

Status and Activity in the OMG Relevant to HPEC

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The Ultimate Performance Machine

Agenda

- **Object Management Group (OMG) standards activities relevant to HPEC**
- **CORBA-based applications**
- **Impediments & risks**
- **Summary**

HPEC-Related OMG Standards Activities

- **Data Parallel CORBA**
- **Real-time CORBA**
- **Extensible transports**
- **High-performance enablers**
- **Deployment & configuration of components**
- **Embedded profile for components**
- **Lightweight services**
- **Software Defined Radio at OMG**

Data Parallel CORBA

- **Standardized to bring data parallel (SIMD) scalability to CORBA**
- **Moving many data-reorg ideas into mainstream standards**
- **Status: adopted, being implemented**
 - ▶ **See Schmidt/Gokhale/Gill HPEC presentation on Realtime/Data Parallel CORBA**
- **Usable in 2003?**

Real-Time CORBA

- **Distributed applications in embedded systems sometimes require deterministic performance**
- **Real-time CORBA 1.0 standardizes how ORBs can deliver this with fixed priorities (typical RTOS scheduling)**
- **Real-time CORBA 2.0 (dynamic scheduling) standardizes how advanced scheduling techniques can work (beyond fixed priorities)**
- **Status: 1.0 available, 2.0 being implemented**

Extensible Transports

- A standard between ORBs (the middleware used by applications), and the underlying data transport layer (typically IP/TCP)
- Allows users or third parties to create/support non-TCP/IP transports without ORB supplier involvement
- It *may* enable transports to avoid data copies that are required by many today
- Status: RFP issued, drafts submitted

- **A process to eliminate remaining performance inhibitors in CORBA**
 - ▶ **Data must be copied before being handed to the underlying “message transport” layer (which may also add extra copies)**
 - ▶ **There is no way for requests to be repeatedly issued from a pre-computed template**
 - ▶ **Data must be reformatted even between identical systems**
- **Status: RFP issued**

Deployment & Configuration

- **Completes the “component software” picture, making it complete and usable**
- **Initial CCM standard was weak here**
- **Moves more lines of code into the standard infrastructure**
- **Extends standardization into deployment issues**
 - ▶ **Packaging SW into the field**
 - ▶ **Installing and configuring for a target environment**
 - ▶ **Runtime environment for managing installed software**

Deployment & Configuration

- **Standards process is combining inputs**
 - ▶ CCM known weaknesses and defects
 - ▶ JTRS/SCA embedded deployment issues
 - ▶ Mercury/SCE heterogeneous, field-upgrade issues
- **Defined in UML as a PIM (an abstract standard not tied to CORBA) as well as a PSM (specific CORBA standard)**
- **Status: RFP issued, first draft submitted (9/02)**

Embedded Profile for CORBA Components

- **Allows standards compliance with a subset appropriate to embedded applications**
- **Similar in spirit to minimum CORBA subset for embedded CORBA apps**
- **Removes mandatory E-commerce artifacts from current CCM standard**
- **Status: RFP drafted**

Lightweight Services

- **Defines embeddable subsets of several currently defined CORBA services (Name, Event, Time)**
- **Focuses on footprint and modular functionality**
- **Status: RFP issued**

Dataflow for UML 2.0

- **Part of the data-flow/component part of the UML 2.0 standard (activity diagrams)**
- **Targets data-reorg/data-flow specification at the model level**
- **Enables modeling of DP CORBA**
- **Status: draft standards submitted**

- **Separate OMG Domain Special Interest Group (DSIG)**
- **Pushing embedded issues into CORBA services**
- **Pushing SCA capabilities into CORBA Components**
- **Defining domain-specific (SDR) standards (e.g. RF Modem)**

CORBA-Based Applications

- **SDR applications, both government (JTRS/SCA) and commercial (SDR Forum)**
- **[insert others here]**
 - ▶ **Shipboard weapons control**
 - ▶ **Theatre High Altitude Defense (THAAD)**
 - ▶ **Helicopters**
 - ▶ **Naval electronics**
 - ▶ **Unmanned underwater vehicles**
 - ▶ **AWACS/Wedgetail**

Impediments/Risks

- **The Chicken and Egg problem**
 - ▶ **The market is skeptical: distributed object computing (DOC) is/was big/slow**
 - ▶ **The investments need a market for lean/mean**
 - ▶ **This problem has been overcome, but more would be better (more trials, more products)**
- **The (e)commerce world invests in Java**
 - ▶ **Distracts from heterogeneous/embeddable**
 - ▶ **But Java/CORBA bridges are maintained**
- **The open-source parallel computing world is centered on MPI**
 - ▶ **SIMD/Parallel CORBA implementations begun**

Summary

- **Standards progress is enabling**
 - ▶ Performance
 - ▶ Embeddable
 - ▶ Deployable
- **Implementation progress is modest**
 - ▶ HPEC market is small *and* fragmented
 - ▶ Commercial overlap (DOC/components) reduced by Java
- **Adoption is modest**
 - ▶ More standards needed to fully enable standards base
 - ▶ JTRS/SCA is a significant milestone, and is moving to merge with OMG standards