GS1 US EPCIS Recommendations for FSMA 204 Critical Tracking Events

Release 1.0, March 12 2024
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## Document Summary

<table>
<thead>
<tr>
<th>Document Item</th>
<th>Current Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Document Title</strong></td>
<td>EPCIS Recommendations for FSMA 204 Critical Tracking Events</td>
</tr>
<tr>
<td><strong>Date Last Modified</strong></td>
<td>March 12, 2024</td>
</tr>
<tr>
<td><strong>Document Description</strong></td>
<td>This document supplements the Retail Grocery and Foodservice Application of GS1 System of Standards to Support FSMA 204 Guideline and seeks to show how the EPCIS standard could be leveraged to capture certain supply chain events and what information from those events can be used to supplement the needed data for FSMA 204 CTEs (Critical Tracking Events) and KDEs (Key Data Elements).</td>
</tr>
</tbody>
</table>
1 Introduction

In July 2020, the FDA announced its 10-year plan to improve food safety, *The New Era of Smarter Food Safety*. This is a framework to "respond more rapidly to outbreaks, address new business models, reduce contamination of food, and foster the development of food safety cultures." It encourages the use of technology, improved traceability, and establishes a food safety culture throughout all members of the supply chain. For more information go to: https://www.fda.gov/food/new-era-smarter-food-safety.

On November 21, 2022, the United States Food and Drug Administration (FDA) published a Final Rule titled, Requirements for Additional Traceability Records for Certain Foods, which is a key component of the FDA's New Era of Smarter Food Safety Blueprint and implements Section 204(d) of the FDA Food Safety Modernization Act (FSMA), which was signed into law in 2011. This rule is commonly referred to as "FSMA 204". Throughout the remainder of this document, 'Final Rule' and FSMA 204 will be used interchangeably as shorthand for referring to this regulation.

EPCIS (Electronic Product Code Information Services) is the flagship data capture and sharing standard from GS1 specifically developed for enabling full supply chain visibility both inside organizations and between trading partners. It does so by providing a framework to model events that occur in supply chains as they truly happen, including "what" supply chain objects are involved, "where" and "when" the events take place, and "why" the events occurred, such as the business process, related transaction documents, and more.

This document seeks to show how the EPCIS standard could be leveraged to capture certain supply chain events and what information from those events can be used to supplement the needed data for FSMA 204 CTEs (Critical Tracking Events) and KDEs (Key Data Elements). Each of the FSMA 204 CTEs are represented in this document with links to accompanying EPCIS example data. The FSMA 204 CTEs are the following:

- Harvest
- Cooling
- Initial Packing
- Transformation
- Shipping
- Receiving
- First Land-Based Receiver

1.1 How to Use This Document

When reviewing sections of this document that are directly related to providing example EPCIS event data, these specific sections contain the following information:

- Which FSMA 204 CTE the section covers
- A description of the provided event data and how it models data that can be used to provide the necessary KDEs each CTE requires.
- EPCIS 2.0 JSON format event data examples that represent captured supply chain events related to FSMA 204 CTEs and KDEs

Mapping tables describing each FSMA 204 KDE for each CTE and corresponding EPCIS event fields and field value types.
1.2 Concepts in Example EPCIS Data

The EPCIS standard is designed to capture when and where supply chain objects are involved in many different processes, including when they are created and when they are transferred between trading partners and locations. When reviewing data requirements for FSMA 204 CTEs and KDEs in the context of EPCIS, it is important to understand what KDEs might be captured in a single EPCIS event rather than two or more EPCIS events.

Depending on the CTE, the full list of KDEs required could be associated with multiple supply chain processes, and therefore would best be captured with multiple EPCIS events.

One example of this concept that will be shown here will be the EPCIS example that could support the data requirements for a Harvest CTE. As outlined in the Final Rule Subpart S – Additional Traceability Records for Certain Foods, for the Harvest CTE, the following Key Data Elements must be captured:

- Commodity and, if applicable, variety of the food
- Quantity and unit of measure of the food
- Location description for the farm where the food was harvested
- For produce:
  - Name of the field or other growing area from which the food was harvested (must correspond to the name used by the grower), or
  - Other information identifying the harvest location at least as precisely as field or growing area name
- For aquacultured food:
  - Name of the container (e.g., pond, pool, tank, cage) from which the food was harvested (must correspond to the container name used by the aquaculture farmer), or
  - Other information identifying the harvest location at least as precisely as the container name
- Date of harvesting
- Reference document type and reference document number
- Location description for the immediate subsequent recipient (other than a transporter) of the food

Most of this required information will be captured during the harvesting of new food that will be introduced into the supply chain. However, the final KDE in the list above for detailing the capturing of the next recipient of the food implies a post-harvest transfer of the food to this location. In EPCIS, this would translate to representing this data with one EPCIS event documenting the harvesting of the food, and an immediate follow-up EPCIS event detailing the transfer of the food to the next recipient per the rule.

In the graphic below showing the flow of whole produce from the harvesting of the produce to final receiving at a retailer, the Harvest CTE encompasses the harvest itself at the field and/or greenhouse locations, as well as the solid/dotted lines indicating a transfer of the newly harvested produce to the immediate subsequent recipient, which would be a cooling/packing location.

To summarize, the EPCIS examples shown in this document illustrate a concept of gathering EPCIS event data captured during processes where supply chain objects are either created or transferred to a new location and assembling them together for data needed in a FSMA 204 CTE.
WHOLE PRODUCE

- #1 Produce Seed Company/Harvester (Owns and grows the produce)

  Field(s)
  1. Harvest CTE

  Greenhouse(s)
  1. Harvest CTE

  Cooling Facility/Packing House
  2. Cooling CTE
  3. Initial Packing CTE (Traceability Lot Code Source)
  4. Shipping CTE

SALAD

- Repacker (Processor)
- Distributor
- Retailer
- Store
  10 Receiving CTE
- Operator
- Restaurant
  10 Receiving CTE

Retailer or distributor could own the distribution center

**Transformation could occur over 1 or more steps**
2 Harvest CTE

The EPCIS JSON document below provides example EPCIS visibility event data that could be captured in support of a FSMA 204 Harvest CTE for raw agricultural commodities not obtained from a fishing vessel.

The document is constructed with two EPCIS events that provide the traceability data outlined in the Harvest CTE description.

The first of these events describes the harvest process KDEs required by the FSMA 204 rule, such as the location of the harvest, harvest date, reference documents, and commodity identifier, and is indicated by the business step value of ‘creating_class_instance’.

The second of these events describes a capturing of the newly harvested food being transferred from the harvest location to an immediate subsequent recipient, which is another KDE required by the U.S. FDA for the Harvest CTE. This is indicated in the event with the business step value of ‘transporting’.

All mappings of KDEs required to be gathered for the Harvest CTE to EPCIS event fields are described in the mapping table following the JSON example.

⚠️ Note: In the EPCIS example for this CTE, the identifiers for the harvested commodities are of a GTIN + Batch/Lot canonical Digital Link. It is noted that the Harvest CTE per FSMA 204 only requires commodity and, if applicable, variety level identification of food in this CTE, but this guidance recommends using an identifier with a trade item and a batch/lot back to the harvest whenever possible to ensure that during a traceability request, food that is initially packed can more thoroughly be associated to a harvest from a particular date and location.
{ "@context": [ "https://ref.gs1.org/standards/epcis/2.0.0/epcis-context.jsonld" ],
"type": "EPCISDocument",
"schemaVersion": "2.0",
"creationDate": "2023-10-25T17:02:27.452Z",
"epcisBody": {
"eventList": [
{ //EPCIS event capturing the harvesting of the food
  "type": "ObjectEvent",
  "eventTime": "2023-10-24T00:00:00-04:00",
  "recordTime": "2023-10-24T00:00:00-04:00",
  "eventTimeZoneOffset": "-04:00",
  "eventID": "urn:uuid:32e4e2a2-5794-4315-9962-9b05979ad01f",
  "action": "ADD",
  "bizStep": "creating_class_instance",
  "disposition": "active",
  "readPoint": {
    "id": "https://id.gs1.org/414/9521234560005"
  },
  "bizLocation": {
    "id": "https://id.gs1.org/414/9521234560005"
  },
  "bizTransactionList": [
    {
      "type": "prodorder",
      "bizTransaction": "urn:epcglobal:cbv:bt:9521234560005:5555"
    }
  ],
  "quantityList": [
    {
      "epcClass": "https://id.gs1.org/01/99521234561111/10/abc1234",
      "quantity": 1000,
      "uom": "LBR"
    }
  ]
},
{ //EPCIS event capturing the transferring of the food to immediate subsequent recipient
  "type": "ObjectEvent",
  "eventTime": "2023-10-25T00:00:00-04:00",
  "recordTime": "2023-10-25T00:00:00-04:00",
  "eventTimeZoneOffset": "-04:00",
  "eventID": "urn:uuid:3e131a0f-e919-4615-b0dc-e7441c0cc3f3",
  "readPoint": {
    "id": "https://id.gs1.org/414/9521234560005"
  },
  "bizLocation": {
    "id": "https://id.gs1.org/414/9521234560005"
  },
  "bizTransactionList": [
    {
      "type": "prodorder",
      "bizTransaction": "urn:epcglobal:cbv:bt:9521234560005:5555"
    }
  ],
  "quantityList": [
    {
      "epcClass": "https://id.gs1.org/01/99521234561111/10/abc1234",
      "quantity": 1000,
      "uom": "LBR"
    }
  ]
}]}
"action": "OBSERVE",
"bizStep": "transporting",
"disposition": "in_transit",
"readPoint": {
    "id": "https://id.gs1.org/414/9521234560005"
},
"quantityList": [
    {
        "epcClass": "https://id.gs1.org/01/99521234561111/10/abc1234",
        "quantity": 1000,
        "uom": "LBR"
    }
],
"sourceList": [
    {
        "type": "owning_party",
        "source": "https://id.gs1.org/417/9521234572220"
    }
],
"destinationList": [
    {
        "type": "location",
        "destination": "https://id.gs1.org/414/9521234560111"
    }
]
# Harvest KDE Mapping Table

<table>
<thead>
<tr>
<th>FSMA 204 Harvest KDE</th>
<th>EPCIS Event Business Step</th>
<th>EPCIS Event Field</th>
<th>EPCIS Event Field Value Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location description for the farm where the food was harvested</td>
<td>creating_class_instance</td>
<td>readPoint</td>
<td>Location GLN*</td>
</tr>
<tr>
<td>Commodity and, if applicable, variety of the food</td>
<td>creating_class_instance</td>
<td>quantityList, epcClass</td>
<td>GTIN**</td>
</tr>
<tr>
<td>Quantity of the food</td>
<td>creating_class_instance</td>
<td>quantityList, quantity</td>
<td>xsd:double</td>
</tr>
<tr>
<td>Unit of Measure</td>
<td>creating_class_instance</td>
<td>quantityList, uom</td>
<td>UOM</td>
</tr>
<tr>
<td>Date of harvesting</td>
<td>creating_class_instance</td>
<td>eventTime</td>
<td>xsd:dateTimeStamp</td>
</tr>
<tr>
<td>Reference document type</td>
<td>creating_class_instance</td>
<td>bizTransactionList, type</td>
<td>BusinessTransactionTypeID</td>
</tr>
<tr>
<td>Reference document number</td>
<td>creating_class_instance</td>
<td>bizTransactionList, bizTransaction</td>
<td>BusinessTransactionID</td>
</tr>
<tr>
<td>Location description for the immediate subsequent recipient (other than a transporter) of the food</td>
<td>transporting</td>
<td>destinationList, destination, type = location</td>
<td>Location GLN*</td>
</tr>
<tr>
<td>Business Name, Phone Number</td>
<td>transporting</td>
<td>sourceList, source, type = owning_party</td>
<td>Party GLN*</td>
</tr>
</tbody>
</table>

* The location and party GLNs serve as the location and party identifiers for EPCIS event data. Specific location and party details would be considered master data of these identifiers and exchanged outside the EPCIS event data.

** The GTIN serves as the commodity identifier for EPCIS event data. For the Commodity KDE, this guidance recommends utilizing the importClassificationTypeCode and importClassificationValue attributes supplemented by the functionalName attribute. This set of attributes can be further augmented by the gpcCategoryCode which is an attribute for expressing the GS1 Global Product Classification (GPC) code value, a product classification scheme already required by GDSN and GDM. These attributes would be considered the master data of the EPCIS identifier.
3  Cooling CTE

The EPCIS JSON document below provides example EPCIS visibility event data that could be captured in support of a FSMA 204 Cooling CTE for raw agricultural commodities not obtained from a fishing vessel.

The document is constructed with four EPCIS events that provide the traceability data outlined in the Cooling CTE description.

The first event describes the harvested food being received at the cooling facility and the farm from which the food came from. This is indicated in the event by the business step value of ‘receiving’.

The second and third events describe the cooling process KDEs required by the FSMA 204 rule, including when the previously harvested commodity, quantity and UOM of such, enter and exit the cooling location within the cooling facility. The business step of ‘arriving’ is used to indicate that the food is entering the specific cooling location in the cooling facility, and the business step of ‘departing’ is used to indicate that the food is being removed from the specific cooling location in the cooling facility. With EPCIS 2.0, optional sensor-based temperature information could also be provided in these events to detail the temperature of the cooling location at the start and end of the cooling process.

The fourth of these events describes a capturing of the cooled food being transferred from the cooling location to an immediate subsequent recipient. This is indicated in the event with a business step of ‘transporting’.

All mappings of KDEs required to be gathered for the Cooling CTE to EPCIS event fields are described in the mapping table following the JSON example.
{  "@context": [    "https://ref.gs1.org/standards/epcis/2.0.0/epcis-context.jsonld"  ],  "type": "EPCISDocument",  "schemaVersion": "2.0",  "creationDate": "2023-10-27T17:02:27.452Z",  "epcisBody": {    "eventList": [      /* EPCIS event capturing food being received at cooling facility */      {        "type": "ObjectEvent",        "eventTime": "2023-10-25T00:00:00-04:00",        "recordTime": "2023-10-25T00:00:00-04:00",        "eventTimeZoneOffset": "-04:00",        "eventID": "urn:uuid:d5029150-5ce9-4ca2-a301-df6c786dd6a",        "action": "OBSERVE",        "bizStep": "receiving",        "disposition": "in_progress",        "readPoint": {          "id": "https://id.gs1.org/414/9521234560111"        },        "bizLocation": {          "id": "https://id.gs1.org/414/9521234560111"        },        "bizTransactionList": [          {            "type": "recadv",            "bizTransaction": "urn:epcglobal:cbv:bt:9521234560111:861-100037169"          }        ],        "quantityList": [          {            "epcClass": "https://id.gs1.org/01/9952123456111/10/abc1234",            "quantity": 1000,            "uom": "LBR"          }        ],        "sourceList": [          {            "type": "owning_party",            "source": "https://id.gs1.org/417/9521234572220"          },          {            "type": "location",            "source": "https://id.gs1.org/417/9521234572220"          }        ]      }    ]  }}
"source": "https://id.gs1.org/414/9521234560005"
],
"destinationList": [
{
"type": "location",
"destination": "https://id.gs1.org/414/9521234560005"
}
],
//EPCIS event capturing food entering cooling location in facility
"type": "ObjectEvent",
"eventTime": "2023-10-26T00:00:00-04:00",
"recordTime": "2023-10-26T00:00:00-04:00",
"eventTimeZoneOffset": "-04:00",
"eventID": "urn:uuid:17f33eac-7abd-4a39-b64c-683746572a35",
"action": "OBSERVE",
"bizStep": "arriving",
"disposition": "in_progress",
"readPoint": {
"id": "https://id.gs1.org/414/9521234560111/254/12345"
},
"bizLocation": {
"id": "https://id.gs1.org/414/9521234560111"
},
"quantityList": [
{
"epcClass": "https://id.gs1.org/01/99521234561111/10/abc1234",
"quantity": 1000,
"uom": "LBR"
}
],
//EPCIS event capturing food exiting cooling location in facility
"type": "ObjectEvent",
"eventTime": "2023-10-27T00:00:00-04:00",
"recordTime": "2023-10-27T00:00:00-04:00",
"eventTimeZoneOffset": "-04:00",
"eventID": "urn:uuid:8dff1b82-e7b6-4db6-ac1b-de1d87bbde69",
"action": "OBSERVE",
"bizStep": "departing",
"disposition": "in_progress",
"readPoint": {
"id": "https://id.gs1.org/414/9521234560111/254/12345"


},
"bizLocation": {
  "id": "https://id.gs1.org/414/9521234560111"
},
"quantityList": [
  {
    "epcClass": "https://id.gs1.org/01/99521234561111/10/abc1234",
    "quantity": 1000,
    "uom": "LBR"
  }
],
"//EPCIS event capturing food being transferred to immediate subsequent recipient
"type": "ObjectEvent",
"eventTime": "2023-10-27T00:00:00-04:00",
"recordTime": "2023-10-27T00:00:00-04:00",
"eventTimeZoneOffset": "-04:00",
"eventID": "urn:uuid:e43bfcf2-b383-4042-b82a-48e3748c612d",
"action": "OBSERVE",
"bizStep": "transporting",
"disposition": "in_transit",
"readPoint": {
  "id": "https://id.gs1.org/414/9521234560111"
},
"quantityList": [
  {
    "epcClass": "https://id.gs1.org/01/99521234561111/10/abc1234",
    "quantity": 1000,
    "uom": "LBR"
  }
],
"sourceList": [
  {
    "type": "location",
    "source": "https://id.gs1.org/414/9521234560111"
  }
],
"destinationList": [
  {
    "type": "location",
    "destination": "https://id.gs1.org/414/9520244560128"
  }
]
**Cooling KDE Mapping Table**

<table>
<thead>
<tr>
<th>FSMA 204 Cooling KDE</th>
<th>EPCIS Event Business Step</th>
<th>EPCIS Event Field</th>
<th>EPCIS Event Field Value Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location description for the farm where the food was harvested</td>
<td>receiving</td>
<td>sourceList, source</td>
<td>Location GLN*</td>
</tr>
<tr>
<td>Commodity and, if applicable, variety of the food</td>
<td>receiving, arriving, departing, transporting</td>
<td>quantityList, epcClass</td>
<td>GTIN**</td>
</tr>
<tr>
<td>Quantity of the food</td>
<td>receiving, arriving, departing, transporting</td>
<td>quantityList, quantity</td>
<td>xsd:double</td>
</tr>
<tr>
<td>Unit of Measure</td>
<td>receiving, arriving, departing, transporting</td>
<td>quantityList, uom</td>
<td>UOM</td>
</tr>
<tr>
<td>Date of cooling</td>
<td>receiving, arriving, departing</td>
<td>eventTime</td>
<td>xsd:dateTimeStamp</td>
</tr>
<tr>
<td>Location description for where you cooled the food</td>
<td>receiving, arriving, departing, transporting</td>
<td>readPoint</td>
<td>Location GLN*</td>
</tr>
<tr>
<td>Reference document type</td>
<td>receiving</td>
<td>bizTransactionList, type</td>
<td>BusinessTransactionTypeID</td>
</tr>
<tr>
<td>Reference document number</td>
<td>receiving</td>
<td>bizTransactionList, bizTransaction</td>
<td>BusinessTransactionID</td>
</tr>
<tr>
<td>Location description for the immediate subsequent recipient (other than a transporter) of the food</td>
<td>transporting</td>
<td>destinationList, destination, type = location</td>
<td>Location GLN*</td>
</tr>
</tbody>
</table>

* The location GLN serves as the location identifier for EPCIS event data. Specific location details would be considered master data of this identifier and exchanged outside the EPCIS event data.

** The GTIN serves as the commodity identifier for EPCIS event data. For the Commodity KDE, this guidance recommends utilizing the importClassificationTypeCode and importClassificationValue attributes supplemented by the functionalName attribute. This set of attributes can be further augmented by the gpcCategoryCode which is an attribute for expressing the GS1 Global Product Classification (GPC) code value, a product classification scheme already required by GDSN and GDM. These attributes would be considered the master data of the EPCIS identifier.
4 Initial Packing CTE

The EPCIS JSON document below provides example EPCIS visibility event data that could be captured in support of a FSMA 204 Initial Packing CTE for raw agricultural commodities not obtained from a fishing vessel.

The document is constructed with all EPCIS events previously described for harvesting and cooling (FSMA 204 requires this data to be provided to the initial packer except for reference documents), as well as a receiving EPCIS event detailing the date the food was received by the initial packer, indicated by the business step value of 'receiving', and a Transformation type event modelling the packing of the raw commodity and the assignment of a Traceability Lot Code, indicated by the business step value of 'creating_class_instance'.

All mappings of KDEs required to be gathered for the Initial Packing CTE to EPCIS event fields are described in the mapping table following the JSON example.
{
    "@context": [
        "https://ref.gs1.org/standards/epcis/2.0.0/epcis-context.jsonld"
    ],
    "type": "EPCISDocument",
    "schemaVersion": "2.0",
    "creationDate": "2023-10-29T17:02:27.452Z",
    "epcisBody": {
        "eventList": [
            //Start of previously provided Harvest CTE events
            "type": "ObjectEvent",
            "eventTime": "2023-10-24T00:00:00-04:00",
            "recordTime": "2023-10-24T00:00:00-04:00",
            "eventTimeZoneOffset": "-04:00",
            "eventID": "urn:uuid:32e4e2a2-5794-4315-9962-9b05979ad01f",
            "action": "ADD",
            "bizStep": "creating_class_instance",
            "disposition": "active",
            "readPoint": {
                "id": "https://id.gs1.org/414/9521234560005"
            },
            "bizLocation": {
                "id": "https://id.gs1.org/414/9521234560005"
            },
            "quantityList": [
                {
                    "epcClass": "https://id.gs1.org/01/99521234561111/10/abc1234",
                    "quantity": 1000,
                    "uom": "LBR"
                }
            ],
            {
                "type": "ObjectEvent",
                "eventTime": "2023-10-25T00:00:00-04:00",
                "recordTime": "2023-10-25T00:00:00-04:00",
                "eventTimeZoneOffset": "-04:00",
                "eventID": "urn:uuid:3e131a0f-e919-4615-b0dc-e7441c0cc3f3",
                "action": "OBSERVE",
                "bizStep": "transporting",
                "disposition": "in_transit",
                "readPoint": {
                    "id": "https://id.gs1.org/414/9521234560005"
                }
            }
        ]
    }
}
"quantityList": [
  {
    "epcClass": "https://id.gs1.org/01/99521234561111/10/abc1234",
    "quantity": 1000,
    "uom": "LBR"
  }
],
"sourceList": [
  {
    "type": "owning_party",
    "source": "https://id.gs1.org/417/9521234572220"
  },
  {
    "type": "location",
    "source": "https://id.gs1.org/414/9521234560005"
  }
],
"destinationList": [
  {
    "type": "location",
    "destination": "https://id.gs1.org/414/9521234560111"
  }
],

//Start of previously provided Cooling CTE events
"type": "ObjectEvent",
"eventTime": "2023-10-25T00:00:00-04:00",
"recordTime": "2023-10-25T00:00:00-04:00",
"eventTimeZoneOffset": "-04:00",
"eventID": "urn:uuid:d5029150-5ce9-4ca2-a301-df6c786ddb6a",
"action": "OBSERVE",
"bizStep": "receiving",
"disposition": "in_progress",
"readPoint": {
  "id": "https://id.gs1.org/414/9521234560111"
},
"bizLocation": {
  "id": "https://id.gs1.org/414/9521234560111"
},
"quantityList": [
  {
    "epcClass": "https://id.gs1.org/01/99521234561111/10/abc1234",
    "quantity": 1000,
    "uom": "LBR"
"sourceList": [
  {
    "type": "owning_party",
    "source": "https://id.gs1.org/417/9521234572220"
  },
  {
    "type": "location",
    "source": "https://id.gs1.org/414/9521234560005"
  }
],
"destinationList": [
  {
    "type": "location",
    "destination": "https://id.gs1.org/414/9521234560111"
  }
],

{ "type": "ObjectEvent",
  "eventTime": "2023-10-26T00:00:00-04:00",
  "recordTime": "2023-10-26T00:00:04:00",
  "eventTimeZoneOffset": "-04:00",
  "eventID": "urn:uuid:17f33eac-7abd-4a39-b64c-683746572a35",
  "action": "OBSERVE",
  "bizStep": "arriving",
  "disposition": "in_progress",
  "readPoint": {
    "id": "https://id.gs1.org/414/9521234560111/254/12345"
  },
  "bizLocation": {
    "id": "https://id.gs1.org/414/9521234560111"
  },
  "quantityList": [
    {
      "epcClass": "https://id.gs1.org/01/99521234561111/10/abc1234",
      "quantity": 1000,
      "uom": "LBR"
    }
  ]
}
"eventTime": "2023-10-27T00:00:00-04:00",
"recordTime": "2023-10-27T00:00:00-04:00",
"eventTimeZoneOffset": "-04:00",
"eventID": "urn:uuid:8dff1b82-e7b6-4db6-ac1b-de1d87bbde69",
"action": "OBSERVE",
"bizStep": "departing",
"disposition": "in_progress",
"readPoint": {
  "id": "https://id.gs1.org/414/9521234560111/12345"
},
"bizLocation": {
  "id": "https://id.gs1.org/414/9521234560111"
},
"quantityList": [
  {
    "epcClass": "https://id.gs1.org/01/99521234561111/10/abc1234",
    "quantity": 1000,
    "uom": "LBR"
  }
],
"type": "ObjectEvent",
"eventTime": "2023-10-27T00:00:00-04:00",
"recordTime": "2023-10-27T00:00:00-04:00",
"eventTimeZoneOffset": "-04:00",
"eventID": "urn:uuid:e43bfcf2-b383-4042-b82a-48e3748c612d",
"action": "OBSERVE",
"bizStep": "transporting",
"disposition": "in_transit",
"readPoint": {
  "id": "https://id.gs1.org/414/9521234560111"
},
"quantityList": [
  {
    "epcClass": "https://id.gs1.org/01/99521234561111/10/abc1234",
    "quantity": 1000,
    "uom": "LBR"
  }
],
"sourceList": [
  {
    "type": "location",
    "source": "https://id.gs1.org/414/9521234560111"
"destinationList": [
{
"type": "location",
"destination": "https://id.gs1.org/414/9520244560128"
}]
],

// EPCIS event capturing the receiving of food at packing location
"type": "ObjectEvent",
"eventTime": "2023-10-28T00:00:00-04:00",
"recordTime": "2023-10-28T00:00:00-04:00",
"eventTimeZoneOffset": "-04:00",
"eventID": "urn:uuid:9e646956-f352-499a-a3c5-1fb46833fa02",
"action": "OBSERVE",
"bizStep": "receiving",
"disposition": "in_progress",
"readPoint": {
"id": "https://id.gs1.org/414/9520244560128"
},
"bizLocation": {
"id": "https://id.gs1.org/414/9520244560128"
},
"quantityList": [
{
"epcClass": "https://id.gs1.org/01/99521234561111/10/abc1234",
"quantity": 1000,
"uom": "LBR"
}
],
"sourceList": [
{
"type": "location",
"source": "https://id.gs1.org/414/9521234560111"
}
],
"destinationList": [
{
"type": "location",
"destination": "https://id.gs1.org/414/9520244560128"
}
]}
{ //EPCIS event capturing creation of Traceability Lot Code
  "type": "TransformationEvent",
  "eventTime": "2023-10-29T00:00:00-04:00",
  "recordTime": "2023-10-29T00:00:00-04:00",
  "eventTimeZoneOffset": "-04:00",
  "eventID": "urn:uuid:3ca7044a-7e8f-4136-b4f2-cbfed5c797bc",
  "inputQuantityList": [
    {
      "epcClass": "https://id.gs1.org/01/99521234561111/10/abc1234",
      "quantity": 1000,
      "uom": "LBR"
    }
  ],
  "outputQuantityList": [
    {
      "epcClass": "https://id.gs1.org/01/19522224560224/10/abc1234",
      "quantity": 500,
      "uom": "CS"
    }
  ],
  "bizStep": "creating_class_instance",
  "disposition": "active",
  "readPoint": {
    "id": "https://id.gs1.org/414/9520244560128"
  },
  "bizLocation": {
    "id": "https://id.gs1.org/414/9520244560128"
  },
  "bizTransactionList": [
    {
      "type": "prodorder",
      "bizTransaction": "urn:epcglobal:cbv:bt:9520244560128:555555"
    }
  ]
}
## Initial Packing KDE Mapping Table

<table>
<thead>
<tr>
<th>FSMA 204 Initial Packing KDE</th>
<th>EPCIS Event Business Step</th>
<th>EPCIS Event Field</th>
<th>EPCIS Event Field Value Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvesting KDEs</td>
<td>See Harvest CTE</td>
<td>See Harvest CTE</td>
<td>See Harvest CTE</td>
</tr>
<tr>
<td>Cooling KDEs</td>
<td>See Cooling CTE</td>
<td>See Cooling CTE</td>
<td>See Cooling CTE</td>
</tr>
<tr>
<td>Date you received the food</td>
<td>receiving</td>
<td>receiving</td>
<td>xsd:dateTimeStamp</td>
</tr>
<tr>
<td>Quantity of food received</td>
<td>receiving</td>
<td>quantityList, quantity</td>
<td>xsd:double</td>
</tr>
<tr>
<td>Unit of Measure of food received</td>
<td>receiving</td>
<td>quantityList, uom</td>
<td>UOM</td>
</tr>
<tr>
<td>Quantity of the packed food</td>
<td>creating_class_instance</td>
<td>inputQuantityList, quantity</td>
<td>xsd:double</td>
</tr>
<tr>
<td>Unit of Measure of the packed food</td>
<td>creating_class_instance</td>
<td>inputQuantityList, uom</td>
<td>UOM</td>
</tr>
<tr>
<td>Date of initial packing</td>
<td>creating_class_instance</td>
<td>eventTime</td>
<td>xsd:dateTimeStamp</td>
</tr>
<tr>
<td>Location description</td>
<td>creating_class_instance</td>
<td>readPoint</td>
<td>Location GLN*</td>
</tr>
<tr>
<td>Commodity and, if applicable, variety of the food received</td>
<td>receiving</td>
<td>quantityList, epcClass</td>
<td>GTIN**</td>
</tr>
<tr>
<td>Traceability lot code you assigned</td>
<td>creating_class_instance</td>
<td>outputQuantityList, epcClass</td>
<td>GTIN + Batch/Lot**</td>
</tr>
<tr>
<td>Product Description of the packed food</td>
<td>creating_class_instance</td>
<td>outputQuantityList, epcClass</td>
<td>GTIN**</td>
</tr>
</tbody>
</table>
* The location GLN serves as the location identifier for EPCIS event data. Specific location details would be considered master data of this identifier and exchanged outside the EPCIS event data.

** The GTIN and GTIN + Batch/Lot serve as the commodity identifier and Traceability Lot Code identifier of packed food for EPCIS event data. For the Commodity KDE, this guidance recommends utilizing the importClassificationTypeCode and importClassificationValue attributes supplemented by the functionalName attribute. This set of attributes can be further augmented by the gpcCategoryCode which is an attribute for expressing the GS1 Global Product Classification (GPC) code value, a product classification scheme already required by GDSN and GDM. The product description of the packed food can be accessed by a lookup of the GTIN component of the GTIN + Batch/Lot identifier used for the Traceability Lot Code.

<table>
<thead>
<tr>
<th>FSMA 204 Initial Packing KDE</th>
<th>EPCIS Event Business Step</th>
<th>EPCIS Event Field</th>
<th>EPCIS Event Field Value Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference document type</td>
<td>creating_class_instance</td>
<td>bizTransactionList, type</td>
<td>BusinessTransactionTypeID</td>
</tr>
<tr>
<td>Reference document number</td>
<td>creating_class_instance</td>
<td>bizTransactionList, bizTransaction</td>
<td>BusinessTransactionID</td>
</tr>
</tbody>
</table>
5 Transformation CTE

The EPCIS document below provides example EPCIS visibility event data that could be captured in support of a FSMA 204 Transformation CTE.

The document models the transformation of food used as ingredients into newly produced food from those ingredients. It is comprised of a single EPCIS event, which details the date and location of the transformation, the traceability lot codes of each of the ingredient foods, the traceability lot code of the new food, and the quantities and unit of measures of all ingredients and the new food.

All mappings of KDEs required to be gathered for the Transformation CTE to EPCIS event fields are described in the mapping table following the JSON example.
{  
  "@context": [  
    "https://ref.gs1.org/standards/epcis/2.0.0/epcis-context.jsonld",  
    {  
      "gs1:bestBeforeDate": {"@type":"xsd:date"}  
    }  
  ],  
  "type": "EPCISDocument",  
  "schemaVersion": "2.0",  
  "creationDate": "2023-09-14T11:30:47.022Z",  
  "epcisBody": {  
    "eventList": [  
      //Event for transforming ingredient food into new food  
      {"type": "TransformationEvent",  
        "eventTime": "2023-10-31T00:00:00-04:00",  
        "recordTime": "2023-10-31T00:00:04:00",  
        "eventTimeZoneOffset": "-04:00",  
        "inputQuantityList": [ //Foods used as ingredients  
          {  
            "epcClass": "https://id.gs1.org/01/19522224560224/10/abc1234",  
            "quantity": 100,  
            "uom": "CS"  
          },  
          {  
            "epcClass": "https://id.gs1.org/01/19522224560323/10/abc1234",  
            "quantity": 100,  
            "uom": "CS"  
          },  
          {  
            "epcClass": "https://id.gs1.org/01/19522224560422/10/abc1234",  
            "quantity": 100,  
            "uom": "CS"  
          }  
        ],  
        "outputQuantityList": [ //New food produced  
          {  
            "epcClass": "https://id.gs1.org/01/19522224512353/10/abc1234",  
            "quantity": 100,  
            "uom": "CS"  
          }  
        ],  
        "bizStep": "creating_class_instance",  
        "disposition": "active",  
        "readPoint": {  
          //Other event details...  
        }  
      }  
    ]  
  }
"id": "https://id.gs1.org/414/9522224512356"
},
"bizLocation": {
  "id": "https://id.gs1.org/414/9522224512356"
},
"bizTransactionList": [
  {
    "type": "prodorder",
    "bizTransaction": "urn:epcglobal:cbv:bt:9520244560128:55555"
  }
],
"ilmd": {
  "gs1:bestBeforeDate": "2023-09-10"
}
]
## Transformation KDE Mapping Table

<table>
<thead>
<tr>
<th>FSMA 204 Transformation KDE</th>
<th>EPCIS Event Business Step</th>
<th>EPCIS Event Field</th>
<th>EPCIS Event Field Value Type</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>KDEs for food used as ingredients</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traceability lot code for the food</td>
<td>creating_class_instance</td>
<td>inputQuantityList, epcClass</td>
<td>GTIN + Batch/Lot**</td>
</tr>
<tr>
<td>Product description for the food to which the traceability lot code applies</td>
<td>creating_class_instance</td>
<td>inputQuantityList, epcClass</td>
<td>GTIN**</td>
</tr>
<tr>
<td>For each traceability lot used, the quantity and unit of measure of the food used from that lot</td>
<td>creating_class_instance</td>
<td>quantityList, quantity, uom</td>
<td>xsd:double, UOM</td>
</tr>
<tr>
<td><strong>KDEs for new food produced</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New traceability lot code for the food</td>
<td>creating_class_instance</td>
<td>outputQuantityList, epcClass</td>
<td>GTIN + Batch/Lot**</td>
</tr>
<tr>
<td>Location description for where you transformed the food (i.e., the traceability lot code source), and (if applicable) the traceability lot code source reference</td>
<td>creating_class_instance</td>
<td>readPoint</td>
<td>Location GLN*</td>
</tr>
<tr>
<td>Date transformation was completed</td>
<td>creating_class_instance</td>
<td>eventTime</td>
<td>xsd:dateTimeStamp</td>
</tr>
<tr>
<td>Product description for the food</td>
<td>creating_class_instance</td>
<td>outputQuantityList, epcClass</td>
<td>GTIN + Batch/Lot**</td>
</tr>
<tr>
<td>Quantity and unit of measure of the food</td>
<td>creating_class_instance</td>
<td>outputQuantityList, quantity, uom</td>
<td>xsd:double, UOM</td>
</tr>
<tr>
<td>Reference document type</td>
<td>creating_class_instance</td>
<td>bizTransactionList, type</td>
<td>BusinessTransactionTypeID</td>
</tr>
<tr>
<td>Reference document number</td>
<td>creating_class_instance</td>
<td>bizTransactionList, bizTransaction</td>
<td>BusinessTransactionID</td>
</tr>
</tbody>
</table>

* The location GLN serves as the location identifier for EPCIS event data. Specific location details would be considered master data of this identifier and exchanged outside the EPCIS event data.

** The GTIN + Batch/Lot serves as the Traceability Lot Code identifier of ingredient and transformed foods for EPCIS event data. The product description of the food can be accessed by a lookup of the GTIN component of the GTIN + Batch/Lot identifier used for the Traceability Lot Code. By utilizing the GTIN as a part of the Traceability Lot Code KDE, companies can link to the other channels they are already utilizing for exchanging attributes with trading partners which describe food products. The GTIN can act as the bridge between the two different data sets when pulling together for an U.S. FDA request under the Final Rule.
6  Shipping CTE

The EPCIS document below provides example EPCIS visibility event data that could be captured in support of a FSMA 204 Shipping CTE.

The document models the shipping of three distinct Traceability Lot Codes to a downstream recipient. It consists of two chronologically ordered EPCIS events.

The first EPCIS event provides previously captured details of the origins of one of three shipped Traceability Lot Codes, covering the requirement of including the Traceability Lot Code Source Reference for the Shipping CTE. This event data can be a version of the initial packing event with any sensitive information redacted that is not required by the FSMA 204 to be included in the Shipping CTE. For brevity, only one of the three Traceability Lot Code creation events is included.

The second EPCIS event models the shipping of a specified amount of the three Traceability Lot Codes to a downstream location. Two of the Traceability Lot Codes are of the same GTIN, but different Batch/Lots, and the third is of a different GTIN and Batch/Lot than the first two. This event also references an SSCC that the Traceability Lot Codes are said to be contained in for transport, such as a pallet, and this example assumes and expects that a previous aggregation step has established the parent-child relationship of the SSCC and the Traceability Lot Codes.

All mappings of KDEs required to be gathered for the Shipping CTE to EPCIS event fields are described in the mapping table following the JSON example.
{  
"@context": [
    "https://ref.gs1.org/standards/epcis/2.0.0/epcis-context.jsonld"
],  
"type": "EPCISDocument",
"schemaVersion": "2.0",
"creationDate": "2023-11-02T20:36:49.005Z",
"epcisBody": {
  "eventList": [
    {  
      //EPCIS event including TLC Source Reference of a shipped TLC
      "type": "TransformationEvent",
      "eventTime": "2023-11-01T00:00:00-04:00",
      "recordTime": "2023-11-01T00:00:00-04:00",
      "eventTimeZoneOffset": "-04:00",
      "eventID": "urn:uuid:4898a223-216a-4f46-9e18-338ccf6fa3ba",
      "inputQuantityList": [
        {  
          "epcClass": "https://id.gs1.org/01/99521234561111/10/abc1234",
          "quantity": 250,
          "uom": "LBR"
        }
      ],
      "outputQuantityList": [
        {  
          "epcClass": "https://id.gs1.org/01/19522224560224/10/abc1234",
          "quantity": 25,
          "uom": "CS"
        }
      ],
      "bizStep": "creating_class_instance",
      "disposition": "active",
      "readPoint": {  
        "id": "https://id.gs1.org/414/9520244560128"
      },
      "bizLocation": {  
        "id": "https://id.gs1.org/414/9520244560128"
      }
    },
    {  
      //EPCIS event capturing the shipping of three TLCs
      "type": "AggregationEvent",
      "eventTime": "2023-11-02T00:00:00-04:00",
      "recordTime": "2023-11-02T00:00:00-04:00",
      "eventTimeZoneOffset": "-04:00",
      "eventID": "urn:uuid:49afe832-5171-432d-99c4-6dc003255ee1",
      "inputQuantityList": [],
      "outputQuantityList": [],
      "bizStep": "transporting_class_instance",
      "disposition": "active",
      "readPoint": {  
        "id": "https://id.gs1.org/414/9520244560128"
      },
      "bizLocation": {  
        "id": "https://id.gs1.org/414/9520244560128"
      }
    }
  ]
}
"parentID": "https://id.gs1.org/00/095202445601288457",
"action": "OBSERVE",
"bizStep": "shipping",
"disposition": "in_transit",
"readPoint": {
  "id": "https://id.gs1.org/414/9520244564515"
},
"bizTransactionList": [
  {
    "type": "desadv",
    "bizTransaction": "urn:epcglobal:cbv:bt:9520244560128:861-10037169"
  },
  {
    "type": "bol",
    "bizTransaction": "urn:epcglobal:cbv:bt:9520244560128:861-101037170"
  }
],
"childQuantityList": [
  {
    "epcClass": "https://id.gs1.org/01/19522224560224/10/abc1234",
    "quantity": 25,
    "uom": "CS"
  },
  {
    "epcClass": "https://id.gs1.org/01/19522224560224/10/abc5678",
    "quantity": 25,
    "uom": "CS"
  },
  {
    "epcClass": "https://id.gs1.org/01/19522224555558/10/abc1234",
    "quantity": 25,
    "uom": "CS"
  }
],
"sourceList": [
  {
    "type": "location",
    "source": "https://id.gs1.org/414/9520244560128"
  }
],
"destinationList": [
  {
    "type": "location",
    "destination": "https://id.gs1.org/414/9523344564515"
### Shipping KDE Mapping Table

<table>
<thead>
<tr>
<th>FSMA 204 Shipping KDE</th>
<th>EPCIS Event Business Step</th>
<th>EPCIS Event Field</th>
<th>EPCIS Event Field Value Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location description for the location from which you shipped the food</td>
<td>shipping</td>
<td>readPoint</td>
<td>Location GLN*</td>
</tr>
<tr>
<td>Traceability lot code for the food</td>
<td>shipping</td>
<td>childQuantityList, epcClass</td>
<td>GTIN + Batch/Lot**</td>
</tr>
<tr>
<td>Quantity and unit of measure of the food</td>
<td>shipping</td>
<td>childQuantityList, quantity, uom</td>
<td>xsd:double, UOM</td>
</tr>
<tr>
<td>Product description for the food</td>
<td>shipping</td>
<td>childQuantityList, epcClass</td>
<td>GTIN + Batch/Lot**</td>
</tr>
<tr>
<td>Location description for the immediate subsequent recipient (other than a transporter) of the food</td>
<td>shipping</td>
<td>destinationList, destination, type = location</td>
<td>Location GLN*</td>
</tr>
<tr>
<td>Date you shipped the food</td>
<td>shipping</td>
<td>eventTime</td>
<td>xsd:dateTimeStamp</td>
</tr>
<tr>
<td>Location description for the traceability lot code source or the traceability lot code source reference</td>
<td>creating_class_instance</td>
<td>readPoint</td>
<td>Location GLN*</td>
</tr>
<tr>
<td>Reference document type</td>
<td>shipping</td>
<td>bizTransactionList, type</td>
<td>BusinessTransactionTypeID</td>
</tr>
<tr>
<td>Reference document number</td>
<td>shipping</td>
<td>bizTransactionList, bizTransaction</td>
<td>BusinessTransactionID</td>
</tr>
</tbody>
</table>

* The location GLN serves as the location identifier for EPCIS event data. Specific location details would be considered master data of these identifiers and exchanged outside the EPCIS event data.

** The GTIN + Batch/Lot serves as the Traceability Lot Code identifier of packed food for EPCIS event data. The product description of the packed food can be accessed by a lookup of the GTIN component of the GTIN + Batch/Lot identifier used for the Traceability Lot Code. By utilizing the GTIN as a part of the Traceability Lot Code KDE, companies can link to the other channels they are already utilizing for exchanging attributes with trading partners which describe food products. The GTIN can act as the bridge between the two different data sets when pulling together for an U.S. FDA request under the Final Rule.
7 Receiving CTE

The EPCIS JSON document below provides example EPCIS visibility event data that could be captured in support of a FSMA 204 Receiving CTE.

The document models the receiving of three distinct Traceability Lot Codes by a downstream recipient. It consists of two chronologically ordered EPCIS events.

The first EPCIS event provides previously captured details of the origins of one of three received Traceability Lot Codes, covering the requirement of including the Traceability Lot Code Source Reference for the Receiving CTE. This event data can be a version of the initial packing event with any sensitive information redacted that is not required by the FSMA 204 to be included in the Receiving CTE. For brevity, only one of the three Traceability Lot Code creation events is included.

The second EPCIS event models the receiving of a specified amount of the three Traceability Lot Codes by a downstream location. Two of the Traceability Lot Codes are of the same GTIN, but different Batch/Lots, and the third is of a different GTIN and Batch/Lot than the first two. This event also references an SSCC that the Traceability Lot Codes are said to be contained in for transport, such as a pallet, and this example assumes and expects that a previous aggregation step upstream has established the parent-child relationship of the SSCC and the Traceability Lot Codes.

All mappings of KDEs required to be gathered for the Receiving CTE to EPCIS event fields are described in the mapping table following the JSON example.
{  
  "@context": [  
    "https://ref.gs1.org/standards/epcis/2.0.0/epcis-context.jsonld"  
  ],  
  "type": "EPCISDocument",  
  "schemaVersion": "2.0",  
  "creationDate": "2023-11-02T00:36:49.005Z",  
  "epcisBody": {  
    "eventList": [  
      {  
        // EPCIS event including TLC Source Reference of a received TLC  
        "type": "TransformationEvent",  
        "eventTime": "2023-11-01T00:00:00-04:00",  
        "recordTime": "2023-11-01T00:00:00-04:00",  
        "eventTimeZoneOffset": "-04:00",  
        "eventID": "urn:uuid:4898a223-216a-4f46-9e18-338ccf6fa3ba",  
        "inputQuantityList": [  
          {  
            "epcClass": "https://id.gs1.org/01/99521234561111/10/abc1234",  
            "quantity": 250,  
            "uom": "LBR"  
          }  
        ],  
        "outputQuantityList": [  
          {  
            "epcClass": "https://id.gs1.org/01/19522224560224/10/abc1234",  
            "quantity": 25,  
            "uom": "CS"  
          }  
        ],  
        "bizStep": "creating_class_instance",  
        "disposition": "active",  
        "readPoint": {  
          "id": "https://id.gs1.org/414/9520244560128"  
        },  
        "bizLocation": {  
          "id": "https://id.gs1.org/414/9520244560128"  
        }  
      },  
      {  
        // EPCIS event capturing the receiving of three TLCs  
        "type": "AggregationEvent",  
        "eventTime": "2023-11-02T00:00:00-04:00",  
        "recordTime": "2023-11-02T00:00:00-04:00",  
        "eventTimeZoneOffset": "-04:00",  
        "eventID": "urn:uuid:49afe832-5171-432d-99c4-6dc003255ee1",  
        "inputQuantityList": [  
          {  
            "epcClass": "https://id.gs1.org/01/99521234561111/10/abc1234",  
            "quantity": 250,  
            "uom": "LBR"  
          }  
        ],  
        "outputQuantityList": [  
          {  
            "epcClass": "https://id.gs1.org/01/19522224560224/10/abc1234",  
            "quantity": 25,  
            "uom": "CS"  
          }  
        ]  
      }  
    ]  
  }  
}
"parentID": "https://id.gs1.org/00/095202445601288457",
"action": "OBSERVE",
"bizStep": "receiving",
"disposition": "in_progress",
"readPoint": {
  "id": "https://id.gs1.org/414/9523344564515"
},
"bizLocation": {
  "id": "https://id.gs1.org/414/9523344564515"
},
"bizTransactionList": [
  {
    "type": "recadv",
    "bizTransaction": "urn:epcglobal:cbv:bt:9523344564515:861-100037169"
  }
],
"childQuantityList": [
  {
    "epcClass": "https://id.gs1.org/01/19522224560224/10/abc1234",
    "quantity": 25,
    "uom": "CS"
  },
  {
    "epcClass": "https://id.gs1.org/01/19522224560224/10/abc5678",
    "quantity": 25,
    "uom": "CS"
  },
  {
    "epcClass": "https://id.gs1.org/01/19522224555558/10/abc1234",
    "quantity": 25,
    "uom": "CS"
  }
],
"sourceList": [
  {
    "type": "location",
    "source": "https://id.gs1.org/414/9520244560128"
  }
],
"destinationList": [
  {
    "type": "location",
    "destination": "https://id.gs1.org/414/9523344564515"
  }
]
### Receiving KDE Mapping Table

<table>
<thead>
<tr>
<th>FSMA 204 Receiving KDE</th>
<th>EPCIS Event Business Step</th>
<th>EPCIS Event Field</th>
<th>EPCIS Event Field Value Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location description for where the food was received</td>
<td>receiving</td>
<td>readPoint</td>
<td>Location GLN*</td>
</tr>
<tr>
<td>Date you received the food</td>
<td>receiving</td>
<td>eventTime</td>
<td>xsd:dateTimeStamp</td>
</tr>
<tr>
<td>Location description for the immediate previous source (other than a transporter) for the food</td>
<td>receiving</td>
<td>sourceList, source, type = location</td>
<td>Location GLN*</td>
</tr>
<tr>
<td>Traceability lot code for the food</td>
<td>receiving</td>
<td>childQuantityList, epcClass</td>
<td>GTIN + Batch/Lot**</td>
</tr>
<tr>
<td>Quantity and unit of measure of the food</td>
<td>receiving</td>
<td>childQuantityList, quantity, uom</td>
<td>xsd:double, UOM</td>
</tr>
<tr>
<td>Product description for the food</td>
<td>receiving</td>
<td>childQuantityList, epcClass</td>
<td>GTIN + Batch/Lot**</td>
</tr>
<tr>
<td>Location description for the traceability lot code source or the traceability lot code source reference</td>
<td>creating_class_instance</td>
<td>readPoint</td>
<td>Location GLN*</td>
</tr>
<tr>
<td>Reference document type</td>
<td>receiving</td>
<td>bizTransactionList, type</td>
<td>BusinessTransactionTypeID</td>
</tr>
<tr>
<td>Reference document number</td>
<td>receiving</td>
<td>bizTransactionList, bizTransaction</td>
<td>BusinessTransactionID</td>
</tr>
</tbody>
</table>

* The location GLN serves as the location identifier for EPCIS event data. Specific location details would be considered master data of these identifiers and exchanged outside the EPCIS event data.

** The GTIN + Batch/Lot serves as the Traceability Lot Code identifier of packed food for EPCIS event data. The product description of the packed food can be accessed by a lookup of the GTIN component of the GTIN + Batch/Lot identifier used for the Traceability Lot Code. By utilizing the GTIN as a part of the Traceability Lot Code KDE, companies can link to the other channels they are already utilizing for exchanging attributes with trading partners which describe food products. The GTIN can act as the bridge between the two different data sets when pulling together for an U.S. FDA request under the Final Rule.
8 First Land-Based Receiver CTE

The EPCIS JSON document below provides example EPCIS visibility event data that could be captured in support of a FSMA 204 First Land-Based Receiver CTE.

The document models the assigning of a Traceability Lot Code of food by a first land-based receiver. It consists of a single EPCIS event, and for the Traceability Lot Code assigned, it details required data for the FSMA 204 rule, including the date range of the food harvest and the Food and Agriculture Organization of the United Nations defined area where the food was caught.

All mappings of KDEs required to be gathered for the First Land-Based Receiver CTE to EPCIS event fields are described in the mapping table following the JSON example.
```json
{
  "@context": [
    "https://ref.gs1.org/standards/epcis/2.0.0/epcis-context.jsonld",
    {
      "gs1:harvestDateStart": {"@type":"xsd:date"},
      "gs1:harvestDateEnd": {"@type":"xsd:date"}
    }
  ],
  "type": "EPCISDocument",
  "schemaVersion": "2.0",
  "creationDate": "2023-09-20T18:46:56.887Z",
  "epcisBody": {
    "eventList": [
      {
        "type": "ObjectEvent",
        "eventTime": "2023-09-20T00:00:00-04:00",
        "recordTime": "2023-09-20T00:00:00-04:00",
        "eventTimeZoneOffset": "-04:00",
        "action": "ADD",
        "bizStep": "creating_class_instance",
        "disposition": "active",
        "readPoint": {
          "id": "https://id.gs1.org/414/9521234560005"
        },
        "bizLocation": {
          "id": "https://id.gs1.org/414/9521234560005"
        },
        "bizTransactionList": [
          {
            "type": "recadv",
            "bizTransaction": "urn:epcglobal:cbv:bt:9521234560005:861-100037169"
          },
          {
            "type": "po",
            "bizTransaction": "urn:epcglobal:cbv:bt:9521234560005:861-100037170"
          },
          {
            "type": "cert",
            "bizTransaction": "urn:epcglobal:cbv:bt:9521234560005:861-100037171"
          }
        ],
        "quantityList": [
          {
            "epcClass": "https://id.gs1.org/01/99521234500028/10/abc1234",
```
"quantity": 1000,
"uom": "LBR"
}
],
"ilmd": {
"cbvmda:vesselCatchInformationList": {
"cbvmda:vesselCatchInformation": {
"cbvmda:catchArea": "21.4R"
}
},
"gs1:harvestDateEnd": "2023-09-20",
"gs1:harvestDateStart": "2023-09-18"
}
]}
}
### First Land-Based Receiver KDE Mapping Table

<table>
<thead>
<tr>
<th>FSMA 204 First Land-Based Receiver KDE</th>
<th>EPCIS Event Business Step</th>
<th>EPCIS Event Field</th>
<th>EPCIS Event Field Value Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location description for the first land-based receiver (i.e., traceability lot code source), and (if applicable) traceability lot code source reference</td>
<td>creating_class_instance</td>
<td>readPoint</td>
<td>Location GLN*</td>
</tr>
<tr>
<td>Locations for the trip during which the food was caught</td>
<td>creating_class_instance</td>
<td>ilmd, catchArea</td>
<td>FAO Code, other</td>
</tr>
<tr>
<td>Harvest date range</td>
<td>creating_class_instance</td>
<td>ilmd, harvestDateStart, harvestDateEnd</td>
<td>xsd:date</td>
</tr>
<tr>
<td>Date the food was landed</td>
<td>creating_class_instance</td>
<td>eventTime</td>
<td>xsd:dateTimeStamp</td>
</tr>
<tr>
<td>Quantity and unit of measure of the food</td>
<td>creating_class_instance</td>
<td>childQuantityList, quantity, uom</td>
<td>xsd:double, UOM</td>
</tr>
<tr>
<td>Traceability lot code you assigned</td>
<td>creating_class_instance</td>
<td>childQuantityList, epcClass</td>
<td>GTIN + Batch/Lot**</td>
</tr>
<tr>
<td>Species and/or acceptable market name for unpackaged food, or the product description for packaged food</td>
<td>creating_class_instance</td>
<td>childQuantityList, epcClass</td>
<td>GTIN**</td>
</tr>
<tr>
<td>Reference document type</td>
<td>creating_class_instance</td>
<td>bizTransactionList, type</td>
<td>BusinessTransactionTypeID</td>
</tr>
<tr>
<td>Reference document number</td>
<td>creating_class_instance</td>
<td>bizTransactionList, bizTransaction</td>
<td>BusinessTransactionID</td>
</tr>
</tbody>
</table>

* The location GLN serves as the location identifier for EPCIS event data. Specific location details would be considered master data of these identifiers and exchanged outside the EPCIS event data.

** The GTIN + Batch/Lot serves as the Traceability Lot Code identifier assigned by the first land-based receiver in EPCIS event data. The product description of the food can be accessed by a lookup of the GTIN component of the GTIN + Batch/Lot identifier used for the Traceability Lot Code. By utilizing the GTIN as a part of the Traceability Lot Code KDE, companies can link to the other channels they are already utilizing for exchanging attributes with trading partners which describe food products. The GTIN can act as the bridge between the two different data sets when pulling together for an U.S. FDA request under the Final Rule.
9 Alternative EPCIS Data Formats

The EPCIS document examples provided in sections 2 through 8 are constructed in the JSON data format and conform to EPCIS 2.0. Support for JSON/JSON-LD is a significant addition to the EPCIS standard and was added to provide a more lightweight data format more familiar to the current generation of software development professionals as well as to enable easier integration of EPCIS data with data from other systems. EPCIS 2.0 also provides additional standard fields to include sensor-based information in a new ‘How’ dimension, such as temperature data that can be included in cold storage applications.

It is noted that existing implementations of EPCIS may currently use the XML data format as well as EPCIS 1.2 for use cases such as capturing data related to the DSCSA (Drug Supply Chain Security Act). All EPCIS examples listed above can be represented in XML rather than JSON. Additionally, all object and location/party identifiers in these examples leverage GS1 Digital Link URIs that are natively interoperable with GS1 element strings in barcodes. These can be used in place of traditional EPC URNs in EPCIS 2.0 format events.

The GS1 EPCIS Sandbox online utility can be used to convert example EPCIS data between versions and data formats, as well as build EPCIS event examples in a user interface. This resource is reachable in this link: EPCIS Sandbox | Home (gs1.org)
10 Additional Resources

- EPCIS and CBV Standards - [https://www.gs1.org/standards/epcis](https://www.gs1.org/standards/epcis)
  - The EPCIS Standard in its entirety can be found here, as well as the accompanying CBV standard, containing all information and vocabulary for populating/formatting EPCIS fields.

- Additional EPCIS Examples - [https://ref.gs1.org/docs/epcis/examples](https://ref.gs1.org/docs/epcis/examples)
  - Additional general EPCIS examples can be found here, in JSON format as well as XML format.

- EPCIS and CBV Implementation Guideline - [https://ref.gs1.org/guidelines/epcis-cbv/2.0.0/](https://ref.gs1.org/guidelines/epcis-cbv/2.0.0/)
  - Guideline on all concepts of implementing the EPCIS and CBV standards, including EPCIS event modelling considerations, querying EPCIS event data, and sharing EPCIS event data between trading partners.

- EPCIS Sandbox - [https://ref.gs1.org/tools/epcis-sandbox/](https://ref.gs1.org/tools/epcis-sandbox/)
  - The EPCIS Sandbox is a tool that can be used to generate example EPCIS 2.0 JSON or XML event data from field values entered in an intuitive user interface, as well as a format converter to take EPCIS 1.2 or 2.0 in JSON or XML and convert between combinations of those standard versions and data structures.

- EPCIS Example JSON Files from this Document
  - The example JSON data in the sections above has been lightly annotated for additional clarity. Click here to download a zip file containing individual JSON files for each CTE without annotations.
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