Paravirt_ops

Linux provides support for different hypervisor virtualization technologies. Historically different binary kernels would be required in order to support different hypervisors, this restriction was removed with pv_ops. Linux pv_ops is a virtualization API which enables support for different hypervisors. It allows each hypervisor to override critical operations and allows a single kernel binary to run on all supported execution environments including native machine -- without any hypervisors.

pv_ops provides a set of function pointers which represent operations corresponding to low level critical instructions and high level functionalities in various areas. pv-ops allows for optimizations at run time by enabling binary patching of the low-ops critical operations at boot time.

pv_ops operations are classified into three categories:

- simple indirect call
  These operations correspond to high level functionality where it is known that the overhead of indirect call isn't very important.

- indirect call which allows optimization with binary patch
  Usually these operations correspond to low level critical instructions. They are called frequently and are performance critical. The overhead is very important.

- a set of macros for hand written assembly code
  Hand written assembly codes (.S files) also need paravirtualization because they include sensitive instructions or some of code paths in them are very performance critical.