

EPA DATA PIPELINE DEMONSTRATOR

European Parking Association

Markus Schneider (EPA SME, APDS Change Control)

NAPCORE Mobility Data Days 7-9 November 2023, Budapest



Starting Point and Motivation

- Continuation of EPA's initiative launched to
 - increase **awareness** of EU delegated regulations,
 - provide a **deeper understanding** and concrete interpretation paired with the offer to
 - get an overview of existing data exchange **standards** and
 - receive **support** in their concrete **implementation**
- Questions to be answered:
 - What is/will become mandatory and when?
 - What exactly are we supposed to provide?
 - What is the best standard to be adopted? What about interoperability?
 - How can we implement this? What does it take? Is it rocket science?

The Approach: a working Data Pipeline Demonstrator

The screenshot shows a web browser window displaying the 'Data Route Demonstrator' interface. The page is titled 'Data Route Demonstrator' and includes a header with the EPA logo and a user login 'Markus Schneider'. The main content area contains an introduction, key intent, and a table of data routes. The table lists three routes: Q-Park France, Q-Park Netherlands, and Q-Park Germany, each with details on source, format, destination, and destination format. A 'Launch Route' button is provided for each entry. Below the table, there is a 'Want to know more?' section with contact information for Nigel Williams, Tom Antonissen, and Markus Schneider.

Data Route Demonstrator

This **Data Route Demonstrator** has been initiated by **EPA**, the [European Parking Association](#) in close cooperation with **Q-Park** as the provider of data for evaluation/demonstration purposes and **APDS**, the Alliance for Parking Data Standards as a contributing supporter.

The key intent is to show that

- interoperability between different data exchange formats is possible and
- making mobility-related data available is no rocket science

To demonstrate this, we have set up two routes / data pipelines. Both of them

- read parking data from a (Q-Park-provided) data source,
- derive an APDS-conformant representation from the source's proprietary format
- convert the data from APDS format to a configurable destination format and then
- send the conversion result to a destination system

The destination system can be a **NAP**, a National Access Point (such as for instance in case of the Dutch Q-Park parking data) or a placeholder as used in case of the French Q-Park data.

The demonstrator is a **live** system, i.e. it pulls actual parking data from the configured data sources, and then performs the described conversion in order to ultimately send the data to the configured destination. Just select a route of your interest and click on "Launch Route".

Data Routes

Route	Data Source	Source Format	Data Destination	Destination Format	Action(s)
Q-Park France	Q-Park International Backend (exposing French data)	APDS (derived from Q-Park 3rd Party)	French NAP Simulator	NeTeX	Launch Route
Q-Park Netherlands	Q-Park International Backend (exposing Dutch data)	APDS (derived from Q-Park 3rd Party)	Dutch NAP Simulator	DATEX II	Launch Route
Q-Park Germany	Q-Park International Backend (exposing German data)	APDS (derived from Q-Park 3rd Party)	German NAP (Mobilithek)	DATEX II	Launch Route

Want to know more?

If we have aroused your interest, please do not hesitate to contact us:

- [Nigel Williams \(EPA, APDS\)](#)
- [Tom Antonissen \(EPA\)](#)
- [Markus Schneider \(APDS\)](#)

FR
NL
DE

From Source to Destination

FR
NL
DE

Source Format	Data Destination	Destination Format
APDS (derived from Q-Park 3rd Party)	French NAP Simulator	NeTEx
APDS (derived from Q-Park 3rd Party)	Dutch NAP Simulator	DATEX II
APDS (derived from Q-Park 3rd Party)	German NAP (Mobilithek)	DATEX II

The screenshot shows the 'Data Route Demonstrator' web application. It includes a header with the EPA logo and a user login section for 'Markus Schneider'. The main content area contains an introduction, key objectives, and a 'Data Routes' table. The table lists three routes: France, Netherlands, and Germany, each with its source, destination, and format. A 'Launch Route' button is provided for each entry. Below the table, there is a 'Want to know more?' section with contact information for Noel Williams, Tom Antonissen, and Markus Schneider.



Example #1: Q-Park France

The screenshot shows a web browser window with the following content:

- Header:** EPA logo (EUROPEAN PARKING ASSOCIATION) on the left, and "Logged in as Markus Schneider" with a "Log out" button on the right.
- Section: Route Details**
 - Q-Park France** (with French flag icon)
 - Route Name: Q-Park France
 - Data Source: Q-Park International Backend (exposing French data)
 - Source Format: APDS (derived from Q-Park 3rd Party)
 - Destination System: [French NAP Simulator](#)
 - Destination Data Format: NeTEx
- Buttons:** "Go back to Routes Overview" and "Run this Route now"
- Section: Route Execution**
 - Status: *inactive*
 - read data from source** (177 records retrieved) with buttons: "View in Q-Park 3rd Party Format" and "View in APDS Format"
 - convert from source format to destination format** (177 records converted) with button: "View in NETEX Format"
 - send converted data to destination** (177 records submitted) with button: "Visit NAP"

FR



Source: Proprietary Q-Park API Format

The screenshot shows a web application interface for 'Mobilithek.info - Die Mobilitätsdaten Plattform'. The main content area displays 'Route Details' for 'Q-Park France'. The 'Data Source' is 'Q-Park International Backend', and the 'Source Format' is 'APDS (derived from Q-Park)'. A modal window titled 'Source Data (Native Q-Park 3rd Party Format)' is open, showing a JSON array of objects representing parking spots. The JSON structure is as follows:

```
[ {
  "id": {
    "countryCode": "fr",
    "uid": "62007_900"
  },
  "commercialName": "Boulogne-sur-Mer - La Plage",
  "openingHours": [ {
    "id": 124446,
    "weekday": 1,
    "startHour": 0,
    "startMinute": 0,
    "endHour": 0,
    "endMinute": 0,
    "driveType": "DriveIn"
  }, {
    "id": 124447,
    "weekday": 2,
    "startHour": 0,
    "startMinute": 0,
    "endHour": 0,
    "endMinute": 0,
    "driveType": "DriveIn"
  }, {
    "id": 124448,
    "weekday": 3,
    "startHour": 0,
    "startMinute": 0,
    "endHour": 0,
    "endMinute": 0,
    "driveType": "DriveIn"
  }, {
    "id": 124449,
    "weekday": 4,
    "startHour": 0,
    "startMinute": 0,
    "endHour": 0,
    "endMinute": 0,
    "driveType": "DriveIn"
  }, {
    "id": 124450,
    "weekday": 5,
    "startHour": 0,
    "startMinute": 0,
    "endHour": 0,
    "endMinute": 0,
    "driveType": "DriveIn"
  }
]
```

Staging: APDS Format

The screenshot shows a web application interface with a modal window displaying APDS-formatted data. The background interface includes the EPA logo, 'Route Details' for 'Q-Park France', and 'Route Execution' steps. The modal window, titled 'APDS-formatted Data', shows a JSON object with the following structure:

```
[ {
  "id": "62007_900",
  "version": 1,
  "name": [ {
    "language": "fr",
    "string": "Boulogne-sur-Mer - La Plage"
  } ],
  "indicativePointLocation": {
    "type": "Point",
    "coordinates": [ 1.594944, 50.731597 ]
  },
  "placeStreetAddress": {
    "city": [ {
      "language": "fr",
      "string": "Boulogne sur Mer"
    } ],
    "countryCode": "fr",
    "postCode": "62200",
    "addressLines": [ {
      "order": 0,
      "text": [ {
        "language": "fr",
        "string": "Boulevard Sainte-Beuve"
      } ],
      "type": "street"
    } ],
    "order": 1,
    "text": [ {
      "language": "fr",
      "string": "Boulogne sur Mer"
    } ],
    "type": "districtTerritory"
  } ],
  "rightSpecifications": [ {
    "id": "62007_900-00",
    "version": 1,
    "credentials": [ {
      "type": "ticket"
    } ],
    {
      "type": "licensePlate"
    }
  ]
} ]
```



Destination Format: NeTex (French Parking Profile)

The screenshot shows a web application interface with a sidebar on the left and a main content area. The sidebar contains the EPA logo and navigation links. The main content area displays 'Route Details' for 'Q-Park France', including route name, data source, source format, destination system, and destination data format. A modal window titled 'NETEX-formatted Data' is open, showing the XML representation of the route data. The XML includes publication information, participant references, and detailed frame information for a parking location in Boulogne-sur-Mer.

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<PublicationDelivery version="1.0" xmlns="http://www.netex.org.uk/netex">
  <PublicationTimestamp>2023-11-01T08:05:48.273Z</PublicationTimestamp>
  <ParticipantRef>APDS_DEMO</ParticipantRef>
  <dataObjects>
    <CompositeFrame id="FR:CompositeFrame:0e1345fb-0fbf-48dd-af90-2b89fb57cab3:LOC" created="2023-11-01T08:05:48.275Z" versi
      <FrameDefaults>
        <DefaultLocale>
          <TimeZone>Europe/Paris</TimeZone>
          <DefaultLanguage>fr</DefaultLanguage>
        </DefaultLocale>
        <DefaultLocationSystem>WGS84</DefaultLocationSystem>
        <DefaultCurrency>EUR</DefaultCurrency>
      </FrameDefaults>
      <frames>
        <GeneralFrame id="GF1" version="1">
          <TypeOfFrameRef ref="FR:TypeOfFrame:NETEX_PARKING" version="2.01:FR-NETEX_PARKING-1.0" </TypeOfFrameRef>
          <members>
            <Parking id="62007_900" version="1" responsibilitySetRef="FR:ResponsibilitySetRef:62007_900:LOC">
              <validityConditions>
                <AvailabilityCondition id="FR:AvailabilityCondition:124446:1" version="any">
                  <IsAvailable>true</IsAvailable>
                  <dayTypes>
                    <DayType id="FR:DayType:01" version="any">
                      <properties>
                        <PropertyOfDay>
                          <DaysOfWeek>Tuesday Wednesday Thursday Friday Saturday Sunday Monday</DaysOf
                        </PropertyOfDay>
                      </properties>
                    </DayType>
                  </dayTypes>
                </AvailabilityCondition>
              </validityConditions>
              <Name lang="fr">Boulogne-sur-Mer - La Plage</Name>
              <Centroid>
                <Location>
                  <Longitude>1.594944</Longitude>
                  <Latitude>50.731597</Latitude>
                </Location>
              </Centroid>
              <PostalAddress id="FR:PostalAddress:62007_900:LOC" version="any">
                <Street lang="fr">Boulevard Sainte-Beuve</Street>
              </PostalAddress>
            </Parking>
          </members>
        </GeneralFrame>
      </frames>
    </CompositeFrame>
  </dataObjects>
</PublicationDelivery>
```



Optional Step: DATA4PT NeTEx Validation Tool

greenlight.ispt.eu

Validations GitHub New validation

Using the online version may apply limitations. For regular use, download and install the tool for free from Docker or GitHub. You can read more about requirements here.

Configuration Files Validate

Go back

NeTEx full (v1.2), all rules

- XSD schema validation
- Every line is referenced
- Every scheduled stop has a name
- Every stop place has a stop place type
- Every stop place has a name
- Every stop place is referenced
- Every stop point have an arrival and departure time
- Frame defaults have a locale and timezone
- Locations are referencing the same point
- Passing times don't have decreasing times
- Stop place quay distance is reasonable

Upload files

Select which files to validate by clicking "Select file(s)"

Select file(s)

Supported formats are xml, zip, gz, bz, tar

Validate

GREEN LIGHT

Resources: Documentation, Requirements, Changelog, Contact, GitHub

Data4PT: Home, About, News, Wiki

ITxPT: Home, About, News

Legal: License, Privacy Policy, Terms of use

#	FILE_NAME	VALIDATION_NAME	START	STOP	VAL ID	ERROR_LINE_NO	ERROR_MESSAGE
1	testdata/input.xml	everyStopPlaceHasACorrectStopPlaceType	2023-11-01T08:18:15Z	2023-11-01T08:18:15Z	true		
2	testdata/input.xml	everyScheduledStopPointHasAName	2023-11-01T08:18:15Z	2023-11-01T08:18:15Z	true		
3	testdata/input.xml	stopPlaceQuayDistanceIsReasonable	2023-11-01T08:18:15Z	2023-11-01T08:18:15Z	true		
4	testdata/input.xml	locationsAreReferencingTheSamePoint	2023-11-01T08:18:15Z	2023-11-01T08:18:15Z	true		
5	testdata/input.xml	everyLineIsReferenced	2023-11-01T08:18:15Z	2023-11-01T08:18:15Z	true		
6	testdata/input.xml	everyStopPlaceHasAName	2023-11-01T08:18:15Z	2023-11-01T08:18:15Z	true		
7	testdata/input.xml	netexUniqueConstraints	2023-11-01T08:18:15Z	2023-11-01T08:18:16Z	true		
8	testdata/input.xml	everyStopPlaceIsReferenced	2023-11-01T08:18:16Z	2023-11-01T08:18:16Z	true		
9	testdata/input.xml	frameDefaultShouldHaveLocaleAndTimezone	2023-11-01T08:18:16Z	2023-11-01T08:18:16Z	true		
10	testdata/input.xml	passingTimesIsNotDecreasing	2023-11-01T08:18:16Z	2023-11-01T08:18:16Z	true		
11	testdata/input.xml	xsd	2023-11-01T08:18:15Z	2023-11-01T08:18:43Z	true		
		VAL ID	TRUE				



Send Result to Destination

The screenshot shows a web browser window with the URL 'localhost'. The page title is 'NAP Placeholder'. The user is logged in as 'Markus Schneider' with a 'Log out' button. The main content area contains a text block explaining that data is being sent to a placeholder location instead of a real NAP. Below this is a 'Receiving Log' table with the following data:

Last Submittal received	Total Submittals received	Details
01.11.2023 09:05	44	View last Submittal

At the bottom of the log table, there is a button labeled 'Go back to Routes Overview'.

View Recording



Example #2: Q-Park Netherlands

The screenshot shows a web application interface for managing routes. At the top left is the EPA logo (European Parking Association) and the text 'EUROPEAN PARKING ASSOCIATION'. At the top right, it says 'Logged in as Markus Schneider' with a 'Log out' button. The main content is divided into two sections: 'Route Details' and 'Route Execution'.

Route Details:

- Route Name: Q-Park Netherlands
- Data Source: Q-Park International Backend (exposing Dutch data)
- Source Format: APDS (derived from Q-Park 3rd Party)
- Destination System: [Dutch NAP Simulator](#)
- Destination Data Format: DATEX II

At the bottom of the Route Details section are two buttons: 'Go back to Routes Overview' and 'Run this Route now'.

Route Execution:

The status is 'inactive'. The execution log shows three steps:

- read data from source: 213 records retrieved. Buttons: [View in Q-Park 3rd Party Format](#), [View in APDS Format](#)
- convert from source format to destination format: 213 records converted. Button: [View in DATEX II Format](#)
- send converted data to destination: 213 records submitted. Button: [Visit NAP](#)

NL

DATEX II



Destination Format: DATEX II v3

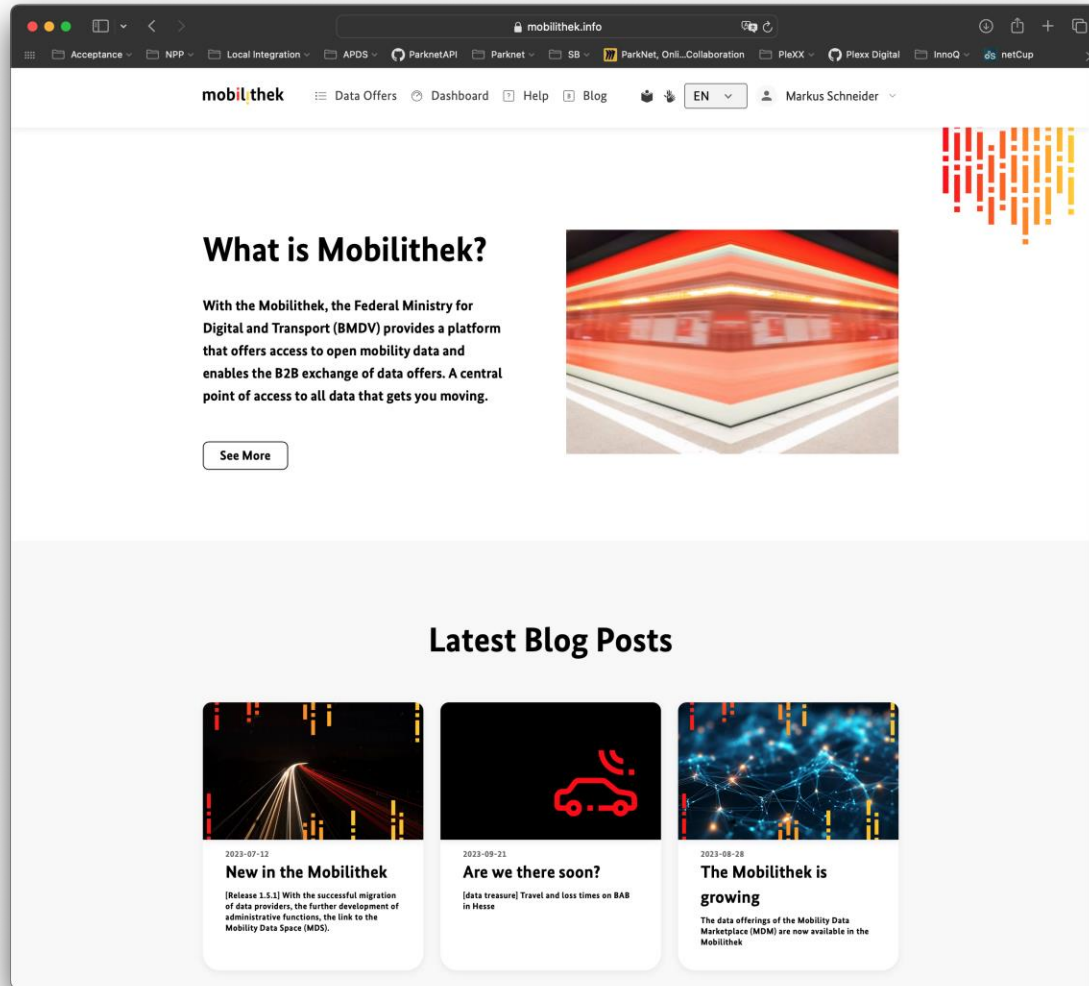
The screenshot shows a web application interface for managing parking routes. The main content area displays 'Route Details' for 'Q-Park Netherlands', including fields for Route Name, Data Source, Source Format, Destination System, and Destination Data Format. A 'Route Execution' section shows an 'inactive' status and buttons for reading data, converting it, and sending it to the destination. A modal window titled 'DATEX II - formatted Data' is open, displaying XML code for a parking table publication. The XML includes details such as publication time, creator, parking table ID, name, location reference, and operating hours.

```
<d2:payload xsi:type="prk:ParkingTablePublication" lang="nl" modelBaseVersion="3" extensionName="ParkingTablePublication" profil
<com:publicationTime>2023-11-01T08:07:36.157Z</com:publicationTime>
<com:publicationCreator>
  <com:country>NL</com:country>
  <com:nationalIdentifier>APDS_DEMO</com:nationalIdentifier>
</com:publicationCreator>
<prk:parkingTable id="I1" version="1">
  <prk:name>
    <com:values>
      <com:value lang="nl">Q-Park Nederland</com:value>
    </com:values>
  </prk:name>
  <prk:versionTime>2023-11-01T08:07:36.159Z</prk:versionTime>
  <prk:hierarchyElementGeneral xsi:type="prk:Place" id="P20002681" version="1">
    <fac:name>
      <com:values>
        <com:value lang="nl">Stadspark III</com:value>
      </com:values>
    </fac:name>
    <fac:operatingHours xsi:type="fac:OperatingHoursSpecification" id="1" version="1">
      <fac:overallPeriod>
        <com:validPeriod>
          <com:recurringDayWeekMonthPeriod>
            <com:applicableDay>monday</com:applicableDay>
            <com:applicableDay>tuesday</com:applicableDay>
            <com:applicableDay>wednesday</com:applicableDay>
            <com:applicableDay>thursday</com:applicableDay>
            <com:applicableDay>friday</com:applicableDay>
            <com:applicableDay>saturday</com:applicableDay>
          </com:recurringDayWeekMonthPeriod>
        </com:validPeriod>
      </fac:overallPeriod>
    </fac:operatingHours>
    <fac:locationReference xsi:type="loc:PointLocation">
      <loc:coordinatesForDisplay>
        <loc:latitude>50.84142</loc:latitude>
        <loc:longitude>5.696483</loc:longitude>
      </loc:coordinatesForDisplay>
    </fac:locationReference>
    <prk:layer>1</prk:layer>
    <prk:type>place</prk:type>
    <prk:responsibilityRoleAssignment>
```

View Recording



Example #3: Destination: German NAP (Mobilithek)



DE



(Exemplary) Publication on NAP

The screenshot shows the mobil.thek website interface. At the top, there is a navigation bar with 'Data Offers', 'Dashboard', 'Help', and 'Blog' links, along with a language selector set to 'EN' and a user profile for 'Markus Schneider'. The main heading is 'Search Results' with a notification badge '1'. Below this is a search bar containing 'Q-Park' and a 'Topicality' dropdown menu. A filter bar shows 'Parking and rest area' selected and 'Clear All Filters' button. On the left, there are three filter sections: 'Map' with a map of Germany, 'Category' with 'Parking and rest area' selected, and 'Data Provider'. The main content area displays the dataset details: 'Offered by: Plexx Digital', 'Visibility: Public', and the title 'Q-Park Facilities (Germany)'. Below the title is a small map of Germany and the text 'Exemplary Dataset of Q-Park Parking Facilities in Germany'. A table provides metadata for the dataset.

CREATED	DATA MODEL	TYPE OF TERMS OF USE
31.10.2023	DATEX II V3	Licence, restricted use, fre...
BROKERING TYPE	GEOGRAPHY	CATEGORY
Brokered	Deutschland (DE)	Parking and rest area



Subscription Offer

The screenshot shows the 'mobil.thek' website interface. At the top, there is a navigation bar with 'Data Offers', 'Dashboard', 'Help', and 'Blog' links, along with a language selector set to 'EN' and a user profile for 'Markus Schneider'. Below the navigation, the page title is 'Search Results - Offer Details'. The offer is provided by 'Plexx Digital' and is public. The main title of the offer is 'Q-Park Facilities (Germany)'. To the right of this title, a yellow 'Subscribe' button is circled in blue. Below the title, there are three buttons: 'Add Reference' and 'Contact'. The offer details are organized into two sections: 'CREATED' (31.10.2023), 'DATA MODEL' (DATEX II V3), 'TYPE OF TERMS OF USE' (Licence, restricted use, free o...), and 'BROKERING TYPE' (Brokered); and 'GEOGRAPHY' (Deutschland (DE)), 'CATEGORY' (Parking and rest area), and 'STATUS' (Published). Below the offer details, there is a section titled 'Offer Details' with sub-tabs for 'General', 'Data Access', 'Terms of Use', 'Declarations', and 'Quality Information'. The 'General' tab is active, showing 'Content Information' with the following details:

Description	Exemplary Dataset of Q-Park Parking Facilities in Germany
Category	Parking and rest area
Category Details	General parking: locations and conditions of parking places and service areas
OpenData Category (GovData)	Transport
Mode of Transport	Car
Network Coverage	Urban and local roads
Language	English

View Recording



Conclusion

- Sharing data matters ... and becomes increasingly obligatory
- Publishing available data is achievable with a manageable amount of efforts (no rocket science)
- Certain flexibility in the choice of the standard to be used (through interoperability)
- The European Parking Association will support their members in understanding the requirements in detail and finding a good approach for implementation

Demonstrator: Next Steps

- Align with EPA Regulated Parking Data Profile
- Work with data providers (operators) to enhance their data sources, aiming at compliance
- Work with additional operators to help them providing data
- Continue to improve awareness of
 - obligations/ regulations
 - data exchange standards and
- Exemplary use cases that potentially go beyond pure compliance
 - reciprocal linking of related datasets, e.g.
 - parking data and EV data or
 - parking data and cycle data

Technical Contact

Markus Schneider
markus.schneider@plexx-digital.com



Thank you!

Technical Contact

Markus Schneider
markus.schneider@plexx-digital.com





Data Route Demonstrator

You have been logged out.

Please log in

markus
pipelines.mobility-network.com

Andere Passwörter für mobility-network.com ...

Log in

Notice

This webspace constitutes an explorative testbed environment for conversion between different data exchange standards and submittal of parking-related data to access points (both, private and public). It is intended for a select group of users who are active in the realm of mobility data standards.

If you have not specifically visited this page, you probably do not belong to its target group. Should you see it otherwise, please contact the European Parking Association to get access: [EPA Contact Form](#)





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Route	Data Source	Source Format	Data Destination	Destination Format	Action(s)
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Q-Park Netherlands	Q-Park International Backend (exposing Dutch data)	APDS (derived from Q-Park 3rd Party)	Dutch NAP Simulator	DATEX II	Launch Route
Q-Park Germany	Q-Park International Backend (exposing German data)	APDS (derived from Q-Park 3rd Party)	German NAP (Mobilithek)	DATEX II	Launch Route



