



Platform Independent Portable Application for Smartphones: A Review

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Abstract – In today's IT industry, we have different types of operating systems. Each has their own capacity to interact with application. Sometimes, performance decreases due to complexity of OS and application. To reduce the overhead, prevent any loss of data and application of OS and increase the performance of any application software, we have number of technologies available in the market, which are redefined to handle the current scenario of IT industry. We can protect our devices from virus like threats and other security threats. This technology breaks the boundary of hardware compatibility problem on all types of devices including smart phones. In this paper, we will discuss part of a technology that is application virtualization, which is using portable software as a solution to increase the performance of any system.

Index Terms – PA- Portable Application, HA- Hosted Application, Virtualization.

I. INTRODUCTION

Today is the time when the world of IT has affected our lives very deeply. Today everyone have smart phones and each one of us wants to get the work done quickly and easily. So the researchers are day by day working on the process to make your lives easy and comfortable. And in today's era the life will be easy only when all the resources are working in order. What if, your work hinders because of system crash and the crash is due to some virus. This mars the user experience. You reboot your PC, but it doesn't work. Now you have the choice of switching your work to your friend's computer but there you cannot get every application you need and with the same customized preferences and settings you set on your PC, which become an obstacle for your smooth flow of work. Next choice is you start setting up your own PC again, which is a very time consuming and tedious job.

Further, sometimes the job demands to work on two versions of the same application, but any two versions of the same application cannot be installed on the same computer.

In this fast growing world, the need of high availability of applications is increasing. All of us want to have availability of their preferred applications even when we are offline. This all needs to be resolved. And the answer can be PORTABLE APPLICATIONS. By portability we mean an application which can be taken out of one PC and can be launched on any other PC without any difficulty like we take our mobile phones where ever we go. Earlier only land line phones were available which had limitations as they hindered our mobility

and availability but with mobile phones we are connected and approachable to everyone all times. As it is portable and handy we can easily carry it anywhere. Same concept can be applied to software also. So that it is available to us where ever we go whether we are connected to internet or not, whether we are on our own PC or not, same application with same environment.

II. PORTING, PORTABILITY AND PORTABLE APPLICATIONS

Porting means to create an executable version of a system unit, so that it may run in a new environment based on existing version.

Therefore, portability means the ability of a system unit to be ported. In the software world, Mooney described two types of portability: Binary portability, means porting the executable form and Source portability, means porting the source language representation. I have studied the Binary portability.

Thus portable applications can be defined as an executable version of a software unit which can be ported to another environment without making any changes in its code.

III. CONCEPT BEHIND PORTABLE APPLICATIONS

Traditional application installations penetrate the operating system and change its configuration. Eventually, managed or unmanaged systems become completely transformed and unrecognizable. For this reason, many organizations continually reimagine their desktops over time to reset them to a known configuration.

Modern operating systems attempt to keep programs isolated from each other. If one program crashes, the remaining programs generally keep running. However, bugs in the operating system or applications can cause the entire system to come to a screeching halt or, impede other operations. This is the major reason virtualization has become desirable.

The basic idea behind the portable applications is application virtualization, which is a concept of virtualization. Virtualization is the creation of a virtual (rather than actual) version of something; therefore in computer world it can be an operating system, a server, and a storage device or network resource. It is basically one physical computer pretending to be many computing environments. Further there are 3 types of virtualization i.e. hardware virtualization, OS virtualization and Application Virtualization. As application virtualization is



used to build the portable applications thus only this technique is discussed in detail. Application virtualization means to virtualize the software and put it in some virtual container so it may not directly interact with the OS. Thus virtualizing an application means re-packaging an application by some means and redistributing this same application under a different outline /layout. The application is fooled at runtime into believing that it is directly interfacing with the original operating system and all the resources managed by it, however in reality it is not. This new "format" is usually a single big file that gets "copied" on top of an OS and that doesn't need to be "installed".

Application virtualization protects the operating system from any modifications and supports completely secure environments. Once an application has been virtualized, it no longer needs to be repackaged each time you need to change the OS.

The end results are that the underlying file system and registry settings are never changed applications no longer create fracas and the base operating system remains intact. This allows running diverse and potentially irreconcilable applications on the same Operating System without each application stepping over each other due to DLL conflicts or registry incompatibilities. This is because these applications are basically shielded and are distributed as single huge file that contain everything like DLL's, custom registry entries etc. Example of products and technologies that implement this concept are Microsoft SoftGrid, ThinApp etc. This concept have the ability to dynamically stream applications to a user which provides flexibility, faster deployment, and greatly reduced IT labor required to deploy and update e applications. Application Virtualization is definitely going to be very applicable in the personal productivity (i.e. PC) environments where you have heterogeneous GUI applications to run and where the local end-user OS requirements are: ease of use and flexibility. For this reason alone, Application Virtualization is one of the most powerful new technologies IT is fast adopting.

IV. VIRTUALIZATION TO PORTABLE APPLICATION

With help of application virtualization technique a virtualized application can be made, which is an application which contains all the necessary system software packages (also called just enough OS or "jeos") and the application software inside a virtual machine container which can launch directly without installation. Fig 1 below shows the concept of portable application. From now onwards virtual application, virtualized application and portable application will be used interchangeably. Now it can be stated that Portable application is transportable and adapts every platform where it launches. It do not require anything extras in order to operate. Thus Portable application which can also be called standalone, is a program designed to run on a compatible computer without being installed in a way that modifies the computer's configuration information. This type of application can be stored on any storage device, including internal mass storage and external storage such as USB drives or Cloud storage for

that matter for storing its program files and any configuration information and data on the storage medium alone.

As the virtualization of applications does not require creating an abstraction for the hardware components, it is very resource-conserving.

V. PARAMETERS FOR COMPARISON

There are two types of metrics explained as follows:

Process metrics measure aspects of development and maintenance processes, and are used to describe resources used such as dollars, equipment, person-days, etc. or production measures such as lines of debugged code, CPU utilization, memory usage, I/O usage.

Product metrics measure attributes of a software unit or system itself, and is used to characterize the "quality" of that software i.e. it measures maintainability, flexibility, testability, portability, reusability, interoperability, and reliability.

VI. COMPARING HOSTED AND PORTABLE APPLICATIONS IN PROCESS METRICS

To develop a hosted application one has to start from scrap again to develop each and every module. Thus a lot of hard work and challenges has to be faced even if some of the modules are reused. The developer than sells the copies of the software developed and one has to build a strong support network which is very cost intensive. However in case of a portable application the developer itself is free from the fear of pirated copies, extensive support system. The developer can very well monitor and analyze its user base and take necessary steps to expand the same. Many tools are available for developing portable applications and deploying the same on various machines with heterogeneous hardware. Even in case of virtualized application being not on cloud the developer can very well distribute its software through secured storage devices. Clearly, from above the developer saves a lot on piracy cost and support network cost.

The metrics used are the utilization of CPU and memory. As portable software unit is not finely tuned to a particular environment, and may exhibit lower performance or less efficient resource usage than a tuned implementation. Some authors have compared (figure 1) between the native (hosted) and virtualized applications and found that there is slight overhead when the virtual application is launched i.e. due to the virtual layer which is induced between the application and the OS. Also the memory and I/O usage is also complex and more utilized. Formal tests have been conducted to show the resource requirements of virtual application are somewhat more than hosted application.

This is because of the fact that virtualized application container need to take the control over the resources indirectly, as it is not in direct contact with the OS. Thus a long communication path between the application and the hardware exist, also the hardware drivers are not in direct link with portable application thus performance degrades. We have measured the CPU usage and RAM usage and the results are



shown in figure 1 and 2 below. As the portable application is not to be or rather never to be installed on the machine it requires higher CPU usage percentage while the app is launched. This performance for hosted application is better however it is to be kept in mind that during installation of the hosted app huge amount of CPU and Ram had been used.

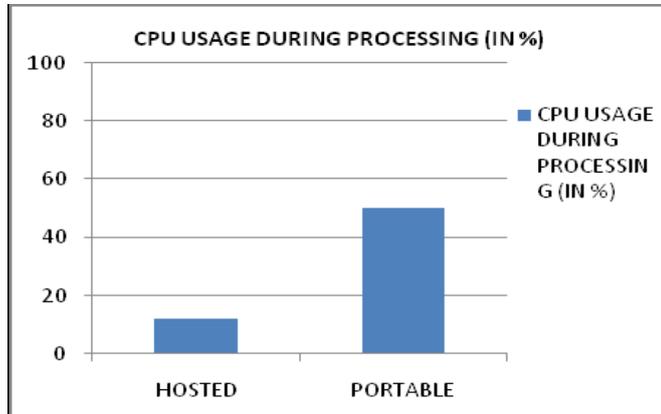


Fig. 1 Comparing CPU Usage

Cache and RAM apart from numerous registry entries in the OS which in-turn affects the system performance for all types of its uses. On the other hand the portable app works in a virtual bubble without affecting the system registry entries and the physical storage.

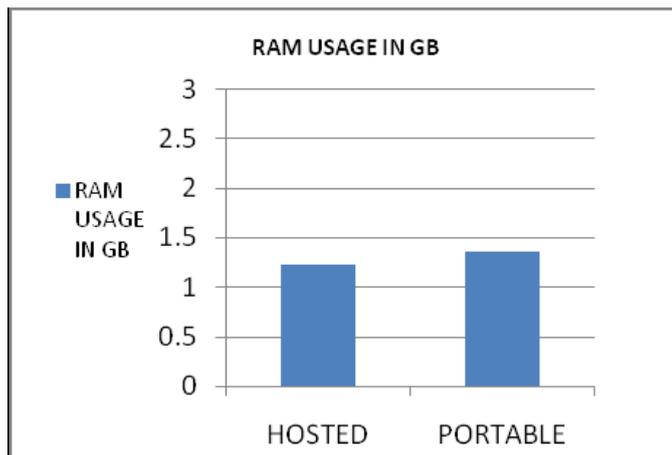


Fig 2 Graph showing RAM usage

The above graph (figure 2) shows that RAM usage of both is nearly the same. Also we have checked it for over around two months using a PC with hosted applications i.e. everything is installed over the OS with number of registries and another with clean PC i.e. nothing is installed over the OS only the virtualized portable applications were used. And it was observed that, the PC with no extra installation over the OS performs better than the 1st PC where there are several entries of registries. Here I have tried to measure those non-functional requirements of a portable application and compared the same with hosted applications also, which may aid in making effective portability related decisions. The results observed are as follows:

1. The biggest flaw in hosted application is failure and recovery time, which is much more in comparison to the slight degradation in performance when portable application is launched.

2. Next good reason to use portable applications is that they are not affected by virus, Trojan and worms, as these are packed in a special container which contains all the administrative specifications and executable files. Thus it is not direct contact with the OS and any other software which is running at the same time. So performance on this side increases.

3. As the portable applications are packed in a container, these don't change any registry of OS, thus when the work is complete and the portable application is closed, the PC remain intact as if no such application ever launched on that PC. On the other hand, when a hosted application is installed it changes the registry, thus burdening the OS performance; when it is closed it saves its data in the form of registry and cache. And when the number of application installations increases the OS become more complex to handle, which lead to failure or bad performance.

4. Because the portable applications use the virtual container in which the run their executable file thus more than two versions of the same software can be launched, which is not possible in hosted applications.

5. Time required to install a hosted application and to launch a portable application is shown in the figure 3 below.

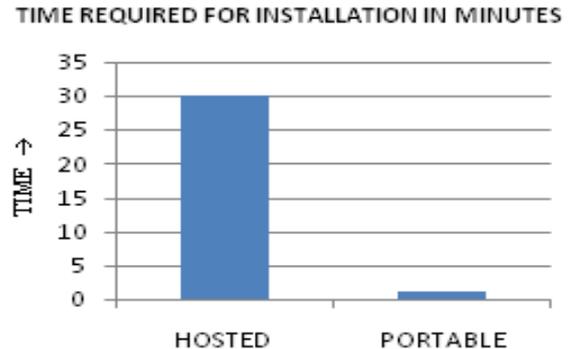


Fig 3 Showing time required to install an application

The chart above clearly shows that if we tend to install a hosted application it will take a long time for the complete process, after that also it might need a reboot to start its working in normal condition. On the other hand a portable application needs less than a minute to launch without any reboot.

6. When the hosted application is installed, and the portable application is also on the same PC or the USB is ready to work, then the launching time of both the applications are same (shown in figure 4).

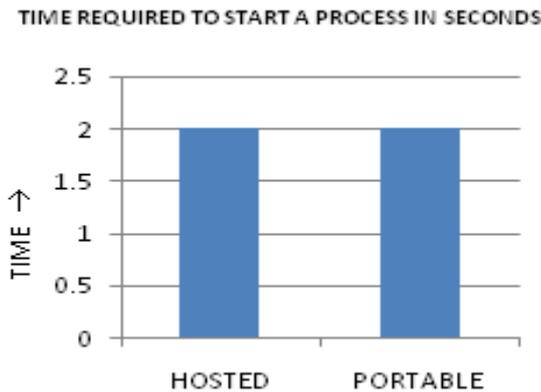


Fig 4 Showing time required to start the process

VII. CONCLUSIONS

In these fast paced times of growing world of technology one needs the work to be done accurately, speedily and smartly, but without much effort. So portable application is the right answer as the IT organizations also need not to put much effort once the application is ready.

The portable application has agent-less architecture i.e. it do not need any agent on the target devices to run and is designed for fast deployment and ease of management. It provides a complete application isolation single executable that runs independently on any endpoint, allowing multiple versions or multiple applications to run on the same device without any conflict. Portable Applications can be deployed on a virtual cloud and then imported to client computers without need of installing. This software is linearly scalable i.e. it can be copied to other PCs The concept of virtualization makes potable applications flexible, isolated from other software, reliable. The long wait of program installations have also reduced by portable applications to just a click of mouse button ..

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