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ShipConstructor®



Featuring: Database Driven Relational Object Model™ (DDRORM™)

Split and Merge

ShipConstructor 2009 Split and Merge
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ShipConstructor Software Inc.

Suite 304
3960 Quadra Street
Victoria, BC
Canada V8X 4A3

Toll Free: 1-888-210-7420
Phone: 1-250-479-3638
Fax: 1-250-479-0868

Information: info@ShipConstructor.com
Support: support@ShipConstructor.com
Sales: SSI@ShipConstructor.com

Website: www.ShipConstructor.com

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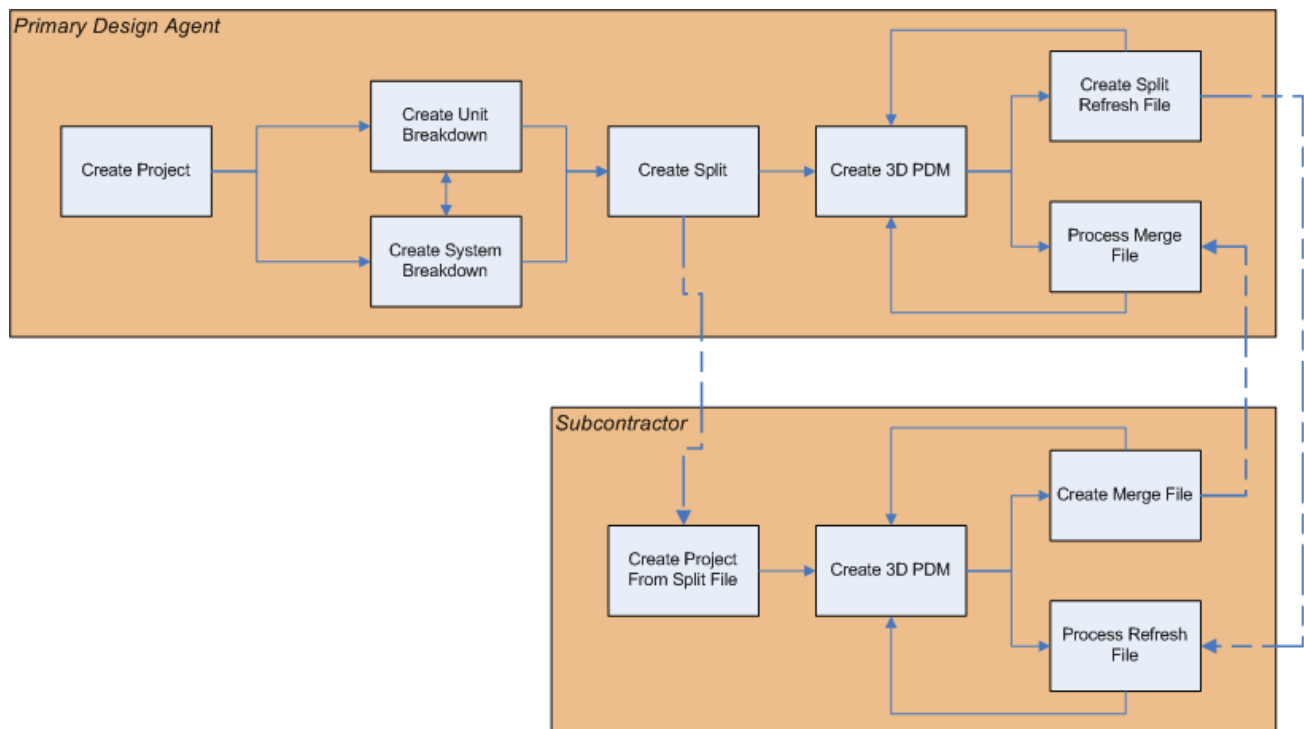
Overview

ShipConstructor users have expressed their need to delegate work on single ShipConstructor projects to designers located at different geographic locations. This requirement exists due to the involvement of multiple design partners in a single project, a single company having multiple satellite offices, or the requirement of a designer to sub-contract portions of the design to other firms in order to meet tight deadlines. ShipConstructor has always supported multiple sites connecting to the same database and project server. However, internet bandwidth required to support regular ShipConstructor use is cost prohibitive to most and not available to many. Split and Merge is designed to support work on a single ShipConstructor project by multiple disconnected project sites.

Split and Merge allows project administrators to partition responsibilities in a project to any number of split projects through creation of project splits and their associate project split file. Geographically separated users can create a ShipConstructor project on their own local project server from the project split file given to them by the master project administrator. The project created from a split file behaves like a normal ShipConstructor project but is aware of its relationship to the master project and the areas of responsibility given to it by the master. Likewise, the master project is aware of all split projects to which it has delegated areas of project responsibility.

As work progresses on a partitioned project, split projects create and send merge files to the master project for processing. The merge files will update the master project with all work performed against the split project in the areas of responsibility delegated to it by the master. Additionally, the master project creates and sends refresh files to the split projects for processing. The refresh files will update the split projects with project content contained in the master that is not contained within an area of responsibility delegated to the receiving split project.

The Split and Merge master project is defined as the project that was originally partitioned using Split and Merge and is the final repository for all ShipConstructor project data. At the completion of a project, when all relationships with split projects have been terminated, the master project will contain all project data and will be no different from a ShipConstructor project that had not been partitioned at all.



Managing a Split and Merge Project

Split and Merge functionality is fully integrated within ShipConstructor. This means that a project can be portioned using Split and Merge at any time during the life cycle of a ShipConstructor project. Additionally, the master project administrator has the ability to un-split and re-split the project at any time.

SQL Server Requirements

All participants in a Split and Merge project must be running the same version of SQL Server. Split and Merge uses database backups to transmit project database information on merge and refresh operations. We do not recommend the use of SQL Server 2000 for Split and Merge projects. SQL Server 2005 should be used.

File Integrity

It is not uncommon for large files to be corrupted when transferring over the internet. When performing project creation from a split file or a merge or refresh operation, Project Split and Merge checks the integrity of the split, merge, or refresh file and will notify you if the file is corrupt. If a corrupt file is detected you should try resending the file.

Before Splitting a Project

Prior to partitioning a project using Split and Merge, a number of project items should be configured:

- ShipConstructor stock catalog
- Product hierarchy rank levels
- Naming conventions
- ShipConPSM file share using ShipConstructor ServerSetup

ShipConstructor Stock Catalog

Split and Merge is designed to only perform limited synchronization of stock catalog items. When you perform merge and refresh operations, split and merge will synchronize any stock catalog data required to merge parts affected by the merge or refresh. However, stock catalog changes not required by the merge or refresh operation are not applied.

For example, if a split project defines a new pipe elbow catalog item and then sends a merge to the master project, the new catalog item will only be merged to the master project if the split project modeled a part based on the elbow stock prior to performing the merge operation.

To reduce the amount of catalog synchronization required, the stock catalog should be finalized as much as possible before a project is partitioned using Split and Merge. Good Split and Merge policy dictates that catalog changes be very tightly controlled using ShipConstructor user permissions and process control. Each split project involved in a Split and Merge project is a standalone ShipConstructor project and must have at least one administrator user with full ShipConstructor and database privileges. This means that each participant project has the ability to assign ShipConstructor permissions as they see fit. You must use alternative process control and education to ensure that undesired catalog changes are not made during the project.

Split and Merge ensures that diverging catalog changes will not corrupt data in your project. However, uncontrolled changes can create an unexpected data state and introduce quality issues in your project.

Adding new stocks

When adding new stocks to your stock catalog, XML Import/Export may be used to send the stocks to the remote site prior to performing a merge or refresh. However, this is only necessary if the stocks need to be used by the remote site immediately, or if they are not going to be used by the local project. If the stocks are in use by the local project, they will be sent automatically as part of the merge or refresh process.

Modifying existing stocks

If an existing stock is modified, the same modification should be performed at all sites, otherwise the conflicting catalog definitions will be branched (split into two separate stocks) during the merge or refresh.

Example:

- Master Project controls Unit01 of structure containing a plate part Plate02 based on plate stock definition PlateStock11.
- Split project control Unit02 of structure containing a plate part Plate04 based on plate stock definition PlateStock11. Master version and split version of PlateStock11 are identical.
- Split project modifies the material grade property of PlateStock11
- On a refresh from Master to Split, the catalog item PlateStock11 will be branched. PlateStock11 in the Split project will be renamed to PlateStock11(1). PlatePart04 will be based on PlateStock11(1). PlateStock11 will be copied in from the master project into the split. PlatePart02 will be based on PlateStock11.

Product Hierarchy Levels

Product hierarchy levels can be added and renamed by the master project during a Split and Merge project. However, level re-ordering and deleting can only be performed by the master project if the master project has product hierarchy control of all units in the project. For this reason ShipConstructor recommends that product hierarchy levels be defined before partitioning a project using Split and Merge.

Naming Conventions

Naming conventions are not modifiable in a project partitioned using Split and Merge. For this reason project naming conventions must be completely defined prior to partitioning a project using Split and Merge. On merge and refresh operations Split and Merge will resolve all naming conflicts to ensure that project data is never left in an invalid state. However, ShipConstructor recommends defining naming conventions in a manner that will prevent naming conflicts between names generated in separate project partitions.

Consider the following example, if structure modeling responsibility for two separate units has been split to two separate projects and the unit is not an element of the structure part naming convention then duplicate names will be generated. On a merge or refresh the conflicting items in the split project will be renamed causing potential confusion.

Managing Communication Between Project Partitions

The master project is the final repository for all work performed in a project partitioned using Split and Merge. During the life cycle of a project, periodic merges should be sent from split projects to the master in order to update the master with project work performed in split projects. Additionally, the master project may send periodic refreshes to split projects to keep them up to date with work performed in the master project and other split projects.

Creation and processing of the merge and refresh files used to perform these updates is performed using the [Split and Merge Manager](#). After creation, merge and refresh files must be sent to the recipient for processing. The files can be sent on CD or DVD, via FTP, or any other convenient data communication medium. Merges and refreshes can be performed as frequently as necessary for your particular project but the procedure and schedule should be discussed and planned with the IT departments involved.

The overriding factor that affects the frequency of merge and refresh operations is the existence of any dependencies on the output of one project participant by another. If company alpha has been split responsibility to model a piping system in units one through three of a project, but the structure of those units is being designed by users of the master project, refreshes will have to be sent from the master project to the split project so they have up to date structure around which to model their piping.

Creating a New Project From a Split File

Upon receiving a split file (.spl) from a master project a local ShipConstructor project must be created from the Split File. To create a new project from a split file:

1. Start ShipConstructor.

2. Choose ShipConstructor > Project > Create Project From Split File. The New Project From Split File window appears.
3. In the Split File text box, use the browse tool to select the location of the split file from which you wish to initialize your project.
4. In the Project File text box, use the browse tool to tell ShipConstructor where to place the project files. If your projects folder is C:\MyProjects and the project you are creating was named M1715 by the master, populating the Project Folder text box with c:\MyProjects will place all project files for this project in C:\MyProjects\M1715.
5. Use the Project Server dropdown to specify the SQL Server instance that you would like to host your project database.
6. Enter a user name and password of a user with ShipConstructor administrator permissions and administrator permissions to the database server.
7. Click OK to begin project creation.

Updating Model Drawings after a Merge or Refresh

After processing a merge or refresh, model drawings containing project data not split to the receiving project may not exist or may be out of date. When drawings are opened after merge or refresh they are updated with data from the project database. This requires additional processing each time the drawing is opened or M-Linked. The ShipConstructor command `_SCUPDATEMODELANDSYSTEMDRAWINGSQUICK` has been provided to optimize the updating of drawings. `_SCUPDATEMODELANDSYSTEMDRAWINGSQUICK` allows you to update all or a portion of your planar group model and system model drawings in one continuous operation reducing the drawing load time of designers after a merge or refresh.

To update project model drawings:

1. Start ShipConstructor and connect to your Split and Merge project
2. Click ShipConstructor > Update Model and System Drawings or execute the AutoCAD command `_SCUPDATEMODELANDSYSTEMDRAWINGSQUICK`.
3. Select the drawings you wish to update
4. Click OK

ShipConstructor will create, or open and update each model drawing you have selected. Using `_SCUPDATEMODELANDSYSTEMDRAWINGSQUICK` after a merge or refresh will significantly lower the amount of time it takes to open and M-Link drawings not split to you.

Merge and Refresh Log Files

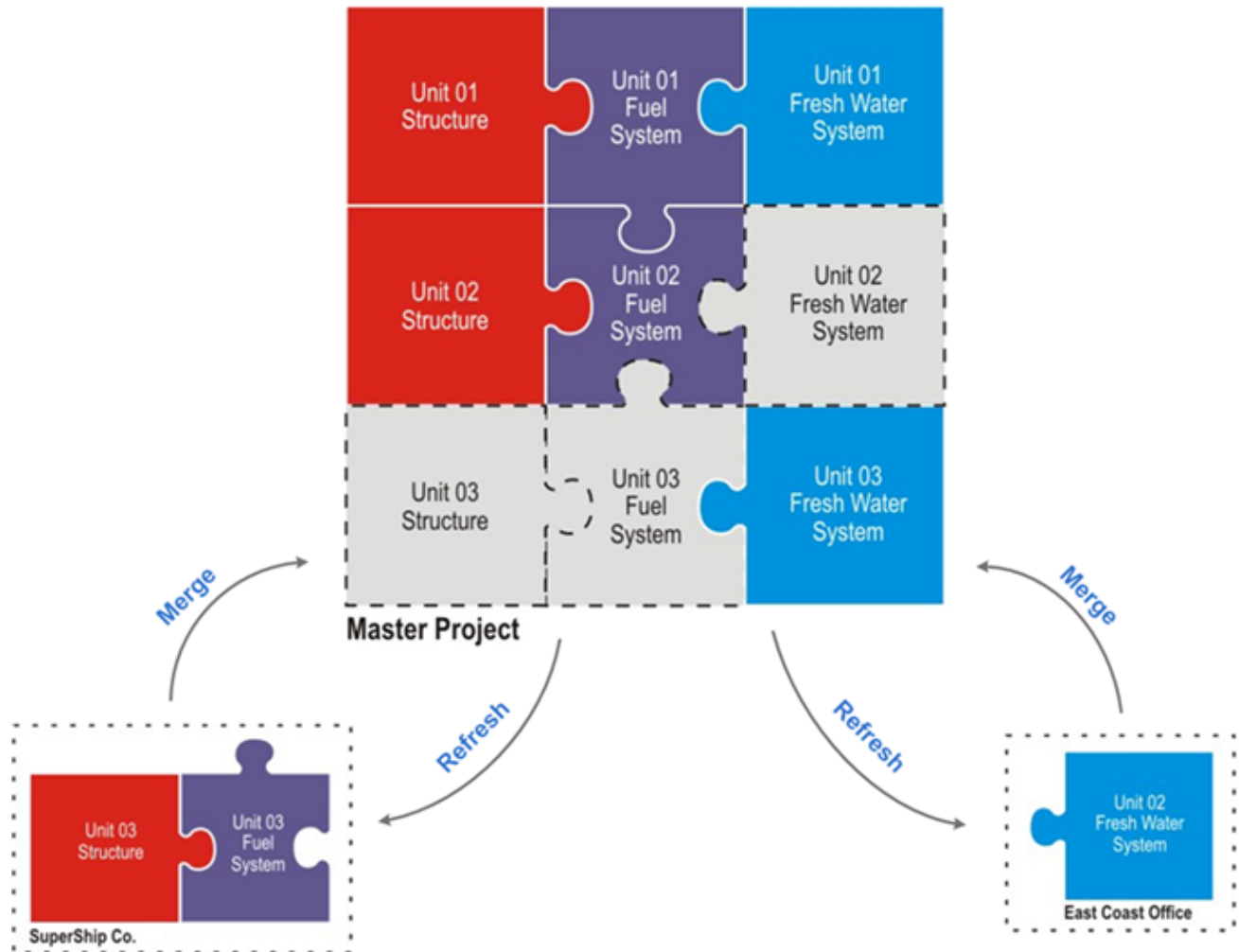
Merge and refresh operations create log files of all of the data operations performed during the event. Log files are created in the LogFiles directory located in the root of the project directory. For example if your project files are located at C:\MyProjects\SuperTanker323 the log files path is C:\MyProjects\SuperTanker323\LogFiles. The naming convention for merge files is Merge-<timestamp>.txt. The naming convention for refresh log files is Refresh-<timestamp>.txt.

Splitting

Partitioning a project using Split and Merge delegates responsibility for areas of the project to multiple split projects. Users of a split project may only make project changes within the areas of responsibility that have been assigned to their split project. Likewise, the master project may only make project changes within the areas of responsibility that he has not assigned to a split project. In a partitioned project, the master still retains full control of the project with the ability to break the logical relationship to a split project at any time. Breaking the relationship returns to the master project full control of all areas of responsibility previously delegated to the split project.

Split and Merge partitions ShipConstructor projects along well-defined lines of responsibility that will direct how you organize your design resources. When using Split and Merge, it is important to understand how Split and Merge affects

usage of ShipConstructor so you can organize your resources and plan your project around the framework provided by Split and Merge.



Splitting Control of Structure Modeling

Permission to model structure is delegated on a product hierarchy unit basis. If a project is partitioned using split and merge, only one split project or the master project will have permission to model structure in drawings contained within each product hierarchy unit. This includes creating, deleting, and renaming of planar group model drawings.

Projects with structure modeling control of a product hierarchy unit have the ability to place and modify the location of their parts in the product hierarchy tree. However, if during a merge or refresh operation, the product hierarchy location of a part conflicts with the location dictated by the project with control of the product hierarchy tree for the unit in question, the location specified by the project with product hierarchy control of the unit will persist. For more information see [Splitting Control of the Product Hierarchy](#).

During initial creation of the split project, only the structural model drawings for curved plates are transmitted across, as other types of structural model drawings will be generated as needed from the modeling information stored in the database.

Splitting Control of Weld

For the purposes of Project Split and Merge, Weld management has been divided into 2 sections: Catalog ownership, and Modeling ownership.

Weld Standards Catalog

Permission to make modifications to the weld standards catalog is assigned to a single site. Any site other than the site that “owns” the weld standards catalog will be unable to make modifications. During a merge or refresh, if the incoming project owns the weld standards catalog, the current project will have its weld standards catalog updated to look like that of the incoming project.

If the local project has welds that use a weld standard which gets deleted by the remote project which owns the weld standards catalog, the weld will have the deleted standard unassigned from the weld.

Weld Modeling

Permission to create welds in the ship model is delegated per unit. For example, the master project could retain control of welds in unit one, but assign welds to a split project for unit two. This means that you can only create or modify welds in a unit for which you own weld modeling control.

Splitting Control of Standard Assemblies

For the purposes of Project Split and Merge, standard assemblies have been divided into 2 sections: Catalog ownership, and Modeling ownership.

Standard Assembly Standards

Permission to make modifications to the standard assembly standards catalog is assigned to a single site. Any site other than the site that “owns” the standards catalog will be unable to make modifications. During a merge or refresh, if the incoming project owns the standard assembly standards catalog, the current project will have its catalog updated to look like that of the incoming project.

If the local project contains standard assemblies that use a standard which has been deleted by the remote project owning the catalog, the standard will not be deleted from the local catalog, and will be imported into the remote (catalog owning) project during the next merge/refresh that project receives.

Standard Assembly Modeling

Permission to modify standard assemblies is assigned on a per-instance basis. Any site can create new standard assembly in any model drawing, and any standard assemblies they create belong to them. The **New Split** dialog will present the user with a tree (arranged by product hierarchy) of all standard assemblies in the project and ownership of each individual standard assembly can be assigned to the new split project.

Splitting Control of Piping and HVAC Modeling

Permission to model Piping and HVAC is delegated on the combination of product hierarchy unit and system. This includes spool definition and spool drawings. For example, the master project could retain control of the fresh water piping system inside unit one while delegating to a split project, the responsibility for the fresh water system inside unit two. This level of splitting granularity also allows the master to split an entire system across all units to a single split project or to split all systems within a single unit to a single split project.

Note: Connections between parts contained in separate project splits are broken when the project is split. After modeling is complete and final merges have been processed by the master project, connections between these parts must be recreated.

Splitting Control of Distributed System Supports

Permission to model distributed system supports is delegated on a product hierarchy unit basis. If a project is partitioned using split and merge, only one split project or the master project will have permission to model supports in drawings contained within each product hierarchy unit.

Projects with distributed system support modeling control of a product hierarchy unit have the ability to place and modify the location of their supports in the product hierarchy tree. However, if during a merge or refresh operation, the product hierarchy location of a part conflicts with the location dictated by the project with control of the product hierarchy tree for the unit in question, the location specified by the project with product hierarchy control of the unit will persist. For more information see [Splitting Control of the Product Hierarchy](#).

Splitting Control of Equipment Modeling

Permission to model equipment is split on a system model drawing basis. This means you can only create, modify, and delete equipment within a system model drawing if responsibility for equipment within that system model drawing has been split to your project.

Splitting Control of Space Allocations

Group Hierarchy

Permission to modify the Space Allocation Group Hierarchy is assigned on a per-group basis. Any site can create a new group.

Modeling

Permission to modify space allocations is assigned on a per-space-allocation basis. Any site can create new space allocations in any model drawing, and the space allocations they create belong to them. The **New Split** dialog will present the user with a tree (arranged by group hierarchy) of all space allocations in the project and ownership of each individual space allocation can be assigned to the new split project.

Model Drawing Load Strategies

Permission to modify the space allocation load strategy of a model drawing is assigned on a per-drawing basis. The New Split dialog will present the user with a tree (arranged by folder structure) of all model drawings in the project. Individual drawings can be selected to assign Space Allocation Load Strategy Control to the new split project.

Splitting Control of the Product Hierarchy

Control of the product hierarchy tree is split on a product hierarchy unit basis. Control of the product hierarchy tree includes the ability to create, modify, and delete assemblies as well as assign parts and spools to locations within the product hierarchy tree. For example, in a project containing two product hierarchy units, the master project administrator could delegate control of the product hierarchy tree for unit one to one split project while retaining control of the second product hierarchy unit or delegating control to a second split project.

Splitting Control of the System Hierarchy

Control of the system hierarchy is split on a system basis. This includes the ability to create branches within controlled systems and to set attributes for controlled systems and branches contained within controlled systems. For more information please see [System Manager](#).

Splitting Control of Hull Drawings

Hull drawings are split on a drawing basis. Users connecting to a project that does not have delegated responsibility for a hull drawing can view and modify the drawing but will not be able to save any changes.

Splitting Control of Output Drawings

Output drawings include approval drawings, arrangement drawings, assembly drawings, product hierarchy drawings, composite drawings, export drawings, interference drawings, plate nest drawings and profile plot drawings. Responsibility for output drawings is split on a drawing basis. The master can delegate responsibility for drawings that exist at split creation. Permission to create new output drawings in a project partitioned by split and merge is controlled by ShipConstructor user permissions. Any new drawings created are considered split to the project that created them.

Merging

Merging project data in ShipConstructor is performed through one of two Split and Merge operations: merge or refresh. Merging involves updating the receiving project with up to date data from the sending project in the project areas of responsibility delegated to the sender. Sending ShipConstructor project data from a split project to the master project is described as a merge. Sending ShipConstructor project data from the master project to a split project is described as a refresh. Both operations have the same functionality but have different names to describe the direction that data is sent. For additional information about merging see [Managing a Split and Merge Project](#).

Note: From the point of view of a split project, the master project is responsible for all areas of the project not delegated to the split project.

Merging Catalog Data

Split and Merge is not designed to fully synchronize stock catalog data during merge and refresh operations. Stock catalog data is only merged if it is required to merge a ShipConstructor part. When merging catalog items, Split and Merge verifies that the items have not diverged in any way. If catalog items have diverged due to either the sending or receiving project modifying an item, ShipConstructor will maintain data integrity by branching the catalog item. Parts controlled by the sender continue to be defined by the sender's version of the catalog item. Parts controlled by the receiver continue to be defined by the receiver's version of the catalog item.

Resolving divergences in structural catalog items offers one additional level of control. You have the choice, prior to beginning the merge or refresh, whether to handle diverging items by branching, whether to keep the master project's version, or whether to keep the split project's version.

These mechanisms for handling catalog divergence ensure that your project data is never in an invalid state. However, diverging catalog data can create unexpected results that can introduce errors and reduce quality. Process control should be used to limit unexpected catalog changes. See [ShipConstructor Stock Catalog](#) for more information.

Merging Structure

Merging structure is very simple in nature. The receiving project's structure data is updated with the project data of the sending project in the structural units split to the sender. Structure data not split to the sender is not modified in the receiving project. The updated data includes database information, planar group model drawings, and nest drawings.

If structural plate or profile stocks need to be imported into the destination project, all associated sizes are brought across as well.

If a plate or profile nest is brought in from the remote project, and the local project does not have enough stock inventory for the nest to be created, inventory is automatically increased to support the new nest.

Merging Welds

Weld Standards Catalog

As the weld standards catalog is owned by a single site, when importing from a site that owns the weld standards catalog, the local weld standards catalog is updated to look exactly like the catalog of the remote site. If there are any welds in the local project that use a standard that is no longer defined in the remote project, that standard is unassigned from the local weld.

Weld Model

When the weld model is imported, all welds contained within the units where the remote project owns weld modeling control are imported into the local project, provided there still exists a minimum of 2 parts for the weld. For example, if the master project controls structure modeling, but assigns weld control to a split, structural parts can be deleted from the master project. This would invalidate welds created in the split project. Therefore, when the split project merges back into the master, any welds assigned to these deleted parts will not be imported.

Merging Standard Assemblies

Standard Assembly Standards Catalog

As the standards catalog is owned by a single site, when importing from a site that owns the catalog, the local standard assembly standards catalog is updated to look exactly like the catalog of the remote site. The one exception to this is that if any standards are in use by the local project that are not defined by the remote (owning) project, then the standards will be left unmodified.

If the local project owns the standards catalog, then the local catalog will be unmodified by the refresh/merge operation, with the exception that any standards used by the remote project that do not exist in the local project will be imported.

Standard Assembly Model

When the standard assemblies model is imported, all standard assemblies owned by the remote project are imported into the local project. The location of the Standard assembly in the product hierarchy is handled in the same manner as regular parts. The Product Hierarchy owner has control over the location of where standard assemblies appear in the product hierarchy.

Merging Pipe and HVAC

Merging pipe and HVAC involves updating the project data of the receiving project for all parts contained within system/unit combinations controlled by the sending project. ShipConstructor allows multiple systems to be modeled within a single system model drawing. This means that multiple participants involved in a Split and Merge project have the ability to modify a single system model drawing. For this reason, system model drawings files are not copied over during a merge or refresh operation.

All data necessary to populate a system model drawing with Pipe and HVAC model data is contained within the project database. System model drawings can be created and updated after a merge or refresh using the `_SCUPDATEMODELANDSYSTEMDRAWINGSQUICK` command. See [Updating Model Drawings after a Merge or Refresh](#).

Merging Distributed System Supports

Merging distributed system supports involves updating the project data of the receiving project for all parts contained within the project hierarchy units controlled by the sending project. As distributed system supports can be modeled in any type of model drawing, and the ability to model other types of parts within that drawing may be controlled by different sites, the model drawings files are not necessarily copied over during a merge or refresh operation.

All data necessary to populate a model drawing with distributed system support model data is contained within the project database. Model drawings can be created and updated after a merge or refresh using the `_SCUPDATERODELANDSYSTEMDRAWINGSQUICK` command. See [Updating Model Drawings after a Merge or Refresh](#).

Merging Equipment

Changes to the equipment class hierarchy are considered catalog changes and are merged according to the rules of merging catalog data. Merging equipment parts involves updating the receiving project with equipment parts modeled in drawings split to the sending project for equipment modeling. As with Pipe and HVAC, equipment is modeled in system model drawings which are not copied in merge and refresh operations. System model drawings can be created and updated after a merge or refresh using the `_SCUPDATERODELANDSYSTEMDRAWINGSQUICK` command. See [Updating Model Drawings after a Merge or Refresh](#).

Merging Space Allocations

Group Hierarchy

Permission to modify the Space Allocation Group Hierarchy is assigned on a per-group basis. Any site can create a new group. If you have space allocations assigned to a group owned by someone else, and they delete the group, your space allocations will be moved to a group named "UNASSIGNED" during the merge/refresh operation

Modeling

Permission to modify space allocations is assigned on a per-space-allocation basis. Any site can create new space allocations in any model drawing, and the space allocations they create belong to them.

Model Drawing Load Strategies

Permission to modify the space allocation load strategy of a model drawing is assigned on a per-drawing basis.

Merging the Product Hierarchy Tree

Merging the product hierarchy tree involves updating the receiving project with the product hierarchy structure of the sending project for product hierarchy units that the sender controls. Parts and spools are moved to the location in the tree dictated by the owner of the product hierarchy unit. Parts existing in assemblies that are deleted during a merge or refresh operation are moved to the default location from parts of that type within the unit the part exists in.

Consider the following example:

1. The master project has control of the product hierarchy for unit one.
2. Split project alpha has control of structural modeling for unit one.
3. The master project deletes assembly panel17 from the product hierarchy tree for unit one.
4. The master project sends a refresh file to split project alpha.
5. When split project alpha processes the split file the following will occur for parts that exist in panel17 of the split project:
 - a. Parts that existed in both the master and split project prior to the refresh operation will be placed in the product hierarchy location defined by the master.
 - b. Parts that existed only in the split project will be placed under default assembly for parts of that type.

Merging the System Hierarchy Tree

Merging the system hierarchy tree involves updating system and branch attributes as well as creating and deleting systems and creating branches. The follow sections illustrate typical system hierarchy tree merge scenarios.

Merging New Branches

Any ShipConstructor project with modeling control of any portion of a system has the ability to create branches under that system. If a project with control of a system hierarchy tree creates new branches under that system, the new branches will be created in any project receiving a merge or refresh. If a project without control of a system hierarchy tree creates new branches under that system the new branches will only be created in the receiving project if the new branches contain parts at the time of the merge or refresh.

Merging Deleted Branches

Branches are merged using a never delete strategy. Deletes of systems and branches are only applied to receiving projects if the receiving projects do not have any parts in the deleted system or branch. The continuation of this scenario dictates that the deleted systems and branches will be re-created in the project that deleted them when a merge or refresh is sent in the other direction. Consider the following example:

1. Project alpha has system hierarchy control of the bilge system.
2. Project beta has modeling control of the bilge system in units one and two.
3. Project alpha deletes the stern branch of the bilge system and sends a merge to project beta.
4. Project beta has already modeled parts in the stern branch of the bilge system so the branch deletion is not applied during the merge.
5. Project beta sends a refresh to project alpha.
6. Upon applying the refresh the stern branch of the build system will be recreated in project alpha along with the parts contained in the branch.

Merging Branches with the Same Name

If branches of the same system, with the same name, are created in separate projects they will not be combined into a single branch on a merge or refresh. Any newly created system or branch will be imported into the receiving project during the operation.

Merging Hull

Merging of hull data involves updating drawings split to the sending project.

Merging Penetrations

Merging penetrations involves updating penetrations where all elements of a penetration: penetrated structure, penetrating pipe, and penetration components are controlled by the sending project.

Merging Locations and Location Groups

Locations and location groups are merged using a never delete strategy. Locations may be deleted by any project. However, the deletion will only persist beyond merge or refresh operations if the location or location group is deleted by all participants of the Split and Merge project.

Merging Project Settings

On refresh operations all project settings, not modifiable by split projects, are updated to match the settings dictated by the master project.

Merging Output Drawings

Output drawings include approval drawings, arrangement drawings, assembly drawings, product hierarchy drawings, composite drawings, export drawings, interference drawings, plate nest drawings and profile plot drawings. Merging output drawings involves updating drawings split to the sending project.

Split and Merge Manager

Split and Merge is a fully integrated ShipConstructor module. The Split and Merge Manager is used for managing all Split and Merge related functions of a ShipConstructor project including:

- Creating project splits
- Creating refresh files from the master project for submission to split projects
- Creating merge files from split projects for submission to the master projects
- Processing refresh files sent by the master project
- Processing merge files sent by split projects
- Breaking the link between the master project and split projects

The administrator in charge of the ShipConstructor project determines the partition design and uses the Split and Merge Manager to partition the project and create split files to send to remote project locations.

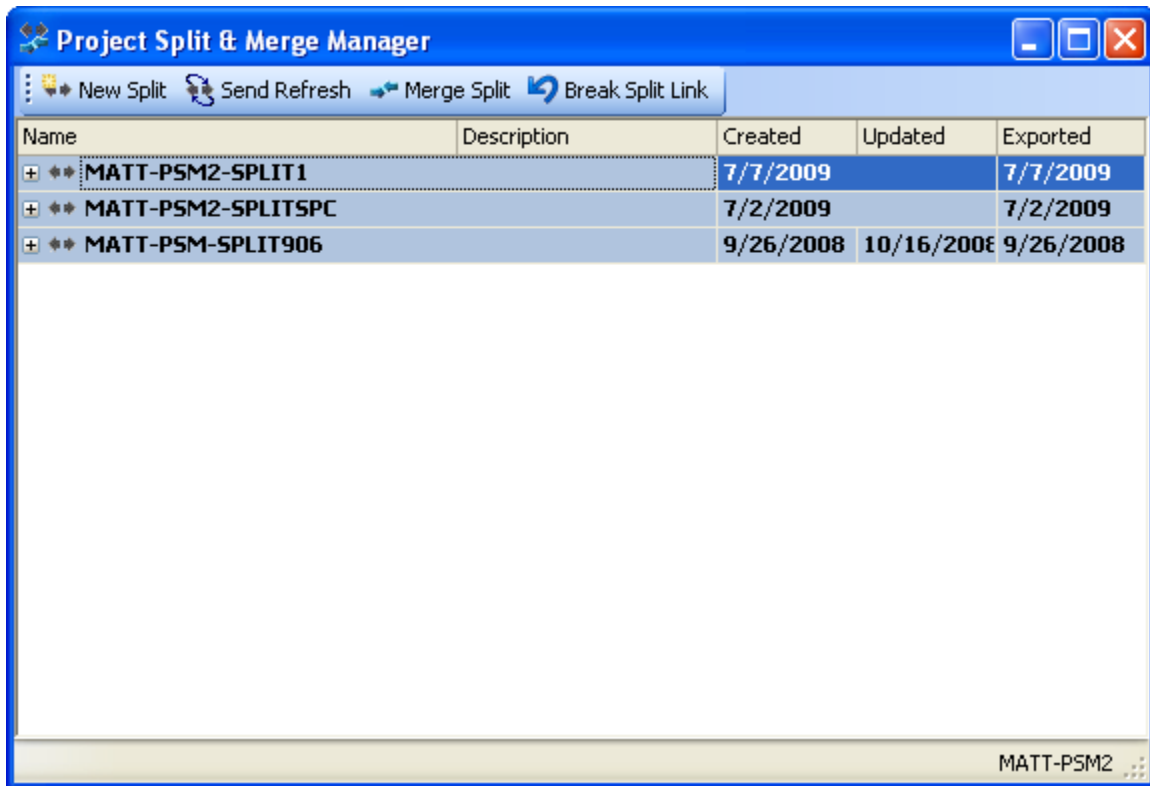
Important: Prior to running the Split and Merge Manager, ServerSetup must be run, on the machine hosting the project database, with Create ShipConPSM share enabled

Starting the Split and Merge Manager

1. Choose Start Menu > All Programs > ShipConstructor 2009 > Utilities > Split and Merge Manager to start the Split and Merge Manager.
2. In the project list select the project you wish to split.
3. Enter the username and password for a user with DB Admin privileges (configured in Administrator) and user permission to create splits (configured in Manager).
4. Click Open

If you connect to an un-split project, the project list will be empty. If you connect to a master project, each split project will be listed. If you connect to a split project, one entry for the master project will be listed. Expanding project nodes will show all responsibilities split to the project represented by the node.

Note: When connecting to a split project using the Split and Merge Manager, only the master project is visible in the project. From the point of view of split projects, the only other project participant is the master project and the master project appears to have responsibility for all other areas of the project even if other splits exist.



Creating a New Split

Creating a new split can be performed on a ShipConstructor project with existing splits or on an un-split project. Create a new split by following these steps:

1. Start the Split and Merge Manager and connect to an un-split or master project. If the project has already been partitioned, existing splits will be displayed in the project list window.
2. Click New Split. The New Split Project window appears.
3. In the Job Name text box enter the name you would like to associate with this split.
4. In the Description text box enter a description for the split. If desired, the Description can be left blank.
5. The Destination text box shows the file location of the split file when the process is complete. Split files are placed on the ShipConPSM share of the database server.
6. Click the Send production drawings not split to project check box if you would like to send all existing production drawings to the split. This will allow the split to open and view production drawings not split to them. However, it will increase the size of the split file.
7. If your split project is to be created at a new site, you may want to divide the split file into smaller chunks to aid FTP transfer. If this is the case, enter a non-zero value for **Volume Size**. For more information, see the section titled [Creating Multi-Volume Archives](#).
8. Navigate the Include tabs to select the project responsibilities you wish to delegate to the split.
9. Click the Ok button.

ShipConstructor generates the split file (.spl) and updates the master project accordingly. The split file must now be sent to the remote project site for project creation from the split file.

Processing a Merge File

Processing a split project merge file updates the master project with content from a split project. Upon receipt of the merge file (.mrg) from the split project, follow the steps below to process the merge.

1. Start the Split and Merge Manager and connect to the master project.
2. In the split project list, select the project whose merge file you wish to process.
3. Click the Merge Split button.
4. Browse to the location of the merge file and click Open.
5. ShipConstructor will prompt for final approval to begin the merge. Click OK.
6. ShipConstructor prompts for the desired action to take if there are structure catalog items that have diverged. Click Master to keep the master's version of diverged catalog items. Click Split to overwrite the master version with the split version. Click Branch to retain the divergence by keeping both definitions of the catalog item.
7. Click OK to complete the merge process.

Depending on the size and breakdown of your project the merge process can take anywhere from ten minutes to four hours. The results of the merge are logged in a log file placed in the project LogFiles directory. For more information see [Merge and Refresh Log Files](#).

Creating a Refresh File

Refresh files allow the master project to update split projects with updated content from the master and other split projects. Follow the steps below to create a refresh file.

1. Start the Split and Merge Manager and connect to the master project.
2. In the split project list, select the project for whom you wish to create a refresh file.
3. Click the Refresh Split button.
4. Click Send structural model drawings not split to project if you wish to send planar group model drawings not split to the receiving split project. Declining to send the drawings will reduce the size of the refresh file. However, the drawings will have to be regenerated from the database by the split project. This means any non-ShipConstructor geometry contained in the drawings will not be available.
5. Click Send production drawings not split to project if you wish to send all existing production drawings to the split. This will allow the split to open and view production drawings not split to them, however it will increase the size of the split file.
6. If your split project is located at a different site, you may want to divide the split file into smaller chunks to aid FTP transfer. If this is the case, enter a non-zero value for **Volume Size**. For more information, see the section titled [Creating Multi-Volume Archives](#).
7. Click the OK button to begin the refresh file creation

ShipConstructor generates the refresh file (.rfs). The file must now be sent to the split project for processing.

Creating a Merge File

Merge files allow split projects to update the master with updated project content. Follow the steps below to create a merge file.

1. Start the Split and Merge Manager and connect to a split project.
2. Click the Send Merge button.
3. If your split project is located at a different site, you may want to divide the split file into smaller chunks to aid FTP transfer. If this is the case, enter a non-zero value for **Volume Size**. For more information, see the section titled [Creating Multi-Volume Archives](#).
4. Click **OK**.

ShipConstructor generates the merge file (.mrg). The file must now be sent to the master project for processing.

Processing a Refresh File

Processing a refresh file updates the split project with content from the master and other split projects. Upon receipt of the refresh file (.rfs) from the master project follow the steps below to process the refresh.

1. Start the Split and Merge Manager and connect to the split project.
2. Click the Refresh button.
3. Browse to the location of the refresh file and click Open.
4. ShipConstructor will prompt for final approval to begin the refresh. Click OK.
5. ShipConstructor prompts the desired action to take if there are structure catalog items that have diverged. Click Split to keep the split version. Click Master to overwrite the split version with the master version. Click Branch to retain the divergence by keeping both definitions of the catalog item.
6. Click OK to complete the refresh process.

Depending on the size and breakdown of the project the merge process can take anywhere from ten minutes to four hours. The results of the refresh are logged in a log file placed in the project LogFiles directory. For more information see [Merge and Refresh Log Files](#).

Break Split Link

During a project or upon completion, the Split and Merge relationship between the master project and split projects can be broken. If the master project administrator wishes to reorganize the project partitioning and delegate new responsibilities to project participants, the relationship to existing splits, containing project responsibility to be reallocated, must be broken.

Breaking a split link in the master project returns to the master, control of the responsibilities previously delegated to the split. Care must be taken when breaking split links because after breaking a split link the master project can no longer process merges from the split project. Before breaking a split link, you must ensure that the master has received all project data it required of the split project.

Split links can be broken from split projects, terminating all knowledge of the master project. After breaking the link on the split project, the project exists as a regular ShipConstructor project that has not been partitioned using Split and Merge. As with breaking split links on the master, extreme care must be taken when breaking links in split projects. Split projects that have broken their link to the master can never again send merges or receive refreshes from the master.

Breaking a Split Link in the Master Project

To break a link to a split project from the master project perform the following steps:

1. Start the Split and Merge Manager and connect to the master project.
2. In the project list, select the split project whose relationship you wish to break.
3. Click the Break Split Link button.

Project responsibility split to the split project is now under control of the master project and no more merges from the split project can be processed.

Breaking a Split Link in a Split Project

To break the link to the master project in a split project, perform the following steps:

1. Start the Split and Merge Manager and connect to a split project.
2. Click the Break Split Link button.

The relationship to the master project is now broken. No merges may be generated for submission to the master project and no refreshes from the master may be processed. The split project is now identical to a non Split and Merge ShipConstructor project and the project has control of all project elements.

Project Split and Merge Command Line Tool

In order allow project administrators to automate merge and refresh tasks, Project Split and Merge Manager functionality is available using the Project Split and Merge Command Line Tool.

SConPSMcmd.exe is located in the root of the ShipConstructor installation folder. For example: C:\Program Files\ShipConstructor2009\

```
usage: SConPSMcmd.exe [-?] [-s] [-m] [-r[1|2|3]:NameofSplit] [-v:50] [-u:user -p:password] [-e ["\path\to\project.pro"]
["\path\to\mergefile.mrg"] ["\path\to\refreshfile.rfs"]
```

```
..... -? : Shows this help message.
..... -s : Create project from split file (does not require .PRO file).
..... -e : Use Windows Authentication (ignores -u, -p if specified)
..... -u : User login name for the ShipConstructor project
..... -p : User password for the ShipConstructor project
..... -m : Create a merge file for the master project
..... -r : Create a refresh file for the specified project
..... -r1 : Create a refresh file for the specified project, including unsplit structural drawings
..... -r2 : Create a refresh file for the specified project, including unsplit production drawings
..... -r3 : Create a refresh file for the specified project, including unsplit structural & production drawings
..... -v : Specifies the volume size (in MB) of the SPL/MRG/RFS files to create.
..... "\path\to\project.pro\": The .PRO file of the project to connect to
..... "\path\to\mergefile.mrg\": The .MRG file to merge into the project specified by the .PRO file
..... "\path\to\refreshfile.rfs\": The .RFS file to merge into the project specified by the .PRO file
```

Examples:

```
..... SConPSMcmd.exe -u:ShipConstructor -p:ShipCon "D:\Projects\Hull88\Hull88.pro"
..... ... this will open up the PS&M Manager UI connected to the specified project

..... SConPSMcmd.exe -s
..... ... this will open up the "Create Project From Split" UI

..... SConPSMcmd.exe -e "D:\Projects\Hull88\Hull88.pro" "\path\to\refreshfile.rfs"
..... ... this will merge the specified refresh file into the specified split project using the provided settings.

..... SConPSMcmd.exe -e "D:\Projects\Hull88\Hull88.pro" "\path\to\mergefile.mrg"
..... ... this will merge the specified merge file into the specified master project using the provided settings.

..... SConPSMcmd.exe -r1:HULL88 Split1" -e "D:\Projects\Hull88\Hull88.pro"
..... ... this will create a refresh file including unsplit structural drawings for the split named "HULL88 Split1".

..... SConPSMcmd.exe -r:* -e "D:\Projects\Hull88\Hull88.pro"
..... ... this will create a refresh file for all splits in this project.

..... SConPSMcmd.exe -m -e "D:\Projects\Hull88\Hull88.pro"
..... ... this will create a merge file to send to the master project.
```

When using the command line Project Split and Merge Tool, the .exe will exit with an error level if any errors occur during the process, and the error message will be written to both *stderr*, and the System's Application Event Log. If no errors occur, the application will exit with an error level of 0, and a message indicating success will be written to the console.

Creating Multi-Volume Archives

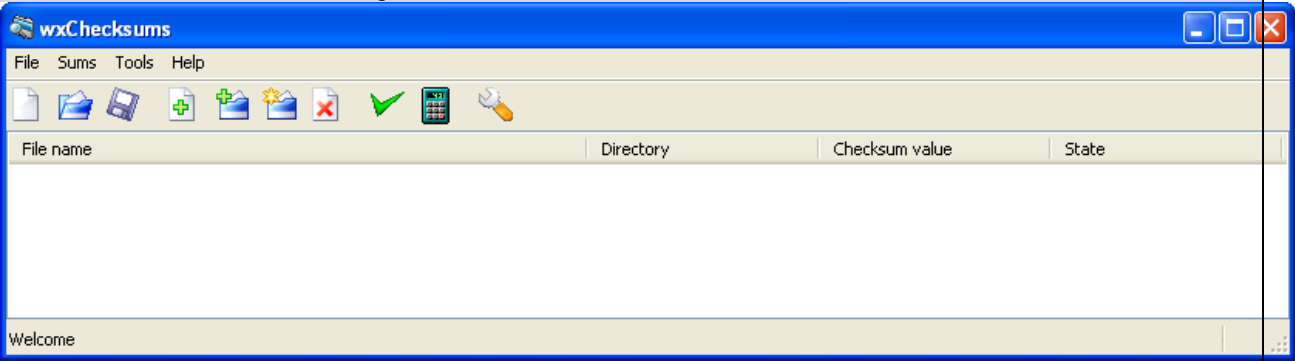
Typically, the master and split projects will be hosted at different sites, and the .SPL, .MRG, and .RFS files will need to be transferred between sites using a file-transfer mechanism such as FTP. The ability to split the SPL/MRG/RFS files into multiple smaller chunks has been provided to make the file transfer easier. Files sent via

FTP will often contain errors, and so if the file is sent in smaller chunks, only a portion of the file will need to be resent. The ideal size to split your archive into is a matter of preference, and would depend on the speed and reliability of the connection between your two sites, and the size of your project. A volume size of 100mb would be acceptable in most situations. To specify a volume size of 100mb, enter *100* in the **Volume Size** field when creating a merge or refresh file, or creating a new split project.

ShipConstructor recommends the use of the open-source software wxChecksums to verify that files sent via FTP are sent intact. wxChecksums can be downloaded from: http://wxchecksums.sourceforge.net/mainpage_en.html
To use wxChecksums, use the following steps:

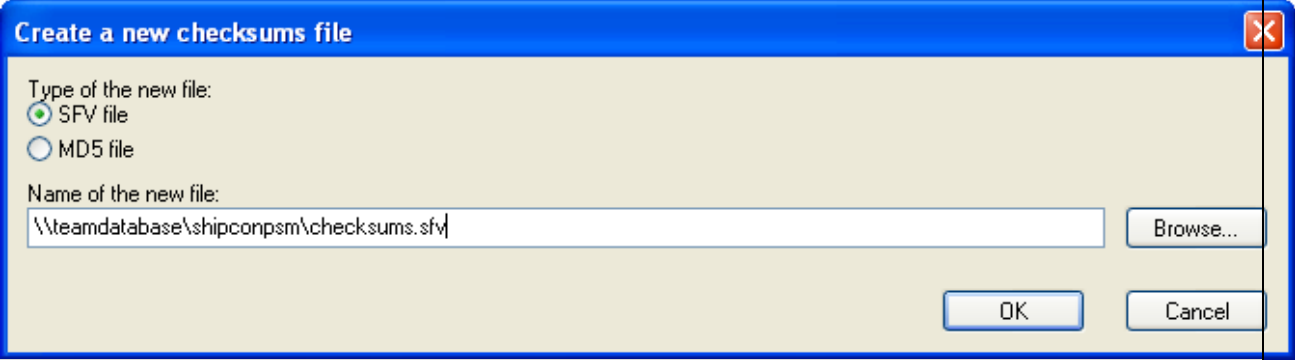
Sender

Run **wxChecksums** (Start | All Programs | wxChecksums)

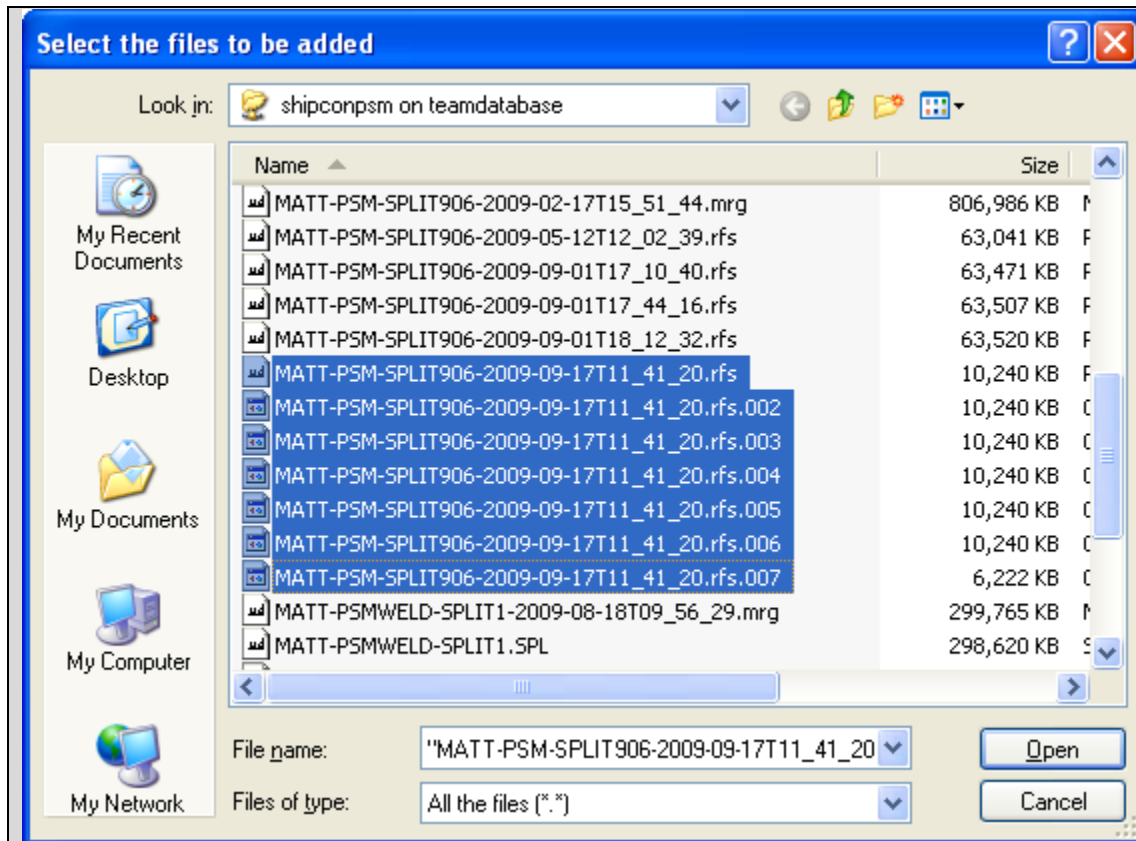


Welcome

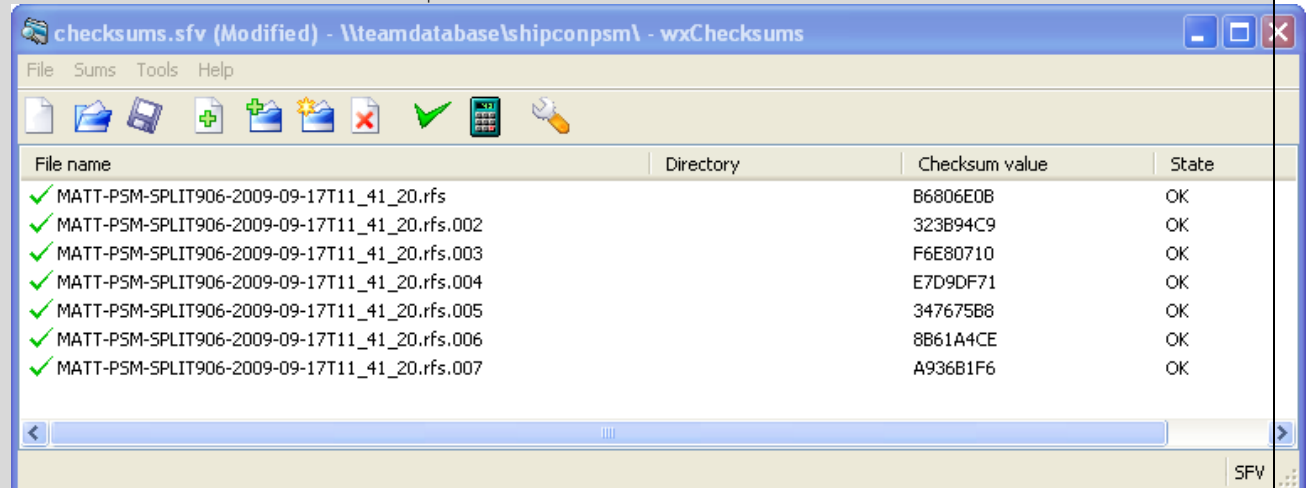
Press the “New” button or select “File | New...”, and choose a name and location



Press the “Insert” key or select “Sums | Add files...”, and choose all of your split files



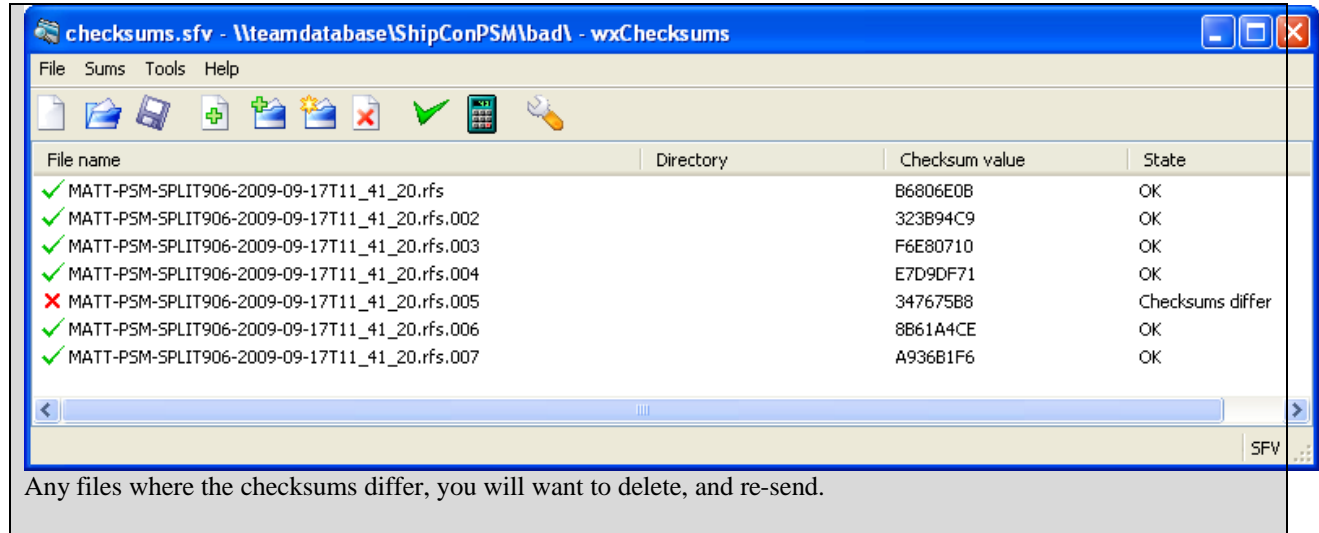
Press the “Save” button or select “File | Save”



Now, when sending your files to the remote site, also send the .sfv file you created with wxChecksums

Receiver

After you have received your files, double-click the .sfv file, and wxChecksums should launch automatically, and verify the integrity of your files for you

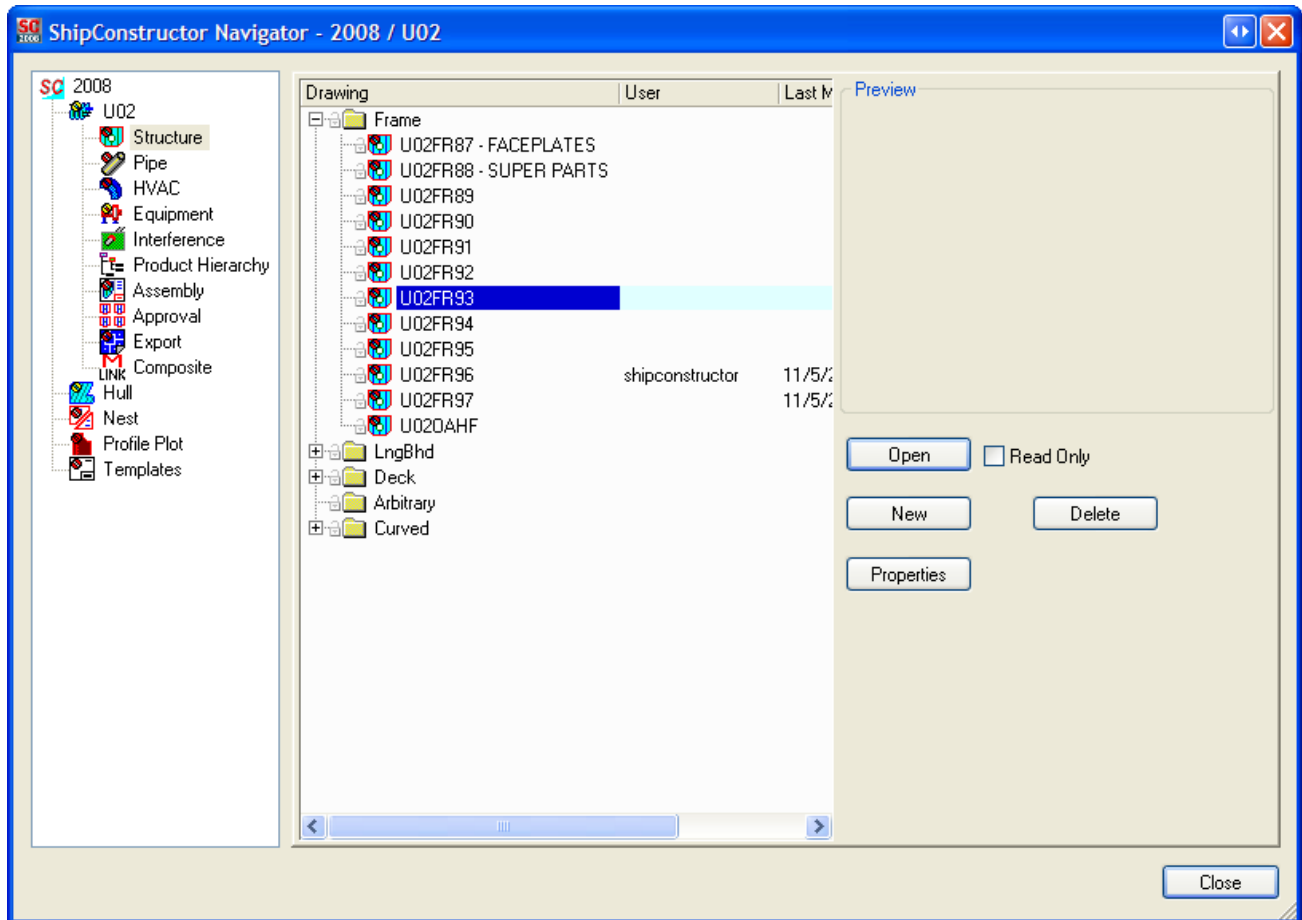


Working in a Split and Merge Project

Working in a Split and Merge project is identical to working in a regular ShipConstructor project with limitations in the areas split to another.

Navigator

ShipConstructor navigator uses icon overlays to indicate components of the project that you can modify or that are split to others.



Units can only be created and deleted by users of the master project. Additionally, units may only be deleted if no project data contained within the unit is split to other projects. This includes structural modeling, product hierarchy control, system modeling, equipment modeling and output drawings such as assembly drawings or approval drawings.

Split Icons

There are two icons that appear indicating split status for a drawing or all drawings of that type. The red icon indicates that the drawing is fully split, and the yellow icon indicates a partial split.

For Structure, when a user does not have structure modeling control of a unit, all the Structure drawing for that unit will have the red split icon.

The various production drawings for the unit (Interference, Product Hierarchy, Assembly, Approval, Export, and Composite) will have a red icon if they are split. If all the drawings are split, then the drawing group icon will have the red icon. If only some of the drawings are split, then the group icon will use the yellow icon instead.

For the non-unit drawings (Hull, Pin Jig, Plate Nest, Profile Plot, and Template), each drawing that is not controlled will have the red split icon. If all drawings are not controlled, then the drawing group icon will have the red split icon, and if some of the drawings are not controlled, then the drawing group icon use the yellow icon.

Pipe, HVAC, and Equipment work slightly differently, because they are system-based. For the model drawings, if all the systems (both pipe and HVAC) are split for the current unit, and the drawing is split for equipment, then the drawing uses the red icon. If only some of the systems are split, or the drawing is not split for equipment, then the yellow icon is used instead. For the arrangement drawings, if the drawing is split for equipment, then the red icon is used. For spool drawings, if the system of the spool is split to the current unit, then the drawing uses the red icon. The group drawing icons include all the above: for example, the pipe drawing icon uses the red icon only if all systems are split, all pipe model drawings are split for equipment, and all pipe arrangement drawings are split.

And finally, the unit icon itself: if the unit is split for structure modeling and product hierarchy, and all production drawings are split, and all system are split for the unit, and all Pipe, HVAC, and Equipment model drawings are split for equipment,

and all arrangement drawings are split, then the unit uses the red icon. If any of these are not split, then the yellow icon is used.

Drawings

It is very important to understand that drawings split to another project are not locked from editing when opened without ShipConstructor using the ShipConstructor Object Enabler or AutoCAD. Any changes that are made to items or drawings split to another project will be overwritten the next time that a merge or refresh is received from the controlling project.

Structure

Modeling

Modeling should not be impacted by Split and Merge unless the user attempts to make changes to parts in a structure unit that is not modifiable. Planar group model drawings split to another project can be opened however they cannot be saved. Planar group model drawings can be created and deleted by the project with structure modeling control of the unit.

Plate Nesting

Plate nesting is fully supported within Split and Merge. However, ShipConstructor does not support nesting of parts split to another project. Plate nest drawings can be created in any project by a user with user permission to create plate nest drawings and the new drawing is automatically considered to the project in which the drawing is created. Responsibility for existing plate nest drawings is delegated by the master project on split creation.

The following restrictions apply in a Split and Merge project:

- No operations may be performed in a plate nest drawing split to another project with one exception: Parts split to another project can have their location changed in a plate nest drawing split to you.
- Parts may only be nested by the project with control of the structural unit in which the parts exist.
- Parts may only be added or removed from a plate nest drawing by the project with modeling control of the parts.
- Parts may only be added or removed from a plate nest by the project with modeling control the parts.
- A plate nest cannot be deleted if it contains parts split to another project.
- No plate nest can be made from a remnant created by another participant in the Split and Merge project.

Profile Nesting

Profile nesting is fully supported within Split and Merge. However, some restrictions apply. You may only insert or remove parts from a profile nest if every other part in the nest is split to you.

Profile Plots

Profile plot drawings can be created in any project by a user with user permission to create profile plot drawings and the new drawing is automatically considered split to the project in which the drawing is created. Responsibility for existing profile plots drawings is delegated by the master project on split creation.

The following restrictions apply in a Split and Merge project.

- No operations may be performed in a profile plot drawing split to another project.
- No plots or plot sheets can be removed from a profile plot drawing if they contain parts split to another project
- No profile plot can be made from any remnant created in another split and merge project.

Pipe and HVAC

Modeling

Modeling piping and HVAC should not be impacted by split and merge unless you attempt to make changes that will affect parts split to another project. ShipConstructor prevents parts split to another project from being modified in any way. Additionally, connections may not be made to parts split to another project. These connections can be made when both parts are under control of the master at the end of the project.

ShipConstructor allows any pipe system, HVAC system, or equipment to be modeled in any system model drawing. In a Split and Merge project, this means that multiple project participants can model in the same system model drawing. For this reason pipe, HVAC, and equipment system model drawings are not sent in a merge or refresh package. Drawings are updated from content in the database the first time that the drawing is opened or when the `_SCUPDATEMODELANDSYSTEMDRAWINGSQUICK` command is run.

You can change the system of parts that are currently under your control. The new system of the part must be a system for which you have responsibility underneath the unit the part exists in.

Spools

You may only create, modify and delete spools if the spooled parts are split to your project. You may only create, modify, and delete spool drawings for spools that are split to your project.

System Manager

If your project has system hierarchy control of a system, you have authority to perform all administrative tasks for that system. You can delete the system, modify system attributes, as well as create, modify, and delete branches under that system.

Projects with authority to model parts in a system, but without system hierarchy control, have the ability to perform a few System Manager operations. This gives maximum flexibility to users of Split and Merge projects. Caution and understanding is important if you perform system manager operations as this type of user, because some changes can be overridden by the project controlling the system hierarchy. Consider this example, if your project has authority to model parts in the bilge system but does not have system hierarchy control of the system, you can perform the following limited operations in the system manager:

- You can create new branches
- You can delete branches you have created as long as you have not sent a merge or refresh to the project with system hierarchy authority for the system and received a merge or refresh in return. This may seem confusing. However, the concept is quite simple and is based on the following two concepts:
 - If you create a new branch, you are able to successfully delete it if you have not sent a merge or refresh to the project with system hierarchy responsibility for the branch. The deletion is successful because the project with responsibility for the system was never aware that the branch existed so deleting it cannot create any data conflicts.
 - If you create a new branch, ShipConstructor will allow you to delete the branch even if you have submitted a merge or refresh to the project with control of the system hierarchy. ShipConstructor allows this because there is no guarantee that the merge or refresh was actually applied to the receiving project. While ShipConstructor will allow you to delete the branch in your project, it will be recreated the next time you receive a merge or refresh from the project with system hierarchy control if they successfully applied the merge or refresh that you sent them.
- The same concepts apply to modification of branch attributes. Users of this project may make attribute changes to branches at any time however if they conflict with the values in the project with control of the system hierarchy the attribute values will be overwritten.

Equipment

You may only create, modify or delete equipment in drawings that are split to your project for equipment editing. You may not make connections to equipment that is not split to your project. System model drawings may be created by any project participating in a Split and Merge project. The new drawing is automatically split for equipment editing to the creating project.

Hull

You can only make changes to hull drawings that are split to your project. New hull drawings can be created by any project and the hull drawing is automatically considered split to the project that created it.

Penetrations

You may only create, modify, or delete penetrations if the penetrated plate and the penetrating pipe or HVAC parts are all split to your project.

Product Hierarchy Dialog

Changes within the Product Hierarchy dialog are limited based on the responsibilities split to your project.

Create, Deleting, Modifying, Moving Assemblies

You can only modify the assembly structure or assembly attributes if product hierarchy control of the assembly unit is split to your project. Assemblies may only be moved from one unit to another if control of both product hierarchy units is split to your project.

Changing Part and Spool Assembly Location

The product hierarchy dialog uses icons with a red circle to indicate which assemblies and parts, whose location you have the ability to change, and which assemblies, whose attributes you can modify. You can change the assembly location of parts and spools if the responsibility split to your project satisfies one of two requirements:

- Product hierarchy control of the unit is split to your project.
- Modeling control of the part or spools is split to your project

The following caveat exists when a project without product hierarchy control of a unit changes the assembly location of parts within the unit. On merge or refresh, if the assembly location of parts or spools conflicts between two projects, the location dictated by the project with control of the product hierarchy unit is used. ShipConstructor allows projects, without control of the project hierarchy of a unit, to change the location of parts and spools under their control in order to give them the flexibility to change the product hierarchy location of parts before the parts have been merged or refreshed to the project with product hierarchy control.

Product Hierarchy Levels

The master project can define new product hierarchy levels at any time in a Split and Merge project. However, product hierarchy levels can only be deleted by the master project if the master project has not split product hierarchy control of any units to any other projects. The same limitation exists for changing the order of product hierarchy levels. You may only modify the order of levels from the master project if the master project controls the product hierarchy for all units. Levels can be renamed by the master project at any time.

Creating and Deleting Product Hierarchies

New product hierarchies can be defined and existing product hierarchies renamed in the master project only. Product hierarchies should be defined with care as they cannot be deleted in a project partitioned by Split and Merge.

Project Settings

All project settings are modifiable on by the master project. Only CPC related project settings are modifiable by split projects. Split projects are automatically initialized the project settings of the master project. On refresh operations all project settings, not modifiable by split projects are updated to match the settings dictated by the master project.

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