KIM, ERIM and the Silo of Doom

Lessons from two long-lived data projects

Alex Ball

DCC/UKOLN, University of Bath

16th July 2010

Funded by JISC

Digital Curation Centre

Who are we?

- UK-based centre of expertise in digital curation.
- Partnership between Universities of Bath, Edinburgh and Glasgow.
- Primary (but not exclusive) focus on research data.

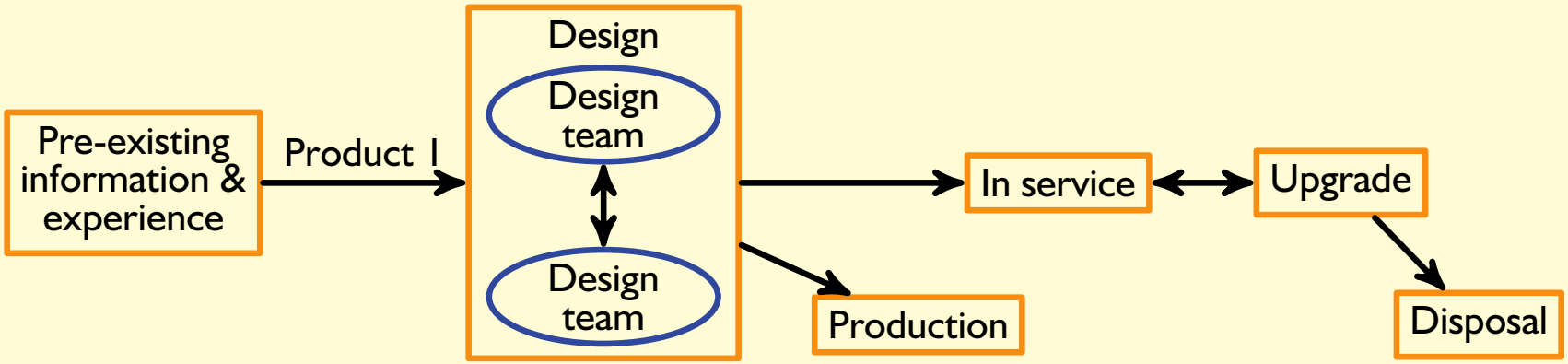
What do we do?

- Develop curation tools, resources and learning materials.
- Provide training and other events.
- Build communities of data curators and foster good practice.
- Collaborate in projects demanding digital curation expertise.

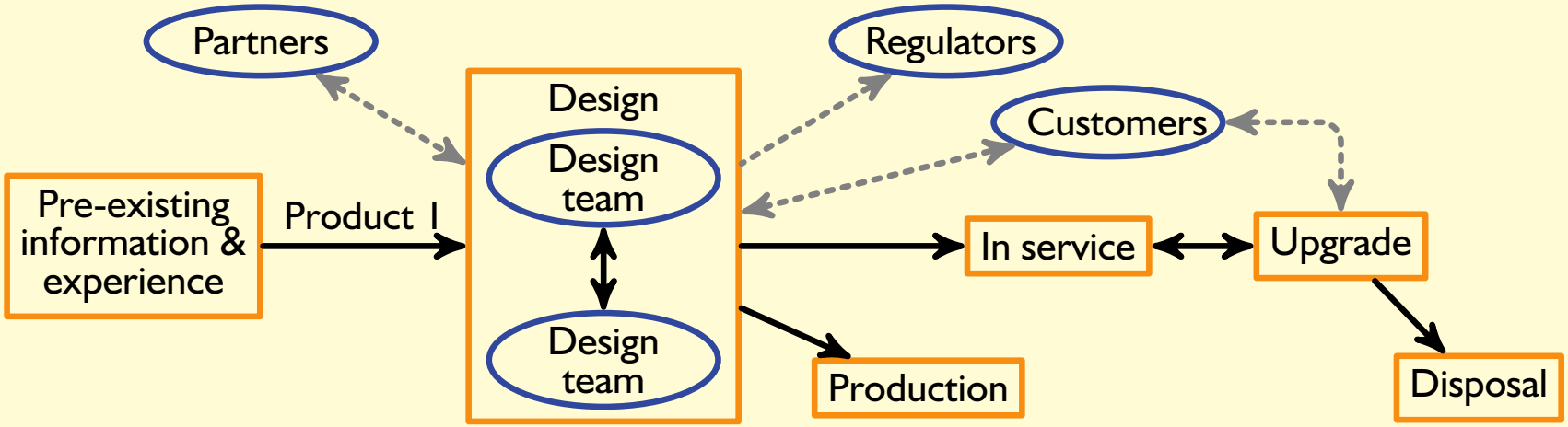
KIM Project

- £5.5 million Grand Challenge project.
- Funded by EPSRC and ESRC.
- 80 industrial collaborators.
- 13 partners across 11 universities.
- Strategies and tools for the emerging product service paradigm:
  - Advanced product representation.
  - Learning throughout the lifecycle.
  - Managing the lifecycle.
  - Environment, Groups, Individuals, Practices, Tools.

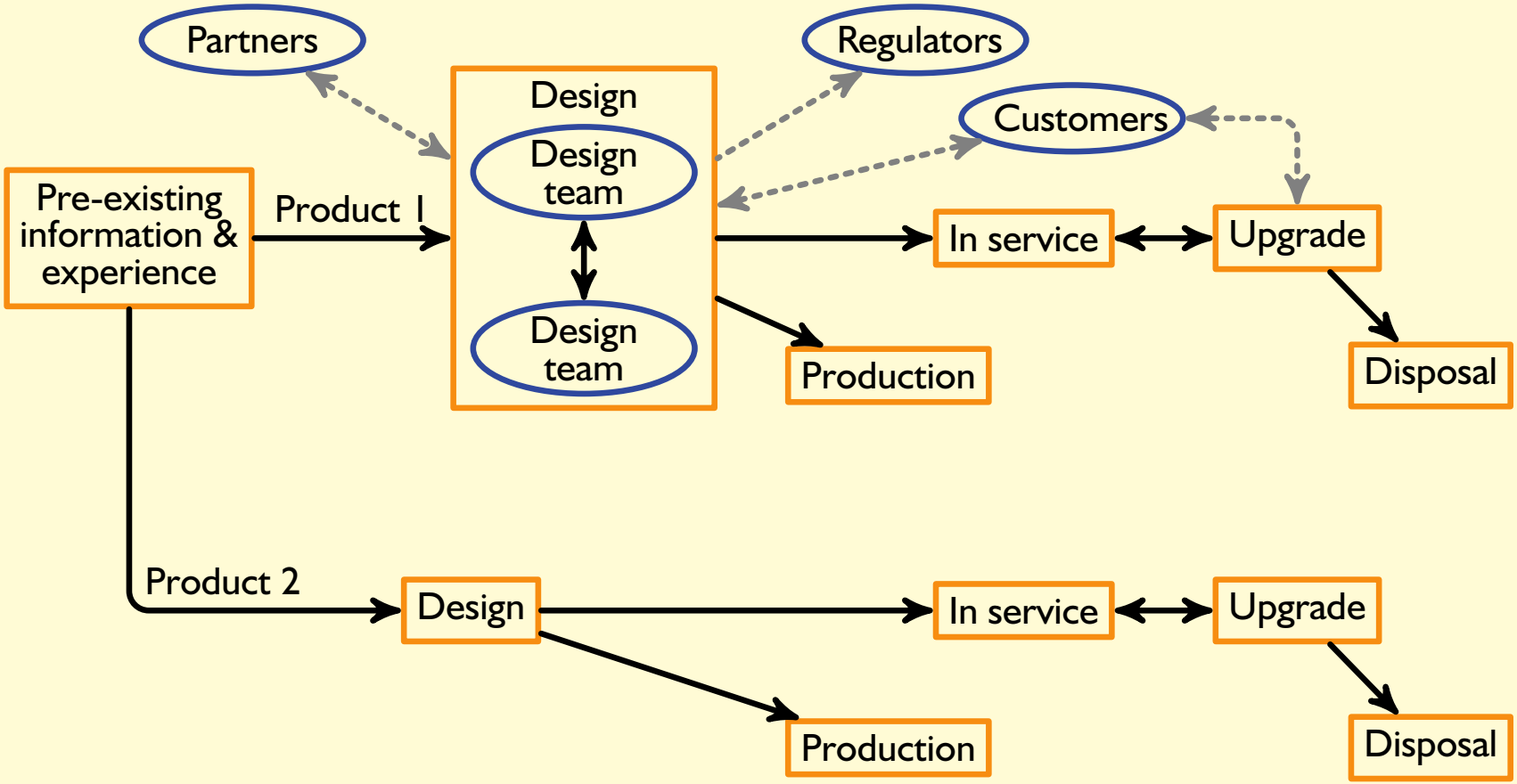
Engineering information flows



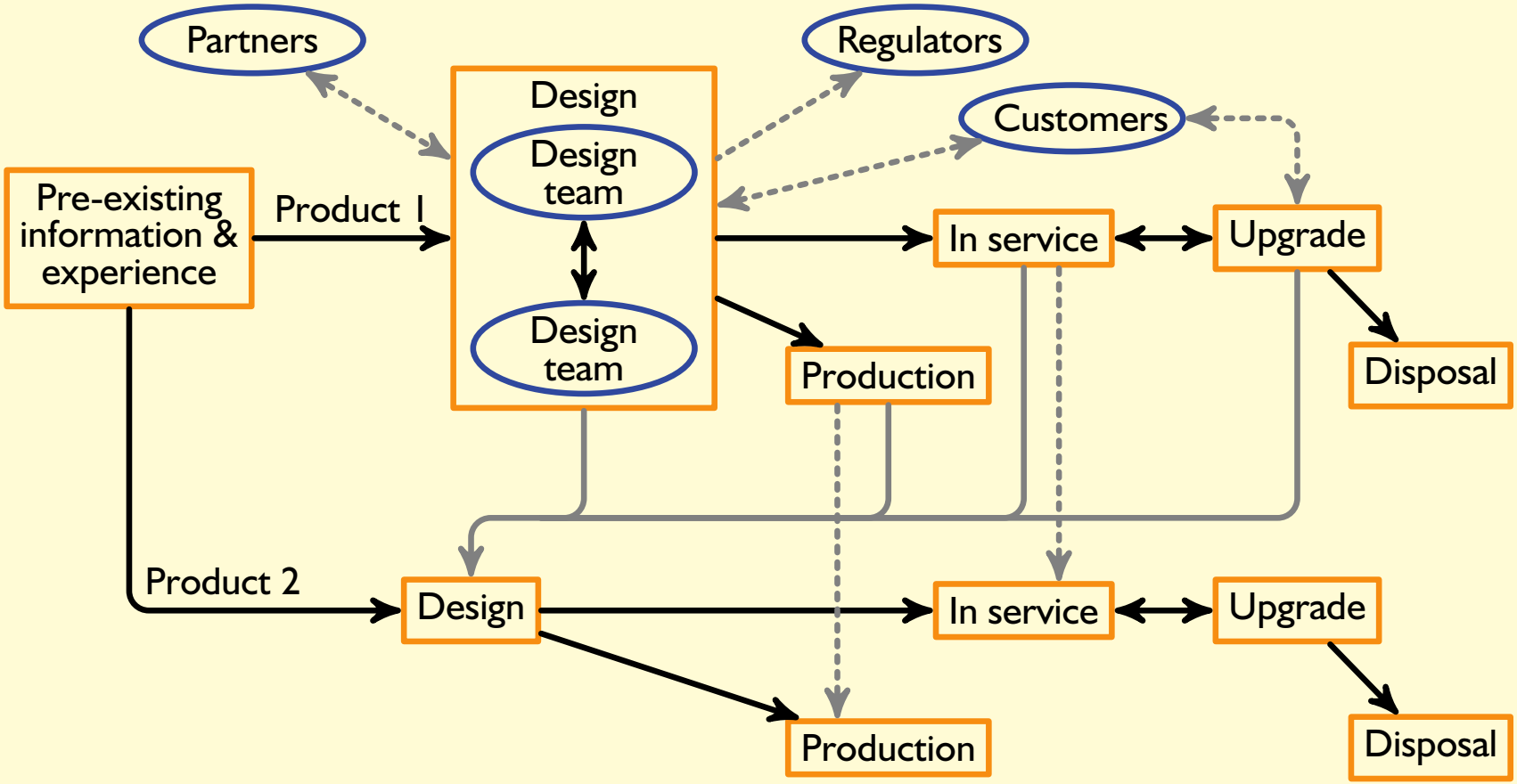
Engineering information flows



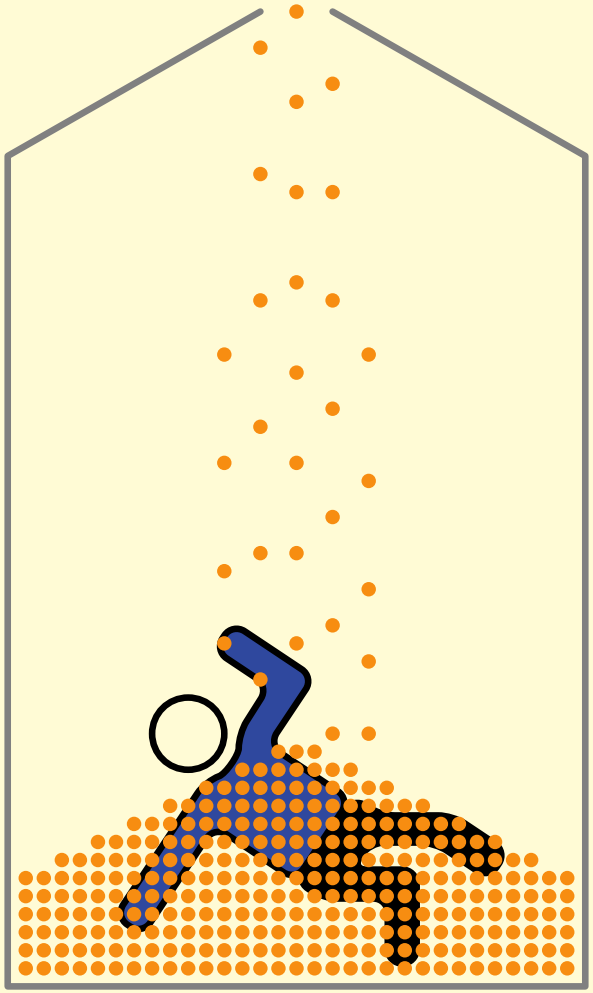
Engineering information flows



Engineering information flows



No, not *this* kind of Silo of Doom



Information silos

CAD models

CNC models

Service records

Performance data

FEA models

Process models

Rationale reports

...

Integrating silos

Curation problems:

- Integrating product information with current lifecycle systems.
  - Computer-aided manufacture
  - Computer-aided engineering
  - Product lifecycle management (PLM) systems

Integrating silos

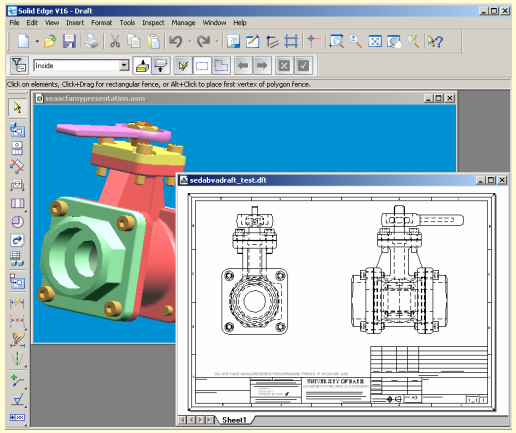
Curation problems:

- Integrating product information with current lifecycle systems.
  - Computer-aided manufacture
  - Computer-aided engineering
  - Product lifecycle management (PLM) systems
- Integrating product information with future lifecycle systems.
  - STEP (ISO 10303)
  - ???

Limitations of CAD models

No direct feedback

Locked into proprietary software



Format quickly obsolete

Multiple viewpoints

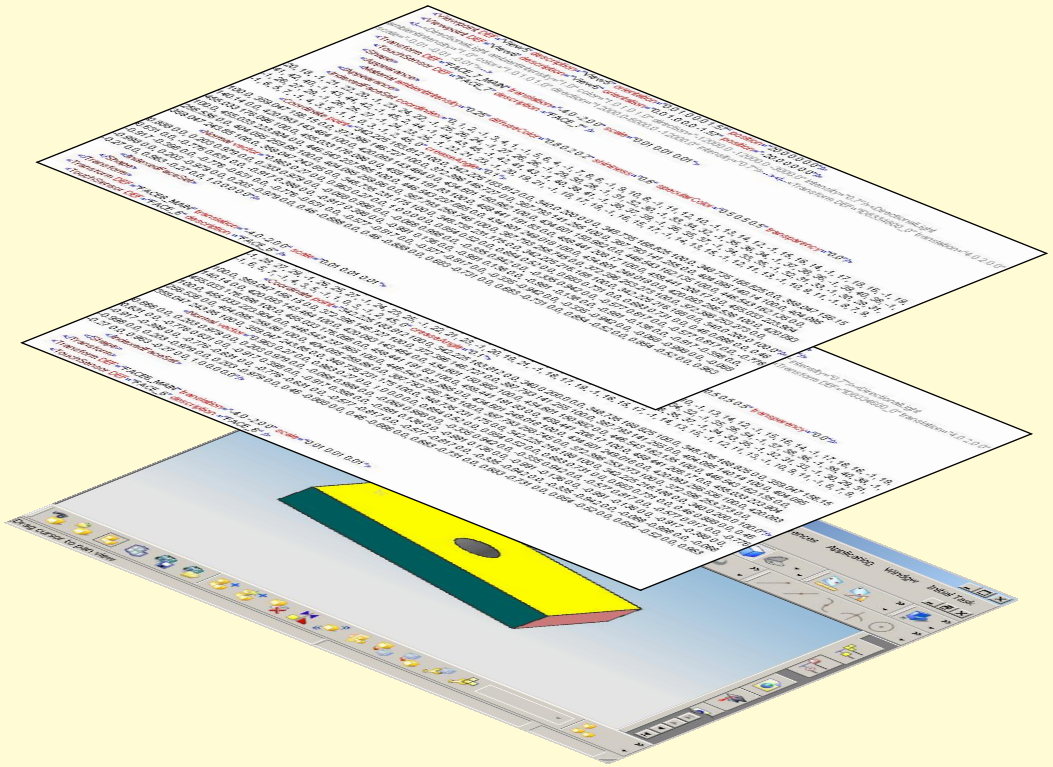
Big file sizes

Commercial secrets

Lightweight Models with Multilayer Annotations

Different annotation layers for different viewpoints (design, manufacture, service) and for different security levels (internal, public)

Geometry layer



Registry/Repository of Representation Information for Engineering

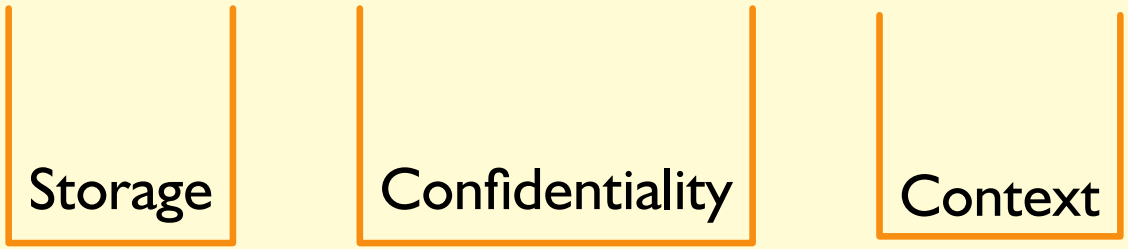
ERIM Project

- Funded by JISC.
- Research Data Management Programme, Research Data Management Planning for Research Funders' Projects strand.
- University of Bath: IdMRC and UKOLN/DCC.
- Managing data produced by
  - KIM Project;
  - other IdMRC research.

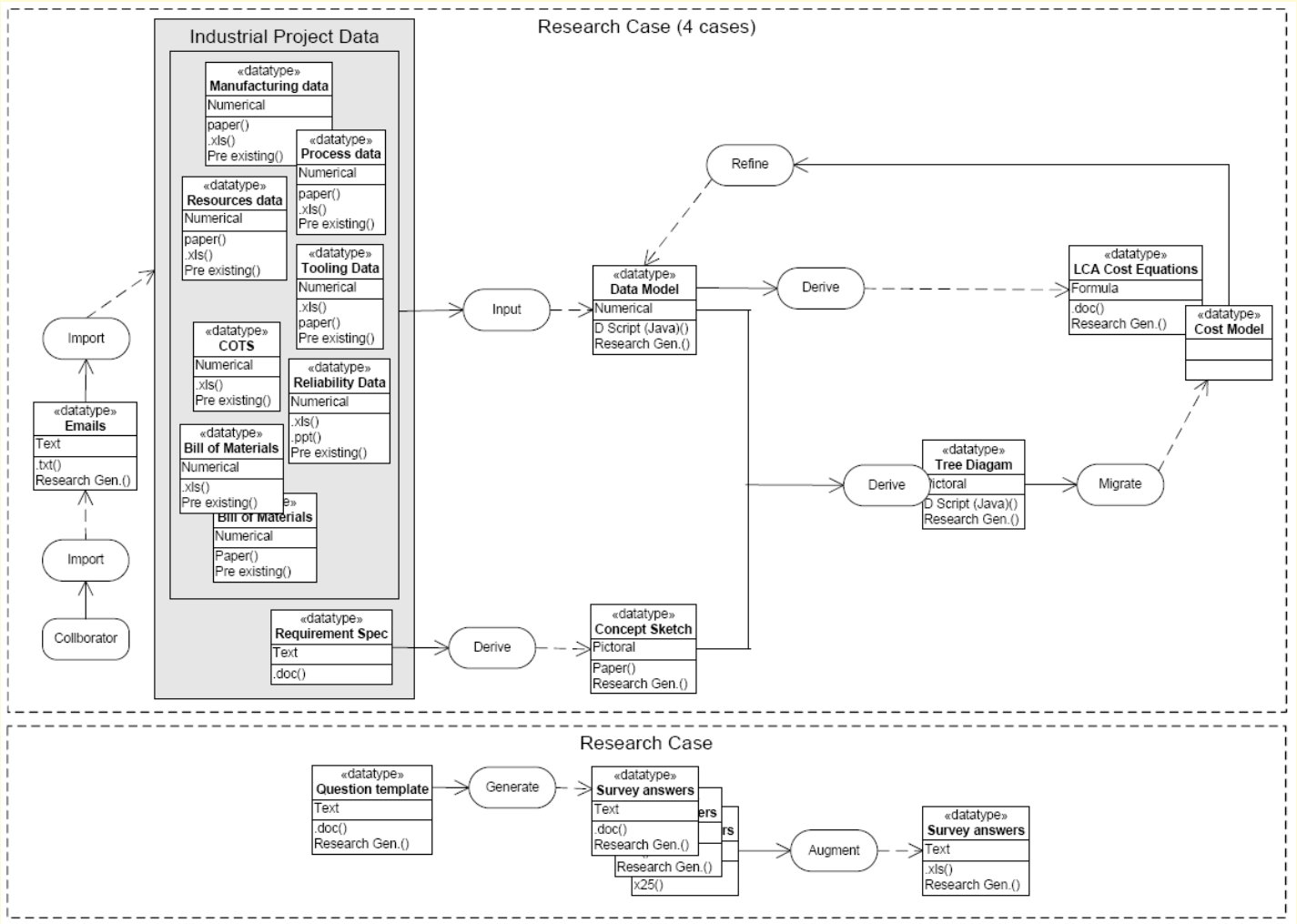
Silo of Doom strikes again

Silo of Doom strikes again

Silo of Doom strikes again



Data processing flows



Conclusions

- STEP where possible.
- Simple solutions elsewhere.
  - Identify the information needed.
  - Identify a simple way of storing that information.
  - Find a way of getting information there that arises from a natural workflow.
- Avoid creating new silos.
- Manage the silos you have carefully.

Further information

Ding, L. et al. (2009). Annotation of lightweight formats for long-term product representations. *International Journal of Computer Integrated Manufacturing*, *22*(11), 1037-1053. DOI: 10.1080/09511920802527616

Ball, A. (2010). Review of the State of the Art of the Digital Curation of Research Data. (ERIM Project Document erim1rep091103ab12). University of Bath. `http://opus.bath.ac.uk/19022`

Other work

FACADE (Future-proofing Architectural Computer-Aided DEsign)

- Archiving architectural CAD models in DSpace.
- `http://facade.mit.edu/`
- Smith, M. (2009). Curating Architectural 3D CAD Models *International Journal of Digital Curation, 4*(1), 98-106. `http://ijdc.net/ijdc/article/view/105`

SHAMAN (Sustaining Heritage Access through Multivalent ArchiviNg)

- Enabling preservation in PLM systems
- `http://shaman-ip.eu/shaman/`
- Brunsmann, J. & Wilkes W. (2009). Enabling product design reuse by long-term preservation of engineering knowledge. *International Journal of Digital Curation, 4*(3), 17–28. `http://ijdc.net/ijdc/article/view/131`

Acknowledgements

- Slide 8: Lian Ding.
- Slide 9: Images by Lian Ding.
- Slide 13: Tom Howard.

- KIM Project: Lian Ding, Manjula Patel, Jason Matthews, Chris McMahon, Glen Mullineux, and many others. . .
- ERIM Project: Mansur Darlington, Tom Howard, Chris McMahon, Steve Culley, Liz Lyon.

Thank you for your attention

DCC Website: `http://www.dcc.ac.uk/`
Alex Ball: `http://www.ukoln.ac.uk/ukoln/staff/a.ball/`