European Commission

LIFO: Location Interoperability Framework Observatory

2020 COUNTRY FACTSHEET

BULGARIA

ISA²

Contents

1. Introduction

Location Interoperability Framework Observatory

The Location Interoperability Framework Observatory (LIFO[1]) monitors the implementation of location interoperability good practices in European public administrations.

The monitoring is based on the level of adoption of the recommendations set out in the five focus areas of the European Union Location Framework (EULF) Blueprint[2] (see Figure 1).

The EULF Blueprint provides guidance for implementing the European Interoperability Framework (EIF)[3] in the geospatial domain.

Consequently, the LIFO complements the EIF monitoring mechanism operated by the National Interoperability Framework Observatory (NIFO)[4].

LIFO is coordinated by the European Location Interoperability Solutions for e-Government (ELISE)[5] action in the Interoperability Solutions for European Public Administrations, Businesses and Citizens (ISA[2])[6] programme.

European Union Location Framework Blueprint
EULF Blueprint

Policy and strategy alignment
a consistent EU and Member State policy and legislative approach where location information plays a significant role

Digital government integration
making location a key enabler in G2B, G2C and G2G digital government processes and systems

Standardisation and reuse
adoption of recognised geospatial and location-based standards and technologies, enabling interoperability and reuse

Return on investment
ensuring funding of activities involving location information is value for money, and taking action to stimulate innovation and growth

Governance, partnerships and capabilities
effective decision making, collaboration, knowledge and skills related to the provision and use of location information in the context of digital government

Figure 1 - EULF Blueprint focus areas

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[1] https://joinup.ec.europa.eu/collection/elise-european-location-interoperability-solutions-e-government/solution/lifo-location-interoperability-framework-observatory/about
[2] http://data.europa.eu/w21/8e942bc2-657a-4289-b057-f2a285ee7375
[3] https://ec.europa.eu/isa2/eif_en
[4] https://ec.europa.eu/isa2/solutions/nifo_en
[5] https://joinup.ec.europa.eu/collection/elise-european-location-interoperability-solutions-e-government/about
[6] https://ec.europa.eu/isa2/home_en

The LIFO data collection is carried out through an online questionnaire sent to country representatives for digital government in the geospatial domain. The questionnaire is based on the LIFO analytical model[7]. This model is composed of primary indicators, calculated using information provided by respondents to the online questionnaire, and secondary indicators, reusing information from existing sources, for example, the monitoring under the INSPIRE Directive[8]. The indicators address good practices in the provision and use of location data in digital government and are shaped by the European policy context. They include measures relating to several EU directives and regulations including, for example, required datasets and means of access under both the INSPIRE Directive and the Open Data Directive[9], obligations under the General Data Protection Regulation (GDPR)[10], approaches under the Public Procurement Directive[11], and factors relevant to the EIF[12].

LIFO involves participating countries that are either EU Member States or other countries implementing the INSPIRE Directive. Results for the non-EU Member States, which apply EU legislative provisions on a voluntary basis, have their own alternatives, or apply the provisions only for specific aspects, must be read taking this into account.

The first LIFO data collection was in 2019 and the second in 2020. The LIFO 2020 model improves the monitoring capabilities of the model used in 2019, while being substantially aligned with it.

LIFO results are published on Joinup (see Figure 2) in the form of *Country factsheets*[13] and a *European State of Play Report*[14] and are available for users to explore in the *LIFO interactive dashboards*[15], which are linked in their turn to the *EULF Blueprint*[16].

Figure 2 - LIFO online resources

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[7] See Annex 1 for the scoring methodology used in the model and Annex 2 for a list of indicators

[8] See https://inspire.ec.europa.eu/inspire-directive/2. As reported in the EULF Blueprint, "Geospatial or location interoperability has been a major feature of both the ISA2 Programme and the predecessor ISA Programme. There was a strong basis for this with the adoption and implementation of INSPIRE. INSPIRE has driven forward the implementation of harmonised pan-European geospatial data for European environmental policy, and has paved the way to stronger location interoperability in other domains where harmonised geospatial data play a significant role.".

[9] https://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32019L1024

[10] https://eur-lex.europa.eu/eli/reg/2016/679/oj

[11] http://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32014L0024&qid=1428299560152&from=EN

[12] As introduced by the Communication from the European Commission of 23/3/2017: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2017%3A134%3AFIN

[13] https://joinup.ec.europa.eu/node/704194

[14] https://joinup.ec.europa.eu/node/704361

[15] https://joinup.ec.europa.eu/node/704247

[16] https://joinup.ec.europa.eu/collection/elise-european-location-interoperability-solutions-e-government/solution/eulf-blueprint/about

The information collected through LIFO can be used to examine current national and European status, compare countries, identify strengths and areas needing improvement, uncover best practice solutions, and plan appropriate measures, including potential partnerships and reuse of solutions.

The LIFO State of Play and the emerging best practices are incorporated in updates to the EULF Blueprint, ensuring the guidance framework remains up-to-date.
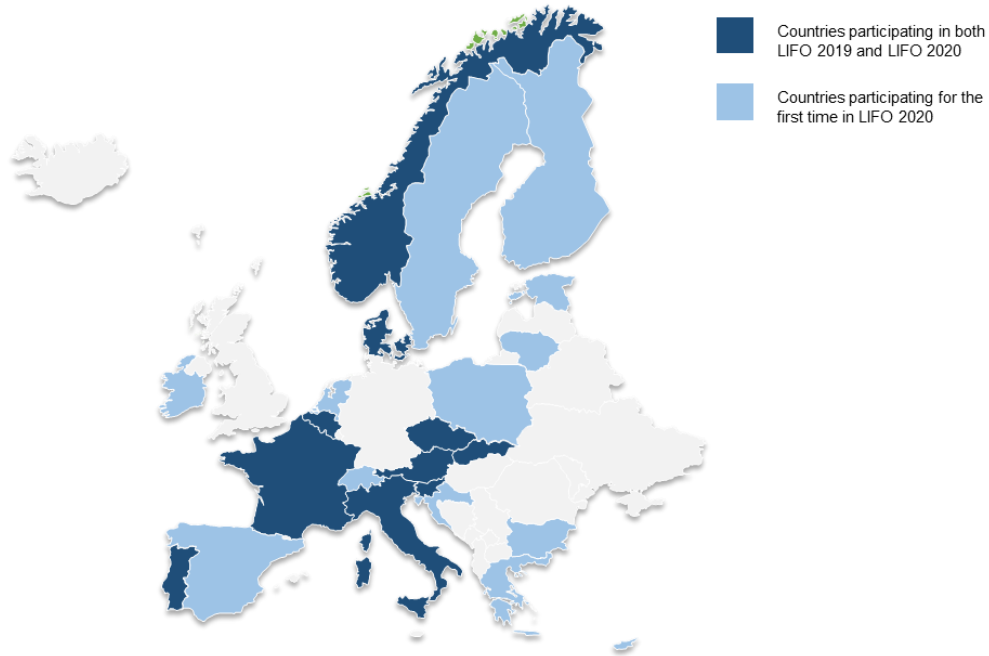

Figure 3 - LIFO participating countries in 2019 and 2020

The LIFO 2019 data collection involved 10 countries, whereas the LIFO 2020 data collection involved 23 countries. Appreciation is given to all participants who contributed to the survey responses and provided further information to ensure the results are representative of the national state of play (see Figure 3)[17].

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[17] Countries participating in both LIFO 2019 and LIFO 2020: Austria, Belgium, Czech Republic, Denmark, France, Italy, Norway, Portugal, Slovakia and Slovenia;
Countries participating for the first time in LIFO 2020: Bulgaria, Croatia, Cyprus, Estonia, Finland, Greece, Ireland, Lithuania, Netherlands, Poland, Spain, Sweden and Switzerland.

2. Structure of the document

This factsheet provides an overview of the information collected on location interoperability in Bulgaria in 2020. It contains the following sections:

- Location Interoperability State of Play where information is provided at two levels:

    - ***Overview of results***: describes the location interoperability state of play in the country across all five focus areas, together with a summary chart and a table with the main strengths and weaknesses;
    - ***Detailed results by focus area:*** organised in five sections; while the overview section gives a bird's eye view of the status across all focus areas, the focus area sections give a more detailed picture, with the vision and recommendations for the focus area, followed by an analysis of the state of play in the country for each of the recommendations. Two focus area charts are included, one displaying the average scores for each recommendation and the other the individual scores for the underlying indicators. In both charts, scores are compared with the average of the monitored countries. The titles of the charts are linked respectively to the table of recommendations in the focus area and to the relevant indicators in Annex 2.

- Best practices: This section highlights initiatives and applications provided as survey 'evidence' which demonstrate the adoption of EULF Blueprint good practices in one or more focus areas / recommendations.

Lists of abbreviations and definitions, figures and tables: These aid cross-referencing in the document.

Annexes to the document are:

- Annex 1: The method of scoring and normalisation applied to the indicators;
- Annex 2: A list of indicators used for each of the recommendations, together with a summary of 2020 indicator changes;
- Annex 3: Additional information for Bulgaria comprising the questionnaire response and the scores and charts based on the response.

The 2020 LIFO monitoring information for Bulgaria has been provided by the *State e-Government Agency*.

3. Location Interoperability State of Play

3.1. Overview

The information collected through the LIFO 2020 data collection indicates that Bulgaria is positioned below the European average across all focus areas, with different degrees of maturity gaps.

The "Policy and Strategy Alignment" focus area is where Bulgaria reaches the best positioning in absolute terms, mostly due to the good use of location-based analysis for evidence-based policy making. There are still relevant shortfalls in this focus area, such as the lack of a fully-fledged location strategy.

The "Return on Investment" focus area comes next in absolute terms. Bulgaria fares better in terms of approaches to facilitate searching, finding and accessing location data and web services for third parties. The existence of a policy on the reuse of public sector information and the scope of efficiency / effectiveness service assessment are also positive aspects. All other practices are still quite immature, particularly concerning the scarce support given to private, non-profit and academic actors in the development of new products, services or research using public sector location data and the lack of a strategic approach to funding public sector location reference data so to make access at point of use cost effective.

The "Standardisation and Reuse" focus area has the third highest score for the country but is also the closest to the corresponding European average. The high degree of conformity of spatial datasets with INSPIRE implementing regulations and the number of key datasets accessible through APIs represent two positive practices. The lack of a commonly used architectural approach for location data and services, the limited reuse of generic ICT solutions in the SDI and the weak approach to location data quality governance are conversely the practices where Bulgaria is less advanced.

In the "Digital Government Integration" focus area, the gap with the European average is quite high. The practices concerning the integration of location and statistical data, the use of spatial data infrastructures (SDIs) for cross-border digital public services, and the level of collaboration with external parties in developing or delivering location-enabled services are still at a low maturity level. There are positive notes concerning the extensive use of the SDI in delivering cross-government digital services, the maturity of INSPIRE implementation and the use of public sector SDI by the private sector for new and innovative applications.

Finally, "Governance, Partnerships and Capabilities" is where Bulgaria's positioning is the weakest. The widest gaps are in capacity building, but the involvement of relevant stakeholders in the governance of the SDI and the use of public-private partnerships to exploit location data are also areas for improvement.

The value of the overall LIFO index combining the scores for all focus areas is 0.34, which reflects the gaps of Bulgaria's practices under various areas of location interoperability. This compares with a European average of 0.55.

Figure 4 - Overall EULF Blueprint implementation

The following table summarises Bulgaria's main strengths and weaknesses across the five focus areas:

Focus Area	Strengths	Weaknesses
Policy and Strategy Alignment	• A wide range of location core reference datasets are freely available for general use • Location-based analysis is used in most of the relevant topics for evidence-based policy making	• There is no location strategy and only tactical actions are taken for the use of location information • No specific reference to INSPIRE and other applicable standards is made in public procurements of location information and services
Digital Government Integration	• The SDI is used in most cases of cross-government digital services delivery • Good overall maturity level of INSPIRE implementation • The public sector SDI is used in a significant number of good examples by the private sector and other organisations (e.g. NGOs) for delivery of new and innovative applications	• Only a limited set of actions is implemented for the integration of location and statistical information • Low level of collaboration with external parties when developing or delivering location-based digital public services • The country does not exploit its spatial data infrastructure (SDI) to deliver cross-border services
Standardisation and Reuse	• Many spatial datasets are conformant with INSPIRE implementing Regulation (EU) No. 1089-2010 • A good number of key datasets can be accessed	• No common architectural approach is adopted for location data and services • Limited reuse is made of generic IT solutions in the SDI

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Focus Area	Strengths	Weaknesses
	through the default GeoNetwork API	• Location data quality governance does not rely on a well-defined review process nor on an established roadmap
Return on Investment	• There are several portals and services to facilitate searching, finding and accessing location data and web services for third parties • There is a policy on the publication and reuse of public sector information	• Scarce support is given to private, non-profit and academic actors in the development of new products, services or research using public sector location data • There is no strategic approach to funding public sector location reference data to make access at point of use cost effective
Governance, Partnerships and Capabilities		• Limited investment in communications and skills programmes to develop awareness and capabilities sufficient for the use of location information in digital public services • Public-private partnerships are not exploited to finance, build and operate location data services or digital public services using location data • Relevant communities, domains, administrative levels and sectors are not involved in decision making on the role of location information in digital government

Table 1 - Strengths and Weaknesses by Focus Area

The following sections present the results in detail for each focus area.

3.2. Policy and Strategy Alignment

Vision	
	There is an aligned and coordinated policy and strategic approach across Europe for the use of location information that enables more efficient and effective integration of cross-sector and cross-border location-based applications, reducing costs and increasing social and economic benefit. Public sector location policies promote accessibility and interoperability. There are simple and consistent approaches to licensing, progressive open data policies that balance the needs of data users and suppliers, and authentic registers in which 'location' has a prominent role.
Recommendation 1	Connect location information and digital government strategies in all legal and policy instruments
Recommendation 2	Make location information policy integral to, and aligned with, wider data policy at all levels of government
Recommendation 3	Ensure all measures are in place, consistent with legal requirements, to protect personal privacy when processing location data
Recommendation 4	Make effective use of location-based analysis for evidence-based policy making
Recommendation 5	Use a standards-based approach in the procurement of location data and related services in line with broader ICT standards-based procurement

Table 2 - Focus Area "Policy and Strategy Alignment" - vision and recommendations

The scores for each recommendation in the "Policy and Strategy Alignment" focus area are shown in Figure 5 and the underlying indicator scores for each recommendation are shown in Figure 6. In both cases, the country scores are compared with the European averages.

The "Policy and Strategy Alignment" focus area index for Bulgaria is 0.47, well below the European average of 0.62. This gap is mostly due to the lack of a fully-fledged location strategy. On the positive side:

- location-based analysis is used for policy-making decisions in most relevant policy topics, more than the European average;
- a wide range of location core reference datasets are available for general use.
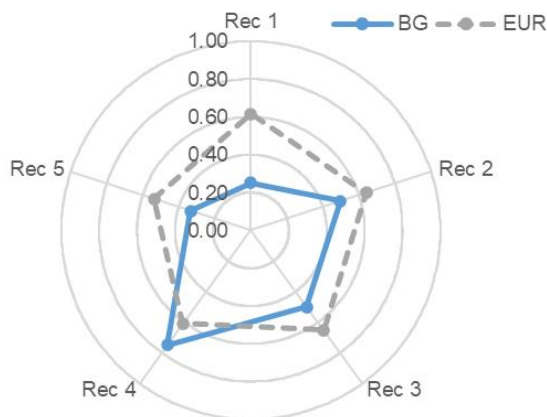
Figure 5 - Policy and Strategy Alignment - scores by recommendation

Under Recommendation 4, Bulgaria reports using location-based evidence to help develop relevant policies and monitor their outcomes in areas such as spatial planning, environmental planning / management, air pollution, water management and meteorology. Some practical examples are:

- location-based analysis is used for identifying areas exposed to flooding at a national level[18];
- location data on snow avalanches, landslides and floods are mapped and used for planning, civil protection and emergency response[19].

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[18] http://gwms.eea.government.bg/giswmr/
[19] http://www.weather.bg/0index.php?lng=1 and http://www.weather.bg/0index.php?koiFail=modelsFire&lng=1 and http://www.weather.bg/0index.php?koiFail=analysisSniag&lng=1 and https://www.weathermod-bg.eu/wr/jar-bg

The policy mandating the availability of core reference location datasets is the Spatial Data Access Act[20], which transposes the INSPIRE Directive in Bulgaria. It is accompanied by Methodological Guidelines[21] issued by the Chairman of the State e-Government Agency, which includes a list of administrations that are the primary administrators of reference spatial datasets on the topics of the Directive. In compliance with that policy, many core location datasets are available free of charge under an open licence without restrictions (Recommendation 2), namely:
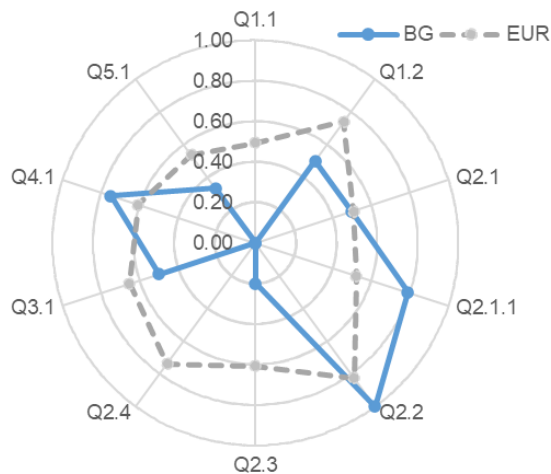

Figure 6 - Policy and Strategy Alignment - scores by indicator

- addresses;
- administrative units;
- air quality;
- geographical names;
- health statistics (illness and cause of death);
- hydrography;
- land cover;
- land use;
- population distribution and demography;
- protected sites;
- statistical units;
- transport networks;
- transport timetables;
- water quality;
- weather observations.

Other location datasets are available free of charge under an open licence with minimum restrictions, such as charges on the volumes of data or types of access. Among these datasets, there are:

- coordinate systems;
- state borders;
- relief data;
- buildings;
- soils;
- utilities and government services;
- environmental monitoring facilities;
- production and industrial facilities;
- agricultural and water management facilities;
- natural risk areas;
- atmospheric conditions and physical atmospheric conditions[22];
- meteorological geographical characteristics. atmospheric conditions and their measurement; precipitation, temperature, evapotranspiration, wind speed and direction;
- oceanographic geographical characteristics;
- marine regions;
- biogeographical regions;
- habitats and biotopes;

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[20]https://e-gov.bg/wps/wcm/connect/e-gov.bg-18083/3828d449-ce8f-45d7-890d-661457485864/%D0%97%D0%94%D0%9F%D0%94.pdf?MOD=AJPERES&CVID=nEOQqqa&useDefaultText=0&useDefaultDesc=0
[21]https://e-gov.bg/wps/wcm/connect/e-gov.bg-18083/5096b260-cac7-410e-80f3-5eb8364c5227/inspire-metodicheski-ukazania.pdf?MOD=AJPERES&CVID=mLRGgsY&useDefaultText=0&useDefaultDesc=0&CVID=mLRGgsY&CVID=mLRGgsY&CVID=mLRGgsY&CVID=mLRGgsY&CVID=mLRGgsY
[22] These include spatial data, based on measurements or models or a combination of the two, as well as locations where measurements have been made

- sources of energy;
- mineral resources;
- satellite data.

A gap under this recommendation is that location data tends to be available through different licensing arrangements from varying data providers.

Only some organisations are aware of potential location data privacy issues and prepared in terms of processes to comply with the GDPR (Recommendation 3).

The country makes rather generic references to INSPIRE or other standards for public procurements of location data and services (Recommendation 5). The European Single Procurement Document (ESPD) is not used for those procurements.

Recommendation 1 is where the country is positioned the lowest. This is mostly because there is no location strategy and only tactical actions are ongoing. However, the use in digital government of authoritative location datasets and services is mandated by sector legislation and/or binding agreements.

3.3. Digital Government Integration

Vision	
	Location is well integrated in digital government processing supporting G2G, G2B and G2C interactions, through location related services across government. Users do not have to supply the same mandatory information multiple times. There is visibility of common coordinating and support structures, expert groups and technologies, a strong user voice in the design, evaluation and improvement of location-based services, and good evidence of take-up of services.
Recommendation 6	Identify where digital government services and processes can be modernised and simplified through the application of location-enabled services and implement improvement actions that create value for users
Recommendation 7	Use spatial data infrastructures (SDIs) in digital public services and data ecosystems across sectors, levels of government and borders, integrated with broader public data infrastructures and external data sources
Recommendation 8	Adopt an open and collaborative methodology to design and improve location-enabled digital public services
Recommendation 9	Adopt an integrated location-based approach in the collection and analysis of statistics on different topics and at different levels of government

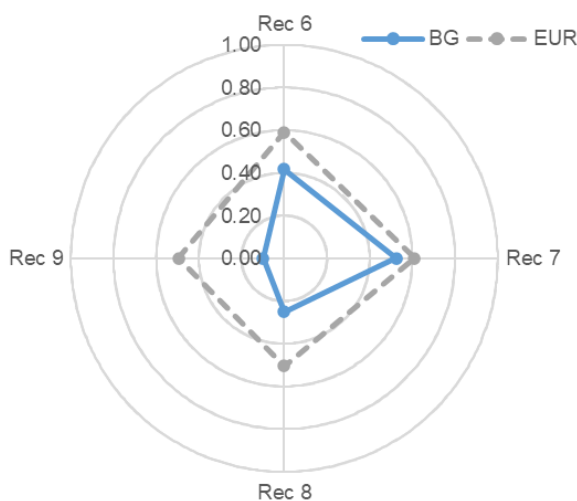*Table 3 - Focus Area "Digital Government Integration" - vision and recommendations*

Figure 7 - Digital Government Integration - scores by recommendation

The scores for each recommendation in the "Digital Government Integration" focus area are shown in Figure 7 and the underlying indicator scores for each recommendation are shown in Figure 8. In both cases, the country scores are compared with the European averages.

The "Digital Government Integration" focus area index for Bulgaria is 0.32, well below the European average of 0.57. This negative deviation is mostly due to the low alignment with Recommendation 9. There are sizeable gaps with the European averages for the other recommendations except for Recommendation 7, where the score is close to the European average.

Under this latter recommendation, application specific location data or data from sector SDIs (in some cases using INSPIRE conformant datasets and services) are used in most cases of digital public services under various domains, such as agriculture[23], environment[24], marine[25],

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[23] https://seu.dfz.bg/drupal/ and https://seu.dfz.bg/seu/f?p=727:8140:::NO and https://www.bfsa.bg/bg/Page/asf_map/index/asf_map/%D0%92%D0%B8%D0%B7%D1%83%D0%B0%D0%BB%D0%B8%D0%B7%D0%B0%D1%86 and https://www.dfz.bg/

[24] https://nwms.eea.government.bg/app/base/home and http://eea.government.bg/zpo/bg/result1.jsp and https://platform.airthings-project.com/; or http://edu.parks.bg/ a platform with the aim of developing an innovative educational toolkit which will combine best practice resources in research fieldwork, data treatment and data usage in environmental management and advocacy; the interactive map of forests in the territorial scope of the Southwestern State Enterprise (https://gori.uzdp.bg/#/23.16820/42.54567/14) allows visualisation and quick access to the entire current database of forests, protected areas and cadastre in Southwestern Bulgaria, including GPS-positioning in the forest if available.

[25] For example, the river information system in the Bulgarian part of the Danube (https://www.bulris.bg/), which provides real-time rendering of river information services as an important condition for the reduction of the risks upon the vessels passing through critical sections of the Danube river thus increasing the level of navigation safety.

transport[26], energy, healthcare, property / land administration, local / regional planning, culture, education, tax policy, farming, utilities, disaster management and defence. The SDI is not used for delivering cross-border digital public services.

The overall implementation maturity of the INSPIRE Directive is aligned with the European average.

The public sector SDI is used in a significant number of good examples by the private sector and other organisations (e.g. NGOs) for the delivery of new and innovative applications[27], but not for the delivery of cross-border services.

The use of location information in key digital public services is often optimised through the adoption of service improvement methods, but not with a breakthrough approach (Recommendation 6). In fact, in all the sectors in which location information plays a significant role to digital public service, location information is still mainly used in a basic way, not yet targeting innovation. Examples thereof in various sectors include:

- disaster management and civil protection: Disaster risk maps[28] produced by the Fire Safety and Civil Protection General Directorate in the Ministry of Interior;
- education: location and addresses of municipal schools and support centres for personal development maintained by the Sofia Municipality[29];
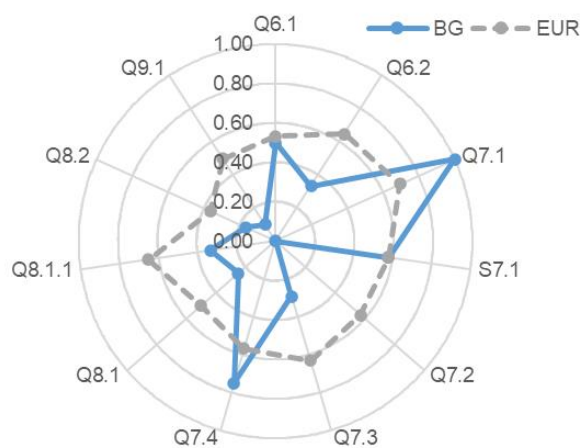

Figure 8 - Digital Government Integration - scores by indicator

- environment: public reporting on the quality of the atmospheric air provided by the Executive Environment Agency[30];
- property and land administration: information on areas, addresses, permanent use etc. of the properties, provided by the Geodesy Cartography and Cadastre Agency[31];
- regional and urban development: reports and consultations on building permits, development plans, etc. produced by the Architecture and Urban Planning Directorate in the Sofia Municipality32;
- transport: information provided by the Road Infrastructure Agency in the Ministry of Regional Development and Public Works on the following:

  - national road network[33];

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[26] For example, the online monitoring of train journeys and actual vs. scheduled positions over a map: https://radar.bdz.bg/bg; the mobile public transport route planner of Sofia municipality: https://www.sofia.bg/mobile-applications; the applications of Sofia municipality for paying parking and getting wheel clamps removed by online payment; https://www.sofiatraffic.bg/bg/parking/vignettes; the LIMA system (https://lima.api.bg/mobile), which enables monitoring in one single site the street condition and traffic status all over the Bulgarian road network, jointly exploiting information from the national Road Infrastructure Agency, all road administrations in the country and the end users; finally a solution to monitor the weather conditions in the Bulgarian part of the Danube, integrating info also from neighbouring countries: http://appd-bg.org/exploration#data_meteo

[27] For example, "SMS Parking" (see best practice BG1)

[28] https://www.mvr.bg/gdpbzn/namaliavane-riska-ot-bedstvia/ocenka-na-riska/

[29] https://www.sofia.bg/schools

[30] https://kais.cadastre.bg/

[31] https://kais.cadastre.bg/

[32] https://www.sofia-agk.com/

[33] http://www.api.bg/index.php/bg/karti/republikanska-ptna-mrezha/

- paid sections in the national road network for use by vehicles with a total mass exceeding 3.5 tons[34];
- possible detours on sections of the national road network, limited for the movement of heavy trucks over 12 tons[35];
- parking lots and emergency sites / recreation areas for heavy trucks in the national road network[36];
- alternative routes on the Hemus Motorway[37].

The application of an open and collaborative methodology to design and improve location enabled digital public services is limited to a few initiatives at national level (Recommendation 8). The only practice adopted is the reuse of location data from external parties (e.g. businesses, citizens, NGOs) in digital public services.

The integration of the statistical and location dimension of data is quite low (Recommendation 9). Of all possible actions, Bulgaria has implemented the collection of census data based on the location reference framework for statistics and the integration of location and statistical information but has not applied other approaches such as the development and use of a geospatial framework for statistics, the dynamic update of location-based statistics, the use of the geo-temporal dimension of statistics, and the use of private sector location data for the production of statistics.

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[34] http://www.api.bg/index.php/bg/karti/plateni-uchastci-za-polzvane-na-republikanskata-ptna-mrezha-na-baza-izminato-razstyanie-za-prevoz5ni-sredstva-s-obsha-tehnichesk/
[35] http://www.api.bg/index.php/bg/karti/karta-obhodni-marshruti/
[36]http://www.api.bg/index.php/bg/karti/nalichni-parkingi-za-tezhkotovarni-avtomobili-po-napravleniyata-na-osnovnite-transportni-osi-v-republika-blgariya/
[37] http://www.api.bg/index.php/bg/karti/alternativni-marshruti-na-am-hemus/

3.4. Standardisation and Reuse

Vision	
	Core data has been defined and a funding model has been agreed for its ongoing maintenance and availability. Consistent use of geospatial and location-based standards and technologies, enabling interoperability and reuse, and integration with broader ICT standards and technologies, including the standards and solutions promoted by the ISA2 programme. Use of these standards in all areas related to the publication and use of location information in digital public services, including metadata, discovery, view, exchange, visualisation etc.
Recommendation 10	Adopt a common architecture to develop digital government solutions, facilitating the integration of geospatial requirements
Recommendation 11	Reuse existing authentic data, data services and relevant technical solutions where possible
Recommendation 12	Apply relevant standards to develop a comprehensive approach for spatial data modelling, sharing, and exchange to facilitate integration in digital public services
Recommendation 13	Manage location data quality by linking it to policy and organisational objectives, assigning accountability to business and operational users and applying a "fit for purpose" approach

Table 4 - Focus Area "Standardisation and Reuse" - vision and recommendations

The scores for each recommendation in the "Standardisation and Reuse" focus area are shown in Figure 9 and the underlying indicator scores for each recommendation are shown in Figure 10. In both cases, the country scores are compared with the European averages.
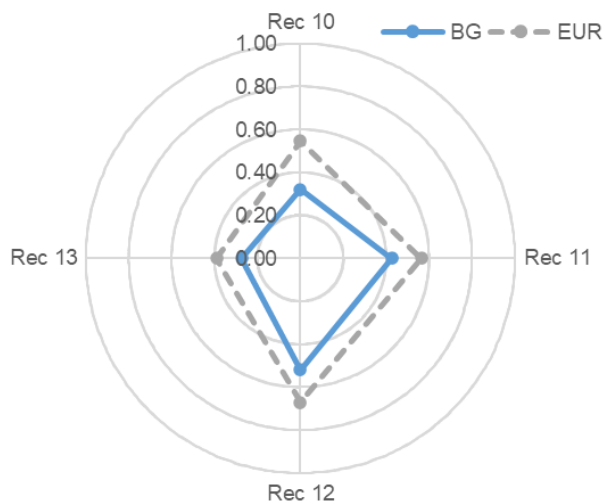
Figure 9 - Standardisation and Reuse - scores by recommendation

The "Standardisation and Reuse" focus area index is 0.38, well below the European average of 0.55. Recommendation 11, Recommendation 12 and Recommendation 13 are relatively close to the European average of the Member States, while the gap is wider for Recommendation 10.

Under this latter recommendation, the country lags behind the European average due to the lack of a common architectural approach for location data and services. Furthermore, only an ad-hoc approach has been implemented so far to discover, explore and incorporate new technological features or emerging technologies, with little testing.

The State e-Government Agency launched a project for a National (INSPIRE) Spatial Data Portal[38] under an Operational Programme, in order to support the fulfilment of the obligations under the INSPIRE Directive. The project is currently in the final phase. Meanwhile, until the completion of the portal, the National Catalogue for Spatial Data[39] provides access to the data required under Annexes I to III to the INSPIRE Directive and the priority datasets through the

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[38] https://inspire.egov.bg/
[39] https://inspire-catalogue.egov.bg/

default GeoNetwork API. The National INSPIRE Portal (SDI), once fully operational, will also use this API, which will allow access to all relevant datasets.

As of now, the "high value" location datasets that can be accessed using the API are:

- administrative units;
- air quality;
- geographical names;
- hydrography;
- land cover;
- land use:
- population distribution and demography;
- protected sites;
- statistical units;
- transport networks;
- transport timetables;
- water quality;
- weather observations.

The GeoNetwork API is documented in open specifications and uses API design best practices (e.g. REST APIs).

The possibility for re-using generic ICT solutions in the SDI is still in the planning phase. Several registers of location information are implemented, namely: geographical names, administrative units, cadastral parcels, buildings, hydrography, transport networks. (Recommendation 11)

Through the environment for inter-register data exchange (RegiX[40]), users can get information automatically by extracting data from some registers containing location information:

- classifiers of localisation units,
- classifiers of current and permanent addresses,
- register of protected areas and zones in Bulgaria.

International standards (like ISO/TC211, OGC, IHO, GDF) are used to develop a comprehensive approach for spatial data modelling (Recommendation 12). Ad hoc specifications and tools are used for metadata to facilitate discoverability of spatial and non-spatial data through joint access mechanisms. When an approach is adopted, national specifications and tools are the main references to design and combine spatial with non-spatial metadata.

The conformity of spatial data sets with Regulation (EU) No 1089/2010 is well above the European average while the conformity of the INSPIRE network services with Regulation (EC) No 976/2009 is aligned with the average.

The country has implemented several actions to assure location data quality (Recommendation 13).

In the design phase, these actions include:

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[40] https://info-regix.egov.bg/public
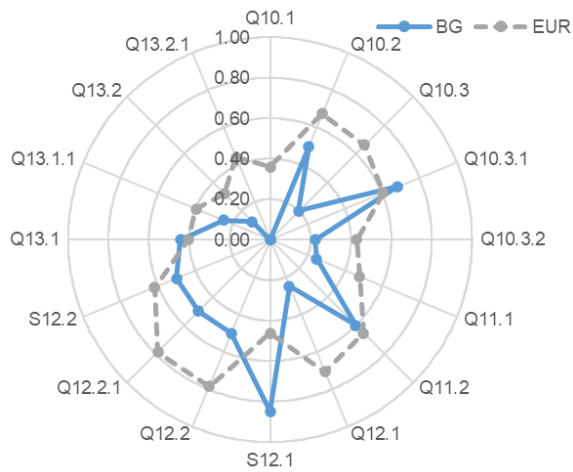
Figure 10 - Standardisation and Reuse - scores by indicator

- linking data quality standards to data standards;
- including the different dimensions of data quality in the standard, such as timeliness, accuracy, completeness, integrity, consistency, compliance to specifications / standards / legislation.

In the measurement phase, the actions implemented are:

- measurement of conformance of data to quality parameters set out in the data policy on an agreed frequency;
- ex-post evaluation of existing data quality issues.

For data quality governance, there is a clear definition of data quality responsibilities but no reliance on an established review process with a well-established roadmap, nor on advanced techniques based on AI or machine learning. There is no national standard for location data quality; the agencies that are legally mandated to create geodetic and cartographic materials and data for providing the state apply their own technical guidelines concerning the products they create (e.g. the Military Geographical Service and the Agency for Geodesy, Cartography and Cadastre). However, these agencies have also applied INSPIRE-compliant data quality standards to upload certain datasets in the National INSPIRE Portal.

3.5. Return on Investment

Vision	
	There is a strategic approach to national and European funding, procurement, and delivery of location information and location-based services to minimise costs and maximise benefits for government, businesses and citizens, recognising best practices, and building on INSPIRE and standardisation tools. The funding and sourcing model for collection and distribution of core location data takes into account user needs from different sectors and the strategic importance of continued supply
of data at a suitable quality. Procurement recognises INSPIRE and other standardisation tools in a meaningful way. There are compelling impact assessments and business cases, a rigorous approach to targeting and tracking benefits, and good evidence that benefits are being achieved.	
Recommendation 14	Apply a consistent and systematic approach to monitoring the performance of location-based services
Recommendation 15	Communicate the benefits of integrating and using location information in digital public services
Recommendation 16	Facilitate the use of public administrations' location data by non-governmental actors to stimulate innovation in products and services and enable job creation and growth

Table 5 - Focus Area "Return on Investment" - vision and recommendations
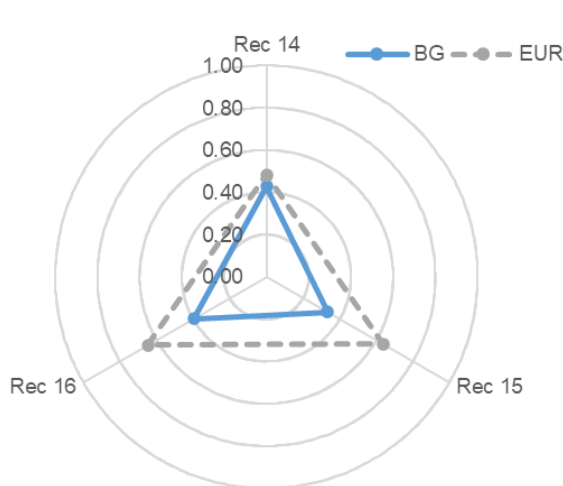
Figure 11 - Return on Investment - scores by recommendation

The scores for each recommendation in the "Return on Investment" focus area are shown in Figure 11 and the underlying indicator scores for each recommendation are shown in Figure 12. In both cases, the country scores are compared with the European averages.

The focus area index for Bulgaria is 0.39, quite below the European average of 0.58. The index for Recommendation 14 is the highest and is close to the corresponding European average, while the gaps are quite significant for Recommendation 16 and most of all for Recommendation 15.

The assessment of the efficiency and effectiveness of location-based services is performed only in certain organisations, through the evaluation of a number of elements (Recommendation 14) in line with the European average, namely:

- reusability;
- availability;
- reduction in administrative burden;
- user satisfaction;
- user-centricity.

The country delivers limited basic communication to raise awareness and understanding about the availability and benefits of location data and location-enabled digital public services (Recommendation 15).

The measures to make the process of searching, finding and accessing location data and web services as easy as possible for companies, research institutions, citizens and other interested parties, as identified in Recommendation 16, consist in:

Figure 12 - Return on Investment - scores by indicator

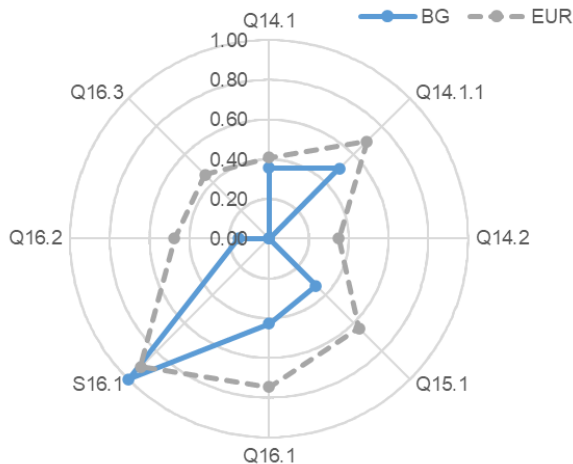- a geoportal (managed by the Military Geographic Service of the Ministry of Defence)[41], harvested by the European Data Portal;
- thematic portals[42] complementing general search facilities with "specialist" search:
  - the Geo-information System for Water Management and Reporting of the Executive Environment Agency,
  - the Cadastral Administrative Information System of the Geodesy, Cartography and Cadastre Agency.

A National (INSPIRE) Spatial Data Portal[43] is being created to provide access to spatial data sets (including priority ones) and services for them on the topics of the annexes of the INSPIRE Directive. It will replace the current National Spatial Data Catalogue. This portal will be publicly available and will contribute to optimising the reuse of spatial data and facilitating their pan-European use. New data sources (related data, sensor data) outside the current spatial data range are being included through connection with the Open Data Portal. Further implementations (availability of data and services, accessibility and interoperability) of the INSPIRE Directive will be driven by common demand at administrative levels and use cases. Ready-made and free to use tools are being implemented.

There is a plan to upgrade the Open Data Portal[44] with functionalities for operations with and visualisation of spatial and location data.

Support to private, non-profit and academic actors in the development of new products and services using location data consists mostly in establishing digital platforms through which a community of data providers, consumers and partners is actively engaged in the sharing, enhancing and using of location data and value is created for all partners in the ecosystem.

The government also considers the existence of base public registers for the private sector as a key step for innovation, growth and job creation; therefore, it regularly launches initiatives for base registers through the State e-Government Agency, working with Big Data (through the creation of working groups for the automotive sector[45], ecology, health, etc.) to promote the free provision of good basic data to the private sector. It also works in close cooperation and signs agreements with research institutes and other institutions (e.g. the GATE Institute and the State e-Government Agency).

Other actions such as promoting innovation labs, sponsorship and funding of innovative pilot projects exploiting location data, collecting requirements of the private and NGO sector for the development of the SDI are not currently implemented.

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[41] https://gis.armf.bg/
[42] http://gwms.eea.government.bg/giswmr/ and https://kais.cadastre.bg/bg/
[43] https://inspire.egov.bg/
[44] https://data.egov.bg/
[45] https://data.egov.bg/dataviz?section=17&item=46

3.6. Governance, Partnerships and Capabilities

Vision	
	There is high level support for a strategic approach to the funding and availability of location information at Member State and EU level, based on INSPIRE and other tools to achieve interoperability. Effective governance, partnerships, work programmes, responsibilities and capabilities to progress such an approach have been established, taking into account the needs and expectations of stakeholders at Member State and EU level. Governments recognise the importance of 'location' understanding and skills and invest in awareness raising, training and resourcing.
Service design takes account of user capabilities. Specialists form communities to share knowledge and develop new ideas related to location information. As a result, there is a sufficient level of understanding and skills to develop, deploy and use effective location-based services.	
Recommendation 17	Introduce an integrated governance of location information processes at all levels of government, bringing together different governmental and non-governmental actors around a common goal
Recommendation 18	Partner effectively to ensure the successful development and exploitation of Spatial Data Infrastructures
Recommendation 19	Invest in communications and skills programmes to ensure sufficient awareness and capabilities to drive through improvements in the use of location information in digital public services and support growth opportunities

Table 6 - Focus Area "Governance, Partnerships and Capabilities" - vision and recommendations
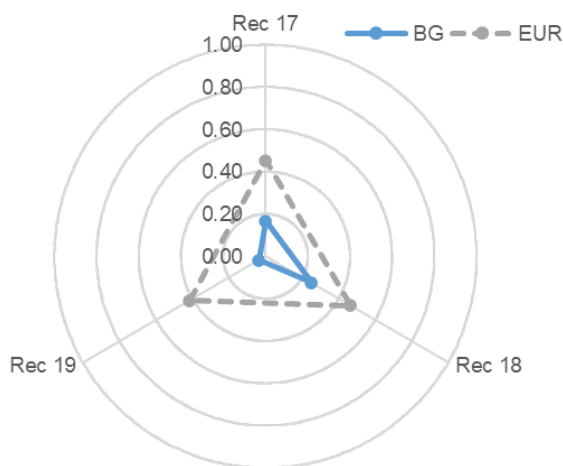

Figure 13 - Governance, Partnerships and Capabilities - scores by recommendation

The scores for each recommendation in the "Governance, Partnerships and Capabilities" focus area are shown in Figure 13 and the underlying indicator scores for each recommendation are shown in Figure 14. In both cases, the country scores are compared with the European averages.

Bulgaria's positioning in the "Governance, Partnerships and Capabilities" focus area is a long way below the European average and scored the lowest of all surveyed countries. The focus area index for Bulgaria is 0.15, significantly below the European average of 0.45. Of the three recommendations, awareness raising and capability building, is the practice showing the most apparent margins for improvement.

Stakeholders in different thematic domains, administrative levels (central and decentralised) and sectors (private, academia, civil society) are scarcely involved in decision making on the role of the SDI in digital transformation (Recommendation 17). The two organisations leading and coordinating the implementation of location information / SDI (the Geodesy, Cartography and Cadastre Agency[46]) and digital government (the e-Government Agency, which maintains the National Spatial Data Catalogue[47]) exercise some joint governance of the role of the SDI in the context of digital government.

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[46] The Agency maintains the Cadastral Administrative Information System (https://kais.cadastre.bg/bg). Some SDI-related functions are also managed by the Executive Environment Agency (concerning the management of the Geo-information System for Water Management and Reporting - http://gwms.eea.government.bg/giswmr/) and the Ministry of Defence (Military Geographic Service) with its geoportal (https://gis.armf.bg/).
[47] https://inspire-catalogue.egov.bg/
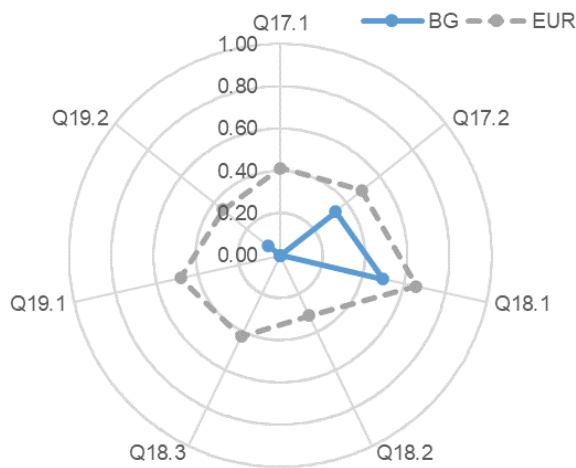
Figure 14 - Governance, Partnerships and Capabilities - scores by indicator

Only limited formal agreements are in place between public authorities inside the country to finance, build and operate many location data services or digital public services using location data (Recommendation 18). Agreements are planned between the State e-Government Agency and the Executive Environment Agency and between State e-Government Agency and the Road Infrastructure Agency for joint actions on the harmonisation of spatial data sets and network services in line with the requirements of the INSPIRE Directive. There are no agreements in place between public authorities and private partners.

The approach to geospatial skills and training is still at a low level of maturity: there is no or very little training or awareness raising on geospatial skills (Recommendation 19). In order to raise such awareness, some public or cross-government events on location information / GI topics have been held.

4. Best practices

Best Practice BG1	**SMS Parking**

Policy domain: Transportation

Process owner: Futurist Labs (https://futurist-labs.com/) with the cooperation of the concerned municipalities

Short description: "SMS Parking" is a mobile application that allows the user to create a profile of all his/her vehicles with their registration numbers and easily pay a fee for the paid parking zones in Sofia and Plovdiv, keeping track of the remaining paid time and locating the park and the car.

The app exploits the information on parking zones and facilities provided by the respective municipalities.

Recommendation: Digital Government Integration (7); Governance, Partnerships and Capabilities (18)

Link: https://apps.apple.com/bg/app/sms-parking-bg/id1242189794

Best Practice BG2	**Platform of the Bulgarian Food Safety Agency (BFSA)**

Policy domain: Agriculture, Food and Forestry

Process owner: Bulgarian Food Safety Agency (BFSA) - Ministry of Agriculture, Food and Forestry

Short description: The Bulgarian Food Safety Agency (BFSA) is an integrated body for control of food and feed safety and quality in the Republic of Bulgaria. Established in early 2011, BFSA follows European best practices for implementing the highest standards of control in the areas of food and feed safety and quality, food and feed additives and beverages, veterinary medicine and animal welfare, plant protection and fertilizers, phytosanitary control, feed, border inspections and others. All BFSA experts carry out strict controls throughout the food chain on a daily basis.

Through its portal, the BFSA pursues a consistent policy of cooperation with all stakeholders throughout the country and in particular with their industry associations. Together with them, the BFSA develops and establishes standards aimed at improving the quality of some basic food products, such as bread and other bakery or pasta products, milk, dairy and meat products, along with some other traditional Bulgarian foods.

The portal has many modules where food safety information (e.g. on diseases, hunting game tests) can be visualised in GIS maps. This helps users search for the food safety information based on its relevance for their respective location

Recommendation: Digital Government Integration (6, 7); Standardisation and reuse (11, 13)

Link: https://www.bfsa.bg/bg/Page/info-lsd/index/info-lsd/%D0%98%D0%BD%D1%84%D0%BE%D1%80%D0%BC%D0%B0%D1%86%D0%B8%D1%8F

https://www.bfsa.bg/bg/Page/asf_map/index/asf_map/%D0%92%D0%B8%D0%B7%D1%83%D0%B0%D0%BB%D0%B8%D0%B7%D0%B0%D1%86

https://www.bfsa.bg/bg/Page/ASF2/index/ASF2

Best Practice BG3   BDZ RADAR train locator application

Policy domain: Transportation

Process owner: Bulgarian State Railways (BDZ)

Short description: The RADAR digital service application from BDZ (radar.bdz.bg) enables travellers to track the location of all passenger trains currently running in the country. On a virtual map of the railway network, all trains currently running are displayed in real time, showing train numbers, different colour markers depending on the service category, and data about their location, schedule and any delays. By selecting an individual train, users get information about its real-time schedule and any delay at the last location reported.

The data are based on information submitted by the ROVR system of the National Railway Infrastructure Company (https://www.rail-infra.bg/) and are subsequently processed and filtered by the type of cause of any delay.

Recommendation: Digital Government Integration (6, 7), Governance, Partnerships and Capabilities (18)

Link: https://www.bdz.bg/bg/a/trafichni-danni-za-dvizhenie-na-vlakovete;
https://radar.bdz.bg/bg ;

List of abbreviations and definitions

Abbreviations

Abbreviation	Meaning
API	Application Programming Interface
BDZ	Bulgarian State Railways
BFSA	Bulgarian Food Safety Agency
DCAT-AP	Data Catalogue vocabulary – Application Profile
EIF	European Interoperability Framework
ELISE	European Location Interoperability Solutions for e-Government
EULF	European Union Location Framework
GDPR	General Data Protection Regulation
GI	Geographic Information
G2B	Government to Business
G2C	Government to Citizen
G2G	Government to Government
ICT	Information and Communication Technology
IHO	International Hydrographic Organization
INSPIRE	Infrastructure for Spatial Information in the European Community
ISA[2]	Interoperability Solutions for European Public Administrations, Businesses and Citizens Programme
ISO	International Standard Organisation
LIFO	Location Interoperability Framework Observatory
NGO	Non-Governmental Organisation
NIFO	National Interoperability Framework Observatory
NMA	National Mapping Agency
OGC	Open Geospatial Consortium
PSI	Public Sector Information
REST	Representational state transfer
SDI	Spatial Data Infrastructure
WCS	Web Coverage Service
WFS	Web Feature Service
WMS	Web Map Service
WMTS	Web Map Tile Service

Definitions

Term	Meaning	Link
Application Programming Interface (API)	A set of functions and procedures that allow the creation of applications which access the features or data of an operating system, application, or other service.	Application Programming Interface | Joinup (europa.eu)
Authentic data	Data that provides an accurate representation of reality with quality parameters that are fit for the intended purposes.	Authentic data | Joinup (europa.eu)
Authoritative data	Data from officially regarded sources. A subset of spatial data may be described as 'authoritative data', where it has legal value because it is defined by a competent authority.	Authoritative data | Joinup (europa.eu)
Core location dataset / High value dataset	Open Data Directive introduces the concept of 'high-value datasets' as datasets holding the potential to (i) generate significant socio-economic or environmental benefits and innovative services, (ii) benefit a high number of users, in particular SMEs, (iii) assist in generating revenues, and (iv) be combined with other datasets. Given this, the Directive requires that such datasets are available free of charge, are provided via Application Programming Interfaces (APIs) and as a bulk download, where relevant, and are machine-readable. The Directive does not include the specific list of high-value datasets—which is expected in the future—but only their thematic categories, one of which is 'Geospatial'. The 'high value dataset' concept is also considered in national data policy and programmes in different European countries, typically incorporating 'core' datasets, including geospatial data.	High Value Dataset | Joinup (europa.eu)
Core reference dataset	Core reference dataset can be defined as the minimum set of authoritative, harmonised and homogeneous framework data needed to either meet common requirements for applications at cross-border, European and global levels or to geo-reference and locate other thematic data. In the latter case, core data may be used as a framework on which other richer, more detailed, thematic geospatial and statistical data would rely.	http://ggim.un.org/meetings/GGIM-committee/documents/GGIM5/E-C20-2015-4%20Fundamental%20Data%20Themes%20Report.pdf
Digital government	Government designed and operated to take advantage of information in creating, optimising, and transforming, government services.	Digital government | Joinup (europa.eu)

Term	Meaning	Link
European Single Procurement Document	The European Single Procurement Document (ESPD) is a self-declaration by economic operators providing preliminary evidence replacing the certificates issued by public authorities or third parties. As provided in Article 59 of Directive 2014/24/EU, it is a formal statement by the economic operator that it is not in one of the situations in which economic operators shall or may be excluded; that it meets the relevant selection criteria and that, where applicable, it fulfils the objective rules and criteria that have been set out for the purpose of limiting the number of otherwise qualified candidates to be invited to participate. Its objective is to reduce the administrative burden arising from the requirement to produce a substantial number of certificates or other documents related to exclusion and selection criteria	[Commission Implementing Regulation (EU) 2016/7 of 5 January 2016](#)
Evidence-based policy making	The development of public policy which is informed by objective evidence, e.g. through data related to the content of the policy.	[Evidence-based policy making | Joinup (europa.eu)](#)
GeoDCAT-AP specification	Data Catalogue vocabulary (DCAT) Application Profile extension for describing geospatial datasets, dataset series, and services.	[GeoDCAT-AP | Joinup (europa.eu)](#)
Geographical Information (GI) Champion	The GI Champion can be appointed to drive through the changes related to running a major GI improvement programme, promoting public sector modernisation through the use of GI, and ensure that the organisation is aware of and convey the benefits of geospatial information and technologies. A GI champion may also be appointed with a pan-government remit.	[LIFO Guidelines and Recommendations](#)
Key digital public services	The most frequently accessed and sometimes mandatory public services which are delivered with the extensive use of ICT, e.g. registration of land and property, health and welfare, civil status registration, transport, environmental protection, energy production and distribution, public safety, transport, public education etc. National legislation may define which services must be considered key.	https://joinup.ec.europa.eu/collection/european-union-location-framework-eulf/document/recommendation-6
Location data framework	Location data framework describes all the elements – including data assets, standards and technologies, policies and guidance, people and organisations – that are required to unlock the power of location. An SDI is a location data framework	[LIFO Guidelines and Recommendations Unlocking the Power of Location: The UK's geospatial strategy 2020 to 2025](#)
Location information strategy	A strategic approach for managing and maximising the value of location information.	[Location information strategy | Joinup (europa.eu)](#)

Term	Meaning	Link
OpenAPI	Specification for machine-readable interface files for describing, producing, consuming, and visualising RESTful web services.	https://swagger.io/specification/
Open and collaborative methodology	Any system of innovation or production that relies on goal-oriented yet loosely coordinated participants who interact to create a product (or service) of economic value, which they make available to contributors and noncontributors alike. Prominently used for the development of open source software.	https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1096442
Open licence	An open licence is a way for the copyright holder (creator or other rightsholder) to grant the general public the legal permission to use their work. The applied open licence is usually indicated directly on the work and wherever the work is shared. As in the case of other licences, open licences do not imply a transfer of copyright or other intellectual property rights. Someone granting an open licence for their work still remains the copyright holder of their materials and can themselves use the materials as they wish, e.g. to commercialise their project outcomes.	https://ec.europa.eu/programmes/erasmus-plus/programme-guide/part-c/important-contractual-provisions/open-licence-intellectual-property-rights_en
RESTful web services	Web services built on Representational State Transfer (REST) principles, where resources used by the services are made available through URIs (Uniform Resource Identifiers) and can be updated without affecting the service.	https://docs.oracle.com/javaee/6/tutorial/doc/gijqy.html
Sector legislation	Legislation about a particular domain (e.g. health, environment) or sub-domain (e.g. hospitals, water). Within INSPIRE, reference can be made to the nine thematic clusters, which have associated legislation, e.g. E-PTRT (European Pollutant Release and Transfer Register) IED (Industrial Emissions Directive).	https://inspire.ec.europa.eu/call-facilitators-%E2%80%93-thematic-clusters/50
Spatial Data Infrastructure (SDI)	In general terms, a Spatial Data Infrastructure (SDI) may be defined as 'a framework of policies, institutional arrangements, technologies, data, and people that enable the effective sharing and use of geographic information' [Bernard et al, 2005]. INSPIRE as an SDI for European environmental policy is defined as 'metadata, spatial data sets and spatial data services, network services and technologies, agreements on sharing, access and use, and coordination and monitoring mechanisms, processes and procedures, established, operated or made available in accordance with the Directive'.	Spatial Data Infrastructure | Joinup (europa.eu)

List of figures

List of tables
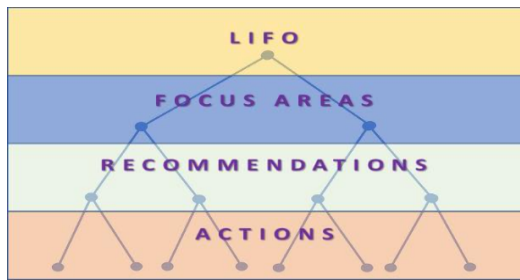
Annex 1: LIFO 2020 Scoring methodology

Figure 15 - Hierarchy of indicators and indexes

The LIFO analytical model, described in the *LIFO 2020 Guidelines and recommendations*[48], is based on a hierarchy of indicators and indexes, as represented in Figure 15: from bottom to top, (action) indicators, recommendation indexes, focus area indexes and LIFO index.

(Action) Indicators: A number of actions[49] have been selected in the EULF Blueprint as being representative of the scope of the recommendations to which they belong. An indicator has been designed to measure how monitored countries are progressing towards the "vision" outlined in the EULF Blueprint for each of these actions. Each primary indicator is represented by a code **Qx.y.z** where *x* is the recommendation number, *y* the progressive indicator number for that recommendation and *z* (where applicable) a second-level indicator providing additional information on the corresponding Qx.y first level indicator. Information to calculate each primary indicator is collected through the replies provided by participating countries to a question for each indicator. The model also includes secondary indicators, represented by a code **Sx.y**. These latter are computed reusing information from existing sources, for example, the INSPIRE monitoring. See Annex 2 for a list of the indicators and pertinent questions for each recommendation.

Each indicator is calculated on a specific scale, which best reflects the nature of the action (e.g. if it can be measured over a continuous or a discrete scale, if it is a binary phenomenon, i.e. yes/no or similar, etc.). Indicators are then normalised over a scale of 0-1, as follows:

Score attributed to the answer / maximum applicable value, where the maximum applicable value is the upper end of the scale that the non-normalised value of the indicator can reach.

Note: Optional questions in the LIFO survey capture supplementary information relevant to corresponding mandatory questions about the actions. The mandatory questions (i.e. those marked '*' in the survey) are scored, whereas the optional questions are not scored.

(Multi-level) indexes: indexes aggregate the action indicators at the levels of recommendations, focus areas, and LIFO overall to represent each country's performance at the respective levels. The relationships between (action) indicators, recommendation indexes, focus area indexes and the overall LIFO index are described in Table 7.

Level	No.	Scoring method
LIFO	1	Average of the 5 focus area indexes
Focus area	5	Average of scores for all recommendations associated with a focus area
Recommendation	19	Average of normalised scores for all indicators associated with a recommendation
Action	48	Scores calculated using different scoring methods converted to standard normalised scores in range 0-1.

Table 7 – Relationships between indicators and indexes

Action indicators, *recommendation indexes* and *focus area indexes* are thus equally weighted in the calculation of their respective upper-level indexes. Note: Some questions have a "*don't know*" response as an option. Respondents are encouraged to provide answers wherever possible. Where a "*don't know*" response is given, the indicator gets a null score. This is shown as zero in the indicator charts, and the indicator is ignored in calculating the index scores.

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[48] https://joinup.ec.europa.eu/sites/default/files/inline-files/2020_LIFO_Guidelines_2.pdf

[49] Described in the "How" section of each Recommendation.

Annex 2: LIFO 2020 Indicators

Focus Area: Policy and Strategy Alignment			Changes vs 2019
No.	Indicator	Question	
Recommendation 1			
Q1.1	Alignment between location and digital government strategies	Is there a location strategy in your country that is closely connected to your digital government strategy?	Change in scale
Q1.1.1	Link to strategies	Please supply links to the location strategy and digital government strategy.	
Q1.2	Use in digital government of authoritative location datasets and services	To what extent is the use in digital government of authoritative location datasets and services regulated by legislation and/or binding agreements?	
Recommendation 2			
Q2.1	Licensing policy	To what extent is location data available free of charge under an open licence without restrictions or with minimum restrictions?	Change in scale
Q2.1.1	Licensing policy – covered datasets	Which of the following core location datasets with high importance for multiple external users (also known as "high value datasets" in national and European open data strategies) can be accessed (e.g. through APIs or downloads) free of charge under an open licence without restrictions or with minimum restrictions?:	New question
Q2.2	Core reference data policy on location data	Are core location reference datasets (for the list of core location datasets please refer to Q2.1.1) made available as part of a broader core reference data policy (which also includes people, businesses, vehicles etc.)?	Change in scale
Q2.3	Use of common data licensing frameworks	To what extent is location data available under a common licensing framework for all government data?	Change in scale
Q2.4	Coverage of location data by national guidelines on the publication of Public Sector Information	Do your pan-government guidelines on the publication of public sector data cover location aspects? "Cover location aspects" means that in the guidelines some specific geospatial topics are highlighted (e.g. formats, encoding, accessibility trough specific web services, specific legislation,).	
Recommendation 3			
Q3.1	Preparedness for GDPR under location aspects	How well-prepared are controllers and processors of public sector location data in your country for GDPR, including awareness of	

		potential location data privacy issues and processes in place to comply with the rights of data subjects?	
Recommendation 4			
Q4.1	Use of location-based analysis for evidence-based policy making	Is location-based evidence and analysis used to help in developing relevant policies and monitoring outcomes?	
Recommendation 5			
Q5.1	References to INSPIRE and relevant standards in procurement documents	For public sector procurements of location information or services, what references are made to INSPIRE and relevant standards in the procurement documents?	

Focus Area: Digital Government Integration			**Changes vs 2019**
No.	**Indicator**	**Question**	
Recommendation 6			
Q6.1	Improvement of location information use in digital public services	To what extent is there a process for identifying opportunities and implementing improvements to key digital public services in their use of location information, including considering new business and delivery models?	Change in scale
Q6.2	Optimal use of location information is used optimally in key digital public services	Please select up to 6 sectors where location information has the most significant role to play in digital public services. For these sectors, please specify how well 'optimised' is the use of location data in digital public services. In this respect, 'optimisation' relates to extent of use and contribution to innovation and quality of service.	Change in scale
Recommendation 7			
Q7.1	Use of SDI in cross-government digital services	To what extent is the SDI used in delivering digital public services across government (in different sectors and levels of government)?	Change in scale
S7.1	implementation status of the INSPIRE directive	Average of indicators for the following five actions in the INSPIRE country fiche: - Availability of spatial data and services - Conformity of metadata - Conformity of spatial data sets - Accessibility of spatial data sets through view and download services - Conformity of the network services	Change of calculation method for the INSPIRE country fiche

Q7.2	Use of SDI in cross-border services	Is the country actively involved in delivering cross-border digital public services using their spatial data infrastructure (SDI)?	Change in scale
Q7.3	SDI approach used	Please specify the main SDI approach used for delivery of key digital public services in the sectors selected in 6.2.	New question
Q7.4	Use of the public sector SDI by private sector and other organisations (e.g. NGOs)	To what extent is the public sector SDI used by the private sector and other organisations (e.g. NGOs) for delivery of 'new and innovative' applications, products and services?	
Recommendation 8			
Q8.1	Use of an open and collaborative methodology in location-enabled digital public services	To what extent is an open and collaborative methodology applied, to design and improve location-enabled digital public services at local, sub-national or national level (e.g. through consultations, user groups, feedback requests, iterative development)?	
Q8.1.1	Level of government where a collaborative approach is used	At what level of government is the collaborative approach applied?	Single choice in 2019, multiple choice in 2020
Q8.2	Collaboration with external parties in service delivery	When developing or delivering location-based digital public services, in what ways are external parties involved? This includes the private sector, NGOs and citizens.	Change in scale
Recommendation 9			
Q9.1	Approach for integration of statistical and location information	What actions are implemented for the integration of location and statistical information in the production of location-based statistics?	

Focus Area: Standardisation and Reuse			**Changes vs 2019**
No.	**Indicator**	**Question**	
Recommendation 10			
Q.10.1	Adoption of a common architectural approach	In your country, does the architecture for location data and services in the SDI fit within a broader national ICT architecture approach that is applied in the design, re-engineering, interconnectivity and reuse of ICT and data in digital public services?	
Q10.2	Procedure to incorporate new technological features	Please describe the approach (if any) to discover, explore and	

		incorporate new technological features or emerging technologies.	
Q10.3	Status of development of APIs for INSPIRE / SDI	Please describe the status of development of APIs for SDI / INSPIRE.	
Q10.3.1	Access to high-value location datasets through APIs	Which core "high value" location datasets can be accessed using APIs?	New question
Q10.3.2	Action to foster APIs take-up	Where there are APIs for location datasets, what steps are commonly taken to stimulate take-up and ensure they are as useful as possible?	New question
Recommendation 11			
Q11.1	Reuse of generic ICT solutions in the SDI	Please describe the reuse status of generic ICT solutions in the SDI.	Single choice in 2019, multiple choice in 2020
Q11.2	Implementation of location information registers	What registers of location information are implemented?	
Recommendation 12			
Q12.1	Use of geospatial standards	What type of geospatial domain standards are used in your country?	Change of question
S12.1	Conformity of spatial data sets to INSPIRE implementing rules	Conformity of spatial data sets to INSPIRE implementing rules and technical guidelines (from INSPIRE monitoring)	
Q12.2	Use of a standardised metadata approach	To what extent is a standardised metadata approach adopted to facilitate discoverability of spatial and non-spatial data through joint access mechanisms such as those listed in the question Q16.1?	New question
Q12.2.1	Use of specifications for combining spatial and non-spatial metadata	Where an approach to facilitate a joint discoverability of spatial and non-spatial data is adopted, what specifications and tools are used to a significant degree to combine spatial with non-spatial metadata in national implementations?	New question
S12.2	Conformity of the INSPIRE network services with INSPIRE implementing rules	Conformity of the INSPIRE network services with Regulation (EC) No 976/2009 (from INSPIRE monitoring)	
Recommendation 13			
Q13.1	Approach to location data quality	What actions are typically implemented to assure quality of location data in your country?	
Q13.1.1	Use of data quality standards	What data quality standard is applied to location data?	New question
Q13.2	Approach to location data quality governance	What type of actions relating to location data quality governance are put in place in your country?	

| Q13.2.1 | Collection of feedback from users | Where feedback is obtained from users, what approach is taken? | |

Focus Area: Return on Investment			Changes vs 2019
No.	Indicator	Question	
Recommendation 14			
Q14.1	Performance monitoring of location-enabled digital public services	What of the following elements are evaluated to assess the efficiency and effectiveness of location-based services in your country?	
Q14.1.1	Performance monitoring scope	Are the measurements done: [ ] At a project or service level [ ] At an organisational level [ ] At an SDI / national level [ ] A combination of the above	
Q14.2	Approach to impact-based improvement	What actions are implemented for impact-based improvement in location-enabled processes and services in your country?	
Recommendation 15			
Q15.1	Approach to communication of benefits	Is communication delivered on the availability and benefits of location data and location- enabled digital public services to raise awareness and understanding using, for example, factsheets, news articles, web-based communication, videos, events?	Change of question
Recommendation 16			
Q16.1	Ease of searching, finding and accessing location data	What measures are implemented to make the process of searching, finding and accessing location data and web services as easy as possible for companies, research institutions, citizens and other interested parties?	
S16.1	Existence of policies supporting the reuse of PSI	Existence of policies supporting the reuse of Public Sector Information by the private sector (from the Open Data Maturity Report)	
Q16.2	Support to the development of products and services by external parties	Which of the following actions are implemented in your country to actively support private, non- profit and academic actors in the development of new products, services or research using public sector location data?	Change of scale
Q16.3	Existence of a strategic approach to funding location reference data	Is there a strategic approach to funding public sector location reference data to make access at point of use cost effective?	

Focus Area: Governance, Partnerships and Capabilities			Changes vs 2019
No.	Indicator	Question	
Recommendation 17			
Q17.1	Involvement of stakeholders in decision making on location information in digital government	To what extent are all relevant communities (location and digital government), domains (thematic), administrative levels (central and local) and sectors (public, private, academic, society) involved in decision making on the role of location information in Digital Government?	Multiple choice in 2019, single choice in 2020
Q17.2	Coordinated governance of SDI and digital government	To what extent do organisations responsible for SDI and Digital Government coordination deal jointly with the governance of the SDI in the context of Digital Government?	Multiple choice in 2019, single choice in 2020
Recommendation 18			
Q18.1	Use of formal agreements between public authorities in the country to operate location data services	To what extent do formal agreements exist between public authorities in the country to finance, build and operate location data services or digital public services using location data?	
Q18.2	Use of formal agreements to operate cross-border location data services	To what extent do formal agreements exist with public authorities in other countries to finance, build and operate cross-border location data services or digital public services using location data?	
Q18.3	Use of public–private partnerships to operate location data services	To what extent do public-private partnerships exist to finance, build and operate location data services or digital public services using location data?	
Recommendation 19			
Q19.1	Use of a strategic approach to geospatial capacity building	To what extent is there a strategic approach to skills and training for innovative geospatial solutions?	Multiple choice in 2019, single choice in 2020
Q19.2	Awareness raising initiatives in the geospatial domain	What type of initiatives are organised to raise awareness and develop geospatial skills?	Change in scale

Note: Some indicators have been modified in LIFO 2020 compared with LIFO 2019[50], with the aim to improve the capability of the LIFO analytical model to represent consistently the state

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[50] LIFO 2019 indicators are listed at https://joinup.ec.europa.eu/node/704929, while LIFO 2020 indicators are listed at https://joinup.ec.europa.eu/node/704251

of play of location interoperability at country and European level. The main changes, and the focus areas / recommendations impacted are:

- Digital Government Integration:
  - Reduced focus on INSPIRE as reference SDI for the delivery of location-enabled services (Recommendation 7);
  - Changes in the calculation of INSPIRE country fiche indicators (Recommendation 7).
- Standardisation and Reuse:
  - More emphasis on the use of APIs for access to and reuse of location data, with new indicators (Recommendation 10);
  - New indicators on the use of metadata for joint discoverability of spatial and non-spatial data (Recommendation 12).
- Governance, partnerships and capabilities:
  - Questions on governance (approaches to joint involvement of all relevant stakeholders in the governance of SDI – Recommendation 17) and capabilities (approaches to geospatial training and skills - Recommendation 19) have passed from multiple choice to single choice

Where changes have been made to the indicators from 2019 to 2020, they are classified as follows:

- "Change in scale": one or more options of reply have been added (or eliminated);
- "Change of question": the question has been completely redrafted;
- "New question": the question was not included in LIFO 2019 questionnaire;
- "Single choice in 2019, multiple choice in 2020": in 2019 it was possible to select only one option as reply, in 2020 more than one option can be selected;
- "Multiple choice in 2019, single choice in 2020": in 2019 it was possible to select more than one option as reply, in 2020 only one option can be selected.

Annex 3: LIFO 2020 Additional information: Bulgaria

Title	Attachment[51]
LIFO Survey questionnaire 2020 – Bulgaria	📎 LIFO Survey 2020 Bulgaria
LIFO Survey questionnaire 2020 scores and charts – Bulgaria	📎 LIFO 2020 scores and charts Bulgaria

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[51] Attachments can be accessed by clicking on the respective icon when opening the factsheet in Adobe Acrobat Reader, provided that the application preferences are set to do so.