ProActive
Programming, Composing, Deploying on the Grid

ProActive.ObjectWeb.org

ProActive is an Open Source Java library (LGPL) for *parallel, distributed,* and *concurrent co*mputing, also featuring *mobility* and *security* in a uniform framework. With a reduced set of simple primitives, **ProActive** provides a comprehensive API that simplifies the programming of applications distributed on:

- **Local Area Network (LAN)**
- **Clusters of workstations**
- **Internet Grids**
- **Peer-To-Peer Intranet**

The library is based on an Active Object pattern that is a uniform way to encapsulate:

- **a remotely accessible object,**
- **a thread as an asynchronous activity,**
- **an actor with its own script,**
- **a server of incoming requests,**
- **a mobile and potentially secure activity.**

ProActive is a 100 % Java library, and requires **no changes to the Java Virtual Machine**, no preprocessing or compiler modification; programmers write standard Java code. Based on a simple Meta-Object Protocol, the library is itself extensible, making the system open for adaptations and optimizations. **ProActive** currently uses the **RMI** Java standard library as a portable transport layer.

A **graphical interface**, IC2D, allows the remote monitoring and steering of distributed applications.

ProActive can also inter-operate with other ObjectWeb softwares (e.g. **JonAS, JOTM, OpenCCM**).

ProActive features:

API and Model:

- **Active objects**
- Asynchronous RPC
- Typed group communications
- **Migration**, Mobile Agents
- Reuse: **polymorphism** objects/remote objects
- **Future-based** synchros **(wait-by-necessity)**
- **Components**

Infrastructure:

- Compatible with **Swing** and **AWT**
- **XML** descriptors for deployment
- **Interfaced with Globus** and **Jini**
- On the fly stub generation with **ASM or BCEL**
- **Transparent, dynamic** code loading (up and down)
- **Seamless** management of RMI Registry
- **Security**

ProActive and the Standards:

- Web Service Exportation
- HTTP Transport
- SSH, RSH, RMI/SSH Tunneling
- Globus GT2 and GT3, sshGSI
- LSF, PBS, Sun grid Engine

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ProActive on 600 processors at once!
See details on the Web.
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"What a refreshing approach!
Your effort to approach the problem of granularity in an abstract and effective manner is particularly refreshing and powerful.
Please accept my sincere congratulations!"

Dr. John G. Michopoulus
Sr. Research Scientist – Naval Research Laboratory
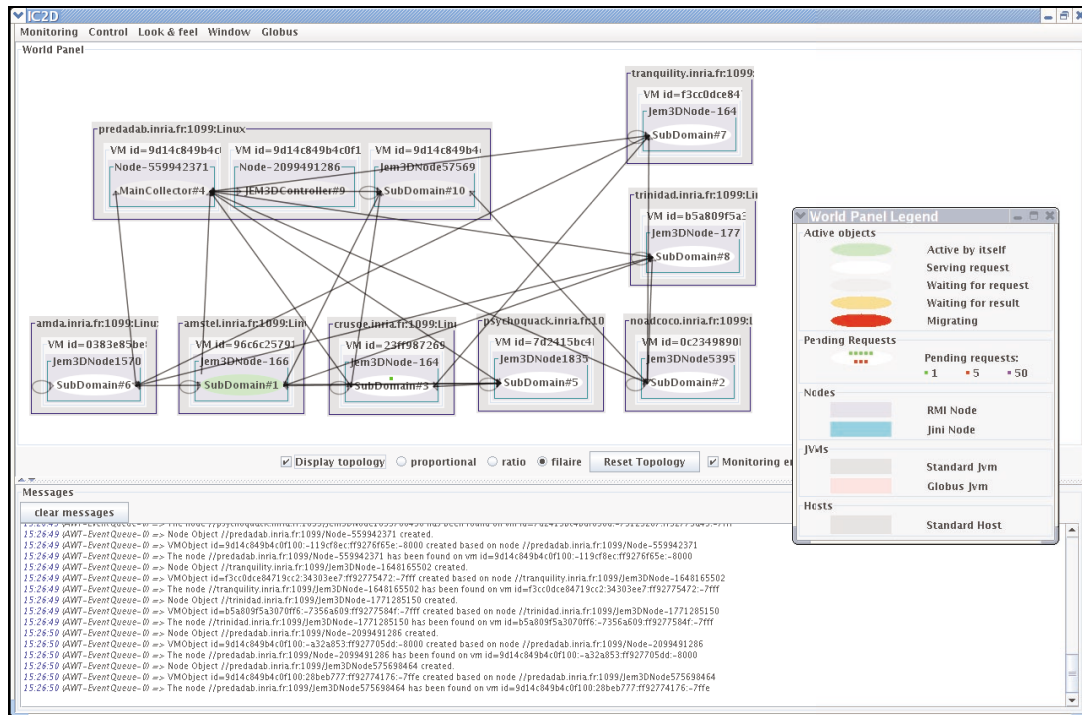*Computational Multiphysics Systems Lab.*
Washington DC

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Drag-and-Drop Tasks around the world
XML Descriptors for GRID Components

ObjectWeb
Open Source Middleware

IC2D

Interactive Control and Debugging of Distribution

IC2D is a **graphical interface** for steering **ProActive** applications.

IC2D features **graphical visualisation** of machines, JVM, and remote objects. It allows Drag-and-Drop migration of running activities from one machine to another.

IC2D is interfaced with **Jini** and **Globus:** it can also serve as a building block for **grid** and **computing portals**. **IC2D** is built on top of **RMI**.


IC2D features:

Graphical Visualisation:
- Hosts, Java Virtual Machines, Active Objects
- Topology: references and communications
- Status of active objects (executing, waiting, etc.)
- Migration of activities
- Host protocols: RMI, Ibis, Jini, Globus, HTTP
- Job managment

Textual Visualisation:
- Ordered list of messages
- Status: waiting for a request or for a data
- Causal dependencies between messages
- Related events (corresponding send and receive, etc.)

Control and Monitoring:
- Step by step execution
- Drag-and-Drop migration of executing tasks
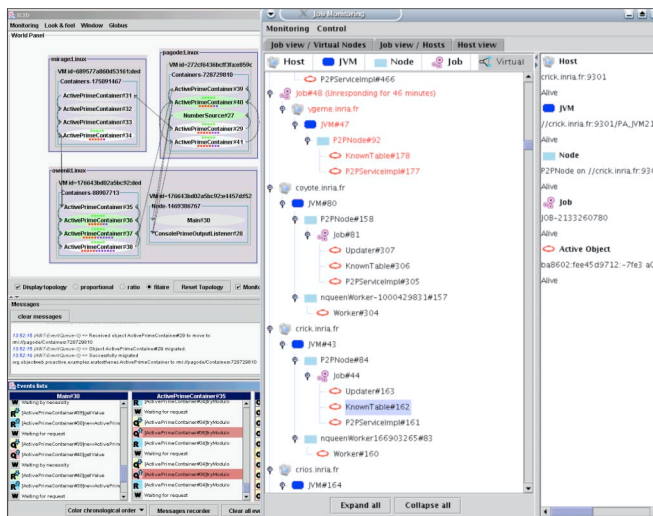
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