Metadata Aggregation

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What to expect

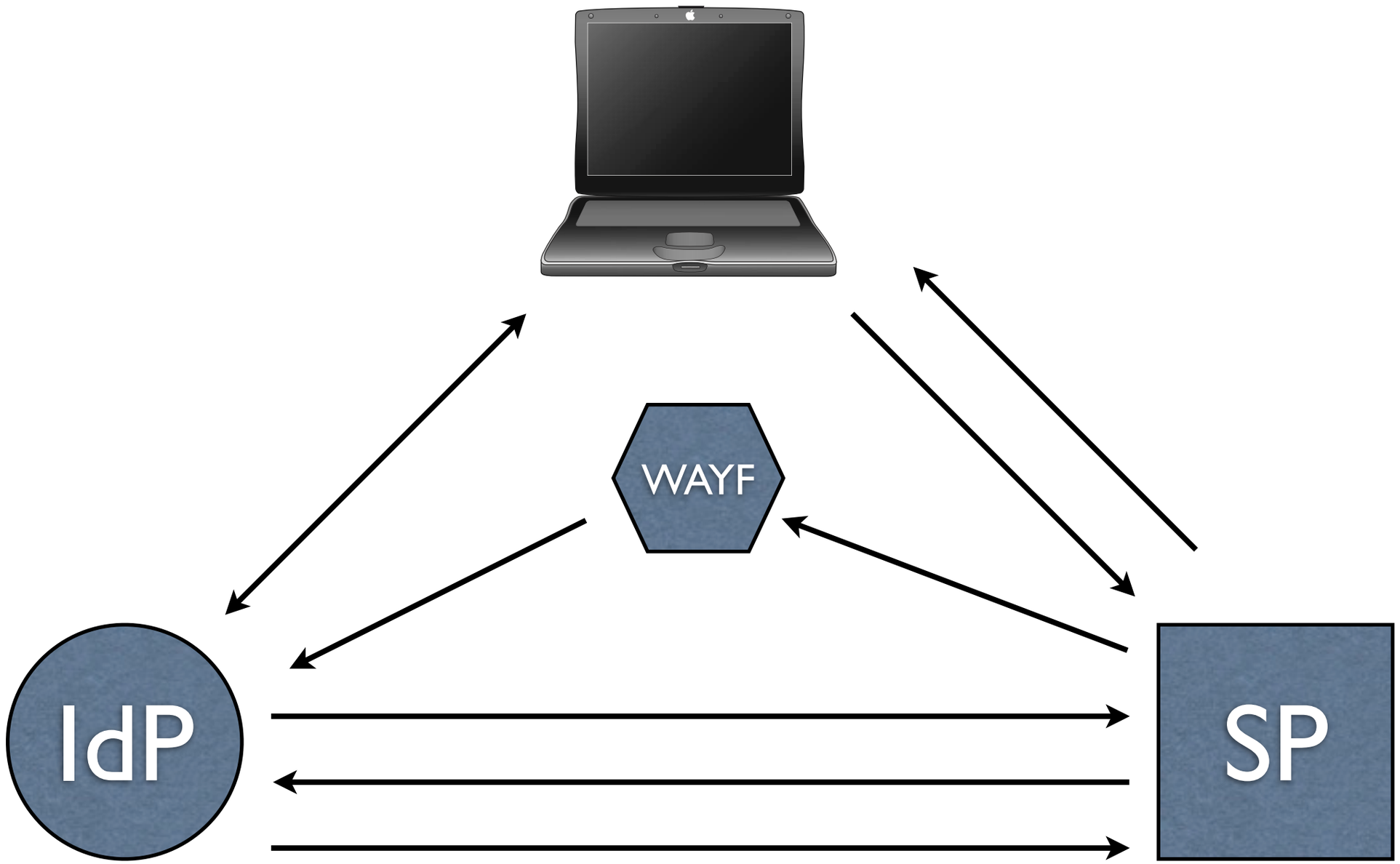
- Federated identity in a multi-federation world.
- Metadata aggregation: a technical approach.
- Aggregation engines: specific technology.
- Conceptual shifts are needed.

Dramatis Personae

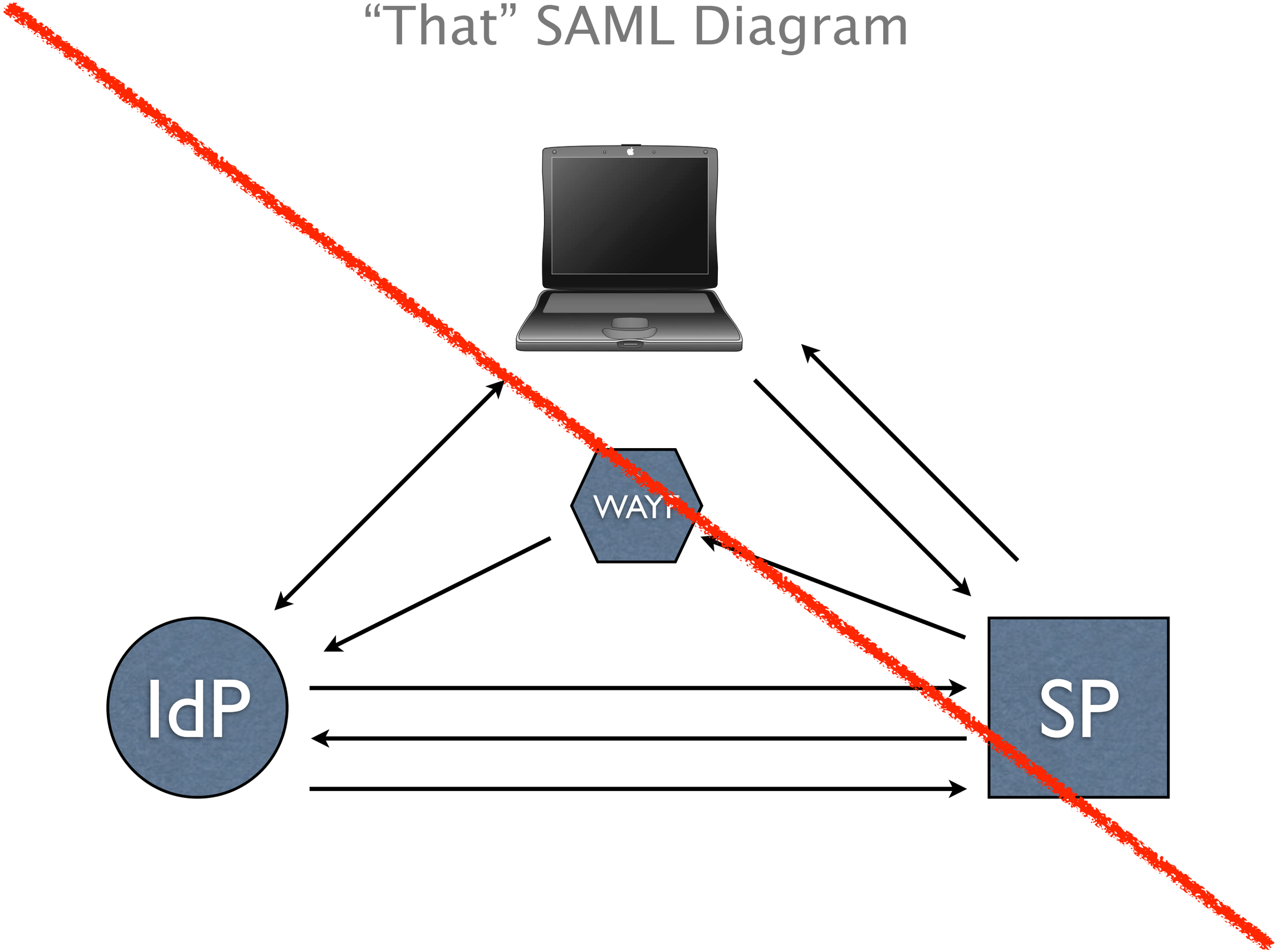
- *Alice*, an *entity* and trusting friend of
- *Bob*, a second *entity*, desirous of conversation with Alice;
- *Sally*, the *subject* of their conversation;
- Sundry *languages*, *cryptosystems* and other *technologies* in attendance.
- (Hopefully) a *chorus* of interesting *questions*.

Rethinking Federation

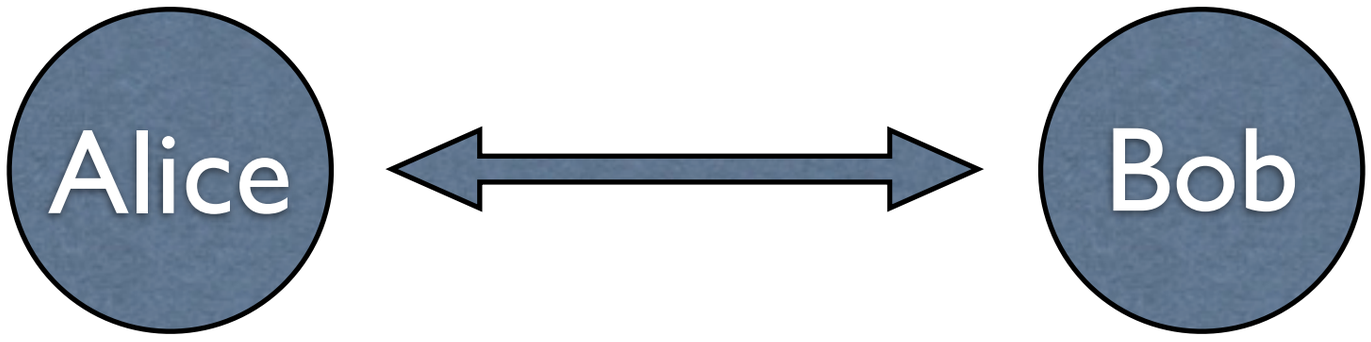
“That” SAML Diagram



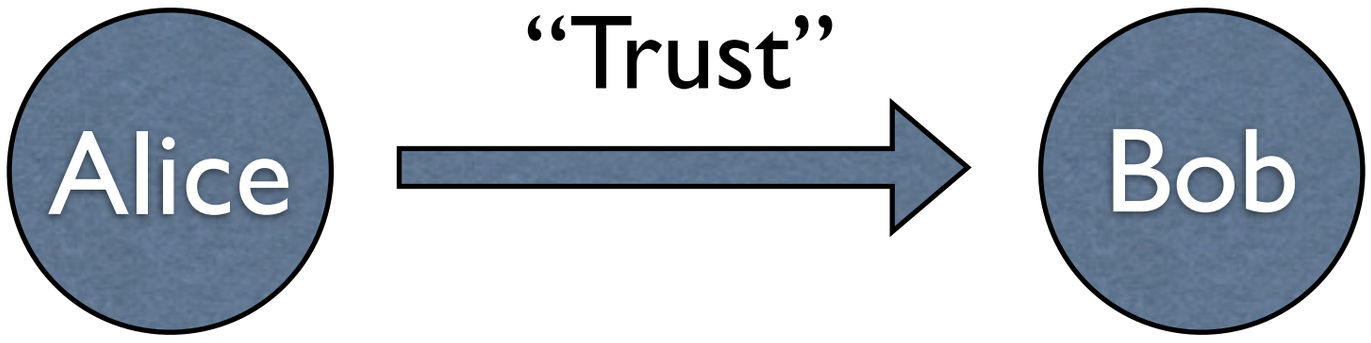
“That” SAML Diagram

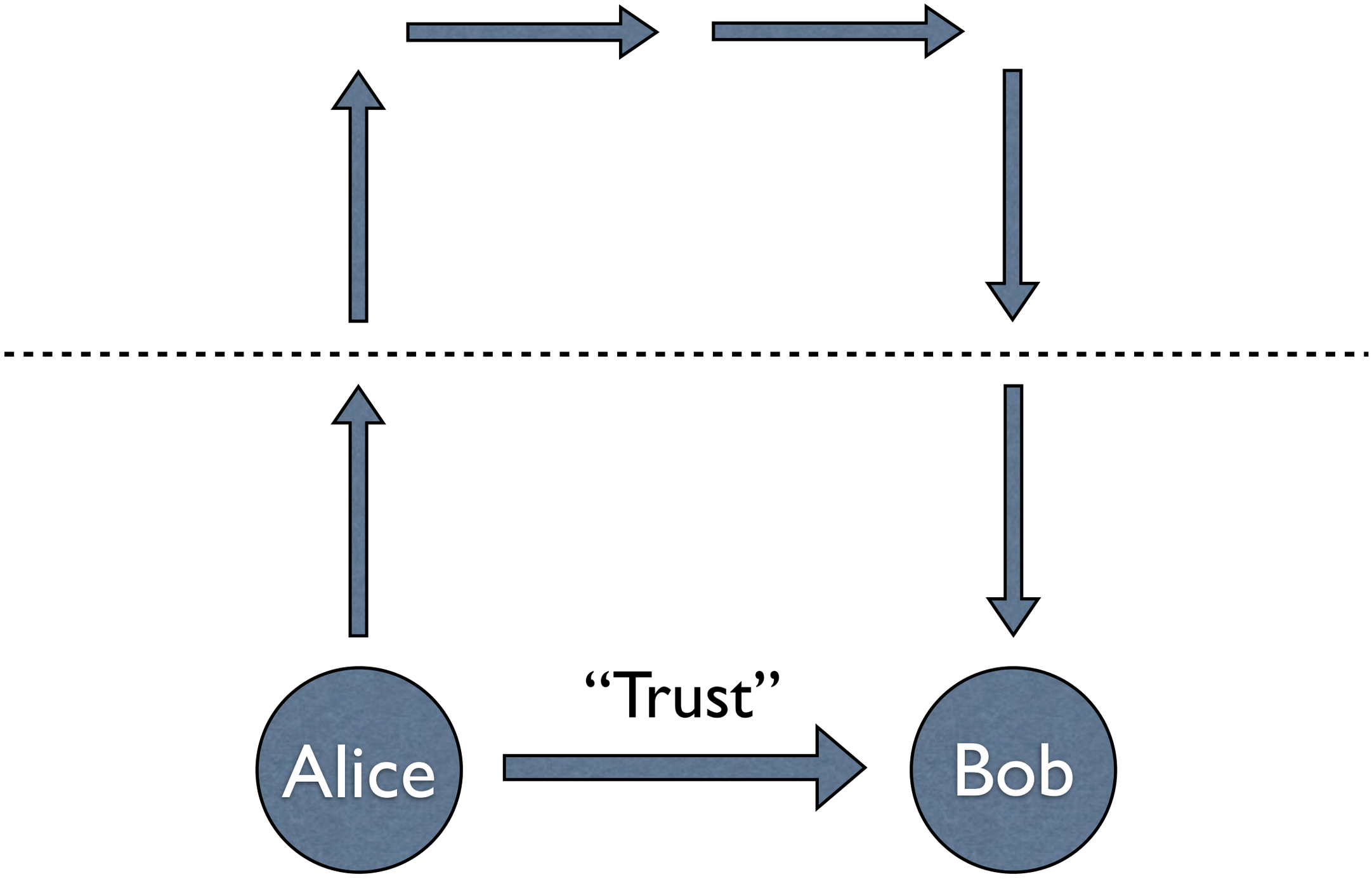


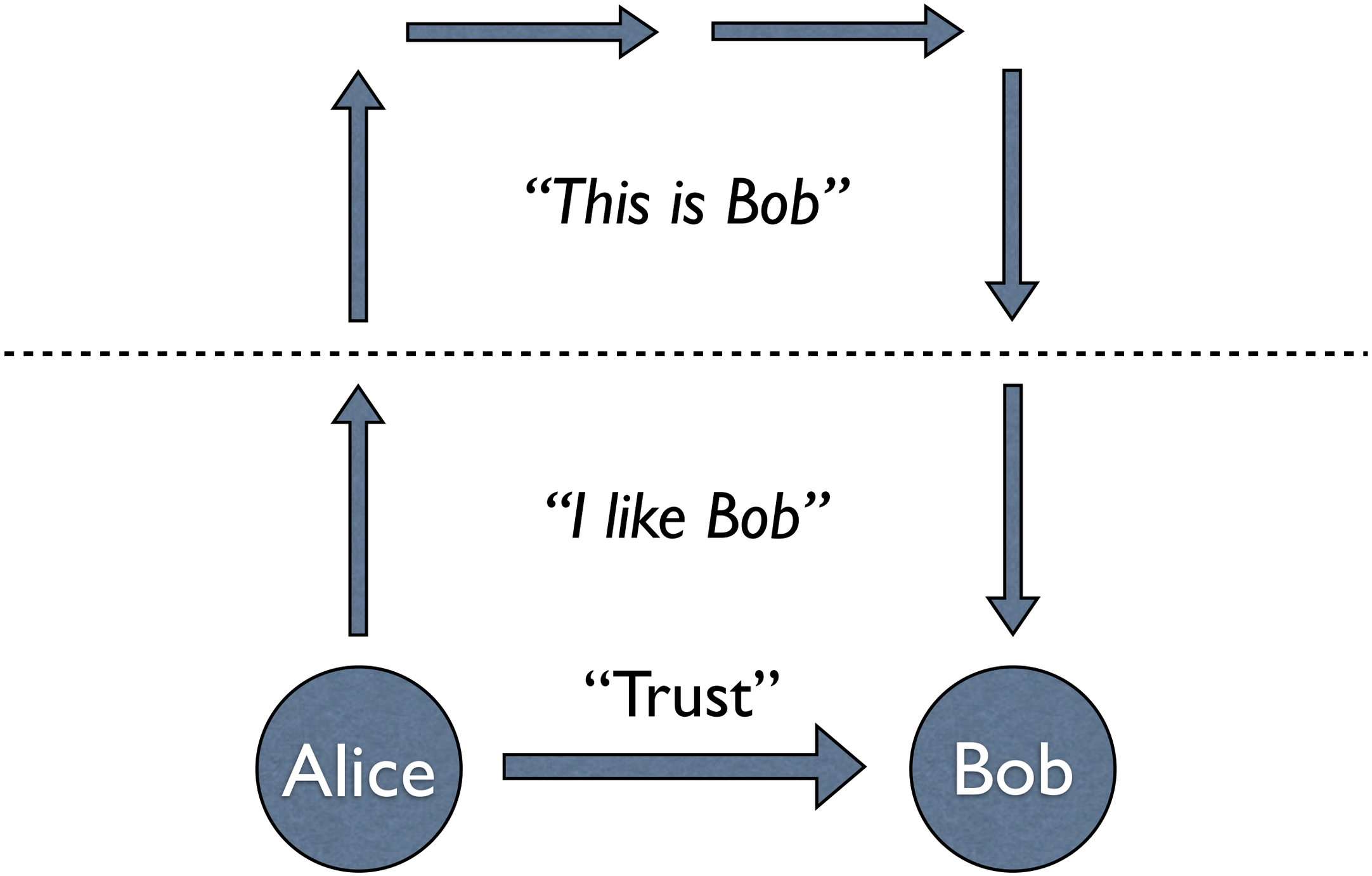
It's all about Alice and Bob

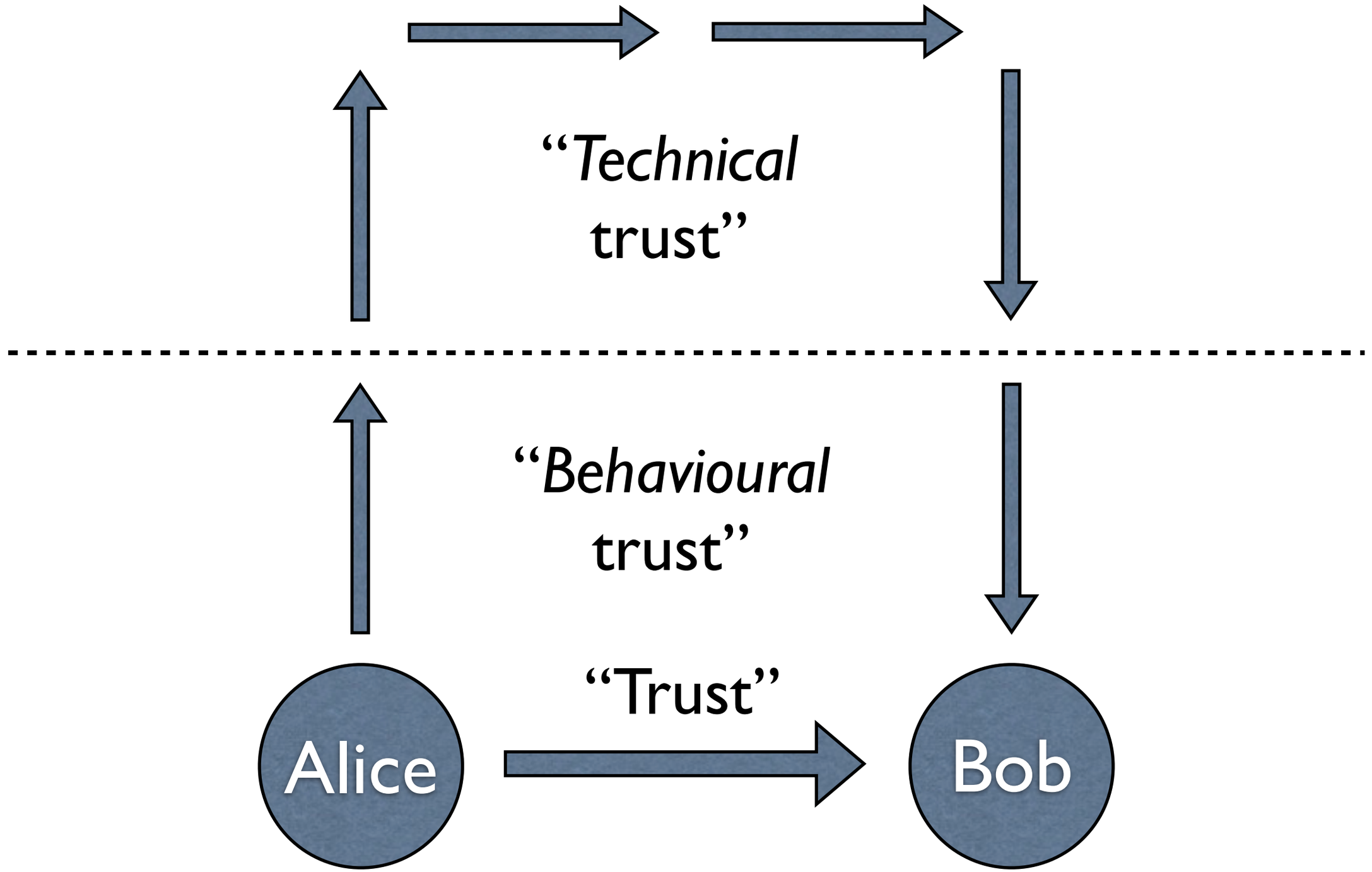


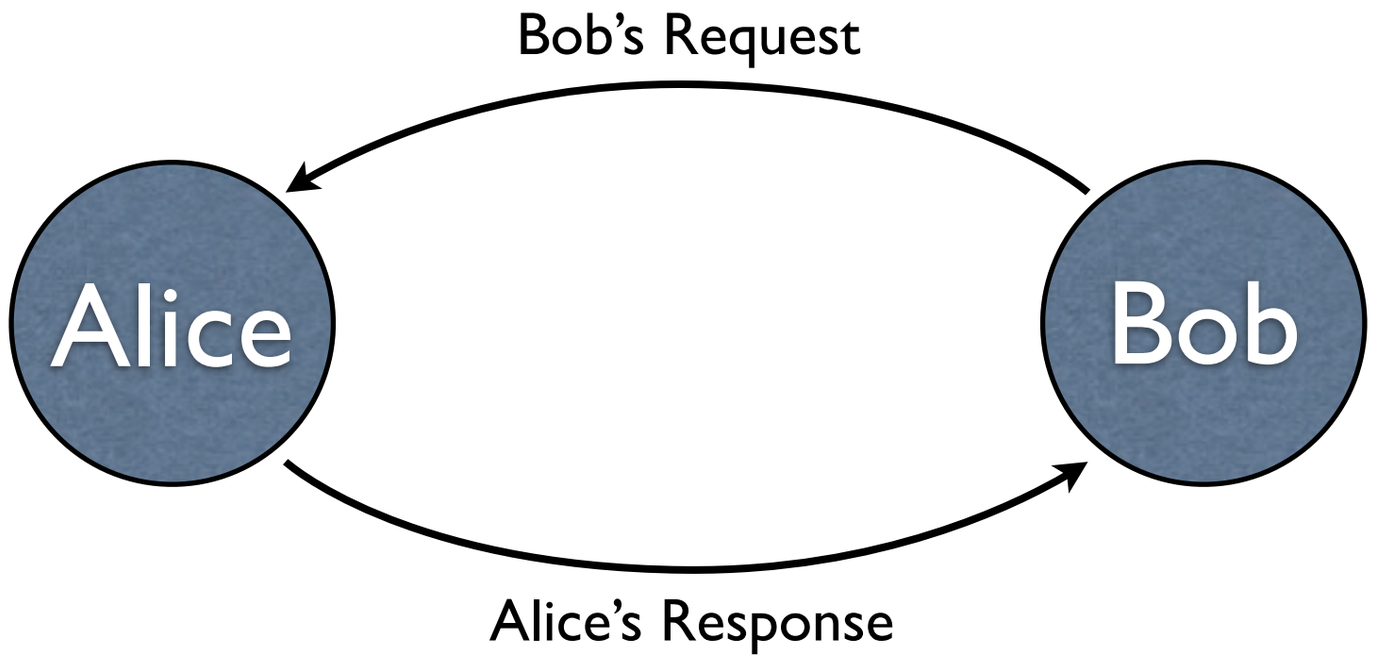
What is Trust?

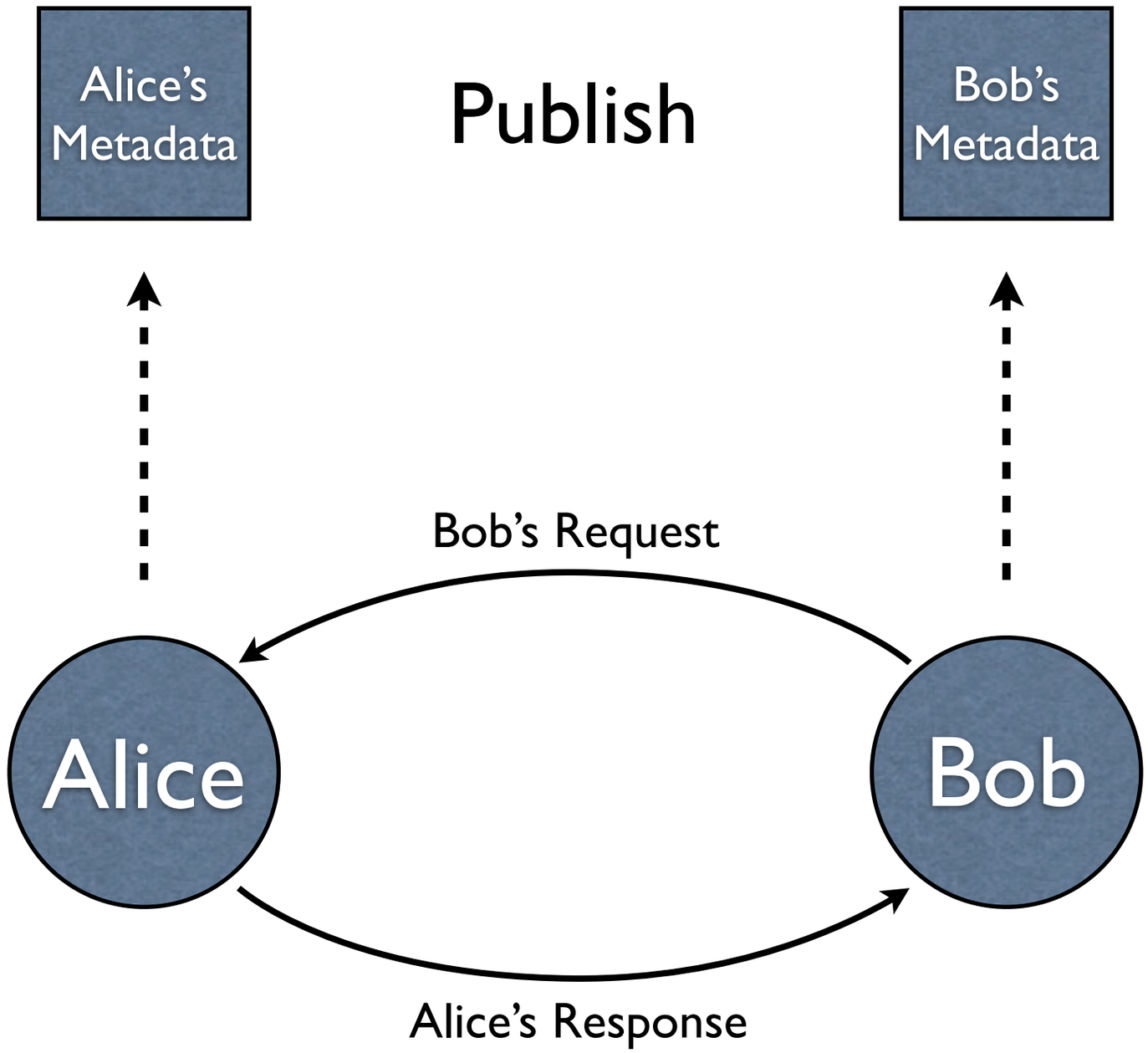

“Trust”
Alice
Bob


"Trust"
Alice
Bob


"This is Bob"
"I like Bob"
"Trust"
Alice
Bob


"Technical trust"
"Behavioural trust"
"Trust"
Alice
Bob

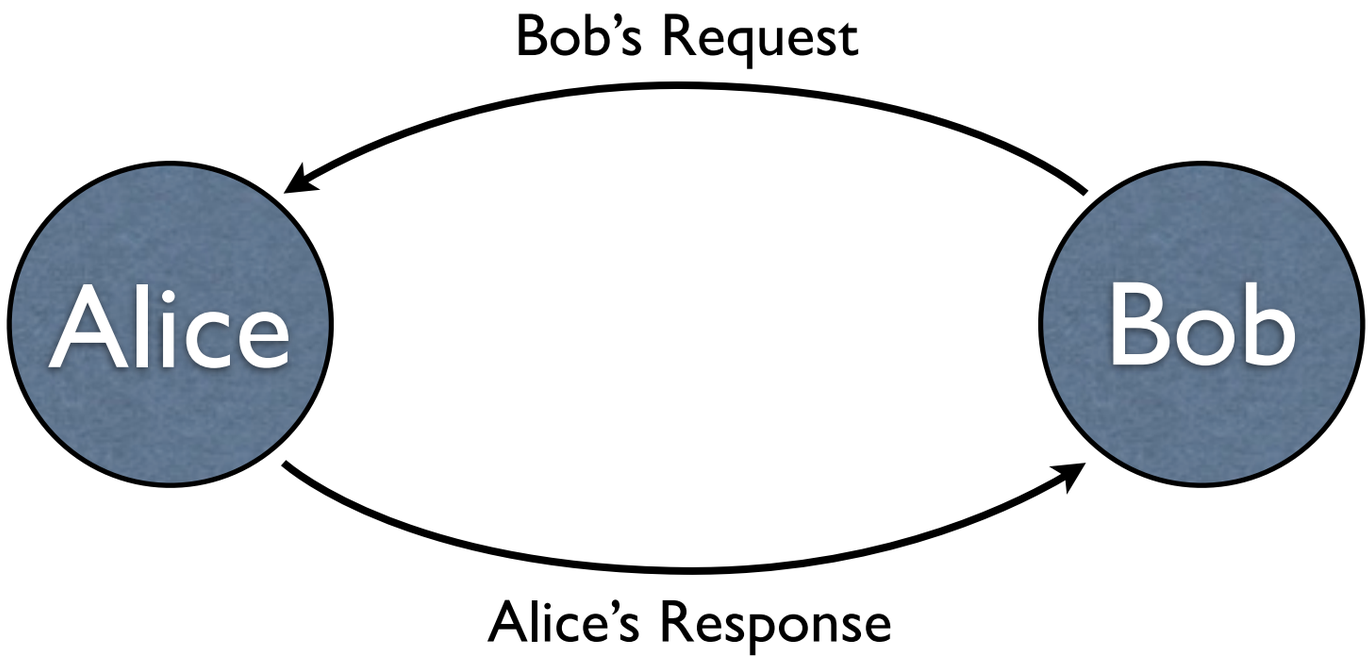

Bob's Request
Alice
Bob
Alice's Response

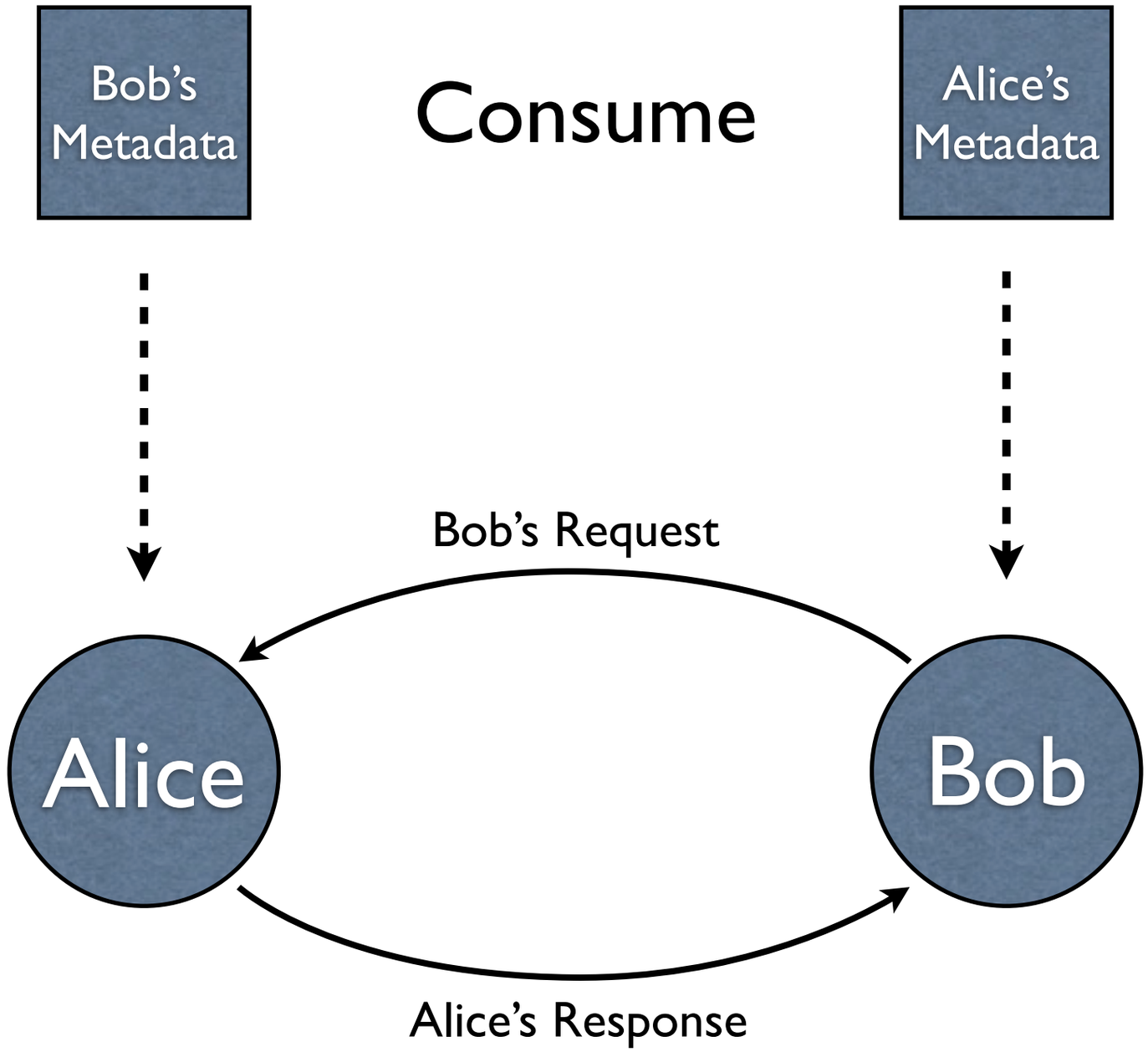

Alice's Metadata
Publish
Bob's Metadata
Bob's Request
Alice
Bob
Alice's Response

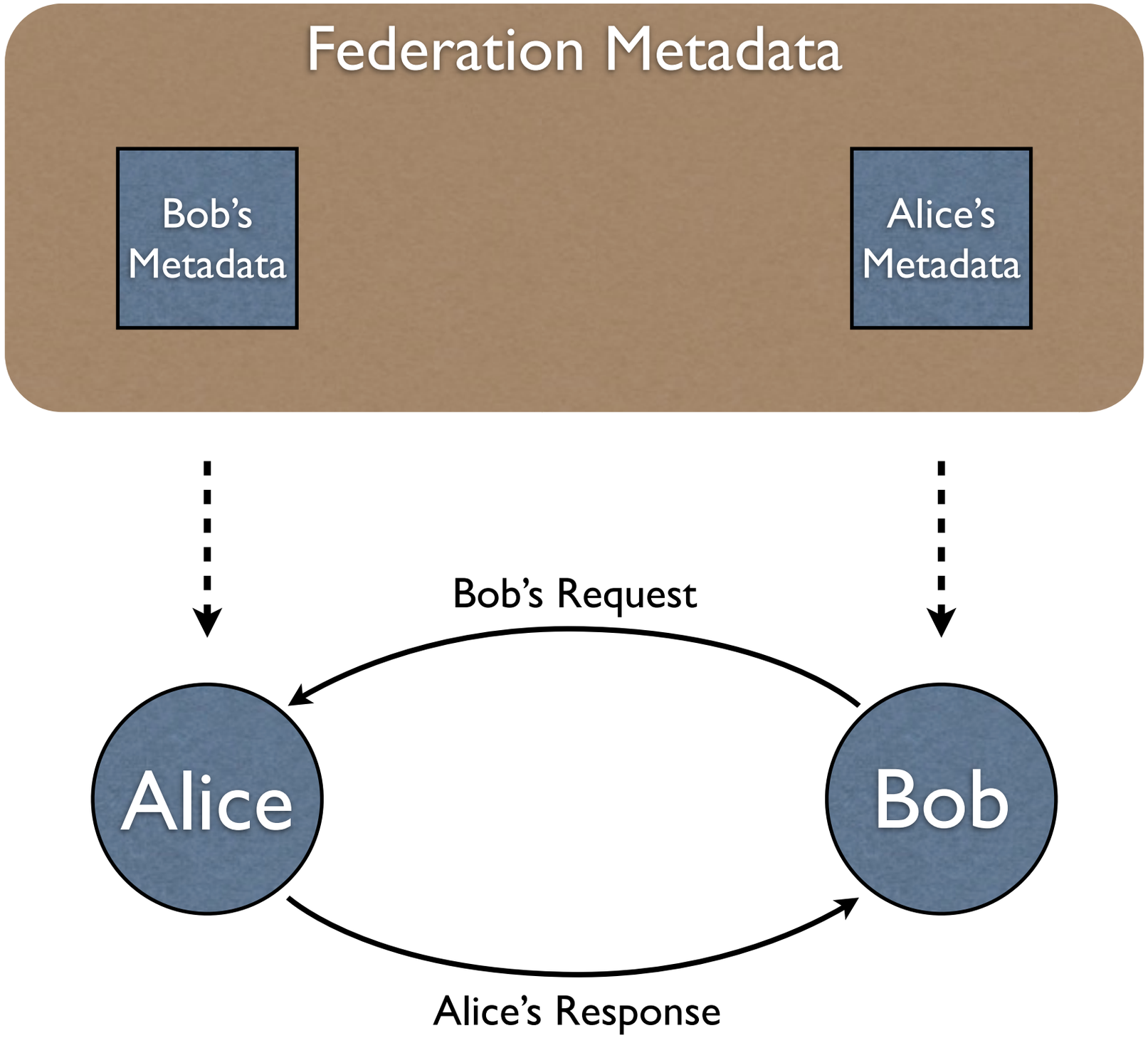
Bob's Metadata

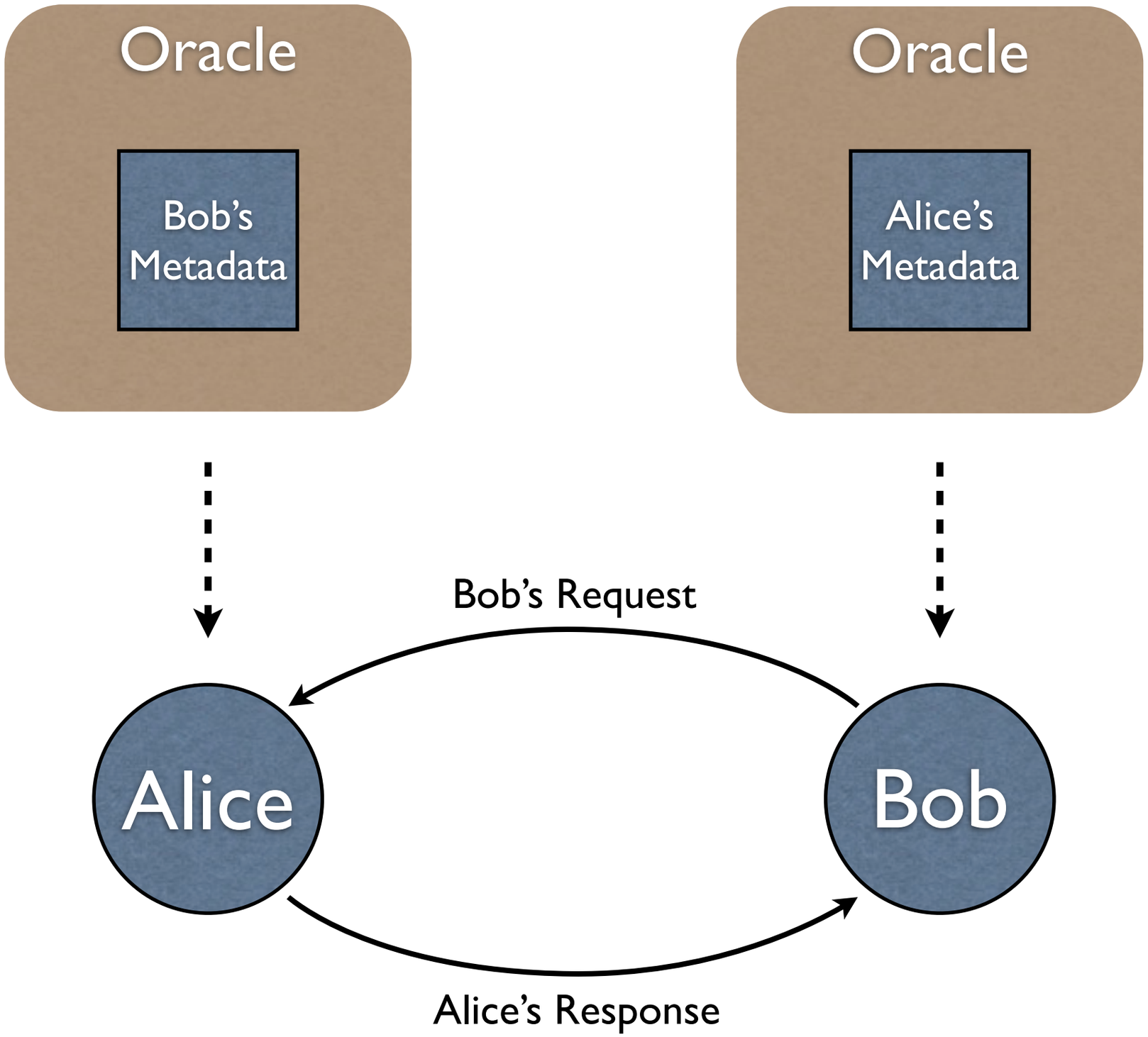
Exchange

Alice's Metadata




Bob's Metadata
Consume
Alice's Metadata
Bob's Request
Alice
Bob
Alice's Response


Federation Metadata
Bob's Metadata
Alice's Metadata
Bob's Request
Alice
Bob
Alice's Response


Oracle
Bob's Metadata
Oracle
Alice's Metadata
Bob's Request
Alice
Bob
Alice's Response

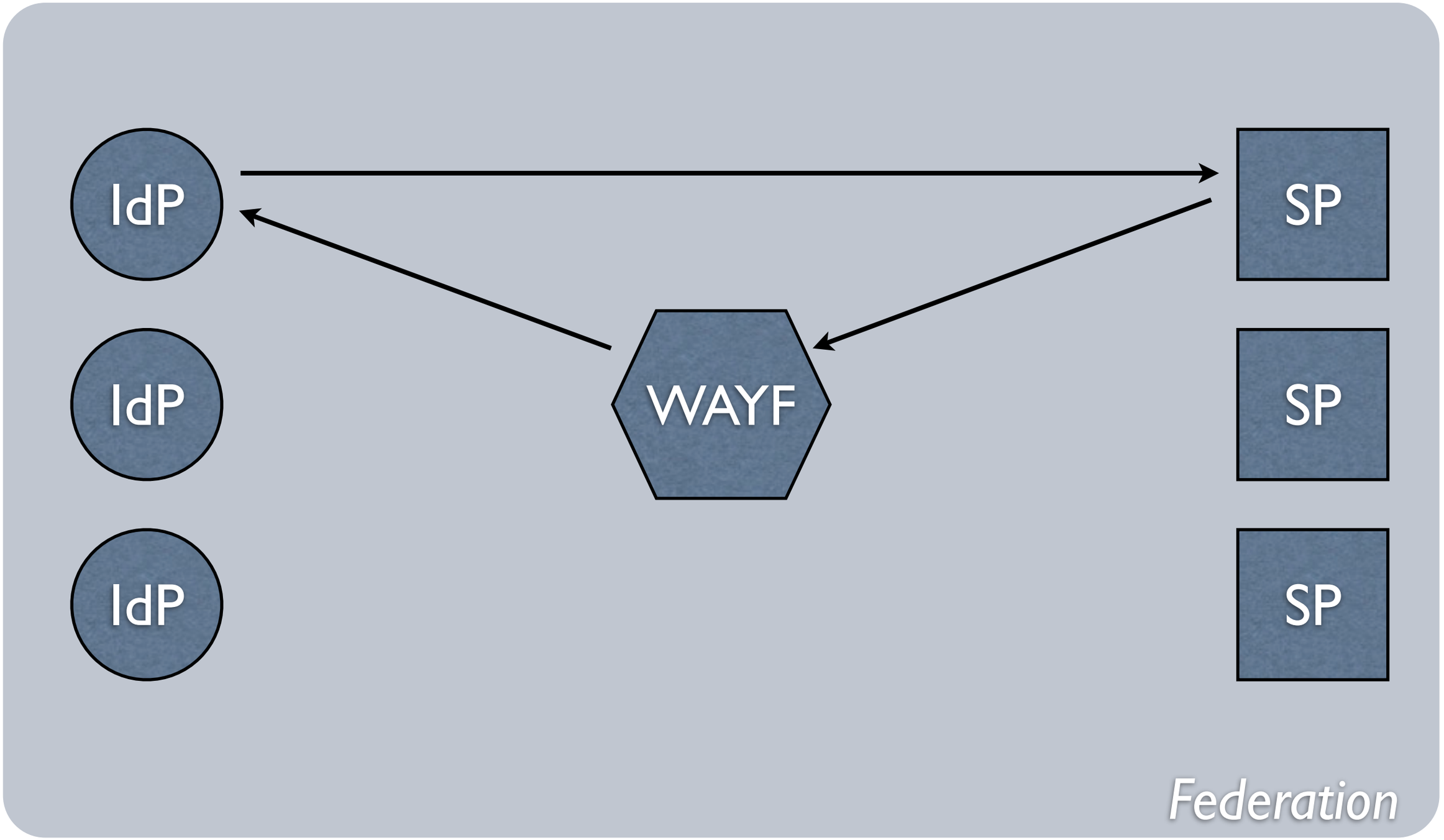
The software doesn't know about federations

– Scott Cantor

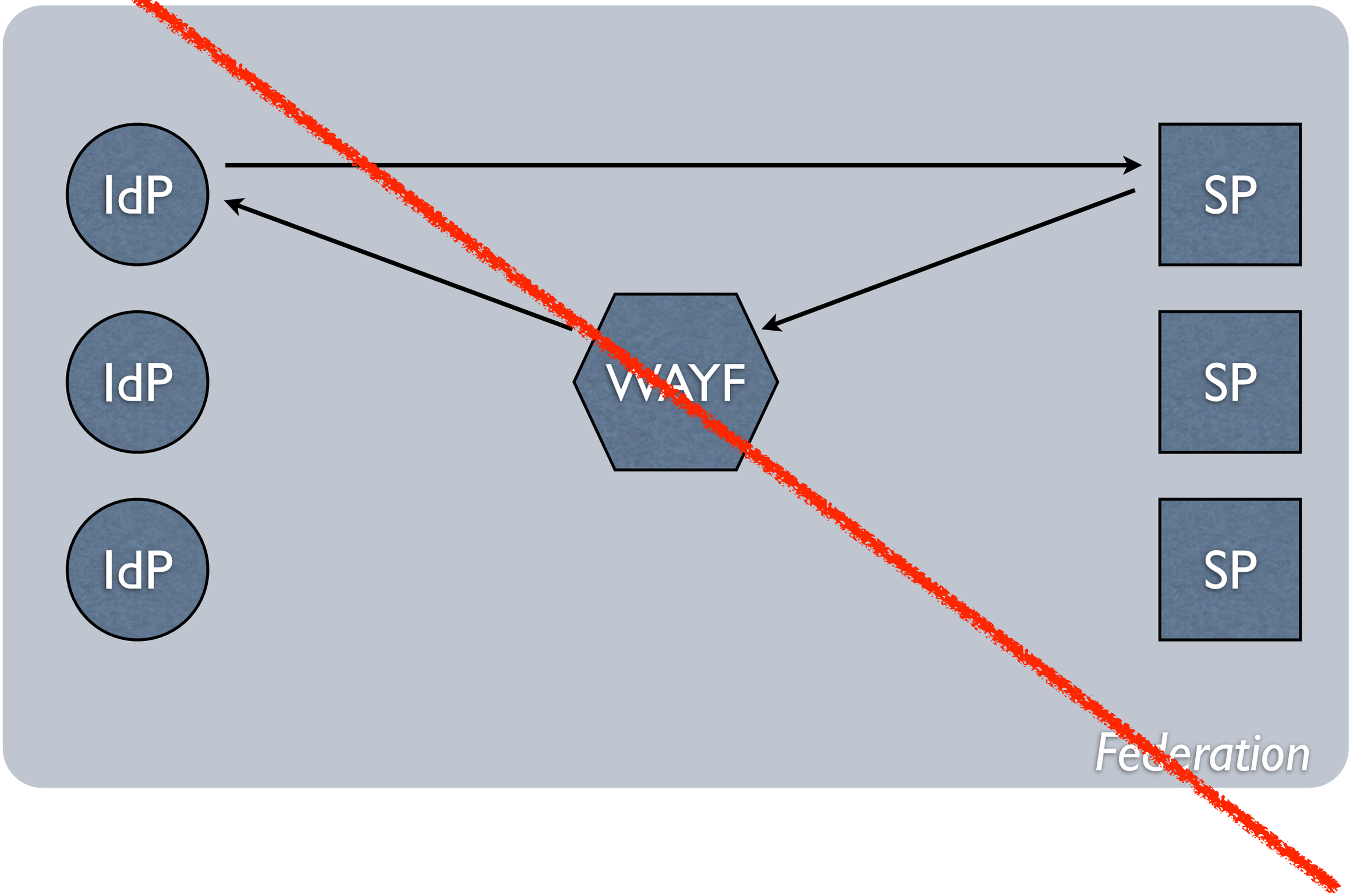
(every few days)

Rethinking Federations

“That” Federation Diagram

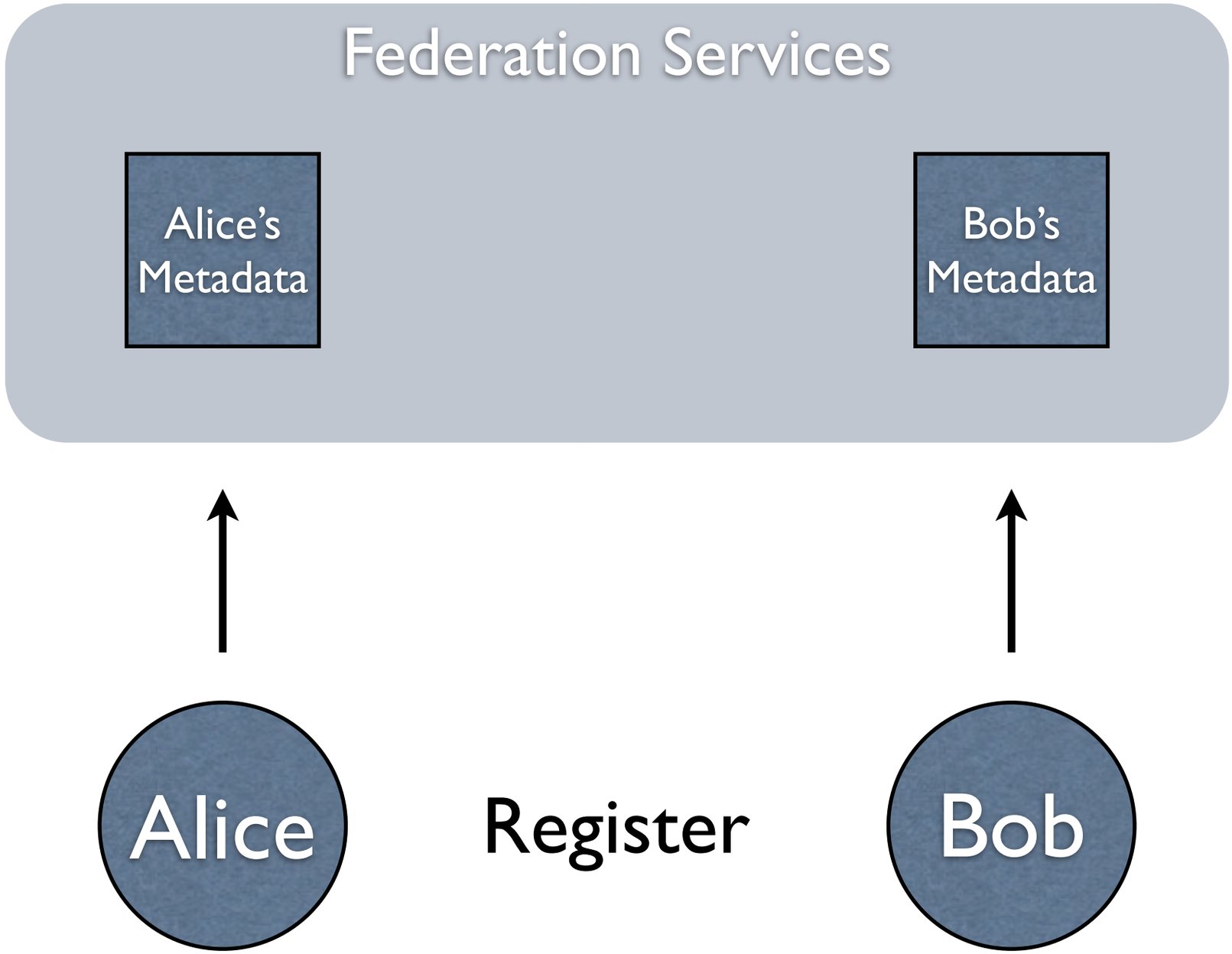


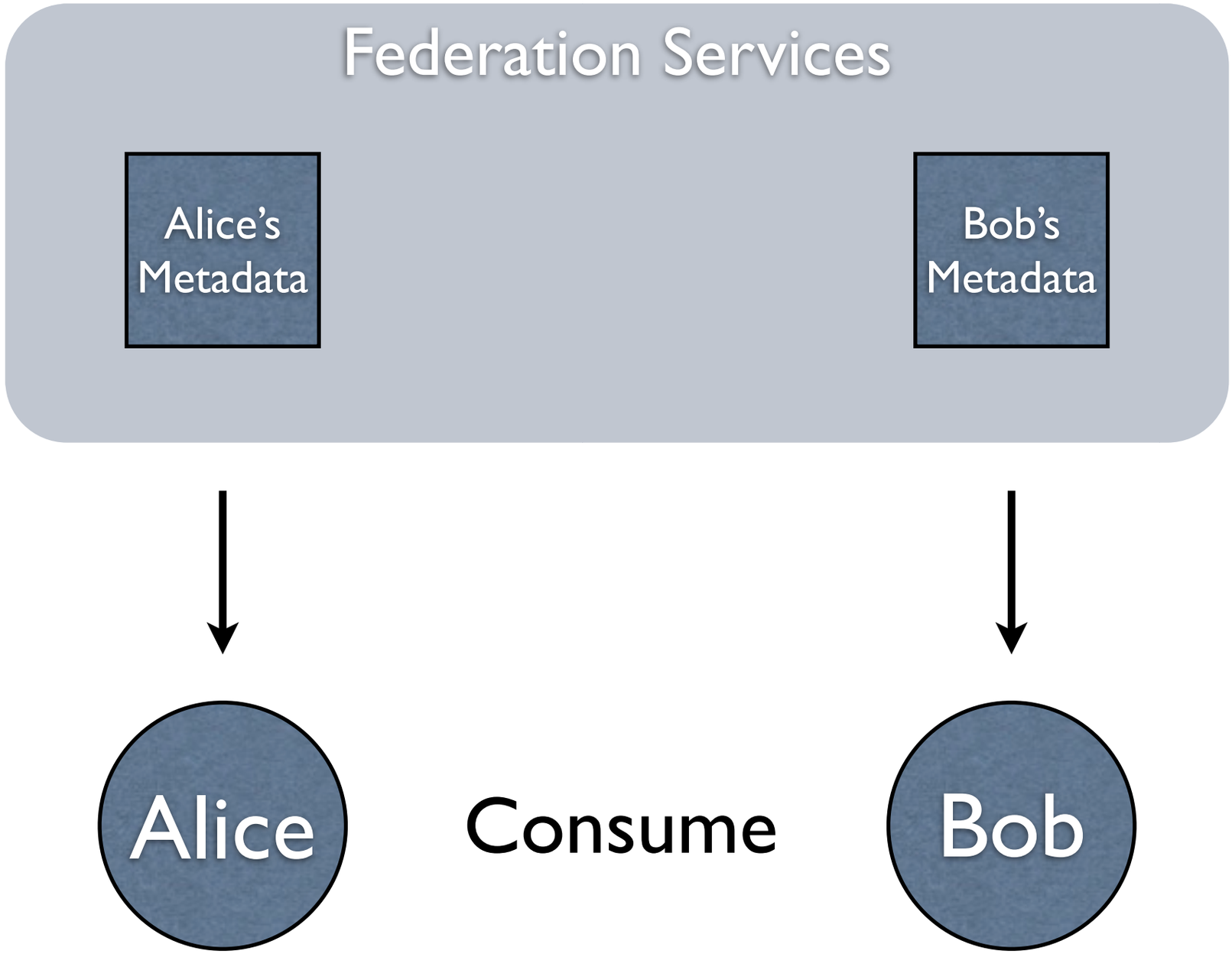
“That” Federation Diagram

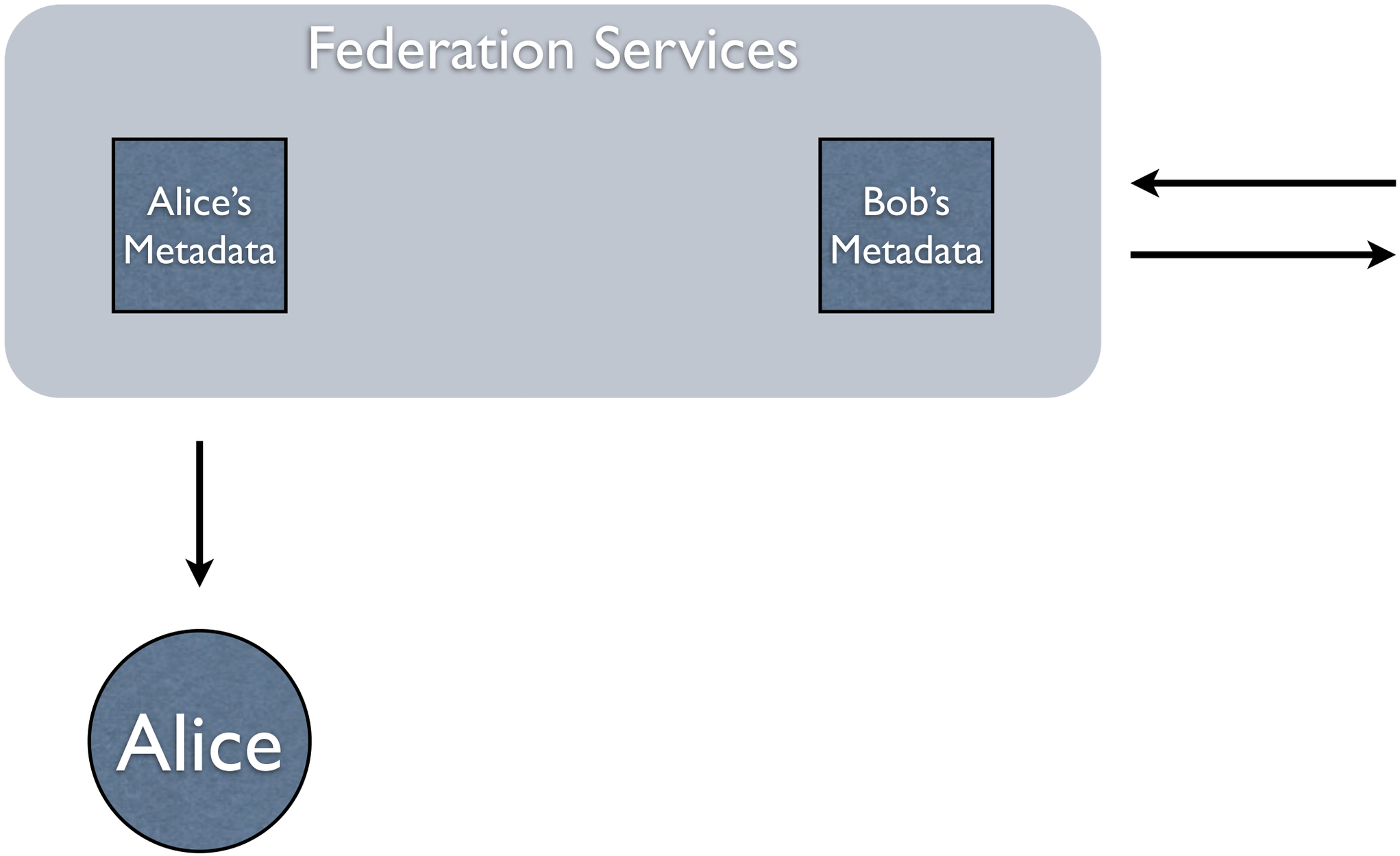


Federations

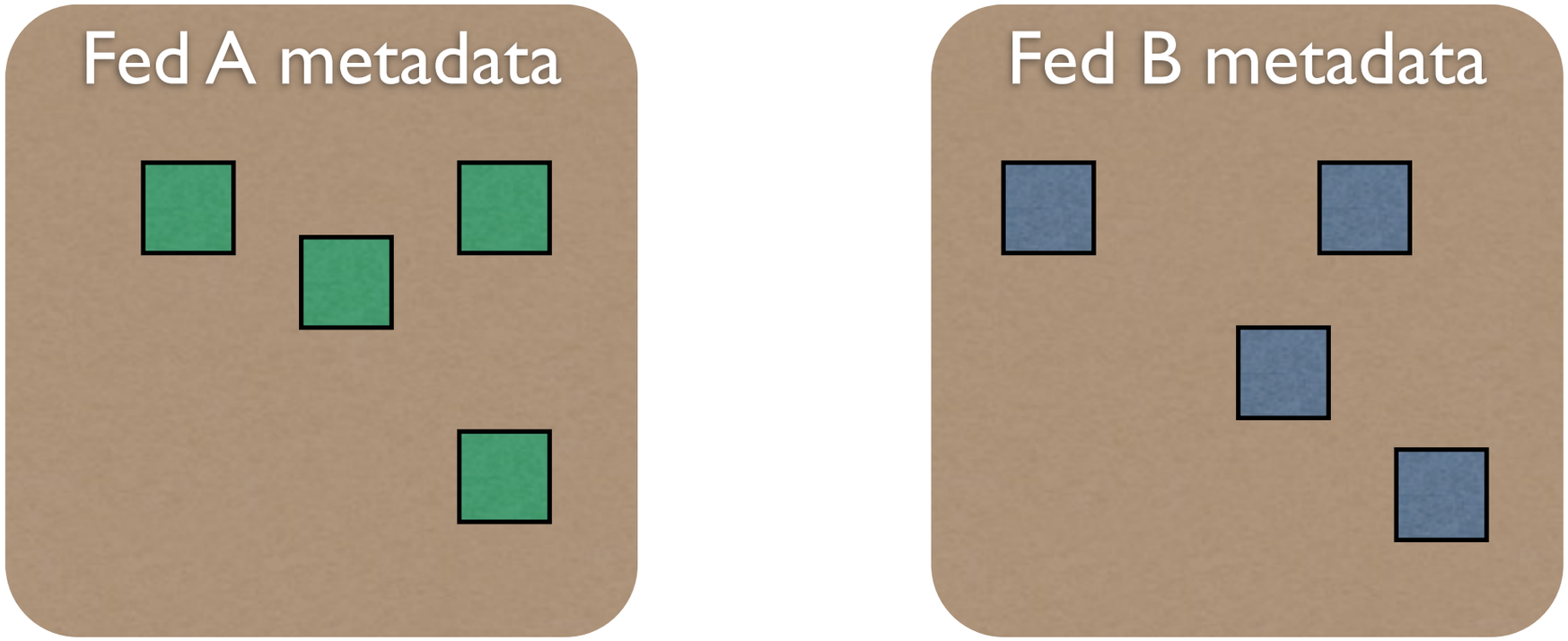
- Primarily social, not technical, structures;
- Do not contain entities, but members;
- *Enable* communications by providing services;
- Many services involve being *trust brokers*.


Federation Services
Alice's Metadata
Bob's Metadata
Alice
Register
Bob

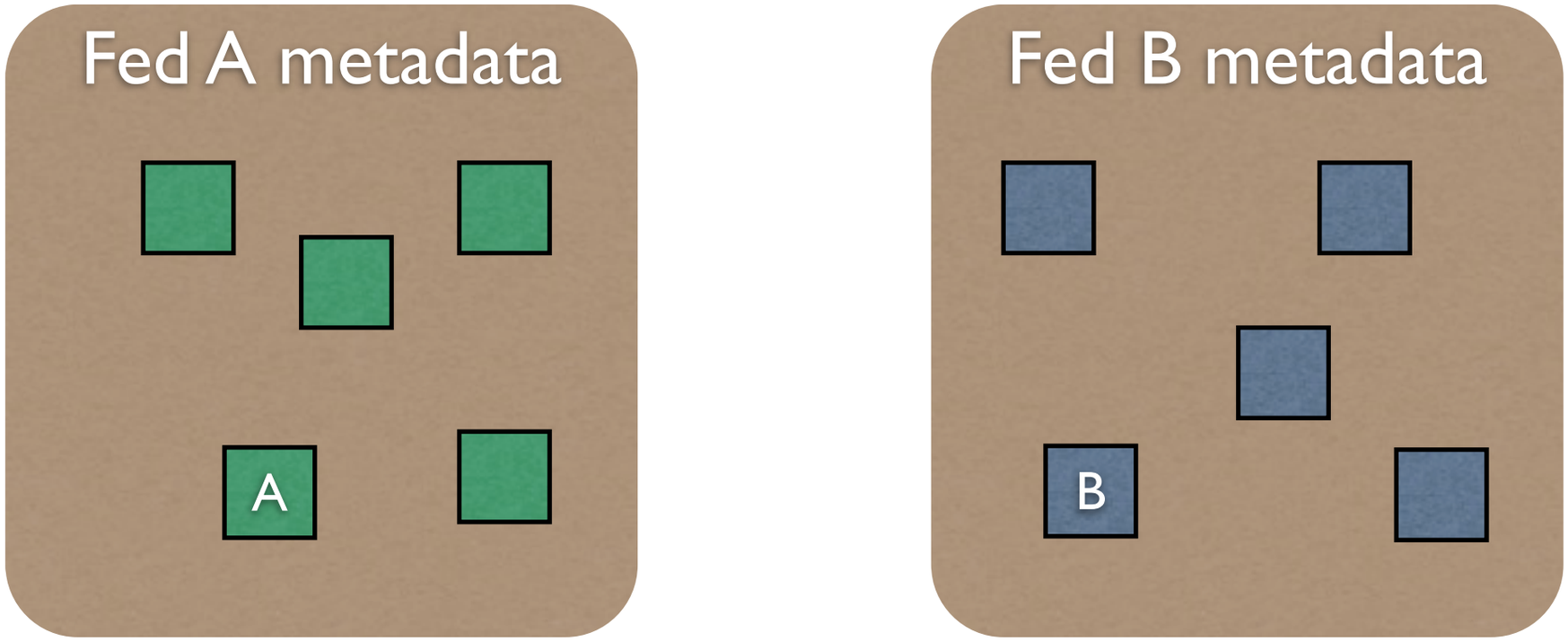

Federation Services
Alice's Metadata
Bob's Metadata
Alice
Consume
Bob


Federation Services
Alice's Metadata
Bob's Metadata
Alice

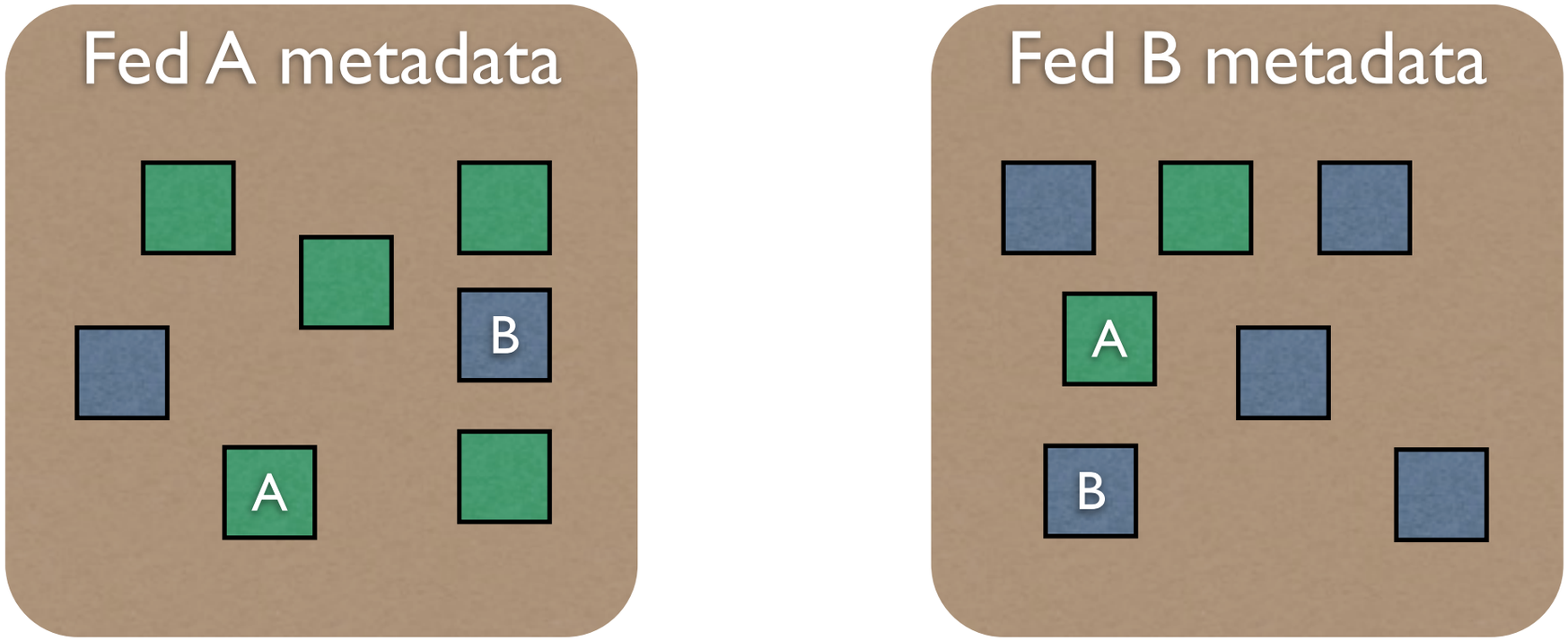
Bilateral Exchange


Fed A metadata
Fed B metadata

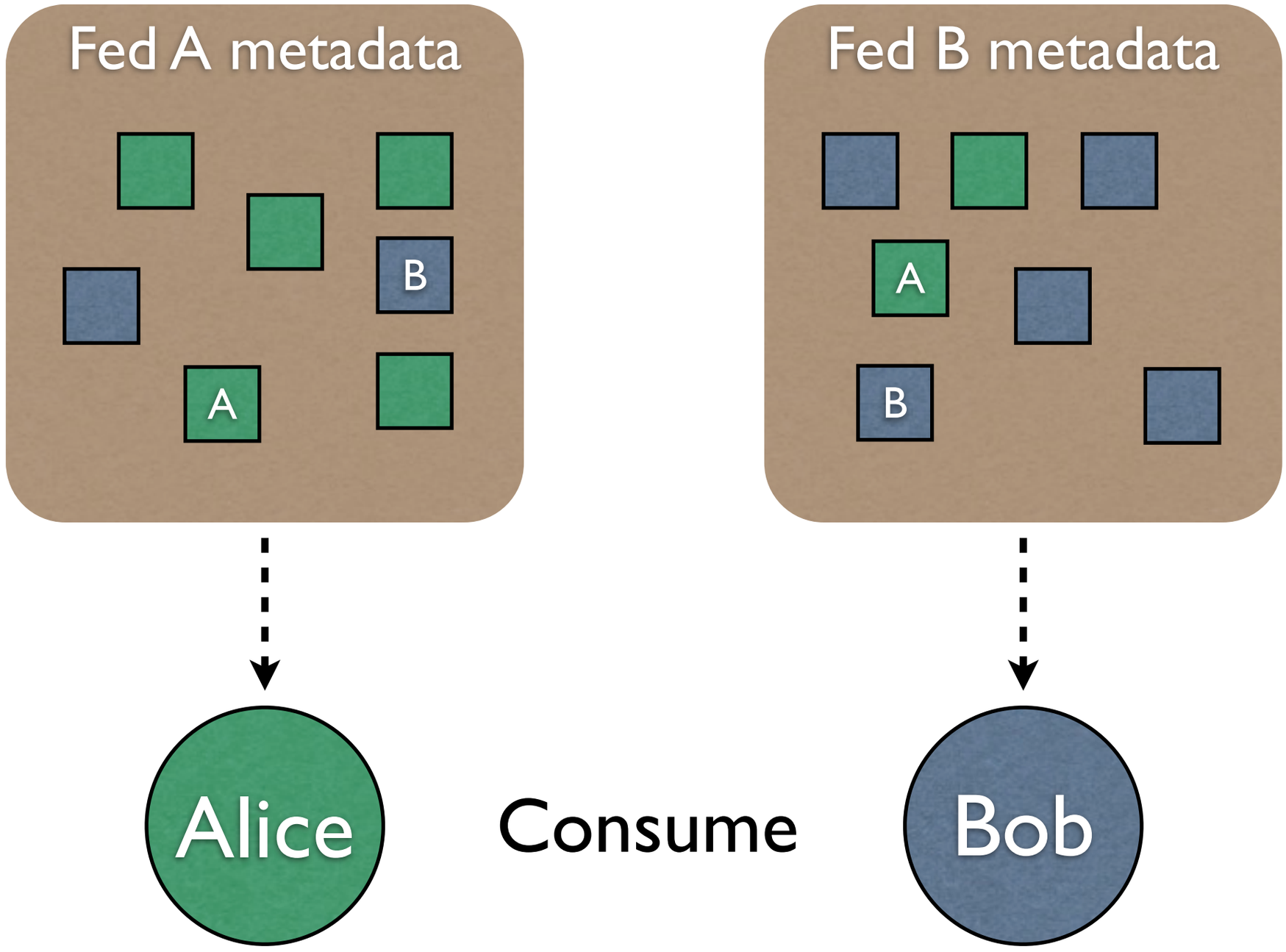
A
Alice
Bob
B


Fed A metadata
A
Fed B metadata
B

Alice
Register
Bob

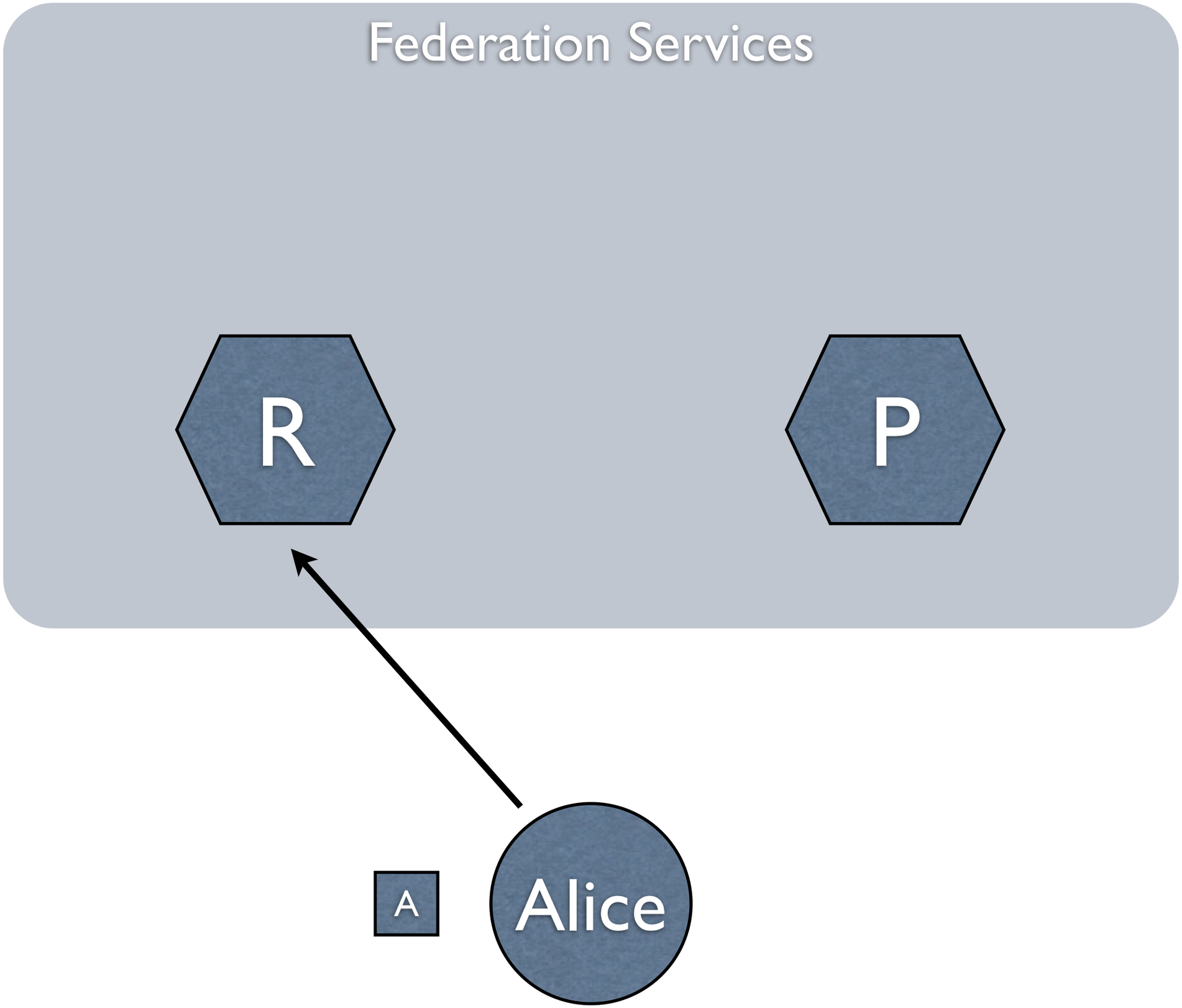

Fed A metadata
B
A
Fed B metadata
A
B

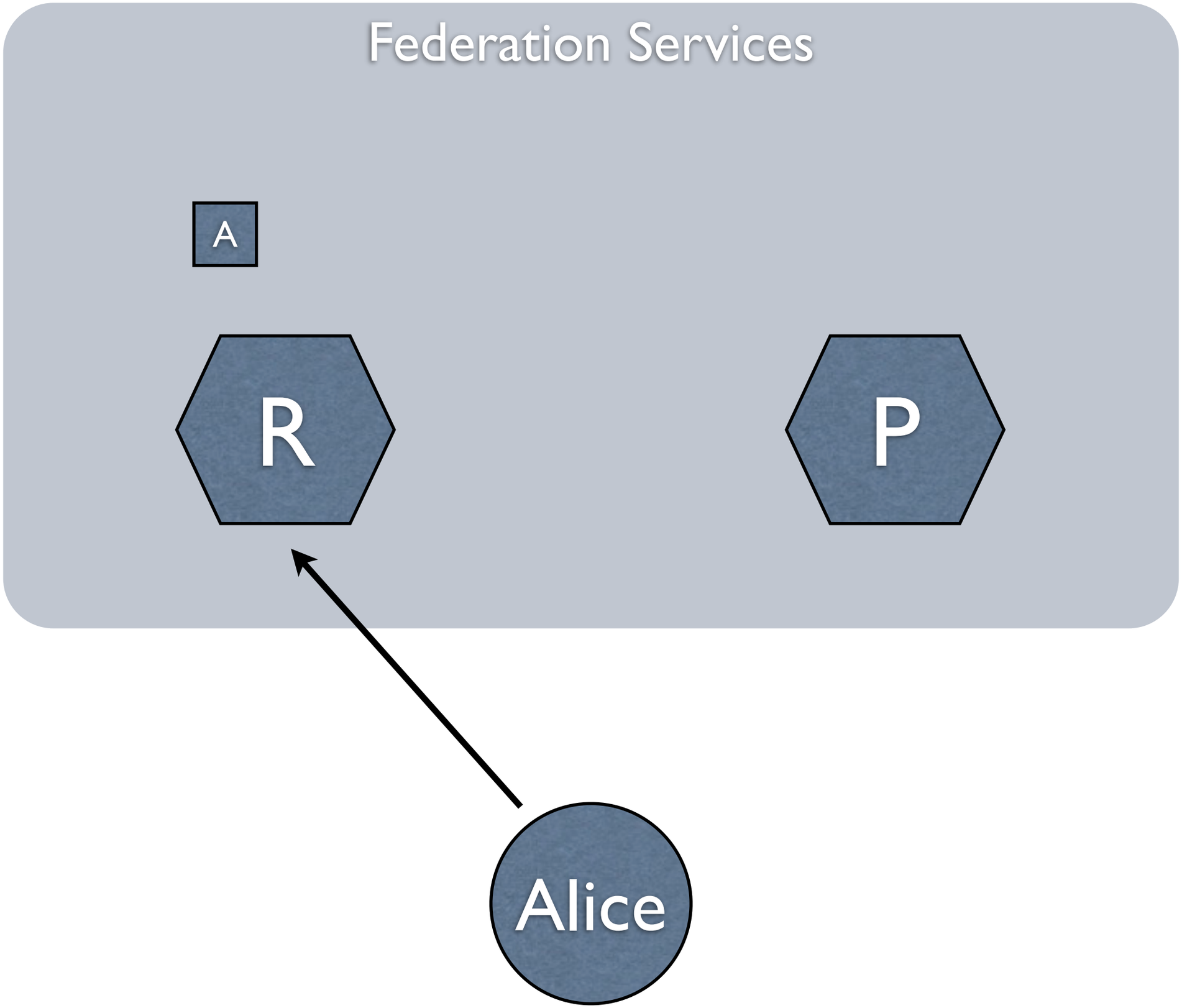
Alice
Exchange
Bob

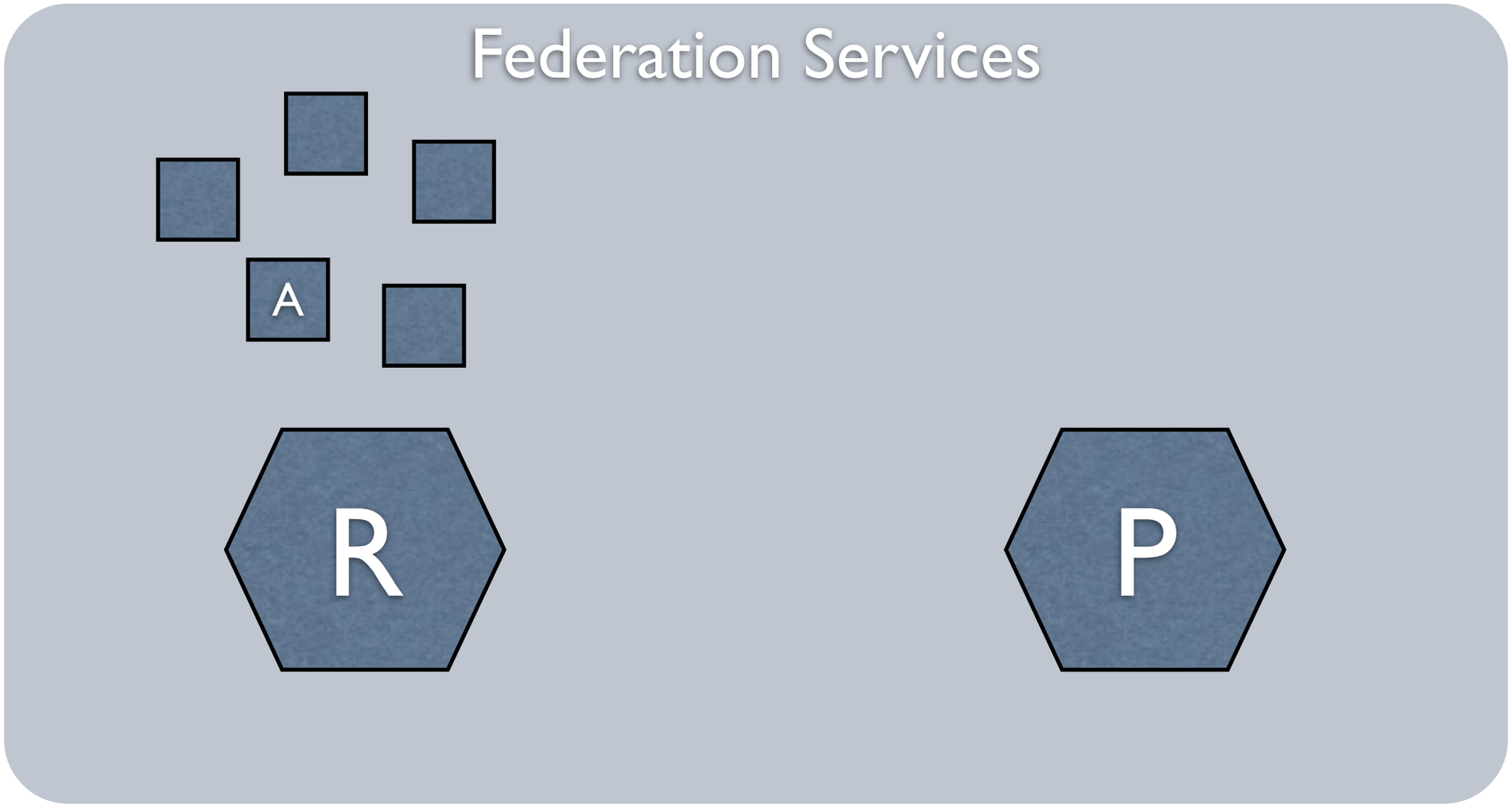

Fed A metadata
B
A
Fed B metadata
A
B
Alice
Consume
Bob

Registrars, Aggregators and Publishers

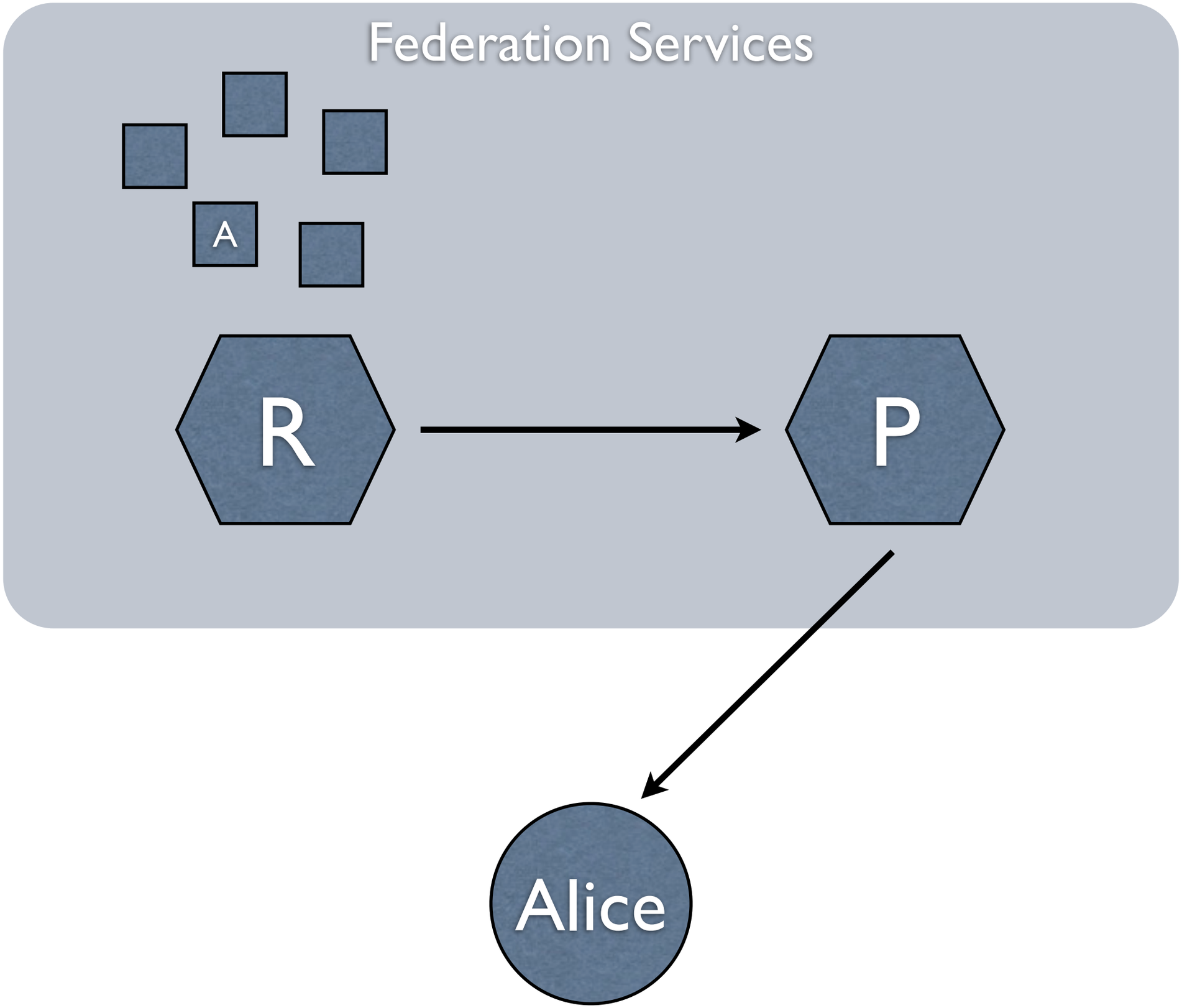
Federation Services
R
P
Alice

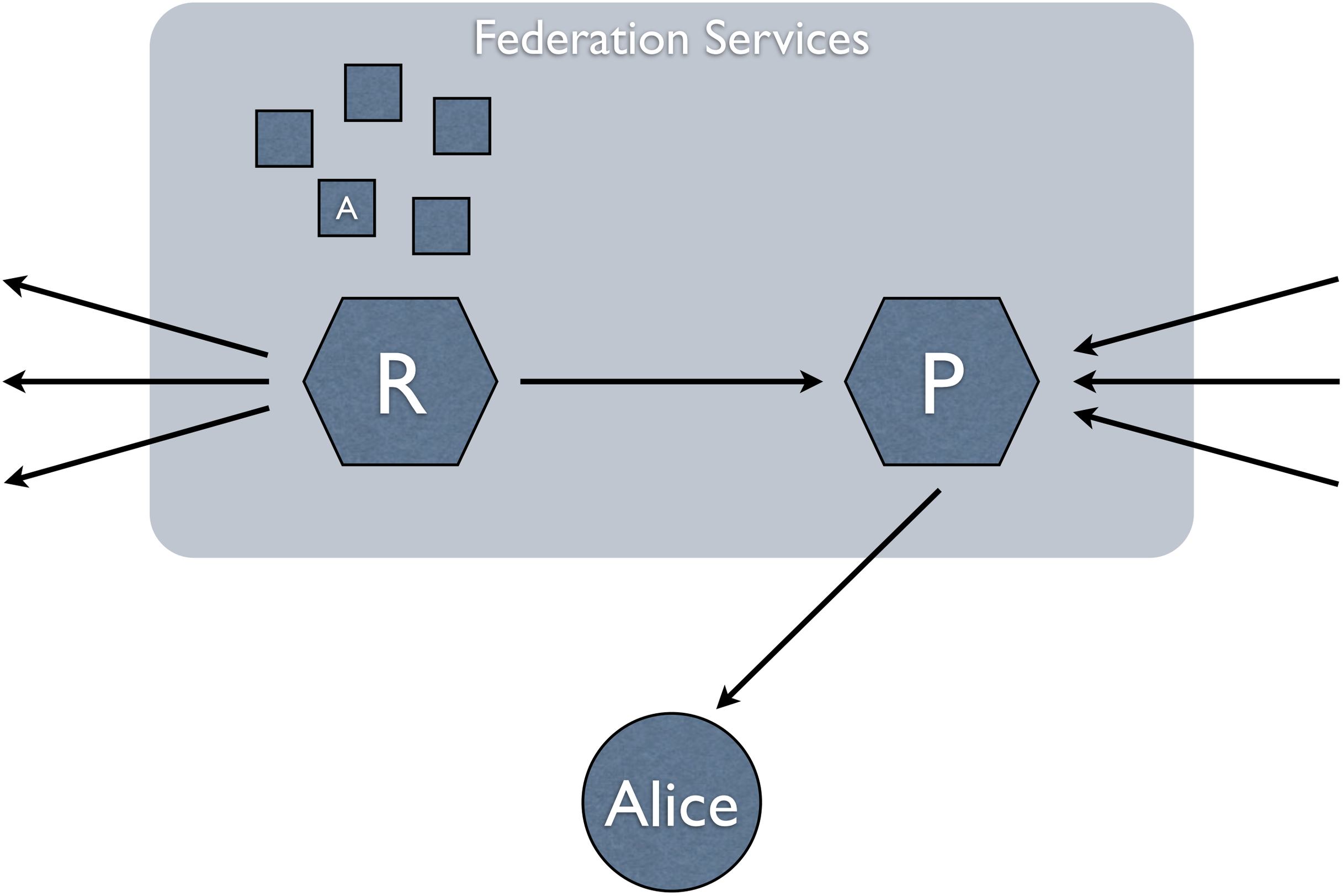

Federation Services
R
P
A
Alice

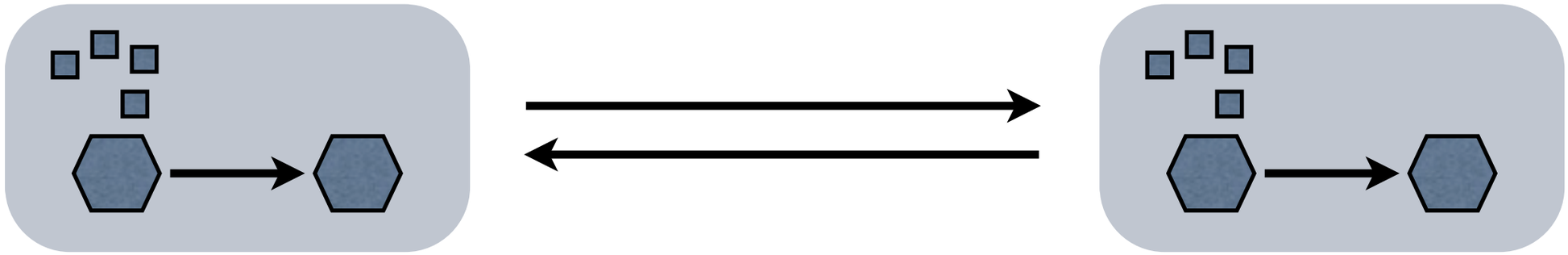

Federation Services
A
R
P
Alice

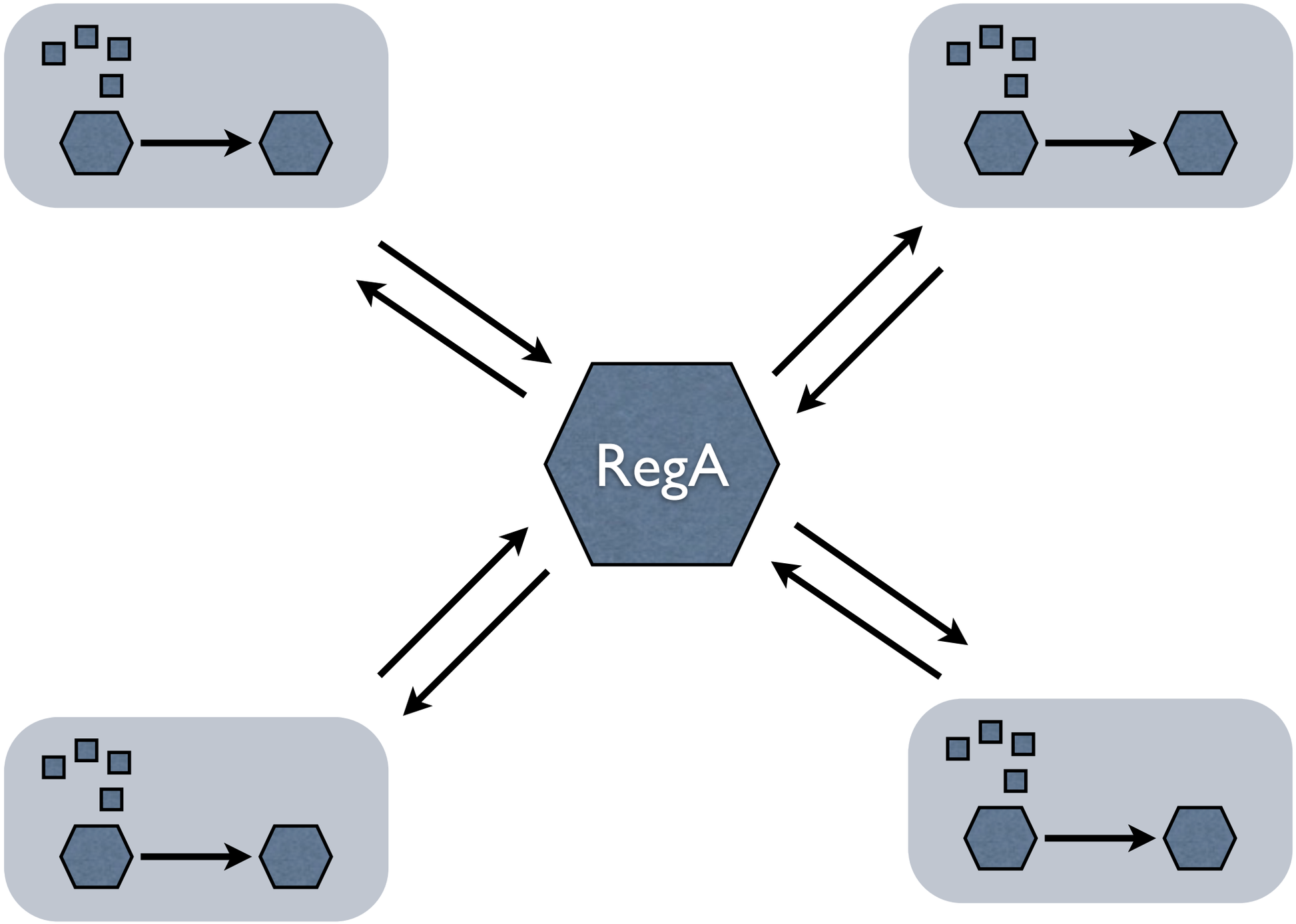

Federation Services
A
R
P

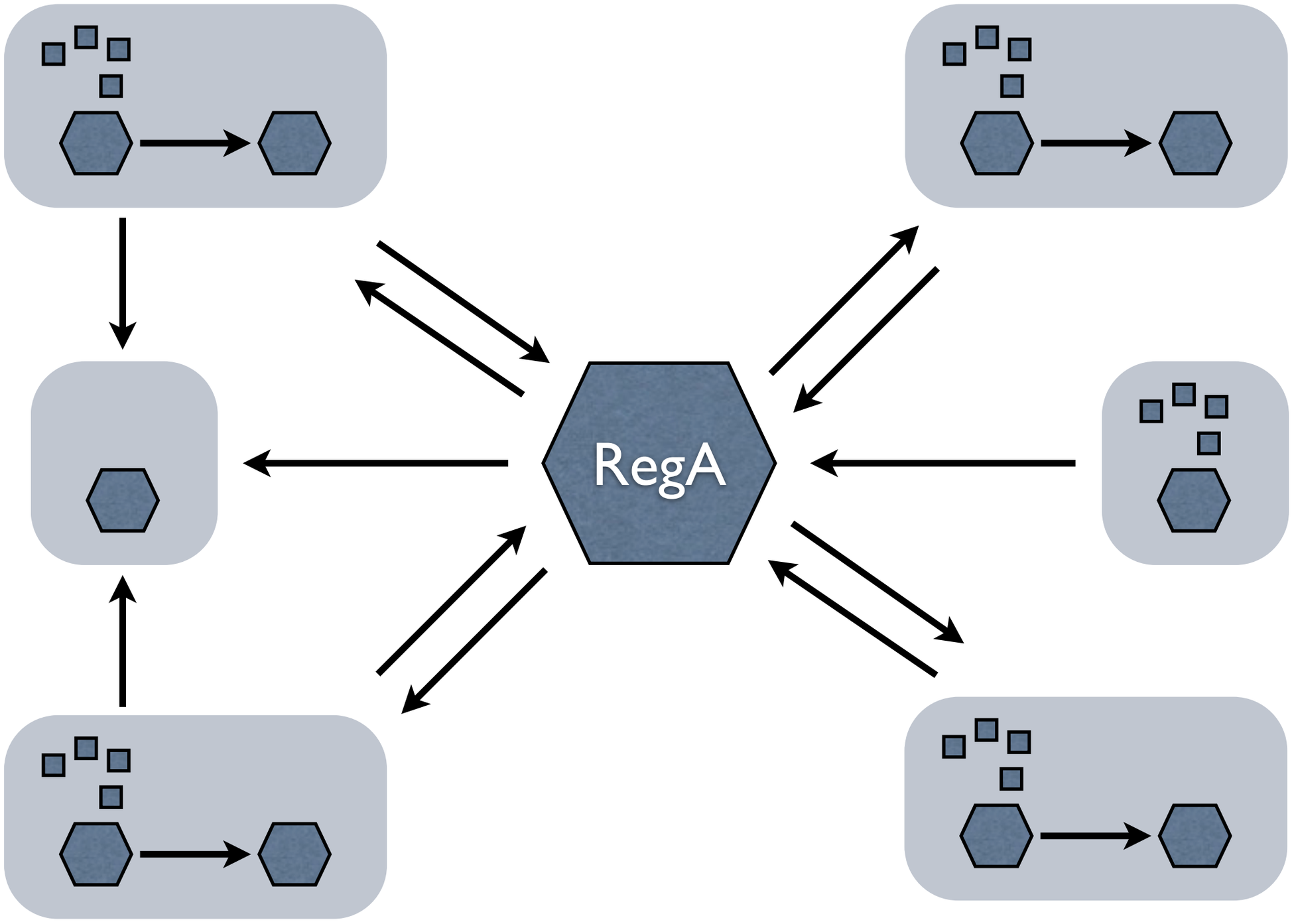
Alice

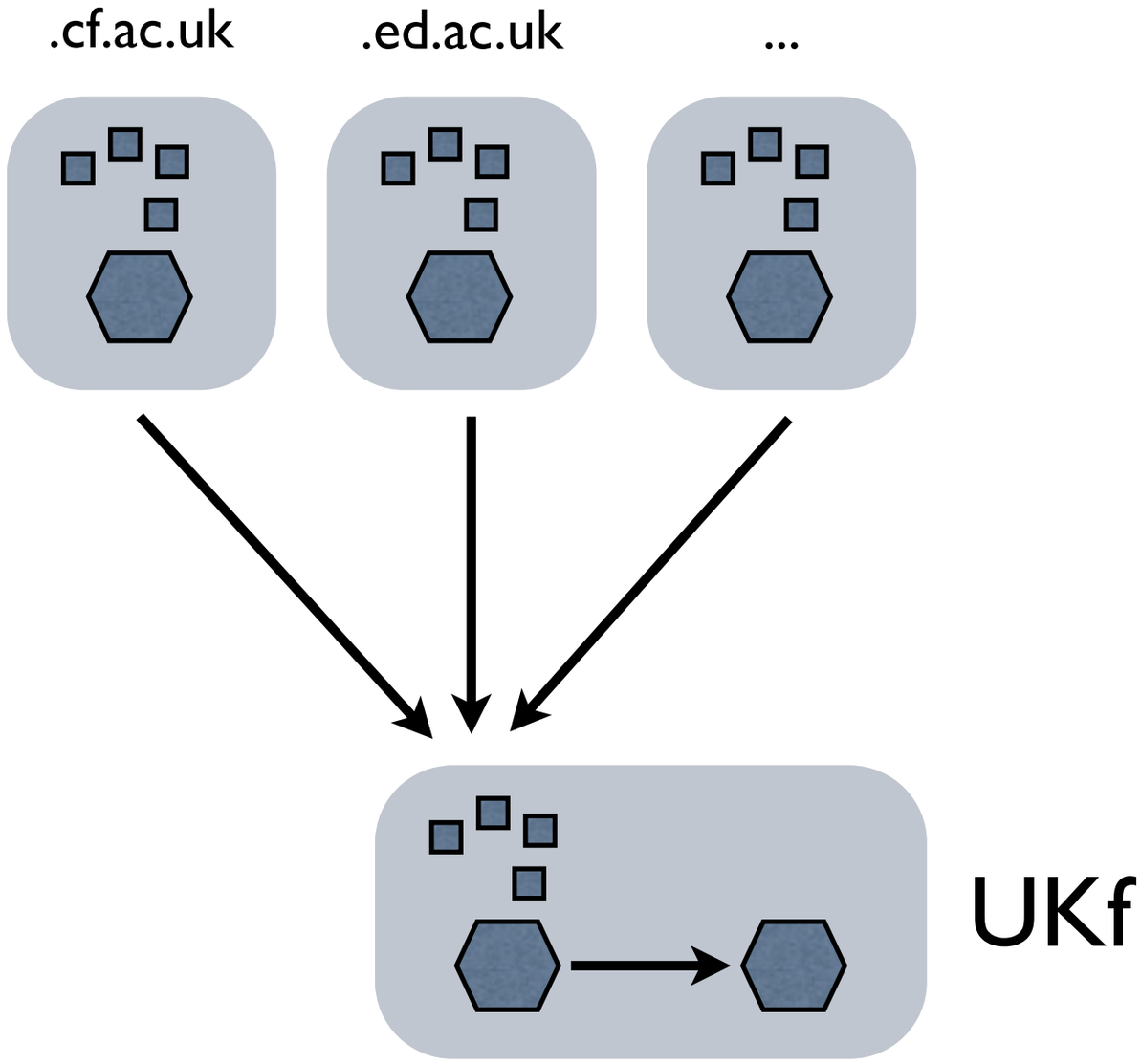

Federation Services
A
R
P
Alice


Federation Services
A
R
P
Alice



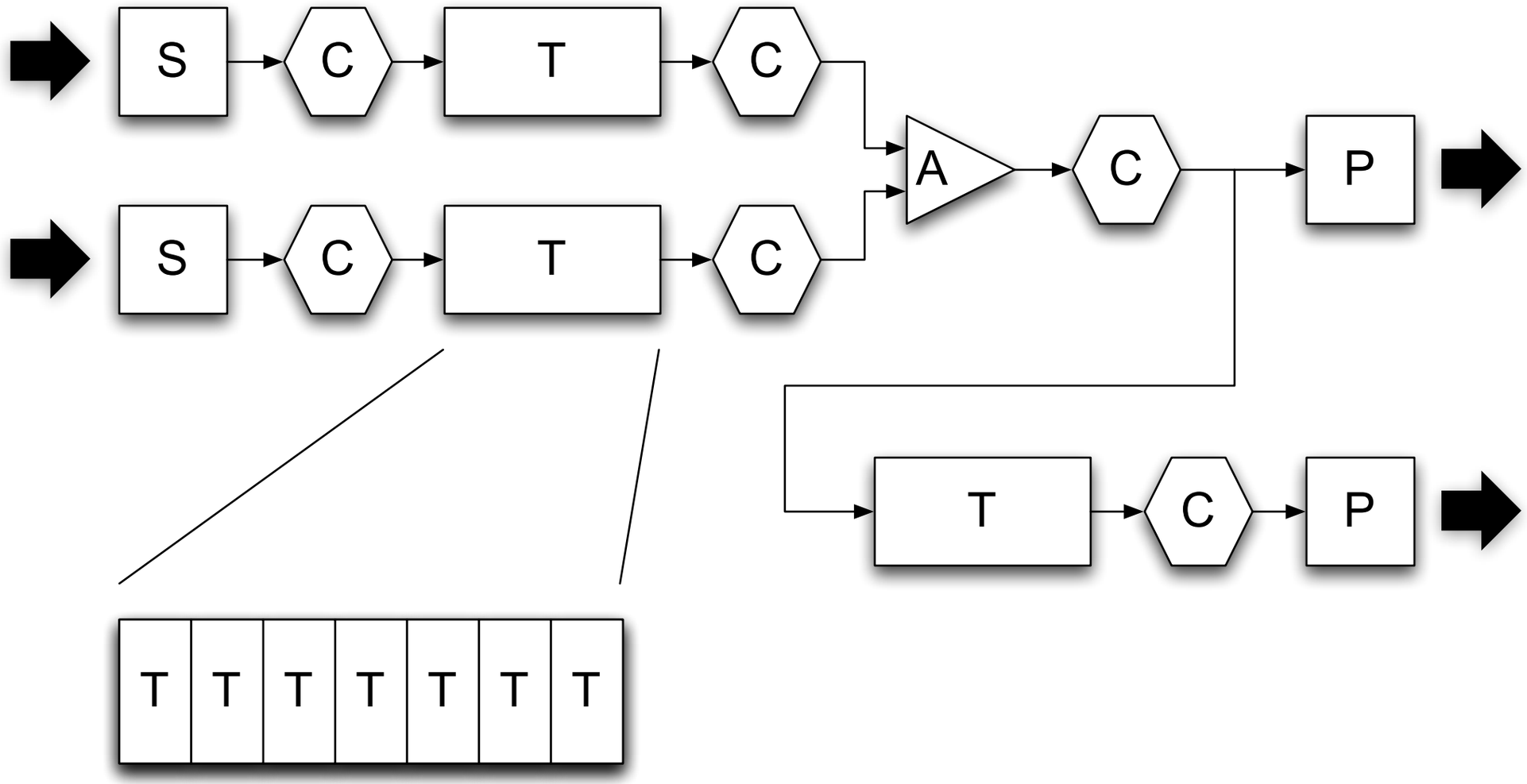

RegA


RegA


.cf.ac.uk
.ed.ac.uk
...
UKf

Aggregation Engines

- A configurable building block for "metadata networks" or "metadata layer":
  - Subscribe,
  - Aggregate,
  - Transform,
  - Publish.


S
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Transformation Steps

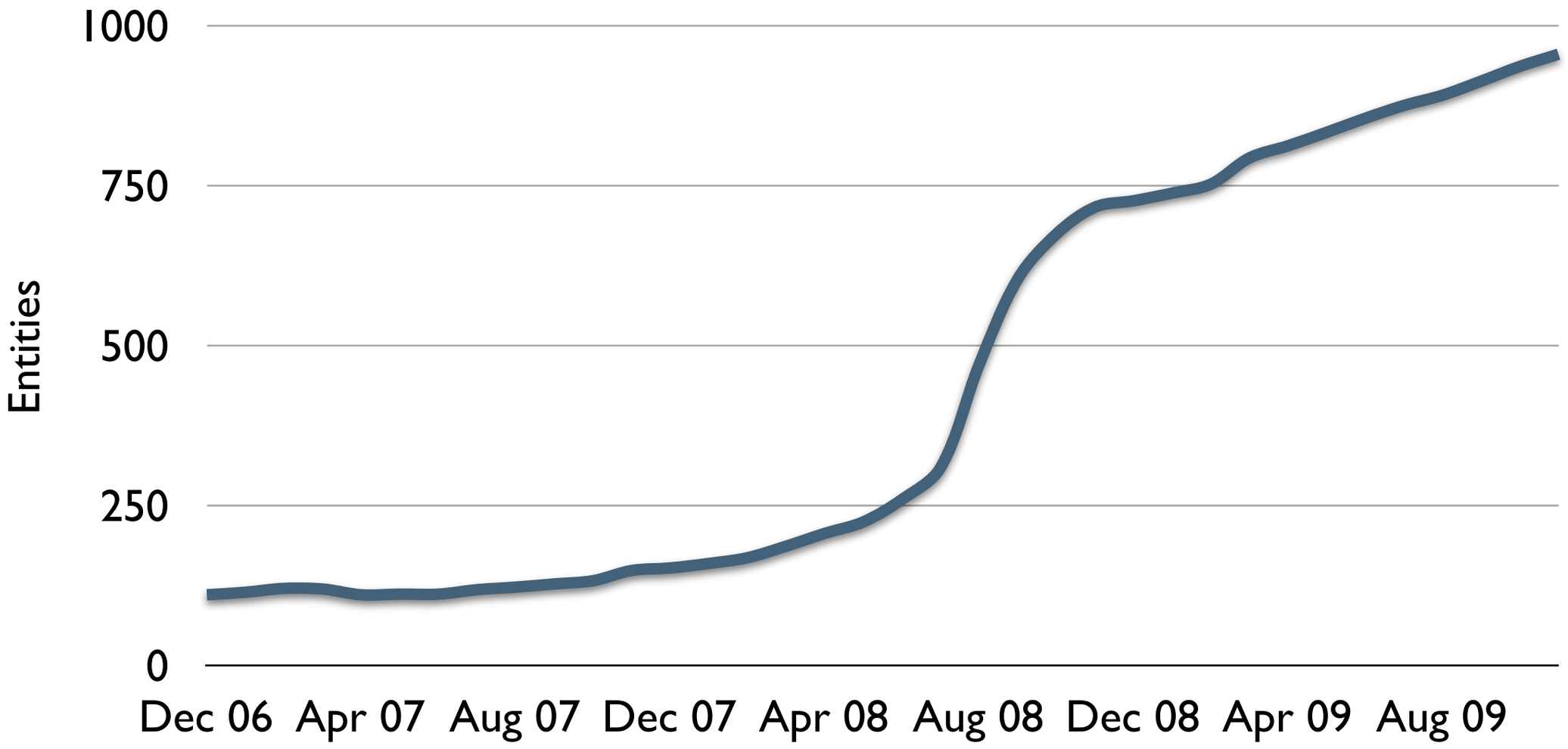
- Whitelist and blacklist by entity ID
- Whitelist and blacklist by XPath matching
- Digital signatures and signature verification
- Arbitrary XSLT
- Scripting languages
- ... or anything else you want to create

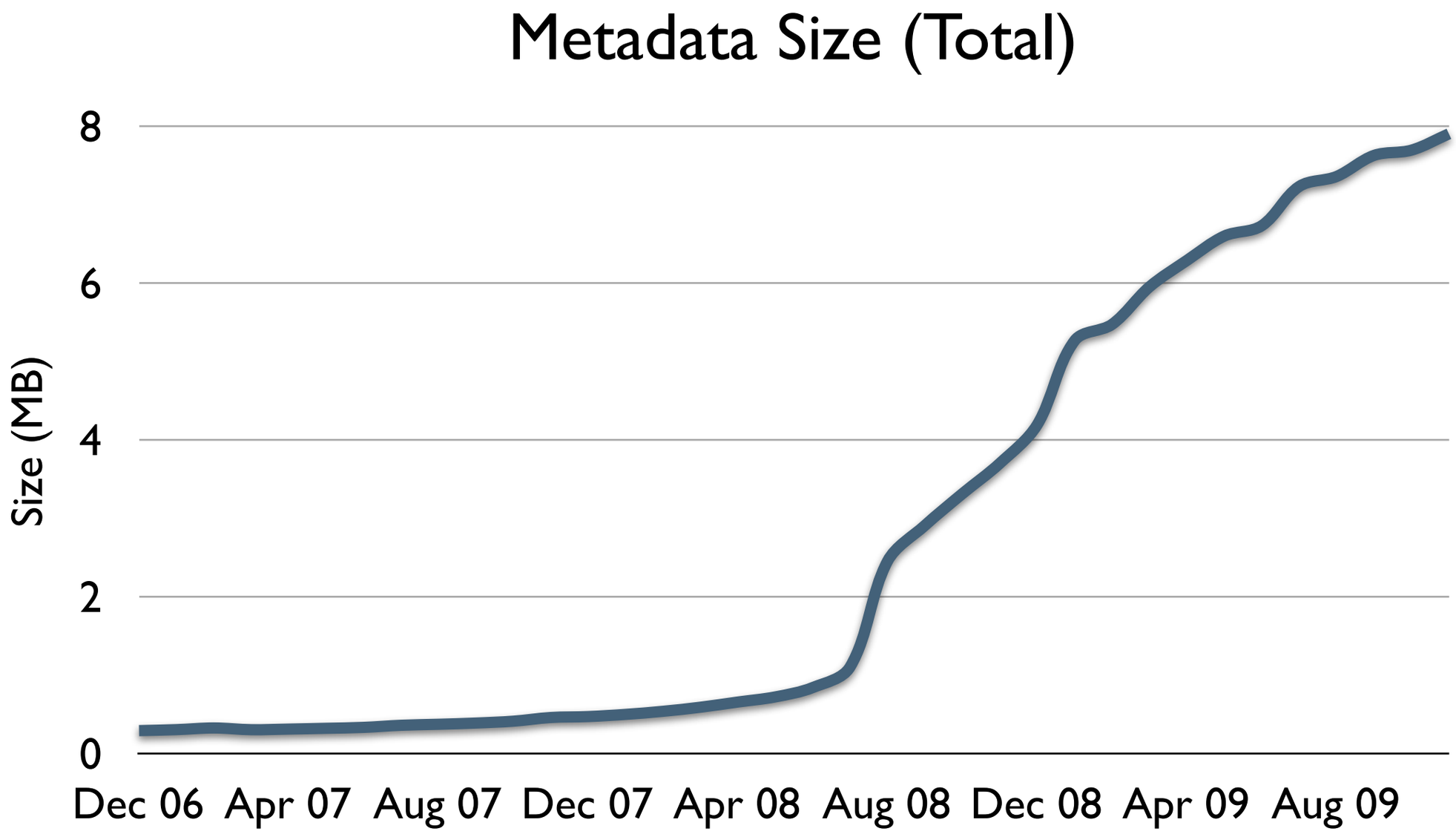
Result...

- All entities have access to (trustworthy) metadata for all potential partner entities.
- This can be seen as a “metadata layer” analogous to the DNS “naming layer”.

Scaling

UK federation entities




Metadata Size (Total)
Size (MB)
8
6
4
2
0
Dec 06
Apr 07
Aug 07
Dec 07
Apr 08
Aug 08
Dec 08
Apr 09
Aug 09

Scaling

- Observation: the UK federation is still getting bigger.
- Observation: the whole world is bigger still.
- If everyone has access to everything, won't that become "too big"?
- Response: don't download everything!
- Move to entity-at-a-time distribution.

I didn't mention...

- Behavioural trust in large systems;
- Trust relationships between aggregators;
- The discovery problem.

Further reading

- Some Notes on Metadata Interchange:
  - http://www.iay.org.uk/blog/2008/10/metadata_interc.html
- Concepts and Methods:
  - http://www.iay.org.uk/blog/2009/05/concepts_and_me.html

Questions?