

COSMIC FUNCTION POINT

COSMIC function points are a unit of measure of software functional size. The size is a consistent measurement (or estimate) which is very useful for planning and managing software and related activities. The process of measuring software size is called functional size measurement (FSM). COSMIC functional size measurement is applicable to business, real-time and infrastructure software at any level of decomposition (from a whole software system down to a single re-usable component or a user story). It is independent of the technology or processes used to develop the system. It is an ISO standard. It is a refined improvement over its predecessors (IFPUG and Mark II FP). The unit of size is the COSMIC Function Point or CFP.

Uses

Once you have measured (or estimated) the size in COSMIC Function Points you can then use this as the base metric to :

- Estimate development effort
- Estimate project duration
- Estimate project quality achievement
- Estimate test effort
- Control scope creep
- Assess the value a software asset
- Estimate maintenance and replacement costs
- Assess the achievement of quality (defect removal rates)
- As the basis for fixed price contracts

Based on Principles

The COSMIC Function Point sizing method of measuring software requirements is based on two main principles:

1. The 'Software Context Model'

Defines the software to be measured

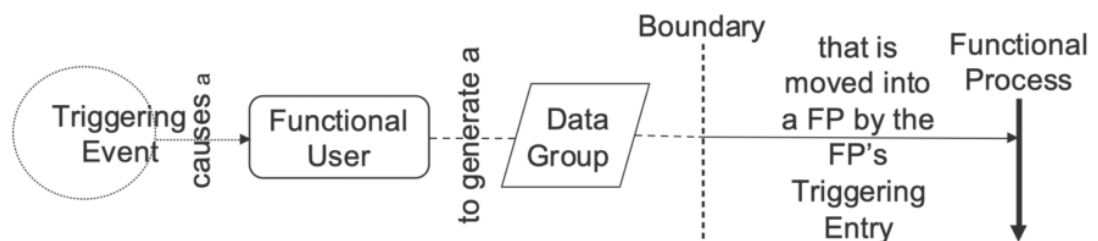
- Software is bounded by hardware and typically structured into **layers**.
- The **scope** of any piece of software to be measured shall depend on the **purpose** of the measurement and shall be confined wholly within a single layer.
- The **functional users** of a piece of software to be measured shall be identified from its Functional User Requirements (FUR) as the senders and/or intended recipients of data to/from the software respectively.
- A precise COSMIC size measurement of a piece of software requires that its FUR are known at a **level of granularity** at which its **functional processes** and sub-processes may be identified.

- An approximate COSMIC size measurement is possible if its FUR are measured at a high level of granularity by an approximation approach and scaled to the level of granularity of the functional processes.

2. The 'Generic Software Model'

Generic concepts applicable to all software

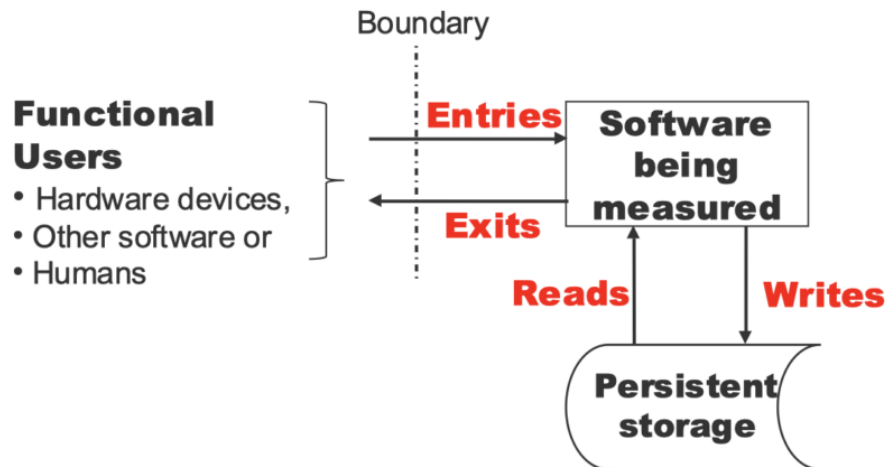
- A piece of software interacts with its functional users across a **boundary**, and with **persistent storage** within the boundary.
- The FUR of a piece of software can be mapped into unique **functional processes**.
- Each functional process is started by its **triggering Entry** data movement. The data group moved by the triggering Entry is generated by a functional user in response to a **triggering event**.
- A functional process shall include at least one Entry data movement and either a Write or an Exit data movement. There is no upper limit to the number of data movements in a functional process



N.B. There can be many-to-many relationships at each stage along this chain, except that any one functional process may have only one triggering Entry

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- Each functional process consists of sub-processes, **data movements (DMs)** and **data manipulations**.
- As an approximation for measurement purposes, the COSMIC method assumes that the functionality of any data manipulation is accounted for by the data movement with which it is associated.
- There are four data movement types, **Entry, Exit, Write and Read**.
- A data movement moves a single **data group**, which consists of a unique set of **data attributes** that describe a single **object of interest**.



The 'Data Movement' is the unit of measure: 1 CFP

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Three Steps to Counting Cosmic Function Points

1) Measurement Strategy – Determine the purpose of the measurement

As per the Software Context defined above e.g. are we measuring an entire application or just a single component / layer. Who are the functional users interacting with the software.

2) Determine the parameters of the 'Generic Software Model'

From the Functional User Requirements (FUR)

1. Triggering Events
2. The Functional Processes
3. Objects of Interest (and Data groups)
4. Data movements

3) Count the Data Movements

For a new application: count the new Data movements (DMs)

For system modifications : Add the new DMs , changed DMs and removed DMs.

And that's it, the sum of the DMs is the CFP total.

CFP forCourse Registration System

INTRODUCTION

This Case Study presents the results of applying the COSMIC v4.0.2 Functional Size Measurement method to the Course Registration software system requirements as described in Chapters 2 - 4. General information about the software application to be measured:

- Application domain: Business Application
- Application type: PC client interacts with server over an organization's network and the world-wide web.

I) FUNCTIONAL REQUIREMENT I:

Maintain Professor Data

Process descriptions	Functional user	Name of Data Group moved	Data Move -ment Type	CFP
Add a Professor	Registrar	Professor details	ENTRY	1
		Professor details	READ	1
	Registrar	Control command	-	-
		Professor details	WRITE	1
	Registrar	Error Messages	X	1

Total 4

Process descriptions	Functional user	Name of Data Group moved	Data Move -ment Type	CFP
Enquire on a Professor's details	Registrar	Professor ID	ENTRY	1

		Professor details	READ	1
	Registrar	Professor details	X	1
	Registrar	Display error message	X	1

Total 4

Process descriptions	Functional user	Name of Data Group moved	Data Move -ment Type	CFP
Modify a Professor's details	Registrar	Professor details	ENTRY	1
		Professor details	WRITE	1
	Registrar	Error Messages	X	1

Total 3

II) FUNCTIONAL REQUIREMENT II:

Maintain Professor's Course Offering commitments

Process descriptions	Functional user	Name of Data Group moved	Data Move -ment Type	CFP
Enquire on Course Offerings (Professor)	Professor	Professor ID	ENTRY	1
		Professor qualifications	READ	1
	Course Catalog	Professor qualifications	X	1

	Course Catalog	Course Offering data	ENTRY	1
		'Application General data. Not counted.	-	-
		Department name	X	1
	Professor	Course Offering data	X	1
	Professor	Error Messages	X	1

Total 7

Process descriptions	Functional user	Name of Data Group moved	Data Move-ment Type	CFP
Create Course Offering commitments	Professor	Professor's Course Offering selections	ENTRY	1
	Course Catalog	Professor's Course Offering selections	X	1
	Course Catalog	Count of conflicting courses	ENTRY	1
	Course Catalog	Conflicting Course Offering selections	ENTRY	1
	Professor	Conflicting Course Offering selections	X	1
			-	-
	Professor	Error Messages	X	1

Total 6

Process descriptions	Functional user	Name of Data Group moved	Data Move -ment Type	CFP
Create Course Offering commitments	Professor	Professor's Course Offering selections	ENTRY	1
	Course Catalog	Professor's Course Offering selections	X	1
	Course Catalog	Count of conflicting courses	ENTRY	1
	Course Catalog	Rejected Course	ENTRY	1
		Offering selections		
	Professor	Rejected Course Offering selections	X	1
			-	-
	Student	Modified Course Offering e-mail	X	1
	Professor	Error	X	1

Total 7

Process descriptions	Functional user	Name of Data Group moved	Data Move -ment Type	CFP
Delete Course Offering commitments	Professor	Professor ID	ENTRY	1

		Prompt Control Command	-	-
		Confirmation Control Command	-	-
	Course Catalog	Course Offering ID	X	1
	Student	Deleted Course Offering e-mail	X	1
	Professor	Error Messages	X	1

Total 4

SUMMARY FUNCTIONAL SIZE MEASUREMENT

S No	Functional process	CFP
<u>1</u>	Add a Professor	4
<u>2</u>	Enquire on a Professor's details	4
<u>3</u>	Modify Professor's details	3
<u>4</u>	Enquire on Course Offerings (Professor)	7
<u>5</u>	Create Course Offering commitments	6
<u>6</u>	Create Course Offering commitments	7
<u>7</u>	Delete Course Offering commitments	4

TOTAL 35