memory on the first physical host and automatically transmitting the data, over a network connection, to a second physical host; and

writing the data to a second memory on the second physical host so that the first and second memories contain the same data.

7. The method of claim **6**, further including using a first hardware memory synchronization controller located on the first physical host to write the data to the first memory and to transmit the data over the network connection and a second hardware memory synchronization controller located on the second physical host to receive the data and to write the data to the second memory.

8. The method of claim **7**, further including:

receiving, in the first hardware memory synchronization controller and from a first hypervisor on the first physical host, an identification associated with the first virtual machine; and

wherein the transmitting the data over the network connection to the second physical host includes transmitting the identification.

9. The method of claim **8**, further including using the identification to determine a memory location of the second memory.

10. The method of claim **6**, further including generating a checksum or hashsum on the data prior to transmitting the data over the network connection and using the checksum or hashsum to ensure that the data received on the second physical host is correct.

11. The method of claim **6**, wherein the second physical host periodically checks availability of the first physical host, detects if the first physical host is not operational and automatically initiates a second virtual machine to take over operation from the first virtual machine.

12. The method of claim **6**, wherein writing the data to the second memory on the second physical host is asynchronous with writing data to the first memory on the first physical host.

13. The method of claim **6**, further including:

in response to launching an instance of the first virtual machine, automatically launching an instance of a second virtual machine, wherein the second virtual machine is maintained in a paused state.

14. The method of claim **13**, further including automatically synchronizing all memory associated with the first virtual machine with memory for the second virtual machine, during an initialization phase, by communicating between hardware-based memory synchronization managers on the first and second physical hosts.

15. The method of claim **6**, further including, in response to the request, transmitting the data, over the network connection, to persistent storage separate from the first and second physical hosts.

16. The method of claim **6**, further including:

providing a first hardware memory synchronization controller located on the first physical host;

generating a hashsum or checksum on the first hardware memory synchronization controller associated with the data;

receiving a hashsum or checksum on the second physical host; and

rebuilding lost data on the second physical host using the hashsum or checksum.

17. One or more computer-readable media storing instructions thereon for executing a method, the method comprising:

providing first and second virtual machines running on different physical servers;

incrementally backing up memory of the first virtual machine by transmitting, to the second virtual machine, changes made to memory by the first virtual machine; and

wherein the changes to memory are automatically and asynchronously transmitted to the physical server associated with the second virtual machine by a hardware memory synchronization manager in response to writes to memory by the first virtual machine, the hardware memory synchronization manager being responsible for both writing to the memory associated with the first virtual machine and for transmitting the changes to the physical server associated with the second virtual machine.

18. The one or more computer-readable media of claim **17**, further including receiving a heartbeat signal in the physical server associated with the second virtual machine indicating that the first virtual machine is operational.

19. The one or more computer-readable media of claim **17**, further including asynchronously transmitting the changes to memory to persistent storage.

20. The one or more computer-readable media of claim **17**, further including generating a checksum or hashsum prior to transmitting the changes and using the checksum or hashsum to ensure that the transmission is without error.

21. The one or more computer-readable media of claim **17**, further including periodically checking availability of the physical server associated with the first virtual machine and, if the physical server associated with the first virtual machine is not operational, automatically initiating the second virtual machine to take over operation from the first virtual machine.

22. The one or more computer-readable media of claim **17**, further including:

in response to launching an instance of the first virtual machine, automatically launching the second virtual machine, wherein the second virtual machine is maintained in a paused state.

23. A system for tracking memory in virtual machines, comprising:

a first physical server for executing a first virtual machine, the first physical server including a first memory synchronization manager and a first memory;

a second physical server for executing a second virtual machine, the second physical server including a second memory synchronization manager and a second memory; and

the first memory synchronization manager coupled to the second memory synchronization manager via a network connection, the first memory synchronization manager for receiving data associated with a memory write request and, in response to the memory write request, for writing the data to the first memory and for transmitting the data over the network connection to the second memory synchronization manager for storage in the second memory.

24. The system of claim **23**, wherein the first memory synchronization manager includes a hash generator for generating a hash value associated with the data.

25. The system of claim **24**, wherein the second memory synchronization manager includes a hash checker for checking the hash value to determine errors in the data.

26. The system of claim **24**, wherein the first memory synchronization manager is configured to generate a heartbeat signal for transmission to the second memory synchronization manager.

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