Object Management Group

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UML™ Profile for Modeling and Analysis of Real-Time and Embedded systems (MARTE)

Request For Proposals

OMG Document: realtime/05-02-06

Letters of Intent due: June 24, 2005
Initial submissions due: November 14, 2005

Objective of this RFP

This Request for Proposals solicits submissions for a UML™ profile that adds capabilities for modeling Real Time and Embedded Systems (RTES), and for analyzing schedulability and performance properties of UML specifications. The new profile is intended to replace the existing UML Profile for Schedulability, Performance and Time (formal/03-09-01). A single profile is proposed for these requirements because they share common concerns about time, resources, and concurrency. As a result, the RFP is structured around three subsets of requirements:

- Requirements for Time and Concurrent Resources (TCR) that define common elements of concern to both modeling and analysis of real-time and embedded systems,

- Requirements for Real-Time and Embedded Modeling (RTEM),

- Requirements for Schedulability and Performance Analysis (SPA) of RTES that support the analysis of temporal properties by specialized analysis tools.

The UML profile for Schedulability, Performance and Time (referred to as SPT in this document) was the first profile dedicated to the real-time domain. It has been adopted and in use for over 18 months. However, in that time other OMG standards have been adopted that have significant implications for the profile. In addition, the use of the profile has led to a number of significant suggestions for improvement and consolidation. The Final RTF Report for the SPT profile (ptc/2004-02-02) deferred a number of such issues to a new RFP, deeming them to be too disruptive for a simple revision (see list in Appendix C). This RFP asks for proposals that address the suggested improvements and align the profile with other relevant standards.

The present RFP divides the concerns of SPT in two parts. The requirements for modeling time and resources (from Chapters 3 to 5 of SPT) are to be addressed in the Time and Concurrent Resources (TCR) part, whereas the requirements for schedulability and performance analysis (from Chapters 6 to 9 of SPT) are to be addressed in the SPA part.

The RTEM requirements are to provide a customization of UML for both real time and embedded areas. This is intended to support modeling of a broad range of applications which may include hardware, software and data, addressing notably reactive, control/command and intensive data flow computation systems. This extension should provide support for specification, design, and verification stages by:

- Providing a common way of modeling both hardware and software aspects of a RTES in order to improve communication between developers.

- Enabling interoperability between development tools used for specification, design, verification, code generation, etc.

- Fostering the construction of models that may be used to make quantitative and partitioning predictions regarding Hardware and Software characteristics.

- This RFP does not address detailed physical hardware design.

It is the intent of this RFP to encourage submissions that propose paradigms of use that are open to automation in order to enable MDA-based approaches.

For further details see Chapter 6 of this document.

1.0 Introduction

1.1 Goals of OMG

The Object Management Group (OMG) is the world's largest software consortium with an international membership of vendors, developers, and end users. Established in 1989, its mission is to help computer users solve enterprise integration problems by supplying open, vendor-neutral portability, interoperability and reusability specifications based on Model Driven Architecture (MDA). MDA defines an approach to IT system specification that separates the specification of system functionality from the specification of the implementation of that functionality on a specific technology platform, and provides a set of guidelines for structuring specifications expressed as models. OMG has established numerous widely used standards such as OMG IDL [IDL], CORBA [CORBA], Realtime CORBA [CORBA], GIOP/IIOP [CORBA], UML [UML], MOF [MOF], XMI [XMI] and CWM [CWM] to name a few significant ones.

1.2 Organization of this document

The remainder of this document is organized as follows:

Chapter 2 – *Architectural Context* – background information on OMG's Model Driven Architecture.

Chapter 3 – *Adoption Process* – background information on the OMG specification adoption process.

Chapter 4 – *Instructions for Submitters* – explanation of how to make a submission to this RFP.

Chapter 5 – *General Requirements on Proposals* – requirements and evaluation criteria that apply to all proposals submitted to OMG.

Chapter 6 – *Specific Requirements on Proposals* – problem statement, scope of proposals sought, requirements and optional features, issues to be discussed, evaluation criteria, and timetable that apply specifically to this RFP.

Appendix A – *References and Glossary Specific to this RFP*

Appendix B – *General References and Glossary*