DESIGN OF AN EXECUTABLE SOLUTIONS MANAGEMENT PLATFORM (ESMAP) BASED ON VIRTUAL MACHINE SNAPSHOTS

By:

Robert Shoniwa   David Fadaraliki   Monica Catherine S.   Tendai Marengereke
Introduction

- Annually, dozens of software solutions are developed by students as part of the mandatory requirements for them to be awarded their respective degree qualifications.

- However, most of these potentially groundbreaking solutions tend to be stored away and forgotten upon completion.

- Also, students tend to try and propose already developed and completed prototypes done at other universities while claiming they are their own due to a disconnect among local universities.
Key Terms

Virtualization
- The concept of virtualization, is essentially a method of dividing a *single machine* into *smaller* virtual machines by running multiple operating systems and giving the impression to an end user that his or her job was running on a *separate, dedicated machine* [3].

Virtual Machine (VM)
- Is an *emulation* of a computer system based on computer architectures and which provides the functionality of a physical computer.
Key Terms

VM Snapshot

- A snapshot preserves the state and data of a virtual machine at a specific point in time.

- **The state** includes the virtual machine’s power state (for example, powered-on, powered-off, suspended).

- **The data** includes all of the files that make up the virtual machine. This includes disks, memory, and other devices, such as virtual network interface cards.
Introduction

The aim of this paper is to design a platform that enables the storage, indexing, retrieval and execution of developed software solutions/prototypes.

This will be done through:

- the design of a user-friendly interface as the front end,
- a database of virtual machine snapshots for each executable system running at the backend
- and a querying engine to interface the two.

This will go far in ultimately aiding universities to become recognized hubs of new, innovative and marketable technologies.
Potential Benefits

- **Projects repository for a university’s software based outputs** (works hand in hand with the document repositories proposed by other presenters)

- Also allows the university to use the acquired data to **generate and analyse statistics** regarding the types of projects and SDGs that are primarily being addressed by the university as well as what other areas that need to be to focus on

- Can **be indexed and searched** by students as a “base project” they can implement new technology on and actually improve over time
Potential Benefits

- Makes it **easier to illustrate the functionality** of a developed system/prototype to interested partners or potential investors in addition to presenting them with a research paper.

- Used to **exhibit projects to high school students** to get them interested in computing sciences and further the global and Zimbabwe STEM-ization agenda.

- **Reduces internal duplication of projects** by students who implement projects that may have been done a few years earlier at the same university but in a different department.

- If implemented **at more universities linked via an NREN**, it would do away with scenarios where students take advantage of this “disconnect” and simply submit a previously done project from a different university as their own.
# Cloud Services

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Fig 1 http://www.hanusoftware.com/azurezone/whats-the-difference-between-different-cloud-services-like-iaas-paas-and-saas/

LMS – Learning Management System
## Overview of research on Private Cloud in University Setting

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Fig 2 Architecture Design
Main Modules

- **Submission Module**
  - Allows students to submit their executable project by installing it in a VM or appending it to a VM snapshot if the installation requirements match an already existing snapshot.
  - Allows students to submit their source code and related systems/prototype documentation including designs and UML diagrams.

- **Retrieval Module**
  - Allows users to search for selected project types and view demonstrations of the prototypes actually running (in a secure manner).
  - Allow students secured access to the source code of the program as well as the project’s corresponding documentation.
Conclusion

- Currently, there is **no standard system or platform** in place in Zimbabwe to harness the student-generated prototypes and solutions for further improvement.

- The ESMAPs repository being suggested in this paper proposes to solve that challenge.
Future Work

- **Code repository** and **verified code repository** (appropriately commented with corresponding UML diagrams)

- Connecting of various university ESMAPs using NRENs to create a unified repository where students or developers can simply search for functions in selected programming languages, download and then implement the code in their scenario.

- We aim to develop further on our solution to provide a fully-fledged private cloud infrastructure (HIT-Cloud) based on existing resources which offers IaaS, SaaS and PaaS within the learning environment.
References

Thank you..

- Robert Shoniwa
rshoniwa@hit.ac.zw
rshoniwa88@gmail.com