



# Clusters 2.0



## Cluster Community System Tool Clusters 2.0 Webinar

*9th July 2020*



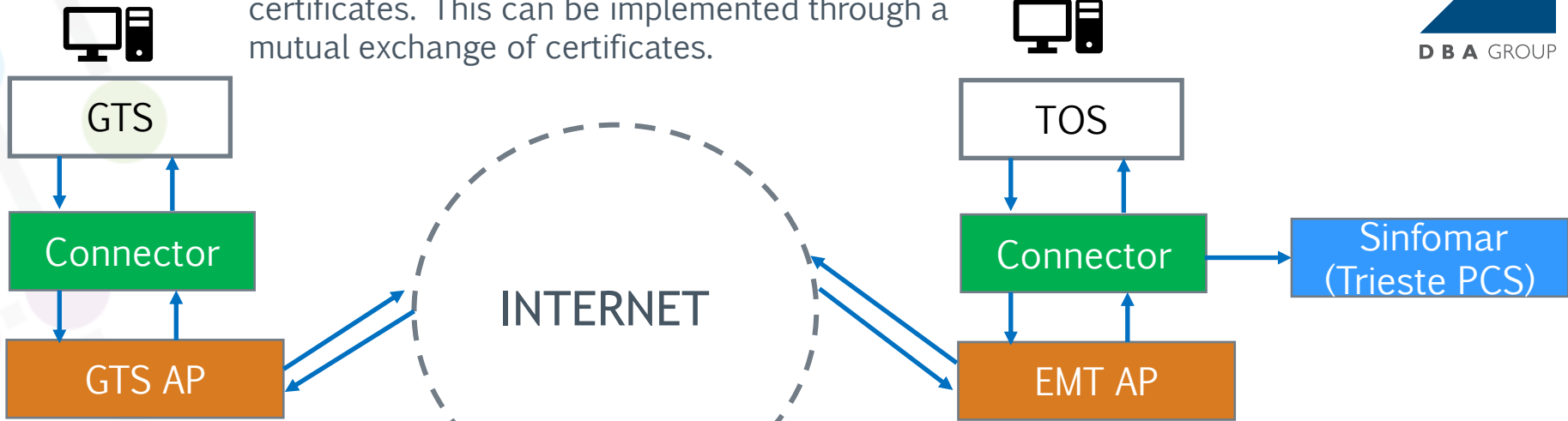
# Agenda

- › CluCS design
- › CluCS interoperability
  - GTS and EMT: services management
  - Sinfomar (PCS of Trieste): Customs procedure management (CH30)
  - X-Intermodal: train time tables sharing
- › DEMO
  - Interoperability with X-Intermodal (*live*)
  - EMT Service Booking (*off-line*)
  - Interoperability with Sinfomar (*off-line*)

Central node of CluCs - Pilot

# CluCS communication infrastructure

**Digital Certificates:** Trust is established using digital certificates. This can be implemented through a mutual exchange of certificates.

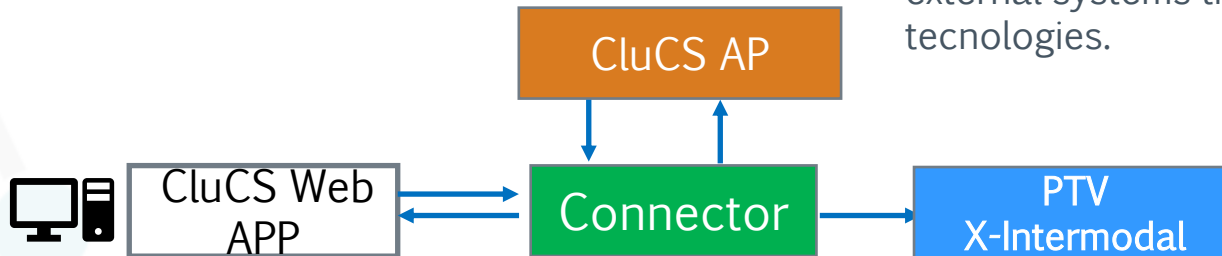


## Access Point:

The access points implement a standardized message exchange protocol (based on AS4) which ensures secure and reliable data exchange within the system.

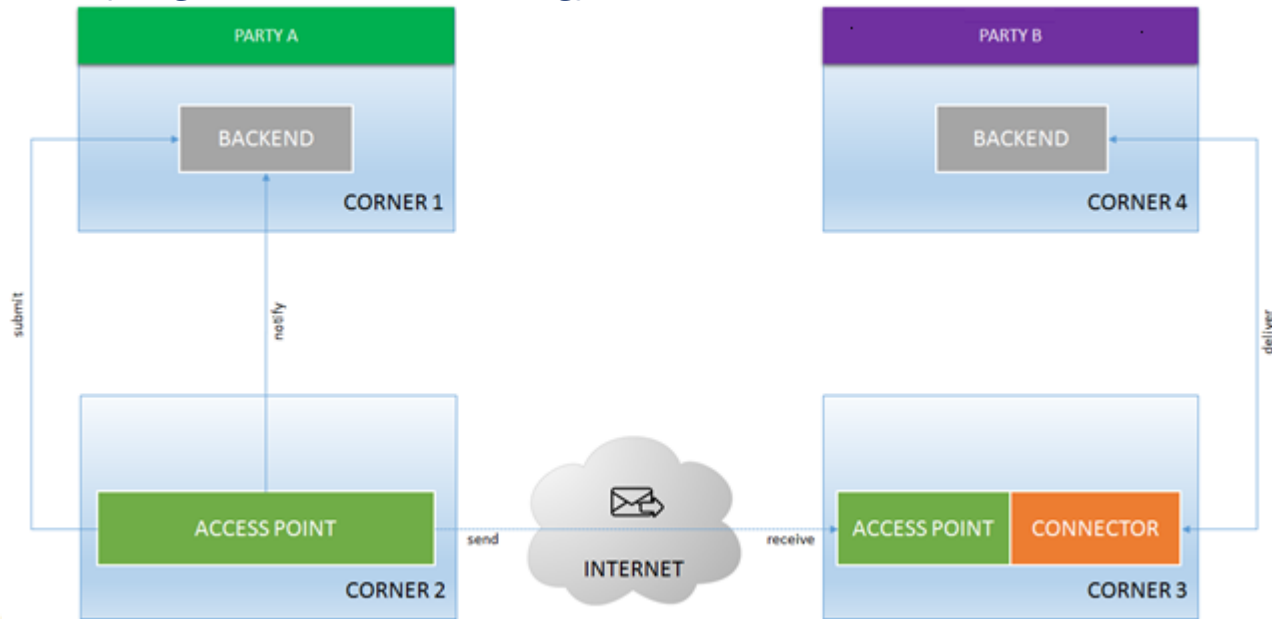
## Backend Integration / Connector:

The Connector enables and facilitates the interaction between the Access Point and the Backend Systems and to external systems that do not adopt AP technologies.



# Architectural design

As Access Point was adopted the Domibus software (JMS implementation). Connectors were implemented with Spring Framework Technology.



Architectural design layers of **Connectors** were divided into:

- **Data layer**, for storage and data access, was implemented using Hibernate as JPA implementation.
- **Business logic layer**, which enables the processing of data according to Domibus payload request or response to deliver. Well known *chain of responsibility pattern* was used to determine the connector's business logic service to be used according to Domibus payload request.
- **Service layers**, which enables the interaction between corner 4's backend and access point via connector, was developed using Spring Framework Technology as RESTful Web Services.
- **Communication layers**, which enables the interaction with external systems (that do not adopt AP technology) was developed as WS consumer and between connector and access point, was developed using Spring Framework Technology as JMS consumer/producer client for Domibus access point.

# GTS and EMT services management

## GTS/EMT

- Backend connects to AP and sends services catalog to CluCS (GTS: only simulator // EMT: TOS integration)
- Services catalog is received by CluCS through its APs and stored in the Cluster Central Node

## Shippers

- Create booking request to CluCS (Central Node) via Web Interface providing details about cargo characteristics and dates

## CluCS

- Receives and elaborates booking request from shippers inserted via CluCS web interface
- Based on services catalogs route the request to proper LSP's AP.

## GTS/EMT

- Accept or reject intermodal service request in its IT system (GTS: only simulator // EMT: TOS integration)
- Sends confirmation of services to CluCS

## CluCS

- Receives booking confirmation from LSPs
- Informs all involved stakeholders of intermodal services confirmation

# Collaboration of CluCS with PTV X-Intermodal

- X-Intermodal visualizes intermodal connections.
- X-Intermodal provides a better understanding on intermodal market.
- X-Intermodal provides a quick overview on intermodal lanes, which are often tough to find.
- X-Intermodal calculates and compares alternative routes (road, rail and barge).
- X-Intermodal calculates and compares indicative costs and CO2 emissions.
- X-Intermodal synchronizes all data provided by intermodal operators.

The screenshot displays the X-Intermodal software interface. The main window is titled 'Intermodale Planung' and 'IM Routenplanung'. It features a 'Routen' (Routes) table with columns for transport mode, land, city, PLZ, location, day, time, distance, duration, terminal, line, and provider. Below this is a summary table with columns for arrival, departure, waiting time, halt time, cost, and CO2 emissions. At the bottom, an 'Ergebnisüberblick' (Overview) table summarizes the routes with columns for route name, color, distance, cost, duration, and CO2 emissions.

Transport...	Land	Stadt	PLZ	Ortsbezeich...	Tag	Zeit	Entfernung	Dauer	Terminake...	Linie	Anbieter
R1_Road	DE	Stuttgart	70184	Start	0	14 h 59 min	164	2 h 25 min			
R2_Rail_SSV	DE	Ludwigshafen	67065	Ludwigsha...	0	17 h 24 min	0	0 min	T_455		
R3_Rail_SSV	DE	Ludwigshafen	67065	Ludwigsha...	0	22 h 09 min	688	12 h 00 min	T_455	ECL_Ludwigshafen_Lübeck-T...	European ...
R4_Rail_SSV	DE	Lübeck-Tra...	23570	Lübeck-Ska...	1	10 h 09 min	0	0 min	T_453	ECL_Ludwigshafen_Lübeck-T...	
R5_Rail	DE	Lübeck-Tra...	23570	Lübeck-Ska...	1	23 h 59 min	278	9 h 00 min	T_453	STENA_LINE_Lübeck-Travem...	Stena Line...
R6_SSV	SE	Malmö	21124	Malmö RoRo	2	8 h 59 min	0	0 min	SEMAL	STENA_LINE_Lübeck-Travem...	
R7_SSV	SE	Hälsstad	30594	Ende	2	11 h 26 min	0	0 min			

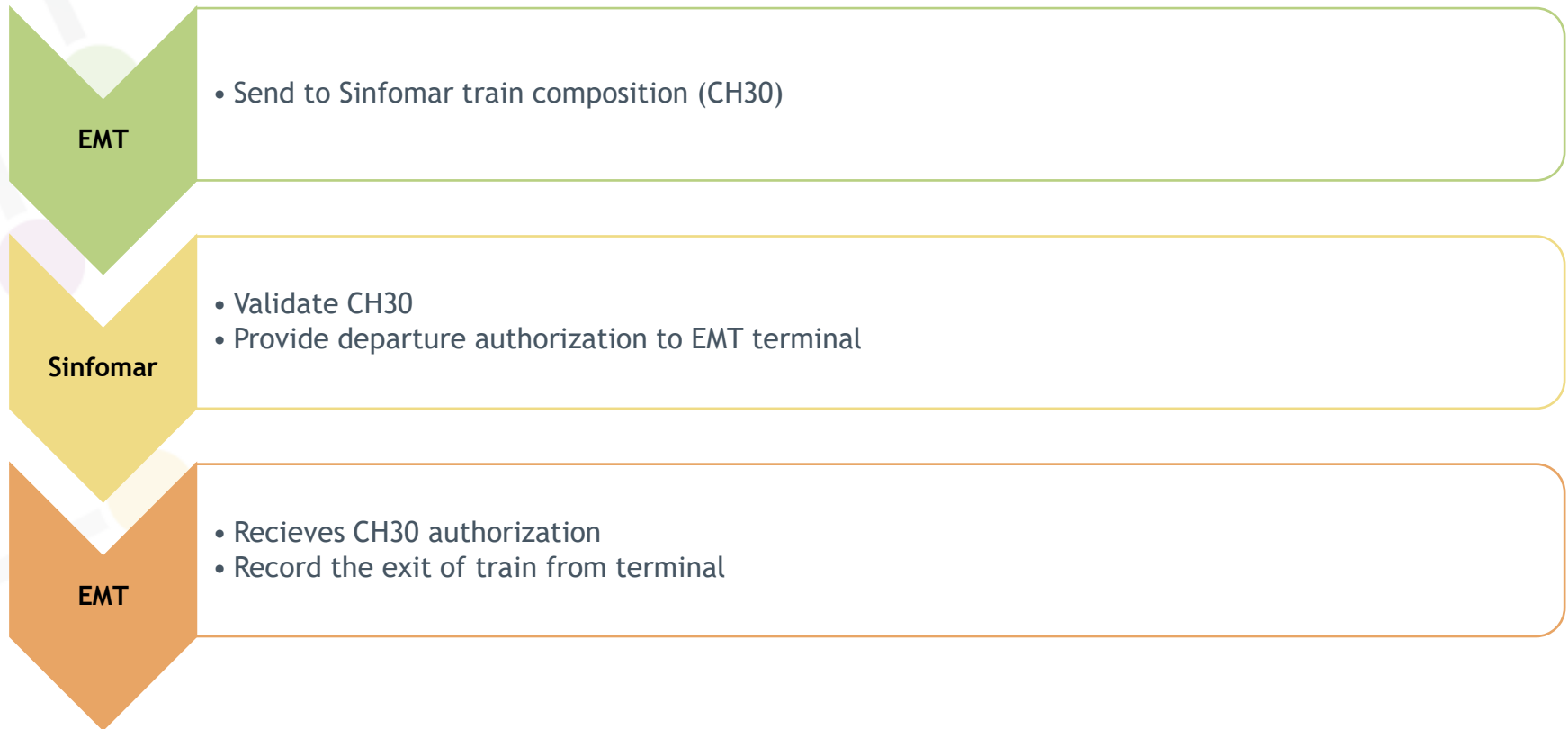
  

Ankunft	Abfahrt	Wartezeit	Haltezeit	Kosten	CO2 [kg]
	Sonntag, 18. September 2016...	0 min	0 min	270 €	135,9















Route	Farbe	Entfernung	Kosten	Dauer	CO2 [kg]
R1_Road	Red	1220,00 km	1.621 €	18 h 01 min	1.182,9
R2_Rail_SSV	Blue	1276,00 km	749 €	1 d 20 h 27 min	681,6
R3_Rail_SSV	Green	1276,00 km	749 €	1 d 08 h 27 min	681,6
R4_Rail_SSV	Purple	1278,00 km	777 €	1 d 06 h 29 min	727,3
R5_Rail	Cyan	1304,00 km	1.014 €	4 d 06 h 14 min	891,9
R6_SSV	Brown	1213,00 km	1.407 €	1 d 00 h 57 min	1.186,4

# EMT node: interoperability with Sinfomar



# EMT node: Interoperability with Sinfomar

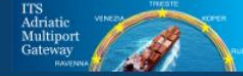


N.Pratica	Data	Traccia	Tipo	Nome conv.	Naz.	Origine / Destinazione	A/P	Terminal	Varco	IG	Stato	Vag. tot.	Vag. pieni	Nr. cntr	Nr. mezzi	Massa netta	Dichiarante
P.10.3.20	10/03/2020	99999998		DCT-KRAILLING		KRAILLING	←	DEPOSITI COSTIERI TRIESTE				15	15	0	0	704.289	DCT
USCITA MUTA VUOTA 10-03	10/03/2020	22		USCITA MUTA		TRIESTE	←	SAMER SEAPORTS TERMINALS	10/03/2020 18:17			15	0	0	0	0	SAMER
1583427623534	10/03/2020	48229		VUOTI DCT INRAIL		SCHWECHAT	→	DEPOSITI COSTIERI TRIESTE				15	15	0	0	0	INRAIL
test41852 10-03-2020 12:44:00	10/03/2020	41852		LUDWIG		LUDWIGSHAFEN	←	SAMER SEAPORTS TERMINALS				1	1	1	0	5.000	E.M.T.
TRS.DNJ	10/03/2020	40862		DUNAJSKA STREDA		DUNAJSKA STREDA	←	TRIESTE MARINE TERMINAL	10/03/2020 12:47			20	17	43	0	689.627	TO DELTA
TRM2.0127P	10/03/2020	41878		BETTEMBOURG2		BETTEMBOURG	←	SAMER SEAPORTS TERMINALS	10/03/2020 10:30			16	14	0	27	358.208	SAMER
TRS-BUD	10/03/2020	42180		BUDAPEST		BUDAPEST	←	TRIESTE MARINE TERMINAL	09/03/2020 20:15			20	20	52	0	753.918	TO DELTA

List of departing/arriving trains



# EMT node: Interoperability with Sinfomar



Salva Chiudi Riep.Treno Pre Carico Ch-30 Ch-30 E Dist.carri Ch-30 no PF Gen.statistiche Dist.manovra Conferma Sopprimi XML XML da ftp XML to RCA XML MIR XML

**Gestione treni**

- Riepilogo
- Riepilogo stati
- Gestione treni
- Gestione shuttle
- Gestione Corridoi Transfrontalieri
- Taric merce sensibile
- Elenco treni**
- Gestione vagoni
- Gestione tracce
- Ricerche arrivi/partenze
- Esci
- Utente connesso
- vboschian@porto.triest**
- Ditta
- AUTORITA' PORTUALE DI TRIESTE**

**Generale** | Vagoni | Mercè | Imp. dati | Excel

**Testata**

**N. pratica**  
test41852 10-03-2020 12:44:00

**Data / Ora TSCM**  
10/03/2020 12:44

**Dichiarante**  
EUROPA MULTIPURPOSE TERMINALS (EMT) S.P.A.

**Terminalista**  
SAMER SEAPORTS AND TERMINAL

**Traccia**  
41852 | IN PARTENZA PER LUDWIGSHAFEN | RAIL TRACTION COMPANY SPA

**ATT Varco**

**ETT Varco**  
10/03/2020 12:59

**MTO**  
KOMBIVERKEHR DEUTSCHE GESELLSCHAFT FÜR

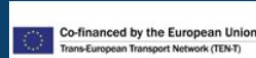
**Terminal**  
1 SAMER SEAPORTS TERMINALS

+ Aggiungi vagoni    ↺ Inverti ordine vagoni    ☰ Cambia visualizzazione    ✖ Elimina vagoni vuoti

Non associati	Vagone
<p>+ CNEU9594969 4.000 Kg (5.000 Kg)</p>	<p>↑ ↓ ✖ 9032017</p> <p>Mt: 34,0 Kg: 35.500</p> <p>+ CNEU9594969 4.000 Kg (5.000 Kg)</p>

Train composition

# EMT node: Interoperability with Sinfomar



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vboschian@porto.trieste
- Ditta
- AUTORITA' PORTUALE DI TRIESTE**

**Generale** **Vagoni** **Merchi** **Imp. dati** **Excel**

**Testata**

**N. pratica**  
test41852 10-03-2020 12:44:00

**Data / Ora TSCM**  
10/03/2020 12:44

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10/03/2020 12:59

**MTO**  
KOMBIVERKEHR DEUTSCHE GESELLSCHAFT FÜR

**Terminal**  
1 SAMER SEAPORTS TERMINALS

+ Aggiungi merce x Svuota merci

Targhe/Sigla n.	Tipo cont./rot.	Documento	Vagone	Merce	Peso (Kg)	Q.ta	Corr.	Stato	D		
<u>CNEU9594969</u>	L2V1		non associato	Non definita	0,000	0		■		🗑️	✖️
	L2V1		1 9032017	Non definita	0,000	0		■		🗑️	✖️

## Goods details

# DEMO