



PlanetTogether

*Stellar Performance in Planning and
Scheduling for Multi-Plant Manufacturers*

Integrating with PlanetTogether

Overview

PlanetTogether was designed to work closely with an ERP (Enterprise Resource Planning) or other order management system. It is possible to import data into PlanetTogether so that data entry can be done in your ERP system and does not need to be re-entered into PlanetTogether. Also, once PlanetTogether is producing accurate schedules it is often useful to load schedule data back into the ERP system in order to update Job schedule dates and material requirement dates. PlanetTogether provides the export tools needed to make this happen.

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Importing to PlanetTogether

ERP systems contain most of the data needed to run PlanetTogether such as:

- Plants
- Warehouses, Items, and Inventories (if using Inventory Management)
- Departments
- Resources (machines, labor, subcontractors, equipment, etc.)
- Resource Capabilities (usually equivalent to Work Centers or Operation Types)
- Jobs
 - o Manufacturing Orders
 - o Operations
 - o Resource Requirements
 - o Material requirements (optional)
 - o Products (if using Inventory Management)
 - o Alternate Paths/Routings (optional)
 - o Successor Orders (for linking Jobs; optional)
- Demand
 - o Sales Orders
 - o Forecasts
 - o Transfer Orders

Some of this data is fairly static, such as Plants and Departments, while Jobs tend to be added, closed, and changed at least daily. All of the above data can be entered manually into PlanetTogether but it is generally preferred to import as much as possible so that data maintenance is in one place -- usually the ERP system.

For some data elements, especially Resources, the definitions in PlanetTogether contain fields that do not have an ERP equivalent. In these cases the values can be left at their default values, calculated in the interface, or manually entered in PlanetTogether after the object is created via the interface (or manually). If a value is omitted in the interface then manual changes to object fields will be preserved even after updating the other fields via the interface.

Typical Import Values

These are the typical ERP tables and fields from which data are imported. There are many additional field values that can be imported but these are the basic values used in most integrations.

Work Order Table:

- Work Order Number
- Item Number
- Due Date
- Qty Required
- Priority
- Customer



- Status (Estimate, Planned, Firm)

Work Order Detail Table (Operations):

- Work Order Number
- Operation Number
- Sequence (order of operations)
- Operation Description
- Machine Hours
- Labor Hours
- Work Center
- Planning Scrap Percent
- Current Qty Complete
- Current Hours Complete
- Finished

Plants Table:

- Plant Name
- Description

Work Center Table:

- Work Center Number
- Description
- Plant

Machines Table:

- Machine Number
- Description
- Work Center Number

Employees Table: (If scheduling specific employees.)

- Employee Name

The tables below are used when importing material constraints.

Work Order Detail Table (Materials):

- Work Order Number
- Operation Number
- Material Item Number
- Qty Required
- Qty Issued

Items Table:

- Item Number
- Description
- Group



- Purchased
- Manufactured

Warehouse Table:

- Warehouse Number
- Description

Inventory Table:

- Item Number
- Warehouse Number
- On Hand Qty
- Default Lead Time

Purchase Orders Table:

- Purchase Order Number
- Received

Purchase Order Line Items Table:

- Purchase Order Number
- Item Number
- Qty
- Due Date

Import Options

There are two options for importing data into PlanetTogether:

1. Use the PlanetTogether Interface Service. This is a Windows service that can import data in batch from ODBC, OLE DB, SQL Server, or Oracle databases. (ODBC access is available for most modern databases including Microsoft Access and Excel.) This can also be used to import from text files by triggering a load of the text data into SQL Server before importing.
2. Build a custom real-time or batch interface using the PlanetTogether API (application program interface). This allows you to “inject” single transmissions of data (such as a new Job for example) into PlanetTogether from anywhere on the network.

The PlanetTogether Interface Service is usually easier and faster to setup since it is configured with the Interface Wizard (pictured in part below) and requires no programming (though it can be customized programmatically too). It is a batch-style, “pull” interface that is initiated from within PlanetTogether or can be run automatically at pre-determined intervals or at specified times of the day. If a real-time, transactional interface is desired or if data volumes are especially high and your database’s ODBC/OLEDB/SQL interface is slow or unavailable then the PlanetTogether API would be a better choice.



PlanetTogether Interface Service

The screens below are used to setup the Interface Service for importing.

This is the Config Manager, which is used to configure the PlanetTogether server components.

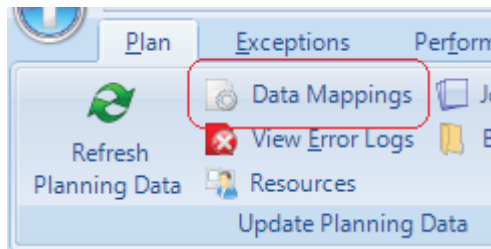
The “ERP Database” tab can be configured to specify the data source for the Interface Service. (Please see the PlanetTogether Help for detailed field level information.)

The “Automatic Actions” tab can be configured to automate various system actions including the import and export of data.

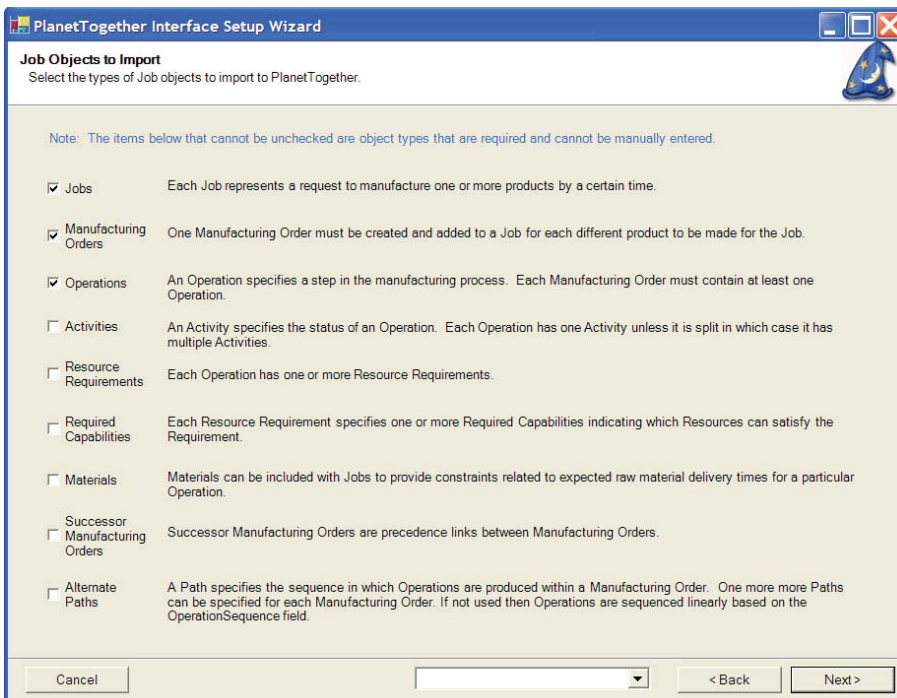
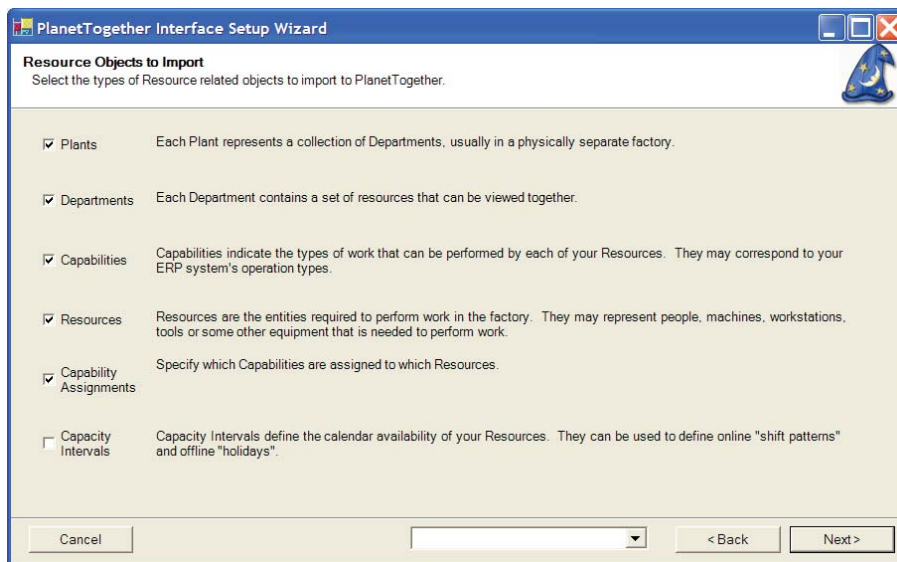
The PlanetTogether “wizard” that can be used to setup the mapping of fields that control the import of data. Imports can run on-demand or at set frequencies and/or times.



The wizard is accessed from the "Plan | Data Mappings" button shown below. To run the import manually, click "Refresh Planning Data".



The initial wizard screens specify which types of data to import.



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Each of the data types has a "mapping" screen similar to the one shown below where the PlanetTogether fields can be mapped to external fields or expressions that will provide the source of data.

Plant Mappings
Set Plant mappings between ERP Fields and PlanetTogether Properties.

Source of Data
Connection: MyERP
Selected Table: Selected Table
Select FROM: plants

Options
Filter (SQL WHERE Clause)

Auto-delete for omitted records Browse SQL Browse Table

Specify Source using Database Fields (or SQL compatible expressions). IMPORTANT: All numeric ExternalId fields MUST be cast as strings using a function like CSTR(<-field>).

Mappings for PlanetTogether Plant			
Property	Type	Required	Source
ExternalId	String	<input checked="" type="checkbox"/>	STR(PLANTID)
Name	String	<input checked="" type="checkbox"/>	PLANT_NAME
AttributeColorCodes	String	<input type="checkbox"/>	
AttributeDescriptions	String	<input type="checkbox"/>	
AttributeMeasures	String	<input type="checkbox"/>	

Database fields for plants		
Field	Type	Sample
PLANTID	Int32	1
PLANT_NAME	String	KSM

Save All Test Perform Import

Cancel < Back Next >

Exporting From PlanetTogether

You might want to update an external system with PlanetTogether results such as schedule dates or material need dates. You can do this in one of two ways:

1. SQL Server (or SQL Express): All data can also be easily exported to the PlanetTogether SQL Server reporting database and linked to Microsoft Access (see below), Crystal Reports, Microsoft Reporting Services, a Web page, or some other report tool.
2. XML: All PlanetTogether data can be easily written to an XML file.
3. A custom export. This can be a Microsoft .Net dll that PlanetTogether calls and passes a DataSet when the export is initiated.

In either case, after schedules have been generated, they can be exported at the push of a button and then are available for import into your other systems. Exports can also be setup to run automatically in the Config Manager (shown above).



JobID	CustomerExtern	EntryDate	NeedDateTime	Classification	Commitment	H
71947	6	005 5:19:43 AM	7/18/2005	Order	Firm	
71970	6	005 5:19:43 AM	7/28/2005	Order	Firm	
72002	6	005 5:19:43 AM	8/12/2005	Order	Firm	
72370	6	005 5:19:43 AM	11/11/2005	Order	Firm	
72405	6	005 5:19:44 AM	6/23/2005	Order	Firm	
72409	6	005 5:19:44 AM	11/11/2005	Order	Firm	
74370	6	05 11:47:32 AM	9/19/2005	Order	Firm	
76766	6	05 11:40:55 AM	11/28/2005	Order	Firm	
76837	6	05 12:23:44 PM	6/3/2005	Order	Firm	
76999	6	005 4:47:28 AM	8/15/2005	Order	Firm	
77876	6	05 10:03:44 AM	9/15/2005	Order	Firm	
77878	6	05 10:03:44 AM	8/25/2005	Order	Firm	

PlanetTogether data table linked in Microsoft Access

Preparing For Integration

These are some common questions to answer when preparing to integrate PlanetTogether with your ERP system:

1. Which data can be gotten from the ERP system and which data need to be entered directly in PlanetTogether?

Most manufacturing ERP systems can provide the following information: Plants, Departments (or Work Centers), Resources (usually Machines and/or Employees), Capabilities (usually from Work Centers), Jobs (sometimes called Work Orders). Job update information usually also comes from the ERP.

Typically the only data entered directly in PlanetTogether are: Users, Resource detail fields (extra fields that don't exist in the ERP Machine definition), Setup Lookup Tables, and Optimization Rules.

2. How will PlanetTogether connect to the ERP to read the data?

PlanetTogether can connect directly to SQL Server, Oracle, ODBC and OLE DB databases. In most situations one of these will be a valid option. ODBC drivers are available for most legacy systems and can also be used to read data from Microsoft Excel, Microsoft Access, and from delimited text files.



If none of these options will work you can also create a custom program that can be called from your legacy system directly in order to send information to PlanetTogether.

3. Will we want to and be able to update our ERP system with PlanetTogether schedules?

The most common information updated in ERP systems from PlanetTogether is: Job/Work Order/Operation scheduled start/end times and Operation scheduled Work Centers.

Some ERP systems allow for external systems to update their tables while others do not. You should check with your ERP provider to see if external database updates are allowed or if import capabilities exist. If the ERP database can be updated externally then you can use the PlanetTogether SQL Server database or XML output and write a program to update your ERP data from there. Also, it is possible to write custom export dlls that can be called directly from PlanetTogether to update your database or to create text files in the correct format for your ERP to import.

4. What will we extract from our ERP to represent “Resources” in PlanetTogether?

This is an important decision since it will be the basis for constructing schedules. Typically Resources represent Machines and Subcontractors. If labor is an important constraint then it should also be modeled. This can be done in one of two ways: (1) Define Capacity Intervals on your Machines to represent the manning of those Machines (You can specify when they're manned and how many employees are on each.) (2) You can create a Resource for each Employee and schedule them explicitly. Option 1 is better if the labor allocated to a work center is fairly stable or when there are pools of labor allocated to work centers (like an assembly area with 10 people working together on jobs). Option 2 is better if labor is highly skilled and specific people with specific skills are allocated to jobs and work on various machine throughout the day (like a “job shop” for example).

5. What will we extract from our ERP to represent “Capabilities” in PlanetTogether?

Capabilities usually come from either “Work Centers” or “Operation Types”. In most ERP systems an Operation can be linked to one Work Center and one Operation Type. Each Machine can usually be linked to one Work Center and sometimes to one or more Operation Types. If all of the Machines in a Work Center are identical in terms of the work they can perform then you can use Work Center = Capability. However, if the machines in a Work Center have slightly different abilities then you may choose to use Operation Types and link the Operation Types to your Resources in PlanetTogether. The most flexible option is to create a new table in your ERP called Capabilities and link one or more of them to your Operations and one or more to your Machines. This is the structure of the data in PlanetTogether and affords to most flexibility in specifying which Resources can perform which Capabilities.

6. How will setup times be modeled?

Modeling sequence-dependent setup time is one of the more complex challenges in scheduling.



Setup time can be driven by a variety of factors such as: material type, material size, packaging size, tools and fixtures required, temperature requirements (in ovens for example), allergens (in food processing), etc. Setup times can be calculated in PlanetTogether as a combination of: Operation setup time, Resource setup time, and Lookup Table based setup times.

For sequence dependent setup you'll need to decide how the setup should be calculated. For example, it might be included whenever the Product of a Manufacturing Order changes or based on the Setup Code or Setup Number in an Operation. If the setup time varies based on a "from/to" relation of what was made last and next then you'll need to use Lookup Tables. These can be based on the Setup Code or Setup Number of the Operation or from a combination of Attributes attached to an Operation. The Lookup Tables can be defined directly in PlanetTogether but the Operation values for Setup Code/Number or Attributes will have to be imported from the ERP system if you will be importing Jobs.

7. When will imports be run?

It's common practice to update the schedule at least every few hours throughout the day but this can vary based on how dynamic the production environment is – how often operations are completed, new orders are entered, or resource capacities change. The imports can be run manually from PlanetTogether. In addition, the PlanetTogether Scheduling Agent service can be setup to trigger imports and/or exports (plus optimizations, clock advances, etc.) at a user-definable interval and/or at specific times of the day.

For more detailed information as well as integration worksheets please contact us at support@planettogether.com.

