# **2021 IEEE World Congress on Services (SERVICES 2021)**

Virtual Conference 5-11 September 2021



IEEE Catalog Number: CFP21SER-POD ISBN: 978-1-6654-2720-3

## Copyright © 2021 by the Institute of Electrical and Electronics Engineers, Inc. All Rights Reserved

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.

 IEEE Catalog Number:
 CFP21SER-POD

 ISBN (Print-On-Demand):
 978-1-6654-2720-3

 ISBN (Online):
 978-1-6654-2719-7

ISSN: 2378-3818

#### **Additional Copies of This Publication Are Available From:**

Curran Associates, Inc 57 Morehouse Lane Red Hook, NY 12571 USA

Phone: (845) 758-0400 Fax: (845) 758-2633

E-mail: curran@proceedings.com Web: www.proceedings.com



## 2021 IEEE World Congress on Services (SERVICES)

## **SERVICES 2021**

### **Table of Contents**

Message from the Steering Committee Chair	X1
Message from Congress General Chairs	
Message from Services Workshop Program Chairs	xiii
J1C2 Chairs Message	xiv
Message from the DIKWN Workshop Chairs	xv
Message from the IWIOS Workshop Chairs	
Organizing Committee	xvii
In Memoriam: Professor Mikio Aoyama	xx
Opening Remarks	xxi
Keynote 1 - Michael Stonebraker - DBOS: A Database-Oriented Operating System	xxii
Keynote 2 - Jay Lee - Transformation: Case Studies and Lessons Learned	
Keynote 3 - Amit Sheth - Don't Handicap AI without Explicit Knowledge	xxiv
Keynote 4 - Ruchir Puri - Engineering the Future of AI for the Enterprises	
Plenary Panel 1 - Cloud HPC: Exploring the Growing Synergy between Cloud and High	
Performance Computing	
Plenary Panel 2 - The Future of Digital Health: Bridging Behavioral Science and	
Engineering with Intensive Longitudinal Assessment	xxviii
Plenary Panel 3 - Advances & Challenges in Software Service Engineering	xxx
Plenary Panel 4 - Quantum Software & Services	
Plenary Panel 5 - Future Trends of Strategic Advances of Services Computing Using AI	
Technologies	xxxv
O Company of the comp	
J1C - Session 1 (MIXED)	
jie oession i (minely)	
Distributed Redundancy Scheduling for Microservice-based Applications at the Edge	1
Checking GDPR Compliance for Cloud-Based Services	2

## J1C - Session 2 (SDMS)

PESC-Translator: Towards Automatically Smart Legal Contract Conversion for lockchain-based Auction Services	3
nabling Fast Public Auditing and Data Dynamics in Cloud Services	4
onstrained App Data Caching over Edge Server Graphs in Edge Computing Environment	5
1C - Session 3 (ICWS)	
cheduling Real Time Security Aware Tasks in Fog Networks Anil Singh (Indian Institute of Technology Ropar, India), Nitin Auluck (Indian Institute of Technology Ropar, India), Omer Rana (Cardiff University, US), and Surya Nepal (Commonwealth Scientific and Research Organization, Australia)	6
ynamic Trust Enforcing Pricing Scheme for Sensors-as-a-Service in Sensor-Cloud frastructure	7
Aishwariya Chakraborty (Indian Institute of Technology Kharagpur, India), Ayan Mondal (Indian Institute of Technology Kharagpur, India), Arijit Roy (Indian Institute of Technology Kharagpur, India), and Sudip Misra (Indian Institute of Technology Kharagpur, India)	
emporal-Perturbation Aware Reliability Sensitivity Measurement for Adaptive Cloud Service	8
Lei Wang (Nanjing Forestry University, China), Qiang He (Swinburne University of Technology, China), Demin Gao (Nanjing Forestry University, China), Jing Wan (Nanjing Forestry University, China), and Yunqiu Zhang (Nanjing Forestry University, China)	0
IC - Session 4 (ICDH)	
ghtweight Privacy-Preserving Medical Diagnosis in Edge Computing	9

A Learning Automata-Based Scheduling for Deadline Sensitive Task in the Cloud
Efficient and Anonymous Authentication for Healthcare Service with Cloud Based WBANs
J1C - Session 5 (CLOUD)
Microservices Monitoring with Event Logs and Black Box Execution Tracing
Secure V2V and V2I Communication in Intelligent Transportation using Cloudlets
Towards Green Service Composition Approach in the Cloud
J1C - Session 6 (SCC)
Value Entropy: A Systematic Evaluation Model of Service Ecosystem Evolution
Edge-Based Runtime Verification for the Internet of Things
Quantitative Assessment of Service Pattern: Framework, Language, and Metrics

## J1C - Session 7 (Mixed)

Delegated Authorization Framework for EHR Services using Attribute Based Encryption
Privacy-Preserving Diverse Keyword Search and Online Pre-Diagnosis in Cloud Computing
SenSchedule: Scheduling Heterogeneous Periodic Sensing Resources with Non Uniform Performance in IoT
DIKWN Workshop Papers
Modeling of Data, Information, Knowledge and Wisdom Session
Modeling and Measuring for Emotion Communication Based on DIKW
Towards Purpose Driven Content Interaction Modeling and Processing Based on DIKW
ASMaaS: Automatic Semantic Modeling as a Service
Knowledge Networking Session
Modeling and Performance Analysis on Federated Learning in Edge Computing
A Novel Method for Network Traffic Prediction using Residual Mogrifier GRU

Service Recommendation Based on Smart Contract and DIKW
Mongolia University, China), and Duan Yucong (Hainan University, China)
IWIOS Workshop Papers
IoS Composition and Recommendation Session
An End-to-end Attention Transfer Network for Cross-Domain Service Recommendation
Abstraction Refinement Approach for Web Service Selection using Skyline Computations
A Fast Real-Time QoS-Aware Service Selection Algorithm
IoS Modeling and Design Session
A Modeling and Engineering Methodology for Developing Internet of Services from Scratch
Identification of Product Service Common and Individual Demands Based on Online Reviews 84  Lin Huang (Shanghai Jiao Tong University, China), Liya Wang (Shanghai  Jiao Tong University, China), and Xinguo Ming (Shanghai Jiao Tong  University, China)
Research on Service Aggregation Driving Mechanism of "Virtual Nursing Home" Based on Evolutionary Game 90 Zongwei Ren (Harbin University of Commerce, China) and Guangmin Zhou (Harbin University of Commerce, China)
Multi-view Scenario-Based Service Resource Description Modeling and Application Method 96 Zhengzuo Li (Harbin Institute of Technology, China), Zhiying Tu (Harbin Institute of Technology, China), Bo Liu (Harbin Institute of Technology, China), Dianhui Chu (Harbin Institute of Technology, China), and Chunshan Li (Harbin Institute of Technology, China)

#### **IoS Infrastructure and Tools Session**

A Decentralized Runtime Environment for Service Collaboration: the Architecture and a Case Study
A Blockchain-Based Infrastructure for Distributed Internet of Services
A Cache-Based Executive Request Dispatching Method in the Distributed Workflow System 115 Bo Lv (North China University of Technology, China), Weilong Ding (North China University of Technology, China), and Ji Liu (North China University of Technology, China)
A Data-Driven Exploratory Service Composition Tool for Data Scientists
IoS Scheduling and Optimization Session
Multi-tenant Cloud-Edge Workflow Scheduling with Priority and Deadline Constraints
Hybrid Cloud Resource Scheduling with Multi-dimensional Configuration Requirements
Research on Evolutionary Game of Service Value Chain Considering the Supervision of Service Platform
Author Index