

**TAF/TAP-TSI TG4**

**Framework for Usage of UpdateLinkMessage**

## History of document versions

Version	Date	Author	Reason for change / comment
0.1	2013-10-22	Seid Maglajlic	Creation (1 <sup>st</sup> draft)
0.2	2013-10-28	Seid Maglajlic	Trigger and the reference to the business scenarios in UML model are added.
0.3	2013-11-18	Seid Maglajlic	The results of the review added – minor changes.

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## 1. About this document

This document contains the concise description of the framework for usage of Update Link messages. The basic cases that explain the usage of the UpdateLink message are provided in the form of a table with one column and four rows:

<p><b>Precondition</b> – the precondition that has to be fulfilled in order to process the particular UpdateLinkMessage</p> <p><b>Trigger</b> – the situation or circumstances which drove the company to the decision to send the UpdateLinkMessage</p> <p><b>Business process</b> – we refer here to the Business Scenarios given in the WG 10 Handbook that are translated into the UML Model Activity Diagrams. <b>The readers are required to be familiar with both WG 10 Handbook and the corresponding UML Model before examining this document.</b></p>
<p>Illustration</p>
<p>UpdateLinkMessage XML content example according to the illustration. The readers are required to be familiar with the XSD of the UpdateLinkMessage when examining this document. The overview of the UpdateLinkMessage XSD model is given in the chapter “Introduction”.</p>
<p>Consequences: what happens after the message is transmitted – which business processes should be considered.</p>

## 2. Introduction

The UpdateLinkMessage framework presented here considers only the Links between Train and Path objects. The examples are made in XML format, according to the XSD that has been designed for UpdateLinkMessage. The structure of the message looks as follows:

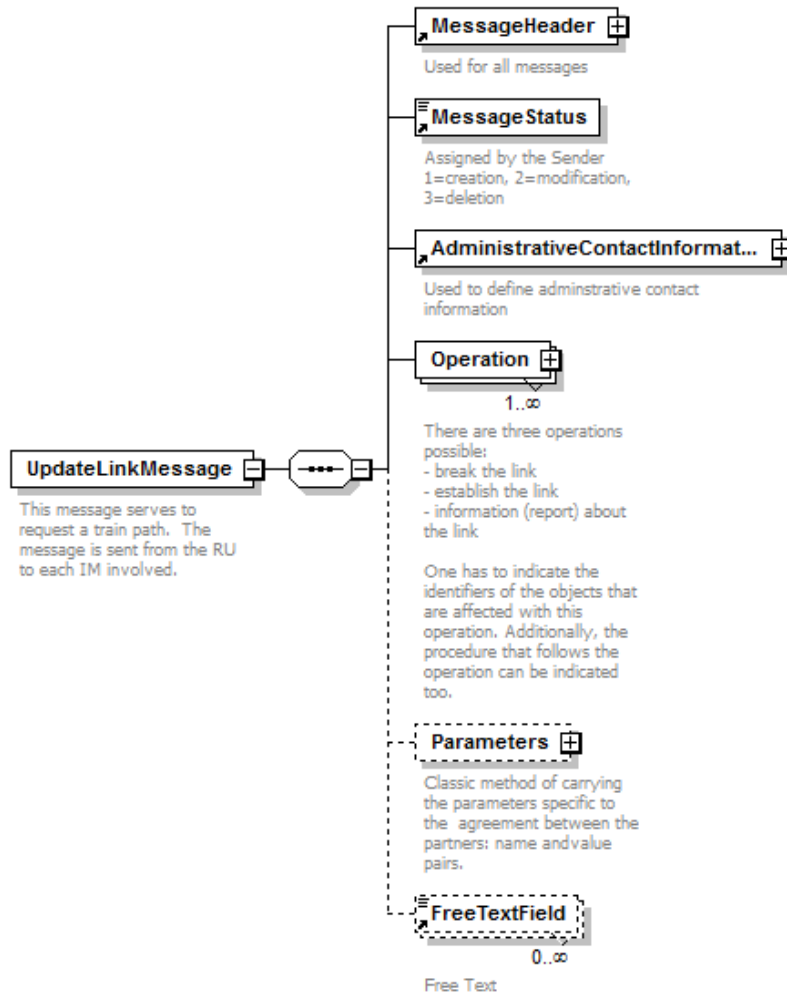


Fig. 1 XSD structure of UpdateLinkMessage

The most important (kernel) part of the message is given in the Operation element:

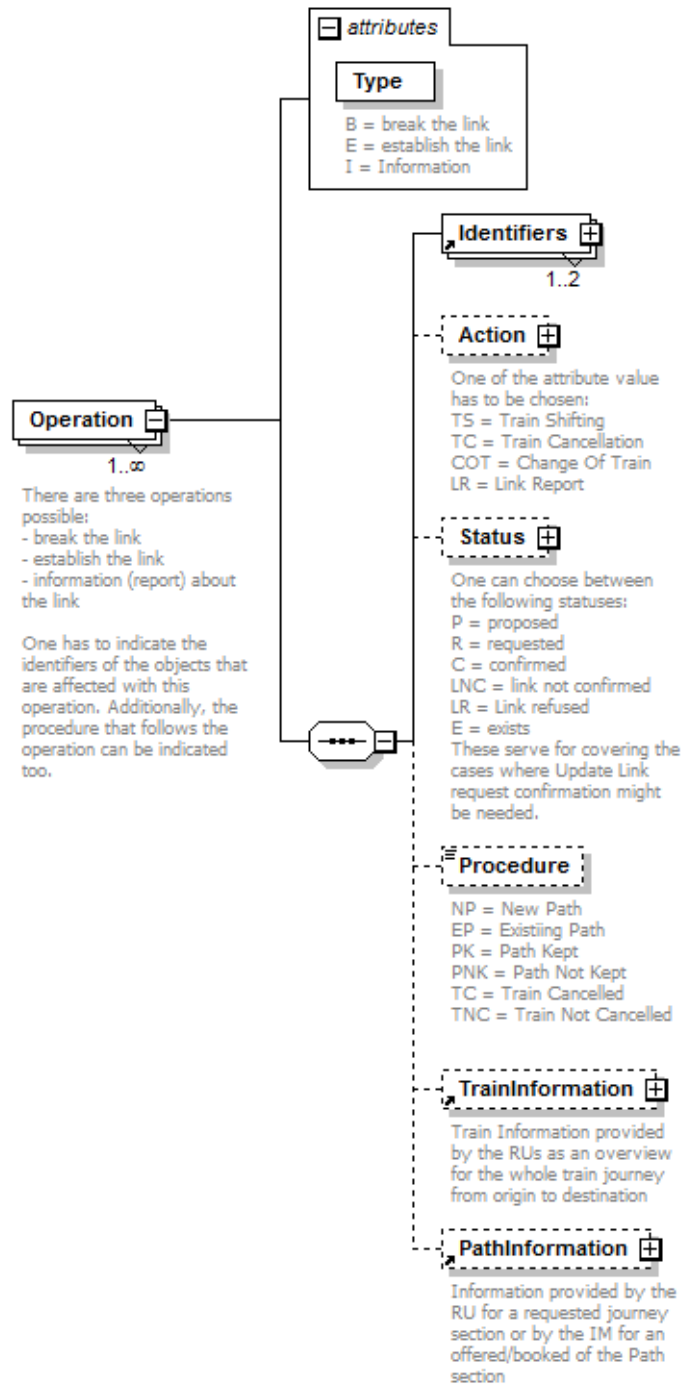


Fig. 2 Operation element

**General pre-condition:**

Both RU and IM have the separated records for objects Train and Path. The status of these objects in both RU and IM systems is up-to-date.

General rule:

- a) Changing of Link must be recorded (documented) in both RU and IM systems

### 3. RU Triggered: UpdateLinkMessage Framework: Train Shifting

**Precondition:**

RU already posses the Path P-new (the path request process has been finished before).

RU is authorized to act upon the Applicant.

**Trigger:**

RU wants to shift the **Train T** to another (new) **Path P-new**

**Business process:**

4.27 Train Shifting to an existing path-changed OTN

4.28 Train Shifting to a new path-changed OTN

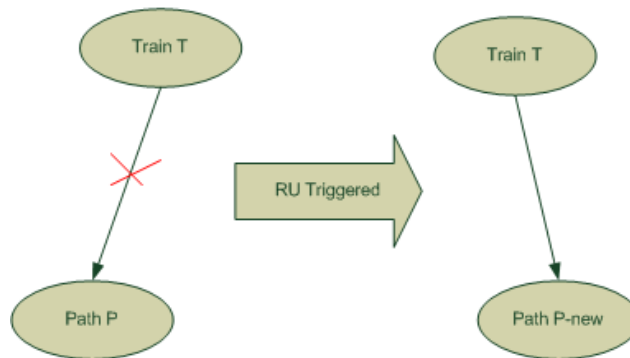
**Activity:** Breaking the link between objects Train and Path

Additionally to the indication about the breaking of the link between Train and Path, the establishing of the new link between Train T and Path P-new can be sent in the same message, as a second operation element (see XML example below).

For this action it is not relevant was the Path P-new already existing or was the Path P-new newly requested and allocated – the important precondition is that the RU is in the possession of the Path P-new.

**Note about changing of OTN:** if the OTN has been changed (it differs from the OTN that was related to the Train via the “old” Path object), the OTN value has to be provided in the PathInformation section in the ObjectInfoMessage. PathInformation and TrainInformation elements in the UpdateLinkFramework is used just as an additional information about the objects whose links are updated We do not provide the PathInformation content in these examples for the simplicity reasons. It is important to note that OTN, as the parameter of the Path object, has to be communicated within the PathInformation XML payload.

Train Shifting



<UpdateLinkMessage>

```

...
<Operation Type="B">
  <Identifiers>
    <PlannedTransportIdentifiers>
      <ObjectType>TR</ObjectType>
      <Company>2080</Company>
      <Core>ttt123456789</Core>
      <Variant>00</Variant>
      <TimetableYear>2014</TimetableYear>
      <StartDate>2013-12-15</StartDate>
    </PlannedTransportIdentifiers>
    <PlannedTransportIdentifiers>
      <ObjectType>PA</ObjectType>
      <Company>0080</Company>
      <Core>ppp123456789</Core>
      <Variant>00</Variant>
      <TimetableYear>2014</TimetableYear>
      <StartDate>2013-12-15</StartDate>
    </PlannedTransportIdentifiers>
  </Identifiers>
</Operation Type="B">
    
```

```

        </Identifiers>
        <Action Type="TS"/>
        <Status Type="R"/>
        <Procedure>EP</Procedure>
    </Operation>
<Operation Type="E">
    <Identifiers>
        <PlannedTransportIdentifiers>
            <ObjectType>TR</ObjectType>
            <Company>2080</Company>
            <Core>ttt123456789</Core>
            <Variant>00</Variant>
            <TimetableYear>2014</TimetableYear>
            <StartDate>2013-12-15</StartDate>
        </PlannedTransportIdentifiers>
        <PlannedTransportIdentifiers>
            <ObjectType>PA</ObjectType>
            <Company>0080</Company>
            <Core>new123456789</Core>
            <Variant>00</Variant>
            <TimetableYear>2014</TimetableYear>
            <StartDate>2013-12-15</StartDate>
        </PlannedTransportIdentifiers>
    </Identifiers>
    <Action Type="TS"/>
    <Status Type="P"/>
    <Procedure>NP</Procedure>
</Operation>
</UpdateLinkMessage>

```

Consequences:

- 1) What happens with Path P is the matter of the local rules and the agreements between the particular RU and IM:
  - a. Is the Path P remaining in the possession of the RU
  - b. Is the Path Cancellation required for Path P
- 2) The partners should agree does RU need an UpdateLink confirmation. If yes, the same message is used with the status "C"(=Confirmation)
- 3) General rules apply

#### 4. RU Triggered: UpdateLinkMessage Framework: Change of Train (COT)

**Precondition:**

RU is authorized to act upon the Applicant

**Trigger:**

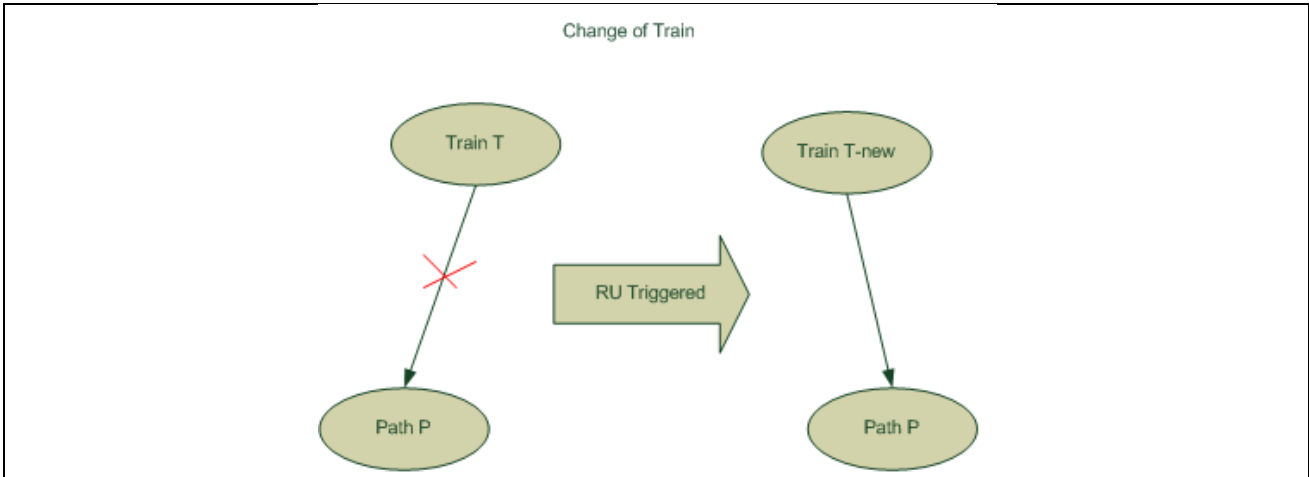
RU wants to use the same **Path P** for the new Train **T-new**

**Business process:**

4.9 CHANGE OF TRAIN

**Activity:** Breaking the link between objects Train and Path

Additionally to the indication about the breaking of the link between Train and Path, the establishing of the new link between Train T-new and Path P can be sent in the same message, as a second operation element (see XML example below).



```

<UpdateLinkMessage>
  ...
  <Operation Type="B">
    <Identifiers>
      <PlannedTransportIdentifiers>
        <ObjectType>TR</ObjectType>
        <Company>2080</Company>
        <Core>ttt123456789</Core>
        <Variant>00</Variant>
        <TimetableYear>2014</TimetableYear>
        <StartDate>2013-12-15</StartDate>
      </PlannedTransportIdentifiers>
      <PlannedTransportIdentifiers>
        <ObjectType>PA</ObjectType>
        <Company>0080</Company>
        <Core>ppp123456789</Core>
        <Variant>00</Variant>
        <TimetableYear>2014</TimetableYear>
        <StartDate>2013-12-15</StartDate>
      </PlannedTransportIdentifiers>
    </Identifiers>
    <Action Type="COT"/>
    <Status Type="R"/>
    <Procedure>TC</Procedure>
  </Operation>
  <Operation Type="E">
    <Identifiers>
      <PlannedTransportIdentifiers>
        <ObjectType>TR</ObjectType>
        <Company>2080</Company>
        <Core>new123456789</Core>
        <Variant>00</Variant>
        <TimetableYear>2014</TimetableYear>
        <StartDate>2013-12-15</StartDate>
      </PlannedTransportIdentifiers>
      <PlannedTransportIdentifiers>
        <ObjectType>PA</ObjectType>
        <Company>0080</Company>
        <Core>ppp123456789</Core>
        <Variant>00</Variant>
        <TimetableYear>2014</TimetableYear>
        <StartDate>2013-12-15</StartDate>
      </PlannedTransportIdentifiers>
    </Identifiers>
    <Action Type="COT"/>
    <Status Type="P"/>
  </Operation>
</UpdateLinkMessage>
  
```



**Consequences:**

- 1) It is recommended that the ObjectInfoMessage regarding the Train T-new is send from RU to IM prior to the UpdateLinkMessage
- 2) The internal procedures of the RU should define what happens with the Train T in the RU-system.
  - a. Is the Train T cancelled
  - b. Is the Train T object “retired” in the RU system
  - c. Is the Train T object “retired” in the IM system
- 1) The partners should agree does RU need an UpdateLink confirmation. If yes, the same message is used with the status “C”(=Confirmation). In that case, IM should send the confirmation back to RU.
- 3) General rules apply

**5. RU Triggered: UpdateLinkMessage Framework: Train Cancelation**

**Precondition:**

Train-Path link exists

**Trigger:**

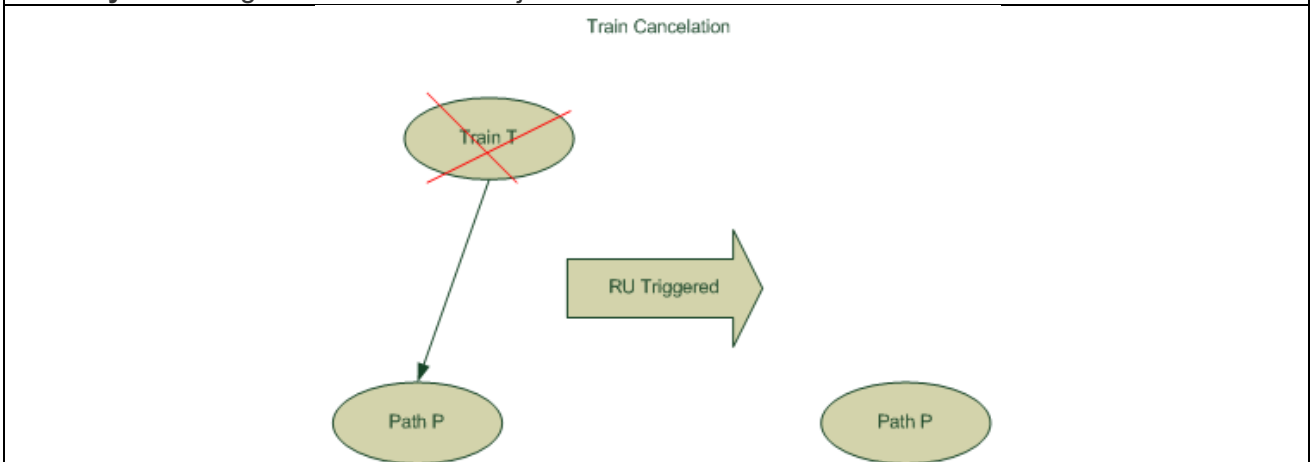
RU wants to cancel the **Train T**, the **Path P** should not be used any more by the **Train T**.

**Business process:**

4.29 Train Cancellation-Path remains in hand of RU Activity,

4.30 Train Cancellation-Path also cancelled by RU Activity

**Activity:** Breaking the link between objects Train and Path



```

<UpdateLinkMessage>
  ...
  <Operation Type="B">
    <Identifiers>
      <PlannedTransportIdentifiers>
        <ObjectType>TR</ObjectType>
        <Company>2080</Company>
        <Core>ttt123456789</Core>
        <Variant>00</Variant>
        <TimetableYear>2014</TimetableYear>
        <StartDate>2013-12-15</StartDate>
      </PlannedTransportIdentifiers>
      <PlannedTransportIdentifiers>
        <ObjectType>PA</ObjectType>
        <Company>0080</Company>
        <Core>ppp123456789</Core>
        <Variant>00</Variant>
        <TimetableYear>2014</TimetableYear>
        <StartDate>2013-12-15</StartDate>
      </PlannedTransportIdentifiers>
    </Identifiers>
    <Action Type="TC"/>
    <Status Type="R"/>
    <Procedure>PK</Procedure>
  </Operation>
</UpdateLinkMessage>

```

#### Consequences:

- 1) What happens with Path P is the matter of the local rules and the agreements between the particular RU and IM:
  - a. Is the Path P remaining in the possession of the RU (indicated with the parameter "Procedure" – in our example "PK=Path kept")
  - b. Is the Path Cancellation required for Path P
- 2) General rules apply

## 6. IM Triggered: UpdateLinkMessage Framework: Replace the Path

#### Precondition:

Train-Path link exists

#### Trigger:

These processes can be a consequence of RU triggered processes.

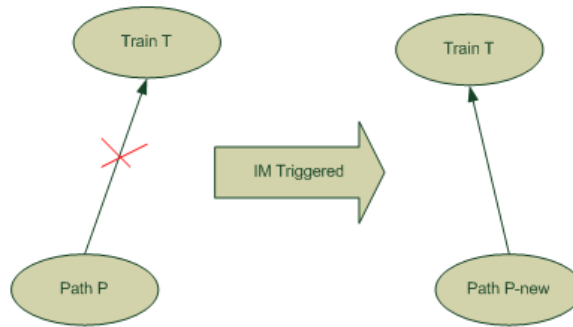
These activities are triggered by IMs in the processes for Path Alteraton, or in the offering-phase of Path Modification.

#### Business process:

4.10 Path Alteration,  
4.11 Path Modification,

**Activity:** Proposal for link between objects Train and Path

Replacing the Path (Path Alteration / Path Modification Offer)



```

<UpdateLinkMessage>
  ...
  <Operation Type="B">
    <Identifiers>
      <PlannedTransportIdentifiers>
        <ObjectType>TR</ObjectType>
        <Company>2080</Company>
        <Core>ttt123456789</Core>
        <Variant>00</Variant>
        <TimetableYear>2014</TimetableYear>
        <StartDate>2013-12-15</StartDate>
      </PlannedTransportIdentifiers>
      <PlannedTransportIdentifiers>
        <ObjectType>PA</ObjectType>
        <Company>0080</Company>
        <Core>ppp123456789</Core>
        <Variant>00</Variant>
        <TimetableYear>2014</TimetableYear>
        <StartDate>2013-12-15</StartDate>
      </PlannedTransportIdentifiers>
    </Identifiers>
    <Action Type="TS"/>
    <Status Type="R"/>
    <Procedure>EP</Procedure>
  </Operation>
  <Operation Type="E">
    <Identifiers>
      <PlannedTransportIdentifiers>
        <ObjectType>TR</ObjectType>
        <Company>2080</Company>
        <Core>ttt123456789</Core>
        <Variant>00</Variant>
        <TimetableYear>2014</TimetableYear>
        <StartDate>2013-12-15</StartDate>
      </PlannedTransportIdentifiers>
      <PlannedTransportIdentifiers>
        <ObjectType>PA</ObjectType>
        <Company>0080</Company>
        <Core>new123456789</Core>
        <Variant>00</Variant>
        <TimetableYear>2014</TimetableYear>
        <StartDate>2013-12-15</StartDate>
      </PlannedTransportIdentifiers>
    </Identifiers>
    <Action Type="TS"/>
    <Status Type="P"/>
    <Procedure>NP</Procedure>
  </Operation>
</UpdateLinkMessage>
  
```

Consequences:

- 2) What happens with Path P is the matter of the local rules and the agreements between the particular RU and IM:
  - a. Is the Path P remaining in the possession of the RU
  - b. Is the Path Cancellation required for Path P
  - c. Is the Path P just archived/historized/retired
- 3) The partners should agree does IM need an UpdateLink confirmation. If yes, the same message is used with the status “C”(=Confirmation). In that case, RU should send the confirmation back to IM.
- 4) General rules apply

### 7. IM Triggered: UpdateLinkMessage Framework: Join 2 or more Paths into the single Path

**Precondition:**

Train-Path link exists

**Trigger:**

These processes can be a consequence of RU triggered processes.

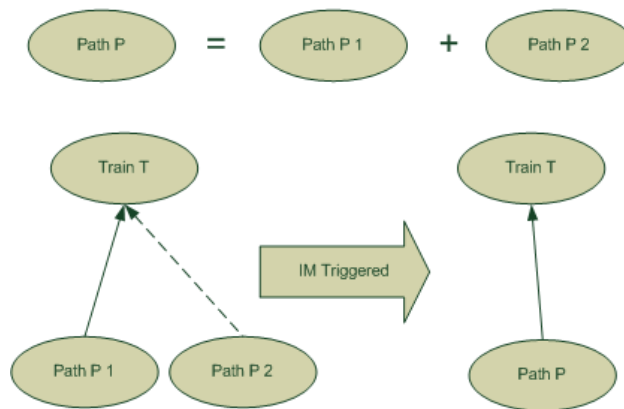
These activities are triggered by IMs in the processes for Path Alteraton, or in the offering-phase of Path Modification

**Business process:**

- 4.10 Path Alteration,
- 4.11 Path Modification,

**Activity:** Proposal for link between objects Train and Path

Joining 2 or more Path object instances



<UpdateLinkMessage>

```

...
<Operation Type="B">
  <Identifiers>
    <PlannedTransportIdentifiers>
      <ObjectType>TR</ObjectType>
      <Company>2080</Company>
      <Core>ttt123456789</Core>
      <Variant>00</Variant>
      <TimetableYear>2014</TimetableYear>
      <StartDate>2013-12-15</StartDate>
    </PlannedTransportIdentifiers>
    <PlannedTransportIdentifiers>
      <ObjectType>PA</ObjectType>
      <Company>0080</Company>
      <Core>ppp123456789</Core>
      <Variant>01</Variant>
      <TimetableYear>2014</TimetableYear>
    </PlannedTransportIdentifiers>
  </Identifiers>
</Operation Type="B">
    
```

```

        <StartDate>2013-12-15</StartDate>
    </PlannedTransportIdentifiers>
</Identifiers>
<Action Type="TS"/>
<Status Type="R"/>
<Procedure>EP</Procedure>
</Operation>
<Operation Type="B">
    <Identifiers>
        <PlannedTransportIdentifiers>
            <ObjectType>TR</ObjectType>
            <Company>2080</Company>
            <Core>ttt123456789</Core>
            <Variant>00</Variant>
            <TimetableYear>2014</TimetableYear>
            <StartDate>2013-12-15</StartDate>
        </PlannedTransportIdentifiers>
        <PlannedTransportIdentifiers>
            <ObjectType>PA</ObjectType>
            <Company>0080</Company>
            <Core>ppp123456789</Core>
            <Variant>02</Variant>
            <TimetableYear>2014</TimetableYear>
            <StartDate>2013-12-15</StartDate>
        </PlannedTransportIdentifiers>
    </Identifiers>
    <Action Type="TS"/>
    <Status Type="R"/>
    <Procedure>EP</Procedure>
</Operation>
<Operation Type="E">
    <Identifiers>
        <PlannedTransportIdentifiers>
            <ObjectType>TR</ObjectType>
            <Company>2080</Company>
            <Core>ttt123456789</Core>
            <Variant>00</Variant>
            <TimetableYear>2014</TimetableYear>
            <StartDate>2013-12-15</StartDate>
        </PlannedTransportIdentifiers>
        <PlannedTransportIdentifiers>
            <ObjectType>PA</ObjectType>
            <Company>0080</Company>
            <Core>new123456789</Core>
            <Variant>00</Variant>
            <TimetableYear>2014</TimetableYear>
            <StartDate>2013-12-15</StartDate>
        </PlannedTransportIdentifiers>
    </Identifiers>
    <Action Type="TS"/>
    <Status Type="P"/>
    <Procedure>NP</Procedure>
</Operation>
</UpdateLinkMessage>

```

#### Consequences:

- 1) What happens with Paths P1 and P2 is the matter of the local rules and the agreements between the particular RU and IM:
  - a. Are the Paths P1 and P2 just archived/historized/retired
  - b. Are the Paths P1 and P2 remaining in the possession of the RU
  - c. Is the Path Cancelation required for Paths P1 and P2
- 5) The partners should agree does IM need an UpdateLink confirmation. If yes, the same message is used with the status "C"(=Confirmation). In that case, RU should send the confirmation back to IM.
- 2) General rules apply

### 8. IM Triggered: UpdateLinkMessage Framework: Splitting the Path

**Precondition:**

Train-Path link exists

**Trigger:**

These processes can be a consequence of RU triggered processes.

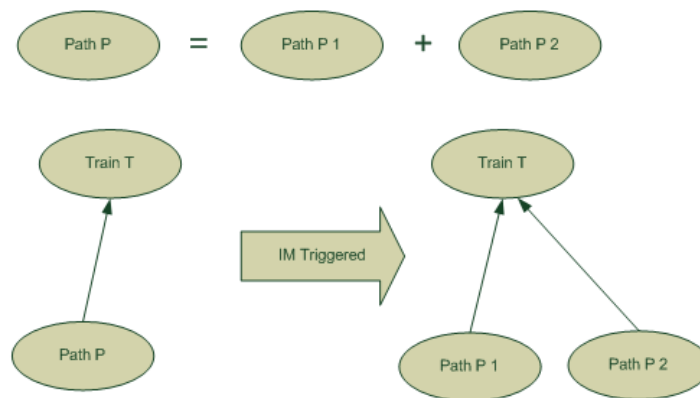
These activities are triggered by IMs in the processes for Path Alteraton, or in the offering-phase of Path Modification

**Business process:**

4.10 Path Alteration, 4.11 Path Modification,

**Activity:** Proposal for link between objects Train and Path

Splitting the single Path object to 2 or more Path instances



<UpdateLinkMessage>

```

...
<Operation Type="B">
  <Identifiers>
    <PlannedTransportIdentifiers>
      <ObjectType>TR</ObjectType>
      <Company>2080</Company>
      <Core>ttt123456789</Core>
      <Variant>00</Variant>
      <TimetableYear>2014</TimetableYear>
      <StartDate>2013-12-15</StartDate>
    </PlannedTransportIdentifiers>
    <PlannedTransportIdentifiers>
      <ObjectType>PA</ObjectType>
      <Company>0080</Company>
      <Core>ppp123456789</Core>
      <Variant>00</Variant>
      <TimetableYear>2014</TimetableYear>
      <StartDate>2013-12-15</StartDate>
    </PlannedTransportIdentifiers>
  </Identifiers>
  <Action Type="TS"/>
  <Status Type="R"/>
  <Procedure>EP</Procedure>
</Operation>
<Operation Type="E">
  <Identifiers>
    <PlannedTransportIdentifiers>
      <ObjectType>TR</ObjectType>
      <Company>2080</Company>
      <Core>ttt123456789</Core>
      <Variant>00</Variant>
      <TimetableYear>2014</TimetableYear>
      <StartDate>2013-12-15</StartDate>
    </PlannedTransportIdentifiers>

```

```

        <PlannedTransportIdentifiers>
            <ObjectType>PA</ObjectType>
            <Company>0080</Company>
            <Core>ppp123456789</Core>
            <Variant>01</Variant>
            <TimetableYear>2014</TimetableYear>
            <StartDate>2013-12-15</StartDate>
        </PlannedTransportIdentifiers>
    </Identifiers>
    <Action Type="TS"/>
    <Status Type="P"/>
    <Procedure>NP</Procedure>
</Operation>
<Operation Type="E">
    <Identifiers>
        <PlannedTransportIdentifiers>
            <ObjectType>TR</ObjectType>
            <Company>2080</Company>
            <Core>ttt123456789</Core>
            <Variant>00</Variant>
            <TimetableYear>2014</TimetableYear>
            <StartDate>2013-12-15</StartDate>
        </PlannedTransportIdentifiers>
        <PlannedTransportIdentifiers>
            <ObjectType>PA</ObjectType>
            <Company>0080</Company>
            <Core>new123456789</Core>
            <Variant>02</Variant>
            <TimetableYear>2014</TimetableYear>
            <StartDate>2013-12-15</StartDate>
        </PlannedTransportIdentifiers>
    </Identifiers>
    <Action Type="TS"/>
    <Status Type="P"/>
    <Procedure>NP</Procedure>
</Operation>
</UpdateLinkMessage>

```

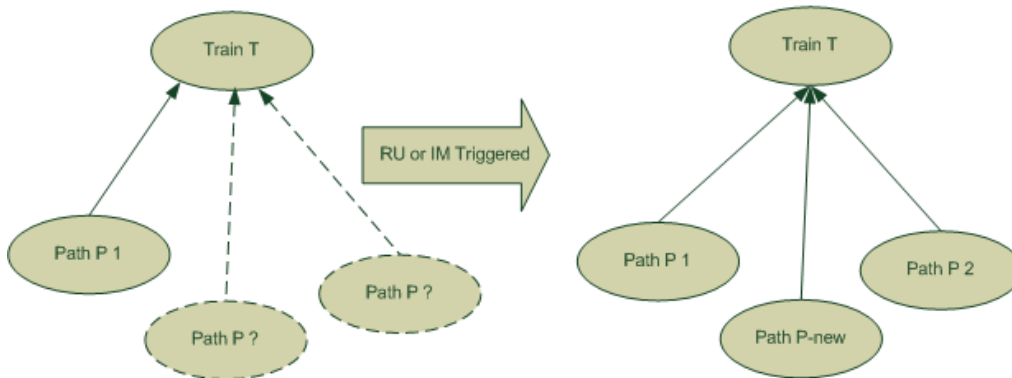
Consequences:

- 1) What happens with Path P is the matter of the local rules and the agreements between the particular RU and IM:
  - a. Is the Path P just archived/historized/retired
  - b. Is the Path P remaining in the possession of the RU
  - c. Is the Path Cancellation required for Path
- 6) The partners should agree does IM need an UpdateLink confirmation. If yes, the same message is used with the status "C"(=Confirmation). In that case, RU should send the confirmation back to IM.
- 2) General rules apply

## 9. RU or IM Triggered: UpdateLinkMessage Framework: Link Report

RU or IM wants to know which Paths are linked to the particular Train T. With this message, RU or IM is able to get the report about the links of the particular Train with the Paths.

I don't know which other Paths are linked to the Train T.



```

<UpdateLinkMessage>
  ...request...
  <Operation Type="I">
    <Identifiers>
      <PlannedTransportIdentifiers>
        <ObjectType>TR</ObjectType>
        <Company>2080</Company>
        <Core>ttt123456789</Core>
        <Variant>00</Variant>
        <TimetableYear>2014</TimetableYear>
        <StartDate>2013-12-15</StartDate>
      </PlannedTransportIdentifiers>
    </Identifiers>
    <Action Type="LR"/>
  </Operation>
</UpdateLinkMessage>
    
```

```

<UpdateLinkMessage>
  ...response...
  <Operation Type="I">
    <Identifiers>
      <PlannedTransportIdentifiers>
        <ObjectType>TR</ObjectType>
        <Company>2080</Company>
        <Core>ttt123456789</Core>
        <Variant>00</Variant>
        <TimetableYear>2014</TimetableYear>
        <StartDate>2013-12-15</StartDate>
      </PlannedTransportIdentifiers>
      <PlannedTransportIdentifiers>
        <ObjectType>PA</ObjectType>
        <Company>0080</Company>
        <Core>ppp123456789</Core>
        <Variant>01</Variant>
        <TimetableYear>2014</TimetableYear>
        <StartDate>2013-12-15</StartDate>
      </PlannedTransportIdentifiers>
    </Identifiers>
    <Action Type="LR"/>
    <Status Type="E"/>
  </Operation>
  <Operation Type="I">
    <Identifiers>
      <PlannedTransportIdentifiers>
        <ObjectType>TR</ObjectType>
        <Company>2080</Company>
        <Core>ttt123456789</Core>
        <Variant>00</Variant>
        <TimetableYear>2014</TimetableYear>
        <StartDate>2013-12-15</StartDate>
      </PlannedTransportIdentifiers>
    
```



```

        <PlannedTransportIdentifiers>
            <ObjectType>PA</ObjectType>
            <Company>0080</Company>
            <Core>new123456789</Core>
            <Variant>00</Variant>
            <TimetableYear>2014</TimetableYear>
            <StartDate>2013-12-15</StartDate>
        </PlannedTransportIdentifiers>
    </Identifiers>
    <Action Type="LR"/>
    <Status Type="E"/>
</Operation>
<Operation Type="I">
    <Identifiers>
        <PlannedTransportIdentifiers>
            <ObjectType>TR</ObjectType>
            <Company>2080</Company>
            <Core>ttt123456789</Core>
            <Variant>00</Variant>
            <TimetableYear>2014</TimetableYear>
            <StartDate>2013-12-15</StartDate>
        </PlannedTransportIdentifiers>
        <PlannedTransportIdentifiers>
            <ObjectType>PA</ObjectType>
            <Company>0080</Company>
            <Core>ppp123456789</Core>
            <Variant>02</Variant>
            <TimetableYear>2014</TimetableYear>
            <StartDate>2013-12-15</StartDate>
        </PlannedTransportIdentifiers>
    </Identifiers>
    <Action Type="LR"/>
    <Status Type="E"/>
</Operation>
</UpdateLinkMessage>

```

1) General rules apply

## 10. Conclusion

The cases provided in this document serve as the basis for further development of applications that use UpdateLinkMessage-s. The further combinations of different operations in the message are possible, and depend on the particular situations and agreements between the partners.