

# **Virtual communities of practice: A study of communication, community and organisational learning**

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## **Abstract**

Communities of practice are recognised as important to the social fabric of knowledge (Wenger, 2004), and are described as social structures which enable knowledge to be managed by practitioners. According to Wenger (2004), members of these groups share a passion for something they know how to do, and they regularly interact for the purpose of improving their discipline. More recently in the literature there has emerged the notion of virtual communities of practice, where members make use of information and communication technologies to share stories, knowledge and communications. The emergence of virtual communities of practice in an organisational setting raises some issues for the ways communication and learning at work occurs.

Little is known about the application of communities of practice theory in the virtual domain, especially in relation to these issues. This paper explores the communication and learning experiences of member of virtual communities of practice by drawing on qualitative data from a study of multiple worksites. The findings identify some barriers to sustaining communities of practice in a virtual context, and the issues which exist when organisations intentionally create these communities for specific organisational purposes. These issues include: ways in which the virtual community of practice is created or emerges, cultural diversity within the community and experience of new members in the community.

**Keywords:** Virtual communities of practice, knowledge management, learning

## **Introduction**

The notion of learning as a key to an organisation's success has enjoyed many years of attention in the literature (Pfeffer & Sutton, 2000; Davenport & Prusak, 1997). For organisations operating in today's digital era, learning retains its prominence, but the ways learning occurs and is managed challenges traditional organisational models (Dubé, Bourhis & Jacob, 2005; Loebbecke & Wareham, 2003).

One theory of managing knowledge is 'Communities of Practice' (Lave & Wenger, 1991). Communities of practice are recognised as important to the social fabric of knowledge (Wenger, 2004), and are described as social structures which enable knowledge to be managed by practitioners. According to Wenger (2004), members of these groups share a passion for something they know how to do, and they regularly interact for the purpose of improving their discipline. More recently the notion of virtual communities of practice has emerged in the literature (Ardichvili, Maurer, Li, Wentling & Stuedemann, 2006; Dubé et al, 2005; Hall & Graham, 2004; Kimble & Hildreth, 2005), where members mainly use information and communication technologies (ICT) to share stories, knowledge and communications.

The emergence of virtual communities of practice in an organisational setting raises some issues for the ways learning at work occurs. As Cramton (2001)

suggests, mutual knowledge and comprehension, both requisite for effective communication, are more demanding the virtual context. Hence there is the need to explore the application of communities of practice theory in the virtual domain, particularly in relation to the learning and community experiences of members. The research question framed to address this need is: 'What are the issues associated with sustaining virtual communities of practice, and how do they influence the communication between community members?' This is achieved through an exploration of three teams developing software in the virtual domain. These teams were selected based on Wenger's (2004) criteria for communities of practice, their comparable size, complexity, high reliance on internal communication and use of ICTs. The groups in our study may be described as virtual communities of practice which have been intentionally created to achieve organisational goals with a view to long-term learning.

This paper firstly provides a background of communities of practice and the more recent virtual communities of practice. An account of the themes uncovered from an analysis of three case studies follows, identifying some issues which influence communication and learning in virtual communities of practice and the difficulties in sustaining these communities in the longer term.

### **Communities of Practice and Virtual Communities of Practice**

Previous research suggests that learning at work constitutes a significant part of the learning by adults during their lives (Boud & Middleton, 2003; Boud, 1999). Boud (1999) contends that informal interaction with peers is a predominant means of learning in the workplace. In contrast, the impact of formal learning can be minimal. Much of this informal learning is undertaken in groups and is prompted by, and in turn contributes to, shared organisational discourses. These discourses contribute to both the identity of the group and its organisational members, and help them to give meaning to their work, thereby enabling them to develop and improve their discipline. It is important to employ theoretical constructs which explore and expose informal learning. One way to do this is through Lave and Wenger's (1991) concept of communities of practice.

Communities of practice are groups of people who informally share, develop and diffuse learning, knowledge and practice (Lave & Wenger, 1991). Kimble and Hildreth (2005) define a community of practice as people 'bound together by a common purpose and an internal motivation' (p.103). Central to communities of practice theory is the notion that more experienced members (or those with expertise) will share freely their knowledge with less experienced members (apprentices) through social interactions (Ardichvili et al, 2006; Lave & Wenger, 1991). New members are attracted to the group in which they recognise common knowledge, energy and a commitment to shared understandings and vision of a way forward for their discipline and practice. These understandings can be negotiated and developed through a shared interpretive repertoire of language, symbols and genres. Contu and Willmott (2003) believe that members are not judged by their level of knowledge but their 'demonstrated ability to 'read' the local context and act in ways that are recognized and valued by other members of the immediate community of practice, that is all-important' (Contu & Willmott, 2003, p.285). Hence, they emphasise the values and shared understandings of a context rather than technical knowledge.

More recently in the literature there appears an increased popularity in the notion of virtual communities of practice (Dubé et al, 2005; Smeds & Alvesalo, 2003). Dubé et al, (2005) consider virtual communities of practice are one form of communities of practice where members primarily use ICTs to share stories, knowledge and communications. For multinational corporations, virtual communities of practice provide a vehicle to disseminate organisational knowledge to workers in remote locations through online collaborative technologies (Ardichvili et al, 2006). While Dubé et al (2005) consider communities of practice in the virtual context are not precluded from face-to-face communications; the opportunities for face-to-face meetings are limited. This creates specific challenges for virtual communities of practice, as face-to-face communication is generally considered necessary to facilitate sharing of stories and symbols and in building trust. Kimble and Hildreth (2005) emphasise the importance of trust and shared confidence in facilitating an effective community of practice.

In communities of practice learning is located in everyday practices and conceived as 'an integral part of generative social practice in the lived-in world' (Lave & Wenger, 1991, p.35). Communities of practice, and the learning that occurs within them, are seen as culturally embedded, with means such as storytelling carrying cultural understandings of the workplace and members' identities. It follows therefore that learning is situated in the practices of the core work of the group. The members' focus is on learning practices necessary for their local (community) needs, rather than broader learning prescribed by the organisation. The commitment to the community and fellow members leads to a focus on practices, rather than codified training often equated with organisational learning.

As learning is situated in practice, rather than formal training, members tend to learn through a process in which they mutually construct knowledge which meets each others' needs and those of their community. The emphasis is on tacit knowledge which can be susceptible to loss as it is rarely recorded. Situated learning is characterised by its focus on a high level of group communication and reference to visual and tactile learning. The constructed and negotiated nature of situated learning necessitates fluent and effective communication. However, this communication varies according to the standing of each group member. Hence, it is pertinent to examine the ways in which it influences members by either enabling full participation in the group, or by marginalising potential members.

For communities of practice, Lave and Wenger (1991) consider group membership as a spectrum ranging from those who are of an apprentice standing to those classed as full group members. New members are given the status of legitimate peripheral participants, whose role in the group is to undertake relatively simple tasks, thereby gaining an understanding of and entrée to the group's practices. It is the intention that this learning enables them to move steadily towards full membership in which they not only share a comprehensive knowledge of their community's discipline, but have also aligned their values and behaviours with the norms of the group. They understand the identities of the community and its members. The transition from a legitimate peripheral participant to a full member of a community of practice is not automatic. Many barriers can prevent or inhibit the processes of learning. Establishing community of practice boundaries is

not an infallible process. Sometimes the practice of excluding or reducing the participation of peripheral members can cause a site of resistance in which ostracised members can establish their own counter-practices. These sites can be either destructive or they can be new sites of creativity.

In a virtual environment, the lack of face-to-face, especially informal, meetings can exacerbate the exclusion of potential participants by those more powerful full members. Power is a concept which has been largely under-explored in recent community of practice studies, including those of virtual communities of practice (Churchman, 2005). With barriers to participation, opportunities to learn both practices and norms sufficiently to gain full membership are unlikely. Full members of a community of practice have the ability, and sometimes the political motivation, to shift the accepted practices continually out of the reach of new members (Paechter, 2006).

Communities of practice are characterised by spontaneous emergence, informal existence and few, if any, organisational regulations (Brown & Druguid, 1991). However, for modern organisations, which are concerned with harnessing and disseminating knowledge to improve customer service, there is motivation to deliberately create communities of practice. Lesser and Everest (2001) suggest that organisations need to manage the existence of communities of practice as part of a systematic and strategic approach to promote the effective management of intellectual capital, and as a means of maintaining long-term organisational memory (Dubé et al, 2005). While this appears an attractive option for organisations determined to overcome the short-comings of traditional organisational learning, researchers such as Brown and Druguid, (1991) and Dubé et al, (2005) warn against excessive organisational involvement in communities of practice. Communities of practice rely on a certain level of autonomy and independence for innovation (McDermott, 2000) and long-term survival.

While there are many issues associated with learning in large organisations, communities of practice can provide a vehicle to share tacit knowledge, which is now recognised in the literature (Davenport, 2001) as a key element in sustaining organisational competitive advantage. Further, because many large companies are dispersed across international boundaries, virtual communities of practice play an important role in knowledge sharing for these organisations.

### **Research Methods**

This research explores the influences on employees in virtual communities of practice cultivated to conduct software development projects in the virtual context as they manage knowledge. Members of these teams communicate mainly using ICTs. In order to research this phenomenon, three similar-sized case studies were conducted. Data was principally collected by taped in-depth interviews. The interviews were informal and semi-structured with non-directive, open-ended questioning to encourage interviewees to describe the complexities of their practices, experiences and problems.

Interviewees were encouraged to compose stories through which they could reflect on both their processes of reality construction and those of their team. These stories enabled the interviewees to be more conscious of the meanings which they attributed to the activities of their team, and the practices specific to their community (Louis & Sutton, 1991). The interviews were transcribed

and data from all sources were analysed using typical case study techniques of themes, descriptions and assertions as detailed in Creswell (1998). Through an analysis of the interviewees' stories and symbols, shared themes emerged which highlighted the ways in which the practices of the community of software developers in three organisations were constructed and shared, as well as the influences of organisational communication on these constructions. The conclusions reported in the following analysis of the case study data represent the authors' interpretations of the evidence.

### **Report from Real Life – Three Case Studies**

The virtual communities of practice in this study have been reported in detail elsewhere (Hanisch, 2004). For this paper, it is relevant that these communities were formed intentionally by their respective managements with the specific aim of establishing knowledge management processes and organisational learning for subsequent information systems development. This forms part of the theory known as 'process improvement' and is becoming increasingly popular in software development (Sommerville, 2004).

The three case studies are described briefly as follows:

Sapphire Software House\*, an international software company based in New Zealand, is privately owned and was chosen for this research because it recently used a virtual community of practice to develop and implement an information system for a large external company located in the UK.

Secure Traders\* is part of a large company within the health, insurance and banking industries. During the past six years the corporation has been developing and enhancing a complex software product between its IT group, which was located in Melbourne (headquarters of company), and several sites across Asia and the UK. In order to achieve this, dispersed employees formed a community of practice to develop their software using ICT.

Scooter\* is a part of a large publicly listed company and was chosen because it was developing numerous systems and products through the use of a virtual community of practice between its IT group, located in Adelaide (headquarters of the IT group), and many sites across USA, Europe and Asia.

The following discussion explores the issues associated with communities of practice in the virtual context.

### **Discussion - Issues for Virtual Communities of Practice**

The themes uncovered from an analysis of three case studies identify some issues associated with the 'emergence' of virtual communities of practice and the difficulties in sustaining the community in the longer term. The analysis of the interview transcripts revealed shared themes for these virtual communities of practice. These themes revolve around the barriers to learning for members and highlight issues that are juxtaposed to management's aim of developing long-term learning and knowledge management.

The shared themes are: the transition of legitimate peripheral participants to full practicing members of the community of practice; tacit learning and the difficulties in sharing knowledge through ICT (miscommunication); cultural issues in international virtual communities of practice; and the ways in which virtual communities of practice are frequently constructed by management to

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\* pseudonym

meet a transient need, rather than cultivated or allowed to emerge. Each theme is now discussed in terms of the literature outlined above.

### **Legitimate Peripheral Participation**

Within the context of communities of practice theory and learning, a feature which separates a work team from a community of practice is the notion of legitimacy. As Zárraga-Oberty and De Saá-Pérez (2006) suggest, 'work teams become communities of practice when they begin to develop informal relationships and change the sources of legitimization' (p. 64). For this study, there was evidence that the work teams may be classified as virtual communities of practice, as they operated in terms of Wenger's (2004) criteria, displaying aspects of legitimate peripheral participation. For example, one interviewee admitted that for a future project, one apprentice would be given more responsibility,

*.....he's [peripheral participant] just grown up a huge amount through the project and so we would look to use him probably as sort of the development lead and I [full member] would just be involved in the design so I can then be just reviewing...and keeping an eye on the whole thing (Interviewee 1).*

As there are fewer opportunities for chance or informal meetings compared with traditional communities of practice who meet face-to-face, interviewees recount that communication using ICT was the most demanding aspect of their daily work. It was difficult for members to ascertain whether messages were conveyed or ensure any technical details were understood. It is of significance that legitimate peripheral participation is more difficult for virtual communities of practice. Further, with fewer opportunities for informal communication, there are barriers for apprentices to develop into legitimate members of the community. Barriers may occur for different reasons. Our study uncovered an issue of power between members who do not understand the complexities of different work environments at the remote sites; and a barrier due to uncertainty that the members would be competent to complete the tasks. Hence it was easier to allocate the work to head office. Further, without the opportunity to meet face-to-face, there are issues associated with the power of work allocation and appropriateness of tasks. For example, once one interviewee had visited a remote site, he changed the way he allocated work in the future. This issue could have been resolved more quickly if members at headquarters understood the work environment at the remote site. The interviewee recounts he now has,

*...a greater appreciation of how it works when you're not at the hub...we send them bits and pieces in totally unrelated areas - they'd always complain about it and I'd say - "Oh yeah - get on with it - it's not that bad". But actually it is that bad. And so that was quite important to learn that because now if somebody says - "Oh just give it to the UK", I say - "no - that's really not a very effective way of doing it". And I'm in a position now to make a much better judgement about what will work and what won't work (Interviewee 10)*

The barrier of power and control over the type of work allocated to the remote sites impacts on the ways members learn and how they perceive the community. From the literature, the practice of excluding or reducing the participation of peripheral members may cause the establishment of counter-

practices (Paechter, 2006). One interviewee admits this occurred at a remote site,

*The UK office – weren't team players in any sense. They were there and they were going their own way – doing their own thing. And they weren't playing the game and that cause quite a lot of tension between the offices...(Interviewee 12)*

*...the guys at the little end think that they're not being listened to or being taken seriously and they are being ignored. Well the answer is - they are! (Interviewee 8)*

Interviewees who were responsible for managing the virtual communities admitted that they often retained work at the Head Office rather than apportion it to remote sites because they were not confident that the work would be completed without unnecessary delays. As one manager recounts,

*There are always decisions that I will make, whether one set of individuals do something or not, and obviously that especially may happen with remote sites (Interviewee 14).*

Interviewees considered that using ICT created a sense of isolation, which was further exacerbated as the distance between the employees increased. As distance increased, so did time zone differences, which resulted in less opportunity for synchronous communication, with more reliance on ICT, and in turn, further delayed responses and feelings that remote employees did not have sufficient knowledge to undertake the required tasks.

Overall therefore, when using ICT it becomes more difficult for members to move into the core of the group and learn the discourse.

### **Tacit Learning**

Closely linked with legitimate peripheral participation, is the concept of tacit learning. From the literature outlined previously, we know that communities of practice place a strong emphasis on tacit learning, rather than formal training. However this knowledge can also be lost as it is rarely recorded. The interviewees support this as they consider that using ICT can lead to a loss of learning. It can also reduce the variety of responses and approaches to problems that apprentices absorb 'on the job', rather than learning from documents and formal training. As indicated,

*... we were trying to skill people – and there were a few people you had to go out and have to mentor them a bit and you'd say "OK we need you to do this" - and so people were learning (Interviewee 12)*

One of the issues uncovered by this study centres on difficulties in sharing this knowledge through ICT, with resultant miscommunication. When using ICT, there is 'enforced formality' on team members because they must document communications in writing, and this may inhibit the social aspects of communications leading to misinterpretation and miscommunication among members (Hanisch, 2001), and limit the amount of tacit learning.

*When you are at the big end you feel like you're the one in control and everybody should just automatically do what you want them to do. When you've not been in that position before you also expect that the other person instantly knows what you're talking about – and that's not always the case and you're not always coming from the same point of reference (Interviewee 8).*

Many virtual teams do create repositories for sharing documents during software development. However, unlike manufacturing or other products,

software development rarely involves the reproduction of previously solved problems. Rather it provides unique solutions to organisational issues. Hence documentation for specific software requirements is of little value for subsequent systems and organisational knowledge management. The learning for software developers revolves around the approaches and management of the software process. This type of learning is situated in the practices of the core work of the community.

From the theory, we know that situated learning is a vital part of communities of practice, and face-to-face communication is requisite for the high level of visual and tactile learning necessary for effective communication (Contu & Willmott, 2003). As evidenced by an interviewee, learning using ICT is more demanding than via face-to-face.

*...we had a big learning curve and the guy over there knew everything, but we had to learn everything. So we had a couple of people to try and teach us, but it's still not the same thing telling you as to actually doing it. All the nitty gritty things which took so long - and because we didn't know what was happening they were getting frustrated (Interviewee 4)*

As Illeris (2004) suggests, learning in the workplace is complex and involves both an individual and social process. As 'learning takes place in a dynamic relation between the employees' learning processes, the communities at the workplace practice and the enterprise as technical-organisational system' (Illeris, 2004, p.431), it is influenced by the encounter between the learning environments of the workplace and the employees' learning processes. For communities of practice whose members are distributed, there are varied learning environments and organisational settings which may influence workplace learning, and which in turn influences the sharing of knowledge.

### **Cultural Diversity**

Research on organisational learning indicates that communication, knowledge sharing and learning are profoundly influenced by cultural backgrounds (Ardichvili et al, 2006; Hofstede, 2001; Pfeffer & Sutton, 2000). Further, the success of communications between individuals from different cultural backgrounds is influenced by differences in cognitive styles, and preferences for different forms of visual and verbal presentation of information (Ardichvili et al, 2006). As virtual communities have limited choices for communication media, communications between individuals from various cultural backgrounds are subject to misinterpretations and misunderstandings.

Interviewees in this study consider that cultural differences using ICT added complexity to communication in virtual communities of practice, because what is conventional, tacit or common knowledge for one employee is not for another who brought different cultural understandings to their tasks. This influenced the ways in which knowledge sharing occurred between employees from different cultural backgrounds. From the stories shared by the interviewees, in multiple sites across many countries, they noted differences in culture and language during information gathering.

*A business analyst...had a very important project we were doing talking to the Tokyo Stock Exchange. Again really frustrating getting the requirements, because that's a huge language and cultural difference (Interviewee 16)*

One manager suggested that cultural issues were more difficult to detect or uncover, because they are subtle.

*...when you've got a cultural issue...the problems are much more subtle. You know something is not happening right...but you can never put your finger on it - at that point there's usually something culturally astray (Interviewee 17)*

This may be explained in part through understanding that members of collectivist society process information differently from those members from an individualistic society (Thanasankit & Corbitt, 2002). Individuals from collectivist or high-context cultures (Ardichvili et al, 2006) place more emphasis on non-verbal communications. As electronic mail (the most popular form of ICT) is contextual, it favours members from an individualistic society. Hence, learning for community members who come from different backgrounds is influenced by using ICT, which in turn influences the sharing of knowledge in the community.

### **Cultivated and Transient Virtual Communities of Practice**

According to Jarvenpaa and Ives (1994), virtual teams are created by organisations to solve business problems in today's digital economy. Jarvenpaa and Leidner (1999) more specifically define virtual teams to be a 'temporary, culturally diverse, geographically dispersed, electronically communicating work group' (Jarvenpaa & Leidner, 1999, p.792). The temporary nature of virtual teams implies there is no history of the team working together or no expected future for the team (Lipnack & Stamps, 1997). This supports the notion of a dynamic network structure (Jarvenpaa & Ives, 1994) in organisations. An important feature of virtual teams or communities is their flexibility in being formed and disbanded readily and within short time frames. However, this has implications for long-term organisational learning.

Lave and Wenger's (1991) early work on communities of practice had a particular emphasis on communities emerging from associations of like-minded workers, rather than management imposed. This aspect of communities of practice appears to have been particularly poorly understood and applied in the virtual environment. More recently (Ardichvili, Page & Wentling, 2003; Hildreth, Kimble & Wright, 2000), it appears well accepted that organisations may purposefully create, or at least cultivate, virtual communities of practice with the aim of encouraging knowledge sharing and tacit learning previously not possible in a networked environment. However, there are barriers for virtual communities of practice which are formed rather than emerge. One such barrier includes the inability for new communities and team members to access members from previous teams. This prevents the passing on of tacit knowledge, such as 'lessons learned' or 'do and don'ts' in relation to the community. A further barrier is the lack of opportunity for new and keen members to move into the community and develop shared meanings or learn the discourse. This supports the findings of Ardichvili et al, (2003) who consider that members' motivation to create and share knowledge is paramount to the community's success.

In an earlier study, Ciborra and Patriota (1998) suggest that members can intentionally resist sharing or prevent sharing learning and knowledge even when the organisation facilitates knowledge exchange. However, interviewees from our study agree that they were willing to share knowledge with others in

their community, indicating an absence of information hoarding. They conceded that if there were a lack of response to electronic communications members attributed it to other reasons, such as leave or ill health, rather than a lack of willingness to participate in the community. However, trust was a recurring term that was used in relation to participation in the discourse. Throughout the literature there have been numerous studies in relation to trust and virtual teams (Handy, 1995), with various researchers (Jarvenpaa & Leidner, 1999) exploring the antecedents of trust. Interviewees in our study consider that without meeting the community members face-to-face there is far less willingness to trust. As one interviewee recounts,

*...You've got to meet people – you've got to be talking to them – you've got to know who you are dealing with. Otherwise, you are faceless – I mean you are nobody. You don't know who they are (Interviewee 2)*

Another interviewee agreed that without the benefit of face-to-face meetings it is difficult to interpret underlying messages and cues.

*...it's very difficult to read body language over the telephone, and impossible over email, so obviously face-to-face meetings are far better because you can interpret things that aren't being said (Interviewee 15)*

While some researchers (Ardichvili et al, 2003) suggest that face-to-face meetings may even be counterproductive for communities of practice, our findings indicate that beyond meeting face-to-face, members of the community prefer to visit each others' worksites in order to improve their understanding of the local issues associated with their working life.

### **Conclusion**

This study has explored the issues, in particular the barriers, which are apparent for virtual communities of practice as they attempt to share knowledge and establish long-term organisational learning. The issues identified in this study include the transition of legitimate peripheral participants to full practicing members of the community of practice; tacit learning and the difficulties in sharing knowledge through ICT (miscommunication); cultural issues in international virtual communities of practice; and the ways in which virtual communities of practice are constructed and transient, rather than cultivated or allowed to emerge. Knowledge management and informal learning are influenced by members using ICT for communication in the virtual context.

Hence there are implications for managers who wish to cultivate sustainable virtual communities of practice. One challenge includes the need to facilitate and support the community to emerge, rather than creating or constructing the community. Further, our study shows that there is a need to understand the remote work environments to improve sharing knowledge. So, while face-to-face meetings are considered necessary, our study shows that beyond meetings, community members need to visit various worksites to gain in-depth understanding of other members' perspectives.

Communities of practice in the virtual environment are often poorly conceived. The inconsistencies in this new conceptualisation of communities of practice render it equivalent to some other management trends which have come and gone during the 1990s. In choosing to ignore the impediments described above, communities of practice concepts are relegated to the management productivity toolbox.

The value of communities of practice lies in their ability to provide texture and heterogeneity, which are integral to creativity. A community of practice is an intrinsic condition for the existence of knowledge, not least because it provides the interpretive support necessary for making sense of its heritage (Lave & Wenger, 1991). This support is increasingly important to organisations and must be applicable to the virtual context. In recent work Wenger's recognition of histories, language, power has been replaced by a study of knowledge as a strategic asset to be commodified. In doing so, he has threatened the integrity and authenticity of knowledge developed by communities of practice. He has condoned management construction of communities of practice and in doing so ignores some of the complexities and nuances which can make them crucial to knowledge management. As Contu and Willmott (2003, p293) note 'a managerialist agenda - which ignores conflicting values and preferences, represents them as pathological, or aspires to resolve them through skilful managerial intervention - is not effortlessly reconciled with the radical dimensions of situated learning'. We contend that the many benefits that communities of practice can offer to virtual work will only be achieved through an awareness of and strategies to overcome the barriers discussed above.

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