

Real-Time Networks from the Middleware Perspective

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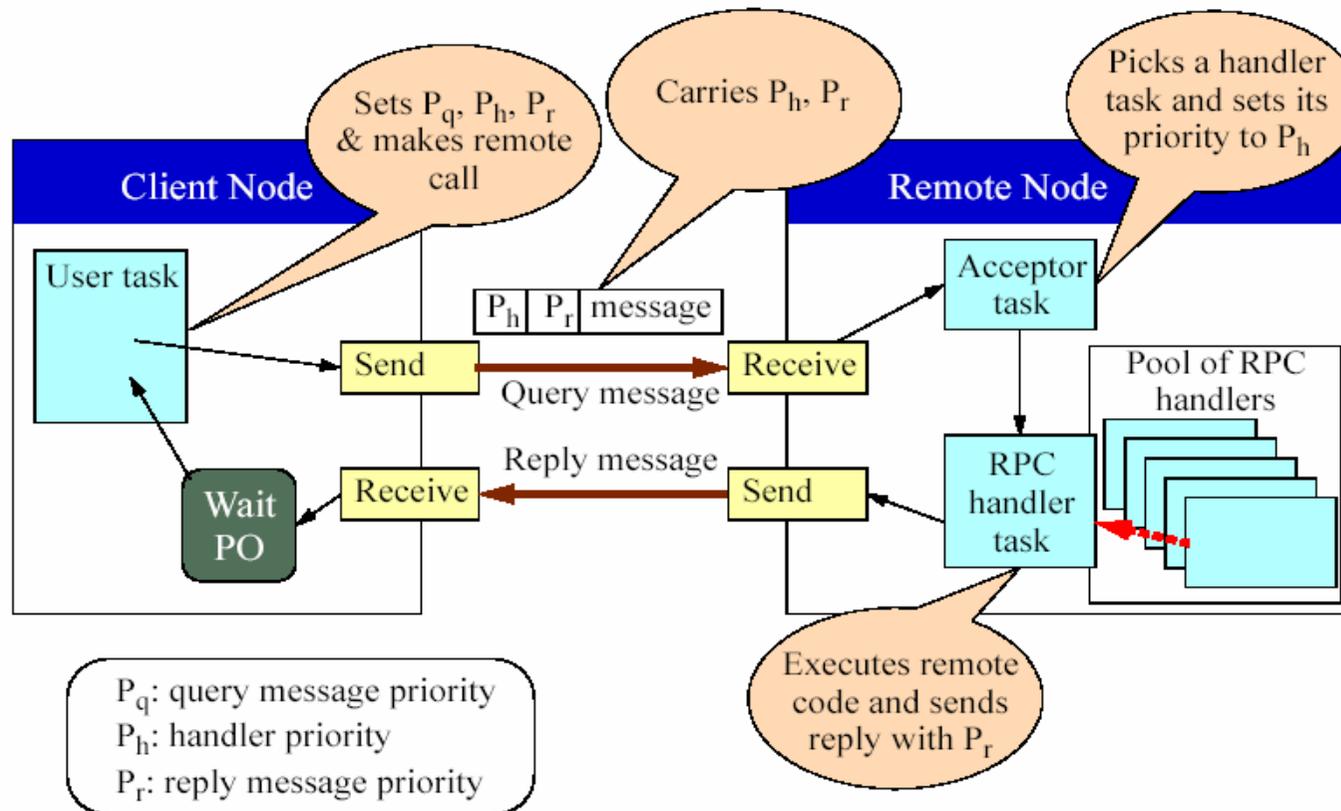
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- Development of distributed real-time platforms
 - RT Operating System: MaRTE OS
 - RT Network Protocols:
 - RTEP (Real-Time Ethernet Protocol based on token passing)
 - CAN-RT-TOP (High level protocol over CAN bus)
 - Common fragmentation layer
 - RT Middleware: RT-GLADE
 - Based on GLADE (GNAT) only for Ada language
 - Different scheduling policies supported
 - Fixed Priorities
 - FSF Contracts

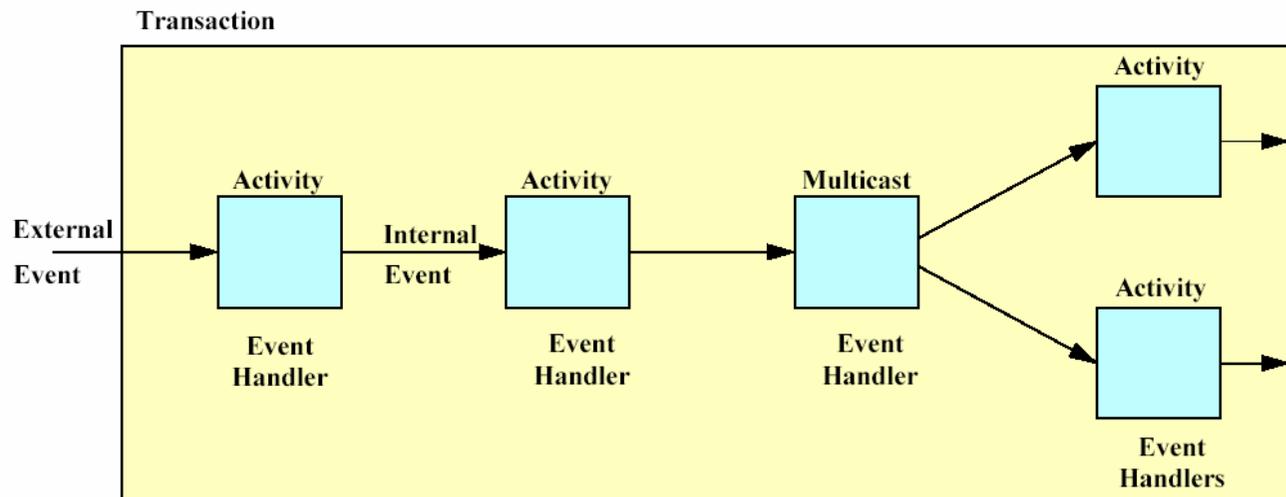
Middleware Architecture



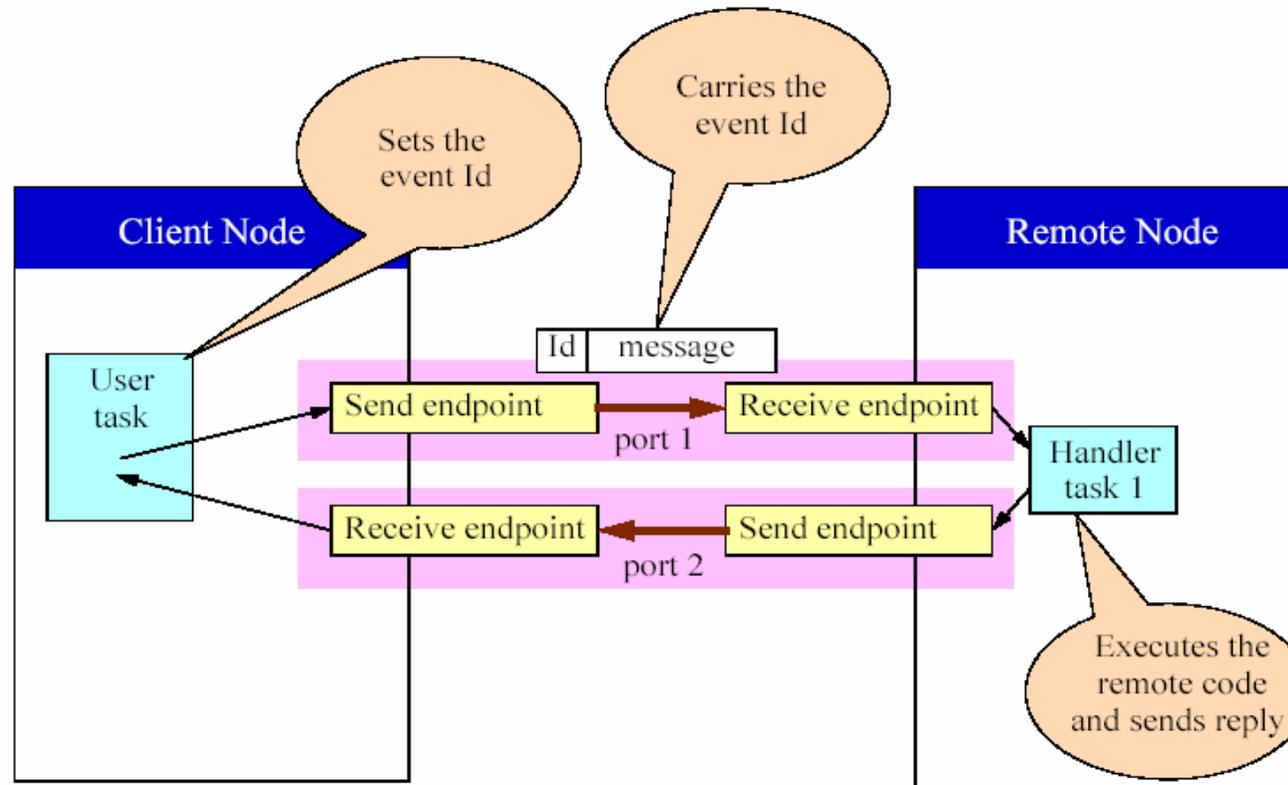
- Scheduling parameters (fixed priorities) sent through the network
- Distributed transaction is not directly supported by the middleware

Middleware Architecture (cont'd)

- Distributed transaction: concept from the schedulability analysis world
 - Event – Driven model that triggers the execution of activities in processors or networks (nested remote calls)



Middleware Architecture (cont'd)



- Remove thread pool and Acceptor Task → Only explicit Handler tasks
- Endpoints to send (holds the sched. parameters) and receive (tasks await)

Middleware + Network issues



- Network entity to be schedulable: Communication ports
 - A network should provide
 - Packet transmission mechanism
 - Scheduling parameters associated at sending (Send Endpoints)
 - Blocking mechanism to allow tasks await (Receive Endpoints)
 - A network does not need to provide
 - Fragmentation layer – can be considered as a part of the middleware
 - Middleware for flexible scheduling
 - Endpoints and networks scheduling parameters associated through `event_id`
 - Dynamic reconfiguration is transparent to middleware → Network should report it and a higher level should take care of it
 - Entities are created and configured in an explicit way before the communication starts

The End ?