Welcome to the Webinar – if you have not dialed into the audio portion, please do so now. In the U.S., dial 1-855-747-8824, passcode **4348124177**. If you are outside the U.S., the webinar invitation includes a list of toll-free numbers for different countries. Please note that your phone is automatically on mute when you join to avoid disturbing other participants.

INCOSE Webinar Series

Wednesday 16th January 2019 – Webinar 120

Machine Assisted Requirements Inspection and Evaluation (MARINE)

Amar Zabarah

Machine Assisted Requirements INspection and Evaluation (MARINE)

January 16, 2019

LOGAPPS

Agenda

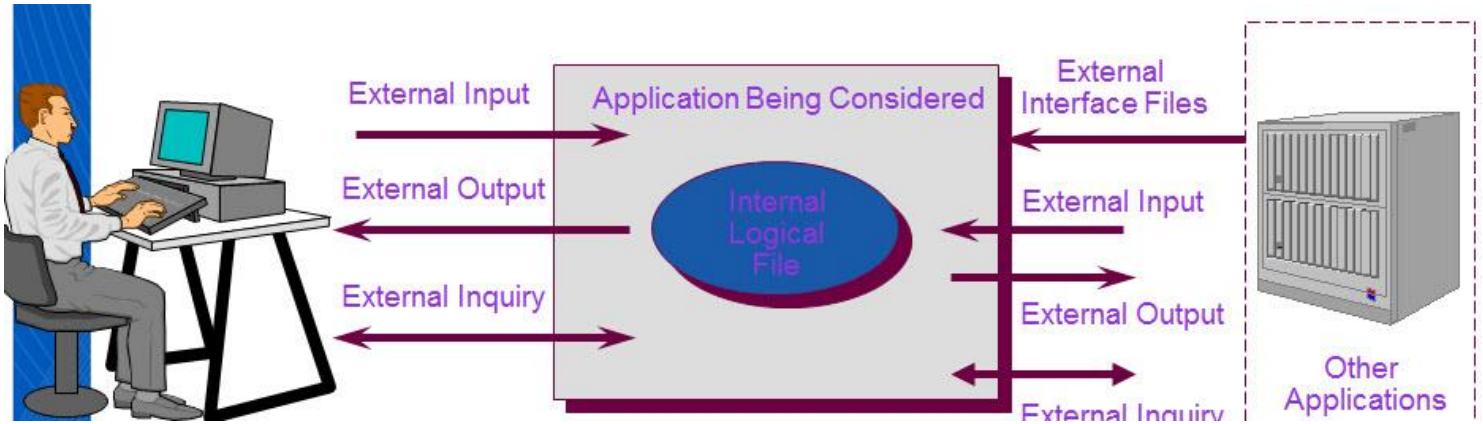
- Software Sizing
- Case Study
- What is MARINE?
- Demo

Software Sizing

- Software sizing is an activity in software engineering that is used to determine or estimate the size of a software application or component
- Software sizing is different from software effort estimation. Sizing estimates the probable size of a piece of software while effort estimation predicts the effort needed to build it
- The most well-known sizing method is the International Function Point Users Group (IFPUG) method called *Function Point Analysis*
  - *A common sizing metric is called Source Lines of Code (SLOC)*

Software Sizing
Function Point Analysis

- **Function Point Analysis (FPA)** represents a user's perspective on software requirements irrespective of technical implementation, language, or architecture
- FPA assesses the functionality delivered to its users based on the user's external view of the functional requirements
- Function points are a measure of functional size, and not effort or complexity



LOGAPPS

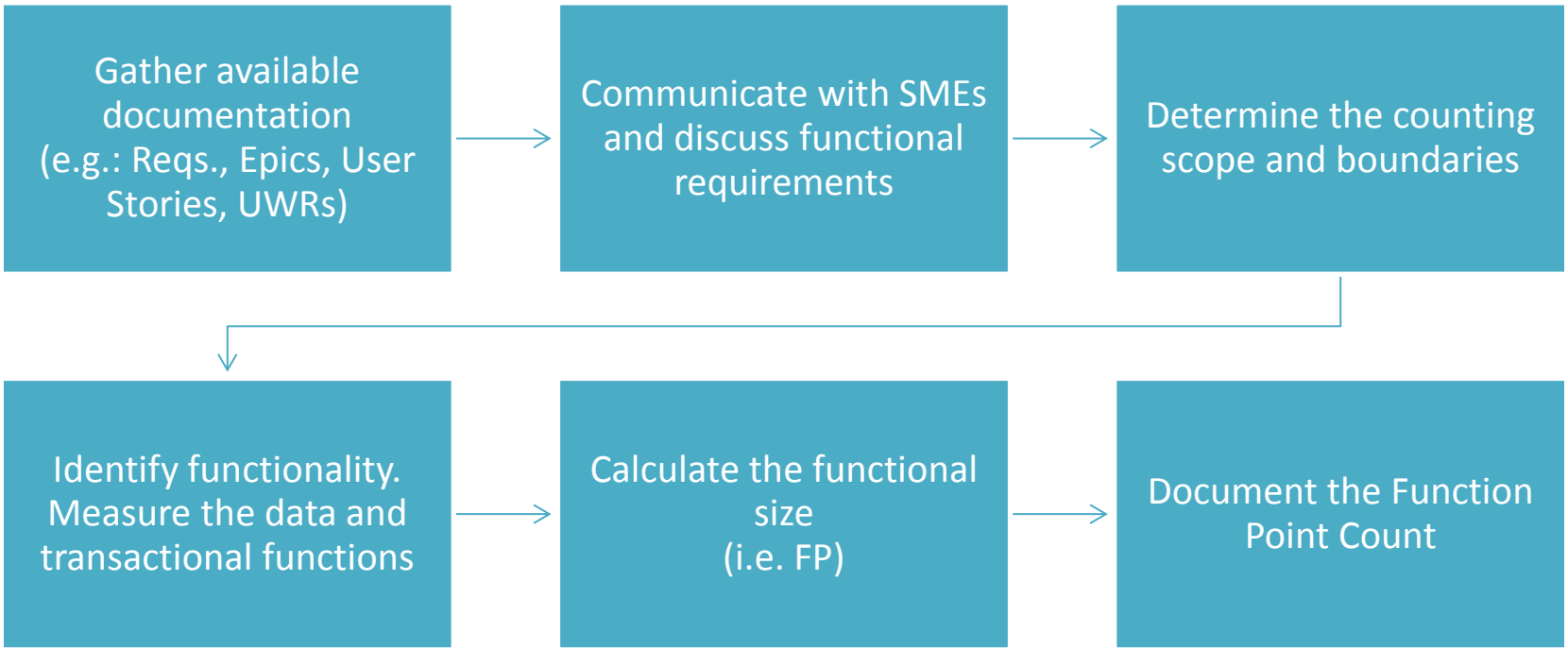
Software Sizing
Function Point Analysis

- Identifying Data Functions:
  - Data functions represent the functionality provided to the user to meet internal and external data requirements
    - Internal Logical Files (ILFs) - represent data stored within the application
    - External Interface Files (EIFs) - are generally other applications that the application either pushes data to, or receives data from

  The term file here does not mean file in the traditional data processing sense; in this case, file refers to a logically related group of data and not the physical implementation of those groups of data

- Identifying Transactional Functions:
  - A transactional function is an elementary process that provides functionality to the user to process data and is one of the following:
    - External Input (EI) – an elementary process that processes data or control information sent from outside the boundary.
    - External Inquiry (EQ) – is an elementary process that sends data or control information outside the boundary (using data retrieval only).
    - External Output (EO) – is an elementary process that sends data or control information outside the boundary and includes additional processing beyond that of an external inquiry.

Software Sizing
Function Point Process



LOGAPPS

Case Study: Judiciary Cash Register (JACR) System

Logapps assisted the program in the collection and analysis of requirements

- **Received over 1000 requirements for the solution, then it was shorten to 840**
- **Identified and removed duplicates (from the text aspects only**
- **Determined Function Point SLOC Count: 95,506**
- **Applied manual functional analysis**

Manual functional analysis determined that requirements came from two legacy systems, and that documented requirements did not address client needs:

- Identified 67 unique functions
- Identified 28 unique interfaces
- Identified 75 unique reports

- The effort took about 100 hours to be completed
- How can we automate the process?

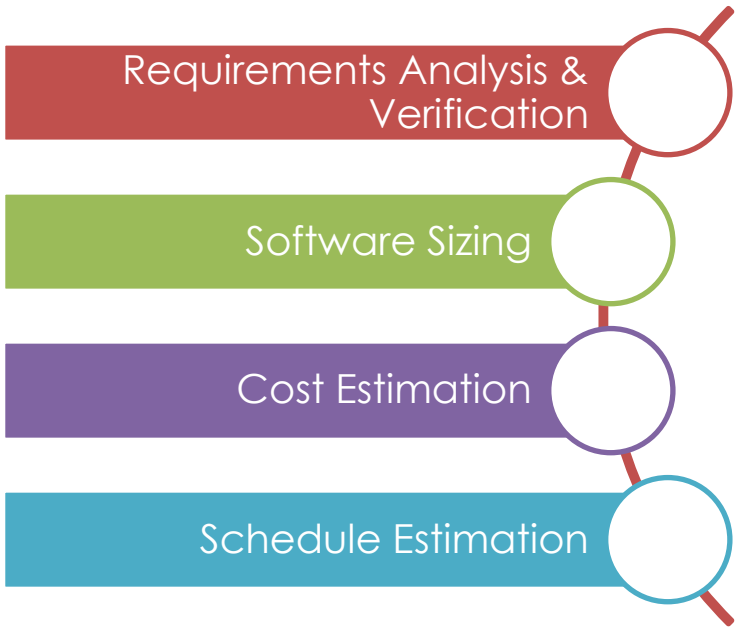
LOGAPPS

Case Study: Judiciary Cash Register (JACR) System [cont.]

	Human	MARINE	Comments
Number of Requirements	840	840	
Identified Duplicates	21	30	Higher than 95% (27 100%)
Similarities	0	50	Greater than 80%, and less than 95%
Identified unique features/ reports/entities	170	88	With some analyst input
Function Point Count	1802	1309	Effected by the analyst review (10 minutes)
Source Lines of Code (estimated)	95,506	69,377	Using Java backfire ratio of 53:1
Time	100 hrs	1147 seconds (~19 minutes)	

What is MARINE?

MARINE is a desktop application developed by LOGAPPS to review software requirements and estimate the cost of functional software size.



- **Analyze and validate requirements**
- **Perform function point count according to industry standards**
- **Produce ROM cost estimates**
- **Produce ROM schedule estimates**

The current beta version is developed around a core NLP capability and a robust rules engine that aims to mitigate weaknesses in the estimation process.

LOGAPPS

What is MARINE?

Natural Language Processing At a Glance

Automating Previously Human-Dependent Functions

- Natural Language Processing (NLP) enables computers to derive meaning from human or natural language input

Cutting-Edge Technology, Getting Smarter by the Day

- NLP has made dramatic strides in the last decade with new tools and extensive research

Wide Use Across Government and Industry

- Industries using NLP technology – defense intelligence, legal, healthcare

✓ Requirements are excellent subjects for NLP analysis because they have a semi-structured construct

LOGAPPS

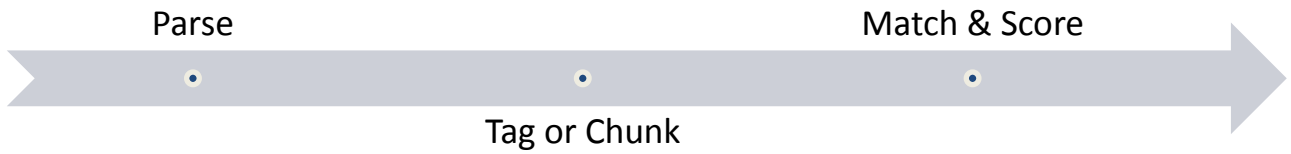
What is MARINE?

Natural Language Processing – Requirement Example

#3.2 System shall update the Masterfile based on XXX calculations.

Req. #	Subject (noun)	Verb	Object (noun)	Prepositional phrase
3.2	System	shall update	Masterfile	based on XXX calculations

Req. #	Key Verb	Other Verb	Proper Noun	Noun	Subject	Object	Verb Phrase
3.2	update	based	System, Masterfile, XXX	calculations	System	Masterfile, XXX, calculations	update the Masterfile based on XXX calculations



✓ Requirements are excellent subjects for NLP analysis because they have a semi-structured construct

LOGAPPS

What is MARINE?

Who Benefits?

Requirements Analyst

Cost Estimator

Project Manager

MAN vs. MACHINE: MARINE decreases experts' time spent and reduces risks associated with human error and subjectivity

LOGAPPS

Demo

[Switch to the tool]

LOGAPPS

Contact Us!

OUR TEAM

Kevin McKeel
Managing Partner
703-592-6361
mckeel@logapps.com

Ed Spriggs
Managing Partner
703-592-6362
spriggs@logapps.com

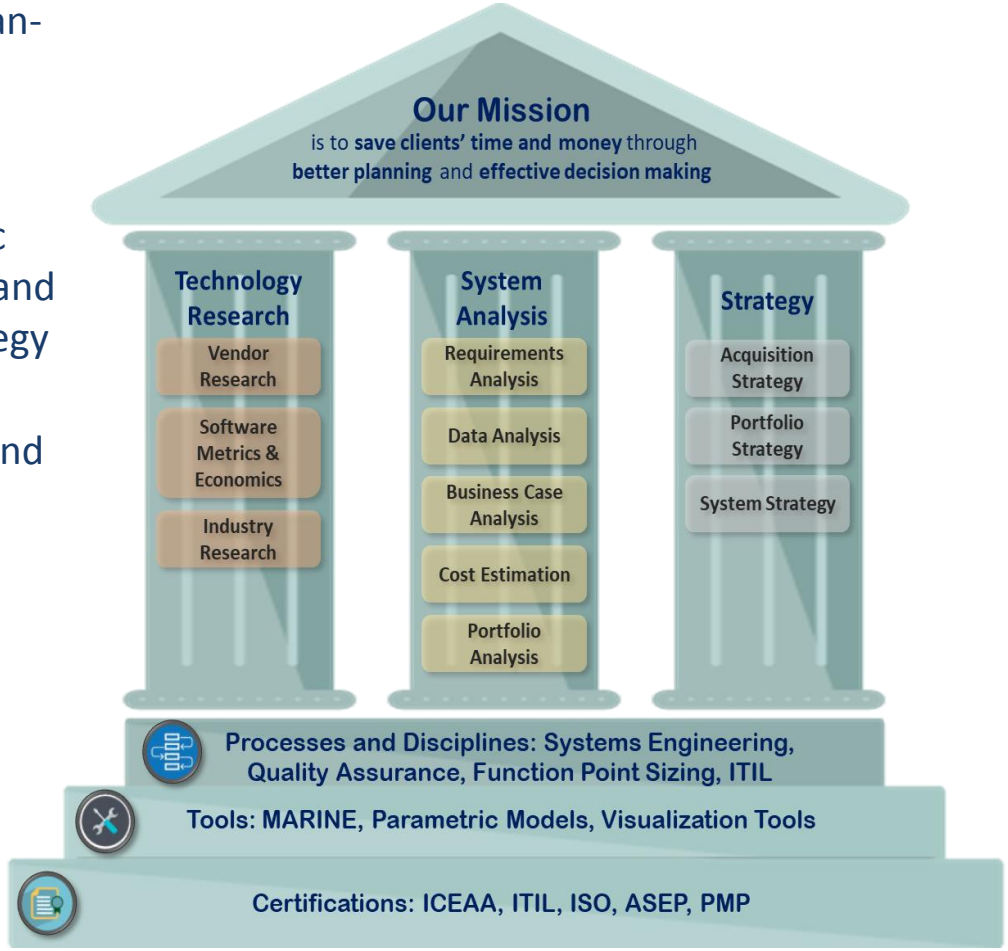
Amar Zabarah
Systems Engineer
703-592-6356
Amar.Zabarah@logapps.com

- Official MARINE Email: **MARINE@logapps.com**
- Official MARINE Webpage: **www.Logapps.com/marine**

LOGAPPS

About Logapps LLC

- Founded in 2007, Logapps LLC is a Veteran-Owned Small Business (VOSB) located in Falls Church, Virginia.
- Senior principals bring many years of experience in: Cost Estimating, Economic Analysis, Systems Engineering, Program and Procurement Planning, Acquisition Strategy
- Extensive network of independent consultants and partners at hand to extend depth of Subject Matter Expertise
- Our clients are



LOGAPPS