SYSTEM FOR CALCULATING DISASTER LOSSES (KAZA)

2. the Deliverable "Exploring Possible KAZA *Solutions"*

Version 1.0

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This document was prepared on behalf of the State Fire and Rescue Service by the "AA Projects", in accordance with the Work Task for the European Commission's Civil Protection Mechanism Financial Instrument Project "Study on the Establishment of a Natural Disaster Damage Database in Latvia (ECHO/SUB/2019/TRACK1/807448, DLD)" of 25 June 2020 (further: KaZa) feasibility study and PREPARATION of THE technical specification for the development and integration of the solution.

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DOCUMENT CHANGE HISTORY

version	Date	Authors	Comments
1.0	***21.01.2021.***	Jānis Avotinš Irina Stepanova Samanta Smirnova Arnis Ļeļs Dita Mukāne Ričards Pinne	Probable KaZa 1 st study of options

CONTENT

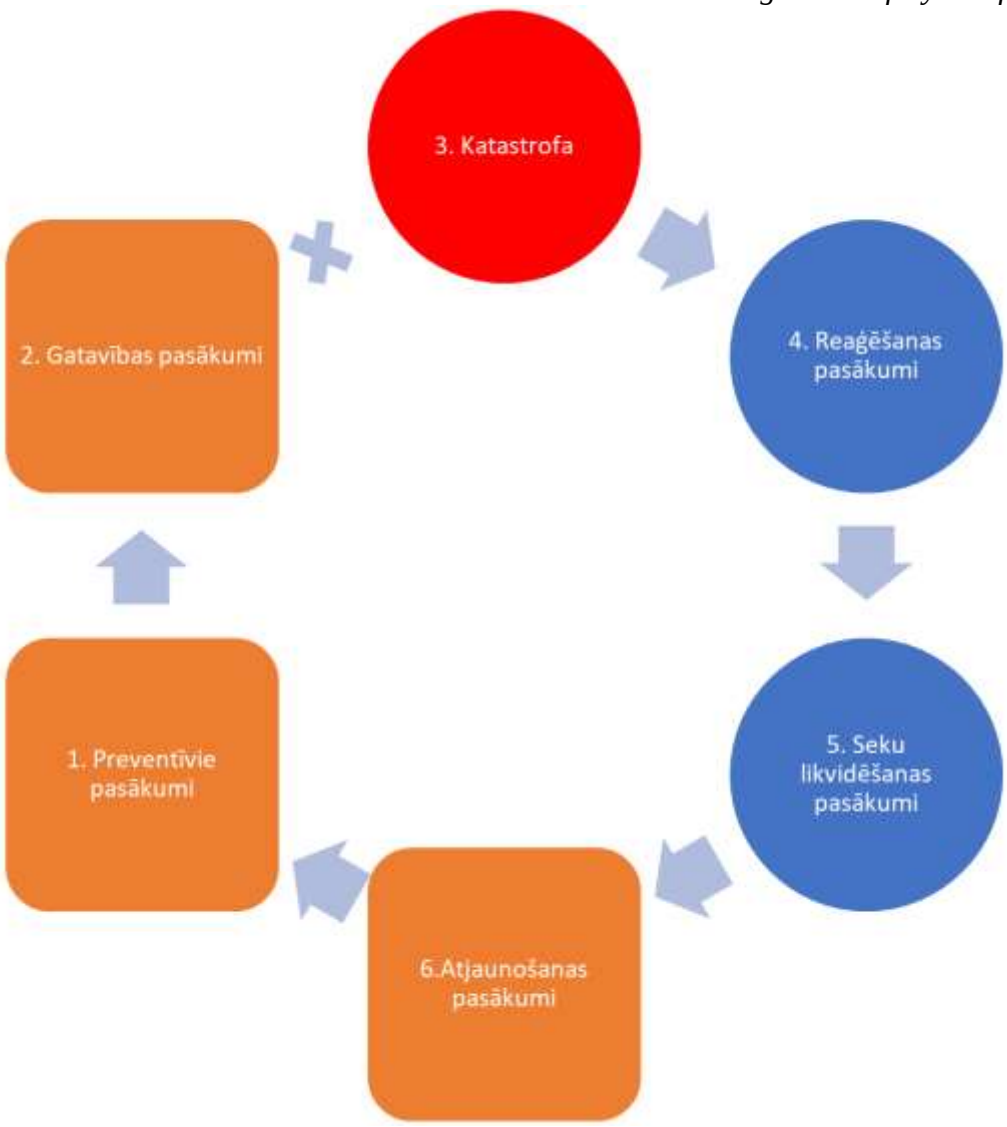
1 The purpose of the document

Assessing possible scenarios for KaZa solutions with a view to identifying the most economically viable solution.

2 Introduction

The study analysed different options and best practices in line with those related to the life cycle of disasters:

Figure 1. Lifecycle of disaster



KaZa the purpose of creating functionality is to ensure data adequacy so that data can be analyzed and decisions taken in phases 3 and 4 of disasters. The study also identified data source holders as options for providing data that could complement the analytical context and direct data on injury analysis in different ways. The study also identified the visualization of geographically linked data on the map as one of the most effective methods of collecting and analyzing data.

Figure 1. KAZA Tasks

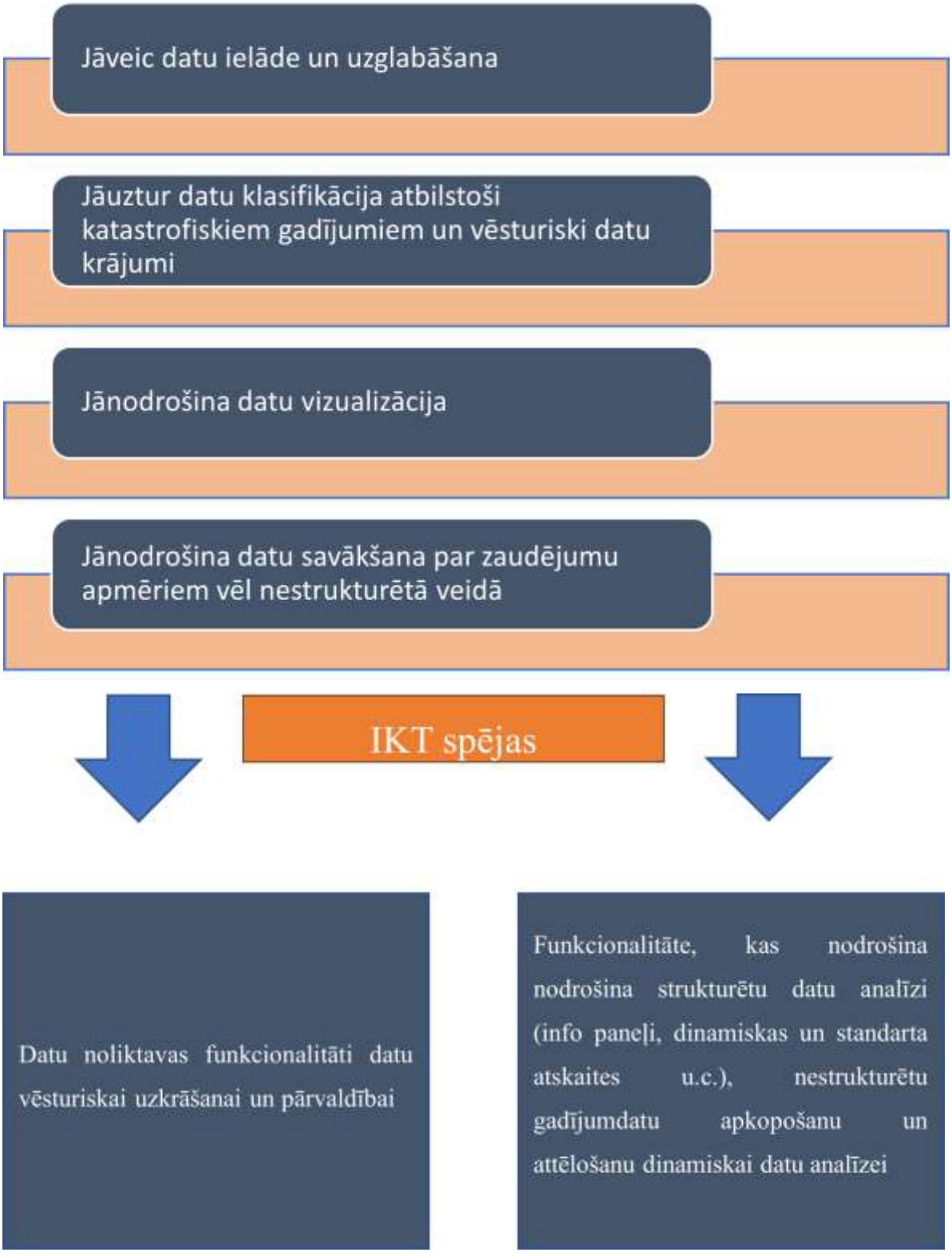
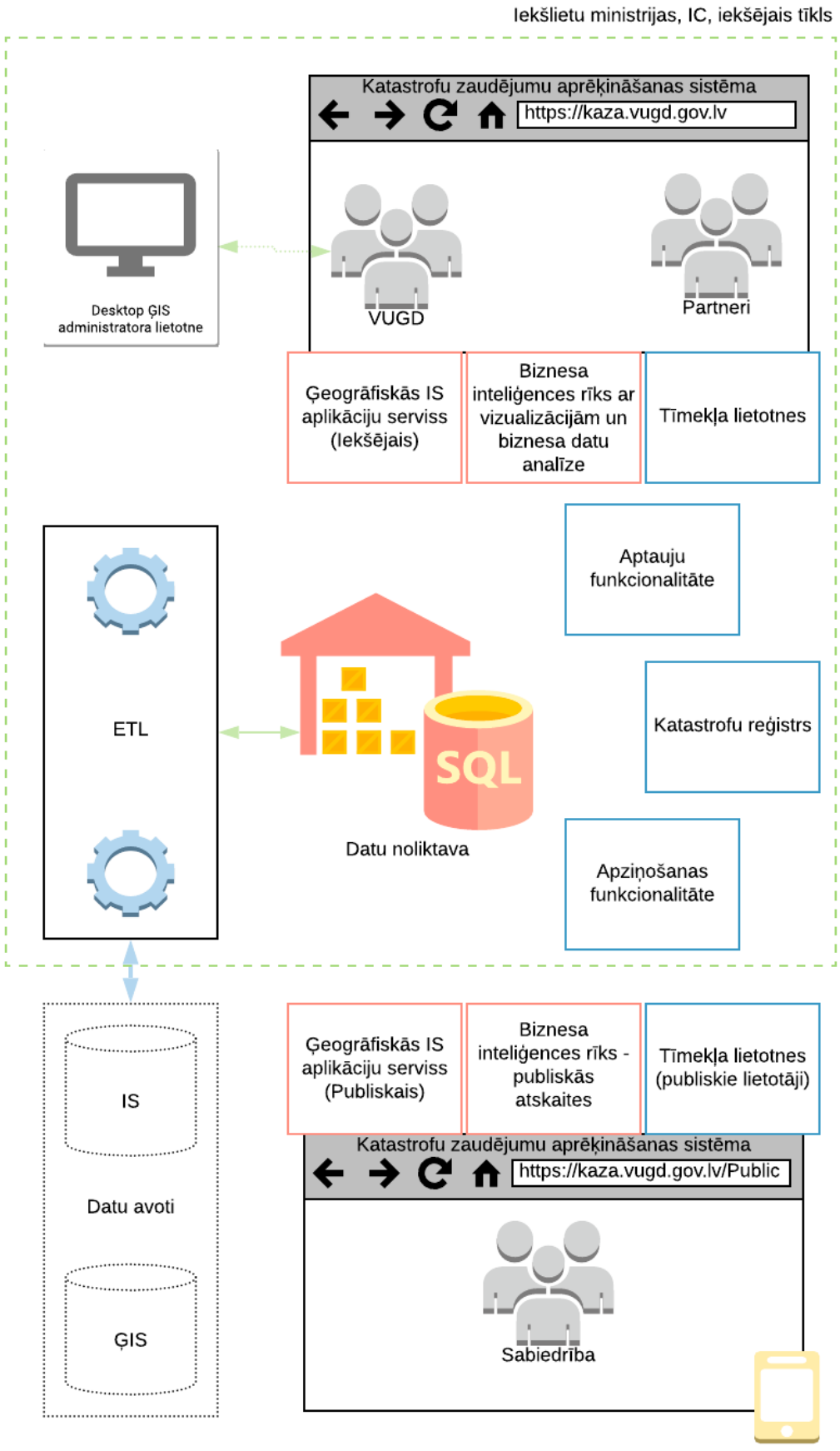


Figure 2. KAZA target architecture



Description of the main functional units:

1. Disaster register. Disaster management: the possibility of adding data in a structured way on catastrophic cases according to target indicator data structures with geographical mapping. The functionality includes adding loss considerations by referring to geographic and analytical data.

2. Survey functionality - Loss identification functionality where data is collected in survey form and the results are displayed in the analytical or geograph data display tools of the KaZa system. The system shall ensure the possibility of identifying the amount of damage by reporting the various objects identifiable from the map or analytical data.

3. Reporting functionality - A service that allows you to segment recipients and send information about different channels controls the delivery state.

4. Data warehouse and ETL - provides data retrieval from data sources, their transformation to KaZ business usage, downloading/storage in a transformed way and the constant structure of data sources. The solution component provides.

5. Mobile Application: A web-based interface that identifies a mobile device and adjusts the design to the resolution of a mobile device and enables you to use most of the functionality of the system.

6. External functionality: functionality for public users that enables data visualization or questionnaire completion;

7. Data download and transfer to external systems - System functionality that provides collaboration with supporting systems.

8. Functionality of GIS and analytical support personnel — standard software that provides in-depth capabilities with GIS and data storage experts, so that data sets of layers or data storage data can be specified.

When designing the Goat solution, it is not planned to create new functionality on the donor side, and the project will use the tools and functional capabilities that already exist in the data holders' infrastructure.

3 Solution Scenarios

3.1 Solution scenario 1 – New solution

The scenario is based on a newly created solution based on the technologies of Iem IC:

1. SAP BO - Data warehouse (Inmon approach [1])
2. PostgreSQL - Database Control Technologies
3. Java or. Net Core - Application Development Technologies
4. ESRI solution — GIS component
5. ETL — Pentaho ETL

Table 1. Indicative estimate of development costs

#	Description	Scope of work (cd)	Cost (EUR)[2]
1	Developing Data Warehouse ETL Processes	300	120000
2	Supplementing GIS solutions with additional data layers	200	80000
3	Functionality development	1 100	440000
4	Licence GIS		72000
5	Licence SAP BO		50000
6	Licence PostgreSQL		0
7	7 Technical resources (CPU (48 cores) + HDD (10 TB)) 10000		10000
8	Project management and supervision	240	96 000
		Kopā	772000

Figure 3. Time schedule

[1] https://tdan.com/data-warehouse-design-inmon-versus-kimball/20300

[2] The costs have been calculated in indicative terms on the basis that the price of one [cd] is EUR 400 and that the cost lines have been assessed excluding VAT

Table 2. Indicative assessment of maintenance costs

#	Description	Scope of wrok (cd)	Costs (EUR)[3]
1	Maintaining Data Warehouse ETL Processes	60	24 000
2	Supplementing GIS solutions with additional data layers	40	16 000
3	Functionality development enhancements	100	40 000
4	Licences ĢIS		9000
5	Licences SAP BO		8000
6	Licences PostgreSQL		0
7	Technical resources (CPU(48 cores) + HDD(10 TB))		2000
8	ĢIS Administrator	0,5 (PLE)	30 000
9	Data warehouse expert	0,3 (PLE)	20 000
		total	**149 000**
		total 5 year period	**745 000**

Table 3. Indicative assessment of total project implementation and 5-year maintenance costs

#	Description	Costs (EUR)[4]
1	KaZa development and deployment	772 000
2	Carrying cost	745 000
3	Additional costs (5%)	75 850
	Total	**1 592 850**

3.2 Solution scenario 2 – Customize existing solutions

This scenario would be based on an existing solution and only the different part of the functionality would be tailored to KaZa needs. The study identified potential partners with similar developments and sufficient development capacity to ensure the quality of

[3] The costs have been calculated in indicative terms on the basis that the price of one [cd] is EUR 400 and that the cost lines have been assessed excluding VAT

[4] The costs have been calculated in indicative terms on the basis that the price of one [cd] is EUR 400 and that the cost lines have been assessed excluding VAT

development. In this scenario, an annual authorisation for use as a service would be purchased..

Table 4. Indicative estimate of implementation costs

#	Description	Scope of wrok (cd)	Costs (EUR)[5]
1	Customize Data Warehouse ETL processes	150	45 000
3	Functionality development	700	210 000
5	Licenses for Data Warehouse Solution		50 000
4	Project management and supervision	100	30 000
		Total	335 000

Figure 4. Time schedule

Table 5. Indicative assessment of maintenance costs

#	Description	Scope of wrok (cd)	Costs (EUR)[6]
1	Data warehouses, including Maintenance of ETL processes	30	9 000
3	Functionality development enhancements	100	30 000
4	Subscription charge		20 000
		Total	59 000
		Total 5 year period	295 000

[5] The costs have been calculated in indicative terms on the basis that the price of one [cd] is EUR 300 and that the cost lines have been assessed excluding VAT

[6]The costs have been calculated in indicative terms on the basis that the price of one [cd] is EUR 300 and that the cost lines have been assessed excluding VAT

Table 6. Indicative assessment of total project implementation and 5-year maintenance costs

#	Description	Costs (EUR)[7]
1	KAZA adaptation and implementation of needs	335 000
2	Carrying cost	295 000
	Additional costs (5%)	31 500
	Total	**661 500**

3.3 3.3 Solution scenario 3 - Hybrid solution scenario with partial data source pseudonationalisation

This option looks at a scenario that extends the option of scenario 2, based on an existing solution and combined in such a way that the partial transformation of data sources already takes place in a datacenter of data sources (e.g. Iem IC), with a view to passing certain data sets securely to another data center. Accordingly, the architecture is based on two data centers: 1 — The Developer Data Center, where all basic ETL processes are performed and data generated for the data warehouse and web application are prepared. This data center also locates the computing resources needed for the KaZa web application. And 2-IeM IC data center, where localized (VNR and ENŽ) ETL process adjusts data to KaZa web application needs, including, personal data containing data sets are pseudonimised [8] and then further used in the application. Data transfer is via a secure data transmission channel. Such an approach can ensure the reliable use of data and the data manager (IeM IC) does not lose control of the data processing process at any time. The problem is that the developer needs to carry out fragmented infrastructure monitoring in a way that does not lose integrity and performance when the solution is located in different data centres. Access can be applied universally to a number of data sources that, driven by various security considerations, cannot transfer data outside their infrastructure. The solution creates additional costs for parallel data warehouses and downloading processes, such as their development, adaptation and maintenance. During the development of the ETL, the solution approach should be developed in such a way that the result is interoperable and that the user's work does not take place in two different functional dimensions. The pseudo-imification algorithms used in the solution should be aligned within the whole solution, i.e. the result of pseudo-imitation should be the

[7] The costs have been calculated in indicative terms on the basis that the price of one [cd] is EUR 400 and that the cost lines have been assessed excluding VAT

[8] https://eur-lex.europa.eu/legal-content/LV/TXT/HTML/?uri=LEGISSUM:310401_2

same in any data source, through a pseudo-imification process with the same data attributes, respectively, that the result of pseudo-imitation should be consistent in order to ensure that data can be combined in uniform data views and that VUGD analysts could continue to perform in different ways. analytical activities. The benefits of this approach are data security and distributed the performance needed for ETL processes, as developed does not need to provide data center resources for these transactions. In addition to all the above activities, a single monitoring mechanism should be established to ensure the continuity of the system.

The introduction of access to the IPM IC data centre requires additional computing infrastructure that will provide ETL and pseudodonimisation processes, at least to that extent:

Table 7. Additional computing infrastructure in the IeM IC data center

#	Resource Name	Required capacity
1	CPU (vCore)	32
2	RAM (GB)	32
3	HDD (TB)	2-10

Figure 6. Target Architecture with Two Data Centers

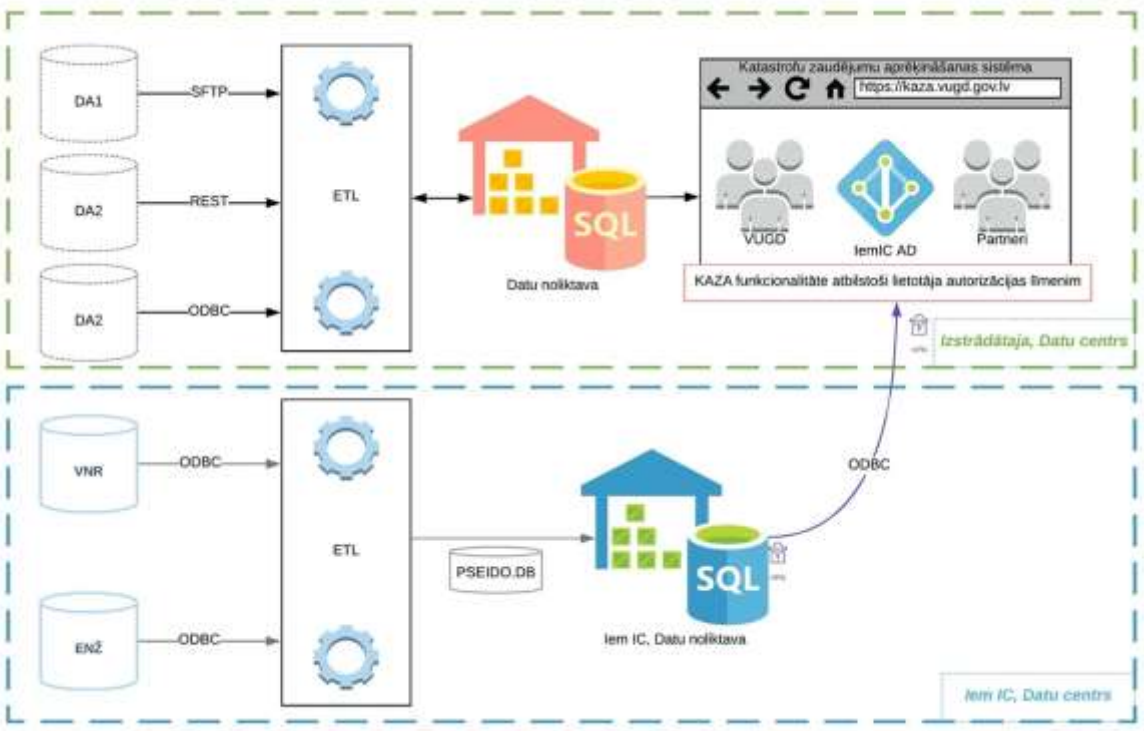


Figure 7. Indicative estimate of implementation costs

#	Description	Scope of work (cd)	Costs (EUR)[9]
1	Customize Data Warehouse ETL processes in two data centers	250	75 000
2	Functionality development	700	210 000
3	OS IC computing capacity replenishment	-	7 000
4	Rentals for the first year	-	70 000
5	Project management and supervision	120	36 000
		Total	398 000

Figure 8. Time schedule

Table 8. Indicative assessment of maintenance costs

#	Description	Scope of work (cd)	Costs (EUR)[10]
1	Data warehouses, including Maintenance of ETL processes	30	9 000
2	Functionality development enhancements	100	30 000
3	Rent to Developer for		20 000
		Total (12 months)	59 000
		Total 5 year period	**295 000**

Table 9. Indicative assessment of total project implementation and 5-year maintenance costs

#	Description	Costs (EUR)[11]

[9] The costs have been calculated in indicative terms on the basis that the price of one [cd] is EUR 300 and that the cost lines have been assessed excluding VAT

[10] The costs have been calculated in indicative terms on the basis that the price of one [cd] is EUR 300 and that the cost lines have been assessed excluding VAT

#	Description	Costs (EUR)[11]
1	KaZa adaptation and implementation of needs	398 000
2	Carrying cost	295 000
3	Additional costs (5%)	34 650
	Total	**727 650**

Additional costs are designed to ensure continued development of the functioning of the goat, the addition of new data sources, the development of GIS usage and data visualization, and this requires continuous technical support, process analysis, the development of analytical processes and, accordingly, the additional VUGD should provide at least 2 posts in line with the above obligations.. The indicative costs of such specialists could total at least EUR 80 000 per year, taking into account current market offers. Additional consideration should also be given to the possibilities of sharing such specialists, including their availability from the supplier of the system.

[11] Izmaksas aprēķinātas ir indikatīvi par pamatu ņemot, ka vienas [cd] cena ir 400 EUR un izmaksu pozīcijas ir vērtētas neskaitot PVN The costs have been calculated in indicative terms on the basis that the price of one [cd] is EUR 400 and that the cost lines have been assessed excluding VAT