

### **INTERNAL LOGICAL FILE (ILF)**

User identifiable group of logically related data or control information maintained within the application boundary. The primary intent of an ILF is to hold data maintained through one or more elementary processes of the application being counted.

**Rules – All of the following must apply:**

- The group of data or control information is logical and user defined.
- The group of data is maintained through an elementary process within the application boundary being counted.

### **EXTERNAL INTERFACE FILE (EIF)**

User identifiable group of logically related data or control information referenced by the application, but maintained within the boundary of another application. The primary intent of an EIF is to hold data referenced through one or more elementary processes within the boundary of the application counted. This means an EIF counted for the application must be in an ILF in another application.

**Rules -- All of the following must apply:**

- The group of data or control information is logical and user identifiable.
- The group of data is referenced by, and external to, the application being counted.
- The group of data is **not maintained** by the application being counted.
- The group of data is maintained in an ILF of another application.

*Complexity for ILFs and EIFs are based on number of RETs/DETs.*

### **DET RULES for ILF/EIF**

- Count a DET for each unique user recognizable, non-repeated field maintained in or retrieved from the ILF or EIF through the execution of an elementary process.
- When two applications maintain and/or reference the same ILF/EIF, but each maintains/references separate DETs, count only the DETs being used by each application to size the ILF/EIF.
- Count a DET for each piece of data required by the user to establish a relationship with another ILF or EIF.

### **RET RULES FOR ILF/EIF**

- Count a RET for each optional or mandatory subgroup of the ILF or EIF.  
OR
- If there are no subgroups, count the ILF or EIF as one RET.

### **EXTERNAL INPUT (EI)**

An elementary process that processes data or control information that comes from outside the application's boundary. The primary intent of an EI is to maintain one or more ILFs and/or to alter the behavior of the system.

**Rules: All of the following must apply**

- The data or control information is received from outside the application boundary. At least one ILF is maintained if the data entering the boundary is not control information that alters the behavior of the system.

- For the identified process, one of the three statements must apply:
  - Processing logic is unique from processing logic performed by other EIs for the application
  - The set of data elements identified is different from the sets identified for other EIs in the application.
  - The ILFs or EIFs referenced are different from the files referenced by the other EIs in the application.

*COMPLEXITY based on number of FTRs/DETs for the EI.*

### **FTR RULES FOR EI**

- Count a FTR for each ILF maintained.
- Count a FTR for each ILF or EIF read during the processing of the EI.
- Count only one FTR for each ILF that is both maintained and read by the EI.

### **DET RULES FOR EI**

- Count one DET for each user recognizable, non-repeated field that enters or exits the application boundary and is required to complete the EI.
- Do not count fields that are retrieved or derived by the system and stored on an ILF during the elementary process if the fields did not cross the application boundary.
- Count one DET for the capability to send a system response message outside the application boundary to indicate an error occurred during the processing, confirm the processing is complete or verify that processing should continue.
- Count one DET for the ability to specify an action to be taken even if there are multiple methods for invoking the same logic.

### **EXTERNAL OUTPUTS (EO)**

An elementary process that sends data or control information sent outside the application's boundary. The primary intent of an external output is to present information to a user through processing logic other than or in addition to the retrieval of data or control information. The processing logic must contain at least one mathematical formula or calculation, or create derived data. An external output may also maintain one or more ILFs and/or alter the behavior of the system.

**Rules – All of the following must apply**

- Sends data or control information external to the application's boundary.
- For the identified process, one of the three statements must apply
  - Processing logic is unique from the processing logic performed by other EOs for the application.
  - The set of data elements identified are different from other EOs in the application.
  - The ILFs or EIFs referenced are different from files referenced by other EOs in the application.

**In addition, one of the following rules must apply:**

- The processing logic contains at least one mathematical formula or calculation.
- The processing logic maintains at least one ILF.
- The processing logic alters the behavior of the system.

### **EXTERNAL INQUIRY (EQ)**

An elementary process that sends data or control information outside the application boundary. The primary intent of an external inquiry is to present

information to the user through the retrieval of data or control information. The processing logic contains no mathematical formula or calculations, and creates no derived data. No ILF is maintained during the processing, nor is the behavior of the system altered.

**RULES – All of the following must apply:**

- Sends data or control information external to the application's boundary.
- For the identified process, one of the three statements must apply
  - Processing logic is unique from the processing logic performed by other EQs for the application.
  - The set of data elements identified are different from other EQs in the application.
  - The ILFs or EIFs referenced are different from files referenced by other EQs in the application.
- **In addition, all of the following rules must apply:**
  - The processing logic retrieves data or control information from an ILF or EIF.
  - The processing logic **does not** contain mathematical formula or calculation.
  - The processing logic **does not** alter the behavior of the system.
  - The processing logic **does not** maintain an ILF.

*COMPLEXITY based on number of FTRs/DETs for the EO/EQ.*

### **FTR RULES FOR EO/EQ**

- Count a FTR for each ILF or EIF read during the processing of the elementary process.

### **ADDITIONAL FTR FOR EO**

- Count a FTR for each ILF maintained during the processing of the elementary process.
- Count a FTR for each ILF that is both maintained and read by the elementary process

### **DET RULES FOR EO/EQ**

The number of DETs is equal to the total number of fields identified from the following rules:

- Count one DET for each user recognizable, non-repeated field that enters the application boundary and is required to specify when, what and/or how the data is to be retrieved or generated by the elementary process.
- Count one DET for each user recognizable, non-repeated field that exits the boundary.
- If a DET both enters and exits the boundary, count it only once for the elementary process.
- Count one DET for the capability to send a system response message outside the boundary to indicate an error occurred during processing, confirm that processing is complete or verify that processing should continue.
- Count one DET for the ability to specify an action to be taken even if there are multiple methods for invoking the same logical process.
- Do not count fields that are saved, retrieved, or derived if they do not cross the boundary.
- Do not count literals, paging, or system-generated stamps.

### WEIGHTED COMPLEXITY OF FUNCTIONS

	Low	Average	High
EI	3	4	6
EO	4	5	7
EQ	3	4	6
ILF	7	10	15
EIF	5	7	10

### GENERAL SYSTEM CHARACTERISTICS

If none of the guidelines descriptions fit the application exactly, a judgment must be made about which Degree of Influence most closely applies to the application. These questions are answered using Degrees of Influence (DI) on a scale of 0 - 5, as follows

- 0 No present, no influence
- 1 Incidental influence
- 2 Moderate influence
- 3 Average influence
- 4 Significant influence
- 5 Strong influence throughout

1. Data Communications
2. Distributed Data Processing
3. Performance
4. Heavily Used Configuration
5. Transaction Rate
6. On-line Data Entry
7. End-User Efficiency
8. On-line Update
9. Complex Processing
10. Reusability
11. Installation Ease
12. Operational Ease
13. Multiple Sites
14. Facilitate Change

### FORMULAS

**New Development FP Count** = (UFP + CFP) \* VAF

**Application FP Count** = ADD \* VAF

**Enhancement FP Count** =

[(ADD + CHGA + CFP) \* VAFA] + (DEL \* VAFB)

**Revised Application FP Count** = [(UFPB + ADD + CHGA) - (CHGB + DEL)] \* VAFA

**Value Adjustment Factor** = (Sum of (DI) \* .01) + .65  
Where:

*ADD = added functionality*

*CFP = conversion functionality*

*CHGA = UFP of changed functionality after enhancement*

*CHGB = UFP of changed functionality before enhancement*

*DEL = deleted functionality*

*UFP = unadjusted function point count*

*UFB = application UFP before project*

*VAF = value adjustment factor*

*VAFA = value adjustment factor after enhancement*

*VAFB = value adjustment factor before enhancement*

### SUMMARY OF FUNCTIONS PERFORMED BY

#### EIs EOs and EQs

Function	EI	EO	EQ
Alter the behavior of the system	PI	F	N/A
Maintain one or more ILFs	PI	F	N/A
Present information to the user	F	PI	PI

#### LEGEND:

- PI the primary intent of the transaction function type  
F function of the transactional function type, but is not the primary intent and is sometimes present  
N/A the function is not allowed by the transactional function type

### SUMMARY OF PROCESSING LOGIC USED BY

#### EIs, EOs and EQs

Form of Processing Logic	EI	EO	EQ
Validations are performed	c	c	c
Mathematical formulae or calculations are performed	c	m*	n
Equivalent values are retrieved	c	c	c
Data is filtered and selected using specified criteria to compare multiple sets of data	c	c	c
Conditions are analyzed to determine which are applicable	c	c	c
At least one ILF is updated	m*	m*	n
At least one ILF or EIF is referenced	c	c	m
Data or control information is retrieved	c	c	m
Derived data is created	c	m*	n
Behavior of the system is altered	m*	m*	n
Prepare and present information outside the boundary	c	m	m
Capability to accept data or control information that enters the application boundary	m	c	c
Resorting or rearranging a set of data	c	c	c

#### LEGEND:

- m** it is mandatory that the function type perform the form of processing logic  
**m\*** it is mandatory that the function type perform at least one of these (m\*) forms of processing logic  
**c** the function can perform the form of processing logic but it is not mandatory  
**n** function cannot perform the form of processing logic

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## IFPUG FUNCTION POINT QUICK REFERENCE CARD

Based on CPM 4.2  
January 2004

### Steps in FP Analysis

1. Determine the type of function point count.
2. Identify the boundary for counting.
3. Count the data functions to determine their contribution to the unadjusted function point count.
4. Count the transactional functions to determine their contribution to the unadjusted function point count.
5. Determine the value adjustment factor.
6. Calculate the adjusted function point count.

### KEY DEFINITION OF TERMS

**User** – any person that specifies Functional User Requirements and/or any person or thing that communicates or interacts with the software at any time.  
**User Identifiable** – defined requirements for processes and/or groups of data that are agreed upon, and understood by both the users and the software developers.

**Application Boundary** – defines the external limitations of the application; is the conceptual interface between internal application and external user world; acts as a membrane through which data passes into and out from the application; encloses the logical data maintained by the application; assists in identifying the logical data referenced by but not maintained within the application; is dependent on the user's external business view of the application; it is independent of technical and/or implementation considerations.

**Scope** – defines a (sub) set of the software being sized; is determined by the purpose of the count; identifies which functions will be included in the function point count; could include one or more than one application.

**Elementary Process** – An elementary process is the smallest unit of activity that is meaningful to the user(s). The elementary process must be self-contained and leave the business of the application being counted in a consistent state.

**Control information** – is data that influences an elementary process of the application. It specifies what, when or how data is to be processed.