

Partition Filtering In MSCK REPAIR TABLE

Motivation:

Currently MSCK command supports only full repair of tables (all partitions) or some subset of partitions based on partitionSpec (need to know the exact partition names). So the aim here is to introduce partition filtering with operators (EQUAL | NOTEQUAL | LESSTHANOREQUALTO | LESSTHAN | GREATERTHANOREQUALTO | GREATERTHAN | LIKE) in the partition column so that a larger subset of partitions can be recovered (added/dropped) without firing a full repair command might take time if the no. of partitions are huge.

Syntax:

```
MSCK REPAIR TABLE <tableName> ADD|DROP|SYNC PARTITIONS  
(<pCol1> <operator> <val>, <pCol2> <operator> <val>, ...);
```

Approach:

Phase 1: Fetch all the partition from the metastore which honors the filter condition.

1. Generate filter expression string from the filter condition provided by traversing through the AST.
2. Use getPartitionsByFilter() metastore api call to list all the partitions which satisfy the filter string.

Phase 2: Fetch all the partition paths from the File System which honors the filter condition.

This phase can be tricky since there is no way to directly push down the filter predicate to the filesystem. The way in which files are scanned in MSCK command is that, We go level by level, fetch all the partition paths and then to a level deeper etc, This happens till we cover all the partition depths.

There are can two approaches to filter out the required partition paths:

1. Fetch all the partition paths, store it in-memory and then later filter out the unwanted partition paths. This approach can be costly since we might end up exploring unwanted parititons.
2. While scanning partition paths at each partition depths, go one step deeper only when the current partition path matches the filter string. This approach can help to prune out the unwanted partition at the early stage and helps to reduce some iterations and fetching can be faster.

Filtering out of partition could have been made easy with the help of the method `PartitionExpressionForMetastore#filterPartitionsByExpr()` since MSCK was moved from ql module to standalone-metastore module we cannot reuse that method, hence we need to build a method which returns true/false based on the partition path and the filter expression string.

One simple solution is to convert the partition path values to appropriate data types based on the partition column type and then do the comparison based on the operator.

Finally remove all the known partition (fetched from metastore) from the partition list fetched from the filesystem and drop/add/sync partitions.