

CORBA Control Systems Request for Information

RFI responses due March 21, 2004

Abstract

This Request for Information (RFI) solicits information about requirements, technologies, theories, models and software products in the area of software elements for implementation of networked closed loop control systems based on CORBA technology.

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1 Introduction to the RFI

This Request for Information (RFI) solicits information about requirements, technologies, theories, models and software products in the area of software elements for implementation of distributed control systems and networked closed loop controllers based on CORBA technology.

The Object Management Group (OMG) and, specifically, the Control Systems Working Group (CSWG) of the Real-time, Embedded and Specialized Systems Platform Task Force (RTESS PTF), will use this information to begin technology adoption processes which will define an OMG-standardized architecture and set of interfaces which will address the needed properties and technology of Common Object Request Broker Architecture (CORBA)-based software components for distributed control applications.

For additional information about OMG and CORBA, see reference material at the end of this document. The accompanying Control Systems White Paper is of major importance for the purpose of this RFI.

The OMG encourages users, consultants, software development methodologists, and developers of software to become involved with this process by responding to this RFI. OMG non-members and members may submit responses.

The Control Systems Working Group (CSWG) and the Real-time Embedded and Specialized Systems Platform Task Force (RTESS PTF) expect to use responses to this RFI to define one or more RFPs leading to OMG-adopted specifications in the area of software components for distributed control applications. The OMG Technology Adoption Process is run according to the procedures laid down in the *OMG Policies and Procedures*.

2 Scope

Applications for CORBA-based distributed control include manufacturing, continuous processes, domotics, transportation, utilities, and defence related systems.

3 Objectives of the RFI

This RFI seeks information to help the Control Systems Working Group make useful and efficient decisions in software components of control systems technology adoption process.

OMG standardizes interfaces, so information with some bearing on interfaces is desired. The interfaces can be active at the time of analysis and/or design of the behaviour of the software, at compile time (including compilation with IDL compiler) and/or at run (execution) time.

OMG would like responders to provide information about available technology to facilitate framing of Requests for Proposal (RFPs), and to provide a set of topics to discuss, for example domain specific infrastructure, platform extensions, IDL extensions, and/or Object Request Broker (ORB) services.

4 Information Being Requested

This RFI is seeking information in the categories described below. Respondents are asked to address areas in which they have expertise and/or interest. Please consider the objectives of this RFI when responding so time is spent on issues that will be helpful to reviewers. Respondents may consider areas not explicitly asked for if they feel the information provides useful guidance. In addition, OMG is requesting descriptions of trends of which the Control Systems Working Group (CSWG) and the Realtime, Embedded and Specialized Systems Platform Task Force (RTESS PTF) should be aware as OMG prepares for the technology adoption process.

4.1 Existing Implementations

OMG requests information on availability, maturity, and importance of any existing models, products, methodologies, etc. which support the distributed control or the closed loop control concept.

4.2 Standards

OMG requests information on relevant standards, both *de facto* and *de jure*. Where multiple standards exist, respondents are asked to compare significant differences

among them. It is also important to identify problems with current standards that prevent their acceptance or cause problems in their implementation.

4.3 Requirements

OMG requests information on user requirements on control systems implementation, architecture and/or performance. Also requirements related to software-based control technologies (compatibility, platforms, etc) are of interest as responses to this RFI.

4.4 Models

Of special interest for the purposes of this RFI is the reception of available object-oriented models of distributed control systems.

4.5 Theoretical studies

Due to the nature of the domain targeted in this RFI, theoretical analyses of object-based, distributed control systems performance are of major interest as potential responses to the RFI.

4.6 Other Information

OMG requests that respondents furnish any other information they think may be relevant.

5 Topics of interest

Topics of interest that responses to this RFI might include but should not be limited to¹:

1. Systems
 - 1.1. Architecture
 - 1.1.1. Software architecture
 - 1.1.2. Control architecture
 - 1.1.3. Supervision architecture
 - 1.2. Infrastructure
 - 1.2.1. Operating System
 - 1.2.2. Middleware (e.g., ORBs, or Messaging Infrastructure)

¹ It is also not necessary to address all of them in a single response.

- 1.2.3. Transports
- 1.2.4. Services
- 1.2.5. Containers and components
- 1.3. Applications
 - 1.3.1. Control
 - 1.3.2. Monitorisation
 - 1.3.3. Supervision
 - 1.3.4. Visualisation
 - 1.3.5. Storage systems
 - 1.3.6. Sensors and actuators
 - 1.3.7. Simulation
 - 1.3.8. Post-mortem Analysis
 - 1.3.9. Interoperation
- 2. Processes and methodologies that can be related to OMG specifications
 - 2.1. Process steps
 - 2.2. Documentation and other artefacts
 - 2.3. UML Models
- 3. Design and Verification Techniques
 - 3.1. Core design
 - 3.2. Temporal verification
 - 3.3. Composability
- 4. Tool Support
 - 4.1. Design Support
 - 4.2. Code Generation
 - 4.3. Design rule checking
 - 4.4. Scheduling Support
 - 4.5. Language Profiles
 - 4.6. Support for Certifiability
- 5. Human Factors Aspects
 - 5.1. Work flow for operators
 - 5.2. System ensuring pre and post conditions
- 6. Related standards and reference documents

6 Who May Respond to this RFI

Any person or company may respond to this RFI, including both OMG members and non-members. OMG especially encourages industry, aviation organizations, users, consultants, software development methodologists, and developers of software to respond to this RFI.

However, only Contributing Members of the OMG will be eligible to respond to any follow-on RFPs issued as a result of this RFI. Any company may join OMG at the

contributing member level and respond; see the OMG website (<http://www.omg.org>) for membership information.

7 Instructions for Responding to this RFI

Take into account that RFI responses will be available to the public.

Organizations responding to this RFI shall designate a single contact within that organization for receipt of all subsequent information regarding this RFI. The name of this contact will be made available to all OMG members.

Responses to this RFI must be received at OMG no later than **March 21, 2004**. (See below for more details on receipt dates and addresses).

The documentation submitted in response to this RFI will be available to all OMG members. This reduces the risk that Technical Committee and Task Force members will arrive at the meetings to review proposals without having seen them and provides time for the OMG to send papers to its members.

NOTE: According to the Policies and Procedures of the OMG Technical Committee, proprietary and confidential material may not be included in any response to the OMG. Responses become public documents of the OMG. If copyrighted, a statement waiving that copyright for use by the OMG is required and a limited waiver of copyright that allows OMG members to make up to fifty copies of the document for review purposes only is required.

7.1 Format of RFI Responses

The RFI response can consist of pre-existing product documentation, but should preferably be organized and presented in accordance with this RFI.

The following outline is offered to assist in the development of your response. You should include:

- A cover letter -- the cover letter should include a brief summary of your response such as indicating which areas you are responding to and indicate if supporting documentation is included in your response.
- Your response to any or all of the areas of information requested by this RFI.
- If required, a glossary which maps terminology used in your response to OMG standard terminology. (See the Appendices to the OMA Guide and the CORBA Specification for OMG's standard terminology.)

Although the OMG does not limit the size of responses, you are asked to consider that the OMG will rely upon volunteer resources with limited time availability to review these responses. In order to assure that your response receives the attention it deserves, you are asked to consider limiting the size of your response (not counting any supporting documentation) to approximately 25 pages. If you consider supporting documentation to be necessary, please indicate which portions of the supporting documentation are relevant to this RFI.

7.2 How to Submit

OMG requests that submitted material be attached to an email cover letter and sent to our process manager at juergen@omg.org. The preferred format is Adobe PDF. Are ASCII text, Adobe Postscript and Microsoft DOC are also welcomed. RTF may additionally be used. In addition, one paper copy is required (as a backup).

The CSWG/RTESS Platform Task Force plan to review submissions at the April 2004 meeting and/or at the June 2004 meeting. Responses to this RFI (and other communication regarding this RFI) should be addressed to:

OMG:

Control Systems RFI
Object Management Group Inc.
Framingham Corporate Center
492 Old Connecticut Path
Framingham, MA 01701-4568
USA

Phone: +1-508-820 4300
Fax: +1-508-820 4303
Email: juergen@omg.org

Email responses to this RFI must be received at OMG no later than 5:00 PM US Eastern Time (22:00 GMT) March 21, 2004 and the confirming paper copy must arrive at OMG shortly thereafter. The outside of packages/envelopes containing submissions or any other communication regarding this RFI should be clearly marked "Control Systems RFI Response".

8 Reimbursements

The OMG will not reimburse submitters for any costs in conjunction with their responses to this RFI.

9 Response Review Process and Schedule

9.1 Process

RFIs such as this one are issued with the intent to survey the industry to obtain information that provides guidance which will be used in the preparation of RFPs.

The OMG membership, specifically the Control Systems Working Group of the Realtime, Embedded and Specialized Systems Platform Task Force (CSWG/RTESS PTF), will review responses to this RFI.

Based on those responses, the PTF will consider revision / extension of its domain architecture, a corresponding roadmap, and one or more RFPs. In accordance with the OMG technology adoption process, each issued RFP will ultimately result in the specification of a portion of the architecture.

See OMG Web Site for a brief description of the OMG technology adoption process and consult the OMA Guide for a complete description of the OMG's requirements, policies, and procedures for technology submissions.

9.2 Clarification of Responses

To fully comprehend the information contained within a response to this RFI, the reviewing group may seek further clarification of that response. This clarification may be requested in the form of brief verbal communication by telephone; written communication; electronic communication; or a presentation of the response to a meeting of the CSWG or RTESS PTF.

Therefore, the CSWG and the RTESS PTF request that submitters attend the CSWG and/or RTESS PTF meetings, prepared to present their responses.

9.3 Schedule

The schedule for responding to this RFI is as follows. Please note that early responses are encouraged.

PTF recommends issuing the RFI	Nov 18, 2003
RFI issued	Nov 21, 2003
RFI responses due	Mar 21, 2004

The tentative schedule for the RFI evaluation process and subsequent RFPs is:

Review of RFI responses **May 21, 2004**
PTF recommends issuing the initial RFP **Sep 21, 2004**

NOTE: This schedule is subject to change based on the number of RFI responses received and the information acquired from the responses.

10 References

10.1 OMG References

CORBA Control Systems White Paper.
OMG Document

Real-Time CORBA. Joint Revised Submission Document Number orbos/1998-12-10, Object Management Group, Needham, MA, U.S.A., December 1998. Available at <http://doc.omg.org/orbos/1998-12-10>.

Real-Time CORBA 2.0: Dynamic Scheduling Specification. Final Adopted specification Document Number ptc/2001-08-34, Object Management Group, Needham, MA, U.S.A., August 2001. Available at <http://doc.omg.org/ptc/2001-08-34>.

Common Object Request Broker Architecture and Specification. Release 3.0. Object Management Group. Falls Church, USA.

Enhanced Views of Time V1.1. Available Specification Document Number formal/2002-05-07, Object Management Group, Needham, MA, U.S.A., May 2002. Available at <http://doc.omg.org/formal/2002-05-07>.

Fault Tolerant CORBA. Available Specification Document Number formal/2002-06-59, Object Management Group, Needham, MA, U.S.A., May 2002. Available at <http://doc.omg.org/formal/2002-06-59>.

Extensible Transport Framework. Revised Submission Document Number mars/2003-02-01, Object Management Group, Needham, MA, U.S.A., March 3, 2003. Available at <http://doc.omg.org/mars/2003-02-01>.

Data Distribution Service submission. Joint Submission Document Number mars/2003-03-16, Object Management Group, Needham, MA, U.S.A., March, 2003. Available at <http://doc.omg.org/mars/2003-03-16>.

Smart Transducers Interface V1.0. Available Specification Document Number formal/2003-01-01, Object Management Group, Needham, MA, U.S.A., January 2003. Available at <http://doc.omg.org/formal/2003-01-01>.

Unified Modeling Language V1.5. Available Specification Document Number formal/2003-03-01, Object Management Group, Needham, MA, U.S.A., March 2003. Available at <http://doc.omg.org/formal/2003-03-01>.

OMG Policies and Procedures.
OMG Document

10.2 Web Sites

More information about the Object Management Group can be found at their website:

<http://www.omg.org/>

More information about the Control Systems Working Group can be found at their website:

http://www.omg.org/realtime/working_groups/ControlSystems.html

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