Cloud Based Framework for Rich Content Mobile Applications

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Motivation and Problem Statement

- Smart Phones have limited resources such as battery, memory, and computation.
- One of the main bottlenecks in ensuring mobile QoS is the level of wireless connectivity offered by last hop access networks such as 3G and Wi-Fi.
- 3G exhibits:
  - Wide area ubiquitous connectivity.
  - But long delay and slow data transfer.
- Wi-Fi exhibits:
  - low latencies/delays
  - scalability issues; as the number of users increases the latency and packet losses increase causing a decrease in application performance.
- 2-Tier Cloud Architecture could increase the QoS of Mobile Applications.

Space-Time Workflow

- To model mobile applications on 2-Tier Cloud architecture, workflow concept from SOA will be used.
- It consists of number of Logical and Precision steps known as a Function.
- Functions could be composed together in different patterns.

- We extend this concept to Space-Time Workflow to capture optimal mobile application.
- In this optimization problem our goal is to maximize the minimum saving of power, price and delay of the mobile applications.

Cloud Resource Allocation for Mobile Applications (CRAM)

- Optimal resource allocation for mobile applications is NP-Hard, so heuristic is needed.
- CRAM uses the combination of two main best practices in heuristic:
  - Simulated Annealing (Catching Global Optima)
  - Greedy Approach(Catching Local Optima)
- It uses the following observation for pervasive environment that: near user resources usually have better QoS.
- Need Efficient way to retrieve information of services on cloud in specific region.
- Example Query: “Retrieve all MPEG to AVI decoder services in distance R of mobile user”
- R-Tree is an efficient way to answer these queries.

System Evaluation and Future Directions

- 3 different classes of mobile applications will be considered:
  - Intensive Computing,
  - Streaming Application,
  - Mobile Pub/Sub.
- Application profiling and simulation will be used to evaluate CRAM.
- When the number of users is high CRAM could achieve 85% of optimal solution.
- In future CRAM will be extended to use efficiently user trajectory.

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