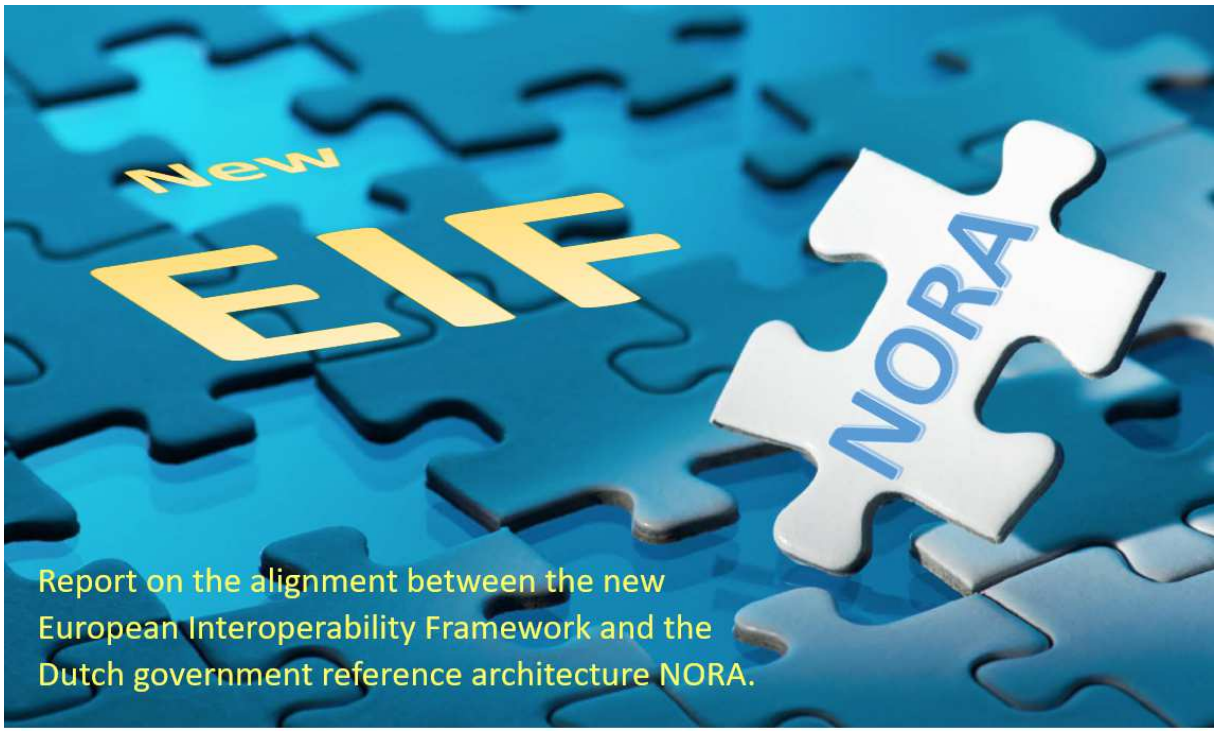

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1. Introduction

This document provides a cross reference between the new EIF of the European Commission and the Dutch Government Reference Architecture NORA. The first part of the document deals with the EIF principles underlying European public services (EIF chapter 2). The second part relates to the setup of digital public services that cover interoperability layers and a conceptual model for integrated public services provision (EIF chapters 3 and 4). For this entire document, all comments in text boxes are NORA reactions to the EIF recommendations directly above.

Part I

Twelve EIF interoperability principles, which are relevant to the process of establishing interoperable European public services, are grouped into four categories with 19 recommendations:

- Principle setting the context for EU actions on interoperability (No 1);
- Core interoperability principles (Nos 2 to 5);
- Principles related to generic user needs and expectations (Nos 6 to 9);
- Foundation principles for cooperation among public administrations (Nos 10 to 12).

We have specified the matching NORA Key Principles (BP[1]) and Derived Principles (AP[2]) per EIF principle and its accompanying 19 recommendations. If no corresponding NORA principle was available, we indicated other relevant information from NORA regarding the EIF recommendations.

Part II

The EIF also contains 28 recommendations on how to set up interoperable digital public services. These recommendations are not based on EIF principles, but reflect additional aspects, such as Interoperability layers (closely linked with NORA's five-layer model) and integrated public services governance. Per recommendation we specified the matching NORA Derived Principles (AP) and / or other relevant information from NORA, like topical issues (thema's).

Not only have we given an indication of the alignment of the NORA framework towards the EIF, but also an indication of the actual implementation of these recommendations and the proposed actions in case the implementation is not matching our quality standards. This qualitative rating is supported by the information and links provided in the various boxes following each EIF recommendation.

For more information, please contact Robert van Wessel or Eric Brouwer at nora@ictu.nl

[1] http://www.noraonline.nl/wiki/Basisprincipes
[2] http://www.noraonline.nl/wiki/Afgeleide_principes

Part I - EIF Principles

2. Principles

Principle 1: Subsidiarity and proportionality

The EIF is envisaged as the **'common denominator'** of interoperability policies in Member States. Member States should enjoy sufficient freedom to develop their NIFs with respect to EIF recommendations. NIFs are expected to be tailored and extended in such a way that national specificities are properly addressed.

Recommendation 1: Ensure that national interoperability frameworks and interoperability strategies are aligned with the EIF and, if needed, tailor and extend them to address the national context and needs.

This EIF principle is in line with NORA's stance on how to inherit content and how to apply architecture frameworks. It has no specific impact on Key Principles (BPs) and Derived Principles (APs).

Principle 2: Openness

Recommendation 2: Publish the data you own as open data unless certain restrictions apply.

The promotion of "open data" in NORA is addressed at the NORA web pages on the 'national semantic plane'[3] that refers to www.data.overheid.nl among others, and NORA's open data portal[4]. NORA itself is published in an open wiki and can be reused.

Recommendation 3: Ensure a level playing field for open source software and demonstrate active and fair consideration of using open source software, taking into account the total cost of ownership of the solution.

Recommendation 4: Give preference to open specifications, taking due account of the coverage of functional needs, maturity and market support and innovation.

Although the word open source is not used in the BP's and AP's, the wording and implications of AP06 (Use standard solutions) and AP08 (Use open solutions) do favour open specifications and address a level playing field for open source.

[3] http://www.noraonline.nl/wiki/Nationaal_Semantisch_Vlak
[4] http://www.noraonline.nl/wiki/Open_data_portal

Principle 3: Transparency

- Allow other public administrations, citizens and businesses to view and understand administrative rules, processes, data, services and decision-making.
- Ensure the availability of interfaces to internal information systems and data they handle.
- Securing the right to the protection of personal data.

Recommendation 5: Ensure internal visibility and provide external interfaces for European public services.

- Transparency is covered in BP06 (Transparent), underpinned with AP25 (Transparent service provisioning).
- Availability of interfaces to internal information systems is addressed by AP41 (Availability) and underpinned by AP01 (Services are reusable) and AP13 (Source registrations are leading). Availability of international interfaces will be addressed with the "connecting Europe facility"[5].
- Protection of personal data is covered in BP08 (Confidentiality) and BP09 (Reliability) as well as the following APs:
    - AP26 The right to review your personal stored information
    - AP33 Baseline quality services.
    - AP42 Integrity
    - AP43 Confidentiality
    - AP44 Controllability

Principle 4: Reusability

Recommendation 6: Reuse and share solutions, and cooperate in the development of joint solutions when implementing European public services.

Recommendation 7: Reuse and share information and data when implementing European public services, unless certain privacy or confidentiality restrictions apply.

Reusability of solutions is covered in NORA BP04 (Uniformity) and more explicit in AP06 (Use standard solutions), AP01 (Services are reusable) and AP07 (Use generic building blocks). AP12 (Single entry, multiple use) and AP13 (Source registrations are leading) cover reusing and sharing information.

[5] https://www.noraonline.nl/wiki/Connecting_Europe_Facility_(CEF)

Principle 5: Technological neutrality and data portability

Recommendation 8: Do not impose any technological solutions on citizens, businesses and other administrations that are technology-specific or disproportionate to their real needs.

Being a reference architecture, NORA does not impose any technological-specific solutions on anyone. AP11 (The result of the service is equivalent regardless of the channel through which the service is requested or delivered) prevents those applying NORA to impose any solution that has no alternatives when developing public digital services.

Recommendation 9: Ensure data portability, namely that data is easily transferable between systems and applications supporting the implementation and evolution of European public services without unjustified restrictions, if legally possible.

Data portability is being promoted in NORA by means of linked (open) data. Please refer to 'Data on the Web'[6] and Platform Linked Data Nederland[7] for specifics that deal with this recommendation.

Principle 6: User-centricity

User needs and requirements should guide the design and development of public services

Recommendation 10: Use multiple channels to provide the European public service, to ensure that users can select the channel that best suits their needs.

Multi-channel service provision is covered in BP03 (Accessibility) and further detailed by AP10 (Alternate service channel), AP11 (The result of the service is equivalent regardless of the channel through which the service is requested or delivered) and AP20 (Personal approach). However, digital by default, as expressed in AP09 (Preferred channel: Internet) ,it is possible to apply for services online.

Recommendation 11: Provide a single point of contact in order to hide internal administrative complexity and facilitate users' access to European public services.

The single point of contact recommendation is covered by BP01 (Proactive) and BP03 (Accessible) and AP20 (Personal service provision) and AP22 (No wrong door).

Recommendation 12: Put in place mechanisms to involve users in analysis, design, assessment and further development of European public services.

BP10 (Customers can provide input about service provisioning) and AP19 (Customers' perspective) make sure users are involved in analysis, design, assessment and further development of public services.

[6] http://www.noraonline.nl/wiki/Data_on_the_web
[7] http://www.noraonline.nl/wiki/Platform_Linked_Data_Nederland_(PLDN)

Recommendation 13: As far as possible under the legislation in force, ask users of European public services once-only and relevant-only information.

The once-only and relevant-only recommendation is covered in BP07 (Customers are not faced with unnecessary questions) underpinned with AP13 (Source registrations are leading) and AP12 (Single entry, multiple use).

Principle 7: Inclusion and accessibility

Recommendation 14: Ensure that all European public services are accessible to all citizens, including persons with disabilities, the elderly and other disadvantaged groups. For digital public services, public administrations should comply with e-accessibility specifications that are widely recognised at European or international level.

Inclusion and accessibility is covered with BP03 (Customers have easy access to public services) and supported with AP10 (Alternate service channel), AP20 (Personal service provision) and AP11 (The result of the service is equivalent regardless of the channel through which the service is requested or delivered). In addition to these NORA principles, guidance for government websites[8] offers a set of requirements that all government websites must comply with to ensure that information on websites is accessible to all, including people with disabilities, mobile phone users and all possible browsers.

Principle 8: Security and privacy

Recommendation 15: Define a common security and privacy framework and establish processes for public services to ensure secure and trustworthy data exchange between public administrations and in interactions with citizens and businesses.

• Information security essentials are covered as part of BP08 (Confidentiality) and BP09 (Reliability) as well as the derived principles based on ISO/IEC 27002:
  ○ AP40 Nonrepudiation
  ○ AP41 Availability
  ○ AP42 Integrity
  ○ AP43 Confidentiality
  ○ AP44 Controllability
• Privacy is partly covered by some of these AP's, and we are currently investigating whether further amendments are necessary (priority for 2017).

[8] https://www.digitoegankelijk.nl/

Principle 9: Multilingualism

Multilingualism should be available in the languages of the expected end-users in a country.

Recommendation 16: Use information systems and technical architectures that cater for multilingualism when establishing a European public service. Decide on the level of multilingualism support based on the needs of the expected users.

No specific directions on multilingualism are provided by NORA. However, AP20 (Personal service provision), however, provides direction to contact citizens in a personal and appropriate manner.

Principle 10: Administrative simplification

Digitisation of public services should take place in accordance with the concepts: digital-by-default and digital-first.

- The concept 'digital as default' is covered by derived principle AP09 (Preferred channel: Internet)
- The concept of 'digital-first' is covered by AP10 (Alternate service channel) and AP11 (The result of the service is equivalent regardless of the channel through which the service is requested or delivered). These APs are based on BP03 (Customers have easy access to public services).

Principle 11: Preservation of information

Recommendation 18: Formulate a long-term preservation policy for information related to European public services and especially for information that is exchanged across borders.

The long-term preservation of electronic records, as part of the 'Archiefwet'[9], is covered as part of NORA topical issue 'Sustainable Accessibility'[10].

Principle 12: Assessment of Effectiveness and Efficiency

Recommendation 19: Evaluate the effectiveness and efficiency of different interoperability solutions and technological options considering user needs, proportionality and balance between costs and benefits.

This recommendation is covered by means of AP31 (PDCA cycle in quality control of digital services) and supported with AP32 (Quality control at the highest level) and AP33 (Baseline quality services).

[9] http://www.noraonline.nl/wiki/Archiefwet
[10] http://www.noraonline.nl/wiki/Duurzame_Toegankelijkheid

Conclusion

Of the 12 EIF Interoperability Principles, seven are fully covered by corresponding NORA principles whereas four other EIF principles are addressed in NORA as well by means of themes and other specific information available at www.noraonline.nl (Figure 1).

Only the principle of 'Multilingualism' is currently not being addressed in NORA, as there are no specific Dutch policies that have to be met in this area.

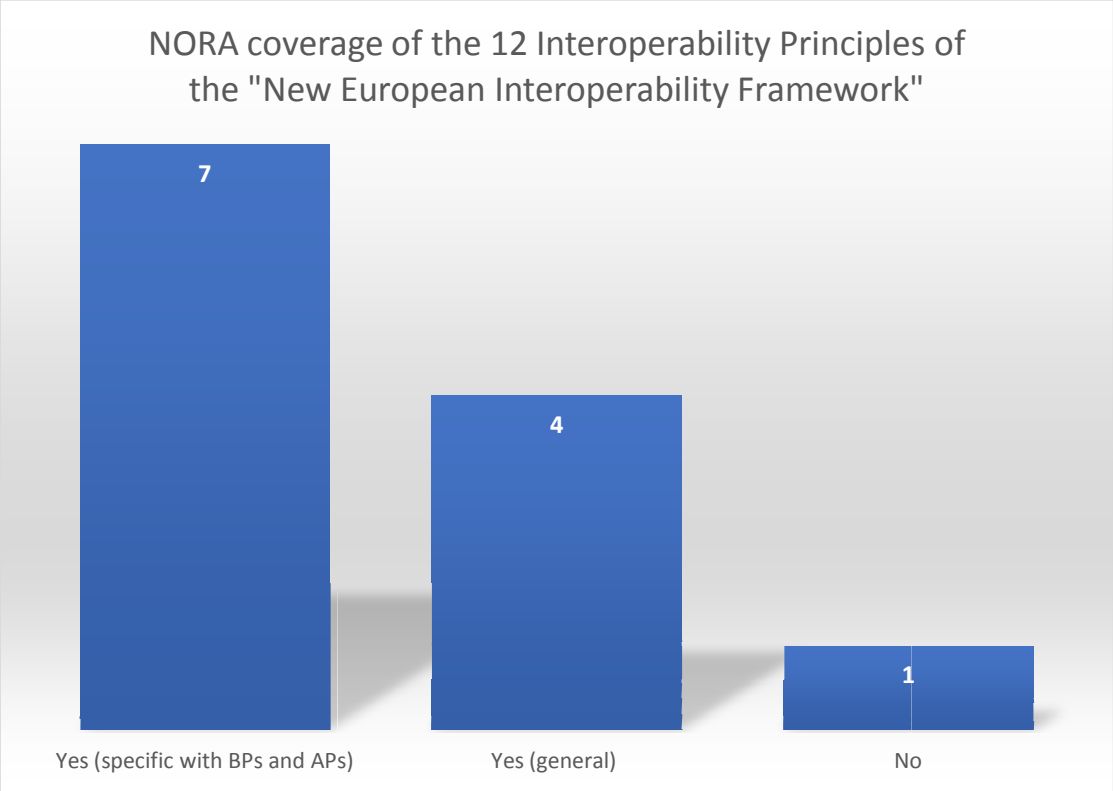

Figure 1. NORA coverage of the EIF Interoperability principles

Part II - How to set up digital public services

In this part, the remaining 28 EIF recommendations will be cross referenced with the NORA contents. For each recommendation, an expert assignment has been carried out by the authors of this document on: a) the level of alignment between EIF and NORA, and b) the level of implementation of the recommendation in the Netherlands.

For this assessment, the following levels of conformity have been defined:

1. Very low
2. Low
3. Moderate
4. High
5. Very high

3. Interoperability layers

3.1 Interoperability governance

Recommendation 20: Ensure holistic governance of interoperability activities across administrative levels and sectors.

To make this recommendation actionable one must have awareness and skills in the legal, organisational, semantic and technical domains. A key instrument to describe these domains is NORA's 5-layered model. Is references the knowledge and tools available in each of these domains in a single view. NORA's 5-layered model includes the legal, organisational, semantic and technical domains and is based on the EIF interoperability model. NORA itself pursues this holistic approach in its own governance as well. The NORA User Counsel (NORA Gebruikersraad) consists of representatives from the various sectorial NORA daughters. These take part in the further development of the NORA contents[11], which in many cases is inherited by sectorial 'daughters'. However, inheritance for several NORA daughters has been only partly accomplished. Proposed action: the inheritance from the NORA to the daughters will be assessed in 2017/2018, e.g. by assessing 1 or 2 daughters per quarter.	
Level of alignment: 5	Level of implementation: 3

3.1.1 Identifying and selecting standards and specifications

Recommendation 21: Put in place processes to select relevant standards and specifications, evaluate them, monitor their implementation, check compliance and test their interoperability.

[11] http://www.noraonline.nl/wiki/Beheer_en_doorontwikkeling_NORA

NORA's derived principle AP08 (Use open solutions)[12] deals with the promotion and application of open standards during projects. And other sections of NORA provide further guidance[13]. Within the Netherlands, the Dutch Standardisation Forum[14] promotes digital collaboration (interoperability) between government agencies and between government, businesses and citizens. The Forum selects and evaluates the relevant open standards and specifications that all government organisations should implement where applicable (comply or explain). This ensures that various digital systems are increasingly connected, and data is easier to share. The use of open standards plays an important role to accomplish this goal. The Forum monitors the use of open standards annually[15] , in procurement and the Dutch Generic Building Blocks (GDI). However, the use of open standards in (generic) building blocks on a local or sector level are not monitored yet. Proposed action: monitor the use of standards in managed environments (beheerde voorzieningen) and of project deliverables.	
Level of alignment: 5	Level of implementation: 3

Recommendation 22: Use a structured, transparent, objective and common approach to assessing and selecting standards and specifications. Take into account relevant EU recommendations and seek to make the approach consistent across borders.

See above, recommendation 21.	
Level of alignment: 5	Level of implementation: 3

Recommendation 23: Consult relevant catalogues of standards, specifications and guidelines at national and EU level, in accordance with your NIF and relevant DIFs, when procuring and developing ICT solutions.

NORA pays attention to procurement[16] and links the subject of procuring ICT solutions to the practical guidance of the Dutch Standardisation Forum (BFS)[17]. Developing ICT solutions is described in DIFs and is the responsibility of the respective governmental domains. The catalogue of standards from the BFS is integrated in NORA and we link to the catalogues of specific domains such as Education[18]. The monitoring and appliance of procurement processes has been initiated a few years ago but does not yet cover all procurements. BFS has started with high risk projects. The results will be evaluated going forward.	
Level of alignment: 5	Level of implementation: 3

[12] http://www.noraonline.nl/wiki/Afgeleide_principes
[13] http://www.noraonline.nl/wiki/Standaarden
[14] http://www.forumstandaardisatie.nl
[15] https://www.rijksoverheid.nl/documenten/rapporten/2016/12/15/monitor-open-standaardenbeleid-rapportage-2016
[16] http://www.noraonline.nl/wiki/Aanschaf
[17] http://www.noraonline.nl/wiki/Lijst_Open_Standaarden_voor_Pas_Toe_of_Leg_Uit
[18] https://www.noraonline.nl/wiki/NL_LOM

Recommendation 24: Actively participate in standardisation work relevant to your needs to ensure your requirements are met.

Various organisations, including those from the Dutch government and specifically the BFS, take part in standardisation at the national, EU and international level[19]. The Netherlands (ICTU and BFS) has developed the BOMOS (Beheer Model voor Open Standaarden), which is also applied in the governance of the NORA and has been adapted in the EU (ISA). Governmental standards in the Netherlands are developed by means of the BOMOS process of public review. As an example: ICTU participates with the Dutch Standard Development Organisation NEN on a best practice standard (NPR) concerning quality assurance of custom software development within the government domain (NEN 5326). Although this participation is important, it is not the main priority of NORA. Conformity of the NORA (and thus standards) in projects is the highest priority.	
Level of alignment: 4	Level of implementation: 3

3.2 Integrated public service governance

Integrated public service governance should include as a minimum:

• the definition of organisational structures, roles & responsibilities and the decision-making process for the stakeholders involved;

• the imposition of requirements for:

- aspects of interoperability including quality, scalability and availability of reusable building blocks including information sources (base registries, open data portals, etc.) and other interconnected services;
- external information/services, translated into clear service level agreements (including on interoperability);

• a change management plan, to define the procedures and processes needed to deal with and control changes;

• a business continuity/disaster recovery plan to ensure that digital public services and their building blocks continue to work in a range of situations, e.g. cyberattacks or the failure of building blocks.

Recommendation 25: Ensure interoperability and coordination over time when operating and delivering integrated public services by putting in place the necessary governance structure.

Guidance for relevant governance structures for Integrated public service governance are reflected in the following four derived principles[20] (APs): • A single organisation is accountable for each public service (AP27); • Combine e relevant services as far as possible (AP21); • Availability of services (AP41); • Quality control at the highest level of the organisation (AP32).

[19] http://www.noraonline.nl/wiki/Standaarden_internationaal

[20] http://www.noraonline.nl/wiki/Afgeleide_principes

Also, relevant in this context is the NORA topical issue "public services chain management"[21] which allows for coordination and collaboration across organisational boundaries in order to ensure adequate Integrated public service delivery. It addresses topics such as: • What are key elements for successful collaboration in public service chains? • What roles and responsibilities are required? • How does this impact managers and staff of organisations that provide public services? In 2017 the Dutch Income-and-Tax Chain has achieved the ASAP Individual Alliance Excellence Award[22], underlining the maturity of interoperability and coordination of integrated public services in certain fields of the Dutch government. Our framework work is fine, but the yearly monitoring of the experienced quality of service shows that services provided by one governmental organisation in general receive an appreciation score of 8 (out of 10), but services provided by more than 3 organisations average an appreciation score below 5 (out of 10). Proposed actions: let the NORA community help to improve design of the worst 3 services every year.

Level of alignment: 5	Level of implementation: 2

3.2.1 Interoperability agreements

Recommendation 26: Establish interoperability agreements in all layers, complemented by operational agreements and change management procedures.

Interoperability agreements are to be met by means of application of the derived principles: that covers 4 out of 5 layers (leaving out the legislation-layer). Specifically, AP33 (Baseline quality services) sets the requirement for a 'baseline public service quality'. This baseline is a common set of norms within an organisation, from which appropriate measures can be derived. It includes interoperability agreements, for example related to semantics[23] that are agreed on throughout the public services chain and on current standards and best practices. These agreements are implemented and reflected in the various governmental domains as reflected in the SLAs of various dictionaries ("gegevenswoordenboeken")[24] and supported by NORA's national semantic plane[25]. Little is known about these agreements. In general, the quality levels of specific services are not published to the public. Proposed actions: keep on monitoring the quality of services each year, but add the check on publication of the agreements.

Level of alignment: 4	Level of implementation: 2

[21] http://www.noraonline.nl/wiki/Ketensturing
[22] http://www.noraonline.nl/wiki/Loonaangifteketen_wint_ASAP_Individual_Alliance_Excellence_Award_2017
[23] http://www.noraonline.nl/wiki/Core_Vocabularies
[24] http://www.noraonline.nl/wiki/Gegevenswoordenboeken
[25] http://www.noraonline.nl/wiki/Nationaal_Semantisch_Vlak

3.3 Legal interoperability

ICT must be considered as early as possible in the law-making process. In particular, proposed legislation should undergo a **'digital check'**:

- to ensure that it suits not only the physical but also the digital world (e.g. the internet);
- to identify any barriers to digital exchange;
- to identify and assess its ICT impact on stakeholders.

Recommendation 27: Ensure that legislation is screened by means of 'interoperability checks', to identify any barriers to interoperability. When drafting legislation to establish a European public service, seek to make it consistent with relevant legislation, perform a 'digital check' and consider data protection requirements.

New legislations are, by and large, implemented through projects that include IT solutions with accompanying PSAs (Project Start Architectures). The projects are based on the Dutch government credo 'digital by default' (digitaal tenzij[26]). In practice, however, the alignment between policy makers and business / IT architects is still lacking, which makes it possible for legislation to be drafted without the necessary interoperability and digital checks. An annual conference to improve the alignment between the Semantic level and the Legal level[27] is co-organized by NORA. Proposed actions: to be determined.	
Level of alignment: 2	Level of implementation: 1

3.4 Organisational interoperability

Recommendation 28: Document your business processes using commonly accepted modelling techniques and agree on how these processes should be aligned to deliver a European public service.

There is currently no formalised standard on how to document business processes, such as BPMN. Proposed actions: ICTU / NORA Beheer will formulate a proposal for the NORA community which includes other proposed standards as well, such as using UML for information modelling.	
Level of alignment: 3	Level of implementation: 3

[26] http://www.digitaleoverheid.org/2014/05/22/dienstverlening-2020/
[27] http://www.noraonline.nl/wiki/Wetgeving_in_Verbinding

Recommendation 29: Clarify and formalise your organisational relationships for establishing and operating European public services.

The setup of organisational relationships for establishing and operating European public services is not available. A register of x-border services and its supporting organisation should be formalised. A good first step in this direction would be a list of EU initiatives of cross-border data exchange from the government as part of the Connecting Europe Facility (CEF)[28]. Proposed actions: no actions are foreseen at this juncture.	
Level of alignment: 3	Level of implementation: 2

3.5 Semantic interoperability

Recommendation 30: Perceive data and information as a public asset that should be appropriately generated, collected, managed, shared, protected and preserved.

"Treat data as a public asset" is not directly translated into the NORA principles. The topical issue 'Data on the Web'[29] is being developed to include data management, open data, linked data et cetera, aimed at increasing the value of data through proper disclosure. In another topical issue, NORA deals with sustainable preservation of data and information[30]. At a national level, this daily practice is carried out by means of the various Dutch Base Registries that are implemented based on Dutch law and regulations. At a regional and local level, various registries are managed by specific organisations in several domains[31.] AP13 (Source registrations are leading) provides direction in this regard. Moreover, Data protection is included in NORAs derived principles related to information security (AP40 to AP44).	
Level of alignment: 5	Level of implementation: 4

Recommendation 31: Put in place an information management strategy at the highest possible level to avoid fragmentation and duplication. Management of metadata, master data and reference data should be prioritised.

NORA is endorsed at the highest possible level, the governmental forum interconnectivity (Regieraad Interconnectiviteit). The information management strategy integrated into NORA is based on 1) taxonomies, controlled vocabularies, thesauri, code lists and reusable data structures/models as part of a governmental strategy and accompanying programme[32], and 2) approaches like data-driven-design[33], coupled with linked data technologies[34].	
Level of alignment: 5	Level of implementation: 3

[28] http://www.noraonline.nl/wiki/Overzicht_internationale_gegevensuitwisseling_in_de_context_van_de_CEF_
[29] https://www.noraonline.nl/wiki/Data_op_het_web
[30] http://www.noraonline.nl/wiki/Duurzame_Toegankelijkheid
[31] https://data.overheid.nl/
[32] https://www.digitaleoverheid.nl/dossiers/gegevenslandschap/dossierpostcontext/bruggen-bouwen-in-het-gegevenslandschap/
[33] http://www.noraonline.nl/wiki/Semantiek
[34] http://www.noraonline.nl/wiki/Linked_Data

Recommendation 32: Support the establishment of sector-specific and cross-sectoral communities that aim to create open information specifications and encourage relevant communities to share their results on national and European platforms.

NORA facilitates sector-specific and cross-sectoral communities as part of the governmental domain structure[35], which includes open information specifications and encourages relevant communities to share their results on a national level via the NORA communities. NORA will pass these results through to the international level when appropriate. Currently NORA refers to 12 Base registries[36] and 145 Sector registries[37].	
Level of alignment: 5	Level of implementation: 3

3.6 Technical interoperability

This covers the applications and infrastructures linking systems and services. This includes interface specifications, interconnection services, data integration services, data presentation and exchange, and secure communication protocols.

Recommendation 33: Use open specifications, where available, to ensure technical interoperability when establishing European public services.

Based upon governmental regulations, NORA prescribes the application of open standards instead of using proprietary specifications and it also promotes the use of open source software above propriety ones[38].	
Level of alignment: 5	Level of implementation: 3

[35] http://www.noraonline.nl/wiki/Domeinen
[36] https://www.noraonline.nl/wiki/Basisregistraties
[37] https://www.noraonline.nl/wiki/Sectorregistraties
[38] http://noraonline.nl/wiki/Beleid_open_standaarden

4. The conceptual model for integrated public services provision

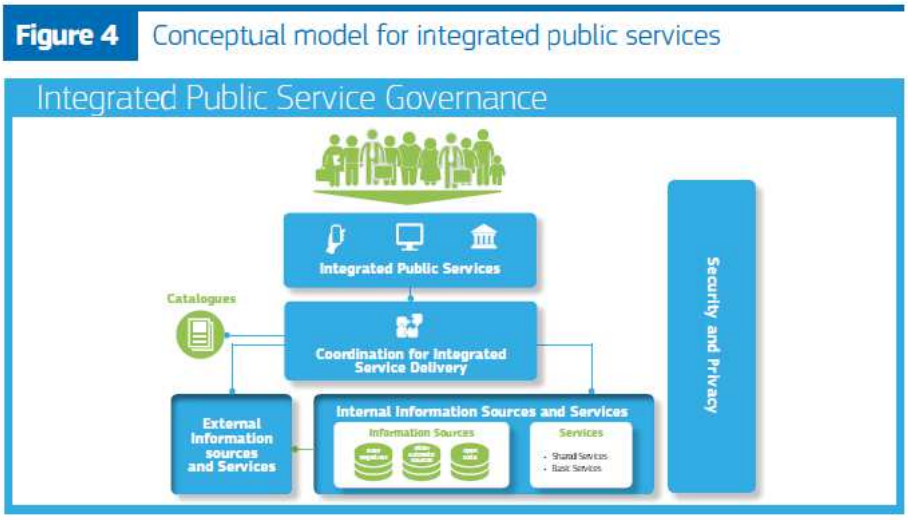

Figure 2. New EIF conceptual model for integrated public services

4.1 Introduction

Recommendation 34: Use the conceptual model for European public services [Figure 2] to design new services or reengineer existing ones and reuse, whenever possible, existing service and data components.

NORA recommends using the five-layer model[39], when designing new services or engineering existing ones. This model was based on the four layers of EIRA and is tested in several domains in combination with the idEA visualisation[40] (see Figure 3). Use of this model benefits the alignment between specialists of the different layers (e.g. policy makers, enterprise architects, information architects, IT architects and the administrators of generic building blocks). All generic building blocks, existing solutions and data sources listed in NORA will eventually be tagged with the appropriate layer, making it easy to find the right element for reuse.	
Level of alignment: 1	Level of implementation: 1

Recommendation 35: Decide on a common scheme for interconnecting loosely coupled service components and put in place and maintain the necessary infrastructure for establishing and maintaining European public services.

NORA provides direction on the coordination of integrated service delivery. AP02 (services are decoupled) and AP03 (services are complementary) Although no common approach for loosely coupled service components is available (e.g. SOA), functional building blocks at a higher level are developed and maintained by various government entities[41]. The core of these consist of the Generic Digital Infrastructure (GDI)[42].

[39] https://www.noraonline.nl/wiki/Vijflaagsmodel
[40] http://www.noraonline.nl/wiki/Bestand:IdEA-GDI-2016-04-19_klein.png
[41] http://www.noraonline.nl/wiki/Bouwstenen/alfabetisch
[42] https://www.digicommissaris.nl/gdi

NORA's functional building block model[43] and five-layer model[44] stimulate the interconnectivity of building blocks for public services, within and without the GDI, and points out links with European public services and building blocks[45,46].	
Level of alignment: 5	Level of implementation: 4

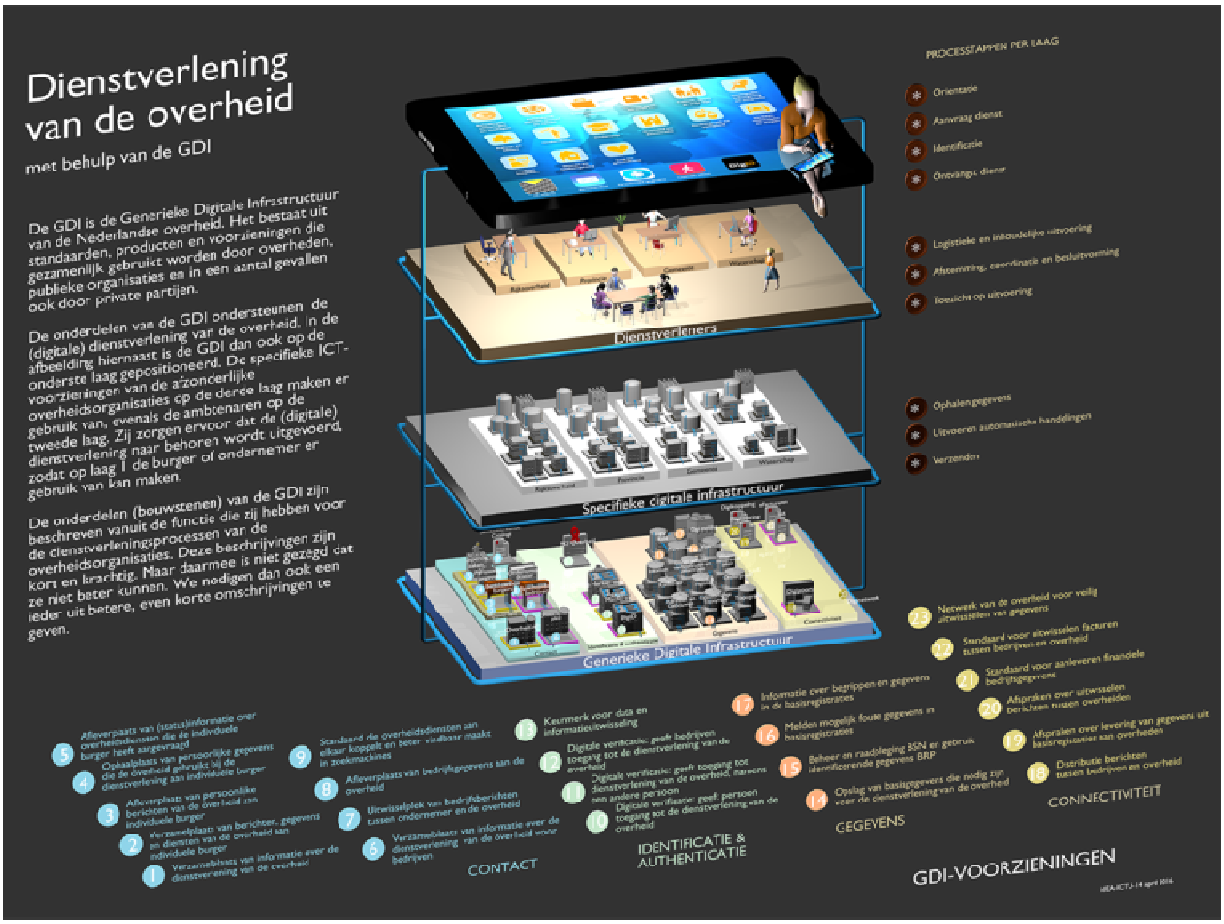

Figure 3. Example of NORA's idEA visualisation

4.2 Model Overview

(No recommendations in this paragraph)

4.3 Basic components

4.3.2 Internal information sources and services

Recommendation 36: Develop a shared infrastructure of reusable services and information sources that can be used by all public administrations.

[43] http://www.noraonline.nl/wiki/Bouwstenen/indeling_functie
[44] http://www.noraonline.nl/wiki/Vijflaagsmodel
[45] http://www.noraonline.nl/wiki/Architectuur_internationaal
[46] http://www.noraonline.nl/wiki/Tabel_bouwstenen_internationaal

A shared infrastructure of reusable services and information sources (Generic Digital Infrastructure, GDI) has been set-up by the Digicommissaris[47], that includes base registries, open data portals, and other authoritative sources of information and services. NORA promotes the use of the GDI by means of derived principle AP07 (Use generic building blocks). NORA lists these building blocks that can be used by all public administrations[48].	
Level of alignment: 5	Level of implementation: 5

4.3.3 Base registries

Recommendation 37: Make authoritative sources of information available to others while implementing access and control mechanisms to ensure security and privacy in accordance with the relevant legislation.
See text box recommendation 40, level of alignment / implementation = 5 / 4

Recommendation 38: Develop interfaces with base registries and authoritative sources of information, publish the semantic and technical means and documentation needed for others to connect and reuse available information.
See text box recommendation 40, level of alignment / implementation = 5 / 4

Recommendation 39: Match each base registry with appropriate metadata including the description of its content, service assurance and responsibilities, the type of master data it keeps, conditions of access and the relevant licences, terminology, a glossary, and information about any master data it uses from other base registries.
See text box recommendation 40, level of alignment / implementation = 5 / 4

Recommendation 40: Create and follow data quality assurance plans for base registries and related master data.
See text box, level of alignment / implementation = 5 / 5

The topic of base registries is widely covered in NORA. The main starting point is the 'System of Basic Registries'[49]. In the Netherlands, twelve base registries contain authoritative sources of information[50] that must be (re)used by all governmental organisations and which are adequately protected with access and control mechanisms. All the metadata is published via a linked data catalogue (Stelsel Catalogus), as a part of the generic digital infrastructure (GDI). A yearly quality assessment is carried out to check the consistency across these twelve base registries[51].

[47] http://www.digicommissaris.nl
[48] http://www.noraonline.nl/wiki/Bouwstenen/alfabetisch
[49] http://www.noraonline.nl/wiki/Stelsel_van_Basisregistraties
[50] http://www.noraonline.nl/wiki/Alle_basisregistraties;
https://www.digitaleoverheid.nl/voorzieningen/gegevens/inhoud-basisregistraties/stelselplaat/
[51] https://www.digitaleoverheid.nl/nieuws/consistentie-stelsel-basisregistraties-zichtbaar/

4.3.4 Open data

Recommendation 41: Establish procedures and processes to integrate the opening of data in your common business processes, working routines, and in the development of new information systems.

Starting point to integrate the open data in common business processes is the data portal of the Dutch government: www.data.overheid.nl. In addition, NORA topical issue Data on the Web[52] provides recommendations from the community:	
Level of alignment: 5	Level of implementation: 3

Recommendation 42: Publish open data in machine-readable, non-proprietary formats. Ensure that open data is accompanied by high quality, machine-readable metadata in non-proprietary formats, including a description of their content, the way data is collected and its level of quality and the license terms under which it is made available. The use of common vocabularies for expressing metadata is recommended.

The subject of open data is promoted via the NORA open data portal[53] and NORA's five-layer model[54]. The publication in machine-readable, non-proprietary formats is still lacking.	
Level of alignment: 5	Level of implementation: 2

Recommendation 43: Communicate clearly the right to access and reuse open data. The legal regimes for facilitating access and reuse, such as licenses, should be standardized as much as possible.

The subject of open data is promoted via the NORA open data portal[55] and NORA's five-layer model. In addition, the Open Data community and its key promoter Paul Suijkerbuijk[56] is very active in publishing and promoting Open Data sets.	
Level of alignment: 5	Level of implementation: 4

4.3.5 Catalogues

Recommendation 44: Put in place catalogues of public services, public data, and interoperability solutions and use common models for describing them.

The Government website overheid.nl shows all products and services offered by the central government that are based on national laws and regulations. Thanks to the Collaborative Catalogues project[57], it is possible to find products from municipalities, provinces and water boards through Products and services and services as well. One can search in a collection of over 3,000 products and services. This includes grants, taxes, licenses, benefits, exemptions, etc. Also, other catalogues exist, such as Stelsel-catalogus, Digikoppeling and Serviceregister, but no common models are used for describing them.	
Level of alignment: 5	Level of implementation: 4

[52] http://www.noraonline.nl/wiki/Software_for_data_on_the_web_community
[53] http://www.noraonline.nl/wiki/Open_data_portal
[54] http://www.noraonline.nl/wiki/Vijflaagsmodel#Laag_4:_Applicatielaag
[55] http://www.noraonline.nl/wiki/Open_data_portal
[56] https://www.linkedin.com/in/palinuro/?ppe=1
[57] http://www.noraonline.nl/wiki/Samenwerkende_catalogi

4.3.6 External information sources and services

Recommendation 45: Where useful and feasible to do so, use external information sources and services while developing European public services.

External information sources and services are being used by the Dutch government, such as services from Google search and Microsoft Office 365. From a NORA perspective, this is underpinned by means of derived principle AP06 "Use standard solutions". The re-use of the EU / CEF Building Blocks is difficult, as we have no actual or complete view on the relationship with the Dutch Building Blocks. In the eDelivery / DigiKoppeling project we have gained some insights.	
Level of alignment: 5	Level of implementation: 2

4.3.7 Security and privacy

Recommendation 46: Consider the specific security and privacy requirements and identify measures for the provision of each public service according to risk management plans.

NORA has good and current focus on security, which includes principles, standards and architecture patterns, next to information security management related topics. Starting point is NORA security[58]. As regards to privacy, the priority for 2017 has been set to disclose the available information better, in connection with the rest of the NORA framework. The CIP organisation will add their privacy specific content to NORA as well[59]and the relationships between that content and NORA principles will be published before the end of the year. Based on legislation, all relevant projects perform a Privacy Impact Analysis (PIA).	
Level of alignment: 5	Level of implementation: 4

Recommendation 47: Use trust services according to the Regulation on eID and Trust Services as mechanisms that ensure secure and protected data exchange in public services.

Trust services are used conform the required regulations[60].	
Level of alignment: 5	Level of implementation: 4

[58] http://www.noraonline.nl/wiki/Beveiliging
[59] http://www.noraonline.nl/wiki/Privacy
[60] http://www.noraonline.nl/wiki/EID

Conclusion

This self-assessment carried out by ICTU on the NORA conformity rating (blue bars in Figure 4) of the remaining 28 EIF recommendations in Chapters 3 and 4, shows that only four of those have a conformity level of three or lower. The adoption of the EIF recommendations (red bars in Figure 4), in casu the NORA adoption by governmental entities shows room for improvement.

Therefore, various actions to mature the interoperability of public services implementation in the Netherlands have been proposed and, if adopted by the NORA community, these will be incorporated in the yearly programme of the NORA-development.

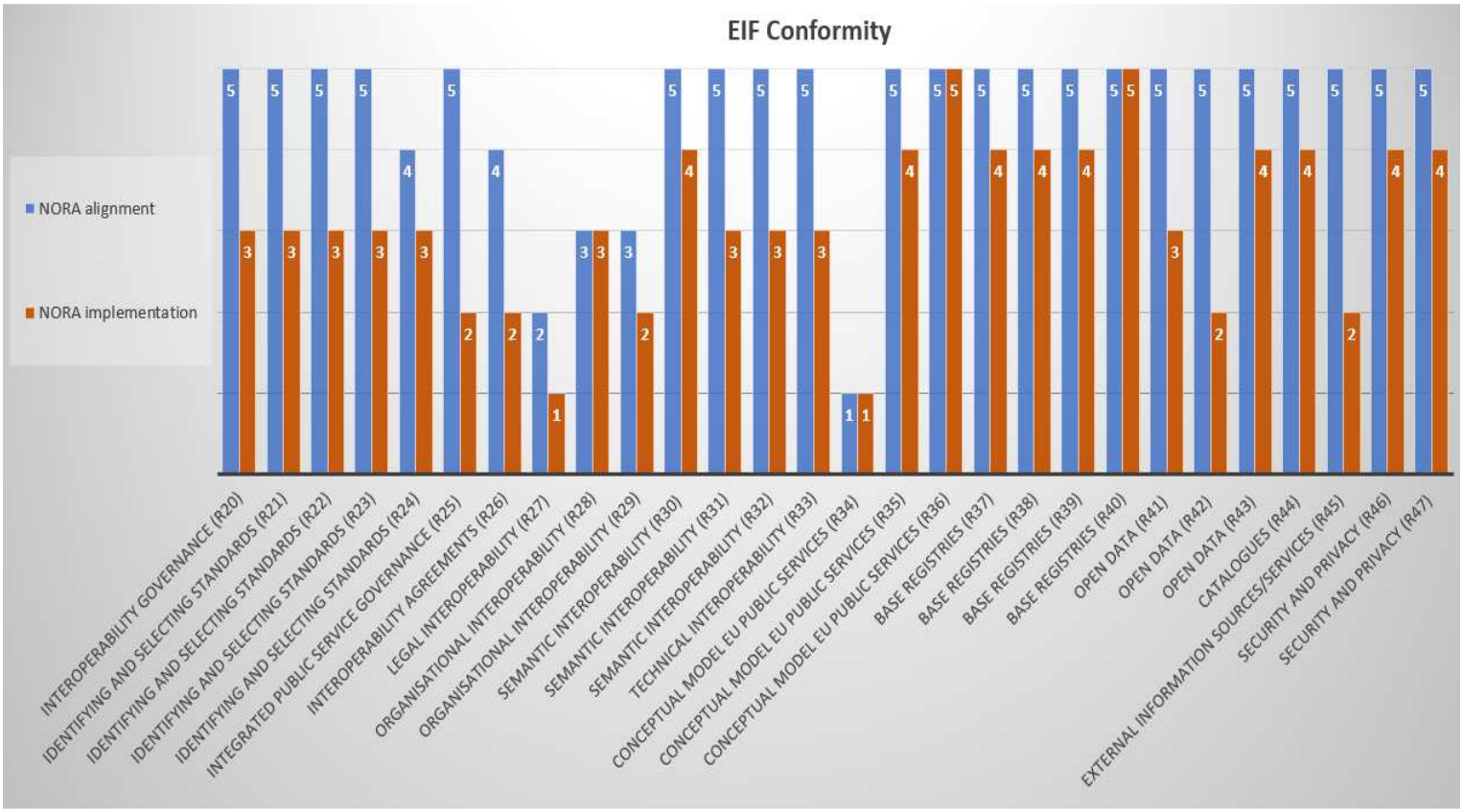

Figure 4. NORA – EIF Conformity

For this assessment, the following levels of conformity have been used:

1. Very low
2. Low
3. Moderate
4. High
5. Very high