



# infraBIM OPEN

# LYON 2024

JAN 29-31

## Scan-to-openBIM

From 3D scans to IFC bridge models

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*Scientific collaborator*

*University of Applied Sciences  
Western Switzerland*

# Project team

## Three research groups

### Digital construction / Applied data science

- + Pr. Bernd Domer
- + Fabian Boujon
- + **Yohann Schatz**



### Geomatics

- + Pr. Bertrand Cannelle
- + Kilian Morel

### Structural engineering

- + Pr. Marco Viviani
- + Mattias Franciosi
- + Vincenzo Savino

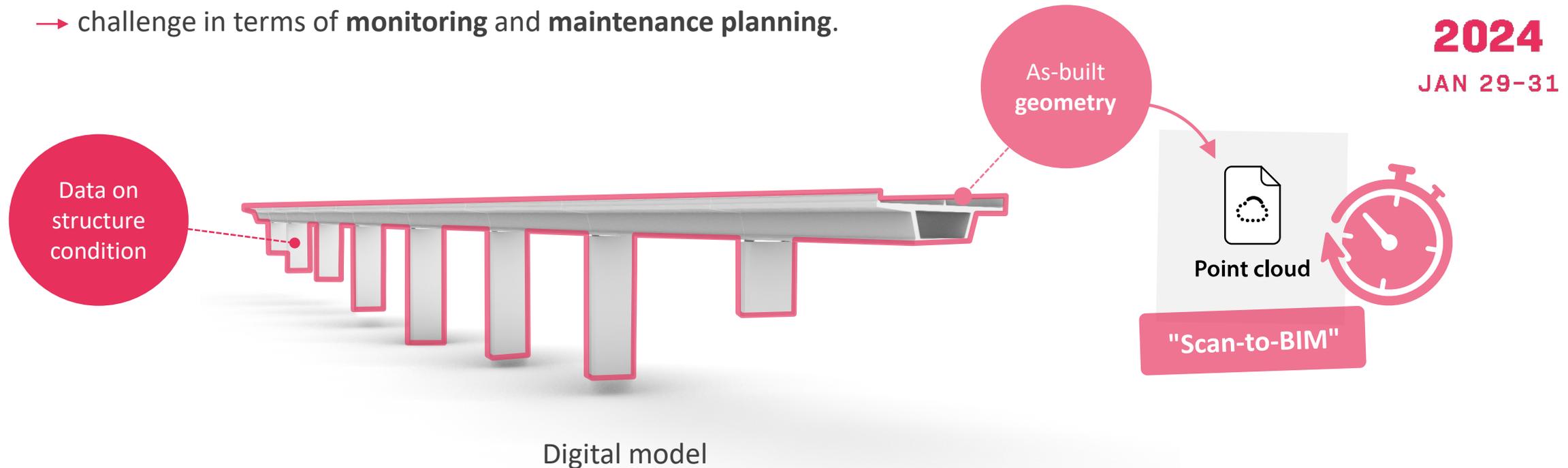
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# Project description

## Context

- + In Switzerland : around 4,500 road bridges and 8,000 railway bridges.  
→ challenge in terms of **monitoring** and **maintenance planning**.



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# Project description

## Objective

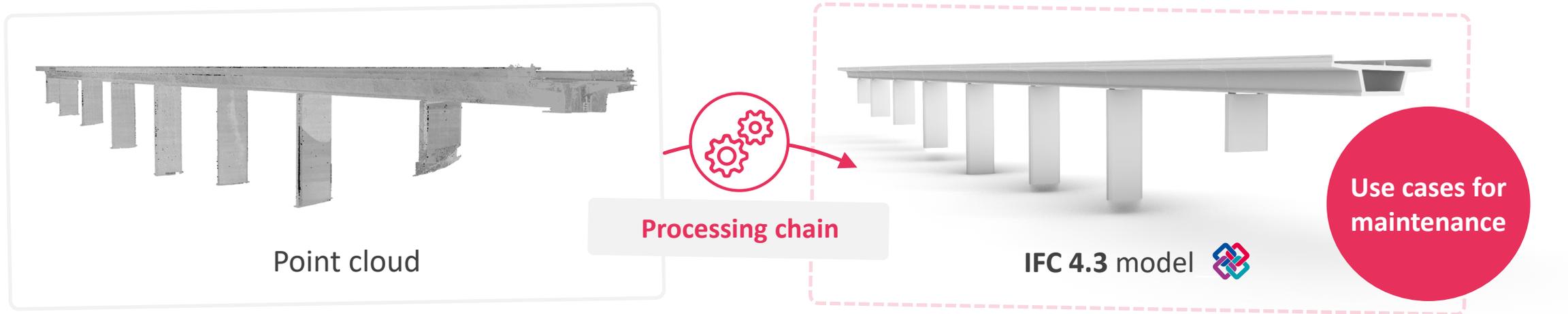
- + Establish a workflow and implement tools for **semi-automatically** creating the digital model of an existing bridge from point clouds.

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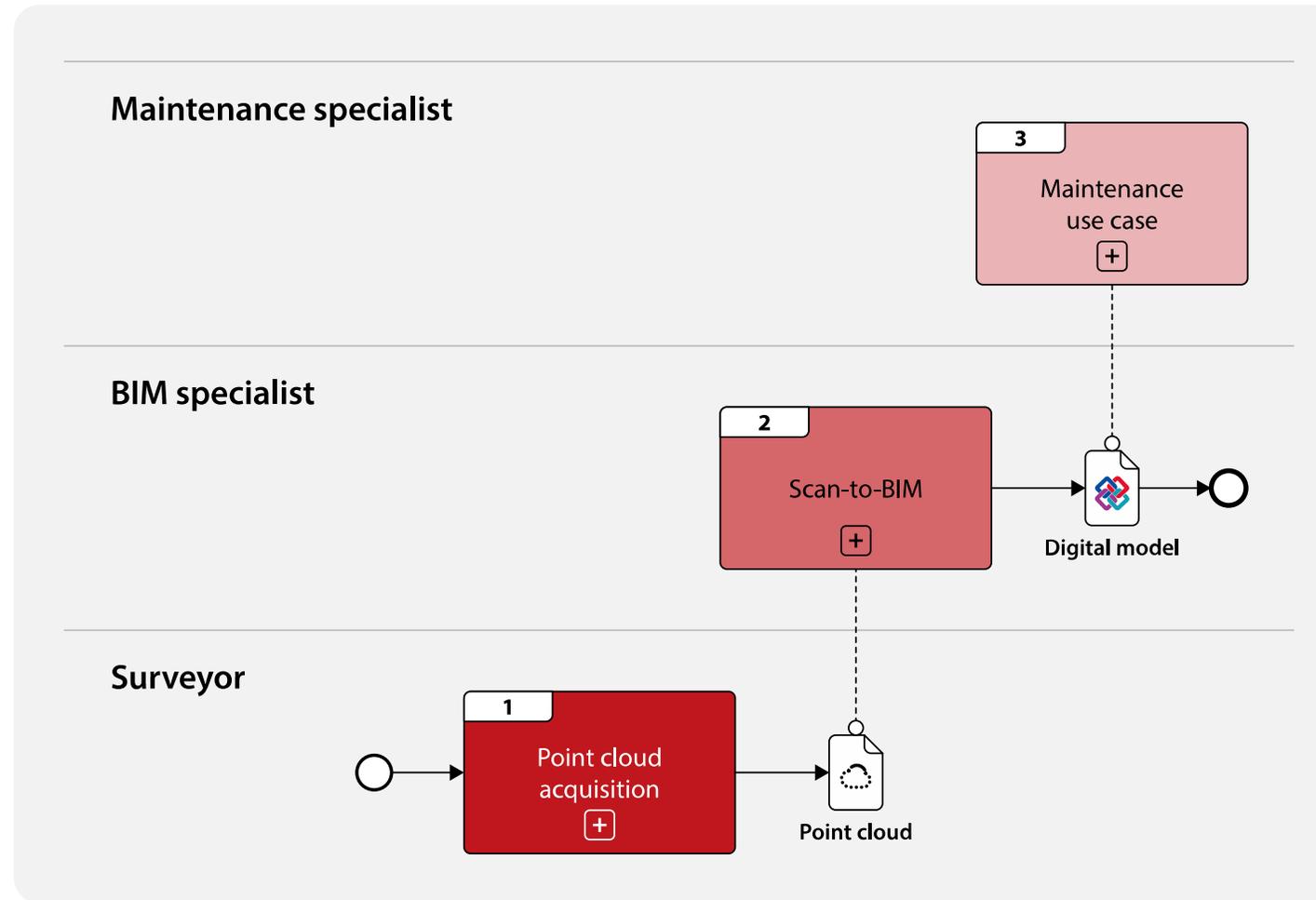
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# Methodology

## General process

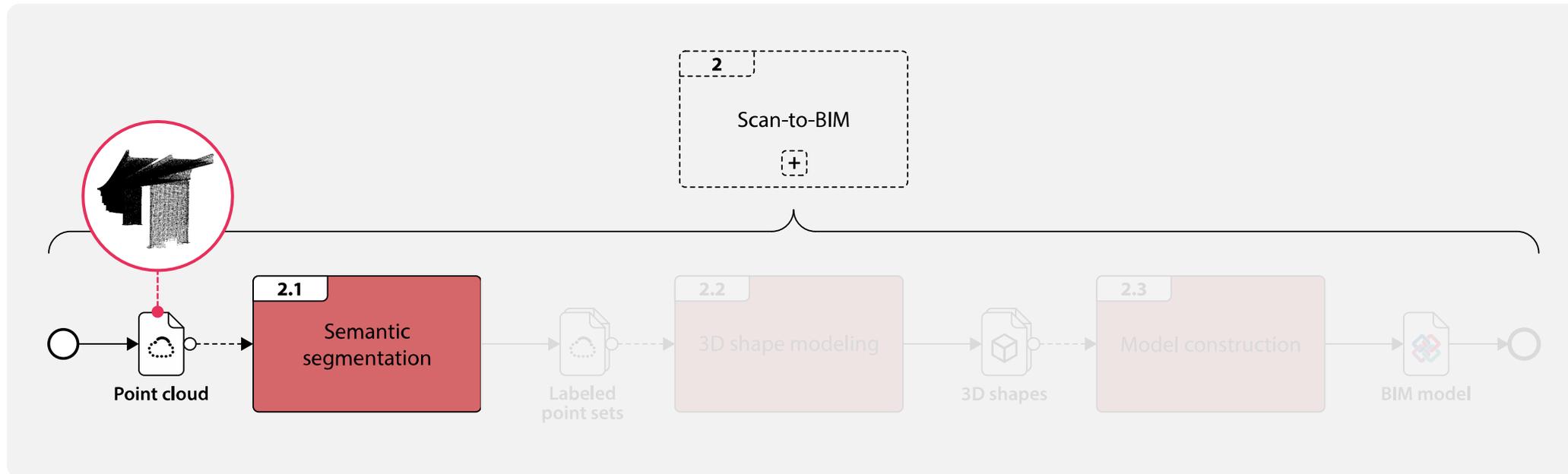
+ Three main stages :



Schatz, Y., Domer B. (2023). *Semi-automated generation of IFC bridge models from 3D scans for maintenance applications* [Preprint].

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## Sub-steps

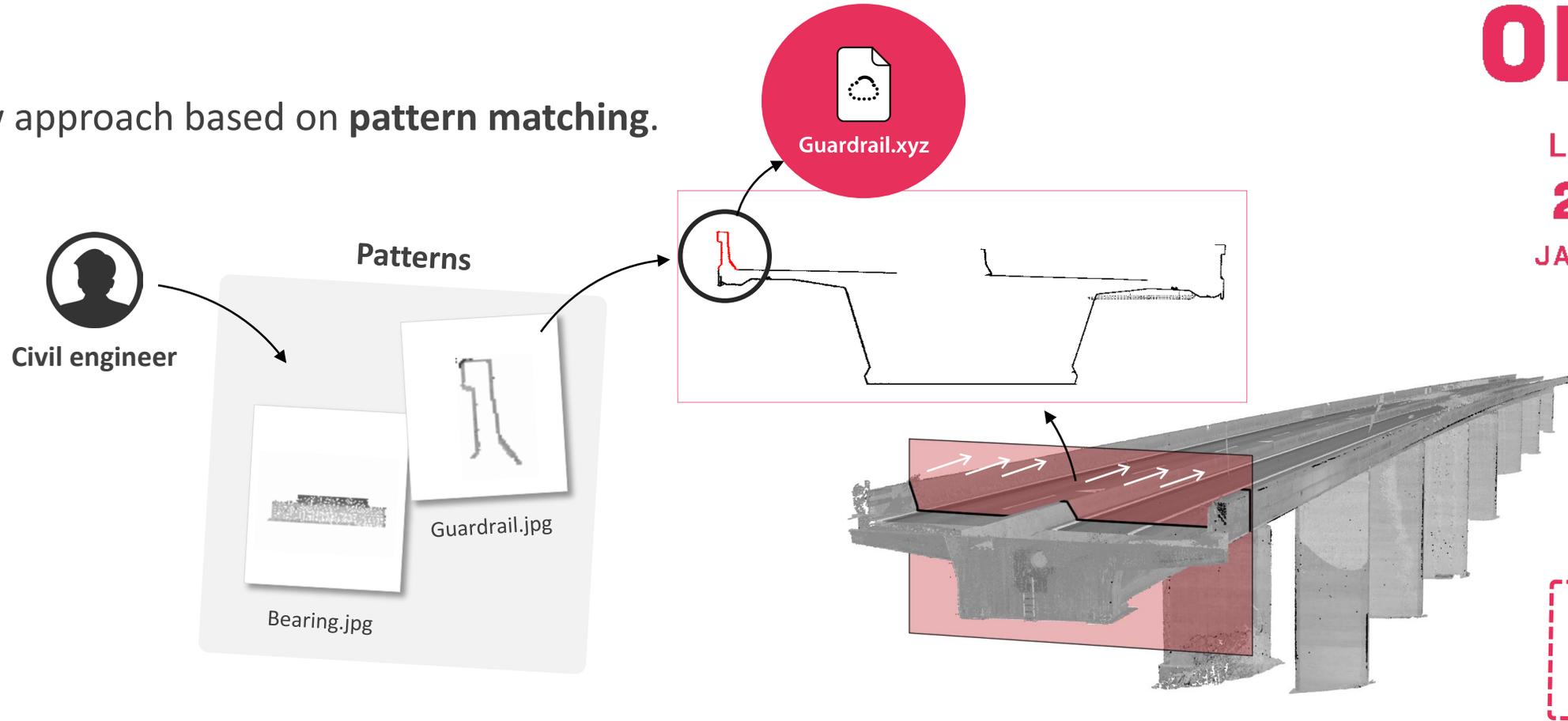


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## Semantic segmentation

+ New approach based on **pattern matching**.



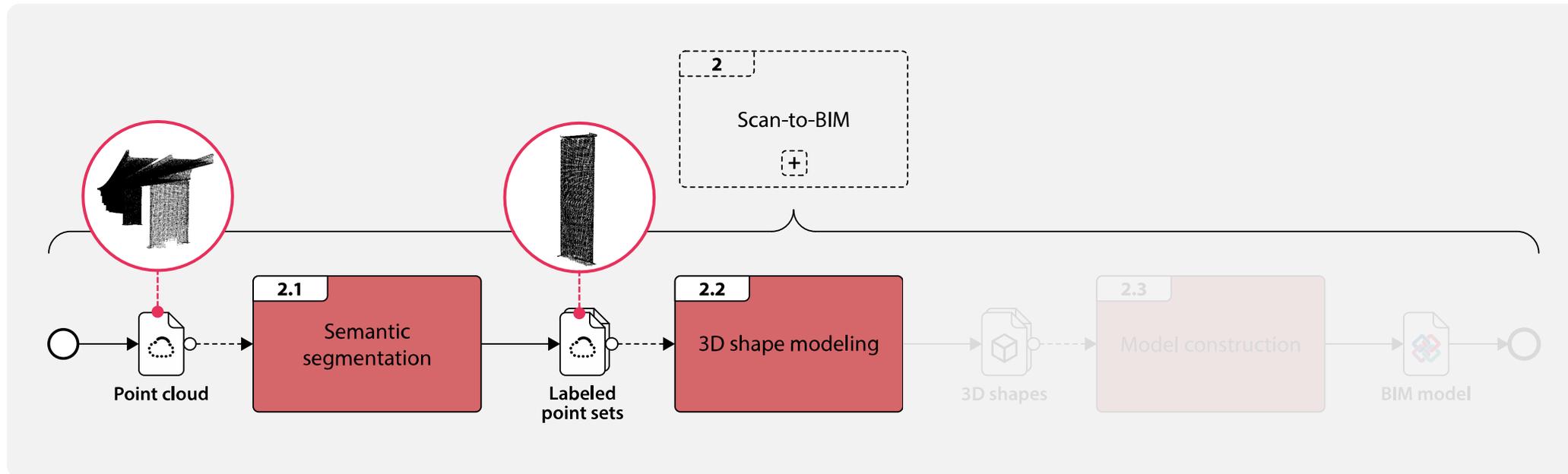
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## Sub-steps

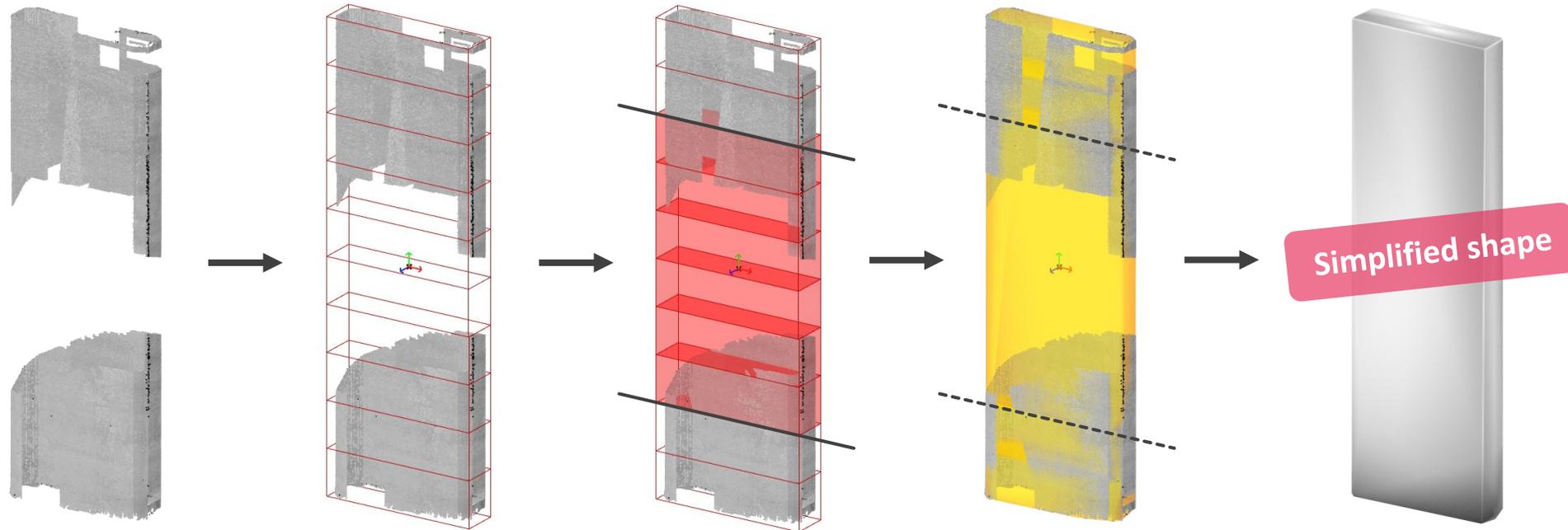


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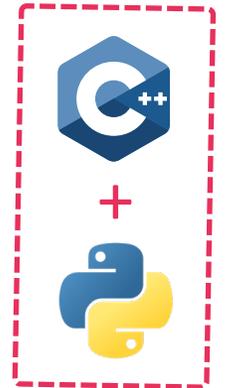
## 3D shape modeling

+ New surface reconstruction algorithm, suitable for incomplete PCD.



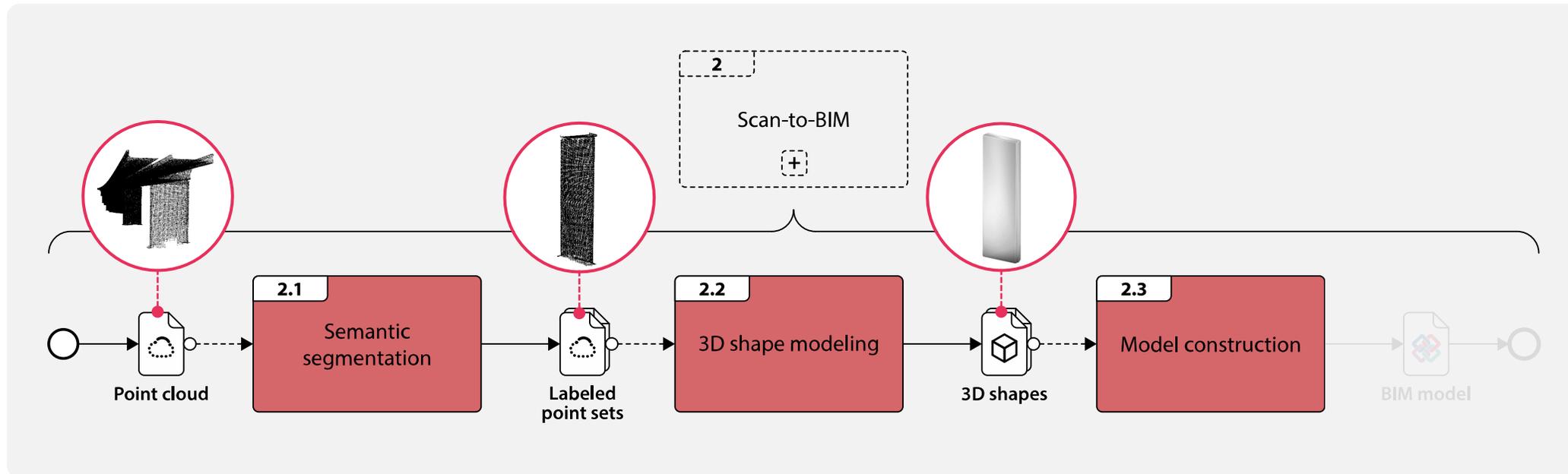
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## Sub-steps

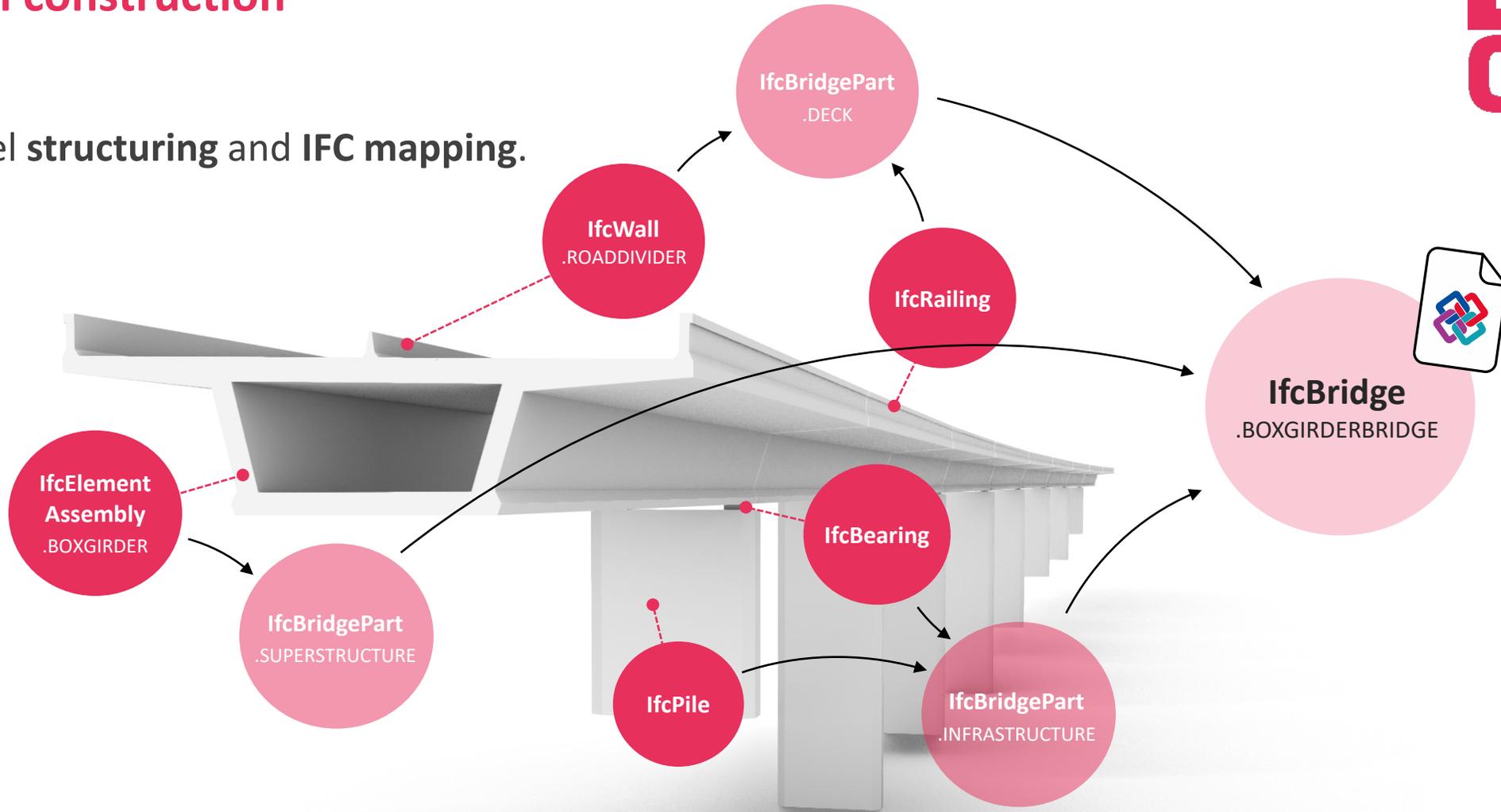


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## Model construction

+ Model structuring and IFC mapping.



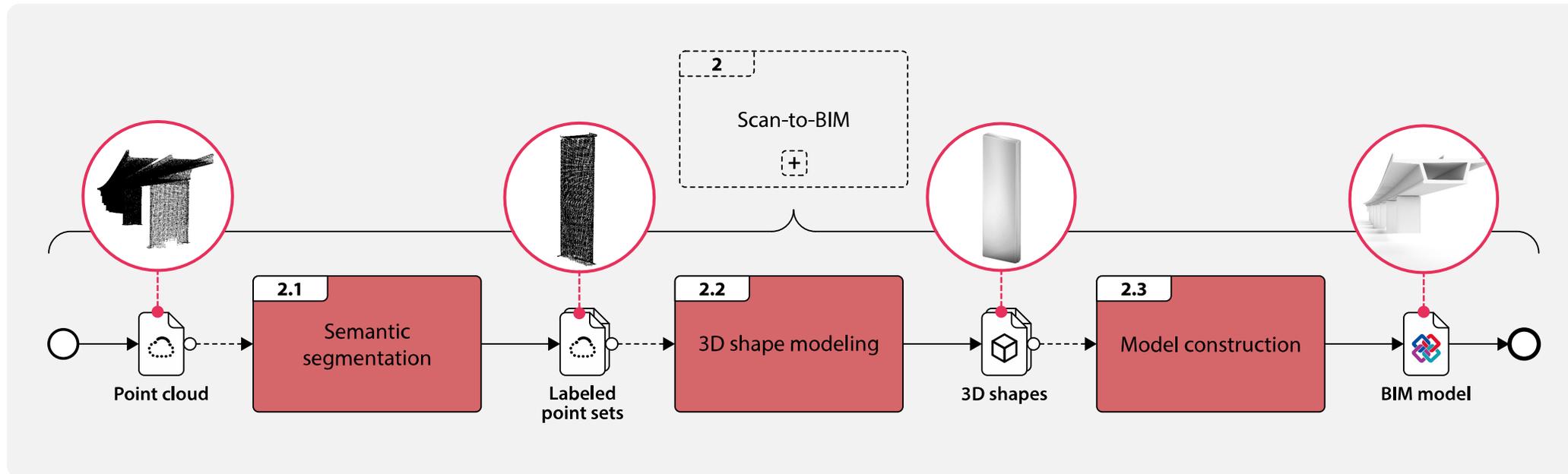
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## Sub-steps



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## Use case

### Database querying

+ Video : <https://drive.switch.ch/index.php/s/dbyuCDofDNvYMm9>.

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# Conclusion

## Key points

- + **Structured, replicable** workflow, covering all stages from acquisition to IFC model.  
→ the IFC model is georeferenced and contains up-to-date information.
- + **Robust and adaptable** solutions for semantic segmentation and 3D shape reconstruction.
- + **Flexible** model structuration *via* ontology.
- + **Open** format (IFC) → **wide** range of use cases.



**Results** soon published in open access.

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## Conclusion

### Aknowledgment

- + University of Applied Sciences Western Switzerland (funding).
- + Swiss Federal Roads Office (technical support)

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