

Digital Thread Proposal

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ISO TC184/SC4 WG15 Digital Manufacturing

Example – tracing requirements

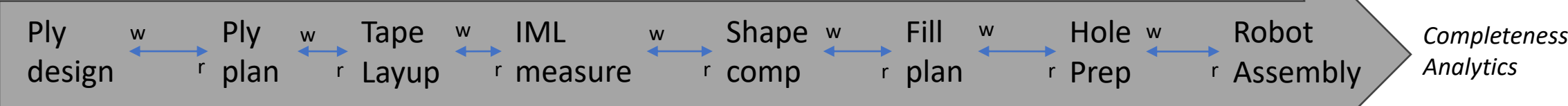
Multiple design disciplines

“How my requirements were met”

Multiple manufacturing solutions

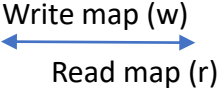


Requirements



Forward flow

Stability in references

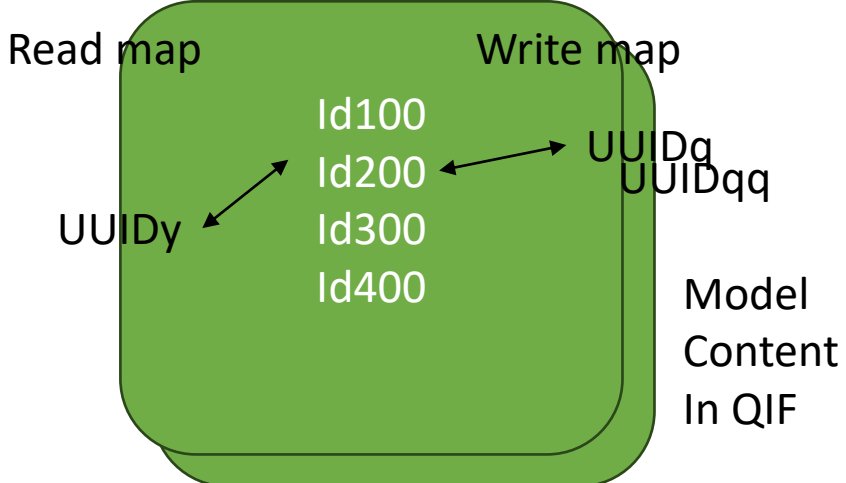
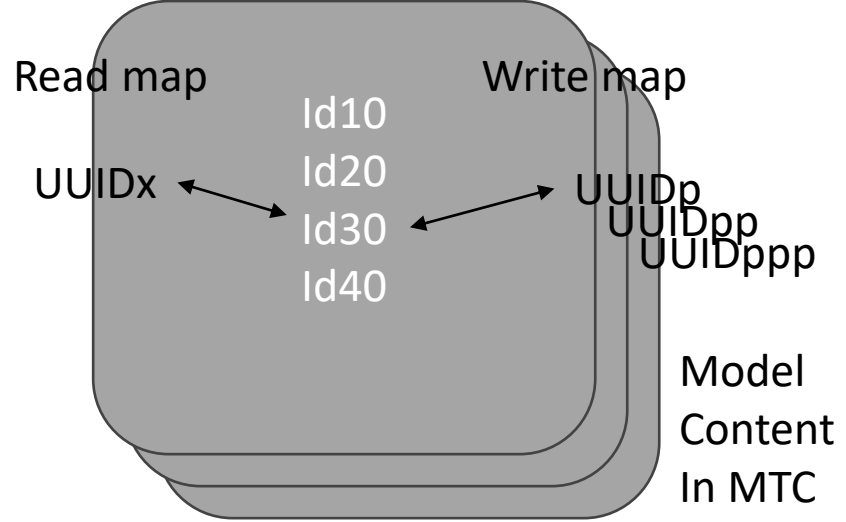
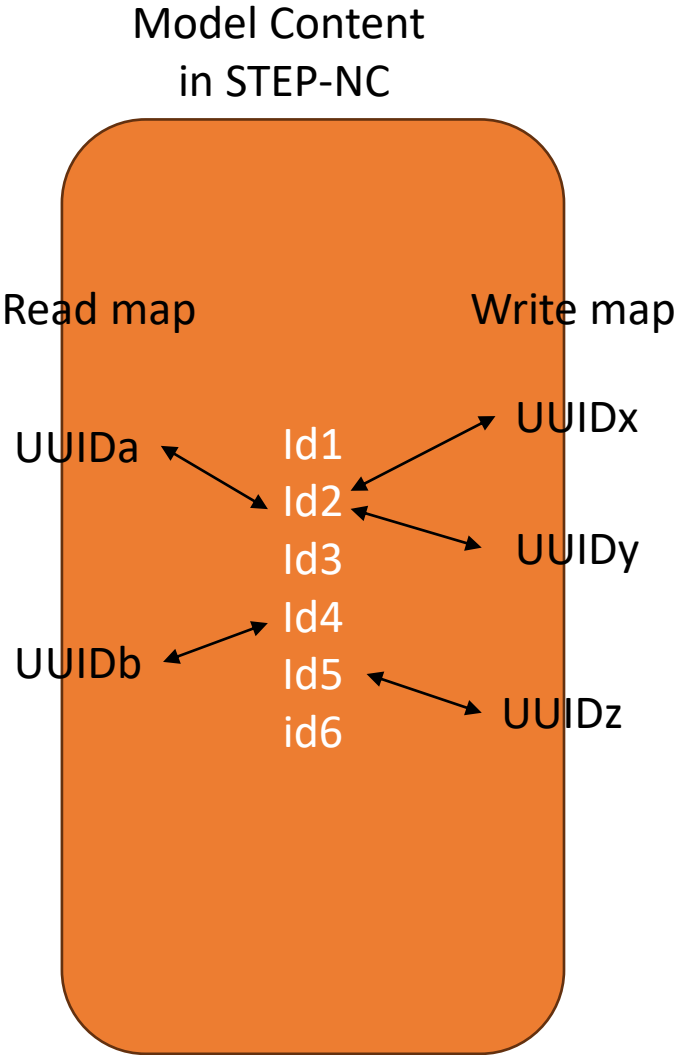


“How my design was used”

Why digital thread

- Requirements are met at multiple stages of the design to manufacturing pipeline
- Linking requirements to solutions is difficult because of islands (or stovepipes) of automation in which design uses one set of tools, engineering another set, and manufacturing yet another
- We propose to link the islands to create a digital thread that can be used to trace and maintain solutions to requirements.
- The proposed thread uses decentralized identifiers (**DiDs**) to link the islands
- The proposed thread uses a **triple store** to trace the requirements

ISO 23247-5 Digital Thread for digital twin



did:thread:step:

position tolerance:UUIDa
 machining workingstep:UUIDx
 measurement workingstep:UUIDy

did:thread:mtc:

feature twin:UUIDp
 feature twin:UUIDpp
 feature twin:UUIDppp

did:thread:qif:

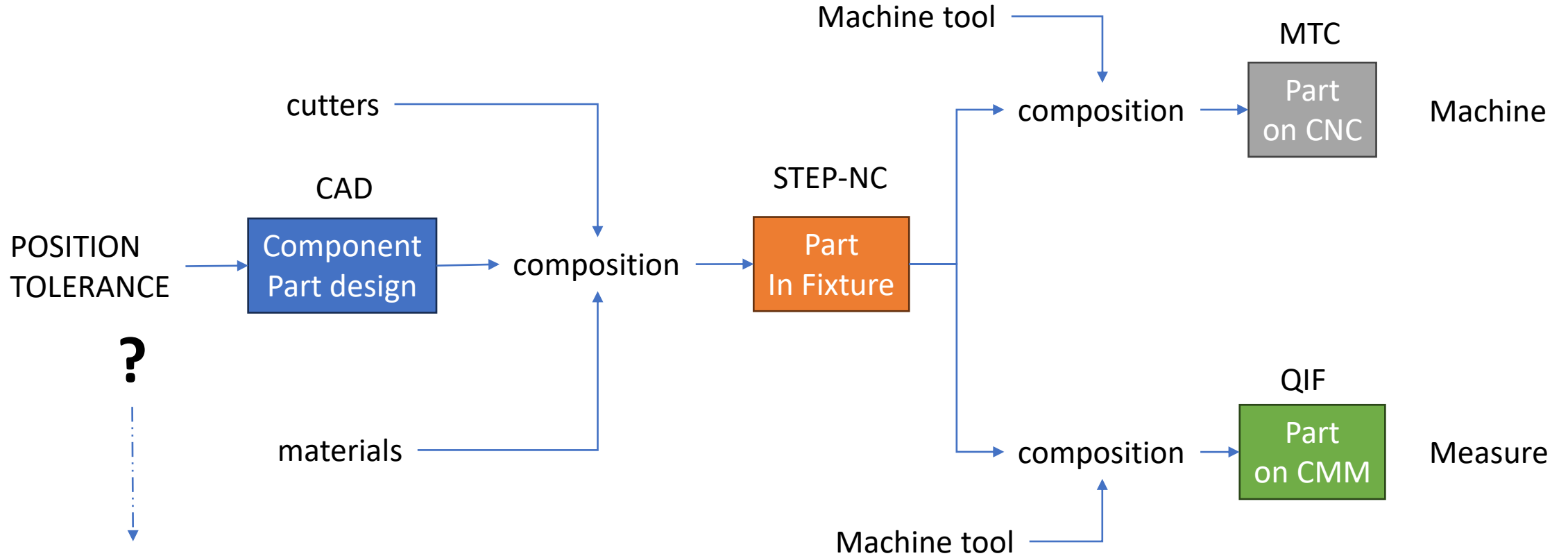
measurement twin:UUIDq
 measurement twin:UUIDqq

Triples

Makes (UUIDa, UUIDx)
 Instance(UUIDx, UUIDp)
 Instance(UUIDx, UUIDpp)
 Instance(UUIDx, UUIDppp)
 measures(UUIDa, UUIDy)
 Instance(UUIDy, UUIDq)
 Instance(UUIDy, UUIDqq)
 Setup(UUIDb, UUIDz)

ISO 23247-6 Digital Twin Composition

Read/write maps for internal and external identifiers as design components are merged to make manufacturing solutions



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- How was this made
- How was this measured
- How well is it being met
- What is the manufacturing cost