Measurement Information Model

What's A "Metric"
OR
"Metric" Revisited

**Practical Software Measurement
User's Group Conference
July 25, 2000**

**Jack McGarry
U.S. Army TACOM-ARDEC**

Measurement Information Model

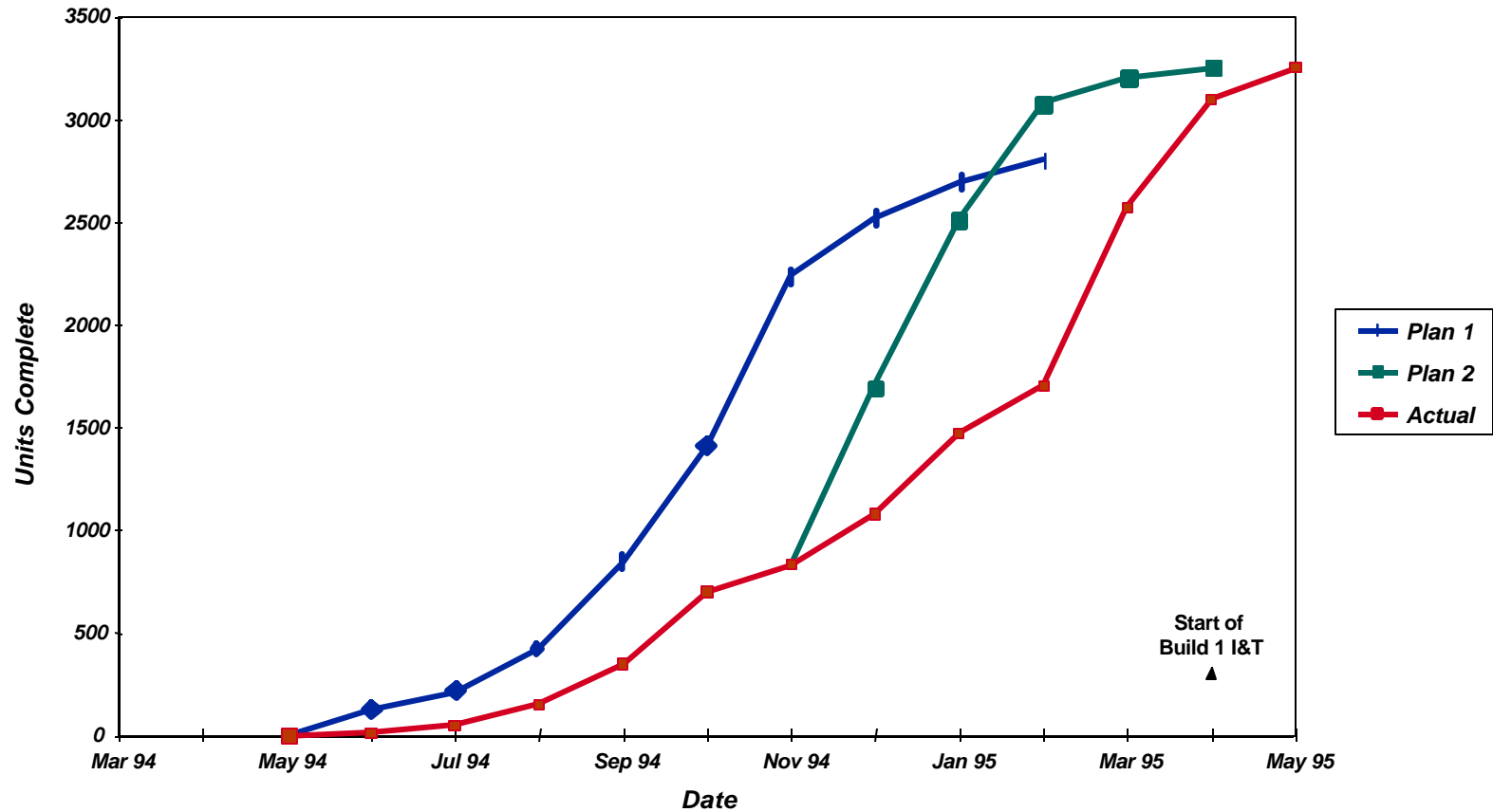# *Professional Metrics Quiz*

Measurement Information Model
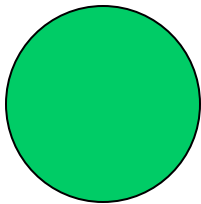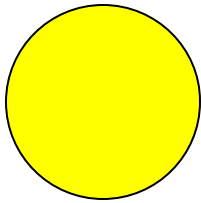
2000 SLOC

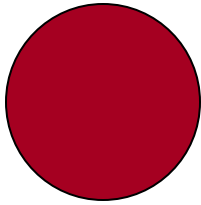# Measurement Information Model

$$\frac{60 \text{ Defects}}{2000 \text{ SLOC}} = 30 \text{ Defects/KSLOC}$$

Measurement Information Model

Software Development Progress - Build 1
Units Completing Detailed Design

Measurement Information Model

Measurement Information Model
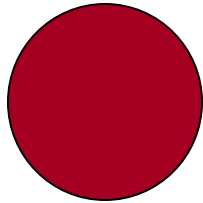
⬤ ***Not Too Good (Never Used)***
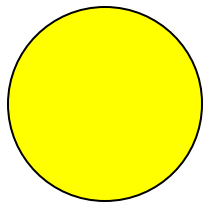
⬤ ***Good, But Not Real Good***
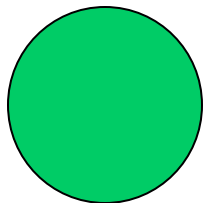
⬤ ***Real Good***
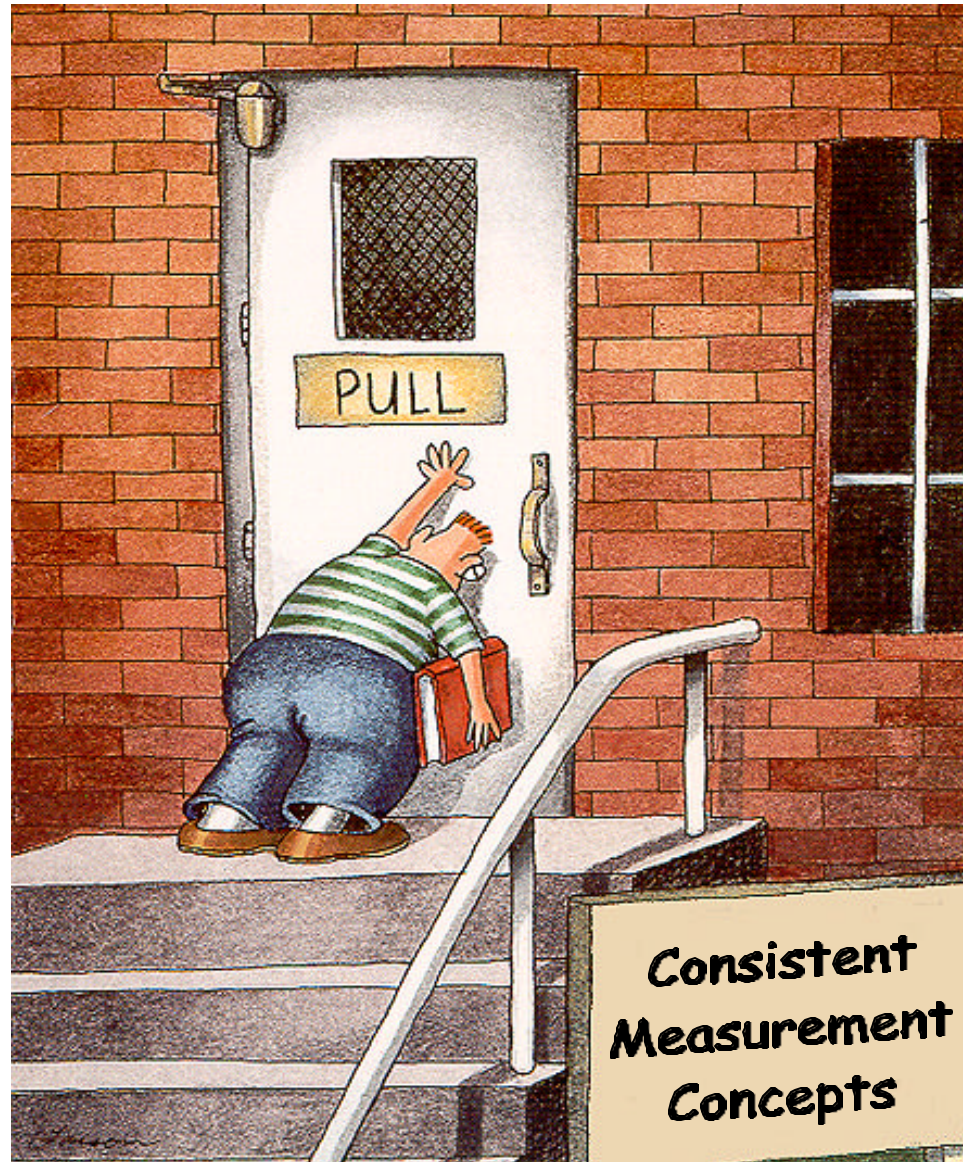
Measurement Information Model

Motivation

- **Inconsistent Communication of Measurement Concepts Across the Software Engineering Community**

  - **Common Terminology - Definitions**
  - **Concept inter-relationships**

- **Increasing Use of Measurement Across Many Types of Organizations**

- **"My Metric is Better than Your Metric"**

Measurement Information Model

ISO/IEC 15939 Measurement "Architecture"

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                    ┌─────────────┐
                    │   ISO/IEC   │
                    │    15939    │
                    └─────────────┘
              ┌───────────┴───────────┐
  ┌─────────────────┐       ┌─────────────────┐
  │   Measurement   │       │   Measurement   │
  │     Process     │       │   Information   │
  │      Model      │       │      Model      │
  └─────────────────┘       └─────────────────┘
```

Information Driven Implementation Approach

Consistently Defined & Understood Concepts

Measurement Information Model

- *Top Level Measurement Information Structure*

- *Provides a Consistent Roadmap Between the Information Required by the Decision Maker and What is Actually Measured*

- *Relates All Measurement Components In an Understandable Structure*
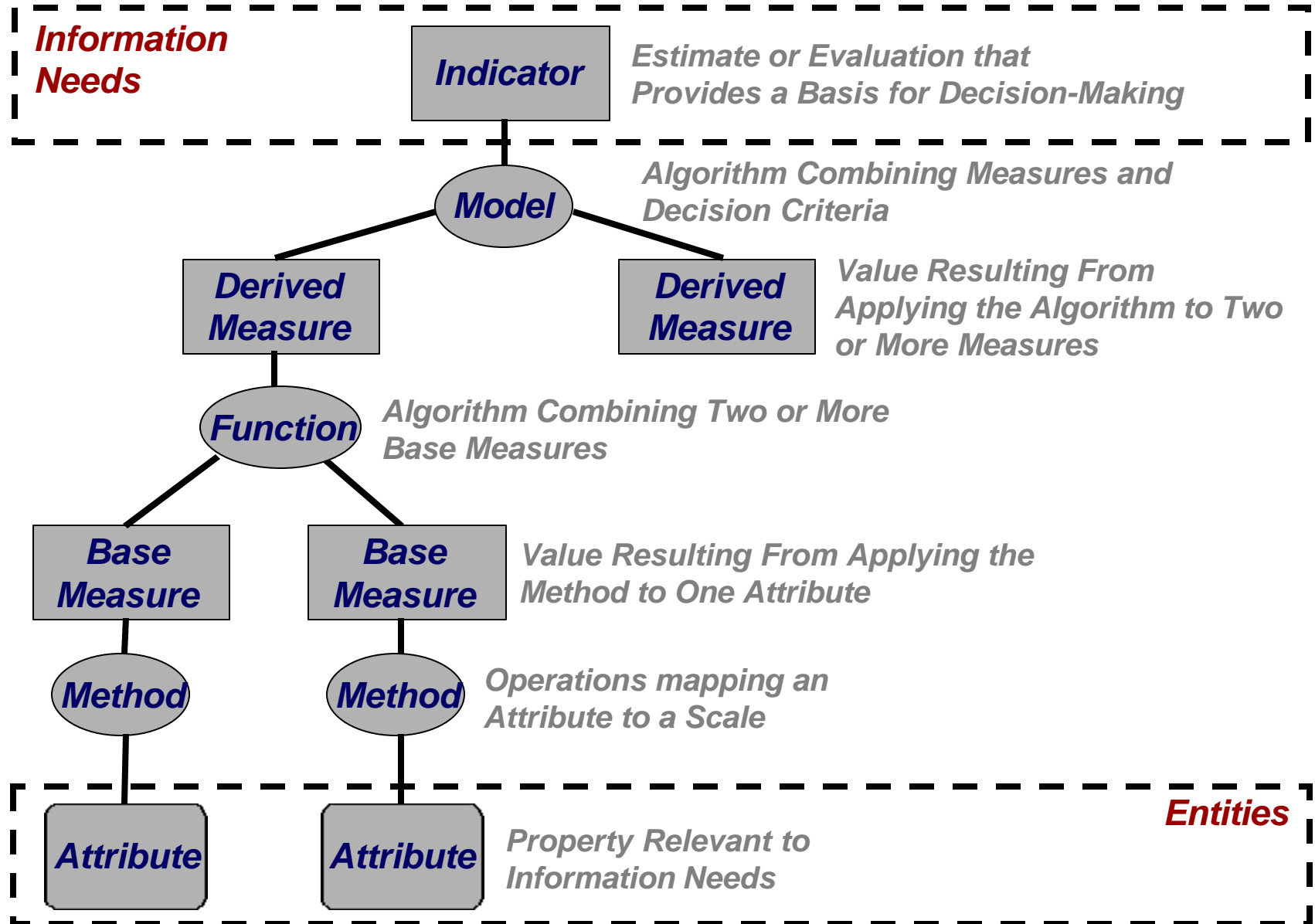
- *Defines a Common Measurement Terminology*

Measurement Information Model

ISO/IEC 15939 Measurement Information Model

ISO/IEC 15939 Measurement Information Model

Information Needs

Indicator — *Estimate or Evaluation that Provides a Basis for Decision-Making*

Model — *Algorithm Combining Measures and Decision Criteria*

Derived Measure

Derived Measure — *Value Resulting From Applying the Algorithm to Two or More Measures*

Function — *Algorithm Combining Two or More Base Measures*

Base Measure

Base Measure — *Value Resulting From Applying the Method to One Attribute*

Method

Method — *Operations mapping an Attribute to a Scale*

Attribute

Attribute — *Property Relevant to Information Needs*

Entities

Measurement Information Model

ISO/IEC 15939 Measurement Information Model (Continued)

Information Needs

Information Product

Decision Criteria

Indicator

Estimate or Evaluation that Provides a Basis for Decision-Making

Model

Algorithm Combining Measures and Decision Criteria

Base Measure

Derived Measure
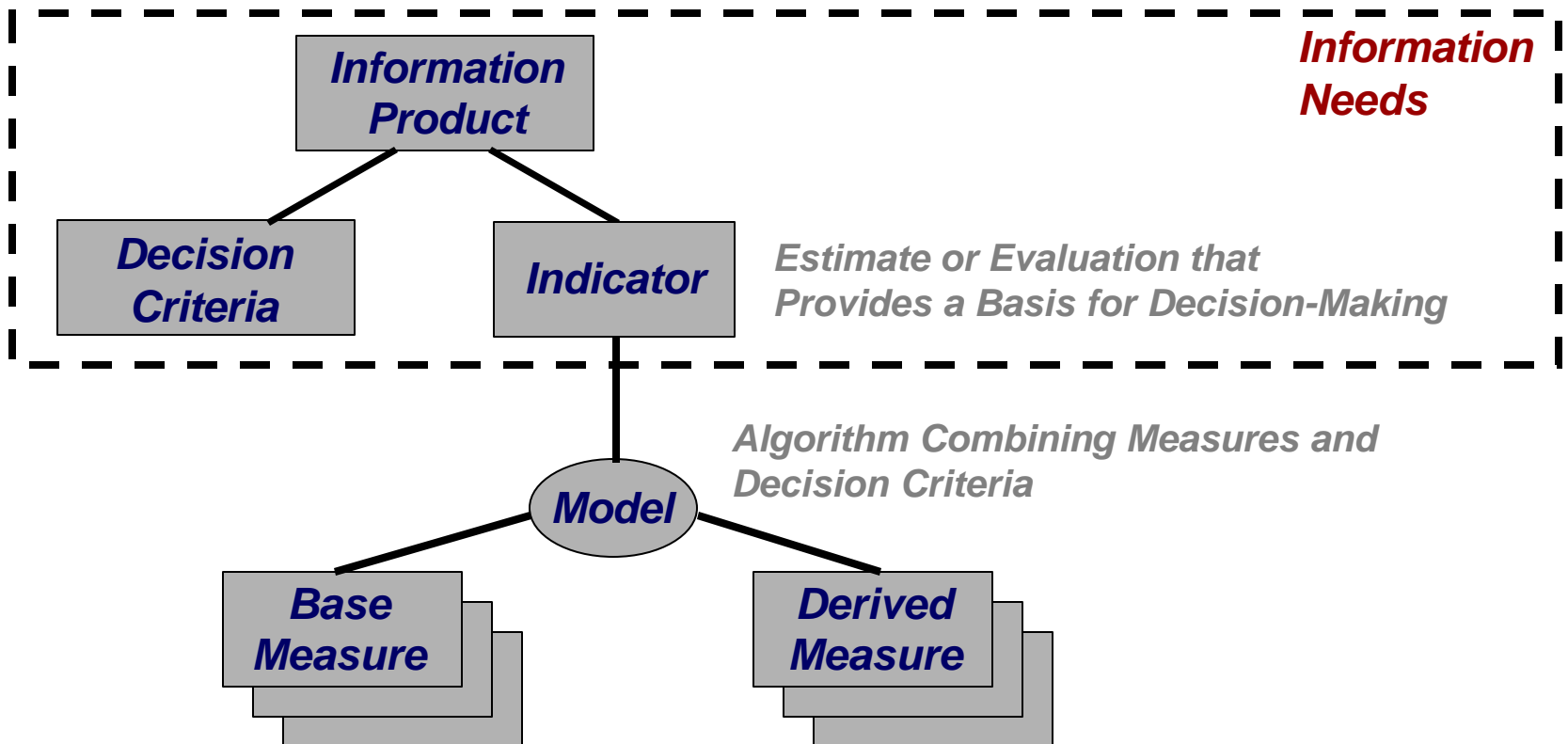
Measurement Information Model Example

Information Need	Estimate productivity for new project
Measurable Concept	Project productivity
Relevant Entities	1. Code produced by past projects 2. Effort expended by past projects
Measurable Attributes	1. Ada language statements (in code) 2. Timecard entries (recorded effort)
Base Measures	1. Project X Lines of code 2. Project X Hours of effort
Measurement Method	1. Count semicolons in Project X code 2. Add timecard entries together for Project X
Type of Method	1. Objective 2. Objective
Scale	1. Integers from zero to infinity 2. Real numbers from zero to infinity
Type of Scale	1. Ratio 2. Ratio
Unit of Measurement	1. Line 2. Hour
Derived Measure	Project X Productivity
Function	Divide Project X Lines of Code by Project X Hours of Effort
Indicator	Average productivity
Model	Compute mean and standard deviation of all project productivity values
Decision Criteria	Computed confidence limits based on the standard deviation. Indicate the likelihood that an actual result close to the average productivity will be achieved. Very wide confidence limits suggest a potentially large departure and the need for contingency planning to deal with this outcome

Measurement Information Model

What's A "Metric?"

List of Banned Words
(B-Words)

- **Infrastructure**
- **Paradigm**
- **Vision**
- **Stakeholder**
- **Overarching**
- **Taxonomy**
- **Meta - Anything**
- **Business Process Reengineering**
- **E-Commerce**

- **Seamless**
- **Ideate**
- **Anything.Com**
- **Enplanement**
- **Disaggregate**
- **Processcentric**
- **Object Oriented**
- **Y2K (Retired)**
- **Better-Faster-Cheaper**
- **Acluistic**

Prospective Banned Words
(PB-Words)

- **Disambiguate**
- **Ergo**
- **Conundrum**
- **Systemic**
- **El Niño**
- **Data "are"**
- **Combinatronic**
- **Proponency**

- **Maintenance**
- **Sustaining Engineering**
- **Mentor**
- **Mentee**
- **Eponymy**
- **Imprimateur**
- **Archetype**
- **Diachronic / Synchronic**

Measurement Information Model

Most Important Banned Word
(MIB - Word)

Metric

Measurement Information Model

John McGarry

**U.S. Army TACOM - ARDEC
AMSTA-AR-QAT
Picatinny Arsenal, NJ 07806-5000**

**(973) 724-7007 (Voice)
(973) 724-2382 (Fax)**

jmcgarry@pica.army.mil