QuO/TAO Adaptation

Christopher D. Gill
Washington University, St. Louis
cdgill@cs.wustl.edu

http://www.cs.wustl.edu/~cdgill/research/scheduling/QuO-adaptation.ps.gz

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TAO/QuO Adaptation: overview

- Adaptation opportunities: a layered view
- Adaptation in the application layer
- Adaptation in the ORB services layer (events)
- Adaptation in the ORB services layer (scheduling)
- Adaptation in the ORB and network protocol layers
- Event suppliers and consumers use case
Adaptation opportunities: a layered view

- Adaptation opportunities can be organized according to architectural layers
- One natural decomposition is into application, ORB services, and ORB layers
- From adaptation perspective, it is useful to subdivide ORB services layer (e.g., Event and Scheduling)
- It is also useful to subdivide ORB layer (e.g., RT-CORBA, pluggable protocols)
Adaptation in the application layer

- Currently, the rt-throughput example does application layer adaptation
  - Provides an RT definition language for operation characteristics
  - Contract determines whether or not to send an event
  - Could set up multiple EC’s and switch events between them
  - Could manage a single EC but control which suppliers send events, or how a single supplier sends its events (e.g., with different RT_Info handles)
Adaptation in the ORB services layer (events)

- Event channel provides event filtering, correlation, and dispatching
- Supplier ID and Event type provide orthogonal dimensions of control for logical “connection” adaptation
- Filtering and correlation nodes form an event topology
- Supplier QoS and Consumer QoS proxies bind operations to edges of that topology
- Event channel projects event topology into operation topology by registering dependencies between RTInfos
Adaptation in the ORB services layer (scheduling)

- Operation topology only considers RTInfos, not events
- Fine-grained adaptation is done by dynamic scheduling
- Coarser grain adaptation is done by reconfiguration of operations, either dynamically or via mode switches
- Coarsest grain adaptation is done via pluggable scheduling strategies
Adaptation in the ORB and network protocol layers

- ORB: RT CORBA 1.0
  - Defines standards for end-to-end priority propagation
  - Client and Servant policies for thread priority (re)mapping

- Pluggable Protocols
  - Allows efficient/tailored transports to be incorporated
  - UIOP vs. IIOP supported in TAO
Event suppliers and consumers use case

- Event suppliers and consumers represent a protocol, from the perspective of adaptive control

- Peer-to-peer “contracts” include
  - Binding operations to events (1:1, 1:n, n:1, etc.)
  - Ranges of event type and supplier ID values that will be used

- Layer-to-layer “contracts” include
  - Creation and setup of operation RT Infos
  - Creation and setup of servants
  - Upcalls to appropriate object method(s) when event is received
Event suppliers and consumers use case, continued

- Introduces some new issues WRT scheduling sub-layer (and possibly others)

  - RT_Info from Consumer QoS determines dispatch priority besides period, e.g., criticality for MUF
  - Need a way to identify versions of an operation represented by different RTInfos

Intro duces some new issues WRT scheduling sub-layer (and possibly others)

Therefore, need to propagate other operation characteristics

Info from Consumer QoS determines dispatch priority besides period, e.g., criticality for MUF

Need a way to identify versions of an operation represented by different RTInfos