COSMIC Full Function Points

- COSMIC FFP – Common Software Measurement International Consortium Full Function Point.
- COSMIC deals with decomposing the system architecture into a hierarchy of software layers.
- A Data Movement moves one Data Group. A Data Group is a unique cohesive set of data (attributes) specifying an 'object of interest' (i.e. something that is 'of interest' to the user). Each Data Movement is counted as one CFP (COSMIC function point).

COSMIC recognizes 4 (types of) Data Movements:

- Entry moves data from outside into the process
- Exit moves data from the process to the outside world
- Read moves data from persistent storage to the process
- Write moves data from the process to persistent storage.

Function Points

Function points were defined in 1979 in Measuring Application Development Productivity by Allan Albrecht at IBM. The functional user requirements of the software are identified and each one is categorized into one of five types: outputs, inquiries, inputs, internal files, and external interfaces. Once the function is identified and categorized into a type, it is then assessed for complexity and assigned a number of function points. Each of these functional user requirements maps to an end-user business function, such as a data entry for an Input or a user query for an Inquiry. This distinction is important because it tends to make the functions measured in function points map easily into user-oriented requirements, but it also tends to hide internal functions (e.g. algorithms), which also require resources to implement. There is currently no ISO recognized FSM Method that includes algorithmic complexity in the sizing result. Recently there have been different approaches proposed to deal with this perceived weakness, implemented in several commercial software products. The variations of the Albrecht- based IFPUG method designed to make up for this (and other weaknesses) include:

- Early and easy function points – Adjusts for problem and data complexity with two questions that yield a somewhat subjective complexity measurement; simplifies measurement by eliminating the need to count data elements.
- Engineering function points – Elements (variable names) and operators (e.g., arithmetic, equality/inequality, Boolean) are counted. This variation highlights computational function.
- The intent is similar to that of the operator/operand-based Halstead complexity measures.
- Bang measure – Defines a function metric based on twelve primitive (simple) counts that affect or show Bang, defined as "the measure of true function to be delivered as perceived by the user." Bang measure may be helpful in evaluating a software unit's value in terms of how much useful function it provides, although there is little evidence in the literature of such application.

- The use of Bang measure could apply when re-engineering (either complete or piecewise) is being considered, as discussed in Maintenance of Operational Systems—An Overview.
- Feature points – Adds changes to improve applicability to systems with significant internal processing (e.g., operating systems, communications systems). This allows accounting for functions not readily perceivable by the user, but essential for proper operation.
- Weighted Micro Function Points – One of the newer models (2009) which adjusts function points using weights derived from program flow complexity, operand and operator vocabulary, object usage, and algorithm.