DigLogs

Pilot Project Plan PP2

Deliverable D5.1.1

WMS 4.0

Responsible partner: Elevante Srl Trieste Involved partners: All			
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Notes:			

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Introduction: MS 4.0

WMS 4.0 is the Pilot Action carried on by Elevante in the framework of Diglogs Project, which will take place in the intermodal rail-road terminal of Gorizia (SDAG), Friuli Venezia Giulia Region, Italy with the overarching aim to demonstrate how multimodal transport arrangements among a heterogeneous set of logistics operators including carriers, logistic providers, transport operators and authorities can be thoroughly and conveniently optimised by exchanging real-time information concerning planned delivery schedules.
WMS 4.0 foresees a Decision Support System, the so called DSS, that will be linked to SDAG Warehouse Management System (WMS), enabling the interconnection between Multimodal Transport Operators (MTO), terminal operators and carriers in one single digital access platform, allowing them to be timely informed and synchronise their delivery schedules, thus optimising the final leg of the intermodal transport chain (i.e. from the SDAG terminal to the final destination) from both operational, economic and environmental perspectives.

1. Pilot project goals

Typically, a MTO acts as a principal "carrier" transporting goods by one or more modes of transport on behalf of the shipper and carries total responsibility and liability to perform the transport contract. As a result, the MTO, being responsible for the whole transport chain, concludes a number of sub-contracts with individual carriers, road, rail and shipping lines, port authorities and terminal operators, thus performing the delivery of goods from each actual sub-carrier, passing them to the next sub-carrier.
In order to achieve the aims, it is therefore crucial for the MTO to have the ability to design and provide efficient and effective transport arrangements, especially in light of the multiple, heterogeneous activities that occur at each transfer point, e.g., loading/unloading, waiting or storage, weighing, packing, reconsolidation, which all contribute to the resulting delivery time and cost, thus affecting the competitiveness of the overall multimodal transport chain. On the other hand, across the whole multimodal transport chain, there are multiple disruptions that may occur on a daily basis, relating to cargo delays, severe traffic conditions on the road network linking up to the relevant terminals, unexpected malfunctions or failure in the terminal equipment, as well as adverse weather conditions and security threats.

The Pilot Action carried on by Elevante, the so-called WMS 4.0, aims to solve the transport challenges affecting the very last mile of the multimodal transport chain, and to this extent, would consist of making the execution of road transport activities from the destination railroad terminal in Gorizia (SDAG), Friuli Venezia Giulia Region, Italy to the final goods delivery destinations in the most efficient, convenient and seamless way.
The pilot will test a web application that is going to be used by carriers, MTO, dry ports and public authorities in the Programme area, which will perform an innovative service: an IT system delivering data and information enabling the realisation of intermodal appointments in the transport nodes. By way of anticipating or mitigating disruptions and/or congestion issues at relevant terminal nodes through real-time information sharing on ongoing transport activities among all relevant transport stakeholders, the expected impacts of such pilot action are expected to consist in a much-improved overall delivery time and costs, thus positively impacting the competitiveness of the overall multimodal transport network.

2. Pilot project functions and scope

A relevant tool of WMS that will be implemented in the Pilot Action is a Decision Support System (DSS), implemented in the form of an open-source platform providing optimised transport arrangements for last mile transport segments by making use of specific algorithms and coordinated data from multiple stakeholders. WMS is a software application, designed to support and optimize warehouse functionality and distribution centre management, specifically facilitating the management of daily planning, organizing and staffing, as well as providing support to control the utilization of available resources, to move and store freight into within and out of a warehouse, to assist staff in the performance of material movement and storage in and around a warehouse. The DSS and the WMS at the Gorizia inland terminal (to which the formed will be connected) will synergically provide an "intermodal transport network IT interface" which, by offering a specific intermodal appointment solution, will allow logistics operators to choose among different possible coordinated scheduling solutions and be timely informed about possible delays/disruptions on their way to the terminal in order to ultimately optimise transport operations for specific legs of the multimodal chain.

One of the main objectives of the DSS is to implement a **Truck Appointment System (TAS),** which will enable a communication exchange between the inland terminal and truck operators, and to

support the terminal manager in the optimum scheduling of operations. By allocating specific time slots to trucks via a booking system, the terminal operator will be able to optimize:

- the flows of incoming vehicles (specifying the gate, vehicle inspection, potential parking slot where to wait, etc.)
- resources utilisation and operations management to the expected volume
- traffic conditions to the terminal premises and surrounding areas
- communication between the terminal and the drivers informing on delays, etc.

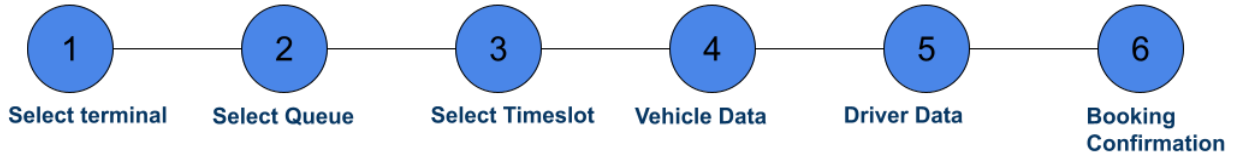


Figure 1. TAS - Booking creation

In addition to the above, the TAS will also be pivotal in advising MTOs on possible free trucks locally available to perform transport for the last mile segment. Upon collecting a heterogeneous set of information from multiple actors regarding the final delivery destination, goods type, vehicle sizes, costs of shipments, the DSS will be able to calculate and offer an array of possible scheduling solutions for different logistics operators. Besides, MTOs can put out requests for offers to truckers for the shipment of goods from the terminal through to the final destination. To this end, WMS 4.0 will create a continuous communication channel between MTOs and drivers/transport companies, aimed at optimisation of cargo delivery to destination by allocating specific time slots and informing multiple actors (e.g., terminal, transport operators, truck companies) on unexpected delays or disruptions.

In summary, the DSS pilot will consist of testing a centralised collaboration platform with MTOs, aimed at collecting from them useful data about their services (e.g. time schedules, origin/destination, delays, ETA/ETD) and providing scheduling support to carriers, other MTOs, dry ports and public authorities. The web application envisaged as part of the pilot will firstly be deployed at Gorizia terminal and will subsequently be open to other dry ports and MTOs in the Programme area, willing to upload their data.

The system will serve as a DSS for key logistics stakeholders (carriers, logistic providers, transport operators and authorities), enabling them to optimise freight transport and interchange processes by finding the best solutions for transport services, combining different parameters like prices, CO_2 emissions, load factor and others. The system could also function as a module integrating WMS and TMS by adding this new source of information in order to improve the planning process, while synchronising the railroad terminal cargo operations with truck arrivals and departures.

In summary, the overarching goal of the pilot system is to improve operational efficiency by integrating heterogeneous sources of data, which will be duly processed through specific algorithms to provide optimal real-time solutions in the complex space of freight transport problems (e.g. best price of combined transport, lower emissions of entire chain, e-procurement tools for maritime transport services, higher bi-directional load factor). As a result, the deployment process of the pilot will include the development of a software, mainly implementing and fine-tuning a pool of specific algorithms solving scheduling problems at key transport nodes.

3. Project methodology

Agile is the principal methodology that will be used during the entire lifecycle of the project. One of most important attributes of this methodology is the flexibility to the changes. The most innovative agile approach is Scrum process, whose aim is to break down large and complex projects, that are hard to comprehend at once.

The project monitoring will run concurrently with project execution, providing visibility, and actionable insight into the project by using standard tools and Inland Terminal/MTOs information system tools, e-mails, Google Cloud Document, Microsoft Word, Excel and PowerPoint.

A combination of frequent on-line progress meetings, face-to-face meetings (if Covid-related travel restrictions are lifted up) and internal progress reports will create a clear view of the progress. A lean, yet rigorous management framework linking all project components will be implemented. The pilot team has been carefully selected to ensure seamless and straightforward coordination of the project consortium, ease communication and coordination at the thematic levels of the work packages and enable efficient and fair decisions about project resources and objectives. Project meetings will be called by the Pilot Coordinator (PP2) on an as-needed basis, with the purpose to maintain the focus, monitor progress, decide on plans, synchronise activities and discuss technical and administrative issues. E-mail, web conferencing and telephone will be used as the key means for internal communication and documents exchange. An online dedicated online management and collaboration software will also be used (e.g., Google Drive/Dropbox shared pilot project folders).

Documents used in the project planning and implementation will be categorized by document type and ownership, so to avoid misunderstandings during all the phases of the project:

- DigLogs set of documents, outlined in DigLogs Application Form (includes this pilot workplan
- Documents created by Elevante
- Documents created by the SW supplier

Expected output documents that will be produced as a part of the pilot project are:

- Pilot Work Plan (this document)
- Technical-functional pilot specification (needed for tendering documentation)
- Pilot development updates and installation documentation
- Concise project reports, minimally on milestones
- Test cases
- User manuals
- Post-deployment evaluation report
- Communication archives (e-mails) – optional and available on request

Monitoring of the pilot project execution will be performed using the following milestones:

1. Compiled draft of the Project Work Plan – by PP2
2. Revised and validated Project Work Plan – by PP5, the package leader
3. Completed Project Work Plan, validated by the project partnership ← **MILESTONE 1**
4. A written draft of the Technical-functional specification – by PP2
5. Completed Technical-functional specification ← **MILESTONE 2**
6. Completed procurement documentation and award by PP2
7. DSS delivered and completed by appointed Supplier ← **MILESTONE 3**
8. DSS testing by appointed Supplier
9. DSS deployment by appointed Supplier and sign off (pilot development completed) ← MILESTONE 4

4. Project preparation

The Pilot Action takes place in an Inland Terminal of Friuli Venezia Giulia Region - Italy, precisely in Gorizia, mandatory transit point of the freight traffic flows between Western and Eastern EU (and also of mostly Italy/Croatia freight flows).
It will concern warehouse operations; intermodal terminal operation; road transport; rail transport; intermodal transport (combined road rail transport).
With the old concept of WMS is not easy to manage daily planning, organising, staffing, directing, and controlling the utilization of available resources, to move and store freight into, within, and out of a warehouse, while supporting staff in the performance of material movement and storage in and around a warehouse.

As far the whole intermodal transport chain is concerned, herewith are the baseline conditions:

- Queues at the dry port entrance
- Truck drivers/transport companies not knowing the warehouse to head for
- Warehouse assigned “on-the-spot”
- MTOs have no coordination with terminals and uncertainty for last mile segment

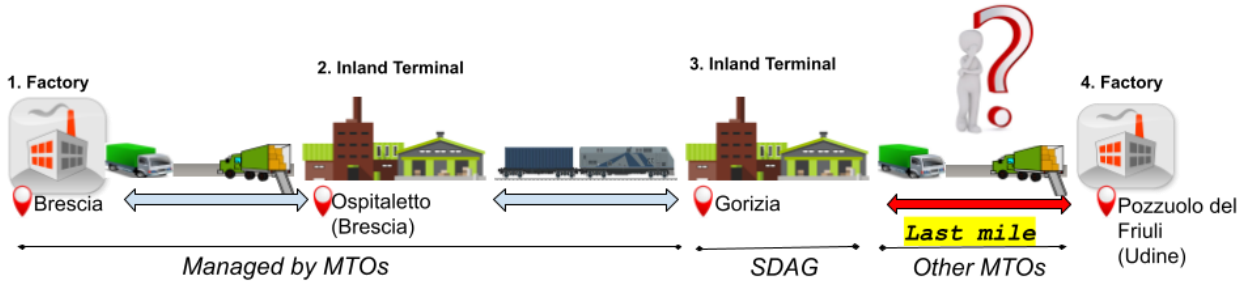


Figure 2. Without WMS 4.0

WMS 4.0 will solve these problems by uploading and sharing data and information from MTOs, Inland Terminal and truck vehicles.

Here are the assumptions and typical conditions expected for the pilot:

- Inland Terminal knows in advance which trucks, type of materials and operation will arrive
- Inland Terminal can plan their deployment of resources and operation in advance
- Inland Terminal can inform drivers before they arrive, and which warehouse to go to
- MTO can put out request for offers to the truck community for the last mile transport segment
- Truck operators can use TAS to book their pickups/drop-offs into the Inland Terminal

The steps for the project preparation are the following:

- Real time monitoring of warehouse stock management volume
- Creating of TAS
- MTOs tendering offers
- DSS implementation
- Service Review

Actors involved are Inland Terminal Management Body, Road hauliers, Combined Railroad transport operators, MTOs, Shippers and Customs operators.

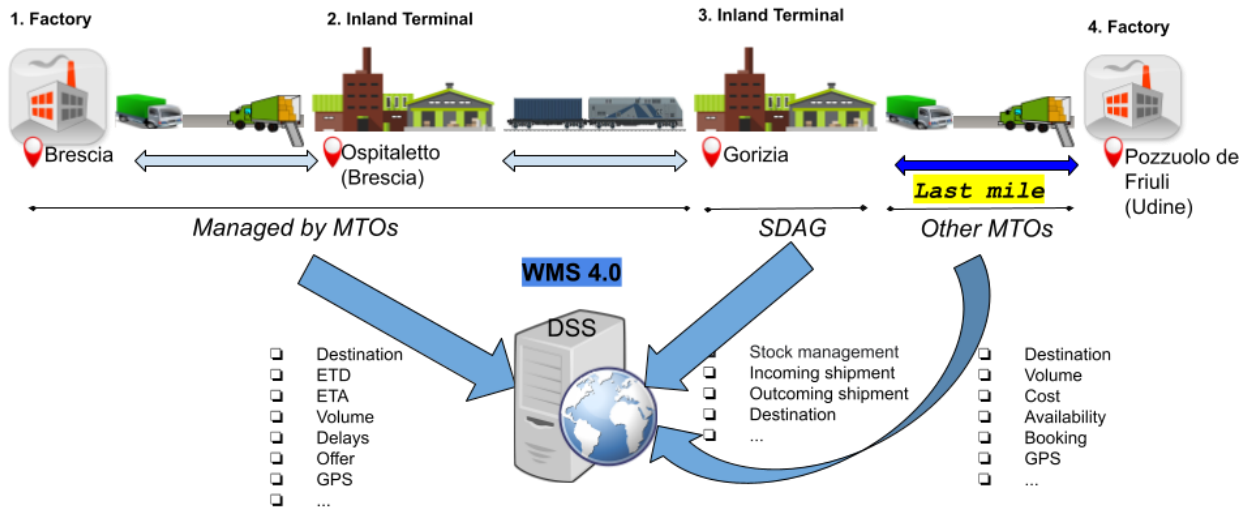


Figure 3. WMS 4.0

4.1 Project functional requirements

Functional requirements shall be linked with the WMS of the inland terminal chosen for the implementation of DSS. The Pilot prerequisites are availability and interoperability between the systems.

The platform will have a multi-user access identifying whether the type of the user is an Inland Terminal, MTO or a truck driver and will automatically redirect to a specific interface, depending on the user type. DSS will be implemented in background, with cross - database queries on all three sides involved.

Functional Requirements

Primary:

- Users can authenticate and register into the platform specifying if they represent a truck operator, Inland Terminal or MTO. All passwords must be hidden when being entered for verification. Passwords held on database tables must be encrypted

- MTO can use TAS system that searches and allocates time slots for pickups and drop-offs to trucks serving the Inland Terminal
- MTO user can put out requests for offers to the truck community for transporting goods for the last mile segment
- Truck operators/drivers can use TAS and be provided by a booking system to the terminal
- Truck operators/drivers can view a list of offers from the MTO tendering procedure. Before this, the preliminary, more extensive list will be processed and filtered out by the DSS, which will only show to registered truckers the offers that are compatible with their characteristics, i.e. according to the vehicle type, freight volume and possible schedules
- Track operators/drivers can accept an offer from MTOs tendering
- Inland Terminal can upload the number of gates, prioritizing them and categorizing by type
- Inland Terminal must register the storage volume, incoming freight and outgoing freight, which will be uploaded and updated in real time
- Inland Terminal can notify trucks for any unexpected disruption into the warehouse or from the MTO
- Inland Terminal can perform real time tracking of trucks, and inform any parties about potential delays in the delivery process
- MTO user can leave a review on the quality and efficiency of the service provided by the truck operator/driver
- Track operators/drivers can make a review by the service provided by MTO
- Users can view ETA (Estimated Time of Arrival), calculated using Strategic DSS Models in Logistics, exploiting the intermodal system
- Users will be notified when the shipment delays or arrives at destination
- Users should have the possibility to monitor the shipment in real time, using end-to-end-logistic data from point of origin to service delivery point
- WMS 4.0 should be able to produce basic graphs with essential information on logistics system performance in a quickly and easily understandable visual format
- Browser Based: The system should be browser based and compatible with IE version 11, Microsoft Edge, Chrome, Firefox, and Safari.

- Languages – User Interface: The system should support the following languages, in terms of text and messages displayed to the user and the format of data (date and number formats) and all associated documentation:
  - English
  - Italian
- Usability – User Interface: Ease of use is a primary requirement for the use interface.
- The user interface and user experience (UI/UX) should be similar in design to the current UI/UX of actual MTOs and Inland Terminal applications to minimize user training and confusion. Error messages should be informative and easy to understand and error messages must be written to error logs to enable these issues to be properly audited and investigated
- The system should incorporate all usability heuristics to support ease of navigation and general use of the system including data entry
- The system should provide on-line context sensitive help and user manual help. These should be capable of being easily modified by system administrators. The system help feature shall assist users in the recognition, diagnosis and recovery from errors
- External interfaces to other systems should be XML/JSON based or be facilitated through database integration using SQL
- Centralised Database: WMS 4.0 must maintain all data in a centrally located ODBC compliant RDBMS.
- The DBMS must support reporting tools that have capability to access, summarize, graph and format all data
- User Access Controls: System Administrators should be able to set up and manage user role-based access controls (RBAC) in a configurable manner.
- Data Imports: Only designated authorized staff will have permission to upload data.
- SQL Injection: The application should be able to reject SQL injection attacks.

Secondary:

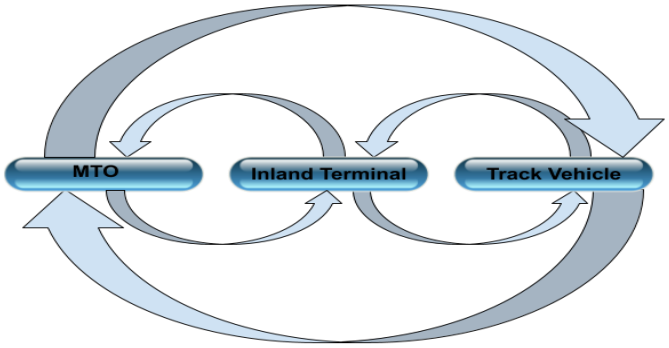
- Users can create profiles (i.e. gravatars)
- Users can receive individual or aggregated emails
- The system can support more languages

4.2 Resource tendering

Regarding the pilot implementation phase, it is considered that the amount of work required to external parties that will assist on the pilot project will not result in a need for a public tendering procedure; however, all costs incurred to implement the pilot activities will be thoroughly minimized – as far as possible – and duly reported as part of the pilot reporting effort.

4.3 Pilot solution design

A web application that will provide to incorporate three types of user's role will be fostered as a pilot solution. The platform will create different interfaces for any of user roles' needs and share information relevant for three parts altogether. WMS 4.0 will optimise the bilateral communication channel between parties.



Nowadays platforms, such as those for e-commerce, dynamic site builders, audit and others, are pushing user defined forms of data to the database. We also have NoSQL database engines which can store JSON based documents. XML is quite useful for a hierarchical data structure, which could be very difficult to manage in an RDBMS.

In SQL Server, the XML and JSON documents may have little overhead with taking up more space compared to other.

Therefore, the solution preferred for the pilot will be a **Web API** being the most flexible and most typically used by the web's communication protocol (again, HTTP), but are not limited in the same way a web service is.

Advantage of web APIs (often referred to as RESTful APIs) is flexibility. The client system ("consumer") and the serving system ("provider") are so independent of one another, that they can each use different languages (Java, Python, Ruby, etc.) for their part of implementation. Additionally, the data payloads can be of multiple types such as JSON or XML.

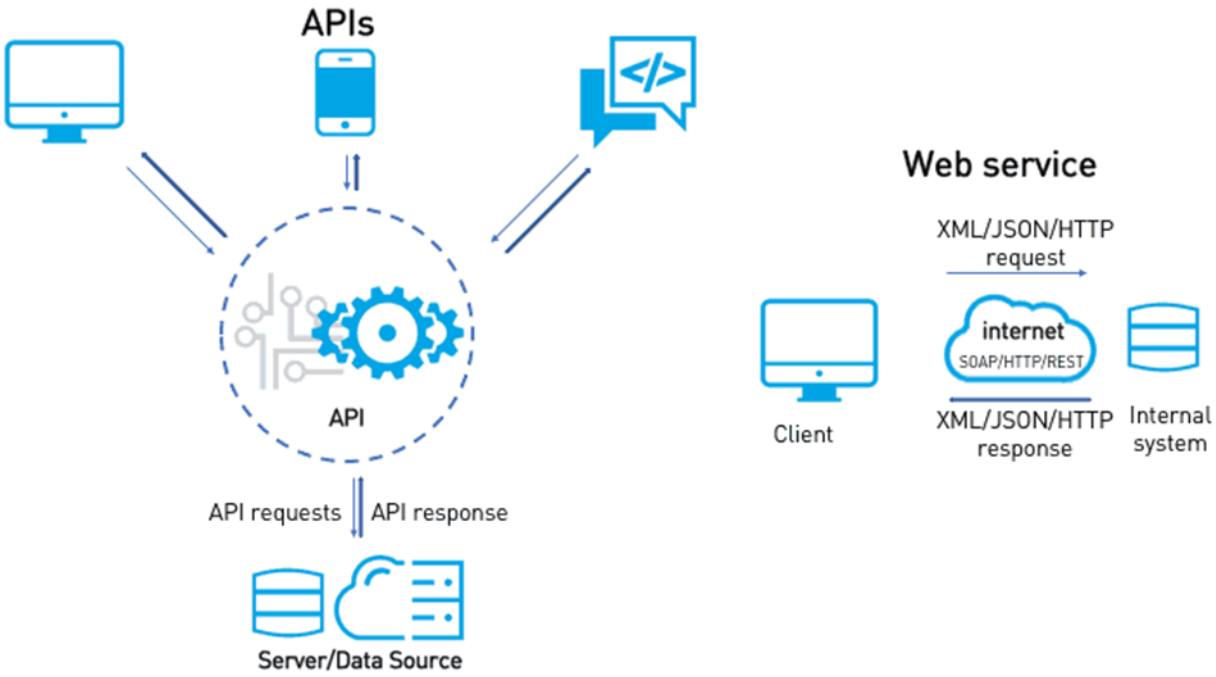
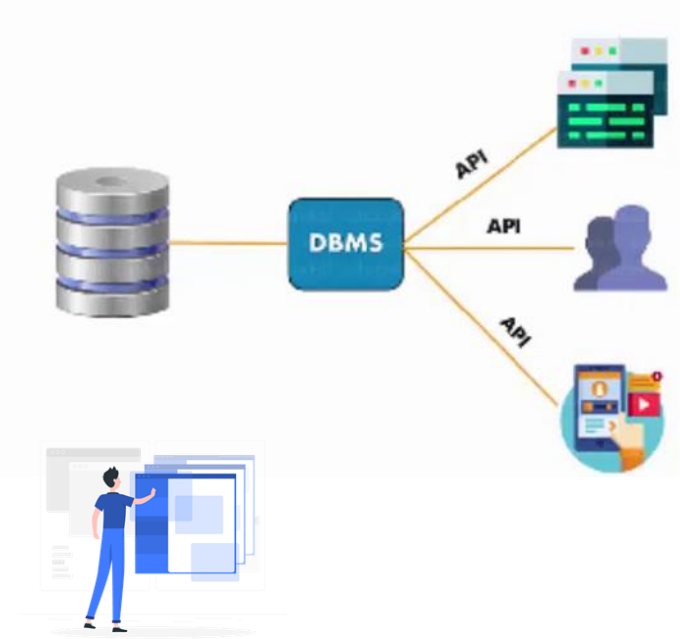


Figure 4. WMS 4.0 Application Programming Interface protocols

Database Management System (DBMS) – to be used in the pilot implementation – allows users to Create, Read, Update and Delete (CRUD) to the database. Compared to the File Based Data Management, DBMS has many advantages:



- Reducing Data Redundancy
- Sharing Data
- Data Integrity
- Data Security
- Privacy
- Backup and Recovery
- Data Consistency

User-friendly interface:

- Easy data entry
- Support for many platforms
- Automatic filling fields

5. Project development

In this paragraph the phases of Pilot project development are described.

5.1 Preparation of the Pilot environment

Taking into account that Pilot application has to be accessible and maintained for the 5-year period, the technical environment in which the WMS 4.0 is going to be developed, tested and finally put in the regular use will require HW, communication and system software resources, as well as configuration of several environments (e.g. development, test, production).
Given the nature and purpose of the pilot application, it may range from very simple to more complex requirements.

For the best preparation of the environment of WMS 4.0, therefore, the alignment with SDAG Gorizia Intermodal Hub is necessary. Therefore, a phase of audit of SDAG needs is foreseen.

Basically, the main function of WMS 4.0 relies on the integration and harmonisation of needs and services provided by all components involved: **MTO**, **Inland Terminal** and **truck operators**. Giving the possibility to upload their own's targeted data, will be a profit for all in terms of cost and time. The database system will be handled by the DSS, giving the possibility to offer the best solution for any request by all involved parties.

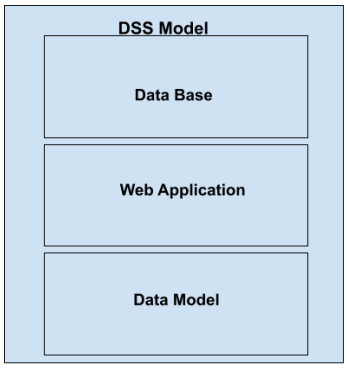
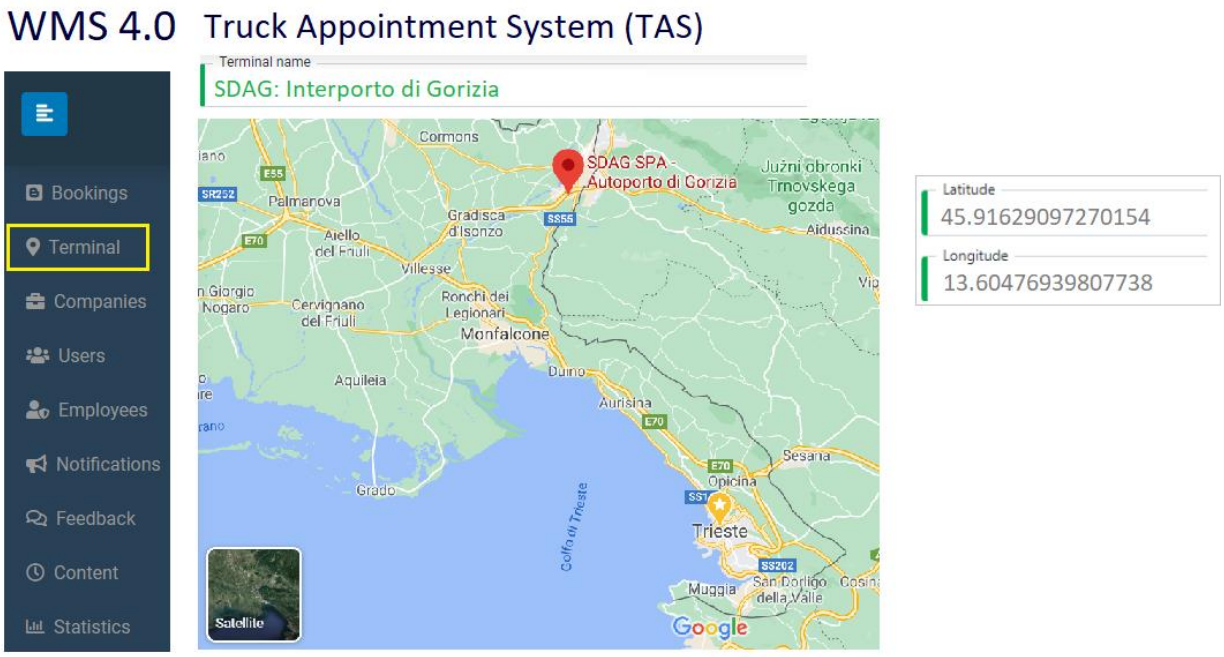


Figure 5. DSS Model

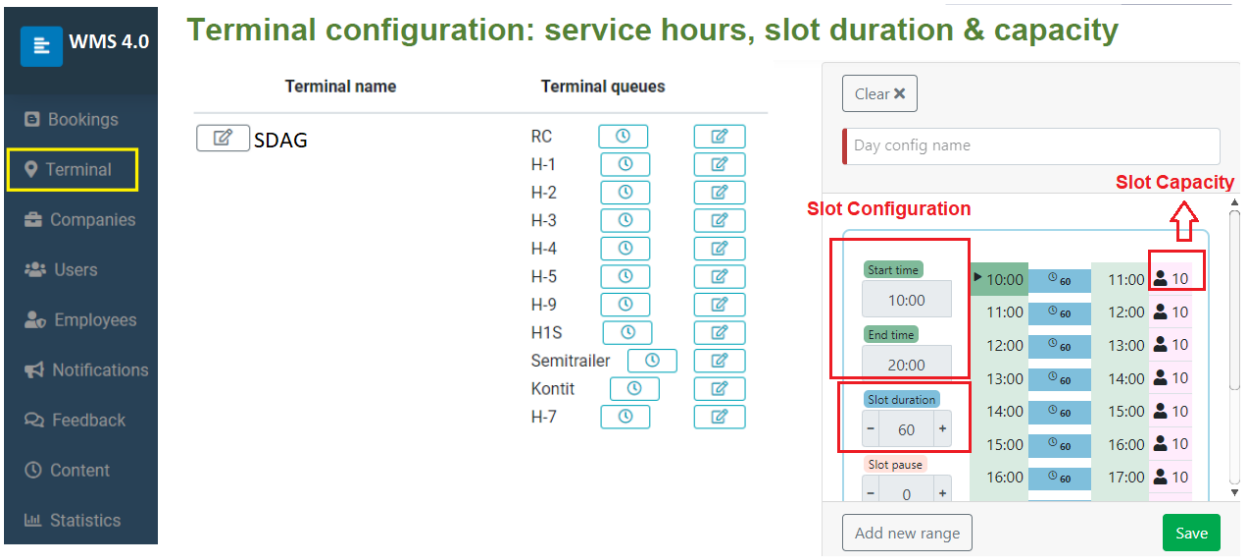
The choice to split the system in three parts is based on a result of previous studies achieved by project, specifically in WP1, WP2, WP3 and WP4, and it will prove much more effective and efficient to solve targeted issues. **Requests for offers by MTOs** will be critical in overcoming the difficulty to find truck drivers for goods delivery along the last mile segment of the travel chain. Moreover, it will also support to reduce overall transport costs by having multiple last-mile delivery method choices and potentially generate lower CO_2 emissions resulting from a better management of resources.

The three main phases of project development are described in the remainder of this section.



- **Booking creation:**

1. Select the terminal (drop-down menu)
2. Select queue (drop-down menu)
3. Select timeslot (date, time from calendar)
4. Vehicle data (drop-down list)
    a) Number of transport order
    b) Vehicle plate number
    c) Vehicle country
5. Driver Data (drop-down list)
    a. First Name
    b. Last Name
    c. Phone number
    d. E-mail



- **Real time monitoring of warehouse storage volume:**

Warehouse processes that need to be planned in real time and controlled include inbound flow handling, product-to-location assignment, product storage, order-to-stock location allocation, order batching and release, order picking, packing, value-added logistics activities, and shipment.

The process information represents a fundamental asset for the implementation of DSS. A common mistake is merely calculating the square footage of the entire facility, without considering additional space within the building that cannot be used for product storage.

As a pre-requisite for the development of the DSS is the monitoring and updating of flows and process information affecting the SDAG terminal to ensure effective and efficient functionality of the DSS. So, the ***reliability*** of this information is one of KPI's that must be considered.

- The aim of **Service Customer Reviews (SCR)** is the improvement of customer's (MTO/track vehicles) trust and confidence. Particularly, this is important as it can provide an edge over competitors who do not use customer reviews. A lack of negative reviews, from both sides, MTOs or truck vehicles, could affect customer's opinion and the decision to enter into negotiations to make a transportation from origin to destination.
  The aim of SCR is to increase the quality of transportation; according to previous studies, nearly 70% of customers trust reviews and the company more if they include both positive and negative reviews.

5.2 Development of the Pilot application

The expected deliverable after the current step, as requested by Consortium, is the Pilot application executable.

As mentioned, the principal components of the pilot Web Application are Data-Model, Backend (DSS) and Front End. The system developed will be integrated in an online platform which will only need Internet connect to be accessed, thus making the service accessible from any PC, Android or Apple devices. The technologies used for development will be provided through Open-source software licensing.

5.3 Pilot application testing and acceptance

Testing of the platform will be performed in different steps. The requirement of the platform will consist only in having a device and a stable internet connection to be accessed, and it will not need any installation or specific hardware as such.

Testing techniques:

1. **Functionality Testing**
   The main goal is to make sure that all the functions within a web app are working smoothly without any technical glitches. This type of testing could cover different thing whether all the links are working properly or not, testing forms in all the pages, cookies, validating HTML or CSS, database testing for security and so on.

2. **Usability Testing**
   The objective of usability testing is to make the application user-friendly and effective, whereby user interface should comply with the standards. It is important to follow all the global conventions and web standards during the development of a web application.

3. **Web UI Testing**
   The most important aspects in a web application are web server interface, application server interface and database server interface. Web UI Testing will ensure the performance of connectivity of individual components, assessing whether they are connected properly. Moreover, the interaction between these servers should be thoroughly checked to understand if they are executed properly.

4. **Compatibility Testing**
   The compatibility of a web application is one of the most crucial things that will be considered while testing the application. Compatibility testing will check the web application for browser compatibility, operating system compatibility, mobile browsing and printing options.

5. **Performance Testing**
   Will help to determine the performance of the web application under various scenarios. Usually, this involves stress testing, scalability testing and load testing. In this testing method, website is usually tested for its functionality on different OS, HW platforms and more.

6. **Security Testing**
   This testing method is one of the most important, as if data leaks or modifications are tolerable or not. It usually involves various aspects like testing the CAPTCHA for automated scripts logins, testing SSL for security measures, whether it is possible to access web directories or files directly or not, etc.

5.4 Pilot deployment and documentation

The deployment of the pilot action will contribute to the following outcomes: smart and efficient management of cargo in the warehouse, savings in terms of time and cost during the moment of loading/unloading in the warehouse, link the Inland terminal to the intermodal network, allow the logistics operators to be extensively informed about the existing intermodal services from the Inland terminal operating in the pilot (and others) and finally, developing and implementing intermodal transport instead of 'all road' transport in the Programme Area.

An effective action plan to ensure accessibility and maintenance of the pilot application for the 5-year period will be provided. This will be done after the pilot implementation, in the last phase of the WP5 package (WP5.5 Action plan).

The expected deliverable after execution of this step, in agreement with Diglogs Partners, is the Post-deployment evaluation. This should serve as the input for WP5.4 (Transferability plan) and WP5.5 (Action plan).

6. Project team

WMS 4.0 will be carried out by Elevante Srl, Trieste – Friuli-Venezia Giulia Italy, in cooperation with SDAG Autoporto di Gorizia, Gorizia – Friuli-Venezia Giulia, Italy.

The Project Team comprises of 5 staff from Elevante with key roles outlined as follows:

- *Gennaro Ciccarelli* with project role being Pilot Project Manager
- *Chiara Sorice*, with project role being Project Manager & Communication Manager, and providing support in disseminating and communicating on pilot activities
- *Maurizio Cociancich*, with project role being Project Director & Financial Manager, and overseeing the overall pilot implementation process
- *Erika Tsakiridis,* with project role being Administrative Officer, and providing admin support related to pilot implementation (e.g., procurement of external resources and subsequent award)

- *Michela Scano,* with project role being Administrative Officer, and providing admin support related to pilot implementation (e.g., procurement of external resources and subsequent award)

As outline earlier, the Pilot implementation activities will be supported by an external supplier, which will be carefully selected according to several technical criteria, including relevant competence, previous similar experience and Clients' referrals, in order to minimise the associated project spend. Upon selection, the Supplier will be part of the overall project team led by Elevante.

7. Project timeline

Below the timeline of the action is described including the most important milestones as reported in chapter 3.

		Year and month							
id	**Activity title**	2021							
		3	4	5	6	7	8	9	10
1	Creation of the pilot work plan draft								
2	Creation of the pilot work plan	M1							
3	Creation of the technical-functional specification draft								
	Creation of the technical-functional specification	M2							
4	Completed procurement documentation and award								
6	Development of preliminary functionalities (e.g., TAS) and system integration								
7	Development of DSS								
8	Fully integrated DSS testing					M3			
9	Full system deployment in production							M4	

8. Project risk management

Common risk register methodology was developed by the LP of the WP4, in earlier stages of the project, and it will be used to identify and mitigate risks that might arise from the pilot execution.

Goal of the risk management of the pilot project is to address all foreseen risks from various aspects:

- Use preventive measures and risk avoidance, where possible, in order to avoid risk occurrence (most favourable),
- Use mitigation measures, where possible, to lessen the risk impact (less favourable),
- Use risk transfer (to third parties), to lessen the risk impact, and
- Establish a clear list of actions and contingencies including escalation path towards WP5 leader and LP and have informed opinion on residual risk.

However, the project will be relatively short in duration (pilot execution), so it is logical that this fact will help significantly in its successful completion.

No higher levels of technical risks are anticipated, so mostly common project risks may reasonably be expected.

Used risk register is shown in the table below.

ID	Date raised	Risk description	Likelihood of the risk occurring	Impact if the risk occurs	Severity *Rating based on impact & likelihood.*	Owner *Party who will manage the risk.*	Mitigating action applicable to pilot project action *Actions to mitigate the risk e.g. reduce the likelihood.*	Contingent pilot project action *Action to be taken if the risk happens.*	Progress on pilot project actions	Status of the registered pilot project risk

1	[risk identification date]	Pilot project purpose and need is not well-defined	Medium	High	High	LP/SC	Complete a business case for the harmonization pilot if not already completed and ensure purpose is well defined according to project plan	Escalate to the LP/SC and inform WP5 leader with an assessment of the risk of runaway costs/never-ending project.	Business case re-written with clear deliverables and submitted to the LP/SC for acknowledgement	[Open/Closed]
2	[risk identification date]	Project design and deliverable definition is incomplete.	Low	High	High	LP/SC	Define the scope in detail via design details, workshops and meetings with PP/LP and input from subject matter experts.	Document assumptions made and associated risks. Request high risk items that are ill-defined are removed from scope.	Design workshops and meetings scheduled.	[Open/Closed]
3	[risk identification date]	Project schedule is not clearly defined or understood	Low	Medium	Medium	PP	Hold scheduling workshops with the project team (internal and external providers) so they understand the plan and likelihood of missed tasks is reduced.	Share the plan and go through upcoming tasks at each weekly project progress meeting.	Workshops scheduled.	[Open/Closed]
4	[risk identification date]	No control over staff priorities	Medium	Medium	Medium	PP	PP should brief internal team managers on the importance of the project. Soft book resources as early as possible and then communicate final booking	Escalate to the PP's top management and bring in back up resource, inform LP/PSC, and inform WP5 leader	PP's top management has to agree to hold briefings. Identification of suitable arrangements (meeting room, teleconferencing tools)	[Open/Closed]

							dates ASAP after the scheduling workshops and meetings. Identify back ups for each project team member engaged on the project.			
5	[risk identification date]	Consultant or subcontractor delays	Medium	High	High	PP	Include late penalties in pilot project contracts. Build in and protect lead time in the schedule. Communicate schedule early. Check in with supplier's progress regularly. Query statements like '90% done'. Ask again and again if the supplier or consultant requires additional information.	Escalate to LP, SC and top management of the supplier and inform WP5 leader. Implement late clauses.	Lead time from each contractor built into the project schedule. Late penalties agreed to and contracts signed.	[Open/Closed]

6	[risk identification date]	Estimating and/or scheduling errors	Medium	High	High	PP	Break this risk into two parts: 'cost estimating' and 'scheduling errors'. Use two methods of cost estimation, and carefully track costs and forecast cost at completion making adjustments as necessary. Build in 10% contingency on cost and scheduling. Track schedules daily and include schedule review as an agenda item in every project team meeting. Flag forecast errors and/or delays to the Project Board early.	Escalate to LP and SC and inform WP5 leader. Raise change request for change to budget or schedule. Pull down contingency.	Contingency agreed by the top management of the PP; LP informed.	[Open/Closed]

7	[risk identification date]	Unplanned work that must be accommodated	Low	High	Medium	PP	Attend project scheduling workshops. Check previous projects, for actual work and costs. Check with peer companies for actual events during similar projects. Check all plans and quantity surveys. Document all assumptions made in planning and communicate to the vendor's project manager before project kick off.	Escalate to the vendor's project manager with plan of action, including impact on time, cost and quality.	PP's team attending scheduling workshops.	[Open/Closed]
8	[risk identification date]	Lack of communication, causing lack of clarity and confusion.	Medium	Medium	Medium	LP/SC/ PP	Write and discuss a communication plan which includes frequency, goal, and audience of each communication. Identify stakeholders early and make sure they are considered I	Correct misunderstandings immediately. Clarify areas that are not clear swiftly using assistance from Project Sponsor if needed.	Communication plan in progress.	[Open/Closed]

							the communication plan. Use most appropriate channel of communication for audience e.g. don't send 3 paragraph email to developers, have a call instead.			
9	[risk identification date]	Pressure to arbitrarily reduce task durations and or run tasks in parallel which would increase risk of errors.	Low	High	Medium	PP	Share the schedule with key stakeholders to reduce the risk of this happening. Patiently explain that schedule was built using the expertise of subject matter experts. Explain the risks of the changes. Insist on contractual obligations towards pilot project vendors.	Escalate to LP and SC with assessment of risk and impact of the change, and inform WP5 leader Hold emergency risk management call with decision makers & source of pressure and lay out risk and impact.	Awaiting completion of the schedule.	[Open/Closed]

10	[risk identification date]	Scope creep	Medium	High	High	PP	Document the pilot project scope in a Project Initiation Document or Project Charter and get it authorised by the PP. Include the full scope in the contract. Refer to it throughout the project and assess all changes against it also ensuring alignment of any changes with the business case.of the pilot project.	Document each and every example of scope creep NO MATTER HOW SMALL in a change order and get authorisation from the project board BEFORE STARTING WORK. This includes ZERO COST changes.	Scope clearly defined in the contract.	[Open/Closed]
11	[risk identification date]	Unresolved project conflicts not escalated in a timely manner	Low	Medium	Medium	PP	Hold regular project team meetings and look out for conflicts. Review the pilot project plan and stakeholder engagement plan for potential areas of conflict.	When aware immediately escalate to LP and PSC and gain assistance from LP to resolve the conflict. Inform WP5 leader	Project team meetings scheduled.	[Open/Closed]
12	[risk identification date]	Proposed pilot action becomes obsolete or is undermined by external or internal changes.	Low	High	High	PP	No ability to reduce likelihood, but make sure early warning is given by reviewing pilot action on regular	Initiate escalation and project close down procedure.	Project close down procedure confirmed with Project Board.	[Open/Closed]

							basis with the LP/PSC prior to stipulating the contract.			
13	[risk identification date]	Delay in earlier project phases jeopardizes ability to meet fixed date. For example delivery of just in time materials, for conference or launch date.	Medium	High	High	PP	Ensure the project plan is as accurate as possible using scheduling workshops and work breakdown structure. Use Tracking Gantt and Baseline to identify schedule slippage early.	Consider insurance to cover costs and alternative supplier as a back up, if possible.	Awaiting completion of the schedule.	[Open/Closed]
14	[risk identification date]	Added workload or time requirements because of new direction, policy, or DigLogs project changes	Low	Medium	Medium	PP	No ability to reduce likelihood.	Acquire advanced notice from PSC/LP if possible. Inform WP5 leader	Pilot project management reviewing options.	[Open/Closed]
15	[risk identification date]	Inadequate testing by the project team or involved (aimed) stakeholders leads to large post go live snag list.	High	High	High	PP	Ensure that test cases/quality checks are timely prepared and testing/quality assurance window is protected.	Raise risk immediately and raise issue if it is clear that UAT testing is inadequate. Stakeholders could extend testing & bring in additional resource.	Stakeholders preparing test cases.	[Open/Closed]
16	[risk identification date]	Legal action delays or pauses project.	Low	Medium	Medium	SC/LP/PP	Ensure all contracts signed before starting the pilot project. Follow all regulatory requirement	Escalate to the PP's management who will notify legal department. Follow instructions from legal	Contracts issued.	[Open/Closed]

							s and complete stakeholder management plan.	department and inform LP/PSC. Inform WP5 leader		
17	[risk identification date]	Stakeholder or PP refuses to approve deliverables/milestones or delays approval, putting pressure on project manager to 'work at risk'.	Medium	Medium	Medium	PP	Ensure that PP's decision maker with budgetary authority is identified before project start and is part of the project board. Communicate dates for sign-off points up front.	Escalate to PP's management and LP and recommend action e.g. - to stop the project. Inform WP5 leader	Pilot project manager is confirming their sponsor / top management of the supplier.	[Open/Closed]
18	[risk identification date]	Theft of materials, intellectual property or equipment.	Low	High	High	PP	Follow security procedures, ensure Non-Disclosure Agreements (NDAs), & compliance certificates are in place along with required confidentiality clauses. Verify all physical security measures in place. Secure insurance, if applicable.	Notify appropriate authorities e.g. police, legal department, LP, PSC and initiate internal investigations. Inform WP5 leader	NDAs issued. Security certificates confirmed for contractors/suppliers working on the pilot project.	[Open/Closed]

19	[risk identification date]	Acts of God for example, extreme weather, leads to loss of resources, materials, premises etc.	Low	High	High	PP	Ensure insurance in place and valid. Familiarise project team with emergency procedures. Where cost effective put back up systems in place, if applicable.	Notify appropriate authorities. Follow health and safety procedures. Notify stakeholders, LP and PSC. Inform WP5 leader	Public Liability Insurance confirmed along with additional premises insurance at site / for the pilot project.	[Open/Closed]
20	[risk identification date]	Pilot project stakeholder's action (or lack of) delays project.	Low	High	High	PP	Identify interested and dedicated stakeholders before start of the pilot project, analyze power and influence and create a stakeholder engagement plan. LP/PSC to check and if applicable, authorise the plan. Revisit the plan at regular intervals during pilot project execution to check all external stakeholders are managed. Consider getting additional insurance.	Notify appropriate authorities and follow internal procedures e.g. for activist demonstrations. Inform WP5 leader	Stakeholder involvement analysis in progress.	[Open/Closed]