

## System Call Implementation

### Definition of a System Call

A system call is a programmed request from a user-space application to the operating system's kernel to perform a privileged operation. Since user applications are restricted from directly accessing hardware and critical system resources, they rely on system calls to interact with these resources securely. Examples include file manipulation, process control, memory management, and time handling.

System calls serve as the interface between user programs and the kernel, allowing the user to request services like reading from a file, allocating memory, or retrieving the system time.

### **The `clock_gettime()` System Call**

The `clock_gettime()` system call is used to retrieve the current time of a specified clock, most commonly the real-time clock. It returns the time in two components:

Seconds: The whole seconds part of the current time.

Nanoseconds: The fractional part of a second, offering high precision.

This system call is essential in systems that require precise timing, such as performance profilers, schedulers, or real-time applications.

### **The Purpose of Implementing `clock_gettime()` system call**

The purpose of implementing the `clock_gettime()` system call is to:

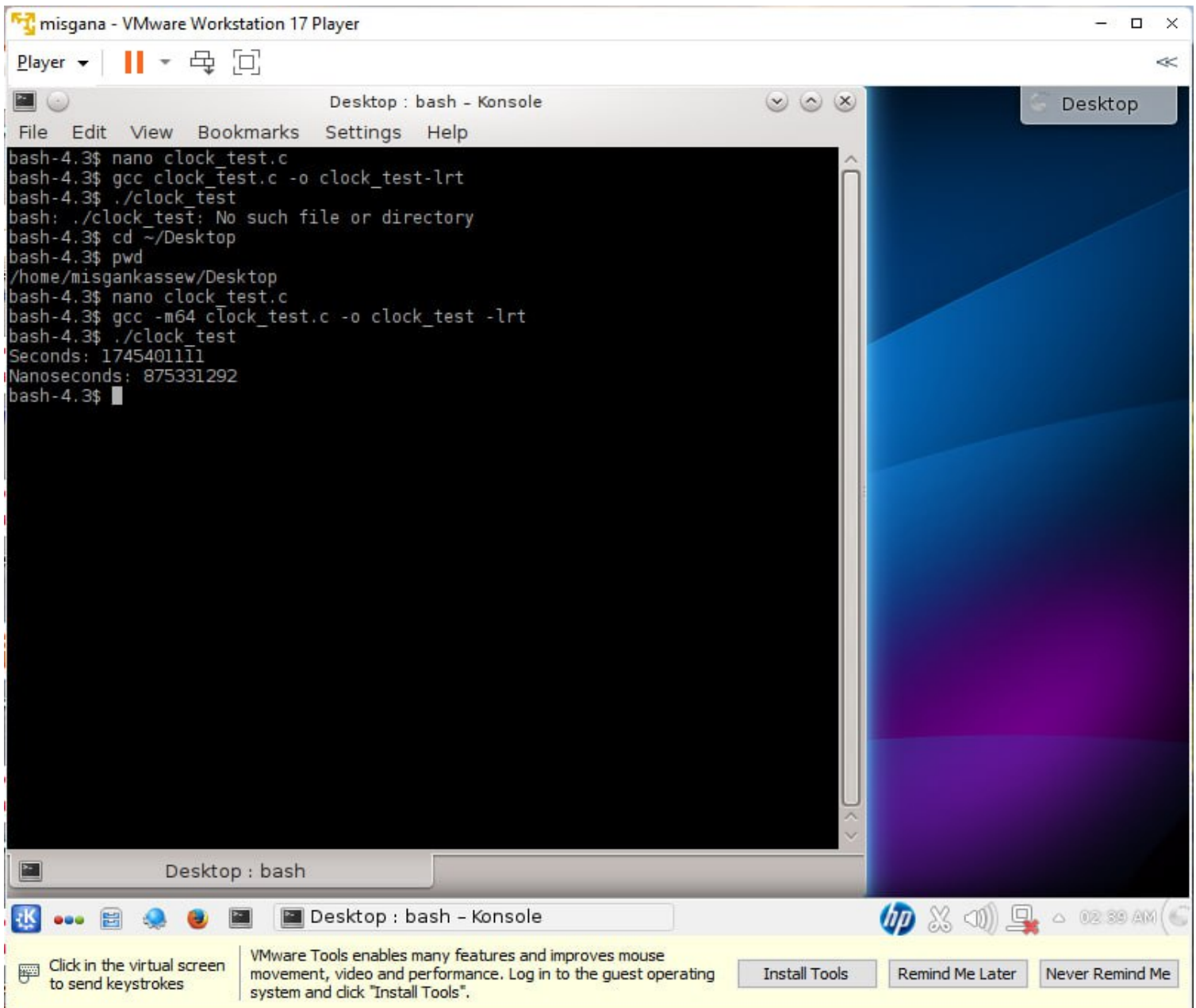
- Understand how time is managed in the Linux kernel.
- Gain practical experience in kernel development.
- Enable applications to access accurate and high-resolution system time.
- This implementation also strengthens the understanding of how user-space and kernel-space communicate.

***Steps that we followed during implementation are the following with their screenshots:***

1. open terminal and create a source file/a.c file named `clock_test.c` and then press enter.



Step 3. Finally compile and run the program and see the results of second and nanosecond.



```
misgana - VMware Workstation 17 Player
Player | [Pause] [Full Screen] [Close]
Desktop : bash - Konsole
File Edit View Bookmarks Settings Help
bash-4.3$ nano clock_test.c
bash-4.3$ gcc clock_test.c -o clock_test-lrt
bash-4.3$ ./clock_test
bash: ./clock_test: No such file or directory
bash-4.3$ cd ~/Desktop
bash-4.3$ pwd
/home/misgankassew/Desktop
bash-4.3$ nano clock_test.c
bash-4.3$ gcc -m64 clock_test.c -o clock_test -lrt
bash-4.3$ ./clock_test
Seconds: 1745401111
Nanoseconds: 875331292
bash-4.3$
```

Desktop : bash

Desktop : bash - Konsole

Click in the virtual screen to send keystrokes

VMware Tools enables many features and improves mouse movement, video and performance. Log in to the guest operating system and click "Install Tools".

Install Tools Remind Me Later Never Remind Me

hp [Volume] [Network] [Time: 02:39 AM]