

Educational Services in Cloud with IBM Technology – a new model for open, on demand learning in higher education

**Florin Anton
IT Specialist
University Relations IBM Romania
IBM Linux Competence Center**

Agenda

- **First Cloud in the Romanian Higher Education System**
- **Why Cloud Computing?**
- **IBM CloudBurst 2.1 Features**
- **HW Architecture**
- **SW Architecture**
- **Virtual Machines Applications**
 - Service Science Knowledge Environment**
 - E-learning**
 - Virtual Labs**
 - Future developments**

First Cloud in the Romanian Higher Education System

- 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

Why Cloud Computing?

Smarter Classroom

Enabling student success and skills

Smart Administration

Optimizing educational systems

Innovation in Research

Accelerating innovation

Cloud Computing

Consumer Devices

Emerging Technologies

Open Platforms

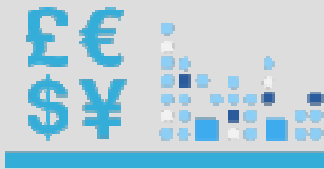
Enabling Strategies

Interoperable Processes

Aligned Data

Shared Services

Why Cloud Computing?



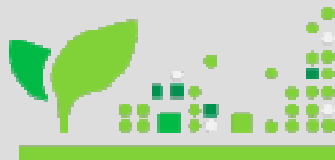
Doing more with less

Reduce capital expenditures and operational expenses



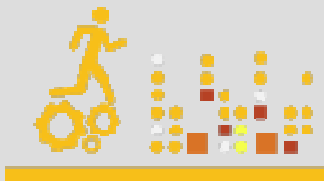
Reducing risk

Ensure the right levels of security and resiliency across all business data and processes



Higher quality services

Improve quality of services and deliver new services that help the business grow and reduce costs

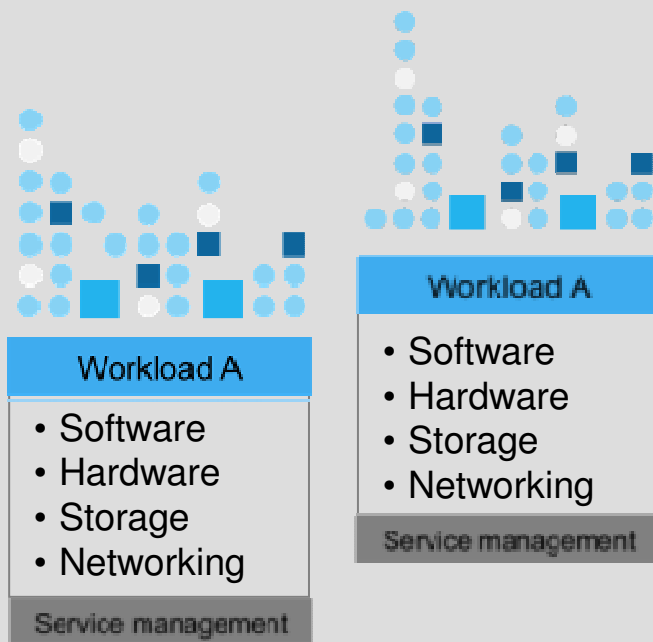


Breakthrough agility

Increase ability to quickly deliver new services to capitalize on opportunities while containing costs and managing risk

Why Cloud Computing?

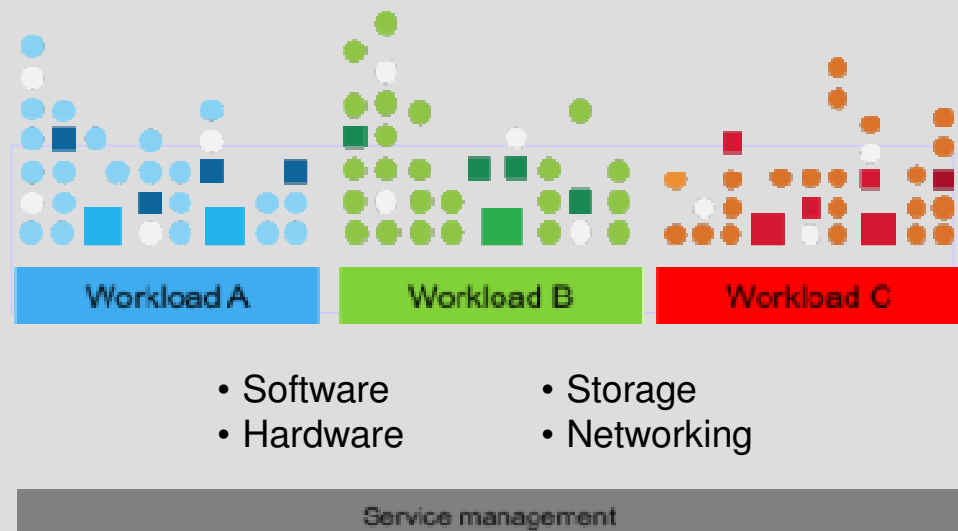
Without cloud computing



With cloud computing

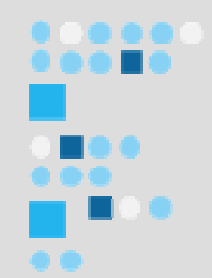


- Virtualized resources
- Automated service management
- Standardized services
- Location independent
- Rapid scalability
- Self-service



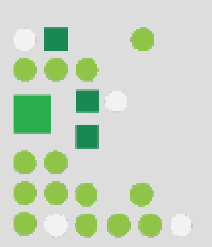
Why Cloud Computing?

Virtualized

- Higher utilization
 - Economy of scale benefits
 - Lower capital expense
- 

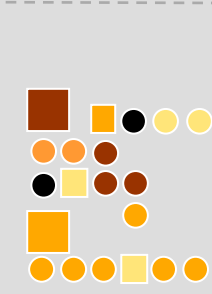
Doing more with less

Standardized

- Easier access
 - Flexible pricing
 - Reuse and share
 - Easier to integrate
- 

Higher quality services

Automated

- Faster cycle times
 - Lower operating expenses
 - Optimized utilization
 - Improved compliance
 - Optimized security
 - End user experience
- 

Breakthrough agility and reducing risk

Why Cloud Computing?

Private

IT capabilities are provided “as a service,” over an intranet, within the enterprise and behind the firewall

Public

IT activities / functions are provided “as a service,” over the Internet



Hybrid

Internal and external service delivery methods are integrated

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

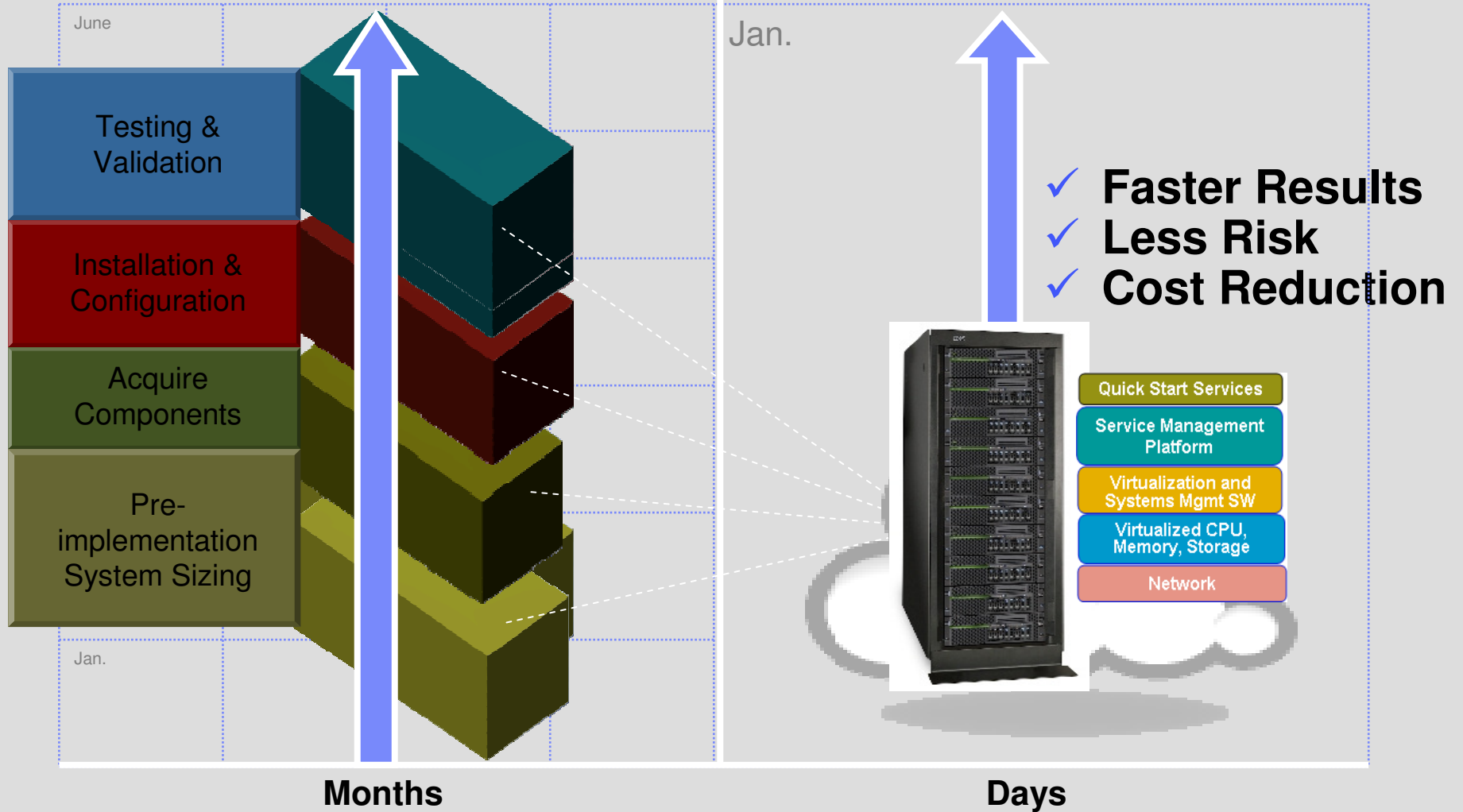


Rapid Time to Value

IBM CloudBurst Delivers Results in Days Versus Months

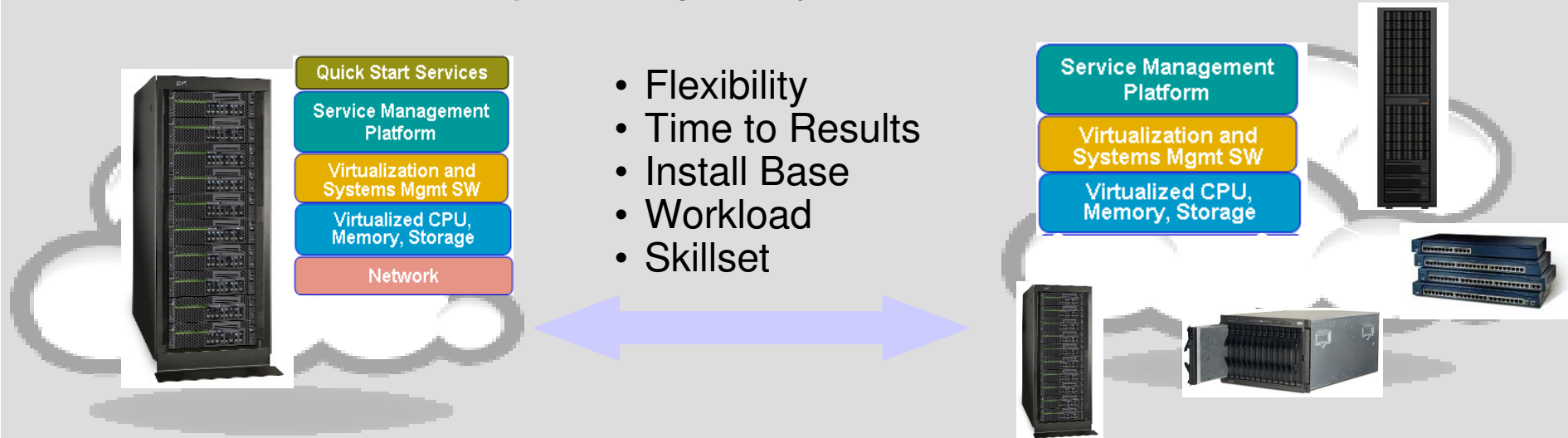
Build from Scratch

Pre-Built



Getting Started: Deploying Cloud

IBM provides options to Customers on how a Cloud Service Delivery infrastructure can be delivered. Which option is right for you?



CloudBurst Solution

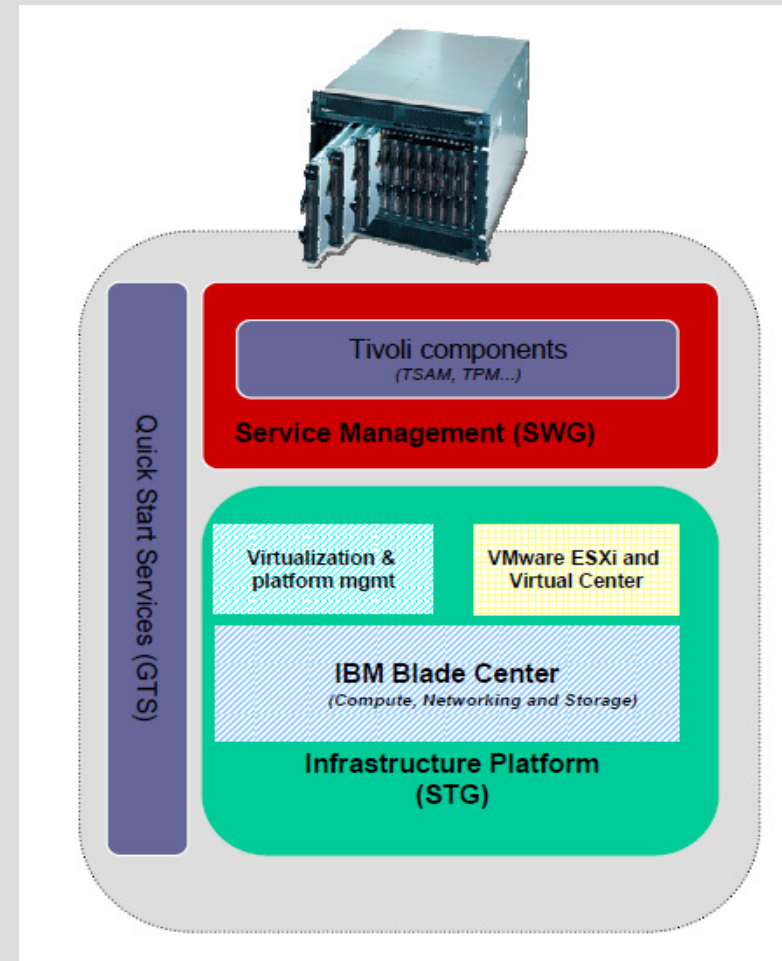
- Pre-integrated and scalable configurations
- Pre-Built at Factory
- Integrated Support
- ~10 day installation
- Self contained & expandable to heterogeneous infrastructure and custom components
- Solution Pricing

Custom Private Cloud

- Unlimited Configurations
- Custom Build
- Product Level Support
- Longer installation
- Installed to support multiple platforms and custom components
- Enterprise Pricing

IBM CloudBurst 2.1 Features

- Automatically extensible and scalable modular Design
- Self Service Portal with autonomous provisioning and no management effort
- Predefined automation templates and workflows of the most common resources (e.g. virtual images VMWare)
- Professional services for installation and configuration
- Technical support for hardware, software and applications
- Unique price for prepackaged and preconfigured hardware, software and networking



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 (IBM 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

ISDM for x86

ISDM-TSAM

Virtual Machine

TSAM 7.2.1

TSA 3.1.06

SUSE 10 SP3

ISDM-TAUM

Virtual Machine

ITUAM 7.1.2

SUSE 10 SP3

ISDM-ITM

Virtual Machine

ITM 6.2.2.1

SUSE 10 SP3

ISDM-NFS

Virtual Machine

TSA 3.1.0.6

HTTP, NFS, Samba Servers

SUSE 10 SP3

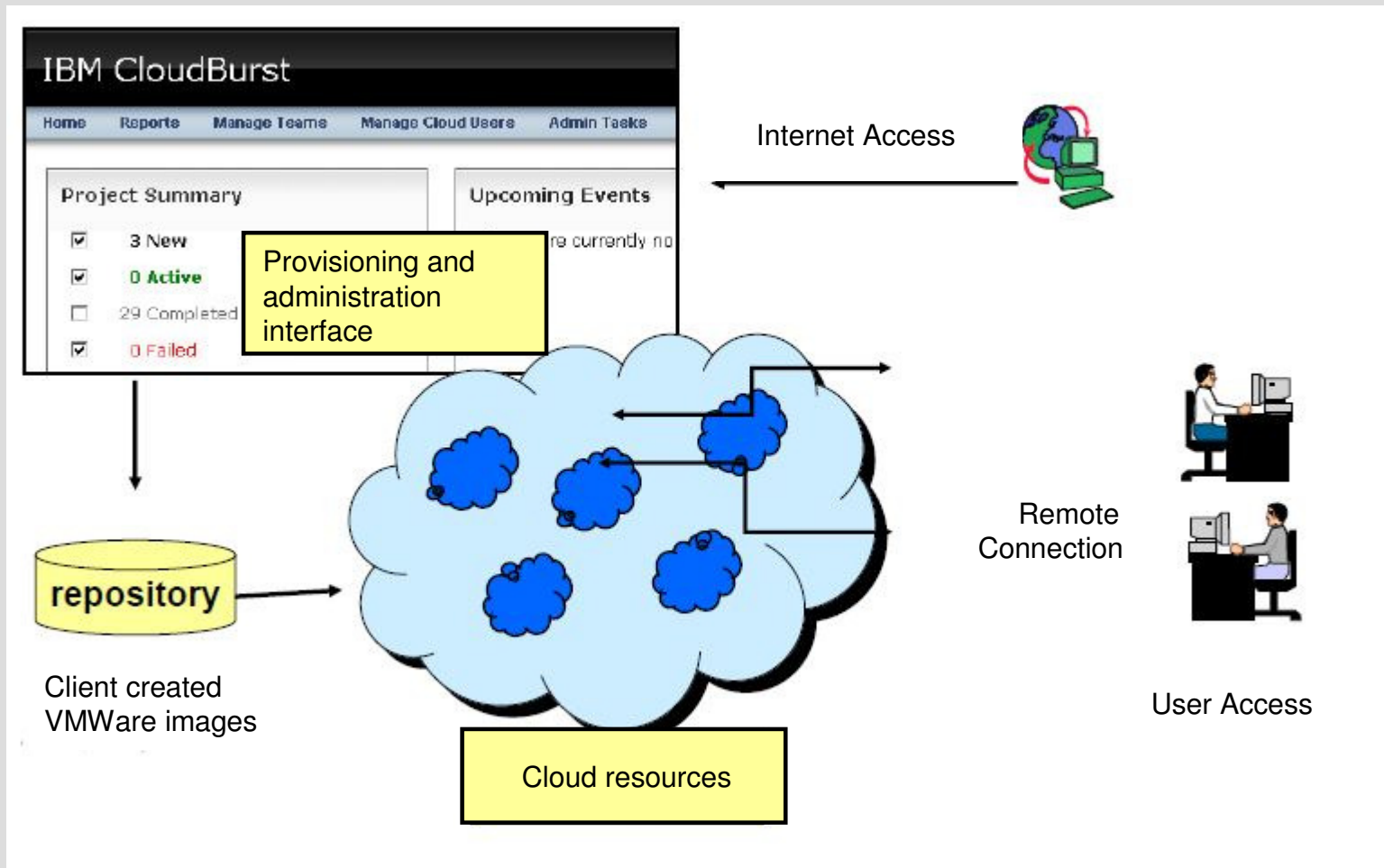
TSAM – Tivoli Service Automation Manager

TSA – Tivoli System Automation

ITM – IBM Tivoli Monitoring

ITUAM – IBM Tivoli Usage and Accounting Manager

IBM Cloudburst - logical diagram



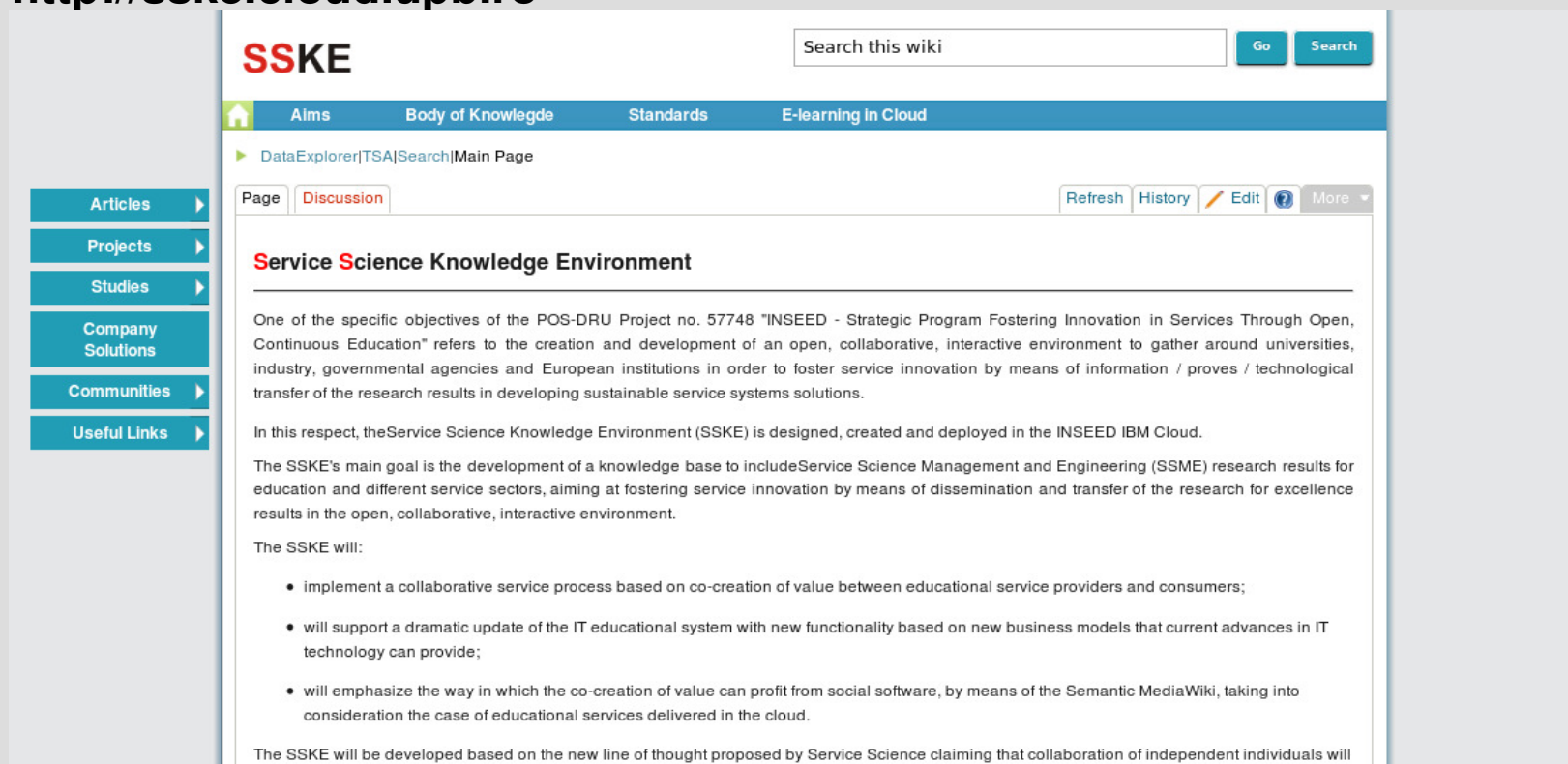
Virtual Machines Applications

■ Service Science Knowledge Environment

Based on MediaWiki

Semantic

<http://sske.cloud.upb.ro>



SSKE Search this wiki

[Home](#) [Aims](#) [Body of Knowledge](#) [Standards](#) [E-learning in Cloud](#)

[DataExplorer](#) | [TSA](#) | [Search](#) | [Main Page](#)

Page [Discussion](#)

Service Science Knowledge Environment

One of the specific objectives of the POS-DRU Project no. 57748 "INSEED - Strategic Program Fostering Innovation in Services Through Open, Continuous Education" refers to the creation and development of an open, collaborative, interactive environment to gather around universities, industry, governmental agencies and European institutions in order to foster service innovation by means of information / proves / technological transfer of the research results in developing sustainable service systems solutions.

In this respect, the Service Science Knowledge Environment (SSKE) is designed, created and deployed in the INSEED IBM Cloud.

The SSKE's main goal is the development of a knowledge base to include Service Science Management and Engineering (SSME) research results for education and different service sectors, aiming at fostering service innovation by means of dissemination and transfer of the research for excellence results in the open, collaborative, interactive environment.

The SSKE will:

- implement a collaborative service process based on co-creation of value between educational service providers and consumers;
- will support a dramatic update of the IT educational system with new functionality based on new business models that current advances in IT technology can provide;
- will emphasize the way in which the co-creation of value can profit from social software, by means of the Semantic MediaWiki, taking into consideration the case of educational services delivered in the cloud.

The SSKE will be developed based on the new line of thought proposed by Service Science claiming that collaboration of independent individuals will

Virtual Machines Applications

- **Service Science Knowledge Environment**

Based on MediaWiki

Semantic

<http://sske.cloud.upb.ro>

- **E-learning**

Courses

Presentations

Applications (access to specific VM's)

<http://elearning.cloud.upb.ro>

Virtual Machines Applications

- **Service Science Knowledge Environment**
Based on MediaWiki
Semantic
<http://sske.cloud.upb.ro>
- **E-learning**
Courses
Presentations
Applications (access to specific VM's)
<http://elearning.cloud.upb.ro>
- **Virtual Labs**
VM Template

Virtual Machines Applications

- **Service Science Knowledge Environment**
Based on MediaWiki
Semantic
<http://sske.cloud.upb.ro>
- **E-learning**
Courses
Presentations
Applications (access to specific VM's)
<http://elearning.cloud.upb.ro>
- **Virtual Labs**
VM Template ->Customization

Virtual Machines Applications

- **Service Science Knowledge Environment**
Based on MediaWiki
Semantic
<http://sske.cloud.upb.ro>
- **E-learning**
Courses
Presentations
Applications (access to specific VM's)
<http://elearning.cloud.upb.ro>
- **Virtual Labs**
VM Template ->Customization -> Final Template

Virtual Machines Applications

- **Service Science Knowledge Environment**
 - Based on MediaWiki
 - Semantic
 - <http://sske.cloud.upb.ro>
- **E-learning**
 - Courses
 - Presentations
 - Applications (access to specific VM's)
 - <http://elearning.cloud.upb.ro>
- **Virtual Labs**
 - VM Template ->Customization -> Final Template
- **Future Developments**
 - Research
 - Industry

Thank you!

Questions?