



A Virtual Web Lab for Teaching Enterprise Web Applications Development

Carlos Pérez-Conde¹, Juan Gutiérrez-Aguado¹, Francisco Grimaldo-Moreno¹,
Wladimiro Díaz-Villanueva¹, and Isabel Castro-Bleda²

¹Departament d'Informàtica, Universitat de València (SPAIN)

²Departament de Química-Inorgànica, Universitat de València (SPAIN)

Introduction

Enterprise Web applications are built by integrating distributed components connected via a network. The runtime environment of these applications consists of an heterogeneous system of specialized components (Web Servers, Application Servers, Database Management Systems, etc ...).

The problem

- Teaching in the area of enterprise Web applications development is a challenge.
- Students should acquire skills in various topics that have traditionally been separate areas of knowledge: software engineering, database management systems, operating systems, computer networks and computer security.
- The teaching of a practical laboratory component in this area requires a dedicated laboratory, isolated from the rest of the infrastructure of the center.
- Construction, management and maintenance of these environments is a complex task and requires a large amount of resources.

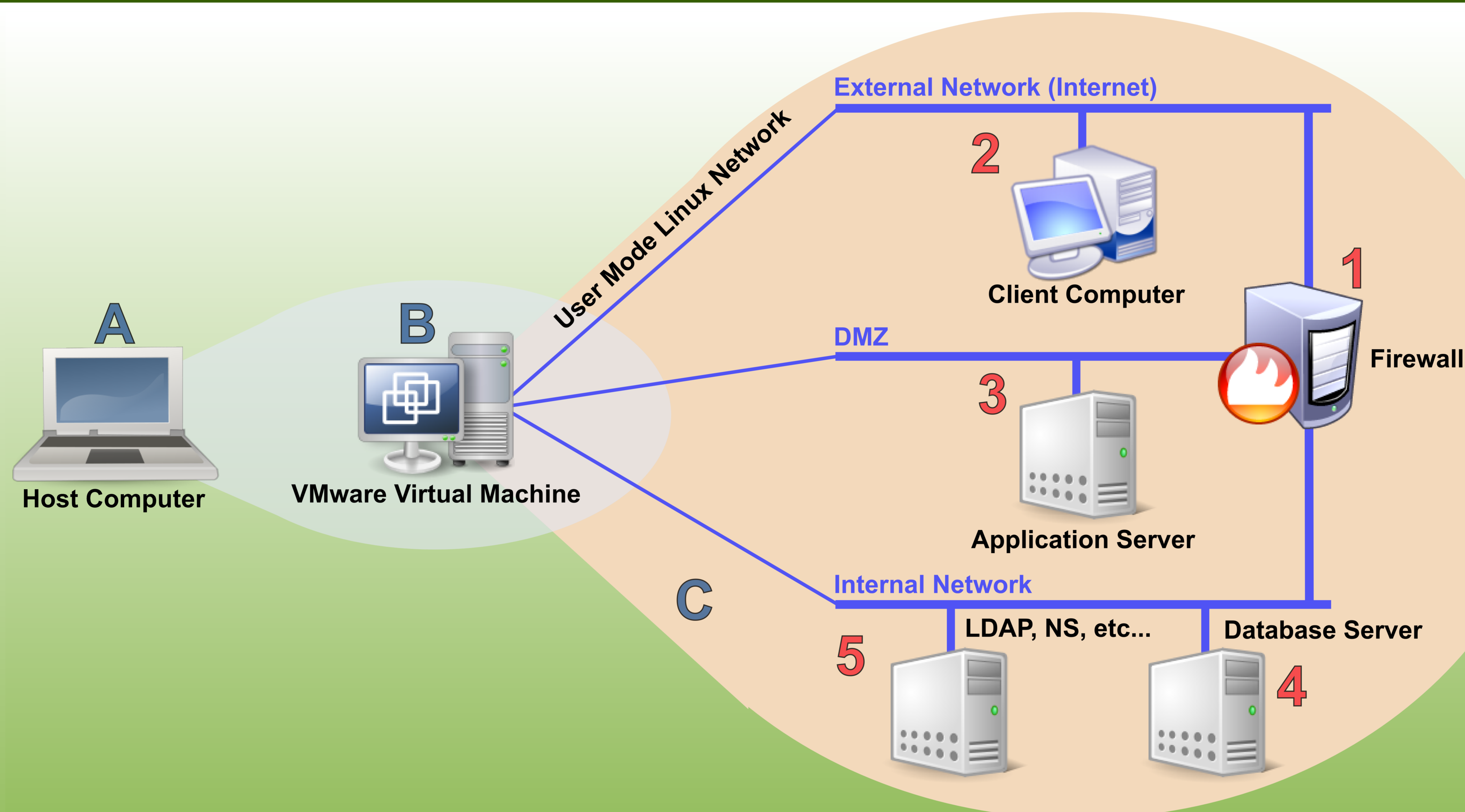
One solution

A virtual laboratories suited for the development of enterprise Web applications:

- Virtualization is an economically viable alternative.
- Allows to build a virtual lab in which students can develop every facet of the Web development.

Our solution

- A virtual environment is based on **NETinVM** [1].
- This tool allows you to create a computer network encapsulated in a portable environment
- We use a VMWare virtual machine on which all the services of an enterprise network are defined and executed as an User Mode Linux (UML) set of Virtual Machines.



The System

- A** Host computer with a free VMWare Player.
- B** Development environment: an OpenSUSE based virtual machine. This machine install Java 1.6, Eclipse, MySQL Database server and other development tools.
- C** The virtual computer network based on User Mode Linux. It mimics the typical structure of a corporate network (**external network**, perimeter network or **DMZ** and the **internal corporate network**).

Advantages

- It is an integrated tool that can be shared by different subjects in different areas such as operating systems management, computer networks, computer and network security and Web development.
- Students can develop, deploy and test their applications in their own portable environment without compromising the real network.
- Students and teachers share a common environment, so classroom demonstrations can be reproduced by the students.
- Better coordination between teachers of different subjects in a course.

Bibliografía

[1] C. Pérez y D. Pérez, NETinVM: una red en una máquina virtual, Actas de las XIX Jornadas de Paralelismo. Publicacions de la Universitat Jaume I. ISBN: 978-84-8021-676-0, September 2008.