PHIRI
Population Health Information Research Infrastructure

Disseminating results using a *human-to-machine* approach

March 27th, 2023

EuroPeristat meeting

IACS Instituto Aragonés de Ciencias de la Salud

www.phiri.eu

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101018317

PHIRI principles

- ***Research Question***
- ***Health Data*** (secondary use)
- Common Data Model (***CDM***)
- Security & ***privacy by design***
- ***"Code meets data"***
- Enabling ***rapid-cycle*** analyses

- **Open source** (software/stack)
- **Literate** statistical **programming**
- **Usability** (easy-to-use interfaces)
- FAIR ***(Reproducible)***
- Aligned with advances towards ***Federated Learning***

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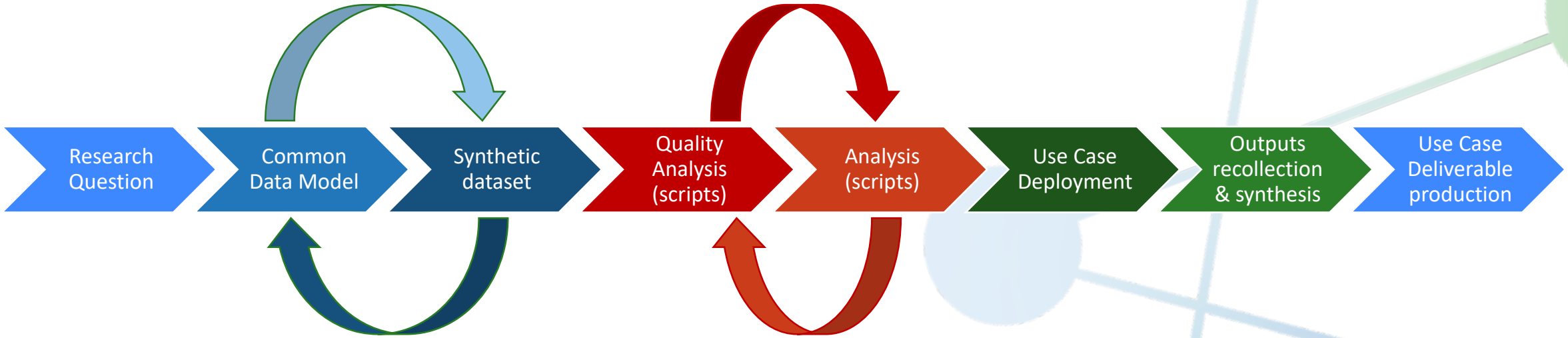
PHIRI workflow *(Use case leader's perspective)*



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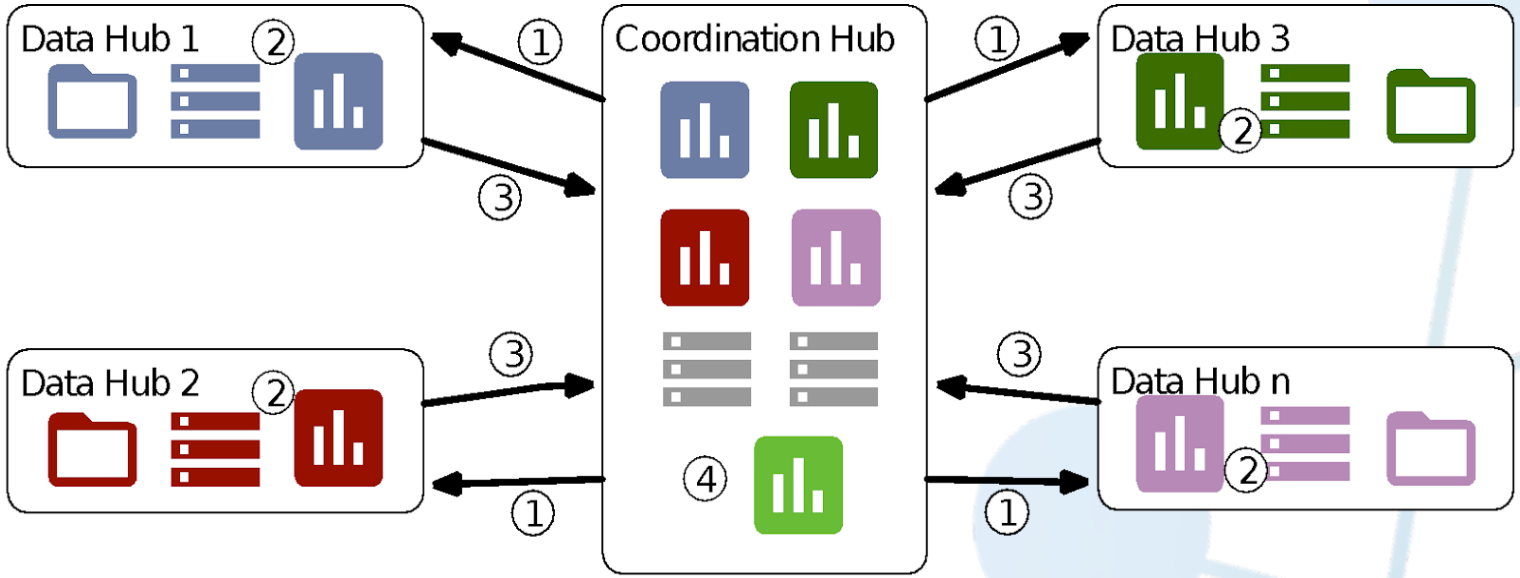
PHIRI federated approach



(1) The coordinator develops the documentation and analysis required for the use case and integrates the into the PHIRI app

(2) Each Data Hub extract and transform their data to the CDM, deploys and runs the PHIRI app to get the expected outputs

(3) Outputs are shared with the coordinator

(4) The coordinator develops the comparative analysis and produces the expected results

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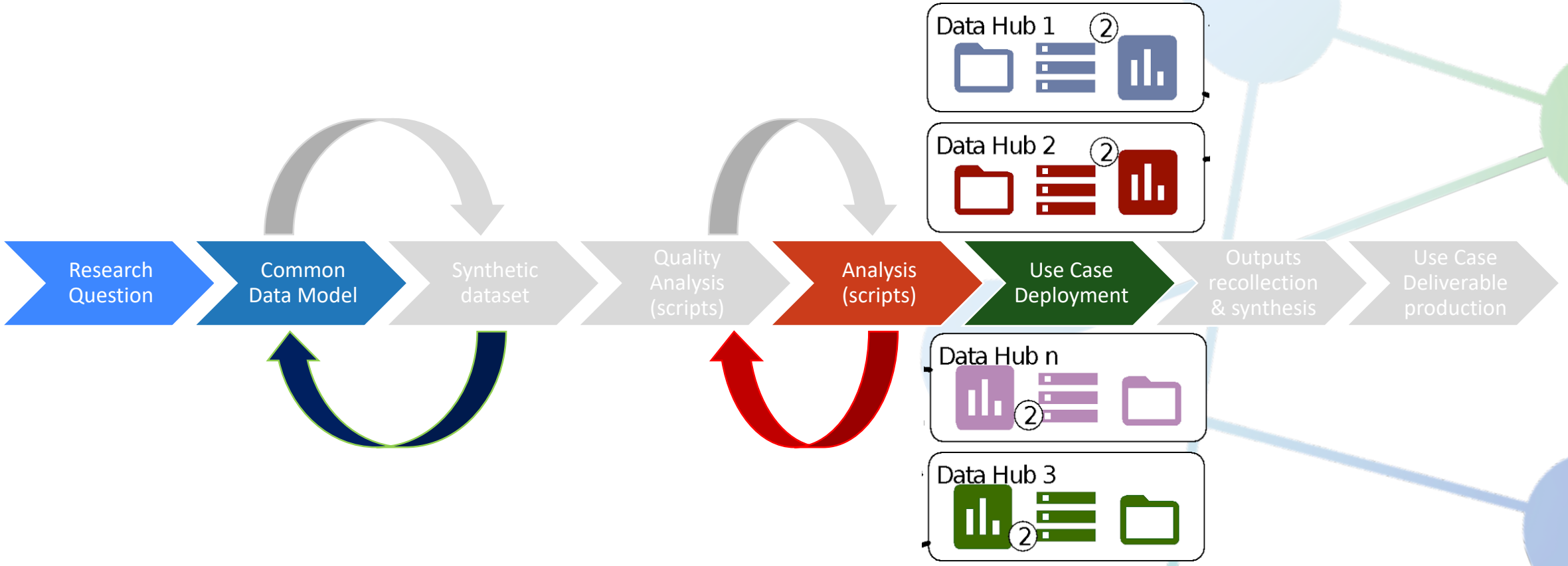
PHIRI workflow (Data hub's perspective)



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PHIRI app Demonstrator

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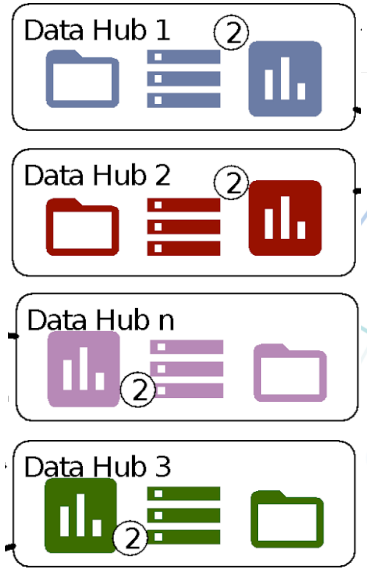
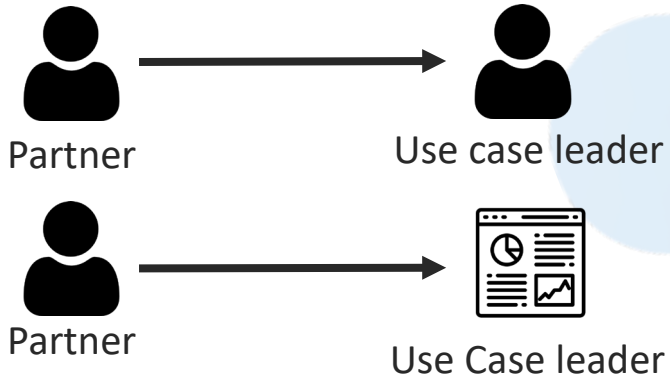
PHIRI workflow (Data hub's perspective)

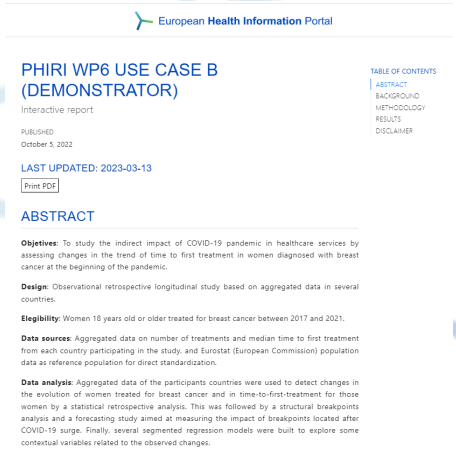
Use Case Deployment

Outputs recollection & synthesis

Use Case Deliverable production







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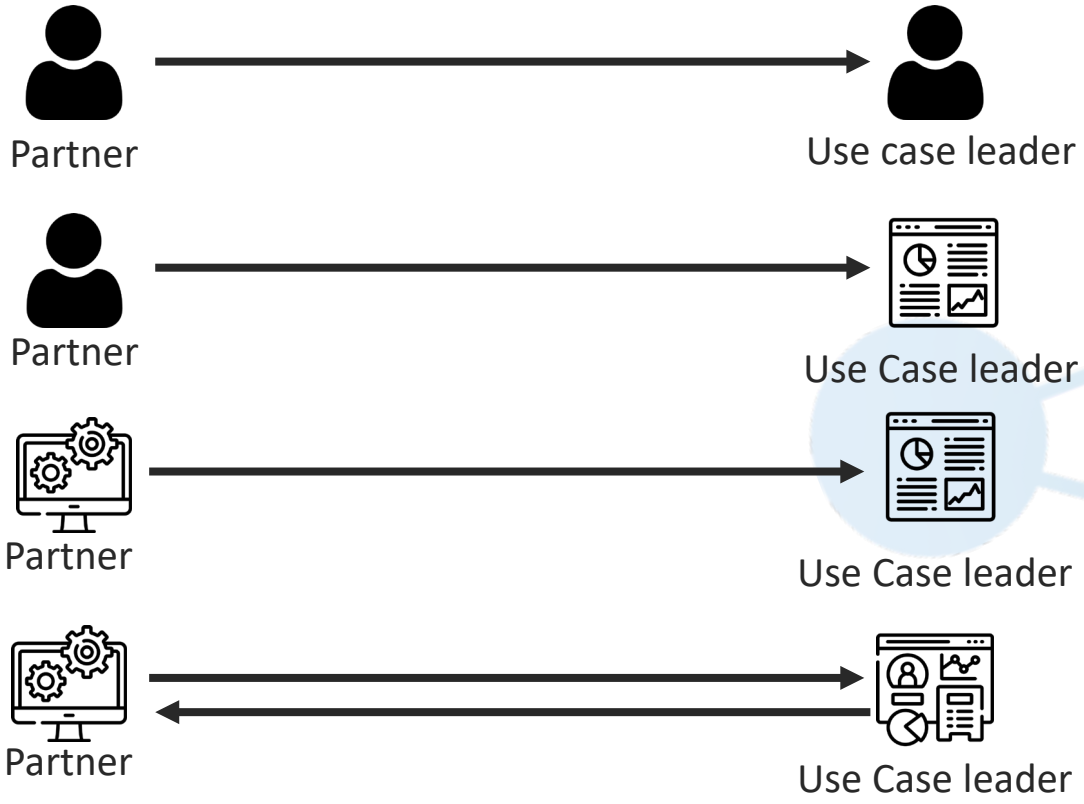
Step-by-step plan towards Federated Learning

- Handling secure interactions (*communications)*:



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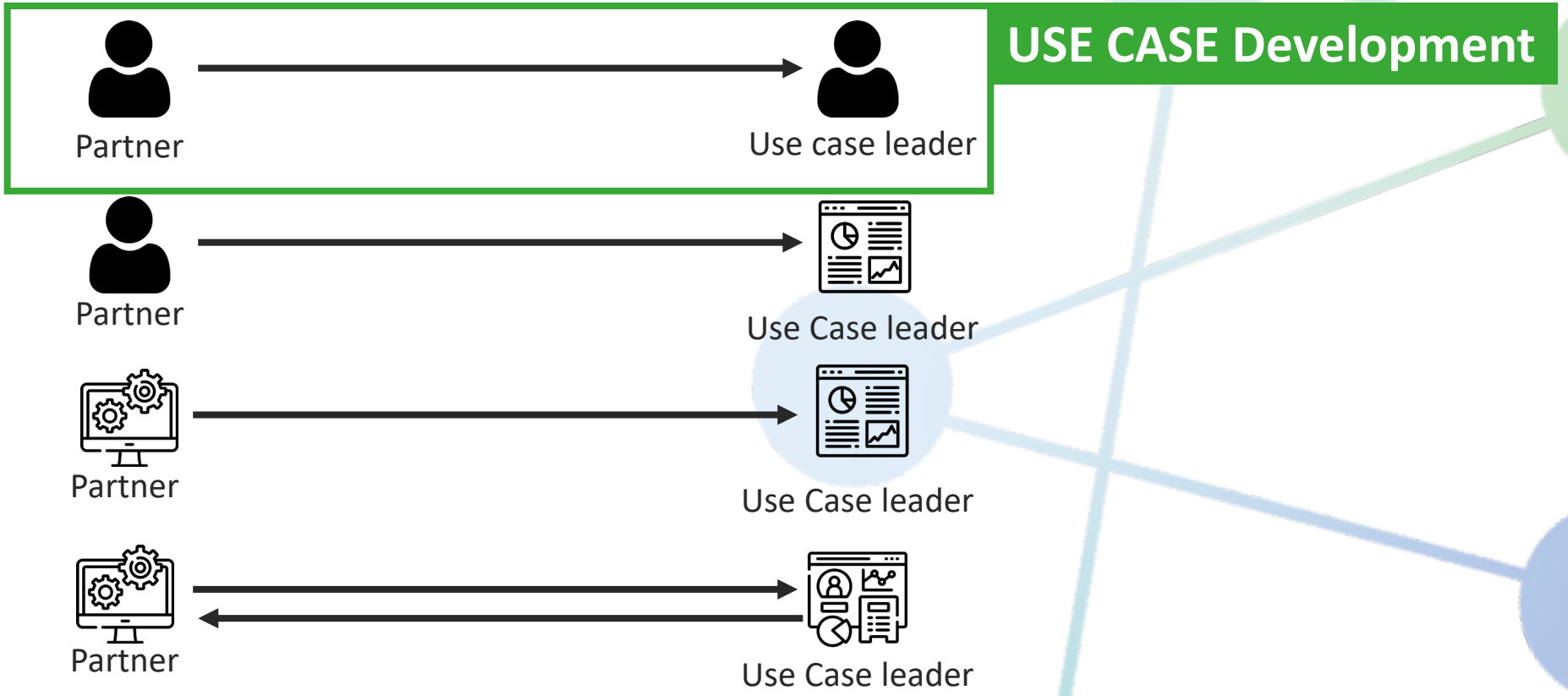

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Step-by-step plan towards Federated Learning

- Handling secure interactions (*communications*):
  - **TIER 0 – HUMAN to HUMAN interactions**
    - Example*: Each participant partner execute the analyses and* ***sends an e-mail with a) the data quality report and b) the aggregate data attached to the use case leader*** *for each use case in which they are participating*
  - TIER 1 – HUMAN to MACHINE interaction (with user interface)
    - Example: *Each participant partner execute the analyses, logs into a website (i.e. health information portal) with user authentication and upload the data quality report and the aggregated data to enable further meta-analysis or comparison by use case leaders*
  - TIER 2 – MACHINE to MACHINE one-way (automating retrieval of the outputs)
    - Example: *Each participant partner execute the analysis and press "Send outputs" to submit the data quality report and the aggregated outputs to a common repository enabling further meta-analysis or comparison by use case leaders*
  - TIER 3 – MACHINE to MACHINE two-way (distributing algorithms – federated learning)
    - Example: *Each participant partner configures an environment where the required data is available for analyses, and manages authorization for the deployment and execution of analytical algorithms on their data and the authorization for sharing their outputs*

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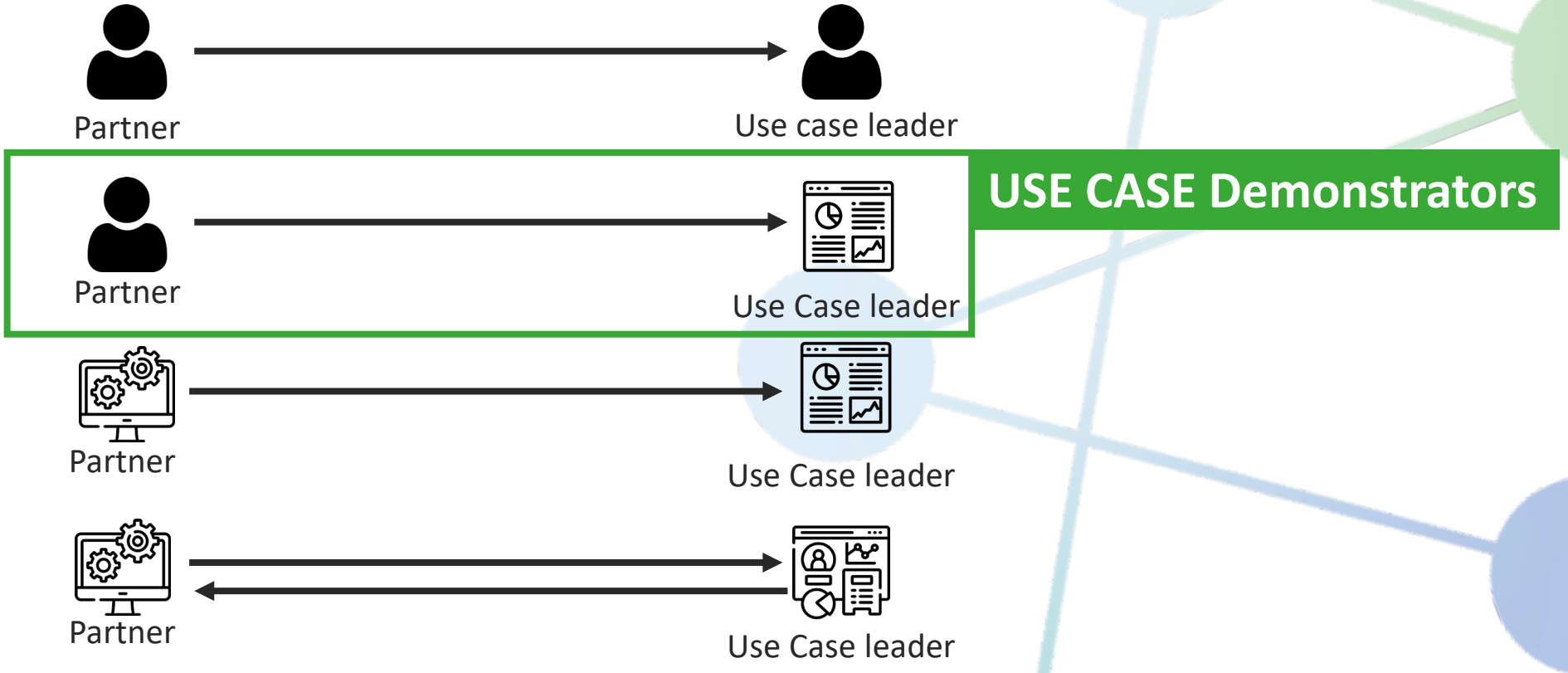

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Use Case B Demonstrator

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Q&A

Thank you!

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