

Virtual PC management tasks automation

Sumer student report

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ABSTRACT

This report summarizes my summer student project in the BE-CO-IN section under the supervision of Luigi Gallerani. My project is about the automation of BE-CO VPC management tasks. The result of my work can be found on the felab server (the path is [user@cs-ccr-felab] \$ /acc/sys/hyperv/project). The documentation can be found on wikis.cern.ch.

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1. Introduction

The BE-CO-IN section manages and supports virtual machines as the standard development and test platform for projects requiring Technical Network access. We call them VPCs, as they are like virtual personal computers. In the policy of keeping big separation between development, test and production, each developer that needs TN access, can request a VPC from this section, and become the main user and the responsible for this virtual device. At the moment, almost 300 developers in the accelerator sector are using everyday VPC, including TE and EN engineers, who also use these VPC as a test platform for their accelerator software. Virtual machines installed and supported are BE-CO Scientific Linux 6 and BE-CO Locally Managed Windows7 VPC, altogether, today, more than 500 machines run on 25 physical servers only.

During this year the section managed to consolidate this existing infrastructure to making it reliable and faster. It's in this context that my project takes place. Indeed, during these 8 weeks as a summer student I had to learn about virtualization and tools to manage BE-CO VPC in order to detect critical mission operations to be automated, to finally design, implement and test a tool to automate these VPC management-tasks. At first, I am going to describe the technical part of my project to present then its diverse uses.

2. Technical part

2.1. *How can I automate?*

Most of the operations are executed manually using tools like Hyper-V from a terminal server, vmm.cern.ch and CMF interface as well as BE-CO ACC-administrators servers (like felab or feop). However, IT-OIS provides SOAP1, SOAP2, HTTP-GET and HTTP-POST interfaces integrating Hyper-V operations (virtual machine creation, stop...), LANDB operations (networking, main user...) and locally Managed CMF for windows machines. So, I had to write scripts as integrated as possible including all this type of operation.

2.2. *Technology used*

All my scripts are written in BASH that is executable from the ACC-administrator servers. I used the "Http wget" query for the IT-OIS interface and Xpath to extract data from XML. All these tools are standard and integrated. Furthermore, they are easy and fast to learn and simple to use

2.3. *Architecture proposed*

I worked with two types of scripts, a library of function and a main program. The library of functions contains functions for the authentication, to get lists of machines and their properties, to execute operations and to change the machines properties. The main program is able to execute

multiple functions on multiple machines, and can be easily modified depending on the tasks that we want to execute.

3. Utilizations

3.1. Functions in detail

In the library of function you can find: the function for the authentication, READPASS and IsUser-Authenticated which allow to read the user password and to test it; the functions to get a list of machines as function ListAllVMNameBECO, ListAllVMLNameBECO and ListAllVMlessCPU or to get a list of machines with their properties as ListAllVMPropBECO and ListAllVMLPropBECO. There are also functions to get properties of a single machine as function VMExist, GetProperties and GetProperty or to change properties as function ChangeCPU and function ChangeMainUser. Moreover, there are also functions to execute operations like Shutdown, Start, Stop RequestVMW, RequestVML, and DeleteVM.

3.2. Utilizations in main scripts

We can execute complex operations on multiple machines by combining the different functions. The applications are numerous. For example, the first goal of my scripts was to assign four CPU to every virtual machine with less than four CPU in order to give better performances. This scripts was very short and simple (eight lines) and consisted of a function to get the list of all the virtual machine with less than four CPU, to then shutdown, change the number and start all the machines in the list. We made an intervention on Monday 29 July, which went very well, and now every Linux machines have four CPU. Another example of use can be to detect all the virtual machines that are not used for more than four months and to get the list of users to then send an email to check if the machine is still needed. Finally, my scripts can also be used to detect abnormalities in the standardization. For example, I have detected that some Template Name are incorrect.

4. Conclusion

During this summer student project I had to learn about virtualization and tools to manage virtual machines. This then allowed me to design, implement, test and use in Production my integrated script. To finish, after some improvement, I have made my scripts readable, adaptable and simple to use. I have also written all the documentation needed. There are now completely available for all the administrator team.

My scripts are public, but can be modified only by the administrators. Those can use the library to create a script to solve a problem and then put it at disposition. Thus, my scripts are in constant evolution and improvement. Moreover, some functions can be easily changed, thanks to the documentation I have created, by changing the arguments.

In the future, an improvement can be done on the authentication part to increase the security.

As regards to the contribution of my work for my section, it has proved that it is really good for the standardization and so for the consolidation of the infrastructure. It also allows detecting and fixing anomalies. So, my project is a part of the vpc-consolidation phase, which started last year. Indeed, consolidation consisted of many technical and organizational improvements to move from an almost unstable system to a reliable, solid and faster solution.

5. Personal comments and acknowledgments

Studying physics and not computer science, I had apprehensions as for my internship within the section BE-CO-IN. However, these have quickly disappeared. Indeed, this internship brought me a lot because it's allowed me to discover a new discipline while using a method and tools that join totally my studies. Furthermore, the program of summer student brought me a lot both from a humane and a professional point of view. I wish to express my sincere gratitude to my supervisor Luigi Gallerani for all the time he dedicated to me and because he allowed this experience to be as enriching as possible.