

NEXT GENERATION INTERNET

NGI FORUM 2023

Event Report

15-16 November 2023

Brussels / hybrid



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Executive Summary

The NGI Forum 2023 – the flagship event of the European Commission's Next Generation Internet (NGI) initiative – convened over 220 on-site and 700 online experts, policymakers, and industry representatives to explore the future of the internet. The event, held in Brussels as a hybrid gathering, focused on critical themes such as digital commons, decentralised technologies, digital identity, open-source security, quantum internet, and large language models.

The NGI faces the challenging mission of transforming the internet into a safer, more open, and useful experience. Emphasising the urgency of its role in the technological transition, the Forum highlighted the exponential growth of AI and the imminent arrival of the Quantum internet. The significance of strong ethics and values in shaping the digital future, particularly through Europe's Digital Commons, was underscored. Challenges in legacy financial and business sectors were discussed, advocating for a reconsideration of regulation and governance models.

The Forum touched upon the importance of user-centric digital identity based on common values, and the NGI community's commitment to transparency and inclusivity. A notable development is the introduction of the 27 million Euro NGI Commons Fund, aimed at advancing the human-centric internet and supporting projects focused on sustainability and security. Four pilot projects addressing strategic topics were introduced.

The concept of Digital Commons aligns with top-down policies and grassroots trust agendas, gaining recognition from European ministers and leading to proposed actions for Member States' engagement. Emerging technologies such as AI, extended reality, IoT, and multilingual technologies were positioned as fundamental for virtual worlds. The Forum praised the NGI's adaptability, agility, and community governance in the face of the internet's evolution into a network of virtual worlds. It concluded with a call to engage sceptics and actively shape the internet's future and associated regulatory landscape.

The keynote address by Director General DG Connect at the European Commission Roberto Viola addressed the evolution of the internet and its initial democratic vision. It emphasised the impact of profit motives, advocating for a community-driven, transparent internet. Successes in internet regulations and the Digital Services Act were highlighted, as is the need for decentralisation, AI regulation, and community engagement.

Henri Verdier discussed Europe's historical contributions to digital technologies and emphasised the importance of digital commons for a quality digital public space. He advocated for political alliances, economic support, and geopolitical efforts to promote a multistakeholder approach, and addressed potential risks such as internet fragmentation and AI impact.

The plenary sessions discussed complexities in defining and managing digital commons, emphasising open governance and raising concerns about the Cyber Resilience Act's impact on the open-source community. The need for responsible AI development was touched on, alongside the role of SMEs in shaping a non-extractive governance. Challenges in open-source software, maintenance, security, and funding were discussed, along with the Software Bill of Materials, EU's Cyber Resiliency Act, and the need for sustainable business

models for open source. Sessions also explored technical, sustainability, governmental, and diversity aspects within the Fediverse, touching on Mastodon's commitment to accessibility.

NGI Impact Stories showcased projects funded by the NGI programme, promoting an open, secure, and human-centric internet. Projects highlighted were Open Food Facts, PeerTube, /e/OS, Tauri, and Transatlantic SSI Interop.

An inspirational talk on Quantum Internet provided an overview of the quantum landscape, stressing collaboration and proactive engagement. It discussed the transformative impact of quantum technology in sectors like healthcare and finance, and highlighted ongoing global efforts to build a comprehensive quantum ecosystem while touching on challenges in standardisation and supply chain development.

Introduction

At the NGI Forum 2023 – the flagship event of the European Commission’s Next Generation Internet (NGI) initiative – over 220 on-site and 700 online policymakers, researchers, innovators, industry representatives, and users dived into the major trends of the future technological transition of the internet. Topics included digital commons, decentralised social media, digital identity, open-source supply chain security, web search and large language models, quantum internet, and many more. The event offered participants an opportunity to gain valuable insights from experts, exchange ideas with peers, stay up-to-date with the latest trends and advancements in the Internet, and be part of a community that is actively working towards a safer, more open Internet.

DAY 1: 15 NOVEMBER

Opening and Welcome Remarks

Jennifer Baker, Expert in EU Policy, Master of Ceremony, welcomed delegates and said that when it comes to the mission of the NGI to reimagine and re-engineer the internet, the primary focus is on creating a safer and more open internet, respecting individual rights, empowering end-users, providing control over data and digital identities, and making the internet more useful to citizens. The ultimate goal is to establish an "Internet of trust."

Executive Summary

Roberto Viola reflected on the evolution of the internet, highlighting its initial democratic vision for shared knowledge and individual empowerment. He addressed the impact of profit-driven motives, leading to powerful companies exploiting algorithms and contributing to polarisation. The NGI initiative aims to create a more open, community-driven internet, prioritising values like transparency, equal opportunities, and a level playing field. Successes in regulations like internet neutrality and the Digital Services Act were discussed. He stressed the need for decentralised architectures and AI regulation to prevent dominance, with a call for community engagement and critical reflection. Key topics included developing a European identity ecosystem and the role of the community as whistleblowers. The speech concluded with a call to action, rejecting apathy and calling for a strong community role in shaping the future responsibly.

Henri Verdier focused on Europe's historical contribution to digital technologies, touching on open, public infrastructure, free software, and open data for democracy and economic prosperity. Digital commons were highlighted as crucial for the quality and authority of the digital public space, offering opportunities for participation, civic engagement, and access to trusted information. He outlined a threefold responsibility: political alliances for protection, economic support for innovators, and geopolitical efforts to promote a multistakeholder approach. Actions proposed included promoting open minds for new technologies, financial support, and building alliances, particularly in Africa. Potential risks were acknowledged such as internet fragmentation and AI impact, calling for ongoing attention to openness, innovation, and democratic values. The talk emphasised proactive measures to safeguard and promote digital commons for Europe's digital future.

Detailed Minutes

Keynote from the European Commission

Roberto Viola, Director General of DG CONNECT, European Commission, reflected on the evolution of the internet and its impact on society. He highlighted the initial democratic vision of the internet as a platform for shared knowledge and individual empowerment. However, he emphasised that the pursuit of profit has led to the rise of powerful companies exploiting algorithms that manipulate user preferences and contribute to polarisation.

Mr Viola explained that NGI aims to create a more open, community-driven internet that prioritises values such as transparency, equal opportunities, and a level playing field for both small and large actors. He discussed the success of certain regulations, such as internet neutrality and the Digital Services Act, in addressing issues in the online space.

Observing a transition from humans working with machines to humans working with intelligent machines, he acknowledged the need for decentralised architectures and the regulation of AI to prevent powerful companies from dominating its use to shape the internet experience. At the same time, community engagement is vital in shaping the future of the internet. He discussed the need for critical reflection and introduced two key topics for consideration: the development of an open and federated European identity ecosystem, and the role of the community as whistleblowers in addressing the risks associated with large AI models.

The speech concluded with a call to action, rejecting apathy and emphasising the community's role in responsibly shaping the future of the internet. There is thus a clear need for continued reflection, engagement, and collaboration to address the evolving challenges and opportunities in the digital landscape.

Inspirational Talk: Digital Commons: A Pillar for Building a European and International Digital Public Space

Henri Verdier, Ambassador for Digital Affairs, Ministry for Europe and Foreign Affairs, France, said that Europe was the birthplace of the digital revolution. His talk focused on the importance of digital commons and the need for Europe to protect and support them. He began by highlighting Europe's historical contribution to digital technologies and emphasised the role of open, public infrastructure, free software, and open data in fostering democracy and economic prosperity.

Digital commons are crucial for the quality and authority of the digital public space, offering opportunities for participation, civic engagement, and access to trusted information. He acknowledged the changing landscape of public infrastructure, where innovators, companies, and communities contribute to digital commons, and stressed the importance of protecting these resources from threats posed by big tech and certain states. Mr Verdier suggested a threefold responsibility:

- Political – forging alliances to protect digital commons;
- Economical – the role of digital commons in serving innovators and contributing to economies of scale;
- Geopolitical – the importance of convincing emerging countries to adopt a multistakeholder approach to digital governance.

To address these challenges, Mr Verdier proposed a set of actions, including promoting open minds for new technologies, supporting the movement financially, and building alliances with other regions, particularly paying attention to Africa. He also mentioned initiatives by the European Commission and Member States to promote digital commons.

The potential risks to digital commons were not forgotten, such as internet fragmentation and the impact of AI development. He called for financial support, the democratisation of digital currency, and ongoing attention to issues of openness, innovation, and democratic values as the next common challenges. Overall, the talk emphasised the need for proactive measures to safeguard and promote digital commons as a foundational element for Europe's digital future.

PLENARY I: Towards Digital Commons: Charting the Course for Europe's Digital Future

Executive Summary

Roberto Viola reflected on the evolution of the internet, highlighting its initial democratic vision for shared knowledge and individual empowerment. He addressed the impact of profit-driven motives, leading to powerful companies exploiting algorithms and contributing to polarisation. The NGI initiative aims to

create a more open, community-driven internet, prioritising values like transparency, equal opportunities, and a level playing field. Successes in regulations like internet neutrality and the Digital Services Act were discussed. He stressed the need for decentralised architectures and AI regulation to prevent dominance, with a call for community engagement and critical reflection. Key topics included developing a European identity ecosystem and the role of the community as whistleblowers. The speech concluded with a call to action, rejecting apathy and calling for a strong community role in shaping the future responsibly.

This session underscored the complexities of defining and managing digital commons, emphasising the importance of open governance, government involvement, sustainable markets, and careful consideration of licences and regulations for a thriving digital future in Europe.

- The **European Digital Infrastructure Consortium** is a potential legal vehicle for European projects.
- Concerns about the **Cyber Resilience Act** and its potential impacts on the open source community demand early engagement in policy making.
- Citizens need to be educated on **responsible data usage**.
- Business models and **user-friendly alternatives** are needed.
- The need for **responsible development in AI** was underlined, with open source tools as a counterbalance to big-tech dominance.
- The responsibility for helping **incubate new companies** and guiding them toward non-extractive governance forms is crucial.

Detailed Minutes

Moderated by Dr Monique Calisti, CEO, Martel Innovate, Director NGI Outreach Office

- Michiel Leenaars, Director of Strategy, NLnet Foundation
- Adriana Groh, Co-Founder, Sovereign Tech Fund
- Sophie Bloemen, Director, Commons Network
- Gabriele Columbro, General Manager, Linux Foundation Europe
- David Manset, Senior Project Coordinator, International Telecommunication Union

The initial discussion revolved around the definition and challenges of digital commons. **Sophie Bloemen** pointed to the definition of digital commons governing a resource democratically within a community. She highlighted the diversity of traditions within the concept, citing different traditions and thinkers like Yochai Benkler. She raised concerns about the risks of openness, especially in data commons, where selective sharing may be necessary for public benefit

without giving away sensitive information. She urged critical thinking about openness, considering the impact on big tech and the potential centralisation of data.

Gabriele Columbro views digital commons as overlapping with open source and data standards, and advocates for open governance, emphasising the need for public sector involvement in governing digital commons. As to challenges, these include recent changes in project licences by companies like HashiCorp, emphasising the need for open governance to prevent such shifts.

David Manset represents a project focused on digital public goods, with the global community as the key target for digital commons. He stressed the importance of open, auditable, transparent, and unbiased data to support digital commons and address citizens' needs worldwide. **Adriana Groh** highlighted the international nature of digital commons and the need to consider often overlooked aspects such as software development tools and the software developers' needs when designing the internet of the future in a holistic way. **Michiel Leenaars** commented on the NGI programme and the need to mainstream digital commons, viewing digital commons as a collective effort to grow ecosystems, and avoiding a zero-sum game. Also mentioned is the importance of choosing what data such as images to give and under what conditions, and he referred to licences as a tool for protection.

Monique Calisti raised the issue of the “tragedy of digital commons”, namely relating to the challenge of protecting digital commons from misuse. Participants discussed the role of licences as a protective measure, the need for government involvement, and the challenge of balancing individual contributions with the collective good. Responses included:

- The need for government involvement in sustaining digital commons, comparing it to investment in physical infrastructure;
- The importance of the government in providing for public digital infrastructure and collaborating with commoners;
- Examples exist of successful markets created around digital commons, focusing on sustainability and aligning the drivers of various stakeholders;
- The challenges of digital commons are multifaceted, including costs, licensing, legal compliance, skills, capacity, governance, adoption, and sustainability.

The discussion explored the complexities of defining and managing digital commons, with participants highlighting the need for open governance, government involvement, sustainable markets, and careful consideration of licences and regulations.

In the **Q&A session**, several key points were discussed:

1. **Collective action and funding** in building digital commons, with the example of the COVID-19 pandemic, suggesting that if governments had collectively invested in digital commons infrastructure, there would be a more robust digital infrastructure today. While funding is crucial, it was highlighted as part of a larger puzzle.

2. The **European Digital Infrastructure Consortium (EDIC)** is a potential legal vehicle for European projects. The need for alignment and coordination in efforts related to other innovation initiatives was acknowledged. The importance of coordinating efforts to support existing digital infrastructure was underscored.
3. **Cyber Resilience Act (CRA) and open source community:** Concerns were raised about the potential inadvertent impacts of the CRA on the open source community. The need for early engagement and consultation with open source communities in the policymaking process was stressed.
4. **Motivating citizens to use software without trading sensitive data:** The discussion revolved around educating citizens and organisations on the importance of using software that does not compromise sensitive data. Examples, such as the "Public Spaces" initiative in the Netherlands, were cited as ways to provide alternatives, communicate with their audiences, and set good examples for responsible data usage.
5. **Business models and user-friendly alternatives:** The role of business models in influencing user behaviour was discussed, along with creating user-friendly alternatives based on European or national infrastructures. New business models are crucial for providing services that are both user-friendly and sustainable.
6. **AI and digital commons:** The discussion on AI highlighted the need for responsible development and the importance of open source tools in making AI models explainable and auditable. The potential of open source AI as a counterbalance to big-tech dominance was put forward.
7. **Incubation of open source projects:** The responsibility of helping incubate new companies and guiding them toward non-extractive governance forms, such as steward ownership, was discussed. Open source was recognised as a gift that allows anyone globally to take the code and start alternative business and ownership models.

PLENARY 2: Shaping Digital Identity and Credentials in the Web 4.0 Era: Empowering and Safeguarding Individuals in the Online World

Executive Summary

Speakers highlighted the significance of the European Digital Identity (EUDI) Regulation in providing citizens with secure digital wallets for identification. A European Blockchain Services Infrastructure (EBSI) based on verifiable credentials and self-sovereign identity could have a pivotal role in supporting European digital identity. The need for international interoperability in digital credentials is paramount to address challenges related to trust and mutual acceptance between jurisdictions.

- Regulation and tools are needed for **secure identification** of digital wallets.
- External feedback was considered essential for a **European identity framework**.
- Collaboration between jurisdictions is necessary for **seamless cross-border functionality** of digital credentials.
- Uncertainty was expressed about incorporating EBSI clauses into W3C standards.
- In any digital identity system, a **human-centric approach** is important to build and maintain trust.
- SMEs have a key role to play in contributing to the future of digital identity, emphasising open standards, interoperability, and privacy preservation.

Detailed Minutes

Moderated by Alex Grech, Executive Director, The 3CL Foundation

- Hennie Bulstra, Innovation Lead, DUO
- Irene Hernandez, CEO, Gataca
- Paul Jackson, Director of Digital Trust, Treasury Board of Canada Secretariat (Government of Canada)
- Maya Madrid, Policy Officer, European Commission

In this discussion on various topics related to the next generation internet, the initial topic was the European Digital Identity (EUDI) Regulation. The participants discussed its significance and its role in providing citizens with digital wallets for secure identification. **Maya Madrid** emphasised the need for both regulation and tools, asserting that the regulation alone is insufficient without providing citizens with the necessary tools. She explained that the EUDI Regulation requires Member States to issue digital wallets to citizens, ensuring a comprehensive approach to digital identity. **Hennie Bulstra** described the diploma use case, which involves creating a European blockchain services infrastructure based on concepts like verifiable credentials and self-sovereign identity. He highlighted the importance of the European Blockchain Services Infrastructure (EBSI) in supporting the European digital identity.

Irene Hernandez, representing smaller innovation companies, brought up the role of SMEs in contributing to the future of digital identity, and sees the importance of open standards, interoperability, and privacy preservation. Challenges mentioned include accessibility to public and private procurement processes and the impact of policy definitions on SMEs. **Paul Jackson** brought up the need for international interoperability in digital credentials, considering the global nature of users' lives and businesses. He described some of the

challenges of trust and mutual acceptance between jurisdictions, and the importance of aligning technology choices and certification standards.

The discussion delved into the use of blockchain and decentralised systems for self-sovereign identity. The view of **Hennie Bulstra** is that while blockchain is a strong combination with concepts like verifiable credentials, it is not the only solution, and the focus should be on interoperability. **Maya Madrid** provided insights into the development of the European identity framework and would like to see external entities provide feedback on the architectural reference framework and implementation. Panellists discussed the global perspective, with **Paul Jackson** highlighting the importance of collaboration between jurisdictions to ensure digital credentials work seamlessly across borders. The **Moderator** raised concerns about the need for individuals to prove their credentials when moving between countries and advocated for a collective approach to address this issue. The discussion also addressed Member States' roles in ensuring privacy compliance in the absence of a certification scheme for the wallet. **Maya Madrid** said that national certification schemes will be in place until a common certification scheme is developed, with scrutiny from other Member States to ensure privacy and security standards.

In the Q&A session, the following points were discussed:

1. **Digital Identity Standards (W3C vs. EBSI):** There is uncertainty about Europe changing World Wide Web Consortium (W3C) standards to incorporate more clauses from EBSI. W3C standards, particularly verifiable credentials data models, are seen as quasi-de facto standards globally. Competing standards exist, and interoperability with different standards may be necessary. The focus is on being agile due to the evolving nature of standards and the need for compatibility with existing systems.
2. **Open source and market development of standards:** Member States may rely on existing standards if they serve the purpose, and the community is open to feedback and enhancements.
3. **Security concerns in digital identity systems:** Despite increased awareness of security, there is a rise in economic damage from social engineering attacks on digital identity systems. The regulation's objective is to build trust, but questions arise about addressing security threats such as social engineering attacks.
4. **Challenges in identity compatibility across jurisdictions:** Concerns include the compatibility of identities across different jurisdictions. A challenge is determining the value of a human and the need for trust in identity systems. The issue is not solely technical; it involves building trust and establishing governance to enable cross-jurisdictional acceptance.
5. **Human-centric approach and trust building:** The focus is on human-centric identity systems and how trust is crucial in facilitating identity acceptance across different entities and ecosystems. Building trust involves addressing not only technical aspects but also governance and relationships between entities.

PLENARY 3: Open Web Search and Large Language Models and Beyond: Challenges and Opportunities for Europe

Executive Summary

The session underscored the importance of addressing current challenges and seizing opportunities collaboratively to shape the future of AI and web search in Europe. Panellists highlighted challenges in the current market oligopoly in web search, the limitations of existing search approaches, and the dominance of American and Asian players in LLMs. Key opportunities include openness, transparency, and collaboration to shape the next generation of the internet. The role of SMEs was explored, along with the importance of cultural representation in AI, and the need for proactive decision-making and investment in future technologies.

- The **Open Web Search project** was proposed to combat the market oligopoly in web search by opening up the core of search engines as open data.
- Limitations exist in current search approaches and the **ad-based business model** has impacted user efficiency.
- Technology independence, transparency, and a shift in approach to promote innovation and a **smarter society** were advocated.
- The **Alliance for Language Technologies** within the EDIC seeks to develop a common infrastructure for natural language processing and an LLM.
- To address challenges related to data provenance and misinformation in LLMs, **trustworthiness in AI outputs** is essential.
- **Collaboration among European open-source AI communities** is needed to collectively address challenges, influence government policies, and shape the future of AI.

Detailed Minutes

Moderated by Christine Plote, Co-Founder, Open Search Foundation e.V

- Isabell Claus, Managing Director, thinkers.ai
- Michael Granitzer, Full Professor, University of Passau
- Georg Rehm, Principal Researcher, Deutsches Forschungszentrum für Künstliche Intelligenz GmbH (DFKI)

- Alexandre Zapolsky, President, LINAGORA
- Milena Sokolic, Senior Project Manager, R&D and Client Relations, Trace Labs

The panellists discussed some of the challenges and opportunities in the current landscape of web search, AI, and large language models, and looked at the importance of openness, transparency, and collaboration to shape the next generation internet. **Michael Granitzer** addressed the issue of the current market oligopoly in web search, which is a critical infrastructure used daily by millions of people but is dominated by a few companies. He proposes the Open Web Search project to open up the core of search engines, particularly the web index, as open data. This aims to allow users to build their own search engines, which promotes information diversity and user choice. He emphasised the need for infrastructure that goes beyond web search, driving innovation in cloud services, apps, digital identities, and AI.

Isabell Claus focused on the limitations of current search approaches and the lack of choice for users. She said the impact of the business model is primarily based on advertisements, leading to prolonged searches rather than on efficiency and relevance of results. She advocated for technology independence and a shift in approach to promote transparency, innovation, and a smarter society. **Georg Rehm** discussed the importance of digital sovereignty in the context of large language models dominated by American and Asian players. He outlined the three main components needed for large language models: data, machine learning, and high-performance computing (HPC), with clean and readily available data being essential for projects such as OpenGPT-X and the European Language Data Space which seek to address this challenge. He introduced the Alliance for Language Technologies within the European Digital Infrastructure Consortium (ALT-EDIC), which seeks to develop a common infrastructure in the field of natural language processing and to develop a large (multi) language model (LLM).

Milena Sokolic addressed some of the challenges related to data provenance and misinformation in the context of large language models. She discussed the need for trustworthiness in AI outputs and introduced Trace Labs' approach, using a decentralised knowledge graph for extractive question answering. She emphasised the importance of building a trusted knowledge foundation to combat misinformation and ensure accurate information retrieval. **Alexandre Zapolsky** highlighted the need for a European-wide initiative in open-source AI, citing the OpenLLM-France Community as an example. He advocates for a bottom-up community approach, contrasting it with what he considers the "fake openness" of certain AI initiatives. He called for collaboration among European open-source AI communities to collectively address challenges and influence government policies, and noted the strong support for open source AI from the French government and the need for European cooperation in shaping the future of AI.

The **Moderator** asked whether search engines will still be needed. The panellists discussed various aspects related to search engines, LLMs, cultural challenges, the role of SMEs, and the need for investments and collaboration. **Michael Granitzer** differentiates between search engines and LLMs: search retrieves information already stored, while LLMs generate new information. He acknowledged the potential of LLMs but notes challenges such as uncertainty,

hallucinations, and limitations in tasks like mathematics or logic. He tends to view LLMs as powerful interfaces for understanding human language and code, suggesting applications beyond search, such as language translation for programming. **Alexandre Zapolsky** raised concerns about the cultural challenge in AI, and highlighted the increasing integration of AI into everyday life, especially in growing countries, and the importance of preserving European culture in AI development. He proposed the creation of public agencies at both national and European levels to provide open-source access to public datasets for AI model training. Also to be addressed is the urgency of addressing issues related to language and cultural representation in AI.

Milena Sokolic discussed the role of SMEs in developing LLMs of the future internet while upholding European values such as trust, sovereignty, and open source. The agility and quick adaptation of SMEs to technological developments is a competitive advantage, and key is collaboration between SMEs and research, leveraging the ability of SMEs to translate research into market needs. Also highlighted is the importance of protecting knowledge and encouraging SMEs not yet using AI to get involved in its development. **Isabell Claus** underscored the current business value of LLMs, emphasising the need for quick adaptation and the importance of taking sufficient time in AI development. She urged Europe to open up to investments, not only in technology but also in marketing these technologies internationally. **Alexandre Zapolsky** advocated for proactive decision-making at the national level, including building exascale clusters for computation. He expressed concerns about the slow pace of decision-making and implementation, suggesting the need to plan for the next generation of technology (zettascale) even before the current one (exascale) is fully operational. He called for politicians to invest in future technologies and emphasised the key role of NGI in supporting these endeavours.

The **Moderator** asked for one specific wish that panellists would like to see implemented. These included the following:

- To act at scale, quickly and decisively;
- To promote trusted data and decentralised AI solutions;
- To seek bold and important statements from politicians to trigger investments in the private sector;
- To stress the importance of the role of the open-source community in catching up with development;
- To approach challenges with a market perspective, and empower an innovative open-source community, and researchers without bureaucratic hurdles or legislative bindings.

The session was opened up for questions from delegates:

On open source engagement in the Nordic, Baltic and Eastern countries: Alexandre Zapolsky commended Finland and Baltic countries for their dynamic open source AI community, and emphasised the ability for engagement from anywhere in Europe.

On concerns about AI and capitalism: Michael Granitzer dismissed doomsday scenarios, stating AI models are software and can be switched off. He stressed the need for technological competence and understanding to counteract undesirable developments, with open source seen as a solution.

On managing AI complexity and security: Isabell Claus acknowledged the perpetual race between good and bad actors in cybersecurity and highlighted the growing complexity, extending beyond information topics to include emerging technologies like quantum, the need for European technologies in cybersecurity, and urgency in addressing the challenges. European Blockchain Services Infrastructure (EBSI) in supporting the European digital identity.

DAY 2:

16 NOVEMBER

NGI Impact Stories Showcasing Exceptional Contributions from NGI Innovators

Executive Summary

This session featured presentations from various projects funded by the NGI programme. Spanning five years, the NGI programme has successfully funded 1000 projects and built a community of EU developers committed to creating an open, secure, and human-centric internet. Its agility in delivering results within 12 to 15 months, especially during the COVID-19 crisis, has demonstrated its effectiveness.

- **Open Food Facts** focuses on the connection between food, health, and environmental impact. A collaborative open data database with over 2.8 million food products is creating nutritional and environmental impact scores.
- Farmasoft's flagship project, **PeerTube**, aims to democratise video hosting by decentralising platforms and has gained popularity with a diverse user base.
- **/e/OS** is a pro-privacy, Google-free mobile operating system which aims to provide a European alternative to major tech companies.
- **Tauri** is an open-source software toolkit focused on creating smaller, more secure, and performant applications, and emphasises a security-first approach.
- The **Transatlantic SSI Interop project**, focusing on Self-Sovereign Identity (SSI), aims to demonstrate the interoperability of digital identity across borders.

Detailed Minutes

Moderated by **Fabrizia Benini**, Head of Unit, Next Generation Internet Unit, DG CONNECT, European Commission

- Alexandre GAREL, Software Engineer, Open Food Facts

- Daniel Thompson-Yvetot, Chairperson of the Board of Directors, Tauri
- Pouhiou Lafon Roudier, Co-director, Framasoft
- Markus Sabadello, CEO, Danube Tech
- Gaël Duval, CEO, Murena

Fabrizia Benini presented an overview of the NGI programme, highlighting its achievements over the past five years. It has funded 1000 projects and fostered a community of EU developers dedicated to building an internet that aligns with shared values: open, secure, and human-centric. Notably, 80% of this community has not received funding from other EU programmes, indicating NGI's success in reaching a unique niche.

Ms Benini emphasised the programme's agility, contrasting it with traditional Horizon programmes that take five to six years to show results. NGI has demonstrated its ability to deliver results within 12 to 15 months, as seen during the COVID crisis when the community played a crucial role in ensuring security and privacy for contact apps developed by Member States and the Commission. Looking ahead, the focus is on increasing critical mass by identifying synergies with Member States. The goal is to collaborate and achieve shared objectives, building on the success and efficiency demonstrated by NGI, particularly in times of unexpected challenges.

Alexandre Garel presented **Open Food Facts**, addressing the connection between what we eat, health issues like obesity, and environmental impact. Open Food Facts aims to empower various stakeholders, including consumers, producers, researchers, government officials, and policymakers, to measure and change the impact of food on both health and the planet. The organisation has a collaborative and crowd-sourced open data database with over 2.8 million food products. They played a significant role in creating the Nutri-Score and experimented with the Eco-Score to label environmental impact on products. Open Food Facts implemented a personalised, transparent, and privacy-first score on food to help consumers make informed choices. This score is integrated into their mobile app released in 2022, available on all products.

Open Food Facts initiated the Open Product Facts project, applying their approach to model all products, not just food. This project aids in quickly modelling new products and allows researchers to track specific topics. The organisation is working on making this project accessible to more users, enabling them to check specific product properties.

A directly related spin-off project, Search-a-licious, addresses the need for an efficient internal search engine. The proof of concept indicates that it is fast, relevant, and has a powerful API. While not yet visible to users, it is designed to be a reusable tool for setting up projects based on open data collections. The speaker stressed the importance of search functionality in helping various groups, including journalists, NGOs, researchers, policymakers, and others, find specific evidence, facts, or insights within the extensive database.

Pouhiou Lafon Roudier presented **Framasoft**, a French non-profit organisation focused on digital education and comment control. Framasoft's flagship project

is PeerTube, an open-source software designed to assist YouTubers and Twitch streamers in liberating themselves from reliance on Google and Amazon. The concept is to uphold old internet values like decentralisation by creating a network of interconnected small platforms instead of a large centralised one. The aim is to democratise video hosting, enabling people to host their videos independently.

Framasoft relies on donations for funding and has benefited from NGI programmes, including search and discovery programmes in 2021 to improve search results and customisation features. In the current year, the Entrust programme has supported Framasoft in developing features like remote transcoding for sustainability and community resource sharing. Challenges exist to make the software more user-friendly, as giving more power and freedom can increase complexity. Nevertheless, PeerTube has gained popularity, with over 1000 platforms sharing almost a million videos in six years, achieved with just one full-time developer until recently. It has a diverse user base, including institutions, the European Commission, educators, content creators, independent media, citizens, and communities.

Gaël Duval presented **Murena and /e/OS** in a speech addressing the widespread issue of personal data leakage through smartphones to Google and Apple. He highlighted that Android users send about 12 MB of personal data daily, while iPhone users send about 6 MB. To tackle this problem, /e/OS was introduced as a pro-privacy, Google-free mobile operating system compatible with 200 smartphone models.

The key features of /e/OS include a cloud workspace with email, documents, and agenda functionalities, ensuring no user tracking or ads. Being 100% open source, the system allows for auditable privacy. The business model involves selling Murena smartphones running /e/OS, backed by hardware partners and the Murena cloud offering free usage for limited data and premium plans for additional capacity.

Mr Duval emphasised the support received from NGI programmes, including NGI Ledger, NGI DAPSI, and NGI Search, which were crucial in developing a robust privacy-centric mobile operating system aligned with European values. The funding helped them compete with major tech companies, doubling monthly users to 30,000 and exceeding 100,000 Murena cloud accounts.

Looking ahead, the focus is on consolidating partnerships, especially with Fairphone, which now sells smartphones with the option to run /e/OS by default. The upcoming Murena 2 will feature privacy-centric kill switches for the microphone and video camera. Plans for 2024 include addressing the B2B market and aspiring to become the leading mobile ecosystem with fair values, open source principles, auditable privacy, and an ESG positive approach. The ultimate goal is to provide a European alternative to big tech, prioritising user rights and fostering collaboration.

Daniel Thompson-Yvetot presented **Tauri**, an open-source software toolkit designed to help people create applications. The motivation behind Tauri was a dissatisfaction with the existing approach of downloading large binaries for each application, resulting in a significant environmental impact. Tauri focuses on creating smaller, more secure, and performant applications.

Tauri is currently ranked 95th on GitHub out of 25 million projects, with 100,000 weekly downloads. These downloads signify the usage of Tauri in building projects rather than individual users downloading the toolkit. The speech highlighted community projects like fig.io, acquired by AWS, and Kino AI, which uses AI to assist filmmakers in processing large amounts of film data.

Tauri emphasises a security-first approach, providing secure defaults, guardrails, and trapdoors for those with advanced knowledge. The importance of verifying security rather than blindly trusting it was also explained.

Tauri 2.0 is set to be released in the first quarter of 2024, and the project is collaborating with Servo, a Mozilla project aimed at informing the development of a new web browser. Tauri is working with grants from NLnet and NGI to ensure the preservation of the investment made in open source through Servo. The future vision involves using Tauri to build browsers and applications with a secure focus, acknowledging the importance of security in all aspects of digital lives.

Markus Sabadello presented the **Transatlantic SSI Interop** project by Danube Tech, a Vienna-based company. The project focuses on Self-Sovereign Identity (SSI), a decentralised approach to digital identity that allows users to authenticate and prove their identity online without relying on centralised platforms like Google or Facebook. The European part of the project, under the EBSI, involves the European Self-Sovereign Identity Framework (ESSIF), collaborating with universities to issue digital diplomas in a decentralised, privacy-preserving, and secure manner. In the U.S., the project works with the Department of Homeland Security on a digital version of the green card, applying the same principles of decentralisation and interoperability.

The team has received support from NGI grants, specifically NGI Atlantic, promoting partnerships between U.S. and EU companies. The goal is to demonstrate how software can connect European and U.S. ecosystems for digital identity, despite the existing challenges in technical, political, governance, and trust-related aspects. While acknowledging there is more work to be done, Mr Sabadello is proud of the success in showcasing the potential of cross-border digital identity.

Other initiatives include the NGI Sargasso programme for collaboration with Canada, and partnerships with companies in South Korea and Zimbabwe, all aiming to promote interoperability of digital identity on a global scale. The overarching objective is to show that digital identity is not confined to borders and should reflect the inherent nature of individuals, aligning with the concept of self-sovereign identity in the digital era.

PLENARY 4: Securing the Open-Source Frontier: Navigating Supply Chain Risks

Executive Summary

Experts emphasised the critical need to address maintenance, security, and funding challenges within the open source software ecosystem. The discussion revolved around key themes such as the complexity of mission-critical systems, security challenges faced by different organisations, the concept of Software Bill of Materials (SBOM), the European Union's Cyber Resiliency Act (CRA), funding and economic models, transparency, issues surrounding big tech, unused security budgets, and procurement policies.

- The importance of investing in **maintaining legacy versions** to address user needs.
- Certain issues may result from **inadequate maintenance** rather than bad code.
- Questions were raised about the **safety of new systems** and vulnerabilities in existing ones.
- The **SBOM concept** for listing software components can enhance understanding and security, but concerns were raised about confusion and lack of standardisation in SBOM implementation.
- The EU's **Cyber Resiliency Act** has a role to play in supporting open source projects and small businesses.
- A plea was made for **incubation programmes** for open source projects to teach sustainable business models.

Detailed Minutes

Moderated by Mirko Presser, Associate Professor, Aarhus University

- Anthony Harrison, Founder, APH10
- Camille Moulin, Consultant, Inno³
- Philippe Ombredanne, CTO, nexB Inc.
- Melanie Rieback, CEO/Co-founder, Radically Open Security

In an interesting and far-reaching discussion, panellists underscored the importance of addressing maintenance, security, and funding challenges in the open source software ecosystem, with a focus on standardisation, transparency,

and community collaboration. The ten main topics discussed are the following:

1. **Maintenance and legacy code: Camille Moulin** argued that issues like Heartbleed and Log4j are not necessarily due to bad code but stem from inadequate maintenance. There is a clear need to invest in maintaining legacy versions to address the requirements of users still relying on older features.
2. **Complexity of mission-critical systems: Anthony Harrison** highlighted the complexity of mission-critical systems, expressing concern about the security assumptions made in both old and new systems. He raised questions about the safety of new systems and the potential vulnerabilities in existing ones.
3. **Security challenges for different organisations: Melanie Rieback** discussed context-dependent security challenges, pointing out that larger organisations struggle to understand their attack surface, especially with the blurring of network boundaries due to remote work. Small players face issues of being under-resourced and lacking knowledge, making standardised solutions essential.
4. **Software Bill of Materials (SBOM): Anthony Harrison** introduced the concept of SBOM, which lists components in software to improve understanding and security. **Philippe Ombredanne** mentioned SPDX and CycloneDX as standards for efficient detection and reporting of software components, and stressed the importance of software licences, known vulnerabilities, and sustainable development processes. **Melanie Rieback** highlighted the confusion and lack of standardisation in SBOM implementation, with various incompatible tools and outputs, and advocated for funding to prevent fragmentation, and the importance of automation due to the extensive number of dependencies. **Camille Moulin** considers SBOMs a good starting point but focused on the need for high-quality information and effective maintenance. **Anthony Harrison** noted that SBOMs should be continuously used in the development process and not just generated and forgotten.
5. **EU's CRA: Philippe Ombredanne** sees the CRA as a positive step, providing provisions for supporting open source projects and small businesses. He stressed the potential of open source tools and data to aid compliance with security requirements.
6. **Funding and economic models: Melanie Rieback** called for incubation programmes for open source projects, teaching sustainable business models and alternative governance structures. She described the economic issues in supply chain security and the need for new economic models for a free internet.
7. **Transparency, open data and funding: Philippe Ombredanne** called for transparency and open data about open source projects, stressing the community and government's role in funding these efforts to enable a free internet. According to **Camille Moulin**, funding often does not reach maintainers, and there's a tendency to value innovation more than maintenance. He called for the establishment of NGI Maintenance.

8. **Issues around big tech: Anthony Harrison** expressed the desire to know who is making money from open source software and raised concerns that big tech may be hesitant to release SBOMs as it would reveal their (commercial) benefits.
9. **Unused security budget within NGI: Melanie Rieback** mentioned that there is a significant budget available for security audits, and encouraged developers to take advantage of it for security by design.
10. **Procurement policies and market creation: Melanie Rieback** called for the European Commission to create market demand for open source solutions, redirecting funds to strengthen the open source ecosystem.

PLENARY 5: Decentralised Social Media and Fediverse: From Niche to Scale

Executive Summary

This session provided a comprehensive exploration of the technical, sustainability, governmental, and diversity-related aspects within the Fediverse. It included an overview of the Fediverse and Mastodon, discussions on lower-powered instances and the GoToSocial project, insights into the Open Internet Discourse Foundation's role, funding models and sustainability strategies, and challenges and concerns regarding undue influence and the need for large-scale adoption. Also covered were user experiences, Mastodon's commitment to accessibility and positive interactions, connecting developers to funding, non-technical benefits of the Fediverse, and concerns about diversity and harassment.

- **Mastodon** has over 1.6 million users across 10,000 instances; the Dutch government is running an interesting pilot project for traffic information.
- **GoToSocial** focuses on Mastodon-compatible instances on lower-powered hardware, which enhances accessibility.
- Governments are called upon to **allocate funds** from mainstream social media to federated platforms.
- Concerns were raised about hosters influencing software development and the need for **large-scale adoption** was expressed.
- It was suggested to promote Mastodon on institutional websites and **encourage journalist involvement**.
- **Non-technical benefits of the Fediverse** include freedom and control over online presence.

Detailed Minutes

Moderated by Jennifer Baker, Expert in EU Policy, Master of Ceremony

- Renaud Chaput, CTO, Mastodon gGmbH
- tobi smethurst, Code person, SuperSeriousBusiness (online)
- Koen de Jonge, Board member, Open Internet Discourse Foundation

The discussion covered technical aspects, sustainability, government involvement, and concerns about diversity and harassment within the Fediverse. An overview of the main topics is as follows:

1. **Overview of Fediverse and Mastodon: Renaud Chaput** defined the Fediverse as a network based on the ActivityPub protocol, allowing servers to communicate and form a federated social network. Mastodon, a major project within the Fediverse, started as an open-source alternative to Twitter and has grown to over 1.6 million users across 10,000 instances. **Koen de Jonge** mentioned that the Dutch government runs a pilot on its own Mastodon server for traffic information, which has received positive feedback.
2. **GoToSocial and lower-powered instances: tobi smethurst** introduced GoToSocial, a project focused on running Mastodon-compatible instances on lower-powered hardware. They received funding from NLnet and NGI Zero and aim to make Fediverse instances more accessible with lower system requirements.
3. **Open Internet Discourse Foundation: Koen de Jonge** discussed the foundation's involvement in hosting open source software, particularly supporting Mastodon.nl's migration to a larger setup. The foundation emphasises scaling websites to handle peak usage and highlights the positive, non-toxic environment of the Fediverse.
4. **Funding models and sustainability: Renaud Chaput** highlighted Mastodon's user donations (over 9,000 people contribute monthly) and an NLnet grant for specific features. Mastodon is working on diverse fundraising models for sustainability. **tobi smethurst** discussed GoToSocial's strategy to stay small, relying on NLnet and NGI Zero funding, although they aim to diversify funding sources in the future. **Koen de Jonge** suggested that governments and institutions should allocate funds spent on mainstream social media to federated platforms. He advocated for legislation promoting the use of decentralised platforms.
5. **Challenges and concerns: tobi smethurst** expressed concerns about hosters having undue influence on software development if they become the primary funders. The panel discussed the emphasis on scaling and

growth in the Fediverse, with **Koen de Jonge** stressing the need for large-scale adoption.

6. **User experiences: Renaud Chaput** emphasised Mastodon's focus on user accessibility and reaching out to news organisations, governments, and content creators to join the Fediverse. The panel discussed the positive quality of replies and comments on Mastodon, attributing it to the presence of paid moderators.
7. **Connecting developers to funding: Renaud Chaput** suggested organisations should promote Mastodon on their websites and encouraged journalists to create official Mastodon accounts. Panellists also expressed openness to support contracts.
8. **Non-technical benefits of the Fediverse: Koen de Jonge** highlighted the freedom to be oneself without excessive moderation and control over one's online presence. **Renaud Chaput** discussed the importance of having one's own space and expressed optimism about Meta joining the Fediverse with Threads. **tobi smethurst** sees the core advantage of the Fediverse being that users can choose whom to follow and have control over their experience, even with the entry of large corporations like Meta. However, he raised concerns about the lack of diversity in the Fediverse, noting that harassment has driven some individuals away.

Inspirational Talk: How to Build the Quantum Internet Network Ecosystem?

Executive Summary

This comprehensive overview of the quantum landscape stressed collaboration and proactive engagement to harness the potential of quantum technology in shaping the future of digital infrastructure. It delved into quantum technology concepts, focusing on qubits and quantum entanglement. The transformative impact of quantum technology was described, across sectors like healthcare, finance, and logistics, showcasing global interest with various countries launching national initiatives. Efforts are ongoing to build a comprehensive ecosystem around quantum technology.

- Introduced the **concept of the quantum internet** and its potential applications, particularly in securing communication and cloud connectivity.
- Explored **ongoing advancements in quantum computing**, sensing, and networking at national and global levels.
- Discussed **the need to connect quantum computers**, highlighted current quantum internet status, and showcased current projects by companies.
- Noted **international collaborations and projects**, such as the European Commission's Quantum Communication Infrastructure in Europe (EuroQCI).

- Addressed **challenges in standardisation and supply chain development** within the quantum domain, with a focus on the Quantum Internet Alliance (QIA).

Detailed Minutes

Jesse Robbers, Co-Founder, Director Industry & Digital Infrastructure, National Lead Quantum (internet) Networks, Quantum Delta NL

Mr Robbers began by sharing his background in electrical engineering and internet infrastructure, transitioning into the world of quantum technology through collaborations with Stephanie Wehner, professor in quantum information at Delft University of Technology. Quantum Delta NL, a national quantum initiative (NQI) in the Netherlands, aims to accelerate quantum technology development. The presentation covered key concepts in quantum technology, emphasising qubits and quantum entanglement. The impact of quantum technology on various industries was highlighted, with examples such as healthcare, finance, and logistics. The global interest in quantum technology was acknowledged, with various countries launching national initiatives to drive its development.

The ongoing efforts to build an ecosystem around quantum technology, fostering research, innovation, and startups were discussed. The importance was stressed of addressing ethical and societal implications, as well as considering the energy implications of quantum technology. The notion of the quantum internet was introduced, along with its potential applications, particularly in securing communication and cloud connectivity. Quantum Key Distribution (QKD) technology was explained as a means to create secure communication channels using qubits.

Mr Robbers provided examples of companies and organisations already working on quantum technology applications, including BMW, South Korea Telecom, HSBC, and the Port of Los Angeles. The ongoing developments in quantum computing, sensing, and networking were discussed at both national and global levels. He believes it is important to translate quantum technology into practical applications for existing digital infrastructure and mentioned the emergence of new companies dedicated to building end-to-end quantum computers.

The discussion shifted to quantum network technology, exploring the need to connect quantum computers and the current state of the quantum internet. Projects and experiments by companies like BT, QuTech, Eurofiber and Juniper Networks were highlighted, showcasing efforts to integrate quantum communication into existing fibre infrastructures. Also touched upon were international collaborations and projects. In the EU, the European Commission has launched a declaration for a Quantum Communication Infrastructure in Europe (EuroQCI), which aims to build a quantum network across Europe, boosting European capabilities in quantum technologies, cybersecurity and industrial competitiveness. The challenges of standardisation and supply chain

development in the quantum domain were addressed. The Quantum Internet Alliance (QIA) is seen as one of the most globally influential projects in this domain to build a global quantum internet.

In conclusion, Mr Robbers described the rapid progress in the quantum domain and the need for cooperation to capitalise on new opportunities. Delegates were urged to be aware of the impending impact of quantum technology on digital infrastructure and to actively engage with its development.

Event Wrap-up and Closure

Executive Summary

The challenging mission of the NGI is to transform the internet into a safer, more open, and useful experience. The urgency of NGI's role in the technological transition was highlighted, with a focus on the exponential growth of AI and the imminent arrival of the Quantum internet. Strong ethics and values in shaping the digital future are crucial. Challenges exist in legacy financial and business sectors, where regulation and governance models are needed. The importance of user-centric digital identity based on common values was emphasised, as was the NGI community's commitment to transparency and inclusivity.

The 27 million Euro NGI Commons Fund will advance the human-centric internet, supporting projects focused on sustainability and security. The concept of Digital Commons aligns with top-down policies and grassroots trust agendas. Emerging technologies like AI, extended reality, IoT, and multilingual technologies were positioned as fundamental for virtual worlds. The internet's evolution into a network of virtual worlds and the NGI's adaptability, agility, and community governance were praised. A call to engage sceptics and shape the internet's future and associated regulatory landscape concluded the talk.

Detailed Minutes

Jennifer Baker, Expert in EU Policy, Master of Ceremony, began by reminding delegates of the challenging mission of NGI to reimagine and re-engineer the entire internet for a safer, more open, and more useful experience for all citizens. The desired outcome is a digital future that respects everyone, regardless of their identity. The role of NGI in the technological transition of the internet was highlighted, stressing urgency, as the future is already unfolding.

The exponential growth of AI was touched upon, along with the impending arrival of the Quantum internet, stressing the need for strong ethics and values in shaping the digital future. In the concept of the Digital Commons, Europe's homegrown standards and protocols are playing a key role. The first panel discussed challenges in legacy financial and business sectors, suggesting the need for regulation and a potential rethinking of governance models.

Ms Baker said that the Forum explored the importance of users and digital identity, acknowledging the contentious nature of identity while underlining its

fundamental role. The goal is to shape a user-centric digital identity based on common values. This round-up speech noted the NGI community's deep commitment to these issues and its concrete discussions emerging from the forum. The discussion on AI highlighted the potential distortion of reality in search results and emphasised the NGI community's transparency and dedication to creating a sense of community for everyone.

Transparency was a key point in the discussion about the open-source supply chain, where the limits of knowledge were acknowledged, while continued efforts were encouraged. The overall message conveyed was the need for more open source, more European involvement, and increased funding to steer the digital future in a direction that is inclusive, useful, and reliable.

Pearse O'Donohue, Director, Future Networks, DG CONNECT, described the vision for NGI as a human-centric internet that integrates several technologies: AI that complements our cognitive capacity, extended reality that enriches our digital experience, sensors that multiply our perception, multilingual support for inclusiveness, and the infrastructures for computing and storage, including cloud HPC and Quantum. He announced some new NGI projects:

- The 27 million Euro NGI Commons Fund which is being awarded to a 15-strong consortium led by the NLnet Foundation. This research and innovation action will fund projects advancing the human-centric internet through cascading grants, ensuring continuity with successful projects from the past. It will significantly extend towards important policy issues such as sustainability and security, and will increase community involvement.
- Four pilots will address strategic topics using NGI incubated technologies: Central Bank digital currencies; scaling Fediverse deployment with service providers; Open Mobile Device technologies; and development in local communities.
- NGI Transoceanic will address joint research with the U.S. and work with scientists in the National Science Foundation.

Mr O'Donohue said that all NGI projects align with the concept of Digital Commons, aiming to combine top-down policies with grassroots trust agendas. He explained the key need for specific instruments and a balance between driving the Digital Commons and ensuring the independence of its makers. Recognition of the value of Digital Commons has been acknowledged by ministers in the European Council, leading to proposed actions that seek Member States' engagement and support.

To further support the Digital Commons, the aforementioned 27 million Euro NGI Commons Fund as well as a new project focused on developing Commons policy will be initiated on 1st January 2024. He also highlighted the importance of emerging technologies such as AI, extended reality, IoT, and multilingual technologies, positioning them as fundamental for virtual worlds. He described the internet as evolving from a network of networks to a network of virtual worlds, making Digital Commons increasingly relevant.

Finally, he praised the NGI for its adaptability, characteristics suited for addressing challenges, and a track record of agile implementation and community-governed developments. He encouraged a mix of bottom-up

projects and piloting solutions, stating the importance of open technologies for long-term societal and economic value. He made a call to engage and persuade those who may not yet believe in NGI's vision, urging the community to shape both the future of the internet and the associated political and regulatory landscape.

WORKSHOP 1: Hands-on ActivityPub Software Workshop for Ex-Twitter Users

Facilitator:

- hellekin, NG10 Mentor, petites singularités

The participants explored federated software options and gained insights into cultural nuances distinct from Twitter. The session emphasised the significance of embracing the Fediverse in the evolving landscape of social media.

WORKSHOP 2: REUSE: Simplifying Licensing and Copyright Information for the Next Generation Internet

Facilitators:

- Lucas Lasota, Legal Program Manager, Free Software Foundation Europe
- Tobias Diekershoff, System Administrator, Free Software Foundation Europe

The participants explored federated software options and gained insights into cultural nuances distinct from Twitter. The session emphasised the significance of embracing the Fediverse in the evolving landscape of social media.

WORKSHOP 3: The NGI Ecosystem, More Than Funding - How to Be Part of It

Facilitators:

- Monique Calisti, CEO, Martel Innovate, Director NGI Outreach Office
- Philippe Félix, Communication Trainer, NGI Outreach Office / Tipik
- Catarina Pereira, Senior Communication and Dissemination Specialist, Martel Innovate
- Giovanni Maccani, Research Director, Ideas for Change

The NGI ecosystem is a growing community of highly-talented researchers and innovators, and the NGI Outreach Office acts as a community hub helping increase awareness and impact of the many NGI-driven efforts. The workshop participants had the chance to hear more about upcoming funding opportunities and discover all services available to NGI community members.

WORKSHOP 4: Ethics in NGI Search

Facilitators:

- Fabian Geier, Head of Department: Science - Technology - Society; Professor of Philosophy, CODE University of Applied Sciences
- Mirko Presser, Associate Professor, Aarhus University
- Renée Ridgway, Post Doc, Aarhus University
- Alexander Nussbaumer, Postdoctoral Researcher, Graz University of Technology

The openwebsearch.eu project is releasing an Open Web Index, which raises a number of ethical dilemmas and opportunities, while projects like NGI search are funding work on large language models that could benefit from an Open Web Index. This workshop discussed what ethical considerations need to be addressed by projects collating data, data ownership as well as the responsibility and accountability regarding search results based on this data.

WORKSHOP 5: Digital Identity and Digital Wallets, Common Ground to Enhance Scalability and Adoption

Facilitators:

- Caroline Barelle, R&D Project Manager, European Dynamics
- Alexander Herranz, Head of Technology, ALASTRIA
- Vasilios Siris, Professor, Athens University of Economics and Business
- Andrés del Álamo Cienfuegos, Researcher, Fundacion Cibervoluntarios
- Muttukrishnan Rajarajan, Professor, University of London
- Ruben Roex, Attorney - Partner, Timelex
- Vlado Stankovski, Professor, University of Ljubljana
- Petar Kochovski, Assistant Professor / Research Associate, University of Ljubljana.

The potential synergy between digital identity and wallets holds significant promise for enhancing the user experience and driving growth in the EU's digital economy. However, the current lack of universally defined terms and a common taxonomy for digital wallets has resulted in interoperability challenges, suboptimal user experiences, and slow adoption of standards. This workshop addressed these issues by investigating barriers to digital wallet adoption, identifying common definitions for a universal digital wallet taxonomy, and providing key insights for developers and policymakers to foster scalability and adoption across Europe.

WORKSHOP 6: Meet the Innovators Behind the NGI Impact Stories

Innovators:

- Alexandre GAREL, Software Engineer, Open Food Facts
- Daniel Thompson-Yvetot, Chairperson of the Board of Directors, Tauri
- Pouhiou Lafon Roudier, Co-director, Framasoft
- Markus Sabadello, CEO, Danube Tech
- Gaël Duval, CEO, Murena

This session allowed onsite participants to meet the innovators behind the NGI impact stories, hear more about their work and ask any burning questions they might have had.