

SQL语句优化建议

查询通话记录

场景：

查询符合用户给定条件的通话记录

- 通话记录按月分表，每表通话记录在600~800万条之间
- 可能存在跨表查询的情况
- 查询条件复杂，存在模糊查询的情况
- 查询结果排序

表结构

```
CREATE TABLE `smdr_v01_201905` (  
  `AutoID` int(11) NOT NULL AUTO_INCREMENT,  
  `VosID` int(11) NOT NULL DEFAULT '0',  
  `DialogID` int(11) NOT NULL DEFAULT '0',  
  `CdrID` char(64) NOT NULL DEFAULT '0_0',  
  `StartTime` int(11) NOT NULL DEFAULT '0',  
  `EndTime` int(11) NOT NULL DEFAULT '0',  
  `CallerUID` char(128) NOT NULL,  
  `CallerDepIDs` varchar(512) NOT NULL,  
  `CallerNumber` char(64) NOT NULL,  
  `InTrunkUID` char(64) NOT NULL,  
  `InTrunkOwNumber` char(64) NOT NULL,  
  `CalleeUID` char(128) NOT NULL,  
  `CalleeDepIDs` varchar(512) NOT NULL,  
  `CalleeDialed` char(64) NOT NULL,  
  `OutTrunkUID` char(64) NOT NULL,  
  `OutTrunkOwNumber` char(64) NOT NULL,  
  `ReplaceCallee` char(64) NOT NULL,  
  `RouteCaller` char(128) NOTNULL,  
  `BusinessCode` char(32) NOTNULL,  
  `TenantID` int(11) NOT NULL DEFAULT '0',  
  `CalledResult` char(32) NOT NULL,  
  `FailCode` int(11) NOT NULL DEFAULT '0',  
  `CallerDevIp` char(32) NOT NULL,  
  `CallType` char(32) NOT NULL,  
  `CommRemarks` varchar(256) NOT NULL DEFAULT '', PRIMARY KEY  
  (`AutoID`),  
  KEY `DialogID_index` (`DialogID`) USING BTREE, KEY  
  `CdrID_index` (`CdrID`) USING BTREE,  
  KEY `StartTime_index` (`StartTime`) USING BTREE, KEY  
  `EndTime_index` (`EndTime`) USING BTREE,  
  KEY `CallerUID_index` (`CallerUID`) USING BTREE,  
  KEY `CallerNumber_index` (`CallerNumber`) USING BTREE, KEY  
  `CalleeUID_index` (`CalleeUID`) USING BTREE,  
  KEY `CalleeDialed_index` (`CalleeDialed`) USING BTREE,  
  KEY `TenantID_index` (`TenantID`) USING BTREE,  
  KEY `RouteCaller_index` (`RouteCaller`) USING BTREE,  
  KEY `OutTrunkOwNumber_index` (`OutTrunkOwNumber`) USING BTREE, KEY `FailCode_index`  
  (`FailCode`) USING BTREE,  
  KEY `CommRemarks_index` (`CommRemarks`) USING BTREE, KEY  
  `CallerDevIp_index` (`CallerDevIp`) USING BTREE  
) ENGINE=MyISAM AUTO_INCREMENT=41 DEFAULT CHARSET=utf8
```

查询语句

```
select AutoID,StartTime,EndTime,CallerUID,CallerNumber,
InTrunkUID,InTrunkOwNumber,CalleeUID,CalleeDialed,
OutTrunkUID,OutTrunkOwNumber,ReplaceCallee,RouteCaller,
TenantID,CalledResult,FailCode,CallType,BusinessCode,CdrID,
CallerDepIDs,CalleeDepIDs,CommRemarks from smdr.smdr_v01_201905
where FailCode>=0 and 302!=FailCode and TenantID='880050' and
(CallerUID like '%u11003%' or CalleeUID like '%u11003%') and
(CallerNumber like '%200%' or CalleeDialed like '%200%') and
(CommRemarks like 'aa%') and AutoID > '20' order by AutoID limit 0,2
```

原始执行计划:

id	select_type	table	type	possible_keys	key	key_len	ref	rows	Extra
1	SIMPLE	smdr_v01_201905	range	PRIMARY,TenantID_index,FailCode_index,smdr...	PRIMARY	4	NULL	11230192	Using index condition; Using where

执行速度(实际数据1100万，表结构没有CommRemarks列): 4秒

问题分析:

1. 没有合适的索引;

推荐优化方案:

1. 建复合索引;
create index smdr_v01_201905_idx on smdr_v01_201905(AutoID, FailCode, CallerUID, CalleeUID, CallerNumber, CalleeDialed);
2. 强制使用索引;

```
select AutoID,StartTime,EndTime,CallerUID,CallerNumber,
InTrunkUID,InTrunkOwNumber,CalleeUID,CalleeDialed,
OutTrunkUID,OutTrunkOwNumber,ReplaceCallee,RouteCaller,
TenantID,CalledResult,FailCode,CallType,
BusinessCode,CdrID, CallerDepIDs,CalleeDepIDs
from smdr.smdr_v01_201905 force index (smdr_v01_201905_idx)
where FailCode>=0 and 302!=FailCode and TenantID='880001' and
(CallerUID like '%u11003%' or CalleeUID like '%u11003%') and
(CallerNumber like '%200%' or CalleeDialed like '%200%') and
AutoID > '20'
order by AutoID limit 0,2;
```

id	select_type	table	type	possible_keys	key	key_len	ref	rows	Extra
1	SIMPLE	smdr_v01_201905	range	smdr_v01_201905_idx	smdr_v01_201905_idx	4	NULL	11230193	Using index condition; Using where

优化结果分析:

1. 执行时间从4秒，提升到1秒;

其它建议：

虽然CallerUID 和CalleeUID 这两个列，字符长度从128改成了64，节省了空间。如果业务允许，应考虑将CallerUID, CalleeUID, CallerNumber, CalleeDialed 四个列的长度由64个字符改为更小，例如32个字符，将进一步缩小表和索引的体积，提高性能。