Spark Memory Management

TrendyTech

Spark Memory Management

◈ Spark memory is divided into two parts

⬥ Heap memory : spark.executor.memory = 4GB

⬥ Off heap memory : max (384, spark.yarn.executor.memoryoverhead of

spark.executor.memory)

= max(384, 10% of 4GB)

Off heap memory. max(384MB, 10% of 4GB)	Java Heap memory - 4GB
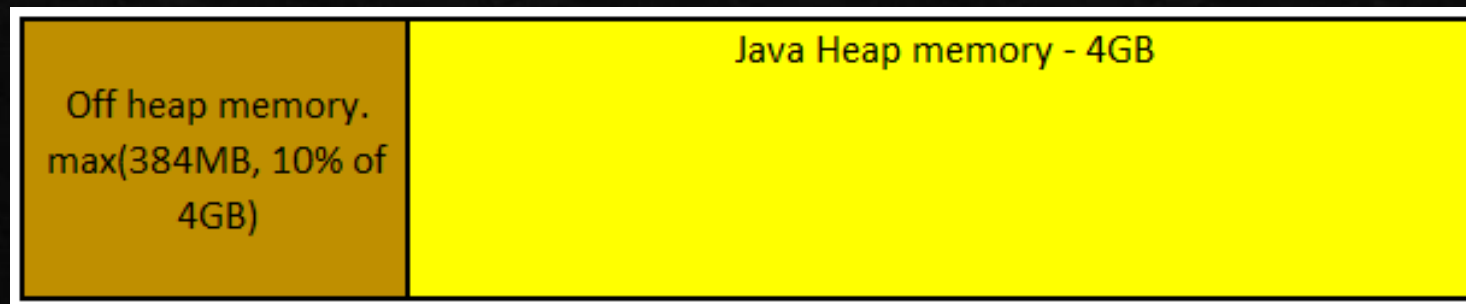
Spark Memory Management

◇ Heap memory : spark.executor.memory = 4GB

    ◇ Reserved memory : 300 MB

Off heap memory. max(384MB, 10% of 4GB)	Java Heap memory - 4GB	
	300MB Reserved	

Spark Memory Management

◈ Heap memory : spark.executor.memory = 4GB

    ◇ Reserved memory : 300 MB

    ◇ Unified memory : (Java Heap - Reserved Memory) * spark.memory.fraction

        ◇ Unified Memory = (4GB - 300MB) * 0.6 = 3.70 GB * 0.6 = 2.22 GB.

    ◇ User memory : (Java Heap - Reserved Memory) * (1- spark.memory.fraction)

        ◇ User memory = (4GB - 300MB) * (1-0.6)= 3.70 GB * 0.4 = 1.48 GB.

Off heap memory. max(384MB, 10% of 4GB)	Java Heap memory - 4GB		
	300MB Reserved	User Memory 1.48 GB	2.22 GB = Execution Memory + Storage Memory

Spark Memory Management

◈ Unified Memory is divided into

    ◇ Execution memory : = (Java Heap - Reserved Memory) * spark.memory.fraction

                 * (1.0 - spark.memory.storageFraction)

         ◈ Execution memory = (4GB - 300MB) * 0.6 * (1-0.5) = 3.70 GB * 0.6 * 0.5)= 1.11 GB.

    ◇ Storage memory : = (Java Heap - Reserved Memory) * spark.memory.fraction

               * spark.memory.storageFraction

         ◈ Execution memory = (4GB - 300MB) * 0.6 * 0.5 = 3.70 GB * 0.6 * 0.5= 1.11 GB.

Off heap memory. max(384MB, 10% of 4GB)	Java Heap memory - 4GB			
	300MB Reserved	User Memory 1.48 GB	Execution Memory 1.11 GB	Storage Memory 1.11 GB

Spark Memory Management

```
Spark Memory
management
    │
    ├─────────────────────────────┐
    │                             │
Off heap memory = max (384,    Java Heap
spark.yarn.executor.memoryoverhead of   memory
spark.executor.memory)             │
                    ┌──────────────┼──────────────────┐
                    │              │                  │
            Reserved memory -    Unified Memory = (Java Heap    User Memory = (Java Heap -
            300 MB               - Reserved Memory) *           Reserved Memory) * (1 -
                                 spark.memory.fraction          spark.memory.fraction)
                                     │
                                     ├─── Execution memory  = (Java Heap - Reserved Memory) *
                                     │     spark.memory.fraction *
                                     │
                                     │     (1.0 - spark.memory.storageFraction)
                                     │
                                     └─── Storage memory = (Java Heap - Reserved Memory) *
                                           spark.memory.fraction *
                                           
                                           spark.memory.storageFraction
```