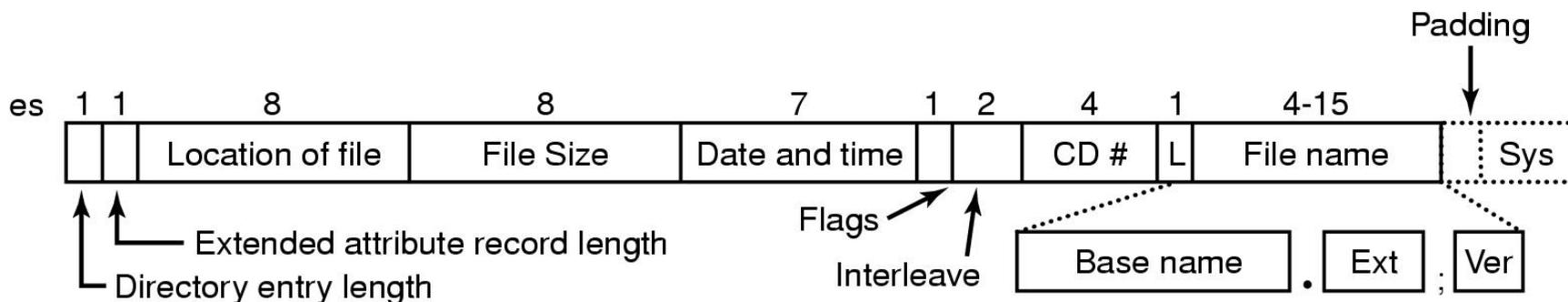


Casi di studio

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

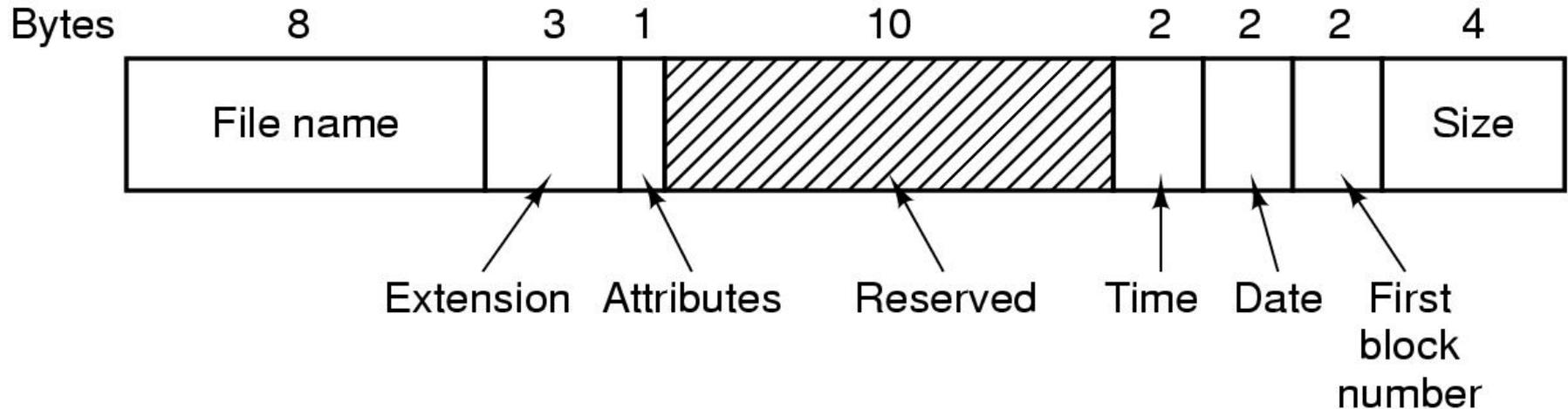
Esempi di File System

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)



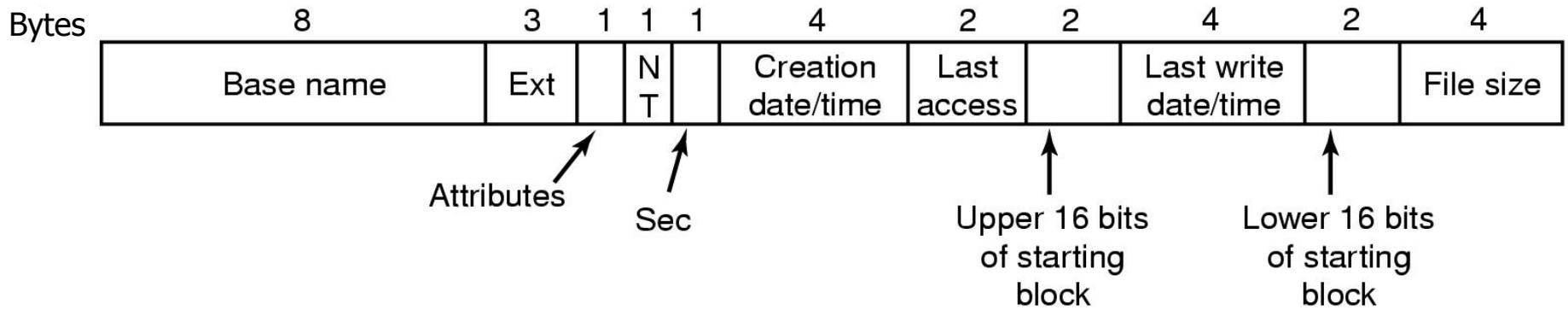
- Rappresentazione di una directory in MS-DOS
- Attributi : file nascosto, file di sistema, etc.

Il File System MS-DOS (2)

Block size	FAT-12	FAT-16	FAT-32
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

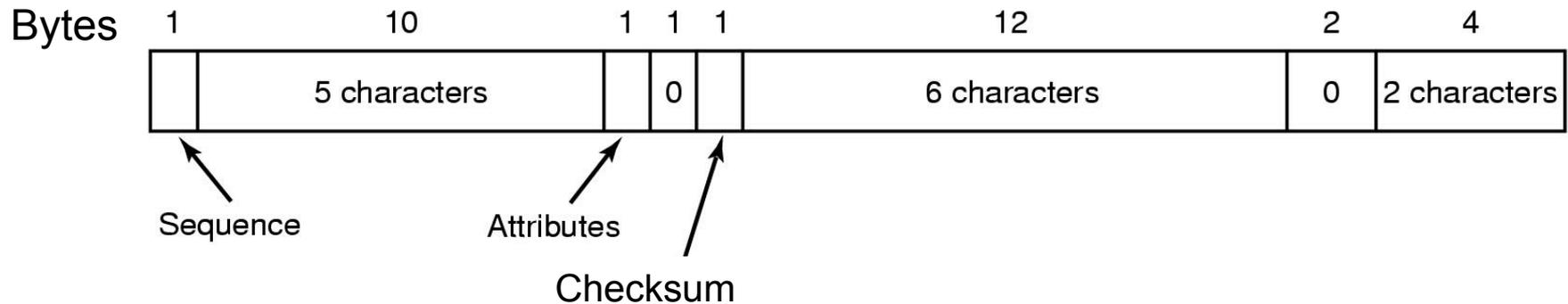
- massima ampiezza delle partizioni per diverse ampiezze dei blocchi
- elementi vuoti = combinazioni non ammesse

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)

68	d	o	g	A	0	C	K							0			
3	o	v	e	A	0	C	K	t	h	e		l	a	0	z	y	
2	w	n	f	o	A	0	C	K	x		j	u	m	p	0	s	
1	T	h	e	q	A	0	C	K	u	i	c	k		b	0	r	o
T	H	E	Q	U	I	~	1	A	N	S	Creation time	Last acc	Upp	Last write	Low	Size	

Bytes

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

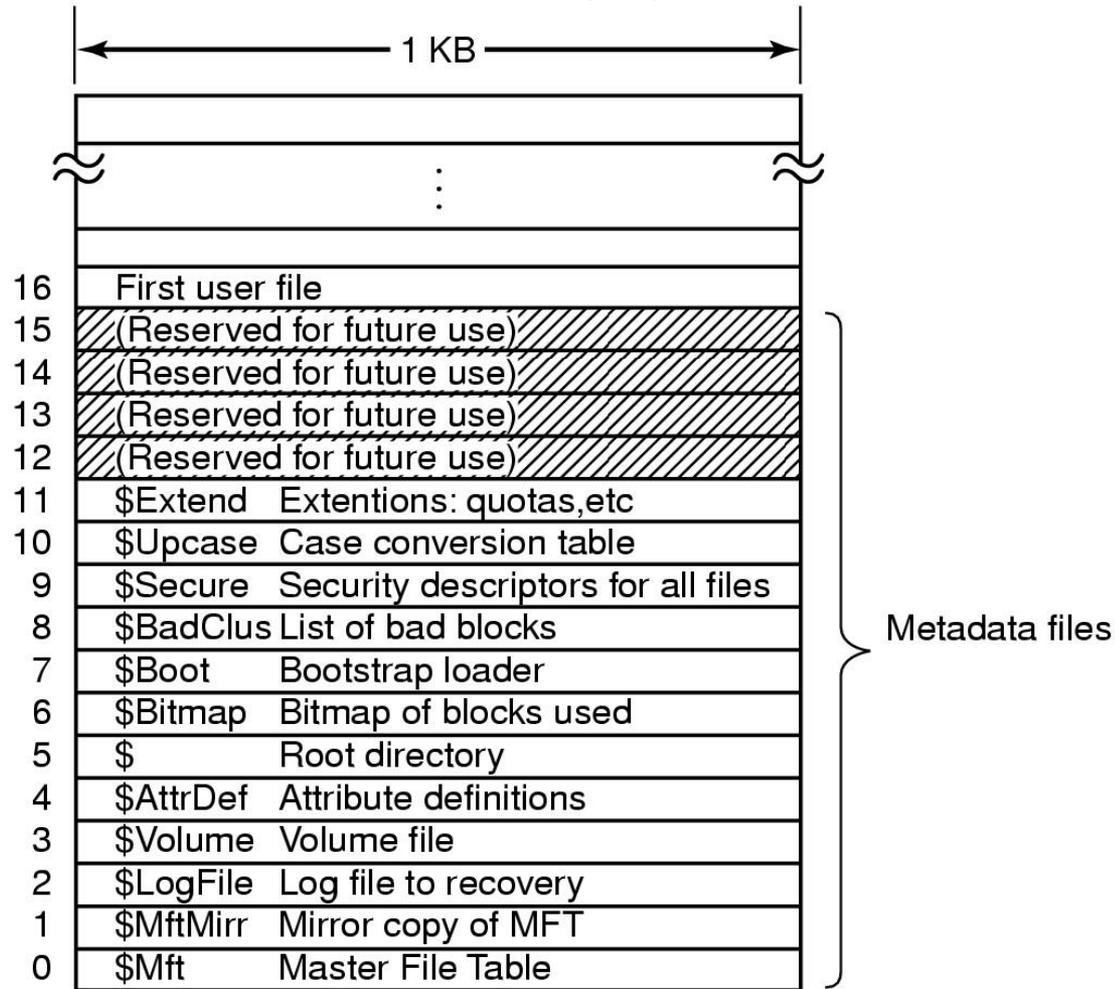
- Principali chiamate della Win32 API relative ai file con il loro equivalente Unix più vicino

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

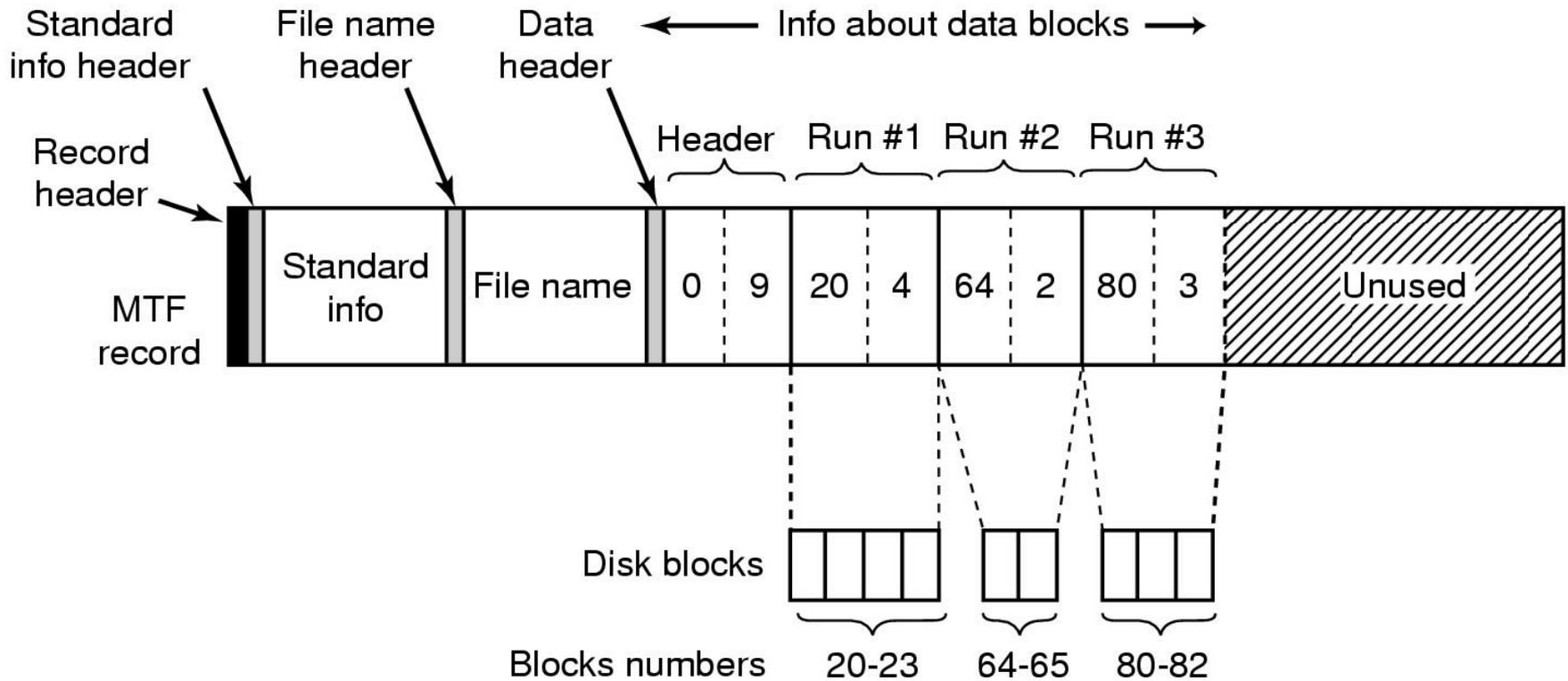
Struttura del File System in Windows 2000 (2)

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

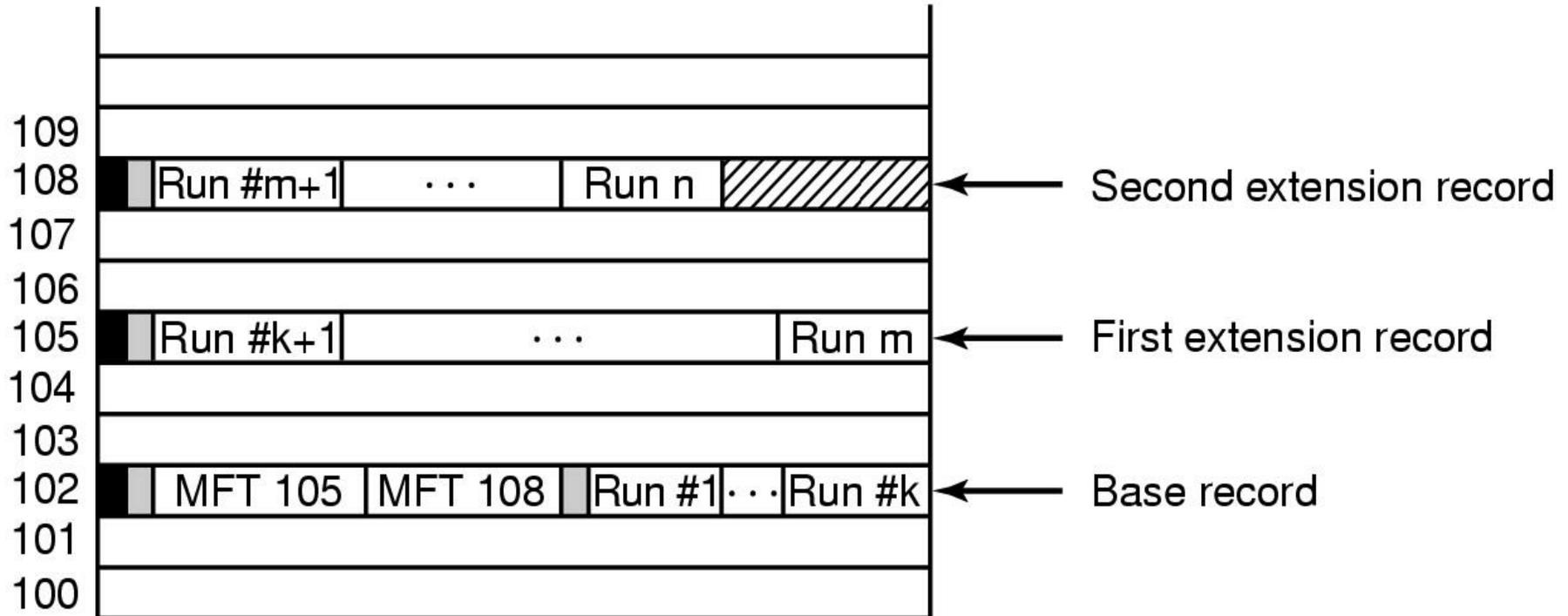
Gli attributi usati nei record MFT

Struttura del File System in Windows 2000 (3)



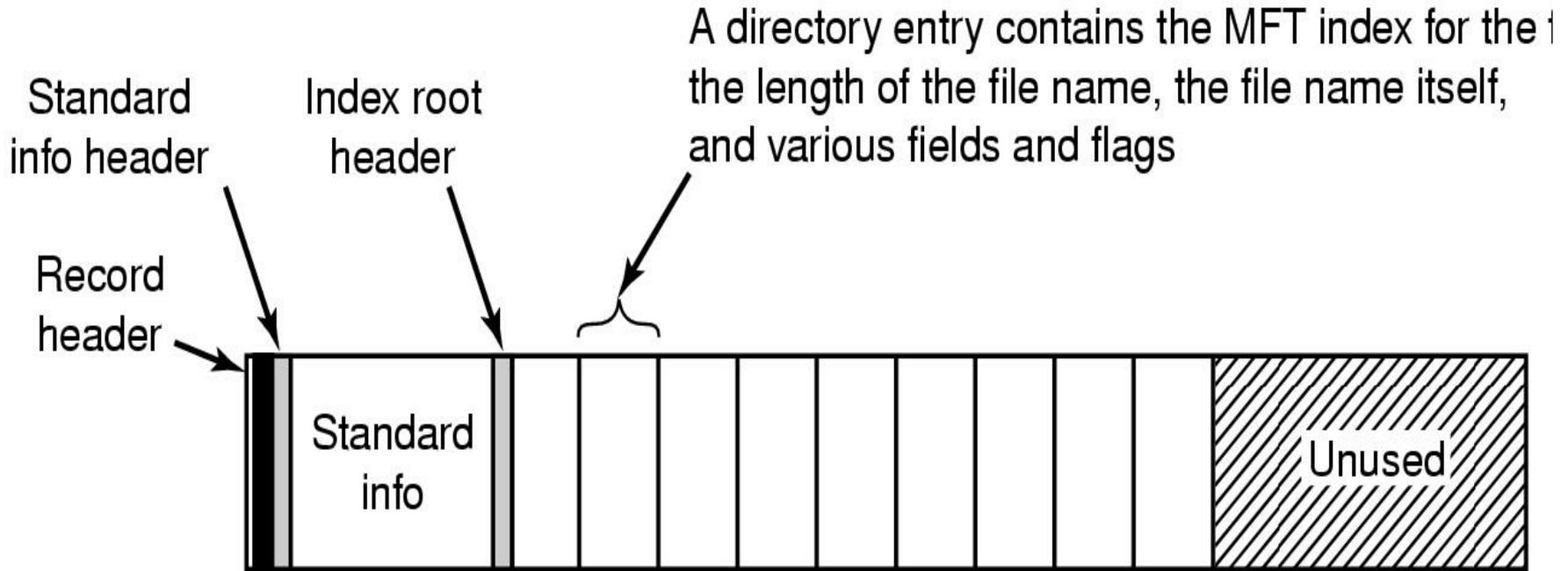
Un record MFT per un file di 3 *run* e 9 blocchi

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.