Proficy Plant Applications 2023

Batch Analysis

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Introduction to Batch Analysis

The Plant Applications Batch Analysis solution helps manufacturers to better understand and control variation in batch related production environments. With powerful analytical tools, reports, and a generic interface to several commercially available batch execution systems, our solution is ideal for manufacturers who need to extend typical batch execution systems with powerful off-the-shelf reporting and analysis capabilities.

Configuration Overview

To use the Batch Analysis solution, you must populate our Event_Transactions table with your batch data.

If you are using:	You will need to:
Proficy Batch Execution	1. Configure Proficy Batch Execution (iBatch), if necessary. 2. Create a department, production line, and production unit in your Plant Applications plant model. 3. Configure Model 5013. 4. Configure Model 118. 5. Configure the following site parameters: • Auto Configure Units • Default Data Source • Default Product Family • Ignore Event Status Changes • Purge Orphaned Records (Days) • Purge Processed Records (Days) • Wait Time (milliseconds)
RSBatch	1. Create a department, production line, and production unit in your Plant Applications plant model. 2. Run the LocalBatchComplete.sql script, which is located in the C:\Proficy\Proficy Server\Support\RSBatch folder 3. Configure Model 5013. 4. Configure Model 118. 5. Configure the following site parameters: • Auto Configure Units • Default Data Source • Default Product Family • Ignore Event Status Changes • Purge Orphaned Records (Days) • Purge Processed Records (Days) • Wait Time (milliseconds)
Another Batch Execution System	1. Create a department, production line, and production unit in your Plant Applications plant model. 2. Configure Model 118. 3. Import your S88 batch data into the Event_Transactions table. 4. Configure the following site parameters: • Auto Configure Units • Default Data Source • Default Product Family • Ignore Event Status Changes • Purge Orphaned Records (Days) • Purge Processed Records (Days) • Wait Time (milliseconds)

Planning Automatic Batch / Lot Detection

The batch trigger as well as batch identification is often driven by the control system. Planning for automatic batch detection starts with auditing the available signals that can be used to determine when a batch has been started and stopped, what the product of the batch is, and potentially when each phase of the batch is active.

Phase information is often used to filter process data, and otherwise trigger calculations related to a batch.

Preparing the Control System for Automatic Batch Detection

1. Establish the rule that defines when a batch has started or stopped.
2. Establish the rule that defines the product code of the batch.
3. Determine the behavior of the available signals. Do they pulse or hold value? When does the product code change relative to the batch start or end? How is phase indicated and when does it change?
4. Where timing is critical, supplement logic in the control system to latch in trigger values, or control the sequencing of events firing to give the Plant Applications event models enough chance to recognize the event and collect data around that event.
5. Collect all signals into the historian at the appropriate resolution.

Batch Analysis and the Event Transactions Table

Batch process data can be imported into the Proficy Plant Applications MES solution where data can be analyzed, reported on, and used as inputs to other core functions within Plant Applications. If you are interfacing Plant Applications with the external S88 batch execution engines such as Proficy Batch Execution or RSBatch, then Model 5013 is used to load S88 batch events from these batch execution platforms into an intermediate transaction table, Event_Transactions, in the Plant Applications database. Model 49000, that is created by Model 118, reads the records from the Event Transactions table and puts them into the appropriate Plant Applications table.

If you are using another batch system, you must write your own stored procedure, and then use Model 602 to load your batch events into the Event_Transactions table.

The Event_Transactions Table Structure

The following table describes the structure for the Event_Transactions table. The value in the **EventType** field will determines which rows are processed and which fields are required. The five valid **EventType** values are:

- **RecipeSetup**
- **ProcedureReport**
- **ParameterReport**
- **MaterialMovement**
- **EventReport**

Field	Data Type	Description
[EventTransactionId]	[int]	Specifies unique identifier for the event transaction record.

[OrphanedFlag]	[bit]	Indicates that the processed transaction was ignored, or an error occurred.
[ProcessedFlag]	[bit]	Indicates that the transaction has been successfully processed.
[ProcessedTimeStamp]	[datetime]	Specifies the timestamp the transaction was last processed.
[EventTimeStamp]	[datetime]	Specifies the local timestamp event created in the batch execution system (BES).
[ProcedureStartTime]	[datetime]	Specifies the start time of the procedure.
[ProcedureEndTime]	[datetime]	Specifies the end time of the procedure.
[RawMaterialDimensionA]	[float]	Specifies the diameter of the material being consumed.
[RawMaterialDimensionX]	[float]	Specifies the weight of the material being consumed.
[RawMaterialDimensionY]	[float]	Specifies the length of the material being consumed.
[RawMaterialDimensionZ]	[float]	Specifies the width of the material being consumed.
[UnitProcedureInstance]	[int]	Specifies the instance of the unit procedure within the batch.
[OperationInstance]	[int]	Specifies the instance of the operation within the batch.
[BatchInstance]	[int]	Specifies the instance of the batch.
[PhaseInstance]	[int]	Specifies the instance of the phase within the batch.
[Proficy_Id]	[int]	Specifies the unique identifier of a Proficy record.
[RawMaterialCellName]	[varchar] (100)	Specifies the cell or production line of the raw material event that will get linked to the main batch event.
[RawMaterialUnitName]	[varchar] (100)	Specifies the production unit of the raw material event that will get linked to the main batch event.
[EventReportType]	[varchar] (50)	Creates a User-Defined Event type by using the name specified in the EventReportType.
[RecipeString]	[varchar] (1000)	Specifies the full recipe string reported by the batch execution system.
[OrphanedReason]	[varchar] (255)	Specifies the reason why the transaction was not processed.
[RawMaterialAreaName]	[varchar] (100)	Specifies the area or department of the raw material event that will get linked to the main batch event.
[RawMaterialContainerId]	[varchar] (50)	Specifies the identification of the container moving the material.
[UserName]	[varchar] (100)	Specifies the user creating or approving the transaction.
[UserSignature]	[varchar] (255)	Specifies the token of the user approving the transaction.
[ParameterAttributeComments]	[varchar] (255)	Specifies the comments that apply to the value being reported.
[RawMaterialProductCode]	[varchar] (25)	Specifies the product code of the raw material being moved or consumed.
[RawMaterialBatchName]	[varchar] (50)	Specifies the source batch or lot of the material being moved or consumed.

[ParameterAttributeName]	[varchar] (100)	Specifies the attribute of the parameter being reported.
[ParameterAttributeUOM]	[varchar] (15)	Specifies the unit of measure of the parameter being reported.
[ParameterAttributeValue]	[varchar] (25)	Specifies the value of the parameter being reported.
[PhaseName]	[varchar] (50)	Specifies the name of the phase.
[StateValue]	[varchar] (25)	Specifies the name of the procedure state or completion status.
[ParameterName]	[varchar] (100)	Specifies the name of the parameter being reported.
[BatchProductCode]	[varchar] (25)	Specifies the product code of a batch.
[UnitProcedureName]	[varchar] (50)	Specifies the name of the unit procedure.
[OperationName]	[varchar] (50)	Specifies the name of the operation.
[CellName]	[varchar] (100)	Specifies a production line in the Batch execution system in the Plant Model.
[UnitName]	[varchar] (100)	Specifies a production line in the Batch execution system in the Plant Model.
[BatchName]	[varchar] (50)	Specifies the name of a batch that includes the UnitCycleCount production line.
[EventType]	[varchar] (20)	Specifies the type of event to be processed.
[EventName]	[varchar] (100)	Specifies the description of the subtype of an event.
[AreaName]	[varchar] (100)	Specifies the name of a department in the batch execution system in the Plant Model.
[ProcessOrderId]	[Int]	Specifies the unique identifier of a process order that enables the inclusion of the process order associated with a Production Event in the ProcedureReport event type.
[InitialDimensionX]	[Float]	Specifies the initial weight of the material produced during a Production Event associated with the ProcedureReport event type.
[InitialDimensionY]	[Float]	Specifies the initial length of the material produced during a Production Event associated with the ProcedureReport event type.
[InitialDimensionZ]	[Float]	Specifies the initial width of the material produced during a Production Event associated with the ProcedureReport event type.
[InitialDimensionA]	[Float]	Specifies the initial diameter of the material produced during a Production Event associated with the ProcedureReport event type.
[FinalDimensionX]	[Float]	Specifies the final weight of the material produced during a Production Event associated with the ProcedureReport event type.
[FinalDimensionY]	[Float]	Specifies the final length of the material produced during a Production Event associated with the ProcedureReport event type.

[FinalDimensionZ]	[Float]	Specifies the final width of the material produced during a Production Event associated with the ProcedureReport event type.
[FinalDimensionA]	[Float]	Specifies the final diameter of the material produced during a Production Event associated with the ProcedureReport event type.
[EventSubtype]	[varchar] (50)	Specifies the subtype of an event that overrides the event associated with a User-Defined Event (UDE) in the S88 batch interface. **Note:** If you do not specify any value for the [EventSubtype] field then the subtype of a UDE is set to one of the following values: • **Operation:** When the **OperationName** field is specified for the UDE. • **Phase:** When the **OperationName** and **PhaseName** fields are specified for the UDE.
[LotIdentifier]	[nvarchar] (100)	Specifies the unique identifier of a Lot associated with a Production Event that enables you to search for events by Lot IDs.
[FriendlyOperationName]	[nvarchar] (100)	Specifies the name of the operation associated with a Production Event. For example, Op1 and Op2.

EventReport Event Type

In the Event_Transactions table, the EventReport event type is used to capture events from the BES not associated with a procedural or parametric element. Generally, these will involve abnormal situations such as mode changes or manual interventions taken during the execution of the batch.

A user-defined event is created based on the name of the EventReportType. The value in the EventName field is used as the description for the user-defined event. For each value in the ParameterName field, a new variable will be created and an entry will be made in the Test table for each value in the ParameterAttributeValue field.

When the EventType is **EventReport**, the following fields in the Event_Transactions table are processed.

Field	Required	Notes
EventType	Yes	Creates user-defined event based on the name of the EventReportType.
EventTimestamp	Yes	Local timestamp event occurred in BES.
EventName	Yes	Description of type of event. Used as the UDE_Desc in the User_Defined_Events table.
AreaName	Yes	Batch execution system AreaName, which maps to department in plant model.
CellName	Yes	Batch execution system CellName, which maps to production line in plant model
UnitName	Yes	Batch execution system UnitName, which maps to production unit in plant model
BatchName	Yes	Name of the batch (including UnitCycleCount). If not specified, the current batch is assumed.

UnitProcedureName	Yes	Name of unit procedure. If not specified, the current unit procedure is assumed.
OperationName	Yes	Name of operation. If not specified, the current operation is assumed.
PhaseName	Yes	Name of phase. If not specified, the current phase is assumed.
PhaseInstance	No	Name of phase instance. If not specified, the current phase is assumed.
ProcedureStartTime	No	The start time of the procedure. If not specified, the EventTimeStamp is assumed.
ProcedureEndTime	No	The end time of the procedure. If not specified, the EventTimeStamp is assumed.
ParameterName	Yes	The name of the parameter being reported. If the ParameterName does not exist as a variable then a new variable will be created.
ParameterAttributeName	Yes	Must be the constant "value".
ParameterAttributeValue	Yes	The value of the parameter specified in ParameterName.
ParameterAttributeComments	Yes	Populating this field will add a comment_id to the test result in the Tests table and store the comment in the Comments table.
UserName	No	The user creating or approving the transaction.
UserSignature	No	The token of the user approving the transaction.
BatchInstance	No	Assumes instance of 1, if not specified.
UnitProcedureInstance	No	Assumes instance of 1, if not specified
OperationInstance	No	Assumes instance of 1, if not specified.
ParameterAttributeUOM	Yes	The unit of measure of the parameter being reported.
EventReportType	Yes	Will create a User-Defined Event event type using the name specified in the EventReportType.

ParameterReport Event Type

In the Event_Transactions table, the ParameterReport event type is used to create variable data and associate it with the appropriate levels of the Batch Procedural hierarchy.

When the EventType is **ParameterReport**, the following fields in the Event_Transactions table are processed.

Field	Required	Notes
EventType	Yes	Used to create variable data and associate it with the appropriate levels of the Batch Procedural hierarchy.
EventTimestamp	Yes	Local timestamp event occurred in BES
AreaName	Yes	Batch execution system AreaName, which maps to department in plant model.
CellName	Yes	Batch execution system CellName, which maps to production line in plant model.
UnitName	Yes	Batch execution system UnitName, which maps to production unit in plant model.

BatchName	Yes	Name of the batch (including UnitCycleCount).
UnitProcedureName	Yes	Name of unit procedure. If not specified, the current unit procedure is assumed.
OperationName	Yes	Name of operation. If not specified, the current operation is assumed.
PhaseName	Yes	Name of phase. If not specified, the current phase is assumed.
PhaseInstance	No	Name of phase instance. If not specified, the current phase is assumed.
ParameterName	Yes	The name of the parameter being reported. If the ParameterName does not exist as a variable, then a new variable will be created.
ParameterAttributeName	Yes	Must be the constant "value".
ParameterAttributeUOM	Yes	Used to update the Engineering Units of the variable.
ParameterAttributeValue	Yes	The value of the parameter being reported.
ParameterAttributeComments	Yes	Populating this field will add a comment_id to the test result in the Tests table and store the comment in the Comments table.
UserName	Yes	Looks up specified Username and attempts to find existing Plant Applications user. If user exists, the User_Id will be used to populate User_Id in Tests table.
UserSignature	Yes	Looks up specified Username and attempts to find existing Plant Applications user. If user exists, the User_Id will be used to populate Second_User_Id in Tests table.
BatchInstance	No	Assumes instance of 1, if not specified.
UnitProcedureInstance	No	Assumes instance of 1, if not specified.
OperationInstance	No	Assumes instance of 1, if not specified.

ProcedureReport Event Type

In the Event_Transactions table, the ProcedureReport event type is used to create events in the Manufacturing Execution System (MES) that are associated with various S88 procedural elements. Batch Events are created as Production events on a Virtual Unit. Unit Procedure Events are created as Production events on the Equipment Unit. Operation and Phase Events are created as User-Defined Events on the Equipment Unit.

For each element, the Event start time, end time, and state changes (along with the time of change in state) must be captured.

Genealogy links must be created in Event_Components that links the Batch on the Virtual Unit to the Unit Procedures events on various Equipment Units. Links also must be established between the Unit Procedure events and the Operation and Phase events.

The BatchName and BatchProductCode must be included in the first procedural transaction for a batch. If the BatchProductCode is not found, then a new product is created and mapped to the associated unit.

The AreaName, CellName and UnitName production lines are used to cross reference the appropriate Equipment Units.

When the EventType is ProcedureReport, the following fields in the Event_Transactions table are processed.

Field	Required	Description
EventType	Yes	Creates events in the Manufacturing Execution System (MES) for various S88 procedural elements.
EventTimestamp	Yes	Specifies the local timestamp events created in the batch execution system (BES).
AreaName	Yes	Specifies the name of a department of the batch execution system in the plant model.
CellName	Yes	Specifies a production line in the Batch execution system in the Plant Model
UnitName	Yes	Specifies a production line in the Batch execution system in the Plant Model.
BatchName	Yes	Specifies the name of a batch that includes the UnitCycleCount production line.
BatchProductCode	Yes	Specifies the product code of a batch. If the BatchProductCode does not exist for a unit mapped to the Area information, then a new product is created.
UnitProcedureName	Yes	Specifies the name of a unit procedure in the batch.
OperationName	Yes	Specifies the name of the operation.
PhaseName	Yes	Specifies the name of the phase.
PhaseInstance	No	Specifies the name of a PhaseInstance. If you do not specify any value for the instance, the PhaseInstance is assumed as 1.
StateValue	Yes	Specifies the status of the procedure.
ProcedureStartTime	No	Specifies the start time of the first event of the procedural element. For the events other than first event, the ProcedureStart time denotes the updated start time recorded for that event.
ProcedureEndTime	No	Specifies the end time of an event. If you do not specify the ProcedureEndTime, then the EventTimestamp is used to update the end time for that event.
UserName	Yes	Specifies the user creating or approving the transaction.
UserSignature	Yes	Specifies the token of the user approving the transaction.
BatchInstance	No	Specifies the name of the BatchInstance. If you do not specify any value for this instance, the BatchInstance is assumed as 1.
UnitProcedureInstance	No	Specifies the name of the UnitProcedureInstance. If you do not specify any value for this instance, the UnitProcedureInstance is assumed as 1.
OperationInstance	No	Specifies the name of the OperationInstance. If you do not specify any value for this instance, the OperationInstance is assumed as 1.
ProcessOrderId	No	Specifies the unique identifier of a process order that enables inclusion of the process order associated with

		a Production Event in the ProcedureReport event type.
InitialDimensionX	No	Specifies the initial weight of the material produced during a Production Event associated with the ProcedureReport event type.
InitialDimensionY	No	Specifies the initial length of the material produced during a Production Event associated with the ProcedureReport event type.
InitialDimensionZ	No	Specifies the initial width of the material produced during a Production Event associated with the ProcedureReport event type.
InitialDimensionA	No	Specifies the initial diameter of the material produced during a Production Event associated with the ProcedureReport event type.
FinalDimensionX	No	Specifies the final weight of the material produced during a Production Event associated with the ProcedureReport event type.
FinalDimensionY	No	Specifies the final length of the material produced during a Production Event associated with the ProcedureReport event type.
FinalDimensionZ	No	Specifies the final width of the material produced during a Production Event associated with the ProcedureReport event type.
FinalDimensionA	No	Specifies the final diameter of the material produced during a Production Event associated with the ProcedureReport event type.
EventSubtype	No	Specifies the subtype of an event that overrides the event associated with a User-Defined Event (UDE) created in the S88 batch interface. **Note:** If you do not specify any value for the [EventSubtype] field then the subtype of a UDE is set to one of the following values: • **Operation:** When the **OperationName** field is specified for the UDE. • **Phase:** When the **OperationName** and **PhaseName** fields are specified for the UDE.
LotIdentifier	No	Specifies the unique identifier of a Lot associated with a Production Event that enables you to search for events by Lot IDs.
FriendlyOperationName	No	Specifies the name of the operation associated with a Production Event. For example, Op1 and Op2.

MaterialMovement Event Type

In the Event_Transactions table, the MaterialMovement event type is used to specify raw material movements, which are used to determine the lot ID, product code, and amount of a particular raw material that was consumed during the batch.

Multiple raw material movements are allowed, as well as multiple instances of the same raw material, as long as the EventTimestamp is different for each instance.

If none of the procedural information is specified, then it will be assumed that the current batch will be the destination of the material movement. Only the EventTimestamp will be used to timestamp the event component record.

When the EventType is **MaterialMovement**, the following fields in the Event_Transactions table are processed.

Field	Required	Notes
EventType	Yes	Associates raw material movements with the batch event.
EventTimestamp	Yes	Local timestamp event occurred in BES
AreaName	Yes	Batch execution system AreaName, which maps to department in plant model.
CellName	Yes	Batch execution system CellName, which maps to production line in plant model.
UnitName	Yes	Batch execution system UnitName, which maps to production unit in plant model.
BatchName	Yes	Name of the batch (including UnitCycleCount).
UnitProcedureName	Yes	Name of unit procedure. If specified, the material movement is linked to the unit procedure. If not specified, the material movement is linked to the virtual batch.
OperationName	Yes	Name of operation. If not specified, the current operation is assumed.
PhaseName	Yes	Name of phase. If not specified, the current phase is assumed.
PhaseInstance	No	Name of phase instance. If not specified, the current phase is assumed.
ProcedureStartTime	No	If the ProcedureStartTime is not specified, it will use the event component start time as the Start_Time of the User-Defined Event. If it is specified, this will be used as the User-Defined Event Start_Time
ProcedureEndTime	No	If the ProcedureEndTime is not specified, it will use the event component timestamp as the End_Time of the User-Defined Event. If it is specified, this will be used as the User-Defined Event End_Time.
RawMaterialAreaName	Yes	Specifies the area or department of the raw material event that will be linked to the main batch event.
RawMaterialCellName	Yes	Specifies the cell or production line of the raw material event that will be linked to the main batch event.
RawMaterialUnitName	Yes	Specifies the production unit of the raw material event that will be linked to the main batch event.
RawMaterialProductCode	Yes	Specifies the ProductCode of the raw material event that will be linked to the main batch event. If the RawMaterialProductCode is not found in Plant Applications, then a new product will be added.
RawMaterialBatchName	Yes	Specifies the Event_Num or BatchName of the raw material event that will be linked to the main batch event.
RawMaterialContainerId	No	The identification of the container moving the material. Not currently used.

RawMaterialDimensionX	Yes	The weight of the material being consumed. Populates the DimensionX field in the Event_Components table.
RawMaterialDimensionY	Yes	The length of the material being consumed. Populates the DimensionY field in the Event_Components table.
RawMaterialDimensionZ	Yes	The width of the material being consumed. Populates the DimensionZ field in the Event_Components table.
RawMaterialDimensionA	Yes	The diameter of the material being consumed. Populates the DimensionA field in the Event_Components table.
UserName	No	The user creating or approving the transaction.
UserSignature	No	The token of the user approving the transaction.
BatchInstance	No	Assumes an instance of 1, if not specified.
UnitProcedureInstance	No	Assumes an instance of 1, if not specified.
OperationInstance	No	Assumes an instance of 1, if not specified.

RecipeSetup Event Type

In the Event_Transactions table, the RecipeSetup event type is used to associate parameter values to specification limits on report parameter variables within the Plant Applications plant model.

When the EventType is **RecipeSetup**, the following fields in the Event_Transactions table are processed.

Field	Required	Notes
EventType	Yes	Associates parameter values to specification limits on report parameter variables.
EventTimestamp	Yes	Local timestamp event occurred in BES
AreaName	Yes	Batch execution system AreaName, which maps to department in plant model.
CellName	Yes	Batch execution system CellName, which maps to production line in plant model.
UnitName	Yes	Batch execution system UnitName, which maps to production unit in plant model.
BatchName	Yes	Name of the batch (including UnitCycleCount).
BatchProductCode	No	Product code of batch. If the BatchProductCode does not exist on the unit mapped to the Area information, then a new product will be created.
UnitProcedureName	Yes	Name of unit procedure. If not specified, the current unit procedure is assumed.
OperationName	Yes	Name of operation. If not specified, the current operation is assumed.
PhaseName	Yes	Name of phase. If not specified, the current phase is assumed.
PhaseInstance	No	Name of phase instance. If not specified, the current phase is assumed.
ParameterName	Yes	The name of the parameter being reported. ParameterName will determine the variable that the specifications will be associated with. If the

		ParameterName does not exist as a variable then a new variable will be created.
ParameterAttributeName	Yes	The attribute of the parameter being reported. The ParameterAttributeName will be used to determine which attribute of the specification should be update. Valid ParameterAttributeNames are "Target," "UpperUser," "LowerUser," UpperWarning," "LowerWarning," "UpperReject," "LowerReject."
ParameterAttributeUOM	Yes	Used to update the Engineering Units of the variable.
ParameterAttributeValue	Yes	The value of the parameter being reported.
ParameterAttributeComments	Yes	If comments are provided in the ParameterAttributeComments then a comment will be stored for the product specification for the variable in question.
BatchInstance	No	Assumes instance of 1, if not specified.
UnitProcedureInstance	No	Assumes instance of 1, if not specified.
OperationInstance	No	Assumes instance of 1, if not specified.

Working with Proficy Batch Execution

Plant Applications provides a way to import S88 batch records from Proficy Batch Execution.

You must first configure Proficy Batch Execution. See "Plant Applications Batch Analysis Reports Configuration" in the Proficy Batch Execution "System Configuration" manual.

To configure Plant Applications:

1. Configure the Plant Model
2. Configure Model 5013
3. Configure Model 118.
4. Configure the following site parameters:
    - Auto Configure Units
    - Default Data Source
    - Default Product Family
    - Ignore Event Status Changes
    - Purge Orphaned Records (Days)
    - Purge Processed Records (Days)
    - Wait Time (milliseconds)

If you are upgrading:

If you have upgraded from an earlier version of Plant Application, you have two options. You can either continue to use the existing batch interface or you can use the new batch interface, the main difference being that you do not have to configure the spS88_iBatchReader stored procedure within SQL Server. Instead, you use model 5013 to set all the parameters.

IMPORTANT: *If you use the new script, you must configure model 5013 with all the parameters used by the original spS88_iBatchReader.*

If you choose to continue using the existing batch interface, you do not need to do anything. If you want to use the new batch interface, you must:

1. Delete the existing spS88_iBatchReader stored procedure.
2. Script in the new spS88_iBatchReader stored procedure. The new stored procedure is located at C:\..\Proficy Server\Support\Proficy Batch
3. Configure Model 5013

Step 1: Configure the Plant Model

To better represent the batch execution system (BES) data within Plant Applications, the batch events are stored in the virtual unit. The unit procedure events will then be stored as production events on the appropriate equipment units. The operation and phases associated with each of the unit procedures will be stored as user-defined events on the appropriate unit procedure unit. Phase data will still be stored in variables and organized in the appropriate phase variable groups, but it will be stored at the end time of the phase event as opposed to the end time of the batch event. The variables will also be of event type "User Defined Event" so that they will be associated with the phase user-defined event.

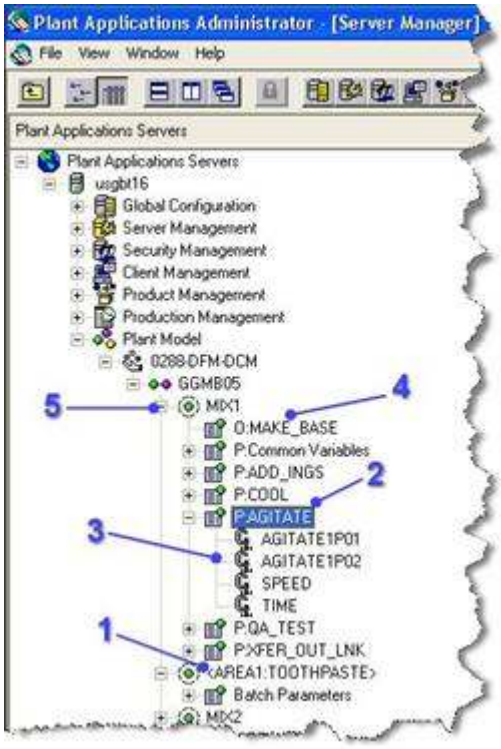
The virtual batch unit is created at the production unit level and the name is enclosed in angle brackets, < >. This unit will be used to capture the start and end time of the batch. There will be one virtual unit per production line. Genealogy links will be associated between the main batch and the unit procedures on each of the equipment units.

The equipment units will represent one piece of equipment that was used in the batching process. The unit procedures that were associated with these pieces of equipment will be stored as events.

Operation and phases will be created as user-defined events on the equipment unit. These will be linked to the unit procedure event. Phase events will also be linked to the operation events. There will be one user-defined event subtype for operations and one user-defined event subtype for phases per equipment unit.

A special variable group is created for identical variables that exist in different phases. These variables are put in the **P:Common Variables** variable group.

For more information on configuring the Plant Model, see the topic Configuring the Plant Model in the online help.



1. Virtual Batch Unit

Virtual batch units are enclosed with angle brackets, < >.

The **Extended Information** field in the **Unit Properties Configuration** dialog box, which is opened by right-clicking on the unit and selecting **Edit <production unit> Properties,** is populated with the value **BATCH:** and this must not be changed.

2. Phase

The **URL** field in the **Edit External Link** window is pre-filled and must not be changed.

3. Phase parameter

The **Input tag** field in the **Variable Sheet** is pre-filled and must not be changed.

4. Operation

The **URL** field in the **Edit External Link** window is pre-filled and must not be changed.

5. Equipment Unit

Step 2: Configure Model 5013

Refer to the “Configure Model 5013 for Batch Analysis” topic in the Plant Applications Models help guide.

Step 3: Configure Model 118

Refer to the “Configure Model 118 for Batch Analysis” topic in the Plant Applications Models help guide.

Step 4: Configure Site Parameters

You can configure the following site parameters:

- Auto Configure Units: This site parameter determines if your plant model will be automatically configured based on how you configure model 118. The default setting is True, which means your plant model will be automatically configured.
- Default Data Source: This site parameter specifies the data source type. The data source type will be used to map various objects (variables, for example) to the batch data.
- Default Product Family: This site parameter specifies the product family your batch product will be associated with. The default value is 1, which means your batch product will be associated with the default, "Product Family." (Product family ID = 1).
- Ignore Event Status Changes: If this site parameter is set to True, there will be no additional Event_Status changes performed after the initial event creation. The default value is False, which means that additional Event_Status changes will be performed after the initial event creation.
- Purge Orphaned Records (Days): This site parameter determines how long orphaned records will be kept in the Event Transactions table. The default setting is 0, which means that orphaned records will never be purged.
- Purge Processed Records (Days): This site parameter determines how long processed records will be kept in the Event Transactions table. The default setting is 0, which means that processed records will never be purged.
- Wait Time (milliseconds): This site parameter specifies the time, in milliseconds, between processing records in the Event Transactions table. The default value is 0, which means that all records will be processed with no wait time between.

Working with RSBatch

The RSBatch interface requires you to execute the LocalBatchComplete SQL script against the source Batchhis (batch journal) database. This script will add a new table called Local_BatchComplete and put a trigger on the source Batchhis table. You must provide permissions for the comxclient user in SQL so that comxclient has 'Select' permissions against the source Batchhis table and 'Select','Update' permissions against the Local_BatchComplete table.

The trigger on the Batchhis table will look for the record where the pvalue = 'End of Batch'. When it finds this record, it indicates that the batch has completed. A row will then be inserted into the Local_BatchComplete table with the processed field set to '0'. Model 5013 will fire on the interval specified when configuring the model and look to see if there are any unprocessed batches in the Local_BatchComplete table. If it identifies unprocessed batches, it will then select all the records from the Batchhis table, perform the required data mapping, insert the records into the Event_Transactions table, and mark the batch as processed in the Local_BatchComplete table.

To configure Plant Applications:

1. Create a department, production line, and production unit in your Plant Applications plant model.
2. Run the LocalBatchComplete.sql script, which is located in the C:\Proficy\Proficy Server\Support\RSBatch folder
3. Configure Model 5013.
4. Configure Model 118.
5. Configure the following site parameters:
    - Auto Configure Units

- Default Data Source
- Default Product Family
- Ignore Event Status Changes
- Purge Orphaned Records (Days)
- Purge Processed Records (Days)
- Wait Time (milliseconds)

Upgrading from earlier version of Plant Applications:

In Plant Applications 5.0, the RSBatch interface has been modified so that updates/deletes no longer are done to the source Batchhis (batch journal) table. You can continue to use the existing interface until you decide to switch over to the new method.

If you are upgrading from an earlier version of Plant Applications and want to use the new interface, you must:

1. Delete the existing spS88_RSBatch6Reader stored procedure
2. Script in the new spS88_RSBatch6Reader stored procedure, which will be located in the ..Proficy\Proficy Server\Support\RSBatch directory.
3. Reconfigure Model 5013. In previous version of Plant Applications, there were multiple parameters that had to be defined in the spS88_RSBatch6Reader stored procedure that have now been set up as Event Configuration Properties, which must be defined in the Administrator, instead of altering the stored procedure. For instructions on configuring Model 5013, see the topic, Configure Model 5013

Step 1: Configure the Plant Model

To better represent the batch execution system (BES) data within Plant Applications, the batch events are stored in the virtual unit. The unit procedure events will then be stored as production events on the appropriate equipment units. The operation and phases associated with each of the unit procedures will be stored as user-defined events on the appropriate unit procedure unit. Phase data will still be stored in variables and organized in the appropriate phase variable groups, but it will be stored at the end time of the phase event as opposed to the end time of the batch event. The variables will also be of event type "User Defined Event" so that they will be associated with the phase user-defined event.

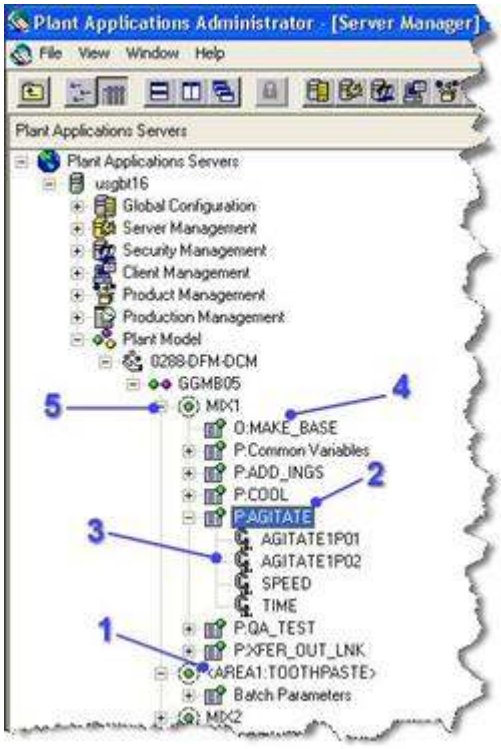
The virtual batch unit is created at the production unit level and the name is enclosed in angle brackets, < >. This unit will be used to capture the start and end time of the batch. There will be one virtual unit per production line. Genealogy links will be associated between the main batch and the unit procedures on each of the equipment units.

The equipment units will represent one piece of equipment that was used in the batching process. The unit procedures that were associated with these pieces of equipment will be stored as events.

Operation and phases will be created as user-defined events on the equipment unit. These will be linked to the unit procedure event. Phase events will also be linked to the operation events. There will be one user-defined event subtype for operations and one user-defined event subtype for phases per equipment unit.

A special variable group is created for identical variables that exist in different phases. These variables are put in the **P:Common Variables** variable group.

For more information on configuring the Plant Model, see the topic Configuring the Plant Model in the online help.



1. Virtual Batch Unit

Virtual batch units are enclosed with angle brackets, < >.

The **Extended Information** field in the **Unit Properties Configuration** dialog box, which is opened by right-clicking on the unit and selecting **Edit <production unit> Properties,** is populated with the value **BATCH:** and this must not be changed.

2. Phase

The **URL** field in the **Edit External Link** window is pre-filled and must not be changed.

3. Phase parameter

The **Input tag** field in the **Variable Sheet** is pre-filled and must not be changed.

4. Operation

The **URL** field in the **Edit External Link** window is pre-filled and must not be changed.

5. Equipment Unit

Step 2: Run the LocalBatchComplete.sql Script

You must execute the LocalBatchComplete.sql script against the source batch journal database (sometimes called the Batchhis database). This will add a new table called Local_BatchComplete and put a trigger on the source batch journal (Batchhis) table. In addition, you must provide permissions for the comxclient user in SQL server so that comxclient has 'r;Select' permissions against the source Batchhis table and 'r;Select','Update' permissions against the Local_BatchComplete table.

This database can be local to the Plant Applications SQL Server or remote. If the Batchhis database is remote, then you must create a LinkedServer in SQL with login credentials for the comxclient user. The comxclient user will need to be created on the Batchhis database, if it does not exist.

The LocalBatchComplete.sql script is located in the ..\Proficy Server\Support\RSBatch directory.

Step 3: Configure Model 5013

Refer to the “Configure Model 5013 for Batch Analysis” topic in the Plant Applications Models help guide.

Step 4: Configure Model 118

Refer to the “Configure Model 118 for Batch Analysis” topic in the Plant Applications Models help guide.

Step 5: Configure Site Parameters

You can configure the following site parameters:

- Auto Configure Units: This site parameter determines if your plant model will be automatically configured based on how you configure model 118. The default setting is True, which means your plant model will be automatically configured.
- Default Data Source: This site parameter specifies the data source type. The data source type will be used to map various objects (variables, for example) to the batch data.
- Default Product Family: This site parameter is specifies the product family your batch product will be associated with. The default value is 1, which means your batch product will be associated with the default, "Product Family." (Product family ID = 1).
- Ignore Event Status Changes: If this site parameter is set to True, there will be no additional Event_Status changes performed after the initial event creation. The default value is False, which means that additional Event_Status changes will be performed after the initial event creation.
- Purge Orphaned Records (Days): This site parameter determines how long orphaned records will be kept in the Event Transactions table. The default setting is 0, which means that orphaned records will never be purged.
- Purge Processed Records (Days): This site parameter determines how long processed records will be kept in the Event Transactions table. The default setting is 0, which means that processed records will never be purged.
- Wait Time (milliseconds): This site parameter specifies the time, in milliseconds, between processing records in the Event Transactions table. The default value is 0, which means that all records will be processed with no wait time between.

Working with Other Batch Execution Systems

Step 1: Configure the Plant Model

To better represent the batch execution system (BES) data within Plant Applications, the batch events are stored in the virtual unit. The unit procedure events will then be stored as production events on the appropriate equipment units. The operation and phases associated with each of the unit procedures will be stored as user-defined events on the appropriate unit procedure unit. Phase data will still be stored in variables and organized in the appropriate phase variable groups, but it will be stored at the end time of the phase event as opposed to the end time of the batch event. The

variables will also be of event type "User Defined Event" so that they will be associated with the phase user-defined event.

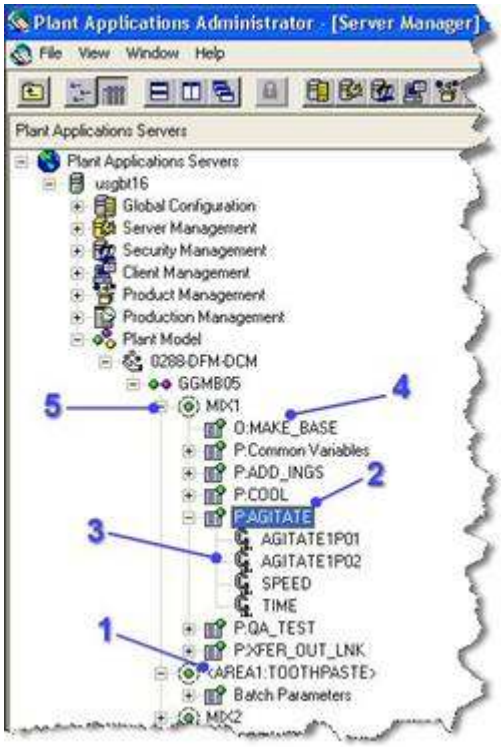
The virtual batch unit is created at the production unit level and the name is enclosed in angle brackets, < >. This unit will be used to capture the start and end time of the batch. There will be one virtual unit per production line. Genealogy links will be associated between the main batch and the unit procedures on each of the equipment units.

The equipment units will represent one piece of equipment that was used in the batching process. The unit procedures that were associated with these pieces of equipment will be stored as events.

Operation and phases will be created as user-defined events on the equipment unit. These will be linked to the unit procedure event. Phase events will also be linked to the operation events. There will be one user-defined event subtype for operations and one user-defined event subtype for phases per equipment unit.

A special variable group is created for identical variables that exist in different phases. These variables are put in the **P:Common Variables** variable group.

For more information on configuring the Plant Model, see the topic Configuring the Plant Model in the online help.



1. Virtual Batch Unit

Virtual batch units are enclosed with angle brackets, < >.

The **Extended Information** field in the **Unit Properties Configuration** dialog box, which is opened by right-clicking on the unit and selecting **Edit <production unit> Properties,** is populated with the value **BATCH:** and this must not be changed.

2. Phase

The **URL** field in the **Edit External Link** window is pre-filled and must not be changed.

3. Phase parameter

The **Input tag** field in the **Variable Sheet** is pre-filled and must not be changed.

4. Operation

The **URL** field in the **Edit External Link** window is pre-filled and must not be changed.

5. Equipment Unit

Step 2: Configure Model 118

Refer to the “Configure Model 118 for Batch Analysis” topic in the Plant Applications Models help guide.

Step 3: Create a Custom Stored Procedure

In order to get the batch data from the batch database to the Plant Applications database, you'll need to configure a stored procedure. Plant Applications provides a stored procedure for customers who use Proficy Batch Execution (spS88_iBatchReader) or RSBatch (spS88_RSBatchReader).

If you don't use either of these applications, you will need to create your own custom stored procedure to write your batch data into the Plant Applications Event_Transactions table.

Batch Analysis Web Reports

Batch Analysis Reporting

The Plant Applications Batch Analysis solution offers many powerful reports to help you:

- Increase quality and consistency of batch operations and reduce variability in batch processes
- Compare cycle times, parameters and variables across batches
- Report and summarize batch data in support of improvement initiatives
- Trend related parameters across batches to understand and control process variation

Before you can use the various batch analysis reports, you need to:

1. Create a department, production line, and production unit in your plant model.
2. Configure Model 118.
3. Configure Model 5013 or use another method to populate the Event_Transactions table.

Batch Analysis Web Report

This Active Server Application is designed to analyze S88 batch data. With the Batch Analysis Web reports, you can:

- Use a variety of criteria to search for a batch
- View details of a specific batch, including genealogy, procedures, and parameters
- Trend parameters across batches and within a batch
- Compare batches to other batches
- View one or more batches with procedures in a graphical timeline
- Analyze cycle time using a variety of criteria

Before you can use the Batch Analysis Web report, you will need to configure your Plant Applications Plant Model and configure the Plant Applications GBDB database to read your batch records. For more information, please see, Introduction to Batch Analysis.

Creating a Batch Analysis

You can create a new Batch Analysis from either the Plant Applications Web Administrator or the Plant Applications Web Report Server.

Before you can use the Batch Analysis Web report, you will need to configure your Plant Applications Plant Model and configure the Plant Applications GBDB database to read your batch records. For more information, please see, Introduction to Batch Analysis.

Batch units are enclosed with angle brackets, < >.

To create a new Batch Analysis from the Plant Applications Web Administrator:

1. Log in to the Plant Applications Administrator.
2. Open **Server Management**.

3. Double-click on **Administer Web Server**.
4. In the **Web Server Administrator**, open the **Web Content** folder.
5. Right-click on **Batch Analysis** and select **View** from the pop-up menu.
6. In the **Saved Batch Analysis** page, click the **Create New** icon to create a new batch analysis.
7. Make your changes in the **Analysis Properties** dialog box.

To create a new Batch Analysis from the Plant Applications Web Report Server:

1. Log on to the Plant Applications Web Report Server.
2. Expand the Report Tree.
3. Click on **Batch Analysis**. (If Batch Analysis is not in your Report Tree, please see your Plant Applications Administrator).
4. In the **Saved Batch Analysis** page, click the **Create New** icon to create a new batch analysis.
5. Make your changes in the **Analysis Properties** dialog box.

Searching for a Saved Batch Analysis

To search for a saved Batch Analysis:

1. Log in to the Plant Applications Web Report Server.
2. If necessary, expand the report tree in order to see **Batch Analysis**.
3. In the report tree, click **Batch Analysis**.
4. In the **Saved Batch Analysis** page, do one of the following:
    - To find all saved batch analysis reports, click **Search**.
    - To filter your results, type all or part of the batch analysis report name and then click **Search**.
5. In the list of returned reports, click the hyperlinked name. This will open the **Query Results** page.

Viewing the Batch Summary

The Batch Summary provides a detailed report of Batch genealogy, procedure details and parameter details.

To view the Batch Summary:

1. Search for your saved Batch Analysis.
2. In the Query Results page, click the radio button next to the desired batch.
3. Under **Single Batch**, click the **View Batch Summary** hyperlink.
4. In the **Batch Summary**, select a different report from the drop-down list.

Batch Summary Toolbar

Click the drop-down list to quickly select a summary.

Click the **Copy** icon to copy the selected parameter's information to the Clipboard. You can then paste the information into another program, such as Excel.

Click the **History** icon to view a history of reports that have been viewed.

Click the **Properties** icon to open the **Options** dialog box. In the **Options** dialog box, you can select the **Display Electronic Signature Information** option. For more information, see Electronic Signature Information.

Using the Report

The following reports can be viewed from the Batch Summary:

- **Unit Summary:** The Unit Summary shows the flow of a batch through multiple units.
- **Procedure Summary:** The Procedure Summary shows cycle times by procedure and links to procedure details. Procedure types are color coded. **Yellow** indicates a Unit Procedure; **Green** is an Operation Procedure; and **Blue** is a Phase Procedure.
- **Parameter Summary:** The Parameter Summary shows a "cross-tab" of parameters for each unit (unit procedure). Cells are color coded according to conformance to specification limits: **Green** indicates within target; **Blue** indicates in Warning; **Red** indicates in Reject.
- **Parameter Detail:** The Parameter Detail shows all parameters and specification limits and provides a launch point for trending and analysis of specific parameters.

Under the **Single Batch** menu:

- Click **View Production Timeline** to view the Production Timeline report.
- Click **View Batch Genealogy** to view the Batch Genealogy report.
- Click **Interactive Trend** to view the Interactive Trend chart.
- Click **Event Detail** to view the Event Detail report.

Under the **Multiple Batch** menu:

- Click **Compare Parameters** to view the Parameter Analysis report.
- Click **Compare Cycle Times** to view the Cycle Time Analysis report.
- Click **Compare Timelines** to view the Multi-Batch Timeline chart.

*Before you can view any of the reports under the **Multiple Batch** menu, you need to have first selected multiple batches in the Query Results page.*

Under the **Batch List** menu:

- Click **View Batch List** to return to the Query Results page.

Click a Phase hyperlink to view the Procedure Detail report.

Electronic Signature Information

To display electronic signature information, click the Properties icon and select **Display Electronic Signature Information**.

If the Display Electronic Signature Information option is selected and electronic information exists, the Electronic Signature table will be displayed. If the Display Electronic Signature Information option is selected and no electronic information exists, then the Electronic Signature table will not be displayed.

In addition, if the Display Electronic Signature Information is selected, the Parameter Detail will display electronic signature information under each variable that has electronic signature information.

Viewing the Batch Production Timeline

This application displays a timeline of batch events across multiple units.

To view the Batch Production Timeline:

1. Search for your saved Batch Analysis.
2. In the Query Results page, click the radio button next to the desired batch.
3. Under **Single Batch**, click the **View Production Timeline** hyperlink.

Using the Report

You can select production units from multiple production lines.

- To select different production units, click the **Properties** icon .
- Click the green arrows to scroll to different events. To search for a specific event number, type the number in the box and then click the **Go** button.
- You can hover over a specific event to view additional information about the event.
- Click the event to go to the **Event Detail** web report.

Viewing Batch Genealogy

This application shows the genealogy for a selected batch. From this report, you can see the individual phases that make up an operation, the individual operation(s) that make up the unit procedure and the unit procedure that makes up the batch.

To view the Batch Genealogy:

1. Search for your saved Batch Analysis.
2. In the Query Results page, click the radio button next to the desired batch.
3. Under **Single Batch**, click the **View Batch Genealogy** hyperlink.

Using the Report

The **gray boxes** indicate that there are additional procedural elements that are not being displayed. In the example above, the gray box with the number **8** in it indicates that there are eight phases that make up the operation. To view the phases, double-click the green box that is pointing to the gray box.

The **green boxes** represent the procedural elements that make up the batch.

- **U** = Unit Procedure
- **O** = Operation
- **P** = Phase

The three small alarm boxes inside the green procedural element box indicate the number and level of alarms. To view the **Alarm List by Units** web part, select the procedural element (green box), and click the desired alarm box.

- The left box indicates the number of **High** alarms.
- The middle box indicates the number of **Medium** alarms.
- The right box indicates the number of **Low** alarms.

To go to a different batch, type the batch name in the box and click the **Go** button.

To view detail for a specific procedural element, select the appropriate green box and then click the **View Detail** button.

To select a different input or output unit, click the **Filter on Unit** button.

Analyzing Parameter Information

Within the Batch Analysis Web report, the Parameter Analysis Web report allows you to compare statistics between selected parameters across multiple batches.

To view the Parameter Analysis:

1. Search for your saved Batch Analysis.
2. In the Query Results page, select the desired batches.

You must select at least three batches.

3. Under **Multiple Batch**, click the **Compare Parameters** hyperlink.
4. In the **Batch Parameters** dialog box, select the batch parameter(s) you want to analyze.
5. Click **OK**.

Using the Report

Under the **Batch Analysis** menu:

- Click **Multiple Selection Mode** to switch to multiple selection mode, where you can select more than one parameter. If you are already in Multiple Selection Mode, the link will be **Single Selection Mode**.
- Click **View Interactive Trend** to view a trend report of the selected parameter(s).
- Click **View Variable Statistics** to view Variable Statistics Summary report.

Under the **List Editor** menu:

- Click **Reselect Batches** to open the Query Results page where you can change your batch selection.
- Click **Edit Query Properties** to open the **Analysis Properties** dialog box.
- Click **Select Parameters** to open the **Batch Parameter** selection dialog box where you can select different parameters.

Parameter Analysis Toolbar

Click the drop-down list to select a different parameter.

Click the green arrows to scroll backward or forward in time. When you scroll backward, the new time period is calculated by multiplying the current time period by -50%. When you scroll forward, the new time period is calculated by multiplying the current time period by +50%. For example, if your current time period is 10 days, when you scroll back in time, the start date of the new time period will be five days before the start date of the current time period. The length of the new time period will still be 10 days.

When you click the **Clock** icon, the **Analysis Properties** dialog box will open with the **Time** tab active, which is where you can specify a new time period.

Click the **Copy** icon to copy the selected parameter's information to the Clipboard. You can then paste the information into another program, such as Excel.

Click the **Properties** icon to open the **Analysis Properties** dialog box.

Click the **History** icon to view a history of reports that have been viewed.

Parameter Statistics

Each parameter is listed under the **Parameter Statistics** tab. For each parameter, the following information is provided:

- **Type:** This indicates whether the parameter is a **Unit Procedure**, **Operation**, or **Phase**.
- **Count:** This is the number of values for the individual parameter.
- **Average:** This is the sum of all values divided by the number of values. In other words, it is the **Total/Count**.
- **Std:** This is the standard deviation.
- **%:** This is the Percent Deviation, which is calculated by dividing the standard deviation (**Std**) by the **Average**.
- **Minimum:** The is the minimum value for the individual parameter.
- **Maximum:** This is the maximum value for the individual parameter.
- **Total:** This is the sum of all values for the individual parameter.

Procedure Graph

This graph plots the values for the selected parameter over the specified time period. On the X-axis, the mid-point in the time period is plotted along with the start time and end time. Click the button to select a different parameter. To close the dialog box, click the button again.

Process Capability Chart

This histogram shows the number of occurrences of a value for the selected parameter. A normal curve is overlaid as a reference. Green bands indicate the values that are within one sigma, a blue band indicates values that within two sigma and a light red band indicates values that are within three siqma.

Parameter Statistics Report

This report restates the information in the Parameter Statistics report for the selected parameter and includes the following information:

- Type

- Average
- Count
- Standard Deviation
- Percent Deviation
- Minimum
- Maximum
- Total
- Upper Reject

Batch List

The Batch List report summarizes the options that were selected for this particular batch and includes the following information:

- Start Time
- End Time
- Crew
- Shift
- Max Size
- Min Size
- Product
- Status
- Unit

Analyzing Cycle Time

The Cycle Time Analysis Web report helps you analyze cycle time by Procedure, Operation, and Phase for selected batches. The analysis is the amount of time, in seconds, between the start time and end time of the selected batches.

To analyze cycle time:

1. Search for your saved Batch Analysis.
2. In the Query Results page, select the desired batches.

You must select at least three batches.

3. Under **Multiple Batch**, click the **Compare Cycle Times** hyperlink.
4. In the **Batch Procedure Selection** dialog box, select the Procedure(s) you want to include on your report and click **OK**.

Using the Report

Under the **Batch List** menu:

- Click **Reselect Batches** to open the Query Results page where you can select different batches for this report.
- Click **Edit Query Properties** to open the **Analysis Properties** dialog box.

- Click **Select Procedures** to open the **Batch Procedure Selection** dialog box where you can edit your batch procedure selections.

Parameter Analysis Toolbar

Click the drop-down list to select a different parameter.

Click the green arrows to scroll backward or forward in time. When you scroll backward, the new time period is calculated by multiplying the current time period by -50%. When you scroll forward, the new time period is calculated by multiplying the current time period by +50%. For example, if your current time period is 10 days, when you scroll back in time, the start date of the new time period will be five days before the start date of the current time period. The length of the new time period will still be 10 days.

When you click the **Clock** icon, the **Analysis Properties** dialog box will open with the **Time** tab active, which is where you can specify a new time period.

Click the **Copy** icon to copy the selected parameter's information to the Clipboard. You can then paste the information into another program, such as Excel.

Click the **Properties** icon to open the **Analysis Properties** dialog box.

Click the **History** icon to view a history of reports that have been viewed.

Cycle Time Analysis

This report provides the following information:

- **Name:** This is the name of the selected Unit Procedure, Operation, and Phase.
- **Type:** This is the type of Procedure.
- **Parent:** This identifies the parent Procedure.
- **Count:** This is the number of batches selected.
- **Average:** This is the average cycle time, in second, for the selected batches.
- **Std:** This is the standard deviation.
- **%:** This is the Percent Deviation, which is calculated by dividing the standard deviation (**Std**) by the **Average**.
- **Minimum:** The is the minimum cycle time, in seconds, for the selected batches.
- **Maximum:** This is the maximum cycle time, in seconds, for the selected batches..
- **Total:** This is the total number of seconds for the selected batches.

Procedure Graph

This graph plots the cycle time for the selected Procedures. On the X-axis, the mid-point in the time period is plotted along with the start time and end time. A green band indicates values that are within one sigma, a blue band indicates values that are within two sigma, and a light red band indicates values that are within three sigma. Click the button to select a different Procedure. To close the dialog box, click the button again.

Process Capability Chart

This histogram shows the number of occurrences of a value for the selected Procedure. A normal curve is overlaid as a reference. A green band indicates values that are within one sigma, a blue band indicates values that are within two sigma, and a light red band indicates values that are within three sigma.

Cycle Time Analysis Report

This report restates the information in the Cycle Time Analysis report for the selected parameter and includes the following information:

- Name
- Type
- Parent
- Average
- Count
- Standard Deviation
- Percent Deviation
- Minimum
- Maximum
- Total
- Upper Reject

Batch List

The Batch List report summarized the options that were selected for this particular batch and includes the following information:

- Start Time
- End Time
- Crew
- Shift
- Max Size
- Min Size
- Product
- Status
- Unit

Comparing Batch Timelines

This report compares the duration of the selected batches against each other. You can sort the report by **Procedure** or by **Batch** and you can filter on a specific procedure.

To compare batch duration:

1. Search for your saved Batch Analysis.

2. In the Query Results page, select the desired batches.

You must select at least three batches.

3. Under **Multiple Batch**, click the **Compare Timelines** hyperlink.

Multi-Batch Timeline Toolbar

On the toolbar do one or more of the following:

Click the **Refresh** icon to refresh the report.

Click the **Batch List Results** icon to view or select batches.

Sort By Procedure Click this drop-down list to select either **Sort by Procedure** or **Sort by Batch**.

Make Dough/Proof Dough Click this drop-down list to filter by procedure.

Using the Report

Within the report, clicking on a Phase Procedure (gray bar) will create the **Procedure Detail** report.

Clicking a Unit Procedure or an Operation Procedure (red bar) will filter on that Procedure.

Viewing Procedure Detail

This report is accessed from the Multi-Batch Timeline report or the Batch Summary report. For the selected Phase, this report lists general information about the selected Phase, summary information for the Unit Procedure and Operation to which it belongs, and detail information for each parameter that belongs to the Phase.

To view procedure detail:

1. Search for your saved Batch Analysis.
2. In the Query Results page, select the desired batches.

You must select at least three batches.

3. Under Multiple Batch, click the Compare Timelines hyperlink.
4. From the Multi-Batch Timeline report, click one of the Phase procedures.

- or -

1. Select a single batch and click **View Batch Summary**. The **Batch Summary** report appears.
2. Under **Procedure Summary**, click a procedure name.

Using the Report

Under the **Single Batch** menu:

- Click **View Production Timeline** to view the Production Timeline report.
- Click **View Batch Genealogy** to view the Batch Genealogy report.
- Click **Interactive Trend** to view the Interactive Trend chart.
- Click **Event Detail** to view the Event Detail report.

Under the **Multiple Batch** menu:

- Click **Compare Parameters** to view the Parameter Analysis report.
- Click **Compare Cycle Times** to view the Cycle Time Analysis report.
- Click **Compare Timelines** to view the Multi-Batch Timeline chart.

*Before you can view any of the reports under the **Multiple Batch** menu, you need to have first selected multiple batches in the Query Results page.*

Under the **Batch List** menu:

- Click **View Batch List** to return to the Query Results page.

Electronic Signature Information

The Procedure Detail Report will display electronic signature information if:

- The report from which the Procedure Detail report was opened was displaying electronic signature information.
- The Display Electronic Signature Information option was selected for this report

***NOTE:** To display electronic signature information, click the Properties icon on the web report's toolbar and select Display Electronic Signature Information.*

If the Display Electronic Signature Information option is selected and electronic information exists, the Electronic Signature table will be displayed. If the Display Electronic Signature Information option is selected and no electronic information exists, then the Electronic Signature table will not be displayed.

Viewing Event Detail

The Event Detail report is accessed from the Batch Summary report or the Procedure Detail report. The Event Detail report provides the following information for the selected Event (i.e., Unit Procedure, Operation, or Phase):

- A summary of the event information
- Alarm information
- Electronic signature
- Output components (if applicable)
- Input components (if applicable)

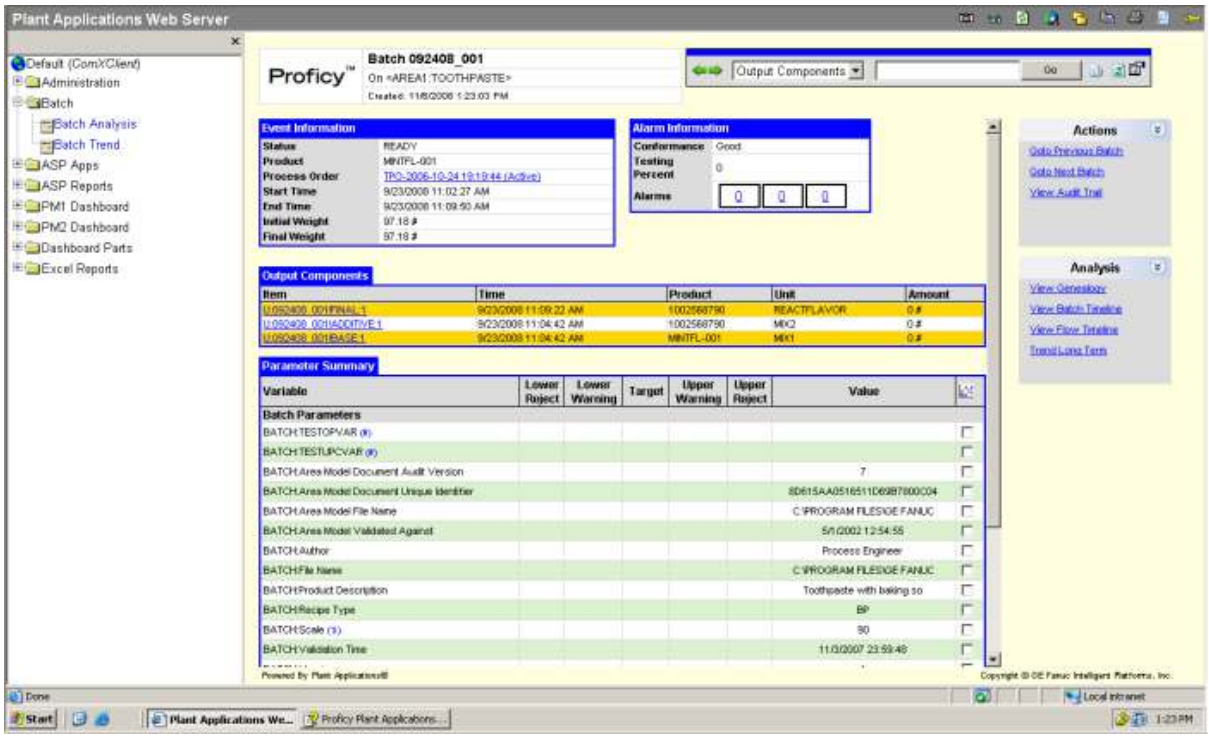
To view event detail:

1. Search for your saved Batch Analysis.
2. In the Query Results page, select the desired batches.

***NOTE:** You must select at least three batches.*

1. Under **Multiple Batch**, click the **Compare Timelines** hyperlink.
2. From the Multi-Batch Timeline report, click one of the Phase procedures.
3. From the Procedure Detail report, click the procedure(s) for which you want to view event detail.
4. Under **Single Batch**, click **Event Detail**.

Using the Report



Under the **Actions** menu,

- Click **Goto Previous** to view event detail for the procedure that precedes the current procedure.
- Click **Goto Next** to view event detail for the procedure that follows the current procedure.

***NOTE:** "Next" and "Previous" are determined by the end times of the procedure.*

- Click **View Audit Trail** to view the Audit Trail report, which lists the changes that were made and the user responsible for the changes.

Under the **Analysis** menu,

- Click **View Genealogy** to view the Batch Genealogy report.
- Click **View Timeline** to view Comparing Batch Timelines
- Click **View Flow Timeline** to view the Production Timeline report.

Under **Alarm Information**, click one of the Alarm Count indicators to view the Alarm List by Units Web part.

Under **Output Components** or **Input Components**, click a procedure to view the inputs and outputs for the selected procedure.