Editorial

Service Migration in Mobile Edge Computing

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With the rapid proliferation of intelligent mobile devices, mobile edge computing (MEC) is proposed to relieve the bottleneck of mobile devices’ limited capacity and low latency for services from the core network. Service migration is a significant issue in MEC. The contradiction between the limited covering area of a single edge server and the mobility of users (e.g., intelligent vehicles and smart devices) will result in significant network degradation if the distance between the user and his serving edge server is beyond a threshold, which can further lead to dramatic drop of QoS/QoE and even interruption of ongoing services. At this moment, service migration bears the responsibility to migrate the user’s ongoing service from the source (current) edge server to the destination edge server near the mobile user.

Although there have been some research efforts relevant to service migration in MEC, many challenges should be addressed. On one hand, the characteristics of service migration for MEC are quite different from the traditional handover process in cellular network and live migration in data center of cloud computing diagram for emphasis on data transferring, different evaluation metrics, more complex network conditions, and so forth. On the other hand, the service migration for MEC should deal with the nontrivial problems in MEC, such as mobility management, cache-enabled, deployment of MEC systems, and resource management. Moreover, energy-saving service migration in real time, architecture design of MEC systems, and the privacy and security mechanisms for service migration are also considered.

The main focus of this special issue is on the proposal of techniques for service migration for MEC and wireless mobile network. This special issue summarizes the most recent developments in the field, which aims to foster the dissemination of high quality research in new ideas, methods, theories, techniques, and applications of evaluation and management for improving mobile services, especially, in areas of

(i) QoS-aware edge server selection algorithm in MEC systems
(ii) Selection algorithm of migration path with both of latency and cost in MEC
(iii) Mobility management for service migration in MEC
(iv) Virtual resource allocation strategy on edge servers
(v) Architecture design of MEC systems for efficient service migration
(vi) Data compression algorithm and transferring optimization in service migration
(vii) Network control protocols and algorithms for service migration in MEC
(viii) Security and privacy issues for service migration in MEC

Twenty-five papers were submitted for this special issue. Our distinguished reviewers from respective research fields narrowed the field to fourteen papers which were finally
accepted. The following is a short summary of the findings of each of these papers.

L. Rao et al. designed an authenticated data structure called bv23Tree for Remote Storage Security, which enables client to batch-verify the indices and values of any number of appointed leaves all at once for efficiency. By utilizing bv23Tree and a hierarchical storage structure, they presented the solution to support dynamic updates of the outsourced data.

Q. Wei et al. proposed a flexible, secure, and reliable data sharing scheme based on collaboration in multicloud environment. For securely and instantly providing data sharing service even if the owner is offline and without trusted third party, they distributed all encrypted split data/key blocks together to multiple cloud service providers, respectively.

B. Cao et al. proposed a flexible dynamic pricing model for cloud service which takes into account occupying time, resource consumption, and maximal concurrency. In the pricing model, the fee of cloud service for the user is mainly composed of three parts: the monthly rental, the fee of his maximal concurrency, and the fee of his using time and resource consumption.

S. Yang et al. proposed a flexible framework which could support three kinds of selection schemes with respect of different service requirements for mobile crowdsensing service. The framework consists of two modules. For collaboration motivating module, they introduced two motivating methods including centralized decision-making and distributed decision-making. For message relaying module, they introduced two methods: contention based relaying and clustered based relaying.

Q. Wang et al. proposed an efficient forwarding capability evaluation method for opportunistic offloading in mobile edge computing. The first step of the method is to judge the possibility of a device contacting the destination within the time constraint of the data using the proposed transient cluster detection method. The second step of the method is to calculate the device's probability of encountering destination within the time constraint of the data as evaluation metric.

D. Yan et al. took the restaurant recommendation as an example and proposed a personalized POI recommender system integrating the user profile, restaurant characteristics, users’ historical behavior features, and subway network features. Then the subway network features such as the number of passing stations, waiting time, and transfer times are extracted and they employed a recurrent neural network model to model user behaviors.

H. Wu et al. proposed a cross-edge model for better personalization service, and they revealed how famous topics in one resource edge server can emerge on several other destination edge servers in mobile edge environment. The prototype of the model consists of the interaction between the users and diverse items, the personalization of new items, and privacy collection and distribution strategies.

W. Liang et al. proposed a weighted hidden Markov model to predict the security situation of the mobile network. In the model, the multiscale entropy is used to address the low speed of data training in mobile network, and the autocorrelation coefficient can reasonably use the association between the characteristics of the historical data to predict future security situation.

Y. Chen et al. proposed a dynamic service request scheduling algorithm, which makes request scheduling decisions to optimize scheduling cost while providing performance guarantees. The algorithm can be implemented in an online and distributed way and can achieve arbitrary tradeoff between scheduling cost and performance.

J. Huang et al. proposed a simulation-based approach of QoS-aware dynamic service selection for mobile edge computing systems. Stochastic system models were presented and mathematical analyses were provided. Based on the analytical results, the QoS-aware service selection problem was formulated by a dynamic optimization problem.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article.