



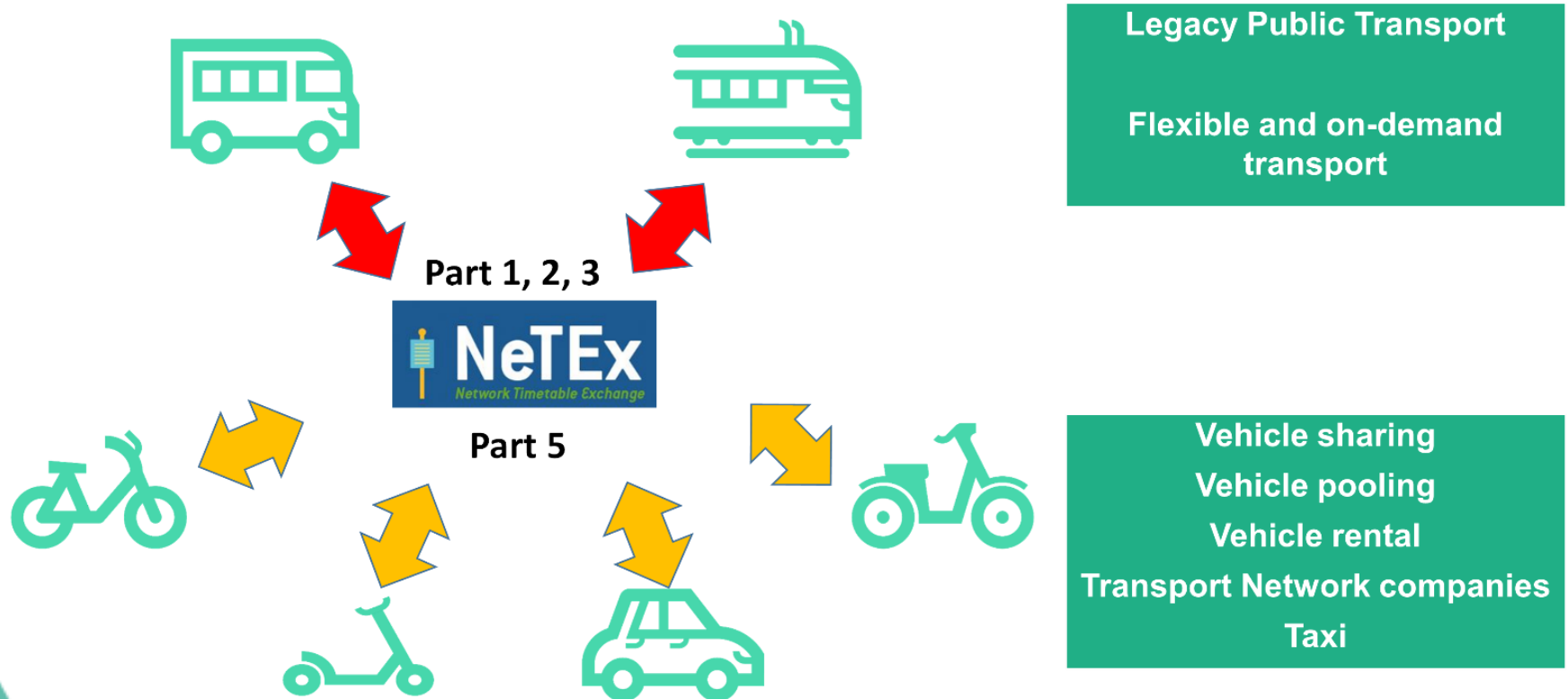
## NeTEx Introduction

**Christophe Duquesne**





# NeTEx: covers all public transport modes (collective and on-demand)





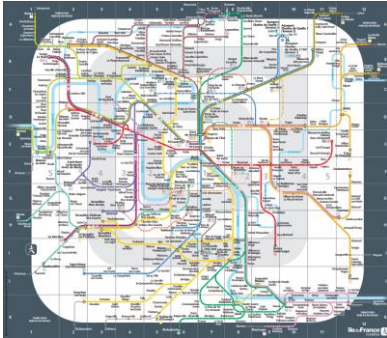
# NeTEx : Examples of scheduled data

- Pricing that changes in a known way during the day is planned
- An "on-demand" service is planned (apart from the final decision to trigger and/or serve): virtual lines, areas, fare offer, etc.
- Replacement service can be scheduled
- An event-based service or pricing (a concert, a football match, incidents, etc.) can be planned

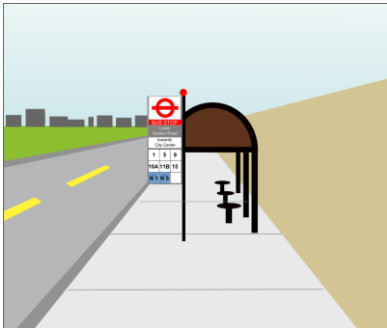




# NeTEx: Domains




**Network structure:** lines, stops, zones, connections, etc.



**Detailed geography of stops** (train station, bus stop, carpool area etc.) and their platforms, structure, equipment, vehicles position, etc.

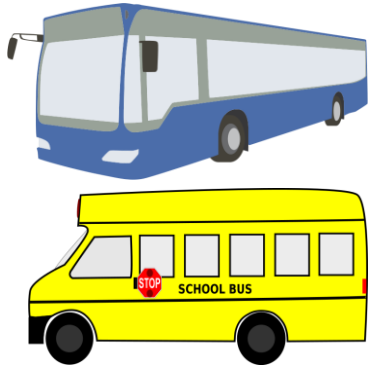


# NeTEx: Domains

		<b>Proserpine to Airlie Beach and Shute Harbour</b> servicing Cannonvale, Whitsunday Plaza, Airlie Beach																												
<b>Monday to Friday</b>		am	am	am	am	am	am	am	am	am	am	am	am	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm
Proserpine (Blair St)		.....	5.55	.....	.....	7.27	.....	8.40	.....	.....	.....	.....	11.02	.....	.....	.....	12.58	.....	.....	3.00	3.41	.....	.....	.....	.....	6.14	.....	.....	.....	.....
Proserpine (Ruge St)		.....	.....	.....	.....	7.30	.....	8.43	.....	.....	.....	.....	11.05	.....	.....	.....	1.01	.....	.....	3.03	3.44	.....	.....	.....	.....	6.17	.....	.....	.....	.....
Proserpine (Anzac Rd)		.....	.....	.....	.....	7.34	.....	8.47	.....	.....	.....	.....	11.09	.....	.....	.....	1.05	.....	.....	3.07	3.48	.....	.....	.....	.....	6.21	.....	.....	.....	.....
Proserpine (Mill St) arrive		.....	.....	.....	.....	7.37	.....	8.50	.....	.....	.....	.....	11.12	.....	.....	.....	1.08	.....	.....	3.10	3.51	.....	.....	.....	.....	6.24	.....	.....	.....	.....
Proserpine (Mill St) depart		.....	5.59	.....	.....	7.44	.....	8.59	.....	.....	.....	.....	11.15	.....	.....	.....	1.13	.....	.....	3.11	3.57	.....	.....	.....	.....	6.30	.....	.....	.....	.....
Mount Julian (Camm Rd)		.....	6.05	.....	.....	7.51	.....	9.05	.....	.....	.....	.....	11.21	.....	.....	.....	1.19	.....	.....	3.17	4.03	.....	.....	.....	.....	6.36	.....	.....	.....	.....
Rifle Range Rd		.....	6.09	.....	.....	7.57	.....	9.11	.....	.....	.....	.....	11.27	.....	.....	.....	1.25	.....	.....	3.23	4.09	.....	.....	.....	.....	6.42	.....	.....	.....	.....
Orchid Rd		5.55	6.13	6.49	7.07	.....	7.59	.....	9.14	.....	10.03	10.42	.....	11.31	.....	.....	1.11	1.29	2.03	2.38	3.05	3.25	.....	4.11	.....	5.28	6.00	6.44	7.05	.....
Whitsunday Plaza		6.16	.....	7.10	7.40	8.02	8.25	8.49	9.20	9.41	10.06	10.45	11.11	11.38	12.06	12.36	1.14	1.32	2.06	2.41	3.08	3.28	3.52	4.14	4.45	5.01	5.31	6.03	6.47	7.08
Adventure Whitsunday Resort		5.58	6.19	6.55	7.13	7.43	8.05	8.28	8.52	9.23	9.44	10.09	10.48	11.14	11.41	12.09	12.39	1.17	1.35	2.09	2.44	3.11	3.31	3.55	4.17	4.48	5.04	5.34	6.06	6.50
Stewart Drive		6.01	6.22	6.58	7.16	7.46	8.08	8.31	8.55	9.26	9.47	10.12	10.51	11.17	11.44	12.12	12.42	1.20	1.38	2.12	2.47	3.14	3.34	3.58	4.20	4.51	5.07	5.37	6.09	6.53
Whitsunday Shopping Centre		6.03	6.24	7.00	7.18	7.48	8.10	8.33	8.57	9.28	9.49	10.14	10.53	11.19	11.46	12.14	12.44	1.22	1.40	2.14	2.49	3.16	3.36	4.00	4.22	4.53	5.09	5.39	6.11	6.55
Beach Road		.....	.....	7.01	7.19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Police Station		6.06	6.27	7.03	7.21	7.51	8.13	8.36	9.00	9.31	9.52	10.17	10.56	11.22	11.49	12.17	12.47	1.25	1.43	2.17	2.52	3.19	3.39	4.03	4.25	4.56	5.12	5.42	6.14	6.58
Abell Point Marina		.....	6.30	.....	.....	7.54	.....	8.39	.....	.....	.....	.....	10.59	.....	.....	.....	1.46	.....	.....	3.42	.....	.....	.....	4.59	.....	5.45	.....	.....	.....	.....
Coral Sea Resort		.....	.....	7.06	7.24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Airlie Central		6.09	6.34	7.09	7.27	7.57	8.17	8.42	9.04	9.35	9.56	10.21	11.02	11.26	11.53	12.21	12.51	1.29	1.49	2.21	2.56	3.23	3.45	4.07	4.29	5.02	5.16	5.48	6.18	7.02
Coconut Grove		6.10	6.35	7.10	7.28	7.58	8.18	8.43	9.05	9.36	9.57	10.22	11.03	11.27	11.54	12.22	12.52	1.30	1.50	2.22	2.57	3.24	3.46	4.08	4.30	5.03	5.17	5.49	6.19	7.03
Port of Airlie		6.13	.....	7.13	7.31	.....	8.21	.....	.....	.....	.....	.....	11.06	.....	.....	.....	1.33	.....	.....	3.27	4.11	.....	5.06	.....	6.22	.....	.....	.....	.....	.....
Jubilee Pocket Tavern		6.16	6.38	7.17	7.34	8.01	8.24	8.46	9.08	9.39	10.00	10.25	11.09	11.30	11.57	12.25	12.55	1.36	1.54	2.25	3.00	3.30	3.49	4.14	4.33	5.09	5.20	5.52	6.25	7.06
Ferntree Rd		6.17	6.39	7.18	7.35	8.02	8.25	8.47	9.09	9.40	10.01	10.26	11.10	11.31	11.58	12.26	12.56	1.37	1.55	2.26	3.01	3.31	3.50	4.15	4.34	5.10	5.21	5.53	6.26	7.07
Flamtree		6.20	6.42	7.21	7.38	8.05	8.28	8.50	9.12	9.43	10.04	10.29	11.13	11.34	12.01	12.29	12.59	1.40	1.58	2.29	3.04	3.34	3.53	4.18	4.37	5.13	5.24	5.58	6.31	.....
Shute Harbour		6.27	6.49	7.28	7.45	8.12	8.35	8.57	9.19	9.50	10.11	10.36	11.20	11.41	12.08	12.36	1.06	1.47	2.05	2.36	3.11	3.41	4.00	4.25	4.44	5.20	5.31	6.05	6.36	.....
<b>Explanations</b>																														
Shaded area service travels via Beach Rd, Club Crocodile Reception and Coral Sea Resort.																														
<b>Saturday</b>		am	am	am	am	am	am	am	am	am	am	am	am	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm	pm
Proserpine (Blair St)		.....	6.32	.....	.....	8.40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.03	.....	.....	.....	.....	.....	.....	.....	.....	6.14	.....	.....	.....	.....
Proserpine (Ruge St)		.....	.....	.....	.....	8.43	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.06	.....	.....	.....	.....	.....	.....	.....	.....	6.17	.....	.....	.....	.....
Proserpine (Anzac Rd)		.....	.....	.....	.....	8.47	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.10	.....	.....	.....	.....	.....	.....	.....	.....	6.21	.....	.....	.....	.....
Proserpine (Mill St) arrive		.....	.....	.....	.....	8.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.13	.....	.....	.....	.....	.....	.....	.....	.....	6.24	.....	.....	.....	.....
Proserpine (Mill St) depart		.....	6.35	.....	.....	8.59	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.19	.....	.....	.....	.....	.....	.....	.....	.....	6.30	.....	.....	.....	.....
Mount Julian (Camm Rd)		.....	6.41	.....	.....	9.05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.25	.....	.....	.....	.....	.....	.....	.....	.....	6.36	.....	.....	.....	.....
Rifle Range Rd		.....	6.47	.....	.....	9.11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.31	.....	.....	.....	.....	.....	.....	.....	.....	6.42	.....	.....	.....	.....
Orchid Rd		5.52	6.49	.....	.....	8.21	9.13	.....	10.03	.....	11.08	11.35	12.17	12.33	.....	1.33	.....	.....	3.53	4.38	.....	.....	.....	.....	6.44	7.05	.....	.....	.....	.....
Whitsunday Plaza		6.52	7.10	8.04	8.24	9.16	9.31	10.06	10.38	11.11	11.38	12.20	12.36	1.22	1.36	2.06	2.45	3.32	3.56	4.41	5.31	5.59	6.47	7.08	7.46	8.24	9.02	9.40	10.18	
Adventure Whitsunday Resort		5.55	6.55	7.13	8.07	8.27	9.19	9.34	10.09	10.41	11.14	11.41	12.23	12.39	1.25	1.39	2.09	2.48	3.35	3.59	4.44	5.34	6.02	6.50	7.10	7.48	8.26	9.04	9.42	10.20
Stewart Drive		5.58	6.58	7.16	8.10	8.30	9.22	9.37	10.12	10.44	11.17	11.44	12.26	12.42	1.28	1.42	2.12	2.51	3.38	4.02	4.47	5.37	6.05	6.53	7.12	7.50	8.28	9.06	9.44	10.22
Whitsunday Shopping Centre		6.00	7.00	7.18	8.12	8.32	9.24	9.39	10.14	10.46	11.19	11.46	12.28	12.44	1.30	1.44	2.14	2.53	3.40	4.04	4.49	5.39	6.07	6.55	7.15	7.53	8.31	9.09	9.47	10.25
Beach Road		.....	.....	7.01	7.19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Police Station		6.03	7.03	7.21	8.15	8.35	9.27	9.42	10.17	10.49	11.22	11.49	12.31	12.47	1.33	1.47	2.17	2.56	3.45	4.07	4.52	5.42	6.10	6.58	7.18	7.56	8.34	9.12	9.50	10.28
Abell Point Marina		.....	6.06	.....	.....	8.38	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.50	.....	.....	3.46	.....	.....	.....	4.55	5.45	.....	.....	.....	.....	.....
Coral Sea Resort		.....	7.04	7.24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Airlie Central		6.09	7.06	7.26	8.18	8.41	9.30	9.45	10.20	10.55	11.25	11.52	12.34	12.50	1.36	1.53	2.20	2.59	3.49	4.10	4.58	5.48	6.13	7.01	7.21	7.59	8.37	9.15	9.53	10.31
Coconut Grove		6.10	7.07	7.27	8.19	8.42	9.31	9.46	10.21	10.56	11.26	11.53	12.35	12.51	1.37	1.54	2.21	3.00	3.50	4.11	4.59	5.49	6.14	7.02	7.22	8.00	8.38	9.16	9.54	10.32
Port of Airlie		6.13	7.10	7.30	.....	9.34	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.44	.....	.....	5.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jubilee Pocket Tavern		6.16	7.13	7.33	8.23	8.46	9.37	9.50	10.25	11.02	11.30	11.57	12.39	12.57	1.41	1.58	2.25	3.04	3.54	4.19	5.05	5.53	6.18	7.06	7.25	8.03	8.41	9.19	9.57	10.35
Ferntree Rd		6.17	7.14	7.34	8.24	8.47	9.38	9.51	10.26	11.03	11.31	11.58	12.40	12.58	1.42	1.59	2.26	3.05	3.55	4.20	5.06	5.54	6.19	7.08	7.28	8.04	8.42	9.20	9.58	10.36
Flamtree		6.20	7.17	7.37	8.27	8.50	9.41	9.54	10.29	11.06	11.34	12.01	12.43	1.01	1.45	2.02	2.29	3.08	3.58	4.23	5.09	5.57	6.22	.....	.....	.....	.....	.....	.....	.....
Shute Harbour		6.27	7.24	7.44	8.34	8.57	9.48	10.01	10.36	11.13	11.41	12.08	12.44	1.08	1.51	2.09	2.36	3.14	4.05	4.30	5.16	6.04	6.29	.....	.....	.....	.....	.....	.....	.....



# NeTEx: Domains



The **vehicles** (train, wagons, bus, school bus, bicycle ...) and their equipment.



The **points of interest**, or places that generate traffic/displacements (cinema, touristic points, city hall, etc.) and their address and entrance.



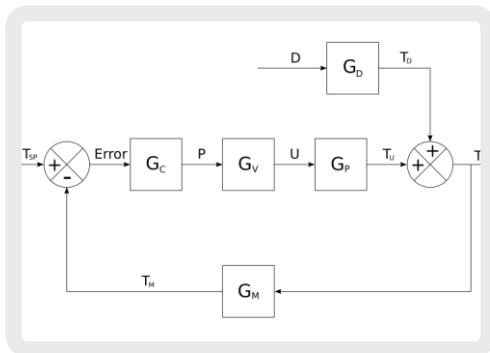
# NeTEx: Domains



The **parking areas** (detailed parking bays plan, entrances for vehicles and pedestrians, etc.) **and parking services**, their characteristics and pricing.



# NeTEx: Domains



The data and processes of **operations**: time points, vehicle services, journey duration, etc.



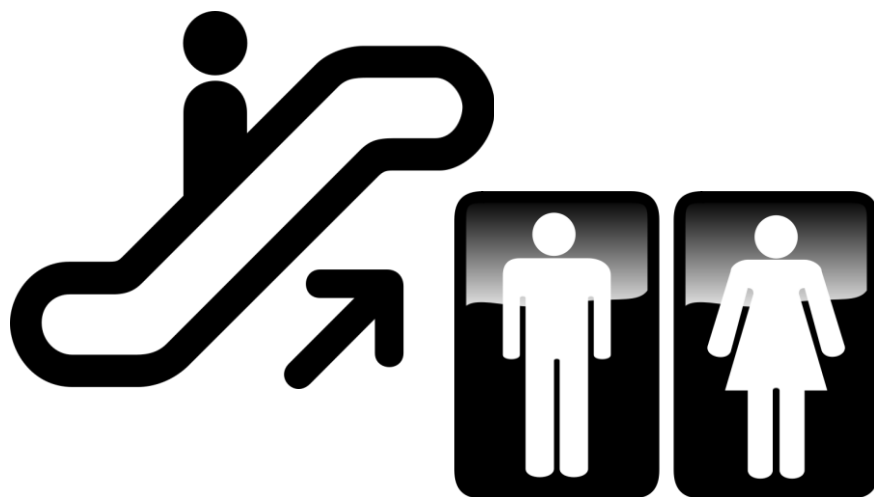
The **tariffs offer** : access rights, user profiles, sales conditions, distribution, prices, etc.







# NeTEx: Domains



The **equipments**:  
escalator, lifts, ticketing  
devices, gates, displays,  
toilets, services, etc  
for places and vehicles.



# NeTEx: Domains



**Accessibility** information and the available services



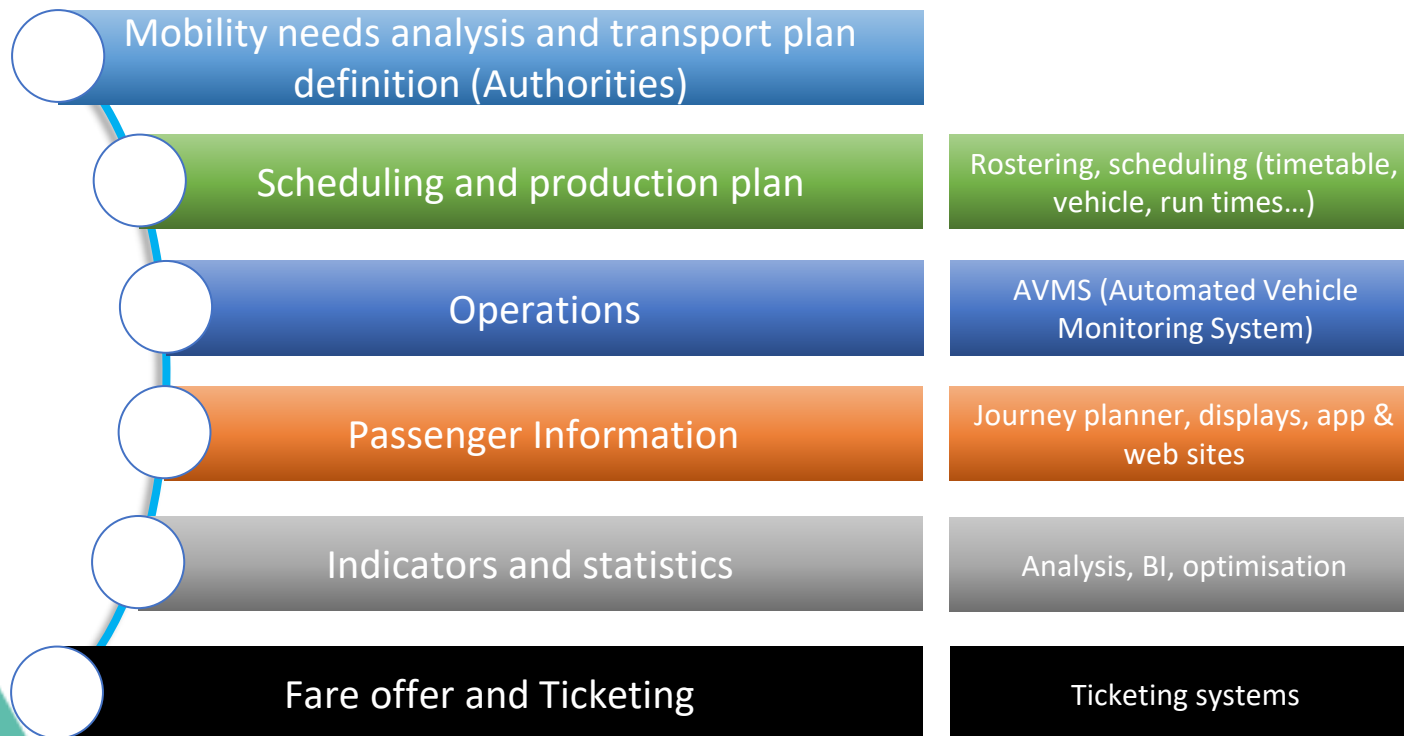
**Pedestrians' paths** (in stations, correspondances, around the stops, etc.) and their characteristics



# NeTEx: Information systems

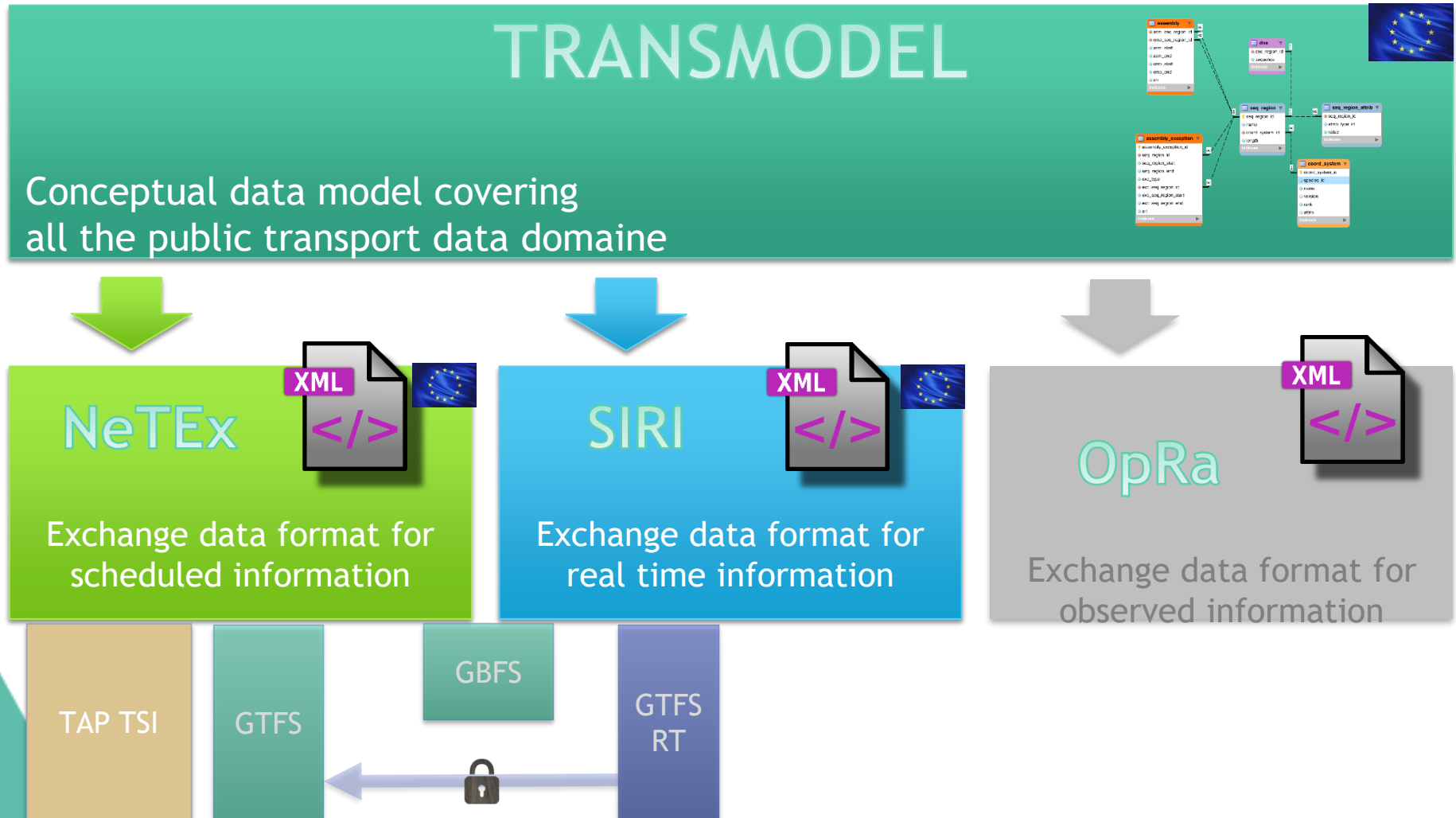
- The tools and concepts used for information systems are different per type of system

## NeTEx ensures consistency



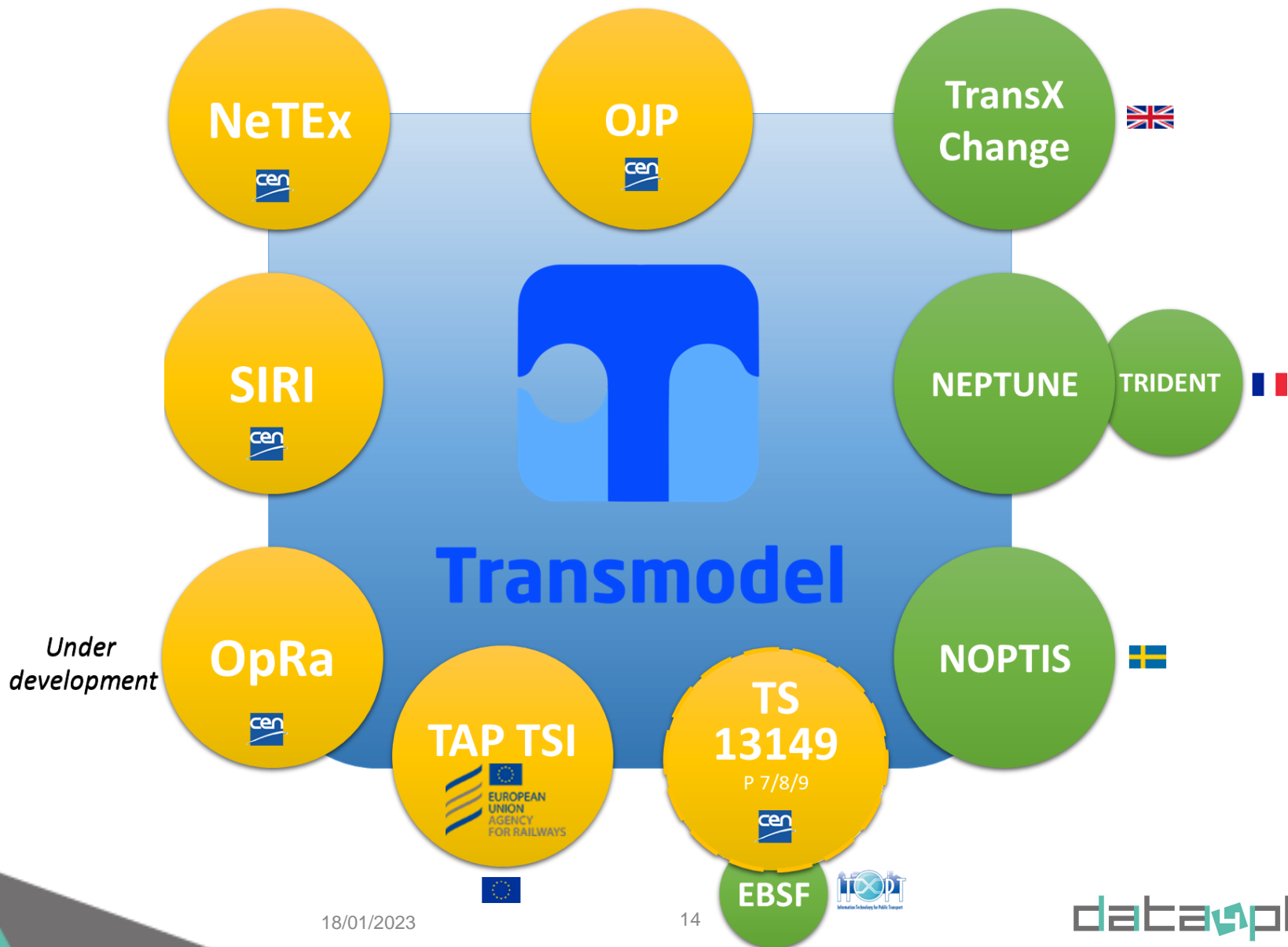


# NeTEx: a consistent ecosystem





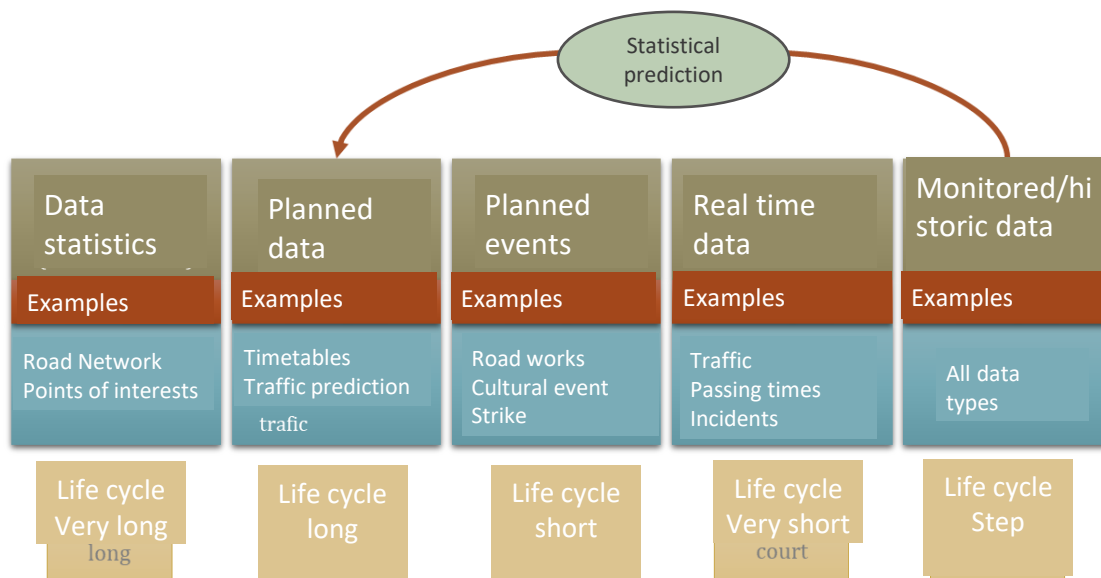
# NeTEx: a consistent ecosystem





# NeTEx: life cycle of data

- Data has a life cycle and must be updated regularly... this goes hand in hand with the notion of Version
- Each data version can have a Validity Period (global to the dataset or by object)
- It is important to be able to broadcast updates in advance, so that the systems have time to take them into account (addition of new stops from next week) and propose them in the route calculations





# NeTEx: life cycle of data

- The unique and permanent Identification is fundamental in particular when there are several suppliers: this mechanism is specified by NeTEx and its profiles
- NeTEx allows to reference objects inside and outside a dataset (necessary for a good use of reference data, like stops)



# NeTEx: exchange format

```
<!-- Frame NETEX_ARRÊT-->
<GeneralFrame version="001" id="AURIGE:TypeOfFrame:NETEX_ARRÊT-Le-Corbusier:LOC">
  <Name>Frame NETEX_ARRÊT Le Corbusier</Name>
  <Description>Frame NETEX_ARRÊT pour l'exemple d'arrêt Le Corbusier</Description>
  <TypeOfFrameRef ref="FR:TypeOfFrame:NETEX_ARRÊT" version="1.01:FR-NETEX_ARRÊT-1.0"</TypeOfFrameRef>
  <members modificationSet="all">

    <!-- ===== -->
    <!-- LIEU D'ARRÊT MONOMODAL Jules Michelet -->
    <StopPlace version="001" id="FR:78197:StopPlace:00004:LOC">
      <!-- le "LOC" sera supprimé si l'on dispose d'un référentiel d'arrêt partagé -->
      <Name>Jules Michelet</Name>
      <Description>Lieu d'arrêt monomodal Jules Michelet</Description>
      <Centroid>
        <Location id="AURIGE:Location:00011:LOC">
          <Longitude>2.071341</Longitude>
          <Latitude>48.766715</Latitude>
        </Location>
      </Centroid>
      <placeTypes>
        <TypeOfPlaceRef ref="monomodalStopPlace"/>
      </placeTypes>
      <RoadAddress version="any" id="AURIGE:RoadAddress:address11:LOC">
        <RoadName>Rue Le Corbusier</RoadName>
      </RoadAddress>
      <Landmark>Face à l'école maternelle Jeanne Moreau</Landmark>
      <TopographicPlaceRef ref="INSEE:TopographicPlace:78297"/>
      <OrganisationRef version="001" ref="AURIGE:Operator:768:LOC"/>
      <!-- Fait partie du Pôle Monomodal Le Corbusier -->
      <ParentSiteRef version="001" ref="FR:78197:StopPlace:00001:LOC"/>
      <TransportMode>bus</TransportMode>
      <StopPlaceType>onstreetBus</StopPlaceType>
      <quays>
        <QuayRef ref="AURIGE:Quay:008:LOC" version="001"/>
        <QuayRef ref="AURIGE:Quay:008:LOC" version="001"/>
      </quays>
    </StopPlace>
  <Quay version="001" id="AURIGE:Quay:008:LOC">
    <Name>Jules Michelet</Name>
```





# Exchange formats (example GTFS)

```
stop_id,stop_code,stop_name,stop_desc,stop_lat,stop_lon,zone_id,stop_url,location_type,parent_station,stop_timezone,wheelchair_boarding
"1001","1001","Longs Champs","Rennes","48.1290770000","-1.6325300000","","","1"
"1002","1002","Bouzat","Rennes","48.1282830000","-1.6377820000","","","1"
"1003","1003","Gallet","Rennes","48.1273690000","-1.6404330000","","","1"
"1004","1004","Donzelot","Rennes","48.1252440000","-1.6426760000","","","1"
"1005","1005","Mirabeau","Rennes","48.1233630000","-1.6463170000","","","1"
"1006","1006","Turmel","Rennes","48.1222900000","-1.6507420000","","","1"
"1007","1007","Assomption","Rennes","48.1214460000","-1.6550360000","","","1"
"1008","1008","Painlevé","Rennes","48.1232120000","-1.6602160000","","","1"
"1009","1009","Metz Volney","Rennes","48.1216350000","-1.6631860000","","","1"
"1010","1010","Guéhenno","Rennes","48.1192410000","-1.6676930000","","","1"
"1011","1011","Fac de Droit","Rennes","48.1183120000","-1.6713150000","","","1"
"1012","1012","Séigné","Rennes","48.1160500000","-1.6742450000","","","1"
"1014","1014","Sainte-Anne","Rennes","48.1137390000","-1.6790380000","","","1"
"1015","1015","Champ Jacquet","Rennes","48.1125200000","-1.6803520000","","","2"
"1016","1016","République","Rennes","48.1100730000","-1.6801010000","","","1"
"1017","1017","Les Halles","Rennes","48.1084150000","-1.6802130000","","","2"
"1018","1018","Plélo Colombier","Rennes","48.1062040000","-1.6809990000","","","1"
"1019","1019","Cité Judiciaire","Rennes","48.1050840000","-1.6847310000","","","1"
"1020","1020","Mermoz","Rennes","48.0974420000","-1.6895660000","","","1"
"1021","1021","Cité Judiciaire","Rennes","48.1054440000","-1.6840050000","","","1"
"1022","1022","Plélo Colombier","Rennes","48.1062220000","-1.6807360000","","","1"
"1023","1023","Les Halles","Rennes","48.1080660000","-1.6804800000","","","1"
"1024","1024","République","Rennes","48.1099770000","-1.6802680000","","","1"
"1025","1025","Champ Jacquet","Rennes","48.1127380000","-1.6802110000","","","2"
"1026","1026","Sainte-Anne","Rennes","48.1148200000","-1.6792420000","","","1"
"1027","1027","Hôtel Dieu","Rennes","48.1171630000","-1.6773510000","","","1"
"1028","1028","Séigné","Rennes","48.1175130000","-1.6735380000","","","1"
"1029","1029","Fac de Droit","Rennes","48.1182810000","-1.6695910000","","","1"
"1030","1030","Guéhenno","Rennes","48.1195720000","-1.6666290000","","","1"
"1031","1031","Metz Volney","Rennes","48.1219870000","-1.6621850000","","","1"
```



# NeTEx: Profiles

- A profile makes it possible to focus only on the part of NeTEx corresponding to a given use case, and to specify the specific rules in a territory
  - They much smaller document and it is usually much easier to start by reading the profiles
  - There are EU and national profiles
- Profiles can focus on Stops, Network, Timetable, Fare, Parking, Accessibility, New Mode, etc.





Thank you for your attention

<https://data4pt-project.eu/>

Illustrations <https://openclipart.org>

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