

DigLogs

Functional specification and Design details

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. Functional specification

This chapter describes the functional specification of the pilot project.

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.

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.

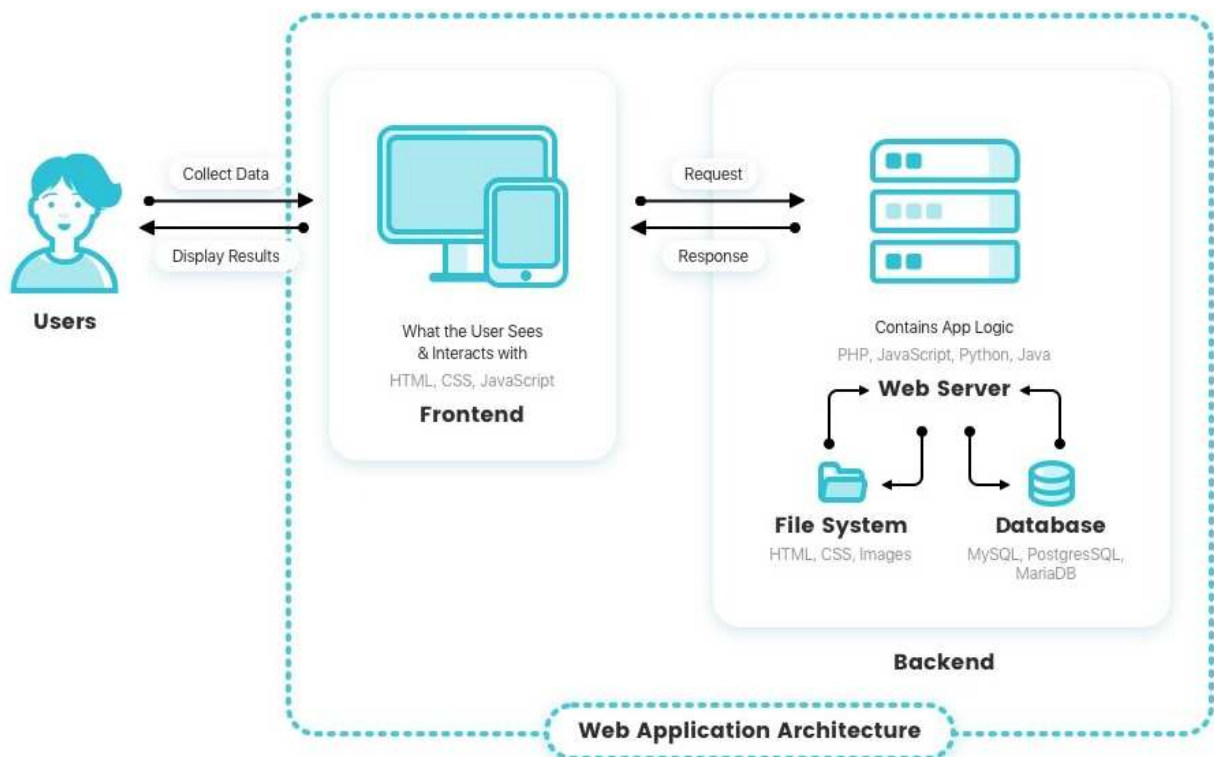


Figure 2: Basic application architecture

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”

2. Design details

2.1 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.
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Table 1: Basic Web functions

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

Nr.	Date Element	Remark
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.

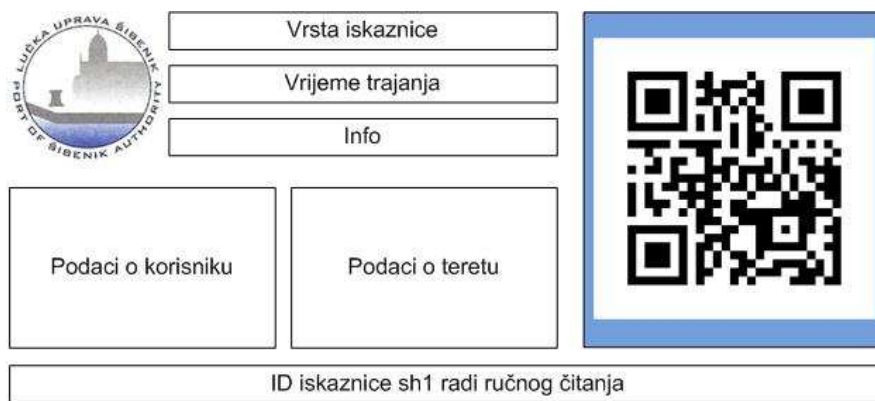


Figure 3: Visual representation of the ID card

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.

2.2 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	Outcome	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

2.3 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.	Function	Description	Outcome	Remark
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

2.4 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.	Function	Description	Outcome	Remark
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