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HyperScalers MVE (MOXROX Virtual Engine) IaaS appliance

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Table of Contents

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1. Executive Summary

The proof of concept creates a MVE (MoxRox Virtual Engine) appliance using Quanta STRATOS S100 compact server and does performance benchmark on the appliance. The MVE appliance provides a cloud platform solution that has low processing overheads, fast disk io, is highly scalable and come with low deployment costs. It executes on Quanta STARTOS S100 1U server with low configuration CPU and Memory DIMMs. The paper compares performance of MVE with Microsoft Azure as IaaS and uses JetStor Raidix NAS as high speed storage solution.

2. Introduction

The MVE executes on a single hardware server and it works as IaaS like Hyper-V. The setup does not use clustering and is a diskless boot. It's a cloud running on one server and can spawn virtual machine and has a set of container templates. The solution prefers gigabit or faster networks. Since these containers utilise namespaces, a low configuration CPU is required for functionality. The hosts run containers using networks running layer 2 or layer 3 interfaces. The containers currently use NFSv3 as its file io backend. These containers utilise a loop device as their disk, which results in very high performance. Container features include; dynamic resize, snapshots and live backups.

The MVE runs on the Quanta STRATOS S100-X1S1N server. It is a one-socket 1U server tailored for applications requiring large local storage in space-constrained datacenters. It supports up to twelve drive bays in a compact 22.5" deep 1U chassis.

3. Test Environment

The test environment consists of following hardware and software components:

Hardware	Quanta STRATOS S100-X1S1N Server • CPU : 1 x E3 1220 V3 • DIMM : 2 x 8GB DDR3 • HDD : 120GB SATA SSD • 1G Ethernet data path
Software	• MoxRox Virtual Environment 4.1-15 • Raidix Software 4.4.0 NAS Storage • Microsoft Azure Pack; Hyper-V setup

The diagram below describes the block involved in executing the appliance.

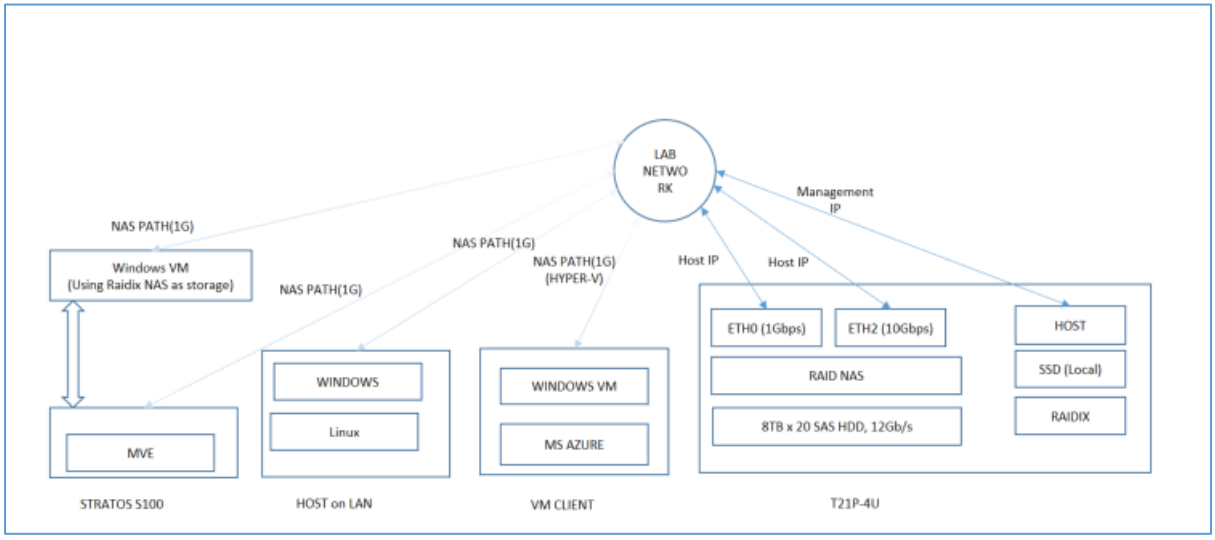


Figure 1: Appliance block diagram

The MVE is installed on STRATOS server. It has onboard SSD; on which the MoxRox software is installed. After installation; it provides a management IP which runs the user interface for creating and configuring VMs and containers. The installation uses NAS over 1G as storage partition for any VM running on the MVE platform.

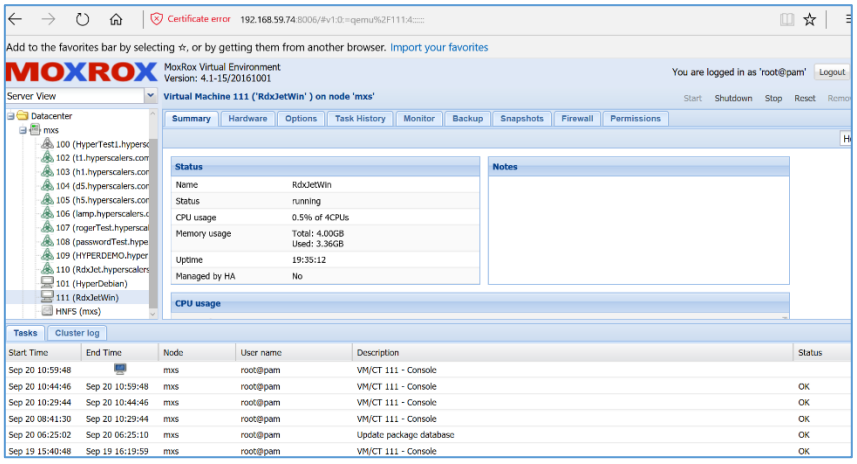


Figure 2: MOXROX virtual environment management UI

The appliance uses following components for executing this PoC.

- MOXROX IaaS
- Microsoft Azure
- Raidix storage NAS

The test setup created a Windows virtual machine on MVE; it uses the NAS as storage running on 1G data path. The similar setup is done on a private Azure cloud running in the HyperScalers lab; which

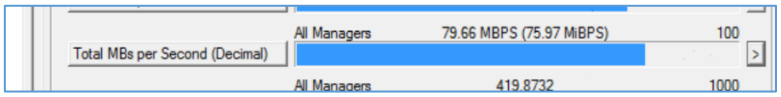
also uses Raidix NAS as a mapped device. The MVE provides mechanism to allocate a storage space either from local SSD drive or attached NAS for configuring VMs.

4. Performance and Accessibility

Following sections describe performance of MVE in various appliance configurations.

4.1 Storage performance on MVE

The MVE appliance executes storage test on NAS file system; which is a storage drive for the virtual machine. The performance is compared with NAS running independently on a target client; connected to lab network.

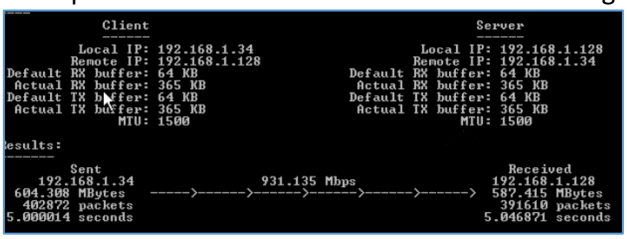


	NAS as storage on VM	**NAS connected on client directly**
Storage performance (MB/s)	82	91

The test shows that MVE software stack does not add much delay on the storage layer. The NAS connected to a client on lab network is 91MB/s while on top of VM; its 82 MB/s.

4.2 Network performance on MVE

The network performance is calculated on VM running on MVE; compared with other VM running on Microsoft Azure. The test setup includes a common server and VMs running as clients.



	VM running on MVE (1G backbone)	**VM running on Azure (10G backbone)**
Network performance (Mb/s)	932	975

The Azure IaaS running with 10G backbone provides 975 Mb/s compared to 932Mb/s on MVE running with 1G backbone. This shows that the network layer in NVE does not add much delay and performs on par with 10G backbone appliance.

4.3 1G vs 10G performance

This setup requires 10G backbone connectivity to the MVE node. TBD

4.4 Accessibility

The appliance can be accessible to the customers using WAP DDNS "http://hyperscalers.asuscomm.com/". Depending on the customer requirements; the administrator can open a port accessible via DDNS VPN.

5. Conclusion

The PoC shows that MVE is a thin IaaS solution; with less software overhead. It does not add to the delay of data and network accesses. Though the appliance still needs to be tested on 10G backbone and stressing the VM and container functionalities. The MVE can execute on a low configured single node server and provide a single box cloud solution.

MVE with JetStor Raidix box and Quanta server hardware can provide an efficient single box cloud solution.