University of Maryland Baltimore County
Department of Information Systems
IS451 Networking Design and Management
Summer 2014 Mondays & Wednesdays 6:00pm-9:10pm

Instructor: Dr. Charles Pak
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Room IT 227, **Office Hours:** Mondays/Wednesdays 6PM – 9:10PM

Course Description: This course covers design and administration of enterprise networking and distributed applications. It includes readings and case studies on network architecture for distributed applications and selected technologies to support enterprise systems. The emphasis of this course is on the application layer of the OSI model- the services that we offer on business networks. **Prerequisite: IS450**.

Course Materials: All course materials are online on the course Blackboard site blackboard.umbc.edu (to be checked by the students **regularly** for announcements and course materials).

Instructional Methods and the Classroom Experience:
Lecture sessions will be interactive and aided by slide presentations. You are expected to participate, ask questions or present comments any time during the lecture. You are expected to review the reading material before the class so you can answer any questions presented by the instructor. The Discussion Board on Blackboard should be used by students to ask any class or material related questions – anyone can post a response in addition to the instructor.

Course Requirements:
- Students are required to attend all lectures and be responsible for everything discussed and presented in class.
- Students are expected to participate in Discussion Board pertaining to the reading materal/topics.
- Students should check the Announcements, Course Materials, Course Syllabus, Discussion Boards, and sections frequently for updates on the course and posting of new documents.

Grading:

Assignments	**Percentage**
Exam1	20%
Exam2	20%
Exam3	20%
Network Management Design Paper	30%
Network Management Design Presentation	10%
Total	**100%**

The grading scale, based on 100 points, is as follows:

A =	90–100
B =	80–89
C =	70–79
D =	60–69
F =	0–59

Exams
If you miss an exam or quiz, you will receive a zero. Make-up exams are not given except for extenuating circumstances stated in the corresponding UMBC policy, such as conflicts, serious illness, etc. If an exam has to be missed, the student has to make the instructor aware of the special circumstance ahead of the exam. Written and unquestionable proof of the extenuating circumstances must be presented to be eligible for a make-up.

Network Management Design Paper
Your paper must conform to APA format with proper citations and a reference list. Please refer to the UMBC library for the proper APA format. The paper should include an executive summary, each section analysis on the network management, your proposed solutions and recommendations, and conclusions. There is no page limit but should be at least 10-pages of length.

Network Management Design Presentation
You will prepare a professional presentation slide deck and present it in class. Your slide deck should be creative in presenting your findings and recommendations.

Quizzes

Grades for the exams and quizzes, as well as final grades will be posted on the class Blackboard site.
With respect to final letter grades, the University's Undergraduate Catalogue states that:
"A indicates superior achievement; B good performance; C adequate performance; D minimal performance; F failure". There is specifically no mention of any numerical scores associated with these letter grades. Consequently, there are no pre-defined numerical demarcations that determine final letter grades; these can be defined only at the end of the semester after all numerical grades have been earned. At that point, numerical demarcations for final letter grades can be defined such that final letter grades in this course conform to the University's officially published definitions of the respective letter grades. In accordance with the published University grading policy, it is important to understand that **final letter grades reflect academic achievement and not effort.** While mistakes in the arithmetic computation of grades and grade recording errors will always be corrected, it is important to understand that in all other situations, final letter grades are not negotiable and challenges to final letter grades are not entertained. **In order to PASS the class, you must get a grade equivalent of "C" or better.**

Class Policies on Academic Integrity
Cheating in any form is not tolerated under any circumstance in accordance with the UMBC Academic Regulations. Any form of plagiarism, receiving inappropriate help in assignments or examinations, and providing inaccurate information concerning an excuse is treated as cheating, and it is the instructor's responsibility to take the actions to the fullest extent of the regulations against the student violating the academic integrity rules.

Course evaluations
The IS department now uses online course evaluations. Students will be prompted via email to complete the online surveys at the end of each semester. Please make sure to fill them out.

Class Schedule:

Week	Date	Topic
1 M	7/7	Introduction; Application Layer and protocols review
1 W	7/9	Application Layer and protocols review
2 M	7/14	Large-scale Network Design
2 W	7/16	Exam 1
3 M	7/21	Network Management and SNMP;
3 W	7/23	Directory Services
4 M	7/28	Storage Networking, Virtualization
4 W	7/30	Exam 2
5 M	8/4	Cloud Computing Network Design Project Presentation
5 W	8/6	Caching/Content Delivery Networks Network Design Project Presentation
6 M	8/11	Network Design Project Presentation Project Paper Due
6 W	8/13	Exam 3

IS451 Network Management Design Project

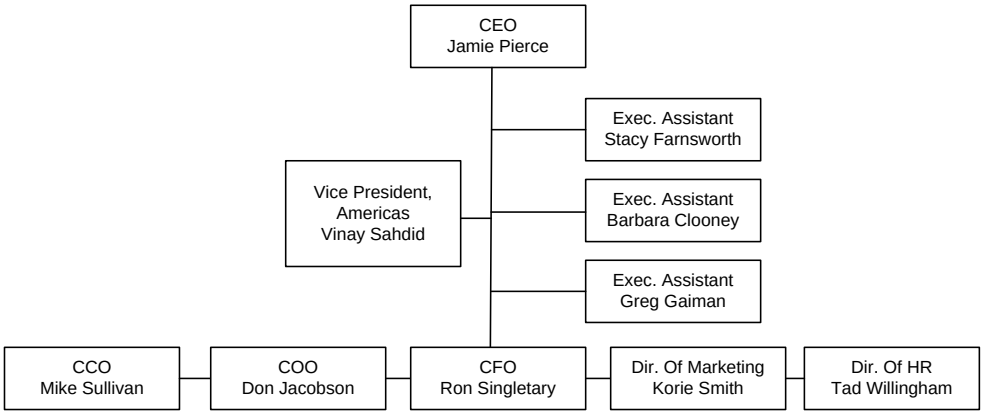
Write your answers and responses in an essay format in APA with full citations and references. See http://www.apastyle.org/ for a proper APA style. Your deliverable report should include a comprehensive evaluation of the case and address those questions listed below. The paper should be properly formatted with a cover page, table of contents, content sections, conclusion, and a list of references.

GLOBAL FINANCE, INC. (GFI)

Global Finance, Inc. (GFI) is a financial company that manages thousands of accounts across Canada, the United States, and Mexico. A public company traded on the NYSE, GFI specializes in financial management, loan application approval, wholesale loan processing, and investment of money management for their customers.

GFI employs over 1,600 employees and has been experiencing consistent growth keeping pace with S&P averages (approximately 8%) for nearly six years. A well-honed management strategy built on scaling operational performance through automation and technological innovation has propelled the company into the big leagues; GFI was only recently profiled in Fortune Magazine.

The executive management team of GFI:



BACKGROUND AND YOUR ROLE

You are the Computer Security Program Manager (CSPM) educated, trained, and hired to protect the physical and operational security of GFI's corporate information system.

You were hired by COO Don Jacobson and currently report to the COO. You are responsible for a $5.25m annual budget, a staff of 11, and a sprawling and expansive data center located on the 5th floor of the corporate tower. This position is the pinnacle of your career – you are counting on your performance here to pave the way into a more strategic leadership position in IT, filling a vacancy that you feel is so significantly lacking from the executive team.

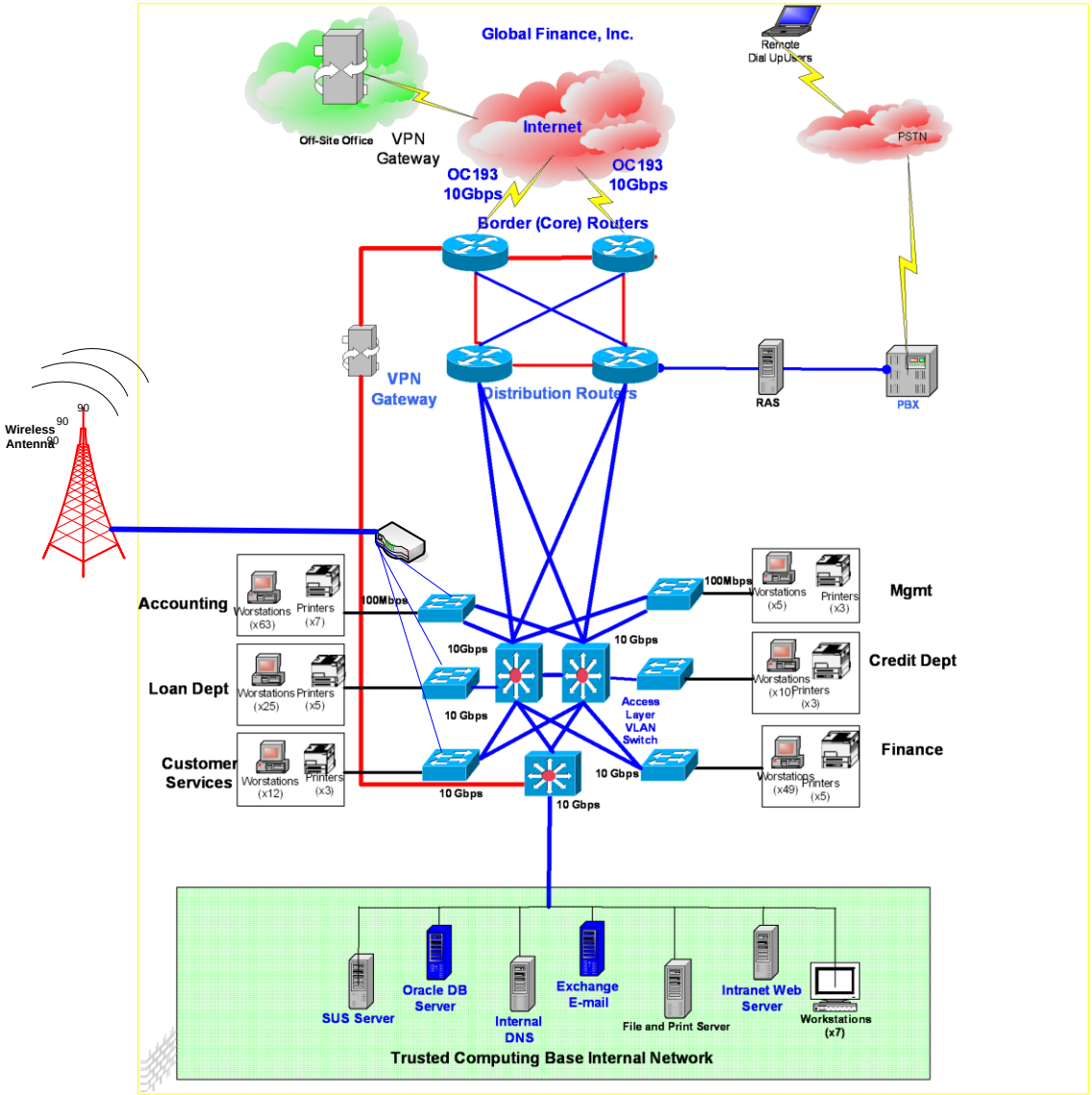
There is actually a reason for this. CEO Jamie Pierce believes that the IT problem is a known quantity – that is, Jamie feels the IT function can be nearly entirely outsourced at fractions of the cost associated with creating and maintaining an established internal IT department; the CEO's strategy has been to prevent IT from becoming a core competency since so many services can be obtained from 3rd parties. Since the CEO has taken the reigns two years ago, the CEO has made significant headway in cutting your department's budget by 30% and reducing half of your staff through outsourcing. This has been a political fight for you: maintaining and reinforcing the relevance of an internal IT department is a constant struggle. COO Jacobson's act of hiring you was, in fact, an act of desperation: the increasing operational dependence on technology combined with a diminishing IT footprint gravely concerned Jacobson, and he begged to at least bring in a manager to whom these obligations could be delegated to. Jacobson's worst nightmare is a

situation where the Confidentiality, Integrity, and Availability of the information system was compromised – bringing the company to its knees – then having to rely on vendors to pull him out of the mess.

GFI has experienced several cyber-attacks from outsiders over the past a few years. In 2012, the Oracle database server was attacked and its customer database lost its confidentiality, integrity, and availability for several days. Although the company restored the Oracle database server back online, its lost confidentiality damaged the company reputations. GFI ended up paying its customers a large sum of settlement for their loss of data confidentiality. Another security attack was carried out by a malicious virus that infected the entire network for several days. While infected the Oracle and e-mail servers had to be shut down to quarantine these servers. In the meantime, the company lost $1.700, 000 in revenue and intangible customer confidence.

There's no question that the company's CEO sees the strategic importance of technology in executing her business plan, and in this way you share a common basis of principle with her: that IT is a competitive differentiator. However, you believe that diminishing internal IT services risks security and strategic capability, whereas the CEO feels she can acquire that capability immediately and on the cheap through the open market. You're told that CEO Pierce reluctantly agreed to your position if only to pacify COO Jacobson's concerns.

CORPORATE OFFICE NETWORK TOPOLOGY



You are responsible for a corporate WAN spanning 10 remote facilities and interconnecting those facilities to the central data processing environment. Data is transmitted from a remote site through a VPN appliance situated in the border layer of the routing topology; the remote VPN connects to the internal Oracle database to update the customer data tables. Data transaction from the remote access to the corporate internal databases is not encrypted.

A bulk of the data processing for your company is handled by Oracle database on a high end super computer. The trusted computing based (TCB) internal network is situated in a physically separated subnet. This is where all corporate data processing is completed and internal support team has its own intranet web server, a SUS server, an internal DNS, an e-mail system, and other support personnel workstations. Each corporate department is segregated physically on a different subnet and shares the corporate data in the TCB network.

OTHER CONSIDERATIONS

1. Ever since the article ran in Fortune about GFI, your network engineers report that they've noted a significant spike in network traffic crossing into the internal networks. They report that they cannot be certain what or who is generating this traffic, but the volume and frequency of traffic is certainly abnormal. The management is very concerned over securing the corporate confidential data and customer information.

2. Increasingly, GFI's CEO Pierce attempts to outsource IT competency. In fact, you've been told of a plan from COO Jacobson to outsource network management and security functions away from your department and to a service integrator. COO Jacobson warns you that the political environment will only become more contentious over time; you must make a compelling case as to what value your department can bring over an integrator that can provide secure services at 40% less annual cost than you.

3. The interrelationship between data and operations concerns you. Increasingly, some of the 10 remote sites have been reporting significant problems with network latency, slow performance, and application time-outs against the Oracle database. The company's business model is driving higher and higher demand for data, but your capability to respond to these problems are drastically limited.

4. Mobility is important for the organization to interact with the customers and other co-workers in near real-time. However, the CEO is concerned with the mobility security and would like to research for the best practice for mobility computing. The CEO is willing to implement a BYOD policy if security can be addressed.

5. Employees enjoy the flexibility of getting access to the corporate network using a WiFi network. However, the CEO is concerns over the security ramifications over the wireless network that is widely open to the company and nearby residents.

6. The company plans to offer its products and services online and requested its IT department to design a cloud computing based e-commerce platform. However, the CEO is particularly concerned over the cloud computing security in case the customer database is breached.

ASSIGNMENTS

- Apply all network management technologies you learned in this course.
- Identify and describe the organizational network technology and network management issues.
- Make a list of access points internal and external (remote).
- Design a secure authentication technology and network security for GFI.
- Make assumptions for any unknown facts.
- Design a network management technology and topology
- Address the CEO's concern over the mobility security and design a secure mobile computing (smart phones, tablets, laptops, etc.) in terms of authentication technologies and data protection.

- Identify wireless vulnerabilities and recommend what safeguards, authentication technologies, and network security to protect data should be implemented.
- Design a cloud computing environment for the company with a secure means of data protection at rest, in motion and in process.

Project Paper Assignment Rubric

Your project assignment paper will be graded based on the following rubric.

Criteria	Non-compliant	Minimal	Compliant	Advanced
Apply all network management technologies you learned in this course.	Did not apply all network management technologies learned in this course. (1)	Identified but minimally applied all network management technologies learned in the course. (3)	Applied all network management technologies learned in the course. (6)	Applied all network management technologies learned in the course with advanced topics. (10)
Identify and describe the organizational network technology and network management issues.	Did not identify or describe the organizational network technology and network management issues. (1)	Minimally identified or described the organizational network technology and network management issues. (3)	Identified or described the organizational network technology and network management issues. (6)	Identified or described the organizational network technology and network management issues with advanced topics. (10)
Make a list of access points internal and external (remote).	Did not make a list of access points internal and external (remote). (1)	Minimally made a list of access points internal and external (remote). (3)	Made a list of access points internal and external (remote). (6)	Made a list of access points internal and external (remote) with advanced topics. (10)
Design a secure authentication technology and network security for GFI.	Did not design a secure authentication technology and network security for GFI. (1)	Minimally designed a secure authentication technology and network security for GFI. (3)	Designed a secure authentication technology and network security for GFI. (6)	Designed a secure authentication technology and network security for GFI with advanced topics. (10)
Make assumptions for any unknown facts.	Did not make any assumptions for any unknown facts. (1)	Minimally made assumptions for any unknown facts. (3)	Made assumptions for any unknown facts. (6)	Made assumptions for any unknown facts with advanced topics. (10)
Design a network management technology and topology	Did not design a network management technology and topology for GFI. (1)	Minimally designed a network management technology and topology for GFI. (3)	Designed a network management technology and topology for GFI. (6)	Designed a network management technology and topology for GFI with advanced topics. (10)
Address the CEO's concern over the mobility security and design a secure mobile computing (smart phones, tablets, laptops, etc.) in terms of authentication technologies and data protection.	Did not address the CEO's concern over the mobility security and design a secure mobile computing in terms of authentication technologies and data protection. (1)	Minimally addressed the CEO's concern over the mobility security and design a secure mobile computing in terms of authentication technologies and data protection. (3)	Addressed the CEO's concern over the mobility security and design a secure mobile computing in terms of authentication technologies and data protection. (6)	Addressed the CEO's concern over the mobility security and design a secure mobile computing in terms of authentication technologies and data protection with advanced topics. (10)

Criteria	Non-compliant	Minimal	Compliant	Advanced
Identify wireless vulnerabilities and recommend what safeguards, authentication technologies, and network security to protect data should be implemented.	Did not identify wireless vulnerabilities and recommend commensurate safeguards, authentication technologies, and network security to protect data. (1)	Minimally identified wireless vulnerabilities and recommended commensurate safeguards, authentication technologies, and network security to protect data. (3)	Identified wireless vulnerabilities and recommended commensurate safeguards, authentication technologies, and network security to protect data. (6)	Identified wireless vulnerabilities and recommended commensurate safeguards, authentication technologies, and network security to protect data with advanced topics. (10)
Design a cloud computing environment for the company with a secure means of data protection at rest, in motion and in process.	Did not design a cloud computing environment for the company with a secure means of data protection at rest, in motion and in process. (1)	Minimally designed a cloud computing environment for the company with a secure means of data protection at rest, in motion and in process. (3)	Designed a cloud computing environment for the company with a secure means of data protection at rest, in motion and in process. (6)	Design a cloud computing environment for the company with a secure means of data protection at rest, in motion and in process with advanced topics. (10)
Formulate 15-25 pages of a quantitative risk assessment in APA format.	Did not follow proper quantitative risk assessment format, and failed to conform to APA format. (1)	Followed proper quantitative risk assessment format but did not conform to APA format. (3)	Followed proper quantitative risk assessment format and conformed to APA but insufficient reference list and page count. (6)	Followed proper quantitative risk assessment format and conformed to APA in a sufficient reference list and page count. (10)
Executive summary of risk assessment.	Did not include an executive summary. (1)	Included an executive summary but lacks details. (3)	Included an executive summary in details, but did not address the mission objectives. (6)	Included an executive summary in details, and addressed mission objectives. (10)

Project Assignment Presentation

You will prepare a professional presentation slide deck to present your findings, design, methodologies, features, and conclusions. You will be graded for your professional presentation slide deck contents, flow of the presentation, and presentation delivery technique.