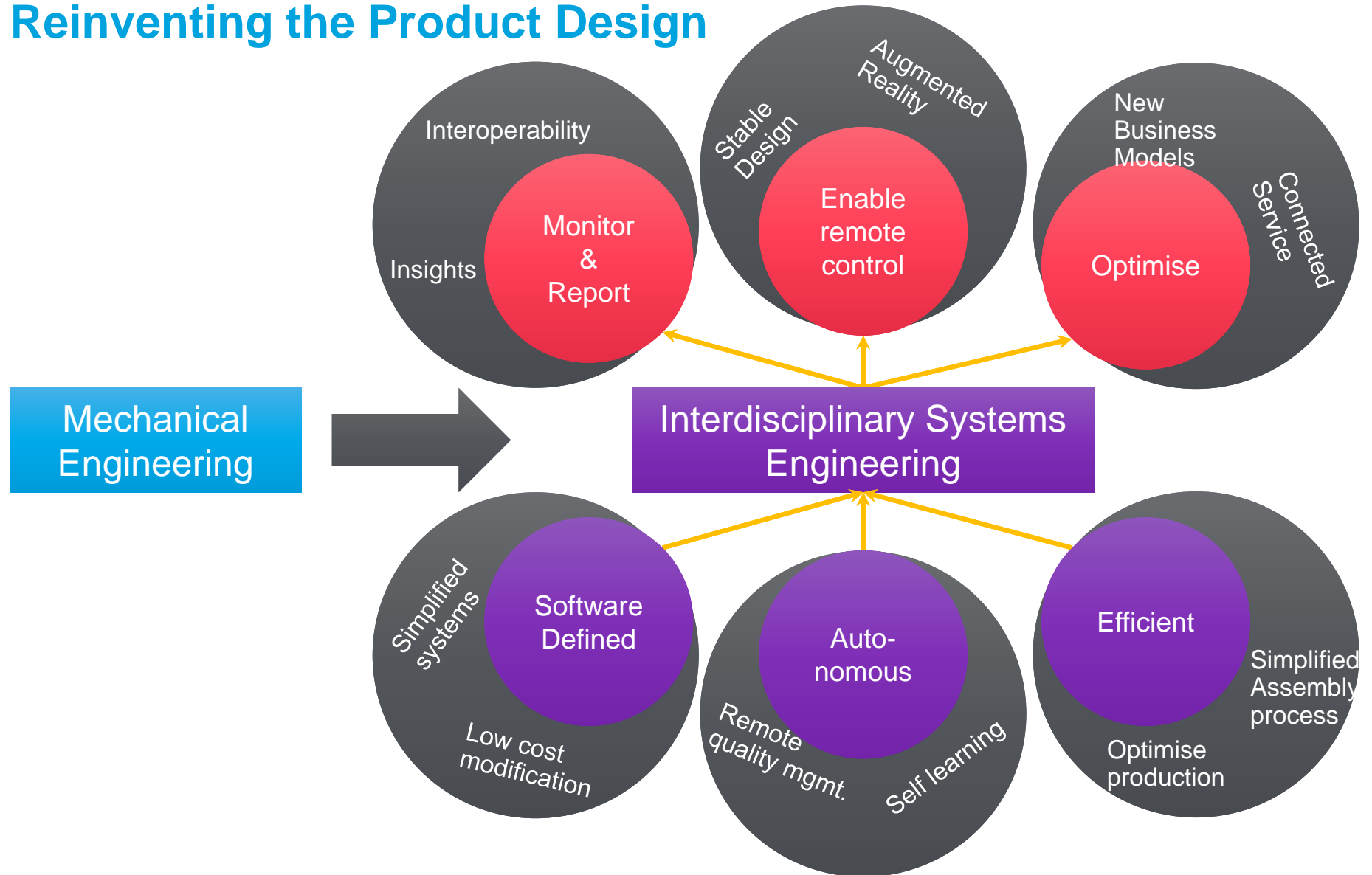
- Mechanical parts
- Electrical and Electronic parts



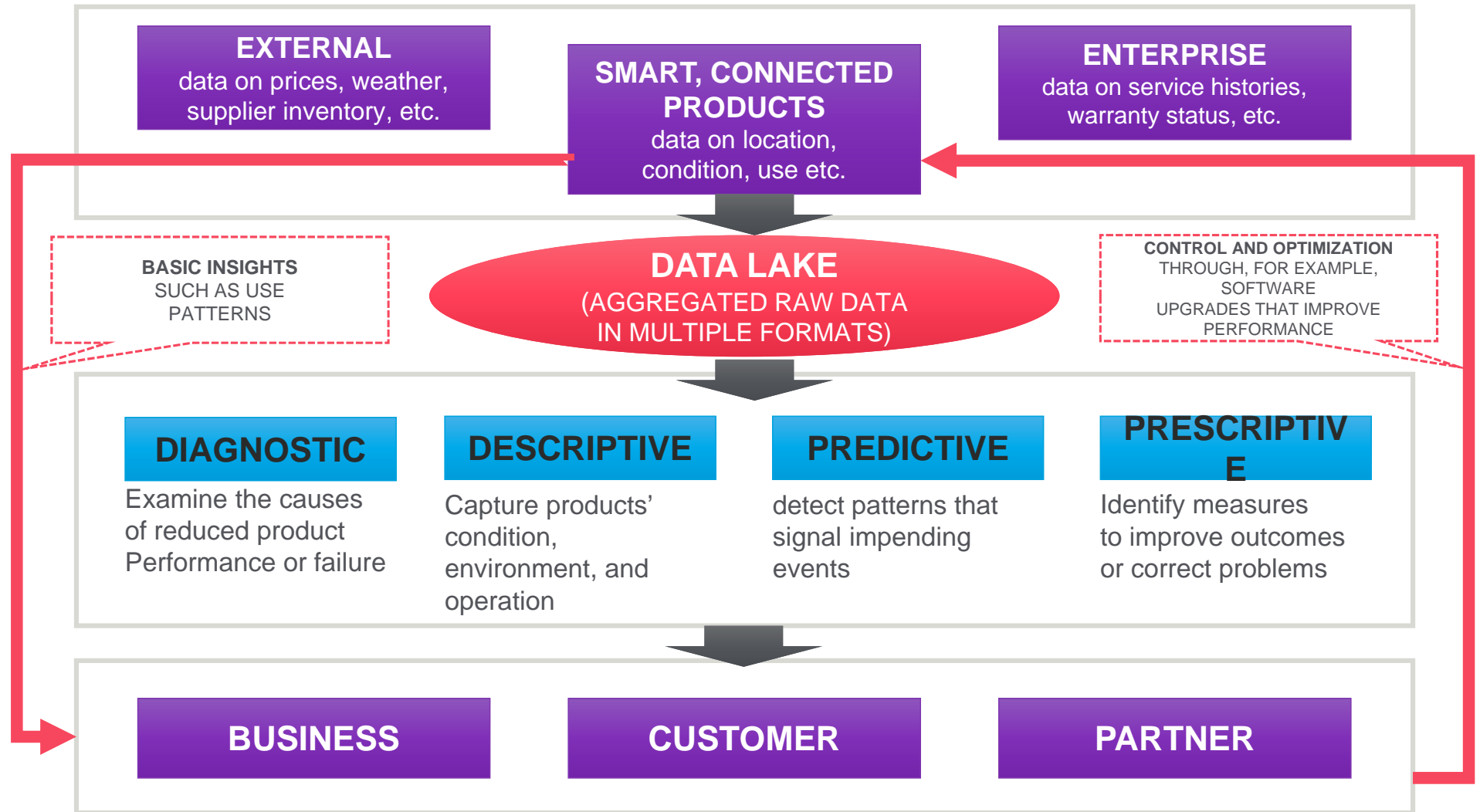
- Sensors
- Microprocessors
- Data storage
- Controls
- Software
- Embedded OS
- Digital UI etc.

- Ports
- Antennae
- Protocols
- Networks

Reinventing the Product Design



Unlocking the full value of data is a new business function



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Cyient case studies

Airframe OEM: Prescriptive Analytics

Observations:

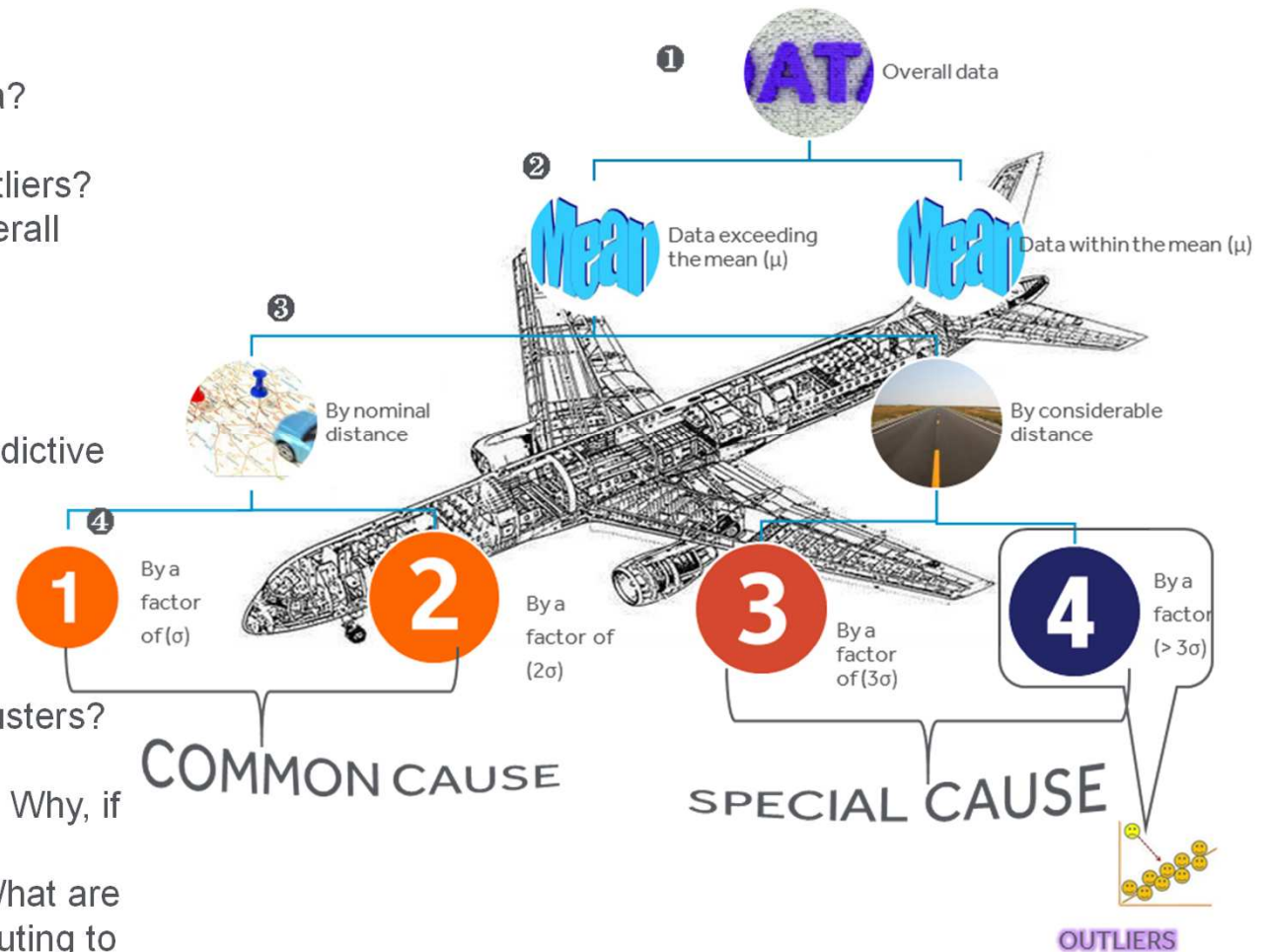
- 1) Are outliers present in data?
- 2) What are the common characteristics of these outliers?
- 3) What is their impact on overall performance objectives?

Method:

Hierarchical clustering and predictive modelling

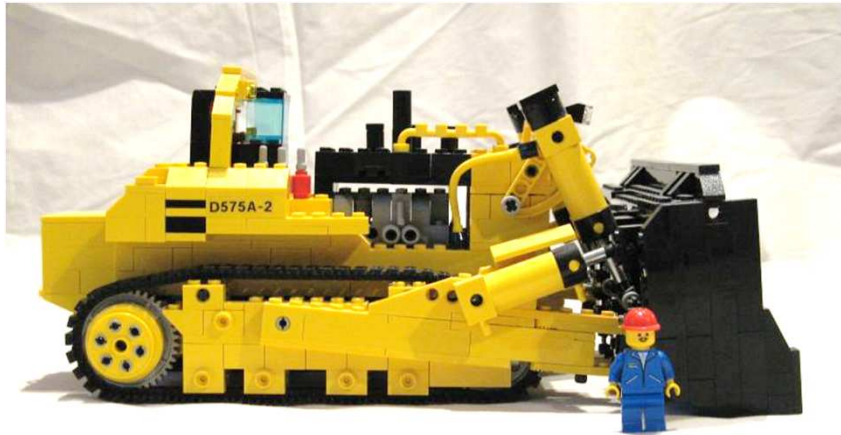
Output:

- 1) TRANSIENT behavior – Are components dynamically changing clusters?
- 2) Contributing REASONS - Why, if so?
- 3) FEATURE extraction - What are the features that are contributing to such migration?



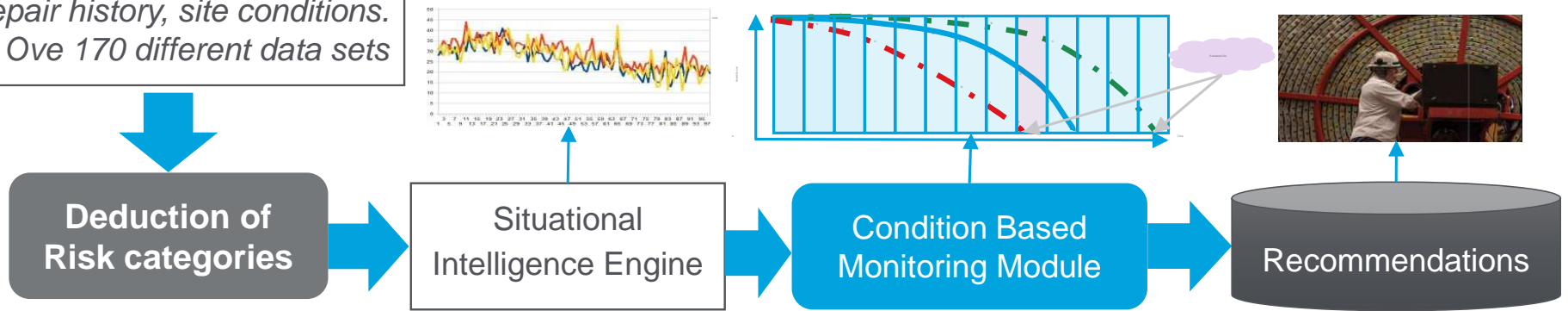
Heavy Equipment Fleet – Predictive Maintenance

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Sensor info, abuse events, exceptions, fluid samples, repair history, site conditions.
– Ove 170 different data sets

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Customer Benefits

Situational Intelligence

- Anomaly detection
- Similar Asset based analysis
- Fleet based analysis
- Site based analysis

Operational Intelligence

- Asset Health Score
- In-between repair time estimation
- Important component failure prediction

New Insights

- Repair Recurrence models
- Event – Repair Association
- Risk category to health quantification

Predictive Maintenance for MRI Machines

Imaging system

- MR imaging controls

Onboard sensors

- Captures temperature at various positions on MR Machine

Patient Data

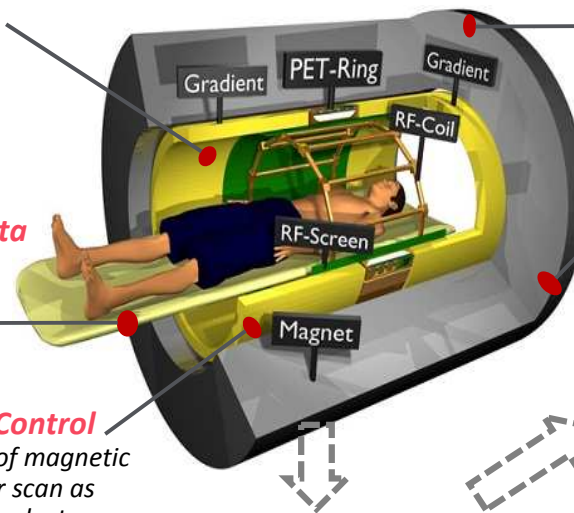
- Body part for scan
- Weight of patient

Magnetic Field Control

- Manual setting of magnetic field required for scan as prescribed by the doctor

Other data sources

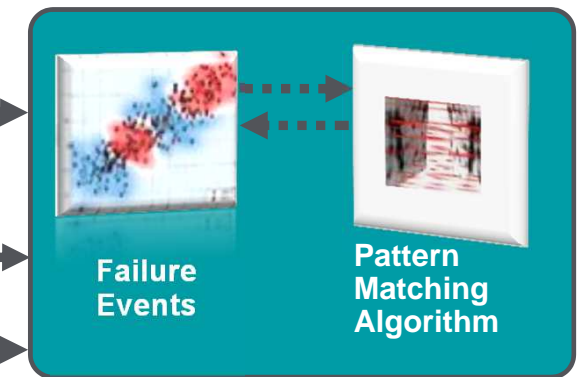
- Equipment History
- Maintenance Records
- Environmental data



System Failure Logs

Operations (Scan) Data

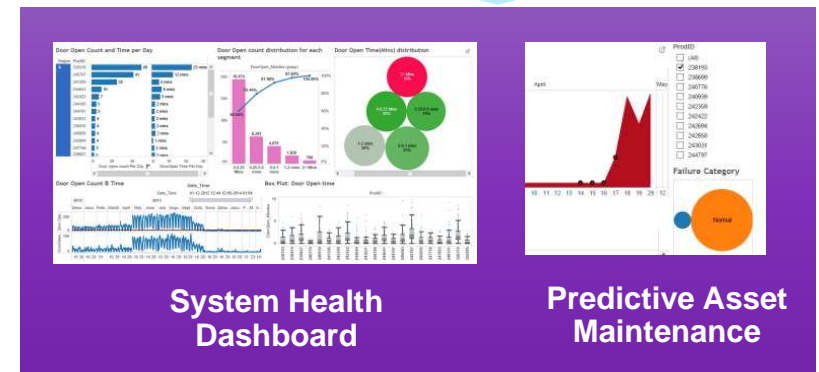
(DAS) Data Acquisition System



Predictive Analytics Platform

Value to Client

- More accurate prediction of failures in MR machines
- Temporal pattern recognition across failures
- Efficient scheduling of maintenance visits to client installations
- Better predictive maintenance of MRI machines
- Optimized inventory holdings at Field Service Locations



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Thank You

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