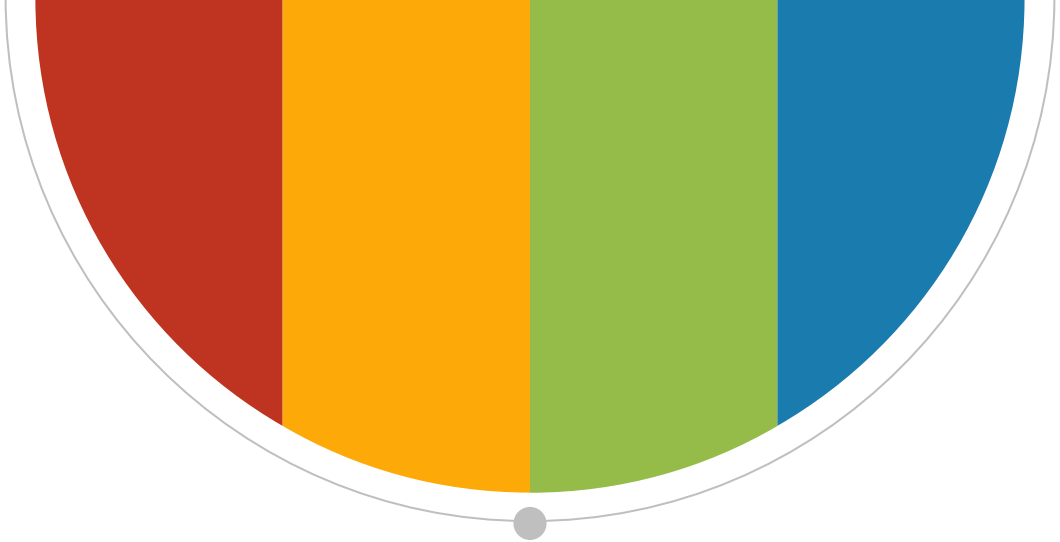

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金融行业

MySQL数据库设计技巧

http://www.5ienet.com

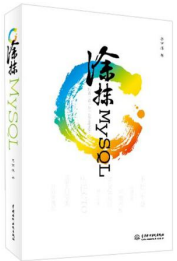
君三思 2018-08

我是谁

Who Am I

- 我是 李丙洋
- 网名 君三思
- 来自 富民银行

著有：



涂抹MySQL

涂抹Oracle

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常见 套路
Common Mode

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- 范式 & 冗余

Normal Forms Defined Informally

- 1st normal form
  - All attributes depend on **the key**
- 2nd normal form
  - All attributes depend on **the whole key**
- 3rd normal form
  - All attributes depend on **nothing but the key**

库表规范

Tables

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- 控制单表数据量
- 分库分表
- 统一字符集
- 命名规范(统一/小写/保留字)
- 数据库只做存取，不做运算

字段规范

Columns

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- 数值类型：TINYINT>SMALLINT>MEDIUMINT>INT>BIGINT>DECIMAL；UNSIGNED；
  (存储空间逐渐变大,性能逐渐变差)

- 用最省的类型，常用数据类型：tinyint/int/bigint/enum/char/varchar/timestamp/datetime

- 慎用NULL/大字段/二进制类型

索引优化

Requirements

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- 谨慎添加索引，索引不是越多越好；
- 索引列的可选择性/唯一性/区分度；
- 有了索引，能不能用上；
- 慎用外键，尽可能由应用保障数据完整性；

SQL优化

Requirements

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- 单条大SQL & 多条小SQL
- OLTP系统避免routines(fucntion/procedure/trigger)
- 避免大事务
- 避免SELECT *
- 模糊匹配的优化
- SQL语句技巧...

应对 策略

Solutions

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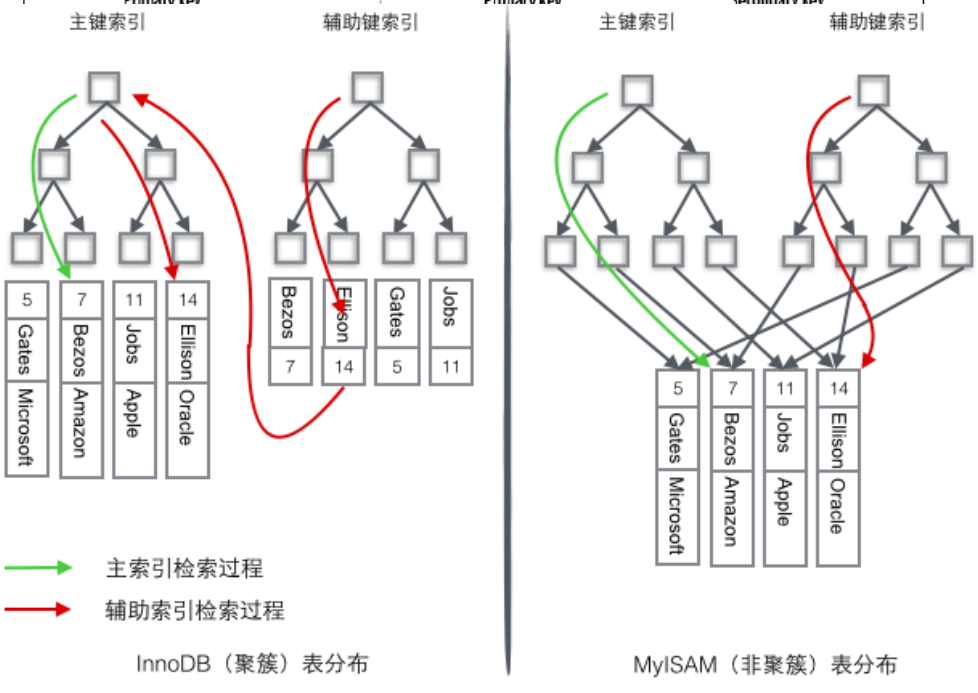
"拼硬件?"

主键和唯一索引有什么区别

讲个案例-主键与唯一索引

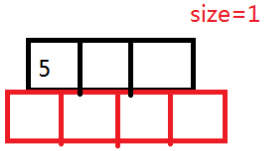
Primary Keys & Unique Keys



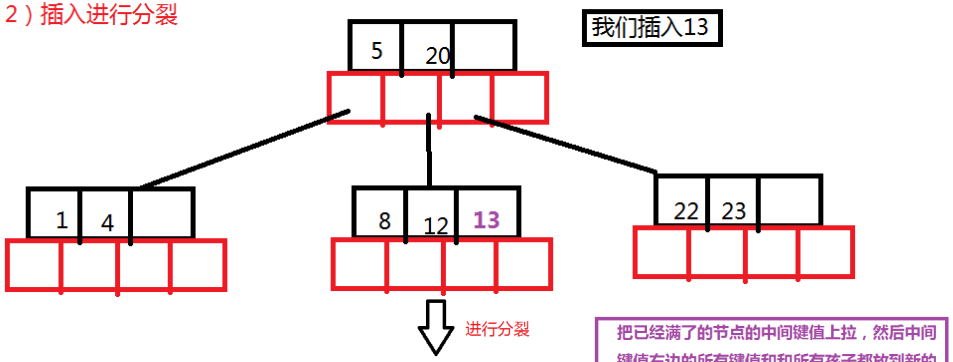
讲个案例-B树的插入

Primary Keys & Unique Keys

1）插入根节点



2）插入进行分裂



讲个案例-B树的插入

Primary Keys & Unique Keys

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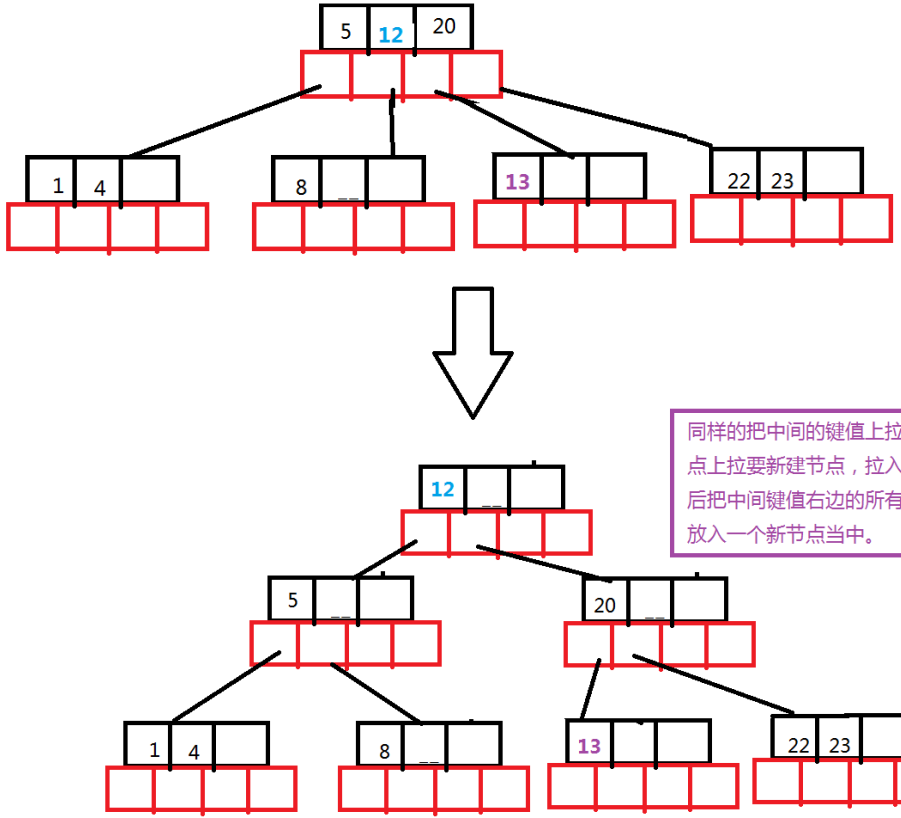

讲个案例-树的高度

Tree Height

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- 索引中的Page长度为：键值 + 指针
- 叶子节点的记录数能够存储的记录数 = PageSize/avgRecordSize
- InnoDB默认PageSize为16K
- 假设主键ID为bigint类型，长度为8字节，指针大小在InnoDB中为6字节，共计14字节
- 假设单行记录平均长度1K，则单个Page能够存储16条记录
- 单个非叶子节点最大存储：16384/14 = 1170
- 高度为 **2** 的树能够存储1170*16 = 18702条记录；高度为 **3** 的树能够存储1170*1170*16=21902400条记录

```
mysql> show variables like 'innodb_page_size';
+------------------+-------+
| Variable_name    | Value |
+------------------+-------+
| innodb_page_size | 16384 |
+------------------+-------+
1 row in set (0.00 sec)
```

讲个案例

Typical Case

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```
create table app_message_group
(
  id              varchar(45) not null,
  group_id        varchar(45),
  sender_kind     smallint,
  sender_id       varchar(80),
  receiver_kind   smallint,
  receiver_id     varchar(80),
  send_time       datetime,
  receive_time    datetime,
  type            smallint,
  content         mediumtext,
  status          smallint,
  push_time       datetime,
  is_push         bool default 0,
  algorithm       smallint default 0,
  needcount       bool default true,
  update_timestamp    timestamp,
  insert_timestamp    timestamp,
  primary key (id)，
  KEY idx_message_group_receiver_id (receiver_id)，
  KEY idx_message_group_group_id (group_id,status,sender_id,receiver_id),
  KEY idx_message_group_status_updatettime (update_timestamp, status),
  KEY ind_message_group (receiver_kind, status)
);
```

为啥不能用UUID

Solutions

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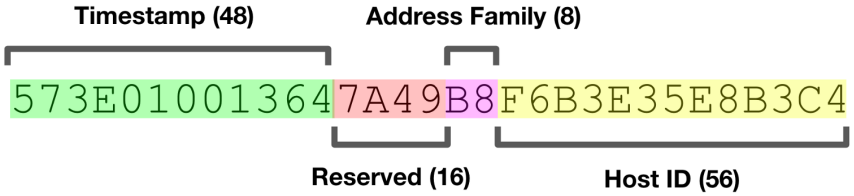
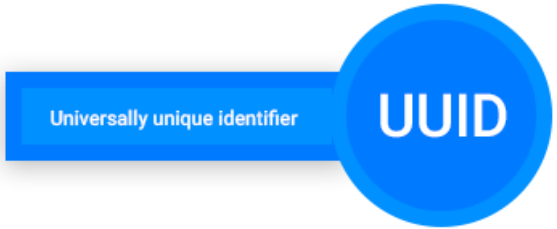
- 无序，索引插入时页的位置不定
- 键值长度
- InnoDB表是聚簇结构





为啥不能用UUID

Solutions

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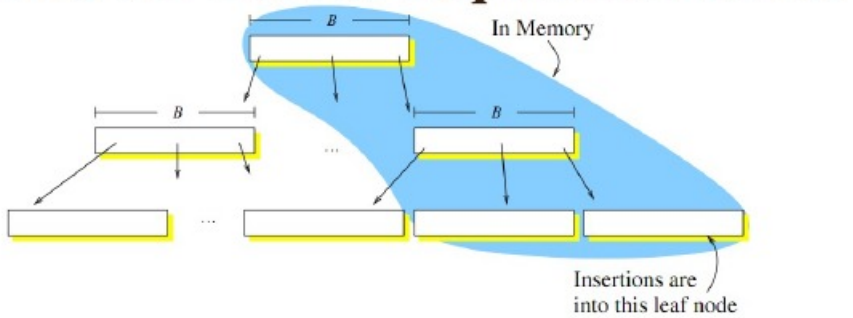
B-Trees are Fast at Sequential Inserts



为啥不能用UUID

Solutions

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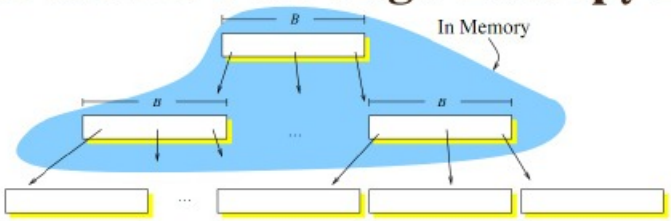
B-Trees are Slow for High-Entropy Inserts



为啥不能用UUID

Solutions

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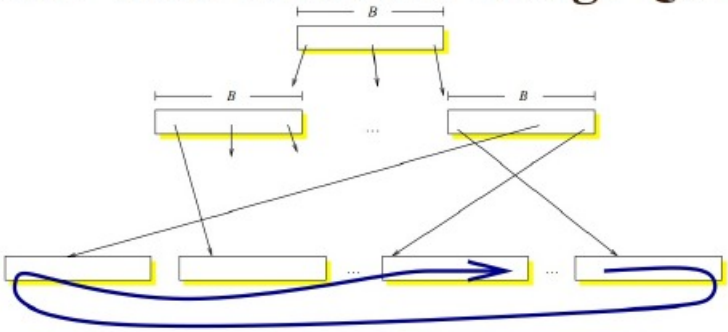
Aged B-Trees Run Slow Range Queries




我书读得多，不会骗你

应对 策略

Solutions

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- 修改表结构，创建键值单调增长的列为主键
- AUTO_INCREMENT，MySQL官方出品
- Redis incr
- SnowFlake
- 消息队列
- uuid_short()，MySQL官方出品

心态要好

Happiness

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Thank you

如有疑问，欢迎随时沟通

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