



IfM Briefing Day

Digitalisation of the Extended Factory

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Distributed Information and Automation Lab

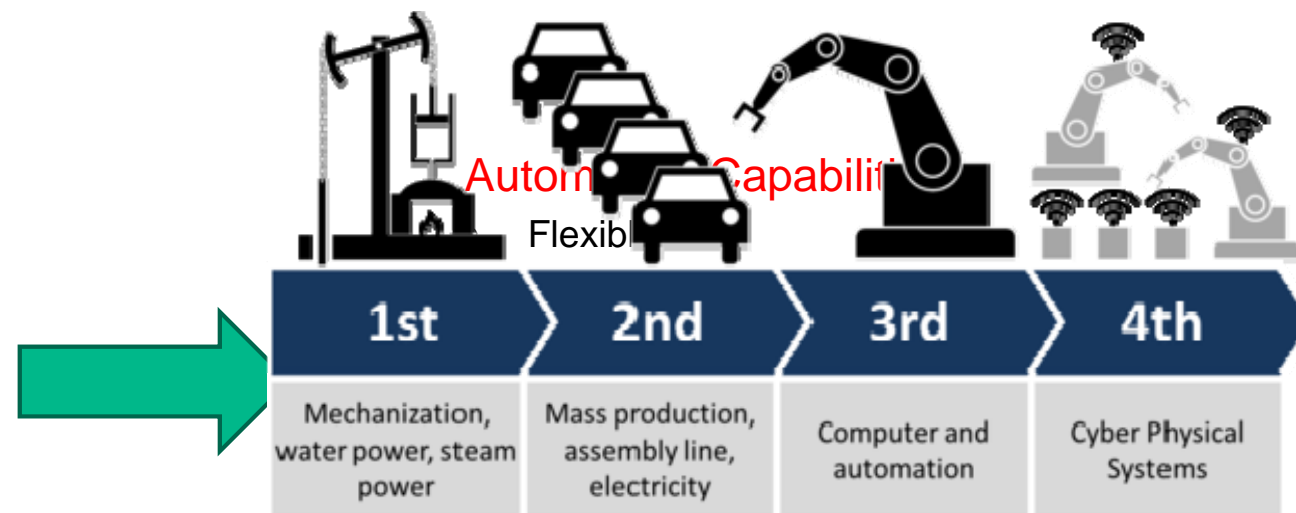
Rationale for digital (extended) factory

Manufacturing organisations are looking to gain the benefits that extend those provided by traditional automation. e.g. Improved operator safety, Reduce labour cost, Increase production rate, Improve product quality

But also cater for future requirements:

- Product Change**
- Product Customisation**
- Product variety / variations**
- Adoption of new materials**
- Collaborative Operations**
- Tolerance to disruptions**
- Product Traceability**
- Integrated Supply Chain Operations**
- Cyber Security**

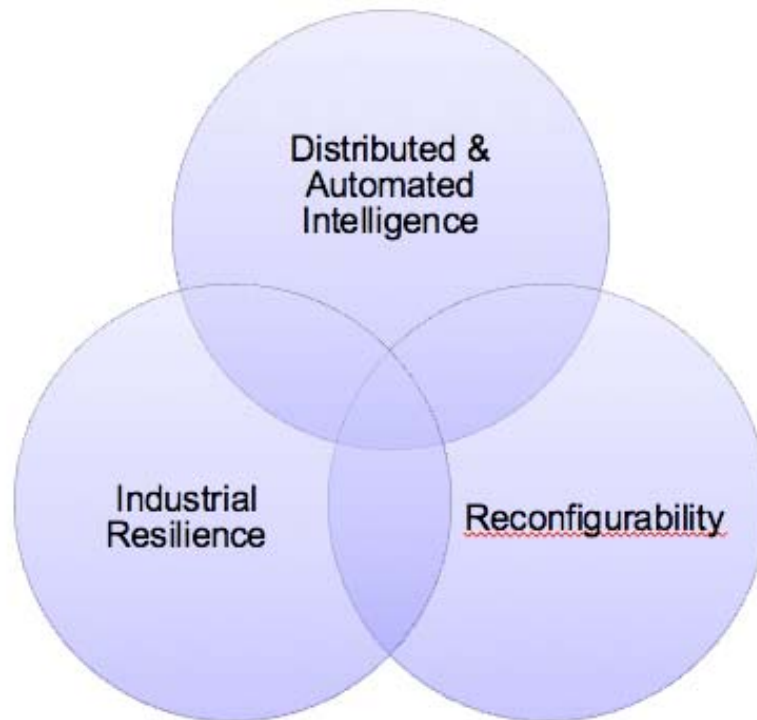
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- Secure

Source: https://en.wikipedia.org/wiki/Industry_4.0

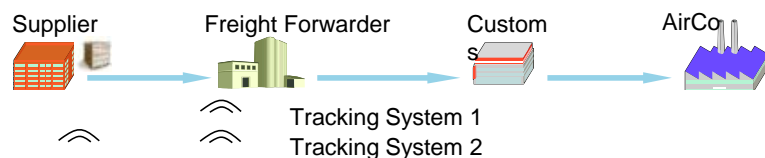
Distributed Information & Automation Lab



Auto-ID based Tracking/Location/Tracing

What is the challenge?

Using asset tagging to detect movements in factories and supply chains to answer operational T&T issues.



How do we tackle the challenge?

- Real time ID data from RFID etc
- Link ID to other item data on network
- Integration of data into probabilistic tracking model
- Learning of flow patterns - predictive tracking, anticipation of delays, etc

What have we done?

- Retail RFID deployments
- Tag Placement Studies
- Factory tool location system
- Airport baggage tracking
- ...

Cyber Physical Systems

What is the challenge?

Integration of both the physical production environment and factory information systems to enable optimum factory operations.



Part Kitting Tray



Manual Sub Assembly Automated Assembly



Robot Mounted
Part ID Reader



Operator
Part ID Reader

What have we done?

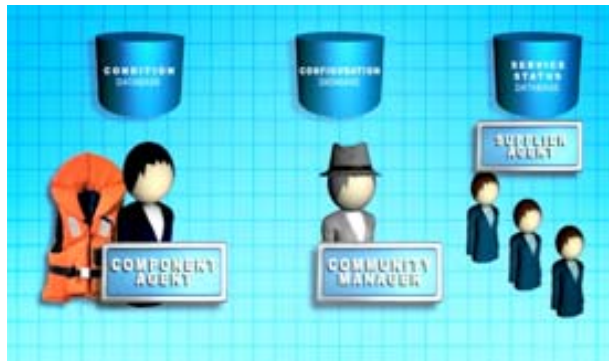
- Smart kitting trolleys to integrate manual and automated production.
- Enriched product data to include UID, location, status, inspection...
- Control system enhance to utilise production flexibility in the face of disruptions (Misplaced parts)



Intelligent Orders and Products

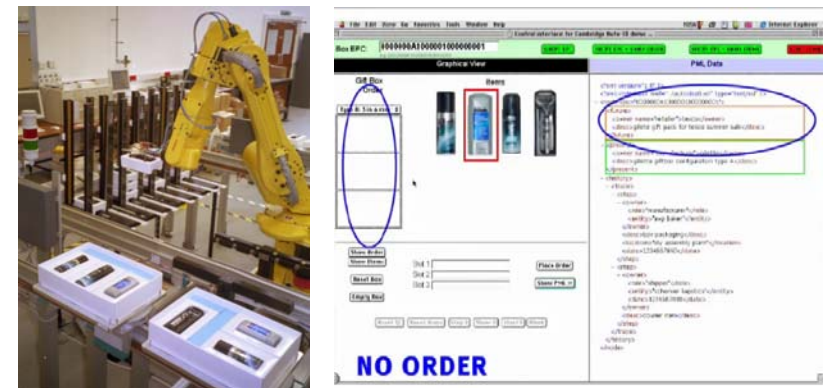
What is the challenge?

Enabling a physical order or product to support or influence the way it is made, transported or maintained



What have we done?

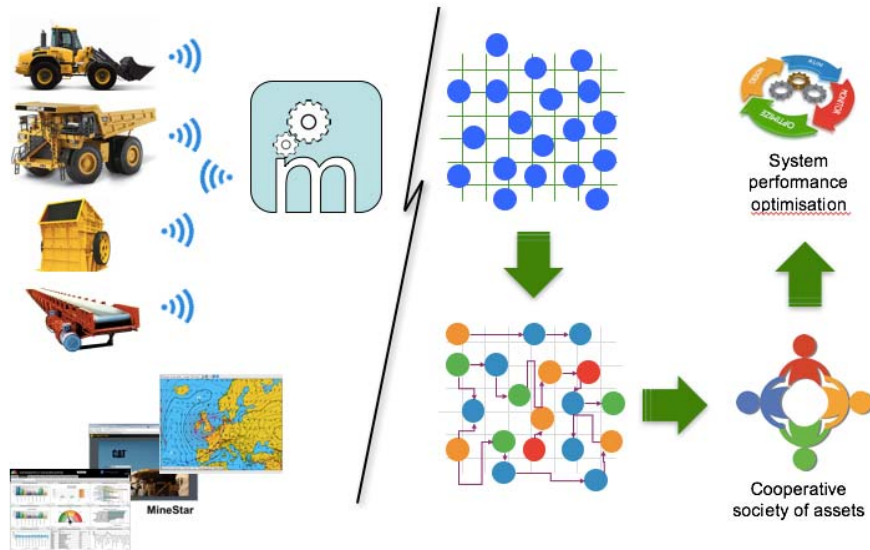
- Developed conceptual model integrating RFID, software agents, dist dbs.
- Customised manufacturing
- Customer oriented logistics offerings
- Distributed spares supply chain
- Intelligent infrastructure asset management



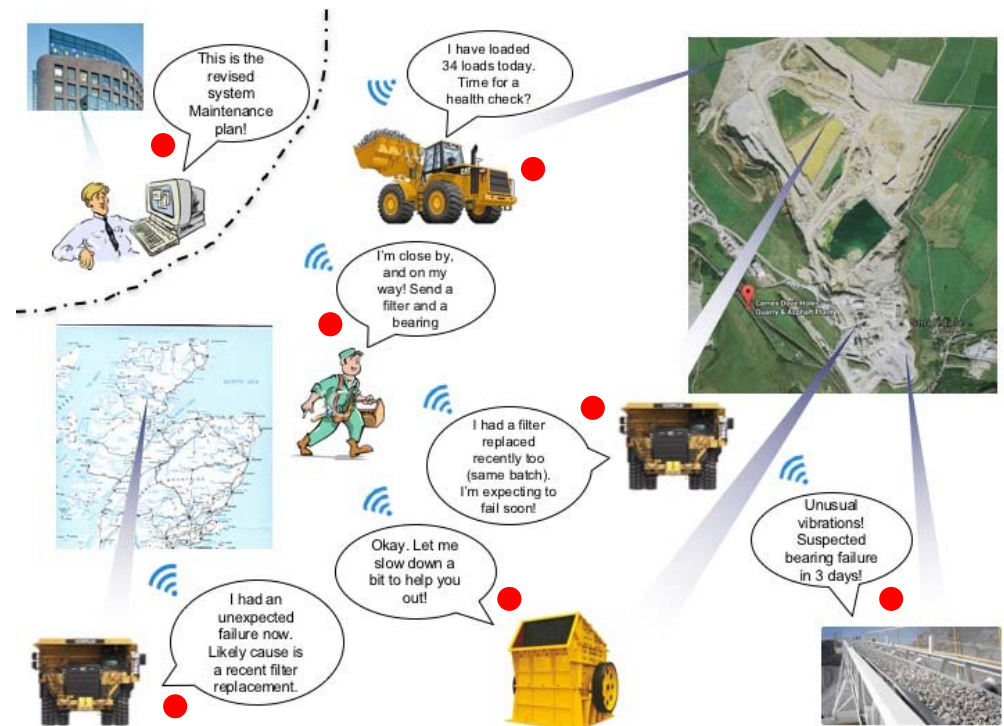
Social Networks for Machines

What is the challenge?

Developing a community of cooperating machines that act in the interest of the system performance



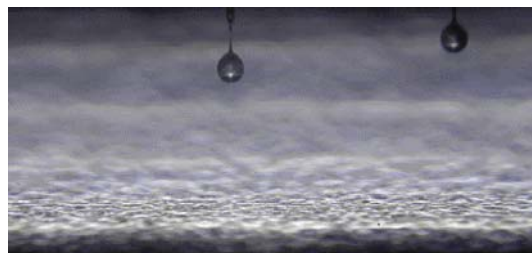
Source: Caterpillar, Finning



Additive Manufacturing in Distributed Networks

What is the challenge?

Integration of 3-D printing technology with conventional manufacturing techniques in a distributed network for enabling rapid response capabilities



[Inkjet Research Centre, IfM]

Benefits?

- Flexibility and responsiveness
- Resilience to disruptions
- Customisation
- Re-configurability
- Spares and repairs

What have we done?

- Automation capability for 3-D printers
- Distributed resilient manufacturing

Thank you

Learn more:

Attend our session at 12:00 in
Seminar Room 3

Tools & Services

- Automation Assessment
- Industrial Resilience
- Big Data
- Data Quality Improvement

Contact us:

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