

Songshi Dou

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CORE COMPETENCE

- Songshi Dou's research focuses on computer networks, including Software-Defined Networking (SDN), Network Function Virtualization (NFV), Data Center Network (DCN), and Content Delivery Network (CDN). He has published 6 journal/conference papers and owned/applied 5 Chinese patents.

EDUCATION

- **Beijing Institute of Technology** Beijing, China
Master of Control Engineering (Supervisor: [Prof. Zehua Guo](#)) Sept. 2019 - Present
- **North China Electric Power University** Beijing, China
Bachelor of Automation Sept. 2015 - Jul. 2019

RESEARCH EXPERIENCES

- **Path Programmability Recovery in SD-WANs under Multiple Controller Failures**
 - We propose to improve the path programmability in SD-WANs under multiple controller failures.
 - 1) For all circumstances, **Matchmaker** is proposed to adaptively adjust the control cost of offline switches based on the limited control resource by changing the paths of flows to realize proper offline switches remapping.
 - 2) If hybrid SDN/legacy mode is supported, **RetroFlow+** can be used to recover the path programmability and achieve low communication overhead by intelligently configuring a set of selected offline switches working under legacy routing mode; **ProgrammabilityMedic** recovers path programmability by fine-grainedly selecting routing mode for each offline flow at each offline switch to fit the given control resource from active controllers.
 - 3) If network slicing techniques (e.g., FlowVisor) are supported, **ProgrammabilityGuardian** is exhibited to recover offline flows with similar path programmability by realizing fine-grained flow-level mappings.
- **Traffic Engineering in SD-WANs with Scalable Routing**
 - We propose **HybridFlow** to achieve good load balancing performance using a single controller with low control overhead, which mainly employs hybrid routing and crucial flow rerouting to reduce the processing load of controller.

JOURNAL PAPERS

- **Songshi Dou**, Guochun Miao, Zehua Guo, Chao Yao, Weiran Wu, and Yuanqing Xia, "Matchmaker: Maintaining Network Programmability for Software-Defined WANs under Multiple Controller Failures", *Elsevier Computer Networks*, vol. 192, p. 108045, 2021. [\[pdf\]](#)
- Zehua Guo, **Songshi Dou**, Sen Liu, Wendi Feng, Wenchao Jiang, Yang Xu, and Zhi-Li Zhang, "Maintaining Control Resiliency and Flow Programmability in Software-Defined WANs During Controller Failures", *IEEE/ACM Transactions on Networking*.
- Zehua Guo, **Songshi Dou**, Yi Wang, Sen Liu, Wendi Feng, and Yang Xu, "HybridFlow: Achieving Load Balancing in Software-Defined WANs with Scalable Routing", *IEEE Transactions on Communications*, vol. 69, no. 8, pp. 5255-5268, Aug. 2021. [\[pdf\]](#) [\[slides\]](#)

CONFERENCE PAPERS

- **Songshi Dou**, Zehua Guo, and Yuanqing Xia, "ProgrammabilityMedic: Predictable Path Programmability Recovery under Multiple Controller Failures in SD-WANs", *IEEE International Conference on Distributed Computing Systems 2021 (ICDCS'21)*. (Accept Ratio: 97/489=19.8%) [\[pdf\]](#) [\[slides\]](#)
- Zehua Guo, **Songshi Dou**, and Wenchao Jiang, "Improving the Path Programmability for Software-Defined WANs under Multiple Controller Failures", *IEEE/ACM International Symposium on Quality of Service 2020 (IWQoS'20)*. [\[pdf\]](#) [\[slides\]](#)
- Yijun Sun, Zehua Guo, **Songshi Dou**, and Yuanqing Xia, "Video Quality and Popularity-aware Video Caching in Content Delivery Networks", *IEEE International Conference on Web Services 2021 (ICWS'21)*. [\[pdf\]](#)

POSTERS AND DEMOS

- Yijun Sun, Zehua Guo, **Songshi Dou**, Junjie Zhang, Changlin Li, and Xiang Ouyang, "Poster: Enabling Fast Forwarding in Hybrid Software-Defined Networks", *IEEE International Conference on Network Protocols 2021 (ICNP'21)* Poster. [\[pdf\]](#)

HONORS AND AWARDS

- **National Scholarship Award (top 1%)**, China 2021
- **OSDI 2021 Student Grant**, USENIX 2021
- **Third Prize of China Post-Graduate Mathematical Contest in Modeling**, China 2020
- **First-class Master Student Scholarship Award**, Beijing Institute of Technology 2019
- **Bachelor Student Scholarship Award**, North China Electric Power University 2015, 2016, 2017