

To enable track and trace for aggregation, disaggregation, and relabelling events a new type of event <tLinkEvent> is proposed to the draft proposal draft-thompson-esds-schema-03. The proposed schema changes are outlined below:

```
<xs:complexType name="tAbstractEvent" abstract="true">
  <xs:sequence>
    <xs:element
      name="objectID"
      type="esds:tObjectID" />
    <xs:element
      name="sourceTS"
      type="xs:dateTime" />
    <xs:element
      name="messageDigest"
      type="esds:tMessageDigest"
      minOccurs="0" />
    <xs:element
      name="extension"
      type="esds:tExtension"
      minOccurs="0" />
  </xs:sequence>
</xs:complexType>

<xs:complexType name="tEventTypeChoice">
  <xs:choice>
    <xs:element
      name="objectEvent"
      type="esds:tObjectEvent" />
    <xs:element
      name="linkEvent"
      type="esds:tLinkEvent" />
  </xs:choice>
</xs:complexType>

<xs:complexType name="tObjectEvent">
  <xs:complexContent>
    <xs:extension base="esds:tAbstractEvent">
      <xs:sequence>
        <xs:element
          name="lifeCycleStepID"
          type="esds:tLifeCycleStepID" />
        <xs:element
          name="serviceIDList"
          type="esds:tServiceIDList"
          minOccurs="0" />
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>

<xs:complexType name="tLinkEvent">
  <xs:complexContent>
    <xs:extension base="esds:tAbstractEvent">
      <xs:sequence>
        <xs:element
          name="linkObjectID"
          type="esds:tObjectID" />
        <xs:element
          name="linkSupplyChainItemList"
          type="esds:tSupplyChainItemList"
          minOccurs="0" />
        <xs:element
          name="linkDiscoveyServiceURI"
          type="esds:tServiceURI"
          minOccurs="0" />
      </xs:sequence>
    </xs:extension>
  </xs:complexContent>
</xs:complexType>
```

Legend:



An event being published to DS for object with identifier 1. Two arrows following each other implies the sequence of the events, the time lapse between the two events does not have any restrictions.

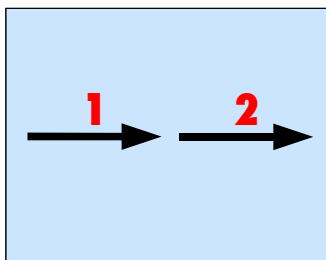


Coloured background refers to a supply-chain, so if the background colour changes it means that the object has moved from one supply-chain to another.

The final goal is that all scenarios will be fully tracable by an authorized users. No Scenario should result in a broken chain in following the sequence of events on the object of interest.

The XML ESDS commands given in the examples are incomplete and only contain relative information (not all required attributes and elements are present).

Relabelling: e.g. object 1 is relabelled to object 2



Broken chain scenario (sorted by event source timestamp):

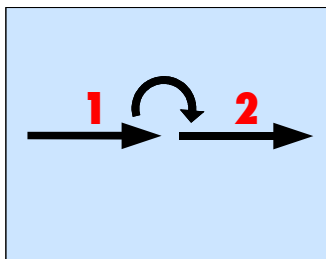
```
<EventCreateIn>
  <objectEvent><objectID>1</objectID></objectEvent>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>2</objectID></objectEvent>
</EventCreateIn>
```

Lookup on Object ID 1 will return:

```
<EventLookupOut>
  <objectEvent><objectID>1</objectID></objectEvent>
</EventLookupOut>
```

Lookup on Object ID 2 will return:

```
<EventLookupOut>
  <objectEvent><objectID>2</objectID></objectEvent>
</EventLookupOut>
```



Directional linked (sorted by event source timestamp):

```
<EventCreateIn>
  <objectEvent><objectID>1</objectID></objectEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>2</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>2</objectID></objectEvent>
</EventCreateIn>
```

Lookup on Object ID 1 will return:

```
<EventLookupOut>
```

```

    <objectEvent><objectID>1</objectID></objectEvent>
    <linkEvent>
      <objectID>1</objectID><linkObjectID>2</linkObjectID>
    </linkEvent>
  </EventLookupOut>
</EventLookupOut>

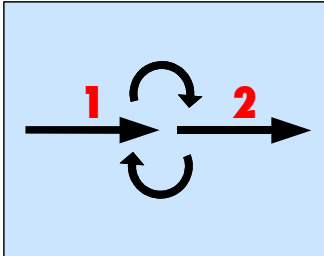
```

Lookup on Object ID 2 will return:

```

<EventLookupOut>
  <objectEvent><objectID>2</objectID></objectEvent>
</EventLookupOut>

```



Double linked (sorted by event source timestamp):

```

<EventCreateIn>
  <objectEvent><objectID>1</objectID></objectEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>2</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>2</objectID><linkObjectID>1</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>2</objectID></objectEvent>
</EventCreateIn>

```

Lookup on Object ID 1 will return:

```

<EventLookupOut>
  <objectEvent><objectID>1</objectID></objectEvent>
  <linkEvent><objectID>1</objectID><linkObjectID>2</linkObjectID>
</EventLookupOut>

```

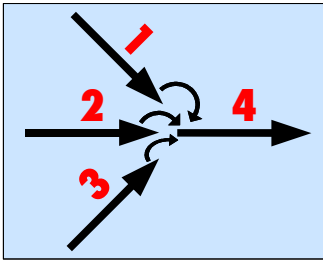
Lookup on Object ID 2 will return:

```

<EventLookupOut>
  <objectEvent><objectID>2</objectID></objectEvent>
  <linkEvent>
    <objectID>2</objectID><linkObjectID>1</linkObjectID>
  </linkEvent>
</EventLookupOut>

```

Aggregation: e.g. objects 1,2,3 are put together into a new package labelled 4



Directional linked forward (sorted by event source timestamp):

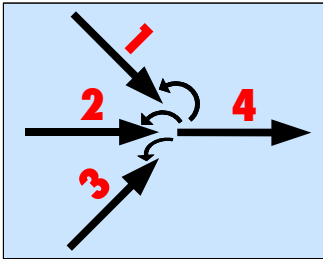
```
<EventCreateIn>
  <objectEvent><objectID>1</objectID></objectEvent>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>2</objectID></objectEvent>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>3</objectID></objectEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>4</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>2</objectID><linkObjectID>4</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>3</objectID><linkObjectID>4</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>4</objectID></objectEvent>
</EventCreateIn>
```

Lookup on Object ID 1 will return:

```
<EventLookupOut>
  <objectEvent><objectID>1</objectID></objectEvent>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>4</linkObjectID>
  </linkEvent>
</EventLookupOut>
```

Lookup on Object ID 4 will return:

```
<EventLookupOut>
  <objectEvent><objectID>4</objectID></objectEvent>
</EventLookupOut>
```



Directional linked backward (sorted by event source timestamp):

```
<EventCreateIn>
  <objectEvent><objectID>1</objectID></objectEvent>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>2</objectID></objectEvent>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>3</objectID></objectEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>4</objectID><linkObjectID>1</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>4</objectID><linkObjectID>2</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>4</objectID><linkObjectID>3</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>4</objectID></objectEvent>
</EventCreateIn>
```

Lookup on Object ID 1 will return:

```
<EventLookupOut>
```

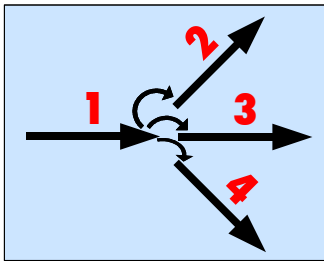
```
<objectEvent><objectID>1</objectID></objectEvent>
</EventLookupOut>
```

Lookup on Object ID 4 will return:

```
<EventLookupOut>
  <objectEvent><objectID>4</objectID></objectEvent>
  <linkEvent>
    <objectID>4</objectID><linkObjectID>1</linkObjectID>
  </linkEvent>
  <linkEvent>
    <objectID>4</objectID><linkObjectID>2</linkObjectID>
  </linkEvent>
  <linkEvent>
    <objectID>4</objectID><linkObjectID>3</linkObjectID>
  </linkEvent>
</EventLookupOut>
```

Doubly linked (forward and backward links) is trivial merging of the two above examples.

Disaggregation: e.g. package 1 is broken down into individual objects 1,2,3



Directional linked forward (sorted by event source timestamp):

```
<EventCreateIn>
  <objectEvent><objectID>1</objectID></objectEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>2</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>3</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>4</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>2</objectID></objectEvent>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>3</objectID></objectEvent>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>4</objectID></objectEvent>
</EventCreateIn>
```

Lookup on Object ID 1 will return:

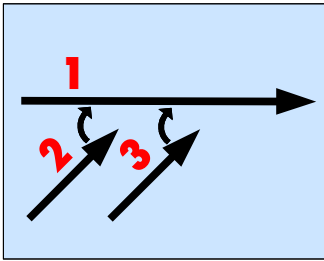
```
<EventLookupOut>
  <objectEvent><objectID>1</objectID></objectEvent>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>2</linkObjectID>
  </linkEvent>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>3</linkObjectID>
  </linkEvent>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>4</linkObjectID>
  </linkEvent>
</EventLookupOut>
```

Lookup on Object ID 4 will return:

```
<EventLookupOut>
  <objectEvent><objectID>4</objectID></objectEvent>
</EventLookupOut>
```

Backward linked and Doubly linked (forward and backward links) is possible as well, example is not provided in this document.

Association: e.g. objects 2,3 are placed in container 1



Directional linked forward (sorted by event source timestamp):

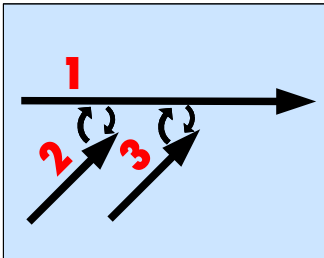
```
<EventCreateIn>
  <objectEvent><objectID>2</objectID></objectEvent>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>3</objectID></objectEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>2</objectID><linkObjectID>1</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>3</objectID><linkObjectID>1</linkObjectID>
  </linkEvent>
</EventCreateIn>
```

Lookup on Object ID 1 will return:

```
<EventLookupOut>
  <objectEvent><objectID>1</objectID></objectEvent>
</EventLookupOut>
```

Lookup on Object ID 2 will return:

```
<EventLookupOut>
  <objectEvent><objectID>2</objectID></objectEvent>
  <linkEvent>
    <objectID>2</objectID><linkObjectID>1</linkObjectID>
  </linkEvent>
</EventLookupOut>
```



Doubly linked (sorted by event source timestamp):

```
<EventCreateIn>
  <objectEvent><objectID>2</objectID></objectEvent>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>3</objectID></objectEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>2</objectID><linkObjectID>1</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>3</objectID><linkObjectID>1</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>2</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>3</linkObjectID>
  </linkEvent>
</EventCreateIn>
```

Lookup on Object ID 1 will return:

```
<EventLookupOut>
  <objectEvent><objectID>1</objectID></objectEvent>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>2</linkObjectID>
  </linkEvent>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>3</linkObjectID>
  </linkEvent>
</EventLookupOut>
```

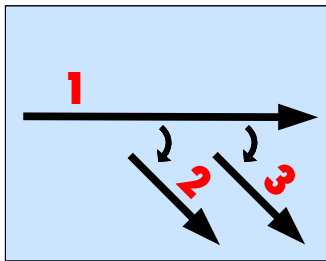
Lookup on Object ID 2 will return:

```
<EventLookupOut>
```

```
<objectEvent><objectID>2</objectID></objectEvent>
<linkEvent>
  <objectID>2</objectID><linkObjectID>1</linkObjectID>
</linkEvent>
</EventLookupOut>
```

Backward linked is possible as well, example is not provided in this document.

Disassociation: e.g. objects 2,3 are taken out of the container 1



Directional linked forward (sorted by event source timestamp):

```
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>2</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>3</linkObjectID>
  </linkEvent>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>2</objectID></objectEvent>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>3</objectID></objectEvent>
</EventCreateIn>
```

Lookup on Object ID 1 will return:

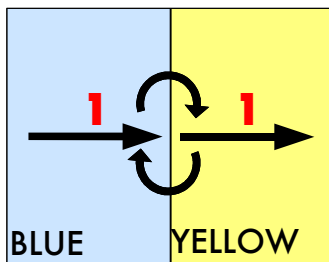
```
<EventLookupOut>
  <objectEvent><objectID>1</objectID></objectEvent>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>2</linkObjectID>
  </linkEvent>
  <linkEvent>
    <objectID>1</objectID><linkObjectID>3</linkObjectID>
  </linkEvent>
</EventLookupOut>
```

Lookup on Object ID 2 will return:

```
<EventLookupOut>
  <objectEvent><objectID>2</objectID></objectEvent>
</EventLookupOut>
```

Backward linked and Doubly linked (forward and backward links) is possible as well, example is not provided in this document.

Changing Supply-chains within a Discovery Service node:



Double linked (sorted by event source timestamp):

```
<EventCreateIn>
  <objectEvent><objectID>1</objectID></objectEvent>
  <supplyChainID>BLUE</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>1</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="YELLOW"/>
    </linkSupplyChainItemList>
  </linkEvent>
  <supplyChainID>BLUE</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>1</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="BLUE"/>
    </linkSupplyChainItemList>
  </linkEvent>
  <supplyChainID>YELLOW</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>1</objectID></objectEvent>
  <supplyChainID>YELLOW</supplyChainID>
</EventCreateIn>
```

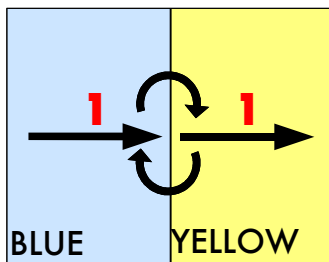
Lookup on Object ID 1 in BLUE Supply-chain will return:

```
<EventLookupOut>
  <objectEvent><objectID>1</objectID></objectEvent>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>1</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="YELLOW"/>
    </linkSupplyChainItemList>
  </linkEvent>
</EventLookupOut>
```

Lookup on Object ID 1 in YELLOW Supply-chain will return:

```
<EventLookupOut>
  <objectEvent><objectID>1</objectID></objectEvent>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>1</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="BLUE"/>
    </linkSupplyChainItemList>
  </linkEvent>
</EventLookupOut>
```

Changing Supply-chains between two Discovery Service instances:



Double linked (sorted by event source timestamp):

```
<EventCreateIn>
  <objectEvent><objectID>1</objectID></objectEvent>
  <supplyChainID>BLUE</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>1</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="YELLOW"/>
    </linkSupplyChainItemList>
    <linkDiscoveryServiceURI>https://yellowds.com</linkDiscoveryServiceURI>
  </linkEvent>
  <supplyChainID>BLUE</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>1</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="BLUE"/>
    </linkSupplyChainItemList>
    <linkDiscoveryServiceURI>https://blueds.com</linkDiscoveryServiceURI>
  </linkEvent>
  <supplyChainID>YELLOW</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>1</objectID></objectEvent>
  <supplyChainID>YELLOW</supplyChainID>
</EventCreateIn>
```

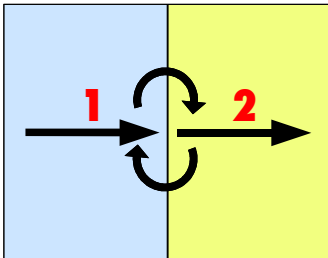
Lookup on Object ID 1 in BLUE Supply-chain will return:

```
<EventLookupOut>
  <objectEvent><objectID>1</objectID></objectEvent>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>1</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="YELLOW"/>
    </linkSupplyChainItemList>
    <linkDiscoveryServiceURI>https://yellowds.com</linkDiscoveryServiceURI>
  </linkEvent>
</EventLookupOut>
```

Lookup on Object ID 1 in YELLOW Supply-chain will return:

```
<EventLookupOut>
  <objectEvent><objectID>1</objectID></objectEvent>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>1</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="BLUE"/>
    </linkSupplyChainItemList>
    <linkDiscoveryServiceURI>https://blueds.com</linkDiscoveryServiceURI>
  </linkEvent>
</EventLookupOut>
```

Changing supply-chain and relabelling:



Double linked (sorted by event source timestamp):

```
<EventCreateIn>
  <objectEvent><objectID>1</objectID></objectEvent>
  <supplyChainID>BLUE</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>2</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="YELLOW"/>
    </linkSupplyChainItemList>
  </linkEvent>
  <supplyChainID>BLUE</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>2</objectID>
    <linkObjectID>1</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="BLUE"/>
    </linkSupplyChainItemList>
  </linkEvent>
  <supplyChainID>YELLOW</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>2</objectID></objectEvent>
  <supplyChainID>YELLOW</supplyChainID>
</EventCreateIn>
```

Lookup on Object ID 1 in BLUE Supply-chain will return:

```
<EventLookupOut>
  <objectEvent><objectID>1</objectID></objectEvent>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>2</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="YELLOW"/>
    </linkSupplyChainItemList>
  </linkEvent>
</EventLookupOut>
```

Lookup on Object ID 2 in YELLOW Supply-chain will return:

```
<EventLookupOut>
  <objectEvent><objectID>2</objectID></objectEvent>
  <linkEvent>
    <objectID>2</objectID>
    <linkObjectID>1</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="BLUE"/>
    </linkSupplyChainItemList>
  </linkEvent>
</EventLookupOut>
```

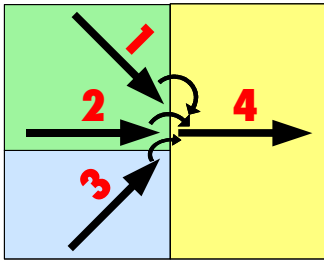
Lookup on Object ID 2 in BLUE Supply-chain will return:

```
<EventLookupOut>
</EventLookupOut>
```

Lookup on Object ID 1 in YELLOW Supply-chain will return:

```
<EventLookupOut>
</EventLookupOut>
```

Aggregation into another supply-chain:



Forward linked (sorted by event source timestamp):

```
<EventCreateIn>
  <objectEvent><objectID>1</objectID></objectEvent>
  <supplyChainID>GREEN</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>2</objectID></objectEvent>
  <supplyChainID>GREEN</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>3</objectID></objectEvent>
  <supplyChainID>BLUE</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>4</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="YELLOW"/>
    </linkSupplyChainItemList>
  </linkEvent>
  <supplyChainID>GREEN</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>2</objectID>
    <linkObjectID>4</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="YELLOW"/>
    </linkSupplyChainItemList>
  </linkEvent>
  <supplyChainID>GREEN</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>3</objectID>
    <linkObjectID>4</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="YELLOW"/>
    </linkSupplyChainItemList>
  </linkEvent>
  <supplyChainID>BLUE</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>4</objectID></objectEvent>
  <supplyChainID>YELLOW</supplyChainID>
</EventCreateIn>
```

Lookup on Object ID 1 in GREEN Supply-chain will return:

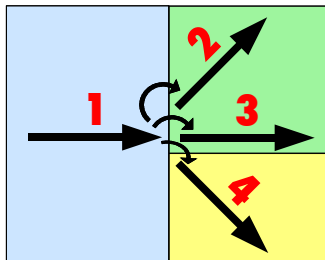
```
<EventLookupOut>
  <objectEvent><objectID>1</objectID></objectEvent>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>4</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="YELLOW"/>
    </linkSupplyChainItemList>
  </linkEvent>
</EventLookupOut>
```

Lookup on Object ID 4 in YELLOW Supply-chain will return:

```
<EventLookupOut>
  <objectEvent><objectID>4</objectID></objectEvent>
</EventLookupOut>
```

Backward linked and Doubly linked (forward and backward links) is possible as well, example is not provided in this document.

Disaggregation into another supply-chain:



Forward linked (sorted by event source timestamp):

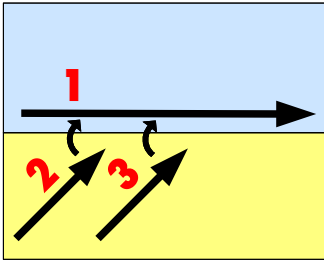
```
<EventCreateIn>
  <objectEvent><objectID>1</objectID></objectEvent>
  <supplyChainID>BLUE</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>2</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="GREEN"/>
    </linkSupplyChainItemList>
  </linkEvent>
  <supplyChainID>BLUE</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>3</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="GREEN"/>
    </linkSupplyChainItemList>
  </linkEvent>
  <supplyChainID>BLUE</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>4</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="YELLOW"/>
    </linkSupplyChainItemList>
  </linkEvent>
  <supplyChainID>BLUE</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>2</objectID></objectEvent>
  <supplyChainID>GREEN</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>3</objectID></objectEvent>
  <supplyChainID>YELLOW</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>4</objectID></objectEvent>
  <supplyChainID>YELLOW</supplyChainID>
</EventCreateIn>
```

Lookup on Object ID 1 in BLUE Supply-chain will return:

```
<EventLookupOut>
  <objectEvent><objectID>1</objectID></objectEvent>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>2</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="GREEN"/>
    </linkSupplyChainItemList>
  </linkEvent>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>3</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="GREEN"/>
    </linkSupplyChainItemList>
  </linkEvent>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>4</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="YELLOW"/>
    </linkSupplyChainItemList>
  </linkEvent>
</EventLookupOut>
```

Backward linked and Doubly linked (forward and backward links) is possible as well, example is not provided in this document.

Association with an object in another supply-chain:



Forward linked (sorted by event source timestamp):

```
<EventCreateIn>
  <objectEvent><objectID>2</objectID></objectEvent>
  <supplyChainID>YELLOW</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>3</objectID></objectEvent>
  <supplyChainID>YELLOW</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>2</objectID>
    <linkObjectID>1</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="BLUE"/>
    </linkSupplyChainItemList>
  </linkEvent>
  <supplyChainID>YELLOW</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>3</objectID>
    <linkObjectID>1</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="BLUE"/>
    </linkSupplyChainItemList>
  </linkEvent>
  <supplyChainID>YELLOW</supplyChainID>
</EventCreateIn>
```

Lookup on Object ID 1 in BLUE Supply-chain will return:

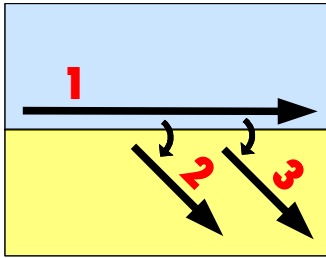
```
<EventLookupOut>
  <objectEvent><objectID>1</objectID></objectEvent>
</EventLookupOut>
```

Lookup on Object ID 2 in YELLOW Supply-chain will return:

```
<EventLookupOut>
  <objectEvent><objectID>2</objectID></objectEvent>
  <linkEvent>
    <objectID>2</objectID>
    <linkObjectID>1</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="BLUE"/>
    </linkSupplyChainItemList>
  </linkEvent>
</EventLookupOut>
```

Backward linked and Doubly linked (forward and backward links) is possible as well, example is not provided in this document.

Disassociation into another supply-chain:



Forward linked (sorted by event source timestamp):

```
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>2</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="YELLOW"/>
    </linkSupplyChainItemList>
  </linkEvent>
  <supplyChainID>BLUE</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>3</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="YELLOW"/>
    </linkSupplyChainItemList>
  </linkEvent>
  <supplyChainID>BLUE</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>2</objectID></objectEvent>
  <supplyChainID>YELLOW</supplyChainID>
</EventCreateIn>
<EventCreateIn>
  <objectEvent><objectID>3</objectID></objectEvent>
  <supplyChainID>YELLOW</supplyChainID>
</EventCreateIn>
```

Lookup on Object ID 1 in BLUE Supply-chain will return:

```
<EventLookupOut>
  <objectEvent><objectID>1</objectID></objectEvent>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>2</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="YELLOW"/>
    </linkSupplyChainItemList>
  </linkEvent>
  <linkEvent>
    <objectID>1</objectID>
    <linkObjectID>3</linkObjectID>
    <linkSupplyChainItemList>
      <item oid="YELLOW"/>
    </linkSupplyChainItemList>
  </linkEvent>
</EventLookupOut>
```

Lookup on Object ID 2 in YELLOW Supply-chain will return:

```
<EventLookupOut>
  <objectEvent><objectID>2</objectID></objectEvent>
</EventLookupOut>
```

Backward linked and Doubly linked (forward and backward links) is possible as well, example is not provided in this document.