DATA4PT Webinar

NeTEx Validation Tool

6 December 2022
15.30 - 16.30 CET

Facilitators, the DATA4PT experts
Petter Kvarnfors
Nick Knowles
Stefan de Konink

DATA4PT overview and tool introduction
Anastasia Founta, ITxPT
Emmanuel de Verdalle, ITxPT

AGENDA

Time (CET)	Topic	Facilitator
15:30 – 15:40	DATA4PT project and introduction of NeTEx validators	Emmanuel de Verdalle
15:40 – 15:50	Demonstration of the Greenlight tool (web interface and terminal version)	Petter Kvarnfors
15:50 - 16:05	Validation rules (current and future developments)	Nick Knowles
16:05 – 16:15	"Real life" examples and relevant validation rules	Stefan de Konink
16:15 – 16:25	Customise Greenlight	Petter Kvarnfors
16:25 – 16:30	Q&A	

data4pt

A CEF Programme Support Action (2020-2023) to **accompany and facilitate** Member States and other relevant stakeholders **in the implementation of MMTIS Delegated Regulation**
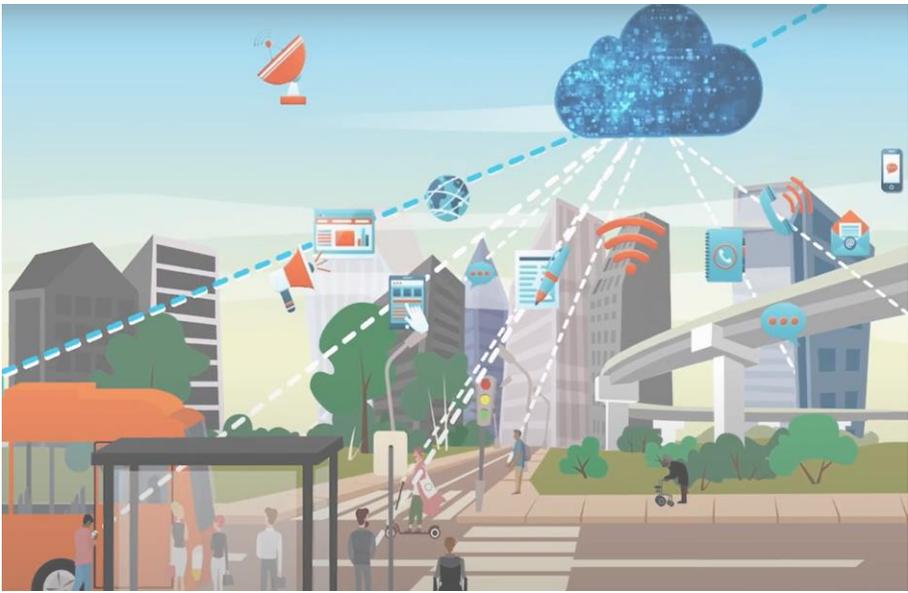
More information on DATA4PT (training material, tools, request of support, technical info...)

https://data4pt-project.eu/


https://data4pt.org/

Introduction to Validators

➢ Why do we need validators?

- ▪ Efficient exchange of high-quality data.
- ▪ Common tool for exporter & importer to certify conformance.

➢ Nature of Validator Tools

- • Static file checkers:
  - ❑ e.g. for NeTEx
- • Dynamic API harnesses: request/response
  - ❑ e.g. for SIRI - several national validators
  - ❑ https://github.com/afimb/siri-validator

➢ DATA4PT Validator Tool

Screenshot from the wiki page with the SIRI validators

- • Harmonised
- • Universal
- • Reliable

Greenlight – The DATA4PT validation tool

Greenlight - The Data4PT NeTEx Validator

➢About the Data4PT NeTEx Validator -

- Open source
  - ❑Go, JavaScript and XPath
  - ❑MIT open license
- Extensible,
  - ❑Common Rules
  - ❑Additional Rules added by users
- Configurable
  - ❑Rules to include, severities,
  - ❑Rule parameters,
- Modular, Configurable Architecture
  - ❑As web service or on local server.
  - ❑With front end GUI calling back-end engine.
  - ❑With batch pipelining of XML documents direct to engine.

Greenlight - ROAD MAP

➢ Beta 1.0 - August 2022

➢ New Revised Beta 2.0 Release - December 2022
- New features e.g. multiple files together
- Test against large NAP data sets
- Usability feedback

➢ Further development?
- Add further common validation rules.
- Support third party customisation of rules.
- Multilingual GUI?

- Strategic issues
  - Hosting of high-volume production throughput – who pays?

Demonstration of Greenlight
Web interface and Command line

Installation of Greenlight
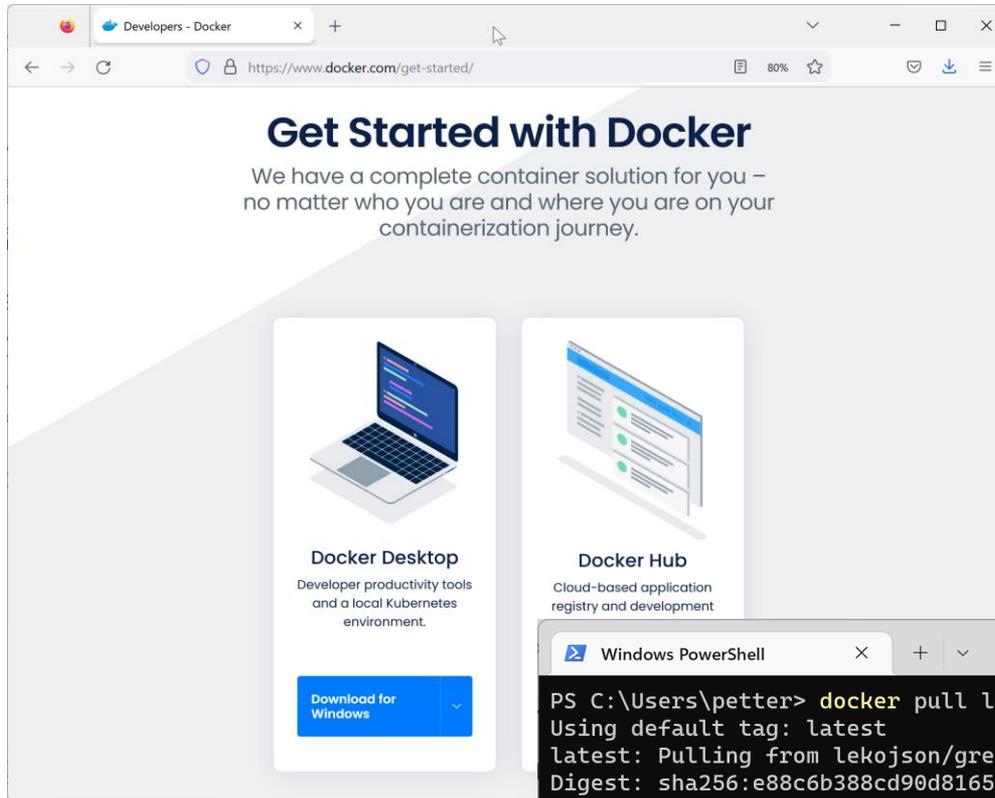
Download Docker from docker.com
Works on Linux, Windows and Mac

Pull the latest image of Greenlight
from DockerHub

Greenlight - Web Interface

Used for quick validation of a NeTEx file

- Self-hosted, or via Data4PT.

- Select your file, NeTEx profile, and rules to validate.

- The result is presented visually with references to warnings and errors in the validated files.

- A new feature is to select a prebuilt package with a NeTEx profile and selected rules suitable for that profile.
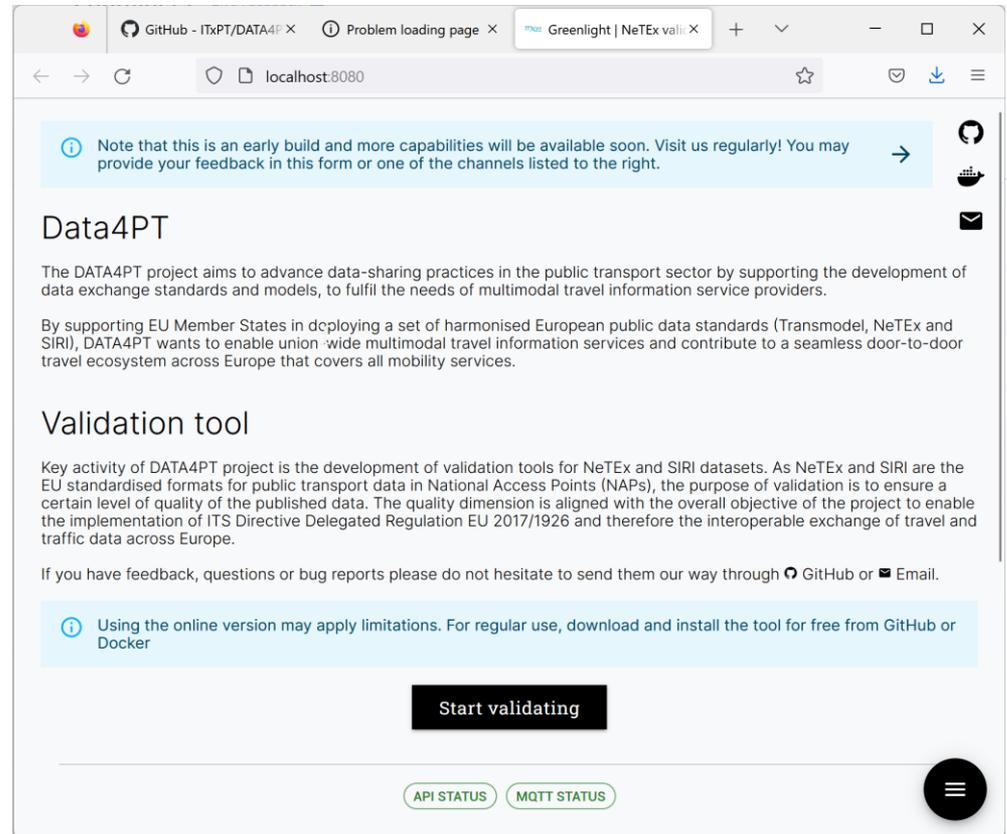
Greenlight - Command line interface

Used for automated validation of large set of files

- For more advanced use cases.

- Use your own rules.

- Result as a return code, console output and written to log files.

- Integrate in import/export pipelines.

Validation rules (current and future)

Exchanging data between systems

System A

PLACES
STOPS
ACCESSIBILITY
OPERATORS
ROUTES
TIMETABLES
FARES
FARE PRICES

EXPORT

NeTEx conformant XML Document

NeTEx
Network Timetable Exchange

XML
</>

System B

PLACES
STOPS
ACCESSIBILITY
OPERATORS
ROUTES
TIMETABLES
FARES
FARE PRICES

IMPORT

- *Correctly formatted?*
- *Self-Consistent?*
- *Up to date / "fresh"?*
- *Complete, Relevant?*
- *Meaningful, true?*

Have we done this right?

Is this data fit to import into System B?

Validating data between systems
Generic XML Validators

System A

PLACES
STOPS
ACCESSIBILITY
OPERATORS

ROUTES
TIMETABLES
FARES
FARE PRICES

EXPORT

NeTEx
Network Timetable Exchange

XML
</>

NeTEx ML SCHEMA

▸ XML Validator

System B

PLACES
STOPS
ACCESSIBILITY
OPERATORS

ROUTES
TIMETABLES
FARES
FARE PRICES

FXC P

Corrections to data

Corrections to Exporter

IMPORT

Fail,
Warning,
Pass

BAD XML

Feedback to improve quality
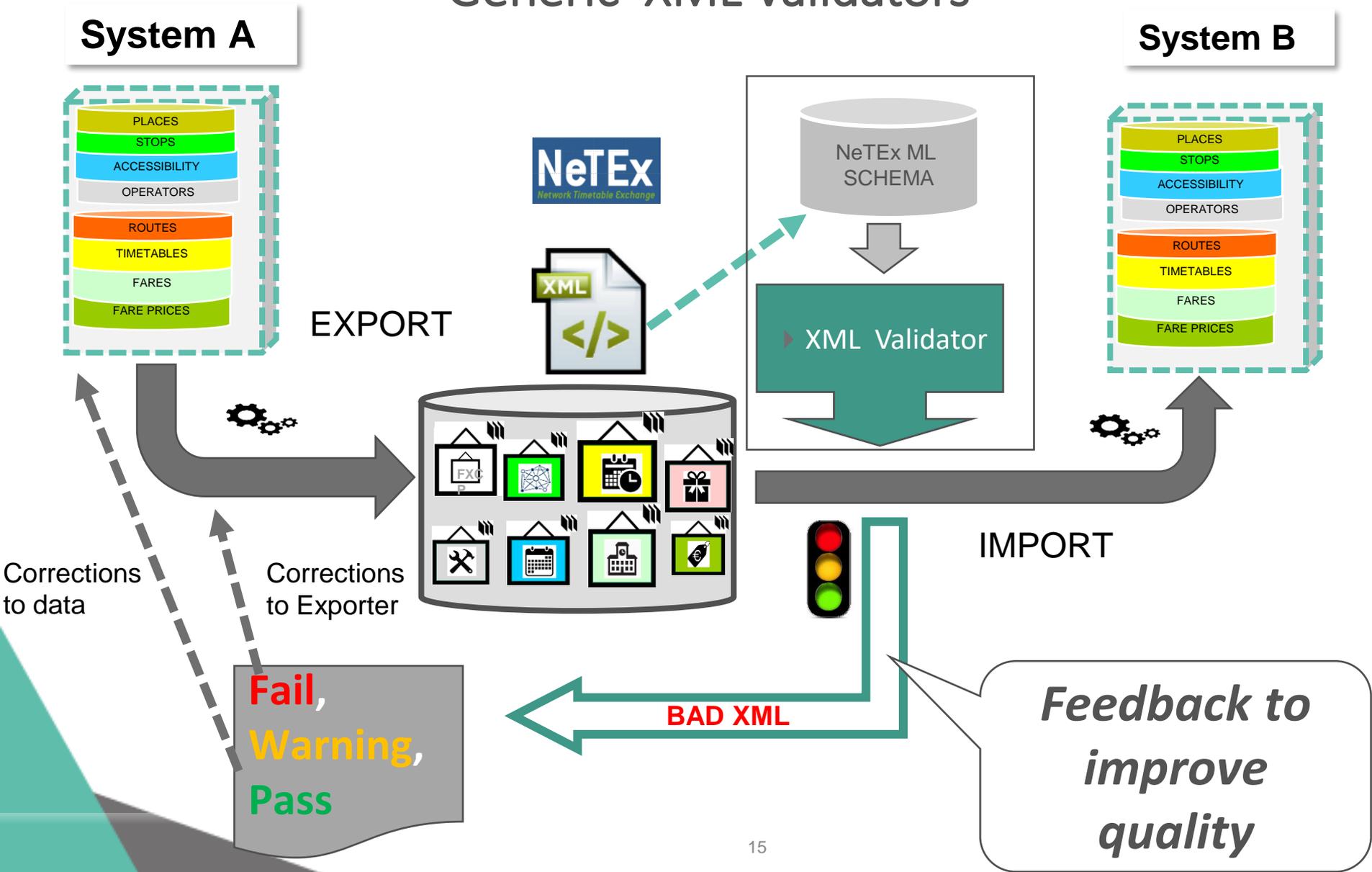
NeTEx Profiles & Custom Validators

System A

System B

GREEN LIGHT

NeTEx XML SCHEMA

General Rules / Custom Rules

XML Validator

Programmed NeTEx Validator (Greenlight)

Corrections to data

EXPORT

Corrections to Exporter

Fail, **Warning**, **Pass**

BAD XML

IMPORT

Does not fully satisfy Profile

Enhanced Feedback to improve quality

dataupt
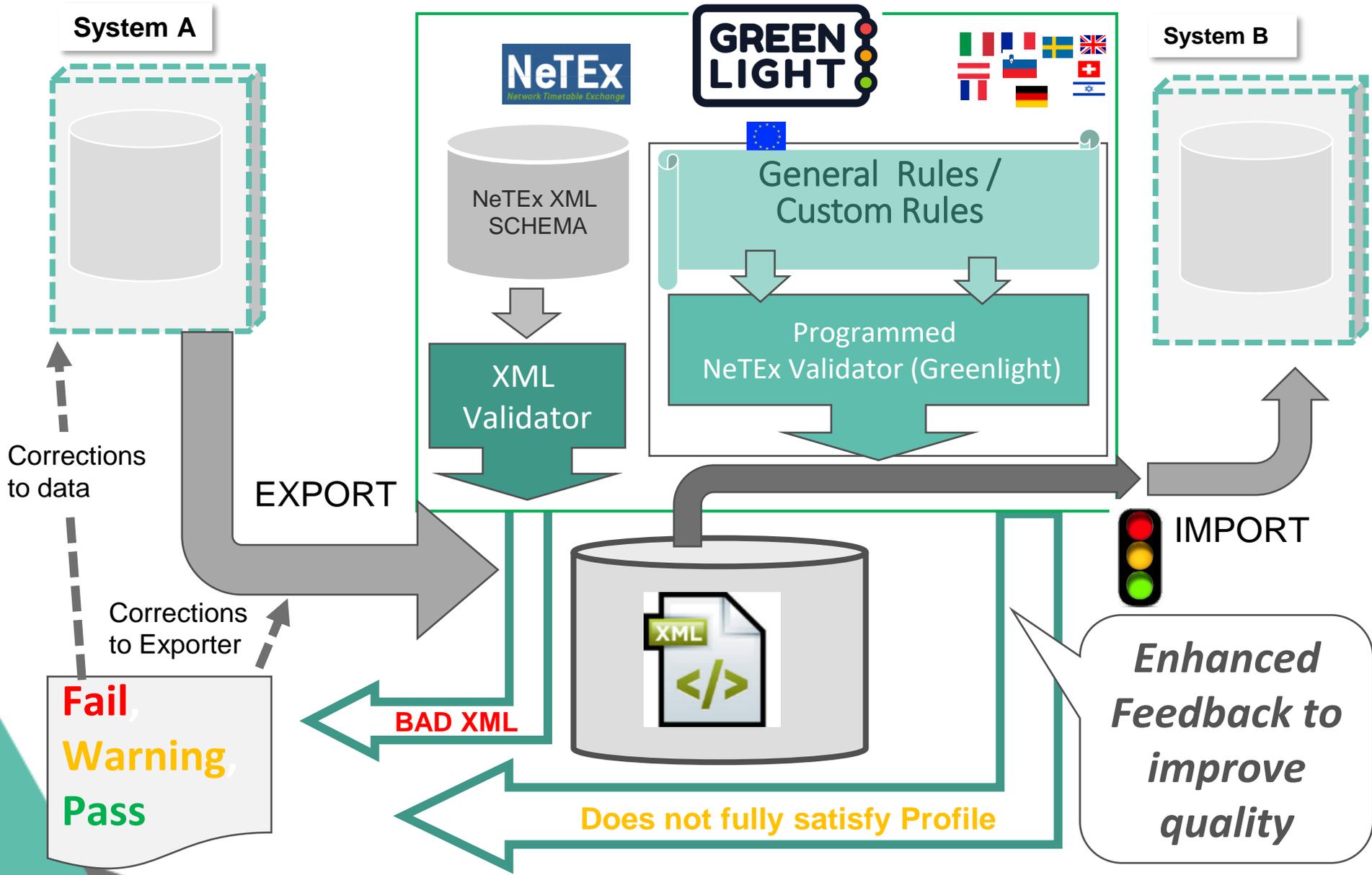
Different Types of Validation Rule

1. **XML schema rules** from **NeTEx Schema** that can be applied automatically by any **XML Validator**
   - Syntactic correctness: Is the document readable by a computer? Does it conform to specific schema rules?

2. **Additional rules** applied by a custom **Validator Program**
   a. Generic checks based on Transmodel semantics.
   b. Generic checks based on NeTEx good practice.
   c. Specific checks for a common profile (e.g.. any Timetable).
   d. Specific additional check for a custom profile (e.g. National Timetable)

- **Severity:**
  - Levels: OK, Warning, Minor Error, Severe Error, Critical Error,
  - Recoverable? – Halt processing or Repair & continue?

data⁴pt

#1. XML Schema rules : «Built-in» validation

Can be applied automatically by **any XML Validator**…

➢ Syntactic checks
- Well-formed XML : syntactically correct .
  - ❑ i.e. <tag attribute="xx">data value</tag>
- XML schema conformance:
  - ❑ Valid tags, in valid order. No empty tags.
  - ❑ Valid cardinality: required, optional, 0,1,n
  - ❑ Encoding of Data Types:
    - Date, Time, text, number, currency value, etc., etc.
  - ❑ Enumerated values are valid. E.g. Mode *bus, rail, tram…*

➢ Integrity cross-checks
- Uniqueness constraints.
  - ❑ Identifiers are unique in document
- Referential integrity constraints.
  - ❑ Any referenced entity must also be present in same file.

Example – Basic XML Validation

Syntax: < , />, ="", unicode

**Tag names, Attribute names
Order, Nesting, Cardinality (0,1 n)**

Data Types

Enumerated values

Referential Integrity

Uniqueness

```xml
<scheduledStopPoints>
        <ScheduledStopPoint version="032" created="2000-12-17T09:30:47.0Z" changed="2002-12-17T09:30:47.0Z" id="SSP0042A">
                <Name lang="fr">Poste, St Jean</Name>
                <Location>
                        <Longitude>-0.2071397147</Longitude>
                        <Latitude>51.4217482061</Latitude>
                </Location>
                <tariffZones>
                        <TariffZoneRef ref="st:Z1" version="any"/>
                        <TariffZoneRef ref="st:Z2" version="any"/>
                </tariffZones>
                <Url>http://www.mybus.fr/st_jean/</Url>
                <VehicleModes>bus</VehicleModes>
                <TopographicPlaceRef ref="fr:stjd" version="any" />
        </ScheduledStopPoint>
</scheduledStopPoints>
<tariffZones>
        <TariffZone version="any" id="st:Z1">
                <Name>Zone One</Name>
                <Centroid><Location>
                        <Longitude>-0.145397128</Longitude>
                        <Latitude>51.4623782042 </Latitude>
                </Location></Centroid>
                <Presentation><Colour>red</Colour></Presentation>
        </TariffZone>
        <TariffZone version="any" id="st:Z2">
                <Name>Zone Two</Name> . . .  Etc etc

</tariffZones>
```

dataupt

Beyond XML - Why we need custom validators

➤ Rules that you cannot express in XML…..

- **Complex cross-checks.**
  - ❑ E.g. Validity dates of elements fall within validity dates of frame.
  - ❑ E.g. Stop spatial coordinates lie within their Tariff Zone spatial coordinates
- **Conditional rules** that only apply in some cases.
  - ❑ E.g. Point-to-point Tariff should have a Distance Matrix but a Zonal Tariff should have Tariff Zones, etc., etc., etc
- **Parameterised rule**s with configurable values.
  - ❑ E.g. Appropriate distances between stops for transport mode.
  - ❑ E.g. Appropriate transfer distances to interchange.
- Checks against **external data sets**/ databases.
  - ❑ E.g. Operator codes, spatial coordinates.
- Data modularized into **multiple XML document**s with cross-references.
  - ❑ E.g. Large National data sets.

Data Completeness; NeTEx references may be internal or external

External Validator

XML Validator

XML Validator

XML Validator

PLACES
STOPS
ACCESSIBILITY
OPERATORS
ROUTES
TIMETABLES

NeTEx XML documents
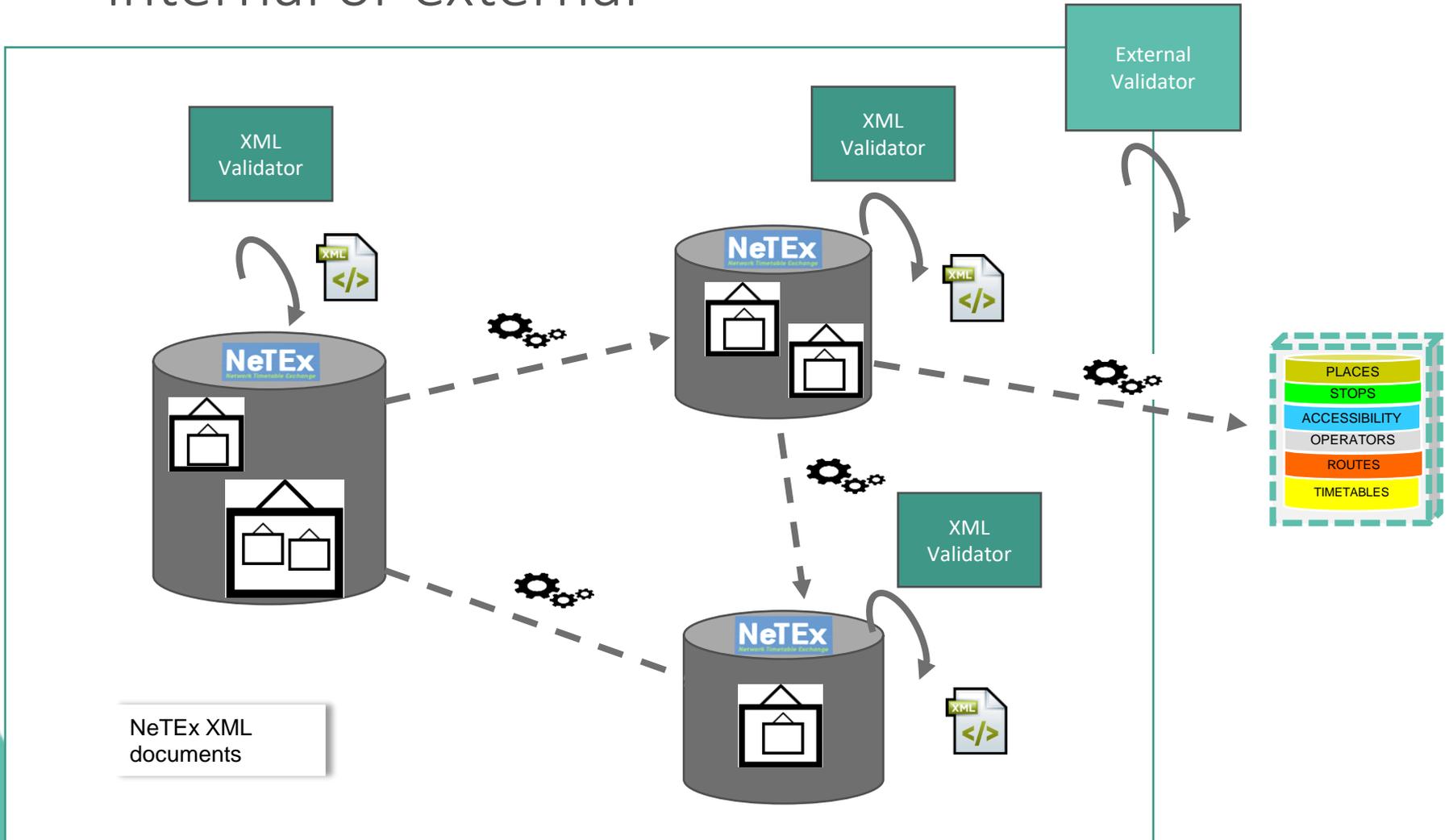
What Validation rules should a NeTEx Validator validate?

- ➢ Formulate, Systemise, Prioritize, implement incrementally. (EPIP Chapter 11)
- ➢ Set Severity levels (10-50).
- ➢ Parameterize certain rules.
- ➢ Decide efficient sequence in which to run.

| No	Description	Functional Area	Aspect	Applies to	How it is implemented	Severity (10=high. 50=low)	Validation Result	Script name	Development status	Development details		Experts comments
C.01.02	The versions of NeTEx schema being used should be specified	Common	Header - versions	All usages	code	10	Error			Every NeTEx document should indicate which version of the schema it is using. e.g. PublicationDelivery version="1.01"		This is important for resolving schema / differences.
C.02.01	All objects are uniquely identified	Common	identifiers	All usages	xmlschema	10	Error	n/a	XmlValidator	XML validator will do this provided a uniqueness constraint has been declared correctky in the schema. - In most cases ID is unique to type of element. - In a few cases id is common to different specialisations of the same type. rule is declared. For example all SiteElements - For some child elements it is unique within id/order rather than id.		We should document uniqueneness rul found in schema)
C.02.05	All frames should have a default CODE SPACE declared	Common	identifiers - Codespace	All usages	code	10	Error			All frames should have a default CODE SPACE declared. The CODE SPACE declares a default prefix to assume for all identifiers that do not have an explicit prefix.		
C.02.05	Any local reference should correspond to an object declared elsewhere in the same document.	Common	references	All usages	xmlschema	10	Error	n/a	XmlValidator	A local reference that has a version on (xxxRef version='xxx') will be checked automatically by the XML validator. provided a keyref rule is declared. in the schema definition		Need to look out for any missing key ref
C.01.03	The versions of the profile being used should be specified	Common	Header - versions	All usages	code	20	Error			Every NeTEx document should indicate which version of the profile it is using the version number on teh TyePFFrameRef versionref="n.n'		Knowing the version number is sometin important for resolving issues. C
C.03.01	The version number of each VERSION FRAME should be populated with a number	Common	Frame	All usages	code	20	Error			A version number should be given at least on the outermost container level. i.e. VERSION FRAME.		
C.09.04	Date ranges of elements in the frame must lie between date ranges of the VALIDITY CONDITION on the VERSION FRAME	Common Content	Dates	All usages	code	20	Error			If a date range for validity is specified on a detailed element it must be in between From Date and To Date of the containing VERSION FRAME.		
T.03.06	An OPERATOR must be declared for each SERVIOCE JOURNEY	Timetable	Journey	All usages	code	20	Error			The OPERATOR should be indicated for each SERVICE JOURNEY.		
T.08.01	A SERVICE JOURNEY have at least one DAY TYPE	Timetable	Day types	All usages	code	20	Error			A DAY TYPE should be specified for each SERVICE JOURNEY		
T.09.03	Successive DayOffset+PassingTimes for the	Timetable	Timings	All usages	code	20	Error	passingTimesHaveInc reasingTimes		Successive DayOffset+PassingTimes for the POINTs IN JOURNEY Pattern or CALLS of a Journey must not		

#2. Beyond XML : Possible Generic rules from Transmodel conceptual model semantics

- **Monotonically increasing range values**:
  - ✓ E.g. Date ranges: start date earlier than end date.
  - ✓ E.g. For a Journey, passing times increase along route.
- **Data Plausibility:** Dates, Distances, Speeds, Spatial relations. Etc, etc ("Real World Physics")
  - ❑ E.g. Stop coordinates lie within relevant country, county, town, etc.
  - ❑ E.g. Implied speeds are appropriate to mode. Ditto Transfer times
  - ❑ E.g. Dates are contemporary / upcoming.
- **Data Consistency**
  - ❑ E.g. Dates of frame contents within validity dates for frame.
  - ❑ E.g. Rail journeys stop at rail stations, buses at bus stops, etc.
  - ❑ E.g. Modes/Submodes correspond.
- **Sufficiency**
  - ❑ E.g. Every SERVICE JOURNEY has a DAY TYPE, OPERATOR, PASSING TIMEs, etc.
  - ❑ E.g. Every stop has a TARIFF ZONE, TOPOGRAPHIC PLACE, etc

Parameterised Rules – Plausibility e.g. Typical values for Journey metrics by mode

Mode	Number of stops in route	Distance Between Stops km	Velocity between stops kph	Number of quays at stop
Bus	2-150	1-10km	10-50	1-20
Coach	2-20	2-200km	20-80	1-50
Ferry	2-20	1-200km	10-30	1-10
Rail (Local)	2-50	2-20	20-100	2-50
Rail (Long)	2-20	20-100	60-220	2-50
Air	2-4	50-1000	200-700	1-100

#3A. Beyond XML
Validation rules from Specific Profiles (EPIP, National)

- **Specific Profile semantics** (EPIP, National)
  - **Data completeness**: all the required types of element for our business **use case** are present (e.g. stops, timetables, fares)
  - **Data fullness**: ditto all the required attributes: name, coordinates, etc
  - **Organisation** of elements is as preferred to simplify production / use.
  - Irrelevant elements are not included (**Relevancy**)

- **Global Identifiers**
  - Guaranteed **uniqueness** : systematic use of specific CODESPACES/ ids

- **Metadata**
  - Which **version** of schema, profile is used, TYPEs of FRAME
  - Data freshness / **currency** of data (daily, weekly, monthly)

- External **references** are valid
  - ❑E.g. Stops are in stop database / another file
  - ❑E.g. Operators are in operator database, etc
  - ❑All the Journeys in a group of journeys are in the same direction

"Real life" examples of using Greenlight and relevant validation rules

Duplicated identifiers

_LU_NAP_LINE_AVL-AVL-10_20221202.xml

	VALIDATION_NAME	VALID	ERROR_LINE_NO	ERROR_MESSAGE
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	frameDefaultsHaveALocaleAndTimeZone	false	41	Invalid <DefaultLanguage />
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	everyLineIsReferenced	false	214	Missing reference for Line(@id=LU::Line:257::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	everyStopPlaceHasACorrectStopPlaceType	true		
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	everyStopPlaceHasAName	true		
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	everyScheduledStopPointHasAName	true		
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	stopPlaceQuayDistanceIsReasonable	true		
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	everyStopPointHaveArrivalAndDepartureTime	true		
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	passingTimesHaveIncreasingTimes	true		
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1844	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22037::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1849	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22038::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1853	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22039::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1857	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22040::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1862	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22041::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1866	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22042::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1871	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22043::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1880	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22045::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1885	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22046::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1889	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22047::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1894	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22048::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1908	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22051::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1912	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22052::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1916	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22053::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1920	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22054::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1925	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22055::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1929	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22056::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1933	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22057::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1937	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22058::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1941	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22059::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1945	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22060::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1954	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22062::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1963	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22064::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1967	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22065::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1976	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22067::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1985	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22069::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	1999	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22072::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2008	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22074::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2012	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22075::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2016	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22076::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2020	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22077::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2044	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22082::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2048	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22083::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2052	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22084::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2076	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22089::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2080	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22090::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2089	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22092::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2093	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22093::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2097	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22094::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2101	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22095::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2105	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22096::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2110	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22097::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2114	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22098::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2119	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22099::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2124	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22100::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2128	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22101::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2132	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22102::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2136	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22103::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2155	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22107::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2159	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22108::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	locationsAreReferencingTheSamePoint	false	2163	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=LU::PassengerStopAssignment:22109::)
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	everyStopPlaceIsReferenced	true		
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	xsd	false	3375	Element '{http://www.netex.org.uk/netex}StopPlace': Duplicate key-sequence ['LU::StopPlace:0_CdT::', '1669973335'] in key identity-constraint '{http://www.netex.org.uk/netex}S~
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	xsd	false	3375	Element '{http://www.netex.org.uk/netex}StopPlace': Duplicate key-sequence ['LU::StopPlace:0_CdT::', '1669973335'] in unique identity-constraint '{http://www.netex.org.uk/nete~
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	xsd	false	3375	Element '{http://www.netex.org.uk/netex}StopPlace': Duplicate key-sequence ['LU::StopPlace:0_CdT::', '1669973335'] in key identity-constraint '{http://www.netex.org.uk/netex}S~
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	xsd	false	3375	Element '{http://www.netex.org.uk/netex}StopPlace': Duplicate key-sequence ['LU::StopPlace:0_CdT::', '1669973335'] in key identity-constraint '{http://www.netex.org.uk/netex}P~
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	xsd	false	3375	Element '{http://www.netex.org.uk/netex}StopPlace': Duplicate key-sequence ['LU::StopPlace:0_CdT::', '1669973335'] in key identity-constraint '{http://www.netex.org.uk/netex}Z~
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	xsd	false	3541	Element '{http://www.netex.org.uk/netex}StopPlace': Duplicate key-sequence ['LU::StopPlace:0_CdT::', '1669973335'] in key identity-constraint '{http://www.netex.org.uk/netex}S~
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	xsd	false	3541	Element '{http://www.netex.org.uk/netex}StopPlace': Duplicate key-sequence ['LU::StopPlace:0_CdT::', '1669973335'] in unique identity-constraint '{http://www.netex.org.uk/nete~
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	xsd	false	3541	Element '{http://www.netex.org.uk/netex}StopPlace': Duplicate key-sequence ['LU::StopPlace:0_CdT::', '1669973335'] in key identity-constraint '{http://www.netex.org.uk/netex}S~
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	xsd	false	3541	Element '{http://www.netex.org.uk/netex}StopPlace': Duplicate key-sequence ['LU::StopPlace:0_CdT::', '1669973335'] in key identity-constraint '{http://www.netex.org.uk/netex}P~
<-PI-01_LU_NAP_LINE_AVL-AVL-10_20221202.xml	xsd	false	3541	Element '{http://www.netex.org.uk/netex}StopPlace': Duplicate key-sequence ['LU::StopPlace:0_CdT::', '1669973335'] in key identity-constraint '{http://www.netex.org.uk/netex}Z~

Data obtained from Luxembourg national access point

data4pt

Reversing latitude and longitude

/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml

#	FILE_NAME	VALIDATION_NAME	VALID	ERROR_LINE_NO	ERROR_MESSAGE
1	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	stopPlaceQuayDistanceIsReasonable	false	0	Element <FrameDefaults /> is missing child <DefaultLocationSystem />
2	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyLineIsReferenced	true		
3	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	frameDefaultsHaveALocaleAndTimeZone	true		
4	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasAName	true		
5	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	14957	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43013:)
6	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	15055	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43016:)
7	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	15127	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43017:)
8	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	15199	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43090:)
9	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	15271	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43093:)
10	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	15330	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43117:)
11	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	15402	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43148:)
12	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	15461	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43400:)
13	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	15520	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43401:)
14	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	15592	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43402:)
15	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	15664	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43403:)
16	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	15736	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43404:)
17	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	15808	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43405:)
18	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	15880	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43406:)
19	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	15952	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43411:)
20	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	16024	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43412:)
21	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	16096	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43413:)
22	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	16168	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43414:)
23	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	16227	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43415:)
24	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	16317	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43434:)
25	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	16376	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43471:)
26	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	16435	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-43924:)
27	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	16507	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-45845:)
28	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	16578	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-47465:)
29	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceHasACorrectStopPlaceType	false	16637	StopPlaceType is not set for StopPlace(@id=at:oov:StopPlace:at-44-47469:)
30	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyScheduledStopPointHasAName	true		
31	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	locationsAreReferencingTheSamePoint	false	19177	ScheduledStopPoint and StopPlace is too far apart (PassengerStopAssignment @id=at:oov:PassengerStopAssignment:at-44-47465-0-1:)
32	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	passingTimesHaveIncreasingTimes	true		
33	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPointHaveArrivalAndDepartureTime	true		
34	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	everyStopPlaceIsReferenced	true		
35	/tmp/oov/NX-PI_01_at_oov_LINE_oov_14-444-j21_20220202.xml	xsd	true		
		VALID	FALSE		

Data obtained from AustriaTech

```
<ServiceLink id="at:oov:ServiceLink:14_at-44-47465-0-1_at-44-47469-0-1:" version="any">
  <Distance>939</Distance>
  <gml:LineString gml:id="SLLS_301192">
    <gml:pos>14.264286 47.991495</gml:pos>
    <gml:pos>47.9915242024934 14.2642962044159</gml:pos>
    <gml:pos>47.9915233007099 14.2643005163292</gml:pos>
    <gml:pos>47.9914839228147 14.2644770352826</gml:pos>
    <gml:pos>47.9914251264512 14.2647585672926</gml:pos>
```

Version=any?

```
<ServiceLink id="at:oov:ServiceLink:14_at-44-47465-0-1_at-44-47469-0-1:" version="any">
  <Distance>939</Distance>
  <gml:LineString gml:id="SLLS_301192">
    <gml:pos>14.264286 47.991495</gml:pos>
    <gml:pos>47.9915242024934 14.2642962044159</gml:pos>
    <gml:pos>47.9915233007099 14.2643005163292</gml:pos>
    <gml:pos>47.9914839228147 14.2644770352826</gml:pos>
    <gml:pos>47.9914251264512 14.2647585672926</gml:pos>
```
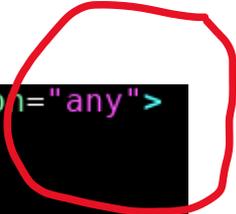
Referencing the wrong object types

```
<ns1:TimingLink id="GVB:TimingLink:04410-04068-bus-nightBus" version="221130163000Z">
 <ns1:Distance>454</ns1:Distance>
 <ns1:FromPointRef version="221130163000Z" ref="GVB:RoutePoint:04410"/>
 <ns1:ToPointRef version="221130163000Z" ref="GVB:RoutePoint:04068"/>
 <ns1:OperationalContextRef version="221130163000Z" ref="GVB:OperationalContext:bus-nightBus"/>
</ns1:TimingLink>
```

Referencing object types you don't specify the type for

```
<OperatingPeriodRef ref="FLI:UicOperatingPeriod:1856153135"
    version="20221101"/>
```

Referencing object types you don't specify the type for

```
<OperatingPeriodRef nameOfRefClass="UicOperatingPeriod"
    ref="FLI:UicOperatingPeriod:1856153135" version="20221101"/>
```

Missing mandatory profile-information

```
/tmp/FLI:Line:34001.xml

#   FILE_NAME                VALIDATION_NAME                        VALID   ERROR_LINE_NO   ERROR_MESSAGE

1   /tmp/FLI:Line:34001.xml  everyScheduledStopPointHasAName        true
2   /tmp/FLI:Line:34001.xml  frameDefaultsHaveALocaleAndTimeZone    true
3   /tmp/FLI:Line:34001.xml  everyLineIsReferenced                  true
4   /tmp/FLI:Line:34001.xml  everyStopPlaceHasAName                 true
5   /tmp/FLI:Line:34001.xml  everyStopPlaceIsReferenced             true
6   /tmp/FLI:Line:34001.xml  everyStopPlaceHasACorrectStopPlaceType false   48              StopPlaceType is not set for StopPlace(@id=FLI:StopPlace:47502)
7   /tmp/FLI:Line:34001.xml  everyStopPlaceHasACorrectStopPlaceType false   74              StopPlaceType is not set for StopPlace(@id=FLI:StopPlace:49221)
8   /tmp/FLI:Line:34001.xml  everyStopPlaceHasACorrectStopPlaceType false   100             StopPlaceType is not set for StopPlace(@id=FLI:StopPlace:48671)
9   /tmp/FLI:Line:34001.xml  everyStopPlaceHasACorrectStopPlaceType false   126             StopPlaceType is not set for StopPlace(@id=FLI:StopPlace:49461)
10  /tmp/FLI:Line:34001.xml  everyStopPlaceHasACorrectStopPlaceType false   152             StopPlaceType is not set for StopPlace(@id=FLI:StopPlace:49061)
11  /tmp/FLI:Line:34001.xml  everyStopPlaceHasACorrectStopPlaceType false   178             StopPlaceType is not set for StopPlace(@id=FLI:StopPlace:48981)
12  /tmp/FLI:Line:34001.xml  everyStopPlaceHasACorrectStopPlaceType false   204             StopPlaceType is not set for StopPlace(@id=FLI:StopPlace:48901)
13  /tmp/FLI:Line:34001.xml  everyStopPlaceHasACorrectStopPlaceType false   230             StopPlaceType is not set for StopPlace(@id=FLI:StopPlace:48831)
14  /tmp/FLI:Line:34001.xml  passingTimesHaveIncreasingTimes        true
15  /tmp/FLI:Line:34001.xml  locationsAreReferencingTheSamePoint    true
16  /tmp/FLI:Line:34001.xml  stopPlaceQuayDistanceIsReasonable      true
17  /tmp/FLI:Line:34001.xml  everyStopPointHaveArrivalAndDepartureTime true
18  /tmp/FLI:Line:34001.xml  xsd                                    false   21              Element '{http://www.netex.org.uk/netex}TypeOfFrameRef': No match found for key-sequence ['epip:EU_PI_LINE_OFFER', 'epip:1.0'] of keyref '{http://www.netex.org.uk/netex}TypeOfFrame_AnyKeyRef'.
19  /tmp/FLI:Line:34001.xml  xsd                                    false   46              Element '{http://www.netex.org.uk/netex}TypeOfFrameRef': No match found for key-sequence ['epip:EU_PI_STOP', 'epip:1.0'] of keyref '{http://www.netex.org.uk/netex}TypeOfFrame_AnyKeyRef'.
20  /tmp/FLI:Line:34001.xml  xsd                                    false   259             Element '{http://www.netex.org.uk/netex}TypeOfFrameRef': No match found for key-sequence ['epip:EU_PI_COMMON', 'epip:1.0'] of keyref '{http://www.netex.org.uk/netex}TypeOfFrame_AnyKeyRef'.
21  /tmp/FLI:Line:34001.xml  xsd                                    false   287             Element '{http://www.netex.org.uk/netex}TypeOfFrameRef': No match found for key-sequence ['epip:EU_PI_NETWORK', 'epip:1.0'] of keyref '{http://www.netex.org.uk/netex}TypeOfFrame_AnyKeyRef'.
22  /tmp/FLI:Line:34001.xml  xsd                                    false   513             Element '{http://www.netex.org.uk/netex}TypeOfFrameRef': No match found for key-sequence ['epip:EU_PI_TIMETABLE', 'epip:1.0'] of keyref '{http://www.netex.org.uk/netex}TypeOfFrame_AnyKeyRef'.
23  /tmp/FLI:Line:34001.xml  xsd                                    false   652             Element '{http://www.netex.org.uk/netex}TypeOfFrameRef': No match found for key-sequence ['epip:EU_PI_CALENDAR', 'epip:1.0'] of keyref '{http://www.netex.org.uk/netex}TypeOfFrame_AnyKeyRef'.

                             VALID                                  FALSE
```

Data produced for Flixbus & reviewed by Mentz

xmllint --noout --schema NeTEx_publication_EPIP-NoConstraint.xsd /tmp/FLI\:Line\:34001.xml

…

/tmp/FLI:Line:34001.xml:653: element dayTypes: Schemas validity error : Element '{http://www.netex.org.uk/netex}dayTypes': **This element is not expected.** Expected is one of ({http://www.netex.org.uk/netex}BaselineVersionFrameRef, {http://www.netex.org.uk/netex}codespaces, {http://www.netex.org.uk/netex}FrameDefaults, {http://www.netex.org.uk/netex}prerequisites, {http://www.netex.org.uk/netex}contentValidityConditions, {http://www.netex.org.uk/netex}ServiceCalendar).

34

Real life validation best-practices

After exporting

- **DATA4PT validator**
- **XMLlint** --noout --schema NeTEx_publication.xsd yourfile.xml.gz

Profile based XSD

- Full NeTEx XSD is good for general validation (but big & slow)
- Define XSDs to check specific profiles:
  add mandatory elements (minOccurs)

Reread the file manually

- Sometimes by just scrolling through the file you will notice stupid mistakes, a validator that does not know the *context* will not observe.

Customisation of Greenlight

Architecture overview
How to write a validation rule

Greenlight - Features that enable customisation

Modularity

- Core module connecting other components
- Standard XML-tools

Extensibility

- API for adding validation rules

Integration

- API for integration with user interfaces and other tool chains
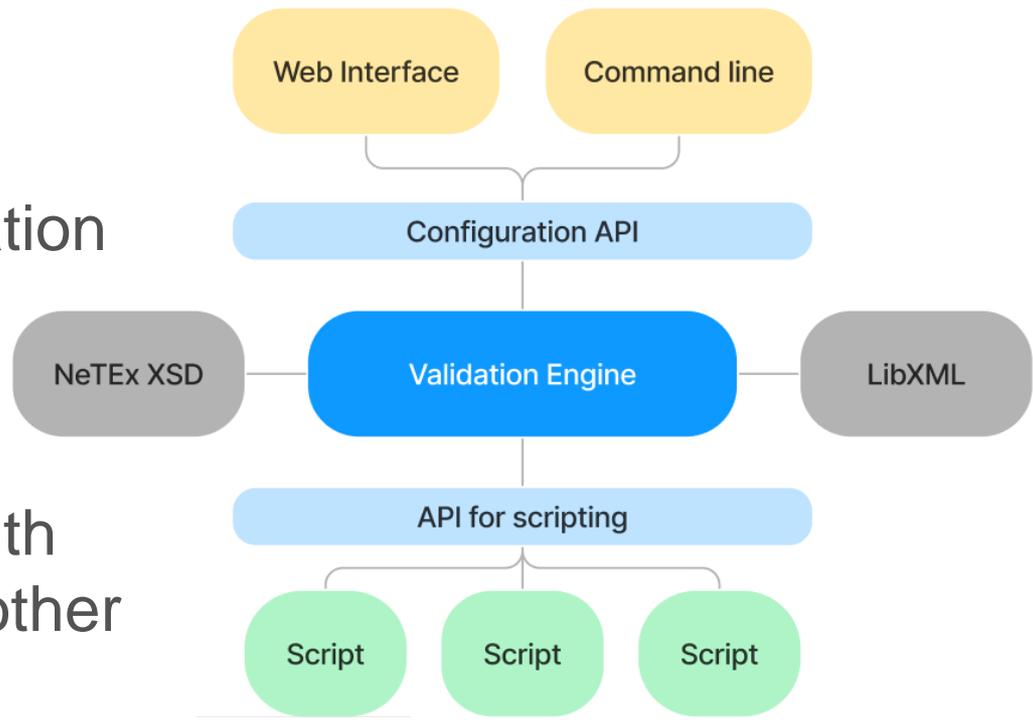
Example of how to customize Greenlight rules

➢ Validate the **length of name** field for **StopPlaces**

Demo Steps:
1. Examine a NeTEx file, find out which elements to validate to understand how the rule shall work.
2. Use a template script or find and copy an existing script with similar functionality.
3. Edit the script to do the new validation.
4. Test the script; a) run the validation on a correct file, b) run the validation on a file with errors.

```javascript
25    * Main entry point
26    *
27    * @param {types.Context} ctx
28    * @return {errors.ScriptError[]?}
29    */
30   function main(ctx) {
31     return ctx.node.find(stopPlacesPath)
32       .map(v => v.reduce((res, node) => {
33         const id = node.valueAt("@id").get();
34
35         if (!id) {
36           res.push(errors.ConsistencyError(
37             `StopPlace is missing attribute @id`,
38             { line: node.line() },
39           ));
40           return res;
41         }
42
43         const name = node.valueAt(namePath).get();
44
45         if (name.length > 20) {
46           res.push(errors.ConsistencyError(
47             `Name to long for StopPlace(@id=${id})`,
48             { line: node.line() },
49           ));
50         }
51
52         return res;
53       }, []))
```

dataupt

Be the first to deliver validated NeTEx standardized data!

Use DATA4PT tool!!

DATA4PT project

DATA4PT @Data4PT

https://data4pt-project.eu/