

# Ch. 2

# File Systems



Computer Security – an overview  
Wecksten, M



# Översikt

- FAT12
- FAT16
- FAT32
- Other file systems (NTFS and CD file systems)

# Grunder FAT

- Reserverat utrymme (VBR)
- FAT
- Data

# File Allocation Table

- FAT – File Allocation Table
  - Länkning av kluster
  - Bokning
- Max antal kluster
  - FAT 12 - 4048
  - FAT 16 - 65524
  - FAT 32 – 67092481
- Maximal storlek?

# Dataarean

- Folderelement
  - 32 byte
  - 8.3
- Long File Name
- Fildata

# Folderelementet

- 32 byte
- Namn
- Storlek
- Start
- Attribut
- Metadata

# Folderelementet - detaljer

**TABLE 2.4** Data Structure for FAT Directory Entry

Byte Offset (Decimal)	Description
0	First character of the file name or status byte.
1-7	Characters 2-8 of the file name.
8-10	Three characters of the file extension.
11	Attributes (detailed in Table 2.5).
12-13	Reserved.
14-17	Created time and date of file; stored as MS-DOS 32-bit date/time stamp.
18-19	Last accessed date; no time!
20-21	Two high bytes of FAT32 starting cluster; FAT12/16 will have zeros.
22-25	Last written time and date of file; stored as MS-DOS 32-bit date/time stamp.
26-27	Starting cluster for FAT12/16; two low bytes of the starting cluster for FAT32.
28-31	Size in bytes of file (32-bit integer). Note: will be 0 for directories!

# VBR

- FAT 32
  - 0,1,2 Boot
  - 6,7,8 Boot Backup
  - Referens till boot-koden (byte 0-2)
  - BIOS parametrar (byte 3-61 / 3-89 FAT32)
  - Boot-koden (byte 62-509/ 90-509)
  - Signatur 0x55AA (byte 510-511)



# File Allocation Table

- 2 st
- FAT2 kopia av FAT1
- Kan konfigureras annorlunda
  
- 0 – oallokerat
- x – allokerat (nästa kluster)
- $> 0xFFFF8 / 0xFFFF FFF8$  – sista allokeringsenheten
- $0xFFFF7 / 0xFFFF FFF7$  – skadat kluster

# Slack

- RAM-slack åtgärdades i Windows 95 B

# Folderstrukturen

- .
- ..

# Folderstrukturen avkodad

File Name	Extension	Created	Accessed	Written	Start Cluster	Length
file1234	txt	6/5/2005 1745 hrs	6/5/2005	1745 hrs 6/5/2005	2	4,095
file5678	txt	6/5/2005 1756 hrs	6/5/2005	1756 hrs 6/5/2005	3	4,097
fileabcd	txt	6/5/2005 1800 hrs	6/5/2005	6/5/2005 1800 hrs	5	4,096
filewxyz	txt	6/5/2005 1815 hrs	6/5/2005	6/5/2005 1921 hrs	6	8,000
file8765	txt	6/5/2005 1820 hrs	6/5/2005	6/5/2005 1820 hrs	7	286

# Att återskapa filer

- Fragmenterade filer

# NTFS

- Bitmap
- Mer att återskapa

# CD

- Begränsningar i filnamn
- Strukturbegränsningar i djup