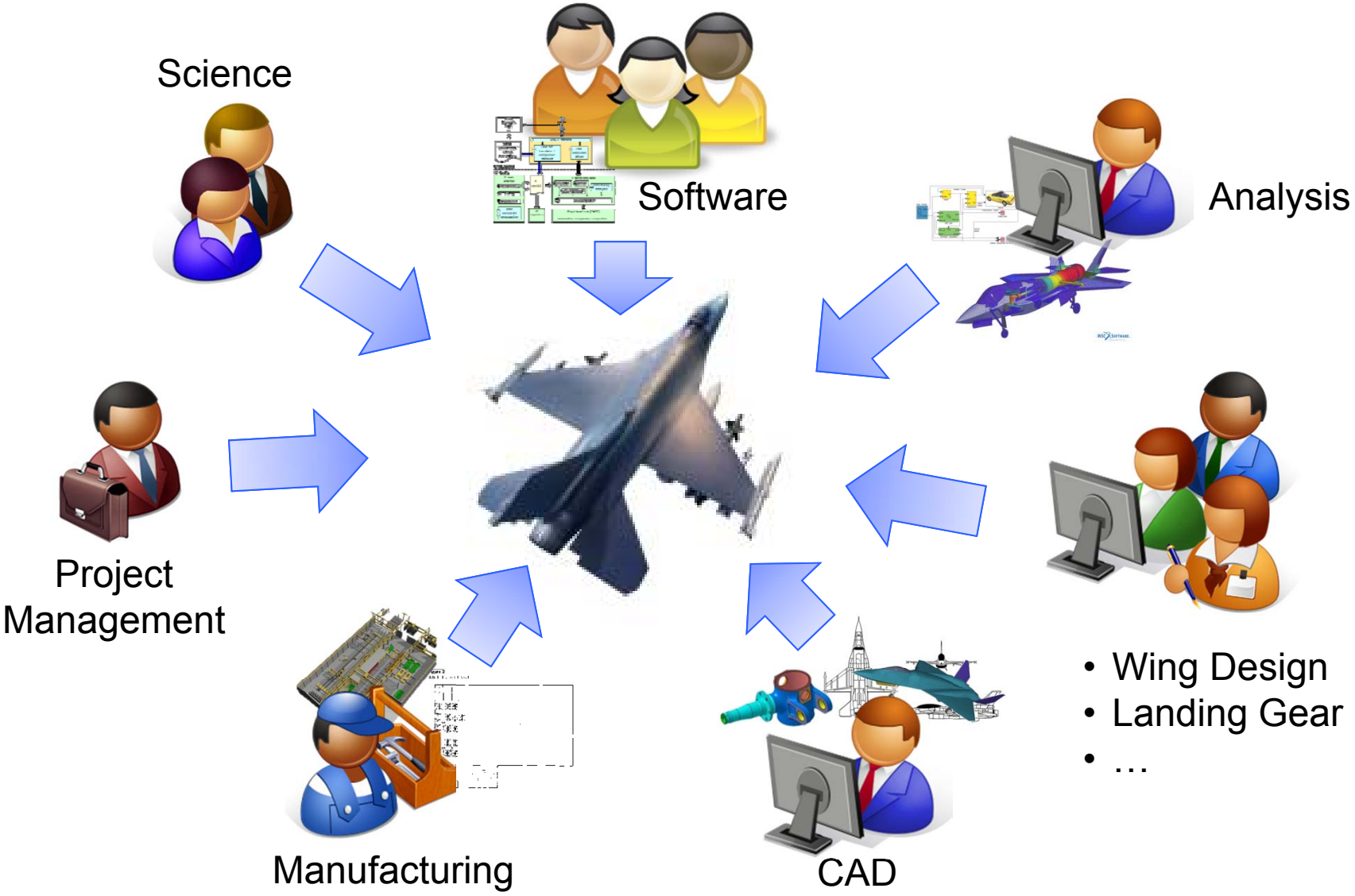
Using Logical Reasoning for Inconsistency Management in OSLC-Based Infrastructures

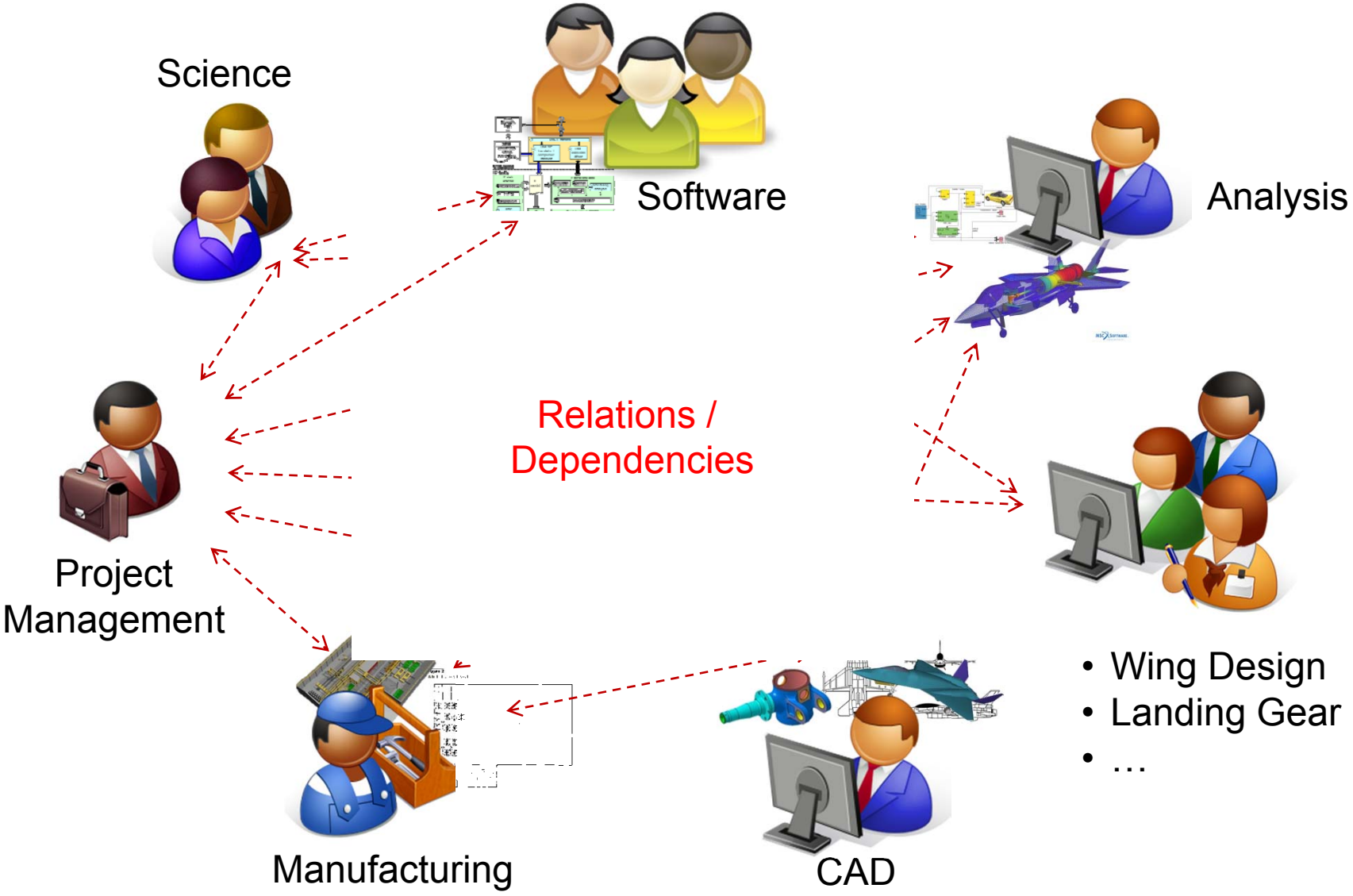
Sebastian Herzig, Ahsan Qamar, Chris Paredis

{sebastian.herzig, ahsan.qamar, chris.paredis}@me.gatech.edu

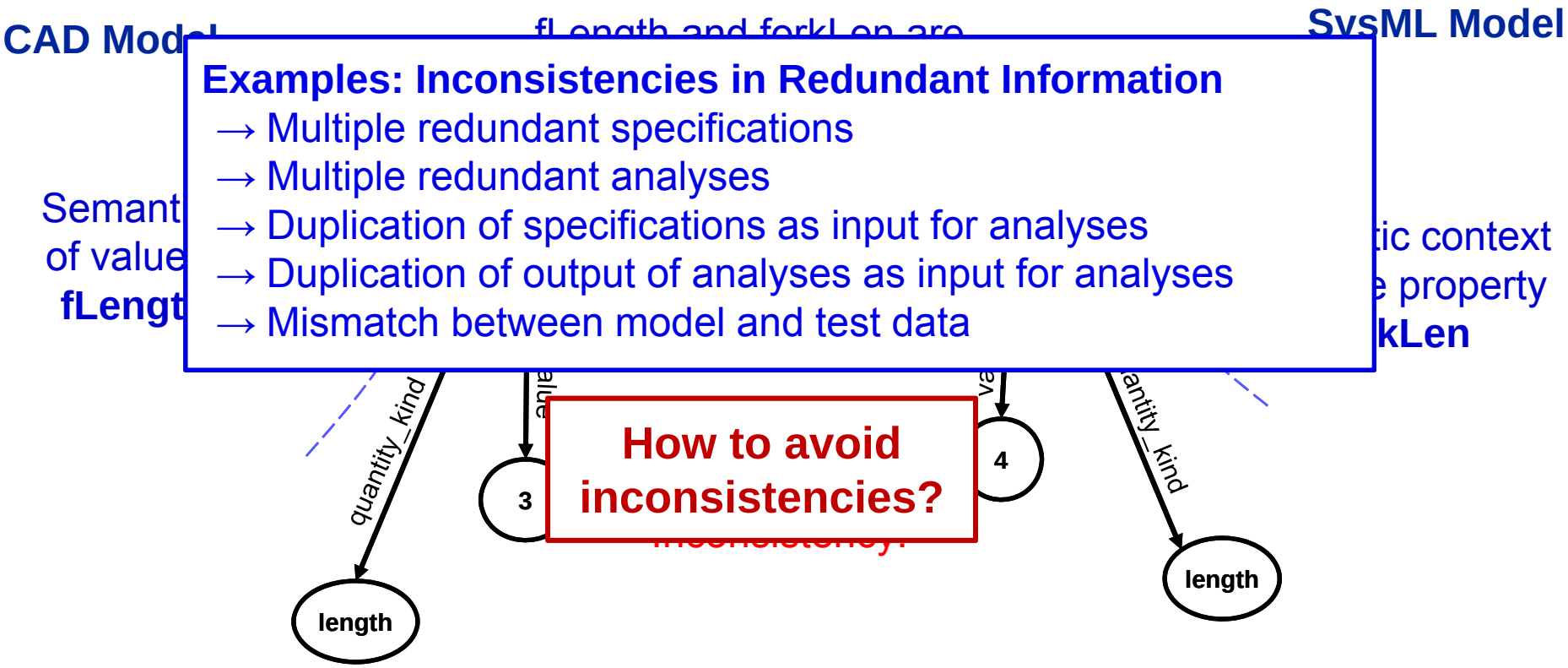
Collaboratively Developing Complex Systems



Highly Interrelated Information & Knowledge



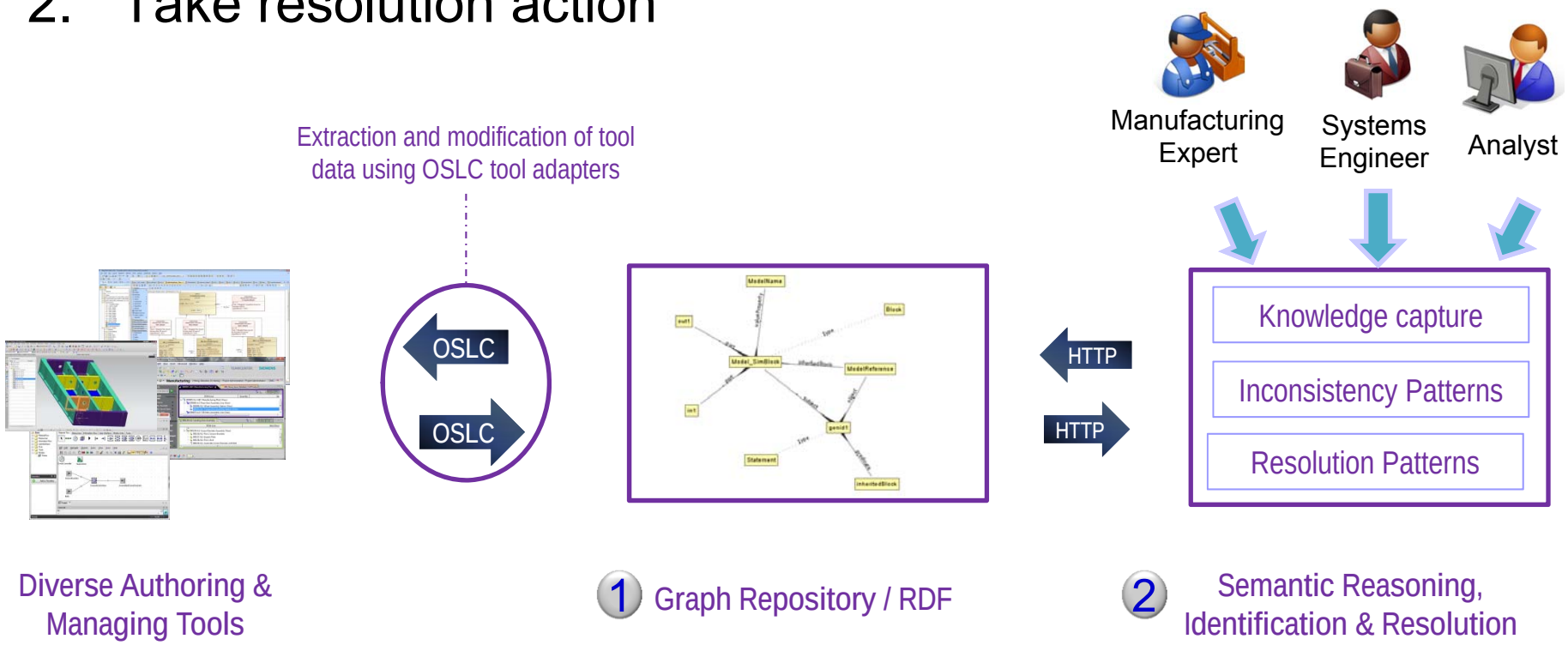
Example of Redundant Specification



Without “equivalentTo” relation, inconsistency cannot be detected…

Approach

1. Populate the graph data base
2. Reason over data (pattern matching)
   1. Identify possible inconsistencies
   2. Take resolution action

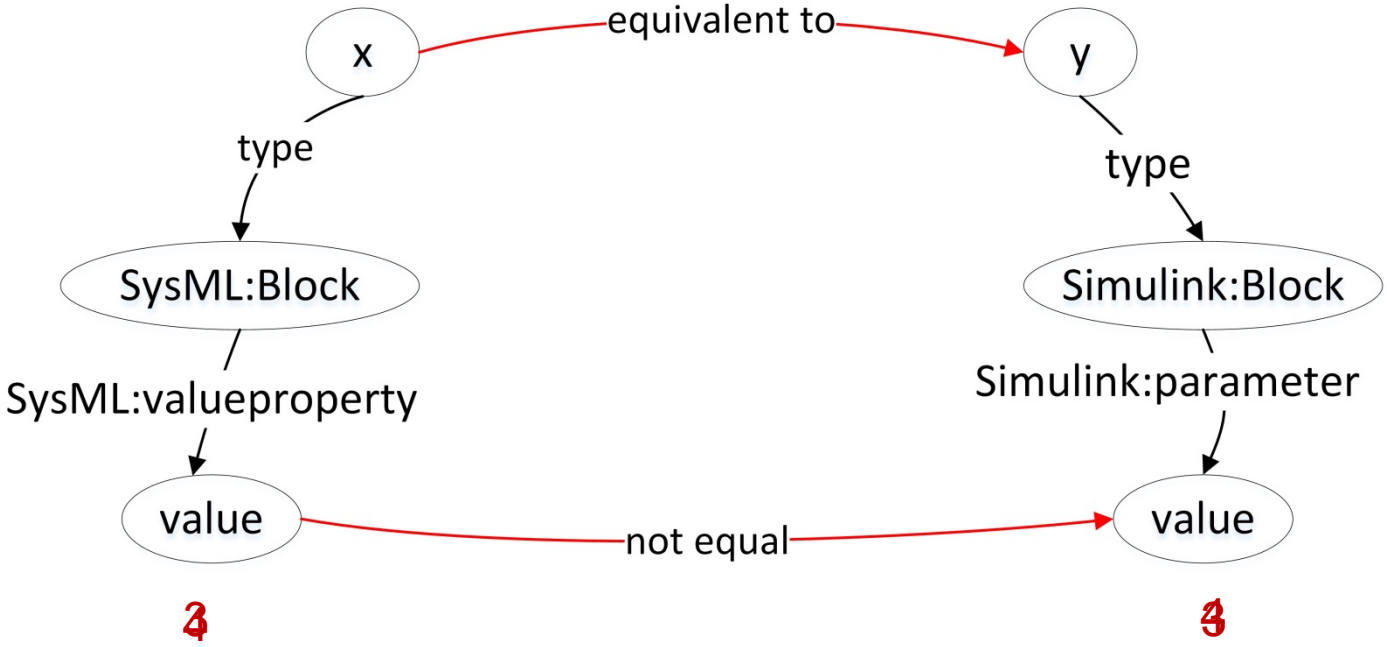


Experiences

- Using patterns to manage inconsistencies can be highly accurate, but requires a lot of maintenance
  - Context can be defined very precisely, but this can lead to very complex patterns
  - Set of patterns required in realistic scenarios potentially very large

Experiences

- Resolving inconsistencies require log of changes made
- Not always valuable to resolve inconsistencies



Key Take-Aways

1. Inconsistency Management = Continuous V&V
2. Inconsistencies can be represented by graph patterns
3. The identification of some inconsistencies requires additional knowledge that must be captured or inferred
4. Inconsistency resolution is a risk management problem
5. OSLC can serve as a basis for implementation of a prototypical infrastructure

Extra SLIDES

Linked Data Infrastructure