Pluggable Transports in Practice

by Michael Pöhn <michael@guardianproject.info>

PGP: 3DBD BA23 810A EE37 7CC8 E9D7 C843 2463 5610 899F

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What’s Pluggable Transports?

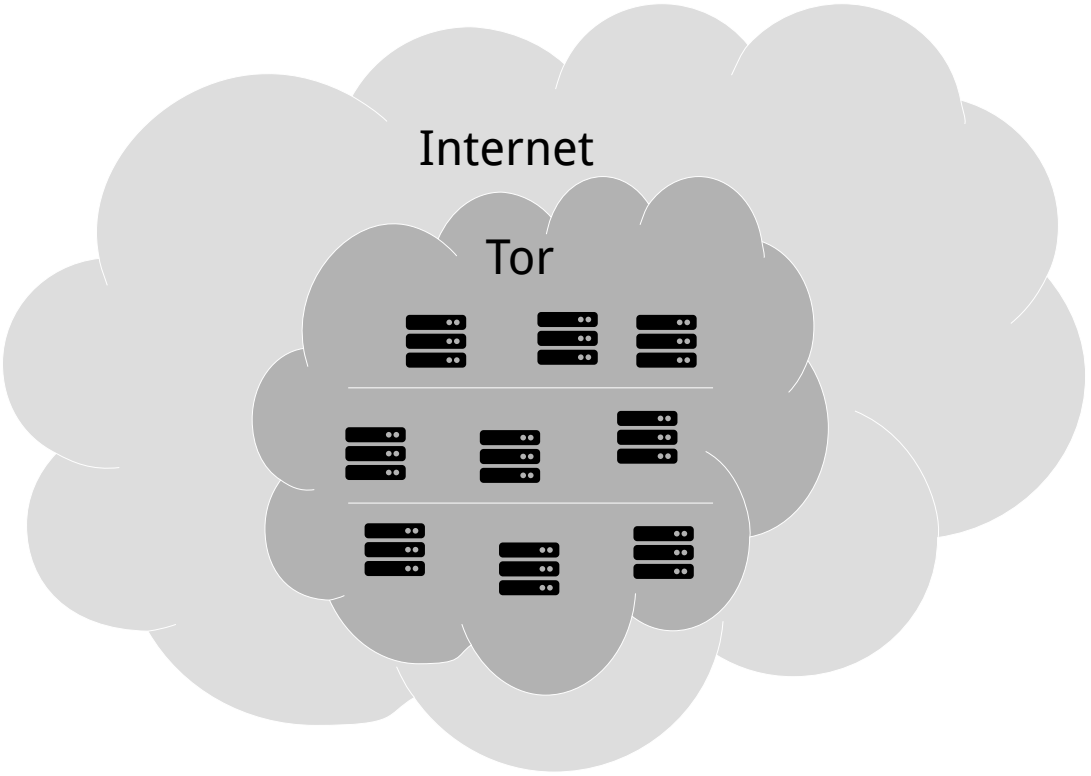
»Pluggable Transports have been created to help developers keep their users connected when censorship occurs. While Transports conform to a single spec, they connect to the network using a variety of different techniques.«

– https://www.pluggabletransports.info/about/

What's Pluggable Transports?

Started out as a censorship circumvention layer of the Tor anonymization network.

Tor – anonymization



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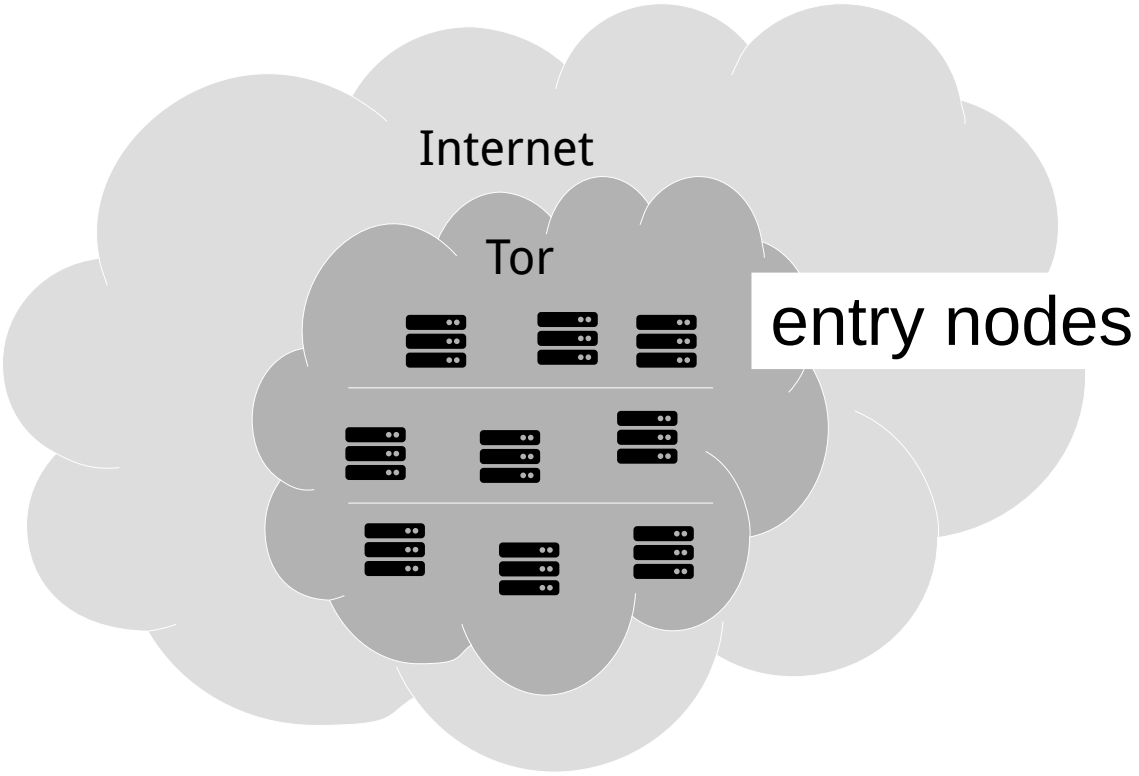

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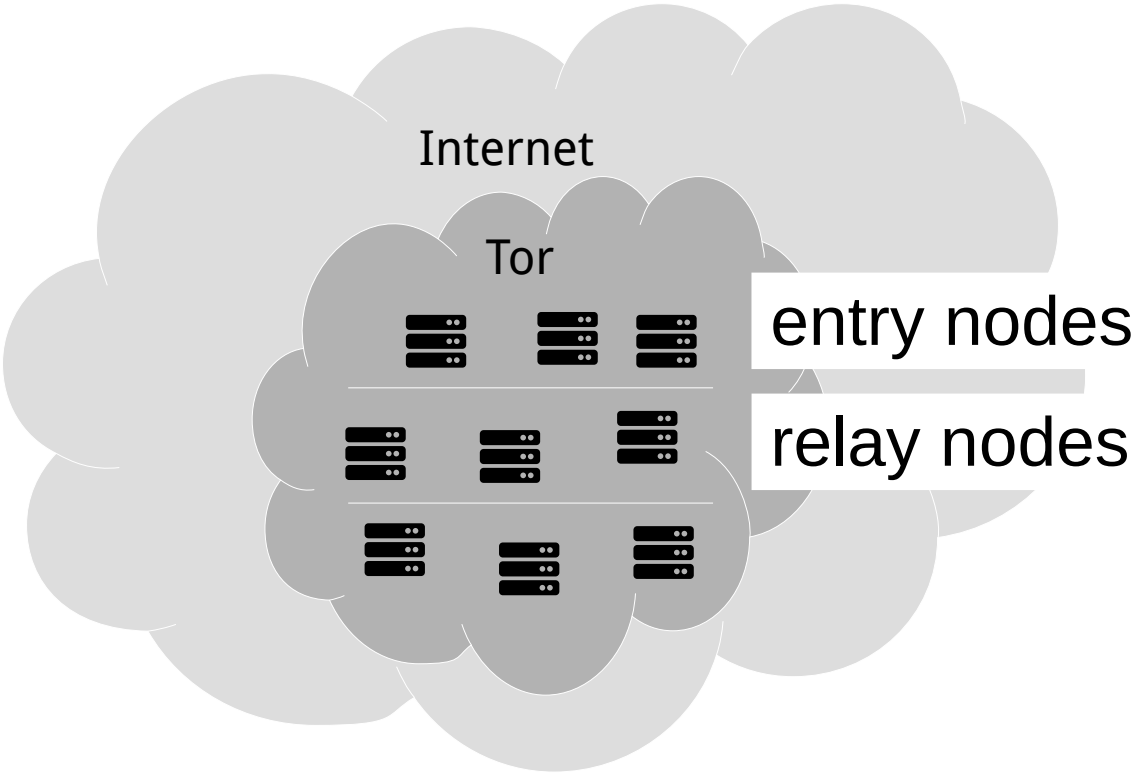

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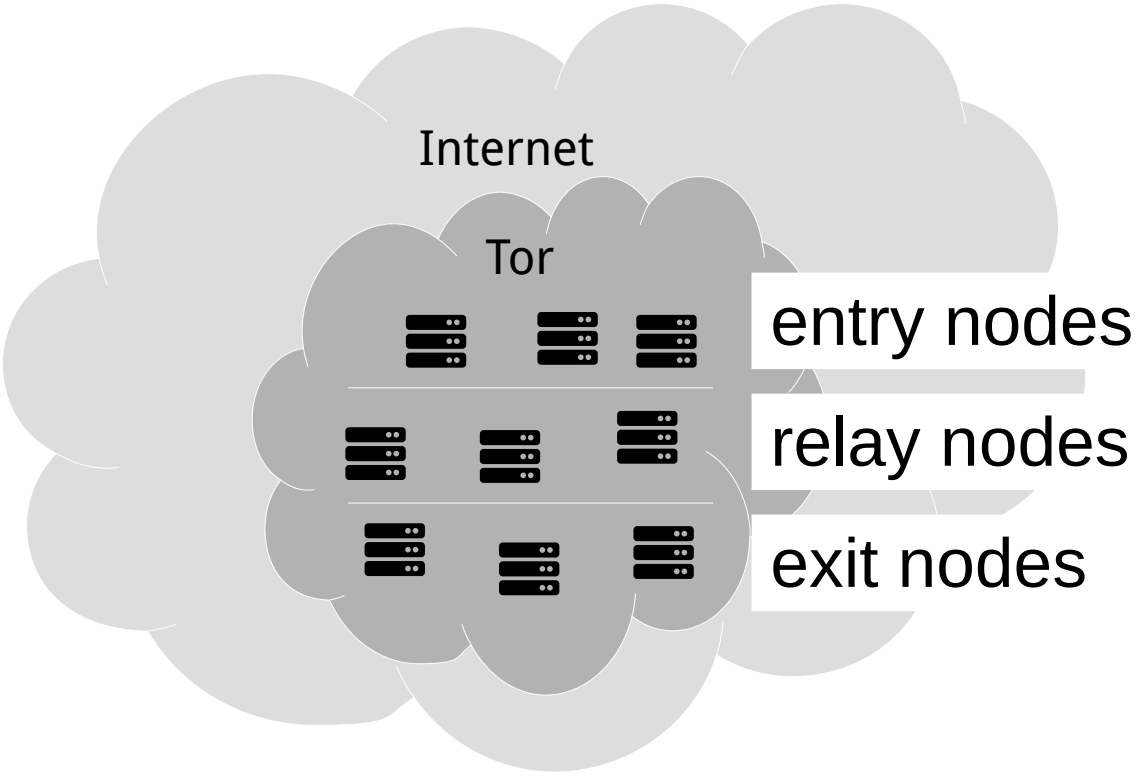

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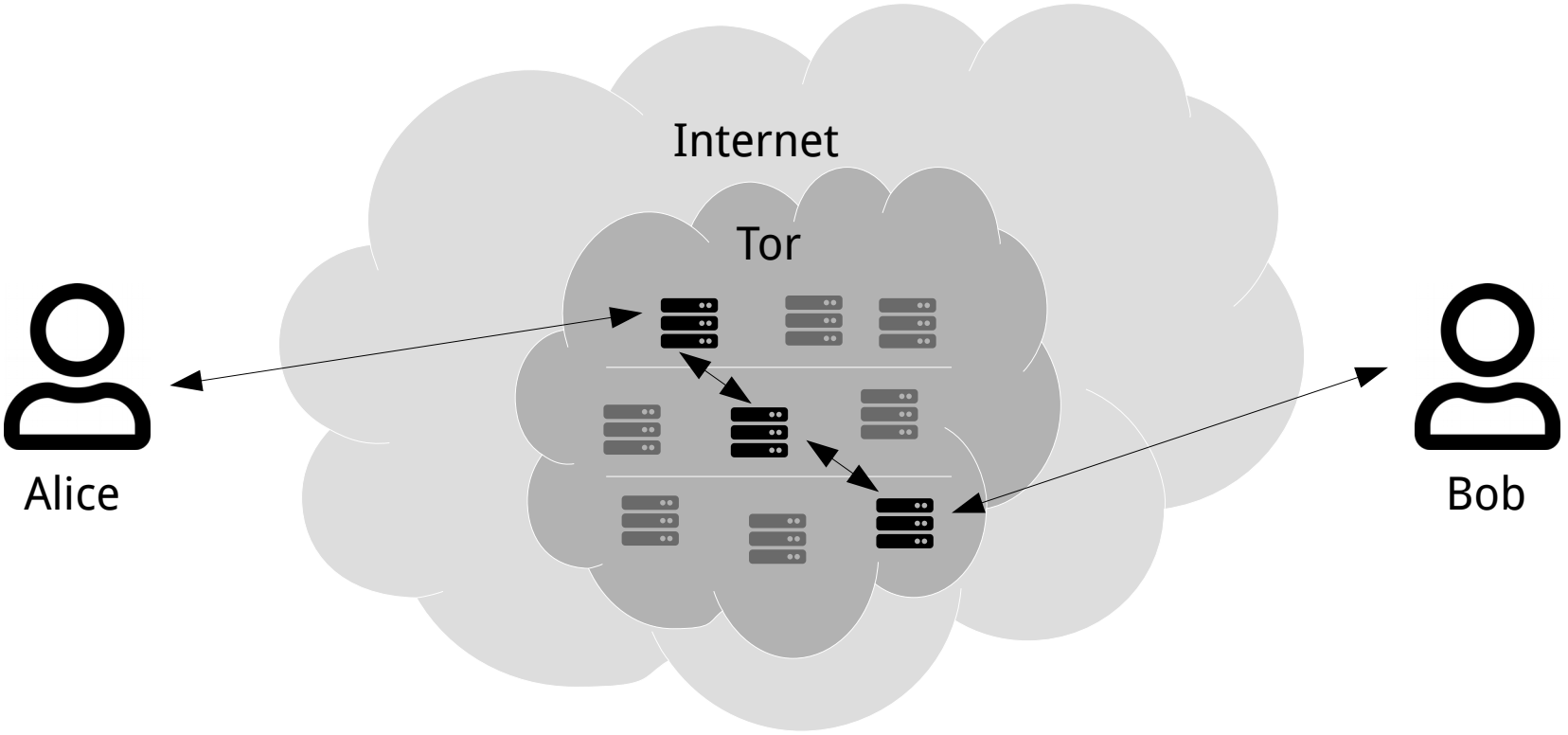

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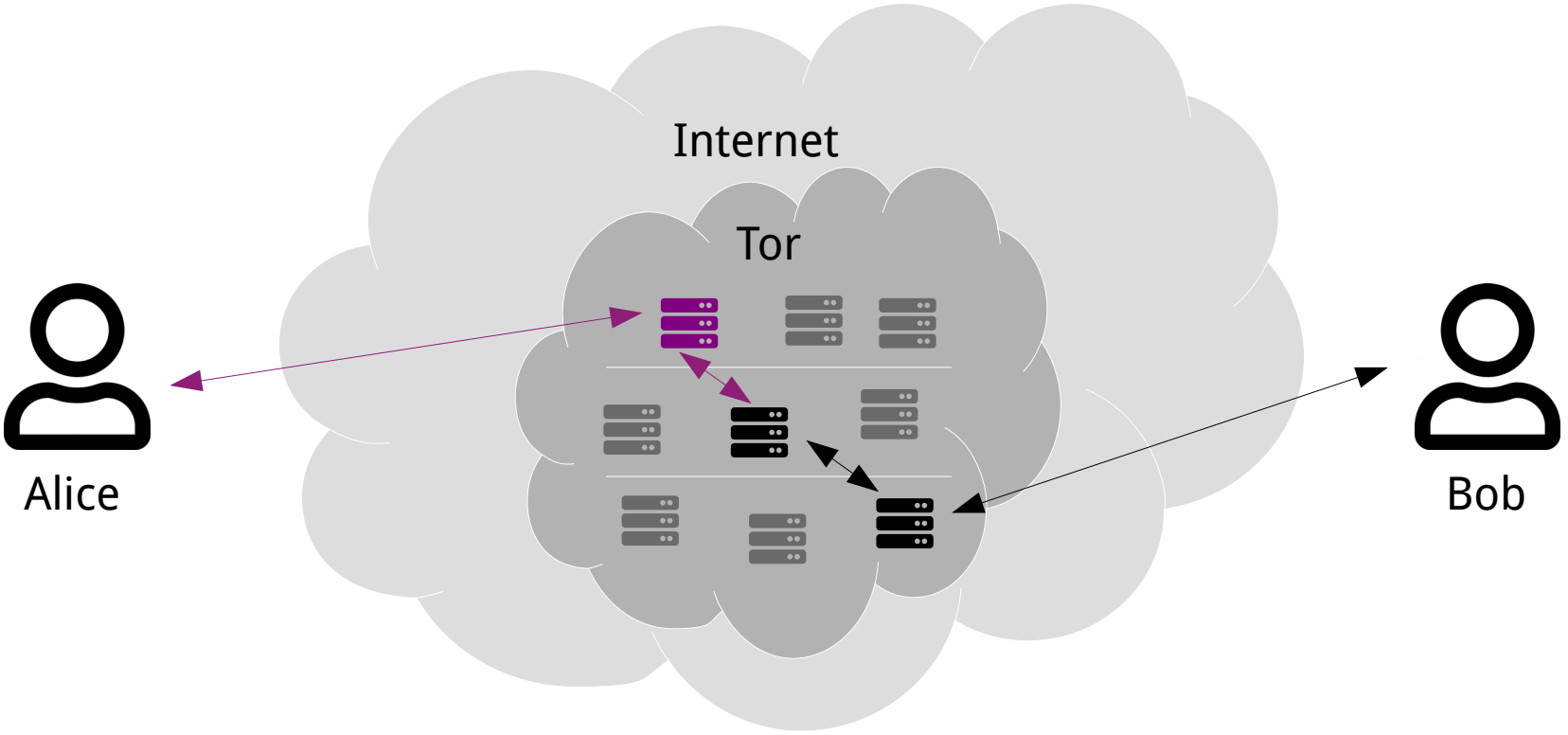

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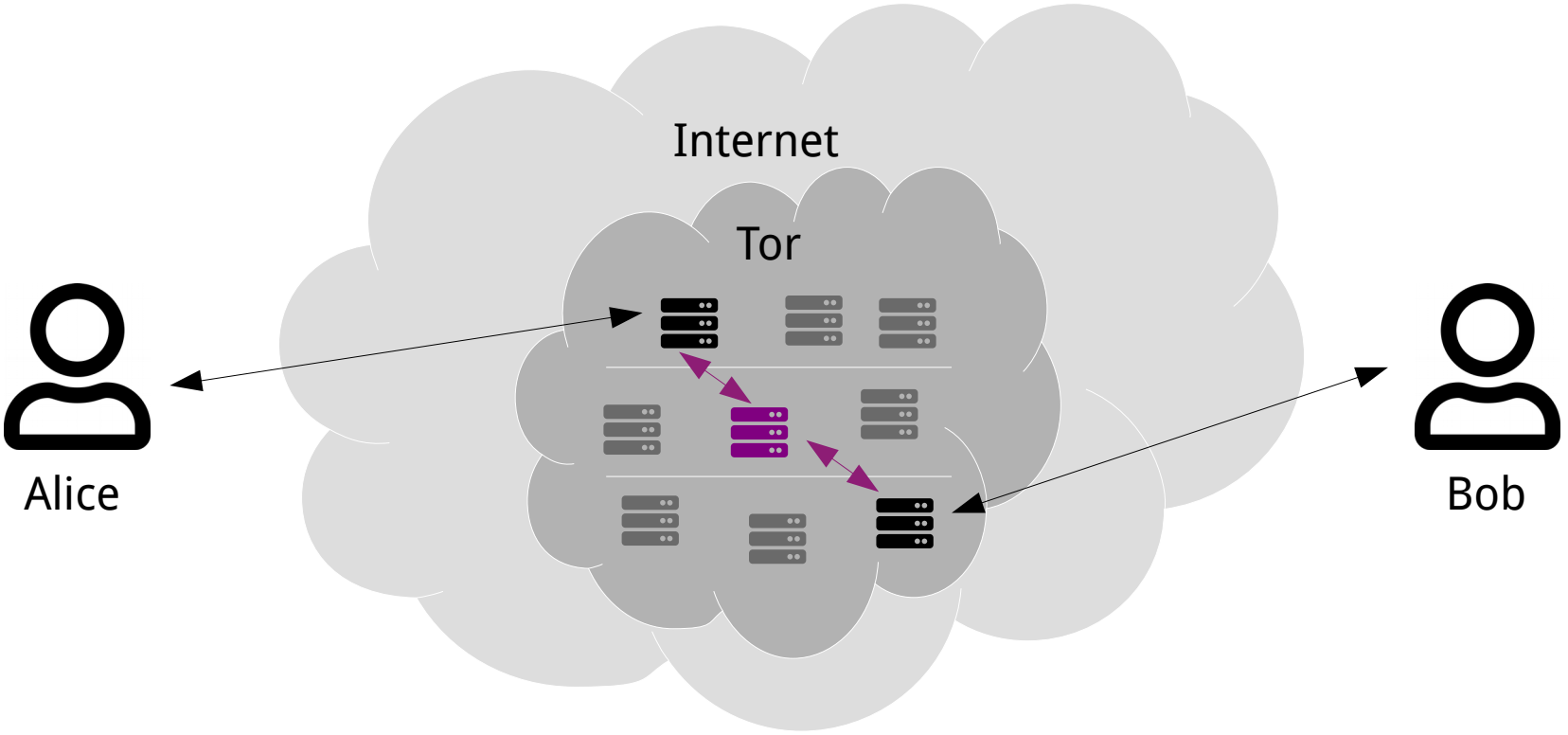

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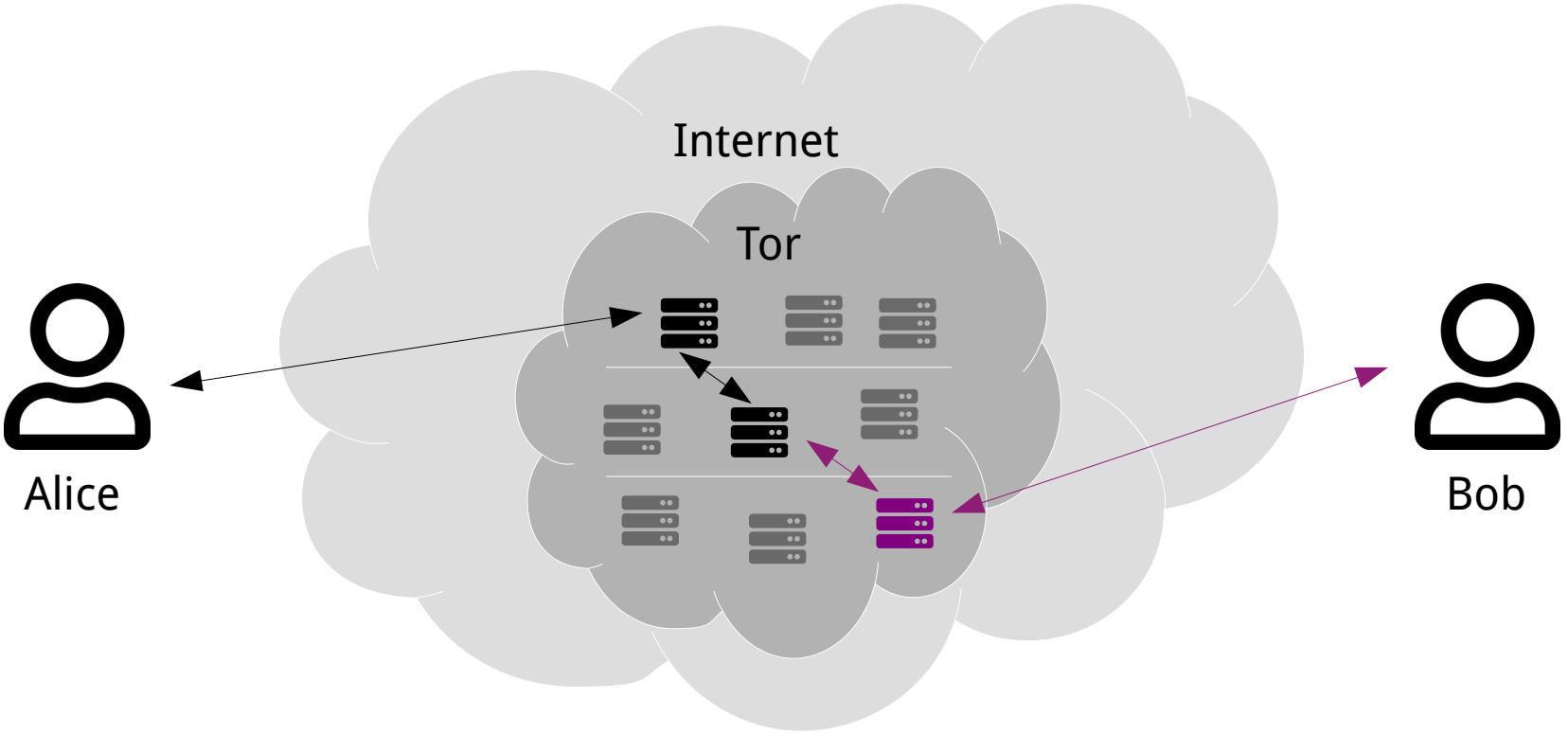

censorship against Tor

- censor Tor software distribution (eg. downloads, store-listings)

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- censor connections to Tor entry nodes

censorship techniques

- DNS blocking

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- IP filtering

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censorship techniques

- DNS blocking
- IP filtering
- Port filtering
- DPI filtering

DNS blocking – circumvention

- alternative addresses

DNS blocking – circumvention

- alternative addresses
- uncensored DNS server

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- uncensored DNS server
- DoH (DNS over HTTPS)

IP filtering – circumvention

- host on alternative / rotating IP addresses

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- use proxy / VPN software

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DPI blocking – against Tor

- since 2012 – China, Iran, Ethiopia
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- since 2016 – Turkey

DPI blocking – against Tor

- Enterprises all over the world
- since 2012 – China, Iran, Ethiopia
- since 2014 – Syria
- since 2016 – Turkey

DPI blocking – circumvention

- use software / proxy / VPN with circumvention capabilities
  eg. using Psiphon, Lantern, TunnelBear or Pluggable Transports.

Back to Pluggable Transports

What are PT actually doing?

- provide network traffic obfuscation implementations
- provide standardized interface for tunneling a network connections

available PT implementations

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fronting:

- meek
- SnowFlake
- ...

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shape-shifting:

- Dust2
- FTEProxy
- ...

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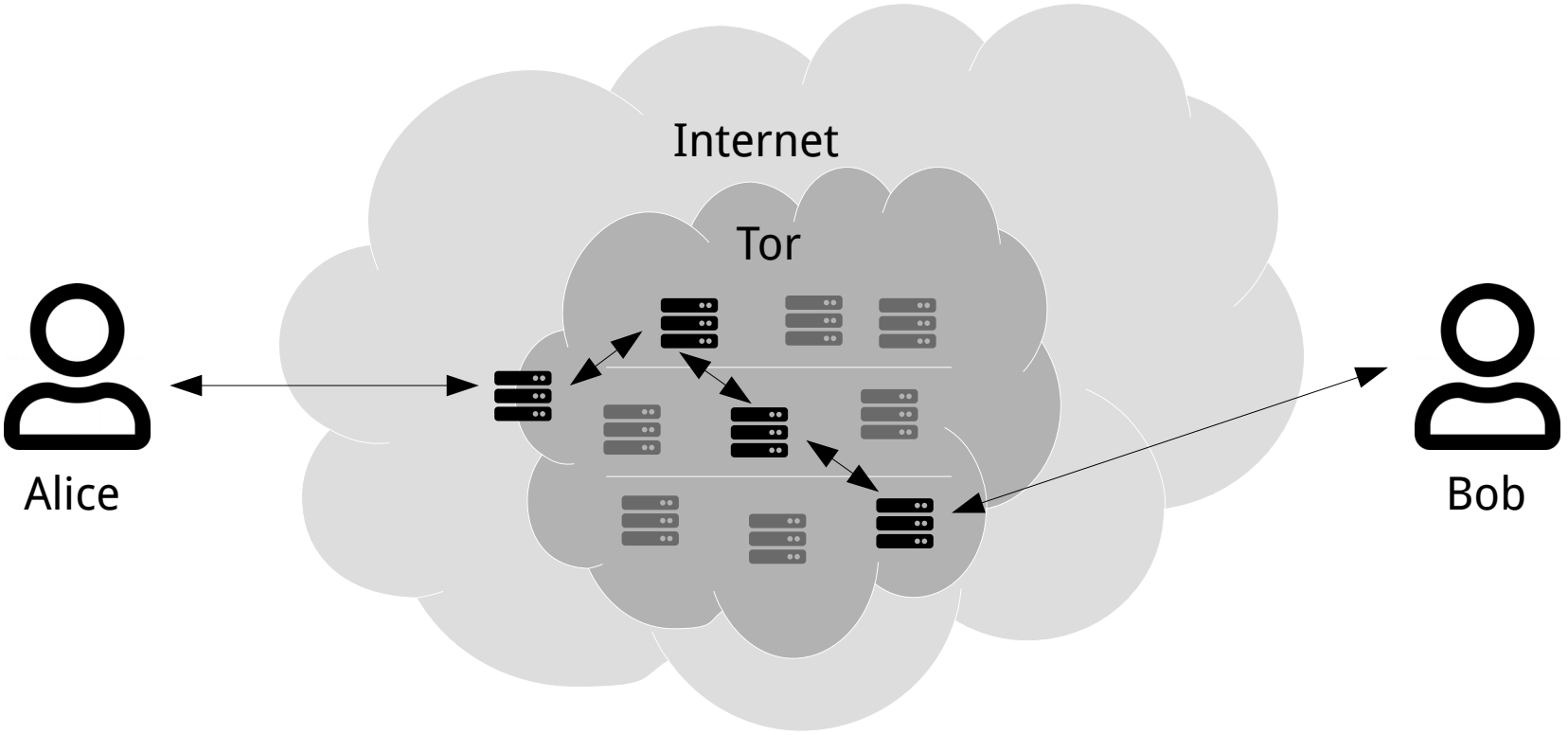
Tor with Pluggable Transports



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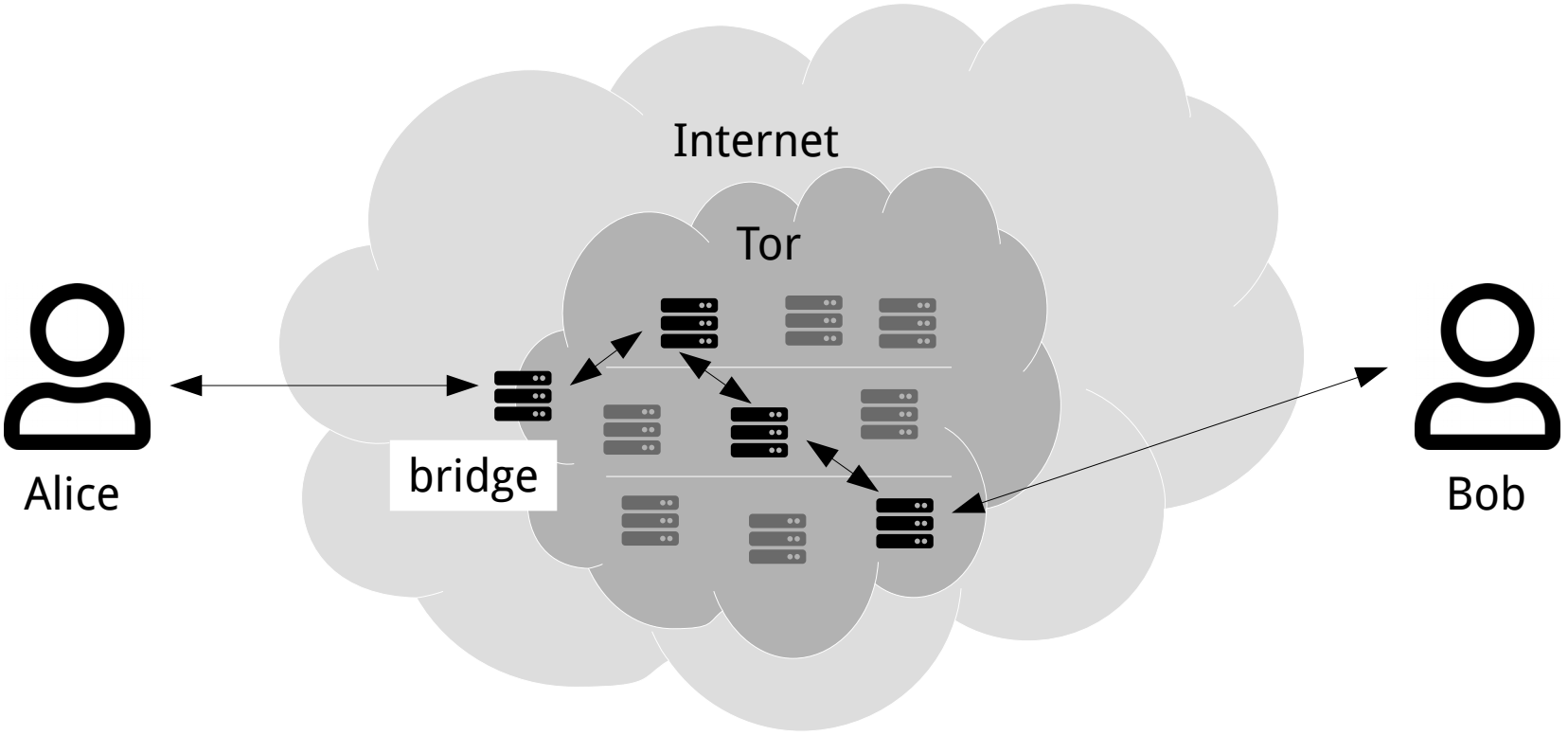

PT APIs

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Dispatcher:

- process for establishing PT tunneling socket

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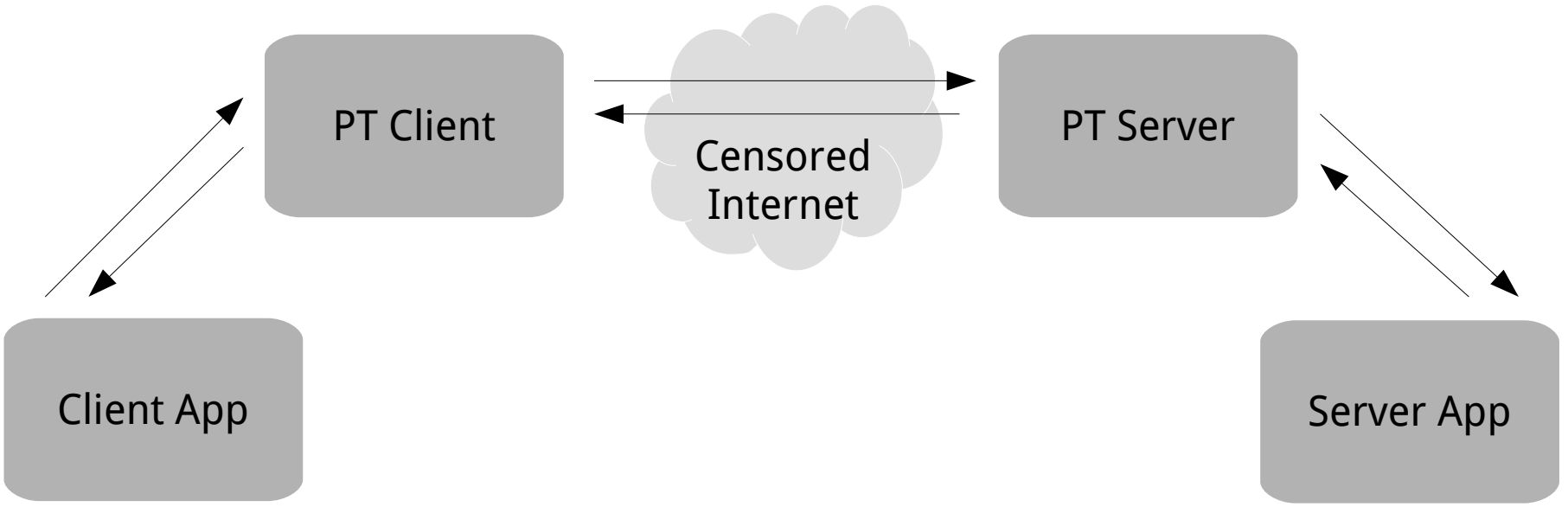
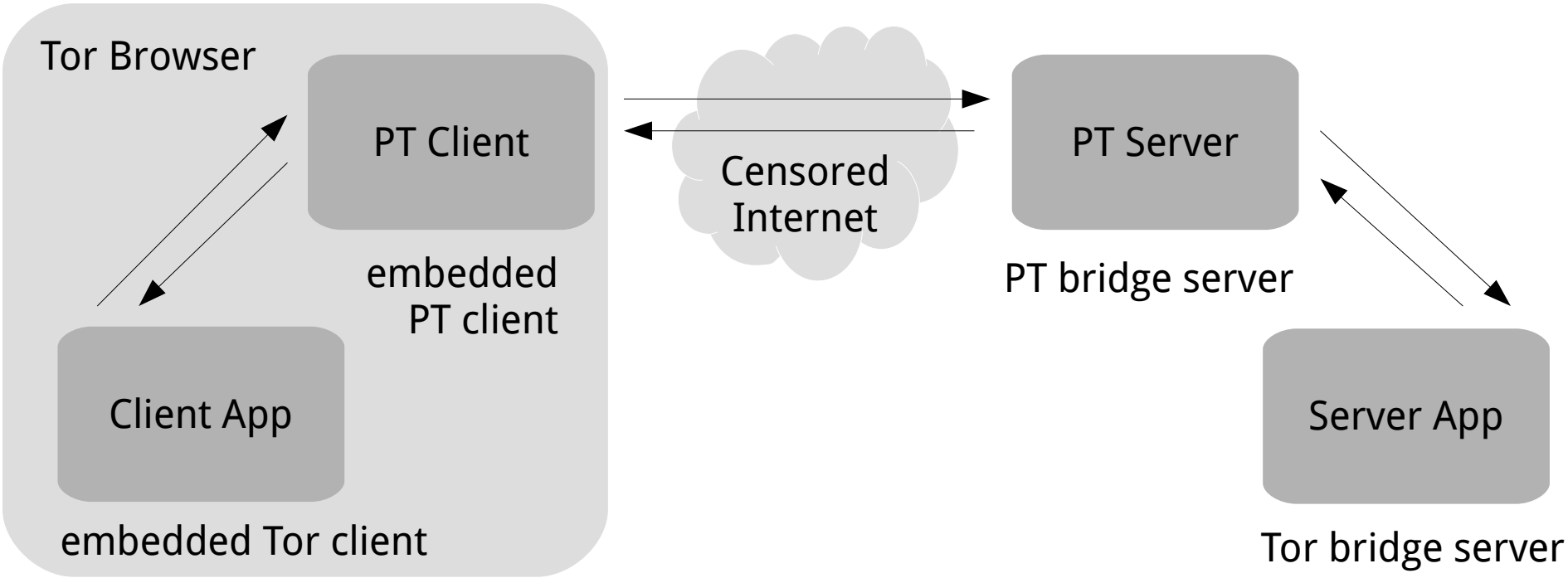
Language/Platform specific APIs:

- Go API, Swift API (iOS), AndroidPluggableTransports, ...

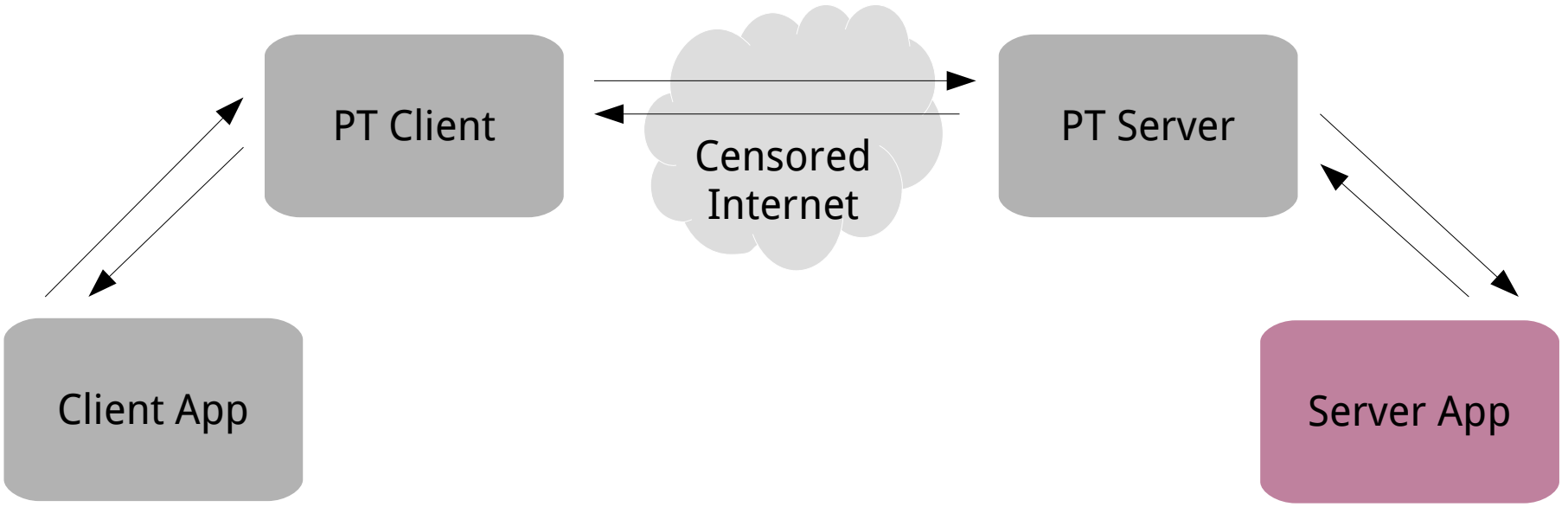
PT Dispatcher Connection



PT Connection – Tor example



PT Dispatcher: Server App



HTTP over Obfs4 – start Server App

let’s start a simple HTTP server, eg:

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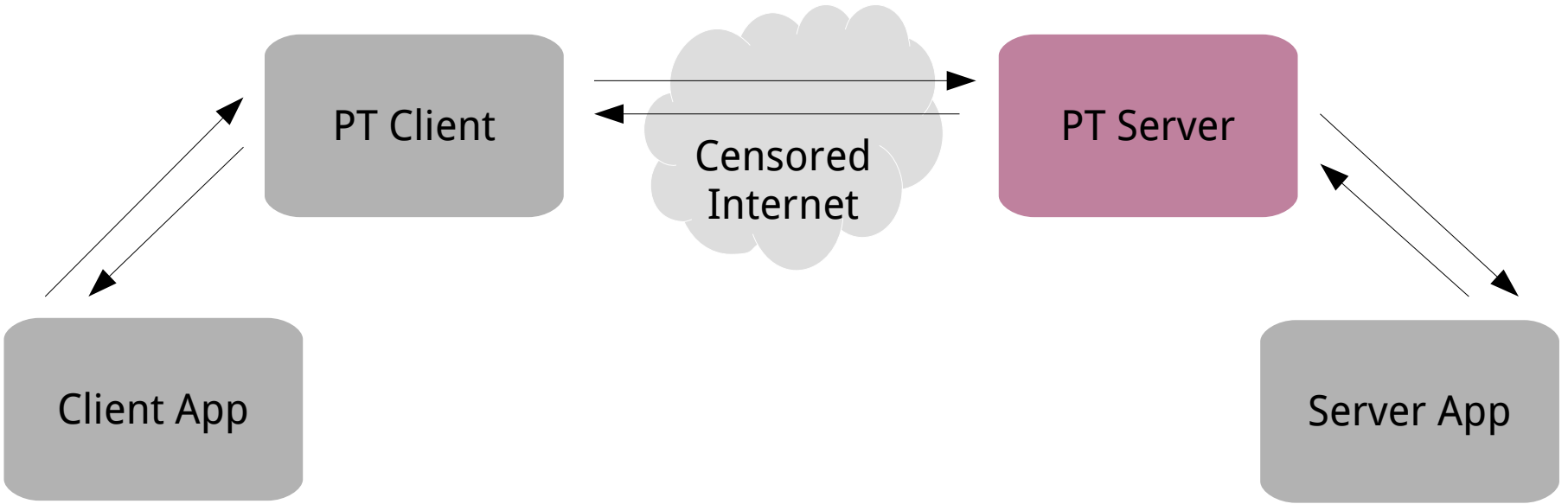

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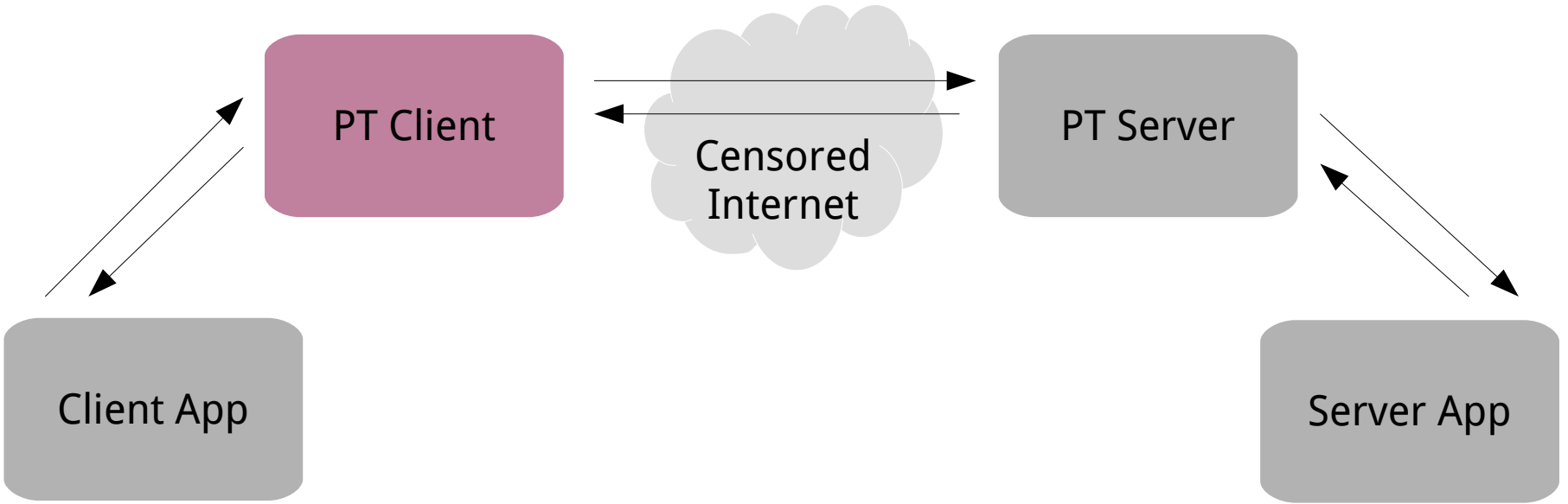

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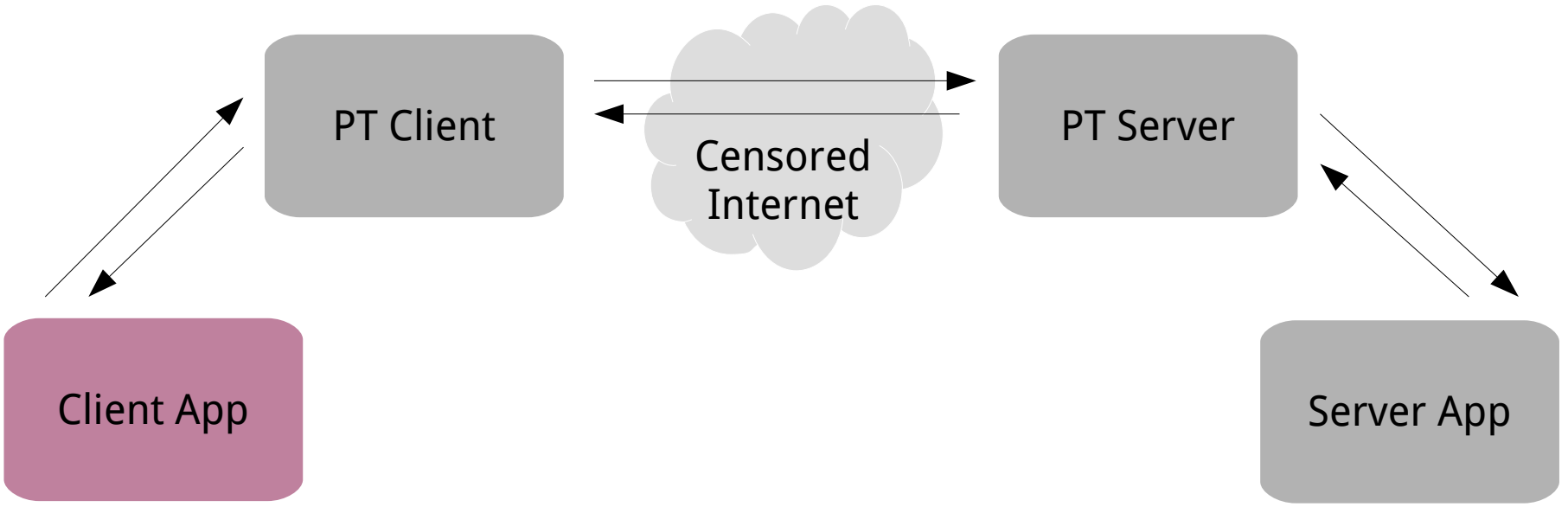

HTTP over Obfs4 – Client App

run HTTP request through Obfs4 Tunnel:

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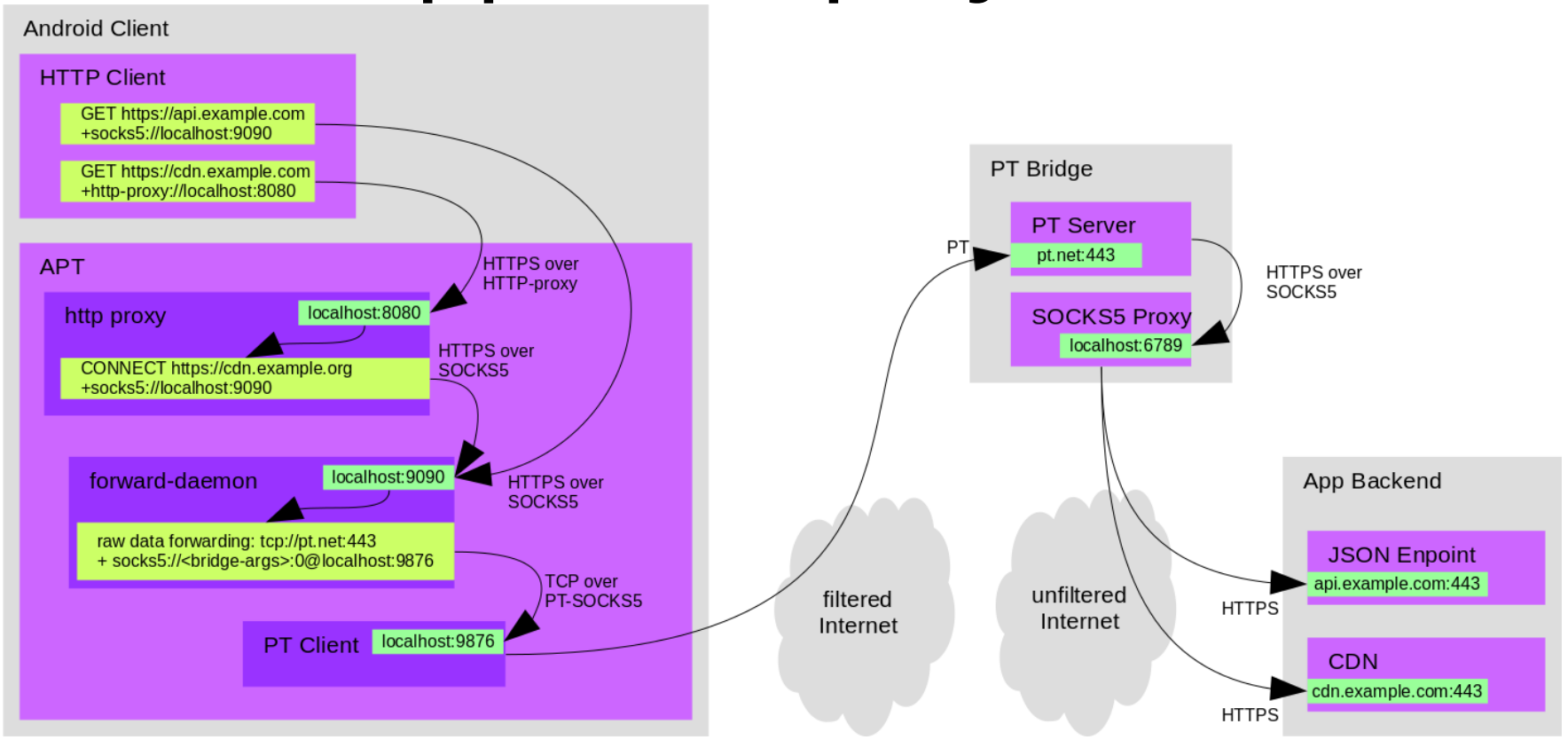
Dispatcher-SOCKS5 is not SOCKS5

When establishing a connection to a PT Dispatcher,
it uses SOCKS5 for passing parameters and establishing
a point to point TCP connection.

Should you need a Proxy you have to run one as Server App.

Android App PT deployment



Credits

- Font Awesome Icons – CC-BY-4.0

also check out:

- https://pluggabletransports.info
- https://guardianproject.info

That’s it.

Michael Pöhn <michael@guardianproject.info>

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