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Reply

From: Atri Sharma <a...@gmail.com>

To: de...@tajo.apache.org

Subject: Parallel Aggregates

Date: 2015/06/15 16:32:43

List: dev@tajo.apache.org

Folks,

I am looking into parallel aggregates/combining aggregates. I have a plan around it which I think can work.

Please update me on current infrastructure and point me around the existing code base. Also, ideas would be most welcome around it.

--

Regards,

Atri

\*l'apprenant\*

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Reply

From: Jihoon Son <j...@apache.org>

Subject: Re: Parallel Aggregates

Date: 2015/06/16 01:55:29

List: dev@tajo.apache.org

Hi Atri, thanks for your question.

First of all, maybe you already did, I recommend that you read this article <http://www.hadoopsphere.com/2015/02/technical-deep-dive-into-apache-tajo.html> before you start implementation. This is written by Hyunsik, and contains the description of Tajo's overall infrastructure. Afterwards, I think that you may ask more detailed question.

Here, I'll roughly list some important classes for aggregate implementation.

- SQLParser.g4 contains our SQL parsing rules. It is written in antlr.
- SQLAnalyzer is our parser based on rules defined at SQLParser.g4.
- SQLAnalyzer translates a SQL query into a tree of Expr which represents an algebraic expression.
- LogicalPlanner translates the Expr tree into a LogicalPlan that logically describes how the given query will be executed.
- GlobalPlanner translates the LogicalPlan into a MasterPlan (distributed query execution plan) that describes how the given query will be executed in distributed cluster.
- Once a MasterPlan is created, QueryMaster starts to execute query processing. A query consists of multiple stages, which are individually processed in some order.
  - For example, a simple aggregation query is executed in two stages, each of which is for parallel aggregation and combining aggregates. These stages are executed sequentially.
- A stage is concurrently processed by multiple tasks, and is executed by TajoWorker.
- Each task contains meta information for input data and a LogicalPlan of the stage. This LogicalPlan is translated into PhysicalExec by PhysicalPlanner.
- PhysicalExec describes how the query is actually executed.
  - For example, there are two types of AggregationExec, i.e., HashAggregateExec and SortAggregateExec, for hash-based aggregation and sort-based aggregation, respectively.

Best regards,

Jihoon

2015년 6월 15일 (월) 오후 11:32, Atri Sharma <at...@gmail.com>님이 작성:

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Reply

From: Atri Sharma <a...@gmail.com>

Subject: Re: Parallel Aggregates

Date: 2015/06/16 08:28:03

List: dev@tajo.apache.org

Thanks.

What are your thoughts on parallel aggregation? Generating query plans that allow states to be generated which can be executed independently and then states recombined?

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Reply

From: Jihoon Son <j...@apache.org>

Subject: Re: Parallel Aggregates

Date: 2015/06/16 13:37:02

List: dev@tajo.apache.org

In Tajo, aggregation is very similar to that in Hadoop MapReduce. Let me consider an example. Given a query of "select \*k\*, count(\*) from \*t\* group by \*k\*", Tajo generates a LogicalPlan as follows.

group by (k)  
|  
scan (t)

This LogicalPlan is translated into a MasterPlan as follows.

-----  
Stage2  
group by \*k\*  
-----  
|  
shuffle tuples with \*k\*  
|  
-----  
Stage1  
group by \*k\*  
|  
scan \*t\*  
-----

As you can see in this example, the query plan consists of 2 stages. Each stage is executed subsequently because the result of Stage 1 is used as the input of Stage 2. Each stage is divided into multiple tasks for each input split as follows.

Stage1  
  
Task 1  
group by \*k\*  
|  
scan \*t\* (0 - 99)

Task 2  
group by \*k\*  
|  
scan \*t\* (100 - 199)  
...

Each task is executed by a TajoWorker. As you can see, tasks of the first stage execute a local aggregation after scanning input split. This local aggregation result is shuffled among TajoWorkers with the aggregation key \*k\*. Then, the final aggregation is computed at the second stage.

Stage1 and Stage2 are similar to Map and Reduce of MapReduce. The local aggregation of Stage1 is similar to the Combiner of Hadoop MapReduce.

I hope that this will be helpful to you.  
If you have any further questions, please feel free to ask.  
Jihoon

2015년 6월 16일 (화) 오전 7:28, Atri Sharma <at...@gmail.com>님이 작성:

Thanks.

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Reply

From: Atri Sharma <a...@gmail.com>

Subject: Re: Parallel Aggregates

Date: 2015/06/17 19:16:22

List: dev@tajo.apache.org

Thank you.

Is there any improvement in aggregates that we are looking at please?

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Reply

From: Jihoon Son <j...@apache.org>

Subject: Re: Parallel Aggregates

Date: 2015/06/17 23:12:44

List: dev@tajo.apache.org

As far as I know, there aren't any plans for improvement except in distinct aggregation. I think that our code for distinct aggregation is too complicated, and the performance also should be improved.

So, when you design the implementation of your algorithm on Tajo, you don't have to consider distinct aggregation part, I think.

2015년 6월 18일 (목) 오전 2:16, Atri Sharma <at...@gmail.com>님이 작성:

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Reply

From: Atri Sharma <a...@gmail.com>

Subject: Re: Parallel Aggregates

Date: 2015/06/18 04:39:15

List: dev@tajo.apache.org

So distinct aggregation is one area, thanks.

I am trying to get enough knowledge of Internals of aggregation engine and query planner to be able to work on rollup and cube so picking smaller tickets first.

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Reply

From: Jihoon Son <j...@apache.org>

Subject: Re: Parallel Aggregates

Date: 2015/06/18 11:37:46

List: dev@tajo.apache.org

It looks good to start.  
Any questions welcome!

Jihoon

2015년 6월 18일 (목) 오전 3:39, Atri Sharma <at...@gmail.com>님이 작성:

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Reply

From: Atri Sharma <a...@gmail.com>

Subject: Re: Parallel Aggregates

Date: 2015/06/18 11:38:46

List: dev@tajo.apache.org

Do we have a ticket around that?

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Reply

From: Jihoon Son <g...@gmail.com>

Subject: Re: Parallel Aggregates

Date: 2015/06/18 11:46:10

List: dev@tajo.apache.org

As far as I know, TAJ0-256, TAJ0-259, and TAJ0-1420 are issues for data cube and grouping sets.  
You can create any issues if you want. Even though some issues can be duplicated, it's ok.

2015년 6월 18일 (목) 오전 10:39, Atri Sharma <at...@gmail.com>님이 작성:

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Reply

From: Atri Sharma <a...@gmail.com>

Subject: Re: Parallel Aggregates

Date: 2015/06/18 11:58:10

List: dev@tajo.apache.org

And for DISTINCT issues?

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Reply

From: Jihoon Son <j...@apache.org>

Subject: Re: Parallel Aggregates

Date: 2015/06/18 13:21:37

List: dev@tajo.apache.org

It seems that there aren't ongoing issues for distinct aggregation.

2015년 6월 18일 (목) 오전 10:50, Atri Sharma <at...@gmail.com>님이 작성:

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Reply

From: Jaehwa Jung <b...@apache.org>

Subject: Re: Parallel Aggregates

Date: 2015/06/18 17:53:45

List: dev@tajo.apache.org

Hi Atri

I think that following articles would be helpful for you to understand tajo architecture.

- Tajo query execution and scheduling sequence : <http://jaso.co.kr/501>
- Tajo stage flow and StorageManager: <http://jaso.co.kr/503>

For the reference, above articles had been written by Hyoungjun Kim who is Tajo PMC. :)

Cheers

Jaehwa

2015-06-18 20:21 GMT+09:00 Jihoon Son <jl...@apache.org>:

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Reply

From: Atri Sharma <a...@gmail.com>

Subject: Re: Parallel Aggregates

Date: 2015/06/19 06:27:48

List: dev@tajo.apache.org

Thanks!

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Reply

From: Atri Sharma <a...@gmail.com>

Subject: Re: Parallel Aggregates

Date: 2015/06/19 06:27:48

List: dev@tajo.apache.org

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