**Project Goals**

The SIM-TBASSCO project at USC ISI is developing a metadata framework for describing software components that supports the dynamic assembly of software systems. The framework supports semantic-level gauges that help application developers to select and combine interoperable software components. This facilitates rapid composition of semantically validated software architectures as components are assembled into special-purpose applications. A *semantically-based scripting tool* helps users design a data-flow style architecture at multiple abstraction levels, and helps users to incrementally modify, instantiate and test the architecture by allocating correct resources. The *interoperability* and *compatibility gauges* assist users in identifying semantically interoperable and compatible software components. The *component insertion gauge* can help system engineers measure the semantic interoperability and compatibility levels of a new software component prior to integrating it into the system.

As a testbed application for this work, we have adopted GeoWorlds, a component-based Web and geographic information management system. GeoWorlds is in use at US Pacific Command (USPACOM), where it is used by analysts at the Virtual Information Center, as well as by USPACOM’s Crisis Operations Planning Team. End users and application developers create special-purpose analysis services by drawing on components in the GeoWorlds system.
Testbed Application: GeoWorlds

- Combines Geographic Information Systems and Web processing services
- Ops and intelligence uses, e.g.,
  - Mapping terrorist bombings
  - Locating recurring natural disasters
  - Investigating drug trafficking and piracy in various locales
- Architected from the beginning as a component-based framework

IntelliGauge TIE: DASADA Applied to Internet Information Systems

Using Gauges Throughout the Software Lifecycle to Improve Internet Information Systems

- Composition of specialized analysis app’s
- Aided by compatibility, interoperability gauges
- Integration of new components
- Interoperability levels gauged; Component library indexed via functional & I/O semantics
- BBN: Abstract Query Engine
- Veridian: Terrain Reasoner
- Runtime service quality monitoring
- Component data flow models enable runtime monitoring gauges
- Columbia/WPI: gauges verify during runtime that services are conforming to requirements

GeoWorlds Extensions Aided by SIM-TBASSCO:
- Architecture: runtime performance tuning
  - BBN: performance gauges
  - Object Services: application profiling and topology gauges on component usage
  - Runtime swapping of components based on performance monitoring
  - Columbia/WPI: quality gauges, e.g., size of search result

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