

# Hadoop的block Size和split Size究竟是什么关系？

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学习hadoop map reduce过程的时候，第一步就是split。我们知道，hdfs中的数据是按block来存储的。问题来了，那么split和block之间是什么关系呢？我google到了stackoverflow上的这篇文章，我觉得这个帖子应该把关系说清楚了，翻译出来，欢迎大家批评指正！以下：

## 问题

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hadoop的split size 和 block size 是什么关系？ 是否 split size 应该 n倍于 block size ？

## 概念

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在 hdfs 架构中，存在 blocks 的概念。 通常来说，hdfs中的一个block 是 64MB 。

当我们把一个大文件导入hdfs中的时候，文件会按 64MB 每个block来分割（如果按默认配置）。

如果你有1GB的文件要存入HDFS中，  $1\text{GB}/64\text{MB} = 1024\text{MB} / 64\text{MB} = 16$  个 blocks 会被分割到不同的datanode上。

## 目的

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数据分割(data splitting )策略是基于文件偏移进行的。文件分割的目的是 有利于数据并行处理， 以及 便于数据容灾恢复。

## 区别

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split 是逻辑意义上的split。 通常在 M/R 程序或者其他数据处理技术上用到。根据你处理的数据量的情况， split size是允许用户自定义的。

split size 定义好了之后，可以控制 M/R 中 Mapper 的数量。如果M/R中没有定义 split size， 就用 默认的HDFS配置作为 input split。

## 举例

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你有个100MB的文件， block size 是 64MB， 那么就会被split成 2 块。这时如果你你没有指定 input split， 你的M/R程序就会按2个input split 来处理， 并分配两个 mapper来完成这个job。

但如果你把 split size 指定为 100MB，那么M/R程序就会把数据处理成一个 split，这时只用分配一个mapper 就可以了。

但如果你把split size 指定为 25MB， M/R就会将数据分成4个split，分配4个mapper 来处理这个job。

## 总结

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1. block是物理上的数据分割，而split是逻辑上的分割。

2. 如果没有特别指定，split size 就等于 HDFS 的 block size 。
3. 用户可以在M/R 程序中自定义split size。
4. 一个split 可以包含多个blocks，也可以把一个block应用多个split操作。
5. 有多少个split，就有多少个mapper。

原文：

Q: What is relationship between split size and block size in Hadoop? As I read in this, split size must be n-times of block size (n is an integer and  $n > 0$ ), is this correct? Is there any must in relationship between split size and block size? \*\*

A:

In HDFS architecture there is a concept of blocks. A typical block size used by HDFS is 64 MB. When we place a large file into HDFS it chopped up into 64 MB chunks(based on default configuration of blocks), Suppose you have a file of 1GB and you want to place that file in HDFS, then there will be  $1\text{GB}/64\text{MB} = 16$  split/blocks and these block will be distribute across the DataNodes. These blocks/chunk will reside on a different DataNode based on your cluster configuration.

Data splitting happens based on file offsets. The goal of splitting of file and store it into different blocks is parallel processing and fail over of data.

Difference between block size and split size.

Split is logical split of your data, basically used during data processing using Map/Reduce program or other processing techniques. Split size is user defined and you can choose your split size based on your data(How much data you are processing).

Split is basically used to control number of Mapper in Map/Reduce program. If you have not defined any input split size in Map/Reduce program then default HDFS block split will be considered as input split.

Example:

Suppose you have a file of 100MB and HDFS default block configuration is 64MB then it will chopped in 2 split and occu-

py 2 blocks. Now you have a Map/Reduce program to process this data but you have not specified any input split then based on the number of blocks(2 block) input split will be considered for the Map/Reduce processing and 2 mapper will get assigned for this job.

But suppose, you have specified the split size(say 100MB) in your Map/Reduce program then both blocks(2 block) will be considered as a single split for the Map/Reduce processing and 1 Mapper will get assigned for this job.

Suppose, you have specified the split size(say 25MB) in your Map/Reduce program then there will be 4 input split for the Map/Reduce program and 4 Mapper will get assigned for the job.

Conclusion:

1. Split is a logical division of the input data while block is a physical division of data.
2. HDFS default block size is default split size if input split is not specified.
3. Split is user defined and user can control split size in his Map/Reduce program.
4. One split can be mapping to multiple blocks and there can be multiple split of one block.
5. The number of map tasks (Mapper) are equal to the number of splits.

ref: <http://stackoverflow.com/questions/30549261/split-size-vs-block-size-in-hadoop>

## 补充

### hdfs中如何设置参数

#### split size 配置:

mapred.max.split.size

#### block size 配置:

注意，请不要轻易更改 block size,因为这个是影响整个hdfs的。

## split size 计算规则：

针对：

mapreduce.input.fileinputformat.split.maxsize

mapreduce.input.fileinputformat.split.minsize

FileInputFormat.computeSplitSize()

按如下规则取 split size：

$\text{Math.max}(\text{minSize}, \text{Math.min}(\text{maxSize}, \text{blockSize}))$

## 性能

1. 一般来说，block size 和 split size 设置成一致，性能较好。
2. FileInputFormat generates splits in such a way that each split is all or part of a single file. 所以 hadoop处理大文件比处理小文件来得效率高得多。

[Read more](#)

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