From Cloud to Edge to IoT for European Data
Information and Brokerage Session Report
7 July 2021 | 9.30 – 13:30 CET

- **Event page: https://horizon-europe-cloud-edge-iot.b2match.io**
- **253 Registrations | 183 Meetings**
- **Recordings: https://www.youtube.com/playlist?list=PLBrivHE6_rsdWf9F9KN-MyFZ9b57RjcDm**

Session	Time	Participants
Opening and Introduction Session - Horizon Europe Section "From Cloud-Edge-IoT to European Data"	9:30 – 10:30	• Rolf Riemenschneider, *Head of Sector IoT, European Commission* • Haydn Thompson, *Founder and managing director of the THHINK Group* • Monique Calisti, *CEO Martel Innovate, Coordinator EU-IoT*

Rolf Riemenschneider, Head of Sector IoT EC

Key points:

- Within the context of Horizon Europe the IoT EC unit is working with a specific set of topics, around new strategies focused on world leading technology at the interface of cloud, data and AI, under Destination 3 of HE - From Cloud to Edge to IoT for European data
- The projects will place a strong emphasis on EU Data Strategy, through initiatives that can generate momentum by advances in cloud and edge computing
- The overall purpose is to strengthen the EU position in the data economy, whilst also investing in alternatives such as a federation of cloud infrastructure based in Europe.
- Today 80% of computing takes place in cloud infrastructures which are built by few world leading cloud service providers. In the future beyond 5 year, there will be a paradigm shift towards more decentralised intelligence and data processing close to connected IoT objects and networked systems, where the data is generated.
- Europe has a unique opportunity to invest in data processing and computing at the edge and build on its strength in designing safe and complex systems.
- The Commission is also looking for co-investment in this area, and collaboration with private Member State initiatives such as GAIA-X, as well as drawing on policy initiatives such as Roadmap of the Industrial Alliance for Cloud and Data, or the Data Market and Governance Act

- Specifically with GAIA-X, the Commission is working on creating a European federation of data, defining the technical architecture leading to interoperability and standards. This will be supported through applications in principal use cases as evidence for the technical architecture. It is worth noting that while HE projects should consider the advice of Gaia-X, it is not compulsory for successful projects to participate in this initiative.
- **The aim is to achieve harmonised data processing along the so-called Computing Continuum, i.e. between Cloud - Edge – IoT.** The Cloud is the dominant computing feature, with 80% of data processing in the Cloud and 20% on Edge. But within 5 years the notion will be reversed, 80% processing on Edge 20% to Cloud, via decentralised approaches such as embedded intelligence, or private 5G networks for connected cars
- Innovation will arise from moving reasoning to the Edge, integrating new chips, processes, incorporating machine learning, dealing with complex environments and decision making, real-time response, enhancing security, filtering and keeping sensitive data confined locally for further processing increasing security; green solutions, decentralised Edge computing solutions, easier to integrate distributed resources, renewable energy use for reducing carbon footprint;
- The aim is for Cloud-Edge orchestration, reaching advances in Cloud and AI learning, deploying AI algorithms, and delivering new functions to the edge of devices. The end vision is a seamless architecture across the continuum, with new business models
- **The set of HE calls under HE Work Programme 2021-22 in next 2 yrs include:**
    - 3 calls for research and innovation projects related to Cloud-Edge-IoT,
    - A CSA call for coordinating the participation of projects in the cloud-edge-IoT topic and cross Work Programme coordination, and another CSA topic for the roadmap of the next generation of IoT technology.
    - A further research topic on open source for cloud will open in 2022
- One RIA topic on Edge metaOS is open NOW and will close in October
- Further on, it is planned to support vertical support for pilots and up-take actions from 2023 onwards, putting selected domains (fast movers) in the lead.
- .In light of fierce global competition, ther won't be one European champion. In order to compete with leading hyperscalers, European companies must join forces; there is a need for partnerships and alliances, focusing on system integration platforms, supported by a vibrant and growing ecosystem.
- These topics are central part of an emerging European Strategy on Cloud-Edge-IoT. So far input has been gathered from from the Strategy Forum and other stakeholder consultations. These consultations will continue as independent forums in the future

Presentations:

- https://www.ngiot.eu/download/rolf-riemenschneider-world-leading-data-and-computing-technologies/?wpdmdl=1884&masterkey=60f82317b7515
- https://www.ngiot.eu/download/rolf-riemenschneider-future-european-platforms-for-the-edge-meta-operating-systems/?wpdmdl=1885&masterkey=60f8236873904

Haydn Thompson - Summary of EC consultations on IoT: Fireside Chat, Strategy Forum Meetings for the Next Generation of IoT

Key points:

- IoT is fast growing, it will be a €1.3 tn market by 2026.

Fireside chat:

- Leading industrialists and experts in the field agreed that Edge is the logical evolution of the cloud model. It will reduce the amount of data sent to the Cloud, bring real-time operation to the Edge, improve security, privacy, etc; it will reduce the energy use of systems in future; **this is an opportunity for Europe.** The Cloud market is dominated by US players, with 80% of global revenues from a few US companies

- The data processing move to Edge opens up a great opportunity for new business and a share of a new market, building up to the Internet of Intelligent Things
- The winner in the Edge market will need to understand both functional and nonfunctional requirements; Europe is a leader in automotive and can build on this
- Strength of Europe is in operations, there is a pressing need for IoT and Edge computing platforms to support this, through strategic action on cloud continuum
- The focus should be on moving to trusted multi vendor open orchestration integration platforms and fair marketplaces, linking with other complementary activities such as open data spaces and federated data architectures.

The Strategy forum:

- 400 experts and strategic stakeholders came together to discuss the future of IoT at this event
- Several sectors came along to present their business needs in integration:
    - In energy there is a strong move to renewable and smart metering
    - For automotive, automation can't build an energy future on silos of the past. There is a need for a common integration platform for the cars of the future, not just electric but also autonomous cars
    - In the industrial domain there is a growing convergence of technology used to optimise and platforms, bringing these together which naturally creates IoT
    - The semiconductor sector fits in many. verticals; in Europe players with know-how in embedded applications are key to win these markets
    - In smart cities there is a focus on data driven solutions for smart transportation, smart energy and governance; the key is trust; citizens need to trust these systems, complicated systems with complex interactions need to be secure
    - In home automation interoperability is needed, many companies are producing solutions but there is a need to connect them ; the Zigbee alliance stressed the high need for standards to interconnect these

Standardisation:

- A need for cross domain applications was expressed, for interoperable domains
- Non functional requirements are a key driver in all application domains
- Need to develop ecosystems and alliances

Trust:

- Digital trust key to digital transformation;
- Trust is built on several layers - in Europe we have GDPR which has helped with trusted data sharing. Data collection needs to be minimised; delete data when not required; data policies are needed for transparency, where data subjects can easily opt out.
- In the AI sector trust is key for the business value of systems
- On a system level, trustworthiness needs to be addressed as first class rather than an add on
- On liability, there is a need to look at the quality of systems produced, ensuring that they do not create surprises when operational. The questions for solutions are: can we do it and also is it affordable
- Trustworthiness is a key USP for businesses, it is a property of the whole system, the system should be loyal to user not service provider in order to gain user acceptance

Looking to the future session:

- Key applications include IoT, edge, AI, wireless, cellular, AI of things, swarm intelligence
- There is a large opportunity for Europe in Edge computing applications, we have strength in manufacturing, automotive and many other domains; we are now seeing operational technology coming together to create IoT applications;
- In terms of cross platforms for functional and nonfunctional applications Europe is a leader, this is where a major share of future edge devices will be. The killer app could be related to either or all of video processing, AR, VR, automation of driving;

- There are many ecosystems we can rely on, we need to bring them together, connecting existing roadmaps
- We should concentrate on standardisation, need to think of ecosystems that are open, global and driven by requirements
- Key issues in terms of certification include how to do it how to make it affordable, cryptographic approaches are needed
- We should focus on impact building through critical and high value projects, moving beyond functional demos to acceptance testing and demonstration of business value

Presentation: https://www.ngiot.eu/download/haydn-thompson-next-generation-iot/?wpdmdl=1886&masterkey=60f823f889437

Summary of the session:

- **Successful proposals will need to be strategic, Europe is strong on system integration aspects, now we need to be supporting the ecosystems, bringing the dots together.**
- This funding topic offers the opportunity for cascading funds to expand the ecosystem and build on trends during the project stage.
- The underpinning characteristics of IoT systems include a need for user acceptance, for this trust is very important, trusted data sharing
- **We also need to think about the business value of solutions**, we should not be creating new software or interoperability if its application is not clear, need to focus on innovation
- It is important to work across domains, interactions such as the energy - automotive domain, across domains and standards to create new applications such as for smart cities are needed.
- Take a context from one domain and apply it in another domain, this is what is needed from projects

Session	Time
Cloud-Edge-IoT – Pitch Session	10:45 - 12:00

Proposal Pitch Block

- University of Oulu, Finland – Computing in the Edge-Cloud Continuum
- ZHAW Zurich University of Applied Science, Switzerland – Processing at the Edge
- MET Communications GmbH, Germany – Artificial Intelligence – Risk Management Framework
- PlatformUptake.eu, Austria – Assessing the State of the Art and supporting an evidence-based Uptake and Evolution of Open Service Platforms in the Active and Healthy Ageing Domain
- Threefold, Belgium – Autonomous Decentralised Cloud Technology
- pi-lar, Germany – Zero Trust: Data Sovereignty and Safe Data Communication
- Ghent University, Belgium – Network on High-Performance Embedded Architecture and Compilation

Organisation Pitch Block

- RISE Research Institutes of Sweden, ICE data center
- Fundación Cibervoluntarios, Spain
- Digital Catapult, United Kingdom
- Green Communications, France
- OpenNebula, Spain
- Instituto Pedro Nunes, Portugal
- F6S Network, Ireland

- pi-lar, Germany
- South-East Asia IP SME Helpdesk, Vietnam

Presentation: https://www.ngiot.eu/download/from-cloud-to-edge-to-iot-for-european-data-pitches/?wpdmdl=1887&masterkey=60f8247f8ea21

Session	Time	Participants
Wrap-Up and Closing Session	13:15 - 13:30	• Rolf Riemenschneider, *Head of Sector IoT, European Commission* • Haydn Thompson, *Founder and managing director of the THHINK Group* • Verena Wottrich, *Communication and Dissemination Specialist, Martel Innovate*

Summary of pitch sessions:

- Sectorial focuses included: intelligent traffic management, industrial automation, healthcare, smart agriculture, logistics supply chain, food wastage in restaurants, public protection, disaster management; while there is not a lot of interaction between sectors now, there are significant opportunities
- Ideas in platforms included decentralised systems, edge to edge computing, web of things
- Many speakers have highlighted the competence in AI, trustworthiness and risk, and federated learning and AI at the edge
- Testbeds for edge or 5G were proposed
- In terms of outreach and commercialisation, dissemination, IP protection, expertise in cascade funding, digital transformation for societal impact are all needed
- How can partners get together in a large project? There are many application domains, orchestration mechanisms, expertise in AI, the question now is how to link these
- Essentially, EC is looking for few strategic projects – where the quality of the consortium and the potential to mobilise key European stakeholders around an emerging strategy is as important as the technical excellence dimension.
- Need to bring topics together that can deal with complex research challenges such as cloud-edge orchestration, AI, cybersecurity etc.. As a general hint to all proposals: Given the limit of page numbers, applicants should pay attention to build a story line that is easy to understand, stripping down complexity and focusing on the most important concepts; high level meta-OS is the clue between cloud and control systems
- To the next level, we have a strong potential to reach a critical mass in Europe, the European supply chain to improve here by building open ecosystems around open platforms
- Trust and trustworthiness are complex area; unlikely to be fully resolved in one project
- To fit within the limit of pages, proposers must ensure that the proposal is easy to be understood by external experts, even for parts that cannot be covered in your work packages; As an important element, proposers may use the opportunity of cascade funding, which may add an element of agile development during the project lifecycle, e.g. by picking up some of the research topics, extending the application space, adding more or other use cases from different areas, edge development and validation process to contribute and maximise the impact of the project
- Very important: Keep an strong focus on the potential impacts of the projects , be specific to the call text under the expected outcome