Implementing a *'Mature'* FPA Process

Pam Morris
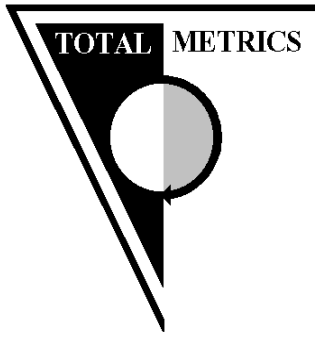
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TOTAL METRICS
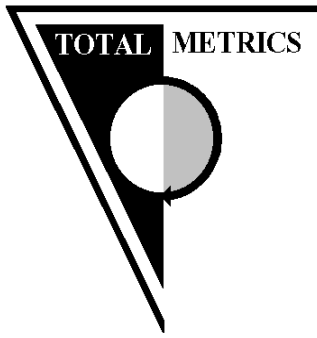
Forward

1

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Pam Morris Profile

- CEO of Total Metrics
- Member of the IFPUG Counting Practices Committee 1993 - 2000
- International Workgroup convenor and project editor ISO/IEC 14143 Functional Size Measurement Standards
- President Australian Software Metrics Association (ASMA)
- Australian Representative ISBGS Committee
- Core project member COSMIC

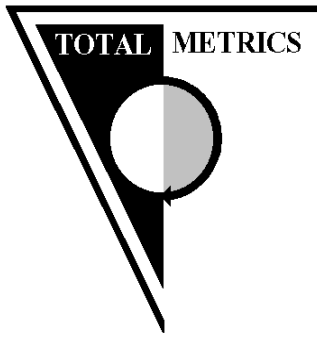# Measurement is a key to successful software development ………..

" You cannot manage what you cannot measure."

"Without objective data you are just another person with an opinion"

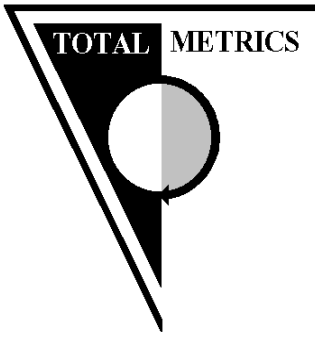*" If you do not know where you are then a map is no use."*

True?

But … what has history shown us?

- *1993* - *"80% of all measurement programs fail"* **Source : Howard Ruben Associates 1993**

- *2000* - *"Metrics usage continues to decline, with a steeper fall in the U.S. than in Non-U.S" companies.* **Source Howard Rubens IT Performance Trends 2000 (Meta Group)**

Why arent we getting better?

Reasons or Excuses?

Functional Size Measurement is a great idea but….

– *"It was too hard"*

– *"We did not have enough resources"*

– *"No-one used the results"*

– *"Never had time to do it"*

– *"Were not sure if we were doing it right"*

– *"The results were meaningless, looked like random numbers"*

– *"Not sure we measuring the same as everyone else"*

– *"No one cared about what we did"*

– *"We did not have any tools"*
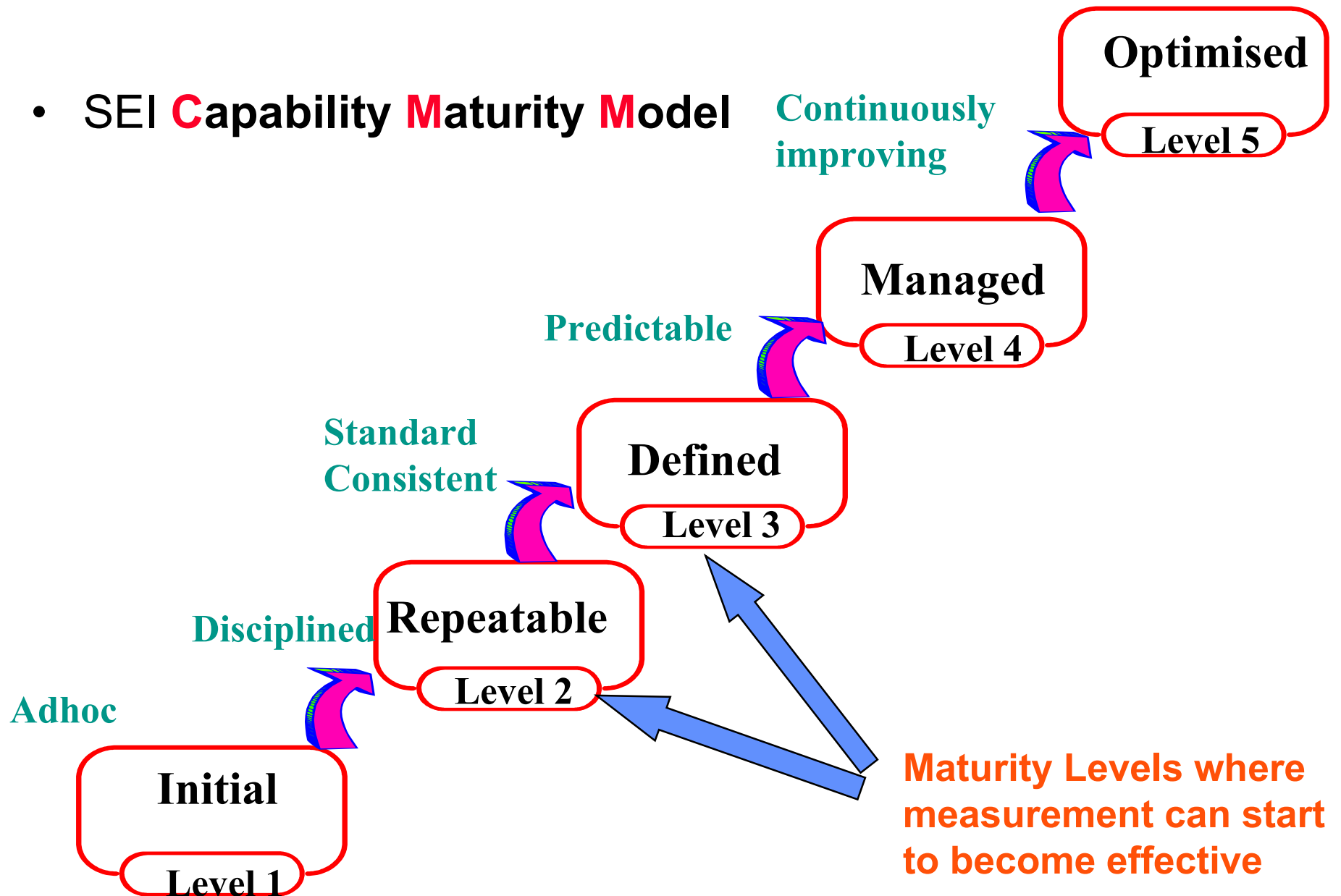
– etc.

Where did we go

5
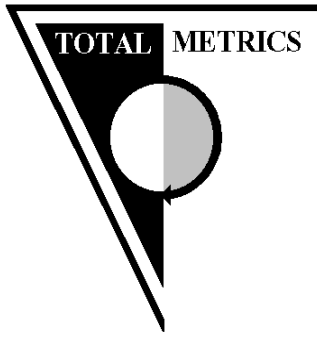
Other IT Processes

- **The 'capability' of an IT organisation is measured by the *maturity* of its 'IT processes'**

- **IT Processes :**
  - **Requirements Management**
  - **Project Planning**
  - **Configuration Management etc**

- ***Mature* processes are ones that are:**
  - **defined**
  - **repeatable and predictable**
 - **controlled, measured and monitored**
 - **optimised for improvement**

SEI - CMM Maturity Level

- SEI **C**apability **M**aturity **M**odel

Adhoc

Disciplined

Standard Consistent

Predictable

Continuously improving

Initial
Level 1

Repeatable
Level 2

Defined
Level 3

Managed
Level 4

Optimised
Level 5

Maturity Levels where measurement can start to become effective

Focus for Improvement

– **5 Optimised**
  - – Process improvement is institutionalised. Includes Change management and defect prevention

– **4 Managed**
  - – Product and processes are quantitatively controlled with detailed measurement

– **3 Defined**
  - – Software engineering and management practices defined and integrated, plus training

– **2 Repeatable**
  - – Project management system in place; performance is repeatable

– **1 Initial**
  - – Process is informal and adhoc; performance is unpredictable
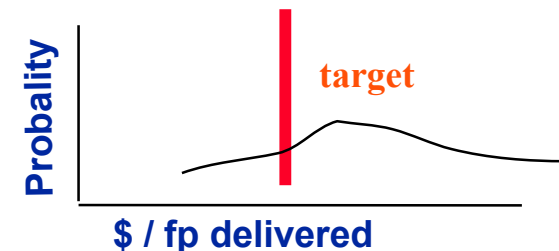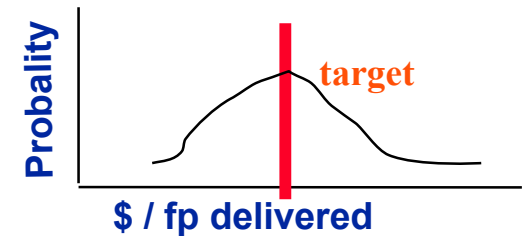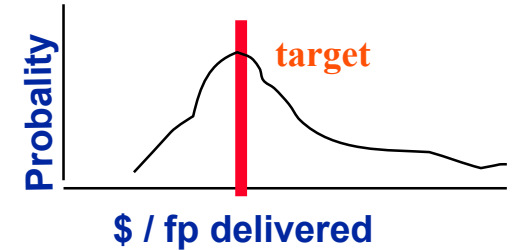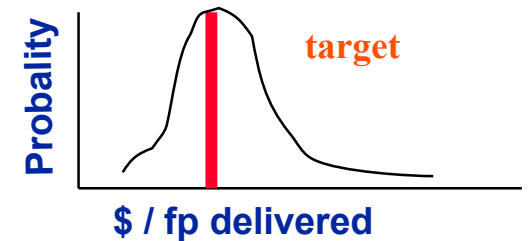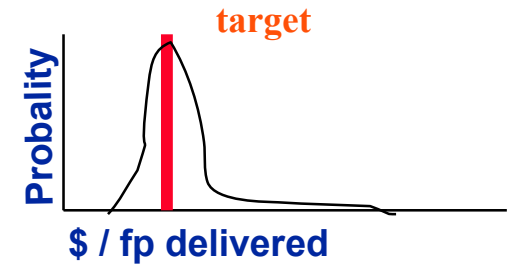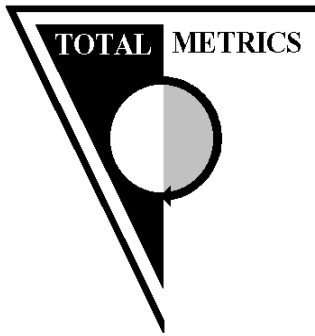
Was failure our fault or the times we lived in?

- **Predicting the future by measuring chaos was not viable**

- **Often the measurement process was as unrepeatable as the process we were measuring - double jeopardy!**

- **Comparing 'apples' and 'oranges' was 'fruitless'**

- **We did not have a 'culture' that supported**
  - **pro-active improvement**
  - **acceptance and adherence to standards**
  - **adoption of a repeatable disciplined approach**
  - **use of our results for continuous improvement**

9

2002 - Now we *can* make FPA Work!

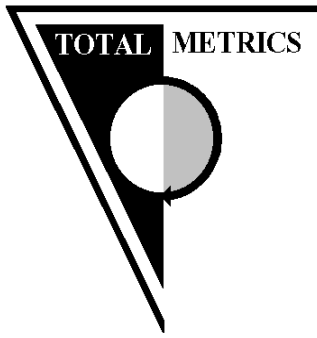- IT development processes are maturing

- IT culture is more accepting of standards and procedures

- IT management needs measurement to support their maturity assessment

- IT performance is being questioned and is becoming accountable

But how do we <u>make</u> it work?

Measurement is also an 'IT process' so to treat it like one!

- **Purchasing FPA Training and FPA software tools is NOT enough!**

- **Mature sustainable processes need to :**
  - **identify and allocate responsibilities for all components of the the FPA process**
  - **implement *standards and procedures* for:**
    - collection
    - validation
    - storage
    - analysis
    - reporting
    - use of FPA results
  - **document local interpretations and applications of industry rules**
  - **continually measure , monitor and improve the process**

11

Process Management

4. Improve the process

2. Measure the process

1. Define the process

3. Control the process

Execute the Process

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12
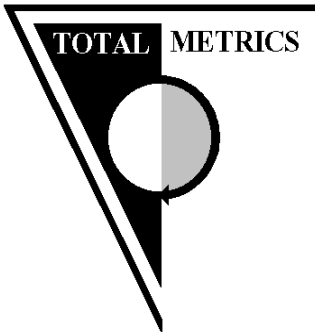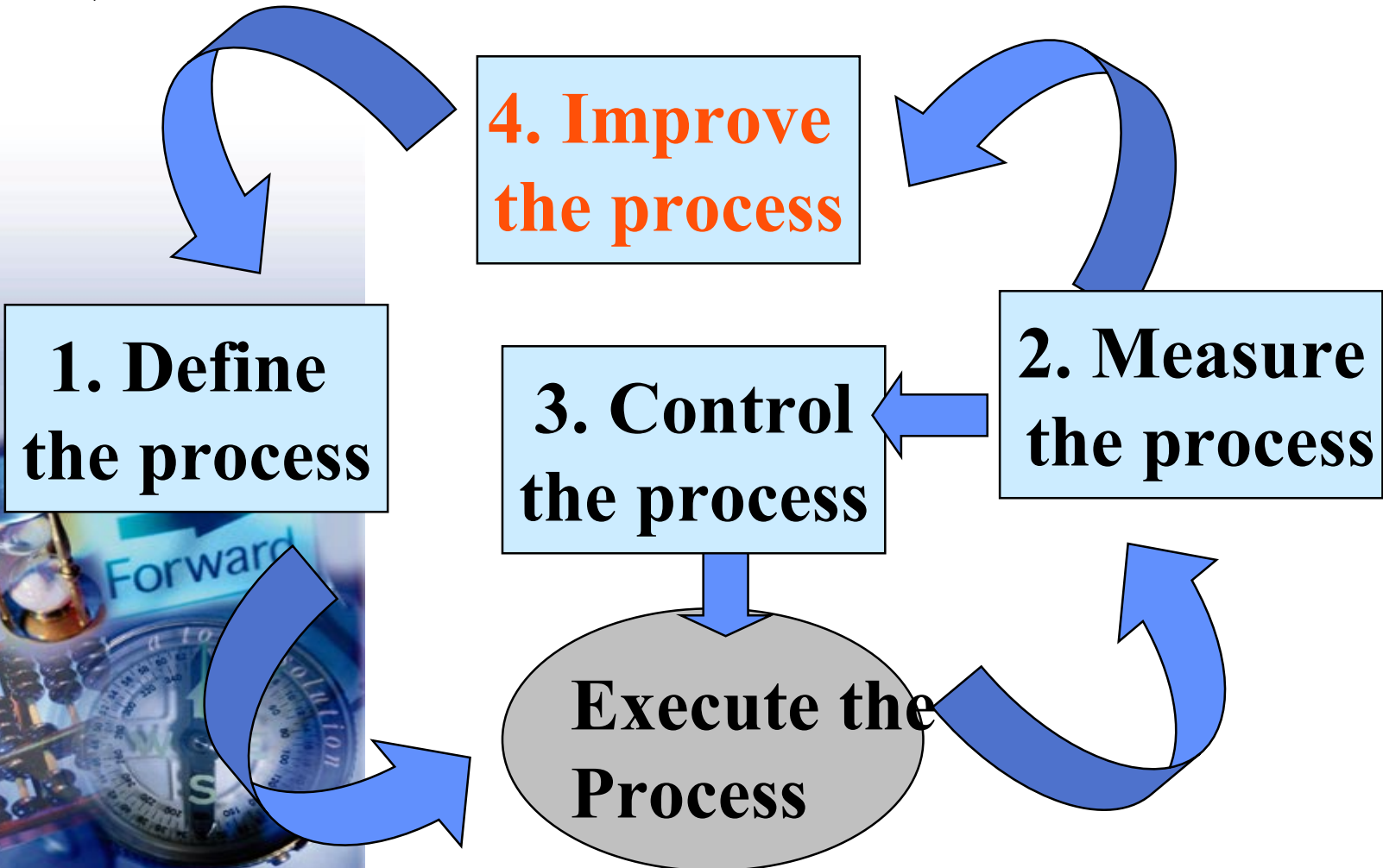
'Process' Definitions

process

A system of operation or series of actions, changes, or functions, that bring about an end or result including the transition criteria for progressing from one stage or process step to the next. [Reference : IEEE P1220]
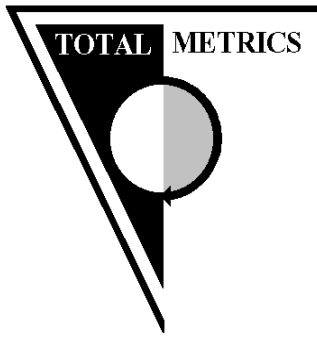
We need to __understand__ the measurement Process

process ownership

All managed processes must be assigned ownership that includes responsiblities for *design,* for *establishing* and implementing mechanisms for *measuring the process* and taking *corrective action* where necessary.

(Reference : SEI Guidebook HB003 97)

We also need to __measure__ the measurement Process
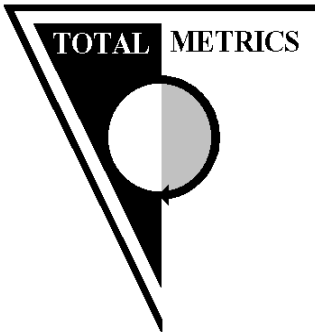
FPA Measurement as a Process

We as Measurement Professionals need to:
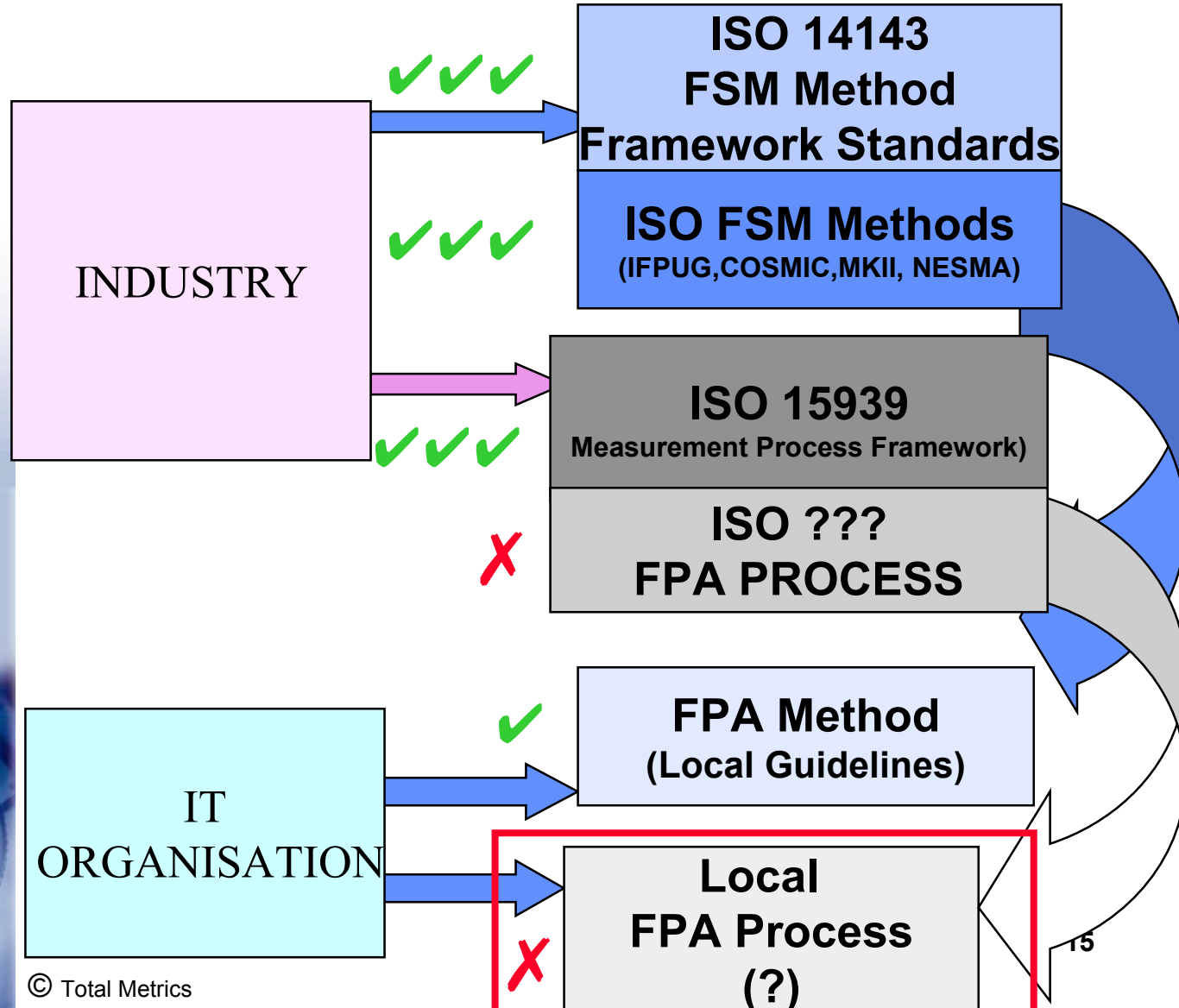
- **become as 'mature' as the processes we measure**

- **be able to provide industry standard 'predictable and repeatable' results**

- **be able to provide realistic resource estimates of the *measurement* effort and costs**

- **document the outcome of measurement to an agreed industry wide standard.**

- **measure the 'measurement process' and optimise our own improvement**

Current Standardisation of FPA Method and Process

INDUSTRY

✔✔✔ →

ISO 14143 FSM Method Framework Standards

✔✔✔

ISO FSM Methods (IFPUG,COSMIC,MKII, NESMA)

→

ISO 15939 Measurement Process Framework)

✔✔✔

✗

ISO ??? FPA PROCESS

IT ORGANISATION

✔ →

FPA Method (Local Guidelines)

→

✗

Local FPA Process (?)
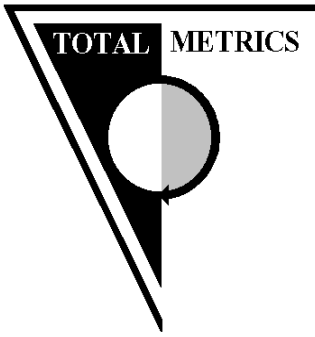
Software Process *Maturity*

– The extent to which a specific process is explicitly defined, managed, measured, controlled, and effective.

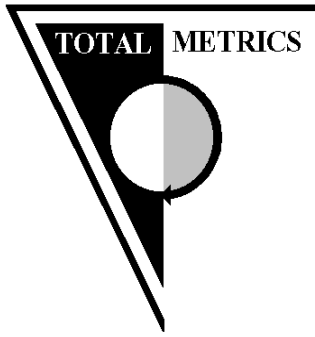– **Maturity implies a** potential for growth in capability **and indicates both the richness of an organization's software process and the consistency with which it is applied in projects throughout the organization**

(**Reference : SEI:SW-CMM)**

Level 2 - CMMI
Key Process Areas
Project Focus

- **Requirements Management**
- **Project Planning**
- **Project Monitoring and Control**
- **Supplier Agreement Management**
- **Measurement and Analysis**
- **Process and Product Quality Assurance**
- **Configuration Management**
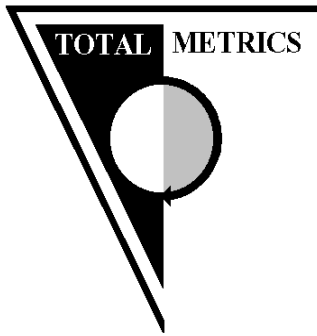
ISO/IEC - 15939

Software Measurement Process Framework

- **Defines the activities and tasks that are necessary to successfully :**
  - identify
  - define
  - select
  - apply
  - improve

  software measurement within an overall project or organisational measurement structure

- **provides standard definitions for measurement**

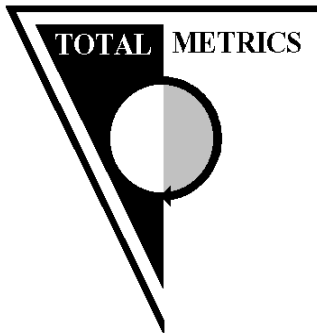# ISO - 15939 Measurement Process

- **15939 Activities:**

  1.Establish and Sustain Measurement Commitment

  2. Plan Measurement Process

  3. Perform the Measurement Process

  4. Evaluate Measurement and improve

- **FPA Process**

  Approve FPA Process

  Set up FPA procedures

  Function Point Counting

  Review and Improve FPA and IT process

19

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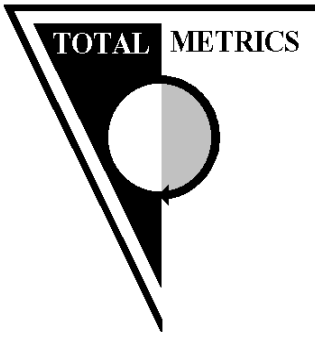
1. Establish and Sustain Measurement Commitment

•**15939 Activities:**

•**management commitment to support measurement**

→ •**FPA Process**

FPA Process approval

•**requirements for measurement are accepted**

→ **Requirements , scope & stakeholders for FPA results are agreed and approved**

•**competent people are assigned**

→ **FPA Trained Counters, Validators, Analysts assigned**

•**adequate resources are assigned**

→ **Budget is allocated to FPA Process**
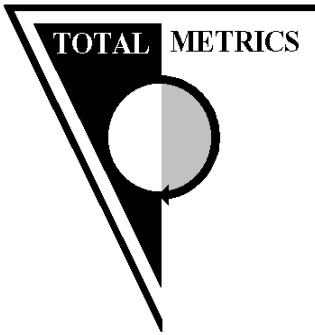
20

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2. Plan Measurement Process

- **15939 Activities:**

  organisational unit ⟶

  Identify information needs ⟶

  Select measures ⟶

  Define data collection, analysis, and reporting procedures
  (continued….)

- **FPA Process**

  Which software to be measured

  Frequency, Accuracy, type of Counts

  Documented Rules for selected Version FPA,

  IFPUG CPM 4.1

  Levels of counting

  FPA Count Procedures

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What do we Mean by 'Levels of Counting'

Standardized descriptions of exactly how the count will be conducted and its deliverables.

Defines Count:
- level of detail
- type of count documentation
- extent of comments and notes
- maintainability
- valid uses
- error margin
- counting rates
- benefits and limitations
- input requirements

22

'Levels of Counting'

Increases

6

Increases

1

Count Level

600 - 6,000

Decreases

➡️Count efficiency

100

(fps counted per day)

- ➡️ count recording
- ➡️ accuracy
- ➡️ quality specifications
- ➡️ maintainability
- ➡️ count cost
- ➡️ count effort
- ➡️ count usefulness
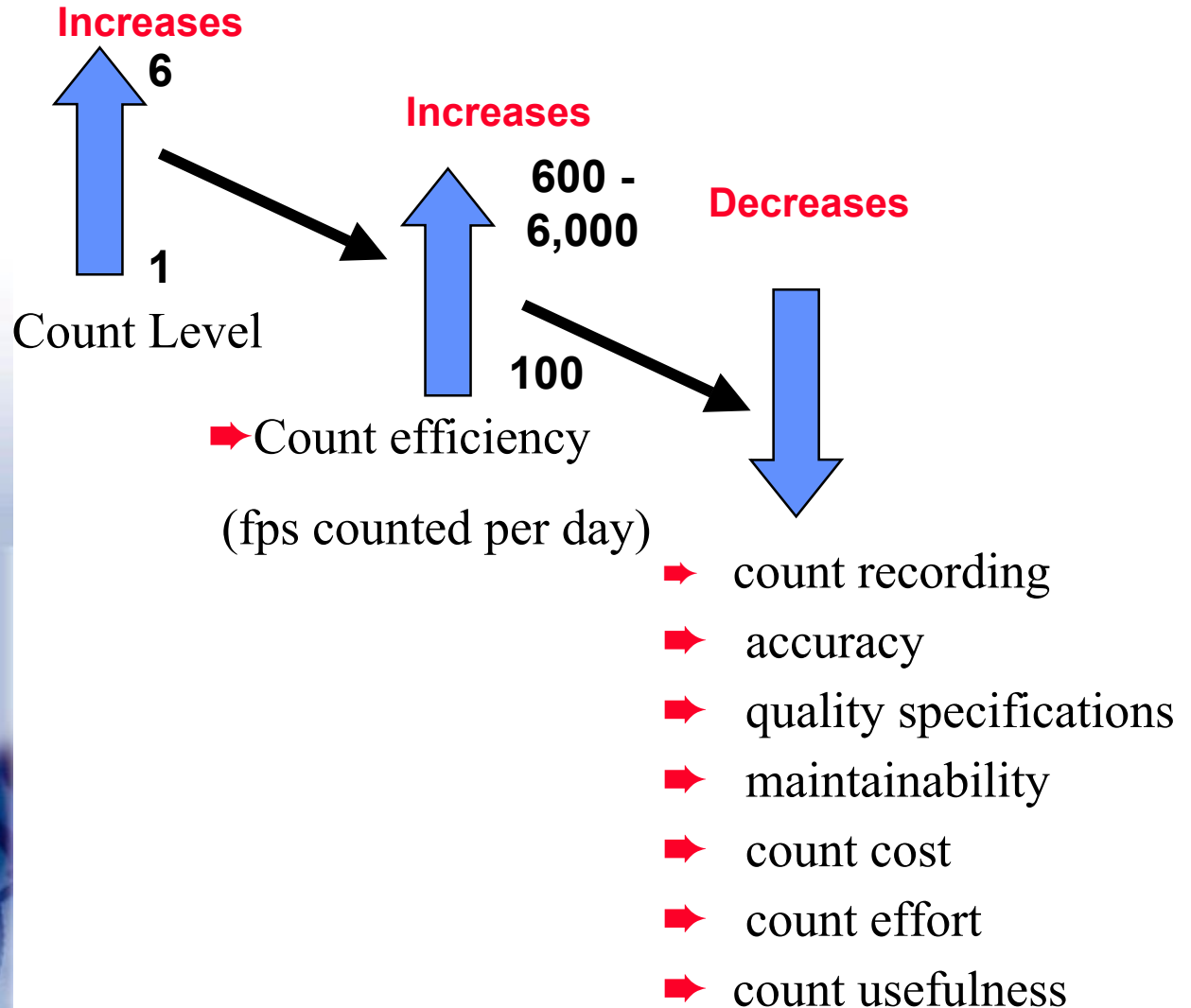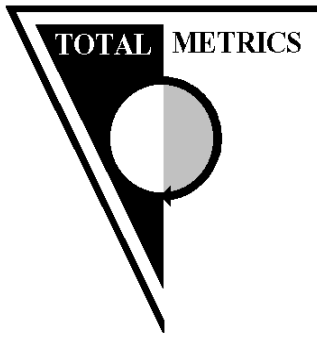
TM Definitions of 'Levels of Counting'

LEVEL 1 = Detailed Linked and Labelled Count

LEVEL 2 = Detailed Linked Count

LEVEL 3 = Detailed Count

LEVEL 4 = Default Complexity Count

LEVEL 5 = Rough Count

LEVEL 6 = Size Approximation.

Need to define and document when each type of Count Level is appropriate for the purpose that the count result will be used

Download full details of Count Levels from Total Metrics WWW Site - WWW.Totalmetrics.com

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2. Plan Measurement Process

- **15939 Activities:**

  organisational unit ⟶

  Identify information needs ⟶

  Select measures ⟶

  Define data collection, analysis, and reporting procedures
  (continued....)

- **FPA Process**

  Which software to be measured
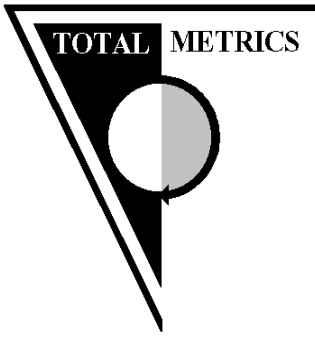
  Frequency, Accuracy, type of Counts

  Documented Rules for selected Version FPA, Levels of counting

  FPA Count Procedures

FPA Count Procedures

- ***Formal documented standardised procedure manuals for :***
  - FPA Count Activity
  - FPA Count Validation Process
  - FPA Count Issues and Resolutions
  - FPA Result Reporting
  - FPA Count Repository Management

- **Each Includes**:
  - Document Configuration Control
  - Roles and responsibilities of participants
  - Deliverables and outcomes
  - References to relevant standards
  - Mapping of FPA process to IT processes
  - Definitions for each task and activity
  - Resource, tools and infrastructure requirements

FPA Result Reporting - standards?

- **Project Productivity Reporting**
  - Project FPA Count = 200 or 2000 ? fps
  - Total Effort = 2000 or 4000 ? hours
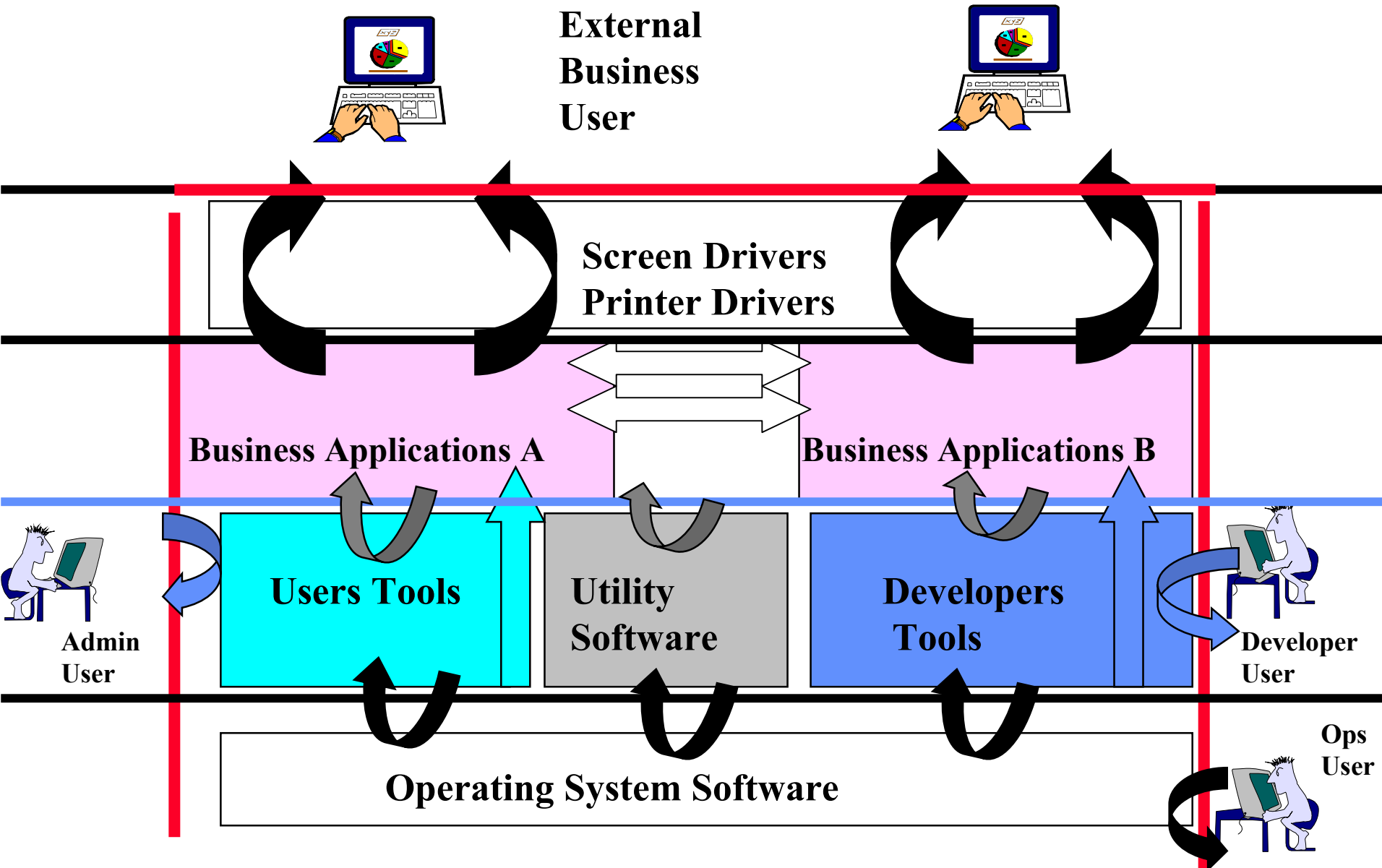 - Productivity = 2 ?or 10 ? or 20? hrs/ fp
- **Whose hours and which FPs?**
  - is the count adjusted or unadjusted?
  - were the FPs, the ones developed, customised and/or delivered by the package or a combination of all three?
  - does the count include all functionality delivered by the package or just the fps actually required by the business?
  - did the count include re-used functionality from another application not developed by the team?
  - does the count only include the business application functionality or does it include changes to functionality of middleware software?
  - Do the hours include DBA, QA, Users?

27

Applications and their Users

External Business User

Screen Drivers
Printer Drivers

Business Applications A

Business Applications B

Users Tools

Utility Software

Developers Tools

Admin User

Developer User

Operating System Software

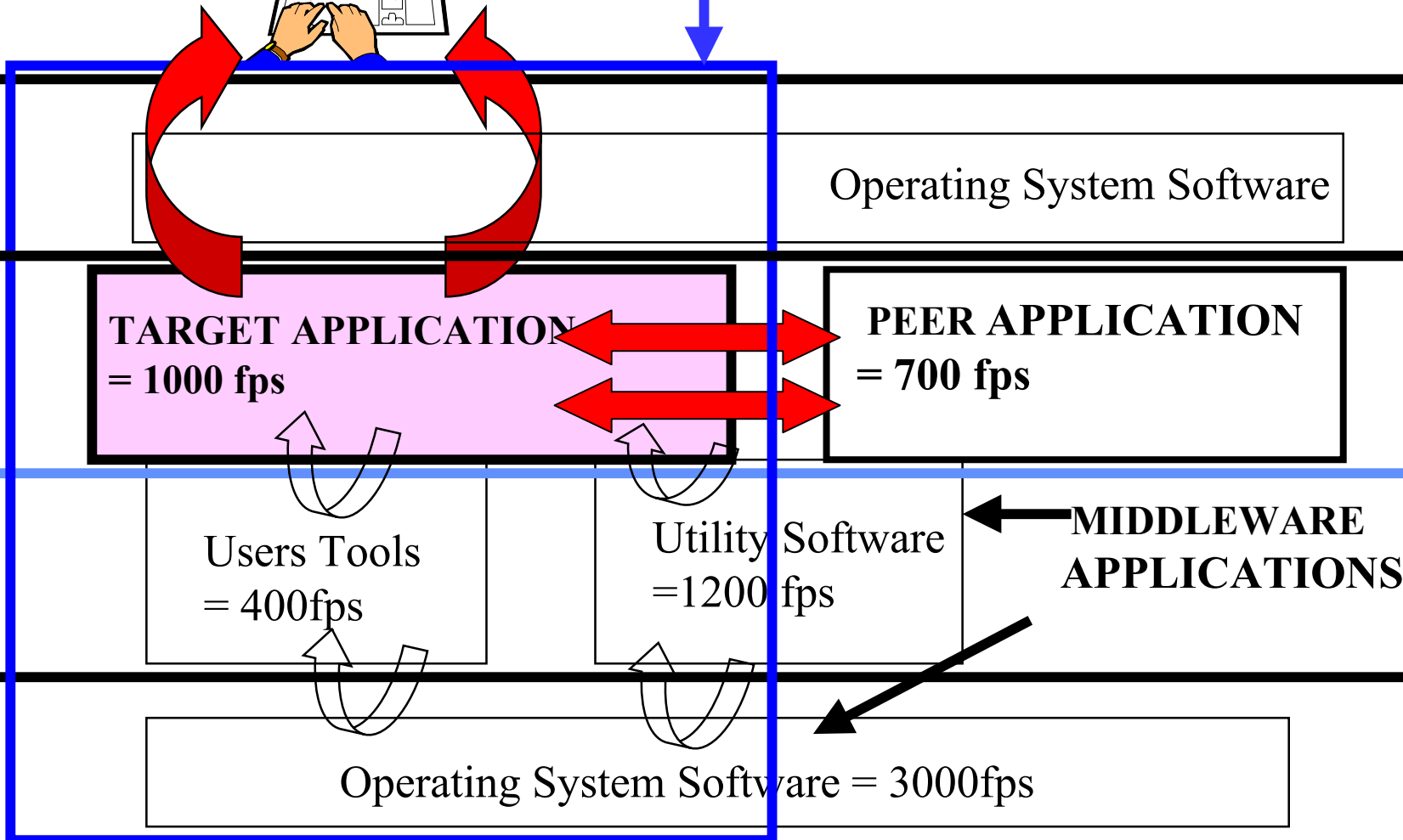Ops User

**COMPLETE
SYSTEM**

External User =
primary user
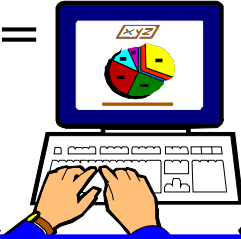
Operating System Software

**TARGET APPLICATION
= 1000 fps**

**PEER APPLICATION
= 700 fps**

Users Tools
= 400fps

Utility Software
=1200 fps

**MIDDLEWARE
APPLICATIONS**

Operating System Software = 3000fps

COMPLETE SYSTEM

Project Scope - Project Managers Viewpoint = 720fps

External User = primary user

A=500

B=100

C=30

D = 40

E = 50
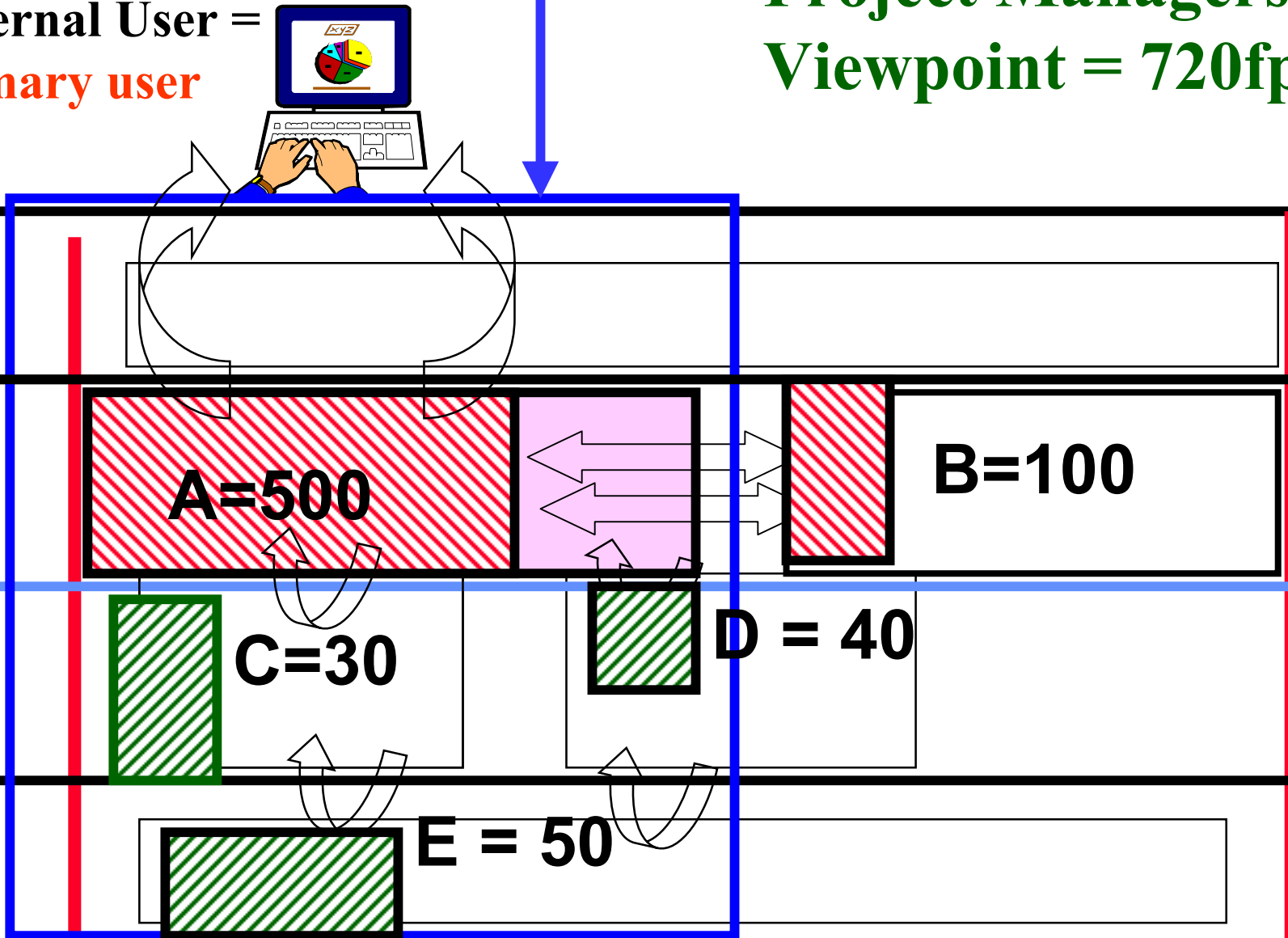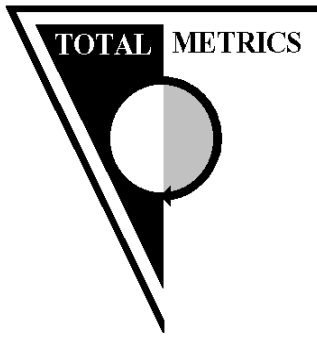
FPA Result Reporting - Industry wide Standards

- **Comparisons need to know each of the 'parameters' influencing how the size was derived**

- **Size Parameters :**
  - **type of count**
  - **purpose for count**
  - **scope of count**
  - **users**
  - **viewpoint**

- **Need a standard set of 'types' of reports that include a standard 'set' of parameters for external benchmarking**

FPA Result Reporting
Standard Set of Report Types

REPORT TYPE	SIZE PARAMETERS					METRICS REPORTING		
	Viewpoint	*Users*	*Purpose*	*Scope*	*Count Type*	Reported Size	Reported Effort	Productivity
End-user Impacted size	Project Sponsor	Business User	Measure functionality delivered for use	Impacted End User functions	Enhancement Project	**Project Size 600 fps** (A+B)	*ISBGS L4 **6000 hrs**	**10** hrs/fp
Project Impact Size	Software Developer	Business User Developers Administration Operations	Estimate total project Effort	All impacted functions	Enhancement Project	**Project Size 720 fps** (A+B+C+D+E)	*ISBGS L1 **4000 hrs**	**5.6** hrs /fp
End-user Delivered Size	Accountant	Business User	New Business Software Asset Size	Net size of end user functions	Application Baseline	**2050 fps** (A+B)	N/A	N/A
Supported Net Size	Support Manager	Business User Developers Administration Operations	Total portfolio size supported	Net size of all functions	Application Baseline	**5920 fps** (A+B+C+D+E)	N/A	N/A

Financial Reporting (dollars)

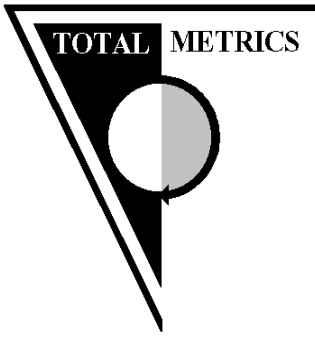Gross Sales = $1,000,000

Gross Profit = $100,000

Net Profit   = $55,000

FPA Reporting (fps)

End User Impacted Size = 600 fps

Project Impact Size = 720 fps

End User Delivered Size = 2050 fps

2 Plan Measurement Process (continued)

- **15939 Activities:**

  Define criteria for evaluating the information products and the measurement process

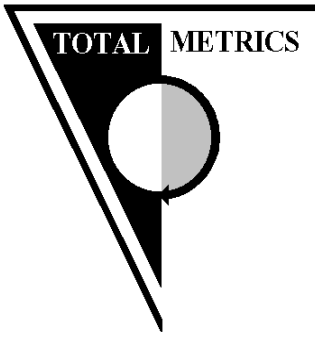 **Review, approve, and staff measurement task**

  Acquire and deploy supporting technologies

- **FPA Process**

  define criteria for repeatability and accuracy of counts, counting rates, resource costs

  Review procedures and standards. Plan and allocate FPA resources

  Schedule training , select FPA recording, repository, analyiss and reporting tools

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33

3. Perform Measurement Process

- **15939 Activities:**

  Integrate Measurement procedures into current processes →

  Collect data →

  Analyse data →

  Communicate the results →

- **FPA Process**

  Integrate FPA into Project process, Map requirements documentation to FPA

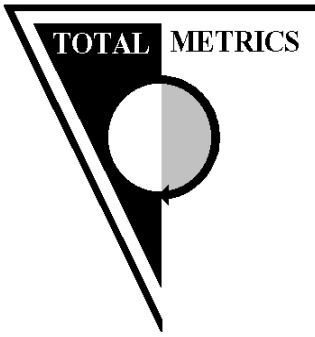 *Identify count Size Parameters*

  Perform and validate count

  Interpret and Analyse FPA results for Metrics reporting

  Formally document FPA metrics results and report

34

4. Evaluate Measurement Process

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•**15939 Activities:**

Evaluate Measures and Measurement process

→

•**FPA Process**

Measure FPA :

–***efficiency***

–***effectiveness***

–***accuracy***

–***repeatability against defined criteria***

Identify Potential Improvements

→

Identify

– ***strengths and weaknesses***

– ***strategies for improvement FPA & IT***

–***feedback to process and stakeholders***

1. Establish

3. Perform FPA Measurement

Count

People

Management

Application Experts

User

Counter

Training

- Plan the Count
- Define Size Parameters
- Establish Application Boundary
- Identify functions and assign points
- Calculate Value Adjustment Factor

2. Plan

- Local Count Standards
- IFPUG CPM 4.1
- Counting Procedures
- Validation Methodology
- Issues and Resolutions
- Reporting Standards
- FPA Training Notes
- Software Product Functional User Requirements

Analyse and Report

Function Point Count

- Documented results from Each Step
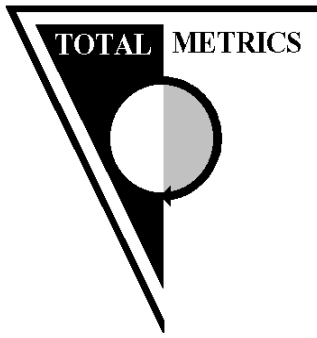- Notes, decisions and Assumptions

Validation Process

Review the Count Process

Review the Count Result

Recommendations

4. Measure and Evaluate Process

Validation Result

Approved Validated Count

Validation Review Report

# Recommendations for Maturing your FPA Process

- Perform a 'gap analysis' - FPA Process versus activities in ISO 15939

- Review 'Planning Activity'- develop standards for
  - count process
  - count validation
  - count issues and resolutions
  - count reporting

- Review 'Evaluation' (analysis and feedback) activities in your FPA process
  - measure FPA process
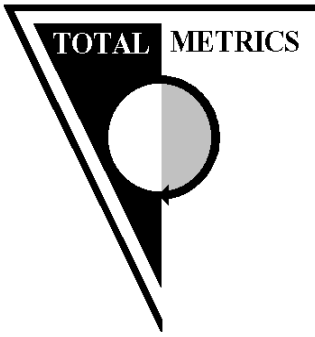 - implement process improvement stragegies

FPA Measurement without a Mature Process

Reporting Standards

FPA Procedures

Feedback Evaluation

Planning

Successful FPA Process
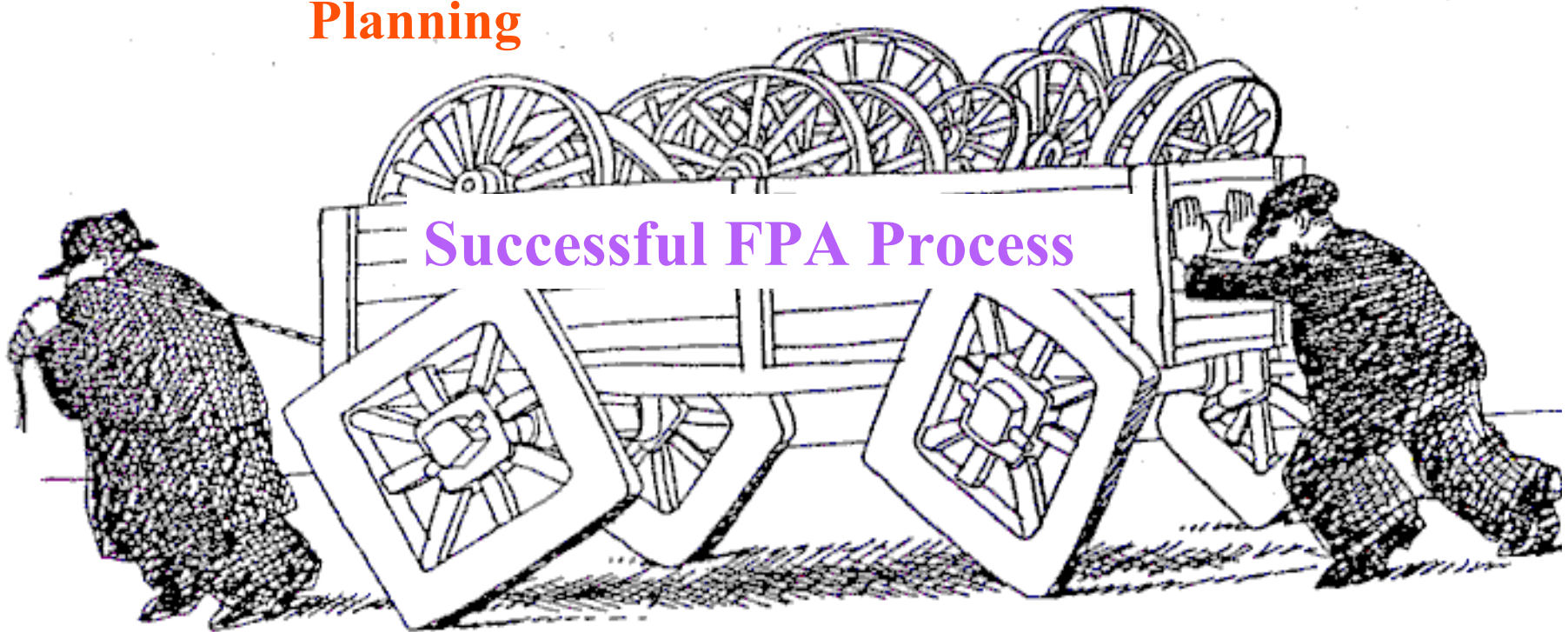
Thank You Good Luck with your FPA Measurement Process !

Download full details from : WWW.Totalmetrics.com

1. Article - Implementing a 'Mature' FPA Process

2. Article - Infrastructure and Resources required for the FPA Process

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