3 Reasons to Deploy NanoVMs

Virtual machines (VMs) running on myriad hypervisors have been a mainstay of IT infrastructure for more almost 20 years. Work on unikernel-based VMs started around the same time – they differ from traditional VMs in that they have much smaller image sizes, less impact on hypervisor resources, faster VM load/execution times and more secure operating environments for business-critical applications.

Old VM Stack	OpenStack	NanoVMs Stack
Application	Application	Application w/ NanoVMs
Operating System	OpenStack Operating System	
Hypervisor	Hypervisor	Hypervisor
Hardware	Hardware	Hardware

FIGURE 1: The size of NanoVMs makes them faster and more secure than OpenStack implementations

NanoVMs and OpenStack

Although NanoVMs are compatible with OpenStack, the complexity of OpenStack becomes an unnecessary burden because NanoVMs offer significant advantages in scalability, performance, and security. See Figure 1 for a comparison of an OpenStack application stack compared to a NanoVMs stack.

Size, Versatility Matters

Unikernel images are compiled with only the OS components – drivers, application libraries and supporting files – they need to support a single application. This design dramatically reduces the unikernel size, with some VMs weighing-in at just 30MB. Compare that image size to VMs running on traditional hypervisors, and the image size disparity is immediately noticeable. Unikernel VMs are by far the smallest, fastest, most secure VMs available today. NanoVMs commercially-available VMs typically run in less than 50MB and can run on any hypervisor.

A comparison of OpenStack resource management compared to NanoVMs is that most OpenStack servers can run only 5-6 VMs, while NanoVMs support as many as 1,000 VMs.

Speed Kills

In OpenStack, VMs are assembled at boot time, and reboots can take minutes whereas NanoVMs are compact enough to boot in seconds. The faster boot and execution time for NanoVMs is because NanoVMs operate in a single memory space and are dedicated to a single application. Thus, there is no context switching, fewer system calls to the OS and the use of far fewer server system resources than OpenStack VMs.

Secure and Tight

NanoVMs have no concept of users, are single-process VMs and use no shell, so there is less surface to attack. Also, security is ensured because only a single application runs in each NanoVMs, so Ring 0 access by rogue applications is eliminated. Compare that to OpenStack, where the public and security domains are untrusted, where the management or control plane domain is trusted except for when bridging to other domains, and where the level of trust in the data security domain is uncertain.

The Sum Total

The competitive advantages of running NanoVMs instead of OpenStack VMs include scalability, security, and performance among other factors such as CAPEX and OPEX savings, and fewer IT resources required to develop, deploy and maintain. In sum, there are compelling arguments to deploying NanoVMs over OpenStack in enterprise IT shops.