On the applicability of COSMIC-FFP for measuring software throughout its life cycle

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Agenda

- ⊙ **Context**

- ⊙ **Early size estimation**

- ⊙ **Designing Early & Quick COSMIC-FFP**

- ⊙ **Further research**

- ⊙ **Conclusion**

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Context

- ⊙ **Software size is a key variable in software engineering economic models**

- ⊙ **Technical size (SLOC) is available too late in the development process**

- ⊙ **Functional size (COSMIC-FFP), although available earlier, is not yet "early enough"**

- ⊙ **<u>Goal</u>: Explore how COSMIC-FFP could be used "early on" in the development process ?**

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Early size estimation

⦿ **Software development "size paradox"**
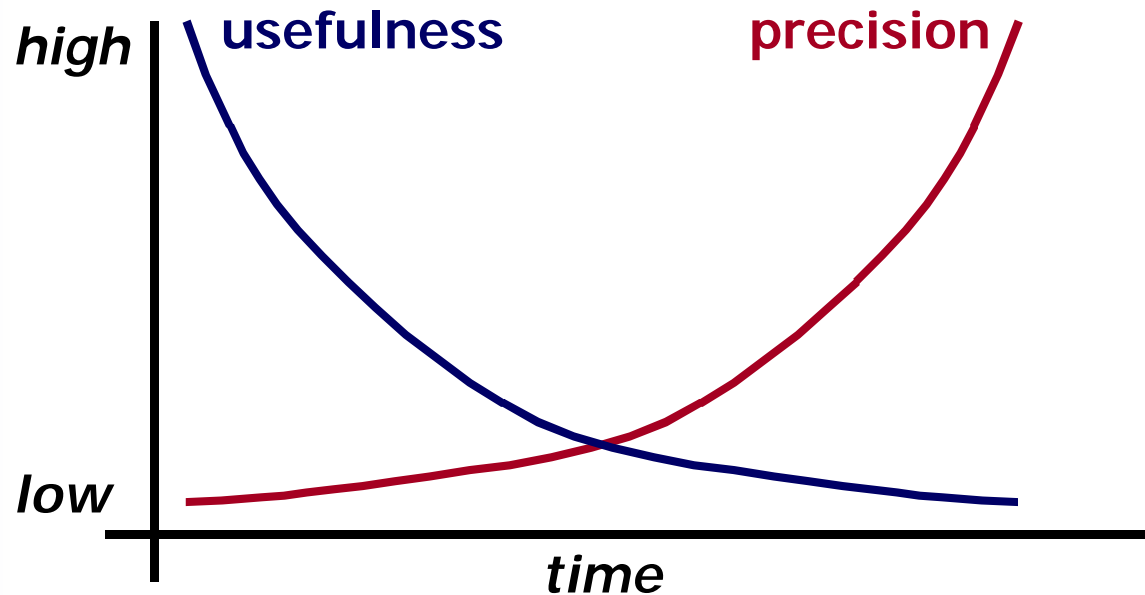
From the perspective of managing the development of new software

"Early" sizing is therefore the result of a compromise between usefulness and precision

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Early size estimation

Early
Size value is obtained before a significant amount of resources have been committed.

Quick
Size value is obtained under constraints, such as time or cost, preventing precise measurement.

Size Measurement
Size value is obtained by rigorous application of the rules and procedures of the COSMIC-FFP measurement manual.

Size Estimate
Size value is obtained by techniques producing a forecast of the measured size.

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Early size estimation

- ⦿ **Early Function Point (EFPA) is a technique to forecast the functional size of software**

- ⦿ **The usefulness of EFPA has already been demonstrated[1]**
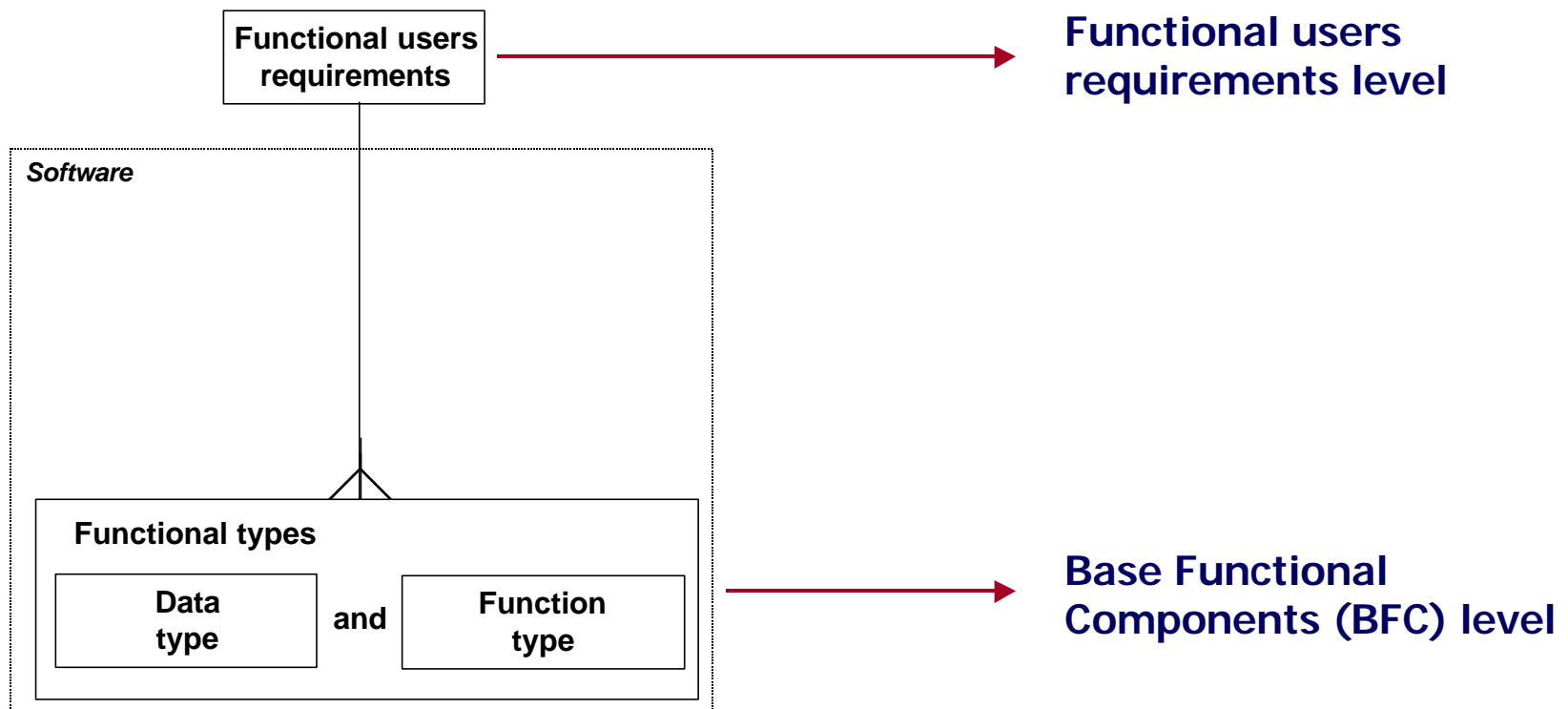
- ⦿ **How could it be applied to COSMIC-FFP ?**

Note 1: See references 5, 6, 8, 10 and 11 in the proceedings paper

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Designing Early & Quick COSMIC-FFP

- ⦿ **Structure of IFPUG FPA**

- ⦿ **Structure of EFPA**

- ⦿ **Structure of COSMIC-FFP**

- ⦿ **Preliminary model of E&Q COSMIC-FFP**

- ⦿ **Similarities and differences**

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Structure of IFPUG FPA

Functional users requirements ————————————→	**Functional users requirements level**

Software

Functional types

| Data type | and | Function type | ————————————→ | **Base Functional Components (BFC) level** |

IFPUG Software model (flat)

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Structure of EFPA

Functional users requirements	→ Functional users requirements level
Software	
"Middle-function" type 1	
. . .	→ "Middle-function" levels
"Middle-function" type 3	
Functional types	
Data type and Function type	→ Base Functional Components (BFC) level
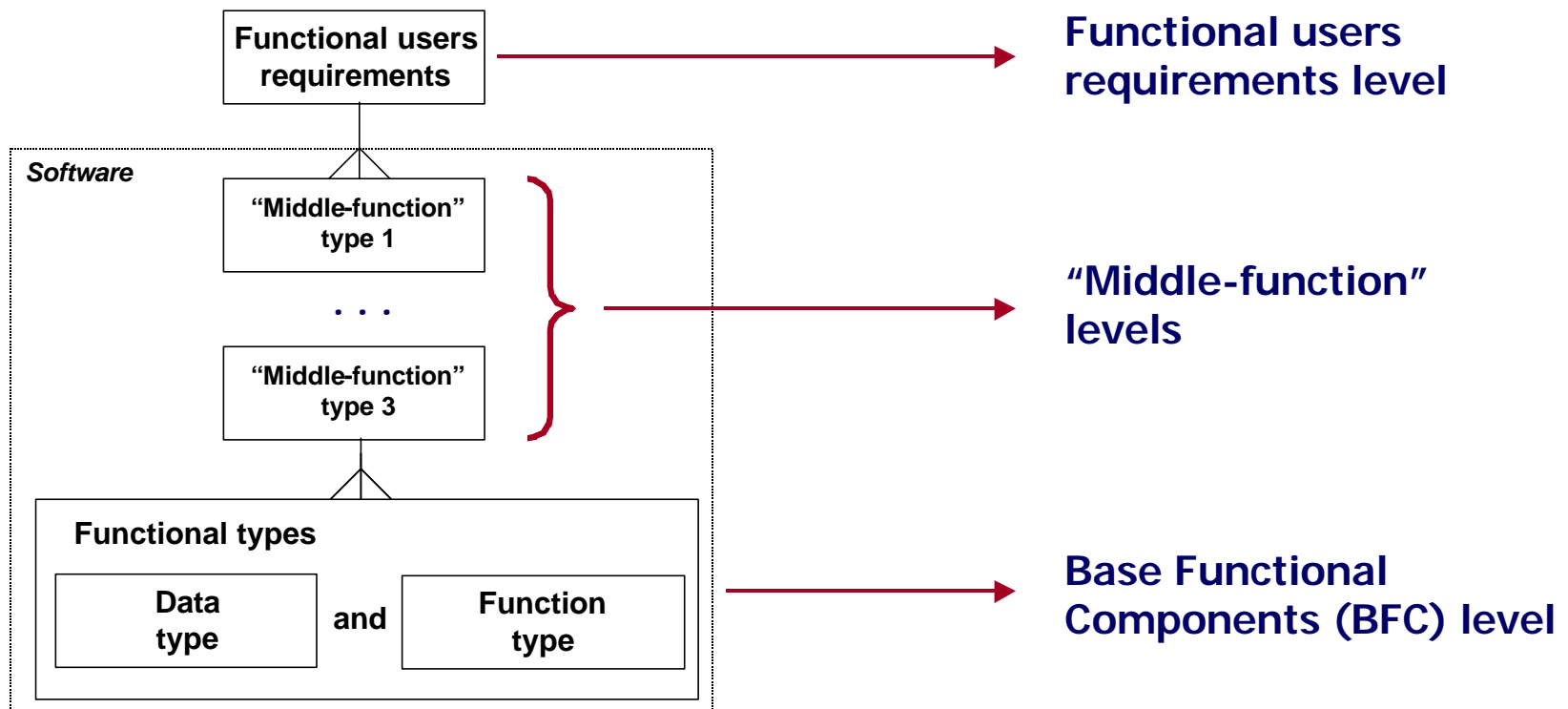
EFPA Software model
(hierarchical)

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Structure of COSMIC-FFP

Functional users requirements → **Functional users requirements level**

Software

Functional process type → **Functional process level**

Sub-process

| Data movement type | and | Data manipulation type |

→ **Base Functional Components (BFC) level**
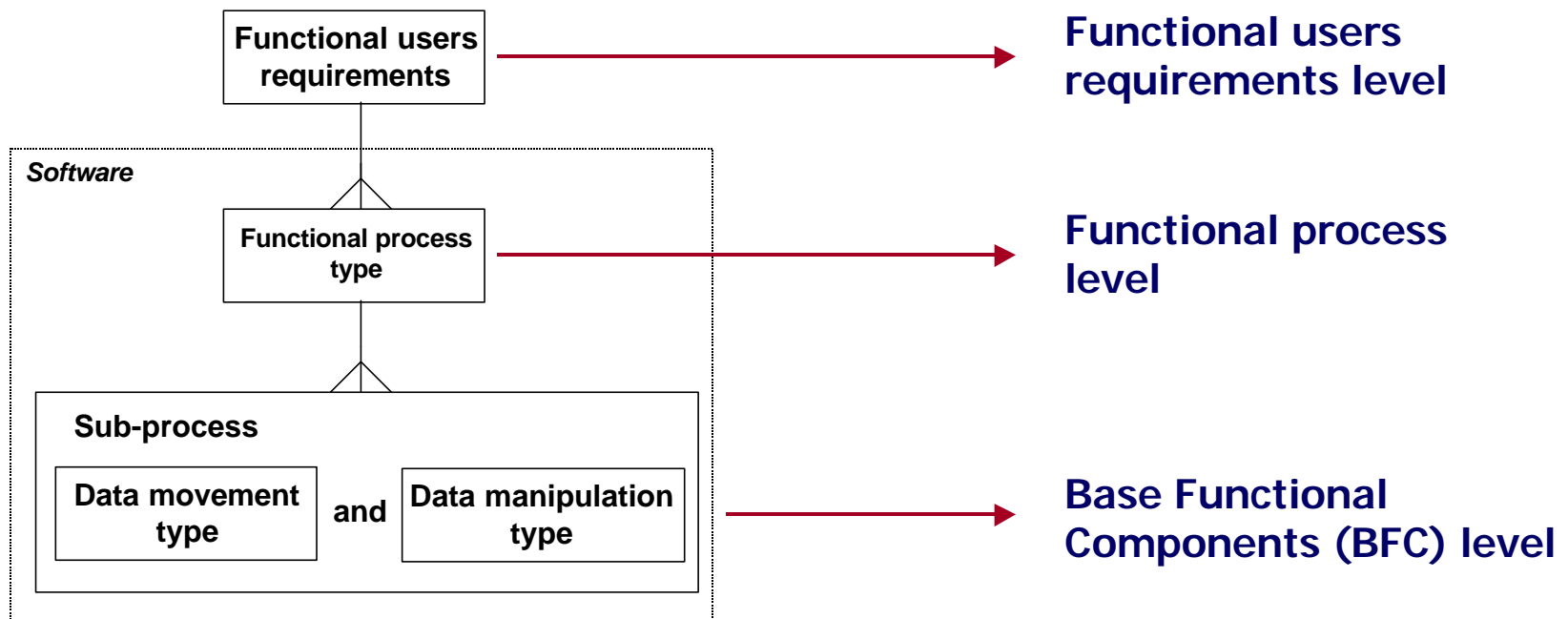
COSMIC-FFP Software model (hierarchical)

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A preliminary model

- ⊙ **"Proto-function" structure**

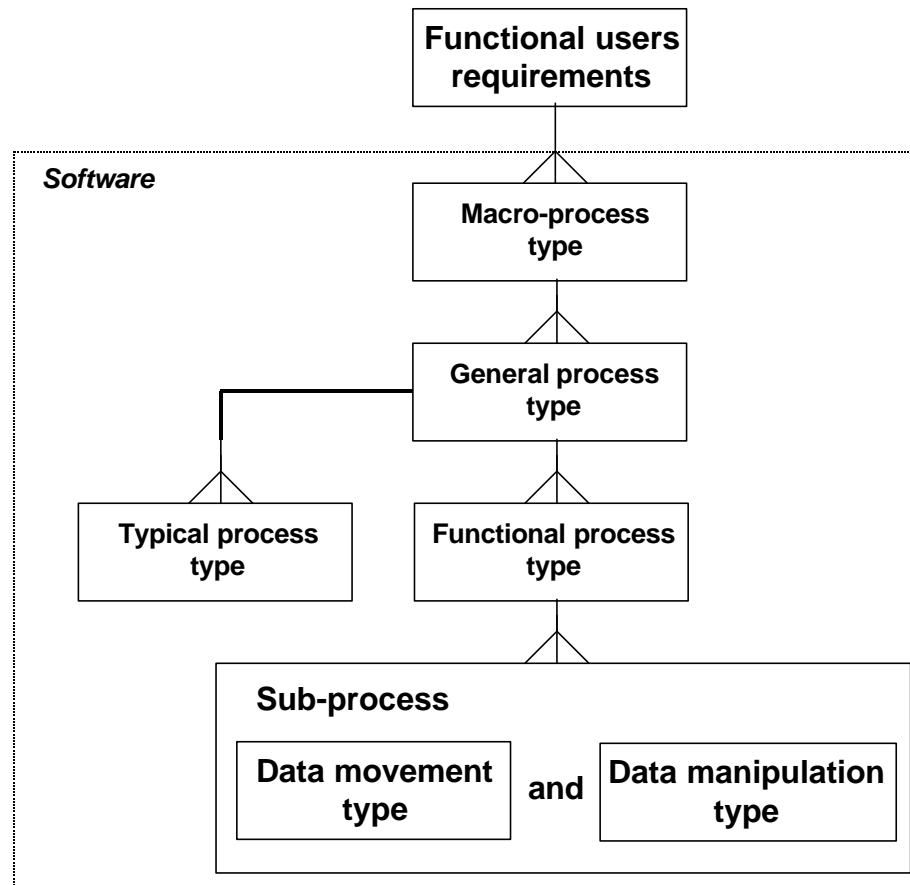- ⊙ **Quantifying "proto-function"**

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A preliminary model - "Proto-function" structure

- ⊙ **Standardize taxonomy around "process"**

- ⊙ **Functional processes not classified as I,O,Q**

- ⊙ **Three size qualification (small, medium, large)**

- ⊙ **Equal contribution of FP size hypothesized**

- ⊙ **No contribution from data groups**

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A preliminary model - "Proto-function" structure

Functional users requirements

Software

Macro-process type

General process type

Typical process type

Functional process type

Sub-process

Data movement type and **Data manipulation type**

E&Q COSMIC-FFP software model

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A preliminary model - Quantifying "Proto-function"

		No. Gen. process	No. Func. process	No. of BFC
Macro process	small	2 to 3		
	medium	4 to 7		
	large	8 to 12		
General process	small		6 to 12	
	medium		13 to 19	
	large		20 to 25	
Functional process	small			to be determined empirically
	medium			
	large			

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A preliminary model - EFPA/E&Q CFFP similarities

- Both approaches propose a hierarchical view

- Size units can be assigned at any level

  within these hierarchies

- Both approaches use analogies to identify

  functional components

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A preliminary model - EFPA/E&Q CFFP differences

- ⊙ Base functional components (BFC) lies at a different functional level

- ⊙ Size units are defined differently

- ⊙ Data groups contribution differs

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Further research

- ⊙ **Validate basic hypotheses and principles**

- ⊙ **Determine empirical values for functional processes**

- ⊙ **Quantify relationship between BFC**

- ⊙ **Study structure of "processes mix" across software domains**

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Conclusion

- **Preliminary work indicates feasibility of obtaining "quick and early" CFFP,**

- **Empirical calibration required at the functional process level,**

- **Further results to be published within the CFFP Measurement Manual**

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