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Information Technology – Automatic identification and data capture techniques –Using RGPS for on demand model selection

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Foreword

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ISO/IEC Technical Report XXXXX, Information Technology –Using RGPS for on demand model selection, was prepared by Joint Technical Committee ISO/IEC JTC 1, Information Technology, Subcommittee SC 32, Data management and Interchange.

Introduction

ISO/IEC Technical Report XXXXX, Information Technology –Using RGPS for on demand model selection, was prepared by Joint Technical Committee ISO/IEC JTC 1, Information Technology, Subcommittee SC 32, Data management and Interchange.

Due to the spread of e-Business and e-Commerce over the Internet, the effective interchange of business transactions or other related information across countries and cultures is an important concern for people in both the IT industry and other non-IT industries.

To follow the current trends of EB or EC, industrial consortia have engaged in the standardization of domain-specific objects including business process models and software components using common modeling facilities and interchange facilities such as UML and XML. They are very active in standardizing domain-specific business process models and standard modeling constructs such as data elements, entity profiles, and value domains.

Each part in ISO/IEC 19763 provides corresponding registration mechanism for different kinds of information resources in business domain, such as ontology, role, goal, process, and service. Users in a specific domain may express their requirements in various ways since they have different background. Based on the registration metamodels in ISO/IEC 19763, TRxxxx describes intrusive and non-intrusive methods for on demand model selection so as to satisfy users' requirements.

Information Technology –Metamodel framework for interoperability (MFI) —Using RGPS for on demand model selection

1 Scope

This ISO/IEC Technical Report specifies a technical guideline on how to use R, G, P, and S metamodels to select appropriate combinations of models and/or services to meet users' goals. It also specifies how to use the RGPS infrastructure to support operational harmonization and interoperability within and between industries.

2 References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 19763-1, Information technology – Metamodel framework for interoperability (MFI) – Part 1: Reference model

ISO/IEC 19763-2, Information technology – Metamodel framework for interoperability (MFI) – Part 2: Core model

ISO/IEC 19763-3, Information technology – Metamodel framework for interoperability (MFI) – Part 3: Metamodel for ontology registration

ISO/IEC 19763-5, Information technology – Metamodel framework for interoperability (MFI) – Part 5: Metamodel for process model registration

ISO/IEC 19763-7, Information technology – Metamodel framework for interoperability (MFI) – Part 7: Metamodel for service registration

ISO/IEC 19763-8, Information technology – Metamodel framework for interoperability (MFI) – Part 8: Metamodel for role and goal registration

3 Terms and definitions

For the purposes of ISO/IEC XXXXX, the definitions contained in ISO/IEC 19763, Part 2, 3, 5, 7, and 8, and the following shall apply.

4 Symbols (and abbreviated terms)

RGPS Role, Goal, Process, and Service

ODMS On Demand Model Selection

5 Overview of RGPS

For the purposes of this Technical Report, RGPS is considered a generic term referring to methods of applying a metamodels in MFI onto on demand model selection.

There are overall relationships among the various kinds of information models (Figure 1). To sum up, roles take charge of their corresponding role goals, and actors prefer their respective personal goals. The goal decomposition process ends until the leaf-level subgoals are operational goals. Processes can directly or collaboratively achieve operational goals. Web services can realize certain processes. More specifically,

An actor can play zero or more roles.

A role must be played by at least one actor.

An actor can prefer zero or more personal goals.

A personal goal must be preferred by at least one actor.

A role must take charge of at least one role goals.

A role goal can be taken charge by exactly one role.

Operational goals have the type of goal.

An operational goal can be achieved by zero or more processes.

A process must achieve exactly one operational goal.

A process can be realized by zero or more services.

A service can realize exactly one process.

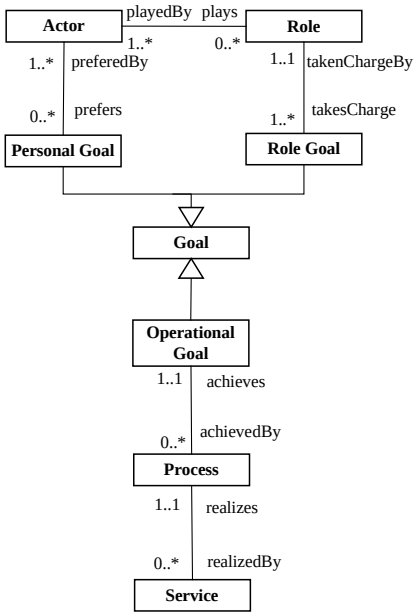

Figure 1 — Relationships in RGPS

6 Typical Model Selection Cases

Some model selection cases will be illustrated to show how RGPS can support on demand model selection based on the registration metamodels in MFI. During the model selection process, two factors should be identified: how users' requirements are represented and what is the expected result for users. In SOA based business application, services are the most desirable information resource. In the model selection cases to be introduced in this clause, service is the expected result for users. RGPS can also support process and goal as the expected selection result.

6.1 Case 1: from role to service

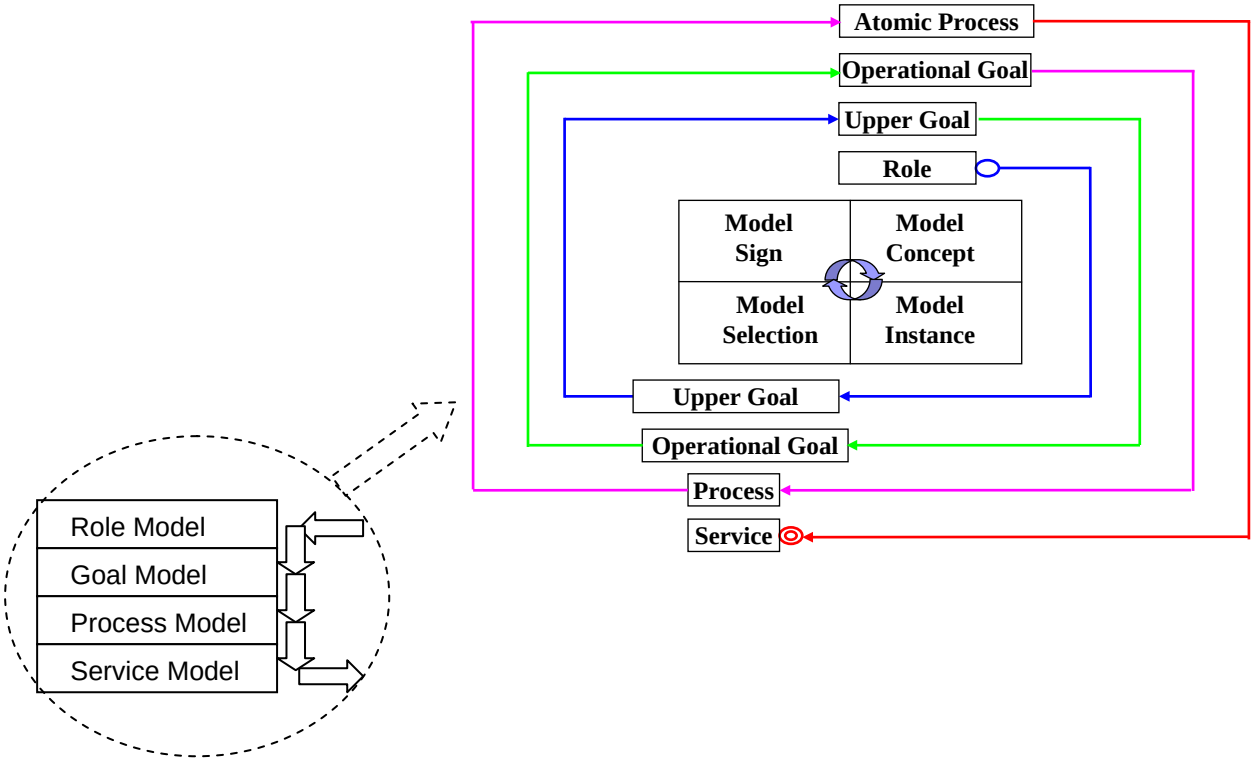

Figure 2 — Model selection from role to service

In this case, user's requirements can be proposed from the perspective of a role, and the service model is his expected response.

The model selection process is as follows (figure 2).

For the role the actor will play, there are some candidate upper goals that can be chosen. The user can select some upper goals. In this selection stage, role is viewed as a model concept, and upper goals are viewed as candidate model instances.

For each upper goal, based on the decomposition relation defined in the goal model, some subgoals can be selected. This process will iterate until all the selected goals have a link to operational goals. Then, based on the constraint relation, the selected goal set can be refined further. If a selected goal relates other goals by a depend relation, these goals should also be selected. If a selected goal related other goals by an exclude relation, these goals should not be coexisted in the resulting goal set. In this selection stage, upper goal is viewed as a model concept, and operational goals are viewed as candidate model instances.

For each selected operational goal, based on the relationship between process and operational goal, the processes that can achieve the operational goals can be selected. Then, these selected processes can be composed as a composite process to achieve an upper goal. The composite process defines the execution procedure of the atomic processes. In this selection stage, operational goal is viewed as a model concept, and processes are viewed as candidate model instances.

For each atomic process, based on semantically matching input, output, precondition, and postcondition, the services that can satisfy the matching condition can be selected to realize the processes. These selected services can be invoked based on the execution procedure defined in the composite process. In this selection stage, atomic process is viewed as a model concept, and services are viewed as candidate model instances.

6.2 Case 2: from goal to service

In this case, user's requirements can be represented as a goal, and the service model is his expected response.

There are two sub cases. First, the users' requirements represented as a goal can b e processed from goal model to process model, then to service model. Second, in order to provide value-added service, based on the proposed goal, the role that the actor plays can be determined. Then, the actor can select some other goals owned by the role.

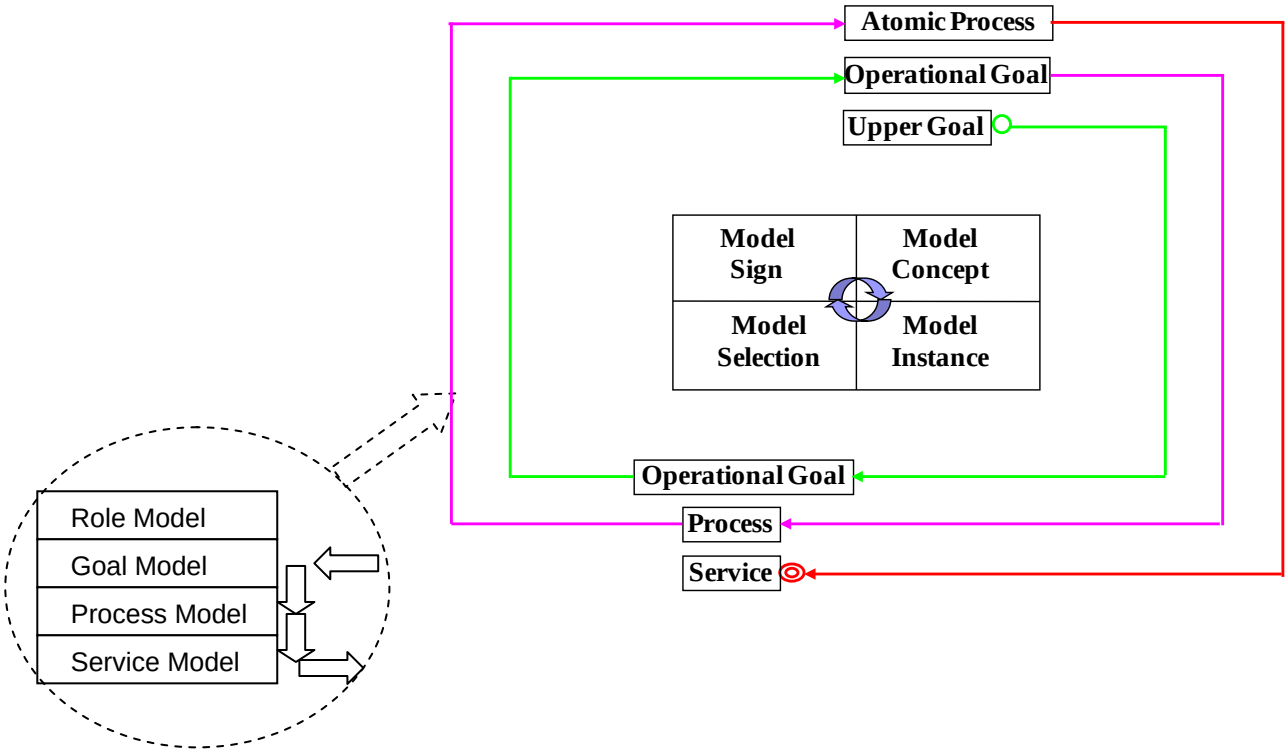

Figure 3 — Model selection from goal to service (1)

In case 2.1, the model selection process is as follows (figure 3).

For this goal, based on the decomposition relation defined in the goal model, some subgoals can be selected. This process will iterate until all the selected goals have a link to operational goals. Then, based on the constraint relation, the selected goal set can be refined further. If a selected goal relates other goals by a depend relation, these goals should also be selected. If a selected goal related other goals by an exclude relation, these goals should not be coexisted in the resulting goal set. In this selection stage, upper goal is viewed as a model concept, and operational goals are viewed as candidate model instances.

For each selected operational goal, based on the relationship between process and operational goal, the processes that can achieve the operational goals can be selected. Then, these selected processes can be composed as a composite process to achieve an upper goal. The composite process defines the execution procedure of the atomic processes. In this selection stage, operational goal is viewed as a model concept, and processes are viewed as candidate model instances.

For each atomic process, based on semantically matching input, output, precondition, and postcondition, the services that can satisfy the matching condition can be selected to realize the processes. These selected services can be invoked based on the execution procedure defined in the composite process. In this selection stage, atomic process is viewed as a model concept, and services are viewed as candidate model instances.

In case 2.2, the model selection process is as follows (figure 4).

Firstly, based on the goal proposed by an actor, the role he plays can be determined.

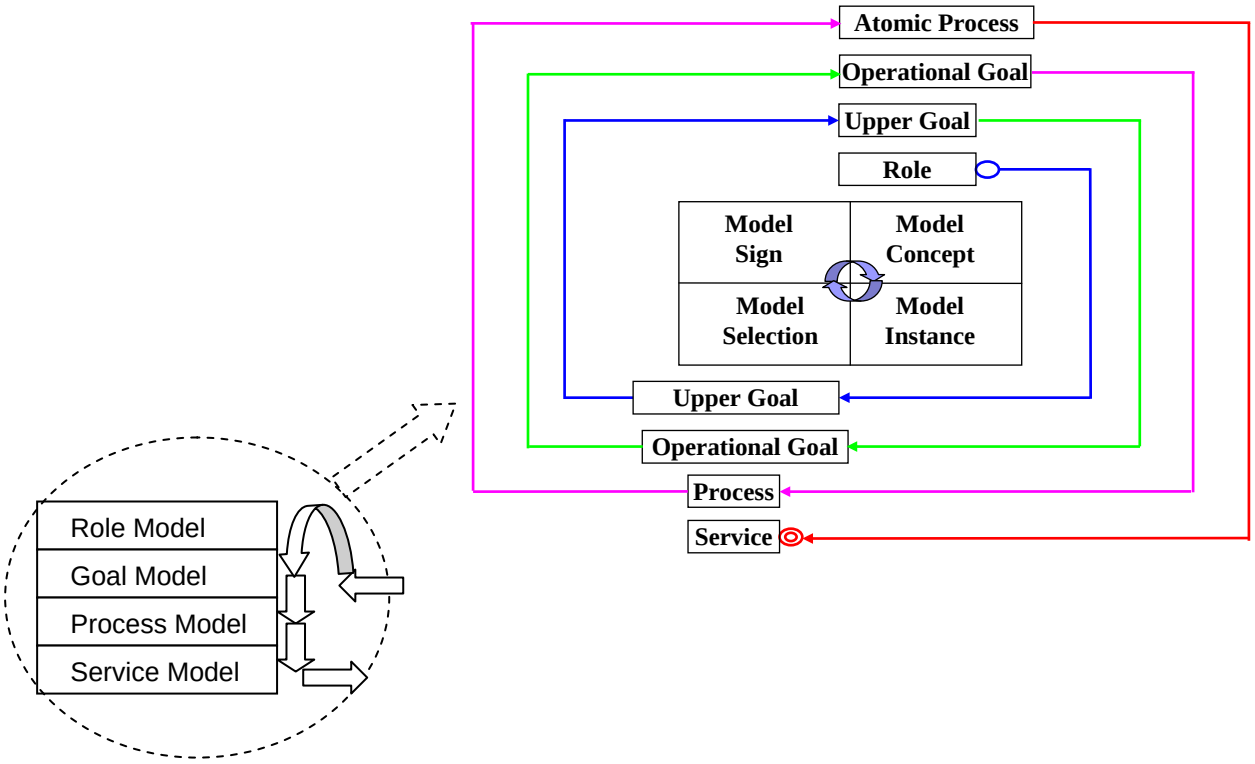

Figure 4 — Model selection from goal to service (2)

For the determined role, there are some candidate upper goals that can be chosen. The user can select some upper goals. In this selection stage, role is viewed as a model concept, and upper goals are viewed as candidate model instances.

For each upper goal, based on the decomposition relation defined in the goal model, some subgoals can be selected. This process will iterate until all the selected goals have a link to operational goals. Then, based on the constraint relation, the selected goal set can be refined further. If a selected goal relates other goals by a depend relation, these goals should also be selected. If a selected goal related other goals by an exclude relation, these goals should not be coexisted in the resulting goal set. In this selection stage, upper goal is viewed as a model concept, and operational goals are viewed as candidate model instances.

For each selected operational goal, based on the relationship between process and operational goal, the processes that can achieve the operational goals can be selected. Then, these selected processes can be composed as a composite process to achieve an upper goal. The composite process defines the execution procedure of the atomic processes. In this selection stage, operational goal is viewed as a model concept, and processes are viewed as candidate model instances.

For each atomic process, based on semantically matching input, output, precondition, and postcondition, the services that can satisfy the matching condition can be selected to realize the processes. These selected services can be invoked based on the execution procedure defined in the composite process. In this selection stage, atomic process is viewed as a model concept, and services are viewed as candidate model instances.

6.3 Case 3: from process to service

In this case, user's requirements can be represented as a process, and the service model is his expected response.

There are two sub cases. First, the users' requirements represented as a process can b e processed from process model to service model. Second, in order to provide value-added service, based on the proposed process, the goal that relate to the process can be determined, and furthermore the role that the actor plays can be determined. Then, the actor can select some other goals owned by the role, and then some other processes can also be selected.

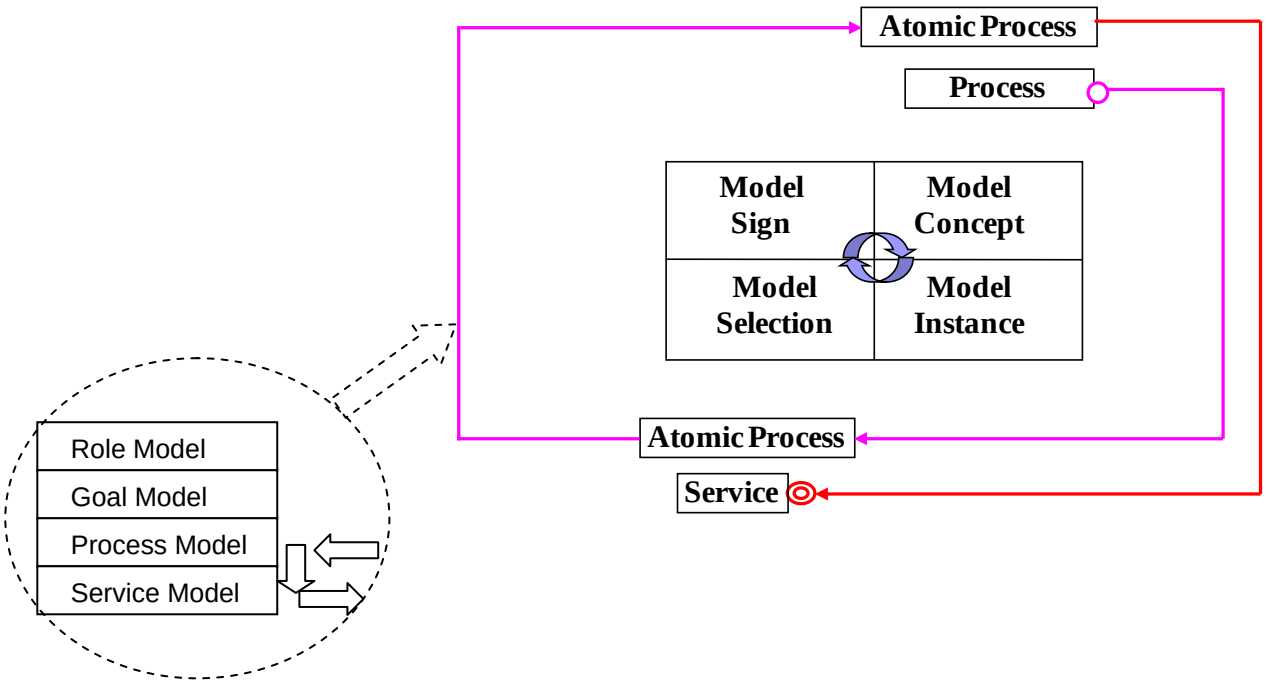

Figure 5— Model selection from process to service (1)

In case 3.1, the model selection process is as follows (figure 5).

The selected processes can be composed as a composite process to satisfy users' requirements. The composite process defines the execution procedure of the atomic processes. In this selection stage, operational goal is viewed as a model concept, and processes are viewed as candidate model instances.

For each atomic process, based on semantically matching input, output, precondition, and postcondition, the services that can satisfy the matching condition can be selected to realize the processes. These selected services can be invoked based on the execution procedure defined in the composite process. In this selection stage, atomic process is viewed as a model concept, and services are viewed as candidate model instances.

In case 3.2, the model selection process is as follows (figure 6).

Firstly, based on the process proposed by an actor, the related goal can be determined, and then the role he plays can be determined.

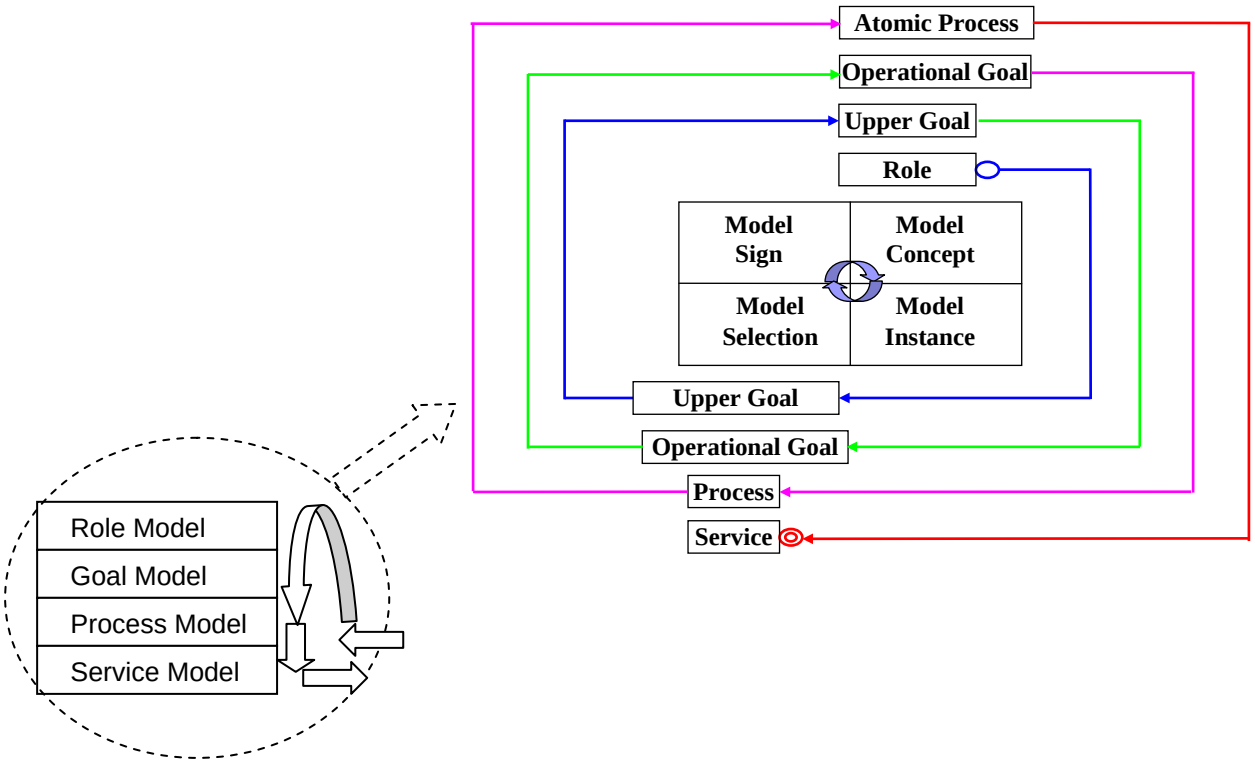

Figure 6— Model selection from process to service (1)

Then, for the determined role, there are some candidate upper goals that can be chosen. The user can select some upper goals. In this selection stage, role is viewed as a model concept, and upper goals are viewed as candidate model instances.

For each upper goal, based on the decomposition relation defined in the goal model, some subgoals can be selected. This process will iterate until all the selected goals have a link to operational goals. Then, based on the constraint relation, the selected goal set can be refined further. If a selected goal relates other goals by a depend relation, these goals should also be selected. If a selected goal related other goals by an exclude relation, these goals should not be coexisted in the resulting goal set. In this selection stage, upper goal is viewed as a model concept, and operational goals are viewed as candidate model instances.

For each selected operational goal, based on the relationship between process and operational goal, the processes that can achieve the operational goals can be selected. Then, these selected processes can be composed as a composite process to achieve an upper goal. The composite process defines the execution procedure of the atomic processes. In this selection stage, operational goal is viewed as a model concept, and processes are viewed as candidate model instances.

For each atomic process, based on semantically matching input, output, precondition, and postcondition, the services that can satisfy the matching condition can be selected to realize the processes. These selected services can be invoked based on the execution procedure defined in the composite process. In this selection stage, atomic process is viewed as a model concept, and services are viewed as candidate model instances.

6.4 Case 4: From service to service

In case 4.1, based on the input and output, or precondition and postcondition proposed by the user, a directly matching can be conducted between uses' requirements and services registered in the service registry.

In case 4.2, the model selection process is as follows (figure 7).

Firstly, based on the process proposed by an actor, the related goal can be determined, and then the role he plays can be determined.

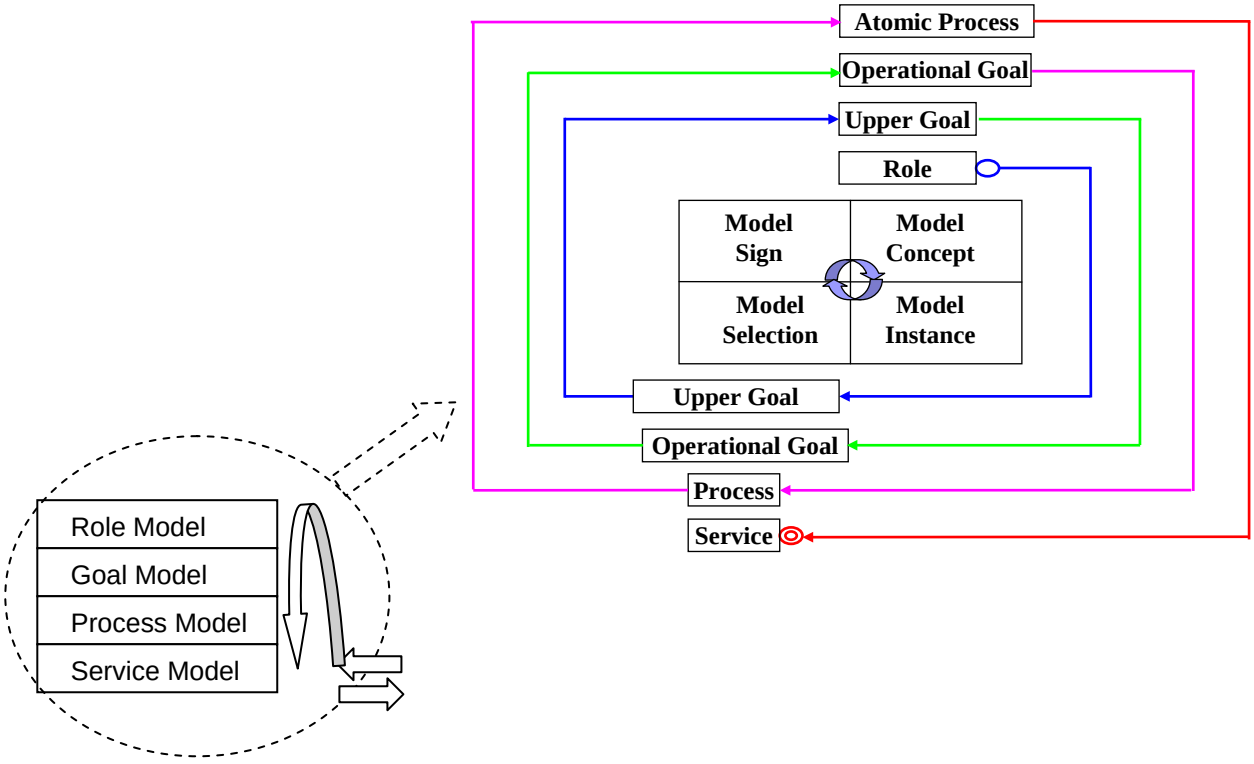

Figure 7— Model selection from service to service

For the determined role, there are some candidate upper goals that can be chosen. The user can select some upper goals. In this selection stage, role is viewed as a model concept, and upper goals are viewed as candidate model instances.

For each upper goal, based on the decomposition relation defined in the goal model, some subgoals can be selected. This process will iterate until all the selected goals have a link to operational goals. Then, based on the constraint relation, the selected goal set can be refined further. If a selected goal relates other goals by a depend relation, these goals should also be selected. If a selected goal related other goals by an exclude relation, these goals should not be coexisted in the resulting goal set. In this selection stage, upper goal is viewed as a model concept, and operational goals are viewed as candidate model instances.

For each selected operational goal, based on the relationship between process and operational goal, the processes that can achieve the operational goals can be selected. Then, these selected processes can be composed as a composite process to achieve an upper goal. The composite process defines the execution procedure of the atomic processes. In this selection stage, operational goal is viewed as a model concept, and processes are viewed as candidate model instances.

For each atomic process, based on semantically matching input, output, precondition, and postcondition, the services that can satisfy the matching condition can be selected to realize the processes. These selected services can be invoked based on the execution procedure defined in the composite process. In this selection stage, atomic process is viewed as a model concept, and services are viewed as candidate model instances.

6.5 Other cases

Besides the cases introduced above, there are also some other model selection cases supported by RGPS. These other cases are very similar to the above mentioned model selection cases, and the difference is that the expected response may be goal models or process models instead of service models.