RoboComp

Hacia un Sistema Operativo Robótico

Robolab
Universidad de Extremadura

Middleware para robótica

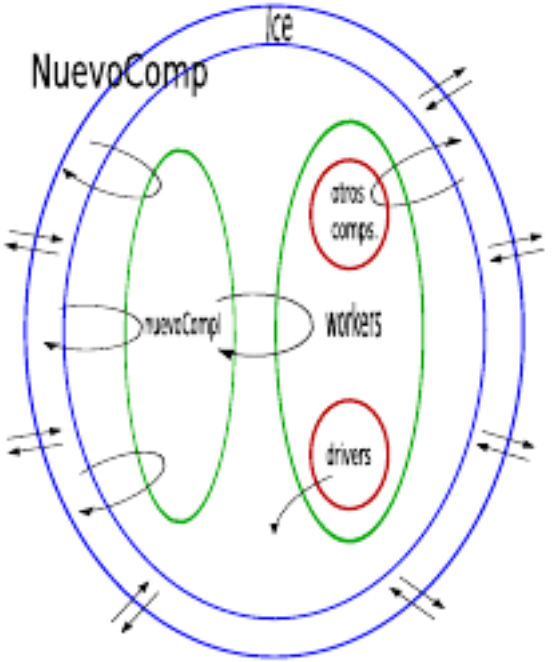
- Estructura básica para incorporar nuevo software (objetos, librerías, plugins, componentes)
- Soporte de comunicaciones para comunicar elementos entre sí (RPC, AMI, Eventos, subscripciones)
- Herramientas auxiliares de generación, mantenimiento, gestión, repositorios, documentación, ...

Ice from ZeroC

- Ice Object-Oriented Communications Framework
  - http://www.zeroc.com
  - C++, .NET, Java, Python, Ruby, PHP
  - Linux, Windows, Mac OS X, Solaris, Android
  - Framework -> Política “Hollywood”
  - RPC, distribución de eventos por publicación y subscripción, persistencia, replicación, tolerancia a fallors, migracioń de servicios, administración centralizada, ...
  - Alternativa a WCF y RMI

Componentes

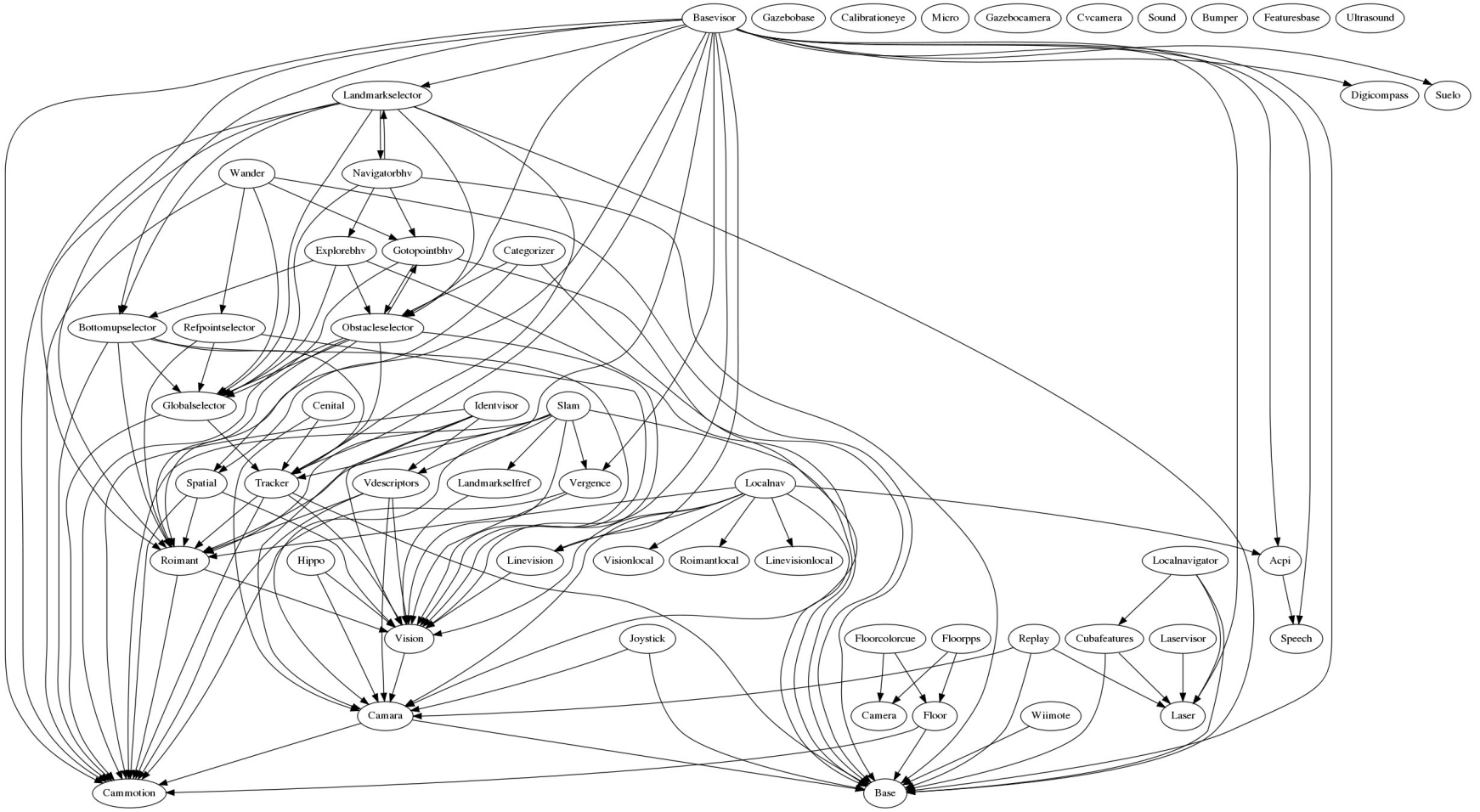
- Componentes software
  - Procesos con interfaz público/ Objetos como procesos
  - Lenguaje de definición de interfaces (IDL, Slice)
  - Concurrencia a varios niveles
  - Reusabilidad
  - Escalabilidad
  - Desarrollo en grupo



Rendimiento de Ice

- 2.2 Ghz dual-core Athlon
- Latencia
  - Loopback : 10.500 msg/sg - 95 us
  - Gigabit : 2.300 msg/sg – 435 us
- Transferencia
  - Loopback : enviar 1.2 Gbits/s. - recibir 800Mb/s
  - Gigabit : enviar 750Mb/s - recibir 650 Mb/s

Grafos de procesos – algunos ejemplos



“Hello World” in Ice

- Example of two Python programs communicating through Ice

Talking to BaseComp

ManagerComp: monitoring processes

- Tool for managing components:
  - Starting and stopping
  - Real time state monitoring
  - Configuring

MakeComp: building components

- Tools for automatic building of connected components

Monitor: connecting from everywhere

- Script-based on line connection to any running component
  - Basic variable types can be visualized graphically
  - Easily extendable with very small Python scripts

Gazebo: going virtual

- Connection to Gazebo simulator as a quick developing and testing platform using RoboComp interfaces

Replay: recording and playing

- Recording sensor and motor state of the robot during extended periods of activity
  - Video
  - Laser
  - Motors
- Replaying for algorithm developing and testing

Perspectives

- Better and New developing tools
  - Component creation and modification
  - Monitoring and interacting
  - Grouping, deploying, service management
- Funds
  - ACROSS
    - 6M€ budget, 13 partners, Spanish funding
    - 240K Unex for Robotic Middleware
- Open source
  - robocomp.sourceforge.net, www.robex-arena.es