Chapter 1 Hardware

Unit 1.4 How Hard Disk Works

备课时间：2019-09-19

词汇与词组

1. **Nearly** every **desktop computer** and **server** in use today contains **one or more** hard-disk drives.

   ➢ **Nearly**：几乎，将近

      1) The bottle's **nearly** empty.

        这瓶子差不多空了。

      2) I've worked here for **nearly** two years.

        我已经在这里工作了将近两年。

      3) I was **nearly** asleep.

        我快睡着了。

   ➢ **Desktop computer**：台式电脑

   ➢ **Server**：服务器

   ➢ **One or more**：一个或多个

      1) This means that it supports **one or more** operations.

        这意味着它支持一个或多个操作。

      2) Each method takes **one or more** arguments.

        各方法接受一个或多个参数。

➢ **Disk drive**：磁盘驱动器

The **disk drive** on a computer is the part that contains the disk or into which a disk can be inserted. The disk drive allows you to read information from the disk and store information on the disk.

2. Every **mainframe** and **supercomputer** is **normally** connected to hundreds of them.

➢ **Mainframe**

a mainframe or mainframe computer is a large, powerful computer which can be used by many people at the same time and which can do very large or complicated tasks. 大型主机

➢ **Supercomputer**

a powerful computer with a large amount of memory and a very fast central processing unit 巨型计算机；超级计算机

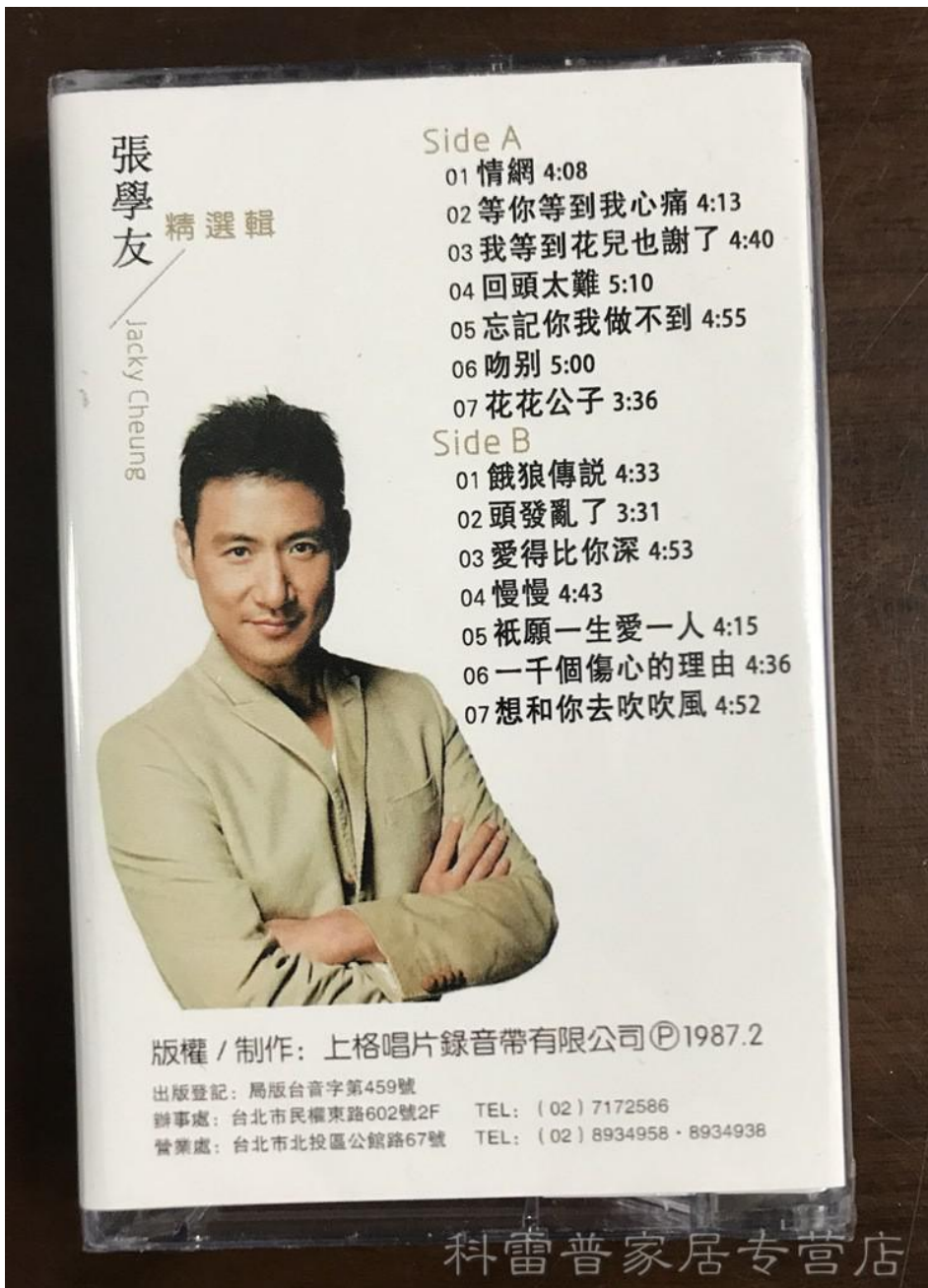➢ **Normally**：usually; in normal circumstances 通常；正常情况下

➢ them 指什么？

3. You can even find **VCR-type** devices and **camcorders** that use hard disks instead of **tape**.

➢ **VCR (video cassette recorder)**：a machine you use to record television programmes or play videotapes 录像机

➢ **Camcorder /ˈkæmˌkɔː də/**：摄影机

➢ Tape：磁带

張學友 精選輯 / Jacky Cheung

Side A
01 情網 4:08
02 等你等到我心痛 4:13
03 我等到花兒也謝了 4:40
04 回頭太難 5:10
05 忘記你我做不到 4:55
06 吻別 5:00
07 花花公子 3:36

Side B
01 餓狼傳説 4:33
02 頭發亂了 3:31
03 愛得比你深 4:53
04 慢慢 4:43
05 祇願一生愛一人 4:15
06 一千個傷心的理由 4:36
07 想和你去吹吹風 4:52

版權/制作：上格唱片録音帶有限公司 ℗1987.2
出版登記：局版台音字第459號
聯事處：台北市民權東路602號2F　TEL：(02) 7172586
營業處：台北市北投區公館路67號　TEL：(02) 8934958・8934938

...

总在刹那间，有一些了解
说过的话不可能会实现，就在一转眼
发现你的脸，已经陌生不会再像从前

...

National Climatic Data Center. Staff with the Tape Drives in the 1970's.

4. In this article, we'll **take apart** a hard disk so that you can see what's inside, and also discuss how they organize the **gigabytes** of information they hold in files.

➢ **Take apart：拆解、剖析**

1) Suzy loves **taking** electronics **apart** and figuring out how to put them back together again.
   苏西喜欢把电子设备拆开并搞明白如何把它们重新组装起来。

2) The storm **took** the house **apart** overnight.
   一夜之间，暴风雨把房子拆散了。

➢ **Gigabytes 千兆字节 （GB）（2^{30}）**

5. They started as large disks **up to** 20 **inches** in **diameter** holding just a few **megabytes**.

> **Up to：多达...**
> **Inch：** An inch is an imperial unit of length, approximately equal to 2.54 centimetres. 英制长度单位，英寸
> **Diameter：**直径
> **Megabytes：**one million bytes of data.兆字节（2^{20}）

6. Hard disks have a hard **platter** that holds the **magnetic** medium, as opposed to the **flexible plastic film** found in tapes and floppies.

> **Platter：** a large flat plate 大盘子
> **Magnetic：**有磁性的
> **magnet：**磁铁
> **superconducting magnet：**超导磁铁
> **As opposed to：** used to make a contrast between two things 与...截然相反
> I am here on business **as opposed to** a holiday.
> 我在这里是办公而不是度假。
> **Flexible：** 灵活的；柔韧的；易弯曲的
> **Plastic：**塑料的
> **Film：**胶带

7. **At the simplest level,** a hard disk **is not that different from** a **cassette** tape.

   ➢ **At the simplest level** 从最简单的层面来看/说

   ➢ is **not that** different form 并没有多大区别

       1) **He's just not that into you.**

         他其实没那么喜欢你

       2) It's a beautiful restaurant, but the food **wasn't that** good.

   ➢ **Cassette /kə'set/** tape 盒式磁带

8. It will remember the **magnetic flux patterns** stored onto the medium for many years.

   ➢ **magnetic flux pattern** 磁通模式

   法拉第 Michael Faraday (1791-1867)

9. The magnetic recording material on a cassette tape is **coated** onto a thin plastic **strip**.

   ➢ **Coat**：外套(名词)；覆盖...的表明(动词)

   ➢ **Strip**：带状物、条状物

10. In a hard disk, the magnetic recording material is **layered** onto a high-precision **aluminum** or glass disk.

   ➢ **Layer**：If you layer something, you arrange it in layers.

   ➢ **Aluminum** /əˈluːmɪnəm/ ：铝

11. The hard-disk platter is then **polished** to mirror-style smoothness.

> **Polish**： 抛光，擦亮；修改，润色；（使）完美，改进

1) nail **polish** 指甲油（用作名词）
2) Would you please **polish** my article right now? （动词）
您现在把我的文章润色一下好吗?

12. With a tape, you have to **fast-forward** or **reverse** to get to any particular point on the tape.

> **Fast-forward**：快进
> **Fast-reverse**：快退
> **Forward**：向前的（地）

The university system requires more **forward** planning.
大学体制要求更具前瞻性的规划。

> **Backward**：后退，向后的（地）

This change is not **backward** compatible.
这个变更不是向后兼容的。

> **Reverse**：反转；相反的

reverse engineering   逆向工程

13. On a hard disk, you can move to any point on the surface of the disk almost **instantly**.

➢ **Instantly**： 立即地；马上地；即刻地

The information was instantly available.

信息即时可得。

➢ **Immediately**

He **immediately** flung himself to the floor.

他立即扑倒在地。

➢ **Instant 立即的；紧急的；紧迫的**

instant messaging services

即时通讯服务（IM service）

14. Cassette-tape deck 盒式磁带机

15. A hard-disk platter can **spin underneath** its head at speeds up to 3,000 inches per second (about 170 mph or 272 kph)!

> **Spin**：旋转（动词或名词）

He threw it back again, putting a slight **spin** on the ball.

他把球略带旋转地又投掷了回去。

> **mph**：英里/小时（miles per hour）

> **kph**： 公里/小时（kilometers per hour）

Convert in/s to mph

Inches per second

3000   [6 decimal ▾]   **Convert**

3000 in/s = 170.454545 mph

Convert in/s to kph

Inches per second

3000   [5 decimal ▾]   **Convert**

3000 in/s = 274.32 kph

16. A hard disk can also access any of its information in a fraction of a second.

> **a fraction of a second** 一转眼的工夫， 一秒钟的若干分之几，顷刻

17. The bytes might be the **ASCII** codes for the characters of a text file, or they could be the **pixel** colors for a **GIF** image.
   - ➢ **ASCII** /'æski/ 美国信息交换标准码（American Standard Code for Information Interchange）
   The database history is stored in **an ASCII** file.
   数据库历史数据存储在一个 ASCII 文件中
   - ➢ **Pixel** /'pɪksl/ 像素
   像素是图像的基本采样单位，它不是一个确定的物理量，因为像素点的物理大小是不确定的，是一个抽象的概念。
   ppi (Pixels Per Inch) 像素密度，每英寸所拥有的像素数量
   dpi (Dots Per Inch) 打印分辨率，每英寸所能打印的点数
   例：
   - ✓ 照片的尺寸是 4 英寸×3 英寸，而打印分辨率横向和竖向都是 300dpi
   - ✓ 则照相机采集的像素数至少为（300×4）×（300×3）= 1080000 像素，约一百万像素
   - ✓ 采集的像素数过低会降低图像的打印质量，过高也不能提升打印质量
   - ➢ **Resolution** 分辨率
   分辨率是屏幕像素的数量，一般用屏幕屏宽像素数乘以屏高像素数

➤ **GIF /dʒif/ graphics interchange format**

18. **Data rate**─ The data rate is the number of bytes per second that the drive can deliver to the CPU.
➤ **Data rate：数据传输率**

19. **Seek time**─The seek time is the amount of time between when the CPU requests a file and when the first byte of the file is sent to the CPU. Times between 10 and 20 **milliseconds** are common.
➤ **Seek time：寻道时间**
➤ **Millisecond：毫秒** one thousandth (10^{-3}) of a second

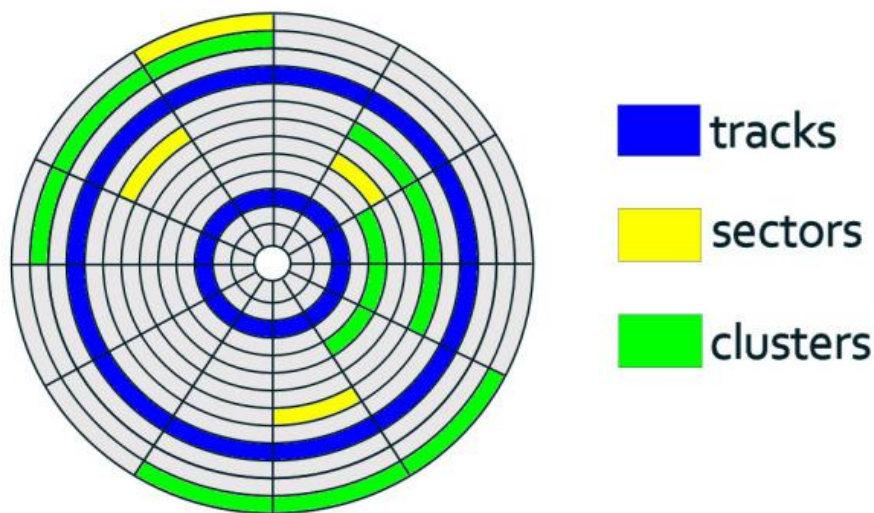20. Data is stored on the surface of a platter in **sectors** and **tracks**.
➤ **Sector：扇区**
➤ **Track：道**

21. Tracks are **concentric** circles, and sectors are pie-shaped **wedges** on a track.
➤ **Concentric：同轴的**
➤ Wedge[wedʒ]：楔（xiē）形物

Hard disk drive structure

Legend:
- **tracks** (blue)
- **sectors** (yellow)
- **clusters** (green)

➢ **Sector:** Smallest Addressable Unit (mostly 512 bytes)

➢ **Cluster:** Smallest Allocation Unit (equals to 1 or more sectors and the number of clusters depends on the file system).

➢ **Bad Sector**

1) A bad sector refers to a single sector that has some physical flaw.

2) Although a disk can operate with a bad sector, any data that was stored in that sector will be lost, further, no data can be written to that sector.

➢ **Lost Cluster**

1) A lost cluster is a cluster that the operating system has classed as being in use, but actually contains no data.

2) The ScanDisk utility within Windows is designed to search for lost clusters and make them available to the file system again.