

Live, Virtual, Constructive Architecture Roadmap Implementation (LVCAR-I) - Improved Interconnectivity Using Gateways/Bridges

NDIA SE M&S and DTE Committee Meeting
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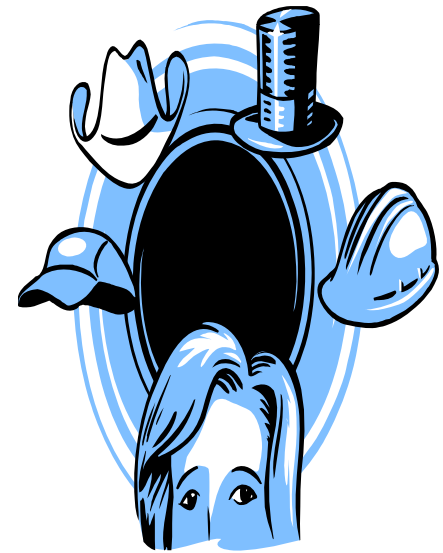
LVCAR-I Drivers



Growing Demand for
LVC Interoperability

Redundancy of
Tools, Gateways &
Repositories

Numerous, Parallel
Architectures
(HLA, DIS, CTIA, TENA)



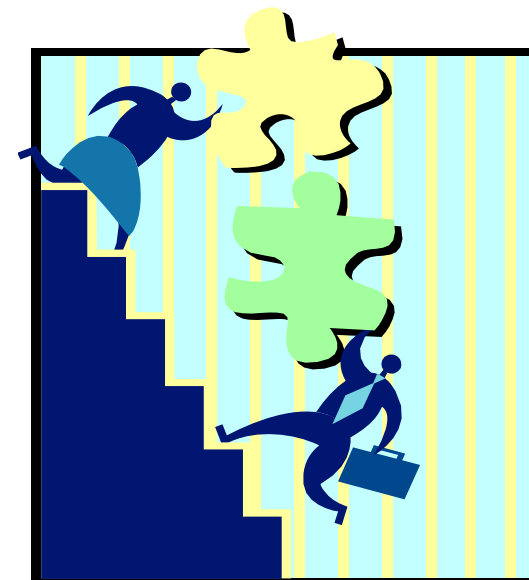
LVCAR Study Framework



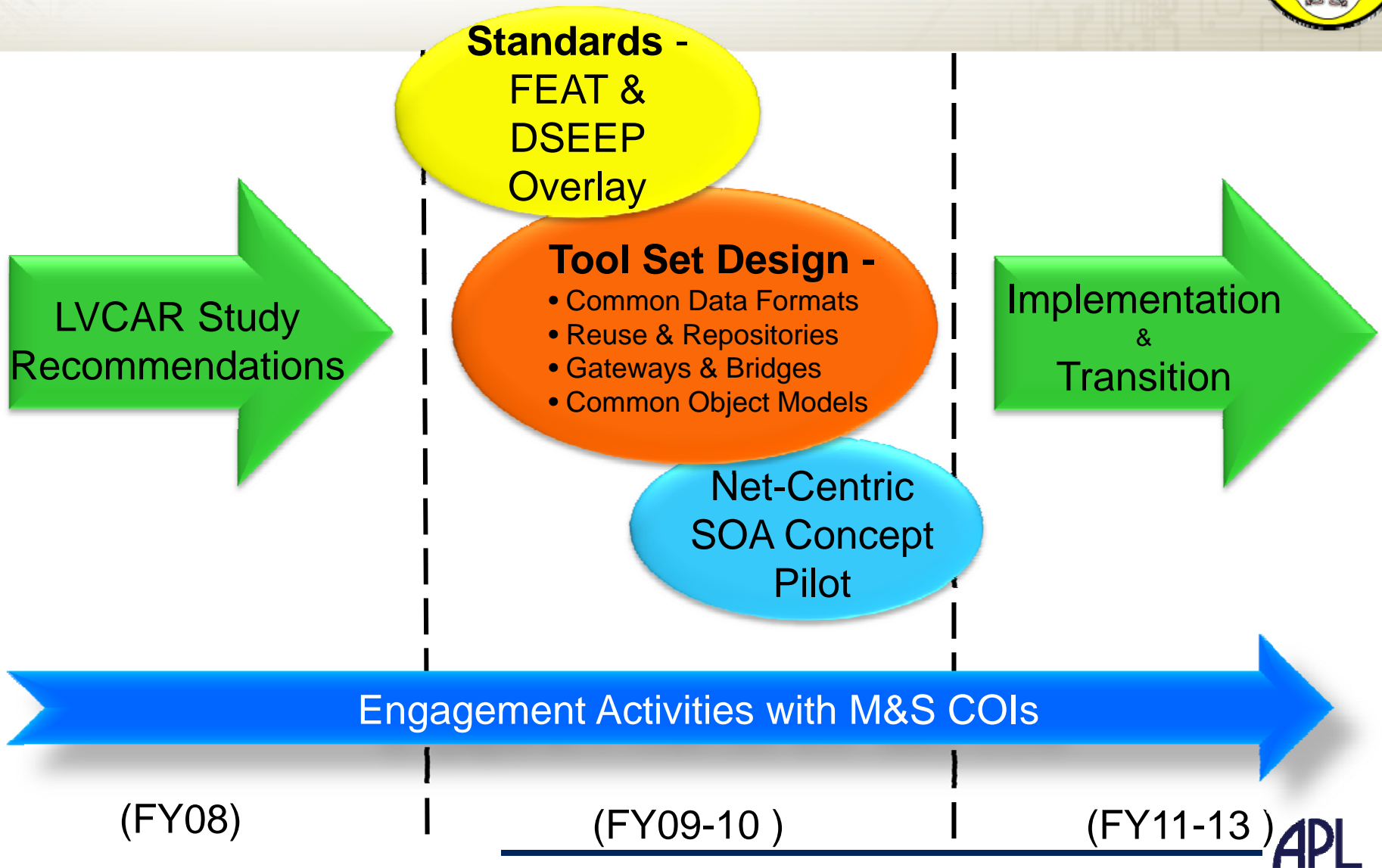
- **Purpose:**
“Develop a future vision and supporting strategy for achieving significant interoperability improvements in LVC simulation environments.”

- **Focus:**
 - Technical Architecture
 - Business Models
 - Standards Evolution
 - Management Process

- **Precepts:**
 - Do no harm
 - Interoperability is not free
 - Start with small steps
 - Provide central management



LVCAR Progression



Gateway Challenges



- Gateways provide the most widely used means of addressing interoperability concerns in multi-architecture LVC environments
- Despite the many documented success stories associated with the use of gateways to facilitate LVC interoperability, there are also some significant issues that impact technical, schedule, and cost risk
- Examples of known gateway issues include:
 - No central “marketplace” of gateways
 - Few mechanisms for user to determine what reuse opportunities are available
 - No mechanisms for direct comparisons of gateways
 - Integrators committing to building their own
 - Gateways built for specific needs
 - Increased intellectual expenditure on ad hoc solutions
 - Not built for reuse/not built for extensibility
 - Extensive duplication of existing gateway capabilities
 - Broad proliferation of gateways
 - Redundant maintenance costs

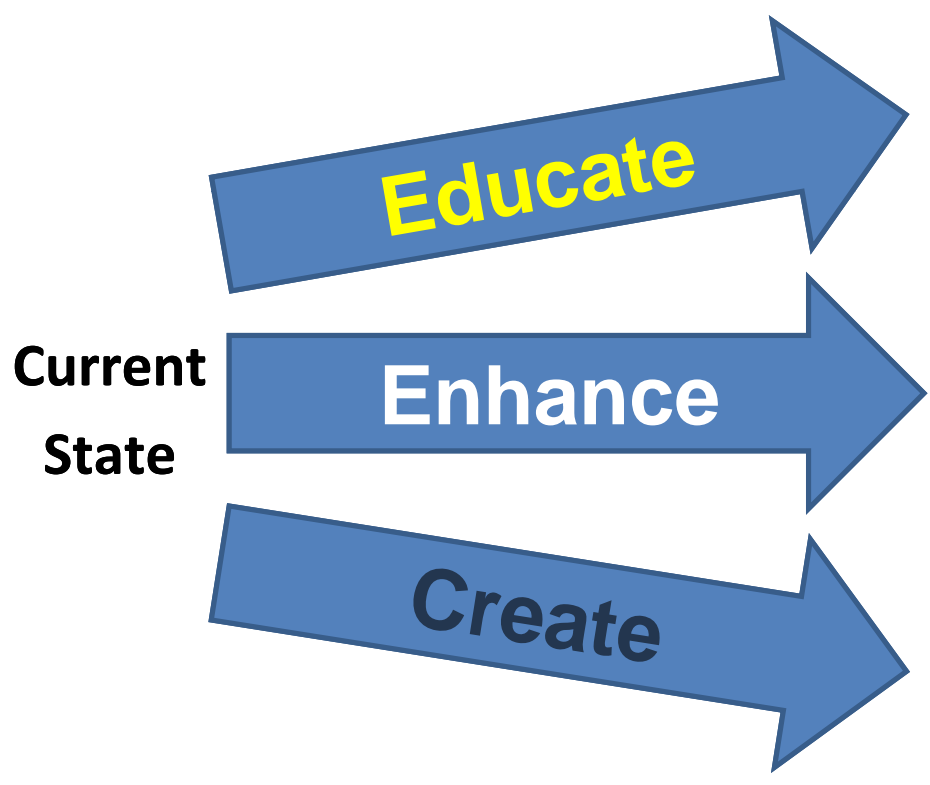
LVCAR-I Gateways Effort – Initial Activities



- **The Gateways component to the LVCAR Implementation (LVCAR-I) project initially focused on two products:**
- **Gateways Characterization Report (May 2010)**
 - **Designed to identify areas where gateway capabilities are not well aligned with user needs**
 - **Identified capabilities offered by a wide range of different existing gateways, based on on-line questionnaires and site visits to numerous user sites**
 - **Mapped user requirements to these capabilities to identify gaps**
- **Gateways Execution Plan (June 2010)**
 - **Identification of viable strategies to address gateway issues and capability gaps**



Strategy Dimensions



- Tutorials
- Classes
- Help Desk

- Machine-readable gateway languages
- Architecture-neutral SDEM representation
- Performance Benchmarks

- Fund existing & enhance
- Fund new
- New business models

Looking for the “sweet spot” that addresses the issues in a timely fashion, for reasonable cost, enacts positive change that is long-lasting, and has a credible business model

LVCAR-I Gateways Effort: Completed Product Development Activities



- Develop a *Gateway Configuration Model* that identifies an explicit set of gateway requirements, and discusses how the emerging gateway products and processes will address those requirements
- Develop a *Gateways Capability Description* document, which formally delineates the various capabilities that individual gateways can offer to user programs, along with specific levels of implementation for each unique capability
- Assess the *Architecture-Neutral Data Exchange Model (ANDEM)*, originally developed by the Joint Composable Object Model (JCOM) Program, to support Simulation Data Exchange Model (SDEM) mapping and/or translation in gateways
- Develop a set of *Gateway Performance Benchmarks (GPBs)* to identify specific gateway performance measures, along with use cases that describe how and where these measures should be applied

LVCAR-I Gateways Effort: In-Progress Product Development Activities



- **Develop a common *Gateway Description Language* (GDL), in a machine-readable format/syntax, for describing both user gateway requirements and the capabilities that individual gateways can offer**
 - Supports user discovery of needed gateway capabilities
- **Develop a common *SDEM Mapping Language* (SML) to formalize format and syntax of mappings between different SDEMs**
 - Reduces number of required mappings, and supports reuse of mapping data
- **Develop repository for GDL-based gateway descriptions. Incorporate applicable search and requirements-to-capabilities matching algorithms**
- **Develop tools for GDL and SML file creation/editing**
- **Develop SML Translators for selected gateways**
 - JBUS, GWB are initial targets
- **Socialize draft GPBs with gateway developer organizations. Incorporate feedback and prepare formal specification**
- **Develop Gateways tutorial**

LVCAR-I Gateways Effort: FY12 and Beyond



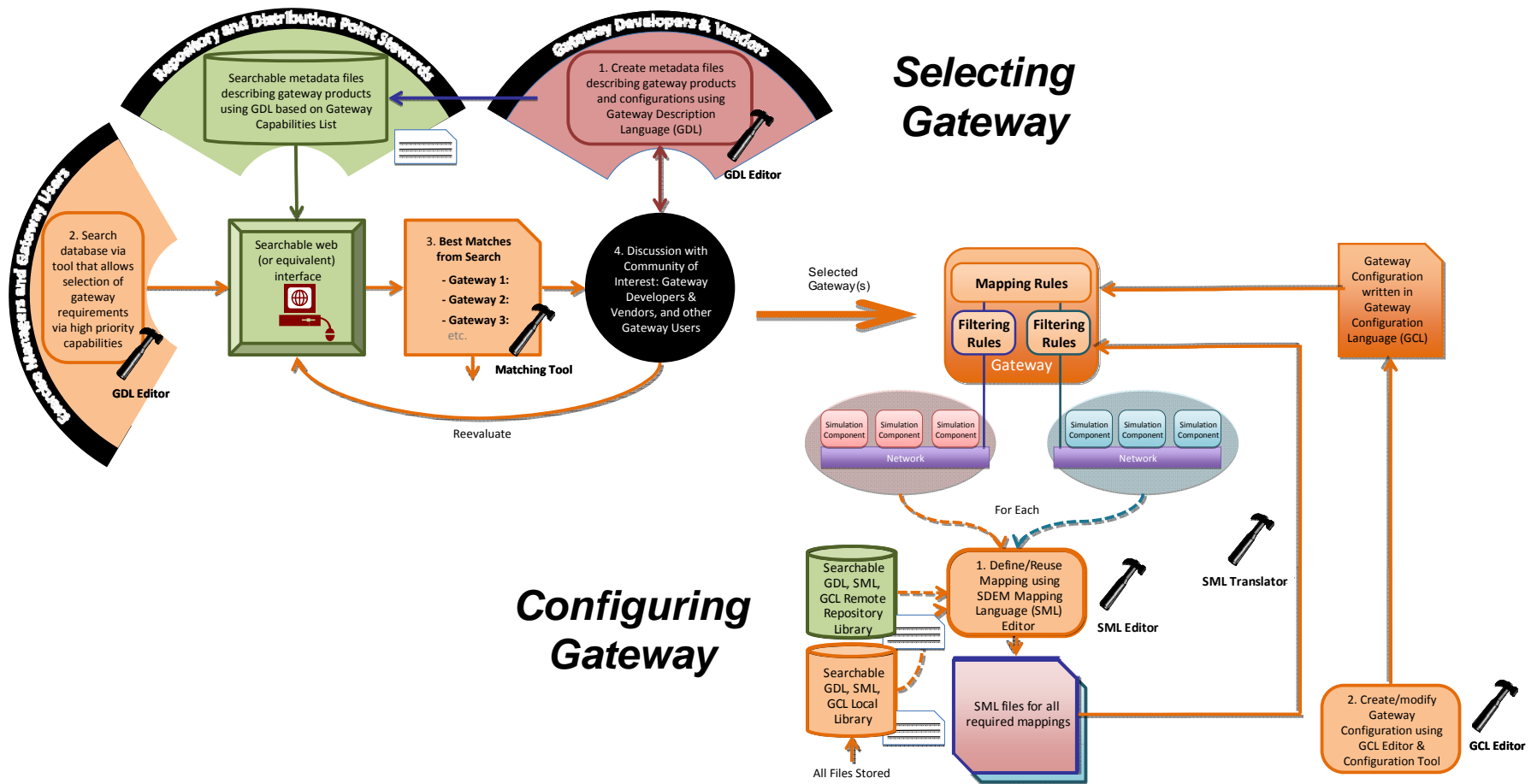
FY12:

- **Develop a Gateway Configuration Language (GCL) which standardizes the format and structure of gateway configuration files**
 - Supports reuse of gateway configuration files
- **Continue development of supporting automated tools**
- **Capability demonstrations with “early adopter” gateway organizations**

Potential:

- **Gateway Testing Laboratory (GTL)**
- **Gateway language standardization**

Gateways Process View



Questions and Feedback

