Secure Internet Live Conferencing

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What is it about?

Protocol for **authenticated** and **encrypted**
Live Conferencing

Supports chat and instant messenger like systems.

/join 20C3

Agenda

- History/Future of SILC
- Protocol
- Using SILC
- Software
- Silc network

History

- designed by Pekka Riikonen, started '96
- work stopped several times
- 1st public release in 2000,
- SILC-client 1.0 Oct. 2003
- currently maturing of protocol
- protocol specs submitted to IETF, currently in a draft phase (will become RFC soon)
- Version 1 of silcd, toolkit to follow soon

The Protocol

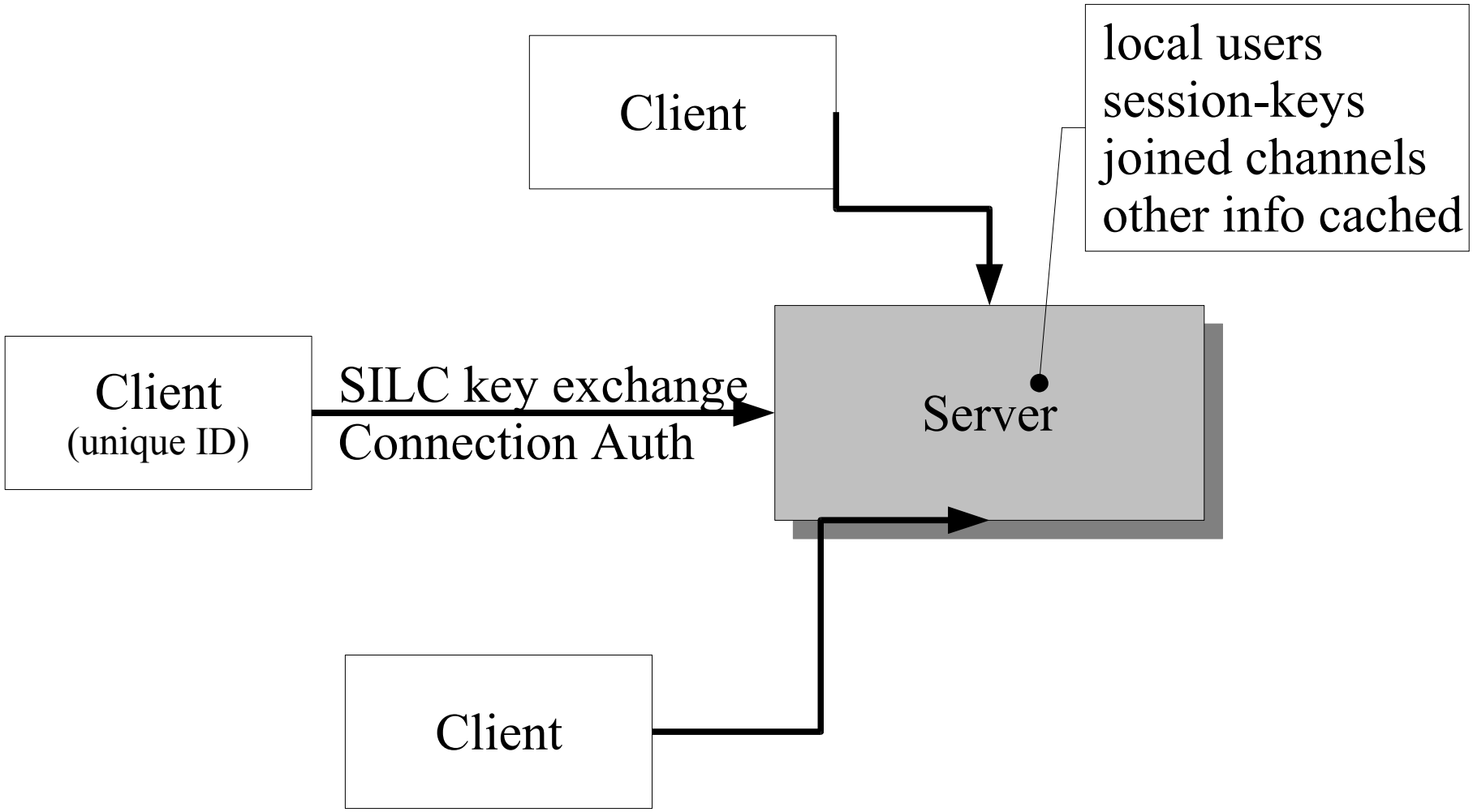
The Protocol

Key-Features:

- **all** messages are **encrypted** and **authenticated**
- Keys managed by server or user
- messages are sent through server-net
- File transfer via sftp

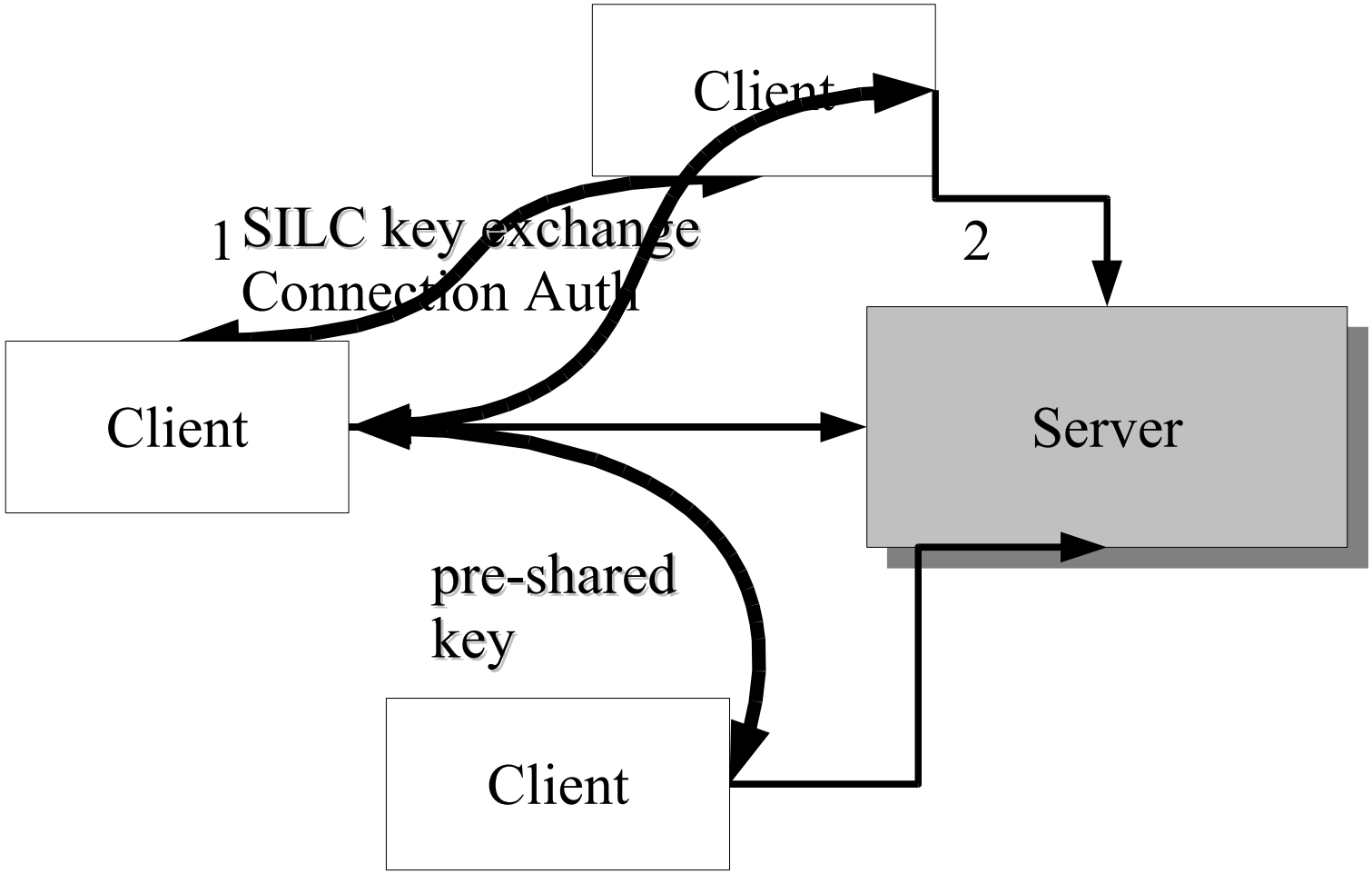
Network Topology

normal client traffic



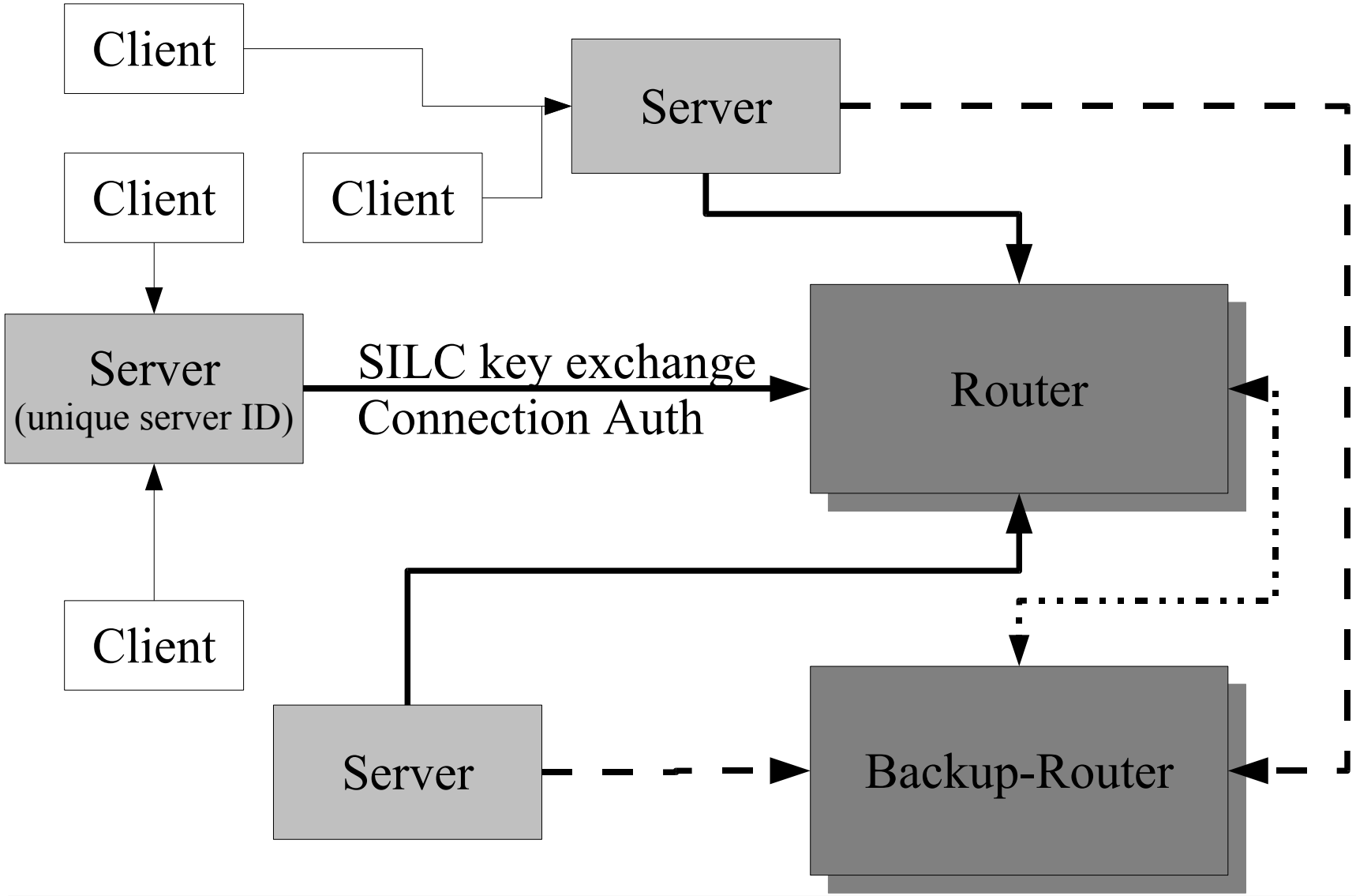
Network Topology

client-client traffic



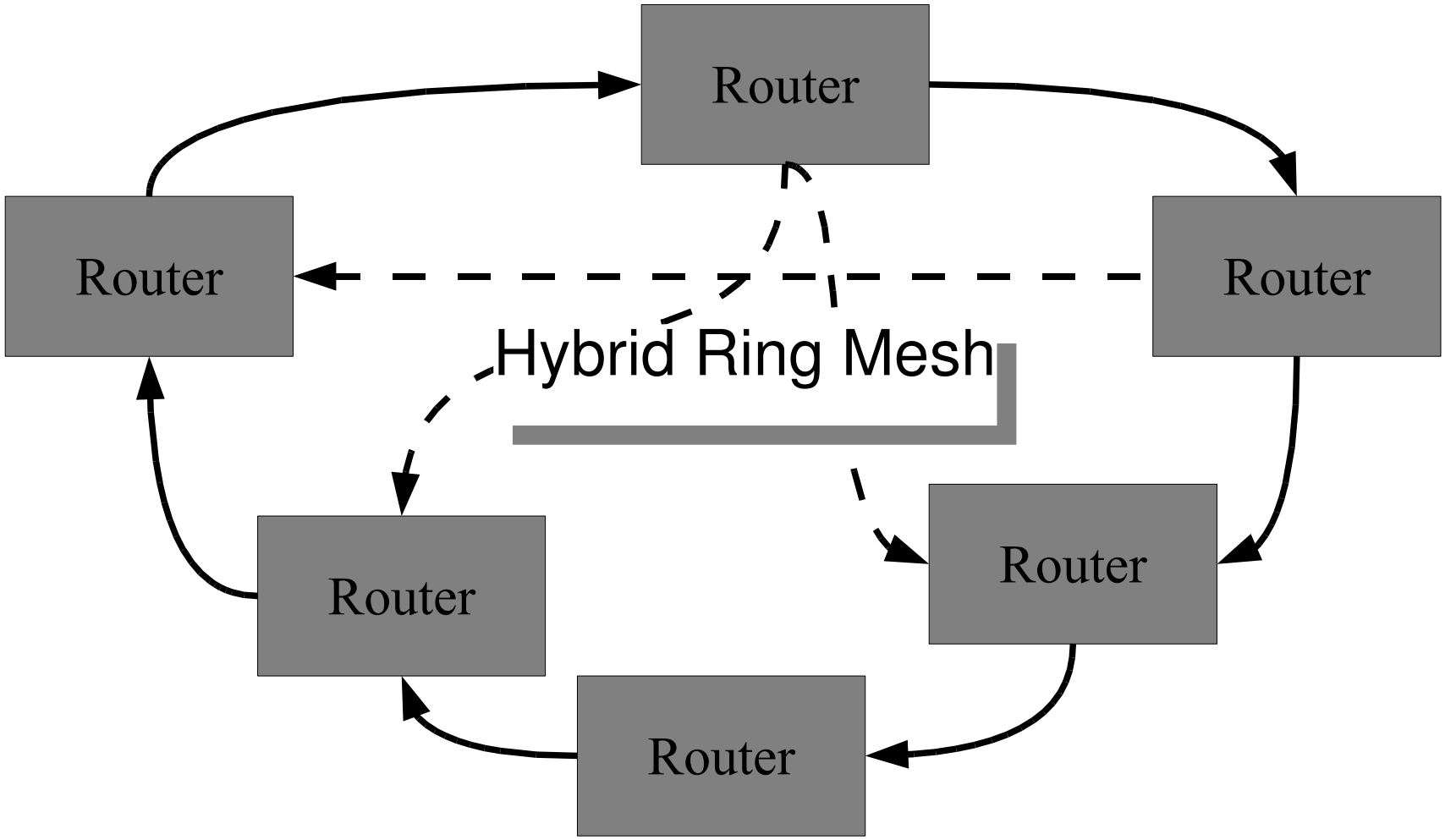
Network Topology

server-router traffic, Cell

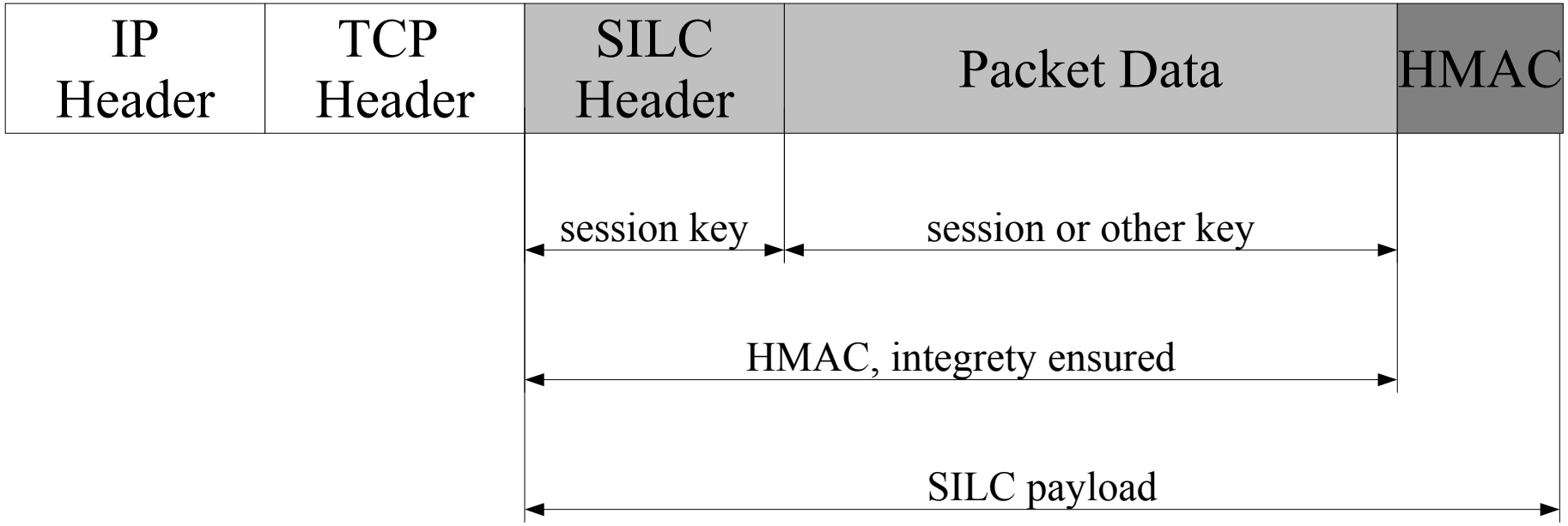


Network Topology

router-router traffic



Packet format overview



SILC Key Exchange (SKE)

(1) initiator sends properties (cipher, hash function, HMAC function, public key algorithm)

(2)responder selects properties

(3)Diffie-Hellman key exchange
exchange public keys too

(4)mutual authentication mode

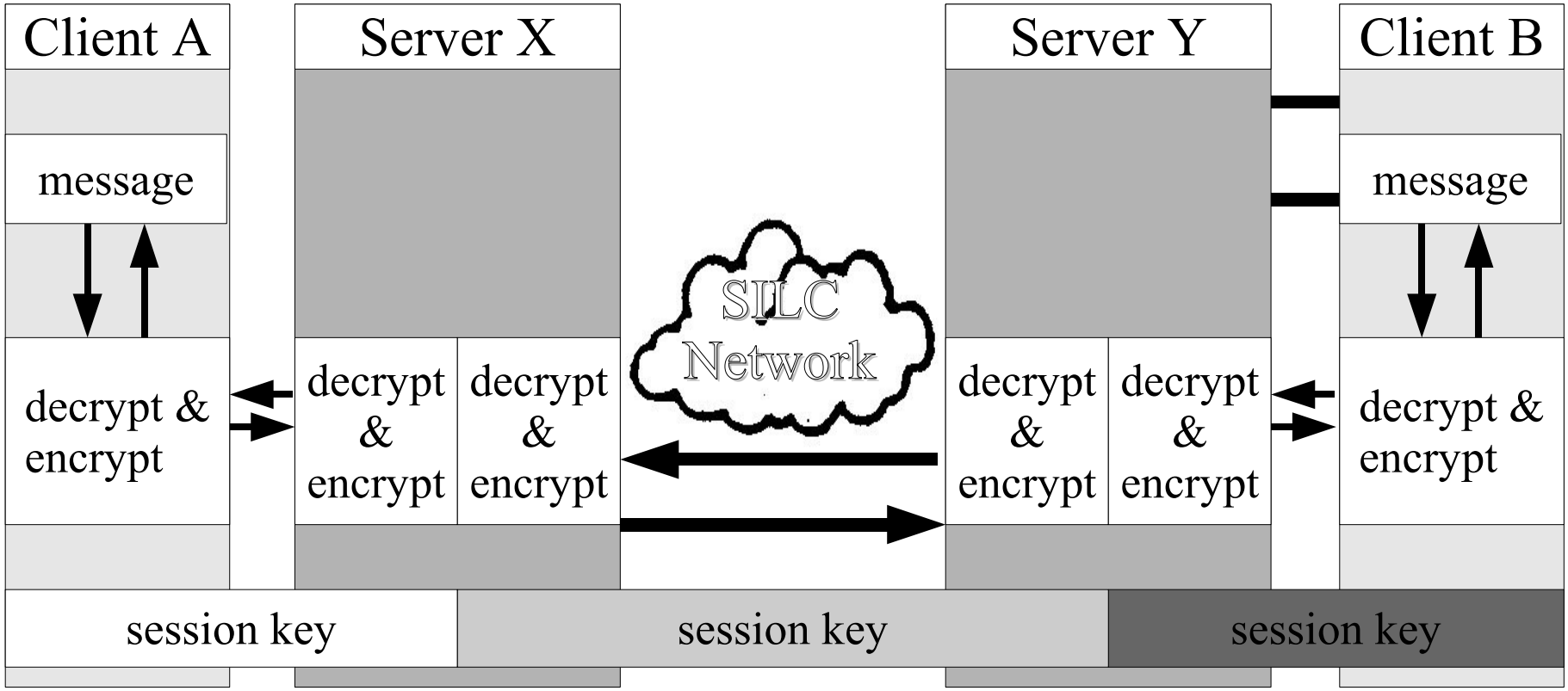
Result: Session key

SILC Connection Authentication

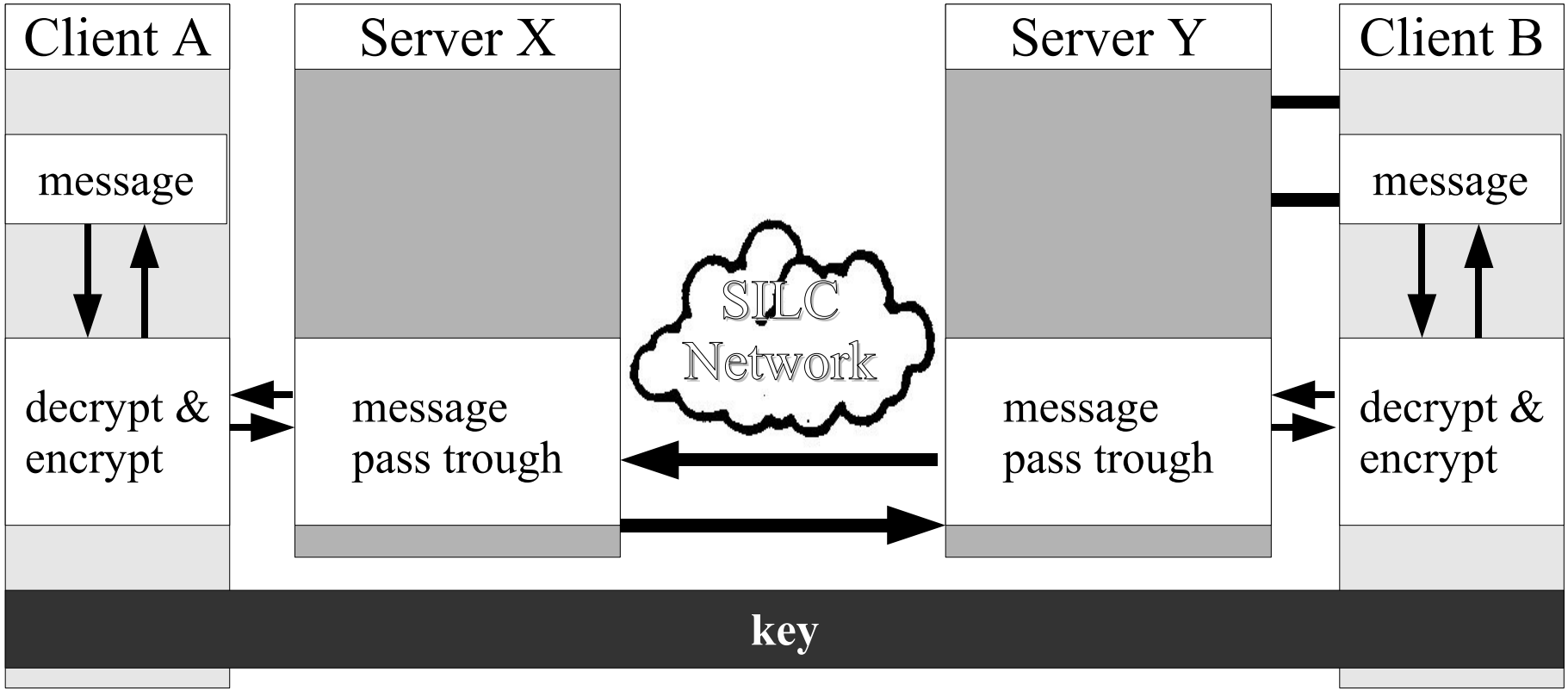
- Done right after SKE
- Authenticate connecting parties (e.g. client to server)
- based on
  passphrase (packet encrypted) or
  public-key (challenge sent to client)

Result: authenticated client

Private Message w/ Session Keys



Private Message w/ Private Key



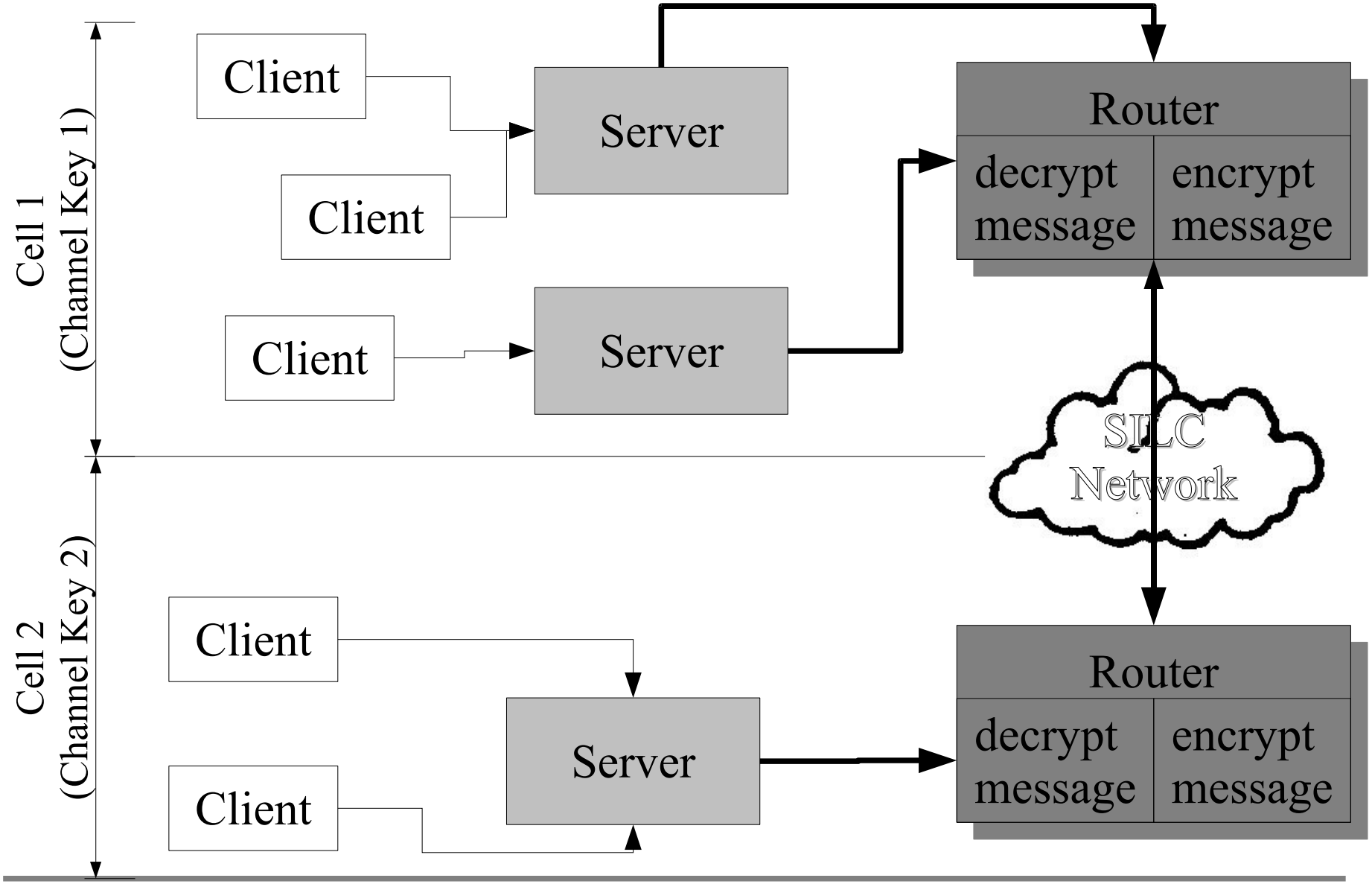
Channels

- Named group, all joined clients receive messages
- Channel names are unique, max. 256 characters

Channel Message Delivery

- All messages in a **cell** are encrypted and authenticated by one channel key
- Messages between cells are encrypted by session key
- regular re-keying
- in addition: key is generated if channel is founded or client joins or leaves
- Private Keys are possible (passphrase, publickey)

Channel Message Delivery illustrated



Using SILC

Using SILC: Nicks

- no unique nick names
- no nick services (avoid nick wars)
- authenticated and identified by public key
- attributes and present modes
- other useful modes
  - blocking non op msgs
  - blocking private msgs
  - marking / blocking bot msgs
  - reject watching

Using SILC: Channels

- joining and founding a channel (save your key!!!)
  `/cmode +f channel`
- no channel services needed (takeovers are difficult)
- can be private, secret, moderated, invite only, limited
- setting channel keys

Using SILC: Channel w/ secret

- get key by mail, phone, ...

```
/JOIN channel
/CMODE +k
/KEY CHANNEL channelname set secret
```

- must be done by each client
- => UserD (and server admin) cannot see msgs

Using SILC: Channel w/ public channel keys

- get key by mail, `/getkey`, ...

```
/JOIN channel

/CMODE channel +C +pubkeyUserA \
    +pubkeyUserB +pubkeyUserC
```

- UserB and UserC join w/ `/JOIN channel -auth`
- => UserD (and server admin) cannot see messages

Using SILC: Messaging

- msgs can be signed (use `/SMSG`)

```
[?] fukami: signed msg, you don't have the key
[S] fukami: signed msg, you've got the key
```

- MIME msgs

```
/SCRIPT LOAD silc-mime.pl
/MMSG -CHANNEL channelname path/to/file
```

- private msg protection with keys

Using SILC: Securing priv msgs

- shared secret by phone, mail, letter ...

```
/KEY MSG UserA set secret
/KEY MSG UserB set secret -responder
```

- => secured communication

Using SILC: File Transfer

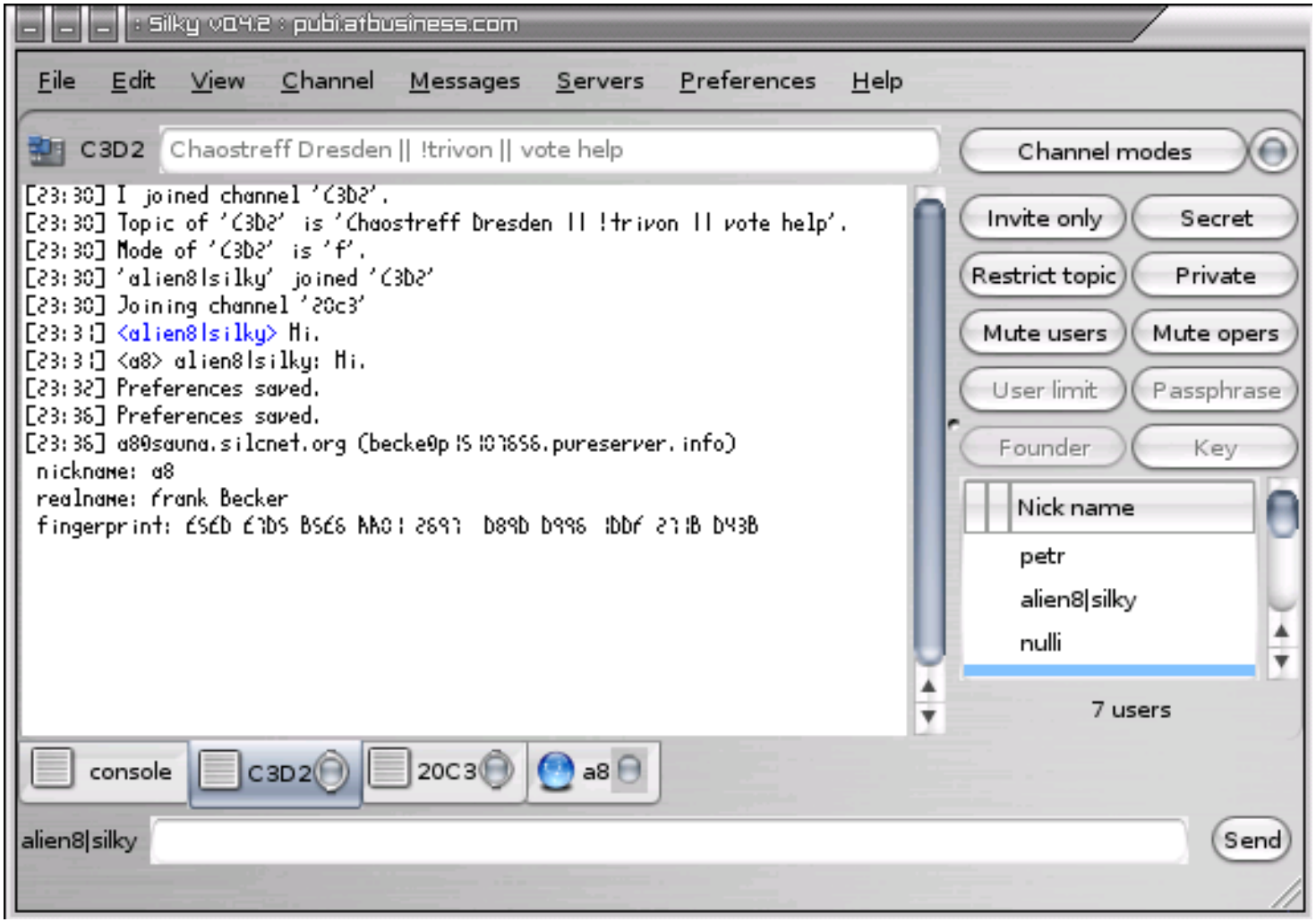
- send file p2p using sftp

```
/FILE SEND path/to/file UserB
/FILE ACCEPT UserB
/FILE CLOSE (to close session immediately)
```

use `-no-listener` if behind NAT

Programmes and Frameworks

- silcd
- silc-client
- silc-toolkit
- Silky
- jsilc
- samadhi



SILC Network

- Connect to a server next to you
- silc.silcnet.net is round-robin DNS to all the SILCNet servers
- multiple server connections are possible

few Credits

- Pekka Riikonen (Main developer, SILCNet coordinator/administrator)
- Timo "cras" Sirainen (Irssi/SILC client)
- Jochen "c0ffee" Eisinger (SILC plugin)
- Toni Willberg (Silky)
- Giovanni Giacobbi (silcconfig,silclog, silcd bugfixes, RPM packages)
- Lubomir "salo" Sedlacik (NetBSD package, project server administrator)
- Tamas Szerb (Debian packages)
- Mika "Bostik" Boström (Man-pages, Bughunting)
- Juha Räsänen (ElGamal implementation)
- Ville Räsänen (Client side of STATS-command, Some ROBXOdoc formatting, Bughunting)
- Patrik Weiskircher (whois attributes, bugfixing)

Links

- Home of SILC: manuals, FAQs, white papers, pre-compiled packages of silcd, silc-client (rpm, deb) and much more: http://silcnet.org
- Irssi-plugin: http://penguin-breeder.org/silc/
- Silky: http://silky.sf.net
- Ports for NetBSD, FreeBSD, OpenBSD, Darwin