Workshop/Documentation

Malte Herlitze/Monika Schmitt, November 5th 2021

MENTZ

EFA JSON API

Introduction

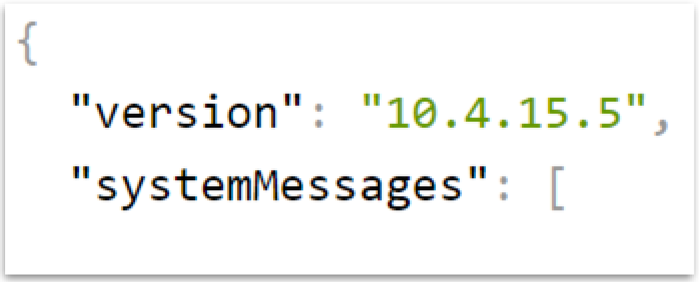
Introduction – Table of Contents

Introduction – EFA Interface
About the Interface

- The EFA Intermodal Journey Planner provides an elder XML and a recent JSON interface (called rapidJSON interface).
- It is controlled via a number of different HTTP requests (basically post), and HTTP parameters.
- It is stateless and modular.
- Each request is matching one functionality of the EFA. Examples for this are the journey planner, the departure board, a stop sequence or the request for elements which can be displayed on an interactive map.

Introduction – EFA Interface Version

- The response of the JSON interface is versioned. Which version you are receiving is shown in the response under version.
- The http parameter `version` lets you request a specific version e.g. `version=10.4.15.5.`
- If the parameter is missing the latest version is returned.



```
{
  "version": "10.4.15.5",
  "systemMessages": [
```

Introduction – HTTP Requests
Requests and Functionality

Requests aBasic Requests

- SystemSystemInfo-Request: system information
- StopFinder-Request: stop search
- ServingLines-Request: line search
- LineStop-Request: passed stop

Basic Journe-Planning Functionality

- Trip-Request: journey planning
- DM-Request: departures from a stop

Print Products

- STT-Request: timetable of a stop
- TTB-Request: timetable of a line

Advanced Journey-Planning Functionality

- TripStopTimes-Request: stop sequence with times (including realtime)
- StopSeqCoord-Request: stop sequence with coordinates
- MapRoute-Request: maps for the route

Map Requests

- Coord-Request : object coordinates
- GeoObject-Request: route coordinates

Optional Functionality

- AddInfo-Request

For internal Use

- StopList-Request: list of stops
- LineList-Request: list of lines

Introduction – Use Cases

See the following slides to get an overview of combining the HTTP requests.

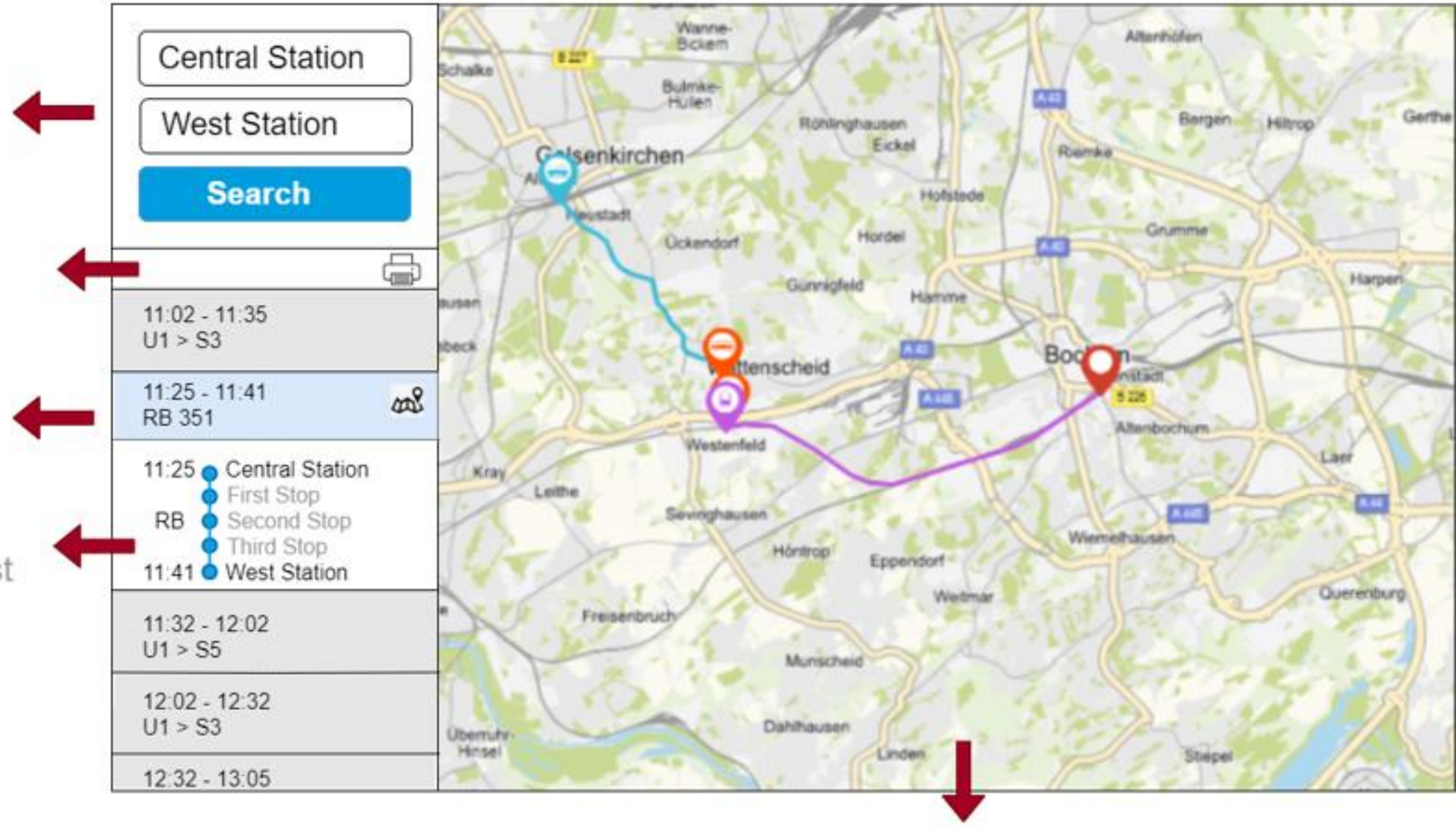
Journey Planner

① Point Search: StopFinder-Request

③ Print (PDF): TripRelation-Request

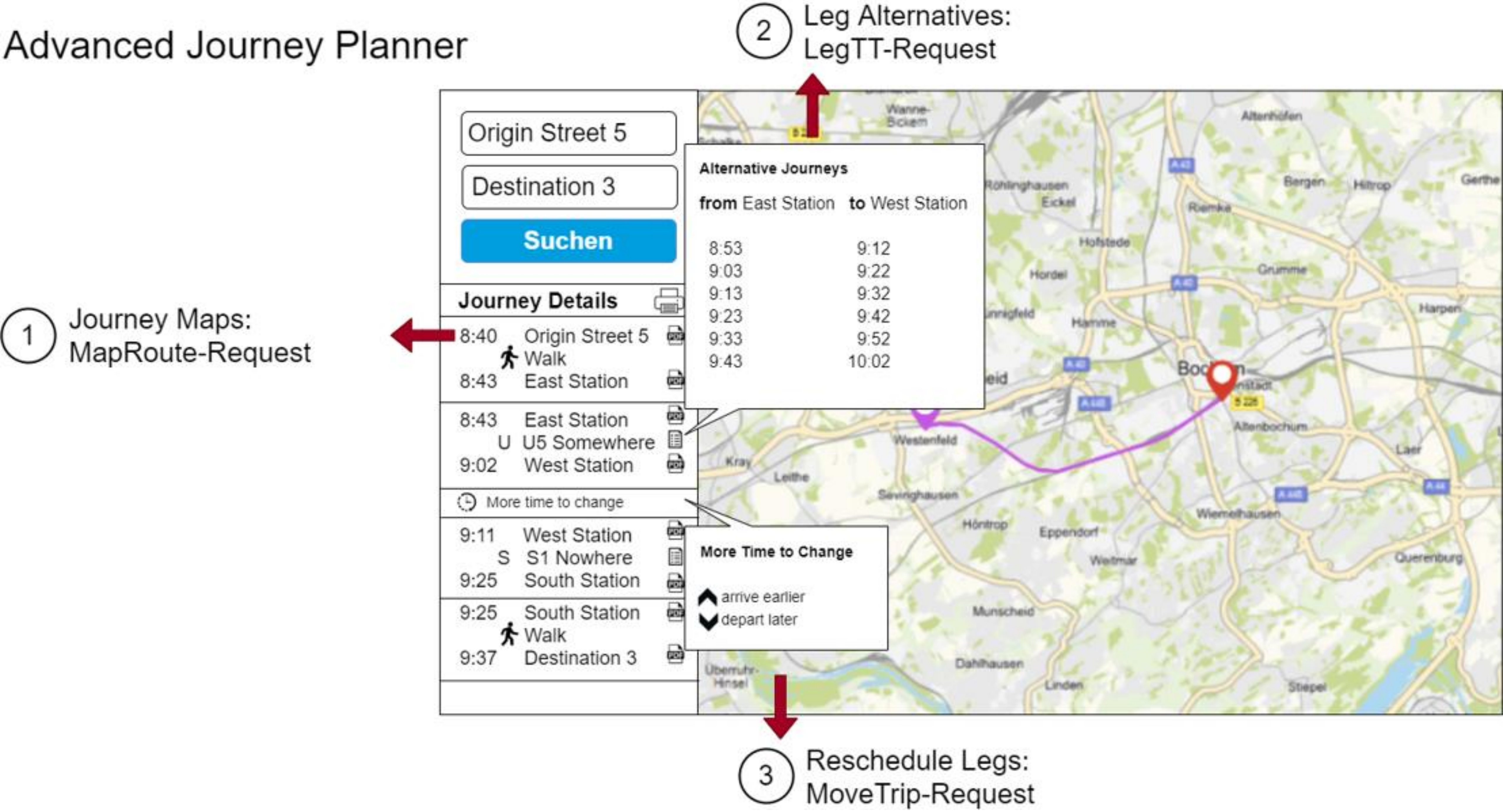
② Journey Planner: Trip-Request

④ Passed Stops: TripStopTimes-Request



⑤ Line Sequence and Passed Stops: StopSeqCoord-Request

Advanced Journey Planner



8:40		Origin Street 5
		Walk
8:43		East Station
8:43		East Station
	U	U5 Somewhere
9:02		West Station
9:11		West Station
	S	S1 Nowhere
9:25		South Station
9:25		South Station
		Walk
9:37		Destination 3

Alternative Journeys

from East Station	**to** West Station
8:53	9:12
9:03	9:22
9:13	9:32
9:23	9:42
9:33	9:52
9:43	10:02

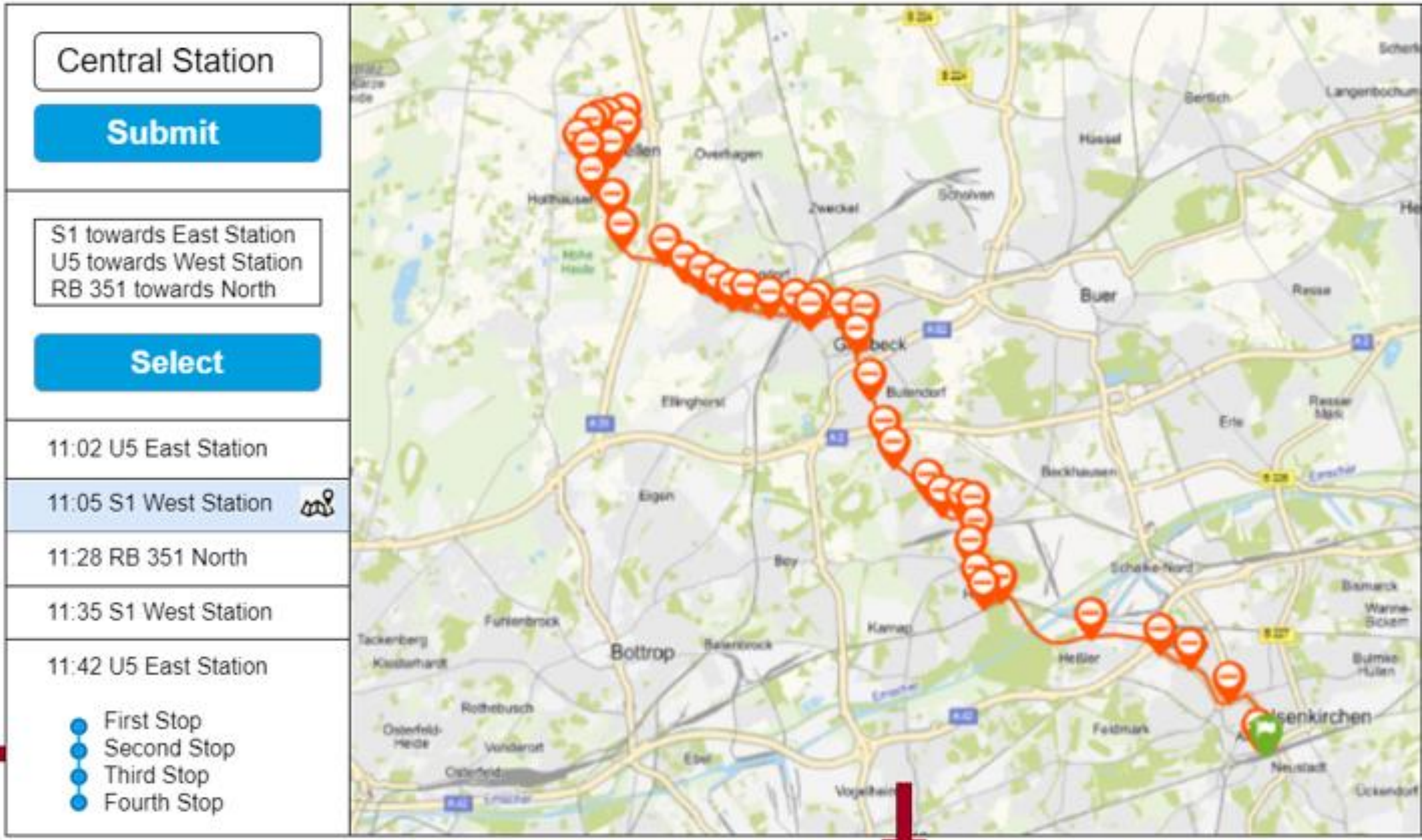
Departure Board

1 Point Search: StopFinder-Request

2 Line Search: ServingLines-Request

3 Departure Board: DM-Request

4 Passed Stops: TripStopTimes-Request



Central Station

S1 towards East Station
U5 towards West Station
RB 351 towards North

11:02 U5 East Station
11:05 S1 West Station
11:28 RB 351 North
11:35 S1 West Station
11:42 U5 East Station

- First Stop
- Second Stop
- Third Stop
- Fourth Stop

5 Line Sequence and Passed Stops: StopSeqCoord-Request

Introduction – Use Cases
Print Products

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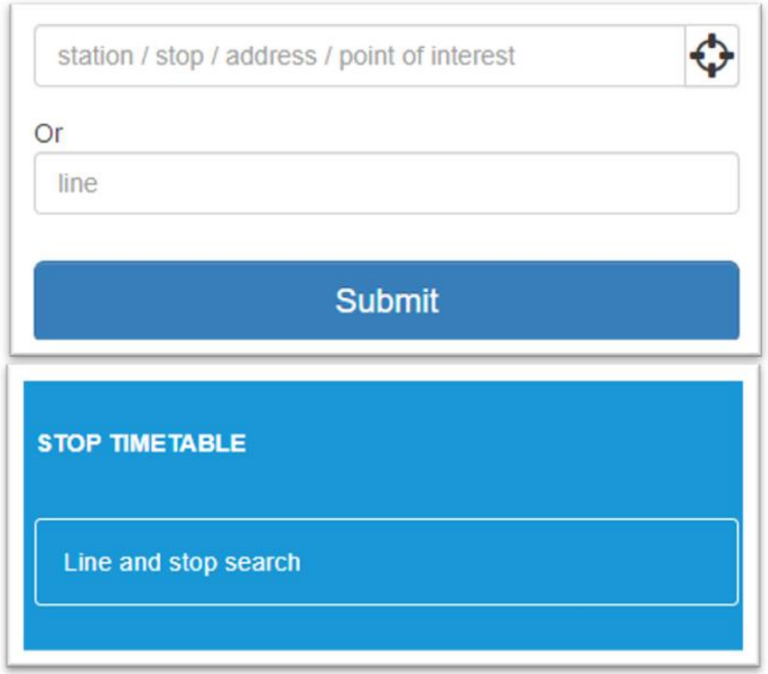
- JSON out output includes base64 encoded stream
- Refer to a stop, a line or a passed stop of a line

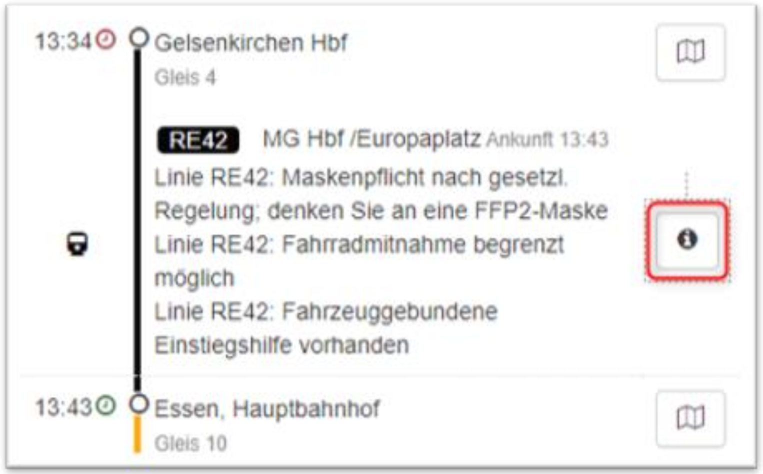
Starting Point: Stop Search

- Stop search with the StopFinder-Request
- If a serving line required: use ServingLines-Request and `mode=odv` to request serving lines of the previously identified stop

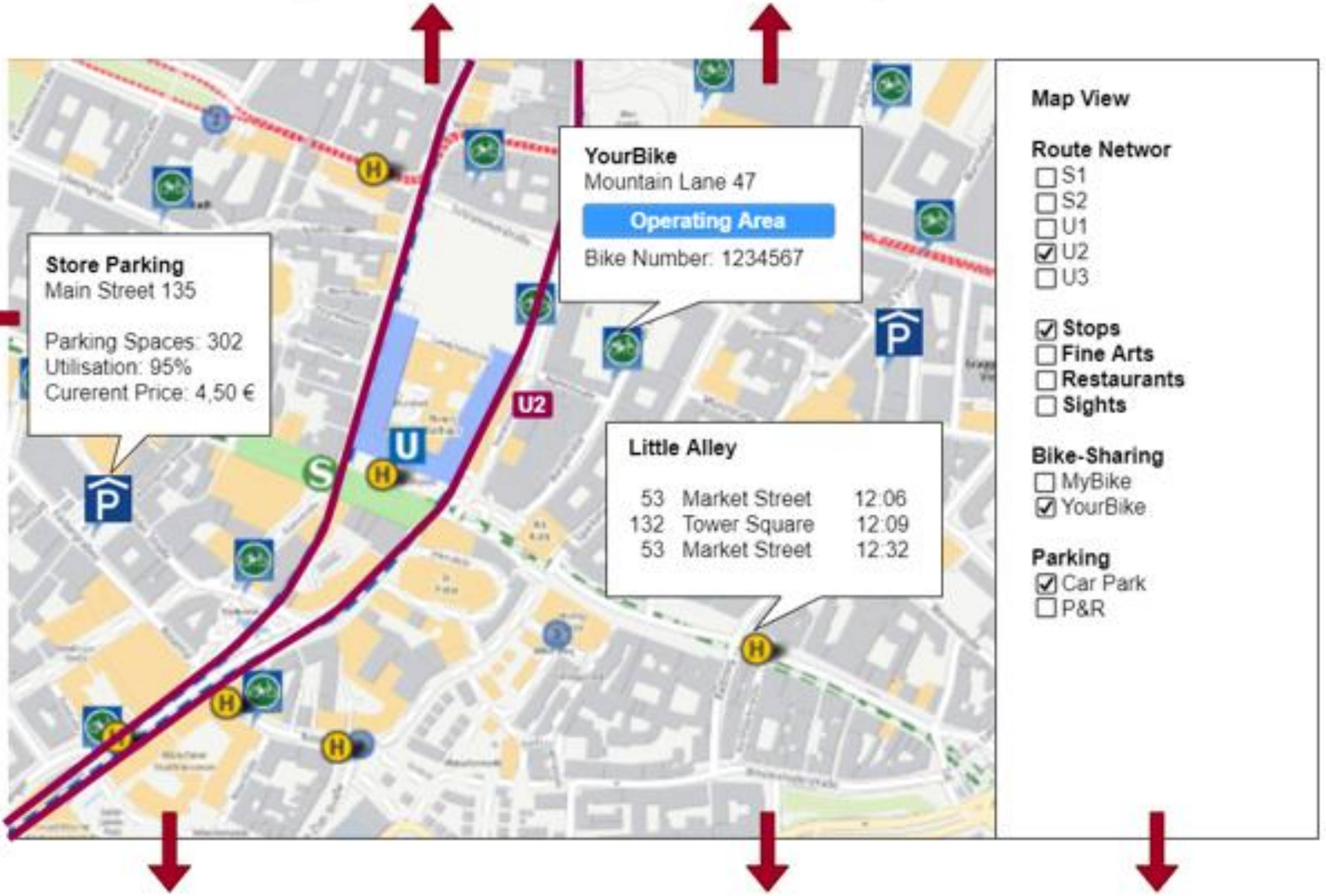
Starting Point: Line Search

- Line search with the ServingLines-Request and `mode=line`
- If a passed stop is required: use LineStopSeq-Request to request passed stops of the previously identified line




13:34 Gelsenkirchen Hbf
Gleis 4
RE42 MG Hbf /Europaplatz Ankunft 13:43
Linie RE42: Maskenpflicht nach gesetzl. Regelung; denken Sie an eine FFP2-Maske
Linie RE42: Fahrradmitnahme begrenzt möglich
Linie RE42: Fahrzeuggebundene Einstiegshilfe vorhanden
13:43 Essen, Hauptbahnhof
Gleis 10

Interactive Map


3 Lines: GeoObject-Request
5 Sharer Details: CoordInfo-Request
6 Operating Areas: OpArea-Request
7 Park Object Details: ParkObject-Request
1 Map Objects (Stops, POI (with hierarchy), Sharer, Park Objects): CoordInfo-Request
4 Departure Board: DM-Request
2 Sharing Operator: OpArea-Request
U2

Store Parking
Main Street 135

Parking Spaces: 302
Utilisation: 95%
Curerent Price: 4,50 €

YourBike
Mountain Lane 47
Operating Area
Bike Number: 1234567

Little Alley

53	Market Street	12:06
132	Tower Square	12:09
53	Market Street	12:32

Map View

Route Networ
- ☐ S1
- ☐ S2
- ☐ U1
- ☑ U2
- ☐ U3

- ☑ Stops
- ☐ Fine Arts
- ☐ Restaurants
- ☐ Sights

Bike-Sharing
- ☐ MyBike
- ☑ YourBike

Parking
- ☑ Car Park
- ☐ P&R

Introduction – Input and Output Request

A request is structured as follows:

```
http://server:port/virt_dir/request?HTTP_parameters
```

Example (Trip-Request)

```
http://osm.demo.mentz.net/training/XML_TRIP_REQUEST2?commonMacro=tri
p
```

Introduction – Input and Output Configuration of the Training System

The following HTTP parameters are set automatically for every request via configuration or parameter injection:

- `outputFormat=rapidJSON` (activates the JSON API)
- `coordOutputFormat=WGS84[dd.ddddd]` (coord format set to WGS 84)
- `locationServerActive=1` (activates EFALocationServer for locality search)

Note: Parameter injection works only for requests with HTTP parameters

Introduction – HTTP Parameter Macros

HTTP parameter macros are HTTP parameters which combine several HTTP parameters. They are defined in the EFA configuration.

Advantages:

- Shorter URLs
- Same set of standard HTTP parameters for each request
- (Standard) parameters can be changed without changing the user interface
- Send more than one HTTP parameter by a HTML input element (e.g. checkbox, drop down list)

Introduction – Analysis Tools

Analyze the Request Parameters

The following tools are useful to analyze the request parameters. Use this for debugging or to have a closer look at the demo Journey Planner:

`https://efademo.mentz.net/sl3+/trip`

Fiddler (freeware):

- Web debugging proxy, which is logging the HTTP(S) traffic
- https://www.telerik.com/fiddler

Browser Developer Tools:

- Analyze HTML/CSS
- JavaScript debugger
- Analysis of performance, headers, requests,...

Analyze the JSON Response

The following tools are useful to analyze the JSON response

JSONView (addon for Chrome/Firefox):

- Formatting of JSON

Common Functionality

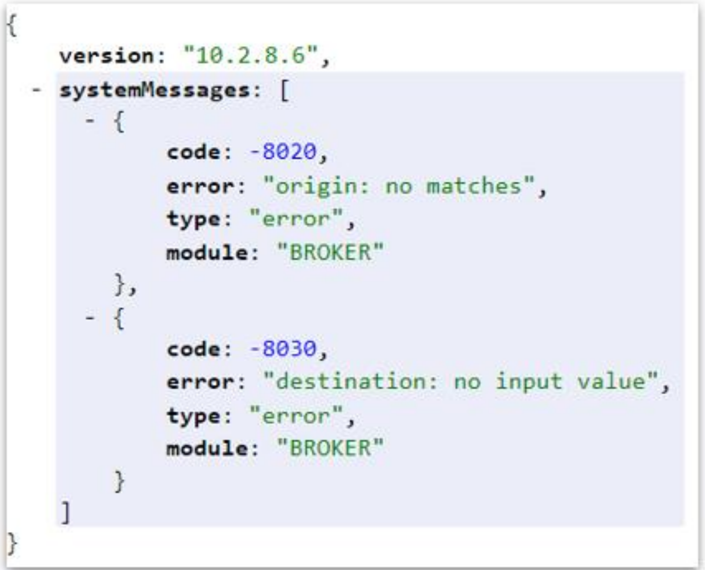
Common Functionality – Table of Contents

Common Functionality – Error Handling

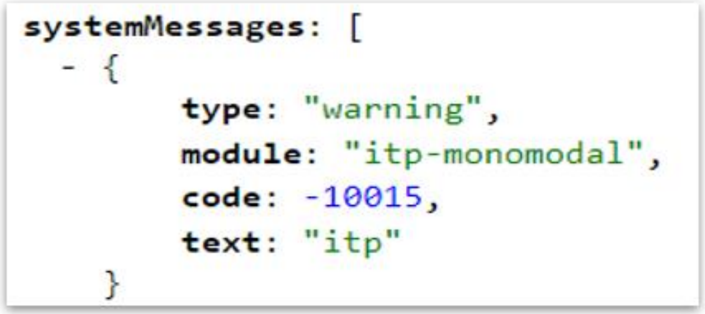
Error messages are handled by the array `systemMessages`.

- `code` is not unique!
- `error` provides a description of the error
- `type` can be message or error
- `module` indicates on which EFA module the error occurred

Refer to document *EFA9-10_Errorcodes_V1.1_en.docx.*



```
{
    version: "10.2.8.6",
  - systemMessages: [
      - {
            code: -8020,
            error: "origin: no matches",
            type: "error",
            module: "BROKER"
        },
      - {
            code: -8030,
            error: "destination: no input value",
            type: "error",
            module: "BROKER"
        }
    ]
}
```



```
systemMessages: [
  - {
        type: "warning",
        module: "itp-monomodal",
        code: -10015,
        text: "itp"
    }
```

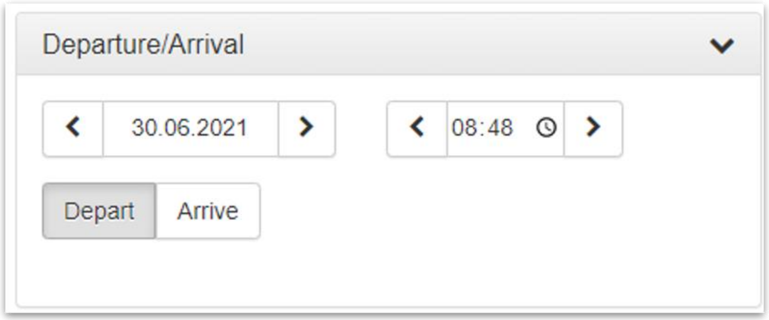
Common Functionality – Date and Time Input and JSON Ouput

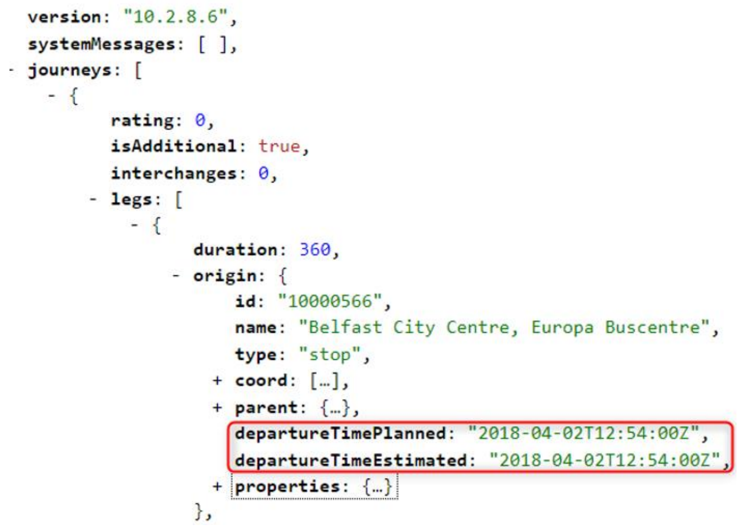
Input

- The input of date and time is optional.
  If not requested differently the current date and time of the server are requested.
- The input date and time corresponds to the server date and time.

JSON Output

- The output corresponds to UTC format (ISO 8601)
- One date and time refers to the scheduled (planned) time,
  the other date and time can contain realtime information (estimated).





```
  version: "10.2.8.6",
  systemMessages: [ ],
- journeys: [
  - {
        rating: 0,
        isAdditional: true,
        interchanges: 0,
      - legs: [
        - {
              duration: 360,
            - origin: {
                  id: "10000566",
                  name: "Belfast City Centre, Europa Buscentre",
                  type: "stop",
                + coord: […],
                + parent: {…},
                  departureTimePlanned: "2018-04-02T12:54:00Z",
                  departureTimeEstimated: "2018-04-02T12:54:00Z",
                + properties: {…}
              },
```

Common Functionality – Date and Time Parameters to choose a Date

Parameter	Description	Format
itdDate	year, month and day	YYYYMMDD | JJMMDD
itdDateDay	day	DD | D
itdDateMonth	month	MM | M
itdDateYear	year	YYYY | YY
itdDateYearMonth	year and month	YYYYMM
itdDateDayMonthYear	day, month and year	DDMMYYYY | DDMMYY | DDxMMxYYYY*

* x stands for any separator

Examples for the Use of different Date Parameters

```
http://osm.demo.mentz.net/training/XML_TRIP_REQUEST2?
ext_macro=trip&type_origin=any&name_origin=10000566&t
ype_destination=1&name_destination=10000011&itdDate=2
0210402

http://osm.demo.mentz.net/training/XML_TRIP_REQUEST2?
ext_macro=trip&type_origin=any&name_origin=10000566&t
ype_destination=1&name_destination=10000011&itdDateDa
y=2&itdDateMonth=4&itdDateYear=2021
```

Common Functionality – Date and Time
Parameters to choose a Time

Parameter	Description	Format
itdTime	hour and minute	HHMM | HH:MM | HH.MM | HHMMa* | HHMMh** | HHMMp*
itdTimeHour	hour	HH | H
itdTimeMinute	minute	MM| M
timeOffset	offset to the current time (in minutes)	MM| M
itdTimeAMPM	Time is am or pm*	am | pm

* Anglo-American format: „am“ and „pm“
** 24-hour-Format

Examples for the Use of different Time Parameters

```
http://osm.demo.mentz.net/training/XML_TRIP_REQUEST2?
commonMacro=trip&type_origin=any&name_origin=5000350&
type_destination=1&name_destination=5006052&itdTime=1
654
```

```
http://osm.demo.mentz.net/training/XML_TRIP_REQUEST2?
commonMacro=trip&type_origin=any&name_origin=5000350&
type_destination=1&name_destination=5006052&itdTimeHo
ur=17&itdTimeMinute=30
```

SystemInfo-Request

SystemInfo-Request – Input and Output

Request to get information about the EFA system and validity information of the data.

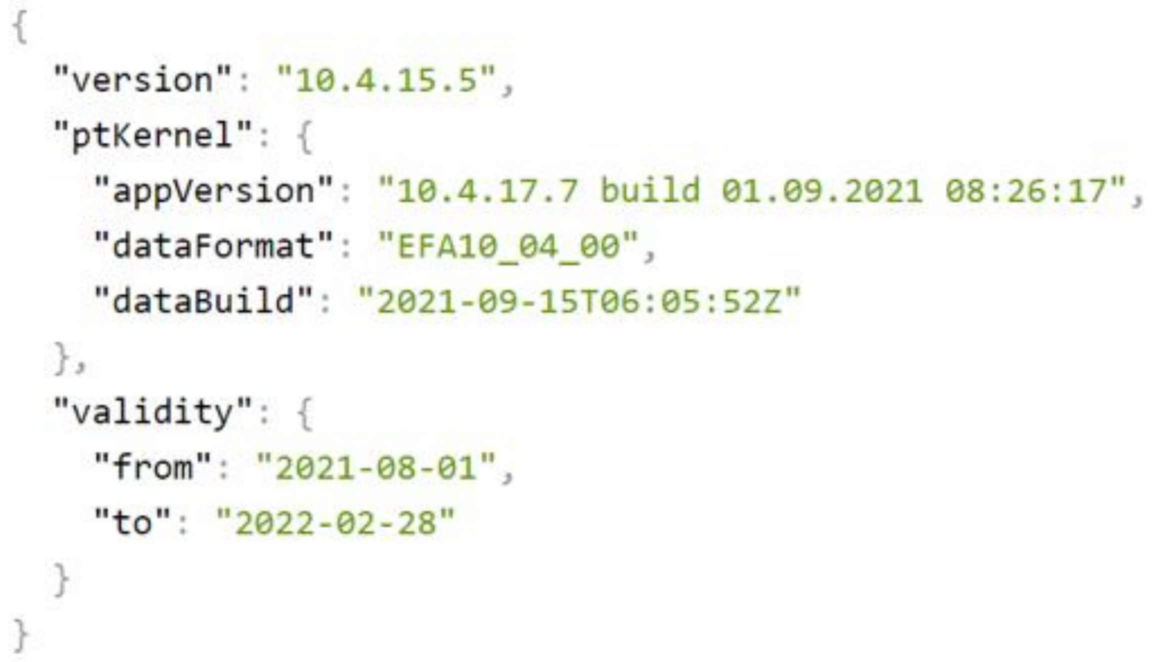
Request

`http://osm.demo.mentz.net/training/XML_SYSTEMINFO_REQUEST?commonMacro=system`

These parameters are given by parameter injection or configuration:

- `outputFormat=rapidJSON` (activates the JSON API)

Remember: Parameter injection workes only for request with HTTP parameters.



```
{
  "version": "10.4.15.5",
  "ptKernel": {
    "appVersion": "10.4.17.7 build 01.09.2021 08:26:17",
    "dataFormat": "EFA10_04_00",
    "dataBuild": "2021-09-15T06:05:52Z"
  },
  "validity": {
    "from": "2021-08-01",
    "to": "2022-02-28"
  }
}
```

StopFinder-Request

StopFinder-Request – Table of Contents

StopFinder-Request – Input and Output Request

The EFALocationServer is the responsible module for the locality search. The StopFinder-Request is used to search a locality and get its unique ID. All other requests require a unique ID or coordinate as locality input.

Request

```
http://osm.demo.mentz.net/training/XML_STOPFINDER_REQUEST?commonMacr
o=stopfinder
```

Part of the StopFinder-Request

- Error Handling
- Date and Time (Stops can be removed or added. Thus it's a good idea if locality search has the same date as journey planning.)

StopFinder-Request – Input and Output JSON Output

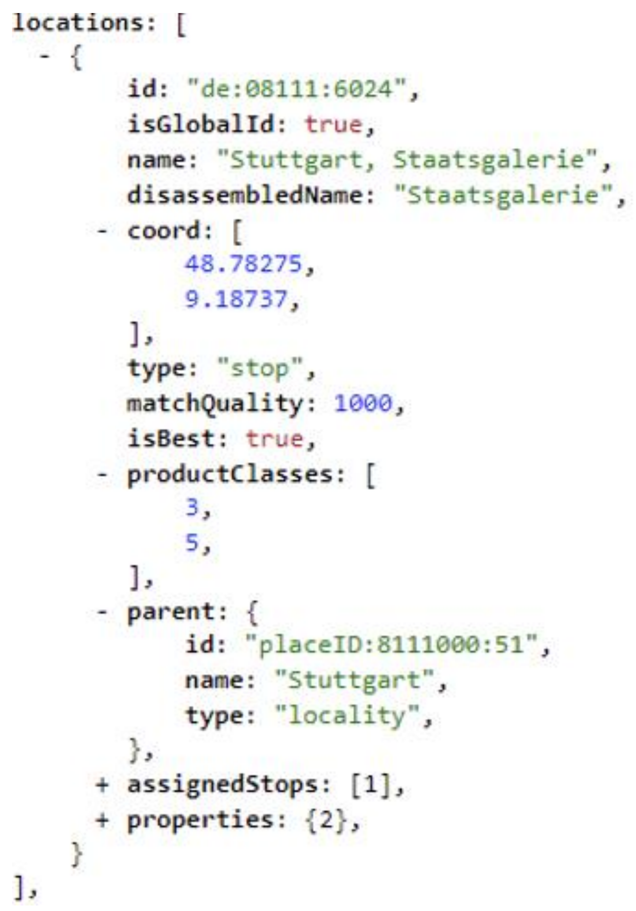
Expamle
`http://osm.demo.mentz.net/training/XML_STOPFINDER_REQUEST?commonMacro=stopfinder&type_sf=any&name_sf=stuttgart staatsgalerie`

JSON Output
`locations` is an array of localities. The locality is specified in more detail by:

- `id` (unique id)
- `name` / `disassembledName`
- `coord` (coordinate)
- `type` (value: `stop, poi, address, street, locality`)
- `productClasses` – array of modes of transport which pass this stop
- `parent` – information about the locality or (in case of a stop point) the stop and locality
- `properties` (additional information)

Additionally in StopFinder-Request:

- `matchQuality` (quality)
- `isBest` (true for best match)



```
locations: [
  - {
        id: "de:08111:6024",
        isGlobalId: true,
        name: "Stuttgart, Staatsgalerie",
        disassembledName: "Staatsgalerie",
      - coord: [
            48.78275,
            9.18737,
        ],
        type: "stop",
        matchQuality: 1000,
        isBest: true,
      - productClasses: [
            3,
            5,
        ],
      - parent: {
            id: "placeID:8111000:51",
            name: "Stuttgart",
            type: "locality",
        },
      + assignedStops: [1],
      + properties: {2},
    }
],
```

StopFinder-Request – Locality Search Mandatory Parameters

These parameters are given by parameter injection or configuration:

- `outputFormat=rapidJSON` (activates the JSON API)
- `coordOutputFormat=WGS84[dd.ddddd]` (coord format set to WGS 84)
- `locationServerActive=1` (activates EFALocationServer for locality search)

Note: Parameter injection works only for requests with HTTP parameters.

Further customer spezific parameters could be included in an HTTP parameter macro **`commonMacro=stopfinder`**.

StopFinder-Request – Locality Search
Mandatory Parameters

`name_<usage>`
Search string/name of the locality (e.g. stop, POI, address) or coordinate (e.g. via click on the interactive map).

`type_<usage> = any | coord`
Tighter specification of the locality. For EFALocationServer the value is always `any`. For coordinate input the value is `coord`.

Parameter Suffix for Locality Input
The parameter suffix `<usage>` for StopFinder-Request is `sf`. Thus parameters are named `name_sf` and `type_sf`.

StopFinder-Request – Locality Search
Excursus: Parameter Suffix for Locality Input

Some requests require more than one locality, e.g. journey planning requires an origin and a destination. To distinguish the parameters, they have a suffix `<usage>`. The suffix differs from request to request. Some examples:

- `origin` (Trip-Request, PS-Request)
- `Destination` (Trip-Request, PS-Request)
- `via` (Trip-Request)
- `dm` (DepartureMonitor-Request)
- …

StopFinder-Request – Locality Search
Search Criteria/Filters

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Find the right search criteria/filters is a design task. It should be included in an HTTP parameter macro **`commonMacro=stopfinder`** in configuration. It could include:

- `anyMaxSizeHitList=30` (maximum size of hit list, criterion: match quality)
- `anySigWhenPerfectNoOtherMatches=1` (no other result for perfect matches)
- Other search criteria defined by customer (e.g. region filter, preferance of regions, preferance of stops served by certain modes of transports)

StopFinder-Request – Locality Search
Selection from a List

Challenge

Search the stop *Stuttgart Fernsehturm*. Use the StopFinder-Request `XML_STOPFINDER_REQUEST`.

Remember: The parameter suffix `<usage>` is `sf`.

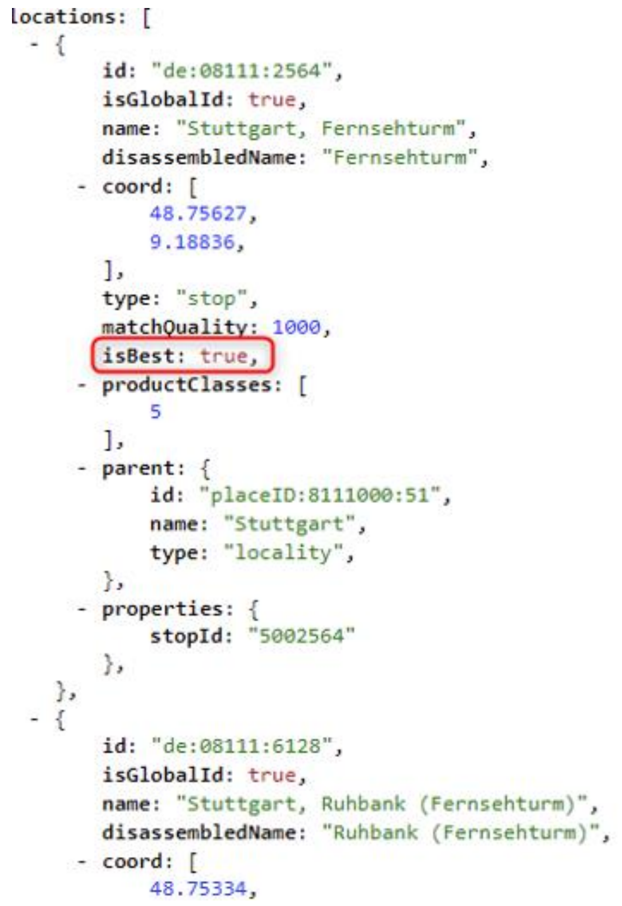
StopFinder-Request – Locality Search Selection from a List

Solution
`http://osm.demo.mentz.net/training/XML_STOPFINDER_REQUEST?commonMacro=stopfinder&type_sf=any&name_sf=stuttgart fernsehturm`

The result is a list!

- If a locality search finds more than one hit for the input, the array `locations` contains more than one element.
- The best matching hit is marked by the element `isBest` with value `true`.
- Use the unique ID `id` or (in case of `isGlobalId=true`) `properties/stopID` for locality input. Or `id` if global IDs are required.

Challenge
Select the best matching hit.

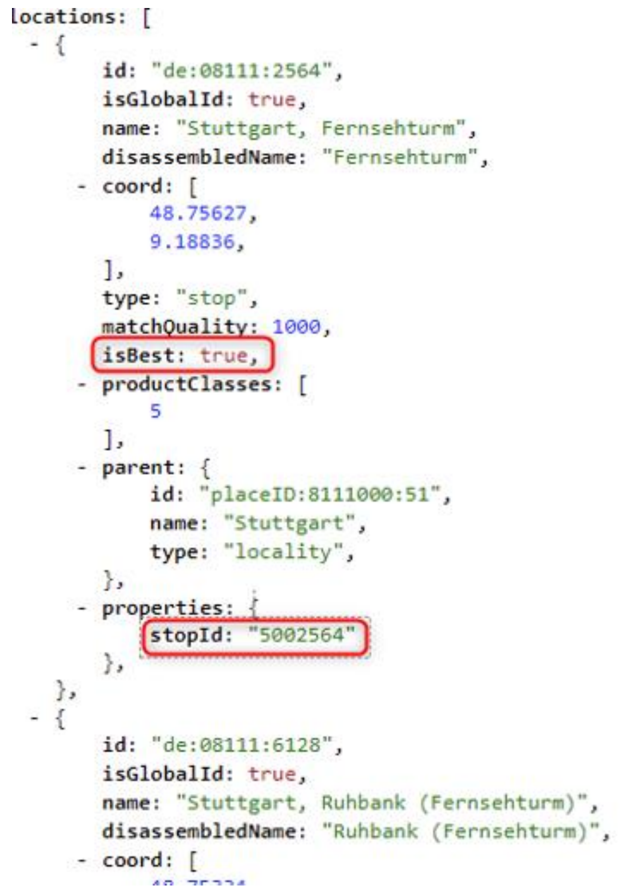


```
locations: [
 - {
        id: "de:08111:2564",
        isGlobalId: true,
        name: "Stuttgart, Fernsehturm",
        disassembledName: "Fernsehturm",
      - coord: [
            48.75627,
            9.18836,
        ],
        type: "stop",
        matchQuality: 1000,
        isBest: true,
      - productClasses: [
            5
        ],
      - parent: {
            id: "placeID:8111000:51",
            name: "Stuttgart",
            type: "locality",
        },
      - properties: {
            stopId: "5002564"
        },
    },
 - {
        id: "de:08111:6128",
        isGlobalId: true,
        name: "Stuttgart, Ruhbank (Fernsehturm)",
        disassembledName: "Ruhbank (Fernsehturm)",
      - coord: [
            48.75334,
```

StopFinder-Request – Locality Search Selection from a List

Solution

http://osm.demo.mentz.net/training/XML_STOPFINDER_REQUEST?commonMacro=stopfinder&type_sf=any&name_sf=5002564



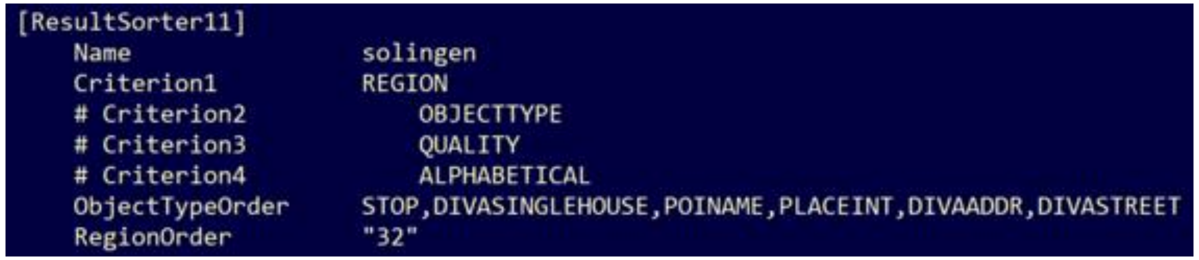
```
locations: [
  - {
        id: "de:08111:2564",
        isGlobalId: true,
        name: "Stuttgart, Fernsehturm",
        disassembledName: "Fernsehturm",
      - coord: [
            48.75627,
            9.18836,
        ],
        type: "stop",
        matchQuality: 1000,
        isBest: true,
      - productClasses: [
            5
        ],
      - parent: {
            id: "placeID:8111000:51",
            name: "Stuttgart",
            type: "locality",
        },
      - properties: {
            stopId: "5002564"
        },
    },
  - {
        id: "de:08111:6128",
        isGlobalId: true,
        name: "Stuttgart, Ruhbank (Fernsehturm)",
        disassembledName: "Ruhbank (Fernsehturm)",
      - coord: [
```

StopFinder-Request – Locality Search
Sort Order of the List

If the list of hits is presented to the user for selection, it should be sorted.
Best way is to do it in configuration.

`anyResSort_<usage> = <Name>`
EFALocationServer can sort the results. Sort order ist defined in configuration.
This parameter chooses the sorter.

Example parameter: `anyResSort_sf=solingen`



```
[ResultSorter11]
    Name                solingen
    Criterion1          REGION
    # Criterion2            OBJECTTYPE
    # Criterion3            QUALITY
    # Criterion4            ALPHABETICAL
    ObjectTypeOrder     STOP,DIVASINGLEHOUSE,POINAME,PLACEINT,DIVAADDR,DIVASTREET
    RegionOrder         "32"
```

StopFinder-Request – Locality Search Filters (Examples)

`anyObjFilter_<usage>`

- The locality search may be limited to certain types of objects using this filter parameter.
- The value of the parameter is a bit mask.
- The individual object types can be combined.

Example: If the search space for the start point should be limited to bus stops and points of interests (2 + 32), the filter should be set to `anyObjFilter_origin=34`.

Challenge

Search for stops *Stuttgart Bad Cannstatt* using the StopFinder-Request.

Value	Description
0	complete search area
1	locations
2	stop IDs and alias names of stops
4	streets
8	addresses
16	Intersections
32	POIs IDs and alias names of POIs
64	post codes

StopFinder-Request – Locality Search Filters (Examples)

Solution

```
http://osm.demo.mentz.net/training/XML_STOPFINDER_REQUEST?commonMacr
o=stopfinder&type_sf=any&name_sf=stuttgart bad
cannstatt&anyObjFilter_sf=2
```

StopFinder-Request – Locality Input
Unique ID

The unique ID determined by StopFinder-Request may be used as an input for any request.

Use the following parameters:

- `name_<usage>`
- `type_<usage> = any`

Alternative: coordinates.

StopFinder-Request – Locality Input Coordinate Input

- A coordinate is entered by the parameter `type_<usage>=coord` and `name_<usage>=<x>:<y>:<coordinate format>:<free text>`.
- The value of `name_<usage>` is composed of three required values and an optional value separated by colon. `<x>` and `<y>` are the x- and the y-coordinate.
- `<coordinate format>` describes the coordinate format. Pre-defined default format for the training server is `WGS84[dd.ddddd]`.
- The last value `<free text>` is optional. If no free text is available the system tries to snap to the nearest street.

Examples

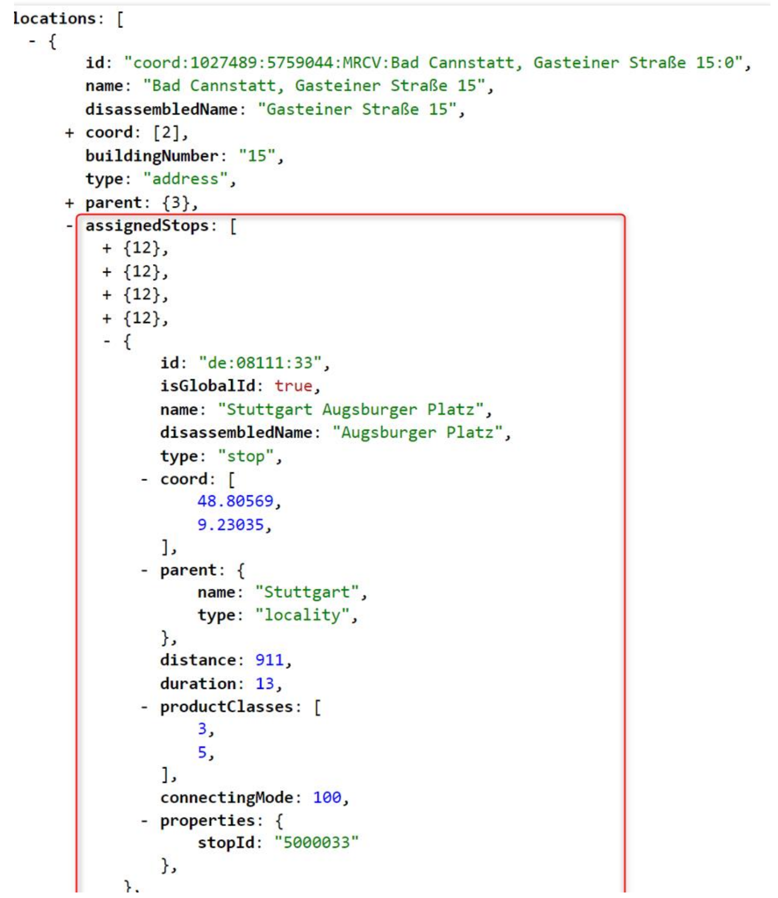
```
http://osm.demo.mentz.net/training/XML_STOPFINDER_REQUEST?commonMacro=stopfinder&type_sf=coord&name_sf=9.23:48.80:WGS84[dd.ddddd]

http://osm.demo.mentz.net/training/XML_STOPFINDER_REQUEST?commonMacro=stopfinder&type_sf=coord&name_sf=9.23:48.80:WGS84[dd.ddddd]:A nice place
```

StopFinder-Request – Nearby Stops

- Some requests require a uniquely identified stop, e.g. timetable.
- In the case of addresses or POIs an additional step is necessary: the selection of a nearby stop (e.g. the one with the shortest distance).
- More complex stops or stations, for example a central station, can be modelled by several stops.
- The array of stops is called `assignedStops`. Its default maximum length is 10.
- To choose a nearby stop the unique ID can be used.

Example
`http://osm.demo.mentz.net/training/XML_STOPFINDER_REQUEST?commonMacro=stopfinder&type_sf=coord&name_sf=9.23:48.80:WGS84[dd.ddddd]`



```
locations: [
 - {
       id: "coord:1027489:5759044:MRCV:Bad Cannstatt, Gasteiner Straße 15:0",
       name: "Bad Cannstatt, Gasteiner Straße 15",
       disassembledName: "Gasteiner Straße 15",
     + coord: [2],
       buildingNumber: "15",
       type: "address",
     + parent: {3},
     - assignedStops: [
         + {12},
         + {12},
         + {12},
         + {12},
         - {
               id: "de:08111:33",
               isGlobalId: true,
               name: "Stuttgart Augsburger Platz",
               disassembledName: "Augsburger Platz",
               type: "stop",
             - coord: [
                   48.80569,
                   9.23035,
               ],
             - parent: {
                   name: "Stuttgart",
                   type: "locality",
               },
               distance: 911,
               duration: 13,
             - productClasses: [
                   3,
                   5,
               ],
               connectingMode: 100,
             - properties: {
                   stopId: "5000033"
               },
           },
```

StopFinder-Request – Nearby Stops

MENTZ

Suppress the Search for Nearby Stops

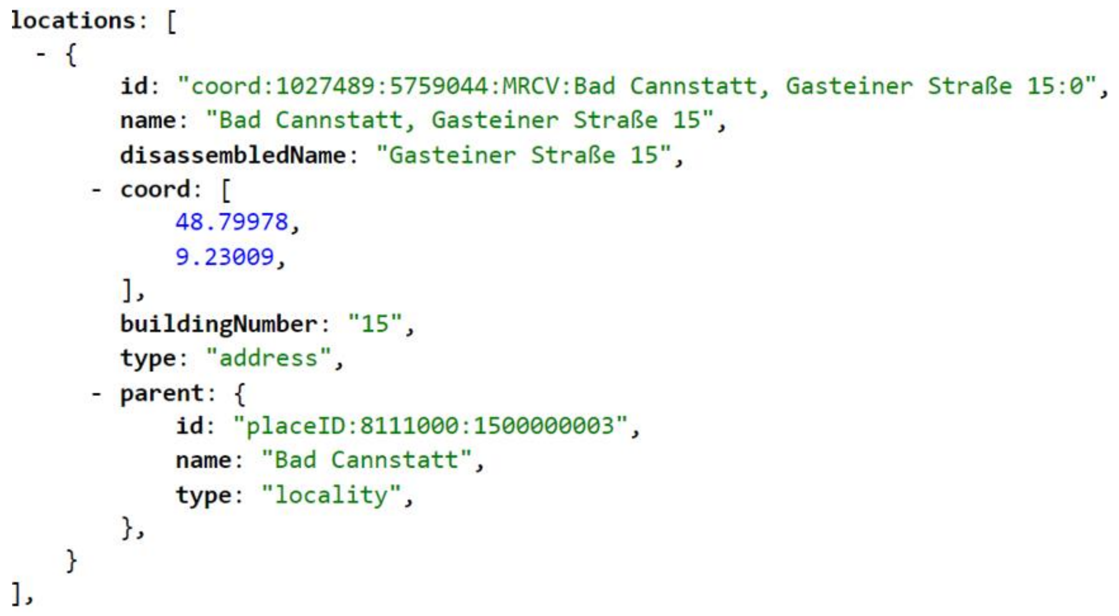
StopFinder-Request searches by default for (nearby) stops. In some cases nearby stops are not required, e.g. for the autosuggest list. Suppress the search to improve performance!

`doNotSearchForStops_<usage> = 1`

Prevents the search for nearby stops. It should be used to increase the performance whenever the routing should not consider public transport.

Example

`http://osm.demo.mentz.net/training/XML_STOPFINDER_REQUEST?commonMacro=stopfinder&type_sf=coord&name_sf=9.23:48.80:WGS84[dd.ddddd]&doNotSearchForStops_sf=1`



```
locations: [
  - {
        id: "coord:1027489:5759044:MRCV:Bad Cannstatt, Gasteiner Straße 15:0",
        name: "Bad Cannstatt, Gasteiner Straße 15",
        disassembledName: "Gasteiner Straße 15",
      - coord: [
            48.79978,
            9.23009,
        ],
        buildingNumber: "15",
        type: "address",
      - parent: {
            id: "placeID:8111000:1500000003",
            name: "Bad Cannstatt",
            type: "locality",
        },
    }
],
```

StopFinder-Request – Default Text

Do not send any “default text” to the EFA system. EFALocationServer gives its best to propose localities. For a default text this does not make any sense and the results will confuse the user. If no program driven is possible use this parameter:

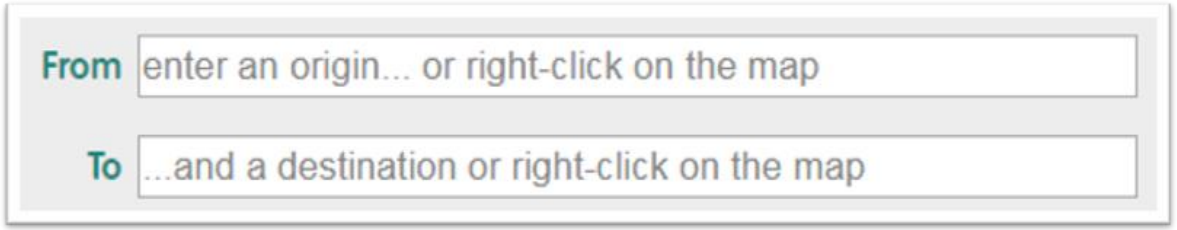
`nameDefaultText_<usage>`

The value of this parameter is a text which is not considered for the locality search of the input given in `name_<usage>`.

Example

```
http://osm.demo.mentz.net/training/XML_STOPFINDER_REQ
UEST?commonMacro=stopfinder&type_sf=any&name_sf=enter
an origin... or right-click on the map

http://osm.demo.mentz.net/training/XML_STOPFINDER_REQ
UEST?commonMacro=stopfinder&type_sf=any&name_sf=enter
an origin... or right-click on the
map&nameDefaultText_sf=enter an origin... or right-
click on the map
```



From enter an origin... or right-click on the map

To ...and a destination or right-click on the map

Trip-Request

Trip-Request – Table of Contents

Trip-Request – Input and Output Request

The Trip-Request calculates journeys to a given origin and destination. Date, time, via locality and travel options are optional. The output includes travel options, optionally with realtime information.

Request

```
http://osm.demo.mentz.net/training/XML_TRIP_REQUEST2?commonMacro=trip
```

Part of the Trip-Request

- Error Handling
- Date and Time
- Locality Input (as described per StopFinder-Request)

TripRequest – Input and Output Mandatory Parameters

Parameters for the Interface

These parameters are given by parameter injection or configuration:

- `outputFormat=rapidJSON` (activates the JSON API)
- `coordOutputFormat=WGS84[dd.ddddd]` (coord format set to WGS 84)
- `locationServerActive=1` (activates EFALocationServer for locality search)

Note: Parameter injection works only for requests with HTTP parameters.

Mandatory Parameters für Trip-Request

These parameters should be included in the HTTP parameter macro **`commonMacro=trip`**:

- `deleteAssignedStops_origin/deleteAssignedStops_destination` (no nearby stops)
- `genC=0`, `genP=0`, `genMaps=0` (prevents output of coordinate sequences, path descriptions and generation of additional pdf files)

Optional customer specific parameters:

Can be added to **`commonMacro=trip`**, e.g.:

- `useUT=1` (enables unified tickets)
- `useRealtime=1` (enables realtime)

Trip-Request – Input and Output
Parameter Suffix for Locality Input

The parameter suffixes `<usage>` are `origin`, `destination` and `via`. The via location is optional.

Callenge

Calculate a journey from the stop *Stuttgart Schwabstraße* to the stop *Stuttgart Feuersee*.
Hint: Trip calculation takes only place if the origin and destination are identified.

Trip-Request – Input and Output
Parameter Suffix for Locality Input

MENTZ

Solution

Step 1: Determine unique IDs for origin and destination, e.g. by StopFinder-Request:

```
http://osm.demo.mentz.net/training/XML_STOPFINDER_REQUEST?commonMacr
o=stopfinder&type_sf=any&name_sf=stuttgart schwabstraße
```

Step 2: Trip calculation with the Trip-Request:

```
http://osm.demo.mentz.net/training/XML_TRIP_REQUEST2?commonMacro=tri
p&type_origin=any&name_origin=5006052&type_destination=any&name_dest
ination=5006221
```

Trip-Request – Input and Output JSON Output

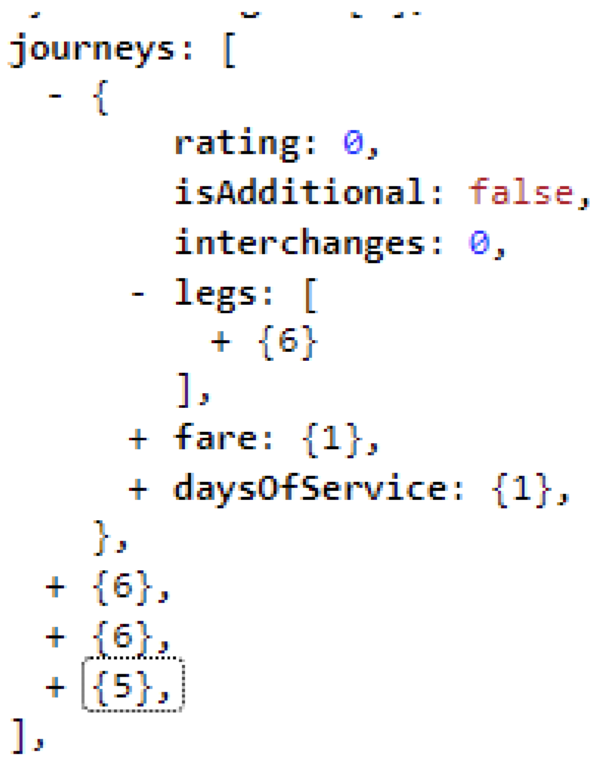
Journeys

`journeys` is an array of journey options. Each journey option contains information about :

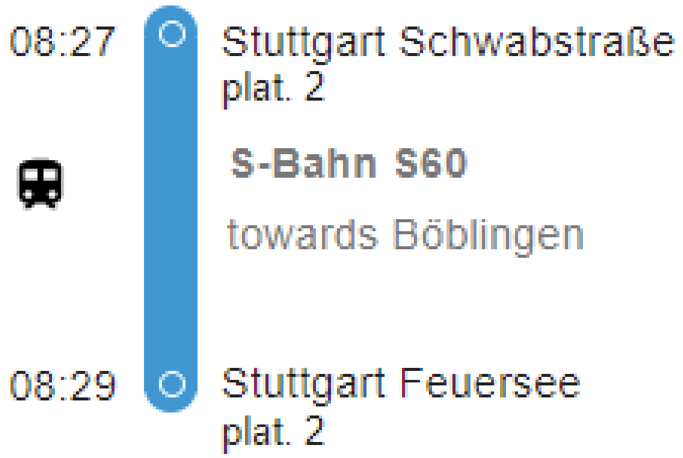
- the number of `interchanges`
- one or more `legs`

And optionally about the :

- `fares`
- and `daysOfService`.



```
journeys: [
  - {
        rating: 0,
        isAdditional: false,
        interchanges: 0,
      - legs: [
          + {6}
        ],
      + fare: {1},
      + daysOfService: {1},
    },
  + {6},
  + {6},
  + {5},
],
```



08:27 Stuttgart Schwabstraße
plat. 2

S-Bahn S60

towards Böblingen

08:29 Stuttgart Feuersee
plat. 2

Trip-Request – Input and Output
JSON Output

Leg

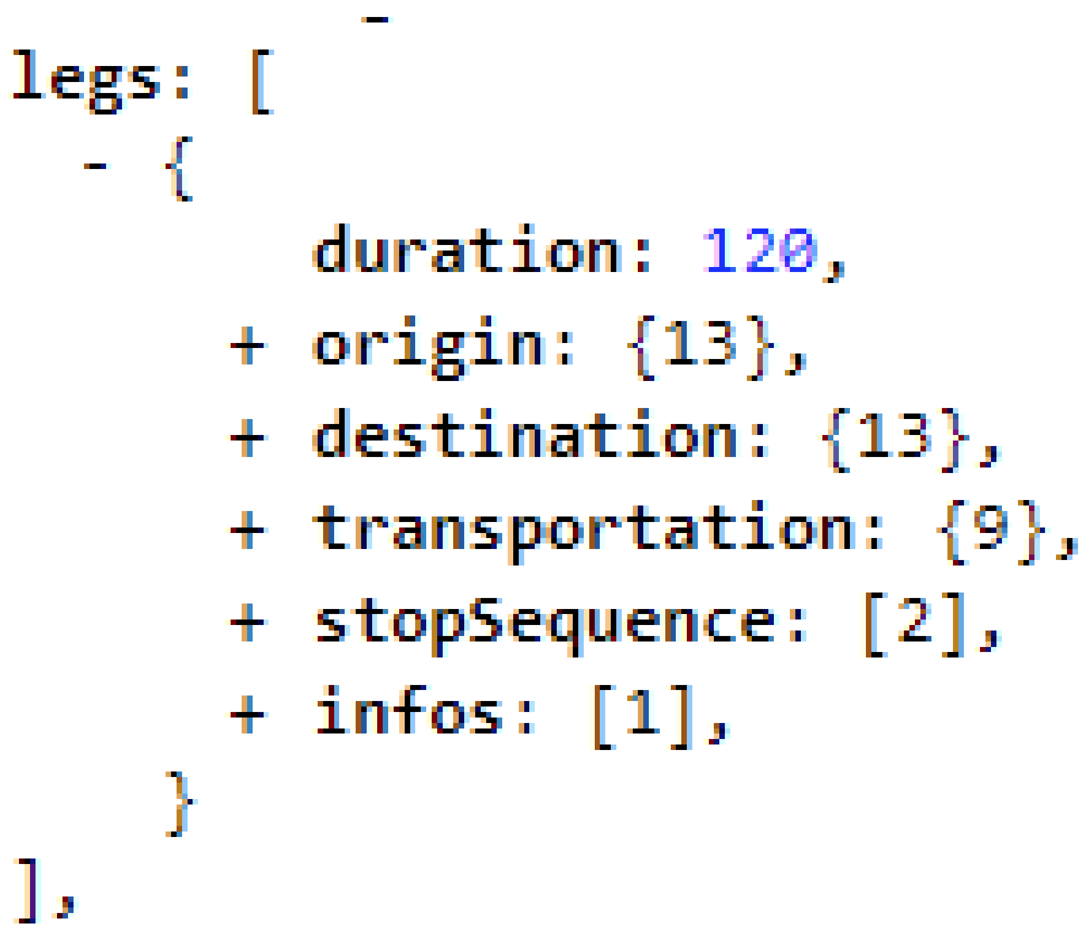
A `leg` includes:

- `duration`
- `origin` and `destination` localities
- `transportation` (mode of transport)
- optionally the `distance` and customer specific `properties` may be included
- optionally `footPathInfo` (interchange footpath, e.g. stairs, elevators)

Public transport legs additionally contain:

- `stopSequence` (sequence of passed stops)

The passed stops have the structure of `location` as described fo StopFinder-Request.



```
legs: [
  - {
        duration: 120,
      + origin: {13},
      + destination: {13},
      + transportation: {9},
      + stopSequence: [2],
      + infos: [1],
    }
],
```

Trip-Request – Input and Output
JSON Output

And optionally:

- `infos` (status updates)
- `hints` (additional information)
- `isRealtimeControlled` (information if the vehicle is realtime controlled)

Unreduced response includes additionally:

- `coords` (array of path coordinates)
- For individual transport turn instructions (`pathDescription`) are available.

Trip-Request – Input and Output JSON Output

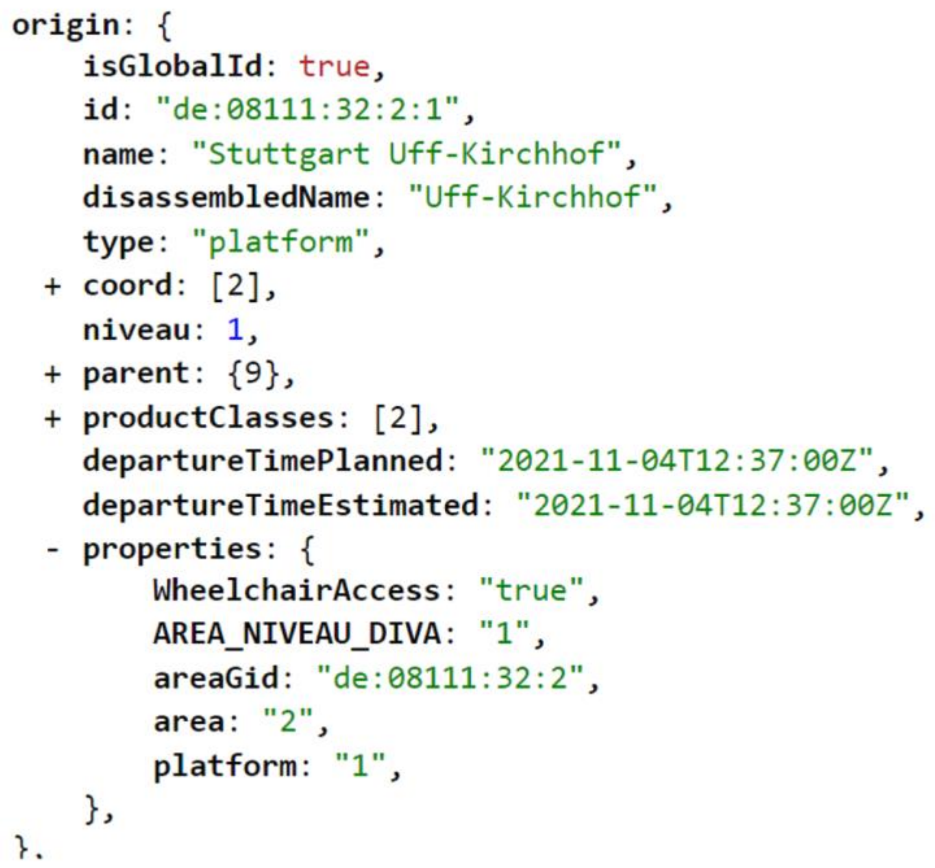
MENTZ

Location

The location (e.g. `origin`, `destination`) is specified as described for StopFinder-Request.

Additionally:

- `epartureTimePlanned/ arrivalTimePlanned` (scheduled departure/arrival time)
- `departureTimeEstimated/ arrivalTimeEstimated` (realtime information)



```
origin: {
    isGlobalId: true,
    id: "de:08111:32:2:1",
    name: "Stuttgart Uff-Kirchhof",
    disassembledName: "Uff-Kirchhof",
    type: "platform",
  + coord: [2],
    niveau: 1,
  + parent: {9},
  + productClasses: [2],
    departureTimePlanned: "2021-11-04T12:37:00Z",
    departureTimeEstimated: "2021-11-04T12:37:00Z",
  - properties: {
        WheelchairAccess: "true",
        AREA_NIVEAU_DIVA: "1",
        areaGid: "de:08111:32:2",
        area: "2",
        platform: "1",
    },
},
```

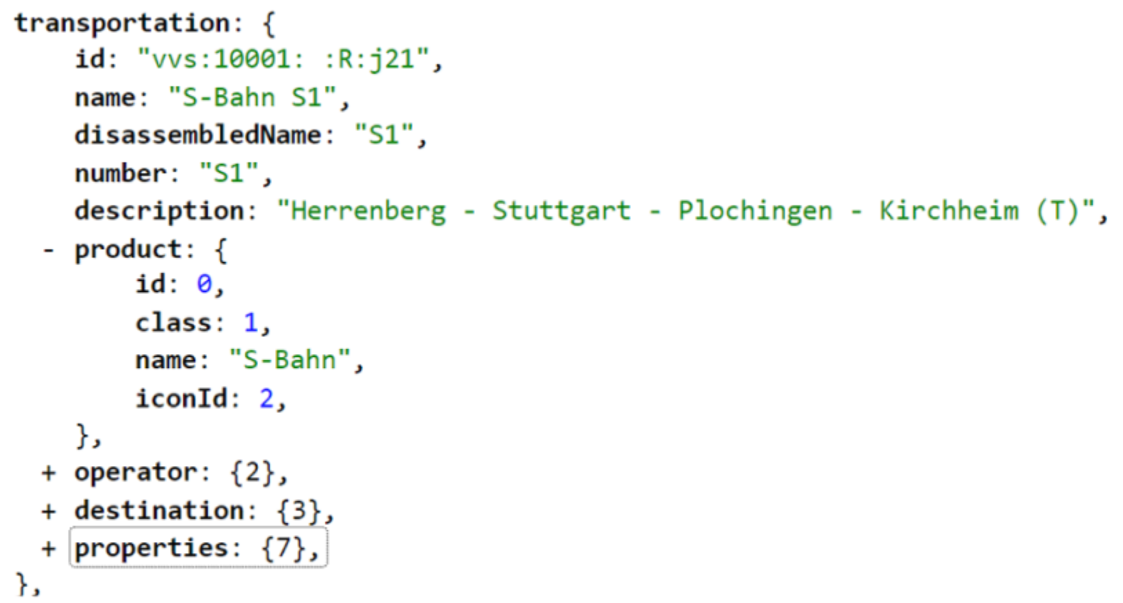
Trip-Request – Input and Output
JSON Output

Transportation

`transprtation` includes information about the mode of transport (public or individual).

Public transport types contain:

- `id` (unique ID)
- `Name/disassembledName`
- `number`
- `description`
- `operator`
- `destination`
- `properties` (includes information about further products available (TTB, STT, ROP))



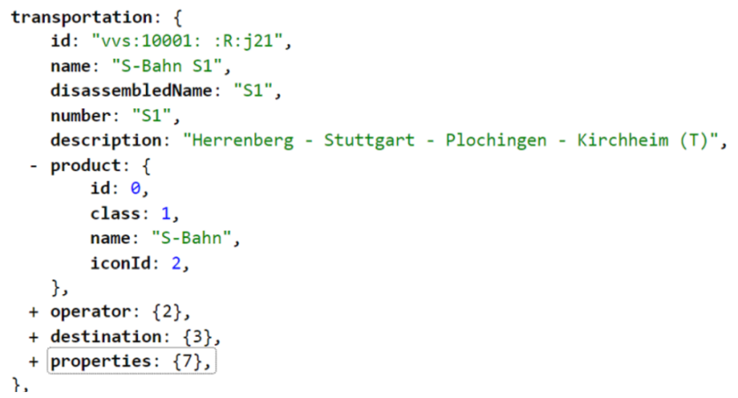
```
transportation: {
    id: "vvs:10001: :R:j21",
    name: "S-Bahn S1",
    disassembledName: "S1",
    number: "S1",
    description: "Herrenberg - Stuttgart - Plochingen - Kirchheim (T)",
  - product: {
        id: 0,
        class: 1,
        name: "S-Bahn",
        iconId: 2,
    },
  + operator: {2},
  + destination: {3},
  + properties: {7},
},
```

Trip-Request – Input and Output
JSON Output

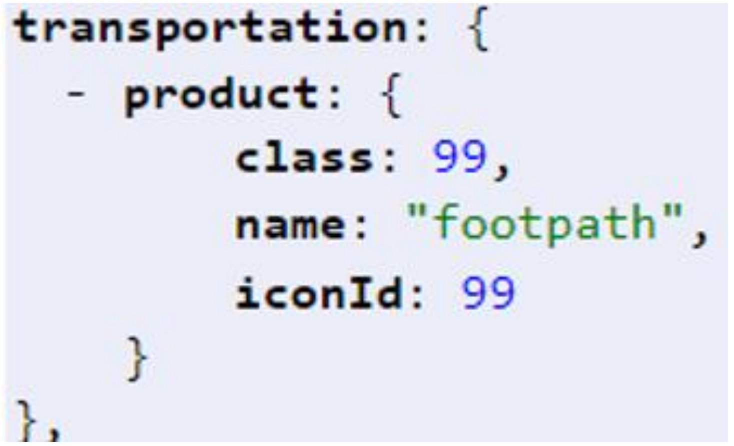
Product

`product` is valid for both public and individual transport:

- `class` (mode of transport)
- `name` (description of mode of transport)
- `iconId` (unique identifier for the icon)



```
transportation: {
    id: "vvs:10001: :R:j21",
    name: "S-Bahn S1",
    disassembledName: "S1",
    number: "S1",
    description: "Herrenberg - Stuttgart - Plochingen - Kirchheim (T)",
  - product: {
        id: 0,
        class: 1,
        name: "S-Bahn",
        iconId: 2,
    },
  + operator: {2},
  + destination: {3},
  + properties: {7},
},
```



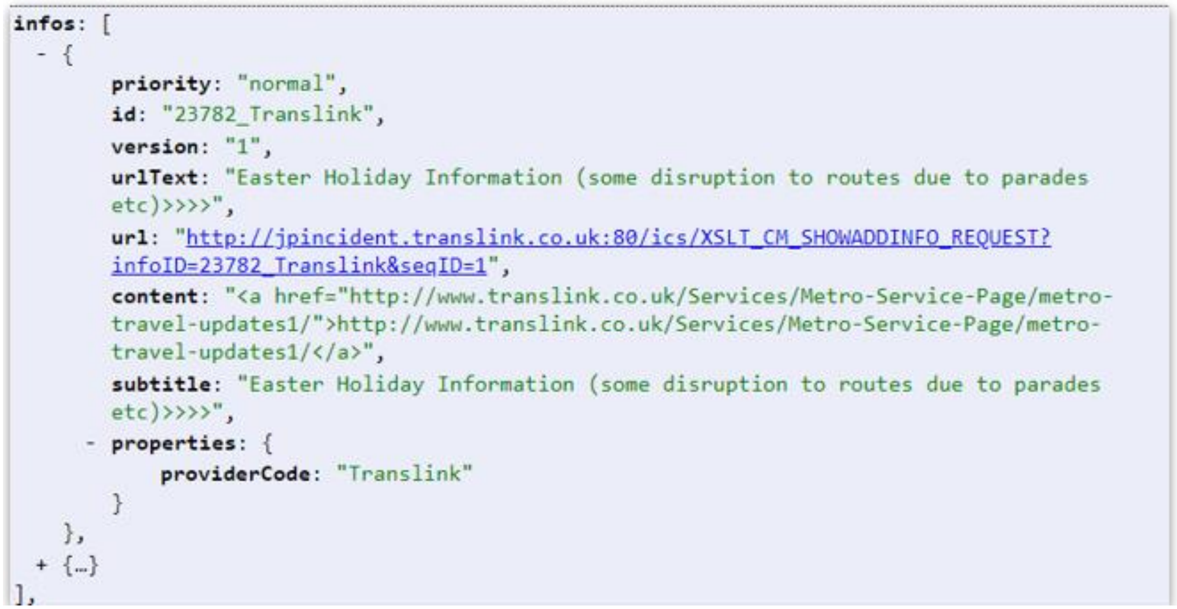
```
transportation: {
  - product: {
        class: 99,
        name: "footpath",
        iconId: 99
    }
},
```

Trip-Request – Input and Output JSON Output

Infos

`infos` is an array of ICS messages:

- `priority` – values: here always normal
- `url, urlText` – link and text for the link
- `subtitle, content` – title and content of the message

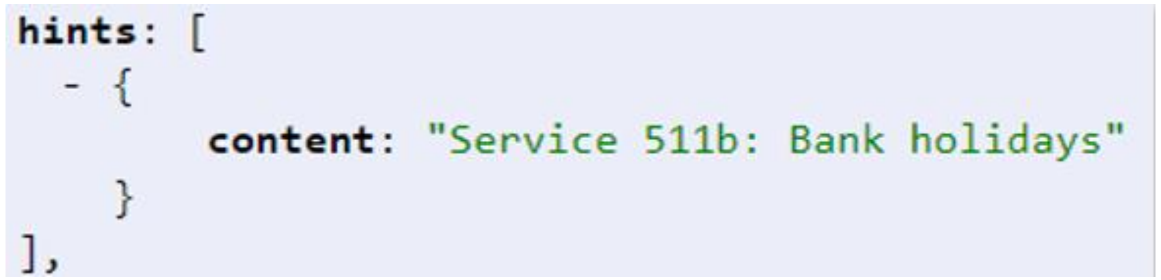


```
infos: [
  - {
        priority: "normal",
        id: "23782_Translink",
        version: "1",
        urlText: "Easter Holiday Information (some disruption to routes due to parades
        etc)>>>>",
        url: "http://jpincident.translink.co.uk:80/ics/XSLT_CM_SHOWADDINFO_REQUEST?
        infoID=23782_Translink&seqID=1",
        content: "<a href="http://www.translink.co.uk/Services/Metro-Service-Page/metro-
        travel-updates1/">http://www.translink.co.uk/Services/Metro-Service-Page/metro-
        travel-updates1/</a>",
        subtitle: "Easter Holiday Information (some disruption to routes due to parades
        etc)>>>>",
      - properties: {
            providerCode: "Translink"
        }
    },
  + {…}
],
```

Trip-Request – Input and Output JSON Output

Hints

`hints` is an array of hints for the service.



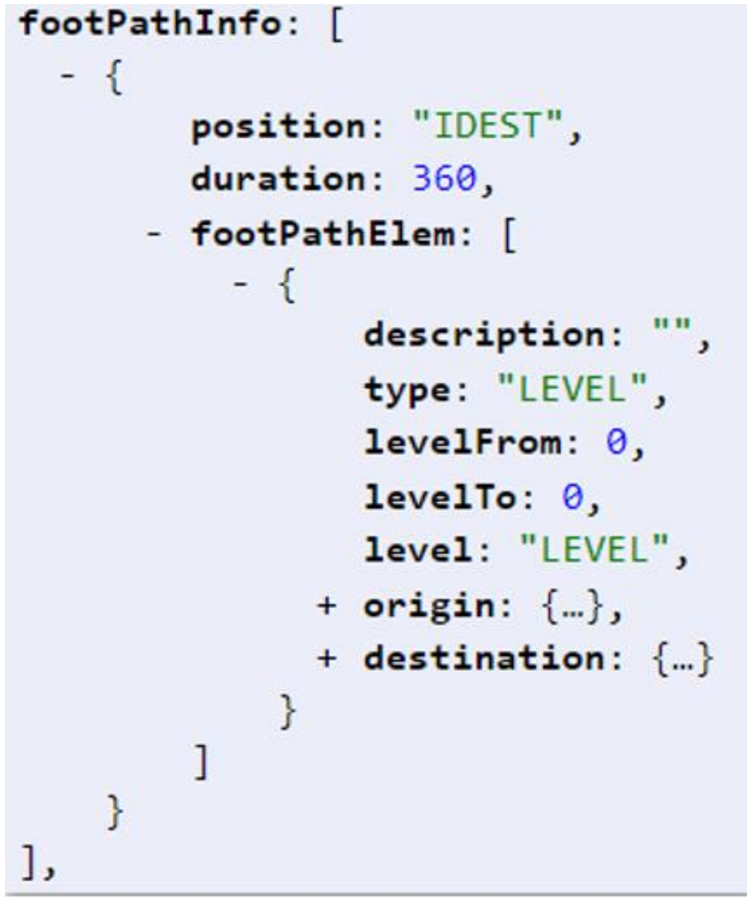
```
hints: [
  - {
          content: "Service 511b: Bank holidays"
    }
],
```

Trip-Request – Input and Output
JSON Output

Footpath Info

footPathInfo includes information about foot paths to reach a stop e.g. the duration, the position relative to the leg (BEFORE, AFTER, IDEST) and an array of descriptive elements footPathElem:

- type – STAIRS, RAMP, ESCALATOR, ELEVATOR, LEVEL
- level – LEVEL, UP, DOWN
- levelFrom and levelTo specifies the change of level in case of level=UP|DOWN



```
footPathInfo: [
  - {
        position: "IDEST",
        duration: 360,
      - footPathElem: [
          - {
                description: "",
                type: "LEVEL",
                levelFrom: 0,
                levelTo: 0,
                level: "LEVEL",
              + origin: {…},
              + destination: {…}
            }
        ]
    }
],
```

Trip-Request – Extension of Date and Time

`itdTripDateTimeDepArr = dep | arr`

Determines whether the journey should depart (`dep`) or arrive (`arr`) at the indicated time. Default: `dep`.

Challenge

On April 28th you are currently near the stop *Stuttgart Schwabstraße* and want to meet your friends later at 17:00 at the stop *Stuttgart Feuersee*. When do you have to leave?

Trip-Request – Extension of Date and Time

Solution

Step 1: Determine unique IDs for origin and destination, e.g. by StopFinder-Request:

```
http://osm.demo.mentz.net/training/XML_STOPFINDER_REQUEST?commonMacr
o=stopfinder&type_sf=any&name_sf=stuttgart schwabstraße
```

Step 2: Trip calculation with the Trip-Request:

```
http://osm.demo.mentz.net/training/XML_TRIP_REQUEST2?commonMacro=tri
p&type_origin=any&name_origin=5006052&type_destination=any&name_dest
ination=5006221&itdDateDay=28&itdDateMonth=4&itdTime=1700&itdTripDat
eTimeDepArr=arr
```

Trip-Request – Connection Options

The basic parameters are perfect for the calculation of a trip, but for more complex requests, they are not always sufficient. Especially for people with special transport needs. Therefore, additional parameters offer further control. This makes it possible, for example, to calculate trips for people with reduced mobility, heavy baggage etc.

Different types of options:

- Common options
- Options valid for public transport
- Options valid for individual transport

Trip-Request – Connection Options
Common Options

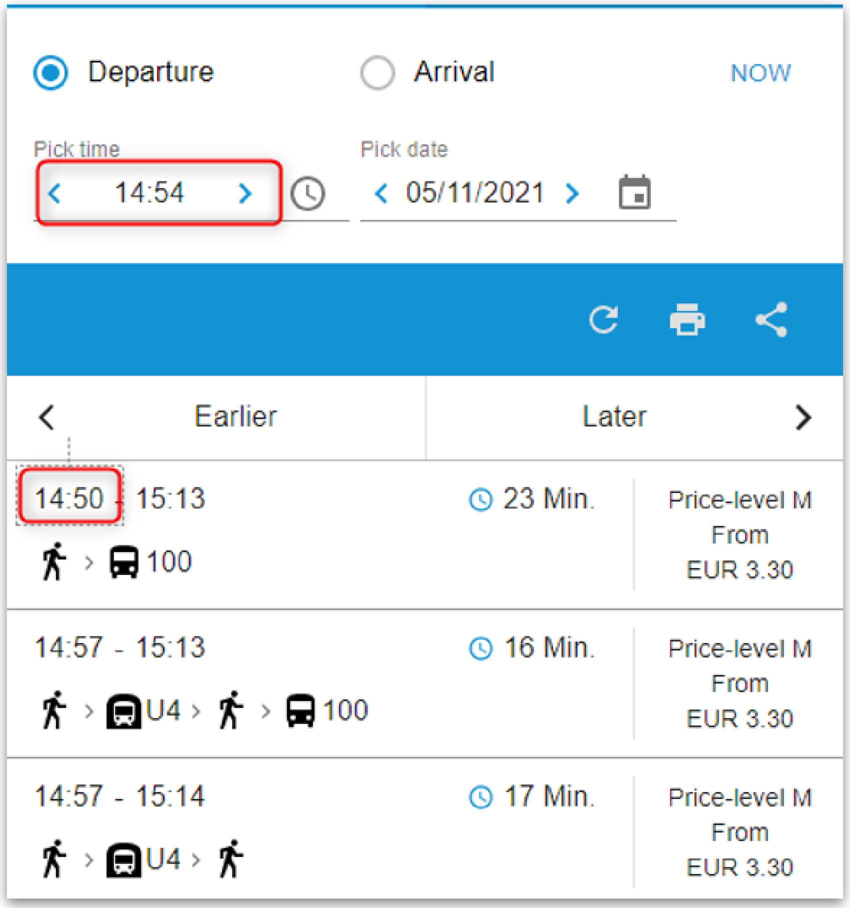
`calcNumberOfTrips`
Specifies the number of trips which are calculated.
Value: Integer
Default: 4 + walk only trip + alternative trips

Alternative trips are identified by `isAdditional=true`. They are recommended journey options which do not match the preferred search criteria, e.g. a fast journey with a couple of interchanges if you prefer fewer interchanges.

Trip-Request – Connection Options Common Options

`calcOneDirection = 1`

Prevents EFA from calculating one journey before the requested departure.



[✓ Departure] Arrival NOW

Pick time: 14:54

Pick date: 05/11/2021

Earlier | Later

14:50 - 15:13 · 23 Min. · 100 · Price-level M From EUR 3.30

14:57 - 15:13 · 16 Min. · U4 › 100 · Price-level M From EUR 3.30

14:57 - 15:14 · 17 Min. · U4 · Price-level M From EUR 3.30

Trip-Request – Connection Options
Options valid for public Transport

To use these parameters, the options for public transport **`ptOptionsActive=1`** must be enabled.

`useProxFootSearch=1`

Taking account of nearby stops. To differentiate between origin and destination stop, the parameter name can be supplemented using the extension `Orig` or `Dest`.

`maxChanges`

Maximum number of changes in one trip. Trips with more than the specified changes will be discarded for the trip request.
Values: `0-9` (Default: `9`)

Trip-Request – Connection Options
Options valid for public Transport

`routeType`

Specifies the criterion according to which the trip request should be optimized:

Value/Criterion	Description
leastinterchange	Connections with least interchanges
leasttime	Fastest connections
leastwalking	Connections with least footpaths

Trip-Request – Connection Options Transport Selection

`exclMOT_<ID>`

- This parameter causes the means of transport with the identification number <ID> to be excluded.
- To exclude multiple transports the parameter can be used multiple times.
- This parameter does not require a value. The means of transport with the identification number <ID> is excluded if the corresponding parameter is passed.
- It is necessary activate this feature with the parameter `excludedMeans=checkbox`. All modes are included initially.
- Altering to parameter `exclMOT_<ID>` means of transports can be excluded with the parameter `excludedMeans=<ID>`.

Note: The means of transport and their IDs are customer specific. The table shows the standard assignment.

ID	Mode of Transport
0	train
1	commuter railway
2	underground train
3	city rail
4	tram
5	city bus
6	regional bus
7	coach
8	cable car
9	Boat
10	transit on demand

ID	Mode of Transport
11	other
12	airplane
13	regional train
14	national train
15	international train
16	high-speed train
17	rail replacement train
18	shuttle train
19	Bürgerbus

Trip-Request – Connection Options Transport Selection

`inclMOT_<ID>`

- This parameter causes the means of transport with the identification number <ID> to be included by the system.
- If several means of transport are taken into account, the parameter can be used multiple times.
- This parameter does not require a value. The means of transport with the identification number is <ID> included when the corresponding parameter is passed.
- By default, the means of transports, when using the transportation inclusion, are disabled and will not be considered.
- Analog to the exclusion of transports. It is necessary to activate this functionality with the parameter `includedMeans=checkbox`.
- Altering to this parameter means of transports can be included with the parameter `includedMeans=<ID>`.

Note: The means of transport and their IDs are customer specific. The table shows the standard assignment.

ID	Mode of Transport
0	train
1	commuter railway
2	underground train
3	city rail
4	tram
5	city bus
6	regional bus
7	coach
8	cable car
9	Boat
10	transit on demand
11	other
12	airplane
13	regional train
14	national train
15	international train
16	high-speed train
17	rail replacement train
18	shuttle train
19	Bürgerbus

Trip-Request – Connection Options Transport Selection

Challenge

Calculate a trip from *Stuttgart Schwabstraße* to *Stuttgart Feuersee* without using the commuter railway (ID = 1).

Hint:

```
http://osm.demo.mentz.net/training/XML_TRIP_REQUEST2?commonMacro=tri
p&type_origin=any&name_origin=5006052&type_destination=any&name_dest
ination=5006221
```

Trip-Request – Connection Options
Transport Selection

Solution

```
http://osm.demo.mentz.net/training/XML_TRIP_REQUEST2?commonMacro=tri
p&type_origin=any&name_origin=5006052&type_destination=any&name_dest
ination=5006221&excludedMeans=1
```

`ptOptionsActive=1` is not necessarily required for exclusion/inclusion of means of transport.

Trip-Request – Connection Options
Options valid for individual Transport

To use these parameters, the options for individual transport **`itOptionsActive=1`** must be enabled.

`trITMOT`
This parameter indicates the means of transport from the starting point to the first stop and from the destination stop to the destination point. The following values are possible:

Alternative: The means of transport can be set separately for origin and destination with the parameters `trITDepMOT` and `trITArrMOT`.

`trITMOTvalue<ID>`
The value of the parameter indicates the maximum time from the starting point to the first stop and also from the destination stop to the destination point.
Value: The time is specified in minutes (Default: 10)

Alternative:
The times can be set separately for origin and destination with the parameters `trITDepMOTvalue<ID>` and `trITArrMOTvalue<ID>`.

ID	Mode
100	footpath
101	bike & ride
102	take your bike along
103	kiss & ride
104	park & ride

Trip-Request – Connection Options
Options valid for public Transport and individual Transport

`changeSpeed`

- Sets the speed for interchange paths, when `ptOptionsActive=1`.

- Sets the speed for the path from the starting point to the departure stop and the speed for the path from the destination stop to the destination, if `itOptionsActive=1`.
- Values:

  PT: `normal` (e.g. 100), `slow` (e.g. 50), `fast` (e.g. 200)

  interchange time [min] = (time from interchange matrix [min] * parameter value) / 100

  IT: `normal` (e.g. 100), `slow` (e.g. 200), `fast` (e.g. 50)

  speed [km/h] = (default speed [km/h] * parameter value) / 100

Trip-Request – Connection Options
Options valid for public Transport and individual Transport

Challenge

Calculate a trip from *Stuttgart Rothenbergstraße 5* to Stuttgart *Schwabstraße 25*. You have your heavy luggage with you. Search for an suitable connection.

Trip-Request – Connection Options
Options valid for public Transport and individual Transport

Solution (Example):

Step 1: locality search

```
http://osm.demo.mentz.net/training/XML_STOPFINDER_REQUEST?
commonMacro=stopfinder&type_sf=any&name_sf=stuttgart
rothenbergstraße 5

http://osm.demo.mentz.net/training/XML_STOPFINDER_REQUEST?commonMacr
o=stopfinder&type_sf=any&name_sf=stuttgart schwabstraße 25
```

Trip-Request – Connection Options
Options valid for public Transport and individual Transport

Step 2: trip calculation with advanced options

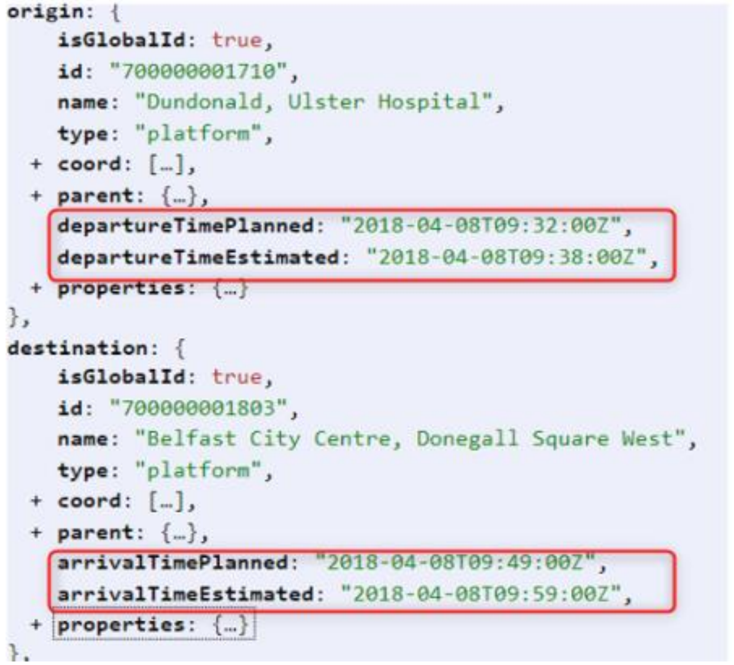
```
http://osm.demo.mentz.net/training/XML_TRIP_REQUEST2?commonMacro=trip&type_origin=any&name_origin=streetID:1500000870:5:8111000:51:Rotenbergstra%C3%9Fe:Stuttgart:Rotenbergstra%C3%9Fe::Rotenbergstra%C3%9Fe:70190:ANY:DIVA_SINGLEHOUSE:1024014:5761338:MRCV:osm:0&type_destination=any&name_destination=streetID:1500000505:25:8111000:51:Schwabstra%C3%9Fe:Stuttgart:Schwabstra%C3%9Fe::Schwabstra%C3%9Fe:70197:ANY:DIVA_SINGLEHOUSE:1019541:5764173:MRCV:osm:0
ptOptionsActive=1&itOptionsActive=1&changeSpeed=slow&routeType=LEASTINTERCHANGE
```

Trip-Request – Realtime

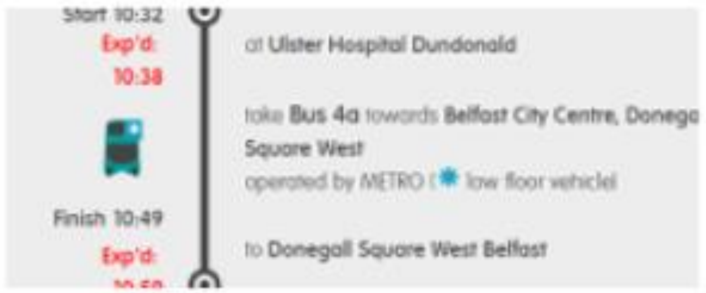
`useRealtime=1`

Activates the realtime output.

`origin` and `destination` of the delayed `leg` include not only the scheduled time (`departureTimePlanned`/`arrivalTimePlanned`) but also the estimated time (`departureTimeEstimated`/`arrivalTimeEstimated`).



```
origin: {
    isGlobalId: true,
    id: "700000001710",
    name: "Dundonald, Ulster Hospital",
    type: "platform",
  + coord: […],
  + parent: {…},
    departureTimePlanned: "2018-04-08T09:32:00Z",
    departureTimeEstimated: "2018-04-08T09:38:00Z",
  + properties: {…}
},
destination: {
    isGlobalId: true,
    id: "700000001803",
    name: "Belfast City Centre, Donegall Square West",
    type: "platform",
  + coord: […],
  + parent: {…},
    arrivalTimePlanned: "2018-04-08T09:49:00Z",
    arrivalTimeEstimated: "2018-04-08T09:59:00Z",
  + properties: {…}
},
```



Start 10:32
Exp'd:
10:38

at Ulster Hospital Dundonald

take Bus 4a towards Belfast City Centre, Donega
Square West
operated by METRO (low floor vehicle)

Finish 10:49
Exp'd:

to Donegall Square West Belfast

DepartureMonitor-Request

DepartureMonitor-Request – Table of Content

DepartureMonitor-Request – Input and Output Request

Next departures of a stop group, several nearby stop groups or a stop point.

Request

`http://osm.demo.mentz.net/training/XML_DM_REQUEST?`

Part of the DepartureMonitor-Request

- Error Handling
- Date and Time
- Locality Input (as described per StopFinder-Request)
- Transport Selection (as described per Trip-Request)

Parameter Suffix for Locality Input

The parameter suffix `<usage>` is `dm`.

DepartureMonitor-Request – Input and Output Mandatory Parameters

Parameters for the Interface

These parameters are given by parameter injection or configuration:

- `outputFormat=rapidJSON` (activates the JSON API)
- `coordOutputFormat=WGS84[dd.ddddd]` (coord format set to WGS 84)
- `locationServerActive=1` (activates EFALocationServer for locality search)

Note: Parameter injection works only for requests with HTTP parameters.

Mandatory Parameters für DepartureMonitor-Request

These parameters should be included in the HTTP parameter macro **`commonMacro=dm`**:

- `mode=direct`
- `useAllStops=1` (all stop points, includes stop points which cannot be reached by a walk, e.g. some underground stop points)
- `lsShowTrainsExplicit=1` (enables trains)
- `useProxFootSearch=0` (no alternative stops)

Optionally customer specific Parameters can be included, e.g.:

- `useRealtime=1` (activates realtime)

DepartureMonitor-Request – Input and Output
Mandatory Parameters

Challenge

Calculate the departure board for *Stuttgart Feuersee* at 11:15.

DepartureMonitor-Request – Input and Output Mandatory Parameters

Solution

```
http://osm.demo.mentz.net/training/XML_DM_REQUEST?commonMacro=dm&type_dm=any&name_dm=5006221&itdTime=1115
```

DepartureMonitor-Request – Input and Output
JSON Output

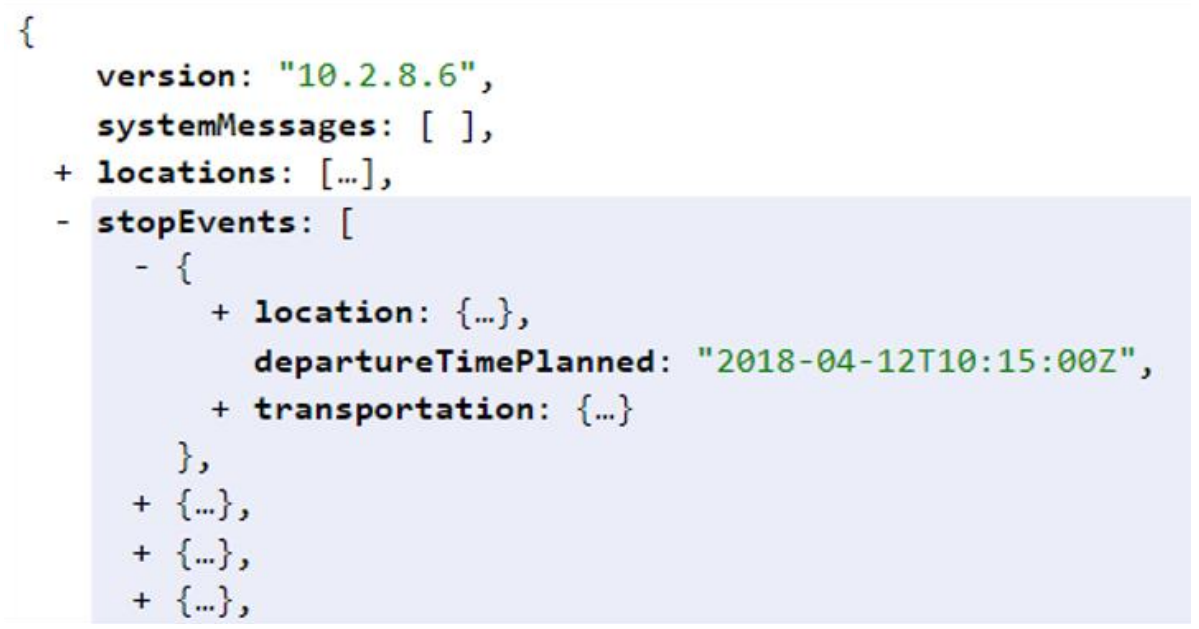
Locations

`locations` contains the locality for the departure board. It includes a list of nearby stops (`assignedStops`) which may include one (for stop) or more (for addresses, POIs,..) stops.

List of Departures

`stopEvents` is an array of departures. It includes:

- `location` – locality of departure
- `departureTimePlanned` /Estimated– departure time
- `transportation` – information about the mode of transport
- `infos` (optionally) - array of ICS messages



```
{
    version: "10.2.8.6",
    systemMessages: [ ],
  + locations: […],
  - stopEvents: [
      - {
          + location: {…},
            departureTimePlanned: "2018-04-12T10:15:00Z",
          + transportation: {…}
        },
      + {…},
      + {…},
      + {…},
```

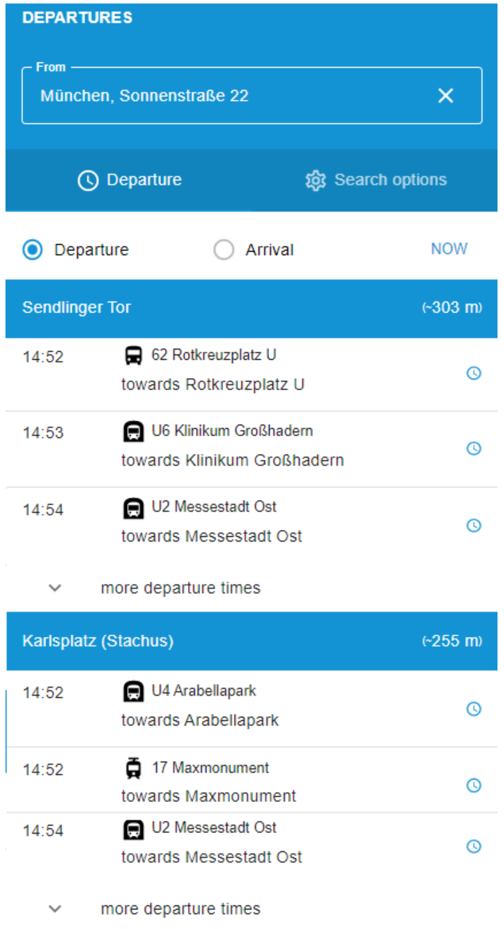
DepartureMonitor-Request - Design Variants

There are two options to display a departure board for POIs or addresses:

- A combined departure board which displays the departures of nearby stop groups
- Select a nearby stop (see StopFinder-Request) and display the departure board for this stop.

Challenge

Get a combined departure board for *Stuttgart Schwabstraße 22*.



DEPARTURES

From: München, Sonnenstraße 22

Departure | Search options

[✓ Departure] Arrival NOW

Sendlinger Tor (~303 m)

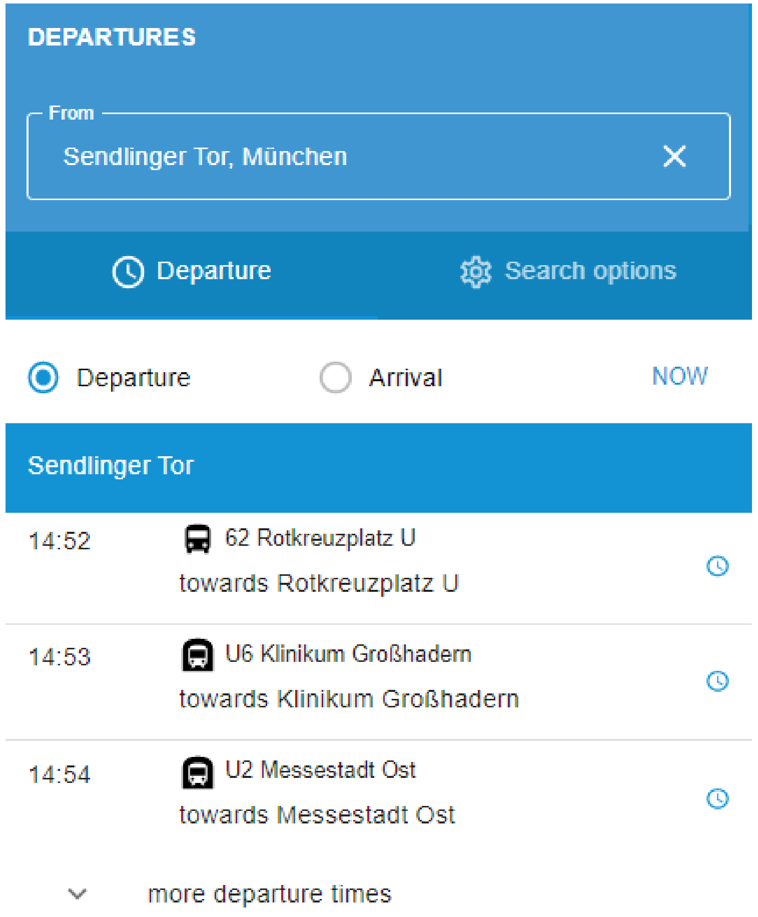
14:52	62 Rotkreuzplatz U	towards Rotkreuzplatz U
14:53	U6 Klinikum Großhadern	towards Klinikum Großhadern
14:54	U2 Messestadt Ost	towards Messestadt Ost

more departure times

Karlsplatz (Stachus) (~255 m)

14:52	U4 Arabellapark	towards Arabellapark
14:52	17 Maxmonument	towards Maxmonument
14:54	U2 Messestadt Ost	towards Messestadt Ost

more departure times



DEPARTURES

From: Sendlinger Tor, München

Departure | Search options

[✓ Departure] Arrival NOW

Sendlinger Tor

14:52	62 Rotkreuzplatz U	towards Rotkreuzplatz U
14:53	U6 Klinikum Großhadern	towards Klinikum Großhadern
14:54	U2 Messestadt Ost	towards Messestadt Ost

more departure times

DepartureMonitor-Request - Design Variants

MENTZ

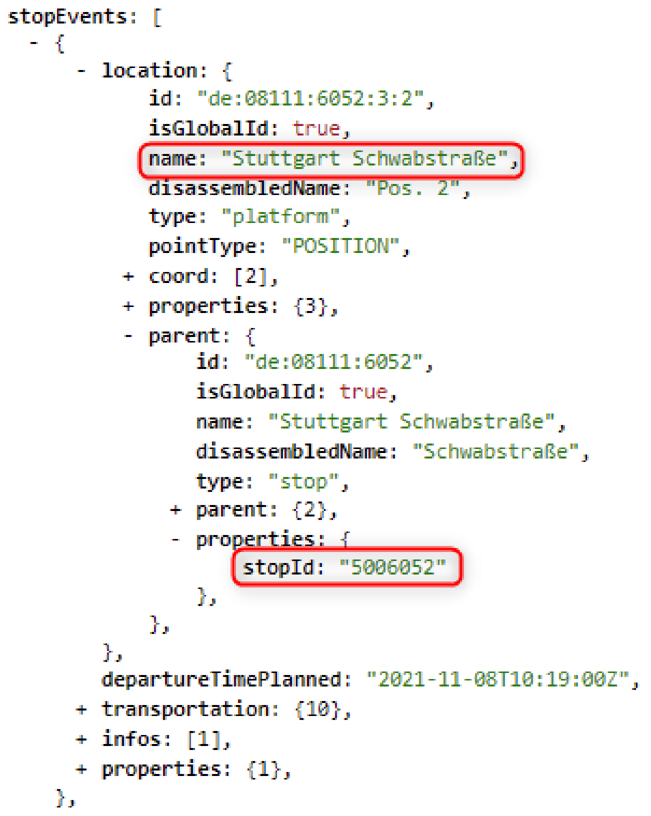
Solution

Step 1: Locality search with the StopFinder-Request

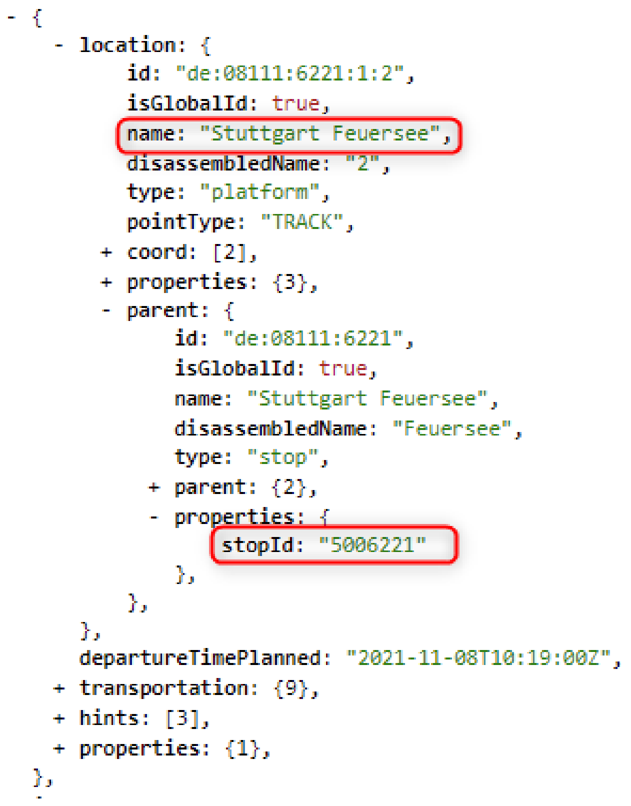
`http://osm.demo.mentz.net/training/XML_STOPFINDER_REQUEST?commonMacro=stopfinder&type_sf=any&name_sf=stuttgart schwabstraße 22`

Step 2: Request the departure board with the ID of the address

`http://osm.demo.mentz.net/training/XML_DM_REQUEST?commonMacro=dm&deleteAssigendStops_dm=1&type_dm=any&name_dm=streetID:1500000505:22:8111000:51:Schwabstra%C3%9Fe:Stuttgart:Schwabstra%C3%9Fe::Schwabstra%C3%9Fe:70197:ANY:DIVA_SINGLEHOUSE:1019512:5764035:MRCV:osm:0`



```
stopEvents: [
  - {
      - location: {
            id: "de:08111:6052:3:2",
            isGlobalId: true,
            name: "Stuttgart Schwabstraße",
            disassembledName: "Pos. 2",
            type: "platform",
            pointType: "POSITION",
          + coord: [2],
          + properties: {3},
          - parent: {
                id: "de:08111:6052",
                isGlobalId: true,
                name: "Stuttgart Schwabstraße",
                disassembledName: "Schwabstraße",
                type: "stop",
              + parent: {2},
              - properties: {
                    stopId: "5006052"
                },
            },
        },
        departureTimePlanned: "2021-11-08T10:19:00Z",
      + transportation: {10},
      + infos: [1],
      + properties: {1},
    },
```



```
- {
    - location: {
          id: "de:08111:6221:1:2",
          isGlobalId: true,
          name: "Stuttgart Feuersee",
          disassembledName: "2",
          type: "platform",
          pointType: "TRACK",
        + coord: [2],
        + properties: {3},
        - parent: {
              id: "de:08111:6221",
              isGlobalId: true,
              name: "Stuttgart Feuersee",
              disassembledName: "Feuersee",
              type: "stop",
            + parent: {2},
            - properties: {
                  stopId: "5006221"
              },
          },
      },
      departureTimePlanned: "2021-11-08T10:19:00Z",
    + transportation: {9},
    + hints: [3],
    + properties: {1},
  },
```

DepartureMonitor-Request - Design Variants

Challenge

Request a departure board for *Stuttgart Schwabstraße 22*. Select your preferred stop, e.g. *Stuttgart Schwabstraße*.

DepartureMonitor-Request - Design Variants

MENTZ

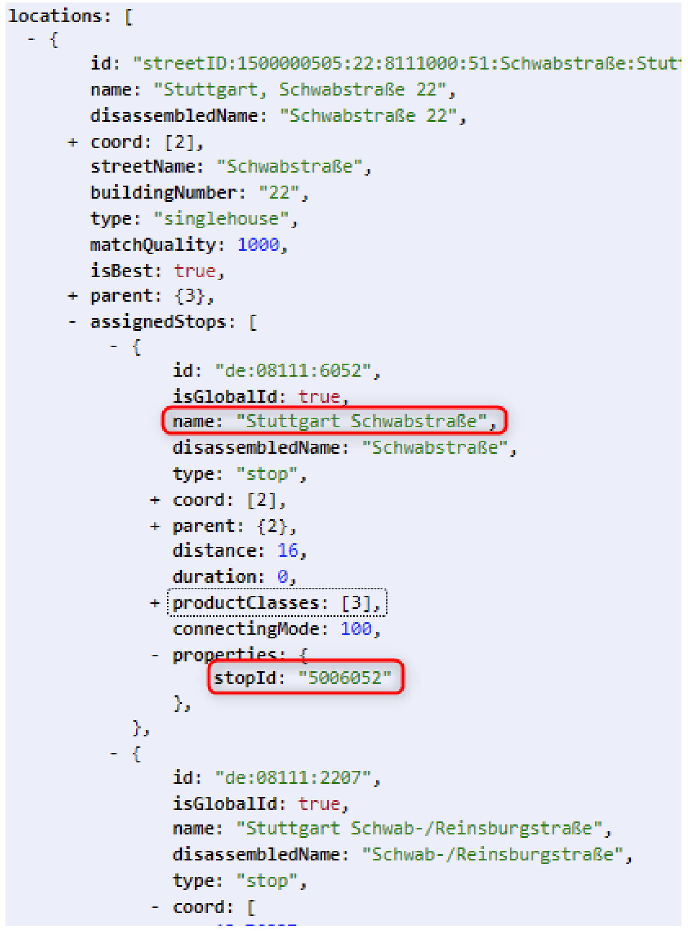
Solution

Step 1: Locality search with the StopFinder-Request

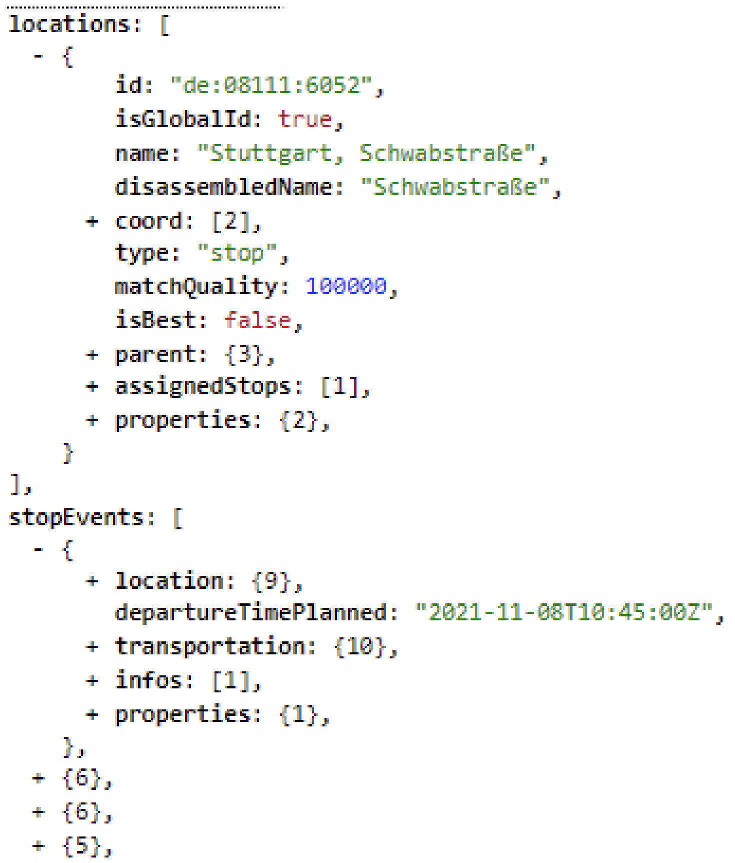
```
http://osm.demo.mentz.net/training
/XML_STOPFINDER_REQUEST?commonMacr
o=stopfinder&type_sf=any&name_sf=s
tuttgart schwabstraße 22
```

Step 2: Request the departure board with the ID of the stop *Stuttgart Schwabstraße*

```
http://osm.demo.mentz.net/training
/XML_DM_REQUEST?commonMacro=dm&del
eteAssigendStops_dm=1&type_dm=any&
name_dm=5006052&doNotSearchForStop
s_dm=1
```



```
locations: [
  - {
        id: "streetID:1500000505:22:8111000:51:Schwabstraße:Stut
        name: "Stuttgart, Schwabstraße 22",
        disassembledName: "Schwabstraße 22",
      + coord: [2],
        streetName: "Schwabstraße",
        buildingNumber: "22",
        type: "singlehouse",
        matchQuality: 1000,
        isBest: true,
      + parent: {3},
      - assignedStops: [
          - {
                id: "de:08111:6052",
                isGlobalId: true,
                name: "Stuttgart Schwabstraße",
                disassembledName: "Schwabstraße",
                type: "stop",
              + coord: [2],
              + parent: {2},
                distance: 16,
                duration: 0,
              + productClasses: [3],
                connectingMode: 100,
              - properties: {
                    stopId: "5006052"
                },
            },
          - {
                id: "de:08111:2207",
                isGlobalId: true,
                name: "Stuttgart Schwab-/Reinsburgstraße",
                disassembledName: "Schwab-/Reinsburgstraße",
                type: "stop",
              - coord: [
```



```
locations: [
  - {
        id: "de:08111:6052",
        isGlobalId: true,
        name: "Stuttgart, Schwabstraße",
        disassembledName: "Schwabstraße",
      + coord: [2],
        type: "stop",
        matchQuality: 100000,
        isBest: false,
      + parent: {3},
      + assignedStops: [1],
      + properties: {2},
    }
],
stopEvents: [
  - {
      + location: {9},
        departureTimePlanned: "2021-11-08T10:45:00Z",
      + transportation: {10},
      + infos: [1],
      + properties: {1},
    },
  + {6},
  + {6},
  + {5},
```

DepartureMonitor-Request – Optional Parameters

`lsShowTrainsExplicit = 1`

Includes trains in the list of routes.

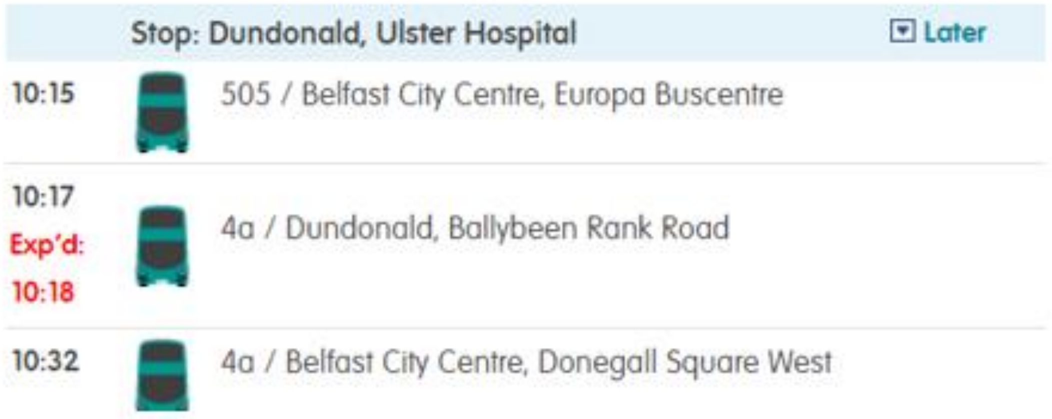
`limit`

Maximum number of departures. By default up to 40 departures within a maximum of 2 days are displayed.

DepartureMonitor-Request - Realtime

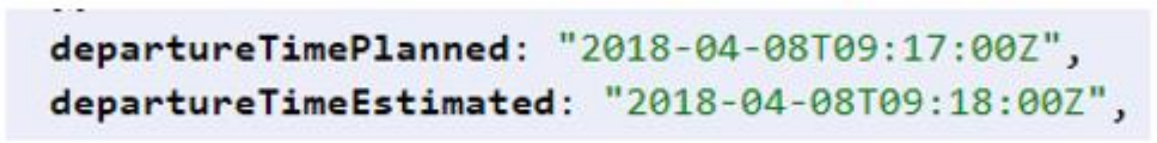
useRealtime=1
Activates the realtime output.
This parameters could be part of the HTT parameter macro **`commonMacro=dm`**.

A realtime controlled `stopEvent` includes not only the scheduled departure time (`departureTimePlannd`) but also an estimated departure time (`departureTimeEstimated`).



Stop: Dundonald, Ulster Hospital

10:15		505 / Belfast City Centre, Europa Buscentre
10:17 Exp'd: 10:18		4a / Dundonald, Ballybeen Rank Road
10:32		4a / Belfast City Centre, Donegall Square West



```
departureTimePlanned: "2018-04-08T09:17:00Z",
departureTimeEstimated: "2018-04-08T09:18:00Z",
```

ServingLines-Request

ServingLines-Request – Table of Content

ServingLines-Request – Input and Output Request

The ServingLines-Request is used for line search. It provides line search via stop search and direct line search.

Request

```
http://osm.demo.mentz.net/training/XML_SERVINGLINES_REQUEST?commonMa
cro=servinglines
```

Example

```
http://osm.demo.mentz.net/training/XML_SERVINGLINES_REQUEST?commonMa
cro=servinglines&mode=odv&type_sl=stopID&name_sl=de:08111:6221
```

ServingLines-Request – Input and Output Request

Part of the Request

- Error Handling
- Locality Input (as described per StopFinder-Request)

Parameter Suffix for Locality Input

The parameter suffix `<usage>` for ServingLines-Request is `sl`.

ServingLines-Request – Input and Output JSON Output / Mandatory Parameters

Lines

The response provides an array of `lines`.

Mandatory Parameters

These parameters are given by parameter injection or configuration:

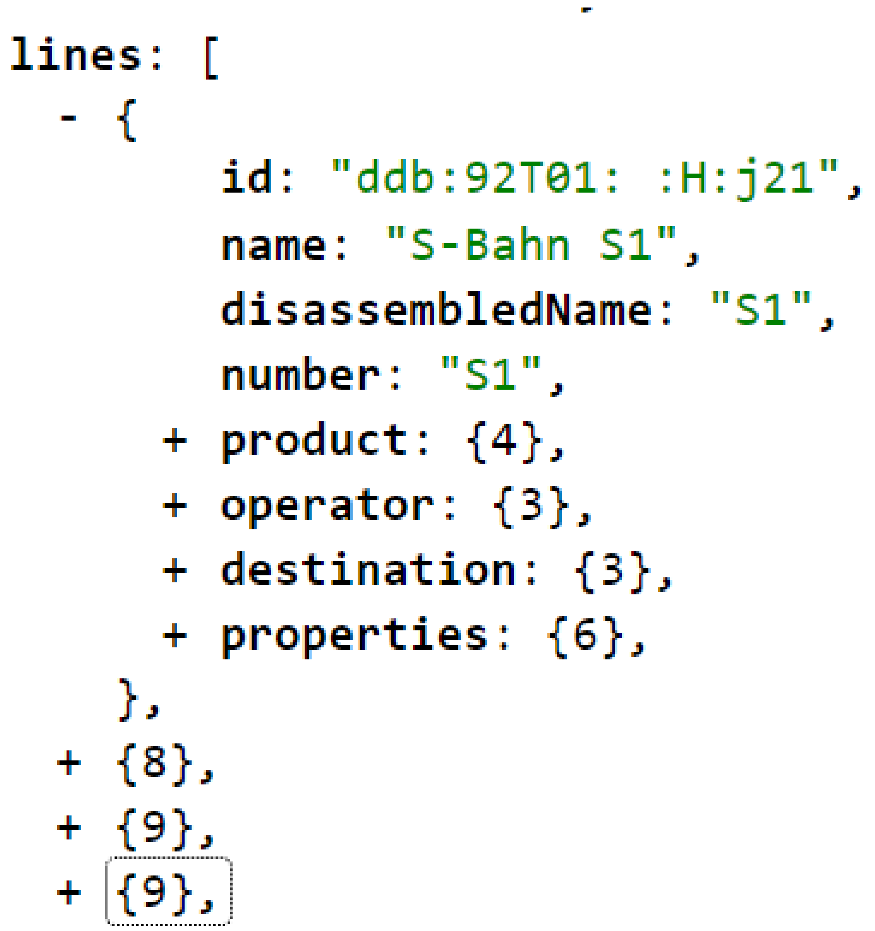
- `outputFormat=rapidJSON` (activates the JSON API)
- `coordOutputFormat=WGS84[dd.ddddd]` (coord format set to WGS 84)
- `locationServerActive=1` (activates EFALocationServer for locality search)

Note: Parameter injection works only for requests with HTTP parameters.

Further customer spezific parameters could be included in an HTTP parameter macro **`commonMacro=servinglines`**.

`mode`

Search mode: line search via locality search or direct line search. Values are `odv` (localities) or `line`.



```
lines: [
  - {
        id: "ddb:92T01: :H:j21",
        name: "S-Bahn S1",
        disassembledName: "S1",
        number: "S1",
      + product: {4},
      + operator: {3},
      + destination: {3},
      + properties: {6},
    },
  + {8},
  + {9},
  + {9},
```

ServingLines-Request – Direct Line Search

`mode=line` required

`lineName`
Search string: name of the searched line.

Challenge
Search for S-Bahn line *S2*.

ServingLines-Request – Direct Line Search

Solution

```
http://osm.demo.mentz.net/training/XML_SERVINGLINES_REQUEST?commonMa
cro=servinglines&mode=line&lineName=S2
```

ServingLines-Request – Line Search via Stop Search

`mode=odv` required

`name_sl`
ID of the stop.

`type_sl = stopID`
Type of locality is **`stopID`**.

Solution

Which lines stop at *Stuttgart Feuersee*?

ServingLines-Request – Line Search via Stop Search

Solution

```
http://osm.demo.mentz.net/training/XML_SERVINGLINES_REQUEST?commonMa
cro=servinglines&mode=odv&type_sl=stopID&name_sl=de:08111:6221
```

ServingLines-Request – Optional Parameters

`lineReqType`

Presentation type – works as a bit mask to combine presentation types

Example: `lineReqType=5` -> 1 + 4

-> Departure Monitor and Timetable

Value	Description
1	Departure Monitor (DM)
2	Stop Timetable (STT)
4	Timetable (TTB)
8	Route Maps
16	Station Timetable

ServingLines-Request – Optional Parameters

`mergeDir = 1`

By default both, inbound and outbound, are taken into account. This parameter merges the directions, thus only inbound is returned if both are available.

`lsShowTrainsExplicit = 1`

By default no services for trains are returned, if not switched on by this parameter.

ServingLines-Request – Line Input (unique ID)

The unique ID determined by ServingLines-Request may be used as an input for any request that requires a line. Therefore HTTP parameter **`line`** is used.

Example

```
line=ddb:92T01: :R:j21
```

LineStop-Request

LineStop-Request – Table of Content

LineStop-Request – Input and Output Request

The LineStop-Request returnes the stops of a line.

Request

```
http://osm.demo.mentz.net/training/XML_LINESTOP_REQUEST?commonMacro=linestop
```

Example

```
http://osm.demo.mentz.net/training/XML_LINESTOP_REQUEST?commonMacro=linestop&line=mvv:01002:E:H:s21
```

Part of the LineStop-Request

- Error Handling
- Line Input (as described per ServingLines-Request)

LineStop-Request – Input and Output JSON Output / Mandatory Parameters

Locations
`loctaionSequence` is an array of locations in the well known format.

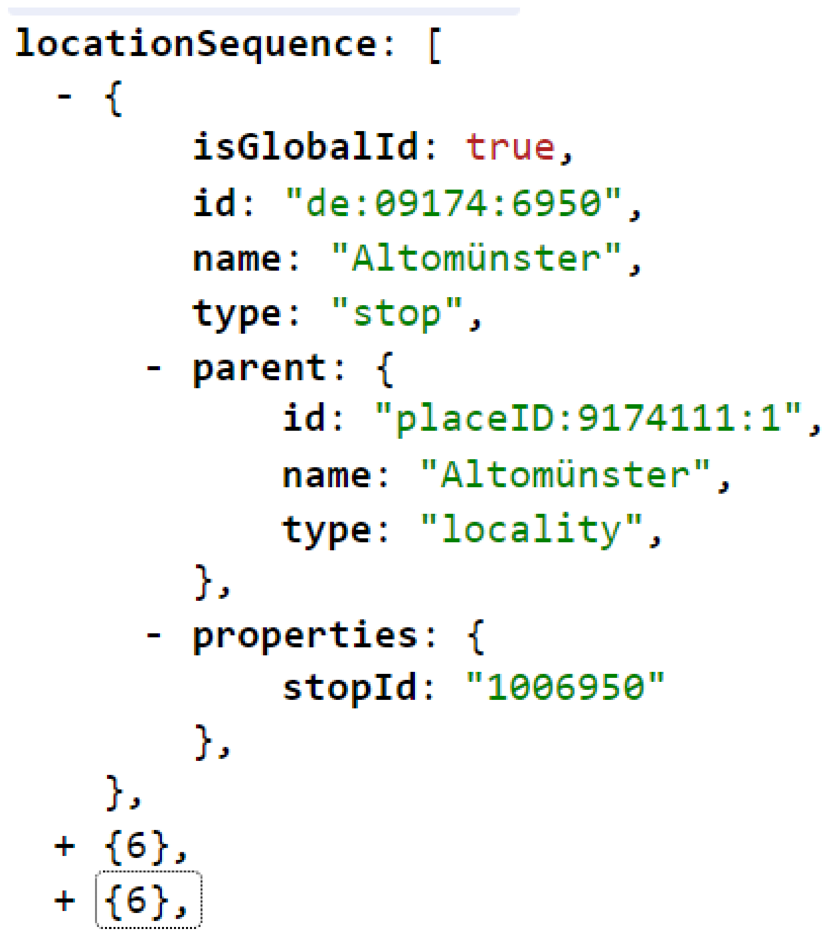
Mandatory Parameters
These parameters are given by parameter injection or configuration:

- `outputFormat=rapidJSON` (activates the JSON API)
- `coordOutputFormat=WGS84[dd.ddddd]` (coord format set to WGS 84)

Note: Parameter injection works only for requests with HTTP parameters.

Further customer spezific parameters could be included in an HTTP parameter macro **`commonMacro=linestop`**.

`line`
Line of which the coordinate sequence is requested. Value: unique route ID.



```
locationSequence: [
  - {
          isGlobalId: true,
          id: "de:09174:6950",
          name: "Altomünster",
          type: "stop",
        - parent: {
              id: "placeID:9174111:1",
              name: "Altomünster",
              type: "locality",
          },
        - properties: {
              stopId: "1006950"
          },
    },
  + {6},
  + {6},
```

LineStop-Request – Additional Information

`allStopInfo = 1`

Provides additional information, e.g. areas and platforms.

Coord-Request

Coord-Request – Table of Contents

Coord-Request – Input and Output Request

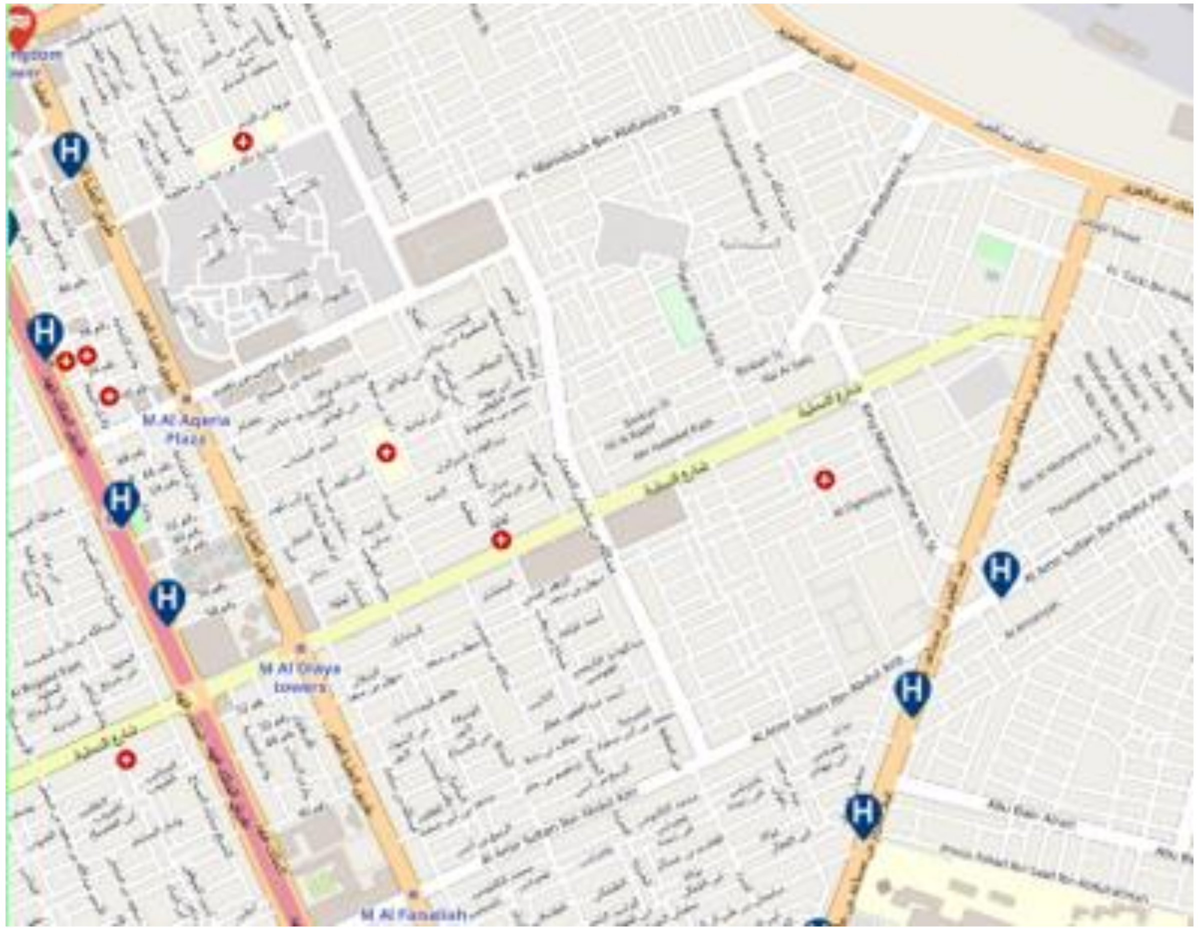
Request coordinates of objects, e.g. stops or POIs.

Request

```
http://osm.demo.mentz.net/training/XML_COORD_REQUEST?
commonMacro=coord
```

Example

```
http://osm.demo.mentz.net/training/XML_COORD_REQUEST?
commonMacro=coord&boundingBox=&boundingBoxLU=9.15:48.
77:WGS84[dd.ddddd]&boundingBoxRL=9.10:48.82:WGS84[dd.
ddddd]&type_1=STOP&inclFilter=1
```



Coord-Request – Input and Output JSON Output

Locations

`locations` is an array of objects found. They have a `name`, an `id` and a coordinate (`coord`).

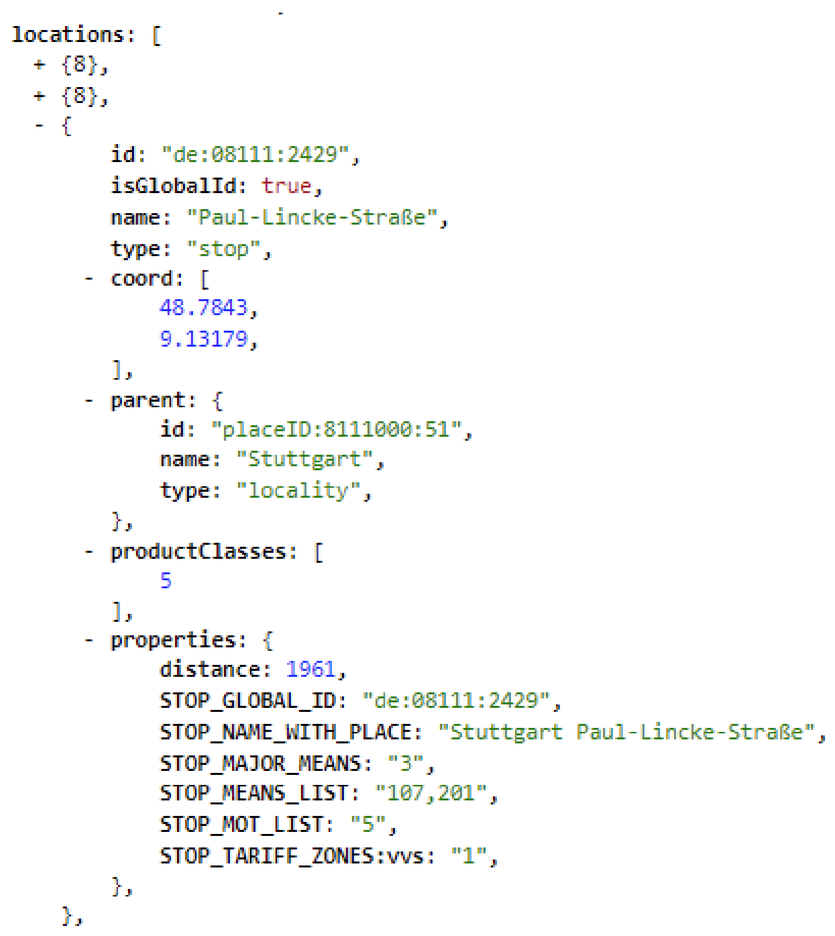
Properties

`properties` provides some information relevant for Coord-Request:

- `distance` (distance from the centre coordinate)
- `STOP_MAJOR_MEANS` (Icon ID)

List of Transports

The array `productClasses` provides the list of means of transport.



```
locations: [
  + {8},
  + {8},
  - {
        id: "de:08111:2429",
        isGlobalId: true,
        name: "Paul-Lincke-Straße",
        type: "stop",
      - coord: [
            48.7843,
            9.13179,
        ],
      - parent: {
            id: "placeID:8111000:51",
            name: "Stuttgart",
            type: "locality",
        },
      - productClasses: [
            5
        ],
      - properties: {
            distance: 1961,
            STOP_GLOBAL_ID: "de:08111:2429",
            STOP_NAME_WITH_PLACE: "Stuttgart Paul-Lincke-Straße",
            STOP_MAJOR_MEANS: "3",
            STOP_MEANS_LIST: "107,201",
            STOP_MOT_LIST: "5",
            STOP_TARIFF_ZONES:vvs: "1",
        },
    },
```

Coord-Request – Input and Output
Mandatory Parameters

These parameters are given by parameter injection or configuration:

- `outputFormat=rapidJSON` (activates the JSON API)
- `coordOutputFormat=WGS84[dd.ddddd]` (coord format set to WGS 84)

Note: Parameter injection works only for requests with HTTP parameters.

Further customer spezific parameters could be included in an HTTP parameter macro **`commonMacro=coord`**.

Coord-Request – Input and Output Mandatory Parameters

MENTZ

Filters

To activate the filters **`inclFilter=1`** is required.

`type_<filter index>`

With this parameter a certain type of point can be chosen. Several point types can be chosen by using this parameter multiple times. Hereby for each point type another index `<filter index>` is assigned. There are the following types:

Point Types	Description
ANY	All points
BUS_POINT	Bus stops
ENTRANCE	Entrances (e.g. vor suburban train stops)
GIS_AREA	GIS-Area
GIS_POINT	GIS-Point
LINE	Services, that cross the street segment passed by the coordinate `coord`
POI_AREA	Area-POIs (important area points)
POI_POINT	Point-POIs (important points)
STOP	Stops
STREET	streets

Coord-Request – Bounding Box

It is possible to provide a bounding box and only objects inside bounding box are calculated. Therefore the following parameters must be requested.

`boundingBox=1`
Enables the bounding box. No value must be provided.

`boundingBoxLU` and **`boundingBoxRL`**
Left upper and right lower coordinate.
Value: `<x>:<y>:<coordinate system>`

Example
```
http://osm.demo.mentz.net/training/XML_COORD_REQUEST?commonMacro=coo
rd&boundingBox=&boundingBoxLU=9.15:48.77:WGS84[dd.ddddd]&boundingBox
RL=9.10:48.82:WGS84[dd.ddddd]&type_1=STOP&inclFilter=1
```

Coord-Request – Radial Search

MENTZ

An alternative to the bounding box is the radial search. The following parameters are needed:

`coord`
This parameter specifies the middle coordinate, which is the focus of the search for the points.
Value: `<x>:<y>:<coordinate system>`

`radius_<filter index>`
With this filter the radius in which the search should be done can be given in meters. The focus of the search is the middle coordinate `coord`.

The radius of each point that is found by `type_<filter index>` can be specified separately by the parameter `radius_<filter index>`. To activate the filters `inclFilter=1` is required.

Coord-Request – Radial Search

Challenge

Calculate stops in a radius of 500 meters for the center coordinate `9.15:48.77:WGS84[dd.ddddd]`.

Coord-Request – Radial Search

Solution

```
http://osm.demo.mentz.net/training/XML_COORD_REQUEST?commonMacro=coo
rd&type_1=STOP&inclFilter=1&radius_1=500&coord=9.15:48.77:WGS84[dd.d
dddd]
```

Coord-Request – Optional Parameters

`max`

This parameter is the maximum number of object that are to be determined and displayed. The objects closest to the center are chosen. By default there is no limit.
Value: Integer

`deadline`

Date for which the stops are valid.
Value: `<JJJJ><MM><TT>,`   default: date of the server.

Coord-Request – Optional Parameters

`purpose`

With this parameter the finding of points (POI) can be reduced to points with a specific purpose. This means that certain groups of important points can be treated separately.

Hint: Using the purpose, it is possible to assign several POIs different kinds of configurations. This is done through different sections with the name of the purpose in the configuration file of the EFAITKernel.
This functionality is identical to the restriction of the search space by using the draw class with the parameter `inclDrawClasses_<filter index>`.

GeoObject-Request

GeoObject-Request – Table of Contents

GeoObject-Request – Input and Output Request

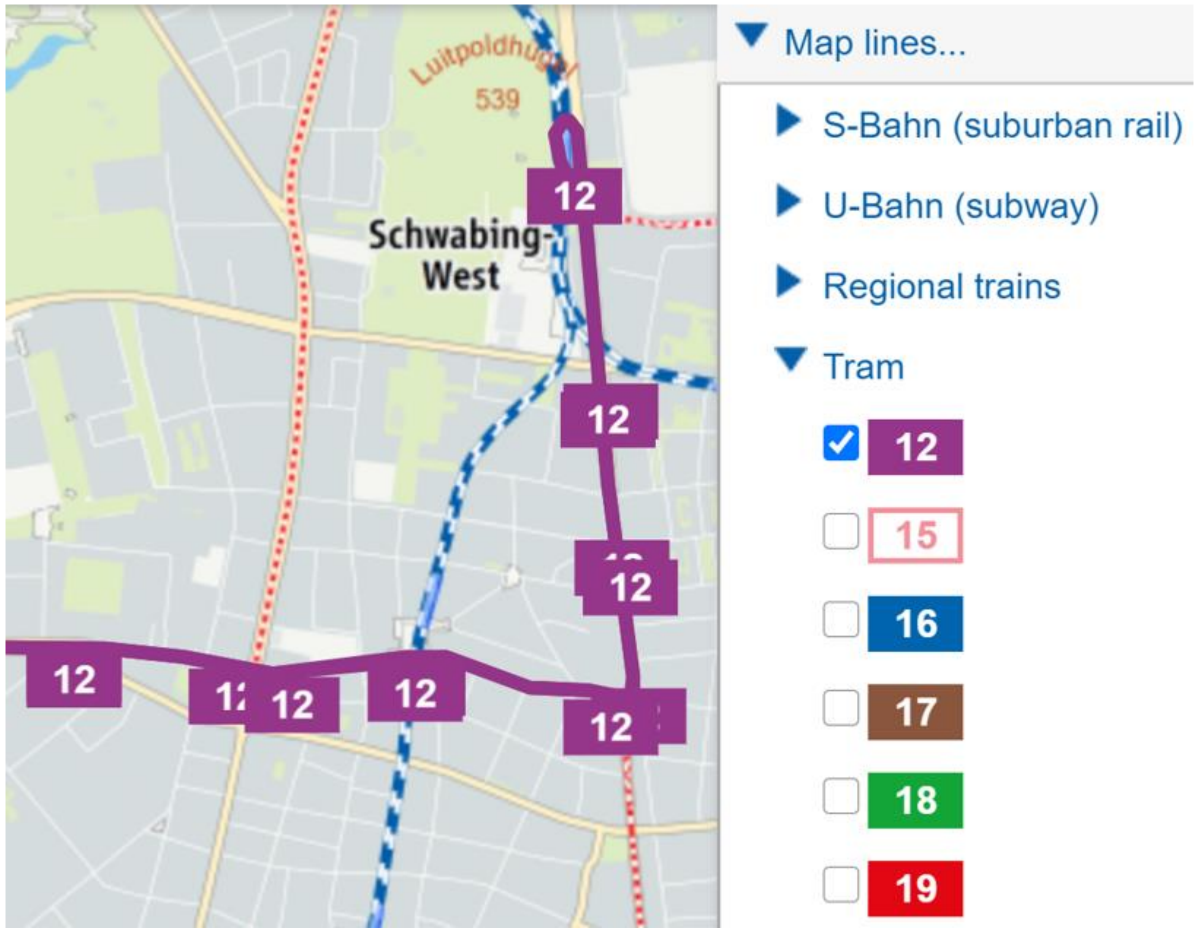
Generate a sequence of coordinates and of all passed stops of a provided service. The coordinate sequence and the points can be shown, for example on an interactive map.

Request

```
https://osm.demo.mentz.net/training/XML_GEOOBJECT_REQ
UEST?commonMacro=geoobj
```

Example

```
http://osm.demo.mentz.net/training/XML_GEOOBJECT_REQU
EST?commonMacro=geoobj&line=vvs:10002:%20:R:j21
```

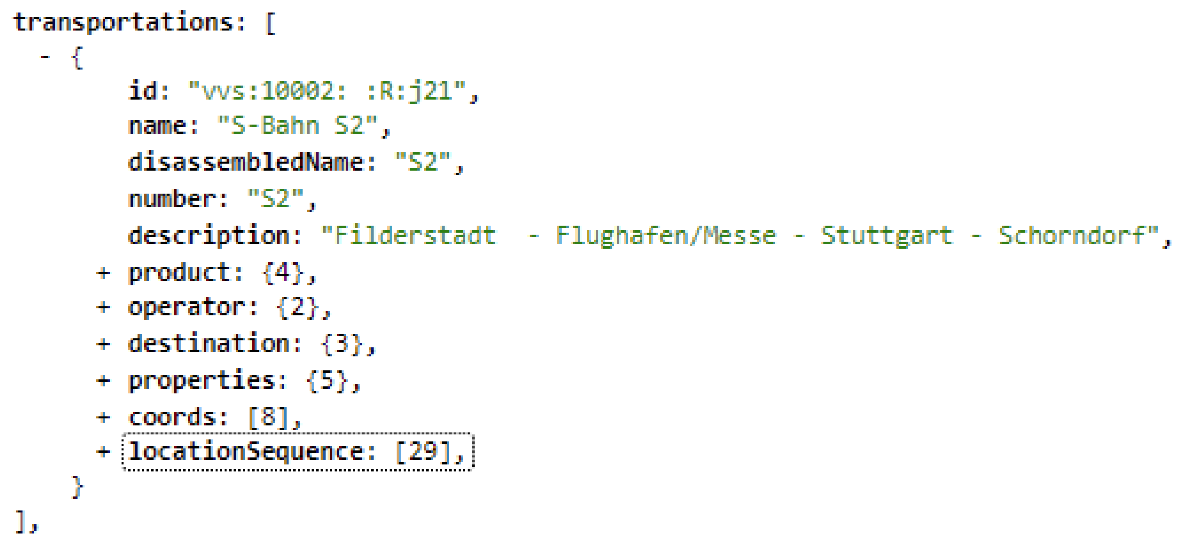


GeoObject-Request – Input and Output JSON Output

Transportation

The element `transportation` contains apart of the usual objects:

- `coords` (array with the coordinate sequence of the service
- `locationSequence` (optional list of passed stops)



```
transportations: [
  - {
        id: "vvs:10002: :R:j21",
        name: "S-Bahn S2",
        disassembledName: "S2",
        number: "S2",
        description: "Filderstadt  - Flughafen/Messe - Stuttgart - Schorndorf",
      + product: {4},
      + operator: {2},
      + destination: {3},
      + properties: {5},
      + coords: [8],
      + locationSequence: [29],
    }
],
```

GeoObject-Request – Input and Output
JSON Output

Coordinates

The coordinate sequence is found in `coords`.

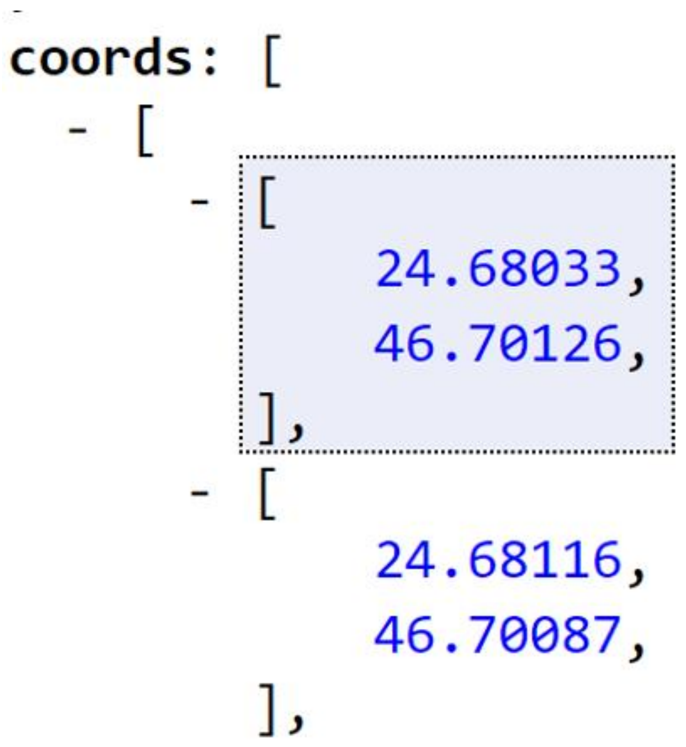
Stop

The passed stops are part of the `locationSequence`:

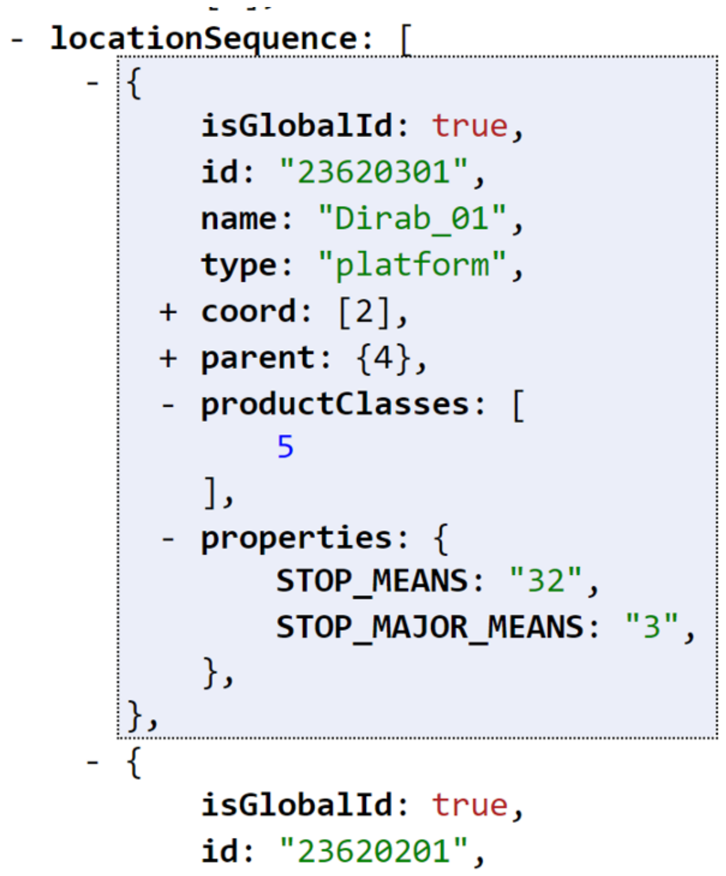
- `name` – name
- `coord` – coordinate
- `productClasses` – list of transports

Part of `properties`:

- `STOP_MAJOR_MEANS - Icon`



```
coords: [
  - [
      - [
            24.68033,
            46.70126,
        ],
      - [
            24.68116,
            46.70087,
        ],
```



```
- locationSequence: [
   - {
         isGlobalId: true,
         id: "23620301",
         name: "Dirab_01",
         type: "platform",
       + coord: [2],
       + parent: {4},
       - productClasses: [
             5
         ],
       - properties: {
             STOP_MEANS: "32",
             STOP_MAJOR_MEANS: "3",
         },
     },
   - {
         isGlobalId: true,
         id: "23620201",
```

GeoObject-Request – Input and Output
Mandatory Parameters

These parameters are given by parameter injection or configuration:

- `outputFormat=rapidJSON` (activates the JSON API)
- `coordOutputFormat=WGS84[dd.ddddd]` (coord format set to WGS 84)

Note: Parameter injection works only for requests with HTTP parameters.

Further customer spezific parameters could be included in an HTTP parameter macro **`commonMacro=geobj`**.

GeoObject-Request – Input and Output Mandatory Parameters

MENTZ

`line`

Line of which the coordinate sequence is requested.

Value: unique route ID or `<network>:<DIVA line>:<supplement>:<direction>:<project>:<mot type>:<type>::<stop sequence>:<line version>`

`<stopSequence>` has to be set to 1 to request the stop sequence.

Example

```
http://osm.demo.mentz.net/training/XML_GEOOBJECT_REQUEST?commonMacro
=geoobj&line=vvs:10002:%20:R:j21
```

GeoObject-Request –Optional Parameters

filterDate

This parameter provides the possibility to get the coordinate sequence and passed stops of one specific date. The format is YYYYMMDD.
Hint: This can be useful if the line has different routes e.g. for weekends.

GeoObject-Request – Bounding Box

Analog to the CoordInfo-Request it is also possible to provide a bounding box and only coordinate sequence and passed stops inside bounding box is calculated. Therefore the following parameters must be requested.

`boundingBox=1`

Enables the bounding box. No value must be provided.

`boundingBoxLU` `and` **`boundingBoxRL`**

Left upper and right lower coordinate.

Value: `<x>:<y>:<coordinate system>`

TripStopTimes-Request

TripStopTimes-Request – Table of Contents

TripStopTimes-Request – Input and Output Request

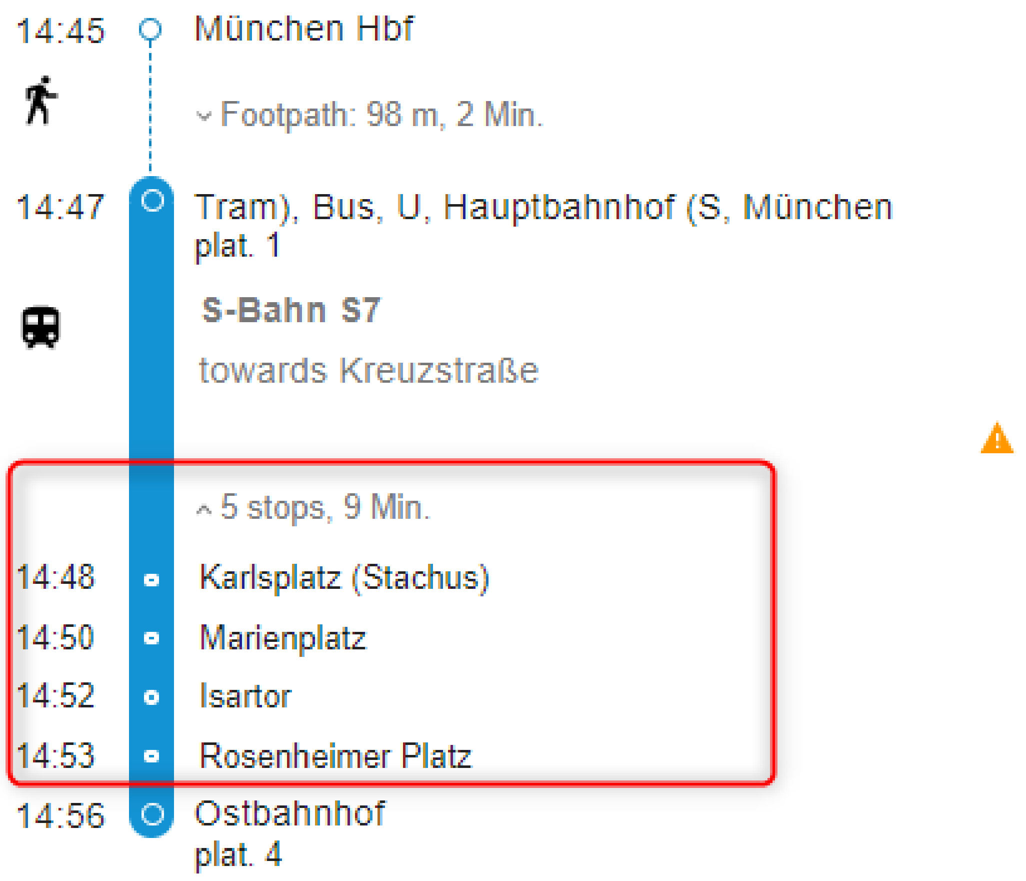
The TripStopTimes-Request is used to get the stop sequence of a journey - including arrival and departure times.

Request

```
http://osm.demo.mentz.net/training/XML_TRIPSTOPTIMES_
REQUEST?commonMacro=tripstoptimes
```

Example

```
http://osm.demo.mentz.net/training/XML_TRIPSTOPTIMES_
REQUEST?commonMacro=tripstoptimes&tripCode=963&stopID
=5006052&time=1432&date=20211109&line=vvs:10006:%20:R
:j21vvs:10006:%20:R:j21
```



14:45 München Hbf

Footpath: 98 m, 2 Min.

14:47 Tram), Bus, U, Hauptbahnhof (S, München
plat. 1

S-Bahn S7

towards Kreuzstraße

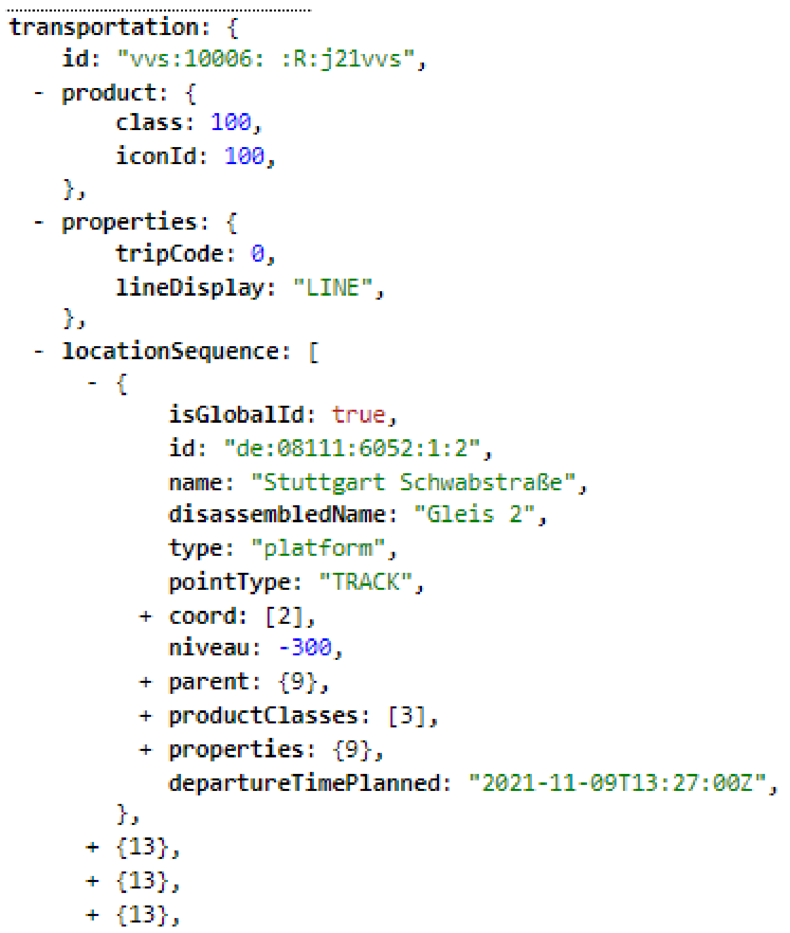
5 stops, 9 Min.

14:48 Karlsplatz (Stachus)
14:50 Marienplatz
14:52 Isartor
14:53 Rosenheimer Platz
14:56 Ostbahnhof
plat. 4

TripStopTimes-Request – Input and Output JSON Output

Stop Sequence

The array `locationSequence` contains stops in the well known format.



```
transportation: {
    id: "vvs:10006: :R:j21vvs",
  - product: {
        class: 100,
        iconId: 100,
    },
  - properties: {
        tripCode: 0,
        lineDisplay: "LINE",
    },
  - locationSequence: [
      - {
            isGlobalId: true,
            id: "de:08111:6052:1:2",
            name: "Stuttgart Schwabstraße",
            disassembledName: "Gleis 2",
            type: "platform",
            pointType: "TRACK",
          + coord: [2],
            niveau: -300,
          + parent: {9},
          + productClasses: [3],
          + properties: {9},
            departureTimePlanned: "2021-11-09T13:27:00Z",
        },
      + {13},
      + {13},
      + {13},
```

TripStopTimes-Request – Input and Output
Mandatory Parameters

These parameters are given by parameter injection or configuration:

- `outputFormat=rapidJSON` (activates the JSON API)
- `coordOutputFormat=WGS84[dd.ddddd]` (coord format set to WGS 84)

Note: Parameter injection works only for requests with HTTP parameters.

Further customer spezific parameters could be included in an HTTP parameter macro **`commonMacro=tripstoptimes`**.

TripStopTimes-Request – Input and Output Mandatory Parameters

Parameters to identify the line of which the coordinate sequence and stops are requested: Take the parameters from the response of the Trip- or DM-Request.

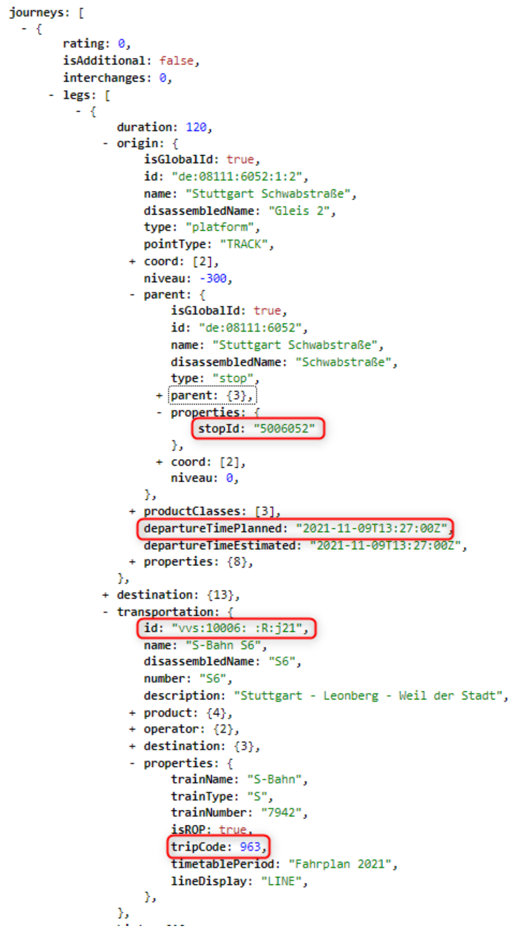
`line`
Unique route ID or
`<network>:<DIVALne>:<supplement>:<direction>:<project>:<motType>:<type>::<stopSequence>:<lineVersion>`

`stopID`
ID of the origin stop.

`tipCode`
Key of the journey.

`date`
Date of the departure `<YYYYMMDD>.`

`time`
Time of the departure `<HHMM>.`



```
journeys: [
  - {
        rating: 0,
        isAdditional: false,
        interchanges: 0,
      - legs: [
          - {
                duration: 120,
              - origin: {
                    isGlobalId: true,
                    id: "de:08111:6052:1:2",
                    name: "Stuttgart Schwabstraße",
                    disassembledName: "Gleis 2",
                    type: "platform",
                    pointType: "TRACK",
                  + coord: [2],
                    niveau: -300,
                  - parent: {
                        isGlobalId: true,
                        id: "de:08111:6052",
                        name: "Stuttgart Schwabstraße",
                        disassembledName: "Schwabstraße",
                        type: "stop",
                      + parent: {3},
                      - properties: {
                            stopId: "5006052"
                        },
                      + coord: [2],
                        niveau: 0,
                    },
                  + productClasses: [3],
                    departureTimePlanned: "2021-11-09T13:27:00Z",
                    departureTimeEstimated: "2021-11-09T13:27:00Z",
                  + properties: {8},
                },
              + destination: {13},
              - transportation: {
                    id: "vvs:10006: :R:j21",
                    name: "S-Bahn S6",
                    disassembledName: "S6",
                    number: "S6",
                    description: "Stuttgart - Leonberg - Weil der Stadt",
                  + product: {4},
                  + operator: {2},
                  + destination: {3},
                  - properties: {
                        trainName: "S-Bahn",
                        trainType: "S",
                        trainNumber: "7942",
                        isROP: true,
                        tripCode: 963,
                        timetablePeriod: "Fahrplan 2021",
                        lineDisplay: "LINE",
                    },
                },
```

TripStopTimes-Request – Input and Output
Mandatory Parameters

Challenge

Get the stop sequence of the *S-Bahn S2*, which departs at November 9th, 2021, 15:00 from *Stuttgart Schwabstraße*.

Hint:

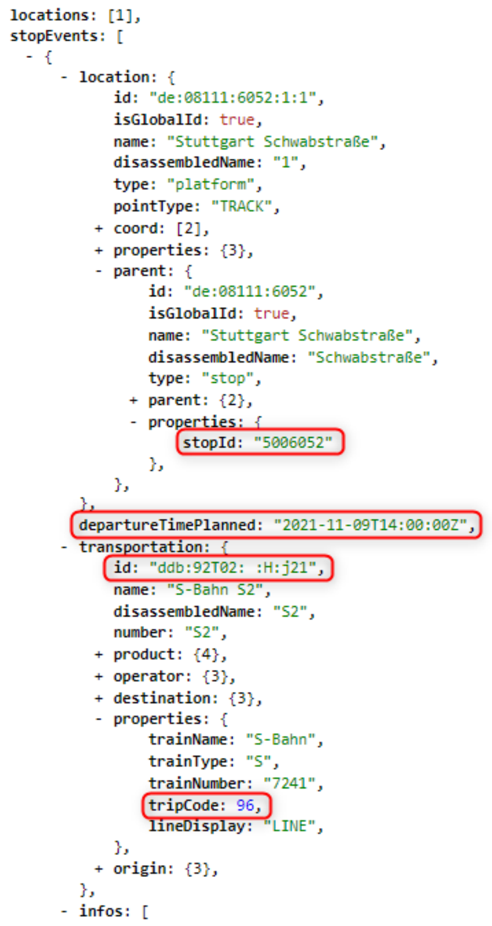
```
http://osm.demo.mentz.net/training/XML_DM_REQUEST?commonMacro=dm&type_dm=any&name_dm=5006052
```

TripStopTimes-Request – Input and Output Mandatory Parameters

Solution

```
http://osm.demo.mentz.net/training/XML_TRIPSTOPTIMES_REQUEST?commonMacro=tripstoptimes&tripCode=96&stopID=5006052&time=1500&date=20211109&line=ddb:92T02:%20:H:j21
```

For a departure board often only the next stops are required, not the previous…



```
locations: [1],
stopEvents: [
  - {
      - location: {
            id: "de:08111:6052:1:1",
            isGlobalId: true,
            name: "Stuttgart Schwabstraße",
            disassembledName: "1",
            type: "platform",
            pointType: "TRACK",
          + coord: [2],
          + properties: {3},
          - parent: {
                id: "de:08111:6052",
                isGlobalId: true,
                name: "Stuttgart Schwabstraße",
                disassembledName: "Schwabstraße",
                type: "stop",
              + parent: {2},
              - properties: {
                    stopId: "5006052"
                },
            },
        },
        departureTimePlanned: "2021-11-09T14:00:00Z",
      - transportation: {
            id: "ddb:92T02: :H:j21",
            name: "S-Bahn S2",
            disassembledName: "S2",
            number: "S2",
          + product: {4},
          + operator: {3},
          + destination: {3},
          - properties: {
                trainName: "S-Bahn",
                trainType: "S",
                trainNumber: "7241",
                tripCode: 96,
                lineDisplay: "LINE",
            },
          + origin: {3},
        },
      - infos: [
```

TripStopTimes-Request – Optional Parameters

`tStOTType`

Filters the stop sequence.

Value	Description
ALL	All stops
NEXT	Next stops relative to the given stop (see parameter `stopID`)
PREVIOUS	Previous stops relative to the given stop (see parameter `stopID`)

StopSeqCoord-Request

StopSeqCoord-Request – Table of Contents

StopSeqCoord-Request – Input and Output Request

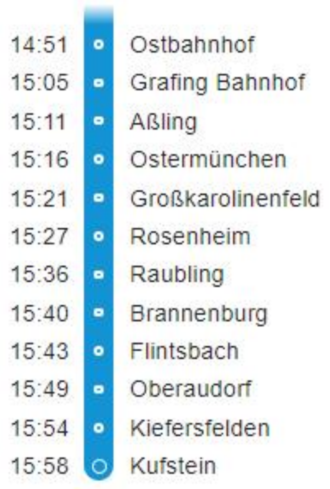
The StopSeqCoord-Request is used to get the stop sequence and the track of an option from departure board.

Request

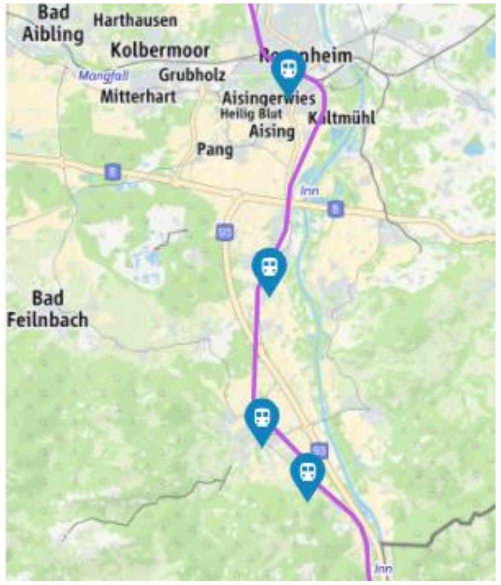
```
http://osm.demo.mentz.net/training/XML_STOPSEQCOORD_R
EQUEST?commonMacro=stopseqcoord
```

Example

```
http://osm.demo.mentz.net/training/XML_STOPSEQCOORD_R
EQUEST?commonMacro=stopseqcoord&tStOTType=NEXT&tripCo
de=96&stopID=5006052&time=1500&date=20211109&line=ddb
:92T02:%20:H:j21
```



14:51	Ostbahnhof
15:05	Grafing Bahnhof
15:11	Aßling
15:16	Ostermünchen
15:21	Großkarolinenfeld
15:27	Rosenheim
15:36	Raubling
15:40	Brannenburg
15:43	Flintsbach
15:49	Oberaudorf
15:54	Kiefersfelden
15:58	Kufstein

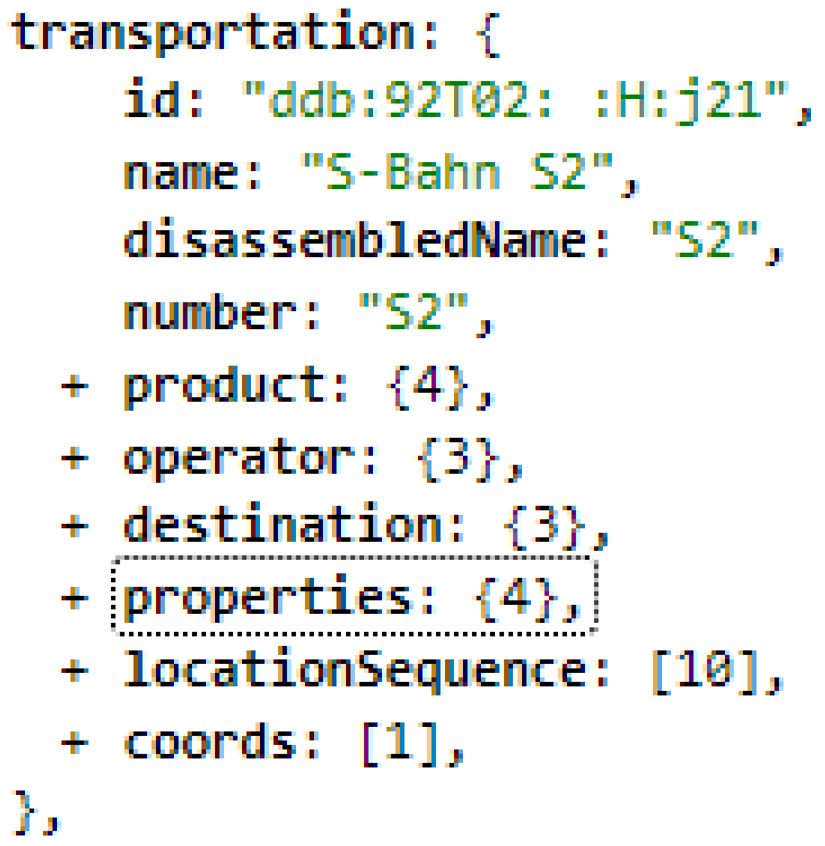


StopSeqCoord-Request – Input and Output JSON Output

Transportation

The element `transportation` contains apart of the usual objects:

- `coords` (array with the coordinate sequence of the service
- `locationSequence` (optional list of passed stops)



```
transportation: {
    id: "ddb:92T02: :H:j21",
    name: "S-Bahn S2",
    disassembledName: "S2",
    number: "S2",
  + product: {4},
  + operator: {3},
  + destination: {3},
  + properties: {4},
  + locationSequence: [10],
  + coords: [1],
},
```

StopSeqCoord-Request – Input and Output
Mandatory Parameters

These parameters are given by parameter injection or configuration:

- `outputFormat=rapidJSON` (activates the JSON API)
- `coordOutputFormat=WGS84[dd.ddddd]` (coord format set to WGS 84)

Note: Parameter injection works only for requests with HTTP parameters.

Further customer spezific parameters could be included in an HTTP parameter macro **`commonMacro=stopseqcoord`**.

StopSeqCoord-Request – Input and Output Mandatory Parameters

Parameters to identify the line of which the coordinate sequence and stops are requested: Take the parameters from the response of the Trip- or DM-Request.

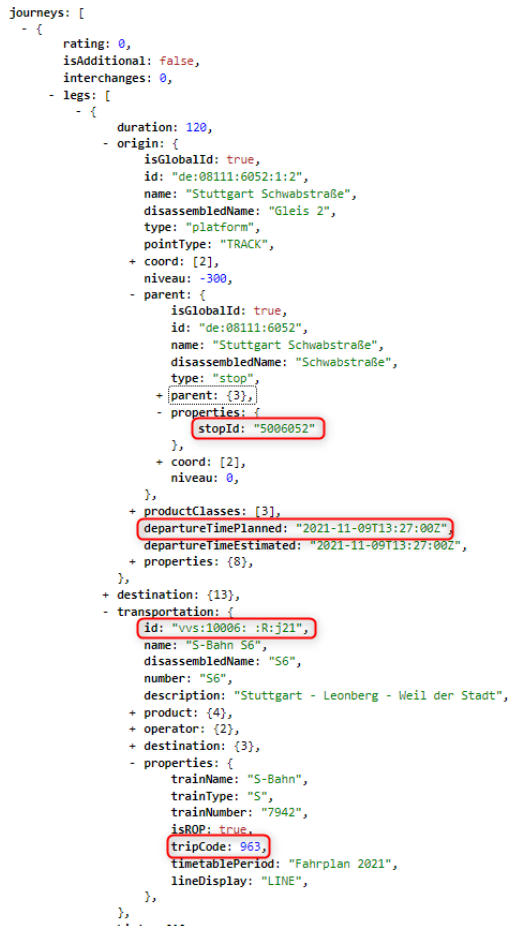
`line`
Unique route ID or `<network>:<DIVALine>:<supplement>:<direction>:<project>:<motType>:<type>::<stopSequence>:<lineVersion>`.

`stop`
ID of the stop.

`tripCode`
Key of the journey.

`date`
Date of the departure `<YYYYMMDD>`.

`time`
Time of the depature `<HHMM>`.



```
journeys: [
  - {
        rating: 0,
        isAdditional: false,
        interchanges: 0,
      - legs: [
          - {
                duration: 120,
              - origin: {
                    isGlobalId: true,
                    id: "de:08111:6052:1:2",
                    name: "Stuttgart Schwabstraße",
                    disassembledName: "Gleis 2",
                    type: "platform",
                    pointType: "TRACK",
                  + coord: [2],
                    niveau: -300,
                  - parent: {
                        isGlobalId: true,
                        id: "de:08111:6052",
                        name: "Stuttgart Schwabstraße",
                        disassembledName: "Schwabstraße",
                        type: "stop",
                      + parent: {3},
                      - properties: {
                            stopId: "5006052"
                        },
                      + coord: [2],
                        niveau: 0,
                    },
                  + productClasses: [3],
                    departureTimePlanned: "2021-11-09T13:27:00Z",
                    departureTimeEstimated: "2021-11-09T13:27:00Z",
                  + properties: {8},
                },
              + destination: {13},
              - transportation: {
                    id: "vvs:10006: :R:j21",
                    name: "S-Bahn S6",
                    disassembledName: "S6",
                    number: "S6",
                    description: "Stuttgart - Leonberg - Weil der Stadt",
                  + product: {4},
                  + operator: {2},
                  + destination: {3},
                  - properties: {
                        trainName: "S-Bahn",
                        trainType: "S",
                        trainNumber: "7942",
                        isROP: true,
                        tripCode: 963,
                        timetablePeriod: "Fahrplan 2021",
                        lineDisplay: "LINE",
                    },
                },
```

StopSeqCoord-Request – Input and Output
Mandatory Parameters

MENTZ

Challenge

Get the stop sequence and coordinates of the *S-Bahn S2*, which departs at November 9th, 2021, 15:00 from *Stuttgart Schwabstraße*.

Hint:

```
http://osm.demo.mentz.net/training/XML_DM_REQUEST?commonMacro=dm&type_dm=any&name_dm=5006052
```

StopSeqCoord-Request – Input and Output Mandatory Parameters

Solution

```
http://osm.demo.mentz.net/training/XML_STOPSEQCOORD_REQUEST?commonMa
cro=stopseqcoord&tStOTType=NEXT&tripCode=96&stopID=5006052&time=1500
&date=20211109&line=ddb:92T02:%20:H:j21
```

StopSeqCoord-Request – Optional Parameters

`tStOTType`

Filters the stop and coordinate sequence.

Value	Description
ALL	All stops/coordinates
NEXT	Next stops/coordinates relative to the given stop (see parameter `stopID`)
PREVIOUS	Previous stops/coordinates relative to the given stop (see parameter `stopID`)

MapRoute-Request

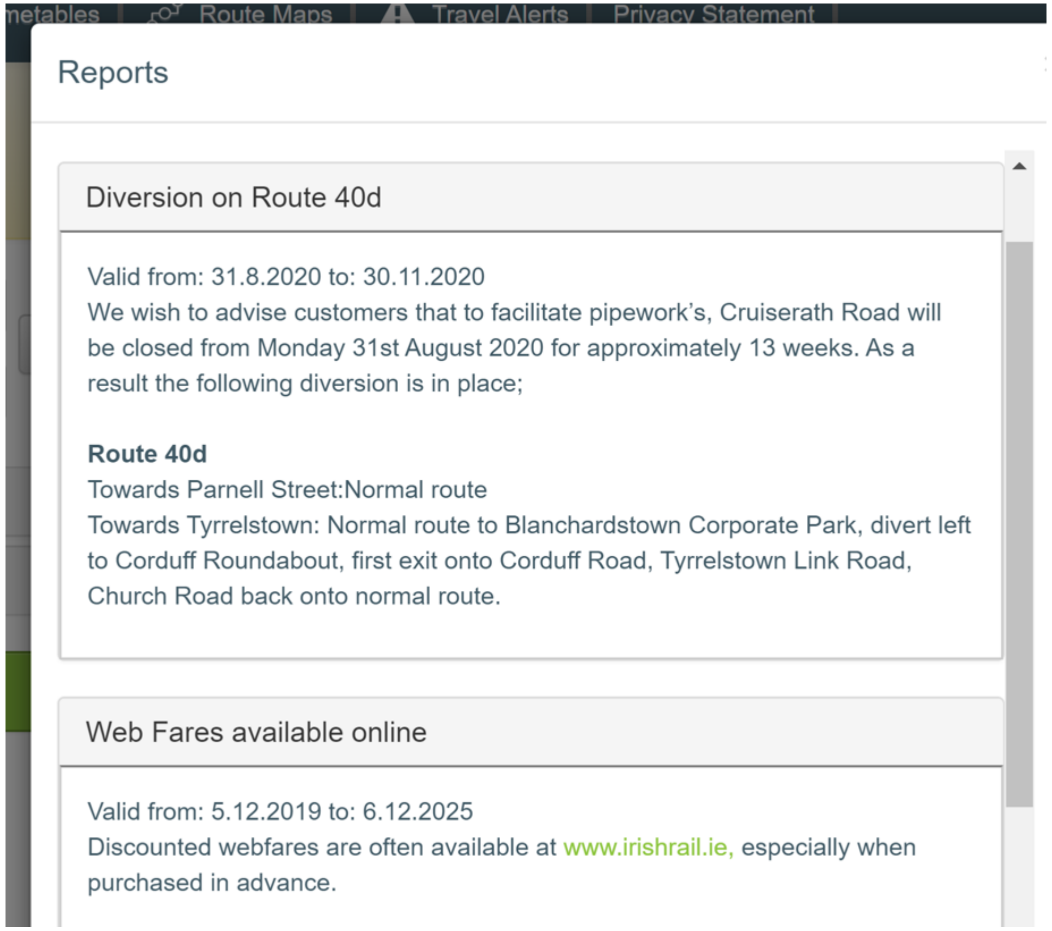
Addinfo-Request – Table of Contents

AddInfo-Request – Input and Output Request

The AddInfo-Request is used to get the travel alerts.

Due to performance reasons it is recommendable to filter the messages. The filter criteria are determined by the HTTP parameters.

Request
```
http://osm.demo.mentz.net/training/XML_ADDINFO_REQUES
T?commonMacrot=addinfo
```



Reports

Diversion on Route 40d

Valid from: 31.8.2020 to: 30.11.2020
We wish to advise customers that to facilitate pipework's, Cruiserath Road will be closed from Monday 31st August 2020 for approximately 13 weeks. As a result the following diversion is in place;

Route 40d
Towards Parnell Street:Normal route
Towards Tyrrelstown: Normal route to Blanchardstown Corporate Park, divert left to Corduff Roundabout, first exit onto Corduff Road, Tyrrelstown Link Road, Church Road back onto normal route.

Web Fares available online

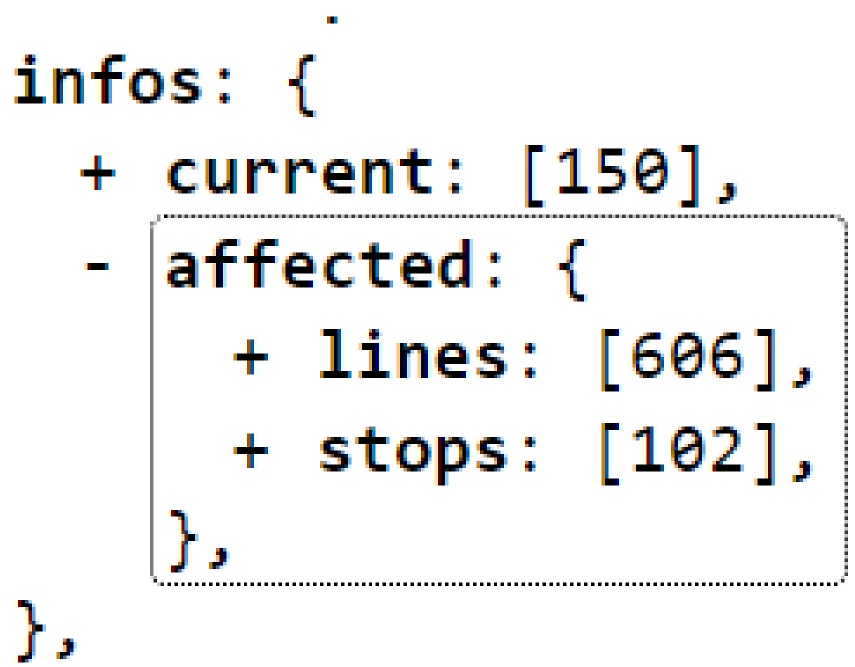
Valid from: 5.12.2019 to: 6.12.2025
Discounted webfares are often available at www.irishrail.ie, especially when purchased in advance.

AddInfo-Request – Input and Output JSON Output

Infos

The response contains an array of `current` travel alerts, optionally an array of `historic` messages and an object which contains:

- affected `lines`
- affected `trains`
- affected `stops`

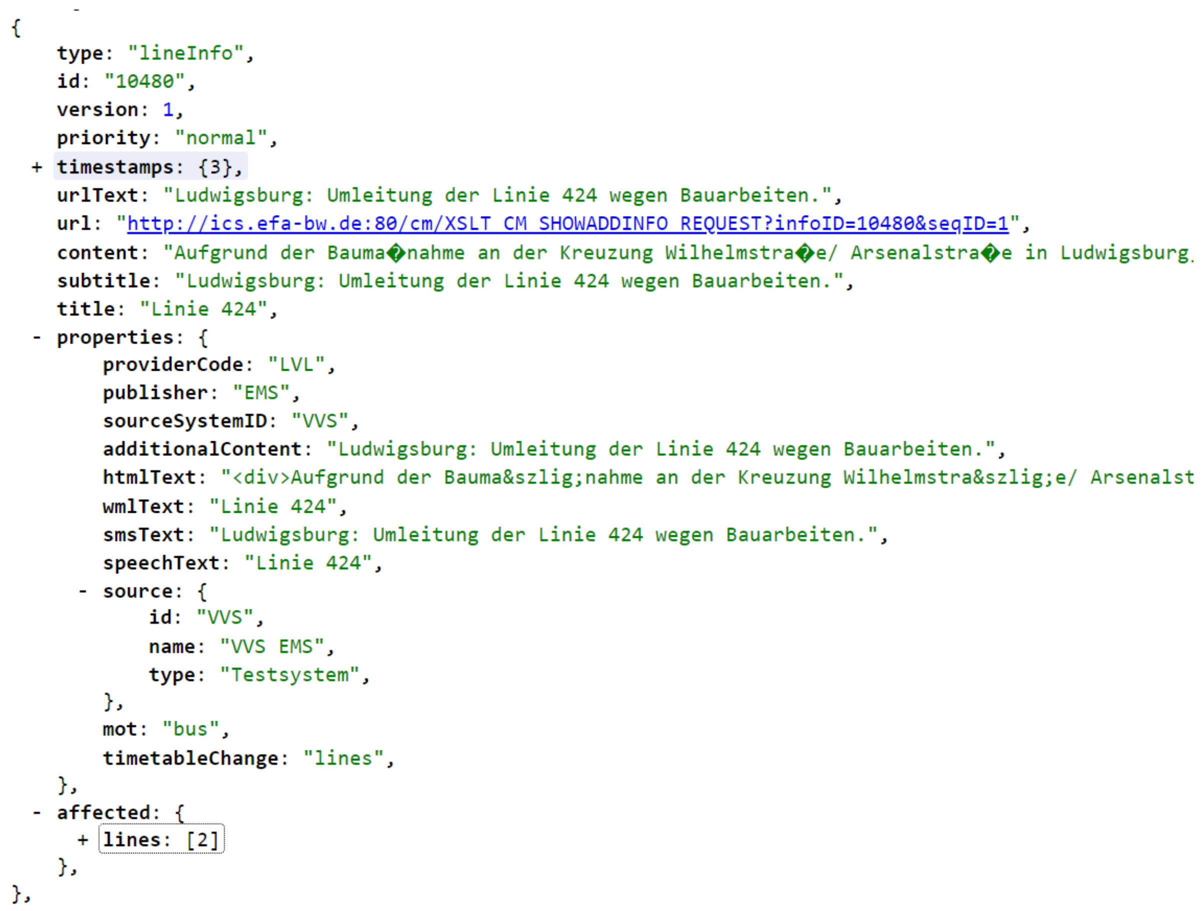


```
infos: {
  + current: [150],
  - affected: {
      + lines: [606],
      + stops: [102],
    },
},
```

AddInfo-Request – Input and Output JSON Output

Travel Alert

- Each travel alert has a `type`, `id` and `priority`.
- Use the objects `url` and `urlText` as a teaser. The content can be quite long.
- The objects `subtitle` an `content` contain the title and the content of the alert in HTML format.
- Information about the provider of the message and the source system is included in `properties`.
- The object `timestamp` includes information about creation date and time, the last modification, the validity and publishing period.
- The object `affected` informs about affected `lines` or `stops`.



```
{
    type: "lineInfo",
    id: "10480",
    version: 1,
    priority: "normal",
  + timestamps: {3},
    urlText: "Ludwigsburg: Umleitung der Linie 424 wegen Bauarbeiten.",
    url: "http://ics.efa-bw.de:80/cm/XSLT_CM_SHOWADDINFO_REQUEST?infoID=10480&seqID=1",
    content: "Aufgrund der Bauma�nahme an der Kreuzung Wilhelmstra�e/ Arsenalstra�e in Ludwigsburg
    subtitle: "Ludwigsburg: Umleitung der Linie 424 wegen Bauarbeiten.",
    title: "Linie 424",
  - properties: {
        providerCode: "LVL",
        publisher: "EMS",
        sourceSystemID: "VVS",
        additionalContent: "Ludwigsburg: Umleitung der Linie 424 wegen Bauarbeiten.",
        htmlText: "<div>Aufgrund der Bauma&szlig;nahme an der Kreuzung Wilhelmstra&szlig;e/ Arsenalst
        wmlText: "Linie 424",
        smsText: "Ludwigsburg: Umleitung der Linie 424 wegen Bauarbeiten.",
        speechText: "Linie 424",
      - source: {
            id: "VVS",
            name: "VVS EMS",
            type: "Testsystem",
        },
        mot: "bus",
        timetableChange: "lines",
    },
  - affected: {
      + lines: [2]
    },
},
```

AddInfo-Request – Input and Output Mandatory Parameters

These parameters are given by parameter injection or configuration:

- `outputFormat=rapidJSON` (activates the JSON API)
- `coordOutputFormat=WGS84[dd.ddddd]` (coord format set to WGS 84)

Note: Parameter injection works only for requests with HTTP parameters.

Further customer spezific parameters could be included in an HTTP parameter macro **`commonMacro=addinfo`**.

AddInfo-Request – Filters
Filter for Publication or Validity Status

`filterPublicationStatus`

Currently active (`current`) or expired (`history`) messages.

`filterPublished = 1`

Only messages which are currently published.

AddInfo-Request – Filters
Filter for Publication or Validity Status

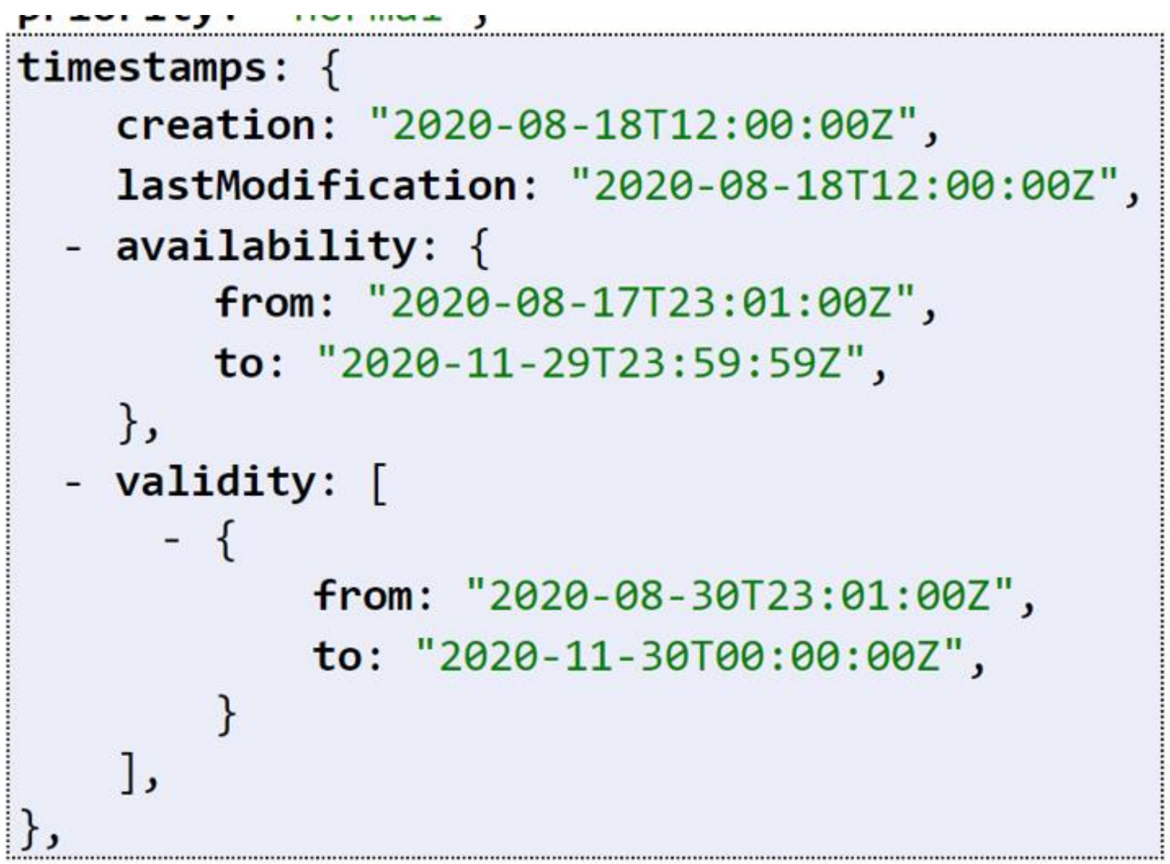
`filterPublicationStatus`
Currently active (`current`) or expired (`history`) messages.

`filterPublished = 1`
Only messages which are currently published.

`filterValid = 1`
Only messages which are currently valid.

`filterDateValid`
Messages which are active for the given day <DD-MM-YYYY>. The filter can be sent multiple times for
messages which are active on several dates.

`filterValidIntervalStart` and **`filterValidIntervalEnd`**
Messages which are active in the given interval <DD-MM-YYYY>.



```
timestamps: {
    creation: "2020-08-18T12:00:00Z",
    lastModification: "2020-08-18T12:00:00Z",
  - availability: {
        from: "2020-08-17T23:01:00Z",
        to: "2020-11-29T23:59:59Z",
    },
  - validity: [
      - {
            from: "2020-08-30T23:01:00Z",
            to: "2020-11-30T00:00:00Z",
        }
    ],
},
```

AddInfo-Request – Filters
Filter for Message Type

`filterInfoType`

For several types use the parameter multiple times. Available message types:

- `areaInfo`
- `stopInfo`
- `stopBlocking`
- `lineInfo`
- `lineBlocking`
- `routeInfo`
- `routeBlocking`
- `generalInfo`
- `bannerInfo`
- `trafficInformation`

AddInfo-Request – Filters
Filter for Priority

`filterPriority`

Filters for messages with the priority:

- `veryLow`
- `low`
- `high`
- `veryHigh`

AddInfo-Request – Filters
Filter for Mode of Transport or Operator

`filterMOTType`

Mode of transport. For several modes use the parameter multiple times.

`itdLPxx_selOperator`

Messages which affect the services of a certain operator. The parameter value is the operator code. For several operators use the parameter multiple times.

AddInfo-Request – Filters
Filter for Network and Services

The following parameters can be used multiple times. For the supplement the character _ needs to be replaced by a space.

`itdLPxx_selLine`
Diva line, e.g. `itdLPxx_selLine=6040D.`

`filterPartialNet`
Messages which affect services that match the network.

`filterPNLineSup`
Messages which affect services that match the network, DIVA line and supplement <network>:<DIVA line>:<supplement>, e.g. `filterPNLineSup=irl:6040D:  .`

AddInfo-Request – Filters
Filter for Services

`filterPNLineDir`

Messages which affect services that match the subnet, DIVA line and direction <network>:<DIVA line >:<supplement>:<direction>, e.g. `filterLineDir=irl:6040D: :H`
Hint: `H` is inbound, `R` is outbound.

`line`

Messages which affect services that match the subnet, DIVA line, supplement, direction and project <network>:<DIVA line >:<supplement>:<direction>:<project>, e.g. `line=irl:6040D: :H:_`.

AddInfo-Request – Filters
Filter for Stops

`passedStops = 1`

Messages which affect all passed stops of a service. See filter by service.
Hint: The selection of a service is required, e.g. `itdLPxx_selLine=6040D&passedStops=1`.

`itdLPxx_selStop`

ID of a stop. The parameter can be used multiple times.

AddInfo-Request – Filters
Filter for Localities

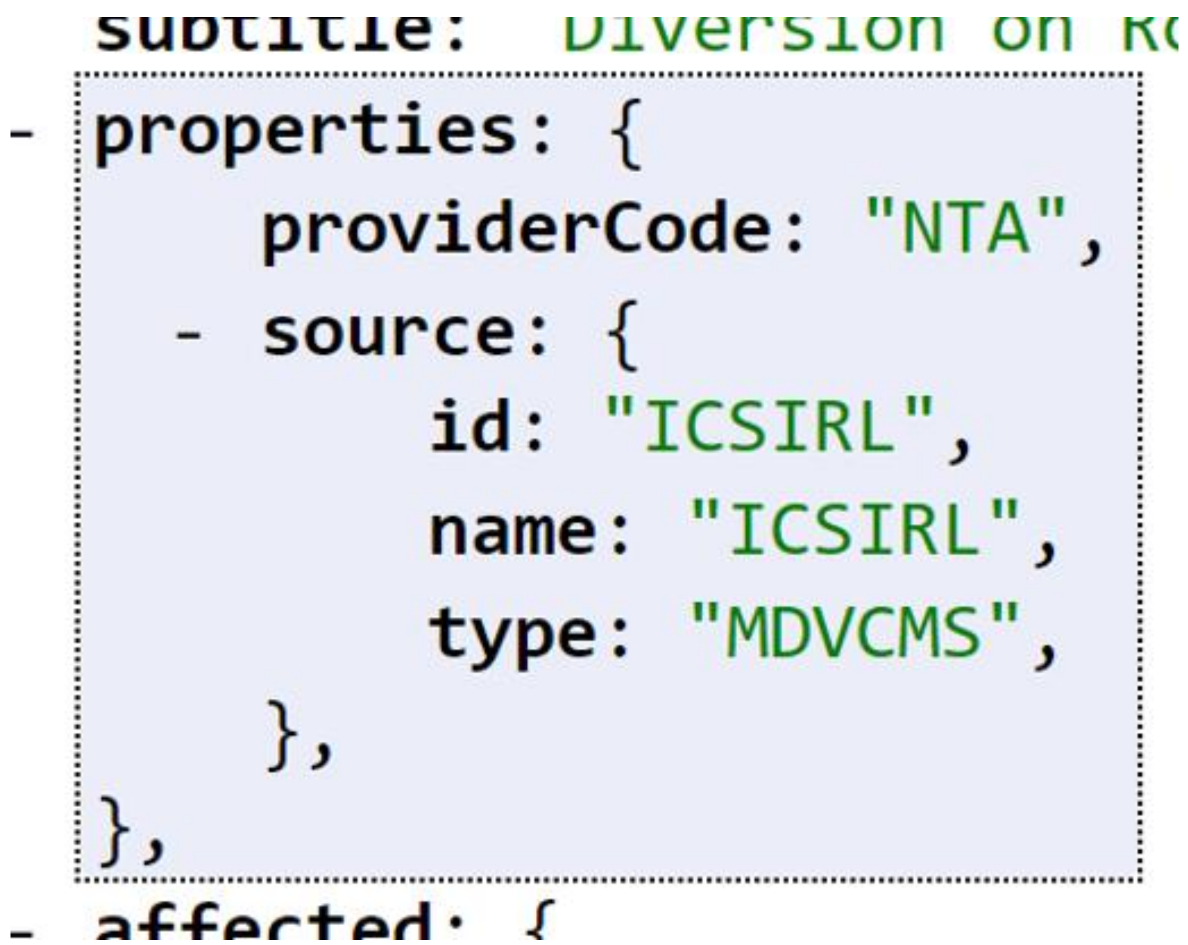
`filterOMC`
Messages which affect one or more municipalities determined by the OMC <OMC>:<OMC>:…

`filterOMC_PlaceID`
Messages which affect a locality given by the OMC and place ID <OMC>:<place ID>. For more than one locality the parameter is used multiple times.

AddInfo-Request – Filters
Filter for Provider and Source

`filterProviderCode`
Provider code. For messages of several providers use the parameter multiple times.

`filterSourceSystemName`
Source system ID. For messages which have been entered to several source systems use the parameter multiple times.



```
  subtitle: "Diversion on Ro
- properties: {
      providerCode: "NTA",
    - source: {
          id: "ICSIRL",
          name: "ICSIRL",
          type: "MDVCMS",
      },
  },
- affected: {
```

AddInfo-Request – Filters
Filter for Message ID

`filterInfoID`

ID of the message. For several messages use the parameter multiple times.

AddInfo-Request – Additional Information / Reduction of the Response

Add required or remove not required elements from the output:

`filterShowLineList = 1 | 0`
Removes the list of affected lines.

`filterShowStopList = 1 | 0`
Removes the list of affected stops.

`filterShowPlaceList = 1 | 0`
Removes the list of affected localities.

StopList-Request

StopList-Reqiest

1. Input and Output
2. Filters
3. Additional Information

StopList-Request – Input and Output Request

The StopList-Request is used to get the stops. Filtering is possible and recommended. Used for analysis and data export.

Note: This request should not be part of a user web interface due to performance reasons. Filtering can help preventing a browser crash.

Request

`http://osm.demo.mentz.net/training/XML_STOPLIST_REQUEST?commonMacro=stoplist` -> Do not enter this in your browser!

Example

`http://osm.demo.mentz.net/training/XML_STOPLIST_REQUEST?commonMacro=stoplist&stopListOMC=8111000`

StopList-Request – Input and Output JSON Output / Mandatory Parameters

MENTZ

Locations

The response includes an array of `locations`. The structure is equal to former examples.

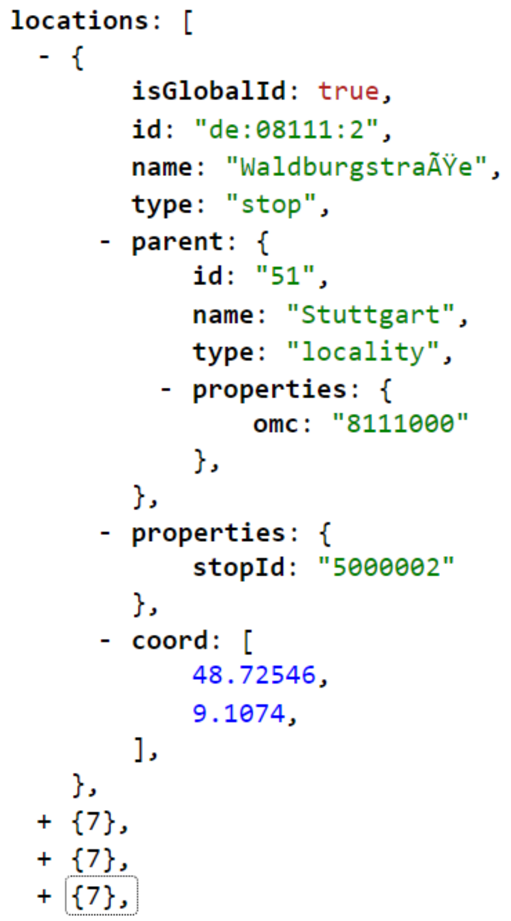
Mandatory Parameters

These parameters are given by parameter injection or configuration:

- `outputFormat=rapidJSON` (activates the JSON API)
- `coordOutputFormat=WGS84[dd.ddddd]` (coord format set to WGS 84)

Note: Parameter injection works only for requests with HTTP parameters.

Further customer spezific parameters could be included in an HTTP parameter macro **`commonMacro=stoplist`**.



```
locations: [
  - {
          isGlobalId: true,
          id: "de:08111:2",
          name: "WaldburgstraÃŸe",
          type: "stop",
        - parent: {
              id: "51",
              name: "Stuttgart",
              type: "locality",
            - properties: {
                  omc: "8111000"
              },
          },
        - properties: {
              stopId: "5000002"
          },
        - coord: [
              48.72546,
              9.1074,
          ],
    },
  + {7},
  + {7},
  + {7},
```

StopList-Request – Input and Output Filters

`stopListOMC`
OMC (municipality code).

`stopListPlaceId`
ID of the place. Can be combined with `stopListOMC`.

`stopListOMCPlaceId`
Combination of `stopListOMC` and `stopListPlaceId`. OMC and ID of the place are separated by colon.

`rTN`
Only stops within the network given by parameter value.

StopList-Request – Input and Output Filters

`stopListSubnetwork`
Only stops served by services from the network given by parameter value.

`fromstop` and **`tostop`**
Only stops with IDs within the intervall restricted by these parameters.

StopList-Request – Input and Output Additional Information

Please take in mind that requesting additional information worsens the performance.

`servingLines = 1`
Services of each stop.

`servingLinesMOTType = 1`
Mayor means of transport of each stop. The combination with `servingLinesMOTTypes=1` is not possible.

`servingLinesMOTTypes = 1`
All means of transport of each stop. Separated by comma. The combination with `servingLinesMOTType=1` is not possible.

StopList-Request – Input and Output
Additional Information

`tariffZones = 1`

Tariff zone of each stop.

LineList-Request

LineList-Request – Table of Content

LineList-Request – Input and Output Request

The LineList-Request is used to get the lines. Used for analysis and data export.

Request

```
http://osm.demo.mentz.net/training/XML_LINELIST_REQUEST?commonMacro=
linelist
```

Example

```
http://osm.demo.mentz.net/training/XML_LINELIST_REQUEST?commonMacro=
linelist&lineListSubnetwork=vvs
```

LineList-Request – Input and Output JSON Output / Mandatory Parameters

Transportation

The array `transportations` includes a list of services in the well known format.

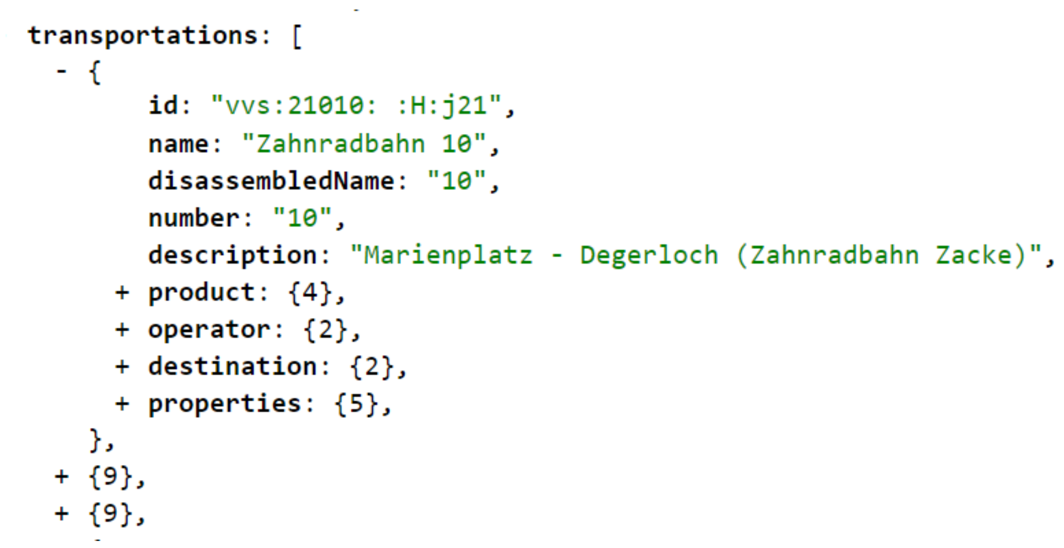
Mandatory Parameters

These parameters are given by parameter injection or configuration:

- `outputFormat=rapidJSON` (activates the JSON API)
- `coordOutputFormat=WGS84[dd.ddddd]` (coord format set to WGS 84)

Note: Parameter injection works only for requests with HTTP parameters.

Further customer spezific parameters could be included in an HTTP parameter macro **`commonMacro=linelist`**.



```
transportations: [
  - {
        id: "vvs:21010: :H:j21",
        name: "Zahnradbahn 10",
        disassembledName: "10",
        number: "10",
        description: "Marienplatz - Degerloch (Zahnradbahn Zacke)",
      + product: {4},
      + operator: {2},
      + destination: {2},
      + properties: {5},
    },
  + {9},
  + {9},
```

LineList-Request – Input and Output
Mandatory Parameters

Use one of these parameters to search for lines:

`lineListBranchCode`
Code of the branch.

`lineListNetBranchCode`
Network and optionally the code of the branch separated by colon.

`lineListSubnetwork`
Network.

`lineListOMC`
OMC (municipality code).

LineList-Request – Optional Parameters

`lineListMixedLines = 1`
Activates the search of composed services.

`mergeDir = 1`
Merges the inbound and outbound service. Thus only inbound services are listed. By default both are listed.

`lineReqType`
Presentation type – works as a bit mask to combine presentation types
Example: `lineReqType=5` -> 1 + 4
-> Departure Monitor and Timetable

Value	Description
1	Departure Monitor (DM)
2	Stop Timetable (STT)
4	Timetable (TTB)
8	Route Maps
16	Station Timetable

Vielen Dank!

Mehr über uns erfahren Sie auf: mentz.net

MENTZ GmbH
Grillparzerstraße 18
81675 München

vertreten durch: Christoph Mentz, Geschäftsführer

info@mentz.net
+49 89 41868-0