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AGREEMENT

ICS

English version

City Resilience Development - Information Portal

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European foreword

CWA 17302 was developed in accordance with CEN-CENELEC Guide 29 “CEN/CENELEC Workshop Agreements – The way to rapid agreement” and with the relevant provision of CEN/CENELEC Internal Regulations – Part 2. It was agreed on 2018-06-21 in a workshop by representatives of interested parties, approved and supported by CEN following a public call for participation made 2017-05-19. It does not necessarily reflect the views of all stakeholders that might have an interest in its subject matter.

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Introduction

This CEN Workshop Agreement (CWA) is based on the results of the Smart Mature Resilience (SMR) research project, and in particular on the “Deliverable 4.3 – Design principles for the use of social network services”.

The Resilience Information Portal (RP) is meant to be used by a diverse group of users, each of which has a different degree of decision-making authority. The information displayed may thus influence decisions that have a severe impact. The RP does not replace control room technology, used to manipulate parts of the system actively (e.g. dispatching emergency units, regulating electricity or managing public transportation). Instead it is intended to be used in addition to existing systems, and partly to interface them. Hence, the main design criteria are to maximize efficiency of use, to minimize physical and mental user workload, and to provide intuitive and easy-to-learn interactions.

CWA series - City Resilience Development

This CEN Workshop Agreement is part of the *City Resilience Development* series, which intends to support cities in becoming more resilient against various kinds of threats. The series consists of the following other two CWAs:

- CWA 17300 City Resilience Development – Operational Guidance;
- CWA 17301 City Resilience Development – Maturity Model.

The CWA on Operational Guidance is the overarching document that refers to the *CWA 17301 City Resilience Development - Maturity Model*, *CWA 17302 City Resilience Development – Information Portal*, as well as to other supporting tools.

1 Scope

This CWA provides a list of requirements for how municipalities can equip an information system that facilitates resilience building through collaboration, communication, and engagement. This marks the functional specification of a Resilience Information Portal. The portal is a platform for communication within a local government, between a local government and its overall stakeholders, and between a local government and citizens. Requirements aim towards a broad-purpose, easy-to-use platform that provides versatility and flexibility.

This document is intended to be used by information technology professionals and information technology decision-makers. It provides them with support in planning municipal information technology as well as operative help for the development process. The functional specification does not impose any specific paradigms, technological frameworks or third-party programs. The specification takes into account existing information technology infrastructure and following the recommendations can complement it. The specification provides for significant freedom and room for customization. This facilitates a technological solution that aligns with political decisions, particularly deriving from a local government's information technology strategy.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

city

local unit based on administrative boundaries within a metropolitan area

3.2

local government

government unit having a local sphere of competence

3.3

maturity

level of gain after a maturation period

3.4

resilience

ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions, while also maintaining the capacity for adaptation, learning, and transformation

3.5

stakeholder

person, group or organization with an interest (stake) in the behavior, decisions, and policies of the city – stakeholders presume they may be affected by these, and they may have the power to affect them

EXAMPLE Local, regional and national government, European policymakers, emergency services, critical infrastructure providers, public-private partnerships, non-governmental organizations, volunteers, media, citizens, international organizations, academic and scientific entities.

3.6 stakeholder map

determination and visualization of the connection of persons or organizations that can affect, be affected by, or perceive themselves to be affected by a decision or activity

4 Symbols and abbreviations

—	AJAX	Asynchronous JavaScript and XML
—	HTML	Hypertext Markup Language
—	RP	Resilience Information Portal
—	URL	Uniform Resource Locator
—	W3C	World Wide Web Consortium
—	WYSIWYG	What You See Is What You Get
—	XML	Extensible Markup Language

5 Design goals and principles of a Resilience Information Portal (RP)

Six design goals of a city's RP are defined, namely:

- 1) Information sharing;
- 2) Establishing a communication structure with stakeholders;
- 3) Engagement and awareness raising among stakeholders, particularly citizens;
- 4) Knowledge sharing;
- 5) Information sovereignty; and
- 6) Usability.

These design goals are necessary to tackle a city's communication challenges. Each design goal is followed by design principles, which refer to the way in which the design goal can be achieved. The design goals are chronologically independent. *Information sharing (1)* is the basis for the RP, followed by *Establishing a communication structure with stakeholders (2)*, *Engagement and awareness raising among stakeholders, particularly citizens (3)*, and *Knowledge sharing (4)*. These four goals can be managed at the operational level, whereas *Information sovereignty (5)* and *Usability (6)* shall be considered the technological foundation of the RP.

- 1) *Information sharing* refers to daily-basis and emergency communication. The overall objectives of such communication are the following: (a) a city's ability to understand the capability of neighbours and of stakeholders in general, as well as (b) a city's ability to locate resources and find out where supporting equipment and people are. Two design principles guide the first step toward its design goal:

Design Principle 1-1: Channel setting – How to reach the stakeholders?

Design Principle 1-2: Identification of target groups – Who shall be reached?

- 2) It is crucial to a city to be able to quickly contact relevant people, whether under normal or emergency conditions, to ensure operation. For this, a city needs to know what relevant stakeholders are doing. The following three design principles track the design goal *Establishing a communication structure with stakeholders*:

Design Principle 2-1: Stakeholder mapping to identify the right contact people.

Design Principle 2-2: Visualization of resource availability and capability.

Design Principle 2-3: Visualization of live communication, e.g. dialogues.

- 3) *Engagement and awareness raising among stakeholders, particularly citizens*, is the foremost goal for a city. The RP shall ensure a two-way information flow between a city and its citizens. A city shall seek to communicate interactively with citizens. Two design principles shall be considered in engaging citizens:

Design Principle 3-1: Descriptive formulation of a certain topic to involve citizens as active participants.

Design Principle 3-2: Engagement of citizens through the collaboration with other stakeholders, including the media and local communities over social media. Communication shall be tailored to specific communities.

- 4) Long-term involvement of stakeholders requires different types of communication. It is less structured than in the case of day-to-day or emergency communication. Opportunities for sharing experiences, risks and best practices shall be provided on a suitable scale, which can be done on a local, national and European level. Related information shall be disseminated regularly to keep stakeholders updated. Three design principles help to build structure for *Knowledge sharing* activities:

Design Principle 4-1: Setting up a resilience library with best practices towards a resilient city.

Design Principle 4-2: Online learning through sharing best practices with other national, European and international cities.

Design Principle 4-3: Traditional communication channels shall be continued to be used, e.g. to reach those groups not accessible via technological communication channels.

- 5) *Information sovereignty* corresponds to communication challenges related to security, information confidentiality, handling of documents marked as confidential, and mal-information on social media.

Design Principle 5-1: Information quality – the RP shall provide consistent and accurate information.

Design Principle 5-2: Role-based authorization – security level differs depending on communication structure.

Design Principle 5-3: Penetration test – to protect the RP from cyber-attacks.

- 6) The unawareness of information reach and the way to show proper information to users are identified as a communication challenge under the design goal *Usability*.

Design Principle 6-1: Accessibility – the user interface design shall allow for each user to customize it, particularly regarding the information to be shown, to their personal needs.

Design Principle 6-2: Information filtering – the RP shall provide means to filter data in order to only show relevant information.

All user interfaces connected to the RP shall be designed in a way that ensures a high usability. Depending on the type and role of the respective user interface, different legal requirements and standards may apply. All developments should be based on an established usability standard, such as EN ISO 9241-110:2006 [2].

If required, each type of information shall be available in a format that suits the tasks of the respective user. Different types of information shall be displayed in a consistent manner. Alerts shall allow for muting or postponing. The information display shall use a high data-ink ratio.

Interfaces for non-professional users such as citizens shall be accessible and available in local language.

The functions compiled in the next section relate to the design principles. For some of the functions, a direct connection is obvious, while others fulfil the requirements more abstractly: they enable users of the RP to use the portal in accordance with the design principles. For this reason, the RP should not be implemented based on the functions alone but following a study of the design principles as well. Thereby, the actual requirements of a specific RP should be aligned with strategic decisions regarding resilience in general as well as communication and IT systems.

6 Functional specifications of a Resilience Information Portal (RP)

6.1 General

In the following chapter the main criteria that characterize a RP are defined. The RP is intended to be run by a local government. Upon initial installation and setup, the portal shall run indefinitely. Regular maintenance and extension shall be expected. The RP needs to be hosted so as to allow continuous service, even in unexpected conditions such as disasters. Therefore, the RP shall be integrated with a local administration website, but failsafe multi-location hosting is required.

6.2 Required and recommended criteria's for the implementation of a RP

The specification distinguishes between such criteria that are critical for the implementation (see Table 1) and such that are reasonable additions, yet optional (see Table 2). Criteria are consecutively numbered. The numbering starts with a capital A or B, indicating required and recommended criteria.

Table 1 — Required criteria

No.	Required criteria
A01	The portal is required to be a publicly available web application.
A02	The portal is required to provide the basic functionality of web applications, most importantly page retrieval.
A03	The portal is required to provide functionality to embed static content as well as dynamic content. In particular, it has to be possible to have newsfeeds, weblogs, wiki pages, and forums.
A04	The portal is required to offer the possibility to provide easy means for structured dynamic content such as content lists. Data sources are required to be available locally and from remote systems.
A05	The portal is required to provide the functionality to include existing dynamic content, both by inlining existing websites and by integration and automatically updating data from XML-based sources.
A06	Extended functionality is required to be provided to compose pages. Page editing has to be supported by WYSIWYG tools, offering an interface similar to Microsoft Word processing software.
A07	Users are required to be able to register for portal usage and to log in.
A08	Adaptive role management shall be realized. It shall be possible to distinguish between different users with varying rights. The realization of role management and subordinate decisions, such as enabling groups, shall be decided individually and shall follow the regulations and practices of the portal owner.
A09	It shall be possible to flag documents as sensitive. Access to such documents shall accompany role management.
A10	Logged in users with corresponding rights shall be able to edit pages, including the option to upload documents.
A11	Administrators or users with rights for sub-areas of the portal shall be able to generate new pages as well as to remove pages from the portal.
No.	Required criteria
A12	Based on the role concept the portal is required to facilitate bidirectional communication flows. In particular, feedback from citizens (or other end-users) shall be a core concern.
A13	<p>The portal is required to provide an <i>Emergency Mode</i> that is set in case of a disaster. In this mode the homepage shows information that is particular to this certain threat. Set to the <i>Emergency Mode</i>, a predefined page with limited content shall be shown instead of the normal homepage as long as the <i>Emergency Mode</i> is activated. It shall be possible to define more than one page to cater for different situations. Which information shall be contained on an emergency page is portal-dependent. In general, only such information shall be presented that is required for immediate mitigation of problems.</p> <p>EXAMPLE An <i>Emergency Mode</i> page for flooding can include a checklist on how to behave correctly, information on parts of the cities to be evacuated, information on where to find shelter and supplies, support of neighbour groups that want to voluntarily help (e.g. caring for elderly), and emergency contact details.</p>

A14	Social media integration shall be provided. In particular, news posting shall be linkable to Facebook and LinkedIn. Moreover, unidirectional integration of Twitter is required.
A15	Accessibility standards as outlined by the W3C shall be followed. If applicable, national laws shall be followed.
A16	Search functionality is required to be provided.
A17	The portal shall provide adequate security. NOTE This includes adherence to well acknowledged standards as well as good common security practices. Compare also with the quality requirements further below.

Table 2 — Recommended criteria

No.	Recommended criteria
B01	Logged in users should be able to customize pages that are set to be customizable. In particular, the homepage should be customizable. EXAMPLE Logged in users can remove elements such as Twitter feeds and certain news categories from the homepage, but also add additional dynamic content from a selection of dynamically updated content elements.
B02	Mobile device support should to be pursued by designing the portal in a responsive fashion.
B03	Provide FAQs (Frequently Asked Questions) to different stakeholders individually in order to communicate solution proposals to recurring or expected disturbances.
B04	Integrate tools for interactively assessing city resilience across different stakeholders. NOTE Tools that can for example be used are described in the <i>CWA 17300 City Resilience Development – Operational Guidance</i> .
B05	The portal should provide reminder functionality for updating pages. It should be configurable by everyone with editing rights for a page to define whom to remind as well as the reminder interval. EXAMPLE A local government has a webpage where it explains the evacuation routine in case of flooding. These routines are regularly updated to reflect the current infrastructure and living situation. In order to keep the portal page – which contains an excerpt from the official plans – up to date, a reminder is set by the editor. Every three months the portal should notify the editor to check if the page is still current.
B06	The user interface should be designed according to international usability standards that have been implemented as European standards. EXAMPLE EN ISO 9241-110:2006 [2], EN ISO 9241-151:2008 [3], EN ISO 9241-161:2016 [4]
B07	The portal should support multiple languages. If cities have more than one official language, the portal should have multi-language capabilities. NOTE The portal may include automated translation services.
B08	The portal should be scalable.
B09	Feeding Twitter posts back to the portal is a reasonable addition.

B10	A backend functionality that scans for redundant information should be carried out.
B11	The portal should provide basic integration of a web-based video conference tool that fulfils corporate requirements. In particular, extended bidirectional information exchange is desired.
B12	The portal's dynamic content should reflect resource allocation done in other systems in real-time and adjust dynamic pages' content accordingly.
B15	In extension to A13, notification functionality should be added; this allows users to register people to be notified in case of emergencies. They can in such a case use the portal to let these people know that they do not require help and are not directly affected. EXAMPLE When the <i>Emergency Mode</i> is enabled the registered users receive a message in their preferred way, pointing them to the RP.
B16	Functionality for the automated dissemination of media through different channels, including social media, should be included.

6.3 Technical product environment

The technical product environment describes preconditions for successfully running and accessing the RP software.

Software

- A current, up-to-date web browser for clients.
- For the server: A technology for enterprise web applications that – if need be with the addition of frameworks and other third-party software – is capable to fulfil the requirements. In particular, scalability and longevity of the portal need to be considered.

Hardware

- On the server side: Hardware that supports the required backend software suffices.
- On the client side: Hardware that can be used to run a modern web browser suffices. This in particular includes mobile devices such as smartphones and tablets.

Interfaces

Existing information systems shall be integrated in the RP. The level of integration as well as the systems to integrate at all is to be determined by the respective local administration.

Hosting

The infrastructure shall allow scalability and reliability. In case of emergencies that effect the whole city, access to the RP shall still be possible. A multi-location hosting in the fashion of a highly available distributed system is required.

6.4 Function per maturity stage

In the following, the functions per maturity stage of the RP are proposed. They are grouped by intended maturity stage: Starting, Moderate, Advanced, Robust, and Vertebrate. Within each of the following subsections, functions are ordered by user first, and by complexity of the function second. The maturity stages provide a staged mean of increasing resilience. Reasoning and in particular details are not further discussed. Please refer to the *CWA 17300 City Resilience Development – Operational Guidance* and *CWA 17301 City Resilience Development – Maturity Model* for more information.

In a number of cases, particularly for the advanced maturity stages, the term “User with a particular right” is used for the role of a user story. In each case, this denotes that there shall be the possibility to

have users on the portal with particular roles and respective rights assigned, that go beyond editing rights, but are not administrative rights in general (i.e. the right to access and edit everything). There can be an arbitrary number of such roles. The particular right in one user story shall not be the same as in another one. In fact, but for successive usage of similar functionality in more sophisticated form on a successively advanced maturity stage, they are never the same but distinctive. Roles are highly implementation specific and shall be decided on an individual level; it is unlikely that they will be similar for two portals but for rather generic roles.

6.4.1 Starting

Functions that are considered for the starting maturity stage are the most basic ones (see Tables below). Unless there is a good reason not to implement them, a RP cannot be considered to be functional without realizing this foundational functionality. Moreover, these functions provide the possibility to extend the portal to reach higher maturity stages.

Table 3 — Functions for the users (Starting)

Stakeholder	Function
As a user	I want to access a public portal.
As a user	I want to retrieve webpages from the portal.
As a user	I want to use recognizable URLs to retrieve pages, so that I will not need to remember character sequences or long numbers.
As a user	I want to be able to access the portal using a computer, smartphone or other web-enabled devices, so that content is displayed responsively.
As a user	I want to be able to create a user account.
As a user	I want the portal to follow generally acknowledged safety practices, so that using it will not compromise my data or pose other harms.
As a user with a user account	I want to be able to log in.

Table 4 — Functions as a logged in user and as a user with editing rights (Starting)

Stakeholder	Function
As a logged in user	I want to rely on industry-hard authentication mechanisms.
As a logged in user	I want to be able to post entries to dynamic pages to which I have been granted access.
As a logged in user	I want to access content marked to be only available to logged in users, so there can be content that is not available publicly.
As a logged in user	I want to access content marked to be only available to logged in users with the rights I hold, so there can be content that is only available privately.
As a logged in user	I want to retrieve information on my roles and rights, so I know what I am allowed to do on the portal.
As a user with editing rights	I want to be able to control portal pages.
As a user with editing rights	I want to be able to create new portal pages.

As a user with editing rights	I want page editing to be supported by WYSIWYG tools, so that creating and changing pages is possible without knowledge in web technologies.
As a user with editing rights	I want to be able to switch page editing to a source code view, so that I can also manipulate pages directly.
As a user with editing rights	I want to be able to create and assign templates, so that pages can get a uniform appearance.
As a user with editing rights	I want to provide guidelines to citizens in an easy way, so that I can for example provide checklists.
As a user with editing rights	I want to be able to present complex information by suitable means for representation, so that the portal is not limited to prose text.
As a user with editing rights	I want to create a newsfeed.
As a user with editing rights	I want to create a weblog.
As a user with editing rights	I want to create further dynamic web 2.0 functionality such as wikis and forums, so that the portal can be used for building knowledge and for discussions.
As a user with editing rights	I want to assign rights to users.
As a user with editing rights	I want to delete data posted on web 2.0 features that I have created, so that I can get rid of inapposite posts.
As a user with editing rights	I want to create contact lists, so I can keep an overview of contacts for particular functions or in particular cases.
As a user with editing rights	I want to link contact lists to data sources with defined interfaces, so that entries are updated automatically.
As a user with editing rights	I want to create FAQ pages, so I can provide collections of frequently asked questions and the respective answers.
As a user with editing rights	I want to embed dynamic webpages that are external to the portal, so that they can be directly accessed from the portal without a change in context.
As a user with editing rights	I want to be able to link directly to external pages, and that such links can also be integrated in the header and footer, or the menu of a page.
As a user with editing rights	I want to flag documents to only be available to users that are logged in.
As a user with editing rights	I want to flag documents to be accessible only for users with a specific role, so that documents can be private.

Table 5 — Functions for an administrator (Starting)

Stakeholder	Function
As an administrator	I want to manage data sources for dynamic content.
As an administrator	I want to create, edit, and delete users from the portal.
As an administrator	I want to manage users' roles and rights.
As an administrator	I want to define roles, so I have categories that I can assign users to.
Stakeholder	Function
As an administrator	I want to create a hierarchy of roles, so that roles can inherit the rights specific to another role.
As an administrator	I want to give a limited role and right management to logged in users, so that they can manage user groups that they are responsible for.
As an administrator	I want to have full control over the editing of templates, so that arbitrary pages can be built using the portal.
As an administrator	I want pages to be based on templates and templates on templates, so that I can build a hierarchy of templates.

Table 6 — Functions for the local administration running the portal (Starting)

Stakeholder	Function
As the local administration running the portal	I want the portal to integrate with the city website.

6.4.2 Moderate

After a basic functionality has been implemented, there are many possibilities for extending the portal. These are summarized according to the moderate maturity stage (see Tables below).

Table 7 — Functions for the users (Moderate)

Stakeholder	Function
As a user	I want to retrieve pages from the portal following accessibility standards, so that I can use its contents even if I am handicapped.
As a user	I want to be able to search for content on the portal.
As a user	I want that sensitive data on the portal to be encrypted, so that security and privacy are improved.
As a user	I want to switch between languages, so that I can view pages that exist in multiple languages in my favoured one.

Table 8 — Functions as a logged in user (Moderate)

Stakeholder	Function
As a logged in user	I want to customize the portal homepage, so that it shows the elements that are most relevant to me.
As a logged in user	I want to select my preferred language, so that the portal shows pages automatically in that language.
As a logged in user	I want to use predefined forms to report resilience-related issues to the city, so that they learn from me of potential threats, infrastructure problems, and similar issues.

Table 9 — Functions as a user with editing and particular right (Moderate)

Stakeholder	Function
As a user with editing rights	I want to switch between a normal user and an advanced user mode that will show otherwise hidden features, so that the portal offers comprehensibility but also versatility when I need it.
As a user with editing rights	I need to be able to create dynamic pages that facilitate bidirectional communication, so that exchange with citizens is enabled.
As a user with editing rights	I want to be able to feed content to social media, so that I can e.g. post on Facebook and Twitter while working with the portal.
As a user with editing rights	I want to be able to set reminders for updates, so that the portal will update me when pages are due for updates.
As a user with editing rights	I want to have access to data structures, so that I can base both static and dynamic pages on them.
As a user with editing rights	I want to be able to define data structures, so that structured data can be stored.
As a user with editing rights	I want to create the same page in multiple languages.
As a user with editing rights	I want to create forms for citizens to report issues.
As a user with editing rights	I want to be notified by email about reported issues.
As a user with editing rights	I want to access reported issues, so that I can open them as cases, edit them, mark them as resolved, and delete them.
As a user with editing rights	I want to give rights to other portal users to open cases.
As a user with editing rights	I want to forward cases to city personnel via email.
As a user with editing rights	I want to include Twitter posts in the portal.
As a user with editing rights	I want to create external data as mashups that are push-updated, so that current data for example the weather is included in the portal.
As a user with a particular right	I want to send an alarm to registered users, so that I can inform them of an immediate incident.
As a user with a particular right	I want to use video call services, so that I can call other city representatives and main city stakeholders directly from within the portal.

Table 10 — Functions for an administrator (Moderate)

Stakeholder	Function
As an administrator	I want to specify social media sources to which content can be fed, so that users with editing rights can use them.

Table 11 — Functions for the local administration running the portal (Moderate)

Stakeholder	Function
As the local administration running the portal	I want the portal to integrate other resilience tools.

6.4.3 Advanced

While a portal with moderate functionality provides most functions that are needed to meet the design principles, its versatility can be much increased. Functionality according to the advanced maturity stage typically requires considerable effort.

Table 12 — Functions for the users (Advanced)

Stakeholder	Function
As a user	I want to use automatic translation services integrated into the portal.

Table 13 — Functions for a logged in user (Advanced)

Stakeholder	Function
As a logged in user	I want to customize all kinds of overview pages, so that they show the elements that are most relevant to me.
As a logged in user	I want to use a structured search, so that I have a sophisticated tool with which I can find information.
As a logged in user	I want to use video call services, so that I can call city representatives directly from within the portal.
As a logged in user	I want the search to take advantage of portal-defined data structures, so that search results can be presented clearly.
As a logged in user	I want to be able to send pictures to the portal from my mobile device’s camera, so that I have a seamless integration with the portal.
As a logged in user	I want to use location services on my mobile device, so that the portal can adjust its content to my location or I can post my location on the portal.
As a logged in user	I want to notify other logged in users about my status if the portal is in <i>Emergency Mode</i> , so that they know I am all right even if they cannot reach me.
As a logged in user	I want to configure who will be notified by me in which case.

Table 14 — Functions as a user with editing and particular right (Advanced)

Stakeholder	Function
As a user with editing rights	I want to use social media syndication flexibly, so that for example from a posted article on the portal only the abstract will be fed to Facebook and only the title will be fed to Twitter.
As a user with editing rights	I want to be able to set reminders for updates also for users without editing rights.
As a user with editing rights	I want to use translation services integrated into the portal, so that I am supported in the manual translation of pages.
As a user with editing rights	I want to prepare templates for special user groups (such as neighbourhood groups and digital volunteers), so that these groups can form communities on the portal.
As a user with editing rights	I want to prepare templates for particular user groups, so that it is easy to set up such groups.
As a user with editing rights	I want to use video call services with multiple participants, so that I can form video conferences directly from within the portal.
As a user with a particular right	I want to forward information posted onto the portal to the media, so that I can keep them informed with little effort.
As a user with a particular right	I want to disseminate the alarm to external systems, so that for examples short message services can be sent to citizens.

Table 15 — Functions for an administrator (Advanced)

Stakeholder	Function
As an administrator	I want to assign a particular right to a user, so that the corresponding functionality becomes accessible to that user.
As an administrator	I want to switch to <i>Emergency Mode</i> , so that the portal only shows a relevant subset of its content relevant to a disaster.
As an administrator	I want to grant the right to enable the <i>Emergency Mode</i> to users, so that for example a crisis manager can enable the mode.
As an administrator	I want to add wrappers that provide access to data sources via interfaces not supported by the portal, so that arbitrary data sources can be used.
As an administrator	I want to provide access to non-XML-based data sources, so that arbitrary data sources can be used.
As an administrator	I want to be able to assess the security of the portal, so that I understand if it might be attacked or used in a malicious way.

6.4.4 Robust

Even an advanced portal can be further improved to provide an even higher contribution to municipal resilience. Functionality according to the robust maturity stage requires even more effort to be implemented and might not provide a reasonable cost-benefit ratio for all implementing parties, at least not in the short-run. Careful considering of such functions will pave the path to increased resilience (see Tables below).

Table 16 — Functions for a logged in user (Robust)

Stakeholder	Function
As a logged in user	I want to create groups for notification, so that the portal can for example be used for neighbourhood help in case of emergencies.
As a logged in user	I want to include portal information in a chat box when using the video call service, so that it is easy to exchange data and to discuss particular content.

Table 17 — Functions as a user with editing, emergency mode and particular right (Robust)

Stakeholder	Function
As a user with editing rights	I want to integrate social media services as data sources into the portal, so that dynamic portal pages are updated with social media content in real time.
As a user with editing rights	I want to use the translation service in a way that allows me to link up with translators, so that I can create pages in other languages and send texts to language experts in one step.
As a user with editing rights	I want to configure dynamic pages to link up with systems for resource allocation, so that they reflect real-time changes in such systems.
As a user with editing rights	I want to be able to use the video call functionality to record pictures and videos, so that I can post them on the portal or feed them to social media.
As a user with editing rights	I want to integrate data from advanced data sources such as sensors, drones, and other live data sources, so that the portal can be dynamically updated both with raw and aggregated data.
As a user with emergency mode rights	I want to define different kinds of emergencies for which the mode can be activated, so that situation-relevant emergency pages can be shown.
As a user with emergency mode rights	I want to be able to define special rights for pages that become active in the <i>Emergency Mode</i> , so that for example looser access rights apply in cases of emergencies.
As a user with a particular right	I want to form a social media task force, so that in case of an emergency I can analyse social media activity covering the city.
As a user with a particular right	I want to use video call services with multiple participants including those from other cities, so that I can organize international video conferences.
As a user with a particular right	I want to use a tool that scans for redundant information on the portal, so that I am notified of potentially superfluous content.
As a user with a particular right	I want to use a tool that scans for potentially outdated content on the portal, so that I can decide whether it needs to be updated.
As a user with a particular right	I want to provide special access to the portal for representatives of the media, so that they get a tailored yet restricted access to information provided by the portal.

Table 18 — Functions for the local administration running the portal (Robust)

Stakeholder	Function
As the local administration running the portal	I want the portal to be hosted in a data-centre in sufficient distance to the city, so that a local shock-event will not risk the portal's functionality.

6.4.5 Vertebrate

Functions according to the vertebrate maturity stage extend the portal beyond its core functionality by providing tools and preconditions for processes that make it a powerful tool for communication, collaboration, and knowledge sharing. Implementing this functionality requires much effort and has to be seen as the theoretical final level of implementation. Typically, parties running the RP select some of these functionalities and define them as goals, striving to eventually implement a subset aligning with the municipal information technology and communication strategy (see Tables below).

Table 19 — Functions as a user with editing and particular right (Vertebrate)

Stakeholder	Function
As a user with editing rights	I want issues reported by users to be automatically categorized, so that I get a proposal for who shall handle them and how urgent they are.
As a user with editing rights	I want to use the video call functionality to stream videos to social media.
As a user with a particular right	I want to form a social media task force, so that in case of an emergency I can react to social media activities covering the city.
As a user with a particular right	I want to use social media analytics tool from within the portal.
As a user with a particular right	I want to configure social media analytics to feed results automatically to dynamic pages of the portal.
As a user with a particular right	I want to configure specific, incident-tailored contact lists for video calls, so that I can call in emergency conferences with external experts in case of incidents.
As a user with a particular right	I want to use the workflow management integration to define which data are automatically fed to the portal, so that the portal reflects current crisis mitigation.
As a user with a particular right	I want to define which data from the portal is feed to the workflow management system in case of a crises, so that crisis managers are provided with additional information.
As a user with a particular right	I want to configure dynamic pages to embed live data from external systems.
As a user with a particular right	I want to assign users to scenario planning (compare with the table below).

Table 20 — Functions as a user assigned to scenario planning (Vertebrate)

Stakeholder	Function
As a user assigned to scenario planning	I want to have the same possibilities as a user with editing rights but for a restricted area, so that I can create sub-portals that are used in preparation, steering, supervision, and reflection of a scenario.
As a user assigned to scenario planning	I want to create and use templates for scenarios.
As a user assigned to scenario planning	I want to set up the portal to include life data from external sources in the dynamic pages belonging to a scenario.

Table 21 — Functions for an administrator (Vertebrate)

Stakeholder	Function
As an administrator	I want to configure the portal for interlinkage with the city’s workflow management system; so that it will be automatically updated with information and that it will automatically provide data in the course of emergency handling.
As an administrator	I want to link the portal to online learning platforms, so that eLearning is facilitated through the portal.
As an administrator	I want to configure the portal for interlinkages with the portals of other cities for the exchange of best practice documents, so that content from other cities is automatically added and updated on my city’s portal.
As an administrator	I want to be able to set up a central repository for best practices, so that our city can create a library of knowledge.

6.5 Data

In the following, basic data requirements are given. Any details going beyond this shall be decided implementation specific.

- The portal shall be saving all data for its content, but for externally linked content. The portal shall keep a users’ database including the user right management and the role management, unless it retrieves such information from other systems used for authentication (such as single sign on functionality). In general, portal data are highly city-specific.
- The pages of the portal are organized hierarchically.
- Users are described by surname, name, email-address, affiliation (optional), and password. Additional attributes may be added such as background and responsibilities. Linking to other databases such as a national citizen registry is optionally possible.
- Roles are described by role name and organized hierarchically.
- Roles are linked to pages to denote access rights: read rights, write rights, administrative rights, and the right to grant rights to others are used.
- Depending on national policies and the city strategy, it is recommended to check open data requirements and possibilities in conjunction with using existing data sources and with providing data from the portal.

6.6 Performance requirements

In the following, non-functional requirements regarding the RP's performance are given.

- All pages of the portal shall be provided without noticeable delay (e.g. less than 500 ms). This particularly concerns pages with personalized dynamic content, such as the portal homepage. The reaction characteristics for frontend users shall at any time be perceived as seamless.
- Performance, particularly regarding the reaction times, should follow the standard series EN ISO 9241 [1].
- The backend editor, where users can edit content, shall take no longer than three seconds to load.
- Content shall be able to be posted within five seconds.
- Search questions shall be completed within five seconds.
- Backend management tasks shall not impose major delays.
- Where applicable, technology such as AJAX shall be used to partially update views rather than imposing page reloads.

6.7 User interface

The portal's design is up to the implementing local administration. It shall follow the corporate design of the local administration. The local administration can adapt a new design or choose a derivative design of the local administration style. Full integration with a local administration website and adherence to that design is an option. Adherence to EN ISO 9241-151:2008 [3] and EN ISO 9241-161:2016 [4] should be given.

6.8 Further quality requirements

Finally, non-functional requirements not (directly) related to system performance are given.

- Extensibility: The portal shall be extensible both with regard to content and to functionality. It is to be expected that the portal shall be run for many years and that it shall constantly be updated for content and for functionality.
- Maintainability: The portal shall be highly maintainable. It shall allow for further development, customization and adaption.
- Robustness: Robustness shall be in line with well-tested web applications. There shall be no obvious flaws, and the system shall react gracefully to improper usage. A particularly high level of robustness is not required, except when it comes to the disruption of service, in which case it shall be extremely robust. The portal shall also be robust in cases of unusual high traffic, for example in case of a crisis. Stress testing is recommended. Robustness should also be reached by following the standards series EN ISO 9241 [1]. In this regard, also EN ISO 22313:2014 [7] and EN ISO 22301:2015 [6] should be assessed.
- Resilience: After a crash of the server, the portal shall resume operation with the last stable state before the crash. No particular resilience is required.
- Compatibility: With relying on current web technology, high compatibility on the client side is given. Compatibility on the server side relies on the used products. Compatibility to existing software systems is determined by the required level of integration.

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- Portability: No particular portability shall be achieved.
- Usability: The portal should respect EN ISO 26800:2011 [8] and the standard series EN ISO 9241 [1]. The system shall be effective, efficient, and satisfactory for the specified users to achieve specified goals within the specified context of use. Its functions shall be easy to understand and to learn. Basic editing functionality needs to be understandable even to technological non-professionals. To avoid a digital divide, basic usage shall be possible even for people with hardly any computer experience.
- Accessibility: The portal shall be as accessible as possible to people with disabilities. EN ISO 9241-171:2008 [5] should be followed. In general, adhering to the latest (standardized) revisions of HTML5 and CSS as well as to best practices in interface design shall support accessibility.
- Documentation: A brief handbook for users with editing rights shall be provided. For frontend users, the portal shall be intuitive enough to make a handbook superfluous. Where needed, explanations shall be put onto pages directly.
- Security: ISO/IEC 29115:2013 [9] and the standard series ISO/IEC 27034 [10] should be considered. The portal shall not be harmful to the users' computers. The underlying software shall be updateable to ensure that potential security wholes are closed. The authentication and authorization mechanisms shall employ best practices to prevent breaches. Higher levels of security are mandated, if the portal provides access to sensitive or confidential information (even if it resides in integrated systems).
- Scalability: The portal shall be scalable. Actual scalability shall take into account the number of potential users in a city as well as prospective city growth. Moreover, it should scale seamlessly with a high number of parallel user requests.
- Regulations: EU regulations and national laws regarding public web services need to be respected. This particularly concerns accessibility, privacy, and security.

EXAMPLE 1 Follow the General Data Protection Regulation (GDPR) (Regulation (EU) 2016/679).

- Standards: Options and obligations shall be checked as to whether and how to structure exchanged data according to existing standards. Such standards exist e.g. for emergency management [12].
- Information sovereignty: Laws and regulations regarding information sovereignty shall be obeyed. Since citizen data will be processed, the right to information requests need to be expected. Processes to react to such requests need to be set up.

EXAMPLE 2 United Kingdom's Freedom of Information Act or Germany's Federal Data Protection Act.

- The authority actually responsible for the portal needs to fix, which parts of the portal fulfil statutory duties (e.g. in emergency management) and which provide voluntary services.
- Besides the here mentioned requirements, honouring ISO/IEC 25000:2014 [11] is recommended to increase overall quality.

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