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INFORMATION MANAGEMENT



Core Spatial Data Theme “Basic Services” Recommendation for Content

Working Group A - Deliverable of Task 1.b

Version 1.0 - 2018-01-17

Version History

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1 Executive Summary

As the United Nations (U.N.) Millennium Development Goals (2000) era came to a conclusion with the end of the year, the U.N. announced the 2030 Agenda for Sustainable Development in September 2015, an ambitious, integrated, indivisible and transformational global agenda with 17 Sustainable Development Goals, 169 associated targets and 230 indicators promising to achieve sustainable development in its three dimensions – economic, social and environmental – in a balanced way. Geospatial data supports measuring, achieving and monitoring several if not all goals and targets set by the 2030 Agenda. The 2030 Agenda mentions the need for new data acquisition and integration approaches to improve the availability, quality, timeliness and disaggregation of data. Goal 17 explicitly emphasizes the need for developing capacities and partnerships. In this context the success of Agenda 2030 depends on senior administrators owning and leading the geospatial efforts in their respective countries.

Building on INSPIRE Directive and pertinent documentation and redirecting the focus on a cohesive Spatial Data Infrastructure without gaps in content and discrepancies in quality, stakeholders in Europe are working on geospatial standardization and increasing richness of data through Core Data Recommendation for Content that corresponds to the first phase of the WG A work program. Core Data is primarily meant for fulfilling the common user requirements related to SDGs in Member States and European Institutions.

Basic services are services of general interest provided for the benefit of the citizens. They are often ruled by public governments or on behalf of them.

Basic services are widely required: typically, many SDG targets mention the access to basic services. Some of these services play key role in disaster management; some others are valuable landmarks and points of interest for most citizens.

This deliverable proposes a minimum list of basic services addressing the following functions: energy supply, waste management, education, health, safety and defense, recreation, general administration, social services, economic services. This minimum list should ideally be a starting point for national standards.

Feature type “Basic Service” has a few key attributes, such as a geometry, a unique identifier, a classification and a name. In addition, it is advised to manage the data life-cycle, to establish association with the area of responsibility and to provide capacity, when appropriate.

Core theme “Basic Services” is related to INSPIRE theme “Utility and Governmental Services”. However, data related to utility networks - though of interest - has not been considered as priority data, due to the remaining significant issues to make it accessible in a user-friendly way. This will be a topic to be considered in future.

2 Foreword

2.1 Document purpose and structure

2.1.1 Purpose

This document provides the main characteristics of core data for theme Basic Services with focus on the recommendation for content. This document aims to help decision makers (from governments, data producers, national coordination bodies, etc.) to define their policy regarding the improvement of existing data and production of new geospatial data. It addresses digital data.

This document has annexes containing more detailed explanations targeting the technical people who will be in charge of implementing or adapting core data recommendations (e.g. for production purpose, as source of other standards, etc.).

2.1.2 Structure

The executive summary synthesizes the main conclusions of the Working Group A (WG A) process and results to develop the recommendation for content. It is meant mainly for high level decision makers.

The foreword reminds the general context of core data, the first step achieved by WG A (i.e. selecting core data themes), and it explains the general principles set by WG A to develop the recommendations for content of core data specifications for all selected themes.

The ‘recommendation for content’ document itself includes four chapters:

- Overview: it provides the general scope of the theme and describes the main use cases addressed;
- Data content: it provides the main characteristics of the recommended content, such as the list of core features and attributes (for vector data), as well as data capture and quality rules;
- Other recommendations: e.g. Coordinate Reference System, Metadata, Delivery;
- Considerations for future: this chapter addresses some key trends or significant user requirements that cannot be considered as core today but that might be considered in future.

The ‘recommendation for content’ document is meant for medium level decision makers. It is written in natural and not too technical language.

The technical explanations included in annexes describe the relationship between the recommendation for content and the corresponding INSPIRE specification, and contain any other appropriate information useful for this theme.

2.2 Core data context

2.2.1 Rationale for core data

The following background of harmonised pan-European data was identified.¹

Authoritative geospatial data are used to support both the implementation of public policies and the development of downstream services. Moreover, geospatial data are required to be homogenous to enable the implementation of public policies in a coherent and coordinated way among countries and at regional or global level. Likewise, significant opportunities exist if services developed by industry can be exploited without requiring country specific adaptation.

The INSPIRE Directive has set up the legal and technical framework for harmonisation of the existing data related to the themes in annexes I, II and III. INSPIRE specifications provide common data models that ensure a first step towards interoperability, however ensuring homogeneous content is outside their scope, as they contain no indication about levels of detail, very few recommendations about quality, and as most features and attributes are “voidable”, i.e. to be supplied if available or derivable at reasonable cost.

This background led the UN-GGIM: Europe Regional Committee to setup in 2014 the Working Group A on Core Data to deal with core data content and quality, production issues, funding and data availability.

Recommendations for content of core data will complement INSPIRE data specifications by defining the priorities on the core content that is encouraged to be made available in Europe in order to fulfil the main user requirements that are common to many countries, with focus on the SDG related ones.

Core data availability may be ensured either through upgrading of existing data when feasible or through production of new data when necessary.

2.2.2 Core data scope

In its first phase, WG A selected core data themes according to the following criteria: core data is the geospatial data that is the most useful, either directly or indirectly, to analyse, to achieve and to monitor the Sustainable Development Goals.

Among the 34 INSPIRE data themes, 14 have been considered as core including theme Basic Services (profile of INSPIRE theme Utility and Governmental Services).

More information about the selection process and results may be found in document [‘Core Data Scope - Working Group A - First Deliverable of Task 1.a - Version 1.2’](http://un-ggim-europe.org/content/wg-a-core-data) on <http://un-ggim-europe.org/content/wg-a-core-data>

¹ Extract from the Report by the Preparatory Committee on the establishment of the UN-GGIM: Europe Regional Committee, European Commission Ref. Ares(2014)1491140 - 09/05/2014.

2.3 Document objectives and principles

2.3.1 Encouraging content availability

This deliverable provides recommendations for national governments and data producers, aiming to help them to define their priorities for enriching existing data or producing new data. This deliverable is meant mainly for data producers; however it defines the recommended result and target but not the production process.

2.3.2 Complementing INSPIRE

Core data specifications are built upon INSPIRE data specifications. On one hand, they often simplify INSPIRE by selecting core feature types and attributes and by restricting or clarifying the scope; On the other hand, they enrich INSPIRE by recommending specific levels of detail, quality rules and sometimes data model extensions. Besides, the INSPIRE common terminology is thoroughly used for naming core features and attributes.

Regarding the levels of detail, the ELF (European Location Framework) project terminology has been used. The ELF levels of detail are the following: Global, Regional, Master level 2, Master level 1, Master level 0. These terms are defined in the glossary.

Regarding delivery, core data may be supplied according to several ways. It is expected that, very often, the core data recommendations will be used to enrich and upgrade existing products. In this case, core data will be available through these improved products. Core data may also be delivered through INSPIRE conditions (specifications and services).

2.3.3 Status of core data recommendations

This document contains recommendations that are not legally binding. However, some recommendations are more important than others. This order is indicated as follow:

Core Recommendation X

It is first priority recommendation, considered as both necessary and achievable in principle. Ideally, it should encourage involved stakeholders to launch short-term actions (typically within a couple of years).

Core recommendations are usually addressing only technical aspects and are meant for the organisations in charge of producing this theme. The set of core recommendations defines the basic expectations on core data.

Good Practice X

It is second priority recommendation; if adopted, it will provide significant added value to core data; it indicates a relevant trend to be adopted as much as possible. It encourages involved stakeholders to take these recommendations into account in long term, if not possible in short term.

NOTE: some of these good practices may be quite easy to achieve and are already effective in some countries whereas some others may be more difficult to achieve. This is typically the case when these good practice recommendations involve other stakeholders in addition to the organisations in charge of producing this theme, and when they address not only technical aspects but also legal or organisational ones.

A “core data set” should contain the minimum data defined by the core recommendations (and ideally also by the good practices) of this deliverable but may of course contain more and/or better information.

2.4 Abbreviations

CAD	Computer Aided Design
CRS	Coordinate Reference System
ELF	European Location Framework
GIS	Geographic Information System
SDG	Sustainable Development Goal
UN-GGIM	United Nations initiative on Global Geospatial Information Management
US	Utility and Governmental Services
WG A	(UN-GGIM: Europe) Working Group on Core data

2.5 Glossary

Global	Level of detail defined by ELF: data to be used generally at scales between 1: 500 000 and 1: 1 000 000, i.e. mainly at international level
Master level 0	Level of detail defined by ELF: data to be used generally at scales larger than 1: 5 000; typically, data at cadastral map level, for local level actions.
Master level 1	Level of detail defined by ELF: data to be used generally at scales between 1: 5 000 and 1: 25 000; data for local level actions.
Master level 2	Level of detail defined by ELF: data to be used generally at scales between 1: 25 000 and 1: 100 000; data for regional (sub-national) actions.
Regional	Level of detail defined by ELF: data to be used generally at scales between 1: 100 000 and 1: 500 000; data for national or regional (European or cross-border) actions.

2.6 Reference documents

INSPIRE Data Specification on “Utility and Governmental Services” Technical Guidelines 3.1:
<http://inspire.ec.europa.eu/id/document/tg/US>

3 Overview

3.1 General scope

Definition: Basic services are services of general interest provided for the benefit of the citizens. They are often ruled by public governments or on behalf of them.

NOTE 1: The core theme “Basic Services” is an adaptation of the INSPIRE theme “Utility and Governmental Services” (US). The INSPIRE theme US includes three sub-themes:

- Utility Network
- Administrative and social governmental services
- Environmental management facilities (waste management)

The core data theme “Basic Services” focuses on INSPIRE sub-theme “Administrative and social governmental services” but also includes a few key features of the two other sub-themes.

More detailed comparison with INSPIRE is available in the annex A.

3.2 Use cases

Typically, SDG 3 (good health and well-being) and SDG 4 (quality education) will require data about health and education facilities, such as hospitals and schools. Several other SDG targets include access to basic services. This data is required in the analysis phase to get the state-of-play of governmental services but also in the operational phase to identify the possible gaps, to decide on best location for a new public service or on the contrary to decide if it is possible to close a public service without decreasing too much the citizen accessibility to basic services.

Education, health and social services are also places where fragile persons (school children, old or ill persons) spend part of their time. Some environmental European Directives ask to report about the number of these fragile persons submitted to various pollutions (e.g. air pollution, noise); similar reports might be required for monitoring the SDGs.

In addition, many governmental services may also be used as landmarks helping travellers to get oriented in a city. More generally, they are places of interest for many stakeholders (citizens, local government, travellers, business persons etc.).

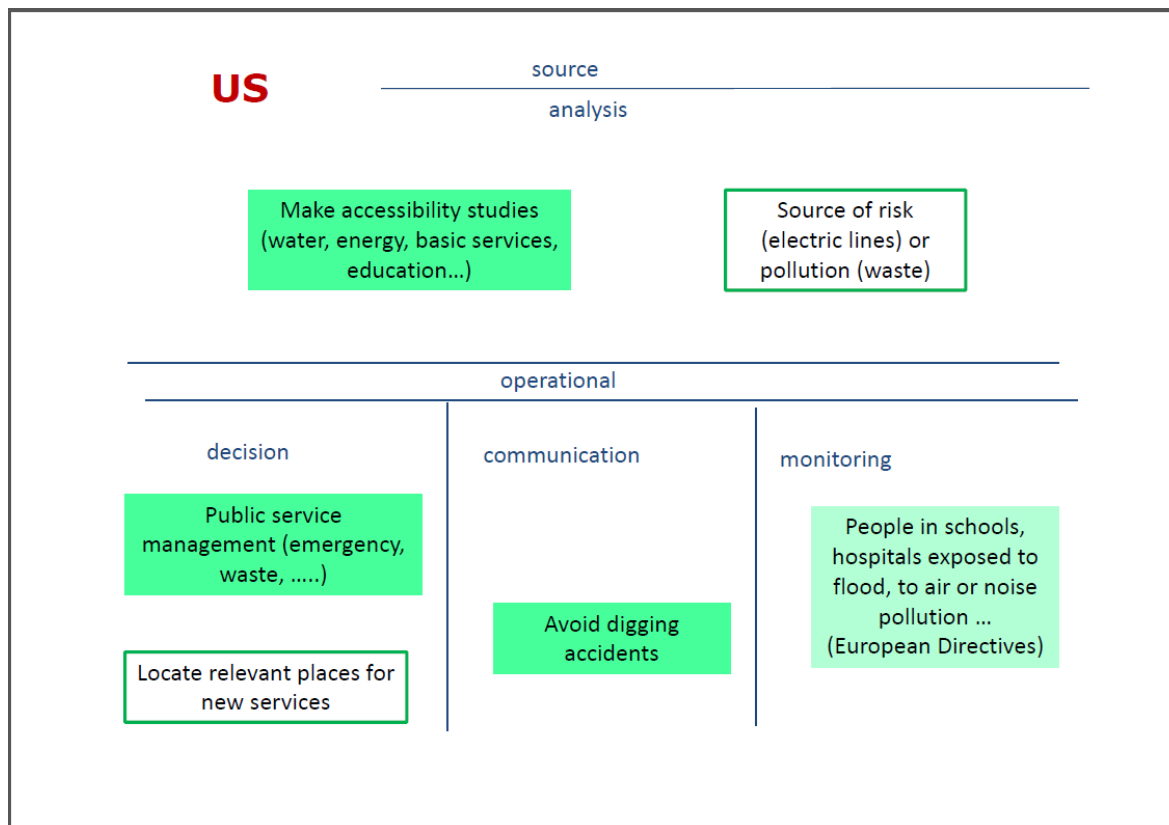


Figure 1: use case map for theme "Basic Services"

NOTE 1: Though very useful, the utility network data has been considered by WG A as too detailed and too challenging to be part of core data (at least for next future). In opposite, the sub-theme related to governmental services has been considered as both very necessary for several SDG and as quite achievable.

4 Data content

4.1 Features types and attributes

Core Recommendation 1

Core data should include feature type **BasicService** with following attributes:

- geometry
- unique and persistent identifier
- classification (basic service type)
- name(s), if any

NOTE 1: the name(s) should be provided as a geographical name, i.e. with the spelling of name and with information on the name, such as its language, status and (if relevant) source.

NOTE 2: the attributes describing the name (language, status, source) should help users to decide on which name(s) are the most relevant to be displayed on a map. The information about "source" is relevant if some sources are considered as more reliable than others.

More detailed information about provision of geographical names is available in the deliverable “Core spatial data theme Geographical Names”.

Core Recommendation 2

Core feature type BasicService should include at least the energy supply services (power plants of various sources: thermic, nuclear, hydro-electric ...), waste management facilities (disposal sites and landfills, waste water management plants, waste management plants), health services (hospitals, emergency medical services), education services (from pre-primary schools to Universities), safety services (police station, fire station, rescue station, Defence Site, Civil Protection site, court or tribunal, prison), leisure services (sport facility, camping site, public park, zoo, library, museum, cultural centre, recreation facility ...), government services (such as town halls or embassies), social services (cemeteries, residence for elders ...) and economic services (post offices...).

Within a Member State, data on Basic Services may be scattered among several data providers and is of interest for a wide range of users.

Good Practice 1

It is recommended to agree on a national standard about the classification of basic services. This national standard should include a hierarchical code list, providing the possible values of the attribute basic service type. It should be easily matchable with the Classification of the functions of government (COFOG) and with the INSPIRE code list ServiceTypeValue.

NOTE 1: this national standard should of course include at least the list of basic services mentioned in “core recommendation n° 2” but in order to fit better with national context, it may be extended. This is especially true for “government services” that has to be enriched, e.g. according to the different administrative levels of a country and to the different nomenclatures used to design the government buildings / facilities. It is also up to Member States to decide how much or under which conditions the private leisure services should be considered or not as basic services.

NOTE 2: the list of basic services mentioned in “core recommendation n° 2” is extending the INSPIRE code list ServiceTypeValue, e.g. by adding the energy supply facilities, the waste management facilities and the leisure services. The advice to have national standard easily matchable with INSPIRE codelist applies of course only to their common part.

Good Practice 2

When relevant, it is advised to capture and provide additional information on Basic Services:

- Area of responsibility
- Capacity (with reference date)

NOTE 1: The capacity is mainly required for hospitals or residences for elders (number of beds) and for schools (number of schoolchildren). It may be of interest also for leisure facilities receiving public at large (e.g. stadium, camping site). This information is necessary to assess the potential impact of risk or of pollution and to take appropriate actions to mitigate it.

4.1.1 Temporal aspects

Core Recommendation 3

Current and valid features are considered as core data.

NOTE: features of the past (disused or destroyed) or features of the future (under project, under construction) are not considered as core.

However, once features have been captured, it is recommended to keep them in the data base, even after their end in the real world

Good Practice 3

It is recommended to manage the history of features, using the mechanism provided by the INSPIRE data specifications: versioning and life-cycle attributes.

4.2 Levels of detail

Core theme Basic Services corresponds to Master level 1 data (large scale data).

4.3 Geographical extent

Core Recommendation 4

Basic Services data should be provided on whole land territory.

NOTE 1: in practice, most (if not all) the basic services are located on land. However, if some of them are located at sea (e.g. an aquarium), they should also be captured and provided.

4.4 Data capture

Good Practice 4

It is recommended to provide the true geometry of a basic service, i.e. to provide the geometry as a surface or multi-surface.

NOTE 1: however, in case of a small size basic service (e.g. just part of a building), a point representation is quite acceptable.

4.5 Quality

4.5.1 Completeness

Core Recommendation 5

Completeness should be ensured for Basic Services, at least for schools and hospitals.

4.5.2 Absolute accuracy

The geometric accuracy should be adapted to representation and use of Basic Services data at Master level 1, i.e. it should generally be better than 10 metres.

4.5.3 Update frequency

Core Recommendation 6

The update frequency of Basic Services data should be one year or better.

NOTE: ideally, data should be continuously updated. However, if the data is scattered among different stakeholders, this may be difficult to achieve and therefore a yearly update is considered as good balance between user requirements and feasibility.

5 Other recommendations

5.1 Coordinate Reference System (CRS)

5.1.1 Case of 2D data

Good Practice 5

Core data should be stored and managed in a CRS based on datum ETRS89 in areas within its geographical scope, either using geographic or projected coordinates.

NOTE 1: geographical scope of ETRS-89 excludes over-sea territories, such as Canary Islands or French Guyana or Madeira Islands and Azores Islands. In these cases, it is recommended to use a CRS based on ITRS (International Terrestrial Reference System).

NOTE 2: storing and managing data in CRS based on international datum facilitates the import of measures from modern sensors, ensures that data is managed in a well-maintained geodetic framework and of course, facilitates the export of data into international CRS (e.g. those mandated by INSPIRE).

NOTE 3: theme Basic Services is expected to be provided as 2D data.

5.2 Metadata

Good Practice 6

Core data should be documented by metadata for discovery and evaluation, as stated in the INSPIRE Technical Guidelines for metadata and for interoperability.

NOTE: this is a legal obligation for the Member states belonging to the European Union. For the other countries, this is a way to make their data easily manageable by transnational users.

5.3 Delivery

It is expected that core data will be made available through improved existing products (or new products) or as INSPIRE data, and perhaps as specific core products (delivery issues still have to be investigated by the working group).

Good Practice 7

Core data corresponding to INSPIRE theme “Utility and Governmental Services” should be made available according to the INSPIRE Technical Guidelines for interoperability, for metadata and for services.

NOTE 1: this is a legal obligation for the Member states belonging to the European Union. For the other countries, this is a way to make their data easily manageable by transnational users.

NOTE 2: some core data will not belong to INSPIRE theme “Utility and Governmental Services” as this theme does not include some of the basic services, e.g. those related to leisure.

Data related to theme “Basic Services” may be scattered among several data providers. However, users should be given an easy access to core data.

Good Practice 8

Data providers of core theme “Basic services” should coordinate their efforts and offer easy access to core data, e.g. through a unique access point.

6 Considerations for future

6.1 Data capture of utilities network

Data on Utility Networks is necessary to achieve the SDGs, in order to ensure safe and efficient access to water, sewage, energy or telecommunications. For instance, knowing the location of underground network is quite helpful to avoid digging accidents, when excavating the streets. However, this might be difficult to achieve under short term, for organisational reasons (data scattered among many network managers) and for technical reasons (data generally exists but is only available in CAD formats and is not always georeferenced).

The geographic community should encourage further research and knowledge exchange in order to improve the data quality and accessibility, e.g. by making easier the transformation of (poor) existing data into GIS data.

7 Annex A: Relationship with INSPIRE

7.1 Scope

The core theme “Basic Services” is an adaptation of the INSPIRE theme “Utility and Governmental Services” (US). The INSPIRE theme US includes three sub-themes:

- Utility Network
- Administrative and social governmental services
- Environmental management facilities (waste management)

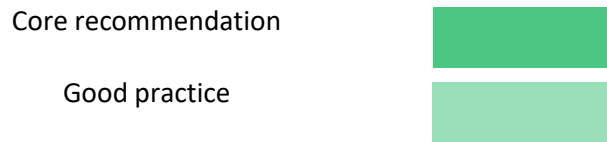
On one hand, the scope of core data theme “Basic Services” strongly restricts the scope of INSPIRE sub-themes “Utility Network” and “Environmental management facilities” as it keeps only a very few features and information from these two sub-themes.

On the other hand, the scope of core data theme “Basic Services” extends the scope of the INSPIRE sub-theme “Administrative and social governmental services”. The INSPIRE data specification include some eligibility criteria for Governmental Services, mainly be mentioned in the Directive (such as schools and hospitals or social services) or be necessary for risk management. The core data theme “Basic Services” includes all the services that are considered as necessary to achieve the SDG, in the three components of sustainable development: environment, economy, society; the only eligibility criteria is based on user requirements.

7.2 Data model

The UML models provided in this annex are only graphical illustrations of the core recommendations and of the good practices present in this document.

The recommendations for content are represented by highlighted the selected attributes in the following way:



7.2.1 Comparison between Core Data and INSPIRE content

Core recommendation 1

Core data should include feature type BasicService with following attributes:

- geometry
- unique and persistent identifier
- classification (basic service type)
- name(s), if any

Core recommendation 2

Core feature type BasicService should include at least the energy supply services (power plants of various sources: thermic, nuclear, hydro-electric ...), waste management facilities (disposal sites and landfills, waste water management plants, waste management plants), health services (hospitals, emergency medical services), education services (from pre-primary schools to Universities), safety services (police station, fire station, rescue station, Defence Site, Civil Protection site, court or tribunal, prison), leisure services (sport facility, camping site, public park, zoo, library, museum, cultural centre, recreation facility, ...), government buildings (such as town halls or embassies), social services (cemeteries, residence for elders ...) and economic services (post offices...).

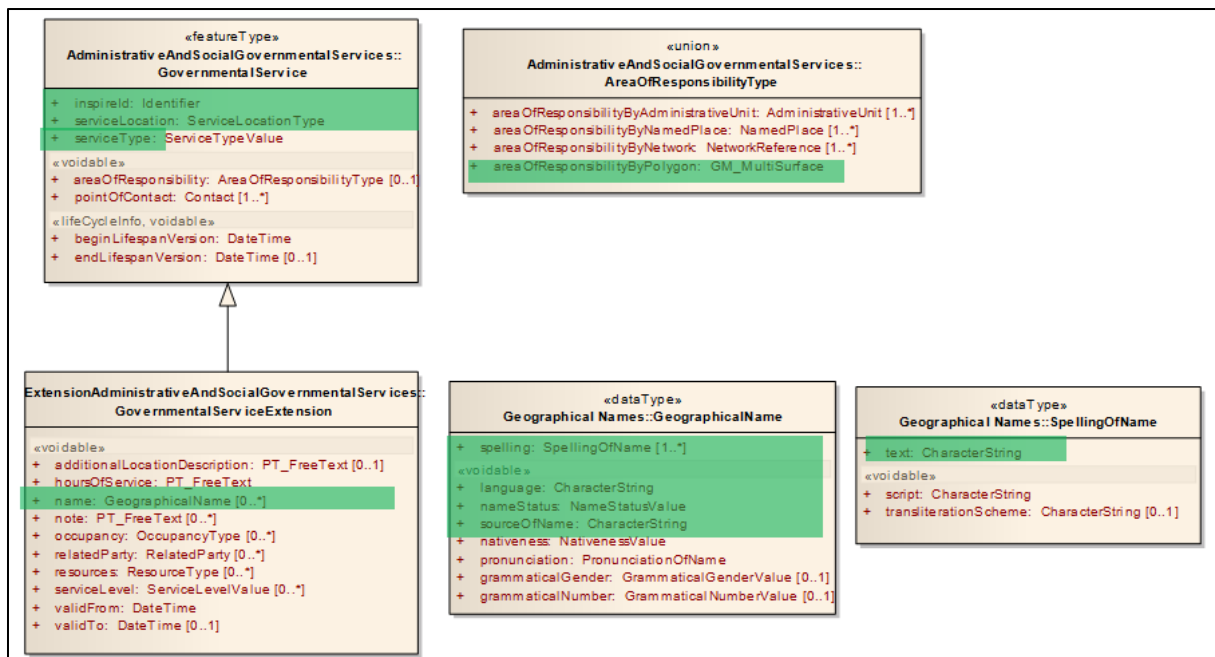


Figure 2: core content of Basic Services compared to the INSPIRE data model on GovernmentalService.

NOTE 1: The above illustration provides a comparison with the INSPIRE data model. **However, the INSPIRE data model cannot be used as such for theme BasicService** because of the attribute serviceType. In INSPIRE, serviceType should be expressed using the values of the INSPIRE code list ServiceTypeValue. Unfortunately, this code list doesn't include all the core basic services (e.g. leisure facilities are excluded from INSPIRE scope) and it is not extensible.

NOTE 2: INSPIRE allows both direct location of a service (by geometry) and indirect location of a service, by a reference to other features (building, address ...). For core data, the direct location is recommended because it is considered more relevant (generally more accurate) and of easier use.

Good practice 2

When relevant, it is advised to capture and provide additional information on Basic Services:

- Area of responsibility
- Capacity (with reference date)

Good practice 3

It is recommended to manage the history of features, using the mechanism provided by the INSPIRE data specifications: versioning and life-cycle attributes.

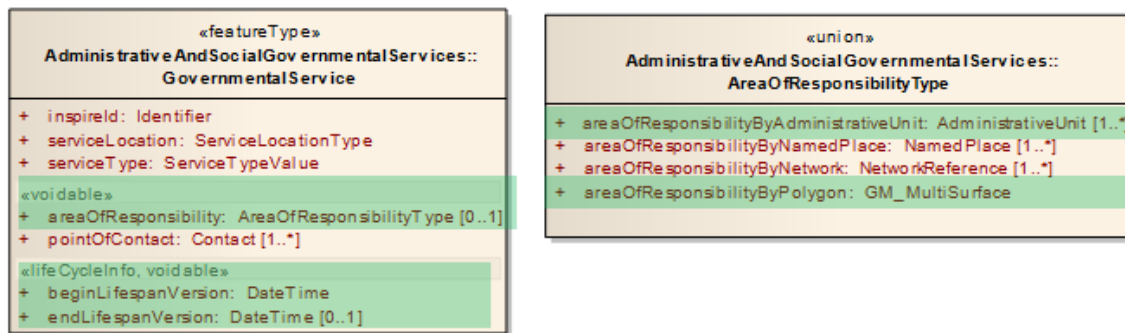


Figure 3: good practice content of Basic Services compared to the INSPIRE data model on GovernmentalService.

NOTE 1: the attribute “capacity” is absent of the INSPIRE data model (even of the extension one).

NOTE 2: the INSPIRE data model allows several options for the AreaOfResponsibility, namely AdministrativeUnits, NamedPlace, NetworkReference and GM_MultiSurface. Regarding core data, it is expected that AreaOfResponsibility is represented by a surface – or multi-surface – and that the area of responsibility is either an administrative unit or a managed unit.

7.2.2 Proposed UML core data model

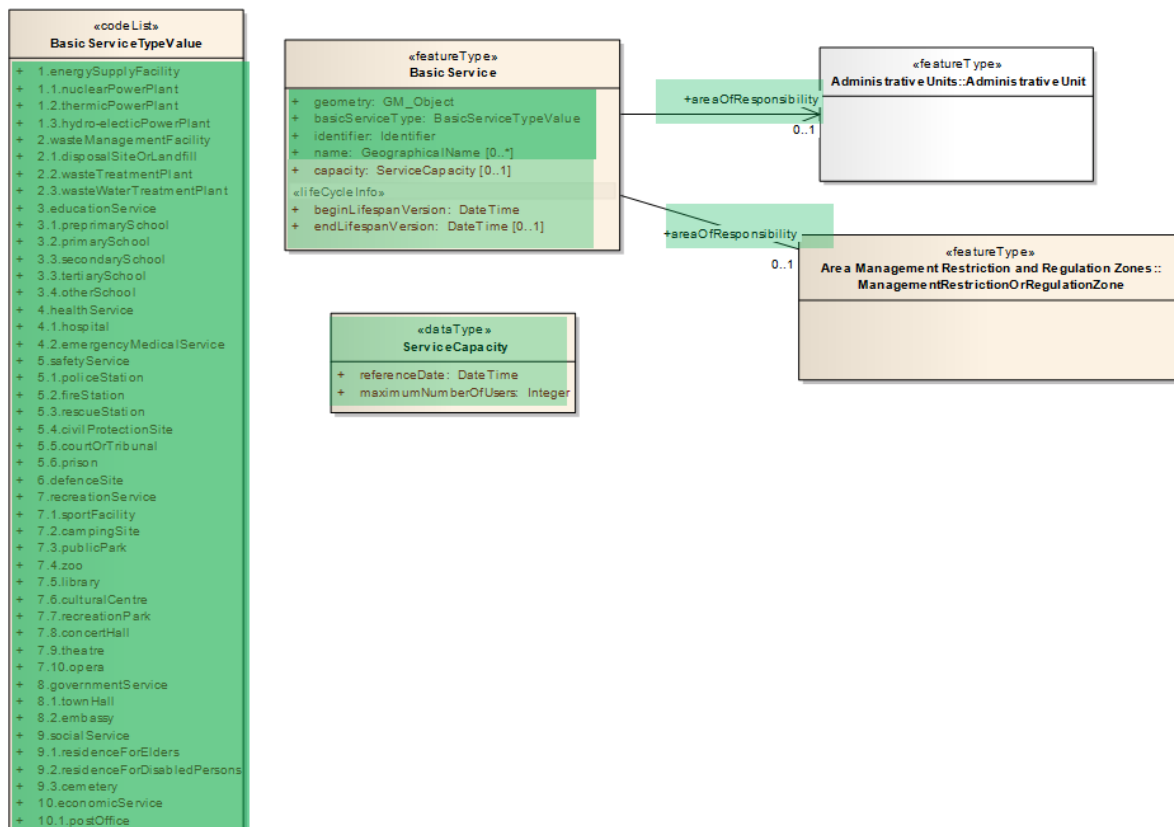


Figure 4: proposed UML model for core theme Basic Services

NOTE 1: the code list BasicServiceTypeValue is proposed as example, as starting point. It should be adapted to the context and specific requirements of each Member State, ideally in a national standard.

NOTE 2: in the proposed codelist BasicServiceTypeValue, the figures are used to indicate the hierarchy of basic services (e.g. 3.2. primarySchool is an example of 3.educationService), helping to provide easier understanding and overview of the expected values. In opposite, there is no priority order between the high level values (e.g. 1.energySupplyFacility is not more – or less- important than 5.safetyService).

NOTE 3: on one hand, this code list is extending the INSPIRE code listServiceTypeValue (e.g. by adding the recreation services); on the other hand, this code list is simplifying the INSPIRE code listServiceTypeValue by proposing less detailed information, typically by less levels in the code list hierarchy.

8 Annex B: Methodology

Core data specifications have been elaborated based on one hand on user requirements (with focus on the ones related to SDG) and on the other hand on INSPIRE data specifications.

Other standards have also been considered, such as the Eurostat requirements related to the services (Points Of Interest) to be provided by EuroGeographics. These requirements include a list of the desired feature types, with indication of priority.

The INSPIRE data specification on sub-theme “Administrative and social governmental services” has provided a very good starting point, regarding the data model, i.e. mainly regarding the candidate attributes of feature type BasicService.

A key issue has been to define a minimum list of the basic services that should be considered as core data. Many SDG targets mention access to basic services, but without defining them. The list of core basic services has been based on a deep analysis of the SDG targets and other user requirements, as shown by the table below.

BasicServiceType	Rationale
Energy Supply Facility	Obviously related to SDG 7 (affordable and clean energy) Power plants are also key assets to be considered by risk management (targets 1.5, 11.5, 11.b, 13.1)
Waste Management Facility	Related to SDG 3 (good health and well-being), to SDG 11 (sustainable cities and communities) and to SDG 12 (sustainable production and consumption). Waste management is explicitly mentioned in targets 3.9, 11.6 and 12.4.
Education Service	Obviously related to SDG 4 (quality education). Schools are hosting children who are vulnerable to risk or pollution. Schools may also be resources (provisory accommodation) in case of disasters.
Health Service	Obviously related to SDG 3 (good health and well-being). Hospitals are hosting ill persons who are vulnerable to risk or pollution. Hospitals are key resources in case of disasters.
Safety Service Defence Site	Safety services such as fire station or rescue stations are key resources for risk management. Safety services such as police station, tribunal or prisons ensure the protection by law of citizens and of nature. They contribute to SDG 1 (no poverty), SDG 3 (good health and well-being), SDG 8 (decent work and economic growth), SDG 11 (sustainable cities and communities) and to protection of natural resources (SDG 6, 14, 15).
Recreation Service	Culture facilities contribute to education (SDG 4), sport and open air facilities contribute to health (SDG 3). Recreation Services contribute to tourism and so to economy (SDG 8) Recreation services may receive lots of persons; they are places with the impact of hazards is high. Valuable landmarks, points of interest for citizens in general.

Government Service	Government Services, especially those receiving citizens, are key assets for general administration and are implied in most of the SDG. Some government buildings (town hall, embassies ...) are landmarks and points of interest.
Social Service	Mainly related to SDG 1 (no poverty) and SDG 3 (good health and well-being). Cemeteries are valuable landmarks
Economic Service	Mainly related to SDG 8 (decent work and economic growth)