Project Estimation Tools

Shellie Wedman
March 28, 2011
Contents

- COCOMO II
  - estimation and COCOMO II
  - Center for Systems and Software Engineering
- Estimation Tools
  - Construx Estimate
  - Costar 7.0
- Function Point Analysis Tool
  - standard and enterprise edition
- Summary
- Questions
Estimation Goal

- Confidence level
- Parameters
- Constraints
- Acceptable Product
Cost of Estimation Error
COCOMO II

- Constructive Cost Model
- Useful for software development processes
  - Quantitative framework
- Allows users to reason about tradeoffs
- 17 cost drivers
- 5 scale factors
### Center for Systems and Software Engineering
### COCOMO cost and scale drivers

#### Software Size
- **Sizing Method**: Function Points
- **Unadjusted**
  - Function Points: 500
  - Language: Java

#### Software Scale Drivers
- **Precededness**: Nominal
- **Development Flexibility**: Nominal
- **Architecture / Risk Resolution**: Nominal
- **Team Cohesion**: Nominal
- **Process Maturity**: Nominal

#### Software Cost Drivers

##### Product
- **Required Software Reliability**: Very High
- **Data Base Size**: Nominal
- **Product Complexity**: Nominal
- **Developed for Reusability**: Nominal
- **Documentation Match to Lifecycle Needs**: Nominal

##### Personnel
- **Analyst Capability**: Nominal
- **Programmer Capability**: Nominal
- **Personnel Continuity**: Nominal
- **Application Experience**: Nominal
- **Platform Experience**: Nominal
- **Language and Toolset Experience**: Nominal

##### Platform
- **Time Constraint**: Nominal
- **Storage Constraint**: Nominal
- **Platform Volatility**: Nominal

##### Project
- **Use of Software Tools**: Nominal
- **Multisite Development**: Nominal
- **Required Development Schedule**: Nominal

#### Software Labor Rates

---
Center for Systems and Software Engineering
http://csse.usc.edu/csse/

- Constraints
  - 500 UFP
  - Java

Results

Software Engineering

Effort = 108 Person-months  
Schedule = 17 Months  
Cost = $0

Total Equivalent Size = 26500

Phase Distribution

<table>
<thead>
<tr>
<th>Phase</th>
<th>Effort (Person-months)</th>
<th>Schedule (Month)</th>
<th>Average Staff</th>
<th>Cost (Dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inception</td>
<td>6.5</td>
<td>2.2</td>
<td>3.0</td>
<td>$0</td>
</tr>
<tr>
<td>Elaboration</td>
<td>25.9</td>
<td>6.5</td>
<td>4.0</td>
<td>$0</td>
</tr>
<tr>
<td>Construction</td>
<td>82.1</td>
<td>10.8</td>
<td>7.6</td>
<td>$0</td>
</tr>
<tr>
<td>Transition</td>
<td>13.0</td>
<td>2.2</td>
<td>6.0</td>
<td>$0</td>
</tr>
</tbody>
</table>

Software Effort Distribution for RUP/MBASE (Person-Months)

<table>
<thead>
<tr>
<th>Phase/Activity</th>
<th>Inception</th>
<th>Elaboration</th>
<th>Construction</th>
<th>Transition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>0.3</td>
<td>3.1</td>
<td>8.2</td>
<td>1.8</td>
</tr>
<tr>
<td>Environment/CM</td>
<td>0.6</td>
<td>2.1</td>
<td>4.1</td>
<td>0.6</td>
</tr>
<tr>
<td>Requirements</td>
<td>2.5</td>
<td>4.7</td>
<td>6.6</td>
<td>0.5</td>
</tr>
<tr>
<td>Design</td>
<td>1.2</td>
<td>9.3</td>
<td>13.1</td>
<td>0.5</td>
</tr>
<tr>
<td>Implementation</td>
<td>0.5</td>
<td>3.4</td>
<td>27.9</td>
<td>2.5</td>
</tr>
<tr>
<td>Assessment</td>
<td>0.5</td>
<td>2.6</td>
<td>19.7</td>
<td>3.1</td>
</tr>
<tr>
<td>Deployment</td>
<td>0.2</td>
<td>0.8</td>
<td>2.5</td>
<td>3.9</td>
</tr>
</tbody>
</table>
Contents

● COCOMO II
  - estimation and COCOMO II
  - Center for Systems and Software Engineering

● Estimation Tools
  - Construx Estimate
  - Costar 7.0

● Function Point Analysis Tool
  - standard and enterprise edition

● Summary

● Questions
Construx Estimate Tool

- Founded in 1996 by Steve McConnell
- Mission: Advancing the art and science of commercial software engineering.
- Tools – Estimate and Code Surveyor
- Management toolbox – checklists, templates
- White papers, Posters, and Webinars
Construx Estimate Tool – Free

- License Agreement: Use on a single computer, made available “as is”, no warranties
- Size of project must be known
- No phase distribution reports
- Calibrate estimates in three ways
  - project type based on industry data
  - cost factor
  - historical data
Project Type Calibration

- Uses Industry productivity data
- Easiest
- Least accurate

Project Types Supported
Cost Factor Calibration

- COCOMO II
  - product attributes
  - project attributes
  - personnel attributes
- Product type and sub type
Historical Data Calibration

- Most accurate
- Less work required
- Data from 3 or more past organizational projects
Historical Database Wizard

Click New Project to define a new project. Select a project from the list and click Next to edit an existing project. You can also delete a project by selecting a project and clicking Delete Project.

<table>
<thead>
<tr>
<th>Project</th>
<th>Start Date</th>
<th>Lines of Code</th>
<th>Staff Months</th>
<th>Schedule (months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>proj2</td>
<td>3/1/2011</td>
<td>50</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

Click Next or New Project to continue.
Estimation Approaches

- SLIM
  - projects follow well defined patterns that can be modeled with a set of exponential equations
  - core of estimations
- COCOMO II
- Monte Carlo Simulation
Kinds of Units

- Function Point
- Lines of Code
- Functions / Subroutines
- Classes / Modules
- Subsystems
Estimation Window

Sample Project
Detailed Requirements / UI Design Complete
Calibration Type: Algorithmic (from cost drivers)
Scope (Lines of Code)
- Expected: 101,203
- Std Dev: 5,740 (±6%)
- Min (5th percentile): 91,933
- Max (95th percentile): 110,459

Nominal Plan
[all priorities equally weighted]
- Effort: 83 staff-months
- Schedule: 13.8 months
- Peak Staff: 9.3 staff
- Cost: $1,116,330

Optimum Plan
[priorities set by estimator]
- Effort: 96 staff-months
- Schedule: 13.3 months
- Peak Staff: 11.2 staff
- Cost: $1,295,387

Project planning is currently most constrained by the schedule constraint.
## Project Type Comparison

<table>
<thead>
<tr>
<th>Constraints</th>
<th>Example Project 1</th>
<th>Example Project 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Type</td>
<td>Avionics</td>
<td>Internet</td>
</tr>
<tr>
<td>Current Phase</td>
<td>General Requirements Completed</td>
<td>General Requirements Completed</td>
</tr>
<tr>
<td>Maximum Schedule</td>
<td>12 months</td>
<td>12 months</td>
</tr>
<tr>
<td>Maximum Effort in Staff Month</td>
<td>60 SM</td>
<td>60 SM</td>
</tr>
<tr>
<td>Priorities</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Unadjusted Function Points</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Programming Language</td>
<td>Java</td>
<td>Java</td>
</tr>
</tbody>
</table>
Avionics Project Estimate

(project not described)
General Requirements Complete
Calibration Type: Algorithmic (from cost drivers)

Scope [Lines of Code]
Expected: 22,500
Std Dev: 5,344 (±24%)
Min (5th percentile): 13,500
Max (95th percentile): 31,500

Nominal Plan (all priorities equally weighted)
Effort: 75 staff-months
Schedule: 14.6 months
Peak Staff: 7.8 staff
Cost: n/a

Optimum Plan (priorities set by estimator)
Effort: n/a
Schedule: n/a
Peak Staff: n/a
Cost: n/a
Project planning is currently overconstrained by the combination of schedule and effort constraints.

Construx
Delivering Software Project Success

Project labor cost needs to be defined

⚠️ Overconstrained | Estimate Quality: Good
Internet Project Estimate

General Requirements Complete
Calibration Type: Algorithmic (from cost drivers)

Scope (Lines of Code)
Expected: 22,500
Std Dev: 5,344 (±24%)
Min (5th percentile): 13,500
Max (95th percentile): 31,500

Nominal Plan
(all priorities equally weighted)
Effort: 27 staff-months
Schedule: 10.3 months
Peak Staff: 3.9 staff
Cost: n/a

Optimum Plan
(priorities set by estimator)
Effort: 27 staff-months
Schedule: 10.3 months
Peak Staff: 3.9 staff
Cost: n/a

Project planning is currently most constrained by the schedule constraint.

Project labor cost needs to be defined

Estimate Quality: Good
# Internet Project

## Cost Factor Calibration

### Before

<table>
<thead>
<tr>
<th>Product Attributes</th>
<th>Project Attributes</th>
<th>Personnel Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyst Capability (general):</td>
<td>50th percentile (average)</td>
<td></td>
</tr>
<tr>
<td>Programmer Capability (general):</td>
<td>50th percentile (average)</td>
<td></td>
</tr>
<tr>
<td>Personnel Continuity (turnover):</td>
<td>12%/year (nominal)</td>
<td></td>
</tr>
<tr>
<td>Experience with Applications Area:</td>
<td>1 year of experience (nominal)</td>
<td></td>
</tr>
<tr>
<td>Experience with Platform:</td>
<td>1 year of experience (nominal)</td>
<td></td>
</tr>
<tr>
<td>Language and Tool Experience:</td>
<td>1 year of experience (nominal)</td>
<td></td>
</tr>
<tr>
<td>Team Cohesion:</td>
<td>Basically cooperative interactions</td>
<td></td>
</tr>
</tbody>
</table>

### After

<table>
<thead>
<tr>
<th>Product Attributes</th>
<th>Project Attributes</th>
<th>Personnel Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyst Capability (general):</td>
<td>90th percentile (exceptional)</td>
<td></td>
</tr>
<tr>
<td>Programmer Capability (general):</td>
<td>90th percentile (exceptional)</td>
<td></td>
</tr>
<tr>
<td>Personnel Continuity (turnover):</td>
<td>3%/year</td>
<td></td>
</tr>
<tr>
<td>Experience with Applications Area:</td>
<td>6 years of experience</td>
<td></td>
</tr>
<tr>
<td>Experience with Platform:</td>
<td>6 years of experience</td>
<td></td>
</tr>
<tr>
<td>Language and Tool Experience:</td>
<td>6 years of experience</td>
<td></td>
</tr>
<tr>
<td>Team Cohesion:</td>
<td>Seamless interactions</td>
<td>21</td>
</tr>
</tbody>
</table>
Internet Project Updated Estimate

(project not described)
General Requirements Complete
Calibration Type: Algorithmic (from cost drivers)

Scope (Lines of Code)
Expected: 22,500
Std Dev: 5,907 (±26%)
Min (5th percentile): 13,500
Max (95th percentile): 31,500

Nominal Plan
(all priorities equally weighted)
Effort: 14 staff-months
Schedule: 8.0 months
Peak Staff: 2.6 staff
Cost: n/a

Optimum Plan
(priorities set by estimator)
Effort: 14 staff-months
Schedule: 8.0 months
Peak Staff: 2.6 staff
Cost: n/a
Project planning is currently not affected by constraints.

Construx
Delivering Software Project Success

Project labor cost needs to be defined

Estimate Quality: Good
## Internet Project comparison
Personnel cost factors adjusted

<table>
<thead>
<tr>
<th></th>
<th>Original Results</th>
<th>Adjusted Results</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effort</td>
<td>27 SM</td>
<td>14 SM</td>
<td>52% decrease</td>
</tr>
<tr>
<td>Schedule</td>
<td>10.3 Months</td>
<td>8 Months</td>
<td>29% decrease</td>
</tr>
<tr>
<td>Staff</td>
<td>3.9 peak staff</td>
<td>2.6 peak staff</td>
<td>1 less staff</td>
</tr>
</tbody>
</table>
Internet Project comparison
Product cost factors adjusted

Original Cost Factors
- average complexity
- average size database
- errors cause small and easily recoverable losses

Adjusted Cost Factors
- extremely complex
- extremely large database
- errors pose risk to life

<table>
<thead>
<tr>
<th></th>
<th>Original</th>
<th>Adjusted</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effort</td>
<td>27 SM</td>
<td>33 SM</td>
<td>22% increase</td>
</tr>
<tr>
<td>Schedule</td>
<td>10.3 months</td>
<td>11.3 months</td>
<td>1% increase</td>
</tr>
<tr>
<td>Staffing</td>
<td>3.9 peak staff</td>
<td>4.5 peak staff</td>
<td>1 more staff</td>
</tr>
</tbody>
</table>
Estimate Summary

(project not described)

Nominal Plan
Current Project Phase: Detailed Requirements / UI Design Complete

<table>
<thead>
<tr>
<th>Management Metric</th>
<th>Expected Value (50% Probability)</th>
<th>Standard Deviation</th>
<th>Standard Deviation as Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Size (lines of code)</td>
<td>23,623</td>
<td>4,879</td>
<td>±21%</td>
</tr>
<tr>
<td>Effort (staff months)</td>
<td>16</td>
<td>34</td>
<td>±21.5%</td>
</tr>
<tr>
<td>Schedule (calendar months)</td>
<td>11.9</td>
<td>5.3</td>
<td>±43%</td>
</tr>
<tr>
<td>Completion Date</td>
<td>3/10/2012</td>
<td>5.3 months</td>
<td>±44%</td>
</tr>
<tr>
<td>Cost</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Peak Staff (people)</td>
<td>2.0</td>
<td>2.2</td>
<td>±10.7%</td>
</tr>
<tr>
<td>Average Staff (people)</td>
<td>1.3</td>
<td>2.5</td>
<td>±21.5%</td>
</tr>
<tr>
<td>Overall Estimate Quality</td>
<td>Fair</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This estimate is the 50/50 estimate—the estimate for which there is both a 50 percent chance of overrunning and a 50 percent chance of understating the estimate. This is also known as the “nominal” estimate. This estimate is for the “incremental” phase of a project, the time from detailed requirements specification complete to software acceptance. Endless phases of a project are not estimated here.

Optimum Plan

<table>
<thead>
<tr>
<th>Management Metric</th>
<th>Optimum Planning Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effort (staff months)</td>
<td>16</td>
</tr>
</tbody>
</table>

Project labor cost needs to be defined.
## Schedule Probabilities Report

### Avionics Project Report

<table>
<thead>
<tr>
<th>Probability (%)</th>
<th>Schedule Will Be Less Than</th>
<th>Difference From Nominal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>9.4</td>
<td>-35%</td>
</tr>
<tr>
<td>5.0</td>
<td>10.5</td>
<td>-28%</td>
</tr>
<tr>
<td>10.0</td>
<td>11.2</td>
<td>-23%</td>
</tr>
<tr>
<td>20.0</td>
<td>12.3</td>
<td>-16%</td>
</tr>
<tr>
<td>30.0</td>
<td>13.1</td>
<td>-10%</td>
</tr>
<tr>
<td>40.0</td>
<td>13.9</td>
<td>-4%</td>
</tr>
<tr>
<td>50.0</td>
<td>14.6</td>
<td>0%</td>
</tr>
<tr>
<td>60.0</td>
<td>15.2</td>
<td>4%</td>
</tr>
<tr>
<td>70.0</td>
<td>16.1</td>
<td>10%</td>
</tr>
<tr>
<td>80.0</td>
<td>17.3</td>
<td>19%</td>
</tr>
<tr>
<td>90.0</td>
<td>19.1</td>
<td>31%</td>
</tr>
<tr>
<td>95.0</td>
<td>22.4</td>
<td>54%</td>
</tr>
<tr>
<td>99.0</td>
<td>33.6</td>
<td>130%</td>
</tr>
</tbody>
</table>

### Internet Project Report

<table>
<thead>
<tr>
<th>Probability (%)</th>
<th>Schedule Will Be Less Than</th>
<th>Difference From Nominal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>5.1</td>
<td>-36%</td>
</tr>
<tr>
<td>5.0</td>
<td>5.8</td>
<td>-28%</td>
</tr>
<tr>
<td>10.0</td>
<td>6.2</td>
<td>-23%</td>
</tr>
<tr>
<td>20.0</td>
<td>6.8</td>
<td>-16%</td>
</tr>
<tr>
<td>30.0</td>
<td>7.2</td>
<td>-11%</td>
</tr>
<tr>
<td>40.0</td>
<td>7.5</td>
<td>-6%</td>
</tr>
<tr>
<td>50.0</td>
<td>8.0</td>
<td>0%</td>
</tr>
<tr>
<td>60.0</td>
<td>8.4</td>
<td>5%</td>
</tr>
<tr>
<td>70.0</td>
<td>8.9</td>
<td>12%</td>
</tr>
<tr>
<td>80.0</td>
<td>9.8</td>
<td>22%</td>
</tr>
<tr>
<td>90.0</td>
<td>11.5</td>
<td>43%</td>
</tr>
<tr>
<td>95.0</td>
<td>14.2</td>
<td>77%</td>
</tr>
<tr>
<td>99.0</td>
<td>33.7</td>
<td>320%</td>
</tr>
</tbody>
</table>
Costar

- Supported estimation models
  - COCOMO II with traditional phases
  - COCOMO II with MBASE.RUP phases
  - Ada COCOMO
  - COCOMO 81
  - Custom model
- Component Tree
- Very Descriptive
- Cost
  - Single license $1900
  - Site license $5000
  - Corporate License $25,000
Costar Estimate Window

### COCOMO II Cost Drivers for Component: Component1

<table>
<thead>
<tr>
<th>Personnel</th>
<th>Platform</th>
<th>Product</th>
<th>User Defined</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACAP...</td>
<td>TIME...</td>
<td>RELY...</td>
<td>USR1...</td>
</tr>
<tr>
<td>APEX...</td>
<td>STOR...</td>
<td>DATA...</td>
<td>USR2...</td>
</tr>
<tr>
<td>PCAP...</td>
<td>PVOL...</td>
<td>CPLX...</td>
<td>USR3...</td>
</tr>
<tr>
<td>PLEX...</td>
<td></td>
<td>RUSE...</td>
<td>USR4...</td>
</tr>
<tr>
<td>LTEX...</td>
<td></td>
<td>DOCU...</td>
<td></td>
</tr>
<tr>
<td>PCON...</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Size Summary
- **Size**: 3000
- **Method**: SLDC

### Totals for entire Project

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Effort (FM)</th>
<th>Duration (Mo)</th>
<th>Cost (k$)</th>
<th>Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements</td>
<td>0.5</td>
<td>1.1</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td>Development</td>
<td>7.0</td>
<td>6.8</td>
<td>0.0</td>
<td>429.4</td>
</tr>
<tr>
<td>Total</td>
<td>7.5</td>
<td>7.9</td>
<td>0.0</td>
<td>401.3</td>
</tr>
</tbody>
</table>

### Equivalent Size
- **Total Size**: 3,000
## Example - Detail Report

Costar 7.02  
01/24/2005  11:34:57  Page: 1

### Costar Detailed Report

<table>
<thead>
<tr>
<th>Phase</th>
<th>Effort (Person-Months)</th>
<th>Cost ($K)</th>
<th>Duration (Months)</th>
<th>Staffing</th>
</tr>
</thead>
<tbody>
<tr>
<td>RQ -- Requirements</td>
<td>0.5</td>
<td>0.0</td>
<td>1.1</td>
<td>0.4</td>
</tr>
<tr>
<td>PD -- Product Design</td>
<td>1.2</td>
<td>0.0</td>
<td>1.6</td>
<td>0.7</td>
</tr>
<tr>
<td>DD -- Detailed Design</td>
<td>1.9</td>
<td>0.0</td>
<td>1.6</td>
<td>1.2</td>
</tr>
<tr>
<td>CT -- Code &amp; Unit Test</td>
<td>2.6</td>
<td>0.0</td>
<td>2.2</td>
<td>1.2</td>
</tr>
<tr>
<td>IT -- Integration &amp; Test</td>
<td>1.4</td>
<td>0.0</td>
<td>1.4</td>
<td>1.0</td>
</tr>
<tr>
<td>Development (PD+DD+CT+IT)</td>
<td>7.0</td>
<td>0.0</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td>Totals (RQ+PD+DD+CT+IT)</td>
<td>7.5</td>
<td>0.0</td>
<td>7.9</td>
<td></td>
</tr>
<tr>
<td>MN -- Maintenance (per year)</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
</tr>
</tbody>
</table>

**Estimate Name:** Example  
**Model Name:** COCOMO II 2000  
**Process Model:** COCOMO II Model  
**Component Name:** Component 1  
**Increment:** 1  
**Developed Size:** 3,000

**Estimate ID:**  
**Model ID:** 2000  
**Phases:** Waterfall  
**Component ID:**  
**Level:** 1  
**EAF:** 0.7100
Model tab

![Costar - Estimate1 (Component1) window](image)

**Costar - Estimate1 (Component1) Window**

- **File**, **View**, **Reports**, **Components**, **Tools**, **Preferences**, **Help**
- **Model**: COCOMO II 2000
- **Component**: Component1

<table>
<thead>
<tr>
<th>Totals for entire Project</th>
<th>Effort (PM)</th>
<th>Duration (Mc)</th>
<th>Cost (K$)</th>
<th>Productivity</th>
<th>Equivalent Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirements RQ:</td>
<td>0.6</td>
<td>1.2</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development FD+DD+CT+IT:</td>
<td>8.4</td>
<td>7.3</td>
<td>0.0</td>
<td>356.6</td>
<td></td>
</tr>
<tr>
<td>Total RQ+FD+DD+CT+IT:</td>
<td>9.0</td>
<td>8.5</td>
<td>0.0</td>
<td>333.3</td>
<td>Total Size: 3,000</td>
</tr>
</tbody>
</table>

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

- **COCOMO Model**: COCOMO II 2000
- **Model ID**: 2000
- **Phases**: Waterfall
- **Model Type**: COCOMO II

**Scale Factors**

- **Precedentedness**: Somewhat Unprecedented
- **Development Flexibility**: Rigorous
- **Architecture / Risk Resolution**: Often (60%)
- **Team Cohesion**: Basically Cooperative
- **Process Maturity**: SEI CMM Level 2

Additional options:

- **Show Equations**
- **APM Settings**

Click on a tab to display another notebook page:

- **Estimate1**: 9.0 PM, 8.5 Months
- **Component1**: 9.0 PM
- **EAF**: 0.3360, **Level**: 1
Contents

● COCOMO II
  - estimation and COCOMO II
  - Center for Systems and Software Engineering

● Estimation Tools
  - Construx Estimate
  - Costar 7.0

● Function Point Analysis Tool
  - standard and enterprise edition

● Summary

● Questions
Function Point Modeler

- Eclipse Graphical Modeling framework (GMF)
- Standard version – free
- Enterprise version - $10,500
- International Function Point User group (IFPUG) CPM 4.2 and 4.x
  - development project counts
  - enhancement project counts
  - application project counts
- Model Driven Architecture (MDA)
Standard Function Point Modeler
Transactional Function

- Type EI, EO or EQ
- Complexity
- UFP automatically calculated
- Enhancement Type
- Process Type
Data Function

- Type ILF or ELF
- Complexity
- UFP
- Enhancement Type
Model Driven Architecture (MDA)
Enterprise Version Features

- Metrics Management Tool plugin
  - manages all IT metrics
- software life cycle experience database (SLED)
- COCOMO II plugin
- Report Designer plugin
- Export to MS Project
- Software Development Process
  - RUP
  - Waterfall
  - Custom
Summary

● COCOMO II
  - Estimation and COCOMO II
  - Center for Systems and Software Engineering

● Estimation Tools
  - Construx
  - Costar

● Function Point Analysis tool
  - Standard edition
  - Enterprise edition
References


● Center for Software Engineering, COCOMO II http://sunset.usc.edu/csse/research/COCOMOII/cocomo_main.html


● Costar Sofware, http://www.softstarsystems.com

● Fairley, R. (2009), Managing and Leading Software Projects, John Wiley & Sons, Inc.

● Function Point Modeler Inc., http://www.functionpointmodeler.com

Questions?