The Solaris operating environment

UFS File System

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Object

- **File System**의 종류
- **UNIX File System layout** 과 그 의미
- **Performance** 향상을 위한 **UNIX File System**
- **UNIX File System** 의 생성 및 관리
- **Mount** 의 의미와 **vfstab file**의 기능
- **File System** 체크의 의미와 방법

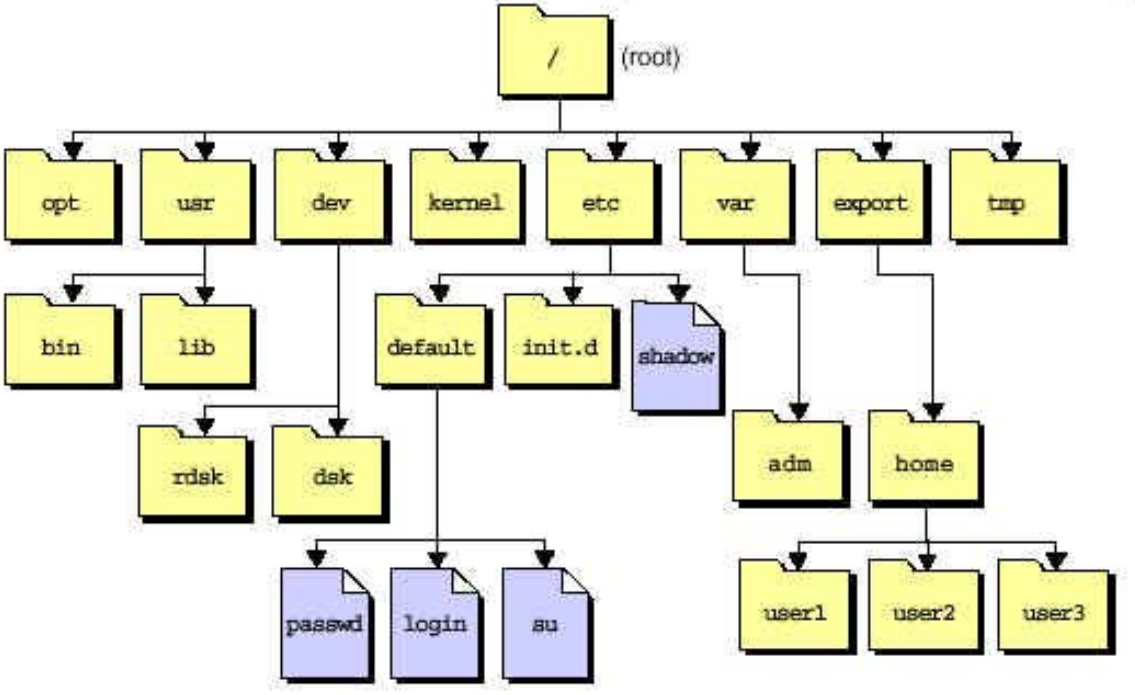
File System Types Supported by the Solaris Operating Environment

The Solaris Operating Environment supports three different types of file systems:

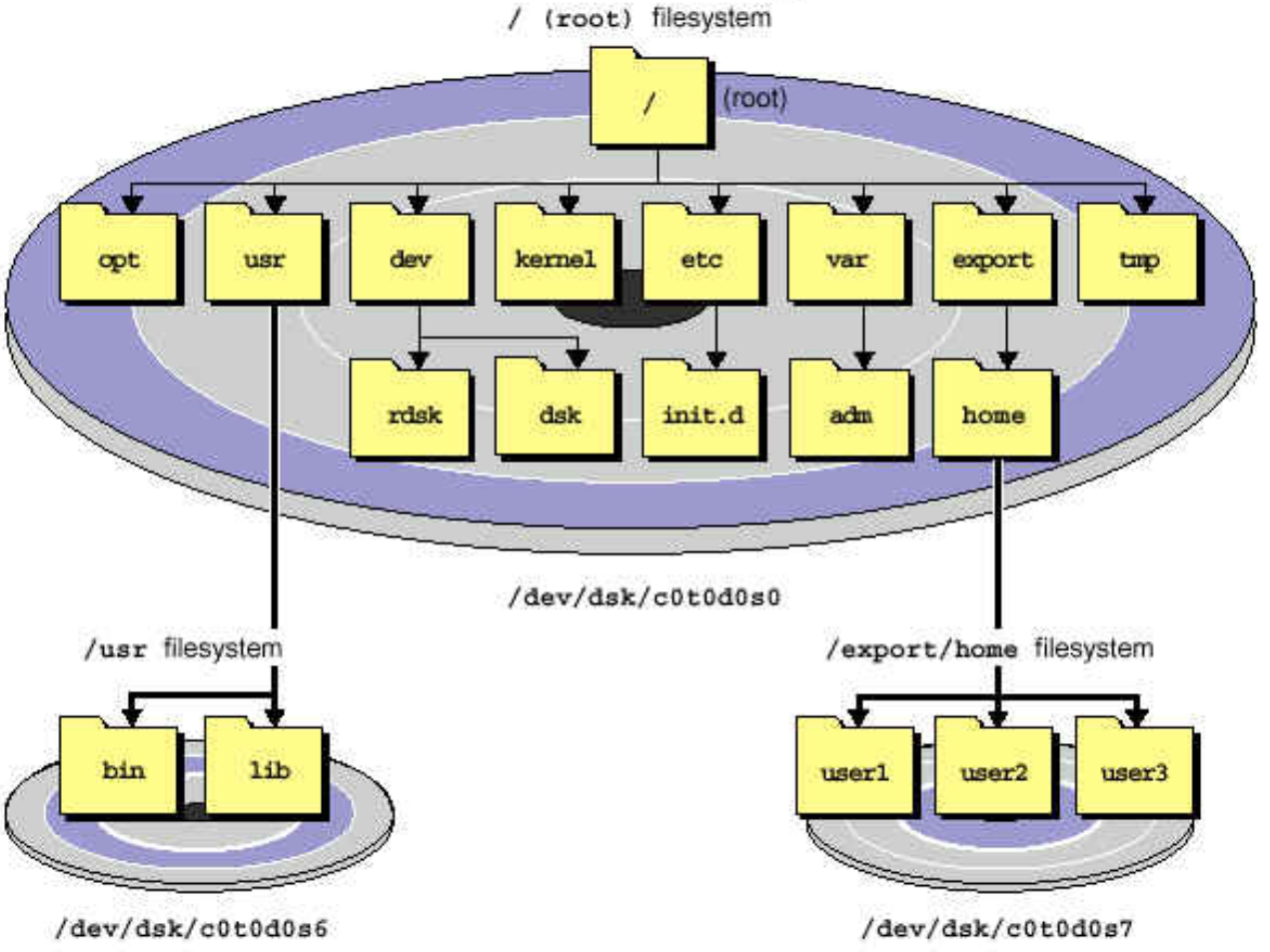
- Disk-based file systems:
  - `ufs, hsfs, pcfs, udfs`
- Distributed file systems:
  - `nfs`
- Pseudo file systems:
  - `tmpfs, swapfs, fdfs, procfs`

Introducing the Solaris `ufs` File System

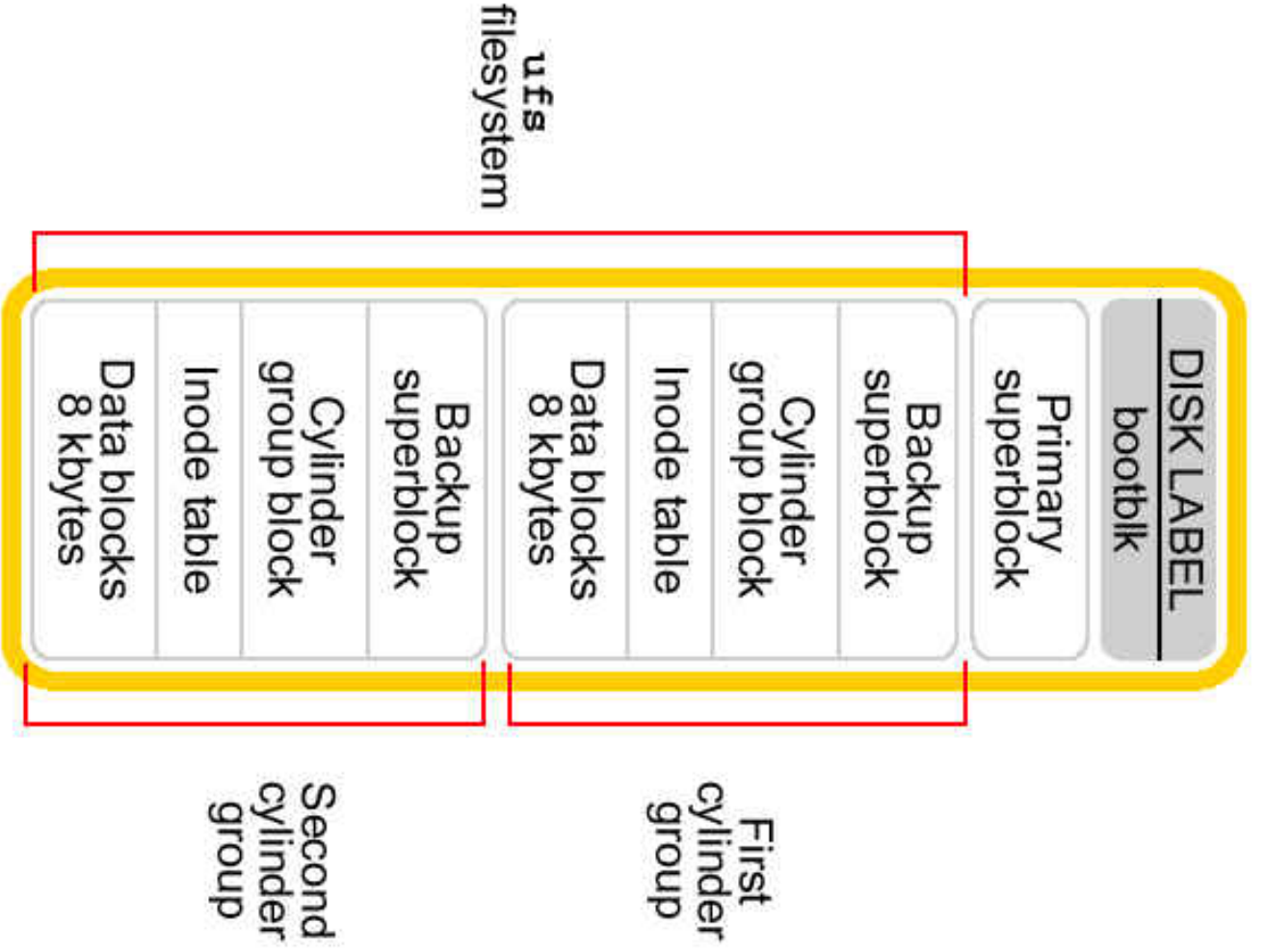
The Solaris Operating Environment stores data in a logical file hierarchy. This file hierarchy is referred to as the Solaris directory tree, which is formed by a number of file systems.



Solaris ufs File Systems



Solaris ufs File System Structure



Creating ufs File Systems

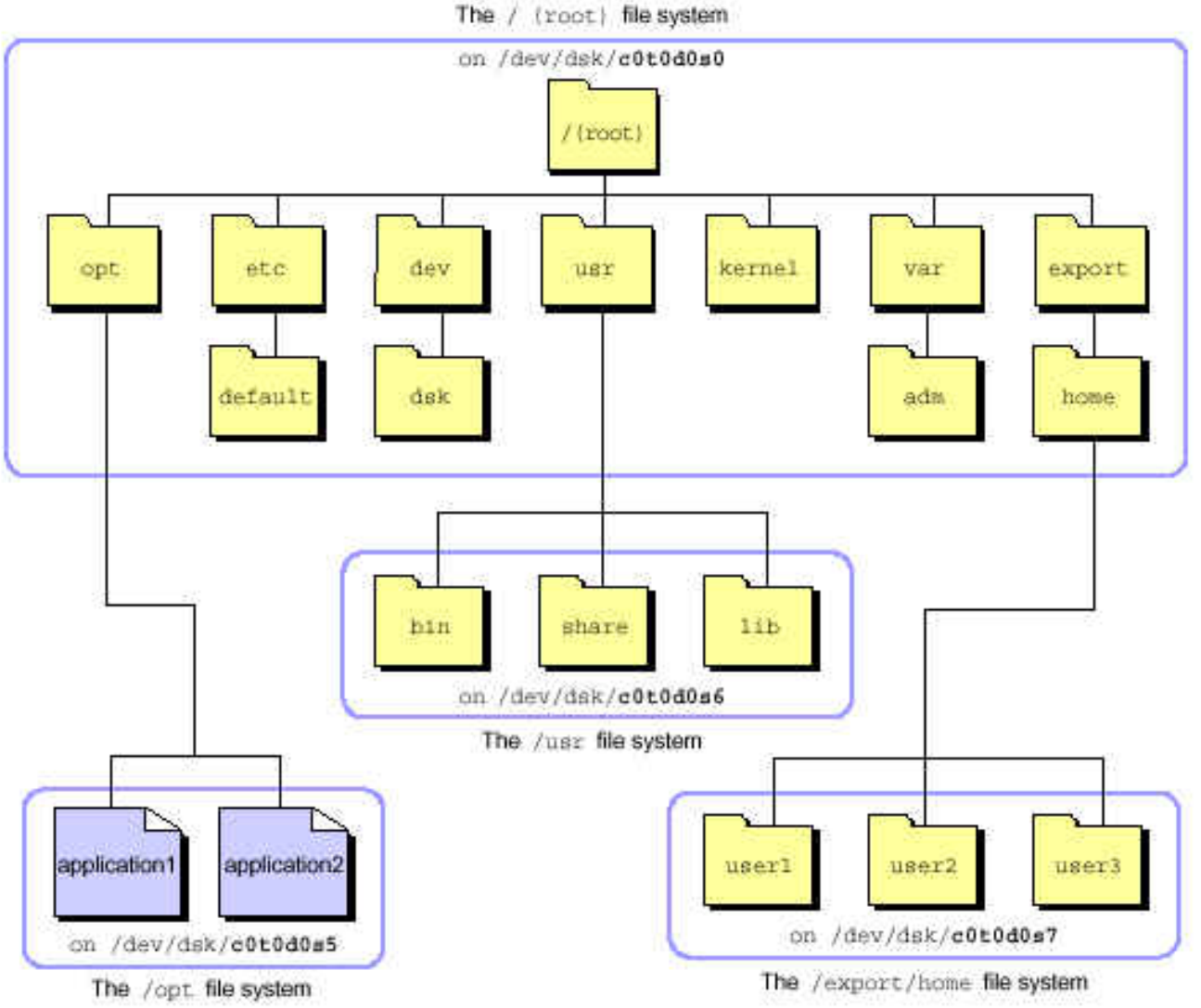
To construct a ufs file system on a disk slice, use the newfs command.

```
# newfs /dev/rdsk/c1t3d0s0
newfs: construct a new filesystem /dev/rdsk/c1t3d0s0: (y/n)? y
/dev/rdsk/c1t3d0s0: 410720 sectors in 302 cylinders 17 tracks 80 sectors
        200.5MB in 19 cyl groups (16 c/g, 10.62MB/g, 5120 i/g)
super-block backups (for fsck -F ufs -o b=#) at:
 32, 21872, 43712, 65552, 87392, 109232, 131072, 152912, 174752, 196592,
 218432, 240272, 262112, 283952, 305792, 327632, 349472, 371312, 393152
```

Mounting File Systems

- Define the term mount point
- Identify mounted and unmounted file systems
- Mount file systems using the commands `mount` and `mountall`
- Describe some of the commonly used options of the `mount` command: `noatime`, `nolargefiles`, and `logging`
- Describe the purpose and format of the `/etc/mnttab` and `/etc/vfstab` files

File Systems and Mount Points



Mounting File Systems

- To mount a local file system manually:

```
# mount /dev/dsk/c0t0d0s7 /export/home
```

  - The default action mounts the file system with the following: `read/write`, `setuid`, `nologging`, `largefiles`, and `onerror`

- To mount a file system as read-only:

```
# mount -o ro /dev/dsk/c0t0d0s7 /export/home
```

- To use multiple mount options on the command line:

```
# mount -o ro,nosuid /dev/dsk/c0t0d0s7 /export/home
```

The Virtual File System Table: /etc/vfstab

The /etc/vfstab file lists all the file systems that are to be automatically mounted at system boot time.

```
# cat /etc/vfstab
#device          device          mount           FS      fsck    mount     mount
#to mount        to fsck         point           type    pass    at boot   options

#/dev/dsk/c1d0s2  /dev/rdsk/c1d0s2  /usr          ufs      1      yes        -
fd                -               /dev/fd         fd       -      no         -
/proc             -               /proc           proc     -      no         -
/dev/dsk/c0t0d0s1 -               -               swapfs   -      no         -
/dev/dsk/c0t0d0s0  /dev/rdsk/c0t0d0s0  /         ufs      1      no          -
/dev/dsk/c0t0d0s6 /dev/rdsk/c0t0d0s6  /usr        ufs      1      no         -
/dev/dsk/c0t0d0s3 /dev/rdsk/c0t0d0s3  /opt        ufs      1      yes        noatime
/dev/dsk/c0t0d0s7 /dev/rdsk/c0t0d0s7  /export/home ufs     1      yes        logging
swap              -               /tmp            tmpfs    -      yes        -
```

The File System Check Program

A file system can become damaged from a variety of reasons:

- Corrupted from a power failure
- A software error in the kernel
- A hardware failure
- An improper shutdown of the system

Data Inconsistencies Checked by `fsck`

The file system check program, `fsck`, checks for data consistency in file systems and corrects or repairs any inconsistencies or damage found.

- The `lost+found` directory
- Superblock consistency
- Inode consistency
- Data block consistency
- Cylinder group block consistency

Phases of fsck

The fsck command runs through five phases for each file system listed in the /etc/vfstab file that has a device to fsck and fsck pass entry.

```
# fsck /dev/rdsk/c0t0d0s7
** /dev/rdsk/c0t3d0s7
** Last Mounted on /export/home
** Phase 1 - Check Blocks and Sizes
** Phase 2 - Check Pathnames
** Phase 3 - Check Connectivity
** Phase 4 - Check Reference Counts
** Phase 5 - Check Cyl groups
7 files, 14 used, 279825 free (17 frags, 347891
blocks, 0.0% fragmentation)
```

Using the `fsck` Command

- To check a single unmounted file system:

  ```
  # fsck /dev/rdsk/c0t0d0s7
  ```

- To check a file system using its mount point directory name as listed in the `/etc/vfstab` file:

  ```
  # fsck /export/home
  ```

- To check and repair a file system in non-interactive mode and exit if a serious problem is encountered:

```
# fsck -o f,p /dev/rdsk/c0t0d0s5
/dev/rdsk/c0t0d0s5: 77 files, 9621 used, 46089 free
/dev/rdsk/c0t0d0s5: (4 frags, 57 blocks, 0.0%
fragmentation)
```

Using Backup Superblocks

If `fsck` fails because of a corrupted superblock, it returns an error message indicating that it must be run using an alternative superblock backup to recover the file system.

```
# fsck -o b=32 /dev/rdsk/c1t3d0s0
Alternate super block location: 32.
** /dev/rdsk/c1t3d0s0
** Currently Mounted on
** Phase 1 - Check Blocks and Sizes
** Phase 2 - Check Pathnames
** Phase 3 - Check Connectivity
** Phase 4 - Check Reference Counts
** Phase 5 - Check Cyl groups
171 files, 3762 used, 5984 free (79 frags, 748 blocks, 0.1%
fragmentation)
```

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