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DEVELOPMENT OF SOFTWARE FOR ELECTRONIC CITIZEN APPEALS TO LOCAL SELF-GOVERNMENT BODIES

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Анотація

У роботі розглянуто проєктування та реалізацію програмного засобу електронних звернень громадян до органів місцевого самоврядування. Запропоновано інтегровану архітектуру, що забезпечує подання звернення онлайн, маршрутизацію на відповідальних посадових осіб, контроль строків, прозоре відстеження статусу та аналітику для підвищення якості управлінських рішень. Особливу увагу приділено вимогам до ідентифікації заявника, захисту персональних даних, журналу аудиту та відповідності нормативним вимогам щодо звернень громадян. Очікуваним результатом є MVP із веб-кабінетом громадянина, робочим місцем службовця та звітністю за показниками термінів розгляду, тематик звернень і завантаження виконавців.

Ключові слова: електронні звернення, місцеве самоврядування, цифрові послуги, маршрутизація, контроль строків, журнал аудиту, аналітика, інформаційна безпека.

Abstract

This paper addresses the design and implementation of a software solution for electronic citizen appeals to local self-government bodies. The proposed system provides a 'one-stop' experience: citizens can submit appeals online, track processing status and deadlines, and receive responses, while officials can register, route, process and analyse appeals efficiently. The architecture combines an intake portal, a case-management workflow, a deadline and SLA controller, and an analytics layer for thematic clustering and performance reporting. Particular attention is paid to identification and contact data validation, privacy-by-design, role-based access control, and immutable audit logging aligned with modern information-security practice. The expected result is an MVP featuring a citizen account, an official workstation, and dashboards for turnaround time, overdue share, and workload distribution.

Keywords: electronic appeals, local government, case management, digital public services, workflow routing, deadline control, audit log, privacy.

Local self-government bodies receive a large number of citizens' appeals (proposals, applications and complaints) that must be registered, routed and answered within statutory time limits. In practice, paper-based or e-mail-based handling often leads to duplication, missing attachments, limited transparency for citizens, and weak managerial visibility over workloads and overdue cases. International benchmarking shows that mature digital public services prioritise user-centric portals, end-to-end tracking, and data-driven management of service requests [1, 2].

The objective of this work is to design and implement a minimum viable product (MVP) of an electronic appeals system that supports online submission and status tracking for citizens, while providing officials with workflow tools for efficient processing and analytics. The scope focuses on appeals to local councils/municipal administrations and assumes multi-channel intake (web form, e-mail forwarding, call-centre operator entry) with a unified back office.

SYSTEM REQUIREMENTS AND BUSINESS PROCESS

Requirements are derived from a full 'appeal-to-resolution' business process: submission → registration → classification and routing → execution and coordination → approval of response → citizen notification → archival. The process model aligns with legal requirements for accepting non-anonymous appeals, mandatory contact details, and the need to provide a formal response within defined deadlines [4, 5].

At submission, the citizen selects an appeal type, topic and locality, provides identification and contact information, and attaches supporting files. The system validates mandatory fields, performs basic plausibility checks (e.g., phone/e-mail format), assigns a unique tracking number, and immediately returns a receipt. A

deadline engine calculates due dates and escalation milestones in accordance with internal policy and statutory norms, enabling proactive reminders.

During processing, a dispatcher or administrator categorises the case (using a topic taxonomy), assigns it to an executor, and may create sub-tasks for specialised units. The case-management workspace supports internal notes, requests for clarification, inter-departmental routing, and preparation of draft responses. Citizens see a simplified timeline: received, in review, additional information requested, response prepared, closed. Transparency and responsiveness are consistent with digital government best-practice recommendations [2, 6].

ARCHITECTURE AND INTEGRATION APPROACH

A modular architecture is proposed to balance rapid MVP delivery with future scalability. Core modules include: (i) citizen portal (intake and tracking), (ii) appeals registry and workflow engine, (iii) document/response generator, (iv) notification service (e-mail/SMS/messengers), and (v) analytics and reporting. Integration is achieved through RESTful APIs and event messages, decoupling user-facing functions from back-office processing.

For the MVP, a single relational database can store canonical entities (citizen profile, appeal, routing events, tasks, attachments metadata) with a clear separation between transactional tables and read-optimised aggregates. Attachments are stored in an object repository with virus scanning and content-type validation. To support future interoperability, the API layer uses stable resource identifiers and versioning, enabling later integration with municipal document management systems and national digital identity services.

The system defines roles and responsibility boundaries: citizen (submission and tracking), operator (assisted intake), dispatcher (classification and routing), executor (processing and drafting), supervisor (approval and SLA control), and administrator (configuration and access). Role-based access control reduces accidental exposure of personal data and supports segregation of duties [3, 7].

SECURITY, PRIVACY, AND AUDITABILITY

Because appeals often contain personal data and sensitive circumstances, security and privacy are treated as first-class requirements. The solution follows an information security management approach, including risk assessment, least privilege, secure configuration, and continuous improvement, consistent with ISO/IEC 27001:2022 [7].

Privacy-by-design is implemented via data minimisation, purpose limitation, and controlled retention. Access to full citizen contact data is restricted to authorised roles; exported reports use aggregation or pseudonymisation where possible. All external connections use TLS, and sensitive fields in the database are encrypted at rest. Authentication supports strong passwords and optional multi-factor authentication for officials.

Auditability is provided through an immutable event log capturing who viewed or modified an appeal, what changed, and when. The log supports investigations and accountability, and allows supervisors to verify compliance with deadlines. The citizen-facing timeline is derived from the same events, ensuring transparency without manual updates.

REPORTING AND KPI EVALUATION

The reporting layer aggregates workflow events to compute key indicators: average turnaround time, share of overdue cases, workload by unit/executor, and topic distribution. Benchmark reports highlight bottlenecks (e.g., delays in classification versus execution) and support evidence-based improvements in service delivery [1, 8].

Impact evaluation is performed as a before-and-after comparison using historical logs: (i) median time from submission to first action, (ii) end-to-end resolution time, (iii) number of re-routes per appeal, and (iv) citizen satisfaction proxy (repeat appeals on the same topic). The KPI set aligns with international assessments of digital public services that emphasise user experience, transparency and reliability [1, 2].

IMPLEMENTATION NOTES AND EXPECTED RESULT

Implementation is planned as a web application with a responsive citizen portal and a secure back-office interface. The workflow engine uses configurable routing rules (topic → responsible unit) and supports manual overrides with mandatory justification to prevent misuse. Notifications are event-driven to reduce polling and ensure timely updates. Testing includes functional, security and usability testing, with special focus on accessibility and clear citizen guidance to reduce incomplete submissions.

The expected result is an MVP that demonstrates end-to-end electronic handling of citizen appeals: online submission, tracking, controlled processing, and analytics dashboards. Future work includes advanced text

analytics for thematic clustering, integration with electronic document signing where required, and publishing open statistics to strengthen public trust and accountability [6].

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