

APIs in the context of OOP

APIs4DGov Project

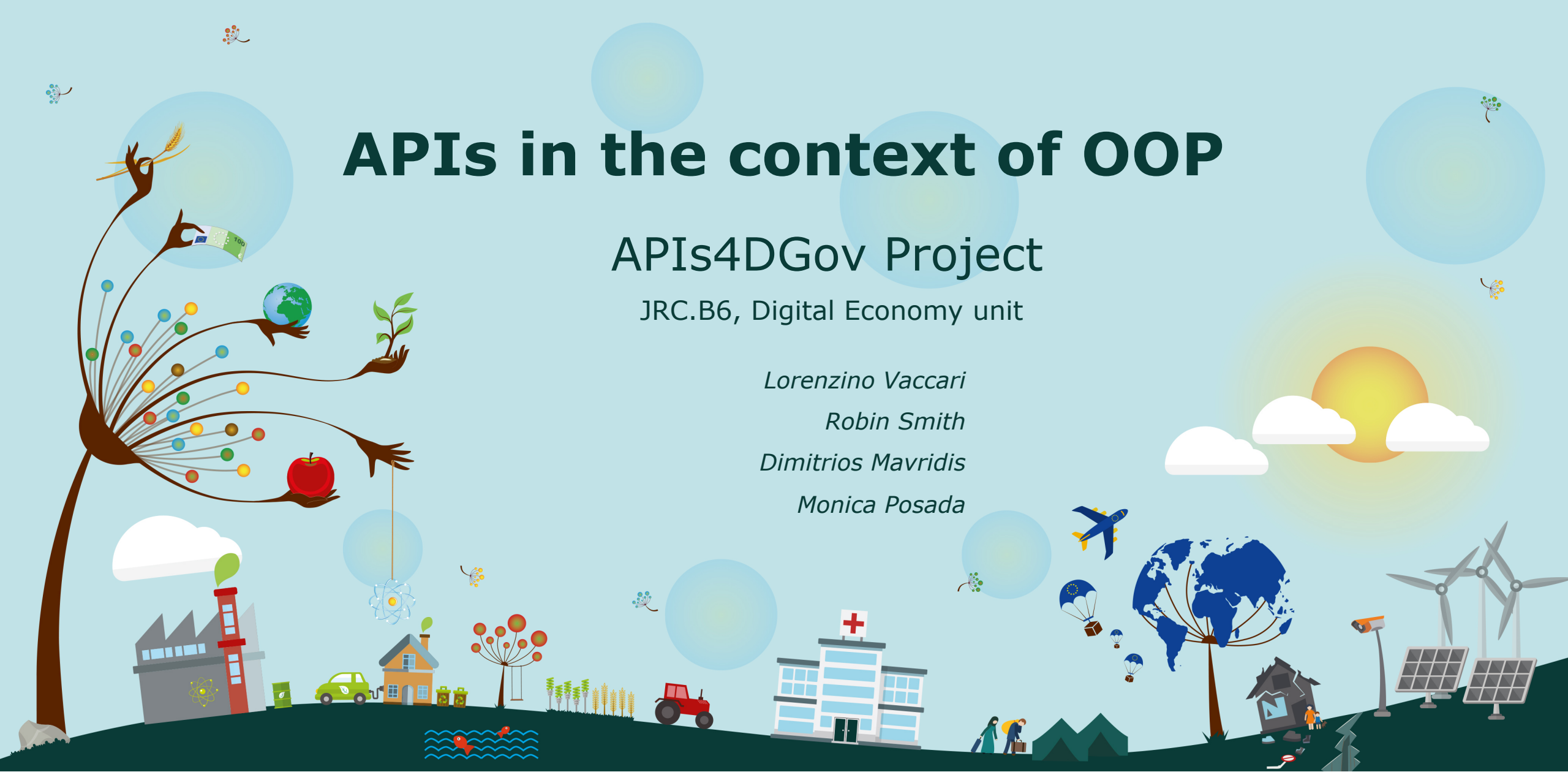
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Joint Research Centre

The European Commission's science and knowledge service



European
Commission

The JRC and B6 Digital Economy Unit

The **Joint Research Centre (JRC)**

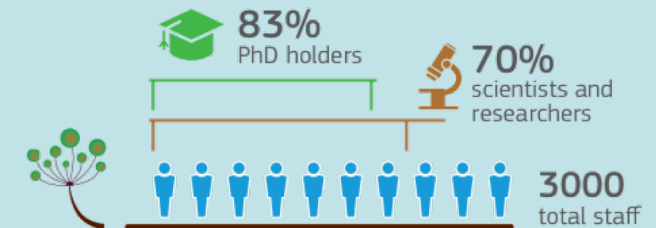
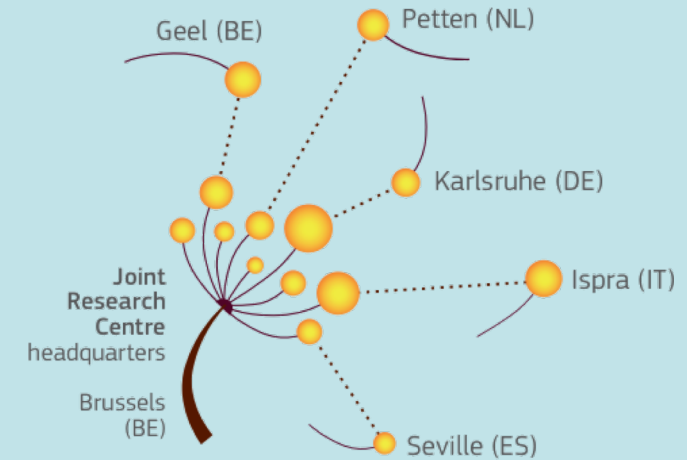
- European Commission's science and knowledge service carrying out research to provide independent scientific advice and support to EU policy.

The JRC **B6 Digital Economy Unit**

- Investigates how the on-going digital revolution and Information and Communications Technologies are affecting the economy and the digital transformation of Governments.

The **APIs4DGOV** Project

- Gather evidences to support the evaluation of EU-policy requirements related to APIs



Why a policy eye on APIs?

JRC RESEARCH CONTEXT

Links with OOP

API research context @ JRC

APIs are instrumental for a healthy and functional **DIGITAL TISSUE**

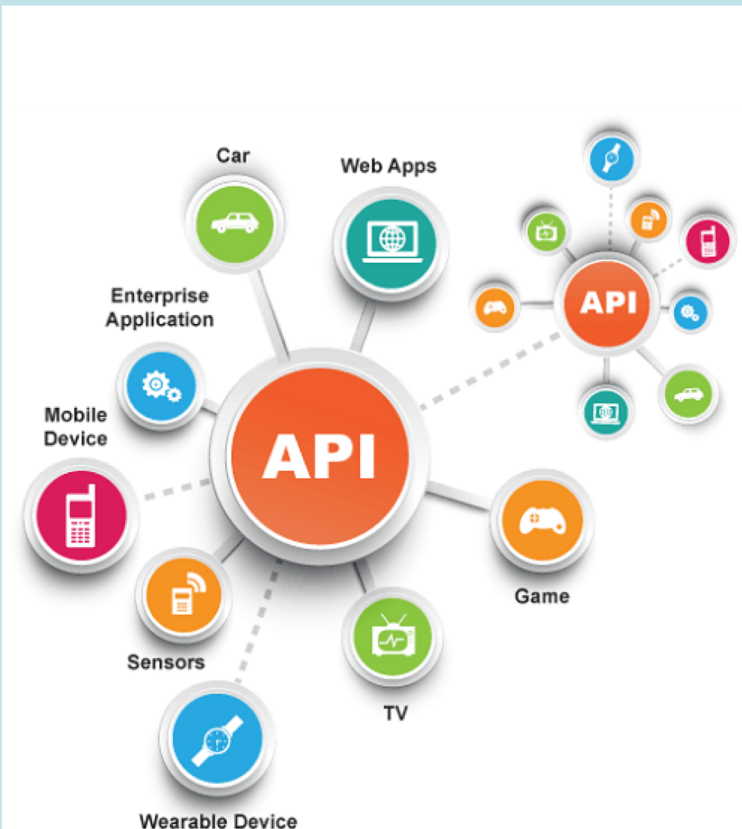
JRC research supports analysis of policy requirements

Governance:

- Is there need for policy intervention to ensure a healthy, safe and competitive API ecosystem?
- Which policy tools could be applied?
- Analyse API-related challenges and opportunities derived from the pervasive deployment of IoT and AI applications

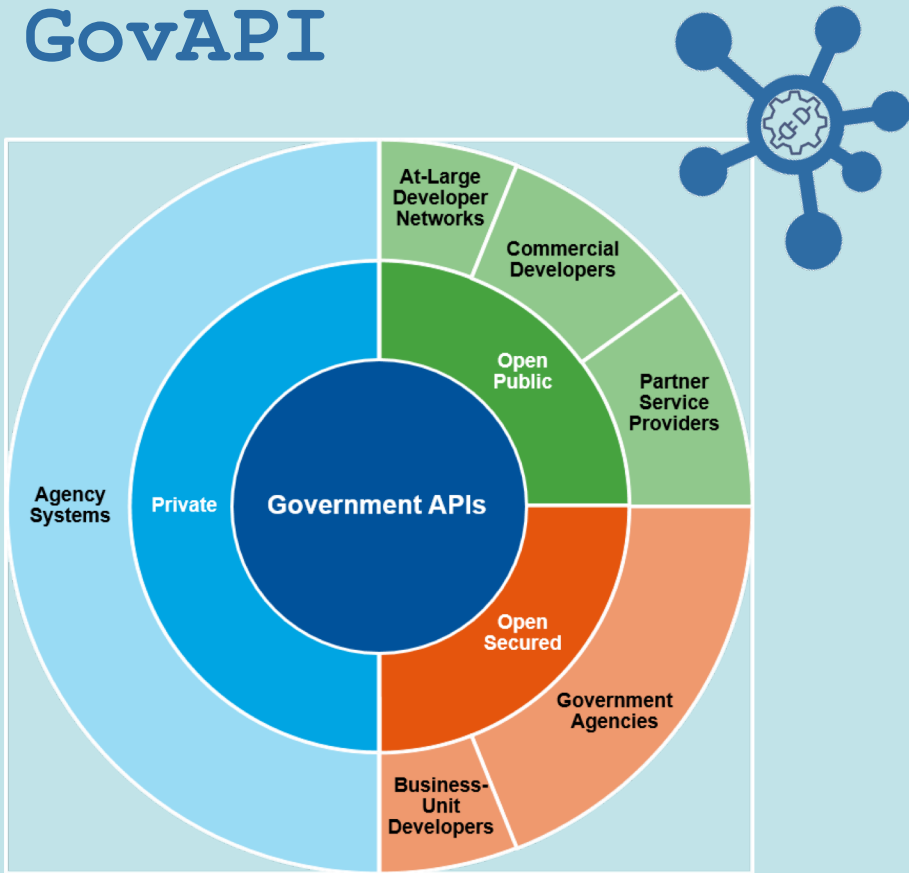
Government:

- Can API solutions facilitate more effective, inclusive, accountable public service provision?
- Opportunities and threats of the use of API in Public Services
- Analysis of the role of government on APIs solutions



APIs in the context of OOP

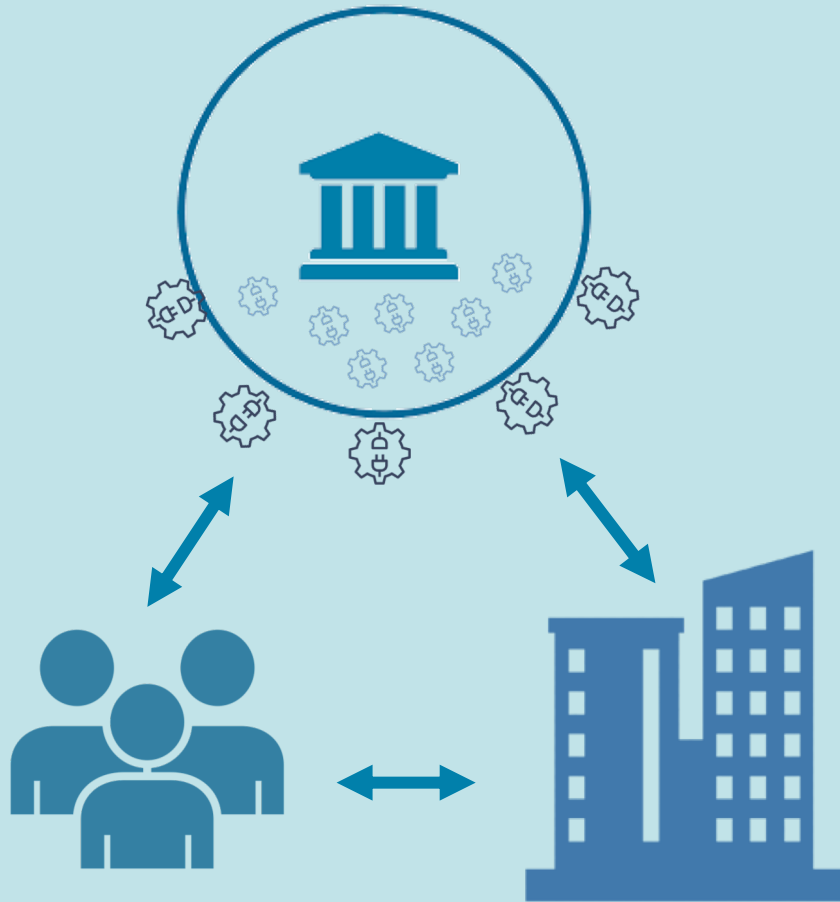
GovAPI



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**.

APIs in the context of OOP



- **Opportunities**

APIs encapsulate access to data

- Only specific data available for specific purposes
- Accessibility control

APIs enables usability monitoring

- User centricity implications
- Quality of Service monitoring

- **Challenges (EU level)**

The Tower of Babel:

- *Multi-stakeholder*
- *Multi-level cooperation*
- *Ecosystem mindset*

APIs4DGov

Digital Government APIs.

The road to value-added Open API-driven services

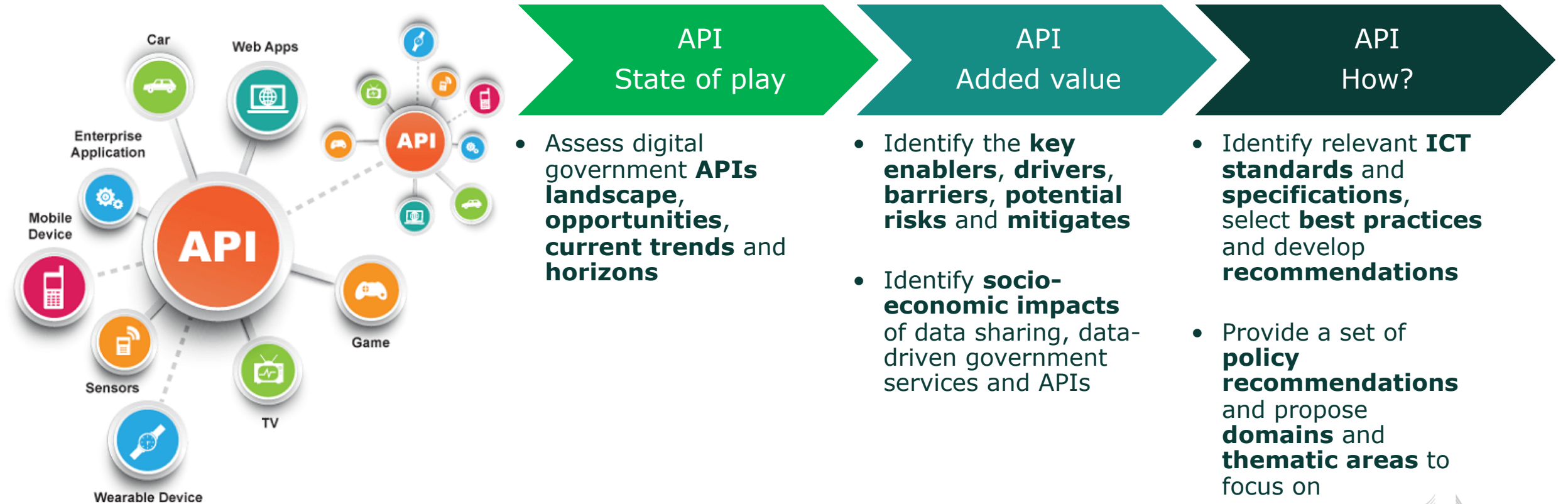
(JRC-B.6 & DG CNECT-H.4, Jan 2018 – Dec 2019)

APIs4DGov study

“Digital Government APIs. The road to value-added Open API-driven services” [\[1\]](#)

- Collaboration between the JRC and DG CNECT (*Jan 2018 - Dec 2019*)
- Contribution to:
 - The **EU eGovernment Action Plan 2016-2020** [\[2\]](#), in particular its open government approach to modernise public administration
 - The implementation of the **European Interoperability Framework** (e.g. actions of the focus area 4: “Develop, maintain and promote key interoperability enablers”) [\[3\]](#)
 - The implementation of the **Once Only Principle** [\[4\]](#)
 - Reinforce the **Building Block** approach adopted in the **Connecting European Facilities (CEF) programme** [\[5\]](#)

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





State of play

State of the art:

Identified EU government APIs

Gathered from disparate sources:

- ProgrammableWeb API directory
- ISA² ELISE Action studies on:
 - Digital Platforms
 - APIs
 - Digital Government Benchmark

API Provider*	Title	Description*	Link*
Austria	Austria-Nat-Code	The Nat Code Austria API allows users in Austria to get the make / model / Engine size and indicative pricing from a NatCode. In Austria, every vehicle is identified by a unique number known as a "NatCode" or "Nationaler Code", allocated by the BMVT and is based on the Eurotax codification.	http://www.natcode.at/api/reg.aspx?op=CheckAustria
Austria	Austria-Data	data.gv.at offers a catalogue of open records and services of the public administration, which are based Open Data principles. Data can freely be used for personal or commercial purposes. The website also offers an API that can be used to directly connect to the website.	https://www.data.gv.at/
Austria	Austria-INSPIRE-Geodata	INSPIRE geo-Portal catalog service of the Federal Ministry of agriculture and forestry, environment and water management.	https://geomatdaten.lfrz.at/at.lfrz.discovery/services/srv/de/csw/202?SERVICE=CSW&REQUEST=GetCapabilities
Belgium	Belgium-Insurance	In Belgium, car owners are obliged to register their cars with the Directorate of Vehicle Registration (DIV). However, via the WebDIV insurance companies can do this online. This allows citizens to just contact their insurance company to buy a car insurance and at the same time to register their car at the DIV.	https://www.inmotiv.be/nl/webdiv
Belgium, Flanders	Flanders-Utility	Flanders Underground Utility Location System. Central platform where all public administrations could share their information regarding the location of underground cables and pipes. See also: https://portal.opengeospatial.org/files/75503	https://klip.agiv.be/api/una
Belgium, Flanders	Flanders-Data	The open data portal is an initiative of the Flemish government where citizens can freely get access to public data.	http://opendata.vlaanderen.be
Belgium	Belgium-Dieren-Theater	Dieren Theater is an independent web service delivering structured data scraped from the website of the Belgian Parliament (La Chambre De Kamer). Available data includes information relating to Deputies, Parties, Commissions, law projects, annual reports, and more.	http://www.dierentheater.be/api/v1/
Belgium, Ghent	Belgium-Ghent	The service provided by the city of Ghent in Belgium encourages open data sharing by companies and other organizations. It seeks to make available operating information about a business such as location, hours of operation, product offerings, and prices. The service encourages interoperation and interaction by applications providing information useful to both residents and visitors. API methods implement protocols of the Data Tank methodology to present open data about government and public services, health and social support functions, demographic information, jobseeking and employment, places of business, tourist attractions and festivals, etc. Returned data provide name and activities associated along with the location, expressed as latitude and longitude.	http://data.appsforghent.be/
Belgium, Brussels	Belgium-Brussels-INSPIRE-Geodata	Discovery of the Brussels-Capital Region metadata service.	http://www.geo.internet.be/GeoNetwork/SRV/tre/CSW?service=CSW & VERSION = 2.0.2 & REQUEST = GetCapabilities
Bulgaria	Bulgaria-Data	The Open data portal is a web-based public information systems that provides publication and management of information for reuse in an open, machine-readable format and together with their metadata. The platform is constructed in a manner that allows the complete extraction of the published information, or parts thereof.	https://opendata.government.bg/
Community, ECMWF, Intergovernmental organisation	ECMWF	ECMWF API: https://software.ecmwf.int/wiki/display/WEBAPI/WebAPI+FAQ https://software.ecmwf.int/wiki/display/WEBAPI/ECMWF+Web+API+Home Quite a well establish community	TIGGE and TIGGE-LAM systems. Poc (from GEOWOW project); David Richardson, Baudouin Raoult: https://software.ecmwf.int/wiki/display/TIGGE/Project http://apps.ecmwf.int/datasets/data/tigge/levtype=sfc/type=cf/
Community, YourDataStories	YDS-YourDataStories	YourDataStories envisions to combine and fuse the two "suppliers" of open data (traditional producers and user-generated content) and to exploit the added value from this amalgamation in order to better satisfy the needs of the "demand side" – meaning citizens, journalists and others.	https://yourdatastories.eu/ http://dev.yourdatastories.eu/YDS-docs/API
Community, GBIF	GBIF	GBIF—the Global Biodiversity Information Facility—is an international network and research infrastructure funded by the world's governments and scientists, where, open access to data about	http://www.gbif.org/developer/summary

Some private API registries

Programmable Web	It's the most complete list of Private and Public APIs	https://www.programmableweb.com/category/all/apis	~20000
Mashape & Rapid API	Private and Public APIs registry as a Marketplace	https://market.mashape.com/explore https://rapidapi.com/	~8000
APIHarmony (IBM, experimental)	API Harmony currently lists APIs. Data stems from APIs.guru, from crawling the web, and from user-provided input	https://apiharmony-open.mybluemix.net/public	1179
APIs.io (Experimental)	Experimental API Search service to help discover APIs on the web. The service uses the APIs.json proposed discovery format	http://apis.io/	1143
APIsGuru (seems old)	API tooling to help developers work with GraphQL and OpenAPI/Swagger	https://apis.guru/browse-apis/	~300

A public API registry (France) [9]

api.gouv.fr Liste des API Liste des services

TOUTES LES API DE L'ADMINISTRATION

API La Bonne Boîte
Pôle Emploi
Récupérez la liste des entreprises classées par potentiel d'embauche

Partenaires: Pôle emploi, La Bonne Boîte

Tags: Pôle emploi, Travail, Emploi, La Bonne Boîte, Embauche, Entreprise, Recrutement

API Entreprise
Etalab (DINSIC)
Simplifier les démarches des entreprises en récupérant pour elles leurs documents administratifs

Partenaires: DGFiP, ACOSS, CNETP, INSEE, INFOGREFFE, FNTP, MSA, OPQIBI, PRO BTP, QUALIBAT, Ministère intérieur, INPI, Banque de France

Tags: Établissement, Entreprise, Certification

API Géo
Etalab (DINSIC)
Interrogez les référentiels géographiques plus facilement

Partenaires: Etalab, La Poste, INSEE, OpenStreetMap

Tags: Communes, Codes postaux, Départements, Régions, EPCI, Surface, Distance

api.gouv.fr
Incubateur de services numériques (DINSIC)
Fabriquez des services en ligne plus simples

Tags: Utilitaire

API Particulier
Incubateur de services numériques (DINSIC)
Pour accélérer l'ouverture des données personnelles et leur réutilisation, automatisez vos demandes de pièces justificatives

Partenaires: DGFiP, CNAF

Tags: Impôts, Quotient Familial, Revenu Fiscal de Référence, Adresse

Infotrabavail
Pôle emploi
Recense des jeux de données liés au marché du travail

Partenaires: Pôle emploi

Tags: Travail, Emploi, Marché du travail, Statistiques

Annuaire des établissements publics de l'administration
beta.gouv.fr (DINSIC)

Tags: Annuaire, Établissements, Publics, Administration

Hub'Eau - Indicateurs Eau potable et Assainissement
AFB / BRGM
Indicateurs des services d'eau et d'assainissement

Partenaires: AFB, BRGM

Tags: Observatoire national des services d'eau et d'assainissement, Indicateurs, Performance, Services, Eau potable, Assainissement

Hub'Eau - Piézométrie
AFB / BRGM
Piézométrie (niveau des nappes d'eau souterraine)

Partenaires: AFB, BRGM, ADES

Tags: Piézométrie, Aquifère, Nappe, Niveau d'eau, Eau souterraine, Hydrogéologie

Hub'Eau - Etat piscicole des rivières
AFB / BRGM

Hub'Eau - Qualité des nappes d'eau souterraine
AFB / BRGM

Hub'Eau - Qualité des cours d'eau
AFB / BRGM

api.gouv.fr Liste des API Liste des services

TOUS LES SERVICES

IFT
Atelier de calcul de l'Indicateur de Fréquence de Traitements phytopharmaceutiques

API utilisée: API Indicateur de Fréquences de Traitements phytopharmaceutiques

Allogarage
Trouvez un bon garage automobile près de chez vous

API utilisée: Base Adresse Nationale

ARPENT(examen)
Inscrivez-vous aux examens de l'enseignement agricole

API utilisées: Base Adresse Nationale, FranceConnect

ARPENT(résultats)
Consultez votre résultat aux examens de l'enseignement agricole et téléchargez votre relevé de notes

API utilisées: API Géo, API Résultats aux examens

BourseSCO
Réaliser sa demande de bourse en ligne

API utilisée: API Particulier

Lyon : Mon compte
Calcul du quotient familial de la ville de Lyon

API utilisée: API Particulier

demarches-simplifiees.fr
Définissez et simplifiez les démarches

Dossier Social Étudiant
Le Dossier Social Étudiant

La Bonne Boîte
Trouvez...

State of the art:

Multiple-case studies analysis

Analysed API cases [ELISE ISA² Action study]

Estonia X-Road: is an API driven data exchange ecosystem platform that was initially developed between 1998 and 2001

Denmark's Addressers Web API (DAWA)

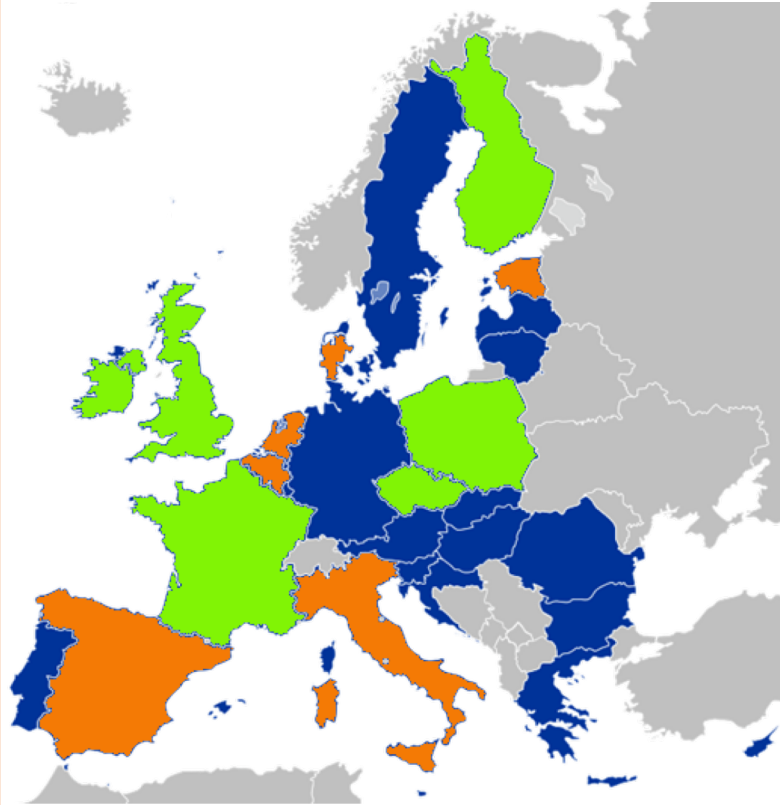
Amsterdam city data: a single portal providing developers with a REST API

Flanders Underground - Cable and Pipe Information Portal (KLIP): was created in 2007 following a gas explosion in 2004 caused loss of life.

Future Internetware (FIWARE): is an open platform which can be harnessed by developers to create and deliver smart, data-driven solutions, applications and services.

Madrid MobilityLabs: an open and interoperable API based platform

Italian Digital Transformation Team



Next proposals

London - Transport for London: have created a Unified API The public TfL data (or 'open data')

Ireland-Patient-Opinion: API enabled platform for the health services

France-API: API registry collected at national level.

EU - EDP: the largest European Governmental Data catalogue.

Helsinki-Issue: the City of Helsinki provides the Issue Reporting API to citizens

GBIF: the Global Biodiversity Information Facility is an international network and research infrastructure

Poland-Granica: provides information to people crossing the border into or out of Poland. Granica offers two APIs, both of which make use of SOAP

Czech-Mapybezbarier: The data on public sites accessibility provided by Maps without Barriers app are open to be used. Social domain.

Open GovAPI uptake is quick and massive

Case study	E.g. Are the government APIs really used (usage)
Denmark Addresses Web API (DAWA)	<ul style="list-style-type: none">• 1.5bn requests in 2017 and approximately 350k unique users per week• The number of API requests is limited to 100 requests per second• There is approximately 5k IT systems which draw data regarding Danish addresses using DAWA.• Unique point of access for addresses for everybody (OOP)
Madrid Mobility Labs	<ul style="list-style-type: none">• 480m requests per year• 2500 developers registered in the System• Around 100 apps developed
X-Road	<ul style="list-style-type: none">• 500m requests per year• Over 1bn transactions• 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	<ul style="list-style-type: none">• 350m requests per year• Visitors per month: 8000, average time spent using the data interface: 20 minutes
KLIP	<ul style="list-style-type: none">• 120m requests per year• 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.

Case study X-Road – EE

OOP Context

X-Road self-declarations:

- OOP one of three X-Road design pillars
- 1100 active GovAPIs
 - exchange ecosystem platform (initial development 1998 and 2001)
 - Cross sector
 - Cross border
 - Since June 2017, EE-FI exchange healthcare records via X-Road
<https://scoop4c.eu/index.php/news/estonia-and-finland-start-sharing-medical-data>

Case study DAWA – DK

OOP context

Danmarks Addressers Web API – self declarations:

- DAWA allows use of authoritative addresses to:
 - authorities (internal):
social security register, company register, building register , tax offices),
 - businesses and citizens (external):
 - Housing agencies, online shops, Banks, Couriers, Debt collection agencies, Energy Companies, Emergency Services, GPS services providers

'By inserting approximately 10 lines of code in a web application, a developer can achieve address entry with autocomplete functionality'



API Added Value

Monitoring API tools



API Monitoring API Compliance API Analysis Industries Pricing Blog Docs Log In

SIGN UP

US Government API Performance Dashboard

July 2018

Locations | 19 Across USA

Calls Made | 300,000

Best Quality APIs | Open FDA

Fastest APIs | DOJ

Best Cloud (latency) | Google / 488ms

Cloud Services | 4 Worldwide

APIs Tracked | 21

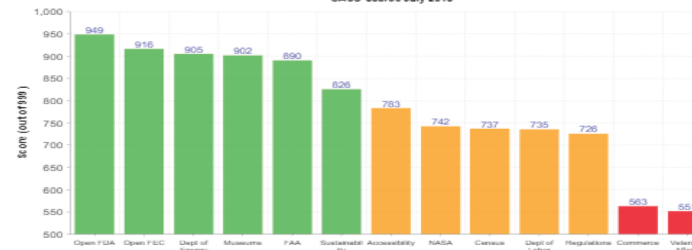
Worst Quality APIs | Veterans Affairs

Slowest APIs | Dept of Commerce

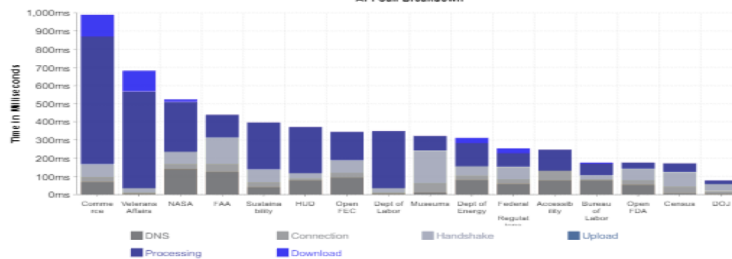
Worst Cloud (mean) | IBM Cloud / 567ms

START MONITORING YOUR APIS

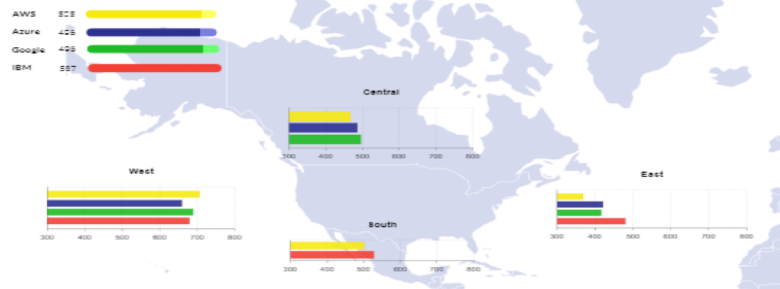
US Government APIs by Dept
CASC Scores July 2018



US Government APIs
API Call Breakdown



Global Cloud Performance



Main findings up to now

Findings	Recommendations
<ul style="list-style-type: none">• API successfully used to share data both internally and externally• Case studies show strong returns in terms of internal reorganization and unexpected external apps development and (economic) growth• Because of the evolution dynamics of the sector, a quick and fast implementation is considered better than extensive plans• Simple APIs specifications are requested by API demand and supply side stakeholders	<ul style="list-style-type: none">• Define and plan how to measure added value• Consider security aspects on your API strategy design• Promote agile development• Consider how to manage versioning• Define what kind of EU policy instruments will support and how API ecosystems in government• Decide on API specifications: stand-alone or distributed into each sector?

APIs4DGov roadmap

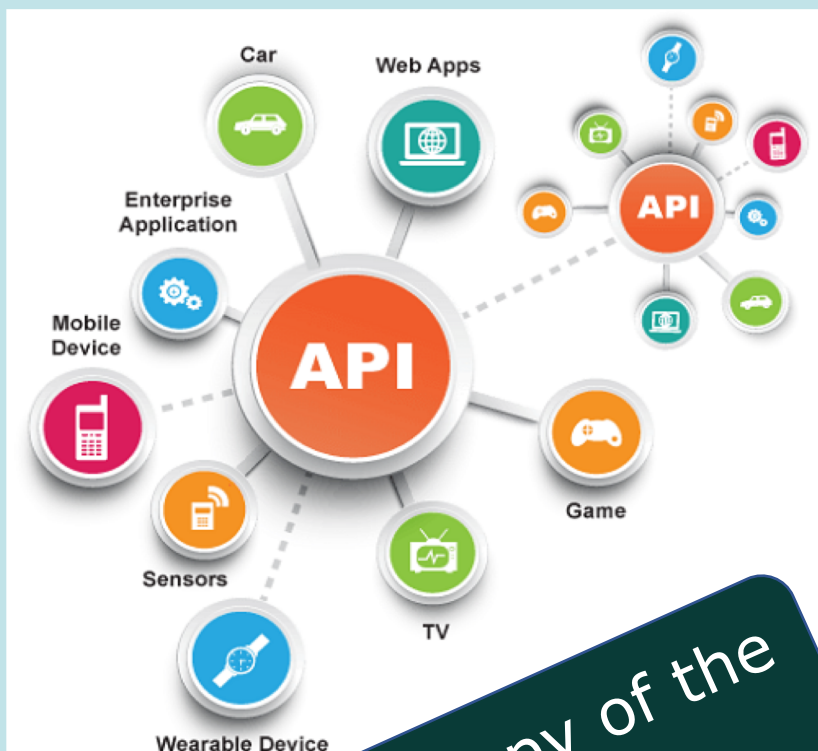
- 2018

- API Landscape
- INSPIRE API Hackathon & API implementation survey
- Workshop & survey on API Strategies across EU
- EMT API pilot
- 31/12/2018: interim report (State of play and Why?)

- 2019

- Socio - Economic analysis
- APIDays series of conferences
- Provide best practices
- Suggest recommendations
- 31/12/2019: report of the study

Contribute to the APIs4DGov study



Get a copy of the results!



As API decision/policy maker

<https://ec.europa.eu/eusurvey/runner/APIs4DGov-Strategy>



As API implementer

<https://ec.europa.eu/eusurvey/runner/APIs4DGov-INSPIRE>

References

- [1] <https://ec.europa.eu/digital-single-market/en/news/new-study-digital-government-apis-apis4dgoi-project>
- [2] <https://ec.europa.eu/digital-single-market/en/news/communication-eu-egovernment-action-plan-2016-2020-accelerating-digital-transformation>
- [3] https://ec.europa.eu/isa2/eif_en
- [4] <https://ec.europa.eu/digital-single-market/en/news/eu-wide-digital-once-only-principle-citizens-and-businesses-policy-options-and-their-impacts>
- [5] <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/About+CEF+building+blocks>
- [6] https://inspire.ec.europa.eu/events/conferences/inspire_2018/submissions/284.html
- [7] <https://ec.europa.eu/eusurvey/runner/APIs4DGov-Strategy>
- [8] <https://ec.europa.eu/eusurvey/runner/APIs4DGov-INSPIRE>
- [9] <https://api.gouv.fr/apis>



Any questions?

Contact us:
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