Institute for
Advanced Manufacturing

The University of
Nottingham

UNITED KINGDOM · CHINA · MALAYSIA

Cloud Manufacturing

- Towards Resilient and Scalable High Value Manufacturing

EPSRC Grant EP/K014161/1

S Ratchev, A Popov, R Gomes, D McAuley, N Krasnogor, B Logan, S Sharples
E Kelly, G Terrazas Angulo, E Castro, P Felli, D Golightly

- Vision:
  - *Cloud Manufacturing – a new platform to enable the provision of resilient, scalable, cost effective and knowledge-intensive distributed manufacturing capabilities, encompassing the whole life cycle of design, production, use, maintenance and recycling*

Principal goal:
  - To define, validate and industrially demonstrate *the informatics and manufacturing architecture and supporting theoretical models, methods and algorithms*

- Key Research Questions:
  - What would be the architecture for the manufacturing cloud?
  - How to develop the required infrastructure and platform services?
  - How manufacturing resources and objects participate in the cloud?
  - What is the scale of the "cloud" and how is it to be built?
  - How is manufacturing data represented, aggregated, shared, stored and processed?
  - How can we capture and analyse digital object footprints?

Current Progress

The University of
NOTTINGHAM
UNITED KINGDOM · CHINA · MALAYSIA

Institute for
Advanced Manufacturing

- Generic architecture, principles and rules for construction and evolution of cloud manufacturing patterns

- Formalisation of the process of dynamic formation and deployment of cloud manufacturing services

- Development of common cloud manufacturing testbeds.

Access
Presentation interface for management, effective provision and control made available to cloud consumers.
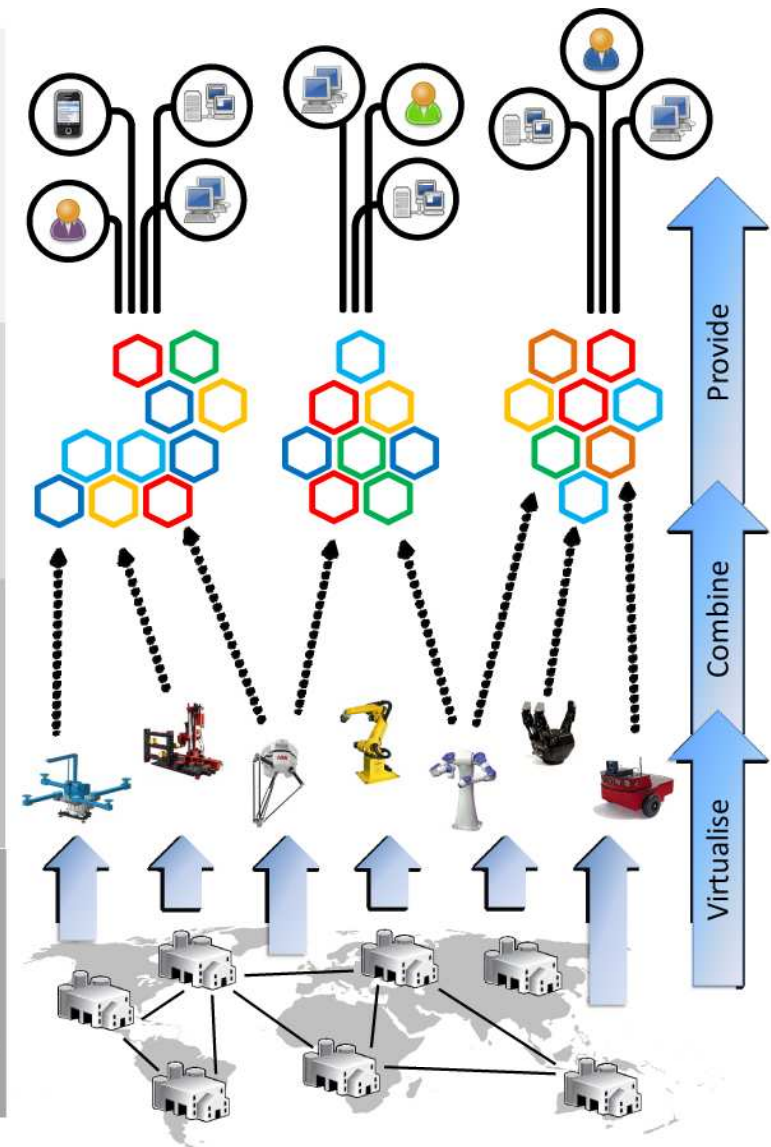
Services
Loosely coupled services for search, match, combine, configure, packing and delivery.

Virtualisation
Logical embodiments that abstract and describe functional capabilities and physical resources.
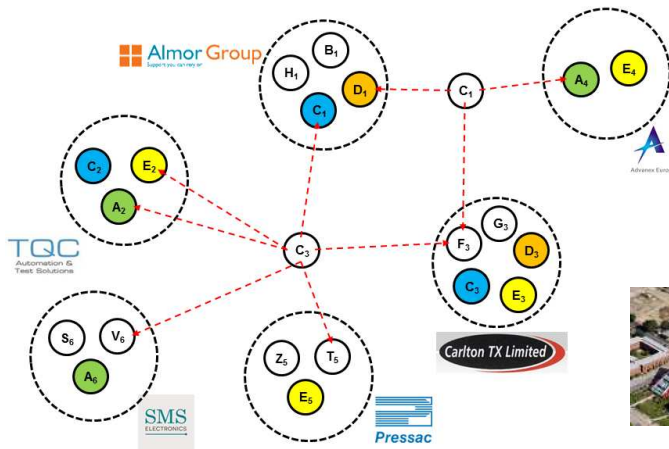
Physical
Hardware and software equipment such as tools, robots, simulations, assembly lines, machines and materials.
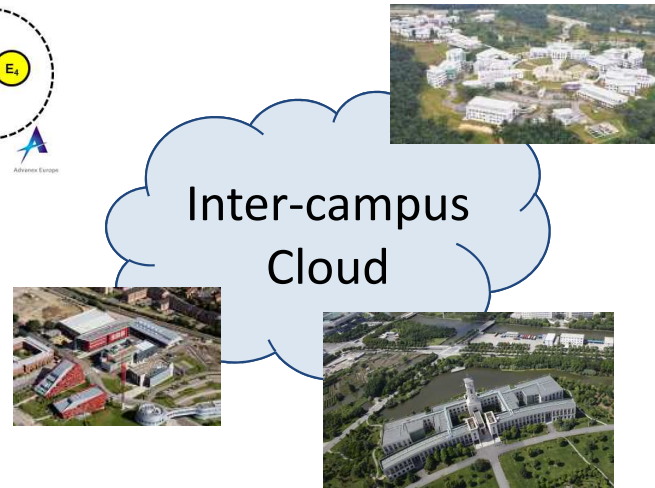
Provide
Combine
Virtualise

Cloud manufacturing
Experimental testbeds

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA
Institute for
Advanced Manufacturing
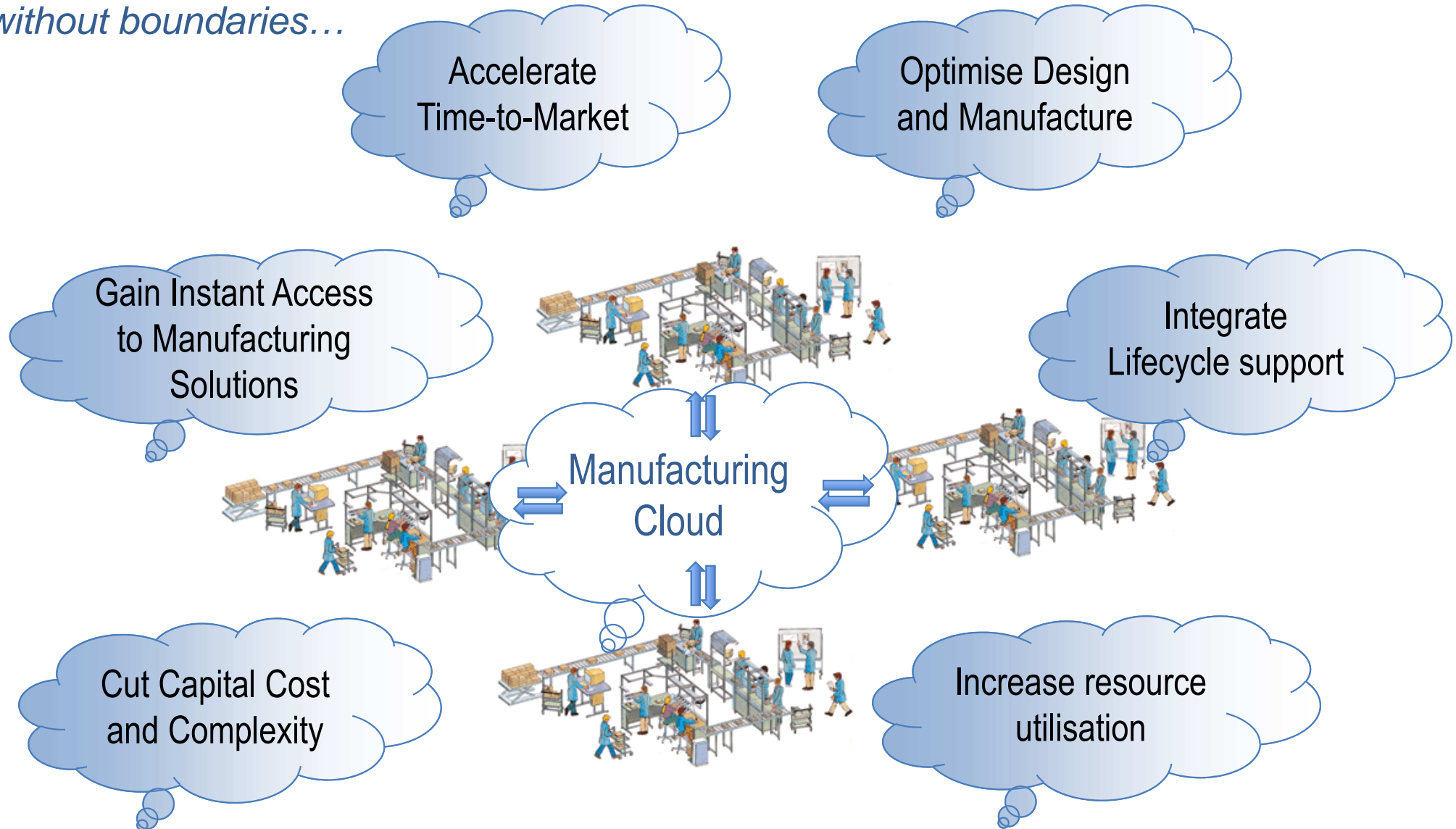
Local networks of SMEs

- How to join the Cloud
- Manufacturing service deployment
- Applications in the cloud
- Technology Integration
- Manufacturing as a Social Network
- Security, IP, risk

Global Cloud

Inter-campus Cloud

- Formation of a manufacturing cloud
- Joint capability offering and optimisation
- Data security
- Accessing the Manufacturing Cloud
- Global logistics

Factory Cloud

Cell data

Cell data

Data Cloud

- Data capture and presentation
- Data aggregation and visualisation
- Data analytics and management
- Digital object footprint analysis

Target Industrial Impact

Delivering manufacturing without boundaries…

Accelerate Time-to-Market

Optimise Design and Manufacture

Gain Instant Access to Manufacturing Solutions

Integrate Lifecycle support

Manufacturing Cloud

Cut Capital Cost and Complexity

Increase resource utilisation

www.nottingham.ac.uk/manufacturing