# Hard Disk Drive (HDD)

**Platter** (aluminum coated with a thin magnetic layer)

- A circular hard surface
- Data is stored persistently by inducing magnetic changes to it
- Each platter has 2 sides, each of which is called a surface

## **Spindle**

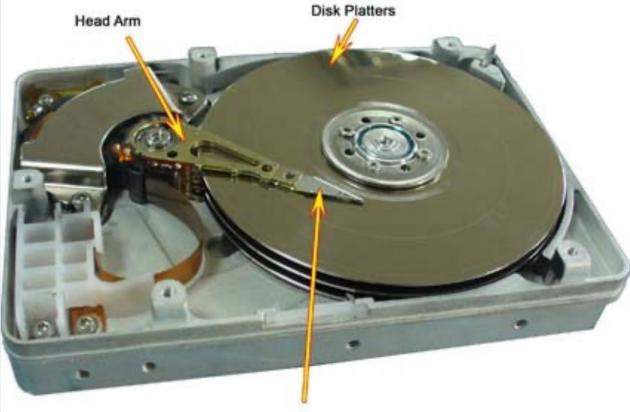
- Spindle is connected to a motor that spins the platters around
- The rate of rotations is measured in RPM (Rotations Per Minute)
  Typical modern values: 7,200 RPM to 15,000 RPM

#### **Track**

- Concentric circles of sectors
- Data is encoded on each surface in a track
- A single surface contains many thousands and thousands of tracks

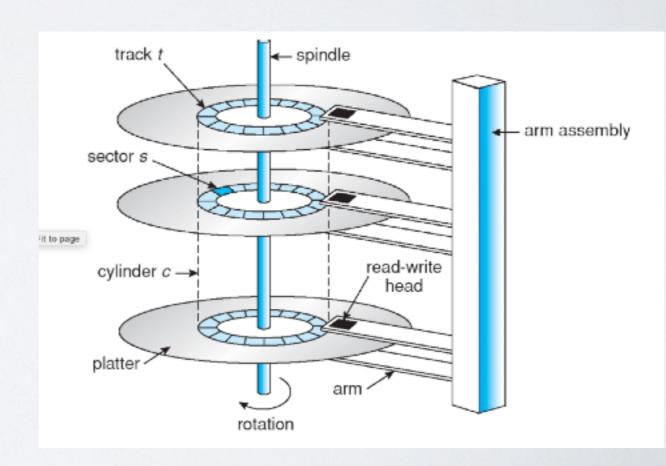
### **Cylinder**

- A stack of tracks of fixed radius
- Heads record and sense data along cylinders
- Generally only one head active at a time

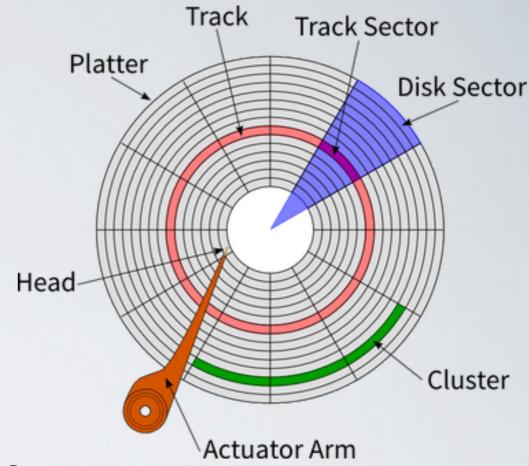


Read and Write Head (Each disk platter has its own head)

#### Inside Hard Disk



# HDD Interface



- → Disk interface presents linear array of sectors
  - Historically 5 I 2 Bytes but 4 KiB in "advanced format" disks
  - Written atomically (even if there is a power failure)
- ✓ Disk maps logical sector #s to physical sectors
- ✓ OS doesn't know logical to physical sector mapping