Looking for an easy-to-use, low cost and flexible test environment for SAP solutions - Part 1

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Independent software vendors (ISVs) wishing to certify their software solution on the SAP NetWeaver platform have multiple opportunities to install an SAP test system. Low cost, easy to use, efficient and effective test systems, offering flexibility to test at different stages of the product life-cycle also help expedite official deployment certification offered by SAP. Especially now, as the IT world is moving towards a Services Oriented Architecture (SOA) world, end user demand set upon internal IT departments has dramatically increased in order to accompany changing business demands quickly and easily at minimum cost.

Ever since the SAP Integration and Certification Centers (ICC) were established in 1995, most ISVs wishing to integrate and certify their products with an SAP solution needed access to low cost SAP test environments. Most ISVs today are smaller shops where cost containment, flexibility, revenue, and profits being top priority in order to survive, accompanied by a limited number of employees in order to serve one or several SAP customers wishing to buy their SAP-certified product. This, of course, is a big challenge for any ISV.

In addition, many SAP customers decide to purchase an add-on product from an ISV only after SAP certification has been obtained for the integration. But SAP certification for third party products is not only an SAP endorsement, but also helps speed up the sales cycle and implementation phase through pre-tested integration which may be beneficial to the ROI of both parties. Integration certification by SAP simply put means that someone from SAP has looked at the ISV product integration and tested it to be functionally correct for a particular business scenario ("integration scenario") or that is adheres to SAP implementation guidelines and installs properly on the SAP NetWeaver platform. Therefore, the SAP-certified endorsement does not guarantee that the entire ISV product is completely error free.

Interesting and legitimate questions which I have been confronted with while working with ISVs in order to help them technically integrate their solution not only with the SAP J2EE-engine, but also with other SAP software were:

- What type of hardware do we need to deploy our solution?
- How much memory, how many CPU's, and how much disk space do we need?
- Which operating and database platform is supported? What about Windows® or Linux® or else?
- Where do we get the necessary SAP software to prepare for certification without having to spend   a lot of money?
- How difficult/easy is it and how long does it take to obtain certification?
- What type of skills do we need and how do we get access to information, if possible for free?
- How much does certification cost and what business value do we get with it?
- Does SAP have SAP software installed on machines which we can use, and if yes, is there remote access in order to avoid travel expenses, save time and money?

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When we take a closer look at all of these questions, it would be rather difficult for an ISV to create a high-quality product at its customer's demand without the possibility to test reliably and thoroughly before releasing it for production.

What is available?

The answer depends on the size of your wallet. If cost is no problem, then you can buy plenty of hardware, software, manpower, lease floor space or whatever, in order to have a reliable test environment. However, if realistically thinking, cost containment and cash flow are a big deal for everybody.

I will describe the various opportunities in this article and in a series of future ones, which test environments the SAP ICCs have been offering in order for ISVs to **test** for example J2EE software deployments while keeping costs low and still be flexible, efficient and effective, and respond and move on quickly in order to accommodate SAP customer demand. Other SAP software and run-time environments can be used in these types of test environments also.

By using **software virtualization**, for example, the ICCs provided complete J2EE test environments remotely for registered ISVs. This convenient test environment avoids the need to reserve or purchase hardware for each SAP product installation an ISV wishes to test against. The test environment can also be located at the ISVs site, by setting up a test environment at there own expense (buy hardware, manpower etc.).

What is important is to understand the concept of software virtualization, what it can and can't do for you, when and when not to use it and what other folks think about it.

To be honest with you, by utilizing software virtualization, the ICCs now have approximately **68** virtual machines (let's call them **VMware guests**) running on two physical servers (lets call them **VMware hosts**). So instead of having 68 physical machines set up, we only have two large ones, and let them take care of business for us. Each VMware guest, totally encapsulated, can be started, stopped as needed, independent of the other ones, provided that there are enough system resources at the VMware host level. System resources to keep an eye on for all of this to work reliably and stable are the VMware host's CPUs, memory, disk space, type of disk controller used (IDE, SCSI, RAID technology, disk duplexing), good disk I/O by utilizing RAID technology and in order to guarantee fault tolerance of the data being stored, network cards, and last but not least a thoroughly tested backup and restore solution (local backup, storage area network, central backup system, DLT's etc). Select your favorite and most reliable solution within your organization.

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What is a VMware guest or VMware host?

This may sound a little too abstract. Before I will explain more about this solution, let's just consider the following. The traditional **x86 architecture is a one PC/server/laptop model**, with a single operating system along with some applications installed on a **single machine** (See **Figure 1** below).
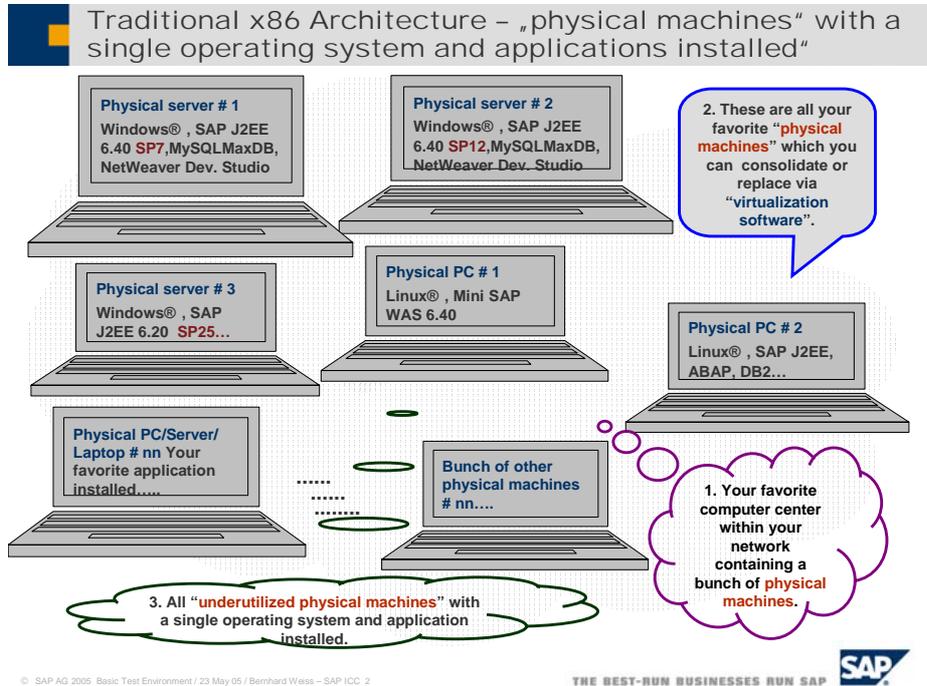

Figure 1

Sometimes, a complete utilization of the system resources (CPU, memory, disk space etc.) is never realized. Money is spent on hardware, which may not be fully utilized, since the applications installed do not require more. Bingo! You need an efficient and effective cost alternative, offering, reliability and flexibility in order to respond quickly as your customer and business demands are changing. This is what software virtualization is all about.

This brings us to the product, which we use at the ICCs for testing purposes, called VMware (http://www.vmware.com). By using a specific type of product from VMware, you can install on physical hardware (PC/laptop/server) which already has for example, an operating system installed, VMware on top of it (see **Figure 2** below).
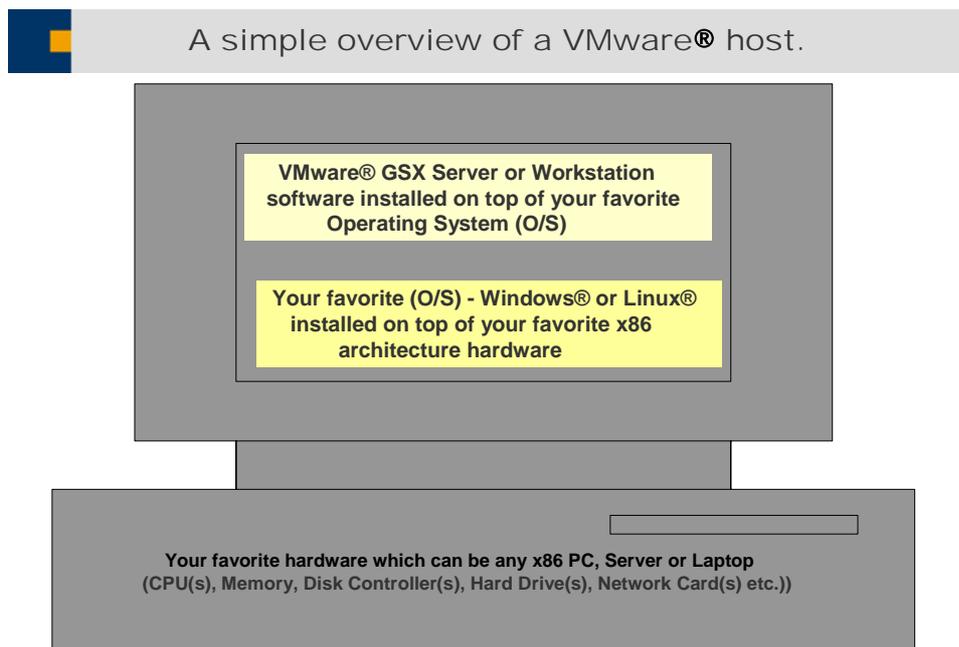

Figure 2

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Ok, so you have a PC/laptop/server, install either the Windows or Linux operating system, for example, and then install VMware on top of all of that. In order to keep things simple, let's say you did all this on a **server** which is now called your VMware host. You elect to install some VMware guests, which are nothing more than virtual machines containing your favorite operating system and application (see **Figure 3** below).
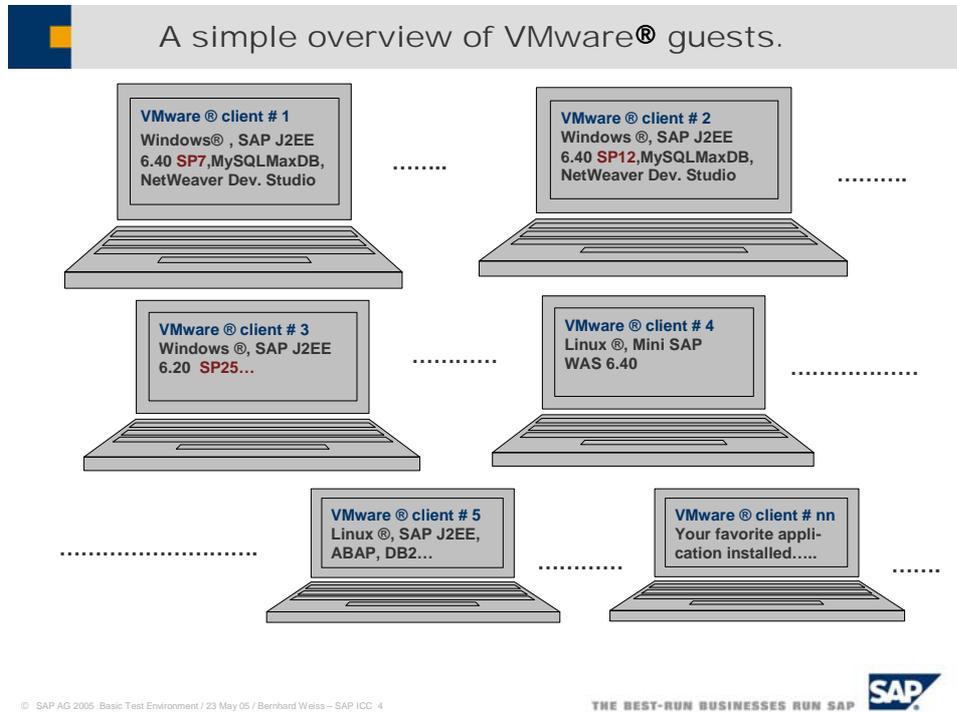

Figure 3

In other words, the VMware host *hosts* the VMware guests, with each VMware guest being accessible in your network, by some means or another (see **Figure 4** below).
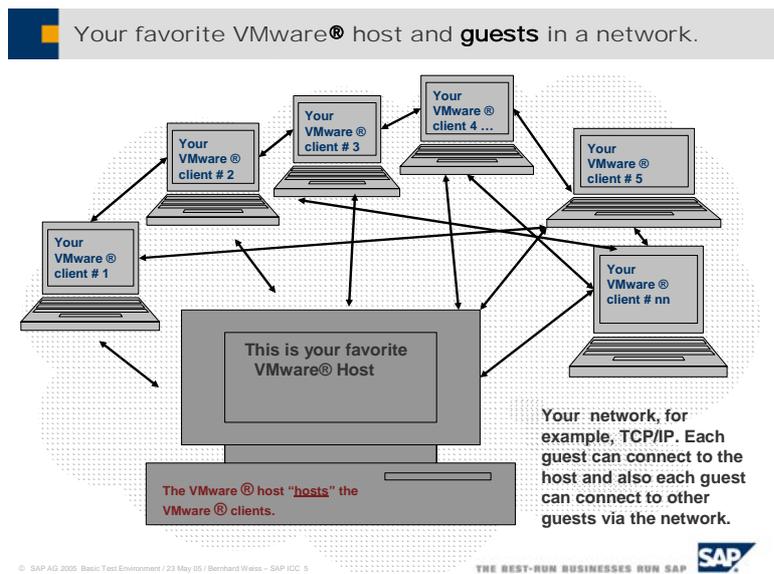

Figure 4

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As you already guessed it, with VMware you also become hardware independent. You can now copy or move VMware guests between different VMware hosts without having to worry about the type of hardware the VMware hosts use since each virtual machine is represented by some files which are located at the VMware host operating system level. Thus, once the VMware host has been installed, you can install several virtual machines called VMware guests. In fact, you can do all of this cool stuff remotely by just simply copying or moving some files between the different VMware hosts.

Even better yet, each VMware guest has its own hostname, can be assigned TCP/IP or DHCP addresses, makes use of sub networks and gateways, registers itself in DNS and WINS etc, uses physical memory, uses a CPU from the VMware host and disk space. In addition, each virtual machine has its own unique MAC address (Media Access Control address or in simple language the hardware address of a network card, or for non-technical folks, your street address number which should be unique). You can even set up your VMware guests if there is a need to have them in front of your network firewall.

If you really think about software virtualization technology, it is indeed mainframe technology adopted on an x86 architecture, allowing you to consolidate physical PCs or servers onto one x86 machine.

What is the concept behind "Snapshots"?

For serious testers, who do a lot of J2EE or other software development and code corrections, which need to install different software versions of the products they are developing or testing, they can use the VMware **snapshot** feature. Just imagine, you put in a lot of days and long hours of work developing a J2EE application, and are ready to roll it out. All of a sudden, some of your customers need a functional product change, requiring you to change 50 percent of your coding, or else the customers will not buy it. So you need to make the changes in your test environment, before you go to SAP and obtain certification, and before your SAP customers will even look at it before making a purchasing decision.

These things are real and do happen everyday in the IT world. As the case may be, the machine which you were working on has already been allocated for other projects within your company, and all of your J2EE coding which you saved either on several machines or on a local/central backup system needs to be restored used again. You talk to your IT guys and luckily receive their one and only server they have. Great! They already have everything installed on the machine for you, with the exception of VMware. They buy a VMware license from a VMware distributor, install VMware, then install your application within a VMware guest with the VMware snapshot feature enabled.

Ok, virtualization software, VMware guests and VMware hosts, and now more stuff, called a **snapshot** which sounds arbitrary. But it is not. With the VMware snapshot feature, to put it in simple terms, you just take a picture of your present J2EE test installation, which you can go back and look at over and over again or use it anytime when needed. Actually, it is like a code freeze before applying any new coding. So you make your changes and experience tells you, backup your work before moving on. No problem. Your IT guys take a new VMware snapshot of your code changes within just a few seconds. They backup your virtual machine for you, before you continue.

You now may have 90 percent of your work done, and the remaining 10 percent should be no problem. Again, before making the changes, your IT guys take another snapshot. So each snapshot taken, overwrites the previous one, but you are happy with the changes, since they meet your customers' demands more and more.

After applying another 10 percent of your J2EE coding changes, you need to reboot the VMware guest, which has a Windows® operating system installed; in order for your application to initialize properly and to make sure your changes work. After you reboot the VMware guest, it <u>**no longer starts**</u>. The VMware guest ends up in a blue screen. Oh no, at first you panic and think all your work is gone and that you will be late for your mothers-in-law's birthday party that evening and that you will not have any positive news to report to your boss who is anxiously waiting for you to get done in order to finalize the deals with the customers.

Well, your IT guy says, don't worry about it, and you don't understand them at first. After the IT guys carry out a VMware **revert snapshot**, the VMware guest boots again, and 90 percent of your previous <u>**coding changes are available again after a few seconds**</u>. You figure out what you did wrong within the last 10 percent of the coding changes, reboot the VMware guest and your application works properly.

After having your J2EE application *remotely* certified by the SAP ICCs later that day, you sell your product successfully and continue to use VMware in order to test other SAP software products with other projects you are working on. You can also go relaxed to the most important birthday party in the world and also tell your boss, have fun and enjoy SAP!

So what's up ahead?

Well, what I wrote above wasn't meant to be sarcastic. Just real life things you are confronted with during a normal IT working day.

In a series of future articles, I will explain how we make use of VMware in an SAP J2EE deployment certification test environment with some other real life examples. An ISV who had its J2EE application certified on our SAP Web AS 6.40 J2EE engine will also share its experiences with us. The ISV will demonstrate different J2EE deployment methods in order to become certified. The focus here will be how we used SAP software in a VMware based test environment.

A description of other SAP software which you can test or just get acquainted with utilizing VMware software or just by installing on physical machines is located at http://sdn.sap.com/sdn/weblogs.sdn?blog=/pub/wlg/1662
We will also take a look at this in another article.

The key thing to keep in mind as we take this exciting journey is the concept of software virtualization, what it is, when and when not to use it, and of course SAP software which you can test with it. Using a VMware based test environment for SAP solutions has made things a lot easier for us (ICC – Integration & Certification Center). The accompanying flexibility and many benefits along with the ability to save hardware costs and respond quickly to technically enable ISVs have been tremendous. Anyone should feel encouraged, to try it in order to successfully test SAP software.

And last but not least, here is what Gartner wrote about software virtualization
http://searchdatacenter.techtarget.com/originalContent/0,289142,sid80_gci1090107,00.html

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