2021 IEEE 46th Conference on Local Computer Networks

LCN 2021

Table of Contents

Message from the General Chair	X
Message from the Program Chairs	xii
Message from the Symposium Chair	xiii
Organizing Committee	xiv
Steering Committee	xvi
Technical Program Committee	xvii
Sponsors and Supporters	xxi
Best Paper Awards for Prior IEEE Local Computer Networks (LCN) Conferences	xxii
Best paper candidates	
A Truly Self-Sovereign Identity System	1
Blockchain Layer Zero: Characterizing the Bitcoin Network Through Measurements, Models, and Simulations	9
Data-Quality Based Scheduling for Federated Edge Learning	17
Regular papers	
Slice Aware Non Terrestrial Networks	24
On the Benefits of Loops for Segment Routing Traffic Engineering	32
Impact of ACK Scaling Policies on QUIC Performance	41
On the Potential of Rate Adaptive Point Cloud Streaming on the Point Level	49

Inferring Connected IoT Devices from IPFIX Records in Residential ISP Networks	57
ASER: Scalable Distributed Routing Protocol for LEO Satellite Networks	65
SDN-Based Self-Configuration for Time-Sensitive IoT Networks	73
Déjà Vu? Client-Side Fingerprinting and Version Detection of Web Application Software	81
Low-Variance Latency Through Forward Error Correction on Wide-Area Networks	90
Anomaly Detection for Discovering Performance Degradation in Cellular IoT Services	99
Opportunistic Routing and Synchronous Transmissions Meet TSCH	107
X-Sync: Cross-Technology Clock Synchronization Among Off-The-Shelf Wireless IoT Devices	115
Less is More: Choosing Fair Network Coding Parameters	123
Understanding MPTCP in Multi-WAN Routers: Measurements and System Design	132
SecGrid: A Visual System for the Analysis and ML-Based Classification of Cyberattack Traffic	140
Adaptive Warden Strategy for Countering Network Covert Storage Channels	148
Provisioning Differentiated QoS for NVMe over Fabrics	154
A Distributed Delivery Architecture for User Generated Content Live Streaming over HTTP	162
WhisperChord: Scalable and Secure Node Discovery for Overlay Networks	170
Outsourcing Secure MPC to Untrusted Cloud Environments with Correctness Verification	178
MonGNN: A Neuroevolutionary-Based Solution for 5G Network Slices Monitoring	185
Delay-Aware DNN Inference Throughput Maximization in Edge Computing via Jointly Exploring Partitioning and Parallelism	193

To Forward or Not to Forward: Optimal Message Scheduling in Mobile Opportunistic Networks	201
An Efficient Metric for Physical-Layer Jammer Detection in Internet of Things Networks	209
Multi-Level Graph Attention Network Based Unsupervised Network Alignment	217
Iterative Soft Decoding of Single Parity Check Convolutional Concatenated Code	225
Toward Driver Intention Prediction for Intelligent Vehicles: A Deep Learning Approach	233
A Formal Method for Evaluating the Performance of TSN Traffic Shapers Using UPPAAL	241
Transfer Learning-Based Accelerated Deep Reinforcement Learning for 5G RAN Slicing	249
Progressive Mesh-Based HTTP Adaptive Augmented Reality Streaming System	257
Anchor-Oriented Time and Phase-Based Concurrent Self-Localization Using UWB Radios	265
A Deep Reinforcement Learning Approach for Service Migration in MEC-Enabled Vehicular Networks	273
Symposium papers	
SPCAuth: Scalable and Privacy-Preserving Continuous Authentication for Web Applications	281
Protecting Software-Defined Enterprise Networks from Packet Injection Attacks	287
Intelligent Cooperative Health Emergency Response System in Autonomous Vehicles	293
Hierarchical Multi-Agent Deep Reinforcement Learning for SFC Placement on Multiple Domains	299
Suitability of Graph Representation for BGP Anomaly Detection	305
Short papers	
Network Traffic Classification Method Supporting Unknown Protocol Detection	311

MPRdeep: Multi-Objective Joint Optimal Node Positioning and Resource Allocation for FANETs with Deep Reinforcement Learning	315
A Machine Learning Approach to Peer Connectivity Estimation for Reliable Blockchain Networking	319
Virtual Framework for Development and Testing of Federation Software Stack	323
Recovering Colliding LoRa Frames from Uncertainties Using LoRa Coding	327
Designing the Interplay of Energy Plane and Communication Plane in the Energy Packet Grid	331
Delta-State-Based Synchronization of CRDTs in Opportunistic Networks	335
Maintenance of Structural Hole Spanners in Dynamic Networks	339
KDST: K-Anonymous Node Discovery Using Separation of Trust	343
Deep Reinforcement Learning for Persistent Cruise Control in UAV-Aided Data Collection	347
Telemetron: Measuring Network Capacity Between Off-Path Remote Hosts	351
Accelerating MPI Communication Using Floating-Point Compression on Lossy Interconnection Networks	355
An Incentive Approach in Mobile Crowdsensing for Perceptual User	359
A Smartphone-Targeted Opportunistic Computing Environment for Decentralized Web Applications	363
LaFlector: A Privacy-Preserving LiDAR-Based Approach for Accurate Indoor Tracking	367
Unifying LoRaWAN Networks by Enabling the Roaming Capability	371
Towards Generalizable Network Anomaly Detection Models	375
On Quantifying the Complexity of IoT Traffic	379
Flow-Aware Low-Latency Multipath Tunnelling	383

A Minimal Delay Violation Downlink LTE Scheduler	387
A Comprehensive Evaluation of Different Approaches to Tunnelling over Multiple Paths	391
A Two-Stage Algorithm for the Virtual Network Embedding Problem	395
Group Communication with OSCORE: RESTful Multiparty Access to a Data-Centric Web of Things	399
Near-Optimal Opportunistic Spectrum Access in Cognitive Radio Networks in the 5G and IoT Era	403
A Vehicle Message Scheduling Scheme for Vehicle Trust Management	407
Distributed Task Migration Optimization in MEC by Deep Reinforcement Learning Strategy	411
Alternative Authentication with Smart Contracts for Online Games	415
A Multidimensional Trust Model for Vehicular Ad-Hoc Networks	419
Enabling Robust Wireless Communication for BMS on Electric Vehicles	423
Graph Based Visualisation Techniques for Analysis of Blockchain Transactions	427
Python-Based TinyIPFIX in Wireless Sensor Networks	431
Prediction of Indoor Wireless Coverage from 3D Floor Plans Using Deep Convolutional Neural Networks	435
Understanding the Achieved Rate Multiplication Effect in FlowQueue-Based AQM Bottleneck	439
ICN PATTA: ICN Privacy Attack Through Traffic Analysis	443
Doctoral Track - Full papers	
Enhancing Adaptive Frequency Hopping for Bluetooth Low Energy	447
QX-MAC: Improving QoS and Energy Performance of IoT-Based WSNs Using Q-Learning	455

DEMONS: Extended Manufacturer Usage Description to Restrain Malicious Smartphone Apps	463
Characterizing Human Mobility Patterns During COVID-19 Using Cellular Network Data	471
Mobility-Aware COVID-19 Case Prediction Using Cellular Network Logs	479
EADAS: Edge Assisted Adaptation Scheme for HTTP Adaptive Streaming	487
Optimal Placement of Recurrent Service Chains on Distributed Edge-Cloud Infrastructures	495
On the Analysis of Adaptive-Rate Applications in Data-Centric Wireless Ad-Hoc Networks	503
Hop-By-Hop: Advancing Cooperative Congestion Control for Cyber-Physical Systems	511
Toward a Lightweight Machine Learning Based Solution Against Cyber-Intrusions for IoT	519
CSDN: CDN-Aware QoE Optimization in SDN-Assisted HTTP Adaptive Video Streaming	525
CURE: Enabling RF Energy Harvesting Using Cell-Free Massive MIMO UAVs Assisted by RIS	533
Quality Preserving Voice Stream Multicast over Mobile Low Power Wireless Networks	541
Towards Dense and Scalable Soil Sensing Through Low-Cost WiFi Sensing Networks	549
Robust Authentication and Data Flow Integrity for P2P SCADA Infrastructures	557
Application Agnostic Container Migration and Failover	565
A Networked Social Virtual Reality Learning Environment Platform for Special Education	573
DRo: A Data-Scarce Mechanism to Revolutionize the Performance of DL-Based Security Systems	581
CLEDGE: A Hybrid Cloud-Edge Computing Framework over Information Centric Networking	589
Revenue Maximization Leveraging Flastic Service Provisioning in Flexible Ontical Networks	597

Author Index	657
Securing Software-Defined Vehicular Network Architecture Against DDoS Attack	653
Public Wireless Packets Anonymously Hurt You	649
Failure Modes and Effects Analysis (FMEA) of Honeypot-Based Cybersecurity Experiment for IoT	645
Doctoral Track – Promising Ideas papers	
Breach Path Detection Reliability in Energy Harvesting Wireless Sensor Networks	637
Upper Bounds on Path Exposure in EH-WSNs with Variable Transmission Ranges	629
Predictive Analytics Integrated Multi-Level Optimization of Offshore Connectivity in Ocean Network	621
Low-Cost Search in Tree-Structured P2P Overlays: The Null-Balance Benefit	613
Improved Monte Carlo Tree Search for Virtual Network Embedding	605