
Subject: Ways to model temporal aspects
Posted by [Lucien Weller](#) on Thu, 11 Jan 2018 10:32:05 GMT
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Dear all,

After our dissemination workshop in Berlin I looked a little bit more in detail at possibilities to model temporal aspects in railML 3. As example it used following simple situation:

It's a simple network with 2 switches and 4 linear net elements. But at a certain date (let's say 2018-07-01) a new switch is installed in track based von LNE2. This lead to a new topology where LNE2 is not in operation any more, but replaced with LNE5 and LNE6 along with LNE7 for new track.

When trying to describe this with railML 3.1 a came across two issues:

1) How to exactly model the validity periods of LNE2, LNE5, LNE6 and LNE7 ?

In my opinion there are to ways to do this

Either with @validFrom @validTo of Element netElement it self:

```
<netElement id="LNE2" validFrom="2018-01-01T00:00:00+01:00"
validTo="2018-06-30T23:59:59+01:00">
...
</netElement>
<netElement id="LNE5" validFrom="2018-07-01T00:00:00+01:00">
...
</netElement>
<netElement id="LNE6" validFrom="2018-07-01T00:00:00+01:00">
...
</netElement>
<netElement id="LNE7" validFrom="2018-07-01T00:00:00+01:00">
...
</netElement>
```

Or with the subelement state:

```
<netElement id="LNE2">
...
<state intrinsicPosFrom="0" intrinsicPosTo="1" type="inOperation">
  <time>
    <period from="2018-01-01T00:00:00+01:00" to="2018-06-30T23:59:59+01:00"/>
  </time>
</state>
```

```

</netElement>
<netElement id="LNE5">
  ...
  <state intrinsicPosFrom="0" intrinsicPosTo="1" type="inOperation">
    <time>
      <period from="2018-07-01T00:00:00+01:00"/>
    </time>
  </state>
</netElement>
<netElement id="LNE6">
  ...
  <state intrinsicPosFrom="0" intrinsicPosTo="1" type="inOperation">
    <time>
      <period from="2018-07-01T00:00:00+01:00"/>
    </time>
  </state>
</netElement>
<netElement id="LNE7">
  ...
  <state intrinsicPosFrom="0" intrinsicPosTo="1" type="inOperation">
    <time>
      <period from="2018-07-01T00:00:00+01:00"/>
    </time>
  </state>
</netElement>

```

This multiple ways to express the same information is not ideal, as we have to handle both possibilities when processing railML data. I'm not sure which one is the better. Attributes @validFrom and @validTo are induced from RTM, so refer to the standard. On the other hand state subelement offers more possibilities to precisely describe the state.

2) How to describe the relationship between LNE2 and LNE5/LNE6, to express replacement ?

An other requirement we have, is to describe the replacement relationship between topological elements replacing each other. This is important, to know the position of an object after modification of network. Here I added a signal to illustrate this, which also can be repositioned by using a linear or geodetic reference system. But the problem arises also with historical values only having a reference to the topology when there where created (by example some measures of track state) which should be compared to corresponding new values created after transformation of network.

For this requirement I have not found a way to describe it with railML 3.1, so any ideas about how we can do this would be appreciated.

Best regards

Lucien Weller

File Attachments

1) [new switch example.png](#), downloaded 26 times
