# Function Point Analysis

By: Abbas HeydarNoori

# Introduction

- Function point metrics, developed by Alan Albercht of IBM, were first published in 1979
- In 1984, the International Function Point Users Group (IFPUG) was set up to clarify the rules, set standards, and promote their use and evolution

# Introduction (Cont'd)

- Function point metrics provide a standardized method for measuring the various functions of a software application.
- Function point metrics, measure functionality from the users point of view, that is, on the basis of what the user requests and receives in return

# Introduction (Cont'd)

- Albercht's initial definition:
  - This gives a dimensionless number defined in function points which we have found to be an effective relative measure of function value delivered to our customer

# Objectives of FPA

- Function point analysis measures software by quantifying the functionality the software provides to the user based primarily on logical design. With this in mind, the objectives of function point analysis are to:
  - Measure functionality that the user requests and receives
  - Measure software development and maintenance independently of technology used for implementation
- In addition to meeting the above objectives, the process of counting function points should be:
  - Simple enough to minimize the overhead of the measurement process
  - A consistent measure among various projects and organizations

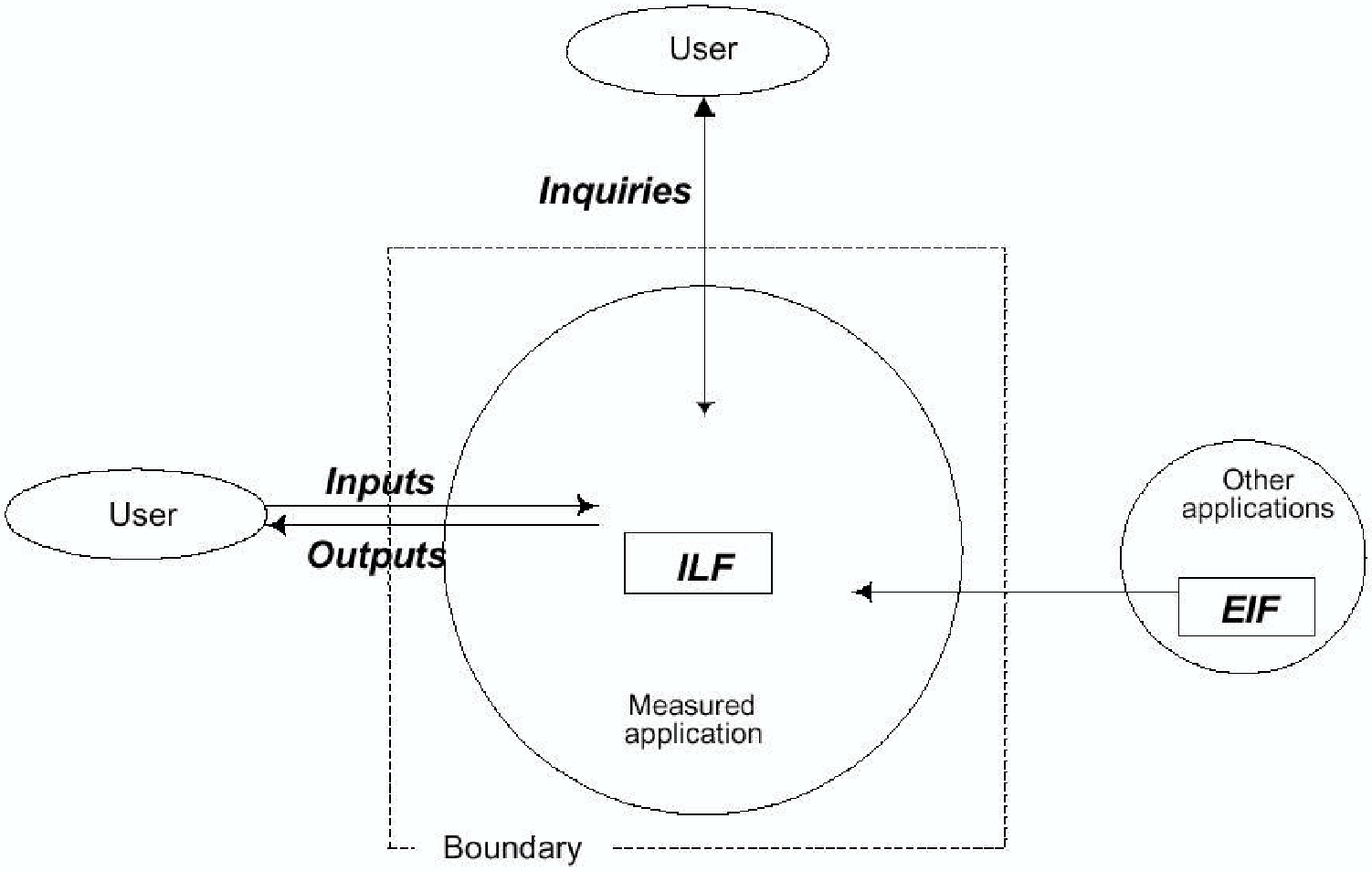
# Benefits of FPA

- Organizations can apply function point analysis as:
  - A tool to determine the size of a purchased application package by counting all the functions included in the package
  - A tool to help users determine the benefit of an application package to their organization by counting functions that specifically match their requirements
  - A tool to measure the units of a software product to support quality and productivity analysis
  - A vehicle to estimate cost and resources required for software development and maintenance
  - A normalization factor for software comparison

# FPA Overview

- The first step in calculating FP is to identify the counting boundary.
  - Counting boundary: The border between the application or project being measured and external applications or the user domain.
  - A boundary establishes which functions are included in the function point count

# FPA Components



# FPA Overview (Cont'd)

- The next step is determining the unadjusted function point (UFP) count
- UFP reflects the specific countable functionality provided to the user by the project or application

# Calculation of the UFP

- This calculation begins with the counting of the five function types of a project or application:
  - Two data function types
  - Three transactional function types

# Data Function Types

- ***Internal Logical File (ILF)***: a user identifiable group of logically related data or control information maintained within the boundary of the application
- ***External Interface File (EIF)***: a user identifiable group of logically related data or control information referenced by the application, but maintained within the boundary of another application.
  - This means that EIF counted for an application, must be an ILF in another application

# Transactional Function Types

- ***External Input (EI)***: An EI processes data or control information that comes from outside the application's boundary. The EI is an elementary process.
  - Elementary process: The smallest unit of activity that is meaningful to the end user in the business

# Transactional Function Types (Con'd)

- ***External Output (EO)***: An EO is an elementary process that generates data or control information sent outside the application's boundary
- ***External Inquiry (EQ)***: An EQ is an elementary process made up of an *input-output* combination that results in data retrieval

# FPA Overview (Con'd)

- These 5 function types are then ranked according to their complexity: Low, Average or High, using a set of prescriptive standards.
- Organizations that use FP methods, develop criteria for determining whether a particular entry is Low, Average or High.
- Nonetheless, the determination of complexity is somewhat subjective.

# FPA Overview (Con'd)

- After classifying each of the five function types, the UFP is computed using predefined weights for each function type

# UFP Calculation Table

| Function Type | Functional Complexity | | Complexity Totals | Function Type Totals |
|---|---|---|---|---|
| ILFs | _____ | Low X 7 = | _____ | |
| | _____ | Average X 10 = | _____ | |
| | _____ | High X 15 = | _____ | |
| | | | | _____ |
| EIFs | _____ | Low X 5 = | _____ | |
| | _____ | Average X 7 = | _____ | |
| | _____ | High X 10 = | _____ | |
| | | | | _____ |
| EIs | _____ | Low X 3 = | _____ | |
| | _____ | Average X 4 = | _____ | |
| | _____ | High X 6 = | _____ | |
| | | | | _____ |
| EOs | _____ | Low X 4 = | _____ | |
| | _____ | Average X 5 = | _____ | |
| | _____ | High X 7 = | _____ | |
| | | | | _____ |
| EQs | _____ | Low X 3 = | _____ | |
| | _____ | Average X 4 = | _____ | |
| | _____ | High X 6 = | _____ | |
| | | | | _____ |
| | | Total Unadjusted Function Point Count | | _____ |

# FPA Overview (Con'd)

- The last step involves assessing the environment and processing complexity of the project or application as a whole.
- In this step, the impact of 14 general system characteristics is rated on a scale from 0 to 5 in terms of their likely effect on the project or application

# Value Adjustment Factor (VAF) Calculation Table

- 0 = No Influence
- 1 = Incidental
- 2 = Moderate
- 3 = Average
- 4 = Significant
- 5 = Essential

| General System Characteristics (GSCs) | Degree of Influence (DI) 0 - 5 |
|---|---|
| 1. Data Communications | _____ |
| 2. Distributed Data Processing | _____ |
| 3. Performance | _____ |
| 4. Heavily Used Configuration | _____ |
| 5. Transaction Rate | _____ |
| 6. Online Data Entry | _____ |
| 7. End-User Efficiency | _____ |
| 8. Online Update | _____ |
| 9. Complex Processing | _____ |
| 10. Reusability | _____ |
| 11. Installation Ease | _____ |
| 12. Operational Ease | _____ |
| 13. Multiple Sites | _____ |
| 14. Facilitate Change | _____ |
| Total Degree of Influence (TDI) | _____ |
| Value Adjustment Factor (VAF) | _____ |
| | VAF = (TDI * 0.01) + 0.65 |

# FPA Overview (Con'd)

- On the whole:

$$FP = UFP \times VAF$$

- The constant values in the equation and the weighting factors are determined empirically