

Design Part 1

What is design?

give a higher level architecture and
design an entire system rather than
some individual components

What can we tell?

- an entire system
- a higher level architecture
- some individual components

What should we do?

- Ask about details that you care
- Give yourself one minute, do not hurry
- Begin with the blueprint (whole architecture)
- fulfill each individual part but not minor details

What are the most important things for a system?

Accuracy

- Google Search Results VS Bank Transaction
- Database Read and Write: race condition
- Throw Exception at proper time: good exception suppress

Performance

- What database? Cache layer?
- Scalability & Distributed System
- Site speed: Async call, make effort alap

make effort as little as possible? Generic

Robustness

- Scalability & High QPS
- Backup System
- Network Security

Knowledge pieces

- Database
- Network, Server, TCP/IP
- Security, Encryption/Decryption
- Distributed System
- Backup System
- *Hadoop

Design pieces

- Accuracy
- Performance
- Robustness
- Scalability
- Test

Google Calendar

Google Calendar

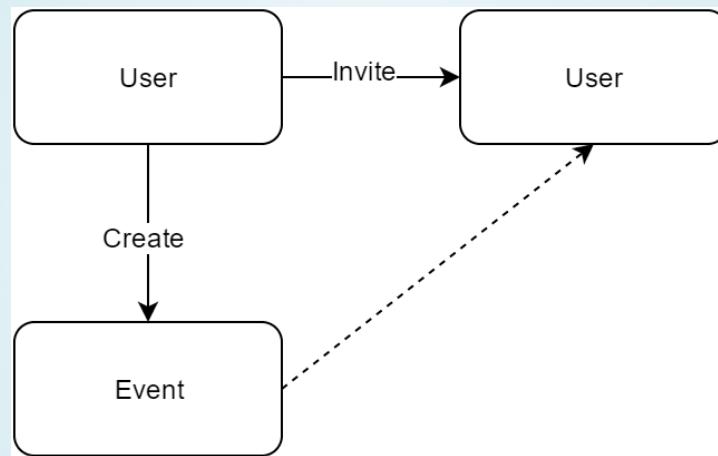
Design a simple google calendar. It has following requests:

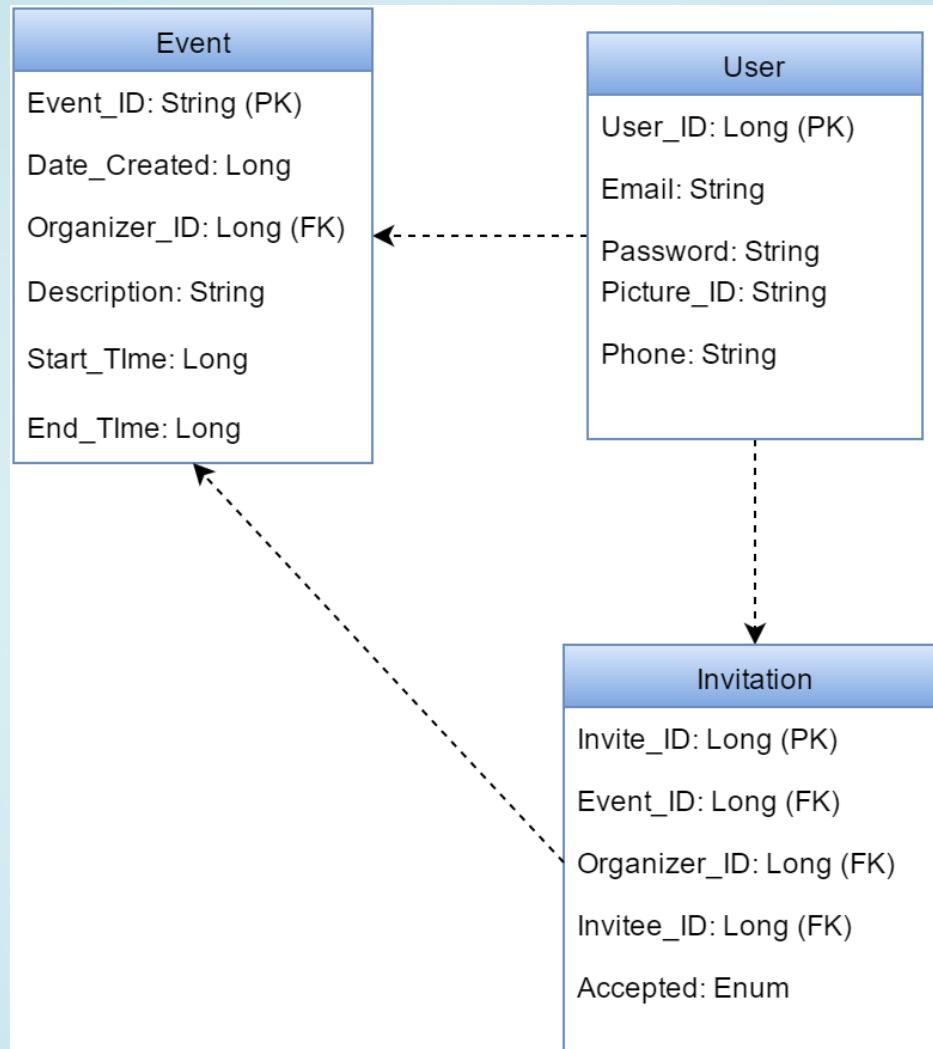
1. The user could register himself using email address
2. The user could have some personal profiles
3. The user can be an organizer and create events and add some detail information for the event
4. The user could add/remove some users to/from his events and send invitation via email
5. The user could know if the people they add is busy or free during the time he sets up for the event.

How to choose and design a database?

- Entity: user, event
- Relationship: create, invite

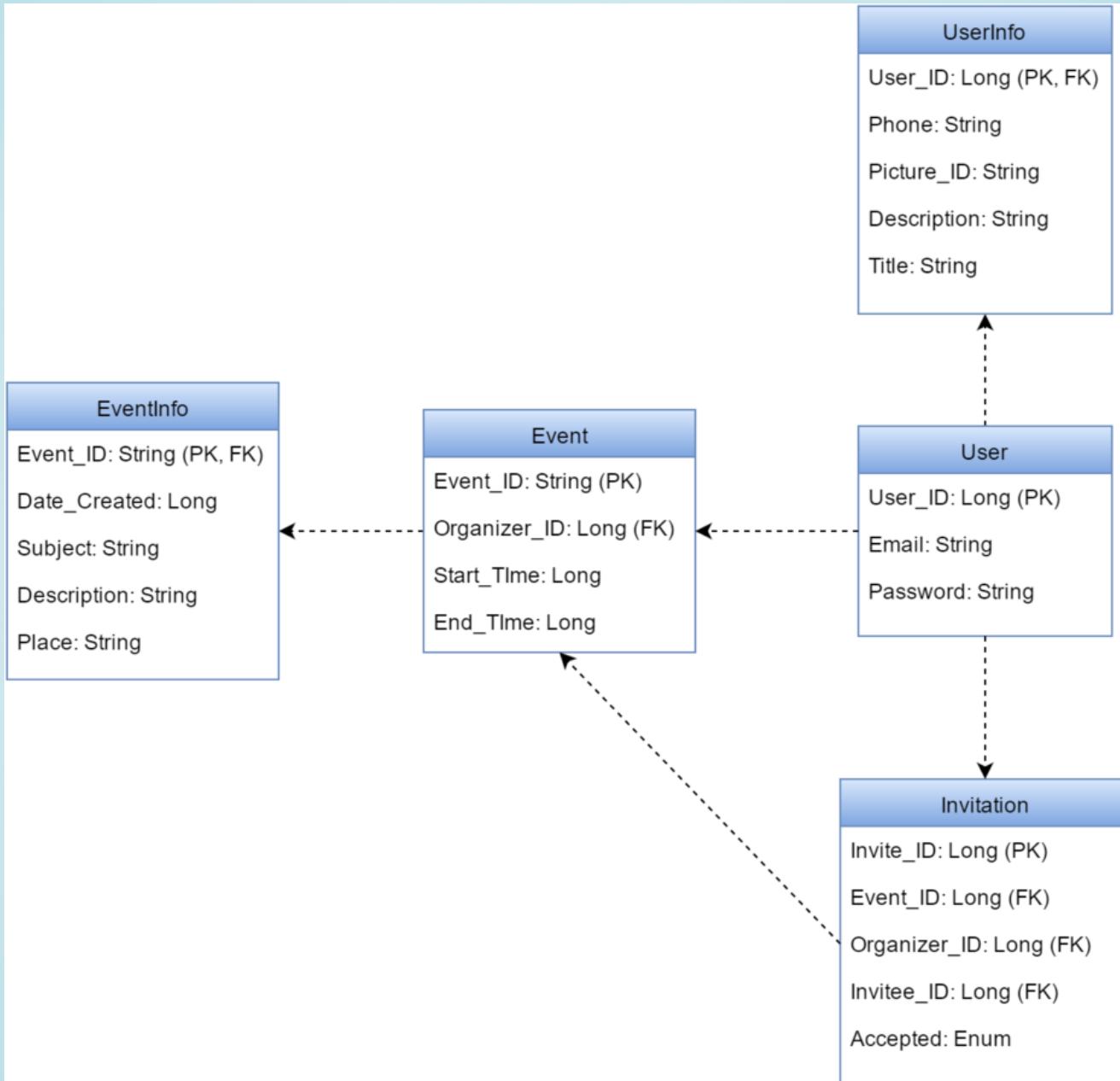
- Entity: user, event
- Relationship: create, invite





Can we make the table cleaner?

More tables: Good or bad?



Basic Operation of SQL

- Select
- From
- Where
- Join
 - Left Join
 - Right Join
 - Outer Join
- Delete
- Create
- Insert Into
- Update
- Distinct
- Count
- Min
- Max
- Avg

Follow up questions

- How to give if someone is busy or not during this time of the event?
- How to deal with so many emails sending? And what if some of them fails?
- How to evaluate the performance? How to improve it?

Distributed System

A distributed system is a model in which components located on networked computers communicate and coordinate their actions by passing messages. The components interact with each other in order to achieve a common goal. Three significant characteristics of distributed systems are: concurrency of components, lack of a global clock, and independent failure of components.

Distributed System

- Routing and Consistent Hash
- Load Balancing
- Sticky Session

Consistent Hash

