

# The Use of Function Points for Software Estimation and Measurement

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# Five Function Point-related Topics

- **Quick hits on Function Points – primer**
- **Now that you know everything, an example**
- **Using measurements throughout the life of the project**
- **Impact on process maturity (CMMI®)**
- **Unique measurement opportunity?**

# Function Point Facts

**The most widely used standard software size metric throughout industry is Function Points.**

**Capers Jones of Software Productivity Research refers to the use of lines of code for measurement as professional malpractice.**

**Function Points are now an ISO/IEC standard. (20926 date: 11/03)**

**Function Points were first developed in 1979.**

**Statistical analysis has demonstrated the integrity of Function Point counting by trained counters.**

**Function Point counting incorporates the following principles:**

- **count all the functionality provided to the customer**
- **count only the functionality provided to the customer**
- **counting must be independent of technology**

**A CFPS is a Certified Function Point Specialist (3-part exam) administered by IFPUG.**

## Function Point Facts (cont'd)

**According to Capers Jones, Function Point usage reduces the risk of:**

- project termination,
- litigation for breach of contract,
- unstable requirements,
- poor quality, and
- cost and schedule overruns

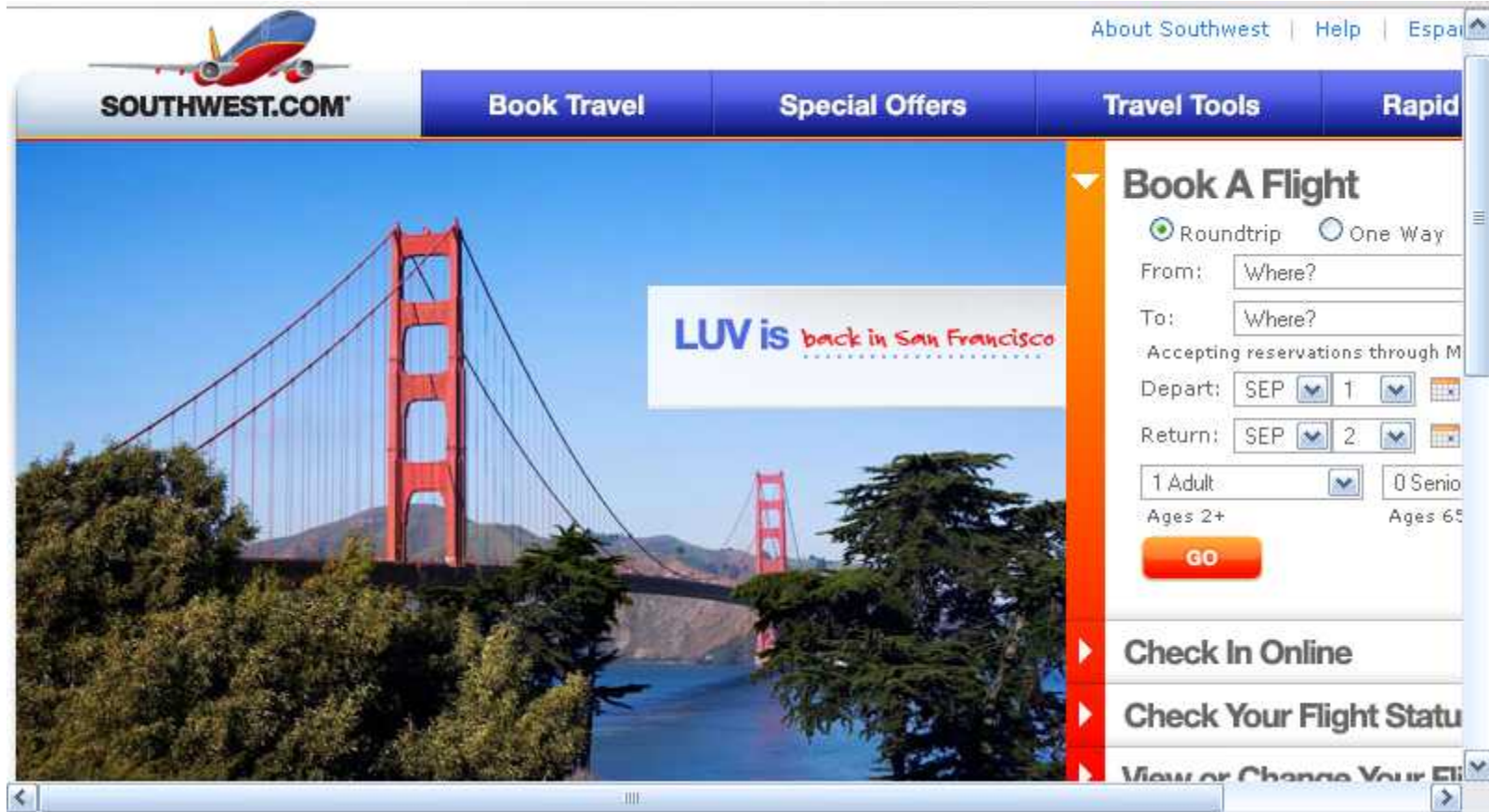
**Function Points are calculated by counting screens, reports, queries, and files / database tables / objects. These are known in FP parlance as:**

- External Inputs,
- External Outputs,
- External Inquiries,
- Internal Logical Files, and
- External Logical Files.

**According to Capers Jones projects with function point analysis:**

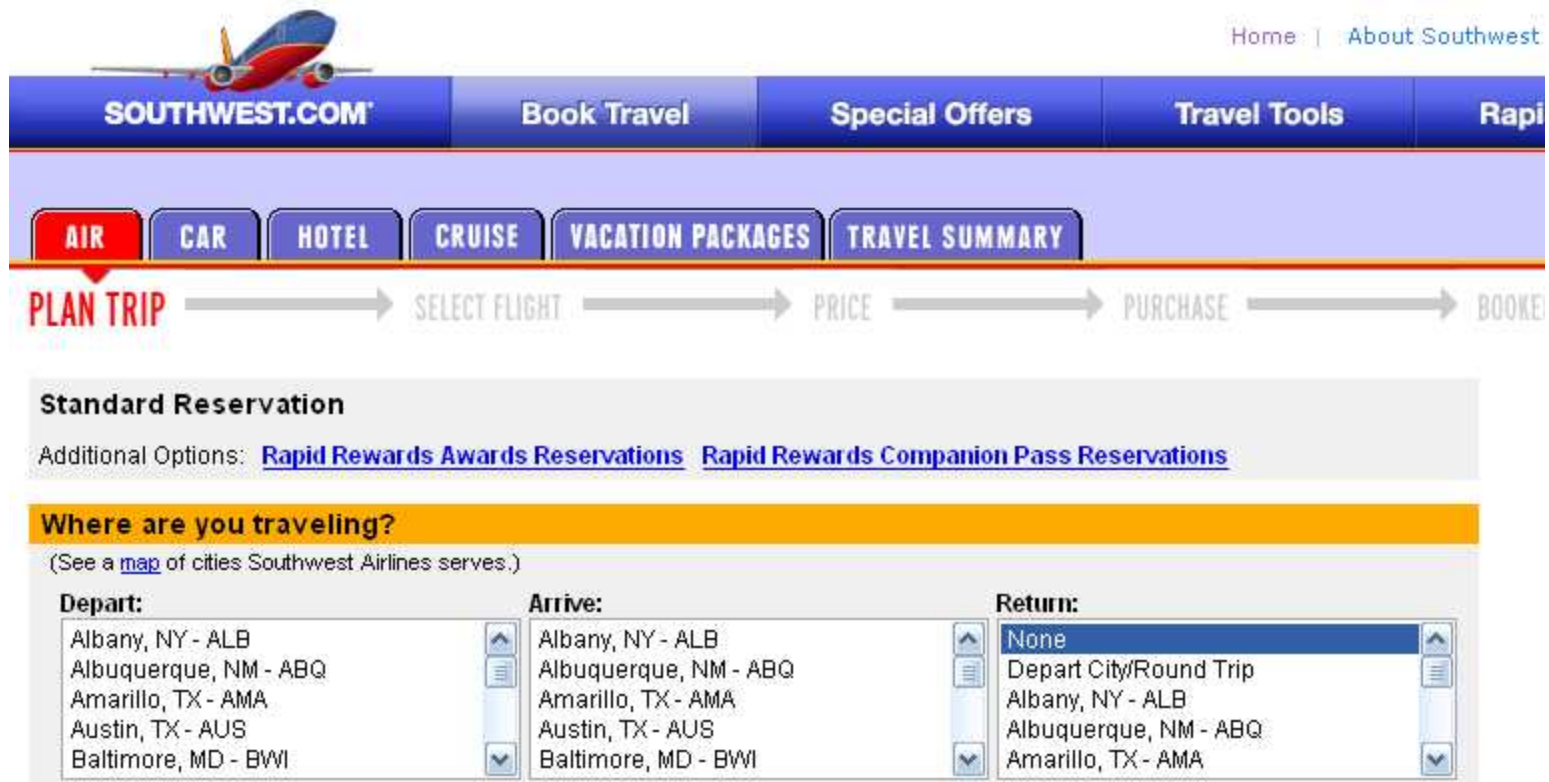
- have less scope creep
- have about 15% lower cost overruns
- have about 25% less schedule slips
- save between \$25 and \$75 per function point

# A Function Point Example



This screen contains no data that is maintained in data structures (partial assumption). Its purpose is for navigational. Navigational interfaces without persistent data have no Function Points.

# A Function Point Example (cont'd)



The screenshot shows the Southwest Airlines website interface. At the top, there's a navigation bar with links for Home, About Southwest, and a logo. Below this is a main menu with buttons for Book Travel, Special Offers, Travel Tools, and Rapid Rewards. A secondary menu highlights various travel options: AIR, CAR, HOTEL, CRUISE, VACATION PACKAGES, and TRAVEL SUMMARY. A progress bar indicates the steps: PLAN TRIP, SELECT FLIGHT, PRICE, PURCHASE, and BOOKED. The main content area is titled 'Standard Reservation' and includes links for 'Rapid Rewards Awards Reservations' and 'Rapid Rewards Companion Pass Reservations'. The 'Where are you traveling?' section features three dropdown menus for Depart, Arrive, and Return cities. The Depart and Arrive menus list several cities with their airport codes, while the Return menu is currently set to 'None'.

**SOUTHWEST.COM** Book Travel Special Offers Travel Tools Rapid Rewards

AIR CAR HOTEL CRUISE VACATION PACKAGES TRAVEL SUMMARY

PLAN TRIP → SELECT FLIGHT → PRICE → PURCHASE → BOOKED

**Standard Reservation**

Additional Options: [Rapid Rewards Awards Reservations](#) [Rapid Rewards Companion Pass Reservations](#)

**Where are you traveling?**

(See a [map](#) of cities Southwest Airlines serves.)

Depart:	Arrive:	Return:
Albany, NY - ALB	Albany, NY - ALB	None
Albuquerque, NM - ABQ	Albuquerque, NM - ABQ	Depart City/Round Trip
Amarillo, TX - AMA	Amarillo, TX - AMA	Albany, NY - ALB
Austin, TX - AUS	Austin, TX - AUS	Albuquerque, NM - ABQ
Baltimore, MD - BWI	Baltimore, MD - BWI	Amarillo, TX - AMA

This screen as shown (apparently) queries a data structure and creates a list of cities served by SWA. An ILF and an EQ are evident.

# A Function Point Example – (cont'd)

## When are you traveling?

(We are currently accepting reservations through January 11, 2008.)

<b>Depart Date:</b>	<b>Depart Time:</b>	<b>Return Date:</b>	<b>Return Time:</b>
August 19 September 20 October 21 November 22 December 23 January 24	<input type="radio"/> Before Noon <input type="radio"/> Noon - 6pm <input type="radio"/> After 6pm <input checked="" type="radio"/> Anytime	August 1 September 2 October 3 November 4 December 5 January 6	<input type="radio"/> Before Noon <input type="radio"/> Noon - 6pm <input type="radio"/> After 6pm <input checked="" type="radio"/> Anytime

## How many are traveling?

(Maximum 8 passengers per reservation.)

Adult(s) (age 2+):

Senior(s) (age 65+):

Southwest Policies:

[Seniors](#)  
[Children Under 12 Traveling Alone](#)  
[Baby on Board](#)

## Do you have a promotion code? (Optional)

(If you have a Southwest Airlines code for discount off of air fare, please enter below.)

Promotion Code:

## Select Departing Flight

Albuquerque, NM to Dallas (Love Field), TX (Tuesday, September 25 2007)

Fares do not include government fees and taxes. More →					→	→	→	→	→	→	→ End
Flight	Depart	Arrive	Stops	Travel Time (hh:mm)	Refundable Anytime \$166	Special Fares \$156	Restricted Fares \$141 - \$151	Advance Purchase \$126 - \$136	Discount Fares \$111 - \$121	Promotional Fares \$99	Internet One-way \$99 - \$110
3219	7:15am	9:45am	N/S	1:30	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1954	9:10am	11:45am	N/S	1:35	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1778	11:50am	2:25pm	N/S	1:35	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
973	12:40pm	3:15pm	N/S	1:35	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
831	3:00pm	5:35pm	N/S	1:35	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2226	4:55pm	7:30pm	N/S	1:35	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2576	6:30pm	9:05pm	N/S	1:35	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
437	8:20pm	10:50pm	N/S	1:30	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Select Returning Flight

Dallas (Love Field), TX to Albuquerque, NM (Thursday, September 27 2007)

Fares do not include government fees and taxes.					More →	→	→	→	→	→	→ End
Flight	Depart	Arrive	Stops	Travel Time (hh:mm)	Refundable Anytime \$166	Special Fares \$156	Restricted Fares \$141 - \$151	Advance Purchase \$126 - \$136	Discount Fares \$111 - \$121	Promotional Fares \$99	Internet One-way \$99 - \$110

This screen as shown (apparently) queries a data structure and creates a list of flights within a destination. An ILF and an EQ are evident. No selection of options on this screen are counted until an attempt is made to purchase the tickets (that is, the transaction is complete from an elementary process view).

# A Function Point Example – (cont'd)

## Southwest Airlines Air Itinerary and Pricing

Air Itinerary						
Trip	Date	Day	Stops	Routing	Flight	Routing Details
Depart	Sep 25	Tue	N/S	ABQ-DAL	3219	Depart Albuquerque (ABQ) at 7:15 AM Arrive in Dallas (DAL) at 9:45 AM
Return	Sep 27	Thu	N/S	DAL-ABQ	2217	Depart Dallas (DAL) at 6:15 PM Arrive in Albuquerque (ABQ) at 7:00 PM

Pricing									
Passenger Type	Trip	Routing	Type of Fare	Base Fare	U.S. Taxes	PFC	Security Fee <sup>1</sup>	Passenger(s)	Total
Adult	Depart	ABQ-DAL	<a href="#">Promotional Any Time</a>	\$92.09	\$10.31	\$3.00	\$2.50	1	\$107.90
	Return	DAL-ABQ	<a href="#">Promotional Any Time</a>	\$92.09	\$10.31	\$0.00	\$2.50	1	\$104.90
Total				\$184.18	\$20.62	\$3.00	\$5.00		\$212.80

<sup>1</sup> Security Fee is the government-imposed September 11th Security Fee.

This screen confirms a transaction that is about to take place. No new data structures are involved yet, but because of the sums in the bottom row this “screen” is an EO (not an EQ).



# A Function Point Example – (cont'd)

## Who is Traveling?

Adult

Passenger 1: First Name: Last Name: Suffix: Rapid Rewards Account Number:<sup>1</sup>

[Add/Edit Disability Assistance Options](#)

<sup>1</sup> Enter your Rapid Rewards Account number to ensure your Rapid Rewards credits will post to your account within seven to ten days after completion of your flight. You may omit the spaces and leading zeros. Rapid Rewards is our frequent flyer program.

## Apply Travel Funds

If you have funds from an unused or cancelled reservation, southwestgiftcards™, or Southwest Luv Vouchers you may apply them toward the purchase of this reservation.

[Apply Travel Funds](#)

## Enter Payment Information...

☒ Credit Card      

Credit Card: Number: Expiration Date:  
Select Your Card  Select Month  Select Year

First Name: Last Name:

Address:

City:

If within the U.S.:  
State: Select Your State   
Zip Code:  -

If outside the U.S.:  
State/Province/Region:   
Postal Code:

Country:  
UNITED STATES OF AMERICA - (US)

Address Type:  
☒ Home ☐ Business ☐ Other

## Enter Contact Information...

If within the U.S.: Phone Number:  -  -   
If outside the U.S.: Phone Number: 011 -  -

## Send confirmation via...

Please select how you would like to receive your Ticketless Travel receipt.  
(Note: Receipts contain confidential billing information. You must select e-mail as your pre receipt delivery option in order to enroll in Click 'n Save® E-mail Updates.)

☒ E-mail to   
☐ I would like a free subscription to Click 'n Save® E-mail Updates for advance notice of southwest.com specials. (A confirmation of enrollment will be sent via email)

☐ Fax to  -  -   
Ticketless Travel Itineraries can be sent to U.S. fax numbers only. If you reside outside the U.S. cannot provide a U.S. fax number, please provide a valid e-mail address for your Ticketless Itinerary receipt.

## Let them know you are on your way...

E-mail Itinerary  
Send a copy of your travel itinerary to as many as four e-mail addresses.  
(Note: Itineraries do not contain confidential billing information)

## Purchase Summary

Item	Description	Due Now
Air	Total amount, including tax, that will be charged to your credit card.	\$ 212.80

Before completing your purchase, please verify your [Passenger Names](#) are correct. Changes to Passenger Names after selecting the "I Want To Purchase This Air Travel" button could result in a fare increase.

[I Want To Purchase This Air Travel](#)

[Start Over](#)

Need [help booking travel](#)?

This screen as shown (apparently) queries several data structures (credit card type, state, country) and creates list of cities served by SWA. Three ILFs and EQs are evident.

Apply travel funds “navigates” to another query.

A Rapid Rewards query is also triggered upon name entry; potentially another ILF and certainly an EQ.

Eventually when clicking “I Want to Purchase this Air Travel” and EI will stored this transaction in a new ILF and also trigger itinerary distribution which as EQs.

# A Function Point Example – (cont'd)

## Select Rental Car...

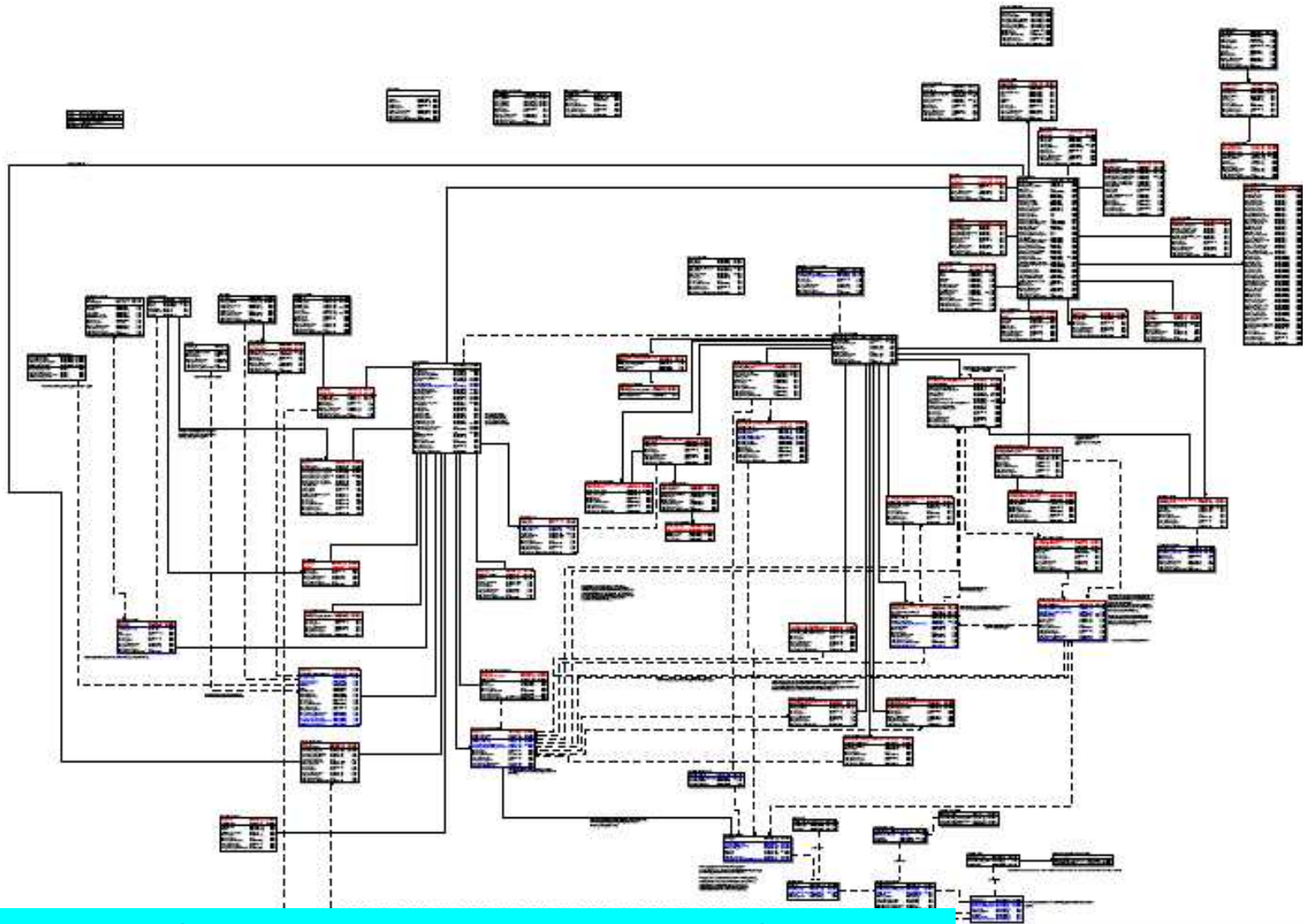
Will you need a rental car? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Company	Vehicle Type	Rental Car Codes/Numbers	
-- Shop All Rapid Rewards Partners -- -- Shop All Cars -- Alamo Budget Dollar Hertz	Economy Compact Mid-size Full-size Premium Luxury	<b>Rate Code</b> - None - <input type="text"/>	<b>Corporate ID/Rate</b> - None - <input type="text"/>
		<b>Promo Code</b> - None - <input type="text"/>	<b>Frequent Renter Num</b> - None - <input type="text"/>
* You may select more than one company by holding down the Ctrl, Shift or Command (Apple) keys.		* See our <a href="#">Vehicle Types</a> page for car descriptions.	
		* Codes and Numbers are accepted only for those Rental Car Companies which are listed in the drop down boxes.	

## Select Hotel...

Will you need a hotel? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Company	Where would you like to stay?	Distance From City/Airport/Point of Interest	
-- Shop All Rapid Rewards Partners -- -- Shop All Hotels -- Cambria Suites Candlewood Suites Clarion Comfort Inn Comfort Suites Courtyard by Marriott	<input checked="" type="radio"/> Stay Near Downtown of Arrival City <input type="radio"/> Stay Near Arrival Airport <input type="radio"/> Other City <input type="text"/> Optional Point of Interest <input type="text"/> (Example: Grand Canyon)	0 - 5 Miles <input type="text"/> <input type="text"/>	All Directions <input type="text"/> <input type="text"/>
		<b>Number of Adults</b> 1 <input type="text"/>	<b>Number of Children</b> 0 <input type="text"/>
		<b>Negotiated Corporate Rate Code</b> <input type="text"/>	
* You may select more than one company by holding down the Ctrl, Shift or Command (Apple) keys.		* Negotiated Corporate Rate Code is assigned by a hotel for a particular company.	

A similar series of event occurs for rental cars and hotels; I'll spare you.

# Using a Data Model to Estimate Function Points



An estimate of Function Point size can be developed from a simple data model. First remove disqualified files as ILFs, and then multiple by . . .

# A Measurement Life Cycle

	<u><a href="#">FPAW</a></u>	<u><a href="#">QDE</a></u>	<u><a href="#">Estimation Worksheet</a></u>	<u><a href="#">FP Counting Worksheet</a></u>
<b>Purpose</b>	Rough size value in Function Points	Rough size, cost, and FTE values	Firm size and resource estimate	Tally and document Function Point counts
<b>Triggers are</b>	Proposal, CRs, Enhancements	Proposal in lieu of detailed project planning data	Data Model, External Interfaces Definition	Product Release for actual Data Model & External Interfaces Definition for estimates
<b>When in Lifecycle</b>	During early plan and throughout lifecycle when requirements change	Planning	Design	Design through Operations
<b>Risk Impact to Project</b>	Higher risk due to uncertainty about product	Higher risk due to uncertainty about product	Minimal risk as functionality is solidified	No risk as product is finished - values are used to improve future estimates
<b>Typically used by</b>	Trained project leader	Trained project leader	Trained project leader	Trained FP counter in conjunction with project team

**FPAW – Function Point Approximation Worksheet**

**QDE – Quick ‘n Dirty Estimate**

# Approximate during Proposal Discussions

Function Point Approximation Worksheet									
<b>Contact:</b> Questions concerning this worksheet may be directed to Joe Schofield									
<b>Purpose:</b> This approximation (approximate when you aren't quite ready to estimate) worksheet supplements the SILC estimation worksheet by providing estimate for the product requirements using Function Points. No knowledge of Function Point counting is required!									
The values generated by this worksheet are used in conjunction with the approximation worksheet as a second dimension to approximating product size									
<b>When to use:</b> As part of planning / replanning and when the project team has an understanding on the types of objects / entities that the product will support and the functions that are likely to be needed in the product.									
<b>How to use:</b> (the derived values in this spreadsheet use medium complexity values, IFPUG 4.2 2004)									
Enter in the Logical Files column the logical data groupings (call these entities or objects) from the customer's perspective that will be maintained (added, changed, or deleted).									
For each logical data set, identify the likely functions to be performed on the logical data groupings. Enter a "y" under the column for Create, Update, Delete, or Read.									
Enter in the Logical Files column the logical data groupings (call these entities or objects) from the customer's perspective that will be interfaced from another system for editing or reporting.									
For each logical data set directly above, enter a "y" under the column for Read.									
<b>What you'll get:</b> An approximated Function Point count that will treat your input as medium complexity Function Point types. This number will NOT likely change in the Approximation Worksheet since your requirements understanding is still likely yet to evolve.									
<b>Limitations:</b> This spreadsheet is designed to work for up to 80 data sets; though it could be easily changed to accommodate more.									
6	2	4	1	3					
<b>Data Functions</b>					<b>Your Approximated Function Point Count</b>				
<b>Logical Files</b>	<b>Create</b>	<b>Update</b>	<b>Delete</b>	<b>Read</b>					
Hotels				y					
Car Rentals		y	y						
Trips	y	y		y					
Travelers		y							
Reservations	y								
Airlines									

Approximate

Can also be used throughout the lifecycle to measure requirements size change!

# The *QDE* provides a ballpark range when you know as few as one of three project variables

QDE Worksheet					
Note: the resulting numbers derived from this worksheet will place your project at a medium or high level of risk until detailed estimates are derived using the SILC Estimating Process.					
<b>Enter Labor Dollars:</b>	200000.00				
Estimated Function Point Size	432.90				
Estimated Cycle Time needed	25.46	person months			
<b>Enter Person Months</b>	25.00				
Estimated Function Point Size	425.00				
Estimated Labor Dollars	196350.00				
<b>Enter Function Points</b>	433.00				
Estimated Labor Dollars needed	200046.00				
Estimated Cycle Time needed	25.47	Person months			

**Approximate**

**Estimates are based on historic organizational performance**

# During planning, real resources and costs can be used to provide a range of expected results

## Project Plan Estimating Worksheet

Steps: input attributes are shaded

In return you receive:

<sup>1</sup>person experience levels

<sup>a</sup>person experience efficiency

<sup>2</sup>person participation levels

<sup>b</sup>FP contribution efficiency

<sup>3</sup>duration in years

<sup>c</sup>person & team cost rates

<sup>4</sup>person labor rates

<sup>d</sup>estimated team FPs per month

<sup>5</sup>SILC phase reliability variance (.4, .3, .2, .1, or 0)

<sup>e</sup>estimated cycle time

<sup>6</sup>estimated size of project

<sup>f</sup>estimated product costs (compare to planned)

<sup>7</sup>other costs (optional)

<sup>g</sup>optimistic and pessimistic variance range

Experience Factors:

Expert

Mature

Rookie

Technology

0.80

1.00

1.30

Methodology

0.80

1.00

1.30

Application

0.80

1.00

1.30

Experience with . . .

Resource	<sup>1</sup> Technology	<sup>1</sup> Methodology	<sup>1</sup> Application	<sup>a</sup> Experience Efficiency	<sup>2</sup> Participation	<sup>b</sup> FP Contribution Efficiency	<sup>3</sup> Duration	Average Labor Rate	<sup>c</sup> Annual Person Rate	<sup>c</sup> Total Person Cost
Person1	1.30	1.30	1.00	1.69	0.08	0.90	0.25	180,000	14,400	3,600
Person2	1.30	1.30	1.00	1.69	0.16	1.80	0.25	180,000	28,800	7,200
Person3	1.00	1.30	1.00	1.30	0.68	9.94	0.25	180,000	122,400	30,600
Person4	1.00	0.80	1.00	0.80	0.12	2.85	0.25	180,000	21,600	5,400
Person5	0.80	0.80	1.30	0.83	0.03	0.57	0.25	180,000	4,500	1,125
Person6	1.00	1.30	1.00	1.30	0.37	5.41	0.25	180,000	66,600	16,650
Totals					1.44	21.47		1,080,000	258,300	64,575
Team Avg. Monthly Efficiency						14.96				

Estimate

	<sup>g</sup> Optimistic	Nominal	<sup>g</sup> Pessimistic
<sup>5</sup> Project Phase Reliability Variance		0.4	
<sup>6</sup> Project Size (Estimated Function Point)	84	140	196
Historic FPPPM Metric	19	19	19
<sup>d</sup> Calculated team FPs per month (predicted)	21	21	21
<sup>e</sup> Cycle time (months - predicted)	4	7	9
<sup>f</sup> Product Cost (predicted)	84234	140389	196545
<sup>f</sup> Product Cost (planned)	64575	64575	64575
<sup>7</sup> Other Costs	0		0

Reliability Variances

SILC Phase

Plan

0.40

ILF = 28 FPs

Analysis

0.30

EIF = ~72 FPs

Design

0.20

Implement.

0.10

Operations

0.00

Subject to change as the project undergoes change!



# Actual Function Point counts are performed based on delivered product

	Low	Average	High	Total	14 System Characteristics (use IFPUG Counting Practices Manual 4.1)									
<sup>1</sup> Internal Logical Files				0	Data Communications							Online Update		
					Distributed Data Processing							Complex Processing		
<sup>2</sup> External Interface Files				0	Performance							Reusability		
					Heavily Used Configuration							Installation		
<sup>3</sup> External Inputs				0	Transaction Rate							Ease of Use		
					Online Data Entry							Multiple Sites		
<sup>3</sup> External Outputs				0	End-User Efficiency							Facilitate Change		
<sup>3</sup> External Inquiries				0										
Total Unadjusted Function Points (UFPs)				0										

**Count Actuals**

**Actuals can be compared to estimates to determine variance, noting approved changes to baselines where applicable.**

<b>Usage:</b>														
Contact the SQA Group immediately if you don't know how to complete any of the information on this worksheet!														
Use this worksheet to estimate Function Points given identified SILC artifacts AND upon project completion to derive an "actual" size.														
Enter the number of low, average, & high Function Point types (ILFs, EIFs, EIs, EOs, EQs) - The worksheet will generate the totals														
<sup>1</sup> These values are derivable from the information model.														
<sup>2</sup> These values are derivable from the external interface model.														
<sup>3</sup> These values are derivable from the presentation layer.														
<sup>4</sup> Use this number for estimating the Function Point size on the Estimation Worksheet														
Enter a value between 0 and 5 for each of the 14 System Characteristics - The worksheet will sum these as multiply them against the UFPs														
(Optionally) Enter additional values below to calculate some key project metrics:														
Enter project labor costs					\$ per FP:					#DIV/0!				
Enter project defects (at implementation)					Defect per FP:					#DIV/0!				
Enter project labor hours					Cycle time per FP					#DIV/0!				



# Actual Function Point counts are performed based on delivered product

Requirements Volatility	
<b>Purpose:</b> The purpose of this worksheet is to measure the degree of change in requirements since the previous count, taking into account new requirements and changes to existing requirements. Refer to the Metrics Glossary for clarification on measurement terms used in this worksheet.	
<b>Process:</b> Not later than the end of each activity (SILC phase) or iteration, use the current "Approximated Function Point Count" from the current FPAW (table) to determine change in size of the product. Enter your "Approximated Function Point Count" in the cell adjacent to "Previous FP Count" below. Make any additions to the FPAW for new functionality since the last update of the FPAW. Enter this value adjacent to "New count;" below. Determine if any of the pre-existing functions on the FPAW have changed since the last measurement. (The value for these can be determined by removing (deleting) that functionality in the FPAW, looking at the Count, re-entering a "Y", and taking the difference.) If the volatility exceeds the threshold established in the IPMP, correction action, including re-planning, should occur. Version control this spreadsheet for future reference.	
Previous FP count:	100
New count:	120
Changes to the existing functionality:	4
Requirements Volatility:	24%

Use Actuals to Manage!

The *cumulative* impact of requirements volatility is the target of threshold management.

# Function Points can contribute to the following highlighted MA practices

## Measurement and Analysis (ML2, Support)

*... develop and sustain a measurement capability that is used to support management information needs.*

**SP 1.1 Establish Measurement Objectives**

**SP 1.2 Specify Measures**

**SP 1.3 Specify Data Collection and Storage Procedures**

**SP 1.4 Specify Analysis Procedures**

**SP 2.1 Collect Measurement Data**

**SP 2.2 Analyze Measurement Data**

**SP 2.3 Store Data and Results**

**SP 2.4 Communicate Results**

# Function Points can contribute to the following highlighted REQM practices

## ***Requirements Management (ML2, Engineering)***

***. . . manage the requirements of the project's products and product components and to identify inconsistencies between those requirements and the project's plans and work products.***

***SP 1.1 Obtain an Understanding of Requirements***

***SP 1.2 Obtain Commitment to Requirements***

***SP 1.3 Manage Requirements Changes***

***SP 1.4 Maintain Bidirectional Traceability of Requirements***

***SP 1.5 Identify Inconsistencies Between Project Work and Requirements***

# **Function Points can contribute to the following highlighted PP practices**

## ***Project Planning (ML2, Project Management)***

***. . . establish and maintain plans that define project activities.***

***SP 1.1 Estimate the Scope of the Project***

***SP 1.2 Establish Estimates of Work Product and Task Attributes***

***SP 1.3 Define Project Lifecycle***

***SP 1.4 Determine Estimates of Effort and Cost***

***SP 2.1 Establish the Budget and Schedule***

***SP 2.2 Identify Project Risks***

***SP 2.3 Plan for Data Management***

***SP 2.4 Plan for Project Resources***

***SP 2.5 Plan for Needed Knowledge and Skills***

***SP 2.6 Plan Stakeholder Involvement***

***SP 2.7 Establish the Project Plan***

***SP 3.1 Review Plans that Affect the Project***

***SP 3.2 Reconcile Work and Resource Levels***

***SP 3.3 Obtain Plan Commitment***

# Function Points can contribute to the following highlighted PMC practices

## ***Project Monitoring and Control (ML2, Project Management)***

***... provide an understanding of the project's progress so that appropriate corrective actions can be taken when the project's performance deviates significantly from the plan.***

***SP 1.1 Monitor Project Planning Parameters***

***SP 1.2 Monitor Commitments***

***SP 1.3 Monitor Project Risks***

***SP 1.4 Monitor Data Management***

***SP 1.5 Monitor Stakeholder Involvement***

***SP 1.6 Conduct Progress Reviews***

***SP 1.7 Conduct Milestone Reviews***

***SP 2.1 Analyze Issues***

***SP 2.2 Take Corrective Action***

***SP 2.3 Manage Corrective Action***

# **Function Points can contribute to the following highlighted IPM practices**

## ***Integrated Project Management (ML3, Project Management)***

***. . . establish and manage the project and the involvement of the relevant stakeholders according to an integrated and defined process that is tailored from the organization's set of standard processes.***

***SP 1.1 Establish the Project's Defined Process***

***SP 1.2 Use Organizational Process Assets for Planning Project Activities***

***SP 1.3 Establish the Project's Work Environment***

***SP 1.4 Integrate Plans***

***SP 1.5 Manage the Project Using the Integrated Plans***

***SP 1.6 Contribute to Organizational Process Assets***

# Function Points can contribute to the following highlighted QPM practices

## ***Quantitative Project Management (ML4, Project Management)***

***. . . quantitatively manage the project's defined process to achieve the project's established quality and process-performance objectives.***

***SP 1.1 Establish the Project's Objectives***

***SP 1.2 Compose the Defined Process***

***SP 1.3 Select the Subprocesses that Will Be Statistically Managed***

***SP 1.4 Manage Project Performance***

***SP 2.1 Select Measures and Analytic Techniques***

***SP 2.2 Apply Statistical Methods to Understand Variation***

***SP 2.3 Monitor Performance of the Selected Subprocesses***

***SP 2.4 Record Statistical Management Data***

# Function Points can contribute to Generic Practices

**GP 1.1 Perform Specific Practices**

**GP 2.1 Establish an Organizational Policy**

**GP 2.2 Plan the Process**

**GP 2.3 Provide Resources**

**GP 2.4 Assign Resources**

**GP 2.5 Train People**

**GP 2.6 Manage Configurations**

**GP 2.7 Identify and Involve Relevant Stakeholders**

**GP 2.8 Monitor and Control the Process**

**GP 2.9 Objectively Evaluate Adherence**

**GP 2.10 Review Status with Higher Level Management**

**GP 3.1 Establish a Defined Process**

**GP 3.2 Collect Improvement Information**

**GP 4.1 Establish Quantitative Objectives for the Process**

**GP 4.2 Stabilize Subprocess Performance**

**GP 5.1 Ensure Continuous Process Improvement**

**GP 5.2 Correct Root Cause of Problems**



# **Advertised Objectives of this Session**

**Why Should I Care? What are Function Points?**

**What problem(s) am I solving with Function Points?**

**What are some useful Function Point metrics? (cost per Function Point, FPPPM, cycle time)**

**How can Function Points be used before I have a stable set of requirements?**

**How can Function Points enable me to better track project progress?**

**What threads through the CMMI exist for Function Points?**

**Are cost and schedule really the most likely constraints to impair project success?**

# And we do this because . . .

**Measurements speak louder than opinions.**

**Function Points can be used for rational negotiation with customers and management (we call this insulation).**

**Unlike stock markets disclaimers, future performance can be predicted based on past performance given similar attributes.**

**Estimates can be made with higher levels of confidence than using new methods with each project.**

**You won't need to clean-up later and you won't need to be as charming! (see first comment above)**

