

Field Descriptions: Data Release 11

Introduction

The ISBSG D&E Repository Data Release 11 contains the following data fields (in this order) in an MS Excel spreadsheet to allow you to perform your own analysis, estimation, comparisons or benchmarking. Please remember that the terms of the licence to use this data prohibit it from being resold in any form or incorporated into any product for resale.

Field Descriptions (Project Data worksheet):

Project ID

A primary key, for identifying projects. These identification numbers have been 'randomised' to remove any chance of identifying a company.

Rating:

Data Quality Rating

This field contains an ISBSG rating code of A, B, C or D applied to the project data by the ISBSG quality reviewers to denote the following:

- A=** The data submitted was assessed as being sound with nothing being identified that might affect its integrity.
- B=** The submission appears fundamentally sound but there are some factors which could affect the integrity of the submitted data.
- C=** Due to significant data not being provided, it was not possible to assess the integrity of the submitted data.
- D=** Due to one factor or a combination of factors, little credibility should be given to the submitted data.

Unadjusted Function Point Rating

This field contains an ISBSG rating code of A, B, C or D applied to the Functional Size (Unadjusted Function Point count) data by the ISBSG quality reviewers to denote the following:

- A=** The unadjusted function point count was assessed as being sound with nothing being identified that might affect its integrity.
- B=** The unadjusted function point count appears sound, but integrity cannot be assured as a single figure was provided.
- C=** Due to unadjusted function point or count breakdown data not being provided, it was not possible to provide the unadjusted function point data.
- D=** Due to one factor or a combination of factors, little credibility should be given to the unadjusted function point data.

Software Age:

Year of Project

Year of Project, derived from implementation date (if known), or from other project dates such as:

- Project end date
- Project start date

- Estimated implementation date
- Data compilation date

If no project date is known, it is the year of data receipt by the ISBSG.

Sizing:

Count Approach

A description of the technique used to size the project. For most projects in the ISBSG repository this is the Functional Size Measurement Method (FSM Method) used to measure the functional size (e.g. IFPUG, MARK II, NESMA, FiSMA, COSMIC-FFP etc.). For projects using Other Size Measures (e.g. LOC etc.) the size data is in the section Size Other than FSM. This helps you to compare apples with apples.

Functional Size

The unadjusted function point count (before any adjustment by a Value Adjustment Factor if used). This may be reported in different units depending on the FSM Method.

Adjusted Function Points

For IFPUG, NESMA, FiSMA and MARK II counts this is the adjusted size (the functional size is adjusted by a Value Adjustment Factor). The resultant adjusted size is reported in adjusted function points (AFP). Where the Adjusted Size has not been supplied by the project then the Functional Size is used in the calculations that use AFP.

Value Adjustment Factor

The adjustment to the function points, applied by the project submitter, that takes into account various technical and quality characteristics e.g.: data communications, end user efficiency etc.

Where available, the VAF is calculated from the 14 General System Characteristics ratings. Sometimes the 14 GSC ratings only are provided to the ISBSG (in which case the VAF is derived from these), sometimes the 14 GSC ratings and VAF are provided, and sometimes the VAF only is provided.

For most projects recently counted this data is not recorded, and the VAF is assumed equal to 1.

Effort:

Normalised Level 1 Work Effort

The development team full life-cycle effort. For projects covering less than a full development life-cycle, this value is an estimate of the full life-cycle effort for the development team only. For projects covering the full development life-cycle, and projects where life-cycle coverage is not known, this value is not normalised and is the same as reported work effort for the development team. For projects where the development team effort is not known this value is blank.

Normalised Work Effort

Full life-cycle effort for all teams reported. For projects covering less than a full development life-cycle, this value is an estimate of the full development life-cycle effort. For projects covering the full development life-cycle, and projects where development life-cycle coverage is not known, this value is the same as Summary Work Effort.

Summary Work Effort

Provides the total effort in hours recorded against the project.

Productivity:

Normalised Level 1 Productivity Delivery Rate (unadjusted function points)

Project productivity delivery rate in hours per functional size unit calculated from Normalised Level 1 Work Effort for the **development team only** divided by Functional Size (Unadjusted Function Points). This is the delivery rate currently recommended by the ISBSG. Use of normalised effort for the development team and unadjusted count should render the most comparable rates.

Normalised Productivity Delivery Rate (unadjusted function points)

Project productivity delivery rate in hours per functional size unit calculated from Normalised Work Effort divided by the Functional Size (Unadjusted Function Point count). This is the delivery rate for the project used and reported by the ISBSG since the year 2002. Use of normalised effort and unadjusted count should render more comparable rates than un-normalised effort and adjusted count.

Pre 2002 Productivity Delivery Rate (adjusted function points)

Project productivity delivery rate in hours per functional size unit calculated from Summary Work Effort divided by Adjusted Function Point count. This is the delivery rate for the project that was used and reported by the ISBSG prior to the year 2002. Since that time the Normalised PDR has been used for analysis and reporting.

Other Metrics:

Defect Density

Defects per 1000 FP calculated as $\text{Total Defects Delivered} * 1000 / \text{Functional Size}$

Measures the quality of software in terms of defects delivered in unit size of software. It is defined as the number of Defects per 1000 Functional Size Units of delivered software, in the first month of use of the software. It is expressed as Defects per 1000 Functional Points.

Speed of Delivery

Functional Size Units per person per elapsed month calculated as $\text{Functional Size} / \text{Project Elapsed Time} * \text{Max Team Size}$

Measures the speed achieved by the project team in delivering a quantity of software over a period of time. It is defined as the Functional Size of the delivered software (measured in functional size units), over the Project Elapsed Time (measured in months) multiplied by the number of people in the project team. It is expressed as Functional Points per person per elapsed month.

Schedule:

Project Elapsed Time

Total elapsed time for the project in calendar months.

Project Inactive Time

This is the number of calendar months in which no activity occurred, (e.g.. awaiting client sign off, awaiting acceptance test data). This time, subtracted from Project Elapsed Time, derives the actual time spent working on the project.

Implementation Date

Actual date of implementation. (Note: where the exact date is not known the date is shown in the data in date format 1/mm/yy).

Project Activity Scope

This indicates what tasks were included in the project work effort data recorded. These are: Planning, Specify, Design, Build, Test and Implement.

Effort Breakdown

When provided in the submission, these fields contain the breakdown of the work effort reported by six categories: Plan, Specify, Design, Build, Test and Implement.

Effort Unphased

Where no phase breakdown is provided in the submission, this field contains the same value as the Summary Work Effort. Where phase breakdown is provided in the submission, and the sum of that breakdown does not equal the Summary Work Effort, the difference is shown here.

Quality:

Defects Delivered

Defects reported in the first month of use of the software. Three columns in the data covering the number of Minor, Major and Extreme defects reported.

Total Defects Delivered

Total number of defects reported in the first month of use of the software. This column shows the total of defects reported (Minor, Major and Extreme). Where no breakdown is available, the single value is shown here.

Grouping Attributes:

Development Type

This field describes whether the development was a new development, enhancement or re-development.

Organisation Type

This identifies the type of organisation that submitted the project. (e.g.: Banking, Manufacturing, Retail).

Business Area Type

This identifies the subset within the organisation being addressed by the project. It may be different to the organisation type or the same. (e.g.: Manufacturing, Personnel, Finance).

Application Type

This identifies the type of application being addressed by the project. (e.g.: information system, transaction/production system, process control.)

Software Process CMM

Software standards typically define a series of actions and documentation structures and contents required to deliver quality software and software processes. Software standards are maintained by international organisations. Software developers are typically required to be formally and externally assessed in order to achieve certification to these standards. This column indicates if the project was performed under CMM processes. Where available, details such as the level or version, and year of certification are included.

Software Process CMMI

This column indicates if the project was performed under CMMI processes. Where available, details such as the level or version, and year of certification are included.

Software Process SPICE

This column indicates if the project was performed under SPICE processes. Where available, details such as the level or version, and year of certification are included.

Software Process ISO

This column indicates if the project was performed under ISO processes. Where available, details such as the version, and year of certification are included.

Software Process TICKIT

This column indicates if the project was performed under TICKIT processes. Where available, details such as the version, and year of certification are included.

Software Process Other

This column indicates if the project was performed under processes other than one of the following: CMM, CMMI, SPICE, ISO or TICKIT. Where available, details such as the version, and year of certification are included.

Package Customisation

This indicates whether the project was a package customisation. (Yes, No or Don't Know).

Degree of Customisation

If the project was based on an existing package, this field provides comments on how much customisation was involved.

Architecture:

Architecture

A derived attribute for the project to indicate if the application is Stand alone, Multi-tier, Client server, or Multi-tier with web public interface.

Client Server?

Indicator of whether the application or product requires more than one computer to operate different components or parts of it. (Yes, No or Don't Know).

Client Roles

The roles performed by the computers that provide interface to the software's external users.

Server Roles

The services provided by the host/server computer(s) to the software application or product.

Type of Server

A description of the server to the software application or product. This data comes from a previous version of the questionnaire.

Client/Server description

A description of the architecture of the client/server software application or product. This data comes from a previous version of the questionnaire.

Web Development

A derived indicator of whether the project data includes any comment that it is a web-development.

Documents & Techniques:

Development Techniques

Techniques used during development. (e.g.: JAD, Data Modelling, OO Analysis etc.). These techniques have not been recorded as being phase specific and therefore may apply to any part of the development lifecycle.

JAD Technique Used

Whether the project used any JAD Techniques. The repository holds fields of techniques used in the project and specifically in specification or design. This column indicates if any Joint Application Design techniques were reported.

Prototyping Technique Used

Whether the project used any JAD Techniques. The repository holds fields of techniques used in the project. This column indicates if any Prototyping techniques were reported.

Planning Documents

The documents or other work products produced during the planning activity.

Specification Documents

The documents or other work products produced during the specification activity.

Specification Techniques

The techniques used during the specification of the software.

Design Documents

The documents or other work products produced during the design activity.

Design Techniques

The techniques used during the design of the software.

Build Products

The items that were produced or modified during the build activity.

Build Activity

The detailed activities that occurred during the build of the software.

Test Documents

The documents or other work products produced during the planning or performance of testing.

Test Activity

The detailed activities that occurred during the testing of the software.

Implementation Documents

The documents or other work products produced during preparation for, or performance of, the implementation activity.

Implementation Activity

The detailed activities that occurred during the implementation of the software.

Functional Sizing Technique

The technology used to support the functional sizing process. Certain technologies used in function point counting can impact on the count's potential accuracy.

FP Standard (Function Size Metric Used)

The functional size metric used to record the size of the project, (e.g.. IFPUG3, IFPUG4 [version 4 series = 4.0,4.1, 4.1.1, 4.2 etc], in-house etc.). Where more than 1 standard has been recorded for the project, this has been rationalised.

FP Standards All

All functional size metrics used to record the size of the project. This column shows all standards recorded for the project, (e.g. IFPUG3;IFPUG4;in-house).

Reference Table Approach

This describes the approach used to assess tables of code or reference data (a comment field), for their contribution to functional size.

Project Attributes:**Development Platform**

Defines the primary development platform, (as determined by the operating system used). Each project is classified as: PC, Mid Range, Main Frame or Multi platform.

Language Type

Defines the language type used for the project: e.g. 3GL, 4GL, Application Generator etc.

Primary Programming Language

The primary language used for the development: JAVA, C++, PL/1, Natural, Cobol etc.

1st Hardware

Where known, this is the primary technology hardware platform used to build or enhance the software (i.e. that used for most of the build effort).

1st Language

Where known, this is the primary technology programming language used to build or enhance the software (i.e. that used for most of the build effort).

1st Operating System

Where known, this is the primary technology operating system used to build or enhance the software (i.e. that used for most of the build effort).

Integrated Development Environment

Where known, this is the primary Integrated Development Environment, a development environment integrating a range of tools to aid the processes of designing, constructing and testing the software; typically, incorporating graphical and component based development techniques.

1st Debugging Tool

Where known, this is the primary technology debugging tool used to build or enhance the software (i.e. that used for most of the build effort), otherwise (if known) it is whether the project used a debugging tool.

1st Data Base System

Where known, this is the primary technology database used to build or enhance the software (i.e. that used for most of the build effort), otherwise (if known) it is whether the project used a DBMS.

1st Component Server

Where known, this is the primary technology object/component server used to build or enhance the software (i.e. that used for most of the build effort); otherwise (if known) it is whether the project used an object/component server.

1st Web Server

Where known, this is the primary technology HTML/Web server used to build or enhance the software (i.e. that used for most of the build effort); otherwise (if known) it is whether the project used an HTML/Web server.

1st Message Server

Where known, this is the primary technology E-Mail or message server used to build or enhance the software (i.e. that used for most of the build effort), otherwise (if known) it is whether the project used an E-Mail or message server.

1st Other Platform

Where known, this is any other component of the primary technology used to build or enhance the software (i.e. that used for most of the build effort).

2nd Hardware

Where known, this is the secondary or other technology hardware platform used to build or enhance the software (i.e. that used for remainder of the build effort).

2nd Language

Where known, this is the secondary or other technology programming language used to build or enhance the software (i.e. that used for remainder of the build effort).

2nd Operating System

Where known, this is the secondary or other technology operating system used to build or enhance the software (i.e. that used for remainder of the build effort).

2nd Data Base System

Where known, this is the secondary or other technology database used to build or enhance the software (i.e. that used for remainder of the build effort), otherwise (if known) it is whether the project used a secondary DBMS.

2nd Component Server

Where known, this is the secondary or other technology object/component server used to build or enhance the software (i.e. that used for remainder of the build effort), otherwise (if known) it is whether the project used a secondary object/component server.

2nd Web Server

Where known, this is the secondary or other technology HTML/Web server used to build or enhance the software (i.e. that used for remainder of the build effort), otherwise (if known) it is whether the project used a secondary HTML/Web server.

2nd Message Server

Where known, this is the secondary or other technology E-Mail or message server used to build or enhance the software (i.e. that used for remainder of the build effort), otherwise (if known) it is whether the project used a secondary E-Mail or message server.

2nd Other Platform

Where known, this is any other component of the secondary or other technology used to build or enhance the software (i.e. that used for remainder of the build effort).

CASE Tool Used

Whether the project used any CASE tool. The full repository holds a breakdown of CASE usage for those projects that reported using a CASE tool:

- Upper CASE tool
- Lower CASE tool with code generator

- Lower CASE tool without code generator
- Integrated CASE tool

Used Methodology

States whether a development methodology was used by the development team to build the software.

How Methodology Acquired

Describes whether the development methodology was purchased or developed in-house, or a combination of these.

Product Attributes:

The user base attributes in this section contain numeric values and text representing number range or approximate value. The data has been collected in different forms dependent on the version of the questionnaire used or the precision of the submitter's data. Interpretation of these values is at the discretion of the user.

User Base - Business Units

Number of business units (or project business stakeholders) serviced by the software application. Where the application covers multiple sets of users, a Business Unit is where a distinct set of business rules applies to a distinct set of application users.

User Base - Locations

The number of physical locations being serviced/supported by the installed software application. A 'distinct installation' is an individual installation of the complete software system.

User Base - Distinct Users

The total number of end users that can invoke the application.

User Base - Concurrent Users

The total number of end users using the system concurrently. The term concurrent end users applies to a single distinct installation.

Intended Market

This field describes the relationship between the project's customer, end users and development team.

Effort Attributes:

Recording Method

The method used to obtain work effort data:

- **Staff Hours (Recorded)** – The WORK EFFORT reported comes from a “daily” record of all the WORK EFFORT expended by each person on project related tasks.
- **Staff Hours (Derived)** – The WORK EFFORT reported is derived from time records that indicate, for example, the assignment of people to the project. This might entail estimating that, for example, only 75% of the assigned time was actually applied to the project; the rest is for holidays, education, etc.
- **Productive Time Only** – The WORK EFFORT reported is only for the “productive time” spent by each person on the project. This often amounts to only 5-6 hours per day.

- **Combination** – A combination of recorded and derived methods was used to obtain the WORK EFFORT.
- **No timesheets recorded by development team** – No timesheets were recorded by the development team.
- **Recorded total hours each day or week** – Only the total hours worked each day or week was recorded as WORK EFFORT.
- **Recorded hours on each project/day/week** – The WORK EFFORT was recorded as hours worked on each project for each day/week.
- **Recorded work on project tasks each day** – The WORK EFFORT was recorded for each project task for each day.

Resource Level

Data is collected about the people whose time is included in the work effort data reported. Four levels are identified in the ISBSG data repository.

- 1 = development team effort (e.g., project team, project management, project administration)
- 2 = development team support (e.g., database administration, data administration, quality assurance, data security, standards support, audit & control, technical support)
- 3 = computer operations involvement (e.g., software support, hardware support, information centre support, computer operators, network administration)
- 4 = end users or clients (e.g., user liaisons, user training time, application users and/or clients)

The number in this field indicates that all effort at this and preceding levels is included in the effort fields. For example, a “3” in this field for a project means that the work effort for the development team, development team support and computer operations is included in the work effort number.

Max Team Size

The maximum number of people that worked at any time on the project (peak team size). This number is given for the Development Team (level 1) only.

Average Team Size

The average number of people that worked on the project, (calculated where available from the team sizes per phase). This number is given for the Development Team (level 1) only.

Ratio of Project Work Effort to Non-Project Activity

The ratio of Project Work Effort to Non-Project Activities.

Percentage of Uncollected Work Effort

The percentage of Work Effort not reflected in the reported data. i.e. an estimate of the work effort time not collected by the method used. The report typically is stated in the following terms:

- less than 5% of that recorded,
- between 5% and 10% of that recorded,
- ___ % over that recorded, and
- unable to estimate.

Size Attributes:

Function Point Categories

Input count / Output count / Enquiry count / File count / Interface count

When provided in the submission, the following five fields that breakdown the Functional Size are provided (note that all values are **unadjusted**):

- Inputs For IFPUG & NESMA = function points (UFP) of External Input
For MARK II = function points (UFP) of Input
- Outputs For IFPUG & NESMA = function points (UFP) of External Output
For MARK II = function points (UFP) of Output
- Enquiries For IFPUG & NESMA = function points (UFP) of External Enquiry
- Files For IFPUG & NESMA = function points (UFP) of Internal Logical Files
For MARK II = function points (UFP) of Entity Reference
- Interfaces For IFPUG & NESMA = function points (UFP) of External Interface

Added count / Changed count / Deleted count

When provided in the submission, the following three fields that breakdown the Functional Size are provided (note that all values are **unadjusted**):

- Additions For IFPUG & NESMA = function points (UFP) of New or Added Functions
For MARK II = function points (UFP) of New or Added Functions
For COSMIC = function points (CFP) of New or Added Functions
- Changes For IFPUG, NESMA & MARK II = function points (UFP) of Changed Functions
For COSMIC = function points (CFP) of Changed Functions
- Deletions For IFPUG, NESMA & MARK II = function points (UFP) of Deleted Functions
For COSMIC = function points (CFP) of Deleted Functions

COSMIC Entry / COSMIC Exit / COSMIC Read / COSMIC Write

When provided in the submission, the following four fields that breakdown the Functional Size are provided:

- Entries For COSMIC = function points (CFP) of number of entries
- Exits For COSMIC = function points (CFP) of number of exits
- Reads For COSMIC = function points (CFP) of number of reads
- Writes For COSMIC = function points (CFP) of number of writes

Size Other than FSM:

Lines of Code

The number of the source lines of code (SLOC) produced by the project. This is only available for some projects.

Lines of Code not Statements

The % of the source lines of code (SLOC) that are not program statements. In some cases this is a general comment on the counting of lines of code.

Other Size Units

The count of software size in units of software, where the count approach is other than a Functional Size Measure (FSM) or Source Lines of Code (SLOC). Where a value is given in this column the units of software are given in the column "Count approach".