

High Level Architecture

Module 1

Basic Concepts



The Society for
Computer
Simulation



Roy Crosbie
John Zenor

McLeod Institute of Simulation Sciences
California State University, Chico

California State University, Chico

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Lesson 1

Introduction to HLA



HLA Components

- Federation Rules
 - Ensure proper interaction of simulations in a federation.
 - Describe the simulation and federate responsibilities.
- Interface Specification
 - Defines Run-Time Infrastructure (RTI) services.
 - Identifies “callback” functions each federate must provide.
- Object Model Template (OMT)
 - Provides a common method for recording information.
 - Establishes the format of key models:
 - Federation Object Model (FOM)
 - Simulation Object Model (SOM)
 - Management Object Model (MOM)



Federation Rules

1. Federations shall have a FOM, documented in accordance with the OMT.
2. All representation of objects in the FOM shall be in the federates, not in the RTI.
3. During a federation execution, all exchange of FOM data among federates shall occur via the RTI.
4. During a federation execution, federates shall interact with the RTI in accordance with the HLA interface specification.
5. During a federation execution, an attribute of an instance of an object shall be owned by only one federate at any given time.



Federate Rules

6. Federates shall have a SOM, documented in accordance with the OMT.
7. Federates shall be able to update and/or reflect any attributes of objects in their SOM, and send and/or receive SOM interactions externally, as specified in their SOM.
8. Federates shall be able to transfer and/or accept ownership of attributes dynamically during a federation execution, as specified in their SOM.
9. Federates shall be able to vary the conditions under which they provide updates of attributes of objects, as specified in their SOM.
10. Federates shall be able to manage local time in a way which will allow them to coordinate data exchange with other members of a federation.



Run Time Infrastructure (RTI) Overview

- What is the RTI?
 - Software that provides common services to simulation systems.
 - Implementation of the HLA Interface Specification.
 - An architectural foundation encouraging portability and interoperability.



RTI Services

- Separate simulation and communication.
- Improves on older standards (e.g., DIS, ALSP).
- Facilitates construction and destruction of federations
- Supports object declaration and management between federates.
- Assists with federation time management.
- Provides efficient communications to logical groups of federates.



Interface Specification Management Areas

- Federation Management
- Declaration Management
- Object Management
- Ownership Management
- Data Distribution Management
- Time Management



Object Model Template

- Object Model Template (OMT)
 - Provides a common framework for HLA object model documentation.
 - Fosters interoperability and reuse of simulations and their components.
- Required Information
 - Object Class Structure Table
 - Object Interaction Table
 - Attribute/Parameter Table
 - FOM/SOM Lexicon
- Optional Information (OMT Extensions)
 - Component Structure Table
 - Associations Table
 - Object Model Metadata



Object Models

- Federation Object Model (FOM)
 - One per federation.
 - Introduces all shared information (e.g., objects, interactions).
 - Contemplates inter-federate issues (e.g., data encoding schemes).
- Simulation Object Model (SOM)
 - One per federate.
 - Describes salient characteristics of a federate.
 - Presents objects and interactions that can be used externally.
 - Focuses on the federate's internal operation.
- Management Object Model (MOM)
 - Universal definition.
 - Identifies objects and interactions used to manage a federation.

