

D-015

The Principles of Handling Process Object in the Method of Resolving Differences -- Reconsidering Object 6 --

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1. Preface

To recognize something in the real world is simply to recognize elements of something and the relations between them. To change something in the real world is simply to change elements of something and/or the relations between them.

Every relation has a possibility to change something. Something that has no possibility to change others or to be changed by others does not exist in the world. The relation having possibility to change something is realized to become movement in the real world.

The requirements on the ideal theory of recognition and changing of the world are to handle every object to be recognized and to operate it in every possible types of changing object in every applying area including technology and institution. [4]

To meet the requirements we must reconsider some basic concepts around object and make some principle to deal with object. Object consists of **System Object** and **Process Object** corresponding to “being” and “movement” respectively, and is everything to be recognized by us. [1][2][3]

Changing Object consists of changing attributes of Object and generating or deleting Object. There are two types of relation between human being and Object. There are big differences between the way of changing Process Object and that of System Object. We can handle System Object directly. On the contrary we can not touch Process Object directly. **Practically one of the reasons Process Object has not been treated explicitly so far is that we don't grasp the way how to deal with it.** So this paper shows the outline of dealing with changing Object including Process Object.

2. The Principles to Change Object Physically

To change the world we must decide logical contents of changing Object first as the purpose, secondly grasp how to change it in the thinking world and finally realize it physically in the real world. Changing Object physically is usually done in two steps in which operating Object by person is done completely or followed by non-human processes of transforming Object. Operating Object by person and transformation of Object in the real world combines to make up a whole of changing Object including Process Object.

21. The Principles of Transforming Object

In Function-Analysis Diagram Object 1 act on object 2 as shown in the Fig.1.



Figure 1: Object 1 and Process Object Makes Object 2

“Object 1- Process Object- Object 2 model” is a simplified one that extracted from m- to- n bilateral relation in the real world to show one to one causal relation, which usually means Object 1 and Process Object makes Object 2. I recognize the real world and use the system as this model says. In this recognition various granularities are available so both Object 1 and Object 2 are not restricted to System Object. We can see the world at various granularities. A social activity acts on another social activity. A physical action acts on another physical action to change the direction of its action.

We have types of “phase” or “mode” on the relation between human being and technical systems or institutional systems. In “**make mode**” we actively make or change technical systems or institutional systems. In “**use mode**” we simply make use of existing technical systems or institutional systems. In these modes person has intentional relation with technology and institution.

This change as in “Use mode” is treated as **Principle U**.

Principle U of changing Object: Object 1 and Process Object makes Object 2

If only Object 1 and Process Object makes Object 2, Principle U of changing Object is available not only in “use mode” but also in “make mode”. (In the same manner we get the next Principle.

Principle U+ of changing Object: We can make Process Object and Object 2 in “Object 1- Process Object- Object 2 Model” change Object 1.)

In recognition of the real world we use “Object 1- Process Object- Object 2 model” as an element of network of recognition.

But we can not use “Object 1- Process Object- Object 2 Model” to change the attributes of Object 1, Process Object or Object 2, because each attributes of this running model is our very target to change.

In use mode” in the real world we have little chance to change the object. Important thing is that the model is effective only in the real world at a granularity to change Object 2 for human being.

I return “Object 1- Process Object- Object 2 model” to the original bilateral relation maintaining one to one relation as in next Figure.



Figure 2: “Object 1- Process Object- Object 2 Model” with Bilateral Relation

This Figure shows the possibility that in some cases Object 1 and Object 2 make Process Object. This is shown in next Figure.



Figure 3: Change Process Object using “Object 1- Process Object- Object 2 Model”

For example to extinguish fire we cut an air, pour water to cool down the temperature of flammable material or remove flammable material. In this example cutting an air or removing flammable material is deleting Object 1 or Object 2 which is both end of Process Object to delete Process Object.

So we get next Principle on transformation of Object in processes of real world.

Principle P of changing Object: We can make Object 1 and Object 2 in “Object 1- Process Object- Object 2 Model” change Process Object. To do so both Object 1 and Object 2 must be restricted to System Object.

It is important that it is not true that Object 1 and Object 2 must be always restricted to System Object. This could narrow our viewpoint.

Besides these Principles next Principle is a general one according to dialectic law.

Principle D of changing Object: Changing total attributes or structure of Object can generate a new Object or delete itself according to Dialectic law.

Contents of Object or **attributes** can change Object itself. Attributes of Object is total attributes and structure of lower level objects. Therefore change of total attributes or structure of lower level objects can change the contents of Object or Object itself. In dialectic relation quantitative change of total attributes or structural change in lower level objects can cause qualitative change of object to become a new Object different from the existing one. This means to generate a new Object or delete the existing Object. This Principle includes the law of the mutual transformation of quantitative and qualitative changes in usual dialectics.

Dialectic law deals with autonomous change in the real world and in the thinking world. But we use this law from the viewpoint of input output relation. On the occasion of using Principle D we change total attributes and structure of lower level objects to change Object itself. To say exactly the input of Principle D is changing total attributes and states of Object and structure of lower level Object which consists of number of elements, structure of elements and elements themselves.

Principle U or Principle P can act on Principle D.

22. Types of Operating Object by Person

First type of operating Object is a very ordinary one but important.

Type A of operating Object: We can Act on each Object in “Object 1- Process Object- Object 2 Model”. Both Object 1 and Object 2 must be restricted to System Object.

The other type of operating Object is rather simple. In “use mode” Object can be generated, deleted or changed in the real world according to “Object 1- Process Object- Object 2 Model”. On the other hands in “make mode” we can intervene in this real time process seemingly freely without any restriction. In this intervention we can generate, delete or change Object in “make mode”. The only restriction we have here is that “make mode” can transit to “use mode” smoothly. That is to say it is the only restriction that “Object 1- Process Object- Object 2 Model” that is to be made in “make mode” can be realized in the world. This means that in this type we can bring in, bring out or replace Object in “make mode” freely regardless of existing Object.

Type R of operating Object: We can bring in, bring out or Replace each Object of “Object 1- Process Object- Object 2 Model”, whole model itself or even a series of the model freely regardless of existing Object.

23. Summary

Thus we get Types of operating Object by person and Principles of transforming Object in processes of real world. Changing Object is usually done in two steps in which each Types of operating Object by person and each Principles of changing Object using Type of operating Object in the real world combines to make up a whole of changing Object including Process Object. The outline of whole structure of changing Object physically is shown in next Figures.

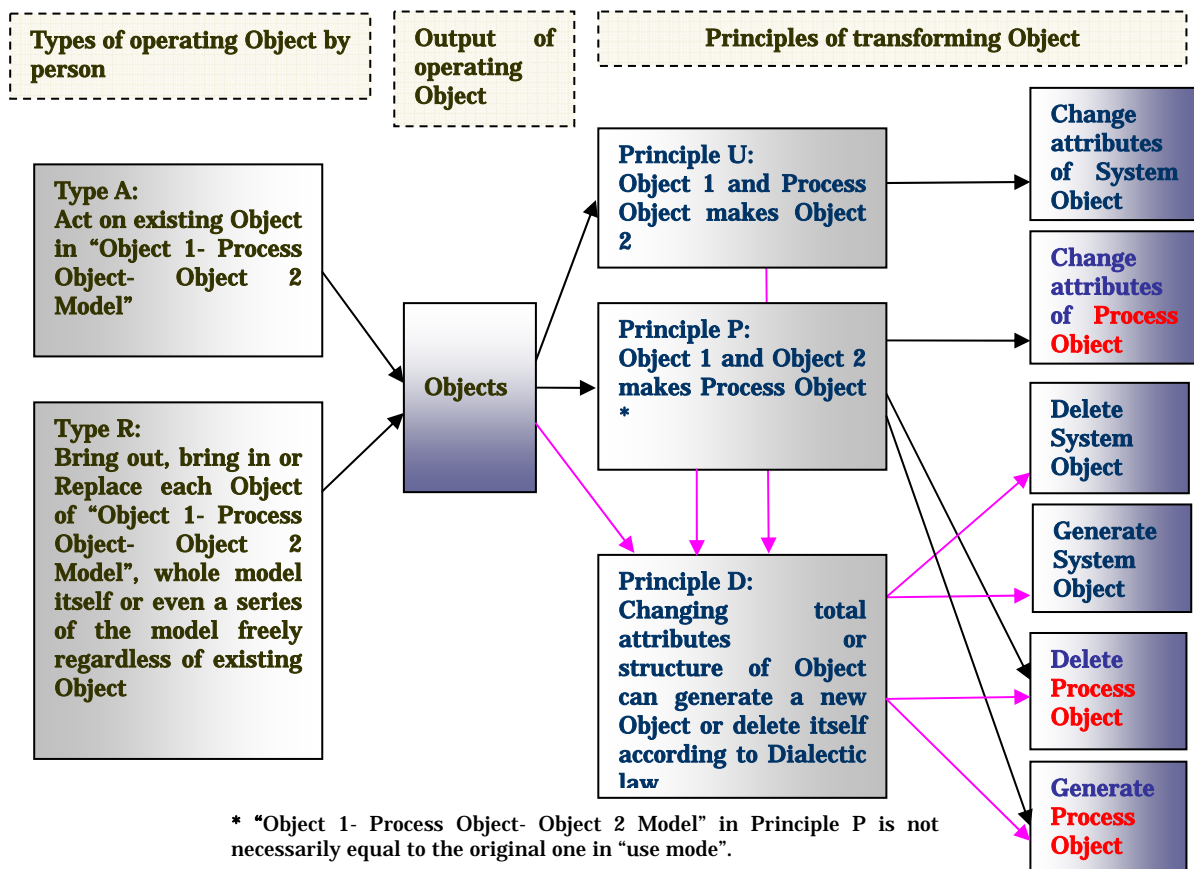


Figure 4: Outline of Physical Structure of Changing Object

3. Logical Contents of Changing Object

Before changing Object physically we must decide logical contents of changing Object which is a result of recognizing differences to be resolved depending on the situation as the functional purpose. [4] Then this content of purpose is realized by principles to change Object physically.

Function is fundamentally positive meaning of Object. [2][4] This function is divided in two types. One is fundamental function or process function which is positive meaning of Process Object itself. And the other is subsidiary function or attribute function which is positive meaning of an attribute of Object which consist of System Object and Process Object.

In general **differences** are the differences between two Objects, differences between an attribute of an Object and an absence of the attribute of the other Object which is the attribute of the Object itself or differences between an Object and an absence of the Object which is in the same way the Object itself.

Purposes or types of resolving differences are enumerated in the following way. First type of resolving differences is making new function to generate Process Object. The other type of resolving differences to delete Process Object or change attributes of Object is divided into idealizing system and resolving issues. Resolving issues is to resolve defective issues caused to users by existing system. Idealizing system is an improvement on system not caused by defects of system. [4] These are shown in the next Figure.

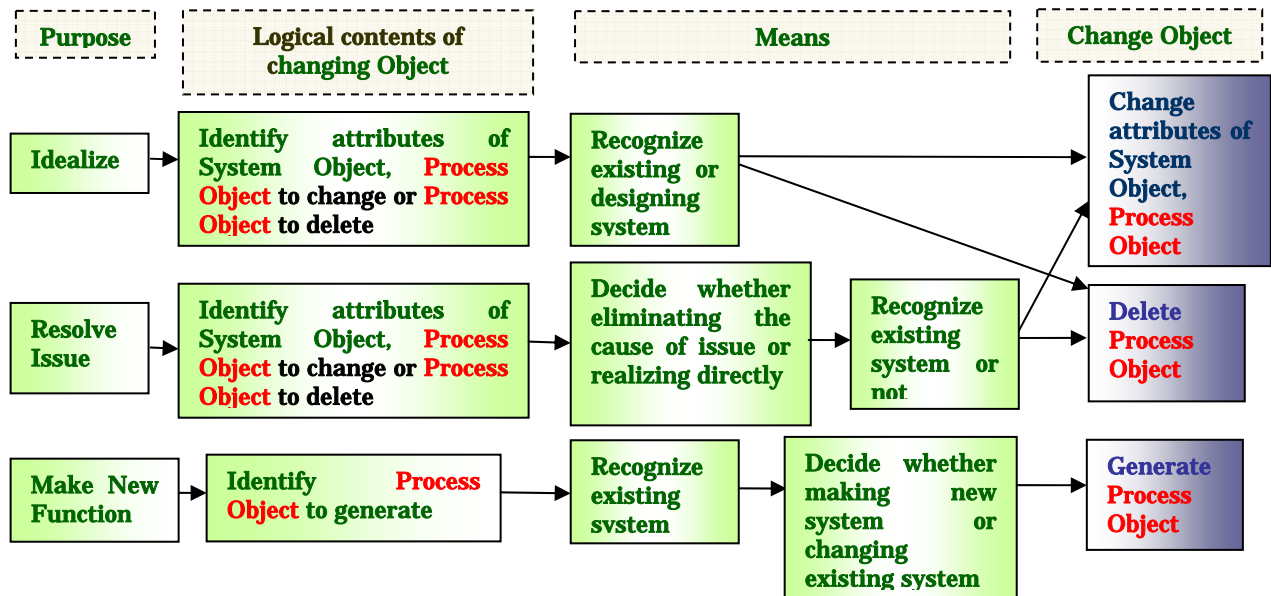


Figure 5: Outline of Logical Contents of Changing Object to Resolve Differences

4. Conclusion

I showed the outline of basic principles of handling Process Object. These basic principles will become the base of the method of changing world which is to resolve differences including usual problem solving, idealizing system and making new system.

References

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- [4] TAKAHARA Toshio, "A Method of Resolving Differences Based on the Concepts of Function and Process Object", 2nd Symposium of TRIZ, Osaka, Japan, Sept.2006.