

**XJTLU Entrepreneur College (Taicang) Cover Sheet**

Module code and Title	IOT304TC Cloud Computing	
School Title	School of Internet of Things	
Assignment Title	Coursework 1	
Submission Deadline	23:59 (Beijing Time) on the 2 of June, 2023	
Final Word Count	N/A	
If you agree to let the university use your work anonymously for teaching and learning purposes, please type "yes" here.		

I certify that I have read and understood the University's Policy for dealing with Plagiarism, Collusion and the Fabrication of Data (available on Learning Mall Online). With reference to this policy I certify that:

- My work does not contain any instances of plagiarism and/or collusion.
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Scoring – For Tutor Use					
Student ID					
Stage of Marking	Marker Code	Learning Outcomes Achieved (F/P/M/D) (please modify as appropriate)			Final Score
		A	B	C	
1 st Marker – red pen					
Moderation – green pen	IM Initials	The original mark has been accepted by the moderator (please circle as appropriate):			Y / N
		Data entry and score calculation have been checked by another tutor (please circle):			Y
2 nd Marker if needed – green pen					
For Academic Office Use		Possible Academic Infringement (please tick as appropriate)			
Date Received	Days late	Late Penalty	<input type="checkbox"/> Category A <input type="checkbox"/> Category B <input type="checkbox"/> Category C <input type="checkbox"/> Category D <input type="checkbox"/> Category E		Total Academic Infringement Penalty (A,B, C, D, E, Please modify where necessary) _____



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ASSIGNMENT TASK (INDIVIDUAL WORK)

SUBMISSION FORMAT INSTRUCTIONS

The assignment must be typed and submitted via Learning Mall Online to the correct dropbox. Only electronic submissions are accepted - no hard copies. The report should be submitted in a single PDF file and the format should follow the below structure:

- Cover page filled in with your student ID
- Your answer to each question
- List of references

All students must download their file and check that it is viewable after submission. Document uploads may become corrupted during the uploading process (e.g., due to slow internet connections). Therefore, students themselves are responsible for submitting a functional and correct file that needs to be tested after submitting it.

Deadline reminder: **11:59 PM China time (UTC+8 Beijing) on Sunday 2 June 2023**

LEARNING OUTCOMES

This assignment tests your ability to:

- A. Demonstrate systematic understanding and critical awareness of well-defined concepts, models, and technologies for Cloud computing technologies and practices.
- B. Demonstrate expertise in different Cloud models and mechanisms, including their strengths and weaknesses.
- C. Adapt or combine the key elements of existing Cloud models and mechanisms to design cloud solutions to the real world application problems.

MARKING CRITERIA

The following criteria will be used to assess the assignment.

Outstanding: Assessment format is consistent throughout including heading styles, fonts, and margins, figure/table/diagram are correctly labelled, effectively interpreted and discussed, writing flows smoothly from one idea to another, information is presented in logical and interesting way, all information is located in the appropriate section, calculation process is clearly presented before arriving to the final answer or conclusion.

Appropriate: Assessment format is generally consistent, figure/table/diagram are properly interpreted, sentences are structured and word are chosen to communicate ideas clearly, information is presented in logical manner, information is located in the appropriate section, calculation process is properly presented before arriving to the final answer or conclusion.

Needs Improvement: Assessment format is inconsistent, figure/table/diagram are poorly interpreted and discussed, sentence structure and/or word choice sometimes interfere with clarity, information is hard to follow as there is very little continuity, many items are in the wrong section, some steps or procedures are missing before arriving to the final answer or conclusion.

Hard to Understand: Assessment format is inconsistent, figure/table/diagram are not used effectively, sentence structure and word choice make reading and understanding difficult, sequence of information is difficult to follow, lack of appropriate sections and many items are

in the wrong section, some steps or procedures are missing in the calculation process, the final answer and/or conclusion are incorrect.

No submission or Missing Section: No submission or missing section of the discussion in the report.

Question 1

(50 marks)

As a **large traditional media company PSS**, you work very hard and constantly push into new markets such as **HD content, streaming video, and travel websites**, as well as new geographies for several different countries. Nowadays you have an international business, including **TV broadcasting, digital content, and e-commerce for multi-national audiences**.

Dynamic digital offerings to media-savvy audiences, however, require substantial **technology investment**. But, with many **decentralised business units(分散的业务单元)**, your company PSS maintains **varied IT environments**. Thus, your global technology team decided to evaluate **unified software development and IT infrastructure options** in an effort to solidify the market.

Challenges:

You are a big company with **more than 20 business units and subsidiaries formed over many years and locations**. **Different regional stations report different business sections** such as content production, ad sales and e-commerce. This **decentralised structure** has allowed teams across the company to drive innovation and growth.

While each business has a tailored approach to software development and platforms, all face similar IT challenges. **Fast-paced markets require rapid and creative content development**, and competitive forces yield **cost and data protection pressure**.

Provisioning of new servers often took days and hindered business agility. To speed time-to-market, some teams turned to **public cloud solutions** such as Amazon Web Services (AWS), Azure, or AliCloud. However, **not all** production applications were best suited for public cloud deployments.

Other divisions migrated to VMware-based **virtualized server environments**, and a few maintained **bare metal and legacy compute environments(裸机和遗留计算环境)**. Emerging development teams leveraged LAMP stacks, node.js, and MongoDB. But with this varied approach, not all teams had adopted the latest IT best practices such as **continuous integration and deployment (CI/CD) (持续集成/部署)** and breaking IT silos.

More recently, **data protection risks** caught the attention of the legal department, **most notably those using public cloud services**. Your company embraced strong data protection policies based on several **new data protection policies such as GDPR**, which requires your company to **rely less on the public cloud**.

Question:

As the CTO of your company, you need to propose a **Hybrid Cloud solution(混合云解决方案)** to provide a **unified IT platform** with stronger central expertise and allow divisions to focus on market leadership and innovation. The core IT team in your company **has suggested using OpenStack**, which is **an open-source private cloud** recently adopted by many other entertainment, online commerce, and gaming companies.



As the CTO, you need to write a **draft report** to the management team including the CEO, COO, CFO, and CIO to convince them your solution is the best option for the company. Please consider **the most important stakeholders**(最重要的利益相关者) such as **IT operations**(IT 操作员), **software developers**(软件开发人员), and **business leaders**(业务领导者) in your proposed solution. Please consider some **important non-functional requirements**(非功能性需求) such as the flexibility, cost, security, availability and usability of your solution.

The report should not only have the **requirement analysis** but also contain the **architecture design** including the detailed designs, technologies and solutions (you can make **any reasonable assumptions** for the existing requirements and relevant technical solutions in your company). You have to draw some **figures** in your report to make it more readable and professional. Since it is just a first draft to give to the management team, please don't make the report too long. (no more than 2000 words).

Question 2

(50 marks)

Choose **either one of the following papers** to repeat its implementation and write a report to explain your work. (30 marks) Please give the theoretical and implementation details **explanation** rather than just the source code and result figures. If you don't have any explanation, you can have at most 10 marks in this subquestion.

- C. Sonmez, A. Ozgovde and C. Ersoy, "Fuzzy Workload Orchestration for Edge Computing," in IEEE Transactions on Network and Service Management, vol. 16, no. 2, pp. 769-782, June 2019. <https://doi.org/10.1109/TNSM.2019.2901346>
- C. Sonmez, A. Ozgovde and C. Ersoy, "Machine Learning-Based Workload Orchestrator for Vehicular Edge Computing," in IEEE Transactions on Intelligent Transportation Systems, doi: 10.1109/TITS.2020.3024233. <https://doi.org/10.1109/TITS.2020.3024233>

Based on either one of the above papers, **criticise** its work and make an **idea/proposal** to improve it from **any reasonable aspect**. You should have both **theoretical proof** and **experiment results**. (20 marks)

(Hint: You can either use a new approach to do a similar task or use a similar approach for a new task. Please just make a **reasonable justification** to prove your idea.)