

16 Culture and Language Module (CLM)

16.1 DS2 Data Share Controller (DHARE)

Owner(s):	ICE
DOA Task:	T6.2
Tier:	2
Nature:	Optional
Results:	Outcome



This task will enable an edge-to-cloud connectivity through applications and devices capable of collecting, processing data and interconnecting this data with the cloud infrastructure of T6.1. It will be receiving, storing, and processing enormous amounts of data and management tools need to extract insights and make data-driven decisions based on data. This task will implement the DLC ecosystem that ensures data security and privacy and implement appropriate measures such as encryption, access control and anonymization. All relevant adapters, interfaces and UIs are developed within this task that allow the use, maintenance, and full control of the ecosystem. This task will establish concepts of open data that permit public data availability and accessibility for use and reuse without restrictions. It will further ensure that individuals and organizations will stay in control of their data, allowing them to control their own data and decide how and when it is shared. Once the federated IDT environment is operational through T6.3 amongst other task, it will be necessary to monitor it continuously at execution time (aka T4.2). Based on a data quality lifecycle, tools will be developed to define and constantly monitor data quality and establish a framework for automatic checks, eg of loss detection.

Purpose: To provide a user orientated view of control plane information related to a specific exchange of data to monitor its status and to potentially limit or block it. It will access data through a Data Interceptor component which it shares with the DS2 Data Inspection component (DINS) which operates more at the data level. It can be seen an In-Dataspace enablement module. Its role is especially important in an Inter-DS environment to provide extra monitoring and control of the data exchanges when partners are less known.

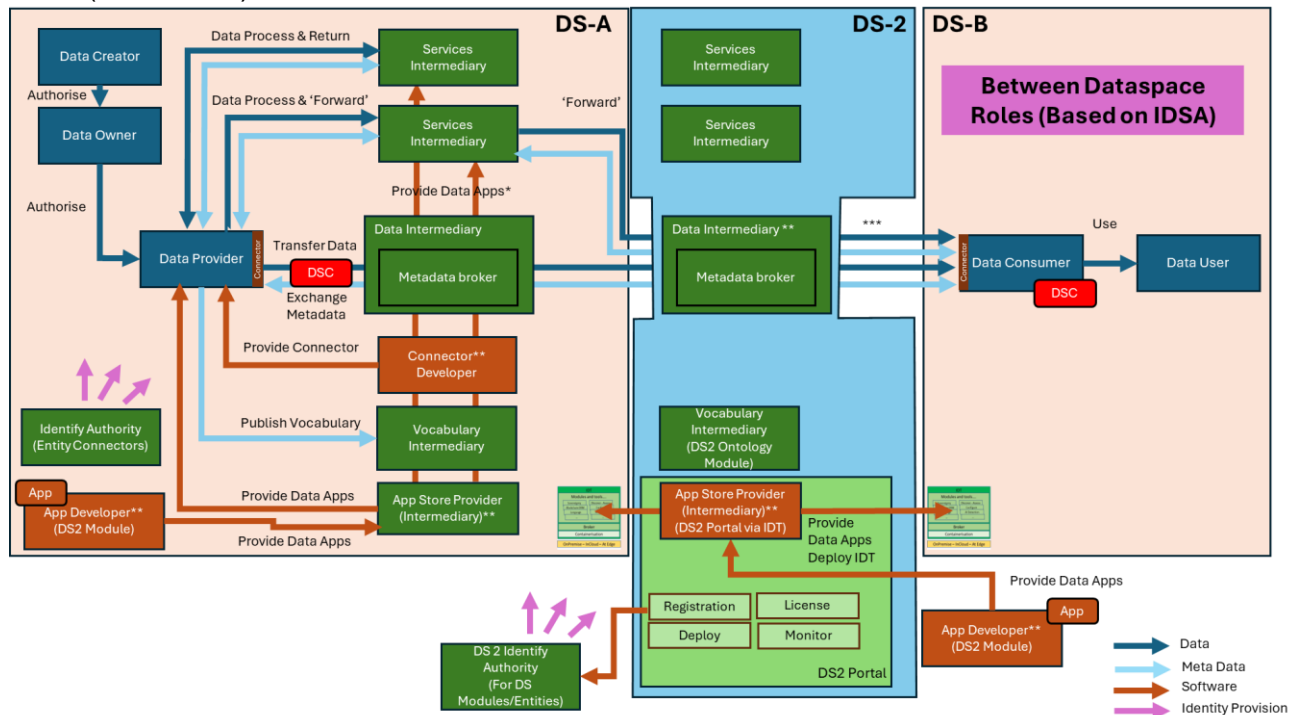
Description: The DS2 DSC module is an experimental module due to its nature. The aim is for it to access control data regarding and exchange via the common Data Interceptor component and an API to the used connector – either within IDT or a specific Dataspace one. It will then log and monitor this information and allow it to be presented in user friendly form. For short duration one shot type transactions this is more of an after-the-event easy-viewer. However, for longer duration transactions (eg querying records over a period of time) this then it allows the user themselves to monitor the flow and perform control-type actions such a limiting or blocking the transaction (of course dependent on the contract agreed)

16.1.1 Where this component fits

16.1.1.1 Big Picture

Note that this module description includes the Data share Controller and the Data Interceptor.

Its fit (RED BOX) in to the DS-DS environment is as follows



Where	Status
Within a single Dataspace for use between participants in that Dataspace only	N/A
Deployed and used by a single participant to enable the participant in either an In-Data space or Inter- Data space scenario	Since it is controlling a participants data flow it is only deployed by a participant in a single data space
Across Dataspaces without Service Intermediary	N/A
Across Dataspace with Intermediary	N/A
Other Comments	N/A

16.1.1.2 Within a single Dataspace (where applicable)

N/A

16.1.1.3 Deployed and used by a single participant

The module only operates in a dataspace to help control its operations. There it will intercept and allow the interception of control plane information to block or limit dataflows due to a participants demands

N/A

N/A

The figure below represents the actors, internal structure, primary sub-components, primary DS2 module interfaces, and primary other interfaces of the module.

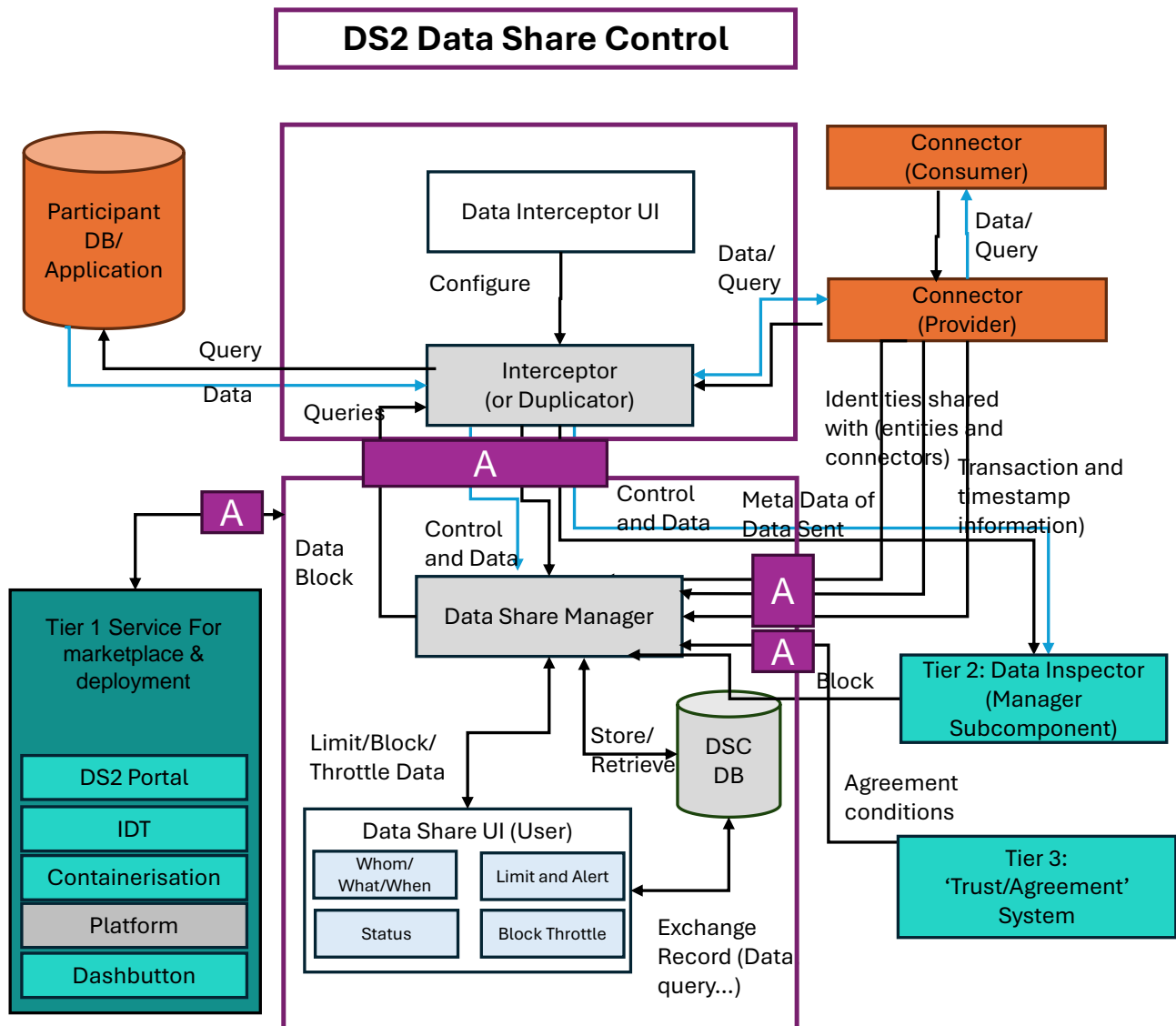


Figure 1: Subcomponent Schema for the Module

This module has the following subcomponent and other functions:

Data Share Controller

- Data Share Manager:** This is the primary module of the component. It aims it to onboard control data, primarily from the Connector, possibly from the interceptor, and more static data from the trust environment, which later will be stored in the DSC DB.

Then it aims correlate this data in the DB. Vice versa it will receive triggers via the data share UI and the Data Interceptor to limit or block data actions

- **Data share UI:** This UI has the following main roles. A) Configuration of the component and its subcomponents. B) Visualisation of retrieved data related to the exchange. C) Ability to control limiting and blocking factors
- **DSC DB:** This is used to store the data of the component – primarily that mentioned in the Data Share Manager, and which can then be used in the UI and Data Share Management subcomponents
- **Connector and API:** Primarily this will be the connector within IDT but other local connectors will be explored. Either through existing connector APIs or created extension API will lead to data being serviced to the Data Share Manager
- **Tier 1 Service Stack for Marketplace and deployment and API:** The full stack will be implemented as generically described elsewhere in this document. Exceptions: The Platform will not be used
- **Tier 2: Data Inspector Manager and API:** The Data Inspector may trigger DSHARE if determines that significant anomalies in the data stream which it perceives should block data transfers
- **Tier 3: Trust Environment and API:** Primary to feed the data share manager with static agreement information which can then be visualised which may help determine user driven or automatic control blocks.

Data Share Interceptor and API

- **Interceptor:** This component will intercept the data and query stream between the IDT/Connector and the participants Business Application/Datastores. It will interface with both DSC and DINS. How practically it intercepts still needs to be further research but one (or a combination) of the following techniques is foreseen:
 - Interceptor acting as a 'man in the middle'; the PRO is that this allows easier blocking and limiting without needing to interface to the business/database end; the CON is the integration to this
 - Duplicator by receiving a duplicate or creating a duplicate fee; the PRO is that this is easier to implement both technically and 'mind-set' wise for the participant, but the CON is that you can for example block without integration into a connector or business applications

The interceptor will thus also be capable of receiving block and limit commands through the Data share Manager (which connectors to both DSC and DINS modules)

- **Interceptor UI:** This will be a UI to control the Interceptor primarily to configure the I/O
- **Participant DB/Application:** This is a representation of business applications which feed the connector the data and receive queries.

In terms of the Data Share UI the base functions are:

Whom/ What/When	Ability to browse transactions
Status	Judge exchange against agreement limit – eg 100 records out of 1000 allowed
Limit and Alert	Allow user to put limit against exchange and issue alert if reached
Block Throttle	Allow user throttle and block transactions

16.1.3 Technical Foundations and Background

This component is not founded on any existing background

Subcomponent/Component	Owner	License
N/A		

16.1.4 Interaction of the Component

The following table specifies the primary input/output controls/data to blocks which are not part of the module and is specified from the perspective of the Data Share Controller.

With Module/Feature	Receives From/ Gives To	What
Data Interceptor	Receives From	Any control level data that can be retrieved above the data
Data Interceptor	Gives To	Triggers so the Interceptor know to take action on the data flow
Data Inspector	Receives From	Trigger information if any transaction needs to be limited
Trust/Agreement Module	Receives From	Policy/Agreement in formation that can be reported
Connector	Receives From	Any control level data that can be retrieved above the data
Connector	Gives To	Trigger from control model to impose limits (if possible)
Business Application	Receives From/Gives To	Data and Queries

16.1.5 Technical Risks

Risk	Description	Contingency Plan
Novelty	The module is build from scratch and due to DS technology and in particular connectors being at their infancy there are expected to be difficulties intercepting control data particularly in Connectors	To operate outside of the connector and sit between the DB/Application and the connector/ This can be parallel data/control flows

16.1.6 Security

Security Issue	Description	Need
Minimal	No major security risks are perceived since the module is operating within a participant's environment	N/A

16.1.7 Data Governance

Data Governance Issue	Description	Need
None	Only control information will be stored – not data itself	N/A

16.1.8 Requirements and Functionality

This module will be used in the following use cases:

City Scope	✓
Green Deal	✓
Agriculture	✓
Inter-Sector	TBD

The data share controller is not meant to reach a specific use case goal but rather to assist in the data transfer. It will be used to monitor and control the data transfer.

WHERE	WHAT	WHY	Run/Design Time	Priority
	Use Case 1: City Scope			
Section 2.2 UC1.x	The data share controller is not meant to reach a specific use case goal but rather to assist in the data transfer. It will be used to monitor and control the data transfer.	There may be the need of controlling the data transfer	D	M
	Use Case 2: Green Deal			
Section 2.2 UC2.x	The data share controller is not meant to reach a specific use case goal but rather to assist in the data transfer. It will be used to monitor and control the data transfer.	There may be the need of controlling the data transfer	D	M
	Use Case 1: Agriculture			
Section 2.2 UC2.x	The data share controller is not meant to reach a specific use case goal but rather to assist in the data transfer. It will be used to monitor and control the data transfer.	There may be the need of controlling the data transfer	D	M

16.1.9 Workflows

The following sub-sections describe the sequence diagrams of the Module:

- Request and return of agreement, query, and other data from a connector
- Selection of module, its purchase, and licensing
- Block signal received from Data Inspector to trigger blocking by connector
- Configure Interceptor I/O

16.1.9.1 Data Share Manager UI Usage

This feature provides the capability to browse and get details of transactions, check status of transactions, apply limits and alerts on transactions, and block and throttle transactions. Figure 2 shows the sequence diagram of this feature.

The main steps/functionalities are as follows:

- Connect to Data Share UI
- Browse Transactions
- Check Transactions Status
- Limit and Alert on Transactions
- Block and Throttle Transactions

Data Share Manager UI Usage

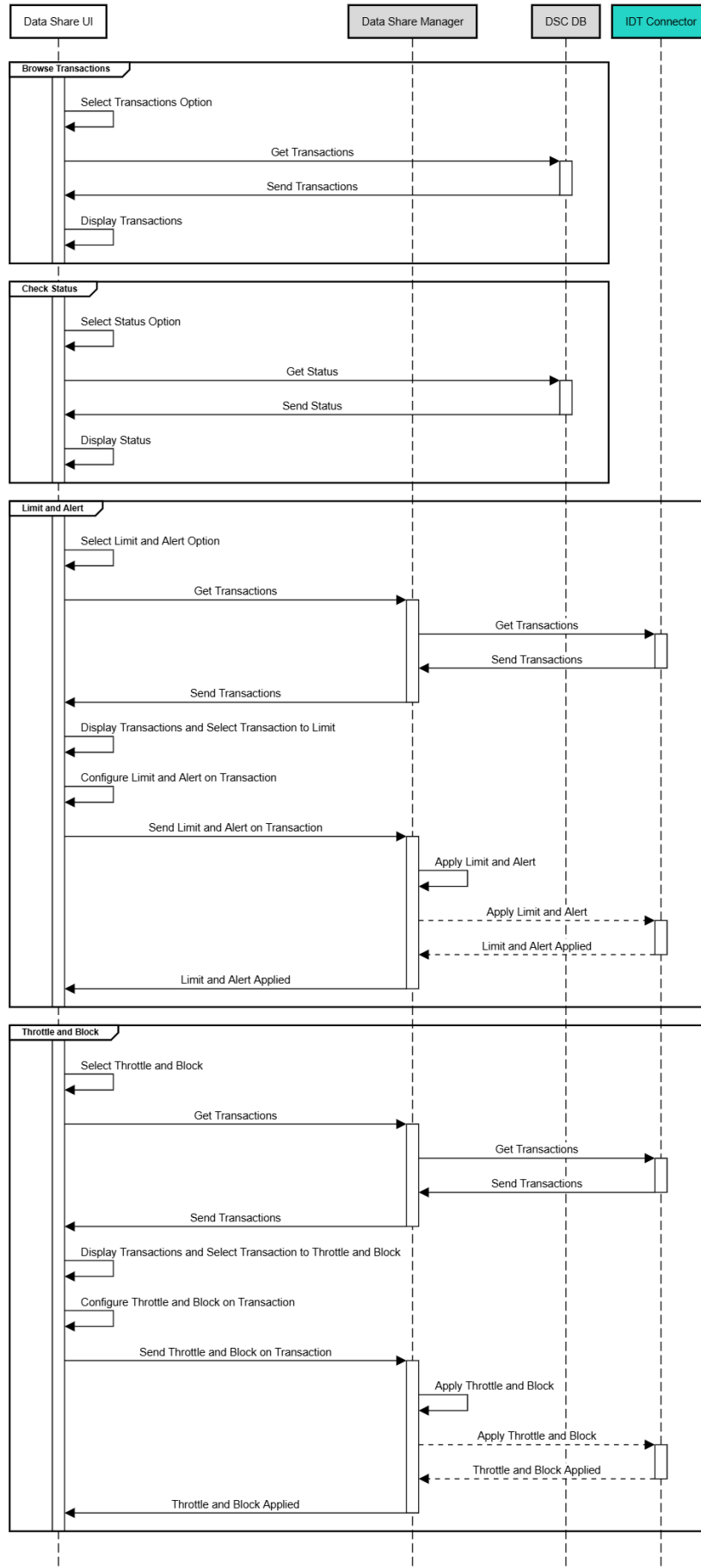


Figure 2: Read data sources sequence diagram

16.1.9.2 Configure Interceptor I/O

This feature provides the capability to configure the Interceptor I/O.

The main steps/functionality are as follows:

- Configure the Interceptor
- Apply Configuration to Connector and/or Participant Database or Application

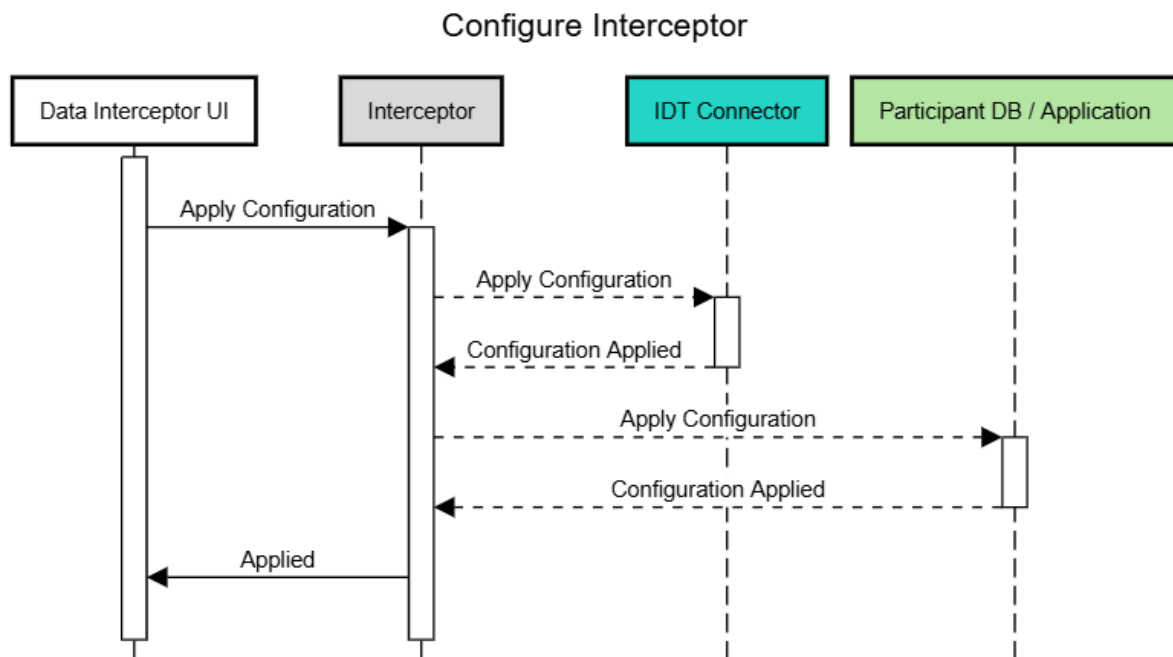


Figure 1: Configure Interceptor

16.1.9.3 Configure Interceptor I/O

This feature provides the capability to intercept the Data between the Connector and the Participant DB / Application.

The main steps/functionality are as follows:

- Intercept Get / Send Data

Intercept Data from Connector and Application

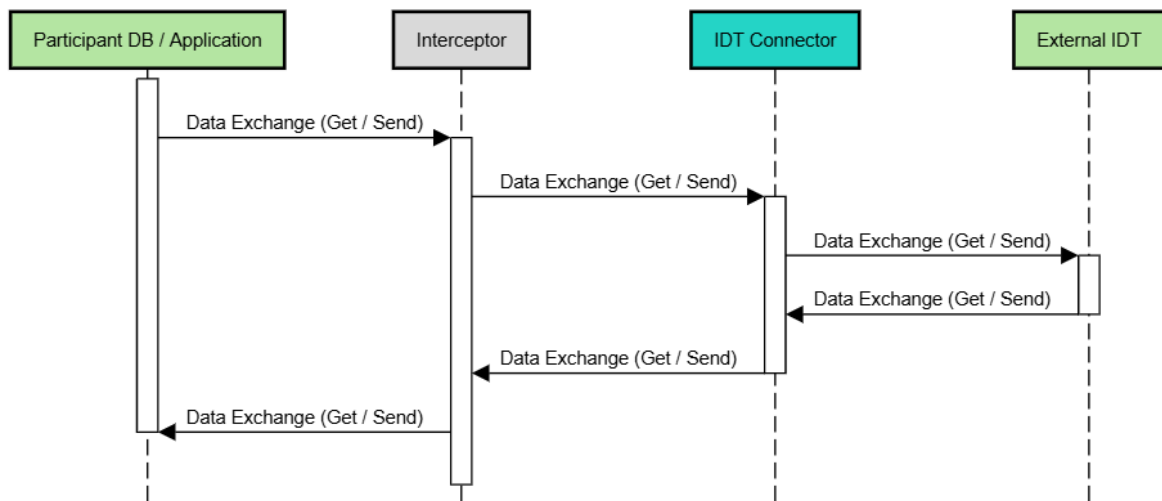


Figure 1: Intercept Data

16.1.10 Role, Resourcing, and Milestones

The whole modules is created from scratch and is not based on any background.

Sub-component	Main Activity	M18	M24	M30	M36
Data Share Manager	Main backend control components. Needs to orchestrate data from eg connector to databases, and the interceptor, and receive triggers to stop or limit data flows				
Data Share UI	Main UI dealing with everything from visualisation of the exchange to configuring its limits				
DSC DB	DB Creation and configuration				
Tier 1: Service Stack	Activity to link to common DS2 features				
Tier 2: Data Inspector Manager	Link to DINS triggers				
Tier 3: Trust Environment	Interfacing to extract policy information for later visualisation				
Interceptor	Intercepting the control plane (for Data Share Module) and data plane (for Data Inspector) to provide necessary data for their functions. NB Depending on research finding it may be that more of this can be done within the connector				
Interceptor UI	This is the UI which configures the inspector at design time to tap into the control/data stream				
Connector	Either tapping in connector APIs or creating them to extract control information later used in the Data Share UI				
Table Total/DOA Task Total/Resilience	Comments: Blockchain, Ontology are sacrificial. Anticipated no new methods are needed				

16.1.11 Open Issues

The following table summarise open issues/uncertainties that need to be resolved during the next stages or implementation.

Issue	Description	Next Steps	Lead or Related Component
Agreement Data	How agreement (DS or Participant) is fetched, where it is fetched from and what it contains	Pending better understanding of information structure and language (WP3) and how available from T4.1 (Policy Agreement)	UOS (WP3) VTT (Agreements) INDRA (T4.1)
Connection to Data Inspector	How the Interceptor and Inspector could interoperate and also the trigger into Data Controller	The Data Inspector needs the actual data from the interceptor -> still to research how the data will be intercepted	INDRA
Connector	What data can be extracted from connectors and difficulty of doing so due to limits of extensions	Further research by ICE on connectors	ICE