

# Why does the disk optimizer put boot files at low-numbered sectors?

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When the disk optimizer rearranges data on the disk, one of the things it does is put boot files at low-numbered sectors. Why is that? Is it just for mathematical convenience? Why not put them at the highest-numbered sectors, so they stay out of the way of regular data?

Rotational media number their tracks and sectors from the outside in. The lowest-numbered tracks and sectors are at the outer rim, and the highest-numbered tracks and sectors are near the center. And it's that geometry that the disk optimizer takes advantage of.

Since rotation is at a constant speed, it means that the velocity at the rim is faster than velocity near the center. This means that the within a single revolution, more storage media pass under a disk head positioned near the rim than under a disk head positioned near the center.

Back in the old days, hard drives stored data at a constant bit rate, resulting in a fixed number of sectors per track. Sectors near the rim would be larger than sectors in the hub, which was a waste of storage media.

Hard drives nowadays store data at a roughly constant bit density per unit of storage media, so that tracks near the rim contain more data than tracks near the center. Within a single revolution, so you can bulk-read more data from tracks near the rim in the same amount of time. And it is this phenomenon that the disk optimizer takes advantage of.

**Bonus chatter:** Commenter [aidtopia](#) points out that while it's true that you get more data per second from the outer tracks, it does come at a cost of added latency because you have to move the head to the far edge of the platter in order to get there. You therefore do not want to put frequently-accessed data there, because you'll be wasting a lot of time seeking. The idea choice for the outer tracks is therefore bulk data that is not used often. And boot files are a great example of this. You need them only once, but when you need them, you need all of them.

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