Cloud Deployments @Institutions

Lycée des Arts et Métiers	RESTENA / Luxembourg	September 2018

The Challenge

Lycée des Arts et Métiers (LAM) in Luxembourg offers a post-secondary education course on "Installation and Configuration of Windows Server" (ISEWI). The two-part course spans two semesters. LAM asked RESTENA to help them identify a suitable cloud provider for hosting the teaching material for the second part of the course, in order to improve efficiency and management. The instructor set the following requirements:

• Allow individual students work on their own VMs (virtual machines) exclusively
• Keep billing and cost data hidden from students
• Allow the instructor to take control over VMs if needed
• Provide an isolated networking environment for a group of VMs per student
• Grant the instructor full control over incurred costs

Why the cloud?

The first part of the course was carried out using the school's local computer resources. This presented several problems and issues. Many students experienced very long response times and there was no backup of the VM state at any time. Because the VMs were stored locally, students had to always use the same machine in the same classroom. There was no possibility to work at home or remotely when the school was closed. Some students preferred to bring their own computing equipment because of the slow response time, and some brought their own external drive or SSDs to store their VMs. This introduced new risks to the students' work, for example the risk of physical damage to their equipment en route.

Approach

CloudSigma's comprehensive delegation model allowed all resources to be tagged, in this case with the name of the student. It also enables managing an Access Control List. This list delegates access to tagged objects. Users can be granted permission to use the resource without exposure to billing data, so that only the designated owner of the resource could access this data. And finally, the solution allows for a private VLAN so that VMs can be connected to an isolated private VLAN network rather than via the Internet.

The CloudSigma solution is well aligned with the typical needs of an educational environment. Full support for eduGAIN federated identity management adds real convenience and value. One central administration can procure cloud resources, in currency or on account, and distribute resources to

Offering

Cloud hosting of virtual machines and other resources with delegated access for post-secondary course on Installation and Configuration of Windows Server (ISEWI).

"My first experience in working with a cloud service was very positive. All in all, the cloud service, in my opinion, offers many advantages in teaching scenarios on ICT topics."

individual instructors. This way instructors do not need to open their own accounts and manage payments. It also ensures managed allocation, preventing a situation in which one or two courses consume entire budgets. RESTENA made the cloud framework Call-Off, added money to its own account, and transferred the estimated sum needed for the course to run to this particular instructor's account. The instructor then created virtual machines and other resources, and delegated access to them to the individual students.

Results

While the switchover from on-premise to cloud solution in the middle of the curriculum could have led to a loss of valuable time since students were not able to continue using their pre-built Windows machines. This was mitigated completely since CloudSigma allows cloning existing VMs. So the instructor only had to prepare a basic installation of Windows configurations and an ActiveDirectory domain and clone that for each student.

The VMs were always available for remote access from any computer at the school or at home. Response time was much improved. In fact, students completed final assignments

much earlier than in previous years, even with the migration from on-prem to cloud infrastructure. Students ran no risk of losing their machines due to system failure and there was no longer any need for additional devices like external HD/SSDs or laptops. Teachers easily logged on to students' machines for evaluation or problem solving. In addition, the cloud solution freed up the school's computer room, which is a resource in very high demand, so it could be used for other courses.

Working with VMs in a cloud infrastructure gave both instructors and students a lot of flexibility. Students finishing assignments fast means more time to be invested into expanding the curriculum. This pedagogical win came at a relatively low price of some € 100 per student for the entire semester.

The CloudSigma solution allows for more efficient management and scale. With local hardware, as the size of the class grows, the potential for hardware issues, system failure and inherent risks from students bringing their own devices increase dramatically because there are so many moving parts. Furthermore, the compute

resources needed for any course can quickly exceed what a typical school computer can manage. Insufficient resources ultimately leads to bad instruction, frustrated teachers and very dissatisfied students. Automatically managing all this reduces the number of vulnerabilities, leaving the instructor with only one administrative task: keeping an eye on the expenses.

NREN Support

LAM worked closely with RESTENA to identify a suitable vendor. RESTENA was the actual procuring entity. RESTENA made the cloud framework Call-Off, added money to its own account, and transferred the estimated sum needed for the course to run to the particular instructor's account.