



1 Integration into DOORS

1.1 Architecture

The architecture consists of two major parts: three DXL scripts on the DOORS side and an orchestration component at the OpenReq side. The following figure shows the main components and their interaction:

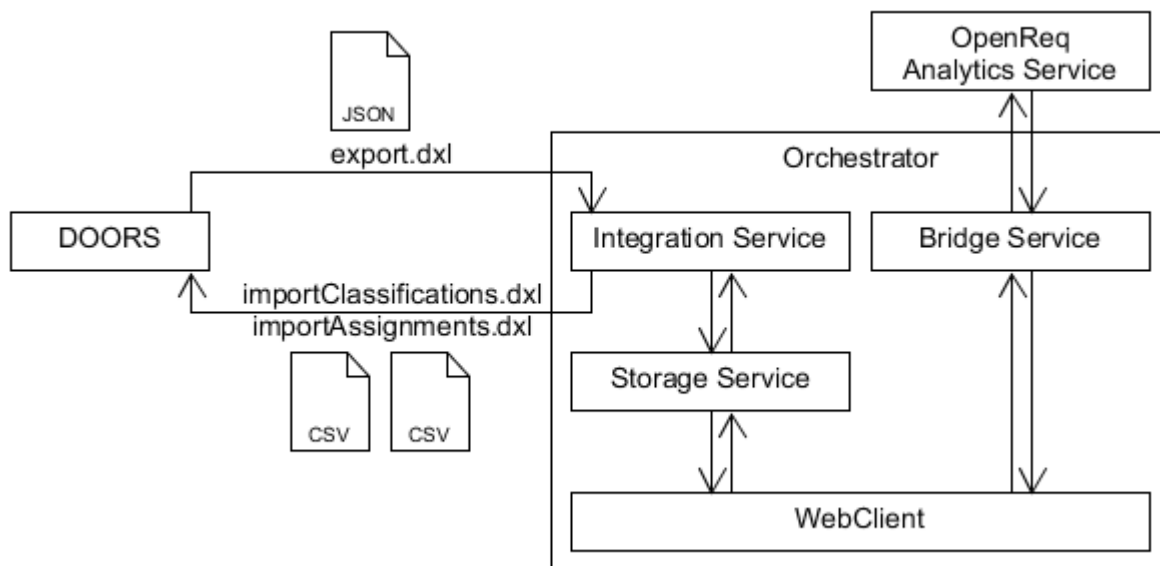


Figure 1: Architecture of DOORS integration

One DXL script exports the requirements from a DOORS module into a JSON file. The other two import the requirements' classifications and domain assignments, respectively, back into DOORS by reading CSV files. The README.md at <https://github.com/OpenReqEU/doors-integration-scripts> describes the details of the scripts and interfaces (JSON, CSV).

The orchestration component transforms the data from/to DOORS into OpenReq ontology format and calls the necessary OpenReq analytics services on the OpenReq platform <http://api.openreq.eu/#/services>. Typically, this requires some domain-specific decisions. Therefore, the orchestrator shall be tailor-made, i.e. implemented specifically for each application. It can be very simple: just doing a few transformations and calling some services via REST. Figure 1 shows a more elaborate approach which includes a storage service, a user interface, and a bridge to harmonize the interface to different variants and versions of services.

1.2 Installation

The necessary DXL scripts for DOORS integration and a description how to use them (see README.md) are available at GitHub: <http://github.com/OpenReqEU/doors-integration-scripts>.

The orchestrator must be developed specifically. Its main task is to glue the files used by the DXL scripts to the OpenReq analytics services. The minimal requirements for such a component (i.e. integration service or orchestrator application) are:

- Read exported requirements from JSON file (according to the schema defined in the README.md at GitHub)



- Send requirements to an OpenReq analytics service (according to its specification on <http://api.openreq.eu/#/services>) to train a model
- Send requirements to a previously trained OpenReq analytics service to classify them
- Collect the classifications and export them into a CSV file (according to the schema defined in the README.md at GitHub)

1.3 Usage

A typical workflow comprises the following steps:

- Export from DOORS (generate JSON): `exportToJson_withTypeAndDomains.dxl`
- Process in OpenReq (call services): dependent on tailor-made orchestrator (see section 1.2)
- Update DOORS (set corresponding attribute values for requirements):
`importClassificationsFromCSV.dxl`, `importDomainAssignmentsFromCSV.dxl`

Details about using the scripts in DOORS are described at <https://github.com/OpenReqEU/doors-integration-scripts#using-the-scripts>.

Example of a complete workflow in the Siemens trial (where we have a separate UI in OpenReq, so that we can call various analytics services such as classification and domain assignment):

- DOORS requirements with empty Type and Domain

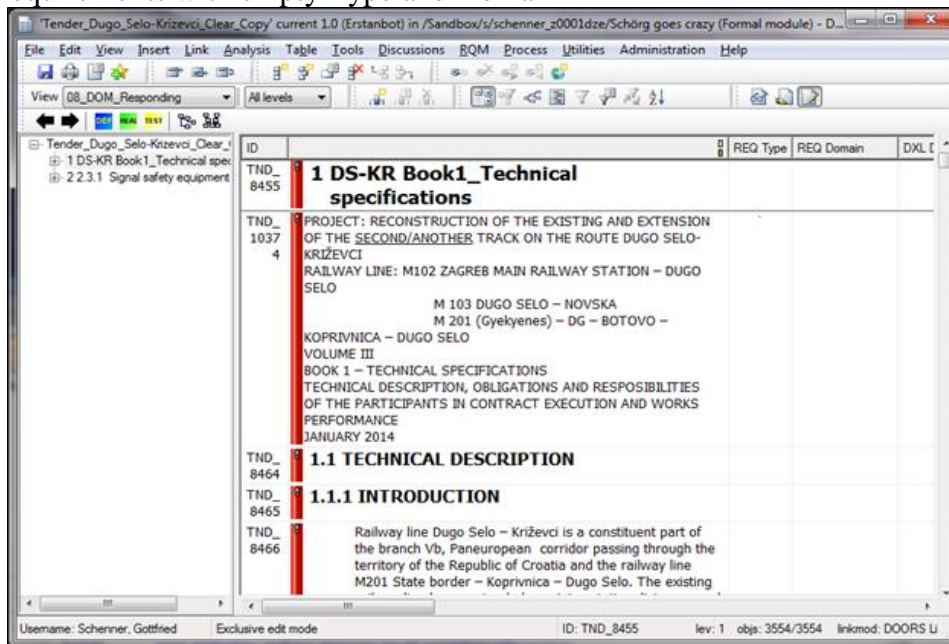


Figure 2: DOORS requirements with empty Type and Domain

- Corresponding requirements in OpenReq after Export from DOORS



| # | Text | Type | Domains | Action |
|-----------|--|---------------|---------|-------------------------|
| TND_8455 | DS-KR Book1_Technical specifications | NotClassified | | Details |
| TND_10374 | PROJECT: RECONSTRUCTION OF THE EXISTING AND EXTENSION OF THE SECOND/ANOTHER TRACK ON THE ROUTE DUGO SELO-KRIŽEVCI RAILWAY LINE: M102 ZAGREB MAIN RAILWAY STATION – DUGO SELO M 103 DUGO SELO – NOVSKA M 201 (Gyekyenes) – DG – BOTOVO – KOPRIVNICA – DUGO SELO VOLUME III BOOK 1 – TECHNICAL SPECIFICATIONS TECHNICAL DESCRIPTION, OBLIGATIONS AND RESPONSIBILITIES OF THE PARTICIPANTS IN CONTRACT EXECUTION AND WORKS PERFORMANCE JANUARY 2014 | NotClassified | | Details |
| TND_8464 | TECHNICAL DESCRIPTION | NotClassified | | Details |
| TND_8465 | INTRODUCTION | NotClassified | | Details |
| TND_8466 | Railway line Dugo Selo – Križevci is a constituent part of the branch Vb, Paneuropean corridor passing through the territory of the Republic of Croatia and the railway line M201 State border – Koprivnica – Dugo Selo. The existing railway line has one track, large inter-station distances and is already now of limited transportation and maximum railway capacity with no possibilities of capacity enhancing. | NotClassified | | Details |
| TND_8467 | By this project, the section Dugo Selo – Križevci is turning into two-track railway line with much more acceptable usage characteristics by which the conditions of interoperability are met, the capacities are enhanced and the time of travel is significantly reduced. | NotClassified | | Details |

Figure 3: Corresponding requirements in OpenReq after Export from DOORS

- Type set after classification in OpenReq

| # | Text | Type | Domains | Action |
|-----------|--|-------|---------|-------------------------|
| TND_8455 | DS-KR Book1_Technical specifications | Prose | | Details |
| TND_10374 | PROJECT: RECONSTRUCTION OF THE EXISTING AND EXTENSION OF THE SECOND/ANOTHER TRACK ON THE ROUTE DUGO SELO-KRIŽEVCI RAILWAY LINE: M102 ZAGREB MAIN RAILWAY STATION – DUGO SELO M 103 DUGO SELO – NOVSKA M 201 (Gyekyenes) – DG – BOTOVO – KOPRIVNICA – DUGO SELO VOLUME III BOOK 1 – TECHNICAL SPECIFICATIONS TECHNICAL DESCRIPTION, OBLIGATIONS AND RESPONSIBILITIES OF THE PARTICIPANTS IN CONTRACT EXECUTION AND WORKS PERFORMANCE JANUARY 2014 | DEF | | Details |
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| TND_8467 | By this project, the section Dugo Selo – Križevci is turning into two-track railway line with much more acceptable usage characteristics by which the conditions of interoperability are met, the capacities are enhanced and the time of travel is significantly reduced. | Prose | | Details |

Figure 4: Type set after classification in OpenReq

- Domains assigned for first requirement in OpenReq

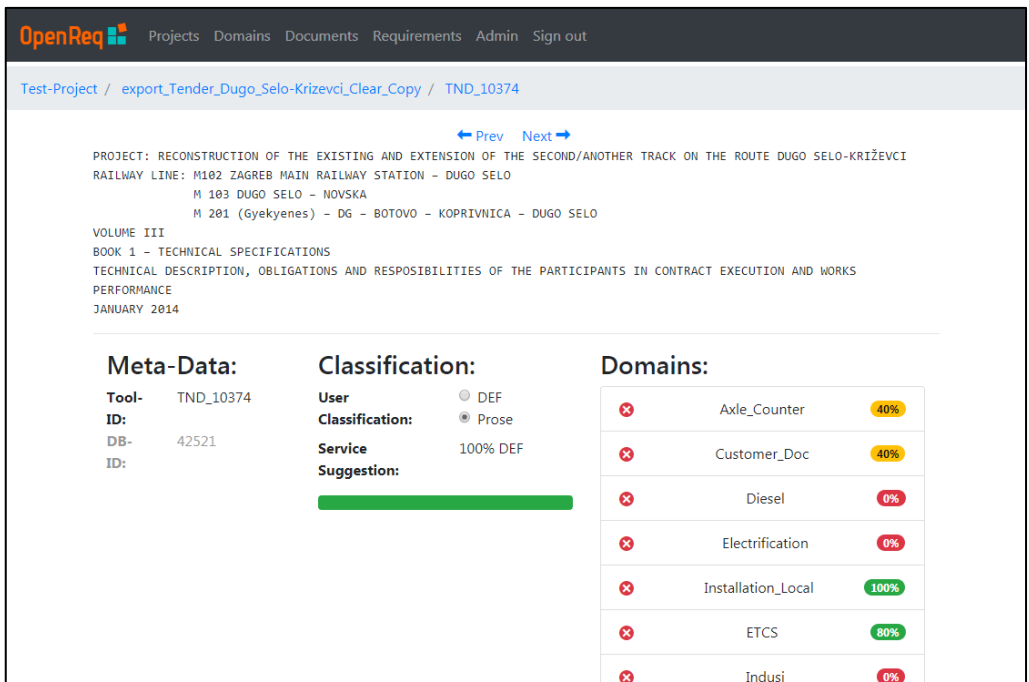


Figure 5: Domains assigned for first requirement in OpenReq

- Attributes (Type, Domain) set in DOORS after Update

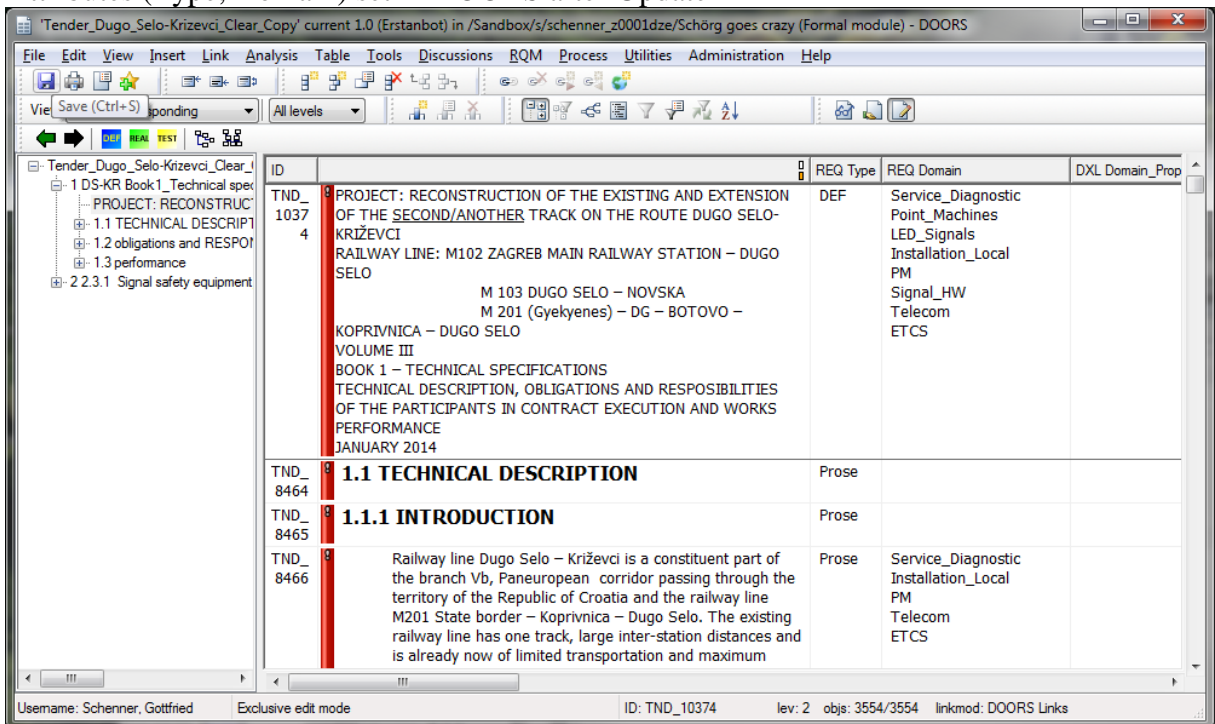


Figure 6: Attributes (Type, Domain) set in DOORS after Update