
Subject: [railML2] Extension proposal: pattern trains, distributions and slots

Posted by [Janne Möller](#) on Tue, 13 Oct 2020 12:32:40 GMT

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Dear railML-community,

For the use case of long-term timetabling we added extensions to railML2.4 in the Norwegian railway sector (railML2.4nor) concerning pattern trains, that we would like to present to you.

A pattern train is a template for other trains. The container element `<nor:patternTrains>` is located directly under `<timetable>`. A `<nor:patternTrain>` is not itself a train that is supposed to run. It uses the same attributes and sub-elements as the element `<train>` and additionally the following newly introduced attributes: `@interval` (intervals in seconds between trains), `@trainsPerHour` (number of trains per normal traffic hour), `@trainsPerDay` (number of trains per normal traffic day), `@trainsPerWeek` and `@distributionRef` (reference to a more detailed distribution, as described below).

When the interval is fixed, it can be given as a single value, e.g. "600" for a pattern that will run every 10 minutes. If the interval varies in cycles, the cycle can be given as space-separated values, e.g. "600 900 300" for a pattern that will run with 10 minutes between the first and second departure, 15 minutes between the second and third and 5 minutes between the third and fourth, before the interval pattern repeats, in this case every 30 minutes. It is not required that the (sum of the) interval(s) evenly divides a whole hour, and a pattern that does not repeat at the whole hour carries over into the next. As an example, an interval of "2400", i.e. 40 minutes, would give a pattern that produces the same minutes of the hour every two hours.

A fixed number of departures per hour, day or week can be given using the respective attributes. As the number of departures per hour in a pattern can vary during a day, and similarly the number of departures per day over a week, we also needed a way to describe a more generalised distribution. The container element `<nor:distributions>` that includes any number of `<nor:distribution>` elements is placed directly under `<timetable>` in the schema. A `<patternTrain>` element can refer to a distribution using the attribute `@distributionRef`. In this way, one distribution can also be used for multiple pattern trains. With `<nor:distribution>`, the distribution of trains over the course of a time period such as one day can be described in a detailed and flexible way. For this, one or more `<nor:slot>` sub-elements are used. Each slot describes the number of trains (`@numberOfTrains`) in a certain time window (`@duration`) from a given starting time (`@startTime`).

Additionally, a `<trainGroup>` can have an attribute `@nor:patternTrainRef`, that refers to the `<nor:patternTrain>` functioning as a template for trains in that `<trainGroup>`.

Any feedback is highly appreciated.

Best regards,
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