OpenTrack - Simulation of Railway Systems

Presentation of the OpenTrack API

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The new OpenTrack API (application programming interface)

- OpenTrack is able to communicate with a 3rd Party Application (over the Internet)
- OpenTrack accepts **Commands** (Messages to OpenTrack) and sends **Status Messages** (Messages from OpenTrack)
OpenTrack API: Messages

- Messages are designed such that they correspond to those exchanged in a real-world Railway System between Trains, Interlocking and Dispatching Units
- Messages from OpenTrack (e.g. Status Messages, Arrival and Departure at Stations, Interlocking Messages, ...)
- Messages to OpenTrack (e.g. Speed Commands, Timetable Changes, Dispatching Decisions, ...)
OpenTrack API: Messages from OpenTrack

- Train Messages (Train created, Train deleted)
- Timetable Messages (Train Arrival, Train Departure, Train passed Station)
- Block Section / Routes Messages (Route reserved, Route released, Part of Route released, Infrastructure Element occupied, ...)
- Simulation Messages (Simulation started, Simulation ended)
OpenTrack API: Messages to OpenTrack

- **Train Messages** (set requested Speed, set Performance, set Engine Switch)
- **Timetable Messages** (set Arrival Time, set Departure Time, set Connection, cancel Connection)
- **Block Section / Routes Messages** (reserve Route, set Route, cancel Route, ...)
- **Simulation Messages** (Start Simulation, Stop Simulation, ...)

**OpenTrack API: SOAP-Communication**

**Example: SOAP over HTTP**

POST /otd HTTP/1.1  
Host: localhost  
SOAPAction:  
Connection: close  
Content-Type: text/xml; charset=us-ascii  
Content-Length: 238

```xml
<?xml version="1.0" encoding="UTF-8"?>
  <SOAP-ENV:Body>
    <trainDeparture trainID="IC4001" stationID="BD" time="36520"/>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```
OpenTrack API: Applications

- Implementation of customer-specific Dispatching Algorithms
- Comparison of new Dispatching Strategies
- Development and Analysis of new Concepts in Train Control (e.g. optimizing Energy Consumption, reducing Delays and Conflicts)
- In-depth Evaluation of Railway Operations
OpenTrack acts as the Replacement of the Reality

The same type of Information is exchanged as in Reality: Commands to OpenTrack and Status Messages from OpenTrack)

Application: developing and testing of new Dispatching Algorithms

Prototype in Co-operation with ZHAW, trafIT solutions and IBM using DIME/SOAP