Come back Function Point Analysis (Modernised) - all is Forgiven!

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Purpose of this talk

- **To trace the evolution of Function Point Analysis**
  - how did it start?
  - what are its strengths and weaknesses?
  - why has its use declined?

- **To discuss the potential for an accurate reliable Functional Sizing method for software**

- **To introduce the COSMIC FFP method**

Agenda

- **The 'ups and downs' of Function Point Analysis**

- **The market potential for an accurate Functional Sizing Method**

- **FPA modernised - COSMIC FFP**

- **Conclusions**

'FPA' was developed to enable productivity comparisons across different technologies
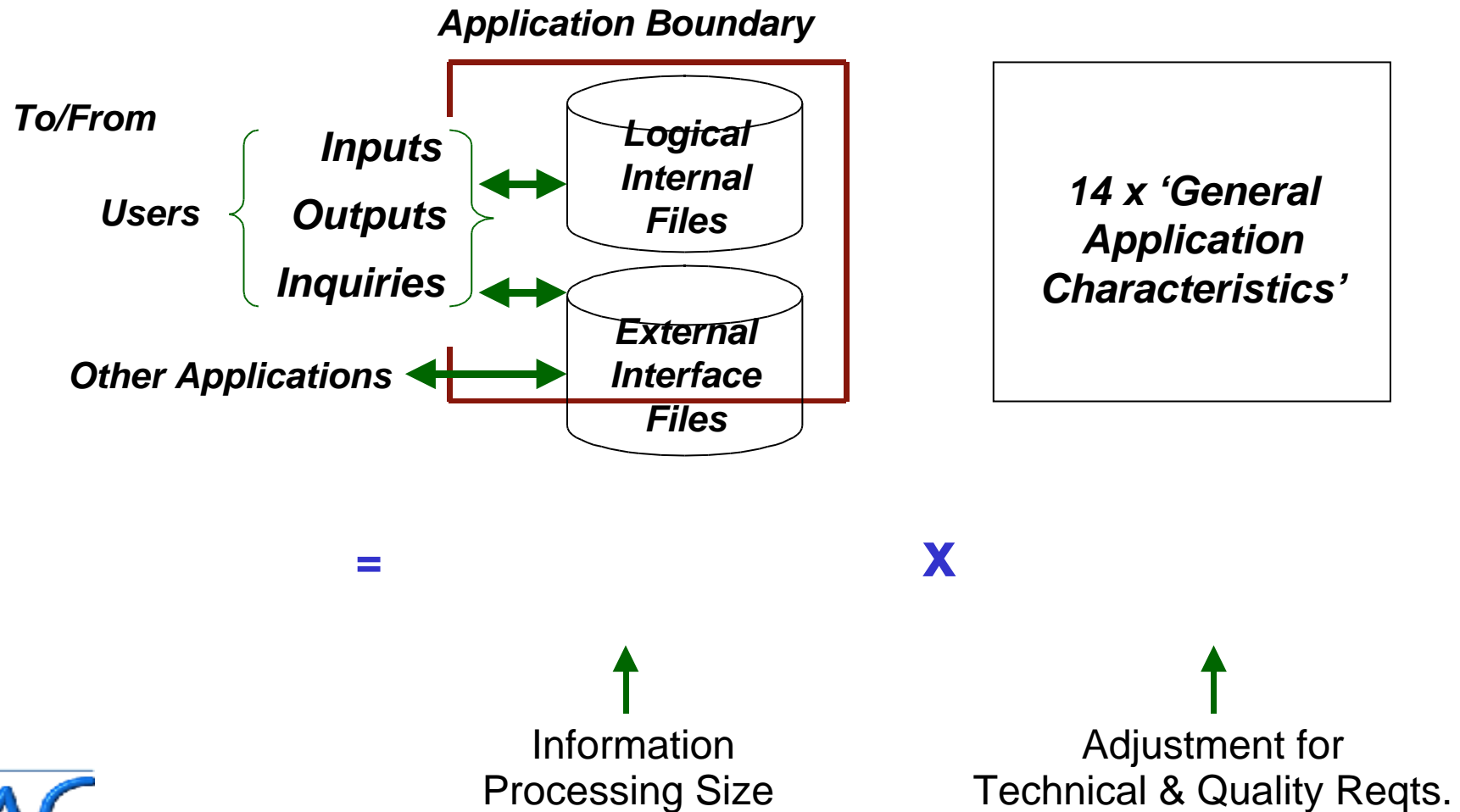
Albrecht's aims:

- A consistent measure of Software Size
  (= work output)
- Independent of the technology used for the system
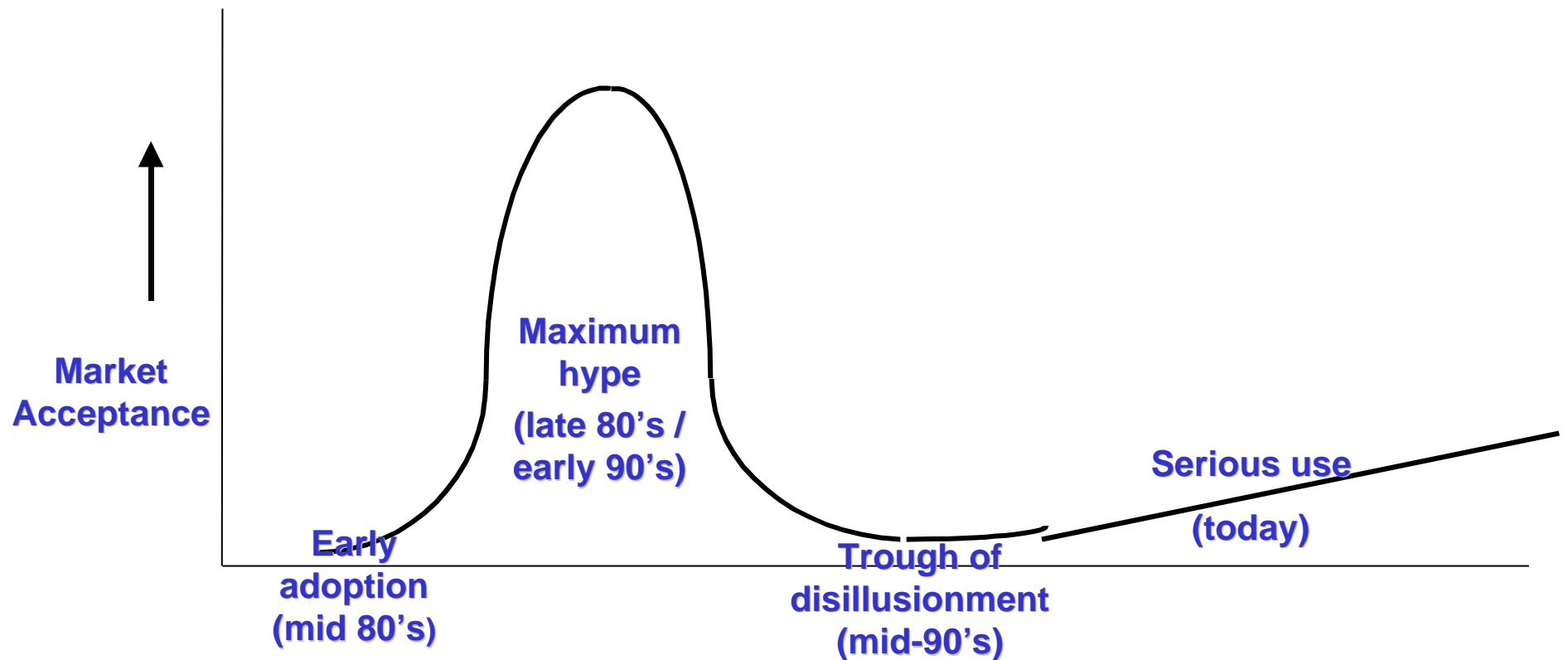- Simple to apply and meaningful to the end-user

Later, the value for estimating effort from a requirements specification was realised

Albrecht's Function Pont Model - a 1970's 'Dow Jones index' of size

Application Boundary

To/From

Users
- *Inputs*
- *Outputs*
- *Inquiries*

Logical Internal Files

External Interface Files

Other Applications

14 x 'General Application Characteristics'

=   **X**

Information Processing Size

Adjustment for Technical & Quality Reqts.

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Function Point Analysis ('FPA') inevitably followed the 'Hype Curve'

Market Acceptance

Maximum hype (late 80's / early 90's)

Early adoption (mid 80's)

Trough of disillusionment (mid-90's)

Serious use (today)

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The Hype initially succeeded

- **IBM's 'programmer productivity' push**
- **Function Point User Groups established standards**
- **Benchmarking clubs published results**
- **Adopted by many major companies and Government Departments**

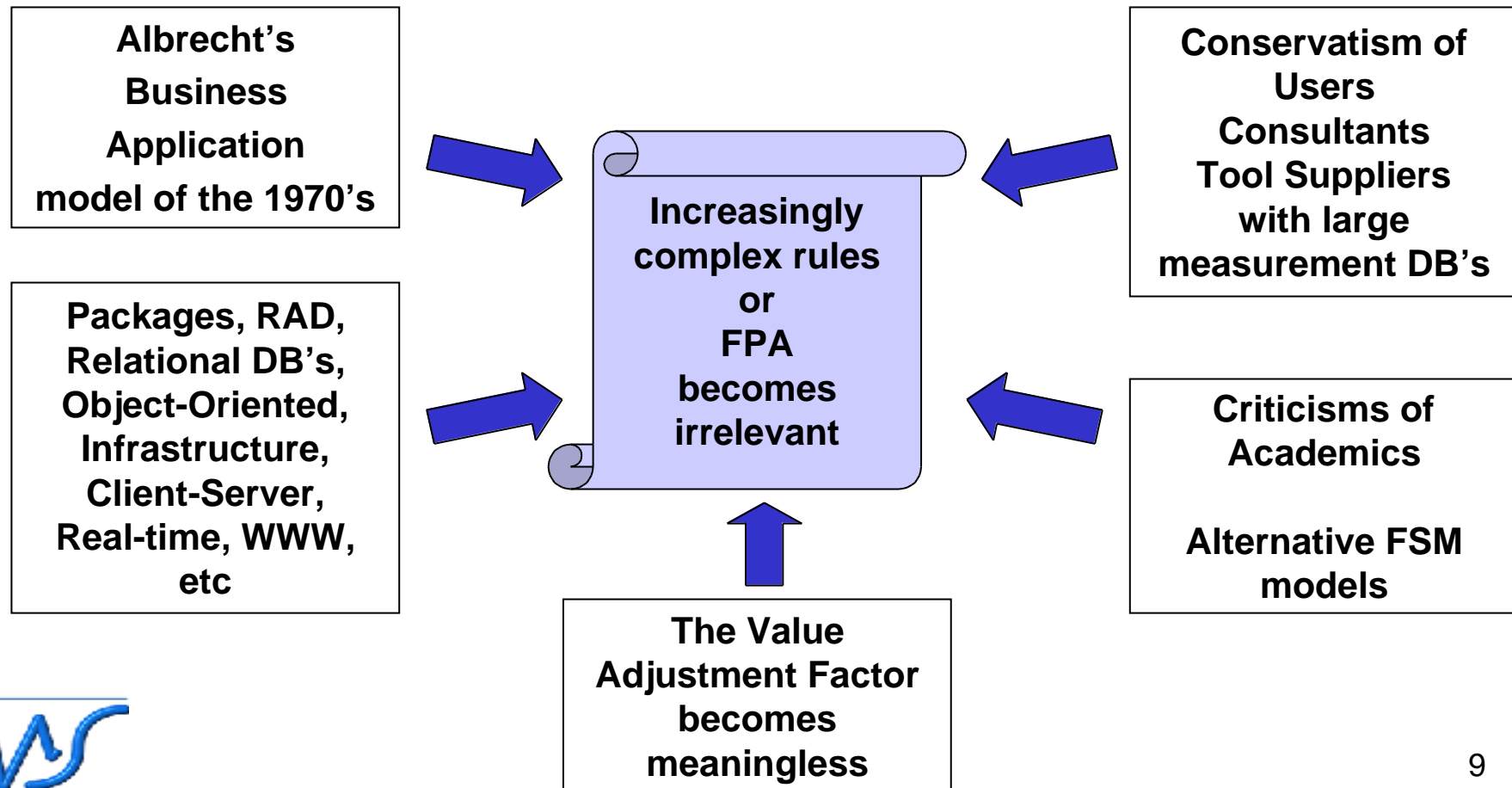## … then the inevitable trough of disillusionment

General Software Metrics problems caused most of the 'trough' rather than FPA

Setting up and managing a Software Metrics Programme proved harder than most imagined

- **Too low in the organisation**

- **Effort of data collection interferes with projects**

- **Poor data analysis and presentation**

- **Continuous re-structuring, cost-cutting and outsourcing**

And the FPA model did not keep pace with changing IT fashions

Albrecht's Business Application model of the 1970's

Packages, RAD, Relational DB's, Object-Oriented, Infrastructure, Client-Server, Real-time, WWW, etc

Increasingly complex rules or FPA becomes irrelevant

Conservatism of Users Consultants Tool Suppliers with large measurement DB's

Criticisms of Academics

Alternative FSM models

The Value Adjustment Factor becomes meaningless

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But in spite of the problems, FPA survives

- **A niche-industry of estimating methods and tools, benchmarking services, consultancy, etc**
- **Some use in outsourcing contracts**
- **…but far below its potential!**

Performance measurement and estimating is enormously important - the software industry needs Functional Sizing!
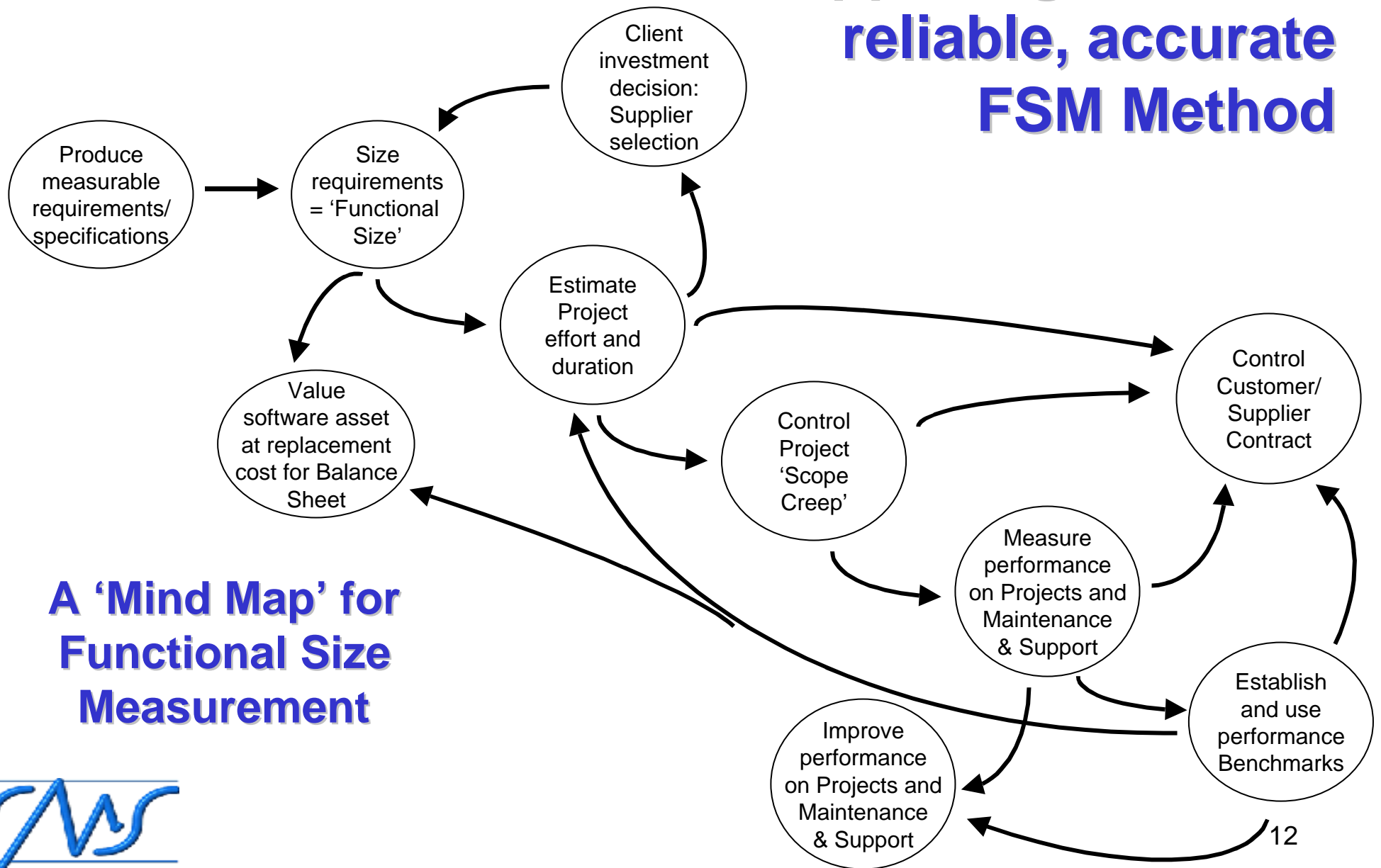
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Supposing we had a reliable, accurate FSM Method

A 'Mind Map' for Functional Size Measurement

- Produce measurable requirements/specifications
- Size requirements = 'Functional Size'
- Client investment decision: Supplier selection
- Estimate Project effort and duration
- Value software asset at replacement cost for Balance Sheet
- Control Project 'Scope Creep'
- Control Customer/Supplier Contract
- Measure performance on Projects and Maintenance & Support
- Establish and use performance Benchmarks
- Improve performance on Projects and Maintenance & Support

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So the market potential for a reliable and accurate FSM Method is huge

Potential beneficiaries:

- Requirements Analysts
- Estimators
- Project Managers
- Investors
- Software Process Improvement engineers
- Procurement and Contract Managers

Functional Size Measurement will only really succeed if it satisfies certain conditions

- (Clear added value in the market ✓)
- Simple to apply; complements modern ways of specifying requirements and developing software
- Any new FSM Method must either enable conversion from existing measurements or there must be a compelling reason to re-invest
- A truly international supply of training, consultancy, tools, standards, marketing, etc
- … and software metrics must be taken more seriously!

Agenda
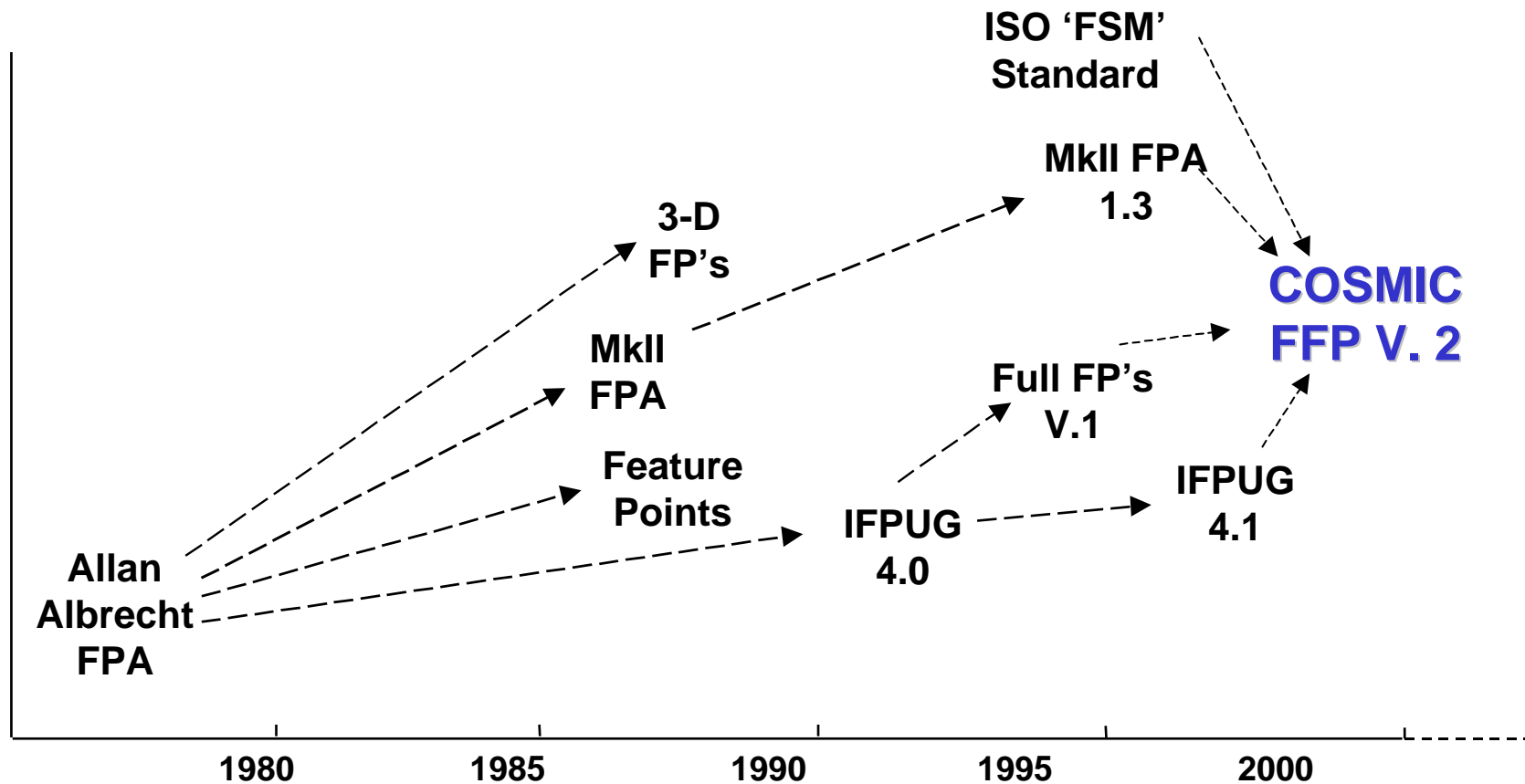
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The COSMIC * FFP Method draws on a long history of experience

ISO 'FSM' Standard

MkII FPA 1.3

3-D FP's

MkII FPA

Feature Points

Full FP's V.1

COSMIC FFP V. 2

IFPUG 4.0

IFPUG 4.1

Allan Albrecht FPA

1980   1985   1990   1995   2000

* Common Software Measurement International Consortium

The COSMIC FFP Project Aims

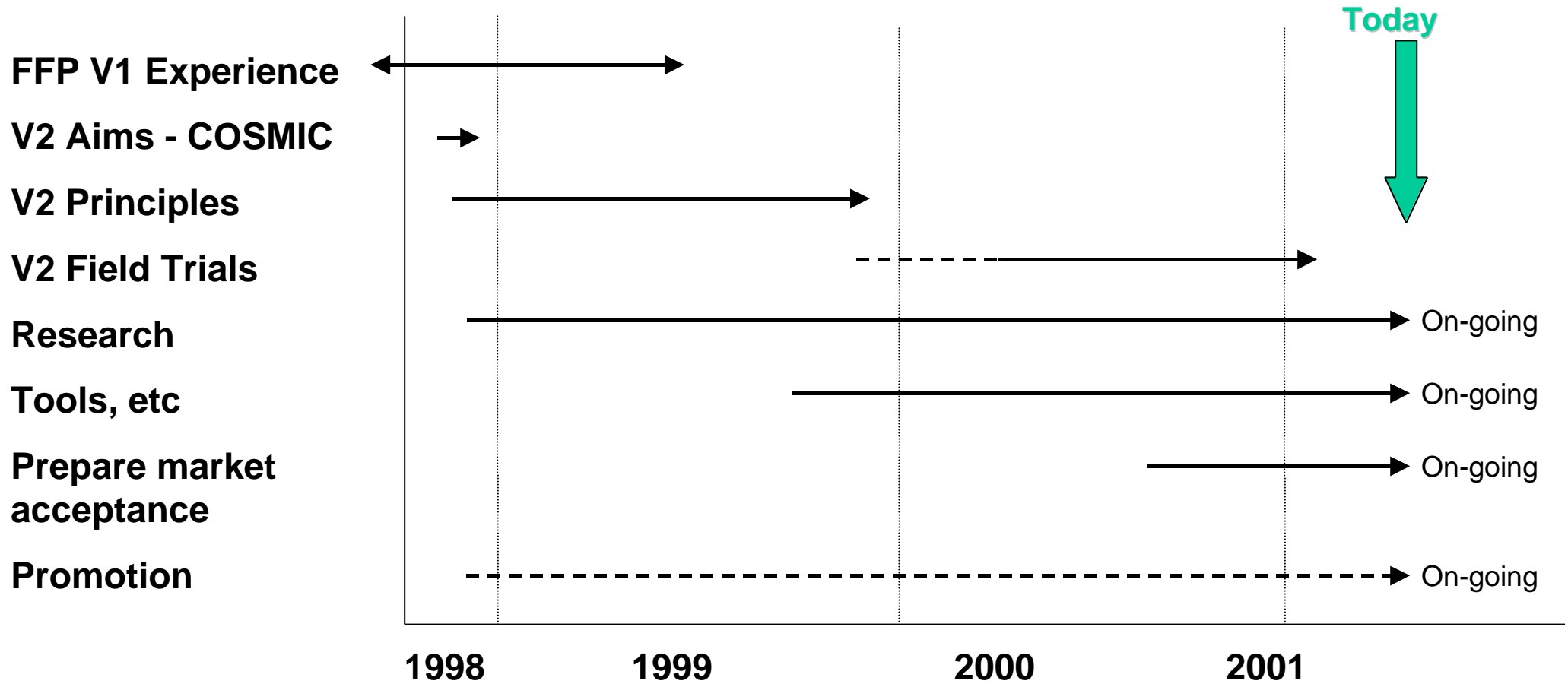**To develop, test, bring to market and gain acceptance as an industry standard, a new generation of software functional sizing methods which are applicable:**

- **in as wide a range of software 'domains' as possible;**

- **priority to be given to business and real-time software (e.g. process control, operating systems, telephony, embedded, etc.)**

for performance measurement

as a component of estimating methods from early in a software item's life

Evolution of COSMIC FFP

Today

	1998	1999	2000	2001

- **FFP V1 Experience**
- **V2 Aims - COSMIC**
- **V2 Principles**
- **V2 Field Trials**
- **Research** — On-going
- **Tools, etc** — On-going
- **Prepare market acceptance** — On-going
- **Promotion** — On-going

COSMIC FFP Core Team: a broad range of academic and practitioner experience

Alain Abran — Canada
Charles Symons — UK
⎱ Joint Project Leaders

Moritsugu Araki — Japan

J.-M. Desharnais, Serge Oligny, Denis St Pierre — Canada

Reiner Dumke, Gunter Buehren — Germany

Peter Fagg, Grant Rule — UK

Vinh Ho — Vietnam

Roberto Meli — Italy

Pam Morris — Australia

Jolijn Onvlee — Netherlands

Marie O'Neill — Ireland

Risto Nevalainen — Finland

Experience:

Academia

Industry

IFPUG, MkII, Laturi, NESMA, etc

ISO SC7/WG12

COSMIC FFP is based on a very simple model of software functionality

Functional User Requirements
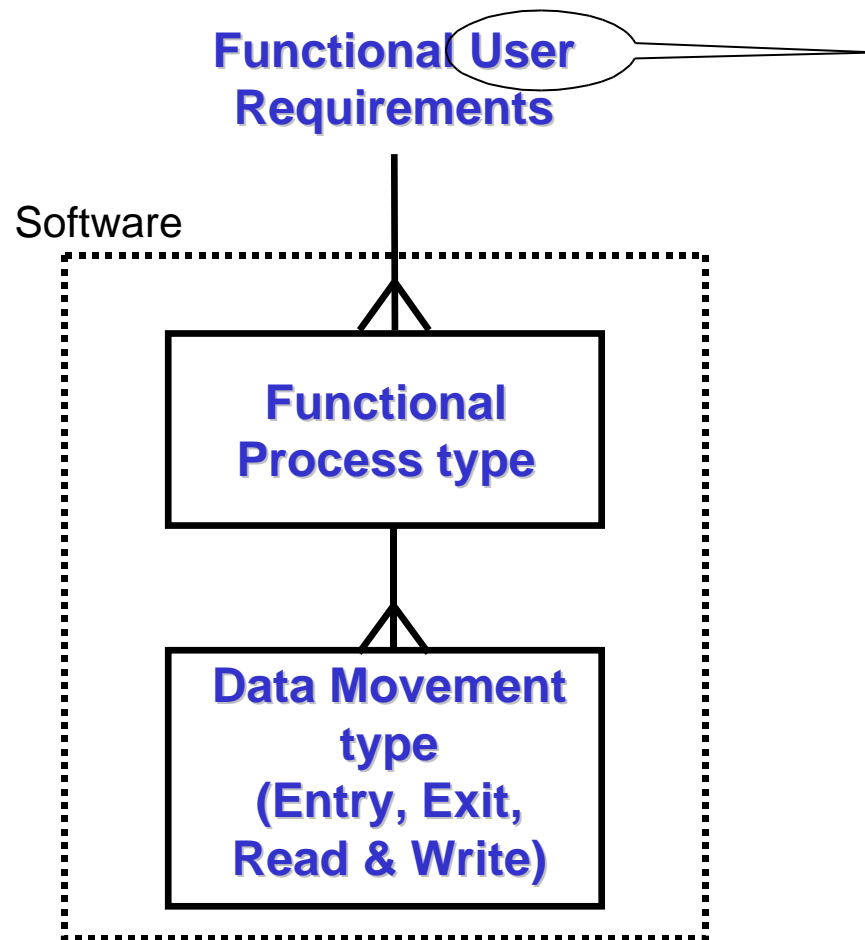
Any person, engineered device or software interacting with the software being measured

Software

Functional Process type

Data Movement type (Entry, Exit, Read & Write)

Data manipulation is ignored

(We assume a constant average amount of data manipulation associated with each data movement)

Definition of a 'Functional Process'

"A functional process is a **unique** **set** of **data movements** (entry, exit, read, write)."

"It is **triggered** directly, or indirectly via an actor, by a unique **event-type** which is indivisible from the requirements viewpoint. The functional process is complete when it has executed all that it is required to do in response to the triggering event."

Equivalent to a MkII "Logical transaction" and
similar in intent (?) to an IFPUG "Elementary process".

The COSMIC FFP Sizing Rules

The size of a Functional Process

- the arithmetic sum of the number of Data Movements (Entries, Exits, Writes and Reads)

- minimum size: 2
- maximum size: no upper limit

The size of an item of software is the sum of the sizes of all the Functional Processes

So why is the COSMIC FFP sizing model superior?

- **Simple and unambiguous**

- **Applicable to Business/MIS and to real-time software (e.g. process control, telecoms, avionics, infrastructure)**

- **Applicable to any component of multi-tier, multi-layered architectures**

- **Eliminates the need for a 'Value Adjustment Factor' for technical and quality requirements**

Much work has been done to keep the model simple and well-defined

The COSMIC FFP model is based on fundamental concepts from Structured Information Analysis established in the 1980's

Example: IBM Global Services found multiple interpretations of the term 'Use Case'

IBM GS has adopted the MkII FP Logical Transaction (= the COSMIC FFP Functional Process) as a key component of its LEAD * method for estimating OO projects

G Jensen, 'Life-cycle Effort and Duration', ACOSM 2000   24

Why no 'VAF'? Example: requirement for an on-line enquiry with no technical or quality constraints

"On entry of a Customer name or ID, the software shall display a list of his/her investments and their current market valuation"

(A complex enquiry, probably requiring retrieval of multiple types of investment products and values from remote databases

- can be sized by any existing FP method)

Example as before: but the response time must not exceed one second

Possible solutions:

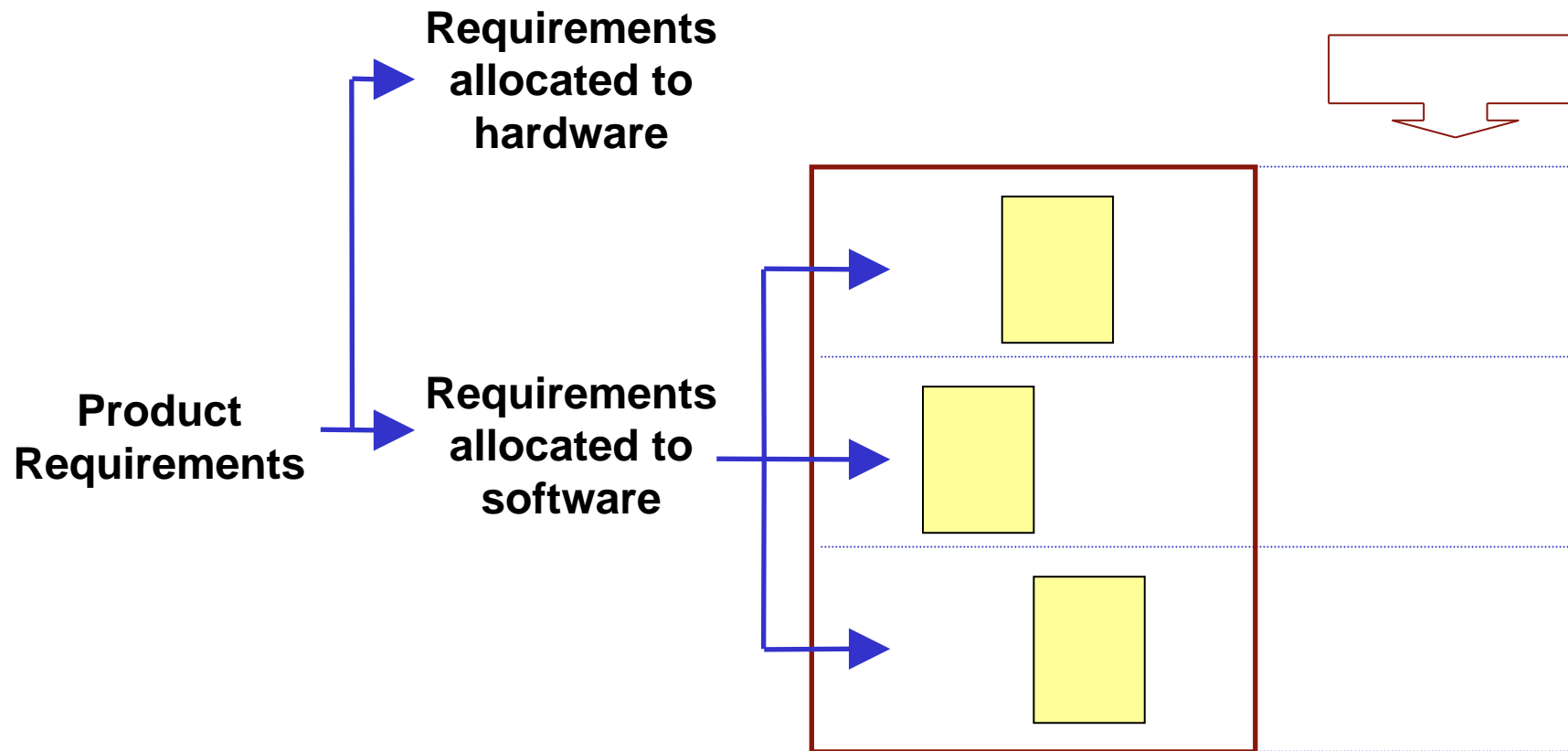• Very fast hardware

• Low-level programming language

} Take into account in project estimating and costing

Extra functional processes to maintain investment values continuously up-to-date
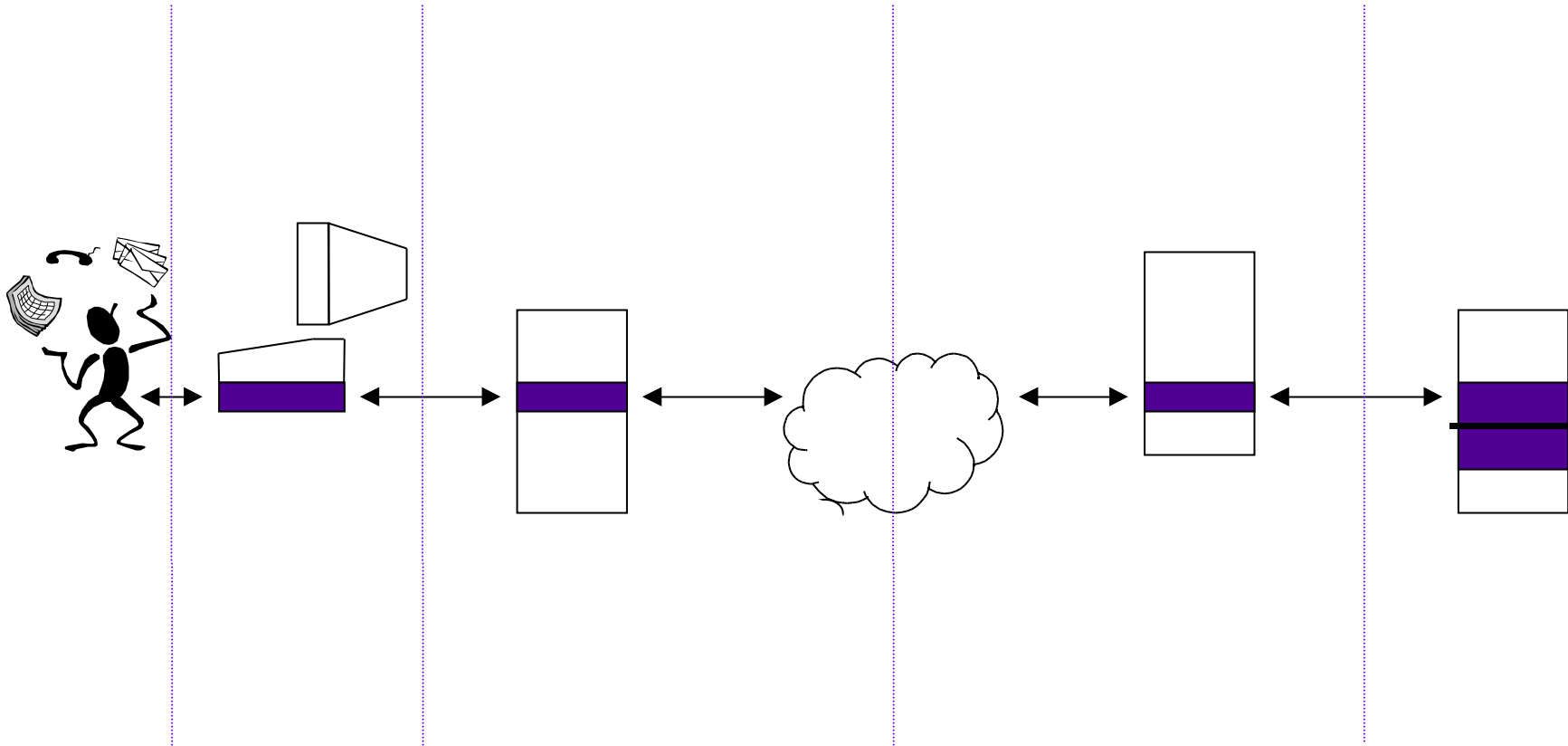
} Increased Functional Size

Example as before: and the User must be able to fax the statement to the customer from his PC

Requirements allocated to hardware

Product Requirements

Requirements allocated to software

COSMIC FFP can size the software in any layer

Example as before: and the application architecture is four-tier client-server

COSMIC FFP can size the human view and also the size of the components of multi-tier, multi-layer software which the developer must build

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Conclusion, we do not need a 'Value Adjustment Factor'

All requirements can be allocated to:

- **Functional User Requirements of software that has to be built or changed in any layer or tier - which can be sized**

- **Project processes, e.g. inspections, testing**
- **Selection of hardware and software to be acquired**

**Take into account in estimating, not in Functional Size**

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Conversion from older FP methods may be possible in some cases

- If the 'old' FP method attempts to measure the same functionality as does the COSMIC FFP method, then conversion should be possible

- If the 'old' FP method misses functionality, then no conversion is possible

Initial interest in COSMIC FFP has come mainly from organisations that have never used an FP method, or have tried and abandoned its use

Summary: the COSMIC FFP Meta-model
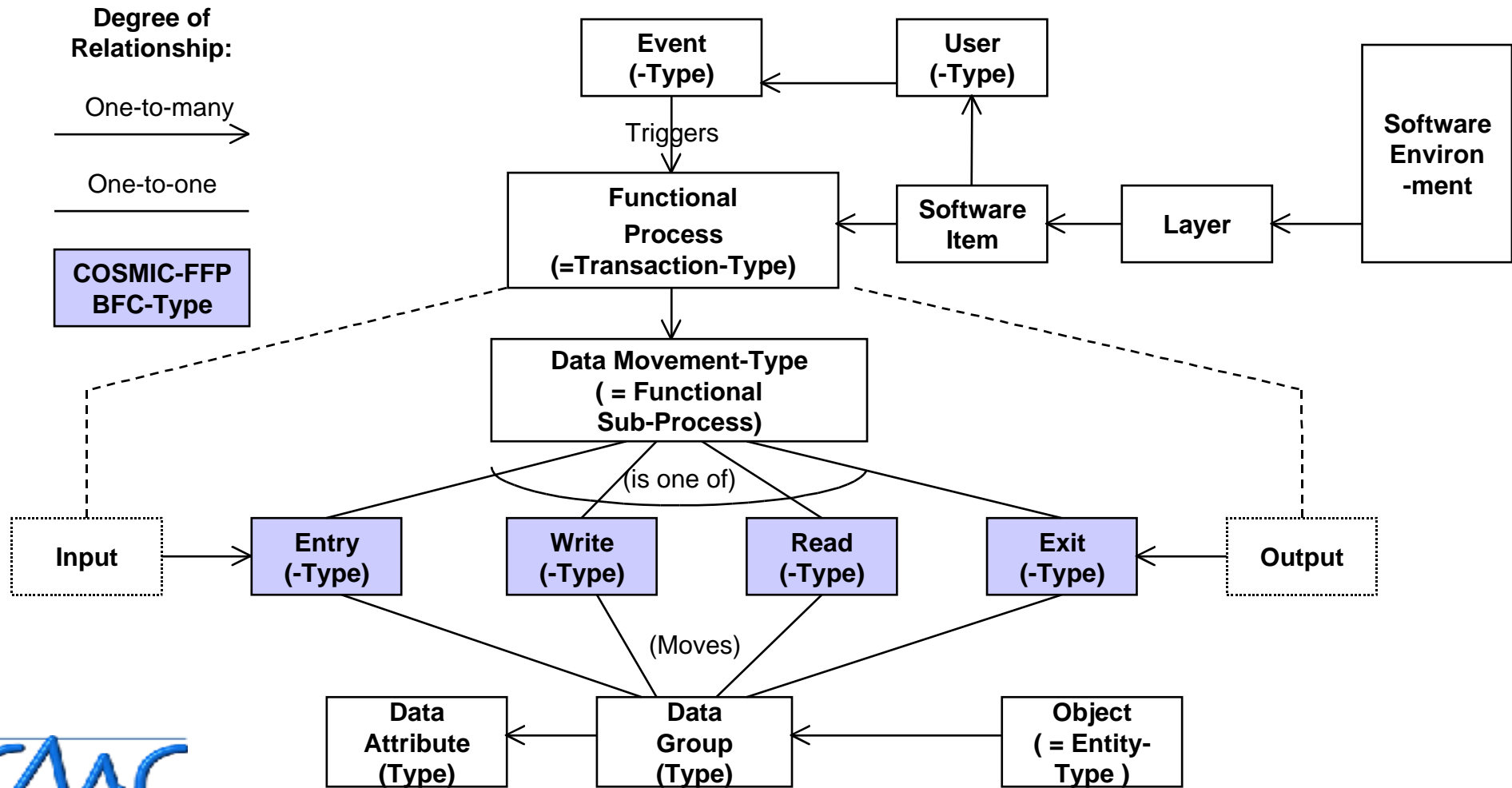
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The COSMIC FFP method is much more valuable than just for sizing

We need requirements which are

- Understandable
- Traceable
- Testable
- **Measurable**

The COSMIC FFP method is a basic requirements analysis and management method – size measurement is almost a spin-off

COSMIC FFP method has achieved a number of 'firsts'

The first Functional Sizing method to:

- be designed by an international group of experts on a sound theoretical basis

- draw on the practical experience of all the main existing FP methods

- be designed to conform to ISO 14143 Part 1

- be designed to work across MIS and real-time domains, for software in any layer or peer item

- be widely tested in field trials before being finalised

There are many drivers for renewed interest in FPA and Software Metrics

- **Improved functional sizing, extending into new software domains**

- **Demands for measurement from ISO 9000 (2000)**

- **The new CMM - I requires measurement at Level 2**

- **Maturing of software contracting and outsourcing requiring performance measurement, better estimating and control of requirements, benchmarking, etc.**

Available resources

- ➤ **Complete documentation** on the Web
  - ✓ **Concepts and definitions,**
  - ✓ **Measurement Manual,**
  - ✓ **Publications,**
  - ✓ **http://www.lrgl.uqam.ca/ffp.html**
  - ✓ **http://www.cosmicon.com**

- ➤ **Training and consultancy** support available in Europe, N America and Asia/Pacific

Thank you for your attention

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