Developing a Remote Sensing and Cloud Computing Curriculum for the Association of Computer/Information Sciences and Engineering Departments at Minority Institutions (ADMI)

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Overview

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- What are ADMI Institutions?
- What is Cloud Computing and Remote Sensing?
- Cloud Computing & Remote Sensing Curriculum
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Abstract

In the past decade, online learning initiatives have become increasingly comprehensive and have allowed students to be unburdened from learning complex subjects in a traditional teach-learn environment. Universities have recognized the need to adapt new teaching-learning approaches for meeting students' diverse inadequacies. Cloud computing, which offers a scalable and flexible approach to storing, processing, and analyzing big data, has benefited from a variety of science applications except for remote sensing. The research explored the potential for a cloud computing and remote sensing curriculum through the use of video resources and hands-on assessments. This research discusses a curriculum for coupling two diverse research areas, cloud computing and remote sensing. The solution acquired information about cloud computing and remote sensing in order to develop five 15-20 minute self-contained modules. Understanding the challenges recognized by minority serving institutions in adapting from a teaching-learning environment to an online environment were also explored.

Purpose and Importance

- To develop an online curriculum for minority serving institutions
  - Integrating Cloud Computing and Remote Sensing
  - Massive Open Online Course (MOOC)
- Increase the knowledge of cutting edge courses
- Train the next generation of Engineers

Online Education Statistics

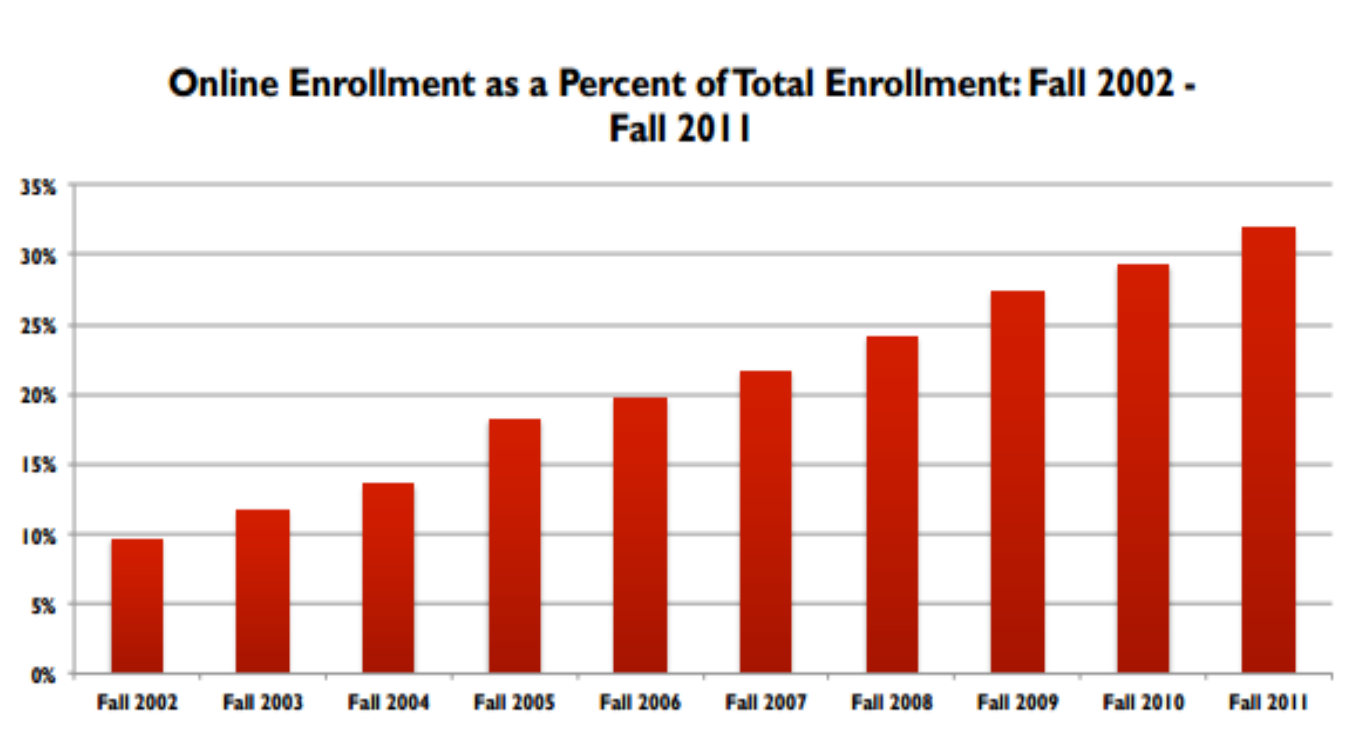


Figure 1: Online Enrollment : Fall 2002- 2001 [1]

- 2006: 19.6% were learning online
- 2011: increased to 32.0%

Related Work

- MIT OpenCourseWare
- Stanford Online

What are ADMI institutions?

http://www.admiusa.org/admi2013/

- Association of Computer/Information Sciences and Engineering Departments at Minority Institutions (ADMI)

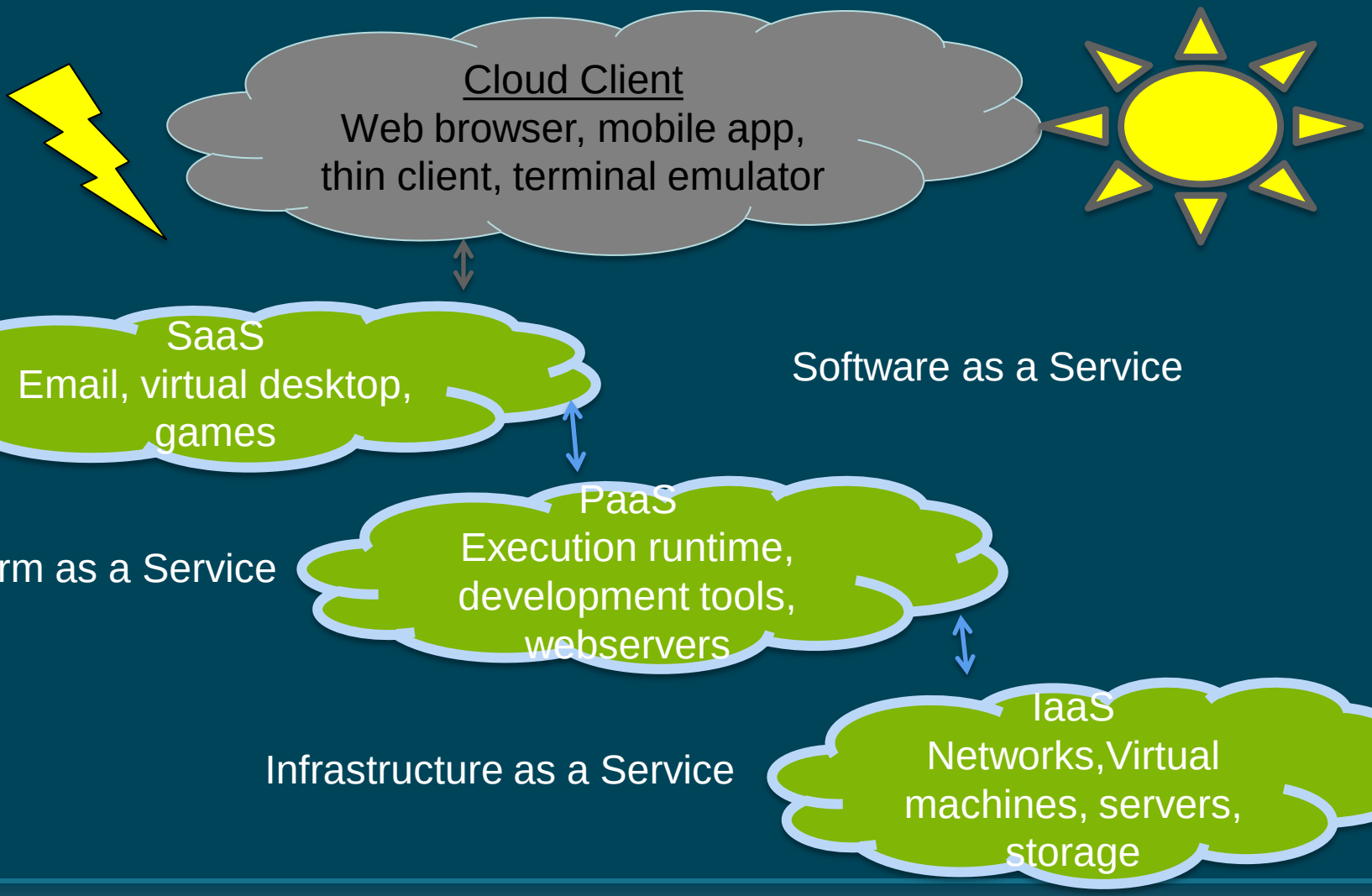
Spelman College
A Choice to Change the World

Mississippi Valley State University

Florida A&M University
FAMU

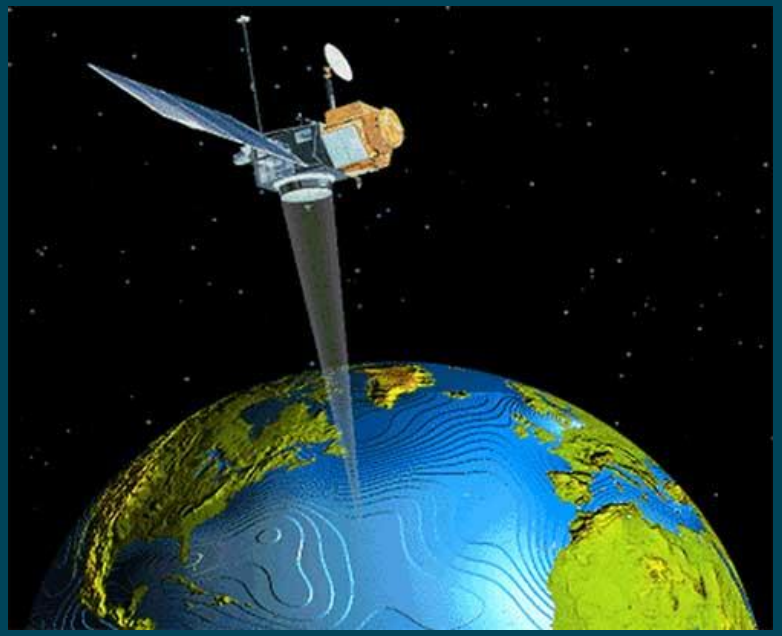
ECSU
Elizabeth City State University
Elevate Higher. Emerge Stronger.

What is Cloud Computing?



What is Remote Sensing?

- Remote Sensing is the art and science of obtaining information about an object without being in direct physical contact with it.



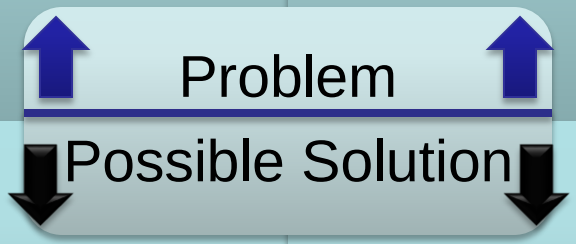
Relation: Cloud Computing & Remote Sensing

- Using cloud computing as a platform in order to store data so people can understand:
  - Big Data
  - Parallel & Distributed Computing
  - Designing Parallel Programs
  - Cloud Computing
  - MapReduce

CReSIS Example

Plethora amounts of data

Difficulty processing this data

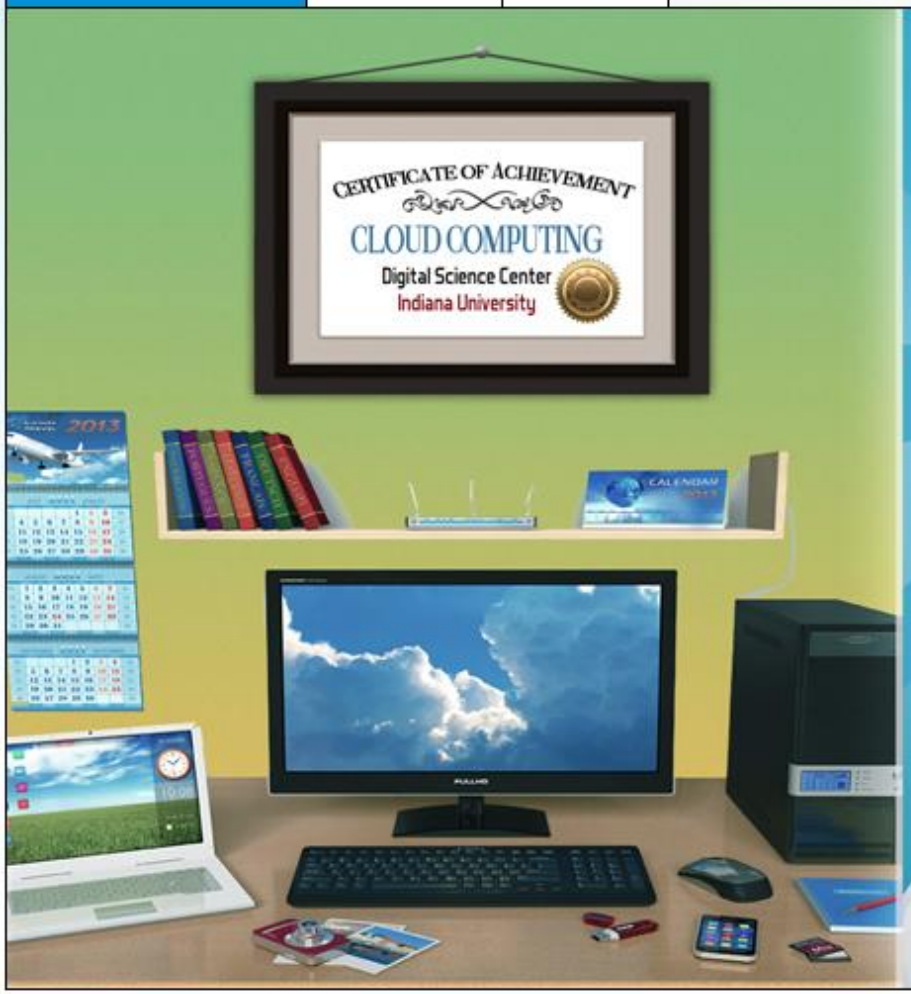


Create an easier way to analyze, process, and store data

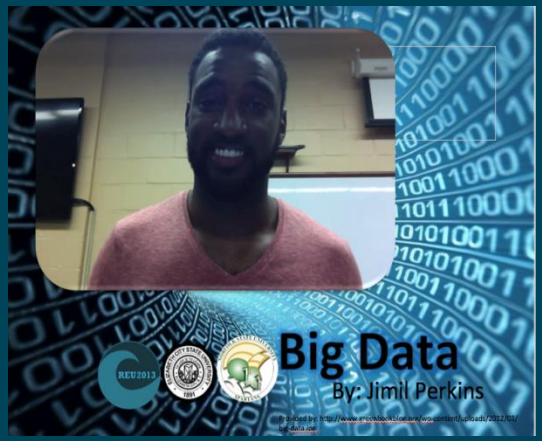
Use MapReduce to process the big data within a cloud

Cloud Computing MOOC Login Register

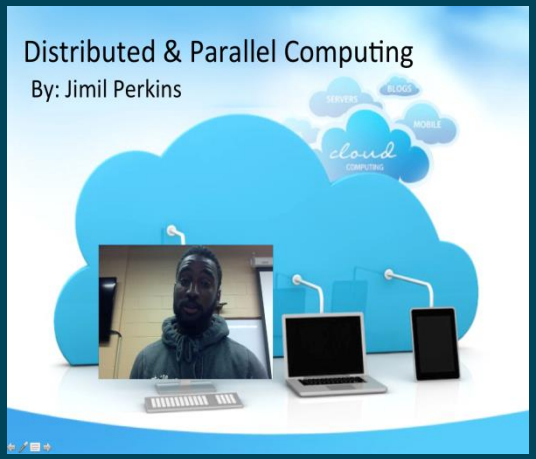
Earn Credentials | Welcome | Signup



Methodology

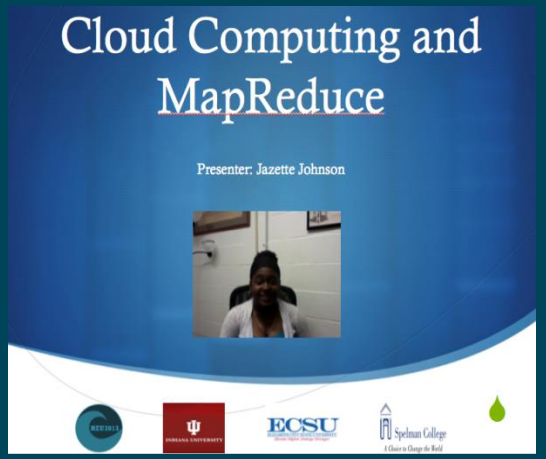


Distributed & Parallel Computing



Designing Parallel Program

Cloud Computing & MapReduce



Conclusion

- We have created modules to introduce cloud computing.
- Some of the topics covered were
  - Big Data,
  - Parallel and Distributed Computing,
  - Cloud Computing
  - MapReduce
- Modules were designed to appeal to multiple learning styles (i.e. auditory).

Future Work

- Expand Modules
- Conduct user experience studies
- Get feedback to reconstruct the modules
- Develop:
  - A Message Passing Interface (MPI)
  - Hadoop (MapReduce) Virtual Appliance
  - so students can apply theoretical concepts gained from the curriculum.
- Merge this curriculum with remote sensing curriculum

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References

[1] Allen, E., & Seaman, J.
(2013). Changing course: Ten years of tracking online education in the united states. (pp. 24-41).

[2] Waggner, S. (2010). Cloud computing: Managing data in the cloud. UC Berkeley iNews

[3] Sriram , I., & Khajeh-Hosseini, A. (n.d.). *Research agenda in cloud technologies*.

[4] Abelson, H. (2007). The creation of opencourseware at mit.Journal of Science Education and Technology

Questions?

QUESTIONS?