

# FUNCTION POINT ANALYSIS AND WORKFLOW PROJECTS

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## ABSTRACT

This paper deals with the cost estimation methods of developing workflow projects. It presents suggestion of the modification of method – FPA for the workflow projects. In this paper there is described estimation question of unadjusted function point count, of these are computed adjusted function points subsequently and cost for the whole project development.

## 1. INTRODUCTION

Process oriented approach to management of companies and institutions is growing more common. This method substitutes older function of view technique which divided the work among function units. On the basis of appropriate skills the function units were created and executed only for specific activity independently from general result.

The automatization of part or whole of company process, during which the documents, information or tasks are transferred in accordance with set of the procedural rules from one participant to the other to processing, is termed workflow. Workflow process is in parts organized set of activities, which on the basis of one or more inputs forms required output repeatedly. In the following text the term workflow projects represents all of projects, which are consisted of the set of workflow processes.

As well as with the information systems, development of workflow project bears considerable financial risks which are related to the development. Consequently, it requires thorough planning and relevant rate of responsibility in the decision. It is necessary to analyse the costs of product development. The common use costs estimation methods are intended especially for typical software systems, not to costs estimation of workflow project. In the case of typical software projects the project costs estimation is calculated by the function point method FPA, which is based on the description of final product functionality. After specific modification of FPA method is possible to be used for calculation of estimated costs of workflow projects.

## 2. ESTIMATION METHOD OF FUNCTION POINTS

Function points are normalized metrics of a software project, which measure the area of application instead of the technical area (see [1]). The costs estimation of workflow process is carried out in several steps. At first, the basic function types of workflow process are identified and their respective complexity are set. The result of this first step is called unadjusted function points. The number of unadjusted function points (UFP) is equal to the addition of all weight values (see [2]). This step is necessary to adapt to workflow processes.

Furthermore, on the basis of the UFP the adjusted function points are calculated. They are adapted to specific workflow process and development environment. Effects of the fourteen factors of general characteristics of the system and their respective degree of influence of the application are set. The factor of adaptation is calculated, each will be multiplied by the previously set value of the unadjusted function points. The result is the final number of adjusted function points (FP).

Consequently, on the basis of the adjusted function points, the workload and price of one function point is calculated, as well as it is possible to calculate the total costs of the particular workflow process (see [3]).

### 2.1. CALCULATION OF THE UNADJUSTED FUNCTION POINTS (UFP)

According to the source [1], [3] the unadjusted function points (UFP) are related to transaction functions or to data functions.

Function points related to transaction functions:

- IN – external inputs: As the external inputs are considered all unique user data or user command inputs, which user enters in the application over the external interface and creates, modifies or deletes data in external logical file. The control information, which enters over application boundary and effects conformity with function specified by user, is also counted. The external inputs are identified from the activities of the workflow process. For example it could be form, let us say its reading, which corresponds to one external input. However, the automated activities are not counted.
- OUT – external outputs: As the external outputs are considered all unique user data or control data, which go out of system external boundary. The external output is considered like unique, if has different data or the other application requires different logic of processing in comparison with other external outputs. The external outputs are also outputs from automatic activities, for example invoice printing.
- ENQ – external queries: As the external queries are considered all unique input/output combination in which the entry is cause and generates an output. The external queries are considered like unique, if has different type of output data elements or requires different logic of processing in comparison with other external queries.

Function points related to data functions:

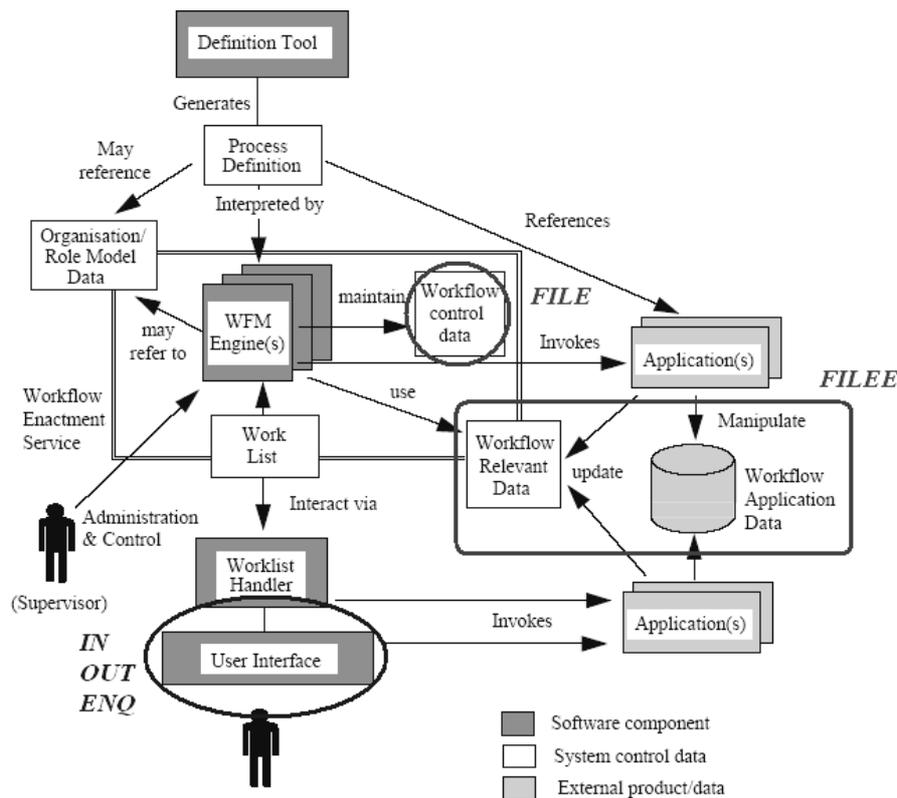
- FILE – internal logical files: As internal logical file are considered all logical groups with user data. Also all information which can be used by application control is considered. Internal logical files are all logical files or DB of all logical data grouping from user view, which is created, used or maintained by application. However, the files which are not user accessible via outside output or query and

which are not maintained conditionally are not considered to be internal logical files. Example of occurrence of the internal logical file is inside the form.

- FILEE – number of the external interface files: As the external interface files are considered all large groups of user data or control operations which are used by application. This information has to be maintained via application. There is also counted all logical file or logical group of data from user point of view, all large logical groups of user data or control information, which is extracted from another application in the form of external interface file.

The main problem in process of unadjusted function points counting is to identify external inputs, external outputs, external queries, internal logical files and external interface files in the workflow process (see [3]).

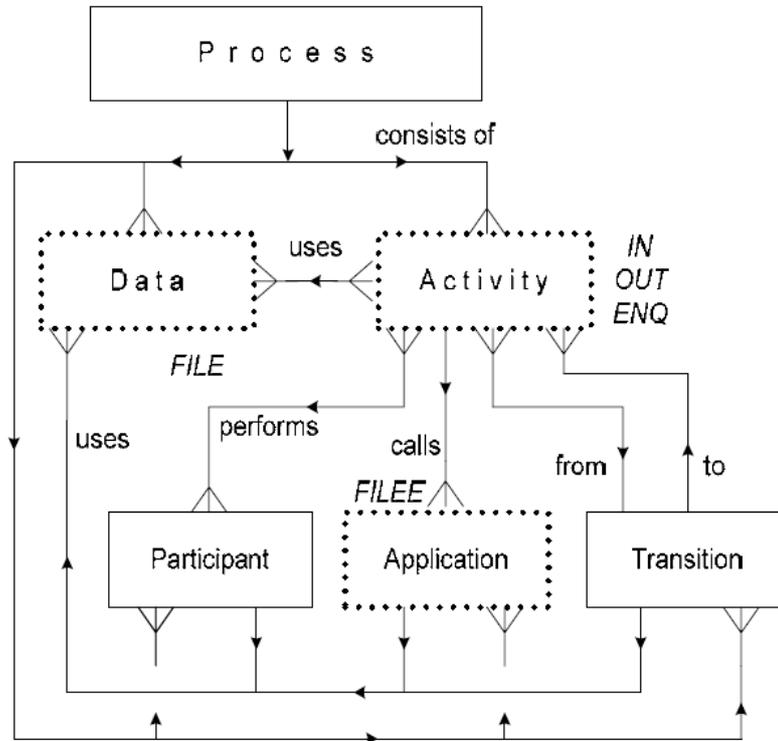
Following scheme (picture 1) presents architecture of the system (see [4], [5]). There is possible to specify the area of occurrence of external inputs IN, external outputs OUT, external queries ENQ, internal logical files FILE and external interface files too. External inputs IN, external outputs OUT, external queries ENQ in the basic workflow structure can be found in user interface area. Internal logical files FILE can be identified in the area of workflow control data and external interface files FILEE can be found in area between applications in which the workflow relevant data and workflow application data are transferred.



**Picture 1:** Basic structure of workflow project

The second scheme (picture 2) displayed meta-model workflow process (see [5]). There are marked out areas where can be identified external inputs, external outputs, external queries, internal logical files and external interface files. Area of IN, OUT, ENQ occur-

rence is located in entity of workflow activity. In the case of IN and ENQ there are used only manual activities – not automated. In the case of OUT there are used both activities – manual and automated. Area for identification of internal logical files FILE is located in entity of workflow data. External interface files FILEE can be found in entity of workflow application.



**Picture 2:** Meta-model workflow process.

All found IN, OUT, ENQ, FILE a FILEE applications are classified into groups according to the type and their complexity. The number of elements of each group will be multiplied by the relevant weight and subsequently added into a sum. The final sum represents the number of unadjusted function points (UFP) (see [3]).

## 2.2. DETERMINATION OF ADJUSTED FUNCTION POINTS (FP)

On the basis of unadjusted function points, the adjusted function points are calculated – in the dependence on environment in which is the workflow process realized. In their calculation, the effects of fourteen factors of general characteristic of the system are taken into consideration. Further steps of calculation are the same as in the case of typical software projects.

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Estimation of function points  $FP$  is determined by the equation (1):

$$FP = NFP \cdot TCA \quad (1)$$

where

$$TCA = 0.65 + 0.01 \cdot DI \quad (2)$$

$TCA$  (2) is the adjustment factor,

$DI$  is the factor of technical complexity (3) – calibration parameter of the workload, which demonstrates the effect of 14 factors, out of which each is evaluated in a six-point scale 0 – 5 according to its effect on the application (0 – without effect, 1 – accidental effect, 2 – simple effect, 3 – average effect, 4 – complex effect, 5 – substantial effect).

$$DI = \sum_{i=1}^{14} DI_i \quad (3)$$

The considered factors: data communications, distributed data processing, performance, heavily used configuration, transaction rate, on-line data entry, end-user efficiency, on-line update, complex processing, reusability, installation ease, operational ease, multiple sites, facilitate change.  $DI$  is determined as an addition of the given estimation of all mentioned factors

On the bases of determined value of adjusted function points, the workload intensity, development time and total costs have to be calculated.

### 3. CONCLUSION

Costs estimation which is needed to software project development is considered to be common and necessary activity. Consequently it is necessary to define methods for costs estimation of relatively newly used workflow project. Because at this moment there are no special methods for costs estimation of workflow project which are known to authors of this paper, they attempted to modify one of often used method for cost estimations of typical software projects.

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