

CORBA in High-Performance Embedded Computing

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Abstract

This presentation provides a summary of CORBA trends that relate to the high-performance embedded computing (HPEC) community. Today, CORBA is found in many mainstream industries on a variety of platforms and is becoming more useful and relevant to HPEC. It will provide the work-in-progress at the OMG (standards-making body) and cover the current and future implementations of the CORBA standard. In addition, the presentation will introduce the emerging Data-Parallel CORBA standard and its use in parallel-processing applications.



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Why CORBA for HPEC?

- It is around us in platforms today (air, ship, land)
 - » Most HPEC systems coexist with other computers
 - » Integration is a significant cost and challenge
 - Operating systems, languages, processors
 - » CORBA targets the integration of distributed systems
- It is mainstream in many industries
 - » Originally targeted to enterprise computing
 - » Adopted in defense, industry, telecom
 - » Embedded and real-time versions available



What is usable today?

- In CY2000, real-time and embedded CORBA is available
- Today's CORBA is well suited to integration and control
- Performance and footprint are acceptable for these tasks
- Not yet suitable for parallel/signal processing
- No standards yet for CORBA transports other than TCP/IP



Work in progress at the OMG (standards-making body)

- Data-Parallel CORBA: the ability to implement an object-based service as a set of parallel objects with data reorganization implicit
 - » Status: initial draft standard submitted
- Dynamic scheduling of “distributed threads” for more realistic, real-time application scheduling across multiple computers
 - » Status: revised (potentially final) standard submitted
- Extensible Transports: standards for “plug-in” non-TCP/IP transports
 - » Status: RFP in process of being issued



Parallel CORBA

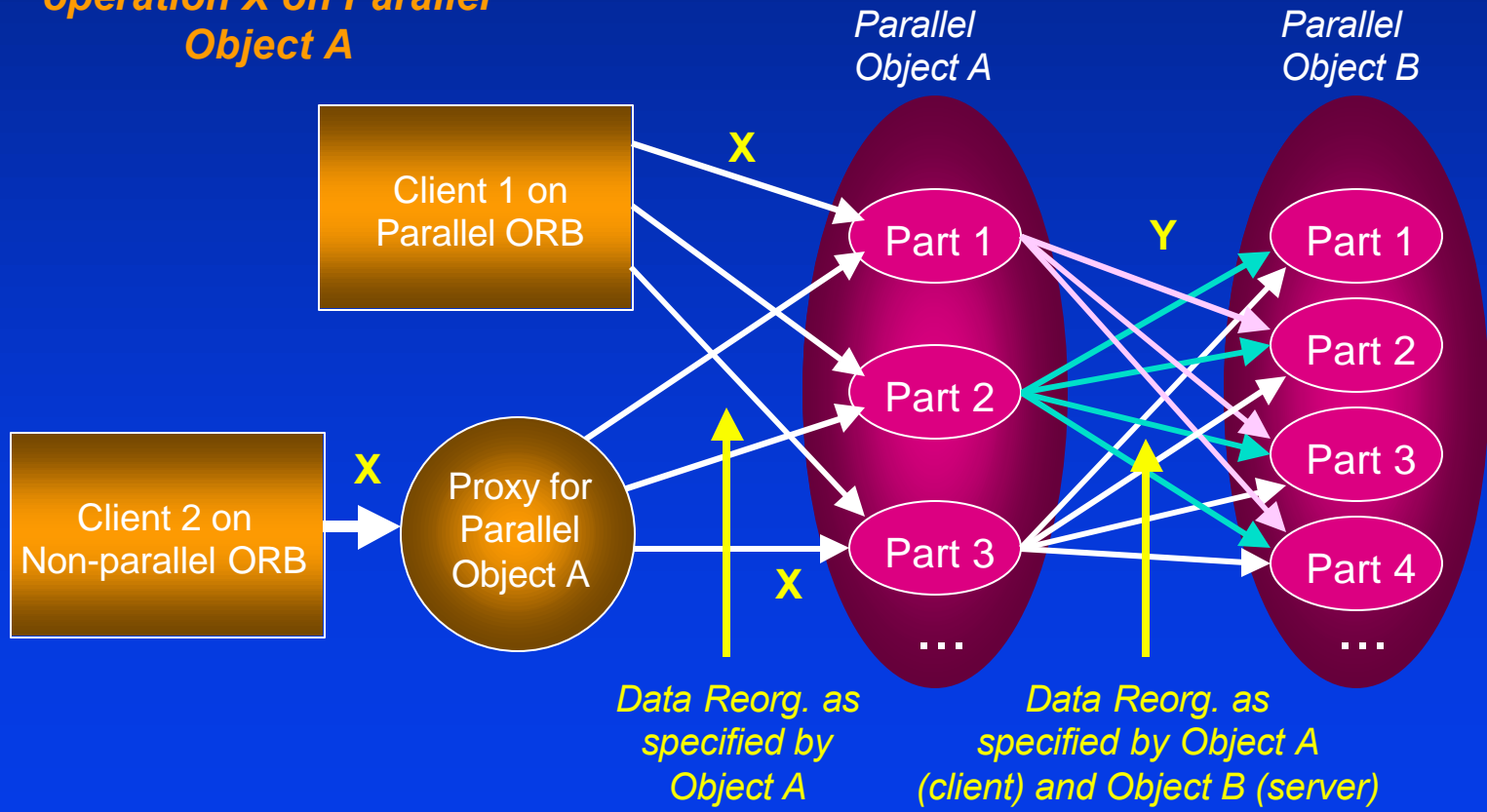
- A standard extension to CORBA for parallel programming
- Allows parallelized implementations of CORBA objects
- Transparent and interoperable with normal, “non-parallel” CORBA applications
- Embodies “data-reorg.” functionality
- Brings data parallel programming to distributed object systems



Parallel CORBA Programming Model

Clients invoking operation X on Parallel Object A

During execution of operation X, the parts of Parallel Object A perform a collective invocation of operation Y on Object B





HPEC CORBA Roadmap

- CORBA for control and integration in HPEC
 - » Usable in 2000
 - » Deployable in 2001
- Parallel CORBA
 - » Standard issued - 1h 2001
 - » First implementations - 2h 2001
 - » Performance and maturity - 2002
- Other relevant futures
 - » Dynamic inter-node, real-time scheduling
 - » Component-level online upgrades