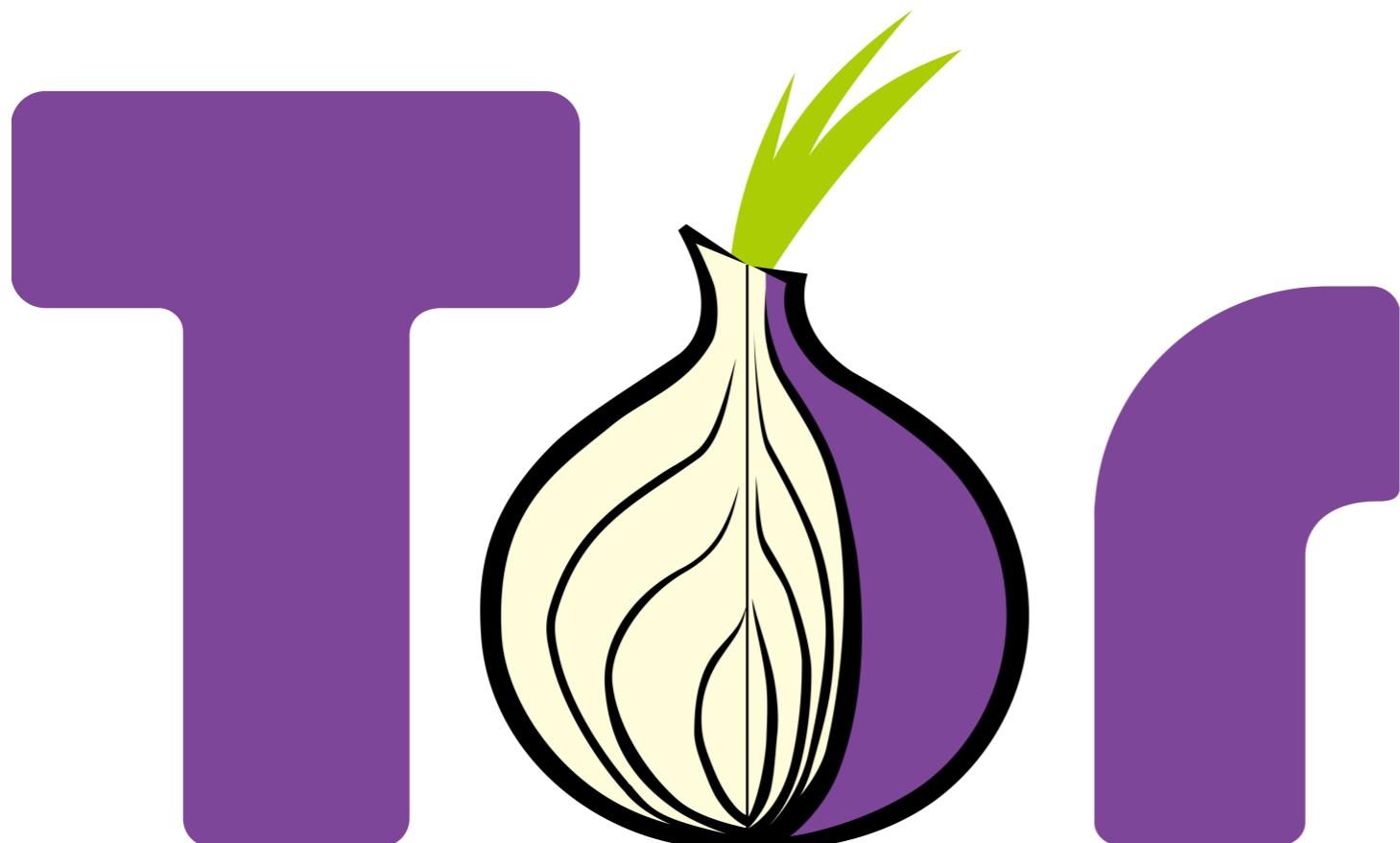


ThoughtWorks®



Using alternative networks to protect your online privacy
Toby Clemson

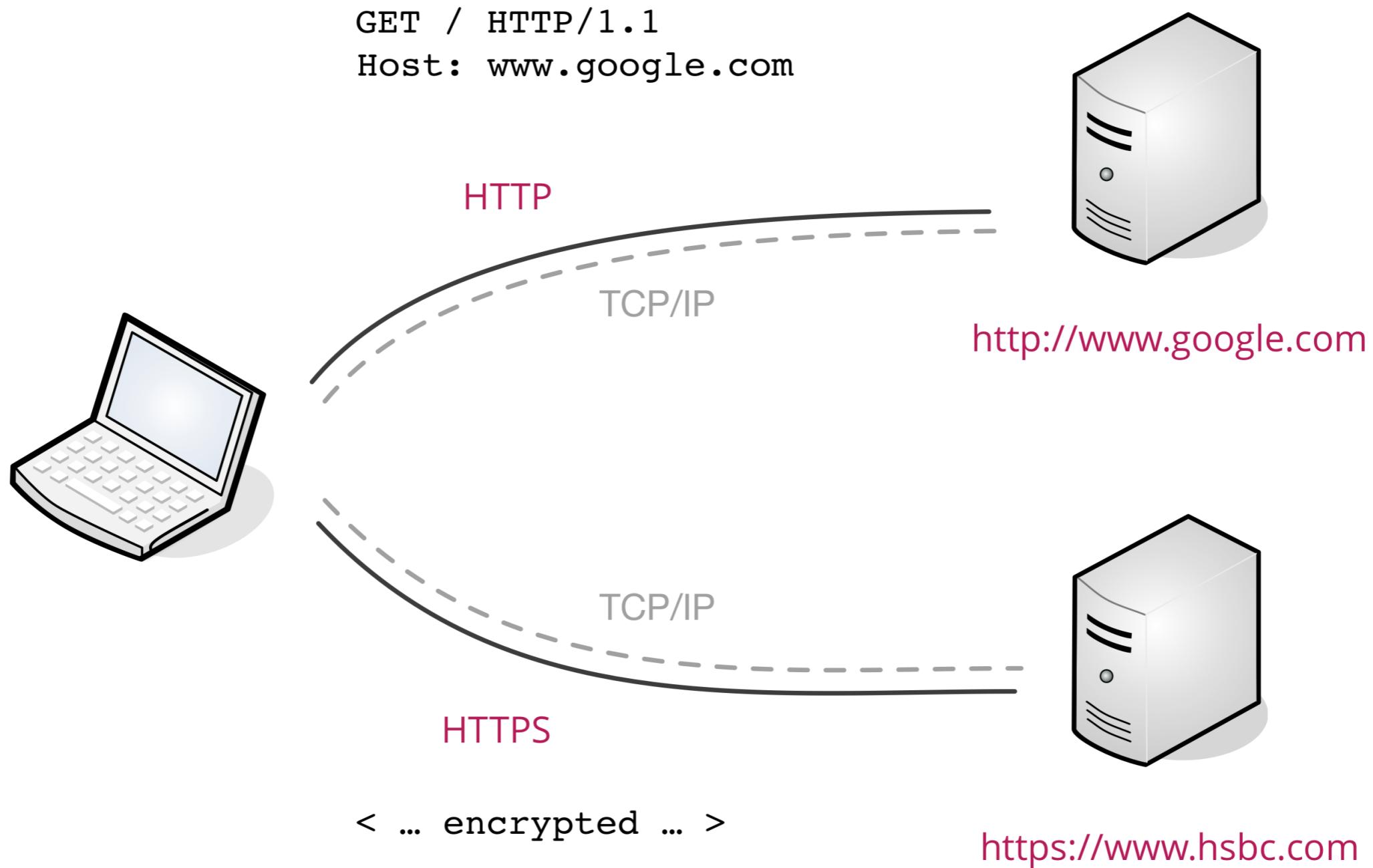
QUESTIONS TO BE ANSWERED

- How much privacy do I have on the Internet?
- What is Tor?
- Why do networks like Tor exist?
- How does Tor work?
- How do I get started?

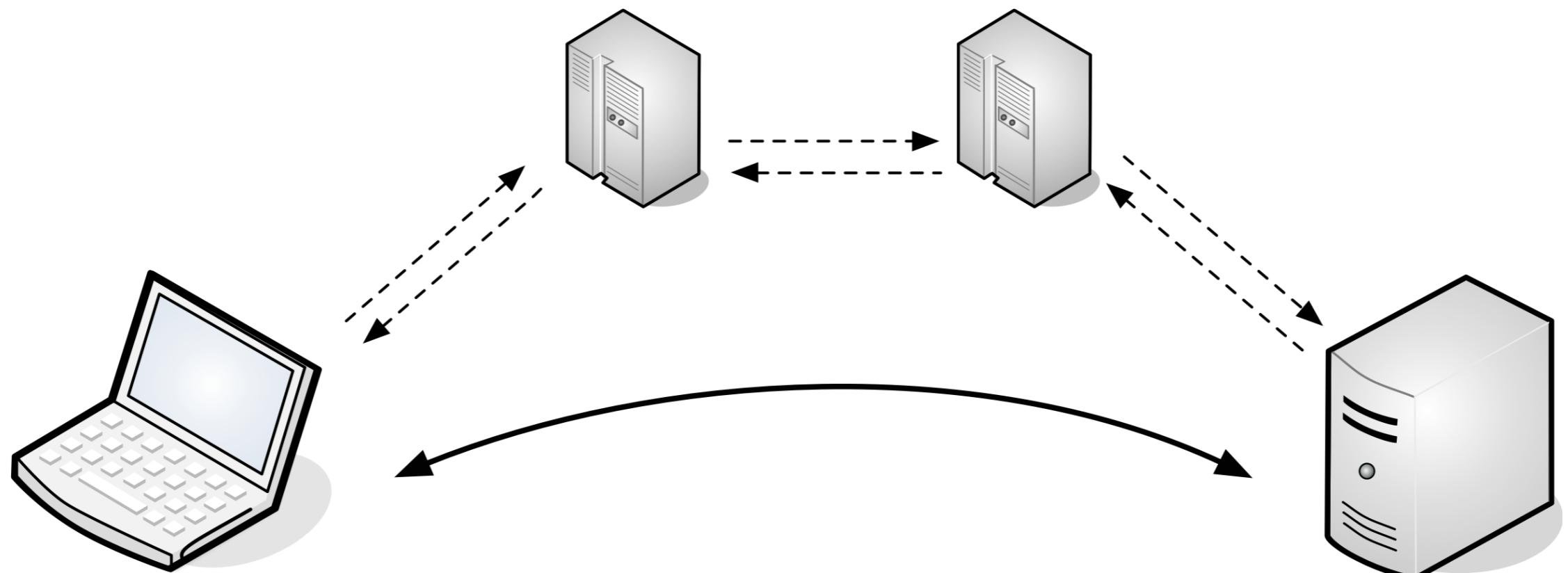
THE INTERNET AS WE KNOW IT: TCP/IP



THE INTERNET AS WE KNOW IT: APPLICATIONS



THE INTERNET AS WE KNOW IT: ROUTING



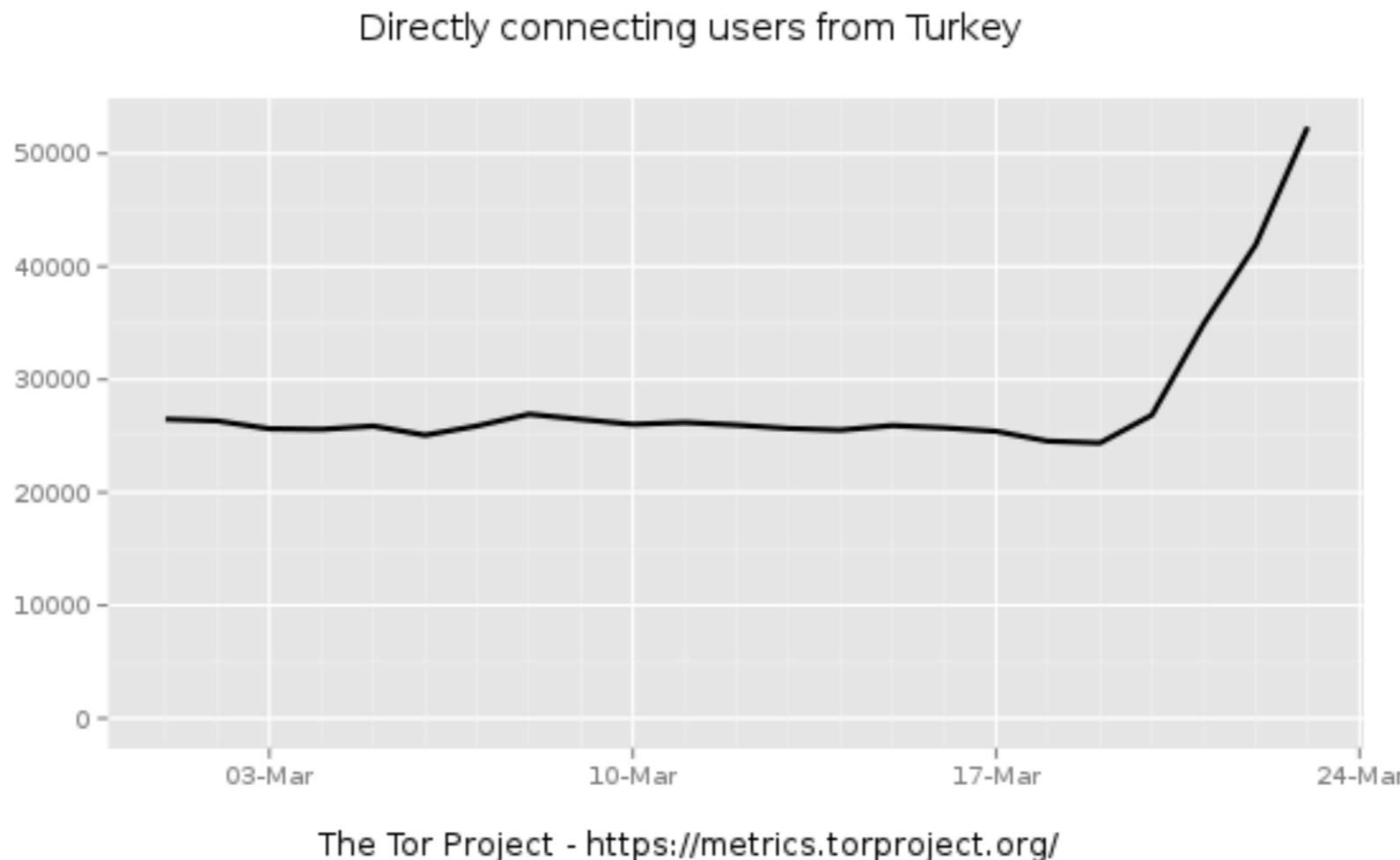
WHAT'S TOR GOT TO DO WITH IT?

- An open network to help defend against traffic analysis and enable online anonymity
- Utilises “onion routing” to conceal the user’s location and usage patterns
- Highly secure yet with low latency

WHY DO WE NEED IT

Example: Oppression in Turkey

- Twitter being used to expose corruption and raise global awareness
- Government ban implemented by ISPs
- Tor allows activists to continue their work



TOR: HOW IT WORKS

Step 1:



Tor client obtains
a list of Tor nodes
from a directory
server



Standard node



Tor node



Unencrypted link



Encrypted link



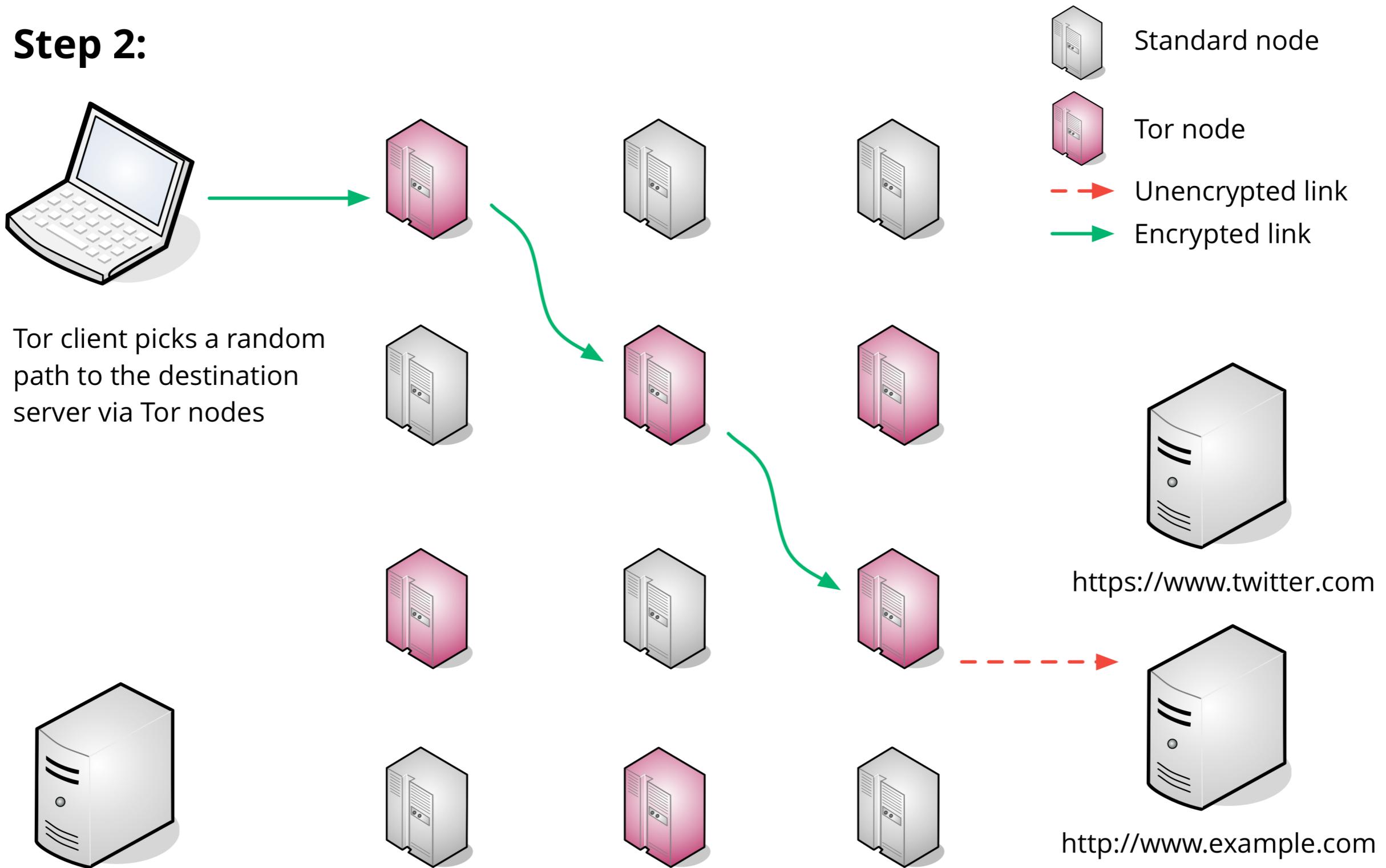
<https://www.twitter.com>



<http://www.example.com>

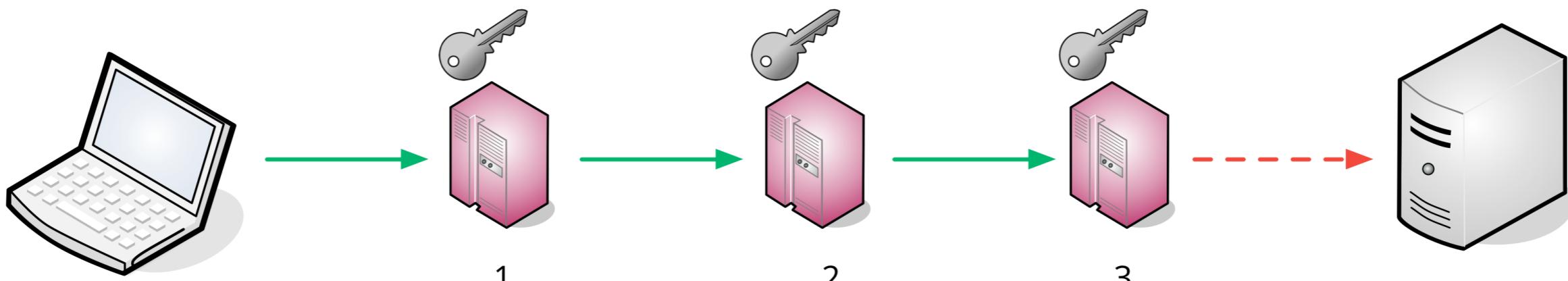
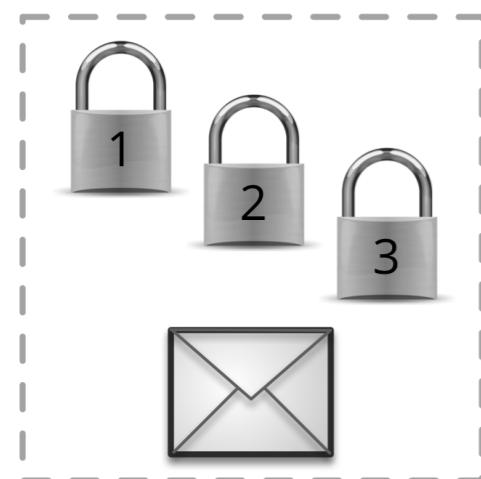
TOR: HOW IT WORKS

Step 2:



TOR: HOW IT WORKS

Encryption



Tor client repeatedly encrypts using public keys of each node in reverse order

Each node decrypts using its private key such that it knows where to send the message next

The last node decrypts to the original message and sends to the destination

TOR: HIDDEN SERVICES

- Various web services are available entirely hidden inside the Tor network
- Avoids the last hop in the routing being publicly visible
- Protects the service and the user

TOR: WEAKNESSES

- Controlling a large number of the nodes allows the controller to correlate requests
- Some protocols leak connection information at the application layer which weakens the overall network
- The larger the network the lower the risk

TOR: GETTING INVOLVED

- **Tor Browser Bundle:** <https://www.torproject.org/projects/torbrowser.html.en>
- **Tails:** <https://tails.boum.org/>
- **Host a relay:** <https://www.torproject.org/docs/tor-doc-relay.html.en>
- **Spread the word**

THANK YOU

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