

# Koen Vanderkimpfen



- ▀ MSc Engineering, Computer Sciences (ir.)
- ▀ Some Academic Experience in Programming Language Design
- ▀ @Smals Research since 2010: IT Researcher/Consultant



- ▀ VCS Systems
- ▀ Cloud: Architecture, aPaaS, SaaS, Serverless
- ▀ Event Driven Software Engineering
- ▀ Reactive SE
- ▀ API Economy
- ▀ BPM engines
- ▀ Low Code Development
- ▀ RPA
- ▀ NewSQL
- ▀ MLOps
- ▀ *Research Lab Administrator*

▀ Main Interest:

***Software Engineering***

# API : the Smals story

Koen Vanderkimpfen, IT Research Consultant, Smals

Heliview API, 03/12/2020

# Smals, and Smals Research



# Smals

ICT for society

E-GOVERNMENT



WWW.SMALS.BE



Know-how



Development

Shared ICT services in Belgian social security & health care since... 1939



Staffing



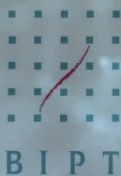
Infrastructure



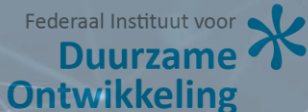
CERTIFIED EXCELLENCE IN EMPLOYEE CONDITIONS



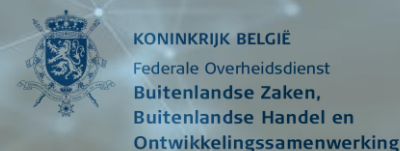
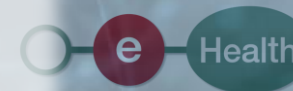
jongere welzijn



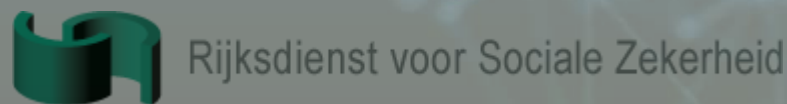
Office national de sécurité sociale



# Over 200 Belgian public institutions ... Federal – Regional – Local



Federale Politie



# Smals Research



Innovation with  
new Technologies



Consultancy  
& Expertise



Internal / External  
Knowledge



Support for  
going live

NewSQL  
Databases

Web Scraping  
for Analytics

Graph  
Analytics  
Visualisation

Advanced  
Cryptography

Anomalies &  
Transaction  
Management

**2020**

API Economy

Quantum  
Computing &  
Cryptography

GIS for  
Analytics

European  
Blockchain  
Infrastructure

Conversational  
Interfaces

AI Cases &  
Deployment

Passwordless  
Authentication

Augmented  
Reality

Knowledge  
Graphs

Near real-time  
Translation

Robotic  
Process  
Automation

# Strategic Goals for API Management

# ICT for Society: Not your typical API strategy

- ▶ Non-profit, for public Sector / Government
  - ▶ No Selling, no Monetization of APIs
- ▶ Our clients need to connect with each other
  - ▶ But are often bound by special rules (GDPR combined with national laws)
  - ▶ They may have duplicate data / functionality
  - ▶ They may have different goals, constraints, volumes, ...



# The general Goals

- ▶ To help our clients make e-Government better and more **efficient**
- ▶ To help improve their **services** to the public
- ▶ To save the **tax-payer** money

# This currently translates To

- ▶ A Horizontal, platform-based approach to maximize co-operation and even homogenization
  - ▶ Higher upfront cost, but greater long-term ROI
  - ▶ **API Management Platform**
- ▶ A strong Focus on **ReUse**
  - ▶ With APIs being the perfect vehicle

**Good API Management is crucial, but it is more than just Tooling !**

**Where are we, and how did we  
get there?**

Unit record equipment

# Improvement driven by Services and APIs

1939



Smals

'59 Mainframe

1990



Crossroads Bank for Social Security

'00 SOAP

'04 EAI

'07 SOA

2008



Health

2014

Only-once law

REST

Containers

2016



2017

API management

2018



Micro services

2020

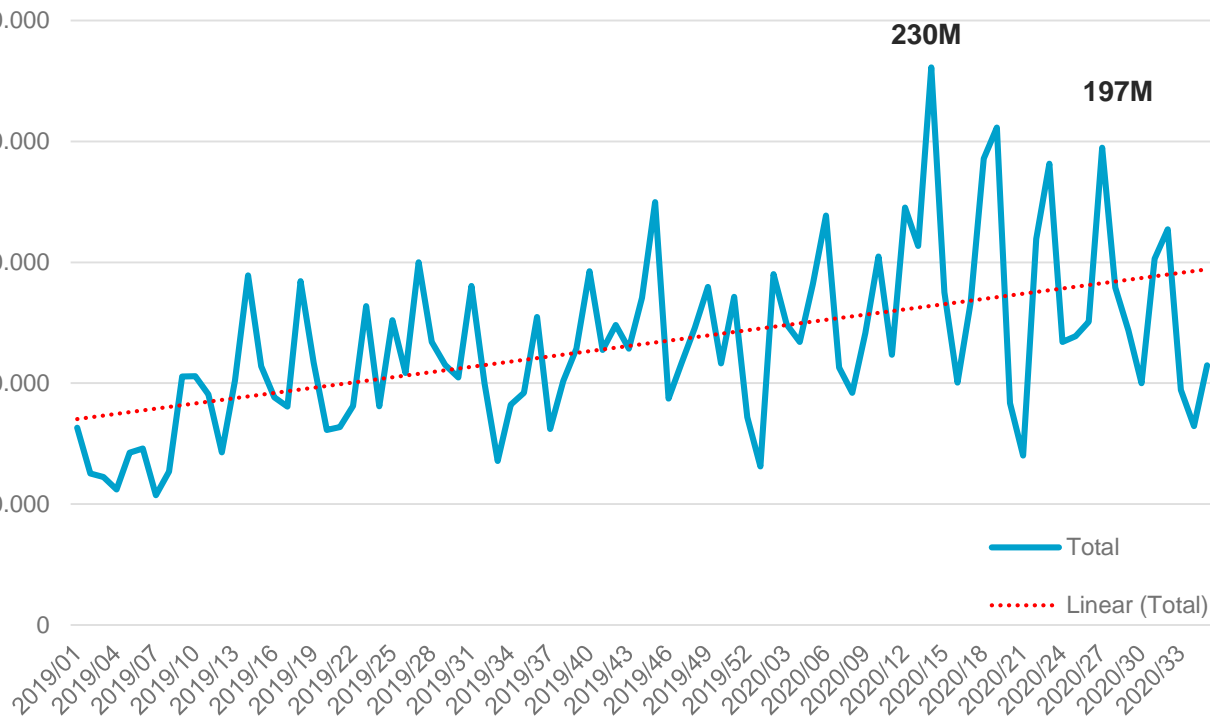
Service mesh



# API: Social Security

- 250+ APIs
- 90% consumers are gov2gov business applications / services (# 150-200)
- Peak load 1000-1500 req / s
- 600M transactions / month

Total per week





# eHealth

Count error requests Count success requests

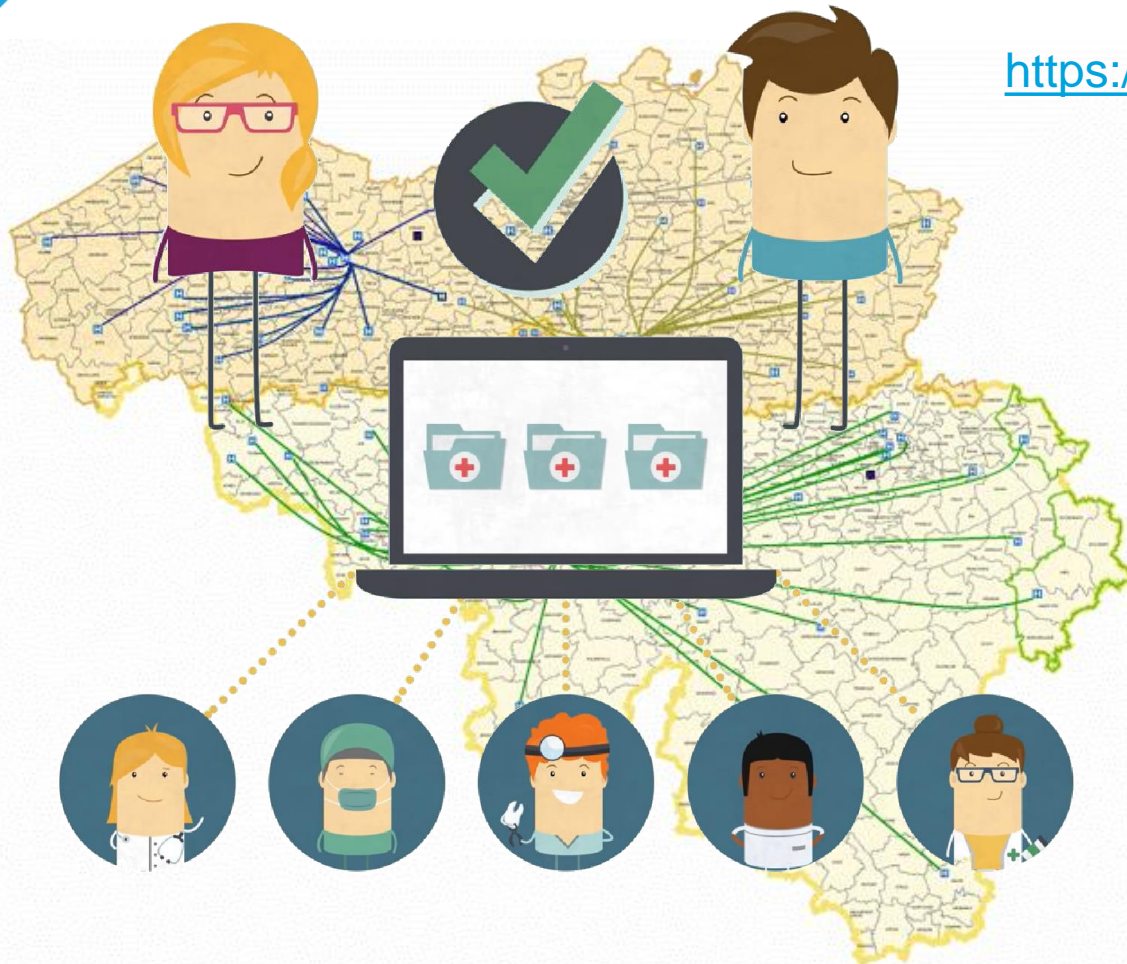


- 100+ APIs
- Most consumers are external  
(# 20,000-24,000)
- Peak load 2000-3000 req / s
- 1.200M transactions / month

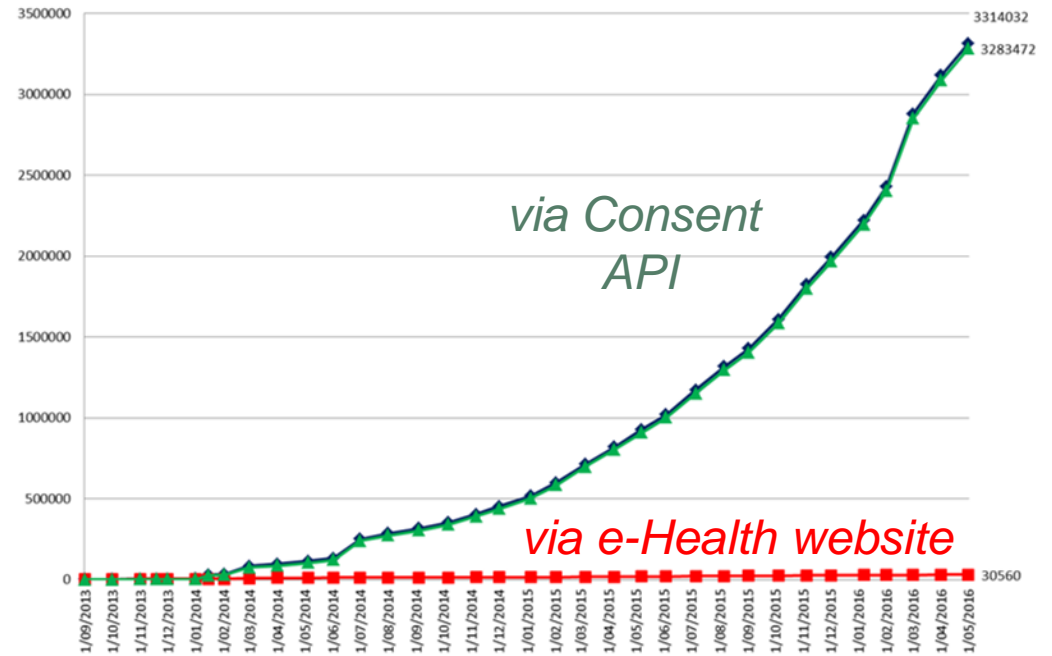
# Global Medical File & Patient Consent



<https://www.patientconsent.be/>



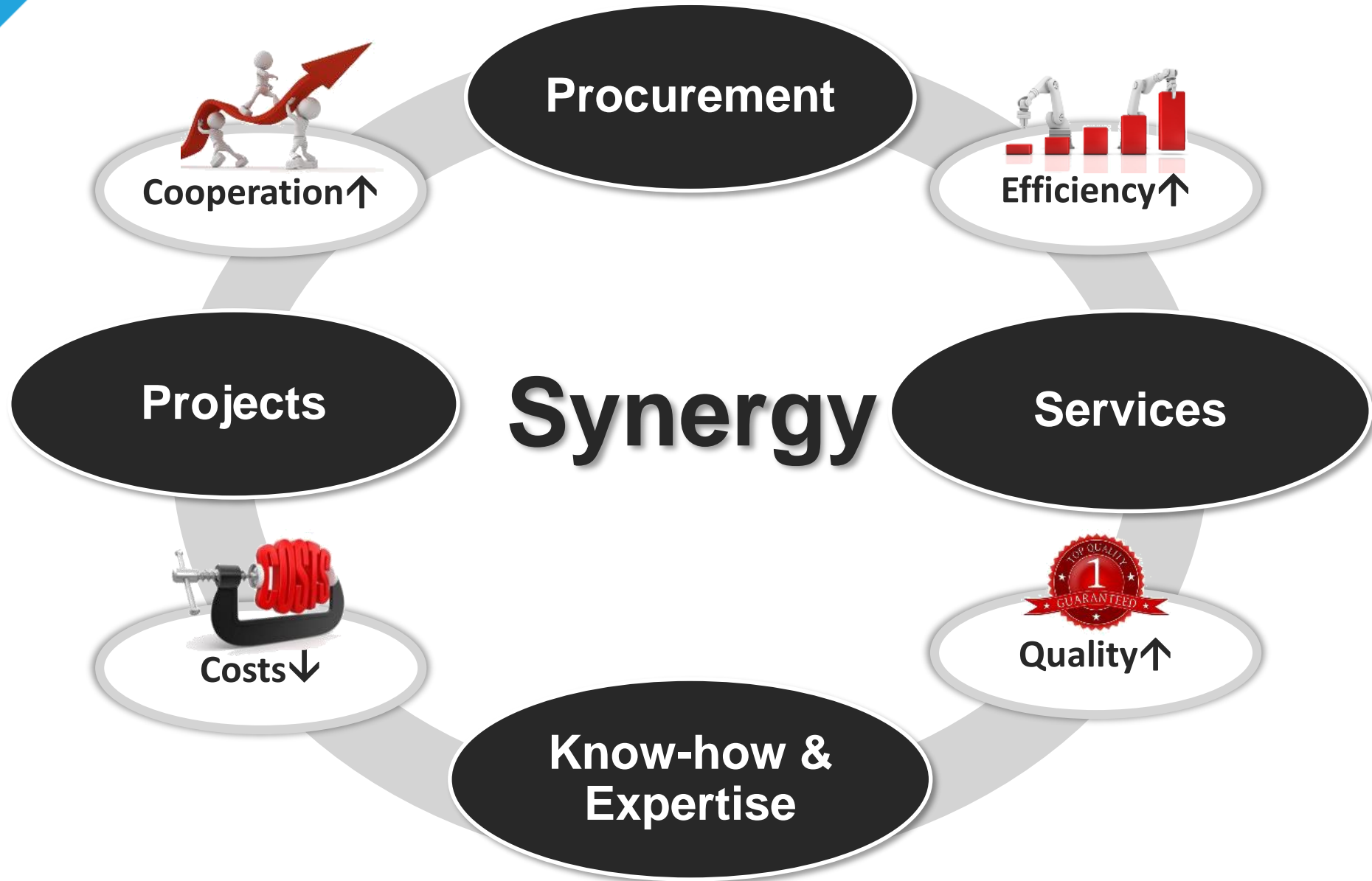
Active Consents Evolution by Entry Type



# A Shared Platform Approach

- ▶ Early days: provide Data Center for several clients, common programming language, negotiate bulk contracts with vendors, ...
- ▶ Later: Integration Platforms, ESB, shared libraries & common frameworks
- ▶ Recently: **G-Cloud**: IaaS followed by PaaS, SaaS
- ▶ Since 2017: **API Management** Platform

# G-Cloud: More than Metal



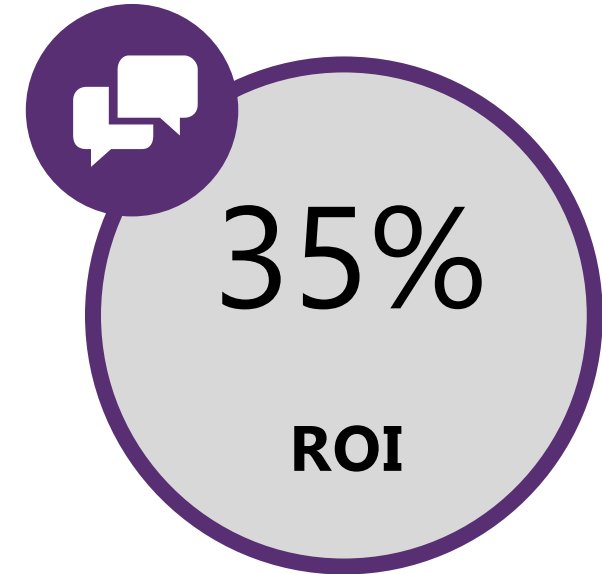
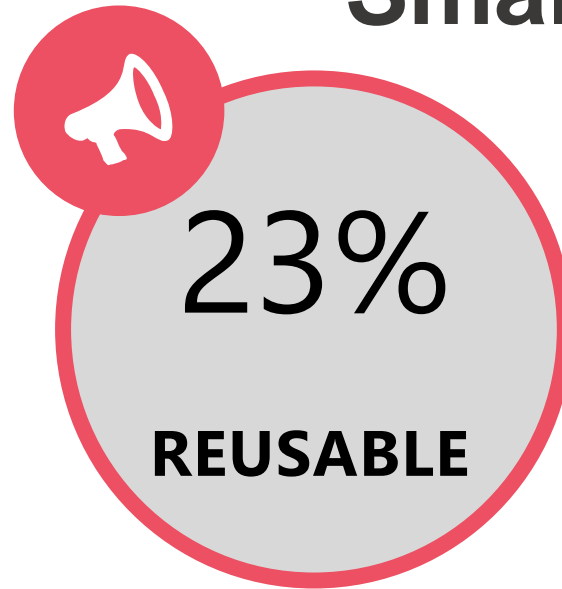
# ReUse and API Management

# Central Strategy: ReUse !



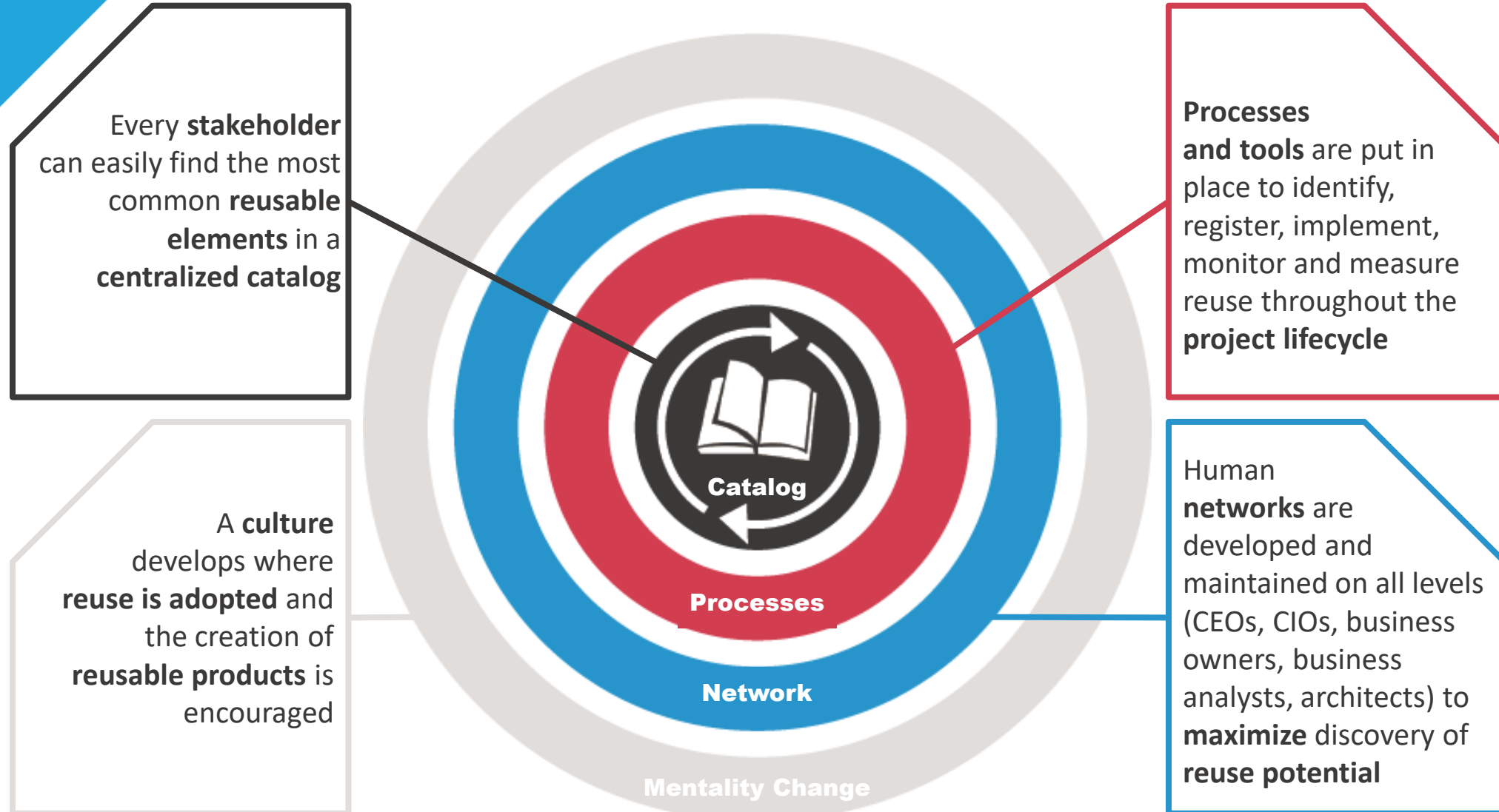
- ▶ Initiative by several public agencies & Smals
- ▶ <https://www.ict-reuse.be/nl>
- ▶ You can only improve what you measure
- ▶ Reuse is embedded in the "project life cycle" of projects carried out by Smals
- ▶ Enables the comparison of project costs (with and without reuse), and to calculate the ROI

# ROI 2019 for projects carried out by Smals

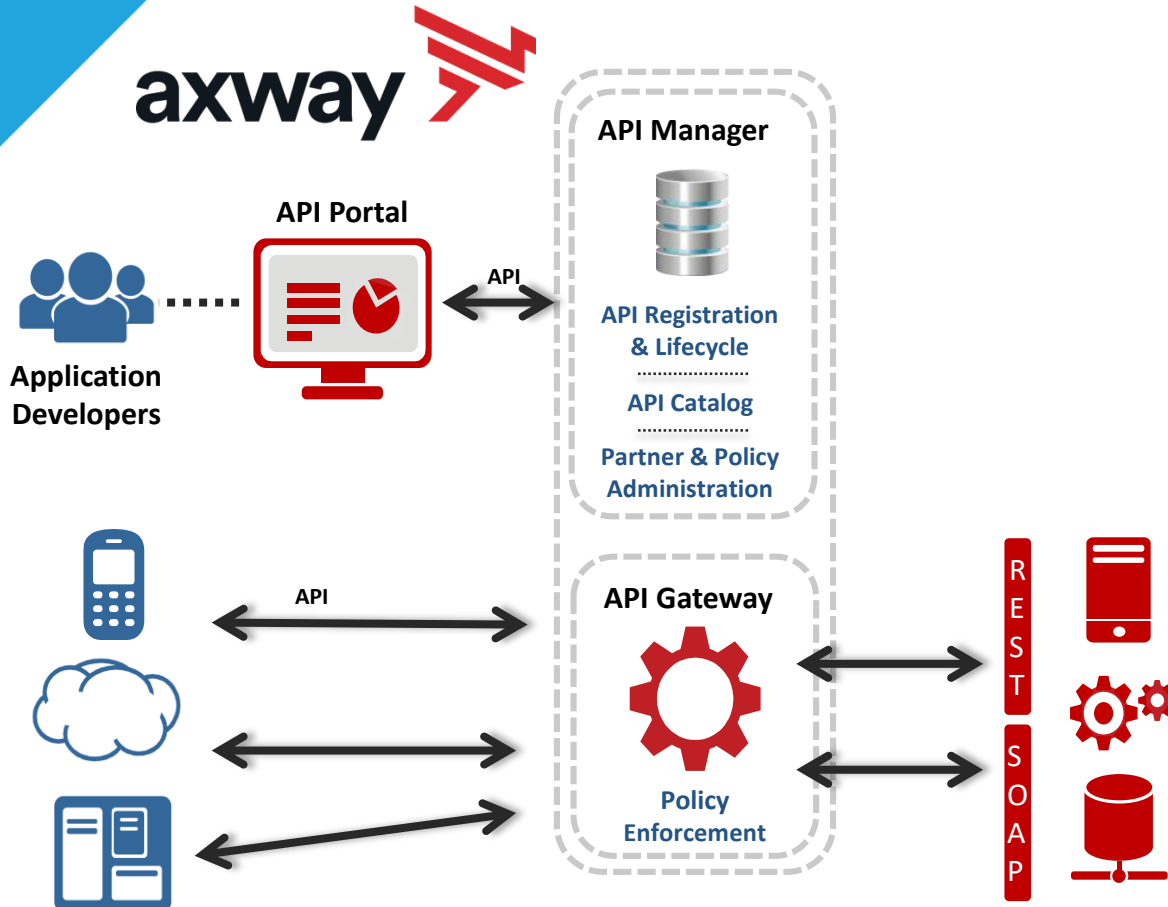


**10.000.000 €**

# ReUse – Vision



# API Management Solution



- From ESB-technology to API Gateway

- Parallel platform
- Zero-impact migration

- Ready for today's technology, but supports our legacy as well

- Flexible to extend and customize

- Accelerates time-to-market

# Beyond tooling: API management throughout the organization's soul

## REST Board

- ▲ Federal uniform vocabulary
- ▲ G-Cloud REST guidelines

## Documentation

- ▲ Extended API Catalog
- ▲ Related to the integration platforms and process at Smals: HOWTOs, FAQ, Troubleshooting, ...

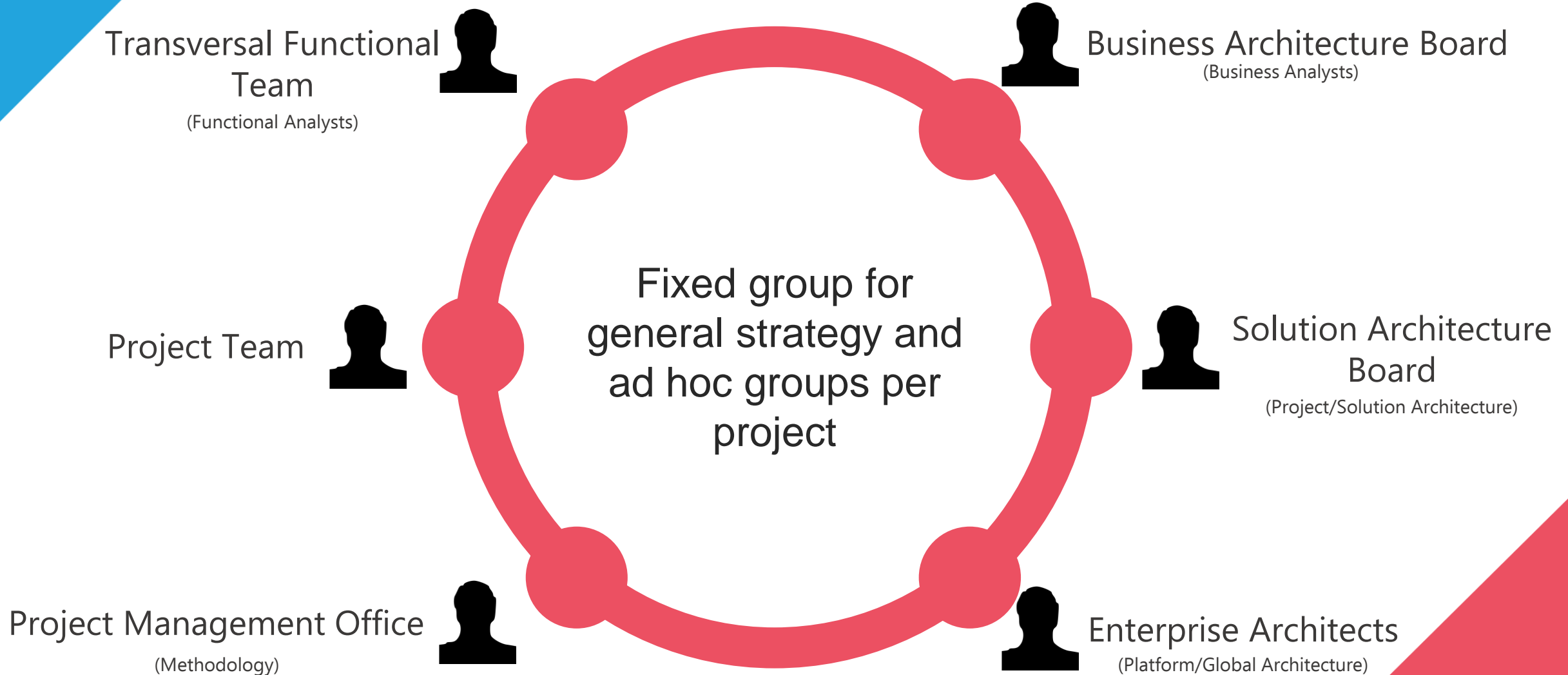
## Focus on training (REST development, how to get your API on the gateway, ... )

## Integration Competency Center (ICC):

- ▲ Development & promotion of all integration platforms
- ▲ E.g. API Gateway, Enterprise Service Bus (ESB), EventBus, Esobus (mainframe), SocSec Portal Integration

## ReUse Competency Center

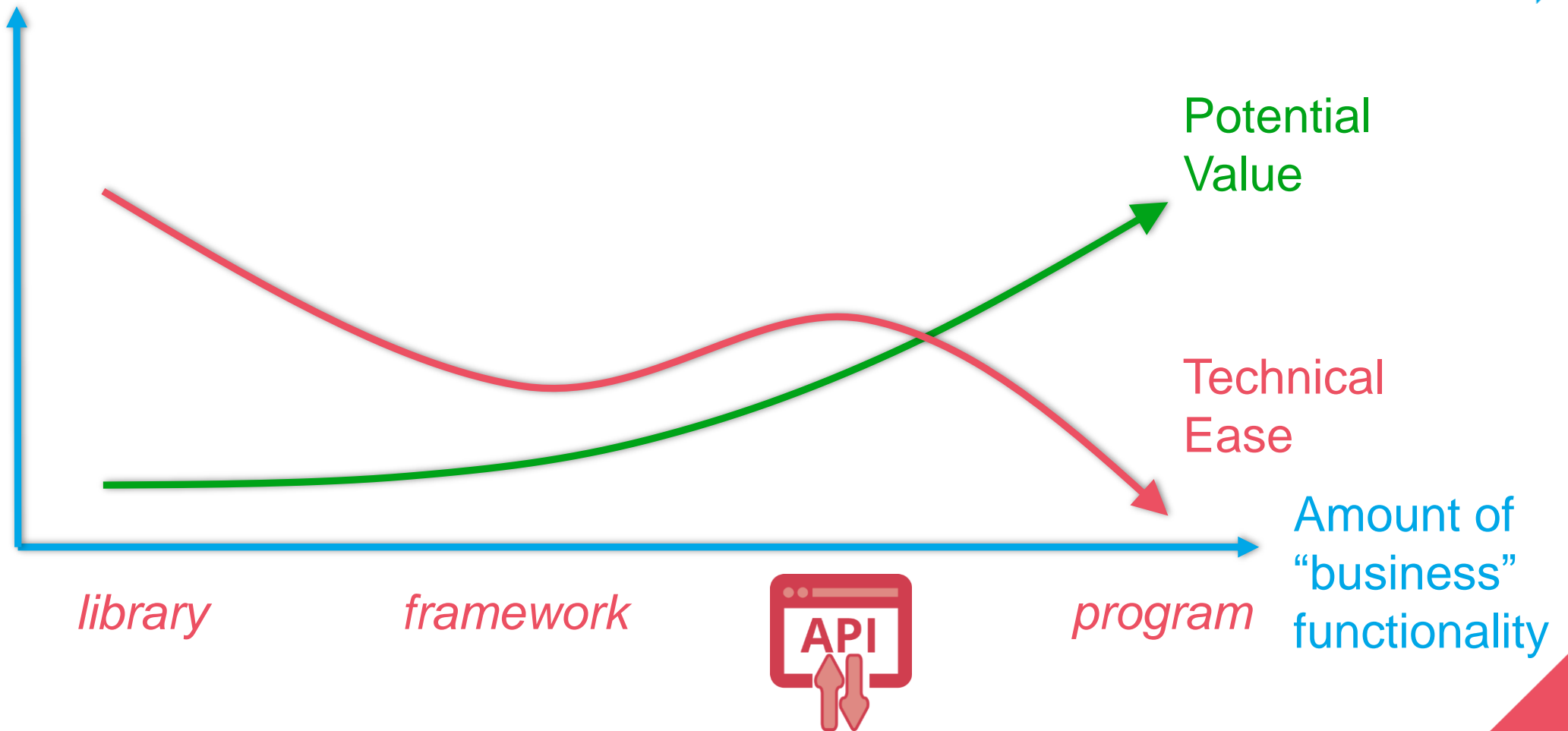
# ReUse Competency Center



# Good API ReUse = business ReUse

(and also ideal from a technical perspective)

ReUse



# API Governance



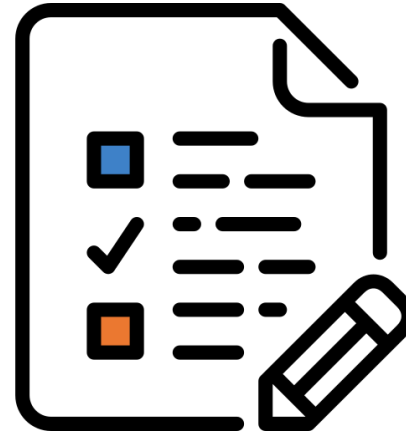
▶ *68 highly reusable,  
business-level APIs*



**#styleguide**

**{A} 1ST**

**#APIfirst**



**#document**



**#catalog**

# Introspective – What's our Next Step?

# Great Progress so far, using a Bottom-Up Approach

- ▶ Moved from Batch to Real-time, ReUsable APIs
  - ▶ Technology Driven
  - ▶ Led by Developers, Architects & IT Departments
- ▶ Moved from Shared Datacenters, over shared Infrastructure and Middleware, towards shareable Business APIs
  - ▶ Always up the stack

# What is our Maturity?

<https://we-archers.com/news/blog/api-maturity-model>

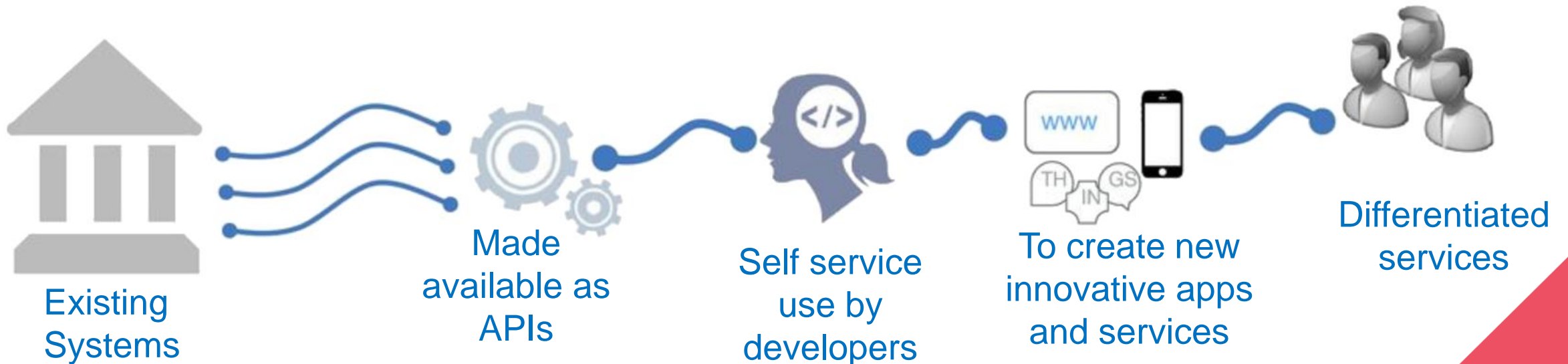
	Organic	Initiating	Exploratory	Emerging	Systematic	Optimized
Description	Developers start using REST	Validate Architecture & Technology with a confined case	Establish way of working, implement w selected use cases	Empower enthusiasts to work with established platform	Platform, Technology & Methodology used by everyone	★ Introduction of improvement cycles of the API framework
Objective	Ad-hoc realization of project needs	Convince the future leads of the API initiative	Convince the future Sponsors of the API initiative	Have API ambassadors spread over the organization	Roll-out standardized framework in the entire organization	★ Continuous improvement of API framework across organization
Scope	Ad-hoc	POC	Pilots	Believers	All	★
Strategy	None	Basic Ideas of API strategy	First version of strategy	Established Strategy based on first cases	★ Established API strategy	Constantly Optimized strategy
Governance	None		Documentation, centralized operational governance, trial strategic governance		★ Centralized governance, established strategic governance	Centralized & decentralized gov. constantly optimized strategic governance
Platform	Ad hoc use of API management platforms		Pilot API management	Standardized use of API management Capabilities		★ Improving use of API mgmt. Capabilities
Organisation	Limited; localized developers	Dev, architects, platform specialists. Limited business involvement	Broader set of dev, arch, specialists. Business product owners	Include business, enterprise / solution / integration architects	Everyone in IT delivery	
Support Model	None	Ad hoc	Platform support in place	CoE established, support for platform, tech and methodology	Center of Excellence active with decentral relaxations in governance	
Design & Realization	None. Google it	Basic API design guidelines	First version API reference and more design guidelines	API reference architecture (including patterns) & API design guidelines		
Marketing & Evangelization	None	Awareness sessions, POC & Pilot results		Awareness now to everyone, Communication of results	★	Comm. Optimizations & results

# Time for Top-Down Involvement!

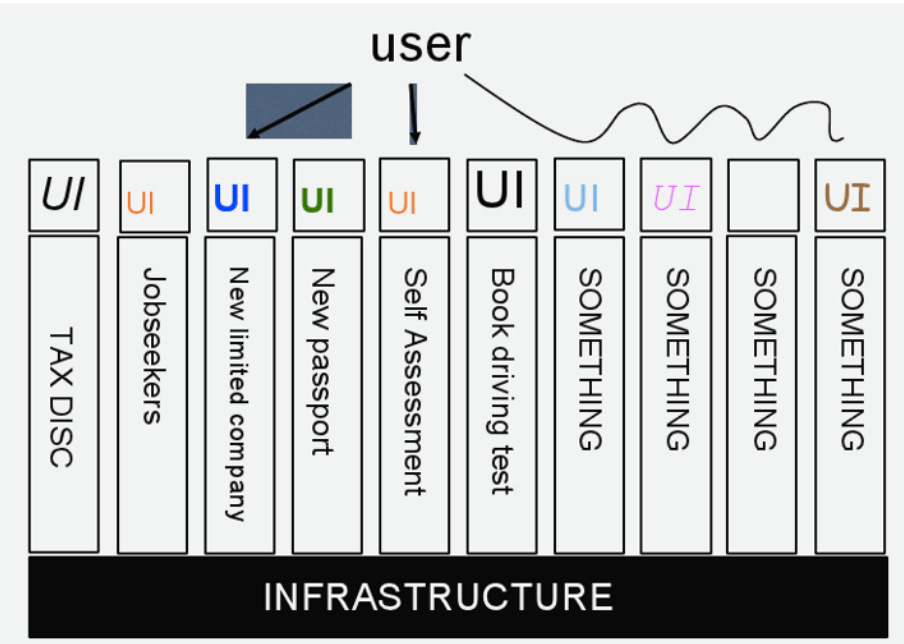
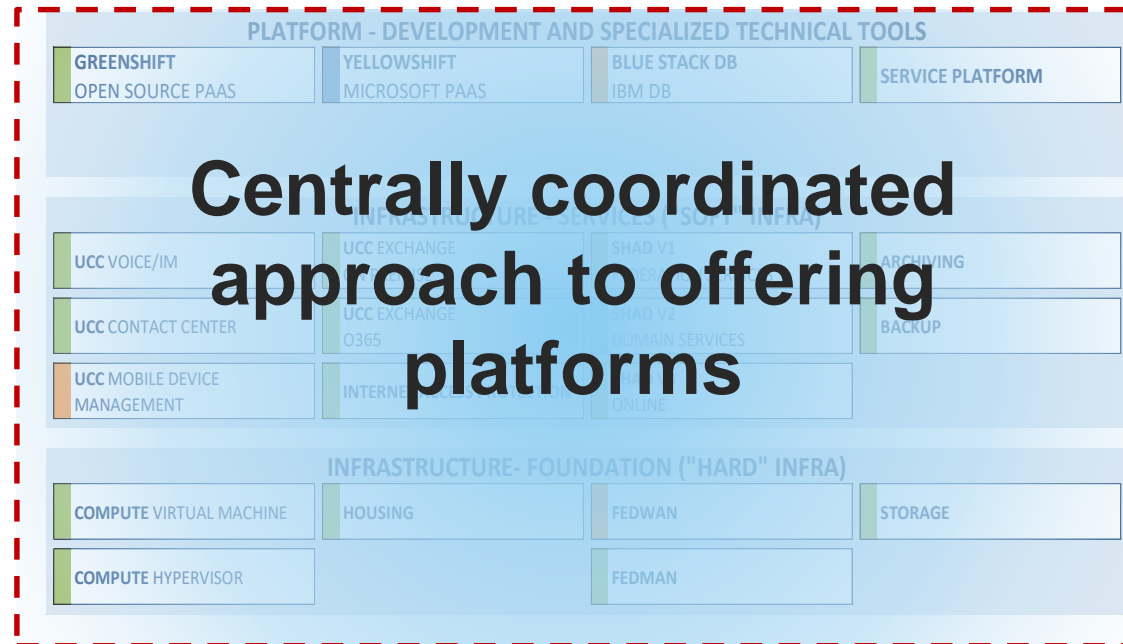
- ▶ More Top Management Involvement, across Government
  - ▶ Establish A **Shared Vision**, followed by a Strategy to achieve it
- ▶ From Project-Driven to Vision Inspired; Challenge the Business!
- ▶ Don't just ask yourself *"What services and data do I need in my project / agency"*, also consider *"What can I offer the Governmental API Economy for the benefit of all (i.e., both institutions and citizens)"*?
- ▶ The goal here is to keep evolving:
  - ▶ More reusable (and reused) APIs, higher level ReUse
  - ▶ APIs not only internal, but reach and involve the end users (companies, citizens)
  - ▶ "Once Only" principle perfected
  - ▶ "Government as a Service" (GaaS)

# Shifting to an API economy: the value chain

- APIs drive today's business processes in e-Government
- APIs are key in real-time information exchange between public - private sector & citizens



# Government as a Service: beyond APIs



# Conclusion

# Conclusion

- ▶ Successful evolution towards API driven Development @Smals
  - ▶ Mostly a bottom-up approach
- ▶ Use the tools of the trade
  - ▶ API Management, OpenAPI, REST tools, ...
- ▶ **But not without transforming the organization!**
  - ▶ Measurable ReUse in project approach
  - ▶ REST Board, ReUse and Integration Competency Centers
  - ▶ Awareness, documentation and training throughout the entire organization and even involving the clients, causing an overall culture-shift
- ▶ Vision for the future: more business involvement

# Further reading

- ▶ Frank Robben: Shifting to an API Economy: Dare to Share (incl GAAS)  
<https://www.frankrobben.be/wp-content/uploads/2019/12/20191212.pdf>
- ▶ Frank Robben: G-Cloud and Beyond  
<https://www.frankrobben.be/wp-content/uploads/2019/12/20181210.pdf>
- ▶ Some of my blogposts on [www.smalsresearch.be](http://www.smalsresearch.be) (NL, in Dutch):
  - ▶ <https://www.smalsresearch.be/hergebruik-de-dos-en-donts/>
  - ▶ <https://www.smalsresearch.be/architecturale-evoluties-deel-1/>
  - ▶ <https://www.smalsresearch.be/architecturale-evoluties-deel-2/>
  - ▶ <https://www.smalsresearch.be/services-in-alle-maten-van-macro-naar-nano/>
  - ▶ <https://www.smalsresearch.be/het-egovernment-als-horizontale-dienstverlener/>
  - ▶ <https://www.smalsresearch.be/data-centric-it-met-rest/>

# Thanks!

- [koen.vanderkimpfen@smals.be](mailto:koen.vanderkimpfen@smals.be)
- [www.smals.be](http://www.smals.be)
- [www.smalsresearch.be](http://www.smalsresearch.be)
- [www.ict-reuse.be](http://www.ict-reuse.be)
- [info@ict-reuse.be](mailto:info@ict-reuse.be)
- [www.gcloud.belgium.be](http://www.gcloud.belgium.be)

## Special thanks to:

- ▲ Willem Salembier
- ▲ Karel Van Eeckhoutte
- ▲ Veronique Adam
- ▲ Pierre-Philippe Delmarcelle
- ▲ Frank Robben