

OpenTrack - Simulation of Railway Systems

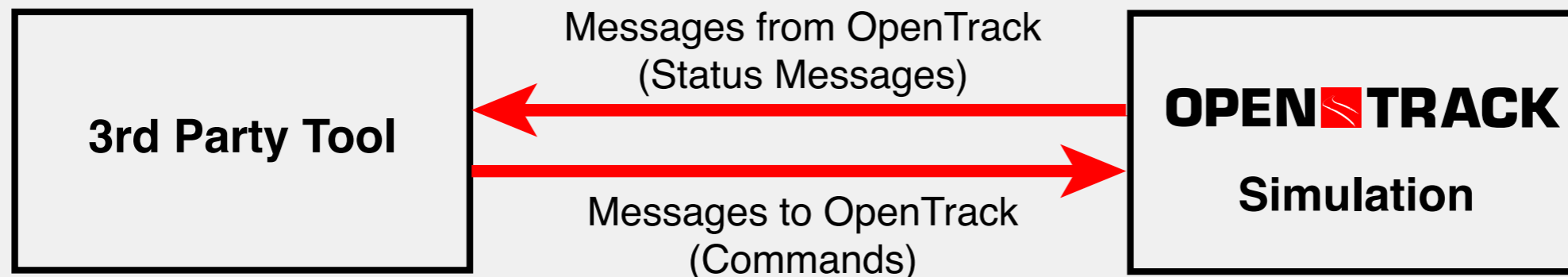


**Presentation of the
OpenTrack API**

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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

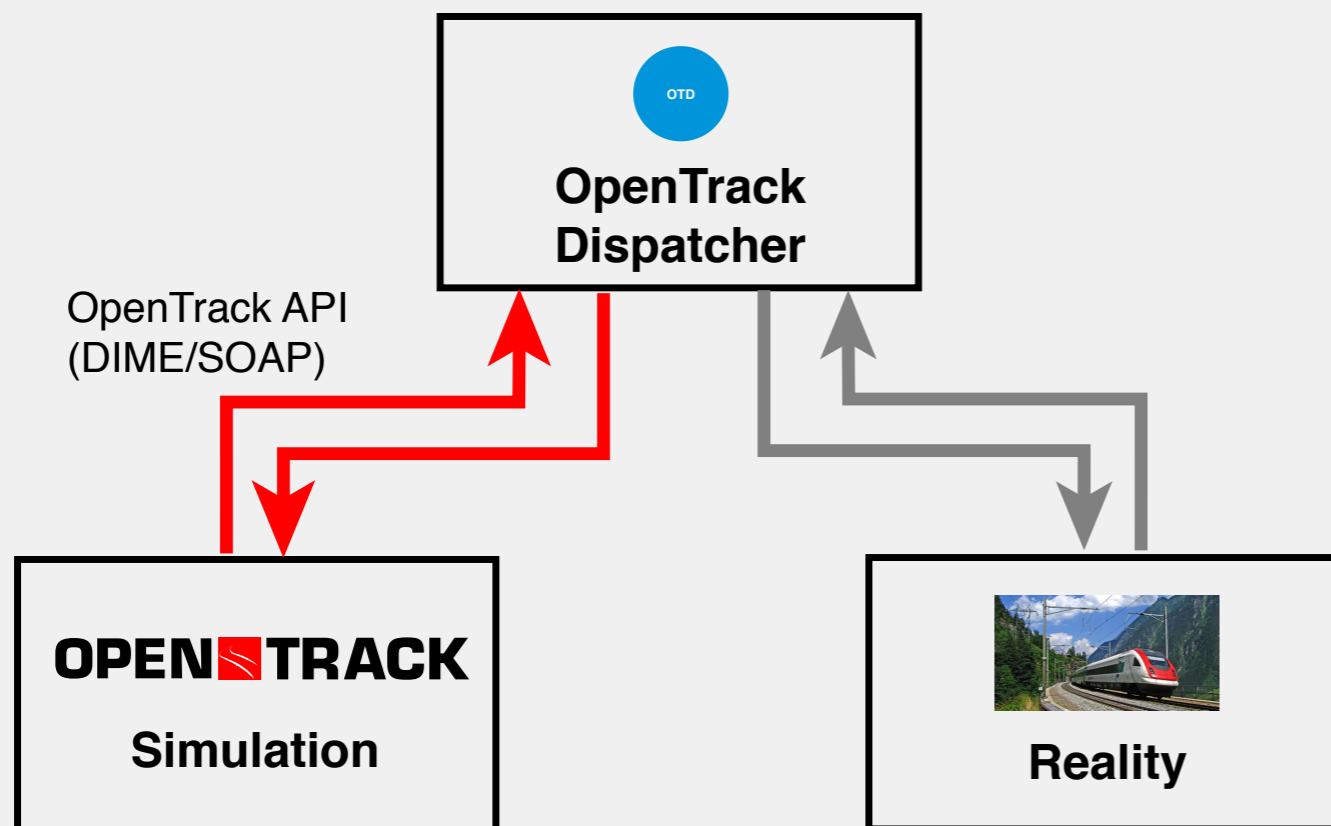
```
POST /otd HTTP/1.1
Host: localhost
SOAPAction:
Connection: close
Content-Type: text/xml; charset=us-ascii
Content-Length: 238
```

```
<?xml version="1.0" encoding="UTF-8"?>
<SOAP-ENV:Envelope xmlns:SOAPENV="http://schemas.xmlsoap.org/soap/
envelope/">
<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

Demo Tool OpenTrack Dispatcher



- 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