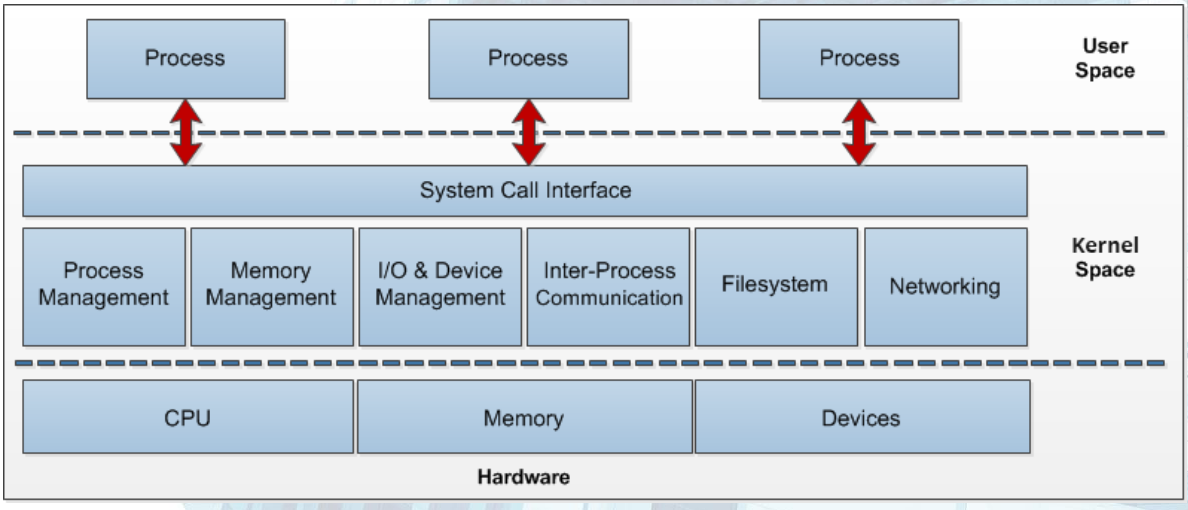
UNIX System Calls and Commands

Some common UNIX systems calls and commands to research and become proficient with are:

SYSTEM CALLS	COMMON UNIX COMMANDS
chmod()	chmod
chown()	chown
close()	dmesg
execve()	insmod
free()	lsmod
malloc()	make
open()	modinfo
read()	modprobe
recv()	pmap
send()	strace
socket()	sysctl
write()	truss
	uname

Kernel Space vs. User Space

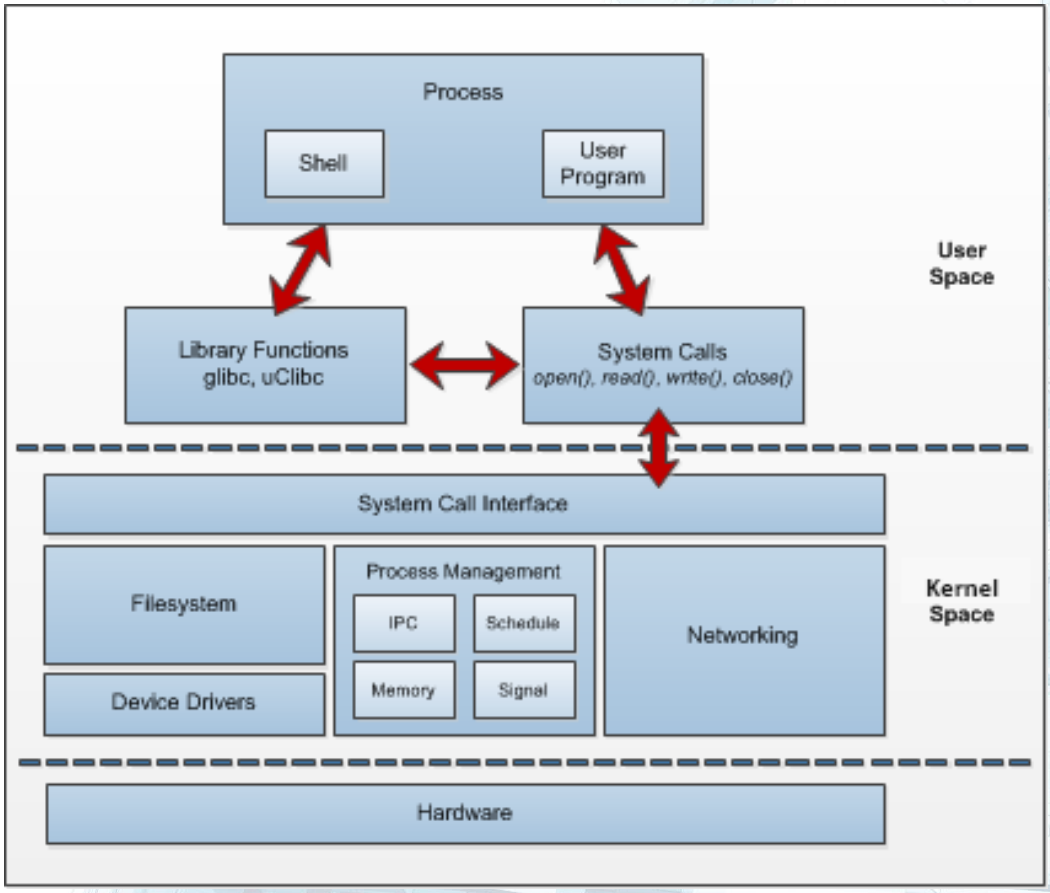
Since the kernel has many responsibilities and it is important for the kernel to be protected from rogue processes, such as malware and those unintentionally created by a user, an operation system is usually divided into two distinct regions – kernel space and user space.



System Calls

The UNIX Kernel essentially provides a set of functions, known as system calls, which user applications use to request services to the kernel. System calls allow processes to perform file operations; process manipulation operations, to include creating or destroying processes; memory operations, such as allocating or freeing memory; and even sending data via the network, not to mention so many other functions.

The most interesting feature of system calls is that they allow the kernel to abstract access to system resources at the highest level. Processes can therefore access various devices regardless of their specificity while the low-level details on how to access devices is left to the kernel and device drivers. In other words, since UNIX provides system calls which can abstract data transfer at a very high-level, many UNIX utilities can work equally well to read and write data from and to any data storage or transfer device.



Recommended Readings

- UNIX and Linux System administration Handbook 4th Edition (Chapter 13)

Recommended Internet Sites

- Man (manual) pages – Use any search engine using the format "[Topic] man page"
    - **Note:** In addition to viewing individual man pages for specific commands, you may also search through all available man pages for keywords using the 'apropos' or 'man –k' commands. For example, if you need to refresh your memory on what commands are available for file compression, you could run 'apropos compress'. The command will return a list of each man page which has the word compress in its name or description.

- RFCs – Use any search engine using the format "RFC [RFC NUMBER]"
- On a CentOS or Redhat system you can run "yum install kernel-doc" to install the kernel documentation. Then you can review it in /usr/share/doc/kernel-doc-<version>/Documentation
- CentOS wiki: https://web.archive.org/web/20160805142727/https://wiki.centos.org/
- Kernel settings: https://web.archive.org/web/20160726163539/https://www.centos.org/docs/5/html/5.2/Deployment_Guide/s1-proc-sysctl.html
- Wikipedia Linux kernel: https://web.archive.org/web/20160805142824/https://en.wikipedia.org/wiki/Linux_kernel
- Wikipedia `strace`: https://web.archive.org/web/20160805142955/https://en.wikipedia.org/wiki/Strace
- Wikipedia `systcl`: https://web.archive.org/web/20160805143044/https://en.wikipedia.org/wiki/Sysctl

Please contact the Course Coordinators if you are unable to access any of the Recommended Internet Sites.