Koen Vanderkimpen

- 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
- A Research Lab Administrator

Main Interest:

Software Engineering



API: the Smals story

Koen Vanderkimpen, IT Research Consultant, Smals Heliview API, 03/12/2020





Smals, and Smals Research





E-GOVERNMENT







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









Smals Research





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, ...





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**

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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?







Z50+ APIs

90% consumers are gov2gov

business applications / services (# 150-200)

Peak load 1000-1500 req / s

600M transactions / month

Total per week

15





Global Medical File & Patient Consent





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https://www.patientconsent.be/



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

<u>https://www.ict-reuse.be/nl</u>

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







Every stakeholder can easily find the most common reusable elements in a centralized catalog

A culture develops where reuse is adopted and the creation of reusable products is encouraged Processes and tools are put in place to identify, register, implement, monitor and measure reuse throughout the project lifecycle

Human **networks** are developed and maintained on all levels (CEOs, CIOs, business owners, business analysts, architects) to **maximize** discovery of **reuse potential**



Mentality Change

API Management Solution



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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









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

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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	Nc	ne	Documentation, cer governance, trial st	ntralized operational trategic governance	Centralized governance, established strategic governance	Centralized & decentralized gov. constantly optimized strategic governance
Platform	Ad hoc use of API ma	anagement 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 ir	n IT delivery
Support Model	None	Ad hoc	Platform support in place	CoE established, support for platform, tech and methodology	Center of Excellence relaxations ir	active with decentral
Design & Realization	None. Google it	Basic API design guidelines	First version API reference and more design guidelines	API reference archited	cture (including patterns) &	API design guidelines
Marketing & Evangelization	None	Awareness sessions	, POC & Pilot results	Awareness now to everyor results	one, Communication of	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 <u>Governmental API Economy</u> 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





Cloue



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BECONNECTED & DU	siness	compo	nents FORMS	
WEB CONTENT MANAGEMENT				
PLATE	FORM - DEVELOPMENT	AND SPECIALIZED TECHN	IICAL TOOLS	
CDEENICLIET	VELLOWCHIET			
OPEN SOURCE PAAS	YELLOWSHIFT MICROSOFT PAAS	IBM DB	SERVICE PLATFORM	
GREENSHIFT OPEN SOURCE PAAS	YELLOWSHIFT MICROSOFT PAAS	IBM DB	SERVICE PLATFORM	
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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) <u>https://www.frankrobben.be/wp-content/uploads/2019/12/20191212.pdf</u>

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):

- <u>https://www.smalsresearch.be/hergebruik-de-dos-en-donts/</u>
- <u>https://www.smalsresearch.be/architecturale-evoluties-deel-1/</u>
- <u>https://www.smalsresearch.be/architecturale-evoluties-deel-2/</u>
- <u>https://www.smalsresearch.be/services-in-alle-maten-van-macro-naar-nano/</u>
- <u>https://www.smalsresearch.be/het-egovernment-als-horizontale-dienstverlener/</u>
- <u>https://www.smalsresearch.be/data-centric-it-met-rest/</u>

Thanks!

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