# Explosion Of Facets

- We are at a point of exponential systems complexity which can only be resolved by cutting the Gordian knot
  - Embedded / Mobile / Pervasive / Global
  - Long-lived multi-versioning
  - Collaborative
  - Consumer specialization
  - …

# National Center for Software Archeology

- What:
    - A publicly available (Web-based) repository of classic software
- Effort:
    - Collection/preservation of classic software
    - Reverse-engineering/collection of essential design artifacts
- Value:
    - Forces consideration of software artifact representation
    - Prior art research for patenting
    - Offers base of material for further research
    - Mining this base for reference architectures
- In effect, the software genome project

# Multi-faceted Software

- What:
  - Software is not flat, but rather is a manifestation of multiple intents from disparate sets of stakeholders
  - Most advances in software involve
    - Understanding a facet better
    - Learning how to make an "effective" representation of a facet (e.g. higher-level programming languages, OOP, patterns, DSL…)
  - Systems emerge from coexisting, interacting effective[1] views

  ---
  [1] changing view has operational effect

# Multi-faceted Software

- However, most of the world does not view software in this manner
- There already exist examples of efforts in this space:
  - Design patterns
  - Collaborative development environments (which should be instrumented)
  - Aspect-oriented programming
  - Domain-specific languages

# Multi-faceted Software

- Effort:
    - What facets are essential (e.g. performance, economic, usability, traditional specs...)
    - How is each facet represented
    - How are facets transformed/combined to form a system
    - How can we accelerate tools for DSL

# Multi-faceted Software

- Value:
    - Design choices and tradeoffs are made explicit
        - Retains the value of the development process
        - Leads us to consider system engineering issues
    - Amplifies the abilities of individual stakeholders, permitting them to proceed relatively independent of other stakeholders, yet providing a (real and virtual) meeting place for these different facets to be reconciled

# Collaborative Development Environments

- What:
  - A virtual meeting place that uses the Web as a platform for software development
- Effort:
  - An understanding of the sociology of software development
  - The instrumentation of the software process
  - Creation of a platform to support the National Center and multi-faceted software

# Potential Research Agenda

- Facet intermediate form
  - Generic toolkit for DSL
  - Weavers
- Correspondence calculus
- Demonstration projects
- Domain recovery
- Software preservation
- Software development ethnography