X3D Best Practices for Computer-Aided Design CAD, 3D Printing, and 3D Scanning Applications

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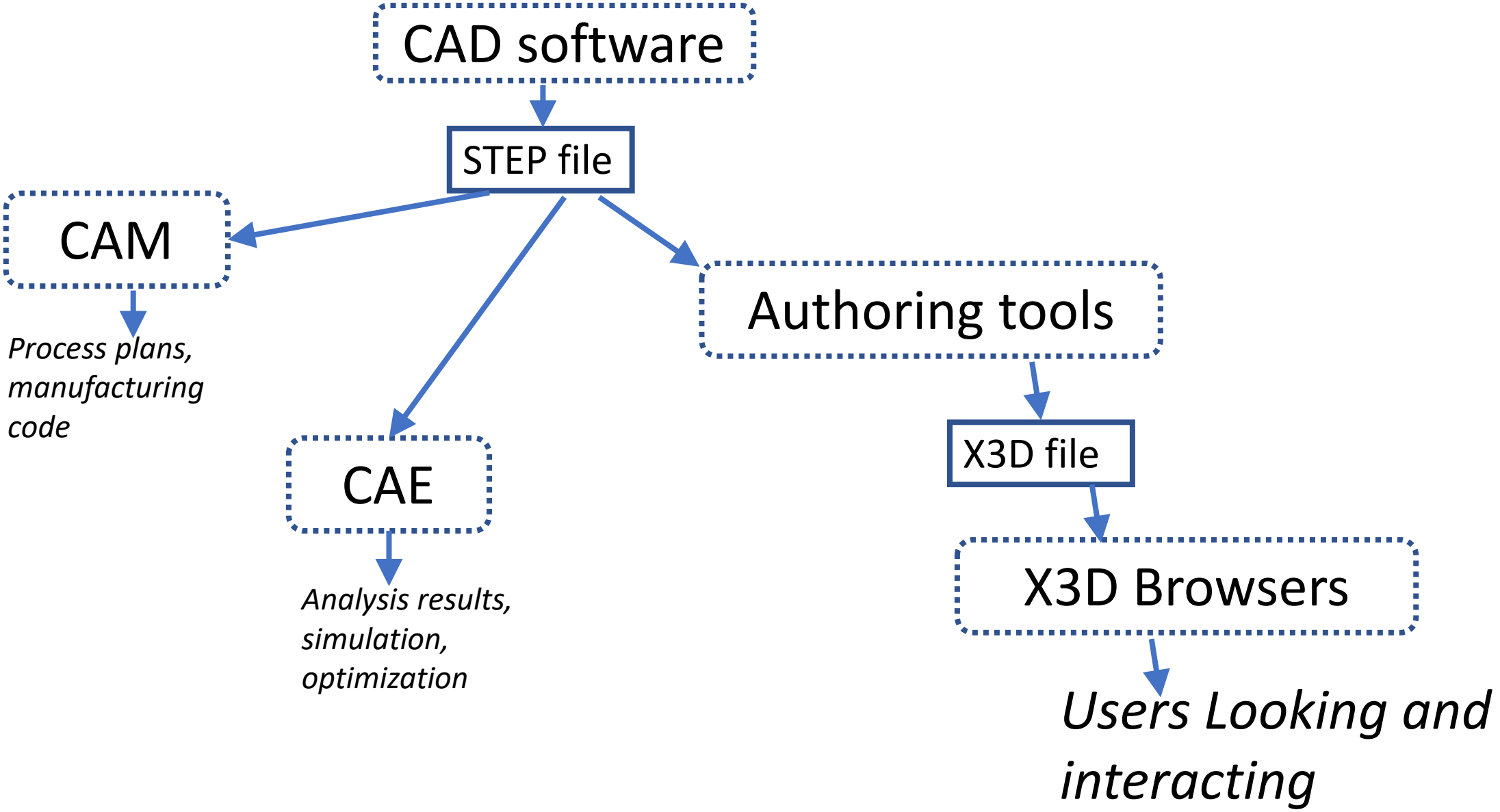
Visualization is a down-stream application



Role of Authoring Tools for X3D CAD applications :1

Conversion from CAD native format or STEP file to X3D

- Create X3D geometry from geometry in the CAD file
- Define orientation and position from CAD to X3D file
  - Where are the top and bottom; front and back?
  - Where is the ground?
- Define parts and assembly structure in the X3D file from the assembly tree in the CAD file

Role of Authoring Tools for X3D CAD applications :2

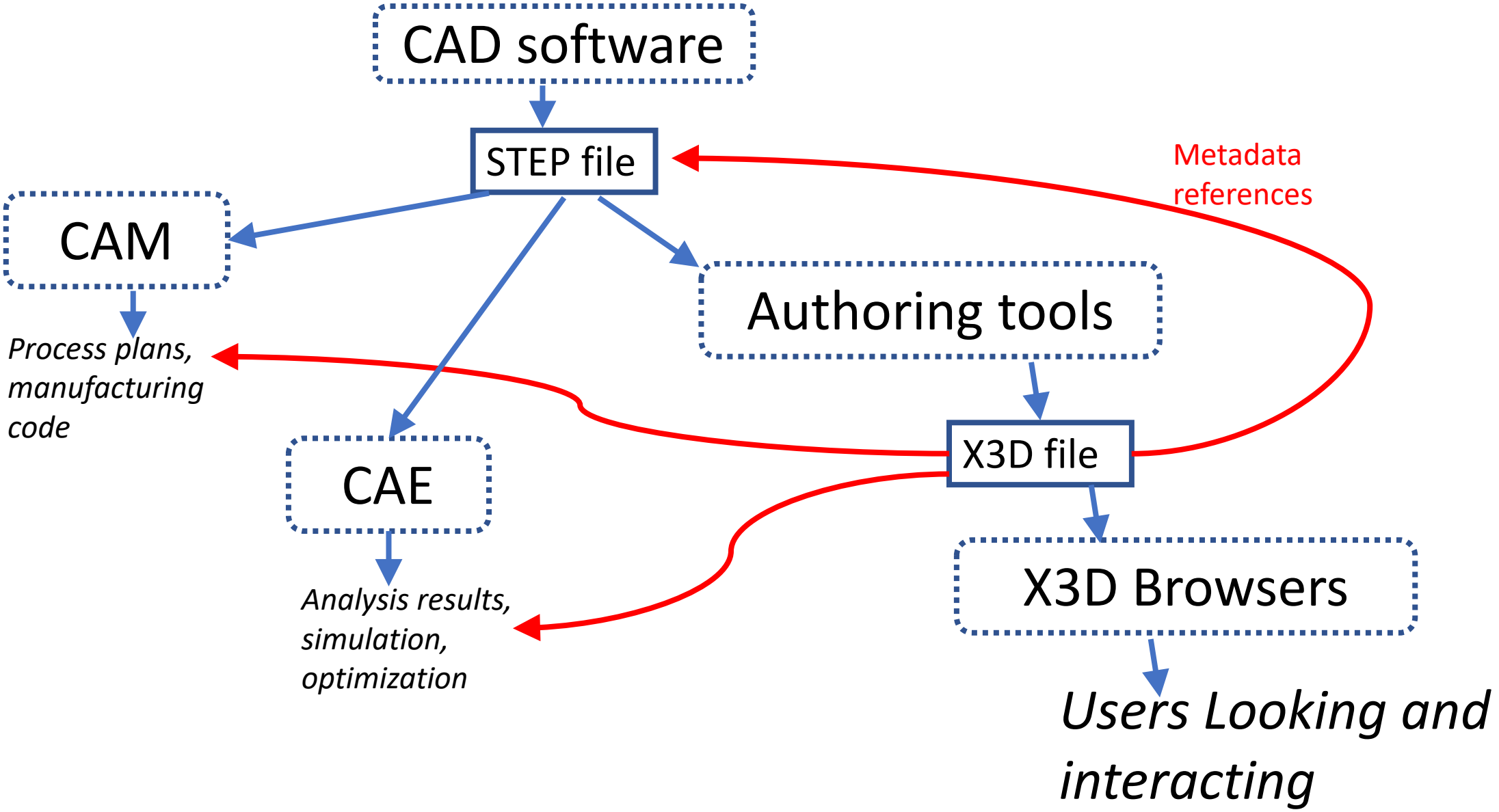
Enhance the X3D model

- Add Viewpoints and Navigation for the user
- Apply material appearance to the X3D geometry
  - Is ‘realistic’ color and appearance important?
- Establish Metadata in the X3D file from the contents of the CAD file.

Role of Authoring Tools for X3D CAD applications :3

- *Edit* or *Simplify* model, show complexity and detail only as needed, to satisfy requirements while keeping model deliverable.
- Add annotation, animation, and interactivity. Assembly-part structure is important.
- *Combine* with other scene elements: geospatial (terrain) visualization, point cloud data, other CAD model.

Metadata are links



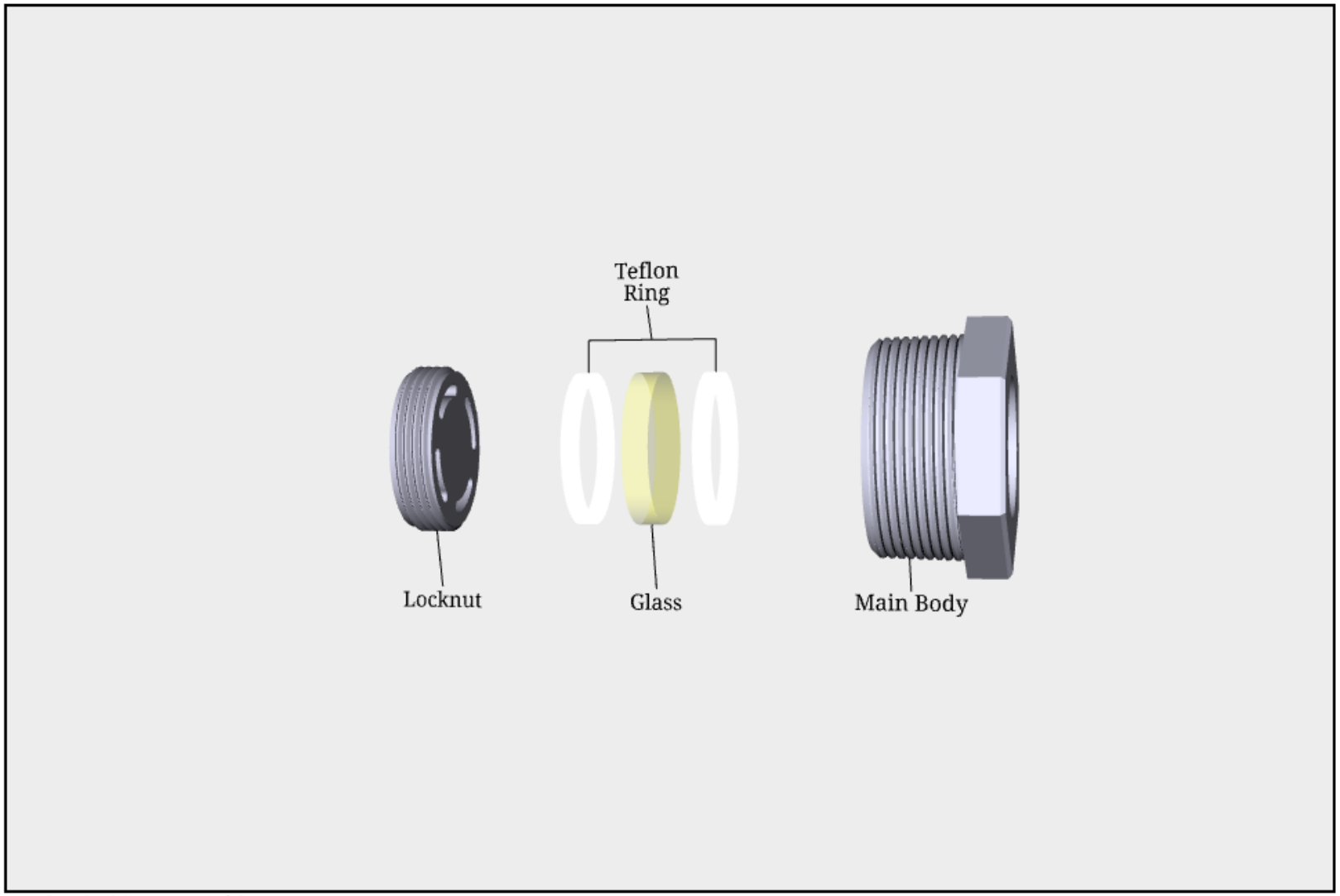
Enabled by open standard X3D

- Using standards (STEP, X3D) as inputs and outputs of the authoring workflow gives more freedom as to the tools that can be used
- The X3D run-time specification means that the X3D file can be used over a range of browsers/viewers
  - Current viewers: X3DOM, X-ITE, Xj3D,
  - Viewers of the futures : AR/VR, WebAssembly

Authoring Tools

- Conversion:
  - CAD Exchanger
  - VRML Exporters
  - SPRI STEP browser
- Enhance/Add
  - X3D-Edit
  - Titania
  - XSLT

Assembly Animation



Rendered with X-ITE 4.6.8

http://kshell.com/pages/exploded_view/

http://spri.kshell.com/xt/shape/x3dom/swtvkzetvkap/233132393036