Memory Resource Management in Vmware ESX server
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This paper discusses aspects of memory management from the VMware ESX server

A very important aspect of any VM layer is how it multiplexes/shares/manages memory.
This paper focuses that aspect as it applies to the commericial VMware ESX server.
The ESX server's main main advantageous memory management techniques that allow
sharing are that of "balooning" which allows machines to overallocate the total memory
between many machines (i.e. 3 machines with 256mb on a machine with only 512mb).
Ballooning shows acceptable performance degradation from a machine that actually had
the allocated amount of memory. Ballooning can allow sharing or allocate/deallocattion
of memory between VMs through idle memory allocation changing the percentage of memory
that each machine holds on to if not using. This way memory not being used can be used
by other machines (the whole idea behind SHARED memory). This aspect shows ok performance.
Also, they share memory in the sense that multiple machines can access the same memory
if it is the same through doing page signature matching. They do an intial search
matching hashes of pages.. and then upon successful hash matches actually scan the entire
page to ensure similarity.. this is maybe I good idea... coudln't really tell from the
paper, they didn't support it well enough... whcih brings me to waht wasn't great about
the paper...

yes the biggest drawback seemed to be that everything was done at a user level that knew
little of the OS machines above them, they had to be very tricky about how to not lose
performance to multi-level paging and such... it seems that this approach or abstraction
is far from perfect.. the sharing of memory by matching content seems like a good idea..
but the whole time I am just wondering if there is a much simpler approach, or at least
more proper one. First off, for efficient virtual machines.. I think it seems necessary
that the OS be proted to run as a virtual machine this could possibly make effecient
implementation of a virtual machine much easier... Some standard communcation layer or
protocol between the virtual machines and the VM management layer seems like a better
solution in the long run... and if there was such a thing that was proven effective
and the protocol of communcation simple enough.. maybe developers would make the ports..

In the future.. well yeah.. I think this approach of running unmodified OS (at least
unmodified OS that didn't have virtual machines in mind when designed) is not a final
solution... a good way to get a working solution for now.. but not for the future...