Macaroons

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Macaroons “cheat-sheet”

- Macaroon is a **bearer token**.
- Macaroon contains zero or more **caveats**.
- Each caveat **limits** something about the macaroon:

  who can use it,

  when they can use it, or

  what they do with it.
- Anyone can **add a caveat** to a macaroon

  … creating a new, more limited macaroon.
- No one can **remove a caveat** from a macaroon

Bearer Tokens

Photo by Alan Cleaver (CC-

How caveats work?

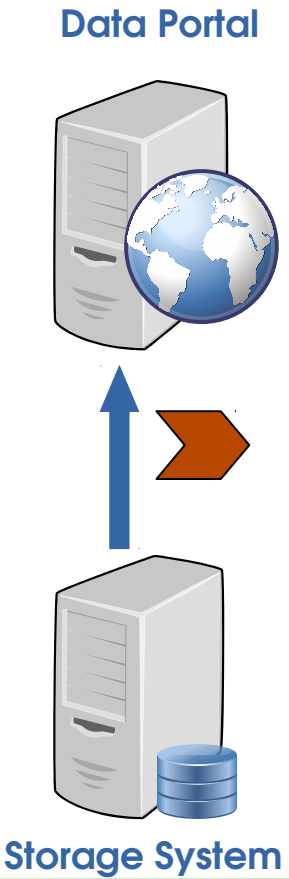

Diagram idea stolen from Tigran

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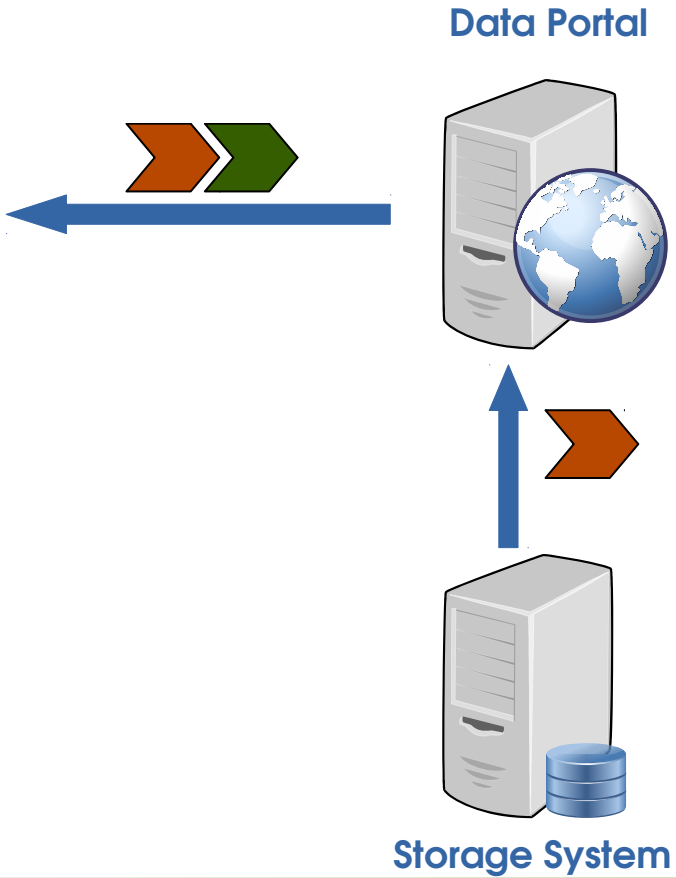

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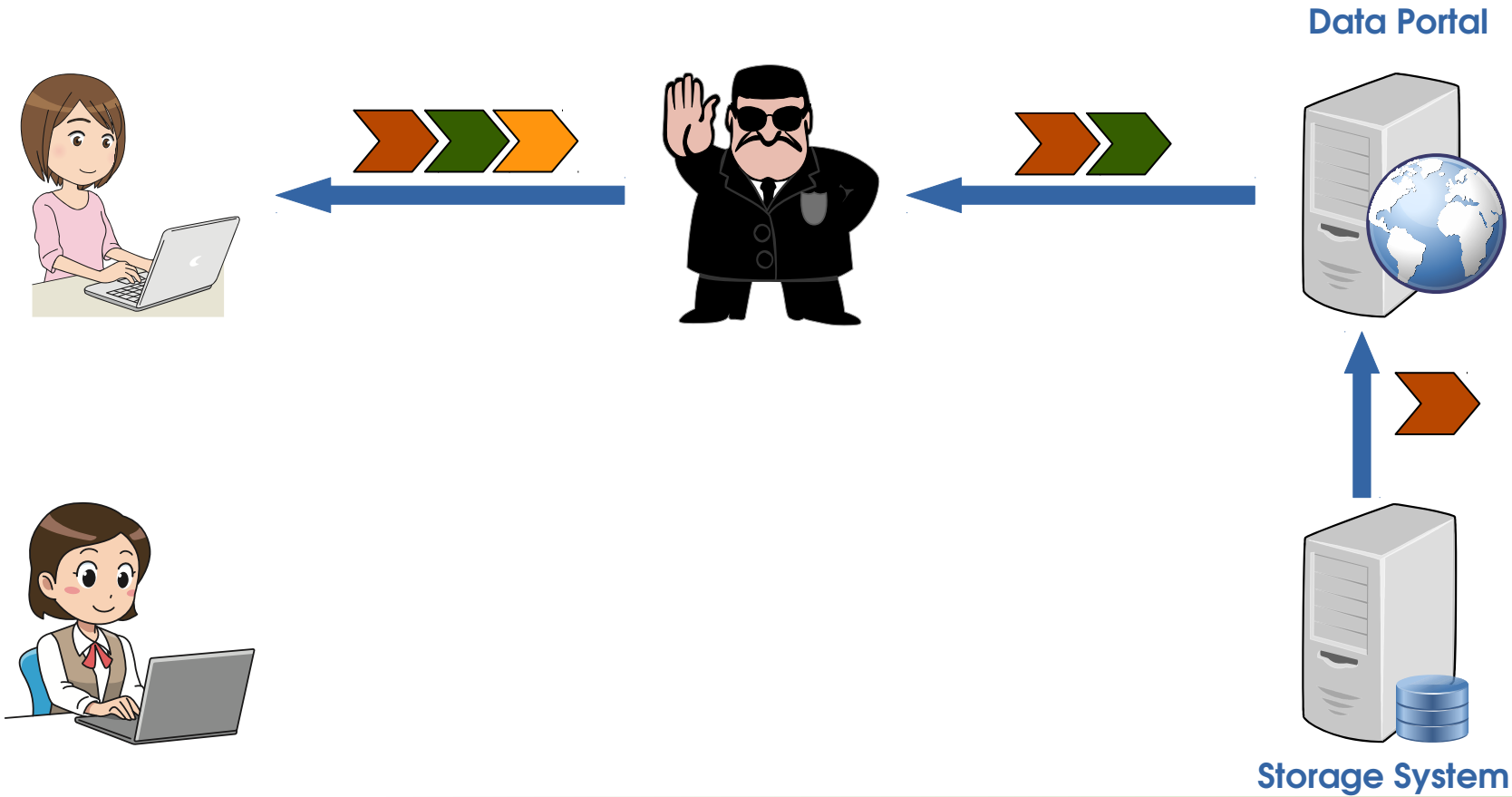

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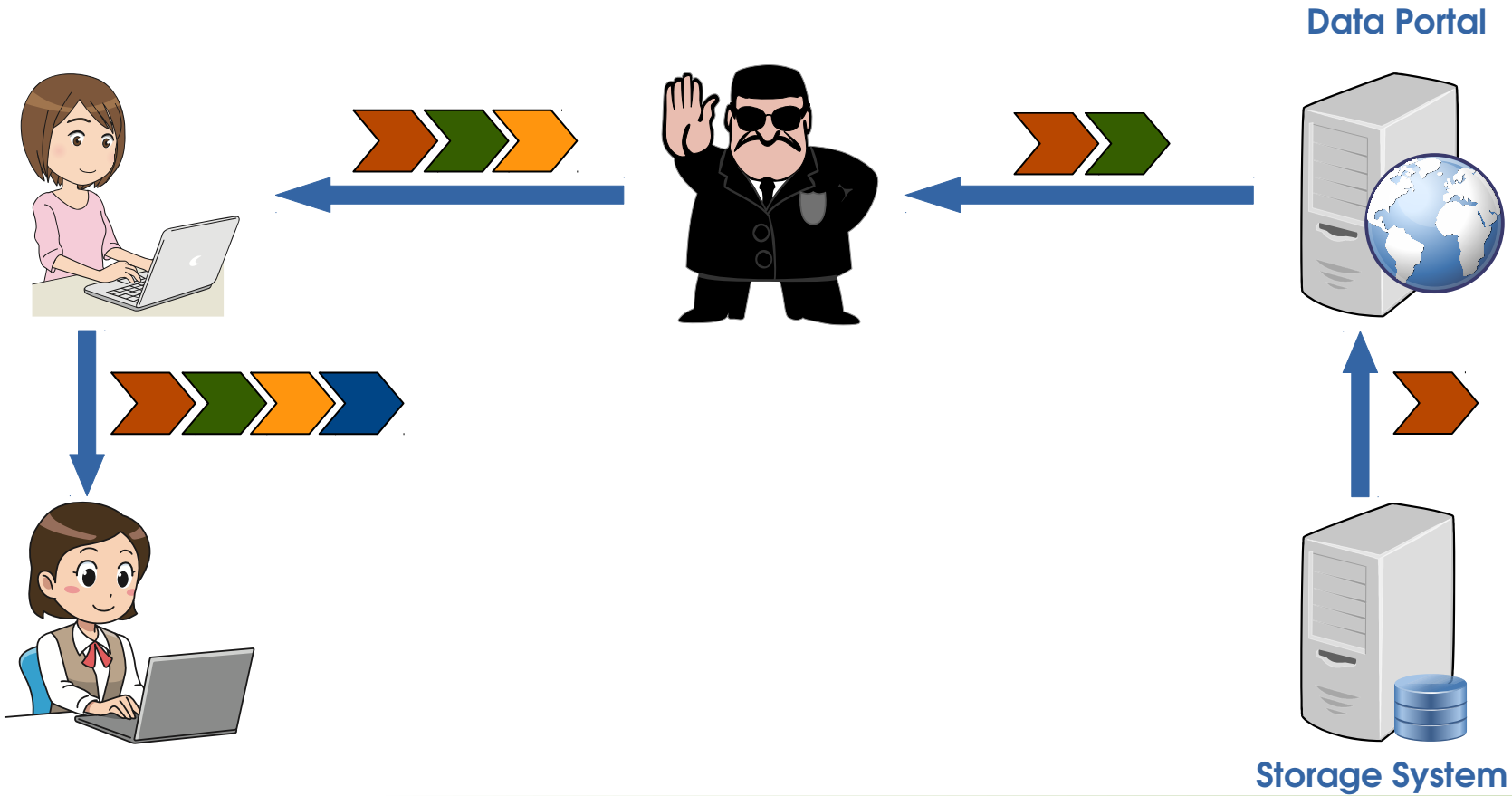

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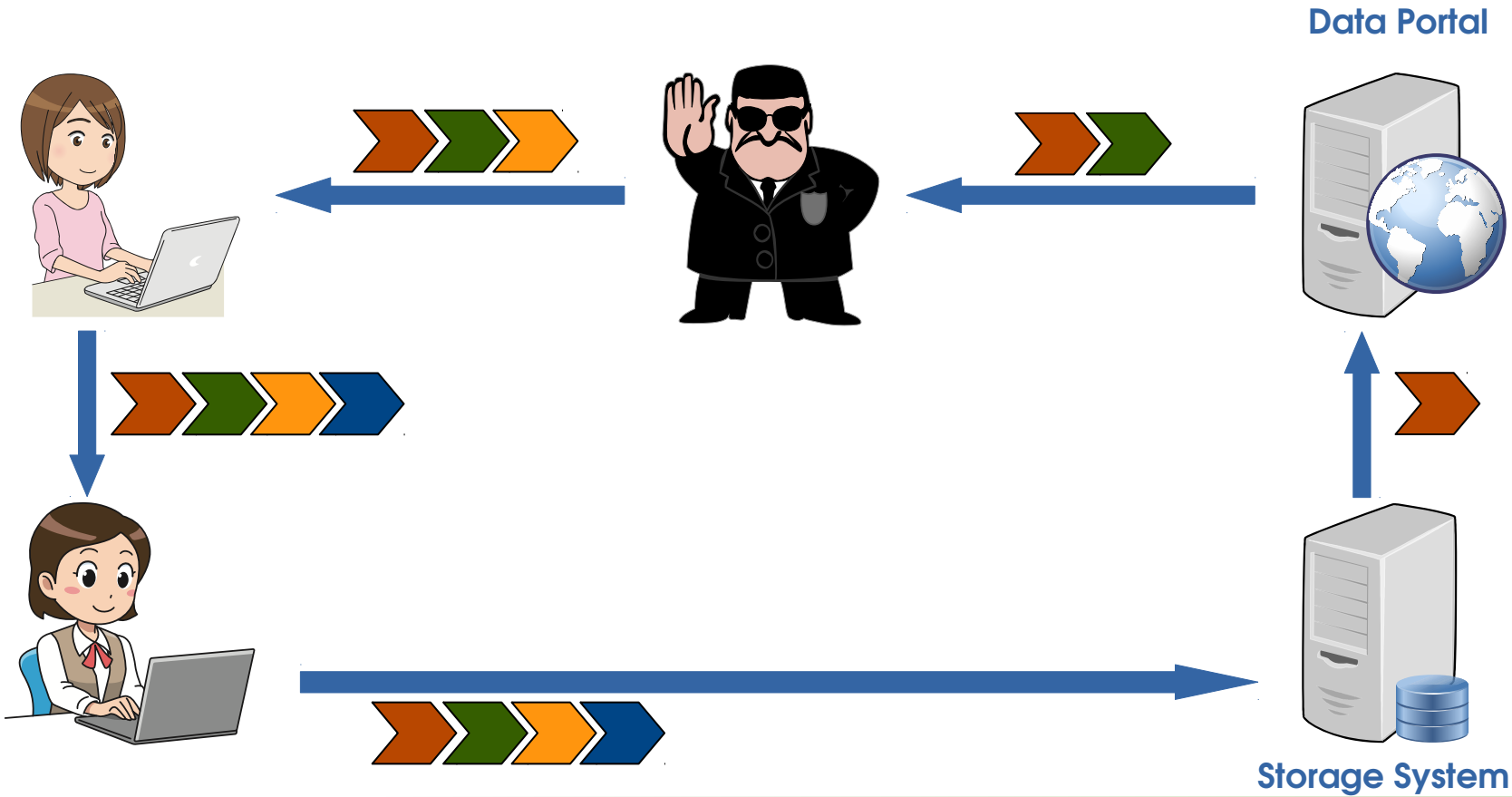

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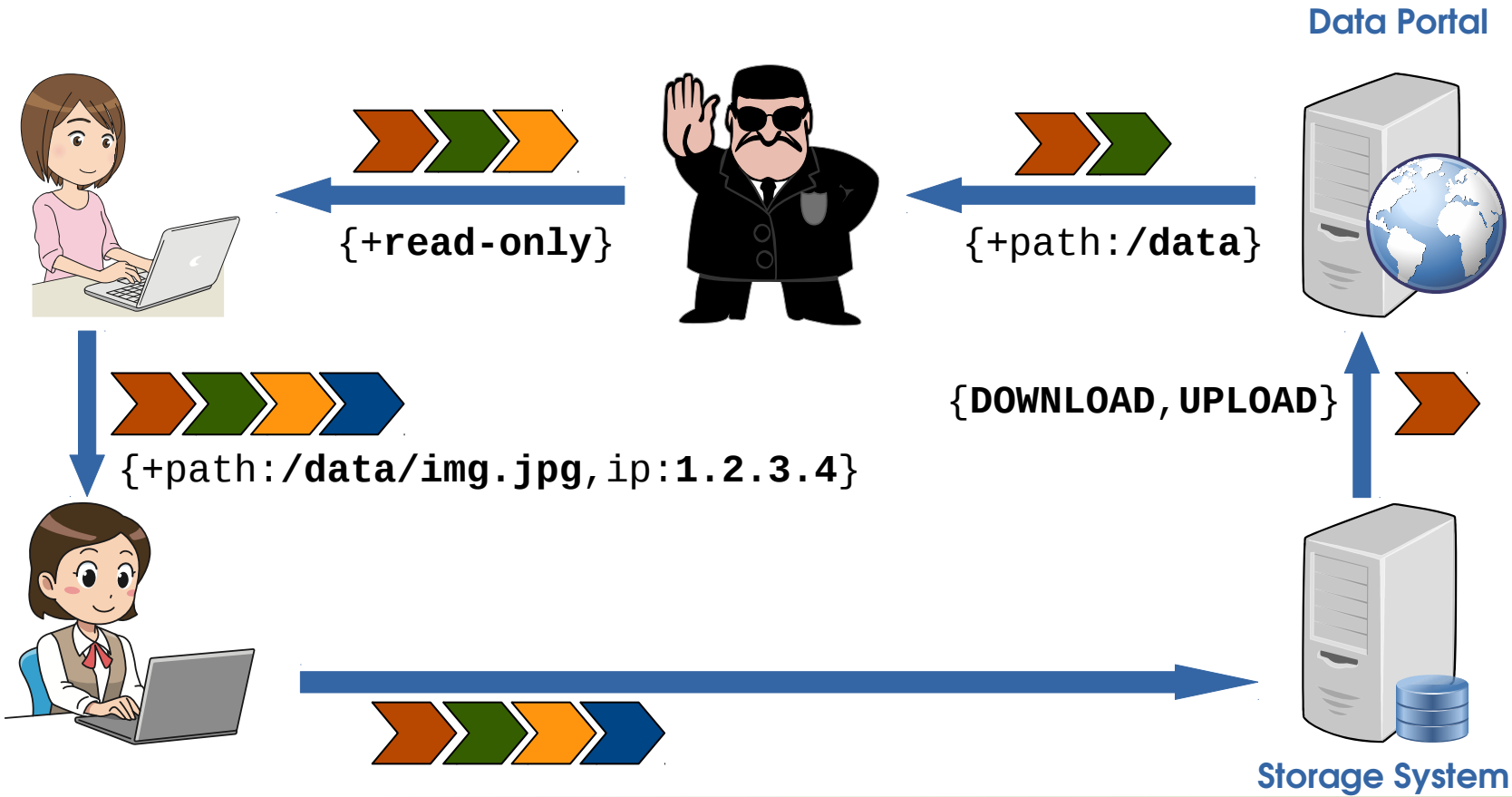
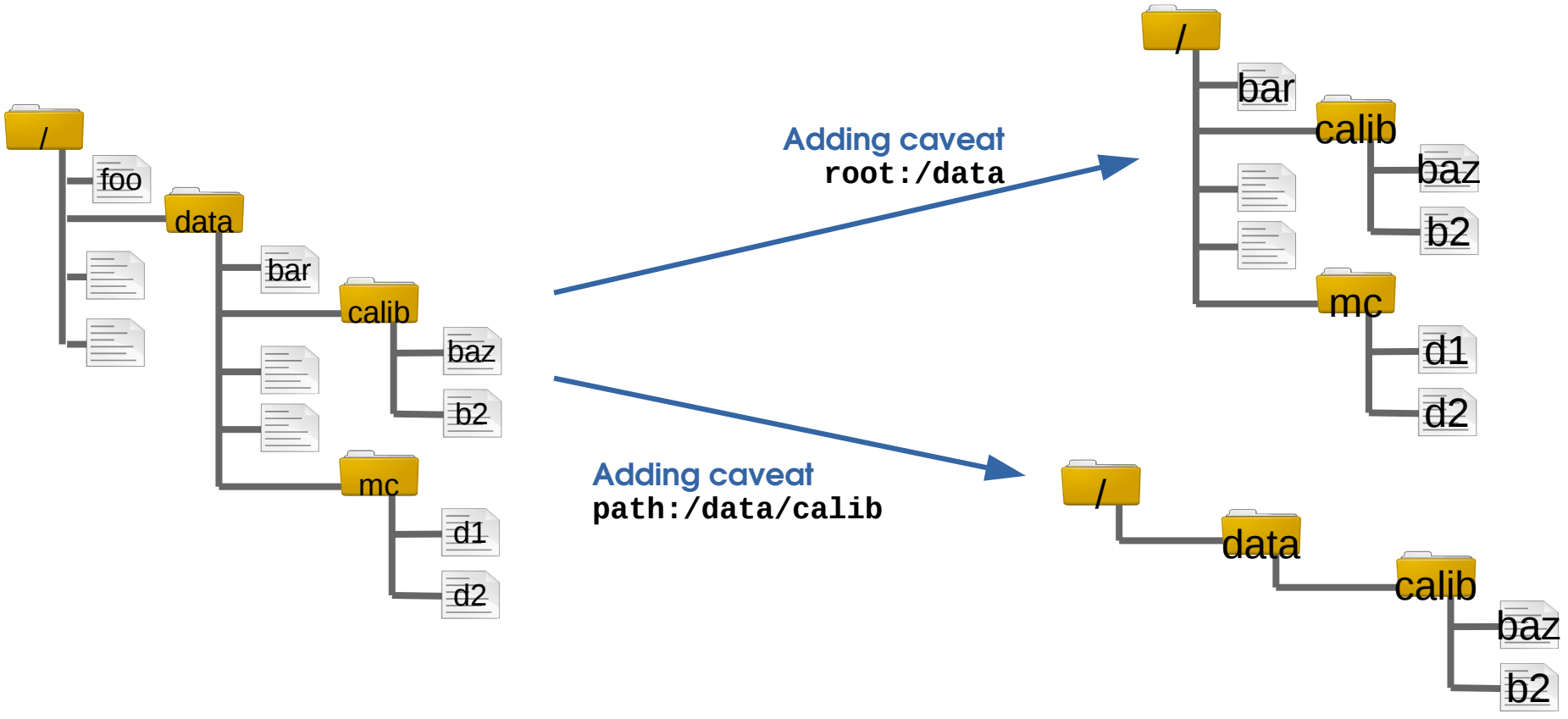


Diagram idea stolen from Tigran

Six caveats supported

- Unfortunately, there are no standard caveats. Here are those that dCache understands:
- Three path caveats:
  - **`root:`**<path> – chroot into this directory,
  - **`home:`**<path> – the user's home directory (not currently used),
  - **`path:`**<path> – only show this path.
- Two context caveats:
  - **`before:`**<timestamp> – when macaroon expires,
  - **`ip:`**<netmask list> – reduce which clients can use macaroon.
- One permissions caveat:
  - **`activity:`**<comma-list> – what operations are allowed.

How path caveats affect namespace



Activity caveats – limited what is allowed

activity:<activity-list>

where **<activity-list>** is a comma-separated list of allowed activities; e.g.,

activity:DOWNLOAD,LIST

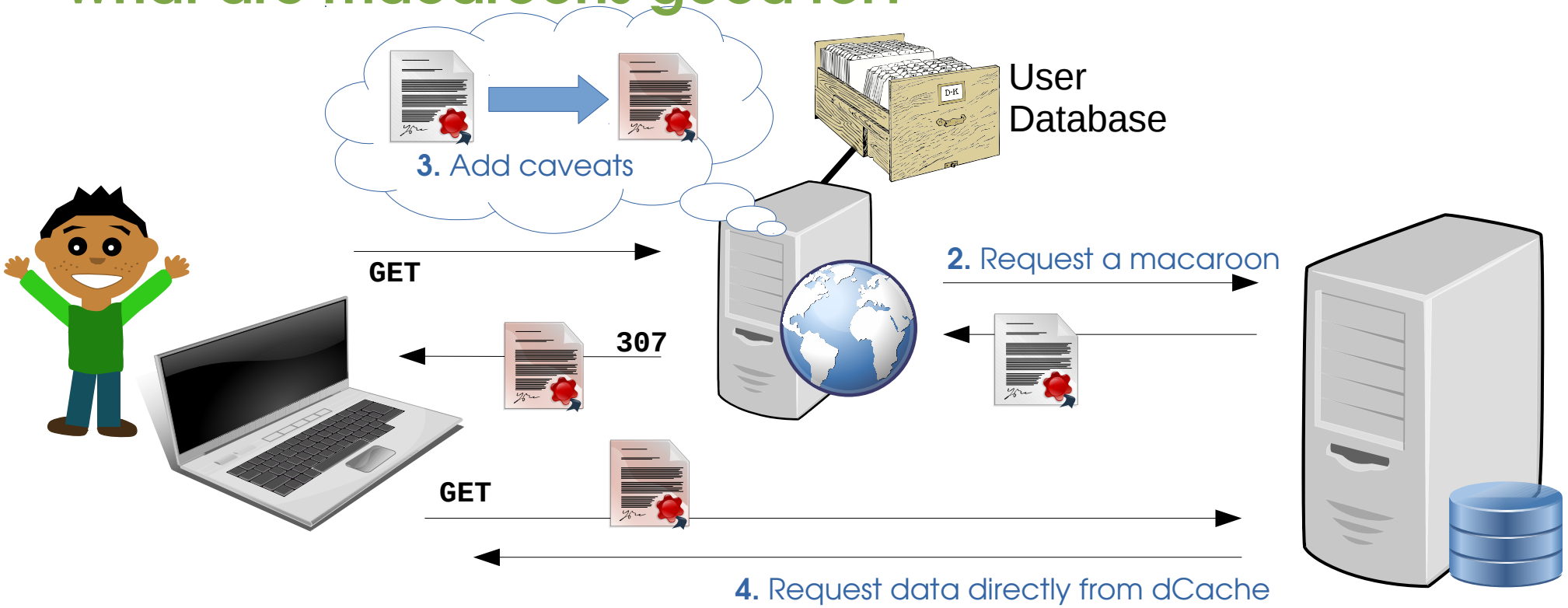
- Possible activities are:

  DOWNLOAD, **UPLOAD**, **DELETE**, **MANAGE**, **LIST**, **READ_METADATA**, **UPDATE_METADATA**.

- Allowed activity may be further reduced by adding more **activity:** caveats.

  No **activity:** caveat means client can do whatever the user requesting the macaroon can do.

What are macaroons good for?



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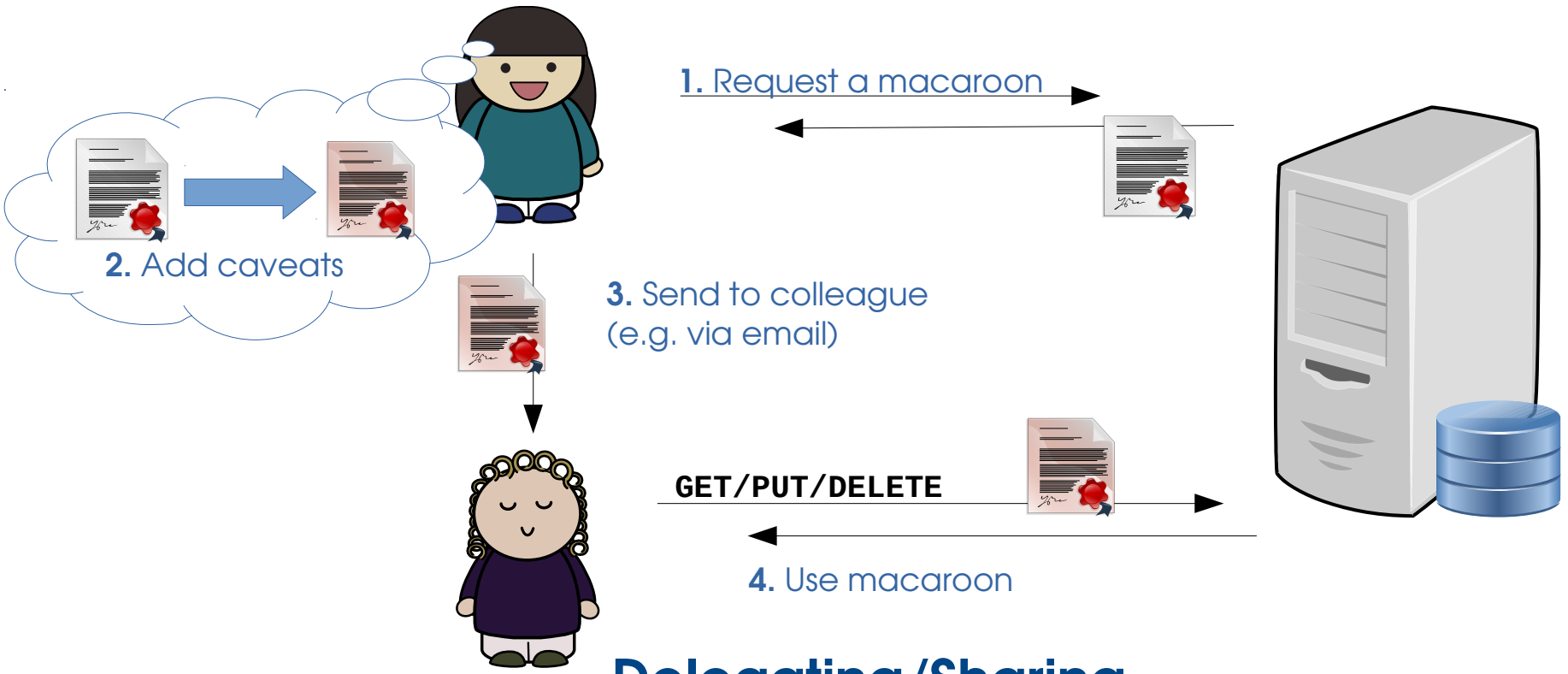

Delegating/Sharing

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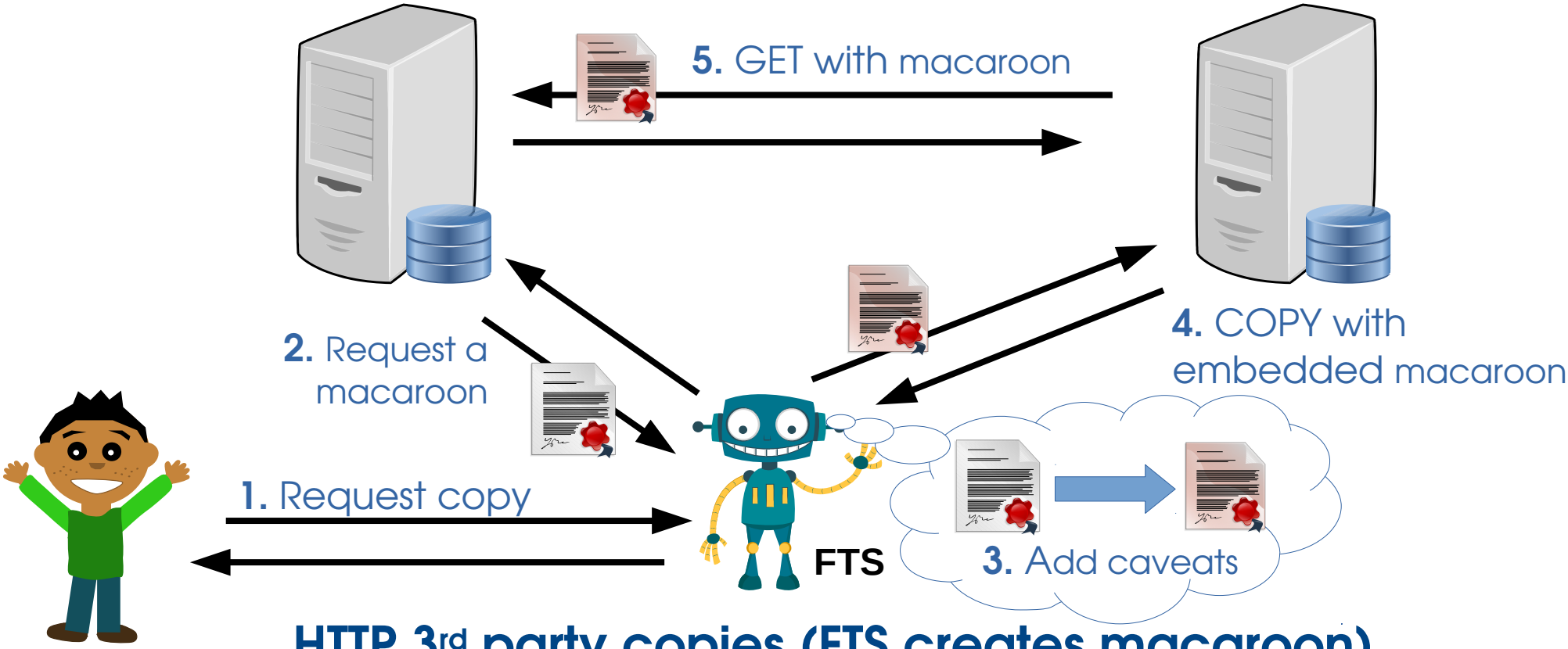

HTTP 3rd party copies (FTS creates macaroon)

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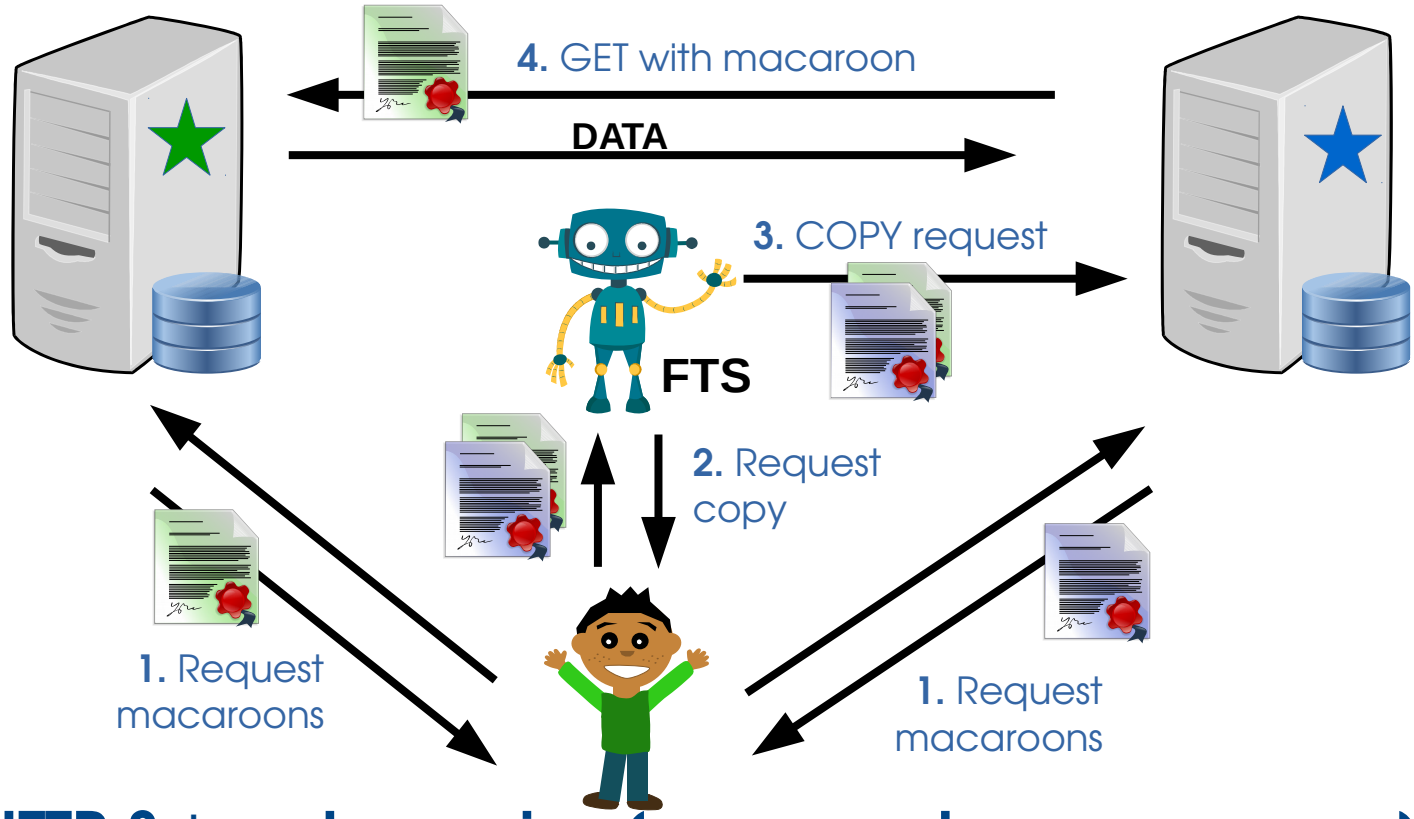
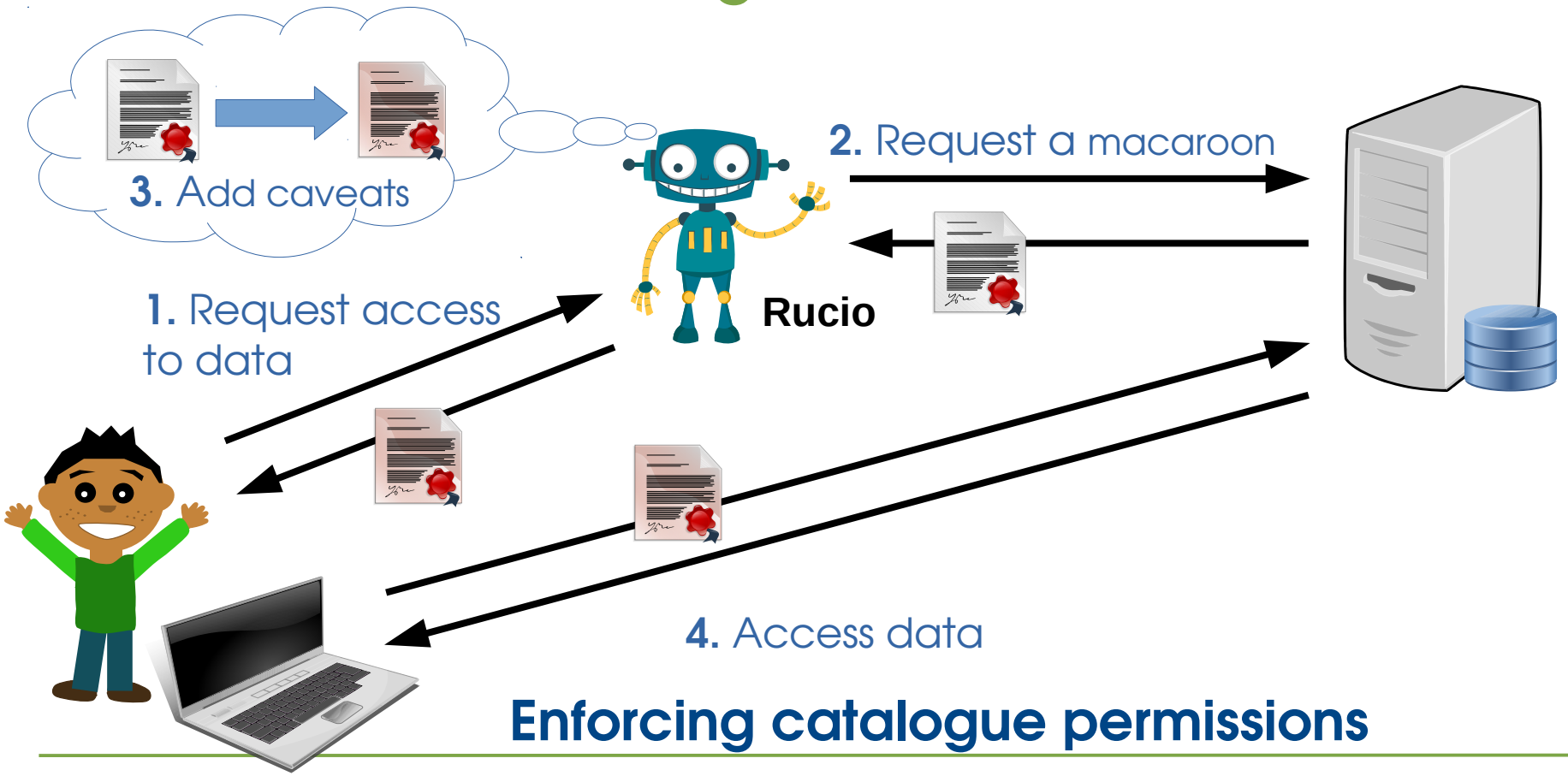


HTTP 3rd party copies (user creates macaroons)

What are macaroons good for?



Enforcing catalogue permissions

Usage of Macaroons

- Nothing yet in production, but …
- SurfSARA have multiple projects exploring macaroons:
  - As **dataset export** for LOFAR (currently separate server)
  - Project MinE: **outsource authz** decision to UMCU (university medical center Utrecht)
  - **Sharing data** without moving it from dCache to ownCloud
  - **Delegated access** to storage; i.e., jobs without X.509 proxy.
- SWESTORE – the **portal use-case**: avoid proxying data transfers.

Current macaroon support in storage systems

- **dCache** fully supported since v3.2
  - available in all supported versions of dCache
- **DPM** experimental support in v1.10
  - currently not recommended in production
- **xrootd** coming soon ("this year")
  - code currently being accepted upstream
- **EOS** not yet, but would add if there's demand
  - would use the xrootd plugin – can investigate once plugin finalised.
- **StoRM** plans to add bearer token authn
  - Initial work focusing on JWT

What's coming next?

- **New features** (in dCache) …
  - ability to cancel subset of macaroons.
  - client identifier caveat.
  - ability to request macaroon outside of WebDAV.
  - support in more protocols (dcap, ftp, …).
- Work with dCache sites to **gain experience**.
- Explore **WLCG use-cases**:

  HTTP 3rd party transfer, …

Summary

- Macaroons provide a solution for **delegated authorisation**.
- Autonomous attenuation means **macaroons scale**.
- Macaroons have **many potential uses**.
- Sites are now **exploring** how to use macaroons.
- **Other storage systems** are exploring macaroons.

Thanks for listening!

Backup slides

Aren't these like SciTokens?

SciTokens vs macaroons: comparison cheat-sheet

- Who issues them?

  (SciToken: "central" service, macaroon: service)

- How expensive to generate?

  (SciToken: a few Hz, macaroon: a few kHz)

- Autonomous reduced token?

  (SciToken: no, macaroon: yes)