Ezilla – Fast Deployment Toolkit for Creating Your Cloud Easily!!

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Abstract - As Cloud computing-based technology has grown, so have services offered over the Cloud. To meet the demands from users, service providers have to deploy Cloud service environments in a quick and easy way. To help resolving this issue, the Ezilla, which is a private Cloud toolkit, has been developed by the Pervasive Computing Team at the National Center for High-Performance Computing (NCHC). This effort of Ezilla integrates the de facto Cloud middleware, Web-based Operating System (WebOS), and coordinated Cloud infrastructure services (storage, computer, and network) to form a virtual computer in distributed computing environment. Via the Ezilla, Cloud users can create a virtual cluster that is customized to meet the specific needs from the users. The Ezilla simplifies the complexity to utilize Cloud services, thus to reduce the barrier for scientists to run their jobs on Clouds.

Keywords - Virtualization Techniques, WebOS, Virtual Cluster.

I. *PROJECT OVERVIEW*

As virtualization technologies become more prevalent, Cloud users usually encounter the problem of building his/her own virtual cluster with a user-friendly interface to manage virtual resources. To tackle this problem, the Ezilla, a private Cloud deployment toolkit, has been developed by the Pervasive Computing Team at the NCHC. Through the Ezilla, Cloud users can easily configure a virtual environment specifically for their applications. It is a lightweight approach helping users to access virtual computing resources. The main goal of this project is to simplify the procedure to utilize Clouds, and thus to provide scientists as well as general users a friendly Cloud envionment.

II. IMPLEMENTATION AND SYSTEM ARCHITECTURE

In Cloud computing environment, the virtual computing resource management has emerged as one of the most important issue in the past few years. Currently, Cloud users have to manually build a virtual cluster with the console mode in order to manage or generate virtual resources. To improve this condition, the *Ezilla* toolkit has been developed by the Pervasive Computing (PerComp) Team at the National Center for High-Performance Computing (NCHC). Ezilla is based on the "Carry-On-Cloud" concept. With the Ezilla, a virtual cluster can be created to meet the demad from the user with one click. Furthermore, Ezilla leverages "unattended installation" techinique, Cloud middlewares, WebOS (Web-based Operating System), and DRBL - SSI mode (Diskless Remote Boot in Linux - Single System Image) [1]. Therefore, Cloud users can bulit the whole private Cloud easily.

The system architecture of the Ezilla is shown in the Figure 1. Upon receiving a Cloud job request via Web Browser, the Ezilla – Cloud WebOS, acquires Cloud Services via Cloud Widgets, which in turn connect the Image Creator Widget, Virtual Machine (VM) Creator Widget, VM Monitor Widget, and VM Control Widget. Each of Cloud Widgets is described in **Section III-B**. The system helps selecting the most adaptive computing resources to create virtual clusters automatically based on the demands from the end users. These Widgets of Ezilla toolkit also drive the Cloud middleware to operate physical computing resources and storage.

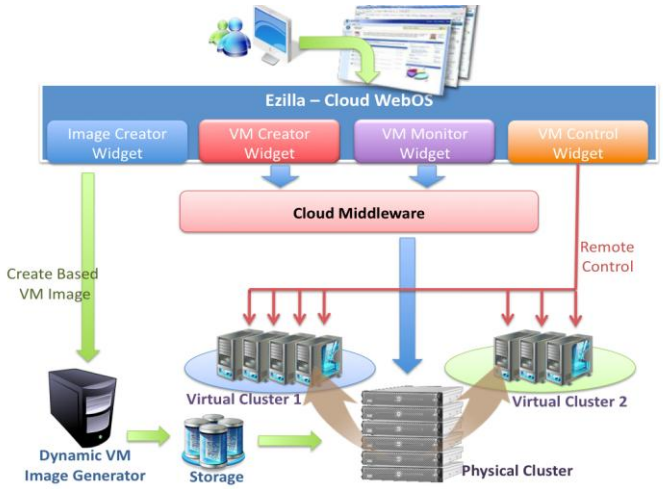

Figure 1. Architecture of Ezilla

III. RESEARCH RESULTS

The key feature of the Ezilla can be categorized into two parts, namely "Fast Delpoy Ezilla" and "Ezilla WebOS and Widgets".

A. Fast Deployment of the Ezilla Toolkit:

The Ezilla is designed to be installed as simply as possible so that users can easily and quickly build their own private Clouds. In fact, an Ezilla Server can be installed in just three simple steps via DRBL – SSI mode, as shown in the following Figure 2, and 3.

- ✓ Step1 - Boot with a genuine Debian CD-ROM and select "Help".
- ✓ Step2 – Key in "auto url=ezilla-nchc.sf.net" once the Help Index has been entered.
- ✓ Step3 - Per the illustration below, the Local Area Network does not use DHCP, therefore, a static IP must be provided.

After completing these three steps, the automatic installation process takes over. Once the installation is completed, a private Cloud is ready for the user, with the boot menu shown in the Figure 4 indicating a completed installation .

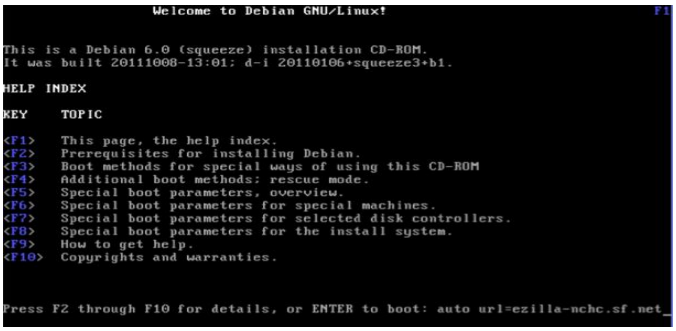

Figure 2. Step 2 - Input “auto url=ezilla-nchc.sf.net”

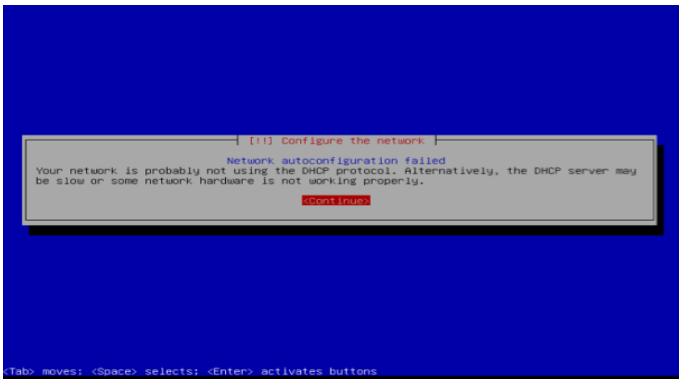

Figure 3. Step 3 – The Setup of Networking

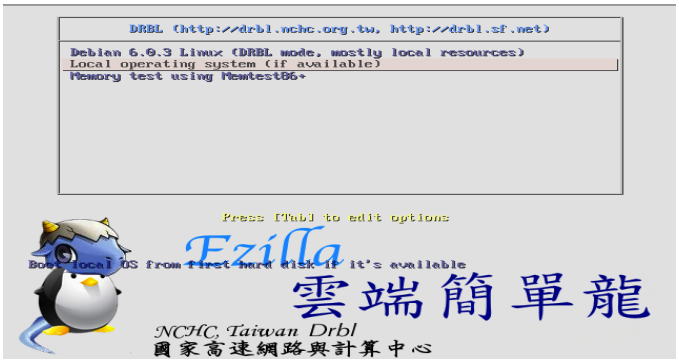

Figure 4. Boot Menu indicating a Completed Installation

B. *Ezilla WebOS and Widgets*

There are four components in the Ezilla toolkit, including Image creator widget, VM creator widget, VM monitor widget, and VM control widget, shown in Figure 5 and 6. NCHC’s Ezilla toolkit not only helps user to build virtual cluster easily and automatically, but also provides customized applications, such as the F-motif simulation widget and ICAS widget. The F-motif simulation widget provides specialized Cloud services to search and analyze the sequence of gene, shown in the Figure 7. The ICAS (IDS-log Cloud Analysis System) Widget is customized for information security purpose, as illustrated in the Figure 8. As illustrated in the Figure 9 and 10, Ezilla WebOS also provides two methods to control virtual machines. One is VNC, the other is SSH on Web.

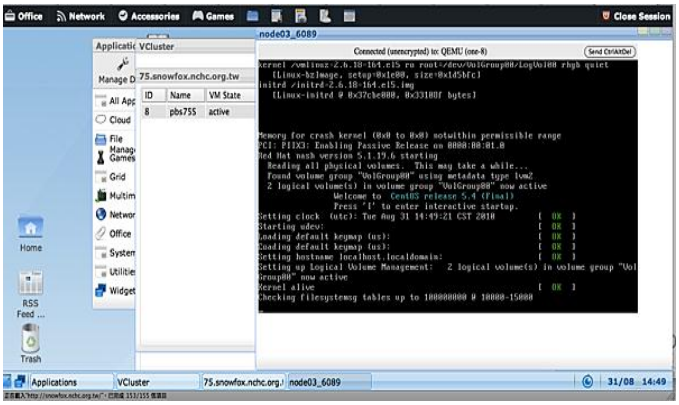

Figure 5. VM control widget – linux booting status & Win7 booting status F-motif Widget in Ezilla WebOS

Figure 6. VM control widget – Win7 booting status

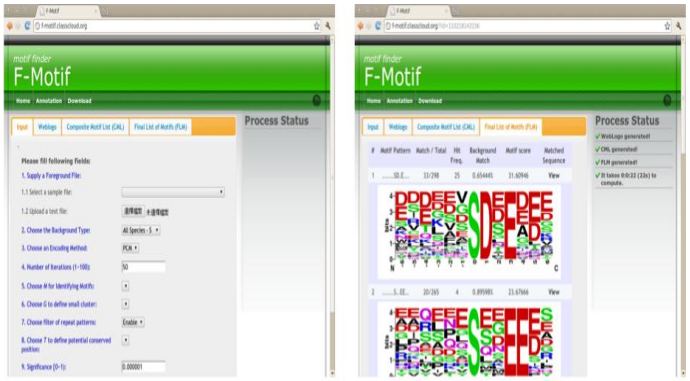

Figure 7. F-motif Widget in Ezilla WebOS

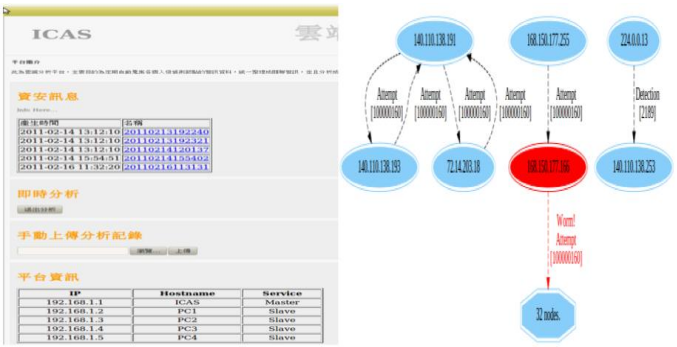

Figure 8. ICAS Widget in Eziila WebOS

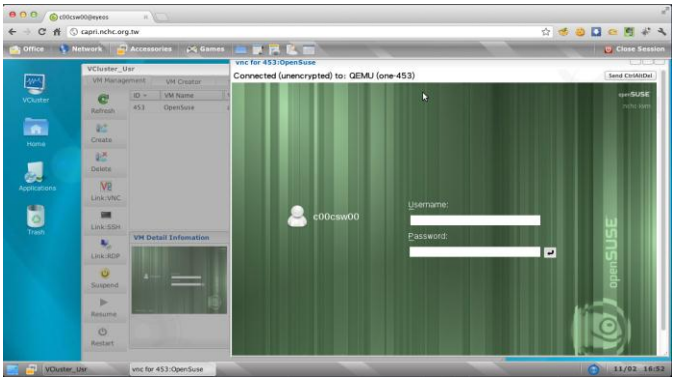

Figure 9. Using VNC to Control VM

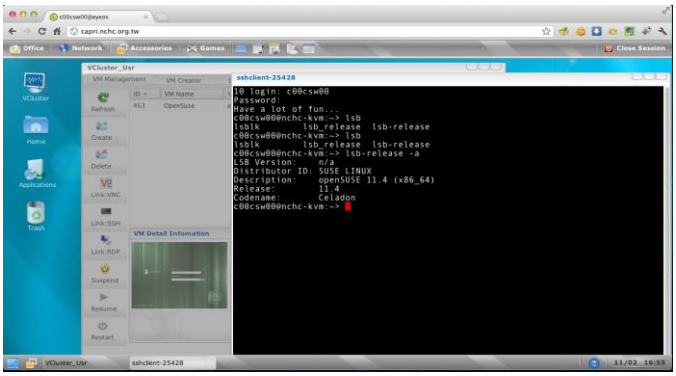

Figure 10. Using SSH to Control VM

IV. CONCLUSION

The proposed toolkit – Ezilla [2], it not only helps user to build virtual cluster easily and automatically, but also provides different varieties of computing environment such as Linux, Win7, and so on. Furthermore, the ability to distribute and balance the workload across multiple physical as well as virtual computing resources will be tackled in the future development of this research.

The ultimate goal of the Ezilla is to provide “Everything as a Service”. Therefore, to promote the Ezilla toolkit, we would like to explore the possibility of education usage, in addition to the scientific applications. The NCHC's Ezilla Development Team would like to call for participants in using the Ezilla to create diverse applications via Cloud services that can be accessed anytime.

References

［1］ http://drbl.sourceforge.net/
［2］ http://ezilla-nchc.sf.net/