Deliverable 11.1
ABT Systems and Equipment

translink

This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 636126

Executive summary

Objectives

- ABT-systems connected with pilot region.
- Leverage existing infrastructure cost effectively as a basis for ABT;
- Test the existing Trans Link Systems (Dutch) back-office fare calculation engine (in operation for today for apportionment) as the basis for the Pay-As-You-Go variant of ABT;
- Use ABT to enable cross-border travelling (within both the Dutch and the German Scheme);
- Test the Generic Secure Token and ABT as a cost effective way to integrate public transport with access door-to-doorservices, such as parking, bike rental, car rental etc;

Deviations from these objectives

- Leverage existing infrastructure cost effectively as a basis for ABT
    - Because the created solution was more complex than anticipated in the beginning, development and integration costs where higher than expected.
- Test the Generic Secure Token and ABT as a cost effective way to integrate public transport with access door-to-doorservices, such as parking, bike rental, car rental etc
    - The scope of the Dutch pilot was limited to focus on the core concepts of ABT, GST and cross border travelling in public transport, thus excluding access to door-to-door services. However, the effectiveness and (cost)-efficiency of adapting terminals to support the GST and the ABT fuctionality of the Central Back Office (as demonstrated in WP11.6), shows the feasibility of extending GST-support beyond public transport.

Work done

- The following components of the ABT system for the Dutch pilot were specified, developed and implemented:
    - The Back Office of Translink, adjusted to support the GST token and transaction
    - The interfacing and connection to the OTI Hub
    - The interfacing and connection to the terminals (Level 1 equipment) of the PTO

Conclusions

- The existing Back Office of Translink, albeit with adjustments made to support the GST, proved a solid base to introduce ABT in the pilot region.

Contribution to the main goal of the project / Link with other tasks or WPs

- By connecting the Dutch Central Backoffice to the various components of the ABT-system, the infrastructure was set up to support ABT-travels during the Dutch pilot.

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ABT system & equipment

The ABT system for the Dutch pilot will consist of :

- the Back Office of Translink, which will be adjusted to support the GST token and transaction
- The interfacing and connection to the OTI Hub
- The interfacing and connection to the terminals (Level 1 equipment) of the PTO

Defined products

ID	Product	Status
11.1.1	Specification interfaces to Back Office	
11.1.2	Back Office functionality	DEV
11.1.3	L1 to Back Office	

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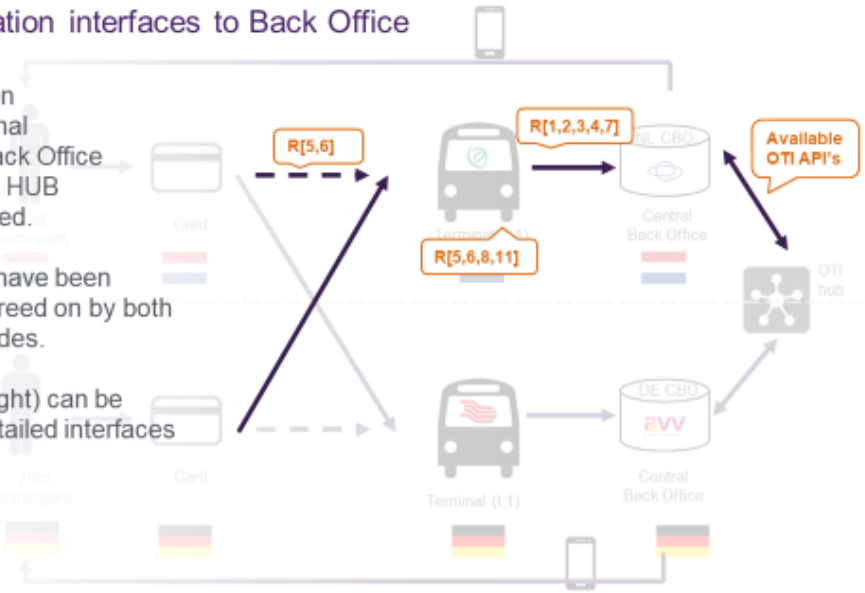
11.1.1 Specification interfaces to Back Office

Interfaces between
1. Card to Terminal
2. Terminal to Back Office
3. Back Office to HUB

have been specified.

All specifications have been discussed and agreed on by both implementation sides.

Reference ID's (right) can be mapped to the detailed interfaces on next pages.



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11.1.1 Details specifications (1/3)

Ref.	Title	Description	Latest Version
R[1]	**DIS Lists and Validation online**	This document contains draft specifications for the message protocol between a Token Terminal and Local and Central servers, to support validation of tokens at use. Specifications may, and probably will be enhanced, extended and changed, during further development of the protocol.	A rev08
R[2]	**DIS Transactions online**	This document contains draft specifications for the Transaction message protocol between a Validation Terminal and Local and Central servers. Specifications may, and probably will be enhanced, extended and changed, during further development of the protocol.	A rev10
R[3]	**EMVdata v 0.05.asn**	In this document the basic message structure of the list and validation messages from validation terminal to local and central servers is specified in detail.	0.05

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11.1.1 Details specifications (2/3)

Ref.	Title	Description	Latest Version
R[4]	**Transaction v 0.8.asn**	In this document the basic message structure of the online transaction message from validation terminal to local and central servers is specified in detail.	0.8
R[5]	**Token Use Case Rev11**	This document contains the Token-Terminal use case specifications.	Rev11
R[6]	**OTI Generic Secure Token Application Specification 2.1**	This document specifies the interface and functionality of version 2.1 of the Generic Secure Token Application (GST Application) used in the interaction with other components in the GST Scheme, for example the validation terminal.	4.2.4
R[7]	**DIS HTTP Transport Protocol**	This document describes the HTTP Transport Protocol that implements the DIS Terminal Online messaging specification over encrypted HTTP (HTTPS). The scope of this document is limited to a HTTP transport protocol used in online interfaces to validate tokens, distribute lists, distribute key updates and collect transactions and audit registers.	A rev2

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11.1.1 Details specifications (3/3)

Ref.	Title	Description	Latest Version
R[8]	**NOA_EN_001 Media selection rev1**	This document describes the media recognition flow for the card readers.	Rev1
R[9]	**PTO feedback**	This document describes the feedback interfaces from the ID-Based Ticketing system to Public Transport Operators.	Rev04
R[10]	**validationstate_map_h2020_v1**	This document describes the validation rules for validation of incoming transactions from the validation terminal	v01
R[11]	**Use of secure keys in the Horizon 2020 pilot_PL1**	This document describes the use of secure keys within the Horizon 2020 pilot and describes what keys are used and how they are being used.	V01

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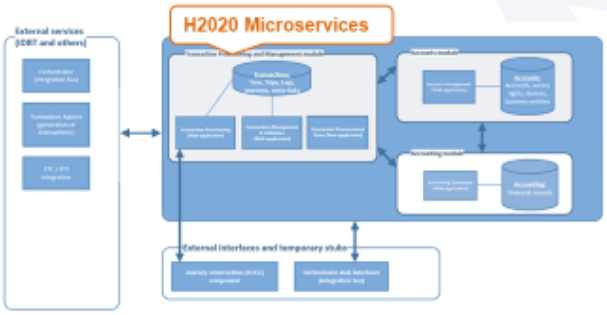
11.1.2 Back Office functionality

- The Back Office of H2020 is an adjustment of the Identity based ticketing Back Office of Translink
- For H2020 several so called microservices have been developed to support the GST:

Component	Status
Import price tables and stations of Arriva	Done and tested
Enrich Journey reconstruction and fare calculation	In test
Component for generating invoicing and settlement	In development

Architecture of the backoffice



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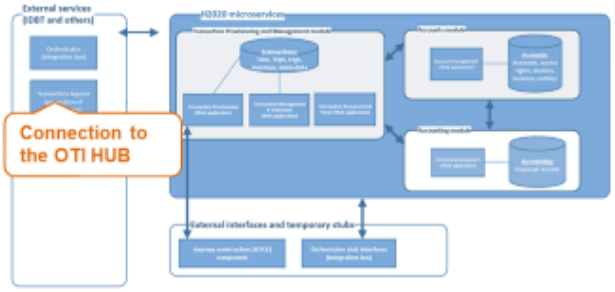
11.1.2 Back Office functionality

- For connection to the OTI HUB, these components have been developed:

Component	Status
Technical connection to the OTI HUB	Done and tested
Acceptance of the payment request of Germany	In test
Receive and proces German V-receipts	In development
Send trigger messages to OTI Hub for German travels on Dutch Busses	In development

Architecture of the backoffice



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11.1.3 L1 to Backoffice

The transaction of the L1 device will lead into an output transaction (see example to the right).

This transaction is used for testing and can correctly be imported and processed by the Back Office.

Example of Transaction:

Etc Transaction

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