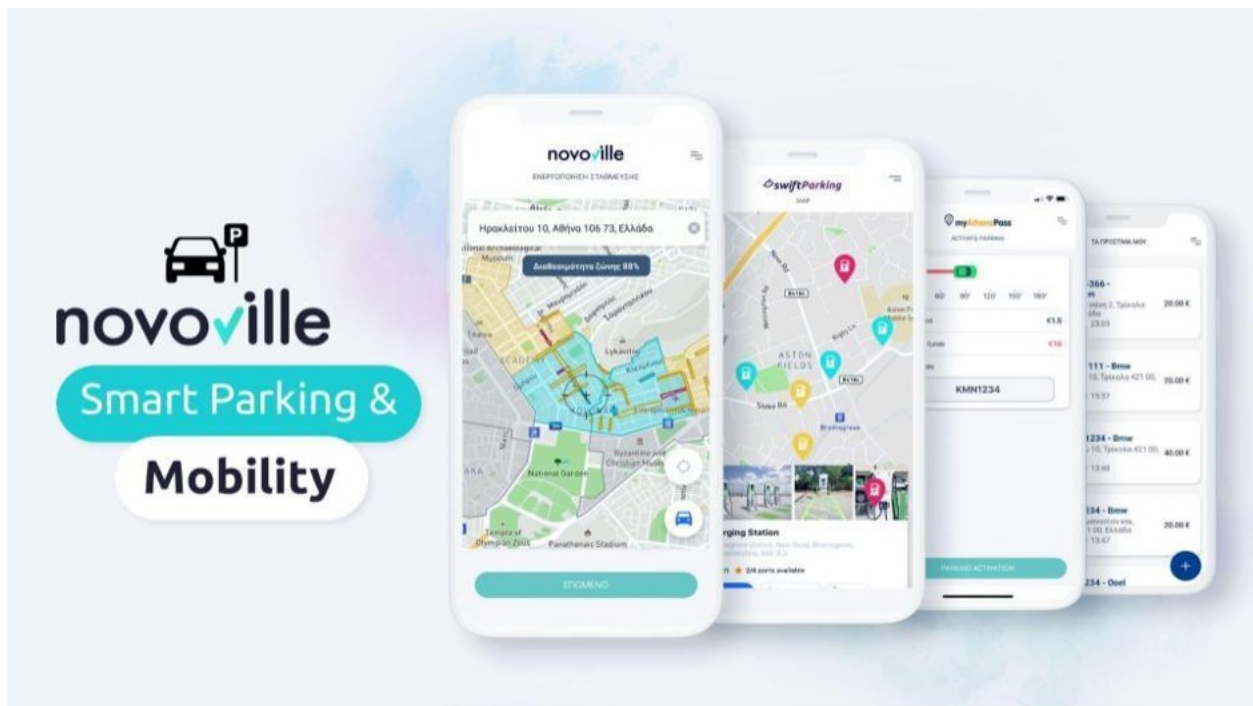

SERVICE DEFINITION
WRITTEN FOR THE DIGITAL MARKETPLACE G-CLOUD 15

Novoville

PARKING & MOBILITY PLATFORM



novoville

1 Kings Avenue, London, N21 3NA, UK | t: 0207 442 5551 | www.novoville.com

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1. Introduction

Efficient management, control, and optimal utilization of both on-street and off-street parking spaces are essential for modern cities. The advancement of technology, coupled with the widespread adoption of smart portable devices and Internet of Things (IoT) applications, plays a central role in contemporary urban mobility approaches, with parking management being a significant component.

The proposed Integrated Web-Based Controlled Parking Management & Urban Mobility System - Novoville Parking & Mobility - constitutes a comprehensive information system that is already successfully operational in councils & municipalities in the UK, Greece and Cyprus, currently covering more than 30,000 controlled parking spaces both on-street and off-street, serving tens of thousands of drivers and Municipal Police officers responsible for parking legality enforcement and compliance with traffic regulations. Additionally, the system manages permits for permanent residents and other special categories while interoperating through programming interfaces with third-party systems (IoT sensor platforms, ERP/financial management, smart city platform, bike-sharing systems, chargers, banking payment systems, etc.).

The Novoville Parking & Mobility information system has been developed, operates, and continuously expands to adapt to the dynamic needs of modern cities, incorporating technologies and functionalities that fully address the requirements of controlled parking while also providing the capability for expansion to cover broader urban mobility systems and functions (urban transport, shared bicycles/micro-mobility, EV charging, etc.).

Novoville Parking & Mobility serves as the central core of the controlled parking system, communicating, collecting, and consolidating heterogeneous data from individual applications and subsystems while also supplying data to end-user interfaces/applications (citizens/municipal police/municipal services). In this way, it significantly reduces the architectural complexity of similar systems, ensuring interoperability of individual subsystems and applications, thus constituting a unified and homogeneous system. This, in fact, is a significant guarantee for the smooth and uninterrupted operation of the Controlled Parking System. Moreover, through programming interfaces (Restful APIs), it has the capability of interoperability with third-party systems, while its modular architecture allows for easy and reliable scalability.

Novoville Parking & Mobility operates entirely in the cloud and consists of the following subsystems & applications, forming an integrated and unified information system:

1. Central Parking Management System, serving as the core of the information system and including the following subsystems:

- A. Parking Policy Configuration Subsystem
- B. Dashboard: Reporting, Metrics & Statistical Data Subsystem
- C. Electronic Payment & e-Wallet Management Subsystem
- D. Management Subsystem for Permanent Resident & Special Categories Parking
- E. Fine Management & Municipal Police Enforcement Control Subsystem
- F. User Management Subsystem
- G. Content Management & End-User Application Communication Subsystem
- H. Request and Problem Reporting Subsystem
- I. Charitable allocation Subsystem
- J. Vehicle Exception Management Subsystem

2. Mobile Application for Drivers/Citizens

3. Municipal Police Mobile Application for Field Inspection and Fine Enforcement

4. Interoperability Interfaces (APIs) for data interchange with third-party systems

5. Third-party POS Terminal Mobile Application

1.1 Expected Benefits

By implementing the proposed system, the council will gain, among other benefits, the following advantages, enabling:

- Have immediate and real-time visibility of the status of all controlled parking spaces in the city (on/off-street).
- Ensure the scalability of the Controlled Parking System and its interoperability with existing and future urban mobility systems.
- Ensure parking for permanent residents and special categories.
- Discourage long-term parking to improve mobility, especially in commercial areas.
- Conduct targeted inspections in areas of responsibility.
- Eliminate manual and time-consuming inspection processes, saving resources and time, while simultaneously increasing efficiency.
- Improve traffic conditions in the city center, both by reflecting the availability of free spaces (on/off-street) and by more effective policing.
- Reduce air pollution due to reduced parking search time and improved mobility conditions.
- Enhance communication and interaction with citizens and visitors.
- Better control the efficiency of its services and integrate all performance indicators (KPIs) concerning them into a unified management center.

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- Achieve better citizen and visitor service.
 - Reduce bureaucracy and administrative costs, saving citizens' time.
 - Make decisions based on real data.
 - Harness smart city technologies with significant expansion capabilities.
 - Generate statistical data that can be utilized in various ways regarding parking and movement in the city by hour, day, and preferred month by citizens.
 - By leveraging the above data, both the local authority and commercial establishments can undertake initiatives to boost commercial activity through promotional actions, etc.
 - Upgrade communication between the Council and Citizens/Visitors through the addition of new communication channels and the utilization of new technological systems (mobile phone applications, push notifications etc.).

2. Technical & Functional Description

The Novoville Parking & Mobility Platform is cloud-hosted and delivered as a Software-as-a-Service (SaaS) solution.

It comprises the following core subsystems and applications:

- A. Central Parking Management System
- B. Mobile Applications for Citizens/Drivers
- C. Mobile Application for Municipal Police Officers
- D. Interoperability Middleware Interfaces with Third-Party Systems
- E. POS Terminal Application for Third-Party Vendors

A detailed description follows:

2.1 Central Parking Management System

The Novoville Parking & Mobility Platform resides in the cloud and serves as the central core and primary management application of the controlled parking system. It enables comprehensive supervision and management of both on-street and off-street parking spaces, policymaking for parking regulations, payment management, enforcement actions and fines by municipal police, as well as the display of processed statistical data and reports (dashboard/reports). Through the central administrative system, integration of all individual subsystems and applications is achieved, ensuring interoperability with third-party systems, thus facilitating the consolidation, processing, and display of

heterogeneous data for complete and effective parking control in the city (sensor data, transaction data, enforcement and fines data, etc.).

It accommodates an unlimited number of parking spaces of various types and an unlimited number of sensors, while currently managing with absolute reliability more than 30,000 on-street and off-street parking spaces in the United Kingdom, Greece, and Cyprus. It is scalable and follows a modular architecture, capable of inherently incorporating additional functionalities of the Novoville platform as well as new services and functionalities.

Access to the system is available through any of the latest versions of popular web browsers such as Google Chrome, Mozilla Firefox, Microsoft Edge, Apple Safari, etc., and from any device with internet connectivity. It follows the logic of "Responsive design" for optimal access from mobile devices and different screen sizes of any available display/device.

The central administrative system and its subsystems are interconnected via documented APIs and exchange data with mobile applications for citizens/drivers, the mobile application of municipal police officers, sensor management software, the POS app for resellers, and, if required, with the municipality's ERP system (provided it has corresponding interfaces-APIs) while being inherently connected to payment acceptance, execution, and settlement services via accredited payment institutions (e.g. Judo Pay, Viva Payments and more).

A detailed description of subsystems follows:

2.1.1 Parking Policy Configuration Subsystem

A specialized subsystem within the central management system facilitates the dynamic input of fundamental operational parameters for the Controlled Parking System, thereby enabling the creation of parking policies grounded on the subsequent characteristics and functionalities:

- Operational Hours of Controlled Parking: This feature empowers the dynamic and/or automated input of operational hour parameters for the days and times of controlled parking activities, including exceptions such as holidays and special circumstances. The operational hour/calendar schedule can be tailored to specific parking zones/areas (on-street) and car park/off-street parking, accommodating diverse operational scenarios simultaneously.
- Pricing Policy: This component allows for the real-time, dynamic adjustment of parking time pricing/purchase costs based on decisions made by municipal authorities. The pricing policy model is characterized by its dynamism and flexibility, supporting various

charging methods with temporal and spatial correlations, including per minute, per half-hour, per hour, per day, per week, per month, per location, per zone, per space, etc. In the UK (West Midlands), the system already supports over 20 different dynamic pricing models depending on factors such as location, time, day, and parking space. Moreover, the system provides the flexibility to select distinct pricing policies for off-street car parks compared to on-street parking.

- Parking Space Classification: This functionality enables the registration of parking spaces based on specific criteria, such as permanent resident, visitor, disabled, and other special categories, leveraging geographical data associated with individual parking spaces.

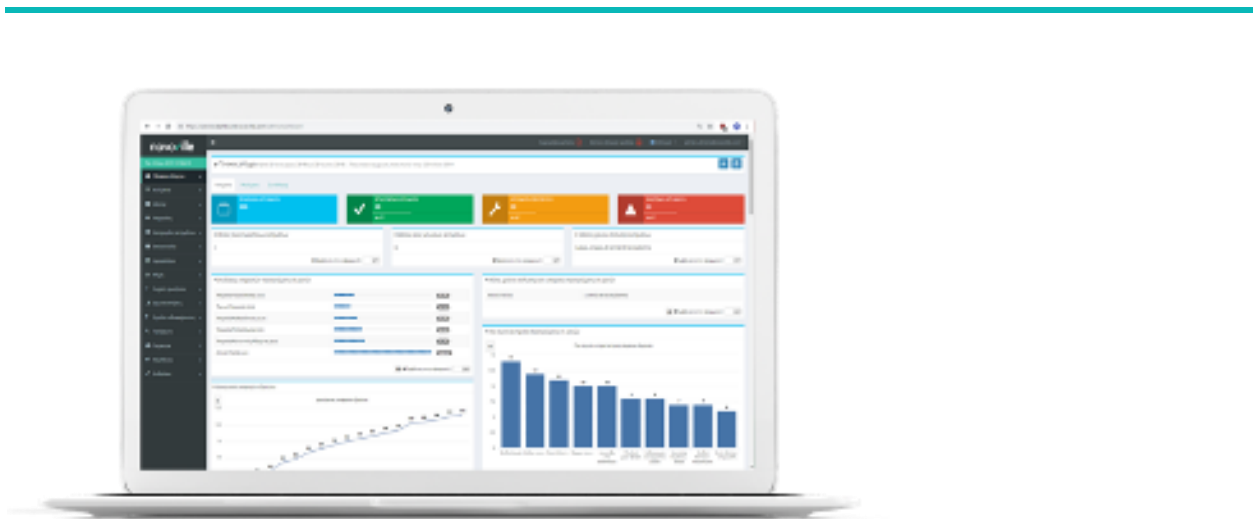
The subsystem is designed to be scalable and can accommodate additional parameters as required in the future.

2.1.2 Dashboard: Reporting, Metrics & Statistical Data Subsystem

The central parking management system incorporates a specialized subsystem designed for the dynamic presentation of processed statistical data and real-time information through a dashboard interface, as well as for the generation of periodic reports. This subsystem facilitates data presentation with the utilization of multiple and combined search criteria, including parameters such as time range, transaction count, revenue range, number of wallet top-ups, top-up amounts, violations/offenses, checks, parking counts per area/zone, and real-time occupancy/availability (if IoT sensors installed). Moreover, it offers the flexibility to export and save reports in various formats such as PDF, XLS-Excel, and CSV.

Functioning as the single interface for comprehensive supervision and monitoring of the city's controlled parking operation, the subsystem gathers and processes data from all "native" sources, including Novoville subsystems and applications, as well as from connected systems like IoT sensor management and of integrated off-street parking management software. Furthermore, its dynamic and expandable nature enables the incorporation of data from additional sources/systems such as buses, bicycles, and traffic data in the future.

The display of statistics and key performance indicators (KPIs) encompasses a diverse range of graphical representations and is fully customizable and dynamic, allowing adjustment to the specific needs and preferences of council and municipal police users.



Key performance indicators (KPIs) and metrics produced include, but are not limited to:

- Total parking transaction amount within the selected time frame
- Total number of parking transactions within the selected time frame
- Total refund amount for parking transactions within the selected time frame
- Total number of refunds for parking transactions within the selected time frame
- Total amount of electronic wallet top-ups within the selected time frame
- Average amount of electronic wallet top-ups within the selected time frame
- Average parking time within the selected time frame
- Average number of parking transactions within the selected time frame
- Total parking time purchased/activated within the selected time frame
- Variance in parking transactions within the selected time frame
- Variance in parking time within the selected time frame
- Transactions per parking space within the selected range
- Transactions per parking zone within the selected range
- Total mobile application users within the selected time frame
- New mobile application users within the selected time frame
- Number of transactions via third-party POS terminals within the selected time frame
- Amount of transactions via third-party POS terminals within the selected time frame
- Number of transactions and transaction amounts per closed/off-street parking space within the selected time frame

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- Daily parking heatmap
 - Number of transactions in off-street parking within the selected time frame
 - Total amount of transactions in off-street within the selected time frame
 - Number of fines within the selected time frame
 - Number of fines per Municipal Police officer within the selected time frame
 - Total amount of fines within the selected time frame
 - Number of Municipal Police checks within the selected time frame
 - Total number of checks per Municipal Police officer within the selected time frame
 - Number of unpaid fines within the selected time frame
 - Total amount of unpaid fines within the selected time frame
 - Total amount of collected fines within the selected time frame
 - Hourly variance in issued fines within the selected time frame
 - Variance in fines per type within the selected time frame
 - Total accepted/rejected/pending appeals
 - Occupancy/availability rates for on-street parking spaces within the selected time frame
 - Occupancy/availability rates for off-street closed parking spaces within the selected time frame
 - Occupancy rates for special parking spaces (e.g., for disabled individuals, residents, loading/unloading, etc.) within the selected time frame
 - Rates/number of violations in special spaces as well as non-special spaces within the selected time frame

2.1.3 Electronic Payments & e-Wallet Management Subsystem

The electronic payments subsystem manages all payments/transactions related to parking operations. It enables end-users (residents or visitors) to purchase parking time electronically and pay any fines imposed on them through mobile device applications, as well as through connected third-party Point of Sale (POS) terminals. Additionally, it allows permanent residents to pay for permanent resident parking permits (if decided by the Council) once their application is approved.

For the payment of parking time or fines, the mobile applications are supported by an electronic wallet (e-wallet) through which users can top up their parking time credits

gradually and pay any parking fines. This can be done either by charging their credit or debit cards or through third-party vendors who possess POS terminals and are certified vendors of the Council. The e-wallet can be topped-up using widely accepted credit and debit cards (such as MasterCard, Visa, Maestro, American Express, etc.), as well as through Apple Pay and Google Pay if the user has activated these services.

To initiate the loading/top-up process, the user selects the desired amount from preset options (e.g., 1, 2, 5, 10, 20 / final amounts to be agreed upon with the Council) and proceeds to a dedicated subsystem of the payment institution, which is integrated into the application. There, the user is informed about the selected amount and enters their credit/debit card details (once). Card details are not stored in the application but are managed by the banking institution system using secure encryption methods.

Consequently, the process of purchasing a parking ticket through mobile apps unfolds as follows:

A. E-wallet Top-Up (First Time):

1. Select desired top-up amount (e.g. 1, 5, 10 - preset amounts).
2. Input (once) desired credit or debit card information. Google Pay and Apple Pay methods are also supported.
3. Complete transaction and e-wallet top-up.

B. Purchase of Parking Time:

1. Select parking location (automatically from GPS/enter parking space number/enter area. Automatic verification by the system with sensor data follows. License plate is already stored).
2. Choose desired parking time.
3. Purchase parking time.

Each user's top-up amount is securely maintained in a dedicated environment of the banking institution (marketplace wallet) and is transferred to the Council's bank account automatically when consumed by the user (e.g., when purchasing an hour of parking). This way, the Council can potentially develop a broader Citizen Wallet for all citizen payments.

The user is notified of the transaction completion through the Novoville application. The process is entirely secure and PCI compliant. Additionally, Novoville is certified by the Financial Conduct Authority of the United Kingdom for conducting electronic transactions.

In the Novoville management system, certified users from the Council//Municipal Police can view all transactions in real-time while amounts from parking time purchase/consumption are automatically transferred to Council's bank account.

The user has the option to store their credit/debit card in a secure environment managed by the payment institution so that they do not need to enter their card details each time they wish to make a transaction. Furthermore, within the e-wallet environment, users can add multiple cards (debit/credit) and use them as needed.

Finally, the system supports multiple Legal Entities and bank accounts to allow differentiation of beneficiaries depending on the type of payment required (e.g., fine vs parking time) and/or location.

2.1.3.1 The advantages of the Novoville e-wallet

The Novoville e-wallet, which is part of the proposed solution, offers significant advantages over other methods that necessitate the manual input of credit/debit card details for each transaction.

Here's a concise summary of these advantages:

A. For users (drivers/citizens):

1. Convenience:

Research and data from over half a million Novoville app users indicate that most mobile parking app users are frequent parkers. For these users, constantly entering credit/debit card information for micro-payments is impractical. Storing card details once and easily topping up their e-wallet ensures swift and hassle-free parking transactions.

2. Reliability & Control:

The Novoville wallet keeps a comprehensive transaction history for users, offering the option to download payment receipts. This transparency minimizes disputes and significantly reduces the workload for customer support services.

3. Support for multiple payment types:

Unlike other solutions, the Novoville wallet enables users to make various payments from a single account. Councils, either independently or in collaboration with other entities, can offer diverse services (e.g., bus tickets, bike rentals) through the same application and wallet, enhancing user convenience and versatility.

B. For contracted third-party vendors (with POS terminals):

Authorised vendors equipped with POS terminals and the Novoville Pay app can streamline parking transactions. Each vendor manages their own e-wallet, simplifying both wholesale purchase of parking time and subsequent sales to customers. Additionally, these certified vendors can resell other municipal services, further expanding the utility of the system.

C. For the Municipality:

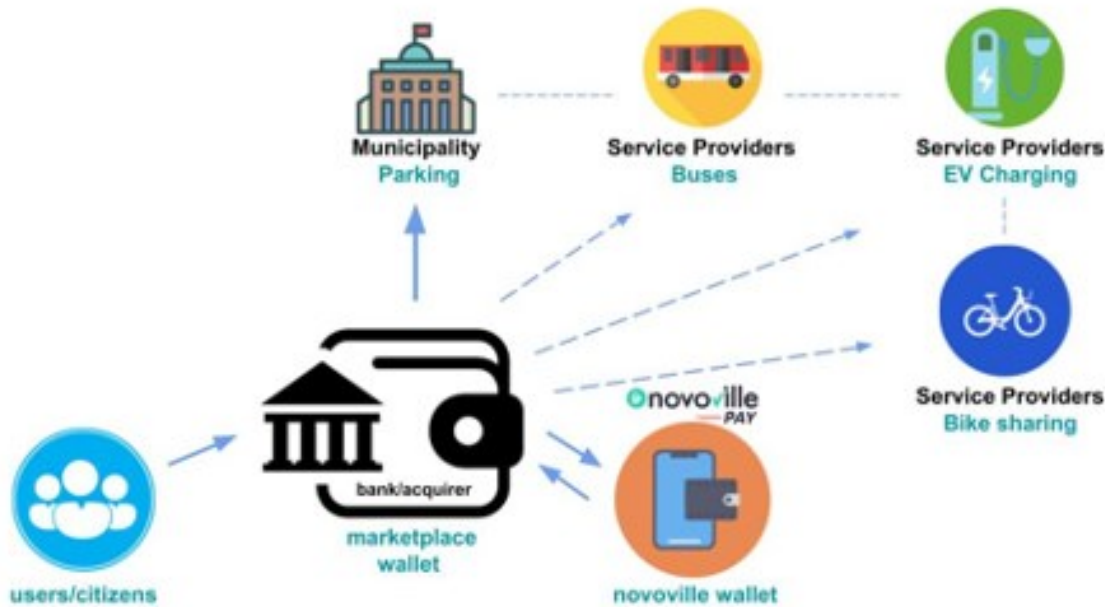
Traditional electronic payment methods often limit Councils to accepting payments solely through banking channels, hindering their ability to consolidate services. By integrating the Novoville e-wallet, Councils can offer a wide array of services through a unified platform, facilitating easy and rapid payments for citizens and visitors. Moreover, the municipality retains flexibility in setting commissions, ensuring the project's long-term financial viability beyond the initial funding period.

2.1.3.2 The macroscopic architecture of the Novoville wallet

The operational infrastructure of the Novoville wallet is based on the creation of an escrow account/marketplace wallet by each Council in collaboration with the banking institution, where the money loaded/topped up by users-citizens is securely held until they use any of the available services. Assuming that in the initial phase the only available service is the purchase of parking time, then the process/flow is as follows:

- A. The User/citizen tops up their electronic wallet with the desired amount of money (e.g., 5 euros/pounds) using their credit or debit card.
- B. The transaction is cleared in real-time by the collaborating banking institution, and the amount is deposited into the escrow account/platform wallet. Simultaneously, the user's electronic wallet in the application (novoville wallet) is updated with the loaded amount (e.g., 5 euros/pounds).
- C. The user activates one hour of parking. If the cost is, for example, 1 euro/pound, then this amount is released from the escrow account/platform wallet and deposited into the Council's bank account. The frequency of clearances is dynamic and configurable (e.g., real-time, daily, weekly, monthly).

Furthermore, in anticipation of future service expansions, such as the potential inclusion of services like bus ticket purchases (park & ride), shared bicycle rentals, electric vehicle charging, etc., or other payments associated with the Council, the proposed solution is designed to accommodate multiple payments for various services (with different beneficiaries) from a single wallet.



2.1.3.3 Summary of the key advantages of the proposed payments management subsystem

The proposed solution offers several key advantages:

1. Users experience seamless navigation and transaction completion, ensuring a smooth overall experience.
2. The entire process can be customized to meet the Council's specific needs, guaranteeing an outstanding user experience.
3. It supports any billing policy chosen by the Council, whether it's charging per minute or at specific time intervals. Changes to the billing policy are seamlessly implemented in real-time by the administrative system.
4. Both the system and the Council maintain strict privacy standards by not retaining any credit/debit card details used during transactions. Card data is securely encrypted within the banking institution's environment, ensuring absolute transaction security.
5. The solution offers the flexibility for future integration of a specialized SMS payment subsystem, catering to the Council's needs as they evolve.

Within the administrative system, authorized administrators of the Council possess access to an extensive array of data and information concerning payments, along with functionalities including:

1. Observing transactions listed in real-time and chronologically.

2. Employing multiple filters to conduct comprehensive transaction searches based on various criteria such as user name, license plate number, transaction date, etc.

3. Presenting comprehensive details of all electronic wallets, top-ups, and their corresponding balances, alongside the capacity for integrated searches. Furthermore, showcasing all transactions pertaining to special parking permits.

4. Revealing the present balance of each individual's electronic wallet.

5. Facilitating refunds in the event of errors or under specific circumstances.

2.1.4 Management Subsystem for Permanent Resident & Special Categories Parking

A specialized subsystem facilitates the electronic issuance process of special parking permits for permanent residents (Residents Parking Permits) and other specific categories, such as disabled individuals, among others. This subsystem empowers the Municipality/Municipal Police to efficiently organize and oversee the issuance of special parking permits, fully digitizing the associated procedures.

The subsystem encompasses the following functionalities:

- Web Application deployed on the Municipality's website: Enables the electronic submission of applications and supporting documents for acquiring the special emblem/license designated for permanent residents. The necessary documentation may vary based on the Municipality's regulatory guidelines. Applicants can monitor the status of their application online and receive notifications via SMS and/or email regarding the approval or rejection of their application.
- Administrative Subsystem: Establishes a platform for managing permanent residents, wherein individuals granted approval for the issuance of the special permit/emblem are registered. This system facilitates registration either with or without payment for a specified duration, such as one year.
- A specialized management system is implemented to register additional special categories, including but not limited to Persons with Disabilities, Professionals, and any other groups as per the Council's regulatory directives. This establishes a digital repository for special parking permits, enhancing and modernizing the process with numerous advantages for both the Council and the recipients. Furthermore, an array of search filters enables instant access to data and information about each beneficiary/special permit holder.

The subsystem is highly adaptable and flexible, designed to meet the specific requirements of the Municipality. The application process for obtaining a special permit is straightforward and transparent, allowing applicants to electronically submit required documentation without the need for physical copies. Moreover, the system automatically notifies applicants via email regarding the status of their application, including approval or rejection, and sends timely reminders to permit holders for renewal. Renewal can be easily completed through a simple

declaration if there are no changes to the current permit data.

Additionally, the system offers multiple search filters for applicants, parking permits, and rejected applications, providing comprehensive details and a complete action history log. Furthermore, authorized administrators have the capability to send bulk notifications/messages to registered users, permanent residents, and others.

2.1.5 Fine Management & Municipal Police Enforcement Control Subsystem

This subsystem allows authenticated users of the Council/Municipal Police (administrators) to manage controls, violations/fines, and their payments. It serves as the central tool for the Municipal Police, providing an overview of the activities of Municipal Police officers, which, in combination with the mobile applications of Municipal Police officers, is expected to significantly improve the effectiveness of controls and overall supervision of controlled parking in the Municipality.

Certified administrators have different access privileges based on the Municipality's needs and hierarchy.

The main functionalities of the subsystem include:

- Real-time recording of fines/violations with all details of the violation as entered by the mobile application of Municipal Police officers (vehicle details, violation details, issuing officer details, etc.).
- Ability for manual entry of a fine/violation by the system administrator.
- Dynamic display of fines/violations in a list in chronological order.
- Multiple and combinational search filters for registered fines/offenses (based on issuance time, address, license plate, Municipal Police officer, etc.).
- Editing of a fine and selection of status (e.g., objection status, paid, etc.).
- Viewing of a fine, its details, internal notes, image, and options for download, storage, printing, etc.
- Management of objections: submission of an objection application and supplementary electronic documents, and automatic updates on the status of the objection. Municipal Police officers can also submit objections through the system.
- Creation of different types of fines: the system dynamically allows the creation of different types of fines for controlled parking and obstruction of traffic.
- Multiple statistical data on controls and fines/offenses using graphs, tables, and display filters based on time range.
- Ability to export data in multiple file formats such as .csv, excel, pdf, etc.

Through the administrative subsystem, the administrator can choose the live visualization of combined data regarding violations, controls, and fines, as well as violation data from sensors on the city map.

Moreover, hovering over each point presents additional details and data (preview) about the violation.



At the same time, when a complaint/request/report regarding illegal parking is lodged through the Novoville mobile application, it is instantly recorded in the subsystem, allowing the administrator to promptly relay it to the Municipal Police officer in the field for investigation.

In essence, the subsystem is equipped with various search filters for reports and metrics, including parameters such as location, time, Municipal Police officer, address, time range, and more. This feature empowers administrators to produce highly useful reports and present them in graphical representations and comprehensive lists.

2.1.6 User Management Subsystem

This subsystem enables centralized management of all users of the parking management system as well as users of mobile applications. It includes the following functionalities:

- Single-Sign On (SSO) functionality for registered users of the management system. The Council will provide our company with information regarding users who will have access to the system on behalf of the Council, as well as the desired access rights, in order to create personalized login credentials (username/password) for each user in the management system.
- Provision of different access rights based on user typology (administrator, regular user, etc.)

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- Access to different data based on user typology
 - Assignment or restriction of access selectively or in bulk based on user typology, e.g., from privilege lists
 - Management of users of mobile device applications (citizens): central administrators will be able to oversee all registered users of mobile device applications, have editing capabilities, access their contact details, and view their transaction history. In case of misuse, they can "block" a user or even delete them. Additionally, they have the ability to edit user details and communicate directly with them through the system.

2.1.7 Content Management & Communication Subsystem

A specialized subsystem of the management system allows for the management of content and communication between the Council and end-users through mobile device applications (mobile apps). The content includes the following functionalities of the applications (mobile apps):

1. Events Calendar Functionality
2. Points of Interest Functionality
3. Announcements & Messages Functionality
4. Personalized Messages Functionality
5. Controlled Parking Operational Hours Functionality
6. FAQs - Frequently Asked Questions / Answers Functionality

In a specific module of the management system, the operator has the ability for each of the above functionalities to edit/input the desired content and send/display it in real-time on end-user applications.

Personalized or bulk messages to end-users of mobile applications are sent via Push Notifications, SMS, and email. The subsystem allows for text input, attachment of image files and hyperlinks via a special text editor, and provides the option for individual or group communication with one or more users, as well as the selection of the desired communication method (push notifications/sms/email). The system maintains a complete log of all sent messages and allows for retrospective editing of a sent message.

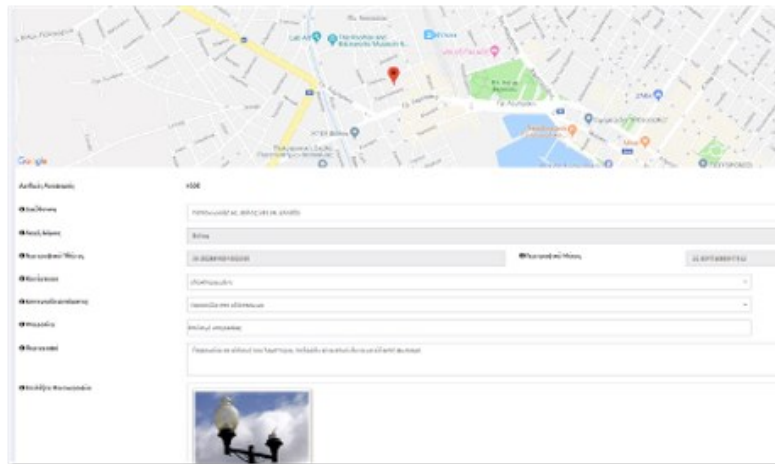
As described below, the system supports the sending of automated push notification messages to users whose parking ticket expires in 10 minutes to either extend it by purchasing a new ticket or move their vehicle.

A specialized subsystem facilitates the reception of requests and reports concerning controlled parking issues. This allows the Council to manage citizens' requests/complaints regarding parking issues (illegal parking, road markings, potholes, etc.) that are submitted to the Council. The main functionalities of the subsystem include:

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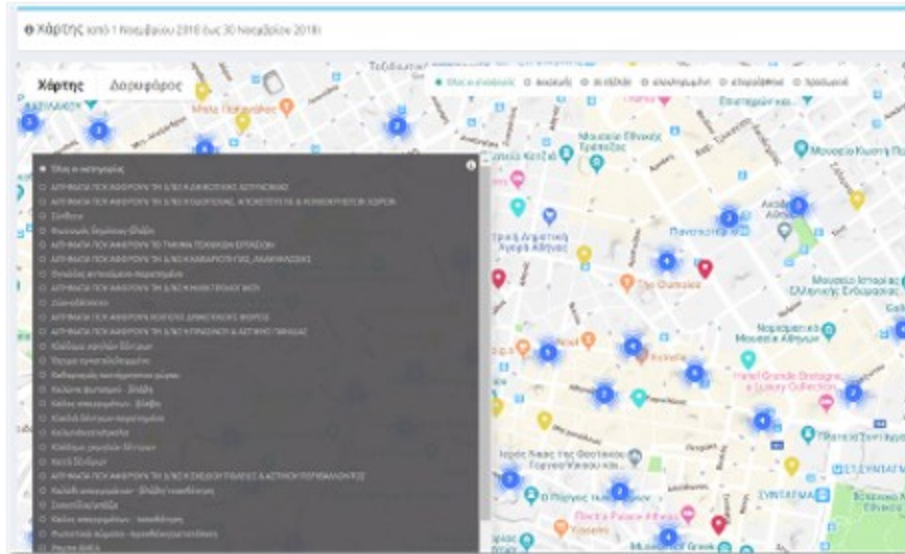
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C) Editing of requests and assignment to the relevant department/employee of the Council: the administrator can assign the resolution of each report automatically or manually to the relevant department or employee who will handle the resolution.



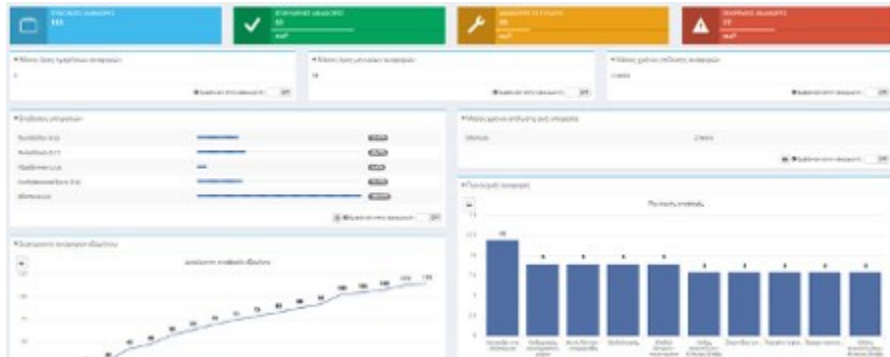
D) Flagging with special color-coded indicators for the resolution stage of the report: The administrator can select the resolution status (stage) of each report. The system has 3 predefined stages, each corresponding to a specific color scheme: Red - pending, orange - in progress, green - completed.

E) Mapping of reports in real-time on the city map: Through the management system, the administrator can choose to display live mapping of reports on the city map with different color-coded indicators depending on the resolution stage of each report. Moreover, filtering functionality of reports is provided, and hovering over each point displays the type of report and the management option, just like in functionality C.



F) Display of processed statistical data: regarding frequent requests, departments with the highest workload, average response/resolution time, etc.: From the main menu of the administrative system, the administrator can access processed statistical data, with special charts and report mining. The processed statistics include:

- City today: charts depicting all reports of the day with a distinction based on their resolution stage.
- City until today: charts depicting all reports until today, distinguished based on their resolution stage.
- City this month: charts displaying all reports of the last month.
- Resources with the highest workload: charts distinguishing the services that have handled the most reports.
- Resource efficiency: charts depicting the efficiency of each service.
- City's most frequent issues: charts depicting the city's most frequent issues by report category.
- Average response time in days: a chart depicting the average response time of the Municipality's services.



2.1.9 Charitable allocation Subsystem

A specialized subsystem empowers the Council, upon future decision, to devise and execute a customized policy of philanthropic distributions from a portion of the proceeds generated by Controlled Parking activities. It provides the capability for direct conversion of a portion of the revenues into units/services/provisions/items for reimbursement (e.g., food bank, other social purposes)

The conversion of revenues into desired reimbursement units (e.g., social projects, sidewalk upgrades, etc.) is done in real-time within the end-user application for transparency purposes.

The subsystem is fully customizable and can address the specific needs of the Council.

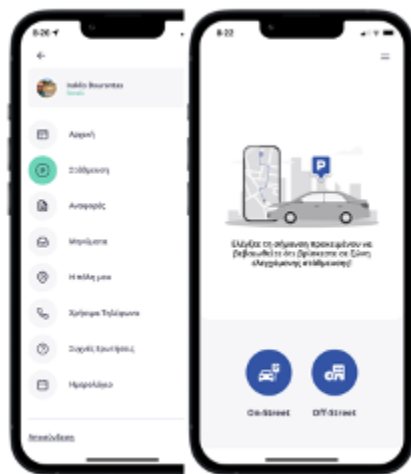
2.1.10. Vehicle Exception Management Subsystem

A specialized subsystem allows for the introduction of special exemptions for vehicles subject to designated parking privileges. Authorized administrators from the Council/Police can input into the subsystem the license plate numbers of exempted vehicles from parking fees, specify the duration of the exemption (one hour, one day, a week, etc.), and the reason for the exemption. Examples of such exemptions may include municipal vehicles, police vehicles, vehicles of VIP visitors, among others. In case of inspection by the Municipal Police, the system will signal back to the Municipal Police application that the specific vehicle holds a special parking permit/exemption, thus no fine will be issued.

2.2 Mobile App for Drivers/Citizens

The mobile application “Novoville” is designed for the two most popular operating systems for smart mobile devices, Apple iOS version 15 and above, and Google Android version 10 and above. The development of the source code has been implemented in native environments for the iOS and Android operating systems.

The Novoville mobile application is already successfully operating in more than 80 Councils/Municipalities in the UK, Greece and Cyprus, offering a plethora of digital services. It is fully customizable and has the capability for expansion and addition of new services according to the future needs and digital transformation strategy of the Council.



Therefore, the proposed solution involves integrating multiple additional services beyond controlled parking, aiming to provide the citizens and visitors with a new digital tool that not only serves parking needs but also functions as a new and direct communication channel between the Council and citizens.

The application supports a multilingual environment. The navigation submenu of the application for parking follows the following basic categories:

1. Parking Ticket Activation
2. Electronic Wallet
3. Ticket Purchase History
4. Controlled Parking Schedule/Operating Hours/Days

The primary objective is to streamline user experience by minimizing the required input. Operational features align with the intuitive user journey logic of the application, structured as follows:

- A. Registration (for new users)
- B. Parking spot location using GPS
- C. Selection of desired parking duration
- D. Input of license plate number (once, as it is saved, with an easy option to change in case of using another vehicle)
- E. Input of area or parking spot (optional)
- F. Input of Debit/Credit card information (for new users who have not saved a card)
- G. Completion of Purchase

H. Countdown timer and display of spot on the map

I. Optional extension of parking time with one step before the expiration of the active ticket. Note that the user automatically receives push notification messages 10 minutes before the parking time expires and can remotely and in one step extend the parking time. The operation of the automated message is feasible even without the user having access to the data network.

Here are the steps for purchasing parking time:



0. Selection between on-street or off-street parking: If both types of parking options (on and off-street) are available, users are prompted to choose between the two on the initial screen to follow the respective flow of steps.

1. Locating a parking spot using GPS: After registration for new users or upon opening the app for registered users, the first interface screen involves locating the user's position using the device's integrated GPS functionality. The location is displayed on an embedded Google Maps map with an accuracy of approximately 2 meters, allowing users to move the marker to the desired spot.



2. Displaying parking location/address: On the location identification interface screen using the map, the exact address of the user's position or a marked spot on the road or even within a defined area, representing a limited number of parking spots marked by vertical signs or boards, is displayed. As the marker is moved, the address updates in real-time. Location accuracy has a deviation of approximately 2 meters.

Additionally, if IoT sensor is available, live occupancy data is displayed on the map, indicating availability per street and area/neighborhood with different color coding. Upon parking activation, users can input the parking spot number or the area number, as defined by the Council.

3. Purchasing a parking ticket: Parking ticket purchase is made using an electronic wallet (e-wallet). On this specific interface screen, users can use and store multiple debit/credit cards. After using/storing the card (MasterCard, Visa, Maestro, American Express, etc.), users can select the desired

ticket value to top up their wallet, choosing from multiple ticket options such as 1, 2, 4, 6, 10, and 20 Euros/Pounds. Ticket amounts dynamically change according to Council indications and policies. Users can always add/modify payment methods, with the already stored payment card visible, as well as the available wallet balance. Additionally, drivers can purchase parking time through third-party sellers equipped with POS terminals. Payment settlement is handled by the payment/banking institution.

4. Displaying & Saving Payment Receipt: After each parking ticket purchase, a detailed history of parking time purchases and wallet top-ups is maintained, and users can "download" the receipt as a PDF file.



5. Activating a parking ticket: Parking ticket activation occurs in 3 steps:

5.1. Selection of parking spot/location (automatically or manually).

5.2. Selection of parking time (per minute or predefined intervals, e.g., 30 minutes, etc.).

5.3. Inputting the vehicle license plate number (once, as it's stored and can be changed by the user anytime).



After selecting a parking spot (either automatically via GPS or manually), a real-time check is conducted to determine whether the selected spot is within a designated controlled parking zone. If the spot is not within such a zone, an automated message/notification informs the user accordingly and prevents the completion of the parking activation process. Conversely, if the spot is within a controlled parking zone, a message with a photo is displayed, warning/urging the user to verify whether the selected spot is legal (e.g., not on a disabled ramp, etc.). After the user's consent, they can proceed to activate the parking ticket.

In the case of selecting an off-street parking lot, all available car parks are displayed on the map, and the user chooses the desired one. Then, a new screen displays information

about the specific car park (availability, operating hours, price list, etc.), and the user can either pre-purchase parking time or navigate to it.

The selection of parking duration is made in a user-friendly manner, presenting the allowed time range, for example, with a minimum allowable time of 30 minutes and a maximum allowable time of 180 minutes, or as specified by the council's parking regulations/policies, including the possibility of minute-based charging for parking fees. Choosing the desired duration will dynamically adjust the corresponding parking cost in real-time, following the Council's Controlled Parking Operation regulations. If the cost of the selected parking duration exceeds the available balance in the user's wallet, the application will not allow the user to activate the parking ticket and will clearly inform them that the available balance is insufficient to complete the transaction. Additionally, on the same interface screen, the user will be able to top up their wallet.

Future Parking Ticket: If the user parks their vehicle in a controlled parking zone outside of operating hours, the application allows them to pre-purchase a parking ticket for the immediately following operating day/hour.

6. Ticket History

In a dedicated section of the application, users can view a complete history of all purchased parking tickets. Each ticket includes detailed information such as date and time, cost, parking duration, license plate, and parking address.

For ease of search, there are filters for immediate sorting of on or off-street parking tickets.

7. Fine Payment:

The easy and fast payment of fines is an essential tool for every council expecting an improvement in the collection of confirmed debts. The available functions include:

7.1. Input of a unique fine number or code.

7.2. Display of the payment amount and any activated discounts.

7.3. Payment using the Wallet feature.

7.4. Downloading of the receipt/payment proof.

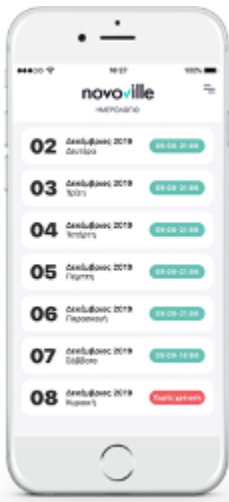
8. Push Notification Feature

The application has the capability to receive and display push notifications. The functionality of notifications covers at least the following scenarios:

8.1. Automated user notification before the expiration of an active ticket. Specifically, 10 minutes before the expiration of active parking time, the application will automatically send a notification indicating the expiration of parking time. The notification will be sent even if the user is offline (local storage/sending).

8.2. General messages/announcements: The application will accept messages and announcements of general interest from the Municipality.

9. Parking Operating Hours/Calendar Function



The application provides detailed operating hours for Controlled Parking (days and hours of operation). If the user opens the application outside operating hours, the “Parking Schedule” interface will be displayed as the first screen, indicating that it is outside operating hours. Additionally, if the user chooses to activate parking time that exceeds the operating hours, they will be notified with a relevant message and will not be allowed to activate beyond the permitted hours.

10. Multilingual Environment

The application supports multiple languages. Adding a new language will be easily accomplished using specific language input standards.

11. New User Registration

New user registration will be performed using the following methods:

a. By entering the desired email (username), which will then be verified along with the desired password.

b. By using social logins, i.e., pre-installed methods of identification using an existing user account on Facebook, Google (for all devices), and Apple ID (for Apple devices). This registration method is considered the most widespread in online services and applications. Management of user personal data fully complies with GDPR regulations.

To complete the registration, the user's mobile phone number will be required, and verification will be performed by automatically sending a four-digit code via SMS message.

10. Problem Reporting

One of the key functionalities of the novoville application involves enabling citizens-users to submit requests/reports/complaints via a special electronic form. The reporting form includes the following features:

- Ability to acquire a unique reference number.
- Option to capture geographic location on the map using the device's integrated GPS.
- Text description input capability.
- Selection of issue/problem type from a standardized, dynamic list.
- Attachment of photographs.
- Option to mark an issue as "urgent."

With this function, citizens will have the opportunity to report real-time issues or complaints to the Council's services regarding controlled parking, such as inadequate signage, worn-out markings, antisocial parking, etc. The types of reports are fully customizable and can be tailored to the Council's needs. Additionally, the applications have the capability to receive automated live updates and push notifications regarding the progress of each request/report until final resolution by the Council's services.

13. Points of Interest (POIs)



My City - Points of Interest: On an interactive map of the city, users can display points of interest using filters, such as pharmacies, public buildings, monuments, museums, electric vehicle charging points, bus stops, etc., with enriched information for each point, including images, descriptions, operating hours, contact numbers, etc. When a user selects a point of interest, they have the option to navigate to it using the device's GPS.

14. Mobile Polls/Consultations

Polls - Have Your Say: The Council has the ability through novoville management system to create short polls/consultations and gather citizens' opinions on various issues in real-time. The questions are displayed in a special section within the application,

and citizens can easily and quickly submit their responses. All responses are recorded and analyzed in real-time in the administrative system.

15. Calendar of Events & Activities

A dedicated section in the application allows for the presentation of all events and activities happening or scheduled to take place in the City. Each event includes a photograph, descriptive text, information, contact details, event interest, other hyperlinks, and even the option to purchase tickets.

16. Frequently Asked Questions (FAQs)

In the app users can view Frequently Asked Questions - Predefined Answers (FAQs) regarding controlled parking and other services provided by the Council (e.g., what is needed to obtain a residents parking permit).

17. Useful Phone Numbers

A special section in the application where citizens can view and directly call all the useful phone numbers of the Municipality.

18. Additional Functionalities with IoT sensors

Interoperability with parking sensor management software enables additional functionalities and services for drivers. Some indicative examples include:

- Display of real-time parking space availability on-street and off-street:



By installing IoT parking sensor infrastructure and networking, mobile applications can display sensor data on the city map with different color coding indicating the occupancy status of parking spaces at a granular level of position, street, and zone/area. This display of availability can be achieved by either entering the desired destination street or moving the cursor on the map. This way, drivers can have a live visualization of available spaces before reaching their desired destination, enabling them to navigate to the nearest available parking spot without making unnecessary detours, thus reducing traffic congestion in the city. Additionally, once the destination is selected (by entering the street or placing the cursor on the map), the integrated GPS

navigation system can be utilized to guide the driver through the optimal route to the selected point. While availability can be shown per spot, due to the rapid change in occupancy, it's not recommended as the optimal practice.

- Display of real-time of car parks availability (off-street):

In drivers' applications, car parks (off-street) are also displayed on the interactive map along with their current availability. The user selects the desired parking facility, which then shows brief information such as name, address, parking cost, operating hours, and current availability. Additionally, users have the option to pre-book a parking space within their desired time frame (e.g., Monday 09:00-11:00 am), purchase the parking ticket, and upon entering the parking facility, present the generated QR code/ticket at the entrance terminal. Interoperability with off-street parking facility management software and ANPR allows real-time display of availability, validation of pre-purchased tickets, and utilization of the electronic wallet, even in non-roadside parking scenarios.

2.3 Mobile App for Police/Enforcement Officers

The mobile application for Municipal Police/Enforcement Officers, “Novoville Enforcement”, is designed for the Google Android operating system, fully functional on versions 10.0 and above.

It operates on any smart portable device (smartphone/tablet) with the Android operating system and is fully compliant with current legislation in the UK, Greece and Cyprus.

The parking enforcement application for Municipal Police Officers is engineered to provide a state-of-the-art, comprehensive, and user-friendly tool. It enables enforcement officers to gather all necessary information and evidence, including photos and geographic data. Photo capture is optional and solely for internal purposes. Simultaneously, the application offers abundant data verification and sharing options to ensure accuracy and timely issuance of parking fines/citations and penalty charge notices. Additionally, the application seamlessly integrates with DVLA Vehicle Enquiry Service allowing Municipal Police Officers to access vehicle data in real-time by simply inputting the license plate, thus avoiding data entry errors and saving valuable time in the field.

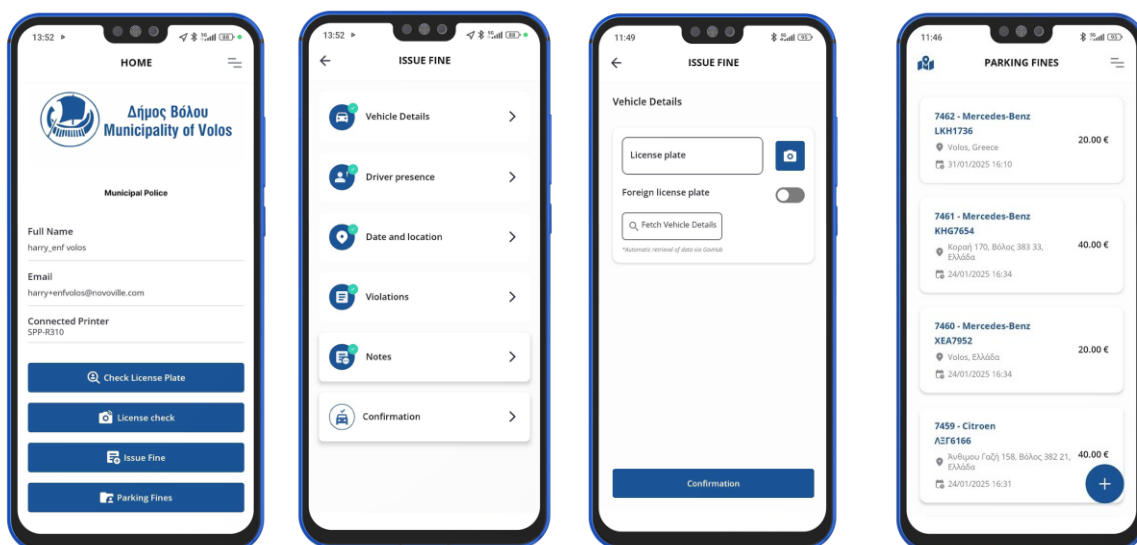
Furthermore, it facilitates printing of fines/citations in any format, size, or form from any compatible printing device, with a wide range of equipment options available — from

waterproof commercial devices to standard printing equipment. Wireless interfacing with portable printers is achieved via Bluetooth.

The application has the capability to integrate real-time data from parking sensors/IoT, enabling Municipal Police Officers in the field to be informed about ongoing violations, thus providing a complete picture of the status of each defined parking location and allowing for optimal routing to the violation site via the device's navigation program. In cases where special vehicle identification cards (IoT Parking Permit Cards) are provided to specific vehicle categories, e.g., disabled persons, the sensor will detect the identification card and refrain from sending a violation notification to the Municipal Police application.

The core features of the app comprise:

1. Authorized Officer Registration: Enable officers to sign up with a unique username and password.
2. License Plate Verification: Allow real-time communication with the Novoville management system and DVLA for inputting and verifying license plates.
3. Fine Issuance: Facilitate the issuance of fines with pre-defined fields and categories.
4. Photo Upload (Optional): Provide the option to upload photos as evidence if selected.
5. Fine History: Maintain a record of issued fines for reference and allows for fine reprinting
6. App Settings: Allow customization of application settings to suit user preferences.
7. Logout: Enable users to securely log out of their accounts to protect privacy and security.



2.4 Subsystem of Interfaces and Middleware Integration with Third-Party Systems

The Novoville Parking system is designed to interact with third-party systems in multiple ways. Specifically, the platform can:

1. Supply any interface (API pull/push, repository, database, etc.).
2. Consume information from any interface (API, repository, database, etc.).
3. Consume information from any system that has access to Novoville API endpoints.

For scenarios 1 and 2, a middleware is typically created (or utilized from our library) to facilitate information exchange. This means that the Novoville platform needs to communicate with the third-party system either to update it (scenario 1) or to acquire information from it (scenario 2).

Scenario 3 is activated when the third-party system requires information from Novoville APIs. Our platform has provided the relevant credentials and parameters to the third-party system, allowing access to the Novoville API endpoint.

Specifically, for the scalability and interoperability of the parking management system, the interfaces are already operational and utilized as follows with the following systems:

1. Integration with Smart City/Parking Sensor Management Platforms: The relevant middleware of the Novoville platform communicates at regular intervals with the "smart city/parking sensor management platform" and consumes real-time information, such as sensor availability (scenario 2). The Novoville management system already interoperates with a number of sensor management solutions available in the market. Occasionally, the "sensor management system" itself updates Novoville API about changes in sensor status (scenario 3). This supplies real-time data on parking space availability and any violations to both end-user applications (citizen/driver mobile app and Municipal Police mobile app) and the central management application, making the system intelligent and versatile.

2. Integration ERP/Back-office Systems: Novoville Parking already interoperates with the ERP/Back-office applications of several Municipalities/Councils, allowing direct recording of parking ticket revenues and necessary fine details. For this interoperability, the platform communicates using a middleware every time there is a transaction for time purchase or fine issuance for relevant updates (scenario 1). If necessary and feasible, the central parking management system can also interoperate with the Municipality's financial/accounting services system.

3. Integration with Off-Street Parking Management System: Novoville Parking interoperates with various off-street parking station management software, allowing direct capture of transaction data and parking space availability in car parks.

2.5 Vendor/Reseller POS Application

The Novoville Pay application, developed for Android operating system version 9.0 and above, is installed on POS terminals to allow third-party vendors affiliated with the council to resell parking time from physical locations. The application enables electronic purchase of parking time at wholesale prices by third-party vendors, using credit or debit cards, and facilitates the resale of time to drivers.

Affiliated third-party vendors must either have existing compatible android POS terminals or request and receive/purchase compatible new terminals.

The process of both purchasing and selling is straightforward and follows these steps:

1. Log into the NovovillePAY application

Log in using the credentials provided by Novoville for each third-party vendor, consisting of the vendor's email (username) and an 8-digit password.

2. Add payment method and wallet top-up (TOP-UP)

To conduct parking transactions, the vendor must add funds to the application's Electronic Wallet, which will be used for purchasing parking time upon ticket activation.

3. Activate parking time

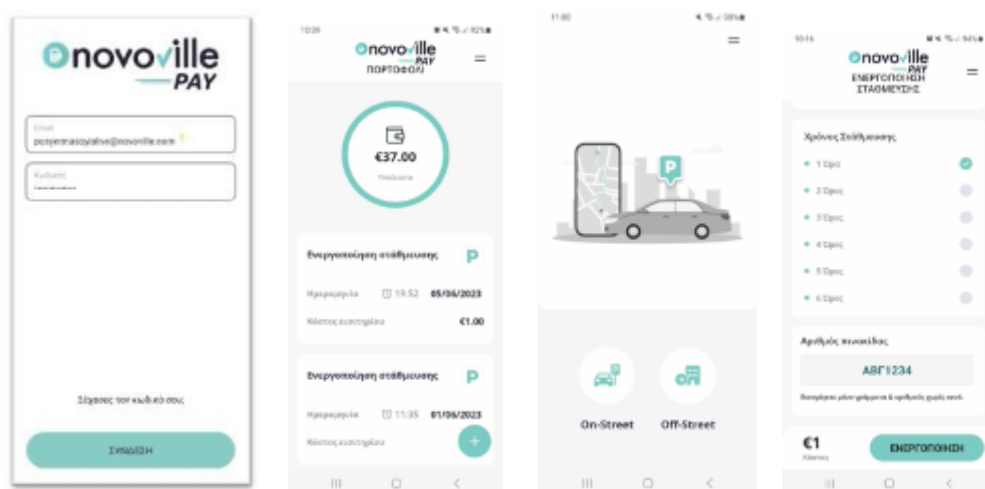
To activate/sell a parking ticket, only the selection of the desired parking duration and the vehicle's license plate are required, with the option to optionally enter the parking spot number.

Customers have the option to pay either by card or cash to complete the transaction. Once the transaction is completed, both the Novoville central management system and the Municipal Police subsystem are updated in real-time.

4. Additional tools and features

The NovovillePay application includes a navigation menu with the following functions:

- Ticket activation: Navigate to the ticket activation/sales screen.
- Wallet: Here, the vendor can view the available balance of the parking time for sale in Euros, as well as the list of all wallet top-up transactions made. Additionally, they have the option to download payment receipts for their transactions and add funds to their wallet.
- Ticket history: This section of the application stores all parking ticket purchase and activation transactions made by the store's customers. Transactions are recorded with date and duration of activation, cost, license plate number, and the location of the store declared in the application profile.
- Profile: In the application profile, the vendor can edit their profile details.
- Controlled parking hours: During hours when controlled parking is not active, the application does not allow ticket activation, and the ticket activation screen displays the Council's/ municipality's controlled parking hours. The regular ticket activation screen will automatically return once the controlled parking hours begin. There is also an option to activate a future ticket that will start at the next available time/day of controlled parking operation.
- Logout: This option allows the user to log out of their account.



3. General Technical Characteristics of the Information System

3.1 General Principles

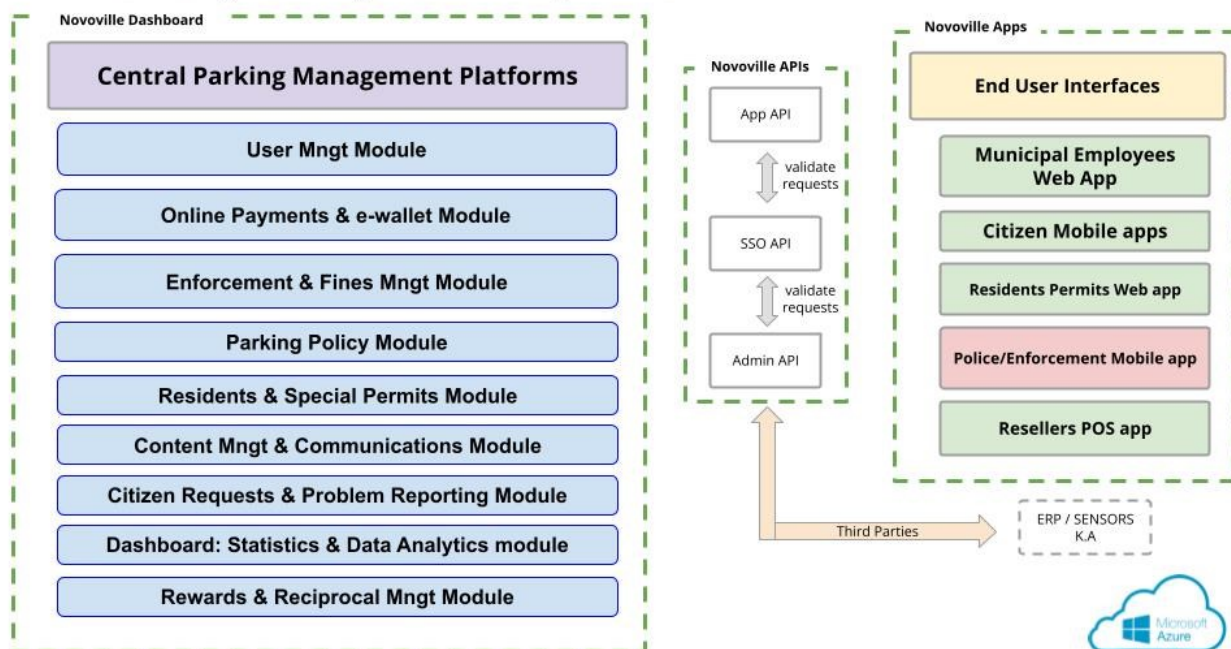
The general principles governing the information system are as follows:

- Open architecture system using open standards to ensure the scalability of subsystems.
- Interoperability with other systems/applications using documented APIs, with the ability to interface/communicate based on international standards (XML). All Novoville subsystems and applications operate via APIs and constitute a unified operational set.
- Interoperability with banking/payment systems
- Modular architecture to allow for future expansions, upgrades, or changes to discrete software components.
- N-tier architecture for flexible load distribution among systems.
- Data encryption both in storage and in communication.
 - Data encryption is performed in the Database using a new encryption "key." For passwords, bcrypt encryption is used with a related key before being stored in the database. This ensures that passwords are not readable by anyone, and access verification is done by comparing the stored hash with the hash generated when the user enters their password. Access to decrypted data is exclusively granted to authorized municipality employees.
 - Symmetric encryption methodology is used for both data storage and communication. The encryption algorithm utilized for project implementation is AES-256 (with a 256-bit key) using OpenSSL.
- Accessibility from any device with internet connectivity (PC, Laptop, etc.).
- The entire management system is web-based.
- Use of a relational database (RDBMS).

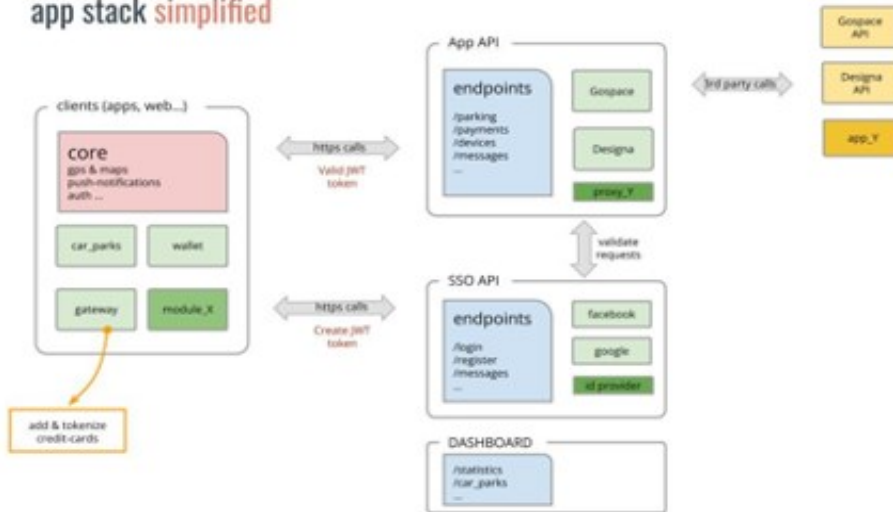
- Support for Single Sign-in/on access.
- Fully localized user interfaces and support for multiple languages
- Standardized data entry forms for both citizens and municipality administrators.
- The system already interoperates with non-cash payment systems, as well as with the municipality's financial management system, operating as a unified whole.
- Hosting of the system is performed on Amazon Web Services (AWS) cloud servers that meet all security specifications and are fully GDPR-compliant.
- The system has the capability to interface with parking sensors as well as third-party sensor management systems (IoT) via standardized APIs. Additionally, it can interface with third-party transportation systems, electric vehicle charging stations, etc.

The macroscopic architecture of the system is depicted in the following diagram.

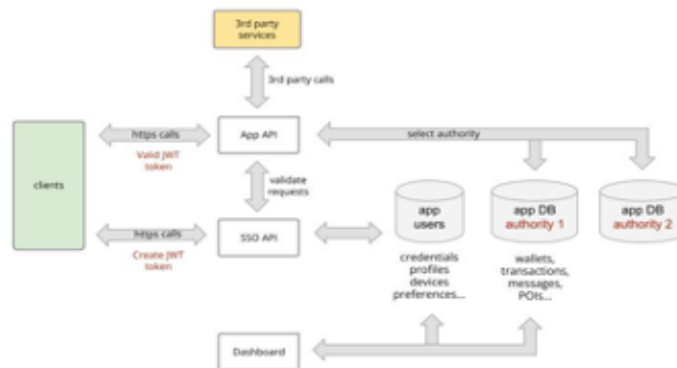
Novoville Parking & Mobility Platform Components



app stack simplified



apps stack & dbs simplified



apps stack & dbs scaling simplified



Macroscopic architecture diagrams for client-database interactions.

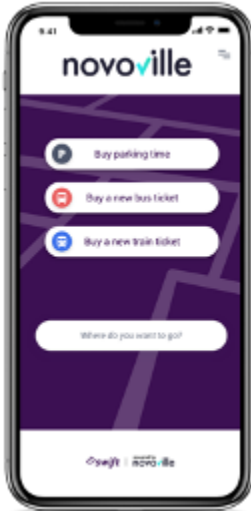
4. Additional Features & Expansions

The Novoville Parking & Mobility platform is fully customizable and expandable, offering the Municipality/Council the opportunity to leverage additional capabilities and functionalities of "Smart City" applications already supported in many other cities. Additionally, through existing interoperable interfaces, it has the capability to integrate functionalities from existing or future systems and applications.

4.1 Combined Mobility & Intelligent Transportation Systems

The increase in the use of electric vehicles, the promotion of combined mobility/Park & Ride, the enhancement of the "multimodality", and the development of intelligent transportation systems and value-added services (LBS) in mobility are strategic axes of modern cities. The interoperability and scalability of the controlled parking system and the ability to integrate additional functions are key points for achieving the above goals. The Novoville Parking & Mobility has the ability, in the short and long term, to incorporate new functionalities that address these challenges while simultaneously creating a unified ecosystem of services for the comprehensive service of citizens and gradually increasing the use of more sustainable modes of transportation. At Novoville, we believe that efforts to change mobility behavior should focus on the car driver, providing incentives, ease, and alternatives to gradually reduce car usage.

4.2 Park & Ride - Integration with urban transportation systems/micromobility



The Novoville Parking & Mobility platform provides interoperability and integration with all urban mobility means available or planned to be introduced by the Local Authority in the future. This creates a unified end-user interface that utilizes the parking application to move within or outside the Municipality/Council, enjoying a seamless experience and utilizing an existing payment channel (e-wallet).

In the case of the existence of a bus telematics system, there is the possibility of real-time display in the end-user applications of bus real-time location, stops, available routes, the arrival of the next bus, and a series of other useful functions that will facilitate mobility and increase the use of public transport.

Additionally, we would propose interoperability with the payment system to ensure the unified utilization of the e-wallet function and to provide the possibility of electronic ticket purchase for urban and/or intercity buses through the Novoville applications (park & ride). Finally, the system is capable of integrating existing or future shared bicycle systems and provides incentives to drivers to use greener and more active modes of transport.

4.3. Integration of Electric Vehicle Charging Stations

The Novoville platform has the capability of interoperability with electric vehicle charging systems and stations by leveraging existing end-user applications.

This way, the Municipality/Council will be able to offer new services to citizens and visitors through the Novoville applications:



a) A citizen application (mobile app) with the following capabilities:

- Mapping all chargers on the city map and navigation to them
- Real-time availability indication
- Charger reservation capability
- Payment capability from the same wallet as parking

b) Management Dashboard with real-time statistics, metrics, and data analysis

4.4 Development of a Sustainable Mobility Loyalty System

The utilization of the unified e-wallet in combination with interoperability with existing mobility systems such as buses and shared bicycles provides the opportunity for both data collection and analysis of combined mobility, as well as the creation of a unified loyalty and incentive program aimed at increasing the use of sustainable modes and means of transportation. For example, a driver who parks in specific areas (e.g., outside the center) receives a discount to rent a bicycle or use the bus.

5. Technical Information

The Novoville Parking & Mobility Platform is developed and hosted as a 'Software as a Service' (SaaS) & 'Transactional Commissioned' enforcement system. It is offered as a cloud-based solution, using Amazon Web Services (AWS) highly secured and reliable infrastructure, diminishing implementation time, and is fully GDPR compliant.

Mobile apps are compatible with Android 6.0 or above and Apple iOS 11.0 or above.

A RESTful API can be supplied to allow third-party software, e.g DVLA, to interface with the Novoville web services directly. Alternatively, we can supply data in standard formats (such as XML) to third-party software. All the above are fully documented and secure.

A separate stand-alone API will deal with the authentication of the users to allow access to parking services. This is Novoville SSO API and can be integrated as an extension to

other SSO APIs. Prior to any in-app action, the app accesses the SSO API in order to get an authentication token that is subsequently used to access any of the functionality supported by the app. User data resides on the secure and encrypted UK-based AWS Novoville servers, but can also be deployed on-premise, if required.

Novoville Parking & Mobility is also compatible with the Cisco Kinetic for Cities platform.

6. Project Scope

Novoville has designed a three-step process to successfully launch and support the solution at each new local government. The goal is to deliver immediate results and drastically reduce implementation time. Novoville can typically implement the Parking & Mobility solution to a local authority within 4 weeks, including the time required for onsite training.

This process consists of the following:

1. Exploration & Requirements Analysis Phase
2. Integration & Launch Phase
3. Support & Maintenance

6.1 Exploration & Requirements Analysis Phase

This phase kicks off with a workshop to understand what the priorities are for the authority. The points covered in the workshop will include the current service provision and the final objective.

As a part of defining the working solution, we will consider the vision for the customer journey and the processes and data that exist currently. Optimising the journey will include onsite visits and focus groups with staff as well as motorists.

Key outcomes of this phase include:

- A. gathering and categorising all available data and where it coexists;
- B. a needs-assessment report;
- C. the customer journey and data flow;
- D. an outline design of the initial service;
- E. selection of relevant key performance indicators;
- F. a draft marketing plan to ensure optimised uptake of the platform.

6.2 Integration & Launch Phase

The components of the customer journey will be created on the app and dashboard and made available to the authority. This process is straightforward and at its basic version consists of the following:

1. Processes: Providing the customer service or support teams with an understanding of the processes and the information required at each stage of the process. Where manual intervention is required, for example to refund a duplicated fare or change charges, to explain how these activities are performed using the dashboard.
2. Local information: The authority selects what additional information needs to be uploaded to the apps (FAQs, POIs, phones numbers, etc). This minimises customer service calls and emails.
3. Integration: Novoville provides a roadmap to integrate legacy systems with the core product. It will then only require a web browser to operate.
4. Testing and training: Once the product is fully integrated and used for training by customer service teams, Novoville tests the functionality in its own sandbox environment. Once signed off, we conduct a short closed user trial period to test that everything works in the way that the authority expects. We then deliver onsite training to all stakeholders. Once the training is completed, results are evaluated. All calls logged are examined and are then incorporated into further training sessions.
5. Marketing: We typically work with the authority's press teams during the launch phase to coordinate our efforts. This includes designing marketing materials and creating online ads on their behalf.

After a few weeks of operation, the Novoville team will make suggestions for further optimisation of service.

7. Support & Maintenance

Novoville provides a single level of support, which is built into the subscription cost.

It includes an online helpdesk and ticketing system available 24/7, as well as telephone support during business hours (9am-5pm, Monday to Friday, except UK Bank Holidays).

On-call support will respond to critical availability issues outside of standard business hours. Our support SLA is included in the terms of service document.

Our helpdesk is staffed with dedicated support engineers, with system admins and other technical experts becoming involved to resolve support issues as necessary.

Each authority or transport provider has a designated account manager and will receive dedicated support for any issue.

For further details please follow the Terms of Services section.

8. Confidentiality Statement

The information contained in this document is confidential, privileged, and only for the information of the intended recipient and may not be used, published, or redistributed without the prior written consent of Novoville Limited.

9. Company Details

Novoville Limited

Company Registration No: 10313940

VAT: 283614101

1 Kings Avenue, London, N21 3NA, UK

www.novoville.com

The logo for Novoville features the word "novoville" in a dark blue, sans-serif font. The letter "v" is stylized with a teal-colored checkmark shape integrated into its center.

Powerful Cities, Empowered Citizens