



# DARE UK

TRE-FX

**Core federation services for a federated network of TREs to enable Five Safes analytics**

Carole Goble (ELIXIR-UK, HDR-UK, University of Manchester)

Phil Quinlan & Tom Giles (ELIXIR-UK, HDR-UK, University of Nottingham)

# TREs, Analysis tools, Infrastructure providers, PPIE



Five Safes framework for TREs to provide safe research access to data.

Federated Analysis using multiple TREs.

How do we standardise the flow of information for federated analysis within the **Five Safes** framework?

Can we develop a mechanism of running federated analytics workflows that is **technology agnostic**?



# Many scenarios where you cannot get all the data into one TRE Analyses across multiple TREs is necessary, possible but VERY HARD

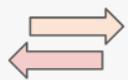
Researchers

Federated Analytics Tools

TREs

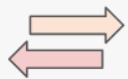


PPIE



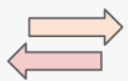
BitFount

Queries

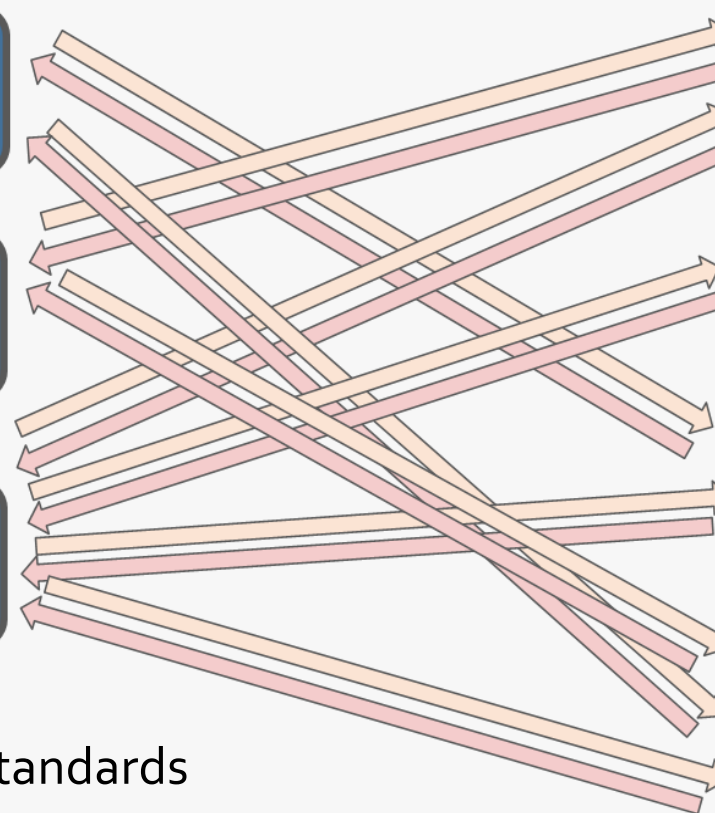


DataSHIELD

Results



Others



FedNet  
(Azure TRE)

Treehouse  
(AWS TRE)

SAIL  
(On-Prem TRE)

Others  
(Any TRE platform)

- Each Toolkit has its own unique exchange standards
- Each TRE has to develop bespoke solution
- Each solution must be independently tested against the Five Safes
- Each solution must be validated by PPIE & governance

# Secure Digital Research Objects standardise and streamline exchange between services, representing the queries & results, and the metadata.

Researchers

Federated Analytics Tools

TREs



PPIE



BitFount

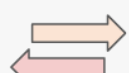


Queries

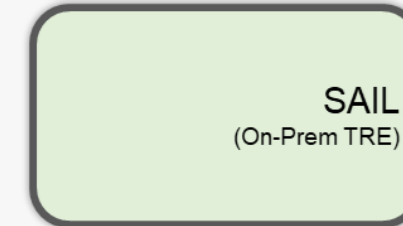
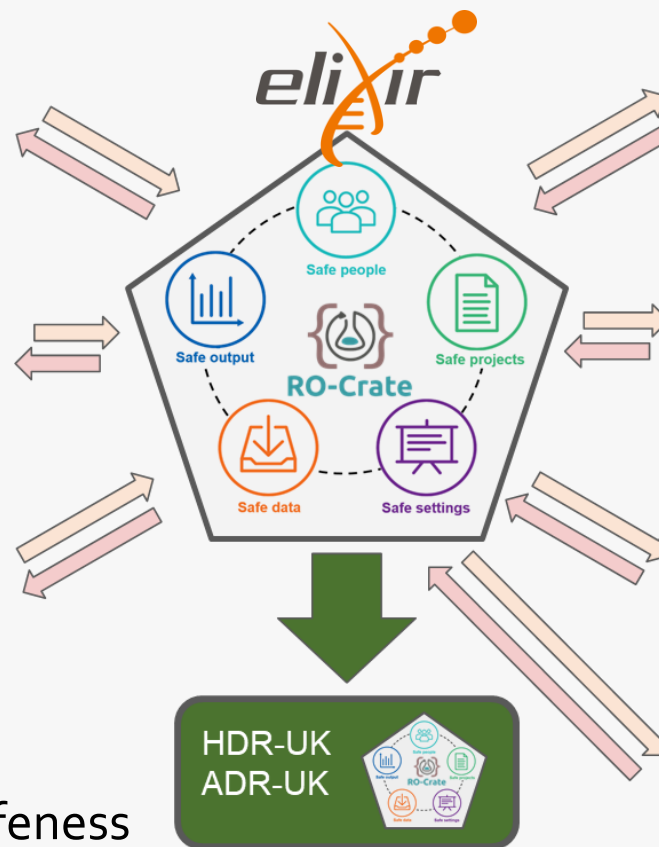


DataSHIELD

Results



Others



- Tools and TREs use RO-crates to enable Five Safeness
- Platform and TRE independent solution
- Transparent & Scalable

# Interoperability framework for exchanging Digital Objects between services, developed by the European RI for Life Science Data



## RO-Crate

<https://www.researchobject.org/ro-crate/>

- Richly structured packages of content.
- "Machine actionable" metadata.
- Off the shelf technologies using lightweight techniques.
- Handles diversity of content.
- Works alongside community content standards.
- Exchange queries, data, workflows, logs, etc ...
- Record provenance (history, origin).

# Preliminary work already done to pass queries and results between platforms and TREs using Five Safes RO-Crates



Federated Analytics Tools

User making the request

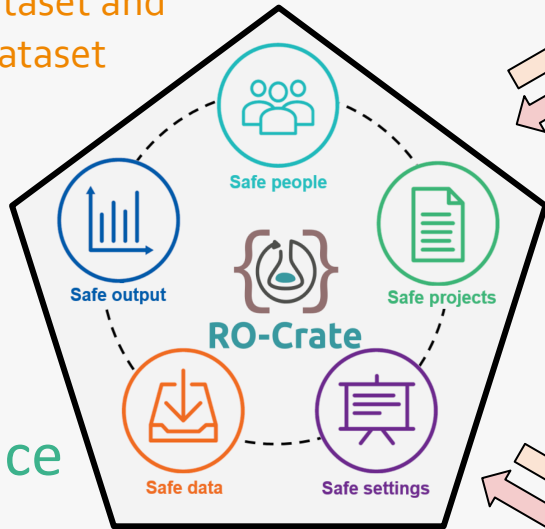
The query to run on the TRE

Metadata of dataset and references to dataset

Queries

Results + Provenance

Outputs approved for release & provenance

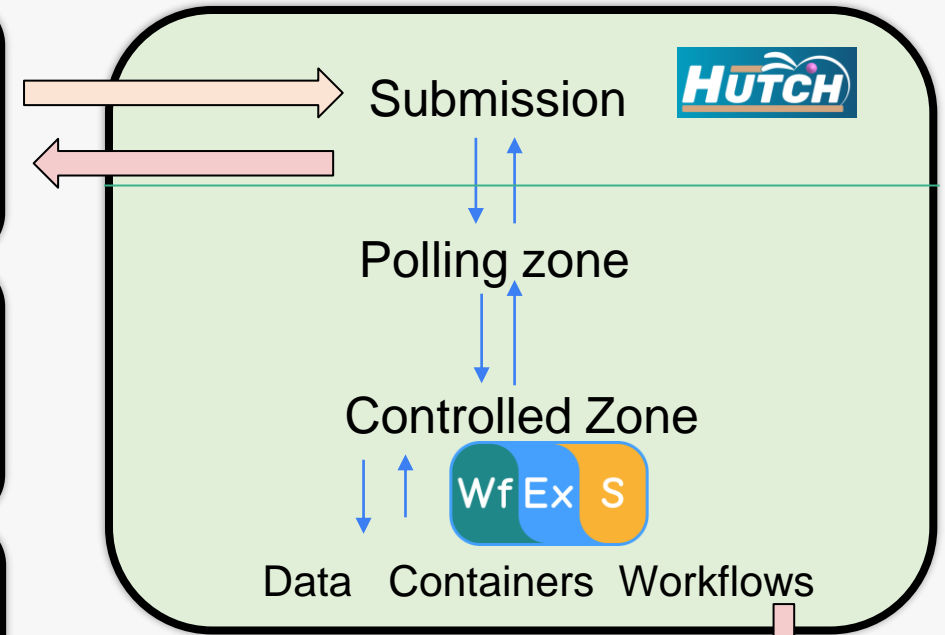


TREs



**HDR-UK**  
Data Use Registry

Transparency



Pre-approved workflows and containers on TRE



# PPIE - One Team - One Mission



## Technical Sprint – Synthetic Data

### Feb 2023

PPI Input to Planning Meeting

PPI Chair Team Meetings

Drafting PPI Action Plan

Development of Public Explanation of Project

Presentation of PPI impact

### May 2023

Video Explainer of TRE-FX

1<sup>st</sup> Public Workshop

PPI Input to blog – workshop outcomes

PPI Representation at Sprint Exemplar Day

### July 2023

Project outcomes explainer for Workshop 2

2<sup>nd</sup> Public Workshop

Feedback on outputs

Lay Summary of Project Outcomes



# Building on existing services, tools, frameworks and collaborations so we can Sprint.

## Previous DARE UK Sprints

FAIR TREATMENT

FED-NET

TREEHOOSE

## Data Infrastructure

SAIL

HDR-UK/ADR-UK

ELIXIR-UK

## Federated Analytics

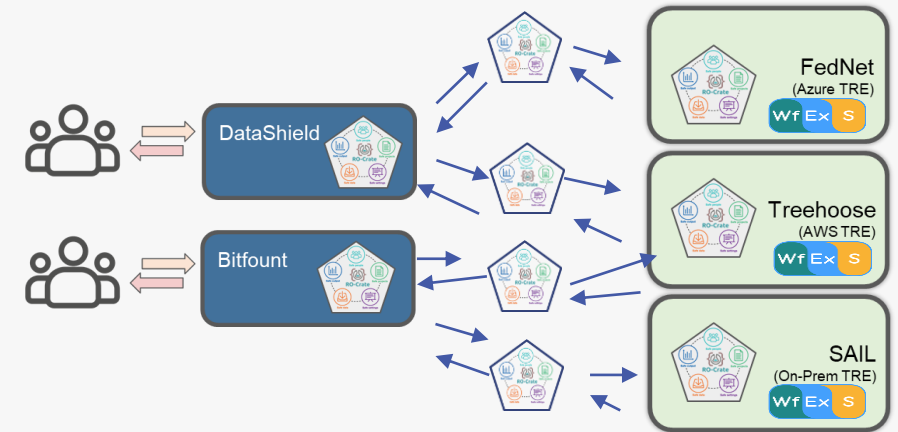
BITFOUNT

DataSHIELD

HUTCH

# Questions we will address through User scenario driven implementations

- Organise our RO-Crate Objects
  - Workflow approval
  - Platform adaptations
  - Agreement on processes between TREs
  - User and Project Validation
- 
- **Simple enough** to be widely adopted by both TREs and Federated Analytic tool providers



## SATRE

Digital objects & workflows in a TRE Blueprint

## SACRO

Semi-Automated Checking of Research Outputs supported by Five Safes RO-Crates

## SARA

Data provenance logs and reports incorporated into Five Safes RO-Crates

## TELEPORT pop-up TRE

An endpoint inbound query for TRE-FX

# Impact Leveraging SeRP, DataSHIELD and ELIXIR

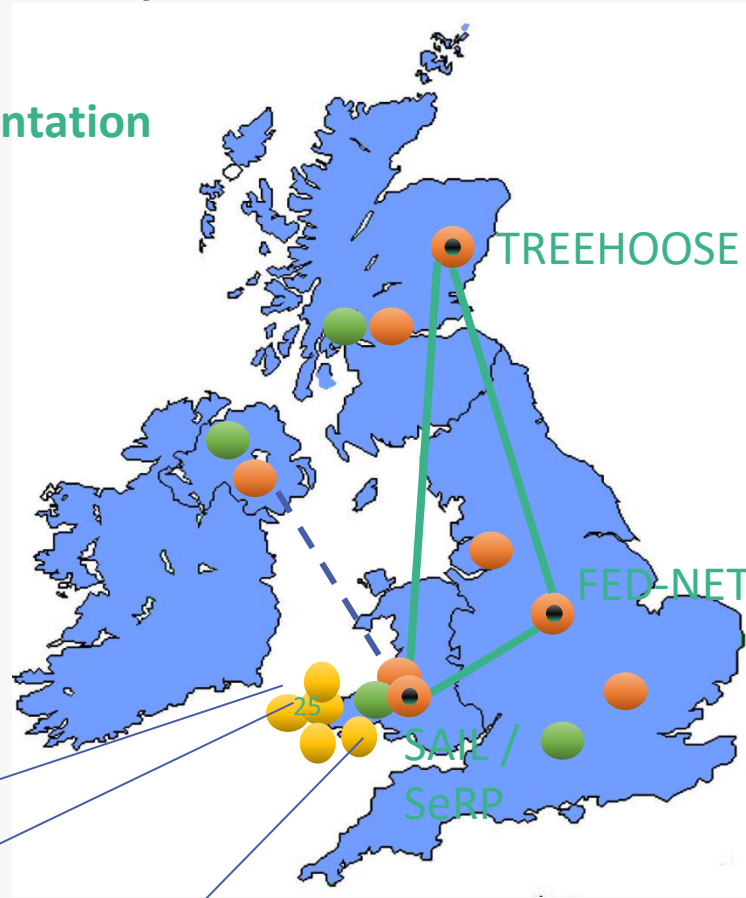


## Credible Reference Implementation

HDRUK Main Sites

ADR Sites

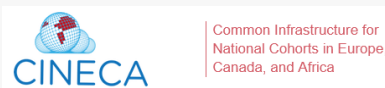
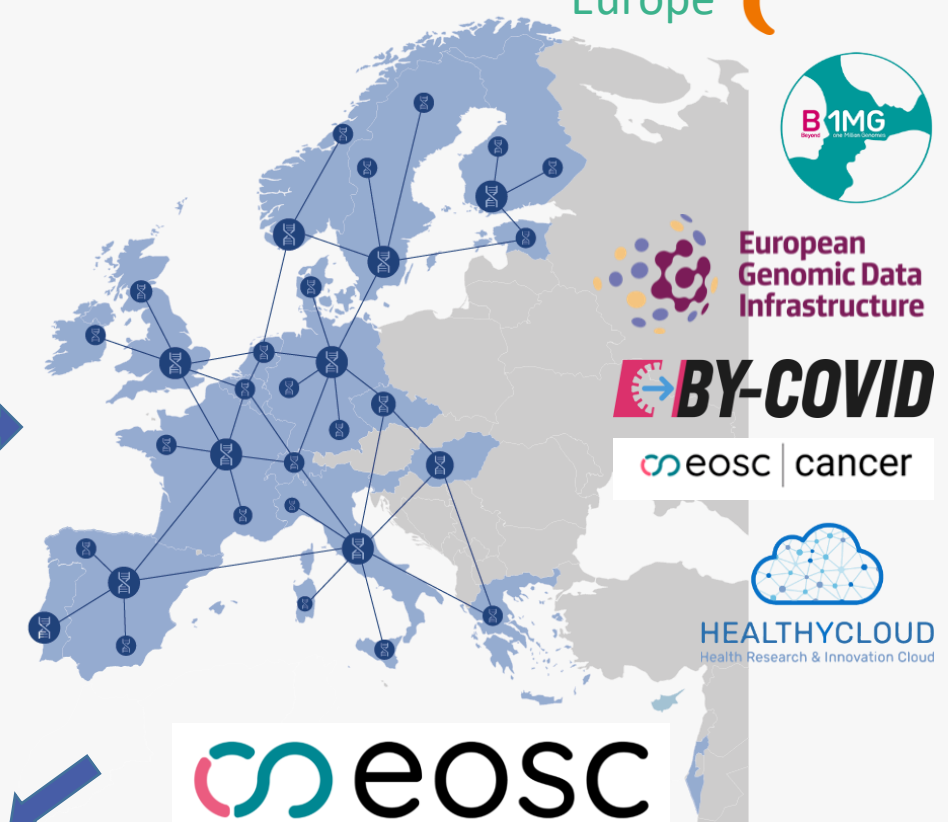
Stretch TRE's



Australia



BC, Canada



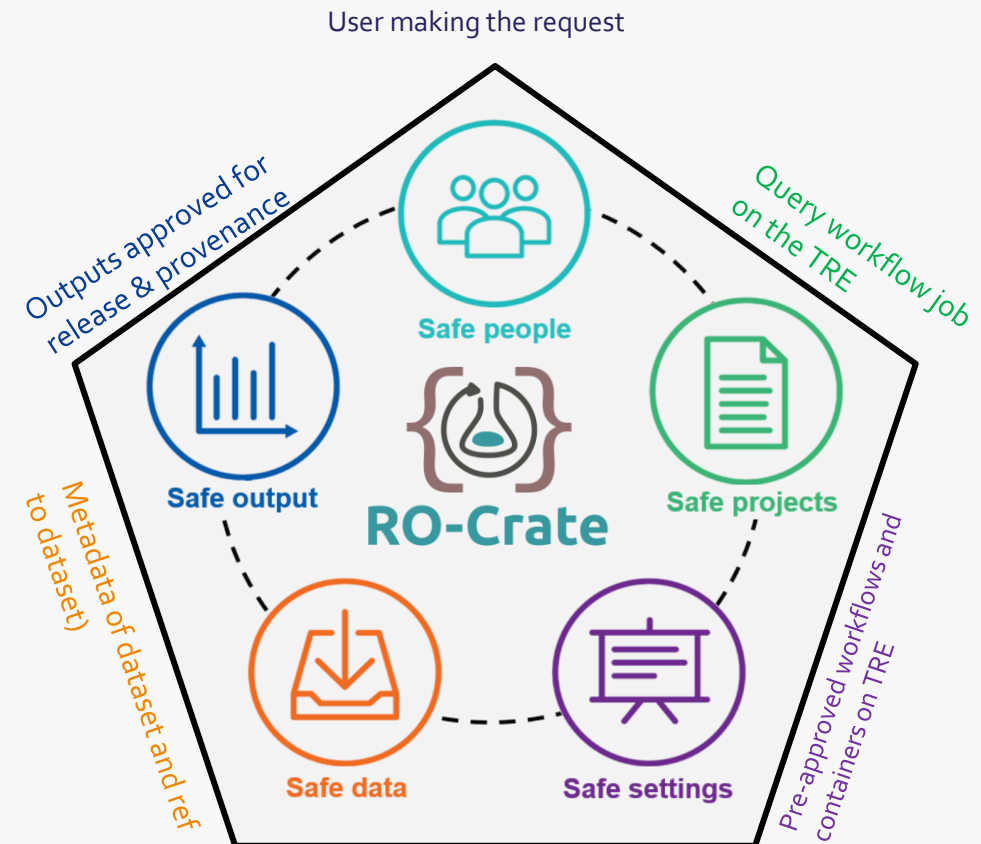
# TRE-FX

## Five Safes Federated Analysis using multiple TREs

**Standardised and streamlined** flow of information using Five Safes RO-Crates

**Technology agnostic** mechanisms for running federated analytics workflows

**Readily adoptable** by existing and future tools and TREs





# DARE UK

Thank you for listening

<https://trefx.uk/>