

BITS Pilani, Dubai Campus

Dubai International City, Dubai

II Semester 2012-13

Course	:	SS G527 CLOUD COMPUTING
PROGRAM	:	B.E.(HONS.) SOFTWARE SYSTEMS (ELECTIVE)
Component	:	Comprehensive Examination (Closed Book) – Elective
Date & Time	:	08-06-2013 & 12:30pm to 3:30pm
Weightage	:	40 % (40 Marks)
No. of Pages	:	3 Pages

Note: Answer all Questions. Draw the diagrams neatly. Write the Question number clearly.

1. Case Study:

If you turn on the television, read newspaper, or surf the web, you're bound to find many dire predictions about large-scale loss of life from biological or chemical attacks or an avian influenza pandemic. Computer models estimate that between 2 and 1000 people could die in the event of a flu pandemic, depending on the characteristics of the virus. Fears of a major health crisis are greater now than ever before, and governments throughout the world are trying to improve their capabilities for identifying biochemical ATTACKS OR PADEMIC OUTBREAKS MAORE rapidly.

On May 12th, 2010, the United States government issued an implementation plan for its national strategy for pandemic Influenza to improve coordination among federal, state, and local authorities and the private sector for pandemics and other public health emergencies. The implementation plan calls for improving mechanisms for real-time clinical surveillance in acute care settings such as hospital emergency rooms, intensive care units, and laboratories to provide local, state, and federal public health officials with continuous.

One Such initiative is the Biosense Real-time clinical connection programme developed by the US federal Centers for Disease control and prevention (CDC). Biosense sits atop a hospital's existing information systems, continually gathering and analyzing their data in real-time. Custom software developed by CDC monitors the facility's network traffic and captures relevant patient records, diagnoses, and prescription information. The data include patient age, sex, ZIP code of residence, ZIP code of the medical facility handling the patient, the principal medical complaint, symptoms, onset of illness, diagnoses, medical procedures, medications prescribed, and laboratory results. The software converts theses data to the HL7 data messaging format, which is the standard of the health-care industry, encrypts the data, and transmits them every 15 minutes over the web to the CDC where they are maintained in a large data repository.

The system summarizes and presents analytical graphs, and tables. Registered state and local public health agencies as well as hospitals and health care providers are allowed to access data that pertain to their jurisdiction. They access Biosense via a Web based application over a secure data network. Information from Biosense could show early signs of pandemic or biologic attack and alert local hospitals, health workers, and federal and state agencies to take preventive measures. The traditional process for public health surveillance is manual and much slower. Hospitals, physicians, and laboratories would mail or fax paper reports to public health agencies, who would then call health care providers for more detailed information. The slow chain of person-to-person communication is not well-suited to a major public health emergency.

By monitoring streaming data about health events as they occur, the system helps CDC epidemiologists quickly detect early signs of a flu pandemic or bioterrorist attack and provide public health and government decision makers with the information needed to manage preparedness and response. Simultaneous access of the data by all levels of public health decreases the time needed to classify health events as serious public health problems; decreases the time to identify causes, risk factors, and appropriate interventions; and decreases the time needed to implement counter measures and health guidance. To help civilian hospitals link to Biosense, the CDC enlist the Consella Group health care information technology consultants. Consella explains the benefits of participating in a project that will serve their specific interests as well as those of the public at large and will put their data in standardized format.

However, many hospitals have not been anxious to jump on the bandwagon because the transition would be burdensome and time-consuming. To transmit data to Biosense, each hospital must standardize its patient and other medical data. Most hospitals use their own coding systems for symptoms, diseases, and medications. CDC's contractors would have to work with the hospital to translate its data codes into the standards used by CDC's software. According to Barry Rhodes, CDC's Director for technology and informatics, "To standardize the data and do all the data validation steps a huge technological challenge". Some in the medical community question whether the Biosense network is worth the effort. "If there is a pandemic flu, we are not going to know about it from a system like this," says Dr. Susan Fernyak, director of communicable disease control and prevention at the San Francisco Department of public health. According to Dr. John Rosenbreg, director of the infectious disease laboratory at the State of California, if an epidemic broke out, "you'd know it before the data rolled in. When your emergency rooms fill up you make a phone call; this is probably a better measure".

David Groves, CDC project head at SAIC, a Biosense contractor, points out that a hospital's medical staff might not know right away that there's a serious problem when patients start showing up with symptoms. CDC scientists using the system will be in a better position to spot a major pandemic or biological or chemical attack over a wider geographic area. Having a bigger picture of what's happening will help CDC help hospitals, police, and emergency units mobilize a better response. Although participation in Biosense is voluntary, physicians and health officials might resent the system because it enables the federal government to encroach on what has traditionally been the domain of local health care providers and organizations. They note that they and not the CDC have the responsibility for responding to and managing a pandemic. Additionally, hospitals are reluctant to sign up because of concerns about maintaining privacy and security of patient information. Biosense would let the CDC "listen in" on their treatment of patients on a real-time basis. The CDC does not use any data that would identify individual patient.

Questions:

- i) For the above said case study analysis, what was the system in place at present and what will be your suggestion so that there is a change in the existing system to improve the performance of it? (4 Marks)
- ii) For the system that have suggested above, what are the common and essential characteristics that you will adopt so that it gives excellent solution for the problem of statement? Justify your answer in two lines for each of the characteristic. (4 Marks)

- iii) Assume that you are suggesting a hybrid Cloud model for the above case study, what are the type of clouds would you suggest and why is it so? (4 Marks)
2. Give the steps for Server Virtualization? (5 Marks)
3. What Are the challenges faced in setting up the Distributed Computing System? List them and explain them in two to three each. (5 Marks)
4. What are the different types of transparency one can feel in a distributed computing system? (3 Marks)
5. What do you mean by failure in distributed computing system and show the failure model with a proper diagram and explain it. (5 Marks)
6. What do you mean by Middleware and what are the goals of it? Explain them. (5 Marks)
7. Explain with a neat diagram of multitier Architecture model that show clearly the thin client to fat client architecture and what is the type of client is famous at present distributed computing system ? (5 Marks)

******All the Best******

BITS PILANI, DUBAI CAMPUS

II SEMSTER 2012-13

COURSE: SS G527 CLOUD COMPUTING

COMPONENT : TEST 2 OPEN BOOK

MARKS: 20 MARKS

Note: each questions carries 4 marks.

1. What is the difference between Full Virtualization and Para Virtualization? What does they represent?
 2. Give an architectural diagram that represent the current distributed computing system and show architecture of that system after virtualization?
 3. Give in two to three lines with a proper diagram that explains the different types of virtual machines?
 4. Give the attributes of the Virtual machines?
 5. Give the advantages of using hardware level virtualization?
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II SEMESTER 2012-13

COURSE	:	SS G527 CLOUD COMPUTING
PROGRAM	:	B.E.(HONS.) SOFTWARE SYSTEMS (ELECTIVE)
COMPONENT	:	TEST 1 (CLOSED BOOK)
WEIGHTAGE	:	25 % (25 MARKS)
DURATION	:	50 MINS
NO. OF PAGES	:	2 PAGES

NOTE:-Answer all the questions.

Text book, Reference books and e-books are allowed.

1. Case Study:

"The Taxpayer base in India has grown significantly year over year, while the capacity of the Department of Income Tax (DIT) to process tax returns has remained constant. As a result, DIT fell further and further behind in issuing refunds and recovering underpayments. The government had to pay interest on delayed refunds, administrative costs increased, and taxpayers were unhappy.

To help alleviate these problems, DIT proposed creating a Centralized Processing Center (CPC) to handle all of India's electronically filed income tax returns. The goal was to update, automate, and standardize processes to make them more efficient, thereby increasing DIT's ability to manage the volume of returns they were receiving. The Government of India approved the proposal in February 2009 and established the CPC in Bangalore, the CPC charges the end user for using their services.

According to the Commissioner of Income Tax who leads the CPC, the number of electronically filed tax returns grew to almost 10 million over two years and, as of this writing, was expected to hit the 20 million mark soon. In 2011, the CPC received the e-governance Gold Award from the Government of India. The simplicity of the program and the availability of low-cost agencies to provide assistance made e-filing very attractive to taxpayers. The processing of e-filed returns has become much faster, which means taxpayers get their refunds sooner.

In July 2011, the commissioner said in Times of India "Prior to the CPC, refunds used to take 15-18 months, now it's just 89 days. People are eager to get their refunds quickly, and that's encouraging them to e-file".

The Goal now is to reduce cycle time to one month. The problems faced by the end user as well as the executers are many like server is busy due multiple taxpayer are trying access the centralized processing unit , and they feel that the services

provided by the CPC is not sufficient enough and also they feel the their data on distributed system is not secure enough. Normally, all the Government departments do their employees tax return submission is done through their personal department all at a time on a particular date they will file the return and there are lot of drawback in the existing system in terms of connectivity even though they are having good internet connectivity, failure in transactions, they have redo all the process whatever they had done if there occurs failure during the process of submitting the e-file, The confirmation (reply) for the e-filed tax returns are not immediate due to network traffic and many more problems associated with the existing system.”

Questions:

- i) For the above said problem description what was the system followed and what will your suggested system so that it will make the end user happy?
(3 Marks)
 - ii) For the suggested systems in question (i), what are the essential characteristics that you will adopt so that it gives excellent solution for the problem of statement? Justify your answer in two lines for each of the characteristic.
(3 Marks)
 - iii) Whether scalability is required for above suggested system? Justify your answer.
(3 Marks)
 - iv) What are the appropriate components you will adopt in your system so that it is said to a highly secured model? Justify your answer for the components you are recommending.
(3 Marks)
 - v) What are the type of transparency characteristics do you want to enforce in this system.
(3 Marks)
 - vi) Whether Middleware model is needed in the suggested system? Why?
(3 Marks)
 - vii) How the locking system does help DIT so that increase efficiency?
(3 Marks)
2. What are the problems associated with locking? State them with two lines of explanations.
(4 Marks)

*****All the Best*****