TrakSYS™ 11 Training Lab Manual Day 3

Revised August 23, 2019

Lab 09 | Performance Configuration

Overview

In this assignment, you will begin working with **OCV Packaging Line 5** configuration to include more complex rules for tracking stoppage **Events**, as well as enable monitoring of real-time **production counts** to facilitate the calculation of efficiency metrics such as **OEE**. This line has been pre-configured to be similar to **OCV Packaging Line 1**.

Additional configuration options can be added to the Packaging Line 5 System, as well as its child systems and **Event Definitions,** to more carefully control which stoppage **Events** are recorded when multiple conditions are occurring simultaneously.

Event Categories will be configured and associated with the Packaging **Line 5** System for operator selection at the plant floor, to allow more detail for root cause analysis.

Finally, a **KPI Calculation** and its associated **KPI Counters** will be configured. These entities will monitor production counters and record data into Intervals that can be aggregated with **Event** data to create standard and custom metrics.

Estimated Time to Complete This Lab

30 Minutes

Details

The following sections describe the detailed steps to be completed for this lab.

1. Configure a System to Split Events

Long **Events** can stretch between different **Dates**, **Shifts**, and production runs (**Jobs**). It is often desirable to force these Event to split on these transitions, so that stoppage time can be attributed to the correct period.

Configure the **Packaging Line 5 System** to split **Events** when the **Date**, **Shift**, **Job**, and **Product** change.

- Navigate to **Configuration | Systems**
- Locate **Packaging | Packaging B | Packaging Line 5**
- Click the **Edit** option from slice 3.
- Set the **System** properties as below…

Split Event on Day Change (Event Splits Tab)	\<checked\>
Split Event on Shift Change (Event Splits Tab)	\<checked\>
Split Event on Job Change (Event Splits Tab)	\<checked\>
Split Event on Product Change (Event Splits Tab)	\<checked\>
Show For Acknowledge (Event Tab)	True

2. Expand the Event Definition Configuration

TrakSYS contains many settings and features to more accurately track the root cause for **Events**. The **OEE Event Type**, **Priority**, and **Re-Evaluate** properties for the Event Definition determine how TrakSYS processes the **Single Active Event** for a System.

Enhance the configuration of the existing **Event Definitions** under **Packaging Line 5** and its Subsystems.

- While in Configuration single click **Packaging Line 5** to reveal **Event Definitions** in slice 3.
- Select the desired Event Definitions and make the following changes.

Name	Priority	Re-Evaluate on Start (Split Tab)	Re-Evaluate on End (Split Tab)	OEE Event Type (OEE Tab)
Break	10	<checked>	<checked>	Availability Loss
Changeover	10	<checked>	<checked>	Availability Loss

Under the appropriate Subsystem, update each of the following Event Definitions with the following settings…

Sub-System	Name	Priority	Re-Evaluate on Start (Split Tab)	Re-Evaluate on End (Split Tab)	OEE Event Type (OEE Tab)
Filler	Tipped Bottle	20	<checked>	<checked>	Performance Loss
Filler	Overheated	20	<checked>	<checked>	Performance Loss
Labeler	Label Jam	30			Performance Loss
Caser	Misplaced Tray	40			Performance Loss

3. Create Event Categories for the Labeler

The OCV management would like the operators to add an additional reason to **Events** that occur at the **Labeler**. This reason should be picked from a pre-defined list of Event Categories.

Configure an **Event Category Group** that will be used by the **Labeler**.

- In the TrakSYS Web, navigate to **Configuration | Categories | Event**.
- Select the **+ New** menu option under **Groups** in slice 1 and add a new **Event Category Group** with properties specified in the table below.

Name	Labeler Categories
Scope	Normal

Select the **Labeler Categories** Group and Add **Event Categories** using the **+ New Root** button in slice 2 with the following properties..

Name
Jam at Drum
Jam at Infeed
Misaligned Label

4. Assign Event Categories to the Labeler

Once the **Labeler Categories** are defined, they must be associated with the appropriate **Event Definition(s)**. In this case, these categories should only be available for selection when the **Label Jam Event Definition** is triggered.

- Navigate to **Configuration | Systems**. Locate and select **Packaging | Packaging B | Packaging Line 5 | Sub-Systems | Labeler**.
- Select the **Event Category Assignments** option in the **Related** menu in slice 3.
- Click **+ Assign** in slice 2, and select **Labeler Categories** from the dropdown.

5. Enable the Labeler to send Events to the User Interface

To limit the amount of data that operators must react to, the TrakSYS standard **Performance** pages will only list **Events** for categorization that are configured to be displayed to the user interface. Configure the **Label Jam Event Definition** to be displayed for categorization and acknowledgement after it has been active for **5** seconds. The Event should remain in the list for operators to address for **30** minutes after it has ended.

- Navigate to **Configuration | Systems - Line 5 | Sub Systems | Labeler | Event Definition**
- Locate the **Label Jam** Event Definition
- Click the **Edit** option from the menu.
- Set the **Event Definition** properties as below...

Show for Acknowledgement (Event Tab)	True
Display Delay Seconds (Event Tab)	5
Acknowledge Duration Minutes (Event Tab)	30

6. Configure a KPI Calculation

A **KPI Calculation** for Packaging Line 5 is needed to monitor and record production counters and related data to calculate standard OEE metrics. The KPI Calculation should be set to record **Intervals** every **30** minutes to obtain the line's **Theoretical Rate** from an existing Virtual Tag.

- Navigate to **Configuration | Systems** and select the **Packaging | Packaging B | Line 5**.
- Select the **KPI Calculations** option in the **Related** menu in slice 3.
- Select the **+ New** option and add a new **KPI Calculation** with the following properties...

Name	OEE
Key	OEE
Interval Duration	30
Derived Input	Total
Calculation Units	Bottles
Theoretical Rate (Rates Tab)	PB.L5.PRODUCT.BOTTLES_PER_MINUTE

- To select a **Tag** for the **Theoretical Rate**, change the picker icon from **123** to the **Tag** symbol to open the **Tag Picker** in the right margin. Type any part of the **Tag** name in the search box (for instance "PB.L5.PRODUCT") and select the **Find Tags** button to filter the

existing **Tags** to the list below. Select the **PB.L5.PRODUCT.BOTTLES_PER_MINUTE** entry in the list to assign it.

7. Configure a KPI Calculation Good Counter

The input counter for good production units will come from pre-existing **Tag** in the **Caser** Sub-System called **PB.L5.COUNTER.GOOD_CASES**. Since the **GOOD_CASES Tag** counts entire Cases, it must be converted to individual Bottles using a multiplier **Tag** called **PB.L5.PRODUCT.BOTTLES_PER_CASE**.

Configure a new **Good KPI Counter** under the **OEE KPI Calculation** for **Packaging Line 5**.

- Navigate **Configuration | Systems** and select **Packaging Line 5**
- Select **KPI Calculation** in slice 3, then select **OEE** from the list of **KPI Calculations.**
- Select the **Good** option in the **Related** menu in slice 3.
- Select the **+ New** menu option under **KPI Counters** and add a new **KPI Counter** with the following properties…

Name	Good Cases
Counter	PB.L5.COUNTER.GOOD_CASES
Counter Units to Input Units Multiplier	PB.L5.PRODUCT.BOTTLES_PER_CASE

8. Configure KPI Calculation Bad Counters

The input counters for bad or reject production units will come from pre-existing **Tags** in the **Filler** and **Labeler** Sub-Systems called **PB.L5.COUNTER.BAD_BOTTLES_FILLER** and **PB.L5.COUNTER.BAD_BOTTLES_LABELER**.

Configure new **Bad KPI Counters** under the **OEE KPI Calculation** for **Packaging Line 5**.

- Navigate **Configuration | Systems** and select **Packaging Line 5**
- Select **KPI Calculation** in slice 3, then select **OEE** from the list of **KPI Calculations.**
- Select the **Bad** option in the **Related** menu in slice 3.
- Select the **+ New** menu option under **KPI Counters** and add **2** new **KPI Counters** with the following properties…

Name	Counter
Bad Bottles Filler	PB.L5.COUNTER.BAD_BOTTLES_FILLER
Bad Bottles Labeler	PB.L5.COUNTER.BAD_BOTTLES_LABELER

Conclusion

In this exercise, you have extended the existing **OCV Packaging Line 5** configuration to more accurately track and record **Event** stoppages. In addition, you have configured and assigned **Event Categories** to the **Label Jam Event Definition** to capture operator driven classifications for downtime. Finally, a **KPI Calculation** and its related counters were configured to monitor and capture real-time production quantities.

These settings and capabilities allow TrakSYS to deliver sophisticated performance management solutions that are tailored to the specific environment, circumstances and business rules present in the manufacturing environment.

Common Mistakes

None

Further Exploration

Event Codes: Part 1 of 2

While **Event Categories** provide a way to look at root causes of a downtime, they are not always an effective mechanism for reporting. Too many options can result to very watered-down values and charts when looking at reports. To group these together into more actionable data, **Event Codes** can be added.

In the configuration, create some Event Codes. These are found under **Configuration | Categories | Event Codes**. Then assign them to your Event Categories. You can do this by going to **Configuration | Categories | Event**, selecting an Event Category, and using the **Set Event Code** menu option in slice 3. Optionally, you can also use the **Set OEE Type** menu option as well. While you will not see any results of the configuration during this lab, it can be used in the Further Exploration of the next lab as well.

Lab 10 | Performance User Interfaces

Overview

In this assignment, you will configure and build a basic user interface for the **OCV Packaging Line** operators. The user interface should allow the operators to start and end **Jobs**, monitor stoppages and KPIs on the Line in real-time, and categorize **Events** that require additional detail.

There is a total of three **OCV Packaging Lines** for **Packaging B**. Create partial configurations (just the **Systems** and **KPI Calculations**) for **Lines 6** and **7**, and use **Page Instances and Values** to enable the single **Packaging Line** interface to service all three Lines.

Estimated Time to Complete This Lab

30 Minutes

Details

The following sections describe the detailed steps to be completed for this lab.

1.   Restart the Logic Service

Ensure that the TrakSYS Logic Service **has been restarted**. This service will monitor **Tag** value changes and enable functionality in the **Performance** user interfaces, but it will not monitor any configuration changes made since the last time it was loaded. To ensure that it reads the configuration made in the previous lab, **restart** the **TrakSYS Logic Service**.

2.   Configure the Packaging Line 5 Real-Time Hub

The **System Discrete Real-Time Overview** is a standard TrakSYS **Content Page** designed to act as a real-time landing page for the plant floor operator.

The primary inputs for this page are a **System ID** and **KPI Calculation ID**. In order to set the proper values, you must first identify the IDs that were generated on your server for **OCV Packaging Line 5** and its **KPI Calculation** (these may be different in each student's configuration).

- Navigate to **Configuration | Systems.** Locate **Packaging | Packing B | Packaging Line 5** System. Its **ID** will be displayed in the details section of the item in slice 3. Record the value below.
- Locate and click the **Packaging Line 5 System's KPI Calculation**. Its **ID** will be displayed in the details section of the item in slice 3. Record the value below.

SystemID		KpiCalcID

In the **Developer|Page Definition**, locate the pre-existing **System Discrete Real-Time Overview Page**. This page is called **Line 5** and can be found under **Training | Day 3 | Lab 10 | Line 5**.

Examining the **Page** properties, it is pre-configured to receive some parameters through the **Values** Dictionary (as keys **SystemID** and **OeeCalculationID**).

In comparison to the previous labs, where the Values were set through the Page Properties, this lab will use a .NET script to add the **SystemID** and **OeeCalculationID** to the **Values Dictionary**. This will be done for the **Line 5** page by using the **Values Script Editor**.

- In **Developer Section** Navigate to and select the **Training | Day 3 | Lab 10 | Line 5.**
- Select the **C# Values** item from the **Actions** menu in slice 3.
- Add the following .NET script to the editor. The code for this script can be found at **C:\Scripts\Values1.txt**.

```
// add fixed values
values["SystemID"] = <your Packaging Line 5 System ID>;
values["OeeCalculationID"] = <your Packaging Line 5 KPI Calculation ID>;

// return
return Result<bool>.ReturnSuccessfulResult(true);
```

Next, navigate to **Developer | Training | Day 3 | Line 5** and **edit** the page properties of the **Packaging Line 5** page. Modify the property as below...

Event Attention (Links Tab)	EventsRequiringAttention?Systems={SystemID}

Unlike the Page Properties, which only affects that specific page, the **Values Script** that you used will provide values to the page as well as all the page's children. To view this, preview your page and enable **Trace**. You will see the values listed as a **Hub3 Value**.

3. Configure the Events Requiring Attention Page

The **Events Requiring Attention Page** is a standard TrakSYS **Content Page** designed to display any **Events** that require additional operator input or acknowledgement.

In the **Developer | Page Definition**, locate and expand the pre-existing **Line 5 Hub**. Add a new **Spoke** Content Page of the type **Event Requiring Attention**.

- Navigate to and select **Developer | Training | Day 3 | Line 5.**
- Locate and click the **Spokes** menu item, in slice 3, while **Line 5** is selected.
- Click the **+ New** menu item at the top of the **Spokes** list in slice 2.
- In the **Content Page** tab, select the **TrakSYS | Application | Event | Events Requiring Attention** item in the tree.

Name (General Tab)	Events Requiring Attention
Key (General Tab)	EventsRequiringAttention
Visible in Navigation (Visibility Tab)	Unchecked
Acknowledge Event (Links Tab)	EventAttention?EventID={EventID}
Return URL (Advanced Tab)	{ETS.FolderUrl}

4.   Configure the Event Attention Page

The **Event Attention Page** is a standard TrakSYS **Content Page** designed to display the details of a single **Event** and offer options to categorize, add notes and acknowledge.

In the **Developer | Page Definition**, locate and expand the pre-existing **Line 5 Hub**. Add a new **Spoke** Content Page of the type **Event Attention**.

- Navigate to and select **Developer | Training | Day 3 | Lab 10 | Line 5.**
- Locate and click the **Spokes** menu item, in slice 3, while **Line 5** is selected.
- Click the **+ New** menu item at the top of the **Spokes** list in slice 2.
- In the **Content Page** tab, select the **TrakSYS | Application | Event | Event Attention** item in the tree.

Name (General Tab)	Event Attention
Key (General Tab)	EventAttention
Visible in Navigation (Visibility Tab)	Unchecked
Return URL (Advanced Tab)	EventsRequiringAttention?Systems={SystemID}

5.   Create new Jobs

Before collecting data on the Packaging Line, a production order must be activated. In TrakSYS, a production order is commonly modeled as a Job. Before activating a **Job**, one must be created. Create **Jobs** by adding them manually to the **Planned Orders Page** in the **Line 5 Hub**.

- Navigate to **Training | Day 3 | Lab 10 | Line 5.**
- Click the **Planned** menu item under the **Job** Header in the **upper left corner** of the **Page**.
- Click the **+ New** menu item under the **Planned Jobs for Packaging Line 5** Header in the upper middle of the **Page**.
- Add the details for a **Job** using the table below and click **Save**.

Name	J-1	J-2	J-3
Product	Adravil	Adravil	Adravil
Planned Start	<Todays Date> 10:00 AM	<Todays Date> 12:00 PM	<Todays Date> 1:00 PM
Planned Duration (Seconds)	7200	3600	7200
Planned Calculation Count	32000	16000	32000
Planned Calculation Count Units	Bottles	Bottles	Bottles
Planned Production Count	1000	500	1000
Planned Production Count Units	Cases	Cases	Cases

6.   Start a New Job

The **Logic Service** monitors the **System's** configured **Job Tag** to indicate which **Job** is running on the Line. Use the standard **Planned Jobs Page** to initiate the start of a **Job**.pb.l5.

- Navigate to **Training | Day 3 | Lab 10 | Line 5**.

- Click the **Planned** menu item under the **Jobs Header** in the upper left corner of the **Page**.
- Select the **Job** to be started and click the **Start** link on the row.
- The **Job Start Page** should be displayed. Confirm that the **Job** should be started.

The **Line 5 Hub** page should be displayed and indicate the current **Job** running in the details along the left margin. If the **Job** does not start, the **Packaging Line 5 Job Tag** may not be configured correctly.

7. Trigger Events

Use the **Logic Service Tags Page** to manipulate the value of the **Filler** and **Labeler Event Trigger Tags** to start and end **Events** on the **Packaging Line 5 System**.

Start and end at least one **Event** from the **Labeler** and **Filler Sub-Systems**.

- Navigate to **Administration | Services | OCV [Logic]**.
- Click the **Tags** item in the **Related** menu.
- Add "PB.L5.LABELER" to the **Filters**. Click the **Updating** menu to switch to real-time **Updating** mode.
- Click **Edit Value** and toggle the following Tag value to trigger **Events**. Change the value from 0, to 1, wait a few seconds, and then change it back to 0.

    o   PB.L5.LABELER.LABEL_JAM

Open the **Line 5 Hub** in another window or tab and monitor the **Active** and **Attention Event Tiles**. If you do not see **Events** being registered in the **Line 5 Hub**, then a **Tag** or **Event Definition** configuration from a previous lab is incorrect.

8. Categorize Events

As **Events** for the **Labeler** occur, operators are expected to apply an additional level of categorization explaining the stoppage. From the **Line 5 Hub**, view the **Events** that require attention, apply **Event Categories**, and acknowledge.

- Navigate to the **Training | Day 3 | Lab 10 | Line 5**.
- Click the **Attention Event Tile** to open the **Event Attention List Page**.
- Select the **Label Jam** Event in the list and click the **Acknowledge** link in the row.
- Select an Event **Category** by clicking the blue rectangle and click **Acknowledge**.

After categorizing the **Event**, navigation should return to the **Event Attention List Page** and the **Event** should be removed from the list.

9. End a Job

As the production run finishes, the operators should notify the **Logic Service** that the **Job** is ending. **End** the **Job** using the standard **Job End Page**.

- Navigate to and select **Training | Day 3 | Lab 10 | Line 5**.

- Click the **End** menu item under the **Jobs Header** in the upper left corner of the **Page**.
- The **Job End Page** should be displayed. Confirm that the **Job** should be ended.

The **Line 5 Hub** page should be displayed and indicate there is no current **Job** running in the details along the left margin.

10. Configure 2 additional Packaging Lines

Since there are three **OCV Packaging B Lines**, an additional two lines must be configured. For the purposes of this lab, only the **System** and **KPI Calculation** must be configured and the property values are largely irrelevant. Navigate to **Configuration | Systems | Packaging B.**

Configure the Line 6 and 7 **Discrete Systems** under **Packaging B** as described below …

System Name	Key	Refresh Key (Advanced Tab)
Packaging Line 6	P6	P6
Packaging Line 7	P7	P7

** Refer to **Lab 1, Step 10** if you need help creating a new system*

Configure a **KPI Calculation** under each named **OEE**. The other properties are irrelevant.

KPI Calculation Name	System	Key
OEE	Packaging Line 6	OEE
OEE	Packaging Line 7	OEE

** Refer to **Lab 9, Step 6** if you need help creating KPI Calculations*

11. Configure the Instances Script for the Packaging Line 5 Hub

Alter the existing **Line 5 Hub Page** to utilize **Instances** to dynamically render a **Line Hub** for each of the configured **Lines** under the **Packaging Area** (there should be three now). A .NET script should be developed that adds instances by SQL using the **Instances** editor interface.

- Navigate to **Developer| Page Definitions.**
- Select the **Training | Day 3 | Lab 10 | Line 5.**
- Select the **Change Instance Mode** item from the **Actions** menu in slice 3.
- From the **Instance Mode** drop down select **Custom Script**, then click **Save**.
- Now **C# Instances** should appear in **Slice 3**. Select **C# Instances**, add the following script.
- For this lab, we will not be using the default script provided. Replace the existing script in the editor with following .NET script. The code for this script can be found at **C:\Scripts\Instances.txt**.

```
// add from sql
string sql = @"
SELECT
  s.ID AS InstanceID,
  s.[Key] AS InstanceKey,
  s.Name AS NavigationTitle,
  s.Name AS PageTitle
FROM dbo.tSystem s
  INNER JOIN dbo.tArea a ON (s.AreaID = a.ID)
WHERE a.[Key] = N'PACK.B'
AND s.ParentSystemID IS NULL
AND s.[Key] != ''
ORDER BY s.Name";
```

```
int cacheTimeoutSeconds = -1; // no cache
instances.AddFromSql(sql, cacheTimeoutSeconds).ThrowIfFailed();

// return
return Result<bool>.ReturnSuccessfulResult(true);
```

12. Configure the Values Script for the Packaging Line 5 Hub

With the Instances script above, TrakSYS will render a Line Hub for each System configured under the Packaging Area. However, the Line Hub Page is currently hard coded with the System and KPI Calculation ID for Line 5.

Examining the **Page** properties, note it is pre-configured to receive these IDs through the **Values Dictionary Keys** (as the keys **SystemID** and **OeeCalculationID**). The **Values** .NET script should be modified to add the **SystemID** and **OeeCalculationID** to the **Values Dictionary** for the current **Instance**, using the **Values** editor interface.

- In **Developer** Section, **Navigate and Select** Training | Day 3 | Lab 10 | Line 5.
- Select the **C# Values** item from the **Actions** menu in slice 3.
- Replace any existing script in the .NET script editor with the following script. The code for this script can be found at **C:\Scripts\Values2.txt**.

```
// add system ID from instance
values["SystemID"] = instanceID;

// add oee calc ID from system ID

var calc = this.Api.Data.DbOeeCalculation.Load.TopBySystemID(instanceID)
.ThrowIfLoadFailed("OeeCalc.SystemID", instanceID);

values["OeeCalculationID"] = calc.ID;
// return
return Result<bool>.ReturnSuccessfulResult(true);
```

13. Modify the Line 5 Hub to be Generic

Finally, some of the properties of the **Line 5 Hub Page** should be altered now that it is representing a generic **Hub** for all the **Systems** in the **Packaging Area**. Alter the **Line 5 Hub Page** properties as below…

- Navigate to and select **Developer | Training | Day 3 | Lab 10 | Line 5.**
- With **Line 5** selected, click the **Edit** menu option and apply the following settings.

Name	Line Hub
Key	LineHub
System (Properties Tab)	-1 (leave SystemID in the Key field)
KPI Calculation (Properties Tab)	-1 (leave OeeCalculation in the Key field)

After making these changes, navigate to the **Training Section**. You should see a **Hub 3** in the left navigation tree for each of the **Systems** configured under the **Packaging Area** (**Line 5**, **Line 6**, and **Line 7**).

Conclusion

In this exercise, you have become familiar with many of the standard **Content Pages** available in TrakSYS to enable rapid development of Performance Management type user interfaces. Operator activities such as starting and ending **Jobs**, **Event** categorization, and real-time production status can be supported and extended using a combination of standard and solution specific user interfaces.

The patterns of configuring **Page Instances** and passing items to the **Values Dictionary** via the **Page** editors are powerful tools in creating complex and large scale user interfaces for similar equipment / processes.

Common Mistakes

None

Further Exploration

Event Codes: Part 2 of 2

If you completed Part 1 of Event Codes in the previous lab, you can now view some of the results. Once you have acknowledged an Event, it may be assigned to an Event Code (depending on your configuration).

Under your **Lab 10** page, you will need to create a new Report. Add the **Event Overview Content Page** to your navigation. This page will require a **System ID** to function, which you can either hard-code or instance like your other pages.

Once it is ready, you can navigate to your new report. You will see options to **Group By** as part of the filters, which will include **Event Categories** and **Event Codes** as an option. Try both grouping options and view the differences. The more categories you have and the less **Event Codes** the more obvious the difference will be. Finding a balance between the two is important to the value this mechanism provides.

Lab 11 | Batch and Storage Systems

Overview

In this assignment, there are two similar topics. For the first topic, you will configure a **Batch System** and create **Function Definitions** to model the equipment units and capabilities of a **Mixing Process Cell**. You will then configure a **Recipe** in the **Product** configuration to define the size, planned duration, material requirements and execution steps for creating a specific Product on the Mixing Process Cell.

First, a **Batch System/Sub-System** needs to be configured in the Batching area of the configuration. **Function Definitions** are then created to model the functions the system can perform.

Then, a **Recipe** needs to be configured for the system. **Recipe Step Definitions** are created using the **Function Definitions** defined for the system. **Materials** can be added to the **Recipe Step Definitions** as well.

For the second topic, you will configure a **Storage System** to represent a silo. For the silo, **Transfer Definitions** will be configured to record **Material** transactions as the silo is filled and emptied.

To help with understanding the **Storage Systems**, a set of **Visual Page Definitions** and **Forms** have been pre-configured to allow visualization of the silo, as well as manage operator driven **Fill** and **Consume** transactions. The user interface is designed to showcase the ability of **Storage** Systems and **Transfers** to manage layering of contents as containers are filled from the top and emptied from the bottom.

Estimated Time to Complete This Lab

30 Minutes

Details

The following sections describe the detailed steps to be completed for this lab.

1. Configure a Batch System and Sub-System

Beneath the **Batching Area**, configure the **Mixing Process Cell System** and **Mixer Sub-System**.

- Navigate to **Configuration | Systems**.
- Select the **Batching Area**.
- In slice 2, select the **Mixing Process Cell** under **Systems** to reveal the system details and **Related** menu in slice 3.
- Click **Edit** in slice 3 to configure the **Mixing Process Cell System** with the following property values…

Planned Size Tag (Job Tab)	B.MPC1.PLANNED_SIZE
Actual Size Tag (Job Tab)	B.MPC1.ACTUAL_SIZE
Refresh Key (Advance Tab)	MPC1

- Click **Save**.
- Select **Sub-Systems** from the **Related** menu in slice 3. The **Mixing Process Cell** details will move to slice 1 and the Sub-System **Mixer** will be listed in slice 2.
- In slice 2, select the **Mixer** under **Sub-Systems** to reveal the sub-system details and **Related** menu in slice 3.
- Click **Edit** in slice 3 to configure the **Mixer Sub-System** with the following property values…

Product Code Tag (Product Tab)	B.MPC1.MIXER.PRODUCT_CODE

2.   Configure a Function Definition

In order to record instances of **Batch Step** records in the TrakSYS database, **Function Definitions** are configured by **Sub-System** and triggered using **Discrete Trigger Tags**. Configure the following **Function Definition** for the **Mixer Sub-System**.

- In the **TrakSYS Web**, navigate to **Configuration | Systems**.
- Select the **Batching Area** in slice 1 to reveal the list of child **Systems** in slice 2.
- Select the **Mixing Process Cell System** in slice 2 to show the **System** details in slice 3.
- Select the **Sub-Systems** option in the **Related** menu in slice 3.
- Select the **Mixer** Sub-System in slice 2 to show the **Sub-System** details in slice 3.
- Select the **Function Definitions** option in the **Related** menu in slice 3. The item details for the **Sub-System** should shift to slice 1 and slice 2 should contain a list of **Function Definitions**.
- Select the **+ New** menu option under **Function Definitions** and add a new **Function Definition** with the following property values…

Name	Trigger Tag
Load	B.MPC1.MIXER.LOAD

3.   Configure a Recipe

A **Recipe** will be configured for the product **Trail Mix** called **Trail Mix Recipe**.

- In the **TrakSYS Web**, navigate to **Configuration | Products**.
- Select the **Batching Set** in slice 1 to reveal the list of **Products** in slice 2.
- In slice 2, select **Trail Mix** under **Products** to reveal the product details and **Related** menu.
- Select **Recipes** in the **Related** menu in slice 3. The item details for the **Product** should shift to slice 1 and slice 2 should contain the **Trail Mix Recipe**.
- In slice 2, select **Trail Mix Recipe** under **Recipes** to reveal the recipe details and **Related** menu in slice 3.
- Click **Edit** in slice 3 to configure the **Trail Mix Recipe** with the following property values…

Planned Number of Batches (Planned Tab)	1
Planned Batch Size (Planned Tab)	1200.0
Planned Batch Size Units (Planned Tab)	g
Planned Batch Duration (Planned Tab)	15

4. Configure a Recipe Step Definition and Materials

After a **Recipe** for a Product is configured, **Recipe Step Definitions** need to be added that detail the **Batching** process for **Trail Mix**. Configure the following **Recipe Step Definition**.

- After the **Trail Mix** recipe is configured, select **Trail Mix Recipe** in the **Recipes** list to expose recipe details and **Related** menu.
- Select **Recipe Step Definitions** in the **Related** menu.
- Select the **+ New** menu option under **Recipe Step Definitions** and add a new **Recipe Step Definition** with the following property values…

Function Definition	Load
Start Sequence	1
End Sequence	1
Planned Duration (Seconds)	120

- After the recipe step definition is created, select the **Load** recipe step definition to expose recipe step definition details and **Related** menu.
- Select **Materials** in the **Related** menu.
- Select the **+ New** menu option under **Materials** and add a new **Material** with the following property values… Repeat for all 3 **Materials**.

Material	Quantity
Candy	340.0
Nut Mix	600.0
Raisins	260.0

5. Restart the Logic Service

Ensure that the **TrakSYS Logic Service** is re-started for the configuration changes to take effect.

6. Open the Batch Overview Page

A small user interface has been pre-configured using Visual Page Definitions to allow the visualization of the **Mixing Process Cell 1 System** contents and the **Batching Process** performed against it. Locate and open the **Batch Overview Page** under the **Training | Day 3 | Lab 11.**

7. Start the Batching Process

Start a job using the **Start Job** tile, then start a Batch with the **Start Batch** tile. When the batch starts, the corresponding **Batch Steps** and **Material Use** records will be generated. Start the **Load** step using the **Next Step** tile. As the step starts, note how the Expected value of each material changes to match the expected consumption for the step.

8. Consume Material

Consume material during the **Load** step by using the buttons under the **Consume Materials** header. As each Consume is executed, note how the **Material Use Records** log is populated with the transactions. Also, note that multiple Consumes may be executed for a single material on a single step.

9. Examine the Solution Pages

Take some time to enter the **Parts** and **Script** editors for the **Batch Overview Page** to examine the inner workings. This **Page** may also be examined for techniques and patterns.

10. Configure a Storage System

In order to track the contents of a fixed storage silo, configure a **Storage System** called **Silo 1** in the **Warehouse Area** of the **OCV** configuration.

- Navigate to **Configuration | Systems**.
- Locate and select the **Warehouse** Area.
- Select the **+ New** menu option under **Systems** in slice 2. Select the **Storage System** type from the System options.

Name	Silo 1
Key	SILO1
Storage Units (Storage Tab)	KGs
Maximum Capacity (Storage Tab)	1000
Refresh Key (Advanced Tab)	S1

11. Configure a Transfer Definitions

In order to track material movements in and out of the Silo 1 System, Transfer Definitions must be configured for Fill, Consume, and Empty operations.

- Navigate to **Configuration | Systems | Warehouse**.
- Locate and select the **Silo 1 System**.
- Select the **Transfer Definitions** option in the **Related** menu in slice 3.
- Select the **+ New** menu option under **Transfer Definitions**. Create the following Transfer Definitions…

Name	Fill Silo
Key	FILL
Trigger Tag	WH.S1.Fill
Transfer Direction	In
Quantity Tag (Quantity Tab)	WH.S1.Quantity
Material Tag (Capture Tab)	WH.S1.Material

- Consume Transfer Definition

Name	Consume From Silo
Key	CONSUME
Trigger Tag	WH.S1.Consume
Transfer Direction	Out
Quantity Tag (Quantity Tab)	WH.S1.Quantity

- Empty Transfer Definition

Name	Empty Silo
Key	EMPTY
Trigger Tag	WH.S1.Empty
Transfer Direction	Set
Quantity Tag (Quantity Tab)	WH.S1.Reset

12. Restart the Logic Service

Ensure that the **TrakSYS Logic Service** is re-started. This service will monitor **Tag** value changes and enable functionality in the **Transfer** user interfaces.

13. Open the Storage System Page

A small user interface has been pre-configured using **Visual Page Definitions** to allow the visualization of the **Silo 1 System** contents and the **Transfers** performed against it. Locate and open the **Storage and Transfers Page** under the **Training | Day 3 | Lab 11.**

14. Fill the Silo with Material

Fill the **Silo 1 System** by using the ↑ **Fill** menu option under the **Transfers Header**. The following materials and quantities should be used. As each **Fill** is executed, note how the **Transfer** log is populated with the transactions.

Name	Quantity
Material A	200
Material B	100
Material C	300

15. Consume Material from the Silo

Consume material from the **Silo 1 System** by using the ↓ **Consume** menu option under the **Transfers Header**. The following quantities should be consumed. As each Consume is executed, note how the **Transfer** log is populated with the transactions. Also note how some of the transactions generate multiple Transfers to deal with layers.

Quantity	Expected Transfers
100	100 from Material A
150	100 from Material A, 50 from Material B
200	50 from Material B, 150 from Material C

Conclusion

In this exercise, you become familiar with **Batch Systems**, **Function Definitions**, **Products/Materials**, **Recipes** and **Recipe Step Definitions**.

Although there are no out-of-the-box **content pages** and **parts** for batching in TrakSYS, real-time interfaces and historical reporting for batch information can be achieved through **custom dashboards**. Batches can be started, executed and ended/completed based on the configuration and the use of custom dashboards.

You have also seen an example of a **Visual Page Definition** based user interface solution to visualize contents and manage **Batching** transactions. Examine the structure of these **Pages** as well as the script behind them to understand how similar solutions can be created.

In addition, you have created the configuration to manage a basic **Storage System** solution. Fixed storage equipment can be modeled and material movements in and out can be recorded with **Transfer Definitions**. **Transfers** can be triggered automatically with **Tag** driven logic.

You have also seen an example of a **Visual Page Definition** based user interface solution to visualize contents and manage **Transfer** transactions. Examine the structure of these **Pages** as well as the script behind them to understand how similar solutions can be created.

Common Mistakes

None

Further Exploration

Examine the Solution Pages

Take some time to enter the **Parts** and **Script** editors for the **Storage and Transfers Page** to examine the inner workings. There are also 2 **Spoke** pages beneath the **Storage and Transfers Page** which represent the **Transfer Forms**. These **Pages** may also be examined for techniques and patterns.

Lab 12 | Task Configuration and User Interfaces

Overview

HACCP (Hazards and Critical Control Points) is a methodology used in manufacturing environments to periodically monitor and verify critical portions of the operation. In this assignment, you will configure a HACCP Check **Task** for **OCV Packaging Line 5**. This **Task** should be executed every 2 minutes (for purposes of frequent availability during the training), and includes reminders for verifying proper operation and cleanliness of various parts of the production **System**.

This configuration should include the **Tag** logic to trigger the periodic check **Task Definition**, as well as HACCP-specific **Task Form Items** which will make up the operator entry form to be completed.

In this assignment, you will configure/build a TrakSYS user interface to allow the HACCP check **Task** form to be completed on the **Packaging Line 5 System**.

First the standard **Task Edit Form** will be used to complete some of the **Tasks** being automatically generated by the **Logic Service** and appearing in the standard **Line Hub Page**.

Next, a specially configured version of the standard **Task Edit Form** will be created, configured, and placed in the **Page Definition** structure. The standard **Line Hub Page** will be altered to call the custom configured form in place of the default out-of-the-box interface.

Estimated Time to Complete This Lab

30 Minutes

Details

The following sections describe the detailed steps to be completed for this lab.

1.   Configure a Tag to Trigger the Task

A **Script Tag** should be used to create a Discrete signal every **two** minutes that will trigger the **Task**. Create a **Script Tag** using logic that will return a transition from **0** to **1** every **two** minutes.

In **Configuration | Tags**, create the following **Script Tag** under **Packaging | Line 5 | [Task]**

Name	PB.L5.TASK.HACCP
Data Type	Discrete
Script Type	Advanced
Force Evaluation (Evaluation Tab)	<checked>
Script (refer to bullet point below)	return (Context.Now.Minute % 2) == 0;

- The **Script Tag** must be created first, then the actual script can be added using the **Script Action** in the slice 3 menu.

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2.   Configure a Task Definition

The **Task Definition** entity is used to define the **Task** reason and other functional settings.
Configure a **Task Definition** for the HACCP check under the **Packaging Line 5 System**.

- Navigate to **Configuration | Systems | Packaging | Packaging B**.
- Locate and select the **Packaging Line 5** System.
- Select the **Task Definitions** option in the **Related** menu in slice 3.
- Select the **+ New** menu option under **Task Definitions** and use the following properties.

Name	HACCP Check
Trigger Tag	PB.L5.TASK.HACCP
Task Completion Seconds	30
Notes (Notes Tab)	<enter some text designed to be work instructions for executing the Task>

3.   Configure a Task Form Item Group

The data entry form items that operators will be asked to complete for the HACCP check must
be defined as **Task Form Items**.

Create a **Task Form Item Group** for the HACCP check.

- Navigate to **Configuration | Miscellaneous | Task Form Items**.
- Select **Packaging Forms** in slice 1.
- Then select the **+ New** menu option under **Groups** in slice 1.
- Create the **HACCP Check Items** form defined below.

Name	HACCP Check Items
Key	HACCP

4.   Create Task Form Items

Task Form Items are logically grouped for assignment into **Task Form Item Groups**.
Beneath the newly created **HACCP Check Items** Task Form Item Group, create the following
Task Form Items…

- Navigate to **Configuration | Miscellaneous | Task Form Items | Packaging Forms**
- Locate and select the **HACCP Check Items** Task Form Item Group.
- Select the **+ New** menu option under **Task Form Items** in slice 2.

Item Name	Key	Data Type	Prompt	Width	Default Value
Metal	METAL	Discrete	Run test metal to verify functionality.	6	0
Seal	SEAL	Discrete	Test seal on a random bottle.	6	0
Label	LABEL	Discrete	Verify label placement is accurate.	6	0
RFID	RFID	Discrete	Test RFID chip from a case.	6	0

5. Associate the Task Form Item Group to the Task Definition

The final configuration step for the HACCP check is to associate the new **Task Form Items** (via the Group) to the **HACCP Check Task Definition**.

- In **Configuration | Systems** locate and select **Packaging Line 5**
- Select **Task Definition** in slice 3, then select **HACCP Check** to reveal its related items.
- Select the **Task Form Item Groups** option in the **Related** menu in slice 3.
- Select the **+ Assign** menu option under **Task Form Item Groups**.
- Select and assign the **HACCP Check Items** Task Form Item Group.

6. Restart the Logic Service

Ensure that the **TrakSYS Logic Service** is re-started. This service will monitor **Tag** value changes and enable functionality in the **Task** user interfaces.

The **Logic Service** should begin generating HACCP **Task** records every 2 minutes. You can verify this be checking the **Line Hub** for the **Packaging Line 5 System**. New **Task** records should be displayed in the right margin.

7. Complete a Task using the standard Task Form

Using the **Line Hub** for the **Packaging Line 5 System**, click one of the **Task** records being displayed in the right margin (these should have been generated from the **Logic Service**). This should display a standard **Task Edit Form** which will allow the necessary checks to be executed and the **Task** to be completed.

- Navigate to **Training | Day 3 | Lab 12 |Line Hub.**
- Click one of the **Tasks** displayed in the right margin under the **Tasks Header**.
- Check the checkboxes, then click **Save**.
- There should be a validation error requiring the **Pass/Fail** result be selected. Select a result and complete the **Save**.

8. Configure a new instance of the standard Task Edit Form Content Page

While the built-in form validation is technically working correctly, this HACCP **Task** should not require a **Pass/Fail** result. Create a new **Task New/Edit Content Page Definition** in the hierarchy and disable the **Pass/Fail** portion of the interface using its properties.

- In **Developer Section**, navigate to and select the **Training | Day 3 | Lab 12 | Line Hub.**
- Select the **Spokes** option from the **Related** menu in slice 3.
- Select the **+ New** menu option under **Spokes** and add a new Spoke **Content Page** of type **TrakSYS/Application/Task/Task New/Edit** with the following properties...

Name	Special Task Form
Key	SpecialTaskForm
Pass/Fail (Content Tab)	No

9. Override the link in the Line Hub Page

Once the special **Task Form Content Page** has been created, the default link in the **Line Hub Page** must be overridden to call the new **Page** (Key = SpecialTaskForm).

- In **Developer Section** Navigate to and select the **Training | Day 3 | Lab 12 |Line Hub.**
- Click the **Edit** item in the top menu to enter the properties for the **Page**.
- Alter the following property…

Task Edit (Links Tab)	SpecialTaskForm?TaskID={TaskID}

This is a relative link that should resolve to the following URL when rendered…

http://servername/ts/pages/ocv/packaging/linehub$p<#>/SpecialTaskForm?TaskID=<TaskID>

10. Complete a Task using the customized Task Edit Form

Once the special **Task Form** and overridden link is in place, use the **Line Hub** for the **Packaging Line 5 System** to complete one of the **Task** records being displayed in the right margin.

- Locate and open the **Line Hub** for Line 5 (**Training | Day 3 | Lab 12**).
- Click one of the **Tasks** displayed in the right margin under the **Tasks Header**.
- Check the checkboxes click **Save**.

Using the new form, the **Pass/Fail** field should not be displayed.

Conclusion

In this exercise, you have created the configuration entities and settings to enable a periodically triggered HACCP check **Task**. When triggered, a **Task** record will be automatically created by the **Logic Service**, and be made available for operators to complete. Also, you become familiar with some of the standard **Task Form** user interface options available to quickly configure a Task Management solution.

Based on the settings, the operators will have 30 minutes to complete the Task (before it is marked as **Late**). The **Task** form will contain a series of checkboxes with descriptions and an overall set of work instructions to be displayed.

The standard **TrakSYS Task Content Pages** may be used to display and record data, or a solution specific user interface may be created. In either case, the form contents, triggering conditions, and basic validation rules can all be controlled by a non-technical resource via configuration.

In cases where the out-of-the-box TrakSYS user interface functionality needs to be extended, you have learned how to override the default link targets in standard **Pages** to call custom **Visual Page Definitions** or specially configured **Content Pages**. This is an important technique as it allows solutions to be built with a practical mixture of standard and solution-specific interfaces which fit together seamlessly and provide a consistent end-user experience.

Common Mistakes

None

Further Exploration

Standardizing Task Form Item Inputs

For many tasks, you will need inputs that are standardized. These inputs do not allow the operator to type in their own response, but instead they are provided with a list of answers to select from. This can be accomplished in two different manners, both of which will be described below.

Before getting into the new content, first create a new Task Form Item in your **HACCP Check Items**. A good example for this scenario would be an input with a set grading scale, such as a rating of cleanliness from 0 to 5. Since the actual data will be recorded by using the number scale value, be sure to put the Data Type of your new input as **Integer**.

You now have two options for creating the input limitations. Creating a Task Form Item Enum List, or using a general Lookup Set.

Creating a **Task Form Item Enum List**:

> You will first need to navigate to your new Task Form Item and select it, then click on **Enums** under **Related** in Slice 3. Here, you can create a set of options that the User can select when completing this Task Item. The **Name** field will be what is shown to the User and the **Value** field will be what is recorded in the database.

Creating a **Lookup Set**:

> Navigate to **Configuration | Miscellaneous | Lookup Sets**. Create a new **Lookup Set** with any name and any key. Select your Lookup Set, then create any number of **Lookup Values**. The **Key** field will be what is shown to the User and the **Value** field will what that set returns when used. In the case of a Task Item, that will be the value recorded.
> The next step is to associate this Lookup Set to your Task Form Item. Navigate back to your Task Form Item and edit it. You should be able to click on the dropdown for the **Lookup Set** property and see your Lookup Set listed. Select it and save the Task Form Item.

The next time a Task is created for the **HACCP Check** Task Definition, you will see your new input. In addition, the options for your new input will be limited to the choices you defined. The result of either option will look the same and will be no different to the User.

Typically, a **Task Form item Enum List** is used if the input is **unique** and will only be used for that single Task or Input. However, if that set of selection criteria is likely to be used across multiple Tasks or Inputs, it is better to use a **Lookup Set** for **standardization and governance** of the options.