New features in burnup framework in Serpent

11th Serpent User Group Meeting
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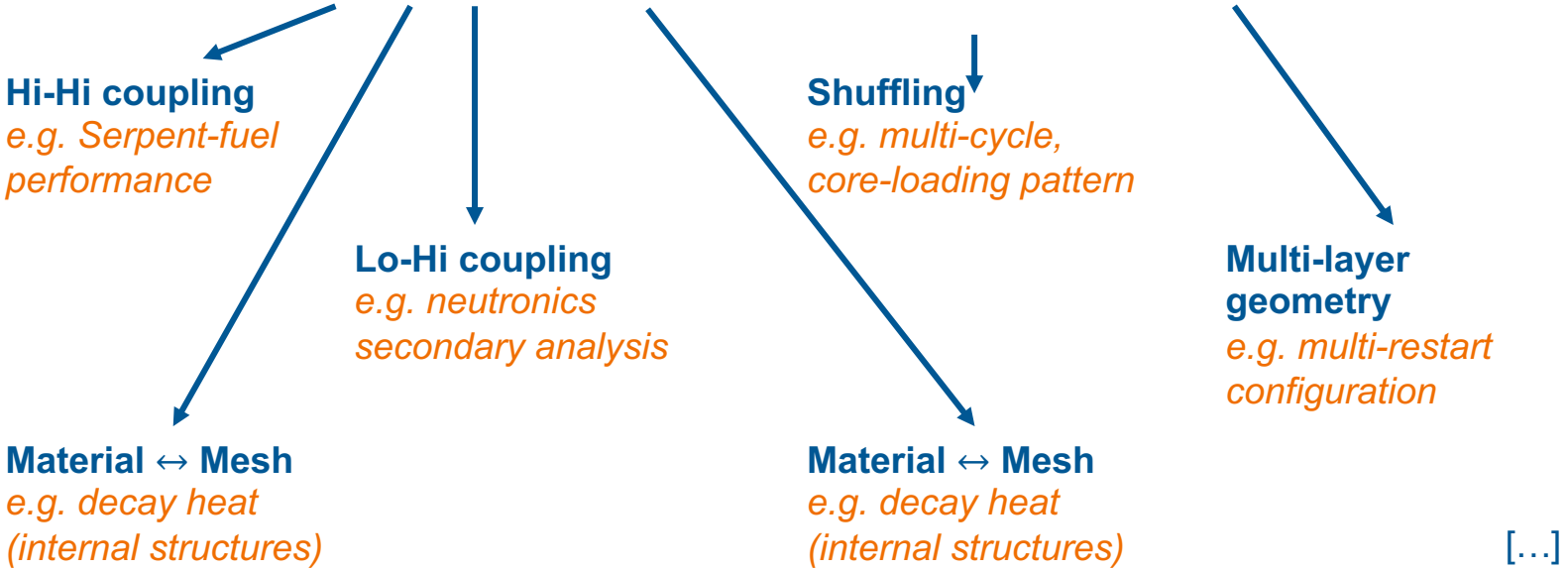
Ana Jambrina, Research Scientist, VTT

Burnup Material Characterization

How do we handle these scenarios?



Burnup Material Characterization

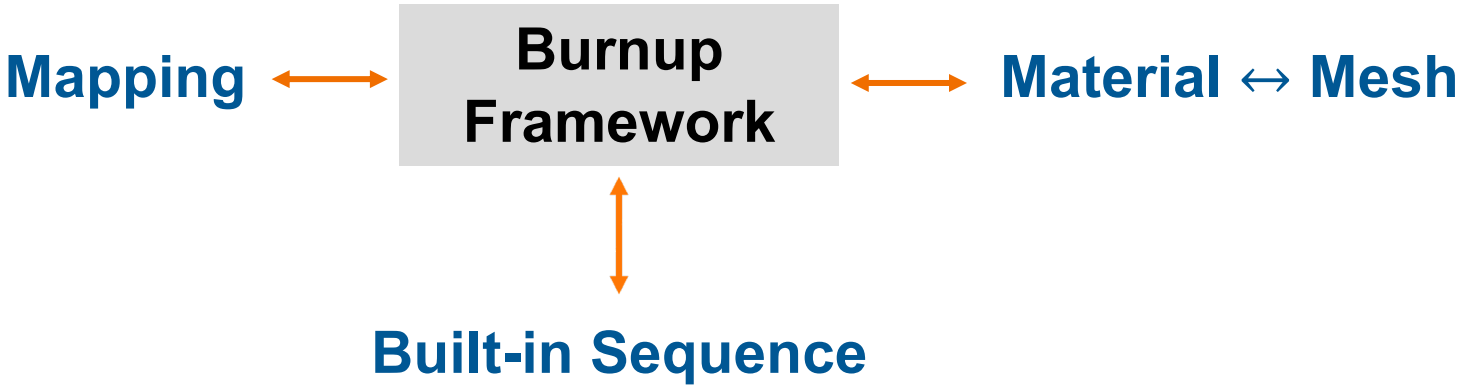
How do we handle these scenarios?

Indexing ⟷ **Bottleneck** ⟷ Structure

Re-configuration ???

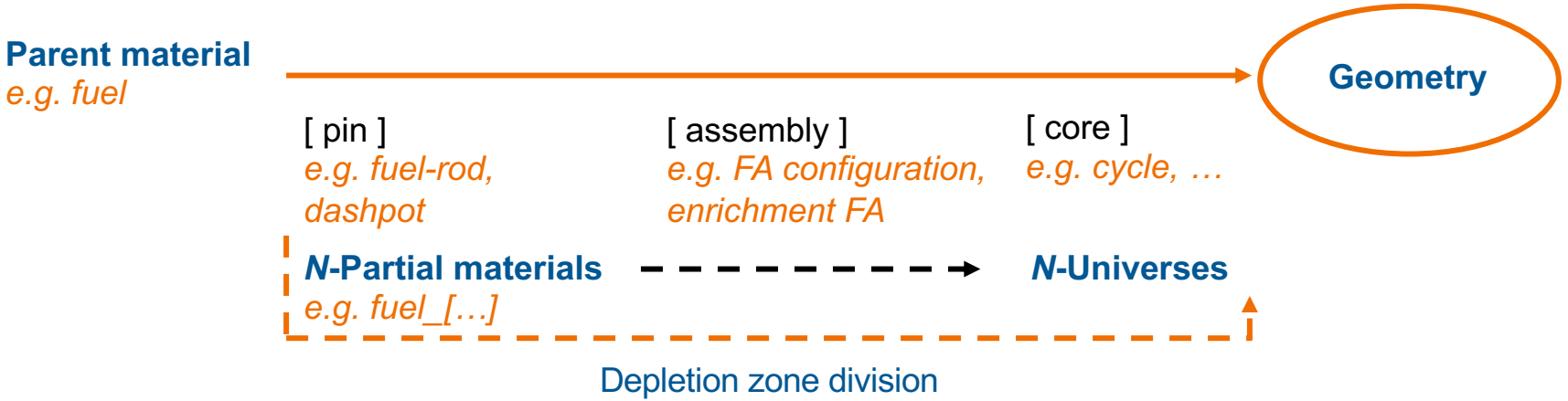
Burnup Material Characterization

How do we handle these scenarios?



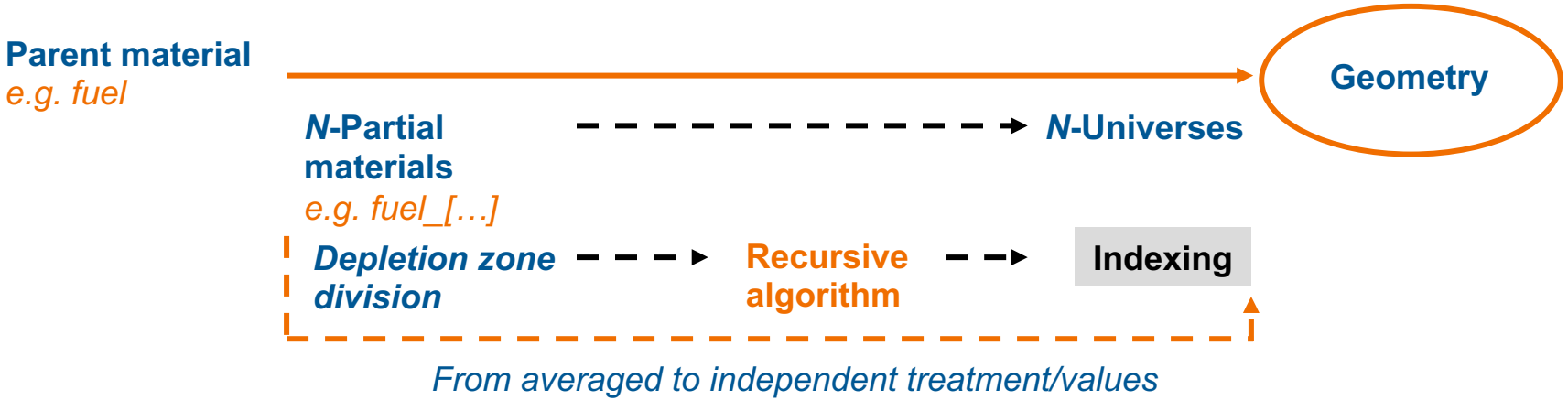
Burnup Framework

Step 1: Mapping



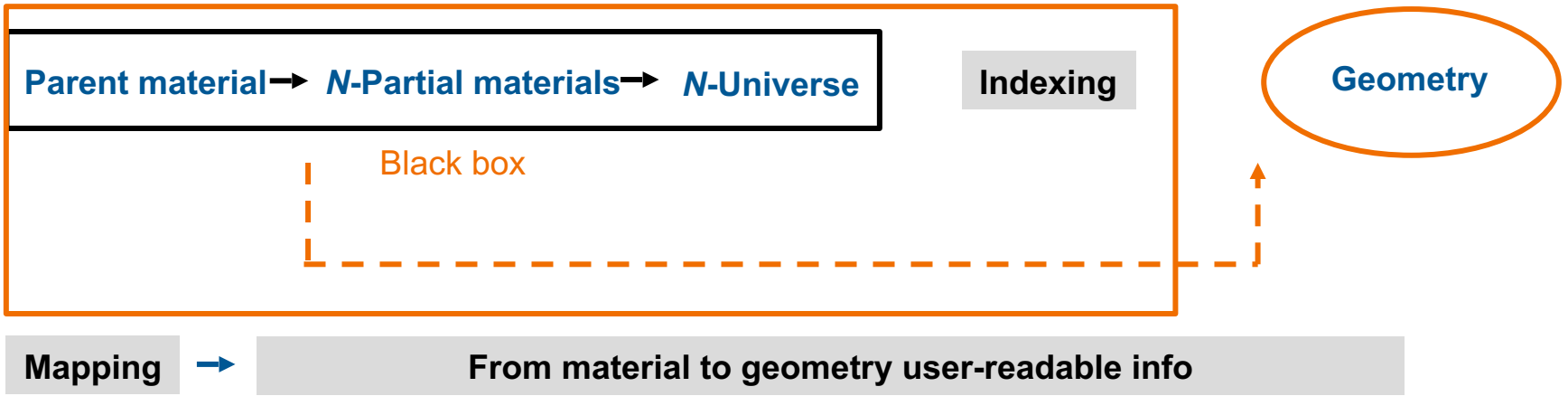
Burnup Framework

Step 1: Mapping



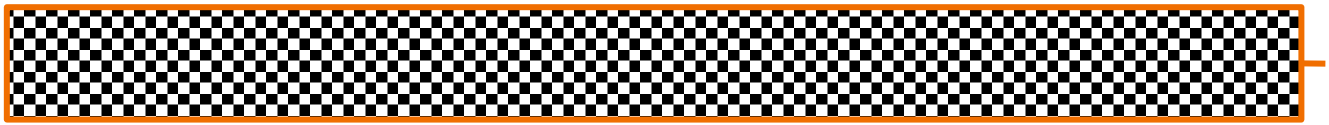
Burnup Framework

Step 1: Mapping



Burnup Framework

Step 1: Mapping



Geometry

Mapping → From material to geometry user-readable info

Based on Monte Carlo sampling

- Volume
- Centre of each element (level)

Based on known info

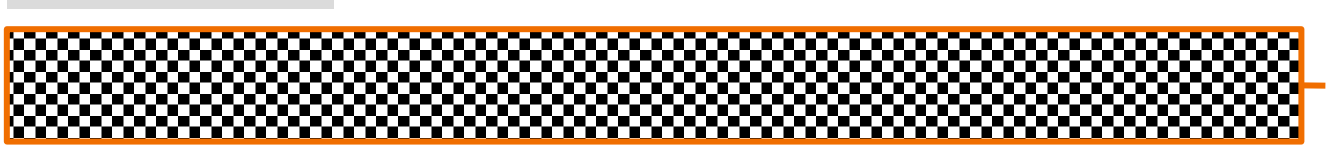
- division structure
- Recursive algorithm

Reconstruction (reverse-engineering)

→ Centre of each element (division)

Burnup Framework

Step 1: Mapping



Geometry

Mapping → From material to geometry user-readable info

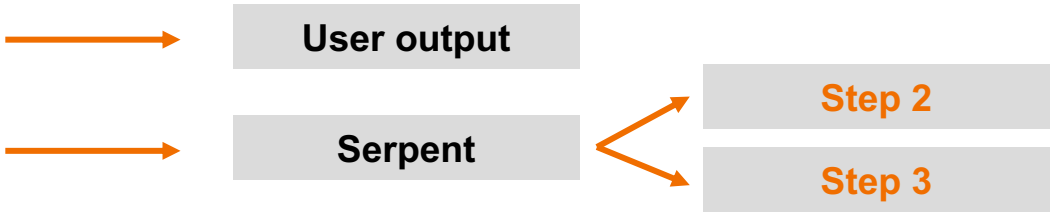
1
- **Who are you?**
  - Parent material
  - Partial material
  - Universe index

2
- **Where are you?**
  - Relative location
    - Lattice, pin, division
  - Absolute location
    - (x,y,z) centre of each depletion zone

3
- **What do you got?**
  - Partial material density
  - Partial material burnup
  - [Nuclide specific info]

Burnup Framework

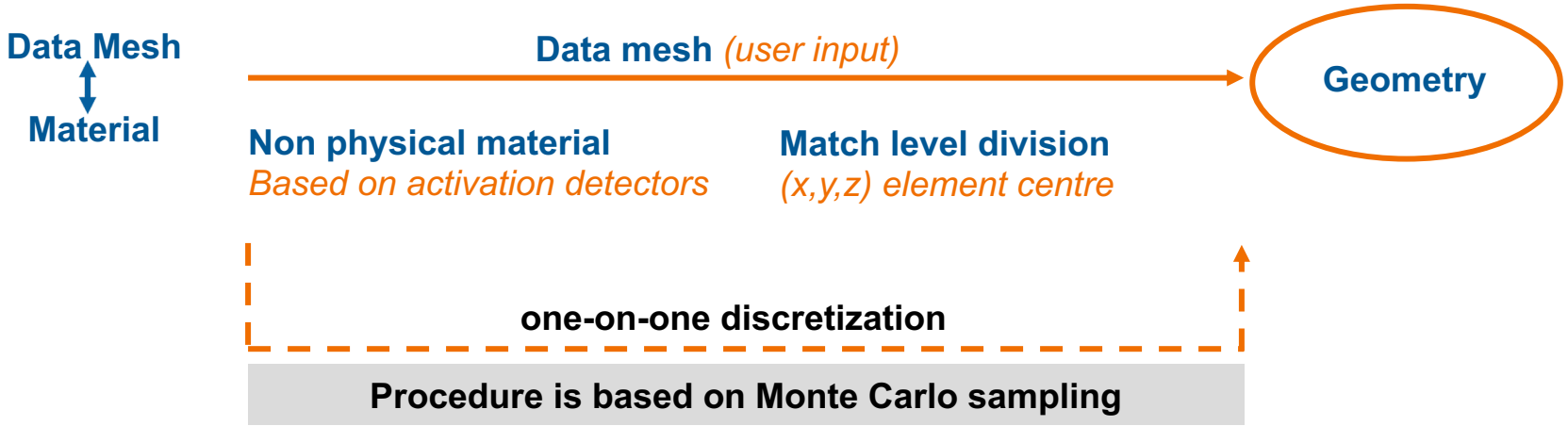
Step 1: Mapping



- **Who are you?** 1
  - Parent material
  - Partial material
  - Universe index
- **Where are you?** 2
  - Relative location
    - Lattice, pin, division
  - Absolute location
    - (x,y,z) centre of each depletion zone
- **What do you got?** 3
  - Partial material density
  - Partial material burnup
  - [Nuclide specific info]

Burnup Framework

Step 2:
Material ↔ Mesh



Burnup Framework

Step 2: Material ↔ Mesh

→ **User output**

→ **One-on-One: material ↔ mesh**

** For external or internal use*

1
- **Who are you?**
  - Parent material
  - Partial material
  - Universe index

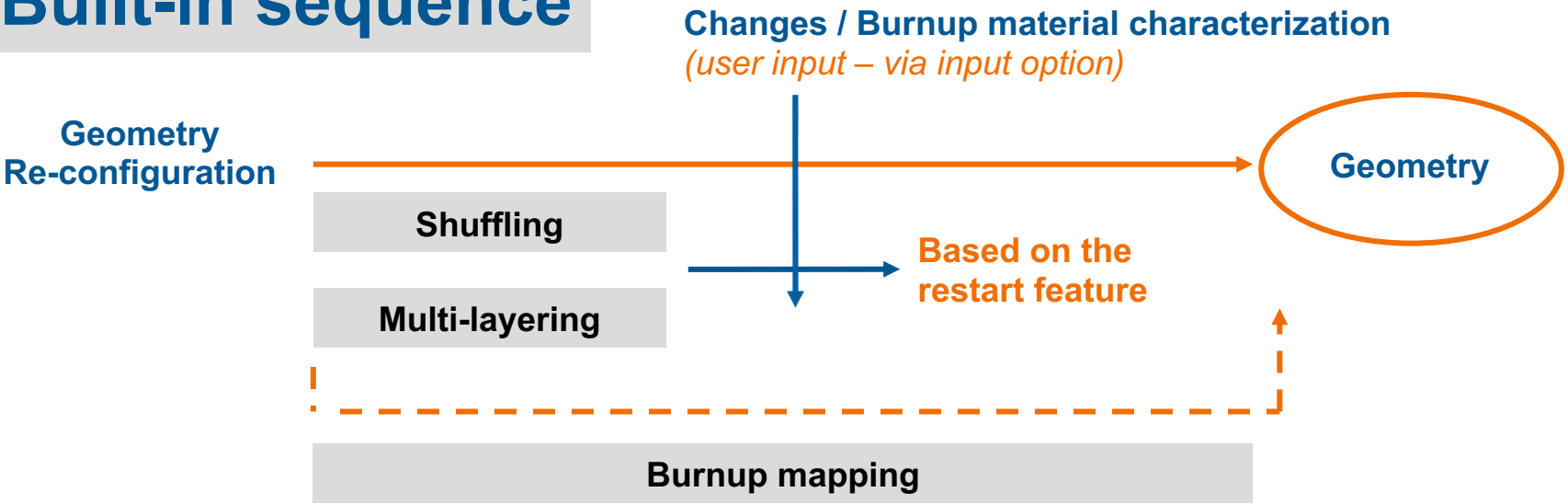
** If there is material division*

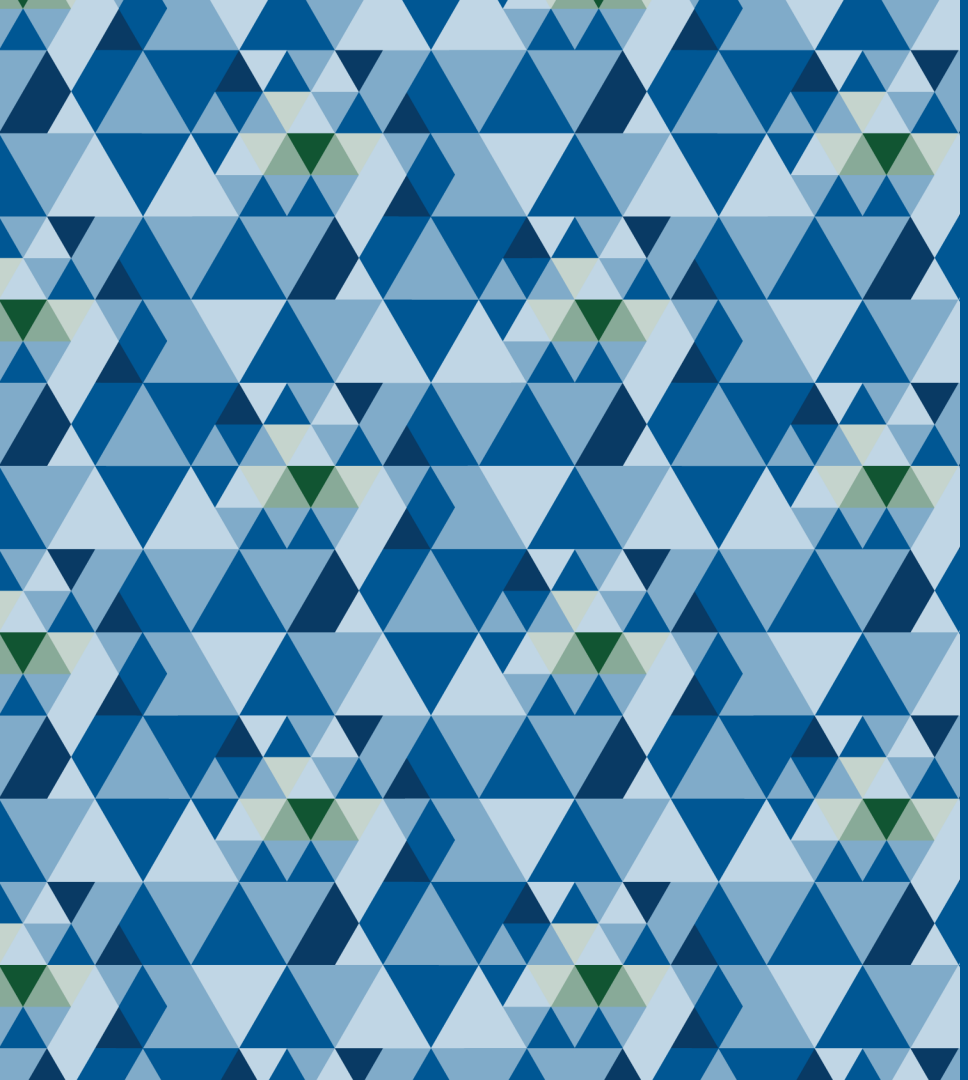
2
- **Where are you?**
  - Location
    - (x,y,z) centre of each element.
  - Indexing within mesh

3
- **What do you got?**
  - Data mesh handles in the information

Burnup Framework

Step 3:
Built-in sequence





Feedback Questions […]

Thank you!

Ana.Jambrina@vtt.fi