



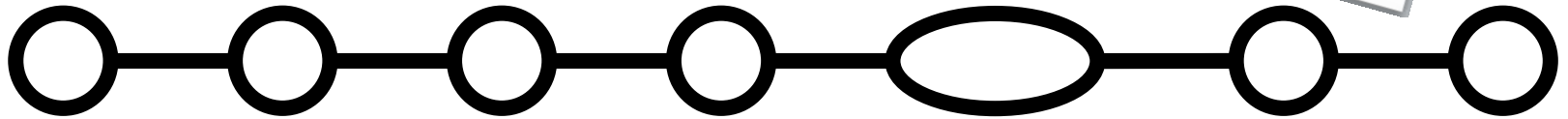
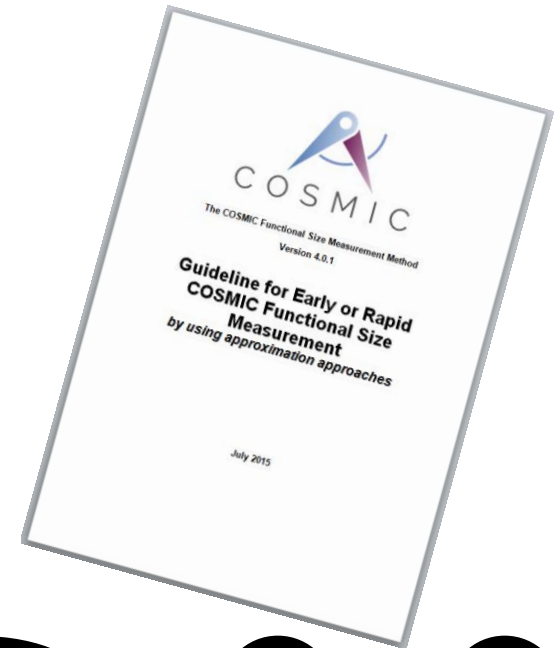
# APROXIMACIÓN DE TAMAÑO FUNCIONAL

**Frank Vogelezang**  
**COSMIC President**



# Agenda

- When do you need approximation
- Count, Compute, Judge
- Scaling
- Classification
- Approximation methods
- Localization



# When do you need approximation



APPROXIMATION



# Reasons for approximation

- Speed
- Timing
- Quality





# Rapid size measurement

- High-level size estimate
- The sooner, the better
- Board-level decisions



# Early size measurement

- Not all details are documented yet
- Needed now
- Budget decisions



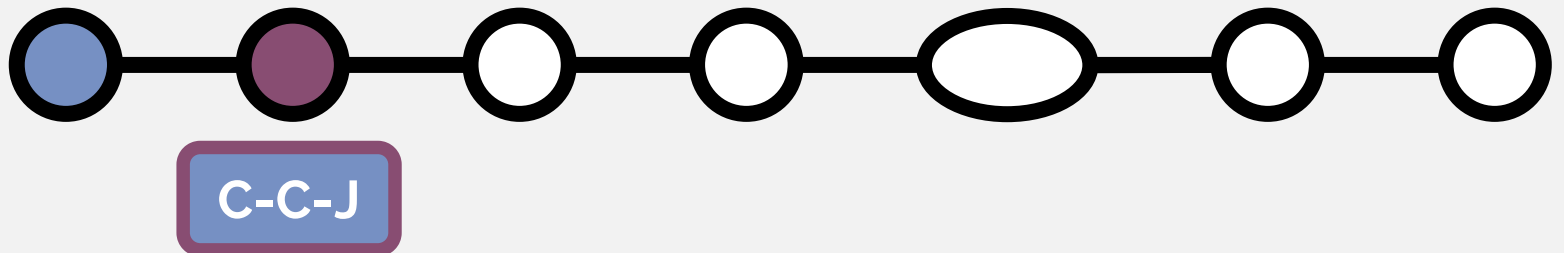
# Approximate size measurement

- Not all documentation is available
- Quality of documentation is poor
- Portfolio decisions





# Count, compute, judge







Estadio Azteca



TODO CON MEDIDA

Coca-Cola  
Corona  
www.estadioazteca.com.mx



# How many people



## COUNT

### Tickets scanned

41.392

### Suites & boxes

24.802

### Staff

1.593

**67.787 people**

## COMPUTE

### Upper ring

~5 sections x

~1.500 seats

### Lower ring

~16 sections x

~2.000 seats

### Suites & boxes

~25.000 seats

**~64.500 people**

## JUDGE

Capacity: 114.500

45% full

**~ 51.500 people**



# Count, Compute, Judge

COSMIC Standard

**Count**

Current  
approximation approaches

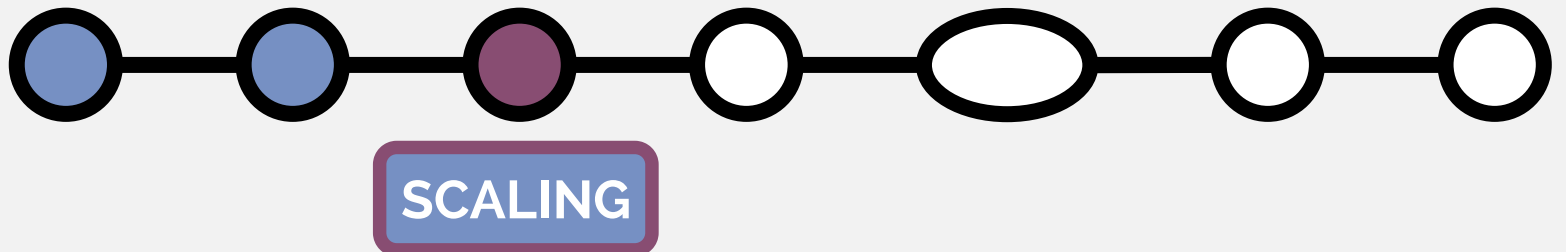
**Compute**

New approaches

**Judge &  
Compute**



# Scaling





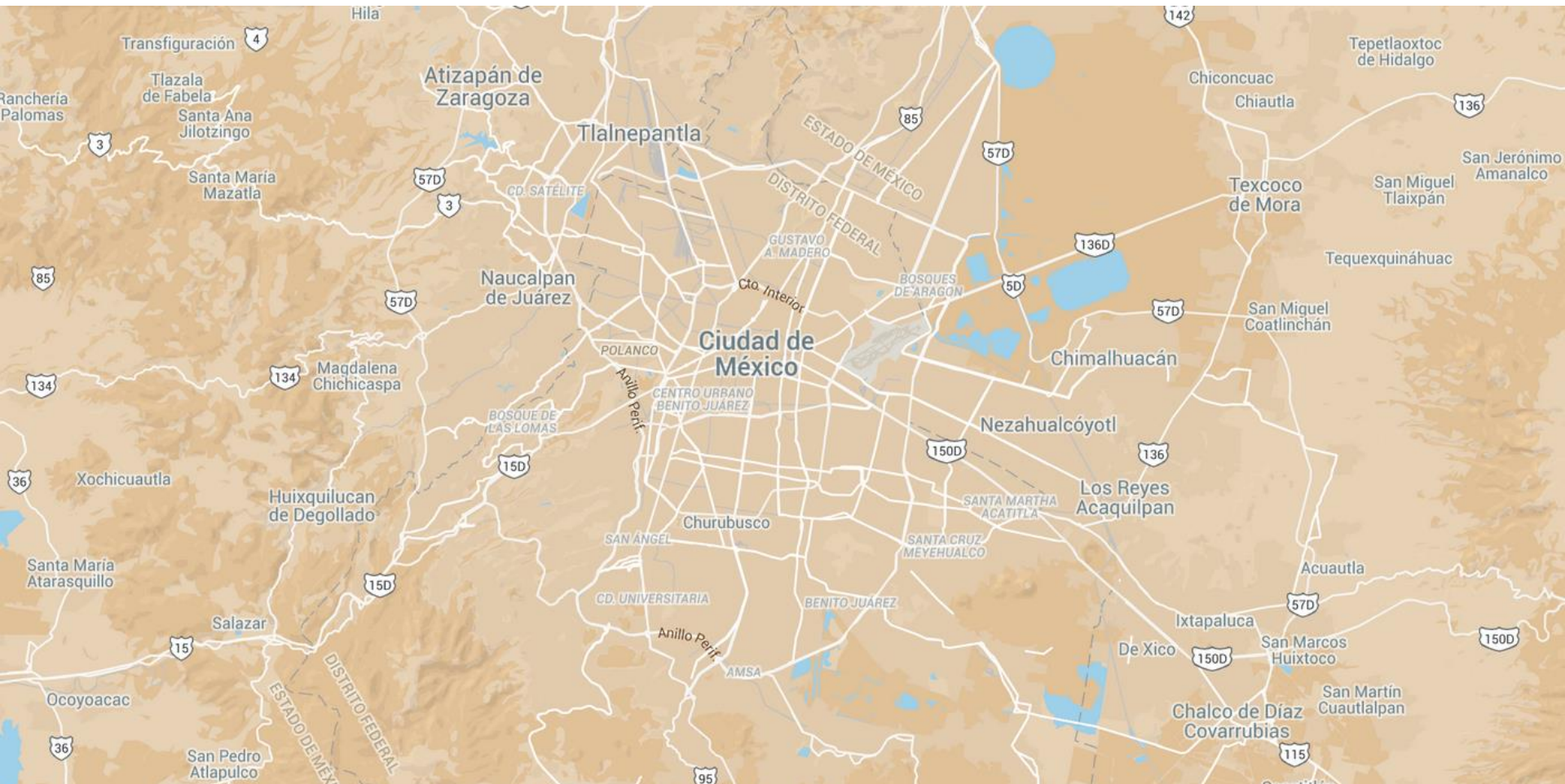


# Scaling – overview





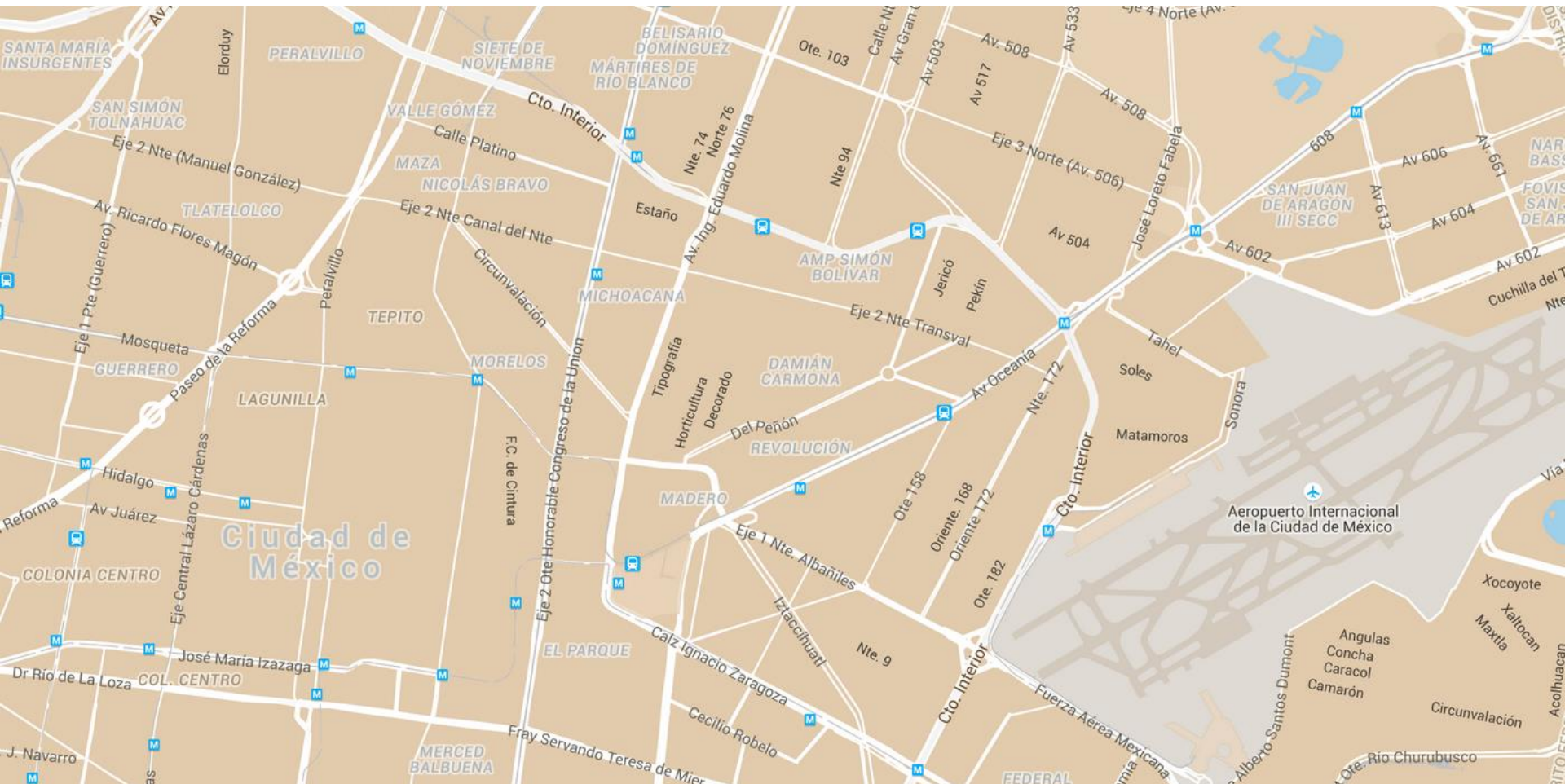
# Scaling – high-level







# Scaling – zooming-in





# Scaling – details





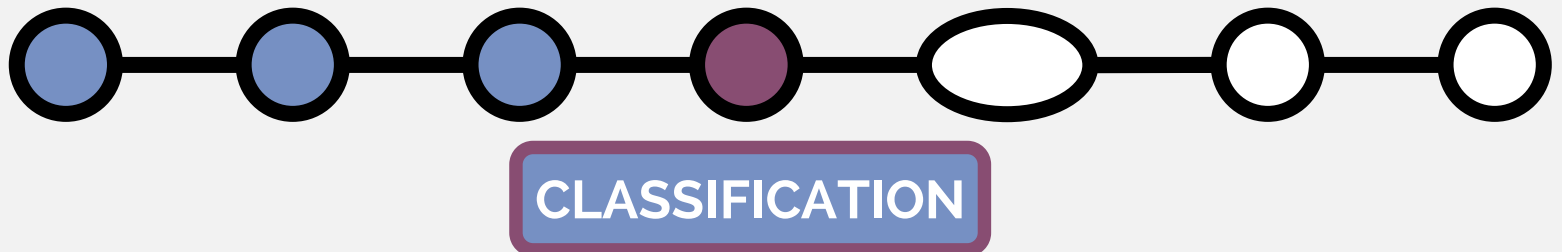


# Scaling – Level of Granularity

Level of granularity of the Actual Requirements	Measurement method	Measurement standard
<p>Actual requirements at a high level of granularity derived from e.g.:</p> <ul style="list-style-type: none"> <li>• high-level statement of actual requirements for the software</li> <li>• architecture artifacts</li> <li>• high-level view of existing software</li> </ul> <p>expressed in locally-defined (countable) units e.g. Use Cases, or in CFP</p>	<p>An 'Approximate approach' to the COSMIC measurement method.</p> <p>Calibrated locally</p>	<p>The size of the locally defined unit, expressed in local units or in CFP</p> <p>↑ scaling factor</p>
<p>The functional process level of granularity</p>	<p>COSMIC measurement method</p>	<p>↓ factor</p> <p>The CFP</p>



# Classification

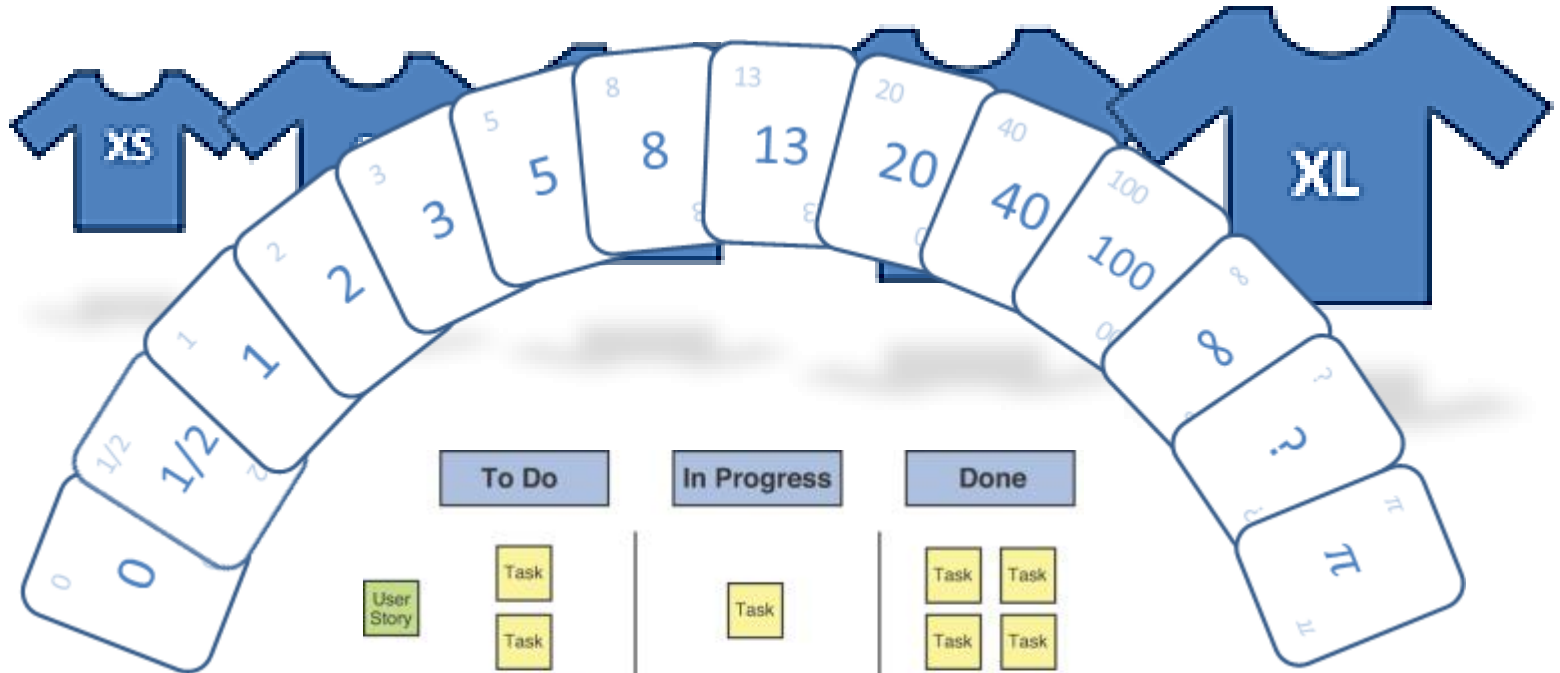


# Classification





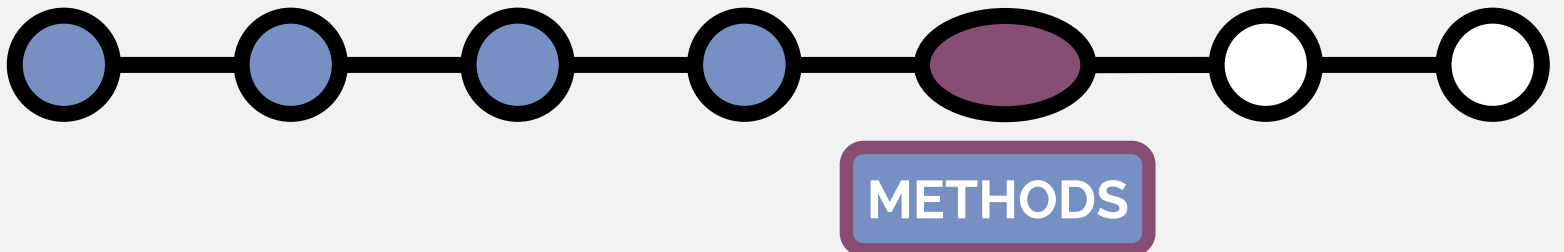
# Classification



	To Do	In Progress	Done
User Story	Task Task	Task	Task Task Task Task
User Story	Task Task Task Task	Task Task	Task Task Task
User Story	Task Task Task	Task Task Task	Task Task



# Approximation methods



# Approximation methods

- Average functional process
- Fixed size classification
- Equal size bands
- Average use case
- Early & Quick
- EASY
- Textual requirements
- EPCU





# Average functional process

Scaling from functional process to CFP



4.880 CFP

610 Functional Processes

8 CFP/Functional Process

# Fixed size classification

Assign a category to a functional process:

Small  
Medium  
Large  
.....



- To estimate:  
Classify in which band a FP belongs





# Equal size bands

- Count a sample of software
- Sort the functional processes on size
- Divide the total size in bands
- Calculate the size of an average functional process in each band
- To estimate:  
Classify in which band a FP belongs



# Equal size bands – example

96 CFP

12 FP

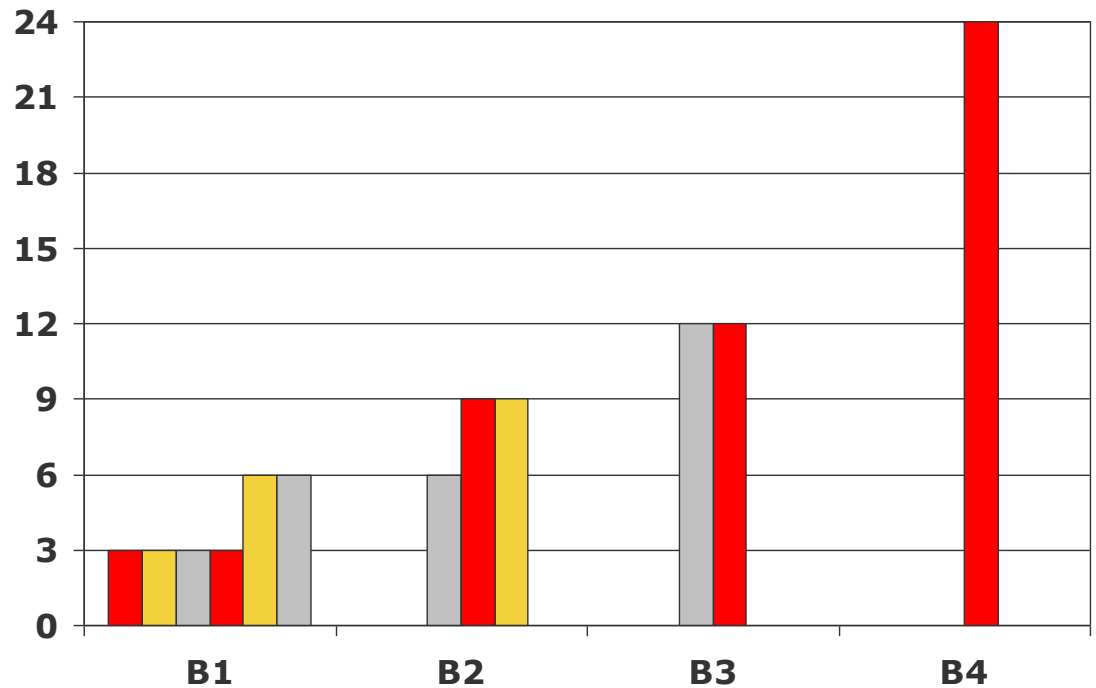
4 bands

**S**  $(4 \times 3 + 2 \times 6) / 6 = 4$

**M**  $(6 + 2 \times 9) / 3 = 8$

**L**  $(2 \times 12) / 2 = 12$

**XL** 24





# Average Use Case

Scaling from Use Case to CFP

8 CFP/Functional Process

3.5 Functional Process/Use Case

28 CFP/Use Case





# Early & Quick

## Two levels of classification

Type	Level	Ranges / COSMIC Equivalent	min CFP	most likely	max CFP
Functional Process	Small	1 - 5 Data movements	2.0	3.9	5.0
	Medium	5 - 8 Data movements	5.0	6.9	8.0
	Large	8 - 14 Data movements	8.0	10.5	14.0
	Very large	14+ Data movements	14.0	23.7	30.0
Typical process	Small	CRUD (Small/Medium processes) CRUD + List (Small processes)	15.6	20.4	27.6
	Medium	CRUD (Medium/Large processes) CRUD + List (Medium processes) CRUD + List + Report (Small processes)	27.6	32.3	42.0
	Large	CRUD (Large processes) CRUD + List (Medium/Large processes) CRUD + List + Report (Medium processes)	42.0	48.5	63.0
General process	Small	6 -10 Generic FP's	20.0	60.0	110.0
	Medium	10 - 15 Generic FP's	40.0	95.0	160.0
	Large	15 - 20 Generic FP's	60.0	130.0	220.0
Macro process	Small	2 - 4 Generic GP's	120.0	285.0	520.0
	Medium	4 - 6 Generic GP's	240.0	475.0	780.0
	Large	6 - 10 Generic GP's	360.0	760.0	1,300



# EASY

## Two types of classification

Classification of the FP	Specification level	CFP (min)	CFP	CFP (max)	Approximate CFP	Probability
Small FP	Little unknown	2 (10%)	3 (75%)	5 (15%)	3.2	>80%
Small FP	Unknown (No FUR)	2 (15%)	4 (50%)	8 (35%)	5.1	<50%
Medium FP	Little unknown	5 (10%)	7 (75%)	10 (15%)	7.25	>80%
Medium FP	Unknown (No FUR)	5 (15%)	8 (50%)	12 (35%)	8.95	<50%
Large FP	Little unknown	8 (10%)	10 (75%)	12 (15%)	10.1	>80%
Large FP	Unknown (No FUR)	8 (15%)	10 (50%)	15 (35%)	11.45	<50%
Complex FP	Little unknown	10 (10%)	15 (75%)	20 (15%)	15.25	>80%
Complex FP	Unknown (No FUR)	10 (15%)	18 (50%)	30 (35%)	21	<50%

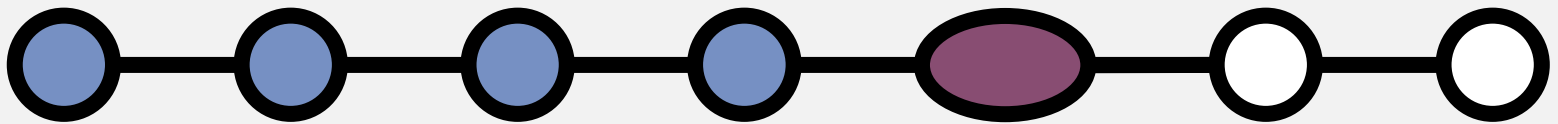
EASY is the acronym for EARly & SpeedY



# Approximation methods

Emerging or new approaches

Beyond



METHODS

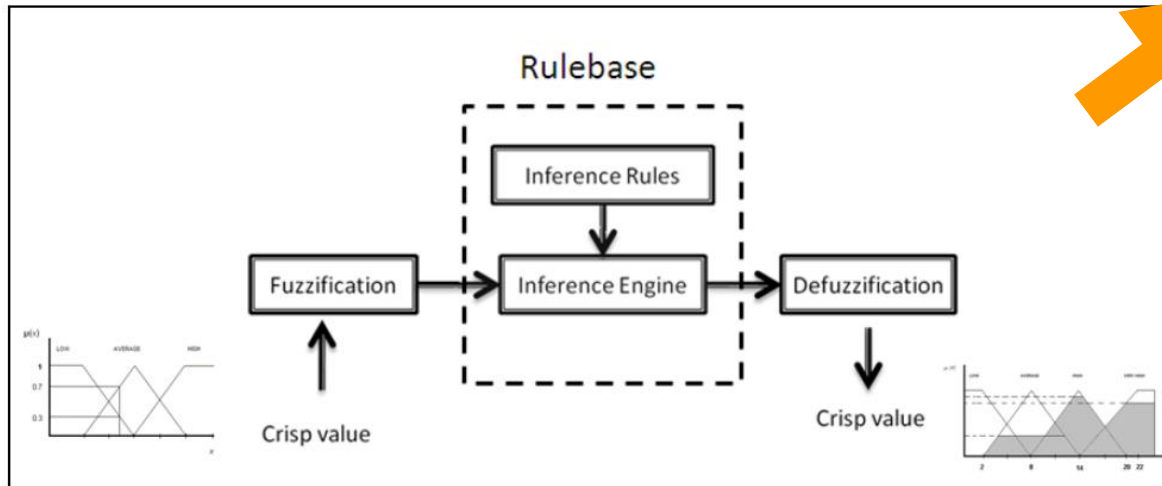
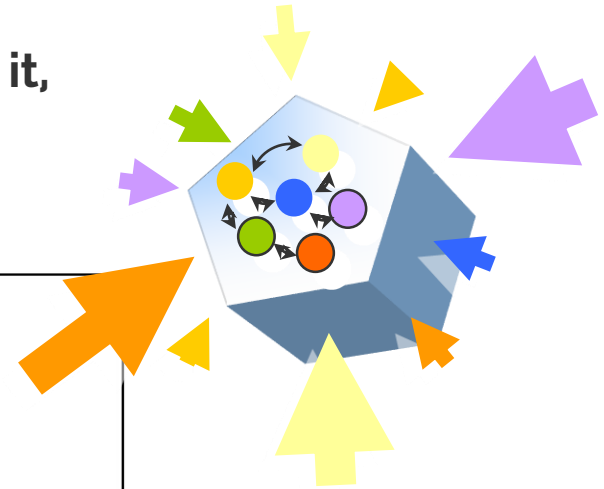


# Textual requirements

- Count informally written requirements per functional process
- Store requirements and size as reference
- Divide functional processes into sets of fuzzy size classes
  
- Train a text classification algorithm to the linguistic features of the reference set



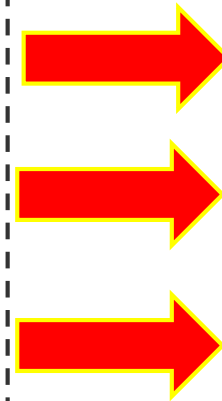
**“The Uncertainty: it is not possible to measure it, however it is possible to contextualize it”**



EPCU is the acronym for Estimation of Projects in a Context of Uncertainty



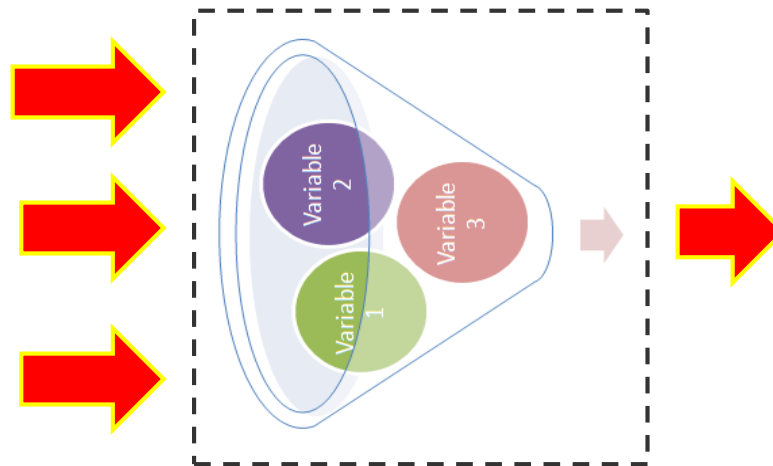
# From seemingly exact experts



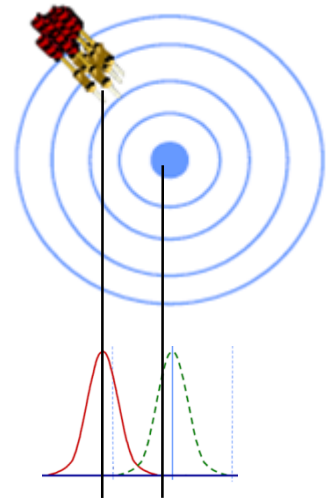
Generador de Estimados



# To focused uncertainty



Generador de Estimados

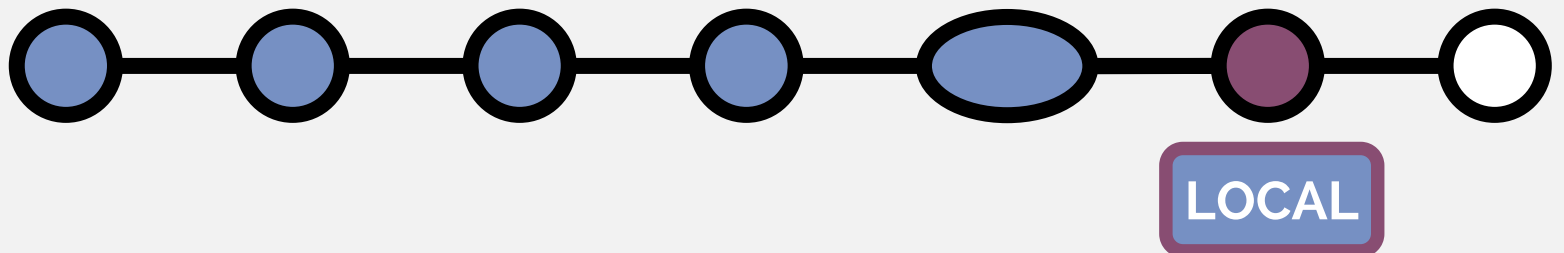


More details in the  
15.30 workshop by





# Localization





# Localization

- All approaches are based on documents
- Content can vary from place to place
- Local calibration is necessary
  
- Local means that calibration is done in an environment that is representative



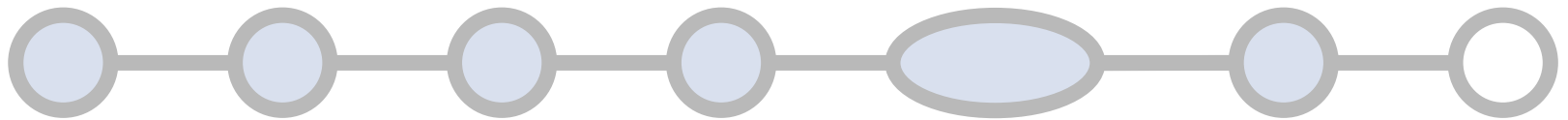
# The localization principle

- Define high-level software artifacts
- Verify that they are representative
- Artifacts must be similar in size or classifiable into size bands
- Determine the scaling factor
- Always give an indication of precision
  
- Verify the local results



# Agenda

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# Recap

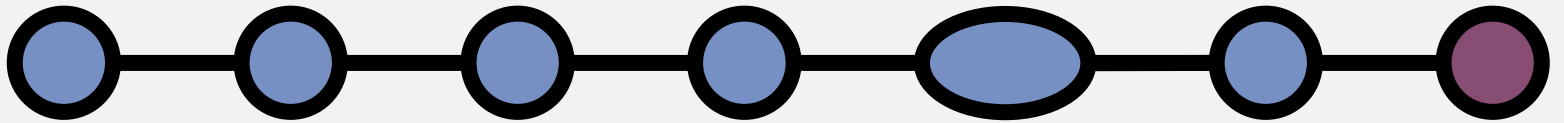
- Three reasons for approximation  
*Speed, Timing or Quality*
- Six established approaches available
- New approaches in development
- Always calibrate locally
  
- **Guideline for Early or Rapid COSMIC FSM**

[cosmic-sizing.org/?p=3244](https://cosmic-sizing.org/?p=3244)



QUESTIONS?

**ANSWERS!**



Q&A





[www.cosmic-sizing.org](http://www.cosmic-sizing.org)