Mobile Applications, Function Points and Cost Estimating

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Agenda

- Mobile Applications – Fun Facts
- Function Points
- Sizing models to consider for Cost Estimation
- The Terrific Tuner – A mobile application

What is meant by Mobile and Connected?

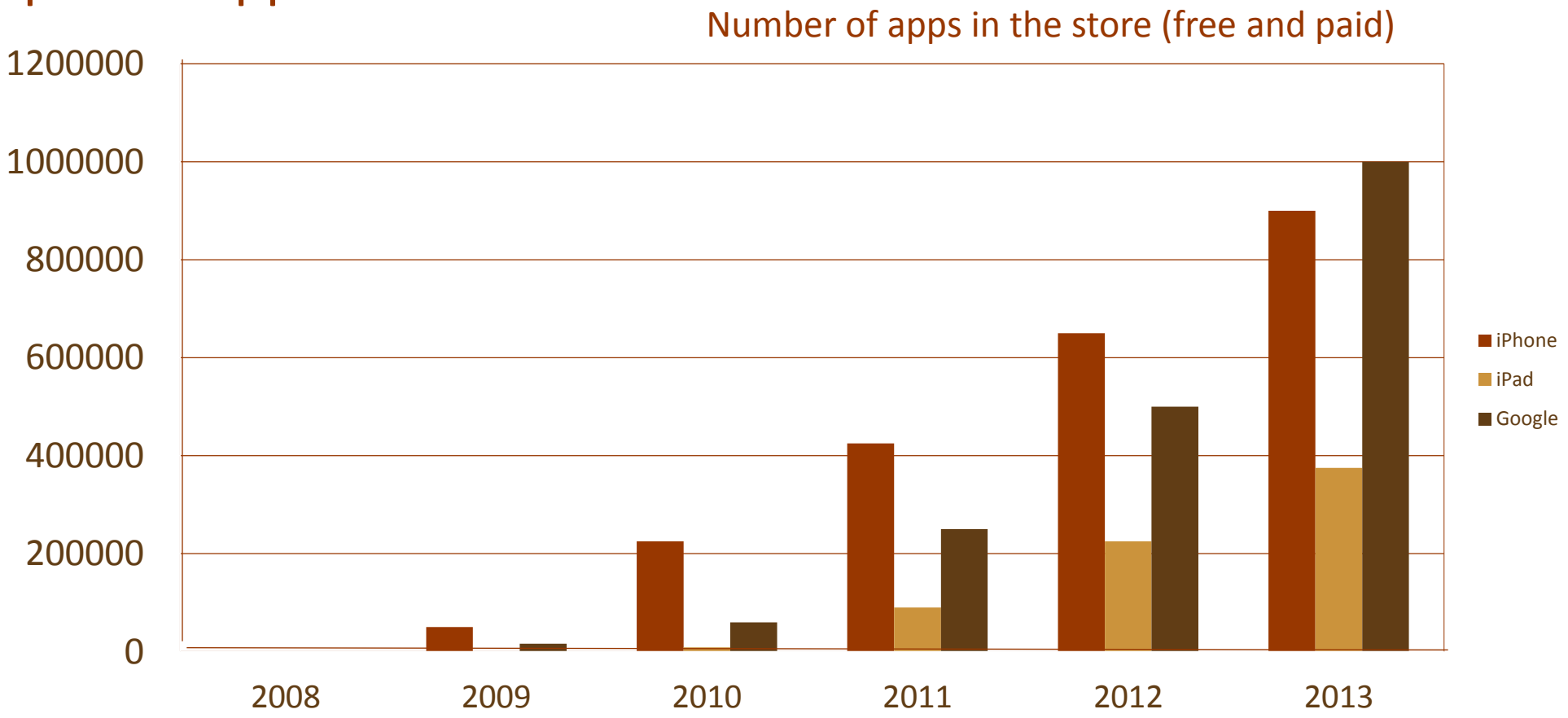
Regulation	Network Protocols	Radio Frequencies in the United States	Distance	Primary use
Licensed	Cell towers (GSM and CDMA standards)	Various frequencies between 700 - 2100 Megahertz	Up to 10 square miles	Cellular coverage
Licensed	Femtocell (GSM and CDMA standards)	Various frequencies between 700 - 2100 Megahertz	5000 square feet	Provide cellular coverage in little to no-coverage areas and residences
Licensed and Unlicensed	Wi-MAX (GSM and CDMA standards)	2.5 Gigahertz	30 miles	Cellular coverage
Unlicensed	Wi-Fi	2.4 or 5 Gigahertz	300 feet	Connect 2 or more devices
Unlicensed	Bluetooth	2.4-2.485 Gigahertz	33 feet	Connect 2 or more devices. Very close range
Unlicensed	Near Field Communications	13.85 Gigahertz	4 cm	Connect 2 devices. Extremely close range

Classification of Mobile Applications

- Connect to a Network
  - Connect tablet to the network
- Use the wireless network for short, bursty data from the originating device or service to another device
  - Find a pet with tracking collars
- Applications that are self-contained on the device
  - The Terrific Tuner
- Social Networking Applications
  - Facebook, Instagram
- Live Streaming, Netflix, various Music services
  - World Cup Games
- Cloud Applications/Storage
  - Salesforce.com
- Combinations of the above

Mobile Application Stores

- Popular: Apple's App Store & Google Play
- Corporate App Stores



Mobile Apps – Other characteristics

- Usually Development teams use Agile
- Native Operating Systems vs. HTML 5
- Companies with small numbers of employees command large market capitalization
  - Rovio – Angry Birds (650 employees in 2013)
  - Facebook – Instagram (13 employees in 2012) when acquired by Facebook - $1 billion
  - Facebook – What's App (55 employees in 2014) when acquired by Facebook) – 19 billion

Function Points (FP)

- Brief Background/History
- What they are?
- How are they used?
- Why are they important to software measurement?

Function Points (FP)
Brief History

1979

- Developed by Allan Albrecht at IBM for better software estimation
- *A New Way of Looking at Tools*

1980's

- First Formal Function Point Guidelines
- IFPUG elects first Board of Directors

1990's

- Publication of Function Points as Assets
- Certified Function Point Specialist Certification
- Publication of Counting Practices Manual

2000's

- **IFPUG FSM Method: ISO/IEC 20926:2009 Software and systems engineering - Software measurement - IFPUG is first ISO approved functional size measurement method**
- CFPS certification test is automated
- Publication of IFPUG Guide to IT & Software Measurements (2012)

2014

- Counting Practices Manual (CPM) v4.3.1
- International Software Measurements & Analysis Conference ISMA 9 Madrid Spain
- Special interest groups in Agile methodology & Cloud
- Working relationships with industry groups including TM Forum, CCC, ICEAA, OMG, NIST, ISBSG

Function Points (FP) Counting Process

1. Gather Available Documentation and Identify Subject Matter Experts (SME)

2. Determine counting scope & boundaries. Identify functional user requirement

3. Measure Data Functions

5. Calculate Functional Size

6. Document & Report

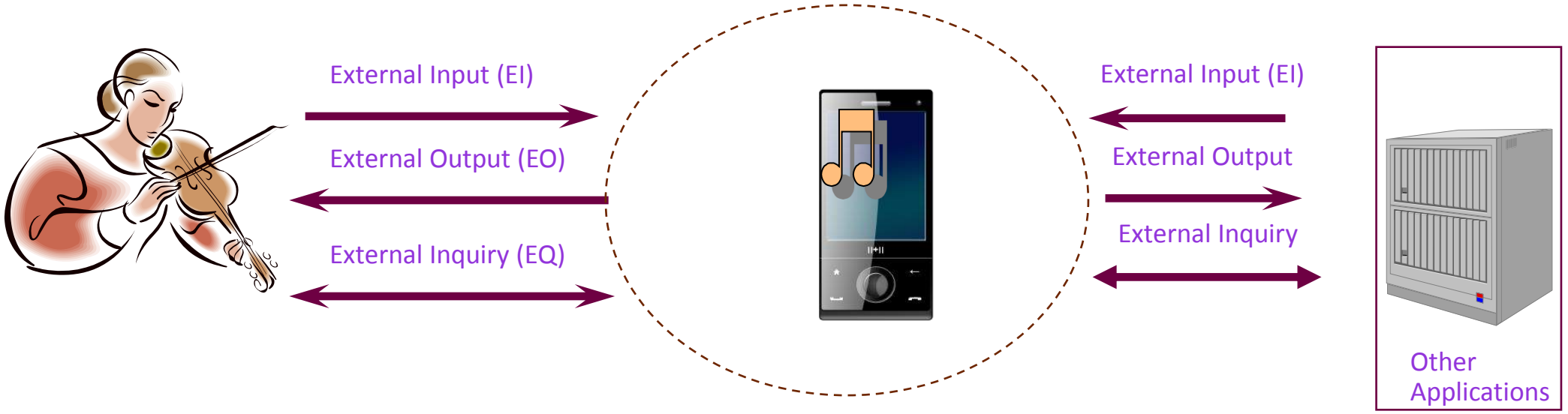
Function Points (FP)
Let's Get Started

- Gather documentation & identify the Subject Matter Experts
- Determine counting scope and boundary
- Identify functional user requirements

Function Points (FP)
Measure Data

- Identify Functional User Requirements
  - Internal Logical Files
  - External Interface Files

Function Points (FP)
Measure Transactions



EI = Maintains ILF or passes control data into the application
EO = data sent out of application with added value (e.g., calculated totals)
EQ = External Inquiry (e.g. queries)

Complexity determined by number of Data Element Types (DETs) and number of File Types Reference (FTRs)
Key is that data is passed into or out of the boundary

Function Points (FP)
Calculate Functional Size & Document

Function Type	Low	Average	High
EI	x 3	x 4	x 6
EO	x 4	x 5	x 7
EQ	x 3	x 4	x 6
ILF	x 7	x 10	x 15
EIF	x 5	x 7	x 10

Function Points (FP)
Where are they used?

- Estimating
  - (What is the estimated effort? Estimated cost per function point)
- Contracting
  - (How much will you charge me per FP?)
- Outsourcing
  - (How much will you charge me per FP?)
- Software Quality
  - (What is my defect ratio? Defects/FP)
- Productivity
  - (What is my productivity? FP/time unit)
- Benchmarking
  - (How do I compare against my company, other companies, international standards?)

Sizing Models to Consider for Estimating Cost

Function Points

Source Lines of Code

User Stories

Cost Estimation & Mobile Applications
Where are sizing measures used?

Stage	FP	SLOC	User Story Pts.
Requirements	X		X
Coding	X	X	X
Testing	X	X	X
Production	X	X	

Cost Estimation & Mobile Applications

- Determine how long it will take to develop the user's requirements for an app
  - Effort months

- Determine how much labor will cost to develop an app
  - Cost per unit of sizing

The Terrific Tuner

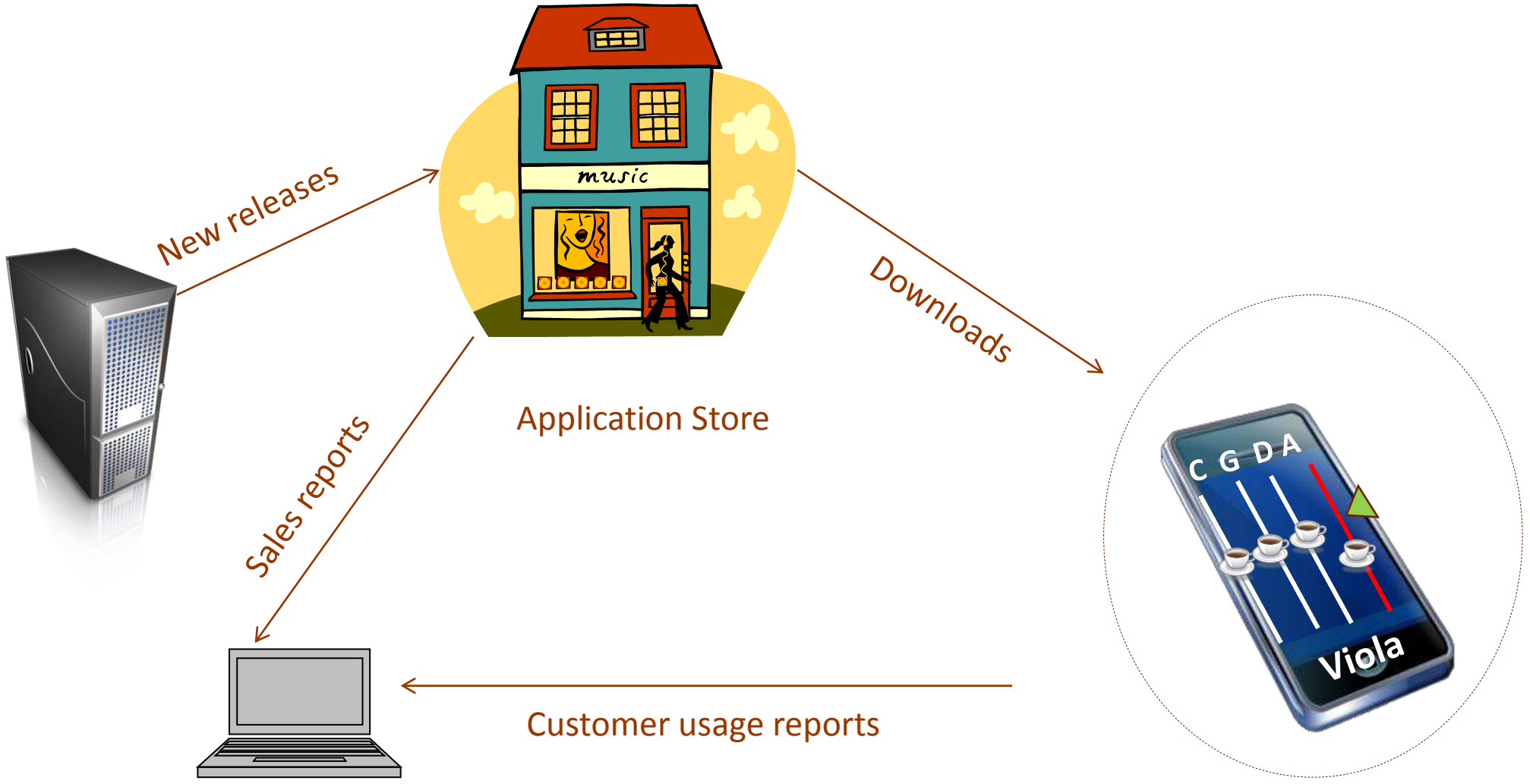
Strategy

- Target Market
  - High School & College Students
- What Problem am I solving?
  - An inexpensive tool used to tune an instrument wherever the student is.
  - Allows the student to have some fun with a boring but important part of performing by customizing the tuning screen with pictures of drinks or friends
- What are competitors doing?
  - Cleartune

Marketing and Pricing

- High School & College Band & Orchestra Directors
- High School & College students
- Professional Musicians
- Where do customers congregate?
  - Social media
  - School
  - Rehearsals
- Pricing – Free to customers
  - Later – Product Placement dollars, click-thru revenue and a percentage of food & beverage sales in many cities

Release 1.0 – The Terrific Tuner



Release 1.0 – The Terrific Tuner
Measure the Data

Data Supporting the application		
Logical data	Data Elements	Data Type
String	Name of instrument	ILF
Instruments	Picture of Instrument	
	Number of Strings	
	Common note names	
	Common tunings (in hertz)	
Favorite	Name of drink	ILF
Drinks	Picture of drink	
Customer Data	Number of times customer opens application	ILF
	Customer's favorite drink	
	Customer location when using application	
	Length of time application is open	
Location	GPS longitude and latitude	EIF
	Wi-Fi registered name	
	Wi-Fi longitude and latitude	
	Cellular Tower identification	
	Cellular Tower longitude and latitude	

Release 1.0 – The Terrific Tuner
Measure the Transactions

Transactions using the data	Logical Data used	Transaction Type
Select string instrument to tune	Strings	EQ
For tuning by ear (aural tuning), present screen to select pitch. Sound pitch.	Strings	EQ
Select Favorite Drink	Favorite Drinks	EQ
For visual tuning, present screen to match pitch. Use pictures of favorite drinks on a string to indicate closeness to pitch. Drinks steam when exact pitch is attained.	Strings, Favorite Drinks	EO
Add new string instrument	Strings	EI
Delete string instrument	Strings	EI
Add new favorite drink	Favorite Drinks	EI
Get Customer Location GPS	Customer, Location	EI
Get Customer Location Wi-Fi	Customer, Location	EI
Get Customer Location Cellular	Customer, Location	EI
Report: Most popular drink	Favorite Drinks	EO
Report: Most popular location	Customer, Location	EO
Report: Average length of use by customer	Customer	EO
Report: Number of times customer opens application in a day	Customer	EO

Release 1.0 – The Terrific Tuner
Summary of Functional Analysis

Summary of Functional Analysis		
Number	Quantity	Data or Transactions
Internal Logical Files	3	Strings, Favorite Drinks, Customer
External Interface Files	1	Location
External Inputs	6	Add & Delete strings, Add drinks, Get Customer Location GPS, Get Customer Location Wi-FI, Get Customer Location Cellular
External Inquiries	3	Select string instrument, Aural tuning, Select Favorite Drink
External Outputs	5	Visual tuning with drinks, All reports (4)

Quick Tip!

Use "Average" Sizes for these functions to get a quick estimate.

ILF = 3 * 10 = 30 FP
EIF = 1 * 7 = 7 FP
EI = 6 * 4 = 24 FP
EQ = 3 * 4 = 12 FP
EO = 5 * 5 = 25 FP
Total = 98 FP

Release 1.0 – The Terrific Tuner
Estimated Costs

- Current development labor cost is $100 per function point.
- Current output is 20 function points in a month.

- How long will it take to develop the Terrific Tuner?

- How much will it cost to develop it?

Release 1.0 – The Terrific Tuner
Estimated Costs

- Current development labor cost is $100 per function point.
- Current output is 20 function points in a month.

- How much will it cost to develop it?
  - Answer: $98,000

- How long will it take to develop the Terrific Tuner?
  - Answer: 5 months

Conclusion

- Function Points are not only are a good analytic tool but also can be used to estimate the cost of mobile applications.
- Functional Sizing (Function Points) is an ISO standard.
- International Benchmarking data is available.

Questions?

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When Tammy isn't playing her clarinet or working for a major telecommunications company, she is mom to a teenager and a long distance bike rider.

Appendix - About IFPUG

- International Function Point Users Group
  - Volunteers who maintain the standards, publish materials to assist counters, and software measurement programs
    - www.ifpug.org
  - Established in 1982
  - Headquarters in Princeton, New Jersey, USA
  - Currently 1,200 members in 30 Countries
  - Members are in AT&T, Steria, IBM, HP, Accenture, Booz Allen Hamilton, Northwestern Mutual, LG CNS, USMC, Banco Brandesco, Banco Central do Brasil, US Department of Defense, Semantys
  - Internatio

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