KillrChat Presentation

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KillrChat presentation

DATASTAX

What is KillrChat ?

- scalable messaging app

Why KillrChat ?

- show real life de-normalization
- provide real application for attendees
- highlight Cassandra eco-system

Technology stack

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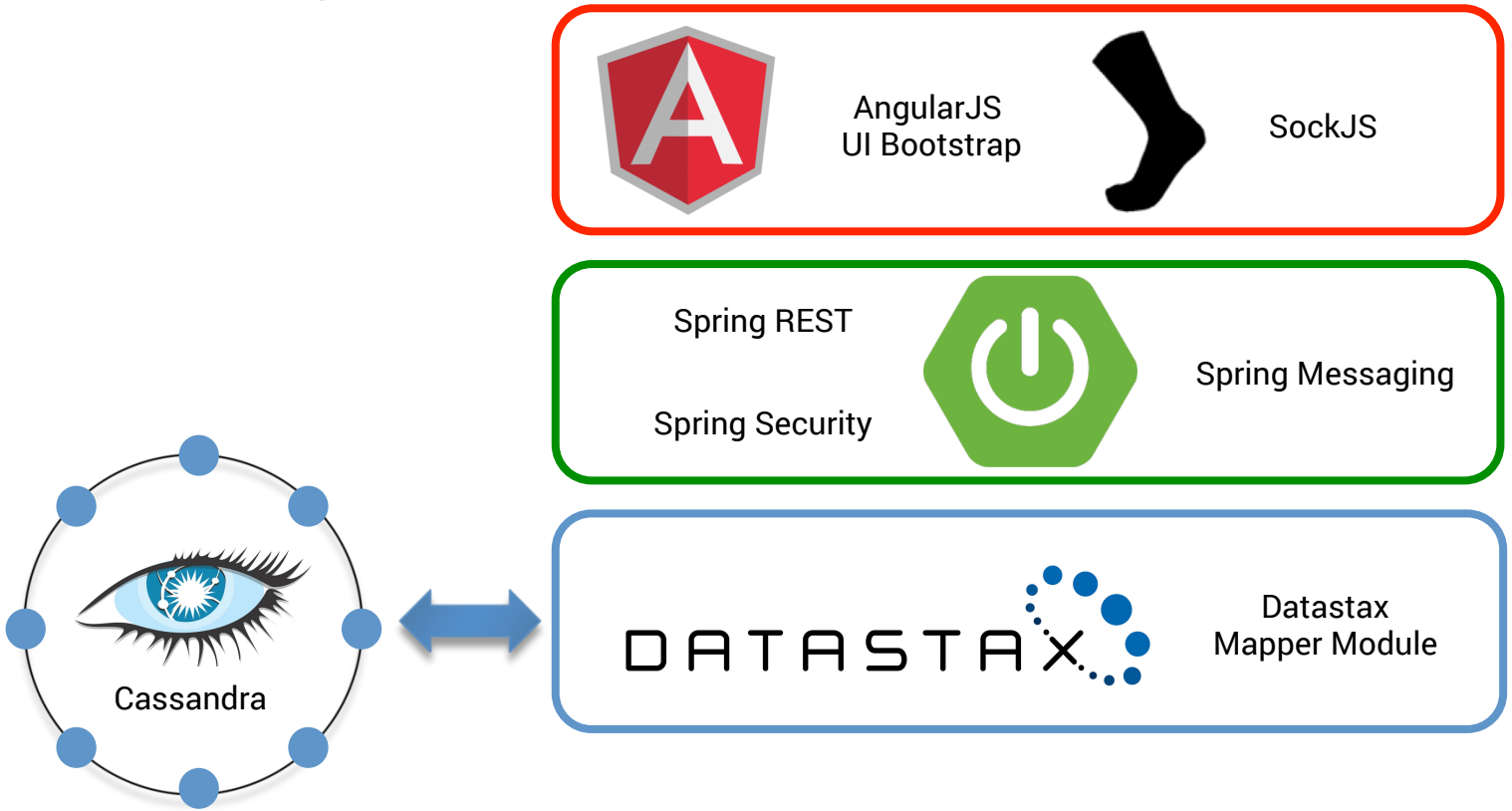
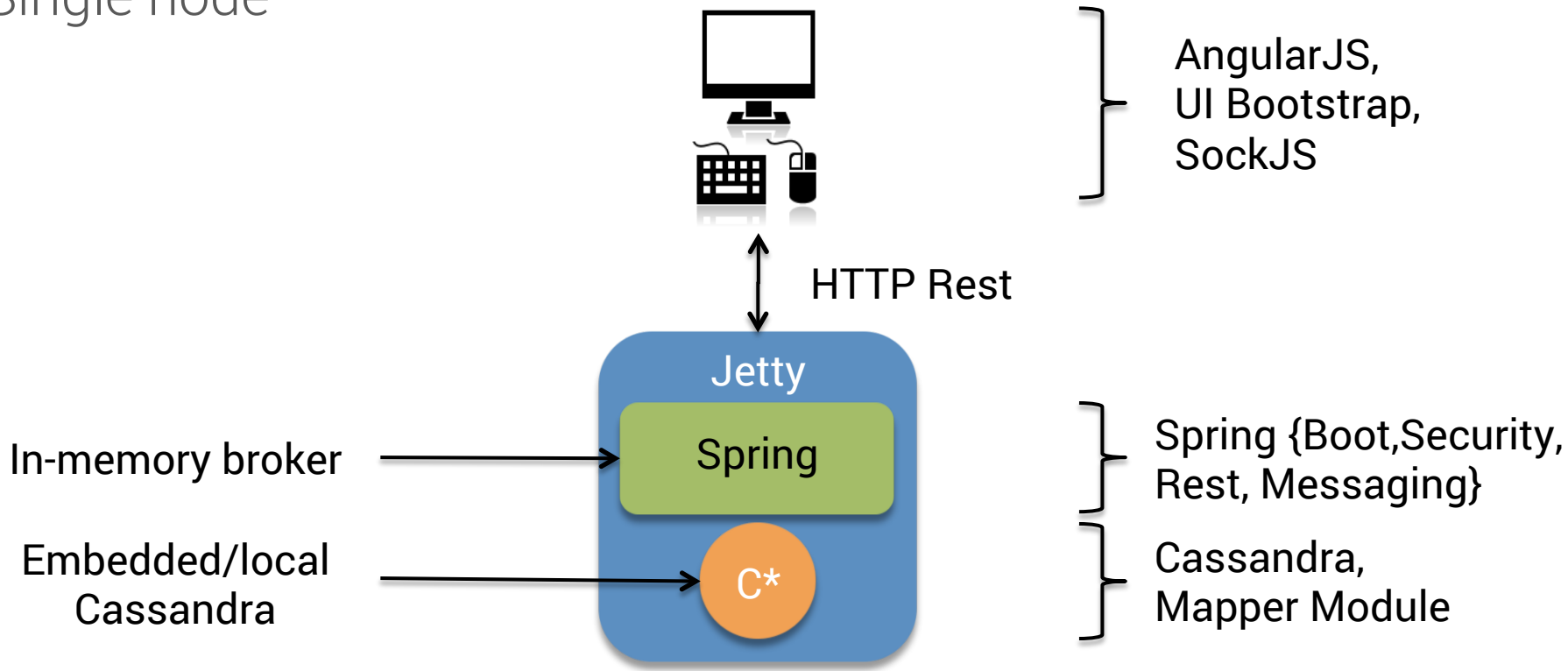


Architecture

Single node



Architecture

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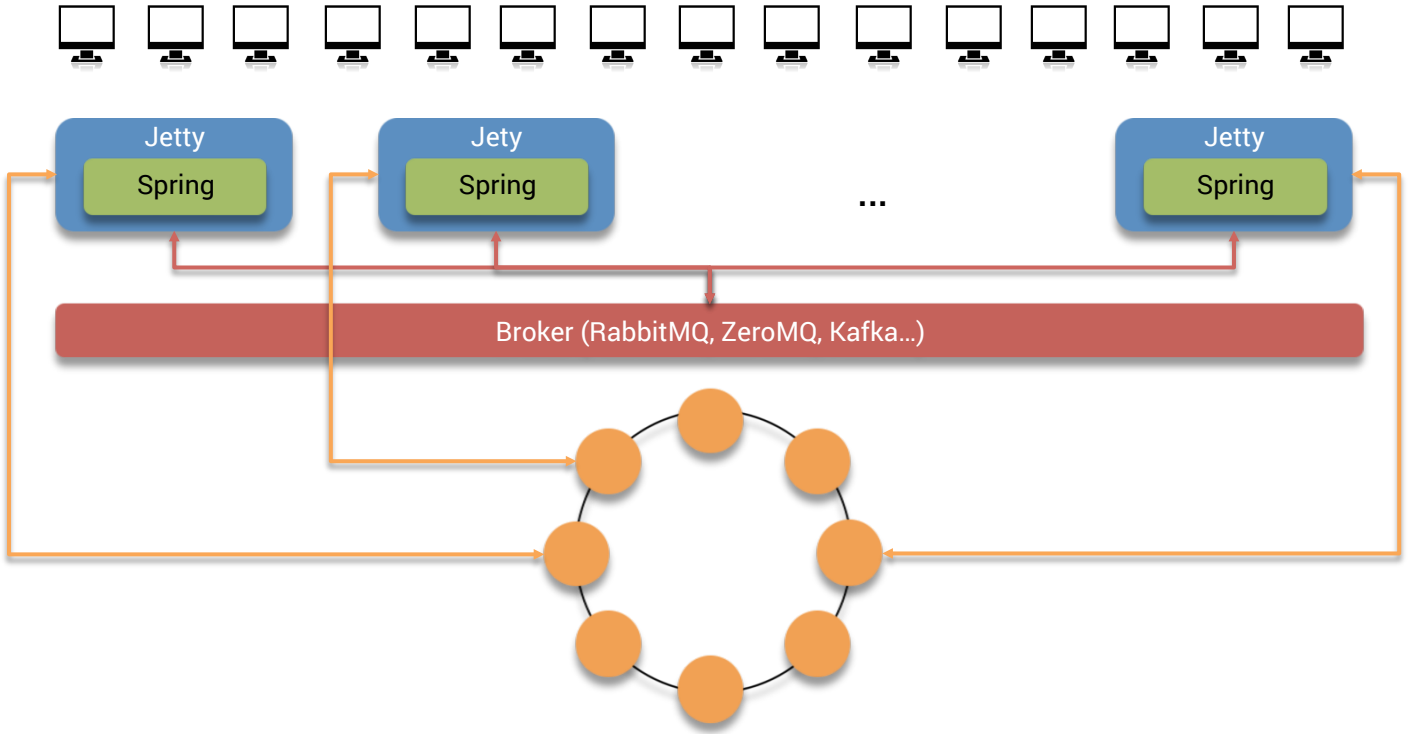
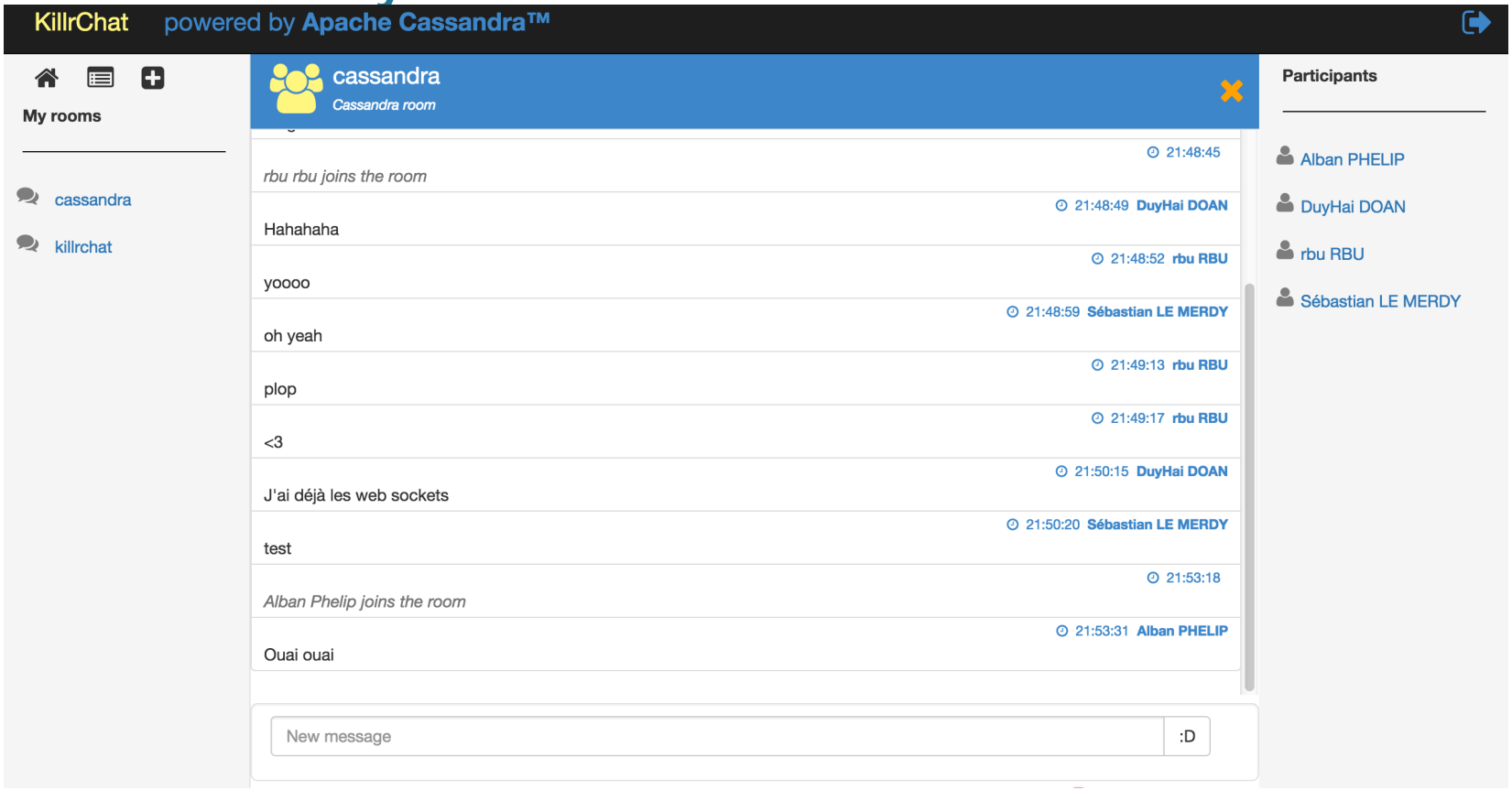
Scaling out



Front end layout



Where can I have it ?

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Clone the Git repository

```
git clone –b CassandraDayParis https://github.com/doanduyhai/killrchat.git
```

Go into the *'killrchat'* folder and launch tests

```
cd killrchat
mvn clean test
```

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User Account Management

Scalability

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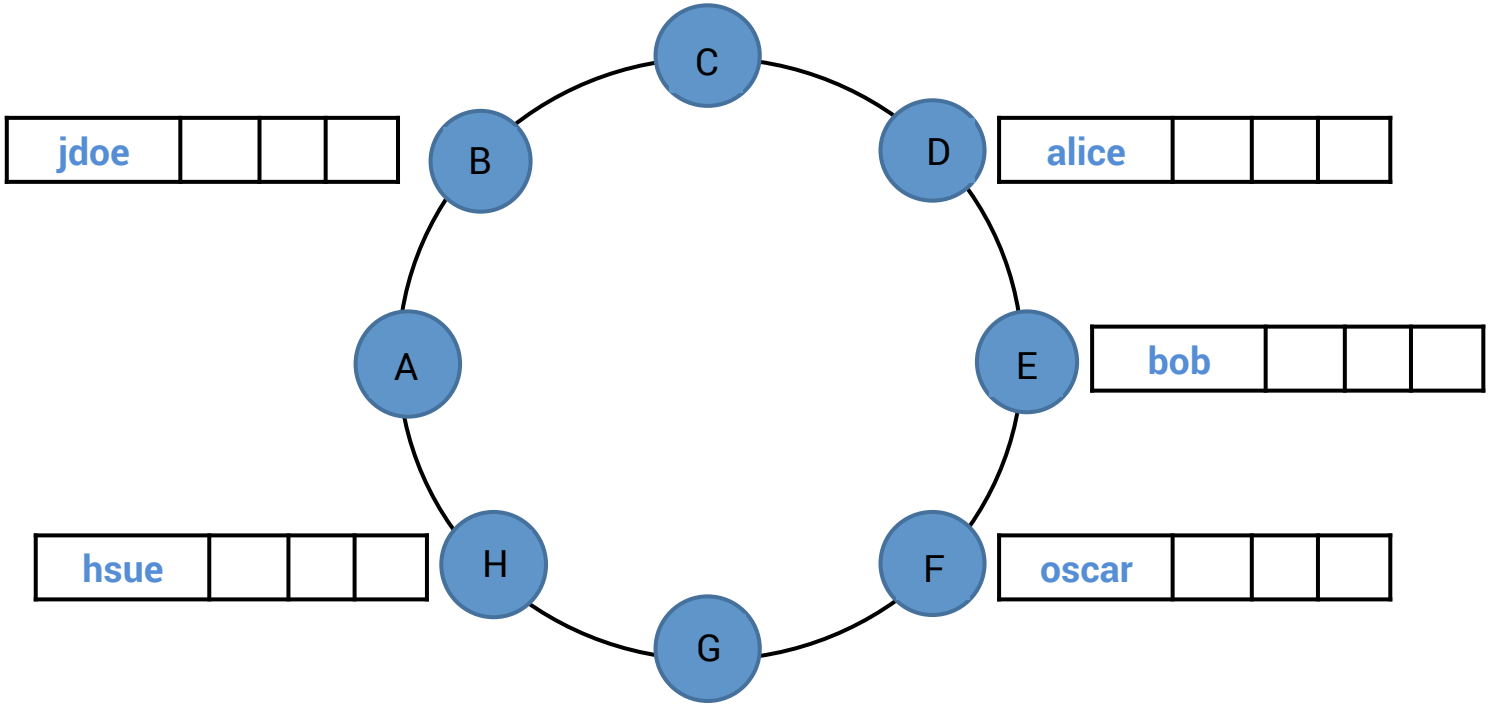
Scaling by login



Data model

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```
CREATE TABLE killrchat.users(
        login text,
        pass text,  //password is not allowed because reserved word
        lastname text,
        firstname text,
        bio text,
        email text,
        chat_rooms set<text>,
PRIMARY KEY(login));
```

User’s chat rooms

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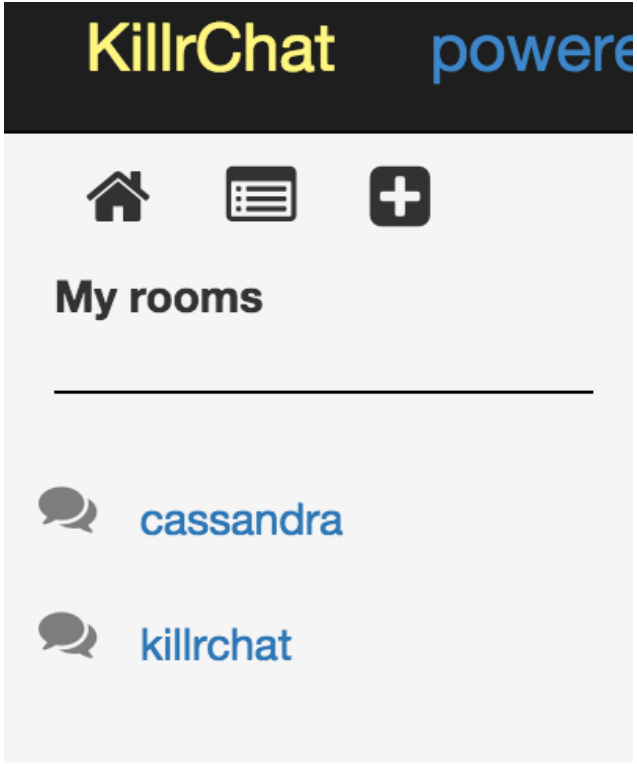

User's chat rooms data model

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How to store chat rooms for an user ?

```
CREATE TABLE killrchat.user_rooms(
        login text,
        room_name text,
PRIMARY KEY((login), room_name));
```

- pros: can store huge room count per user (10^6)
- cons: separated table, needs 1 extra SELECT

User's chat rooms data model

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Best choice

```
CREATE TABLE killrchat.users(
    login text,
    ...
    chat_rooms set<text>, //list of chat rooms for this user
PRIMARY KEY(login));
```

- 1 SELECT fetches all data for a given user
- usually, 1 user is not in more that **1000** rooms at a time
- stores only room name

Lightweight Transaction

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Avoid creating the same login by 2 different users ?

☞ use Lightweight Transaction

```
INSERT INTO killrchat.users(room_name, …)
VALUES (‘jdoe’, …) IF NOT EXISTS ;
```

Expensive operation

☞ do you create a new account every day ?

Demo

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Chat Room Data Model

Scalability

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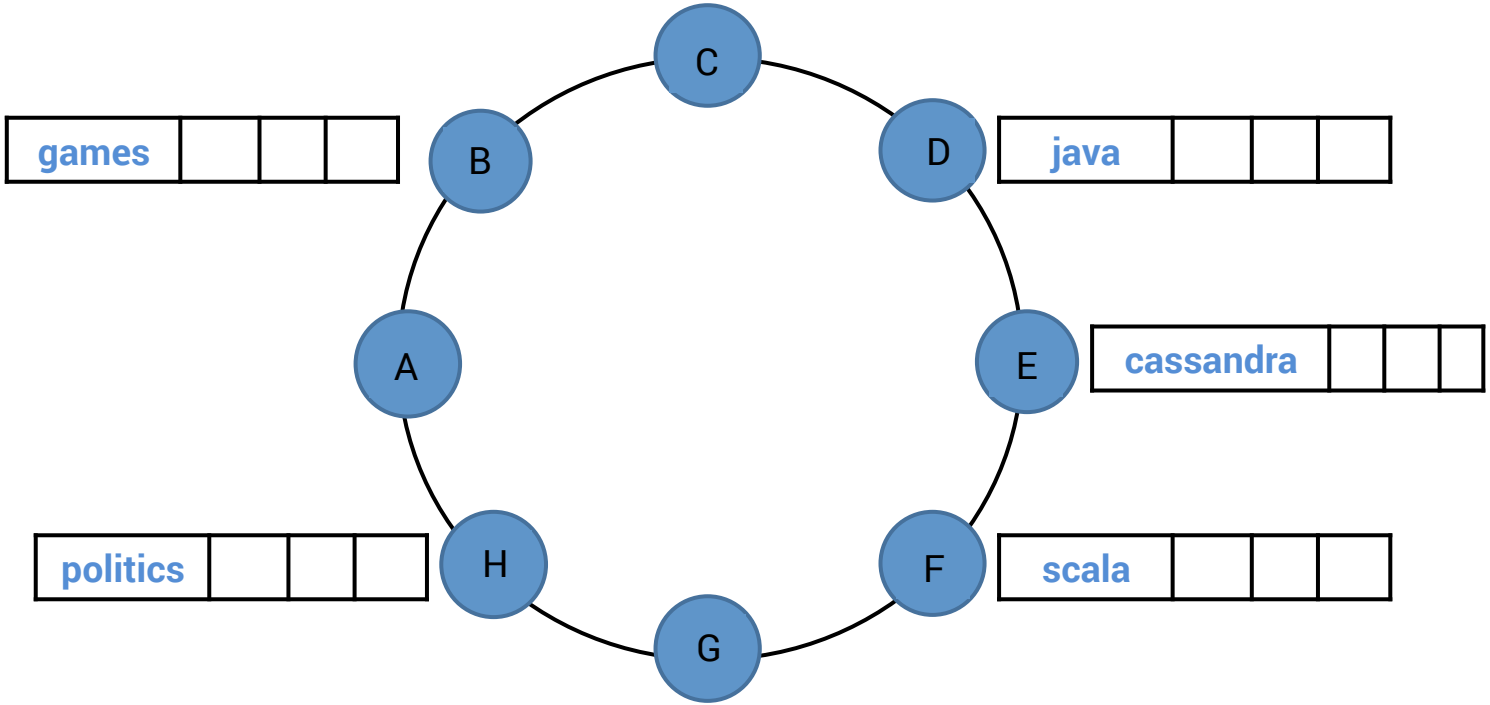
Scaling by room name



Data model

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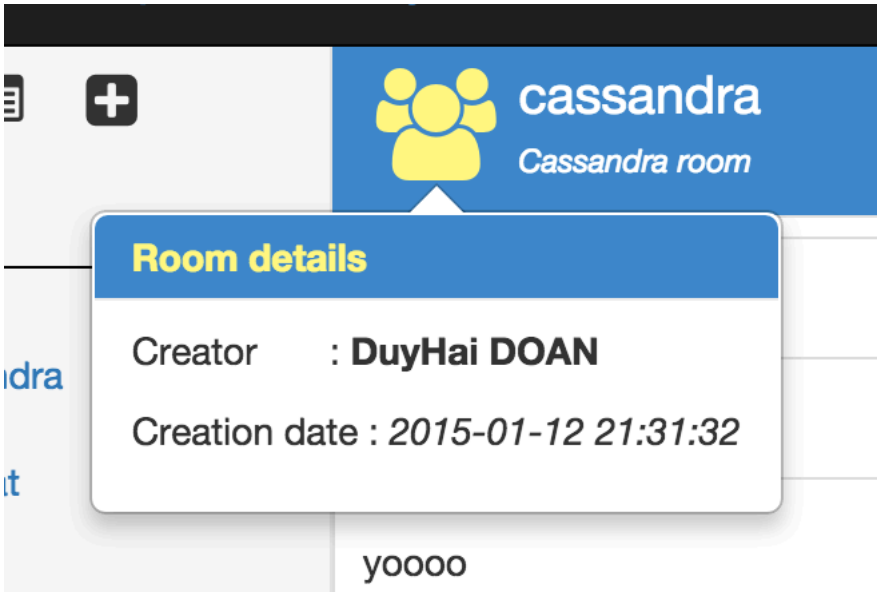
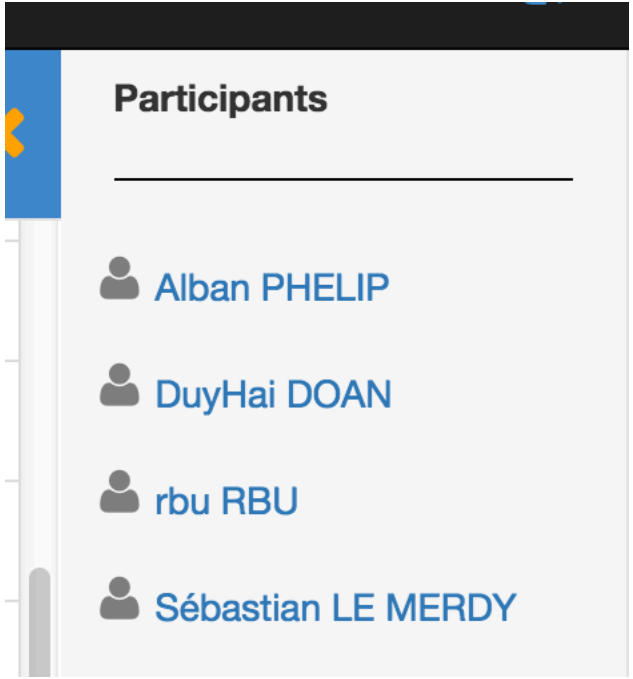
```
CREATE TABLE killrchat.chat_rooms(
        room_name text,
        creation_date timestamp,
        banner text,
        creator ???,
        creator_login text,
        participants ???,
PRIMARY KEY(room_name));
```

Room details



Room participants



De-normalization

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```
CREATE TYPE killrchat.user(
        login text,
        firstname text,
        lastname text);

CREATE TABLE killrchat.chat_rooms(
        ...
        creator frozen<user>,                   // de-normalization
        ...
        participants set<frozen<user>>,         // de-normalization
PRIMARY KEY(room_name));
```

Lightweight Transaction

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Avoid creating the same room by 2 different users ?

☞ use Lightweight Transaction

```
INSERT INTO killrchat.chat_rooms(room_name, …)
VALUES (‘games’, …) IF NOT EXISTS ;
```

Demo

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Chat Room Management

Participants management

Room deletion

Participant joining

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Adding new participant

```
UPDATE killrchat.chat_rooms SET participants  = participants + {...}
WHERE room_name = 'games';
```

What if the creator deletes the room at the same time ?

Concurrent delete/update

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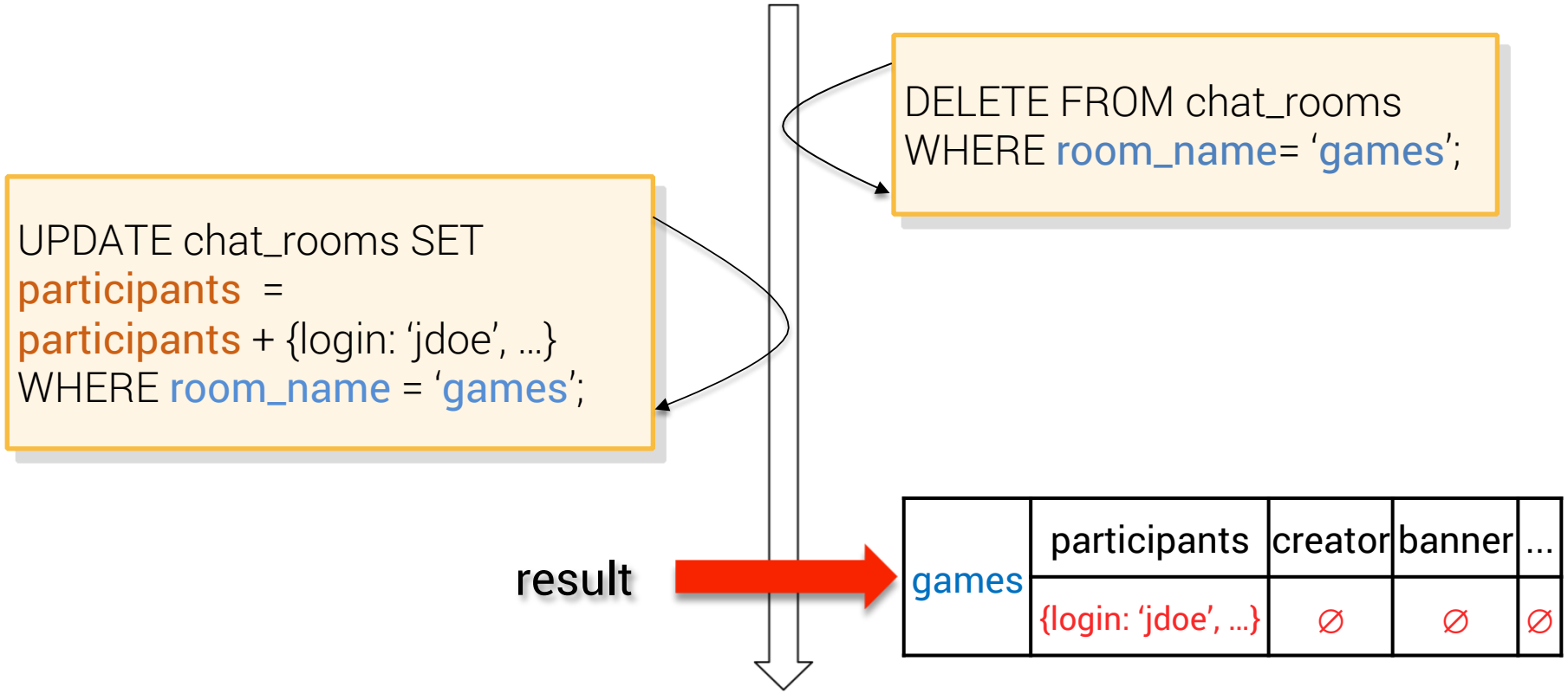

Participant joining

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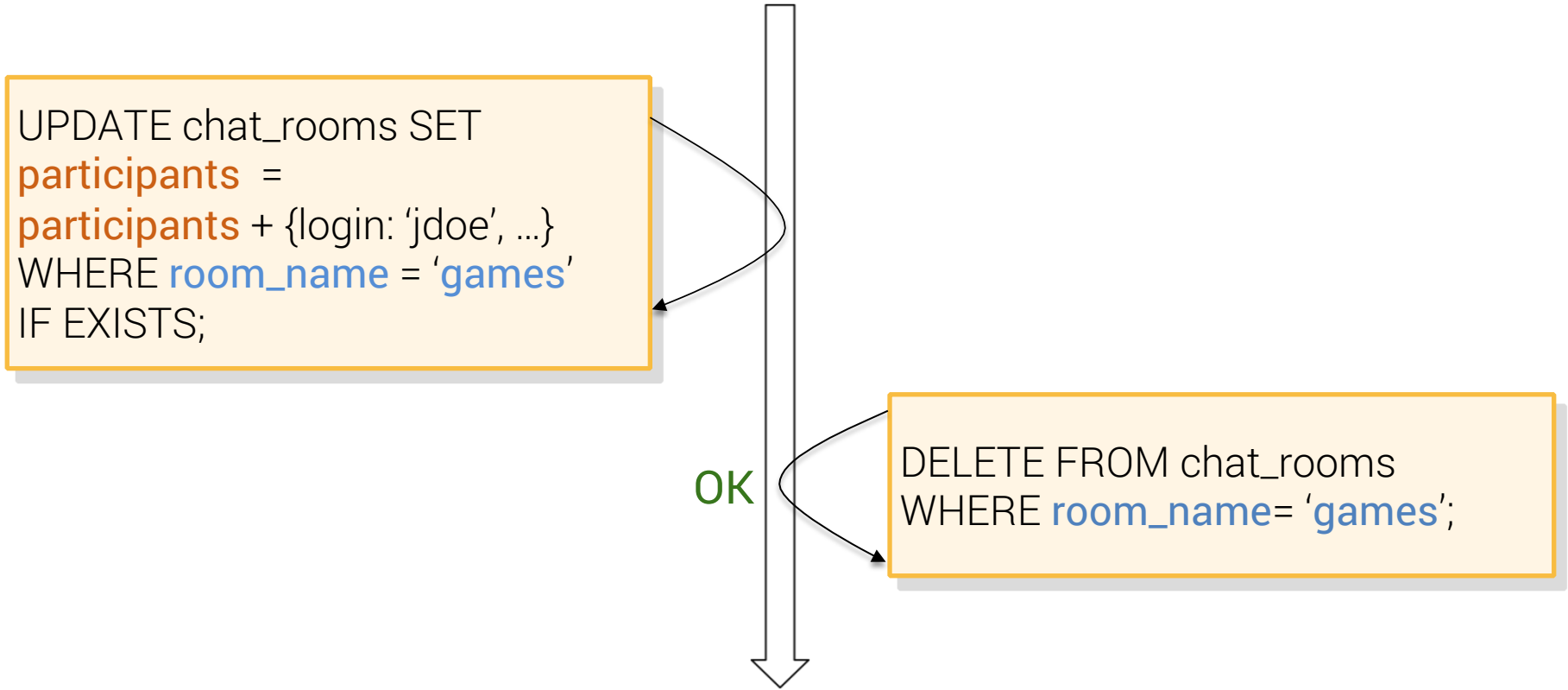
Solution

☞ use Lightweight Transaction

```
UPDATE killrchat.chat_rooms SET participants  = participants + {...}
WHERE room_name = 'games' IF EXISTS;
```

Concurrent delete/update



Concurrent delete/update

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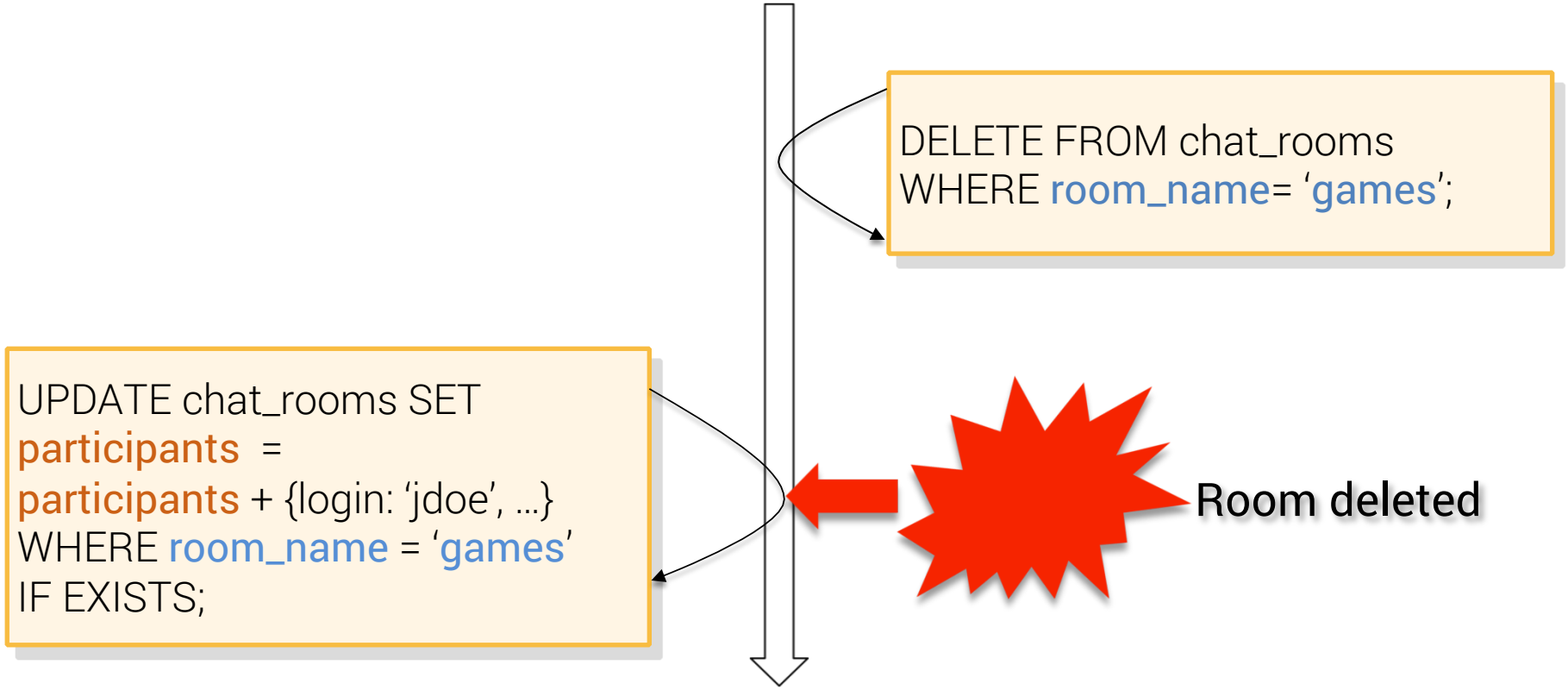

Participant leaving

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Removing participant (no read-before-write)

```
UPDATE killrchat.chat_rooms SET participants  = participants - {…}
WHERE room_name = 'games';
```

What if the creator deletes the room at the same time ?

- we'll create a tombstone
- tombstone will be garbage-collected by compaction

Concurrent delete/update

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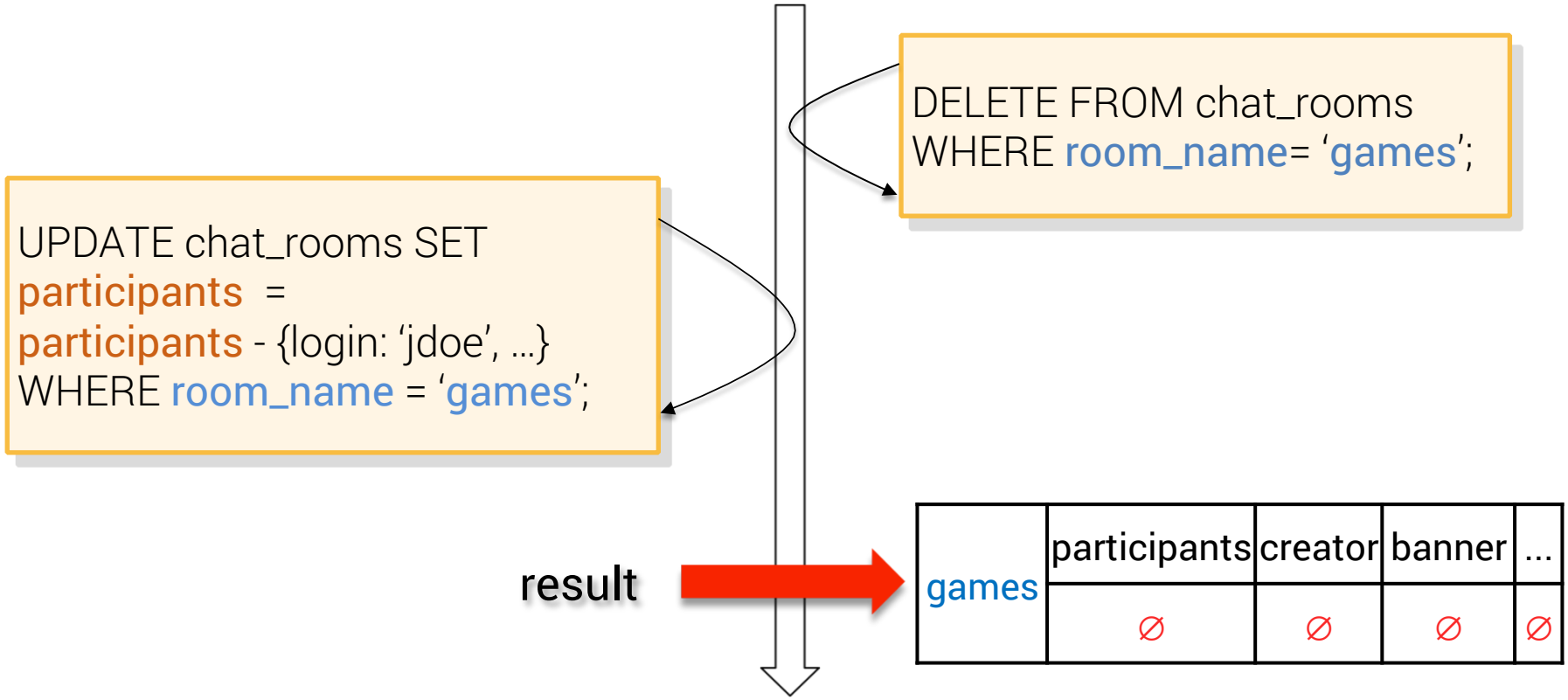

Deleting room

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What if participant leaving at the same time ?

- not a problem, tombstone will be garbage

What if participant joining at the same time ?

☞ use Lightweight Transaction

Only room creator can delete room, no one else!

☞ use Lightweight Transaction

Deleting room

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Solution

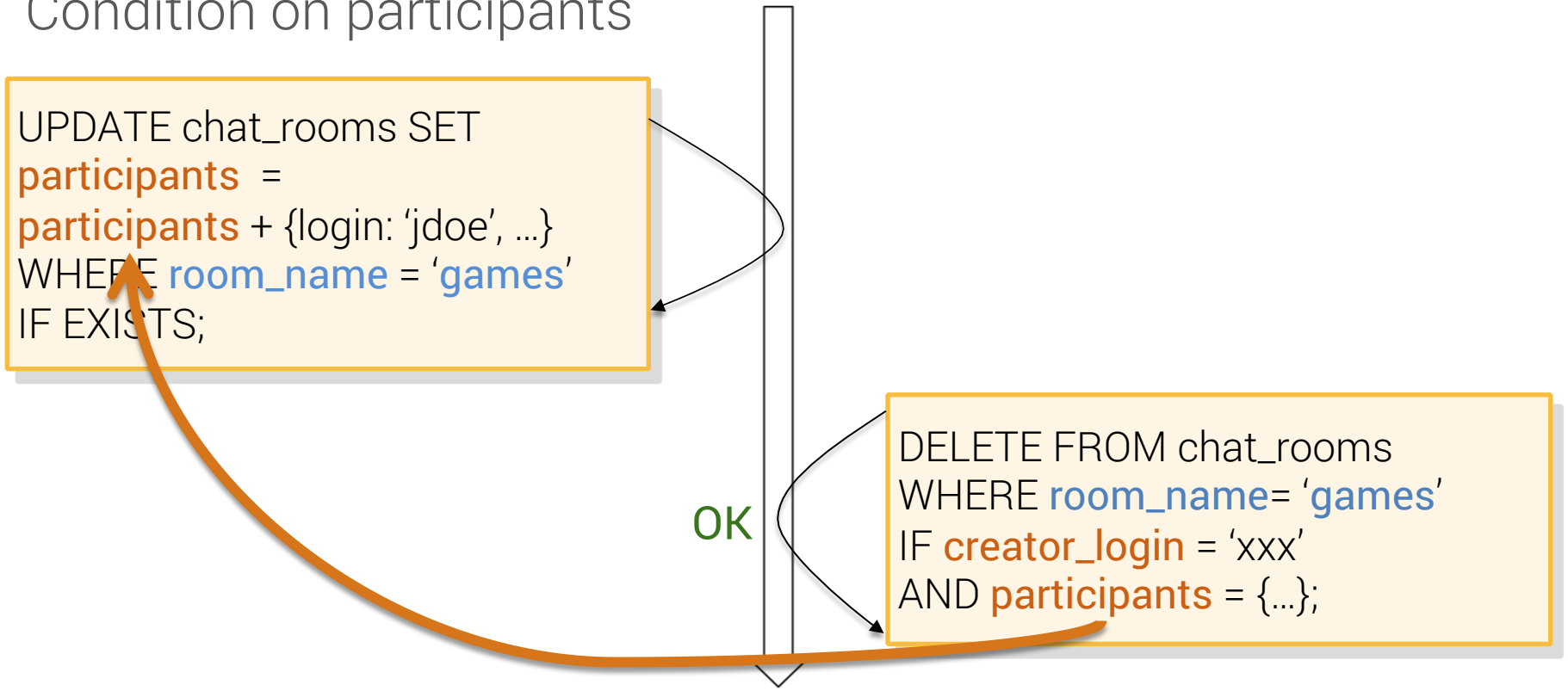
```
DELETE killrchat.chat_rooms
WHERE room_name = 'games'
IF creator_login = <current_user_login> AND participants = {...};
```

Condition on creator_login

- current user login coming from **security context**, no cheating !

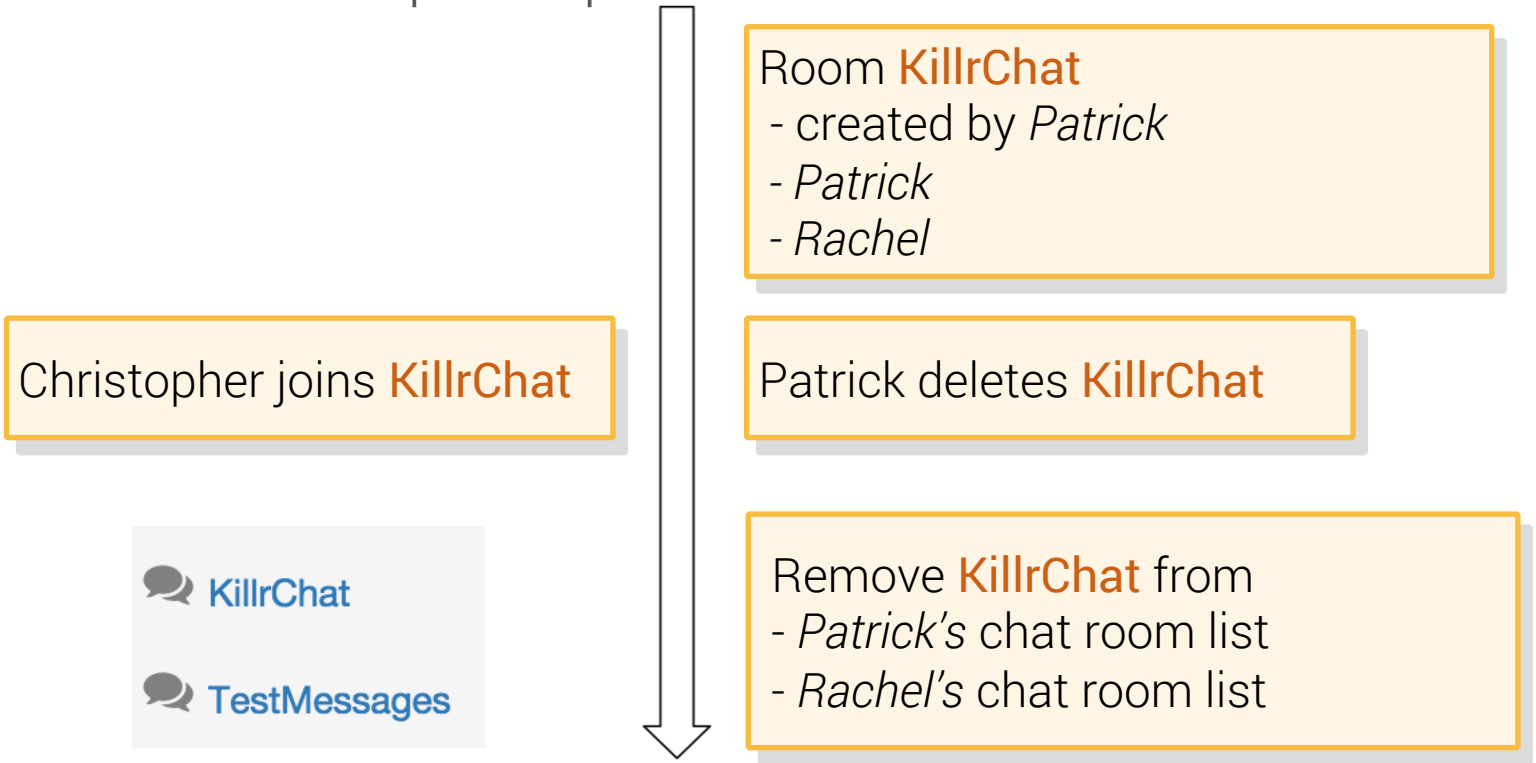
Deleting room

Condition on participants



Deleting room

Without condition on participants



Deleting room

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LightWeight Transaction is slow ....

... but how often do you delete rooms ?

Demo

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Chat Messages

Scalability

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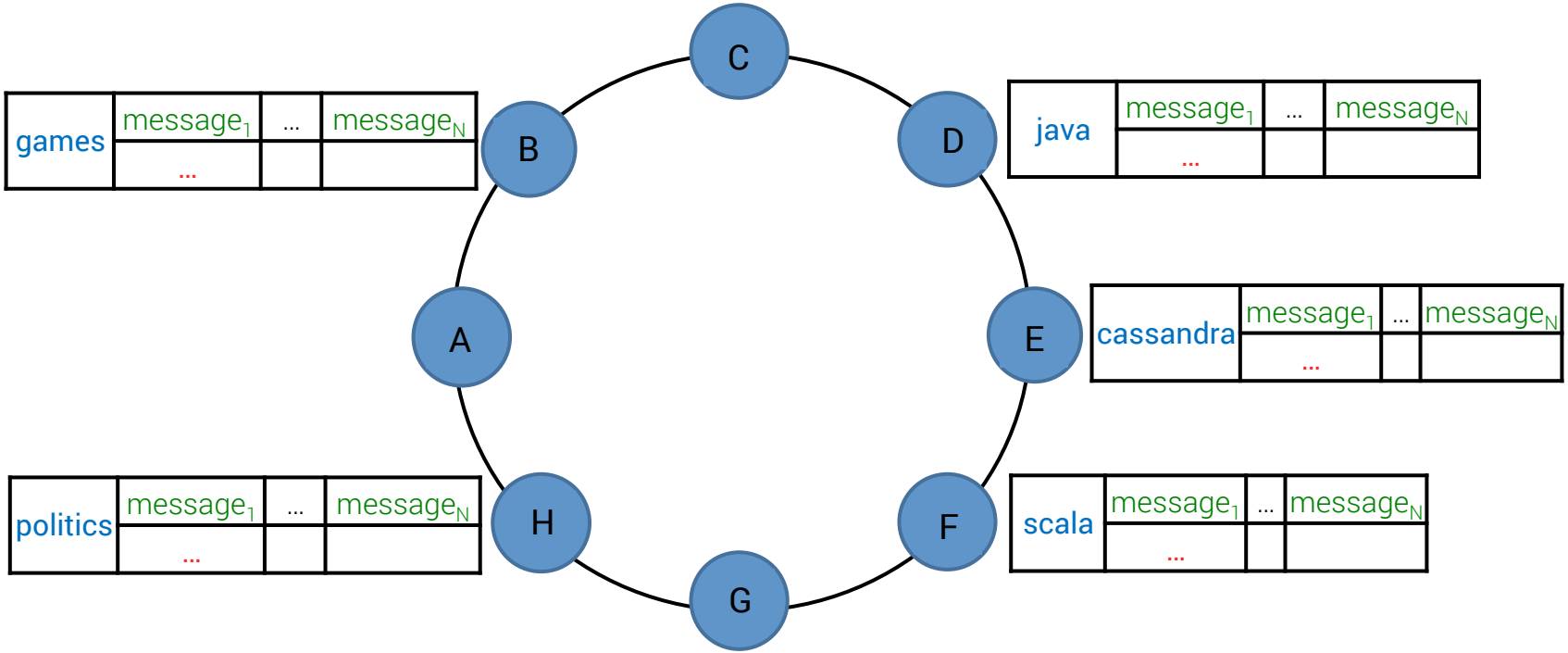
Scaling messages by room name



Data model

```
CREATE TABLE killrchat.chat_room_messages(
        room_name text,
        message_id timeuuid,
        content text,
        author frozen<user>,                    // denormalization
        system_message boolean,
        PRIMARY KEY((room_name), message_id)
) WITH CLUSTERING ORDER BY (message_id DESC);
```

Data model

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Clustering column **message_id** order by DESC

- latest messages first

Improvements

- current data model limits messages count to ≈ 500 x 10^6
- bucketing by day is the right design

PRIMARY KEY((room_name, day), message_id) *//day format **yyyyMMdd***

Demo

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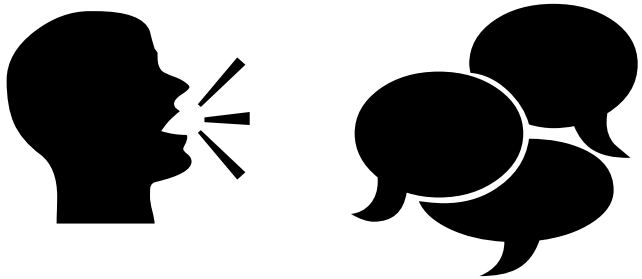

Q & R

Thank You

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