

DigLogs

Pilot project Plan

Deliverable D5.2.1

5.2.4 Innovative solution for access control

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Introduction: Innovative solution for access control

There is an ongoing CEF-cofinanced project of a national PCS (Port Community System) implementation, initially as a pilot project in the port of Rijeka that started in April 2018. and will be fully completed by end of 2021. The project is well underway and executed on time under supervision of TA (Technical Assistance) team comprised of subject matter experts. Initially, the project should have been completed by the end of 2020, but it will receive a one-year extension.

PCS implementation project does not envisage a separated module for access control, rather, it relies on the data exchanged with already existing systems. Port of Šibenik does not have automated IT solution for this purpose, and especially not for the passenger traffic segment, hence **motivation for the proposed content of the pilot project.**

1. Pilot project goals

Project goal is to establish a new, innovative and automatic solution for passenger and physical persons ID card issuing, tracking and management within remit of Port of Šibenik Authority with particular focus on passenger traffic. This need is greatly increased with the fact that creation of a national PCS system is ongoing and it does not have a dedicated system for access control.

PCS needs to be connected to the surrounding systems (such as CIMIS) with underlying goal being avoidance of multiple data entry and facilitation of data exchange between stakeholders. Along with all the other systems enabling electronic communication in maritime traffic, PCS forms an important constituting and participating element of the NSW platform. The "Project of setting up a single national Port Community System" is currently underway, with the Ministry of the Sea, Transport and Infrastructure being the bearer of the project. Cooperating parties in this project are, among others, Port of Rijeka Authority and Port of Ploče Authority. Once the mentioned project is completed by the end of 2021., all the Croatian port authorities will have a fully functional PCS system at their disposal that will be adaptable to all Croatian cargo ports with minor changes and adaptation dependant on local characteristics of each individual participating port. One of such ports is also port of Šibenik. Layout of operative quays of the port of Šibenik, and main characteristics (designation, name, length, depth and purpose) are shown in map and table below, and on the next page:



Designation	Name	Length (m)	Depth (m)	Purpose
8-9	Vrulje, W1	114	10,00	Ferryboats
10	Vrulje, W2	50	10,00	Ferryboats
11	Vrulje, S1	133	08,00	Cruise lines
12	Vrulje, S2	29	10,00	Customs
13	Vrulje, E	191	10,00	Cruise lines
Cargo port				
14	Dobrika	228	10,00	Bulk cargo import
15	Connection coast	128	08,00	RO RO, Ferryboats
16	Rogač 1	210	10,00	Bulk and general cargo
17	Rogač 2	240	07,00 - 09,00	Bulk and general cargo
19	TB 1	120	07,00	Timber terminal
20	TB 1	120	05,20	Timber terminal

Map 1: Layout of operative quays of the Port of Šibenik

This way, additional benefits will be reaped both by control authorities overseeing security and safety of the passenger as well as end user stakeholders – passengers, providing additional flexibility and payment options. It will also have transfer effects for Port of Šibenik Authority, as the underlying processes will be greatly enhanced.

Long term goal of the project is to facilitate ongoing building of PCS that will have a significant impact on all port of Šibenik stakeholders and their IT systems, and they have been involved in the process from the very beginning, even before than CEF funding was secured. PCS will have several dedicated modules for various concessionaires, and they will have to adjust their systems a part of regular planned internal growth and maintenance activities. Access control is one of such systems, once the PCS will extend also to liners and passenger maritime traffic.

Decision on the pilot content was made because immediately, it came to the attention of the Port of Šibenik Authority's management that there is a room for implementation of an innovation within scope of the DigLogs project, in its essence a sustaining incremental innovation, that digitalizes a process that is currently executed manually and presents a large obstacle in modernization of processes inside port of Šibenik, but also is not addressed within the scope of the new to-be PCS system that will also be deployed in the port of Šibenik. This is a new **digital access control system, fully aligned with current business needs, whose full scope is to be defined within this pilot work plan**, and that encompasses stakeholders whose activities are aimed towards processes underlying passengers disembarking and boarding cruisers and passenger ships, port concessionaires, business personnel, vehicles, drivers, containers and other stakeholders within identified target groups. Presently, access control to the Port of Šibenik area is governed by the subject Regulation about identification cards of the Port of Šibenik Authority from 11th September 2015. ID cards used for ingress and egress control and access to information, cargo, premises and operative port spaces are used to identify persons and vehicles and they are particular to a certain person or vehicle and non transferrable. There is also a quite detailed pricing list for permit issuing, as it presents a source of revenue for the Port of Šibenik Authority, in force as of 6th January 2017.

The pilot already contains **integration with more complex solutions**, and provides insight to external involved parties (police – Ministry of the interior) and in the future can interface with internal business information system used by the Port of Šibenik Authority.

2. Pilot project functions and scope

Main pilot function is to envisage, deploy and put into production an innovative solution for passenger flow control in covered Port of Šibenik terminals, and achieve automated solution for enhancement of security and safety in the port area including payment, tracking, oversight and analysis solutions. Its function is to serve as an input solution for further connection with the national PCS system whose implementation is ongoing in parallel with this pilot project.

Scope of the pilot is requisitioning and purchase of the envisaged equipment, its installation and functional integration, development of the web and mobile applications aimed towards administration, passengers and the police, and implementation of analytic capabilities for the system.

Exact technical requirements, connectivity and input-output possibilities are subject to further determination during pilot development and component identification up to its end, as some components might change even during pilot execution. While main components are already identified as a part of analysis and requirements specification, it is possible that some smaller components will be identified later in the pilot execution, so flexibility will be required during later stages.

Enforcement of this process is still implemented in physical form, using manual labour and plastic cards, causing delays, excessive consumption of time and other resources, and diminishing integration and analytics, contrary to the ISPS requirements and modern business process execution inside ports.

This is especially prevalent when processing large number of passengers from cruisers whose access permits need to be processed sometimes even overnight, using manual process. For example, passenger terminal Vrulje with a cumulative quay length of 510 meters, has a projected capacity of 1.000.000 passengers annually and with the ongoing capacity expansion to 2.000.000 passengers annually, an inherent need for a new digital system of permits issuing based on innovative digital solution becomes even more clear.

A required innovative passenger ID card issuing and control system must possess **adequate technical qualities to support envisaged role**.

Also, **compliance with the existing regulation** already used in Port of Šibenik is a requirement for the pilot.

Pilot project limitations are primarily in form of focus on only passenger area, and not other port areas (for example, areas processing maritime cargo). Port of Šibenik has a quite diverse port structure, and full coverage would greatly exceed the budget and scope of the proposed pilot project.

Project assumptions are:

1. Time frame dedicated for pilot execution will be adequate,
2. Financial means for pilot requisitioning will suffice,
3. There are suitable locations for uninterrupted installation and operative usage of the ID card reading equipment,
4. The stakeholders will be interested in the project deliverables (checked during WP4), and satisfied with the project outcomes,
5. Port access and ID issuing regulations might have to be revised as a consequence of the pilot execution.

3. Project methodology

Custom project management methodology will be used, based on PMI-PMP methodology. Best practices and concepts from classic project management methodology will be used. It will cover the entire lifecycle of the pilot project implementation. It is best suited to the fast track and relatively short project like this pilot.

In order to manage the project, **standard tools** will be used, like internal business information systems of the Port of Šibenik, document management system, e-mail and office automation tools (Microsoft Word, Excel and Powerpoint). Furthermore, Gantt chart is used to track the project execution.

Project team communicates directly (peer to peer), in person and using remote presence tools (WebEx and Skype). Brief weekly coordination meetings are held in order to inform all project team members with development of the project and to resolve ongoing issues. Meetings are also held on a need basis between external consultant and the development services vendor, however, all information regarding the project is channeled back to the project manager, internal team member from the PP8.

Documents used in the project planning and implementation can be divided into several categories, based on the document type and ownership:

1. DigLogs set of documents, outlined in DigLogs Application Form (includes this pilot work plan)
2. Documents created by the Port of Šibenik Authority and its consultants
3. Documents created by the solution vendors, integrators and developers

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

1. Pilot Work Plan (this document),
2. Functional – technical pilot specification (serves as a basis for tendering documentation),
3. Tendering documentation (used in the public procurement process),
4. Installation and development logs and related documentation,
5. Equipment delivery and integration (development) services delivery notes,

6. User manuals and additional documentation,
7. Invoicing documentation,
8. Communication archives (emails).

Monitoring of the pilot project execution will be executed using the following milestones, in sequence (check points):

1. Compiled draft of the project work plan – approved by PP8,
2. Completed project work plan, **← CHECK OFF MILESTONE 1**
3. Written draft of the technical-functional specification,
4. Completed rest of the public procurement (tendering) documentation,
5. Issued requests/invitations for quotations,
6. Received commercial offers,
7. Evaluation of offers completed and best offers selected,
8. Awarded integration and development services contracts, **← CHECK OFF MILESTONE 2**
9. Equipment delivered and installed,
10. Integration development services delivered and completed,
11. UAT testing, and
12. Full system functional (pilot development completed). **← CHECK OFF MILESTONE 3**

4. Project preparation

This chapter describes the **phases of the Pilot project preparation** before the actual development and later execution phases.

4.1 Project functional requirements

Architectural 3D visualisation of Vrulje passenger terminal upgrade project with phase 3 installations is shown in Figure 1 that follows.

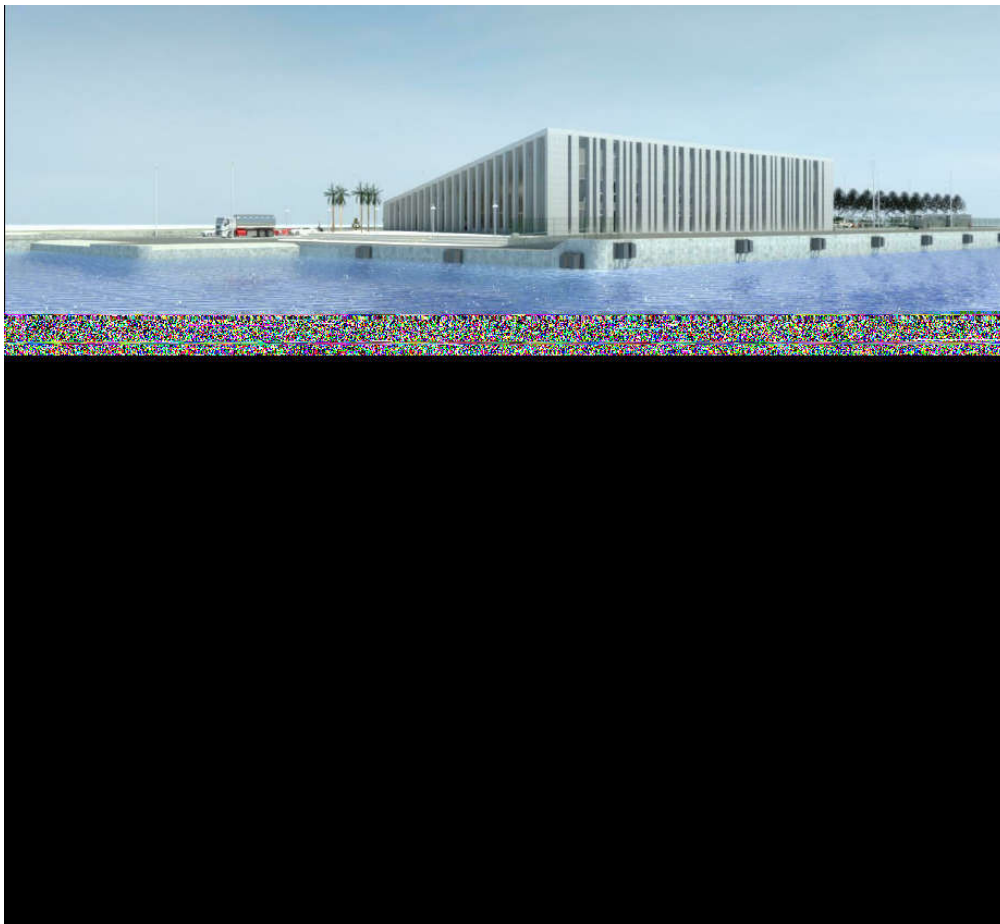


Figure 1: Passenger terminal Port of Šibenik, upgrade of Vrulje quay, building of the passenger terminal with traffic installations from the 3rd phase – architectural 3D visualisation

At the moment according to the applicable regulation, there are two levels of ID cards, and articles 8-14 of the applicable regulation govern layout, characteristics and use of ID cards.

Physical cards at the moment can be divided into several categories: (continued on the next page)

1. Red colour

- Employees of Port of Šibenik Authority
- Internal security personnel
- External security personnel (vigilance)
- State employees (police officers, Customs officers, employees of Harbourmaster's office, employees of the State inspectorate)

2. Blue colour

- Concessionaires using port infrastructure and superstructure
- Concessionaires not using port infrastructure and superstructure
- Ship agents, with previous permit for work
- Shipping agencies in the area of port of Šibenik
- Cargo agents
- Subcontractors of the concessionaires

3. Light grey colour – temporary vendors and contractors

4. Green colour

- Visitors
- Commercial activity parties (recording of marketing materials, documentaries or TV shows)

ID cards according to the applicable Regulation are furthermore divided into three top-level categories:

1. Permanent
2. Temporary Daily

The process is not presently digitalized and there is no connection whatsoever with other IT systems. Issuing and tracking relies on manual procedures. Also, no systematic analysis is possible, including statistics, cross-referencing and data import or export for categories of users other than those accessing port areas using cargo vehicles.

This lack of complete informatization of access control process can be identified as an evident bottleneck, and especially in relation to ISPS requirements and port security procedures.

Entry and exit terminals, are to be designated as positions where the ID cards are checked in order to allow entry that are identified. Initially and within DigLogs scope, they include locations (entry to quays and terminals) that are mostly affected by the flow of the passenger traffic.

Analysis shows that **deployment of a modern, innovative digital access control and preparation** for full integration of access control system with the new, future PCS, whose deployment is imminent, as it is steered by the Ministry, is critical at the moment of pilot action analysis and proposal, especially considering lack of funding and no funds anticipated at the PCS side to cover aforementioned functionalities.

Affected **stakeholders within identified targeted groups** except all passengers are all freight agents operating in port of Šibenik, all terrestrial cargo traffic operators (categorized for simplicity as one item) and all other occasional or permanent visitors to port area (police, Customs officers, other state agency officials, vendors, consultants, subcontractors, teams filming in the port area etc.) who need to fill paper documents in order to obtain access to port area. In the current scope of PCS, no module is envisaged to support permit issuing due to time and financial constraints of the ongoing PCS project. It is evident that in order to increase digitization in the area of port of Šibenik for almost all stakeholders, but especially passengers, further steps need to be undertaken in order to upgrade processes and technology by introducing and building a completely new innovative IT system to facilitate permit issuance, storage, monitoring and oversight, further underlining ISPS compliance.

4.2 Resource tendering

An external consultant was contracted to follow up work within scope of the WP5, aiming to implement and test innovative technologies. Main task of the consultant was to create a Pilot's work plan defining steps and success check methodology and later on, Pilot's Transferability plan, including KPIs and differentiation between "as is" and "to be" situations.

Call for offers was issued by PP8 on the 22nd May 2020 and three offers were collected. Using the lowest offered price criteria, a consulting company Aksentijevic Forensics and Consulting, Ltd. from Rijeka was selected. The contract for services was stipulated on the 10th June 2020.

After creation of the basic technical and functional specification for the purchase of required equipment/integration and development services will have been completed, a call for offers will be issued by PP8, with tentative date of execution falling early in October 2020. PP8 is aiming to collect three offers. Using the primary criteria of lowest offered price, as required by the public procurement rules, PP8 is aiming to select integration services vendor and stipulate underlying contract.

This activity will mark end of procurement/tendering phase of the pilot execution.

4.3 Pilot solution design

Basic motivation to build the system is digitalization of the demand request and access permits for the passenger side of Port of Šibenik. Permits therefore become digital products whose status can be checked from any physical place using tools embedded in the system. In order to make the system automatic, every access permit will have a unique identification code (for example, QR code) that will be embedded and enable cross-checking with other data from the permit. Content of the QR code is hash string derived using ID-number crypting by SHA-x methodology. Full digitalization should ensure traceability and follow up to every request for permit issuing. Digitalization will enable additional functions for better traffic management and tracing port resources and increase general level of security. End users will gain higher service levels and lowered levels of stress, as they will be able to perform all these actions in advance and remotely.

Basic characteristics of the system is on-line work. It included dislocated, centralized and unique database with remote access in real time. Database is the only location for data storage and interexchange in the system.

Communication with the database is achieved using web services that are a part of a broader application layer. Local applications, portable applications and the Web communication with the database using only web services. Basic architecture of the application is shown in the following Figure 2.

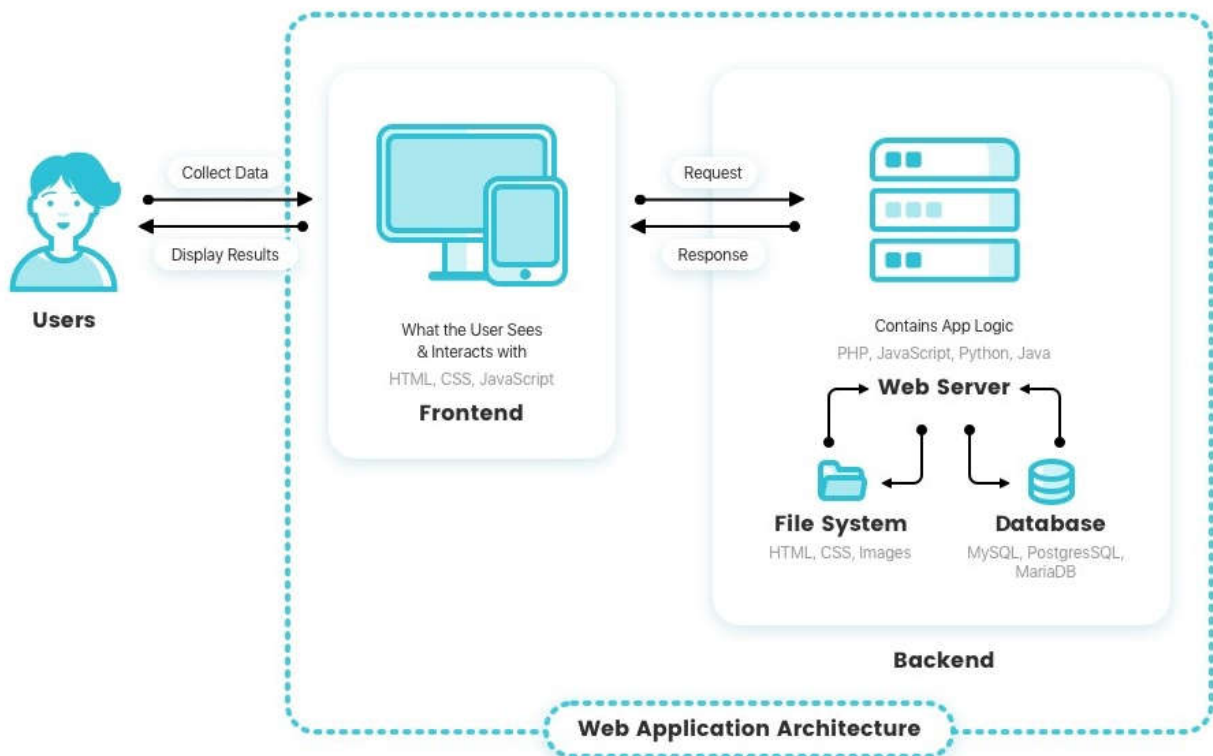


Figure 2: Basic application architecture

This type of solution (cloud) enables good **overview of the system operations**, protects data and raises level of system availability. It ensures required SLA (Service Level Agreement) levels. This solution requires a quality local IT infrastructure (LAN and web access with low latency levels).

The system includes the following **elements**:

1. *E-mail and SMS notification* subsystems following the highest standards and guaranteeing user reach inland and abroad,
2. *Payment gateway* for credit card payment on the web for domestic and foreign users,
3. *Interface towards ingress and egress equipment* (terminals); data acceptance and transfer towards equipment at the control points and other defined or random locations inside the area of remit of the Port of Šibenik. Basic records are “ingress/egress” and “check” (Control records), and
4. *Back up system*

4.3.1 Web functions design

Basic envisaged way to issue permit cards for the port access will be achieved using **Web client**. This is going to be a public and permanently accessible multi-language web page (anticipated languages are Croatian and English languages) based on a web-shop principle.

Considering that this is also a payment application and it is tied with prescribed rules for use by the side of the payment gateway and the banks that will be contracted for the credit card acceptance, certain levels of security during these actions are required. Login system generates user account whose basic primary key is tax number for the Croatian citizen and the passport number for the foreign citizen.

Web sale of the ID cards will be possible using direct card payment or issuing an offer with payment elements (2D bar code) using Internet banking or physical payment locations.

Basic **Web functions** are shown in the Table 1. below.

Nr.	Function	Description	End result	Remark
1	Log in	Creation of the access and user account, acceptance of the terms and conditions, data entry	Generated record in the database, generated user data, <i>user name</i> and <i>password</i> (encrypted)	Log in for non residents should acknowledge the type of document suitable for identification

2	Selection of the user category according to the regulations (selection of the article/service)	User must be identified according to the category suitable for him/her – proper request form must be selected	This step determines exact product (ID card) being sold	After the first selection, category is connected with the user account. The same user account can have several categories.
3	Electronic data entry (table 2 shows minimum required data for daily entry ID card)	Filling the form request according to regulation, enables automatic entry of set of data from the application or previous request.	Creating ID permit request that will be forwarded for relevant checks and approvals, followed by the status of the automatic approval and ability of ex-post approval by the police and other vigilance services.	Use existing data as much as possible and reuse them during the next tentative use.
4	Creation of the product selection	Based on the request, product selection is made. During this procedure, additional product attributes are determined (for example, beginning and end of the ID card validity, options, amount if applicable) and others. Other type of the product may be prepaid vouchers that could be purchased on the Web and used as a payment means.	Shopping cart is populated with the product, followed by payment or abandoning the process.	The user can view the shopping cart, add and delete articles from it.
5	Product (ID card) payment	Payment using payment gateway is envisaged.	Allowed set of data is entered in the payment forms. The user is following recommendations of the payment web page. The system does not remember entered credit card data.	

6	Product (ID card) activation	After return from the payment page, the selected product is automatically activated according to the preset product attributes (for example, if the projected time of duration is some other date in the future).	E-mail or SMS, payment receipt note along with the bill or link where the bill can be downloaded and the voucher (product, ID card) with required protection elements (QR code) are forwarded. The ID card (pass) can be printed or displayed using smartphone	
7	User account status	During log in the user has overview of his/her own activities, can change access data and has overview of the products, accounts and ID card statuses.	Account overview, overview of the purchased products, overview of activities, ID card status. Possibility to change some product attributes, according to requirements of the new upcoming Regulation.	It is necessary to communicate changes of the request because some of them can trigger repeated checks by the police. Creation of the change record.

Table 1: Basic Web functions

Minimum required **dataset** is shown in table 2. below.

Nr.	Podatak	Opaska
1	FIRST NAME AND LAST NAME	First name and the last name of the physical person or name of the company
2	DATE AND PLACE OF BIRTH	
3	PLACE OF RESIDENCY, ADDRESS AND HOUSE NUMBER	
4	CITIZENSHIP	
5	NAME AND TYPE OF THE PERSONAL ID DOCUMENT	ID card number / passport number
6	DATE AND PLACE OF ISSUING	
7	VALIDITY PERIOD	
8	ID DOCUMENT ISSUED BY	

9	EMPLOYMENT	
10	TITLE OF THE LEGAL ENTITY AND THE TAX NUMBER:	
11	REASON FOR ISSUING (description of the activity and work tasks)	
12	VRIJEME KRETANJA I ZADRŽAVANJA:	ID card is valid for 24 hours, required announcement in advance

Table 2: Minimum required dataset

Description of the **electronic ID** card and the voucher – purchase and issuing of the card in the system and using on-line equipment in the passenger terminal and connected within the system, requirements for the electronic, non-material ID card are fulfilled. For the user, form of the ID card is denoted by the return message to the user that contains QR code, PDF document that can be readily available and accessed and, if required, printed ID card / pass.

Visual **representation** of the ID card in Croatian language is shown in Figure 3.

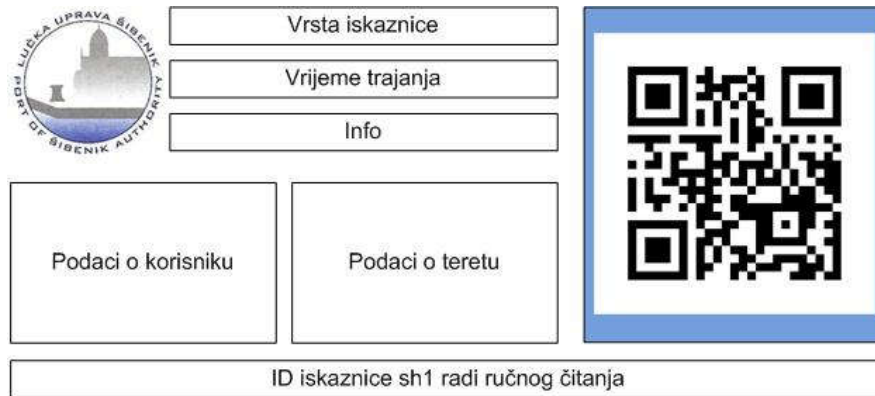


Figure 3: Visual representation of the ID card

User is receiving only the QR code shown in the right-hand corner of Figure 2. The rest of the data is in the body of the email. Width of the ID card is similar to the A4 paper width, with preset 1 cm margin for physical ID card printing.

4.3.2 PC application design

PC application is used as a stationary register and back-end reporting and oversight component. Central PC application is used to sell all products envisaged as a part of the project, fulfil all requirements of all user categories and pay for the product and activate or deactivate them. For those user categories that need more permanent ID pass cards, there is an option to issue RFID cards.

Basic **sale channel** for ID cards is the Web. Advantage of the PC application is ability of the person in charge to intervene in case of need, there is no need to create user account (this activity is transferred to the user) and there is oversight of all business processes and phases. Large portion of the application is the reporting part. It is possible to determine roles and access rules to the application server. Laser printing of the reports and bills and ID cards is supported. Basic function of the PC application is shown in the following table 3.

Nr.	Function	Description	End result	Remark
1	Login/logout	Application login: user is the responsible person of the Port of Šibenik Authority, some of the concessionaires and responsible for security and safety	Roles according to defined rules for application utilization. Cashiers are separately defined in order to be connected with the sales venues and the cash register	
2	Overview of the basic data	Data about legal entity, owner of the system, name, tax number, address, bill numbers etc.	Populated during system introduction and the changes	End user cannot alter all existing data
3	Overview of the business process parameters	Parameters defining functioning of the system	Not accessible to the end user	
4	Field data	Entry of locations, streets, zones, sectors, ingress and egress locations, vehicle types, categories of users etc.	Data in the database is required for proper application functioning	All other data denoting the systems' spatial and other references
5	Other technical application settings	Communication parameters, connection with printers and other peripheral devices, definition of notification channels and system behavior, message content etc.	Set up in the broader sense, customization of the user requirements	Not fully accessible to the end user

6	Article overview (list)	Entry, definition and article coding (permits, ID cards and other sellable products).	The article must have certain attributes, according to the valid regulation	
7	Overview and request management	Overview of received requests with the possibility to change status	Status of approval or denial of the police must be shown separately from the police and other denials	Definition of the status of the request processing. Creation of the code list of requirements according to the type and phase of approval.
8	Dynamic overview of the ID card use INDIVIDUAL AND GROUP	Overview of the ID pass card use by categories, time and location, license plate number or any other applicable data from the request. Possibility to cancel single or multiple passes.	Record and on-line overview of ingress-egress operations. Overview of number of vessels in different locations, graphic overview with map visualization. Statistics of ingress, egress and time spent at locations. In a separate overview, activities by a single ID pass (number of entries and exists and locations).	Described data are elements of the system upgrade with automatization and optimization of the object utilization: dynamic ID pass that can be adjusted according to the field/object situation
9	Overview of the field events and Research function	Ability to filter according to request data Overview of all events by registration, number of ID pass etc.	For example, overview of all check points where a vehicle with certain registration plate is registered	
10	Others	Various overviews and other reporting, including ad hoc reporting	Bill entry is required considering that the application will issue offers	
11	SMS and e-mail notifications	Embedded possibility of the individual and group notification sending using both channels	Menu for creation of the group permits according to certain criteria (not only ID permit type but also all other parameters like announced time of arrival)	

Table 3: Basic functions of the PC application

4.3.3 Police (Ministry of Internal Affairs) PC application design

PC application for the police is a derivative of the base PC application that has a single basic function which is overview and processing of the created requests for access to the port area. Police employee or security designated person can deny access without changing the requests. Comment can be entered. There are basic reporting functions envisaged to view requests that have been cancelled ex posts – in order to check the work of the police and security officers. Police officer is a special dedicated class of the user representing him/herself using ID badge number.

The technology of the request acceptance and approval is similar to that used in the communal traffic vigilance.

Every processing has a separate *processing ID* and *approval ID*. Approval ID is an integral part of the ID and it is visibly shown in every form of the ID (physical or digital). Additional functions are search functions of the database that enables additional checks of the ID card usage. Basic functions of the police application are shown in the table 4 that follows.

Nr.	Funkcija	Opis	Rezultat	Opaska
1	Log in / log out	Login to the application: the user is police officer or safety/security official with the rights to view data and process them	Police PC application is purposefully focused to menus related to requests overview	
2	Overview of requests using chronological order with possibility of filtering according to all fields	The overview must clearly show the approval status and the officer can change it while stating the reason for rejection using drop down menu and entering the comment that is not mandatory	In case of change of the data entered in the request (new validity time or different vehicle license plate) it is necessary to resubmit the request for approval,. These requests need to be highlighted for processing speed.	It is possible that in case of change of significant data, previous request will be cancelled and a new one created and charged.

3	Search: comparison of requests	Embedded possibility to compare new and old request based on the same data	For example, overview of all requests that contain the same license plate or the same physical person or legal entity dispatching a vehicle. Possibility of a mass approval withdrawal – cancellation for all requests and ID passes connected to a certain license plate, person, date or time.	This is an option, but highly recommendable.
4	Request to amend already issued request	Foresee possibility of a feedback information towards the request seeker in order to amend the request	In case that this function is developed, internal logic for subsequent follow up and resubmission for approval needs to be developed	An option
5	Reporting	Reporting module must have the ability to show activity of the officer and statistics of the request processing	Overview of log in time for officers, overview of approvals in time period and per officer. Overview of rejected requests.	Other reporting according to the demand of the police
6	Overview of the field events	Ability of the filtering according to the request data	For example, overview of all check points where a vehicle with certain license plate was registered	
7	Processing of a separate request	Printing requests with the status and reason for rejection or approval	Can be used during escalations and complaints.	A possibility / option
8	Possibility of listing, printing and data export to PDF, Excel and text	Possibility to transfer data for further processing		

Table 4: Basic functions of the PC application

4.3.4 Portable Android application design

Portable **Android application** serves a terminal that can be used to read QR code from the ID pass or printer paper or enter the data contained in the ID pass (for example, vehicle registration plate) in order to check the status. Checks are entered in the system along with supplemental data related to location, time, means of control and control end results. Envisaged **functions** are shown in table 5 that follows.

Nr.	Funkcija	Opis	Rezultat	Opaska
1	Log in / log out	Log in to program: user is police officer of security (safety) officer (official with reading and processing rights)	Police PC application is purposefully focused to menus related to request overview	
2	Reading and checking permit ID or license plate entry (in some cases, it will be basic way of data entry)	Reading ID pass (QR code) or license plate entry if the vehicle is remote or without driver or the driver does not possess the pass with him/her	Display of the status and basic pass data Possibility to change status Possibility to initiate action: vehicle release (towards inner perimeter or towards surrounding area)	Basic function of the application. The terminal can be configured and used as an alternative for entry or exit in case of need (manual override with event data logging)
3	Search	Simplified version of the "research" function	Activity log according to entered IS pass and requested data element	
4	Request overview	Overview and possibility of change valid requests and ID pass or group of ID passes based on the common data, spatial, time or personal preference		OPTIONALLY

5	Search: request comparison	Envisage possibility of comparison of the new and old request based on the same data element	Display of all requests containing similar vehicle license plate, physical person or legal entity dispatching a vehicle. Possibility of mass approval withdrawal, for example, for all requests and ID passed tied to a vehicle license plate, person, time or date.	OPTIONALLY
6	Record of the field overview	Every request needs to be recorded (similar to the requests for the communal parking facilities)	Consequence of the control, does not need to be necessarily visible in the portable application	

Table 5: Basic functions of the portable (Android) application

5. Project development

This section describes **the phases of Pilot project development**. It is covering the following topics (subchapters), as follows.

5.1 Preparation of the Pilot environment

Some useful **requirements** and **suggestions** for successful implementation of the ID card and permits issuance can also be identified prior to commencement of the pilot:

1. *Changes to current Regulation*: They should be relatively minor and include primarily change in description of ID cards (colour and composition), and recognition of virtual ID cards (especially applicable for “daily” category of usage) that are represented by a valid and properly processed database entry.
2. *Technology*: Affirmative experience gained with implementation of QR codes for entry and exit from container terminals forms a positive guideline also for virtual ID cards – permits for physical person ingress-egress control. QR codes can be created in a way to contain useful information like location, first and last name and vehicle’s license plate. IT system should be robust and follow all modern ICT and cybersecurity requirements. Solution should be in line with GDPR and ensure alignment with national Cybersecurity regulation.
3. *Payment possibilities and end-user (stakeholder) satisfaction*: Considering that ID card and permit issuance carries payments for certain categories of private and legal persons and vehicles, integration with payment gateways supporting various means of payment (subscription, credit cards, PayPal, prepaid) would also be highly advisable and trivial for integration, and it would results in high levels of satisfaction for identified stakeholders (end-users).
4. *Integration*: entry and exit gate procedures should be prepared for integration with the future PCS system, in order to use input data. Furthermore, a module for maritime police

will have to be included with entry function enabling police officers in charge to deny entry to a particular terminal.

5. *Other:* Access using mobile or Web application with adequate usability for mobile phones, tablets or other devices with small screens is advised, especially if used by the police, or for field control purposes.

5.2 Development of the Pilot application

Crucial project **components** to be delivered are:

1. Web application,
2. PC and mobile application,
3. Police and security application,
4. End user education and training, and
5. Final production work – delivery.

Database that will be used is *Microsoft SQL*. Prior to application development, data tables need to be developed according to the request of the Port of Šibenik Authority and identified processes.

Links towards fixed entry and exit points will be established in order to facilitate the system functioning.

This project involves introduction of the system that belongs to a group of mission critical components of the Port of Šibenik Authority in the area of the access control. This requires maximum possible system availability by ensuring availability to distributed system parts and application and database collocation (vendor of the system). Energy supply and network links are determined to be critical parts of the required infrastructure. Availability and security of the system needs to be ensured by technical measures and equipment, both on the side of the **end user** (*Port of Šibenik Authority*) and perspective **system vendor**, divided as follows.

User side:

On the user side, it is required to ensure Internet access in all terminal locations for the QR code reading. As a failover possibility, mobile operator infrastructure and functions of the mobile application will be used.

Vendor side:

Vendor is using external data centre services with constant supervision, uninterruptable dual power supply, and systems for automatic alerting and fire suppression. Cloud backup is used, and it enables periodic data saving to an external server used in high quality data centre. Backup is achieved using replication and network synchronisation, including snapshots that record every change, allowing for data restore from a protected replica, especially in case of disaster. Additionally, data backup is done also using local server. Part of the availability and system security is also end user education, which is envisaged integral part of the system introduction that will be also completed as an integral part of the end package delivery and development.

Used technologies:

- 1. Web application development will use the following technologies: ASP.net, JavaScript, Ajax, Bootstrap,*
- 2. PC application development will use Visual Studio c#, and*
- 3. Web application development will use the following technologies: Android studio, Java.*

Direct added value of the project is further extension of the gathered and processed information towards end users-passengers, thus enabling direct benefits for them. For example, a QR code, or similar interconnectivity technology may be used as a form of notification that would be posted at the passenger terminal, or using digital outlets with similar functionality, which would allow passengers to download and install mobile application via smart mobile devices, and access visual representation and numerical data representing all information related to the vessel traffic in port of Šibenik that is applicable and significant for them.

The application would be useful for passengers arriving at the port of Šibenik as they would have real-time information into the arrival / departure and position of the maritime traffic inside the port of Šibenik and presents a possibility for further project enhancement.

As a part of **post deployment activities**, some additional steps are performed. General public is informed about the project deliverables using channels already identified as a part of project's WP2. A video promotion campaign was used, where a video company was hired to create a video presenting DigLogs pilot project action as a whole. Interested stakeholders are also informed about the pilot using placement on the Port of Šibenik Authority's web page.

End of the pilot action has marked beginning of the **operative system exploitation and maintenance**. No specific maintenance is envisaged, considering robustness of the installed equipment. In terms of ongoing maintenance, it will be primarily reactive, meaning that appropriate actions will be taken if there is interruption in the functioning. Representation using Internet map will be checked for functioning and managed as a part of the existing information system. Check procedures and maintenance became an integral part of the IT department's duties inside *Port of Šibenik Authority*.

Financial means required for maintenance of the product are considered to be marginal, and after depreciation and end of functional amortization, it will be replaced within regular asset renewal policy of the Port of Šibenik Authority.

Usage of the system is measured using web access counter page, already used for access to map served by the existing information system. This metric will show utilization of the map by the end users – passengers and stakeholders within identified target groups.

As a summary, successful pilot project execution marks beginning of additional functionality provided to end users in a simple and easily accessible manner, adding a layer of visibility in the port area, especially aimed at safety and oversight of the passenger traffic, thus achieving the pre-set project goals during earlier project phases.

5.3 Pilot application testing and acceptance

Testing will be performed using several levels and each time, development and installation team, Port of Šibenik Authority, external consultant and end users will be involved.

A test on a real population will be required in order to measure adoption of the technology by end users (operators and passengers). This is the main objective of a pilot action immediately preceding the final system deployment.

Internal testing is planned, first by the developer's team, and then UAT (user acceptance test) will be performed both by the Port Security expert and the external expert (consultant).

Final configuration and testing will mark the final phase of the pilot deployment, when the readers will be connected, all database and production services started and the system will go live towards identified stakeholders from target groups. Feedback will be gathered and hopefully will be largely positive, in line with stakeholder input received during WP4 activities. Previous experience shows that some received suggestions cannot be acknowledged as a part of the ongoing project, but they will be considered as a part of future system upgrades using other sources.

Planned **pilot integration testing** will include several phases:

1. *Unit testing* - separate testing of parts of pilot (specification, hardware, cabling, software). This test is usually performed primarily by the persons in charge, using development environment, during development phase,
2. *Integration testing* - already tested modules will be combined and tested as a group, within certain functionalities,
3. *System testing* - check of functionalities and reliability of the completed pilot, using test scenarios covering all processes. Initially completed by the hardware and software vendors, and then, will be performed by dedicated consultant and Port of Authority Šibenik,
4. *Performance testing* - testing and check of functionalities, includes stress test and reliability of the system as a whole (readers, database, communication layer, presentation

layer – Web services), and

5. *User acceptance testing* - performed at the end of development and installation, during system deployment. User acceptance testing encompasses functional and operational landscapes of the pilot.

All found and known errors and issues will be classified to a few categories and handled in order of importance until all were fixed:

1. *Critical errors* - all errors that could cause the system to be inoperative were identified and fixed,
2. *Less important problems* - such errors will be treated using workarounds, and
3. *Requests for Enhancement (RFE)* - this is input that will be gathered during testing, but after the plan was drafted, and hardware and services procured. Such requests could not be fulfilled as a part of the project, due to time and budgetary constraints. They will be treated as separate small projects, in the period after pilot deployment, using own funding, if their evaluation shows it could be beneficial for the port community, focused on the passengers

5.4 Pilot deployment and documentation

A test on a real population is required in order to measure adoption of the technology by end users (operators and passengers). This is the main objective of a pilot action immediately preceding the final system deployment.

Formal procurement for the hardware and integration services as a part of public procurement will be completed early in October 2020, by stipulating a contract with a suitable integration services vendor after procurement process aligned with national rules.

An inclusive procurement for the consulting services for follow up of activities in WP5 was formalized also as a part of public procurement process on 10th June 2020., by stipulating a contract with consulting company Aksentijević Forensics and Consulting, Ltd., from Viškovo, Croatia.

The technical specification is dimensioned in a way to ensure adequate information and process business process modelling for the development and integration services vendor to complete its services mainly in Q4/2020 and early in Q1/2021.

A prerequisite for the integration and development services that may partially be developed in parallel with the integration is purchase and installation of hardware (sensing/reading devices).

Successful completion of envisaged activities will in fact mark completion of front-end development services – Web, customer and police facing applications.

Information related to the pilot, including QR code leading to the application will be placed on suitable and applicable information panels that are installed both in physical and virtual venues, and will serve for the project visibility purposes.

Part of the pilot deployment is also informing stakeholders within identified target groups about the pilot's go-live by means of e-mail and posts on social networks of the project.

With completion of these steps, the pilot will pass from the planning phase through development and execution to the production/exploitation phase of the project.

Documents arising from the project development will be withheld as a part of project archive.

6. Project team

Core project team tasked with project execution is comprised of the following resources with identified roles and responsibilities:

1. *Čedo Petrina*, internal team member, job role: Port of Šibenik Authority director, project role: Project Director, in charge of top level project steering,
2. *Gordana Mrčela*, internal team member, job role: marketing manager, project role: Project Manager, responsible for overall project governance, and financial and organizational aspects of the project,
3. *Krešimir Bulat*, internal team member, job role: Port Facility Security Officer (PFSO), project role: internal process consultant, responsible for security compliance aspects of the project,
4. *Saša Aksentijević*, external team member, job role: consultant, project role: technologies, process and EU funding methodology consultant, responsible for technical aspects of the project, documenting and funded project compliance.

Extended project team includes members of the vendors and DigLogs WP5 leader:

1. *Karmen Krivičić Spajić*, external team member, job role: Project manager for PP5 team involvement within DigLogs, project role: DigLogs WP5 package leader, in charge of WP5 steering, progress assurance and compliance assurance with the Application Form, and
2. *Representatives of respective vendors, external team members*, project role: vendors, tasked with delivery of project requisitioning goods and integration services:
 - a. *Šime Bumbak*, project director on the vendor's side
 - b. *Josip Gašperov*, developer

7. Project Timeline

Project timeline for the duration of the he entire pilot project is shown in table 5 below (*note: in Croatian language*), along with the most important milestones.

Entire pilot project duration is envisaged to be 180 days from the contracting day.

The project commences from the 01.08.2020. when WP5 has started and ends up on the 01.03.2021.

Prerequisites for the project are stipulated contract for the Web payment channel and ICT infrastructure on the user side, including procurement, delivery and installation of required equipment. Pilot execution involves three basic control gates/milestones:

1. Development and delivery of the application program components
2. Integration testing
3. System production

Project timeline is shown in Fig. 4 on the next page.

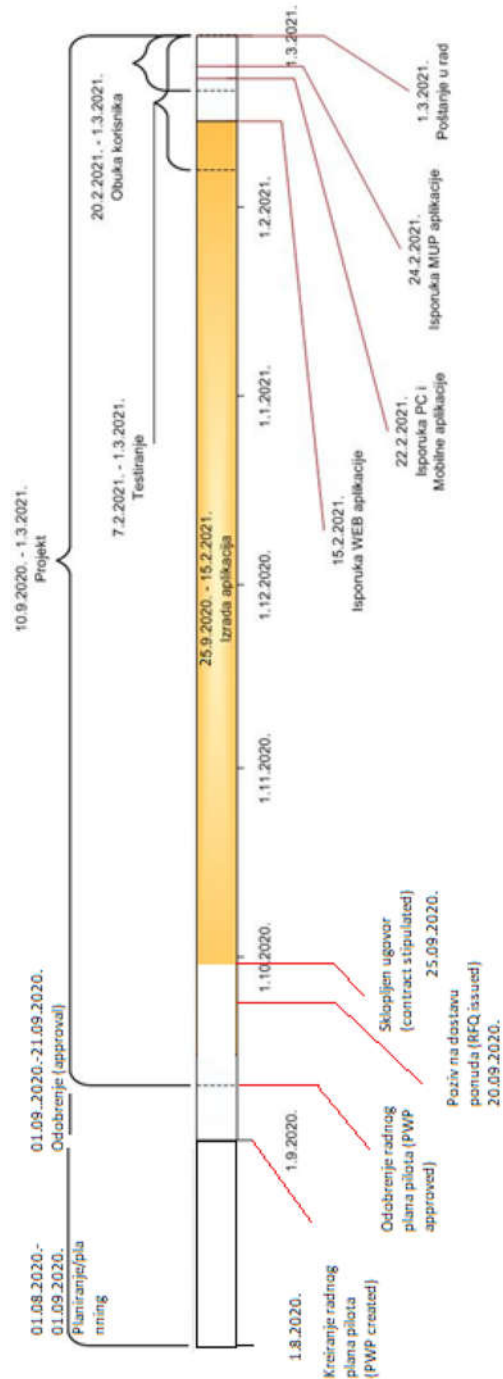


Figure 4: Application development and system integration project plan (timeline)

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 favorable),
- Use mitigation measures, where possible, to lessen the risk impact (less favorable),
- 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 high level of technical risks is anticipated, so mostly common project risks may reasonably be expected.

Used risk register is shown in Table 6 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 on 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	Escalate to the LP/SC and inform WP5 leader with an assessment of the risk of runaway	Business case re-written with clear deliverables and submitted to the LP/SC for acknowledgment	[Open/Closed]

							purpose is well defined according to project plan	costs/never-ending project.		
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 dates ASAP after the scheduling workshops	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]

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

6	[risk identificati on date]	Estimating and/or scheduling errors	Medium	High	High	PP	<p>Break this risk into two parts: 'cost estimating' and 'scheduling errors'.</p> <p>Use two methods of cost estimation, and carefully track costs and forecast cost at completion making adjustments as necessary.</p> <p>Build in 10% contingency on cost and scheduling.</p> <p>Track schedules daily and include schedule review as an agenda item in every project team meeting.</p> <p>Flag forecast errors and/or delays to the Project Board early.</p>	<p>Escalate to LP and SC and inform WP5 leader. Raise change request for change to budget or schedule. Pull down contingency.</p>	<p>Contingency agreed by the top management of the PP; LP informed.</p>	[Open/Closed]
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7	[risk identificati on date]	Unplanned work that must be accommodated	Low	High	Medium	PP	<p>Attend project scheduling workshops.</p> <p>Check previous projects, for actual work and costs.</p> <p>Check with peer companies for actual events during similar projects.</p> <p>Check all plans and quantity surveys. Document all assumptions made in planning and communicate to the vendor's project manager before project kick off.</p>	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 identificati on date]	Lack of communication, causing lack of clarity and confusion.	Medium	Medium	Medium	LP/SC/PP	<p>Write and discuss a communication plan which includes frequency, goal, and audience of each communication.</p> <p>Identify stakeholders early and make sure they are considered I</p>	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 WPS 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 identificati on date]	Scope creep	Medium	High	High	PP	<p>Document the pilot project scope in a Project Initiation Document or Project Charter and get it authorised by the PP.</p> <p>Include the full scope in the contract.</p> <p>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.</p>	<p>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.</p> <p>This includes ZERO COST changes.</p>	Scope clearly defined in the contract.	[Open/Closed]
11	[risk identificati on date]	Unresolved project conflicts not escalated in a timely manner	Low	Medium	Medium	PP	<p>Hold regular project team meetings and look out for conflicts.</p> <p>Review the pilot project plan and stakeholder engagement plan for potential areas of conflict.</p>	<p>When aware immediately escalate to LP and PSC and gain assistance from LP to resolve the conflict. Inform WP5 leader</p>	Project team meetings scheduled.	[Open/Closed]
12	[risk identificati on date]	Proposed pilot action becomes obsolete or is undermined by external or internal changes.	Low	High	High	PP	<p>No ability to reduce likelihood, but make sure early warning is given by reviewing pilot action</p>	<p>Initiate escalation and project close down procedure.</p>	Project close down procedure confirmed with Project Board.	[Open/Closed]

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

Table 6: Risk register

Legend:

LP = Lead Partner

PSC = Project Steering Committee

SC = Steering Committee (same as PSC)

PP = Project Partner (PP8 in this case)

References and attachments

- [1] Screenshots – N/A
- [2] Links – N/A
- [3] Documents used – N/A
- [4] Information sources – N/A
- [5] Other references – N/A