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Advances on P2P, Parallel, Grid, Cloud and Internet Computing

Proceedings of the 15th International Conference on P2P, Parallel, Grid, Cloud and Internet Computing (3PGCIC-2020)

Springer

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Welcome Message from 3PGCIC-2020 Organizing Committee

Welcome to the 15th International Conference on P2P, Parallel, Grid, Cloud and Internet Computing (3PGCIC-2020), which will be held in conjunction with BWCCA-2020 International Conference from October 28 to October 30, 2020 in Yonago City, Tottori Prefecture, Japan.

P2P, grid, cloud and Internet computing technologies have been established as breakthrough paradigms for solving complex problems by enabling large-scale aggregation and sharing of computational data and other geographically distributed computational resources.

Grid computing originated as a paradigm for high-performance computing, as an alternative to expensive supercomputers. The grid computing domain has been extended to embrace different forms of computing, including semantic and service-oriented grid, pervasive grid, data grid, enterprise grid, autonomic grid, knowledge and economy grid.

P2P computing appeared as the new paradigm after client–server and Web-based computing. These systems are evolving beyond file sharing toward a platform for large-scale distributed applications. P2P systems have as well inspired the emergence and development of social networking, business to business (B2B), business to consumer (B2C), business to government (B2G), business to employee (B2E) and so on.

Cloud computing has been defined as a "computing paradigm where the boundaries of computing are determined by economic rationale rather than technical limits." Cloud computing is a multipurpose paradigm that enables efficient management of data centers, timesharing and virtualization of resources with a special emphasis on business model. Cloud computing has fast become the computing paradigm with applications in all application domains and providing utility computing at large scale.

Finally, *Internet computing* is the basis of any large-scale distributed computing paradigms; it has very fast developed into a vast area of flourishing field with enormous impact on today's information societies. Internet-based computing serves thus as a universal platform comprising a large variety of computing forms.

The aim of the 3PGCIC conference is to provide a research forum for presenting innovative research results, methods and development techniques from both theoretical and practical perspectives related to P2P, grid, cloud and Internet computing.

Many people have helped and worked hard to produce a successful 3PGCIC-2020 technical program and conference proceedings. First, we would like to thank all the authors for submitting their papers, the PC members and the reviewers who carried out the most difficult work by carefully evaluating the submitted papers.

We thank Web Administrators for their excellent work and support with the Web Submission and Management System of conference. We are grateful to Prof. Makoto Takizawa, Hosei University, Japan, as Honorary Chair of the conference for his support and encouragement. Our special thanks also go to keynote speakers.

We hope you will enjoy the conference and have a great time in Yonago City, Japan.

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3PGCIC-2020 Keynote Talks

Fairness and Efficiency in Network Resource Sharing

Masato Tsuru

Kyushu Institute of Technology, Japan

Abstract. With the expansion of network users and applications, the network traffic is still growing and a better sharing of limited network resources among multiple users/applications is required. In particular, recent strong demand on Internet of Things (IoT) for smart and connected communities along with architectural advancement, such as software-defined networking (SDN) and multi-access edge computing (MEC), has posed new challenges in fair and efficient resource sharing by multiplexing with complex and heterogeneous settings. In this talk, after briefly reviewing recent trends in communication networks, we discuss the concept of fairness in terms of achieved performance of each user through simple examples in wireless and wired networks. Then, we go into more details in few examples (multipath-multicast file transfer on OpenFlow network; wireless shared channel scheduling) and see how a fair and efficient resource sharing can be realized by time-division, space-division and information-coding multiplexing.

Road Status Sensing and V2X Technologies toward Autonomous Driving on Challenged Network Environment

Yoshitaka Shibata

Iwate Prefectural University, Morioka, Japan

Abstract. Autonomous driving systems are expected as future safe and effective vehicles and have been investigated and developed in industrial countries and actually driving on the exclusive and highway roads with flat surface, clear driving lanes and centerlines separated from the opposite direction and on good weather conditions. In the future autonomous driving systems, more general road status and weather status environments such as heavy snow countries in addition to challenged network environment where no public communication network is available must be considered to realize safer and reliable mobility infrastructure. In this talk, in order to resolve the above problems, IoT-based crowd-sensing technology using various environmental sensors to precisely identify qualitative and quantitative road status using AI technology is discussed. The next-generation V2X communication technology to exchange and share those road status and GIS information among surrounding vehicles and roadside bases stations is also explained. Finally, a wide road status information-sharing platform for challenged weather and network environments based on the 5G and the next-generation high-speed LAN is introduced.

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