

# **DRAFT September 30, 2002**

## **Object Management Group**

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### **UML™ Profile for Business Process Definition**

#### **Request For Proposal**

OMG Document: BEIDTF/2002-09-02

**Letters of Intent due: April 14, 2003**

**Submissions due: May 12, 2003**

#### **Objective of this RFP**

This Request For Proposals solicits submissions that specify a UML™ profile for business process definitions. These business process definitions may describe managed business processes that are enacted in controlled, recoverable environments, or they may describe collaboration processes that occur through the interaction of two or more business entities, or they may describe complex processes that involve both these types of processes.

The specification developed in response to this RFP is expected to achieve the following:

- Robust representation of business processes
- Support for leading business process modeling notations
- Business process models that are compatible with existing UML modeling elements
- Integration of process models for workflow management processes, automated business processes, and implicit processes performed by collaborating business entities.

## *Business Process Definition RFP*

- Support for modeling business processes as components of complete system specifications to assure consistency and completeness of specifications.
- Support for the specification of web services collaboration processes and the internal business processes with which they interact to perform system-to-system electronic business transactions.

A standard for business process definition will provide modelers with interoperability between modeling tools, and between tools and execution environments. This will increase communication between modelers, including between business and software modelers, provide flexible selection of tools and execution environments, and promote the development of more specialized tools for the analysis and design of processes. Basing business process definition on UML also will leverage the existing user skills, tools, and community knowledge of UML.

For more details, see section 6 of this document.

## **6.0 Specific Requirements on Proposals**

This section provides the information specific to this RFP.

### **6.1 Problem Statement**

A standard for business process definition will provide modelers with common modeling concepts, structure and semantics and the ability to exchange models between different modeling tools and execution environments. This will increase the communication between modelers, including between business and software modelers, provide flexible selection of tools and execution environments, and promote the development of more specialized tools for the analysis and design of processes. Basing business process definition on UML will leverage existing user skills, tools, and the body of community knowledge already developed for UML. It will also enable the development of integrated system models that include robust process specifications.

Process definitions in UML and its extensions will be translatable to notations and process implementations. Existing tools provide a variety of textual notations and graphical representations. This RFP does not attempt to resolve these differences in notation, but is intended to provide a common underlying metamodel that represents the concepts, process semantics and relationships that are inherent in a process specification. This allows for continued development of notation and graphical techniques to support process definition activities. Furthermore, the model is not to be designed for a specific execution platform or environment. Definitions should express the intent a modeler has for runtime behavior, rather than the means by which that behavior is realized. Implementers may continue to explore new performance and reliability enhancements to process implementations.

A business process consists of one or more activities that respond to a business requirement for action. A process defines the results to be achieved, the context of the activities, the relationships between the activities, and the interactions with other processes and resources. Activities are units of work that commit when completed, i.e., they are recoverable at the point of last completion. At runtime, a business process definition may have multiple instantiations, each operating independently of the other (except as they may compete for the same resources), and each instantiation may have multiple activities that are concurrently active.

Process definitions must represent two basic forms: managed and collaborative.

A managed process is the traditional form of process automation. Processes are executed by a computer or cooperating distributed computers within a managed environment. The managed environment assures consistency and recoverability of process activities and associated data.

On the other hand, a collaborative process is a process that is implicit in the behavior and interaction between two or more business entities. Here the process is controlled only by the intentional conformance of the independent entities to an agreed-upon exchange of messages. The activities of a collaborative process are the actions performed by the participating entities in response to messages they receive from other participating entities. An activity in a collaborative process must be implemented by a managed process, but the managed process could employ another collaborative process to perform the activity of the collaboration process

The goal of this specification is to model both forms of business process in a way that assures that they will interoperate to achieve the desired business objectives.

For example, a collaborative process definition might specify the exchange of messages between two entities to perform the purchase of a product and arrange for payment and shipping. A managed process might implement the order processing of the seller to cause the order to be validated, payment terms to be accepted, the product to be produced, packaged and shipped, and the invoice to be generated. The negotiation of payment terms could involve another collaborative process with a financial institution.

A collaborative process activity will be implemented by activities of a managed process. For example, a collaborative process might have an activity for seller receives order. The message is received by an activity in the seller's internal process. The activity may then cause other activities and potentially sub-processes to take appropriate action on the order. When the seller's process has determined that the order is acceptable and assigned a price and delivery date, another activity will send a response message. The sending activity is then complete and may cause another activity to wait for the buyer's acceptance of the price and date. Similar actions may occur for each activity in the collaborative process.

Processes may be recursive. In a managed process, an activity in one process may invoke another process. In a collaborative process, the activities are performed by activities in processes of the participating entities.

Both forms of process may involve the participation of resources, but the resources of a collaborative process are managed by the managed processes of the participating entities, e.g., a purchasing agent assigned by the buyer entity process.

Resources to be assigned to a managed process are specified by selection criteria to be applied to a defined source of resources. This may be, for example, people in an organization, facilities on a campus or materials in an inventory.

A collaborative process may involve multiple participating entities described as having different roles. A participating entity may perform more than one role, but these will typically represent different business function responsibilities within the entity. So an entity might have the role of both seller and creditor. Generally, the assignment of entities to roles will occur when the collaboration is initiated.

Managed process definitions will provide parameters and constraints on the runtime execution such as resource selection criteria, and initialization requirements. Collaborative processes define constraints on the behavior of the participating entities, i.e., constraints on the processes that implement the entity behavior.

### 6.1.1 Examples of Business Processes

The intent of the following examples is to give a sense of the capabilities of process definitions that a submission should be able to support. The list is by no means complete or exhaustive. All of the processes represented are based on real production processes. For the purposes of this RFP the essential or unique characteristics of each process is presented, rather than the full description.

#### 6.1.1.1 *Employee Expense Reimbursement (EER) Process*

This process provides for reimbursement of expenses incurred by employees for the company. For example buying a technical book, office supplies or software. In a normal day there are several hundreds of instances of this process created.

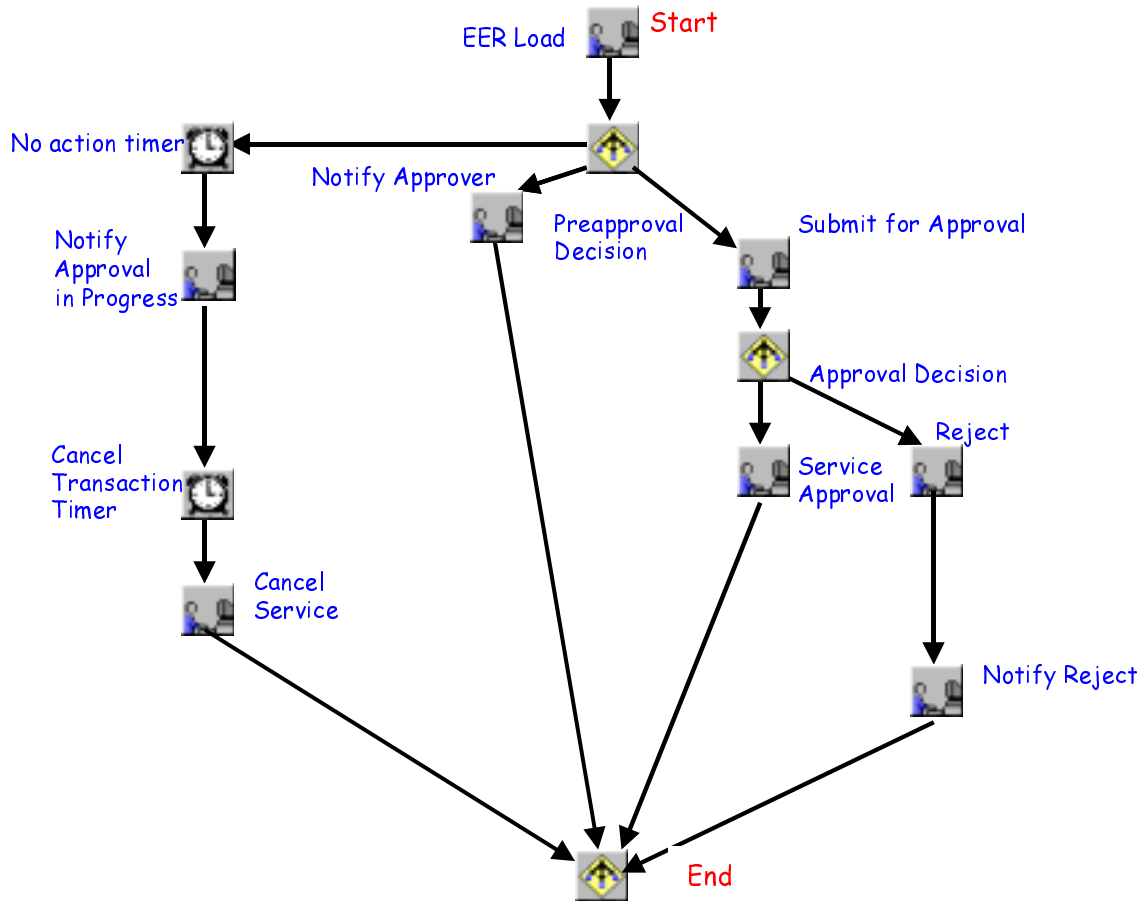
## *Business Process Definition RFP*

The main rules of the process are

- Amounts under \$200 are automatically approved.
- Amounts equal to or over \$200 require approval of the supervisor.
- The reimbursement goes to the employee's direct deposit bank account.
- In case of rejection, the employee must receive a rejection notice by email.
- If no action has happened in 7 days, then the employee must receive an approval in progress email.
- If the request is not finished within 38 days, then the request is cancelled and the employee receives an email cancellation notice and must re-submit the expense report.

Below is a graphical representation of the EER process. There are 3 types of nodes shown in the graphic: work nodes (person at computer icon), routing nodes (3 arrow icon), and timer node (clock icon). A work node represents a task performed by a human or application. A routing node indicates where the flow branches or combines. A timer node represents a waiting period or an absolute date. The process flow is indicated by arrows. There are many aspects of the process definition that do not appear in the graphical image. One important example of this is the rules that control the flow of the process at routing nodes. Another is the process data involved that is used by the workers, applications and rules.

There are two important characteristics in this example. The first is the time check path running in parallel to the basic approval path. Whichever path finishes first wins. This is the same as the test process in school; the test is done when the student has answered all the questions or when the test time is finished. The second is the branching with multiple outflows of which only some might be taken and multiple inflows of which only some might be necessary to trigger the subsequent activity.



**Figure 1, Employee Expense Reimbursement (EER) Process Graph**

More detail about this process can be found in bom/00-01-06.

**6.1.1.2 Airplane Design (AD) Process**

This example centers on the design of an airplane. Design of an airplane means the selection of standard parts to assemble the interior of the airplane, not the aerodynamic aspects of the body and wings. There are two groups of people involved, the airplane designers and the standard part engineers. Each group has its own business processes.

The airplane designer works within the context of a process. In his work he discovers the need for a standard part within an activity in his process. That need is translated into a search process instance within the system of the standard part engineer group. A successful search returns an appropriate part specification to the plane design engineer activity.

An unsuccessful search results in a process for modification to a standard part being started in the standard part group system. Part of

the modification process is to check the search conditions. The airplane designer might not have formulated the correct search because of the large number of parts and part categories. If no part is found with the reformulated search, then the process leads the standard parts group through a consideration of alternatives: whether to modify an existing part or to create a new standard part.

Whether a part is to be modified or a new part created, a process instance is started to develop a modified part. The process needs to take into account that not every standard part engineer can work on any standard part. To a certain extent this process definition is determined from a template at process instantiation time. The availability of a qualified engineer to create or modify the part is critical to the scheduling and enactment of the process instance. This schedule information is given back to the airplane designer for approval. If the new standard part cannot be designed in time then an alternate design is followed. In order to minimize lead time, concurrent processes may be initiated for alternative approaches.

One of the unique characteristics of this example is the messages or interactions that may occur between process instances. These exchanges might be described as a collaborative process. The collaboration is the basis for determining if one or more parallel processes is no longer justified based on the status or progress of other processes.

There are processes that define or complete the definition of other processes. There are complex resource qualification and assignment rules. The rules must take into account not only the skills and qualifications needed, but also the availability of the engineer in relation to the airplane schedule.

More detail about this example can be found in bom/98-02-14.

#### *6.1.1.3 Trouble Ticket (TT) Process*

The Trouble Ticket process covers quality assurance teams or customer support teams. A "bug" or "problem" is identified; it must be recorded; the record must be checked for accuracy; from a single instance of a problem, the underlying cause is identified; a resolution is identified, and the result must be communicated back to the original party with the problem identification.

This process contains a potential loop. If the resolution cannot be verified as successful, then the problem goes back to the resolution activity. Rework is quite common in processes, because the ability to



verify if work was properly done might only be possible several activities later,

More detail about this example can be found in bom/98-02-09 and bom/98-07-13

## 6.1.2 Common Business Process Patterns

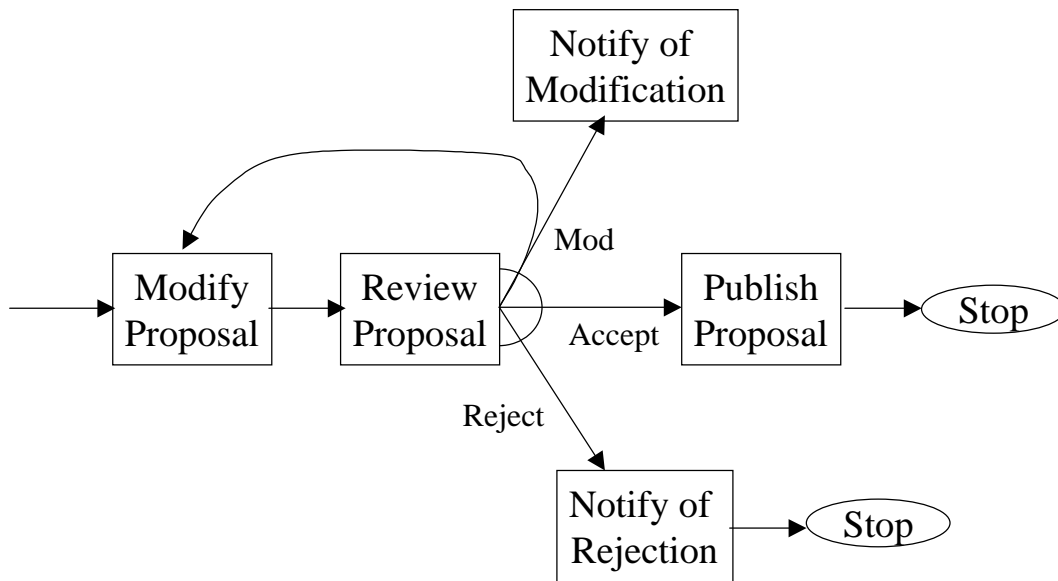
The following paragraphs provide examples of common business process patterns to be considered.

### 6.1.2.1 *Multiple inputs*

A process may depend upon multiple inputs. Each input may require processing by different activities. Any of the alternative inputs might be received first, and initial processing of one input is not dependent on completion of processing of the other, i.e., the receiving activities could be concurrent. For example, an invoice may be received by an accounting activity and notice of receipt of a shipment may also be received by the accounting activity for the same shipment. Either the invoice or the notice of receipt may be received first, and initial processing of either may occur without waiting for the other.

### 6.1.2.2 *Multiple subsequent activities*

When an activity completes, there may be more than one subsequent activity. It may be appropriate for all of these activities to be performed concurrently, or for their execution to be conditional so that less than all are executed. For example (see Figure 2, below) a review activity might result in asking for a modification of a document resulting in a notice and a return to the modification step. In the alternative, if the document passes the review, only the publish activity would be activated. Finally, if the document were rejected, then only the rejection notification activity would be performed. Just as in the EER example, section 6.1.1.1, above, there are branches that do not join before the end of the process, but unlike the EER example there are no “races” to completion.



**Figure 2, Document Review Process**

More detail about this example can be found in bom/00-01-05.

### 6.1.2.3 Multiple resources for the same role

In the above example, the Modify Proposal activity may be performed more than once as a result of the review. It is possible that the modification could be assigned to a new resource. Thus another resource would be assigned to the same activity and role within a process instance. In this case, only one resource at a time would be assigned to the role

It is also possible that an activity could be performed by a team, so that multiple resources could be concurrently assigned to the same role. This would give all such resources the same responsibility and authority, so that any of the resources could perform the work or report the result.

### 6.1.3 Resource Specification Examples

A process definition will need to specify the resources it needs at various levels of abstraction. The specification of the resources can be viewed as a constraint expression.

The resource specification will (in the most general case) have two aspects. The first aspect of the specification consists of constraints associated with the instance enactment history such as a preference for the same person that worked on an earlier activity. The evaluation of these constraints will add to the second aspect of the resource expression. The second aspect consists of the characteristics of the resource needed. This part will be handed to a resource manager for identification of a resource.

The resources will usually be referenced as participants in roles. In this situation the term role is used in multiple ways. The first way is the role the resource plays via the assignment. Is the resource a performer or an artifact? A second way role is used is as an abstraction for a set of characteristics or capabilities. This might be a set of skills, an availability, a capability, an authority level, a location, etc.

A few example resource specifications of the kind that would appear in process definitions are included below. See bom/00-01-03 for more discussion and examples.

**A person in organization position Z** – a typical reference to a position in the organization structure, officer of the company, R&D manager, leader of project A

**The manager of X, where X is initiator of process or some other participant** – a typical reference into an organization structure that satisfies a relationship

**Joe Smith** – a direct reference

**A mechanical engineer with skills in structural analysis and who is a registered Professional engineer in the state of Colorado** – reference to a skill or capability set, often this information is not in the corporate organization structure

**A master machinist and a 5 axis milling machine that can handle a part of 1m maximum dimension and 90 cm of stock (#12345A) and 5 diamond tipped bits (#45-678)** – a reference to a set of resources that come from several different resource models

**The gear XXX CAD model to be changed and CAD models yyy, vvv and zzz as reference and context for the change** – these references include roles that the information resources play during the process enactment

## **6.2 Scope of Proposals Sought**

This section describes the scope of proposals sought by this RFP. Specific requirements are set forth in Section 6.5, 6.6 and 6.7, below.

### **6.2.1 Business Process Definition metamodel**

Proposals are expected to provide a metamodel that incorporates a subset of the UML metamodel, and extends it if necessary. Model elements incorporated from UML are expected to represent semantics consistent with their UML semantics. OCL is part of UML.

This RFP is not requesting a notation, although a notation could be provided as part of a submission, and a non-normative notation would be valuable for providing illustrations and examples. Existing UML tools should be able to express and operate on aspects of business process definitions that are compatible with existing UML models and notation.

### **6.2.2 Collaborative and Managed Processes**

Proposals should comprehend both managed and collaborative processes and their interoperation. Collaborative processes describe the interactions between business entities to perform a business transaction, and it must be possible to define the compatible behavior implemented by managed processes of one or more participating entities to support a collaboration. A managed process is implemented in a managed, recoverable environment and engages resources.

### **6.2.3 Initiation of Activities**

The sequence of execution of activities may be defined in different ways. In some cases, the initiation of an activity will be expressed in terms of the completion of one or more preceding activities. In other cases, the initiation of an activity may be expressed in terms of the state of one or more variables. In still other cases, an activity may be initiated by the receipt of a message or request (e.g., an event or a message in a collaborative process). It should be possible to express all such forms of activity initiation.

### **6.2.4 Types of Performers**

A process definition will involve specification of work to be done by different kinds of performers. For example, the activity may be

performed by another business process, it may be performed by a computer application, it may be performed by a human, or it may be performed by a human using a computer application.

These different types of performers will have different forms of interface. Human performers typically will have work lists. An application may have an API. A sub-processes will have process parameters and return values.

#### 6.2.5 Asynchronous, concurrent process execution

Instances of processes are expected to execute independently of each other and to be capable of concurrent processing. A process that invokes another process may proceed with other concurrent activities while waiting for the invoked process to complete, and a process that is completed is expected to commit to its completed state and be recoverable to that state.

#### 6.2.6 Activity atomicity

Activities are units of work that are committed when they are completed so that the containing process is recoverable to that state. Activities are initiated based on committed state, so that an activity does not depend on the un-committed state of another activity. An activity may invoke applications or other processes. Invocation of an application may be synchronous, so that it is completed before the activity commits, or asynchronous so that the request for the application is committed when the activity commits.

#### 6.2.7 Specification of Managed Processes

A collaborative process can only affect its implementation through constraints on the behavior of its participants, i.e., the actions taken by the processes of the participating entities. Definitions of managed processes, however, will include additional specifications that affect the manner in which the process is executed. The following paragraphs describe managed processes that should be addressed.

##### 6.2.7.1 *Creating process instances*

Process instances are created from process definitions at execution time. Process definitions may define constraints on when a process instance can be created based on time and date, the content of a request, or the state of the system at the time of the request.

The process definition may specify requirements for initialization of the process such as initialization of variables and instantiation of associated objects.

*6.2.7.2 Control of execution behavior*

- a) The process definition may specify the method and scope of propagation of process state change, such as whether pausing a process pauses the current activity being executed or allows it to finish.
- b) Process definitions may specify execution constraints or characteristics such as maximum duration, predicted start time, the inability to pause or interrupt a process, or the ability to rollback execution to an earlier activity in the flow.

*6.2.7.3 Control of Process Termination*

- a) Completion of a process may be determined by specified conditions.
- b) Actions may be specified to be performed at the completion or abnormal termination of a process. In particular, specialized activities or processes may be initiated to back out the effects of completed activities.
- c) The effect of abnormally terminating a process on its active activities and invoked processes may be specified.
- d) The effect of termination on process variables may be specified.
- e) The result returned to a requester at process termination may be specified.

*6.2.7.4 Event Publication*

A process or activities within a process may issue events to enable external actions to be initiated or progress of the process to be monitored. A process definition may specify events to be posted to a publish and subscribe facility, including parameters that would be provided in the event publication.

**6.2.7.5 *Event Subscription***

An activity within a process may be initiated by the receipt of an event. The process definition may specify parameters for the event subscription and criteria for acceptance of an event.

**6.2.7.6 *Audit Log Generation***

Business processes typically generate logs of events and actions that occur in the execution of the process. This provides information for audit and for performance analysis. The process definition may include specifications for the generation of audit log records.

- a) The process definition may specify which audit events are produced.
- b) The process definition may specify the data to be included in a log record.

**6.2.7.7 *Resource Assignments***

A process definition will specify the criteria by which resources are to be selected, but the process definition will not define how the resource assignment is actually accomplished. Selection criteria may include

- a) A specific resource identifier (e.g., a person's name)
- b) A conditional expression to be applied to attributes of a resource
- c) Dependencies on resource assignments for other activities in the same process including dependencies on relationships between resources.

The process definition may specify policies regarding when a resource is assigned and when released. It may also specify the effect of removing a resource as where a replacement resource is assigned and the process must restart from an earlier activity.

**6.2.7.8 *Access Control***

A business process definition is not expected to provide specification of security access controls. However, a business process definition does define the criteria by which resources are selected as participants. These assignments should provide a basis for control of access to the process instance and its artifacts. For example, where an individual normally

may not have access to certain business records, they may have access to specific instances of records as a result of their assignment in a particular process instance. Furthermore, the authority of a participant may change as the process progresses.

Business process access controls should complement not replace access control specifications applicable to other systems and applications.

#### *6.2.7.9 Subject Matter*

A business process typically will operate on objects representing the subject matter of the activity such as a purchase order or product specification. The business process may create such objects, it may be given references to such objects in parameters or return values, or it may retrieve such objects based on selection criteria that it receives or computes. The specification of these objects is outside the scope of the business process definition, per se, but a specification will typically be incorporated by reference to support business process operations on the attributes and methods of the subject matter objects.

#### *6.2.8 Shared State*

The state of subject matter objects and process variables may be shared by the activities of a managed process. However, for a collaborative process, the state of the process and subject matter must be maintained by each of the participants. In order to maintain consistency among the participants, relevant changes of state, along with other information affecting the flow of control, must be exchanged in the messages between participants.

Consequently, while the participants internally may use different representations of the same subject matter, a collaborative process must specify the content, semantics and format of the messages to be exchanged. Details of the message format specifications are beyond the scope of this specification, but this specification should define the essential elements of message content and must provide for incorporation of message format specifications by reference.

#### *6.2.9 Support for Simulation*

Proposals may include support for simulation such as the specification of data that describes parameters or characteristics of the process execution. For example, process definitions might include expected task duration,



maximum task duration, expected process duration, maximum process duration, expected branch activation probability, etc.

### 6.3 Relationship to Existing OMG Specifications

Proposals are expected to have relationships to, extend or, possibly override the following specifications. In each case, the most recent version is applicable unless the most recent version was adopted less than six months before the final submission to this specification.

- *OMG Workflow Management Facility* - Original Specification: bom/98-06-07 plus Errata bom/98-07-15. RTF 1.2 report: dtc/99-07-04 and IDL dtc/99-07-06. Convenience document, dtc/99-07-05. Proposals are expected to support implementations that are compatible with this existing specification for execution interfaces.
- *Unified Modeling Language (UML) Specification*. The business process definition profile should incorporate a subset of UML and extend it only as necessary. This would include *UML 1.4 with Action Semantics*, ptc/02-01-09.
- *Meta Object Facility Specification*, ad/99-09-05. It should be possible to store process definition specifications in a MOF facility.
- *XML Metadata Interchange (XMI) Specification version 1.1*, ad/99-10-02 and ad/99-10-03. It should be possible to exchange process definition specifications in XMI format.
- *Party Management Facility* - finance/98-12-09. This specification involves the specification of roles with respect to parties to a contract or agreement. This may influence the approach to assignments of resources in a business process.
- *PDM Enablers* formal/2000-11-11 especially PdmResponsibility, PdmFoundation, and PdmChangeManagement. This specification involves specification of personnel resources associated with product specifications.
- Additional Structures for OTS – orbos/00-06-19
- *Organizational Structure Facility*, dtc/01-09-01. Personnel resources should be assigned using an Organizational Structure Facility for such factors as the organizational relationships and job codes.
- *UML Profile for Event-based Architectures in Enterprise Application Integration (EAI)* - doc??? Enterprise Application Integration (EAI)

involves the asynchronous exchange of data between applications. Aspects of this may affect communications between business processes and between business processes and other applications.

- *UML Profile for Enterprise Distributed Object Computing (EDOC)* – doc? The UML Profile for EDOC includes a basic representation of process elements. The Business Process Definition specification should support the specification of processes in the context of EDOC specifications.

For more information see <http://www.omg.org/schedule> and [http://www.omg.org/technology/documents/spec\\_catalog.htm](http://www.omg.org/technology/documents/spec_catalog.htm).

## **6.4 Related Activities, Documents and Standards**

6.4.1 The Workflow Management Coalition ([www.wfmc.org](http://www.wfmc.org)) has published the following specifications related to this RFP:

- Workflow Reference Model : WfMC-TC-1003, provides a general architecture for workflow management systems.
- Terminology & Glossary : WfMC-TC-1011, provides definitions for terms commonly used in discussions of workflow management.
- Workflow Process Definition Interchange : WfMC-TC-1016
- Resource Model : WfMC-TC-1020
- Process Definition Attributes List : WfMC-TC-1024

6.4.2 The following are other non-OMG specifications that are relevant to this RFP:

- Business Process Execution Language for Web Services (BPEL4WS) is a leading proposed notation for specification of web services processes. <http://www-106.ibm.com/developerworks/library/ws-bpel/>
- Business Process Markup Language (BPML) is proposed business process definition notation. <http://www.bpml.org/bpml.esp>
- Web Services Definition Language (WSDL) defines specifications for the interfaces of web services that will participate in collaborative business processes. <http://www.w3.org/TR/wsdl>

- Web Services Conversation Language (WSCL)  
<http://www.w3.org/TR/wscl10/>
- Web Services Choreography Interface (WSCI)  
<http://dev2dev.bea.com/techtrack/wsci.jsp>

6.4.3 The following OMG technology processes which are currently underway, address concerns related to this RFP ( see more details at <http://www.omg.org/techprocess/meetings/schedule/index.html>). Submissions should address their relationship to these efforts:

- UML 2.0 Infrastructure and Superstructure  
Submitters should be aware that the design of the UML metamodel may change in UML 2.0, in particular the relation between State Machines and Activity Modeling.
- UML 2.0 Object Constraint Language (OCL)  
Submitters should be aware that a metamodel for OCL will be defined in UML 2.0 and that this may relate to conditional expressions for process definitions.
- Business Process Runtime Interfaces  
The desired goal is for business process definitions to be compatible with this platform independent model of business process execution.

## **6.5 Mandatory Requirements**

Background for many of the following mandatory requirements can be found in sections 6.1 and 6.2.

### **6.5.1 UML compatibility**

Proposals shall incorporate existing model elements and define extensions as necessary in a manner that is completely consistent with UML semantics. Proposals shall not define models that have semantics already available in UML and shall reuse as much of UML as possible. OCL is part of UML and shall be treated in the same way.

### **6.5.2 Procedural and rule-based flow of control**

Proposals shall provide for specification of process flow based on control flow from completed activities to activities to be initiated as well as initiation of activities based on rules or pre-conditions.

### 6.5.3 Specification of Activity Performers

Proposals shall provide for the specification of interfaces to performers including human performers, applications and sub-processes.

### 6.5.4 Asynchronous and Concurrent Execution

Proposals shall provide mechanisms for specifying concurrent execution of activities:

- a) A process model shall be able to define when multiple, concurrent activities are initiated.
- b) A process model shall be able to define when an activity or completion of a process depend on the completion of multiple, concurrent activities. This shall include initiation of an activity based on completion of  $n$  of  $m$  concurrent activities (where  $n \leq m$ ).
- c) Business processes shall be able to invoke nested sub-processes that execute asynchronously.
- d) The model shall support specification of the publication of events and messages for asynchronous delivery.
- e) The model shall support receipt of messages from a collaborator and subscription to events. Messages and events will be received as asynchronous inputs for concurrent execution of a receiving activity with other activities in the process.

### 6.5.5 Specification of initiation and termination

Proposal shall provide modeling constructs for specifying initiation and termination of activities and processes:

- a) Pre or post conditions
- b) Actions for initialization and termination with consideration of actions required for abnormal termination, including the initiation of back-out processes.
- c) Propagation of termination to active activities and sub-processes.

**6.5.6 Collaborative and Managed Processes**

Proposals shall provide for the specification of collaborative and managed processes and for their interoperation.

**6.5.7 Audit Log Generation**

Proposals shall provide means for specifying when log records are produced and the data to be contained in the log records to support audits and performance analysis.

**6.5.8 Resource Selection Criteria**

Proposals shall provide for the specification of selection criteria for resources needed by the activities in a process including selection based on

- a) Specific resource identity
- b) Resource attributes
- c) Relationships with other assigned resources
- d) Relationships to subject matter
- e) Combinations of the above.

**6.5.9 Distributed Execution**

Proposals shall ensure that the form of definition does not preclude distributed execution.

**6.5.10 Process Definition import and export**

Proposals shall support XMI export and import for exchange of process definitions.

**6.6 Optional Requirements**

**6.6.1 Additional Execution Constraints**

Proposals may provide for the ability to model additional execution constraints, like maximum duration of a process or activity execution.

For these additional constraints the behavior of constraint violation should be modeled and its affect on the process enactment described.

**6.6.2 Support for Simulation**

Proposals may provide for the representation of data needed for the support of simulation of defined processes.

**6.6.3 Process Definition Auditing**

Proposals may provide a means of tracking changes to the process definition so that versions may be differentiated.

**6.6.4 Access Control**

Proposals may provide a means of modeling requirements for access controls for process data, artifacts, activities in a process, and process enactment.

**6.7 Issues to be discussed**

These issues will be considered during submission evaluation. They should not be part of the proposed normative specification. (Place them in Part I of the submission.)

**6.7.1 Relationship to existing UML metamodel**

Proposals shall discuss the relationship of model elements used for business process modeling to the existing UML metamodel to demonstrate consistency with the UML metamodel.

**6.7.2 Relationships between collaborative and managed processes**

Proposals shall discuss how the relationships and interactions between collaborative and managed processes are modeled.

**6.7.3 Relationship to Related UML Profiles**

Proposals shall discuss business process definitions may be incorporated with or complement other UML profiles for specification of business systems, particularly the UML Profile for EDOC.

**6.7.4 Mapping to Existing Business Process notations and UML Notation**

Proposals shall discuss how the proposed metamodel may be mapped to existing process definition notations as a demonstration of completeness and compatibility.

**6.7.5 Relationships with related OMG specification activities.**

Proposals shall discuss how the specifications relate to the specification processes under way as noted in Section 6.4.3.

**6.8 Evaluation Criteria**

Proposals will be evaluated against the mandatory and optional requirements, above, the solutions requested under issues to be discussed, and the extent to which they address the business needs as described in sections 6.1 and the scope as described in section 6.2.

**6.9 Other information unique to this RFP**

Not applicable.

**6.10 RFP Timetable**

The timetable for this RFP is given below. Note that the TF may, in certain circumstances, extend deadlines while the RFP is running, or may elect to have more than one revised submission step. The latest timetable can always be found in the Member Services section of OMG’s Web page (URL <http://www.omg.org/>)

<b>Approx Day</b>	<b>Event or Activity</b>	<b>Actual Date</b>
	<i>Preparation of RFP by TF</i>	
	<i>Approval of RFP by Architecture Board Review by TC (“Three week rule”)</i>	
<i>0</i>	<i>TC votes to issue RFP</i>	<i>November 26, 2002</i>
<i>60</i>	<i>LOI to submit to RFP due</i>	<i>April 14, 2003</i>
<i>120</i>	<i>Initial submissions due</i>	<i>May 12, 2003</i>
<i>134</i>	<i>Voter registration closes</i>	<i>June 13, 2003</i>
<i>141</i>	<i>Initial submission presentations</i>	<i>June 10, 2003</i>
	<i>Preliminary evaluation by TF</i>	<i>September, 2003</i>
<i>240</i>	<i>Revised submissions due</i>	<i>October, 2003</i>

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<i>261</i>	<i>Revised submission presentations</i>	<i>November, 2003, meeting</i>
	<i>Final evaluation and selection by TF Recommendation to AB and TC</i>	<i>January, 2003, meeting</i>
	<i>Approval by Architecture Board Review by TC (“Three week rule”)</i>	<i>January, 2003</i>
<i>330</i>	<i>TC votes to recommend specifications</i>	<i>January, 2003</i>
<i>360</i>	<i>BOD votes to adopt specifications</i>	<i>March, 2003</i>



## Appendix A      References and Glossary

### A.1              References

The following documents are referenced in this document:

[BCQ] OMG Board of Directors Business Committee Questionnaire,  
<http://www.omg.org/cgi-bin/doc?bc/02-02-01>

[EDOC] UML Profile for EDOC Specification,  
[http://www.omg.org/techprocess/meetings/schedule/UML\\_Profile\\_for\\_EDOC\\_FTF.html](http://www.omg.org/techprocess/meetings/schedule/UML_Profile_for_EDOC_FTF.html)

[FORMS] Download of OMG templates and forms,  
[http://www.omg.org/technology/template\\_download.htm](http://www.omg.org/technology/template_download.htm)

[Guide] The OMG Hitchhiker's Guide, Version 6.1,  
<http://www.omg.org/cgi-bin/doc?omg/2002-03-03>

[MDAa] OMG Architecture Board, "Model Driven Architecture - A Technical Perspective", <http://www.omg.org/mda/papers.htm>

[MDAb] "Developing in OMG's Model Driven Architecture (MDA)," <http://www.omg.org/cgi-bin/doc?omg/2001-12-01>

[MDAc] "MDA Guide" (to be published)

[MDAd] "MDA "The Architecture of Choice for a Changing World™", <http://www.omg.org/mda>

[MOF] Meta Object Facility Specification,  
<http://www.omg.org/technology/documents/formal/mof.htm>

[OMA] "Object Management Architecture™",  
<http://www.omg.org/oma/>

[OTS] Transaction Service,  
[http://www.omg.org/technology/documents/formal/transaction\\_service.htm](http://www.omg.org/technology/documents/formal/transaction_service.htm)

[P&P] Policies and Procedures of the OMG Technical Process,  
<http://www.omg.org/cgi-bin/doc?pp>

[RM-ODP] ISO/IEC 10746

[SEC] CORBA Security Service,  
[http://www.omg.org/technology/documents/formal/security\\_service.htm](http://www.omg.org/technology/documents/formal/security_service.htm)

[TOS] Trading Object Service,  
[http://www.omg.org/technology/documents/formal/trading\\_object\\_service.htm](http://www.omg.org/technology/documents/formal/trading_object_service.htm)

[UML] Unified Modeling Language Specification,  
<http://www.omg.org/technology/documents/formal/uml.htm>

[UMLC] UML Profile for CORBA, <http://www.omg.org/cgi-bin/doc?ptc/01-01-06>

[UMLM] Chapter 6 of UML Profile for EDOC, <http://www.omg.org/cgi-bin/doc?ptc/02-02-05>

[XMI] XML Metadata Interchange Specification,  
<http://www.omg.org/technology/documents/formal/xmi.htm>

[XML/Value] XML Value Type Specification, <http://www.omg.org/cgi-bin/doc?ptc/2001-04-04>

These documents (and information about the OMG in general) can be obtained from the OMG's web site (<http://www.omg.org>). Documents may also be obtained by contacting OMG at [documents@omg.org](mailto:documents@omg.org). Questions related to the OMG's technology adoption process may be directed to [omg-process@omg.org](mailto:omg-process@omg.org). General questions about this RFP may be sent to [responses@omg.org](mailto:responses@omg.org).

## A.2 Glossary

**Architecture Board (AB)** - The OMG plenary that is responsible for ensuring the technical merit and MDA-compliance of RFPs and their submissions.

**Board of Directors (BoD)** - The OMG body that is responsible for adopting technology.

**Common Object Request Broker Architecture (CORBA)** - An OMG distributed computing platform specification that is independent of implementation languages.

**Common Warehouse Metamodel (CWM)** - An OMG specification for data repository integration.

**CORBA Component Model (CCM)** - An OMG specification for an implementation language independent distributed component model.

**Interface Definition Language (IDL)** - An OMG and ISO standard language for specifying interfaces and associated data structures.

**Letter of Intent (LOI)** - A letter submitted to the OMG BoD's Business Committee signed by an officer of an organization signifying its intent to respond to the RFP and confirming the organization's willingness to comply with OMG's terms and conditions, and commercial availability requirements.

**Mapping** - Specification of a mechanism for transforming the elements of a model conforming to a particular metamodel into elements of another model that conforms to another (possibly the same) metamodel.

**Metadata** - Data that represents models. For example, a UML model; a CORBA object model expressed in IDL; and a relational database schema expressed using CWM.

**Metamodel** - A model of models.

**Meta Object Facility (MOF)** - An OMG standard, closely related to UML, that enables metadata management and language definition.

**Model** - A formal specification of the function, structure and/or behavior of an application or system.

**Model Driven Architecture (MDA)** - An approach to IT system specification that separates the specification of functionality from the specification of the implementation of that functionality on a specific technology platform.

**Platform** - A set of subsystems/technologies that provide a coherent set of functionality through interfaces and specified usage patterns that any subsystem that depends on the platform can use without concern for the details of how the functionality provided by the platform is implemented.

**Platform Independent Model (PIM)** - A model of a subsystem that contains no information specific to the platform, or the technology that is used to realize it.

***Platform Specific Model (PSM)*** - A model of a subsystem that includes information about the specific technology that is used in the realization of it on a specific platform, and hence possibly contains elements that are specific to the platform.

***Request for Information (RFI)*** - A general request to industry, academia, and any other interested parties to submit information about a particular technology area to one of the OMG's Technology Committee subgroups.

***Request for Proposal (RFP)*** - A document requesting OMG members to submit proposals to the OMG's Technology Committee. Such proposals must be received by a certain deadline and are evaluated by the issuing task force.

***Task Force (TF)*** - The OMG Technology Committee subgroup responsible for issuing a RFP and evaluating submission(s).

***Technology Committee (TC)*** - The body responsible for recommending technologies for adoption to the BoD. There are two TCs in OMG – *Platform TC* (PTC), that focuses on IT and modeling infrastructure related standards; and *Domain TC* (DTC), that focus on domain specific standards.

***Unified Modeling Language (UML)*** - An OMG standard language for specifying the structure and behavior of systems. The standard defines an abstract syntax and a graphical concrete syntax.

***UML Profile*** - A standardized set of extensions and constraints that tailors UML to particular use.

***XML Metadata Interchange (XMI)*** - An OMG standard that facilitates interchange of models via XML documents.