Urbi & Orbi

A language oriented approach of Distributed Virtual Environment

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I – Our framework

- Goals:
  - Architecture 3 1/3
  - Reactivity
  - Robustness

- Models:
  - Group communication
  - Asynchronous
  - Code migration
I – Our framework

- A virtual synchrony kernel or « a global synchrony for asynchronous local messages ».
- A concurrent renderer
- A scripting language

Urbi & Orbi is a « kernel » composed of three threaded modules in charge of the network, the display and the execution of the language.
II - The main stream

VRML
- Renderer
- Scene graph

+ human readable
  + declarative
  - static 3D data only

VRML97
- Events
- EAI

+ first step toward:
  • a semantic
  • dynamic behavior
  - not expressive enough

JAVA
II - The main stream

JAVA
- API Java
- Distributed by hand

ORB
- advanced design of distributed applications
- inter-operability

+ expressive
- heterogenous
- poor performances

NOW?

+ fully featured distributed application
- yet another layer
- not well suited for many-cast

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II - The main stream

A three layers architecture has some major drawbacks:

- Too heterogenous.
- Unfit for many-cast, realtime use.
- Suffering serious performance penalty.
III – GOAL: A scripting language

- Uniform environment
- High level API
- Simple language
- Code migration
III – GOAL: A scripting language

To make uniform

- Code - behavior
- 3D - data
- Encapsulation

Object Oriented
III – GOAL: A scripting language

Extended interactivity

- Animation
- 3D widget

Event Driven (daemon)

VRML97

More?
III – GOAL: A scripting language

Network & performances

- Language level
- Virtual syncrony
- Asynchrony

ORB

More ?

Concurrent language

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III – GOAL: A scripting language

GOAL - Group and Object Asynchronous Language.

Object Oriented

Event Driven by daemon

Concurrent language

A concurrent frame language with message passing
IV – Architecture

- Net
- Display
- « kernel »
IV – Architecture

Net -> VSync

GVM <-> Proc

Display -> openGL

Closure

« kernel »
IV – Architecture

Net

VSync

Display

openGL

Closure

Goal – bytecode

GVM

Proc

« kernel »
IV – Architecture

Closure

Goal – bytecode

Goal - converted

« kernel »
V – Further work...

- How to handle:
  - Security issue
  - Authentication issue

Urbi & Orbi is a pliant framework to test different virtual reality system structures.