SIM-TBASSCO – Semantic Interoperability Measures: Using multi-level architecture views to overcome faults/bottlenecks

- Software architecture views enable dynamic, rapid response to faults by
  - providing visibility into software systems
  - identifying control points to adjust their behavior
- Multi-level views offer a greater range of adjustments than any single level
  - A system architecture view enables dynamic adjustment of servers:
    - create additional server to accommodate increased demand
    - migrate server from overloaded host to new host
  - A dataflow architecture view enables reformulation of an application:
    - substitute alternative type of service for non-functioning or unavailable service
- GeoWorlds applications provide testbed for monitoring/repairing faults
  - GeoTopics “Hot News” Portal application executes as 120 individual components
  - Multiple DASADA contractors using GeoWorlds-based testbed

**Dataflow Architecture View**
- Load dataflow architecture; extend it at run-time
- Update dataflow architecture to replace malfunctioning service at run-time

**System Architectural View**
- Detect overloaded server; re-host the server
- Update system architecture automatically to reflect re-hosted server

- Real World: Service Failure Due to Host Crash
- Model Adaptation: Run-time Service Substitution (92% speedup; 2 hrs to 10 min)
- Model Transformation: Migrate Servers from the Overloaded Host (99% speedup of architectural revision; hours to seconds)