
Effektive Formen der Zusammenarbeit -> BIM-Collaboration

BIM-Model
BIM-Modelling
BIM-Management
BCF-BIM Collaboration Format
BIM-Collaboration CDE-Common Data Environment

Prof. Rasso Steinmann



- Professor für Bauinformatik, Hochschule München – FK02
- Leiter, iabi-Institut für angewandte Bauinformatik an der Hochschule München

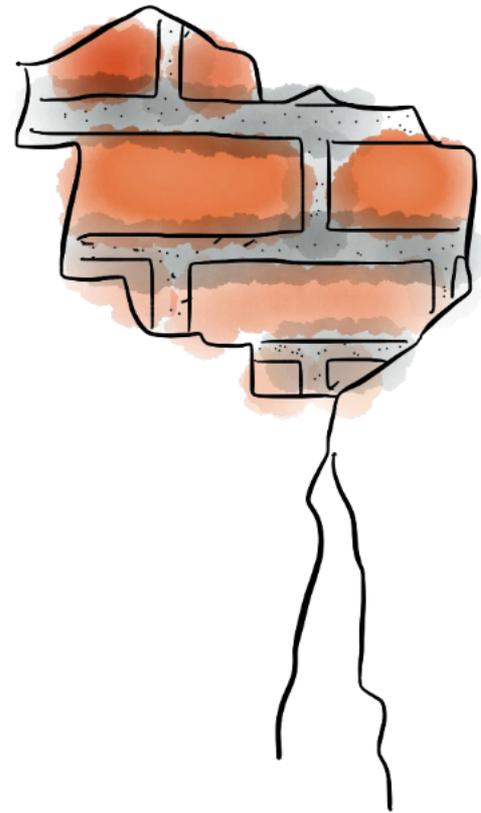


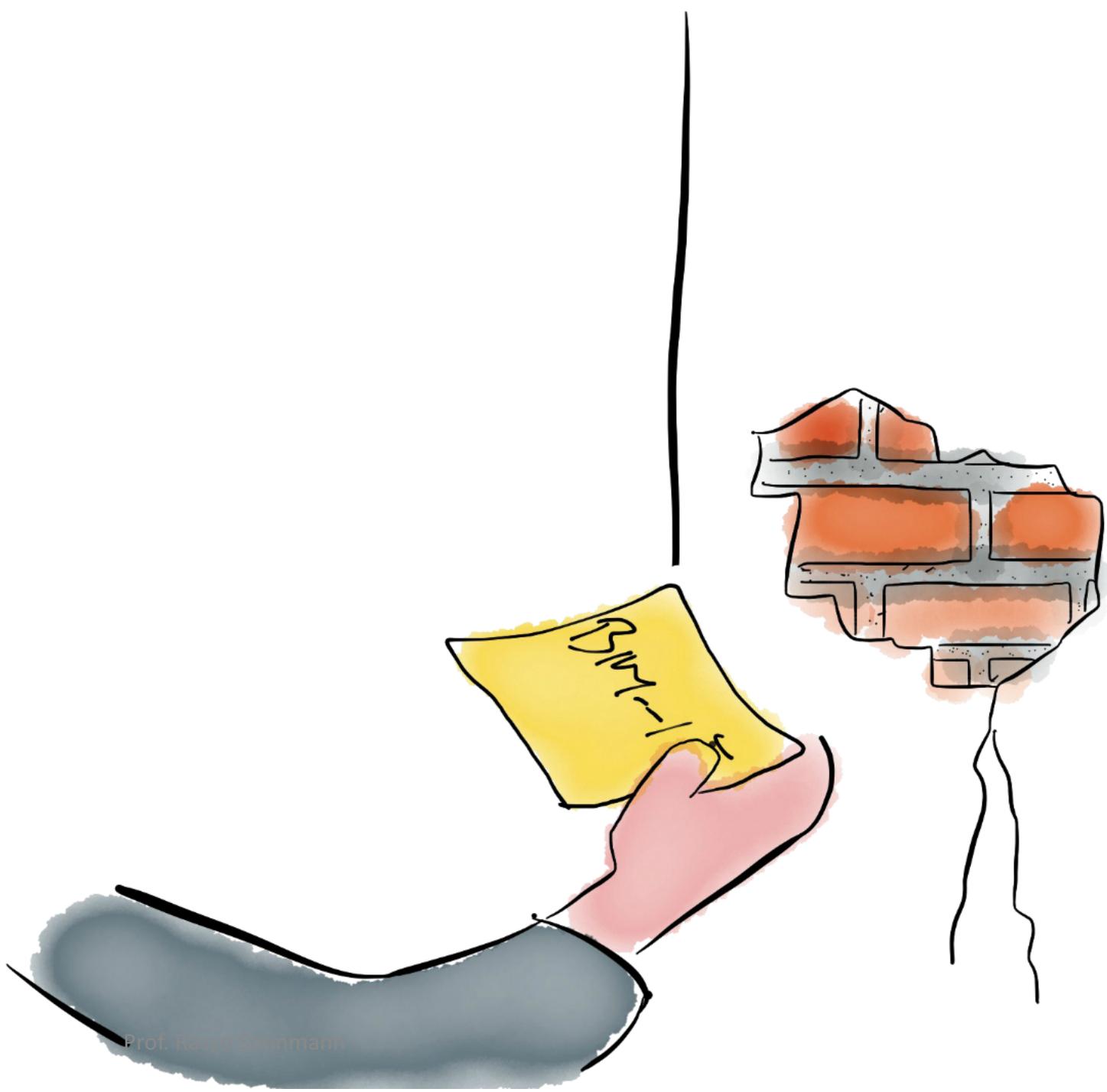
- Leiter, VDI Koordinierungskreis BIM
- Vorstandsmitglied, VDI Gesellschaft Bau und Gebäudetechnik

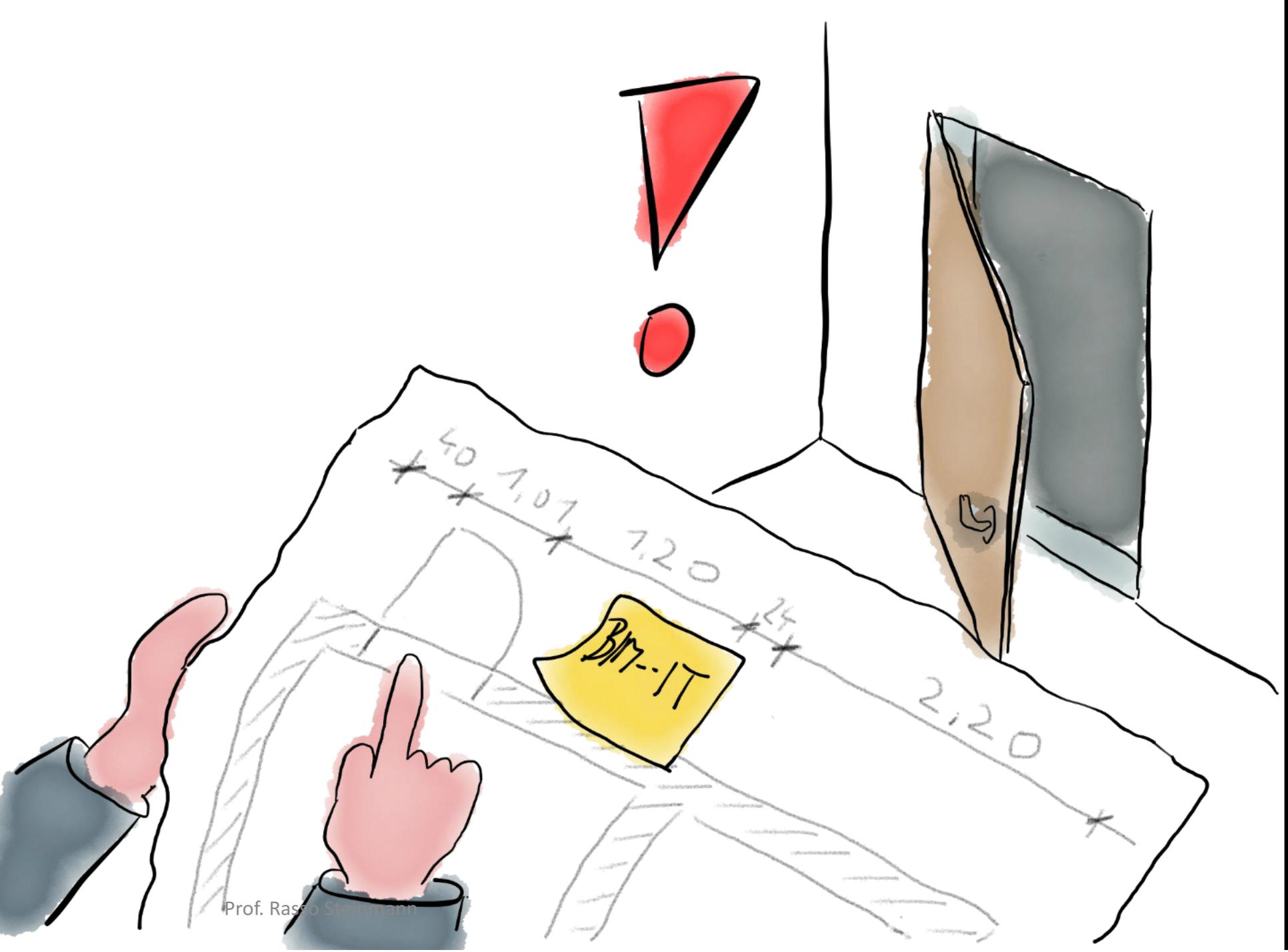


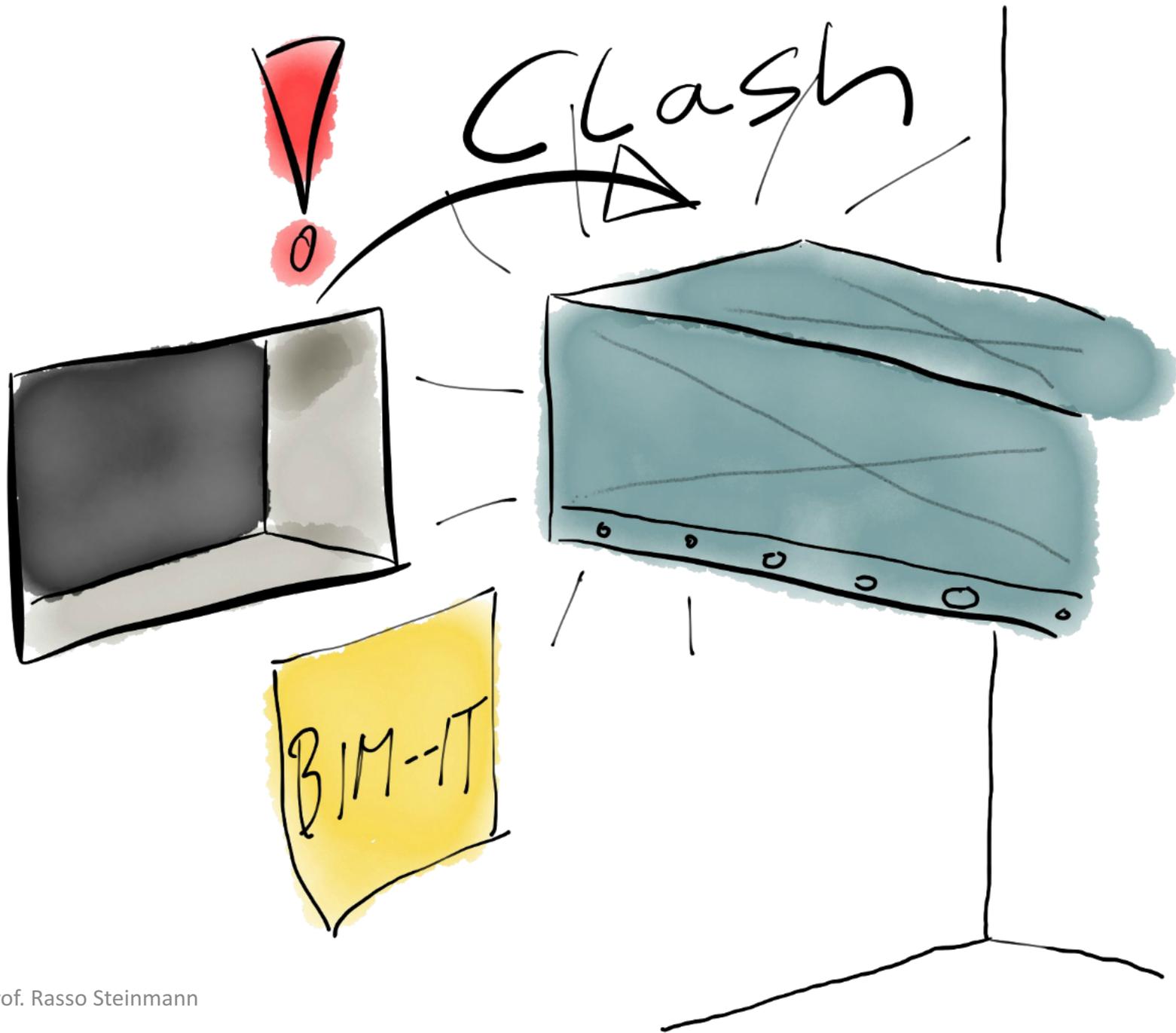
- Vorstandsvorsitz, buildingSMART GS
- Board Member, buildingSMART International
- Software Certification für buildingSMART International
- 20 Jahre ISG Chairman, buildingSMART International

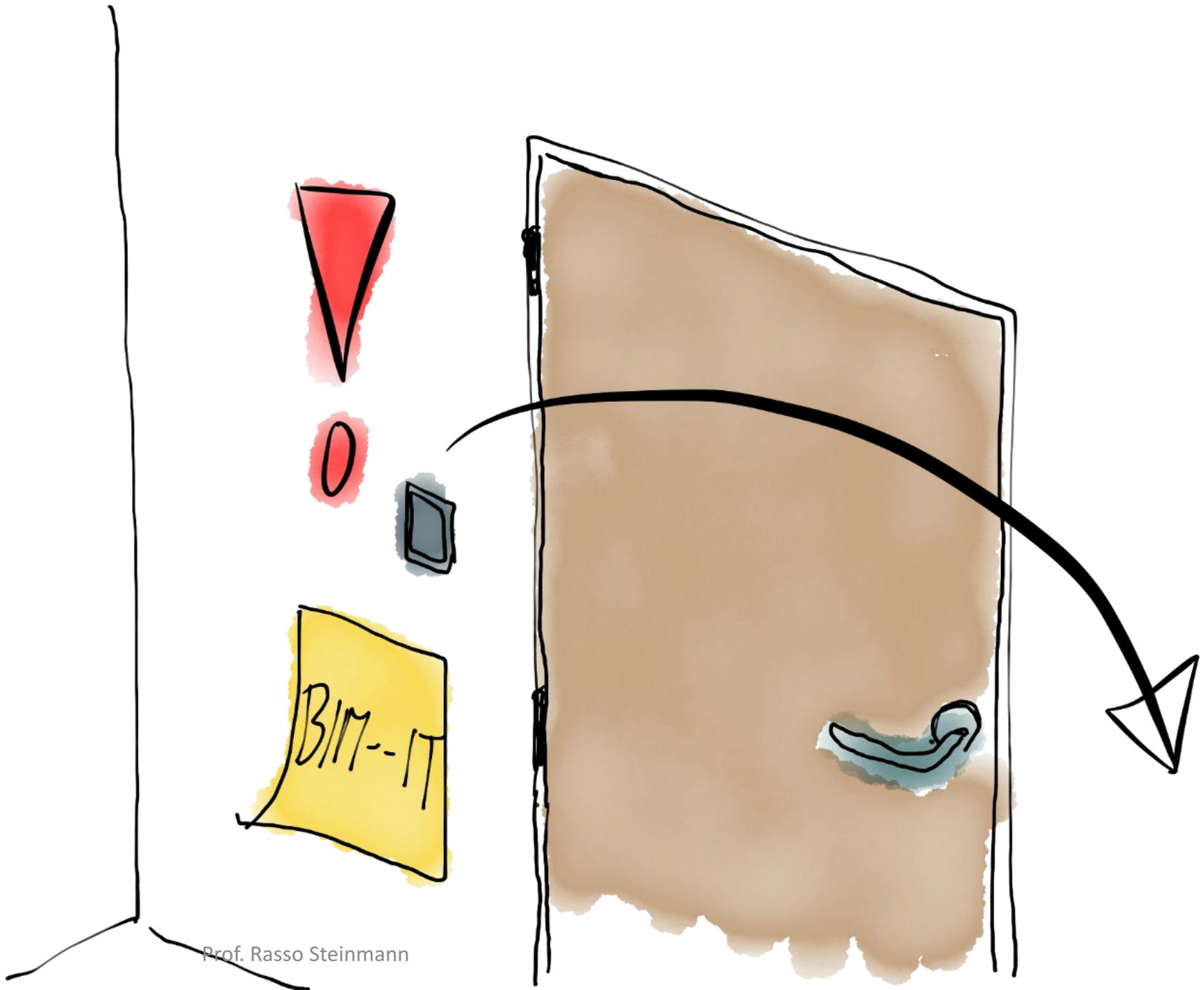


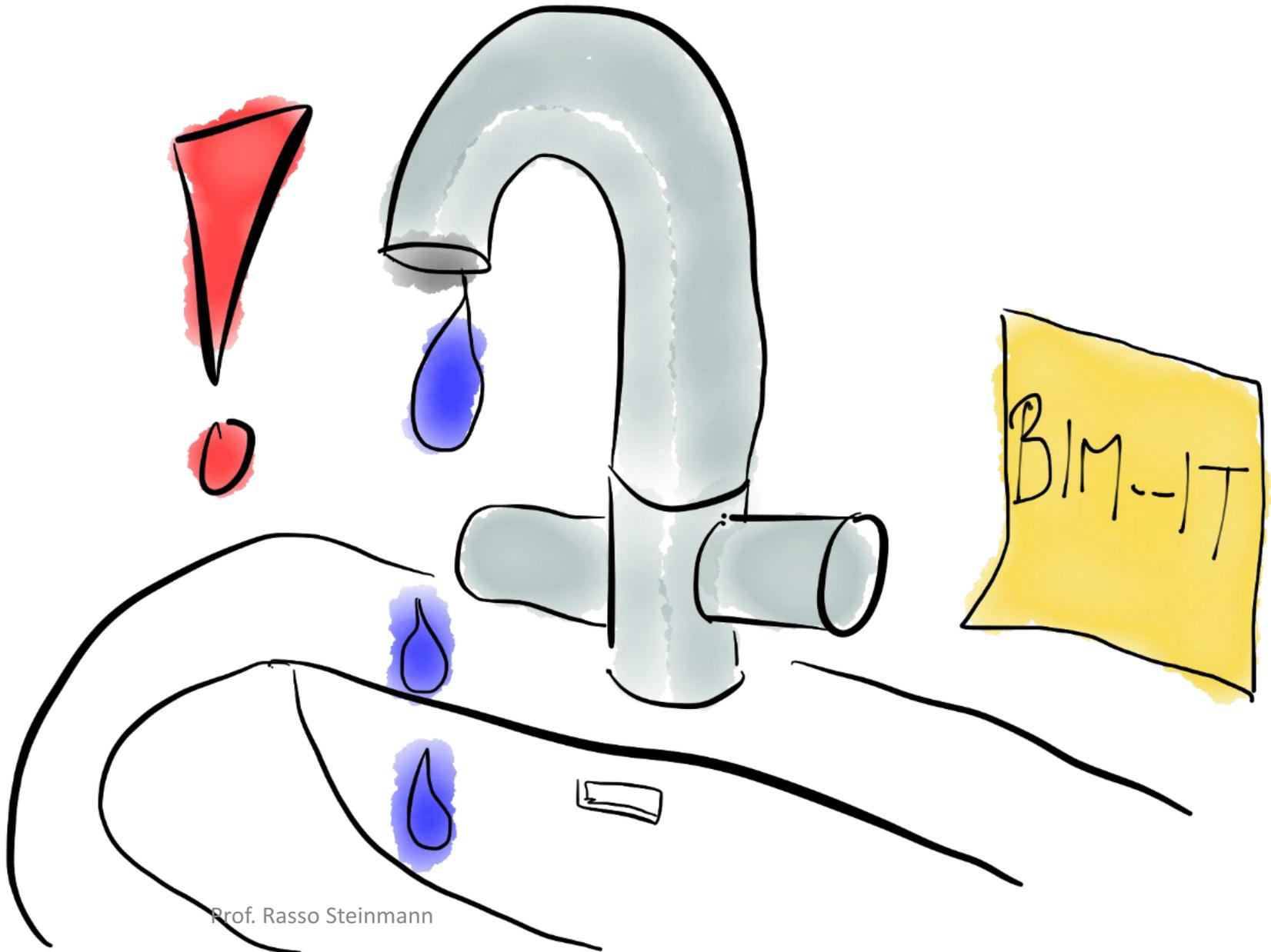


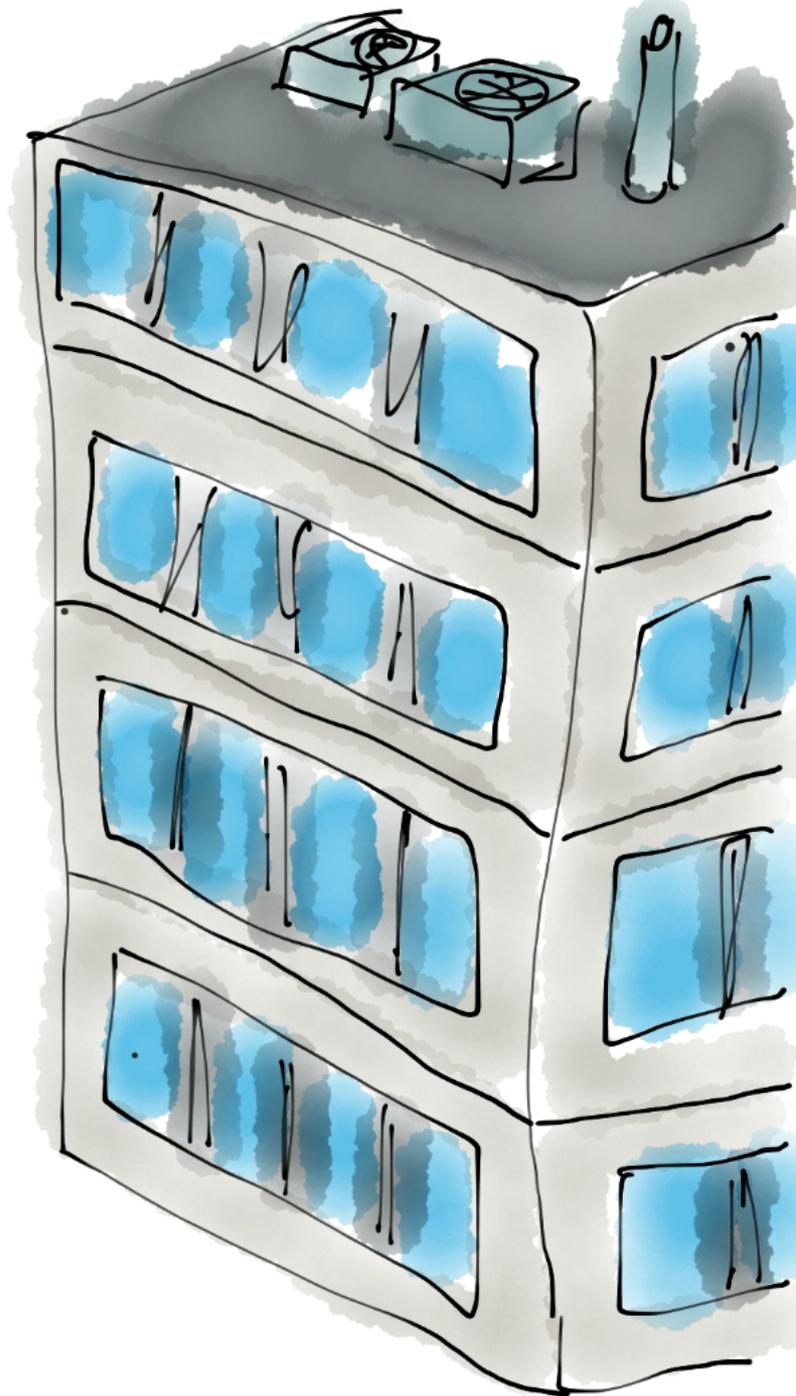
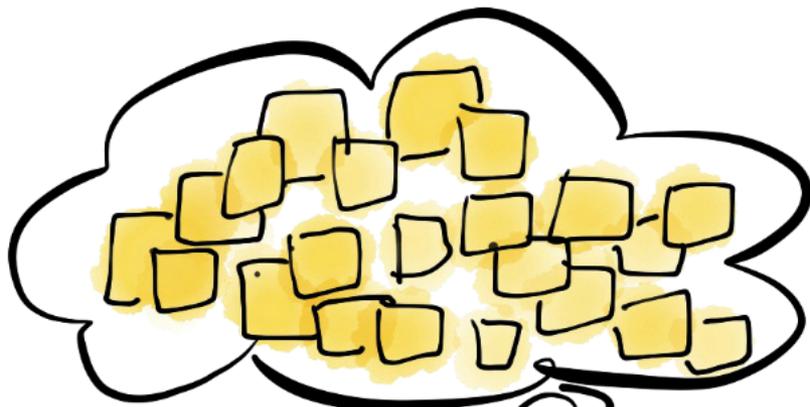


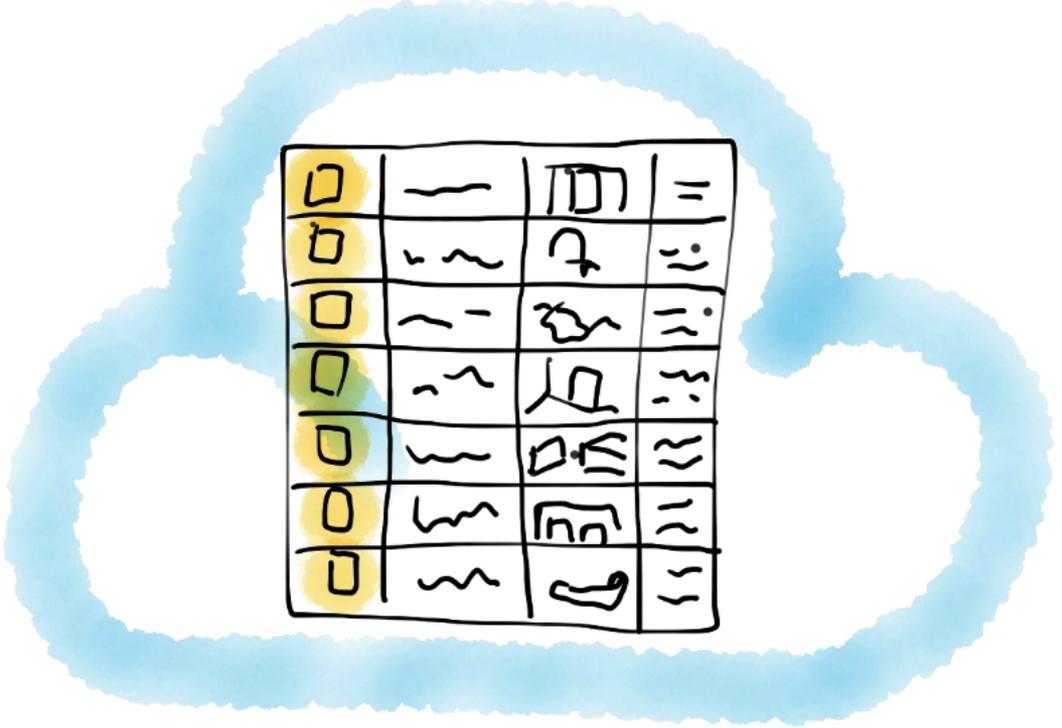






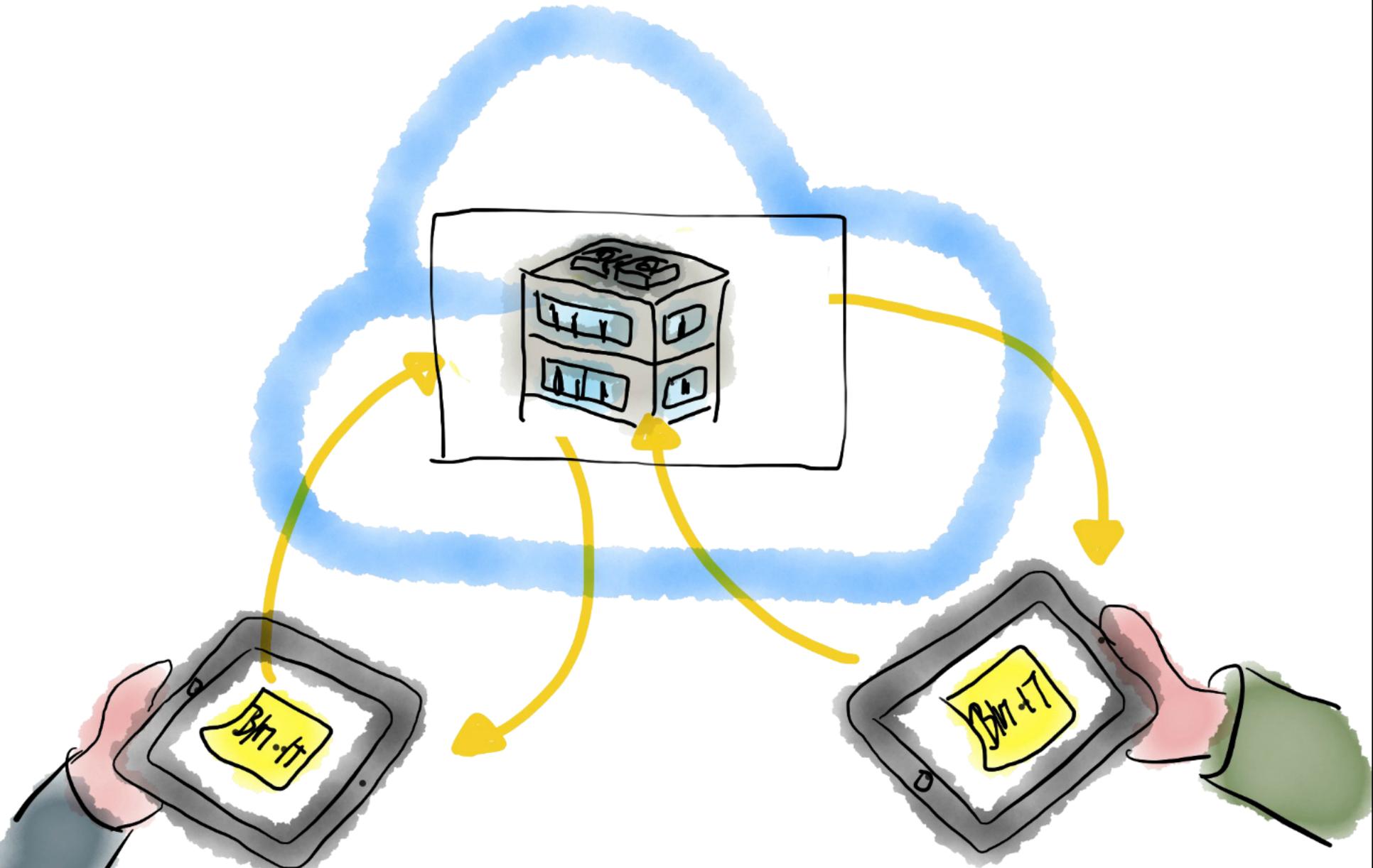


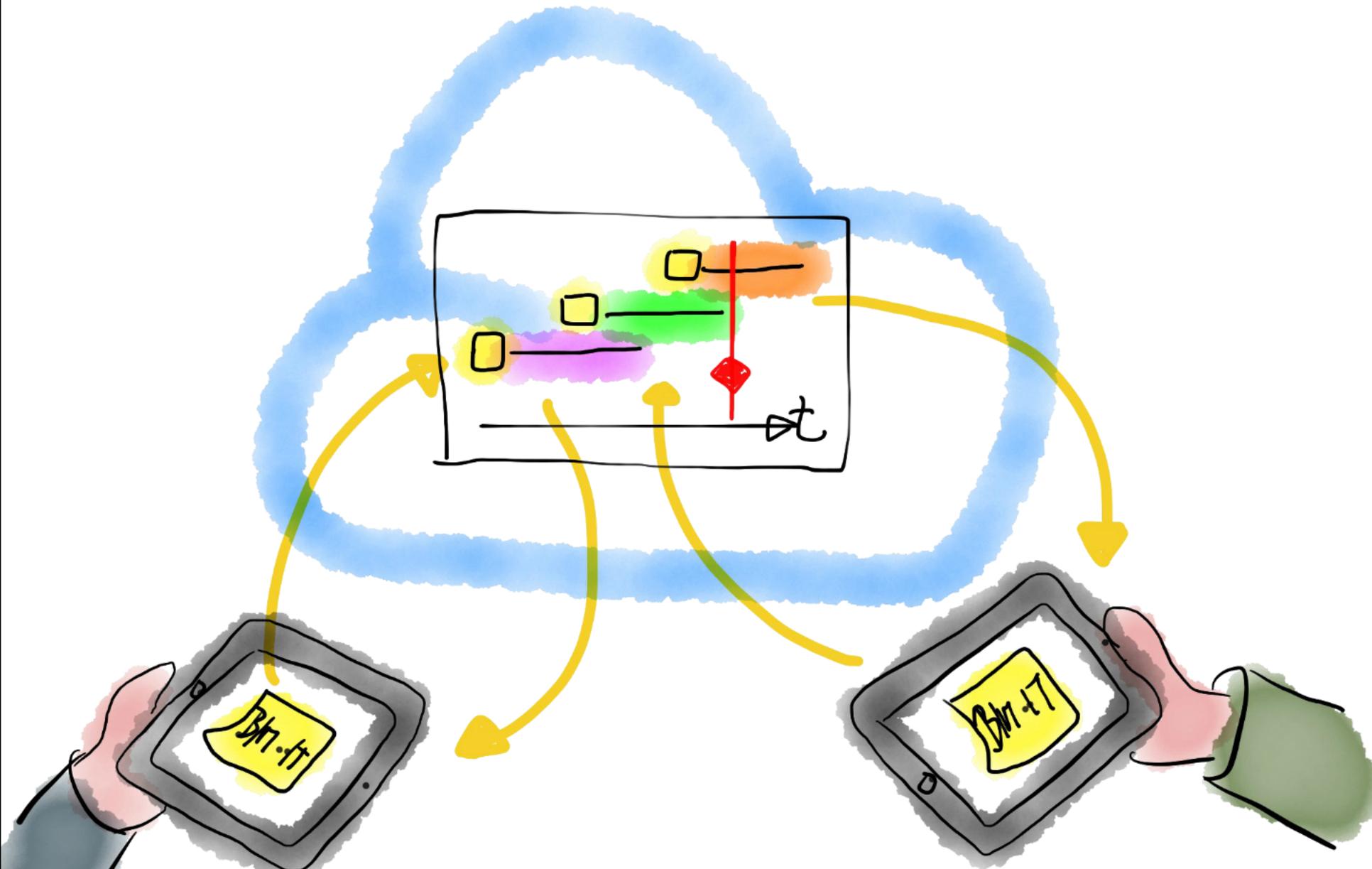


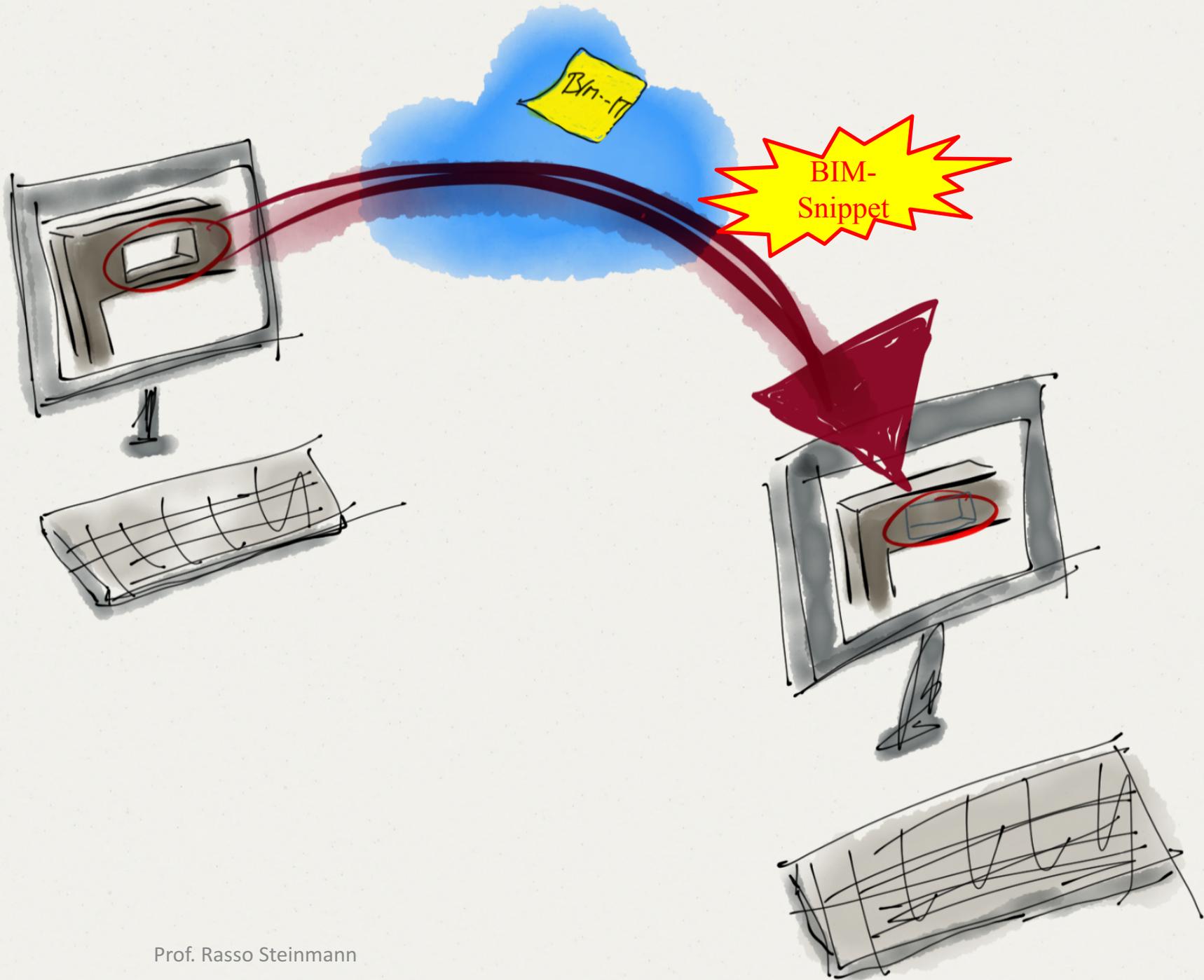


□	~	□	
□	~	7	
□	~	7	
□	~	□	
□	~	□	
□	~	□	
□	~	□	









„BIM“

Drei eigenständige aber vernetzte Funktionen

Building Information Modeling:

Ist ein **BUSINESS PROCESS** zur Beschreibung aller BIM-Funktionen (Design, Simulation, Kostenschätzung, Entscheidungen, Datenvalidierung, Datenübergabe, ...) im Lebenszyklus eines Gebäudes.



Building Information Model:

Ist die **DIGITALE REPRÄSENTATION** aller Daten eines Gebäudes (in jedem Fall mehr als nur Geometrie)



Building Information Management:

Ist die **ORGANISATION & KONTROLLE** des Business Prozesses über den gesamten Lebenszyklus eines Gebäudes.

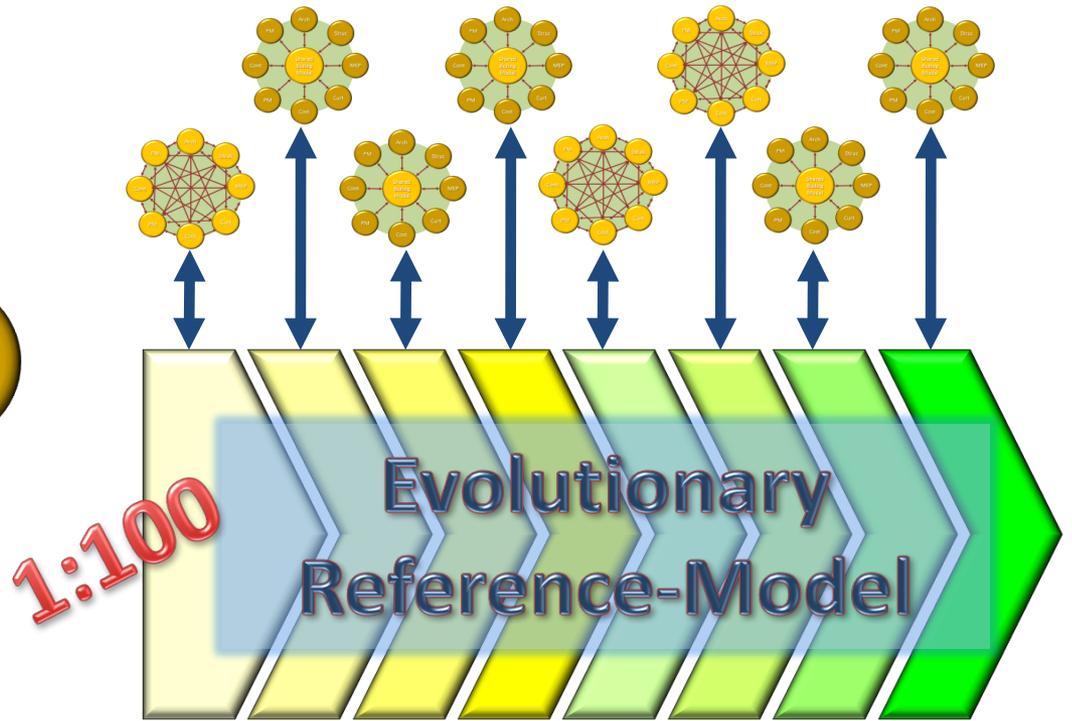
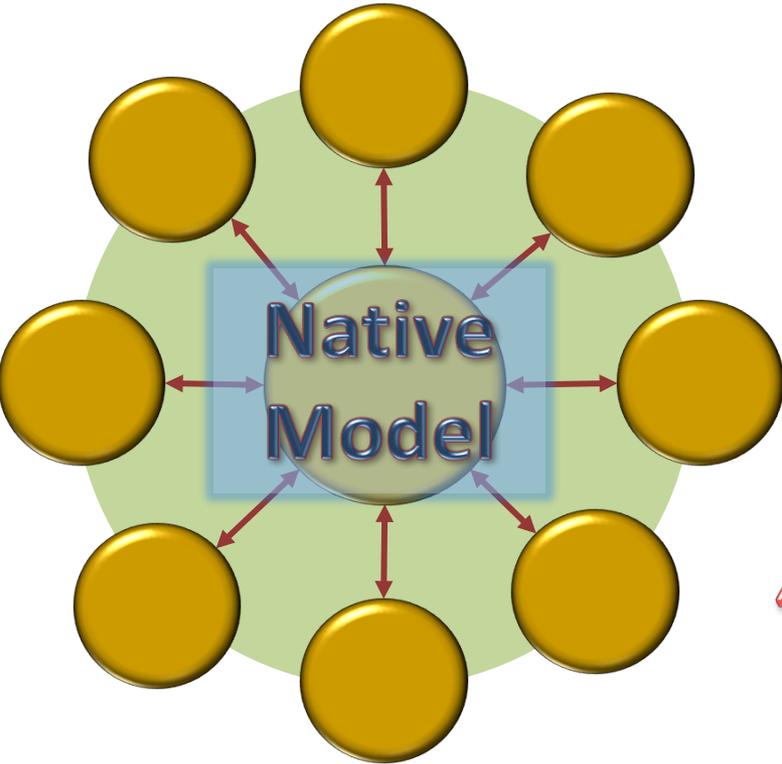


Synchrone Prozesse

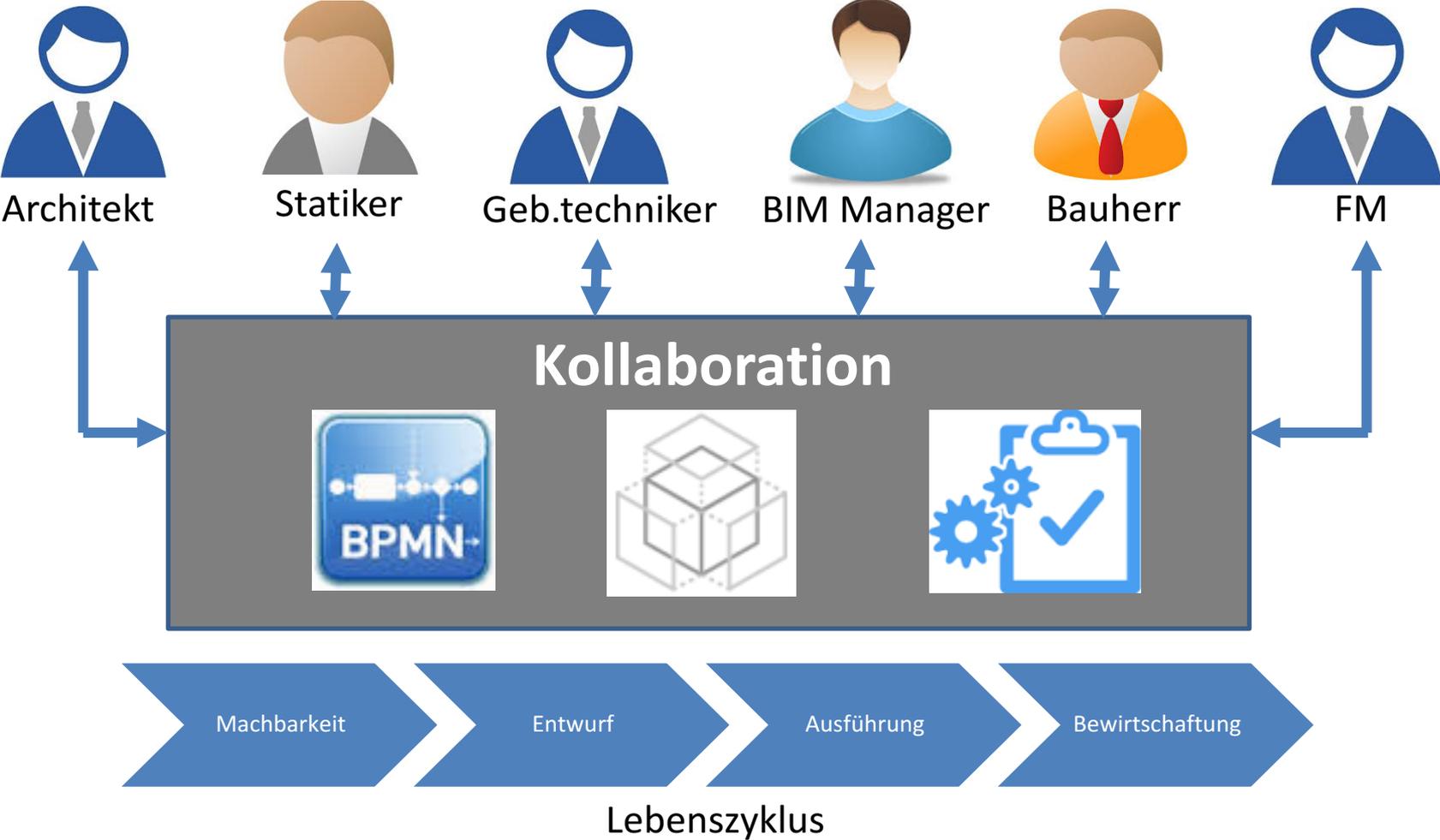
- 1 Team
- 24 h an 1 Project
- Innerhalb 1 Firma

Asynchrone Prozesse

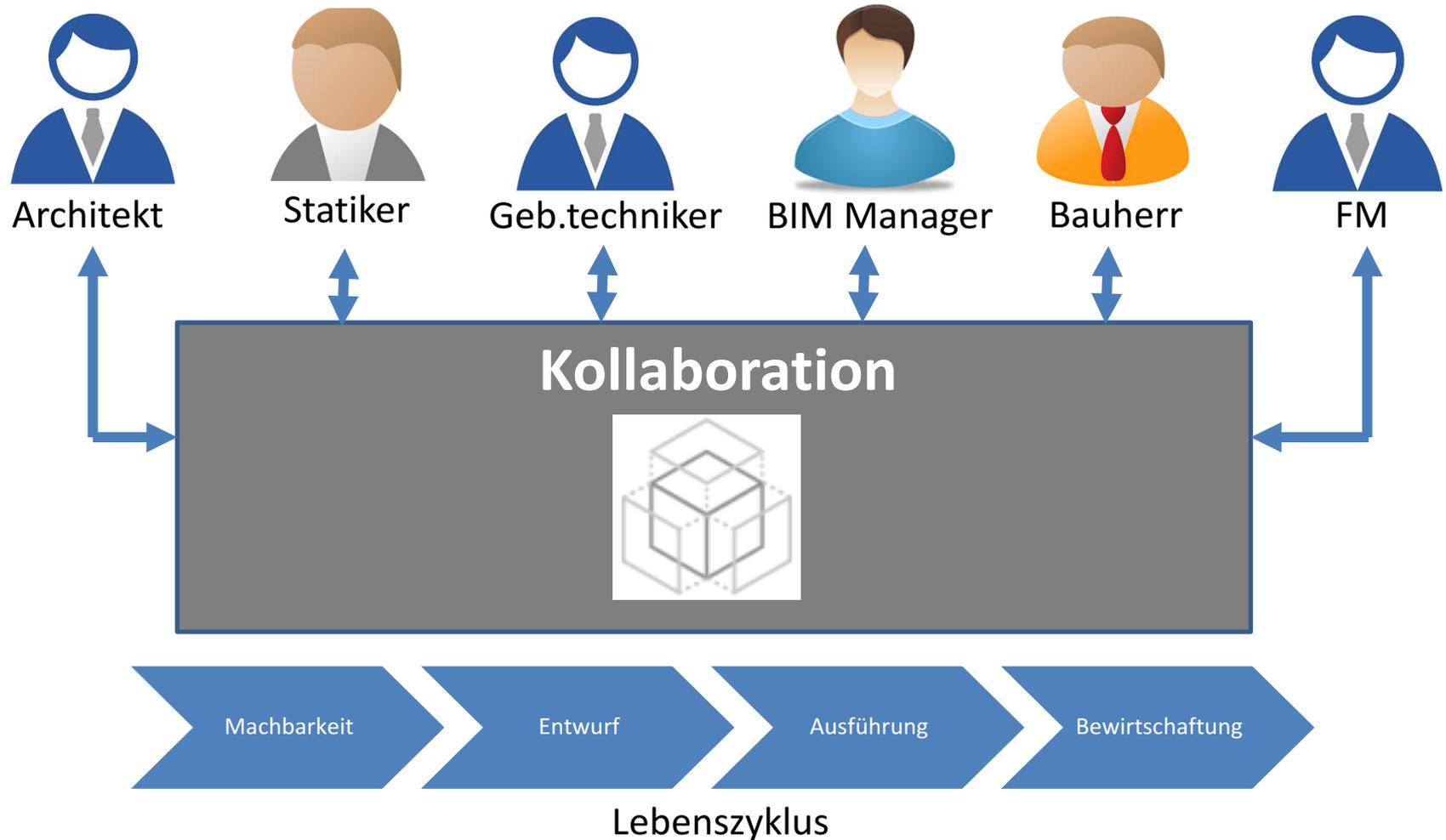
- Verschiedene Teams
- Arbeiten nicht gleichzeitig
- Unterschiedliche Software
- Unternehmens-übergreifend



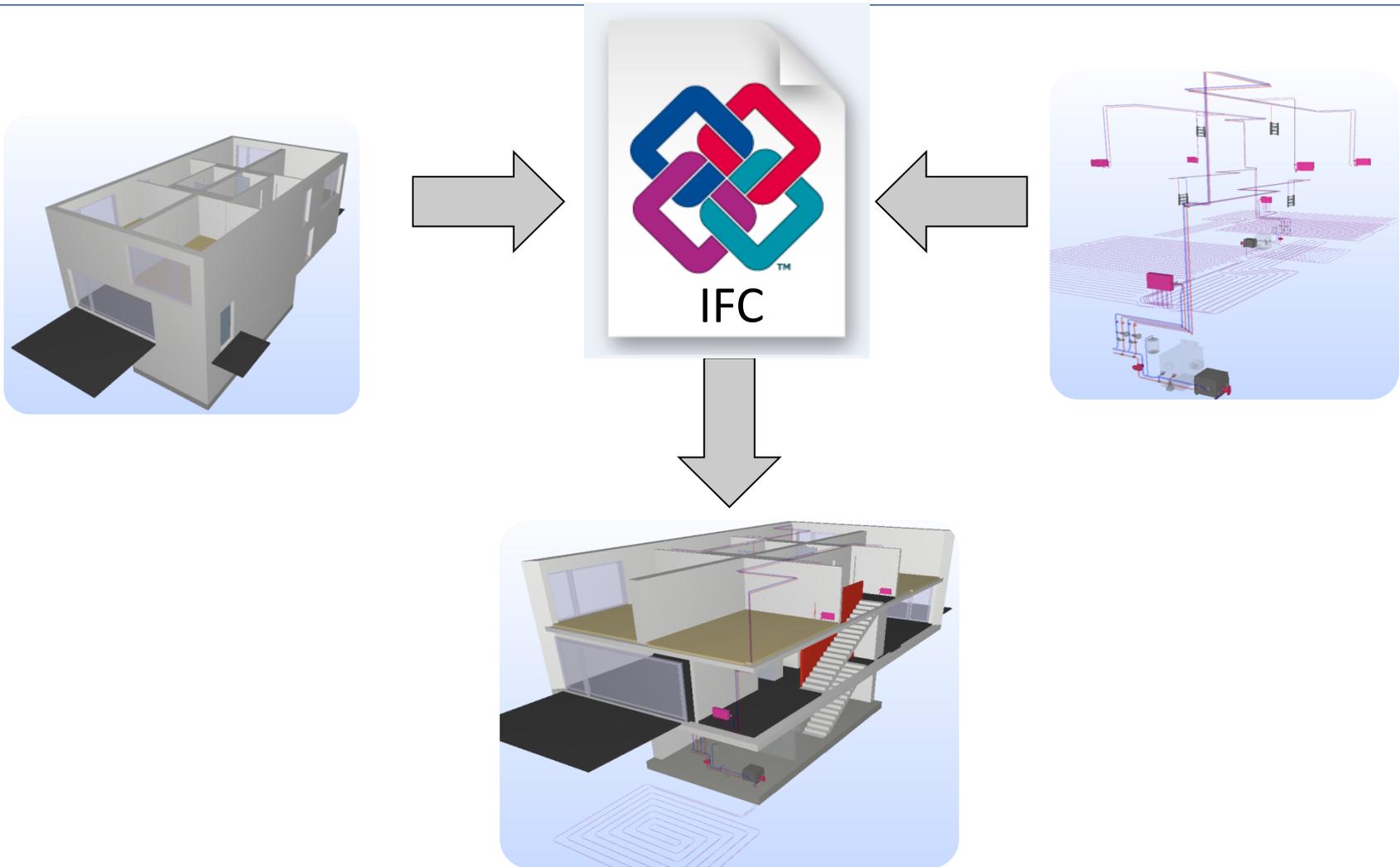
BIM - Collaboration



BIM – Kollaboration BI-Model

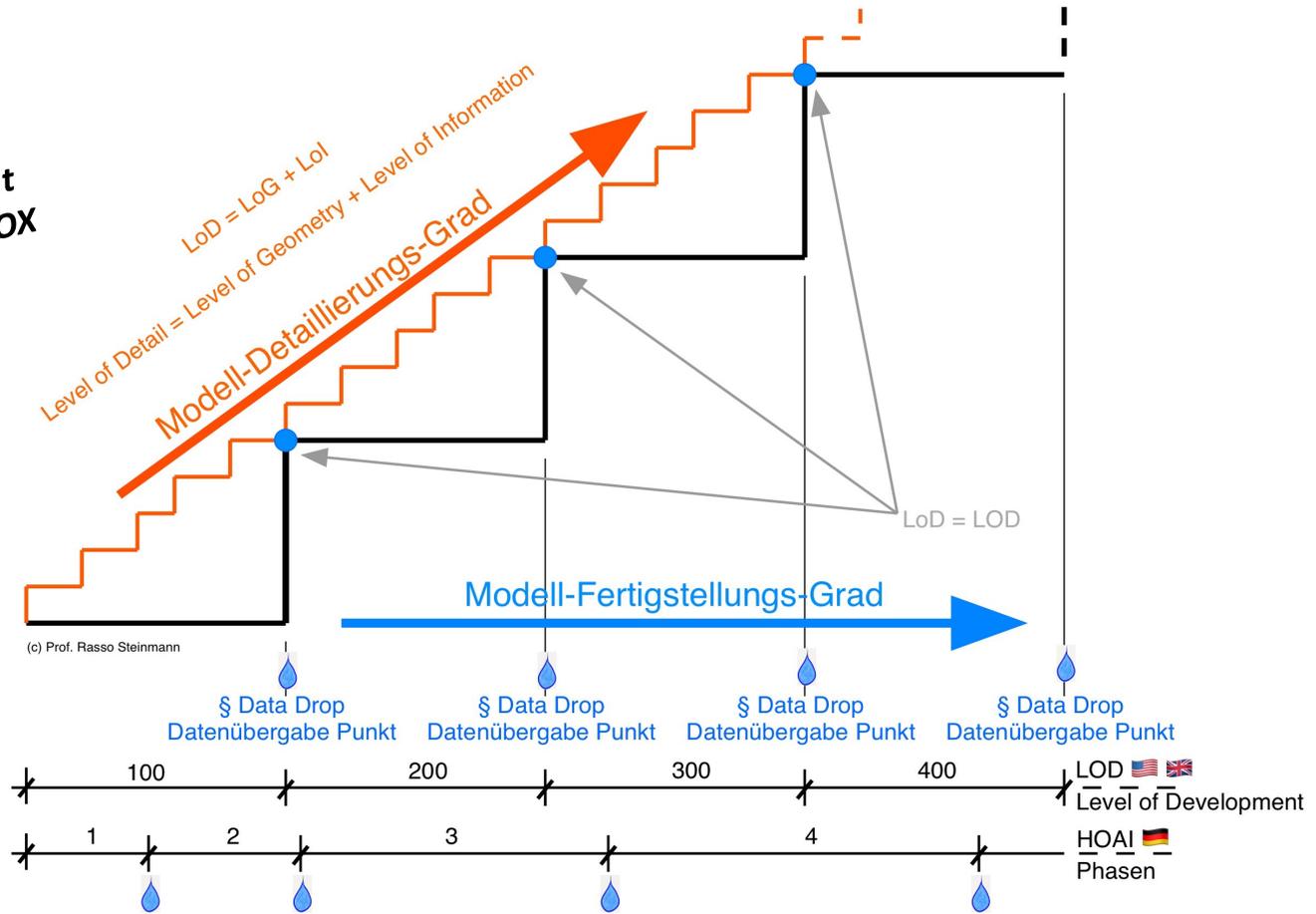


Koordination in zusammengeführten Modellen aus partiellen Modellen der Fachplaner

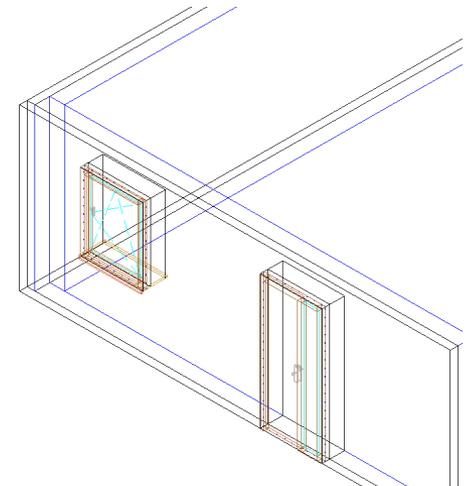


Differenzierung zwischen Modell-Granularität und -Fertigstellungsgrad ist entscheidend für Konsolidierung und Verträge

Begriffe werden zur Zeit
unter dem Stichwort LOX
heftig diskutiert

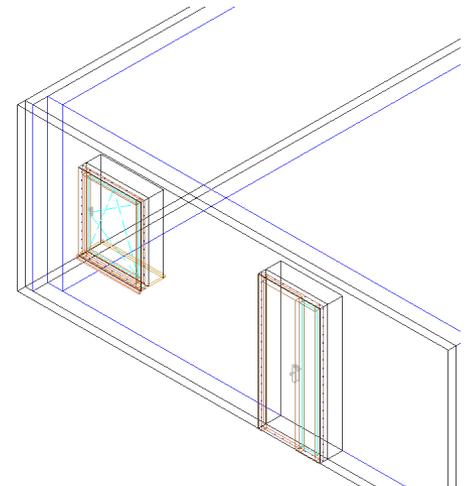


Welchen Detaillierungsgrad braucht man für BIM wann?



<http://www.countessclaire.com/>

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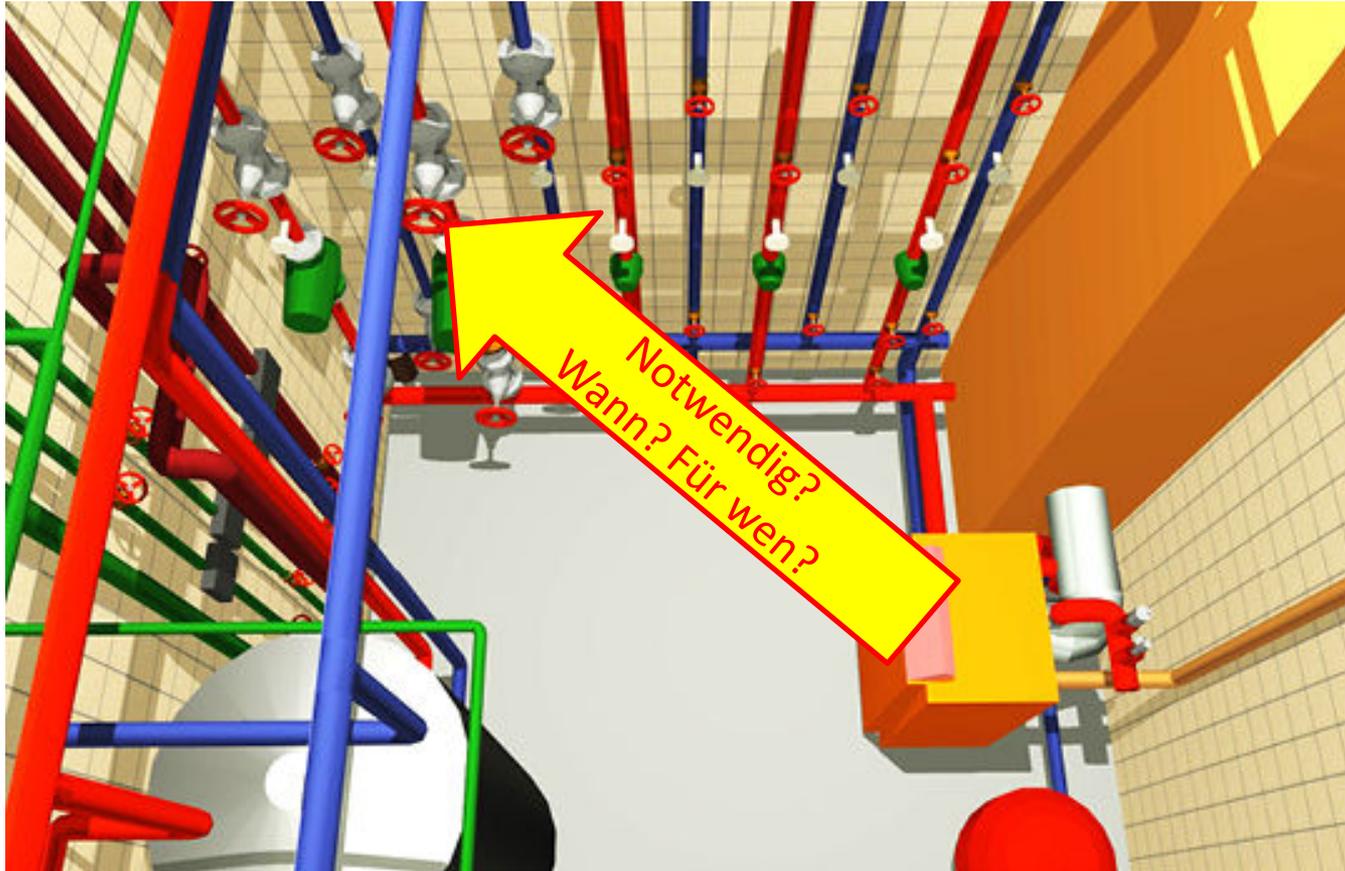
Welchen Detaillierungsgrad braucht man für BIM wann?

Notwendig?



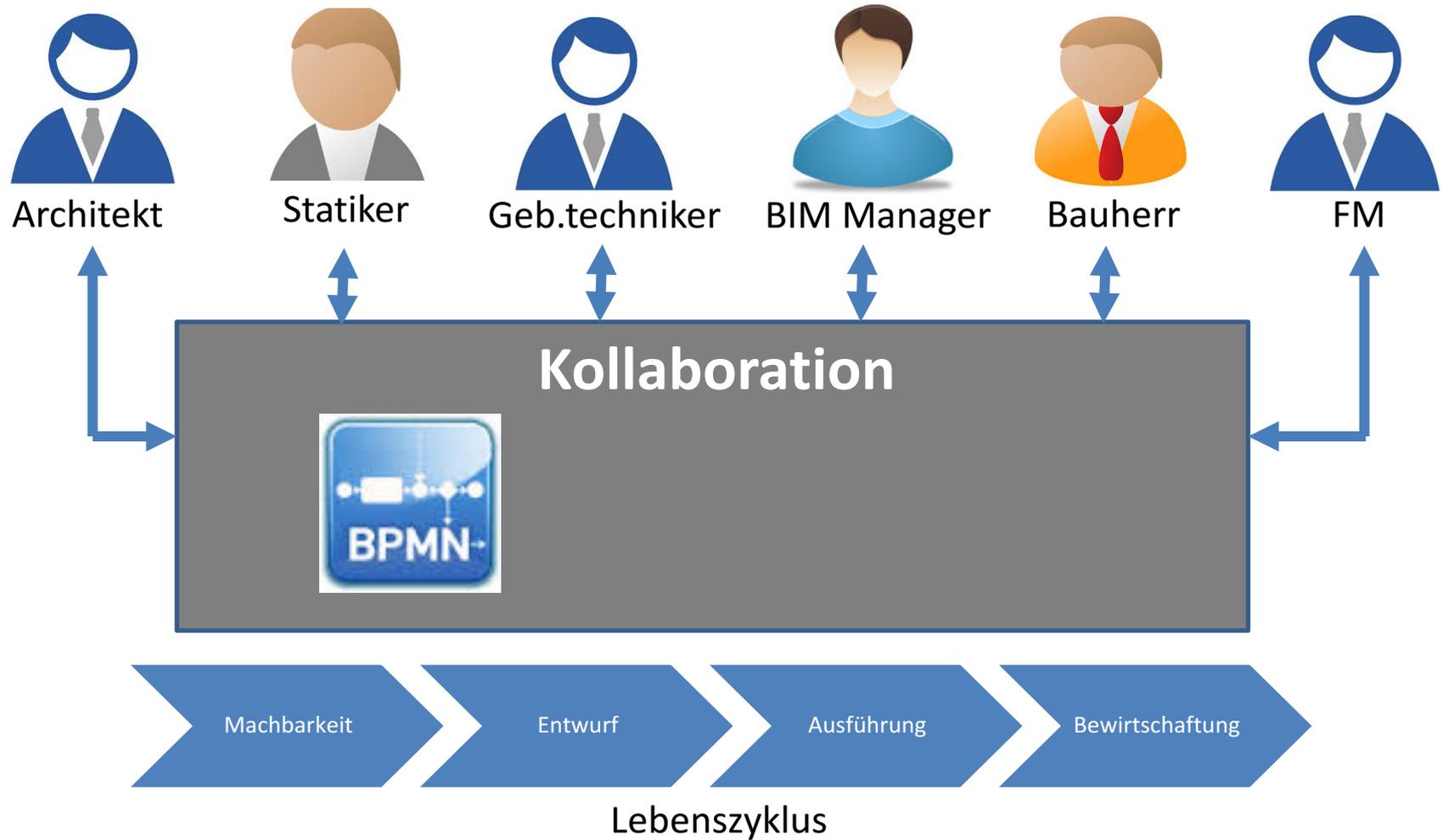
<http://www.countessclaire.com/>

Welchen Detaillierungsgrad braucht man für BIM wann?



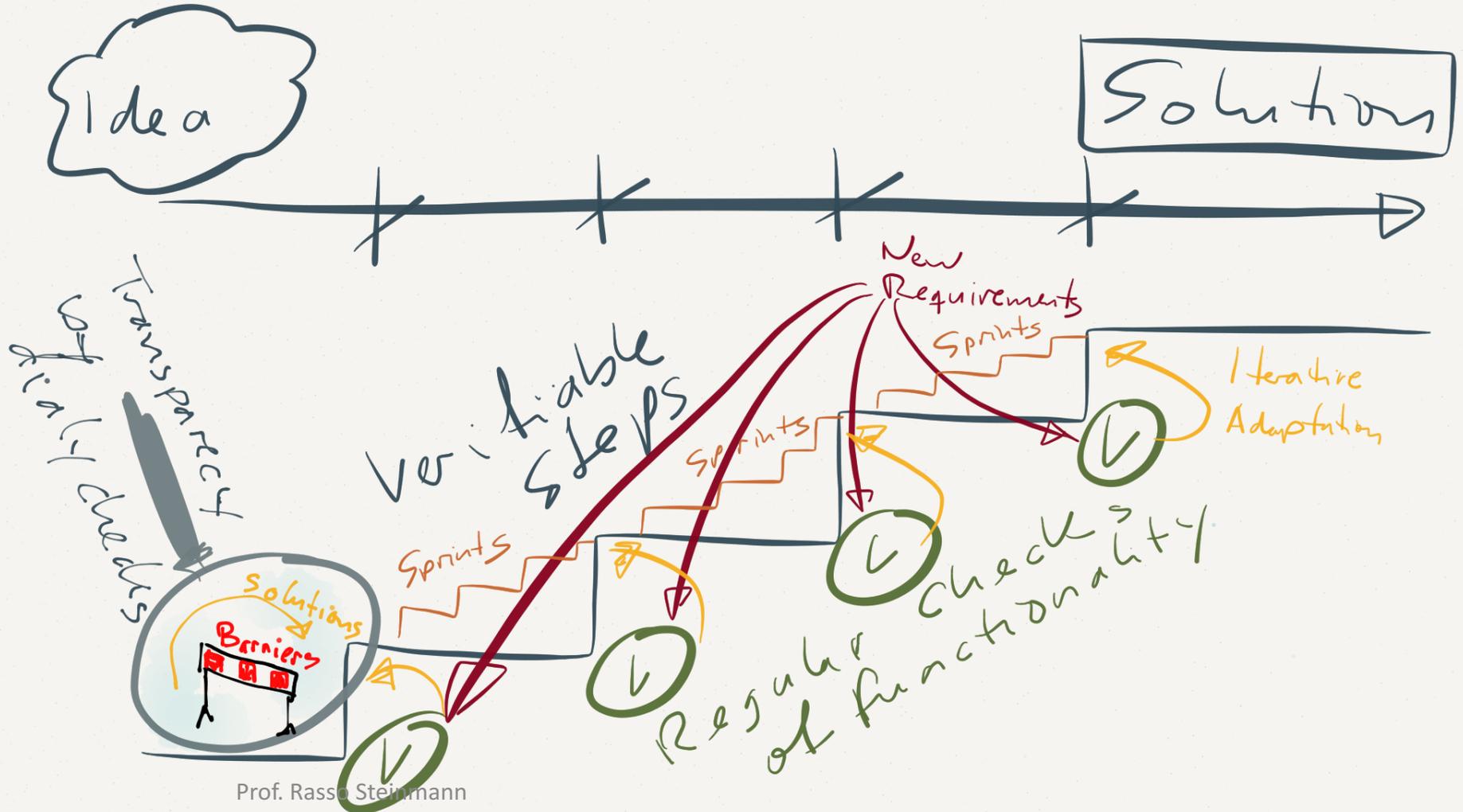
<http://www.tga-fachplaner.de/>

BIM – Kollaboration BI-Modelling



SCRUM

Empiric
Incremental
Iterative



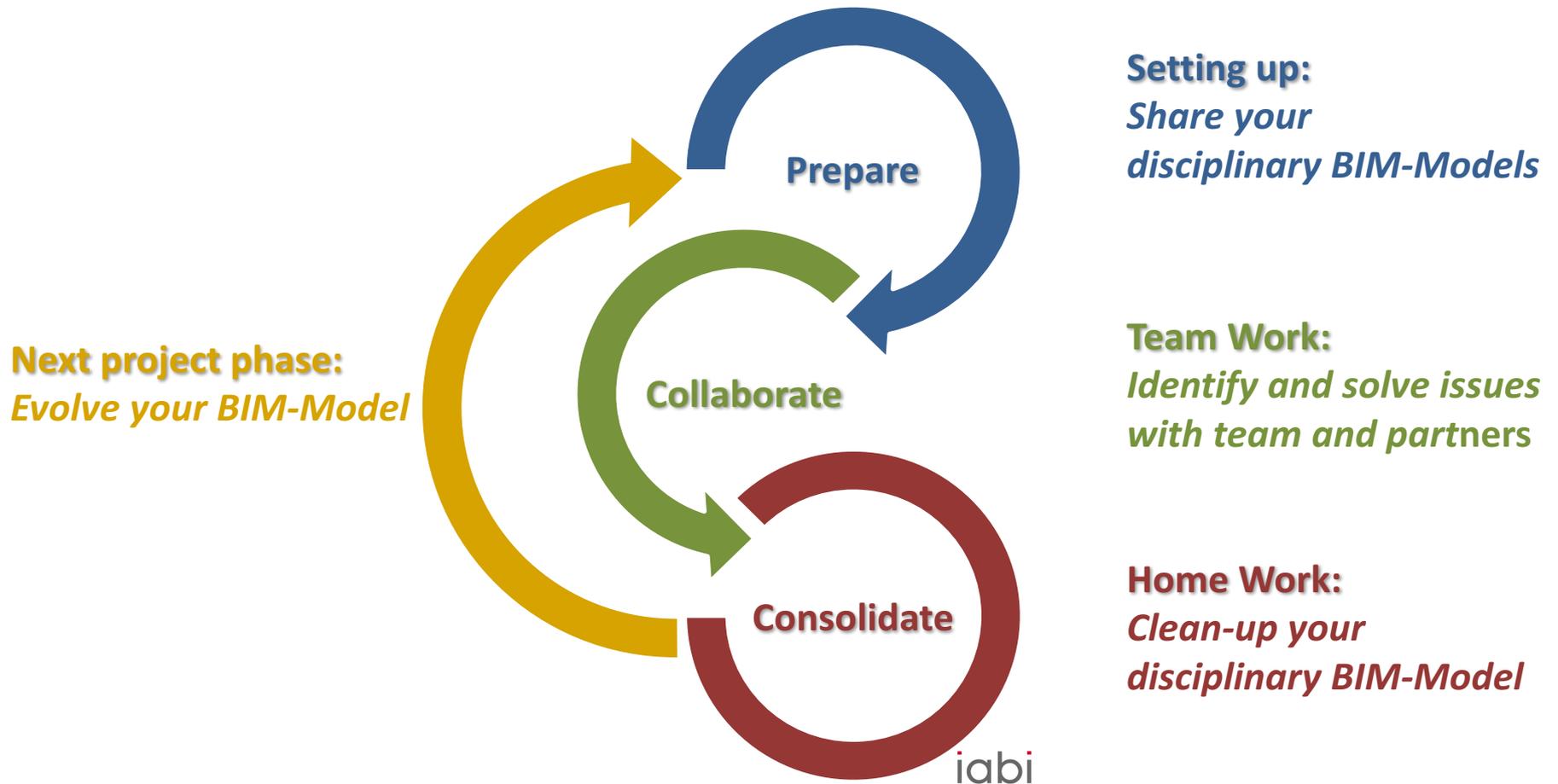
Workflow: Die **PCC** BIM-Methode

Developed by iabi



Die iabi PCC BIM-Methode

Was es bedeutet



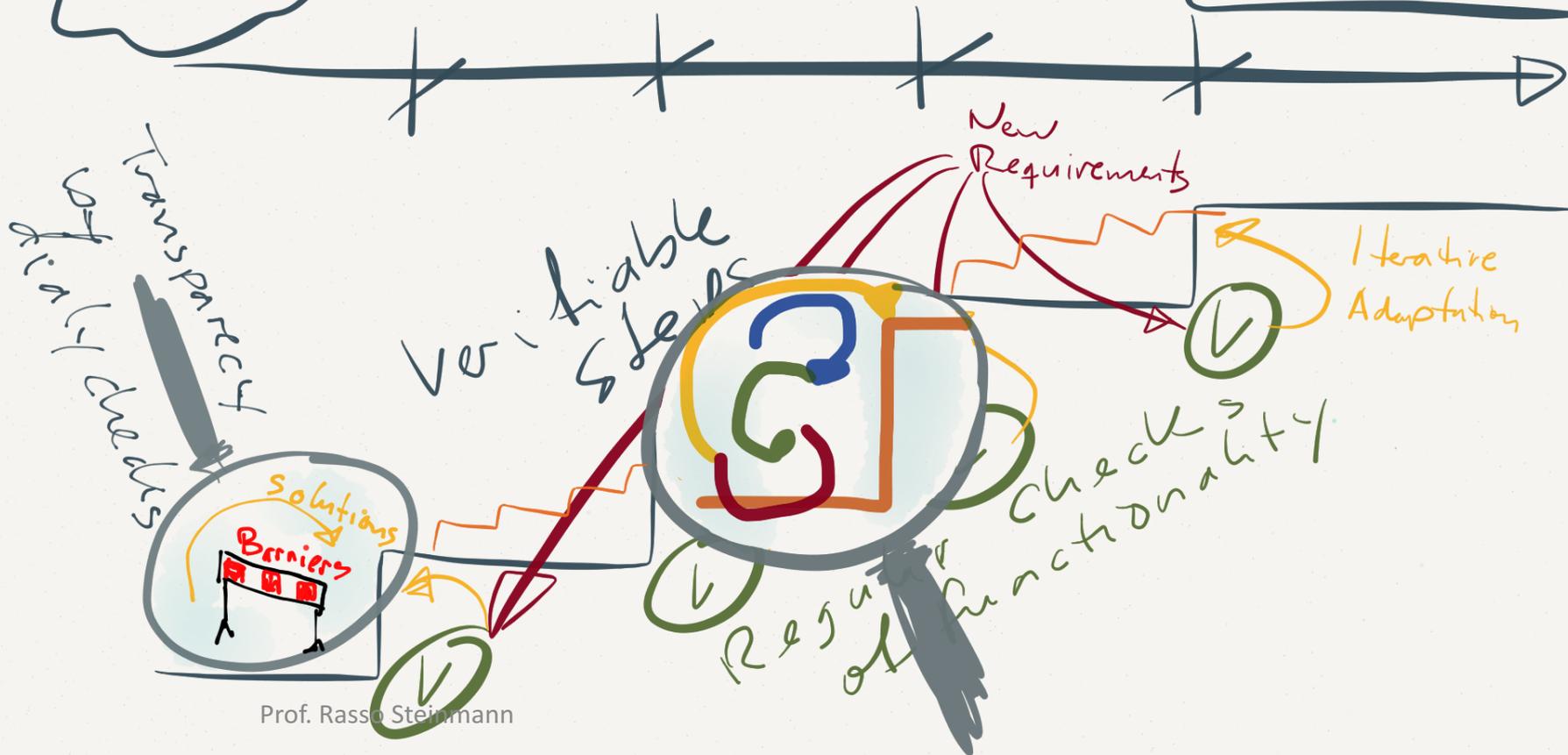
SCRUM

Empiric
Incremental
Iterative

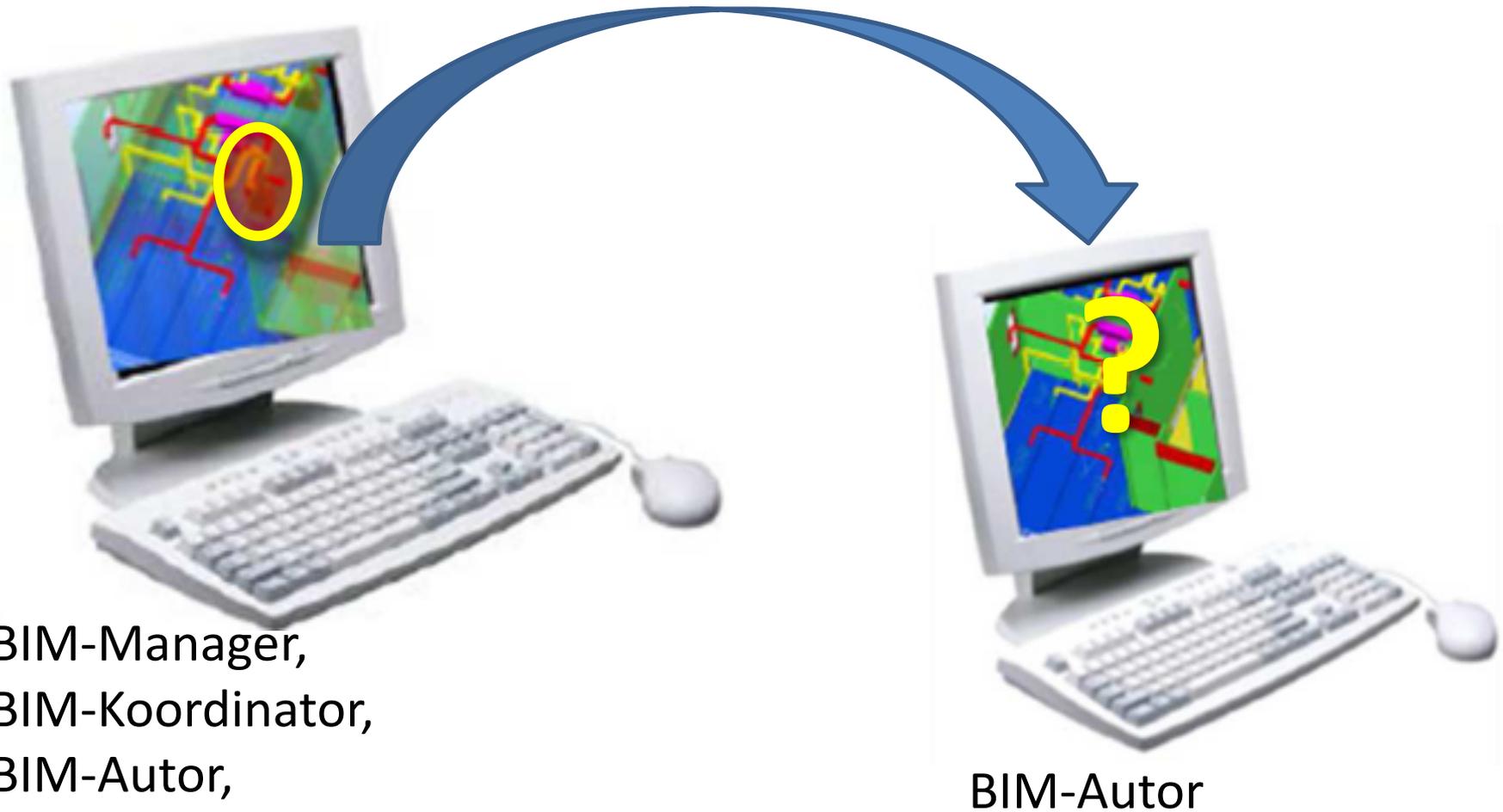


Idea

Solution

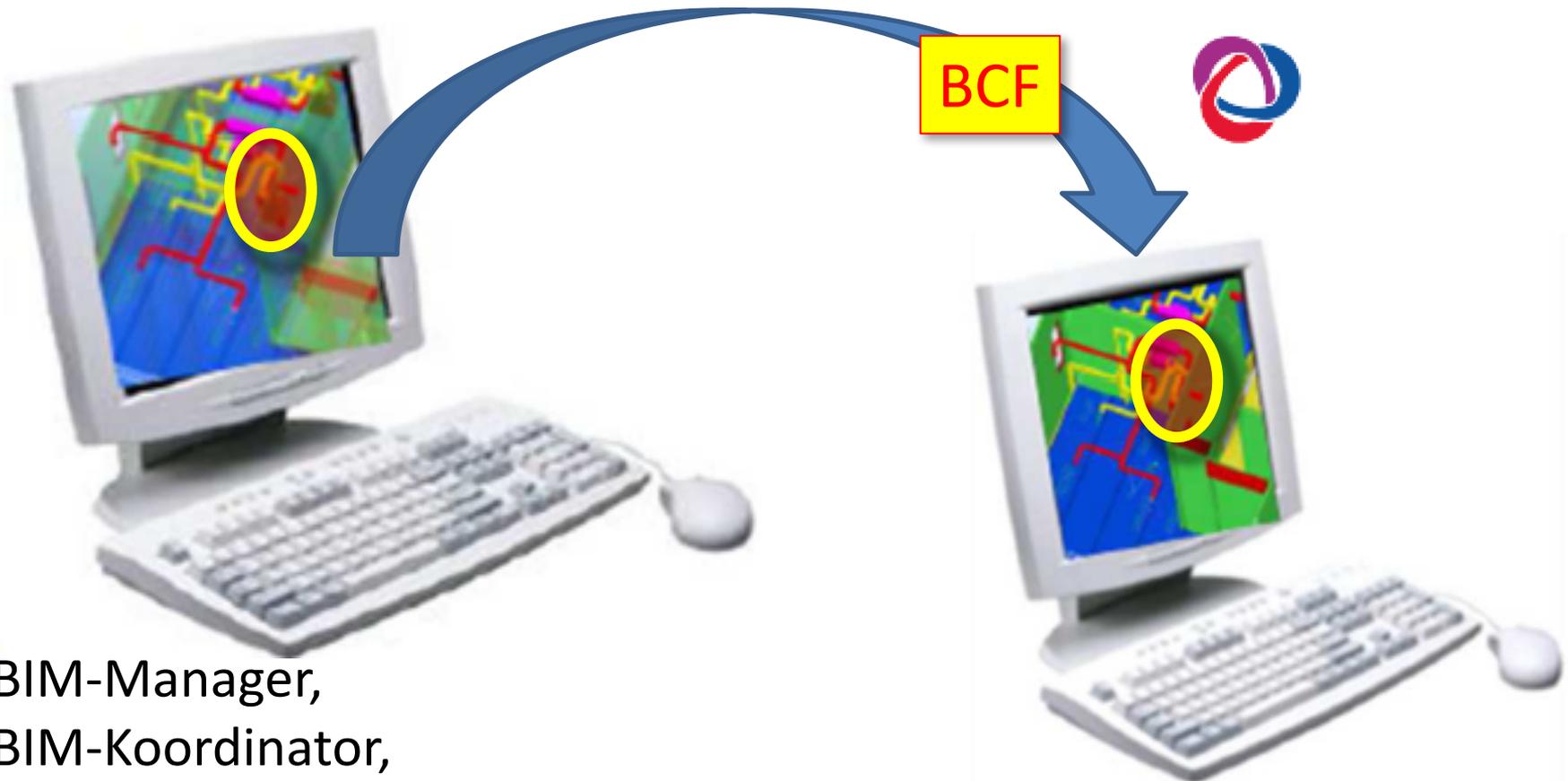


Herausforderung 1: Kommunikation und Lokalisierung der Probleme



Lösung 1: BCF

BIM Collaboration Format



BIM-Manager,
BIM-Koordinator,
BIM-Autor,
BIM-Nutzer, ...

BIM-Autor

BCFXML

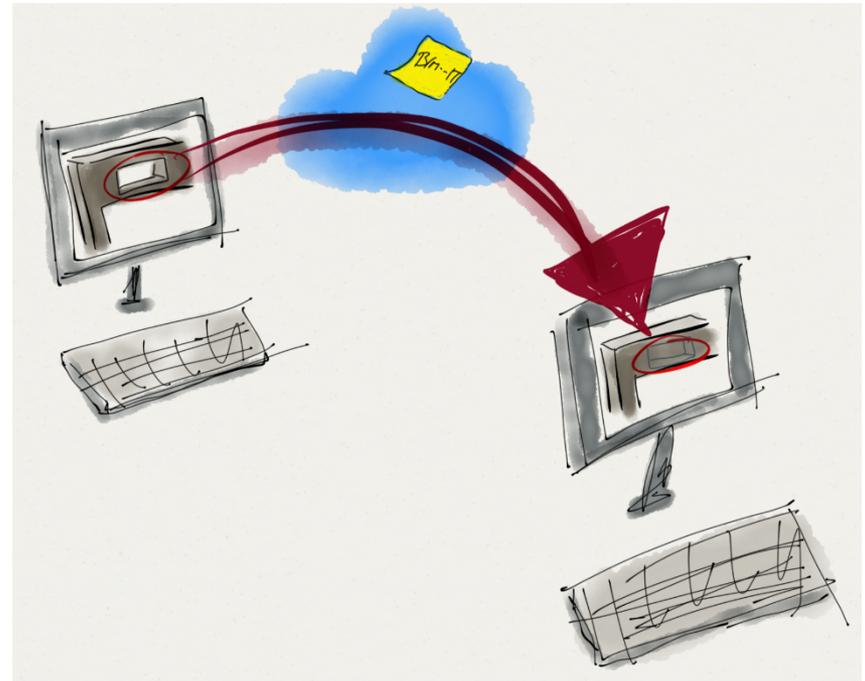
BIM Collaboration Format

- XML-Format to communicate BIM-related issues between Software
 - Zip-Container
 - Markup.bcf
 - Viewpoint.bcfv
 - Snapshot.png
- Version 1 (2010)
- Version 2 (2014 Offizieller buildingSMART Standard)
 - Erweiterungen
 - DocumentReferences (File oder URL)
 - Projektspezifische Attributierung der Topics
 - Multiple Viewpoints
 - Teilmodelltransfer oder Austausch von Referenzen mit BIM-Snippets



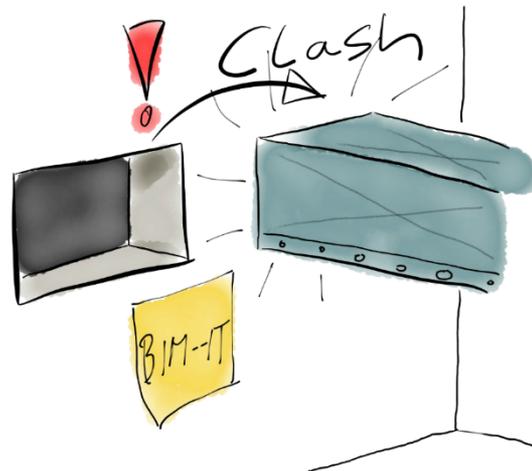
Die besondere Rolle von BIM-Snippets

- Teilmodel Austausch (Clash, PfV, Opening, Fire Rating Properties, ...)
- Austausch schematisierter Dateien
- Maschinen lesbare Topics
- Austausch von Referenzen

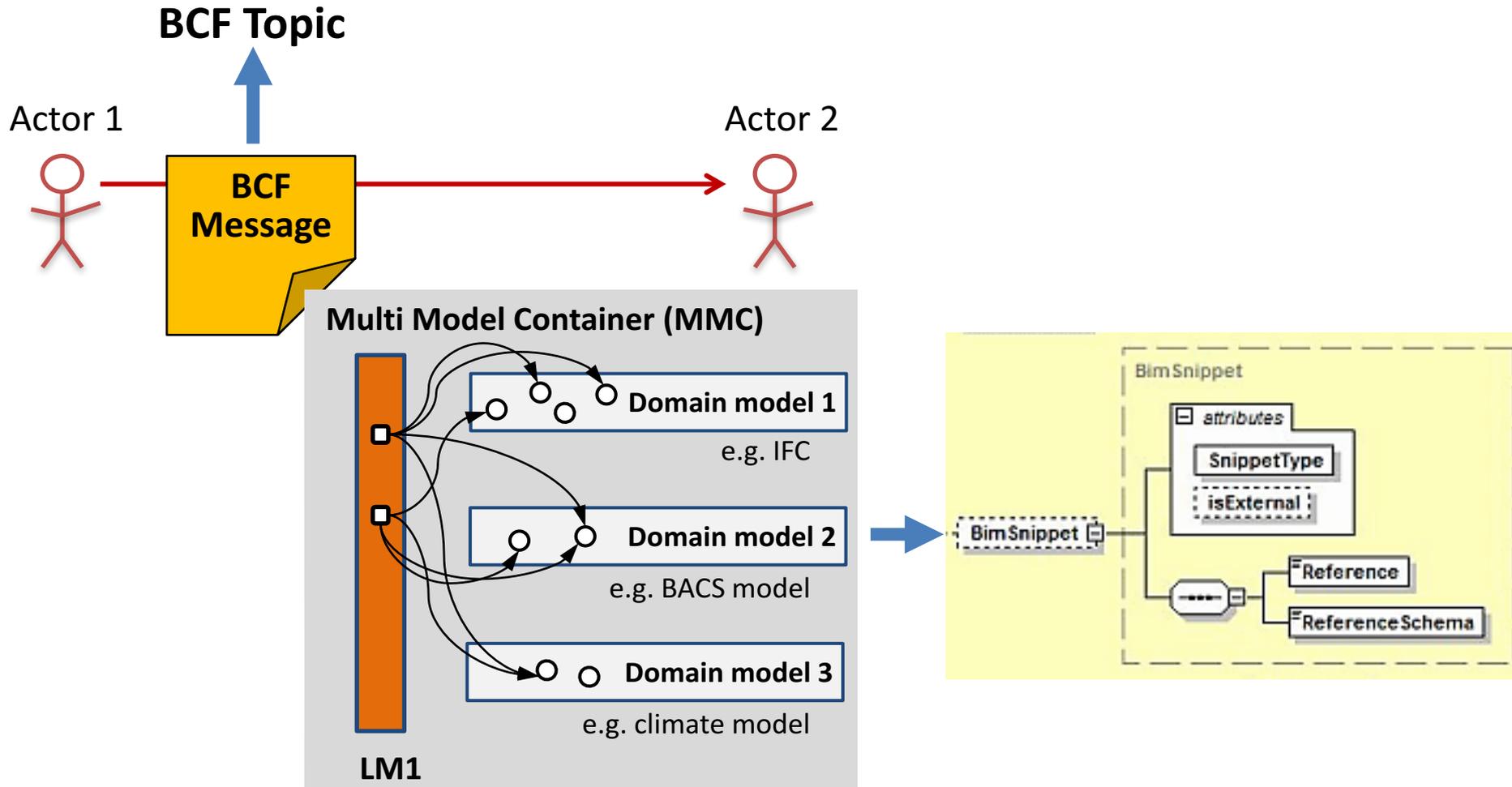


Ein Clash als BIM-Snippet

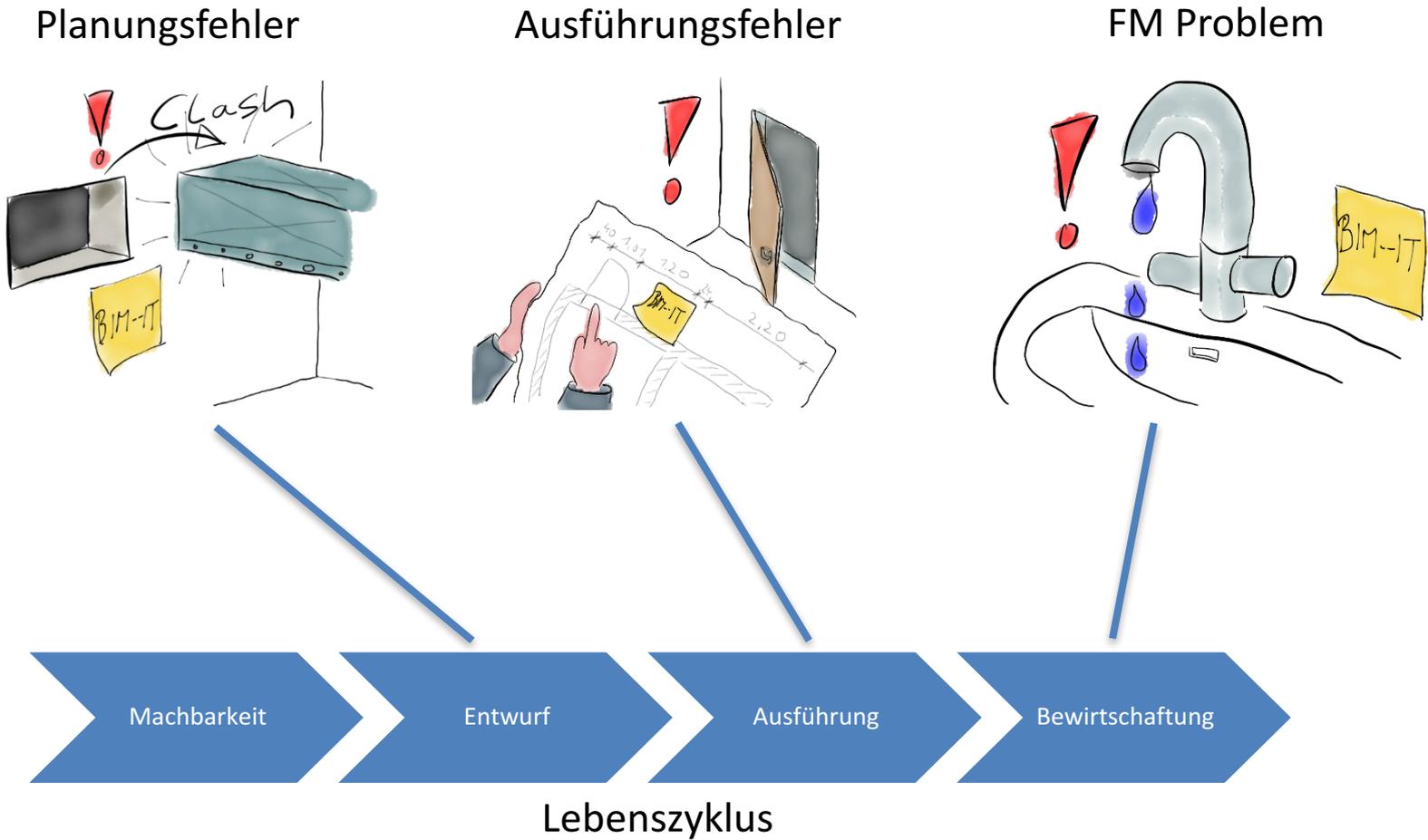
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  <DetectedClashes>
    <DetectedClash>
      <Number>1</Number>
      <Origin1>Heating</Origin1>
      <GUID1>1T8thYJhvFE93dSo_NJd4g</GUID1>
      <Entity1>IFCFLOWSEGMENT</Entity1>
      <FileName1>C:\Users\Georg\AppData\Roaming\Bim Snippet Creator\Data\BA Dangl\V1\Spieln1_Heating_V1.ifc</FileName1>
      <Origin2>Sanitary</Origin2>
      <Revision>V1</Revision>
      <GUID2>0TYJF1u_5EihnsC5rafmiL</GUID2>
      <Entity2>IFCFLOWSEGMENT</Entity2>
      <FileName2>C:\Users\Georg\AppData\Roaming\Bim Snippet Creator\Data\BA Dangl\V1\Spieln1_Sanitary_V1.ifc</FileName2>
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      <Y>7.014</Y>
      <Z>2.8949999999999996</Z>
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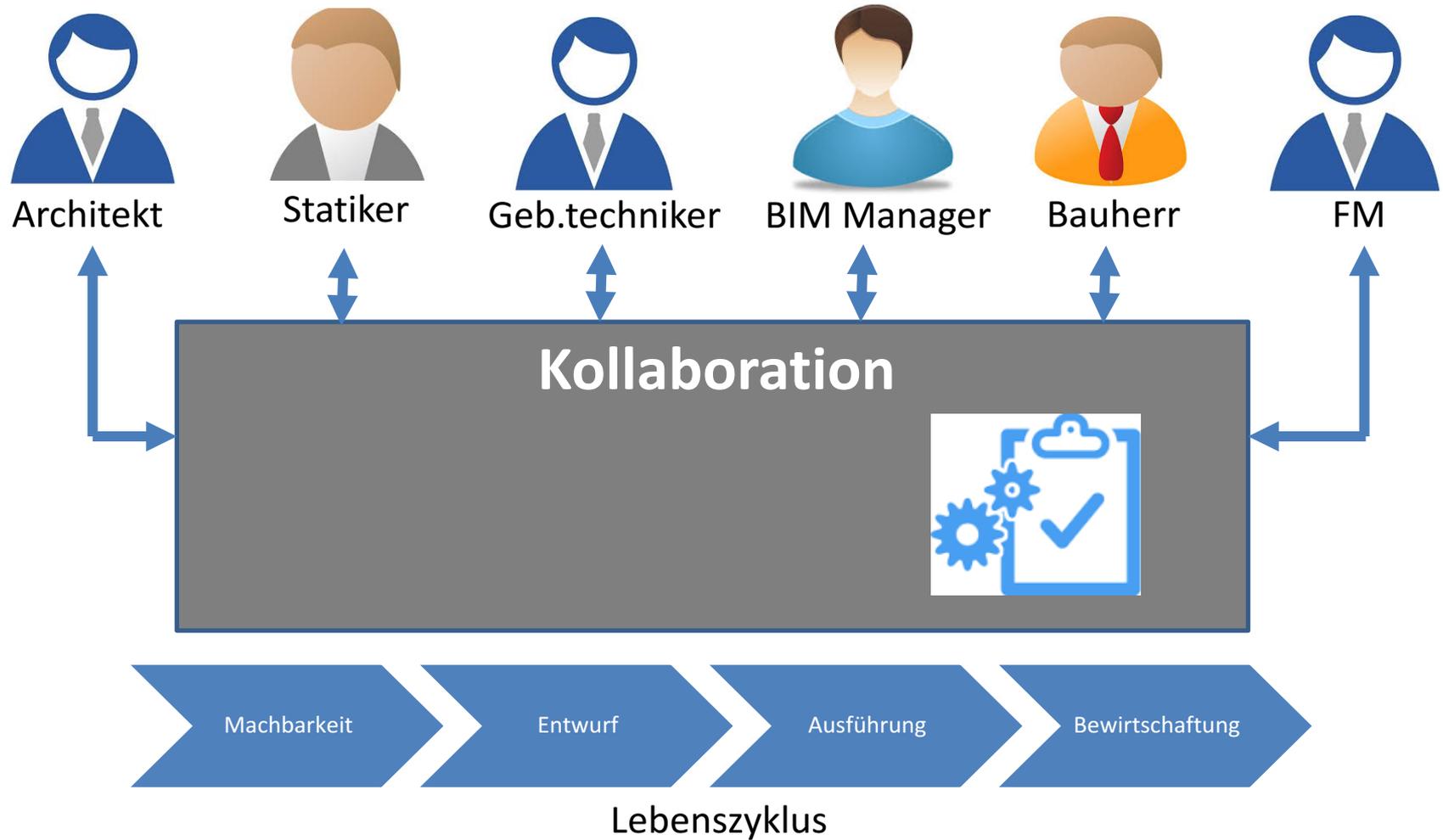
MMC – Multi Model Container als BIM-Snippet Content



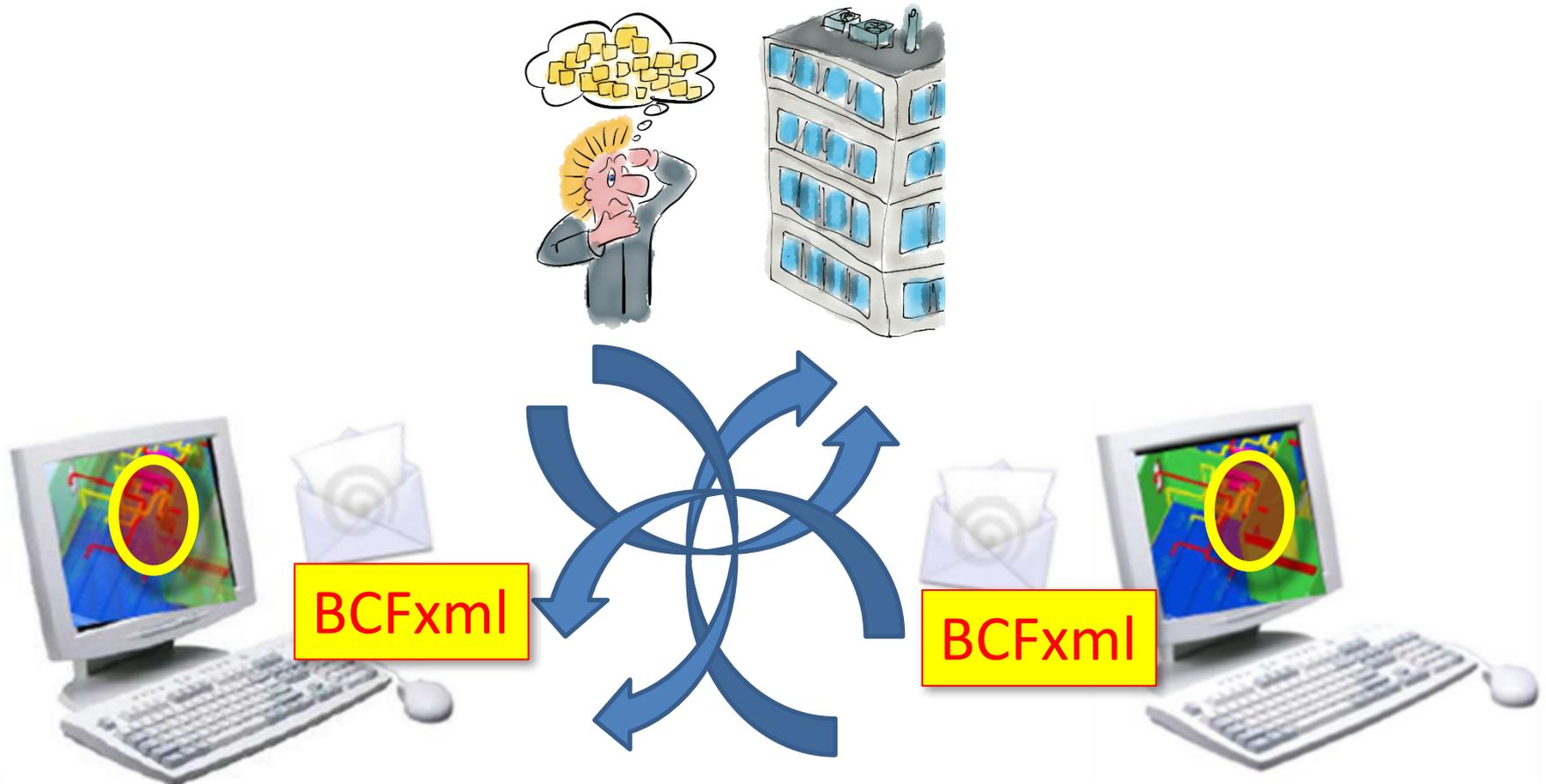
Einsatzbereiche BCF



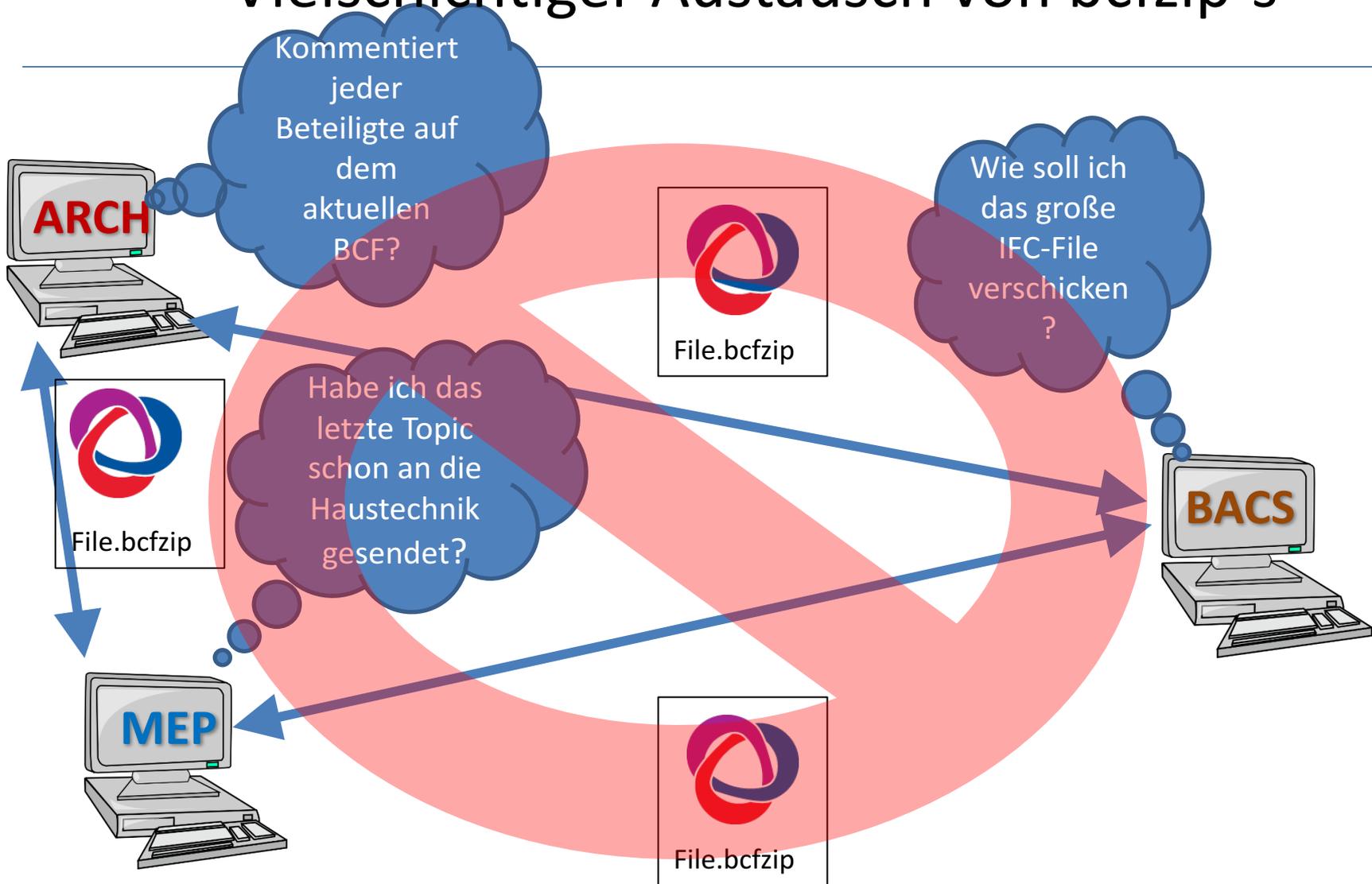
BIM – Collaboration BI-Management



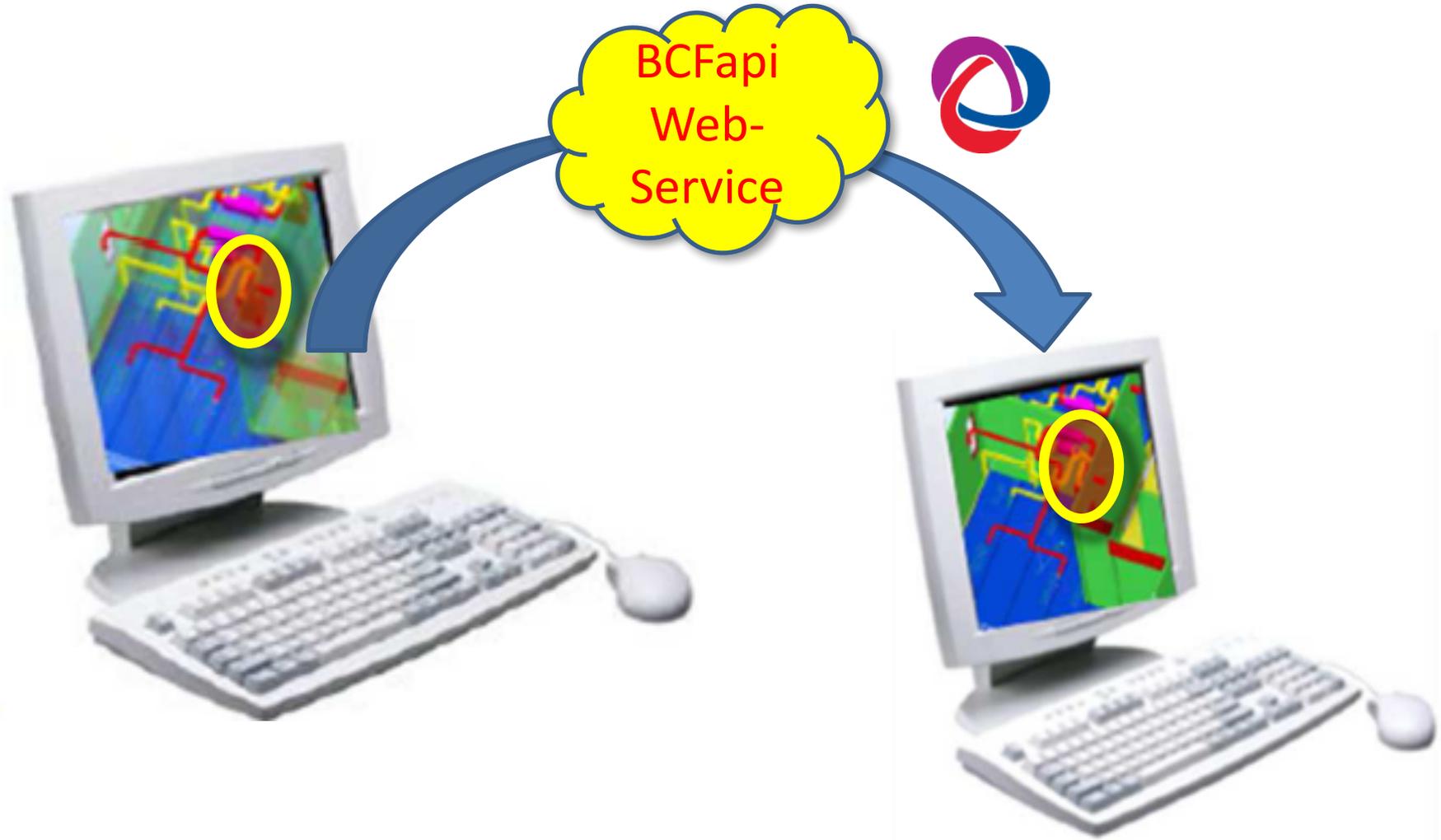
Herausforderung 2: Kommunikation via E-Mail Chaos



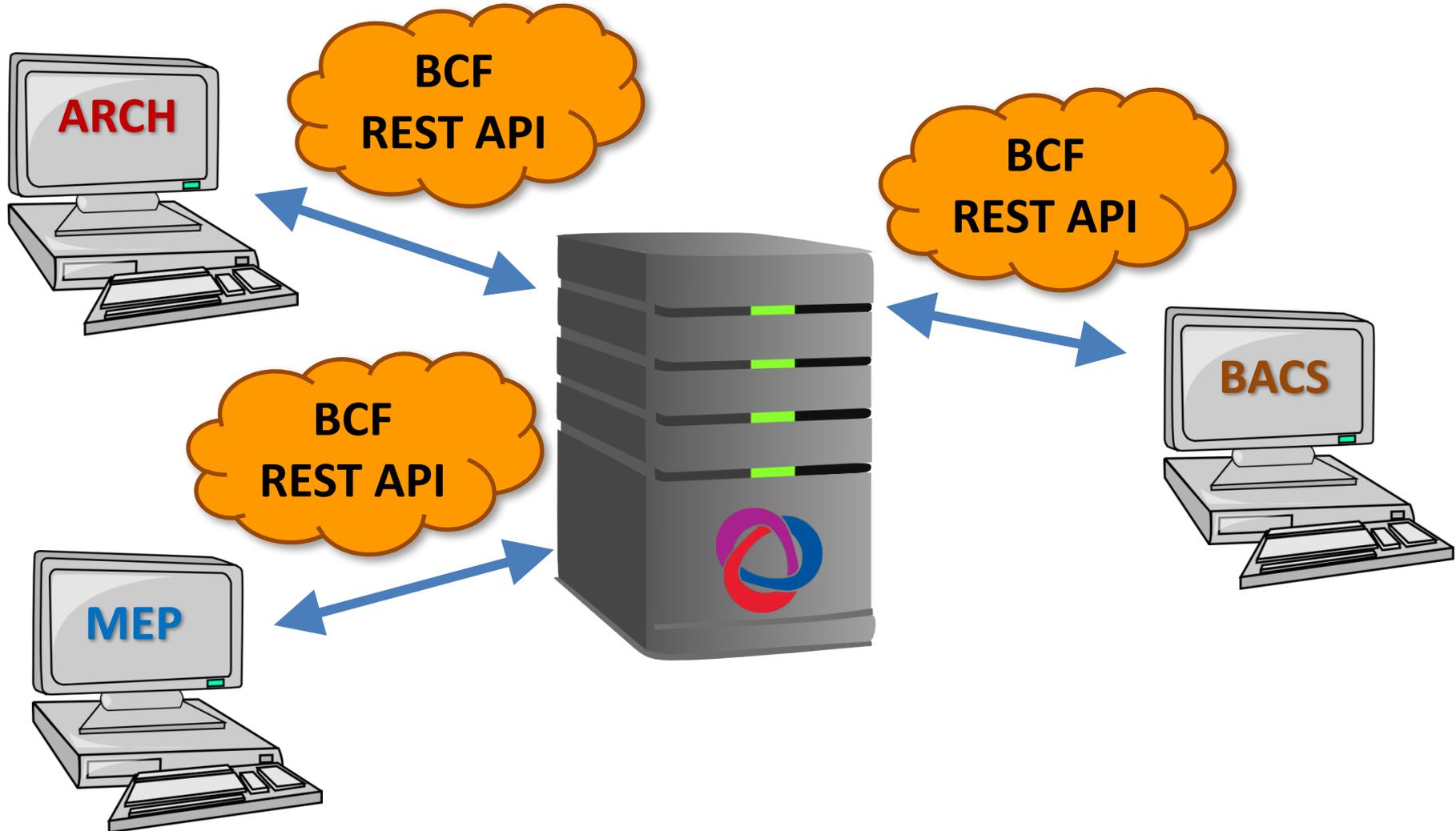
Vielschichtiger Austausch von bcfzip's



Lösung 2: BCFapi Web-Service



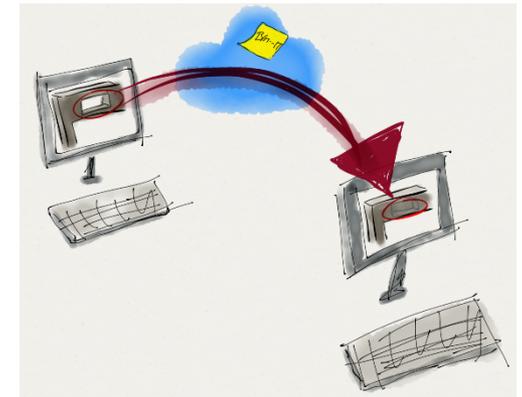
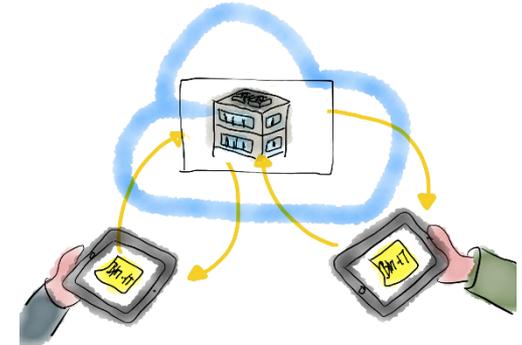
BCF Server - zentraler Kommunikations Hub



BIM Collaboration Format v2.1

Version 2 (2013/14)

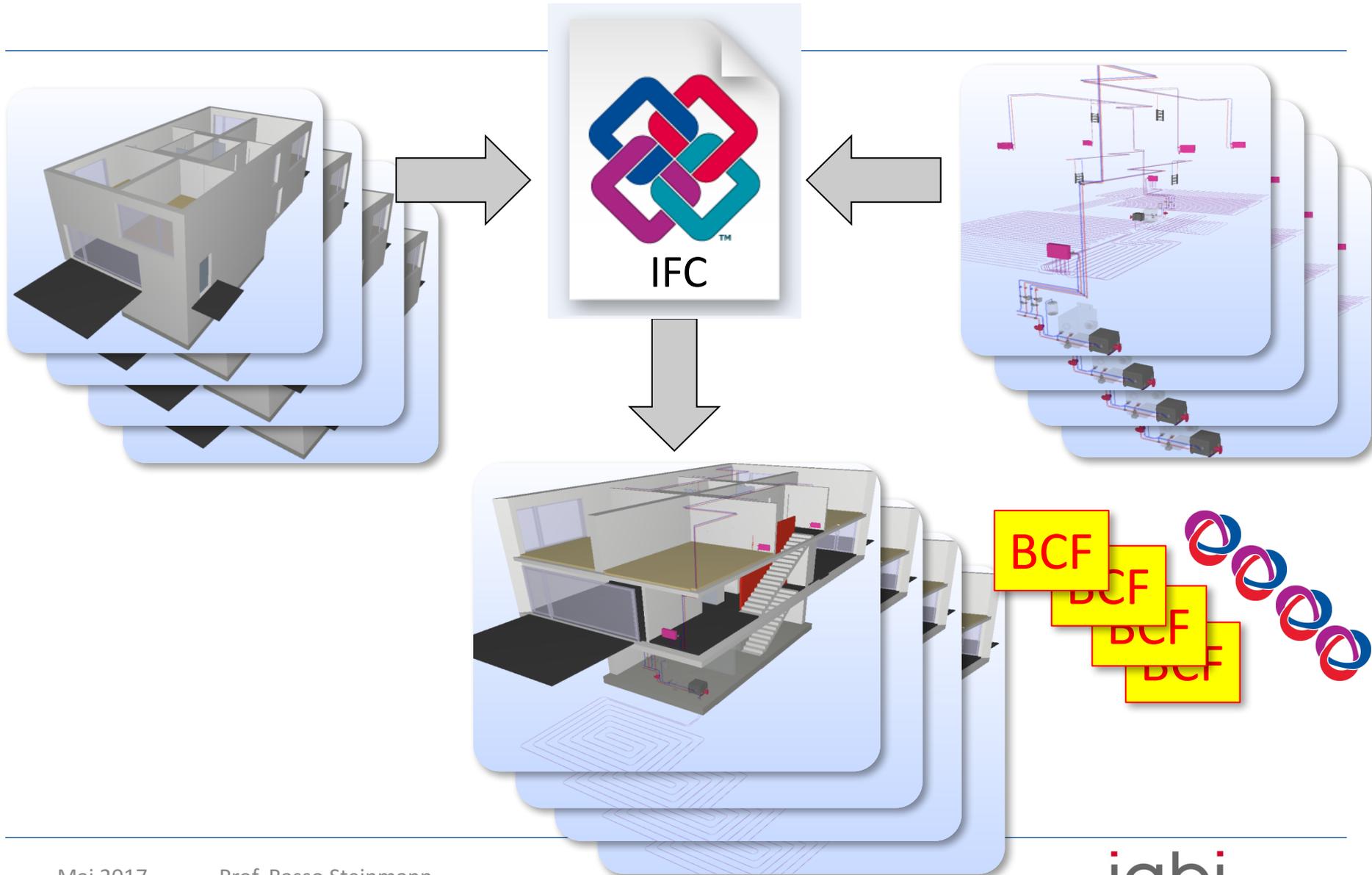
- 2015 Offizieller buildingSMART Standard
- Implementation Group: Catenda, DDS, HENN, iabi, bim+, Solibri, Aconex, Tekla, Kubus, Graphisoft, ...
- <https://github.com/BuildingSMART/BCF-API>
- Erweiterungen
 - DocumentReferences (File oder URL)
 - Projektspezifische Attributierung der Topics
 - Multiple Viewpoints
 - Teilmodelltransfer oder Austausch von Referenzen mit BIM-Snippets



Version 2.1 (2016/17)

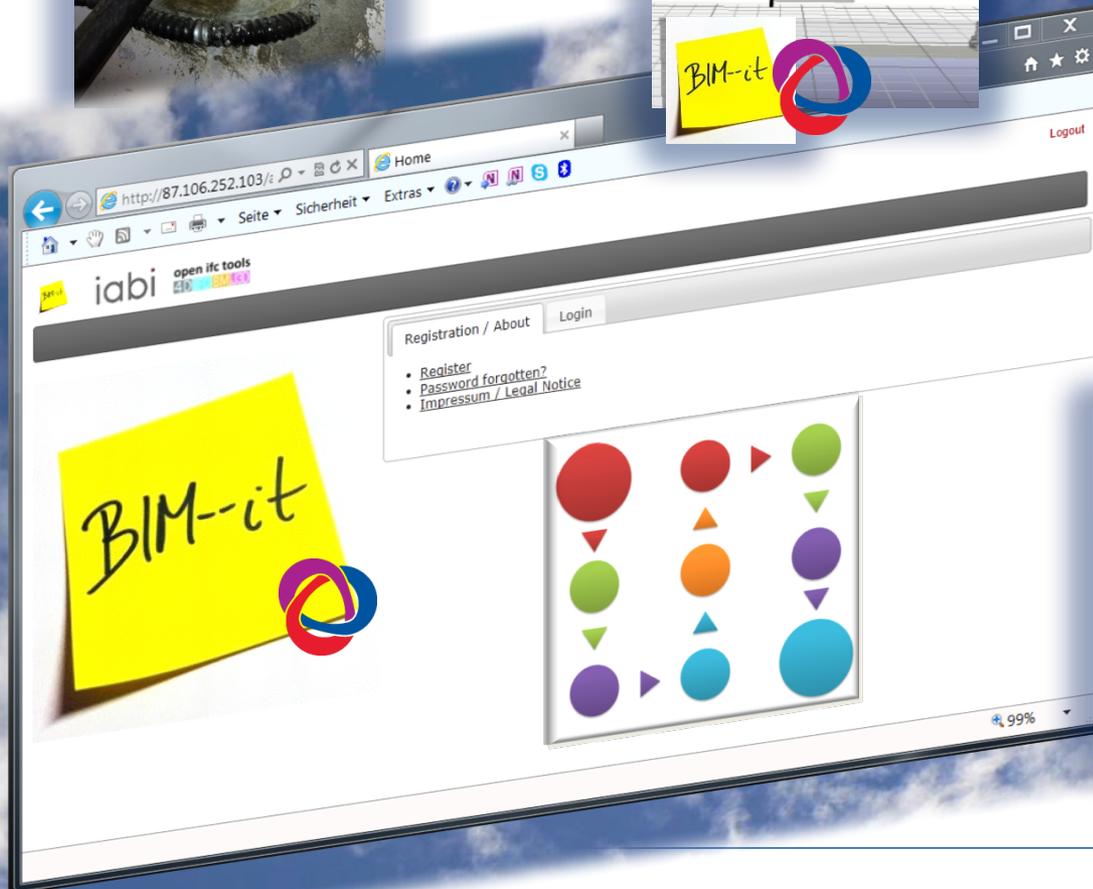
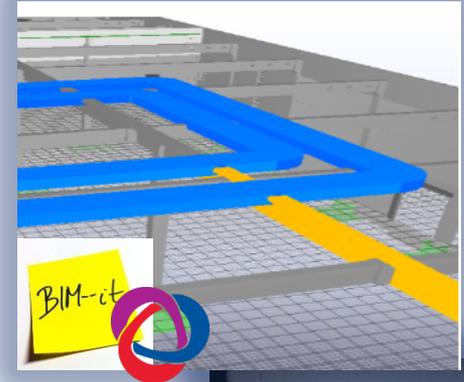
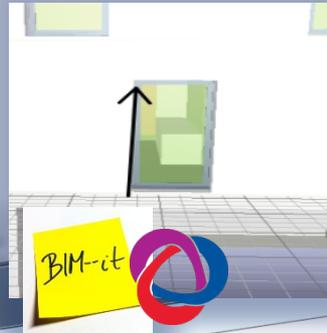
- 2015/16 Weiterentwicklung
- 2017 Offizieller buildingSMART Standard

Herausforderung 3: Spezifische Probleme in unterschiedlichen Modell-Versionen



Lösung 3: Neuartige BIM-Software

z.B. **BIM--IT**© eine BIM-Workflow-Cloud-Anwendung



BIM--IT© in der Praxis

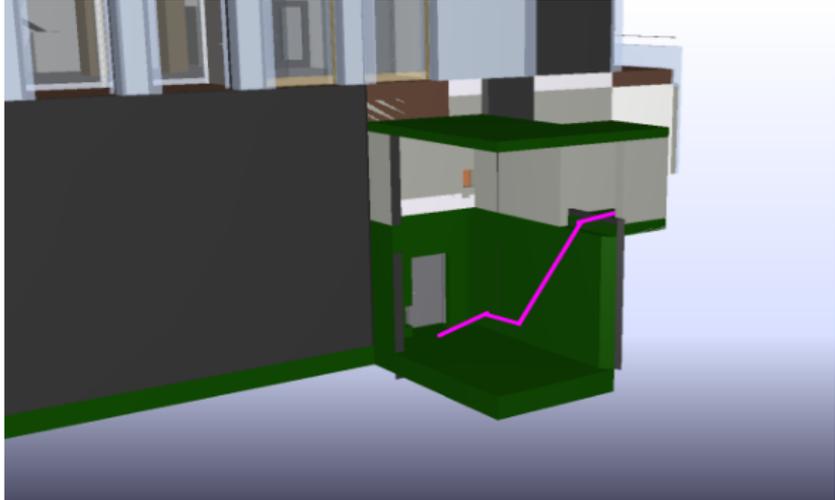
 **iabi**  IFC TOOLS PROJECT
VISUALIZE YOUR DIGITAL KNOWLEDGE

Welcome: STEINMANN@IABIEU [Logout](#)

Home Project Structure Project Timeline **Coordination** Administration Super Admin BCC Administration BCC Library

Coordination Overview

Comment Thumb Replies BIM Snippet



- 2012.05.21 - 18:14:46 - [redacted] er - Fenster allgemein
- 2012.05.21 - 18:22:52 - [redacted] er - Ausfachung zwischen Stützen
- 2012.05.21 - 18:24:37 - [redacted] er - Übergangstür
- 2012.05.21 - 18:30:03 - [redacted] er - Wandöffnungen
- 2012.05.21 - 18:31:20 - [redacted] er - Wand-Decken Verschneidung
- 2012.05.21 - 18:33:22 - [redacted] er - Stützen-Decken Verschneidung
- 2012.05.21 - 18:55:54 - [redacted] er - Ausfachung
- 2012.05.21 - 19:03:49 - [redacted] er - Verschnittfehler
- 2012.05.22 - 11:35:38 - [redacted] er - Zugangstreppe fehlt**
- 2012.05.22 - 11:35:39 - [redacted] eier - Open
- 2012.05.22 - 11:36:32 - [redacted] er - Wandöffnungen

BCF



BIM Collaboration Format

BIM--IT© CDE – Common Data Environment



New Topic **Advanced Search**

Timeline **Topic** Viewer Models

Labels	Stati	Type
All	All	All
Architecture	Open	Error
General	ReOpened	Info
MEP	Closed	Warning
Structural		

Show Hidden Show Finished

Search...	
Dachfenstertyp prüfen	
Steinmann	0
25.01.2017 17:22	
Fenstertyp prüfen	
Steinmann	0
23.01.2017 20:41	

Dachfenstertyp prüfen



steinmann@iabi.eu

Type

Warning

Status

Open

Labels

Architecture

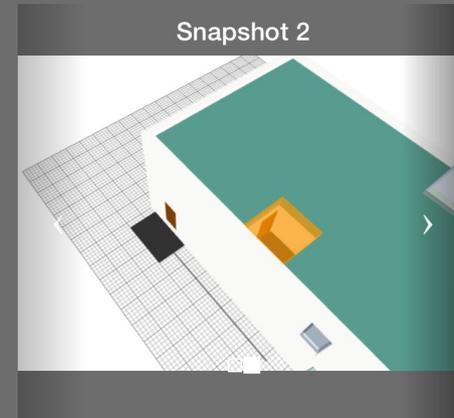
Priority

High

Assignee



linhard@iabi.eu



Upload Photo

Discussion BIM Snippet Documents Related Topics



steinmann@iabi.eu 25.01.2017 17:29

Besonders Anschlussdetail auf Machrbarkeit prüfen.

Reply

New Comment

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Edit Topic

BIM--IT© CDE – Common Data Environment



New Topic Advanced Search

Timeline Topic Viewer Models

Labels	Stati	Type
All	All	All
Architecture	Open	Error
General	ReOpened	Info
MEP	Closed	Warning
Structural		

Show Hidden Show Finished

Search...	
Dachfenstertyp prüfen	
Steinmann	0
25.01.2017 17:22	
Fenstertyp prüfen	
Steinmann	0
23.01.2017 20:41	

Dachfenstertyp prüfen



steinmann@iabi.eu

Type

Warning

Status

Open

Labels

Architecture

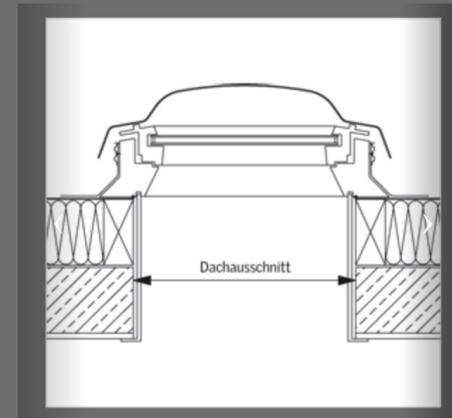
Priority

High

Assignee



linhard@iabi.eu



Upload Photo

Discussion

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Related Topics



steinmann@iabi.eu 25.01.2017 17:29

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Edit Topic

BIM--IT© CDE – Common Data Environment

BIM--it Start BIM Manager Team Administration



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New Topic Advanced Search

Timeline Topic Viewer Models

Labels	Stati	Type
All	All	All
Architecture	Open	Error
General	ReOpened	Info
MEP	Closed	Warning
Structural		

Show Hidden Show Finished

Search...	
Dachfenstertyp prüfen	
Steinmann	0
25.01.2017 17:22	
Fenstertyp prüfen	
Steinmann	0
23.01.2017 20:41	

Timeline



Dachfenstertyp prüfen



steinmann@iabi.eu

Type

Warning

Status

Open

Labels

Architecture

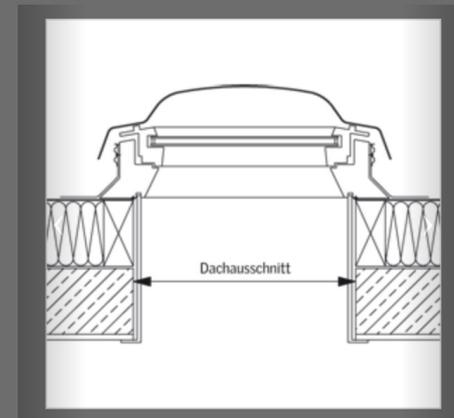
Priority

High

Assignee



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Upload Photo

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Documents

Related Topics



steinmann@iabi.eu 25.01.2017 17:29

Besonders Anschlussdetail auf Machbarkeit prüfen.

Reply

BIM--IT© CDE – Common Data Environment



New Topic **Advanced Search**

Timeline **Topic** Viewer Models

Labels	Stati	Type
All	All	All
Architecture	Open	Error
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MEP	Closed	Warning
Structural		

Show Hidden Show Finished

Search...	
Dachfenstertyp prüfen	
Steinmann	0
25.01.2017 17:22	
Fenstertyp prüfen	
Steinmann	0
23.01.2017 20:41	

Dachfenstertyp prüfen



steinmann@iabi.eu

Type

Warning

Status

Open

Labels

Architecture

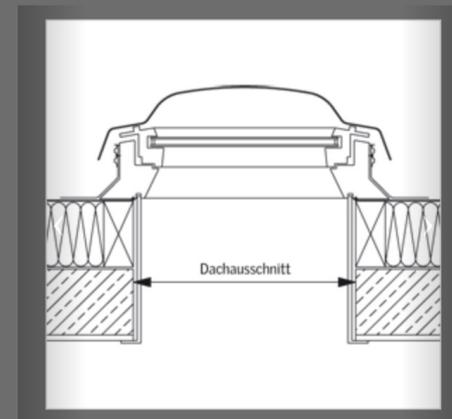
Priority

High

Assignee



linhard@iabi.eu



Upload Photo

Discussion

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Documents

Related Topics



steinmann@iabi.eu 25.01.2017 17:29

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Edit Topic

Available Models

Architecture

v2

Visible



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Edit Topic

Available Models

Architecture

v2

Visible

Heating

v1

Visible

Plumbing

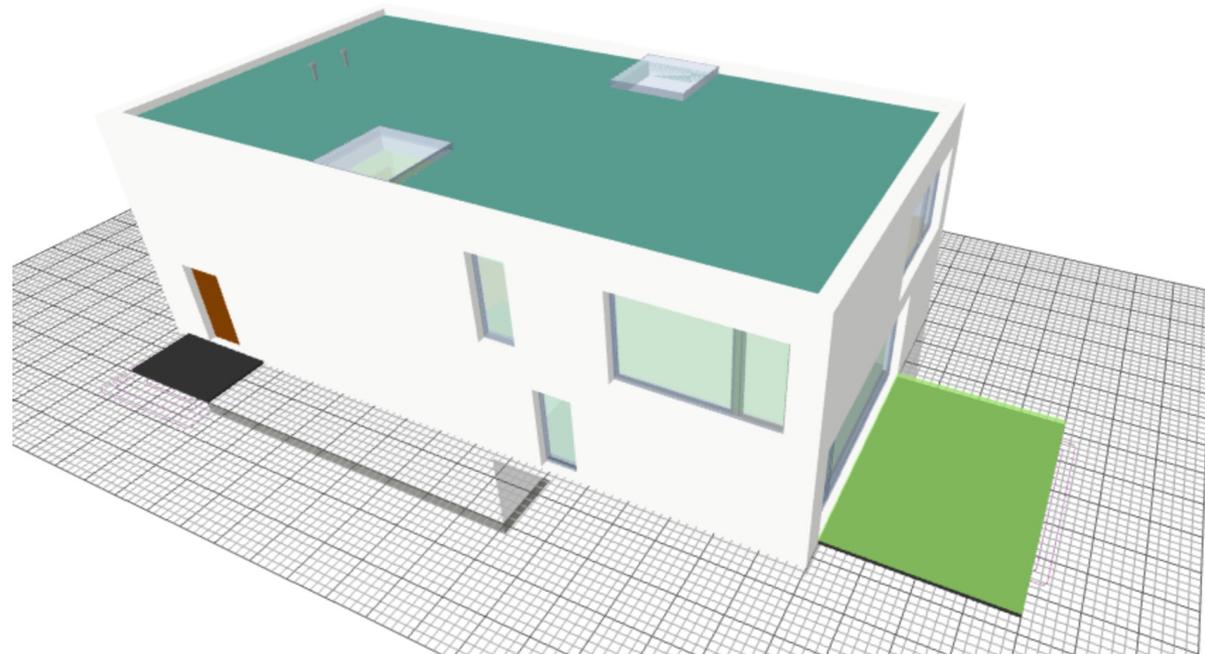
v1

Visible

Merged Models

Merge all domains

Load Merged Model



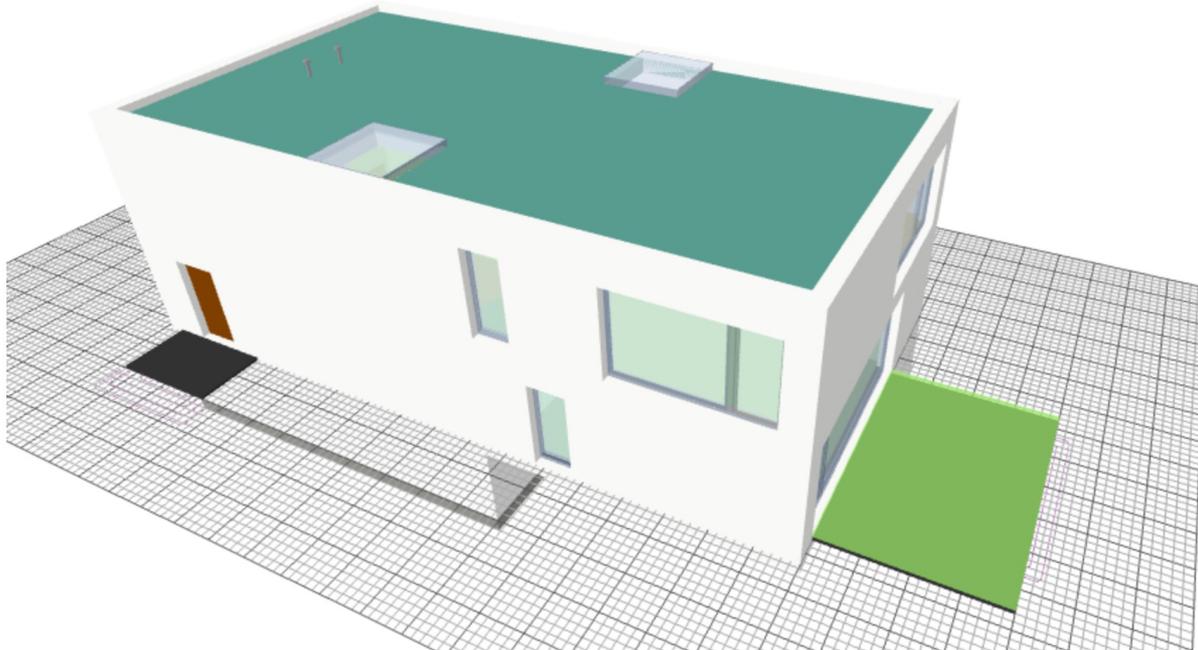
Ne v2 ✓
Do v1

Availa

- Architecture v2 Visible
- Heating v1 Visible
- Plumbing v1 Visible

Merged Models

Merge all domains Load Merged Model





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Edit Topic

Available Models

Architecture

v2

Visible

Heating

v1

Visible

Plumbing

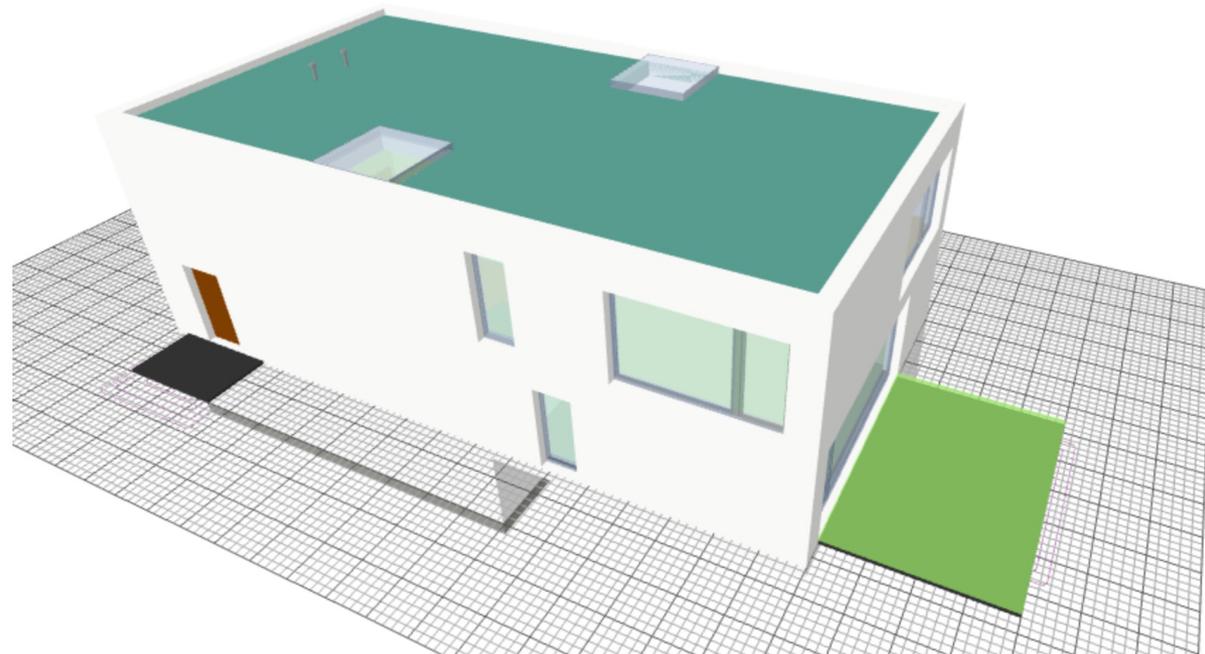
v1

Visible

Merged Models

Merge all domains

Load Merged Model





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Available Models

Architecture

v2

Hidden

Heating

v1

Visible

Plumbing

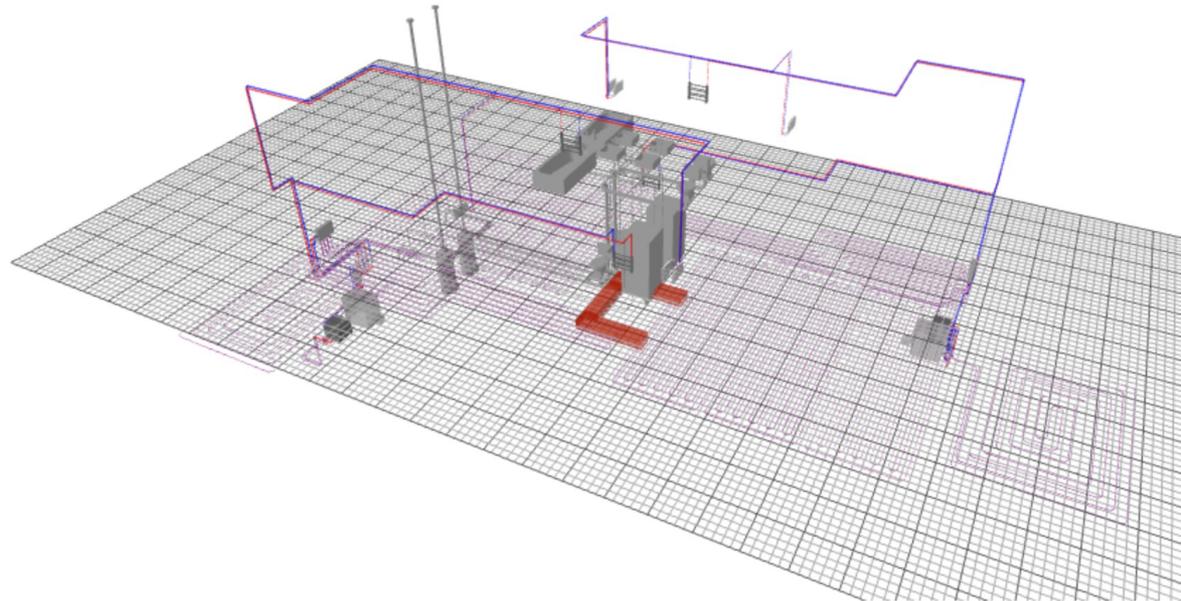
v1

Visible

Merged Models

Merge all domains

Load Merged Model





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Edit Topic

Available Models

Architecture

v2

Hidden

Heating

v1

Hidden

Plumbing

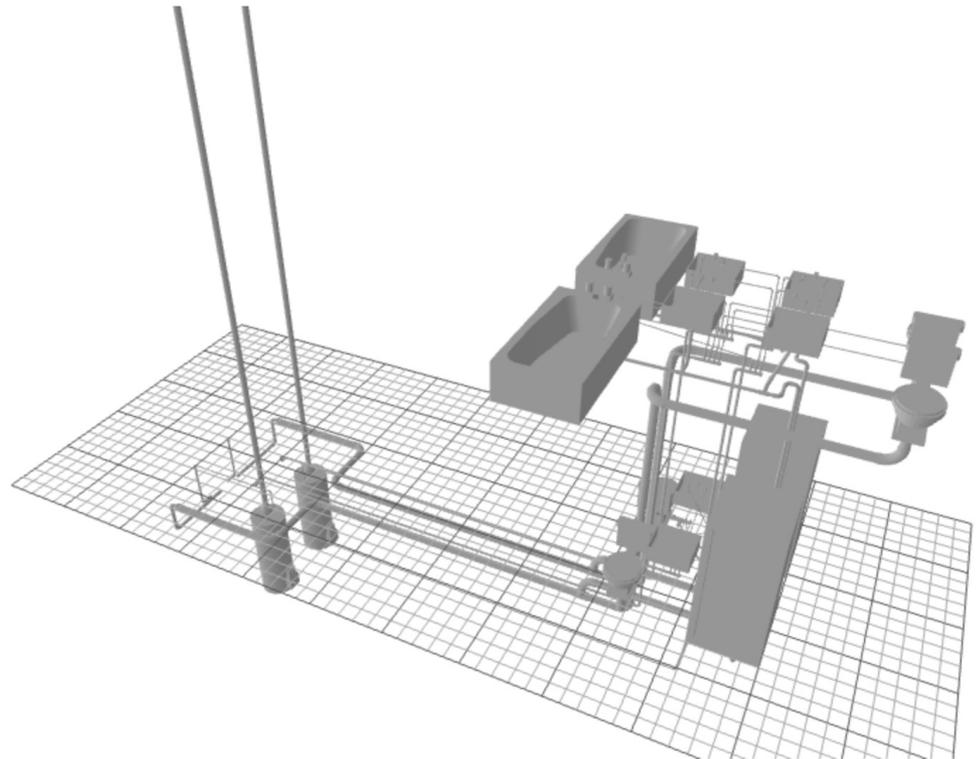
v1

Visible

Merged Models

Merge all domains

Load Merged Model





Download as BCFZip

Edit Topic

Available Models

Architecture

v2

Visible

Heating

v1

Visible

Plumbing

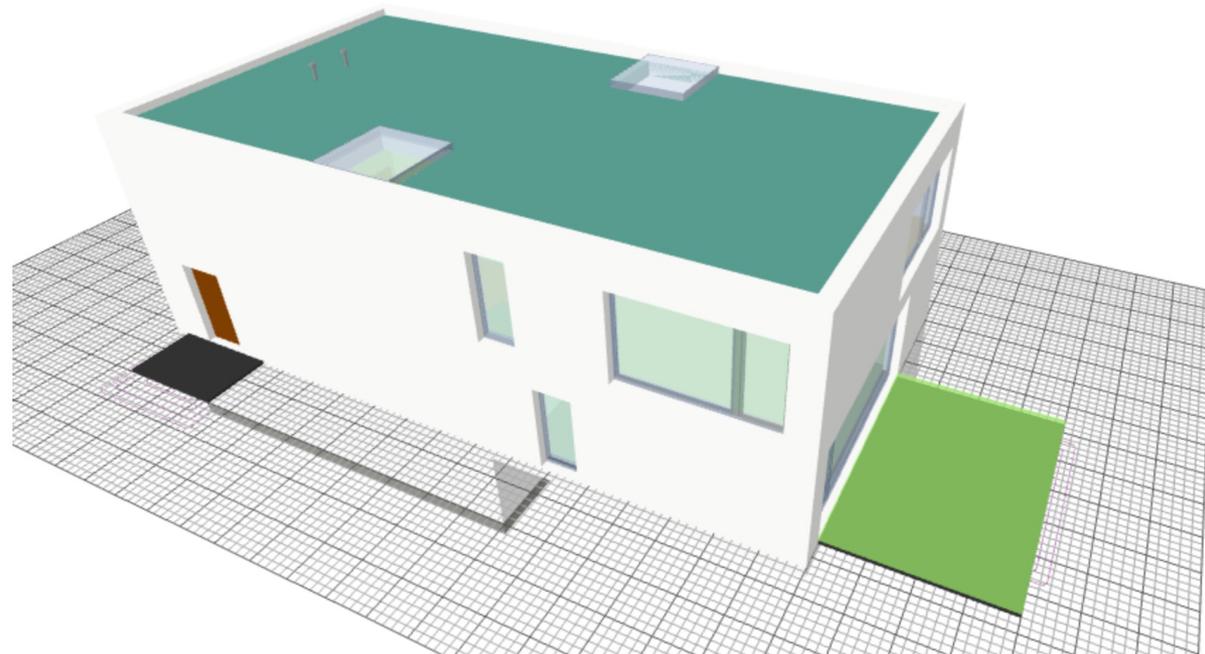
v1

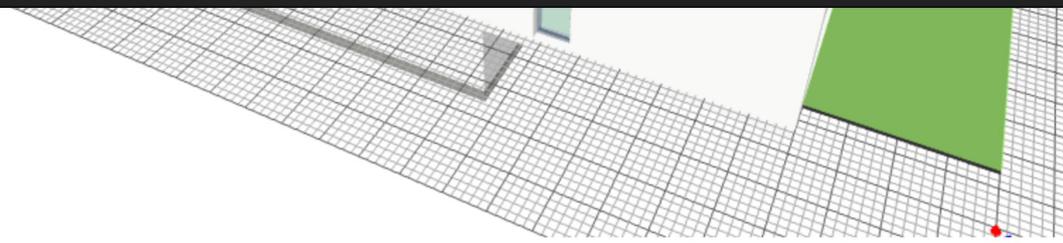
Visible

Merged Models

Merge all domains

Load Merged Model



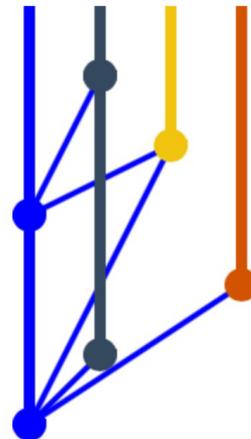


Models

Name	Domain	Latest Revision	Color	View Revisions	New Revision
Architecture	Architecture	v2		View Revisions	
Plumbing	MEP	v1		View Revisions	
Heating	MEP	v1		View Revisions	

Model Flow

This graph is a visualization of the modeling progress in this project



- Architecture, v1, linhard@iabi.eu at 23.1.2017
- Plumbing, v1, linhard@iabi.eu at 23.1.2017
- First merge model, linhard@iabi.eu at 23.1.2017
- Heating, v1, linhard@iabi.eu at 23.1.2017
- Architecture, v2, linhard@iabi.eu at 23.1.2017
- Merge all domains, linhard@iabi.eu at 23.1.2017

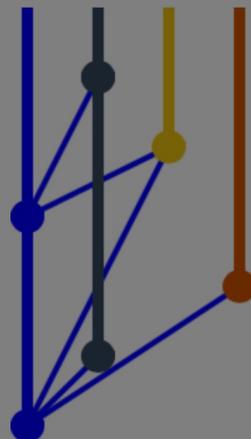
Revisions for Architecture

Version	Description	Date	Author	
v2	Removed collisions against plumbing	23.01.2017 16:42 (UTC)	 linhard@iabi.eu	Download
v1	Initial Model	23.01.2017 16:13 (UTC)	 linhard@iabi.eu	Download

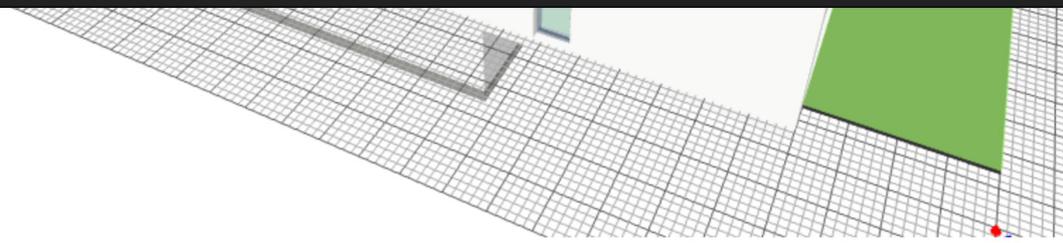
Architecture	Architecture	v2		View Revisions
Plumbing	MEP	v1		View Revisions
Heating	MEP	v1		View Revisions

Model Flow

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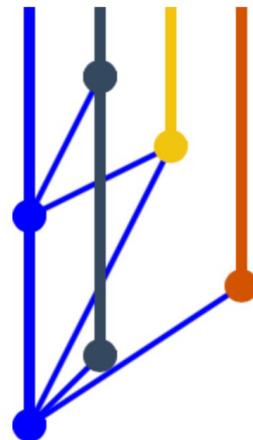


Models

Name	Domain	Latest Revision	Color	View Revisions	New Revision
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Plumbing	MEP	v1		View Revisions	
Heating	MEP	v1		View Revisions	

Model Flow

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- Architecture, v1, linhard@iabi.eu at 23.1.2017
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BIM-Collaboration A Low Hanging Fruit

