

# vMoodle: Virtual Machine based Online Learning Environment

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# Problem Background



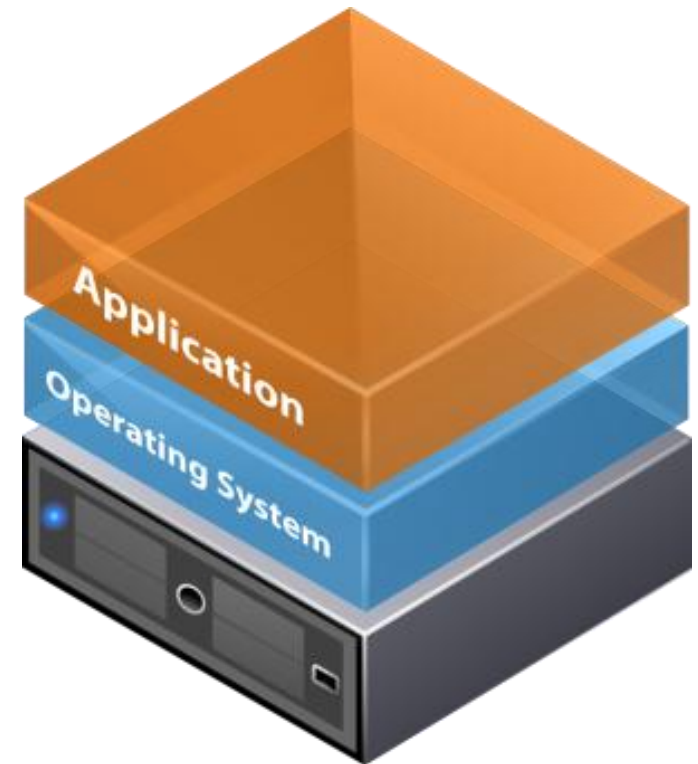
## Web-based Virtual Learning Environments (VLEs)

- Interactive learning environment
  - Deliver course materials
  - Through the Internet
  - Educators conveniently
    - Create materials
    - Deliver materials
  - Students easily use material
- E.g., Moodle, Blackboard

# Problem Background

## Virtual machine (VMs)

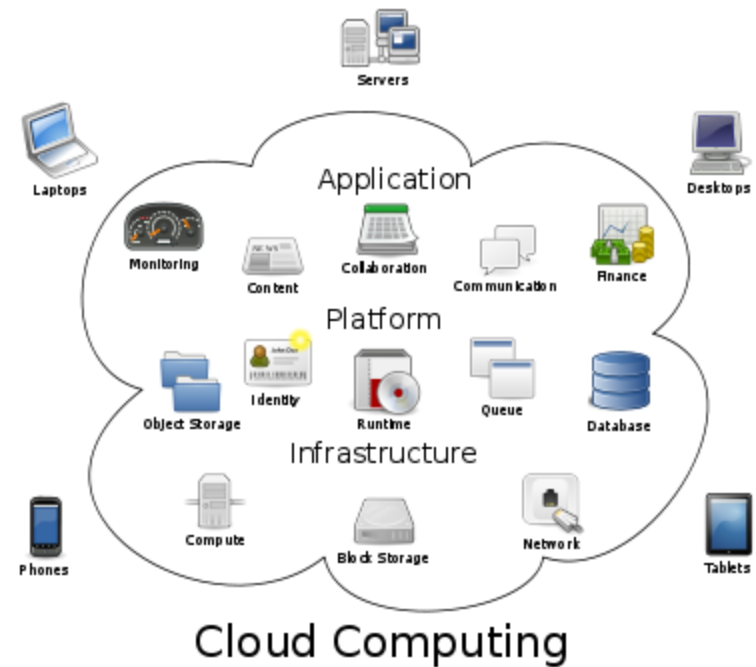
- A valuable tool for creating educational modules
  - Self-contained
  - Portable
  - Replication and deployment
    - Transparently
    - Anywhere
- E.g., VMware, VirtualBox, Xen



# Problem Background

## Cloud computing

- Deliver computing as utility
  - “Infinite”, on demand
  - Public and private clouds
  - Can host entire lab on clouds
- E.g., Amazon EC2, Windows Azure



[http://en.wikipedia.org/wiki/Cloud\\_computing](http://en.wikipedia.org/wiki/Cloud_computing)

# Current System

- Download and upload VMs as files
  - Bandwidth
  - Storage
- Lab Sessions
  - Limited availability
  - Inconvenient
  - Requires more planning from instructor

# VM and Cloud based Online Learning

- Allow users to create and use VMs within Moodle
  - Access VMs anytime anywhere
  - No need to download or upload VMs
- Allow lab to be hosted on clouds
  - Rent resources on demand
  - No need to purchase or manage physical labs

## vMoodle Current Status

- Integrating Moodle with locally hosted VirtualBox VMs
- Integrating cloud-hosted Amazon EC2 VMs
- Resource management of local VMs
- Live demo: <http://visa.cs.fiu.edu/vmoodle/>

# Next Step?

- Resource management of cloud VMs
- Support of Blackboard system
- Support of mobile devices
- ...