Use-cases for TAO's Real-time ORB Endsystem Architecture

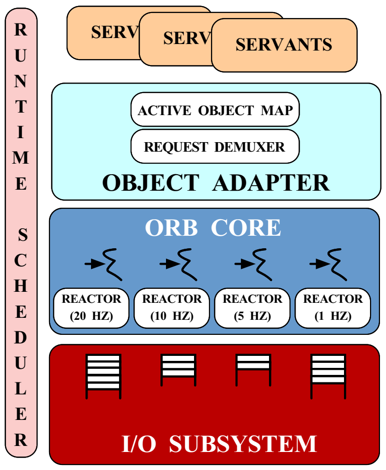
Douglas C. Schmidt and David L. Levine
schmidt@cs.wustl.edu and levine@cs.wustl.edu

Washington University, St. Louis

Design Requirements and Forces

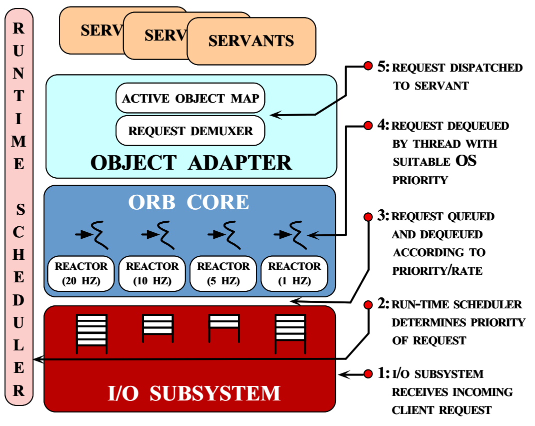
- Integrate real-time scheduling/dispatching in ORB and I/O subsystem
- Provide all applications with real-time capabilities, not just event-driven apps
- Minimize context switching and priority inversion
- Remain as CORBA-compliant as possible
- Interoperate with JSF Ada architecture

TAO's Real-time ORB Endsystem Architecture



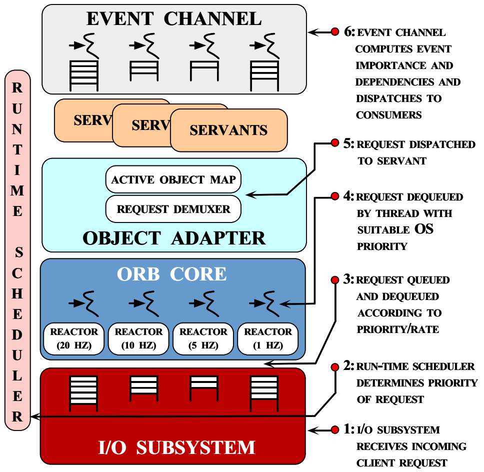
- **Design Overview**
  - Each thread has its own "ORB" instance
    - ∗ All ORB state is stored per-thread
    - ∗ Thus, no locking is necessary within an ORB/thread
  - Servants can be shared amongst rate groups
    - ∗ But they must then provide locking

Request Reception Use-case



- **Synopsis**
  - I/O subsystem uses port numbers to demux requests to queues and RT threads per rate group
  - A Reactor demuxes/dispatches requests for each rate group

Event Channel Reception Use-case



- **Synopsis**
  - Event Channel threads handle event *importance* and *dependencies*
  - I/O subsystem and ORB Core handle *priorities*