UMR 5205 CNRS

Versioning and IFC

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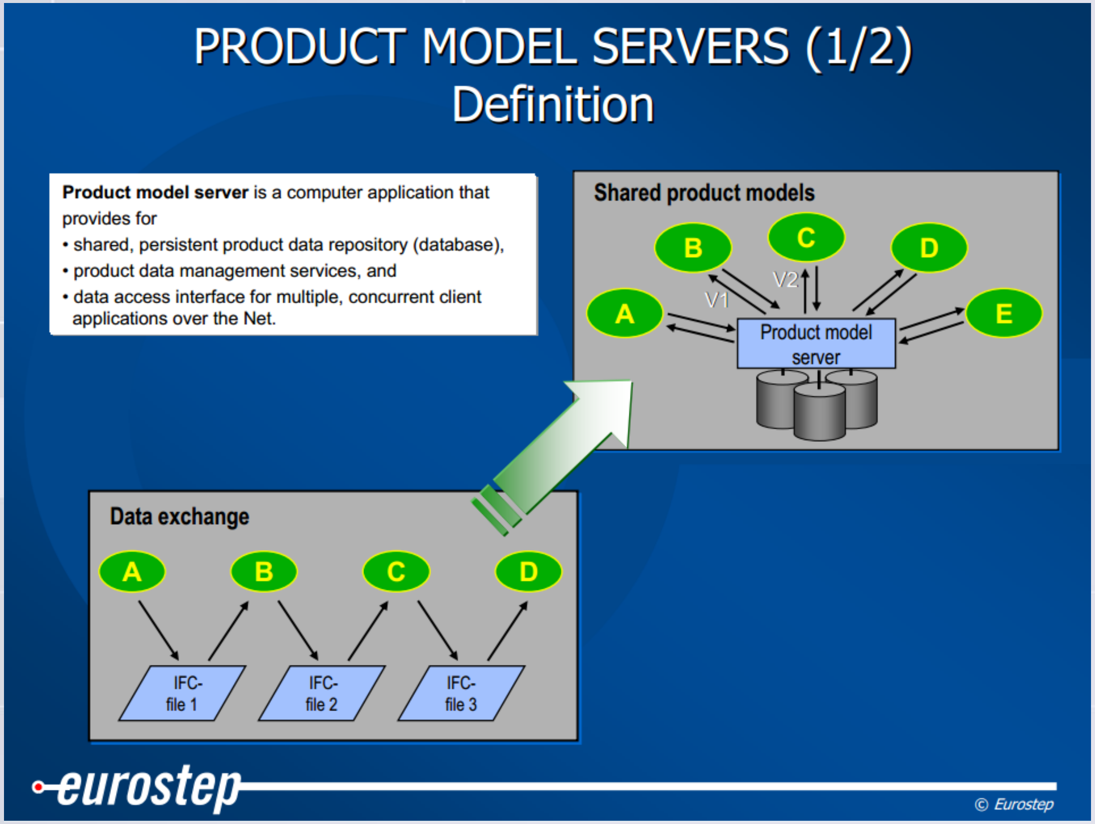
Introduction

- Short state of the art on Versioning system for IFC
- A previous discussion has been done between Karl-Heinz Haefele, Thomas Kolbe and Gilles Gesquière during 3D Geoinfo 2014
- Currently, IFC does not own a versioning system, but some extensions have been proposed in the litterature
- In the following slide, several paper are briefly presented

About sharing building product model data

Kari Karstila, Tero Hemiö,www.eurostep.com

Sharing a same goal



PRODUCT MODEL SERVERS (1/2)
Definition

Product model server is a computer application that provides for

- shared, persistent product data repository (database),
- product data management services, and
- data access interface for multiple, concurrent client applications over the Net.

http://cic.vtt.fi/projects/vbe-net/data/Sharing_Building_Product_Models.pdf

About sharing building product model data

Kari Karstila, Tero Hemiö,www.eurostep.com

- **PRODUCT MODEL SERVERS (2/2)- Typical concepts Typical**
  - Model repository
    - Persistent product model storage in a database
  - Object metadata
    - **Version, ownership, modifier, update dates / times**
  - Versioning
    - **Provides for versioning of objects, while IFC doesn't currently support versioning**
    - **Note: An update of an object creates a new version (revision) of it**
  - User management
    - Roles
    - Access rights
  - Data access interface
    - A defined interface for data access to applications
  - Partial model exchange
    - Import / export of partial models

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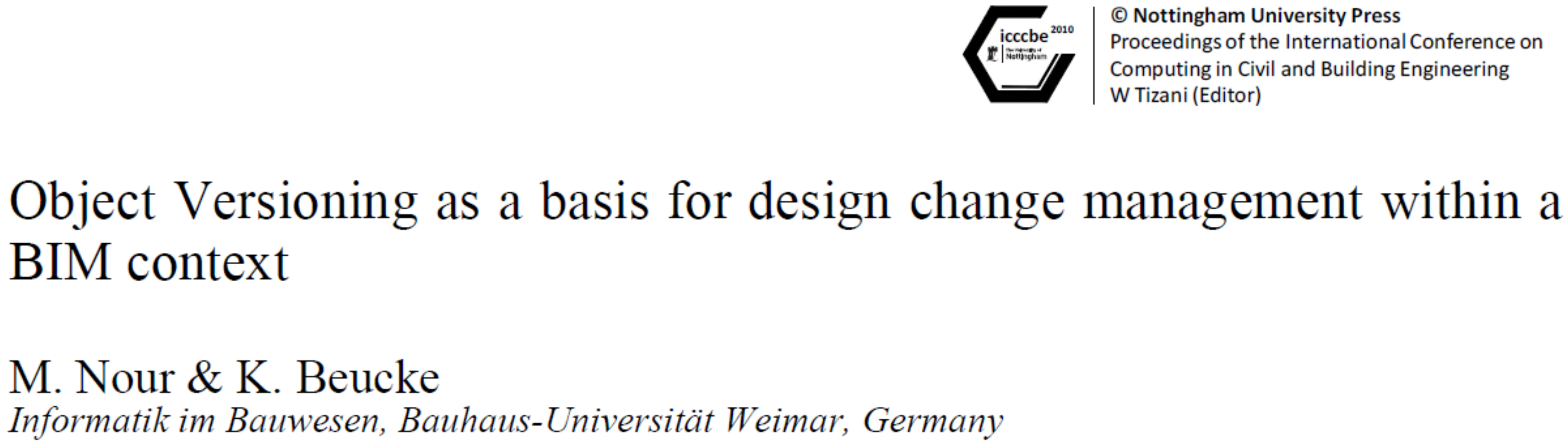
Object Versioning as a basis for design change management within a BIM context

M. Nour & K. Beucke
Informatik im Bauwesen, Bauhaus-Universität Weimar, Germany



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Object Versioning as a basis for design change management within a BIM context

M. Nour & K. Beucke
Informatik im Bauwesen, Bauhaus-Universität Weimar, Germany

- InPro project within the 6th EU Framework Program for Research and Development
- It adresses the problem of change management in early design
- It introduces a novel approach where both object versioning and IFC model are integrated together in an open multidisciplinary collaborative environment

Object Versioning as a basis for design change management within a BIM context

- **Object Versioning give the possibility to have several versions of the content (attributes' values) of an object**
- **The development of desing in terms of addition of new objects, deletion of objects or modifications of attributes' values of pre-existing objects can be captured in a graph structure**

Object Versioning as a basis for design change management within a BIM context

- Description of the relation between object versions (left)
- With this graph, it is possible to compute the object status (attributes and corresponding values)

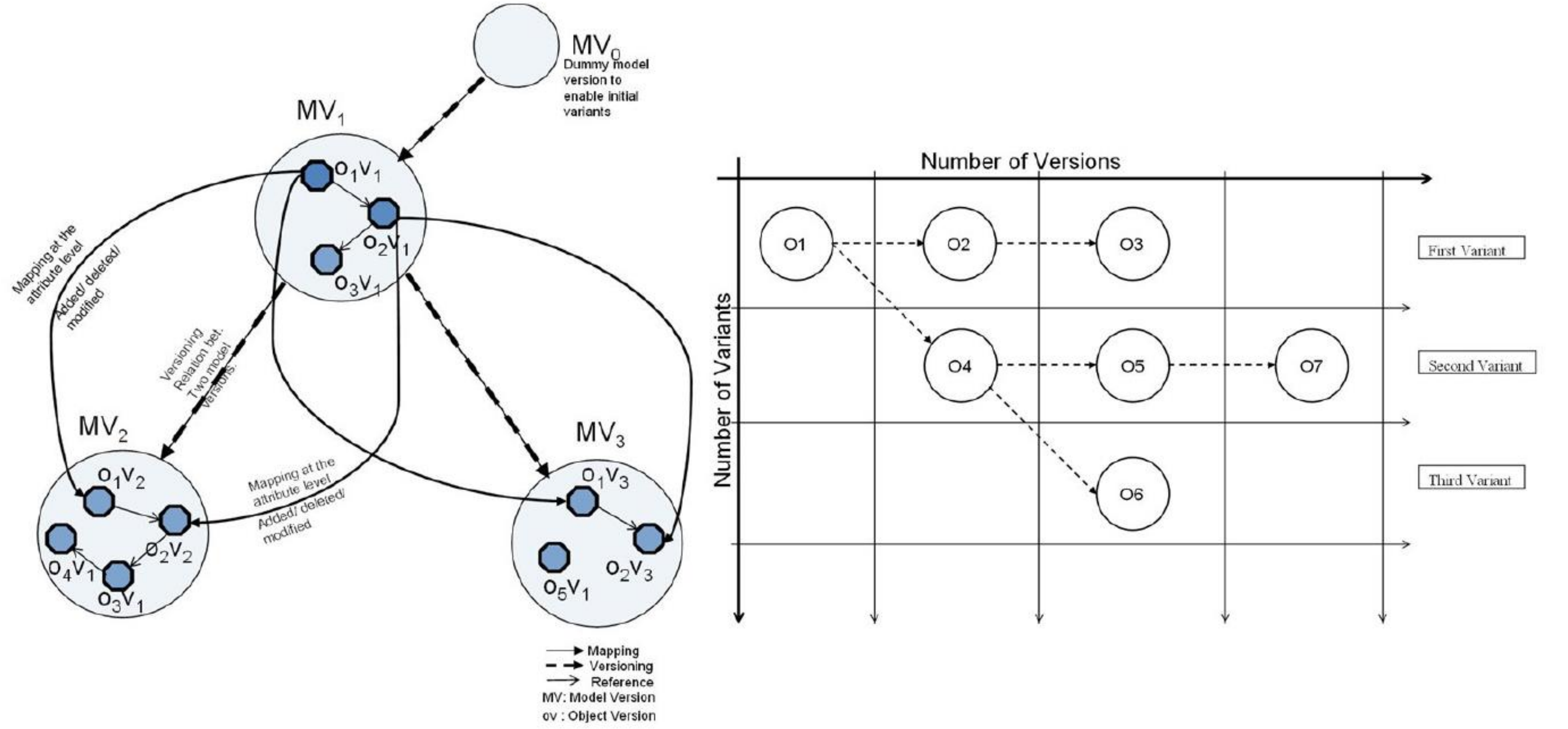
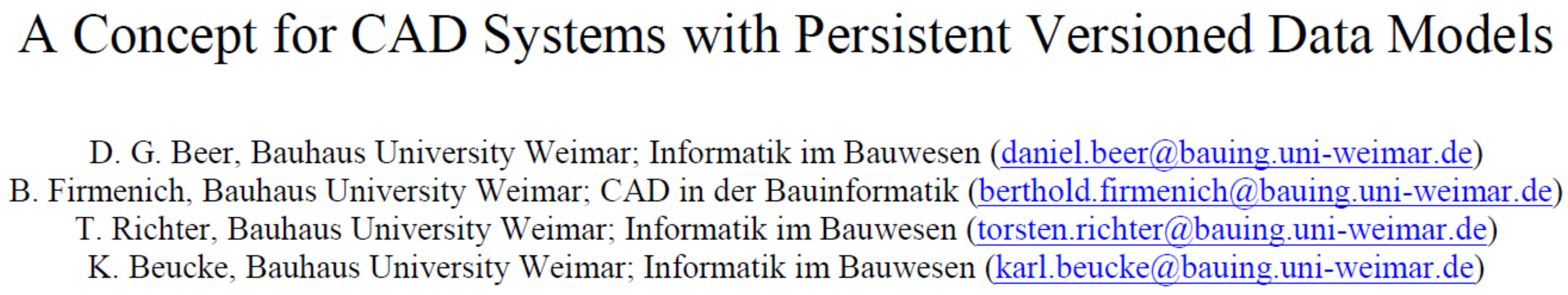


Figure 1 Left: IFC Object Versioning Example, Right: The branching of the versioning graph to indicate variants

Object Versioning as a basis for design change management within a BIM context

- **Object Versioning System can be expressed using a system of Sets that consists of model versions and their relationship as well as object versions and their relationship**
- **Document management Systems**
  - Give a much finer degree of granularity, that is the objects and its attributes rather than part of documents.
- **In this paper, a set of experimental tools were developed by the author to provide a proof of concept for the IFC object versioning system**



A Concept for CAD Systems with Persistent Versioned Data Models

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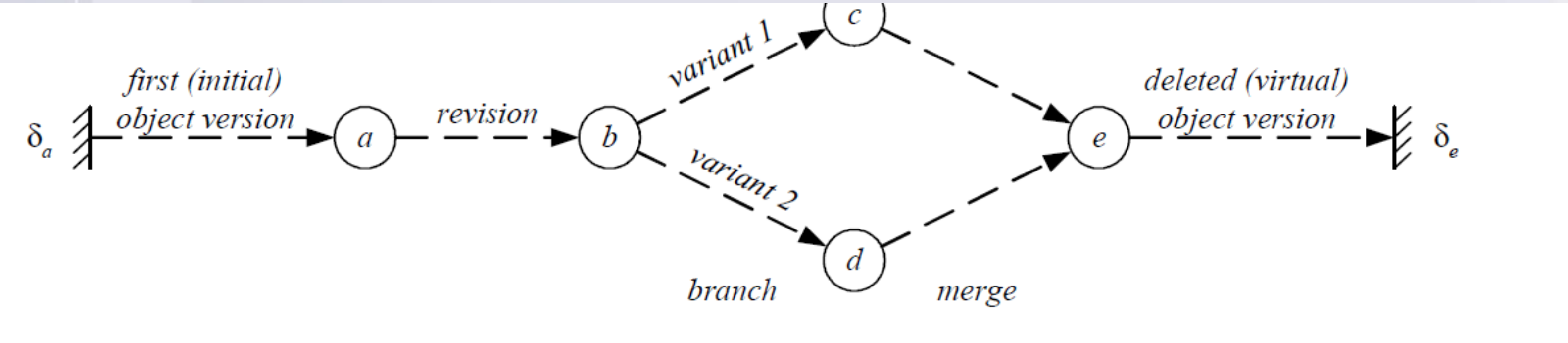
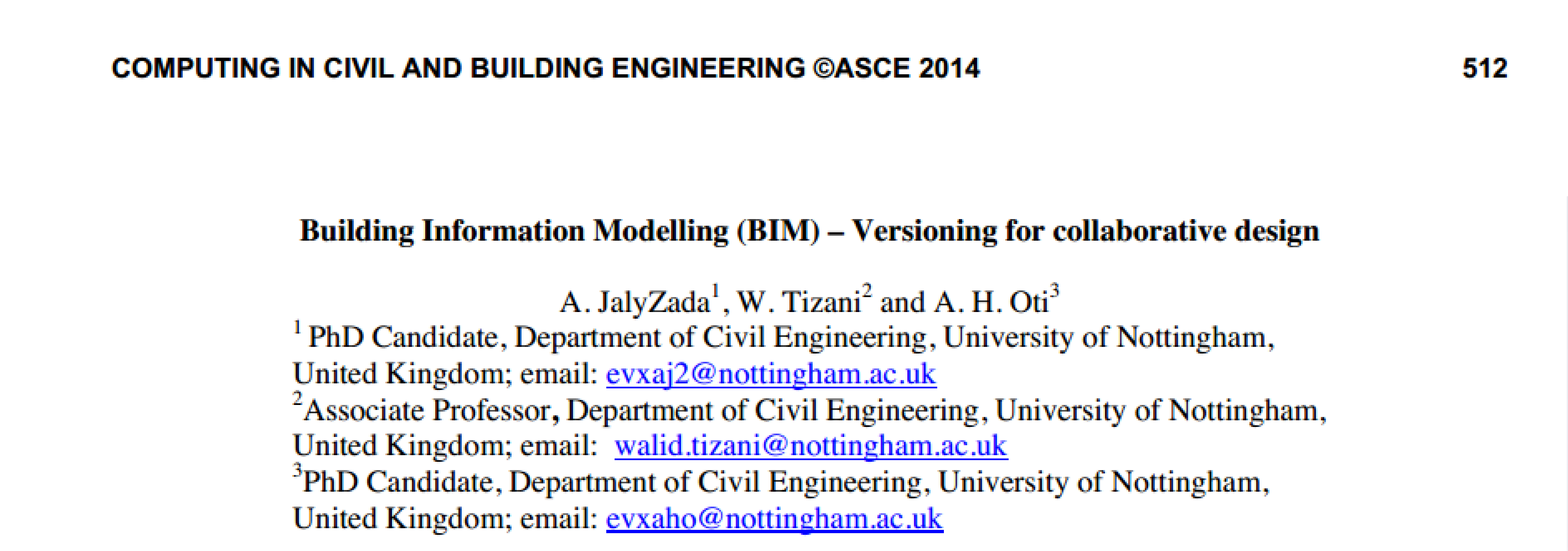
- **Discussion on the versioning for CAD objects**
- **We can find concepts that seem to be near our graph representation**


δ_a
first (initial) object version
a
revision
b
variant 1
variant 2
c
d
branch
merge
e
deleted (virtual) object version
δ_e



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Building Information Modelling (BIM) – Versioning for collaborative design

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- The main goal of this research is to develop a collaborative BIM platform that tackles the challenges of integrating object versioning, as a change management approach, and an IFC model, as data representation of BIM.
- This has been done through suggesting new IFC extensions to add further concepts representing the history of changing to any object of the model

Extension of the IFC Standard

- Six existing entities from the IFC standard have been suggested to be modified to represent as new entities within the IFC schema to support the idea of object versioning that holds the history of changes to objects of the BIM model.
- Three of these new entities represent detailed information about the changes that have occurred in the current BIM version and the other three represent the collector to all instances of entities
- For instance for a modified object
  - There are more than one instance of IfcVersionPropertySingleValue entity to represent all modified properties of that object
  - Thus, for each version, there are more than one instance of IfcVersionBuildingElement entity to represent all modified elements of that version.
  - And so on for all versions, there are more than one instance of IfcVersionInformation entity to represent all modified versions in the unique IFC file.

Conclusion

- There is not a standardized approach for IFC, but the problem seems to be the same
- New IFC entities are proposed to make a link between two objects, or set of objects.
- The problem of the UID seems to be the same (need to check that we have a unique UID for each object).
- Important to check the validity between two successive versioned files