

# Web Advice Module Case Study

## Using COSMIC in a Service Oriented Architecture

Frank Vogelezang  
Ordina – Proposal Management Center  
frank.vogelezang@ordina.nl

Eric van der Vliet  
Logica  
eric.van.der.vliet@logica.com

Fred de Wilde  
ING Domestic Banking  
fred.de.wilde@ing.nl

Jolijn Onvlee  
Onvlee Opleidingen & Advies  
jolijn@onvlee.com

Harold van Heeringen  
Sogeti – Sizing, Estimating & Control  
harold.van.heeringen@sogeti.nl

Peter Bellen  
QSM Europe – Estimation  
peter.bellen@qsm-europe.com

**Abstract**—With version 3.0, the COSMIC functional size measurement method reached maturity, offering a stable framework for detailed documentation of the method. The most detailed level of documentation is the Case Study, a fully documented functional size measurement of a piece of software.

For the understanding and propagation of the COSMIC method it is important to have Case Studies available from all domains of applicability of the method. At present, only a limited number of case studies are available. Most of the available size measurement methods have never been applied.

The COSMIC working group from the Netherlands Software Metrics Association (NESMA) has produced a Case Study about a web service in the business application domain. This is a domain where first generation functional size measurement methods are frequently used and where there is a struggle how to use these methods to size web services as separate components within a Service Oriented Architecture.

The new Case Study illustrates the use of the COSMIC method in a Service Oriented Architecture. It offers to measurement professionals a detailed example on how to size a web-based business application using the COSMIC method.

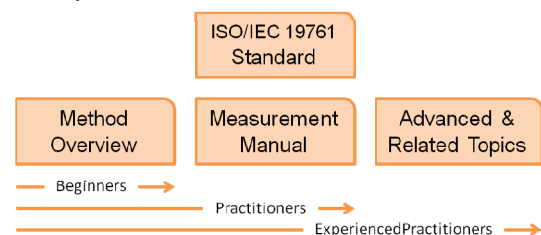
### *COSMIC, Case Study, sizing, Service Oriented Architecture*

#### I. INTRODUCTION

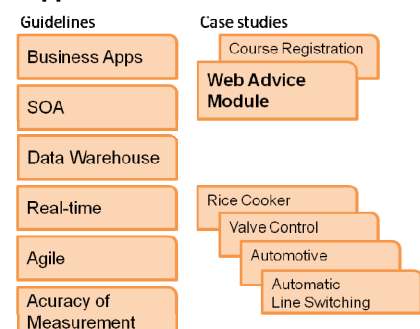
With version 3.0 the COSMIC method became a maturely documented functional size measurement method, offering a stable framework for detailed documentation of the method. The highest level of this framework is the ISO/IEC 19761:2011 standard, describing the fundamental normative definitions and rules of the COSMIC functional size measurement method. The second level is the Measurement Manual, the COSMIC

method core text, describing the implementation of the COSMIC method in detail. It is the reference document for the COSMIC practitioner that provides domain-independent explanation and examples in order to help measurers to fully understand and to apply the method. The third level of detail is formed by Guidelines whose purpose it is to provide additional guidance beyond that given in the Measurement Manual on how to apply the COSMIC method to size software from a specific domain. The most detailed level of method documentation is the Case Study.

#### Principles and Rules for the COSMIC Method:



#### Domain-specific support documents:



## II. THE USE OF CASE STUDIES

The purpose of a Case Study is to present practical example material both for the novice and for the experienced measurer. Each Case Study consists of a realistic specification of a piece of software such as the reader may encounter in practice, and the details of its solution.

For the understanding and propagation of the COSMIC method it is important to have Case Studies available from all domains of applicability of the method. At present, only five Case Studies are available [1; 2; 3; 4; 5]. Most of the available Case Studies come from the real-time domain where first generation functional size measurement methods have never been applied.

The authors together are the COSMIC working group from the NESMA (Netherlands Software Metrics Association) and have produced a Case Study about a web service in the business application domain. This domain is the home of first generation functional size measurement methods like Function Point Analysis according to NESMA (ISO/IEC 24570:2005) or IFPUG (ISO/IEC 20926:2009) and MkII Function Point Analysis (ISO/IEC 20968:2002). In this domain there is a struggle how to use these methods to size web services as separate components within a Service Oriented Architecture.

The new Case Study illustrates the use of the COSMIC method in a Service Oriented Architecture. It offers measurement professionals a detailed example on how to size a web-based business application. This Case Study can be of use to any organization that needs a versatile method for functional size measurement in web-based and/or a service oriented architecture.

## III. BUSINESS APPLICATION SOFTWARE

The primary purpose of business application software is to capture, store and make available data about assets and transactions in the business world (both from the private and public sectors) so as to support such business by record-keeping, by enabling enquiries and by providing information for decision-making. This is the domain where first generation functional size measurement methods were developed to size monolithic single purpose business application software.

Since the new millennium a different kind of software is becoming more predominant, composed of smaller applications or services that can interoperate with other applications to offer flexible solutions to changing customer needs or demands. Currently the Service Oriented Architecture is the most frequently used architecture for this type of flexible solutions. The COSMIC method has been designed to be able to work in an environment like this. For this Case Study two of the COSMIC guidelines are relevant:

- *Guideline for Sizing Business Application Software*
- *Guideline for Sizing Service Oriented Architecture Software*

This Case Study illustrates the advantages of the COSMIC method for Business Application Software in a Service Oriented Architecture. It offers measurement professionals a detailed example on how to size a small web-based business application.

## IV. CREATING A CASE STUDY

The purpose of this Case Study is to share our experience with the COSMIC community to help others to implement and expand use of the method. In our view a good Case Study should be small enough to be measured within half a day, should be simple enough to be understood by novice measurers and should contain enough complexity for discussion about the COSMIC measurement principles. The web advice module we selected is a real application, which could be encountered by any measurement professional. Because of its compact, yet complicated nature we decided to make a Case Study out of this application.

Although based on real requirements, the original requirements have been edited for the purposes of this Case Study. We tried to make the requirements as unambiguous as possible to be able to focus on the counting principles. For this purpose we left one possible ambiguity. The functional user requirements could be implemented in a number of different ways physically, but would logically be translated into the same functional processes. We also left out all elements that are not necessary for determining the functional size, for example design decisions and non-functional requirements.

This Case Study has been discussed within the COSMIC working group to make an unambiguous Case Study with as much discussion details in the solution as possible. When we were satisfied with the concept we have sent the Case Study to external COSMIC measurement experts with experience in writing or teaching case studies. They cooperated in making this Case Study a good basis for explaining the measurement principles of the COSMIC method.

The final step (currently under way) is to get approval from the COSMIC Measurement Practices Committee that this Case Study is fully compliant with the COSMIC method and the currently available relevant guides.

Although there is no formal template for a Case Study, each Case Study needs to contain a number of elements to present practical example material both for the novice and for the experienced measurer on the details of the solution. These elements are described in separate chapters of the Case Study.

**Overview :** Contains the purpose of this Case Study and explains what the reader can expect from it. An overview is not mandatory, but in our opinion highly useful to put the Case Study in perspective.

**Requirements :** The requirements for the Web Advice Module are the basis for the functional size measurement. They are in the original structure, which is not the most ideal form for measurement purposes, since it is not fully synchronous to the functional processes. This is a structure that is not uncommon and is illustrative of what a measurement expert can encounter.

**Measurement strategy :** The purpose and scope of the measurement, what functional users can be identified and at which level of granularity the functional size has been determined.

**Mapping phase :** The identified functional processes from the requirements. For each functional process the relevant objects of interest are determined and from that the data groups with their data attributes can be identified.

**Measurement phase :** The translation of the functional processes to a functional size measurement in such a way that the measurement can be reviewed by subject experts.

**Discussion :** This section contains questions that a measurer can have when doing a functional size measurement on the functional user requirements for this Case Study and provides the answers. This chapter is the main teaching element on how the COSMIC method deals with these kind of requirements.

As long as the software industry produces requirements in the form of not strictly structured documents, requirements always have to be interpreted by humans to translate them into a functional size measurement [6]. When all requirements are documented in a way that the functional size measurement can be automated, then the need for Case Studies will diminish.

## V. ABOUT THE CASE STUDY

The Web Advice Module is a small business application on the website of a large commercial bank. Its purpose is to increase the interest of a specific audience for this website.



This module aims to attract (young) clients who need to make the choice whether they are going to rent a house or buy one by assisting them with a simple questionnaire. The client fills in his response to a couple of propositions and is presented a rough advice from the web advice module. Based on this advice the client can contact his local branch for a detailed advice from a human advisor.

The Case Study is based on real requirements and the functionality has successfully been implemented on the website of the bank.

The Case Study can be downloaded from the COSMIC website [www.cosmicon.com](http://www.cosmicon.com).

## VI. CONCLUSION

This Case Study, although very small, contains a lot of interesting clues about how the COSMIC method should be applied correctly. It is a real application, which could be encountered by any measurement professional. Because of its compact, yet complicated nature we decided to make a Case Study out of this application. We hope that it helps the COSMIC community to understand a number of aspects of the method better and assists in identical interpretation of the COSMIC principles. We hope that the publication of this Case Study will inspire other COSMIC measurement professionals to submit new case studies to the COSMIC community.

## VII. NESMA

The Netherlands Software Metrics Association is a not for profit voluntary organization. Its mission is to improve the predictability of the cost of the delivery and the maintenance of software, making the predictability objective by means of unambiguous measurement data and offering instruments to both customer and supplier organizations to get to an agreement on the predictability.

NESMA wants to provide an independent platform to share knowledge related to the predictability of the cost of the delivery and the maintenance of software.

The goal of the COSMIC working group is to facilitate measurement professionals to use the COSMIC method and to accelerate the use of the method in the Netherlands.

## VIII. FUTURE WORK

The working group is currently getting approval from the COSMIC Measurement Practices Committee that this Case Study is fully compliant with the COSMIC method and the currently available relevant guides.

The working group will monitor the use of the Case Study and handle comments and improvement suggestions.

## References:

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