

Creating Communities of Practice

Authors: John Noll¹ & Sarah Beecham²

Lero Technical Report: TR_2019_03
30 September, 2019

¹John Noll,
Senior Lecturer
University of Hertfordshire
Hatfield, Herts
UK

²Sarah Beecham
Senior Research Fellow
Lero – The Irish Software Research Centre
University of Limerick
Ireland

Document prepared in support of the Ocuco-Lero Project
(SOW2017-015E1)

WP2: Lean-Agile Global Software Development Quality Management

Creating Communities of Practice

John Noll and Sarah Beecham

September 25, 2019

Executive Summary

Communities of Practice (CoPs) are cross-organizational groups of people who share interest in a particular domain, and engage in joint action to develop solutions to problems in their domain of interest. Figure 1 is one example of the high level components that underpin CoPs according to SAFe (Scaled Agile Inc. 2018).

CoPs evolve from a small set of core members, and may eventually become formal organizational units in their own right, or die out naturally as their purpose fades.

Creating a CoP involves some key steps:

1. Identify a topic with concrete benefits to participants and the organization (Paasivaara and Lassenius 2014). This implies there is a sponsor (either a manager or business unit) with a stake in the topic.
2. Find or appoint a *founder* who creates the CoP and recruits initial members (Gongla and Rizzuto 2001). Ideally, these should be members of an existing informal network.
3. Provide basic tool support for communication among community members, and archiving the knowledge created by the community. Initially this can be a simple mailing list with archiving and searching capability, possibly supported by a wiki for archiving larger documents (Paasivaara and Lassenius 2014; Gongla and Rizzuto 2001; Zagalsky et al. 2016).
4. Exercise *patience*. “Because they are organic, communities of practice need time to find the right kind of information to share, the right level of detail, the right participants and the right forums” (R. McDermott 1999).



Figure 1: Three components of a Community of Practice (Scaled Agile Inc. 2018)

What is a community of practice?

Communities of practice (CoPs) are defined as “groups of people informally bound together by shared expertise and passion for a joint enterprise” (E. C. Wenger and Snyder 2000), “institutionalized, informal networks of professionals managing domains of knowledge” (Gongla and Rizzuto 2001); in other words, “a group of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis” (E. Wenger, McDermott, and Snyder 2002).

CoPs have three characteristics: a domain, a community, and a practice (Paasivaara and Lassenius 2014). “The *Domain* defines the area of interest in which the members collaborate, share and create knowledge” (Paasivaara and Lassenius 2014). The *Community* comprises members actively engaging in joint activities, forming relationships with each other, and sharing information. The *Practice* is when members develop a shared set of resources for addressing problems in their domain of interest (Paasivaara and Lassenius 2014).

Communities of Practice are not teams or other formal organizational units; rather they have more global scope, focus on a domain of knowledge rather than a product, and are sponsored by an executive or business unit with a need for knowledge management and sharing (Gongla and Rizzuto 2001).

CoPs have both long term and short term benefits; for the organization, CoPs help to drive strategy, start new lines of business, provide an arena for problem solving, transfer of best practices, and development of professional skills, and retain talent. For members, they can help with challenges, the ability to contribute to one’s team, and promote enhanced professional reputation, a stronger

sense of professional identity, and *fun*.

In software engineering, CoPs can help with functional learning, knowledge sharing between organizationally separate individuals with similar roles (Paasivaara and Lassenius 2014), such as QA, product owners, or scrum masters. CoPs can also help solve inter-team issues, and adapting agile in the large, such as was the case for Nokia (Paasivaara and Lassenius 2014).

Examples of Communities of Practice include (Paasivaara and Lassenius 2014; Rus, Lindvall, and Sinha 2002):

- Coaching CoPs, for knowledge sharing and learning, and organizational development.
- Feature CoPs, focusing on specific product features that require input from multiple teams;
- Feature Coordination CoPs, for coordination between teams working in the same product area;
- Feature Design Cops, focusing on technical product design;
- Developer CoPs, focusing on software craftsmanship and tools;
- Ad-hoc CoPs, used for single or a series of ad-hoc meetings to solve a common problem. After the problem is solved, the CoP is dissolved.
- End-to-end CoPs aimed at improving product development flow through the organization;
- Software Program Managers Network;
- Software Experience Consortium;
- Sun's community for Java programmers;
- Software Process Improvement Network;
- Special interest groups of the IEEE and ACM.

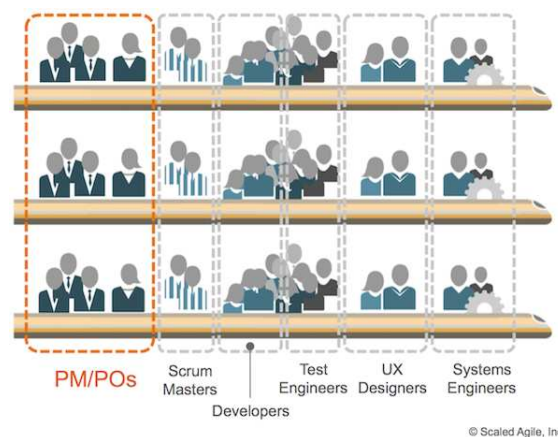


Figure 2: Role-oriented CoP (Scaled Agile Inc. 2018)

Figure 2 shows CoPs based on roles, which represent groups of people with similar responsibilities and demands, who meet to share experiences, issues and solutions. In the list of example CoPs this would include Developer CoPs (and more specifically Java Programmers), and Software Program Manager CoPs.

Features of Successful Communities of Practice

Successful CoPs exist in a supportive organizational context. They have certain features, including:



Figure 3: CoP levels of participation (Scaled Agile Inc. 2018)

Figure 3 shows CoP levels of participation and how individual members fit into the community. According to SAFe, members can move between levels of participation, depending on their current need and expertise (Scaled Agile Inc. 2018).

1. Members with specific roles:
 1. A *founder* who serves as the initial instigator of the CoP, and recruits initial members (Gongla and Rizzuto 2001). Ideally this is a passionate leader with decision making authority over issues concerning the CoP (Paasivaara and Lassenius 2014).
 2. A *sponsor* who provides management support (Gongla_2001_Evolving; Paasivaara and Lassenius (2014)).
 3. A *community coordinator* who helps potential members find a common ground, see the value of connecting, sharing knowledge and solving problems together (Paasivaara and Lassenius 2014).
 4. *Active* members, who actively participate in discussions and knowledge creation (Paasivaara and Lassenius 2014).

5. *Peripheral* members, who occasionally or passively participate (Paasivaara and Lassenius 2014).
2. An interesting topic with concrete benefits to participants and a proper agenda valued by the organization (Paasivaara and Lassenius 2014). “The organization actively seeks out people to form the knowledge network community and purposefully creates introductions and potential connections among them. The organization may even create a ‘matchmaking’ responsibility to help locate and link individuals (Gongla and Rizzuto 2001).”

Figure 4 illustrates topic based CoPs where the topic attracts different roles; anyone with an interest in the topic can join these CoPs.

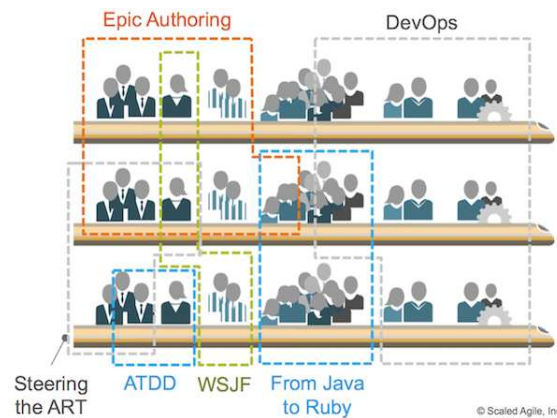


Figure 4: Topic-oriented CoP (Scaled Agile Inc. 2018)

3. Openness of participation, across sites (Paasivaara and Lassenius 2014).
4. Supporting tools to create transparency (Paasivaara and Lassenius 2014) and manage the knowledge produced by the CoP (Gongla and Rizzuto 2001).
5. Managers’ and coaches’ support in building the CoP. Strong Management support is needed as well as time and patience. Initially people in the organization may not understand why they should partake in the CoP meetings, and what the meetings are supposed to accomplish (Paasivaara and Lassenius 2014).

Creating a Community of Practice

Successful CoPs build communities around a few important topics. “Focusing on strategically important topics will make it considerably easier to expand beyond the original communities” (R. McDermott 1999). They should build on natural networks. “Once you have identified an important topic to form communities around, find the networks of people who already share knowledge about that topic” (R. McDermott 1999).

A CoP requires community coordinators and core groups. The coordinator “is usually a well-respected, and well-connected community member” (R. McDermott 1999). But the CoP should invite different levels of participation (allow for different activity levels and motivations of participant (e.g. coordinators, core, active and peripheral members, as well as external interest groups) (E. Wenger, McDermott, and Snyder 2002). This requires both public and private community spaces, and support for formal meetings and one-to-one networking (E. Wenger, McDermott, and Snyder 2002).

The coordinators should combine familiarity and excitement by having a routine program, but also including novel experiences, such as invited speakers.

Initially, the CoP should have simple knowledge sharing activities. “Rather than explaining or extensively designing communities of practice, engage people in participating in them by starting a few in your organization” (R. McDermott 1999).

Successful CoPs require management support: “. . . managers need to give people the time and encouragement to reflect, share ideas with other teams and think through the implications of other teams’ ideas” (R. McDermott 1999). This also includes technical support for the CoP infrastructure. “Form a team to find, practice and use . . . [community] development tools” (R. McDermott 1999).

CoPs should focus on value: encourage members to be explicit about the value to the community, but let value emerge, don’t try to design it by force (E. Wenger, McDermott, and Snyder 2002).

Management needs to be patient. “Because they are organic, communities of practice need time to find the right kind of information to share, the right level of detail, the right participants and the right forums” (R. McDermott 1999).

Community of Practice Lifecycle

As shown in Figure 5, there is a natural beginning and end to successful CoPs. However, some CoPs, for example ad hoc CoPs formed to address a specific problem, may go through the entire lifecycle very quickly - in a few meetings.

CoPs grow, evolve and die according to their individual needs, with the literature identifying five phases: potential, committing, or unrecognized; coalescing, starting-up, or “bootlegged” (E. Wenger 1999); legitimized, operating, and maturing; supported through stewardship, possibly winding down; and institutionalized through transformation or shutting down (E. Wenger 1999; Paasivaara and Lassenius 2014; Scaled Agile Inc. 2018):

At the **Potential** stage there is no community yet, just a set of interested people who start networking around a topic of joint interest. These may be a group of experts selected by the sponsoring manager or business unit to form a community to transform their collective expertise into value for the larger organization (Gongla and Rizzuto 2001). During this stage, they need to network and evolve into a real community of practice by finding enough common ground among members to help them see the value of connecting, sharing knowledge and solving problems together.

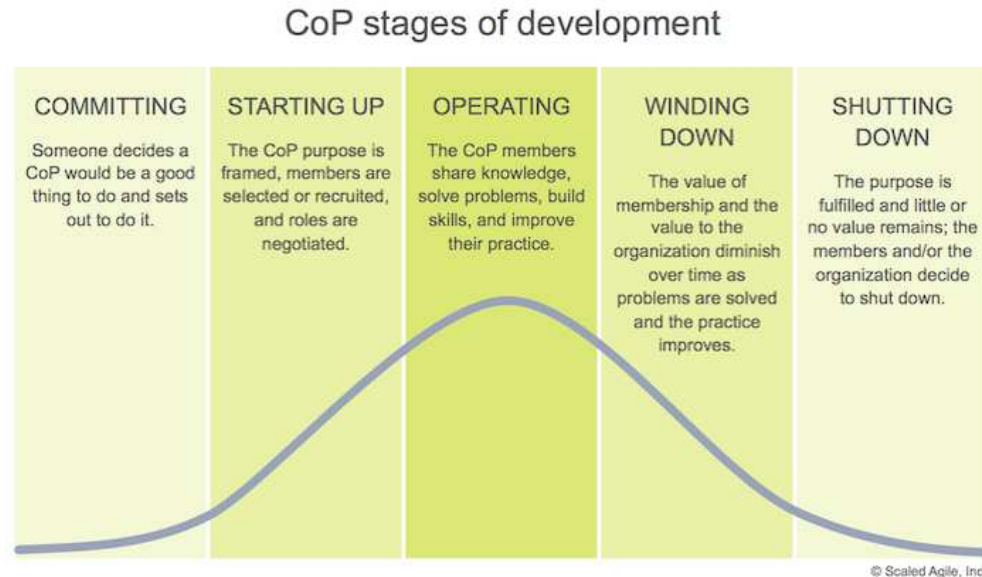


Figure 5: CoP lifecycle according to SAFe (Scaled Agile Inc. 2018)

At the **Coalescing** stage, the community knows what exists in the organization with respect to its domain, the community is officially launched, and community events are arranged.

In the **Maturing** stage, the community has delivered immediate value, proved its worth, and so the focus shifts to clarifying the focus, role and boundaries of the CoP.

During the **Stewardship** stage, the CoP maintains momentum and tries to keep the CoP going.

At the **Transformation** stage, the CoP ceases to exist, fades away or turns into another structure such as a social club, or becomes institutionalized, e.g. as a department.

Mechanisms and infrastructure for CoPs

Figure 6 showing the infrastructure according to IBM (Rader and McDonald 2008) is just one example of the different support mechanisms offered to CoPs.

It is not necessarily an exhaustive list (e.g. there seem to be asynchronous communication channels missing).

Knowledge created by CoPs includes a wide range of topics:

1. “Core competencies (such as enterprise systems management, application development, testing methods and practices, product platform, and organization change” (Gongla and Rizzuto 2001).
2. “‘Go to market’ competencies (such as e-business, package integration, total systems



Figure 6: CoP Infrastructure as envisioned at Rational (Rader and McDonald 2008)

management, mergers and acquisitions, and knowledge management)” (Gongla and Rizzuto 2001).

3. Competencies related to a specific industry sector (Gongla and Rizzuto 2001).
4. Answers to questions about how to do something, including examples, hints, and discussions about alternative approaches (Zagalsky et al. 2016).

This requires tool support, for both creation, exchange, and management.

Tools for communication and knowledge exchange

Communication tools for CoPs support three kinds of interaction

1. One-to-one conversations, for example between a team member and a domain expert. These are supported by email, chat, and on-line directories and expert and community ‘yellow pages’ or locators (Gongla and Rizzuto 2001).
2. One-to-many exchanges, where community or team members can pose questions or requests for assistance to the community as a whole.

These are supported by on-line forums (Gongla and Rizzuto 2001), such as Stack Overflow or Stack Overflow for teams (Miller 2018). Forums are most appropriate for answers to questions about how to do something (Zagalsky et al. 2016). “Stack Overflow’s competitive environment creates an incentive to be the first to answer rather than improve other answers and participate in discussions” (Zagalsky et al. 2016).

3. Group discussions (many-to-many exchanges), where the community explores alternative solutions, exchanges experiences, and shares best practices.

Mailing lists are appropriate for ad-hoc, informal discussions, and enables elaboration of solutions, examples, hints, and alternatives (Zagalsky et al. 2016).

Phone calls and teleconferences (Gongla and Rizzuto 2001), and electronic meetings and team work rooms (Gongla and Rizzuto 2001), provide support for more formal exchanges

Tools for curating and archiving

Mailing lists and forums are primarily communication tools, but their persistent nature means they are useful for archiving knowledge produced as a side effect of interactions.

Mailing list knowledge has a natural structure based on the metadata (subject, date, and sender) (Zagalsky et al. 2016), which mailing list tools provide support for searching.

Forums provide more support for knowledge curation (Zagalsky et al. 2016), including the ability to “tag” questions and answers according to topic (Miller 2018).

Common repositories (Gongla and Rizzuto 2001), such as Confluence or wikis, provide a means for organizing and archiving larger documents (Gongla and Rizzuto 2001).

Anti-patterns

Some “anti-patterns” were mentioned by Gongla and Rizzuto in their study of “knowledge networks” at IBM (Gongla and Rizzuto 2001):

1. “Too much technology, not enough process or people”.
2. Failure to create processes to integrate new members.
3. Process relies too heavily on core group, especially for knowledge curation.

Adding to the above list, Wasko and Faraj (2000) in their investigation of public communities of practice, warn of several inhibitors to people joining and participating in CoPs, and give reasons for why people leave the community early or only participate occasionally, to include:

4. Discomfort with their own level of expertise (exposing a weakness, and inability to give advice).
5. Reluctance to help people who haven’t tried to at least first help themselves (do not want to do other people’s work for them; ‘rtfm’ mode).
6. Disruptive big egos (whose primary objective doesn’t appear to be for the general good, but to show off and try to better other people’s answers - one-upmanship).
7. Perceived ‘personal attacks’.
8. Time consuming.
9. Size - when communities become very large, filtering out valuable information becomes difficult.

References

- Gongla, Patricia, and Christine R. Rizzuto. 2001. “Evolving Communities of Practice: IBM Global Services Experience.” *IBM Systems Journal* 40 (4). IBM: 842–62.
- McDermott, Richard. 1999. “Learning Across Teams.” *Knowledge Management Review* 8 (3): 32–36.
- Miller, Alex. 2018. “Stack Overflow for Teams Is Now Available.” Web log (blog) post, accessed 2 August 2018. <https://stackoverflow.blog/2018/05/03/stack-overflow-for-teams-is-now-available/>.
- Paasivaara, Maria, and Casper Lassenius. 2014. “Communities of Practice in a Large Distributed Agile Software Development Organization—Case Ericsson.” *Information and Software Technology* 56 (12). Elsevier: 1556–77.
- Rader, Darrel, and John McDonald. 2008. “The Rational Approach to Technical Enablement.” IBM DeveloperWorks series white paper. IBM. https://www.ibm.com/developerworks/rational/library/edge/08/oct08/rader_mcdonald/rader_mcdonald-pdf.pdf.

- Rus, Ioana, Mikael Lindvall, and S Sinha. 2002. "Knowledge Management in Software Engineering." *IEEE Software* 19 (3): 26–38.
- Scaled Agile Inc. 2018. "Communities of Practice." WWW page, accessed 2 August 2018. <https://www.scaledagileframework.com/communities-of-practice/>.
- Wasko, M. McLure, and Samer Faraj. 2000. "'It Is What One Does': Why People Participate and Help Others in Electronic Communities of Practice." *The Journal of Strategic Information Systems* 9 (2-3). Elsevier: 155–73.
- Wenger, Etienne. 1999. *Communities of Practice: Learning, Meaning, and Identity*. Cambridge University Press.
- Wenger, Etienne C., and William M. Snyder. 2000. "Communities of Practice: The Organizational Frontier." *Harvard Business Review* 78 (1): 139–46.
- Wenger, Etienne, Richard Arnold McDermott, and William Snyder. 2002. *Cultivating Communities of Practice: A Guide to Managing Knowledge*. Harvard Business Press.
- Zagalsky, Alexey, Carlos Gómez Teshima, Daniel M German, Margaret-Anne Storey, and Germán Poo-Caamaño. 2016. "How the R Community Creates and Curates Knowledge: A Comparative Study of Stack Overflow and Mailing Lists." In *Proceedings of the 13th International Conference on Mining Software Repositories*, 441–51. ACM.