

Ontology for Software Production

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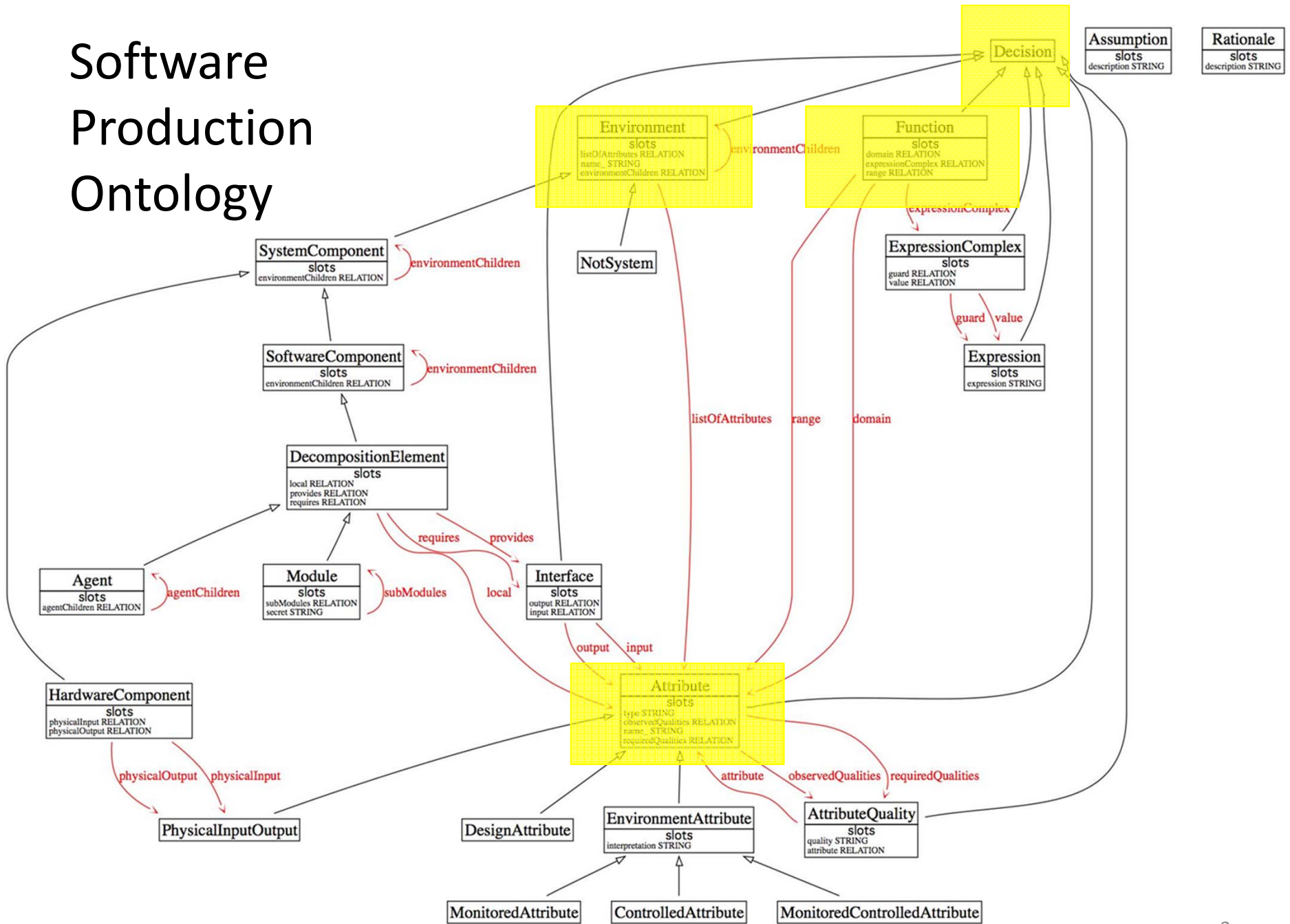
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*With contributions from David Weiss, Robyn Lutz, and others

Software Production

- Software creation + sustainment (evolution) + assurance
 - Years of development
 - Decades of operation
- Decision making process
 - What are those decisions?
 - How are decisions recorded?
 - How are decisions organized?
- Capture decisions in ontology
- Instantiating the ontology describes design of a particular system

Software Production Ontology



Understanding Software Production

- Inadequate, anecdotal understanding
 - How to create, sustain software infrastructure in response to changing needs and technologies?
- Few examples of large-scale data collection
- Little standardization of data
- Widely-varying industrial settings
 - Avionics, Automotive, Medical, Energy, Defense, Telecommunications, Entertainment
- Evidence is often anecdotal or based on small-scale trials

Software Production Data

- Decisions considered, rejected, made, changed
 - Rationale
- Formal software artifacts
 - Source and executable code; specifications; machine-readable models
- Structured informal artifacts
 - Pseudo-code, requirements, graphical models, test plans, email addressing info, subject
- Unstructured artifacts
 - Email body, notes, code comments, etc.

Software Production

- Information process
 - Sequence of representations (Denning)
- Software production representation
 - Union of existing artifacts at point in time
- Sequence of representations
 - Demarcated by creation of artifacts and changes to them over time
- State space of software production

Software Production Information Process

- Open source software (OSS) Mozilla Core as of 20 May 2011
 - 1379 developers over 13 years
 - 10.8M lines of codes and comments
 - 205,799 changes committed to version control system
- State space of Mozilla Core software production
 - 205,799 representations X average of ~5M lines
- Note:
 - Artifacts other than code not considered
 - Not a very large project
 - One OSS project vs. Commercial vs. contractor-developed government project vs.

Questions?