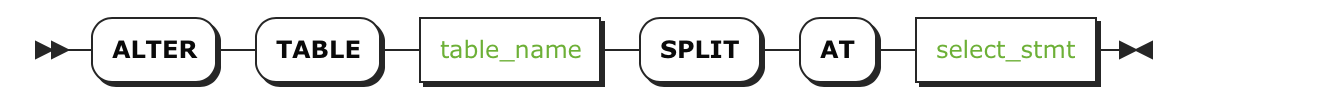
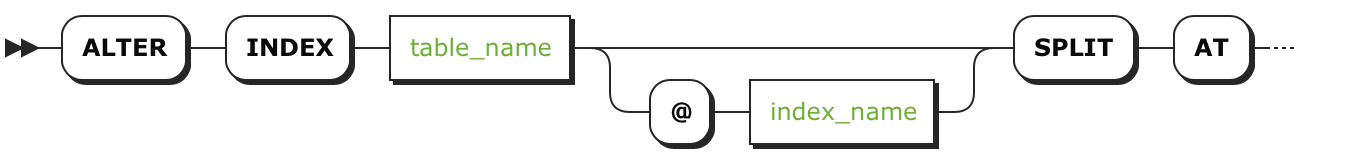
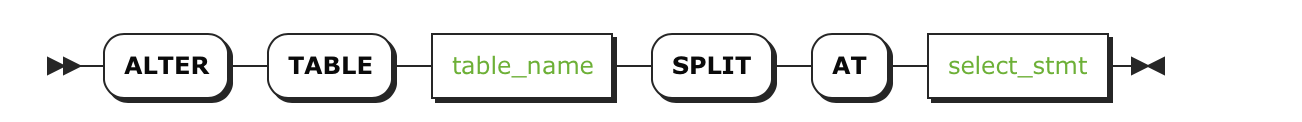
SPLIT AT [语句](http://doc.cockroachchina.baidu.com/#develop/sql-statements/overview/)用于依据表或索引的特定行，对key-value层的range进行强制拆分。

概要

所需权限

用户必须具有表或索引的INSERT [权限](http://doc.cockroachchina.baidu.com/#deploy/access-management/privileges/) 。

参数

| **Parameter** | **Description** |
| --- | --- |
| table\_name table\_name @ index\_name | 需拆分的表名或索引名 |
| select\_stmt | 一个 [选择查询](http://doc.cockroachchina.baidu.com/#develop/sql-syntax/selection-queries/)，会生成一个或多个要拆分表或索引的行 |

为什么手动进行拆分？

CockroachDB的key-value 层被分成连续的key-space，这些连续的key-space就是ranges。CockroachDB 默认range的大小是小于64MiB。当一个range的大小大于64MiB，系统会自动进行拆分 [split](https://www.cockroachlabs.com/docs/stable/architecture/distribution-layer.html#range-splits)。大多数情况下，这种自动拆分是有效的，不需要关心系统何时进行range拆分。

但是，针对如下情形，需要手动拆分表或索引：

* 当一张表的数据仅仅占据一个range时，这张表的所有读写会传递至这个range的 [leaseholder](https://www.cockroachlabs.com/docs/stable/architecture/replication-layer.html#leases)。如果表的数据量小但流量特别大时，会出现负载均衡的问题。通过手动对表的range进行拆分，可以将这个表的访问分布到多个节点上。有多个range数据的表，负载会自动的分布到几个节点上，不存在上面的问题。
* 当一个表创建后，仅仅只有一个单独的range。如果预期会有大量的写流量访问这个表，可以根据预期的写入分布，先进行手动得range拆分。这样可以避免由于range的自动拆分跟不上写流量的增长，从而导致性能降低的情况出现。

例子

拆分一张表

> **SHOW** EXPERIMENTAL\_RANGES **FROM** **TABLE** kv;

+-----------+---------+----------+----------+--------------+

| Start Key | End Key | Range ID | Replicas | Lease Holder |

+-----------+---------+----------+----------+--------------+

| NULL | NULL | 72 | {1} | 1 |

+-----------+---------+----------+----------+--------------+

(1 row)

> **ALTER** **TABLE** kv SPLIT **AT** **VALUES** (10), (20), (30);

+------------+----------------+

| key | pretty |

+------------+----------------+

| \u0209\x92 | /Table/64/1/10 |

| \u0209\x9c | /Table/64/1/20 |

| \u0209\xa6 | /Table/64/1/30 |

+------------+----------------+

(3 rows)

> **SHOW** EXPERIMENTAL\_RANGES **FROM** **TABLE** kv;

+-----------+---------+----------+----------+--------------+

| Start Key | End Key | Range ID | Replicas | Lease Holder |

+-----------+---------+----------+----------+--------------+

| NULL | /10 | 72 | {1} | 1 |

| /10 | /20 | 73 | {1} | 1 |

| /20 | /30 | 74 | {1} | 1 |

| /30 | NULL | 75 | {1} | 1 |

+-----------+---------+----------+----------+--------------+

(4 rows)

使用复合主键对表进行拆分

使用复合主键对表进行拆分（比如，当使用[partitions](http://doc.cockroachchina.baidu.com/#deploy/define-table-partitions-(enterprise)/#partition-using-primary-key))。

创建一个有复合主键的表。

**CREATE** **TABLE** t (k1 INT, k2 INT, v INT, w INT, **PRIMARY** **KEY** (k1, k2));

使用如下的sql对复合主键进行拆分：

**ALTER** **TABLE** t SPLIT **AT** **VALUES** (5,1), (5,2), (5,3);

+------------+-----------------+

| key | pretty |

+------------+-----------------+

| \xbc898d89 | /Table/52/1/5/1 |

| \xbc898d8a | /Table/52/1/5/2 |

| \xbc898d8b | /Table/52/1/5/3 |

+------------+-----------------+

(3 rows)

使用SHOW EXPERIMENTAL\_RANGES查看详细信息。

**SHOW** EXPERIMENTAL\_RANGES **FROM** **TABLE** t;

+-----------+---------+----------+----------+--------------+

| Start Key | End Key | Range ID | Replicas | Lease Holder |

+-----------+---------+----------+----------+--------------+

| NULL | /5/1 | 151 | {2,3,5} | 5 |

| /5/1 | /5/2 | 152 | {2,3,5} | 5 |

| /5/2 | /5/3 | 153 | {2,3,5} | 5 |

| /5/3 | NULL | 154 | {2,3,5} | 5 |

+-----------+---------+----------+----------+--------------+

(4 rows)

同时，也可以通过复合主键的前缀列进行range拆分。

> **ALTER** **TABLE** t SPLIT **AT** **VALUES** (3);

+----------+---------------+

| key | pretty |

+----------+---------------+

| \xcd898b | /Table/69/1/3 |

+----------+---------------+

(1 row)

**SHOW** EXPERIMENTAL\_RANGES **FROM** **TABLE** t;

+-----------+---------+----------+----------+--------------+

| Start Key | End Key | Range ID | Replicas | Lease Holder |

+-----------+---------+----------+----------+--------------+

| NULL | /3 | 155 | {2,3,5} | 5 |

| /3 | NULL | 165 | {2,3,5} | 5 |

+-----------+---------+----------+----------+--------------+

(2 rows)

拆分索引

> **CREATE** **INDEX** secondary **ON** kv (v);

> **SHOW** EXPERIMENTAL\_RANGES **FROM** **INDEX** kv@secondary;

+-----------+---------+----------+----------+--------------+

| Start Key | End Key | Range ID | Replicas | Lease Holder |

+-----------+---------+----------+----------+--------------+

| NULL | NULL | 75 | {1} | 1 |

+-----------+---------+----------+----------+--------------+

(1 row)

> **ALTER** **INDEX** kv@secondary SPLIT **AT** (**SELECT** v **FROM** kv **LIMIT** 3);

+---------------------+-----------------+

| key | pretty |

+---------------------+-----------------+

| \u020b\x12a\x00\x01 | /Table/64/3/"a" |

| \u020b\x12b\x00\x01 | /Table/64/3/"b" |

| \u020b\x12c\x00\x01 | /Table/64/3/"c" |

+---------------------+-----------------+

(3 rows)

> **SHOW** EXPERIMENTAL\_RANGES **FROM** **INDEX** kv@secondary;

+-----------+---------+----------+----------+--------------+

| Start Key | End Key | Range ID | Replicas | Lease Holder |

+-----------+---------+----------+----------+--------------+

| NULL | /"a" | 75 | {1} | 1 |

| /"a" | /"b" | 76 | {1} | 1 |

| /"b" | /"c" | 77 | {1} | 1 |

| /"c" | NULL | 78 | {1} | 1 |

+-----------+---------+----------+----------+--------------+

(4 rows)

See Also

* [Selection Queries](http://doc.cockroachchina.baidu.com/#develop/sql-syntax/selection-queries/)
* [Distribution Layer](https://www.cockroachlabs.com/docs/stable/architecture/distribution-layer.html)
* [Replication Layer](https://www.cockroachlabs.com/docs/stable/architecture/replication-layer.html)