



# API4IPS technical essentials

## API4IPS WG & Blockchain #4

eDelivery informal cooperation Network

*16<sup>th</sup> December 2020*

*European Commission – Joint Research Centre*

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*Lorenzino Vaccari*

Joint  
Research  
Centre

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# API for Digital Government tools and reports

## APIs are technical enablers of the Digital Transformation of Government

**EU SCIENCE HUB**  
The European Commission's science and knowledge service

European Commission > EU Science Hub > News > Igniting digital transformation governments APIs

Igniting the digital transformation of governments with APIs

**SEP 17 2020** JRC experts have uncovered the potential of application programming interfaces (APIs) and proposed a framework of practical recommendations for their adoption in the public sector and the development of new applications for citizens.

APIs are the connective tissue of the digital ecosystem @sermax55, RF123 2020

APIs are machine-to-machine computing interfaces that enable one digital application to use the data and functionalities of another. They are, in a way, the connective tissue of the digital ecosystem.

As an under-the-bonnet aspect of digitalisation, users and decision-makers often overlook the importance of APIs.

The JRC report "Application Programming Interfaces in Governments: Why, What and How" argues that they should not. When governments did take a stab at rolling out API-based services, the uptake of these was rapid and massive.

JRC SCIENCE FOR POLICY REPORT

Application Programming Interfaces in Governments: Why, what and how

Channelling government digital transformation through APIs

Vaccari L., Posada M., Boyd M., Getwinkel D., Mourido D., Smith R. S., Soriano M., Navei S., Medjroui K., Rossi L., Switzer S. and Fris-Christensen A.

2020

EUR 30227 EN

JRC TECHNICAL REPORT

An Application Programming Interface (API) framework for digital government

Boyd, M., Vaccari, L., Posada, M., Getwinkel, D.

**The API framework**

- Policy support**: Align APIs with policy goals; Design metrics and procedures; Measure policy impacts of APIs.
- Platform**: Define the government platform vision; Formulate platform and ecosystem assets; Build API platform components.
- People**: Define government structure; Establish core competency teams; Assign responsibilities, metrics, and goals.
- Processes**: Form guiding principles for API processes; Follow an API product approach; Adopt an API lifecycle approach.

2020

EUR 3026 EN

eUSurvey

Introduction  
This maturity assessment tool, built within the European Commission APIs4Gov study, has been prepared to self-assess the adoption of APIs in governments.

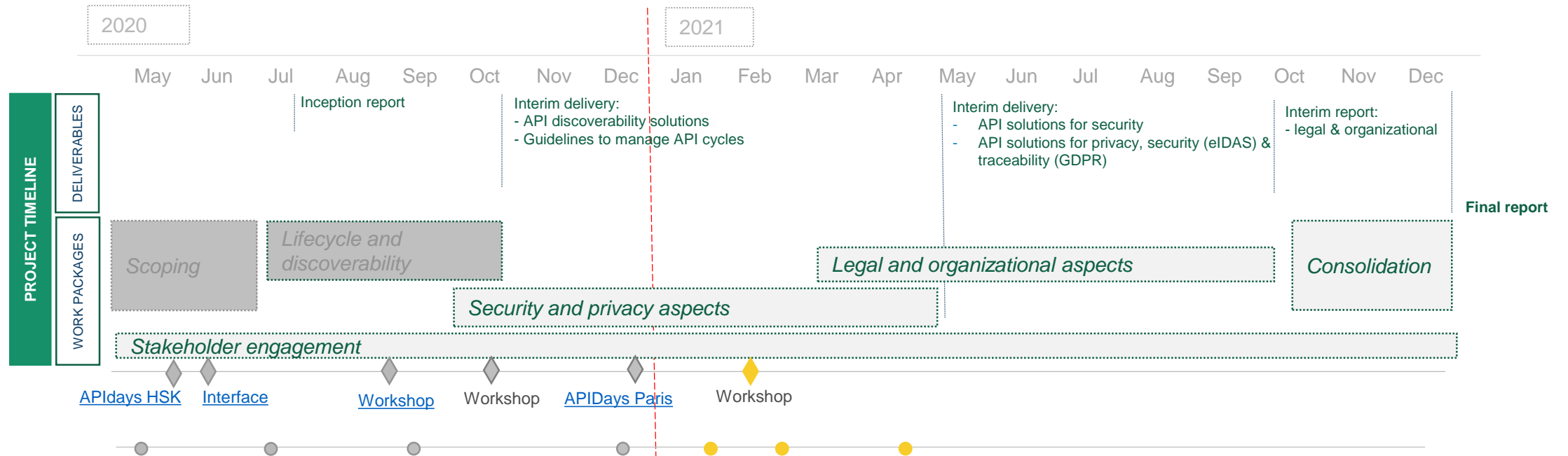
The framework is based on twelve proposals distributed on four aspects or 'pillars' (policy, platform, people and processes) and three action levels (strategic, tactical and operational). It is inspired by the EIF of the European Commission and available government best practices documents on API adoption.

<https://ec.europa.eu/eusurvey/runner/APIFrameworkTool>

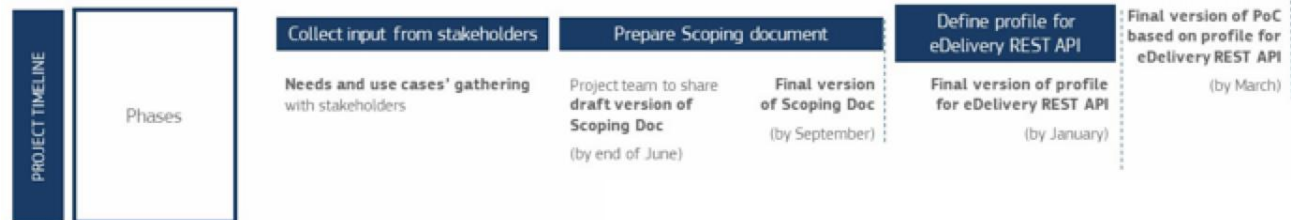
- [1] [APIs in Governments: why, what and how](#)
- [2] [API Framework for Government](#)
- [3] [API Framework Self Assessment Tool](#)

# API4IPS work structure

## Indicative timeline



### REST-based API extensions for eDelivery



# APIs for the public sector & *apidays*

2020 & beyond



## Workshop I. API technical essentials

*Public administration & private sector API co-design*



## Workshop II. API technical essentials

*API governance, Security & Specifications*



## Keynote:

- *API for the digital transformation of the public sector*
- *Reconcile EU data strategy with Green Deal objectives*



## Q1 2021:

*API in government:  
privacy, organisational & legal aspects*



# API4DT joinup collection – stay tuned!

Application Programming Interfaces (APIs) for the digital transformation

Last update 5 days ago | 5 Members | 0 Solutions

## About Application Programming Interfaces (APIs) for the digital transformation

The European Commission understands the key role that APIs play in the digital sphere, and it is gaining deep understanding aspects of its adoption in organizations. This JoinUp collection presents a series of outputs that investigate on these aspects.

Quickly check the outputs

Reports | Events | Data | Tools | Surveys

Join our community and stay tuned:



Contact us directly [jrc-apis4dgv@ec.europa.eu](mailto:jrc-apis4dgv@ec.europa.eu)

## REPORTS



## DATASETS

**Dataset: API for government datasets**  
Document

The European Commission's DG CONNECT together with the Joint Research Centre (JRC) launched the "APIS4DGov - Digital

API4DT APIDT-data

document

## TOOLS & SURVEYS

<p><b>Survey: API strategies and use in governments</b> Guideline</p> <p>In January 2018, the European Commission's DG CONNECT and the Joint Research Centre (JRC) of the European Commission</p> <p>API4DT APIDT-surveys APIS4DGov</p> <p>document</p>	<p><b>Tool: API for government framework - API strategy self assessment</b> Guideline</p> <p>This maturity self-assessment tool builds on the API framework proposed by the European.</p> <p>API4DT APIDT-tools APIDT-surveys</p> <p>document</p>
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## EVENTS

<p>Event: Assessing Government API strategies across the EU</p> <p>17/10/2018 event</p>	<p>Event: APIs for governments: public sector track and workshop</p> <p>14/11/2019 event</p>	<p>Workshop: API technical essentials: Public administration &amp; private</p> <p>25/09/2020 event</p>
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# Interim deliverables highlights

## API technical essentials

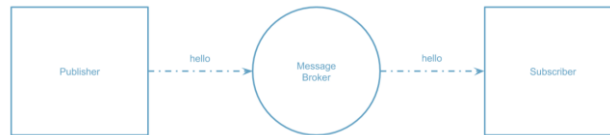
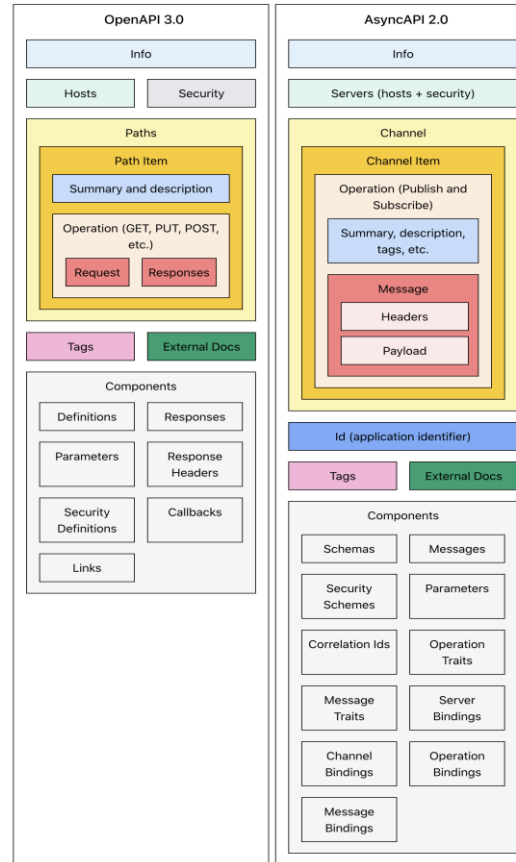
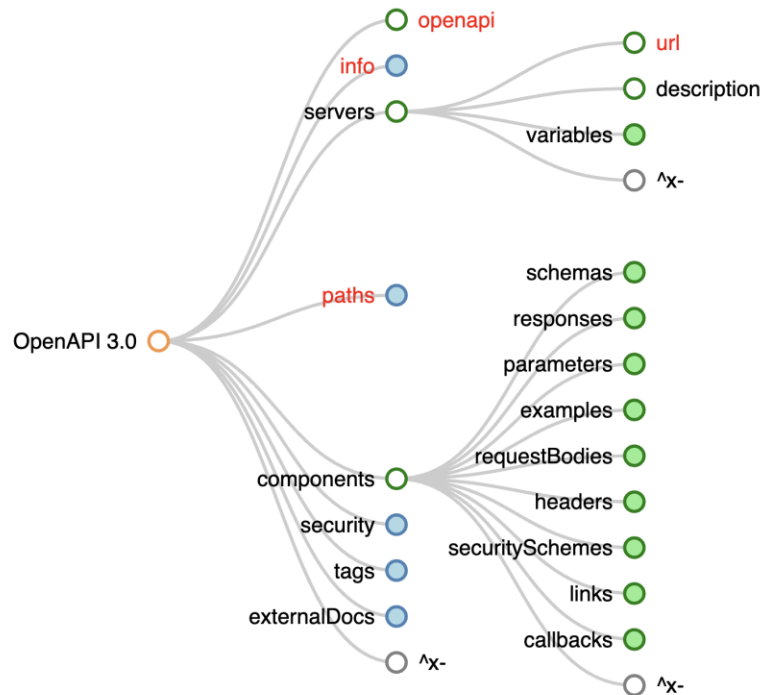
- API management,
- versioning,
- discoverability



# API as a product

- Requires:
  - The knowledge of the main API consumers and final users
  - The knowledge of the digital asset to share via APIs
  - Long-term monitoring and maintenance
  - Complete lifecycle management

# API Documentation & styles



- *RPC* style (e.g. gRPC)
- *Resource* style (e.g. REST API)
- *Hypermedia* style (e.g. RESTful API)
- *Query* style (E.g. GraphQL)
- *Event-based* style (e.g. Pub-sub, Message Queue Telemetry Transport - MQTT)

<https://openapi-map.apihandyman.io/>



# Change management

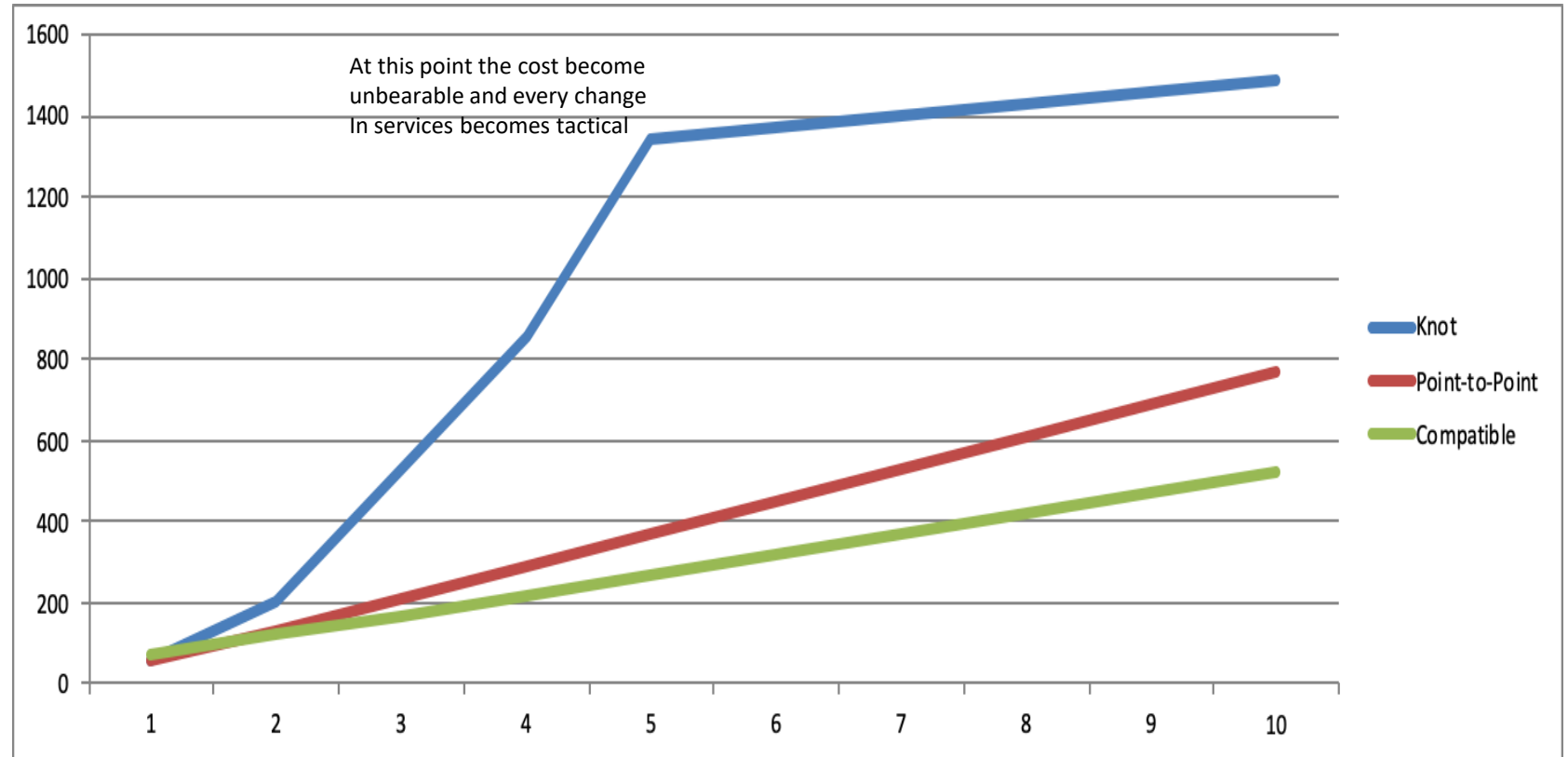
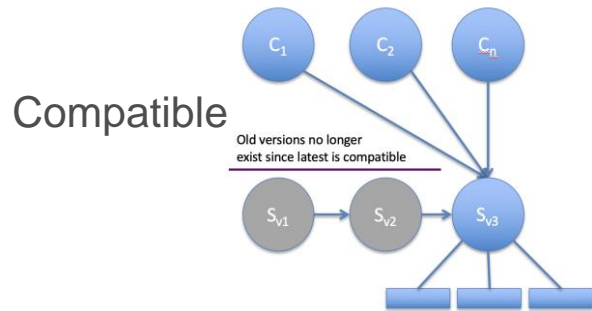
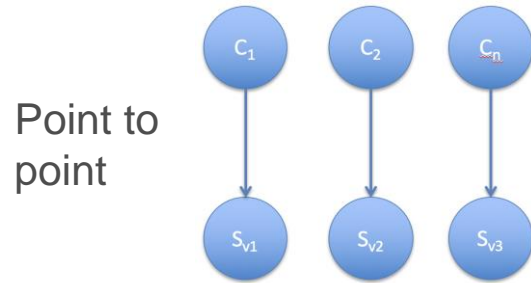
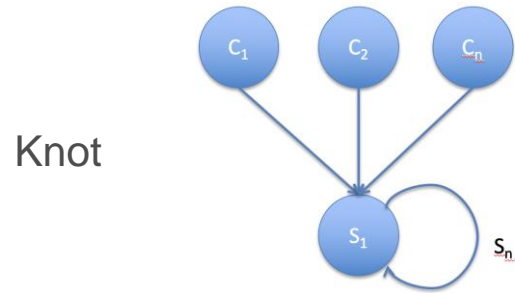
**Breaking changes:** Input data, output data, status codes, use cases and flow operations

API versioning: **MAJOR.MINOR.PATCH**

- MAJOR version when incompatible (breaking) API changes are made
- MINOR version when functionalities are added in a backwards compatible manner
- PATCH version when backwards compatible bug fixes are made

Communicating API versioning: Accept header versioning, **URL path versioning**

# The cost of API versioning



# Guidelines on API change management

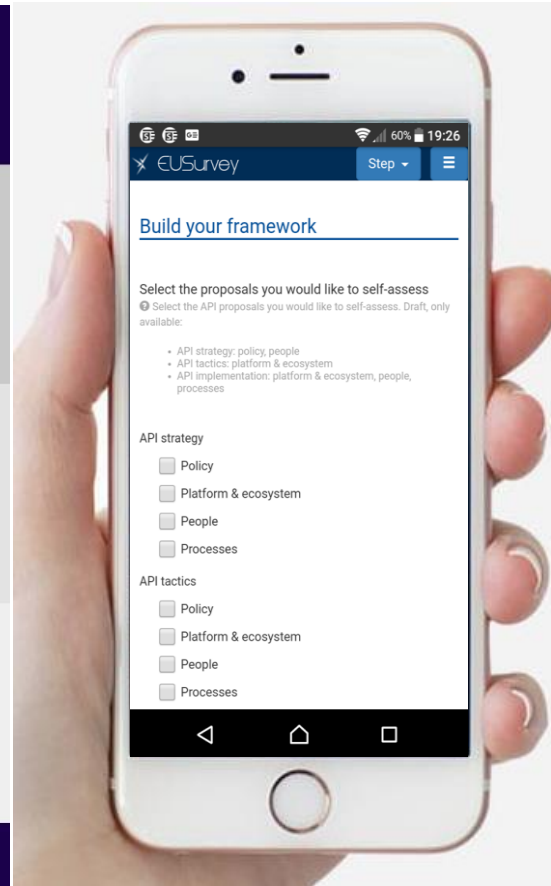
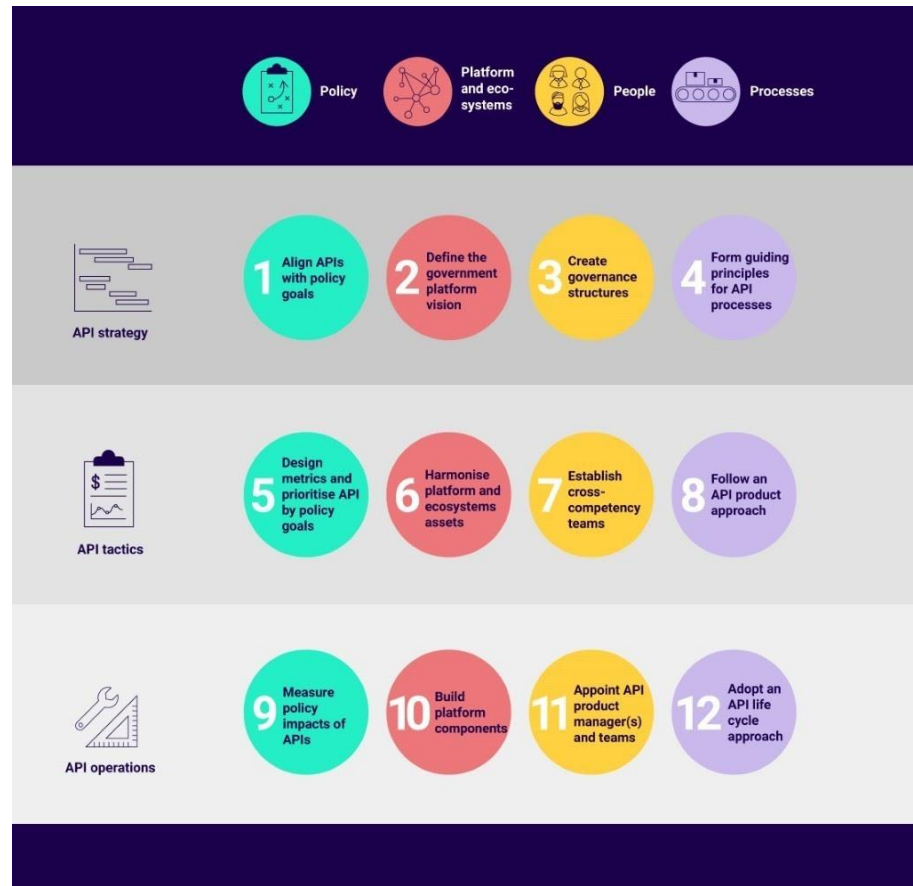
[The Government of the Netherlands API guidelines](#)

[The Government of New Zealand](#)

[The Government of UK](#)

[The guidelines of the Whitehouse](#)

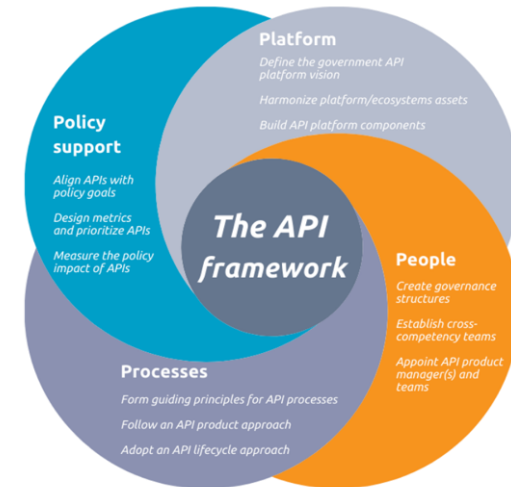
# API portfolio management & self-assessment online tool



## Introduction

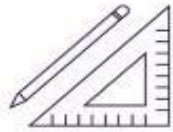
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# API discoverability mechanisms



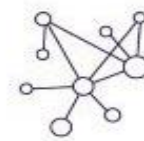
## API design

1. Metadata
2. Standardization



## API publication

3. Developer Portals
4. Search Engine Optimization (SEO)
5. Directory Listings
6. APIs on Open Data Platforms
7. Business-focused portals
8. GitHub accounts
9. Postman collections



## Ecosystem facilitation

10. Social media
11. Hackathons and Challenges
12. Developer Summits and Information sessions
13. Accelerators
14. Case studies, storytelling
15. Domain-level ecosystem networks and websites
16. Mailing lists

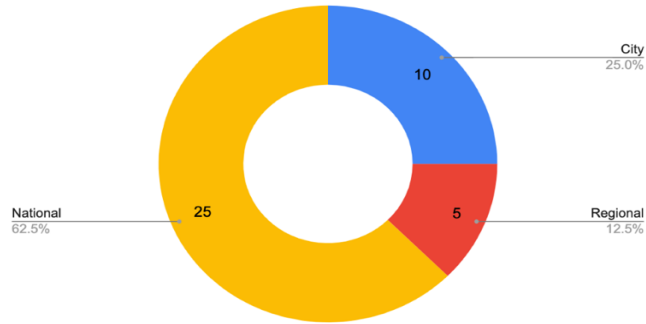


## Automated tooling

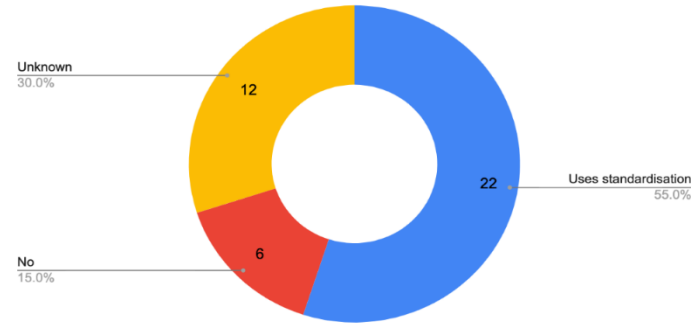
17. Citizen and no-code tools
18. Service discovery tools
19. Predictive analytics
20. Recommendation engines

# API discoverability in government (web search)

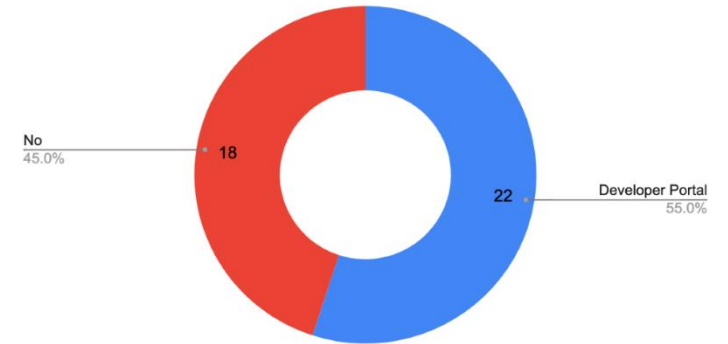
Government API portals and API sites (N=40)



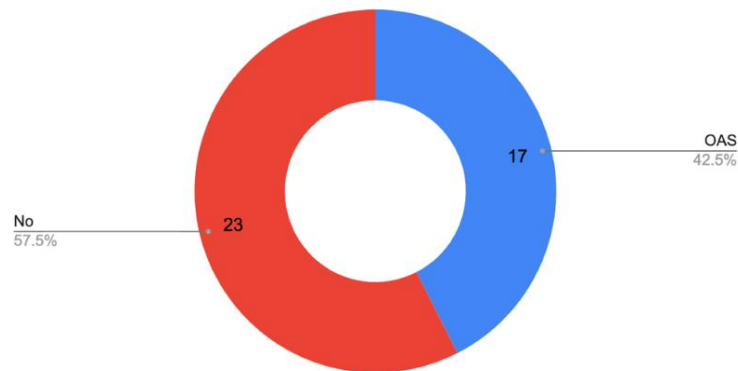
Government API portals known to use standardisation (N=40)



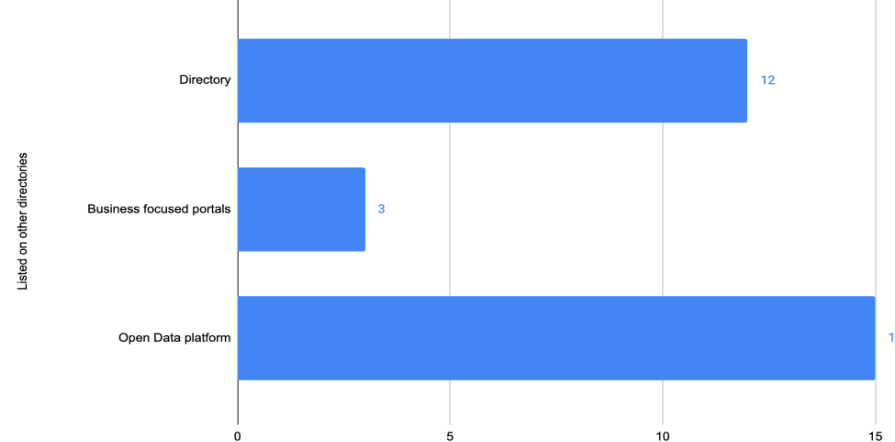
Use of Developer portals amongst Government API teams (N=40)



Use of OpenAPI Specification (OAS) amongst Government API portals (N=40)



Are Government API sites listed on other directories? (N=40, multiple selection allowed)





# Case studies (interviews)

Owner	Description	Highlights
<a href="#">Antwerp, Belgium</a>	The Antwerp City as a Platform portal aims to provide a single portal for all government digital services components. This includes APIs.	Use of AI NLP to discover APIs
<a href="#">Zaragoza, Spain</a>	Zaragoza open data portal has been built with an API for the complete open data catalogue and encourages consumers (“re-utilizers”) of the city’s data to consume data sets via the API	A community of practice is promoted: reuse of APIs, documentation and FAQ, discoverability of apps
<a href="#">New York, US</a>	An API product page that stands as an individual API product portal for potential users of the Benefits Screening API.	Clearly definition of intended audience, list of current partners and describe API features also in non-technical language
<a href="#">Lombardy, Italy</a>	The Lombardy region of Italy has developed an open digital ecosystem to share APIs that external parties can use to design new products and services	Ecosystem oriented, user-friendly interface for searching among domains
<a href="#">Victoria, Australia</a>	The Victorian government of Australia has developed a single developer portal for publishing all government APIs in a single site.	Initially internally oriented, clear and user-friendly interface
<a href="#">Denmark</a>	DAWA Denmark Addresses web API portal, Denmark discoverability strategies describes some of the discoverability components of Denmark’s API portal,	Single product (addresses) oriented, API documentation include guides, use case description
<a href="#">France</a>	A whole-of-government API catalogue targeting both internal government users that may require reusable government APIs to build their next digital government services, and external consumers looking for open APIs	User-friendly, clear and guided API catalogue
<a href="#">Netherlands</a>	The Netherland Government Developer portal is an initiative created out of the cross-government IT standards group in order to encourage reuse of APIs by departments	Not just across national government but drawing on regional and city APIs as well

# Main conclusions on discoverability

- API discoverability processes are emerging to ensure Government APIs uptake
- API discoverability in government is mostly targeting internal audiences
- Developer portals are the most widely used discoverability mechanism
- API discoverability is acknowledged as enabler of organizations interoperability
- API discoverability innovative practices

# Next steps

## Event series #3:

*Legal essentials – API & data portability (GDPR and other legal context)*



The image is a promotional poster for an event. At the top left, the text 'apidays essential' is written in a teal, lowercase font. To the right of this text is a teal square containing a white circular logo with a stylized 'Q'. Below the main title, the text 'in collaboration with' is written in a smaller, black font. Underneath this, the European Union flag is displayed, with the words 'European Commission' written below it. The central part of the poster has a dark blue background with the text 'Public Administration – Private Sector API Codesign' in white. Below this, the main title 'Exploring the legal context of APIs' is written in a large, teal font. At the bottom of this section, the text 'Tentative date: 28<sup>th</sup> January 2021' is written in a smaller, white font.

# Thank you!



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