

more embodiments and implementations are possible. Accordingly, the embodiments described herein are examples, not the only possible embodiments and implementations.

What is claimed is:

1. A method comprising:

allocating a portion of memory by:

selecting a type of memory to allocate in a client device from a group of memory types in response to a memory allocation request and/or in response to a request to access a portion of an address space addressable by a processor of the client device, wherein the selection of the type of memory to allocate is based on an available memory determination, wherein the group of memory types includes a local primary memory, wherein the group of memory types further includes an external primary memory and/or a memory-mapped file, wherein the external primary memory is memory that is located in a memory appliance external to the client device but is treated as primary memory at the client device; selecting a portion of the local primary memory, a portion of the external primary memory, and/or a portion of the memory-mapped file for the portion of memory to allocate at the client device depending on the selected type of memory; and mapping at least the selected portion to the address space,

wherein the allocated portion of memory in the local primary memory is converted to the memory-mapped file in one of following manners:

copying data in the selected portion of the local primary memory to a second portion of local primary memory that is associated with the memory-mapped file; or

associating the selected portion of the local primary memory with the memory-mapped file without copying the data of the selected portion of the local primary memory.

2. The method of claim 1, wherein the type of memory to allocate is selected from the group of memory types including the local primary memory and the external primary memory, and wherein data in the external primary memory is accessible via client-side memory access in which a communication interface of the memory appliance is configured to access the data in memory of the memory appliance.

3. The method of claim 1, wherein the type of memory to allocate is selected from the group of memory types including the local primary memory and the memory-mapped file.

4. The method of claim 1, wherein the type of memory to allocate is selected in response to a memory allocation request, which includes an invocation of an operating system programmatic procedure configured to allocate memory for a caller of the operating system programmatic procedure.

5. The method of claim 1, wherein the available memory determination includes a determination that an amount of allocated local primary memory is less than a limit and, therefore, the local primary memory is selected as the type of memory to allocate.

6. The method of claim 1, wherein the available memory determination includes a determination that an amount of local primary memory used to cache the external primary memory and/or to cache the memory-mapped file is within a limit and, wherein the external primary memory and/or memory-mapped file is selected as the type of memory to allocate.

7. The method of claim 1, wherein the available memory determination includes a determination that a ratio of an amount of allocated local primary memory to an amount of local primary memory used to cache the external primary memory and/or to cache the memory-mapped file is within a limit and, therefore, the local primary memory is selected as the type of memory to allocate.

8. The method of claim 1, wherein the type of memory to allocate is selected from the group of memory types including the local primary memory and the memory-mapped file, wherein the available memory determination includes a determination of available local primary memory and/or available file space in the memory-mapped file.

9. The method of claim 1, further comprising reading data into the selected portion of the local primary memory from a swap backing store before associating the selected portion of the local primary memory with the memory-mapped file.

10. The method of claim 1, wherein the available memory determination is controlled by setting a configurable parameter indicating a limit on a usable amount of the local primary memory and/or the external primary memory.

11. The method of claim 1, wherein the allocated portion of memory in the local primary memory is converted in response to a second available memory determination.

12. The method of claim 1, wherein one or more lock primitives are held during converting the allocated portion of memory, and wherein holding the one or more lock primitives prevents a page fault logic or a segmentation fault logic from making progress.

13. The method of claim 1, wherein copying the data is repeated in response to the allocated portion of memory being accessed or modified.

14. The method of claim 1, wherein the second portion of the local primary memory is mapped to the address space in an atomic operation with checking whether the allocated portion of memory has been accessed or modified.

15. A client device comprising:

a processor; and

a local primary memory in communication with the processor, the local primary memory comprising:

an application logic unit; and

a client logic unit configured to:

receive a memory allocation request from the application logic unit to allocate a portion of memory and/or receive a request to access a portion of an address space addressable by the processor;

select a type of memory to allocate at the client device from a group of memory types in response to the memory allocation request and/or in response to the request to access the portion of the address space, wherein the selection of the type of memory to allocate is based on an available memory determination, wherein the group of memory types includes the local primary memory, wherein the group of memory types further includes an external primary memory and/or a memory-mapped file, wherein the external primary memory is memory that is located in a memory appliance external to the client device but is treated as primary memory at the client device; select a portion of the local primary memory, a portion of the external primary memory, and/or a portion of the memory-mapped file for the portion of memory to allocate at the client device depending on the selected type of memory; and

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map at least the selected portion to the address space, wherein the allocated portion of memory in the local primary memory is converted from the memory-mapped file in one of following manners:
 copying data from the portion of the memory-mapped file to a second portion of the local primary memory not associated with the memory-mapped file; or dis-associating the allocated portion of memory from the memory-mapped file and updating one or more page table entries to reference the allocated portion of memory without copying data of the allocated portion of memory.

16. The client device of claim 15, wherein the selection of the type of memory to allocate is based on the available memory determination and on a configurable parameter indicating a manner in which the allocated portion of memory is to be used.

17. The client device of claim 15, wherein the client logic unit is configured to map the at least the selected portion to the address space before the memory allocation request and/or the request to access the portion of the address space is received.

18. The client device of claim 15, wherein the client logic unit includes a swap implementation of an operating system.

19. The client device of claim 15, wherein the application logic unit includes a virtualization instance, a virtual machine, a container, a jail, or a zone.

20. A computer readable storage medium comprising computer executable instructions executable by a processor of a client device, the computer executable instructions comprising:

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instructions executable to allocate a portion of memory by:

selecting a type of memory to allocate in the client device from a group of memory types in response to a memory allocation request, wherein the selection of the type of memory to allocate is based on an available memory determination, wherein the group of memory types includes a local primary memory and an external primary memory, wherein the external primary memory is memory that is located in a memory appliance external to the client device but is treated as primary memory at the client device, wherein data in the external primary memory is accessible via client-side memory access in which a communication interface of the memory appliance is configured to access the data in memory of the memory appliance;

selecting a portion of the local primary memory and/or a portion of the external primary memory for the portion of memory to allocate at the client device depending on the selected type of memory; and mapping at least the selected portion to an address space addressable by the processor;

wherein the allocated portion of memory in the local primary memory is converted to the memory-mapped file in following manner:

copying data in the selected portion of the local primary memory to a second portion of local primary memory that is associated with the memory-mapped file.

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