

## Smartphone as a Virtual Machine

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### Abstract

*Smartphone is a mobile device capable of running various powerful applications and is integrated with the dedicated GPU, Processor with high frequency rate. Smartphone is capable of running virtual machines with the help of workstation software which is compatible with the smartphone devices just like virtual operating systems such as Windows 8, Ubuntu, Kubuntu, RHEL 5 etc. running on the desktops and laptops with the help of virtual machine managers, in the same way smartphone is capable of running virtual machines on its device to provide the virtual access to any device or computer on the smartphone device. Virtualizing smartphone with the help of compatible virtual machine managers which is specially built for smartphone devices. It also enables the users to create and host the multiple virtual machines on the single smartphone device. It allows smartphone device to access desktop operating systems as well as it allows to install and access mobile operating systems.*

in mobile VM which is enhanced to seamlessly work with the Android and Windows Phone UI changes. Mobile virtual machines can now convert a standalone smartphone to a virtual machine. It has the more control feature and creates the restricted smartphone virtual machines that can expire at a predefined date & time. When the smartphone device is powered on, the virtual machine(VM) will query with the local server at some specified time intervals and storing the current smartphone's system time in the restricted VM's policy file as a trusted timestamp. It also supports the virtual tablet sensors in such a way that it enable the virtual machines to take the advantage of the magnetometer sensor, accelerometer sensor, gyroscope sensor, compass sensor and ambient light sensor when running on a smartphone.

Multiple monitors on the smartphone setups are very much easier than ever, whether you are using 2 or 3 or more. Smartphone Virtual machine Manager VM provides the new interface for using multiple virtual machines on a smartphone.

### 1. Introduction

Virtual Machine for smartphone is recognized for its broad operating system support with its rich user experience and a comprehensive feature to be set on the high performance. It is designed for smartphone users that rely on mobile virtual machines to get their job done in real-time. It continues to deliver innovative features that developers, users and technical professionals rely on every day. It's a perfect tool to make your personal works on VM seamlessly, intuitive & more connected to the platform. The Unity mode

### 2. Requirements

High end smartphone device with pre-installed Android Operating System or Windows Phone Operating System is recommended to run Virtual Machine on a smartphone device. The device must be rooted to run the VM kernels and Virtual Machines in smartphone. The host smartphone device with good WLAN or 3G Network

connectivity will run the virtual machines smoothly.

**Table: 1 Requirements**

Operating System	: Android 4+ or Windows Phone 8
Processor	: 1.2GHZ Quad Core
GPU	: NVidia Kepler GPU
RAM	: Minimum 1GB RAM (2GB Recommended)
Internal Storage	: Minimum 4GB Internal storage (8GB Recommended)
Web Browser	: Supports all smartphone Web Browsers
Connectivity	: WLAN or 3G or 4GLTE

### 3. Understanding Virtual Machines on Smartphone

A mobile virtual machine is a software smartphone computer that, like a physical smartphone machine, runs multiple operating systems and various virtual applications. A virtual machine also uses the physical resources in the smartphone of the physical smartphone machine on which it runs, which is also known as host system. Smartphone virtual machines have the virtual devices that provides the same functionality as the physical hardware of the smartphone, but with the other additional benefits such as portability of smartphone machine, manageability and the smartphone virtual machine security. A smartphone virtual machine has a standalone virtual operating system and the virtual resources that you can manage them in much the same way you manage the physical smartphone machine.

#### 3.1 vmrun Utility on smartphone

- Users can use the vmrun command-line utility to control the smartphone virtual machines and automated guest operations on the smartphone.
- The vmrun utility for smartphone is included in the VIX API libraries.
- The vmrun utility also runs on the most smartphone platforms, including the smartphone Workstation.
- The VIX API libraries included in the smartphone virtual machine managers and vmrun command utility are often the excellent way to automate the guest operations in the virtual machine manager.
- It has good Capabilities of running the vmrun Command on the smartphone

#### 3.2 Power Commands for Mobile VM

- Power commands control on these mobile virtual machine operations control the smartphone virtual machines easier and faster to access the functionalities.
- Commands are as follows: start -power on, stop-power off, reset-reboot, suspend-suspends the smartphone's virtual machine, but it can be resumed, pause-pauses VM without any interruption and unpause-to continue the virtual machine.
- Smartphone workstation can group all the virtual machines in multiple teams and can also apply the power operations to the whole VM team on the smartphone.

#### 3.3 Maintenance Commands

- The current category includes the commands to list all running smartphone virtual machines, users can upgrade the smartphone virtual machine hardware at any time.
- The version control is enabled in the VM and can install the smartphone virtual machine tools in the guest operating system.
- Smartphone users can clone the virtual machine image to another smartphone's virtual machine.
- Smartphone users can register and unregister the smartphone virtual machines.

#### 3.4 Mobile VM Limitations

- Smartphone Virtual Machine does not support snapshot trees.
- Smartphone Virtual Machine does not support pause and unpause, snapshot operations and cloning etc.
- Smartphone Virtual Machine will not support the teams VM's and shared folders in VM.
- In Smartphone Virtual Machine UI can be overwritten in existing snapshots.

- The virtual machine records and replay commands were deprecated for mobile workstation.

#### 4. VM tools for Smartphone

Smartphone virtual machine uses the various virtual machine tools to manage the different VM's, VM tools runs with the help of virtual machine (VM) engine. Tools divided into different types as follows:

##### 4.1 OVFTool for Smartphones

The virtual machine manager allows Open Virtual Machine Format, it is a smartphone's virtual machine distribution format that clearly supports the sharing smartphone virtual machines between the products and the organizations. The OVF Tool for smartphone is a command-line utility that enables the users to import and export the multiple OVF packages. The OVFTool runs on the smartphone virtual machines to and from the virtual machine manager. The OVFTool for smartphone is used to import from an .OVF file that may come in the handy when importing the smartphone virtual machines created using the virtual machine manager.

##### 4.2 Enhancements Tool

The VMRun command line utility for smartphones has been enhanced with the two new options to get the Guest IP address on the virtual machine with help of virtual network adapter and the check the Tools State to retrieve the smartphones Network adapter IP address of the VM guest OS on the smartphone's virtual machine and to determine the state of the VM tools in a guest virtual machine.

##### 4.3 VM Cloud Management Tool

The smartphone with virtual machines to enable the cloud management tools for VM to be used with multiple virtual machines for smartphone running in the mobile Workstation.

#### 4.4 VM Converter Tool

The inclusion of VM SDK tool with the latest version of the virtual machine and virtual application Standalone Converter. The VM standalone converter enables the smartphone users to turn a physical smartphone machine into a smartphone virtual machine.

### 5. Architecture

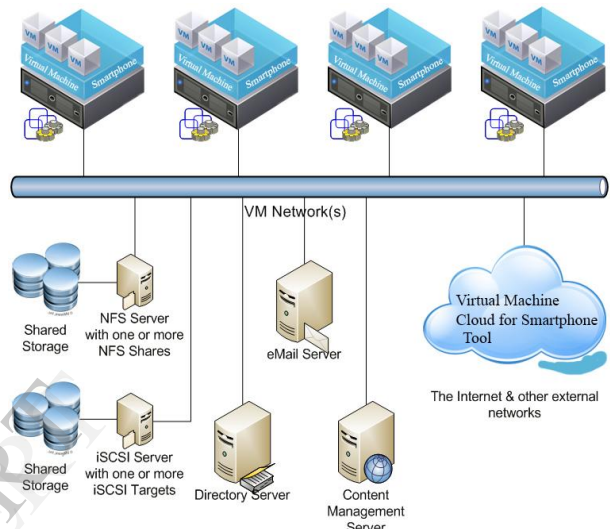


Figure: 1 Virtual Machine for Smartphone

### 6. User Interface(UI) Enhancements

There are many types of smartphone user interface improvements. The highlights of enhancements include:

- **VM Unity Mode**

We are continuing to improve the smartphone virtual machine with unity mode for user interface works with modern UI.

- **VM Monitor Navigation**

When running VM with the 2 or more monitors it has more frustrating to use and the full screen mode of the smartphone virtual machine as a workstation and to toggle through the each combination of smartphone's monitors to get the full screen toolbar.

- **VM Hardware Upgrade**

When working with the smartphone virtual machines running on the remotely mobile networks on the virtual machine with another instance of the mobile workstation, user can now remotely upgrade on the network and can configure and can configure the virtual machine hardware.

- **6 virtual CPUs**

Smartphone virtual machines can now run the 6 virtual CPUs and this enables the speed improvement of processor intensive applications that to be run in a smartphone's virtual machine.

Note: Running the smartphone virtual machines with 6 virtual CPUs requires that the both host and the guest OS to support the 6 logical processors. Your physical smartphone virtual machine must have at least 4 cores with hyper-threading to be enabled to power on the smartphone's virtual machine with the accurate system configuration.

- **VM Expiry**

The smartphone virtual machine has the enhanced capabilities of Restricted smartphone Virtual Machines to include the ability to make or create the expire of a smartphone virtual machine on a specified date and time. This feature also enables the users to create the smartphone virtual machines to be shared with the others. The restricted smartphone virtual machines will run until it terminates.

The expiring capability also establishes the secure connection to a standalone server to validate the date and the current time to prevent the users from rolling back to their smartphone's system clock. The ability to set the remote synchronization frequency is to be added to allow the users to balance the expiration time for virtual machine, which effects the load on the VM virtual network. Expiring the smartphone virtual machines include the ability to display the customized message for all the running smartphone virtual machines which are about to expire and after the smartphone virtual machine has expired.

## 7. Conclusion

Smartphones are as powerful as personal desktops and laptops. It's a hardware capability enables to run critical applications on smartphone. Virtual Machines is currently is being used on personal desktops, workstations and laptops. The current paper shows that smartphones are truly capable of running broader applications, business applications, virtual applications and virtual machines. Virtual Machine software can be made compatible with the smartphone devices to run the virtual machines, it also enables to establish the cloud connectivity and remote connectivity with the other VM Smartphone devices.

We hereby conclude that the virtual machine application or software for smartphone can be developed and it will be very much useful for the end-users and the business users. Finally, smartphone can be turned into smart virtual machine.

## 8. References

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