PILOT
Practices and infrastructure for long term collaboration
PEPR eNSEMBLE
Kick-off
November 17, 2023
Coordinators

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Agenda

- Round table (15 min)
- Presentation of the project (30 min)
- Presentations from participants + Discussion (1 hour)
- Discussion on PILOT priority topics and AMI topics (30 min)
PILOT Objectives

• Socio-technical models for long-term collaboration

• Multi-organizational, sovereign, secure, interoperable collaboration platforms promoting trust and digital well-being
Project Axes

• **Axis 1**: Understanding current and future forms of long-term collaboration

• **Axis 2**: Open technical frameworks and protocols for long-term collaboration

• **Axis 3**: Conceptual Frameworks for long-term collaboration

• **Axis 4**: Actionable guidelines and demonstrators for long-term collaboration
1- Identify new forms of collaboration / new social needs

Collect, build and organize a repository of up-to-date analyses, use cases and reports about future forms of long-term collaboration, their challenges and their limits.

Foundations for the future infrastructure for long-term collaboration by providing new technology components that can be at the heart of safe, sustainable and secure collaborative services.

3- Define conceptual and analysis tools to ensure socio-technological approaches

New conceptual constructs for analysis, modelling, and design for articulating social needs and technology capabilities in a socio-technical perspective.

2- Investigate new technological capacities

4- Provide actionable visions, guidelines and patterns

Prototypes and demonstrators, guidelines, visions, patterns
Resources

• Budget: 5 M€
• Period: 7 years (Sept. 2023 – Aug. 2030)
• Non permanent resources
  • 18 PhD theses
  • 4 postdocs of 2 years
  • 2 engineers of 4 years
  • 12 internships of 6 months
• 14 partner institutions: Inria, CNRS, Univ. Paris-Saclay, Univ. Grenoble Alpes, Sorbonne Univ., IMT, UTT, INSA Lyon, UCB, Nantes Université, ENSAM, Univ. de Lille, Univ. de Toulouse
Axis 1
Understanding current and future forms of long-term collaboration
Adopting a practice-centered computing approach

The concept of ‘practice’ is here used to focus on the techniques and strategies through which cooperative work is ordinarily accomplished in an orderly way, in contrast to: design paradigms in which new technologies are developed in laboratories, based on the experiences and predilections of the engineers and designers themselves, an approach that would base new technologies on models of human behavior derived from theories imported from cognitive or social psychology, from social linguistics, or from small-group sociology, approaches committed to building new technologies on (prescriptive) didactic theories and models, (prescriptive) theories and models of efficient or effective decision making.

“The design of such interventionist technologies cannot be based merely on a model of the application domain in the form of some idealized representation of prescribed procedures or relatively stable patterns of activity; rather, the design must also take into account the actual practice in which the system in question is to be integrated, its contingencies, variations, local circumstances, and so on” (Schmidt, 2018 p. 5).

To design technology that supports collaborative practices requires that we uncover the largely unarticulated detail of what people actually do when they work together” (Suchman and Trigg, 1991, p. 221).
Studying emerging forms of collaboration
Analyzing these emerging forms of collaboration

Building and organizing a repository of up-to-date analyses, use cases and reports about future forms of long-term collaboration

⇒ opportunities for reflexivity, comparison, and concept building
2 PhDs just started

Lisa Formentini
Que reste-t-il du confinement ?
Evolution des écologies d’artefacts dans des organisations de sécurité civile - LORIA/INRIA

Simon Lecuyeur
Développement d’un dispositif pour soutenir l’autorégulation des apprentissages collaboratifs - LIG/Université Grenoble Alpes
Axis 2
Open technical frameworks and protocols for long-term collaboration
Sustainable and safe infrastructure

- Collaboration modes: connected, disconnected, ad hoc, inter-organisational
- P2P infrastructures
- Replication mechanisms
- Security for distributed collaboration
Interoperability

- Open and extensible formats, ontological approaches
- Software models and infrastructures capable of fostering collaboration among heterogeneous actors and artifacts.
1 PhD just started

Yann Trividic: “Facilitating collaboration and appropriation in single-source publishing factories through creative coding”. ex)situ team, UPSaclay, Inria, CNRS
Axis 3

Conceptual Frameworks for long-term collaboration
Forget the unified collaborative platform
Embrace diversity

• Collect cases studies and technologies
• Develop analysis frameworks for collaboration across organisations considering
  • Coordination mechanisms
  • Heterogeneity of the artifacts and asymmetries in the collaboration
  • Evolution of the collaboration over time
• With different domain perspectives
  • Software engineering, health care, civil security, education
Axis 4
Actionable guidelines and demonstrators for long term collaboration
In the steps of Engelbart

Build a **shared statement** on ways to **achieve common goals** through collective efforts and shared resources from **different organizations** with **different backgrounds and cultures** and a **long duration scope** (months, years).
Actionable visions

• Building actionable visions for long-term collaboration among organisation through
  • A living repository of guidelines, patterns, practices and artifacts
  • their declination for different domains
• Collect and formalize patterns for problems relative to long term collaborative activities (e.g. tool migration, partner onboarding or removal, share repository management, access rights)
Presentations from participants
Equipe ACES, Télécom Paris
Collaborative long-term maintenance of open source software

- **Open source:**
  - a successful emerging **model of collaboration**
  - with **massive impact** on how software is developed today

- **The long-term maintenance of open source software in question:**
  - lack of clear model so that widely used pieces of open source keep being maintained
  - need for collaborative models of organization to enable long-term maintenance
  - emerging solutions such as Community Package Maintenance Organizations
  - We can **develop conceptual frameworks and tools** to facilitate **collaborative maintenance**

- **Contributions to:**
  - Axis 1 (understanding current and future forms of long-term collab.), especially WP 1.5
  - Axis 3 (conceptual frameworks for long-term collab.), especially WP 3.4
  - Axis 4 (actionable guidelines and demonstrators for long-term collab.), especially WP 4.2 / 4.3
Delys Team (LIP6 – SU/CNRS)

• **Distributed algorithms** to support large-scale asynchronous collaborations

• Focus on **causal broadcast** (building block for consistency of publish/subscribe distributed systems, collaboratives applications…)

• Existing protocols do not scale (prohibitive extra cost on messages size, centralization, fix number of participants,…) and don't support mobility and/or disconnection
Causality and consistency for long-term collaborations

**Challenge**: How to adapt causal broadcast to large and open communities?

**Contributions**: New models (dynamic graphs), distributed algorithms, implementations
Coast team - Distributed secure collaboration

Distributed file system

- P2P architectures (IPFS, Matrix, …) for supporting different collaboration modes (connected, disconnected, ad-hoc)
- Conflict-free Replicated Data Types (CRDTs) for consistency maintenance
Security for distributed mutable data without central authority

- Easy to use distributed access control
- Encryption for mutable data by means of CRDTs
Towards better collaborative tools for skill sharing

Axis 2 - Open technical frameworks and protocols for long-term collaboration

WP2.2 Interoperability for long-term collaboration
  • Explore skill sharing descriptions that are platform and version free (see WP3.3-3.4 below)

WP 2.4 Collaborative interaction histories
  • Investigating how collaborative histories on a shared document could be analyzed and distributed to facilitate skill sharing among collaborators/within community of practices (focus on graphical editing and spreadsheet formula?)

Axis 3 - Conceptual frameworks for long-term collaboration

WP3.3 Asymmetries and heterogeneity in asynchronous collaboration
  • Understanding friction created by these asymmetries. design of adaptive or assistive interfaces

WP 3.4 New models for software engineering and design
  • Implementing "compilable" tutorials based on skill sharing descriptions
Ongoing work

PhD Raphael Perraud (ANR JCJC Discovery)
Characterizing frictions encountered in asynchronous skill acquisition (tutorials)
• Paving the way for platform-version free skill sharing descriptions

Ongoing reflections
• Reflective tools for skill sharing (alongside A. Tabard, Univ. Lyon)
• Collaborative interaction histories (alongside M. Nancel)
Axis 1 - Understanding current and future forms of long-term collaboration

WP1.3 Long-term collaborative practices for the future of digital and hybrid learning
- analysis of existing practices, concepts and tools
- modeling co-regulation in team-based learning situations

Axis 4 - Actionable visions for future forms of long-term collaboration

WP 4.2 Derive and design actionable guidelines and visions for different domains
- design principles for indicators to regulate collaborative learning
- guidelines for teachers to stimulate co-regulation
...and also:
- use cases in education
- a platform that can serve as field of experimentation

- work in progress in the special domain
  Computer Supported **Collaborative Writing**

**Methods:**
- design based research
- user centered approach
Écosystème de collaboration, système de référence fonctionnel commun capable de s'adapter à différentes situations

Approche proposée :
• Adapter le comportement de référence aux situations souhaitées : 1/ Les interactions (dispositifs, métaphores d'interaction, objets d'interaction et objets réels) 2/ L'espace ou les espaces d'action et de déroulement (virtuels, réels, leur répartition géographique et/ou logique). 3/ L'organisation dans le temps (synchrone, asynchrone), le respect des processus (workflow).
• Etude de l'évolution du fonctionnement de l'interface utilisateur qui peut être exécutée par tout le monde ou par des acteurs identifiés.
• Architecture matérielle et logicielle visant en assurer le fonctionnement et assurer la relation entre l'écosystème et ses situations de travail.
• Etude des modèles, formalismes, méthodes, architectures et IHM CSCW déjà existants en vue de les revisiter.
• Validation expérimentale (plateformes matérielles et logicielles).

Domaines : applications industrielles, la ville intelligente et l'apprentissage en ligne
Hyperglosae : la glose de la glose
« Une plateforme de blogs sous stéroïdes »
pour repenser le rapport aux sources
Hyperglosae : le « docuverse »
Partager et remixer des biens communs dans le respect des auteurs
Ways of participating in PILOT
## Doctoral program: [https://pepr-ensemble.fr/prog_doctoral.html](https://pepr-ensemble.fr/prog_doctoral.html)

<table>
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<tr>
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<tbody>
<tr>
<td>1</td>
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<td>27 mars</td>
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<td>Envoi des propositions de sujets de thèse</td>
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<td>Sélection de propositions</td>
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<td>Notification aux porteurs et affichage des sujets de thèse</td>
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<td>Candidatures retenues</td>
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PILOT Report on 2023

- Priority topics:
  - Emerging and future forms of long-term collaborative practices
  - Distributed infrastructure for long-term collaboration
  - Interoperability for long-term collaboration

- 9 PhD subjects were proposed
- 6 interviews were conducted
- 3 PhD were selected
- 2 funded PhD theses (1 finally financed by UPSaclay) + 2 environmental costs
AMI, AAP

Call for Expressions of Interest (AMI) – **deadline January 15**

2 Calls for projects (AAP): in 2024 and 2025 (Total of 5 M€)

Rules per project:

- Duration: max of 4 years
- Budget: 800 K€ - 1 M€
- Partners: 2-5 research teams (at least from 2 different institutions)
Discussions

https://miro.com/app/board/uXjVNNnnWRY=/?share_link_id=786076193725