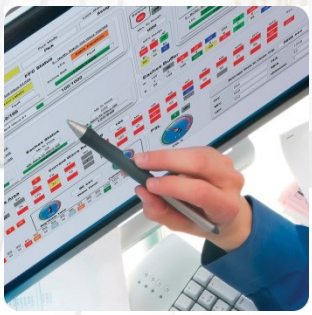
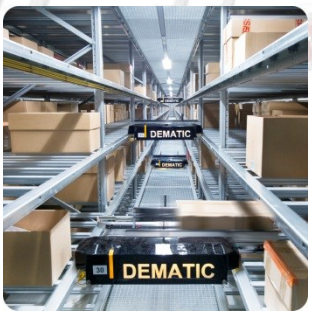
HelloFresh

Barleben, Germany
The Hybrid Line

Dematic iQ

Fact Specification V2.4.2
2024-12-03





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Release Dates

Version	Release Date	Description	Authored By / Revised By
1.0	02-Jun-2022	Official Release after rework according to HelloFresh review	E.Alalami
2.0	16-May-2023	Small changes during development and according to HelloFresh feedback during test phase	E.Alalami
2.1	11-September-2024	Document update containing all current changes to the Facts	L.Kus
2.2	18-September-2024	Minor changes	L.Kus
2.3	24-October-2024	Added new Facts: WeightTrackingPicking, SystemStatus	L.Kus and E.Mohamed
2.4	07-November-2024	Adding new fields to WeightTrackingPickingFact. Adding all decision points into SystemStatusFact	E.Mohamed
2.4.1	18-November-2024	Updating some SystemStatusFact fields and requirements	E.Mohamed
2.4.2	03-December-2024	Added MFCTraceFact spec	L.Kus and H.Tolba

Contents

1 Introduction

1.1 Purpose

This document describes the Facts, which are provided by Dematic iQ Optimize for the current project. It defines the provided attributues and gives specific triggers at which point these are sent to the host system.

1.2 Audience

This specification is for HelloFresh and Dematic project team to define the content and event time of each Fact and to assist in designing and implementing an interface to their systems

1.3 Scope

This document focuses on the format, values and event time of the Facts provided by Dematic iQ Optimize for the host. All defined Facts are provided by Dematic iQ Optimize and no inbound Facts or triggers are allowed. It does not include interfaces to the ERP-Hostsystem or to any other system, such as PLCs.

1.4 Acceptance Certificate

The Fact Specification V2.4.2 identified by release date: 2024-12-03 for HelloFresh meets the requirements under the terms of the valid contract and replaces all former specifications and side letters in the form of protocols, email, or verbal definitions.

HelloFresh and Dematic have verified this document for accuracy and completeness and agree. This host interface specification is – in terms of contractual commitments – the exclusive basis for realization of host interface

Later changes, enhancements, or deletions require agreement between HelloFresh and Dematic.

HelloFresh, Project Manager Software – Enio Alburez	Date

Dematic, Software Project Lead – Essam Alalami	Date

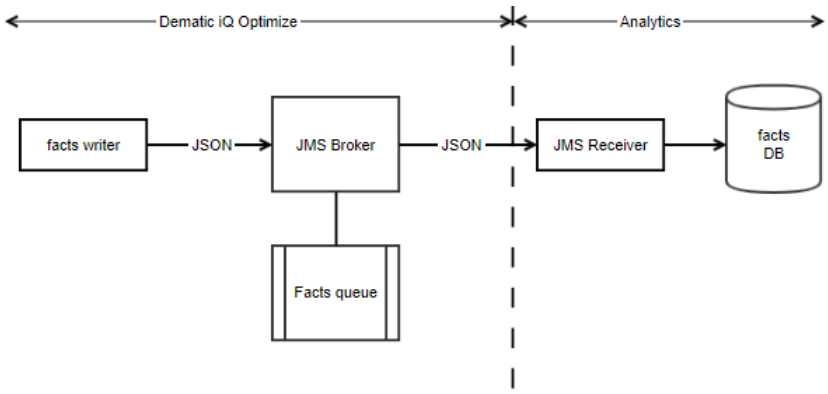
2 Fact Writer

The analytics interface provides a mechanisms for writing a fact to a data storage so that the concrete implementation of this data storage is transparent to the generator of the fact.

There are two prominent flavors of such data storages:

- The Dematic iQ Optimize database itself. In this case facts data are written either synchronously or asynchronously.
- The "Analytics" database which is a completely different system which in general runs on a different host (maybe in the cloud). For the analytics system there are two ways to receive the data:
    - receiving each individual fact via a JMS queue
    - receiving a bunch of facts via exported data files

The following picture shows the details of how Dematic iQ Optimize interacts with the Analytics System:



- Whenever a fact is to be created on the " Dematic iQ Optimize" side, the facts writer converts the data structure of the fact to a JSON String which is sent via the JMS broker (Active MQ) to a dedicated "facts queue".
- On the "Analytics" side a JMS receiver connects to the "facts queue". Whenever a new fact is received, it will get stored into the facts DB for further processing (translation, aggregation, ...).

- The "facts queue" is managed on the Dematic iQ Optimize side. This has the advantage that facts messages are queued persistently in case "Analytics" is not reachable.
- Dematic provides the connection data to ActiveMQ and the Queue-Name (AnalyticsCollectQueue) for the Analytics system to consume the facts from the queue

  Example:

  <property name="activemq.jmx.url" value="service:jmx:rmi:///jndi/rmi://[IP]:[PORT]/jmxrmi"/>

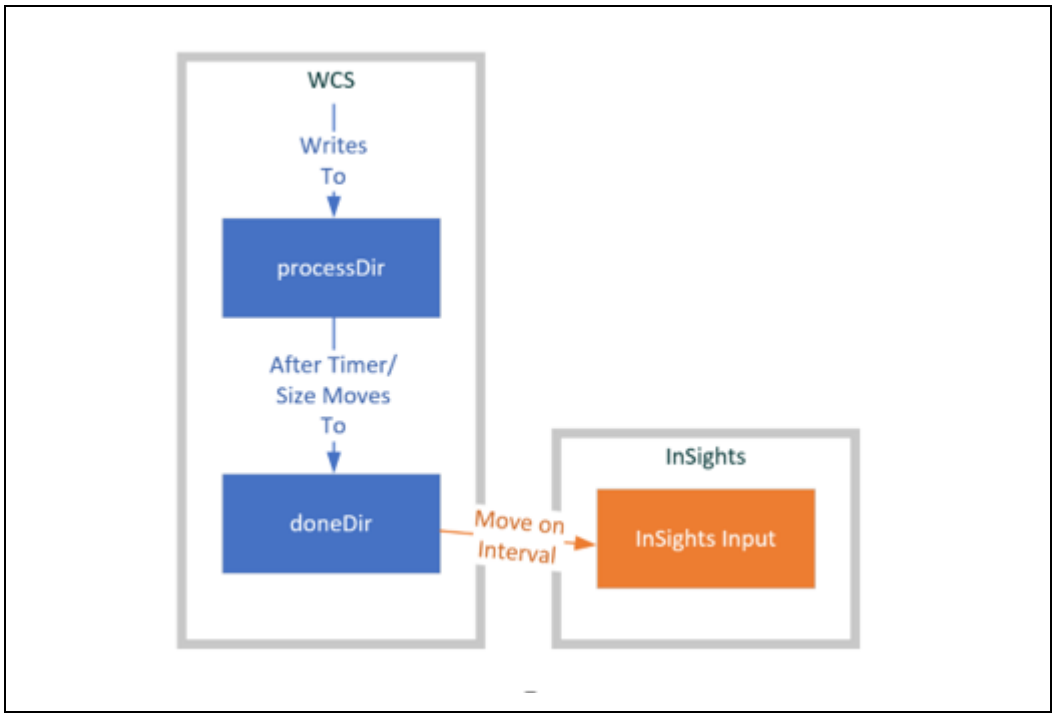
- The standard DiQ installation dose not have any authentication for ActiveMQ

The facts queue resp. the whole broker storage is monitored. In case of a reached threshold, further writing to the facts queue is inhibited. This should prevent storage exceptions in case when the Analytics system is down and can not process the messages.

2.1 AnalyticsJsonFileFactWriter

Besides the Analytic-System is directly connected to the Fact-Queue to get all facts immediately, there is a solution over JSON-Files available as well.

Using a File Share / Mapped Drive the common processing looks like (here Analytic-Sytem Insights is taken as example):



2.1.1 Configuration

```
<?xml version="1.0" encoding="UTF-
8"?><app:configuration xmlns:app="http://www.dematic.com/dcdng/wms/app" xmlns:analytics
="http://www.dematic.com/dcdng/wms/app-analytics">
    <analytics:AnalyticsCollector>
        <active>true</active>
        <processDir>D:/temp/AnalyticsCollector/process</processDir>
        <doneDir>D:/temp/AnalyticsCollector/done</doneDir>
        <maxFileSizeInKilobyte>10000</maxFileSizeInKilobyte>
        <maxFileAgeInMinutes>60</maxFileAgeInMinutes>
        <fileScanDelayInMs>10000</fileScanDelayInMs>
        <fileWriteChunkSize>1000</fileWriteChunkSize>
        <fileWriteCompletionTimeoutInSeconds>30</fileWriteCompletionTimeoutInSeconds>
    </analytics:AnalyticsCollector>
</app:configuration>
```

Table 1 JSON File Fact Writer configuration

Property	Description	Value recommendation
active	Defines, if the AnalyticsCollector background process is active or not	Should be activated, if a AnalyticsJsonFactWriter is used; otherwise: deactivate it!
processDir	Defines the directory (not a file!) where the FCT_xxx.log files should be written to.	Use an absolute path name, where the DCD system has write access to.
doneDir	Defines the directory (not a file!) where the FCT_xxx_yyyyMMddHHmmss .log files should be moved to, when the rotation policy (size or age) applies.	Use an absolute path name, where the DCD system has write access to. It has to be a different directory than 'processDir'!
maxFileSizeInKilobyte	Property for the rotation policy of the LOG files which defines the max file size (in Kilobyte, KB) of a written LOG file.	A value of 10000 means 10 MB.
maxFileAgeInMinutes	Property for the rotation policy of the LOG files which defines the max allowed file age of a written LOG file.	The value depends on how often you want to get 'done' files for the analytics component.

Table 1 JSON File Fact Writer configuration

Property	Description	Value recommendation
fileScanDelayInMs	This property defines, how often the written LOG files in the processDir are checked against the maxFileSizeInKilobyte and maxFileAgeInMinutes.	A values of 10000 means, that the polling interval is 10 seconds.
fileWriteChunkSize	Defines the number of processed facts after which the JSON representation of facts should be forced to write to disk. Default: 1000	A higher value means more performance for the file writing. The value should be in relation to the creation rate of facts and also the maxFileSizeInKilobyte / maxFileAgeInMinutes
fileWriteCompletionTimeoutInSeconds	Defines a timeout after which the JSON representation of facts should be forced to write to disk. Default: 30	A higher value means more performance for the file writing. The value should be in relation to the creation rate of facts and also the the maxFileSizeInKilobyte / maxFileAgeInMinutes

3 Fact Descriptions

This chapter describes the different Facts, which are used to inform the host system about defined changes.

Table 2 Fact Overview

Fact	Description	Chapter
HFBBoxArrivesAtBufferFact	Sends on arrival at any workstation buffer, e.g. cool pouch, addon, hybrid lines, QC and everything else available as workstation buffer.	3.1
HFBBoxArrivesAtWorkstationFact	Sends on arrival at any workstation, e.g. cool pouch, addon, hybrid lines, QC and everything else available as workstation.	3.2
HFBBoxLoopingFact	For the hybrid lines and outbound sorter on every loop of a box this fact is generated.	3.3
HFBChuteManagementFact	When a box enters a chute or when a chute is deactivated this fact is created.	3.4
HFBLoadUnitTrackingFact	Tracks the area change of each box.	3.5
HFBMealKitBufferCrateFact	This Fact informs about input and output of crates in MealKitBuffer.	3.6
HFBMealKitBufferDeviceFact	This Fact informs about status of the devices in MealKitBuffer.	3.7
HFBOrderStatusChangeFact	Informs about all order status (flags included) changes.	3.8
HFBOutOfStockLoopFact	On entering and leaving the out-of-stock loop this fact is created and contains all involved SKUs.	3.9
HFBPickedQuantityOnWorkstationFact	While leaving a workstation this fact informs about the picked quantity or just about the leaving without any quantity, when no pick was done (for example when leaving cool pouch closing station).	3.10
HFBQcDecisionFact	This fact gives an overview over the decision made at specific QC stations.	3.11
HFBStockInOutFact	About stock-out on specific location (inside a workstation) by the operator and on replenishment message by the host this fact is sent by DiQ.	3.12
HFBTransportTrackingFact	Gives the initial calculated transport route to each location/station. Further when a previous calculated route is changed an update is generated.	3.13

Table 2 Fact Overview

Fact	Description	Chapter
HFBUserTrackingFact	This fact informs about the login and logoff of a user. If it was on a specific workstation, this information is also provided by this fact.	3.14
HFBWeightAdjustmentFact	Every gross weight changed is communicated through this fact.	3.15
HFBWorkstationStatusFact	This Fact informs about status of a workstation changed.	3.16
NOKIntervalFact	This Facts contains all of the fault information from the PLC.	3.17
HFBWeightTrackingPickingFact	This Fact informs about the measured weight of a load unit and expected contents.	3.18

- **Type:** The data type of the attribute:
  - A: Alphanumeric (default length is 255)
  - ENUM: Same as Alphanumeric, but restrict to specific values only
  - D: Date (yyyy-MM-dd)
  - DT: DateTime (yyyy-MM-ddTHH:mm:ss.fff-TimeZoneoffset e.g: 2021-01-31T16:00:00.000-05:00)
  - T: Time (HH:mm:ss.fff e.g: 16:00:00.000-05:00)
  - N: Numeric (float)
  - B: Boolean (true/false)
  - CMPLX: Complex Type

3.1 Fact: HFBBoxArrivesAtBufferFact

Purpose

In order to track when a box arrives at any workstation buffer.

Triggers

- A box arrives at any workstation buffer.

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
orderId	Order.orderId	Y	A	Unique ID of the order
loadUnitId	Order.loadUnit.id	Y	A	Unique ID of the box
loadUnitType	Order.loadUnit.luType	Y	A	Type of the box (e.g. small, medium, large)
currentTime	Timestamp	Y	DT	Timestamp when this fact is generated
stationId	Workstation.id	Y	A	Unique ID of the workstation, where the box arrives.
stationType	Workstation.type	Y	ENUM	Type of the workstation.
stationStatus	Workstation.status	Y	ENUM	Current status of the workstation. If any flags are used as status, these will be also included in this status.

3.2 Fact: HFBBoxArrivesAtWorkstationFact

Purpose

In order to track when a box arrives at any workstation.

Triggers

- A box arrives at any workstation.

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
orderId	Order.orderId	Y	A	Unique ID of the order
loadUnitId	Order.loadUnit.id	Y	A	Unique ID of the box
loadUnitType	Order.loadUnit.luType	Y	A	Type of the box (e.g. small, medium, large)
currentTime	Timestamp	Y	DT	Timestamp when this fact is generated
stationId	Workstation.id	Y	A	Unique ID of the workstation, where the box arrives.
stationType	Workstation.type	Y	ENUM	Type of the workstation.
stationStatus	Workstation.status	Y	ENUM	Current status of the workstation. If any flags are used as status, these will be also included in this status.

3.3 Fact: HFBBoxLoopingFact

Purpose

This fact gives visibility to the boxes which must go for another loop over the hybrid lines or outbound sorter.

Triggers

- Next loop starts for a box at the hybrid lines
- Next loop starts in the outbound sorter

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
orderId	Order.orderId	Y	A	Unique ID of the order
loadUnitId	Order.loadUnit.id	Y	A	Unique ID of the box
loadUnitType	Order.loadUnit.luType	Y	A	Type of the box (e.g. small, medium, large)
currentTime	Timestamp	Y	DT	Timestamp when this fact is generated
area		Y	ENUM	Possible values: • HYBRID_LINES • OUTBOUND_SORTER
loopCount	Order.loadUnit.loopCount	Y	N	Number of physical loops done by the LU, independent of the number of error reasons on each loop. E.g., If the box is looping for the first time, because of workstationBuffer_full and afterwards in the same loop because of weight deviation in HLP (sent_to_qc) then: • 2 FACTS will be generated with the timestamp of the events occurred on the line (buffer full and weight deviation) • loopCount= 1 for both FACTS. (Assuming box is doing the first loop).

reasonOfLoop	Order.loadUnit.loopReason		ENUM	• OUT_OF_STOCK_BUFFER_FULL
				  ○ Triggers: OoS box cannot enter OoS buffer
				  ○ locations: point C.
				• CHUTE_NOT_REACHABLE
				  ○ Triggers: box cannot enter sorter chute.
				  ○ locations: CCSP01DP99
				• WORKSTATION_BUFFER_FULL
				  ○ Triggers: box cannot enter picking workstation and needs to go to new destination over main loop.
				  ○ locations: area leave.
				• TO_OOS_BUFFER
				  ○ Triggers: sku is system wide out of stock and next destination of box is out of stock buffer.
				  ○ locations: area leave.
				• STRING_OOS
				  ○ Triggers: string where the box was planned to go became OoS and box needs to recirculate. Missing sku is system wide in stock
				  ○ locations: area leave.
				• RACKPLAN_ISSUE
				  ○ Triggers: when rackplan is not allowing for picking without looping, because all needed SKUs for a box are in different strings in HLP/HLN.
				  ○ Location: point A
				• SENT_TO_QC
				  ○ Triggers: transport creation with destination QC station in following cases
				  ▪ QC is not at the same line (from HLP to HLN)
				  ▪ QC is at the same line but there are still other open picks and therefore box cannot go directly to lidder after clarification.
				  ○ locations: After QC clarification
				• QC_BUFFER_FULL

Attribute Name	DiQ Field	M	Type	Description
				○ Triggers: box cannot enter QC station ○ locations: QC workstation • SCAN_SEQ_VIOLATION ○ Triggers:.Box at end of line with still open picks from the same line. This can be caused by e.g. No read in line, Manual push of box through conveyor or, placing manually box after a scanner. • LIDDER_UNREACHABLE ○ Triggers: box when both lidder are not available ○ locations: decision point of lidder • DESTINATION_UNREACHABLE ○ Triggers: box is looping cause of any other reason does not capture in the reason defined here ○ locations: point C
location	Order.loadUnit.currentLocation	Y	A	Exact position on the conveyour where the message was triggered. For Example HFB.HLP.HL0305.WS05.CCPI03NP05

3.4 Fact: HFBChuteManagementFact

Purpose

This fact gives visibility on the chutes and the boxes in different chutes.

Triggers

- When a chute is assigned a route
- When a chute is unassigned (e.g. cleared by the operator)

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
orderId	Order.orderId	Y	A	Unique ID of the order
loadUnitId	Order.loadUnit.id	Y	A	Unique ID of the box
loadUnitType	Order.loadUnit.luType	Y	A	Type of the box (e.g. small, medium, large)
currentTime	Timestamp	Y	DT	Timestamp when this fact is generated
modes		Y	ENUM	Possible values: • ENTERING • DEACTIVATED
chuteId	Chute.id	Y	A	Id of the chute
chuteStatus	Chute.status	Y	ENUM	Possible values: • ASSIGNED • UNASSIGNED
Route	Order.routeId		A	The route assigned to the order.
errorReason	Order.loadUnit.errorReason		A	Only filled when arriving overflow or NOK chute

3.5 Fact: HFBLoadUnitTrackingFact

Purpose

This fact provides the ability to track the boxes in different areas.

Triggers

This fact is written when a box changes the area.

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
orderId	Order.orderId	Y	A	Unique ID of the order
loadUnitId	Order.loadUnit.id	Y	A	Unique ID of the box
loadUnitType	Order.loadUnit.luType	Y	A	Type of the box (e.g. small, medium, large)
currentTime	Timestamp	Y	DT	Timestamp when this fact is generated, this matches the timestam when box changes area.
newArea	Order.loadUnit.currentLocation.area	Y	A	The new area the box is entering. HelloFresh areas will be: • CARTON_ERECTOR • RECIPES_PRINTING • COOL_POUCH_INSERTION • COUPON_DISPENSER • ICE_AREA • ADD_ON_AREA • HYBRID_LINES • LIDDING_SHIPPING • SORTER_LANES

3.6 Fact: HFBMealKitBufferCrateFact

Purpose

This Fact informs about input and output of crates in MealKitBuffer.

Triggers

- A Crate is stored in its mealkit buffer channel
- A crate is depleted from its mealkit buffer channel
- On quantitity correction inside the lane

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
crateId	LoadUnit.loadUnitId	Y	A	The crate id which is stored or depleted.
skuId	Sku.skuId	Y	A	The sku for which is containing the crate
description	Sku.description	Y	A	The sku description for which is containing the crate
locationId	Location.id	Y	A	The location identifier where the crate was stored.
reason		Y	A	Possible values: • stored • depleted • manualCorrection
crateCountInChannel		Y	N	The number of crates which are currently in the channel.
crateCountToChannel		Y	N	The number of crates which are currently on the way to the channel.
currentTime	Timestamp	Y	DT	Timestamp when this fact is generated

3.7 Fact: HFBMealKitBufferDeviceFact

Purpose

This Fact informs about status of the devices in MealKitBuffer.

Triggers

- The status of a device in meal kit buffer changed

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
deviceId	Group.id (Aisle) Subgroup.id (Level) Location.id (Lane)	Y	A	The device which is changed. This could be the aisle, level or a specific location (lane). In all cases the id of them is provided here.
Status	Group.lockStatus Subgroup.lockStatus Location.lockStatus	Y	A	The new status of the device. This could be: ● AVAILABLE ● LOCKED_IN ● LOCKED_OUT ● LOCKED_INOUT
currentTime	Timestamp	Y	DT	Timestamp when this fact is generated

3.8 Fact: HFBOrderStatusChangeFact

Purpose

This fact tacks the status of each order, e.g., when it is available, on hold or any other status changes happens to an order.

Triggers

- Order is available in DiQ (status=pending).
- Order is ready for selection (status=prepared).
- Order set to hold by host (flag=onHold).
- Order is ready but couldn't be released (flag=preparedOnHold).
- Box erected and labeled and connected to the order (status=released).
- First pick to the order fulfilled (status=active).
- Box sent to QC (flag=InQC)
- Box on the OoS lane (flag=InOos)
- When shipping label applied to the box (flag=ShippingLabelApplied)
- Box is completely picked and dispatched to chute (status=Completed)
- Host acknowledge to be sent to host (status=ToConfirm)
- Host acknowledged (status=Finished)
- Order completely cancelled (status=Cancelled)

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
orderId	Order.orderId	Y	A	Unique ID of the order
loadUnitId	Order.loadUnit.id		A	Unique ID of the box. Can be empty when it is not yet connected to the order.
loadUnitType	Order.loadUnit.luType		A	Type of the box (e.g. small, medium, large). Is empty when no box is connected to the order.
currentTime	Timestamp	Y	DT	Timestamp when this fact is generated, which matches the timestamp when status is changed
newStatus	Order.status and the different flags	Y	A	Also, the flags are converted to a status. The values given above are used here. For example, inQC , inOos , shippingLabelApplied , pending , active , …

errorReason	Order.loadUnit.errorReason OR Order.releaseErrorReason		A	Only set when box was diverted to a QC station or order could not released. Order release: • CARTON_COULD_NOT_BE_ERECTED • ORDER_NEED_TO_BE_PROCESSED • SYSTEM_CAPACITY_EXCEEDED • ORDER_HAS_NO_ROUTE • OUT_OF_STOCK • UNAVAILABLE_WORKSTATION • BLOCKED_SKUS • SKUS_NO_WEIGHT_SET • ALLOWED_NO_OF_OUT_OF_STOCK_BOXES_EXCEEDED • SHIPPING_LABEL_NOT_AVAILABLE • LOAD_UNIT_TYPE_NOT_AVAILABLE • PRINT_MEDIA_NOT_AVAILABLE • ORDER_ON_HOLD • COOL_POUCH_AND_COUPON_NOT_IN_SAME_LINE • SYSTEM_CAPACITY_EXCEEDED_OTHER_ROUTES • NO_CARTON_ERECTOR_AVAILABLE • NO_PRINT_ON_DEMAND_AVAILABLE • NO_COOL_POUCH_AVAILABLE • NO_COUPON_AVAILABLE Load Unit error: • MARKED_BY_OPERATOR • OUT_OF_STOCK_SKUS • MISSING_INVENTORY • NO_VALID_ADVICE_FOUND • CLOSED_ORDER • QC_CHECK_BY_HOST • ORDER_HAS_BEEN_RESTARTED • NO_COOL_POUCH_CLOSING_FOUND • INFORMATION_LOST • COOL_POUCH_MISSING • PRINT_ISSUE • MAX_LOOP_DURATION • PICK_CANCELED_NO_REPEAT_RETRIEVAL • LOAD_TOO_HIGH • LOAD_TOO_WIDE • GENERAL_ERROR • NOREAD

Attribute Name	DiQ Field	M	Type	Description
				• WEIGHT_TO_LOW • WEIGHT_TO_HEIGH
machineId	Order.loadUnit.errectorMachine (The deviceId retrieved from the PLC) or order.loadUnit.shippingLabelPrinter		A	Only set, when the order becomes released and a box is connected to the order.
expectedWeight			N	Only set when the load unit error equal WEIGHT_TO_LOW or WEIGHT_TO_HEIGH
actualWeight			N	Only set when the load unit error equal WEIGHT_TO_LOW or WEIGHT_TO_HEIGH

3.9 Fact: HFBOutOfStockLoopFact

Purpose

This fact informs when and why a box is in the OoS-Loop and when it leaves this loop.

Triggers

- Entering the OoS-Loop
- Leaving the OoS-Loop

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
orderId	Order.orderId	Y	A	Unique ID of the order
loadUnitId	Order.loadUnit.id	Y	A	Unique ID of the box
loadUnitType	Order.loadUnit.luType	Y	A	Type of the box (e.g. small, medium, large)
currentTime	Timestamp	Y	DT	Timestamp when this fact is generated
direction		Y	ENUM	Possible values: • ENTERING • LEAVING
skus		Y	CMPLX	List of skus causing entering the OoS-Loop or becomes available for leaving the OoS-Loop
leavingLoopReason			ENUM	Possible values: • PICKING • TO_QC • PICK_COMPLETED • LOOP_DURATION_EXCEEDED

ComplexType: skus

Attribute Name	DiQ Field	M	Type	Description
skuId	inventorUnit.sku.skuId	Y	A	Unique identifier of the SKU.
skuDescription	Sku.description		A	

3.10 Fact: HFBPickedQuantityOnWorkstationFact

Purpose

This gives an overview on the picked quantity on a single workstation.

Triggers

- When a box leaves a workstation after picking.

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
orderId	Order.orderId	Y	A	Unique ID of the order
loadUnitId	Order.loadUnit.id	Y	A	Unique ID of the box
loadUnitType	Order.loadUnit.luType	Y	A	Type of the box (e.g. small, medium, large)
startTime	Timestamp	Y	DT	Timestamp when the box reaches the picking position and PbL turn on
finishTime	Timestamp	Y	DT	Timestamp when the master pick by light button is pressed
stationId	Workstation.id	Y	A	Unique ID of the workstation the box is leaving.
stationType	Workstation.type	Y	ENUM	Type of the workstation.
stationStatus	Workstation.status	Y	ENUM	Current status of the workstation
pickedQuantities		Y	CMPLX	For each picked SKU an entry is added. Can be an empty list, when no picking was possible. For example cool pouch closing or out of stock.

ComplexType: PickedQuantities

Attribute Name	DiQ Field	M	Type	Description
orderLineId	OrderLine.id	Y	A	Unique identifier of the order line which was picked.
skuId	OrderLine.inventoryCriteria.sku.skuId	Y	A	The SKU that was picked.
requestedQuantity	OrderLine.quantityTarget	Y	N	The original quantity announced by the host for picking.
quantityPicked	OrderLine.quantityCurrent	Y	N	The total quantity for the order line picked to this time.
quantityPickedOnCurrentWorkstation	Pick.quantityCurrent (on current station only)	Y	N	Here only the quantity is given, which was picked on the current workstation.
pickerId	Pick.PickerId	Y	A	The login user of the station
pickStartTime	Pick.startTime	Y	DT	When lights are illuminated
pickEndTime	pick.endTime	Y	DT	When pick is finished

3.11 Fact: HFBQcDecisionFact

Purpose

The arrival to a QC station with a reason is given in the OrderStatusChangeFact. This fact gives only the decision made on a QC station while leaving it.

Triggers

- When a QC action is performed

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
orderId	Order.orderId	Y	A	Unique ID of the order
loadUnitId	Order.loadUnit.id	Y	A	Unique ID of the box
loadUnitType	Order.loadUnit.luType	Y	A	Type of the box (e.g. small, medium, large)
currentTime	Timestamp	Y	DT	Timestamp when this fact is generated
stationId	Workstation.id	Y	A	
currentQuantity	LoadUnit.InventoryUnit.quantity		N	Only set if QTY_CORRECTION is done
clarificationAction	LoadUnit.clarificationAction (new field)		ENUM	Possible values: • QTY_CORRECTION • SKU_ SUBSTITUTION • ORDER_RESTART • BOX_CHANGED • BOX_TYPE_CHANGED • WRONG_SKU_ADDED • STORING_OUT_OF_STOCK • CP_NOT_PRESENT_IN_BOX • ICE_QUANTITY_NOT_CORRECT
clarificationOperator	User.id	Y	A	The current log-in user at the clarification station.
skuId	Sku.id	Y	A	The sku id of the sku which is reworked
skuDescription	Sku.description	Y	A	
substitutionSKU			A	SKU that it is being substituted with. Only set if SKU_ SUBSTITUTION is done
substitutionQuantity			N	Quantity that it is substituted with. Only set if SKU_ SUBSTITUTION is done

3.12 Fact: HFBStockInOutFact

Purpose

This Fact informs about the Stock-In and Stock-Out.

Triggers

- Stock out is selected by the operator (mode=StockOut)
- New Stock was announced by the Host (mode=StockIn)

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
stationId	Workstation.id	Y	A	The workstation Id where the stock was changed.
area	Workstation.location.area	Y	A	The area the workstation is assigned to.
skuId	SKU.Id	Y	A	The sku id where the stockout or stockin was initiated.
Description	SKU.description	Y	A	The sku description where the stockout or stockin was initiated.
locationId	Location.id	Y	A	The location where the stockout or stockin was initiated.
userId	User.id		A	Only in case of stockout. This can be the userId or the cardId.
currentTime	Timestamp	Y	DT	Timestamp of this event
modes		Y	ENUM	Possible values: • STOCK_OUT • STOCK_IN

3.13 Fact: HFBTransportTrackingFact

Purpose

Track the initial and updated planned transports for each box. With this for one box several facts can be sent. For example, when reaching the Addon stations, then destinations/stations of only Addon-Station-Type are sent. Later when reaching the hybrid lines the destinations/station of it will be sent.

Triggers

- When initially a transport route is planned for a box.
- Evertime when DiQ changes the initial determined original transports.

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
orderId	Order.orderId	Y	A	Unique ID of the order
loadUnitId	Order.loadUnit.id	Y	A	Unique ID of the box
loadUnitType	Order.loadUnit.luType	Y	A	Type of the box (e.g. small, medium, large)
currentTime	Timestamp	Y	DT	Timestamp when this fact is generated
locationOfDecision	LoadUnit.currentLocation	Y	A	The location (also called area, see above) where the calculation was done.
reasonForDestinationChange			ENUM	Possible values: • NEW • UPDATE
destinations			CMPLX	Gives the complete open transport route for the box.

ComplexType: destinations

Attribute Name	DiQ Field	M	Type	Description
Sequence	IntermediateDestination.sequence	Y	N	Sequence in which the box arrives at different stations.
Destination	IntermediateDestination.location	Y	A	The locations where the box will be sent. Possible locations are: • Printers and dispensers • Picking stations • QC stations • OOS buffer • Shipping label printers • Sorter chutes • etc

3.14 Fact: HFBUserTrackingFact

Purpose

Overview of user login and logout at specific workstations.

Triggers

- When a user login to a station (mode=LOGIN)
- When a user logoff from a station (mode=LOGOFF)

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
stationId	Workstation.id		A	Unique identifier of the workstation, where the user logged in or logged off. Empty, when the current terminal is not assigned to a workstation.
area	Workstation.location.area		A	The area the workstation is belonging to.
userId	User.id	Y	A	In case of card-scan this could be cardId.
currentTime	Timestamp	Y	DT	Timestamp when this fact is generated
modes		Y	ENUM	Possible values: • LOGIN • LOGOFF

3.15 Fact: HFBWeightAdjustmentFact

Purpose

This Fact informs about the weight change (gross weight) by an operator.

Triggers

- Gross-Weight set or changed by an operator

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
skuId	Sku.skuId	Y	A	The sku for which the weight was changed.
skuDescription	Sku.description	Y	A	The sku description for which the weight was changed
userId	User.id	Y	A	This can be the userId or the cardId.
currentTime	Timestamp	Y	DT	Timestamp when this fact is generated
newWeight		Y	N	The new weight.

3.16 Fact: HFBWorkstationStatusFact

Purpose

This Fact informs about status of a workstation changed.

Triggers

- The status of a workstation changed

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
stationId	Workstation.id	Y	A	Workstation Id of the station
status	Workstation.Status	Y	A	The new status of the workstation. This could be: ● ACTIVE_MANNED ● ACTIVE_NO_REPLEN ● ACTIVE_NO_REAR_REPLEN ● ACTIVE_NOT_MANNED ● CLOSED_WITH_CLEAR_DOWN ● CLOSED_WITH_CLEAR_DOWN_TO_RACK ● CLOSED_WITH_ACTIVE_REPLEN ● AVAILABLE ● PAUSED ● CLOSED
currentTime	Timestamp	Y	DT	Timestamp when this fact is generated

3.17 Fact: NOKIntervalFact (DiQ Standard Fact)

NoKIntervals are the result of STAX messages in the Dematic controls interface (DCI), which is used by all Dematic material handling equipment. NokInterval messages contain all of the fault information from the PLC. One record is written out at the completion of a fault (once the fault has ended).

For a system to produce NoKIntervals, it must produce STAX messages.

For HelloFresh STAX is supported for Multishuttle and depends on PLC Design.

Attribute Name	DiQ Field	M	Type	Description
tuId			string	The load unit ID. Explicitly set via STAX telegram since only the STAX carries the detailed fault information and the TUID.
startTime		Y	datetime	Date/time that the NOK period started as reported by the STAT telegram. ADC format (ISO 8601): 2020-02-25T02:55:35.658+01:00 Text file format: 2020-02-25 02:55:35.658
endTime			datetime	Date/time that the NOK period ended as reported by the STAT telegram. ADC format (ISO 8601): 2020-02-25T02:55:35.658+01:00 Text file format: 2020-02-25 02:55:35.658
AcknowledgeTime			datetime	Date/time that the repair was started as reported by the STAT telegram. ADC format (ISO 8601): 2020-02-25T02:55:35.658+01:00 Text file format: 2020-02-25 02:55:35.658
faultRepairTime			integer	The duration between the Acknowledgement Time and the End Time of the fault in milliseconds.
faultDuration			integer	The total duration of the fault in milliseconds.
faultCode		Y	long	The code of the fault that occurred. If the classification is not Fault (see below), use 0 as the faultCode for this record.

Attribute Name	DiQ Field	M	Type	Description
classification			string/ NokIntervalClassificationType	The type of NokInterval event that occurred. Fault: the default if status is FL in the STAT telegram Planned_Downtime (offline): the default if status is OF in the STAT telegram Planned_Maintenance: the default if status is MA in the STAT telegram Lock: the default if there is a dispositive lock
deviceId		Y	string	The device identifier for the logical device.
locationId			string	The (virtual) location corresponding to the device. For ConveyorElements, there is no generic navigation to a location. It must be configured explicitly during the configuration of the conveyor element.
relevance			long	If classification == fault, this parameter specifies the relevance of the fault for Dematic: 0 .. 100 A value of 0 means that the fault is not relevant. Default value: 100 if classification == fault; otherwise, 0.
weightFactor			double	Weight factor of the fault for calculating the site availability.
UserComment			string	Text added by a user of the system.
mtsType			string/ MeansOfTransportType	Means of Transport. e.g. AGV, VEHICLE, DEPALLETIZER, MONORAIL, SORTER, CONVEYOR, FLS, MULTISHUTTLE, STACKERCRANE. For systems that use multiple components for one function, a module name is used. For example, if a site installs multiple cranes of different types (e.g. Mini Load - ML, Unit Load - UL) from a single source system, the module name is used to identify that type of stacker crane. e.g. STACKERCRANE-ML, STACKERCRANE-UL

Attribute Name	DiQ Field	M	Type	Description
tenantName			string	Identifies the tenant associated with a third-party logistics provider.
Record_Timestamp_Offset			datetime with offset	Format: 2020-07-21 12:56:06.727 -04:00 JSON format: embedded in existing time fields (startTime, endTime etc)
hardwareIdentifier			string	MAC address of the shuttle device. Also known as the Physical Device ID.
skuId			String	Identifies a SKU

3.18 Fact: HFBWeightTrackingPickingFact

Purpose

This Fact informs about the measured weight of a load unit and expected content.

Triggers

- On every event where box weight is measured at scales.

Notes

In TargetMinWeight, TargetMaxWeight, and TargetWeight, value will be sent how are you yeah i'm goodNULL after QC clarification and also when there will not be any weight calculation due to no picks in the respective area.

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
orderId	Order.orderId	Y	A	Unique ID of the order
targetMinWeight			N	Target minimum weight of the load unit
targetMaxWeight			N	Target maximum weight of the load unit
targetWeight			N	Target (calculated) weight of the load unit
locationId	LoadUnit.currentLocation.Id	Y	A	Unique ID of the location
locationAlias	LoadUnit.currentLocation.Alias		A	Alias of the location
currentTime		Y	DT	Current system timestamp when the Fact was created
picks			CMPLX	List of picked sku’s
measuredWeight			N	Weight of the box measured by PLC scale
loadUnitID			A	Unique ID of the load unit
ignoredLightWeight			N	Ignored weight for the current scale
standardUpperDeviation			N	Added deviation to the calculated upper tolerance
standardLowerDeviation			N	Subtracted deviation to the calculated upper tolerance

ComplexType: picks

Attribute Name	DiQ Field	M	Type	Description
skuId	pick.sku.skuId	Y	A	Unique ID of the stock keeping unit
qtyPicked	pick.quantityPicked	Y	N	Quantity of the picked sku's
skuWeight		Y	N	Weight of the single sku item
workstationId			A	Unique ID of the workstation
workstationAlias			A	Alias of the workstation

3.19 Fact: HFBSystemStatusFact

Purpose

This Fact is for analytical purposes, data with regards to the system setting and corresponding box entry in various areas across the site.

Triggers

- On every HFBSystemStatusDemon run.

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
currentTime		Y	DT	Current system timestamp when the Fact was created
requiredQuantityInHL		Y	N	Max quantity of pending picks in hybrid line area
picksQuantityInHL		Y	N	Number of open picks in hybrid line area without boxes in OoS buffer
picksQuantityInOoSBuffer		Y	N	Number of open picks in OoS buffer
maxCapacityInHL		Y	N	Max number of boxes in hybrid line area
boxesQuantityInHL		Y	N	Number of boxes in hybrid line area without OoS buffer (based on the configuration) and QC boxes
boxesQuantityInOoSBuffer		Y	N	Number of boxes in OoS buffer
costs			CMPLX	List of workstations with costs data
numberOfPickers		Y	N	Number of pickers logged into PBL system
cartonErectorToBolStringOneBoxes		Y	N	Number of boxes from carton erector to BOL string 1 Locations: **From CCBL01IS0[1-3] to CCCP01DP98**
cartonErectorToBolStringTwoBoxes		Y	N	Number of boxes from carton erector to BOL string 2 Locations: **From CCBL01IS0[4-6] to CCCP02DP98**
boxesBetweenBolAndIce		Y	N	Number of boxes in connecting conveyor between BOL and ICE including ICE QC boxes Locations: **CCCP0[1-2]DP99**
iceStringOneBoxes		Y	N	Number of boxes in ice string 1 Locations: **From CCIC01DP91 and before CCIC01DP94**
iceStringTwoBoxes		Y	N	Number of boxes in ice string 2 Locations: **From CCIC01DP95 and before CCIC01DP97**
boxesBetweenIceAndAddonBypass		Y	N	Number of boxes in connecting conveyor between ICE and AddOn / bypass including ICE QC boxes Locations: **CCIC01DP94, CCIC01DP97, CCAO01NP91, CCAO01NP92, CCAO01NP93 and CCAO01CS01**
hybridLineBypassToHybridBoxes		Y	N	Number of boxes on the HL bypass line from ICE to Hybrid

Attribute Name	DiQ Field	M	Type	Description
				Locations: **CCAO01DP91 and CCAO01DP98**
addOnBoxes		Y	N	Number of boxes in addon Locations: **From CCAO01DP92 and before CCAO01DP96**
boxesBetweenAddOnAndHybrid		Y	N	Number of boxes in connecting conveyor between AddOn and Hybrid including AddOn QC boxes Locations: **From CCAO01DP96 and before CCTA01DP04**
hybridAreaBoxes		Y	N	Number of boxes in hybrid area including QC and OOS buffer Locations: **From CCTA01DP0[3-4] and before CCSP01LC[1-5]0**
lidderToEndOfChutesBoxes		Y	N	Number of boxes between lidder and end of chutes Locations: **CCSP01LC[1-5]0 to FXCH0110[01-19]**

ComplexType: costs

Attribute Name	DiQ Field	M	Type	Description
stationId	workstation.id	Y	A	Workstation Id
stationAlias	workstation.displayedId	Y	A	Workstation alias
workstationCost		Y	N	Cost of workstation
stringCost		Y	N	Cost of workstation's string

3.20 Fact: MFCTraceFact

Purpose

This Fact tracks box movements with each telegram sent by PLC.

Triggers

Every Telegerm sent by PLC to track box movements.

Attribute Descriptions

Attribute Name	DiQ Field	M	Type	Description
sourceLocation		Y	A	Load unit original location
currentLocation		Y	A	Load unit current location
destination		Y	A	Load unit next destination
loadUnitId		Y	A	Unique ID of the box
length		Y	N	Load unit measured length
width		Y	N	Load unit measured width
height		Y	N	Load unit measured height
weight		Y	N	Load unit measured weight
eventCode		Y	A	Event code sent by PLC (OK, DN, BO, ….)
contour		Y	A	Contour data sent by PLC
reasonCode		Y	A	Reason code sent by PLC
responseTime		Y	N	Telegram response time
operationId		Y	A	Telegram operation id (TUDR, TUNO, TURP, TUMI)
actionTime		Y	DT	Telegram create date