

# CoreBOX Technical Document

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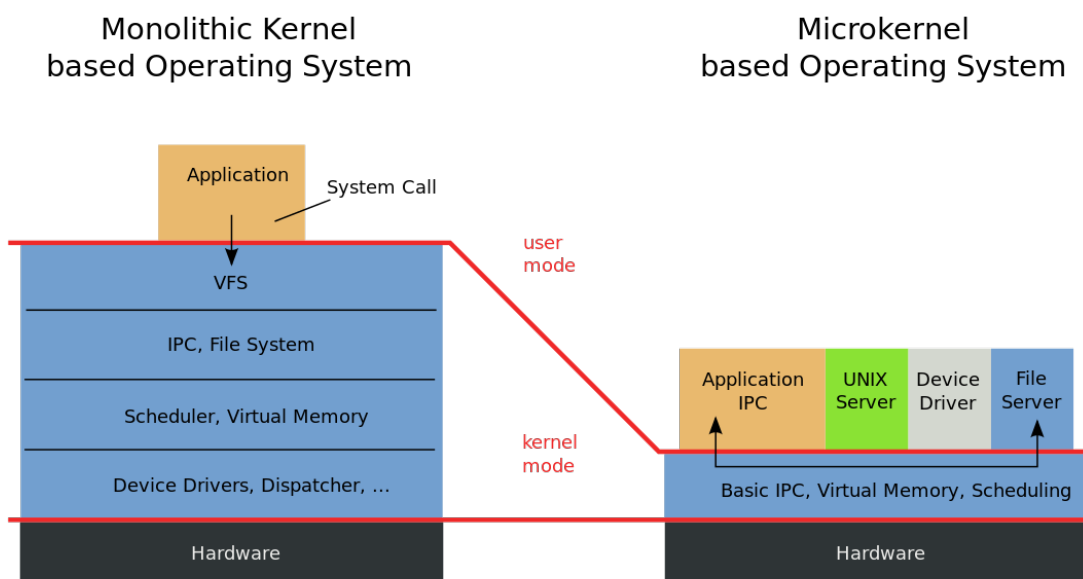
## CoreBOX

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## What is Hypervisor ?

A hypervisor or virtual machine monitor (VMM) is a computer software, firmware or hardware that creates and runs virtual machines. actually the power of VMM depends on kernel model of operating system. in general there are three types of kernel model, microkernel, monolithic and hybrid. here are pros and cons to each type.

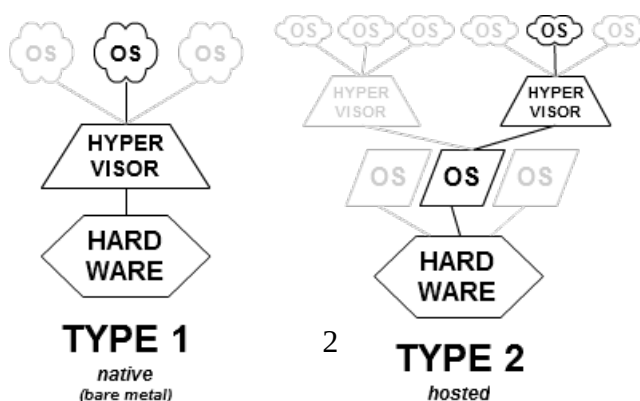
Kernel model concept is beyond the scope of this document and heavily needs OS knowledge but most hypervisors uses 2 of them. microkernel and monolithic.



microkernel kernels are slower but these types are more secure, stable and extendable. adding a new feature to a monolithic kernel requires recompiling the whole kernel whereas with microkernels you can add new features or patches without recompiling.

Bear in mind that FreeBSD is not pure monolithic, it is modular monolithic and can load any driver dynamically.

There are also 2 types of VMMs:



**Type-1**, native or bare-metal hypervisors

These hypervisors run directly on the host's hardware to control the hardware and to manage guest operating systems. For this reason, they are sometimes called bare metal hypervisors. The first hypervisors, which IBM developed in the 1960s, were native hypervisors.

Today there are many type-1 hypervisors like Citrix XenServer, Microsoft Hyper-V, and VMware ESX/ESXi.

Type-1 hypervisors can be monolithic or microkernel. for instance, Hyper-V is microkernel and ESXi is monolithic.

In fact there is controlling function that controls all aspects of the hypervisor. Hyper-V implements the controlling function in its Windows OS and In ESXi, the controlling function is implemented within the ESXi kernel.

**Type-2** or hosted hypervisors

A guest operating system runs as a process on the host. Type-2 hypervisors abstract guest operating systems from the host operating system. CoreBOX and KVM are in this domain.

It is difficult to say which design is better. However, there are a few advantages and disadvantages associated with each of them. one of the advantage of using the microkernelized type-1 design is that you can assigne diferrent roles to your hypervisor like dns or web-server but on the other hand in this design, system suffers from the lack of modern features, like a modern file-system.

In fact performance and compatibility are not the only issue. in almost same situation simplicity is more valuable. if you wants easily to combine hypervisor with something like HA feature, ignoring type-2 is so difficult.

**What is CoreBOX ?**

CoreBOX is Type-2 FreeBSD-Based High-Performance hypervisor that designed for building carrier-grade virtual infrastructure.

It runs FreeBSD 9+, OpenBSD, NetBSD, Linux and MS Windows desktop (7, 8/8.1/8.2 and 10), as well as MS Windows Server (versions 2008/2008R2, 2012/2012R2 and 2016) guests.

**Why CoreBOX based on FreeBSD ?**

FreeBSD is an advanced computer operating system used to power modern servers, desktops, and embedded platforms. A large community has continually developed it for more than thirty years. Its advanced networking, security, and storage features have made FreeBSD the platform of choice for many of the busiest web sites and most pervasive embedded networking and storage devices.

## Why Type-2 Hypervisor ?

Day-to-day tasks needs many tools and you can't add them to Type-1 hypervisors easily. actually there is no "Pure" Type-1 which means, today Type-1 hypervisors are nothing more than minimal Type-2. beside Type-2 hypervisors are limit-less on features and everyting you can add to your OS will be added to your hypervisor.

## CoreBOX remarkable features:

### Remarkable Features :

1. Massively IO-Tuned(3GB Per Sec)
2. Role-Based VM creation
3. Predefined OS template
4. Built-in firewall
5. Passed by hardening SANS/DISA checklists
6. Enterprise SSD compatible
7. Priority flag support(set priority on machines)
8. User-Friendly and easy GUI
9. x86-64 Compatible
10. ZFS/UFS Ready
11. Update whole system on-the-fly
12. Appliance delivery/Non-Appliance delivery
13. Windows/Linux/\*BSD support
14. Auto-Tuning(Beast-Mode)
15. UEFI/GOP support
16. Online/Offline backup
17. Virtual-Switch support
18. iSCSI ready
19. Private OS repository support
20. VM in-depth monitoring technology
21. Full-Disk encryption support
22. Backdoor-Resistant
23. HA support

## Comparison

This comparison based on main local compatitors. in this section we will compare VMware ESXi, Xen Citrix, KVM and CoreBOX.

<b>Features</b>	<b>CoreBOX</b>	<b>KVM</b>	<b>XEN</b>	<b>ESXi</b>
<b>Hypervisor Type</b>	2	2	1	1
<b>OS Class</b>	FreeBSD	Linux	Linux	Linux
<b>IO-Tuned</b>	YES	NO	NO	NO
<b>OS Template</b>	YES	NO	NO	NO
<b>Role-Based VM Creation</b>	YES	NO	NO	NO
<b>Built-In Firewall</b>	YES	YES	YES	YES
<b>Hardened(SANS-DISA)</b>	YES	NO	NO	NO
<b>Priority Flag</b>	YES	NO	NO	NO
<b>Easy GUI</b>	YES	YES	NO	YES
<b>x86-64 Compatible</b>	YES	YES	YES	YES
<b>ZFS Support</b>	YES	NO	NO	NO
<b>Non-Appliance Delivery</b>	YES	YES	YES	YES
<b>Appliance Delivery</b>	YES	NO	NO	NO
<b>UEFI/GOP</b>	YES	YES	YES	YES
<b>Easy Update</b>	YES	NO	NO	NO
<b>Virtual-Switch</b>	YES	YES	YES	YES
<b>ISCSI</b>	YES	YES	YES	YES
<b>OS Repository</b>	YES	NO	NO	NO
<b>Monitoring Tools</b>	YES	YES	YES	YES
<b>SSD Compatible</b>	YES	YES	YES	YES
<b>Auto-Tuning</b>	YES	NO	NO	NO

<b>Backdoor-Resistant</b>	YES	NO	NO	NO
<b>Online/Offline Backup</b>	YES	YES	YES	YES
<b>Highly Available</b>	YES	-	-	YES
<b>Full-Disk Encryption</b>	YES	NO	NO	NO

## Conclusion

If you in need of a stable and high performance hypervisor that based on FreeBSD, CoreBOX is the only enterprise solution that exist.