Practical Privacy-Preserving Authentication for SSH

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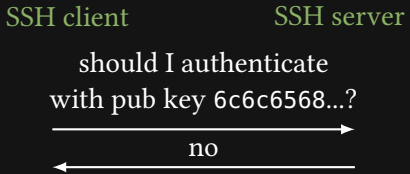
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SSH server
should I authenticate
with pub key 6c6c6568...?
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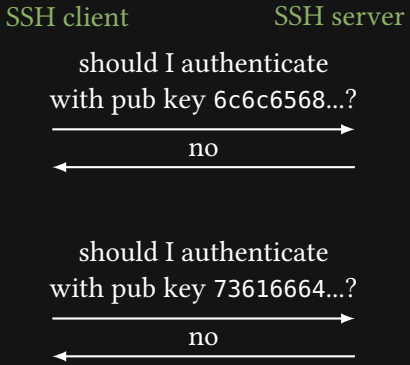
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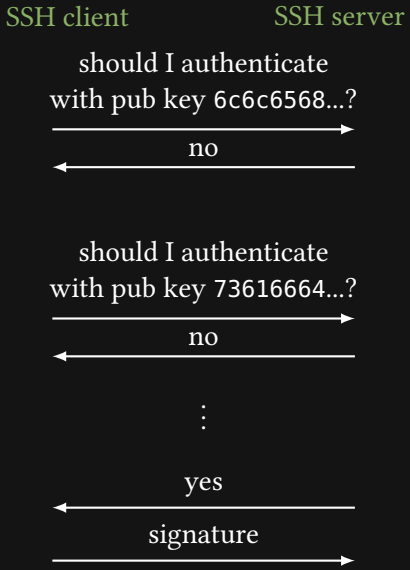
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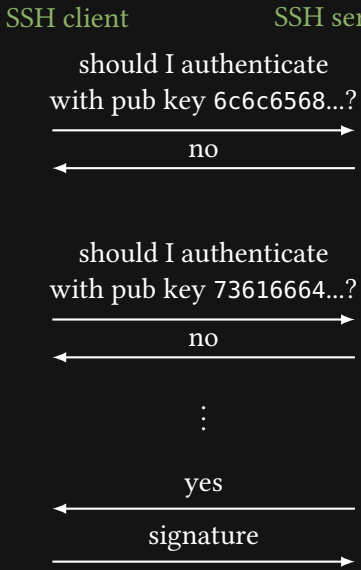
signature



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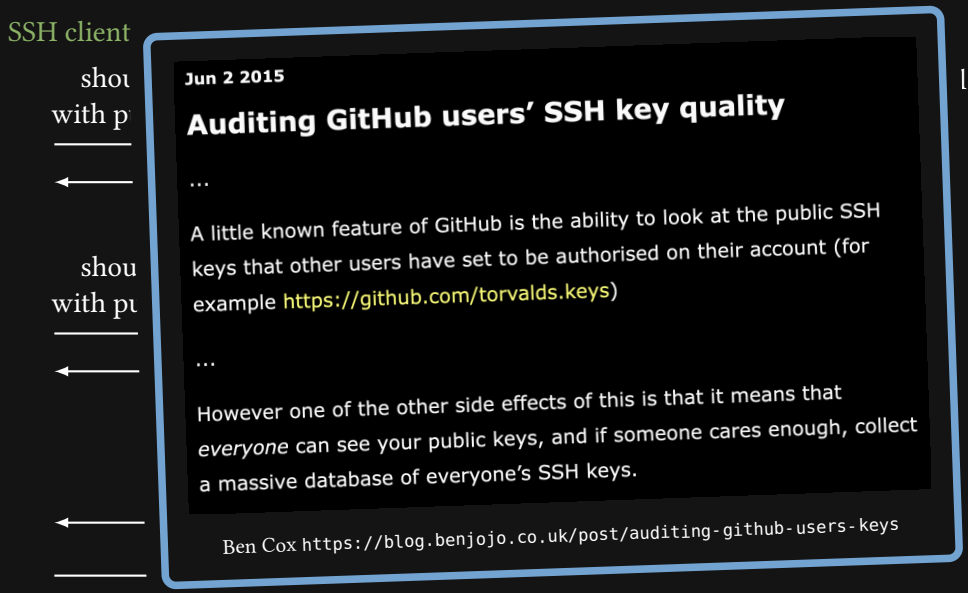
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Jun 2 2015
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...
A little known feature of GitHub is the ability to look at the public SSH keys that other users have set to be authorised on their account (for example https://github.com/torvalds.keys)
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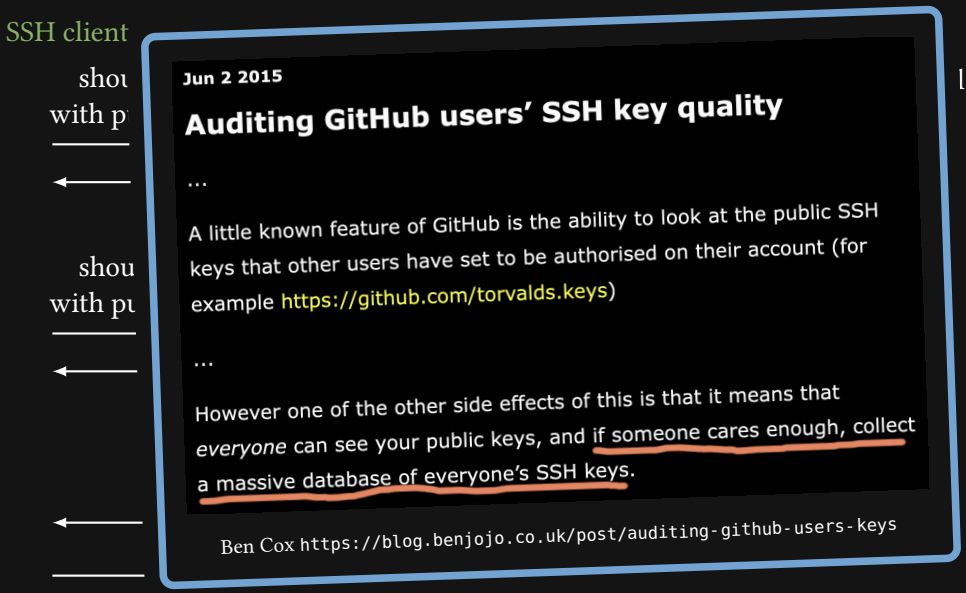
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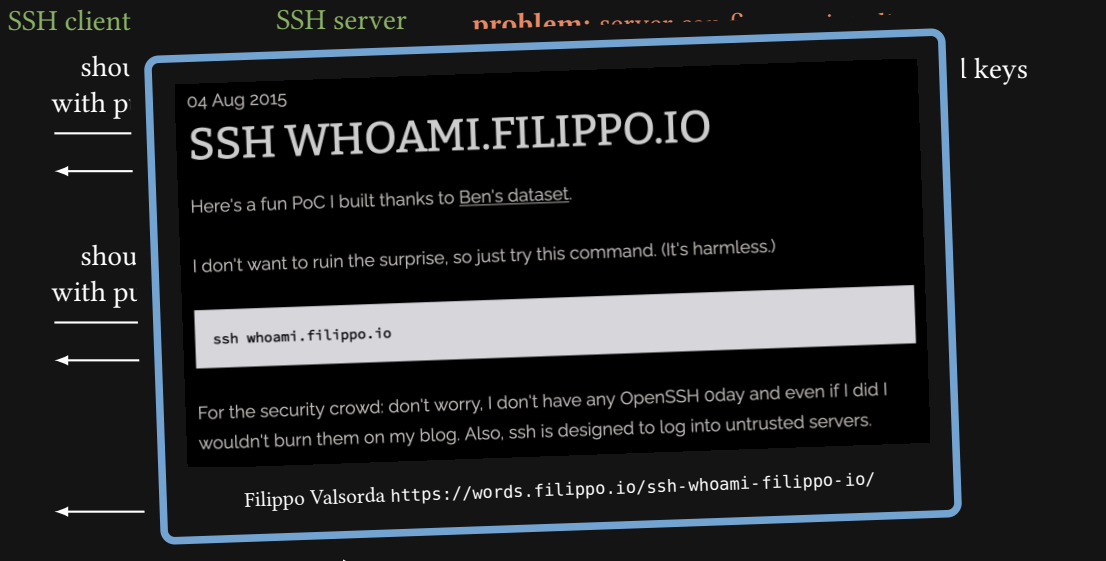
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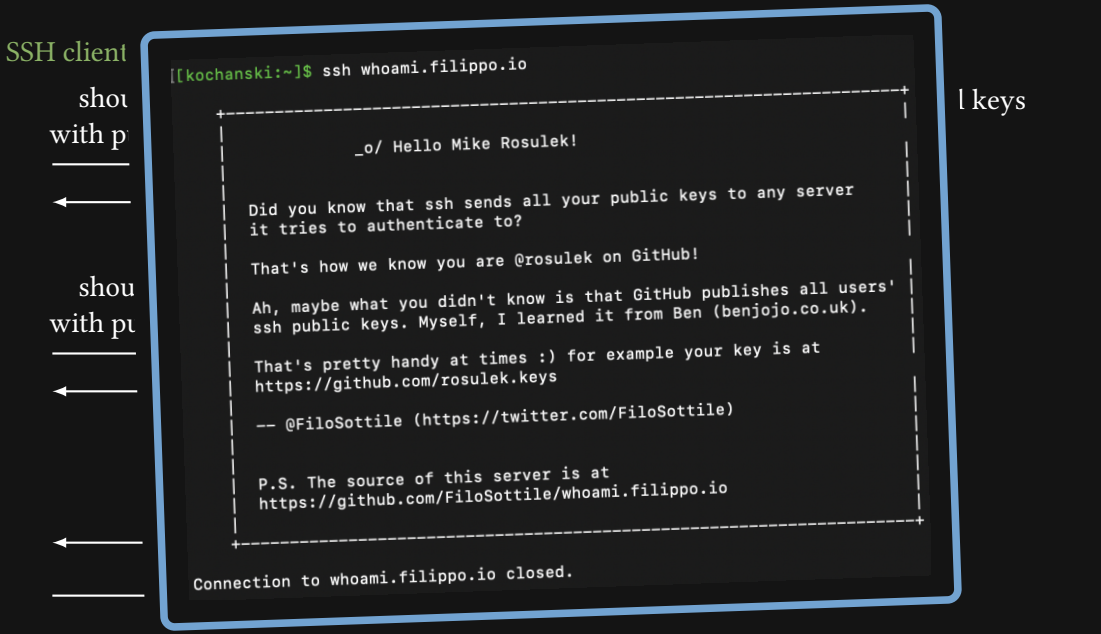
04 Aug 2015
SSH WHOAMI.FILIPPO.IO
Here's a fun PoC I built thanks to Ben's dataset.
I don't want to ruin the surprise, so just try this command. (It's harmless.)
ssh whoami.filippo.io
For the security crowd: don't worry, I don't have any OpenSSH oday and even if I did I wouldn't burn them on my blog. Also, ssh is designed to log into untrusted servers.
Filippo Valsorda https://words.filippo.io/ssh-whoami-filippo-io/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That's how we know you are @rosulek on GitHub!
Ah, maybe what you didn't know is that GitHub publishes all users'
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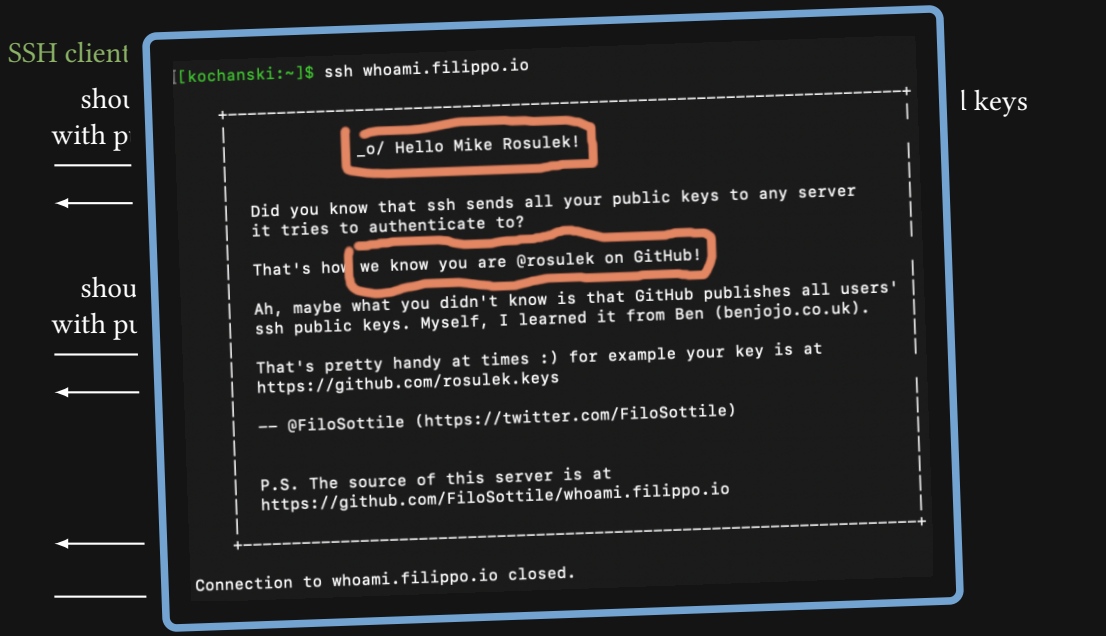
That's pretty handy at times :) for example your key is at
https://github.com/rosulek.keys
-- @FiloSottile (https://twitter.com/FiloSottile)
P.S. The source of this server is at
https://github.com/FiloSottile/whoami.filippo.io
Connection to whoami.filippo.io closed.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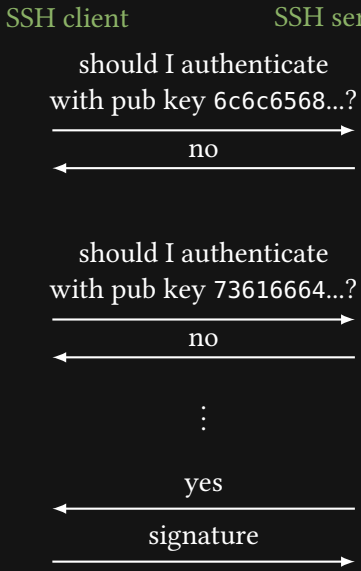

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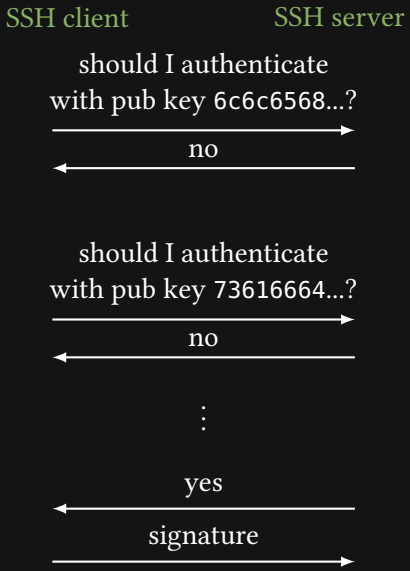

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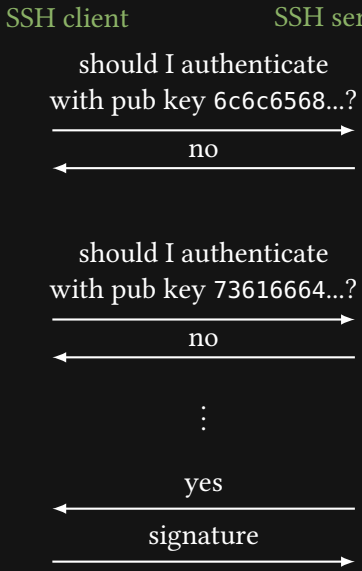

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- and can **prove it!** ⇒ authentication not deniable
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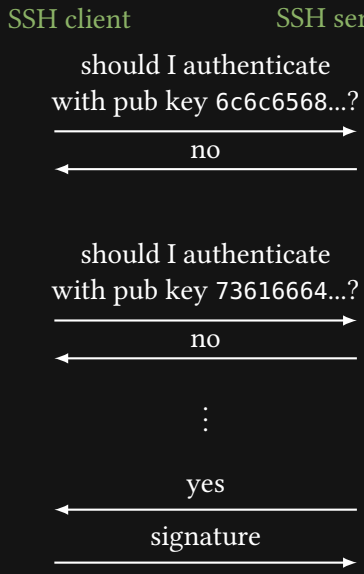

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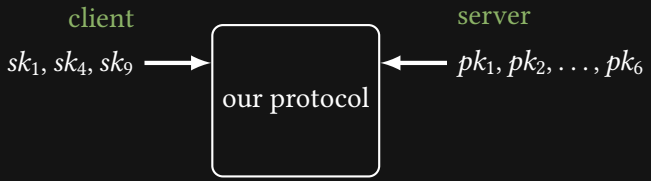
problem: server can act as honeypot:

- accept *any* key, even ones never seen before
- fundamental to protocol

our new authentication method: big picture



- can include any mixture of existing RSA, ECDSA, EdDSA keys, in a single authentication attempt

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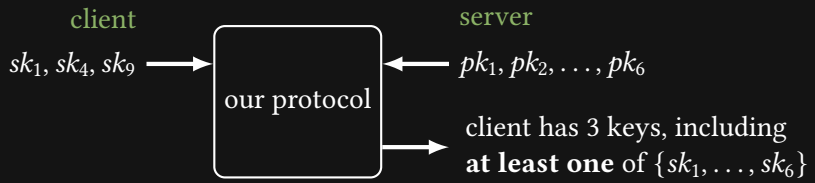

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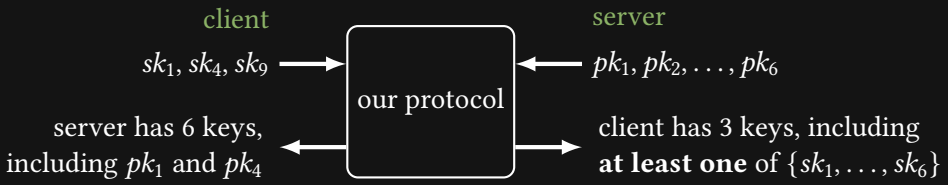

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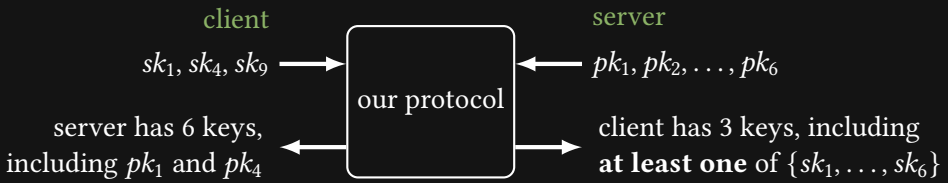

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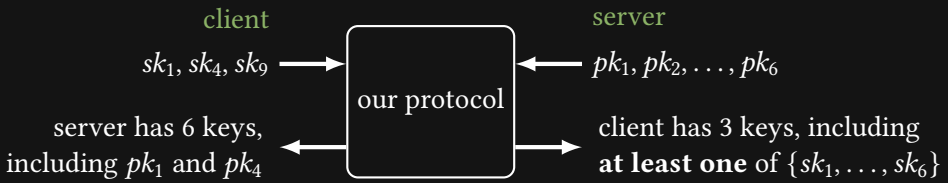

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- does not depend on site-specific configuration; both parties can just safely use all their keys
- client won't connect unless server **knows** and **explicitly includes** one of client's keys

technical overview

client (with $\{sk_i\}_i$):

server (with $\{pk_j\}_j$):

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server (with $\{pk_j\}_j$):

$c, \{m_j\}_j \leftarrow \mathsf{Enc}\Big(\{pk_j\}_j\Big)$

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address ciphertext to $\{pk_j\}_j$;
sk_j decrypts c to m_j;
c hides pk_j recipients

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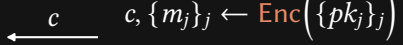

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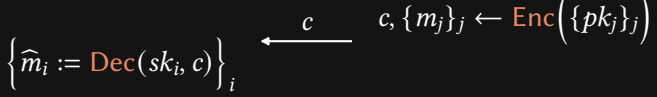

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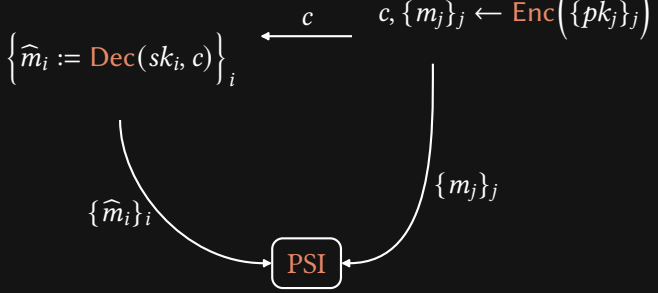

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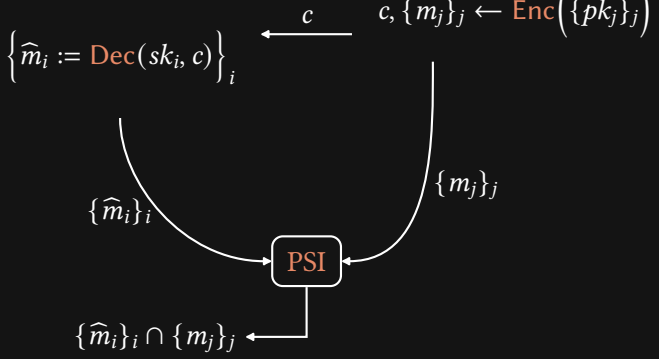

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each party has set of items;
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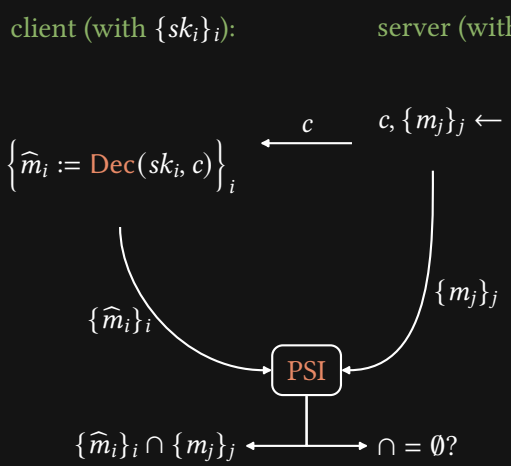

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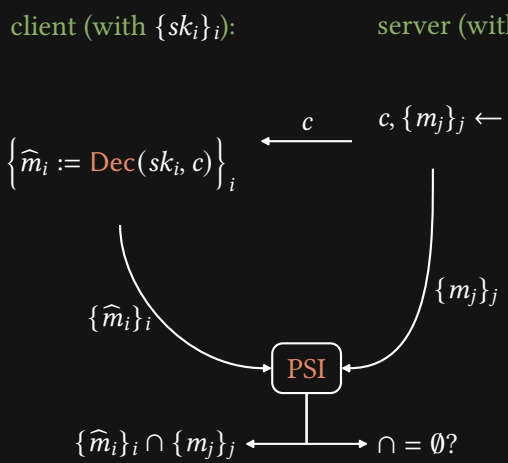
technical overview & contributions



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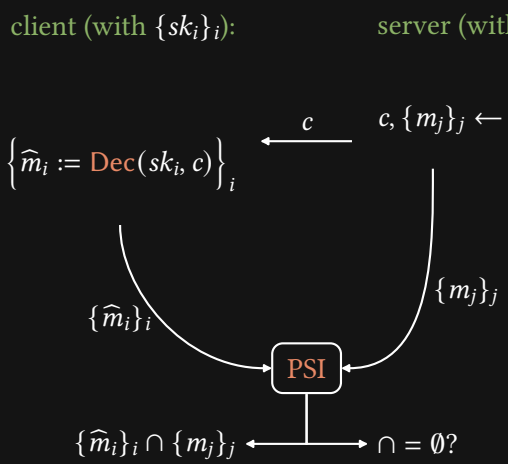

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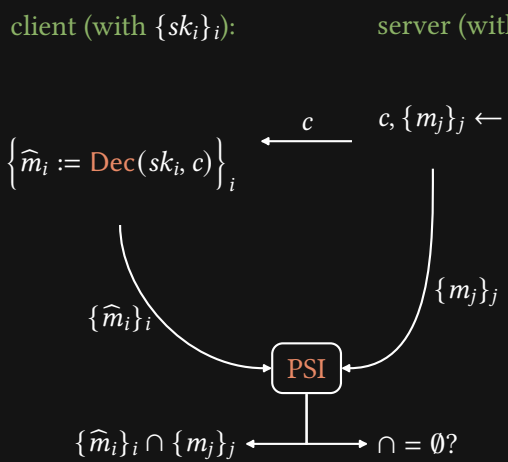

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+ full UC security analysis

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client	server		

2 commodity desktop computers on LAN

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5	10	60 ms	9 ms

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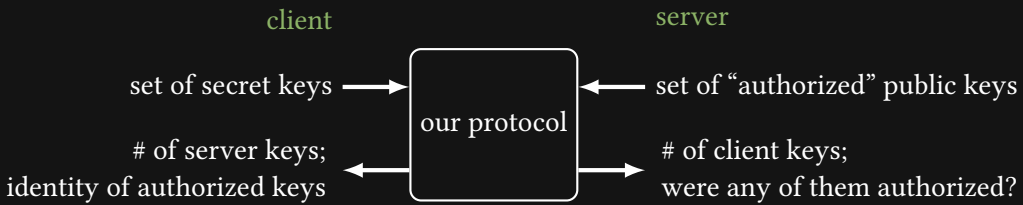

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