Michio Honda

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INTERESTS

Operating Systems, Networking, Distributed Systems, Machine Learning

EDUCATION

Keio University, Tokyo Japan

Ph.D. in Graduate School of Media and Governance — Apr 2009 – Mar 2012
Program: Cyber Informatics
Thesis: The Internet is not an Internet—Principles, Evasion and Implications for Transport Protocols

M.S. in Graduate School of Media and Governance — Apr 2007 – Mar 2009
Program: Cyber Informatics
Thesis: Bidimensional-Probe Multipath Congestion Control for Shared Bottleneck Fairness

B.S. in Faculty of Environment and Information Studies — Apr 2003 – Mar 2007
Thesis: Fast Transport Layer Handover Using Single Wireless Interface

WORK EXPERIENCE

Lecturer, School of Informatics, The University of Edinburgh, UK — Jan 2020 – present
Senior research scientist, NEC Laboratories Europe, Heidelberg, Germany — Nov 2016 – Dec 2019
Software engineer, NetApp, Munich, Germany — Dec 2014 – Oct 2016
Research scientist, NEC Laboratories Europe, Heidelberg, Germany — Jul 2012 – Nov 2014
Part-time lecturer, Keio University, Japan — Apr 2011 – Mar 2012

RESEARCH EXPERIENCE

Visiting student researcher, University College London (UCL), London, UK — Apr 2010 – Sep 2010
Advisor: Prof. Mark Handley
Focus: Middlebox, Multipath Transport Protocol.

Research intern, Nokia Research Center, Espoo, Finland — Jul 2008 – Jan 2009
Advisor: Dr. Lars Eggert
Focus: Multipath Transport Protocol.

AWARDS

Best paper award, ACM SOSR'15 — Jun 2015
Community award, USENIX NSDI'12 — Apr 2012
Applied Networking Research Prize (ANRP), 82th IETF meeting — Nov 2011

RECENT RESEARCH

A Storage Stack for SoC-Based Accelerators — HotStorage'20
This work is motivated by the slow storage access in the applications that run in the PCIe-attached accelerator devices equipped with general-purpose CPU cores in addition to the specialized ones. It explores direct storage access architecture that bypasses the host CPUs, process or kernel, while providing useful abstractions to the applications.

Prism: Content-Aware Routing over TCP — NSDI'21
Prism enables content-aware routing of arbitrary-sized, encrypted application data over TCP, unlike the existing systems that rely on a custom UDP-based protocol. Prism modernizes the TCP handoff in the aid of programmable switches for robust operation and conformance to relevant features in recent Linux kernels.

PASTE: A Network Stack for Non-Volatile Main Memory — NSDI'18, HotNets'16, ATC'16
PASTE is a network stack that offers unified abstractions of network and non-volatile main memory. It fills the gap between the storage and network stacks designed in isolation, and solves the problem with the costs of moving and transforming data between these stacks that are significant for non-volatile main memory that offers fast, byte-addressable persistence.

mSwitch: A Highly-Scalable, Modular Software Switch — SOSR'15, CCR'14, NSDI'14, SoCC'17
mSwitch solves the scalability problem of existing software switches that is crucial to consolidate a large number of VMs or virtualized network functions by a novel packet forwarding algorithm and streamlined data path. It was initially designed for ClickOS, a tiny unikernel that runs Click, and MultiStack, a framework that runs multiple user-space network stacks.

Middlebox Measurement for TCP Extensibility — IMC'11, NSDI'12
This work was motivated by exploring viable design of Multipath TCP. It transmits various non-existent TCP traffic that mimics possible future TCP extensions to our server and examines on-path actions to the packets. This is the first work that examines in-depth middlebox behaviour prevalent in the Internet.

PUBLICATIONS

Yutaro Hayakawa, **Michio Honda**, Douglas Santry and Lars Eggert, *"Prism: Proxies without the Pain"*, USENIX Symposium on Networked Systems Design and Implementation (**NSDI**), Apr 2021.

Shinichi Awamoto, Erich Focht and **Michio Honda**, *"Designing a Storage Software Stack for Accelerators"*, USENIX Workshop on Hot Topics in Storage and File Systems (**HotStorage**), Jul 2020.

Maurice Bailleu, Jörg Thalheim, Pramod Bhatotia, Christof Fetzer, **Michio Honda** and Kapil Vaswani, *"Speicher:Securing LSM-based Key-Value Stores using Shielded Execution"*, USENIX Conference on File and Storage Technologies (**FAST**), Feb 2019.

Salvatore Pontarelli, Roberto Bifulco, Marco Bonola, Carmelo Cascone, Marco Spaziani, Valerio Bruschi, Davide Sanvito, Giuseppe Siracusano, Antonio Capone, **Michio Honda**, Felipe Huici and Giuseppe Bianchi, *"FlowBlaze: Stateful Packet Processing in Hardware"*, USENIX Symposium on Networked Systems Design and Implementation (**NSDI**), Feb 2019.

Michio Honda, Giuseppe Lettieri, Lars Eggert and Douglas Santry, *"PASTE: A Network Programming Interface for Non-Volatile Main Memory"*, USENIX Symposium on Networked Systems Design and Implementation (**NSDI**), Apr 2018.

Kenichi Yasukata, Felipe Huici, Vincenzo Maffione, Giuseppe Lettieri and **Michio Honda**, *"HyperNF: Building a High Performance, High Utilization and Fair NFV Platform"*, ACM Symposium on Cloud Computing (**SoCC**), Sep 2017.

Simon Kuenzer, Anton Ivanov, Filipe, Manco, Jose Mendes, Yuri Volchkov, Florian Schmidt, Kenichi Yasukata, **Michio Honda** and Felipe Huici, *"Unikernels Everywhere: The Case for Elastic CDNs"*, ACM International Conference on Virtual Execution Environments (**VEE**), Apr 2017.

Michio Honda, Lars Eggert and Douglas Santry, *"PASTE: Network Stacks Must Integrate with NVMM Abstractions"*, ACM Workshop on Hot Topics in Networks (**HotNets**), Nov 2016.

Kenichi Yasukata, **Michio Honda**, Douglas Santry and Lars Eggert, *"StackMap: Low-Latency Networking with the OS Stack and Dedicated NICs"*, USENIX Annual Technical Conference (**ATC**), Jun 2016.

Michio Honda, Felipe Huici, Giuseppe Lettieri and Luigi Rizzo, *"mSwitch: A Highly-Scalable, Modular Software Switch"*, ACM SIGCOMM Symposium on SDN Research (**SOSR**), Jun 2015. **Best paper award**

Michio Honda, Felipe Huici, Costin Raiciu, Joao Araujo and Luigi Rizzo, *"Rekindling Network Protocol Innovation with User-Level Stacks"*, ACM SIGCOMM Computer Communication Review (**CCR**), Apr 2014.

Joao Martins, Mohamed Ahmed, Costin Raiciu, Vladimir Olteanu, **Michio Honda**, Roberto Bifulco and Felipe Huici, *"ClickOS and the Art of Network Function Virtualization"*, USENIX Symposium on Networked Systems Design and Implementation (**NSDI**), Apr 2014.

Costin Raiciu, Christoph Paasch, Sebastien Barre, Alan Ford, **Michio Honda**, Fabien Duchene, Olivier Bonaventure and Mark Handley, *"How Hard Can It Be? Designing and Implementing a Deployable Multipath TCP"*, USENIX Symposium on Networked Systems Design and Implementation (**NSDI**), Apr 2012. **Community Award**

Michio Honda, Yoshifumi Nishida, Costin Raiciu, Adam Greenhalgh, Mark Handley and Hideyuki Tokuda, *"Is it Still Possible to Extend TCP?"* ACM Internet Measurement Conference (**IMC**), Nov 2011. **Applied Networking Research Prize**

Michio Honda, Yoshifumi Nishida, Pasi Sarolahti and Lars Eggert, *"Multipath Congestion Control for Shared Bottleneck"* International Workshop on Protocols for Future, Large-Scale & Diverse Network Transports (**PFLDNeT**), May 2008.

Michio Honda, Jin Nakazawa, Yoshifumi Nishida, Masahiro Kozuka and Hideyuki Tokuda, *"A Connectivity-Driven Retransmission Scheme Based On Transport Layer Readdressing"*, IEEE International Conference on Distributed Computing Systems (**ICDCS**), Jun 2008.

POSTERS

Michio Honda and Mathias Niepert, *"GrepStore: Scaling Graph Representation Learning"*, USENIX Symposium on Operating System Design and Implementation (OSDI), Oct 2018.

Michio Honda, Felipe Huici and Luigi Rizzo, *"MiniStack: Operating System Support for Fast User-space Network Protocols"*, USENIX Symposium on Operating System Design and Implementation (OSDI), Oct 2012.

SERVICE

USENIX ATC, Program Committee	2017, 2018 and 2020
ACM/IEEE SC, Program Committee	2019
ACM/IEEE ANCS, Program Committee	2018
ACM SOSR, Program Committee	2018
ACM EuroDW, Program Committee	2018
ACM/IEEE ToN, Reviewer	2017–2018
ACM SOSP poster, Program Committee	2013

TEACHING

Data Structures and Programming, Keio University	Fall 2011
Fundamentals of Information Technology, Keio University	Spring 2011

STUDENT MENTORING

Yutaro Hayakawa, Master Thesis, Keio University	Fall 2018
Nanako Momiyama, Bachelor Thesis, Keio University	Fall 2016
Yutaro Hayakawa, Bachelor Thesis, Keio University	Fall 2016
Kenichi Yasukata, Master Thesis, Keio University	Fall 2015

GRANTS

Research Fellowship for Young Scientists (DC1) Apr 2009 – Mar 2012
Japan Society for the Promotion of Science, 9.2M JPY

Excellent Young Researcher Overseas Visit Program Apr 2010
Japan Society for the Promotion of Science, 1M JPY

Young Leader Scholarship Apr 2009
Keio University, 1M JPY

R&D COLLABORATIONS

Fed4IoT (H2020 No. 814918) Jul 2018 – present
The Federation for IoT (Fed4IoT) project aims at integrating heterogeneous IoT platforms and devices by virtualizing resources at multiple levels, including devices, platforms and information. Project volume is €3 million in total.

SSICLOPS (H2020 No. 644866) Feb 2014 – Jan 2018
The Scalable and Secure Infrastructures for Cloud Operations (SSICLOPS) focuses on cloud networking techniques in software-defined data centers and across wide-area networks. Project volume is €7 million.

OPEN SOURCE CONTRIBUTION

PASTE	https://micchie.github.io/paste/
netmap	mSwitch and various features https://github.com/luigirizzo/netmap
MultiStack	https://github.com/sysml/multistack
Linux kernel	SCTP extensions https://www.kernel.org/
FreeBSD kernel	mSwitch and SCTP extensions https://www.freebsd.org/

[*CV compiled on 2020-07-08*]