2024 IEEE 30th Real-Time and Embedded Technology and Applications Symposium (RTAS)

RTAS 2024

Table of Contents

essage from the RTAS 2024 Chairs FAS 2024 Organizing Committee	
ΓAS 2024 Program Committee	xii:
apers	
usted Timing Services with TimeGuard	1
tegrating Sporadic Events in Time-Triggered Systems via Affine Envelope Approximations Anaïs Finzi (TTTech Computertechnik AG, Austria), Silviu S. Craciunas (TTTech Computertechnik AG, Austria), and Marc Boyer (ONERA / DTIS, Université de Toulouse, France)	15
ptimal Synthesis of Fault-Tolerant IDK Cascades for Real-Time Classification Sanjoy Baruah (Washington University in St. Louis), Iain Bate (University of York), Alan Burns (University of York), and Robert Davis (University of York)	29
SB Interrupt Differentiated Service for Bandwidth and Delay-Constrained Input/Output Zhiyuan Ruan (Boston University, USA), Anton Njavro (Boston University, USA), and Richard West (Boston University, USA)	42
Predictable SIMD Library for GEMM Routines Iryna De Albuquerque Silva (ONERA, France), Thomas Carle (IRIT - Univ. Toulouse 3, France), Adrien Gauffriau (Airbus, France), Victor Jegu (Airbus, France), and Claire Pagetti (ONERA, France)	55
fe and Secure? On the Timing Analysability of Cryptographic Implementations Alexander Stegmeier (University of Augsburg, Germany), Peter Knauer (Augsburg Technical University of Applied Sciences, Germany), Philipp Schubaur (Augsburg Technical University of Applied Sciences, Germany), Christian Piatka (University of Augsburg, Germany), Dominik Merli (Augsburg Technical University of Applied Sciences, Germany), and Sebastian Altmeyer (University of Augsburg, Germany)	68

PAAM: A Framework for Coordinated and Priority-Driven Accelerator Management in ROS 2 81 Daniel Enright (University of California, Riverside), Yecheng Xiang (University of California, Riverside), Hyunjong Choi (San Diego State University), and Hyoseung Kim (University of California, Riverside)
Extending Network Calculus to Deal with Min-Plus Service Curves in Multiple Flow Scenarios 95 Anja Hamscher (RPTU Kaiserslautern-Landau, Germany), Vlad-Cristian Constantin (RPTU Kaiserslautern-Landau, Germany), and Jens B. Schmitt (RPTU Kaiserslautern-Landau, Germany)
Real-Time Scheduling for 802.1Qbv Time-Sensitive Networking (TSN): A Systematic Review and Experimental Study
Sync or Sink? The Robustness of Sensor Fusion Against Temporal Misalignment
Optimizing Logical Execution Time Model for Both Determinism and Low Latency
DAG Scheduling with Execution Groups
A Hybrid Approach to WCTT Analysis in a Real-Time Switched Ethernet Network
RT-Mimalloc: A New Look at Dynamic Memory Allocation for Real-Time Systems
Exclusive Hierarchies for Predictable Sharing in Last-Level Cache

Core-Local Reasoning and Predictable Cross-Core Communication with M³	.99
End-To-End Timing Analysis and Optimization of Multi-Executor ROS 2 Systems	!12
TinyBFT: Byzantine Fault-Tolerant Replication for Highly Resource-Constrained Embedded	
- <i>j</i> - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	225
Harald Böhm (Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)),	
Tobias Distler (Friedrich-Alexander-Universität Erlangen-Nürnberg	
(FAU)), and Peter Wägemann (Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU))	
OmniWasm: Efficient, Granular Fault Isolation and Control-Flow Integrity for Arm Microcontrollers	239
Maorui Bai (The George Washington University), Runyu Pan (Shandong	رں۔
University), and Gabriel Parmer (The George Washington University)	
Strict Partitioning for Sporadic Rigid Gang Tasks)52
Binqi Sun (Technical University of Munich, Germany), Tomasz Kloda (LAAS-CNRS, Universite de Toulouse, INSA, France), and Marco Caccamo (Technical University of Munich, Germany)	.02
HAEST: Harvesting Ambient Events to Synchronize Time Across Heterogeneous IoT Devices 2 Adeel Nasrullah (University of Massachusetts Amherst) and Fatima M. Anwar (University of Massachusetts Amherst)	<u>2</u> 65
Fast Attack Recovery for Stochastic Cyber-Physical Systems	<u>'</u> 80
Demystifying NVIDIA GPU Internals to Enable Reliable GPU Management	<u> 1</u> 94
DECNTR: Optimizing Safety and Schedulability with Multi-Mode Control and Resource Allocation Co-Design	306
An Empirical Study of Performance Interference: Timing Violation Patterns and Impacts	320

Elastic Scheduling for Harmonic Task Systems Marion Sudvarg (Washington University in St. Louis), Ao Li (Washington University in St. Louis), Daisy Wang (Washington University in St. Louis), Sanjoy Baruah (Washington University in St. Louis), Jeremy Buhler (Washington University in St. Louis), Chris Gill (Washington University in St. Louis), Ning Zhang (Washington University in St. Louis), and Pontus Ekberg (Uppsala University)	334
Algorithms for Canvas-Based Attention Scheduling with Resizing	348
InsectACIDE: Debugger-Based Holistic Asynchronous CFI for Embedded System Yujie Wang (Washington University in St. Louis), Cailani Lemieux Mack (Vanderbilt University), Xi Tan (University at Buffalo), Ning Zhang (Washington University in St. Louis), Ziming Zhao (University at Buffalo), Sanjoy Baruah (Washington University in St. Louis), and Bryan C. Ward (Vanderbilt University)	360
RT-Swap: Addressing GPU Memory Bottlenecks for Real-Time Multi-DNN Inference Woosung Kang (DGIST, Republic of Korea), Jinkyu Lee (SungKyunkwan University, Republic of Korea), Youngmoon Lee (Hanyang University, Republic of Korea), Sangeun Oh (Ajou University, Republic of Korea), Kilho Lee (Soongsil University, Republic of Korea), and Hoon Sung Chwa	373
(DGIST, Republic of Korea)	
(DGIST, Republic of Korea) Brief Presentations	
	items 386
Brief Presentations Work in Progress: Predictable Execution of Isolated Real-Time Tasks on Multicore Sysusing the LET Paradigm Konstantin Dudzik (FZI Research Center for Information Technology, Germany), Maximilian Kirschner (FZI Research Center for Information Technology, Germany), Victor Pazmino Betancourt (FZI Research Center for Information Technology, Germany), and Jürgen Becker (FZI Research	386

Brief Industry Paper: Delay-Aware Control in Networked Systems using Smart Actuators	
Demo: Vulnerability Analysis for STL-Guided Safe Reinforcement Learning in Cyber-Physical Systems	
Work in Progress: Guaranteeing Weakly-Hard Timing Constraints in Server-Based Real-Time Systems	
Work in Progress: Emerging From Shadows: Optimal Hidden Actuator Attack to Cyber-Physical Systems	
Author Index	