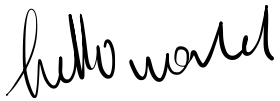
CS558 Network Security



Lecture 20: Censorship Circumvention pt 2

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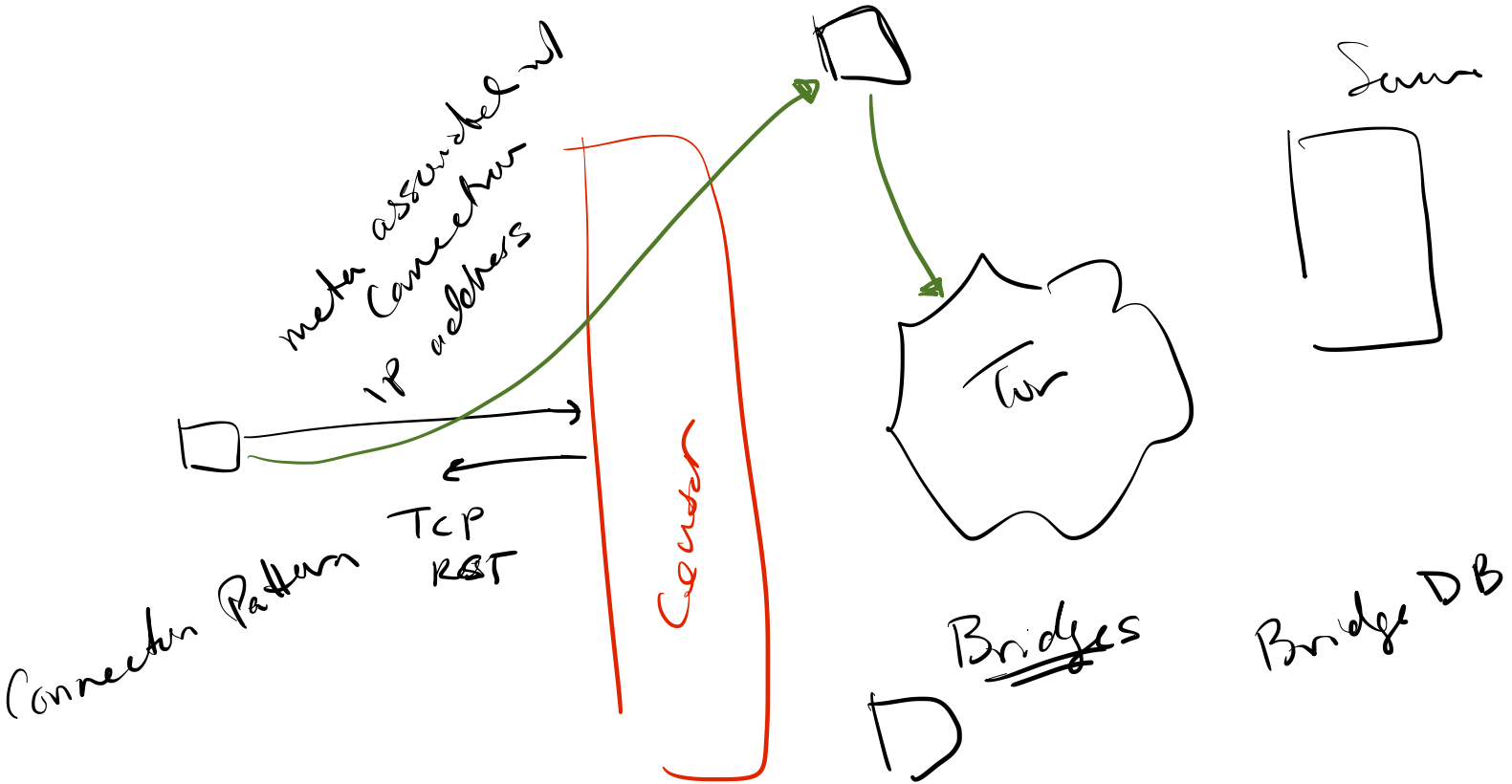
Review: Internet Censorship

Tor gave Censorship resistance



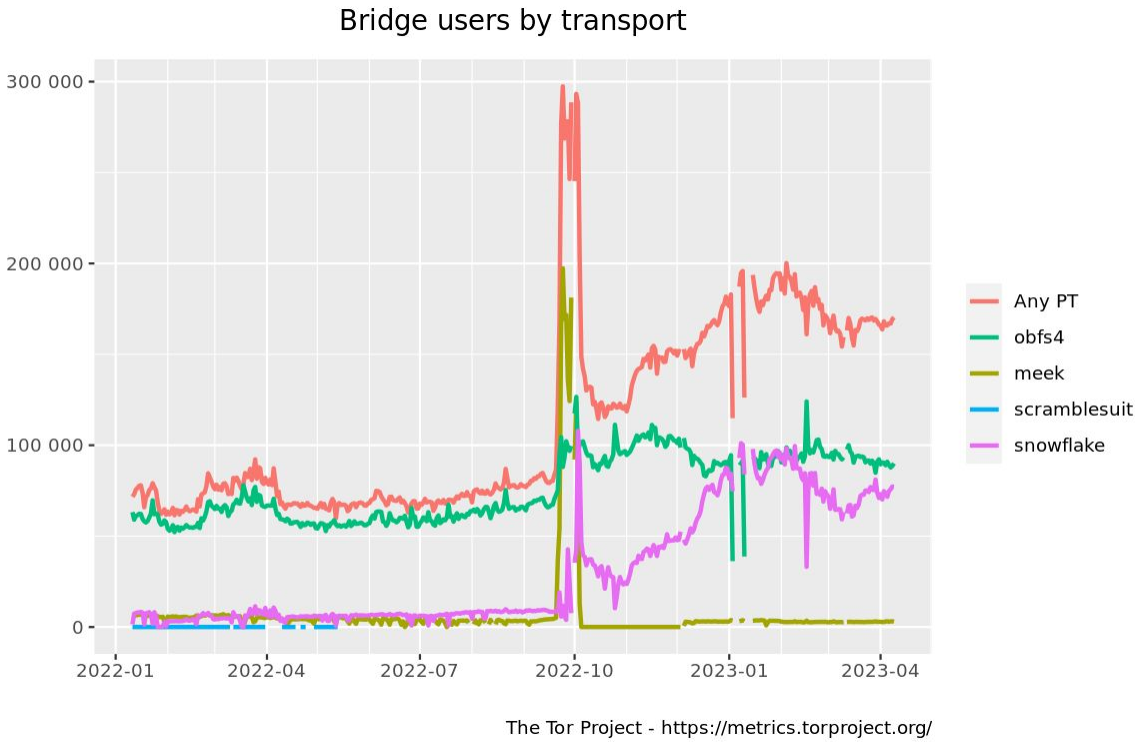
Censorship Circumvention is Active Research

Active Pluggable Transport

- Obfs4
- Meek
- Format-Transforming Encryption
- ScrambleSuit
- Snowflake

Non-active Pluggable Transport

- StegoTorus
- Skypemorph
- Dust



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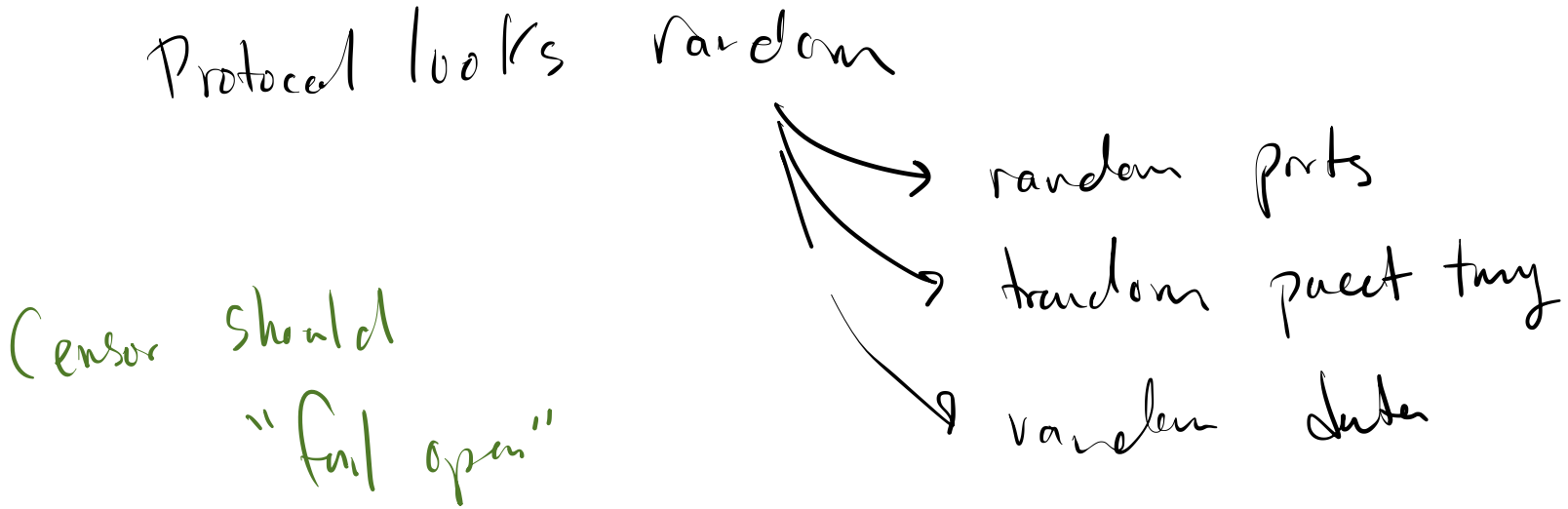
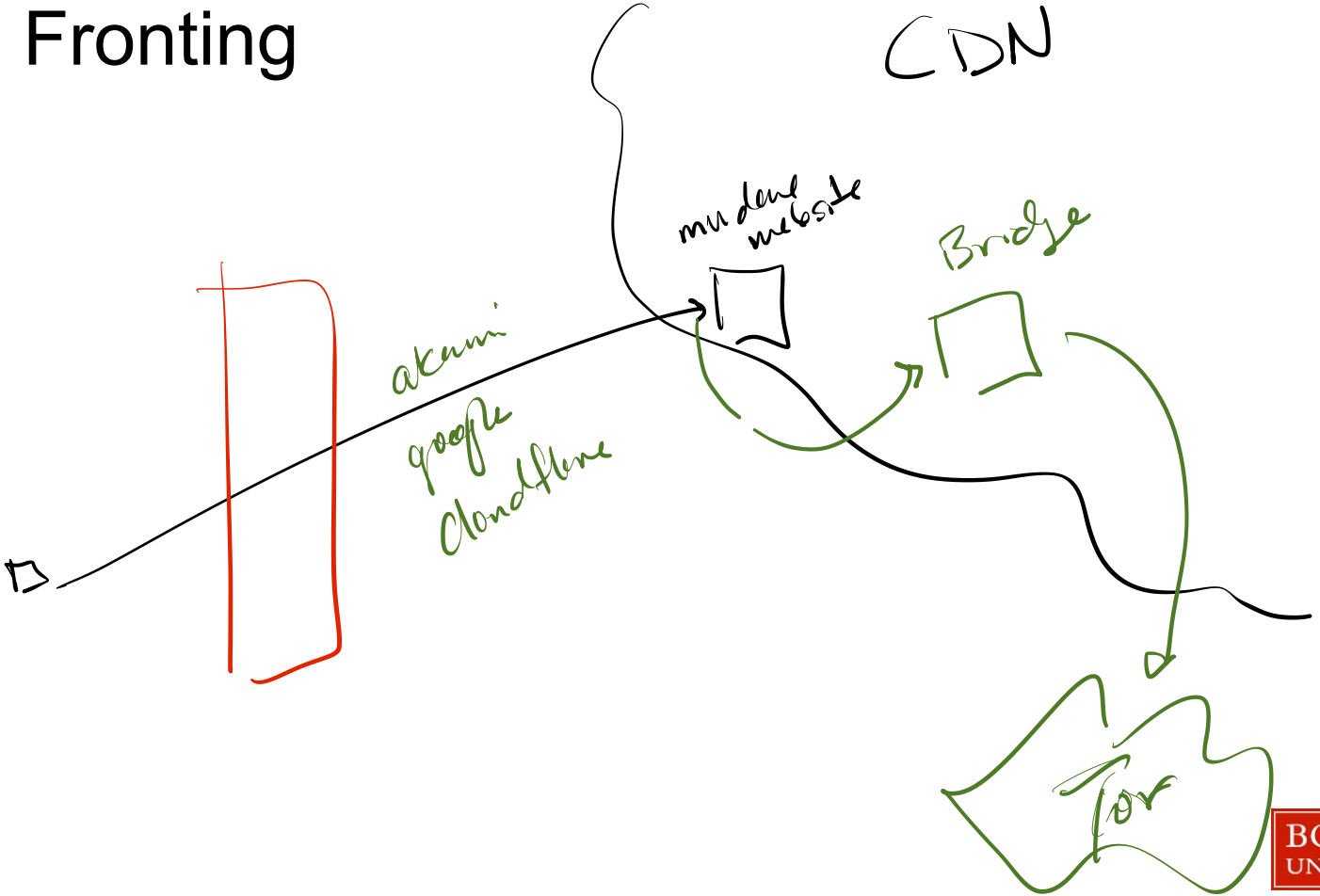
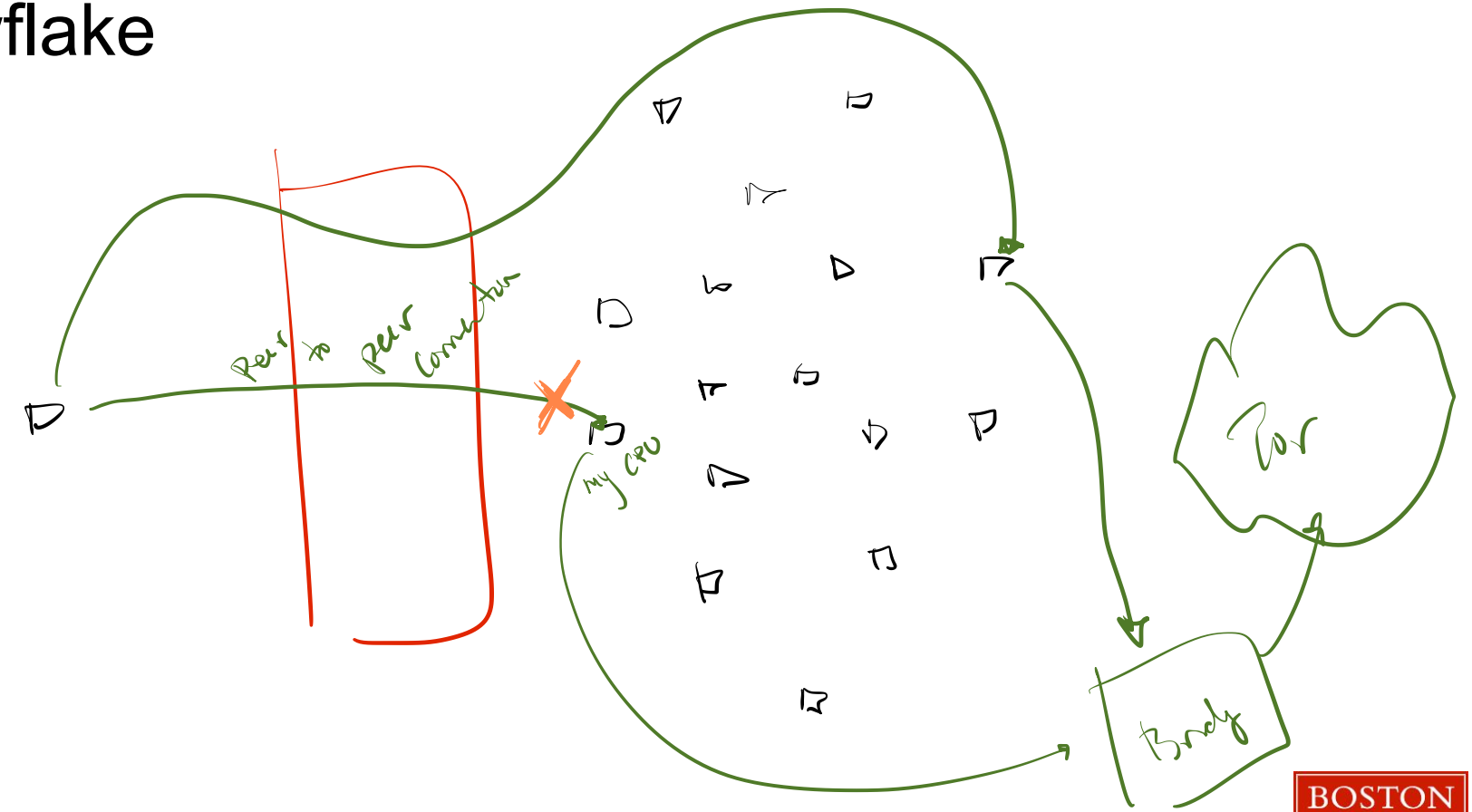
Pluggable Transport (Protocol Obfuscation)

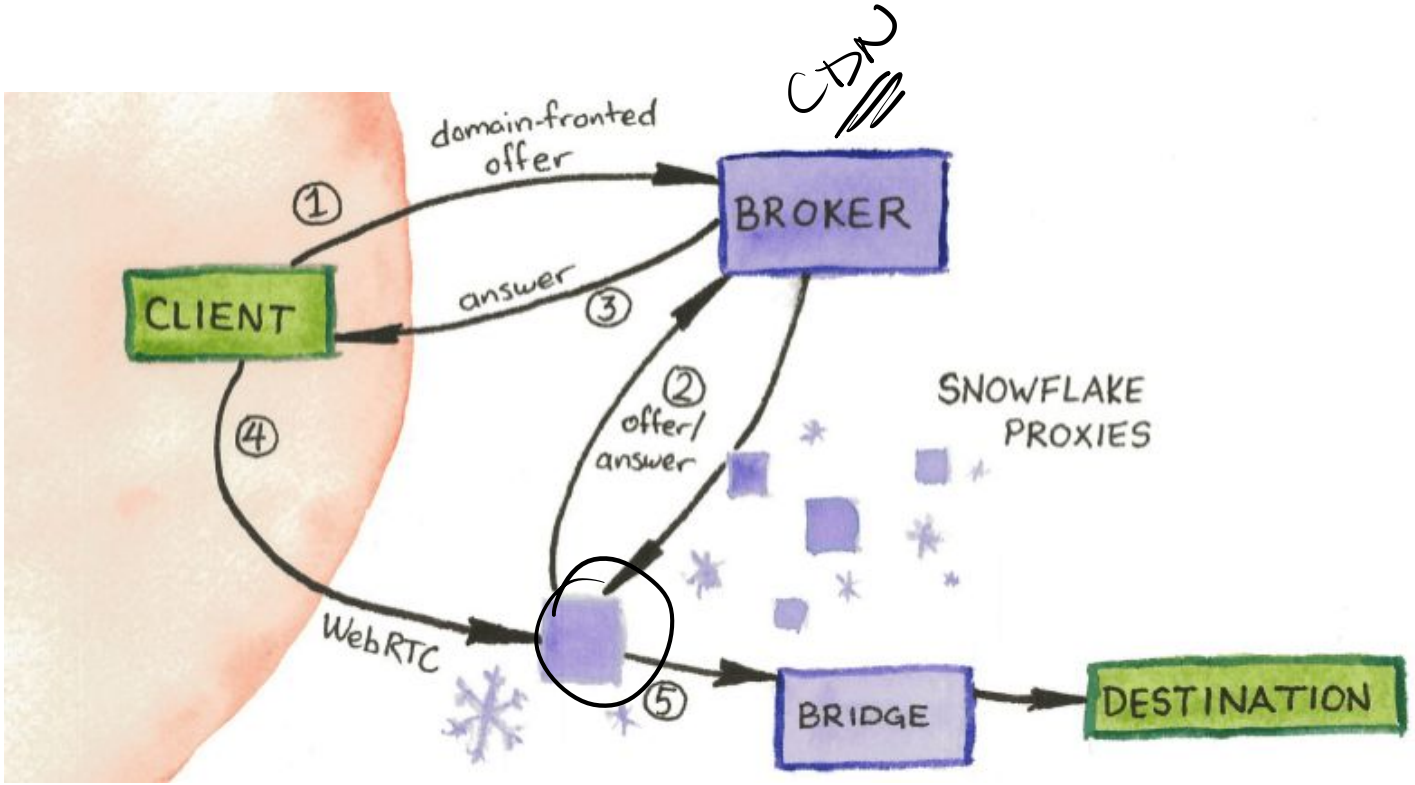


Domain Fronting

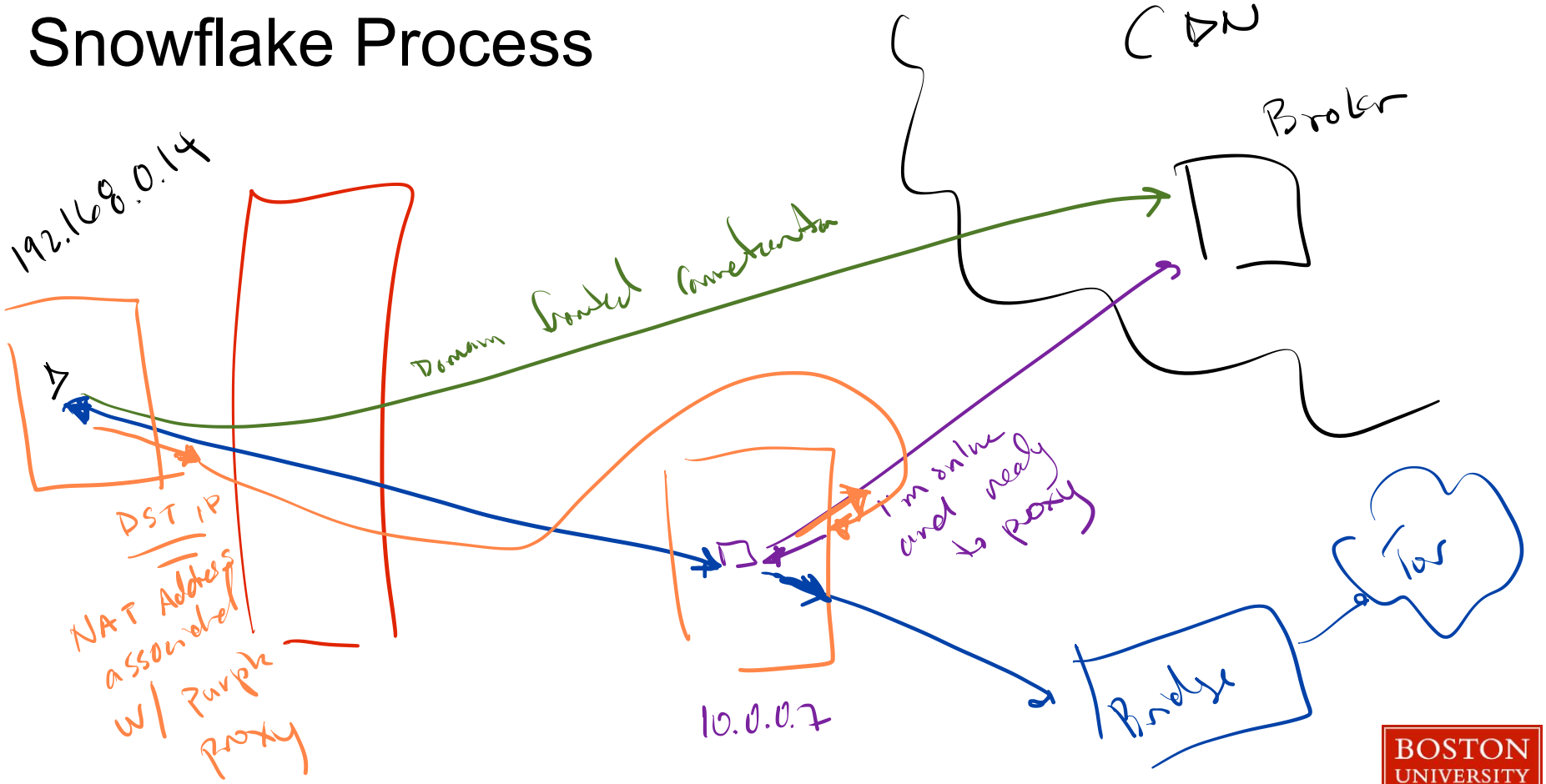


Snowflake





Snowflake Process



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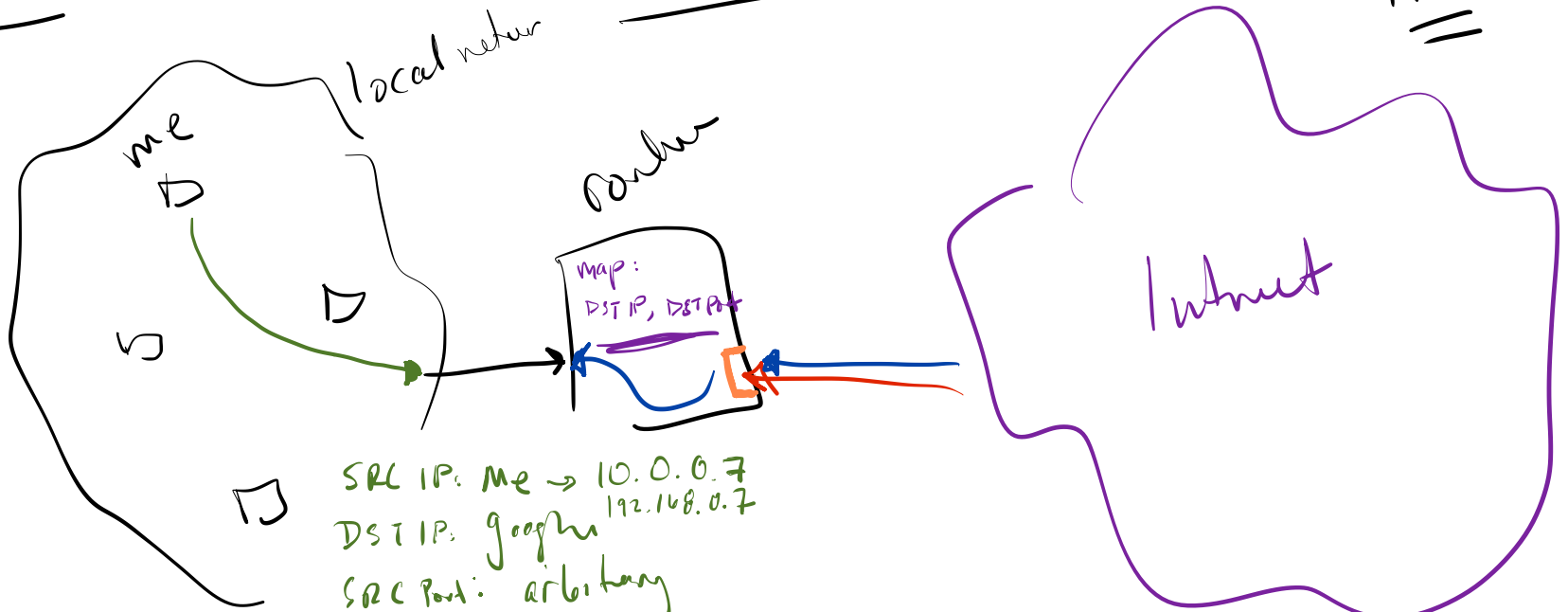
NAT Reminder

Network Address translation

IPV4



SRC IP: Me → 10.0.0.7
192.168.0.7
DST IP: google
SRC Port: arbitrary
Dst Port: 443

SRC IP, SRC Port ⟷ globally accessible Port | IP

Big Picture: Steganography

Plugable transport
protocol obfuscation

what we want

m = "hey lets protest"

random looking

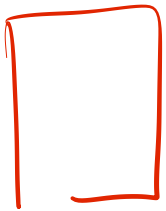
obvious idea

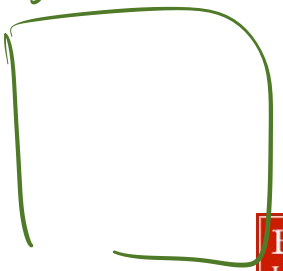
$Enc(m)$

Decode ("hey hows your grandma")
→ "hey lets protest"

stego

"hey hows your grandma?"





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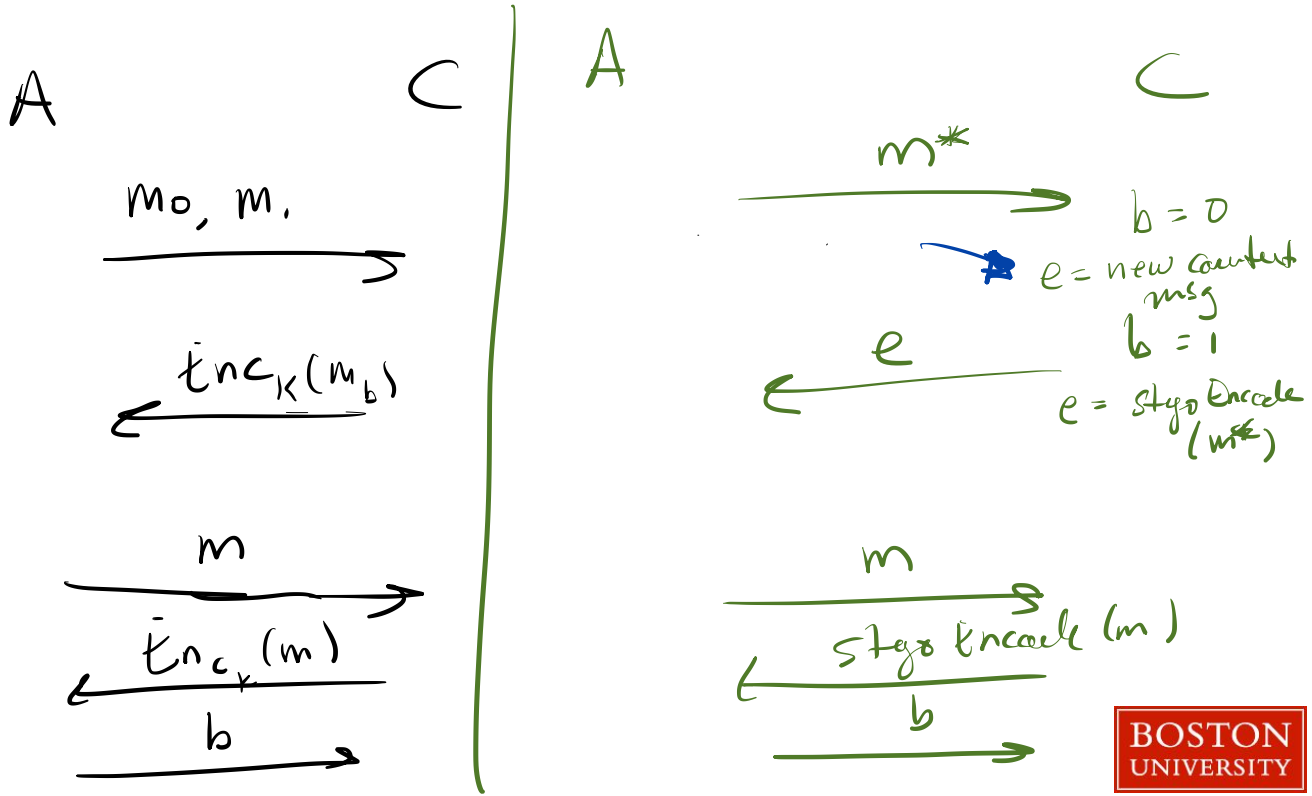
Formal-ish Sketch of Steganography

Covertext channel

CPA



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What do we know about achieving steganography?

① Theory

You can encode messages into any Covertext distribution, as long as the covertext channel has Entropy

② Practice

JPEG Stgo heuristic Stgo approaches

AI/ML-powered Steganography