

Aggregation – Incremental Map-Reduce

1. Setup the Data.

```
> db.sessions.save({userid:"a",ts: ISODate('2014-07-03  
14:17:00'),length: 95});
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.sessions.save({userid:"b",ts: ISODate('2014-07-03  
14:23:00'),length: 110});
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.sessions.save({userid:"c",ts: ISODate('2014-07-03  
15:02:00'),length: 120});
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.sessions.save({userid:"d",ts: ISODate('2014-07-03  
16:45:00'),length: 45});
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.sessions.save({userid:"a",ts: ISODate('2014-07-04  
14:17:00'),length: 105});
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.sessions.save({userid:"d",ts: ISODate('2014-07-04  
16:45:00'),length: 45});
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.sessions.save({userid:"c",ts: ISODate('2014-07-04  
15:02:00'),length: 120});
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.sessions.save({userid:"b",ts: ISODate('2014-07-04  
14:23:00'),length: 110});
```

```
WriteResult({ "nInserted" : 1 })
```

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2. Understand the data

```
> db.sessions.find().pretty()

{
  "_id" : ObjectId("53cd737629e07f90c2234855"),
  "userid" : "a",
  "ts" : ISODate("2014-07-03T14:17:00Z"),
  "length" : 95
}
{
  "_id" : ObjectId("53cd738d29e07f90c2234856"),
  "userid" : "b",
  "ts" : ISODate("2014-07-03T14:23:00Z"),
  "length" : 110
}
{
  "_id" : ObjectId("53cd73a129e07f90c2234857"),
  "userid" : "c",
  "ts" : ISODate("2014-07-03T15:02:00Z"),
  "length" : 120
}
{
  "_id" : ObjectId("53cd73b629e07f90c2234858"),
  "userid" : "d",
  "ts" : ISODate("2014-07-03T16:45:00Z"),
  "length" : 45
}
{
  "_id" : ObjectId("53cd73cb29e07f90c2234859"),
  "userid" : "a",
  "ts" : ISODate("2014-07-04T14:17:00Z"),
  "length" : 105
}
{
  "_id" : ObjectId("53cd73d329e07f90c223485a"),
  "userid" : "d",
  "ts" : ISODate("2014-07-04T16:45:00Z"),
  "length" : 45
}
{
  "_id" : ObjectId("53cd73da29e07f90c223485b"),
  "userid" : "c",
  "ts" : ISODate("2014-07-04T15:02:00Z"),
  "length" : 120
}
{
  "_id" : ObjectId("53cd73e629e07f90c223485c"),
  "userid" : "b",
  "ts" : ISODate("2014-07-04T14:23:00Z"),
  "length" : 110
}
```

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3. Define the Map Function

```
> var mapFunction = function(){var key = this.userid;var value = {userid:this.userid,total_time:this.length,count:1,avg_time:0};emit(key,value);};
```

4. Define the Reduce Function

```
> var reduceFunction = function(key,values){var reducedObject = {userid:key,total_time:0,count:0,avg_time:0};values.forEach(function(value){reducedObject.total_time += value.total_time;reducedObject.count += value.count;});return reducedObject};
```

5. Define the Finalize Function

```
> var finalizeFunction = function (key,reducedValue){if(reducedValue.count>0)reducedValue.avg_time=reducedValue.total_time/reducedValue.count;return reducedValue;};
```

6. Perform map-reduce on the newly created data

```
>db.sessions.mapReduce(mapFunction,reduceFunction,{out:"session_stat",finalize:finalizeFunction})
```

```
{
  "result" : "session_stat",
  "timeMillis" : 76,
  "counts" : {
    "input" : 8,
    "emit" : 8,
    "reduce" : 4,
    "output" : 4
  },
  "ok" : 1,
}
```

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7. Check the Output collection

```
> db.session_stat.find().pretty()
{
  "_id" : "a",
  "value" : {
    "userid" : "a",
    "total_time" : 200,
    "count" : 2,
    "avg_time" : 100
  }
}
{
  "_id" : "b",
  "value" : {
    "userid" : "b",
    "total_time" : 220,
    "count" : 2,
    "avg_time" : 110
  }
}
{
  "_id" : "c",
  "value" : {
    "userid" : "c",
    "total_time" : 240,
    "count" : 2,
    "avg_time" : 120
  }
}
{
  "_id" : "d",
  "value" : {
    "userid" : "d",
    "total_time" : 90,
    "count" : 2,
    "avg_time" : 45
  }
}
```

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8. Add more documents to the previously created collection

```
> db.sessions.save({userid:"a",ts: ISODate('2014-07-05  
14:17:00'),length: 105});
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.sessions.save({userid:"b",ts: ISODate('2014-07-05  
14:23:00'),length: 110});
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.sessions.save({userid:"c",ts: ISODate('2014-07-05  
15:02:00'),length: 120});
```

```
WriteResult({ "nInserted" : 1 })
```

```
> db.sessions.save({userid:"d",ts: ISODate('2014-07-05  
16:45:00'),length: 45});
```

```
WriteResult({ "nInserted" : 1 })
```

9. Perform map-reduce to find only new documents.

```
>db.sessions.mapReduce(mapFunction,reduceFunction,{query:{ts:{$gt:ISOD  
ate('2014-07-05  
00:00:00')}}},out:"session_stat",finalize:finalizeFunction);
```

```
{  
  "result" : "session_stat",  
  "timeMillis" : 93,  
  "counts" : {  
    "input" : 4,  
    "emit" : 4,  
    "reduce" : 0,  
    "output" : 4  
  },  
  "ok" : 1,  
}
```

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10. Check the output collection

```
> db.session_stat.find().pretty()
{
  "_id" : "a",
  "value" : {
    "userid" : "a",
    "total_time" : 105,
    "count" : 1,
    "avg_time" : 105
  }
}
{
  "_id" : "b",
  "value" : {
    "userid" : "b",
    "total_time" : 110,
    "count" : 1,
    "avg_time" : 110
  }
}
{
  "_id" : "c",
  "value" : {
    "userid" : "c",
    "total_time" : 120,
    "count" : 1,
    "avg_time" : 120
  }
}
{
  "_id" : "d",
  "value" : {
    "userid" : "d",
    "total_time" : 45,
    "count" : 1,
    "avg_time" : 45
  }
}
```

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11. Perform map-reduce to see all documents

```
>db.sessions.mapReduce(mapFunction,reduceFunction,{out:"session_stat",  
finalize:finalizeFunction})
```

```
{  
  "result" : "session_stat",  
  "timeMillis" : 78,  
  "counts" : {  
    "input" : 12,  
    "emit" : 12,  
    "reduce" : 4,  
    "output" : 4  
  },  
  "ok" : 1,  
}
```

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12. Check the Output collection

```
> db.session_stat.find().pretty()
{
  "_id" : "a",
  "value" : {
    "userid" : "a",
    "total_time" : 305,
    "count" : 3,
    "avg_time" : 101.66666666666667
  }
}
{
  "_id" : "b",
  "value" : {
    "userid" : "b",
    "total_time" : 330,
    "count" : 3,
    "avg_time" : 110
  }
}
{
  "_id" : "c",
  "value" : {
    "userid" : "c",
    "total_time" : 360,
    "count" : 3,
    "avg_time" : 120
  }
}
{
  "_id" : "d",
  "value" : {
    "userid" : "d",
    "total_time" : 135,
    "count" : 3,
    "avg_time" : 45
  }
}
}
```