**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**SECTION -4F**

**EXTENSION QUESTIONS**

1. Question-1

1. Write a paper that investigates the modular architecture of the Aneka framework, focusing on the interaction between the platform's core components and how these enable distributed application management in the cloud. Compare its architecture with other cloud middleware frameworks, emphasizing scalability and resource efficiency.
2. Conduct a literature review that explores case studies of both application types in HTC environments. The paper should analyze their performance characteristics, scalability potential, and optimal usage in real-world scenarios.

2. Question -2

1. Develop a comparative study that discusses the architecture of the Aneka container and how it contrasts with container Docker in managing cloud infrastructure. The report should include performance metrics and a comparison of Aneka’s service orchestration and workload management capabilities.
2. Prepare a research paper that implements a parameter sweep application on Aneka and compares its performance with similar HTC platforms. Include quantitative benchmarks to measure execution time, resource utilization, and cost-efficiency for large-scale simulations.

3. Question -3

1. Provide a detailed paper that focuses on building a cloud application using Aneka SDK, presenting step-by-step details of the development process. The report should discuss the performance trade-offs, ease of development, and potential limitations, supported by comparisons to SDKs from other platforms like Microsoft Azure or Google App Engine.
2. Write a comparative analysis paper that evaluates task scheduling and execution efficiency between Aneka’s task model and frameworks like Condor, Grid Engine, or SLURM. Include performance evaluations across various workloads, focusing on aspects like fault tolerance, latency, and scalability.

4. Question -4

1. Present a research paper analyzing the performance and cost-effectiveness of Aneka’s cloud deployment modes across different industries. Use case studies or simulations to evaluate which deployment mode is optimal under varying conditions, such as security needs, workload types, and data sensitivity.
2. Create a comprehensive report that examines the use of HTC in scientific computing, with a focus on how Aneka handles large-scale simulations or data analysis tasks. Compare HTC frameworks in terms of scalability, fault tolerance, and energy efficiency using case studies from fields like astronomy or genomics.

5. Question -5

1. Develop a research-based report that compares Aneka with other cloud application development platforms such as Google Cloud, AWS, or Microsoft Azure. The report should focus on Aneka’s strengths and weaknesses in terms of flexibility, scalability, ease of use, and pricing.
2. Write a paper that proposes a novel workflow for HTC applications using Aneka. The report should highlight the integration of tools and APIs, analyze the impact of workflow optimizations, and compare the results with existing task dependency models used in other cloud environments.

6. Question -6

1. Present a research study that builds and tests a hybrid cloud application using Aneka’s task model, focusing on distributed computing tasks. Evaluate its performance under different network conditions and cloud environments, comparing Aneka’s hybrid capabilities with traditional cloud models.
2. Research how embarrassingly parallel applications are supported on Aneka and compare it to similar implementations on platforms like Hadoop or Spark. Use a real-world application example, such as Monte Carlo simulations or image processing, to demonstrate scalability and resource efficiency.

7. Question -7

1. Produce a detailed research report that explains how PAL provides portability across different operating systems. Compare Aneka’s PAL with abstraction layers in other cloud platforms, such as Apache Mesos or Kubernetes, analyzing their role in system integration and cross-platform deployment.
2. Conduct a performance benchmarking study that measures Aneka’s efficiency in managing parameter sweep applications against other HTC frameworks like Pegasus or Swift. The report should include quantitative data on task scheduling efficiency, error management, and resource consumption.

8. Question -8

1. Write a paper on cloud monitoring and management tools, comparing Aneka’s monitoring capabilities with other popular tools like Nagios, Prometheus, or AWS CloudWatch. Include case studies or experiments on large-scale cloud environments and evaluate the effectiveness of each tool.
2. Present a comparative study of MPI applications versus other HTC application models, focusing on their use cases in distributed computing. The report should highlight differences in task scheduling, communication overhead, and performance on cloud environments, using case studies from scientific research.

9. Question -9

1. Develop a paper that explores scenarios where Aneka’s architecture excels in scalability and resource optimization. Use simulations or case studies to evaluate how well Aneka handles large, variable workloads compared to other cloud platforms like AWS Lambda or Google Cloud Run.
2. Write a research paper outlining the design, implementation, and performance analysis of a large-scale data processing application using Aneka’s task-based programming model. The report should focus on task decomposition, fault tolerance, and load balancing strategies.

10. Question -10

1. Prepare a research-based report on how to deploy a distributed application in a private cloud using Aneka. Analyze its scalability, fault tolerance, and cost-effectiveness compared to other private cloud solutions like OpenStack or Eucalyptus.
2. Write a research report that explores task-based computing in HTC, comparing its efficiency and scalability with Many-Task Computing (MTC). Use performance metrics from large-scale simulations or real-world applications to support your analysis.

Reference - author:

<https://scholar.google.com/citations?user=C9YzE4wAAAAJ&hl=en&oi=ao>