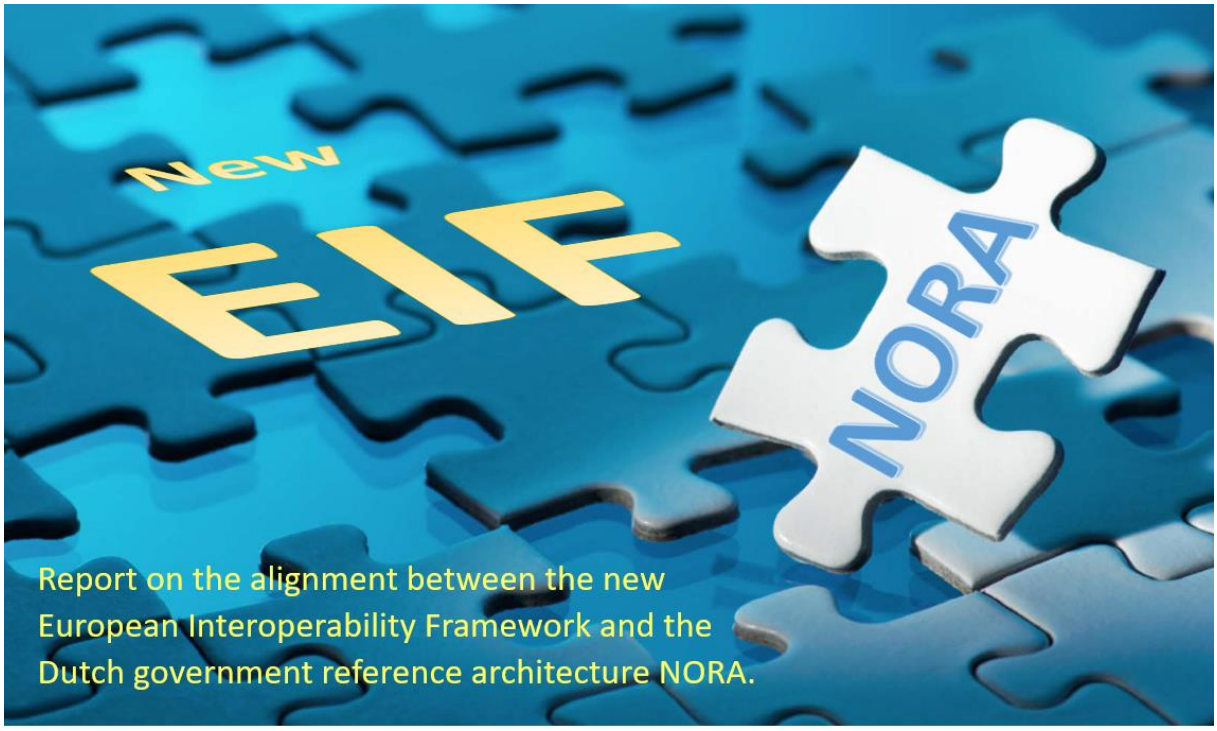

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Version 0.9 (draft) zodra Vakgroep EU van ICTU heeft gereageerd en 1.0 als het in de GR wordt besproken, waarbij wij de laatste puntjes op de i hebben gezet

1. Introduction

This document provides an updated cross reference between the new EIF[1], part of the Interoperable Europe initiative of the European Commission, and the Dutch Government Reference Architecture NORA. The objective of EIF is to provide guidance on how to set up interoperable EU digital public services.

As per January 2023 the core of NORA has been significantly updated. Instead of a more or less self-contained structure consisting of 10 Key Principles and 39 Derived Principles, 17 new NORA Architecture Principles have been formulated. These NORA Architecture Principles are closely linked to digital information and transition policies of the Dutch central government as well as decentral governments in the Netherlands[2]. Via 5 *Core Values of Service Provision* and 20 *Quality of Service Goals*, these *Architecture Principles* offer concrete guidance by means of 89 *Implications* on 5 architecture layers. The architectural layers are closely linked to the EIF's architectural layers. The corresponding metamodel of NORA is depicted in Figure 1.

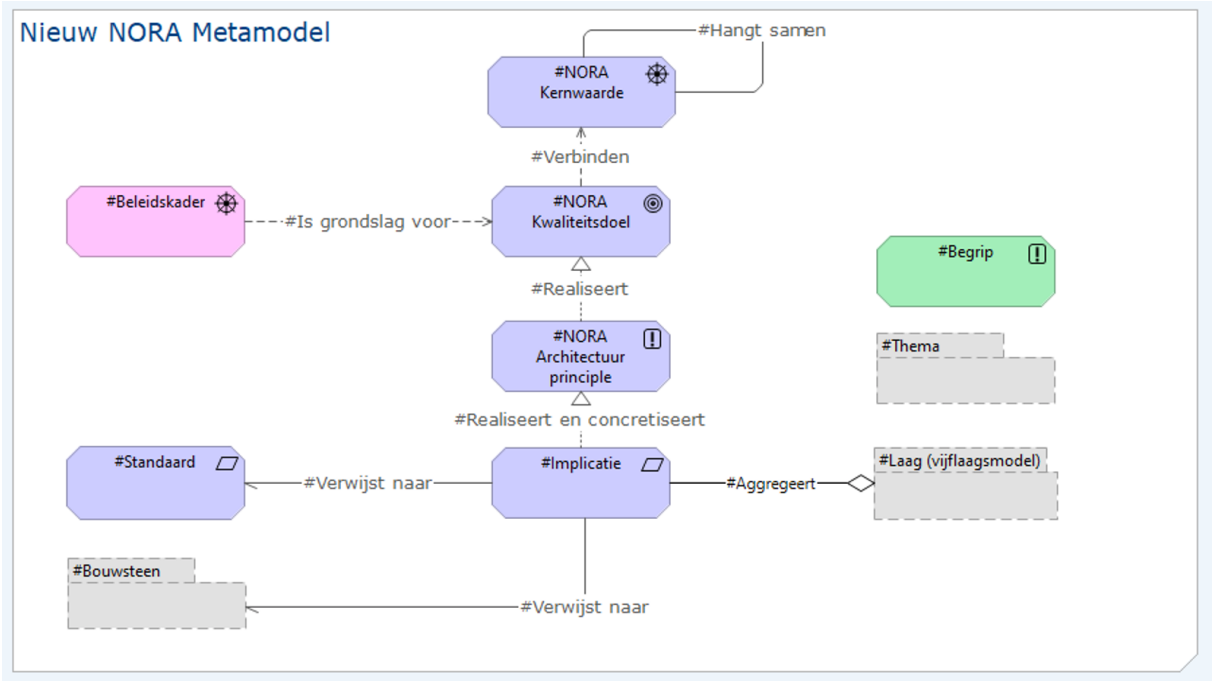

Figure 1 The new NORA Metamodel

The remainder of this document is structured as follows. Section 1 deals with the EIF principles underlying EU public services (EIF Chapter 2). And section 2 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).

[1] The European Interoperability Framework in detail | Joinup (europa.eu) see also: https://ec.europa.eu/isa2/sites/default/files/eif_brochure_final.pdf; https://ec.europa.eu/isa2/eif_en/

[2] https://www.noraonline.nl/wiki/Bindende_Architectuurafspraken

Section 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:

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

We have specified the matching Quality of Service Goals [3] (KDs), NORA Architecture Principles[4] (NAPs) and Implications (IMPs)[5] per EIF principle including its accompanying 19 recommendations.

Section 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 have specified the matching NORA Core Values, Quality Goals and Architecture Principles (AP) and other relevant information from NORA, like topical issues (NORA Themes[6]).

Following the same structure of our previous report of 2017[7] [1], we have provided an indication of the alignment of the NORA framework towards the EIF, and an indication based on a qualitative assessment of the implementation of these recommendations. This qualitative rating is supported by the information and links provided in the various boxes following each EIF recommendation.

In this document we use the flowing abbreviations:

- Core Values of Public Service Provision: KW[reference number], see Kernwaarden van Dienstverlening
- Quality of Service Goals: KD[reference number], see Kwaliteitsdoelen
- NORA Architecture Principles: NAP[reference number], see Architectuurprincipes
- Implications: IMP[reference number], see Implicaties van Architectuurprincipes

Comments in the blue text boxes relate to the NORA implementation of the corresponding EIF recommendations.

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

[3] https://www.noraonline.nl/wiki/Kwaliteitsdoelen
[4] https://www.noraonline.nl/wiki/Architectuurprincipes
[5] https://www.noraonline.nl/wiki/Implicaties_van_Architectuurprincipes
[6] https://www.noraonline.nl/wiki/Thema%27s
[7] https://www.noraonline.nl/images/noraonline/9/93/Xref_new_EIF_and_NORA_-_final_21jul17.pdf

Section 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 be able to align 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 completely in line with NORA's stance on how to inherit content and how to apply architecture frameworks and tailor NORA as a NIF. Our sub-national NIFs (provinces, water boards and municipalities in the Netherlands) apply the subsidiarity and proportionality principle as well. This is reflected in NORA's core values of public service provisioning, especially in KW04 "Effective" and KW05 "Efficient".

Principle 2: Openness

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

- IMP003 "Publish data as much as possible as open data" is fully in line with recommendation 2. It says to make government data actively available for reuse by third parties unless laws and regulations explicitly impose restrictions.
- Furthermore, the promotion of "open data" in NORA is addressed at the NORA webpages on the 'national semantic plane'[8] that refers to www.data.overheid.nl among others, and NORA's open data portal[9]. 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.

- IMP027 "Use open source" is fully in line with recommendation 3. It says that with equal suitability, open source software is the preferred option when developing public services.

[8] http://www.noraonline.nl/wiki/Nationaal_Semantisch_Vlak
[9] http://www.noraonline.nl/wiki/Open_data_portal

- Standards contain specifications as well, therefore NORA has added to its new set of Implications: IMP036 “Apply open standards” and IMP075 “Use open standards for modelling”.

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

- IMP039 “Provide open specifications” is fully in line with recommendation 3. It provides transparency, allows third parties to participate in the design of new public services and facilitates easy reuse.

Principle 3: Transparency

- Allows other public administrations, citizens and businesses to view and understand administrative rules, processes, data, services and decision-making.
- Ensures the availability of interfaces to internal information systems and data they handle.
- Secures 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 KD01 “Transparent”, underpinned with the following NAPs: NAP01 “Put yourself in the user's perspective”, NAP02 “Provide insight into service processing”, NAP09 “Accurately describe the service”.
- Availability of interfaces to internal information systems is covered with KD06 “Availability” and underpinned by NAP14 “Never trust, always verify” / IMP069 “Apply the zero-trust model” and NAP15 “Make services scalable”.
- Protection of personal data is covered in KD02 “Reliability”, KD05 “Privacy”, KD07 “Integrity” and KD08 “Confidentiality” and as well as the supporting implications IMPs:
  - IMP008 “Make decisions traceable and auditable”.
  - IMP049 “Ensure correct, up-to-date and complete information”.
  - IMP080 “Check data processing”.

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 are covered in KD18 “Uniformity”, the related NAP06 “Reuse, before buy, before build” and NAP08 “Standardize whenever possible“. These NAPs are supported by the following IMPs:

- IMP021 “Promote data reuse”
- IMP023 “Direct the reuse of services in the chain”
- IMP028 “Make services reusable”

- IMP039 “Provide open specifications”
- IMP057 “Know the ownership of a managed source data”

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. NAP03 “Deliver a channel-independent result” should ensure that result of a public service is the same regardless of the channel through which the service is requested or delivered. This prevents those applying NORA to impose any solution that has no alternatives when developing public digital services. In addition, IMP029 “Separate process from data” has the objective to separate the various architecture layers and to make software, hardware agnostic.

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’[10] and Platform Linked Data Nederland[11] for specifics that deal with this recommendation.
Furthermore, the following architecture implications give further substance to this recommendation, notably:

- IMP001 “Describe information objects in a model”
- IMP038 “Use standardized reference data”
- IMP045 “Record the ‘purpose limitation’ in the metadata of the data object”
- IMP047 “Apply the FAIR data principles”
- IMP072 “Set up data governance”

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 KD14 “Accessible” and further detailed in NAP03 “Provide a channel-independent result” which deals with alternative service channels and states that the result of a service is always the same, regardless of the channel through which the service is requested or delivered. In addition, IMP011 “Use the user's preferred channel” specifies that users can use by default the channel that best suits their needs.

[10] http://www.noraonline.nl/wiki/Data_on_the_web
[11] http://www.noraonline.nl/wiki/Platform_Linked_Data_Nederland_(PLDN)

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 specifically covered by IMP005 "single point of contact".

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

KD03 "Receptive" states that customers and companies can easily provide input about service provisioning and that their concerns are considered seriously. Furthermore, NAP01 "Put yourself in the user's perspective" makes sure that users are involved in analysis, design, assessment, and further development of public services.

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 KD19 "Strictly Necessary" that states customers are not faced with unnecessary questions and is underpinned with NAP12 "Get data at the source" that states source registrations are leading and IMP021 "Promote data reuse".

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 are covered with KD14 "Accessible", that states customers must have easy access to public services and via NAP01 "Put yourself in the user's perspective" and NAP03 "Deliver a channel-independent result", with the following implications: ○ IMP010 "Provide multi- and omni-channel services" ○ IMP011 "Use the user's preferred channel" ○ IMP012 "Make the service accessible to all users" ○ IMP016 "Apply design guidelines to websites and portals and apps" In addition to these NORA principles, guidance for government websites[12] 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 "CIA" is covered as part of KD08 "Confidentiality" KD07 "Integrity" and KD06 "Availability" and its supporting NAPs: NAP10 "Use data as

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

foundation", NAP13 "Continuously manage risk", NAP14 "Never trust, always verify", NAP15 "Make services scalable" and several related architecture implications (IMPs)
- Privacy is covered by KD05 "Privacy" and its supporting NAPs: NAP02 Provide insight into service processing, NAP11 "Apply 'purpose limitation'", NAP10 "Use data as foundation", and related IMPs such as IMP004 "Data minimalisation"

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.

Multilingualism is addressed in NORA with IMP013 "Make the service accessible to non-native speakers" which gives direction to contacting citizens personally and appropriately, in the expected language of the end user.

Principle 10: Administrative simplification

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

Recommendation 17: Simplify processes and use digital channels whenever appropriate for the delivery of European public services, to respond promptly and with high quality to users' requests and reduce the administrative burden on public administrations, businesses and citizens.

Digital-by-default and digital-first are at the core of NORA and engrained into many NAPs and IMPs. Administrative simplification is covered in KW05 "Efficiency" and specifically addresses the reduction of administrative burdens. Its related KD20 "Cost efficiency" with its seven underlying NAPs, especially NAP16 "Avoid unnecessary complexity" with its IMPs:

- IMP014 Eliminate unnecessary process steps
- IMP026 Adapt your own process and organization to the standard solution

Principle 11: Preservation of information

Long-term preservation of information held by public administrations is required to ensure that records and other forms of information keeps their legibility, reliability and integrity and can be accessed as long as needed subject to security and privacy provisions.

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

KW03 Future-oriented, and related KD11 Sustainable result, among others, in the implications IMP002 "Prevent loss of information" that deals with sustainable accessibility of information and IMP052 "Store information in a permanently accessible file format" that specially addresses this topic.

Furthermore, the long-term preservation of electronic records, as part of the 'Public Records Act[13], is covered as part of NORA topical issue 'Sustainable Accessibility'[14].

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 NAP 17 "Enable cyclical management of quality of service" which includes an PDCA cycle on the effectiveness of digital services and also covers efficiency related topics such as reuse and standardisation.

Conclusion

There is a significant improvement compared to the previous cross-reference between EIF and NORA in 2017 (Figure 2). Of the 12 EIF Interoperability Principles, seven were previously specifically covered by corresponding NORA Principles, four others were covered by NORA only in general terms and the principle of 'Multilingualism' was not addressed. Now all EIF principles are covered with NORA Quality of Service Goals, Architecture Principles and Implications. In other words, there is now a 100% match between the NORA and EIF at the abstract level of public service interoperability.

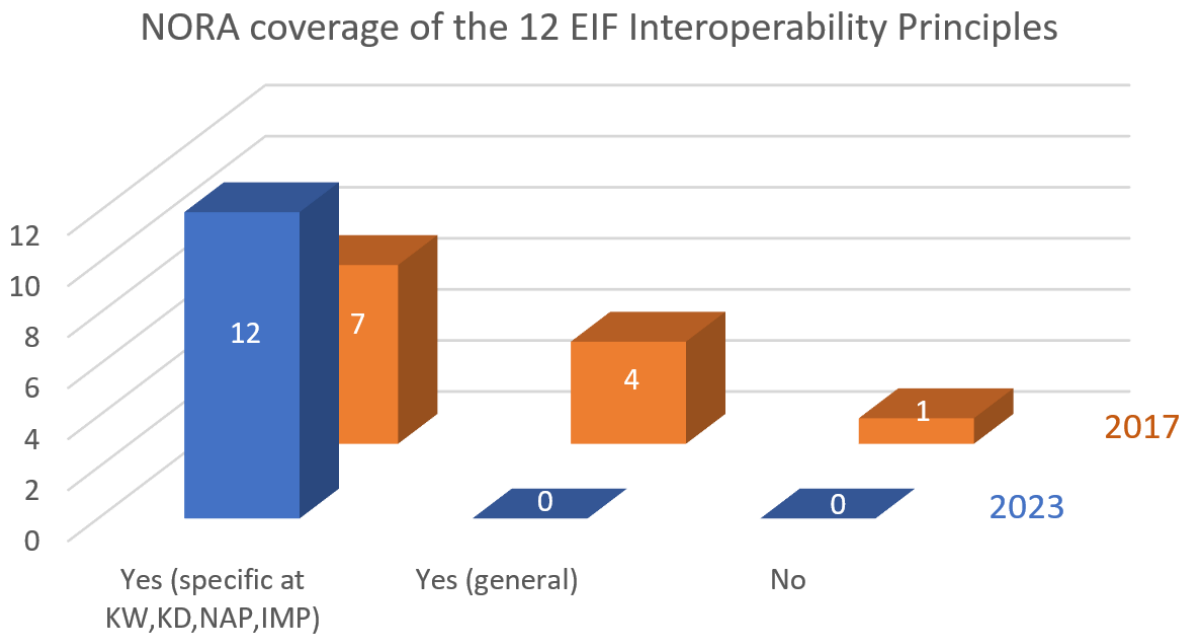

Figure 2. NORA coverage of the EIF Interoperability principles

[13] http://www.noraonline.nl/wiki/Archiefwet
[14] http://www.noraonline.nl/wiki/Duurzame_Toegankelijkheid

Section II - How to set up digital public services.

In this part, the remaining 28 EIF recommendations will be cross referenced with the NORA contents. Just like the previous report of 2017, for each recommendation an expert assessment 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*".
- If there is a change between 2017 and 2023, it will be indicated by "*X -> Y*".

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. It 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 Family[15] members. These take part in the further development of the NORA contents[16], which in many cases is inherited by sectorial '(reference)architecturesd. Compared with the previous assessment, inheritance for NORA daughters has been significantly improved since the new NORA set-up with KW-KD-NAP-IMPs has been adopted by at least three NORA Family members and more are expected to follow.	
Level of alignment: 5	Level of implementation: 3 -> 4

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.

[15] https://www.noraonline.nl/wiki/NORA_Familie

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

NORA's architecture principle NAP08 "Standardise where possible" deals with the use of standards and to deviate only when strictly necessary. IMP036 "Apply open standards" and IMP075 "Use open standards for modelling" provide further details. Standardization reduces variety and costs, improves interoperability and security and facilitates agility. Vendor lock-in is prevented by opting for open standards. Other sections of NORA provide further guidance[17]. The Dutch Standardisation Forum[18] 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[19] , in procurement and the National Building Blocks[20] (GDI). However, the use of open standards in (generic) building blocks on a local or sector level are not monitored yet. The "Monitor Open Standards" shows that the above instruments pay off due to a gradual increase in the number of standards applied in services year-on-year.
Level of alignment: 5 | Level of implementation: 3 -> 4

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 recommendation 21.
Level of alignment: 5 | Level of implementation: 3 -> 4

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[21] and links the subject of procuring ICT solutions to the practical guidance of the Dutch Standardisation Forum (BFS)[22]. 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[23].

[17] http://www.noraonline.nl/wiki/Standaarden
[18] http://www.forumstandaardisatie.nl
[19] https://www.noraonline.nl/wiki/Monitor_Open_Standaarden
[20] https://www.noraonline.nl/wiki/Bouwstenen_en_gebruikte_standaarden
[21] http://www.noraonline.nl/wiki/Aanschaf
[22] http://www.noraonline.nl/wiki/Lijst_Open_Standaarden_voor_Pas_Toe_of_Leg_Uit
[23] https://www.noraonline.nl/wiki/NL_LOM

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

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[24]. 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 on governance for Integrated public services are reflected in the following three architecture principles: • NAP04 “Package services”

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

- NAP13 “Manage risks continuously”
- NAP17 “Cyclic quality management”

Also relevant in this context, is the NORA topic “public services chain management”[25] which allows for coordination and collaboration across organisational boundaries in order to ensure adequate Integrated public service delivery. It addresses areas 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?

Our framework works 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).

Since 2020 the initiative “Gebruiker Centraal" started to describe several life-events. This provides the basis for a (NORA) community to help improve design of the worst 3 services every year. At UWV an implementation is carried out for “being sick” and “unemployment”. Also at the Ministry of Justice for “immigration”.

Level of alignment: 5	Level of implementation: 2 -> 3

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 architecture principles that cover 4 out of 5 layers (omitting the legislation-layer), notably NAP08 “Standardize whenever possible, NAP10 “Use data as foundation”, and NAP17 “Cyclic quality management”. This sets the foundation for interoperability requirements that are accompanied with the following concrete implications at the information layer:

- IMP049 “Ensure correct, up-to-date and complete information”
- IMP056 “Record data at the source”
- IMP065 “Verify data quality throughout the process lifecycle“
- IMP072 “Set up data governance”
- IMP073 “Determine the quality of each data element”

So this includes interoperability agreements, for example related to semantics[26] that are agreed on throughout the public services chain and on standards and best practices. These agreements are implemented and reflected in the various governmental domains as reflected in the SLAs of various dictionaries (“gegevenswoordenboeken”)[27] and supported by NORA’s national semantic plane[28]. However, little is known about these agreements.
In general, the quality levels of public services is published[29].

[25] http://www.noraonline.nl/wiki/Ketensturing
[26] http://www.noraonline.nl/wiki/Core_Vocabularies
[27] http://www.noraonline.nl/wiki/Gegevenswoordenboeken
[28] http://www.noraonline.nl/wiki/Nationaal_Semantisch_Vlak
[29] https://www.noraonline.nl/wiki/Kwaliteit_van_dienstverlening

Also, several governmental organizations publish their actual quality of Service on their websites. For example the Central Tax Office (Belastingdienst), the Central Judicial Collection Agency (CJIB), the Central Bureau of Statistics (CBS) and the Care Needs Assessment Centre (CIZ) [30].

Level of alignment: 4	Level of implementation: 2 -> 3

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;
- 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) in which the legal view is mandatory. This implies that relevant legislation and policies are to be interpreted for the specific application by the project. The projects are based on the Dutch government credo 'digital by default' (digitaal tenzij[31]). Also, a draft of new legislation is reviewed by the operational organizations as well as organizations responsible for supervision. Still, since 2020 in practice the alignment between legal drafters, policy makers and business / IT architects is still partly lacking. Therefor a major National program "Werken aan Uitvoering" has started to align the policies and legislation and the operations. Also many decentralized initiatives are started to align the many (European) legislation.

Level of alignment: 2 -> 4	Level of implementation: 1 -> 2

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.

The most important improvement since 2021 is the new conceptual processmodel for integrated public services, which is published on EU Joinup as a good practice[32]

[30] https://www.noraonline.nl/images/noraonline/0/05/Hoe_de_MFG-partijen_de_Kwaliteit_van_Dienstverlening_verbinden_met_Architectuur_31jan21_-_definitief.pdf
[31] http://www.digitaleoverheid.org/2014/05/22/dienstverlening-2020/
[32] https://joinup.ec.europa.eu/collection/nifo-national-interoperability-framework-observatory/solution/eif-toolbox/dutch-governmental-reference-architecture-nora

There is currently no formalised standard on how to document business processes, although in IMP075 "Use open standards for modelling" NORA recommends BPMN.	
Level of alignment: 3 -> 4	Level of implementation: 3

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 good described cross-border services is still not formalised on European level and therefore not available for the Member States. This withholds the setup of supporting organisations. A good first step in this direction are the Single Points of Contact per Member State. In The Netherlands we have set up a list of EU initiatives of cross-border data exchange from the government as part of the Connecting Europe Facility (CEF)[33].	
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 now reflected in the NORA principle NAP10 "Use data as foundation" which is reflected in more than a dozen implications:

- IMP001 "Describe information objects in a model"
- IMP002 "Prevent loss of information"
- IMP003 "Publish data as much as possible as open data"
- IMP021 "Promote data reuse"
- IMP045 "Record the 'purpose limitation' in the metadata of the data object"
- IMP046 "Assign responsiblilty for each piece of data"
- IMP047 "Apply the FAIR data principles"
- IMP048 "Put the context of an information object in metadata"
- IMP049 "Ensure correct, up-to-date and complete information".
- MP050 "Ensure data traceabiblity to its origin"
- IMP051 "Record audit logs at the data source (CRUD)"
- IMP052 "Store information in a permanently accessible file format"
- IMP058 "Determine the source for each piece of data"
- IMP073 "Determine the quality of each data element"

The topic 'Data on the Web'[34] has been further 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[35].

[33] http://www.noraonline.nl/wiki/Overzicht_internationale_gegevensuitwisseling_in_de_context_van_de_CEF_
[34] https://www.noraonline.nl/wiki/Data_op_het_web
[35] http://www.noraonline.nl/wiki/Duurzame_Toegankelijkheid

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[36]. NAP12 "Get data at the source" provides direction in this regard. Moreover, data protection is included in NORAs Quality of Service Goals related to information security KD08 "Confidentiality" KD07 "Integrity" and KD06 "Availability" and its supporting NAPs.	
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 OBDO[37] (Government-wide Digital Policy Board). 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[38], and 2) approaches like data-driven-design[39], coupled with linked data technologies[40]. In 2022 a major program "Interbestuurlijke Datastrategie[41]" has started to develop a Federatief Data Stelsel, which connects the Base Registries and other authorative data sources. Also a program has started to ensure the management of metadata(standards)[42]. The importance of managing of all kinds of government data is reflected in the various implications listed under EIF Recommendation 30.	
Level of alignment: 5	Level of implementation: 3 -> 4

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[43], which includes open information specifications and encourages relevant communities to share their results on a national level via the NORA communities. NORA passes these results through to the international level when appropriate. Currently NORA refers to 10 Base registries[44] and 145 Sector registries[45].	
Level of alignment: 5	Level of implementation: 3

[36] https://data.overheid.nl/
[37] https://www.digitaleoverheid.nl/nieuws/overheidsbrede-beleidsoverleg-digitale-overheid-obdo/
[38] https://www.digitaleoverheid.nl/dossiers/gegevenslandschap/dossierpostcontext/bruggen-bouwen-in-het-gegevenslandschap/
[39] http://www.noraonline.nl/wiki/Semantiek
[40] http://www.noraonline.nl/wiki/Linked_Data
[41] https://www.digitaleoverheid.nl/interbestuurlijke-datastrategie/
[42] https://www.noraonline.nl/wiki/Visie_metadatamanagement
[43] http://www.noraonline.nl/wiki/Domeinen
[44] https://www.noraonline.nl/wiki/Basisregistraties
[45] https://www.noraonline.nl/wiki/Sectorregistraties

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[46]. This recommendation is reflected in the following implications: ○ IMP003 "Publish data as much as possible as open data" ○ IMP027 "Use open source" ○ IMP036 "Apply open standards" ○ IMP039 "Provide open specifications" ○ IMP075 "Use open standards for modelling"	
Level of alignment: 5	Level of implementation: 3 -> 4

4. The conceptual model for integrated public services provision

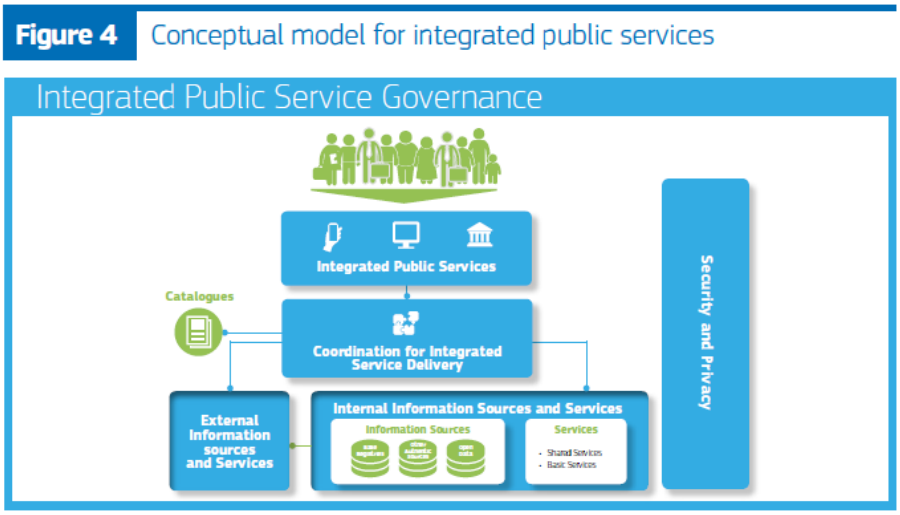

Figure 3. New EIF conceptual model for integrated public services

4.1 Introduction

Recommendation 34: Use the conceptual model for European public services [Figure 3] to design new services or reengineer existing ones and reuse, whenever possible, existing service and data components.

[46] http://noraonline.nl/wiki/Beleid_open_standaarden

Although NORA uses a different visualization for the conceptual model for integrated public services, it contains all the aspects which are described in the New EIF conceptual model. In addition, NORA advices to use the five-layer architecture model[47], when designing new services or engineering existing ones. This model is based on the four layers of EIRA and has been tested in several domains in combination with the idEA visualisation[48] (see Figure 4). 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. As a key element, in the new NORA the NAPs and IMPs are mapped to the five-layer model, which can be easily translated to the corresponding EIF layers. And at the moment of writing at least a handful of public organisations has adopted the new NORA structure with KDs-KWs-NAPs-IMPs.	
Level of alignment: 1 -> 5	Level of implementation: 1 -> 2

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. NAP07 “Build services in a modular way” and IMP029 “Separate process from data” contribute to the goal of designing loosely coupled service components to increased flexibility. 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[49]. The core of this consists of the Generic Digital Infrastructure (GDI)-Architecture, abbreviated as GA[50]. NORA’s functional building block model[51] and five-layer architecture model stimulate the interconnectivity of building blocks for public services and provides references links with European public services and building blocks[52,53].	
Level of alignment: 5	Level of implementation: 4

[47] https://www.noraonline.nl/wiki/Vijflaagsmodel
[48] http://www.noraonline.nl/wiki/Bestand:IdEA-GDI-2016-04-19_klein.png
[49] http://www.noraonline.nl/wiki/Bouwstenen/alfabetisch
[50] https://www.noraonline.nl/wiki/GDI-Architectuur_(GA)
[51] http://www.noraonline.nl/wiki/Bouwstenen/indeling_functie
[52] http://www.noraonline.nl/wiki/Architectuur_internationaal
[53] http://www.noraonline.nl/wiki/Tabel_bouwstenen_internationaal

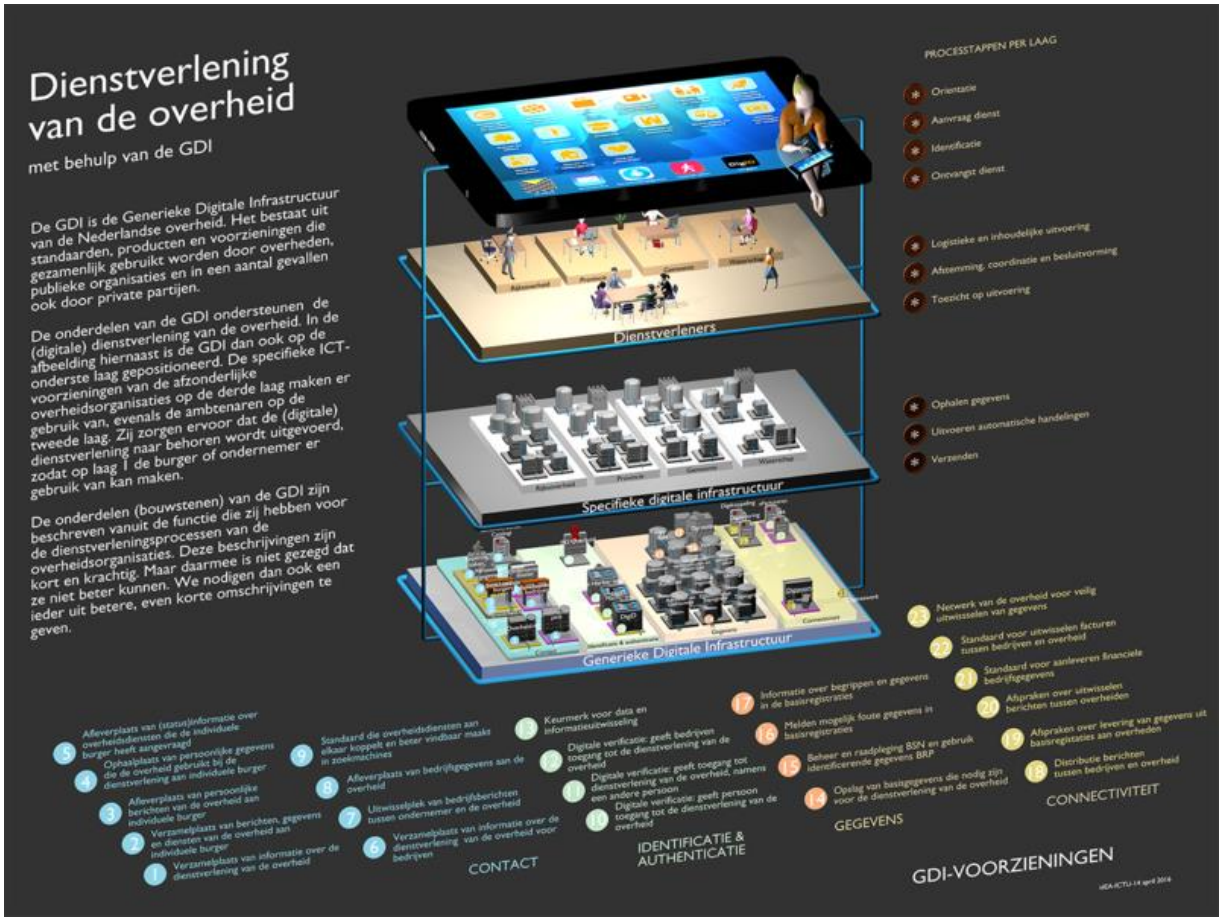

Figure 4. Example of NORA's idEA visualisation

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.

A shared infrastructure of reusable services and information sources (Generic Digital Infrastructure Architecture, GA) consists of four domains: Access, Interaction, Data Exchange and Infrastructure. NORA promotes the use of the GA by means of KD18 "Uniformity", related NAP06 "Reuse, before buy, before build" and it's implications IMP028 "Make services reusable" and IMP074 "Identify the standard solutions relevant to the service". Moreover, NORA lists these building blocks that can be used by all public administrations[54].	
Level of alignment: 5	Level of implementation: 5

[54] http://www.noraonline.nl/wiki/Bouwstenen/alfabetisch

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 below; 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'[55]. In the Netherlands, ten base registries contain authoritative sources of information[56] 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 Architecture (GA). A yearly quality assessment is carried out to check the consistency across these base registries[57].
In addition, NAP12 "Get data at the source", IMP051 "Record audit logs at the data source (CRUD)" and IMP056 "Record data at the source" support the implementation of the EIF recommendations 37 to 40.

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 was the data portal of the Dutch government: www.data.overheid.nl. In addition, since may 2022 the re-use of open data is supported on the legislation level by the "Wet Open Overheid" and has led to many initiatives to re-design the processes and systems for re-use of data. The NORA supports this

[55] http://www.noraonline.nl/wiki/Stelsel_van_Basisregistraties
[56] http://www.noraonline.nl/wiki/Alle_basisregistraties;
https://www.digitaleoverheid.nl/voorzieningen/gegevens/inhoud-basisregistraties/stelselplaat/
[57] https://www.digitaleoverheid.nl/overzicht-van-alle-onderwerpen/stelsel-van-basisregistraties/kwaliteit-en-terugmelden/

with reference-architectures for Personal Data Management[58] and the Federative Data Network[59] and the theme Datamanagement[60]tIMP003 "Publish data as much as possible as open data" gives further substance to this recommendation.	
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[61] and NORA's five-layer model[62]. The publication in machine-readable, non-proprietary formats is growing with the use of Linked (open) Data, some of which are published[63]. In combination with IMP003 "Publish data as much as possible as open data", IMP048 "Put the context of an information object in metadata" and IMP049 "Ensure correct, up-to-date and complete information" provide further details to how to deal with this recommendation.	
Level of alignment: 5	Level of implementation: 2 -> 3

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[64] and NORA's five-layer model. In addition, the Open Data community and its key promoter Paul Suijkerbuijk[65] is very active in publishing and promoting Open Data sets.	
Level of alignment: 5	Level of implementation: 4

4.3.5 Catalogue

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[66], 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 a API-register[67]

[58] https://www.noraonline.nl/wiki/Referentiearchitectuur_Regie_op_Gegevens
[59] https://www.noraonline.nl/wiki/Inleiding_Federatief_Datastelsel
[60] https://www.noraonline.nl/wiki/Gegevensmanagement
[61] http://www.noraonline.nl/wiki/Open_data_portal
[62] http://www.noraonline.nl/wiki/Vijflaagsmodel#Laag_4:_Applicatielaag
[63] https://www.begrippenxl.nl/nl/
[64] http://www.noraonline.nl/wiki/Open_data_portal
[65] https://www.linkedin.com/in/palinuro/?ppe=1
[66] http://www.noraonline.nl/wiki/Samenwerkende_catalogi
[67] https://developer.overheid.nl/

and a software-register is being developed, but no common models are used for describing them. IMP006 “Know your customers and tailor services accordingly” and IMP043 “Include public services in a products and services catalog (PDC)” provide more details on this topic.	
Level of alignment: 5	Level of implementation: 4

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 financial service providers and telecom operators. According to IMP058, for every data, an authoritative source needs to be used i.e. external sources[68]. This re-use is growing along with the use of API’s. 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.

Security and privacy are important elements of NORA and reflected by the Privacy and ‘CIA’ *Quality of Service Goals* (KD’s 5 to 8) related to EIF recommendation 15. Furthermore, the CIP organisation (Centre for Information Security and Privacy) manages the detailed content in this domain[69] [70]. Security and Privacy by design are covered by NAP11 “Apply 'purpose limitation'”, NAP13 “Continuously manage risk” and its related IMPs related to risk: IMP032 “Design services with ‘purpose limitation’ and ‘legal basis’ as preconditions”, IMP061 “Reduce residual risks” and IMP062 “Evaluate the risk analysis in case of changes”. The importance of Business continuity for public services is reflected in: ○ IMP063 “Determine the continuity requirements” ○ IMP078 “Monitor continuity and draw up a disaster plan” ○ IMP079 “Ensure the availability of systems” whereas identification, authentication and authorization (see also theme IAM[71]) is reflected in:

[68] https://www.noraonline.nl/wiki/Stel_voor_ieder_gegeven_de_unieke_bron_vastto
[69] http://www.noraonline.nl/wiki/Beveiliging
[70] http://www.noraonline.nl/wiki/Privacy
[71] https://www.noraonline.nl/wiki/Identity_%26_Access_Management_(IAM)

○ IMP051 “Record audit logs at the data source (CRUD)” ○ IMP060 “Determine authorizations with metadata” ○ IMP068 “Make access to applications and data dependent on authentication level” ○ IMP069 “Use the zero-trust model” ○ IMP081 “Safeguard the confidentiality of data in measures” ○ IMP088 “Grant only strictly necessary access rights” Finally, implications that deal with trust services, transfer mechanisms of information and management of information are: ○ IMP019 “Make joint agreements about identification and authentication” ○ IMP083 “Exchange data between (web) applications with APIs” ○ IMP084 “Encrypt data at rest and in transit” ○ IMP072 “Set up data governance” ○ IMP066 “Set up a strong logging and audit trail”	
Level of alignment: 5	Level of implementation: 4 -> 5

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 continuously improved (developed) and used conform the required regulations. Also major programs were started to implement EID, eWallets and Trustframeworks[72].	
Level of alignment: 5	Level of implementation: 4

[72] https://www.noraonline.nl/wiki/Toegang

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. EIF recommendation 34 increased from 1 to 3 due to the mapping of the new NORA structure to architecture layers. This is the only improvement compared with previous assessment of 2017[73]. NOG EVEN CHECKEN obv deze wijzigingen

The adoption of the EIF recommendations (red bars in Figure 5), i.e. the NORA adoption by public organisations, shows more improvements in comparison to 2017. Eight EIF recommendations, with numbers 20, 21, 22, 31, 33 and 34, 42, 46 all increased by one point.

To further develop the interoperability of public services in the Netherlands, this topic will be discussed with the NORA community. And if there is agreement on the measures to be taken, actions will be included in the NORA development annual programme.

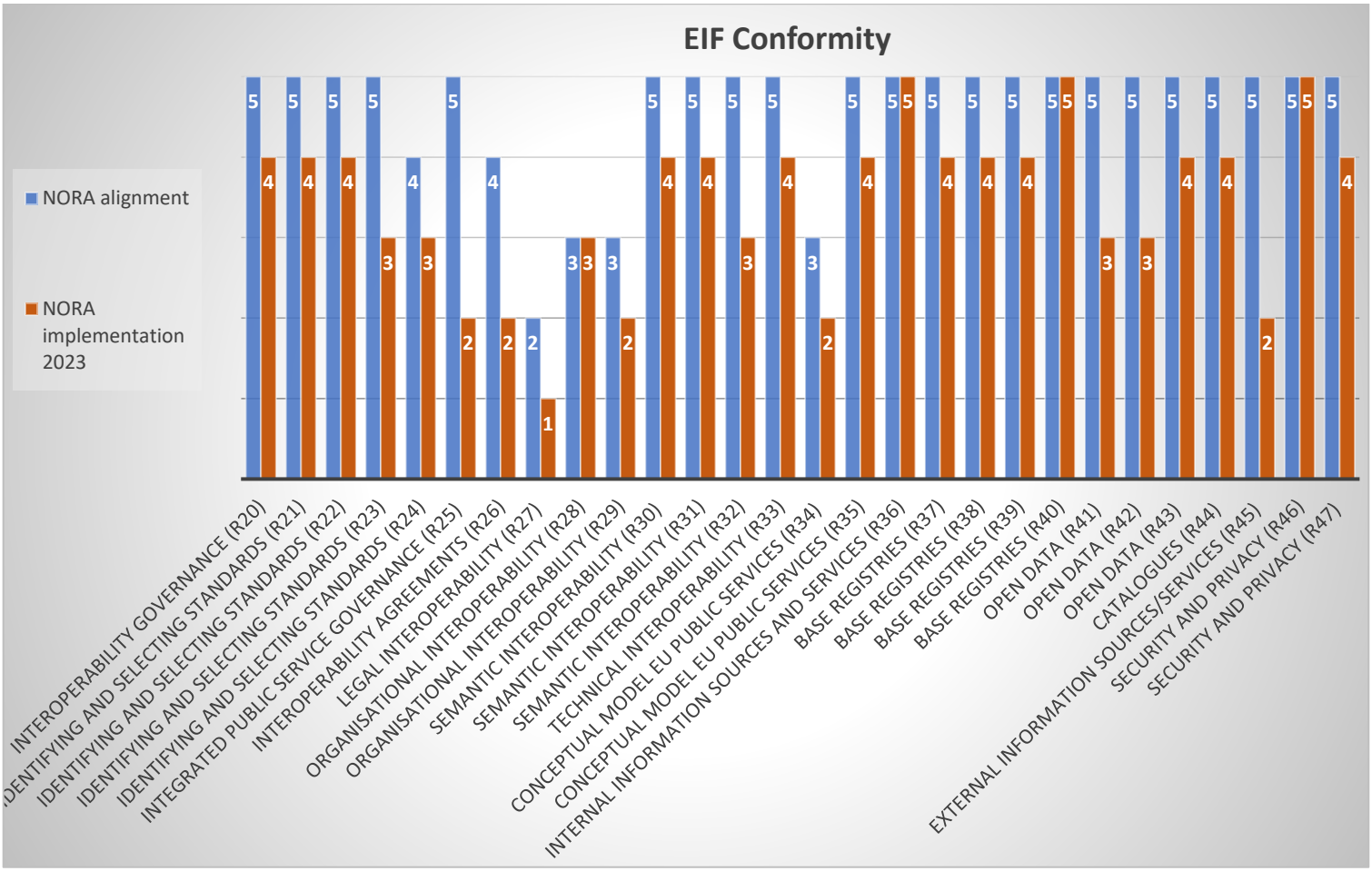

Figure 4. NORA – EIF Conformity

The following levels of conformity have been used: 1 Very low; 2 Low; 3 Moderate, 4 High; 5 Very high.

[73] https://www.noraonline.nl/images/noraonline/9/93/Xref_new_EIF_and_NORA_-_final_21jul17.pdf