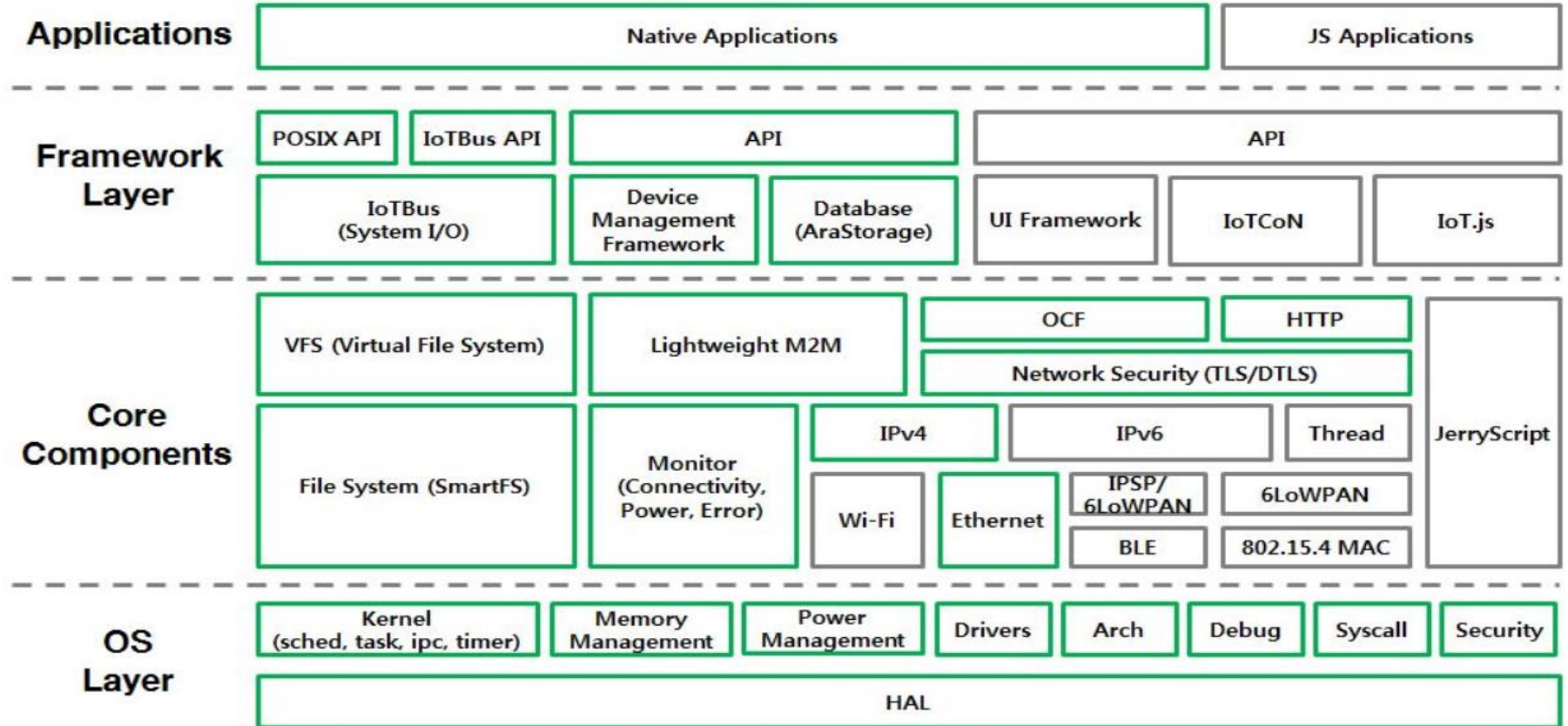


File Systems



An Actual Example of Architecture for OS Development



Contents

- System Calls for File Operations
- Hidden Directories
- File Permissions

File Systems

- OS uses **Files** as an abstraction to deal with accessing the information kept in blocks on a disk
- **Files** are logical units of information created by processes.
- **File Systems** are parts of the OS that manages **Files**.
 - How files are structured, named, accessed, used, protected, implemented, and managed.

System Calls for File Operations

File Operations

- **Create** - with no data, sets some attributes.
- **Delete** - to free disk space
- **Open** - after create, gets attributes and disk addresses into main memory.
- **Close** - frees table space used by attributes and addresses
- **Read** - usually from current pointer position. Need to specify buffer into which data is placed
- **Write** - usually to current position.

Hidden Directories

File Permissions

Types of Files

➤ **Regular files**

- Contains user information
- Binary file (executable file)

➤ **Directories**

➤ **Character special files**

- I/O devices, used to model I/O devices (terminal, networks, printers).

➤ **Block special files**

- model disks
- The device driver transfers chunks or blocks of data between the operating system and the device.

Type of Files

```
$ ls -l
```

```
total 124
```

```
-rwxr--r-- 1 tt dinh tt dinh   25 Nov 18 11:27 InputFile.txt  
-rwxr--r-- 1 tt dinh tt dinh 119707 Nov 19 06:28 Lab13.pdf
```


File Types

Type of Files

```
$ ls -l
```

```
total 124
```

```
-rw-r--r-- 1 tt dinh tt dinh 25 Nov 18 11:27 InputFile.txt  
-rw-r--r-- 1 tt dinh tt dinh 119707 Nov 19 06:28 Lab13.pdf
```

- 
- Regular file
 - d Directory
 - b Block device
 - c Character device
 - p Named pipe (se man mkfifo)
 - l Symbolic link
 - s Socket (se f.eks. i /run)

File Types

Type of Files

```
$ ls -l
```

```
total 124
```

```
-rwxr--r-- 1 tt dinh tt dinh 25 Nov 18 11:27 InputFile.txt  
-rwxr--r-- 1 tt dinh tt dinh 119707 Nov 19 06:28 Lab13.pdf
```



File Permission

9 permission setting

Type of Files

```
$ ls -l
```

```
total 124
```

```
-rwxr--r-- 1 tt dinh tt dinh 25 Nov 18 11:27 InputFile.txt  
-rwxr--r-- 1 tt dinh tt dinh 119707 Nov 19 06:28 Lab13.pdf
```

File Permission

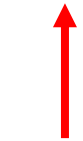
r	read
w	write
x	execute

Type of Files

```
$ ls -l
```

```
total 124
```

```
-rwxr--r-- 1 tt dinh tt dinh 25 Nov 18 11:27 InputFile.txt  
-rwxr--r-- 1 tt dinh tt dinh 119707 Nov 19 06:28 Lab13.pdf
```



Owner

r	read
w	write
x	execute

Type of Files

```
$ ls -l
```

```
total 124
```

```
-rwxr--r-- 1 tt dinh tt dinh 25 Nov 18 11:27 InputFile.txt  
-rwxr--r-- 1 tt dinh tt dinh 119707 Nov 19 06:28 Lab13.pdf
```



Group

r	read
w	write
x	execute

Type of Files

```
$ ls -l
```

```
total 124
```

```
-rwxr--r-- 1 tt dinh tt dinh 25 Nov 18 11:27 InputFile.txt  
-rwxr--r-- 1 tt dinh tt dinh 119707 Nov 19 06:28 Lab13.pdf
```



Other (All users)

r	read
w	write
x	execute

Type of Files

```
$ ls -l
```

```
total 124
```

```
-rwxr--r-- 1 tt dinh tt dinh 25 Nov 18 11:27 InputFile.txt  
-rwxr--r-- 1 tt dinh tt dinh 119707 Nov 19 06:28 Lab13.pdf
```



Links, ignore for now

Type of Files

```
$ ls -l
```

```
total 124
```

```
-rwxr--r-- 1 tt dinh tt dinh 25 Nov 18 11:27 InputFile.txt  
-rwxr--r-- 1 tt dinh tt dinh 119707 Nov 19 06:28 Lab13.pdf
```



Owner of the file

Type of Files

```
$ ls -l
```

```
total 124
```

```
-rwxr--r-- 1 tt dinh tt dinh 25 Nov 18 11:27 InputFile.txt  
-rwxr--r-- 1 tt dinh tt dinh 119707 Nov 19 06:28 Lab13.pdf
```



Group

Type of Files

```
$ ls -l
```

```
total 124
```

```
-rwxr--r-- 1 tt dinh tt dinh 25 Nov 18 11:27 InputFile.txt
```

```
-rwxr--r-- 1 tt dinh tt dinh 119707 Nov 19 06:28 Lab13.pdf
```



File size in bytes

Type of Files

```
$ ls -l
```

```
total 124
```

```
-rwxr--r-- 1 tt dinh tt dinh    25 Nov 18 11:27 InputFile.txt
```

```
-rwxr--r-- 1 tt dinh tt dinh 119707 Nov 19 06:28 Lab13.pdf
```



Last time modified

Type of Files

```
$ ls -l
```

```
total 124
```

```
-rwxr--r-- 1 tt dinh tt dinh    25 Nov 18 11:27 InputFile.txt
```

```
-rwxr--r-- 1 tt dinh tt dinh 119707 Nov 19 06:28 Lab13.pdf
```



File name

