



VDI (Virtual Desktop Infrastructure) Implementation for Control System - Overview and Analysis

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VDI OVERVIEW



Comparison of VDI vs Desktops performance

Virtual Desktop Infrastructure (VDI) is the virtualization of desktops which are used in every office.

This method is called a *thin client* and it allows to implement an end-user application and its configured environment on the server. This involves creating a virtual machine resource (VM) for each user who is authorized and has access when logging into VMware Horizon 7 with the installed agent on the terminal. The created virtual machines (VM) are on the server and work under control of hypervisor using the same process as in server virtualization.

Each VM desktop has appropriately configured RAM memory, disk space, and other resources. The entire installation takes place on a virtual disk created on the physical server. The user interacts with the VM using the remote graphical terminal protocol, for example: RDP (Remote Desktop Protocol).

The VDI client is a simple terminal whose operation is solely connecting to the VDI infrastructure on the server.

This solution works very well in places where computers or laptops are used for multi-tasking and multi-shifts, or for different users who have access to a particular desktop where each of them have their own applications, directories and data.

Also all data lives in the data center, not on the endpoint, so there are significant security benefits of VDI. There is no data on the machine itself. This is a big advantage and massive benefit of using VDI in the control system and therefore it was decided to test it in NCPS "Solaris".

VDI BENEFITS



The advantages of VDI implementation in the Control System are as follow:

- Ability to use a **lot off devices** to connect with VDI (Laptops, Desktops, Smartphones, nettops, terminals etc.)
- Access of **any computer** to the VM
- Possibility to dedicate appropriate groups to the VM with specific rights to access resources - **security**
- Easy Backup**
- Can be used as **Ansible** - easy to deploy VM with the corresponding system configuration
- Lack of **physical computers** (cheaper operation, no support, no failure)
- Efficiency**

TEST VDI IN NCSP „SOLARIS”



Tests were performed in the control room. Eleven desktop computers with CentOS 64 v7.3 operating system and Tango system were virtualized. All computers had a special configuration, and were very sensitive to any changes. Many packages and repositories have been installed for a long period of time to balance the quality of work and requirements imposed by operators.

After moving this computers and creating the same number on virtual machines (VM), it occurred that there were no losses on the hardware performance. *"Everything worked as well if not better" - this is a quote from the system users'*. Also the assumption was made that the server must have efficient graphic card because each station has to be able to operate four monitors. The NVIDIA Tesla M60 GPU graphics card was used for testing. It was expected to be very efficient and meet our expectations.

After many tests a problem with the drivers was detected. The card could not handle four monitors at the same time. The problem occurred while defining the main monitor. After the configuration of the graphical environment and the desktop by the Operator occurred that the image starts to flicker and constantly refresh itself.

An attempt to set up a Ticket in Nvidia was made. Unfortunately, there was no improvement.

After many tedious tests the solution was found and it was simpler than anticipated. A standard graphics card located on the server was used as a solution. Everything worked smoothly. The fault was only in the compatibility of CentOS drivers.

VDI DISADVANTAGES

The main disadvantages of this system is hardware and Staff cost.

Also big disadvantage of VDI is ensuring compliance within the business. Besides from the cost intensive hardware procurement, the business also needs to make sure that the programmes installed on all desktops are correctly licensed. Administration, security and licence management are very time consuming.



BIBLIOGRAPHY

- ✓ <https://oneclick-cloud.com/en/blog/trends-en/vdi-and-daaS-advantages-and-disadvantages/>
- ✓ <https://pubs.vmware.com/horizon-7-view/index.jsp?topic=%2Fcom.vmware.horizon-view.planning.doc%2FGUID-F64BAD49-78A0-44FE-97EA-76A56FD022D6.html>
- ✓ <https://www.vmware.com/content/dam/digitalmarketing/vmware/en/pdf/techpaper/vmware-horizon-7-view-blast-extreme-display-protocol.pdf>
- ✓ <https://www.vmware.com/products/horizon.html>
- ✓ <http://www.dell.com/en-us/work/shop/cty/pdp/spd/poweredge-r830>
- ✓ <http://www.extremenetworks.com/products/switching-routing/>