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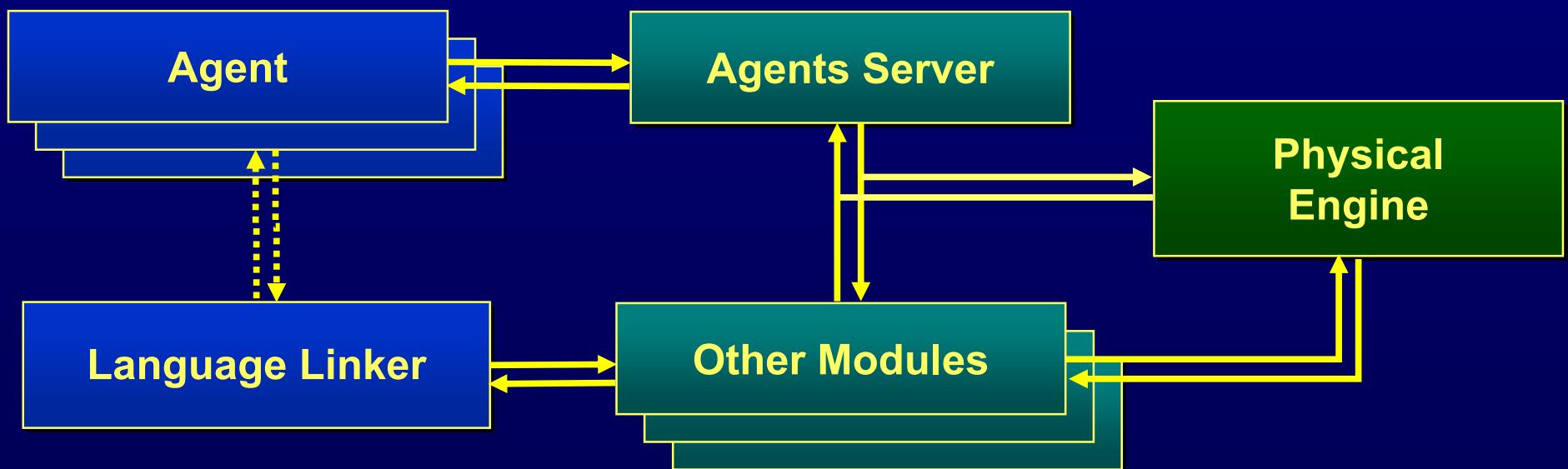
THE SOFTWARE FRAMEWORK FOR MULTI-AGENT SYSTEMS RESEARCH

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MULTI-AGENT SYSTEMS

AGENTS' PROPERTIES

- Agents don't concern any information about external modules
- Agents initialize interactions with each other via Agents Server (and may continue the interaction directly for optimization)
- Agents may use any module which has exported its interface to Language Linker
- Agents are composed from orthogonal projections to a subset of system modules at current system state



SYSTEM ARCHITECTURE

ARCHITECTURE CONCEPTS

STRUCTURAL

Modularity
Open Design
Multi-Layer
Distributed
OS-in-OS

FUNCTIONAL

Flexibility
Reliability
Scalability
Portability
Scriptability

Property Panels

Visualization Engine

3DS Max Models Import Module

Sound Engine

Data Access Gate

Agents Server

Physical Engine

Debuggers

Language Linker
(Inter-language Gate)

Compilers

Interpreters

Data Abstractor and Compiler Abstraction Layer (CAL)
Type-safe Storage Master API
(data abstraction and data type support)

Storage Master
Multi-type array object storage,
RAM and resources allocation

Components Loader

Components loading,
basic modules interaction,
system integrity support

Execution Manager

Threads and process
control and interaction,
event-driven process
management

Event Manager

System state control,
structural synchronous
dump, exception manager

Network Distributor

Remote calls (RPC),
data synchronization
and access management

System Console

System and configuration
commands interpretation,
direct user system control

Software Abstraction Layer (SAL)

Hardware Abstraction Layer (HAL),
including processor-specific optimizations

K E R N E L

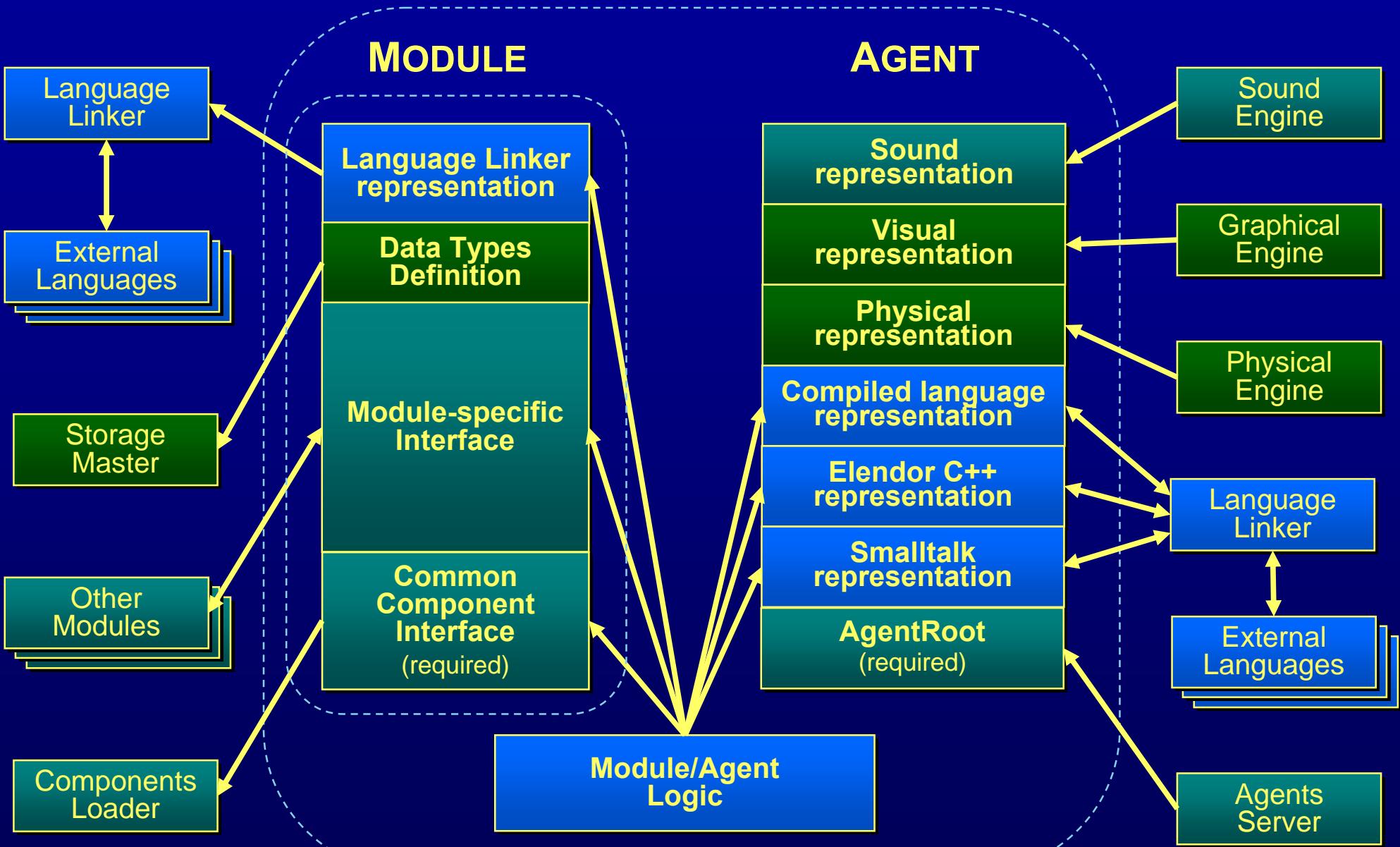
The Developers

Xroft
Andrew Tatarinov

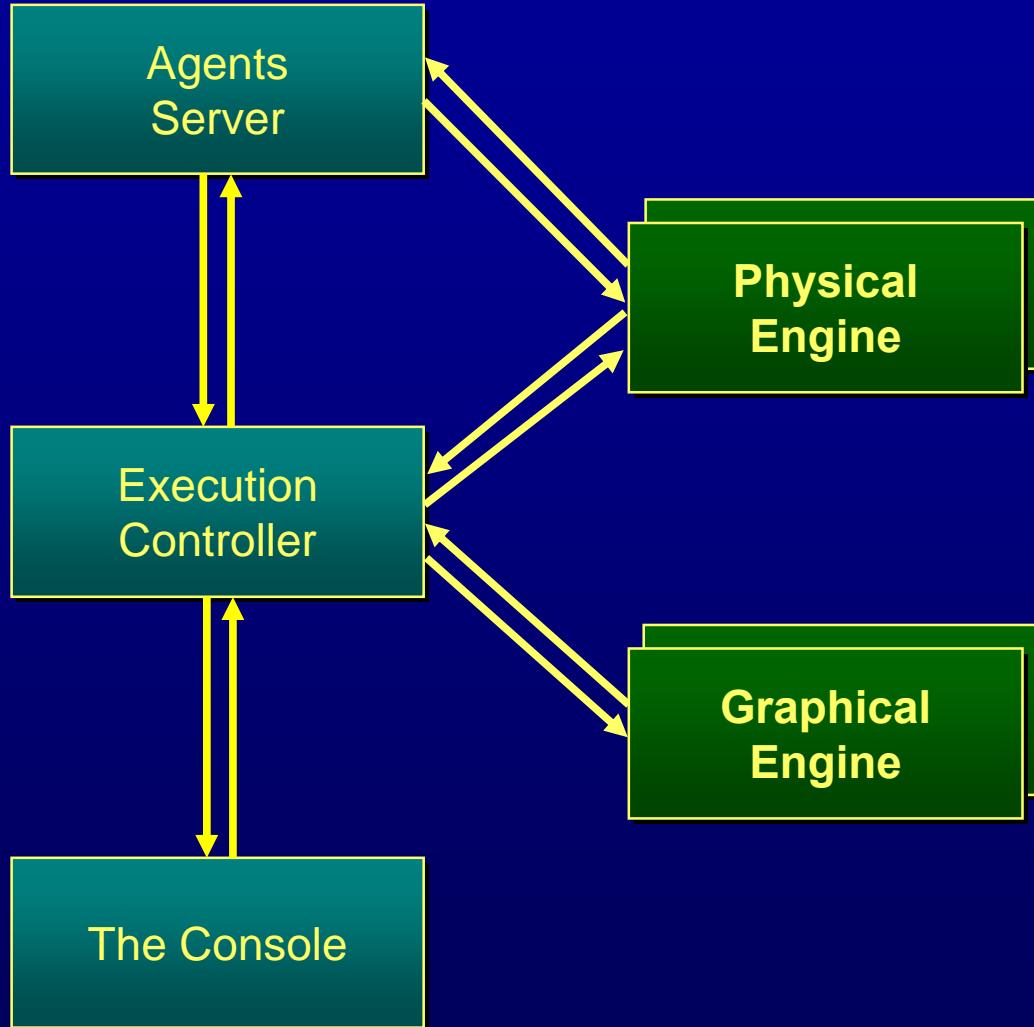
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Vasily Fedoseev

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MODULE AND AGENT STRUCTURE



PHYSICAL AND GRAPHICAL ENGINES



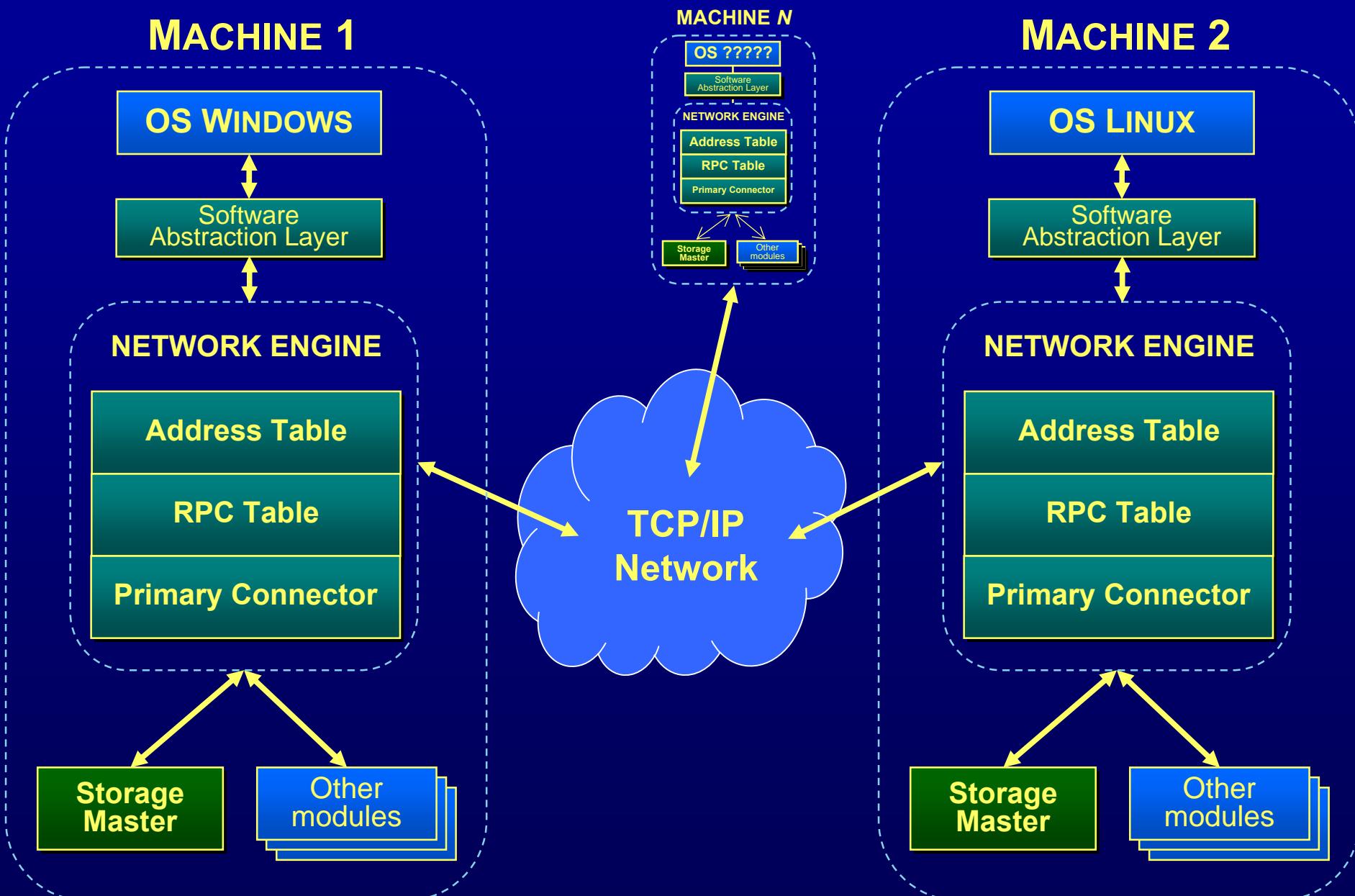
PHYSICAL ENGINE

- Moves agents in virtual space using real-physics laws
- Detects and processes collisions between agents and other objects and the landscape

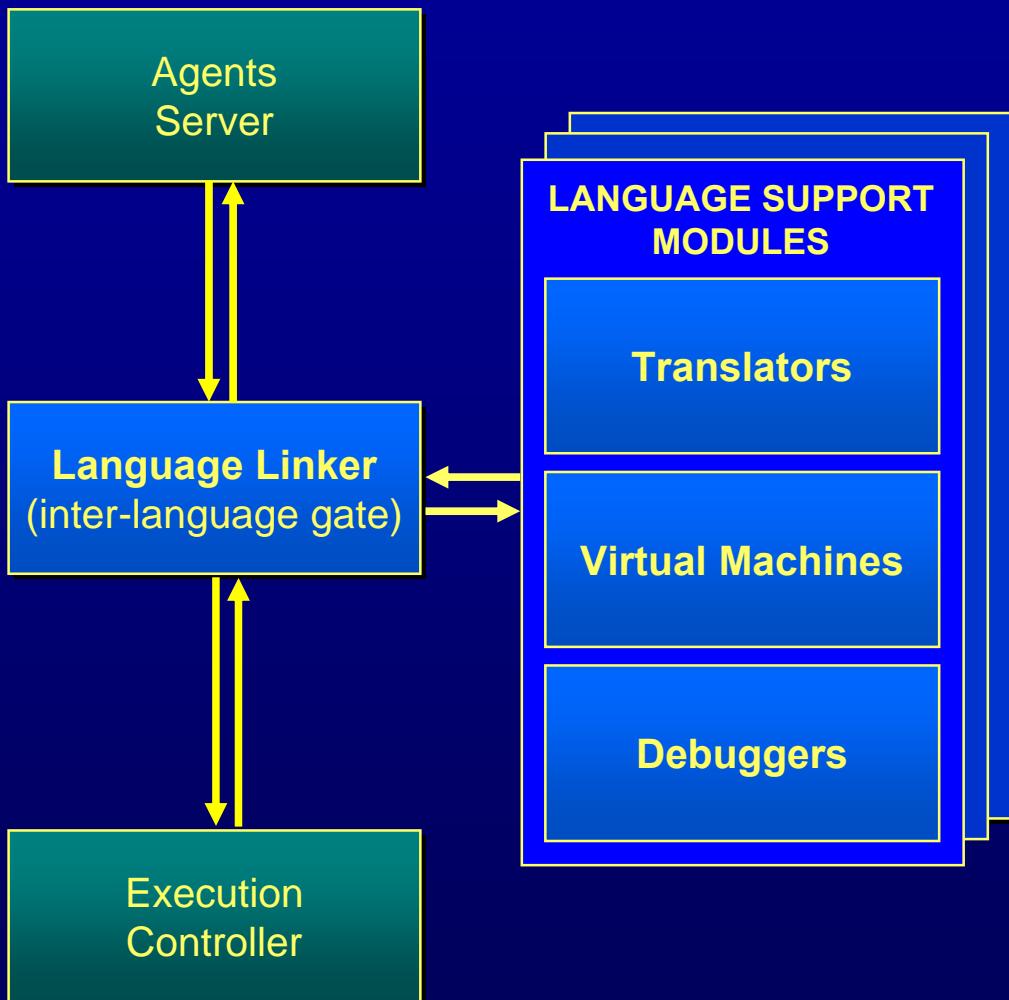
GRAPHICAL ENGINE

- Visualizes agents in a virtual world
- Allows to move around a virtual world and to watch agents' behavior

NETWORK SUPPORT

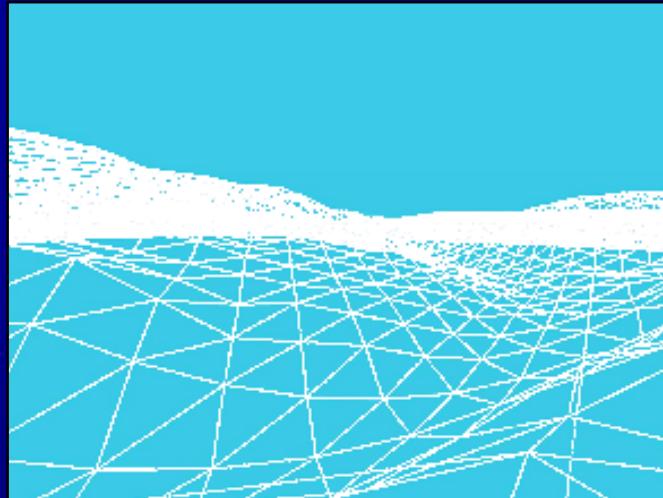


LANGUAGE SUBSYSTEM

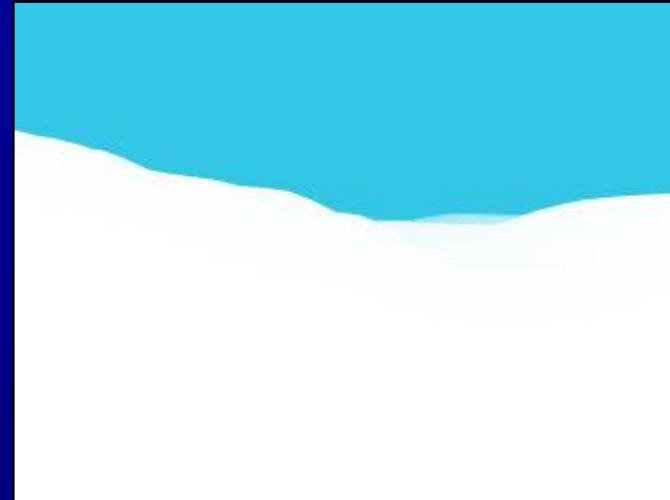


- Language subsystem translates the sources to byte-code and allows to execute and debug this code on virtual machines provided by language support modules
- The subsystem is designed to work with any set of programming languages
- Language linker is responsible for interaction of portions of code written in different languages and executed on different virtual machines
- It is possible to use few languages to develop one agent or module
- Currently, the modules for Smalltalk, Elendor-C++ (a subset of C++) and Console scripting language (ECSL) is provided

VIRTUAL WORLD VISUALIZATION



Wireframe mode



Solid faces mode

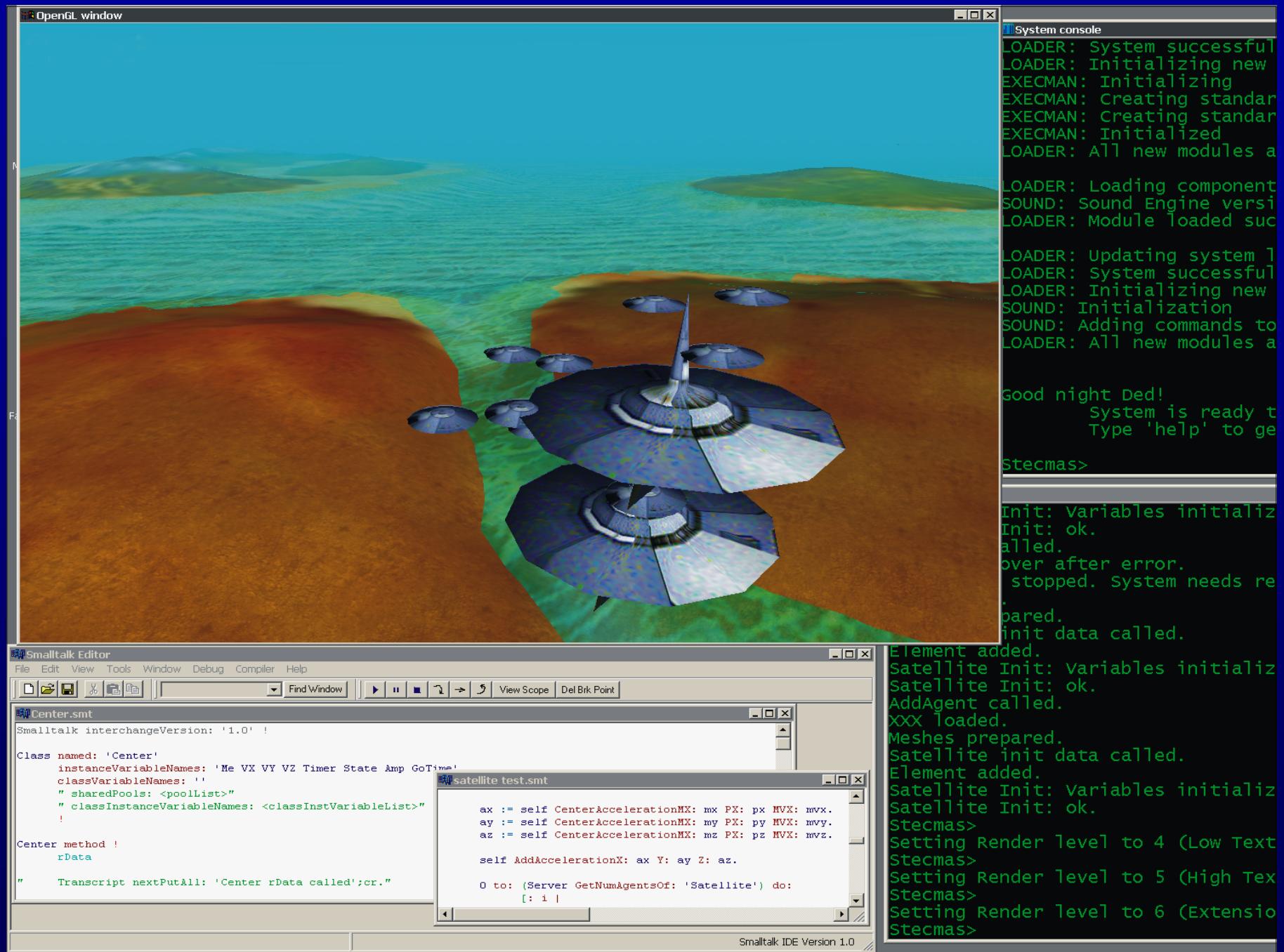


Simple lightening mode



Multi-textured mode

SYSTEM AT WORK



SYSTEM AT WORK

