

# Accessing Privacy-preserving decentralized data

*In decentralized environments,  
public*

*Query engines need to*

*Privacy-preserving aggregation  
that untrusted third-party*

ing data the right  
preserving query  
tralized environ

onments such as Solid not

to be able to authenticate th

gregation techniques need

parties are not able to read

*right way!*

ving over

ments

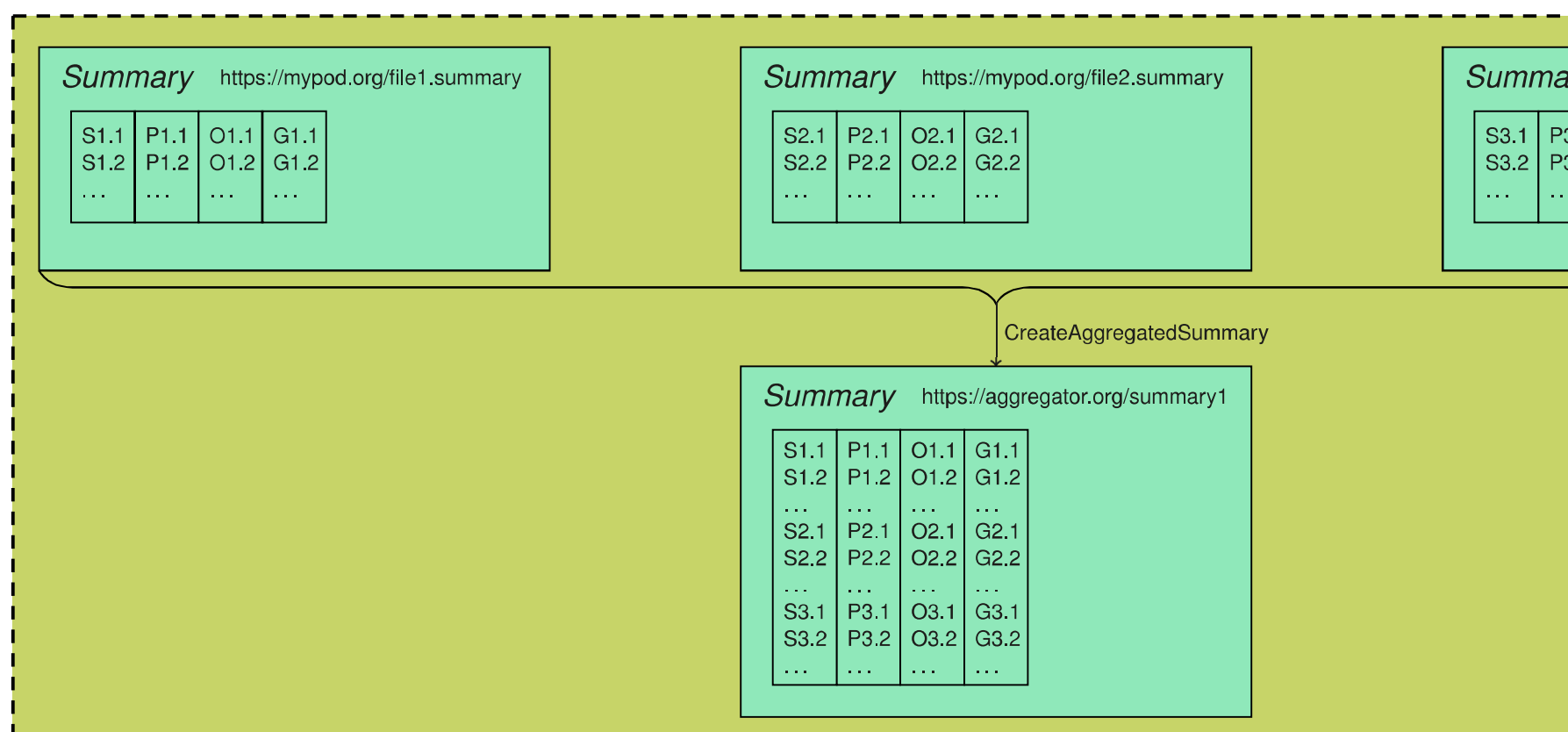
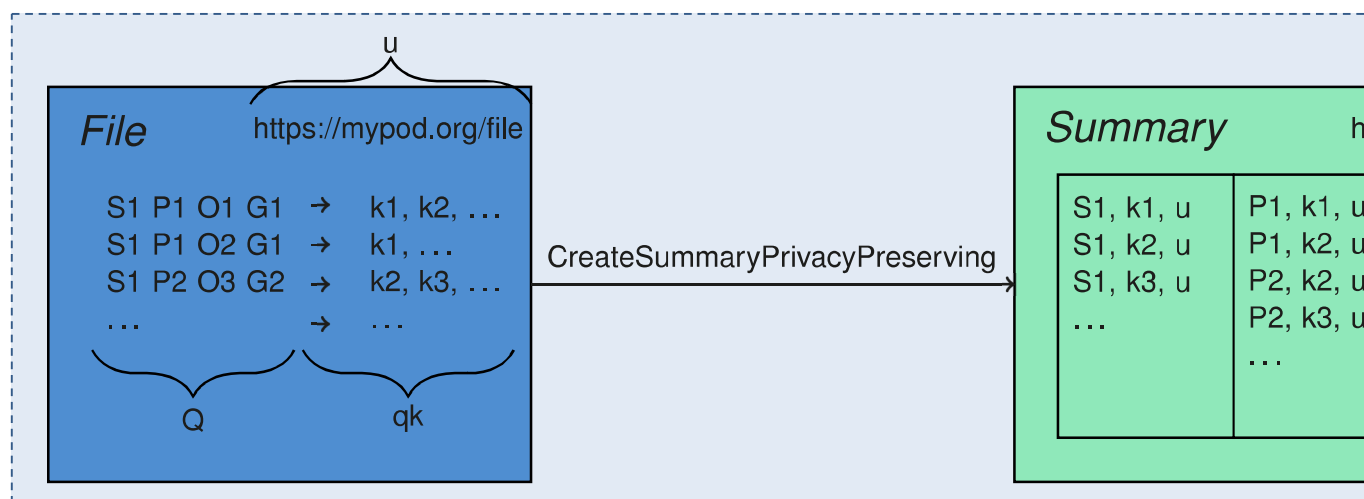
*all data is necessarily*

*themselves to sources*

*l to be introduced, so*

*data*

# Privacy-Preserving Aggregation



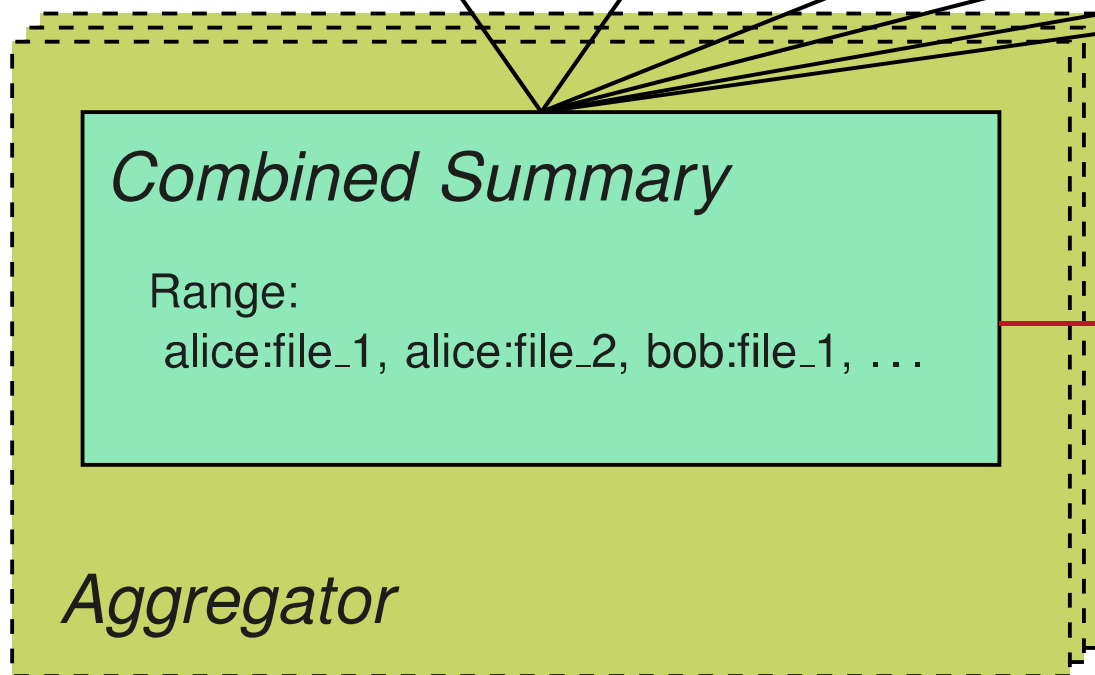
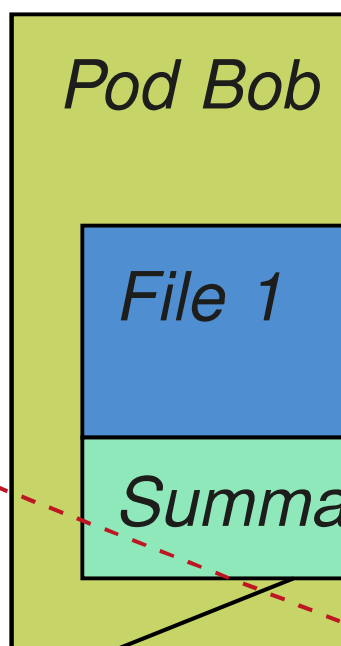
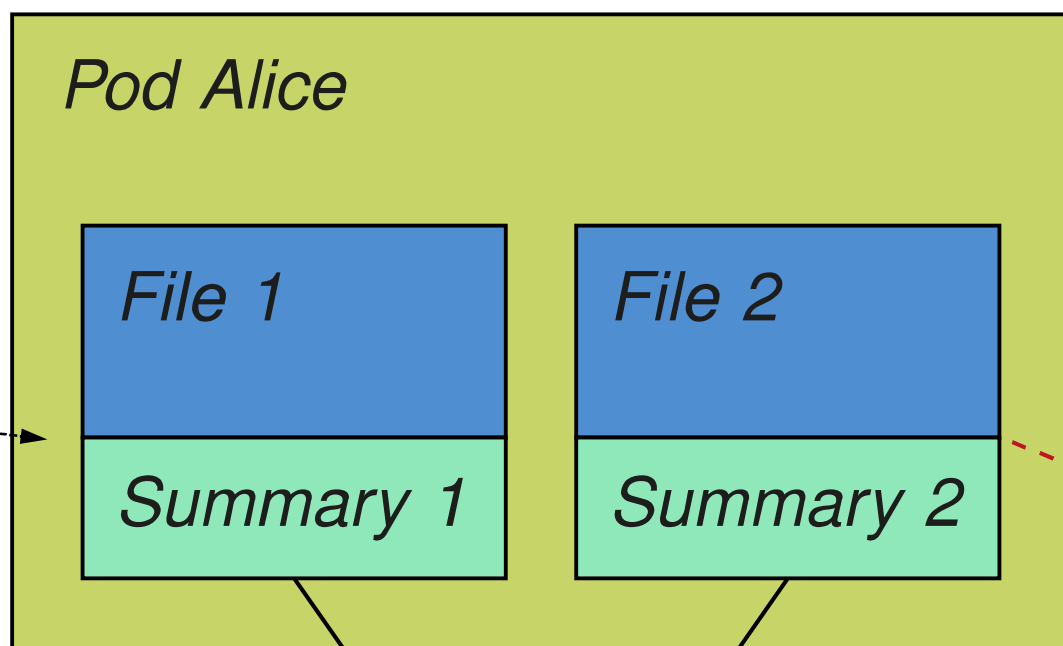
# Fine-grained Access control

```
<http://alice.pod/share/policy> a odrℓ:Policy ;
  odrℓ:permission [
    odrℓ:target [
      a odrℓ:AssetCollection ;
      odrℓ:source <https://alice.databox.me/docs/file1> ;
      odrℓ:refinement [ # refine the asset/resource
        a sh:NodeShape ;
        sh:pattern "public" ; sh:flags "i"
      ] ] ;
      odrℓ:action acl:Read ; ] .
```



https://mypod.org/file.summary		
u	O1, k1, u	G1, k1, u
u	O1, k2, u	G1, k2, u
u	O2, k1, u	G2, k2, u
u	O3, k2, u	G2, k3, u
u	O3, k3, u	...
...	...	...

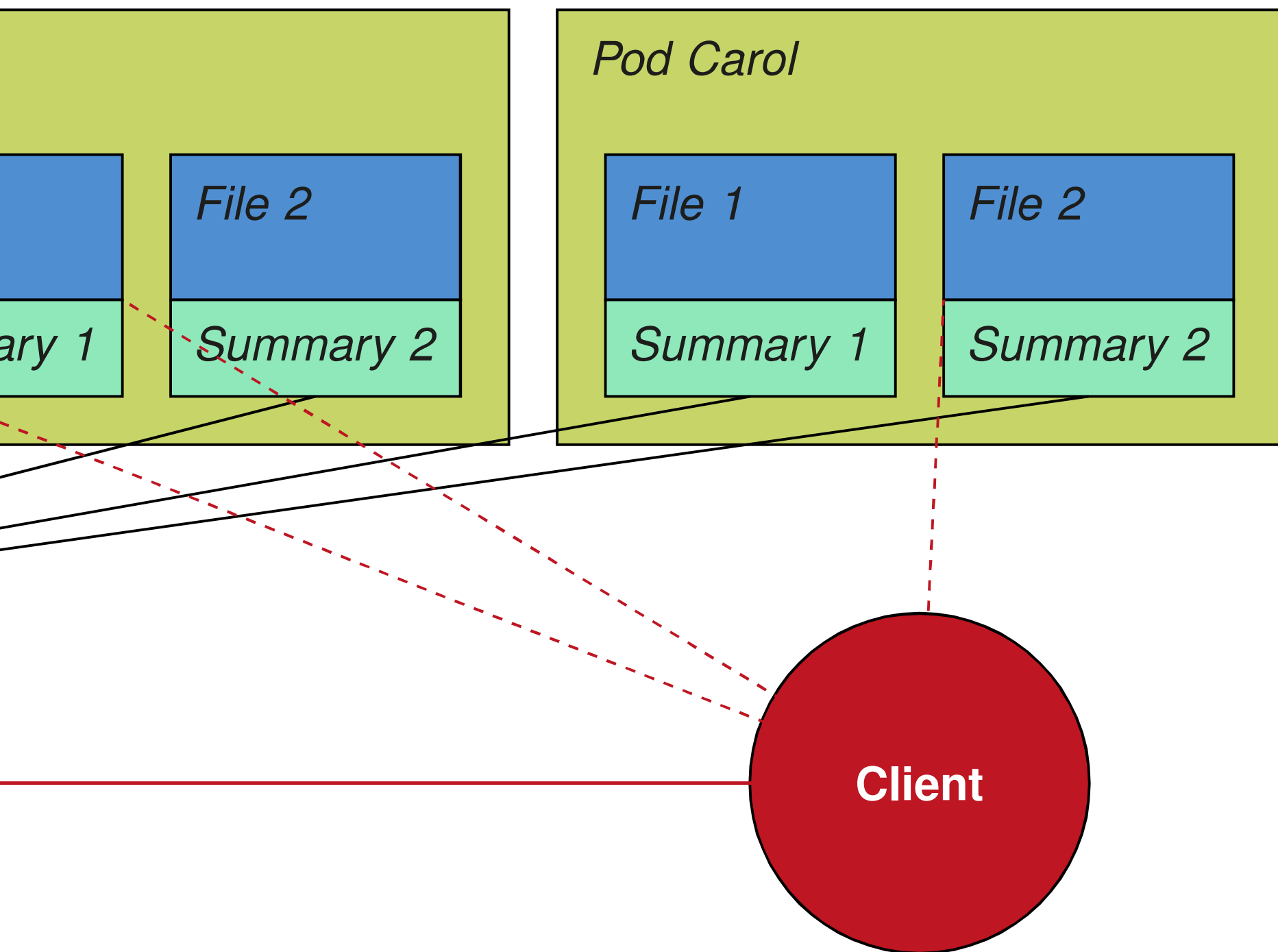
ary https://otherpod.org/file3.summary		
P3.1	O3.1	G3.1
P3.2	O3.2	G3.2
...	...	...



<http  
odr  
o  
o

```
<http://alice.pod/share/policy> a odr:Policy ;
  odr:permission [
    odr:target <http://alice.pod/share/photoAnnotations/> ;
    odr:action acl:Read ;
    odr:assignee [
      a foaf:Agent ;
      odr:source <https://alice.example.com/work-groups#Accounting>;
      odr:refinement [ # refine the agent
        a sh:NodeShape ;
        sh:property [
          sh:path foaf:interest ; sh:minCount 1 ;
          sh:hasValue <#photography> ]]] .
```





```
http://alice.pod/share/policy> a odrl:Policy ;
odrl:permission [
  odrl:target <http://alice.pod/share/photoAnnotations/> ;
  odrl:action [
    rdf:value acl:Read ;
    odrl:refinement [# refine the agent
      a sh:NodeShape ;
      sh:targetObjectsOf ldap:contains ;
      sh:rule [ a sh:SPARQLRule ;
        sh:construct "" CONSTRUCT WHERE { $this a ?o . } "" ;
        sh:condition [
          sh:pattern "private" ; sh:flags "i" ;
          sh:property [
            sh:path [ sh:inversePath ldap:contains ] ;
            sh:hasValue <http://alice.pod/share/photoAnnotations/> ;
            sh:minCount 1 . ]]]]]].
```



# Privacy-Preserving Federated Que

query  $Q$ , sources  $U$ , keys  $K$

query results

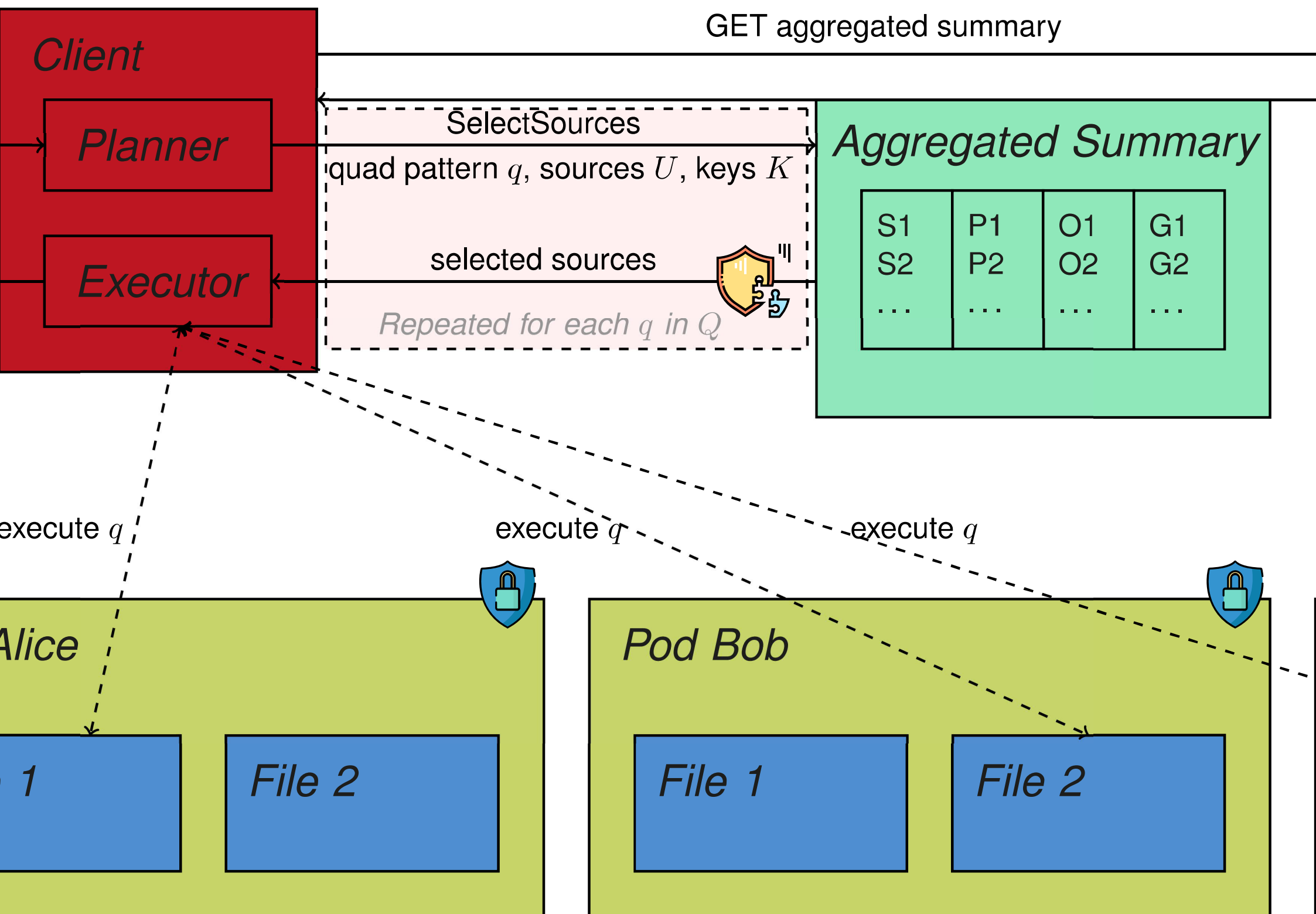
Pod A

File

*Ruben Taelman*  
*Sabrina Kirrane*  
*Simon Steyskal*



# Querying



GHENT  
UNIVERSITY



WIRTSCHAFTS  
UNIVERSITÄT  
WIEN  
UNIVERSITY OF  
ECONOMICS  
AND BUSINESS





Shape the action/mode that can be performed on the data

