



Because good research needs good data

# KIM, ERIM and the Silo of Doom

Lessons from two long-lived data projects

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# 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?

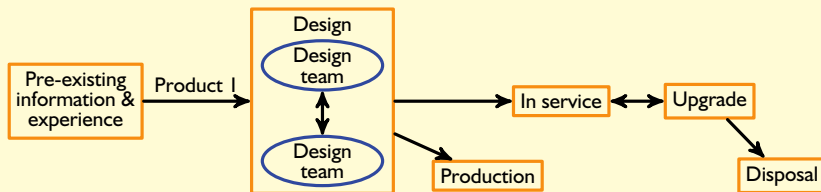
- ▶ Develop curation tools, resources and learning materials.
- ▶ Provide training and other events.
- ▶ Build communities of data curators and foster good practice.
- ▶ Collaborate in projects demanding digital curation expertise.

# KIM Project

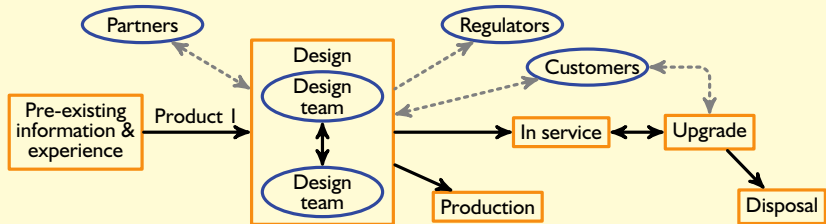
- ▶ £5.5 million Grand Challenge project.
- ▶ Funded by EPSRC and ESRC.
- ▶ 80 industrial collaborators.
- ▶ 13 partners across 11 universities.
- ▶ Strategies and tools for the emerging product service paradigm:
  - ▶ Advanced product representation.
  - ▶ Learning throughout the lifecycle.
  - ▶ Managing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



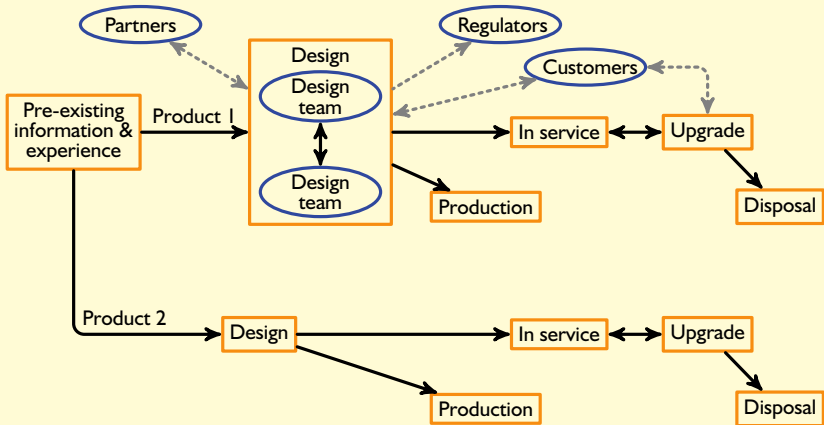
# Engineering information flows



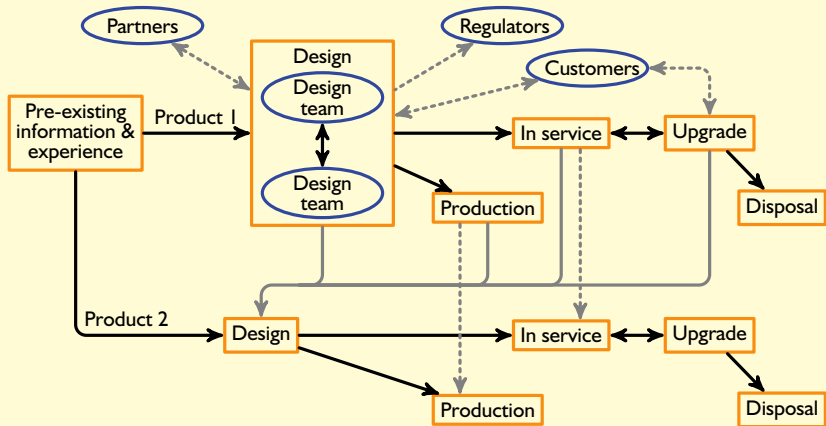
# Engineering information flows



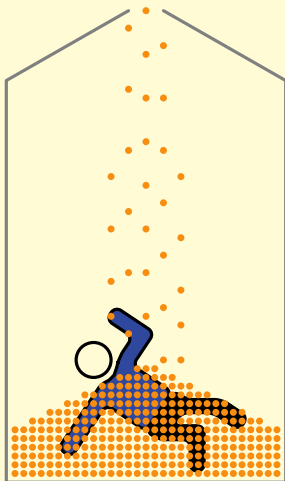
# Engineering information flows



# 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

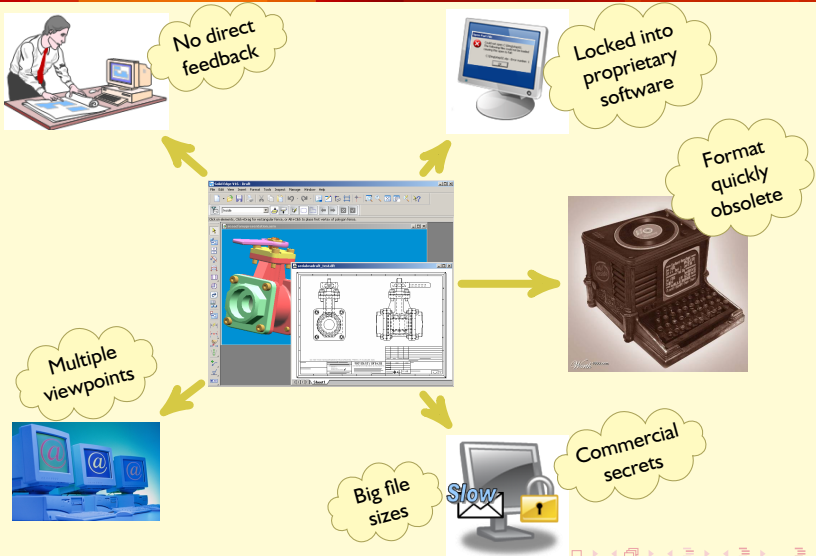
# Integrating silos

## 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)
  - ▶ ???



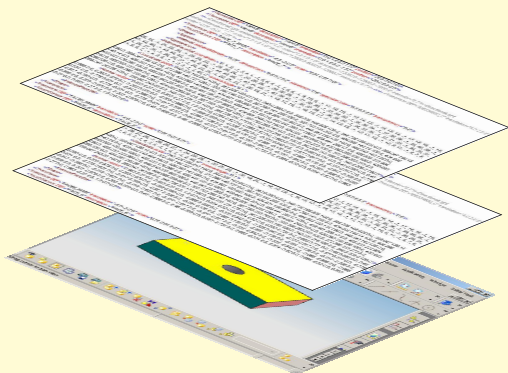
# Limitations of CAD models



# 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



Storage



# Silo of Doom strikes again

Storage

Confidentiality

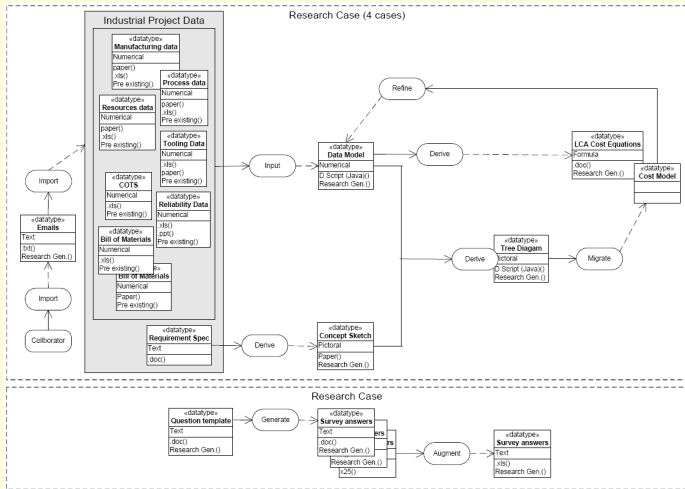
# Silo of Doom strikes again

Storage

Confidentiality

Context

# 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 DDesign)

- ▶ 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.
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Thank you for your attention

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