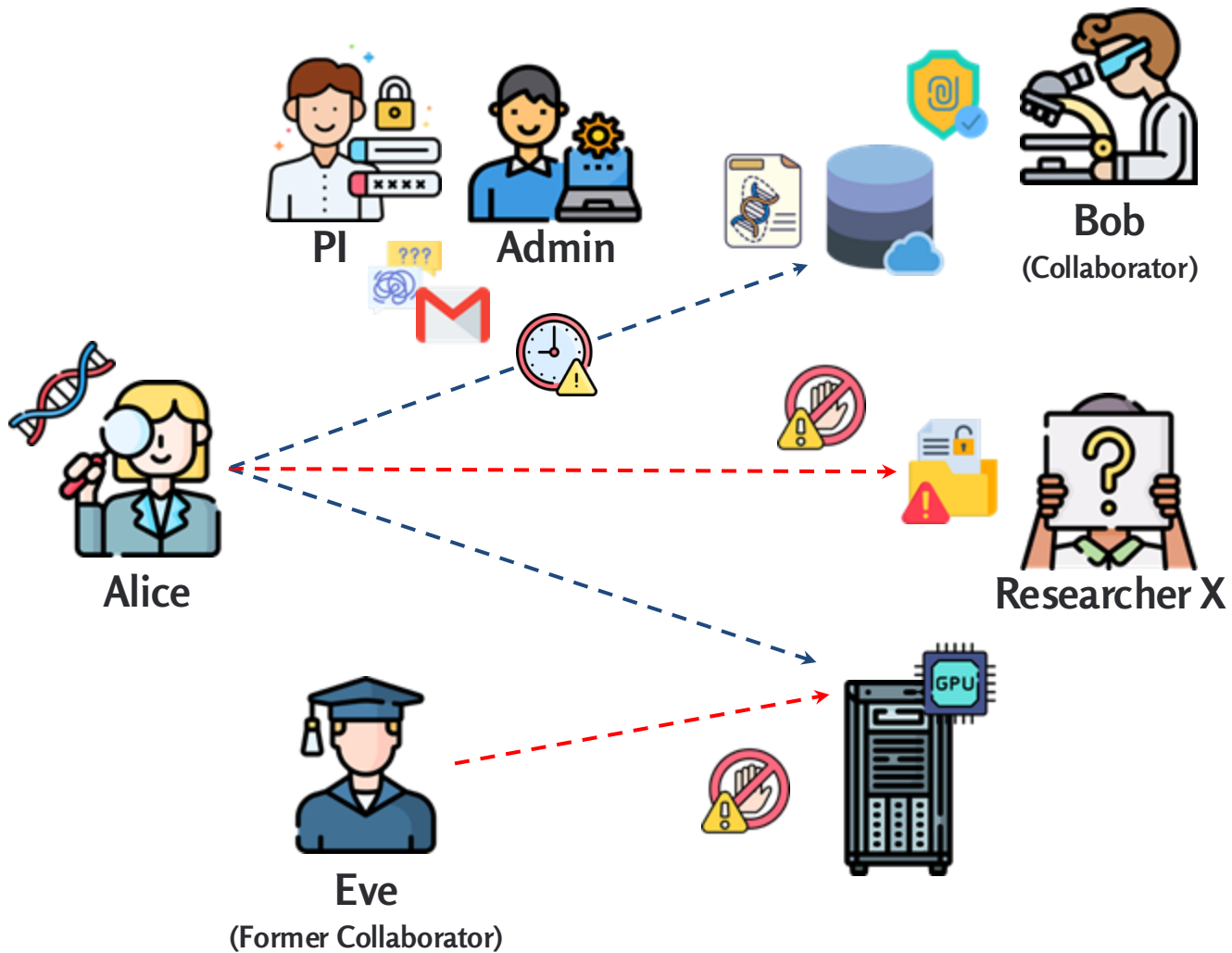
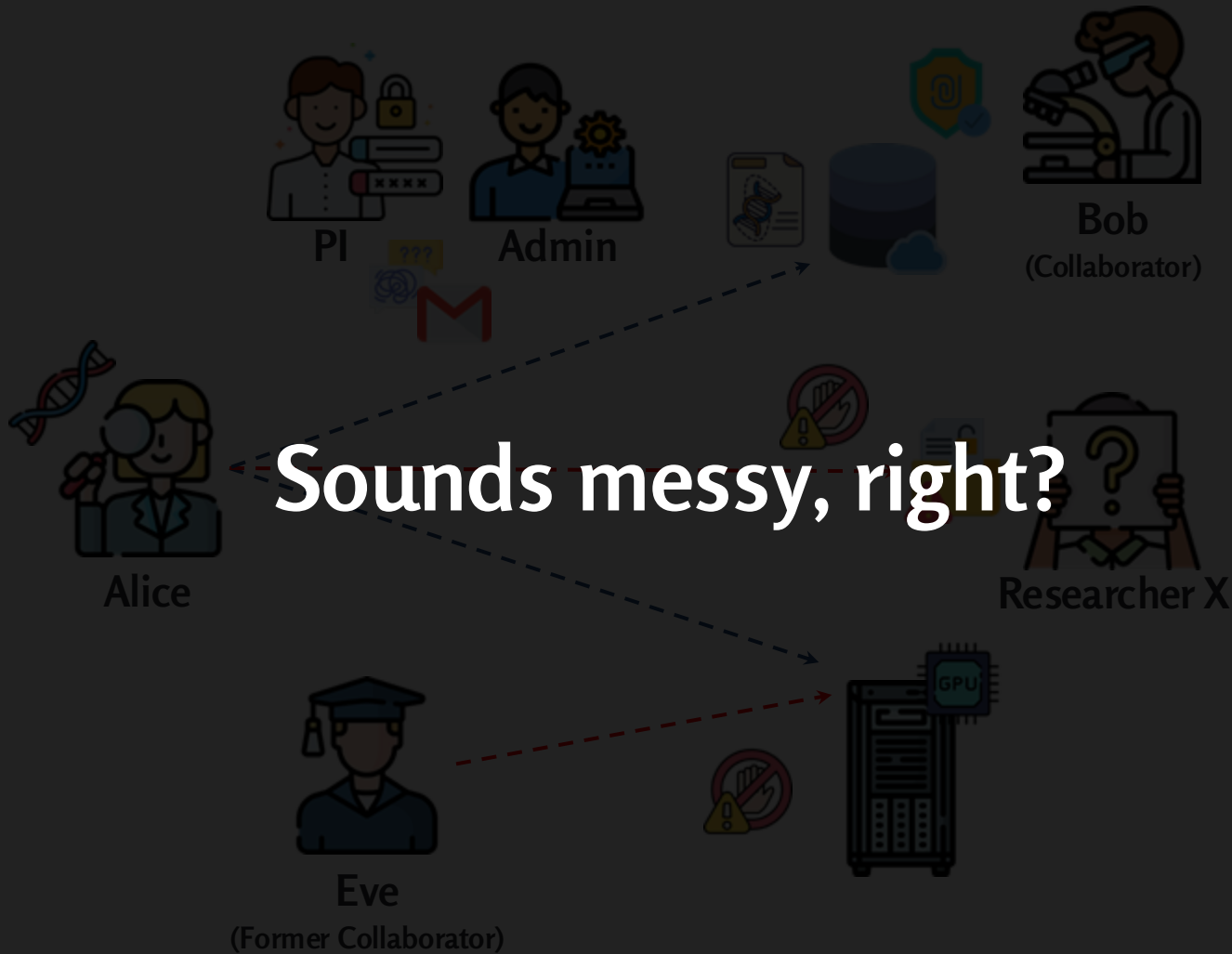


“It’s almost like Frankenstein”: Investigating the Complexities of Scientific Collaboration and Privilege Management within Research Computing Infrastructures

Souradip Nath[†], Ananta Soneji[†], Jaejong Baek, Tiffany Bao, Adam Doupé,
Carlos Rubio-Medrano, and Gail-Joon Ahn

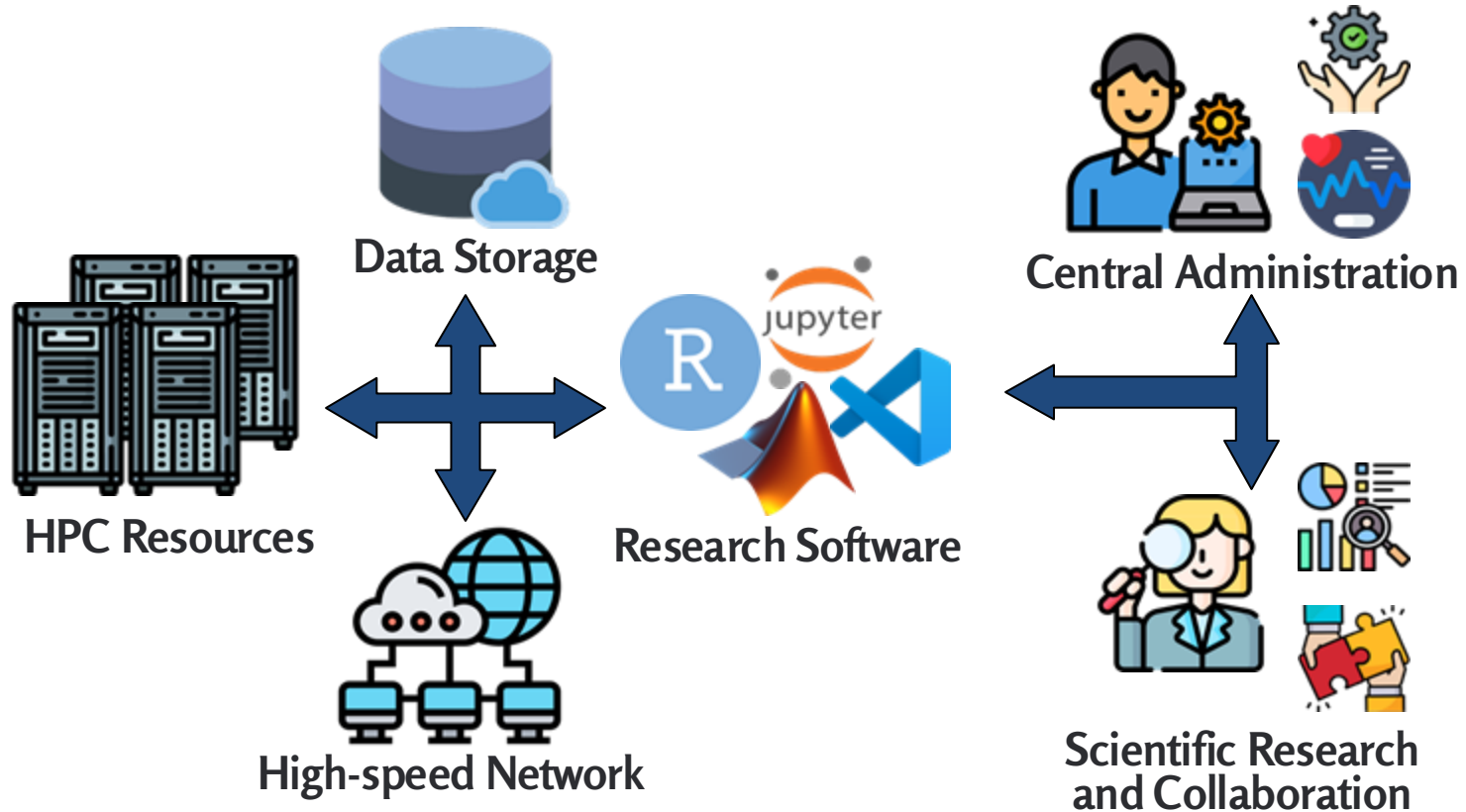




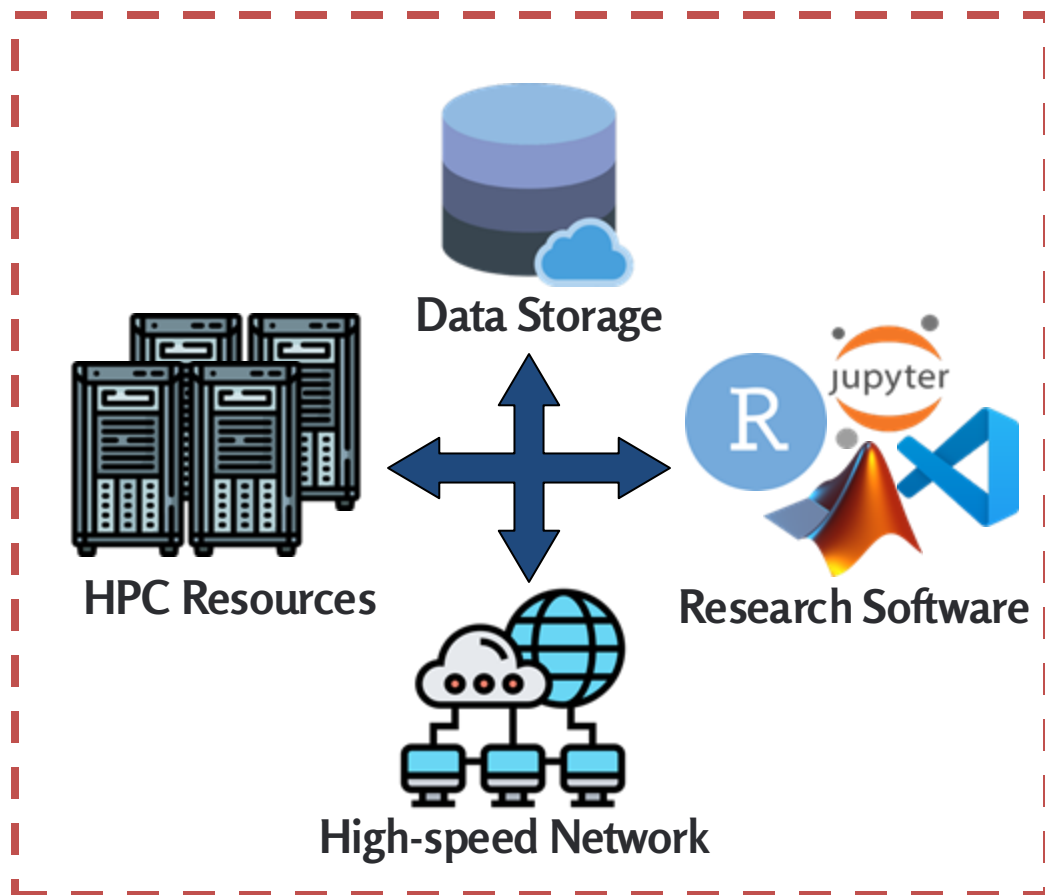


“It’s almost like Frankenstein”: Investigating the **Complexities**
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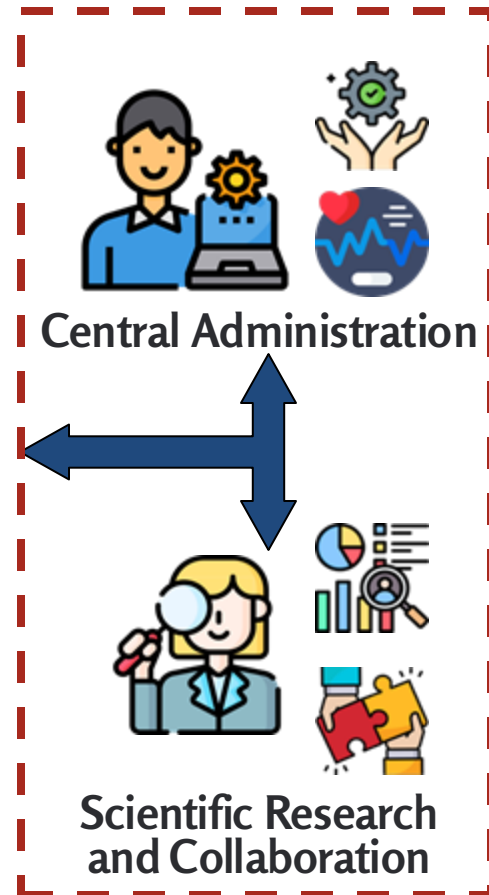
Research Computing Infrastructure (RCI)



Existing Research on RCI Security (Access Control)



Our Work



Semi-structured Interviews

What are the human-centered **practices**, **challenges**, and **needs** around **scientific collaboration** and **access control** in RCIs?



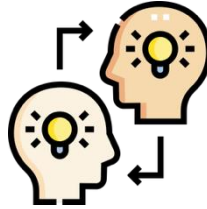
12
Research Institutions

Results

Administrative Complexities and Challenges



Layered Resource Ownership



Shared Decision Making



Nuances in Delegation and Dependencies



Lack of Automation and Systematic Processes



Infrastructure Complexity and Integration Challenges

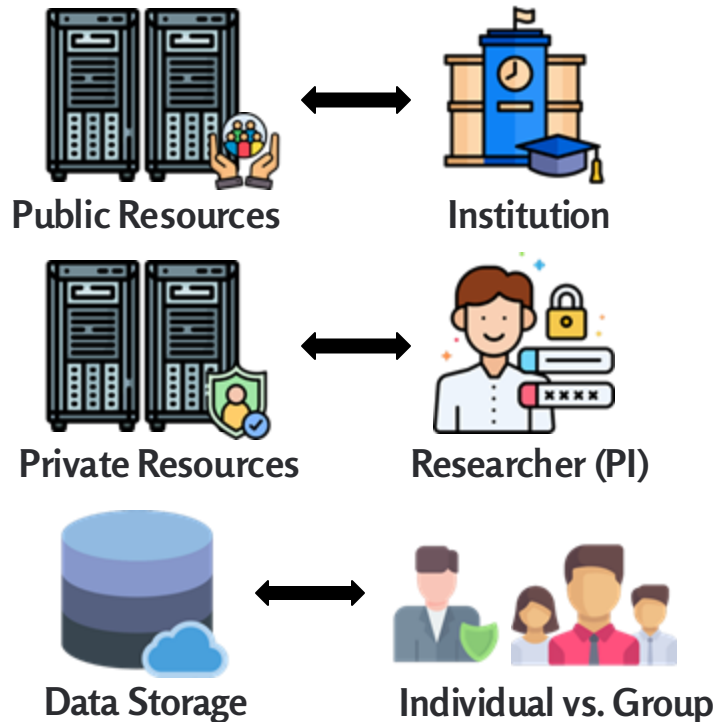


Fragmented Infrastructure and Extensibility Issues

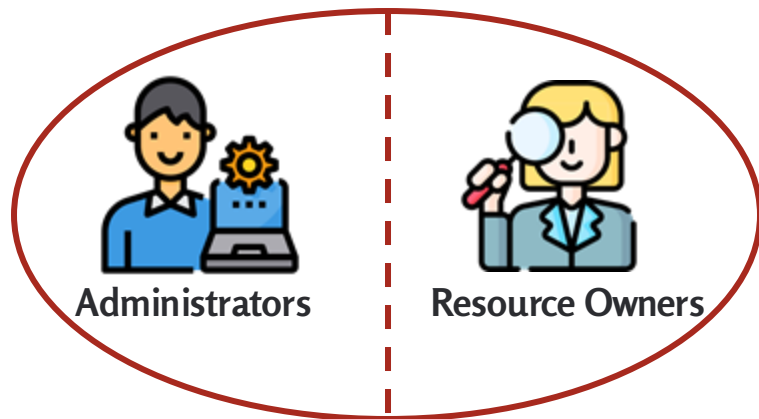


Human-centric Barriers to Security Practices

A Layered and Nuanced Structure of Resource Ownership

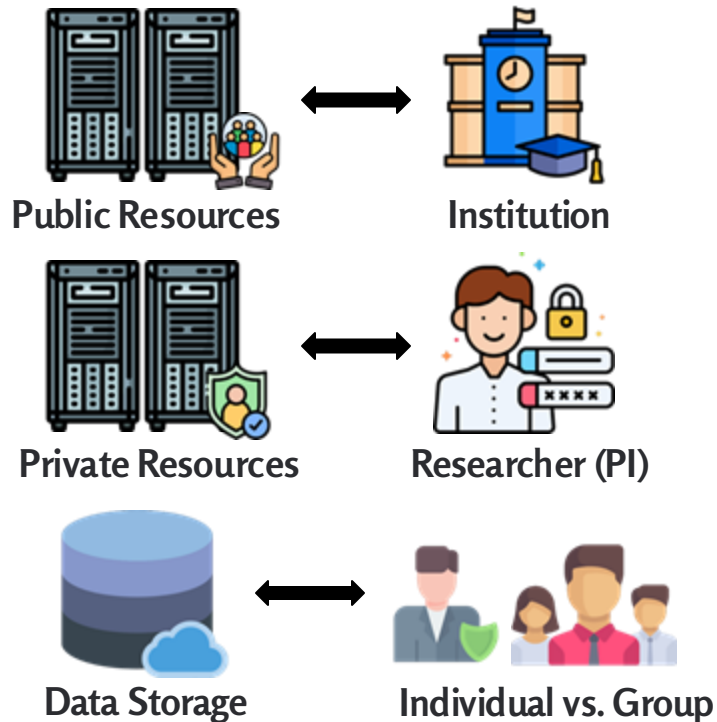


Who gets to make the access decision?



“Shared Decision Making”

A Layered and Nuanced Structure of Resource Ownership



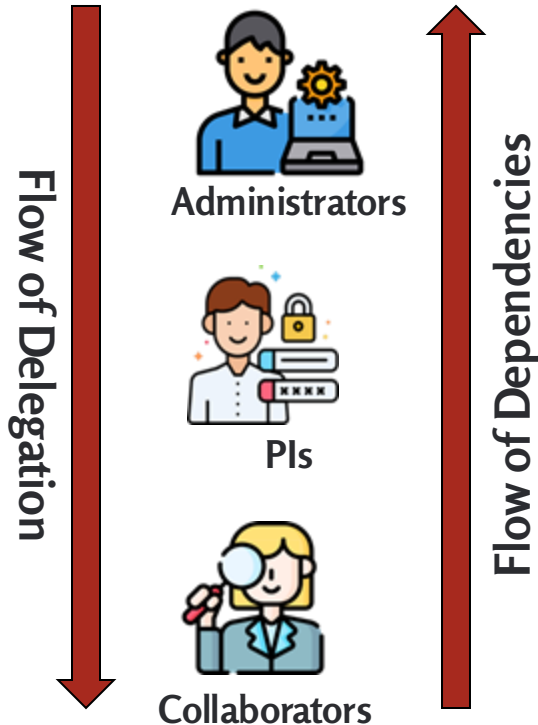
Who gets to make the access decision?

“

*We're trying to **push down the access decisions to the PIs** because they have the most information about which students should have access.*

—A05

Delegation and Dependencies in Shared Decision Making



Resource Management Policies
Risk of Access Misconfigurations
Lack of Technical Expertise

“

To be honest, *a lot of the faculty members don't touch these systems very much...* So, if they are the ones configuring access control, *there's a possibility an error goes off.*

—A06

Access Control within Research Teams

n=12



Trust-Driven, Ad-hoc
Access Decisions



Coarse-grained



Over-privileged



(Unintended) Exposure
of Sensitive Resources



(Malicious) Data
Alteration or Deletion



Manual, and
Reactive
Revocation



Reliance on
Administrative
Enforcement

“

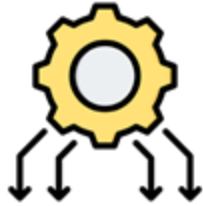
*It's very likely that **one can delete the data of others...** I can access my professor's folder and can **have access to others' folders.***

— R12

Access Control Recommendations



Formal Modeling
of Ownership



Multi-layered
Delegation



Conflict
Resolution



Context-aware
Revocation

Access Control Recommendations



Formal Modeling
of Ownership



Multi-layered
Delegation

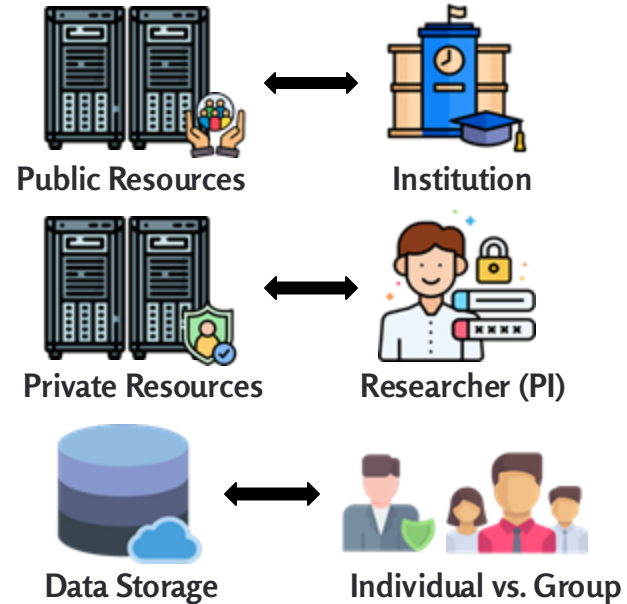


Conflict
Resolution



Context-aware
Revocation

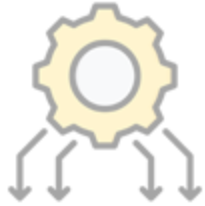
Layered and Nuanced Ownership



Access Control Recommendations



Formal Modeling
of Ownership



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Context-aware
Revocation

Flow of Delegation



Administrators



PIs



Collaborators

Access Control Recommendations



Formal Modeling
of Ownership



Multi-layered
Delegation



Conflict
Resolution



Context-aware
Revocation

Privileges tied to Temporal Contexts



Thank you

Read the paper



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