Dongbiao He

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Education

Tsinghua University, Beijing, China 2013 – Present

PhD student in Computer Science and Technology

University of California, Santa Cruz, California, America 2017 – 2018

Visiting Scholar in Computer Science and Engineering

Jilin University, Changchun, China 2009 – 2013

B.S. in Software Engineering

Projects

Cloud/Edge computing support Infrastructure Development Sep, 2013– Now

In this project, we developed a lightweight virtual cluster management system, named as Humilis, for enabling adaptable resource management in practice. For the adaptation from cloud to edge, Humilis decouples the control module, computing module and storage module in order to fit the varying bandwidth requirement. This design offers flexibility for placing the virtual instance image files in a shared disk manner or non-shared disk manner. In Humilis, the allocation and recovery of resources could be automatically achieved, which provides a more efficient and reliable running virtual platform for the entire cluster.

- Support self-defined software installation and KVM/LXC on-line migration;
- Support Data Deduplication Storage for VM images;
- A Cache manage plane in control module for coordianting VM image blocks distribution and fast migration in WAN.

In-network Caching Sep, 2015 – Now

In content distribution and 5G wireless networks, in-network caching has become an important solution for efficient data transmission in using network resources. Based on the acquisition of transport protocol features (e.g., TCP / IP, ICN, etc.), this project obtains cache metrics and proposes distributed content placement strategies for supporting network cache architecture.

- A Bayesian ranking model is used to cache content with the aggregation caching features;
- A network partitioning scheme is put forward to avoid metadata flooding and reduce the complexity of the caching model;
- The proposed approach can reduce 56% content access latency.

Immersive Video Stream Networking Nov, 2017 – Now

The Immersive video stream has the problems of unnecessary data transmission and high-quality QoE requirement in the AR/VR network field. The project aims to predict immersive video user behavior information and select appropriate video content based on network delay estimation as well as adjusting video bitrate.

- Combining the network delay, we adjust the bit rate and the user's field of view adaptively;
- It improves the bit rate of about 1.34×and has a better QoE;
- Also, a user behavior simulation tool based on the Markov model and Beta distribution is implemented.

Others Jan, 2016 – Now

- Participating in the key technology research of big data transmission by the National Natural Science Foundation of China;
- Design and development of disaster recovery Software Suite;
- Participating in the research on Key Technologies of multidimensional climate data storage and processing;
- Participating in the Key technologies of cloud service integration platform and implementation of the distributed storage system.

Publications

AR/VR Network

- Dongbiao He, Cedric Westphal, and J.J. Garcia-Luna-Aceves. 2018. Joint Rate and FoV adaptation in immersive video streaming. In Sigcomm Workshop on AR/VR Network, August 24, 2018, Budapest, Hungary.
- Dongbiao He, Cedric Westphal, and J.J. Garcia-Luna-Aceves. Network support for AR/VR and immersive video application: a survey. ICETE 2018, Porto, Portugal .
- Dongbiao He, Jinlei Jiang, Guangwen Yang, Cedric Westphal and J.J. Garcia-Luna-Aceves. Towards Tile Based Distribution Simulation in Immersive Video Streaming. IFIP NETWORKING 2019. *to appear*

In-Network Caching Algorithm

- Dongbiao He, Jinlei Jiang, Guangwen Yang, Cedric Westphal. MCPC: Improving In-network Caching by Network Partition. Proceedings of International Conference on Parallel and Distributed Systems. IEEE, 2018.
- Dongbiao He, Jinlei Jiang, Guangwen Yang, Cedric Westphal. Coda: Achieving Multipath Data Transmission in NDN. Proceedings of IPCCC. IEEE, 2018.
- Dongbiao He, Jinlei Jiang, Guangwen Yang, Cedric Westphal, RankRoute: Efficient Interests Forwarding by Nodes Ranking, IEEE ICNC 2019.

Cloud & Data Center

- *Dongbiao He, Teng Ma, Jinlei Jiang, Guangwen Yang, Fast VM Migration in Edge Cloud: A VM Slicing and Caching Approach.* USENIX OSDI 2018 Poster. [Poster]
- *Teng Ma, MingXing Zhang, Dongbiao He, Kang Chen, Yongwei Wu, NVM Allocator in Disaggregation Era,* USENIX OSDI 2018 Poster. [Poster]

Prizes

First prize of RenMinWang Scholarship in Technical Subjects	NoV, 2018
First prize in the Sixth Student RDMA Programming Competition	Oct, 2018
National Scholarship of China	2011-2012
Meritorious prize in Mathematical Contest in Modeling (MCM)	2011-2012

Academic Talk

MCPC: Improving In-network Caching by Network Partition	December 2018, Singapore
Joint Rate and FoV adaptation in immersive video streaming	August 2018, Hungary
A PIT-Driven Approach to In-network Caching for Named Data Network	March 2018, The USA
EDTS: An Extensible Data Transmission Service for the Internet	August 2013,China

Other Information

- Research Interest: Distributed System, Cloud/Edge Computing, Networking
- Academic experience: NSDI 2018, Sigcomm 2018, IPCCC 2018, ICPADS 2018, ICPP 2015(External Reviewers), IEEE Transactions on Multimedia reviewer
- Program language: C/C++, Java, Python