Ontology for Software Production

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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?