CLAIMS

What is claimed is:

1. A file access method, comprising:

receiving a file access request from a process, wherein the file access request comprises a file identifier that indicates a to-be-accessed target file;

accessing a first physical address space according to a pre-set first virtual address space and a pre-set first mapping relationship between the first virtual address space and the first physical address space, wherein the first virtual address space is a part of user space in an operating system, and the first physical address space stores a file system and is a part of memory space;

obtaining an index node of the target file from the first physical address space according to the file identifier of the target file, wherein the index node comprises file page table information of the target file;

obtaining a file page table of the target file according to the file page table information, wherein the file page table records a second physical address space in the first physical address space, a data page of the target file is stored in the second physical address space, and the data page of the target file stores file data; and

accessing the target file according to the second physical address space.

2. The method according to claim 1, wherein the accessing the target file according to the second physical address space comprises:

allocating a second virtual address space to the target file, wherein the second virtual address space is a part of private space in the user space in the operating system, wherein the private space is allocated to the process, and wherein the second virtual address space is a contiguous address space;

establishing a second mapping relationship between the second physical address space and the second virtual address space; and

accessing the target file in the second physical address space based on the second mapping relationship.

3. The method according to claim 2, wherein the establishing a second mapping relationship between the second physical address space and the second virtual address space comprises:

establishing the second mapping relationship by linking the file page table of the target file to a process page table corresponding to the second virtual address space.

4. The method according to claim 2, wherein length of the second virtual address space is greater than length of the second physical address space; and

the accessing the target file in the second physical address space based on the second mapping relationship comprises:

performing a read operation on the target file in the second physical address space based on the second mapping relationship; and

ending the read operation when a virtual address corresponding to data to be read through the read operation is not included in a virtual address space corresponding to the target file.

5. The method according to claim 2, wherein length of the second virtual address space is greater than length of the second physical address space; and

accessing the target file in the second physical address space based on the second mapping relationship comprises:

performing a write operation on the target file in the second physical address space based on the second mapping relationship; and

ending the write operation when a virtual address corresponding to data to be written through the write operation is not included in the second virtual address space.

6. The method according to claim 1, wherein the method further comprises:

establishing, in kernel space, the first mapping relationship between the first virtual address space and the first physical address space;

storing, in a process page table corresponding to the kernel space, a mapping page table corresponding to the first mapping relationship; and

linking, to a process page table corresponding to the first virtual address space, the mapping page table corresponding to the first mapping relationship stored in the process

page table corresponding to the kernel space when the process page table corresponding to the first virtual address space does not record the first mapping relationship.

7. A storage system, comprising:

a memory, configured to store a file; and

a processor, coupled to the memory and configured to:

receive a file access request from a process, wherein the file access request comprises a file identifier that indicates a to-be-accessed target file in the memory;

access a first physical address space according to a pre-set first virtual address space and a pre-set first mapping relationship between the first virtual address space and the first physical address space, wherein the first virtual address space is a part of user space in an operating system, and the first physical address space stores a file system and is a part of memory space;

obtain an index node of the target file from the first physical address space according to the file identifier of the target file, wherein the index node comprises file page table information of the target file;

obtain a file page table of the target file according to the file page table information, wherein the file page table records a second physical address space in the first physical address space, a data page of the target file is stored in the second physical address space, and the data page of the target file is used to store file data; and

access the target file according to the second physical address space.

8. The storage system according to claim 7, wherein in the step of accessing the target file, the processor is configured to:

allocate a second virtual address space to the target file, wherein the second virtual address space is a part of private space in the user space in the operating system, wherein the private space is allocated to the process, and wherein the second virtual address space is a contiguous address space;

establish a second mapping relationship between the second physical address space and the second virtual address space; and

access the target file in the second physical address space based on the second mapping relationship.

9. The storage system according to claim 8, wherein the processor is configured to establish the second mapping relationship by linking the file page table of the target file to a process page table corresponding to the second virtual address space.

10. The storage system according to claim 8, wherein length of the second virtual address space is greater than length of the second physical address space; and

wherein in the step of accessing the target file, the processor is configured to:

perform a read operation on the target file in the second physical address space based on the second mapping relationship; and

end the read operation when a virtual address corresponding to data to be read through the read operation is not included in a virtual address space corresponding to the target file.

11. The storage system according to claim 8, wherein length of the second virtual address space is greater than length of the second physical address space; and

wherein in the step of accessing the target file, the processor is configured to:

perform a write operation on the target file in the second physical address space based on the second mapping relationship; and

end the write operation when a virtual address corresponding to data to be written through the write operation is not included in the second virtual address space.

12. The storage system according to claim 7, wherein the processor is further configured to:

establish, in kernel space, the first mapping relationship between the first virtual address space and the first physical address space; and

store, in a process page table corresponding to the kernel space, a mapping page table corresponding to the first mapping relationship,

wherein the processor is further configured to:

link, to a process page table corresponding to the first virtual address space, the mapping page table corresponding to the first mapping relationship stored in the process page table corresponding to the kernel space when the process page table corresponding to the first virtual address space does not record the first mapping relationship.

13. A non-transitory computer-readable storage medium comprising instructions which, when executed by a computer, cause the computer to carry out:

receiving a file access request from a process, wherein the file access request comprises a file identifier that indicates a to-be-accessed target file;

accessing a first physical address space according to a pre-set first virtual address space and a pre-set first mapping relationship between the first virtual address space and the first physical address space, wherein the first virtual address space is a part of user space in an operating system, and the first physical address space stores a file system and is a part of memory space;

obtaining an index node of the target file from the first physical address space according to the file identifier of the target file, wherein the index node comprises file page table information of the target file;

obtaining a file page table of the target file according to the file page table information, wherein the file page table records a second physical address space in the first physical address space, a data page of the target file is stored in the second physical address space, and the data page of the target file is used to store file data; and

accessing the target file according to the second physical address space.

14. The non-transitory computer-readable storage medium according to claim 13, wherein the instructions which cause the computer to carry out the step of the accessing the target file further comprise:

allocating a second virtual address space to the target file, wherein the second virtual address space is a part of private space in the user space in the operating system, wherein the private space is allocated to the process, and wherein the second virtual address space is a contiguous address space;

establishing a second mapping relationship between the second physical address space and the second virtual address space; and

accessing the target file in the second physical address space based on the second mapping relationship.

15. The non-transitory computer-readable storage medium according to claim 14, wherein the instructions which cause the computer to carry out the step of the establishing a second mapping relationship comprise:

establishing the second mapping relationship by linking the file page table of the target file to a process page table corresponding to the second virtual address space.

16. The non-transitory computer-readable storage medium according to claim 14, wherein the instructions which cause the computer to carry out the step of the accessing the target file comprise:

performing a read operation on the target file in the second physical address space based on the second mapping relationship, wherein length of the second virtual address space is greater than length of the second physical address space; and

ending the read operation when a virtual address corresponding to data to be read through the read operation is not included in a virtual address space corresponding to the target file.

17. The non-transitory computer-readable storage medium according to claim 14, wherein the instructions which cause the computer to carry out the step of the accessing the target file comprises:

performing a write operation on the target file in the second physical address space based on the second mapping relationship, wherein length of the second virtual address space is greater than length of the second physical address space; and

ending the write operation when a virtual address corresponding to data to be written through the write operation is not included in the second virtual address space.

18. The non-transitory computer-readable storage medium according to claim 13,

further comprising instructions which, when executed by a computer, cause the computer to carry out:

establishing, in kernel space, the first mapping relationship between the first virtual address space and the first physical address space;

storing, in a process page table corresponding to the kernel space, a mapping page table corresponding to the first mapping relationship; and

linking, to a process page table corresponding to the first virtual address space, the mapping page table corresponding to the first mapping relationship stored in the process page table corresponding to the kernel space when the process page table corresponding to the first virtual address space does not record the first mapping relationship.