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Network applications requirements to lightweight virtualization for network modelling usage

My name is Anatoly Vasilenko and today I would like to tell you about network applications requirements to lightweight virtualization for network modelling usage.

Concept of virtualization today can be named as an old concept, but few years ago, it got new development push, named today as a lightweight virtualization. This new concept is based on using containers, which came to the question of isolation not only applications, but their environments too. This led to an opportunity to run applications in isolated scopes with controlled virtual environment. However, as it enables resource management it can be perfectly used instead of hypervisors that provide virtualization. The only design constraint of containers is forcing applications to work under the same operating system as host system.

In networking world, containers can be used in three different ways: firstly, for realization of modern NFV concept, (NFV means Network Function Virtualization), secondly, for virtualization realization in data centers, where containers can successfully complete with hypervisors and finally, for modelling, in particular for network modelling.

Network modelling has its some specific characteristics. Good models are usually tremendously big with many identical hosts. Its simulation requires the ability of model to be distributed, and at the same time, there must be optimizations performed for those identical hosts, which are emulated on the same computer system. Fortunately, containers has such an ability, because inside it consists of elementary capabilities called namespaces and cgroups. Namespaces enables to create virtual devices per container such as network adapters, file system or mount points and cgroups enables to control resources usage by monitoring and constraining cpu, memory and other resources usage. In particular, union file systems can be used for containers, which enables to use the same image for identical containers and store changes of file system. It gives an opportunity to create hundreds of containers, e.g. virtual machines within seconds. Some container technologies like OpenVZ even enables to migrate containers on the fly without actually stopping it.

So, it looks like containers perfectly fits for network modelling usage and can make revolution in this technical sphere.