Cost Analysis – How to Deal with Cycles

Prerequisites: *general orientation in the Craft.CASE environment, mathematical and logical basics.*

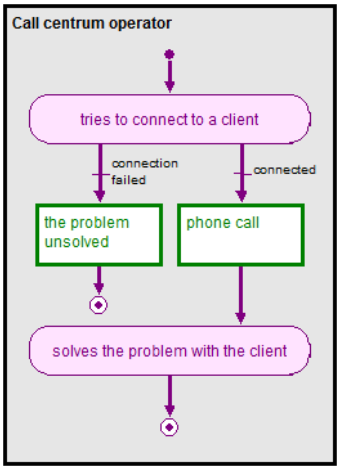
In our newsletters we have already focused on using your business process model to evaluate the process costs. We demonstrated with a simple example how a customized package for cost analysis could automatically generate a cost report for your processes. This time, we will attempt to explain cost analysis in more detail, focusing chiefly on cycles.

What have we covered so far?

Remember, in the 2010-04-06 Customized Package for Cost Analysis newsletter we learnt about substantial user properties for cost analysis:

- a text property '*Time*' on activities, identifying how much time is needed to execute the activity, and
- a real number property '*Frequency*' on communications, transition-starts and transition-ends, identifying the probability that the process will flow through the branch.

The following picture shows an example of a very simplified process using the new *Time* and *Frequency* properties.



Activity	**Time**
"tries to connect to a client"	1 min
„solves the problem with the client"	5 min

Condition	**Probability**
"connection failed"	0.3 (30%)
"connected"	0.7 (70%)

In the 2010-05-10 Advanced Simulation Control newsletter we spoke about another two properties, which are important for the cost analysis package to work properly, although in most situations understanding them is not necessary:

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- a '*condition-function'* property and
- a '*variable-function'* property.

Both of them are *"control"* properties; they control simulations in both Craft.CASE and cost analysis computing.

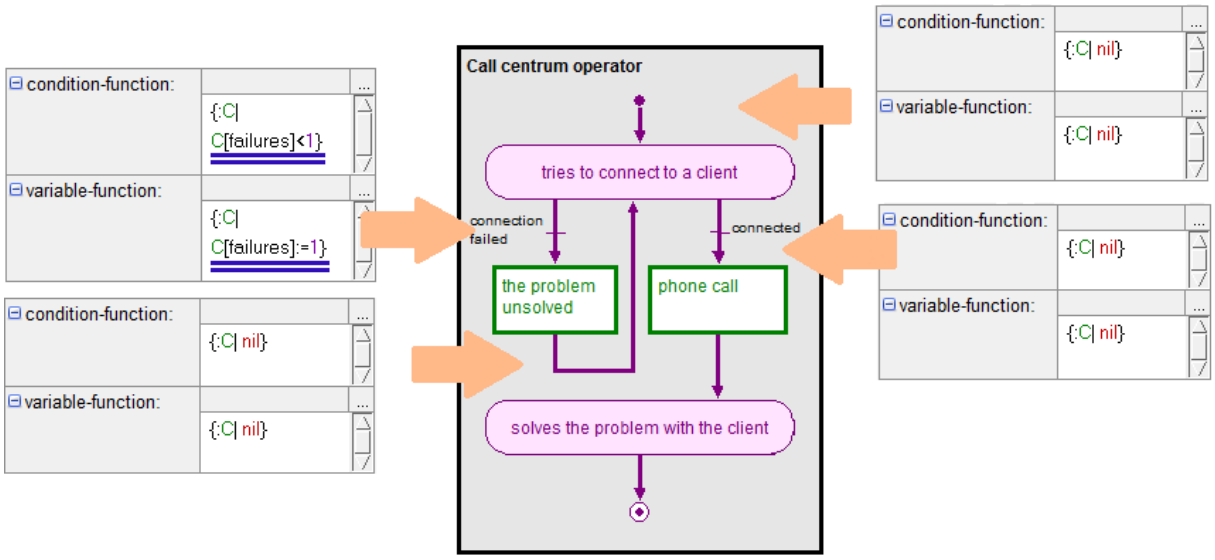
But the real world looks a bit more complex…

An observant reader would likely have noticed that the simplified process from the example would not necessarily reflect reality. If the operator tries to connect to a client and a connection fails, the process will not end. Instead, the operator will probably try again in a few minutes, which begs the question:

"*Is the probability of failure the same in the second attempt?*"

Let's assume that in our simplified example the operator always connects to a client when trying for the second time.

See the picture below. It shows how to correct the process and the properties of '*condition-function'* and '*variable-function'* to reflect both the real world and our initial assumption.



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Here is the result of the cost report. All the problems are solved with the clients (70% on the first try, and 30% on the second try).

The operator initially tries to connect to the client in 100% of the cases, and then tries to connect to the remaining 30% the second time. In summary, it means that the activity "*tries to…*" is executed in 130% of the cases.

Activity	Probability
"tries to …"	1.3
"solves the …"	1

How does it work?

When the process comes to a transition which has defined a *variable-function* (not default *nil*), Craft.CASE assigns a value(s) to use later. In our example, when Craft.CASE goes through the "*connection-failed*" branch for the first time, Craft.CASE assigns the number of failures as 1 (`C[failures]:=1`). Later, when it comes to the decision of whether "*connected*" or "*connection failed*" for the second time, the condition-function of the "*connection-failed*" branch will return **false** because **failures is not < 1** (as it is exactly one). So the process **will not** visit it.

Note that when it comes to the same decision the first time, Craft.CASE has not been assigned a 'failure' number yet, so the condition-function of the "*connection-failed*" branch does not return '**false'**.

Supplementary Information:

- See the 2010-04-06 Customized Package for Cost Analysis newsletter
- See the 2010-05-10 Advanced Simulation Control newsletter
- See the cost analysis tutorial (will be provided with the customized package)
- See the cost analysis methodology (will be provided with the customized package)
- Visit our scripting training to receive a more comprehensive understand of functions

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