

Creating or Modifying Templates

SLIM-ESTIMATE® HOW TO SERIES



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Overview

This document will show you how to create custom estimation templates calibrated to various lifecycles and project types. Once created, these template files will help you streamline and standardize future project estimates. Documents in the *SLIM-Estimate® How To* series walk you through SLIM's estimation process. Each guide tells you what the goal is, what steps are required to achieve the goal, and what information you configure or enter. Some important things to understand about configuring SLIM-Estimate® to your development environment include.

- SLIM-Estimate® is a flexible, yet robust simulator. New clients can quickly produce “out of the box”, industry based estimates using settings derived from the QSM database, but customizing SLIM-Estimate® to match your environment and lifecycle fine-tunes the model to produce more accurate effort, cost, schedule, and defect discovery plans.
- Template files make it easy to share knowledge and expertise. As your organization's experience increases, you can build one or more custom templates that make this knowledge available to others.
- Fine-tuning your workbooks is an ongoing process. If you have little to no data available, rely on the QSM default templates and simple solution options. As your project metrics database grows, you can gradually update and refine your custom templates.
- The estimation process must be managed. Creating templates, making files available across the enterprise, and presenting consistent and accurate estimate solutions helps you build confidence and ensures consistent results.

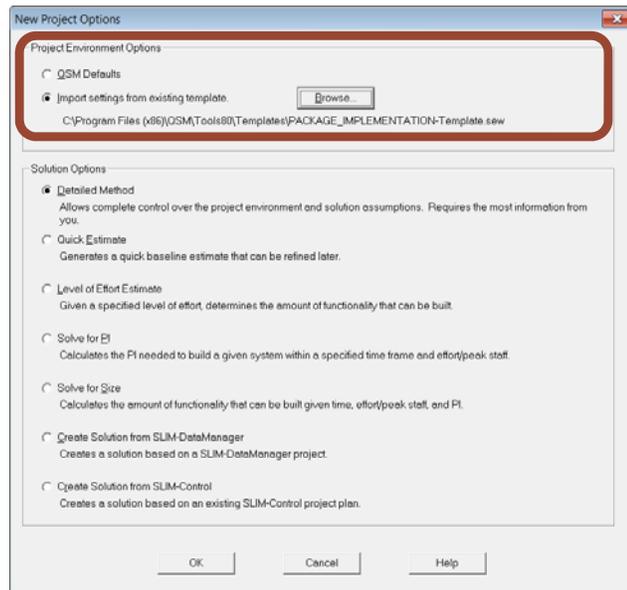
What is a Template?

In general, a template is an object used as a standard or pattern for creating new objects of the same type. In SLIM-Estimate®, there is no special file format for templates. Virtually any workbook (.sew file) can be used to transfer collections of project settings (Global Options, Project Environment settings, phase duration/effort/overlap tuning factors, defect tuning factors, and industry trend lines) to new project estimates.

In fact, your very first estimate can be used over and over again as a model for estimating similar projects! This template can be refined as you collect historical data and gain experience. As you learn, your templates will get “smarter.”

Creating New Files from Existing Templates

If you've ever created a new workbook in SLIM-Estimate®, you've already used a template. When you select **File | New** from the menu, you will be asked to base your new workbook on QSM Default settings or settings from an existing SLIM-Estimate® workbook. Choosing **QSM Defaults** creates a new workbook that reflects generic industry settings from the QSM database. Selecting **Import settings from existing template** creates a new workbook using the Global Options and Project Environment settings, plus industry or custom reference trends from a template you select.



SLIM-Estimate® ships with an extensive set of samples and template files pre-configured for use with various project types. Each one models a different combination of project characteristics. For example, the Agile template features QSM's Agile Benchmark trend lines, multiple development iterations within the build phase, and sizes the estimate in Stories and Features. The QSM default templates can be found in the \QSM\Tools80\Templates folder. A list of QSM templates with brief descriptions appears in the appendix of this document.

As you create new templates (or modify the templates that ship with SLIM-Estimate®), you will discover how templates save time and standardize the estimation process. Most parameters found in the **Global Options** and **Project Environment** areas remain fairly constant within an organization. Once these settings have been calibrated to your environment and methods, estimators will be free to focus on the unique characteristics of each new project.

Templates can also be used to spread knowledge across the enterprise. Teams new to Agile can leverage Agile templates created by other teams who have already mapped their Agile terminology and lifecycle characteristics to QSM's high level phases and activities.

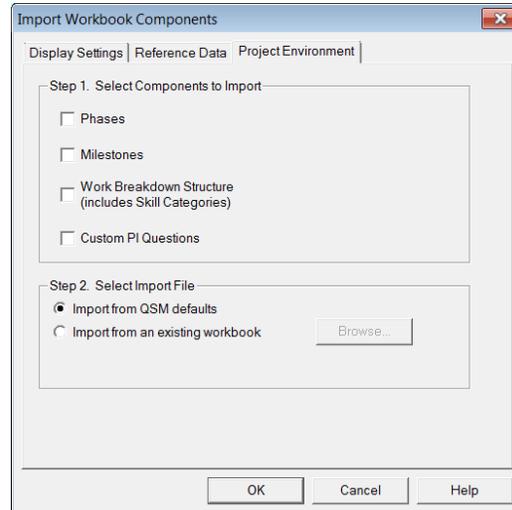
Importing Individual Settings from an Existing Workbook

In addition to importing an entire set of template settings via the **File | New** menu item, estimators can also import individual workbook components into an existing SLIM-Estimate® file. These are the configuration sets that can be imported:

- Phase or Milestone names, acronyms, and definitions
- Work Breakdown Structures, Skill Categories, and associated Labor Rates
- Custom PI Adjustment Factors

- Reference trends
- Chart and Report outlines, and color and font settings

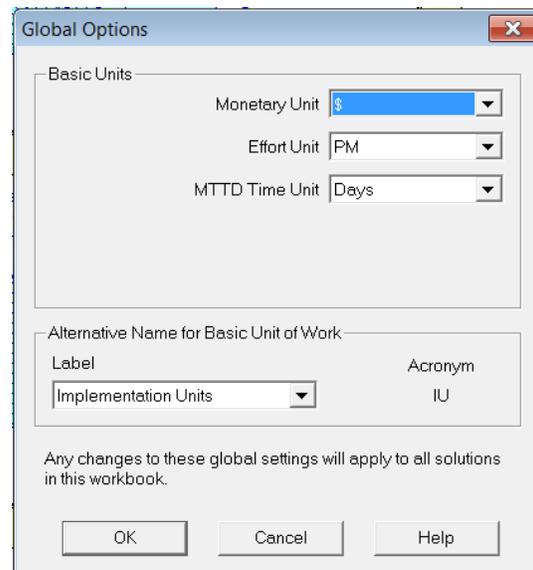
In addition to basing your entire workbook on an existing SLIM-Estimate® file, you can also import individual groups of settings into your workbook by selecting **File | Import Workbook Components** from the menu. The tabs on this dialog are described in detail in the online Help, accessible via the Help button on each tab.



Customizing the Global Options

The first step in customizing your template is to configure the **Global Options**. Global options are units of measure, like dollars (\$), that rarely change within a given group or division. Select **File | New** from the menu and select either the QSM default workbook or an existing template. These settings will apply to every solution - current or logged - in the workbook:

- **Monetary Unit (cost)** – determines the currency symbol displayed with cost.
- **Effort Unit (effort)** – typically PHRS or PM, the effort unit should reflect the way your organization typically collects and reports effort. If “PHRS” is selected, SLIM-Estimate® will display the effort estimate in hours rather than SLIM’s default (PM). This field has no effect on the underlying effort solution value – think of it as a conversion or display option.
- **MTTD Time Unit (quality)** – the average time the delivered system should run between the discovery of a defect. For Business/IT systems, use days. For mission critical or high reliability systems, hours may be more appropriate.
- **Basic Work Unit (size)** – display name for the smallest identifiable unit of programming work. The default display name is “Source Lines of Code”, but with the advent of GUI languages and environments, there may be situations where SLOC is no longer a meaningful unit. You may designate an alternate basic unit of work, keeping in mind that the unit you choose should carry approximately the same amount of time and effort as writing a line of code.



The **Help** button on each dialog will bring up specific information to help you customize these dialogs to your environment. You will also find complete descriptions of each setting in the *SLIM-Estimate® User Manual*, found in the **Doc** folder of your **Tools80** directory.

Customizing the Project Environment

SLIM's Project Environment area (**Tools | Customize Project Environment**) groups common project characteristics together. Whereas each project produces a unique product of a given size, requiring associated commitments of effort, time, and staffing, the Project Environment describes the way you do business, reflecting your phase and task names, milestone names and descriptions, and defect category names and percentages of total defects. Each tab represents a logical groupings of project descriptive information and data.

Project Description Settings

The **Project Description** tab contains high level data. The Summary project data (Organization and Description) is descriptive in nature and has no direct influence on the estimate. Product Construction and Trend Group fields (Function Unit, Gearing Factor, Primary Trend Group, or Trend Mix) are used to calculate solutions. Because they can affect estimated time and effort, care should be taken to get these settings right:

The screenshot shows the 'Project Environment' dialog box with the 'Project Description' tab selected. The dialog is divided into several sections:

- Summary:** Contains fields for 'Project Name' (FPGA), 'Organization', and 'Description' (Estimate for next generation of field-programmable gate array (FPGA)).
- Product Construction:** Contains dropdowns for 'Function Unit' (Logic Gates), 'Gearing Factor' (1), and 'Code is counted after' (Integrated).
- Trend Group:** Contains a 'Primary Trend Group' dropdown (FPGA Systems) and a 'Trend Group Description' text area. Below this is a checkbox 'Use this mix of trend statistics to calculate default project parameters such as PI.' and three rows of dropdowns for 'Trend Mix' (QSM Microcode, <none>, <none>) with percentage values (100%, 0%, 0%).

Buttons for 'OK', 'Cancel', and 'Help' are located at the bottom right of the dialog.

- The **Function Unit** is the top level sizing unit for the project. In most cases, particularly if you are using one or more of the detailed sizing techniques available in the **Sizing Calculator**, your Function Unit should be the same as the **Basic Work Unit** defined in the Global Options and will have a **Gearing Factor** of 1. For a more in depth discussion of sizing, see *Understanding SLIM-Estimate® Inputs, How to...*). If you are NOT planning to use the

detailed sizing techniques, you may wish to set up your template with a single, high level Function Unit other than the Basic Work Unit. Examples would be Function Points, Objects, Requirements, etc. Because these are more abstract sizing units, their gearing factors should reflect the average number of elementary programming steps (the smallest unit of programming effort, approximately equal to writing a line of code) needed to implement a function point, object, requirement, or other abstract size unit. Gearing factors are best determined from your completed projects, but if you need help you can [contact QSM support](#).

- The **Primary Trend Group** determines the trends used to select a default PI. Reference trends from your primary trend group will also be displayed by default on all scatter plot charts unless you override this manually at the individual chart level.

Your Primary Trend Group may be a QSM trend group or a custom trend created from your own historical data in SLIM-Metrics. Custom trends can be imported into any SLIM-Estimate®, SLIM-Control, or SLIM-Metrics workbook via the **File | Import Workbook Components** menu item. QSM industry data is stratified into application or complexity domains. Descriptions of the application types are available via the Help button. Choose the reference group that most closely resembles your current project. One you have created one or more estimates, use the trends to validate your estimate against similar projects from your own history or the QSM database, or industry with the industry average.

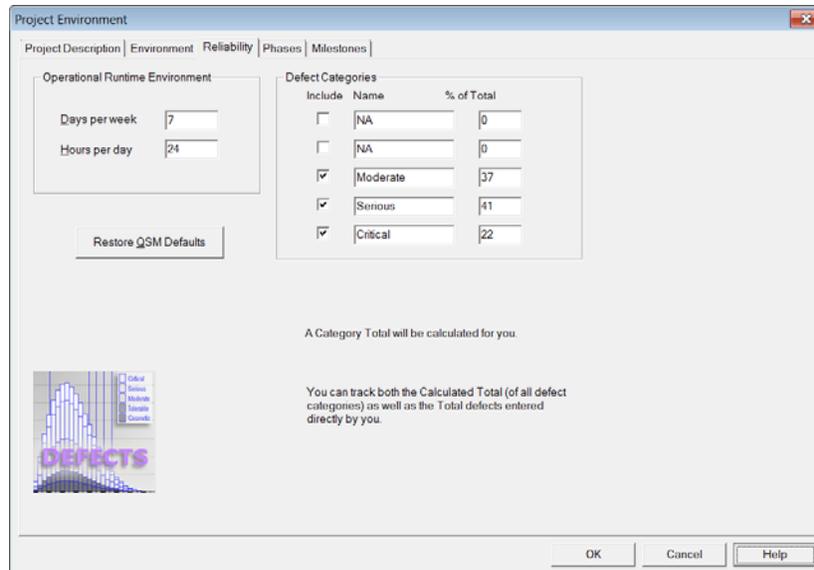
Environment Settings

On the **Environment** tab, you can enter information about your development tools and industry sector. This information does not affect the estimate calculations, but provides documentation to support benchmarking analysis and future estimates. It helps all stakeholders understand the project assumptions, and reasons for actual project performance.

Reliability Settings

Though QSM provides default defect category names and percentages, defect category percentages are best determined from your historic data. Defect definitions and tracking procedures can vary widely from organization to organization. Use defect data from your completed projects to calculate the percentages of total defects for each defect category.

The category names and defect percentages are used to build the defect reports provided by SLIM-Estimate®. You can include all five defect categories or customize the category names and percentages to reflect your defect history and counting practices. To exclude any defect category, clear the checkbox next to the category name.

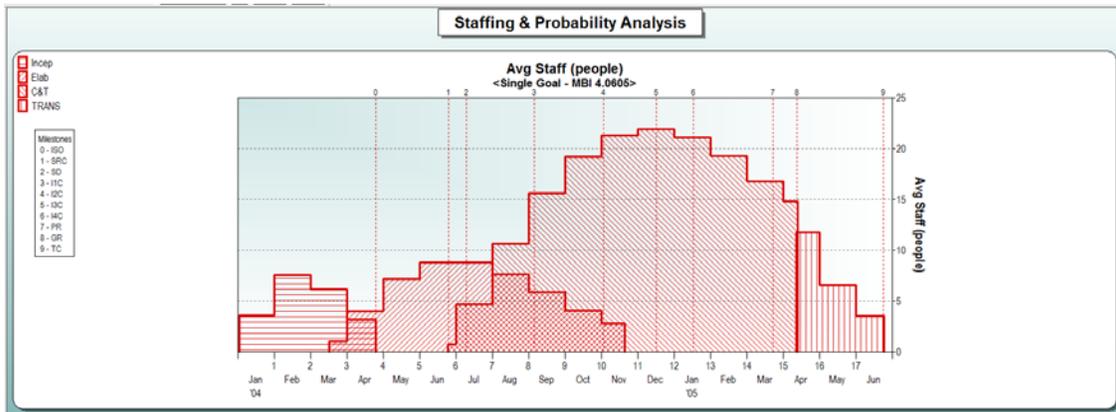


Because the defect categories and percentages are used to break the overall defect estimate out by category, it is important that the information you provide here reflect the way you typically report and track defects in your environment,. **If you choose to include only Serious and Critical defects, for instance, your defect totals will reflect the sum of Serious and Critical defects only** (by default, 51% of the total body of expected defects). MTTD calculations and defect charts would then be calculated from this 51% of the total defects. If, on the other hand, you typically track all defects but only break your total defects into 3 categories, you should make sure your three categories represent all defect categories being counted in your defect totals.

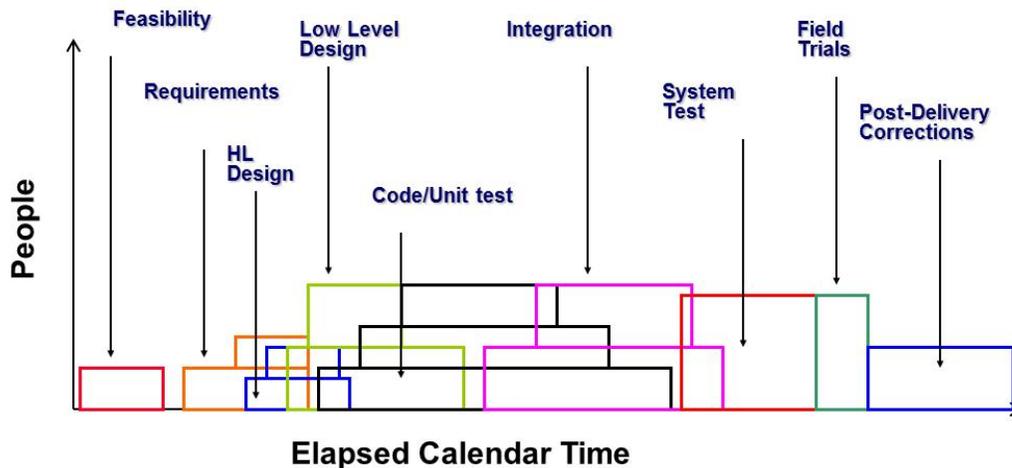
Phase Settings

SLIM estimates a project at the macro level. Despite the variety of software lifecycle methodologies and development approaches used today, every development effort includes the same high level activities:

- Phase 1 (What) – Determine what the project scope is and if it should be done; Feasibility Study.
- Phase 2 (How) – Determine how the software will be built; Detailed Requirements and High Level Design.
- Phase 3 (Do) – Detailed Design, Construct, Integrate, and Test; Build and Deploy.
- Phase 4 (Clean Up) –Remove latent defects; Post Delivery Warranty.

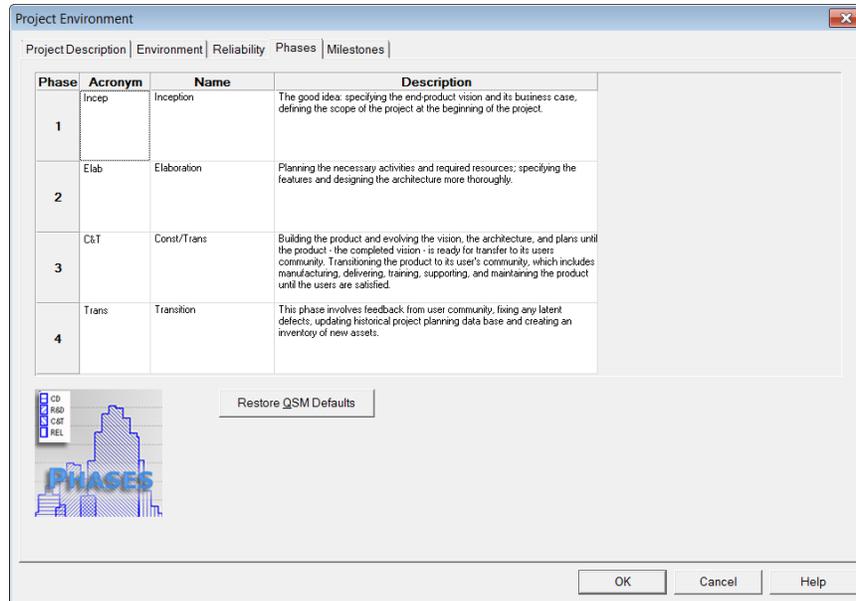


The first task in mapping the lifecycle is to identify how summary level tasks in your environment correspond to each of SLIM's 4 high level phases. Not all phases must be included in every estimate. Only Phase 3 is required.



The diagram above shows how a variety of development activities are conducted during the project lifecycle. They are typically performed by different people and often overlap in time, however each can be mapped to the SLIM's default phase definitions.

Configure the QSM default phase definitions to match your project's environment by modifying the Acronym, Name, and Description fields. The screen below shows phase information for a QSM Rational Unified Process (RUP) template.



The information entered here is descriptive in nature and has no direct effect on the estimate. Phase shapes and overlap data is specified on the **Solution Assumptions** screen (see *Creating Defensible SLIM-Estimate® Solutions*). You may configure the rate of staff buildup on the project by specifying the Rayleigh curve shape on the **Basic Info** tab, and the phase overlap on the **Phase Tuning** tab. The reason this information is separate is because the phases included, shape, and overlap may vary from project to project. However, within a given project type or organizational group, you may find that your chosen development methodology and resource allocation practices show consistent shape and overlap patterns. More detailed information on this aspect of phase configuration is covered in future documents. It is mentioned here, because preserving this information in a template promotes consistent and accurate life cycle modeling.

Milestone Settings

Modify the milestone data to match typical project process gates (such as peer reviews) or completed deliverables (like design document or integration build). Milestones are attached to the phases in which they occur. Milestone data in SLIM-Estimate® is used for creating charts and reports. The reports are especially useful for documenting and sharing the project plan. Use the Milestone Calculator to determine the phase duration percent using that phase's start and end dates, along with the milestone date. SLIM calculates the planned completion date for each milestone, along with the total number of months from the project start. For example, if the Requirements and Design phase is scheduled to start on January 1, and end on March 31, and the Requirements Review is set for February 15, then you specify the milestone occurrence as 50% of Phase 2.

If you plan to use SLIM-Control® to track your project, the milestone data is an important variable in forecasting. QSM finds comparing planned versus actual milestone dates to be a good prediction of project performance, particularly early in the life cycle.

Project Environment

Project Description | Environment | Reliability | Phases | Milestones

Include	ID	Acronym	Name	%	of Phase	Description
<input checked="" type="checkbox"/>	0	ISO	Inception Sign-off	100	Phase 1	Exit Criteria for this phase include creation of a preliminary project plan and an approved business plan. The business plan should
<input checked="" type="checkbox"/>	1	FR	Functional Requirements	35	Phase 2	The completion criteria for this milestone are 1) the creation of a functional requirements document that contains use cases and a
<input checked="" type="checkbox"/>	2	SD	Systems Design Review	10	Phase 3	The completion criteria for this milestone are 1) creation of a system design document, 2) project plan elements including
<input checked="" type="checkbox"/>	3	DD	Detailed Design Review	30	Phase 3	The completion criteria for this milestone are creation of 1) a architecture design document, 2) a updated RTM, 3) a
<input checked="" type="checkbox"/>	4	IT	Start Integration Test	50	Phase 3	The completion criteria for this milestone are creation of 1) an integrated system, 2) fault records, 3) test coverage reports, a
<input checked="" type="checkbox"/>	5	ST	Start Systems Integration Test	71	Phase 3	The completion criteria for this milestone are creation of, 1) a functional test plan, 2) an intergrated system, 3) testing standards.
<input checked="" type="checkbox"/>	6	PR	Pre-release	93	Phase 3	A careful, tentative first use under rigid control. Often a trial by selected end users.
<input checked="" type="checkbox"/>	7	GR	General Release	100	Phase 3	The completion criteria for this milestone are a 1) tested system, a version control document, final end user deliverables.
<input checked="" type="checkbox"/>	8	PGR	Post General Release Cleanup	100	Phase 4	The point after general release at which 95% of the original body of errors have been found and corrected.

Automatically renumber after insertions and deletions

Right-click on any cell for editing menu.

Sort by ID

Sort by % and Phase

Restore QSM Defaults

Milestone Calculator...

OK Cancel Help

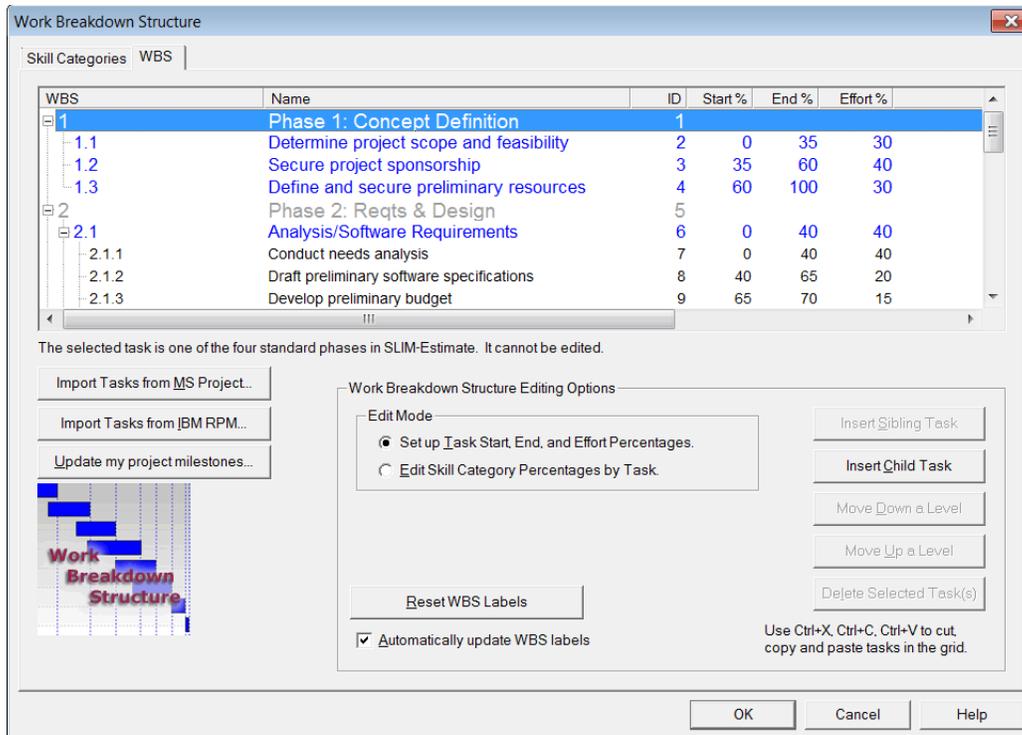
NOTE: Any lifecycle detail below the phase level must be tied to phases by percentages. This preserves the complete lifecycle definition as various estimate “what-if” scenarios are run, and enables an organizational level template to be used for many projects.

Customizing the WBS

The QSM Default Template subdivides the four major phases into a Work Breakdown Structure (WBS) with one or more levels of detail. This set of parent and child tasks describe major activities performed within each phase, along with the relative sequence, effort, and duration for each task. Configuring the WBS to reflect the activities performed for a typical life cycle development methodology within your organization does a few things:

- Helps all stakeholders understand and accept the estimate because familiar terms are used.
- Provides detailed data on projected effort, time, and resource requirements to support the solution comparison process or detailed project planning
- Builds a plan that can be exported to MS Project or other planning tool.

Select **Tools | Customize WBS | Set up Tasks** to edit the default WBS. You may add, change, or delete tasks manually or import a WBS outline from Microsoft (MS) Project.



As noted previously for milestones, WBS items define an additional level of detail below QSM's four high level phases, and they are used for charts and reports. Task duration and effort are defined as percentages of the top level task or phase in which they occur. You will also want to review the QSM default **Skills Categories** and respective labor rates, and tailor them to your organization's resource information. This customization helps project personnel see how SLIM relates to their understanding of project activities and resources, and enables SLIM to accurately calculate and chart effort and cost data by task. The charts and reports become workable schedule and cost plans.

The *SLIM-Estimate® User Manual* provides detailed step-by-step instructions for importing or customizing a WBS.

Simplifying Estimation with Organizational Standards

Well defined and documented software development processes make them repeatable. The project team will readily adopt standard processes when they see how it benefits their job and saves time. Taking time to configuration SLIM-Estimate® templates to accurately model your development environment not only promotes standard procedures for the estimation process, it also reinforces standard development methodologies and planning practices.

New projects will adapt the templates you create to accurately model its unique characteristics. The goal of organizational standards is to minimize that level of tailoring. It is easier to 'tailor out' than to 'tailor in.' This simply means that if your development approach is made up of activities performed on only a few projects, include them in the template. Estimators and project managers can delete optional tasks more easily than figuring out where to add in new

ones. For example, the QSM Agile Template divides Phase 3 into six Iterations plus System Testing. Tasks performed during each iteration are not shown. To customize this template for your group, you may want to define your standard approach by adding on level of child tasks for each WBS item, and reduce the number of iterations to four



Documenting Your Templates

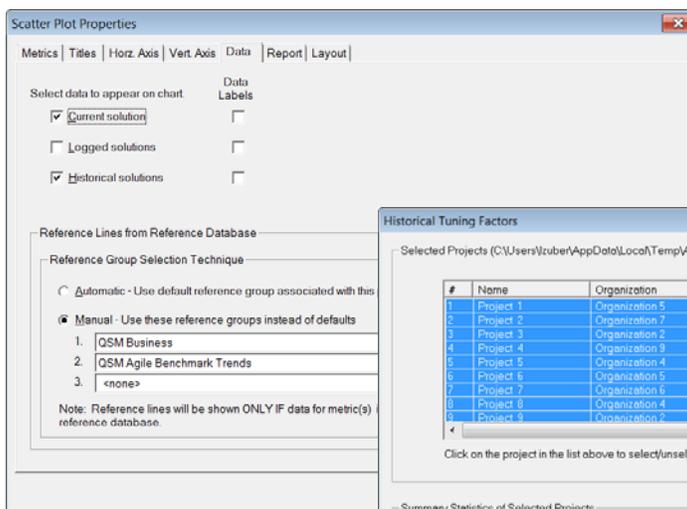
Create a template for every major project type, matching skills categories and phase overlap percentages appropriately. Create a central repository of available templates, along with a list of template names, descriptions, and uses. List projects estimated using each template to promote an exchange of information and expertise. The PI and size estimates particularly may vary, thus descriptive data helps estimators accept or modify these inputs based upon known assumptions.

Creating Consistent Size Estimates

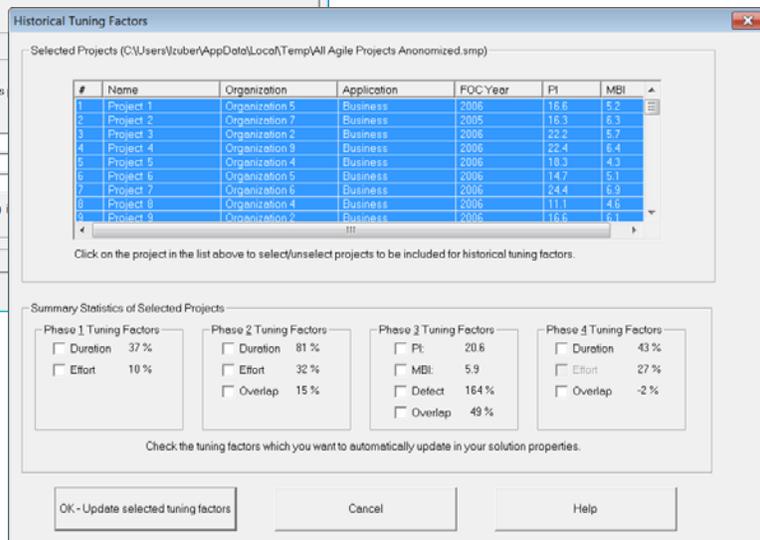
Quite a lot of data can be contained within SLIM's Sizing Calculator. There are seven sizing techniques to choose from, accommodating multiple entries within each selected technique. Prepopulating templates with commonly used sizing units (Basic Unit of Work, Function Unit) and Gearing Factors allows each estimator to decide which techniques to include or exclude without having to remove them. Be sure to update this data as your historical database grows and you refine your sizing methods. Detailed step-by-step instructions for sizing is covered in the next document in this series, *Constructing Sizing Methods*.

Preload Historical Projects and Trend Groups

SLIM-Estimate® templates can be preloaded with a subset of your historical project database to facilitate history tuning and comparison. This is particularly important when determining the PI for each new estimate. Although a large number of projects can be accommodated, you want to select only projects with similar characteristics, like the percent of new development or reuse, team size, industry, or tools. Despite the advances in any of these environmental factors, or the perception that every project is different, QSM has found that project teams tend to conduct business in a particular way for a particular high-level project type. Thus, the staffing profiles and phase overlap represented in the completed project data will likely show consistent patterns you will want new projects to understand. Historical data on defect detection and removal can be used to preset the **Defect Tuning Factor** also.



preload additional trends to promote consistent comparisons. The Primary Trend Group will automatically be displayed on comparison charts, unless otherwise specified. Simply right-click on any scatter plot to modify the **Reference Group Selection**, and **Display** options.



Whether you are using a QSM trend group or custom trend lines created from your historical projects, set the **Primary Trend Group** and

What Are the Next Steps?

The second document in this series, *Constructing Sizing Methods*, presents the best practices for sizing the project's delivered product. Support is free and unlimited, so do not hesitate to contact QSM Support for assistance.

Appendix

Matrix of QSM Templates

Template Name	Description	Function Unit	Detailed Custom Sizing Technique	Benchmark Trend
HW-ASIC	Template for estimating the next generation of field-programmable gate array (FPGA) devices.	Logic Gates	Sizing by History-Fuzzy Sizing from Trend Statistics	ASIC Systems
PACKAGE IMPLEMENTATION	Template for an SAP Package implementation	IU	Sizing by History-Fuzzy Sizing from SAP Statistics	Package Implementation group
SW-Call Center Estimation	Template for setting up a Help Desk call center.	IU	Sizing by Decomposition	Infrastructure Benchmark Trends
SW-Comm IT App Dev FP	Commercial IT Template that uses function points as the primary sizing method.	FP	FP Sizing	QSM Business
SW-Comm IT App Dev	Commercial IT Template that uses Source Lines of Code as the primary sizing method.	SLOC	No	QSM Business
SW-Comm IT OO App Dev	Commercial IT Object Oriented Template.	Objects	No	QSM Business
SW-Comm Prod Engineering	This is a template for commercial engineering projects.	SLOC	No	QSM C&C
SW-Comm Prod Real Time	This is a template for a commercial real time embedded product development.	SLOC	No	QSM Real Time
SW-Comm Shrink Wrap Dev	Shrink Wrap Commercial Products Template.	Objects	No	QSM Business
SW-Data Center Estimation		IU	Sizing by Decomposition-Hardware Installation	Infrastructure Benchmark Trends

SW-Database Dev	Template for design and construction of a database project.	Data Elements	No	QSM Business
SW-DOD Engineering Proj	DOD Engineering project template.	SLOC	No	QSM C&C
SW-DOD Realtime	DOD Real time embedded project template.	SLOC	No	QSM Real Time
SW-Minor Enhancement	This is a template for basic minor enhancement maintenance projects.	SCRs	No	QSM Business
SW-OO Dev	Object Oriented Project Template.	Objects	No	QSM Business
SW-Rational RUP	Rational Unified Process Template.	Use Cases	No	QSM Business
SW-Simple Outline	Simple chart/report outline.	SLOC	No	QSM Business
SW-SLIM 40	SLIM-Estimate® 4.0 template.	SLOC	No	QSM Business
SW-Small Project	This is a template for development of small projects.	SLOC	No	QSM Business
SW-Small Web Site	This is a template for basic website development projects.	Web Pages	No	QSM Business
SW-WBS Outline	Chart and report outline used to append a set of WBS charts and reports.	SLOC	No	QSM Business
SW-WBS With Milestones	Same WBS chart/report outline but with Milestones displayed.	SLOC	No	QSM Business
SW-Web Site Template	This is a template for website development projects	Web Pages	No	QSM Business
