**Interoperability Solutions
for European Public Administrations**

European Commission – ISA Work Programme

# DIGIT – Federated catalogue of public services

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| | |
|---|---|
| A2A | Administration to administration |
| A2B | Administration to business |
| A2C | Administration to citizen |
| ADMS | Asset Description Metadata Schema |
| API | Application Programming Interface |
| CA | Competent Authorities |
| CAB | Change Acceptance Board |
| COFOG | Classification of the Functions of Government |
| CMS | Content Management System |
| CPSV | Core Public Service Vocabulary |
| CQL | Contextual Query Language |
| CSV | Comma-separated values |
| CWCMS | Corporate Web Content Management System |
| DG | Directorate General |
| EC | European Commission |
| ECAS | European Commission Authentication Service |
| ECMT | European Commission Machine Translation |
| EEA | European Economic Area |
| EFIR | European Federated Interoperability Repository |
| eID | Electronic Identity Card |
| EIF | European Interoperability Framework |
| eSD | Electronic Service Directory |

| | |
|---|---|
| esd-toolkit | European Service Delivery-toolkit |
| EU | European Union |
| FCOPS | Federated Catalogue of Public Services |
| FOAF | Friend of a Friend |
| FRBR | Functional Requirements for Bibliographic Records |
| HTTP | HyperText Transfer Protocol |
| IMI | Internal Market Information system |
| IOP assets | Interoperability assets |
| ISA | Interoperability Solutions for European Public Administrations |
| LAU | Local Administrative Unit |
| LSP | Large Scale Pilot |
| MS | Member State |
| MT@EC | Machine Translation at the European Commission |
| NGI | National Geographic Institute |
| NIF | National Interoperability Framework |
| NUTS | Nomenclature of Territorial Units for Statistics |
| OCD | Omnifarious Container for e-Documents |
| OWL | Web Ontology Language |
| PA | Public Administration |
| PSC | Points of Single Contact |
| PIL | Patient Information Leaflets |
| PS | Public Service |
| RDF | Resource Description Framework |

| | |
|---|---|
| REST service | REpresentational State Transfer service |
| ROI | Return on Investment |
| RSS | Really Simple Syndication<br>Rich Site Summary |
| SC | Service Catalogue |
| SKOS | Simple Knowledge Organisation System |
| SP | Service Provider |
| SPOCS | Simple Procedures Online for Cross-border Services |
| sTESTA | Secure Trans European Services for Telematics between Administrations |
| SRU | Search/Retrieve via URL |
| SWOT | Strengths, Weaknesses, Opportunities, Threats |
| UI | User Interface |
| UPL | Uniform Product name List |
| URI | Uniform Resource Identifiers |
| URL | Uniform Resource Locator |
| YEST | Your Europe Syndication Tool |
| W3C | World Wide Web Consortium |

# GLOSSARY

**Catalogue of public services**

A **catalogue of public services** is a database or structured document that contains all the services which are provided by public administrations.

**COFOG**

The **Classification of the Functions of Government** (COFOG) is a classification defined by the United Nations Statistics Division. These functions are designed to be general enough to apply to the government of different countries. The accounts of each country in the United Nations are presented under these categories. The value of this is that the accounts of different countries can be compared.

**Controlled vocabulary**

A **controlled vocabulary** is a code list which is used to organise or give structure to certain information. It contains predefined values for a certain subject. These vocabularies could be used for indexing schemes, subject headings, taxonomies, etc.

These controlled vocabularies are used to give a structure to the federated catalogue of public services and categorise the public services (generic and specific).

**CWCMS**

The **Corporate Web Content Management System** of the European Commission.

**eGovernment portal**

An **eGovernment portal** is a public administration portal to facilitate digital interactions through eServices between public administrations and citizens, businesses and other public administrations.

**eID**

eID is an electronic identity card that can be used for online and offline identification of the citizens. The card can also be used for signing electronic documents by means of a digital signature.

**eService**

An **eService**, in the EU context, is (part of) a public service that is made available on an eGovernment portal by a public administration. The administrative procedures can be completed via a user interface which is published on the internet and can request one or more web services.

| | |
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| Federated architecture | A **federated architecture** is a composition of autonomous (decentralised) organised systems. It is an approach to coordinate the exchange of information across the organised system. A mapping is created between the multiple autonomous systems which forms the federated architecture; this is achieved by defining guidelines and standardised mapping. |
| | In a federated catalogue, content syndication is in place. The syndication will support the information exchange between the different systems. |
| Federated catalogue of public services | A **federated catalogue of public services** is a collection of other catalogues of public services which are joined together in a standardised method. The database or structured document contains all the public services of the catalogues included. |
| Generic public service | A **generic public service** is a service which is defined generically, i.e. it only contains information that applies to all the administrations that offer this service. They are typically defined by a coordinating body in a standardised way. These generic services detail the "what" but do not provide detail on "how" and "where" they are offered by a public administration. However, they can refer to the government level at which they are offered. |
| | Each service contains a number of fields to describe the content of the service (title, content and generic conditions, procedures, exceptions, documents and regulations). In addition, each service contains metadata; these fields serve to classify the service (competent authority/government level, authority/government level that delivers this service, theme, type and keyword). |
| | These services are constructed by a coordinating body as a unique list, agnostic of all public services offered by all executing public administrations. The outcome is a set of generic public services based on a standardised data model, taxonomy and ontology. |
| Interoperability | **Interoperability**, for European public service delivery, is the ability of disparate and diverse organisations to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organisations, through the business processes they support, by means of the exchange of data between their respective ICT systems. |

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| Legal framework/legal basis | A **legal framework** contains a set of rules or procedures which are legally defined and are applied to a certain domain or area.

Legal frameworks dealing with public services, eGovernment aspects, transparency, etc. could be of interest for this study. These frameworks can have a direct or indirect impact on the development of the federated catalogue of public services. |
| Local government level | The **local government level** is the lowest level of administrative division in a country. These correspond to the local administrative units (LAU), LAU-1 and LAU-2, as defined in NUTS. |
| Member States | The **Member States** mentioned in this document are not only the Member States of the European Union but further include the three other EEA countries.

EU-28 plus Iceland, Liechtenstein and Norway. |
| Mirror | A **mirror** represents an exact copy of a data set taking over the same structure and semantic model.

A mirror of a catalogue of public services is created by generating a copy of the catalogue without making any changes to the semantic metadata model and taxonomy. |
| Mirroring | One-way synchronisation or **mirroring** occurs when it is expected that only one data source serves a master where the updates are performed. The synchronisation process only occurs in one direction and is pushed from the master source to the other location(s).

The 'add', 'change', 'delete' actions will be carried out only on the master data source. The second source can be consulted ('read'), but it is not permitted to add, change or delete data. |

| Multilingualism | **Multilingualism** is the act of using multiple languages. Multilingualism is becoming a social phenomenon governed by the needs of globalisation and cultural openness. Owing to the ease of access to information facilitated by the Internet, individuals' exposure to multiple languages is becoming increasingly frequent thereby promoting a need to acquire additional languages.

In this study, it is a concept which deals with the language coverage of the different Public Services in various domains in the federated catalogue.

While developing the federated catalogue, there is a need to deal with **multilingualism**. It is a matter of debate which languages should be available within the federated catalogue. |
|---|---|
| NUTS | The **Nomenclature of Territorial Units for Statistics** or Nomenclature of Units for Territorial Statistics (NUTS from French Nomenclature des Unités Territoriales Statistiques) is a geocode standard for referencing the subdivisions of countries for statistical purposes. The standard is developed and regulated by the European Union, and thus only covers the Member States of the EU in detail. The Nomenclature of Territorial Units for Statistics is instrumental in the European Union's Structural Fund delivery mechanisms. For each Member State, Eurostat has established a hierarchy of three NUTS levels; the subdivisions in some levels do not necessarily correspond to administrative divisions within the country. |
| One-stop-shop | A **one-stop-shop** is a portal where the public (citizens and businesses) can comply with all their obligations in terms of rules, regulations and formalities without consulting other systems. . |
| One-way synchronisation | **One-way synchronisation** or mirroring occurs when it is expected that only one data source serves a master where the updates are carried out. The synchronisation process only occurs in one direction and is pushed from the master source to the other location(s).

The 'add', 'change', 'delete' actions will be carried out only on the master data source. The second source can be consulted ('read'), but it is not permitted to add, change or delete data. |
| Ontology | **Ontology** is the science of describing the relationship between concepts. This can be used to gain insight into a particular domain by modelling the concepts and ideas (conceptualisation). The reasoning behind the federated catalogue can be defined by describing the relationships between the multiple concepts (catalogues). |

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| Ownership | The **ownership** of the federated catalogue means that an organisation has certain rights and duties concerning the operation of the catalogue. The owner will be held responsible in the event of errors such as the malfunctioning of the catalogue, etc. The owner should guarantee the functionalities of the catalogue and the content syndication. |
| Point of single contact | The Services Directive requires the Member States to set up a **Point of Single Contact**. This is a public administration portal (and a one-stop-shop) for service providers with two main goals: providing information and completing administrative procedures. It is necessary for the portal to describe the requirements, procedures and formalities which are necessary to perform or access the services within a Member State. It also needs to provide contact details of competent authorities, access to public registers, and online forms, and process the applications filed. |
| Public administration | **Public administrations** are the competent authorities responsible for public services. They consist of national civil servants across the Member States and the European Commission.<br><br>The federated catalogue of public services will include all public authorities at supranational, national, regional and local level of all EU Member States and EEA countries. |
| Public administration portal | A **public administration portal** is a portal owned by a public administration that provides information about what the public administration does and which public services they provide to citizens, businesses and other public administrations. |
| Public service | A **public service** is a service rendered by a public administration to either business (A2B), citizens (A2C) or other public administrations (A2A). |
| Regional government level | The **regional government level** is an administrative division in a country. These correspond to the NUTS 1, 2 and 3 regions. |
| Semantic data model | A **semantic data model** is a conceptual data model that represents data objects together with their properties and relationships and includes the capability to express information that enables parties to the information exchange to interpret meaning (semantics) from the instances, without the need to know the meta-model. |

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| Service | A **service** is a resource that represents the capability to bring a certain outcome and value to the service requester and is enabled by the service provider. |
| Services Directive | The **Services Directive** is an EU Directive on services in the Internal Market, which aims to release the untapped growth potential of services markets in Europe by removing legal and administrative barriers to trade in the services sector.<br><br>The simplification measures foreseen by the Directive should significantly facilitate life and increase transparency for SMEs and consumers when they want to provide or use services in the single market. |
| Service model | A **service model** is a semantic data model which describes how the public service is built. The description of the service is created by means of metadata (data about data) which identifies all the characteristics and specifications of the data structure of a service. |
| Services of general interest | The concept **Services of general (economic) interest** (SG(E)I) is an official term used by the European Union for all services that are of specific interest to society. This includes all public services. The scope of the SGIs is broader than the scope of the public services in this document and can also include services which are often, but not always, in hands of private companies (e.g. water, electricity, mail). |
| SOAP | **Simple Object Access Protocol** (SOAP) is a protocol specification for exchanging structured information in the implementation of Web Services. |

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| Specific public service | **Specific public services** are the public services which are actually rendered by a specific public administration.

A specific service may be linked to a generic public service (if the generic concept exists at Member State level). The specific service is the executable and actionable part of a generic public service offered by a public administration. The same generic service (e.g. issue and ID card) could be executable and offered in many local authorities in various ways (different local forms, different buildings and opening hours).

In contrast to generic services, these specific services also detail the "how" and "where" they are offered by a public administration and how they can be rendered by business (A2B), citizens (A2C) or other public administrations (A2A). It will spell out in detail to which authority/building/office one needs to go, give contact details of the organisation that provides the service, forms that need to be filled in and how the service can be rendered electronically. |
| Taxonomy | The **taxonomy** determines the classification of concepts, the division of ordered groups or categories. It is a science which defines a set of principles in order to classify concepts. In this case the definition of the controlled vocabularies could be seen as the taxonomy. |
| Two-way synchronisation | In a **two-way synchronisation** (bi-directional/both-ways synchronisation) the two sources are synchronising with each other when changes are performed. The synchronisation process copies the changes in both directions; the data source with the most recent version of the data will reconcile the changes in the other location.

In contrast to one-way synchronisation, the two locations are considered equivalent. |
| Users of the federated catalogue | The federated catalogue of public services will be used by many parties. The catalogue is developed to support the public administrations and they will be the **primary users**. The public administrations will use the content of the federated catalogue to a certain extent (output). They will also support the content creation of the catalogue (input).

A **secondary user group** is the public. The citizens and businesses can consult the federated catalogue as well (output). |
| Web crawler | A **web crawler** is an Internet bot that systematically browses the internet, typically for the purpose of web indexing. |

| Web service | A **web service** is a software system that enables communication between two or multiple information systems via interfaces that are described in a machine-readable language (WSDL). The information systems can interact with the web service in a pre-defined way (e.g. SOAP-messages). |
| --- | --- |
| Web scraping | **Web scraping** (web harvesting or web data extraction) is a computer software technique for extracting information from websites. |
| Web syndication | **Web syndication** is a form of syndication in which website material is made available to multiple other sites. |
| WSDL | The **Web Services Description Language** (WSDL) is an XML-based interface description language that is used for describing the functionality offered by a web service. A WSDL description of a web service (also referred to as a WSDL file) provides a machine-readable description of what the service can be called, what parameters it expects, and what data structures it returns. It thus serves a purpose that corresponds roughly to that of a method signature in a programming language. |

## EXECUTIVE SUMMARY

This ISA study on a European federated catalogue of public services ("FCOPS") is the second study under ISA work programme Action 1.3 'Accessing Member State information resources at European level, Catalogue of Services'. The first study focused on the set-up of a common catalogue containing cross-border services and its interoperability aspects. Its scope was limited to administration-to-administration services that involve the exchange of information (web services).

The scope of this study compared to the previous study has shifted from a catalogue of web services to a catalogue of public services offered by all public administrations at all government levels in all EU Member States and the three other EEA countries ( "Member States"), which are the members of the ISA Programme. The analysis in this study has shown that some Member States already possess a catalogue of public services. Other Member States stated that they did not have yet a catalogue of public services, but intended creating one. Therefore different models of catalogues were defined and investigated according to ISA's LOST-principles (Legal, Operational, Semantic and Technical).

The main objective of this study is to determine the feasibility of building a FCOPS. The study consists of two work packages, each with a final report as main deliverable. The first work package focused on the current state of affairs in the Member States in the field of catalogues of public services. The second work package examines the requirements and different scenarios for establishing a FCOPS, and proposes and action plan on how to achieve this. This executive summary summarises both work packages 1 and 2.

## EXAMINATION OF THE CURRENT STATE OF AFFAIRS IN THE MEMBER STATES

The first part of this study was work page 1, setting out the scope and a conceptual model of FCOPS. The scope of the catalogue is all public services offered by all public administrations at all levels of Member State government. The conceptual model shows how a central platform can be used by the public administrations, citizens and businesses to access all information on the public services offered by the Member States. It will serve as a single point of contact available in all official languages across the EU.

The proposed catalogue is based on a federated architecture, using a core vocabulary to describe the public services. This vocabulary will be used to create a mapping between FCOPS and the different systems used by the Member States. The conceptual model for this vision is presented in the figure below.
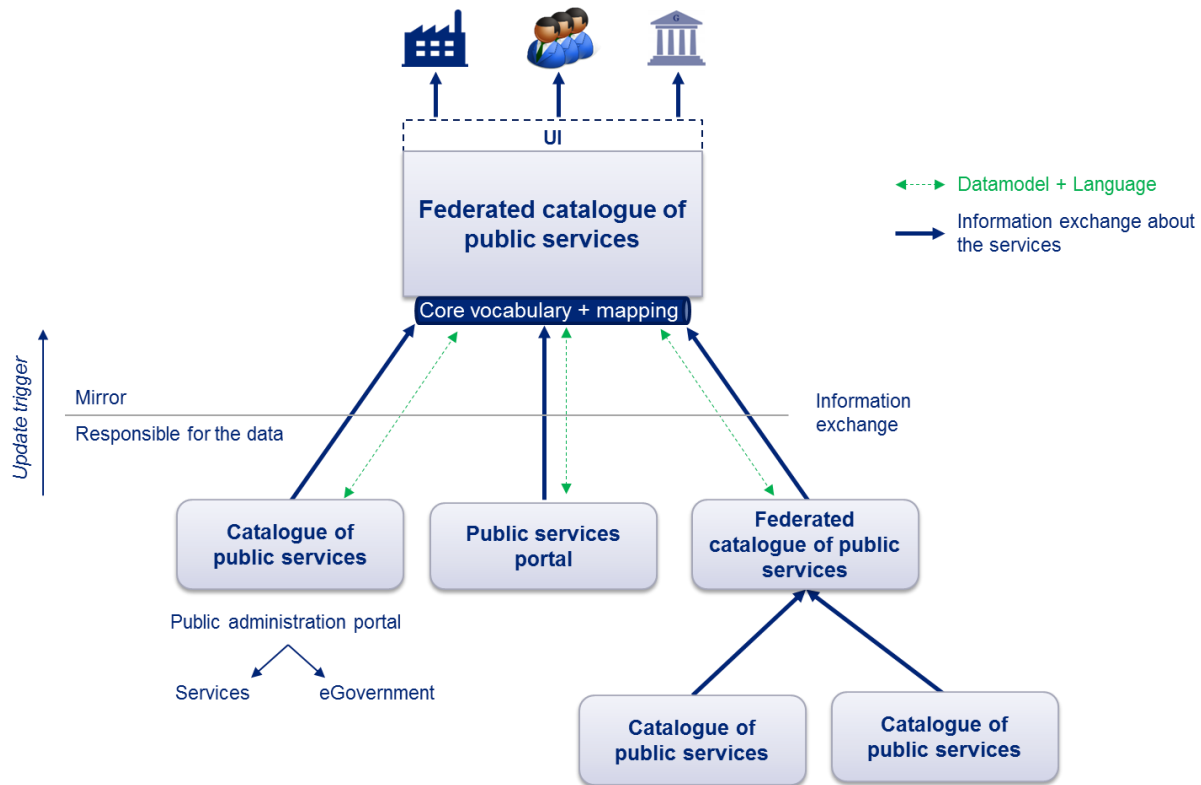
**Figure 1 – Federated architecture of the catalogue of public services**

This analysis of the current state of affairs focused on four aspects: the legal context, relevant initiatives, a high-level analysis of the Member States' portals, and an in-depth analysis of the interesting cases with a focus on catalogues of public services and other catalogues.

## LEGAL CONTEXT

Dealing with FCOPS also involves legal frameworks which could support and stimulate the usage and cooperation of Member States. A number of legal sources were identified during the study:

- **Services Directive:**
  The Services Directive introduces the concept of points of single contact (PSCs) that provide online information about public services for businesses. Certain Member States have gone a step further and also included information about public services for citizens. These PSCs increase the transparency of public service procedures. Therefore the Services Directive can already be a justification to provide information on public services in FCOPS.

- **European Interoperability Framework:**
  The EIF contains a number of principles which enhance the interoperability across the Member States. Three of these principles can be linked with FCOPS: transparency, reusability, and effectiveness and efficiency. FCOPS will increase the transparency of public administrations by providing all the public services offered by all the public administrations of the Member States. This will also lead to more effective and efficient cooperation between public administrations as they will have insights into how the services are provided and how to access them. Moreover,

Member States can learn from each other how to organise/offer equivalent public services in order to be more efficient. Once FCOPS is developed, Member States will be able to reuse the assets (e.g. semantic model, taxonomies, systems, etc.) in order to build a catalogue on their own.

- **Public sector information directive:**
  This directive deals with the sharing of public sector information and introduces a common legislative framework regulating how public sector bodies should make their information available for re-use in order to remove barriers. The public services offered by the public administrations are also public sector information and hence should be shared with the public.

## ANALYSIS OF RELEVANT INITIATIVES

Several initiatives have already improved the collaboration between the Member States on public services. Each initiative was built separately with a unique well-defined scope and each has a different purpose. Some of these initiatives can contribute to the development of FCOPS. This contribution can range from collaboration on best practices to semantic elements of the initiatives and tools. Only the main initiatives are described briefly below.

- **Your Europe:**
  The 'Your Europe' portal provides practical help and advice on EU rights for the cross-border activities of citizens and businesses. The portal is structured in accordance with a thematic classification (e.g. life events) in order to navigate to the desired/required actions and information. The 'Your Europe' initiative can be taken as a leading example for setting up a governance model, how to offer the information, etc.

- **Pilot study performed by 'Your Europe': Semantic annotation and web scraping:**
  Currently the 'Your Europe' initiative and the editorial board follow a manual procedure for updating and managing the content of the portal. This study was carried out in order to examine which content syndication techniques (manual and automatic) are feasible and which are more efficient to handle. This study can be used as an input for FCOPS. Conclusions are reached and the most effective and efficient technique is selected: semantic annotation and web scraping. In order to set this technique up, the Member States need to include standardised metadata tags on their portal/catalogue in order to identify the relevant information blocks (semantic annotation). The web scraper will go through the Member State information sources on a regular basis and extract the information blocks needed to update the content of FCOPS.

- **Core Public Service Vocabulary:**
  This vocabulary represents a common data model for describing public services. It was designed by a working group in order to increase standardisation across the EU. This will also lead to a uniform way of communicating across the Member States. This model can be used as a basis to set up FCOPS. A number of initiatives have already used the CPSV to create a mapping with their metadata model.

- **Classifications:**
  The classification of the public services will be used to create structure on the portals and as a navigation tool to find the right public services. Therefore these classifications need to be intuitive and easy to use/understand. A standardised classification across the EU should be optimal, but would require a significant effort. In addition, a multidimensional classification can be used within FCOPS to increase the flexibility and user-friendliness of the catalogue. The following classifications are described:

    - Classification of the Functions of Government (COFOG): standard classification with the purpose of mapping government activities;
    - Nomenclature of Units for Territorial Statistics (NUTS): standardised code list for geocodes.

- **Joinup platform:**
  This is a platform designed to encourage collaboration between Member States, experts and the ISA team. The platform is used to share their experience on interoperability and to stimulate discussion in order to reach a common understanding on certain interoperability objects. The CPSV is also a product that is discussed and designed on Joinup. Therefore FCOPS can initially be uploaded on Joinup during the development process. Once it is finalised, FCOPS can be hosted somewhere else because the focus of Joinup differs from the final focus of FCOPS.

- **Machine Translation @ the European Commission (MT@EC):**
  MT@EC is a machine translation tool developed by the EC in order to translate documents by using the terminology within the EU domain. This tool can be used in order to translate all the public services into all official languages of the EU. Unlike Google Translate, this tool cannot be used on a real-time base but functions via a request-response and with a (small) delay.

Each of these initiatives could deliver input or can be used for the development of FCOPS.

## ANALYSIS OF MEMBER STATES PUBLIC ADMINISTRATION PORTALS

All Member States have a portal for citizens and businesses. Most Member States have set up multiple portals for different purposes (e.g. public administration portal and eGovernment portal); other Member States have a single portal for all purposes. The intention of the public administration portals is to provide information on the different functions of public administrations and on the public services they offer to citizens, businesses and other public administrations.

In this study, 41 portals of 31 countries were analysed and used as input for FCOPS feasibility study. The conclusions here are grouped by LOST principles.

- High-level analysis:

    - 56% of the portals focus on public services of different levels of government; the remainder focus only on national public services;
    - The main focus on providing information to citizens and businesses

- Legal:

    - 26% of the analysed portals refer to regulations in force within the Member State;
    - Increased transparency is seen as a justification for disseminating information.

- Organisational:
    - The ownership of the information on public services provided on the portals is assigned to:

        | | |
        |---|---|
        | Public administrations | 51% |
        | Central body | 10% |
        | Mixed (central & public administrations) | 7% |
        | Unknown | 32% |

    - 22% of the portals provide guidelines/rules on how to publish the information on public services.

- Semantic:
    - Front-end elements of the Member States semantic metadata model are identified;
    - A thematic classification is used in 90% of the portals analysed;
    - 34% of the portals are only available in the official languages of the Member State.
    - If the portal is available in a language other than the official language(s), then in 61% of the cases English is used (in combination with other languages).

- Technical:
    - Content syndication techniques are used on the Member States' portals (multiple techniques possible per Member State):

        | | |
        |---|---|
        | RSS | 56% |
        | API | 10% |
        | XML (without RSS) | 5% |
        | Other (mail, mobile, CSV, etc.) | 17% |

    - In 27% of the portals analysed, a Content Management system is used to manage the data on the portals.

Most Member States have developed one or more portals containing the information about the public services. However in some Member States the portals are supported by a catalogue of public services in the back-end. These cases were further investigated in-depth.

## ANALYSIS OF CATALOGUES OF PUBLIC SERVICES

Based on the high-level analysis and certain points of single contact, it was possible to identify several cases of particular interest for FCOPS. These were selected based on several key points:

- is there a catalogue of public services available which might feed the portal with information?
- does the Member State use certain techniques for content syndication?
- how broad is the scope of the portal/catalogue (inter/intra-Member State public services, national public services only or limited to a specific government level)?

The two most interesting cases for this study are the esd-toolkit and the 'Samenwerkende Catalogi'.

The esd-toolkit consist of two sections: the Citizen Insights for identifying the demographic groups for the North Sea Region countries and the Standard Lists containing generic public service descriptions for the

local services offered in these countries. The Standard Lists are of especial interest for FCOPS. They provide a list of the local authorities' public services in the participating Member States at a granular level and define a categorisation. These lists use a service model for describing the diverse public services. This can be of interest for FCOPS. In a pilot, this service model has been mapped with the CPSV. The lessons learned from this exercise can give valuable input for mapping the service model of the Member States' service models to the CPSV. The multidimensional classification can also be used as an example.

The 'Samenwerkende Catalogi' is an excellent example of a federated catalogue of public services and FCOPS can learn a significant amount from this Dutch experience. It represents a catalogue managed by the Dutch Ministry of the Interior and Kingdom Relations and contains generic descriptions of all public services offered by public administrations at all government levels in the Netherlands. These generic service descriptions can be reused by the public administrations in return for making their specific public service description available.

The Dutch example comes closest to the conceptual model of FCOPS; a mapping is created between the specific and generic public services. An extra feature offered by the Dutch Ministry is a search banner. This banner is made available for the administrations to embed it in their own portals. Performing a search through the banner will generate a search query in the 'Samenwerkende Catalogi' and the result will show the public services requested. This creates a harmonised means of searching for public services offered in the Netherlands through the portals of different public administrations.

## CONCLUSION ANALYSIS

The first part of the study (work package 1 summarised above) showed that the Member States have been working independently, which results in a diverse state of affairs throughout the Member States. Each having systems at different levels of maturity creates a complex and difficult environment for FCOPS.

Therefore FCOPS will have to comprise a great deal of flexibility in order to cooperate with all Member States without excluding any. Taking a general look at the federation at Member State level, it is possible to abstract three ways of working in the Member States, which are shown in the figure below.
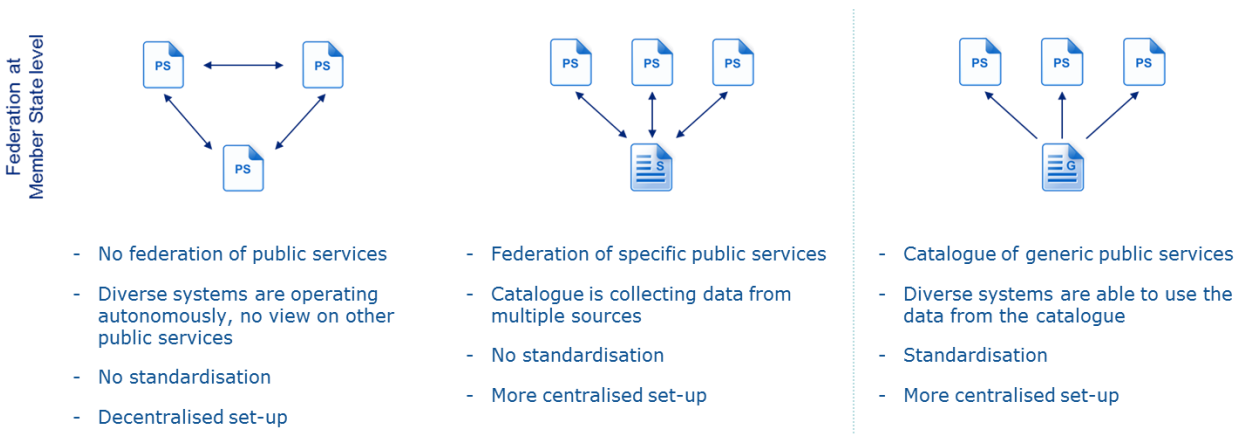


**Figure 2 – Current approaches to catalogue services**

Based on our analysis we can conclude that some Member States have already built a catalogue of public services, but that little standardisation and cooperation has been observed across Member States' borders (with the exception of esd-toolkit).

## REQUIREMENTS AND SCENARIOS FOR FCOPS

The requirement-gathering and scenario-building in this report represent the second deliverable (work package 2). This section describes what is needed in order to build FCOPS at EU level in accordance with the vision and in a way that is efficient for the Member States.

### MOVING FORWARD TO FEDERATION AT MEMBER STATE LEVEL

Based on the different situations in the Member States, several operational scenarios have been designed for FCOPS. These scenarios do not focus on the implementation of the portals or catalogues within the Member States. However, it is vital that these scenarios take into account whether the Member State has a catalogue available or not. An overview of the scenarios can be found in the figure below.

To keep the figure simple, no distinction is made between a generic catalogue and a specific catalogue of public services at Member State level. The scenarios are ranked in terms of ease of implementation for the Member States. Scenario 1 represents the current situation, where there is no federation; the desirable end-state is scenario 4.
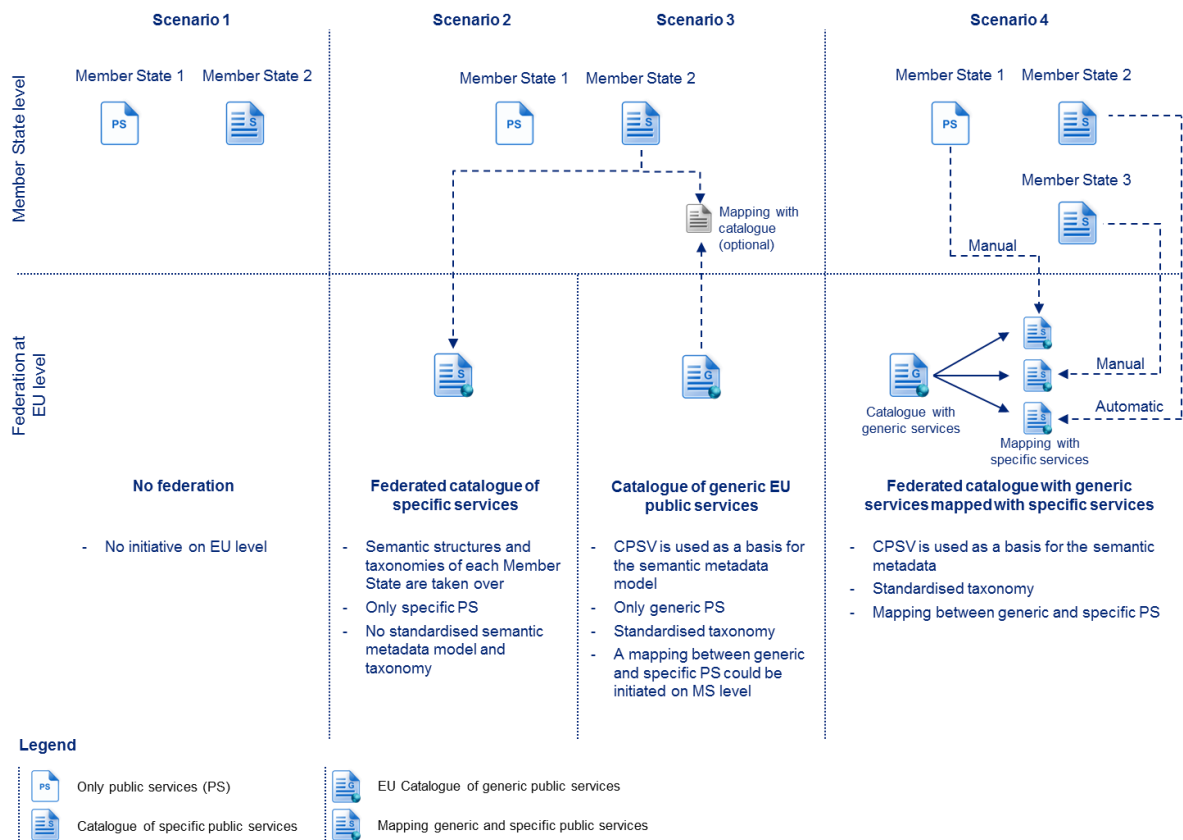


**Figure 3 – Operational scenarios for catalogues of public services**

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### Scenario 1

The first scenario represents the current state of affairs. Hence no changes will be required at EU level. The Member States are, however, encouraged to develop their own catalogue of public services in order to improve the cooperation between and accessibility of cross-border public services. This will be not a prerequisite; it is only recommended.

### Scenario 2

Compared to the first scenario, the second scenario will introduce a European catalogue of public services. This catalogue will consist of a federation of all the catalogues available in the Member States. This results in a centralised collection of all the public services from national, regional and local level across the Member States.

Within this scenario public administrations are able to consult the catalogues of public services offered in other Member States. They can see how they are organised and managed by the public administrations. A second advantage is that they can be used by public administrations when they receive information requests from citizens or businesses. They are able to consult the different specific public services of a particular country in the federated catalogue of specific public services. In addition, the catalogue will be available and a useful tool for citizens and businesses in order to discover public services offered by the Member States.

The European catalogue of specific public services will already improve interoperability within the EU. However, it will not have standardised assets (such as a common metadata model, taxonomies). The catalogue will be developed by creating a mirror of the catalogues available within the Member States. Each Member State's taxonomy and metadata model will be adopted by the mirror without changing it to a common model. This implies high complexity when searching for a particular public service.

It should be noted that if a Member State wants to cooperate with the catalogue of specific public services, it needs to have a catalogue of public services available. In other words, the specific public services of the Member States without a catalogue are not included within the catalogue of specific public services at EU level.

### Scenario 3

The third scenario involves the development of a catalogue of generic public services. Within this model a European catalogue of generic public services will be built based on a standardised metadata model and taxonomy. A working group will be dedicated to defining the generic public services by consolidating all the specific public services at all government levels. Each generic public service is based on at least one specific public service that is provided by at least one public administration. Describing the public services according to these assets and in a standardised way will generate a generic and distinct view of all public services offered across the EU.

The Member States are able to map their offering of public services to the generic services published within the federated catalogue of generic public services. This mapping is only initiated at Member State level; they are able to decide autonomously whether they want to create the mapping or not. This means that there will be no general mapping between generic and all specific public services at EU level.

There is a dual purpose in setting up a catalogue of generic public services with a focus on administrations. The first aim is that the public administrations should have a good overview of which public services may be provided within a Member State. They are able to compare their offering with what

is generally provided across the EU. The second purpose is the learning aspect, and reusability for public administrations and Member States. The catalogue of generic public services at EU level can be used as a leading example to build a new catalogue at Member State level. The standardised assets (like taxonomy, ontology, metadata model) will be made available for the Member States.

### Scenario 4

The last scenario is a blend of scenarios 2 and 3. In this case a federated catalogue will be built which includes the generic and the specific public services. This catalogue of public services will provide the opportunity to create a distinct overview via the generic public services of all the public services offered. To extend the set-up, the specific public services across the EU will be mapped to the generic services. This will create a holistic and easy to use overview of which generic public services are offered in which Member States.

Similar to scenario 2, this set-up will enable the different public administrations to compare their catalogue with other Member States. This will make it possible to identify which services they are not yet offering or which services they are offering but are not offered by other Member States.

This will also support the helpdesks; they can easily go through the diverse public services provided in other Member States in one central place. The complexity of the search will be significantly reduced compared to scenario 2 due to the standardisation of generic public services and the mapping. Citizens and businesses can likewise consult the federated catalogue to search for public services.

### Selection of the scenario

The selection of the most feasible and suitable scenario for FCOPS was carried out by testing each scenario against a SWOT-analysis and an evaluation against principle. These principles are based on the vision of the study and the conceptual model of FCOPS. The table below shows the results of the evaluation of the scenarios against the principles.

| Principle | Scenario 1 – No federation | Scenario 2 – Federated catalogue of specific public services | Scenario 3 – Catalogue of generic EU public services | Scenario 4 – Federated catalogue of public services |
|---|---|---|---|---|
| P1 – Centralisation | Not accepted | Accepted | Not accepted | Accepted |
| P2 – Exhaustiveness | Not accepted | Not accepted | Not accepted | Accepted |
| P3 – Flexibility | Not accepted | Not accepted | Not accepted | Accepted |
| P4 – Standardisation | Not accepted | Not accepted | Accepted | Accepted |
| P5 – Learning | Not accepted | Not accepted | Accepted | Accepted |
| P6 – Reusability | Not accepted | Accepted | Accepted | Accepted |
| P7 – Accessibility | Not accepted | Accepted | Accepted | Accepted |
| P8 – Multilingualism | Not accepted | Not accepted | Accepted | Accepted |

**Table 1 – Selection of the scenario based on the principles**

Looking at the overview in the table and at the SWOT analysis, the last scenario has the outcome which makes it the most suitable scenario for this feasibility study. This proposed scenario is further elaborated on in this document.

### *Gradual evolution*

It will only be feasible to implement the final scenario step-by-step. It is not feasible to implement a federated catalogue with an initially complete set of generic and specific public services. This scenario is more a long-term target vision that should be pursued and achieved. In order to get there, the development process can contain several phases which gradually evolve towards this target.

The first phase will pursue the vision of scenario 3, where a catalogue of generic public services is introduced. There will be a need for standardisation of the semantic metadata model and taxonomy in order to describe the generic public services. Once the assets have been defined, the generic public services can be created and included within the catalogue at EU level.

After this phase the catalogue of generic public services can be made available to the Member States and they will have the opportunity to include the specific public services in the catalogue with support from the EC. These services will be transformed into the standardised service model. This phase will consist of multiple pilot projects. Each project would focus on all the specific public services offered within one specific Member State or supranational organisation.

When all the Member States have included their specific public services in the catalogue, the vision of the fourth scenario is fulfilled. FCOPS set-up can be further refined and developed by adding for example new classifications (taxonomy), refining generic public services, or providing more input and output functionalities.

## REQUIREMENTS

The development of FCOPS will be rather complex due to the different aspects that need to be taken into account. Therefore a series of requirements have been defined to provide a checklist for the implementation of FCOPS. Each of these requirements should be addressed and applied during the development process. They are derived from the interviews and based on the fourth scenario (even certain requirements are applicable to the other scenarios as well). The requirements are listed in accordance with the interoperability levels (legal, organisational, semantic and technical – LOST).

These requirements should be incorporated in order to create a well-functioning FCOPS that is in line with the vision, the conceptual model and scenario 4.

| Functional requirements |
| --- |
| **High-level requirements** |
| **Requirement 1** All EU Member States and EEA Member States should be included within the scope of FCOPS. |
| **Requirement 2** FCOPS should initially focus on supporting the public administrations at the back-end integration and interoperability. Additionally, FCOPS should provide information to citizens and businesses. |

| **Legal requirements** |
| :--- |
| **Requirement 3** FCOPS should find support in existing legal initiatives (e.g. Services Directive) The transparency clause should be extended to the EU level. |
| **Organisational requirements** |
| **Requirement 4** A working group should be established, consisting of representatives of the Member States and the European Commission, in order to coordinate FCOPS development and set-up process.<br><br>**Requirement 5** The system ownership of FCOPS will be assigned to the policy domain owner, who will be responsible for developing the functionalities and need to safeguard the operations of FCOPS.<br><br>**Requirement 6** The data ownership relating to the metadata model, taxonomy and data (generic public services) at EU level should be assigned to the policy domain owner; the data ownership of the specific services should be kept in the hands of the Member States.<br><br>**Requirement 7** The mapping between the generic public services and the specific public services should be a task performed by the Member States.<br><br>**Requirement 8** The system owner should manage the FCOPS access rights and authentication rules.<br><br>**Requirement 9** FCOPS should be publicly available for everyone, though restrictions should be placed on the update functionalities of the public services. |
| **Semantic requirements** |
| **Requirement 10** The semantic metadata model used for FCOPS should be based on the Core Public Service Vocabulary.<br><br>**Requirement 11** FCOPS should support a multidimensional controlled vocabulary in order to improve the flexibility and user-friendliness.<br><br>**Requirement 12** The controlled vocabularies used within FCOPS should be translated into all official EU languages.<br><br>**Requirement 13** The public services within FCOPS should also be available in all official languages, potentially by means of a machine translation tool. |
| **Technical requirements** |
| **Requirement 14** FCOPS should provide a manual technique for managing the public services within the catalogue and provide a content syndication technique for Member States on a lower level of maturity.<br><br>**Requirement 15** FCOPS should provide an automatic content syndication technique to support the Member States which are at a higher level of maturity. |

Table 2 – Requirements to develop FCOPS

## ACTION PLAN TO IMPLEMENT FCOPS

It is not feasible to take a big-bang approach to implement FCOPS. It requires a phased and gradual evolution. The actual implementation will consist of different phases each having an own purpose and investigating another dimension of FCOPS. The approach pursued for FCOPS consists of different steps within each action block/iteration.

The figure below shows an overview of the different iterations proposed for the development of FCOPS. For each action block, the figure below shows the scenario in which it occurs. The short-, medium- and long-term objectives are mentioned at the bottom of the figure.
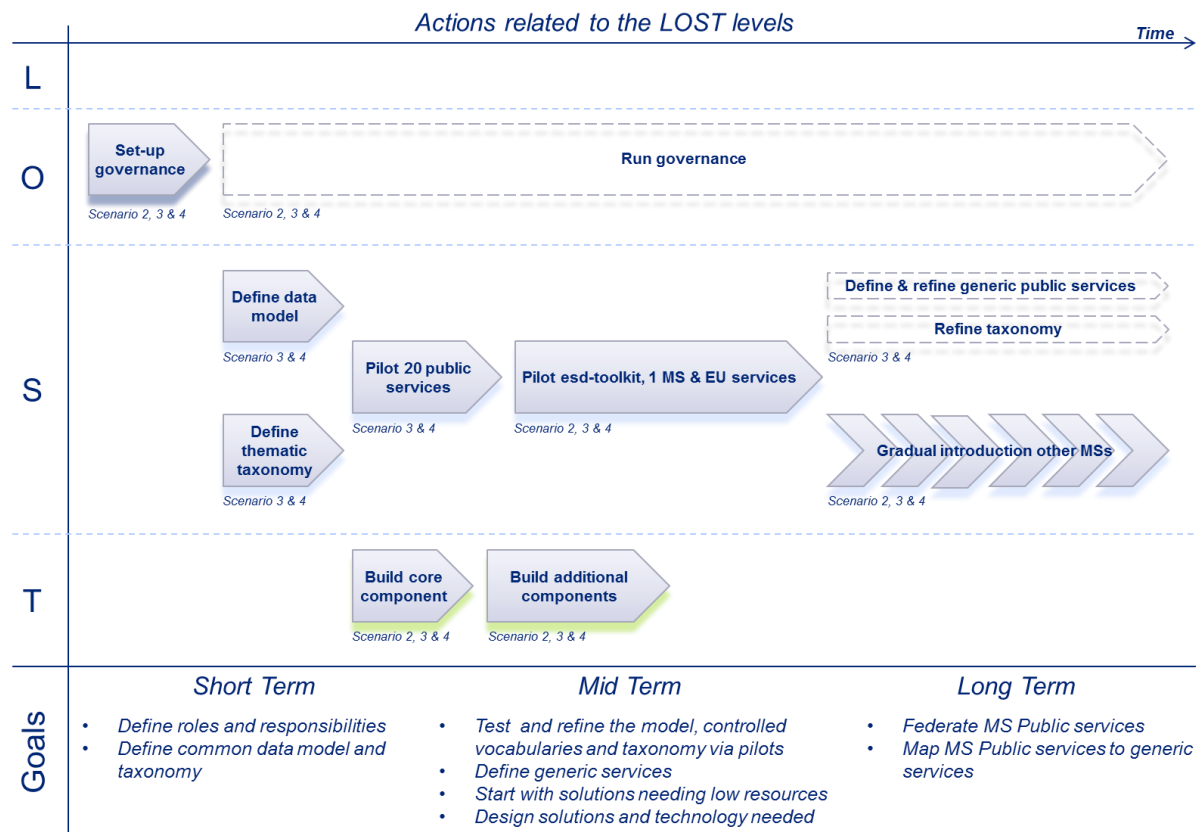


Figure 4 – Action plan for the development of FCOPS

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# 1 INTRODUCTION

## 1.1 OBJECTIVES OF THIS STUDY

This study is one of the steps in the broader Action 1.3 'Accessing Member State information resources at European level, Catalogue of Services' of the ISA work programme. The main objectives of this action are:

- **Harmonisation** around national and European service catalogues to give European public administrations a better insight into what is available and how to access this information;
- **Interconnect** the service catalogues of all the public administrations;
- **Build** cross-border services.


This study, the Catalogue of Services (CoS) Study II, is one step in the Action. The specific goals of this study are to:

- Analyse the **existing public services models** and recommend what should be done to set up a common public services model;
- Analyse and determine the **feasibility** of setting up a European catalogue of public services;
- Define a **roadmap** with a concrete set of steps on how to implement the catalogue.

## 1.2 CONTEXT AND RELATIONSHIP BETWEEN THE DIFFERENT WP'S

This study is the second step in the Action. The first step was Study I on a Catalogue of web services. That study analysed the vision of a registry for web services by the public administrations of the Member States. For Study II the scope has changed: the emphasis is not on web services but on the establishment of a federated catalogue of public services (referred to subsequently as "FCOPS").

Study II of the Catalogue of Services is divided into two work packages:

1. Examination of the current state of affairs in the Member States;
2. Requirements and scenarios for FCOPS.
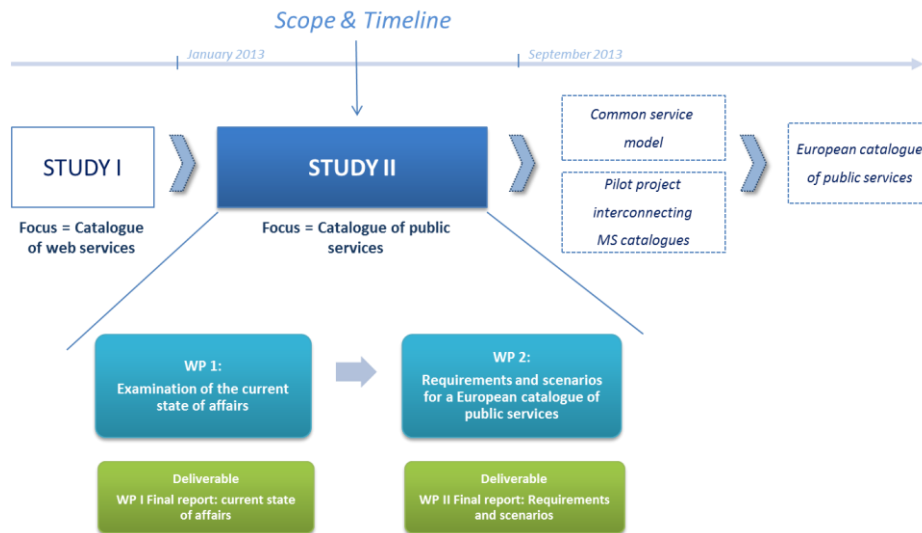
**Figure 5 – Scope and timeline of the study**

## 1.3 OBJECTIVES OF THIS DOCUMENT

This document is the deliverable WP II Final Report within the Catalogue of Services (CoS) Study II. The purpose of this document is to determine the feasibility of building FCOPS by:

- looking into feasible scenarios for federating national catalogues;
- identifying the legal, technical, semantic and organisational requirements and scenarios;
- suggesting practical steps and courses of action;
- Identifying the tools required to facilitate implementation.

## 1.4 HOW TO READ THIS DOCUMENT

Public administrations involved with the ISA programme, and specifically public service owners and developers, are the main audience for this document. Anyone with a stakeholder interest in the interoperability and efficiency of public administrations may well find it of interest.

This document is organised as follows:

- **Chapter 1** recapitulates the analysis of work package 1 because highlights from the analysis are used throughout this document and in order to ensure that this document stands alone;
- **Chapter 2** presents user stories of what exactly FCOPS wants to achieve. The non-technical nature of user stories facilitates reader understanding. The user stories contain fictional 'real-life' examples, which help clarify the purpose of FCOPS;
- **Chapter 3** explains the method used to develop four alternative scenarios for establishing FCOPS, and analyses and compares them;
- **Chapter 4** describes the requirements of the most feasible scenario in further detail. These requirements are grouped according to the four layers of interoperability;

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- **Chapter 5** contains a high-level action plan on how to implement FCOPS, with indicative timing and priority assigned to the actions, which are presented in a graphical roadmap.
- **Chapter 6** highlights different tools needed to implement and run FCOPS and examples of those tools identified in the various catalogues and portals.

The annexes to this document provide more detail or additional material in relation to the different chapters.

The content of this study is specific to FCOPS at European level, but it can also be used as input by Member States who wish to implement a federated catalogue of public services at national level.

## 2 ANALYSIS OF THE CURRENT SITUATION

### 2.1 FIRST ANALYSIS – PORTALS

The analysis of the current situation within EU borders showed that each Member State is working differently and autonomously from Member States. The analysis was carried out in two phases: a high-level analysis and a more in-depth analysis of the interesting cases.

The first high-level analyses investigated Member State portals. The analysis covered only portals with a focus on citizens and businesses. Certain countries have developed multiple portals, each focusing on a specific target audience. A total of 41 portals were analysed in 31 Member States, i.e. the Member States of the EU and the three other EEA countries.

These portals provide a list of public services which are structured according to a certain classification. The public services can be offered in diverse formats: a description of physical services, reference to web services or forms that are made available for the public through the portal. In the majority of the cases the portal owner has defined a thematic classification to give structure to the portal and the public services.

During the analysis of the portals, the different EIF layers were investigated in-depth. From the fact sheets from Work Package 1, it was possible to extract statistics and determine trends within the European Union. The following trends were identified in the high-level analysis and for each LOST[1] interoperability layer:

**1) High-level**

Most of the portals have a multidimensional purpose. Most Member States' portals provide information about the public services at multiple levels of government; only 44% restrict their scope to national public services instead of having a multidimensional purpose.

Besides the provision of information, the analysis showed that in most cases the portal has a broader focus than just one particular audience. Most Member States' portals (73% and 85% respectively) provide information for citizens as well for businesses.

The final trend identified in the high-level analysis was that 98% of the portals provide some kind of service description that further elaborates on the services offered. In multiple instances these service descriptions were further extended with eServices (34%), forms (27%) or references to more detail or the related eServices (15%).

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[1] Legal, Organisational, Semantic and Technical

## 2) Legal

In the legal aspect of the analysis, it was remarkable that 73% do not refer to a legal framework. Only in 25% of the portals analysed were the public administrations stimulated to publish their public service by reference either to a law – 5%, or the EIF transparency principle – 20%. In the case of Germany (representing 2% of the portals analysed), the portal mentioned a legal basis[2] which is interpreted as meaning that the public administrations in the Länder (regions) were not allowed to publicise their public services on a national or federal portal. However, the legal basis allows an exception if specific cooperation agreements are made between the Länder and the Bund to permit the publication.

## 3) Organisational

From an organisational point of view, the trend is to keep ownership of the public services in the hands of the public administrations themselves. The public administrations are in these cases responsible for managing the service descriptions and other information within the catalogue. It is necessary that this information be always up-to-date. In only 10% of the instances analysed did a central body manage the public service descriptions within the catalogue. In another 7%, the responsibility lay partially with the administrations and partially with a central body.

Another aspect of the organisational analysis was the provision of rules and guidelines on how to publish public services. In 22% of the portals analysed, guidelines were mentioned on how the public services should be published within the Member State. Providing such guidelines could improve the interoperability and standardisation within a Member State.

## 4) Semantic

The analysis focused on several aspects from the sematic point of view of a portal. The first aspect was the semantic data model; the different information blocks provided on the portal are only a tip of the iceberg. The real data model is hidden in the back end of the portal. However, it was possible to identify the items published most frequently (if >70%): title, links to more details, service descriptions, further contact details and input (e.g. enter a name, login, documents, etc.)

Another important trend discovered was that Member States provide a thematic classification. Furthermore in multiple instances analysed, the portals had gone a step further and created a multi-dimensional classification for the public services. In such a set-up, the user can choose the preferred classification, which improves the user-friendliness of the portal. The combination of a thematic classification with an A-Z list is mostly preferred as providing a multidimensional taxonomy.

Dealing with multilingualism becomes very important when operating across linguistic boundaries. Therefore this concept was analysed from two separate points of views in the first work package. The first major trend identified was that most Member States translate the information to one or more other languages. In certain cases this is made possible by providing a Google Translate API. Only in 34% of the portals analysed was the information limited to the official languages of the country. Taking the analysis a step further shows that English is the most commonly used of the other languages offered (61% of the portals analysed).

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[2] Art. 83 Constitution, http://dejure.org/gesetze/GG/83.html

## 5) Technical

The last interoperability layer within the EIF is the technical point of view. Although the analysis focused on the front end of the portal, it was possible to identify some technical elements as well. The elements which it was possible to identify were those relating to how the information is published by the public administrations. Apart from the portal interface, they have developed several alternatives, for example APIs, CSV, mail, RSS, XML (Open Data) etc. The most frequently used technique is RSS (56% of the portals provide RSS feeds); this technique is used to send updates to the people who have subscribed to the RSS feeds.

Another aspect analysed was the support for the portal. In 27% of the instances analysed it could be shown that a Content Management System is used to support the creation and maintenance of the Member State's portal. This number is rather low and it is reasonable to assume that more portals are built via a CMS, without referring to it on the portal.

## 2.2 SECOND ANALYSIS – CATALOGUES OF PUBLIC SERVICES

In certain Member States the portals examined are powered by catalogues of public services. The in-depth analysis focused especially on those cases. This catalogue can be developed at different government levels within the Member State. For example, in Spain the national portal (060.es) provides several catalogues containing only national public services. These national catalogues are created without regard to regional government portals which describe regional public services or provide other catalogues. In Belgium, on the other hand, there is a catalogue which has been created at a regional level (Flemish) which contains the public services at all government levels in order primarily to support the helpdesk ('*Vlaamse Infolijn*').

Irrespective of the Member States' set-up at other government levels, it was possible to identify three common ways of working in cataloguing services at Member State level. An overview is given in Figure 6.
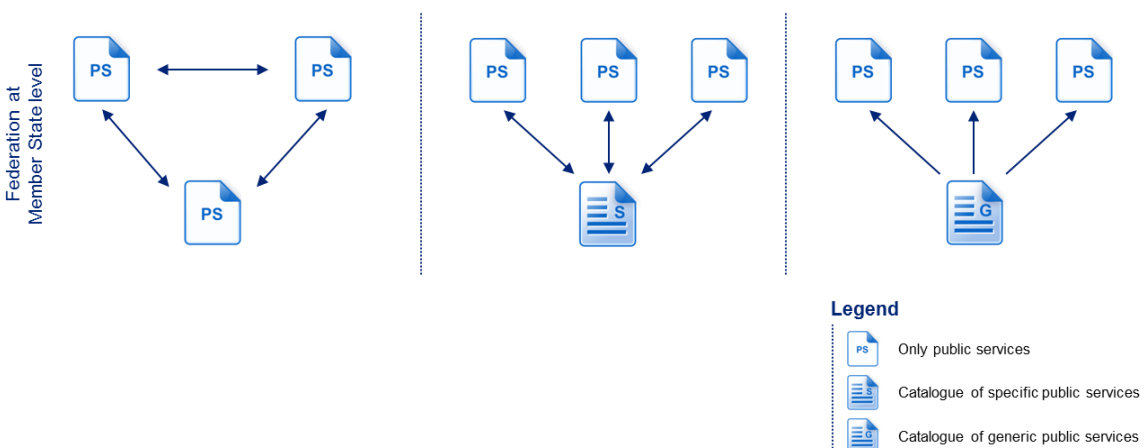


**Figure 6 – Current state of affairs**

The majority of Member States have not created a catalogue of public services (see set-up at the left of Figure 6). In this case, the public administrations offer their own public services separately, without knowing what is offered by other administrations. However, a listing of the public services within the

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Member State can often be found on their portal. These portals each provide their own classification, which might differ from Member State to Member State, and even from public administration to public administration. This is a decentralised way of working, and it is difficult to provide support and information to citizens and businesses in relation to public services offered by other public administrations.

Within the second set-up (see middle set-up in Figure 6), a Member State has created a catalogue of specific public services. This is a centralised model; all public administrations publish information about the services they offer in a (national) catalogue (manual input or automatic federation). By using such a catalogue it is possible to create an overview of what is offered within the various public administrations.

An example of this set-up can be found in Latvia, where the State Regional Development Agency has created a catalogue of public services. The national and local public services are created and managed in the central system by the relevant public administrations responsible. Through the set-up of the catalogue Latvian citizens and businesses are able to find information about all public services in the national portal. And in addition, all public administrations are able to pull the information on public services to their own portals.

Within the third possible set-up, the catalogue includes only generic public services (see right hand side in Figure 6). These public services are described in a standardised format by using pre-defined assets (e.g. semantic data model, taxonomy). The purpose of such a catalogue is to create a generic and distinct overview of which public service is offered within the Member State. These services can be used by and tailored to the different public administrations.

These services are defined by consolidating the offering of all the public administrations within the Member State. They can use this as a basis to define the generic public services.

Examples of this set-up can be found in the Netherlands, in Denmark and in Norway.

The Dutch Ministry of Interior Affairs has defined all the generic services provided for public administrations and incorporated them in the Uniform Product name List - UPL). Therefore they have created a taxonomy (thematic classification), UPL, metadata model, etc. The administrations are still free to create their specific public services in the way that suits them, but each specific service must specify which the related generic service in the UPL is. They do this by entering the standardised name of the service in the data element foreseen within the catalogue of the public administration. In this way the public administrations establish a connection between the overarching catalogue of the Dutch Ministry of Interior Affairs and the generic public services. The assets and pre-defined standards provided by the Ministry stimulate interoperability between public administrations and improve standardisation within the Netherlands.

Denmark (FORM[3]) and Norway ('Nasjonale Tjenestekatalog') work via editors. These editors describe the different public services according to a pre-defined and standardised data model and publish the services in a catalogue. The different municipalities and administrations can use these standard public services, which are described in a common language and structure, in order to make them applicable to all government levels. This editorial task is given to a government institution within Denmark, but in Norway the work is done by a private company specialising in software development for public administrations.

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[3] http://www.form-online.dk (24/6/2013)

# 3   USER STORIES

A user story is a technique used in software development to give an idea of the purpose of a system for the users. A user story does not provide a complete set of user requirements, nor does it describe a process in detail.

For this study we want to use the user story to show when FCOPS will be used and what the added value will be for the users. The primary users will be the Member State public administrations at national, regional and local level. Citizens and business will be secondary users.

## 3.1   INCREASING CUSTOMER SATISFACTION WITH PUBLIC SERVICES

A FCOPS will mean a public administration is able to look up any public service offered anywhere in the European Union, in order to become more proactive in providing a public service to citizens and businesses.

This user story is placed in a context where a public administration which is in the process of providing a public service to a citizen may need to consult a public service of another public administration. If the public administration can already provide information to the citizen or business proactively based on that other public service, this will significantly improve customer satisfaction.

This user story also includes cross-border public services within the EU. This is already covered by the 'Your Europe' portal. This will lead to close cooperation with the portal; whenever a cross-border public service is accessed, the user will be directed towards the 'Your Europe' portal.

This user story is portrayed via a fictional 'real-life' story:

> A Spanish citizen, who is a resident of Rotterdam, wants to get married. The Rotterdam civil servant will be able to provide the public service of marriage, but will need some documents such as an original birth certificate. Instead of sending the citizen away without any additional information on how to obtain the birth certificate, the civil servant would be able to consult FCOPS and find out how the citizen can obtain the birth certificate from his place of birth.

## 3.2   CREATING BETTER PUBLIC SERVICES

A FCOPS will mean a public administrator is able to find any public service from anywhere in the European Union in order to create better public services for citizens and businesses.

A public administration is in the process of creating a new public service or is reviewing an existing public service. Instead of reinventing the wheel the public administration is able to browse through FCOPS and find out how other public administrations provide similar public services.

This user story is portrayed with a fictional 'real-life' story:

> A public administrator in Riga is reviewing the current street-cleaning public service in the wake of some complaints the city has recently received and because the public service is becoming a burden on the budget. Via FCOPS, the public administrator is able to find the comparable public

services of other public administrations. The details of the public services will make it possible improve this public service by learning from the experience of other public administrations, and this will also open up the possibility of being able to contact other public administrations for more information.

## 3.3 SUPRANATIONAL PUBLIC SERVICES FOR THE PUBLIC

A FCOPS will mean a citizen or a business is able to find any supranational public service offered by European institutions without searching the web.

A citizen or a business is often not aware of how to access the public services offered by an official European entity. Instead of browsing through the web in the hope of finding more information, they can access the preferred EU public services through FCOPS. The scope of FCOPS should include these supranational public services.

This user story is portrayed with a fictional 'real-life' story:

> A farmer in Italy is currently facing pressure from large imports from low-wage countries, forcing the farmer's prices to drop below the average cost price. Therefore the farmer was advised to ask for support from the European Union by means of subsidies or production-related aid. Through the implementation of FCOPS the farmer is able to access the EU public services and request the right support. During the consultation of FCOPS, the farmer is also able to identify the standards which need to be met in order to enjoy the benefits of the support.

# 4 MOVING FORWARD TO FEDERATION AT MEMBER STATE LEVEL

Based on the different situations in the Member States (cf. Figure 6 – Current state of affairs), several operational scenarios have been designed. These scenarios do not focus on the implementation of the portals or catalogues within the Member States. However, it is vital that these scenarios take into account whether the Member State has a catalogue available or not. They describe the different possibilities for setting up a federated catalogue at a European level. An overview of the scenarios can be found in Figure 7 – Operational scenarios for catalogues of public services. To keep the figure simple, no distinction has been made between a generic catalogue and a specific catalogue of public services at Member State level.

The order of the scenarios is that of ease of implementation for the Member States. It is clear that at this moment there is no federation and that the desirable end-state is scenario 4.

The most logical approach to implementation is to start with scenario 3. As will be explained in the chapter on the action plan (cf. 6 Action plan to implement FCOPS), the reality when implementing will be in the middle, and scenarios 2 and 4 will be running in parallel.

The scenarios presented in the Figure below are described in detail in the following sections. The approach which is followed to describe them is explained in the next section.
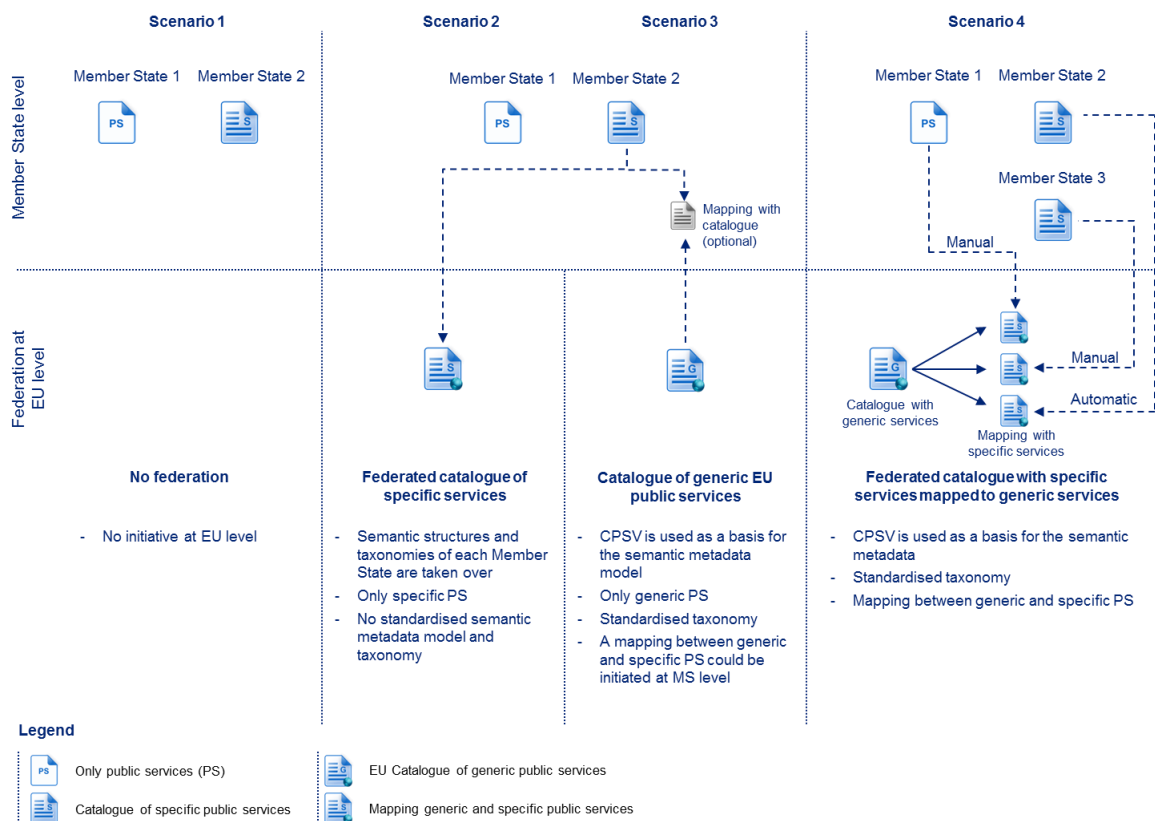


**Figure 7 – Operational scenarios for catalogues of public services**

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## 4.1 METHODOLOGY FOR SCENARIO ANALYSIS

The method pursued in defining the different scenarios contains different sections which are consistently used over the four options. The format of the scenarios is presented and explained in the first part of this chapter. The second part sets out and briefly describes the principles for the evaluation criteria.

### 4.1.1 FORMAT OF SCENARIO ANALYSIS

The format of the scenario analysis is divided into several sections. The first two sections explain what the scenario will represent and the implications it will have at Member State and EU level. These introductory sections are followed by a description of the legal, organisational, semantic and technical aspects, and then finally the scenario is evaluated.

The scenario description contains the following sections:

***Vision at a glance***

The first section provides a small introduction to the scenario. It gives a graphical representation of the set-up at Member State level and at European level. This representation is linked to Figure 7 above.

The graphical representation the scenario is followed by a brief description which explains how the scenario will operate and how it would be set up. The key characteristics of this vision are highlighted in this section.

The last part of the *vision at a glance* mentions the examples which are used as a basis for the scenario. These examples originate in the analysis of portals and catalogues performed in work package 1.

***Implications of the current situation***

This section clarifies the implications the scenario will have at different levels and these are established as answers to a series of questions:

- *What are the implications at EU level?*
  This question covers all the changes that need to be made at EU level and briefly describes the model's new concepts and building blocks.

- *How does this scenario improve the interoperability of public administrations across the EU?*
  This question tackles the interoperability advantages achieved by pursuing a particular scenario.

- *What are the implications for Member States?*
  This final question describes the changes that it will mean for Member States and what is expected from the Member States in cooperating with the scenario set-up.

***Legal aspect***

The legal section focuses on one specific question about replication:

- *Does this involve any replication of the public service?*
  This investigates whether there are replication aspects involved while building the catalogue at EU level and gathering the information on public services.

### Organisational aspect

This section poses the following questions:

- *How are Member States organised to gather public service information?*
  This question deals with the process of information gathering and set-up of the scenario. It defines who is responsible for doing what, and more specifically what the Member States have to do in order to implement the scenario.

- *How is the governance of the catalogue organised?*
  This question deals with the governance of the scenario, e.g. the ownership of the public services, catalogues and other components. It briefly describes the policies which are necessary.

- *How is access to the catalogue managed?*
  This question details who manages the access rights and who has the rights to access the catalogue at EU level.

### Semantic aspect

This section describes which diverse semantic components and building blocks are needed to describe the public services and develop the catalogue.

- *How are the public services described and used?*
  This question identifies which architectural building blocks are needed to describe the services within the catalogue.

### Technical aspect

This section deals with the technical aspect of the scenario by asking the following question:

- *What implications will this scenario have at EU level and Member State level?*
  This defines which technical components are required to set up the scenario, including the systems to collect, manage and maintain public services.

### Operations and responsibilities overview

This section is added only for scenarios 2 and 3. The section describes the process flow in developing the set-up of the scenario. For each step, an indication is given of which responsibilities are assigned to the stakeholders involved.

### Architectural building blocks

This identifies the components that are needed to actually develop the scenario; this is essentially a summary of the semantic and technical assets. Two questions are posed in order to make a distinction between the building blocks at EU and Member State level:

- *What is defined at EU level?*
  This question identifies the design or build requirements at EU level.

- *What should the Member State develop?*
  This question identifies what the Member States have to develop or make available to enable use at EU level.

*Evaluation of the scenario*

Two evaluation methods have been applied per scenario in order to select the most suitable and feasible scenario for implementation.

The first technique performs a qualitative assessment by means of a SWOT analysis:

- *What are the strengths of this vision?*
  This describes the strengths of this vision. The most important advantages related to the strengths are highlighted.

- *What are the weaknesses of this vision?*
  This question deals with the weaknesses of the scenario and highlights the disadvantages.

- *What are the opportunities associated with this vision?*
  The opportunities and the additional objectives that can be reached are mentioned in this section. This identifies the incentives for choosing which scenario is most suitable.

- *What are the threats associated with this vision?*
  This question identifies the threats related to the vision. These threats can become an obstacle to choosing the scenario.

To extend the evaluation of the scenarios, each is then checked against a number of predefined principles. These principles are explained in detail below (cf. 4.1.2 Principles used for evaluation criteria).

## 4.1.2  PRINCIPLES USED FOR EVALUATION CRITERIA

The scenarios are tested against a second validation technique in order to find the most suitable scenario for the study. Therefore a number of principles are defined based on the vision and the conceptual model defined in work package 1.

These principles formulate the objectives of this study, and should be respected and enforced within the selected scenarios. These principles support the European Interoperability Framework; the related EIF principles[4] are mentioned within the description of the principles. The principles can be found in Table 3 – Principles for evaluation criteria.

| Principles |
|---|
| **P1.    The set-up must provide a single place for starting the search for public services. *(Centralisation)*** |
| The objective of FCOPS is to have a single point of contact to discover public services. This will reduce the time and effort in searching for a particular public service provided within the EU. <br><br> This principle supports the statement given in the vision from work package 1; 'Wouldn't it be great if I could start my search for a public service in any Member State from any place?' |

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The data should be gathered centrally and need to be available for all citizens, businesses and public administrations in Europe.

➔ *EIF principle – User-centricity*: the scenario that is opted for should support the needs of citizens and businesses. The scenario selected should provide an overview of which public services are provided across the Member States and how these public services are offered to the citizens and businesses (and public administrations).

➔ *EIF principle – Administrative simplification*: this EIF principle relates to reducing the administrative burden. A centralised set-up will reduce time and effort for a citizen, business or public administration in searching for a public service. Without centralisation, the interested party will have to browse the web, which can lead to a waste of time.

| P2. | **The catalogue must include all public services offered within the EU.** *(Exhaustiveness)* |
|---|---|

FCOPS must collect the information on all public services for citizens, businesses and public administrations offered by all public administration at all government levels within all the Member States. This principle is derived from the scope of the conceptual model described in work package 1.

➔ *EIF principle – Transparency*: citizens, businesses and public administrations should have an overview of which public services are offered within all Member States and how these are offered.

| P3. | **The system must be flexible if it is to cooperate with Member States' current systems.** *(Flexibility)* |
|---|---|

The Member States work autonomously. This leads to differences in the current state of affairs. Therefore FCOPS must be flexible in order to cooperate with Member States' current systems. This depends on the maturity of the Member States; a Member State could have a catalogue of public services available, only a portal or even nothing.

The system need to be flexible enough to enforce principle P2 and not exclude any public service in Member States due to differences in the state of affairs.

Flexibility is required in order to reach all public services and Member States without excluding any services. This flexibility principle is consequently linked to the scope of the conceptual model described in work package 1.

➔ *EIF principle – Inclusion and accessibility*: the set-up of the scenario should not exclude other Member States due to a different state of affairs. The scenario should allow every Member State to take full advantage of the opportunities gained by the scenario. From an output perspective, every person should be able to use FCOPS with the same service level, including persons with disabilities and the elderly.

➔ *EIF principle – Technological neutrality and adaptability*: the system developed at EU level needs to be flexible in order not to impose any specific technological solution on citizens, businesses and public administrations. It needs to take into account the different set-ups of Member States' public administrations and the level of maturity of their systems.

| P4. | The set-up of FCOPS should be based on standardised assets in order to enhance interoperability.<br>*(Standardisation)* |
|---|---|

FCOPS needs to be developed based on standardised assets. These assets will be used for establishing information exchange in a commonly used format. This will improve current and future interoperability initiatives. The concept of standardisation is linked to the conceptual model by defining a common model and mapping of semantic assets.

This principle is not directly related to one of the EIF principles, but does relate to a recommendation: interoperability agreements. In order to design standardised assets, the Member States needs to agree on these assets. This can be seen as a form of interoperability agreement. These assets will also be used later in order to establish a communication channel between the Member States' systems and the system at EU level.

| P5. | The catalogue must enable the learning aspect for public administrations. This must be supported in three areas: public service portfolio, how to offer public services, reusable solutions for the system.<br>*(Learning)* |
|---|---|

Building FCOPS must enable the learning aspect for Member States and public administrations. This can be achieved in three different areas:

- Public service portfolio: the public administrations are able to compare their public service offerings with what other Member States' administrations are offering. This allows them to identify the public services which are not yet offered to the public or which are superfluous.

- How to offer public services: the public administrations can learn from other administrations how to manage and organise the public services they offer. They can compare it with their offerings and the good practices can be taken as examples.

- Reusable solutions for the system: by developing standardised assets the Member States are able to reuse them for their own systems (cf. P4). These assets are especially valuable for Member States without a catalogue to learn from and to use them to build their own catalogue. The Member States with an existing system can create a mapping with the standardised assets or transform their existing system (optional) in order to establish information exchange.

The learning aspect of FCOPS can be derived from the scope of the conceptual model. It will contain all the public services across the EU. Therefore public administrations are able to consult equivalent public services offered by other Member States and learn how they are offered and organised.
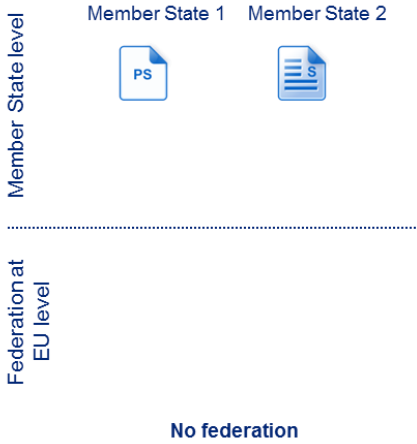
➔ *EIF principle – Openness*: applying the principle of openness will lead to knowledge and assets being shared across Member States' public administrations. This helps in gaining insights and ideas from others which could increase the development of efficiency.

➔ *EIF principle – Reusability*: the public administrations are able to reuse the systems and they can take advantage of the solutions, concepts, and architectural building blocks. Therefore the assets used for FCOPS will be shared among Member States.

➔ *EIF principle – Effectiveness and efficiency*: this EIF principle mentions that public administrations need to help businesses and citizens in the most effective and efficient manner. When the system at EU level is standardised and shared with the Member States, the public administrations can use it as a tool to learn from (which public service, how to organise it, and reusing the standardised building blocks).

| P6. | **Existing initiatives must be reused within the catalogue of public services.**<br>*(Reusability)* |
| --- | --- |

Existing initiatives available in the EU must be promoted and reused as much as possible. This only includes standardised architectural building blocks which are accepted by the Member States' representatives. Reusing these architectural building blocks will lead to an increased willingness on the part of the Member States to cooperate with FCOPS.

This principle relates to the semantic aspect described in the conceptual model. Mention was made in that section of the fact that a standardised semantic metadata model should be defined. Using existing standards will decrease the effort and time required and will increase the quality of the model. Core Public Service Vocabulary[5] is an example of a standard that could be adopted within FCOPS.

➔ *EIF principle – Reusability*: reusing existing initiatives reduces the work and time in developing FCOPS; consideration should be given to what solutions, concepts, frameworks, tools and other building blocks are available.

| P7. | **The catalogue of public services must be publicly accessible for citizens, businesses and public administrations.**<br>*(Accessibility)* |
| --- | --- |

FCOPS must be publicly available. Public administrations will be the primary users of FCOPS. They will use it as a tool to learn from (cf. P5) and as support for the helpdesk. It will improve the quality of helpdesk services by eliminating barriers to consulting services from another public administration within or across Member State borders. They can easily respond to requests from citizens and businesses.

On the other hand, FCOPS must be available for citizens and businesses in order to consult the public service information themselves.

This principle is linked to the organisational section of the conceptual model, more specifically defining the users of FCOPS. This provides that the public administration and the public (citizens and businesses) should be able to access FCOPS.

➔ *EIF principle – Inclusion and accessibility*: FCOPS should be available for everyone; more specifically people with disabilities and the elderly should be able to use the catalogue easily with the same service level.

| P8. | **The catalogue must meet the language expectations of citizens, businesses and public administrations.**<br>*(Multilingualism)* |
| --- | --- |

FCOPS must be in the language of the citizens, businesses and public administrations and dealing with multilingualism becomes very important. Within the EU there are many language differences which create a dynamic barrier to developing a system that can be understood by all. This principle is directly related to the multilingualism concept described in the conceptual model.

➔ *EIF principle – Multilingualism*: the EIF principle advises finding a balance between the language expectations of citizens and businesses and offering the public services in all languages. This balance needs to be agreed upon by all the Member States because the system will be used across linguistic boundaries.

**Table 3 – Principles for evaluation criteria**

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[5] http://joinup.ec.europa.eu/asset/core_public_service/description (04/03/2013)

## 4.2  SCENARIO 1 – NO FEDERATION

| The vision at a glance |
|---|

**Scenario 1**

Member State level

Member State 1    Member State 2

PS

Federation at EU level

**No federation**

| Description |
|---|

The first scenario represents the current situation across the Member States. Each Member State is still working independently, which leads to different states of affairs. Within this set-up, there will be no federation introduced at EU level.

The level of maturity in each Member State can be different; this implies that certain countries can have created one or multiple catalogues of public services, while in other countries this is not the case. Such a catalogue can support the public administrations and empower the Member State's portal. Whenever a country has not created such a catalogue at the back-end, then the public services are described without cataloguing them.

| Examples |
|---|

The current situation is the basis for scenario 1; there is no existing central catalogue which contains all the public services from all Member States. To compare this scenario at Member State level, then Spain and Germany can be used as examples.

Within Spain there are catalogues developed at different government levels, but they only contain the public services provided on the same level as the catalogue. There is no overarching catalogue which contains the public services of all levels of government.

The same situation can be found in Germany. A catalogue has been created with the national public services but they currently do not include the public services provided by the Bundesländer.

There are also countries, for example Romania, where no catalogue of public services has been developed.

## Implications of the current situation

### What are the implications at EU level?

The changes compared with the as-is situation are minimal to none.

As mentioned in the description, this scenario represents the current situation within the EU; each Member State works independently and they are only loosely coupled. However, within this scenario the Member States can be advised to develop a catalogue of public services. The catalogue will be used as a tool by the public administrations to provide information to citizens and businesses. It will assist the administrations through faster and more effective search opportunities for public services.

### How does this scenario improve the interoperability of public administrations across the EU?

The interoperability between the public administrations will be very complex and require a lot of effort in time and resources. A simple search for public services in another country will require a lot of time for a foreign administration due to other taxonomies, formulations, potential language differences, etc. Data exchange across Member State borders will be a manual process without the support of automatic mechanisms.

### What are the implications for Member States?

At a first glance, there will be no implications involved for the set-up of this scenario. However the Member States are advised to develop a catalogue of public services in order to enhance the interoperability among the Member States.


## Legal aspect

### Does this involve any replication of the public service?

Replication is not a prerequisite in loosely coupled set-ups across Member States and in the absence of federation at EU level.


## Organisational aspect

### How are Member States organised to gather public service information?

Within this vision, there is no standardised procedure for consultation or exchanging information about a public service. Each transaction will be performed manually by consulting the Member State portals or contacting the authority responsible for more information. If data needs to be exchanged, this will be done manually.

### How is the governance of the catalogue organised?

Not applicable.

### How is access to the catalogue managed?

The access rights at a European level are not applicable in this scenario.

The Member States manage and determine internally the access rights relating to their public service descriptions.

| Semantic aspect |
| --- |
| **How are the public services described and used?** |
| Within this scenario each Member State can determine how their public service is structured and described. There will be no common language, data model, taxonomy, etc. defined across the EU.<br><br>However, a Member State can create common assets which are enforced at different government levels and across the public administrations within the Member State. |

| Technical aspect |
| --- |
| **What implications will this scenario have at EU and Member State level?** |
| This scenario will not involve any implications at EU and Member State level. However it is advised that Member States develop a catalogue of public services. This will create an overview of the public services available within their borders. This will improve the support that public administrations provide to the public and it will benefit public administrations in other countries in gaining insights into the Member States' public services. |

| Architectural building blocks | |
| --- | --- |
| **What is defined at EU level?** | |
| **Type** | **Building block** |
| None | None |
| **What should the Member State develop?** | |
| **Type** | **Building block** |
| Specification | Catalogue of public services (advised) |
| Specification | Public service metadata model (advised) |
| Specification | Taxonomy for the catalogue (advised) |

| Evaluation of the scenario | |
| --- | --- |
| **Evaluation based on SWOT analysis** | |
| *What are the strengths of this vision?* | *What are the weaknesses of this vision?* |
| The Member States have the autonomy to decide whether they want to build their own catalogue and how it is set up. There will be no development of central standards for a catalogue of public services. | Decentralised way of working; each Member State works independently. It will require a lot of effort (time and resources) for the Member State to consult public services in another country. |

| What are the opportunities associated with this vision? | What are the threats associated with this vision? |
|---|---|
| The Member States have room to develop. Member States that currently do not have a catalogue of public services are stimulated to create one. A catalogue at Member State level will create a central point for the public administrations within the Member State and across borders to consult public services. | There is little incentive for public administrations to cooperate with other Member States' administrations due to a higher workload. Language barriers can be a particular barrier to make the effort.<br><br>It will require a great deal of time to provide support to the public (citizens/businesses) when a query is received that involves a public service from another Member State. |

### Evaluation based on the principles

**P1.    The set-up must provide a single place for starting the search for public services.**    *Not accepted*

The first scenario does not enforce a single point of contact. Each Member State works autonomously, which results in decentralisation.

**P2.    The catalogue must include all public services offered within the EU.**    *Not accepted*

This principle is not enforced within this scenario; each Member States works autonomously. In certain countries, there is no catalogue available which would permit an overview of the specific public services. Therefore not all public services are accessible.

**P3.    The system must be flexible if it is to cooperate with Member States' current systems.**    *Not accepted*

As a consequence of the first principle, this principle is also not complied with. There is no central system that is required to be flexible in order to cooperate with other systems. If a public administration wants to establish communication with another Member State's public administration, they need to establish interoperability agreements or an interface between systems.

**P4.    The set-up of FCOPS should be based on standardised assets in order to enhance interoperability.**    *Not accepted*

This set-up will not enforce standardisation from the very first moment. Each Member State works autonomously and is free to define (and enforce) its own standardisation (semantic data model, taxonomy) within its borders. There is no enforced standardisation across Member States.

| P5. | The catalogue must enable the learning aspect for public administrations. This must be supported in three areas: public service portfolio, how to offer public services, reusable solutions for the system. | *Not accepted* |
|---|---|---|

This principle is also not enforced in the three areas:

- Service portfolio: there is no central system for consulting all the public administrations within the EU. In order to learn from each other, public administrations need to go to their portal or catalogue if this is available.

- How to offer public services: this is similar to the service portfolio; public administrations need to access the portals or the catalogue of other public administrations to see how these are offered. This is only possible if such a system is available.

- Reusable solutions for the system: this cannot be enforced in the first scenario.

| P6. | Existing initiatives must be reused within the catalogue of public services. | *Not accepted* |
|---|---|---|

Existing architectural building blocks can be reused by the Member States, but this is not a prerequisite. Therefore Member States in the process of developing a catalogue are advised to reuse the existing building blocks, e.g. Core Public Service Vocabulary, but this scenario does not enforce the reuse of existing building blocks.

| P7. | The catalogue of public services must be publicly accessible for citizens, businesses and public administrations. | *Not accepted* |
|---|---|---|

Within this scenario no catalogue is developed at European level.

| P8. | The catalogue must meet the language expectations of citizens, businesses and public administrations. | *Not accepted* |
|---|---|---|

This scenario does not provide for a catalogue at European level. The catalogues and portals provided at Member State level are not always translated into other languages. Even the analysis in work package 1 showed that 34% of the Member States provide the portal only in their official languages. The remainder provide translation of the portals in languages other than the official languages of the country. The most commonly used of these is English.

**Table 4 – Detailed description of scenario 1 - no federation**

This scenario is not considered to be a valid scenario since Member States' existing practice is already to engage in supranational initiatives to catalogue and compare public services, e.g. esd-toolkit[6]: the North Sea Region countries have created a catalogue of all their local public services. This scenario is also out of scope of the aim of this action.

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[6] http://www.esd-toolkit.eu/ (04/03/2013)

## 4.3  SCENARIO 2 – FEDERATED CATALOGUE OF SPECIFIC PUBLIC SERVICES

| The vision at a glance |
|---|



Scenario 2

Member State level

Member State 1    Member State 2

Federation at EU level

Catalogue of federated specific services
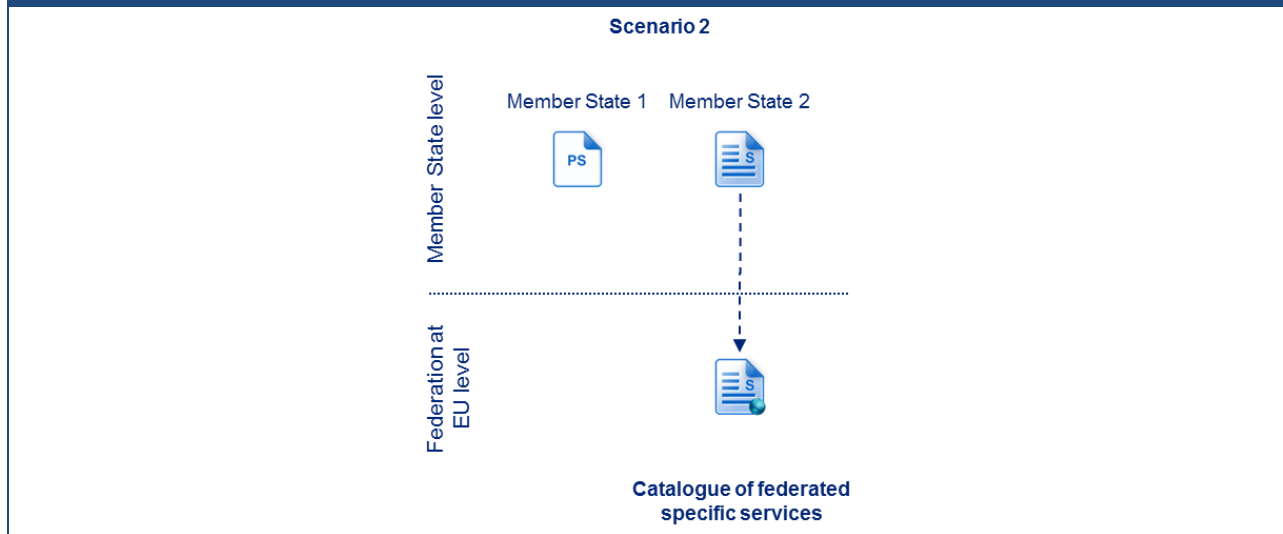
| Description |
|---|

Compared to the first scenario, the second scenario introduces a catalogue of public services at EU level. This catalogue will consist of a federation of all the catalogues available within the Member States. This results in a collection at EU level of all the public services from national, regional and local level across the Member States.

Within this scenario public administrations are able to consult the catalogue for public services offered in other Member States. They can see how these are organised and managed by the public administrations. A second advantage is that the catalogue can be used by public administrations when they receive information requests from the public. They can then consult the different public services of a particular country in one central place without needing to browse the web. The catalogue will also be available and a useful tool for citizens and businesses in order to discover the public services of a particular Member State.

The catalogue of public services at EU level will already improve interoperability within the EU, but it will not be based on standardised assets (such as a common metadata model, taxonomies). The catalogue will be developed by creating a mirror of the catalogues available within the Member States. Each Member State's taxonomy and metadata model will be adopted by the mirror without changing it to a common model. This will lead to increased complexity for public administrations if they want to search for a public service.

Mirroring is also characterised by one-way synchronisation; the public services are updated only at Member State level and are afterwards copied to the catalogue at EU level. There will be no possibility of changing something at EU level and synchronising it to all Member States.

If a Member State wants to cooperate with the catalogue of specific public services, it will need to have a catalogue of public services readily available. It is possible that a Member State will have multiple catalogues available at different levels (horizontal – different instances at one government level – and vertical – at different government levels).The different catalogues are then included within the catalogue at European level.

This catalogue at EU level can be seen as an overarching catalogue which consists of the mirrors of the various catalogues of public services of the Member States.

**Examples**

This scenario is based on the portal analysed for Latvia. This contains a catalogue of all the public services offered within Latvia. The owner of the portal works closely together with the public administrations, who in turn work autonomously, in order to exchange information about the services. These public services are created, managed and published manually by the Latvian government.

The only difference between the Latvian portal and this scenario is that Latvia has defined a fixed taxonomy and metadata model to describe the public services. That will not be the case in this scenario, which will use the diverse taxonomies and data models of the different Member States.

**Implications of the current situation**

**What are the implications at EU level?**

There is nothing available in the current way of working that contains information about all public services across the Member States. This concept will introduce a catalogue at EU level which contains mirrors of the catalogues available in Member States. There will be a single point of contact for consulting information about public services.

**How does this scenario improve the interoperability of public administrations across the EU?**

By using a federated catalogue of specific public services, the public administrations can always start their search for a public service at the same location. This will decrease the effort (time and resources) required for the public administration to find a specific public service in another country or public administration.

However the search quality and functionality will not be optimal because the catalogue at EU level will not be standardised or described in one common format and structure. This will lead to only a minimal reduction in the complexity of a search for a public service in another country or public administration.

**What are the implications for Member States?**

The effort which is required of the Member States will be limited because the federated catalogue of specific public services will include a mirror of the catalogues available within the Member States. It is not necessary that the Member States convert their catalogue into a standardised format. They only need to provide the public service descriptions by creating those mirrors.

A direct consequence of mirroring (one-way synchronisation) is that the Member States need to keep their public services up-to-date within their portals, catalogues and other systems. They then have to update this information afterwards within the catalogue at EU level. It is not possible to make changes within the catalogue at EU level and synchronise it afterwards with the systems within the Member State.

## Legal aspect

### Does this involve any replication of the public service?

The catalogue of public services at European level will contain replications of the public service descriptions. However the Member States still have the ownership of the service descriptions. The federated catalogue of specific public services will always have to respect the disclaimer of the Member States, so that it will be good practice to mention or refer to the specific disclaimer.

## Organisational aspect

### How are Member States organised to gather public service information?

Each Member State will be responsible for making the public service descriptions available for the catalogue at European level. The Member States do not have to convert their existing catalogues into a standardised format; nor do they need to create a mapping with the standardised metadata model.

The catalogue will include all the Member States' catalogues of public services by creating a mirror of those catalogues. The mirror will be searchable for the Member States in order to let them consult the public service descriptions. However, the search functionality within the catalogue will be rather complex. This is the result of taking over the data model and taxonomies of the diverse Member States. There will be no common taxonomy to support the search engine; the search functionality will be based on comparing a regular expression (string) within the public service descriptions.

### How is the governance of the catalogue organised?

A central body, preferably a working group, will be responsible for setting up the catalogue of public services. It will work closely with the Member States to create mirrors of the Member States' catalogues. Once the mirror is created, the central body will include it within the catalogue at EU level.

The Member States will keep the ownership and the responsibility for keeping the services description up-to-date. The ownership of the catalogue of specific public services at European level will be conferred on the European Commission and the working group.

The working group can provide rules or guidelines for Member States on how the mirrors should be created and made available.

### How is access to the catalogue managed?

The working group will be responsible for managing at EU level the overarching catalogue which consists of the different mirrors of the Member State. The working group will have the overall authorisation to update and manage these separate mirrors. The Member States for their part will only have access to their specific mirror stored within the catalogue of public services at EU level. They will be able to update their mirror (one-way synchronisation is enforced).

The working group needs to grant access to the Member State representatives responsible for the mirrors. This responsibility can be devolved to a number of people given the high workload for these representatives. This needs to be clearly communicated and the access rights need to be granted correctly.

## Semantic aspect

### How are the public services described and used?

The Member States can keep the metadata model, languages and other semantic assets which were used to build their catalogue. This scenario will not enforce a standardised semantic metadata model or a commonly used language. This will reduce the effort for Member States and for the working group.

A pre-defined taxonomy within the catalogue at EU level is also out of scope; only a geographical classification of countries can be enforced. The taxonomy used within the different Member States' catalogues are taken over and used within the mirrors.

As mentioned before, each Member State needs to have a catalogue of public services readily available in order to cooperate with the catalogue of public services at EU level. From the analysis in the previous work package it has been shown that not all the Member States have developed a catalogue or do not yet have all the public services described in a catalogue. This implies that these countries should develop a catalogue so that the European catalogue covers the entire public service offering within the EU. This will take time and effort from the Member States to set up such a system, metadata model and taxonomy to gather and structure the public services offered.

Another aspect of semantic interoperability is multilingualism. The different catalogues are only available in certain languages. The advice given will be that the public service descriptions should be translated into the most commonly used language. However, this is not mandatory. The language barriers are still present while performing a search for public services in a foreign country.

## Technical aspect

### What implications will this scenario have at EU and Member State level?

In the set-up of the second scenario, a catalogue of public services is introduced. The catalogue will gather information on all the specific public services which are available within the EU. In order to gather that information, there is a need for an information exchange mechanism, e.g. content syndication.

The owner of the catalogue should establish agreements with the Member States on how to exchange the information, because several alternatives are possible involving a manual procedure or an automatic process (e.g. RSS, web services). These are further elaborated on in relation to the requirements (cf. 5.5 Technical requirements).

A Content Management System should be introduced to support the maintenance of the catalogue. Via the Content Management System and the precise access rights, the Member States and the owner of the catalogue can easily update and maintain the content and the catalogue in order to create a reliable system.

**Operations and responsibilities overview**

The process flow in developing this scenario involves three major steps:

1. The catalogue at EU level is introduced and access rights are granted.

   *A policy domain owner will be held responsible for the data and system ownership (this will be further elaborated on in 0*
   *Organisational requirements* – Governance*). The central organisation is also responsible for the maintenance of the catalogue and the systems. This organisation will also grant the access rights to the stakeholders of the catalogue.*

2. The specific public services are added to the catalogue by means of the input functionalities.

   *The Member States are responsible for making the data available (automatic input technique) or uploading the public services. The Member States are the owners of the data (specific public services) and keeps the ownership of the data gathered within the catalogue at EU level. They are responsible for the data and need to keep it up-to-date.*

3. The catalogue can be accessed by Member States and they are able to consult the specific public services of other Member States.


**Architectural building blocks**

**What is defined at EU level?**

| Type | Building block |
|---|---|
| Specification | Catalogue of federated public services |
| Software | Information exchange mechanism, in agreement with Member States |
| Software | Content Management System |

**What should the Member State develop?**

| Type | Building block |
|---|---|
| Specification | Catalogue of public services |
| Specification | Public service metadata model |
| Specification | Taxonomy defined in the catalogue |

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| Evaluation of the scenario |
|---|

| Evaluation based on SWOT analysis |
|---|

| *What are the strengths of this vision?* | *What are the weaknesses of this vision?* |
|---|---|
| Citizens, businesses and public administrations can consult all the public services within the EU at one central place (Single Point of Contact).<br><br>The support for citizens and businesses is improved by using the federated catalogue of specific public services as a tool for the helpdesk. The public administration can easily access and consult the public services of another public administration or Member State.<br><br>The Member States which already have a catalogue of public services do not have to develop anything additional. A flexible information exchange mechanism is in place. | The complexity of the search for a public service is reduced but is still not optimal. The EU catalogue does not enforce a common taxonomy or metadata model to describe the public services.<br><br>Only Member States with a catalogue of public services can cooperate with the overarching catalogue. This will exclude the public services from the Member States without any public services. They will need to develop a new catalogue, which requires a lot of effort. |
| *What are the opportunities associated with this vision?* | *What are the threats associated with this vision?* |
| Gathering the specific public services in one central place creates the opportunity for the Member States to learn from others. They are able to search the catalogue for similar services offered by other Member States. However the complexity of the search will be high because there is no definition of a common semantic model or taxonomy for describing the services within the catalogue. | Member States which do not have a catalogue of public services need to develop one. This may be a disincentive for cooperation with the catalogue at EU level. |

| Evaluation based on the principles |
|---|

**P1.    The set-up must provide a single place for starting the search for public services.**    *Accepted*

This catalogue provides one central catalogue which contains all the specific public services. This centralisation will create a single point of contact for public administrations, citizens and businesses to start their search.

**P2.    The catalogue must include all public services offered within the EU.**    *Not accepted*

This principle is not enforced within this scenario. Only those Member States that have a catalogue available are able to cooperate with the catalogue at EU level. A mirror will be created and included in the catalogue.

The public services of a Member State without a catalogue need to develop a catalogue in order to cooperate with the catalogue at EU level.

| **P3.** | **The system must be flexible if it is to cooperate with Member States' current systems.** | *Not accepted* |
| --- | --- | --- |

The system proposed in this scenario is only flexible for the Member States with a catalogue. For those catalogues a mirror will be created and included in the catalogue. This will not require a standardised taxonomy or metadata model.

However, it is not flexible enough for the Member States without a catalogue. Their public services will not be included in the catalogue. There is no technique for manual input and therefore this principle is rejected for this scenario.

| **P4.** | **The set-up of FCOPS should be based on standardised assets in order to enhance interoperability.** | *Not accepted* |
| --- | --- | --- |

The set-up of the catalogue at EU level will use the diverse taxonomies and semantic data models which are designed by each Member State. This scenario will not allow standardisation of these assets.

| **P5.** | **The catalogue must enable the learning aspect for public administrations. This must be supported in three areas: public service portfolio, how to offer public services, reusable solutions for the system.** | *Not accepted* |
| --- | --- | --- |

This principle will only be partly covered by the scenario:

- Public service portfolio: the public administrations can compare their offering with the public services of another Member State. They will be able to identify missing or superfluous public services.

- How to offer public services: public administrations can look up how other administrations organise and manage their public services. They are able to find the good practices and learn from them.

However the public administrations are limited to the public services included within the catalogue. Certain Member States will not be able to add their public services without having a catalogue available within the Member State.

- Reusable solutions for the system: The set-up does not use standardised assets which can be reused by the Member States.

| **P6.** | **Existing initiatives must be reused within the catalogue of public services.** | *Accepted* |
| --- | --- | --- |

The Member States have already defined their own taxonomy and data model which is used within their catalogue and/or portals. These architectural building blocks are adopted within the catalogue at EU level without making any changes to them. The federated catalogue of specific public services will contain all the diverse taxonomies and data models of each Member State. Likewise the Member States are able to keep their own taxonomy and data model without making any changes. This will reduce the time and effort that is required to develop the proposed scenario.

There will be no standardisation of the building blocks used at European level or Member State level.

| P7. | The catalogue of public services must be publicly accessible for citizens, businesses and public administrations. | *Accepted* |
|---|---|---|
| | The catalogue at EU level can be made publicly available for everyone. | |
| P8. | The catalogue must meet the language expectations of citizens, businesses and public administrations. | *Not accepted* |
| | The catalogue at EU level contains mirrors of the existing Member State catalogues; it will include all the different taxonomies and different languages. This will lead to a complex system that does not support a uniform taxonomy or commonly used language. Consulting public services offered by another Member State can cause language barriers or complex search tasks. | |

**Table 5 – Detailed description of scenario 2 – Federated catalogue of specific public services**

## 4.4  SCENARIO 3 – CATALOGUE OF GENERIC EU PUBLIC SERVICES
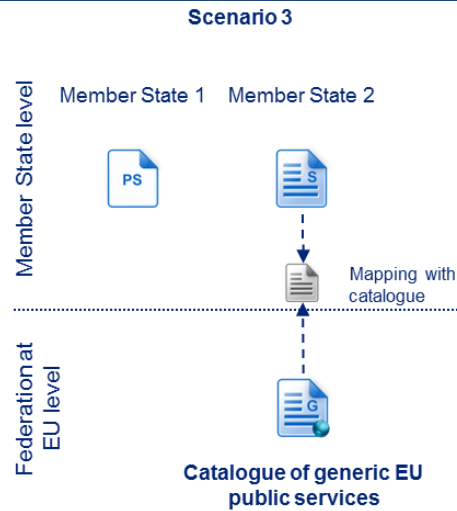
| The vision at a glance |
|---|



| Description |
|---|

A possible third scenario is the development of a catalogue of generic EU public services. Within this model a catalogue will be built at EU level based on a standardised metadata model and taxonomy. A working group will be dedicated to defining the generic public services (cf. 5.3 Organisational requirements – Governance) by consolidating all the specific public services at all government levels. Each generic public service is based on at least one specific public service that is provided by at least one public administration. However there will be no mapping at EU level between the generic public service and the specific public service.

In the previous scenario, the catalogues of specific services were gathered within one central catalogue without defining a standardised metadata model or taxonomy. In this case, the catalogue will require the standardisations of these assets. Describing the public services according to these assets and in a standardised way will generate a generic and distinct view of all public services offered across the EU. In the previous scenario the catalogue could contain duplicates of public services with a similar purpose, but provided by another public administration within the same or another Member State.

These generic public services can be used as a categorisation or standardised code list for the public services. The Member States are able to map their offering of public services with the generic services published within the federated catalogue of generic public services. This mapping is only initiated at Member State level; they are able to decide autonomously whether they want to create the mapping or not. This means that there will be no general mapping between generic and all specific public services at EU level.

The set-up of a catalogue of generic public services will have a focus on administrations for two purposes. The first aim is for public administrations to have a good overview of which public services could be provided within a Member State. They are able to compare their offering with what is generally provided across the EU. The second purpose is the learning aspect and reusability for public administrations and Member States. The catalogue at EU level can be used as a leading example to build a new catalogue at Member State level. The standardised assets (like taxonomy, ontology, metadata model) will be made available for the Member States.

| Examples |
|---|
| This scenario is based on the set-up used in Denmark (FORM) and in Norway ('Nasjonale Tjenestekatalog'). Within these countries a central body defines the generic public services and publishes them for the public administrations. This task is sourced to a government institution in Denmark while in Norway a private company defines the generic public services and sells this as a commercial product.<br><br>Another example is the esd-toolkit; this tool contains all the generic service descriptions of all the public services provided by municipalities within the North Sea Region countries. |

| Implications of the current situation |
|---|
| **What are the implications at EU level?** |
| In this scenario a catalogue containing a generic list of public services at European level is introduced. These services will be described in a standardised format so that the descriptions are applicable to each public administration in the EU (if they offer it). The public administrations can use these descriptions directly or first tailor them to their needs.<br><br>In order to create a catalogue of generic public services, the working group needs to define a standardised metadata model and taxonomy in order to describe the public services. These assets can be reused by Member States to create a catalogue or convert their existing systems (optional).<br><br>No synchronisation will be required on the input side of the database for the reason that the catalogue only contains information on generic public services. However, there could be a need for one-way synchronisation on the output side in order to make the data available for the Member States' public administrations, citizens and/or businesses. The data can be replicated from the EU catalogue and distributed to the interested parties by means of output functionality (e.g. RSS-feeds, etc.) |
| **How does this scenario improve the interoperability of public administrations across the EU?** |
| This scenario will improve the interoperability of public administrations in diverse areas. First of all it will create a generic and distinct list of all the public services offered in the European Union. This list will improve the learning aspects in several areas:<br><ul><li>Public administrations can use this list as a tool to check whether their offering of public services is exhaustive. They can identify the services which are not yet offered but which it is interesting to offer;</li><li>Public administrations can use the list as a basis for describing their services. Standardisation across the EU will be stimulated;</li><li>Pursuing this vision will create a need to set up a standardised catalogue with a pre-defined metadata model, taxonomy and ontology. These assets can be reused by the public administrations/Member States to develop a catalogue of public services if they do not yet have one. Existing catalogues can also be mapped with the standardised catalogue. In this way, the Member States can communicate in a standardised way. However, this is not a prerequisite and consequently is optional.</li></ul> |

| **What are the implications for the Member States?** |
|---|
| This vision will not have direct implications for the Member States. However, a working group will consolidate the public services of different Member States. This may involve the Member States needing to make their public service descriptions available for the working group. |
| However, as indicated previously, each Member State has the power to decide whether to create a mapping between their specific public services and the generic public services gathered within the catalogue at EU level. This mapping is initiated at Member State level and is not mandatory. |

| **Legal aspect** |
|---|
| **Does this involve any replication of the public service?** |
| The specific public services are consolidated by the working group and are used as a basis for creating the new generic public service. This method can infer replication of public services, except that the generic public services are not a direct copy of the specific public services. |

| **Organisational aspect** |
|---|
| **How are Member States organised to gather public service information?** |
| The Member States do not need to make any changes; nor do they have the responsibility for creating the generic public services. However a working group should be formed containing representatives from different Member States and the European Commission. This group will be responsible for the generic services. |
| **How is the governance of the catalogue organised?** |
| As mentioned previously, a working group will generate all the generic public services. This group will also gain the ownership rights of those generic services and the catalogue at EU level. The Member States will not be held responsible for the catalogue or the services; full ownership will be assigned to this group. |
| The working group will cooperate closely with the public administrations from the Member State in order to access and consult all the specific public services offered in the EU. This will improve the information-gathering process and the public services descriptions that become available will be used as a basis for the definition of generic public services. |
| **How is access to the catalogue managed?** |
| The access rights to the catalogue at EU level only need to be assigned to the members of the working group. The Member States and the public administrations will only access the catalogue to consult the generic service description or the standardised assets used within the development of the catalogue. |

| Semantic aspect |
|---|
| **How are the public services described and used?** |
| The set-up of this scenario will require a considerable amount of standardisation in order to create an understandable and highly usable catalogue. This implies that the working group will need to define the following elements:<br><br>▪ Semantic metadata model: this model will create an approach to describing the generic public service in a uniform and standardised way;<br><br>▪ Taxonomy: a standardised classification could be very useful in creating an understandable structure within the catalogue;<br><br>▪ Ontology: (optional) Member States can create a mapping between their offerings (specific services) and the generic public services registered in the catalogue.<br><br>This set-up needs also to take into account the concept of multilingualism (cf. 5.4.4. Multilingualism) This catalogue will be used by different Member States, each with their own culture and language(s). The catalogue should be developed in such a way that it meets everyone's language expectations. |

| Technical aspect |
|---|
| **What implications will this scenario have at EU and Member State level?** |
| This scenario will not have any implications at Member State level, but a catalogue of generic public services will be introduced at EU level. This catalogue will be created based on the semantic metadata model and standardised taxonomy defined.<br><br>The catalogue does not require a content syndication tool on the input side (from the Member States to the EU catalogue). It does not use information from Member State sources directly or on a frequent basis. The public service descriptions are consulted only to define new generic public services. However, consideration could be given to the use of a content syndication tool on the output side (from the EU catalogue to the Member States). Certain Member States will use the published generic public services and will be interested in receiving any updates via a content syndication tool (e.g. RSS feeds, cf. 5.5 Technical requirements).<br><br>Finally, a content management system should be created to maintain the catalogue of generic public service at an EU level. |

**Operations and responsibilities overview**

The process flow for developing this scenario contains three major steps:

1. The public service metadata model and taxonomy is defined in order to set up a catalogue at EU level.

   *A central organisation (e.g. working group) will be held responsible for defining a semantic metadata model and taxonomy in order to describe the public services within the catalogue at EU level.*

2. The generic public services are defined and described within the catalogue at EU level.

   *The central organisation needs to define the generic public services in cooperation with (the representatives of) the Member States. Therefore the specific public services can be consolidated and used as a basis for defining the generic public services. The central organisation will be held responsible and responsible for these generic public services. They are the owner of these services and need to keep the services up-to-date.*

3. The catalogue of generic public services will be made available for the Member States and the public. The access rights to the catalogue are granted. Once the catalogue is available, the Member States are able to consult the generic public services.

   *The central organisation will be assigned as data and system owner of FCOPS (policy domain owner) and the maintenance of the catalogue of generic public services. The central organisation will also implement the access rights for the stakeholders.*

**Architectural building blocks**

**What is defined at EU level?**

| Type | Building block |
|---|---|
| Specification | Catalogue of generic public services |
| Specification | Public service metadata model |
| Specification | Taxonomy (based on countries) |
| Software | Content syndication on the output side (send updates to Member States) |
| Software | Content Management System |

**What should the Member State develop?**

| Type | Building block |
|---|---|
| Specification | Catalogue of specific public services (optional) |
| Specification | Public service metadata model (optional) |
| Specification | Taxonomy (optional) |
| Specification | Mapping with the generic public services (optional) |

| Evaluation of the scenario | |
|---|---|
| **Evaluation based on SWOT analysis** | |
| *What are the strengths of this vision?* <br><br> The catalogue creates a generic and distinct overview of all the public services offered across the Member States. <br><br> Pursuing this vision will improve and stimulate standardisation within the EU: description, metadata model, etc. <br><br> The public administrations can reuse the standard public service descriptions for communication with the public. They can use it on their portals or catalogues. This will create a uniform description across the EU. <br> (The service descriptions will be tailored to the public administrations but are based on the standardised descriptions). | *What are the weaknesses of this vision?* <br><br> This vision creates a considerable amount of work in developing an exhaustive list of generic public services. <br><br> The generic list does not indicate which Member States offers a specific public service; it gives only an indication that such a public service is offered by a certain public administration. |
| *What are the opportunities associated with this vision?* <br><br> The Member States can use the catalogue of generic public services to compare it with their offering and identify the services which are not offered. <br><br> The diverse assets (e.g. metadata model, taxonomy, service descriptions) which are created for the catalogue can be reused by the Member States to set up a catalogue on their own. If this is reused, the Member States create a similar structure which stimulates future interoperability with the catalogue at EU level or with other Member States. | *What are the threats associated with this vision?* <br><br> This vision implies a very considerable amount of workload in generating the standardised public services. |

| Evaluation based on the principles |
|---|

**P1.  The set-up must provide a single place for starting the search for public services.**   *Not accepted*

This scenario introduces a centrally managed catalogue of generic public services. These can be accessed by public administrations across the EU. However the administrations are not able to access the specific public services provided in a particular Member State via these generic public services. The generic public services are not mapped at EU level, but Member States can carry out the mapping themselves.

It should be noted that the Member States can do the exercise themselves and map their specific public services with the generic public services offered within the catalogue.

**P2.  The catalogue must include all public services offered within the EU.**   *Not accepted*

The catalogue will contain a generic overview of what is offered within the EU. The public service descriptions are standardised and described in a commonly agreed format. However the specific public services are not included within the catalogue (similar to principle P1).

**P3.  The system must be flexible if it is to cooperate with Member States' current systems.**   *Not accepted*

The system works autonomously and does not require any flexibility in order to cooperate with Member States' systems (e.g. catalogues, portals). Thanks to standardisation it is possible to establish a communication channel to each Member State in a uniform format, but this is not a requirement or intention for this scenario.

**P4.  The set-up of FCOPS should be based on standardised assets in order to enhance interoperability.**   *Accepted*

Within this scenario the catalogue is developed by using standardised assets like the semantic data model and taxonomy. These assets are used to describe the generic public services.

**P5.  The catalogue must enable the learning aspect for public administrations. This must be supported in three areas: public service portfolio, how to offer public services, reusable solutions for the system.**   *Accepted*

The catalogue will stimulate the learning aspect for public administrations in the following areas:

- Public service portfolio: the public administrations have a generic view on what is offered within the EU. They can easily compare their offerings with the standardised public services.

- How to offer public services: the description of the generic public services indicates the most commonly used way of working in offering the public service. This can be used to learn from or compare it with how the service is offered by a public administration.

- Reusable solutions for the system: the catalogue is built by using standardised architectural building blocks. These components are made available for public administrations to reuse them. For example, a Member State without a catalogue yet can use these building blocks in order to develop one. Others can use these building blocks to standardise their catalogue, but this is not a prerequisite.

| P6. | **Existing initiatives must be reused within the catalogue of public services.** | *Accepted* |
|---|---|---|
| | The existing initiatives can be used to define the standardised assets in this scenario. For example the Core Public Service Vocabulary can be used as semantic metadata model. Other best practices can be used as an example. | |
| P7. | **The catalogue of public services must be publicly accessible for citizens, businesses and public administrations.** | *Accepted* |
| | This catalogue can be made publicly available for citizens, businesses and public administrations. The catalogue will mostly be used by the public administrations to learn from. | |
| P8. | **The catalogue must meet the language expectations of citizens, businesses and public administrations.** | *Accepted* |
| | The catalogue only contains the generic public services which can be described in a language agreed on and used in common. The catalogue can easily be translated into other languages as well. | |

**Table 6 – Detailed description of scenario 3 – Catalogue of generic EU public services**

## 4.5 SCENARIO 4 – FEDERATED CATALOGUE WITH SPECIFIC SERVICES MAPPED TO GENERIC SERVICES

### The vision at a glance



**Scenario 4**

Federated catalogue with specific services mapped to generic services
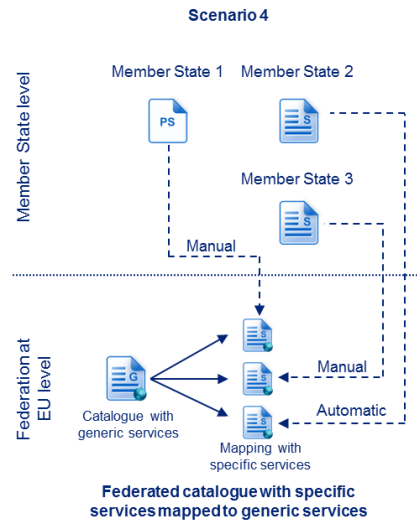
### Description

The last scenario is a blend of scenarios 2 and 3. In this case, a federated catalogue of public services will be built which include the generic and the specific public services. This catalogue will have the opportunity to create a distinct overview of all public services offered via the generic public services. To extend the set-up, the specific public services across the EU will be mapped with the generic services. This will create a holistic and easy-to-use overview of which generic public services are offered in which Member States.

Similar to scenario 2, this set-up will enable the different public administrations to compare their catalogue with other Member States. This will make it possible to identify which services they are not yet offering or which services they are offering but are not yet offered by other Member States.

The helpdesks will also be supported; they can easily go through the diverse public services provided in other Member States in one central place. The complexity of the search will be significantly reduced compared with scenario 2 due to the standardisation of generic public services and the mapping. Citizens and businesses can likewise consult the federated catalogue of public services to search for public services.

### Examples

The 'Samenwerkende Catalogi' in the Netherlands is a good example of this scenario. Within the Netherlands, a standardised database, taxonomy, uniform product list (generic public services), metadata model and a search function have been created. The government was responsible for generating a uniform product list applicable for each public administration.

Most public administrations in the Netherlands already had their own catalogue of public services made available to the public through their own website. The concept of the 'Samenwerkende Catalogi' is that all the participating organisations provide their catalogue of public services in a standardised XML-format. The participating organisations in turn have full access to the entire database of public services.

## Implications of the current situation

### What are the implications at EU level?

This vision will build further on the two previous scenarios. A standardised catalogue, metadata model and taxonomy will be used to describe the generic public services and specific public services offered by public administrations. There will be a mapping within the catalogue between the generic and specific public services.

Looking at the database implications, there is a need for synchronisation. As in the case of scenarios 2 and 3, there will be one-way synchronisation in place, but the set-up of the database will nonetheless require input and output functionalities. On the one hand, the database will request the data of specific public services from the Member State sources, and on the other, the database needs to make the generic public services available for the Member States' public administrations, citizens and businesses.

One-way synchronisation will be in place because there is only one source which serves as the master data source and holds the original data. The synchronisation process will only go in one direction:

- Input: the specific public services will be synchronised from Member State sources (master) to the EU catalogue;
- Output: the generic public services will be synchronised from the EU catalogue (master) to the Member States' public administrations, citizens and businesses.

### How does this scenario improve the interoperability of public administrations across the EU?

By creating a mapping between the specific public services and the generic public services, the public administrations are able easily to compare their offerings with the offerings from other public administrations within or outside the Member State. This will help them identify which public services they do not offer or which are 'superfluous'.

Creating such a catalogue will also improve the quality of public administrations' helpdesks; they will be able to reduce the time taken to help the public (citizens and businesses) in relation to public services offered by public administrations in other Member States.

Pursuing this vision will lead to more standardisation across the EU. The catalogue will contain the standardised service descriptions of the generic public services which are accessible and available to reuse within the specific public service offerings. In addition, the assets created to set up this catalogue (e.g. metadata model) can be reused by Member States to create a catalogue of their own.

### What are the implications for the Member States?

The biggest implications will be for members of the working group; they will be responsible for the creation of the generic public services. The Member States will need to cooperate closely with the working group in order to create a mapping between the generic public services and the specific public services they offer.

The Member States will also need to make their public service descriptions available to include them within the federated catalogue of public services. Therefore the working group and the Member States will need to conclude interoperability agreements.

| Legal aspect |
|---|
| **Does this involve any replication of the public service?** |
| This catalogue will contain replications of the specific public service descriptions from the Member States. The Member States will keep the ownership of the service descriptions which are used in the catalogue. Therefore the disclaimer defined by the Member States should always be respected and it would be good practice to mention or refer to it within the catalogue. <br><br> The generic public services are also created by consolidating the specific public services. This could also lead to replication of public services except that the generic services are not an exact copy of the specific services. |

| Organisational aspect |
|---|
| **How are Member States organised to gather public service information?** |
| A working group consisting of Member State representatives will be responsible for the set-up of the federated catalogue of public services and the definition of the generic public services. The Member States themselves need to make their offering of public services available in order to include them in the federated catalogue of public services. Therefore there is a need for an interoperability agreement between the working group and the Member States on exchange of this information. The Member States will need to create a mapping between the generic public services and their specific public services. <br><br> This interoperability agreement will be further described when the requirements and the different alternatives are set out (cf. 5.3 Organisational requirements – Governance). |
| **How is the governance of the catalogue organised?** |
| The Member States will keep the responsibility for and the ownership of the specific public services and their task is to keep the descriptions always available and up-to-date. The working group is the owner of the generic public services and will also need to determine the semantic metadata model, taxonomy and create the federated catalogue of public services. <br><br> The federated catalogue of public services will be publicly available for citizens, businesses and public administrations. They can easily access the catalogue to consult the diverse generic and specific public services offered across the EU. |
| **How is access to the catalogue managed?** |
| The access rights involved in this scenario will be two-faceted: in relation to the generic public services and to the specific public services. <br><br> The first area affects the working group. They will have the rights to manage and maintain the federated catalogue and the generic public services. They will be responsible for keeping the catalogue available at all times and determine the access rights for the Member States. <br><br> The access rights for the Member States should be restricted to managing their specific public services only. However the public administrations can still consult the other public services. These access rights are further elaborated on in the requirements (cf. 5.3.2.3 Identity and access management). |

## Semantic aspect

### How are the public services described and used?

Within this vision there is a need for standardisation in order to create an understandable and highly usable catalogue.

- Semantic metadata model: this model will create an approach to describing the generic public service in a uniform and standardised way;

- Taxonomy: a standardised classification could be very useful to create an understandable structure within the catalogue;

- Ontology: Member States can create a mapping between their offerings (specific services) and the generic public services registered in the catalogue.

The specific public services offered by the diverse Member States will be mapped with the generic public services. However these specific public services will also be described and included in the federated catalogue of public services according to the standardised metadata model.

Another important concept while dealing with the federated catalogue of public services is multilingualism. This catalogue will be used by different Member States, each with their own culture and language(s). The catalogue should be developed in a way that it meets everyone's language expectations.

## Technical aspect

### What implications will this scenario have at EU and Member State level?

In this set-up the biggest impact will be found at EU level: a federated catalogue of public services will be implemented based on a standardised semantic metadata model and taxonomy. The metadata model will be used in the first place to define the generic public services at a European level.

The advice to be given to Member States should be that it will be appropriate to have a catalogue of their public services readily available. However, this is not a requirement. If they have a system available, then they will be able to map their existing metadata model with the standardised metadata model used within the federated catalogue of public services.

When this mapping has been completed, it can be used to support the development of a content syndication tool to federate the public service descriptions. The different alternatives for content syndication are described below in relation to the technical requirements (cf. 5.5 Technical requirements). Unlike the previous scenario, the content syndication will be used on both sides of the catalogue, i.e. for input and for output of information.

Finally, a content management system should be created to maintain the catalogue of generic public service at EU level.

## Architectural building blocks

### What is defined at EU level?

| Type | Building block |
|---|---|
| Specification | Catalogue of federated public services |
| Specification | Public service metadata model |

| Specification | Taxonomy |
|---|---|
| Software | Content syndication (input and output) |
| Software | Content Management System |
| **What should the Member State develop?** | |
| **Type** | **Building block** |
| Specification | Catalogue of public services (optional) |
| Specification | Public service metadata model (optional) |
| Specification | Taxonomy defined in the catalogue (optional) |
| Specification | Ontology; mapping between the generic and specific public services (in cooperation with the working group) |

| Evaluation of the scenario |
|---|
| **Evaluation based on SWOT analysis** |

| *What are the strengths of this vision?* | *What are the weaknesses of this vision?* |
|---|---|
| Citizens, businesses and public administrations can easily consult all the public services (generic and specific) within the EU at one central place (Single Point of Contact). | In order to implement this scenario, the working group will have a very significant workload in generating an exhaustive list with generic public services and creating a mapping with the specific public services. |
| The catalogue provides a distinct overview of all the public services offered across the Member States (based on the generic public services). | The Member States without any catalogue of public services could have a larger workload in order to cooperate fully with the federated catalogue of public services. This will depend on the mechanism chosen for information exchange (further elaborated on in the requirements, cf. 5.5 Technical requirements). |
| Starting from the overview, the user is able easily to access the specific public services of a certain Member States. This is made possible via the standardisation and the mapping between the generic and specific public services. | |
| The support for citizens and businesses is improved by using the federated catalogue of public services. The public administration can easily access and consult the public services offered by another public administration or Member State. | |
| Pursuing this vision will improve and stimulate standardisation within the EU, e.g. description, metadata model, etc. | |

| | |
|---|---|
| Public administrations can use the standardised descriptions of services to describe their public services. This will create standardisation across the EU and will improve the communication with the public.<br><br>(These service descriptions can still be tailored to the public administrations)<br><br>The complexity of the search mechanism is reduced due to the standardised taxonomies and the mapping between generic and specific public services. | |
| *What are the opportunities associated with this vision?*<br><br>The Member States are able to compare their offering of public services with the generic list in order to identify the services which are not provided. They can also learn from other Member States how the public services are organised and managed within other Member States.<br><br>The diverse assets (e.g. metadata model, taxonomy, service descriptions) which are created for the catalogue can be reused by the Member States to set up a catalogue on their own. If this is reused the Member States create a similar structure which improves the (future) interoperability with the catalogue or with other Member States. | *What are the threats associated with this vision?*<br><br>This vision will imply a very considerable workload for the working group to define the standardised public services and create a federated catalogue of public services.<br><br>There will be an increased workload for Member States depending on the level of maturity of their public service offering. |

**Evaluation based on the principles**

**P1.    The set-up must provide a single place for starting the search for public services.**                    *Accepted*

The specific and generic public services are centralised within one catalogue. Citizens, businesses and public administrations can start their search in the federated catalogue of public services.

**P2.    The catalogue must include all public services offered within the EU.**    *Accepted*

The catalogue considers all the public services offered by all public administrations at all government levels in all Member States. Unlike scenario 2, it will also include the public services offered by Member States without a catalogue. These can be included in the federated catalogue of public services via a manual procedure.

**P3.** **The system must be flexible if it is to cooperate with Member States' current systems.**　　*Accepted*

The federated catalogue of public services can be built to be flexible; it is possible to include all public services regardless of the maturity of the Member State. This set-up can support automatic as well as manual content syndication.

An automatic procedure must be built in order to extract the public service descriptions from the mature Member States with a catalogue. However, a manual procedure is necessary to create the generic public services and can be used by Member States without a catalogue.

**P4.** **The set-up of FCOPS should be based on standardised assets in order to enhance interoperability.**　　*Accepted*

The working group needs to have standardised assets in order to create the generic public services which are included in the federated catalogue of public services. These assets will be used in common to describe the specific public services in the catalogue as well. This will enhance current and future interoperability initiatives between the federated catalogue of public services and the Member States by establishing a uniform way of communicating.

**P5.** **The catalogue must enable the learning aspect for public administrations. This must be supported in three areas: public service portfolio, how to offer public services, reusable solutions for the system.**　　*Accepted*

This principle is enforced in each area:

- Public service portfolio: all the generic and the specific public services are gathered in the federated catalogue of public services. This will create the opportunity for public administrations to compare their offerings with the public services offered by Member States. This comparison can easily be made via the generic public services and drilling down to the specific public services;

- How to offer public service: the public administrations are able to access the specific public services of other administrations in order to see how they have organised and managed their services. This can also be found in the generic public services, but it should be noted that the standard value is not always applicable for each Member State. This can be tailored to the needs of the public administrations.

- Reusable solutions for the system: the public administrations without a catalogue can easily reuse the standardised assets for the development of a federated catalogue of public services. Member States with an existing catalogue can use these assets to convert their set-up. However, this is not a prerequisite.

**P6.** **Existing initiatives must be reused within the catalogue of public services.**　　*Accepted*

The set-up of the federated catalogue of public services requires the agreement of all the Member States. This agreement can be stimulated by reusing existing initiatives. For example the Core Public Service Vocabulary is a valuable semantic data model which has been designed and standardised by Member State representatives.

Other existing initiatives can support the development of this federated catalogue of public services.

| | | |
|---|---|---|
| **P7.** **The catalogue of public services must be publicly accessible for citizens, businesses and public administrations.** | | *Accepted* |

The federated catalogue of public services can be accessed by everyone: citizens, businesses and public administrations.

| | | |
|---|---|---|
| **P8.** **The catalogue must meet the language expectations of citizens, businesses and public administrations.** | | *Accepted* |

Using a common taxonomy and data model reduces the complexity of the catalogue and it will enforce a uniform way of describing public services. Another advantage of this scenario is that the generic public services can easily be defined in a language used in common. Then the user is able to search the preferred generic service and drill down to the specific service offered by a particular Member State. These advantages will reduce the number of barriers to creating an understandable system; this principle is accepted.

**Table 7 – Detailed description of scenario 4 – Federated catalogue with specific services mapped to specific services**

## 4.6 SELECTION OF THE SCENARIO

In the previous sections the different scenarios were explained in detail. In order to select the most suitable and feasible scenario, each scenario was tested against two evaluation methods: a SWOT analysis and an evaluation based on selected principles. These principles are defined based on the vision and conceptual model of this study and are linked to associated EIF principles.

A scenario can be seen as feasible if it supports the different principles in their set-up and in a sense that it provides the largest flexibility and is able to cater for all the Member States. The scenario should not focus only on the Member States that have already an own catalogue of public services.

In the table below these scenarios are plotted against the principles.

| Principle | Scenario 1 – No federation | Scenario 2 – Federated catalogue of specific public services | Scenario 3 – Catalogue of generic EU public services | Scenario 4 – Federated catalogue of public services |
|---|---|---|---|---|
| **P1 – Centralisation** | Not accepted | Accepted | Not accepted | Accepted |
| **P2 – Exhaustiveness** | Not accepted | Not accepted | Not accepted | Accepted |
| **P3 – Flexibility** | Not accepted | Not accepted | Not accepted | Accepted |
| **P4 – Standardisation** | Not accepted | Not accepted | Accepted | Accepted |
| **P5 – Learning** | Not accepted | Not accepted | Accepted | Accepted |
| **P6 – Reusability** | Not accepted | Accepted | Accepted | Accepted |
| **P7 – Accessibility** | Not accepted | Accepted | Accepted | Accepted |
| **P8 – Multilingualism** | Not accepted | Not accepted | Accepted | Accepted |

**Table 8 – Selection of the scenario based on the principles**

The overview given above indicates that the first scenario, which described the status quo, does not accept, i.e. align with, any of the principles. As mentioned previously, this scenario is out of scope for this study.

The second scenario introduces a catalogue that contains all the specific public services by federating mirrors of the existing catalogues in the Member State. This scenario accepts only three principles: centralisation, reusability of existing initiatives and public accessibility. Nevertheless, this is regarded as an interesting scenario because it provides an overview of all the public services offered in the Member States. However, the search for public services remains complicated, the set-up lacks the learning path and the comparative analytical power for public administrations is rather low.

The third scenario introduces a standardised catalogue of generic public services that provides a distinct overview of the EU offering of public services. No mapping is created with the Member States' offering which leads to non-acceptance of the principles of centralisation, an exhaustive catalogue and the flexibility to cooperate with the Member States' set-ups. But, the mapping between the specific and the generic public services can be initiated at Member State level. All the other principles are enforced by this scenario and therefore it is considered as valuable.

The last scenario is a blend of the second and the third scenarios. The SWOT analysis has shown that this scenario combines the strengths and opportunities and eliminates the weaknesses and threats of both scenarios. It represents a catalogue with standardised generic public services and it includes a mapping with the specific public services initiated at EU level. This indicates that all the public services are encompassed by the catalogue and that public administrations can learn from the flexible system.

Even though this scenario eliminates the weaknesses of the second and third scenario, it has its own weaknesses. It is important to realise that this scenario will require a very considerable effort to investigate the specific public services, define the generic public services and create a mapping between them. In order to describe and gather these services within the federated catalogue of public services, the working group will need to define a standardised semantic metadata model and taxonomy. The investment in achieving the final goal of the federated catalogue of public services will place high demands on the working group.

Looking at the overview in the table and the SWOT analysis, the outcome of this last scenario nevertheless is the most suitable scenario for this feasibility study. This proposed scenario will be further elaborated on as FCOPS within this document.

## 4.7  GRADUAL EVOLUTION OF SCENARIOS

A step-by-step approach should be taken to setting up the final scenario. It is not feasible to implement a federated catalogue with generic and specific public services directly. This scenario is more of a long-term vision that should be pursued and achieved. The development process can contain several phases which gradually evolve to the ultimate vision.

The first phase that should be entered upon pursues the vision of scenario 3. There will be a need for standardisation and a common model to be used at EU level. Therefore a semantic metadata model and standardised taxonomy should be defined and used to set up the system. Once the metadata model and taxonomy are defined, the generic public services should be determined and included within the catalogue.

After completing this phase, the catalogue can be made available for the Member States' public administrations. This will create the opportunity to learn from and use the generic public services. The semantic metadata model and taxonomy should also be made available once they are defined and finalised. Member States without a catalogue can already develop their own system based on these standardised assets. This will enhance future interoperability with FCOPS.

A second phase encompasses the specific public services. This step is related but not equivalent to scenario 2 for the reason that this set-up includes the generic public services. The Member States' specific public services will be inserted and described according to the semantic metadata model and taxonomy used within the catalogue at EU level. In parallel with the insertion, a mapping will be created with the generic public services.

This phase will contain multiple pilots whereby each pilot should focus on all the specific public services offered within one specific Member State or by a supranational organisation.

Once phase two is accomplished, the vision of the fourth scenario will have been fulfilled. The set-up of FCOPS can be further refined and developed by adding new classifications (taxonomy), refining generic public services, adding more input and output functionalities, etc.

## 4.8  LONG-TERM OBJECTIVES OF SCENARIO 4

The long-term vision of scenario 4 covers the set-up of a 'platform' where citizens, businesses and all public administrations across the EU can consult all the public services offered within the EU. This will create one central place where they could start their search for a public service at local, regional, national and supranational level (cf. Vision – work package 1 and cf. 3.3 Supranational public services for the public).

A second objective is that public administrations be able to enhance their service levels (the support to citizens and businesses). Using the federated catalogue of public services (FCOPS) will provide them faster and better insights into the public services provided by other administrations within or across the borders of the Member State. The time taken to respond to the requests for 'foreign' public services (services offered by other public administrations) will improve. In addition, the interoperability between diverse public administrations will increase as a result of the transparency in the way of working (if

described in the public service description). All these improvements will support the first user story mentioned above (cf. 3.1 Increasing customer satisfaction with public services).

Another objective of scenario 4 (and scenario 3) is to set up a standardised system for describing public services. This encompasses the semantic metadata model and taxonomy which need to be defined at EU level. Once these assets are defined, they can be made available for Member States and public administrations. The administrations are able to reuse these assets in order to create their own catalogue of public services or create a mapping with their public service models.

Another aspect achieved by setting up FCOPS is the learning aspect. Public administrations are able to compare their range of public services with the services offered by other (equivalent) public administrations. They can identify missing or superfluous public services and see how other public administrations are organising and providing similar services. These objectives will support the second user story mentioned above (cf. 3.2 Creating better public services)

# 5   REQUIREMENTS

The development of FCOPS is rather complex because a large number of different aspects need to be taken into account. Therefore the EIF[7] levels are used to form the basis for the requirements.

However, the four interoperability levels (legal, organisational, semantic and technical) are extended with one extra element: the high-level requirements. These requirements are based on the high-level analysis in work package 1.

All the requirements mentioned below are derived from the interviews carried out in work package 1, and are required to build FCOPS. If these requirements are not incorporated, it will be hard to create a well-functioning catalogue.

Each level is first introduced with a brief description and followed with more details of the requirements.

## 5.1   HIGH-LEVEL REQUIREMENTS

The first requirements related to the scope of FCOPS. They will drive the catalogue in one direction without being too broad or too narrow. The scope of FCOPS needs to be well aligned and it focuses only on the Member States.

Each Member State has established several government levels, each with a different level of power and providing different public services to citizens or businesses. These different structures in the Member States impact on the functionality of FCOPS. Certain services in one Member State can be supported by another government level in a second Member State. Hence FCOPS will focus on the services offered by all government levels: national, regional and local public services.

To extend the set of public services, supranational public services are also included in FCOPS. This kind of service is offered by overarching organisations like the EU itself, NATO, etc. From the interviews with different stakeholders it became clear that they are especially interested in this kind of service. For example the contact persons from esd-toolkit, Leiedal and Vlaamse Infolijn explicitly mentioned these services. They want to include information about these services on their portal and/or catalogue to extend the support for citizens and businesses.

Another dimension of the high-level requirements is the target audience. FCOPS is in the first instance built to provide support for public administrations. They can use the information to make comparisons with other Member States and to extend their range of information. A user interface (UI) is in this case not the first set of goals behind this study. At a later stage, once the feasibility of setting up FCOPS has been evaluated and the back-office integration is complete, the time would be ripe to tackle the front end. However, FCOPS can also be used by citizens and businesses to discover the public services available in the EU. In this case a user interface becomes a really important aspect. A considerable amount of flexibility is needed to improve the user-friendliness.

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[7] http://ec.europa.eu/isa/documents/isa_annex_ii_eif_en.pdf

## 5.2 LEGAL REQUIREMENTS

The legal interoperability level of EIF mentions that each public administration will operate within its own national legal framework. When it comes to provision of European public services, incompatibilities can arise between national legislations. Once they are discovered, legal initiatives at EU level are initiated to counter these incompatibilities.

Such an initiative could improve the cooperation of public administrations with FCOPS. Currently, there is no legal basis within the European Union which explicitly encourages the Member State to create any kind of catalogue of public services. Nevertheless, some Member States are using the directives and declarations as a basis for stimulating their public administration.

For example the Services Directive[8] is designed to remove the legal and administrative barriers to trade within the service sector. It obliges the Member States to create a point of single contact through which service providers can obtain all relevant information. Some public administrations have gone a step further; they have extended their portals with information for citizens as well. The Services Directive has therefore already created a boost in the right direction for FCOPS. Consideration might be given to extending the Services Directive with transparency clauses at EU level.

Establishing a new legal framework would be very beneficial in encouraging the administrations to cooperate with FCOPS. However such a legal framework will be very hard and complex to arrange. Therefore the study refers back only to existing frameworks like the Services Directive, public sector information directive[9] and the European Interoperability Framework.

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[8] http://ec.europa.eu/internal_market/services/services-dir/index_en.html (27/06/2013)
[9] http://ec.europa.eu/information_society/policy/psi/index_en.htm (27/06/2013)

## 5.3 ORGANISATIONAL REQUIREMENTS – GOVERNANCE

Within the EIF the organisational interoperability level is referred to as follows:

"*This aspect of interoperability is concerned with how organisations, such as public administrations in different Member States, cooperate to achieve their mutually agreed goals.*"[10]

Put differently, the organisational requirements take the business processes and data exchange into account. They will define the different roles of the stakeholders in a way that the person responsible can understand what is expected and what should be done. This section details the governance aspect for FCOPS and contains three major parts;

- Organisation: this section identifies FCOPS stakeholders;
- Policies: this section defines what is expected of the stakeholders; the processes will be described at a high level;
- Controls: this section deals with the execution of the policies defined; a few examples relating to access policy are mentioned.

### 5.3.1 ORGANISATION

From an organisational point of view, there is a need to identify the different stakeholders using or involved in the development process of FCOPS.

A range of interested parties can be acknowledged as relevant stakeholders during the development process of FCOPS. Each of these parties will have a specific purpose during each of the phases and can go from coordination and leading to just providing support to the process.

One of the first steps while defining the governance for the development of FCOPS will be the formation of a working group. It will be a supranational working group consisting of representatives of the Member States and the European Commission. It is important that the representatives be aware of how the public services are organised and offered within their Member State (at each government level). Therefore this responsibility can be spread among multiple representatives to split the complexity and the workload. The lessons learned from 'Your Europe' indicate that it is too complex to devolve this to a single person; most Member States appoint two or three representatives.

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[10] http://ec.europa.eu/isa/documents/isa_annex_ii_eif_en.pdf (09/07/2013)

In addition to the working group, there will other stakeholders involved during FCOPS development process. These are listed below and the role of each stakeholder in the process is defined. These roles and the corresponding responsibilities will be further elaborated on in the next section (cf. 5.3.2 Policies). The coordination, participation and supporting roles will be elaborated on still further in the description of the action blocks (cf. 6 Action plan to implement FCOPS).

| Stakeholder | Role |
|---|---|
| Policy domain owner | - Data ownership of generic public services<br>- FCOPS system owner<br>- Participation in the pilot studies |
| esd-toolkit | - Participation in pilot study |
| EU institutions | - Participation in pilot study |
| ISA | - Set up governance<br>- Provide support during the pilot studies |
| Member States | - Representatives on the working group<br>- Involved during the set-up of the governance<br>- Data ownership of specific public services<br>- Participation in the pilot studies |
| Working group | - Coordination of all action blocks and actions performed during the development phase (more details on the action blocks can be found in section 6 Action plan to implement FCOPS) |

**Table 9 – Stakeholders and roles**

The working group will have a vital role during the development process, coordinating all actions. Therefore the group can split into subgroups to focus on the coordination of a specific action block (e.g. definition of semantic metadata model, definition of the thematic taxonomy, building the core components, etc.) Each subgroup will focus and lead the coordination of the specific actions required in order to build up the higher level picture of FCOPS. Nevertheless, the subgroups will form one working group formed by Member State representatives and representatives of the European Commission.

In addition to these stakeholders, the citizens, businesses and public administrations are identified as the users of FCOPS. They are also defined as stakeholders and will use FCOPS as a tool.

> **Requirement 4** A working group should be established, consisting of representatives of the Member States and the European Commission, in order to coordinate the FCOPS development and set-up process.

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## 5.3.2 POLICIES

This section specifies the different FCOPS processes by explaining the different ownerships. It sets out in detail what is expected of the different stakeholders in order to assure the cooperation and development process. Taking a look at the ownership of such a catalogue enables a distinction to be made between the system ownership and the data ownership. Figure 8 gives an overview of the different aspects of ownership involved in the set-up of the preferred scenario (cf. 4.5 Scenario 4 – Federated catalogue with specific services mapped to generic services).

These two views are further explained after the figure.
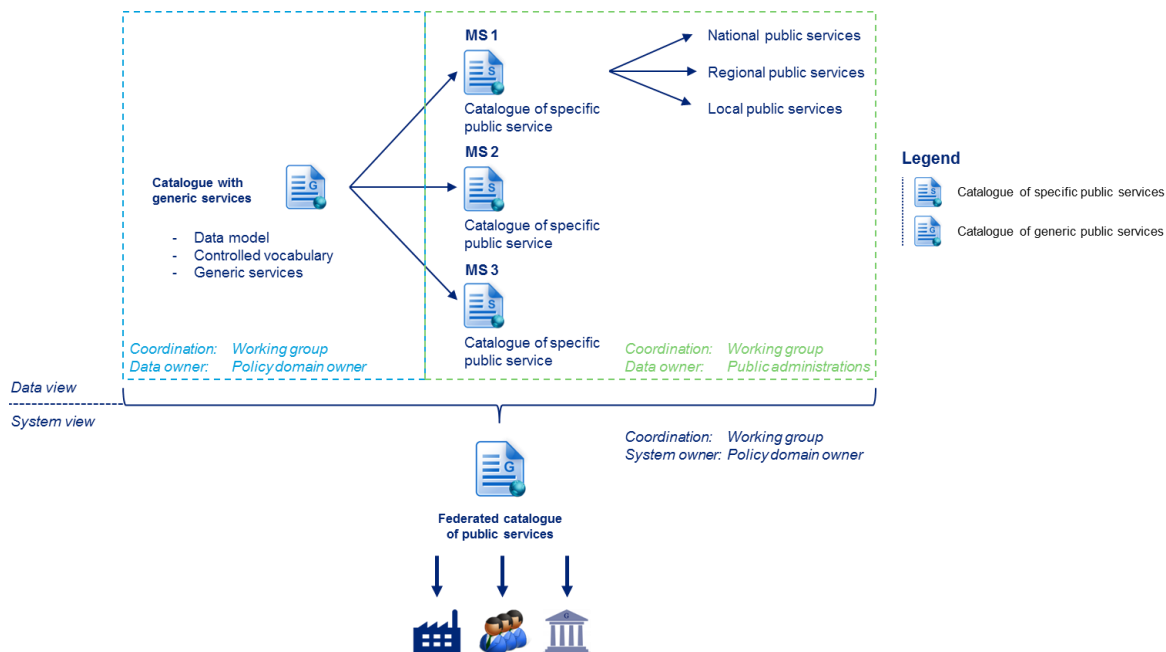


**Figure 8 – Governance policies**

### 5.3.2.1 SYSTEM VIEW

Looking at FCOPS policies from a systems point of view, then the role as a system owner can be further defined. This role can be taken up by one central organisation (policy domain owner).

The system ownership brings with it responsibility for the functionalities of the catalogue, covering:

- input: manual and automatic input for public services (focus on public administrations);

- output: manual and automatic output of public services (focus on citizens, businesses and public administrations; e.g. portal, search banner); and

- access mechanisms: identification and access rights (primary focus on public administration).

The system ownership is taken up by a policy domain owner who is responsible, in cooperation with the working group, for the mechanisms (e.g. content syndication) and tools. Next, the policy domain owner need to define the process that establishes any data exchange between the public administrations and FCOPS (input) and between FCOPS and the public administrations, citizens and businesses (output).

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In addition to providing the diverse functionalities, there is a need to safeguard effective operation of FCOPS. This entails ensuring that enough capacity is foreseen to deal with the requests and keep FCOPS running at all times as it will serve as a platform that others (citizens, businesses and administrations) can consult for more information. The system ownership will be assigned to the policy domain owner.

Joinup[11] could also play a role in hosting the system. Joinup can be used throughout FCOPS development process. Once FCOPS is finalised and can be made available for the public, then the hosting can be assigned to another organisation.

> **Requirement 5** The system ownership of FCOPS will be assigned to the policy domain owner, who will be responsible for developing the functionalities and need to safeguard the operation of FCOPS.

### 5.3.2.2  DATA VIEW

The second focus of ownership is the data dimension. This covers a number of concepts. An initial distinction can be made from the data standpoint while looking at Figure 8: the catalogue of generic public services and the catalogue of specific public services (actual services offered).

It is recommended that a working group be responsible for consolidating all the specific public services and coordinating the definition of a list of generic public services. A service is defined as generic when it only contains information that applies to all the administrations offering this service. It details the 'what' but does not detail how and where they are offered by a public administration. However it can refer to the government level at which it is offered. Other policy domain owners can also play a vital role in the definition of these generic public services. They have already experience in describing cross-border public services and can provide support and insights during the development of FCOPS. Once the services are defined, the data ownership of these services could be assigned to an authorised body (policy domain owner).

Before the generic public services are defined, the working group should first develop a semantic data model which can be used for describing public services. It is advised that existing initiatives be used as an inspiration for the semantic data model, e.g. the Core Public Service is an example of such a standardised model.

The controlled vocabularies (taxonomy) are another aspect that the working group will manage. These vocabularies will serve as classifications and are available in FCOPS. This will be further discussed below in section 5.4.2 Controlled vocabularies for classification.

The next section on the semantic requirements will already describe a possible semantic data model and taxonomy that could be used for FCOPS. The proposed semantic data model is based on the Core Public Service Vocabulary which has been developed by a Joinup working group.

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[11] http://joinup.ec.europa.eu/ (04/03/2013)

In addition to generic services, FCOPS will also include the specific public services which are offered by the public administrations in the Member States. These services will not be managed by the working group. It is the responsibility of the Member States to keep the information on the services accurate and up-to-date. The update trigger will be initiated by the public administrations and not by the working group.

The Member States will be responsible for mapping their public services with the semantic data model and controlled vocabularies which are provided by the working group. The mapping will be required in order to establish the exchange of public service descriptions. The Member States are free to determine how the mapping is done, but they are restricted to the standardised format and rules which are imposed by the working group. The Member States can consider two alternatives for exchanging the information. They can assign the responsibility to one coordinating body within the Member State which receives the information from the public administrations. For example, it can be devolved to the owner of the national portal containing all the public service descriptions. Another option is for each public administration within the Member State to be responsible for the mapping with FCOPS. The option chosen will also have implications for the identity and access management.

Each public service needs to be mapped with each defined controlled vocabulary used within FCOPS (see 5.4.2). Whenever a public service cannot be mapped within a controlled vocabulary, then it will be classified to an additional group in that vocabulary. This group will be reviewed on a frequent base and when several common public services are identified, the working group can consider creating a new classification group. This should especially be the case when it could not be mapped with a generic public service. This should trigger the process for defining a new generic public service on a later stage.

> **Requirement 6** The data ownership relating to the metadata model, taxonomy and data (generic public services) at EU level should be assigned to the policy domain owner; the data ownership of the specific services should be kept in the hands of the Member States.

> **Requirement 7** The mapping between the generic public services and the specific public services should be a task performed by the Member States.

### 5.3.2.3  IDENTITY AND ACCESS MANAGEMENT

Identity and access management is a security matter that defines the access rights and authentication rules on FCOPS output and input procedures.

Each Member State will need to identify certain representatives responsible for FCOPS input stream. The Member States are free to decide on how they divide up the different responsibilities. As mentioned previously, they can select more than one representative to be responsible for the content creation and information exchange with FCOPS.

The communication between system owner and the Member States (data owner) needs to be very clear. The system owner needs to be aware of who is responsible for maintaining the data in order to grant the access rights. This is very important for safeguarding the data accuracy, consistency and reliability.

> **Requirement 8** The data owner should manage FCOPS access rights and authentication rules.

### 5.3.3 CONTROLS

The final element within the governance of FCOPS deals with the execution of policies. Therefore a few examples are given which are subject to identity and access management.

The range of tasks for the Member State representatives is rather complex and will require a great deal of time and effort. Therefore this responsibility can be spread across a number of persons within a given Member State. A 'circle of trust' can be created in order to reduce the complexity of identity and access management and safeguard the data consistency and reliability. There is an alternative in which one individual per Member State is appointed as 'editorial manager' for that country. That person is able to grant access to others (representatives of that Member State) to support them in the process of gathering information on specific public services and mapping them with the generic public services. However, it is important that this responsibility not be misused and therefore be assigned with a high level of trust. These editorial managers only have limited access rights and can grant access rights to the public services of their Member State.

One of the related controls is that associated with the need on the part of Member State representatives to have access to FCOPS in order to create new public services, maintain/update existing services or delete old services. This control depends also on whether the data exchange occurs via a manual process (cf. 5.5.1 Data input with user interface) or via an automatic process (cf. 5.5.2 Automatic data input).

Another control is that relating to the fact that FCOPS should be publicly available to everyone, taking into account all public administrations, citizens and businesses. No restrictions are needed at any time to access (read) FCOPS in order to consult the descriptions. Even the public administrations need to be able to use these descriptions fully on their portals and within their systems (output functionality, e.g. content syndication).

> **Requirement 9** The FCOPS should be publicly available for everyone, though restrictions should be placed on the public service update functionalities.

## 5.4 SEMANTIC REQUIREMENTS

Semantic interoperability agreements are vital for public administrations to exchange and process information form external sources. In the context of FCOPS the semantic interoperability layer especially becomes very important. There is a need for a commonly used semantic model which includes sets of data structures and elements. The vision that needs to be pursued is that of a standardised semantic model enforced across the EU. The Core Public Services Vocabulary is already a good example of standardisation of the semantic data model.

The EIF highlights the following aspects in relation to the semantic interoperability layer:

- *"Semantic interoperability is about the meaning of data elements and the relationship between them. It includes developing vocabulary to describe data exchanges, and ensures that data elements are understood in the same way by communicating parties."*

- *"Syntactic interoperability is about describing the exact format of the information to be exchanged in terms of grammar, format and schemas."*[12]

The following paragraphs describe the following elements in more detail: data model, controlled vocabulary, generic public services and the multilingualism aspect. These paragraphs are a proposal as to how FCOPS could be set up. They can form a basis for further development of a standard at European level.

Some Member States have not yet created a catalogue of public services. In these cases the Member State could use these semantic elements as a starting point to build their catalogues. This would already provide a good starting point without re-inventing a new catalogue. This will also improve interoperability with FCOPS.

## 5.4.1  METADATA MODEL

An important asset of FCOPS is the definition of a semantic metadata model. This will be the core of the whole FCOPS set-up; it defines the structure of how the public services (both generic as specific) are described within the catalogue. The working group will be responsible for discussing this metadata model and coming to a consensus in order to create the final set-up.

In order to define this metadata model the working group does not have to start from the beginning. They are able to base the metadata model on the existing model defined within the Core Public Service Vocabulary. This is an existing standardised abstract metadata model that can be used. However this model is just a proposed abstract concept and can be further developed during the development process.

Looking at the model, the Core Public Service Vocabulary uses diverse notations to describe certain attributes and classes. The different assets that are used within the Core Vocabulary are listed below:

- Dublin Core Vocabulary (dcterms)[13]: is a standard vocabulary consisting of fifteen properties which can be used in resource descriptions.

- Core Location Vocabulary[14]: represents a simplified, reusable and extensible data model to describe locations, geographic names, or geometry. Much like the Core Public Services Vocabulary it is discussed and published by a working group on Joinup;

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[12] EIF: http://ec.europa.eu/isa/documents/isa_annex_ii_eif_en.pdf
[13] Dublin Core: http://dublincore.org/documents/dces/ (30/08/2013)
[14] Core Location Vocabulary: https://joinup.ec.europa.eu/asset/core_location/description (30/08/2013)

- Simple Knowledge Organisation System (SKOS)[15]: represents a W3C-standard notation using RDF, to describe thesauri, classification schemes, subject heading systems and taxonomies;

    - Web Ontology Language (OWL)[16]: is a W3C-standard for describing ontologies in order to facilitate machine interoperability by providing additional vocabulary. It is an extension of RDF;

- Friend of a Friend (FOAF)[17]: is a descriptive vocabulary representing a machine-readable ontology for describing objects, people and their relationships. The FOAF notation uses RDF and OWL;

- Functional Requirements for Bibliographic Records (FRBR) expressions[18]: represent an entity-relationship model of metadata for information objects. The model includes four levels of representation:

    - Work: a distinct intellectual or artistic creation (e.g. a legislation – Formal Framework);

    - Expression: the specific intellectual or artistic creation;

    - Manifestation: the physical embodiment of an expression of a work;

    - Item: a single exemplar of a manifestation.

The next section fleshes out the proposed semantic metadata model. The first section gives a view on all the attributes that should be included within the model. The second section describes the attributes that the controlled vocabularies associated with the public services consist of. The third section is a graphical representation of the abstract metadata model.

### 5.4.1.1   DATA FIELDS WITHIN THE METADATA MODEL

The table below contains the different attributes that are included within the metadata model. A brief description and the data type (source) is given for each attribute. The sources mentioned refer to the data types described above (e.g. Dublin Core, SKOS, FOAF, and FRBR).

'dcterms' represents the data type in the Dublin Core. The text data types (dcterms:title and dcterms:description) used within the metadata model represent a combination of a string (text data type) and a language identifier. This combination is relevant when using descriptions that are available in multiple languages; it also enhances the multilingual aspect of FCOPS. These languages are noted via the ISO 3166-1 Alpha 2 codes (e.g. "DE" for German), optionally followed by a locale definition such as "-AT" meaning "German as spoken in Austria."

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[15] SKOS: http://www.w3.org/TR/skos-reference/#concepts (30/08/2013)
[16] OWL: http://www.w3.org/TR/owl-features/ (30/08/2013)
[17] FOAF: http://xmlns.com/foaf/spec/ (30/08/2013)
[18] FRBR: http://vocab.org/frbr/core.html (30/08/2013)

| Attribute | Source | Description |
|---|---|---|
| *Public service title* | dcterms:title | This field describes the exact title of the public service which is offered within the Member State. This will identify the diverse public services. A language identifier is also included in order to create more than one name; this includes the multilingual contexts.<br><br>This field is built in accordance with the Dublin Core. |
| *Description* | dcterms:description | This field is used as a textual description of the public services. As in the title, the language identifier is again included within this attribute. It should contain a brief explanation of the public service, describing the content and the purpose of the service.<br><br>The publishers should describe the public service in a reasonable level of detail. |
| *Language* | dcterms: linguisticSystem | *Language* identifies the language(s) in which the public service is available. The value given within this field should represent the URIs of the Named Authority List of Language of the Publications Office of the European Union. These URIs refers to all languages recognised in ISO-693-3. |
| *Translation check* | dcterms:description | Certain instances of public services represent a translation of the official specific or generic public service. For each translation done via a machine translation tool, a human translation check is required to see whether the translation is faithful to the original content of the public service. This field indicates if this human check has been carried out. |
| *Start public service* | dcterms:date | *Start public service* defines the starting point of the lifecycle of the public service. It is recommended that an encoding scheme be used (best practice); for example the W3CDTF profile of ISO 8601 can be used as a notation. |
| *End public service* | dcterms:date | *End public service* indicates the end point of the public service's lifecycle. The same scheme should be used as for the field *Start public service*. |

**Table 10 – Data fields within the metadata model**

### 5.4.1.2  CONTROLLED VOCABULARIES WITHIN THE METADATA MODEL

Within the metadata model there are a number of fields that are linked with a controlled vocabulary. These fields can be considered as a separate class within the abstract metadata model; an identifier can be used within the main class to refer to the precise value (foreign key principle).

| Attribute | Source | Description |
|---|---|---|
| *Type* | skos:concept | *Type* describes the controlled vocabularies which are linked with the public services. This field uses the SKOS Concept Scheme to identify the controlled vocabulary. |
| | | This field will contain reference to multiple controlled vocabularies in order to create a multidimensional classification (cf. 5.4.2 Controlled vocabularies for classification). |
| *Type name* | dcterms:description | *Type name* represents the full description of the controlled vocabulary. This is linked with the previous field: *Type*. |
| *Spatial* | dcterms:spatial | *Location title* identifies the country in which the public service is available. Whenever it relates to a generic public services, it should mention a default value; e.g. 'Generic descriptions'. |
| | | This field is linked with the Location Core Vocabulary and serves as a form of foreign key. Therefore it is situated with the relationship between the public service and the abstract class Location. |
| | | The Core Public Service Vocabulary mentions that this field would use the code list of the Publications Office of the European Union via an URI set. However consideration could be given to using the code list discussed in work package 1: the ISO standard for country codes (ISO 3166-1 alpha-2 code[19]). |
| *Location description* | dcterms:description | *Location description* is linked with the country code field; it defines the full name of the country. |
| *Level of government code* | skos:concept | *Level of government code* indicates at which government level the public service is offered within a certain Member States (specific). In the case of generic public services, it will show the most commonly used (trend) level for that service. |
| | | This field uses SKOS classification schemes; it is recommended that NUTS[20] and LAU[21] codes be used, cf. work package 1. |
| *Level of government name* | dcterms:description | *Level of government name* is related to the *Level of government code* field; it represents the full name of the government level. |
| *Input title* | dcterms:title | *Input title* provides the name of the input instance. This is typically a name that is formally known for the input source. |
| *Input type* | skos:concept | *Input type* identifies the type of input source by using a SKOS concept scheme to link with the controlled vocabulary. |
| *Input description* | dcterms:description | *Input description* provides a textual view on the source; it describes the characteristics and what is needed in order to perform the public service. An example of an input can be an application document. |

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[19] http://www.iso.org/iso/country_codes/iso_3166_code_lists/country_names_and_code_elements.htm (22/07/2013)
[20] http://epp.eurostat.ec.europa.eu/portal/page/portal/nuts_nomenclature/introduction (22/07/2013)
[21] http://epp.eurostat.ec.europa.eu/portal/page/portal/nuts_nomenclature/local_administrative_units (22/07/2013)

| | | |
|---|---|---|
| *Output title* | dcterms:title | *Output title* provides the name of the input instance. This is typically a name that is formally known for the output source. |
| *Output type* | skos:concept | *Output type* identifies the type of source by using a SKOS Concept scheme to link with the controlled vocabulary. |
| *Output description* | dcterms:description | *Output description* provides a textual view of the source; it describes the characteristics and what is retrieved once the public service is fulfilled. An example of an output can be a document such as a certification.<br><br>A public services output could be an input of another public service. This relationship is described within the associated *Rule*. |
| *Rule* class | FRBR expression | The *Rule* class represents a document that describes the rules, guidelines or procedures that are required for an instance of a public service. The notation used for this rule is an FRBR expression, which represents an abstract concept of the rules themselves (e.g. a document). |
| *Formal Framework* class | FRBR expression | The *Formal Framework* class represents instances of policies that are used as a basis for the rules that steer the public service. Similar to the *Rule* class, the instances are described via an FRBR expression which represents the abstract concepts of the legislation. |
| *Agent class* | Dublin Core and FOAF | An instance of the *Agent* class represents any resource that can 'act' or has the 'power to act'. These instances use the FOAF descriptions and can contain the following subclasses: foaf:Person, foaf:Group and foaf:Organisation. |
| *Channel title* | dcterms:title | The *Channel* class represents the medium through which the agent can provide, use or interact with the public service. The *Channel title* gives the formally known name of the channel that is used. |
| *Channel description* | dcterms:description | *Channel description* gives a textual explanation of the medium and its characteristics. |
| *Homepage* | FOAF | *Homepage* is a property of the *Channel* class; it provides the homepages of the service provider. |
| *Physically located at* | dcterms:location | *Physically located at* is a field that is linked with the Core Public Service Vocabulary. It describes the physical location and other details (e.g. office opening hours, accessibility information about the site, etc.) |

**Table 11 – Controlled vocabularies within the metadata model**

> **Requirement 10** The semantic metadata model used for the FCOPS should be based on the Core Public Service Vocabulary.

### 5.4.1.3 GRAPHICAL REPRESENTATION OF THE METADATA MODEL

Based on the previous section and in combination with the Core Public Service Vocabulary, it is possible to represent the semantic metadata model graphically. This model is an abstract model and can be developed in greater detail during implementation. This model already goes further into specifics, however, than the Core Public Service Vocabulary and it provides a first insight into how to describe the public services within FCOPS.

More information about the semantic data model defined in the Core Public Service Vocabulary can be found on the Joinup platform[22]. The model is described in detail and an example of such model is provided within the document.

The 'Interbestuurlijke producten- en dienstencatalogus', a Belgian catalogue of public products and services, and the esd-toolkit have already taken the initiative to map their public service data model with the data model presented within the Core Public Service Vocabulary. These mappings can be used as leading examples in order to map the data model of the Member States.
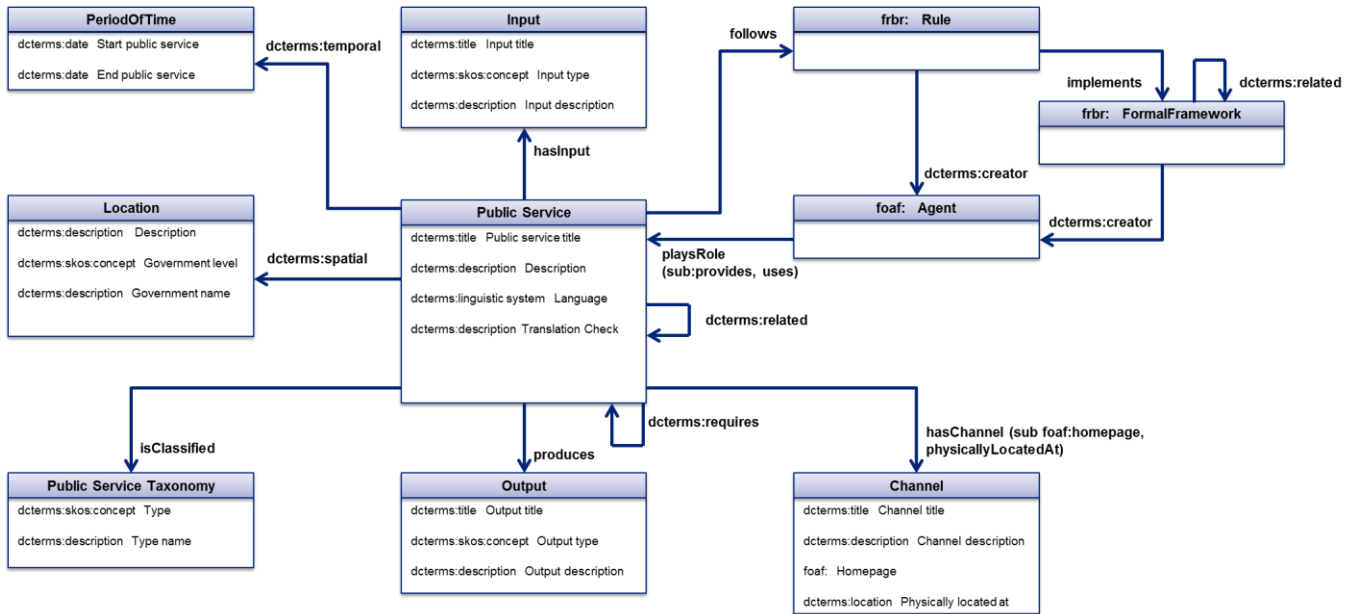


**Figure 9 – Proposed data model for the public services in FCOPS**

### 5.4.2 CONTROLLED VOCABULARIES FOR CLASSIFICATION

Controlled vocabularies for public services (taxonomy) are another essential element for FCOPS. The purpose of these vocabularies is twofold: to create a structure in FCOPS and to map the generic public services with specific public services. As a first step, the information provided within FCOPS will be divided up by means of these vocabularies. This will provide a form of pathway for the user to click-through or even drill-down to the information they want. Therefore the usability (intuitive) and flexibility become important for the user.

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[22] Link to the latest version: https://joinup.ec.europa.eu/asset/core_public_service/asset_release/core-public-service-vocabulary-0

In addition, these vocabularies will be used to create a mapping between the specific public services in the Member State and the generic services. The mapping is required to enforce the learning aspect for public administrations. They will be able to see which public services are commonly used in other Member States and compare them with their range of public services. It will also be easier for citizens and businesses to find the desired service in another Member State based on the known public services provided.

To improve the usability and the flexibility of FCOPS implementation of various controlled vocabularies within FCOPS is advisable. The analysis in work package 1 showed that 22% of the portals have implemented a multidimensional classification. The most commonly used classification combination is thematic categories and an A-Z list. These thematic categories are very intuitive for the user, but they can differ from one Member State to another. Therefore it could be useful to determine a common thematic categorisation, such as generic life events for example (cf. 'Your Europe').

Throughout our research we encountered several times the need for a single European standard. This standard should be based on life events and in the future it should be used by all Member State portals. Such a common taxonomy would improve the interoperability for administrations and user-friendliness for the public across the Member States.

Another classification analysed in the first work package is the Classification Of the Functions Of Government (COFOG)[23]. This was developed by the Organisation for Economic Co-operation and Development (OECD) and published by the Statistical Division of the United Nations. Currently COFOG is a standardised vocabulary to map government activities and it contains three levels of detail: divisions, groups and classes.

As COFOG is a standardised classification and is already used by Member States, it can be included as another controlled vocabulary.

To extend the vision of a multidimensional FCOPS controlled vocabulary improves the flexibility for the user, the following controlled vocabularies can be combined:

- Generic public services: these public services can be used by citizens and businesses as a starting point. They can provide a general overview of the public services and afterwards the user is able to drill-down to the preferred Member State;

- Government levels: these are the different levels of authorisation in the Member States and at European level: supranational, national, regional and local levels (e.g. NUTS and LAU-codes);

- Member States: the diverse Member States can also be used as a starting point for a controlled vocabulary.

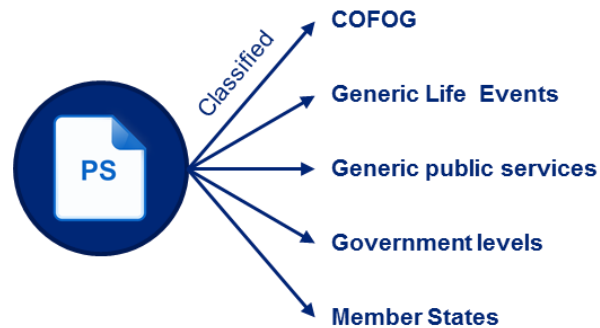An overview of the controlled vocabularies considered is given in Figure 10.

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[23] http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=4

**Figure 10 – Controlled vocabularies to classify the public service**

These different controlled vocabularies will significantly increase the flexibility and the user-friendliness of FCOPS. A multidimensional classification of this type is also already enforced in the esd-toolkit[24]. This initiative has built a dynamic structure where the user can drill-through.

Building such a multidimensional classification will increase the complexity of the development of FCOPS. The Member States will also have an increased workload in order to map their specific public services to each controlled vocabulary. The working group should define which classifications will be enforced for FCOPS.

> **Requirement 11** The FCOPS should support a multidimensional controlled vocabulary in order to improve the flexibility and user-friendliness.

### 5.4.3  SYNTAX OF GENERIC PUBLIC SERVICES

Section 5.3 Organisational requirements – Governance described the organisation and policies of the generic public services. The focus of this section is on the grammar and syntax of generic public services.

Each service contains a number of fields to describe the content of the service (title, content and generic conditions, procedures, exceptions, documents and regulations). In addition, each service contains metadata; these fields serve to classify the service (competent authority/government level, authority/government level that delivers this service, theme, type and keyword).

They are constructed by a coordinating body as a unique list, agnostic of all public services offered by all executing public administrations. The outcome is a set of generic public services based on a standardised data model, taxonomy and ontology.

Therefore the way in which the public services and the syntax of the public services are formulated will be very important for the reason that Member States should be able to use those descriptions within their offerings. The working group should agree on how the generic public service is formulated.

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[24] http://standards.esd.org.uk/ (12/07/2013)

Some countries like Denmark (FORM), Netherlands (UPL) and in the UK (esd-toolkit) have introduced generic public services. These standardised services are offered by a coordinating body acting on behalf of the public administrations.

### 5.4.4 MULTILINGUALISM

Dealing with multilingualism is a very important concept that should be discussed before developing FCOPS. The optimal set-up would be for FCOPS to be available in all official EU languages. Currently there are 24 official languages and to translate the content of FCOPS would require a considerable amount of resources, money and time. This will also be very hard to organise. Another option is to follow the trend that found in the analysis of work package 1: make the content of FCOPS available in English.

The minimum requirement if the catalogue it to be user-friendly is for the controlled vocabularies to be available in all official EU languages and the official language of other participating countries. This will support the public administrations, citizens and businesses in clicking-through FCOPS and accessing the desired public services.

The information published on most portals is available in a limited number of languages. These translations can already be used within FCOPS. A machine translation tool can be considered to translate the text into the other languages. An option is to use MT@EC within FCOPS; it is an internal machine translation tool developed by DG Translation. The tool doesn't provide a real-time and ad-hoc translation API, but the information is translated using an interactive method. This means that the documents and web pages need to be sent through and the documents are received back with a short delay.

DG Translation still advises having the translations revised by individuals to check whether the meaning of the content represents the original content as the machine can distort or misinterpret the meanings of words. The MT@EC was originally created to translate documents according to common terminology that is used within the European Commission.

> **Requirement 12** The controlled vocabularies used within the FCOPS should be translated into all official EU languages.

> **Requirement 13** The public services within the FCOPS should also be available in all official languages, potentially by means of a machine translation tool.

## 5.5 TECHNICAL REQUIREMENTS

The technical requirements cover all aspects involved in the set-up of FCOPS and linking with other information systems. These requirements are absolutely essential in developing FCOPS and ensuring the interoperability with the public administrations.

According to the EIF, the technical interoperability layer includes everything like interface specifications, interconnection services, data integration services, data presentations and exchange, etc. All the public administrations and Member States need to agree on all those aspects in order to establish any information exchange.

WP1 of this study showed that not all Member States have the same level of maturity in terms of catalogues of public services. At the lowest level of maturity, there is no catalogue of public services. If these Member States are to participate in FCOPS, a manual user interface is needed where the public administrations of these Member States can insert and maintain their public services. In this way, these Member States will take over the common ontology, data model and taxonomy of FCOPS, which will become the de facto standard which will improve the interoperability between the Member States

There are other Member States, however, which already have a catalogue of public services. Therefore it cannot be expected, and it would be inefficient, for these public administrations to use the manual user interface. These Member States should be able to continue to manage their public services locally. FCOPS can receive the data from these specific public services through automated content syndication techniques.

Both the user interface and the automatic data input allow maximal flexibility for all Member States and are required for successful implementation of FCOPS. If only one set-up for data input is implemented, there is a considerable risk that many Member States will not participate. If only the manual user interface were implemented, Member States that already have their own catalogue of public services would most likely see the investment double maintenance in their own system and in FCOPS as too high. If only the automatic data input were implemented, the Member States without their own catalogue of public services will first have to create their own solution before they are able to participate.

## 5.5.1  DATA INPUT WITH USER INTERFACE

FCOPS will need a user interface which will allow the management of (a) generic public services, of (b) specific public services by the Member States' public administrations, especially those that do not have their own catalogue of public services, and of (c) the controlled vocabularies.

It is necessary for both the generic and the specific public services and all the entries of the controlled vocabularies that they can be fully managed through the user interface throughout their entire life-cycle. This means that it should be possible to create, update and delete all public services and entries in the controlled vocabularies via the user interface, though some referential integrity checks with the controlled vocabularies will be needed to prevent broken links when an entry is deleted.

Access management will be very important for this set-up in order to authenticate which persons are allowed to access certain data. This can be done at the level of a single public service, public administration or per Member State. Access management is explained in more detail in section 5.3.2.3 Identity and access management.

A content management system is an option that should be considered. Via a CMS the administrations can easily create and manage the information they want to publish in FCOPS. Such a CMS will be a useful tool for managing the generic public services and the specific public services that originate in Member States without a catalogue.

An example of a manual process for publishing content can be found on the 'Your Europe' portal. An editorial board consisting of representatives of all Member States is responsible for generating the content of the portal. They go through the public administrations' portals manually and prepare the relevant information for 'Your Europe' via a Java-based tool, named LiveRay. Once the content is validated, the information is documented and published via Documentum[25] and a Corporate Web Content Management System (CWCMS)[26] tool on the portal

The tailored user interface or the CMS for FCOPS will be built according to the defined semantic metadata model. The user will need to fill in all the required information fields in order to create, update or delete any public services (generic/specific) or controlled vocabularies. This system should be very intuitive and easy to handle.

> **Requirement 14** The FCOPS should provide a manual technique for managing the public services within the catalogue and provide a content syndication technique for Member States at a lower level of maturity.

## 5.5.2  AUTOMATIC DATA INPUT

In addition to the manual data insertions, it is recommended that FCOPS provide the opportunity for Member States to exchange the data automatically. Certain Member States already have a catalogue of public services available and it would be very inefficient for these Member States to use the manual user interface or CMS to manage the public services.

To make sure that every Member State is able to cooperate with FCOPS, the working group could consider the development of various channels for interaction. This will improve the flexibility for the Member States, but it will require quite some effort from the working group to develop the different content syndication techniques. The following technologies can be considered:

- *Standardised XML-file*: this file will contain all the content of public services within one Member State;

- *RSS-file*: this file can send updates, new services, etc. FCOPS will have a reader to extract all the content from the RSS-file that originates from a certain Member State or even a certain public administration. Different parties in the Member State can send these files through or publish them in a specific place (agreed with the working group). This technology can also be considered for the output of FCOPS.

- *Web service*: FCOPS can create a web service that explicitly extracts the information on a periodic basis from the Member States' catalogues.

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[25] http://www.emc.com/domains/documentum/index.htm (16/07/2013)
[26] http://ec.europa.eu/ipg/tools/wcm-portal/ (16/07/2013)

- *Semantic annotation* and *a crawler*. In order to use this technique the Member States need to add standardised tags to the information published on their portal or catalogue. With the use of these tags the crawler can go through the different sources to select the relevant content for FCOPS. Finally, the crawler will extract, transform and load the information into FCOPS.

   It should be noted that in this case, the update trigger is no longer initiated by the Member States; the crawler can go through the different sources on a regular basis.

To develop these automatic data input methods, the working group needs to create a metadata model to be used in common which is accepted by all (participating) Member States. The different Member States will need to create a mapping between their public service metadata model and the semantic metadata model developed for FCOPS. This mapping will be required in order to ensure the automatic federation of the content. How this mapping is done will depend to a very large extent on the technique that is opted for (see list above).

An example of an automatic scenario can be found in the Netherlands. The Dutch Ministry of the Interior and Kingdom Affairs has created a fully federated catalogue called 'Samenwerkende Catalogi'. For the set-up of this platform the Ministry created a standard taxonomy, a uniform product list, a metadata model, a database and a search banner (cf. 5.5.5 Search banner).

Most Dutch public administrations at all levels (local, regional and national) have created their own catalogue of public services, which is publicly available through their portals. The concept of the 'Samenwerkende Catalogi' is that all the participating organisations provide their catalogue of public services in a standardised XML-format. The participating organisations will in turn have full access to the entire database of public services.

Another approach can be found in the 'Your Europe' portal. DG MARKT performed a study in order to investigate a number of automatic content syndication techniques. This study was initiated with the goal of moving from the manual procedure currently used for content gathering and publishing to an automatic content syndication process.

The pilot study examined various techniques by performing a qualitative analysis (based on development cost, maintenance, ROI, operation complexity, human resources and security), an analysis of distribution of effort (for Member States, EC staff and IT contractor) and identified the advantages and drawbacks in order to compare the different scenarios. Based on the output of these evaluation criteria, the study concluded that '*tagged national content*' would be the most appropriate technique for content syndication. This technique would require the least amount of effort for the Member States by adding metadata tags to the national content. The workload for this scenario is shared between the European Commission and the Member States.

The tagged national content technique corresponds to the semantic annotation technique mentioned above. This technique requires additional metadata tags on the Member States' portals and a crawler that gathers the necessary data from the portal.

The ideal vision in the long term is for each Member State to have a catalogue available covering all public services at all government levels. FCOPS could be therefore be used as a leading example and the different assets can be reused by the Member States to develop a catalogue. This would significantly

increase the efficiency and reduce the workload in cooperation with FCOPS. The interoperability will also be improved across Member States for public administrations, and even for citizens and businesses.

> **Requirement 15** The FCOPS should provide an automatic content syndication technique to support those Member States which are at a higher level of maturity.

### 5.5.3  DATA OUTPUT WITH USER INTERFACE

For the citizens, businesses and even public administrations a user interface is required to consult the information on FCOPS. This user interface needs to be very intuitive and flexible. The multidimensional controlled vocabularies will be used as a basis for the structure within FCOPS. The user can then drill-through to the preferred public service.

Unlike the data input, there will be no (access) restrictions to the output user interface. All FCOPS content should be publicly available to support the administrations, citizens and businesses.

> **Requirement 16** The FCOPS should provide a (flexible) user interface for citizens, businesses and public administrations in order to consult the public services.

### 5.5.4  AUTOMATIC DATA OUTPUT

To extend the manual data output and usage of data, an automatic data output technique should be provided as well. This data output can be generated by means of XML or RSS-files. These files have a standardised format and will be available for the public and administrations at a central location.

RSS-files can be used specifically for sending new services and updates to those who are interested. The public administrations can subscribe for a particular section of public services; the RSS-files will then automatically send information through whenever something changes.

The XML-files can be used to establish the Open Data concept. These files will contain the information of all public services included in FCOPS and will be made available.

These output techniques can be used by a Member State to gather information from other Member States and compare it with their public services. They can also use it to enrich their own content with the services provided by other Member States. For example, they can refer on their own portal to the public services of another country. This leads to a broader purpose for their portal and an improvement for the citizens and businesses.

A last possibility is to use web services for automatic data output. These web services need to provide the functionality to extract the content from FCOPS and load it directly on the portals.

> **Requirement 17** The FCOPS should provide an automatic data output mechanism in a way that the user can retrieve data from the catalogue. The data retrieved should be described in a standardised format.

### 5.5.5 SEARCH BANNER

An extra functionality that should be provided together with FCOPS is a search banner. The Member States' administrations will be able to use this banner as a tool to extend the functionality of their portals. The tool will be made available for citizens and businesses in order to access all public services across the EU via their portal. Whenever the search banner is used it will launch a query in FCOPS to retrieve the requested data in a standard XML-message.

The idea behind the search banner is based on the example of the 'Samenwerkende Catalogi' created by the Netherlands. The Dutch Ministry has developed a banner that can be used on the public administrations' portals. When a user performs a search task, the banner launches a SRU-query in the 'Samenwerkende Catalogi'. Search/Retrieve via URL (SRU)[27] is a standard XML-focused search protocol for Internet search queries that uses CQL (Contextual Query Language), a standard syntax for representing queries. As a result of the search query an XML message is returned in accordance with the SRU specifications.

The public using the search function on the portals of the public administrations might not even be aware that they are searching in the 'Samenwerkende Catalogi'. The public administrations are free to choose how they use the search function on their own portal as long as they use the predefined SRU specifications.

> **Requirement 18** The FCOPS should provide a search banner to increase the functionality of the catalogue and the Member States' systems (portals, catalogues, etc.)

## 5.6 SUMMARY OF THE REQUIREMENTS

During the development of FCOPS the working group will need to take a lot of different aspects into account. All the requirements mentioned in previous section already provide a good view of what needs to be done in order to create a flexible, efficient and operative system. They need to be considered carefully and implemented in the lifecycle of FCOPS. It will not be possible to take a big bang approach in developing the implementation and design of FCOPS; but a phased/iterative approach over a planned timeframe should be in place. This action plan will be discussed in the next section (cf. 6 Action plan to implement FCOPS).

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[27] http://www.loc.gov/standards/sru/index.html (20/6/2013)

Such an agile approach can include each of the pre-defined requirements. An overview of all the requirements can be found in the table below. This table can be used as a checklist during the development process.

| Functional requirements |
| --- |
| **High-level requirements** |
| **Requirement 1** All EU Member States and EEA Member States are included within the scope of FCOPS. <br><br> **Requirement 2** FCOPS should initially focus on supporting public administrations, back-end integration and interoperability. Additionally, FCOPS should provide information to citizens and businesses. |
| **Legal requirements** |
| **Requirement 3** FCOPS should find support in existing legal initiatives (e.g. Services Directive) The transparency clause should be extended to the EU level. |
| **Organisational requirements** |
| **Requirement 4** A working group should be established, consisting of representatives of the Member States and the European Commission, in order to coordinate the development and set-up process of FCOPS. <br><br> **Requirement 5** The system ownership of FCOPS will be assigned to the policy domain owner, who will be responsible for developing the functionalities and need to safeguard the operations of FCOPS. <br><br> **Requirement 6** The data ownership relating to the metadata model, taxonomy and data (generic public services) at EU level should be assigned to the policy domain owner; the data ownership of the specific services should be kept in the hands of the Member States. <br><br> **Requirement 7** The mapping between the generic public services and the specific public services should be a task performed by the Member States. <br><br> **Requirement 8** The system owner should manage the FCOPS access rights and authentication rules. <br><br> **Requirement 9** FCOPS should be publicly available for everyone, though restrictions should be placed on the update functionalities of the public services. |
| **Semantic requirements** |
| **Requirement 10** The semantic metadata model used for FCOPS should be based on the Core Public Service Vocabulary. <br><br> **Requirement 11** FCOPS should support a multidimensional controlled vocabulary in order to improve the flexibility and user-friendliness. |

**Requirement 12** The controlled vocabularies used within FCOPS must be translated into all official EU languages.

**Requirement 13** The public services within FCOPS should also be available in all official languages, potentially by means of a machine translation tool.

**Technical requirements**

**Requirement 14** FCOPS should provide a manual technique for managing manage the public services within the catalogue and provide a content syndication technique for Member States on a lower level of maturity.

**Requirement 15** FCOPS should provide an automatic content syndication technique to support the Member States which are on a higher level of maturity.

**Requirement 16** FCOPS should provide a (flexible) user interface for citizens, businesses and public administrations in order to consult the public services.

**Requirement 17** FCOPS should provide an automatic data output mechanism in a way that the user can retrieve data from the catalogue. The data retrieved should be described in a standardised format.

**Requirement 18** FCOPS should provide a search banner to increase the functionality of the catalogue and the Member States' systems (portals, catalogues, etc.)

**Table 12 – Requirements to develop FCOPS**

## 5.6.1 RECOMMENDATION FOR THE MEMBER STATES

The analysis in work package 1 showed that not all the Member States have a catalogue of public services available yet. Therefore this overview of the requirements can be used as a form of checklist/tool during the development of a catalogue at Member State level. However, the Member States do not need to focus on the organisation requirements; these are specifically applicable to FCOPS.

The other requirements, especially the semantic and technical requirements, are worth considering for the Member States. These requirements provide the baselines which are required for the catalogue at Member State level and need to be aligned with FCOPS. In addition to these requirements the Member States can reuse the assets defined and developed and used to build FCOPS, thinking of the semantic metadata model, taxonomies, the tools, etc. This will enhance the interoperability and harmonisation across the EU.

For the Member States that do have a catalogue available are able to use these requirements to get aligned with FCOPS. They also have to set up a mapping between their catalogue and FCOPS in order to exchange information about the public services and use FCOPS in an efficient way.

# 6 ACTION PLAN TO IMPLEMENT FCOPS

This section describes and details the timeframe and action plan. As mentioned above, a big bang approach to implementing FCOPS will not be feasible. The implementation will consist of different phases, each having its own purpose and investigating another dimension of FCOPS. The approach that is pursued for FCOPS consists of different steps within each action block/iteration.

The figure below shows an overview of the different iterations proposed for the development of FCOPS. This scenario in which it occurs is indicated for each action block. The bottom of the figure mentions the short-, medium- and long-term objectives.
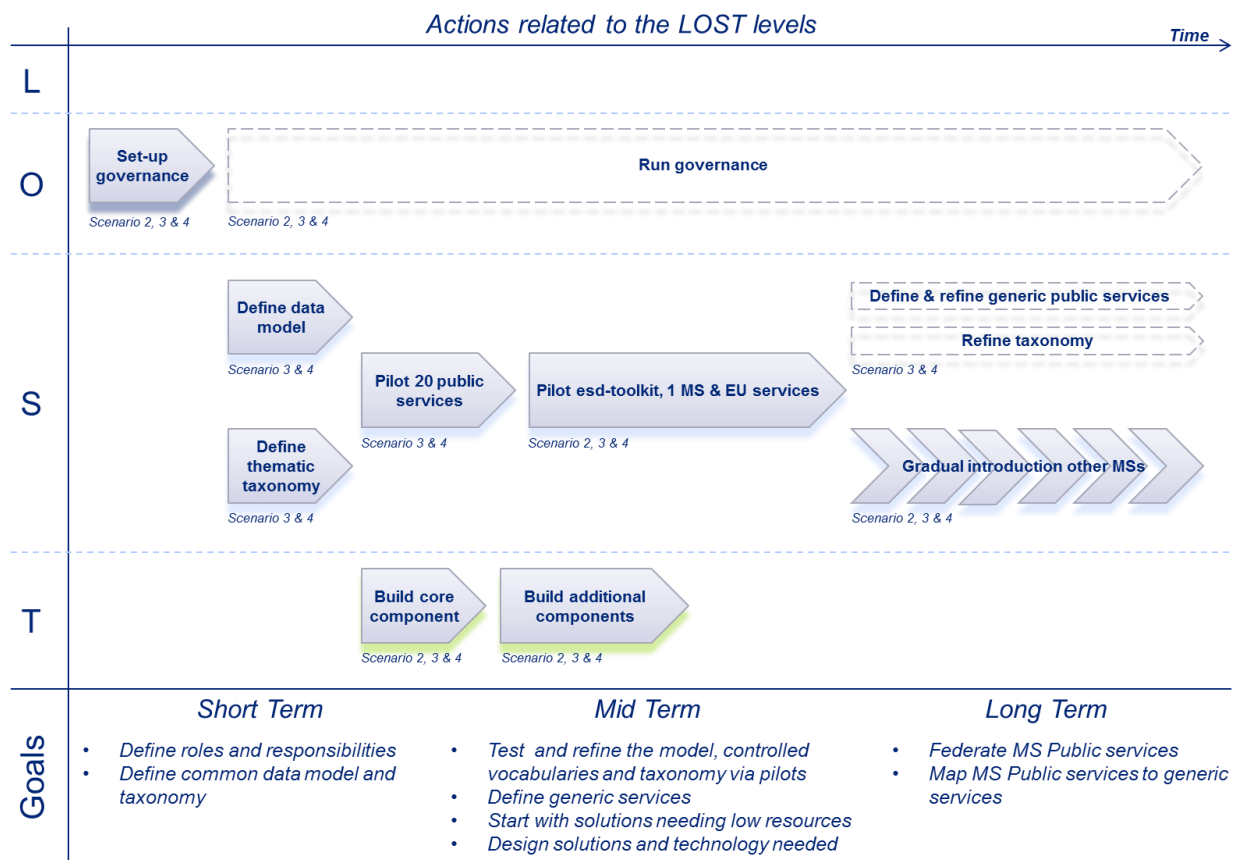


**Figure 11 – Action plan for the development of FCOPS**

The action plan can be divided into three major phases:

- The set-up of the governance model;
- The development of the system and the prerequisites of the system:
    - Define data model;
    - Define thematic classification;
    - Build FCOPS system (core components and additional components);
    - Define and refine generic public services;
    - Refine controlled vocabularies.
- Pilot:
    - Pilot 20 public services;
    - Pilot esd-toolkit, one Member State & EU services;
    - Pilots of other Member States.

The different iterations can be intertwined and use other iterations as input for their actions. The objectives and the action blocks are further detailed out in the following sections.

## 6.1 LEGAL – ISA LEGAL FRAMEWORK

The development of FCOPS will not lead to a definition of a new legal framework.

## 6.2 ORGANISATIONAL – SET UP AND RUN GOVERNANCE

Before proceeding with one of the iterations, it is important to first create and assemble a governance body that takes on the accountability from the beginning. This will be a supranational working group consisting of representatives of different FCOPS stakeholders. They will serve as the primary governance body.

As mentioned in the governance section of the requirements (cf. 5.3.1 Organisation), the working group can be divided into different subgroups, each focusing on a particular action block. These groups will each take on the responsibility and accountability for a specific iteration during the development process.

The goal of this working group is to lead the development of FCOPS and guide the iterations in the right direction. They will decide on the policies and controls which should be enforced for the development. This working group will be made up of Member State representatives and representatives of the European Commission. The set-up of the actual governance will be coordinated by the ISA.

Figure 12 provides an overview of the different action blocks mapped with the governance provided for in the requirements (cf. 5.3 Organisational requirements – Governance). It shows who is involved in each action block and indicates where the ownership lies.
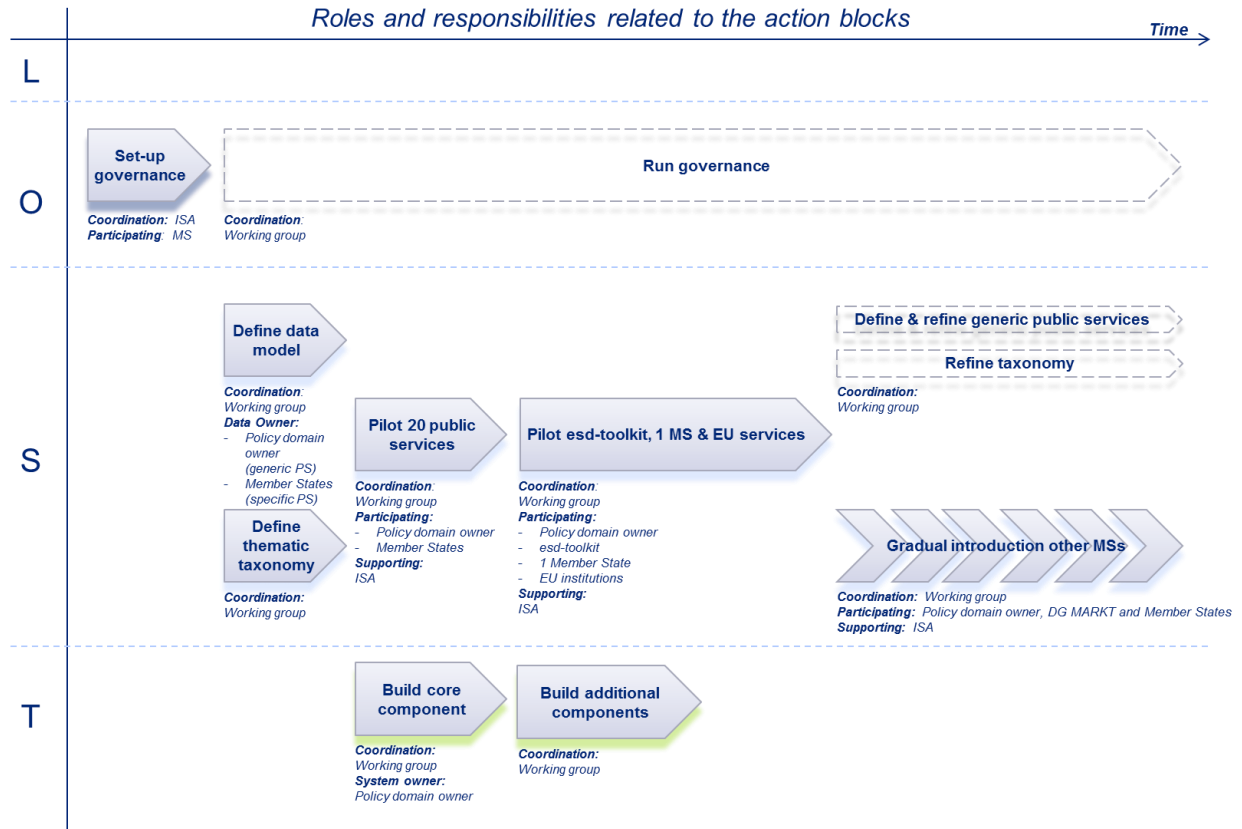


**Figure 12 – Action plan mapped with the governance**

| Input |
|---|
| - Study Catalogue of services II: work package 1 |
| - Study Catalogue of services II: work package 2 |
| **Output** |
| - Working group/hierarchy of subgroups |
| - Governance model (Organisation, Policies, Controls) |

**Table 13 – I/O of the Governance iteration**

## 6.3  ORGANISATIONAL – DEFINE THE DATA MODEL

One of the prerequisites before the system development for FCOPS can start is the definition of the semantic metadata model. As soon as the governance body has been set up, it is important that they reach a consensus on the public service model.

The goal of this iteration is for the proposed semantic metadata model (cf. 5.4.1 Metadata model) to be further developed and tailored to the needs of FCOPS. This model will be used to describe the public services within FCOPS and establish a mapping with the specific public services.

The pilot studies performed on the CPSV could be used as a leading example and support this iteration. During the pilot, the CPSV is mapped with the IPDC (Flemish initiative), 'Nasjonale Tjenestekatalog' (Danish initiative) and the esd-toolkit (UK initiative). The lessons learned and the insights gained during this study could be valuable in order to gain insights into how the mapping could actually be done and whether they encountered any difficulties.

| Input |
| --- |
| - Study Catalogue of services II: work package 2 |
| - Core Public Service Vocabulary |
| - CPSV pilot[28] |
| - Working group |
| **Output** |
| - Standardised semantic metadata model |

**Table 14 – I/O of the data model iteration**

## 6.4  ORGANISATIONAL – DEFINE THEMATIC TAXONOMY

Once the governance body and model has been set up, a working group is dedicated to reach a consensus on a standard for a thematic classification. The working group can perform this iteration in parallel with the definition of the metadata model.

Certain Member States had already taken the initiative to set up a standard thematic classification applied at all government levels within their borders. This classification is enforced among all public administrations to structure their public services. Examples of such initiatives can be found within Austria, Denmark, Norway and the Netherlands. These countries could serve as a basis for creating a standard classification for FCOPS.

The definition of this thematic classification is an on-going learning process which will keep running after the development of FCOPS and the pilot studies of all the Member States. During the pilots the standard classification will be tested to see whether it is complete. Whenever a public service could not be mapped

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[28] CPSV pilot: http://cpsv.testproject.eu/CPSV/

with one of the themes (classification), then it will be assigned to a default group. The working group reviews the default group on a regular basis and they will decide whether there is a need to create a new theme (cf. 5.3.2.2 Data view). These checks will be also performed after the set-up of FCOPS and after the pilots. For example, when a Member State is introducing a new public service, it should carry out a mapping with one of the themes in the standard classification. If it is not possible to map it, the service will be assigned to the default group and a new theme could be proposed.

The primary goal of this iteration is to have a standard classification in place for FCOPS. Going a step further and looking to the final aim, then the thematic classification should become a standard across all Member States. This vision was proposed by the contact persons from the analysis in work package 1.

| Input |
| --- |
| - Working group |
| - Study Catalogue of services II: work package 1 |
| - Study Catalogue of services II: work package 2 |
| - The classifications used within the Member States |
| **Output** |
| - Standardised thematic classification |

**Table 15 – I/O of the classification iteration**

## 6.5 ORGANISATIONAL – PILOT OF 20 PUBLIC SERVICES

The first pilot is performed as an initial test and provides valuable input in order to determine the feasibility and the planning for the alignment of all Member States with FCOPS. The pilot can be performed in a testing environment (e.g. offline, in a spread sheet) without requiring that the system for FCOPS be already built. However the environment used should be aligned with the semantic metadata model. Once the system is ready, the generic public services described in the testing environment can be directly inserted into FCOPS.

The goal of this iteration is for the working group to try to define a number of generic public services that could be applicable for all Member States. The working group will take a selection of 20 public services spread across all government levels (this could be in cooperation with 'Your Europe'). For these 20 public services the working group need to consult all the specific public services for each Member State. Based on that input the working group will be able to define the generic public services according to the semantic data model.

| Input |
| --- |
| - Working group |
| - Study Catalogue of services II: work package 2 |
| - Controlled vocabularies |
| - The 20 specific public services from all Member States |

| Output |
| --- |
| - 20 generic public services<br>- Planning for the alignment of all Member States with FCOPS |

**Table 16 – I/O for the pilot of 20 cross-border services**

## 6.6 ORGANISATIONAL – PILOT OF ESD-TOOLKIT, ONE MEMBER STATE AND EU PUBLIC SERVICES

Within the second pilot the scope is defined more broadly compared to the first testing pilot. It will cover all public services from the esd-toolkit, one particular Member State and all the EU public services.

The first step within this iteration deals with all the public services gathered within the esd-toolkit. These service description are already generic for the local governments in seven countries (England and Wales – pioneer, Belgium, Germany, the Netherlands, Norway, Scotland and Sweden). Due to the standard format, the working group and the owners of the esd-toolkit only need to create a mapping between the semantic data models in order to include these services within FCOPS. These services can be used as a basis for the definition of the preliminary generic public services at local level. At a later stage these generic public services will be tested and updated when necessary.

In the second step of this iteration, all public services are covered that are offered at all the government levels within one specific Member State. This step is the pioneer for all the following pilots covering the other Member States. Therefore it is recommended that a Member State with a higher level of maturity be chosen; a leading example could be the Netherlands. The Dutch set-up of the catalogue of public services is highly comparable with the set-up of FCOPS.

In this step, a mapping first needs to be created between the semantic models of FCOPS and the catalogues of the Member State. This is required in order to include the specific public services in FCOPS. Once all the specific public services have been mapped, the working group is able to use those descriptions as a basis for the definition of the generic public services. The local generic public services from the esd-toolkit and the services from pilot 1 can also be checked to see whether they are generic enough for this Member State.

The final objective of this iteration is to include all supranational public services, including all services offered by EU instances. These public services will enhance the support for FCOPS. This step can be carried out in parallel with the implementation of the specific public services of the Member State.

| Input |
|---|
| - Working group |
| - Study Catalogue of services II: work package 2 |
| - Controlled vocabularies |
| - Pilot 20 public services |
| - Generic public services from esd-toolkit |
| - Specific public services offered by all administrations at all government levels within one particular Member State |
| - All supranational public services |
| **Output** |
| - Mapping between a pioneer Member State and FCOPS |
| - Preliminary generic public services at all government levels |
| - Specific public services offered by the pioneer are described within FCOPS |
| - A mapping of the predefined controlled vocabularies (test) |

**Table 17 – I/O for the pilot of esd-toolkit, 1 Member State and EU public services**

## 6.7 ORGANISATIONAL – DEFINE AND REFINE GENERIC PUBLIC SERVICES

The aim of this block of the action plan is to define and fine-tune the generic public services within FCOPS. It is seen as a continuous action under the control of the working group. The pilots executed will provide support for this action block by providing a base of specific public services. During the second pilot especially, the focus of the working group will be to generate all generic public services at all government levels. The subsequent pilots are then used the check these generic public services and update or create new services when needed.

This block will continuously repeat for each Member State, which will enhance the quality of the generic description after each pilot. During the first pilots the workload involved in checking the generic public services will be rather high, but the workload will decrease pilot-by-pilot as the descriptions become more and more generic.

The ultimate goal is to define generic public services which are applicable in all Member States. Each Member State should be able to use the generic public service descriptions within their own catalogue in order to provide information to the public.

| Input |
|---|
| - Working group |
| - Study Catalogue of services II: work package 2 |
| - Pilot studies |
| **Output** |
| - Definition of the generic public services |

**Table 18 – I/O for defining the generic public services**

## 6.8 ORGANISATIONAL – REFINE CONTROLLED VOCABULARIES

This action block will focus on refining the controlled vocabularies used within FCOPS. The focus is not only on the standardised thematic classification (cf. 6.4 Organisational – define thematic taxonomy), but this action block will also cover all controlled vocabularies mentioned within section 5.4.2 Controlled vocabularies for classification.

The various pilot studies are used as input in order to fine-tune the controlled vocabularies. During these pilots the specific public services included within FCOPS and mapped with exactly one item per classification (thematic, COFOG, geographical, etc.) Whenever it is not possible to map the service, they will be assigned to a default group.

The working group will review this default group on a regular basis and check whether there is a need for a new item within a particular classification. This action block will be performed during each pilot and continue after the last pilot. For example, when a Member State launches a new public service which could not be mapped with an item in a specific classification, the working group should assign it to the default group and consider creating a new value for that classification.

| Input |
|---|
| - Working group |
| - Study Catalogue of services II: work package 2 |
| - Defined controlled vocabularies |
| - Input from the pilot studies |
| **Output** |
| - Updated controlled vocabularies |

**Table 19 – I/O for refining the controlled vocabularies**

## 6.9 ORGANISATIONAL – GRADUALLY INTRODUCE FCOPS IN ALL MEMBER STATES

The first two pilots are used to test and explore the functionalities of FCOPS. Once these pilot studies have been performed and accepted, and FCOPS system is running, this action block can be started. It will consist of different phases, each representing exactly one Member State.

By following this approach, all specific public services across the EU will gradually be inserted within FCOPS. It is not a prerequisite that each pilot have to be finalised before another can start; multiple Member States can be covered simultaneously but each pilot is seen as distinct.

The goal of this iteration is to have a working FCOPS which includes all specific public services from all government levels within all Member States. In addition, at the end of this iteration the controlled vocabularies are tested and fine-tuned. These controlled vocabularies can afterwards be accepted as a standard.

| Input |
| --- |
| - Working group |
| - Study Catalogue of services II: work package 2 |
| - Pilot of 20 public services |
| - Pilot of esd-toolkit, one Member State and EU public services |
| - Controlled vocabularies |
| **Output** |
| - A fully-fledged FCOPS |
| - Exhaustive testing of the controlled vocabularies for all Member States' public services |

**Table 20 – I/O for the pilot studies for the other Member States**

## 6.10 TECHNICAL – BUILD CORE COMPONENTS

Once the working group has defined the semantic metadata model, the actual FCOPS development process can start. The primary focus of the development process will be on the core components of FCOPS. These are listed below.

- Database: used to describe and store the generic and specific public services according to the semantic metadata model. The classifications are also gathered within the database;

- Content management system: used to manage the data within the database and safeguard data security and consistency through the implementation of identity and access management;

- Identity and access management system: this system can be implemented within the content management system and is used for authorisation and authentication rules to set the access to the data within FCOPS.

The working group in cooperation with the system owner will develop these core components in order to create FCOPS. It should be noted that this system does not have to be finalised before initiating the first pilot study. The description of these 20 public services can be produced in an alternative environment which is less complex (e.g. an Excel-sheet). Nonetheless the core components should be finalised before going on to the next pilot studies.

The content management system will also require a user interface in order to insert the generic public services and manage the data. This can also be seen as a manual input functionality. This is required before the next pilot study can start.

| Input |
|---|
| - Working group |
| - Study Catalogue of services II: work package 2 |
| **Output** |
| - Core components of FCOPS |

**Table 21 – I/O of the development process of FCOPS core components**

## 6.11 TECHNICAL – BUILD ADDITIONAL COMPONENTS

Once the core components of FCOPS are built, the working group can focus on developing the additional components. These components encompass the input and output functionalities which are required for the information exchange between FCOPS and the Member States' systems.

The first focus should be on the input functionalities, including the content syndication techniques for manual and automatic insertion of specific public services (cf. 5.5 Technical requirements). The output functionalities can be developed at a later stage and in parallel with the development of the search banner and integration of the machine translation tool.

Once this iteration is finalised, FCOPS will be fully fledged and can be published. The Member States should be able to use and consult FCOPS after the completion of this phase.

| Input |
|---|
| - Working group |
| - Study Catalogue of services II: work package 2 |
| - Core components of FCOPS |
| **Output** |
| - Additional components of FCOPS |

**Table 22 – I/O of the development process of FCOPS additional components**

# 7 FCOPS BUILDING BLOCKS AND SOLUTIONS

## 7.1 INTRODUCTION TO THE BUILDING BLOCKS

Based on the scenarios, requirements and action plan described, it is possible also to provide a description of all the building blocks that are required to implement FCOPS. The set-up will involve multiple building blocks that will function as the backbone and front-end of FCOPS.

Figure 13 provides an overview of the building blocks involved in a cohesive structure. The figure also shows how these building blocks are interrelated in order to function as FCOPS. Each component is further elaborated on in the next sections, where the following aspects are described:

- The functionalities;
- The requirements related to the building block (cf. 5.6 Summary of the Requirements);
- The solutions to support the building block.

When these building blocks are realised they need to be in line with the EIA[29] and fit with the EIA building blocks. Furthermore, all the solutions developed for FCOPS should be described according to ADMS and added to EFIR[30]. Via EFIR, the (semantic) assets used in FCOPS can be made available and reusable for other administrations.
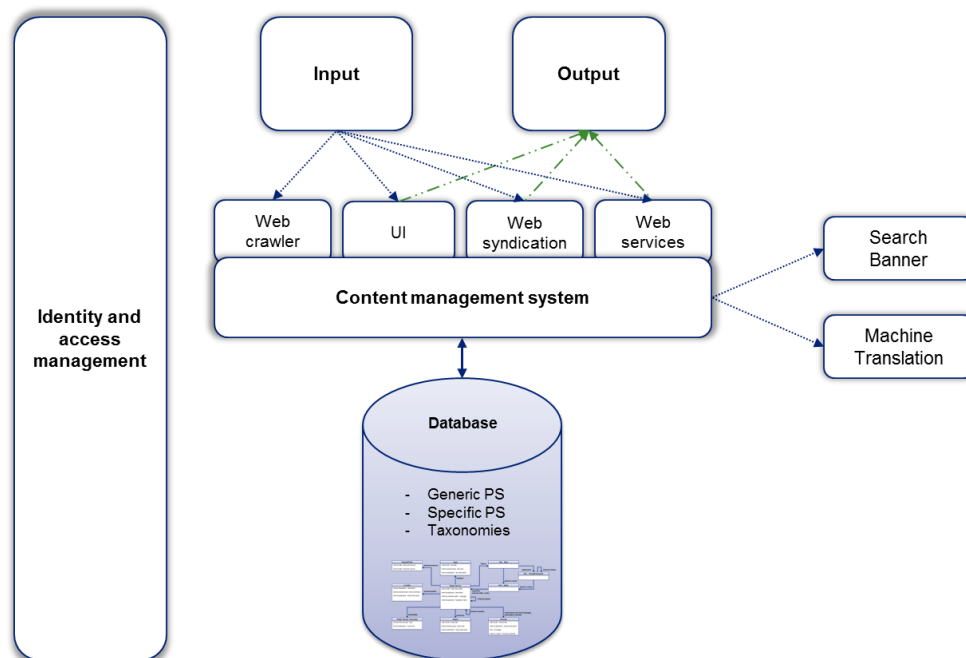


**Figure 13 – Set- up of FCOPS and tools**

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[29] European Interoperability Architecture project ISA Work programme: D1 - European Interoperability Architecture - Reference Architecture, D2 - European Interoperability Architecture - Reference Architecture and D5 - Governance of the EIA Reference Architecture and Cartography
[30] ADMS and EFIR are briefly explained in section '4.7 Asset description metadata schema' in work package 1

## 7.2  CORE COMPONENTS

### 7.2.1  SEMANTIC METADATA MODEL

#### 7.2.1.1  PURPOSE AND FUNCTIONALITY

The semantic metadata model is the core of FCOPS. This model will be standardised and used to describe the public services within FCOPS. It will have an essential purpose and is therefore planned for one of the initial phases of the development process.

The model determines which information is required in order to describe the public services (abstract data classes) and how this information should be structured to gather them within FCOPS database (relationships between data classes). The working group should coordinate and lead the definition of the semantic metadata model of public services. A detailed description can be found in the requirements section (cf. 5.4.1 Metadata model).

This public service model will also be required in order to establish information exchange between the Member States' systems and FCOPS. The standardised metadata model at EU level will be mapped with the model used within the Member States. By creating such mapping the information can be stored within the database.

#### 7.2.1.2  REQUIREMENTS FIT

The requirements which are related to the semantic data model are listed below:

- *Requirement 6: The data ownership relating to the metadata model, taxonomy and data (generic public services) at EU level should be assigned to the policy domain owner; the data ownership of the specific services should be kept in the hands of the Member States.*

  The working group will, in close collaboration with the data owner at European level, define the semantic metadata model. The working group will specifically lead and coordinate the development of the model.

- *Requirement 7: The mapping between the generic public services and the specific public services should be a task performed by the Member States.*

  The mapping can only be established once FCOPS metadata model has been defined. The Member States are able to map their data classes and fields with those used within the standardised model.

- *Requirement 10: The semantic metadata model used for FCOPS should be based on the Core Public Service Vocabulary.*

  The definition of the semantic metadata model should be based on the CPSV, a standardised and abstract metadata model built by the CPSV working group. The group consists of representatives from across the EU and also academics providing support to the definition of the public service model.

- *Requirement 11: FCOPS should support a multidimensional controlled vocabulary in order to improve the flexibility and user-friendliness.*

  The abstract metadata model should allow the definition of multiple classifications per public service. This is required in order to describe the public services and implement the multidimensional controlled vocabularies within FCOPS (flexibility).

- *Requirement 12: The controlled vocabularies used within FCOPS should be translated into all official EU languages.*

  The public service model should support and allow the use of multilingual versions of the services. This will take into account the multilingualism across the EU.

The semantic metadata model will have an indirect impact on the input- and output functionalities through the use of the mapping between the semantic models. Therefore requirements 14 (manual input), 15 (automatic input), 16 (manual output), 17 (automatic output) and 18 (search banner) have an indirect relationship with the public service model.

### 7.2.1.3 SOLUTIONS

The metadata model defined should be based upon the Core Public Service Vocabulary. This is an abstract model that should be further refined and tailored to the requirements mentioned above. There are existing models of different technologies to describe the data type of the fields for inclusion: Dublin Core Vocabulary, Core Location Vocabulary, Simple Knowledge Organisation System, Web Ontology Language, Friend of a Friend and Functional Requirements for Bibliographic Records. The actual model will be built in XML in which the data can be structured and described.

## 7.2.2 DATABASE

### 7.2.2.1 PURPOSE AND FUNCTIONALITY

The next main building block of the implementation of FCOPS is the database. It will contain all the information on the generic public services, specific public services and all defined controlled vocabularies (taxonomies). This set-up will be very essential and therefore the semantic metadata model should be finalised and optimised in order to store the information optimally.

The reliability and consistency of the system will have a significant influence on the functionalities of FCOPS. Therefore it is vital that the data is well managed and secured by a content management system, and an identity and access management system. The data should also be kept up-to-date and complete by the Member States.

### 7.2.2.2 REQUIREMENTS FIT

Looking at the requirements mentioned in section 5.6, it is possible to reference a number of requirements dealing with the database:

- *Requirement 1: All EU Member States and EEA Member States should be included within the scope of FCOPS.*

  This requirement is enforced by gathering the data on all the public services which are offered by these countries. The information on the services is gathered and stored centrally in a database.

- *Requirement 5: The system ownership of FCOPS will be assigned to the policy domain owner, who will be responsible for developing the functionalities and need to safeguard the operations of FCOPS.*

  The policy domain owner will be responsible for the development of the database (system owner). The development process will be done in close cooperation with the working group.

- *Requirement 6: The data ownership relating to the metadata model, taxonomy and data (generic public services) at EU level should be assigned to the policy domain owner; the data ownership of the specific services should be kept in the hands of the Member States.*

  The ownership of the data stored within the database will be split between data owner at European level (generic services) and the Member States (specific services), each having their own obligations and rights. The data owner at European level will be assigned to the policy domain owner.

- *Requirement 7: The mapping between the generic public services and the specific public services should be a task performed by the Member States.*

  Within the database one common metadata model is used, which also require a mapping with the controlled vocabularies. Therefore each specific public service should be mapped with the semantic metadata model and exactly one generic public service (controlled vocabulary).

- *Requirement 10: The semantic metadata model used for FCOPS should be based on the Core Public Service Vocabulary.*

  The semantic metadata model represents the core of the database. This requirement is certainly apposite when dealing with the development of the database structure.

- *Requirement 11: FCOPS should support a multidimensional controlled vocabulary in order to improve the flexibility and user-friendliness.*

  The database stores all the controlled vocabularies and it should provide the possibility of supporting a multidimensional classification.

The development of the database involves all these requirements and some are also related with other building blocks of FCOPS.

### 7.2.2.3   SOLUTIONS

The MySQL tool is used by many portals and catalogues, e.g. 'Interbestuurlijke Producten- en DienstenCatalogus'. This solution is often used in cooperation with Drupal to create a content management system. MySQL is also deployed together with Drupal within Joinup.

### 7.2.3   CONTENT MANAGEMENT SYSTEM

### 7.2.3.1   PURPOSE AND FUNCTIONALITY

The content management system (CMS) is another central part of FCOPS. It is a software tool that enables the publication of documents and information. In the case of FCOPS it will deal with the information on generic and specific public services. To increase the flexibility of FCOPS the CMS needs to support multiple input techniques (cf. 7.3.1 Input) in order to insert and store public services within the integrated database. A manual user interface (UI) will also be required to manage the public services within the database. This UI will mainly be used by Member States without a catalogue and by the

working group to create the generic public services. Otherwise the CMS will also be used as a presentation layer in order to consult the public services as a user of FCOPS.

The CMS serves also as a protection layer for the database; it secures the data in a way that non-authorised users cannot access the data. The identity and access management module is therefore interacting with the content management system.

A content management system thus consists of an administration module to insert, update or delete public services, a database to store the public services and a presentation module to consult the public services. In addition to these components the CMS can be extended with a search module, login module, etc. Within the set-up of FCOPS, there is a focus on two extra components: a search banner and a machine translation tool. These are further elaborated on with the sections below (cf. 7.3.3 Search banner and 7.3.4 Machine translation.

### 7.2.3.2  REQUIREMENTS FIT

The requirements related to the content management system are listed below:

- *Requirement 5: The system ownership of FCOPS will be assigned to the policy domain owner, who will be responsible for developing the functionalities and need to safeguard the operations of FCOPS.*

  This requirement indicates that system owner is responsible for setting up the content management system for FCOPS. The extensions of the CMS like the search banner and machine translation will also be their responsibility. They will work together with the working group.

- *Requirement 6: The data ownership relating to the metadata model, taxonomy and data (generic public services) at EU level should be assigned to the policy domain owner; the data ownership of the specific services should be kept in the hands of the Member States.*

  The content management system, and the identity and access management tool determine whether the user is authorised to access specific parts of the data. For example Spain will only be able to access and manage the Spanish public services; however they will be able to consult the generic public services and all other public services offered by other Member States.

- *Requirement 8: The system owner should manage the FCOPS access rights and authentication rules.*

  Although the access rights and policies are determined and described within the identity and access management, the CMS tool will enforce these policies and protect the database from unauthorised access.

- *Requirement 9: FCOPS should be publicly available for everyone, though restrictions should be placed on the update functionalities of the public services.*

  Via the CMS the content of the database can be made available for everyone; it will represent the presentation layer of FCOPS.

### 7.2.3.3  SOLUTIONS

Three solutions are proposed in order to develop the CMS for FCOPS:

- Drupal: as mentioned previously, Drupal is already used for the development of Joinup. It is a collaborative platform for sharing semantic assets, and working groups can easily cooperate on initiatives like Core Vocabularies. FCOPS can be made available and accessible via Joinup. Another example of Drupal implementation is 'Interbestuurlijke Producten- en DienstenCatalogus'.

- Corporate Web Content Management System: CWCMS for short is the solution that is mainly used to publish documents or information on the portals of the European Commission. Advice could therefore be given that CWCMS set up a CMS for FCOPS.

- SharePoint: this is a platform developed by Microsoft using web technologies to exchange information. A SharePoint environment is used to increase the collaboration within an organisation or group. Therefore a SharePoint solution could be considered for FCOPS.

## 7.2.4  IDENTITY AND ACCESS MANAGEMENT

### 7.2.4.1  PURPOSE AND FUNCTIONALITY

Identity and access management will be used to determine access rights, authentication rules and authorisation rules in relation to the various stakeholders/users of FCOPS. A tool should support the creation of the diverse policies which are required to safeguard the data consistency and reliability. These policies could be realised through the configuration of the content management system.

The policies which are required primarily concern the input of data and the management of the data within the database. It is especially important to enforce the policies mentioned in section 5.3 Organisational requirements – Governance via the identity and access management.

### 7.2.4.2  REQUIREMENTS FIT

The requirements associated with identity and access management are listed below:

- *Requirement 5: The system ownership of FCOPS will be assigned to the policy domain owner, who will be responsible for developing the functionalities and need to safeguard the operations of FCOPS.*

  The system owner will be responsible for implementing the identity and access management tools during FCOPS development process.

- *Requirement 8: The system owner should manage the FCOPS access rights and authentication rules.*

  The system owner will be able to manage the access rights and authentication rules through the solution for identity and access management.

- *Requirement 9: FCOPS should be publicly available for everyone, though restrictions should be placed on the update functionalities of the public services.*

  Access rights will be determined in relation to the input of the public services, but there will be no restrictions on consulting FCOPS (output). The data should be publicly available for everyone.

### 7.2.4.3  SOLUTIONS

The identity and access management will be integrated within the CMS in order to implement the permissions and the restrictions. eID can be used to ensure the real identity of the user while working with FCOPS.

The STORK project[31] can be used to support the use of eID in FCOPS. It is a European eID interoperability platform that enables the authentication of citizens and competent authorities that want to establish new e-relations across borders. The STORK platform will use the national eID to identify the user and retrieve (personal) data from that user. This information will only be used to send data to the cross-border eservices. At all times, the consent of the owner will be required before it can be sent to the service provider.

STORK can be used by FCOPS as a central repository that keeps track of which competent authorities are authorised to access the data of FCOPS. It can support the identity and access management of FCOPS by having a list of authorised parties and integrate electronic identification of the stakeholders.

In addition to eID and STORK, FCOPS could make use of the European Commission Authentication Service (ECAS). This service provides a log-in procedure for all systems, websites or services offered by the European Commission and can be integrated with STORK. ECAS enforces the single sign-on principle by identifying the user once and granting access to all the services for which the user is authorised. The user needs to keep his/her browser open to enjoy the benefits of single sign-on.

ECAS can be considered as a means of authenticating and granting access to FCOPS users. The Member State representatives can then easily update their specific public services within FCOPS.

ECAS is made possible by the Security Directorate of DG HR (business owner) and DIGIT (for technical issues). They developed the system for the support of the staff of EU institutions but also for external users.

## 7.3  ADDITIONAL COMPONENTS

### 7.3.1  INPUT

#### 7.3.1.1  PURPOSE AND FUNCTIONALITY

Retrieving information from Member States requires a lot of flexibility due to the fact that Member States work autonomously. Each Member State has its own systems and ways of working to help their citizens and businesses. Therefore the working group needs to take this flexibility into account and create the opportunity for each Member State to insert their specific public services.

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[31] https://www.eid-stork.eu/

### 7.3.1.2  REQUIREMENTS FIT

The requirements that are associated with the input techniques for information are listed below:

- *Requirement 5*: *The system ownership of FCOPS will be assigned to the policy domain owner, who will be responsible for developing the functionalities and need to safeguard the operations of FCOPS.*

  The policy domain owner will be responsible for building the input facilities for FCOPS. They need to provide diverse techniques in order to cooperate with all Member States.

- *Requirement 14: FCOPS should provide a manual technique for managing manage the public services within the catalogue and provide a content syndication technique for Member States at a lower level of maturity.*

  A user interface will be built and integrated within the content management system. Via the user interface the Member State and the working group will be able to update and manage the content within the database depending on the access permissions.

- *Requirement 15: FCOPS should provide an automatic content syndication technique to support those Member States which are at a higher level of maturity.*

  The working group will provide three diverse techniques in order reach out to the Member States at a higher maturity level.

### 7.3.1.3  SOLUTIONS

A user interface will be made available through the content management system to insert and manage the public services (generic and specific) manually. There is also a requirement to support automatic content syndication techniques. Therefore the following techniques should be integrated within the content management system:

- Web Crawler: by means of a web crawler it will be possible to go through the various Member State portals. The web scraping technique will then be applied to extract the information required and store it via the CMS within the database. If the right information is to be identified, the Member States will need to add pre-defined metadata tags within their portals.

- Web Syndication: it is possible to upload the information about the public services required within FCOPS by means of RSS feeds or other standardised XML-files. The working group needs to reach an interoperability agreement with the Member States defining one central place for publishing the feeds or XML-files. These feeds and files will be structured according to the semantic metadata model used for describing the services within FCOPS.

- Web services: The working group can develop RESTful APIs or other web services (e.g. in SPARQL, SOAP) in order to establish an information exchange channel between the Member States' catalogue and FCOPS. The Member States are able to send data through to FCOPS (e.g. RDF-format). Another example of web services is Google Refine. Using this Google web service the data within FCOPS or Member States systems can be converted in a RDF-format using an own vocabulary.

### 7.3.2 OUTPUT

#### 7.3.2.1 PURPOSE AND FUNCTIONALITY

FCOPS needs to create different possibilities for presenting the users (citizens, business and public administrations) with the information gathered in the database. The most convenient method is to provide a user interface which displays the data in a structured and intuitive way. Using the multidimensional controlled vocabularies the public services will be presented in an enhanced and user-friendly format. The user is able to choose between different pathways in order to drill-through to the preferred public service. FCOPS should provide other methods as well.

#### 7.3.2.2 REQUIREMENTS FIT

The requirements which are associated with the output side are:

- *Requirement 5: The system ownership of FCOPS will be assigned to the policy domain owner, who will be responsible for developing the functionalities and need to safeguard the operations of FCOPS.*

  Similar to the case of the input functionalities of FCOPS, the system will be held responsible for the output functionalities.

- *Requirement 16: FCOPS should provide a (flexible) user interface for citizens, businesses and public administrations in order to consult the public services.*

  The user interface will be established via the CMS. The system will publish the information about the public services in accordance with the semantic metadata model and the controlled vocabularies. It will provide a multidimensional classification to enhance the user-friendliness of the UI.

- *Requirement 17: FCOPS should provide an automatic data output mechanism in a way that the user can retrieve data from the catalogue. The data retrieved should be described in a standardised format.*

  FCOPS should provide automatic data output functionalities for the citizens, businesses and public administrations. Two mechanisms are recommended and described below.

#### 7.3.2.3 SOLUTIONS

The diverse output opportunities are integrated with the content management system. The CMS will serve as an intermediary between the output and the database. The following automatic techniques should be made possible in addition to the manual user-interface:

- Web Syndication: it is possible to download the information about the public services from FCOPS by means of RSS feeds or other standardised XML-files. The working group can publish these feeds and XML-files on FCOPS portal. The Open Data concept can be linked with these standardised XML-files.

- Web services: The working group can develop RESTful APIs or other web services in order to establish an information exchange channel between the Member States' catalogues and FCOPS. The Member States are able to retrieve the public services from FCOPS automatically.

### 7.3.3 SEARCH BANNER

This can also be seen as output functionality, but this section is added separately for the reason that the search banner has a significant additional value for Member States.

### 7.3.3.1 PURPOSE AND FUNCTIONALITY

The primary focus of a CMS is to manage information and publish it for a number of stakeholders. This tool can be extended with additional features like search functionality. During the analysis it was shown that most Member States' portals provided a search engine. In one specific case (the Netherlands) it was found that the various portals were provided with one similar search banner that launches queries in the 'Samenwerkende Catalogi'.

It is recommended that a search banner be developed for FCOPS in order to enhance collaboration across the EU. All Member States will be able to implement this banner within their portals to create the opportunity to the public to search for specific public services offered by other Member States.

### 7.3.3.2 REQUIREMENTS FIT

Creating such a search banner will enforce the following requirement:

- *Requirement 18: FCOPS should provide a search banner to increase the functionality of the catalogue and the Member States' systems (portals, catalogues, etc.)*

### 7.3.3.3 SOLUTIONS

This search banner can be made available by generating SRU-queries that are launched within FCOPS. This is a standard XML-focused search protocol for Internet search queries that uses CQL. An XML message will be returned in answer to the SRU specifications.

## 7.3.4 MACHINE TRANSLATION

### 7.3.4.1 PURPOSE AND FUNCTIONALITY

Another extension of the content management system is the machine translation tool. This tool should be used to translate the public services into all official languages within the EU. It will support the multilingual aspect of FCOPS.

The machine translation should only be used to translate the specific and generic public services into the other official languages. The controlled vocabularies should be translated by means of human involvement.

### 7.3.4.2 REQUIREMENTS FIT

This extension of the content management system is associated with the following requirements:

- *Requirement 13: The public services within FCOPS should also be available in all official languages, potentially by means of a machine translation tool.*

### 7.3.4.3 SOLUTIONS

MT@EC (cf. work package 1) could be of support as translation tool for the FCOPS. The tool, created by DG Translations, uses the terminology within the EU domain to translate any document or web pages with a small delay. It is not possible to provide real-time or ad-hoc translations at this moment.

# 8 CONCLUSIONS

The Catalogue of Services Phase II study is one of the steps under ISA work programme Action 1.3 'Accessing Member States information resources at European level, Catalogue of Services'. The main objective of this study is to determine the feasibility of setting up a European federated catalogue of all public services ("FCOPS") offered by the Member States of the EU and the three other EEA countries. This covers all public services offered at the national, regional and local level of Member States but also the public services offered at European level. By performing an analysis and gathering together all the requirements by building scenarios, **we conclude that it is feasible to build such a catalogue and make it publicly available. However, a phased and step-by-step approach should be followed in developing FCOPS.**

The Catalogue of Services study is subdivided into two work packages, each forming a deliverable that has its own vision and drivers.

The first work package focused on the examination of the current state of affairs in the Member States. First, a vision and a conceptual model were defined within the deliverable. A preliminary analysis of various initiatives was then carried out in order to identify a number of tools, techniques and processes which could support the vision of FCOPS. It was found that certain insights from these initiatives could be reused or used as a leading example during the development of FCOPS, e.g. the Core Public Service Vocabulary (standardised semantic metadata model) and 'Your Europe' (definition of cross-border public services and interaction with Member States).

This was followed by a second analysis focusing on identifying the trends and commonalities in the legal, organisational, semantic and technical aspects in relation to the national public administration portals in the Member States. This analysis led to a number of valuable insights that could be taken into account for the development of FCOPS, e.g. multidimensional classification and dealing with multilingualism.

From the high-level analysis of the portals, it was possible to identify a number of interesting cases. These cases were characterised by a catalogue of public services at the back-end that supports the public administration portals. These catalogues were helpful for acquiring an understanding of how they have defined their public services, which processes are followed to gather together the specific public services and a number of other elements that could be used within FCOPS (e.g. search banner and definition of generic public services – 'Samenwerkende Catalogi' in the Netherlands).

It was noticeable that each Member State works differently and separately. This lack of standardisation is leading to inefficiencies in interoperability within the EU. Therefore, *now* **is the moment to implement FCOPS** in order to boost the degree of standardisation and interoperability. If development of FCOPS is postponed, then this situation will deteriorate and be more fragmented than now. Certain countries, e.g. Austria and Scotland, are even waiting for the European Commission to move in order to increase the standardisation across Member States. **If the development of FCOPS were to be postponed, then certain Member States would start taking initiatives on their own; this could lead to resistance to future cooperation at EU level.**

The second work package used the first work package as a basis for defining the principles, scenarios and requirements for FCOPS. The initial step was the definition of all the principles which are linked to the

vision of FCOPS and the EIF principles. These principles were used as an evaluation technique to determine the feasibility and validate the alignment of the scenarios with the vision and conceptual model.

The scenarios were built based on the differing situations in the Member States, though these scenarios do not focus on the implementation of the portals or the catalogues within the Member States. Each scenario represents a different set-up of a catalogue at European level. Based on two evaluation methods (SWOT-analysis and principles), **the most feasible scenario is scenario 4 – a federated catalogue with generic public services and mapped with the specific public services.** This indicates that this scenario provides the largest flexibility and is able to cater for all the Member States and not only the ones have already an own catalogue of public services.

The set-up of the fourth scenario (FCOPS) will bring many benefits for and improvements in interoperability across the EU. Public administrations, citizens and business will be able to consult any public service offered within the EU in one central place. Public administrations will be able to learn from other administrations: 'How are other public administrations organising their services?', 'How are other administrations offering and describing their public services?' and 'Which public services are we missing or are superfluous compared with the other Member States'.

In addition, **including the generic public services will increase the standardisation across the EU**. Public administrations will be able to reuse these descriptions for their own purpose and tailor them further to their needs. Not only will these descriptions be available, but the semantic assets to develop FCOPS will be available for the Member States. **These assets can be used by Member States or public administrations in order to build a catalogue of public services on their own. This will also enhance future interoperability with FCOPS.**

The next step of the second deliverable was the definition of the requirements. These were based on the fourth scenario and were in line with the vision defined in the first work package. Each of the requirements is vital for implementation of a well-functioning and fully-aligned catalogue of public services. Once these requirements were finalised, a roadmap was drawn up.

This roadmap consists of an action plan and the identification of the building blocks. The action plan represents a phased approach for the development of FCOPS. It consists of different action blocks where each focuses on specific elements and aspects of FCOPS. The various steps identified also take into account the building blocks required to build FCOPS. These building blocks represent architectural components, like a database, content management system, input and output functionalities, etc.

**The findings of the Catalogue of Services Phase II study can only lead to a feasible outcome if the vision is based on a long-term base. The development process can and should proceed in stages towards this vision. In other words, it will indeed be possible to set up a catalogue at EU level that contains all public services at all levels of government in all Member States, but the process needs to be in line with the predefined requirements and action plan. The building blocks and the actual implementation of the requirements can be worked on further throughout the development process.**