

APIs4DGov study

Digital Government APIs, the road to
value-added open API-driven services

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Joint Research Centre

The European Commission's science and knowledge service



The JRC and the B6 Digital Economy Unit

The Joint Research Centre (JRC)

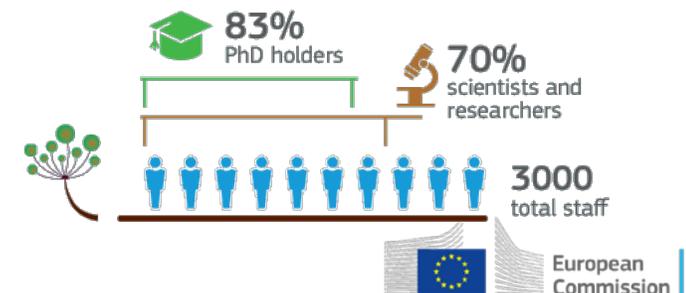
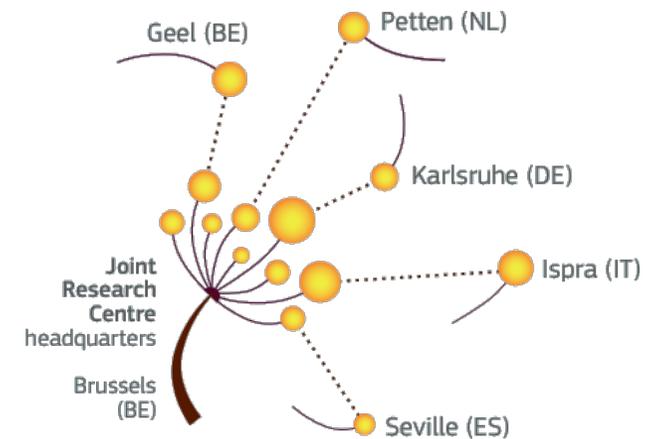
- European Commission's science and knowledge service carrying out research to provide independent scientific advice and support to EU policy

The JRC B6 Digital Economy Unit

- Investigate how the on-going digital revolution and ICTs are affecting the economy and the digital transformation of Governments

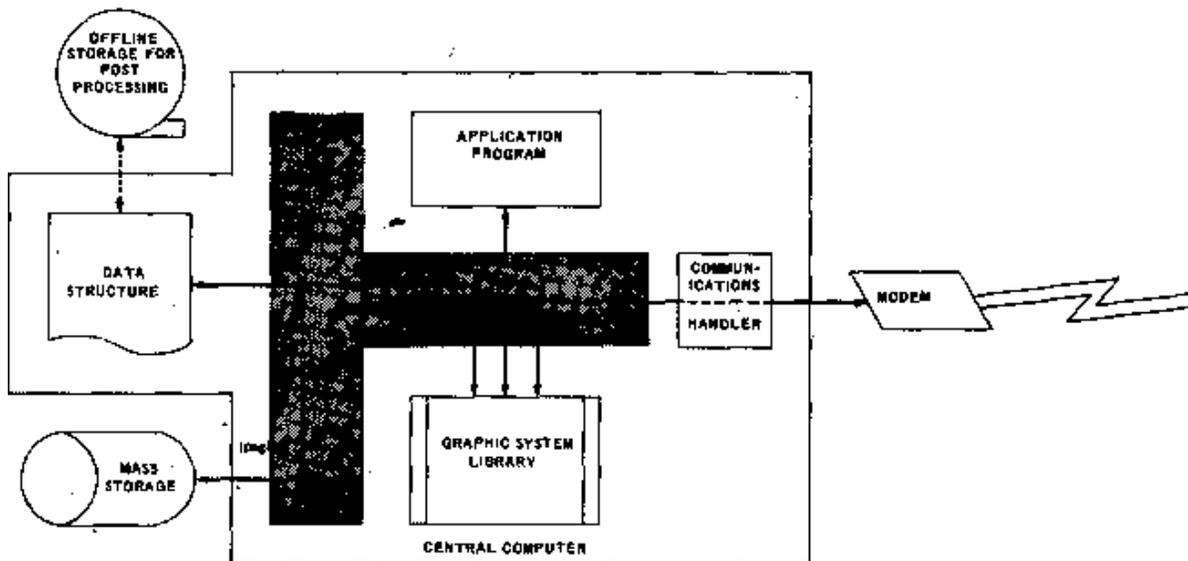
The APIs4DGov study

- A 2 years study that gather evidences to support the evaluation of EU-policy requirements related to APIs (e.g. for the adoption of the recent PSI revision)



“API is a software interface that allows applications to communicate with one another”

*1968: “Normally, the interface between application programs and the system is desired via FORTRAN -type subroutine calls.”**



*Nowadays: “An interface definition that permits invoking services from application programs without knowing details of their internal implementation”***

The collage illustrates modern API usage. It includes a 'Live Bus Arrivals' map, a 'WebCAT' interface, a smartphone displaying a bus stop, a cloud icon with 'API' and a padlock, and a 'TfL Rail' interface.

Live data and APIs include;

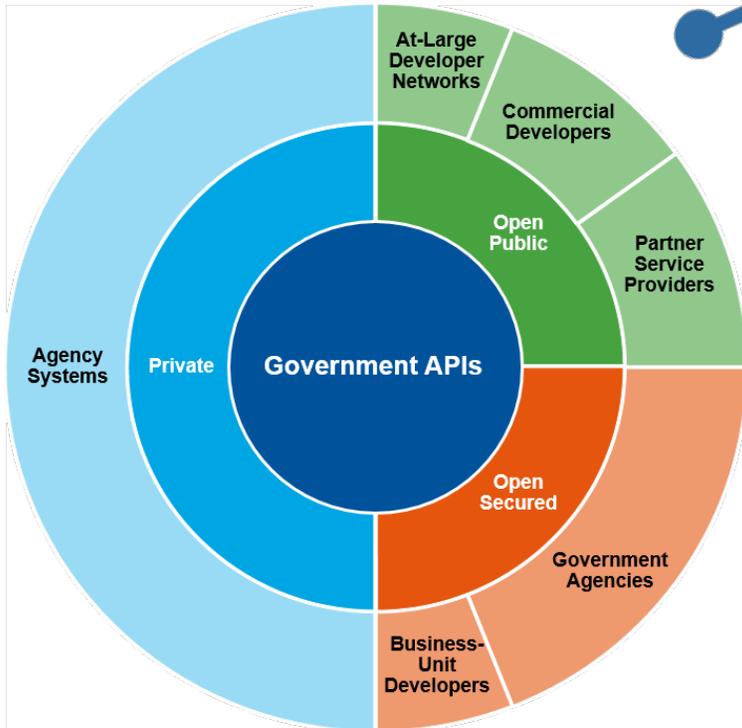
- Bus arrivals – stream and API
- Tube movements, departures, status
- Cycle hire docking station status
- River boat status and arrivals
- Roads status
- Journey Planner API

*Cotton, I.W., & Greatorex, F.S. (1968). Data structures and techniques for remote computer graphics. AFIPS Fall Joint Computing Conference.

**OGC glossary

APIs in the context of e-Government

GovAPI

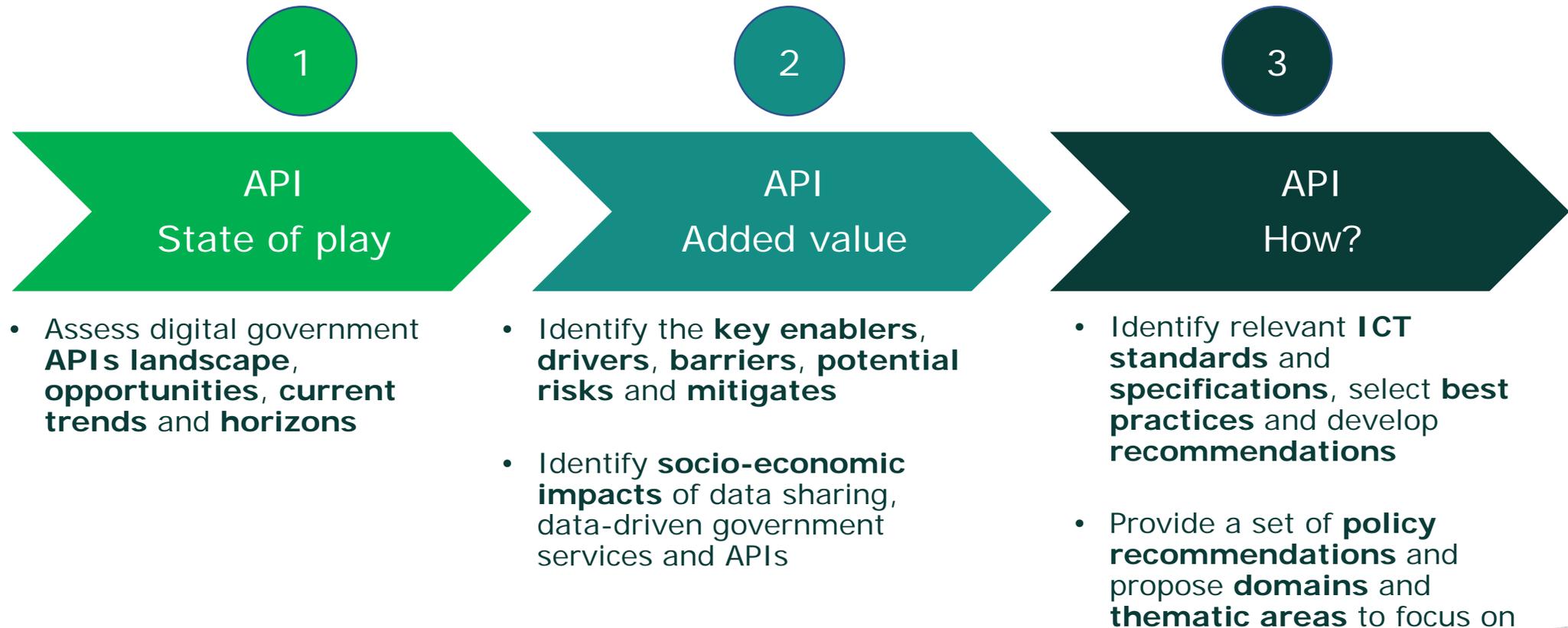


Source: Gartner (December 2017)

- **API** is a **connector** that enables machine to machine communication
- API solutions can **facilitate government interactions**:
 - internal (G2G)
 - external (G2G, G2C, C2G, G2B, B2G, B2B)
- **Purpose, scope and accessibility** come by **design**

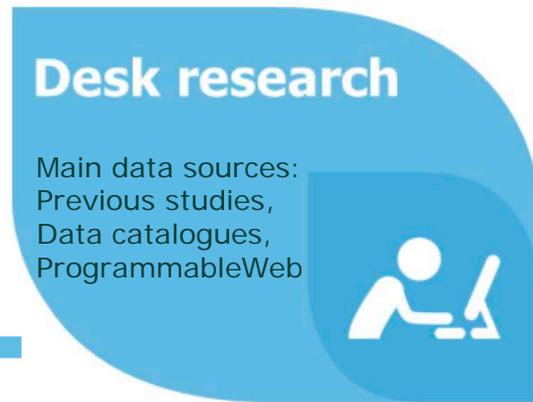
APIs4DGov Study

- *Why governments should invest resources in setting up an API ecosystem?*
- *Which government actions should be taken in developing government APIs?*



Our research is based on many sources

- API cases
- API communities
- API standards
- API best practices
- The added value of API



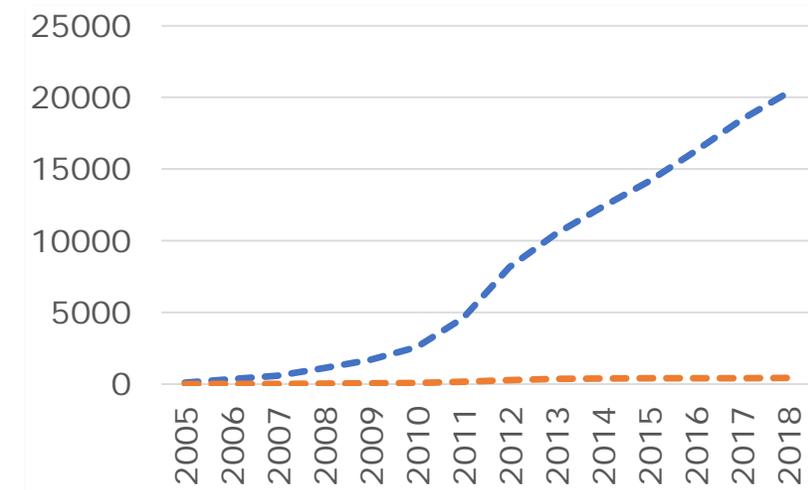
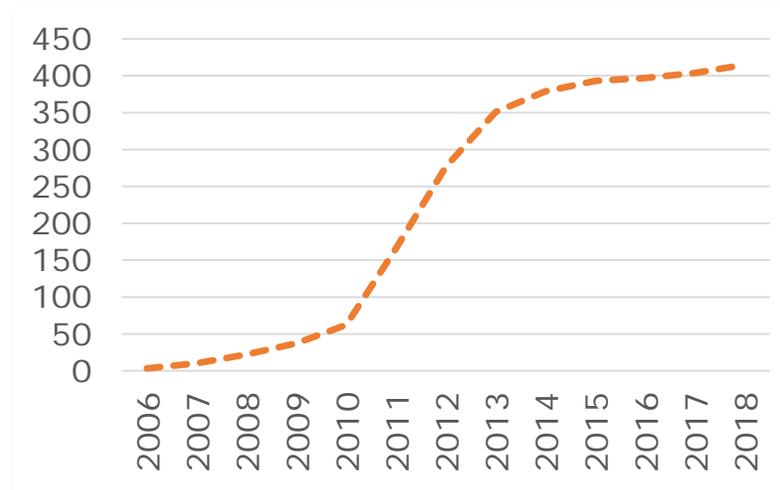
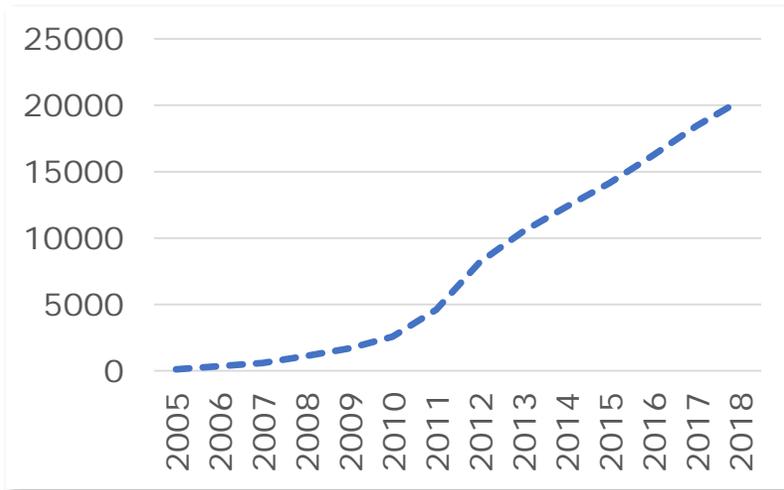
- Case studies
- API strategies
- Expert knowledge on specific fields:
 - Technologies (IoT, Bid Data, AI)
 - Digital Government,
 - API in the private sector

- Costs and Benefits
- Drivers
- Enablers
- Risks
- Barriers
- Socio-economic impact

- Comparison of EU experiences
- Learning from each other
- Community building
- Public meet private

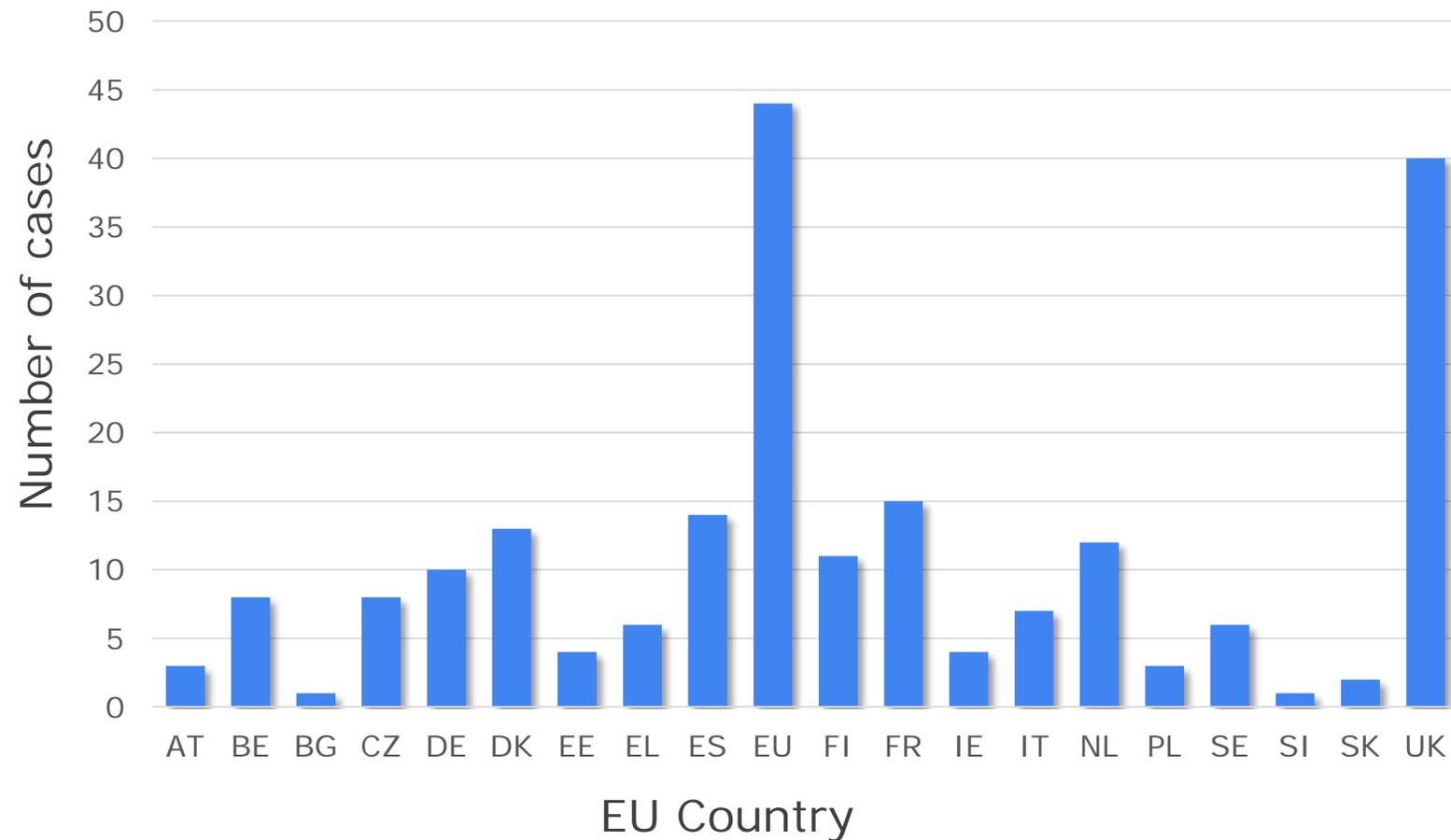
(Source: ICT Impact Assessment Guidelines, ISA² Program).

Number of registered API in ProgrammableWeb

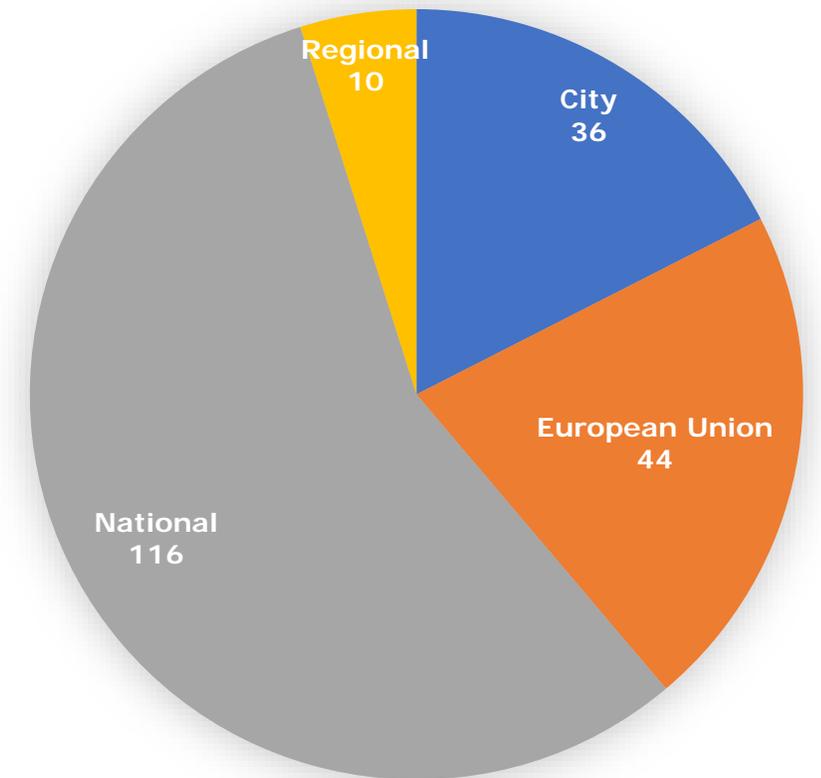


- **ProgrammableWeb directory** is a rich source of information
 - The registration is volunteer, so this is probably a subset of the available APIs
 - It contains more than 21000 registered APIs
 - Of which less of 500 have 'Government' as a primary keyword
 - And less of 100 are registered as European APIs

Government APIs in EU cases (work in progress)



Administrative distribution



Government API uptake is quick and massive

Denmark Addresses
Web API (DAWA)

There is approximately **5000 IT systems** which draw data regarding Danish addresses using DAWA

Unique point of access for addresses for everybody (OOP)

Madrid Mobility
Labs

2500 developers registered in the System

Around **50 apps** developed

X-Road

925 institutions and enterprises connected, including **706 public sector institutions**

99% of government services covered

Circa **52,000 organisations** as indirect users of X-Road services

Amsterdam City
Data

350m requests per year

Visitors per month: 8000, average time spent using the data interface: 20 minutes

Utility System in
Flanders (KLIP)

10713 registered Map Requester Initiators (MRI), made up of **1502 companies and 1258 citizens**

200,000 map requests a year, for each request 6-7 utility company involved

Goals of API adoption

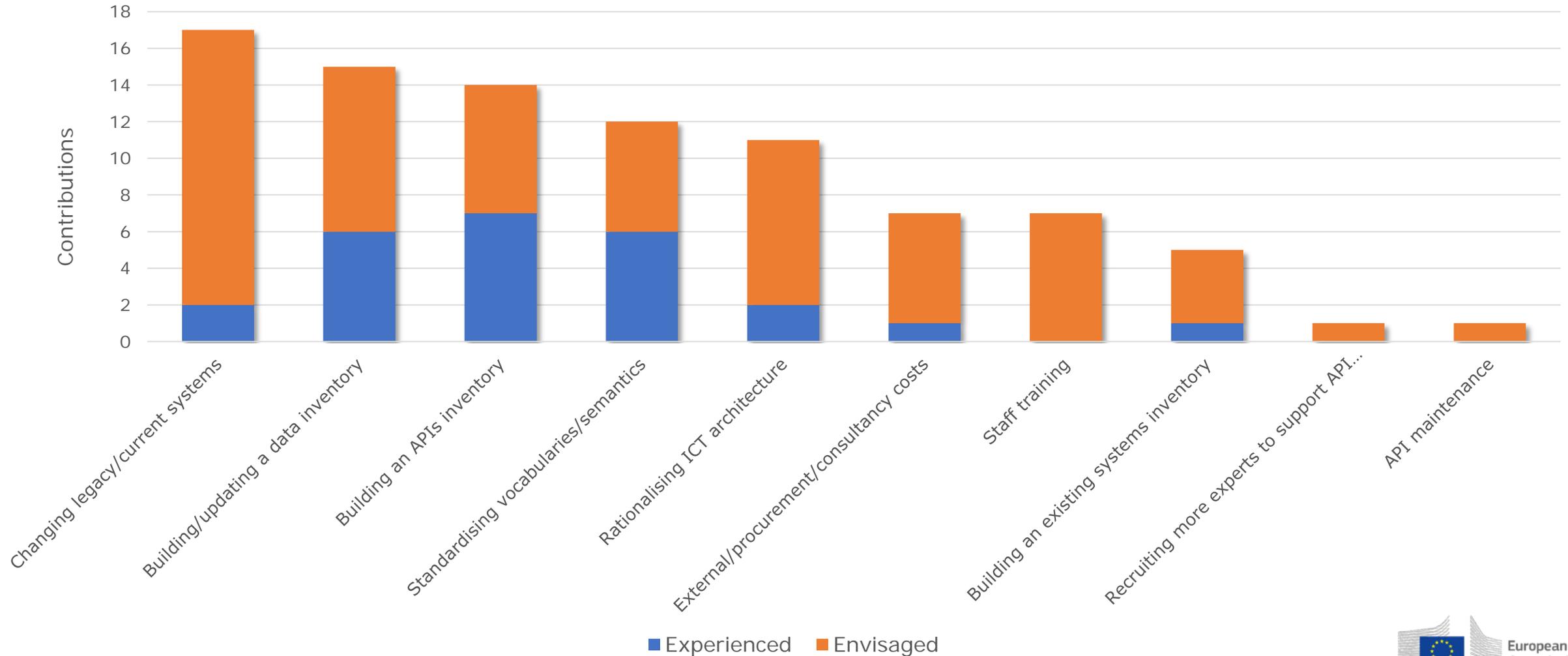
Internal

- Organisational and policy demands
- Stakeholder (including citizens and business) demand

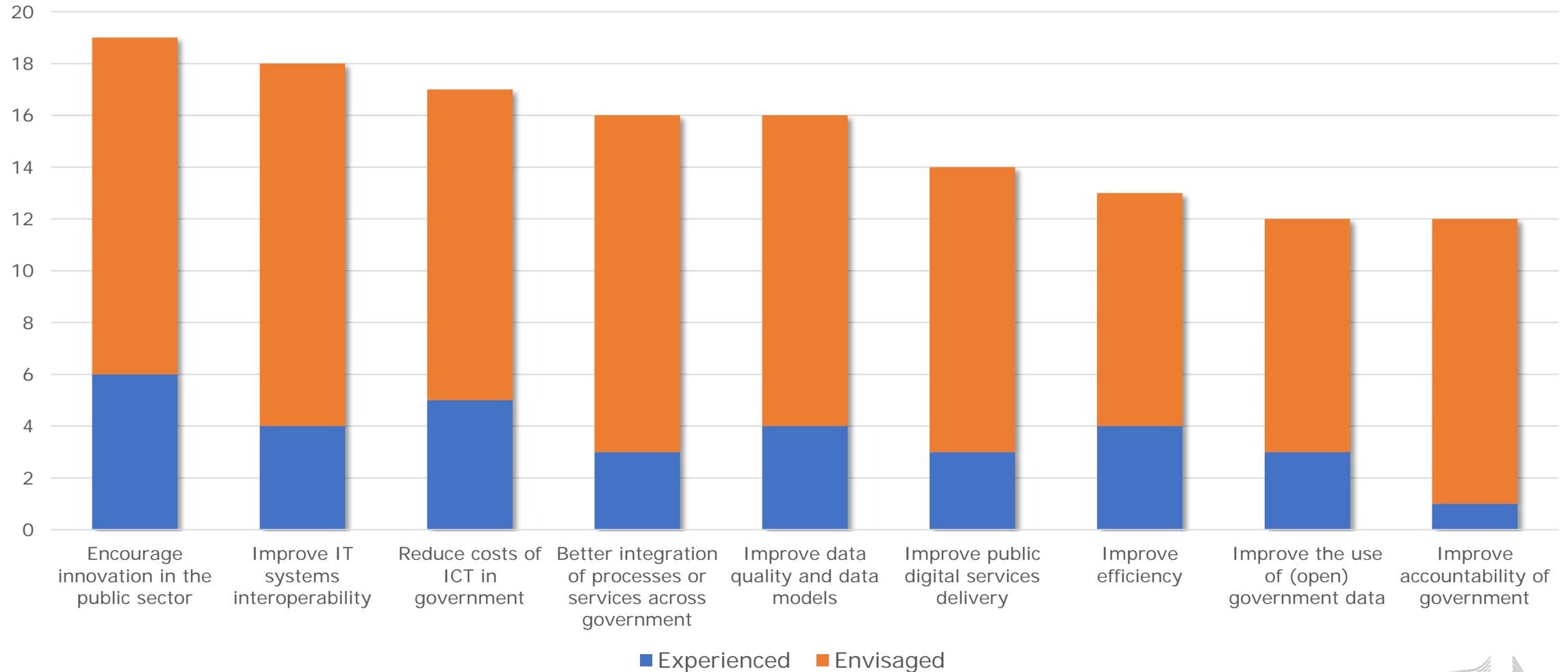
External

- **Control and analyse the usage of open data**
- Establish a **bidirectional channel** with external stakeholders to:
 - **provide the updated version** of the data
 - **let the stakeholder interact** and modify the data
- Improve data exchange in specific thematic domains (e.g. health, location, agriculture, mobility, etc.)

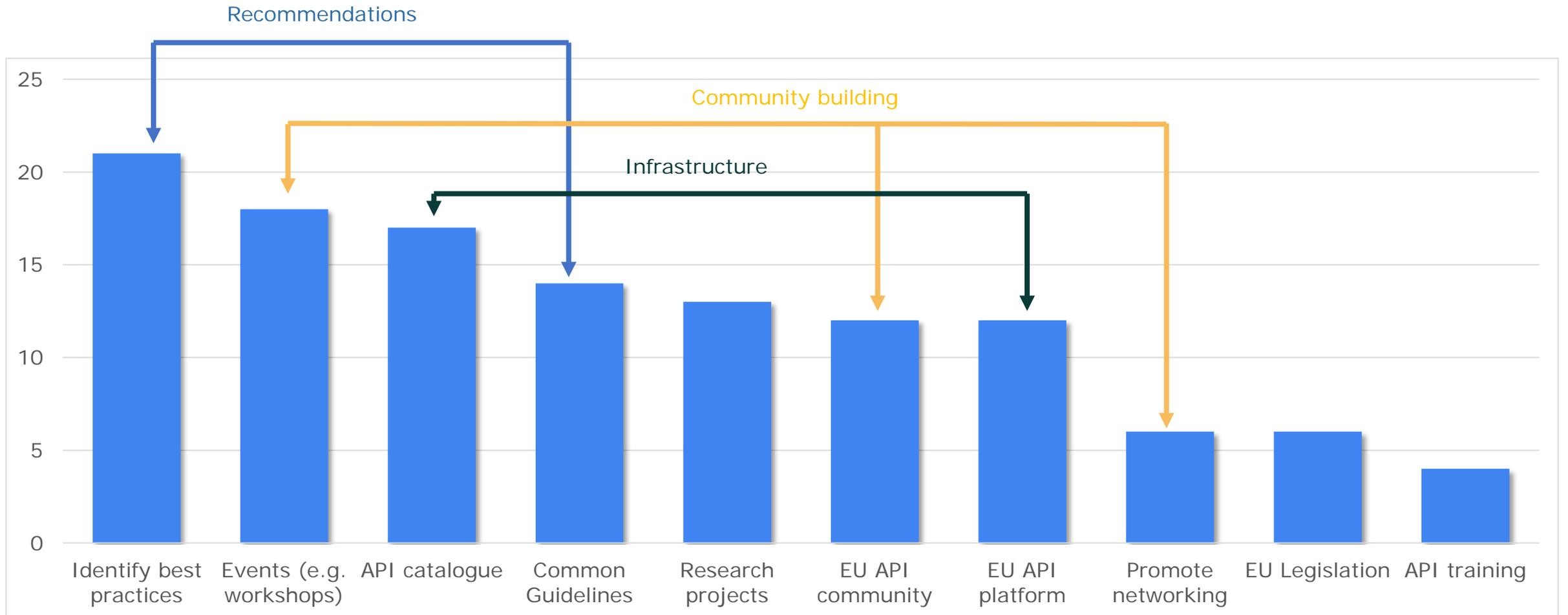
Main costs



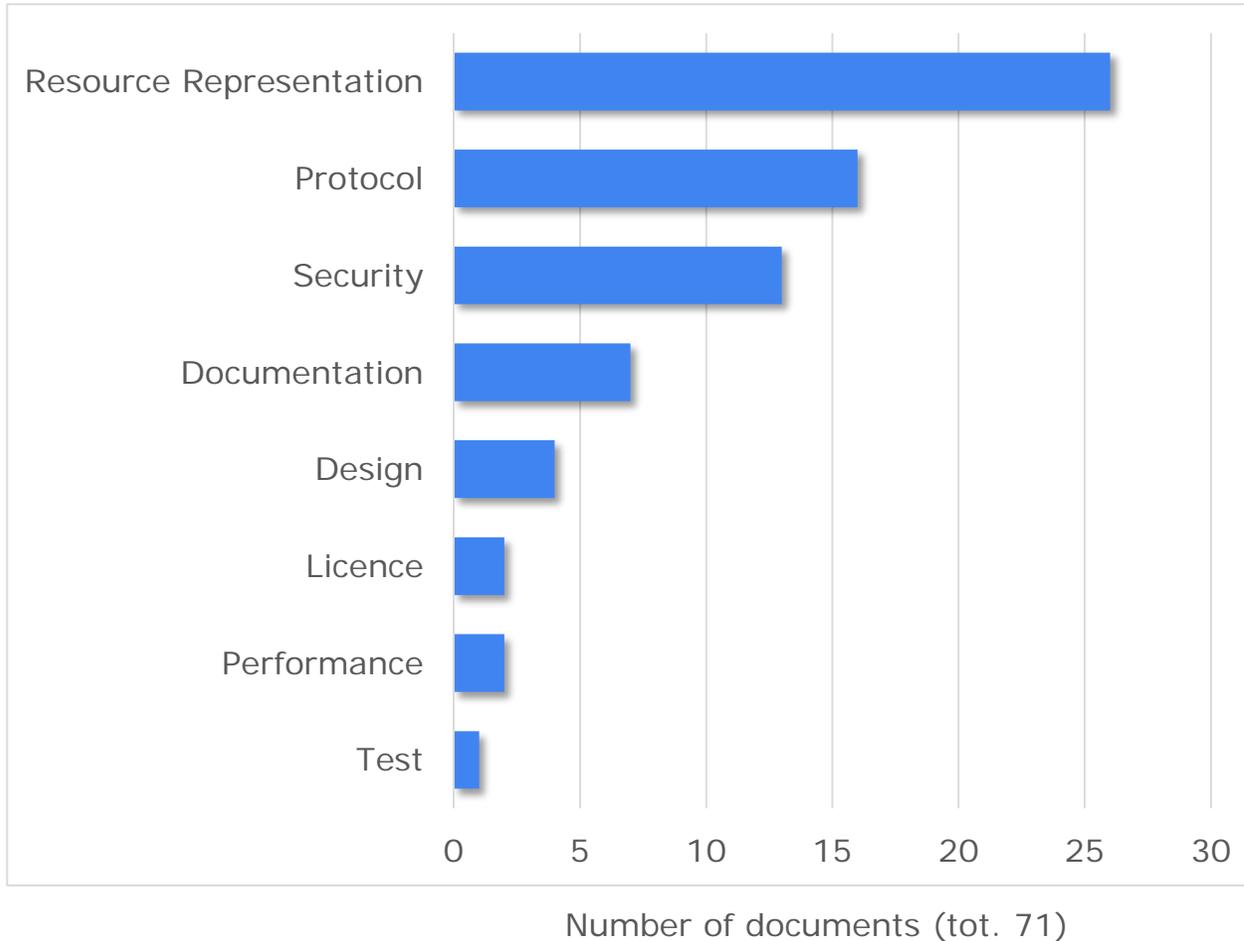
Main benefits



EC support to API strategies



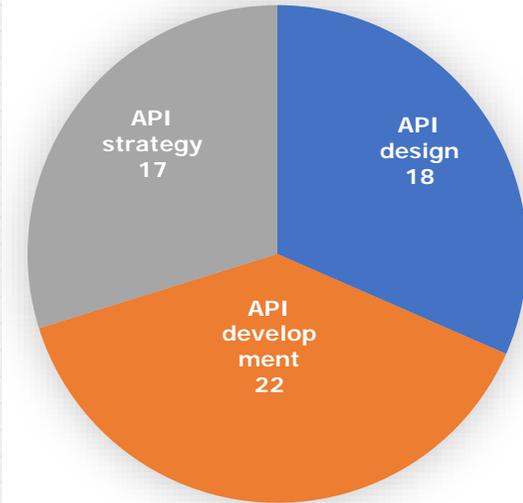
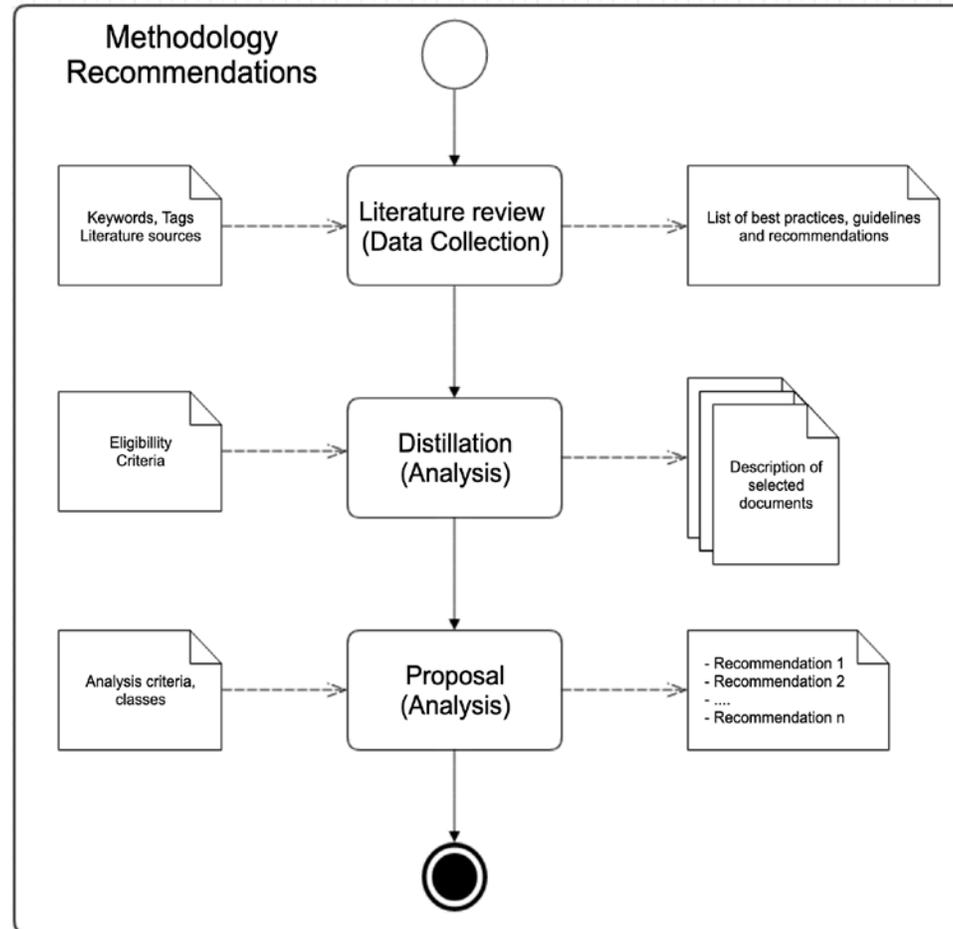
API Standards and specifications



Name	Use	Provided by	TS/S	Scope	Theme	Initial Release
Application Performance Index (APDEX)	API performance	APDex Alliance	TS	Generic	Various	2007
API Blueprint	API documentation	apiblueprint.org	TS	Specific	Various	2013
Atom feed	Data encoding	IETF	S	Generic	Various	2005
Connecting Europe Facilities (CEF) Building Blocks	ICT service	European Union	TS	Generic	Various	2018
Collection+JSON	Pattern	Mike Amundsen	S	Specific	Various	2012
Common Object Request Broker Architecture (CORBA)	Architectural style	Object Management Group (OMG)	S	Generic	Various	1991
Context Broker	ICT service	European Union	TS	Generic	IoT	2018
Core Service Public Vocabulary (CPSV-AP)	Data model	European Union	TS	Generic	Public service	2012
Date and Time on the Internet: Timestamps	Timestamp	IETF	S	Generic	Various	2002
eArchiving	ICT service	European Union	TS	Generic	Various	2018
eDelivery	ICT service	European Union	TS	Generic	Document	2018
eID	ICT service	European Union	TS	Generic		2018
eIDAS	Regulation	European Union	TS	Generic	Electronic Identity	2014
eInvoicing	ICT service	European Union	TS	Generic	Business	2018
eSignature	ICT service	European Union	TS	Generic	Security	2018
eTranslation	ICT service	European Union	TS	Generic	Translation	2018
European Union		European Union	S			

Best practices

Location	Author(s)	Title	Topic	Author type	Target public	Area	Focus	Document	Type
Australia	Government of Australia	Digital Service Standard	Digital service standard	Public administration	Tactical	National	Generic	Official publication	Guideline
Finland	CitySDK	The City SDK Cookbook: CitySDK Transforming digital service development with harmonized APIs	API lifecycle	Consortium	Tactical	City	Specific	Official publication	Best practice
Finland	Finnish Government	Web API development guide	API development	Public administration	Operational	National	Specific	Official publication	Guideline
Finland	6Aika	Harmonised Smart City APIs A Cook Book for Cities	API lifecycle	Consortium	Tactical	City	Specific	Official publication	Best practice
Finland	6Aika	API Toolkit	API lifecycle	Consortium	Tactical	City	Specific	Official publication	Best practice
Finland	6Aika	Open API recommendations for cities	API strategy	Consortium	Strategic	City	Specific	Official publication	Best practice
Finland	6Aika	Working together towards open data business	Open Data	Consortium	Tactical	City	Generic	Official publication	Best practice
Internat.	APIGea (Google)	API Best Practices Managing the API Lifecycle	API lifecycle	Private company	Tactical	International	Specific	Book	Best practice



Just Open Data is not enough

API is a key technological solution to **exchange Government Open Data**. It has great advantages in terms of accessibility, scalability and speed. For example:

- APIs allow device flexibility with respect to bulk data download
- APIs documentation can also expose (machine-to-machine) syntax and semantic of the data (e.g. links to schema.org in the case of OAS 3.0)

APIs allow **app developers** to build applications tailored to the particular citizen-facing problems

To speed-up API adoption in Governments

The private sector is **far more advanced** than the public sector

API strategy maturity is different in the public sector



It is fundamental to **exchange experiences** and **best practices...** and use **common interoperable standards** and **specifications**

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APIs are eating the world

Helsinki

4,5 June

Barcelona

12,13 September

Paris

10,11 December

And contribute to our survey!



*“We’re not going to specify all the details of how you interoperate;
we’re just going to say, ‘Please do it’”*

Tim O’Reilly, Government as a Platform section of [11]



Thanks a lot for your attention!

Questions?

Contact us at: jrc-apis4dgv@ec.europa.eu