

Anonymous Messaging

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Advised by

Professors Sewoong Oh, Kannan Ramchandran, and Pramod Viswanath

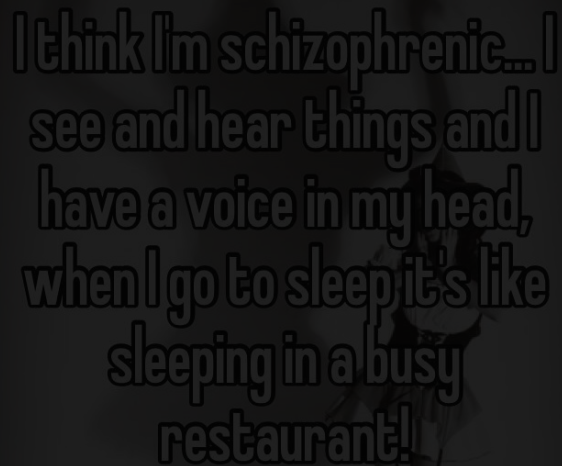
Some people have important,
sensitive things to say.



Some people have important,
sensitive things to say.



Others have less important,
but sensitive things to say.



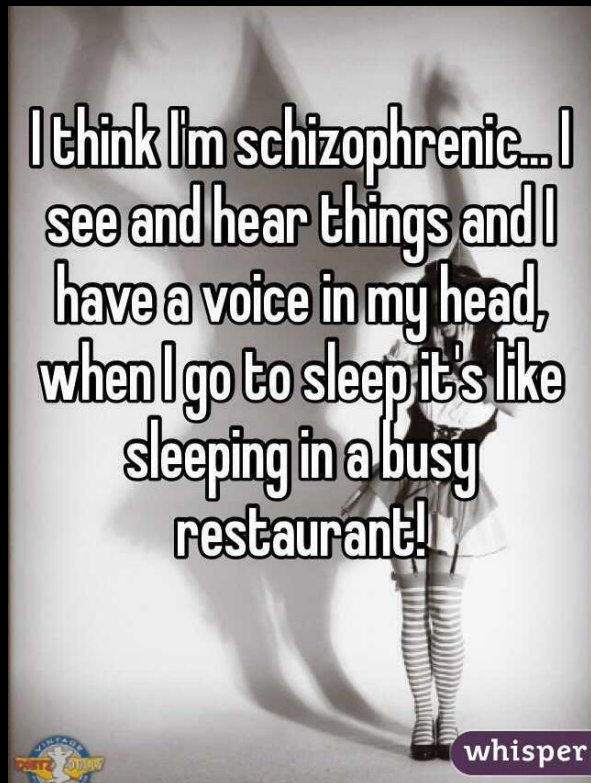
I think I'm schizophrenic... I
see and hear things and I
have a voice in my head,
when I go to sleep it's like
sleeping in a busy
restaurant!

whisper

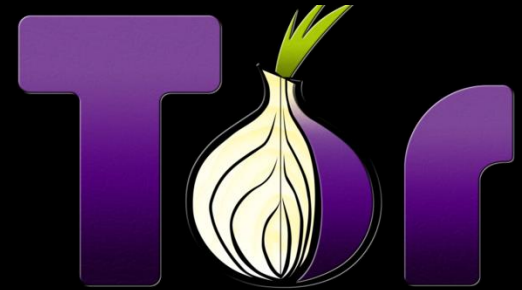


I'm a Mormon, and losing my
faith.

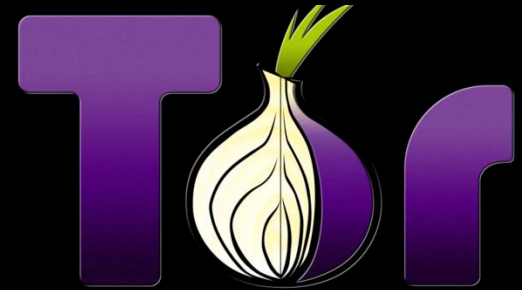
Others have less important,
but sensitive things to say.



Anonymous communication



Anonymous communication



designed for anonymous point-to-point communication

Existing anonymous messaging apps



secret

whisper

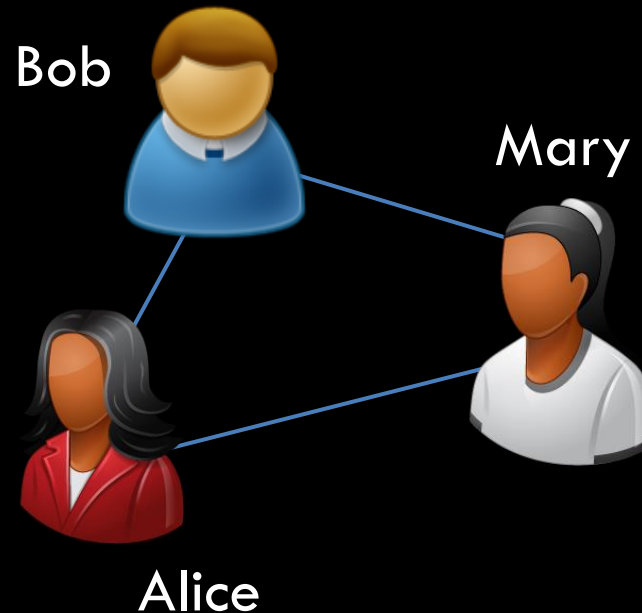


Existing anonymous messaging apps



secret

whisper

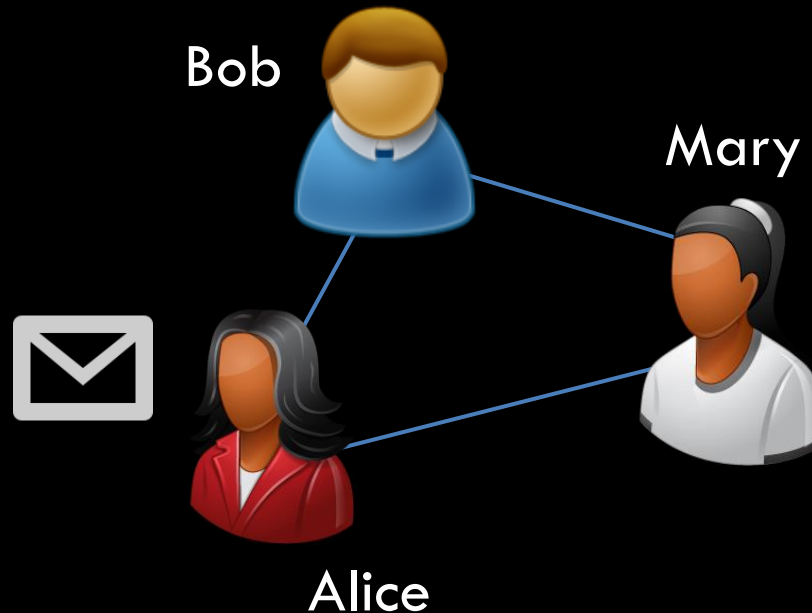


Existing anonymous messaging apps



secret

whisper

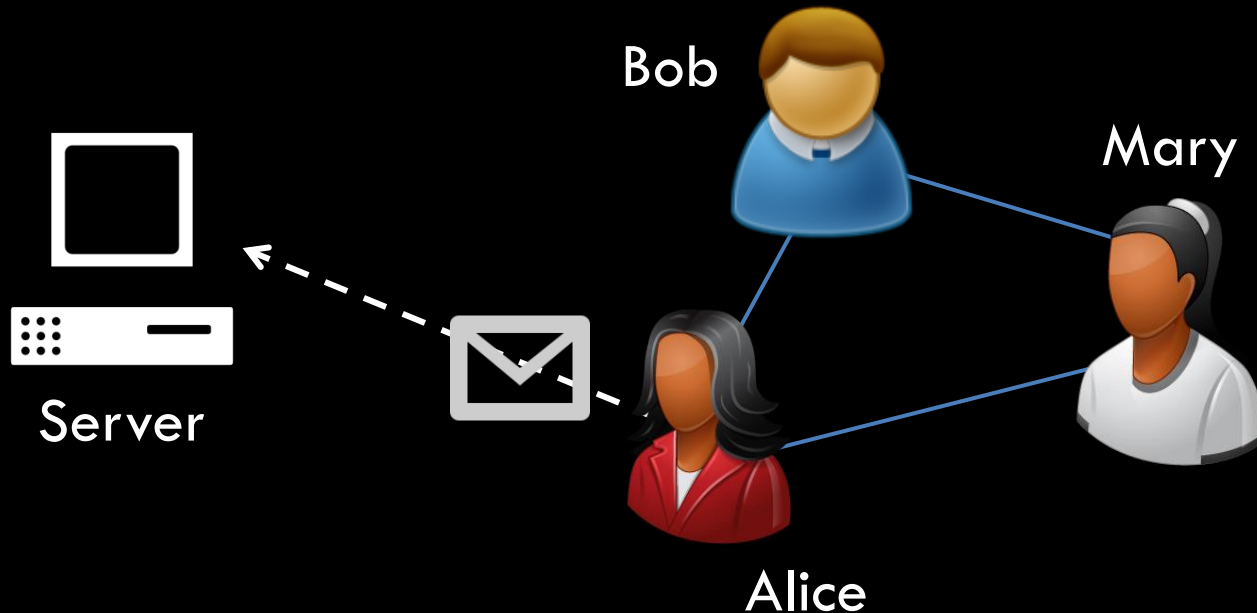


Existing anonymous messaging apps



secret

whisper

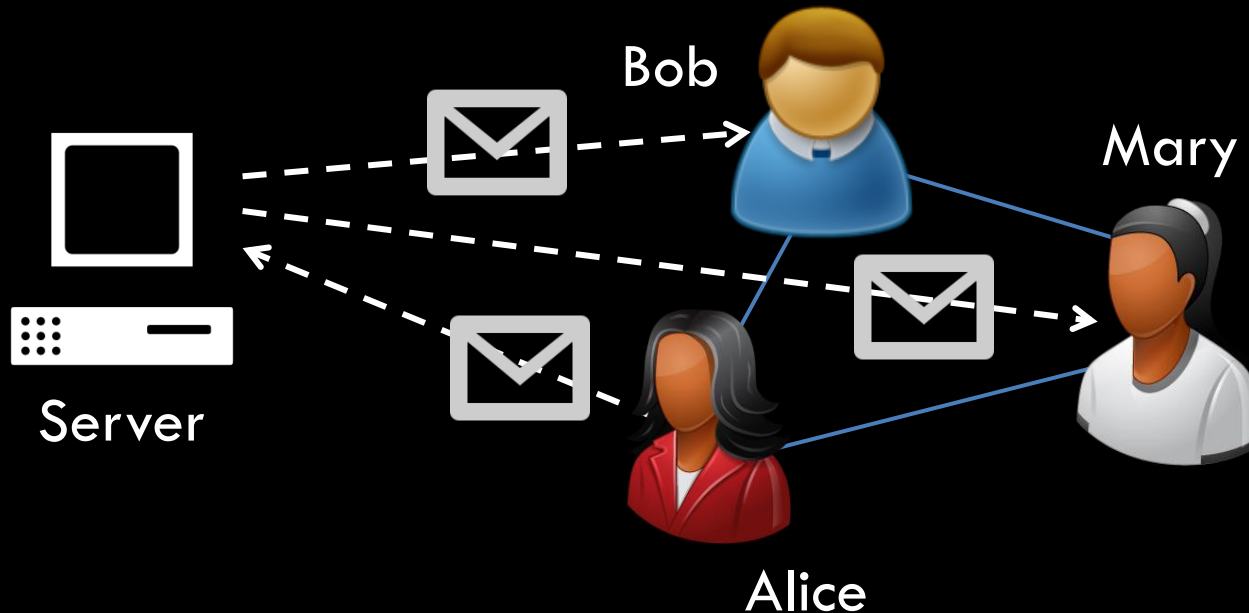


Existing anonymous messaging apps



secret

whisper

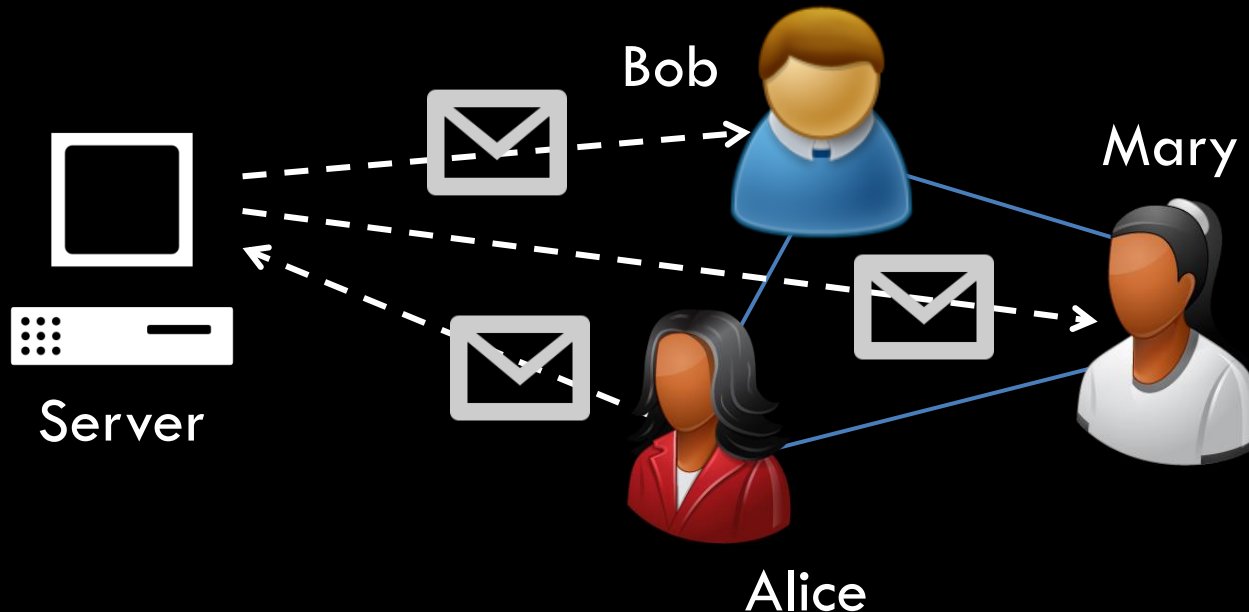


Existing anonymous messaging apps



secret

whisper



centralized networks **are not** truly anonymous!

Compromises in anonymity

theguardian

whisper



Compromises in anonymity

theguardian

whisper



Compromises in anonymity

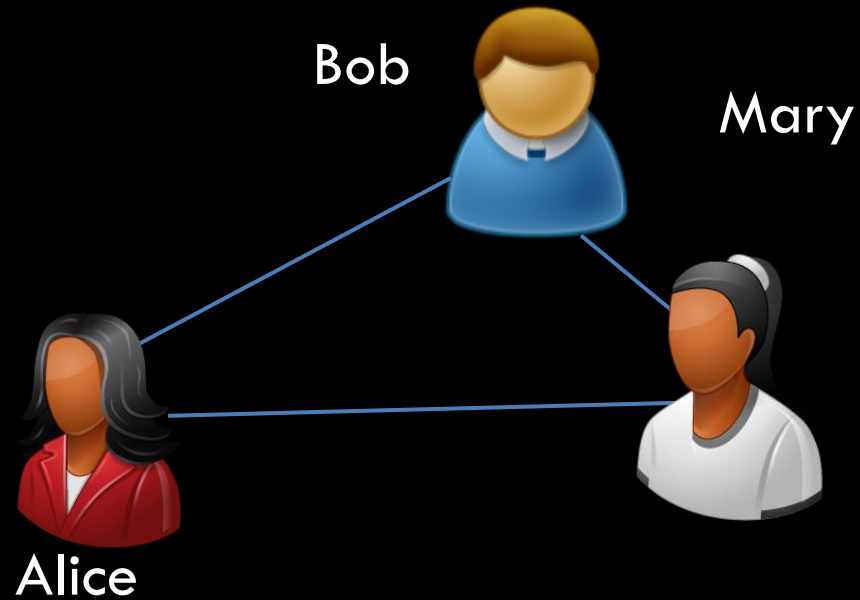
theguardian

whisper

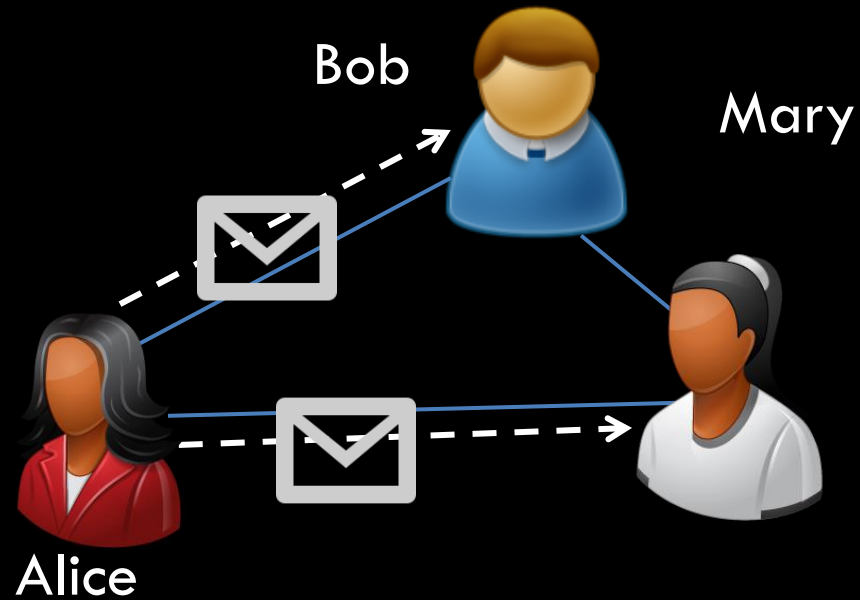


anonymity loss extends beyond the network

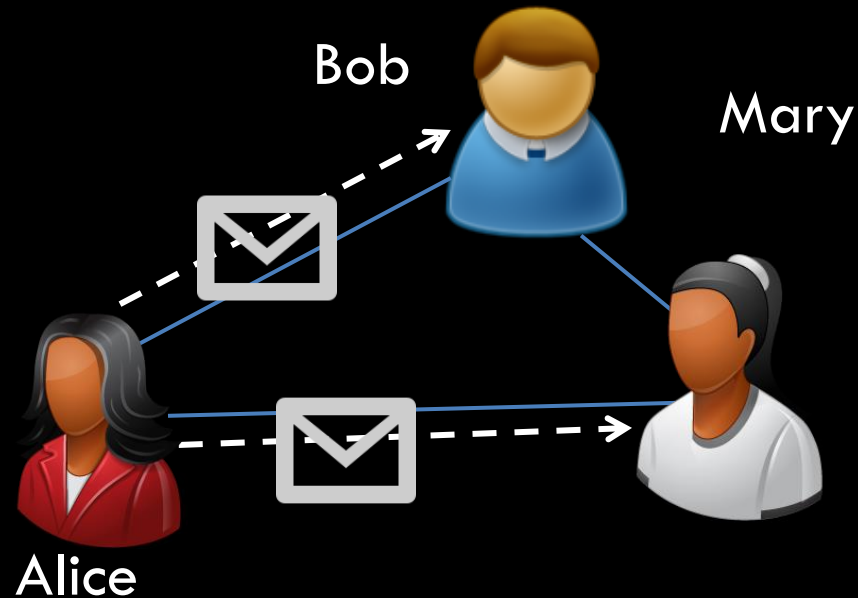
Distributed messaging



Distributed messaging

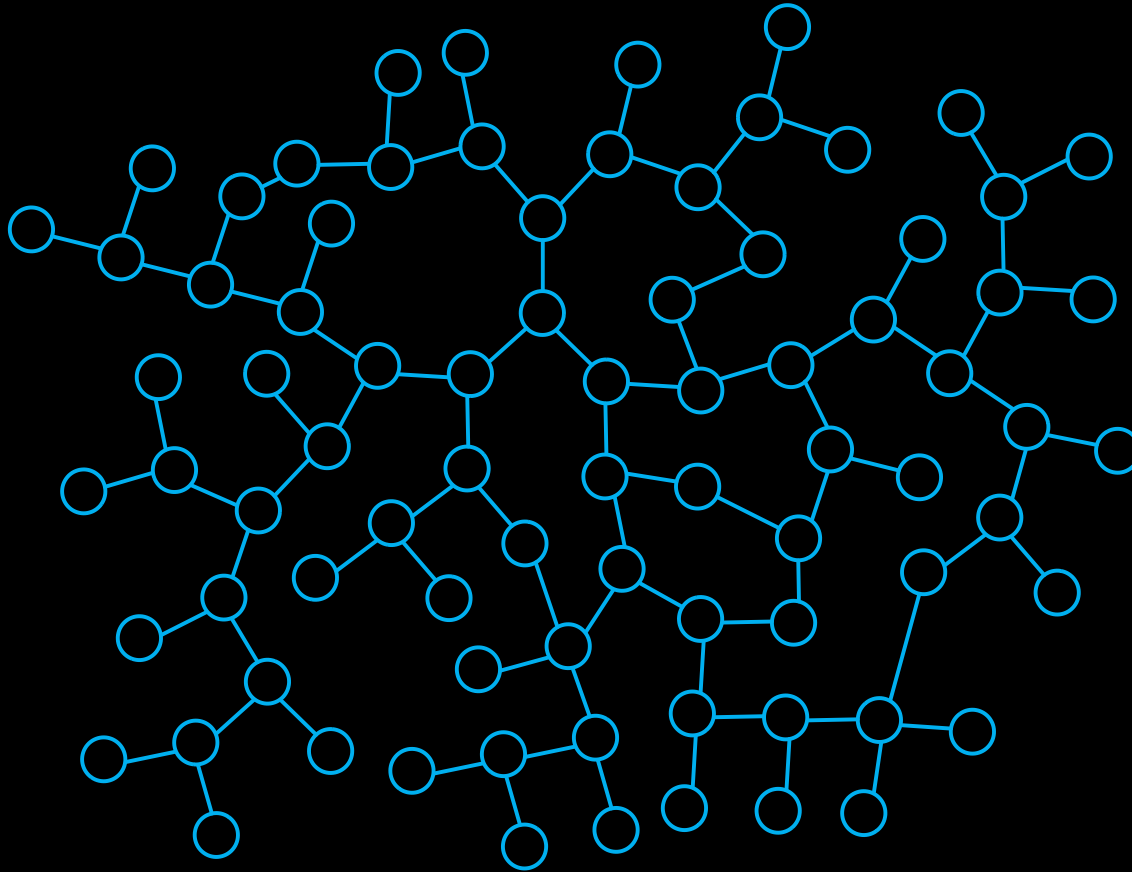


Distributed messaging

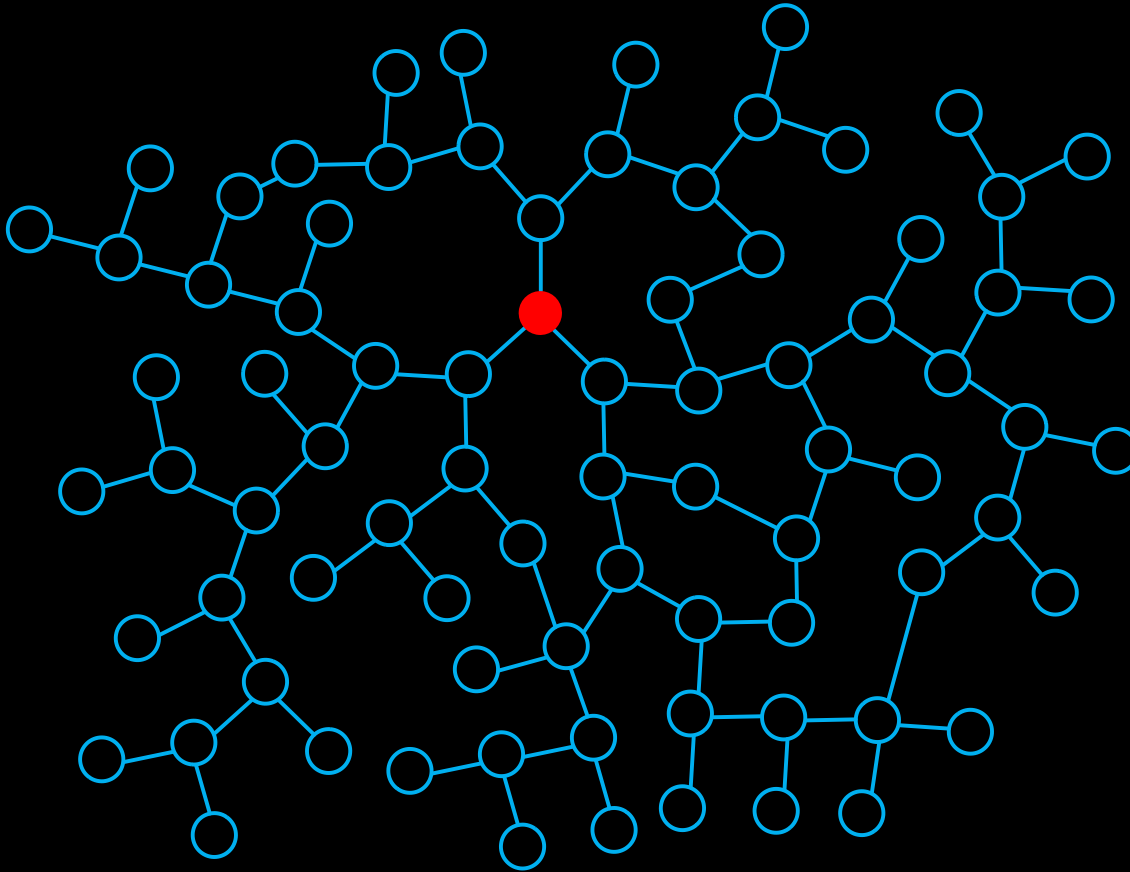


rumor source **can still** be identified

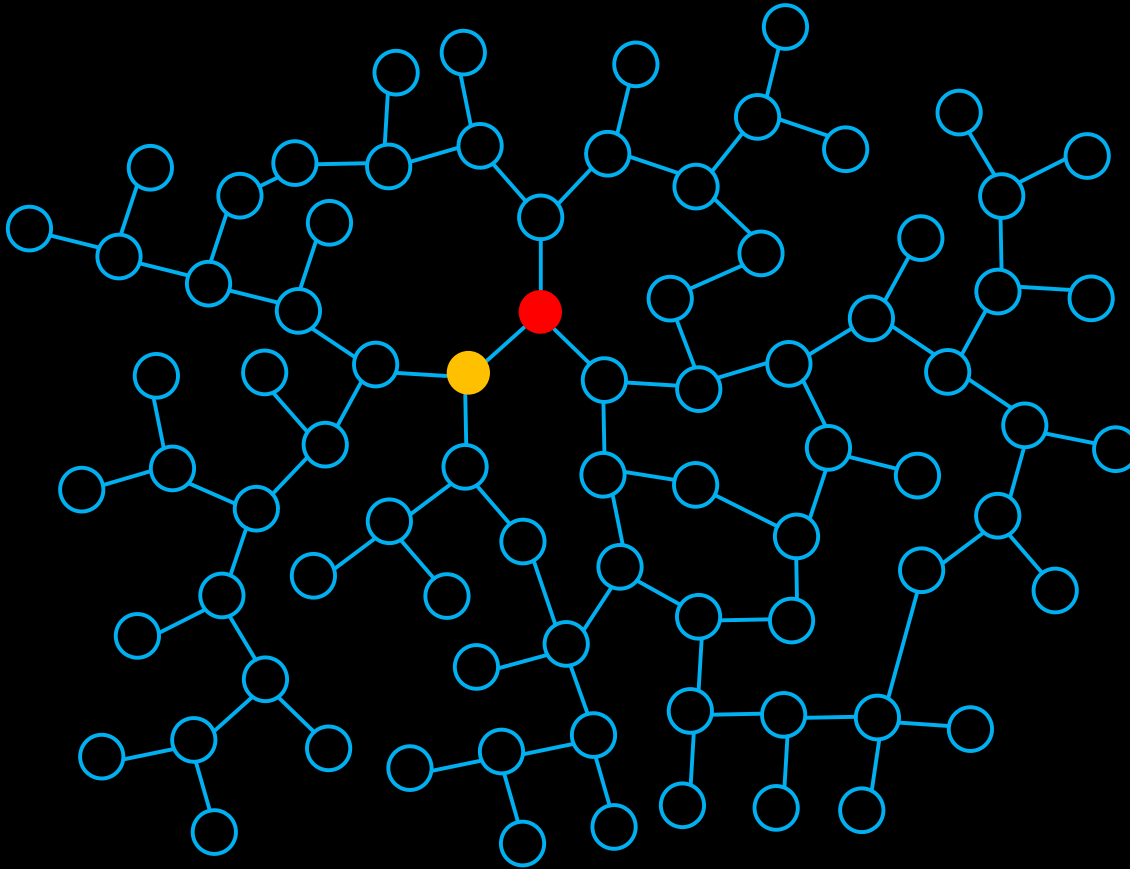
Rumor source identification



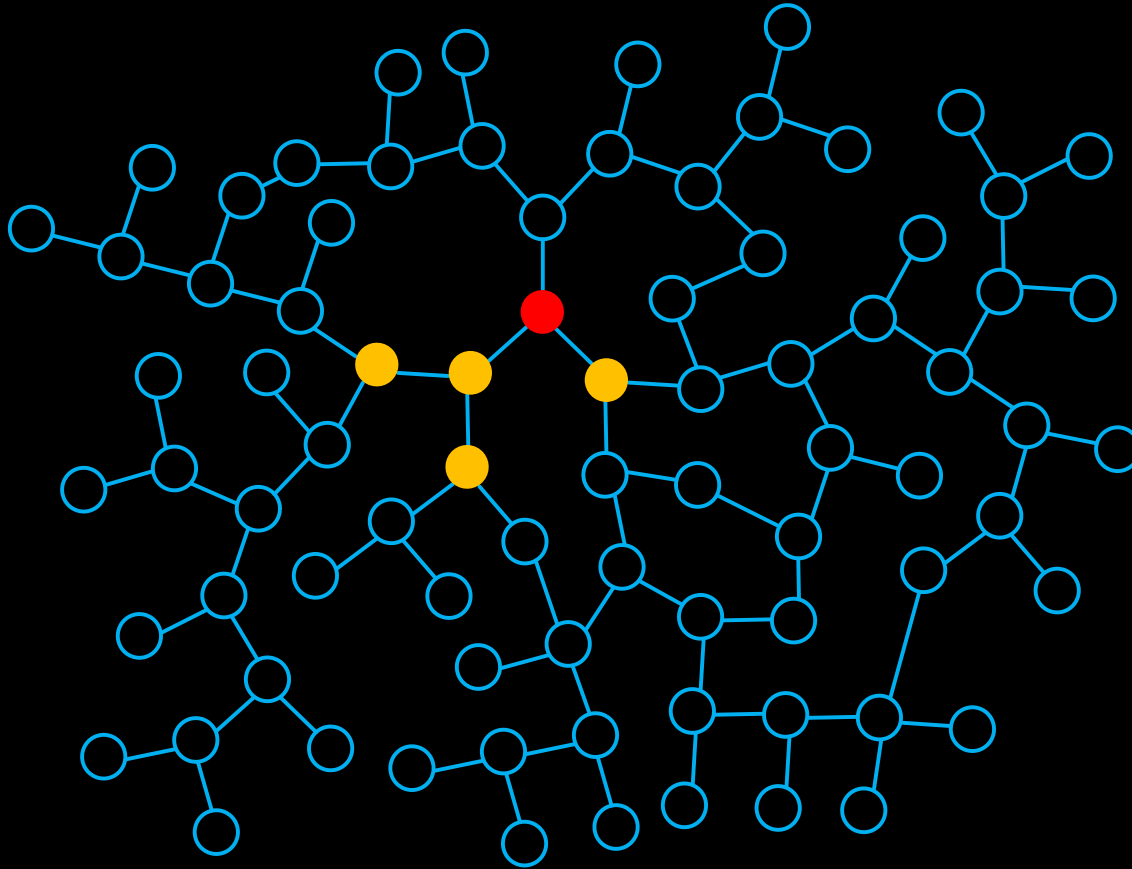
Rumor source identification



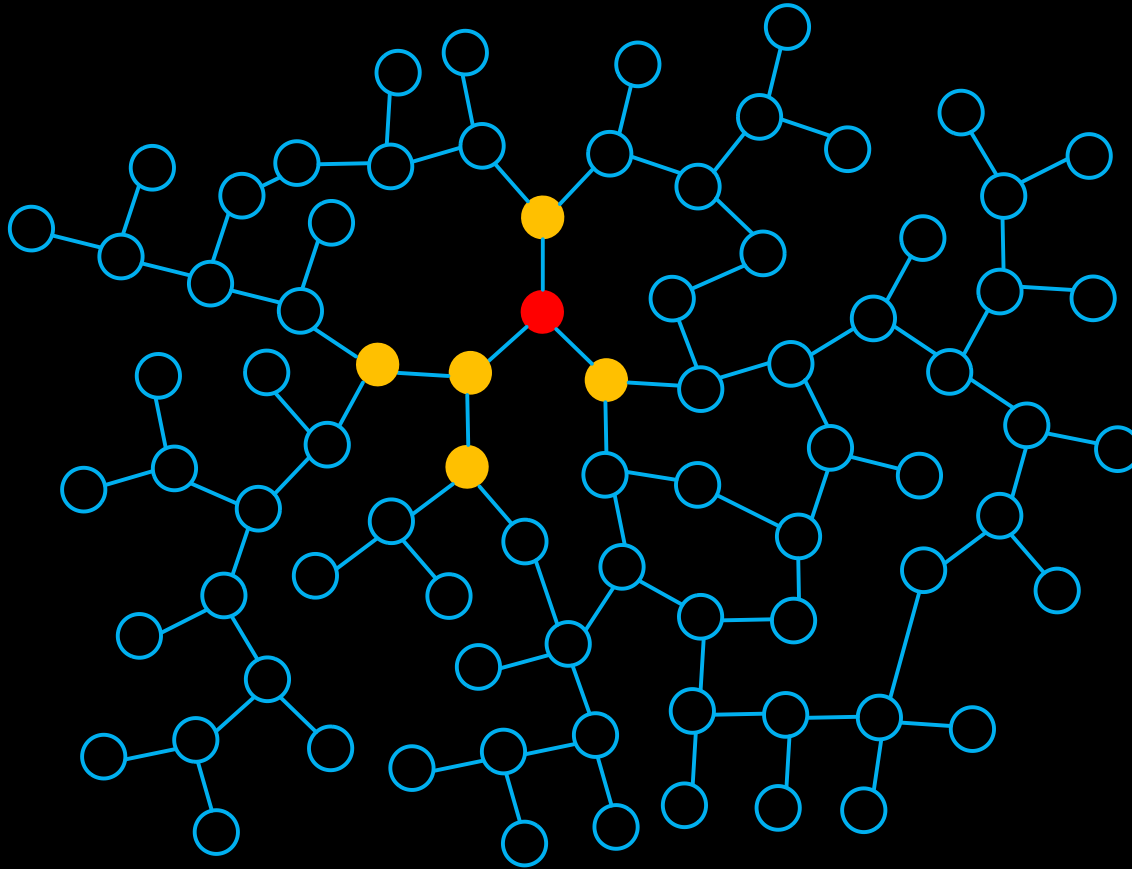
Rumor source identification



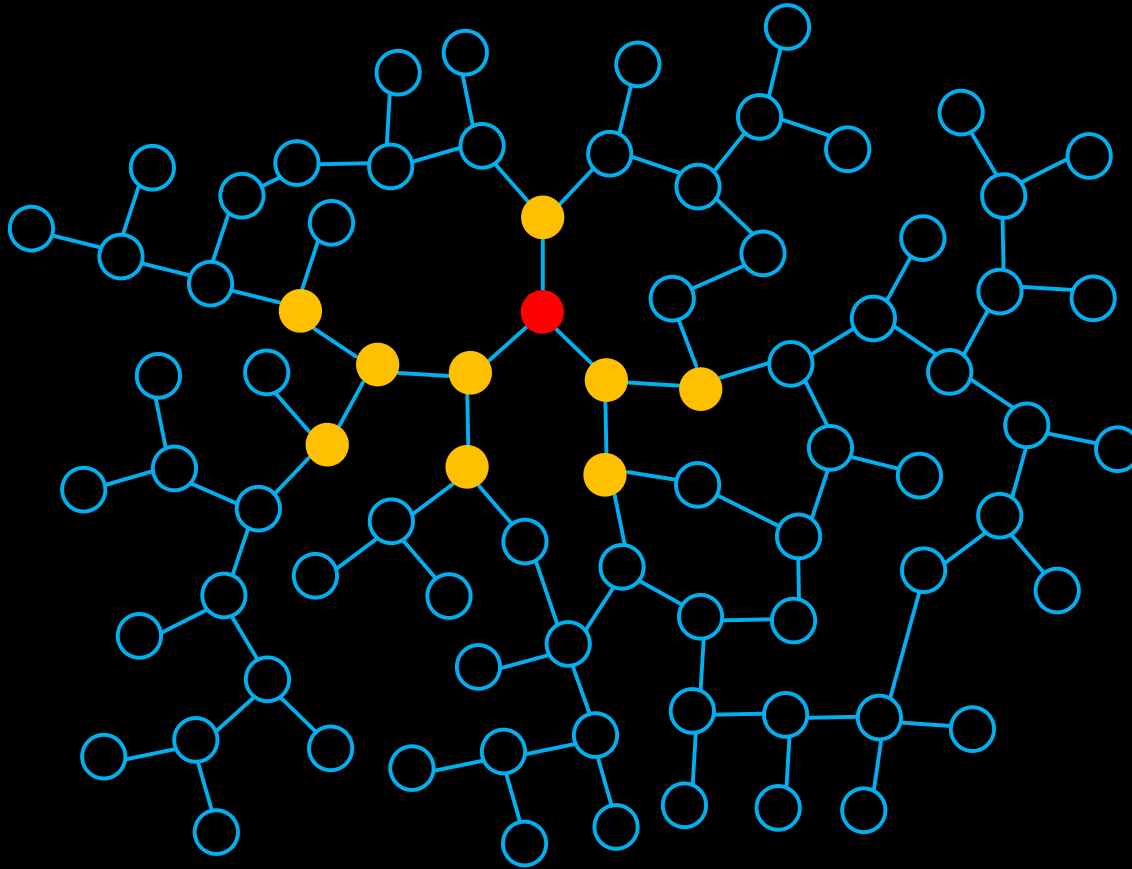
Rumor source identification



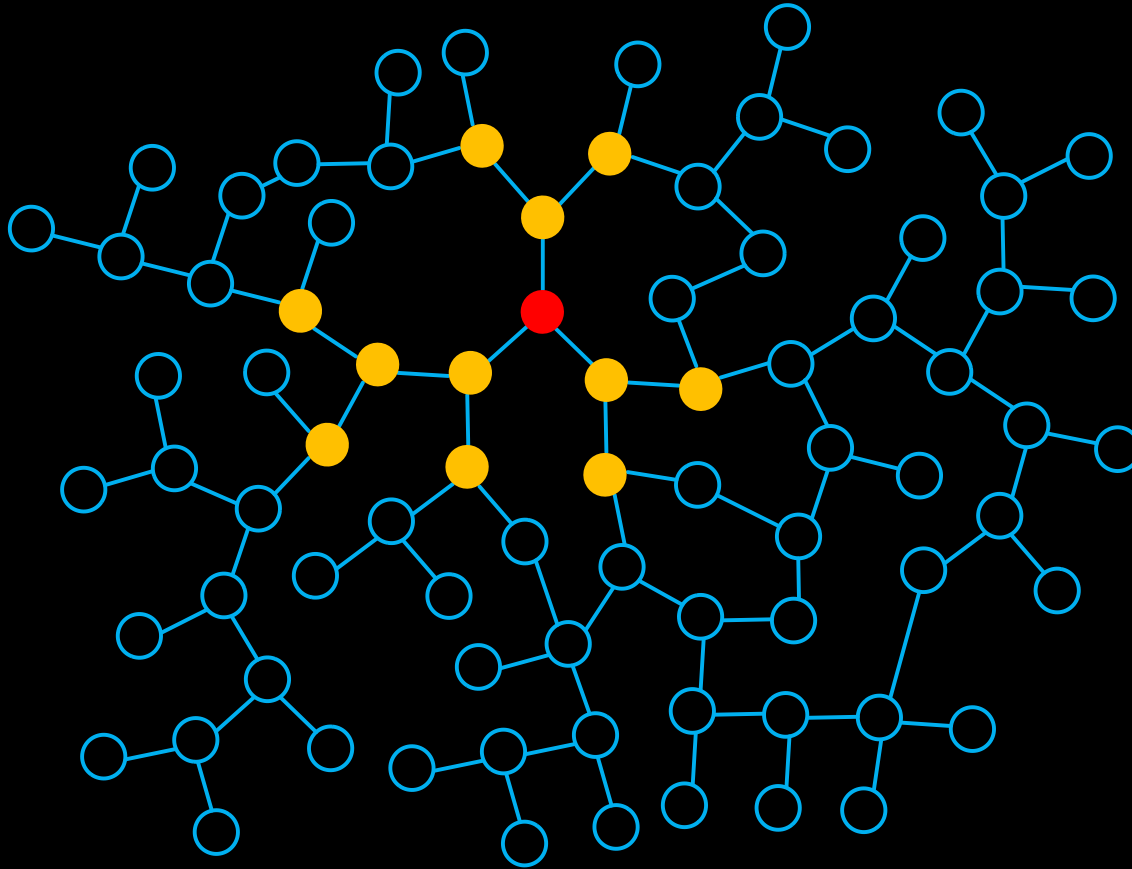
Rumor source identification



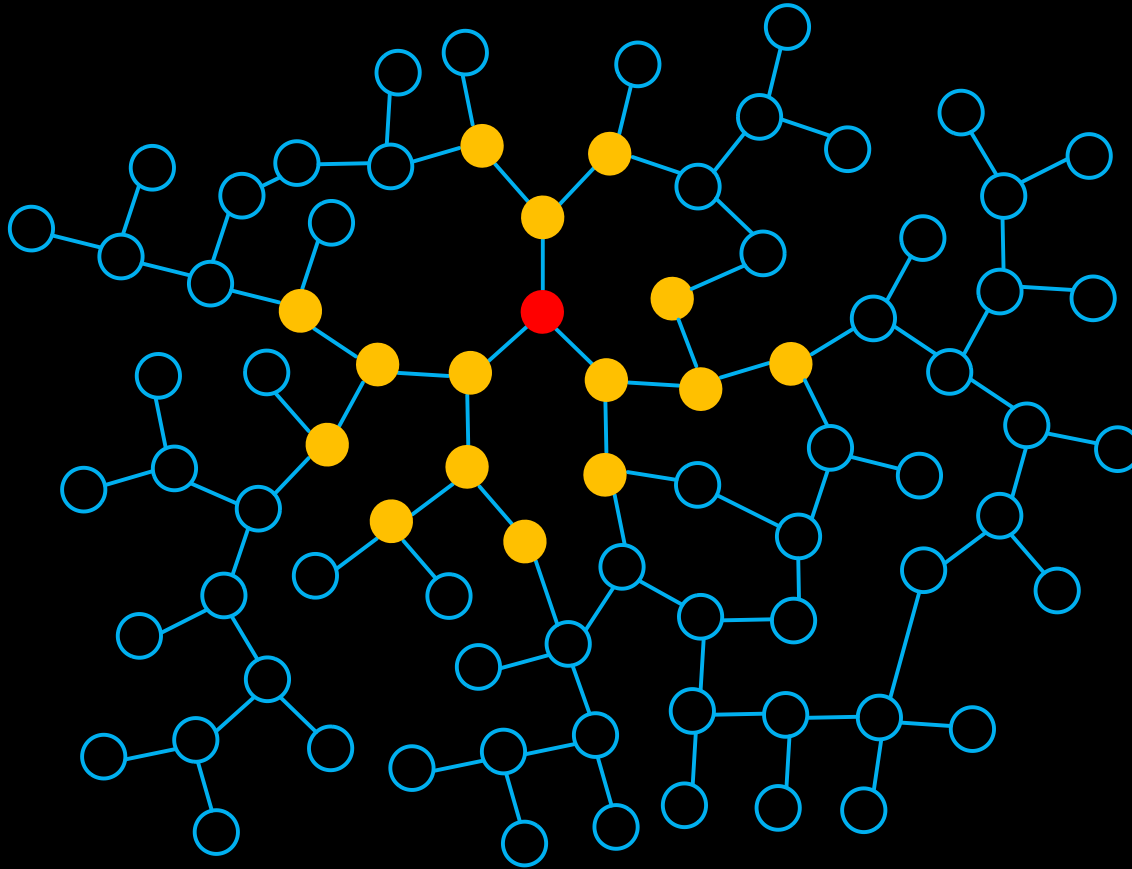
Rumor source identification



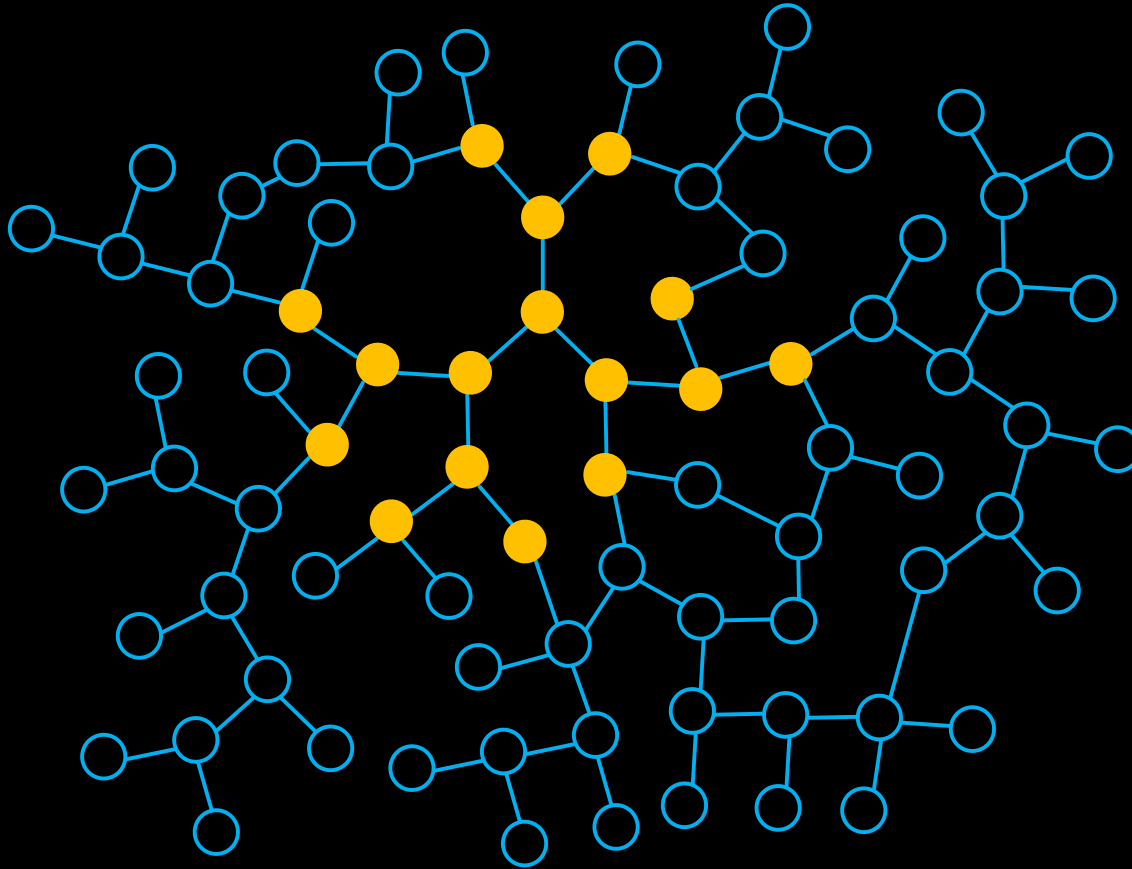
Rumor source identification



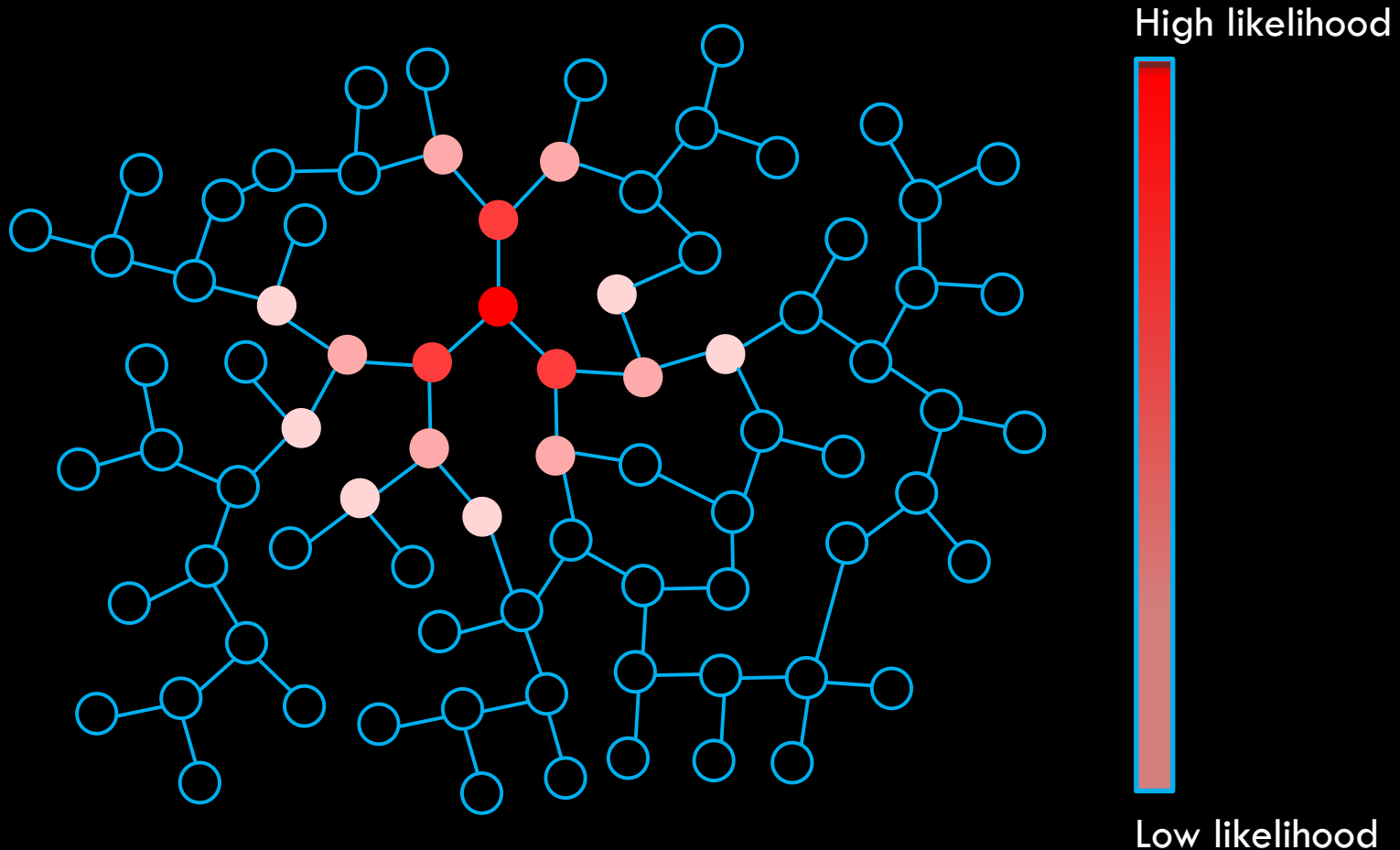
Rumor source identification



Rumor source identification

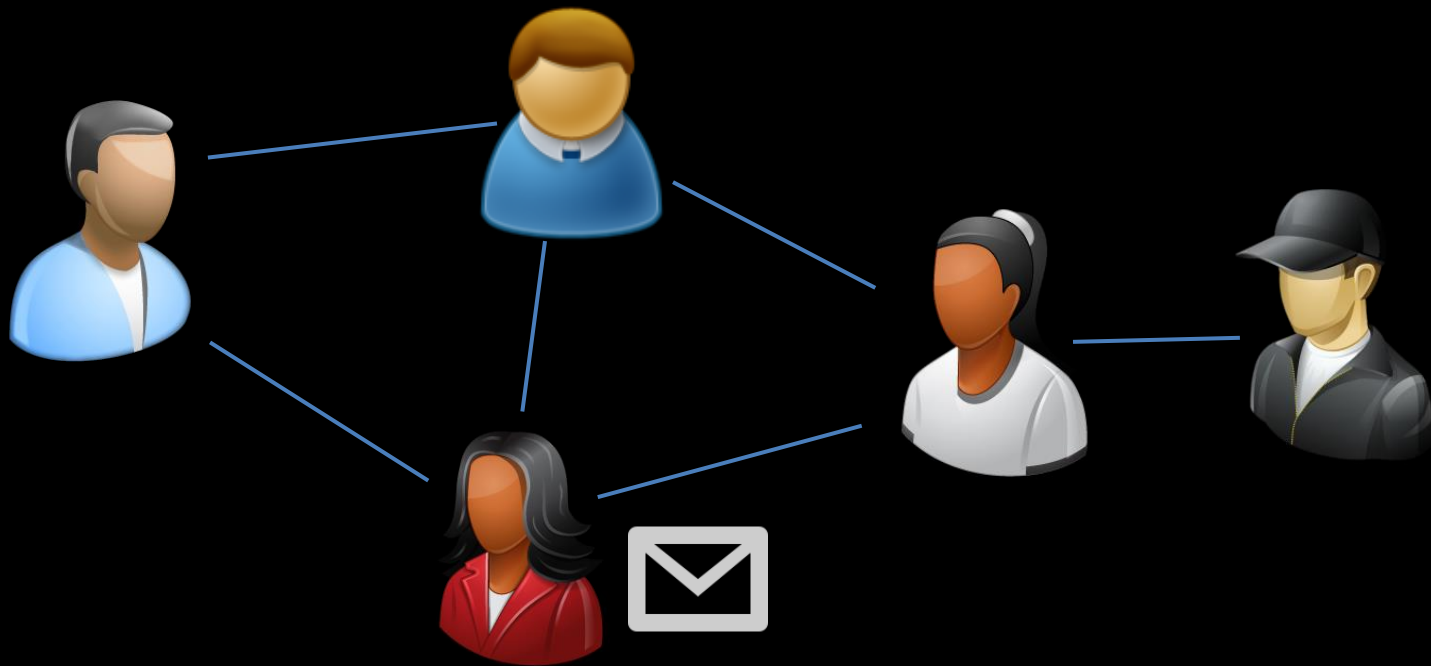


Rumor source identification



diffusion does not provide anonymity

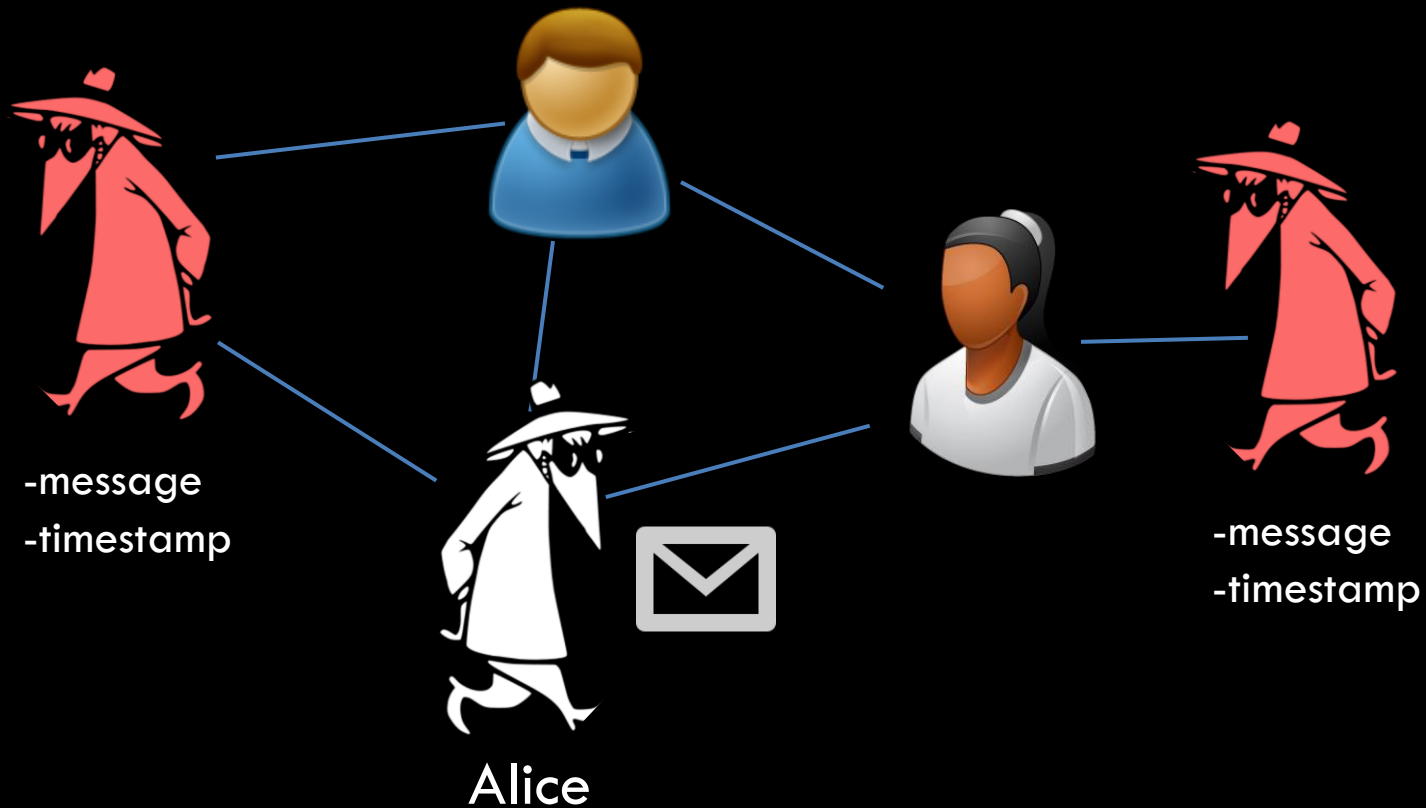
Research statement



Alice

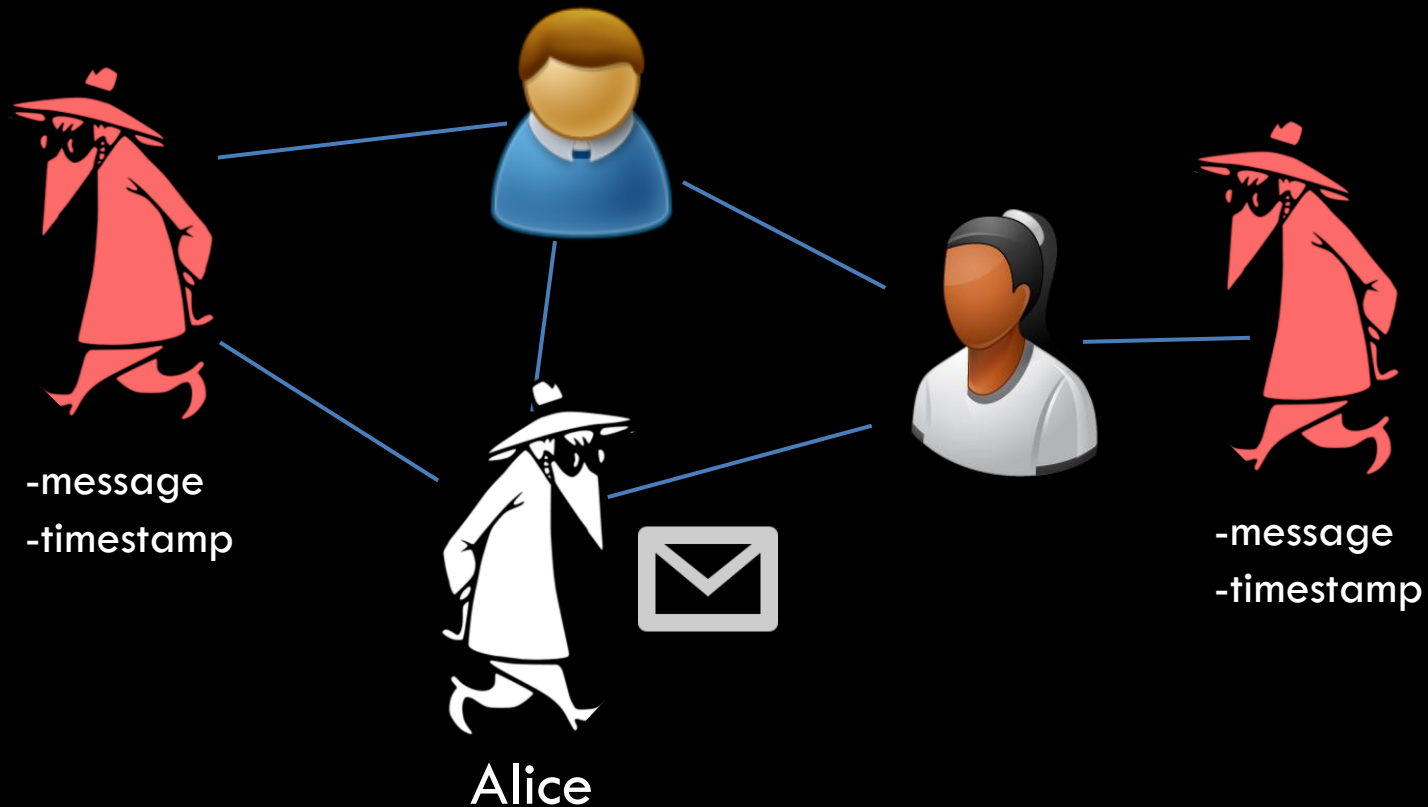
Research statement

SPY vs SPY



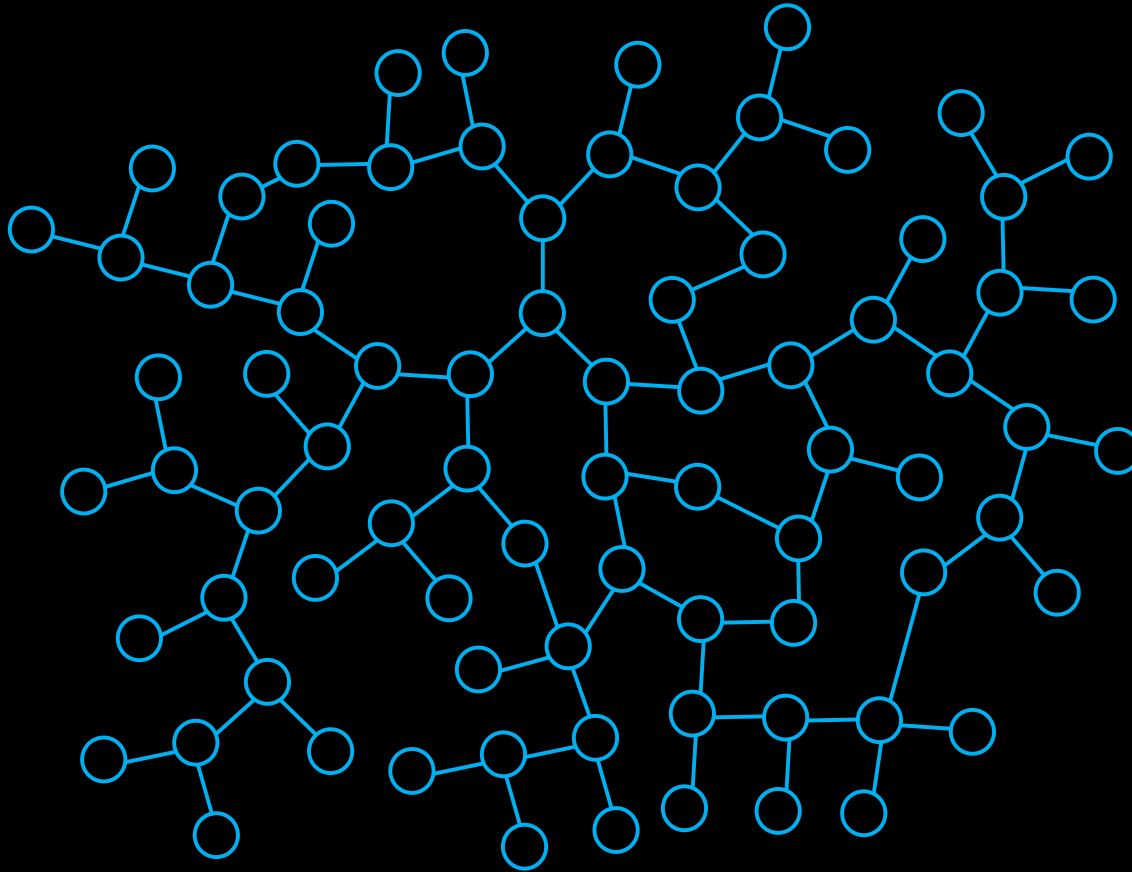
Research statement

SPX vs SPY

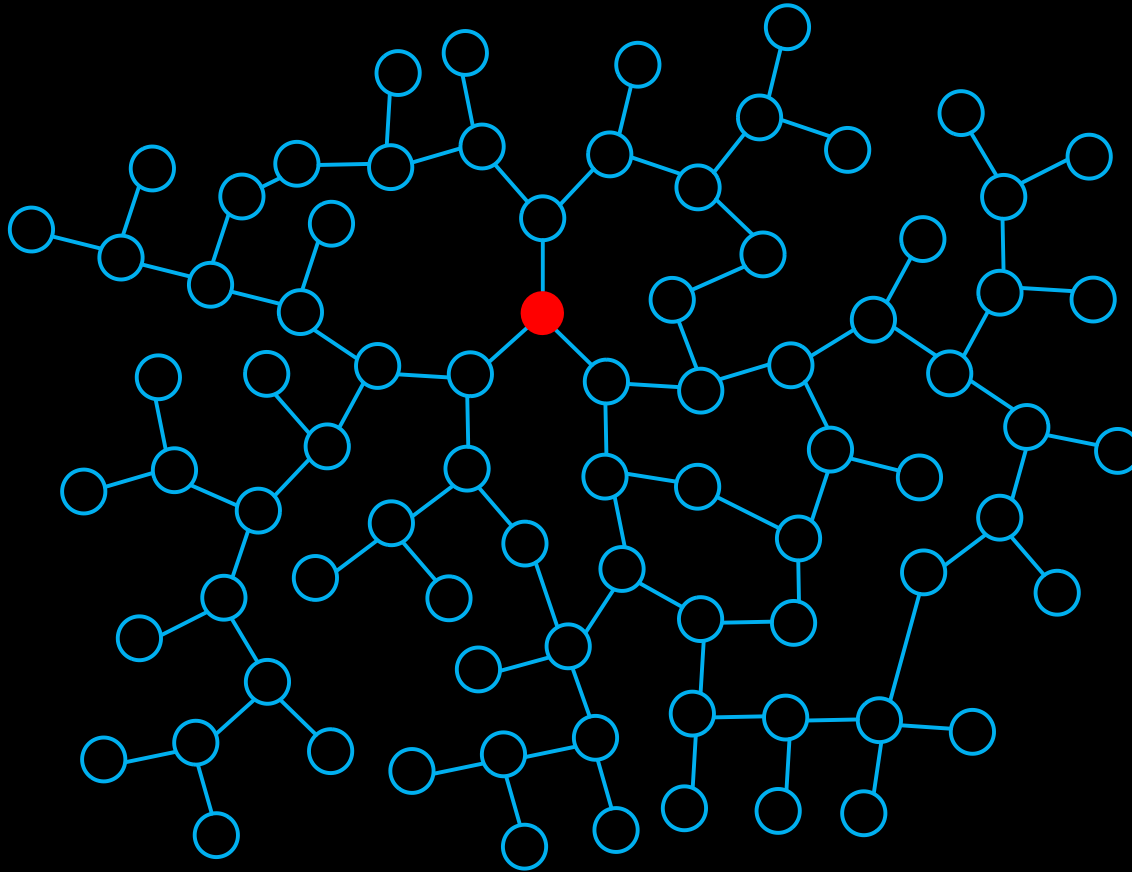


engineer the spread to **hide authorship**

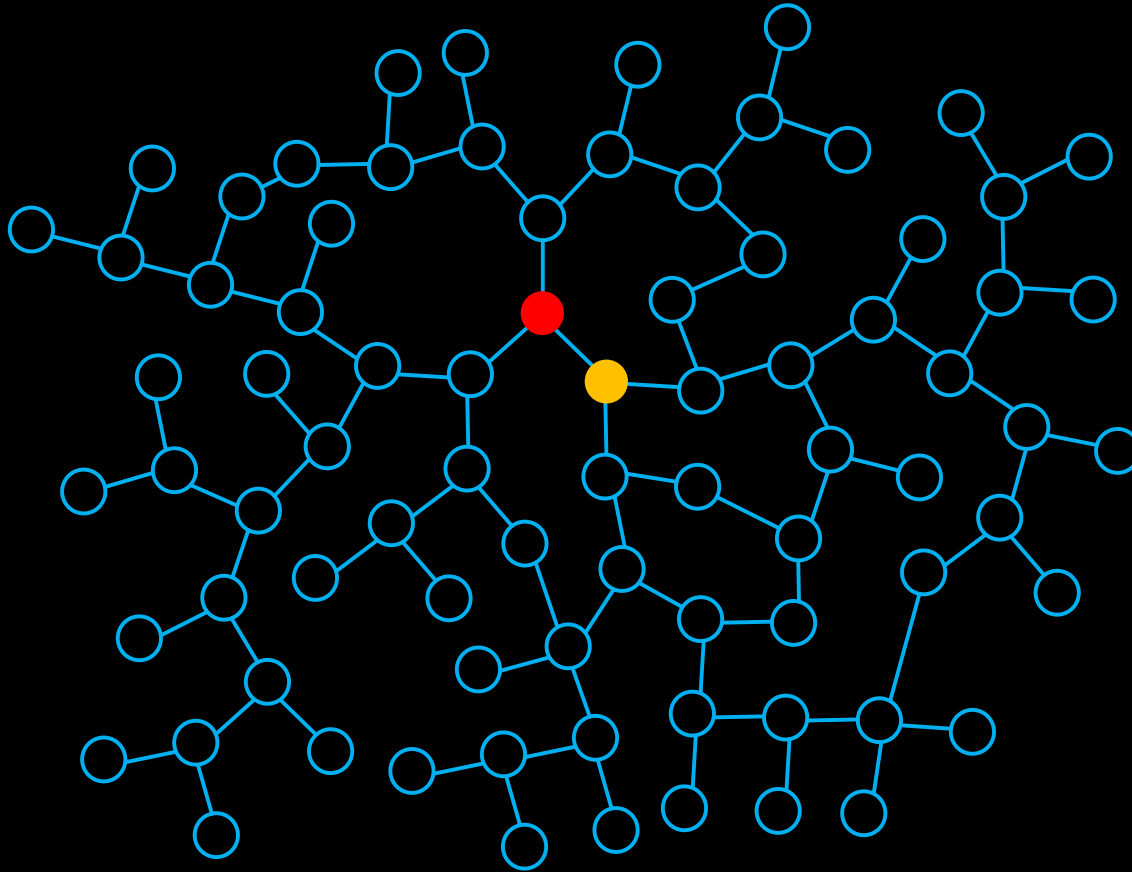
Current progress: **Adaptive diffusion**



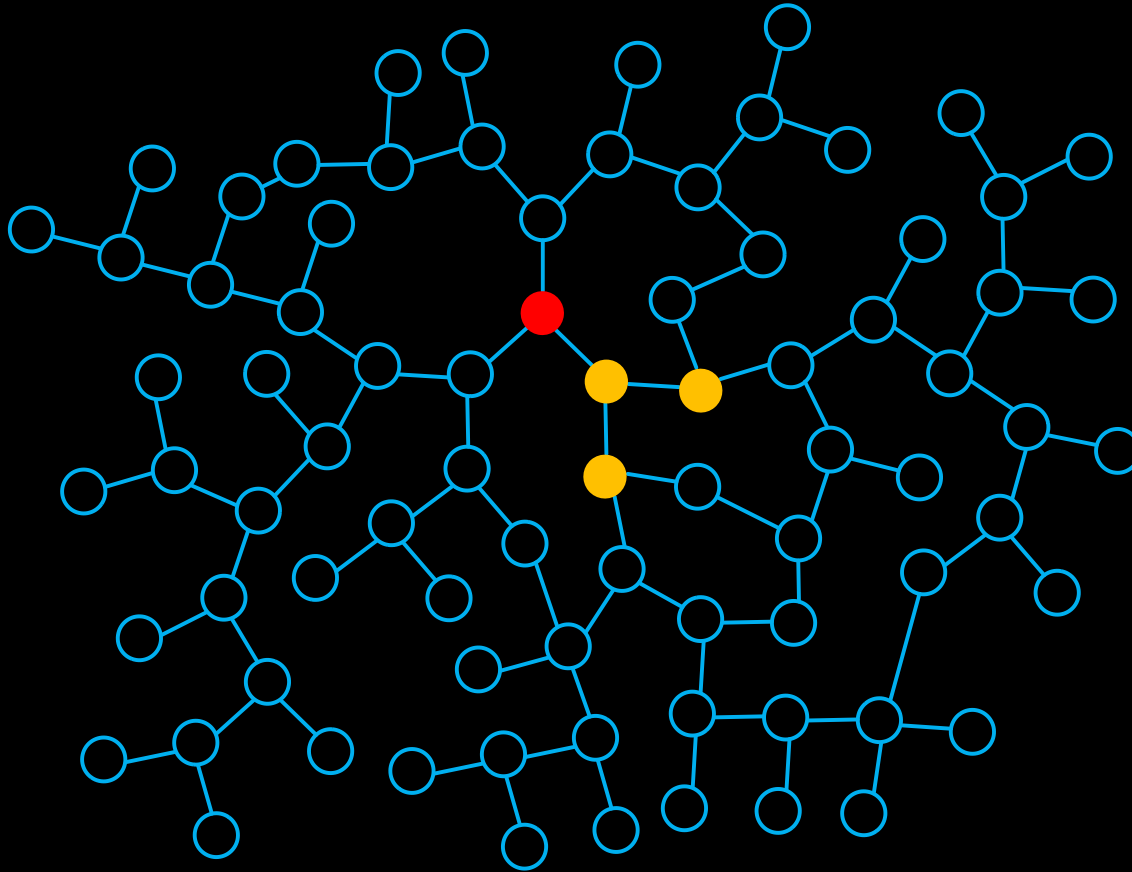
Current progress: **Adaptive diffusion**



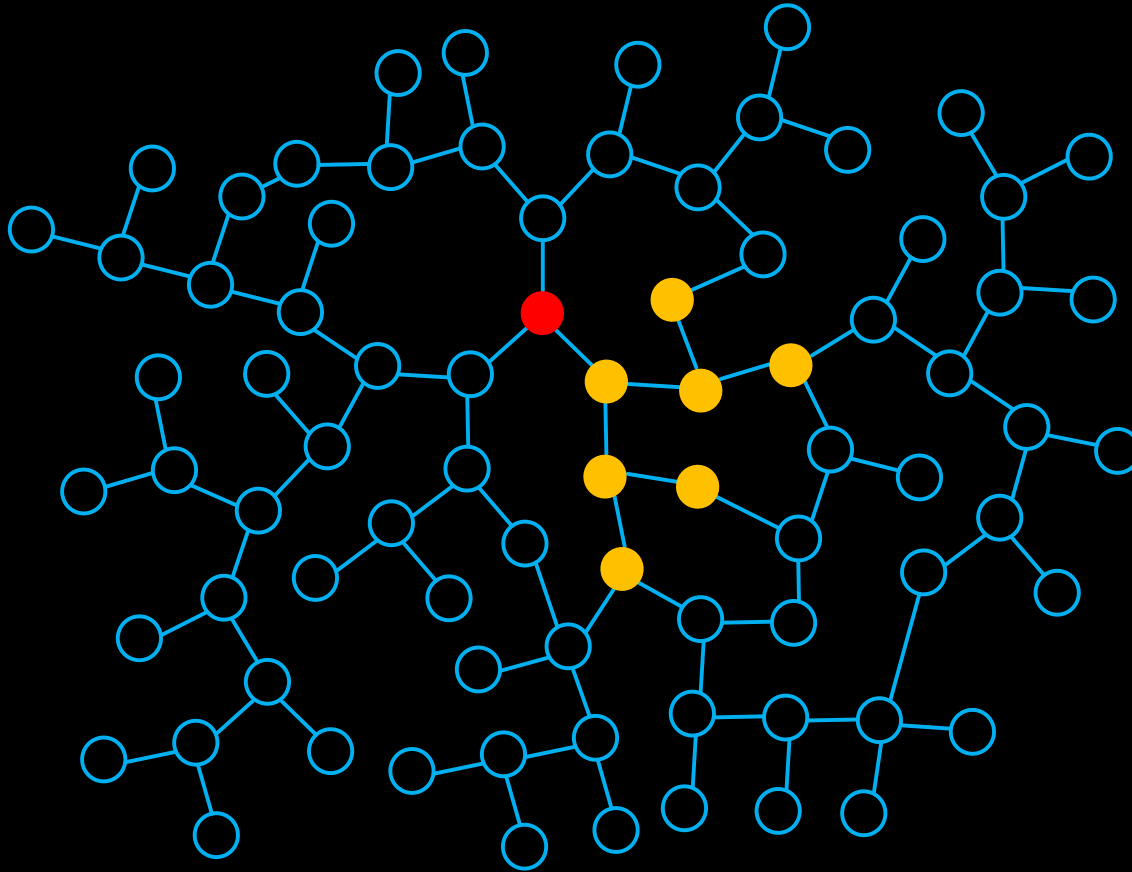
Current progress: **Adaptive diffusion**



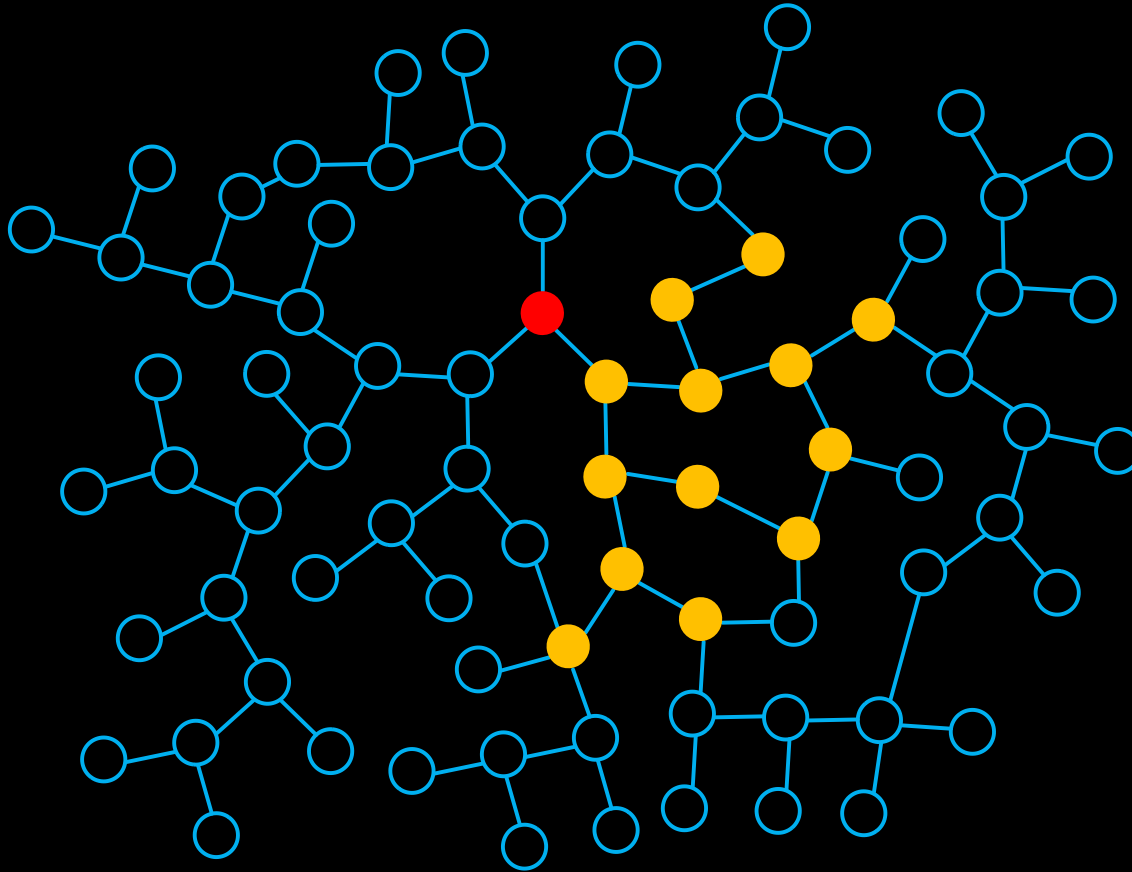
Current progress: **Adaptive diffusion**



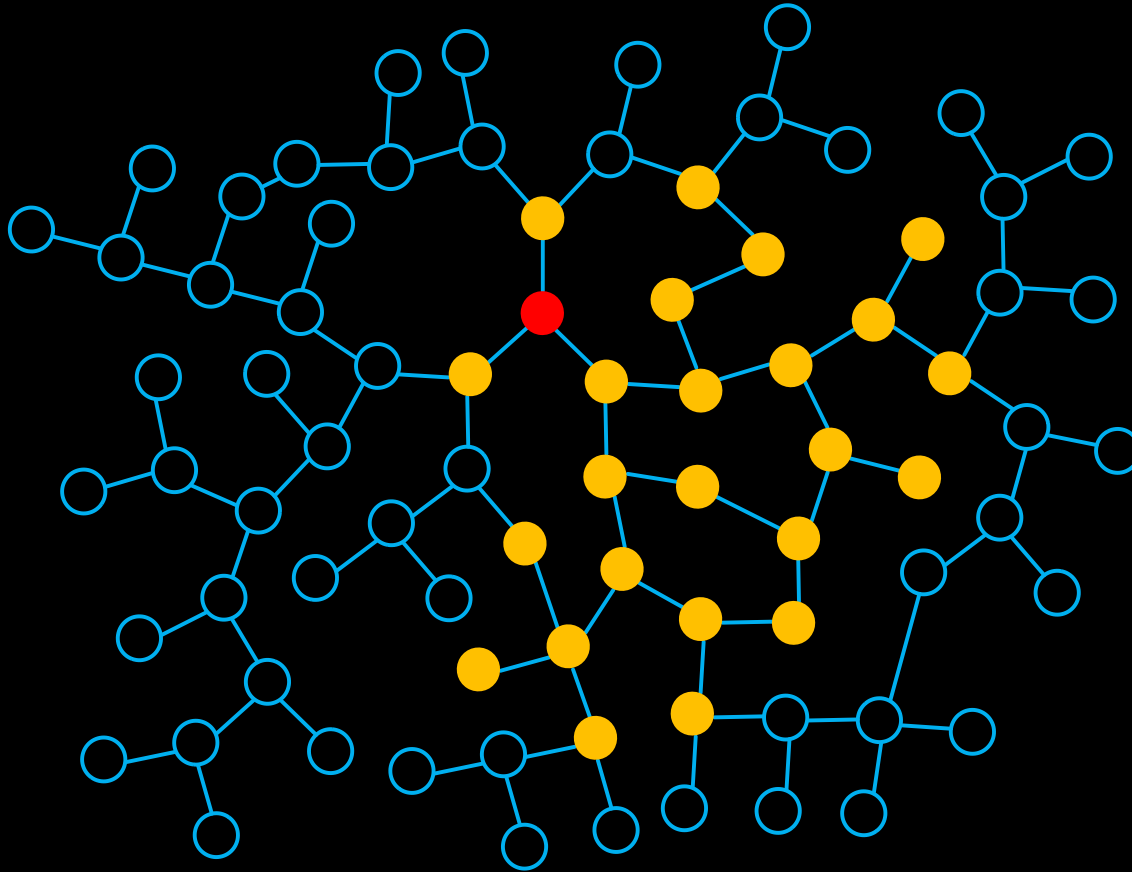
Current progress: **Adaptive diffusion**



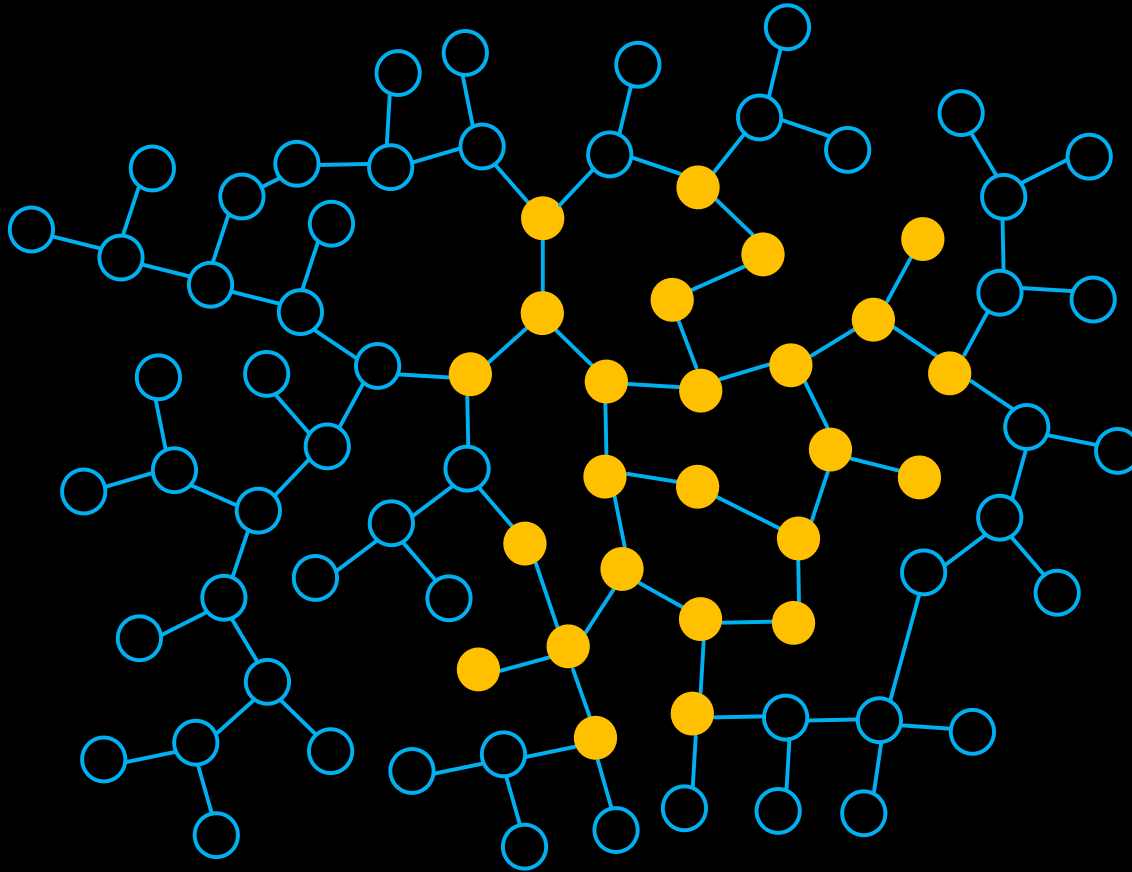
Current progress: **Adaptive diffusion**



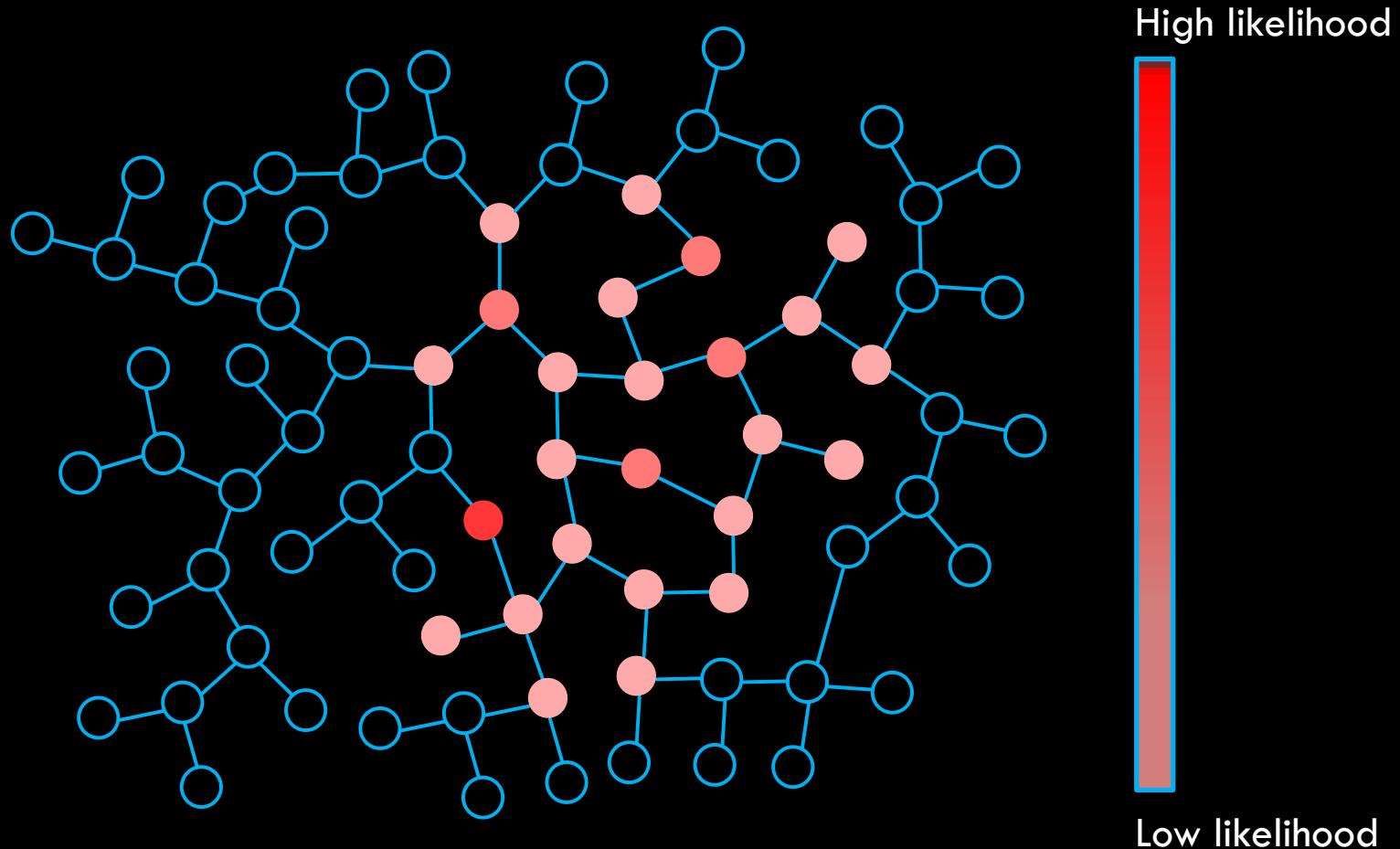
Current progress: **Adaptive diffusion**



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Current progress: **Adaptive diffusion**



provides provable **anonymity guarantees**

[Spy vs. Spy: Rumor Source Obfuscation, to appear in ACM SIGMETRICS 2015]

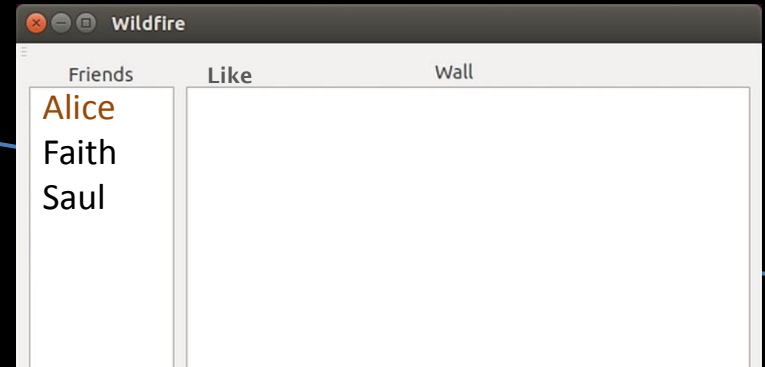


Current progress: **Wildfire**

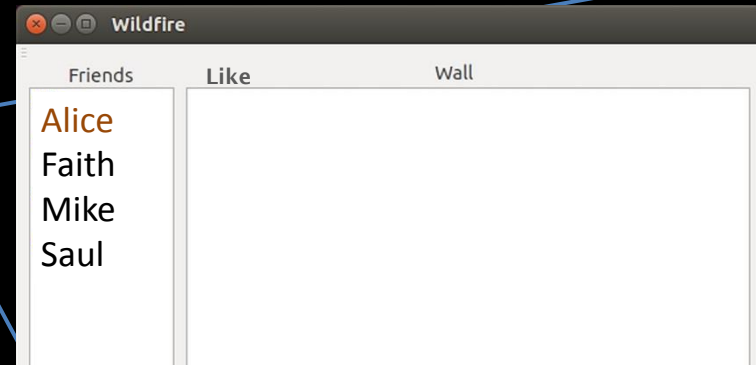
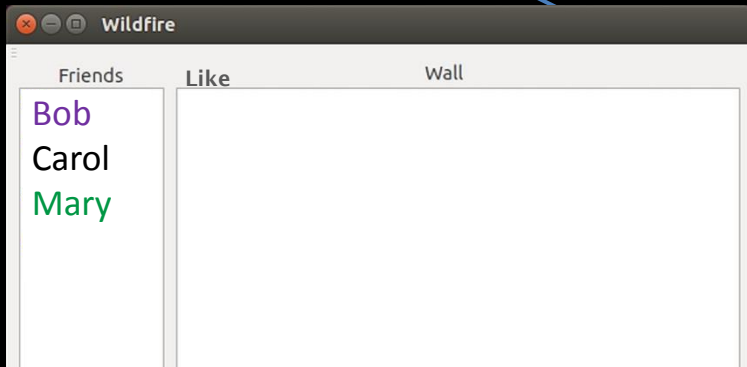
Alice



Bob



Mary



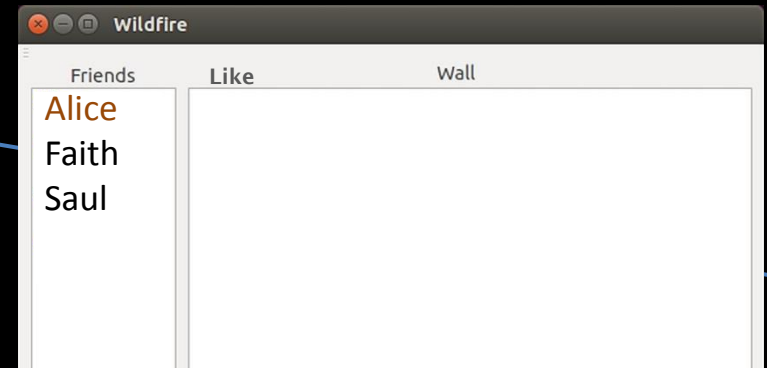
Current progress: **Wildfire**



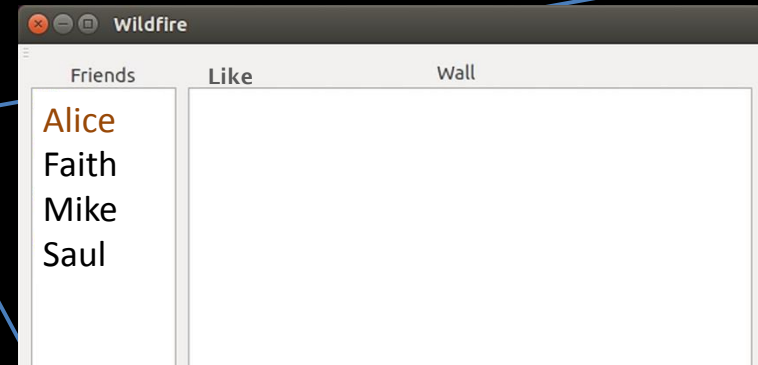
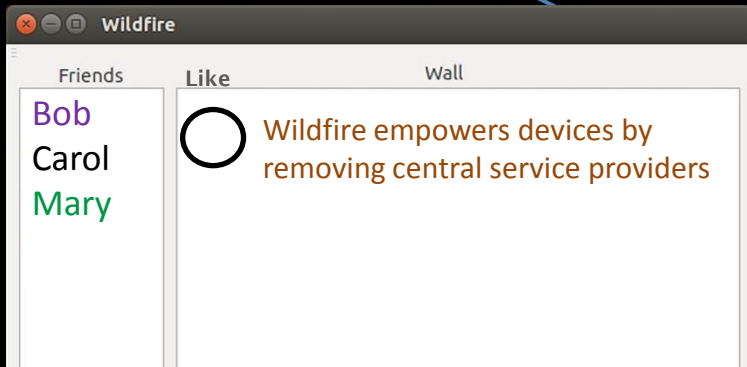
Alice



Bob



Mary





Current progress: **Wildfire**

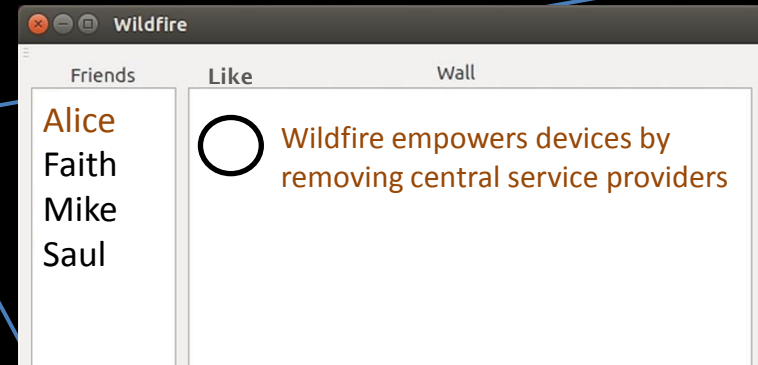
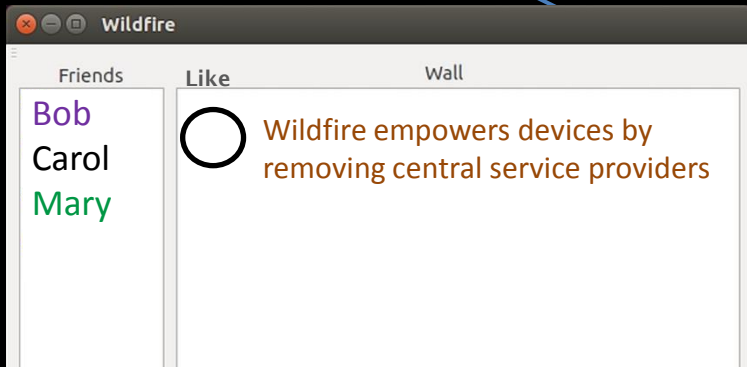
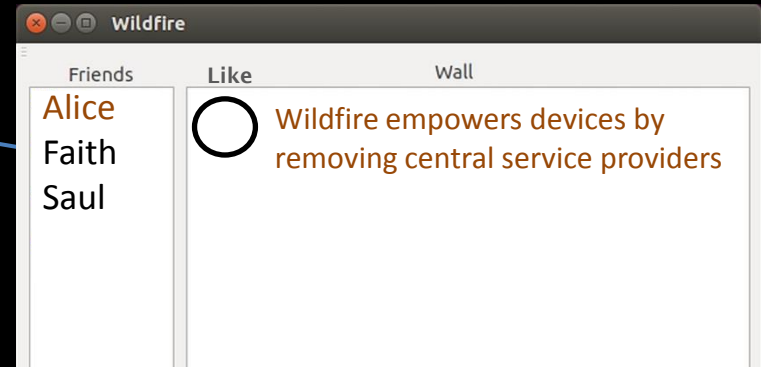
Alice



Bob



Mary



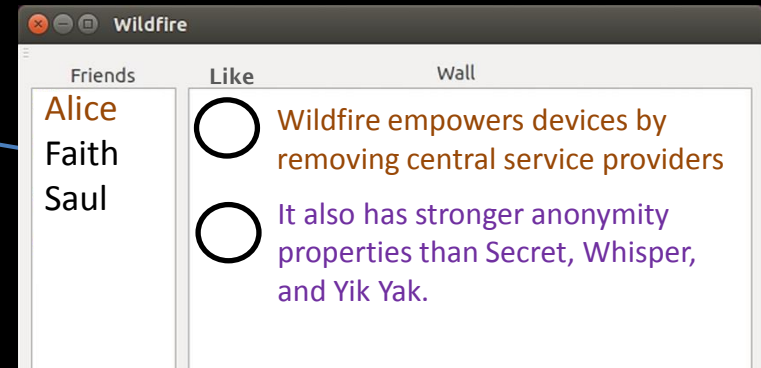


Current progress: **Wildfire**

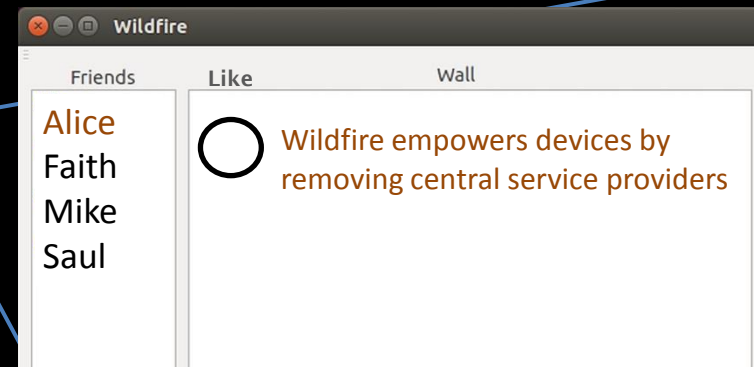
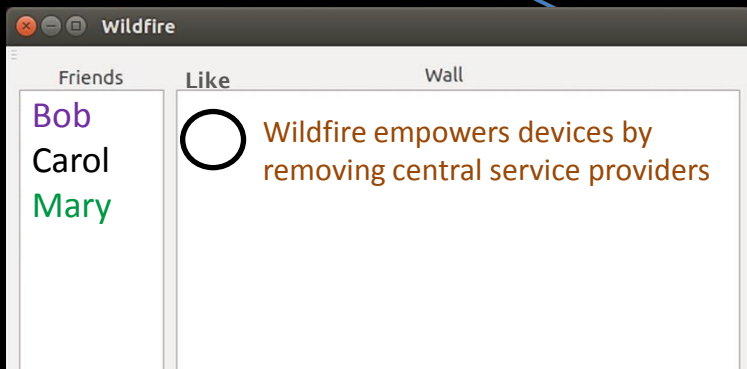
Alice



Bob



Mary



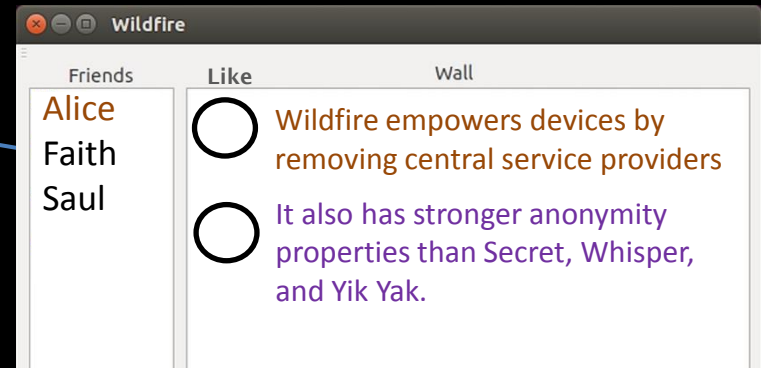


Current progress: **Wildfire**

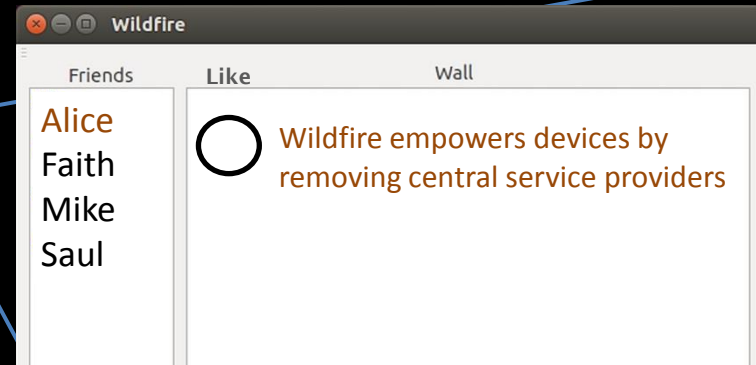
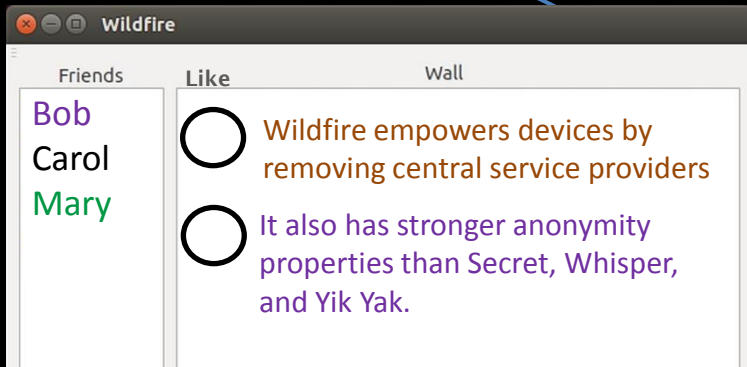
Alice



Bob



Mary



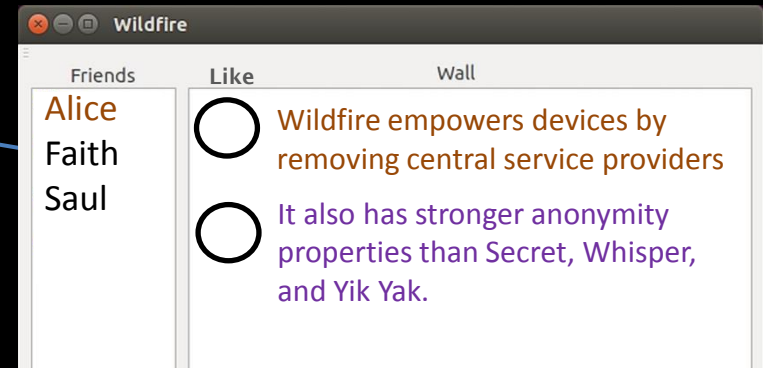


Current progress: **Wildfire**

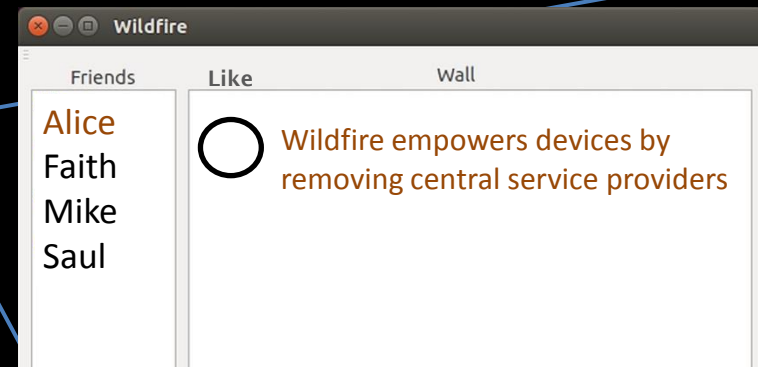
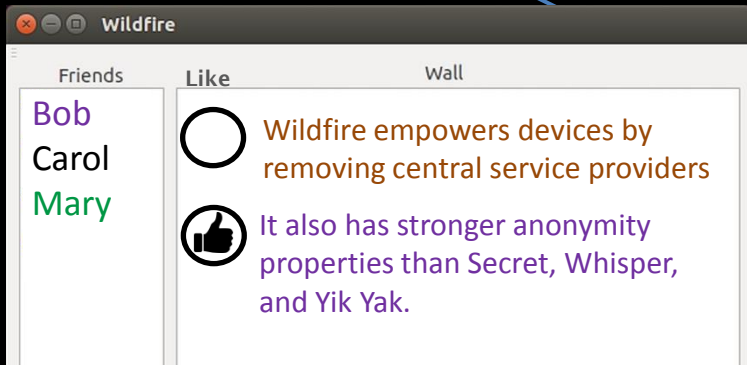
Alice



Bob



Mary



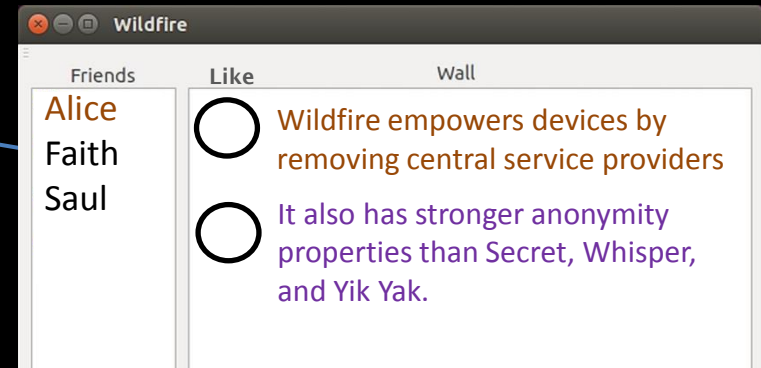


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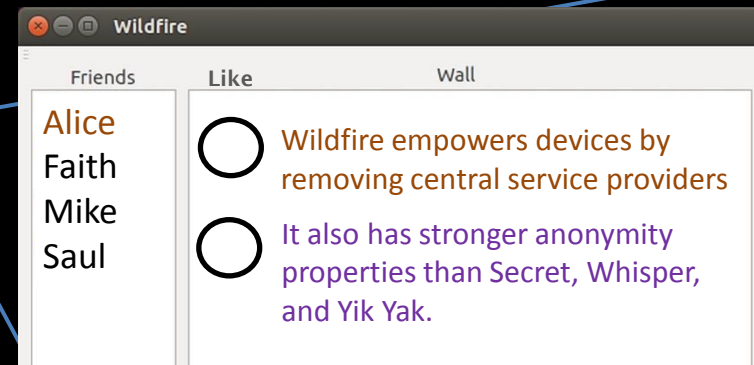
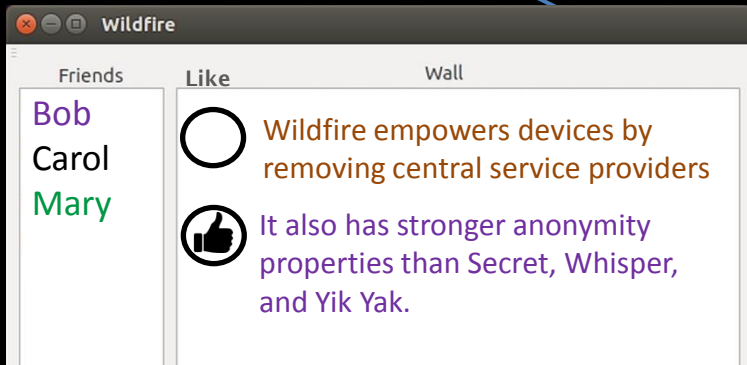
Alice



Bob



Mary



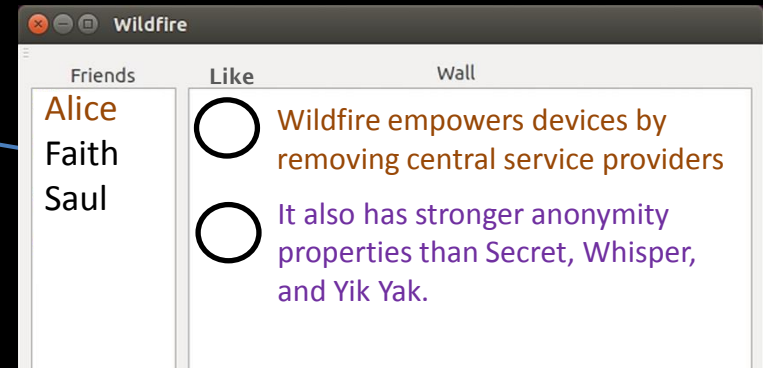


Current progress: **Wildfire**

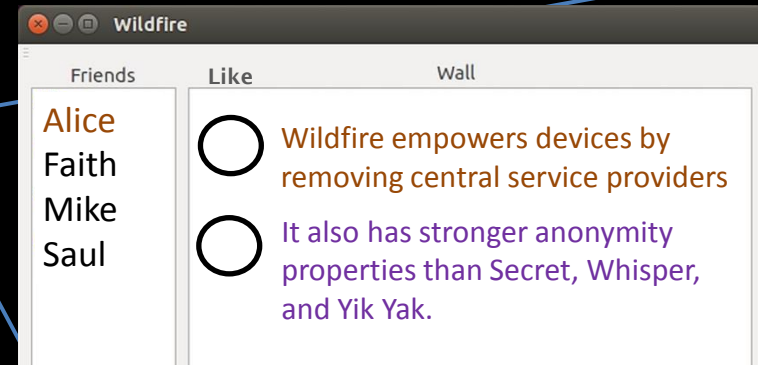
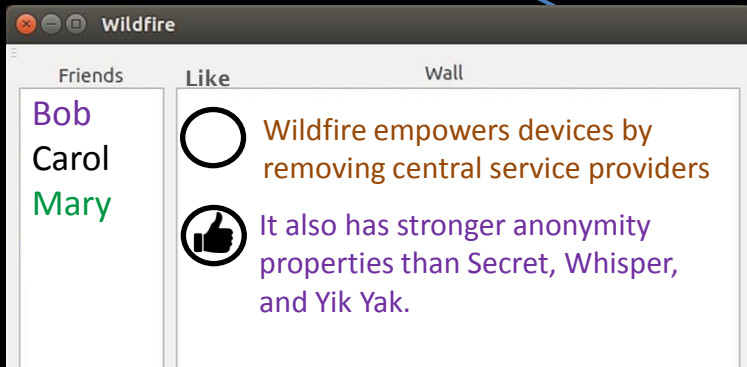
Alice



Bob



Mary



anonymous, distributed, secure implementation

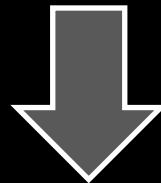
Upcoming research

Theoretical

- Peer-to-peer dynamic networks
- Hiding relays
- Multiple message sources

Systems

- Video sharing
- Message caching
- Bootstrapping contacts



Wildfire Release