

# Cloud-Based Multi-Purpose Application Analysis

## Scenario

A cloud-based application combines e-commerce, video streaming, and live event hosting, experiencing a significant increase in user activity. The application runs on a distributed operating system using multiple servers to handle various functionalities.

## Given Variables

- Each server can handle:
  - E-commerce transactions: 500 requests per minute
  - Video streaming: 300 videos per minute
  - Live event hosting: 200 active users per minute
- Total servers currently deployed: 5
- Current user base for each functionality:
  - E-commerce: 1,200 transactions
  - Video streaming: 1,000 videos
  - Live event hosting: 800 users
- Latency for:
  - E-commerce Checkout: 100 milliseconds
  - Video buffering: 200 milliseconds
  - Live event interaction: 150 milliseconds
- Daily failure rates:
  - E-commerce system: 0.01 (1%)
  - Video streaming service: 0.005 (0.5%)
  - Live event platform: 0.02 (2%)
- Cost considerations:
  - Cost of first server: \$2,500
  - Cost of each additional server: \$1,800

## Questions

### Throughput Calculation

What is the total throughput for each functionality if all 5 servers are used?

**Calculations:**

### Latency Analysis

If a user requests a video and has an average latency of 200 ms, how long will it take for 4 users to receive their video stream simultaneously?

### Scalability Assessment

If user demand increases to 2,500 e-commerce requests, 2,000 videos, and 1,200 live event users, how many additional servers would be required for each functionality?

**Calculations:**

### Reliability Calculation

What is the probability that the e-commerce system can run without failure for 15 consecutive days?

**Calculation:**

**E-commerce Reliability for 15 Days:**

**Video Streaming Reliability for 30 Days:**

**Live Event Reliability for 15 Days:**

## Cost Analysis

Given the cost of servers and the current server deployment, what is the total cost for the current server setup and how much would it cost to scale up to the necessary servers identified earlier?

**Current Server Cost:**

**Cost for E-commerce Requirement:**

For 5 servers needed:

**Cost for Video Requirement:**

For 7 servers needed:

**Cost for Live Event Requirement:**

For 6 servers needed:

**Conclusion**

This analysis highlights the various aspects of operating a multi-purpose cloud-based application, including throughput, latency, scalability, reliability, and cost. It demonstrates the importance of careful planning and resource allocation to ensure optimal performance and user satisfaction.