

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



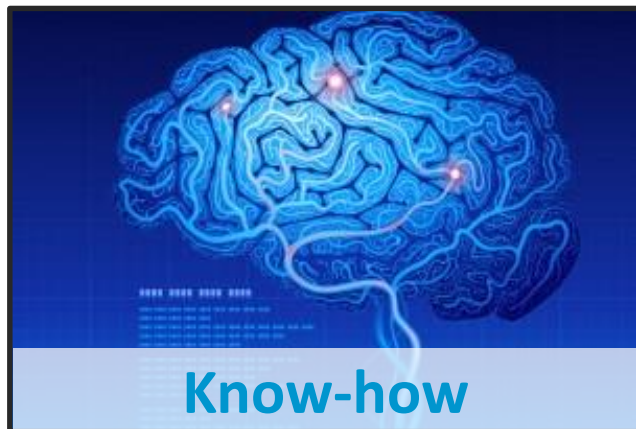
Smals

ICT for society

E-GOVERNMENT



WWW.SMALS.BE

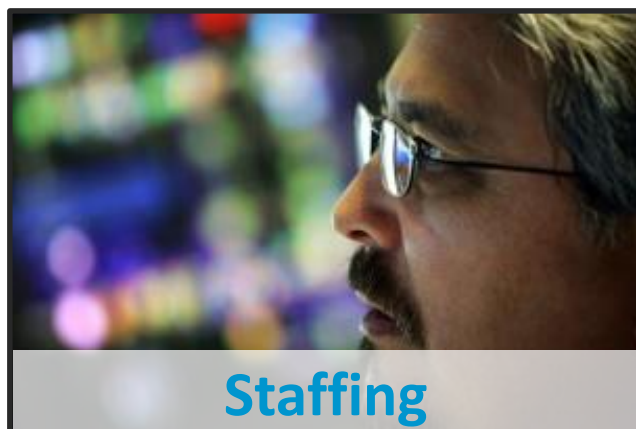


Know-how



Development

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



Staffing



Infrastructure





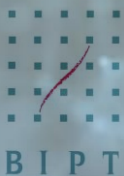
jongere welzijn



Vlaanderen
is zorg



actiris.brussels
de weg naar werk



FEDRIS



hvw
OPENBARE INSTELLING
VAN SOCIALE ZEKERHEID

CREG



Office national de sécurité sociale

fedasil
FEDERAAL AGENTSCHAP OPVANG ASIELZOEKERS
AGENCE FEDERALE ACCUEIL DEMANDEURS D'ASILE



DG Digitale Transformatie
FOD Beleid en Ondersteuning
DG Transformation digitale
SPF Stratégie et Appui



POD
SPP



Maatschappelijke Integratie
Intégration Sociale

Federaal Instituut voor
Duurzame
Ontwikkeling



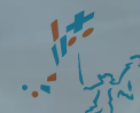
Over 200 Belgian public institutions ...
Federal – Regional – Local



Federaal Kenniscentrum voor de Gezondheidszorg
Centre Fédéral d'Expertise des Soins de Santé
Belgian Health Care Knowledge Centre



fagg
federaal agentschap voor
geneesmiddelen en
gezondheidsproducten



FAMIFED
Federaal agentschap
voor de kinderbijslag



Rekenhof
Cour des comptes

VDAB



RJV
ONVA

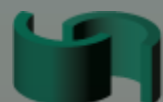
Kind & Gezin



KONINKRIJK BELGIË
Federale Overheidsdienst
Buitenlandse Zaken,
Buitenlandse Handel en
Ontwikkelingssamenwerking



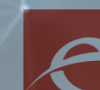
Federale Overheidsdienst
Sociale Zekerheid



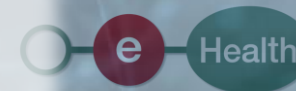
Rijksdienst voor Sociale Zekerheid



Federale Politie



economie
FOD Economie, K.M.O., Middenstand en Energie



KSZ
BCSS

Smals Research



Innovation with
new Technologies



Consultancy
& Expertise



Internal / External
Knowledge



Support for
going live

NewSQL
Databases

Web Scraping
for Analytics

Graph
Analytics
Visualisation

API Economy

Advanced
Cryptography

Anomalies &
Transaction
Management

GIS for
Analytics

2020

European
Blockchain
Infrastructure

Quantum
Computing &
Cryptography

Conversational
Interfaces

Augmented
Reality

AI Cases &
Deployment

Knowledge
Graphs

Passwordless
Authentication

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

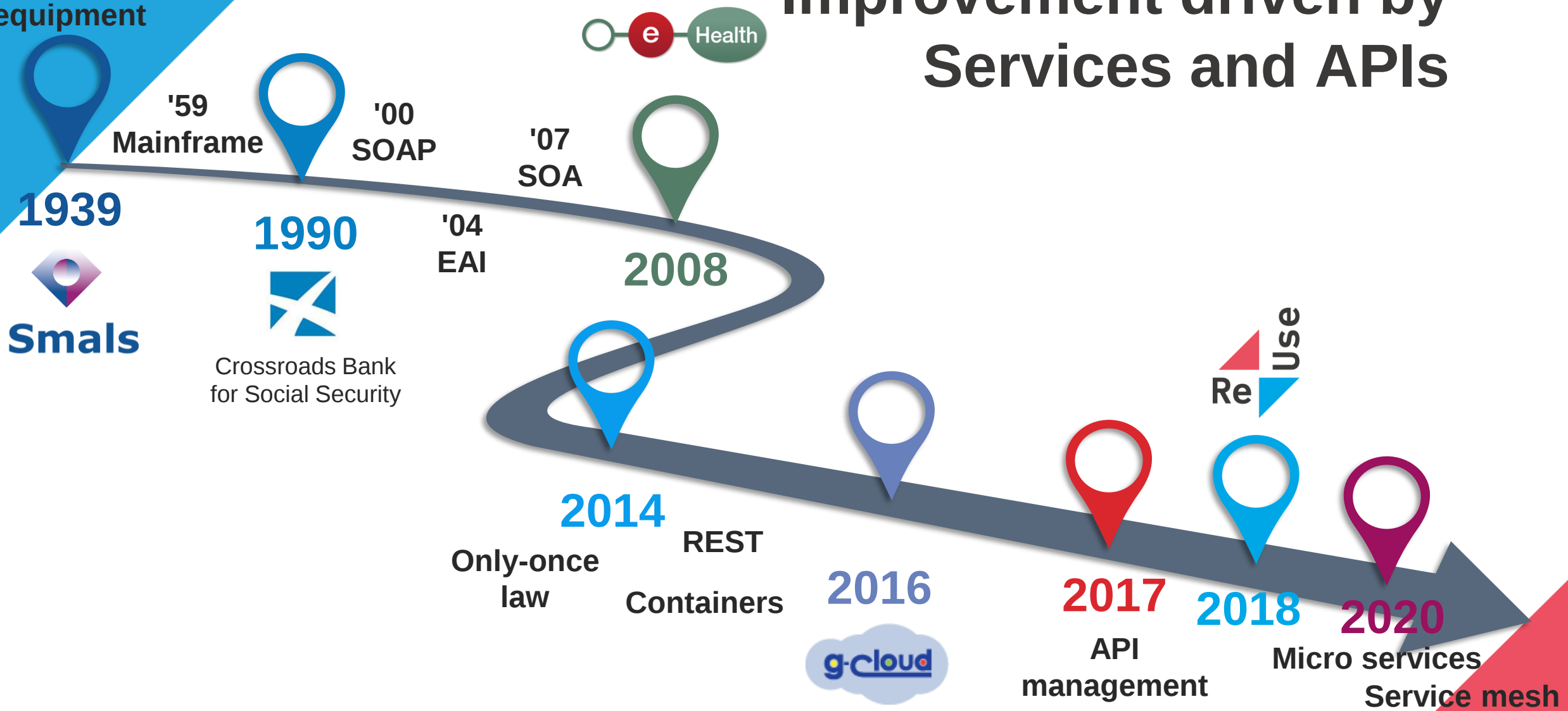
Good API Management is crucial, but it is more than just Tooling !



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

Unit record
equipment

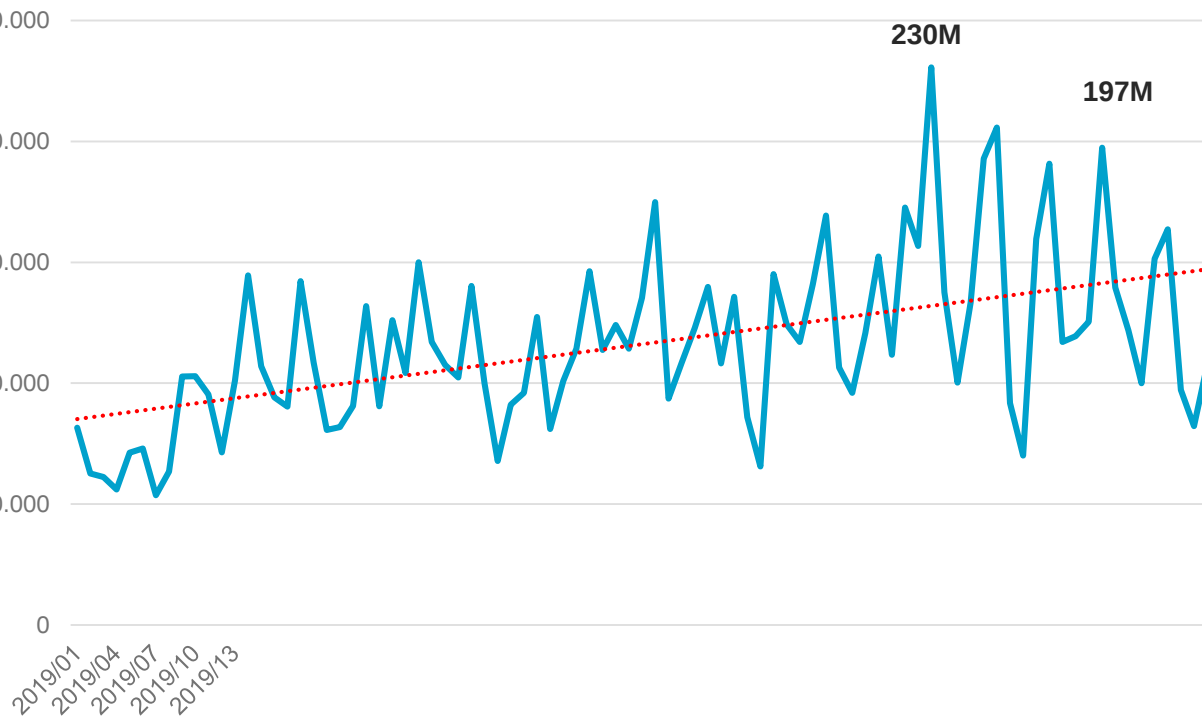
Improvement driven by Services and APIs





API: Social Security

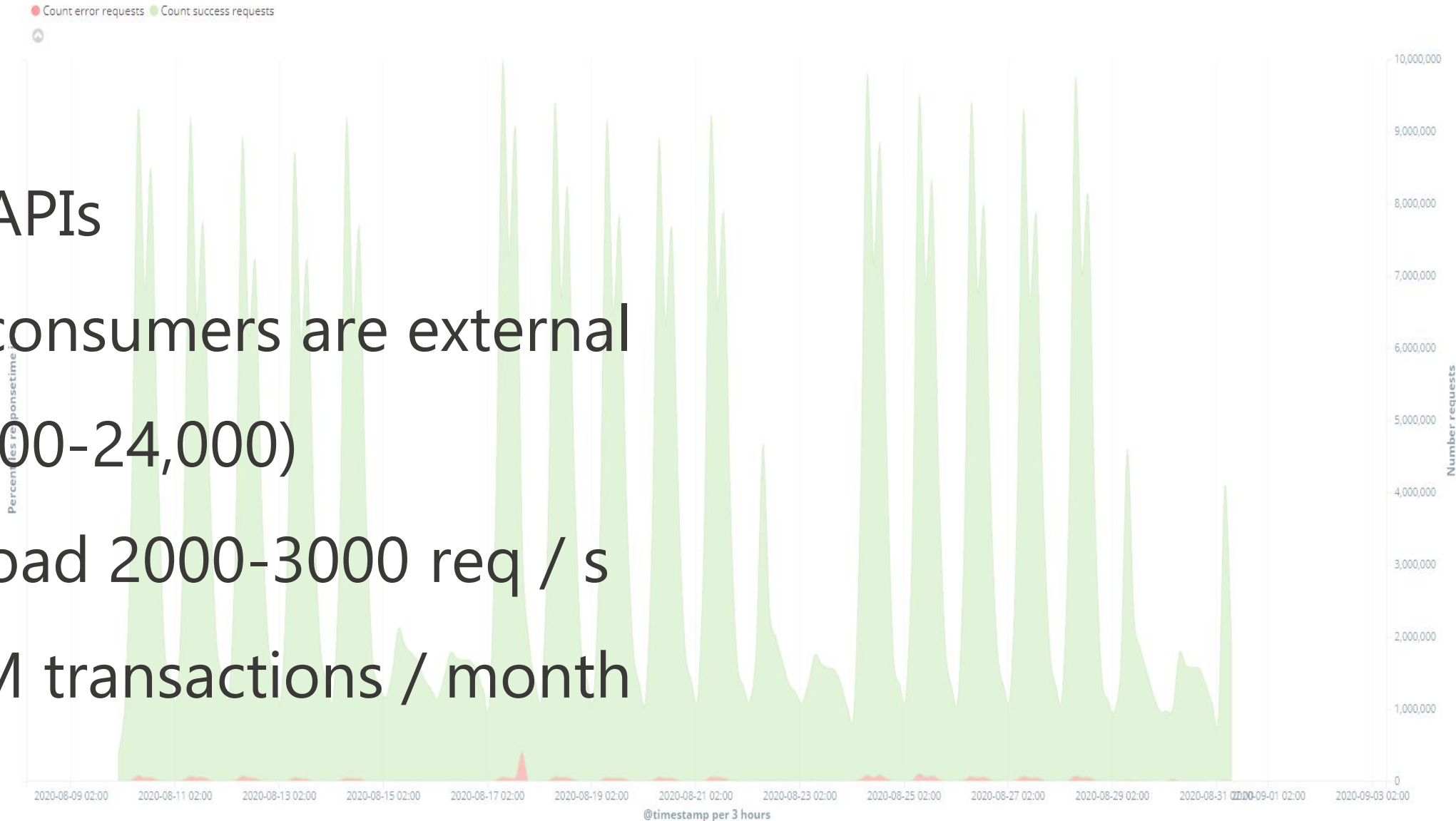
- 250+ APIs
- 90% consumers are gov2gov
business applications /
services (# 150-200)
- Peak load 1000-1500 req / s
- 600M transactions / month





eHealth

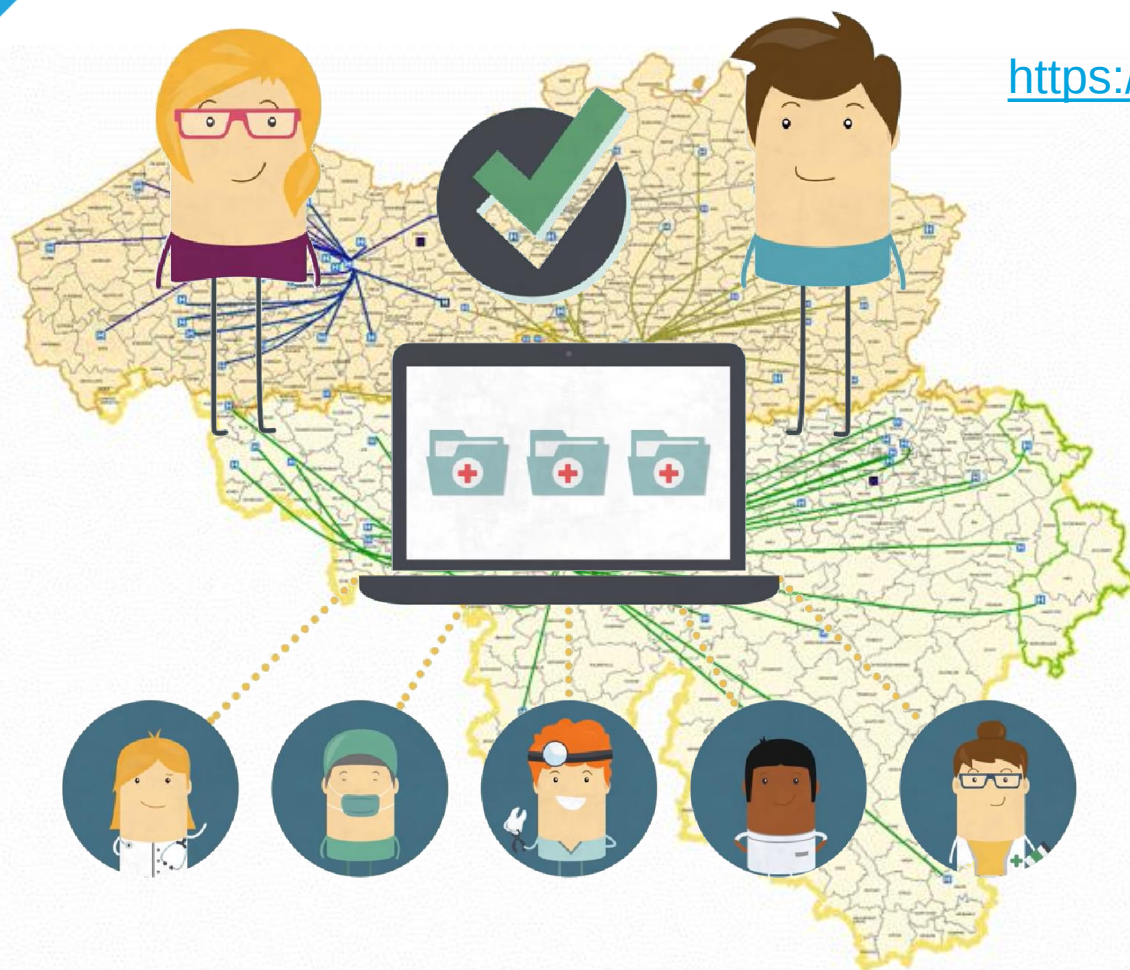
- 100+ APIs
- Most consumers are external
(# 20,000-24,000)
- Peak load 2000-3000 req / s
- 1.200M transactions / month



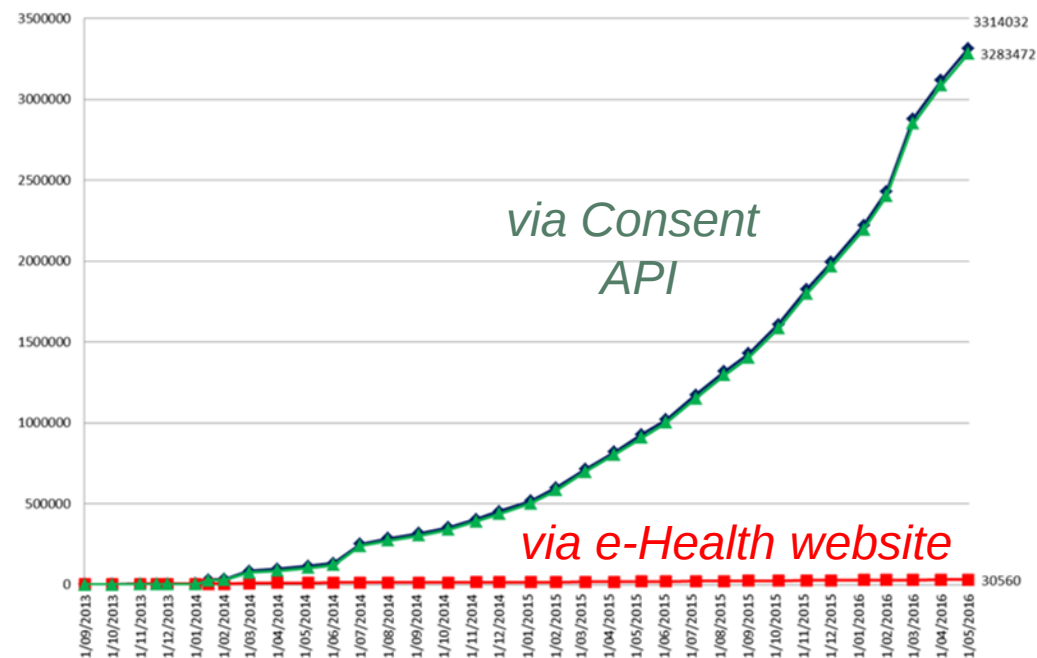
Global Medical File & Patient Consent



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



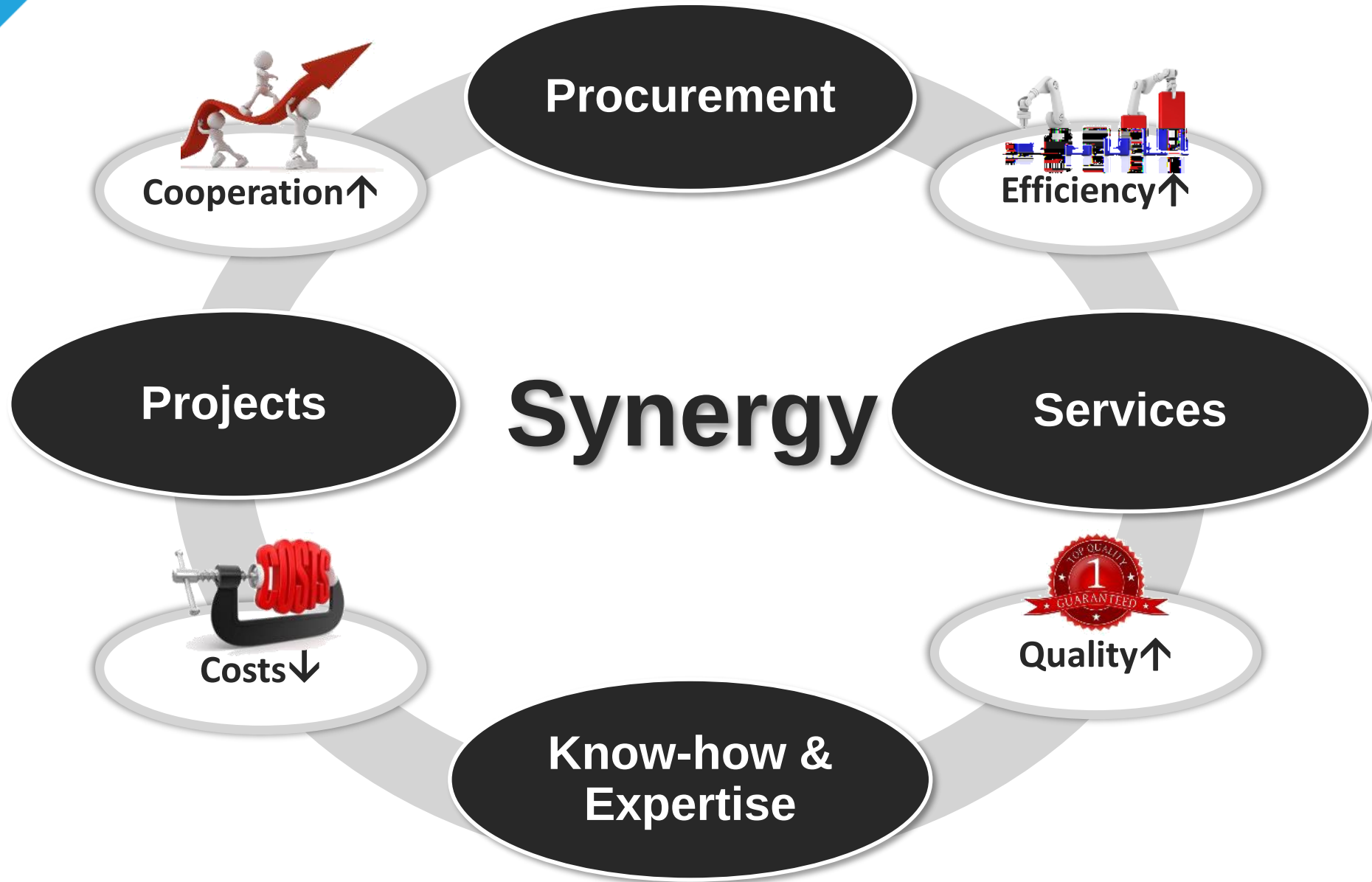
Active Consents Evolution by Entry Type



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



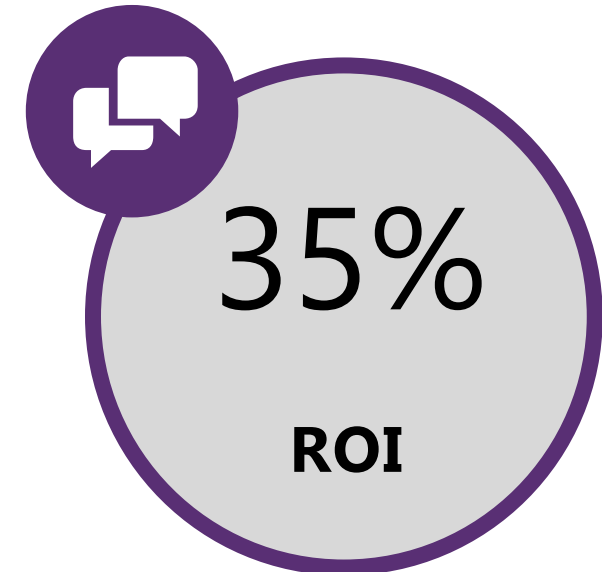
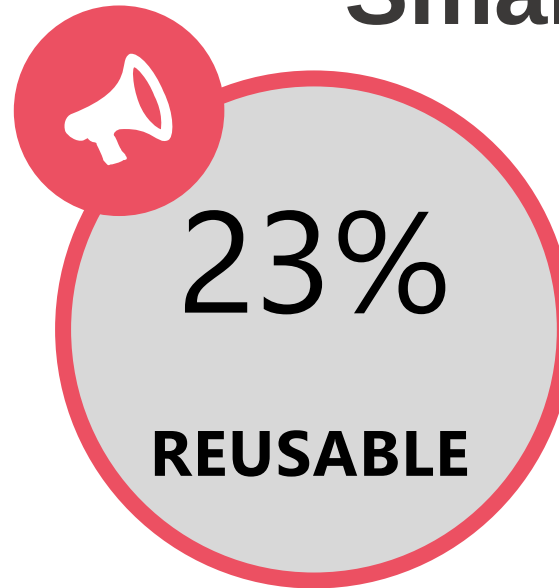
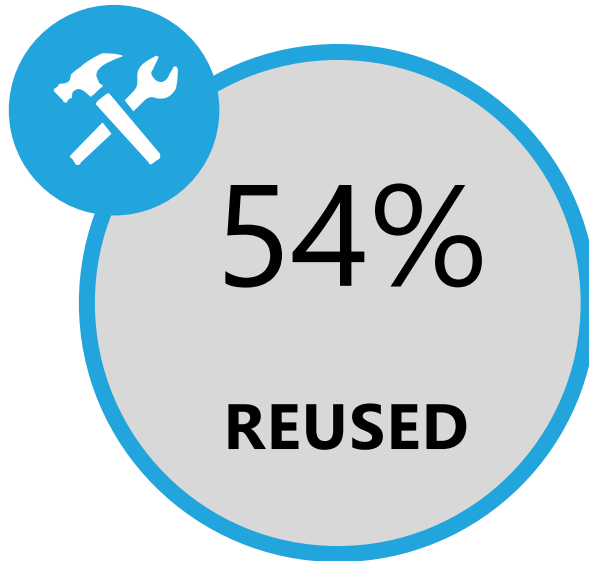
ReUse and API Management

Central Strategy: ReUse !



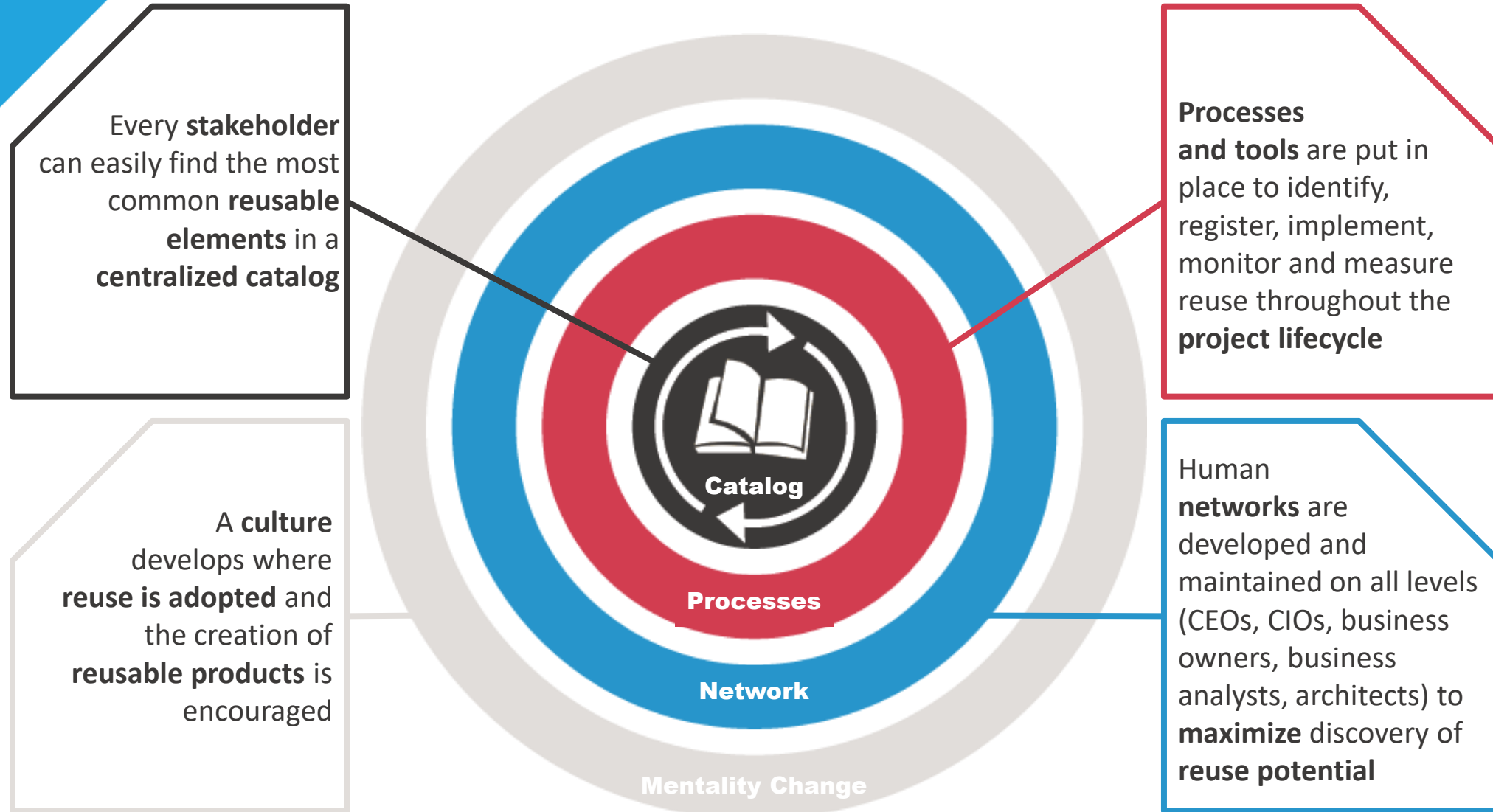
- Initiative by several public agencies & Smals
- <https://www.ict-reuse.be/nl>
- You can only improve what you measure
- Reuse is embedded in the "project life cycle" of projects carried out by Smals
- Enables the comparison of project costs (with and without reuse), and to calculate the ROI

ROI 2019 for projects carried out by Smals

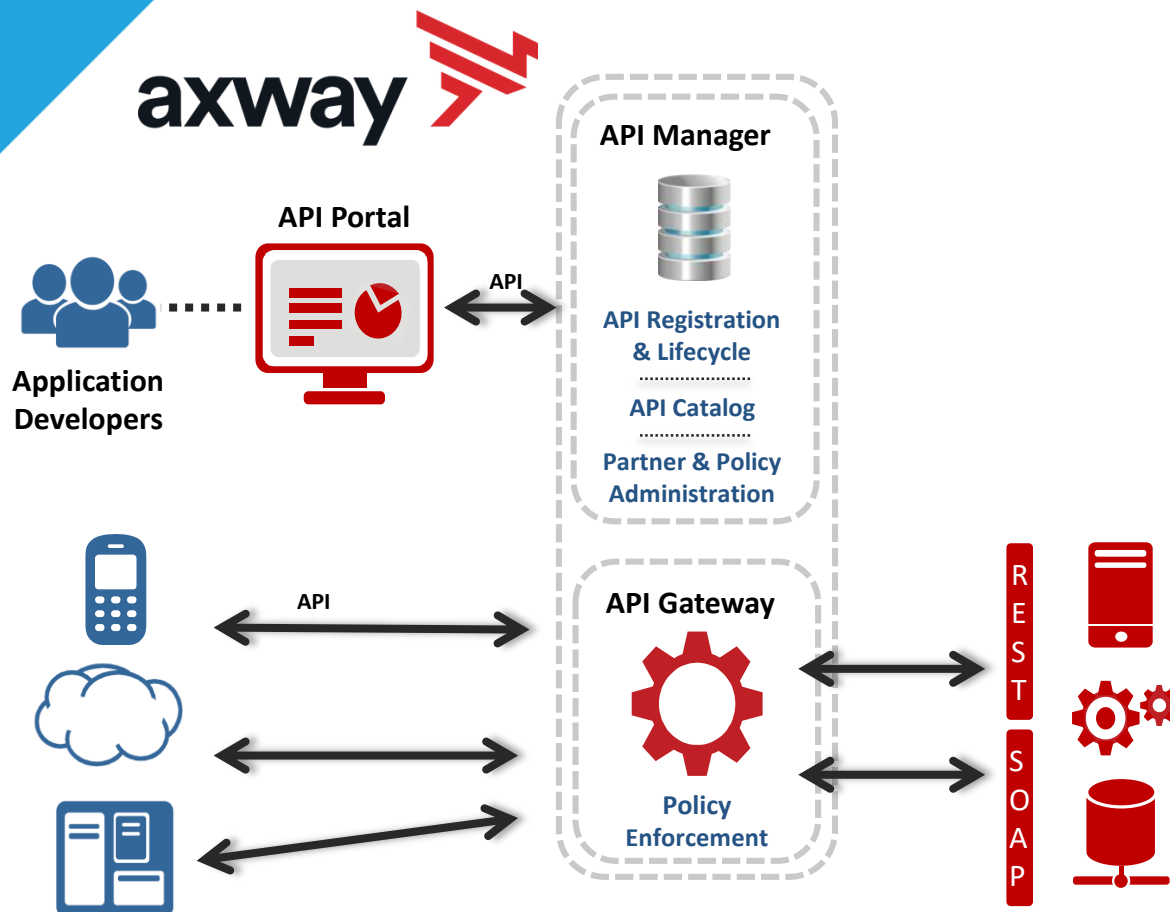


10.000.000 €

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, ...

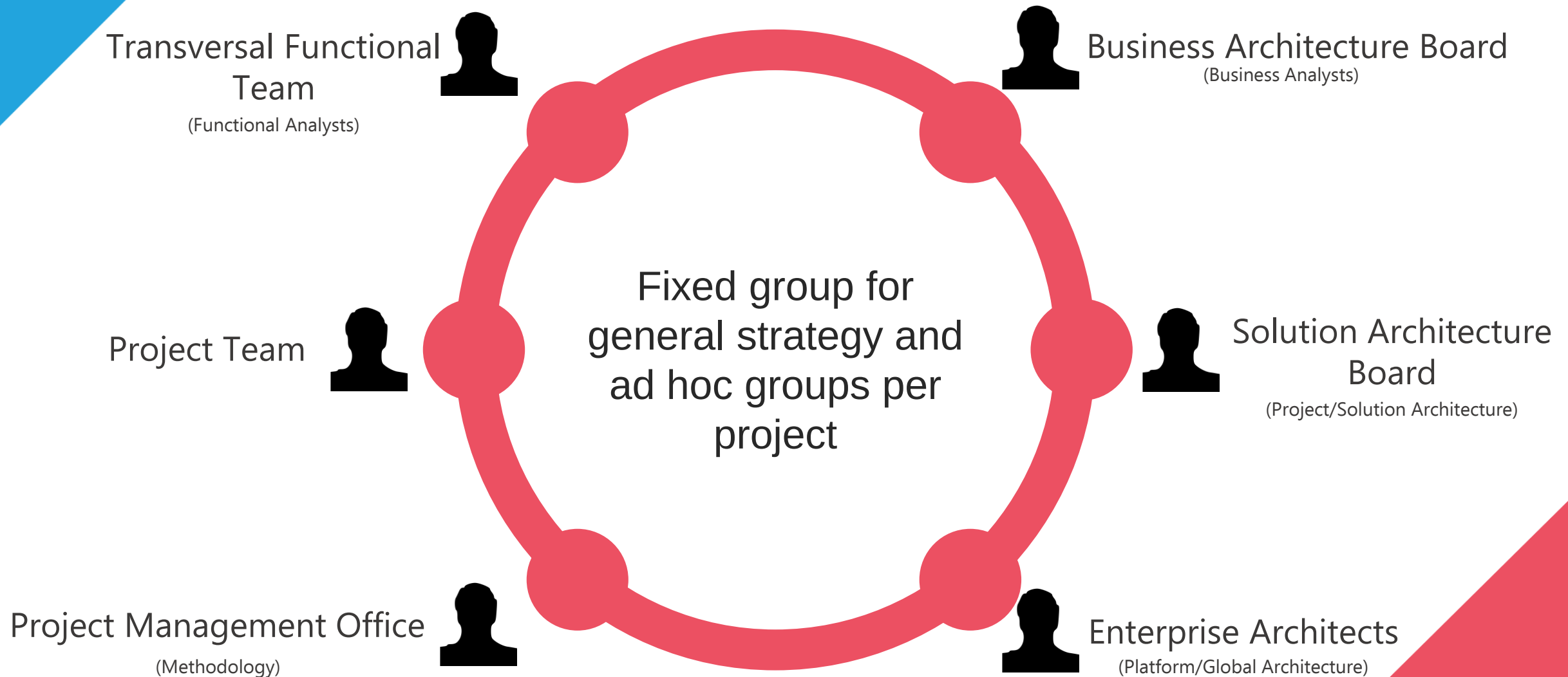
■ Focus on training (REST development, how to get your API on the gateway, ...)

■ Integration Competency Center (ICC):

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

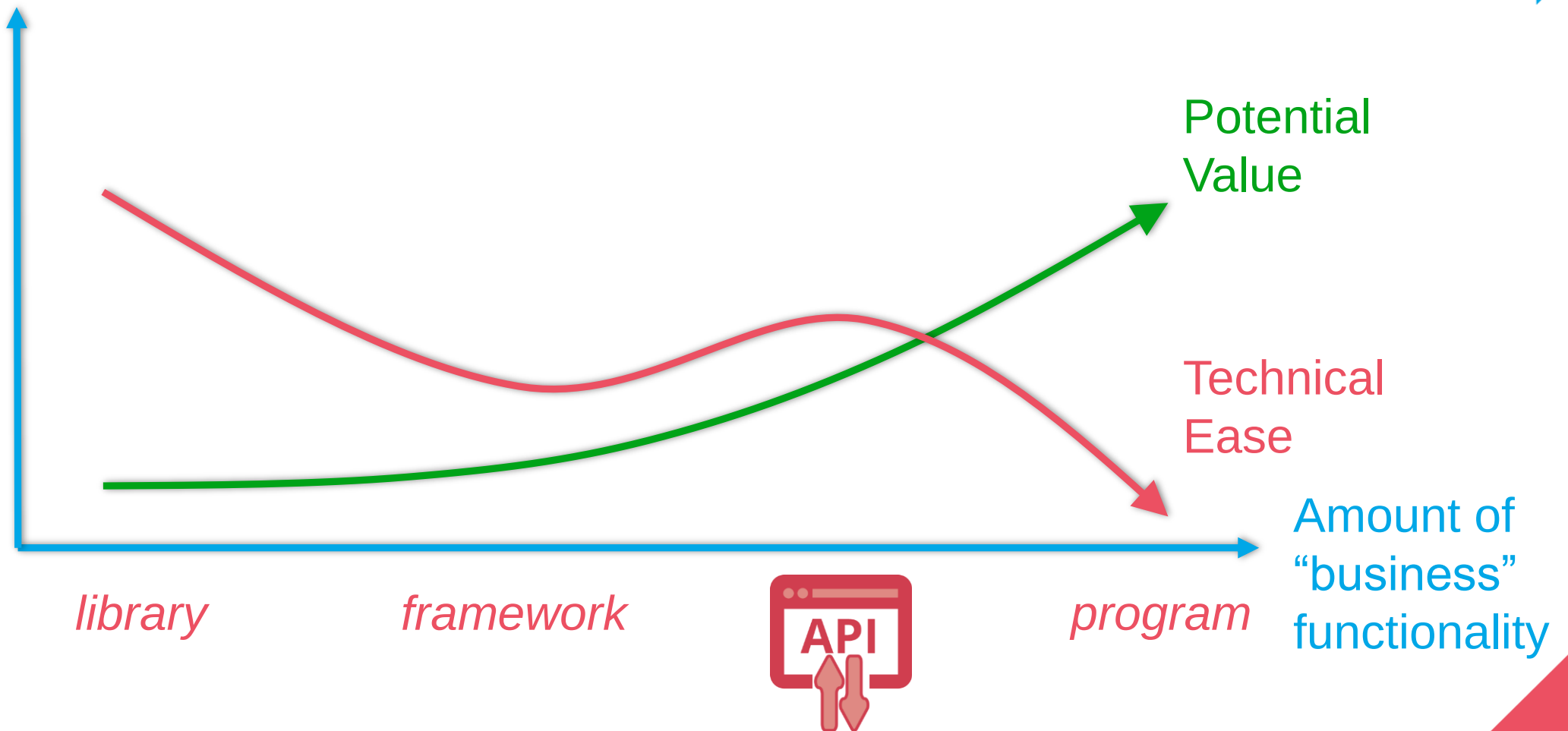
■ ReUse Competency Center

ReUse Competency Center



Good API ReUse = business ReUse

(and also ideal from a technical perspective)



API Governance



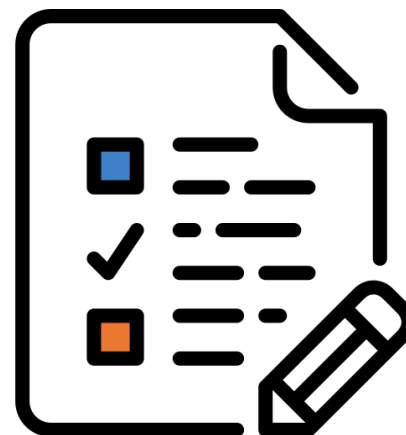
68 highly reusable,
business-level APIs



#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>

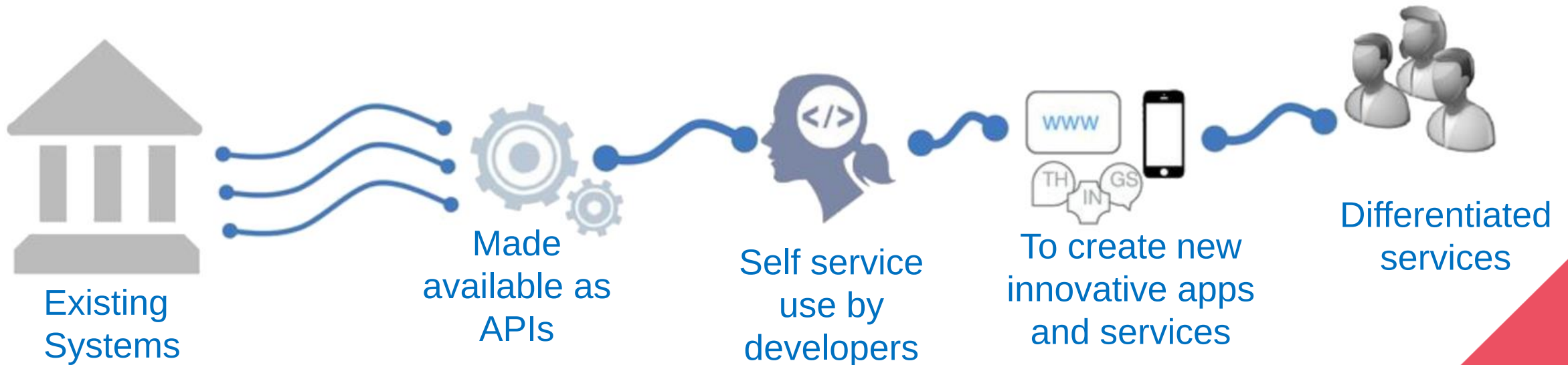
	Organic	Initiating	Exploratory	Emerging	Systematic	Optimized
Description	Developers start using REST	Validate Architecture & Technology with a confined case	Establish way of working, implement w selected use cases	Empower enthusiasts to work with established platform	Platform, Technology & Methodology 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!

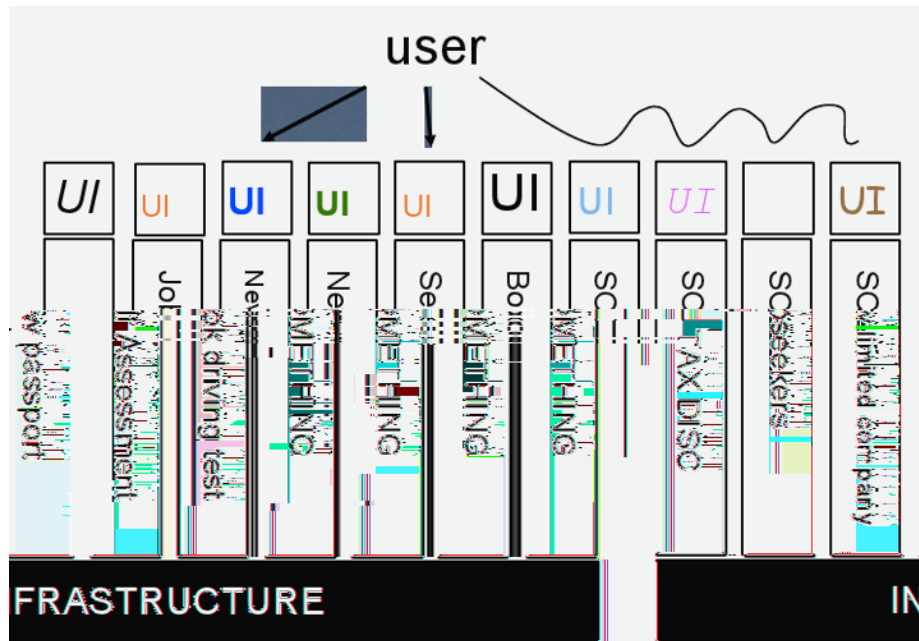
- More Top Management Involvement, across Government
 - Establish A **Shared Vision**, followed by a Strategy to achieve it
- From Project-Driven to Vision Inspired; Challenge the Business!
- Don't just ask yourself *"What services and data do I need in my project / agency"*, also consider *"What can 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 (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!

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- www.gcloud.belgium.be

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