

# DIRECTIONS IN AGILE SOFTWARE DEVELOPMENT

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# Agile Software Development

- Used by Everyone. Everywhere.
- Iterative, incremental, Small self-organising teams, close customer collaboration, focus on working code
- We run HackCamp
  - Agile student projects (~150 students ~25 teams)
  - Clear academic calendar for 10 days
  - 2022, 13 commercial partners
    - Scottish Power, AJ Bell, Rolls-Royce SMR, etc.





# Agile Project Failure

- UK National Health Service
  - Free healthcare at point of delivery
  - Much loved institution in UK
- 2004 National Programme for IT (NPfIT)
- World's largest non-military IT project
- Accenture global leader on project delivery
- 2006 Accenture quit NHS technology overhaul

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# "System of Record" Migration

- UK's Trustee Savings Bank (TSB) experienced a massive IT migration failure
- TSB rented transaction handling from Lloyd Bank
- 2015, TSB's tech firm SABIS tasked with migration to parent Spanish bank Sabadell's Proteo banking platform
- 2018, Proteo goes live for TSB customers; Facebook post show team popping champagne
- 2 million customers locked out of their accounts;
- investigation by UK Financial Regulator; TSB appears before Parliamentary Committee
- 2020, the bank's CEO resigned



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# “Monumental” Data Breach

- Police Service of Northern Ireland
  - Exposed the names and rank of every serving police officer
  - Published online details of more than 10,000 officers and employees
  - Early August 2023
- A spreadsheet was mistakenly published online
- UK Information Commissioner’s Office (ICO) has launched an investigation
- Republican paramilitaries (who have, in the past, claimed responsibility for murdering police officers) have obtained the leaked data



# Outline

- Agile Tailoring
  - Non-functional requirements
  - Security
- Large-scale Agile
  - Product Owner Role
  - Artefacts
  - Architectural alignment

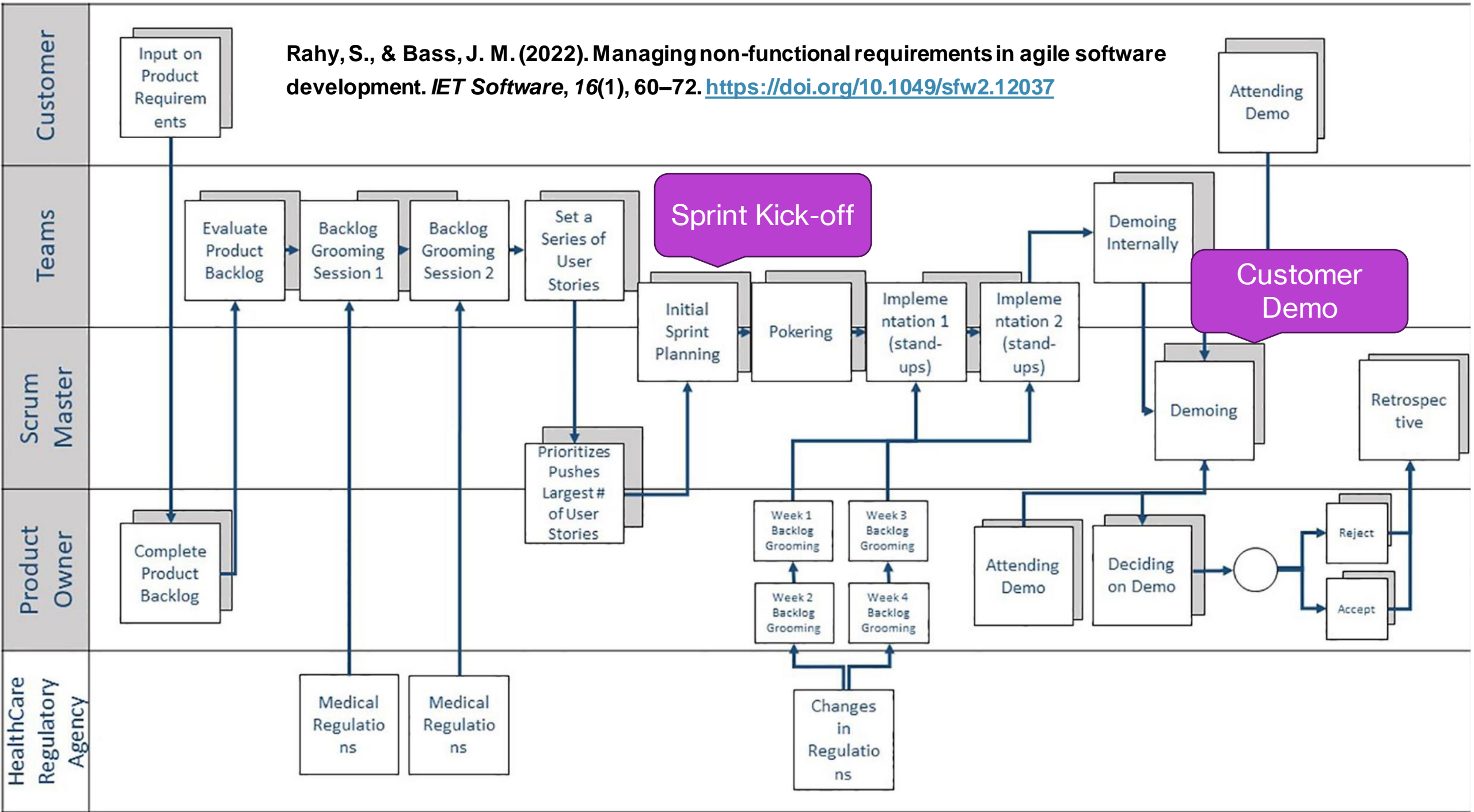


# Agile Tailoring

- Adapting agile to specific contexts
- Roles, artefacts and ceremonies
  - Secure Agile, Artefacts but no ceremonies
  - DevOps, Artefacts but no ceremonies



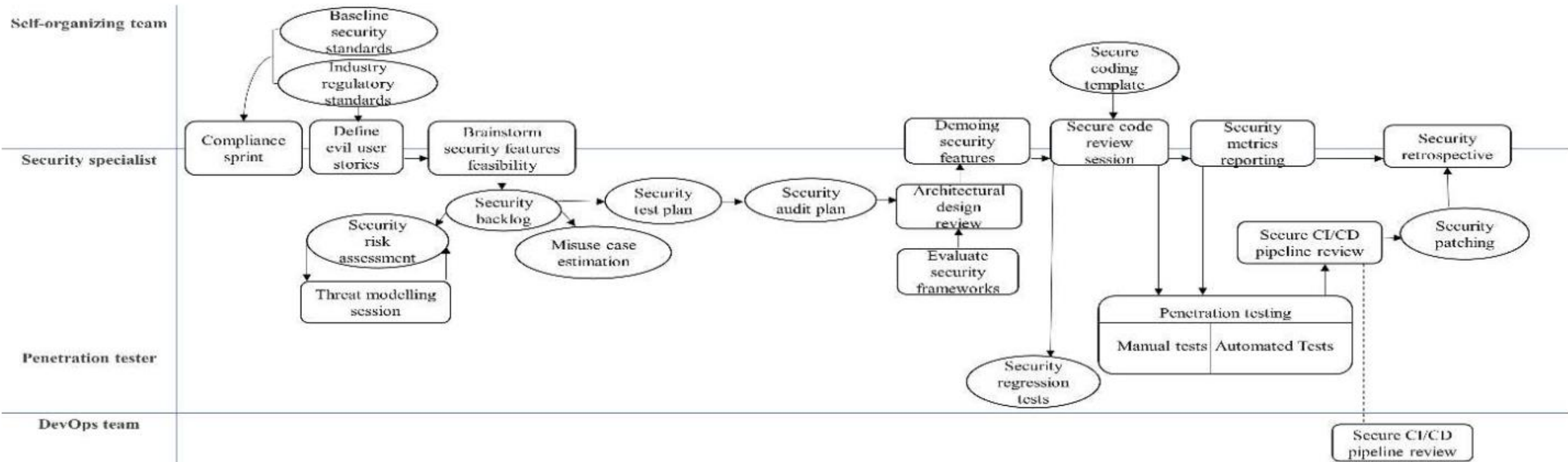
Rahy, S., & Bass, J. M. (2022). Managing non-functional requirements in agile software development. *IET Software*, 16(1), 60–72. <https://doi.org/10.1049/sfw2.12037>





# SECURE AGILE DEVELOPMENT

Ardo, A. A., Bass, J. M., & Gaber, T. (2022). Towards Secure Agile Software Development Process: A Practice-Based Model. *2022 48th Euromicro Conference on Software Engineering and Advanced Applications (SEAA)*, 149–156. <https://doi.org/10.1109/SEAA56994.2022.00031>



# Taxonomy of DevOps in Practice

	Cloud	Hybrid Cloud
Senior Developers	<b>Outsourced Ops</b> <ul style="list-style-type: none"><li>• Application, CI/CD pipeline and infrastructure deployed and managed by developers</li></ul>	<b>Ops</b> <ul style="list-style-type: none"><li>• Application, CI/CD pipeline and cloud infrastructure deployed and managed by developers.</li><li>• Physical infrastructure managed by Ops</li></ul>
DevOps Team	<b>DevOps</b> <ul style="list-style-type: none"><li>• Application, CI/CD pipeline and infrastructure deployed and managed by DevOps teams.</li></ul>	<b>DevOps bridge</b> <ul style="list-style-type: none"><li>• Application deployed and managed by developers.</li><li>• CI/CD pipeline and cloud infrastructure deployed and managed by DevOps teams.</li><li>• Physical infrastructure managed by Ops</li></ul>
<b>AUTOMATION</b>		

Macarthy, R. W., & Bass, J. M. (2020). An Empirical Taxonomy of DevOps in Practice. *2020 46th Euromicro Conference on Software Engineering and Advanced Applications (SEAA)*, 221–228.

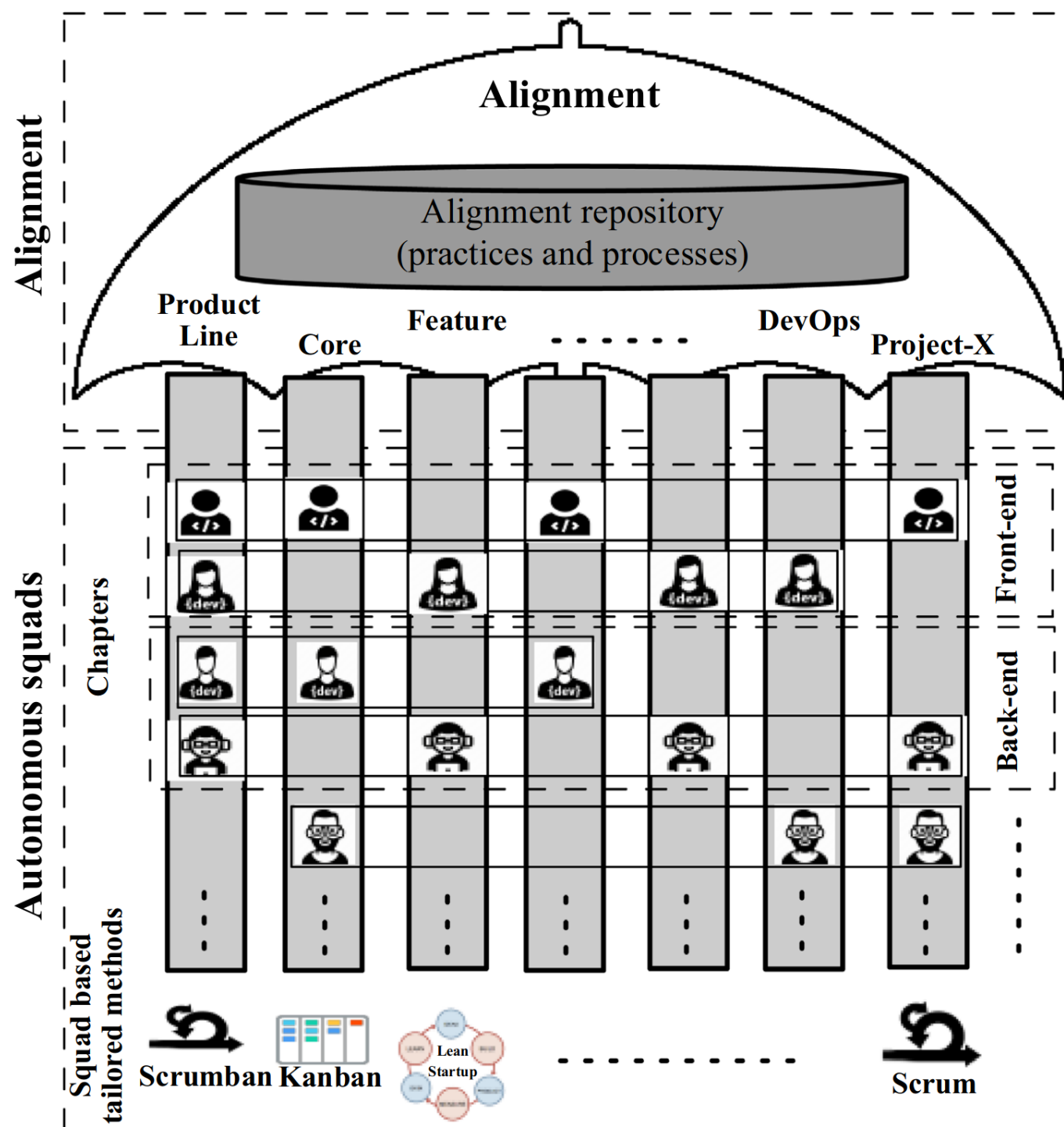
# Large-scale Agile

- Product Ownership becomes a team sport
  - Product sponsor
  - Technical Architect
  - Proxy product owner
  - Bass, J. M. (2015). How product owner teams scale agile methods to large distributed enterprises. *Empirical Software Engineering*, 20(6), 1525–1557.  
<https://doi.org/10.1007/s10664-014-9322-z>
  - Bass, J. M., & Haxby, A. (2019). Tailoring Product Ownership in Large-Scale Agile Projects: Managing Scale, Distance, and Governance. *IEEE Software*, 36(2), 58–63.  
<https://doi.org/10.1109/MS.2018.2885524>

- Large-scale Agile Artefacts
  - Expanded range of artefacts compared with small scale projects
  - Risk register – every increment
  - Test Strategy
  - Product Roadmaps
    - Bass, J. M. (2016). Artefacts and agile method tailoring in large-scale offshore software development programmes. *Information and Software Technology*, 75, 1–16.  
<https://doi.org/10.1016/j.infsof.2016.03.001>

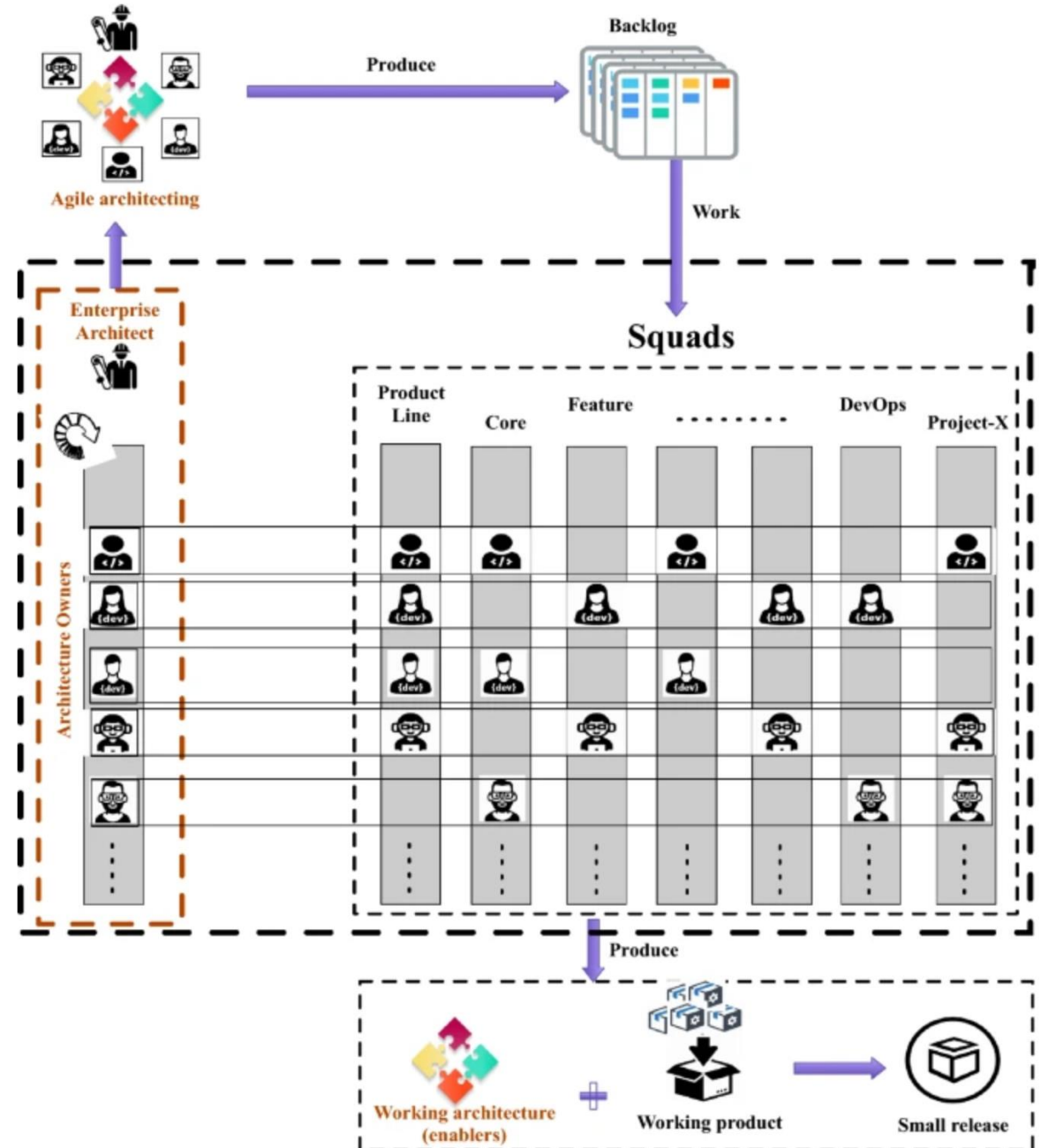
# Spotify model

- Squads, Tribes and Chapters
- Matrix management
  - Squad autonomy
  - Alignment to product strategy
- "Grow your own" not follow and "agile transformation" plan
  - Spotify vs. SAFe



# Architecture for Squad Alignment

- Salameh, A., & Bass, J. M. (2021). An architecture governance approach for Agile development by tailoring the Spotify model. *AI & SOCIETY*.  
<https://doi.org/10.1007/s00146-021-01240-x>



# Build Source Code Static Analysis Tools

- Goal to measure code technical debt density in near real-time
- Integrates with Version Control Repositories
- Dashboard provides (comparative) feedback on source code quality
- Working with
  - Competa B.V., The Hague, Netherlands
  - OpenBaraza, Kenya
    - Supporting open-source framework
    - Source code quality enhancement



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[www.redocelot.com](http://www.redocelot.com)

# Agile Software Engineering Skills

Undergraduate and early career practitioner text book. 2023 XXV, 317 p.

- Part I – People
- Part II – Product
- Part III – Process
- Part IV – Advanced Skills
- <https://link.springer.com/book/10.1007/978-3-031-05469-3>



# Conclusions

- Despite all our hard work, IT is still rather rudimentary
- Agile project failures are still project failures
- Software "craftsmanship" influential
  - Martin, R. (2008). *Clean Code: A Handbook of Agile Software Craftsmanship*. Prentice Hall.
  - Mancuso, S. (2014). *The Software Craftsman: Professionalism, Pragmatism, Pride*. Pearson.
- Yet, Craftsmanship too bespoke (suggests hand-made, home-made, crafted)
- "Toolmakers" not Craftsmen
  - Tool-and-die work that is done in support of the manufacturing
  - Make tooling used to produce software products
  - Focus on precision
  - Work as part of an agile manufacturing engineering team
- We need more sophisticated tailored agile and lean processes
  - Improved collaboration around artefacts
- Goal: repeatable quality built-in