

Cloud based services for on-demand education

Florin Anton, Monica Dragoicea, Theodor Borangiu, Silvia Anton, Florin Pop, Iulia Voinescu
University Politehnica of Bucharest

Agenda

- Cloud Advantages in Higher Education
- Service Management Cloud Infrastructure Options
- CloudBurst 2.1 Implementation at UPB & UTBv
- The INSEED Project
- HW Architecture
- SW Architecture
- Virtual Machines
- Using Cloud @UPB
- Cloud @UPB integration with Moodle
- Conclusion

Cloud Advantages in Higher Education

- Smarter Classroom
 - Enabling student success and skills
- Smart Administration
 - Optimizing educational systems
- Innovation in research
 - Accelerating innovation
- Cost control
- Efficient resource usage
- High Availability

Service Management Cloud Infrastructure Options

Integrated Service Mgmt

Customizable

- Individual software offerings, fully customizable to the environment
- Could begin with TSAM, or could require other SM capabilities for cloud, such as security or storage mgmt.
- Designed for customized data center automation.

IBM Service Delivery Mgr

Flexible HW Configurations w/Fast Time to Value

- Integrated software-only service management offering for cloud computing.
- Same basic SW function as CloudBurst
- Delivered as a set of virtual machines for simplified deployment and faster time to value
- Allows flexibility of the HW platform, with a pre-determined set of service management tasks and workflows

IBM CloudBurst

Fixed Configurations, Faster Time to Value

- Pre-Integrated HW/SW/Services release in a pre-determined configurations
- Includes HW for System x, or Power Systems, Tivoli Service Management Software, GTS QuickStart services
- Self-contained management
- Designed for quick deployment

Customizable



Rapid Time to Value

CloudBurst 2.1 Implementation at UPB & UTBV

- INSEED Project
 - Consortium of 4 Universities:
 - University Politehnica of Bucharest (UPB)
 - University “Transilvania” of Brasov (UTBV)
 - Academy of Economic Studies (ASE)
 - University of Medicine and Pharmacy Carol Davila (UMF)
- Main objective
 - to create a modern, educational framework for training and skills forming in higher education in **science, design and services management (SPMS)** and to **promote innovation in services industries** based on an **open, continuous learning model** and on a distributed computing infrastructure of cloud type with **virtualized and accessible resources as services**, interconnected with European structures.
- Tools
 - IBM CloudBurst 2.1 Small Size (UTBV)
 - IBM CloudBurst 2.1 Medium Size (UPB)
 - Stand alone or interconnected

The INSEED Project

- Tools: **INSER@SPACE**
 - E-learning: <http://e-learning.cloud.upb.ro/>



UNIUNEA EUROPEANĂ



GUVERNUL ROMÂNIEI
MINISTERUL MUNCII,
FAMILIEI ȘI PROTECȚIEI
SOCIALE
AMPOSDRU



Fondul Social European
POS DRU
2007 - 2013



Instrumente Structurale
2007 - 2013



MINISTERUL
EDUCAȚIEI
CERCETĂRII
TINERETULUI
ȘI SPORTULUI

OIPOSDRU



Universitatea
POLITEHNICA
din Bucuresti

Nu sunteți autentificat. ([Autentificare](#))

Pagina principală

Română (ro) ▾

Meniu principal



Pagina principală

▶ Cursuri

Cursuri

- ▼ Cursuri master
 - ▶ Facultatea de Automatica si Calculatoare
- ▼ Cursuri module compacte
 - ▶ Facultatea de Inginerie Electrica
 - ▶ Facultatea de Energetica
 - ▶ Facultatea de Automatica si Calculatoare
 - ▶ Facultatea de Electronică, Telecomunicații și Tehnologia Informației
 - ▶ Universitatea Transilvania din Brasov
 - ▶ Academia de Studii Economice din Bucuresti
- ▼ Program formare continua
 - ▶ Facultatea de Inginerie Electrica
 - ▶ Facultatea de Energetica
 - ▶ Facultatea de Automatica si Calculatoare
 - ▶ Facultatea de Electronică, Telecomunicații și Tehnologia Informației
 - ▶ Universitatea Transilvania din Brasov
 - ▶ Academia de Studii Economice din Bucuresti
 - ▶ Universitatea de Medicina si Farmacie "Carol Davila" Bucuresti

Caută cursuri: Execută[MINIMIZEAZĂ TOATE](#)[MAXIMIZEAZĂ TOATE](#)

Calendar



septembrie 2013

Lu	Ma	Mi	Jo	Vi	Sâ	Du
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

Nu sunteți autentificat. ([Autentificare](#))

The INSEED Project

- Tools: **INSER@SPACE**
 - E-learning: <http://e-learning.cloud.upb.ro/>
 - SSKE: <http://sske.cloud.upb.ro/>



Share



Last visited: Service Science Knowledge Environment

Keywords

Documents

Articles

Books

Journals

Reports & Thesis

Projects

Research

Studies

Education

Commercial

Patents & Standards

Events

Workshops

Conferences

Virtual Exhibitions

Company Solutions

Service Science Knowledge Environment

More ▾

(Redirected from [Main Page](#))

The main goal the **Service Science Knowledge Environment (SSKE)** is to implement a collaborative environment that would gather different academic partners with the overall aim of creating a modern educational framework in the areas of [Science](#), [Design](#) and [Management services](#), while promoting [service innovation](#) in different [service sectors](#).

The **Service Science Knowledge Environment (SSKE)** targets also at creating a solid knowledge-based link between [academia](#) and [government](#), along with other [European institutions](#). It supports sharing relevant information on [Service Science](#) that would be stored in a way based on a common vocabulary using an integrated ontology.

The **Service Science Knowledge Environment (SSKE)** is delivered as a [service](#) in the [cloud](#). It will be further used for *managing service system related knowledge*. It intends to exploit the best opportunities for [business service innovation](#) using IBM cloud technologies as a mean for *information service innovation* through *virtualization* and improvement of *service front ends* for academia, industry and stakeholders.

It aims at fostering [service innovation](#), sustaining this endeavor through the transfer of the research results in terms of [information](#), [Proof of Technology](#), [methodologies](#), aiming to develop sustainable *service systems innovation solutions*.

The INSEED Project

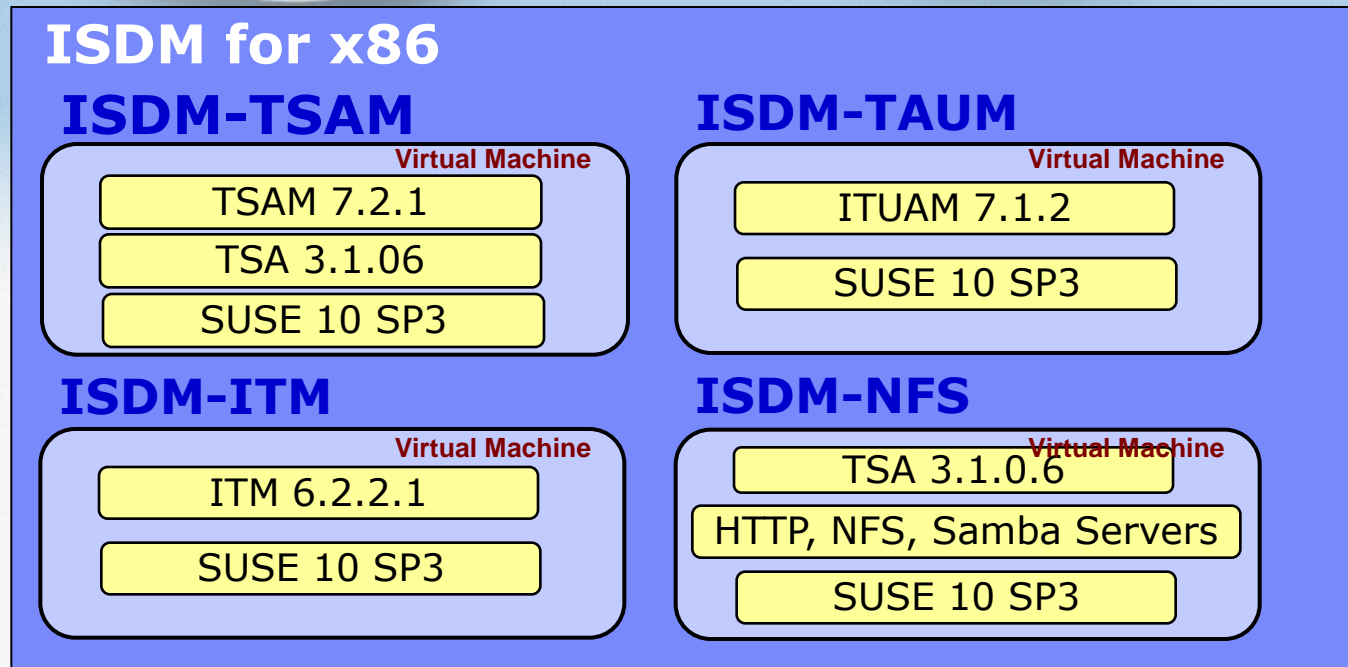
- Tools: **INSER@SPACE**
 - E-learning: <http://e-learning.cloud.upb.ro/>
 - SSKE: <http://sske.cloud.upb.ro/>
 - Virtual Labs
 - Access to SW applications
 - Access to SW and HW equipments

HW Architecture



- **42U Rack Cabinet**
- **Server management node (IBM System x3550 M3 with dual-socket Intel Xeon 5620 2.4 GHz 4-core processors)**
- **1 Cloud management and 13 Cloud compute nodes (BM BladeCenter H, HS22V blades with dual-socket Intel® Xeon® 5660 2.8 GHz 6-core processors, 72 GB memory)**
- **External storage 29 TB (IBM System Storage® DS3400; optional IBM Systems Storage SAN Volume Controller, EXP3000 storage expansion units)**
- **Ethernet switches (10 Gb Ethernet switches for normal operations, 1 Gb Ethernet switches for out-of-band management)**
- **Ethernet adapter (Dual 10 Gb Ethernet ports included on each blade)**
- **Fibre Channel SAN switch (8 Gb SAN switches)**
- **Fibre Channel adapters (Dual 8 Gb Fibre Channel adapters on each blade server)**
- **Software**
 - Blade operating system: VMware vSphere 4.1 Enterprise Edition
 - Server management node software: Microsoft® Windows® 2008 R2 Standard Edition 64-bit; IBM Systems Director including Network Control and Active Energy Manager; BladeCenter Open Fabric Manager
 - Cloud management node software: VMware vCenter 4.1; ISDM

SW Architecture



TSAM – Tivoli Service Automation Manager

TSA – Tivoli System Automation

ITM – IBM Tivoli Monitoring

ITUAM – IBM Tivoli Usage and Accounting Manager

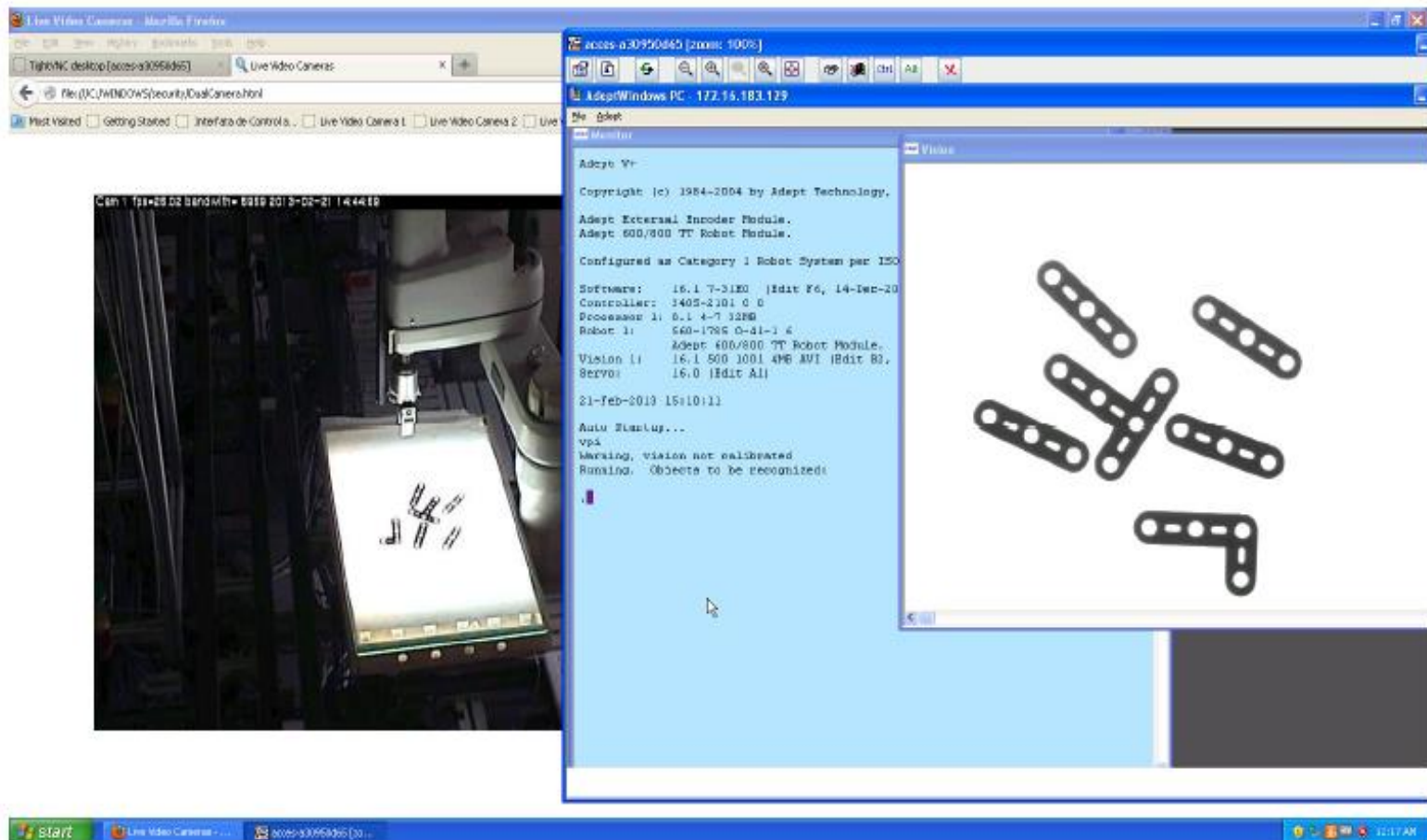
Virtual Machines

- **Support Applications**
 - **Service Science Knowledge Environment - <http://sske.cloud.upb.ro>**
 - **E-learning - <http://elearning.cloud.upb.ro>**
 - **Video Conference**
- **Virtual Machines**
 - **Basic Templates**
 - **Windows 7 Enterprise x86, x64**
 - **Windows XP Professional x86, x64**
 - **Windows 2003 Enterprise Server x64**
 - **RedHat Enterprise Linux 5.3 x86, x64**
 - **RedHat Enterprise Linux 5.4 x86, x64**
 - **RedHat Enterprise Linux 5.5 x86, x64**
 - **SuSE Linux Enterprise Server 10 x86, x64**
 - **SuSE Linux Enterprise Server 11 x86, x64**
 - **CentOS Linux 5.6 x64**
 - **OpenSuSE Linux 11.1 x86**

Virtual Machines

- **Virtual Machines**

- **Access to HW Equipments: Robot-Vision**



Virtual Machines

- Virtual Machines

– Access to HW Equipments: Smart Cameras

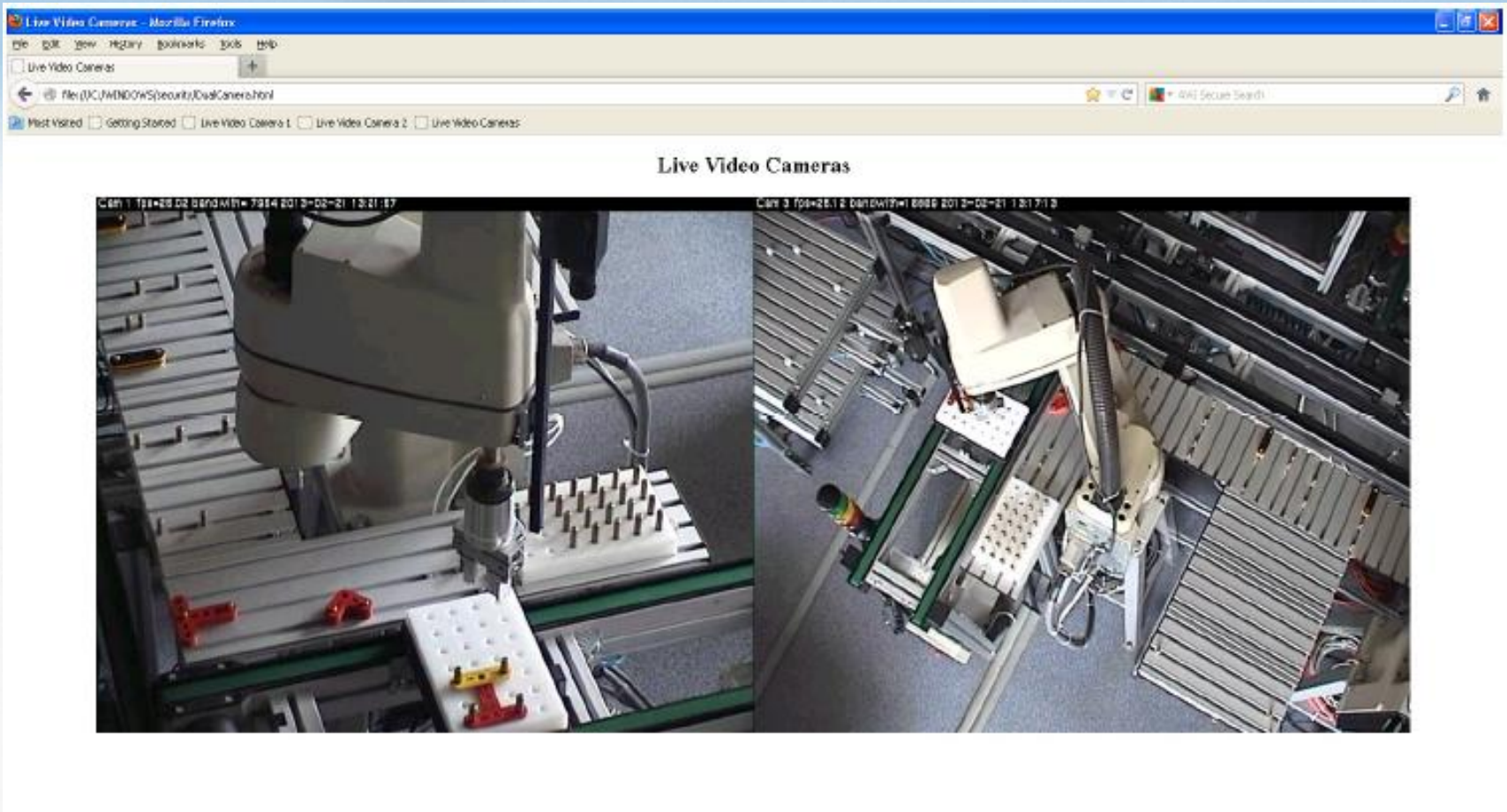
The screenshot displays the In-Sight Explorer software interface. The main window shows a camera feed with a red bounding box around a central object. The interface includes a left sidebar with 'Application Steps' (1. Start, 2. Set Up Tools, 3. Configure Results, 4. Finish) and a bottom status bar with 'Rate: 0.0% (0/1000248)' and 'Time: 93.3ms'. A 'Results' table is visible on the right and bottom, listing detected objects and their classification results.

Name	Result	Pass	Fail	Time/ms
Negu	Color!	191677/1000248	813571/1000248	3.4
Galben	No Match	0/1000248	1000248/1000248	3.4
Galben_1	No Match	0/1000248	1000248/1000248	3.4
Galben_2	No Match	0/1000248	1000248/1000248	3.5
Polten_1	No Match	0/1000248	1000248/1000248	31
ID Code_1	No Match	0/1000248	1000248/1000248	0.3
Negu_1	No Match	92270/1000248	912970/1000248	3.0
Negu_2	No Match	92201/1000248	909467/1000248	3.5

Virtual Machines

- **Virtual Machines**

- Access to HW Equipments: Observation Cameras



Virtual Machines

- **Virtual Machines**
 - **Virtual Labs**
 - **Cloud Computing**
 - **E-commerce**
 - **SOA in Cloud**
 - **SOA in Manufacturing**
 - **BAO**
 - **BPM**
 - **Business Optimization**
 - **Rational and WebSphere**
 - **Enterprise Resource Management**
 - **Supply Chain Management**
 - **.**
 - **.**

Using Cloud @UPB

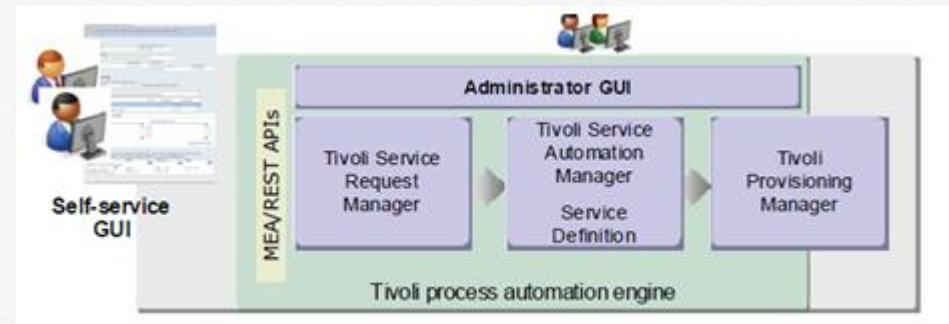
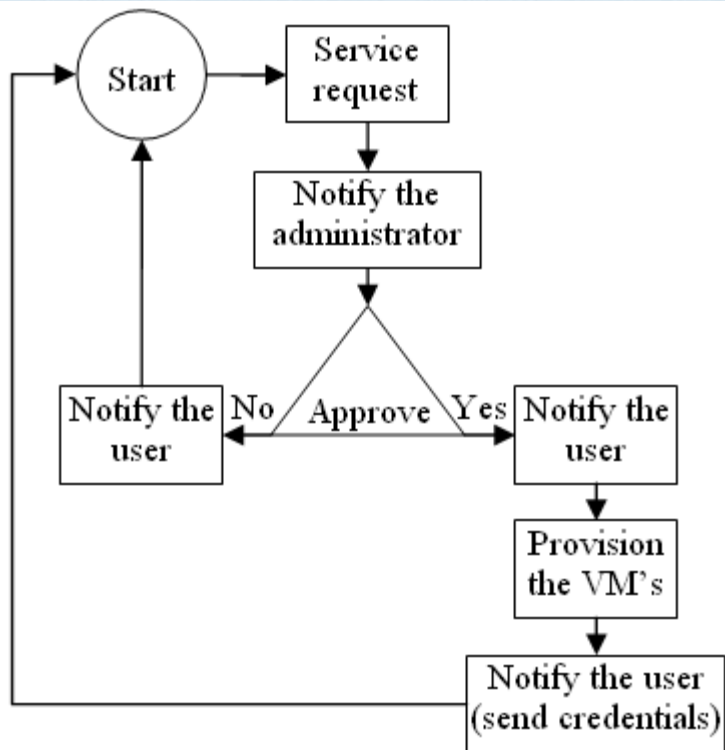
- Accessing Cloud@UPB
 - Step 1:
 - Connect to the main page:
 - <http://sske.cloud.upb.ro/sskemw/index.php/Cloud@UPB>
 - Step 2:
 - Register: http://sske.cloud.upb.ro/sskemw/index.php/Cloud@UPB_Register
 - Step 3:
 - Consult the Cloud Offerings:
<http://sske.cloud.upb.ro/sskemw/index.php?title=Special:EmbedWindow&target=Pdf%3ACloud+Offerings.pdf>
 - Step 4:
 - Login and create requests:
http://sske.cloud.upb.ro/sskemw/index.php/Cloud@UPB_Self_Service_Interface
 - <https://141.85.204.6/SimpleSRM/>
 - Step 5:
 - Access virtual machines

Cloud @UPB integration with Moodle

- Problem
 - Only 30% of VM used
 - Cloud resources blocked but not used
- Solution
 - Allow each student to create its own VM

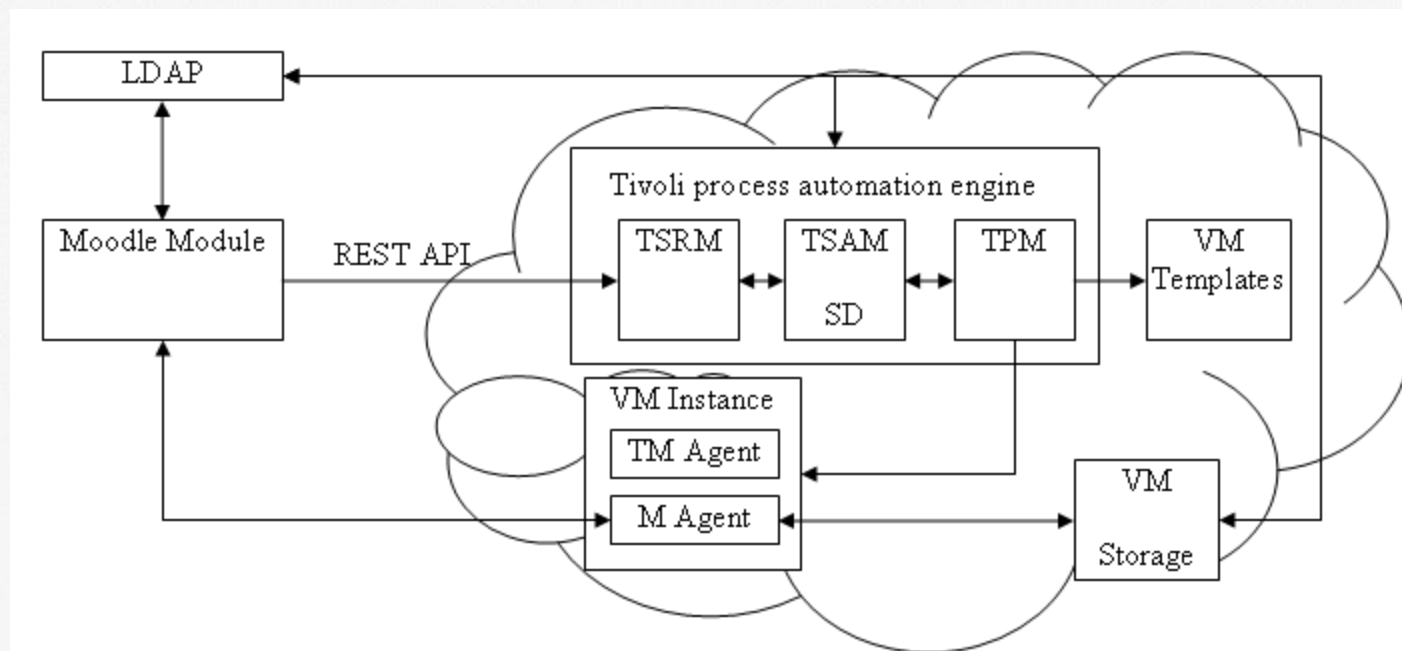
Cloud @UPB integration with Moodle

- Project provisioning



Cloud @UPB integration with Moodle

- Moodle - project provisioning



Cloud @UPB integration with Moodle

The screenshot shows a web browser window with the URL `e-learning.cloud.upb.ro/course/view.php?id=9`. The browser's address bar contains the search term "journal of cloud computing". The page header includes the logo "INSER@SPACE" and navigation links for "E-Learning", "Service Science Knowledge Environment", and "Cloud@UPB".

The main content area displays a calendar of course activities:

- 14 May - 20 May**
 - Course 8: Wireless, IDS & Network Security
 - Lab 8: IP Address and Port Scanning
- 21 May - 27 May**
 - Lab 9: GUI-Based Vulnerability Scanners
 - Course 9: Security practices & attacks
- 28 May - 3 June**
 - Lab 10: Researching System Vulnerabilities
 - Course 10: Messaging and Web components
- 4 June - 10 June**
 - Lab 11: Using Metasploit
 - Course 11: Secure SW Development and Disaster Recovery
- 11 June - 17 June**
 - Lab 12: Password Cracking
 - Course 12: Risk, Change and Privilege Management
- 18 June - 24 June**
 - Lab 13: Web SQL Injection
 - Course 13: Forensics and Legal Issues
- 25 June - 1 July**
 - Lab 14: Web Browser Exploits
 - Course 14: Privacy

On the left side, there is a "Settings" sidebar with a "Course administration" section containing options like "Turn editing on", "Edit settings", "Users", "Unenrol me from C15 NSS", "Filters", "Grades", "Backup", "Restore", "Import", "Publish", "Reset", and "Question bank". Below this is a search bar and a system status box showing "Connected Time: 1:30", "CPU: 34%", and "MEM: 73%", along with buttons for "Create VM", "Extend Time", and "Delete VM".

At the bottom right, a message states: "You are logged in as Florin Anton (Logout)".

Conclusion

- Advantages
 - Optimal utilization of resources (VM lifetime – max 2 hours idle)
 - Lab progress is saved and stored for 1 month
 - Higher capacity (no of users)
- Things to do:
 - Full integration with Moodle (remote control interface for VMs)

Thank you!

Q&A