‘Ideas and actions for a digital transformation’ with APIs

Application Programming Interfaces for Digital Government (APIs4DGov) study: final workshop

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The Application Programming Interfaces for Governments (APIs4DGov) study

- Why APIs matters in government?
- The APIs4DGov project
- State of the art
- Costs and benefits
- API framework for governments
- Policy recommendations

Why APIs matter?

Digital transformation in governments is **extremely** challenging

- Citizens expect Government to adapt to the digital era and innovate public digital services
- Create robust digital ecosystems dealing with privacy issues and cyber-security
- Support EC priorities and implement policy documents
- Oversee the behaviour of external digital ecosystems

APIs are the **key technical enablers** of digital transformation of Governments

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Why APIs in government?

Government as API provider

- **API strategies can support** organizational change management along their **transformation process**
- **APIs facilitate** flexible, effective, inclusive, accountable **public service provision**
- **APIs enable government interactions**
  - Internal (G2G)
  - External (G2G, G2B, B2G)

Source: own elaboration based on (Lacheca, 2016)

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APIs4DGov project

1. *Whether and why should governments adopt APIs?*
2. *Which government actions should be taken in developing government APIs?*

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What?

- Definitions, glossary, policy context
- Landscape: cases, strategies, standards, best practices
- Key enablers, drivers, barriers, risks

Why?

- Costs and challenges
- Benefits
- Social highlights

How?

- EU API framework
- Thematic areas and technologies to focus on
- Policy recommendations

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Research methodology

- Cases
- Standards
- Best practices
- Trends
- Domains
- Technologies

- Strategies
- Recommendations
- Private sector
- Metrics
- Technologies
- Internal issues & gains

- Costs
- Benefits
- Drivers
- Enablers
- Barriers
- Risks

- State of the art in EU
- Technical issues
- Private sector solutions
- Knowledge transfer
- Validation
- Community building

(Source: ICT Impact Assessment Guidelines, ISA^2 Program)

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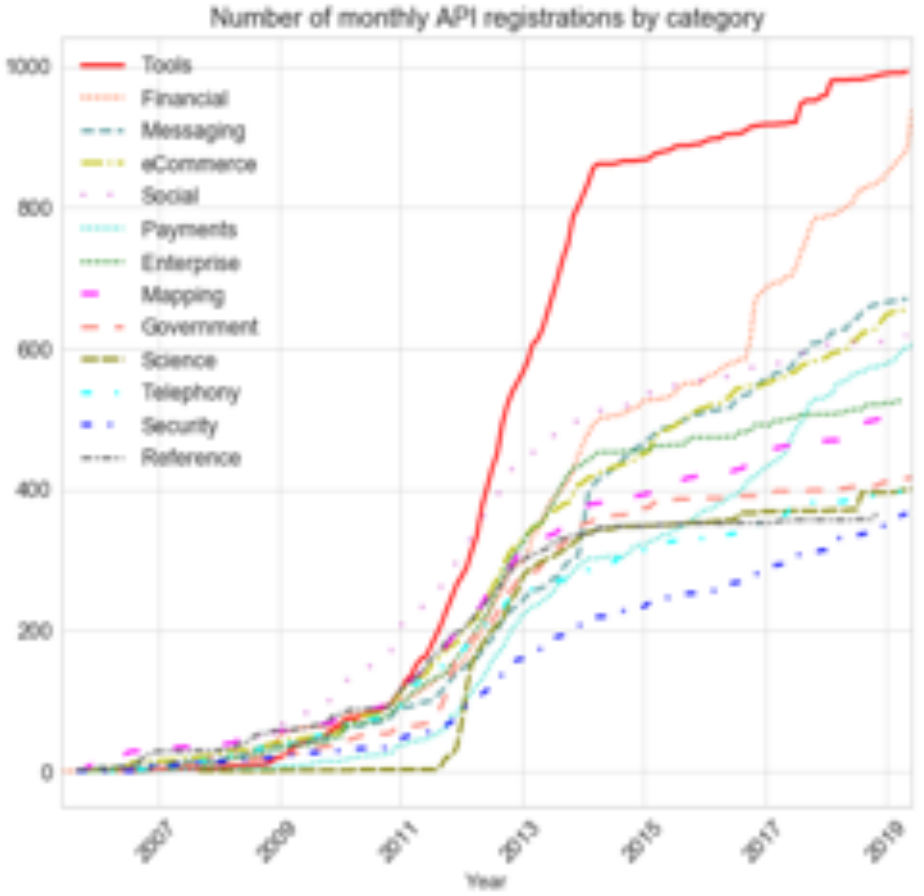
Trends

Cumulative registration of APIs in ProgrammableWeb.com's API directory



Source: JRC, own elaboration based on ProgrammableWeb.com

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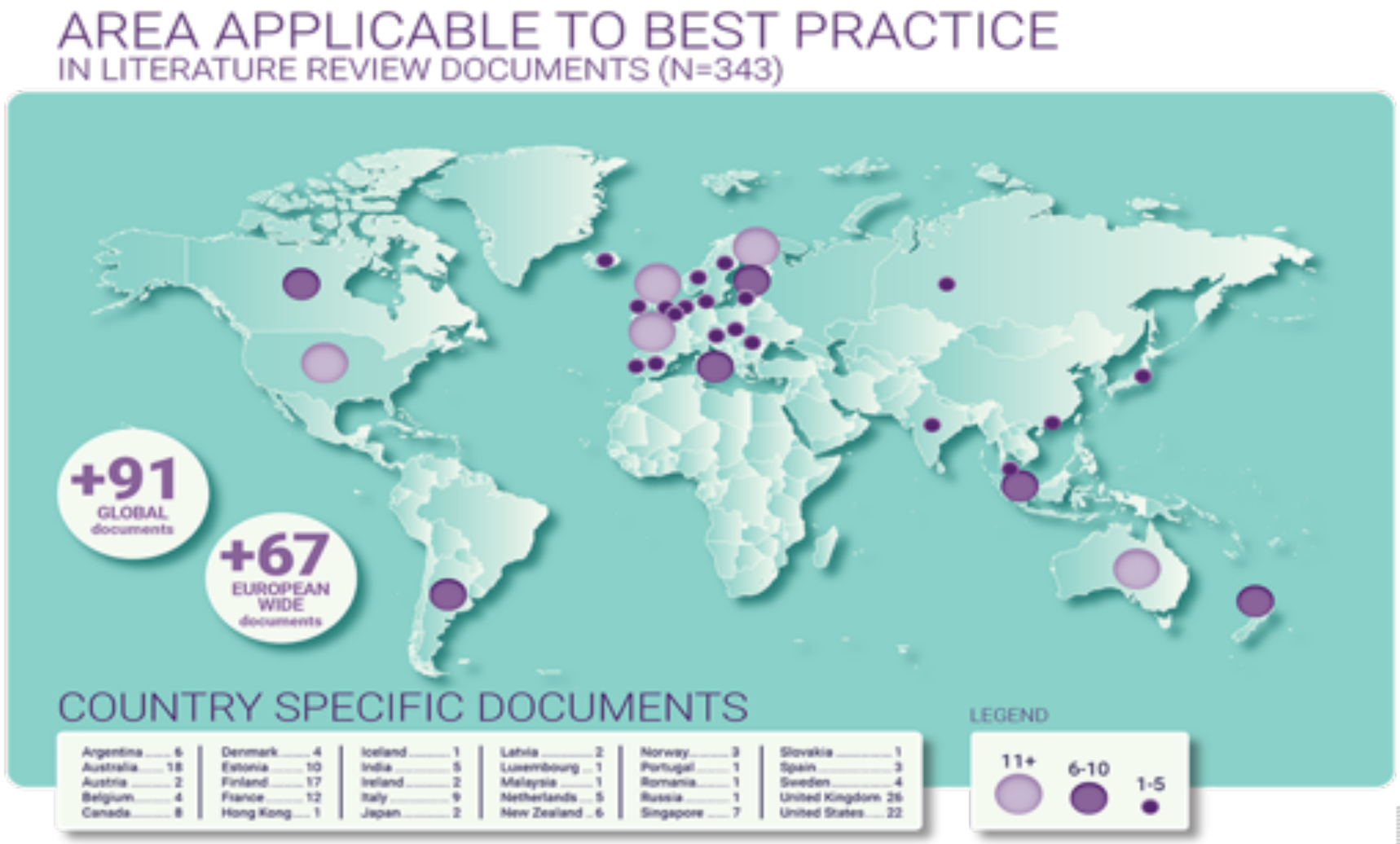
State of the art: API best practices



Source: JRC, own elaboration

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When implemented, the API uptake is huge!

350m requests per year

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

Approx. **5000 IT systems** which draw data from DAWA

Unique point of access for addresses for everybody (OOP)

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

Denmark's Addressers Web API (DAWA): A unique access point for the addresses in Denmark

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

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

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: building a specific API project

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

EU Standard Based platform for **IoT and Smart Cities**

2500 developers registered in the System

Around **50 apps** developed

Three years national ICT plan **'API-first'**

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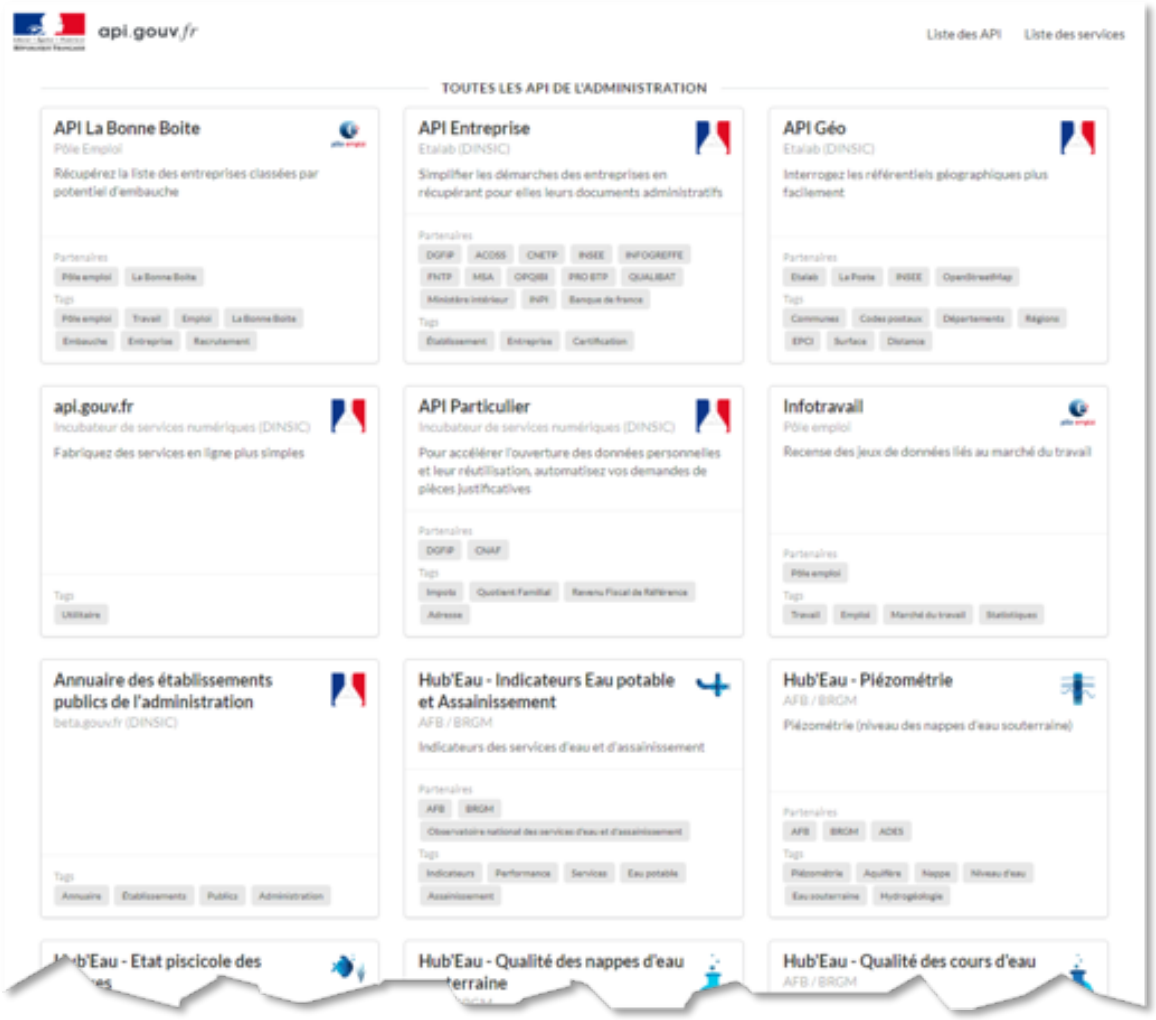
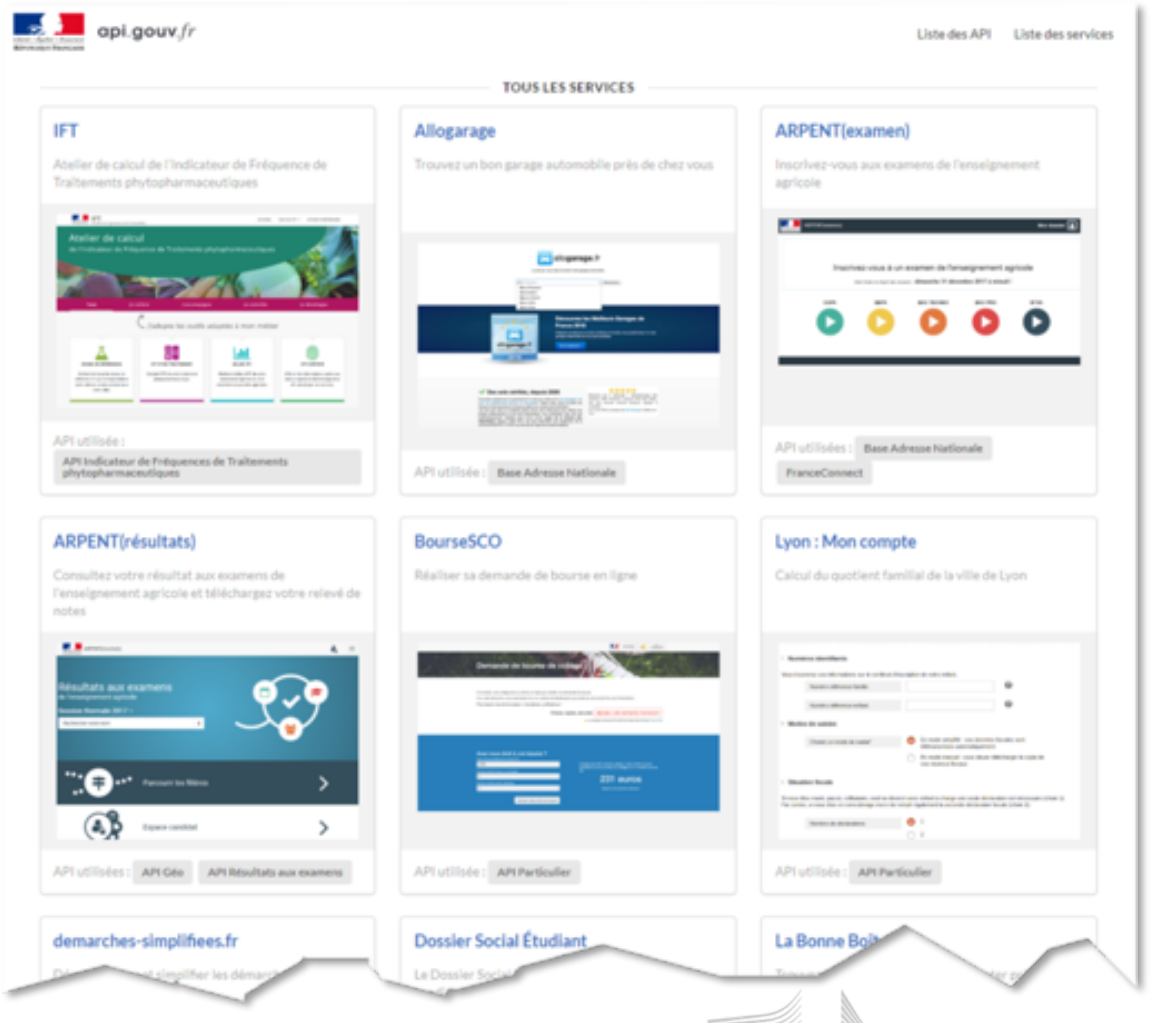
Source: JRC, own elaboration

The French government public API registry





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Benefits: Efficiency gains

- Reduction of costs
- Improve the quality of digital assets
- Improve internal processes and digital public services
- Enhance reporting flows in government processes
- Improve access to (Open) data

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Source: Licenced from AdobeStock.com

(Source: Marco Panebianco, Regione Lombardia)

(Source: Patrick Amarelis, DINUM, France)

Additional benefits

- Fostering innovation in the public sector
- Enablement of digital ecosystems
- Economic opportunities
  - Help SMEs reducing costs of establishing and running business
  - Easier access to Open Data can further stimulate new economic development

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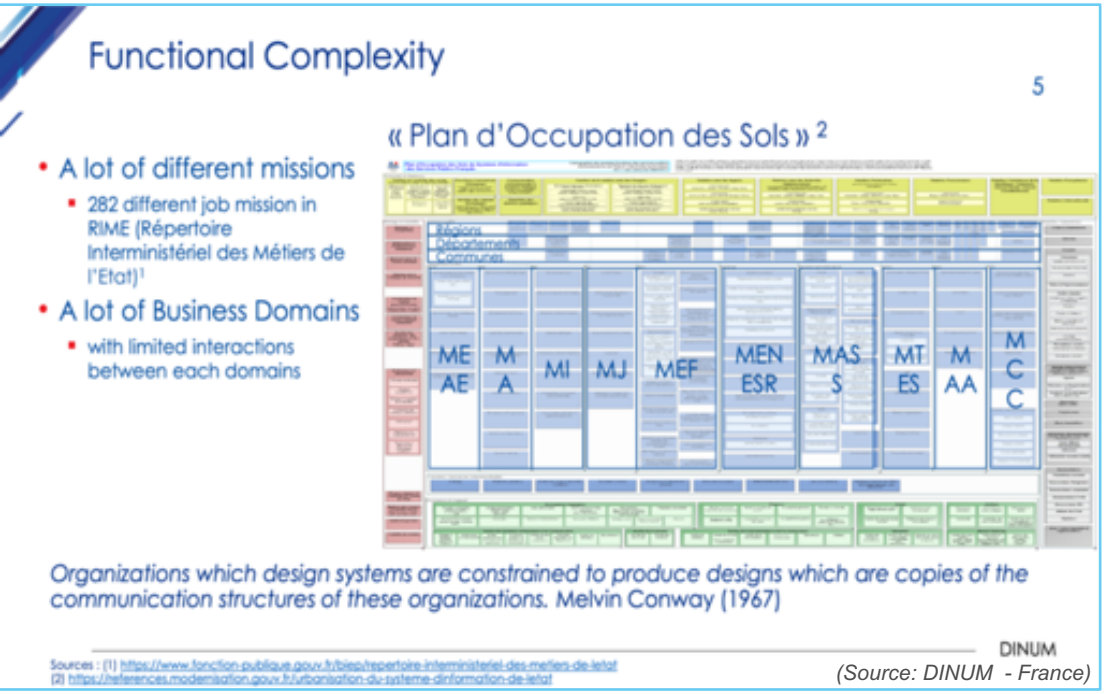
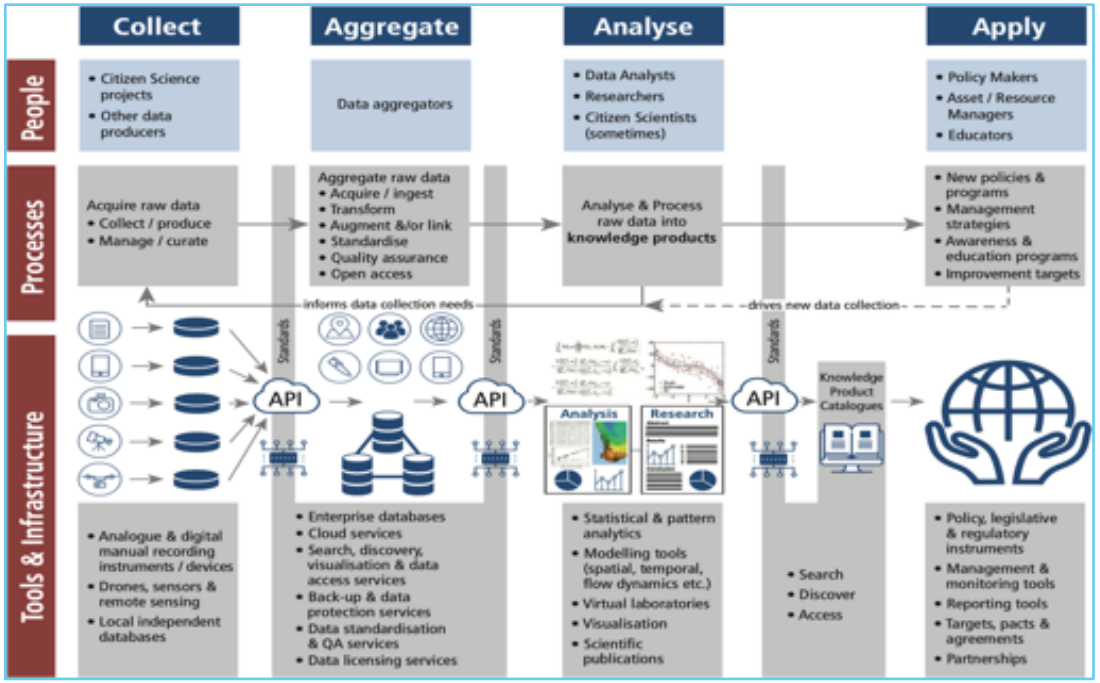


(Source: DINUM - France)

Costs

- Implement a whole of government platform vision and re-engineering existing systems towards APIs
- Cultural change, need to acquire new skills



(Figure: A conceptual model for a digital information supply chain. Source: (Brenton et al., 2018)

Challenges

- Increase the cyber-security
- Adhere to legislation (e.g. adoption of GDPR)
- Improve the policy understanding and support

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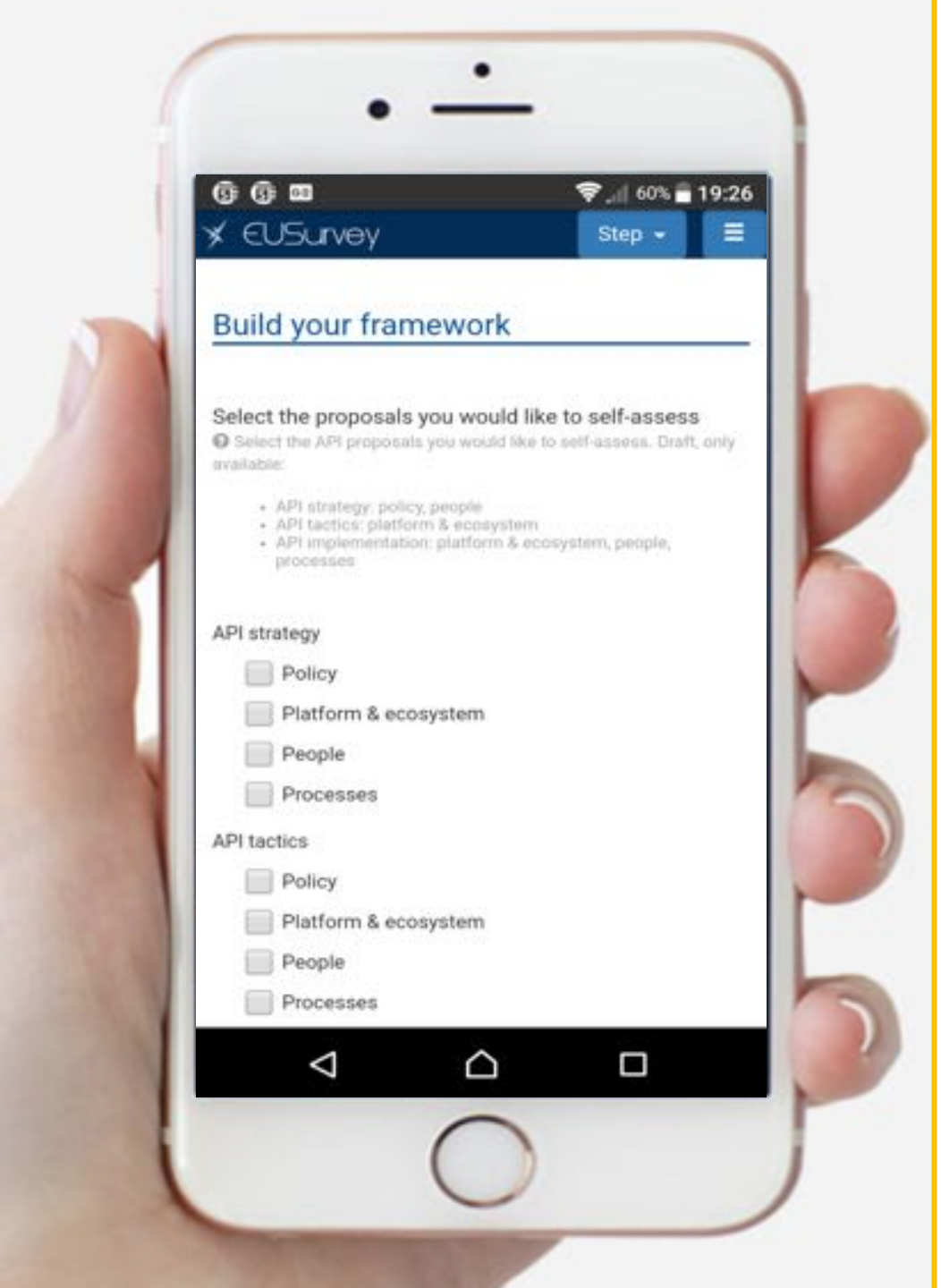

How to implement APIs in governments?

	Policy support	Platform and ecosystems	People	Processes
API strategy	1. Align APIs with policy goals	2. Define the government API platform	3. Create API governance structures	4. Form guiding principles for API processes
API tactics	5. Design metrics and prioritize API by policy goals	6. Harmonize data models and other platform/ecosystems assets	7. Establish cross-competency teams	8. Follow an API product approach
API operations	9. Measure policy impacts of APIs	10. Build API platform components	11. Appoint API product manager(s)	12. Adopt an API lifecycle approach

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Source: JRC, own elaboration

Policy recommendations

Explicitly **adopt APIs** in governments

Create and improve the '**API culture**' in governments

Utilize and validate our **API framework**

Become **digital ecosystem aware**: Engage both public EU governments actors and the private sector

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Dati e informazioni sul **COVID-19**:

- World Health Organization
  - mappa World Health Organization, http://who.maps.arcgis.com/apps/opsdashboard/index.html#/c88e37cfc43b4ed3baf977d77e4a0667
  - web map service https://services.arcgis.com/5T5nSi527N4F7luB/ArcGIS/rest/services
  - dati che alimentano mappa via API, https://services.arcgis.com/5T5nSi527N4F7luB/ArcGIS/rest/services/Cases_by_country_Plg/FeatureServer/0/query?where=0%3D0&objectIds=&time=&geometry=&geometryType=esriGeometryEnvelope&inSR=&spatialRel=esriSpatialRelIntersects&resultType=none&distance=0.0&units=esriSRUnit_Meter&returnGeodetic=false&outFields=*&returnGeometry=true&returnCentroid=false&featureEncoding=esriDefault&multipatchOption=xyFootprint&maxAllowableOffset=&geometryPrecision=&outSR=&datumTransformation=&applyVCSProjection=false&returnIdsOnly=false&returnUniqueIdsOnly=false&returnCountOnly=false&returnExtentOnly=false&returnQueryGeometry=false&returnDistinctValues=false&cacheHint=false&orderByFields=&groupByFieldsForStatistics=&outStatistics=&having=&resultOffset=&resultRecordCount=&returnZ=false&returnM=false&returnExceededLimitFeatures=true&quantizationParameters=&sqlFormat=none&f=pjson&token=
  - report https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports
- European Centre for Disease Prevention and Control
  - Situation update https://www.ecdc.europa.eu/en/geographical-distribution-2019-ncov-cases
  - web map service https://gis.ecdc.europa.eu/public/rest/services/nCOV2019
- Ministero della Salute
  - Situazione in Italia e nel mondo http://www.salute.gov.it/portale/nuovocoronavirus/dettaglioContenutiNuovoCoronavirus.jsp?lingua=italiano&id=5338&area=nuovoCoronavirus&menu=vuoto
- Johns Hopkins CSSE
  - Mappa https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6
  - web map service https://services1.arcgis.com/0MSEUqKaxRlEPj5g/arcgis/rest/services/Coronavirus_0122/FeatureServer
  - repository https://github.com/CSSEGISandData/COVID-19

Thematic areas

- Transversal
  - Public service provision and Open Data
  - Geospatial and Statistics
  - Smart cities and Citizen science
- Vertical
  - Health
  - Environment and Earth observation
  - Mobility
  - Meteorology, Agriculture
  - Companies and Financial
  - Energy, Industrial

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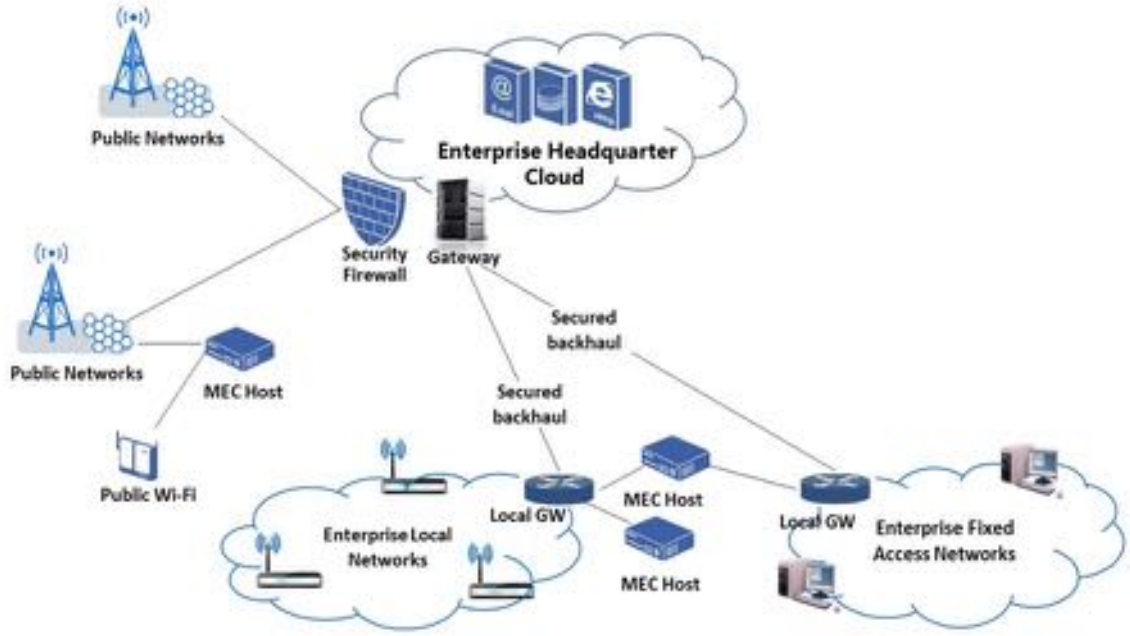
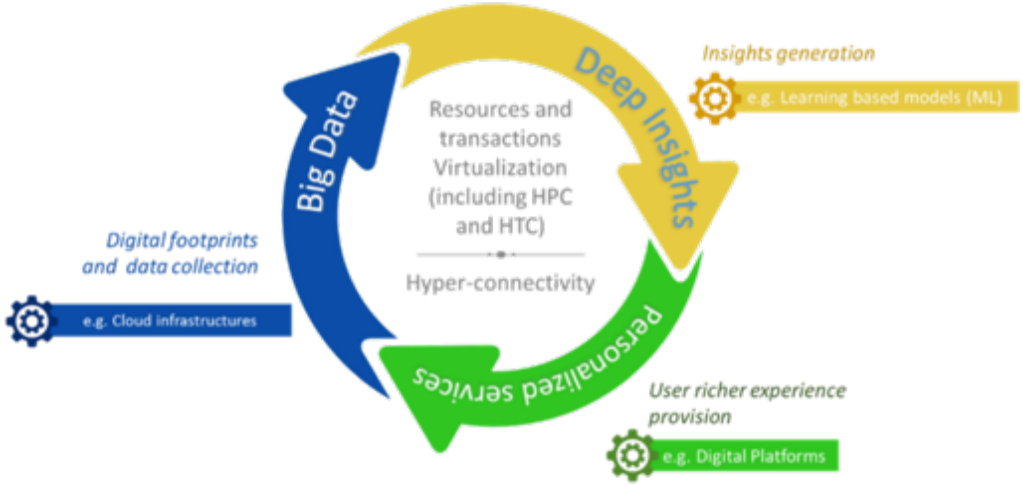
(Source: courtesy from Andrea Borruso)



Multi-access Edge Computing deployment across different enterprise networks. (Source: IEEE)



Datafication paradigm (Source: JRC, own elaboration

Technologies

- Artificial Intelligence
- Internet of Things
- Edge computing
- Digital twins
- Autonomous things
- Big Data and Cloud computing
- Microservices
- Blockchain

To know more

Ongoing publications
(June 2020)

European Commission

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Main policy instruments*

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- European Union (2015b), Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on **payment services in the internal market**, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC, OJ L 337, 23.12.2015, p. 35–127.
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** The complete list is available in the APIs4DGov final report*

Keep in touch

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Thank you*

"Data is vital for modern digital ecosystems. Like water for the biological ecosystems, it sustains them and can be used in a huge number of ways.

But data without APIs is like water in a well: to use water you have to go there, load your bucket and bring it home.

***With APIs data will come to your tap**."*

* This work has been performed thanks to the whole 'APIs4DGov extended team' (Vaccari L., Posada M., Boyd M., Gattwinkel D., Mavridis D., Smith R. S., Santoro M., Nativi S., Medjaoui M., Reusa I., Switzer S., Friis-Christensen A.) and by many colleagues and external experts.

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