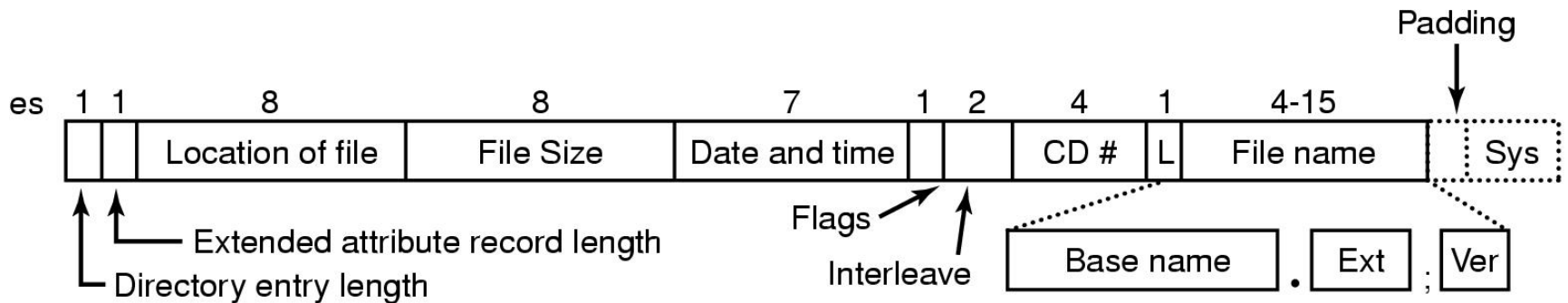


# Casi di studio

- ISO 9660
- FAT-12, FAT-16, FAT-32
- NTFS

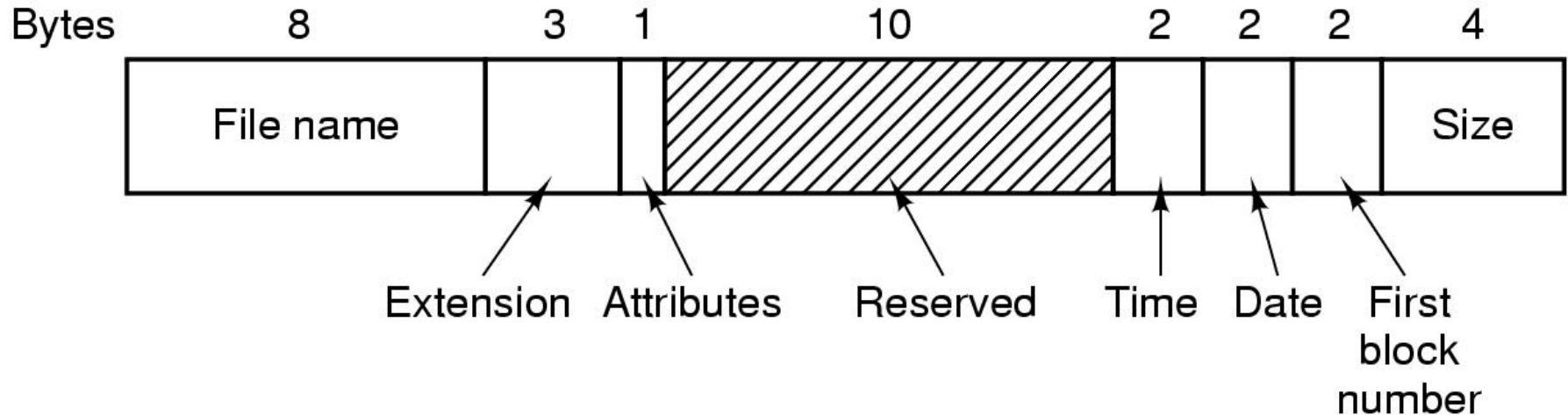
# Esempi di File System

## Il file system di un CD-ROM



- Rappresentazione di una directory nel file system ISO 9660
- Allocazione contigua, senza lista blocchi liberi

# Il File System MS-DOS (1)



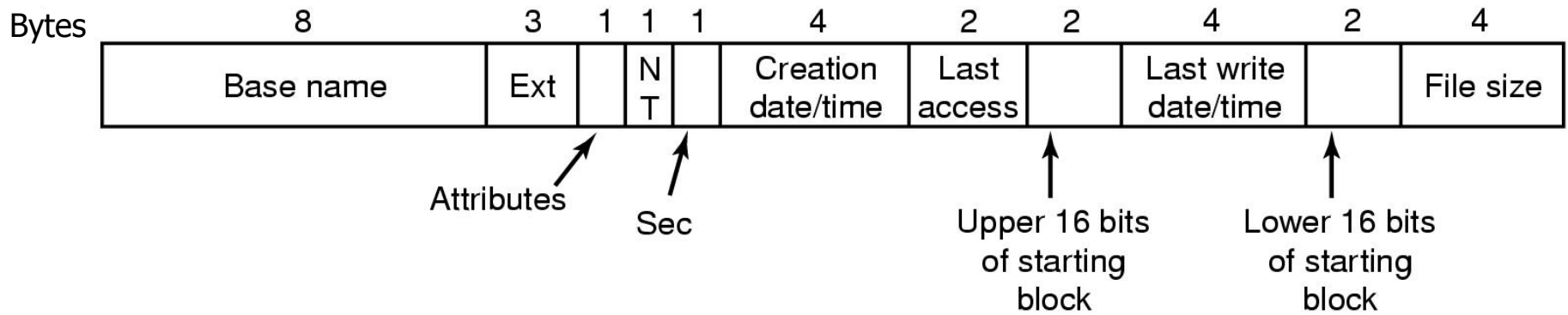
- Rappresentazione di una directory in MS-DOS
- Attributi : file nascosto, file di sistema, etc.

# Il File System MS-DOS (2)

<b>Block size</b>	<b>FAT-12</b>	<b>FAT-16</b>	<b>FAT-32</b>
0.5 KB	2 MB		
1 KB	4 MB		
2 KB	8 MB	128 MB	
4 KB	16 MB	256 MB	1 TB
8 KB		512 MB	2 TB
16 KB		1024 MB	2 TB
32 KB		2048 MB	2 TB

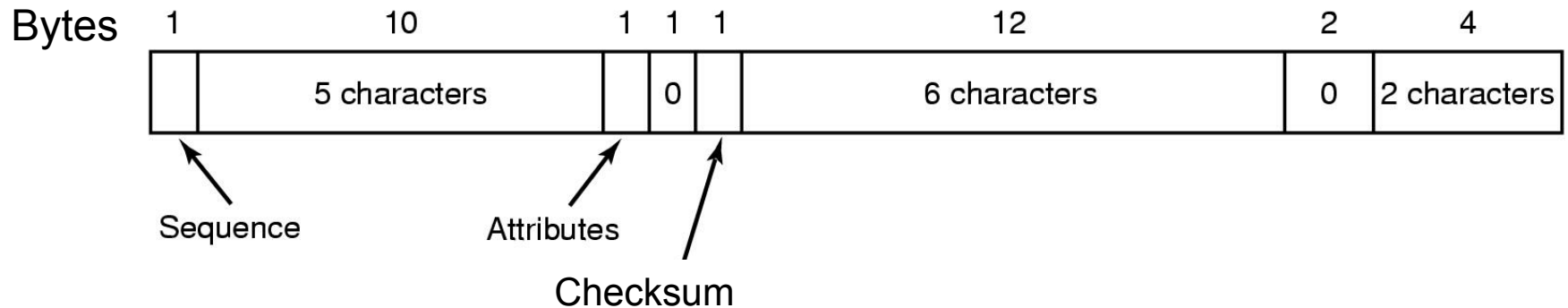
- massima ampiezza delle partizioni per diverse ampiezze dei blocchi
- elementi vuoti = combinazioni non ammesse

# Il File System di Windows 98 (1)



La rappresentazione estesa di una directory MS-DOS  
utilizzata in Windows 98

# Il File System di Windows 98 (2)



La rappresentazione di (parte di) un nome di file “lungo” in Windows 98

# Il File System di Windows 98 (3)

Bytes	68	d o g								A	0	C	K				0		
	3	o v e								A	0	C	K				0	z y	
	2	w n f o								A	0	C	K				0	s	
	1	T h e q								A	0	C	K				0	r o	
	T	H E Q U I ~ 1								A	N	T	S	Creation time	Last acc	Upp	Last write	Low	Size

Esempio di come viene rappresentato un nome “lungo” in Windows 98

# File System API in Windows 2000 (1)

Win32 API function	UNIX	Description
CreateFile	open	Create a file or open an existing file; return a handle
DeleteFile	unlink	Destroy an existing file
CloseHandle	close	Close a file
ReadFile	read	Read data from a file
WriteFile	write	Write data to a file
SetFilePointer	lseek	Set the file pointer to a specific place in the file
GetFileAttributes	stat	Return the file properties
LockFile	fcntl	Lock a region of the file to provide mutual exclusion
UnlockFile	fcntl	Unlock a previously locked region of the file

- Principali chiamate della Win32 API relative ai file con il loro equivalente Unix più vicino

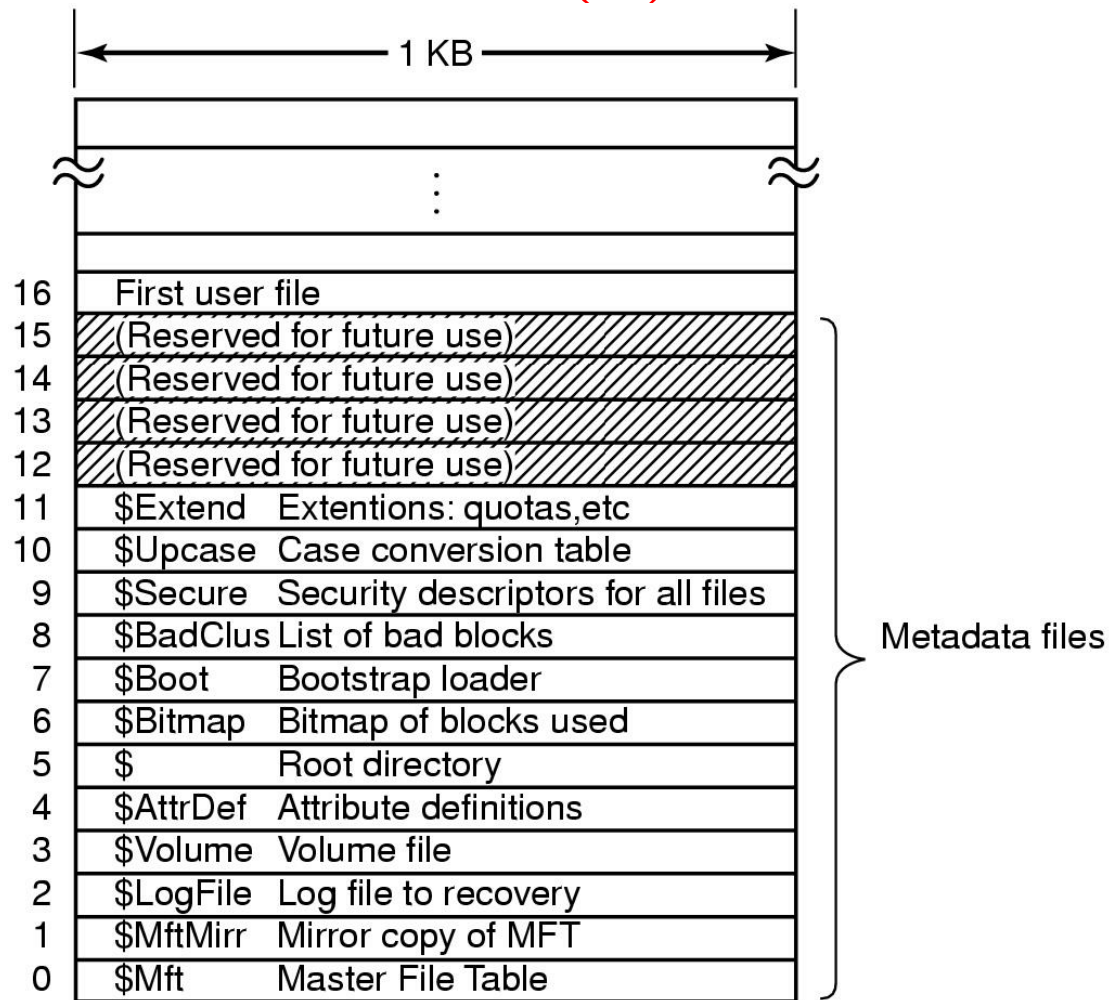


# File System API in Windows 2000 (3)

Win32 API function	UNIX	Description
CreateDirectory	mkdir	Create a new directory
RemoveDirectory	rmdir	Remove an empty directory
FindFirstFile	opendir	Initialize to start reading the entries in a directory
FindNextFile	readdir	Read the next directory entry
MoveFile	rename	Move a file from one directory to another
SetCurrentDirectory	chdir	Change the current working directory

- Principali chiamate della Win32 API relative alle directory con il loro equivalente Unix più vicino

# Struttura del File System in Windows 2000 (1)



*La master file table di NTFS*

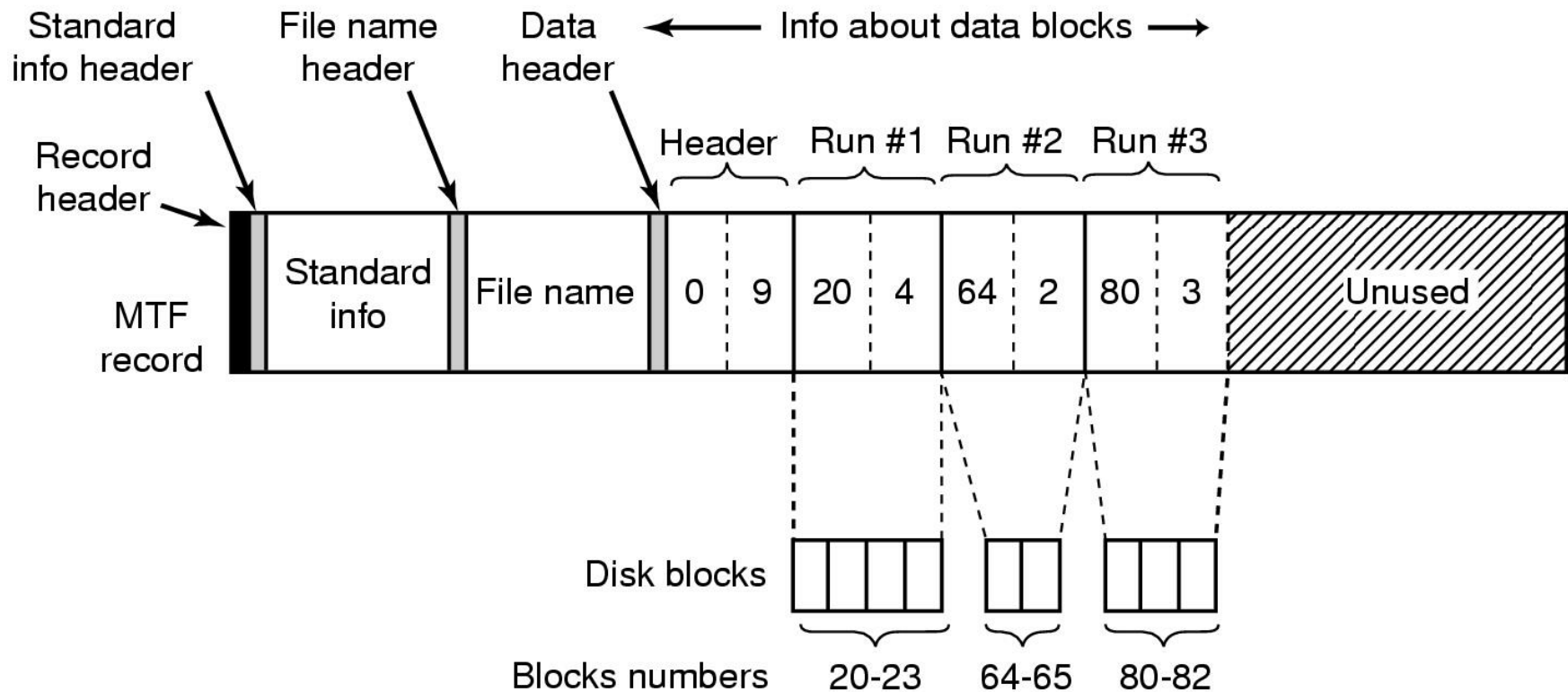
# Struttura del File System in Windows 2000 (2)

Attribute	Description
Standard information	Flag bits, timestamps, etc.
File name	File name in Unicode; may be repeated for MS-DOS name
Security descriptor	Obsolete. Security information is now in \$Extend\$Secure
Attribute list	Location of additional MFT records, if needed
Object ID	64-bit file identifier unique to this volume
Reparse point	Used for mounting and symbolic links
Volume name	Name of this volume (used only in \$Volume)
Volume information	Volume version (used only in \$Volume)
Index root	Used for directories
Index allocation	Used for very large directories
Bitmap	Used for very large directories
Logged utility stream	Controls logging to \$LogFile
Data	Stream data; may be repeated

partizioni

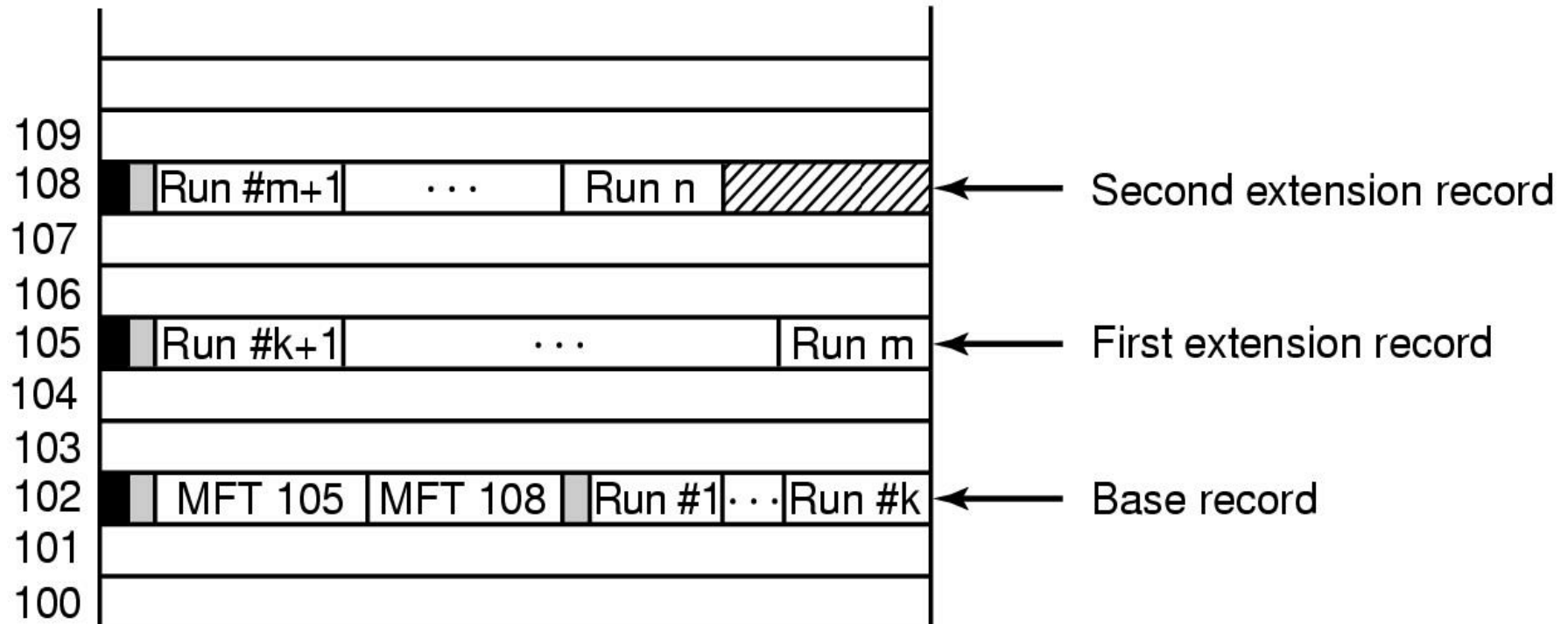
## Gli attributi usati nei record MFT

# Struttura del File System in Windows 2000 (3)



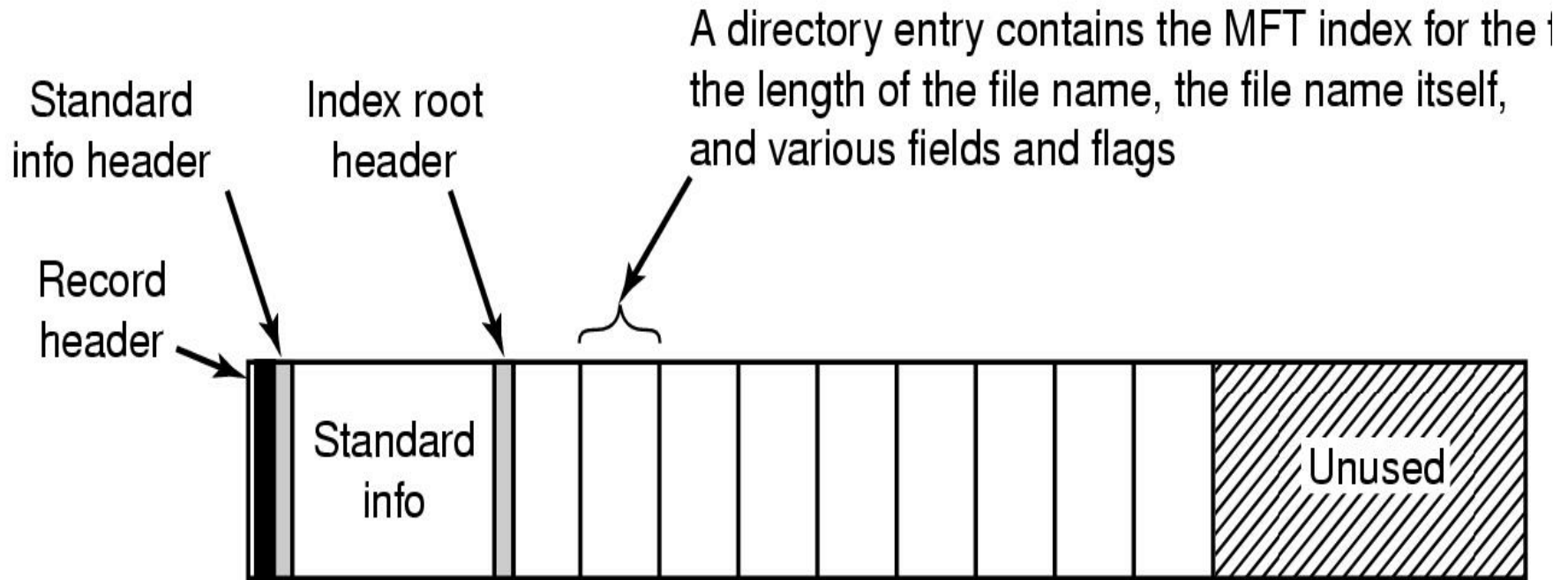
Un record MFT per un file di 3 *run* e 9 blocchi

# Struttura del File System in Windows 2000 (4)



Un file che richiede 3 MFT record per memorizzare i suoi *run*

# Struttura del File System in Windows 2000 (5)



Il record MFT di una piccola directory.