



# Исследование инструментов автоматизации процесса оценки программного обеспечения

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# Agenda

- **Несколько слов об известных методиках оценки**
- **Какой процесс предлагают инструменты автоматизации?**
- **Обзор инструментов**
- **Итоги и заключение**



# Несколько слов об известных методиках оценки



- **Экспертная оценка**
  - Декомпозиция
  - Wide-Band Delphi
  - По аналогии
- UseCase Points
- Functional Points
- Early Functional Points
- ...

# Как работают методы оценки?<sup>1</sup>

- **Экспертная оценка**

Expert Method Estimation Details				
Estimation Results				
Parameter	Units	Min	Avg	Max
Size	SLOC			
Effort	Man-day			
Duration	Day			

the  
good  
expert



- **Wide-Band Delphi**

- Разновидность экспертной оценки
- Несколько участников оценивают «в параллель»
- Оценка принимается, только если результаты всех участников совпали или все участники, по результатам обсуждения пришли к единому мнению.

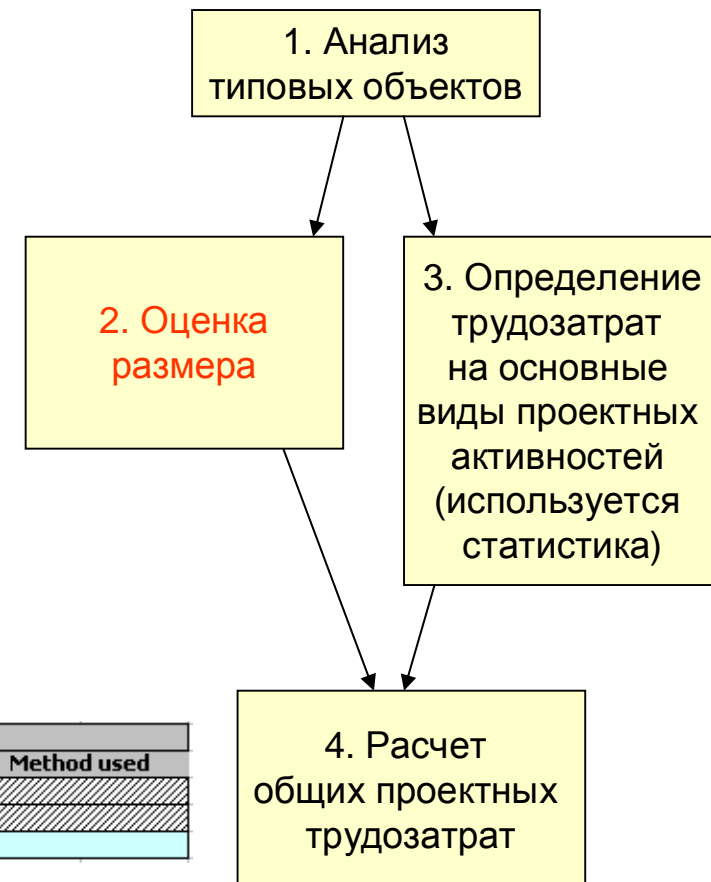
# Как работают методы оценки?<sup>2</sup>

## ■ Оценка по аналогии

"By Analogy" Method Estimation Details				
Development Project				
Indicator	Complexity			Total
	Min	Avg	Max	
System Use-Case		5		5
Report				0
External Interface (import)				0
External Interface (export)				0
UI Screens				0
Database Entity				0
Development Size (SLOCs)				2500

Project activity efforts (man-hour)				
Activity	Min	Avg	Max	Comments
Project Management	63,2	152	228,8	
Project Management Plan Elaboration	16	20	24	
Testing Strategy Elaboration				see PI PSTD-MNG-07~03
Use-Cases Requirement Preparation	40	100	160	

Estimation Results					
Parameter	Units	Min	Avg	Max	Method used
Size	SLOC		5000		
Effort	Man-day	47,4	114	171,6	
Duration	Day				



# Как работают методы оценки?<sup>3</sup>



- Use Case Points

Actors		
#	Actor	Complexity
1		
2		
3		

Use Cases		
#	Use Case	Complexity
1		
2		
3		

Technical Factors		
#	Description	Influence
T1	Distributed system	
T2		
T3		

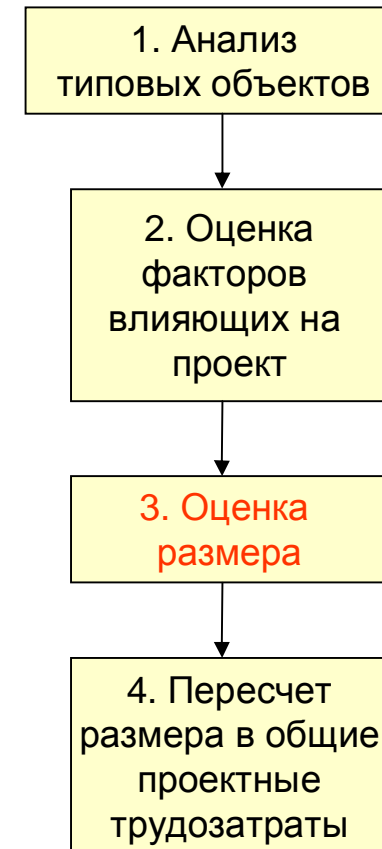
Environment Factors		
Factor number	Description	Complexity
E1	Familiar with the Software Development Methodology that is used	
E2	Application experience	
E3	Object-oriented experience	

Summary		
#	Item	Value
	UUCP	0,0
	TCF	0,6
	EF	1,4
	UCP	0,0
	Man-hours per UCP	32,0

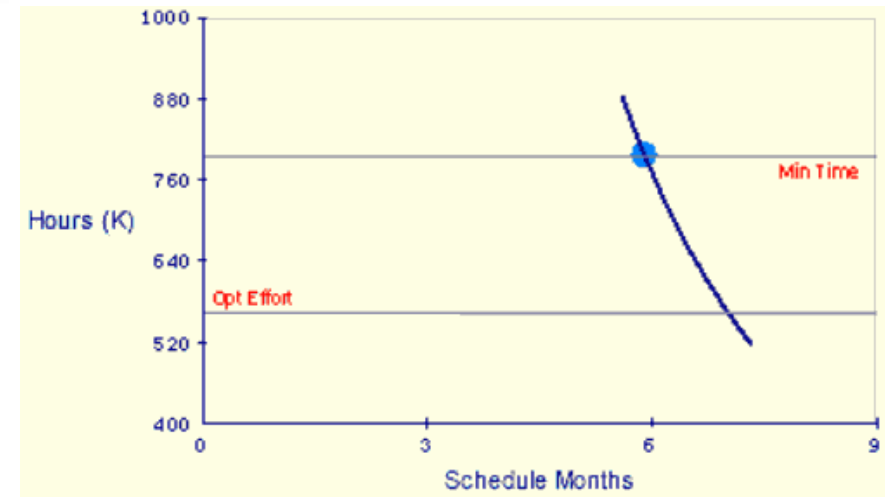
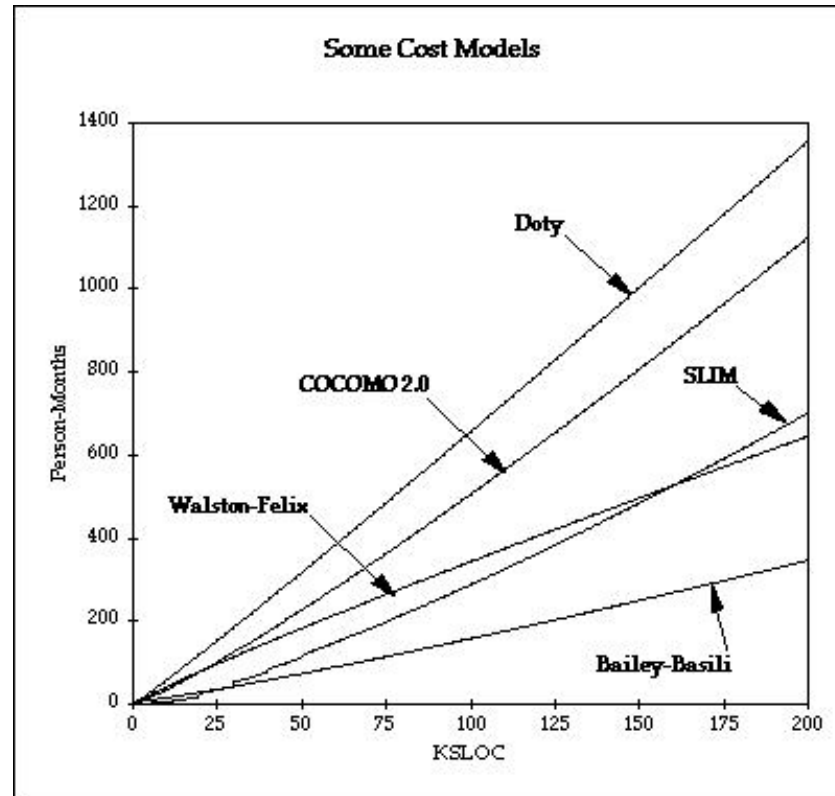
  

Estimation Results				
Parameter	Units	Min	Avg	Max
Size	SLOC			
Efforts	Man-day		0	
Duration	Day			





# Как работают мат. модели?

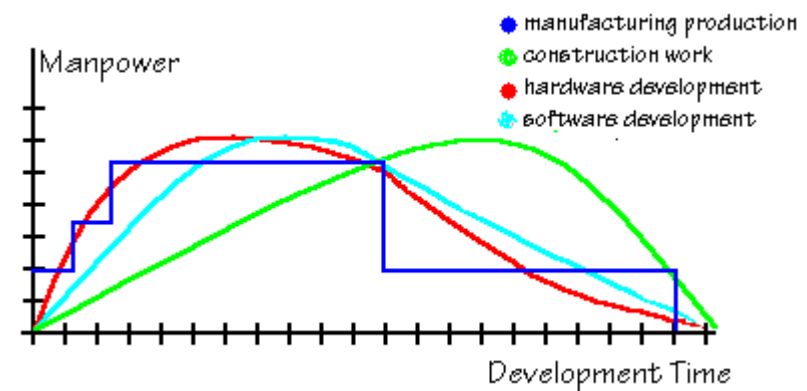


$$\text{Effort} = a (\text{KSLOC})^b$$

$$\text{Schedule} = 2.5 \text{ Effort}^c$$

Organic:  $a=2.4, b=1.05$   
 Semidetached:  $a=3.0, b=1.12$   
 Embedded:  $a=3.6, b=1.20$

Organic:  $c=0.38$   
 Semidetached:  $c=0.35$   
 Embedded:  $c=0.32$



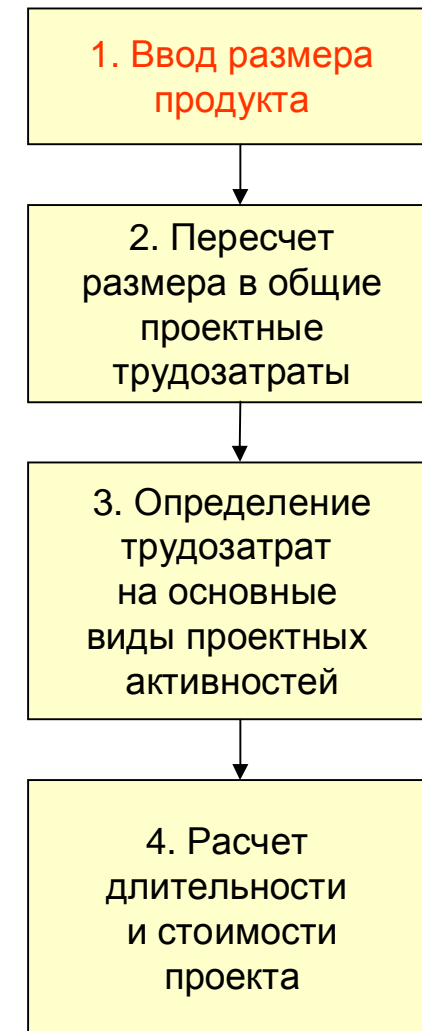
# Какой процесс предлагают инструменты автоматизации?

- Практически все инструменты используют концепцию «размер-трудозатраты»:

- SLIM-Estimate
- ConstruxEstimate
- CoStar
- CostXpert
- KnowledgePlan
- SEER-SEM



- И только один инструмент Circa – использует другой подход





# SLIM-Estimate



# SLIM-Estimate



- **Версия: 2008 год**
- **Стоимость: 3000\$ for evaluation license (60 days); 12500\$ - лицензия на год.**
- **Кол-во факторов модели: 5**
- **Вход: размер в элементах GUI , функциональных точках, объектных точках, SLOC-ах.**
- **Выход: трудозатраты, длительность, ресурсы, стоимость + сильные средства графического анализа.**
- **Отчетность: да**
- **Возможность настройки под статистику компании: да**
- **Модель расчета затрат: SLIM (Lawrence Putnam)**

# SLIM-Estimate



**Ecommerce.sew - SLIM-Estimate**

File Edit View Estimate History SolutionLog Run Help

<Current> Current Solution

**Compare Estimates to Historical Data**

**Life Duration (Months) vs Effective Obj**

**Life Effort (MM) vs Effective Obj**

**Errors SIT-FOC vs Effective Obj**

**Life Peak Staff (People) vs Effective Obj**

**SOLUTION PANEL <Current Solution>**

	C&T	Life Cycle	
Duration	12.7	15.9	months
Effort	83	101	MM
Cost	833	1011	\$(K)
Peak Staff	8.9	8.9	people
MTTD	1.2	3.0	Days
Start Date	02/08/2001	01/01/2001	
<b>PI=15.1 MBI=1.9 Eff Obj=274</b>			

**Solution Comparison Life Duration (Months)**

Current Solution  
 Quick Estimate Used ...  
 Peak Staff = 12 People  
 Productivity Required ...  
 Functionality that Fits ...  
 Balanced Probabilities ...  
 LC Time = 12 month ...  
 LC Cost = 1500 \$ Y ...  
 Peak Staff = 20 ppl ...  
 Life MBI = 3 Days (A ...  
 PI = 17.3 (Auto) ...  
 Size = 140 (Auto) ...  
 PI = 16.3, Size = 183 (...)

■ Current Solution   
 ● Logged Solutions   
 ● Historical Projects   
 — Commerce Division Trends   
 — Avg. Line Style   
 — 1 Sigma Line Style   
 - - - 3 Sigma Line Style

**Return To Menu**  
**Continue**  
**Pause**  
**Back**  
**Forward**  
**Exit**

Section 2 - View 12

# Constux Estimate v 2.0



# Constux Estimate v 2.0



- **Версия:** 2001 год
- **Стоимость:** Freeware
- **Кол-во факторов модели:** 27+
- **Вход:** размер в системах/подсистемах, элементах GUI, функциональных точках, функциях, SLOC-ах.
- **Выход:** трудозатраты, продолжительность, стоимость (номинальные и оптимальные расчеты)
- **Отчетность:** да, выгрузка в текстовый файл
- **Возможность настройки под статистику компании:** да
- **Модель расчета затрат:** гибридная (SLIM + COCOMO II)

# Constux Estimate v 2.0



**Multiple Module Scope Estimate**

Modules:

- Business Layer -- 36 582 loc
- Client Scripting -- 33 333 loc
- Server Processing -- 15 667 loc
- UI Layer -- 15 560 loc

Basic Scope Estimate    Module Name: Business Layer  
 Function Points Estimate  
 GUI Components Estimate

**Basic Scope Estimate**

Size Estimate

Kind of Units: Lines of Code

Units:	Low Estimate	Expected
	24 000	32 000

If using low and high fields, estimate size so there is < 5% difference between project will be less than the "Low Estimate" and < 5% more than the "High Estimate."

Programming Language: JavaScript

Enter scope information for the project.

**Function Points Scope Estimate**

Influence Multiplier: 0 - 5

General Information

Programming Language: Microsoft Visual C++ (using wizard)

Estimate Accuracy: ± 25 %

Function Points Count

	Low Complexity	Medium Complexity	High Complexity
Inputs:	15	45	10
Outputs:	8	20	5
Inquiries:		10	6
Internal Files:		6	3
External Interfaces:	9	36	15

Unadjusted Function Point Total: 1 080

**Total Function Points: 907**

Influence Multiplier Descriptions

Scores: 0-No influence; 1-Insignificant influence;

**GUI Components Scope Estimate**

Dialogs | Windows | Reports/Outputs | Data Files | External Interfaces

Number of message boxes:    Warnings, notification messages, hooks to help files, etc.

Number of simple dialogs:    Yes/no/cancel dialogs, dialogs with only one edit field, menu selections, etc.

Number of average dialogs:    File-open, file-save, each tab in a tabbed dialog, and other dialogs of average complexity

Number of complex dialogs:    Modeless dialogs, highly interactive dialogs, etc.

Programming Language: \_\_\_\_\_

Ready



# Constux Estimate v 2.0



**Planning Assumptions**

Schedule Information

Current Project Phase: Detailed Requirements / UI Design Complete

Design Start Date: Start of Feasibility Study

Estimate covers the portion of the project from the start of customer acceptance. Design is completed and design is being implemented. For iterative lifecycles, use the following phases:

- Start of Feasibility Study
- Feasibility Study / Product Concept Complete
- General Requirements Complete
- Detailed Requirements / UI Design Complete
- High-Level Design Complete
- Detailed-Design Complete
- Feature Complete / Code Complete
- Start of User-Oriented System Test (beta test)

Estimate Confidence Level

Confidence level: Normal - Recommended scenario

Estimate uses Monte Carlo simulations to create many possible scenarios for your project's estimate. Adjusting the confidence level changes where in the distribution of scenarios Estimate selects the Nominal Plan. The higher the confidence level, the less likely the estimate will be larger than Estimate's prediction for the Nominal Plan. Use this feature with care.

Hourly Labor Rates

General  Detailed

Detailed Hourly Rate

Technical Staff: 85

QA Staff: 85

Project Management: 110

General Hourly Rate

General Rate: 0

What If OK Cancel

Ready

**Calibrate Productivity**

Project Type: Intranet Systems (internal) Project Subtype: <no type>

Product Attributes

Reliability Requirements: Intranet Systems (internal) Moderate, recoverable loss

Database Size: Real-time embedded / Avionics <100K < 10 (small database)

Complexity: Simple

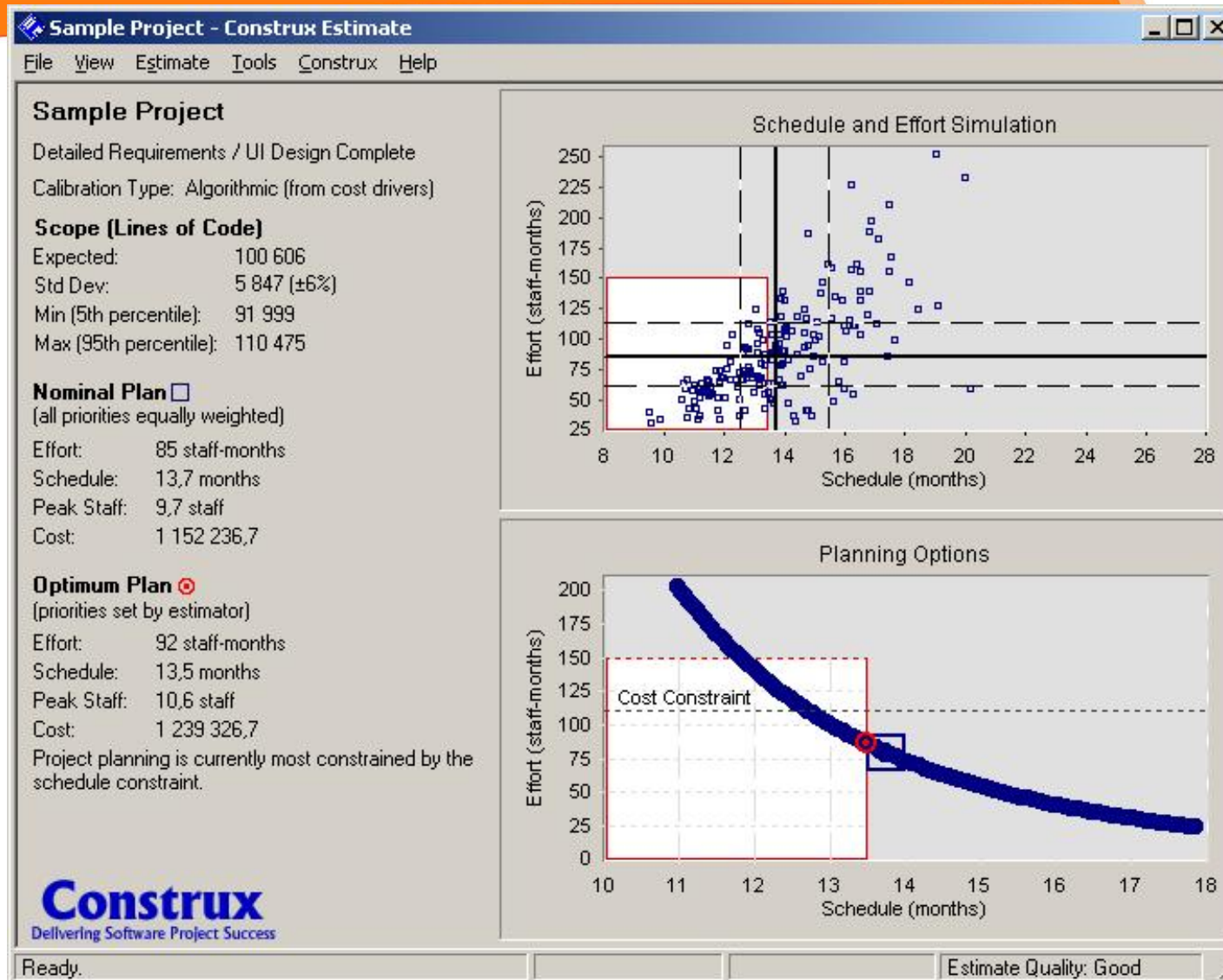
Execution Time Constraint: Program uses <= 50% of available execution time (nominal)

Storage Constraint: Program uses <= 50% of available storage (nominal)

Precedentedness of Application: Largely familiar

What If OK Cancel

# Constux Estimate v 2.0



# Costar 7.0



# Costar 7.0



- **Версия**: 2004 год
- **Стоимость**: single license - 1900\$, site license 5000\$, corporate 25000
- **Кол-во факторов модели**: 22
- **Вход**: размер в функциональных точках, SLOC-ах.
- **Выход**: трудозатраты, продолжительность, стоимость.
- **Отчетность**: да, выгрузка в формат MS Excel
- **Возможность настройки под статистику компании**: да
- **Модель расчета затрат**: COCOMO II



# Costar 7.0



★ Costar - Estimate1 (Component1)

File View Reports Components Tools Preferences Help

Estimate: Estimate1 ID: Model: COCOMO II 2000

Component: Component1 ID: Increment: 1

ACT ARC CBR CDR CMP CST DET EBR EFF EGS GCS GMI GST IDT ISM MSZ NAM SCH SIZ SSM STR

Totals for entire Project		Effort (PM)	Duration (Mo)	Cost (K\$)	Productivity	Equivalent Size
Requirements	RQ:	0.0	0.0	0.0		Total Size: 0
Development	PD+DD+CT+IT:	0.0	0.0	0.0	0.0	
Total	RQ+PD+DD+CT+IT:	0.0	0.0	0.0	0.0	

COCOMO II Cost Drivers for Component: Component1

**Personnel**

ACAP... Nominal

APEX... Nominal

PCAP... Nominal

PLEX... Nominal

LTEX... Nominal

PCON... Nominal

**Platform**

TIME... Nominal

STOR... Nominal

PVOL... Nominal

**Product**

RELY... Nominal

DATA... Nominal

CPLX... Nominal

RUSE... Nominal

DOCU... Nominal

**Project**

TOOL... Nominal

SITE... Nominal

SCED... Nominal

**Size Summary**

Size:

Method: SLOC

**User Defined**

USR1... Undefined

USR2... Undefined

USR3... Undefined

USR4... Undefined

Drivers & Size / Model / REVL / Reuse / Function Points / Increments / Breakage / Costs / Rates / Maint. / Filter / Descr.

Estimate1: 0.0 PM, 0.0 Months    Component1: 0.0 PM    Level: 1

# CostXpert v3.5





# CostXpert v3.5



- **Версия:** 2008 год
- **Стоимость:** price for one license is 2250 EUR; annual Service Contract to get all updates, upgrades, bug-fixes, support is 720 EUR per license.
- **Кол-во факторов модели:** 56+
- **Вход:** размер в функциональных точках, SLOC-ах, элементах GUI, Domino points, Feature Points...
- **Выход:** трудозатраты, продолжительность, стоимость.
- **Отчетность:** да, выгрузка в формат MS Project
- **Возможность настройки под статистику компании:** да
- **Модель расчета затрат:** COCOMO II-based

# CostXpert v3.5



**Cost Xpert 3.5**

File Edit Reports Maintain Wizards Tools Help

Project | Sizing | Environment | Quality & Risk | Results

Project Name: CX Sample Project 3.5

Start Date: 1/17/2006

**Project Method**  
Select the "Project Type", the "Lifecycle" and the development "Standard" that will be used on this project.

Project Type: Internet - Web

Lifecycle: Rational Unified Process

Standard: MBASE

**Project Memo**  
Enter a brief description for this project; including the modules that will be developed and/or any assumptions that have been made.

Sample Cost Xpert 3.5 Project

Method | Financial Parameters | Labor Rates | Development Environment | Actuals | Contact Info

CX Sample Project 3.5      Effort: 202.9 Person-months      Schedule: 25.7 Months      Cost: \$3,649,213.11

# CostXpert v3.5



Cost Xpert 3.5

File Edit Reports Maintain Wizards Tools Help

Project Sizing Environment Quality & Risk Results

Project Name: CX Sample Project 3.5

Start Date: 17.01.2006

**Rates per Labor Category**  
Enter the hourly rate for each labor category. Each category represents a specific job function performed on the project, which may be fulfilled by one or more individuals.

Strategists	110,00\$ per hour	Test/QA	90,00\$ per hour
Analysts	100,00\$ per hour	Copywriters	70,00\$ per hour
Designers	110,00\$ per hour	Art & Media	70,00\$ per hour
Programmers	85,00\$ per hour	Management	120,00\$ per hour

Method Financial Parameters Labor Rates Development Environment Actuals Contact Info

CX Sample Project 3.5 Effort: 297,6 Person-months Schedule: 17,4 Months Cost: 5 225 842,70\$

# CostXpert v3.5



Cost Xpert 3.5

File Edit Reports Maintain Wizards Tools Help

Project Sizing Environment Quality & Risk Results

New  Reused  COTS

Equivalent SLOC: 41220 Equivalent UML Class Method: 229

Metric	Best	Expected	Worst	Mean	Equiv. Pts	Std. Dev.
Class - Control	30	35	70	40	20	6.67
Class - Interface	25	25	25	25	7.75	0
Class - Other	28	32	36	32	8	1.33
Logical Internal Tables	40	47	49	46.17	69.25	1.5
Methods	1,000	1,000	1,200	1,033.33	124	33.33

Save Undo

Hint

Enter your best, expected, and worst case estimate of the number of control classes. Control classes represent coordination, sequencing, transactions, and other event control mechanisms.

MK II Function Pts Object Metrics UML Class Method UML Use-Case Pts Bottom Up Top Down

SLOC Capability Requirements Domino Points Fast Function Points Feature Points GUI Metrics Internet Points

CX Sample Project 3.5 Effort: 202.9 Person-months Schedule: 25.7 Months Cost: \$3,649,213.11

# CostXpert v3.5



Cost Xpert 3.5

File Edit Reports Maintain Wizards Tools Help

Project Sizing Environment Quality & Risk Results

Method Effort (PM) Schedule (Mth)

<input checked="" type="checkbox"/> SLOC	248,3	16,3
<input checked="" type="checkbox"/> Capability Requirements	350,9	18,4
<input checked="" type="checkbox"/> Domino Points	295,7	17,3
<input checked="" type="checkbox"/> Fast Function Points	343,2	18,3
<input checked="" type="checkbox"/> Feature Points	290,9	18,3
<input checked="" type="checkbox"/> GUI Metrics	292,8	18,3
<input checked="" type="checkbox"/> Internet Points	281,4	18,3
<input checked="" type="checkbox"/> MK II Function Pts	280,0	18,3
<input checked="" type="checkbox"/> Object Metrics	279,4	18,3
<input checked="" type="checkbox"/> UML Class Method	274,4	18,3
<input checked="" type="checkbox"/> UML Use-Case Pts	317,6	18,3

Effort and Schedule

**Effort** 297,6 Person-Months

**Schedule** 17,4 Months

Effort in Person-Hours 45 242,4

Project Start Date 17.01.2006

Project End Date 29.06.2007

Calendar Duration 528 days

Number of Work Days 378 days

Summary WBS Risks Labor Maintenance Deliverables

CX Sample Project 3.5 Effort: 297,6 Person-months

Phase Types Gantt

MPX CSV XLS PDF HTML XHTML

Index	Name	Percent	Effort (Person-hrs)	Cost	Start Date	End Date	Duration	Work Days	Included
30	Beta release coding	1,46	660,5 h	61 153,05	15.03.2007	30.03.2007	15 days	11 days	<input checked="" type="checkbox"/>
30.1	(DOC) Release Descrip	0,00	0,0 h	0,00	15.03.2007	30.03.2007	15 days	11 days	<input type="checkbox"/>
30.2	(Average development €	1,46	660,5 h	61 153,05	15.03.2007	30.03.2007	15 days	11 days	<input type="checkbox"/>
31	Component maintenance	1,46	660,5 h	61 153,05	30.03.2007	13.04.2007	14 days	11 days	<input checked="" type="checkbox"/>
31.1	(Average development €	1,46	660,5 h	61 153,05	30.03.2007	13.04.2007	14 days	11 days	<input type="checkbox"/>
32	Initial release assessment	2,56	1158,2 h	106 724,90	26.02.2007	23.03.2007	25 days	20 days	<input checked="" type="checkbox"/>
32.1	(DOC) Peer Review Pla	0,00	0,0 h	0,00	26.02.2007	23.03.2007	25 days	20 days	<input type="checkbox"/>
32.2	(Average development €	2,56	1158,2 h	106 724,90	26.02.2007	23.03.2007	25 days	20 days	<input type="checkbox"/>
33	Alpha release assessment	1,41	637,9 h	58 782,07	15.03.2007	29.03.2007	14 days	10 days	<input checked="" type="checkbox"/>
33.1	(DOC) Peer Review Rej	0,00	0,0 h	0,00	15.03.2007	29.03.2007	14 days	10 days	<input type="checkbox"/>
33.2	(Average development €	1,41	637,9 h	58 782,07	15.03.2007	29.03.2007	14 days	10 days	<input type="checkbox"/>
34	Beta release assessment	1,41	637,9 h	58 782,07	30.03.2007	13.04.2007	14 days	10 days	<input checked="" type="checkbox"/>
34.1	(DOC) Regression Tes	0,00	0,0 h	0,00	30.03.2007	13.04.2007	14 days	10 days	<input type="checkbox"/>
34.2	(Average development €	1,41	637,9 h	58 782,07	30.03.2007	13.04.2007	14 days	10 days	<input type="checkbox"/>
35	Develop User Manual	4,38	1981,6 h	183 459,14	13.04.2007	27.05.2007	44 days	31 days	<input checked="" type="checkbox"/>
35.1	(DOC) Software Users I	0,00	0,0 h	0,00	13.04.2007	27.05.2007	44 days	31 days	<input type="checkbox"/>
35.2	(DOC) Training Materia	0,00	0,0 h	0,00	13.04.2007	27.05.2007	44 days	31 days	<input type="checkbox"/>
35.3	(DOC) System and Soft	0,00	0,0 h	0,00	13.04.2007	27.05.2007	44 days	31 days	<input type="checkbox"/>
35.4	(Average development €	4,38	1981,6 h	183 459,14	13.04.2007	27.05.2007	44 days	31 days	<input type="checkbox"/>
36	Transition phase mgmt & cor	1,81	816,6 h	76 181,37	27.05.2007	14.06.2007	18 days	13 days	<input checked="" type="checkbox"/>
36.1	(DOC) Transition Plan	0,00	0,0 h	0,00	27.05.2007	14.06.2007	18 days	13 days	<input type="checkbox"/>
37	Environment maintenance	0,82	414,0 h	38 618,26	27.05.2007	05.06.2007	9 days	6 days	<input checked="" type="checkbox"/>
38	Requirements maintenance	1,66	751,0 h	70 061,53	27.05.2007	12.06.2007	16 days	12 days	<input checked="" type="checkbox"/>
39	Design maintenance	2,33	1054,1 h	98 339,38	27.05.2007	19.06.2007	23 days	16 days	<input checked="" type="checkbox"/>
40	Component maintenance(2)	3,30	1493,0 h	139 278,95	27.05.2007	29.06.2007	33 days	24 days	<input checked="" type="checkbox"/>
41	Product release assessmen	1,49	674,1 h	63 584,47	27.05.2007	11.06.2007	15 days	10 days	<input checked="" type="checkbox"/>

Summary WBS Risks Labor Maintenance Deliverables

CX Sample Project 3.5 Effort: 297,6 Person-months Schedule: 17,4 Months Cost: 5 225 842,703.

# KnowledgePLAN 4.1



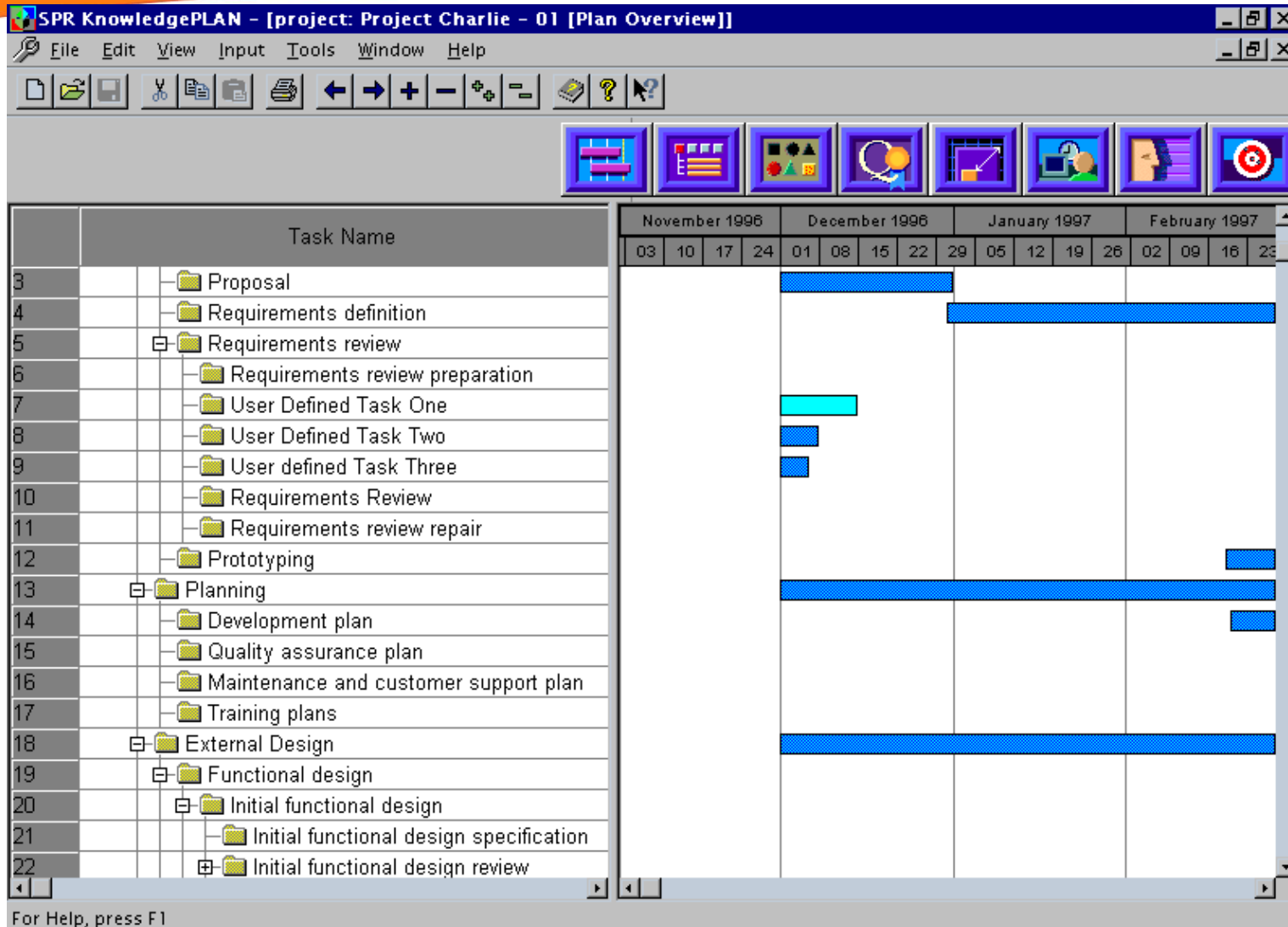


# KnowledgePLAN 4.1



- **Версия:** 2005 год
- **Стоимость:** single license - 10000 EUR, site license **на 25 человек** – 99000 EUR.
- **Кол-во факторов модели:** 16+
- **Вход:** размер в функциональных точках, SLOC-ах, SPR Feature Points, user-defined единицы.
- **Выход:** трудозатраты, продолжительность, стоимость.
- **Отчетность:** да, используется Crystal Reports; **выгрузка в формат MS Project**
- **Возможность настройки под статистику компании:** да
- **Модель расчета затрат:** закрыта (возможно по ист. данным)

# KnowledgePLAN 4.1



Circa 7.0



# Circa 7.0



- **Версия: 2008 год**
- **Стоимость: fixed single - 975 USD, floating – 3915 USD.**
- **Кол-во факторов модели: 5+**
- **Вход: UseCases, Classes, SubSystem, Components, Interfaces, Web-pages, Scripts, Packages.**
- **Выход: трудозатраты.**
- **Отчетность: да, экспорт в MS Excel; экспорт в формат MS Project.**
- **Возможность настройки под статистику компании: да**
- **Модель расчета затрат: ObjectMetrics**

# Circa 7.0



**Circa - [Car Rental]**

File Project Edit View Software Production Personnel Risks Defects Metrics Process Schedule Help

**Project Browser**

- Software
  - Class
    - Bill statement
    - Customer
    - Customer
    - Hire
    - Hire record
    - Hire schedule
    - Inventory
    - Payment details
    - Quotation
    - Service history
    - Special offer
    - Vehicle
    - Vehicle
  - Class <<GUI>>
  - Component
  - Interface
- Production
- Personnel
- Risks
- Defects

**Navigator**

Welcome to Circa - Advanced Project Management

Manage the entire Application Development Lifecycle, from detailed specification of business requirements to the delivery of high-quality software solutions - on time and on budget.

- Project Settings and Terms of Reference
- Requirements and Application Scope
- Creative Content and Production Artifacts
- Personnel and Team Organisation
- Risk and Contingency Control
- Estimation and Progress Monitoring
- Process Planning and Task Scheduling
- Defect Logging and Tracking
- Metrics and Technology Settings
- Management Information Reports

Getting Started with Circa

**Project Details**

Name	Description	Priority	Size	Complexity
Customer details screen		1	Large	Difficult
Hire details screen		1	Large	Difficult
Inventory screen		1	Large	Difficult
Payment processing scr...		1	Large	Difficult
Vehicle records screen		1	Large	Difficult

**Process Details**

Name	Description	Sequence	Priority	Effort
Entire Project		--	--	
Process		--	--	
Unscheduled Work		--	--	

file:///C:/Program%20Files/Tassc/Circa/Navigator/software.htm

CAP NUM SCRL

# SEER-SEM





# SEER-SEM



- **Версия: 2007 год**
- **Стоимость: лицензия на рабочее место - 2000 usd, корпоративная лицензия 29500 usd.**
- **Кол-во факторов модели: 25+**
- **Вход: размер в SLOC-ах, функциональных точках, use case-ах, объектах, features-ах, user-defined единицах.**
- **Выход: трудозатраты, стоимость, длительность.**
- **Отчетность: да; экспорт в формат MS Project.**
- **Возможность настройки под статистику компании: да**
- **Модель расчета затрат: SEER-SEM**

# SEER-SEM



Trading.PRI - SEER-SEM

Project WBS

- 1 Σ Trading Support System
  - 1.1 Σ New York Hemisphere
    - 1.1.1 Analyst Support
      - 1.1.1.1 Analysis and Query Tools
      - 1.1.1.2 Screen Interface Library
    - 1.1.2 Vendor Data Mining Solution
      - 1.1.2.1 Interfacing Software (Glue)
      - 1.1.2.2 Off-The-Shelf Cognition
      - 1.1.2.3 COTS component
    - 1.1.3 Trading Support
      - 1.1.3.1 "Tactician"
        - 1.1.3.1.1 GAUSS Interface
        - 1.1.3.1.2 GAUSS Glue Code
        - 1.1.3.2 "Strategician"
    - 1.1.4 Client-Server Support Infrastructure
    - 1.1.5 Report System (SQL)
  - 1.2 Σ Chicago Hemisphere
    - 1.2.1 Prices Database
    - 1.2.2 Intranet Library (Perl)

Parameters - Program Trading Support

Programmer's Language Experience	Nom	Hi	VHi
Development System Experience	Nom	Nom	Nom
Target System Experience	Nom	Nom	Nom
Practices & Methods Experience	Nom	Hi	VHi
<b>- DEVELOPMENT SUPPORT ENVIRONMENT</b>			
Modern Development Practices Use	Nom-	Nom	Nom+
Automated Tools Use	Nom	Nom+	Hi
Turnaround Time	VLo	Low-	Nom
Response Time	Low-	Hi-	Hi
Multiple Site Development	Nom	Nom	Nom
Resource Dedication	Nom	Nom	Nom
<b>Resource and Support Location</b>			
Resource and Support Location	Nom	Nom	Nom
Development System Volatility	Nom	Nom	Nom
Process Volatility	Low	Low+	Nom
<b>- PRODUCT DEVELOPMENT REQUIREMENTS</b>			
Requirements Volatility (Change)	Nom	Nom	Hi
Specification Level - Reliability	VLo	Low	Low+
Test Level	Nom	Nom	Nom+
Quality Assurance Level	VLo	VLo	VLo+
Reheat from Development to Target	Nom	Nom	Nom+

Views

- FAVORITES
- SPECIFY SIZING ASSUMPTIONS
- SPECIFY PROJECT ASSUMPTIONS
- SPECIFY PRODUCTIVITY ASSUMPS
- ANALYSIS & TRADE-OFFS
- SEER-SEM CLASSICS
- PPMC
- PROJECTMASTER
- OSM Trade
- Maintenance

Quick Estimate

	Program: Trading Support Estimate	Program: Trading Support Reference	Diff.
Development Schedule Months	11.34	11.12	2%
Development Effort Months	37.44	35.24	6%
Development Effort Hours	5,690	5,357	6%
Development Base Year Cost	651,402	613,250	6%
Cost of Ownership	651,402	613,250	6%
Defect Prediction	20	26	-23%
Constraints	MIN TIME	MIN TIME	



# Итоги...



- 1) Средняя стоимость single лицензии в год составляет USD 5550/год (ценовой диапазон от USD 975 до 13000).
- 2) Любой тул представляет из себя серый ящик, на вход которого подается предполагаемый размер программного продукта. Это может быть как размер в строках кода, так и в других единицах (Functional Points, Feature Pomits, компонентах UI, функциях и т.д). Большинство инструментов, в конечном счете, пересчитывают размер в строки кода. Точность оценки на входе, в большинстве своем, определяет точность оценки на выходе.
- 3) Строки кода пересчитываются в общие проектные трудозатраты, вычисляется время требуемое на разработку продукта. Используются уравнения моделей COCOMO II, SLIM, SEER-SEM и гибридные. Для всех уравнений задаются поправочные (калибровочные) коэффициенты. Для проектов небольшого размера, при сходных настройках - все модели выдают близкие результаты.

# Итоги...



- 4) Трудозатраты бьются на конкретные работы. В основном используются исторические данные. В некоторых тулах, перед оценкой, можно настроить жизненный цикл проекта, обозначить основные проектные активности и их веса. В этом случае на выходе тул выдаст структуру работ Work Breakdown Structure. Иногда её можно экспортировать в формат MS Project. Кроме этого можно создать большое количество отчетов. Нельзя говорить, что эти операции существенно экономят время по сравнению с ручной разбивкой и подготовкой плана-графика проекта, но все же - экономия.
- 5) Стоимость проекта рассчитывается исходя из стоимости человека-часа для основных проектных ролей (задается в настройках). В инструментах автоматизации понравилось то, что можно задавать ограничения проекта по кол-ву людей/длительности и мгновенно смотреть как играет стоимость.

# Заключение



- Ни один estimation tool не даст гарантий точности, если недостаточно времени/опыта для правильного определения размера предполагаемого продукта.
- Для эффективного использования таких инструментов нужно понимание устройства выбранной оценочной модели. Очень важен практический опыт её использования, включая сравнительный анализ сделанных оценок с фактическими данными полученными по результатам выполнения проекта.

# Вопросы?





# Спасибо за внимание!

**Артём А. Бабамуратов,**  
ababamuratov@luxoft.com  
Process Architect,  
Luxoft.

Back ups...



**New Project Options**

Project Environment Options

QSM Defaults

Import settings from existing template.

---

Solution Options

Detailed Input Method  
This method creates a more detailed estimate. It allows you more control over the project description and solution assumptions.

**Quick Estimate Wizard**  
This method generates a basic estimate that is available. It requires the least amount of input.

Solve for PI Wizard  
This method allows you to input the size, time, SLIM-Estimate will determine the Productivity Index.

Solve for Size Wizard  
This method will generate an approximate size (or peak staffing) and PI.

Create Solution from History  
Use this method to create a solution based on previous projects.

**Quick Estimate Wizard: Step 4 of 5 - PI**

Do you know your anticipated PI?

No, calculate a PI value based on my application mix, my size estimate, and the following assessment of my development environment.

Starting: 18.5  
(based on QSM 1999 Business reference data)

1. How good are the tools & methodologies that will support this development process?  -0.7

2. How would you rate the technical complexity of this project?  -1.6

0.0

Modified code adjustment: 0.0

Final PI: 16.3

**Quick Estimate Wizard: Step 3 of 5 - System Size**

Total system size

Can you estimate your total system size?

No, calculate an estimate based on my intuitive assessment of the total system size in Objects and the QSM historical database of sizes for this type of application.

Size:

Very Small   Small   Medium   Medium Large   Large   Very Large

Yes, use this estimate of the final system size.  
Enter the total system size in Objects

---

New and modified breakouts

What % of the total system is completely new code?  %

What % of the total system is existing code that requires modification?  %

If new and modified % total less than 100%, remaining % will be assumed to be reused, unmodified code. The default PI will be adjusted to reflect the amount of reused code.

# SLIM



**Ecommerce.sew\* - SLIM-Estimate**

File Edit View Estimate History SolutionLog Run Help

<Current> Quick Estimate Wizard Solution

**Staffing & Probability Analysis**

**Monthly Avg Staff (people)**  
 <Quick Estimate Wizard Solution>

View Plans, Adjust Plans, and Log Solutions.

**RISKGUAGE <Quick Estimate Wizard Solution>**

Duration ↓ Cost ↓ Peak Staff ↓ Quality ↓

LC Time <= 12 months LC Cost <= 1500 \$K  
 Peak Staff <= 20 ppl Life Mttid >= 3 Days

**SOLUTION PANEL <Quick Estimate Wizard Solution>**

	C&T	Life Cycle	
Duration	12.0	15.0	months
Effort	106	129	MM
Cost	1061	1289	\$(K)
Peak Staff	12.0	12.0	people
MTTD	0.9	2.2	Days
Start Date	02/05/2001	01/01/2001	
<b>PI=15.1 MBI=2.5 Eff Obj=274</b>			

**CONTROL PANEL <Quick Estimate Wizard Solution>**

PI: 15.1, 9.1, 21.1  
 Peak Staff: 12.0, 0.5, 23.9  
 Eff Obj: 274, 4, 549

Return To Menu  
 Continue  
 Pause  
 Back  
 Forward  
 Exit

Section 1 - View 2

**Solution Assumptions** [X]

Basic Info | Phase Tuning | Accounting

**Phases**

Project Start Date:

CD      
  
 R&D      
  
 C&T      
  
 WARTY     

**Defect Tuning Factor**

Total defect tuning factor:  %

**Expected Total Size**

Total Obj:       New %: 
  
Gearing Factor:       Mod %: 
  
Reused %: 
  
      Eff Obj: 274

**Uncertainty Range**

     99% Eff Range: 192 to 356

**PI**

Expected PI:      

**Uncertainty Range**

     99% Range: 14.4 to 15.8

**Solution Method**

Unconstrained (QSM Default Solution)
  
 Design to Input (design a solution to meet a single input value)
  
 Constrained Solution (find best solution that meets my constraints)

Select parameter:       Goal:

# SLIM

**Select Sizing Technique** [X]

<input type="radio"/> Sizing by History	Use this technique to obtain an initial "ballpark" estimate based on the average sizes of the various application types in the QSM historical database.
<input type="radio"/> Total system mapping	Use this technique to map the total system to a single functional unit such as number of requirements.
<input type="radio"/> GUI Sizing	Use this technique to break the system into its GUI (Graphical Interface) components.
<input type="radio"/> Sizing by decomposition	Use this system to break the system into logical subsystems or modules...
<input type="radio"/> Function point sizing	This technique is based on the standard IFPUG method of defining the number of function points in the system.

Create from a Slim-compatible Excel Spreadsheet

<input checked="" type="radio"/> Excel Spreadsheet	<input type="button" value="Browse..."/>
--	--



# SLIM



Microsoft Excel - B2BObjects.xls

File Edit View Insert Format Tools Data Window Help

Formula Bar: =IF(LEN(D17)>0,CONCATENATE(\$C\$8,"",B17), "")

## GUI Sizing

Calculated Results (Objects)

Expected Total: 372  
Sigma: 19  
99% Range: 314 to 429

Function Unit:

#	Component Name	Gearing Factor (Objects/Component)			Components			Exp	Sigma	Sigma Squared
		Low	Likely	High	Low	Likely	High			
1	Simple Tables	1	1	1	5	6	9	6	1	0.44
2	Average tables	1	2	3	4	5	6	10	2	3.23
3	Simple Forms	3	5	8	1	3	5	16	4	18.42
4	Average Forms	4	6	8	5	8	10	47	7	52.68
5	Complex Forms	5	7	10	4	6	8	43	7	48.14
6	Simple Queries	2	2	3	8	10	12	22	2	4.88
7	Average Queries	3	4	6	8	10	12	42	6	32.83
8	Simple Reports	2	3	4	10	15	20	45	7	50.31
9	Average Reports	3	5	7	5	10	15	50	11	115.12
10	Complex Reports	4	6	8	3	5	7	30	5	27.31
11	Simple Macros	1	1	1	25	30	35	30	2	2.78
12	Average Macros	1	3	3	8	10	15	32	4	12.25
13								0	0	0.00
14								0	0	0.00
15								0	0	0.00

Return To Menu

Continue

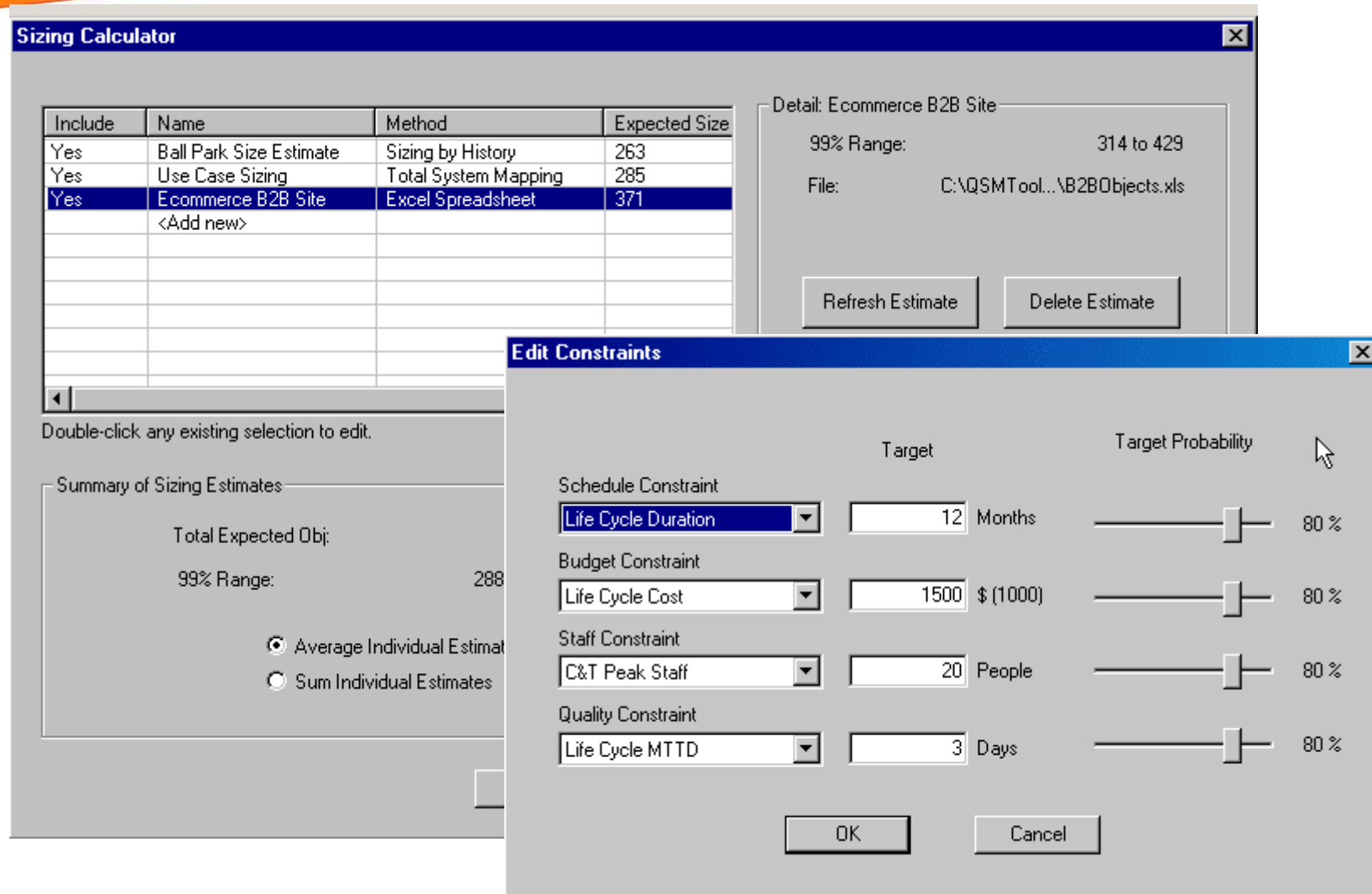
Pause

Back

Forward

Exit

# SLIM



**Sizing Calculator**

Include	Name	Method	Expected Size
Yes	Ball Park Size Estimate	Sizing by History	263
Yes	Use Case Sizing	Total System Mapping	285
Yes	Ecommerce B2B Site	Excel Spreadsheet	371
	<Add new>		

Detail: Ecommerce B2B Site

99% Range: 314 to 429

File: C:\QSMTool...\B2BObjects.xls

Refresh Estimate Delete Estimate

Double-click any existing selection to edit.

Summary of Sizing Estimates

Total Expected Obj: 288

99% Range: 288

Average Individual Estimates  
 Sum Individual Estimates

**Edit Constraints**

	Target	Target Probability
Schedule Constraint		
Life Cycle Duration	12 Months	80 %
Budget Constraint		
Life Cycle Cost	1500 \$ (1000)	80 %
Staff Constraint		
C&T Peak Staff	20 People	80 %
Quality Constraint		
Life Cycle MTTD	3 Days	80 %

OK Cancel

# SLIM

**Load Historical Projects** [X]

Step 1: Identify Source of Historical Projects

C:\QSMTools50\ecommerce.smp

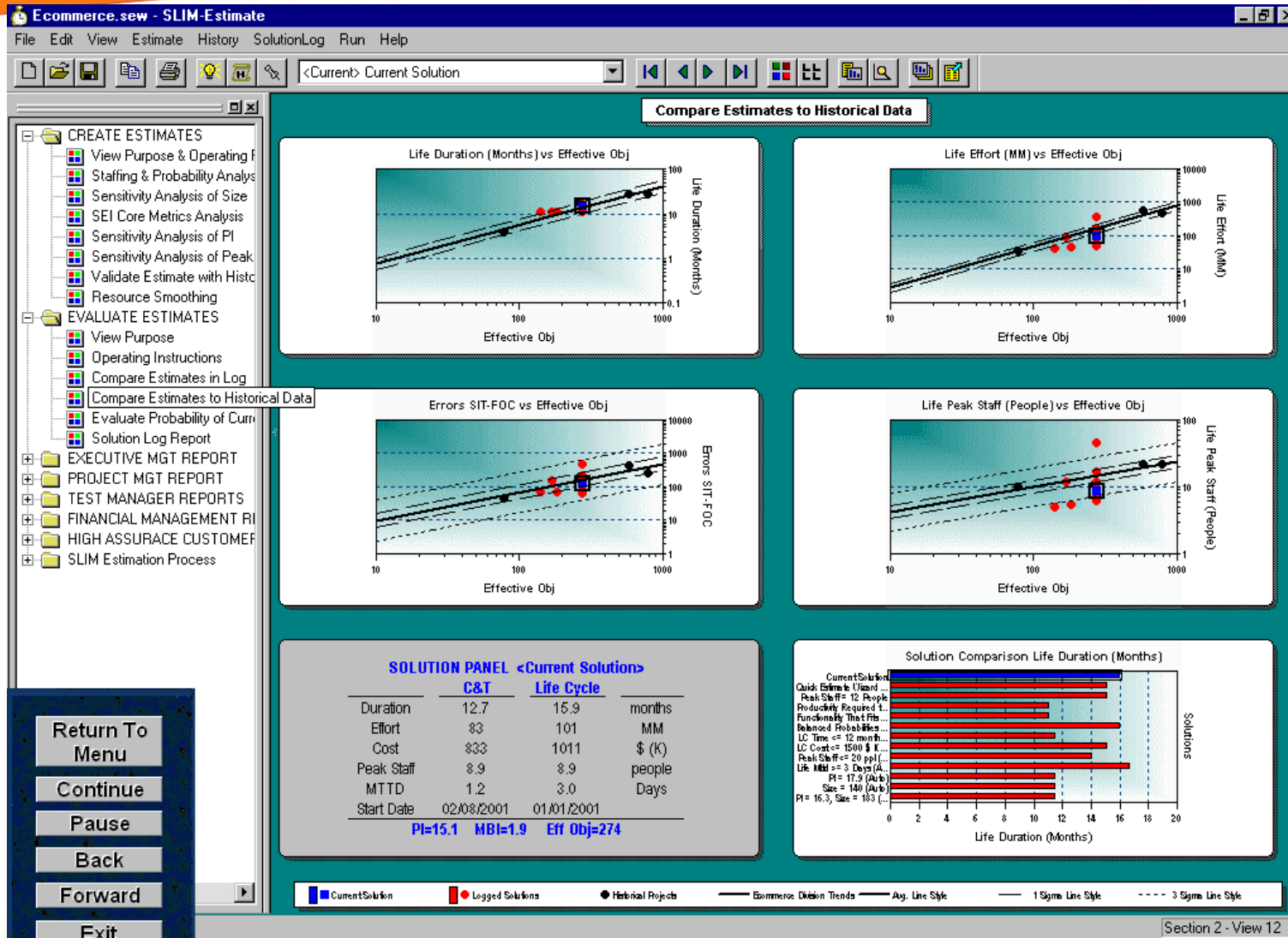
Step 2: Load or Reload Projects

Step 3: Toggle Individual Projects On/Off

#	Name	Organization	Application	FOC Year
1	Smartshop.com 3.0	StarSystems	Business	1999
2	etail 1.0	StarSystems	Business	1998
3	CarParts.com 1.1	StarSystems	Business	1998
4	CarParts.com 1.0	Star Systems	Business	1997

Note: Selected projects will be displayed on all charts that display "historical data" and will be available for the calculation of historical tuning factors.

# SLIM



Return To  
Menu

Continue

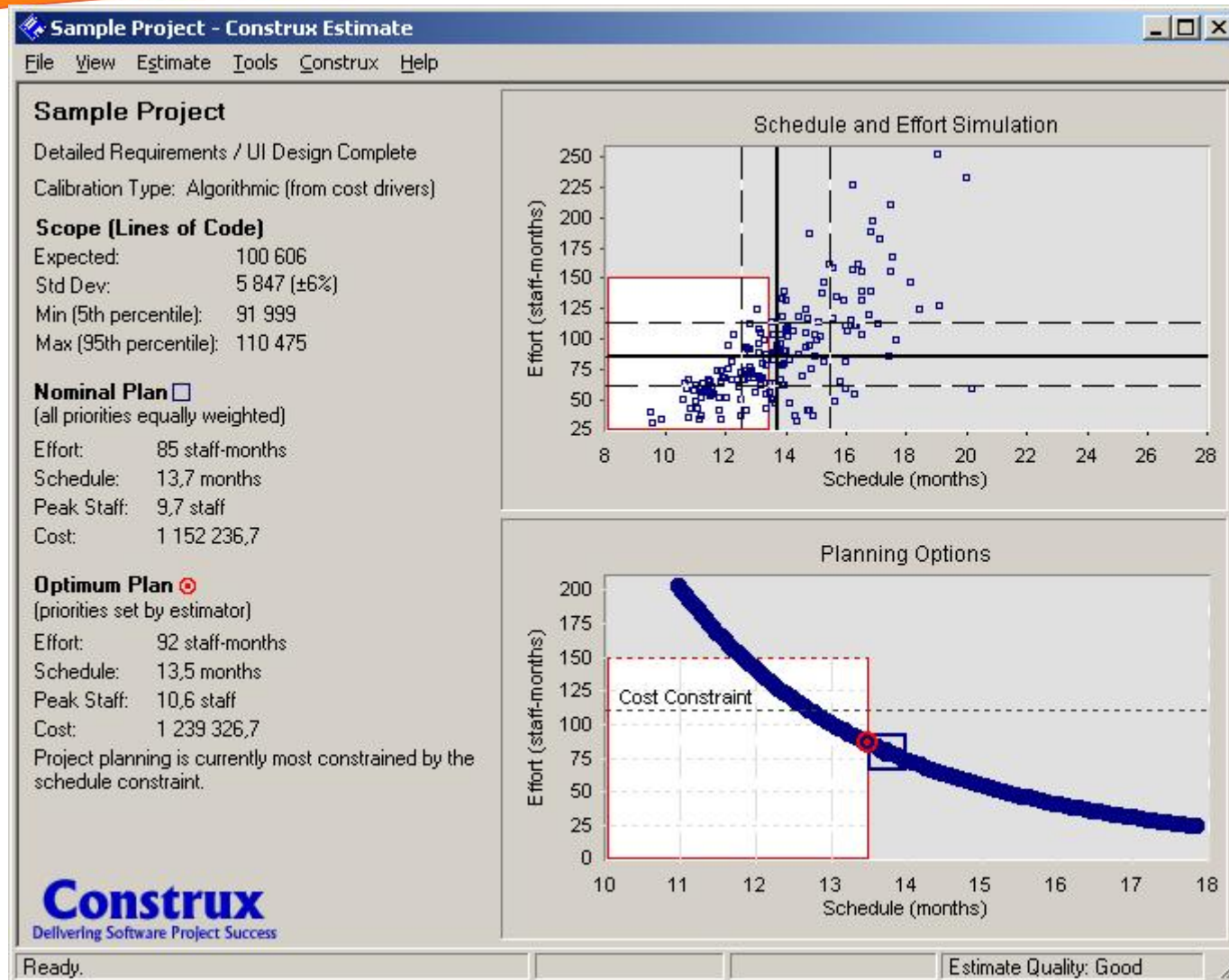
Pause

Back

Forward

Exit

# Constux Estimate v 2.0





# Constux Estimate v 2.0



Sample Project - Construx Estimate

File View Estimate Tools Construx Help

Zoom: + - 100% Fit

Print Selected Reports

- Title Page
- Estimate Summary Report
- Estimate Summary View Screen
- Estimate Quality
- Planning Options Overview
- Planning Options Graph
- Planning Options Report
- Constraints and Priorities
- Milestones**
- Staffing Profile
- Cash Flow
- Simulation Scatter Plot
- Project Scope Probabilities
- Project Effort Probabilities
- Project Cost Probabilities
- Project Schedule Probabilities
- Calibration Summary
- Estimation Technical Notes
- Estimation Software Background

XYZ Corporation Milestones

## Milestones for Optimal Project Plan

### Sample Project

The table below contains project milestones for the optimal project plan. This estimate is for the "main build" phase of a project, that is, the time between detailed requirements specification complete to software acceptance. Dates are not provided for milestones prior to the project start date.

Project Da					
n/a	n/a	Start of Feasibilit			
Stud					
	n/a	n/a			
n/a	n/a	Feasibilit			
Stud					
/ Product					
Concept	n/a	n/a			
Complete					
n/a	n/a	General Requirements Complete	n/a	n/a	
1	01.08.2001	Detailed Requirements / UI Design Complete	0%	n/a	
82	22.10.2001	High-Level Design Complete	20%	5%	
177	24.01.2002	Detailed-Design Complete	43%	22%	
234	23.03.2002	Feature Complete / Code Complete	57%	38%	
328	25.06.2002	Start of User-Oriented S			
stem Test (beta test)					
	80%	70%			
382	18.08.2002	Development and Test Complete	93%	89%	
411	15.09.2002	Software Accepted	100%	100%	

Ready. Estimate Quality: Good



# Costar 7.0



**Costar - Estimate1 (Component1)**

File View Reports Components Tools Preferences Help

Estimate: Estimate1 ID: Model: COCOMO II 2000

Component: Component1 ID: Increment: 1

ACT ARC CBR CDR CMP CST DET EBR EFF EGS GCS GMI GST IDT ISM MSZ NAM SCH SIZ SSM STR

Totals for entire Project		Effort (PM)	Duration (Mo)	Cost (K\$)	Productivity
Requirements	RQ:	0.0	0.0	0.0	
Development	PD+DD+CT+IT:	0.0	0.0	0.0	0.0
<b>Total</b>	<b>RQ+PD+DD+CT+IT:</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

**COCOMO II Scale Factors for Estimate: Estimate1**

COCOMO Model: COCOMO II 2000

Model ID: 2000

Phases: Waterfall

Model Type: COCOMO II

Precedentedness: Somewhat Unprece...

Development Flexibility: Some Relaxation

Architecture / Risk Resolutio: Often (60%)

Team Cohesion: Basically Cooperative

Process Maturity: SEI CMM Level 2

Drivers & Size Model REVL Reuse Function Points Increments Breakage Costs Rates Maint. Fil

Estimate1: 0.0 PM, 0.0 Months Component1: 0.0 PM Level: 1

**Select COCOMO Model**

Model Name	Short Name	ID	CO
COCOMO_II.2000_Waterfall	COCOMO II 2000	2000	CO
COCOMO_II.2000_MBASE	COCOMO II 2000	2000	CO
Early_Design.2000_Waterfall	Early Design 2000	2000	CO
Early_Design.2000_MBASE	Early Design 2000	2000	CO
COCOMO_II.1997_Waterfall	COCOMO II 1997	1997	CO
COCOMO_II.1997_MBASE	COCOMO II 1997	1997	CO
Early_Design.1997_Waterfall	Early Design 1997	1997	CO
Early_Design.1997_MBASE	Early Design 1997	1997	CO
REVIC_9.2	REVIC	V9.2	CO
APM_88	APM 88	1988	Ad
ADA_87	ADA 87	1987	CO
COCOMO_87	COCOMO 87	1987	CO
COCOMO_85	COCOMO 85	1985	CO

Show Short Name in Main Window

OK Cancel App

# Costar 7.0



★ Costar - Estimate1 (Component1)

File View Reports Components Tools Preferences Help

Estimate: Estimate1 ID: Model: COCOMO II 2000

Component: Component1 ID: Increment: 1

ACT ARC CBR CDR CMP CST DET EBR EFF EGS GCS GMI GST IDT ISM MSZ NAM SCH SIZ SSM STR

Totals for entire Project		Effort (PM)	Duration (Mo)	Cost (K\$)	Productivity	Equivalent Size
Requirements	RQ:	0.0	0.0	0.0		Total Size: 0
Development	PD+DD+CT+IT:	0.0	0.0	0.0	0.0	
Total	RQ+PD+DD+CT+IT:	0.0	0.0	0.0	0.0	

Reuse Settings for Component: Component1

Percent Design Modified: 0 %  Inherit DM

Percent Code Modified: 0 %  Inherit CM

Percent Integration Required: 0 %  Inherit IM

Conversion Planning Increment: 0 %  Inherit CPI

Lines Being Adapted: 0

Newly Created Lines: 0

Assessment & Assimilation: 0 %

Software Understanding: 0 %

Unfamiliarity with Software: 0.00

Size before REVL: --

Drivers & Size / Model / REVL / Reuse / Function Points / Increments / Breakage / Costs / Rates / Maint. / Filter / Descr.

Estimate1: 0.0 PM, 0.0 Months    Component1: 0.0 PM    Level: 1

# Costar 7.0



★ Costar - Estimate1 (Component1)

File View Reports Components Tools Preferences Help

Estimate: Estimate1 ID: Model: COCOMO II 2000

Component: Component1 ID: Increment: 1

ACT ARC CBR CDR CMP CST DET EBR EFF EQS GCS GMI GST IDT ISM MSZ NAM SCH SIZ SSM STR

Totals for entire Project		Effort (PM)	Duration (Mo)	Cost (K\$)	Productivity	Equivalent Size
Requirements	RQ:	0.0	0.0	0.0		Total Size: 0
Development	PD+DD+CT+HT:	0.0	0.0	0.0	0.0	
Total	RQ+PD+DD+CT+HT:	0.0	0.0	0.0	0.0	

Function Point Settings for Component: Component1

		Simple	Average	Complex
External Input	EI	0	0	0
External Output	EO	0	0	0
Logical Internal File	ILF	0	0	0
External Interface File	EIF	0	0	0
External Inquiry	EQ	0	0	0

UnAdjusted Function Points: 0

Adjusted Function Points: 0

Lines per Function Point: 100

Size before REVL: --

Drivers & Size / Model / REVL / Reuse / Function Points / Increments / Breakage / Costs / Rates / Maint / Filter / Descr.

Enter the number of Simple External Inputs

Estimate1: 0.0 PM, 0.0 Months    Component1: 0.0 PM    Level: 1



# Costar 7.0



**Costar - Estimate1 (Component1)**

File View Reports Components Tools Preferences Help

Estimate: Estimate1 ID: Model: COCOMO II 2000

Component: Component1 ID: Increment: 1

ACT ARC CBR CDR CMP CST DET EBR EFF EGS GCS GMI GST IDT ISM MSZ NAM SCH SIZ SSM STR

Totals for entire Project		Effort (PM)	Duration (Mo)	Cost (K\$)	Productivity	Equivalent Size
Requirements	RQ:	0.0	0.0	0.0		Total Size: 0
Development	PD+DD+CT+IT:	0.0	0.0	0.0	0.0	
Total	RQ+PD+DD+CT+IT:	0.0	0.0	0.0	0.0	

Incremental Settings for Estimate: Estimate1

1	0.0	0.0	0.0	0.0	0.0	
	RQ	PD	DD	CT	IT	
2	0.0	0.0	0.0	0.0	0.0	0.0
	RQ	PD	DD	CT	IT	
3	0.0	0.0	0.0	0.0	0.0	0.0
	RQ	PD	DD	CT	IT	
4	0.0	0.0	0.0	0.0	0.0	0.0
	RQ	PD	DD	CT	IT	
5	0.0	0.0	0.0	0.0	0.0	0.0
	RQ	PD	DD	CT	IT	
6						
7						

Start Point  
 SDR  
 SSR  
 PDW  
 PDR

Reset

Drivers & Size / Model / REVL / Reuse / Function Points / Increments / Breakage / Costs / Rates / Maint. / Filter / Descr.

Click on a blue triangle to synchronize an increment with an earlier or later milestone in the previous increment

Estimate1: 0.0 PM, 0.0 Months | Component1: 0.0 PM | Level: 1

# Costar 7.0



**Costar - Estimate1 (Component1)**

File View Reports Components Tools Preferences Help

Estimate: Estimate1 ID: ID: Model: COCOMO II 2000

Component: Component1 ID: ID: Increment: 1

ACT ARC CBR CDR CMP CST DET EBR EFF EQS GCS GMI GST IDT ISM MSZ NAM SCH SIZ SSM STR

Totals for entire Project	Effort (PM)	Duration (Mo)	Cost (K\$)	Productivity	Equivalent Size
Requirements RQ:	0.0	0.0	0.0		
Development PD+DD+CT+HT:	0.0	0.0	0.0		
Total RQ+PD+DD+CT+HT:	0.0	0.0	0.0		

**Costs for Component: Component1**

Cost per Person-Month

Requirements	\$ 0	<input checked="" type="checkbox"/> Inherit RQ	<input type="checkbox"/> Use Rates Tab & Labor Distribution
Product Design	\$ 0	<input checked="" type="checkbox"/> Inherit PD	<input type="checkbox"/> Use Rates Tab & Labor Distribution
Detailed Design	\$ 0	<input checked="" type="checkbox"/> Inherit DD	<input type="checkbox"/> Use Rates Tab & Labor Distribution
Code & Unit Test	\$ 0	<input checked="" type="checkbox"/> Inherit CT	<input type="checkbox"/> Use Rates Tab & Labor Distribution
Integration & Test	\$ 0	<input checked="" type="checkbox"/> Inherit IT	<input type="checkbox"/> Use Rates Tab & Labor Distribution
Maintenance	\$ 0	<input checked="" type="checkbox"/> Inherit MN	<input type="checkbox"/> Use Rates Tab & Labor Distribution

Drivers & Size / Model / REVL / Reuse / Function Points / Increments / Breakage / Costs / Rates / Maint / Filter / Descr.

Estimate1: 0.0 PM, 0.0 Months | Component1: 0.0 PM | Level: 1

**Labor Rates for Estimate: Estimate1**

Labor Class	Cost per Person-Month
Programmer	0
Senior Programmer	0
Analyst	0
Supervisor	0
Tech Writer	0
Department Head	0
Tester	0
Reviewer	0
	0
	0
	0
	0
	0
	0
	0
	0
	0

The Rates tab is an alternative to the Costs tab.

- 1) Define the names and rates of your labor classes in the table on the left. The rate is the Cost per Person-Month. These apply to the entire estimate.
- 2) Edit the Labor Distribution Worksheet for each component. Costar will calculate the cost per Person-Month for each phase (displayed on the Costs tab)

Edit Labor Distribution Worksheet...

Revert to Model Values

Drivers & Size / Model / REVL / Reuse / Function Points / Increments / Breakage / Costs / Rates / Maint / Filter / Descr.

Estimate1: 0.0 PM, 0.0 Months | Component1: 0.0 PM | Level: 1

# Costar 7.0



★ Estimate1 - Activity Report

Print    Export...    Save as Graphic     Headers    << Back    Next >>

**Estimate1 - Activity Report**

Costar 7.0 Demo                      02.10.2008    17:11:37                      Page: 1

Estimate Name: Estimate1  
 Model Name: COCOMO II 2000  
 Process Model: COCOMO II Model

Activity	Effort in Person-Months			
	RQ	PD	DD	CT
Requirements	0.5	0.3	0.1	0.2
Product Design	0.2	0.9	0.3	0.4
Programming	0.0	0.3	2.0	2.8
Test Plans	0.0	0.1	0.2	0.2
V & V	0.1	0.1	0.3	0.4
Project Office	0.1	0.3	0.3	0.4
CM/QA	0.0	0.1	0.2	0.3
Manuals	0.1	0.2	0.2	0.3
<b>Totals</b>	<b>0.9</b>	<b>2.3</b>	<b>3.6</b>	<b>4.9</b>

★ Estimate1 - Estimate Comparison Report

Print    Export...    Save as Graphic     Headers    << Back    Next >>

**Estimate1 - Estimate Comparison Report**

Costar 7.0 Demo                      02.10.2008    17:38:04                      Page: 1

Estimate Name: Estimate1                      Estimate ID:  
 Model Name: COCOMO II 2000                      Model ID: 2000  
 Process Model: COCOMO II Model                      Phases: Waterfall

Estimate Name                      Estimate1  
 Development Mode                      n/a  
 Filename  
 Model Name                      COCOMO II 2000  
 Process Model                      COCOMO II  
 Phases                      Waterfall  
 Increments                      1

Estimate Summary (RQ to IT)

Developed Size	4,000
Total Cost (K\$)	0.0
Total Effort (Person-Months)	14.4
Total Duration (Months)	9.8
Productivity (Lines/PM)	276.8
Unit Cost (\$/Line)	0.00

Requirements

Cost (K\$)	0.0
Effort (Person-Months)	0.9
Duration (Months)	1.4
Average Staffing	0.7

Product Design

Cost (K\$)	0.0
------------	-----



# Costar 7.0



★ Estimate1 - Archive Report

Print    Export...    Save as Graphic     Headers    << Back    Next >>

### Estimate1 - Archive Report

Costar 7.0 Demo                      02.10.2008    17:17:26                      Page: 1

Estimate Name:	Estimate1	Estimate ID:	
Model Name:	COCOMO II 2000	Model ID:	2000
Process Model:	COCOMO II Model	Phases:	Waterfall

File:  
Description:  
Model File:            Built in.

Hours per Person-Month:    152

COCOMO Estimating Equations			
Effort	= 2.9400 * EAF * (KSLOC)	<sup>1.0997</sup> EAF = 1	= Effort in
Schedule	= 3.6700 * (Effort)	<sup>0.3179</sup>	= Duration
Maintenance Effort	= 2.9400 * EAF * (KSLOC)	<sup>1.0997</sup>	= Effort (per year) in Person-months

#### Select Export Options

Export Options

- Export to Excel
  - Update Policy
    - One Shot
    - Live Update
  - Export All Reports to Excel
  - Comma Separated Values (CSV)
  - Legacy Text Format

Export    Cancel    Help

# CostXpert v3.5



**Lifecycles**

Lifecycles | Activities

Name	M(A) Adj.	Low Percent
Spiral - 4 loops	0,88	0,50
System	1,01	0,50
Telecom - Back Office	1,24	0,50
Telecom - E-Commerce	1,08	0,50
Telecom - Switching and Control	1,00	0,50
Telecom - Voice Processing	1,07	0,50
Telecom - Web	1,08	0,50
<b>Waterfall</b>	1,01	0,50

Description

Traditional waterfall development.  
More information can be found at  
[http://asd-www.larc.nasa.gov/barkstrom/public/The\\_Standard\\_Waterfall\\_Model\\_For\\_Systems\\_Development.htm](http://asd-www.larc.nasa.gov/barkstrom/public/The_Standard_Waterfall_Model_For_Systems_Development.htm)

Copy Lifecycle

Restore Defaults

OK Cancel Help

Buttons: Add, Save, Cancel, Remove, Report

# CostXpert v3.5



Cost Xpert 3.5

File Edit Reports Maintain Wizards Tools Help

Project Sizing Environment Quality & Risk Results

Project Standard: MBASE Document Deliverables

Document Name	Pages	Selected
Operational Concept Description (LCO)	1294	<input checked="" type="checkbox"/>
SSRD (LCO)	438	<input checked="" type="checkbox"/>
SSAD (LCO)	1080	<input checked="" type="checkbox"/>
LifeCycle Plan (LCO)	901	<input checked="" type="checkbox"/>
Feasibility Rationale Description (LCO)	438	<input checked="" type="checkbox"/>
Operational Concept Description (LCA)	323	<input checked="" type="checkbox"/>
SSRD (LCA)	109	<input checked="" type="checkbox"/>
SSAD (LCA)	269	<input checked="" type="checkbox"/>
LifeCycle Plan (LCA)	216	<input checked="" type="checkbox"/>
Feasibility Rationale Description (LCA)	109	<input checked="" type="checkbox"/>
Iteration Plan	538	<input checked="" type="checkbox"/>
Iteration Assessment Report	360	<input checked="" type="checkbox"/>
Release Description	269	<input checked="" type="checkbox"/>
Quality Management Plan (QMP)	367	<input checked="" type="checkbox"/>
Test Plan	153	<input checked="" type="checkbox"/>
Test Description and Results	899	<input checked="" type="checkbox"/>
Peer Review Plan	117	<input checked="" type="checkbox"/>
Peer Review Report	540	<input checked="" type="checkbox"/>
Transition Plan	363	<input checked="" type="checkbox"/>
Software Users Manual	550	<input checked="" type="checkbox"/>
Training Materials	362	<input checked="" type="checkbox"/>

Description: Operational Concept Description at the Lifecycle Objectives (LCO) milestone: top-level system objectives and scope, operational concept, shared vision and context for stakeholders.

Summary WBS Risks Labor Maintenance Deliverables

CX Sample Project 3.5 Effort: 297,6 Person-months Schedule: 17,4 Months Cost: 5 225 842,70\$.

# KnowledgePLAN 4.1



**New Project Wizard - Project Nature**

Is the deliverable for this project something new, modified, ported, configured or supported?

Project Nature:

- New software development
- Re-engineering
- Reverse engineering
- Enhancement
- Package customization
- Code conversion
- Full system port
- Package implementation
- Maintenance

System or application with new and unique features built without Reused and leveraged components may be used.

< Back   Next >   Cancel

**Project Sizing Wizard - Sizing Method**

If you have already sized this project using a Software Metric, such as function points or source lines of code, you should select Sizing by Metric.

If you can specify the approximate number of data entities or procedural events in this project and want KnowledgePLAN to extrapolate the rest of the project size, you should select Sizing by Components.

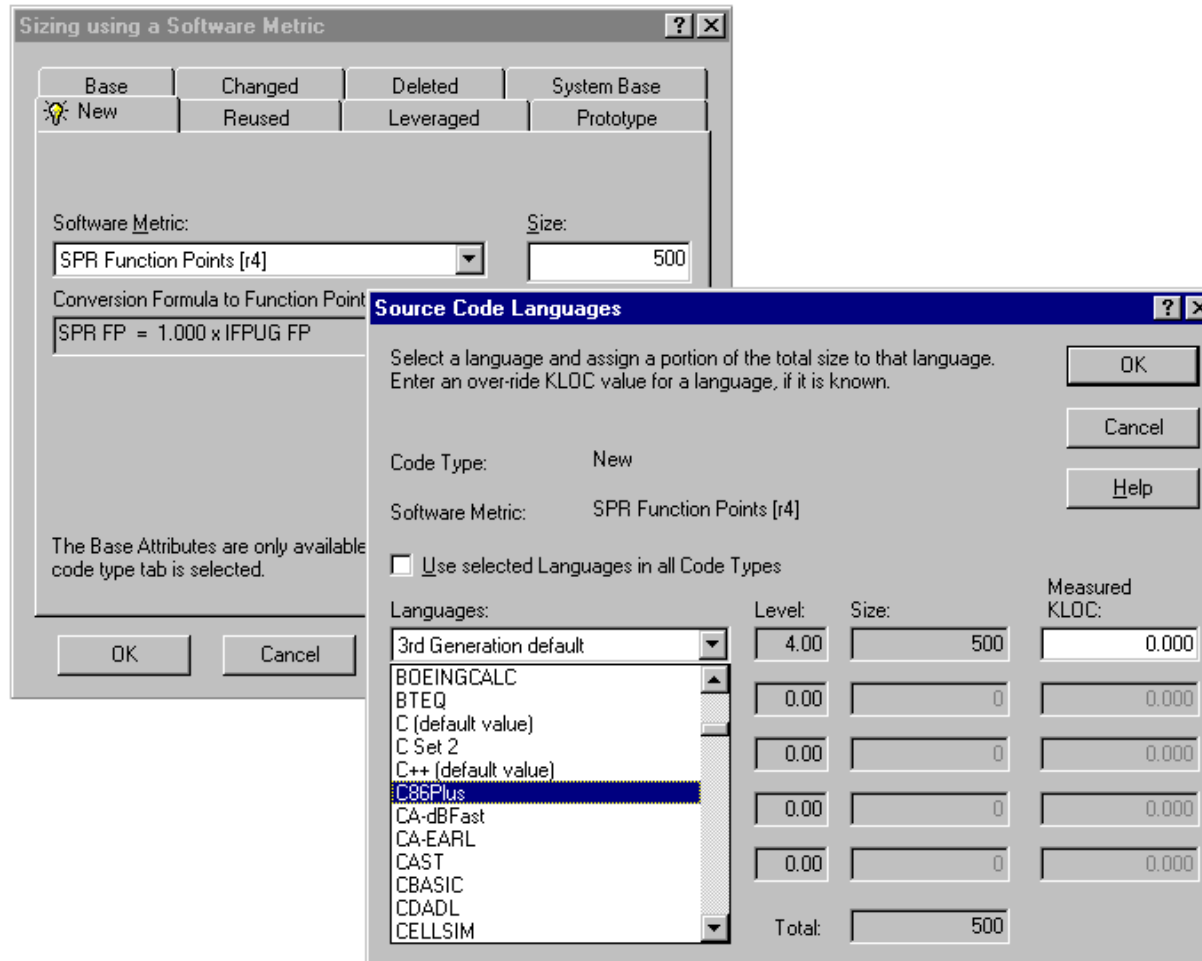
If you prefer to size the project by selecting from a list of software products and specifying unique project characteristics, select Sizing by Analogy.

Sizing Method

- Sizing by Metric
- Sizing by Components
- Sizing by Analogy

< Back   Next >   Cancel   Help

# KnowledgePLAN 4.1



The image shows two overlapping dialog boxes from the KnowledgePLAN 4.1 software. The background dialog is titled "Sizing using a Software Metric" and the foreground dialog is titled "Source Code Languages".

**Sizing using a Software Metric Dialog:**

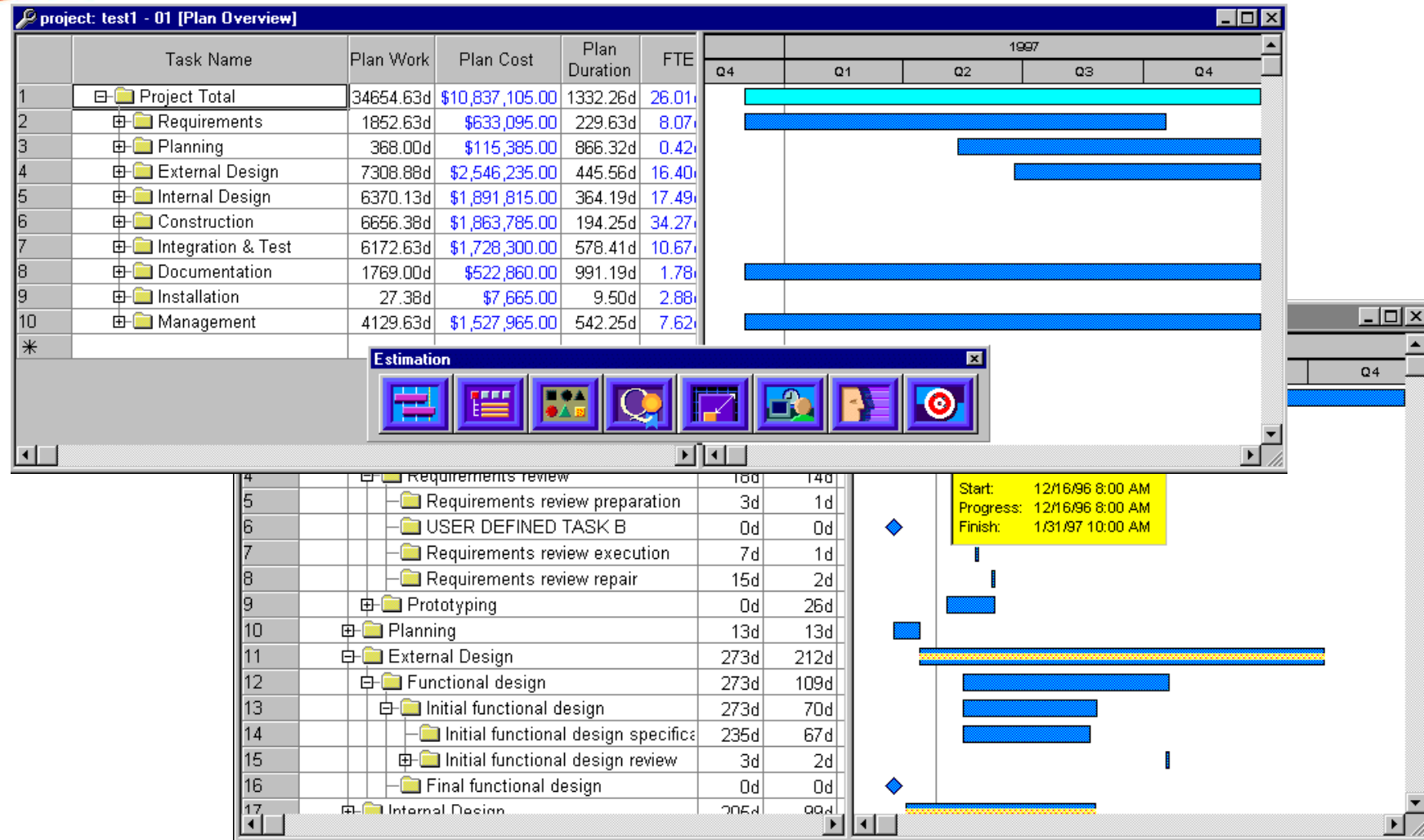
- Buttons: Base, Changed, Deleted, System Base, New, Reused, Leveraged, Prototype.
- Software Metric: SPR Function Points [r4]
- Size: 500
- Conversion Formula to Function Point:  $SPR\ FP = 1.000 \times IFPUG\ FP$
- Text: "The Base Attributes are only available code type tab is selected."
- Buttons: OK, Cancel

**Source Code Languages Dialog:**

- Code Type: New
- Software Metric: SPR Function Points [r4]
- Use selected Languages in all Code Types
- Instructions: "Select a language and assign a portion of the total size to that language. Enter an over-ride KLOC value for a language, if it is known."
- Buttons: OK, Cancel, Help
- Table:

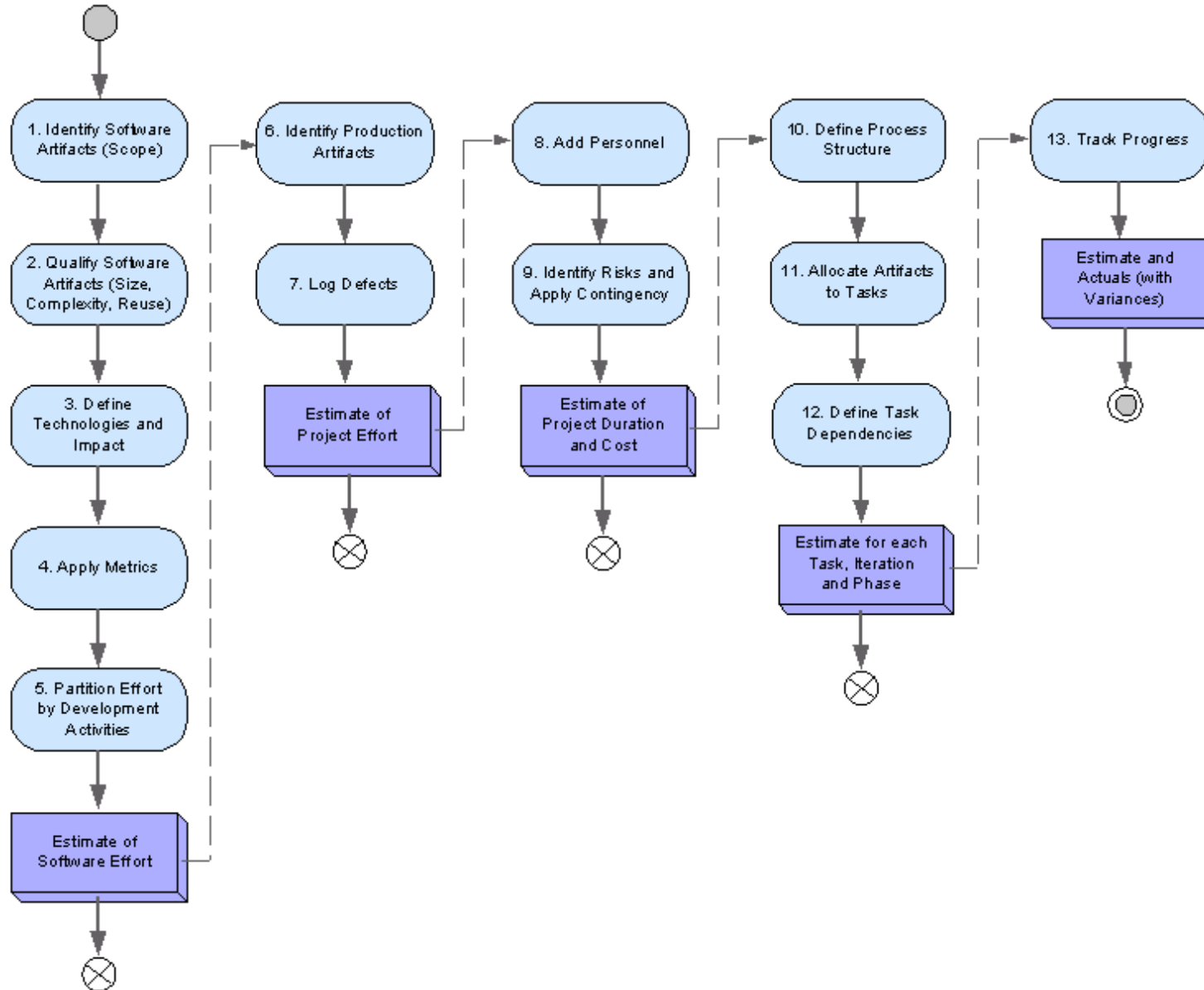
Languages:	Level:	Size:	Measured KLOC:
3rd Generation default	4.00	500	0.000
BOEINGCALC	0.00	0	0.000
BTEQ	0.00	0	0.000
C (default value)	0.00	0	0.000
C Set 2	0.00	0	0.000
C++ (default value)	0.00	0	0.000
C85Plus	0.00	0	0.000
CA-dBFast	0.00	0	0.000
CA-EARL	0.00	0	0.000
CAST	0.00	0	0.000
CBASIC	0.00	0	0.000
CDADL	0.00	0	0.000
CELLSIM	0.00	0	0.000
Total:		500	

# KnowledgePLAN 4.1





# Circa 7.0



# Circa 7.0



Project Browser

- Software
  - Class
    - Bill statement
    - Customer
    - Customer
    - Hire
    - Hire record
    - Hire schedule
    - Inventory
    - Payment details
    - Quotation
    - Service history
    - Special offer
    - Vehicle
    - Vehicle
  - Class <<GUI>>
    - Customer details screen
    - Hire details screen
    - Inventory screen
    - Payment processing screen
    - Vehicle records screen
  - Component
  - Interface
  - Package
  - Script
  - Subsystem
    - Customer hiring
    - Vehicle tracking
  - Use Case
    - Add vehicle to inventory
    - Allocate vehicle to customer

Production  
Personnel  
Risks  
Defects

Production Personnel Risks Defects

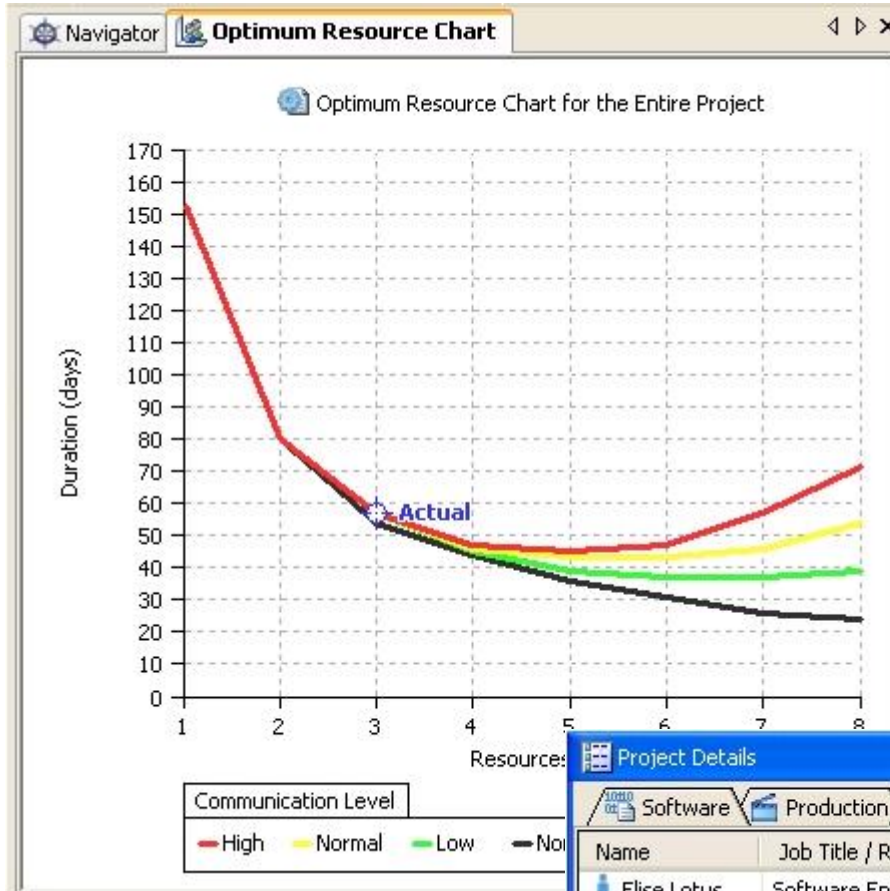
Description	Priority	Size	Complexity	Genericity	Reuse	Baseline	Effort (hours)
er hiring	1	Medium	Medium	None	None	New Software Artifact	158.4
racking	1	Medium	Medium	None	None	New Software Artifact	158.4
er hiring features	1	Medium	Medium	None	None	New Software Artifact	26.4
racking features	1	Medium	Medium	None	None	New Software Artifact	26.4
er details screen	1	Large	Difficult	None	None	New Software Artifact	12.5
ails screen	1	Large	Difficult	None	None	New Software Artifact	12.5
ry screen	1	Large	Difficult	None	None	New Software Artifact	12.5
c processing scr...	1	Large	Difficult	None	None	New Software Artifact	12.5
ecords screen	1	Large	Difficult	None	None	New Software Artifact	12.5
icle to inventory	1	Medium	Medium	None	None	New Software Artifact	12.4

Activity Detail

Estimate of Entire Project

	Hours	%	
Total	720.0	100	
Production Total	0.0	0	<input type="text"/>
Software Total	720.0	100	<input type="text"/>
Planning	90.0	12.5	<input type="text"/>
Analysis	144.0	20.0	<input type="text"/>
Design	117.0	16.3	<input type="text"/>
Build	99.0	13.8	<input type="text"/>
Testing	108.0	15.0	<input type="text"/>
Integration	108.0	15.0	<input type="text"/>
Review	54.0	7.5	<input type="text"/>

# Circa 7.0



Summary

Estimate of Entire Project

	Software	Production	Project
Effort (hours)	710.2	0.0	710.2
Person Days	108	0	108
Cost (£)	16200	0	16200

Duration (days)	57	Start	03 Mar 2008
Contingency (%)	0.0	End	28 Apr 2008

Project Details

Software Production Personnel Risks Defects

Name	Job Title / Role	Standard Hours	Total Hours	Standard Rate (£)	Overtime Rate (£)
Elise Lotus	Software Engineer	7.50	7.50	20.00	20.00 0 100
Martin Aston	Software Engineer	7.50	7.50	20.00	20.00 0 100
Robin Reliant	Software Engineer	7.50	7.50	20.00	20.00 0 100

# Circa 7.0



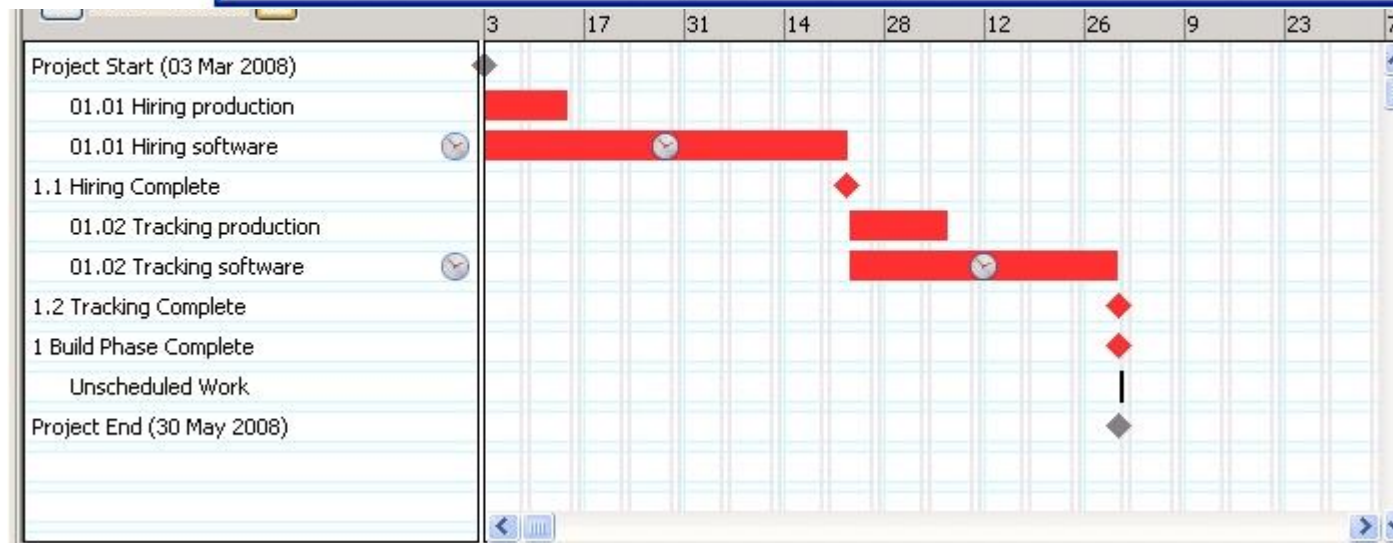
Process Browser

- Project Summary
- All Tasks (4)
- Process
  - 01 Build Phase
    - 01.01 Hiring
      - Hiring software
      - Hiring production
    - 01.02 Tracking
      - Tracking software
      - Tracking production
  - Unscheduled Artifacts (8)
  - Warnings (2)

Process Details

Estimates/Actuals | Artifacts | Warnings

Name	Type	Effort (hours)	Cost (£)	Segment Size (%)
Client training / Training	Production Artifact	45	0	100
Icons and branding / Product Branding	Production Artifact	0	3500	100
Online help for hiring / Help Materials	Production Artifact	40	0	100
Online help for tracking / Help Materials	Production Artifact	40	0	100
User guide manual / Help Materials	Production Artifact	0	2400	100
PR-001 / Pre Release Defects	Defect	0	1000	--
SW-001 / Pre Release Defects	Defect	15	0	--
SW-002 / Pre Release Defects	Defect	4	0	--

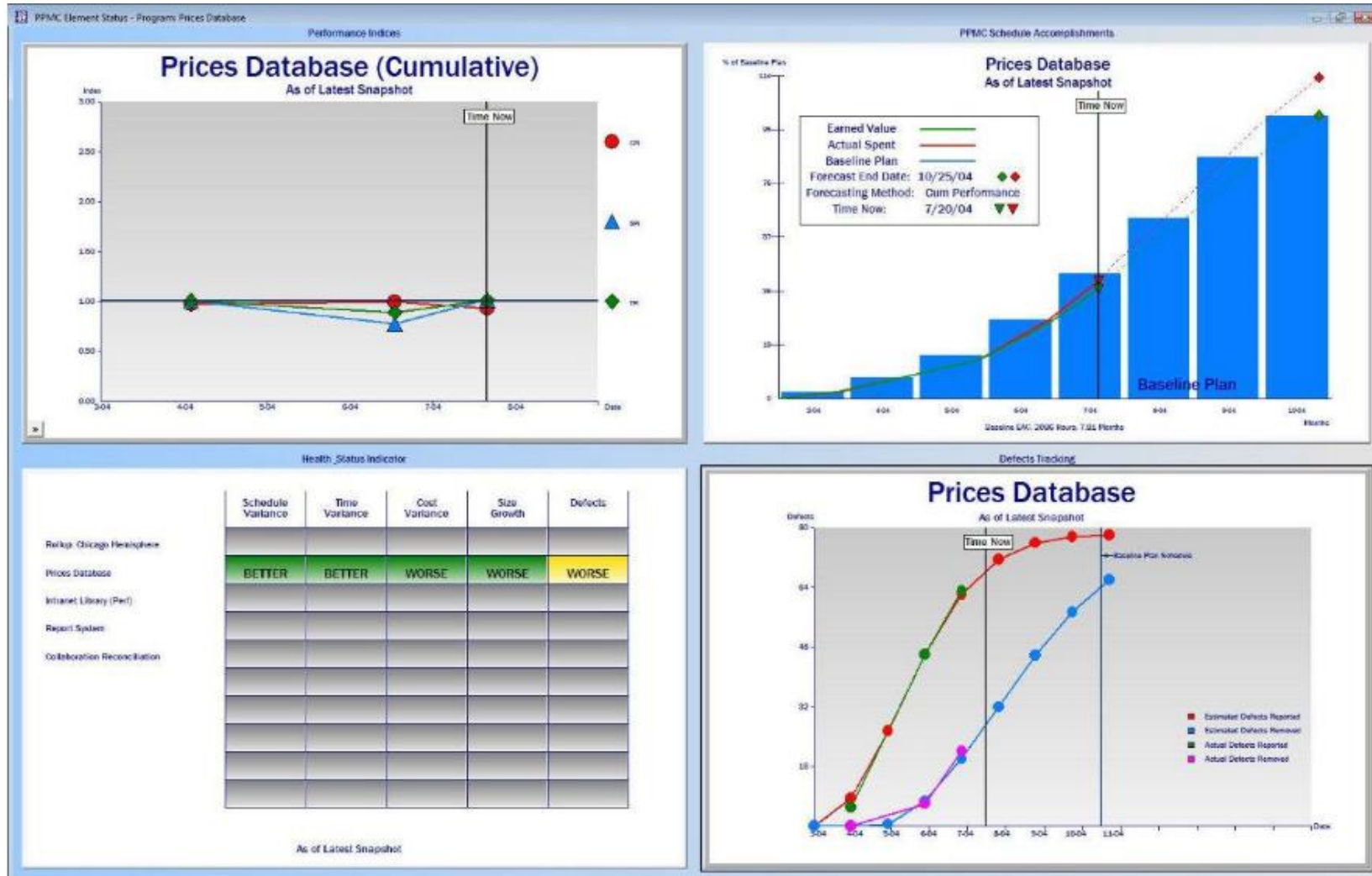




# SEER-SEM



# SEER-SEM





# SEER-SEM

