New Views - FFP Concepts

COSMIC-FFP - ISO 19761
The 2nd generation of functional size measurement

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List of topics

- Introduction:
  - Software Measurement
- Functional Size: Past & Present
- COSMIC-FFP
- Competitive Advantages
- Conclusion

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Measurement

Measurement is a technology:

- **Measurement Designs** =
  - Technical Knowledge
  - Consensus on related concepts & conventions
    - International Standards & Metrology
- **Measurement Procedures** = Know How
- **Tools** = Measuring instruments
  - including software tools

...and technologies emerge, evolve, mature...

  - they get into mainstream if they provide enough benefits to meet the market needs
Introduction

Software Engineering:

- “The application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software;

- That is: the application of engineering to software”.

Institute of Electrical and Electronics Engineering - IEEE
Can you imagine sciences, business or engineering without measurements?

Is measurement **mainstream** in the management of software projects?

- What is the status of functional size measurement?
- What about COSMIC-FFP, this new kid on the block?
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Functional Size Measurement = a technology
  • It must evolve to meet market needs
    – Not a religion

‘Function Point Analysis’: + 25 years old

• Large name recognition in the market place but...
  • In MIS: .... at most x.. %
  • Elsewhere: ... next to 0%

What does it mean?
  • ... irrelevance?
  • or immaturity of:
    – Technology?
    – Industrial environment?
Where is it going?

- In the mid-1990’s, FPA was proposed for international standardization – ISO
  - While there was about +35 variants on the market!

What happened?

- ISO Agreement:
  - on benefits but.............
  - FPA was not recognized as the solution

  - ISO 14143: Parts 1 to 5
Software Size

ISO 2002-2004

- Emergence of a 2\textsuperscript{nd} generation to meet ISO criteria = **COSMIC-FFP - ISO 19761**
- Recognition of three 1\textsuperscript{st} generation methods:
  - MKII
  - IFPUG
  - NESMA
- Integration of FSM standards within the ISO standards infrastructure – ISO 90003:
  - To ensure the technology fit
  - To market software measurement
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COSMIC-FFP

Design funded by industry to address business needs for sizing software:

- Real-time and embedded software
- Multi-layer software
- Compatible to MIS software
- Compatible with modern software design techniques
- Compliant to new ISO requirements
- Sound theoretical foundations
COSMIC FFP: built and based on lessons learned

Context...

20 years of research in universities across the world
**Functional User Requirements**

Software

- **Functional process type**

- **Sub-process types**
  - Data movement types
  - AND
  - Data manipulation types

**Functionality = Data movements and Data manipulations**
COSMIC model of software size

**Functional User Requirements**

Software

- Functional process type

Sub-process types

- Data movement types
- ... only, as a reasonable approximation each data movement is assumed to have an associated constant average amount of data manipulation

Functionality = Data movements + some processing
User view of software functional requirement components

- Users
  - OR Engineered devices
  - OR other Software

- Boundary
  - DATA IN (‘ENTRY’)

- Software
  - STORE PERSISTENT DATA (‘WRITE’)
  - DATA MANIPULATION OR TRANSFORMATION
  - RETRIEVE PERSISTENT DATA (‘READ’)
  - DATA OUT (‘EXIT’)
Different kinds of software

<table>
<thead>
<tr>
<th>USERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIS</td>
</tr>
<tr>
<td>Embedded or Real-time software</td>
</tr>
<tr>
<td>Utility</td>
</tr>
<tr>
<td>Users tools</td>
</tr>
<tr>
<td>Dev. tools</td>
</tr>
</tbody>
</table>

SYSTEM SOFTWARE

‘APPLICATI ONS’

‘MIS’ = Management Information Systems, i.e. Business ‘data-rich’ software
COSMIC and Software Layers

**BOUNDARIES**

<table>
<thead>
<tr>
<th>HUMAN USER</th>
<th>PC</th>
<th>« Back office » Server</th>
<th>« Front end » Processor</th>
<th>Mainframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>New client application</td>
<td>Enhancement to server software</td>
<td>Enhancement to “FEP”</td>
<td>New Server application</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Each piece of software is the user of the next piece across their shared boundary
Concurrent Viewpoints

Customer

Supplier

Users

Functional User Requirements

Software

Functional Size

Outsourcing Company

Software Layers
COSMIC-FFP Outputs

- Functional Size:
  - for estimation
  - for productivity analysis and
    +
  - Quality analysis of the requirements:
    - Ambiguity
    - Inconsistency
    - Incompleteness,…(IEEE 830)

- Functional tests plans
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Key competitive advantages:

- Full ISO recognition
- Flexibility for a wide range of software:
  - Real-time software
  - Telecom
  - Embedded
  - MIS, etc.
- Ability to capture size from multiple viewpoints
- Compatibility with modern software engineering concepts
- **Free and accessible anywhere in the world**
COSMIC-FFP

- First method to be designed by an international team:
  - Multiple countries
  - Multiple backgrounds:
    - Industry
    - ISO
    - Research

- Simple: Easy to
  - train,
  - understand & use
COSMIC-FFP

- Recognized by:
  - International Repository Authority – ISBSG

- Translated into:
  - English
  - Japanese
  - Spanish
  - Italian
  - French

- Recognized research topic: a sound theoretical foundation
COSMIC-FFP

Some challenges:

• Not yet mainstream:
  - Being picked up by early adopters
  - Mainstream will follow
  - Catch-up to do in the international ISBSG repository

• Automation : The tools to support the industry and its key players:
  - software staff develop software with methodologies and software tool kits (The cultural factor)
  - Design (+ marketing) of support tools for data collection and analysis
COSMIC C-FFP

2005 - Key needs for COSMIC C-FFP

- Techniques for early size estimation
- Improved understanding of layers
- Integration within the education framework
- Repository of case studies

- Certification and accreditation?
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Conclusions

A tremendous market need for:

- Estimation
- Performance understanding
- Benchmarking
- ...+ quality up front in the requirements!

...and measurement, including Software Functional Size, can help
Conclusions

Next steps for you: The **know how**

- to apply COSMIC-FFP

- to leverage the COSMIC output for:
  - estimation
  - quality management

- It is up to you as active industry players
Resources

www.lrgl.uqam.ca/cosmic-ffp

www.cosmicon.com
QUESTIONS

THANK YOU FOR YOUR ATTENTION
When does an industry adopt a technology?

- When the technology becomes integrated:
  - into the technological environment
  - within the business context

- ...and has been proven to work well in a large variety of contexts
  - The technology has matured, or is maturing rapidly
Software Measurement

When-Why does an industry promote a new technology?

The industry must recognize that:

- Current practices are not good enough
- There is a direction that has been proven to work in other contexts
- It needs to speed up the transition to the new technology to overcome an acknowledged problem
Software Measurement

What about software measurement?

Who is doing what to speed up adoption?

- The big customers of software:
  - Design and deployment of software process assessment models
  - Regulatory framework
    - Consensus on measurement standards and on their fit into the national technology frameworks