2015 IEEE 34th International Performance Computing and Communications Conference (IPCCC 2015)

Nanjing, China
14-16 December 2015
# TABLE OF CONTENTS

## SESSION 1

<table>
<thead>
<tr>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>AN ENHANCED ALGORITHM BASED ON PATHS ALGEBRA STRATEGY TO SOLVE THE VNE PROBLEM</td>
<td>1</td>
</tr>
<tr>
<td>Canhui Wang, Fangjin Zhu, Qijia Zhang</td>
<td></td>
</tr>
<tr>
<td>A NOVEL ALGORITHM FOR PATTERN MATCHING WITH BACK REFERENCES</td>
<td>8</td>
</tr>
<tr>
<td>Liu Yang, Vinod Ganapathy, Pratyusa Manadhata, Ye Wu</td>
<td></td>
</tr>
<tr>
<td>LIFETIME MAXIMIZATION IN RECHARGEABLE WIRELESS SENSOR NETWORKS WITH CHARGING INTERFERENCE</td>
<td>16</td>
</tr>
<tr>
<td>Yi Qu, Ke Xu, Haiyang Wang, Dan Wang, Bo Wu</td>
<td></td>
</tr>
<tr>
<td>PRIVACY-PRESERVING MIN AND K-TH MIN COMPUTATIONS WITH FULLY HOMOMORPHIC ENCRYPTION</td>
<td>24</td>
</tr>
<tr>
<td>Bingbing Jiang, Yuan Zhang</td>
<td></td>
</tr>
</tbody>
</table>

## SESSION 2

<table>
<thead>
<tr>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPEEDSTREAM: A REAL-TIME STREAM DATA PROCESSING PLATFORM IN THE CLOUD</td>
<td>32</td>
</tr>
<tr>
<td>Li Zhao, Zhang Chuang, Xu Ke-Fu</td>
<td></td>
</tr>
<tr>
<td>EFFICIENT TV WHITE SPACE DATABASE CONSTRUCTION VIA SPECTRUM SENSING AND SPATIAL INFERENCE</td>
<td>42</td>
</tr>
<tr>
<td>Mengyun Tang, Ze Zheng, Guoru Ding, Zhen Xue</td>
<td></td>
</tr>
<tr>
<td>MINING FRIENDSHIPS THROUGH SPATIAL-TEMPORAL FEATURES IN MOBILE SOCIAL NETWORKS</td>
<td>47</td>
</tr>
<tr>
<td>Jianwei Niu, Danning Wang, Jie Lu</td>
<td></td>
</tr>
<tr>
<td>PARALLEL AND DISTRIBUTED NORMALIZATION OF SECURITY EVENTS FOR INSTANT ATTACK ANALYSIS</td>
<td>55</td>
</tr>
<tr>
<td>David Jaeger, Andrey Sapegin, Martin Ussath, Feng Cheng, Christoph Meinel</td>
<td></td>
</tr>
</tbody>
</table>

## SESSION 3

<table>
<thead>
<tr>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLASS-BASED DELTA-ENCODING FOR HIGH-SPEED TRAIN DATA STREAM</td>
<td>63</td>
</tr>
<tr>
<td>Yangxin Lin, Ping Wang, Jinlong Lin, Meng Ma, Ling Liu, Lin Ma</td>
<td></td>
</tr>
<tr>
<td>ON THE CHANNEL CAPACITY OF MIMO-RADAR-BASED COMMUNICATIONS</td>
<td>71</td>
</tr>
<tr>
<td>Renhui Xu, Laixian Peng, Wendong Zhao</td>
<td></td>
</tr>
<tr>
<td>NETWORK CODING BASED TRANSMISSION SCHEMES IN DTNS WITH GROUP MEETINGS</td>
<td>78</td>
</tr>
<tr>
<td>Abdurrahman Arikan, Yuexin Mao, Xiaolan Zhang, Bing Wang, Shengli Zhou, Song Han</td>
<td></td>
</tr>
</tbody>
</table>

## SESSION 4

<table>
<thead>
<tr>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDN-BASED TCP CONGESTION CONTROL IN DATA CENTER NETWORKS</td>
<td>86</td>
</tr>
<tr>
<td>Yifei Lu, Shuhong Zhu</td>
<td></td>
</tr>
<tr>
<td>BANDWIDTH GUARANTEED VIRTUAL NETWORK FUNCTION PLACEMENT AND SCALING IN DATACENTER N</td>
<td>93</td>
</tr>
<tr>
<td>Fangxin Wang, Rulin Ling, Jing Zhu, Dan Li</td>
<td></td>
</tr>
<tr>
<td>DYNAMIC FLOW CONSOLIDATION FOR ENERGY SAVINGS IN GREEN DCNS</td>
<td>101</td>
</tr>
<tr>
<td>Chao Zhu, Yu Xiao, Yong Cui, Zhenjie Yang, Shihan Xiao, Antti Yla-Juuski</td>
<td></td>
</tr>
<tr>
<td>TOWARDS SHORTER TASK COMPLETION TIME IN DATACENTER NETWORKS</td>
<td>109</td>
</tr>
<tr>
<td>Yuchao Zhang, Ke Xu, Haiyong Wang, Meng Shen</td>
<td></td>
</tr>
</tbody>
</table>
SESSION 5

OMO: OPTIMIZE MAPREDUCE OVERLAP WITH A GOOD START (REDUCE) AND A GOOD FINISH (MAP) ................................................................. 117
Jiayin Wang, Yi Yao, Ying Mao, Bo Sheng, Ningfang Mi

TOWARDS ADAPTIVE ELASTIC DISTRIBUTED SOFTWARE DEFINED NETWORKING ......................................................... 125
Yanyu Chen, Qing Li, Yuan Yang, Qi Li, Yong Jiang, Xi Xiao

PIROGUE, A LIGHTER DYNAMIC VERSION OF THE RAFT DISTRIBUTED CONSENSUS ALGORITHM .......................................................... 133
Jehan-Francois Paris, Darrell D. E. Long

SESSION 6

DETECT AND ANALYZE LARGE-SCALE BGP EVENTS BY BI-CLUSTERING UPDATE VISIBILITY MATRIX ............................................................... 157
Meng Chen, Mingwei Xu, Qing Li, Xirui Song, Yuan Yang

BUILDING SMARTPHONE AD-HOC NETWORKS WITH LONG-RANGE RADIOS ............................................................... 165
Ying Mao, Jiayin Wang, Bo Sheng, Fan Wu

SCALABLE NAME-BASED INTER-DOMAIN ROUTING FOR INFORMATION-CENTRIC NETWORKS ............................................................. 173
Sangmun Kim, Zhenhai Duan, Fernando Sanchez

RAPIT: RTT-AWARE PENDING INTEREST TABLE FOR CONTENT CENTRIC NETWORKING ............................................................. 181
Yalei Tan, Qing Li, Yong Jiang, Shutao Xia

TRAFFIC-AWARE NETWORKING FOR VIDEO STREAMING SERVICE USING SDN ............................................................. 189
Calvin Hue, Yu-Jia Chen, Li-Chun Wang

SESSION 7

ON STOCHASTIC OPTIMAL BIDDING STRATEGY FOR MICROGRIDS ................................................................. 194
Qingyu Yang, Dou An, Wei Yu, Xinyu Yang, Xinwen Fu

SENSOR PLACEMENT BASED ON DELAUNAY TRIANGULATION FOR COMPLETE CONFIDENT INFORMATION COVERAGE IN AN AREA WITH OBSTACLES ................................................................. 202
Lu Dai, Bang Wang

DEFENDING AGAINST ENERGY DISPATCHING DATA INTEGRITY ATTACKS IN SMART GRID ................................................................. 210
Xiaofei He, Xinyu Yang, Jie Lin, Linqiang Ge, Wei Yu, Qingyu Yang

POWER-FREE STRUCTURAL HEALTH MONITORING VIA COMPRESSIVE SENSING ................................................................. 218
Ju-Min Zhao, Ding Feng, Deng-Ao Li

DISTRIBUTED LOAD SCHEDULING IN SMART COMMUNITY WITH CAPACITY CONSTRAINED LOCAL POWER SUPPLIER ................................................................. 226
Nuo Yu, Lan Mu, Yuting Miao, Hejiiao Huang, Hongwei Du, Xiaohua Jia

SESSION 8

PERFORMANCE ANALYSIS OF A CLOUD SYSTEM ................................................................. 234
Xiwei Qiu, Peng Sun, Xiao Guo, Yanping Xiang

HOW GREEN ARE CLOUD PATTERNS? ................................................................. 240
S. Amirhossein Abtahizadeh, Foutse Khomh, Yann-Gael Guicheneuc

VIRTUAL MACHINE PLACEMENT BASED ON THE VM PERFORMANCE MODELS IN CLOUD ................................................................. 248
Hui Zhao, Qinghua Zheng, Weizhan Zhang, Yuxuan Chen, Yunhui Huang
MINIMIZING RESPONSE LATENCY VIA EFFICIENT VIRTUAL MACHINE PLACEMENT IN CLOUD SYSTEMS ................................................................. 256
Hou Deng, Liusheng Huang, Chenkai Yang, Hongli Xu, Bing Leng

A CUSTOMIZABLE MAPREDUCE FRAMEWORK FOR COMPLEX DATA-INTENSIVE WORKFLOWS ON GPUS .................................................. 264
Zhi Qiao, Shuwen Liang, Hai Jiang, Song Fu

SESSION 9

ENERGY COST MINIMIZATION VIA INTELLIGENT TEMPORAL AND SPATIAL RESOURCE ALLOCATION IN GREEN HETEROGENEOUS CELLULAR NETWORKS ............................................................. 272
Qiang Yang, Bang Wang

COMPARATIVE ANALYSIS OF BIG DATA TRANSFER PROTOCOLS IN AN INTERNATIONAL HIGH-SPEED NETWORK ........................................... 280
Se-Young Yu, Nevl Brownlee, Aniket Mahanti

TOWARDS CONTROLLER PLACEMENT FOR ROBUST SOFTWARE-DEFINED NETWORKS .......................................................... 289
Sheng Guo, Shu Yang, Qi Li, Yong Jiang

ON SECURE SHARED KEY ESTABLISHMENT FOR MOBILE DEVICES USING CONTEXTUAL INFORMATION ........................................ 297
Ala Altaweel, Radu Stoleru, Subhajit Mandal

SESSION 10

CHARGING YOUR SMARTPHONES ON PUBLIC COMMUTERS VIA WIRELESS ENERGY TRANSFER .......................................................... 307
Wenzheng Xu, Weijia Liang, Su Hu, Xiaola Lin, Jian Peng

EFFICIENT RSS MEASUREMENT IN WIRELESS NETWORKS BASED ON COMPRESSIVE SENSING ...................................................... 315
Yanchao Zhao, Wenzhong Li, Jie Wu, Songlu Lu

ON THE COEXISTENCE OF 802.11 AND 802.15.4 NETWORKS WITH DELAY CONSTRAINTS .......................................................... 323
Wei Zhang, Mahima A. Suresh, Yukun Zhao, Raghavan S. Veerav, Radu Stoleru

STOCHASTIC DUTY CYCLING FOR HETEROGENEOUS ENERGY HARVESTING NETWORKS .......................................................... 331
Jianhui Zhang, Mengmeng Wang, Zhi Li

TRAFFIC CONDITION ESTIMATION USING VEHICULAR CROWDSENSING DATA .......................................................... 340
Lu Shao, Cheng Wang, Zhong Li, Changjun Jiang

SESSION 11

ON BALANCING THE ENERGY CONSUMPTION OF ROUTING PROTOCOLS FOR OPPORTUNISTIC SOCIAL NETWORKS ......................... 348
Chen Yang, Radu Stoleru

ADAPTIVE PARTIAL FREQUENCY REUSE IN LTE-ADVANCED RELAY NETWORKS .......................................................... 357
Chen Sun, Jian Shi, Wei Zheng, Zhiliang Yang, Xiaojun Wang

OPTIMUM REFERENCE NODE DEPLOYMENT FOR INDOOR LOCALIZATION BASED ON THE AVERAGE MEAN SQUARE ERROR MINIMIZATION ..................... 365
Fei Long, Aydin Behnad, Xianbin Wang

NETWORK PERFORMANCE ISOLATION SCHEME FOR QOE IN A MOBILE DEVICE .......................................................... 371
Woonghee Lee, Hyunsoo Kim, Joon Yeop Lee, Albert Yongjoon Chung, Yong Seok Park, Hwangnam Kim

NETWORK INTRUSION DETECTION AND PREVENTION MIDDLEBOX MANAGEMENT IN SDN .......................................................... 379
Wen Wang, Wenbo He, Jinshu Su

SESSION 12

PATHA: PERFORMANCE ANALYSIS TOOL FOR HPC APPLICATIONS .......................................................... 387
Wucherl Yoo, Michelle Koo, Yi Cao, Alex Sim, Peter Nugent, Kesheng Wu
ENERGY-EFFICIENT, DELAY-AWARE PACKET SCHEDULING IN HIGH-SPEED
NETWORKS ................................................................. 395
Qun Yu, Taieb Znati, Wang Yang

SPATIO-TEMPORAL TENSOR COMPLETION FOR IMPUTING MISSING INTERNET
TRAFFIC DATA ............................................................ 403
Huibin Zhou, Dafang Zhang, Kwan Xie, Yuxiang Chen

ATLAS: AN ADAPTIVE FAILURE-AWARE SCHEDULER FOR HADOOP .................................................. 410
Mbarka Souldia, Foutse Khomh, Sofiene Tahar

SCALASEM: SCALABLE VALIDATION OF SDN DESIGN WITH DEPLOYABLE CODE .......................... 418
Nan Zhu, Wenbo He

SESSION 13

NARROWING DOWN THE DEBUGGING SPACE OF SLOW SEARCH RESPONSE TIME ................. 426
Dapeng Liu, Youjian Zhao, Dan Pei, Chengbin Quan, Qingqian Tao, Pei Wang, Xiyang Chen, Dai Tan, Xiaowei Jing, Mei Feng

PRICING AND REVENUE SHARING IN SECONDARY MARKET OF MOBILE
INTERNET ACCESS ......................................................... 427
Hengky Susanto, Benyuan Liu, Byunguk Kim, Honggang Zhang, Xinwen Fu

INCREMENTAL DEPLOYMENT FOR TRAFFIC ENGINEERING IN HYBRID SDN NETWORK .............. 435
Yingya Guo, Zhiliang Wang, Xia Yin, Xingang Shi, Jianping Wu, Han Zhang

COMPLETE FONT GENERATION OF CHINESE CHARACTERS IN PERSONAL
HANDWRITING STYLE ........................................................ 443
Jeng-Wei Lin, Chian-Ya Hong, Ray-I Chang, Yu-Chen Wang, Shu-Yu Lin, Jan-Ming Ho

LEARNING THRESHOLDS FOR PV CHANGE DETECTION FROM OPERATORS’ LABELS .................... 448
Dapeng Liu, Youjian Zhao, Kaixin Sui, Shiwen Cheng, Dan Pei, Chengbin Quan, Jiao Luo, Xiaowei Jing, Mei Feng

SESSION 14

INTEGRATED CACHING AND TIERING ACCORDING TO USE AND QOS REQUIREMENTS ................. 457
Mark Abashkin, Assaf Natanzon, Eitan Bachmat

P ASSI: A PARALLEL, RELIABLE AND SCALABLE STORAGE SOFTWARE
INFRASTRUCTURE FOR ACTIVE STORAGE SYSTEM AND I/O ENVIRONMENTS ................................. 465
Hsing-Bung Chen, Song Fu

P-CLS: A POPULARITY-DRIVEN CACHING LOCATION AND SEARCHING SCHEME IN
CONTENT CENTRIC NETWORKING ........................................ 473
Yuemei Xu, Shuai Ma, Yang Li, Fu Chen, Song Ci

WALLOC: AN EFFICIENT WEAR-AWARE ALLOCATOR FOR NON-VOLATILE MAIN
MEMORY ................................................................. 481
Songping Yu, Nong Xiao, Mingzhu Deng, Yuxuan Xing, Fang Liu, Zhiping Cai, Wei Chen

SESSION 15

A GOODPUT DISTRIBUTION MODEL FOR IEEE 802.11 WIRELESS MESH NETWORKS ......................... 489
Ying Qu, Bryan Ng, Winston K. G. Seah

NEW TIGHT UPPER BOUNDS ON THE CAPACITY FOR GENERAL DETERMINISTIC
DISSEMINATION IN WIRELESS AD HOC NETWORKS .......................................................... 497
Cheng Wang, Jieren Zhou, Tianci Liu, Lu Shao, Huiya Yan

SESSION 16

REDUCING INTER-TASK INTERFERENCE DELAY BY OPTIMIZING BANK-TO-CORE
MAPPING* ........................................................................ 505
Jizan Zhang, Zhimin Gu, Mingquan Zhang
AN EFFECTIVE SERVICE DISCOVERY APPROACH BASED ON FIELD THEORY AND CONTRIBUTION DEGREE IN UNSTRUCTURED P2P NETWORKS ......................................................... 621
Wanchun Yang, Chenxi Zhang, Jiangfeng Li

MEASURING THE INTERNET ROUTING SCALABILITY FROM THE PERSPECTIVE OF ADDRESS ALLOCATION ......................................................................................................................... 623
Dan Wu, Zhiliang Wang, Xia Yin, Xingang Shi, Jianping Wu

LATENCY-AWARE ROUTING WITH BANDWIDTH ASSIGNMENT FOR SOFTWARE DEFINED NETWORKS .......................................................................................................................... 625
Qiongyu Zhang, Liehuang Zhu, Meng Shen, Mingzhong Wang, Fan Li

AN ASIP BASED PHYSICAL LAYER VIRTUALIZATION METHOD OF CENTRALIZED RADIO ACCESS NETWORK ................................................................................................................ 627
Fang Xiao, Yiqing Zhou, Shan Huang, Jiangnan Lin, Lin Liu

BLIND IDENTIFICATION OF HELICAL INTERLEAVING OF THE FIRST TYPE .............................................................................................................................. 631
Li Huang, Wengu Chen, Hong Chen

A DOMINATING-SET-BASED AND POPULARITY-DRIVEN CACHING SCHEME IN EDGE CCN ........................................................................................................................... 633
Weiyuan Li, Yang Li, Wei Wang, Yonghui Xin, Tao Lin

CHARACTERIZING I/O WORKLOADS OF HPC APPLICATIONS THROUGH ONLINE ANALYSIS ....................................................................................................................... 635
Wenrui Dong, Guangming Liu, Jie Yu, You Zuo

REDUCING THE READ LATENCY OF IN-LINE DEDUPLICATION FILE SYSTEM ................................................................. 637
Yongtao Zhou, Yuhui Deng, Yan Li, Junjie Xie

MINIMIZING ENERGY COST FOR GREEN CLOUD DATA CENTERS BY USING ESDS .............................................................................................................................. 639
Chonglin Gu, Lingmin Zhang, Zhixiang He, Heijiao Huang, Xiaohua Jia

Author Index