Identification and Evaluation of Incentive Mechanisms for Opening Internal Systems via Partner APIs

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Outline

- Motivation
- Problem Statement
- Research Questions and Approach
- Initial Results
- Next Steps
- Timeline

Motivation – current scene at Siemens AG

Ongoing projects

- Platform centered to one department
- APIs related to IoT topics
- Existing incentives for external developers

Siemens Data Layer

- Designed to ease app developers
- Collects engineering and simulation, operations and monitoring and maintenance data

Paused projects

api.siemens.com

- Platform aimed to all divisions
- Paused due to lack of funding
- Goal: bring transparency within Siemens

Source: https://new.siemens.com/de/de/unternehmen/messen-events/20190821-siemens-mindsphere-meetup.html

Motivation – researching incentives

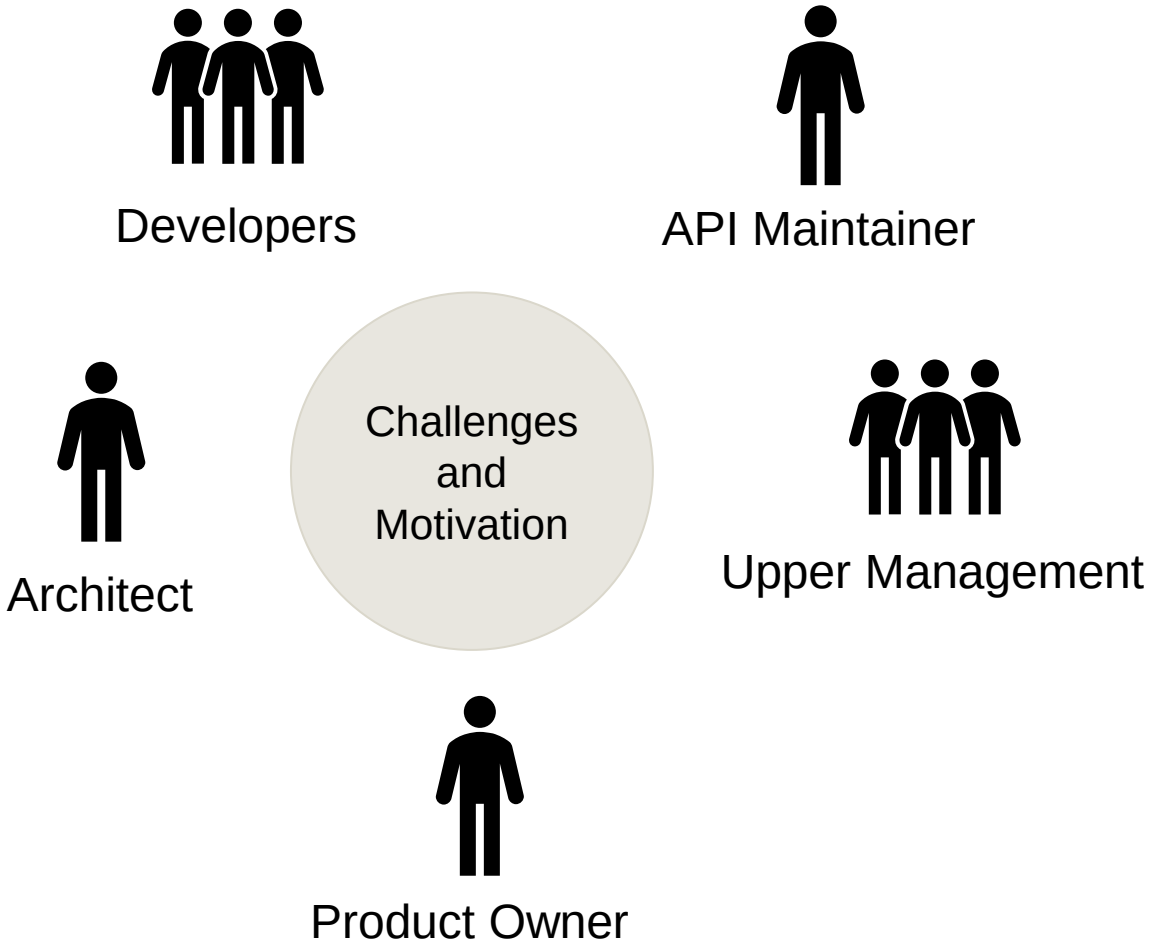
- APIs – sources of strategic value in today's digital economy
- Companies have different policies about API development

  → Amazon obligates employees to open systems via APIs

- What are the best applicable incentives?

Problem Statement

For large organizations the different roles have to be incentivized separately depending on the project



Research Questions and Approach

What are the challenges for providing partner APIs in internal solutions?

What are existing incentive mechanisms motivating teams to provide partner APIs?

What incentive mechanism/mix of incentive mechanisms can be applied within the context of Siemens AG?

How could a process for incentivizing teams to provide partner APIs look like?

→ Literature review
→ Expert interviews in two rounds
→ Concept of process and process requirements

Literature Review

Initial approach:

Search queries: “Incentive API”, “Incentive API development”, “Incentive API management”

→ No publications about incentives for API development and maintenance specifically

Researching challenges

based on: “API challenges” and “API management challenges”

Researching existing incentives

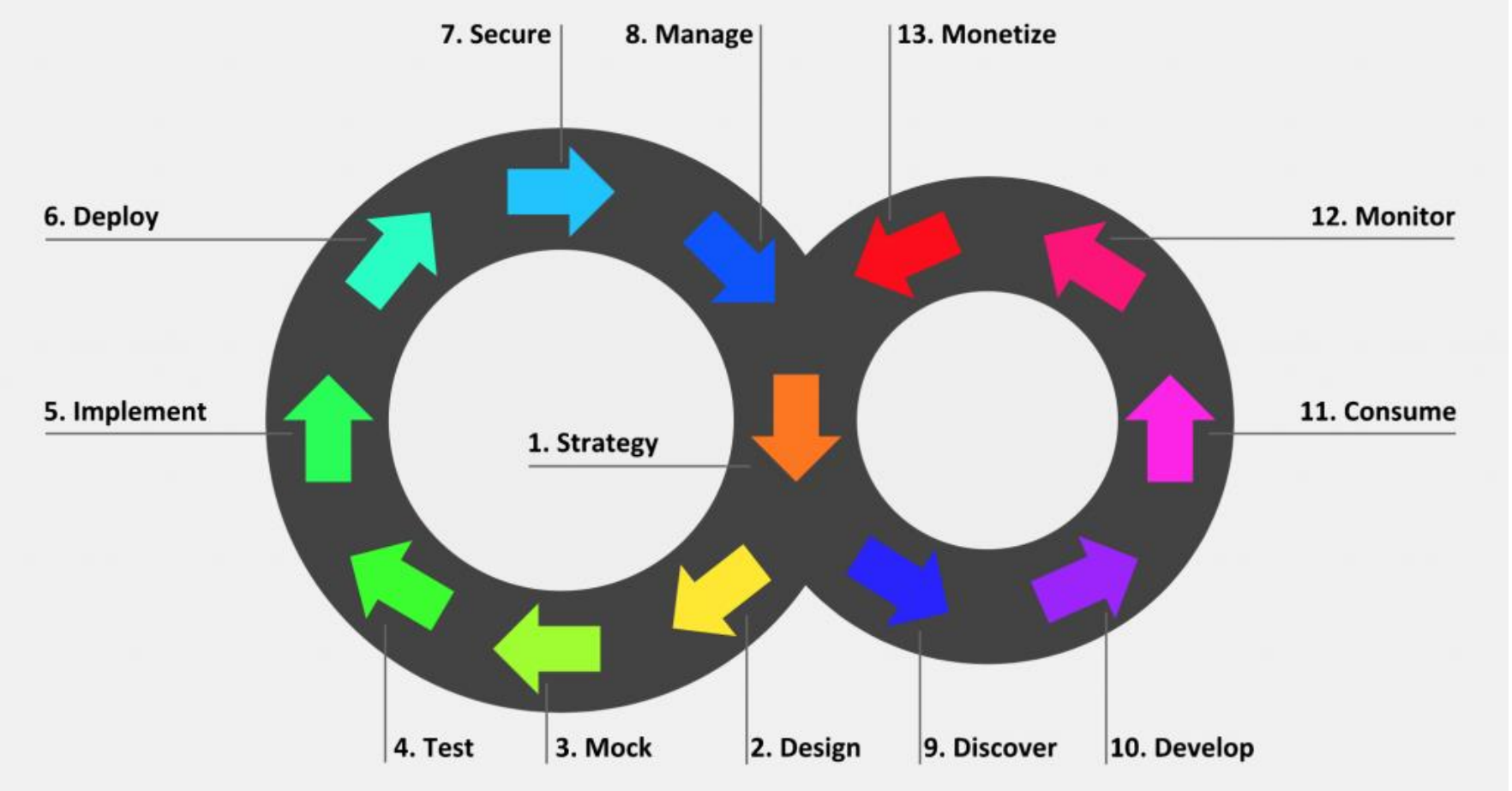
→ Incentives from other areas such as:

- Software Process Improvement
- Developer ecosystems
- Open Source Software
- Service Oriented Architecture

Source: https://twitter.com/ieeexplore
https://www.hs-augsburg.de/Bibliothek/ScienceDirect.html
https://de.wikipedia.org/wiki/Datei:Google_Scholar_logo.svg

API Lifecycle management

- Two-fold cycle – displays both producer and consumer activities
- Contains key steps such as strategy and management
- Detailed view of the API lifecycle



Source: https://developers.redhat.com/blog/2019/02/25/full-api-lifecycle-management-a-primer/

Challenges

	Strategy	Design	Mock	Test	Implement	Deploy	Secure	Manage	Discover	Develop	Consume	Monitor	Monetize
Web API Management Meets the Internet of Things [2]						Publishing details of the APIs, documentation, SDKs		Metadata publishing, access control and key management	Developer portals		Throttling	Monitoring usage control	Monetization of interactions
Continuous API Design for Software Ecosystems [3]	Plan and carry out API ecosystemability assessment; API value-chain: continuous flow of value delivery	Designing and implementing APIs that satisfy the ecosystemability need;						Continuous API evolution		API quality and usability: allow application developers to achieve expected results in an efficient fashion			
API designers in the field: Design practices and challenges for creating usable APIs [4]	Lack of dedicated API designers; Lack of training resources; responsible for API design	Discern valuable use cases; No previous knowledge of API design; Guidelines not good enough to define the whole development process; Lack of consistency in the design; Hand to obtain good abstraction	Getting peer reviews	Obtain early feedback from customers	No obvious design best practices (e.g. for pagination)	Automatic generation of SDKs and documentation - not tunable enough		Change in the API is hard due to existing dependent software	Writing proper documentation to increase discoverability	Usability - APIs are not well designed and therefore have usability problems		Gather feedback and intrepret it	
Continuous API Management [18]								From “an API” to an ecosystem: Enterprise Architecture group cannot keep up with all projects					
API management challenges in ecosystems [17]	Lack of developers' education; Lack of continous education	Difficulties to design a good deprecation process						Different innovatio speed; management of dependencies					
Interview 1	Developers are not seen as dedicated customer segment	Developing APIs of good quality; defining guidelines to provide good APIs				No common cloud solution in the organization		Lack of centralized gateway					
Interview 2	Identification existing APIs in an organization; lack of approval from upper management							Lengthy process that varies for each API					
Interview 3	Having an API responsible												
Interview 4	Defining the business values of the API before design and implementation												
Who is affected?	Platform provider; Architect; API responsible person	Architect; Developer	Architect; Developer	Architect; Developer	Developer	Developer		Maintainer; Architect	Developers	Architect; Developer	Maintainer	Maintainer	Product Owner

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Incentive mechanisms

	Project management	Recognition	Technical	Self-development	Monetary
Motivators of Software Process Improvement: An analysis of practitioners' views [7]	Visible success; meeting targets; bottom-up initiatives and top-down commitment	Recognition by senior management; empowerement; process ownership	Resources		
Building a developer ecosystem: What vendors do to attract you to their platforms [8]	Help with marketing; creating awareness; existing successful stories; crowdsource approach;	Free t-shirts; coffee mugs; challenges with prizes; badges;	Easy software integration into platform; sample code; quality tech support;	Developer programs available on premise; free downloads for self-development; community and collaboration	
Incentives for Developers' Contributions and Product Performance Metrics in Open Source Development: An Empirical Exploration [9]		Receiving gratitude - from peers or management; ownership culture;		Exchainging knowledge; creating new forms of cooperation	Job prospects, promotions, salary increases
If Open Source Code Is a Public Good, Why Does Private Provision Work(Or Does It)? [10]	Success stories; promise of successful work				
To strengthen security, change developers' incentives [11]			Guidelines		
The future of enterprise computing [16]	Innovation; shift mindset towards IT value				
Interview 1	Top-down commitment; developers seen as customers		Sand-box for developers; centralized gateway		
Interview 2	Customer value of API				
Interview 3	Transparency; understanding the business value				
Interview 4	Understand where the API is within a value chain				

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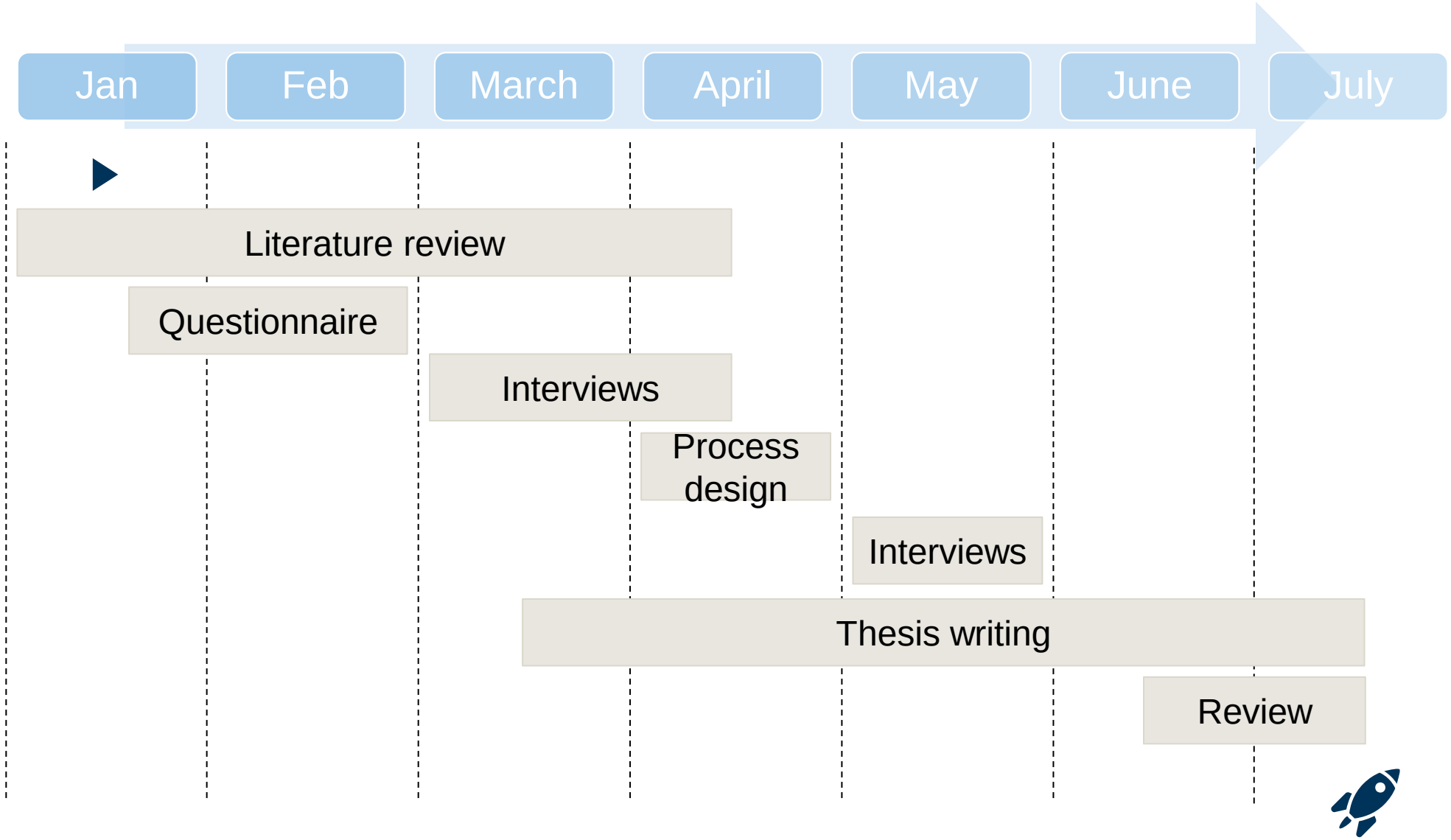
Next steps

1. Identify challenges and existing or potential incentive mechanisms based on **interviews**
    - Interview people from **several departments** at Siemens AG
    - Interview people with **different roles** in the organization
2. Design a strategy for incentivizing teams based on the analysis of first round of interviews
3. Evaluate the process based on second round of interviews

Timeline



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