

Prioritized Mutual Exclusion support for RT - CORBA

Goals

Supporting prioritized mutual exclusion on a Real Time CORBA system by way of implementing the known protocol for prioritized mutual exclusion for distributed systems in a Real Time CORBA system that conforms to OMG RT-CORBA specification.

Work Done (During Last Month)

- The implementation of the small-scale system (Dining philosopher) is in progress. Specifically, we know how it is to be done and a simpler implementation is being built.
- The conformance of our protocol to the RT-CORBA and CORBA/IIOP specifications is checked and found OK.
- The interfaces in the RT-CORBA pertaining to our protocol are identified and understood with respect to their relative levels of operation.
- The document summarizing our understanding of the task and OMG specifications is prepared.
- The simple DSM modules are used in the implementation to facilitate message passing.
- The scope of the implementation of the small-scale system is identified (Some points are to be discussed in the meeting).
- ACE+TAO stable releases installed. There seems to be some problem with dynamically loaded shared libraries in both the stable and the beta version.
- An installation script to easily install the ACE+TAO combination on RedHat machines is created. It is a modified version of the script available with the distribution. An installation guide is created.
- Primary version of my homepage <http://www4.ncsu.edu/~nvdesai> contains important links for this project.

Future Work (Up to foreseeable future)

- The implementation can be completed step by step:
 - With Priority support (without same priorities, to avoid timestamp handling)
 - With same Priorities taken care of by timing
 - With Read/Write locks
 - With Intent locks
- As soon as we finish the small-scale implementation we have to switch to TAO. So the problems with running tests should be resolved by then.
- The interface implementations of the RT-CORBA interfaces in TAO should be identified and studied. This will require look into the ACE modules implementing basic communication wrappers. This means identifying those modules and then find the points of interaction between ACE and TAO.

- We have to map the small-scale implementation to the protocol to the existing TAO implementation (After studying TAO interfaces). This may be done by extending the implementation step-by-step to reduce the risk and then applying those changes to TAO.

Work done (From Start)

- Studied the protocol for priority and for priority inversion extensions.
- Studied the OMG specifications of relevant services and architectures. e.g. CORBA/IIOP, RT-CORBA, RT-Notification service, Concurrency service and Joint Revised Submission of RT-CORBA by Dr. Schmidt's team.
- Correlated the specifications with the properties of the protocol and found that the protocol conforms to the RT-CORBA and CORBA/IIOP specification.
- Installed the beta and stable releases of ACE+TAO on Redhat Linux machines. Installation is complete but the tests are failing. Some problem with shared object files. We should overcome this problem soon.
- An installation script to easily install ACE+TAO on Redhat systems is created. It's a modified version of the Installation script in the distribution.
- Implementation of the small-scale system with the prioritized protocol in progress. It should be finished soon.
- Interfaces in the RT-CORBA pertaining to the mutual exclusion are identified and understood with respect to where do they fit in the system.
- The document summarizing the task to be done and our understanding is prepared.
- Primary version of my homepage containing important links for this project is prepared.

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