KuVS Newsletter

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Editor Message

Sehr geehrte KuVS Mitglieder,

wir möchten Sie recht herzlich zur sechsten Ausgabe des KuVS Newsletters begrüßen. Nach den ersten fünf Newslettern haben wir zahlreiche positive Rückmeldungen und weitere interessante Beiträge für den neuen Newsletter erhalten. In diesem Rahmen möchten wir sowohl über aktuelle Geschehnisse der Fachgruppe, als auch deren Mitglieder berichten. Hierzu zählen insbesondere Geschäftsberichte der Fachgruppe, Neuigkeiten aus den Arbeitsgruppen (Promotionen, Auszeichnungen, Stellenbewegungen, offene Stellen), Projektberichte, sowie Veranstaltungsberichte und Calls. Der Newsletter ist zur Zeit auf ein halbjährliches Erscheinen ausgerichtet. Die nächste Ausgabe erscheint im Juni des nächsten Jahres.

Weitere Informationen und Newsletter finden Sie unter https://www.kuvs.de/newsletter/. In der aktuellen Ausgabe finden Sie Berichte zu der "Crowdsouring and Internet of Things" Summer School, der 15. Fachtagung des ITG Fachausschusses 5.2 Kommunikationsnetze und -systeme "Zukunft der Netze", einer Exkursion zum Internetknotenpunkt "DE-CIX", sowie zu dem neuen Competence Centre on Cognitive Products and Production Systems beyond Industrie 4.0 "Pro^{2}Future". Ferner finden Sie Calls zu dem International Teletraffic Congress ITC 30, dem 17th Annual Mediterranean Ad Hoc Networking Workshop sowie dem ACM SIGCOMM 2018 First Workshop on Security in Softwarized Networks: Prospects and Challenges (SecSoN), und einem IEEE JSAC Special Issue zu SDN. Diesmal haben wir ferner die Gelegenheit sehr viele abgeschlossene Promotionen Ihnen vorstellen zu können. Der Newsletter beinhaltet weiterhin Ausschreibungen zu offenen Stellen, Ankündigungen und kommenden Veranstaltungen. Einreichungen für den nächsten Newsletter sind herzlich erbeten.

Wir wünschen viel Spaß bei der Lektüre des vorliegenden Newsletters.

Ihre Newsletter Editoren,

Kalman Graffi
Heinrich-Heine-Universität Düsseldorf

Oliver Hohlfeld
RWTH Aachen

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Fachgruppe KuVS

Neues aus den Arbeitsgruppen

Awards und Preise

- Wael Alkhatib, Leon Alexander Herrmann und Christoph Rensing haben den Best Paper Award der KEOD (9th International Conference on Knowledge Engineering and Ontology Development) 2017 gewonnen. Der Titel des Papers lautet: "Onto.KOM Towards a Minmally Supervised ONtology Learning System based on Word Embedding and Convolutional Neural Networks".

- Martin Henze (COMSYS, RWTH Aachen) wurde für seine Beiträge zum Bereich Information & Communication Technology von der RWTH Aachen mit dem ICT Young Researcher Award ausgezeichnet.

- Das SIGSIM-PADS paper "Automated Memoization for Parameter Studies Implemented in Impure Languages" von Mirko Stoffers, Daniel Schemmel, Oscar Soria Dustmann und Klaus Wehrle wurde als einer von 231 Artikeln für die ACM's 21st Annual Best of Computing Serie ausgewält.

- Auf der dritten IEEE Conference on Network Softwarization (NetSoft) 2017 in Bologna wurde dem Team um Stefan Geißler, Stefan Herrnleben, Robert Bauer, Steffen Gebert, Thomas Zinner sowie Michael Jarschel der Best Student Paper Award verliehen.

- Das Paper "Mission Accomplished? HTTP Security After DigiNotar" von Johanna Amann, Oliver Gasser, Quirin Scheitle, Lexi Brent, Georg Carle und Ralph Holz wurde mit dem Community Contribution Award der ACM SIGCOMM Internet Measurement Conference (IMC'17) ausgezeichnet.

- Der Open Source Packet Generator "MoonGen" der TU München wurde von der Internet Research Task Force (IRTF) mit dem Applied Networking Research Prize ausgezeichnet.

- Auf der Network Traffic Measurement and Analysis (TMA) Konferenz wurden die Arbeit "Push Away Your Privacy: Precise User Tracking Based on TLS Client Certificate Authentication" von Matthias Wachs, Quirin Scheitle und Georg Carle mit dem Best Paper Award ausgezeichnet. Ebenfalls wurde die Arbeit "HLOC: Hints-Based Geolocation Leveraging Multiple Measurement Frameworks" von Quirin Scheitle, Oliver Gasser, Patrick Sattler und Georg Carle mit dem Best Dataset Award ausgezeichnet.

- Die Arbeit "Multi-User-Centric Virtual Cell Operation for V2X Communications in 5G Networks" von Taylan Sahin, Markus Klügel, Cahn Zhou und Wolfgang Kellerer wurde auf der IEEE CSCN 2017 mit dem Best Paper Award ausgezeichnet.

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Personalia

- PD Dr. Thomas Zinner (Akademischer Rat auf Zeit, Lehrstuhl für Informatik III (Kommunikationsnetze) Julius-Maximilians-Universität Würzburg) habilitierte sich am 17. Oktober 2017 zum Thema "Performance Evaluation of Novel Network and Application Paradigms and Management Approaches". Ihm wurde mit Wirkung vom 28.11.2017 die Lehrbefugnis an der Universität Würzburg für das Fachgebiet "Informatik" erteilt.

3.1 Stellenausschreibungen

Auf den folgenden Seiten finden Sie aktuelle Stellenausschreibungen.

Fog Computing for Robotics and Industrial Automation

Looking for job in the industry or academia?
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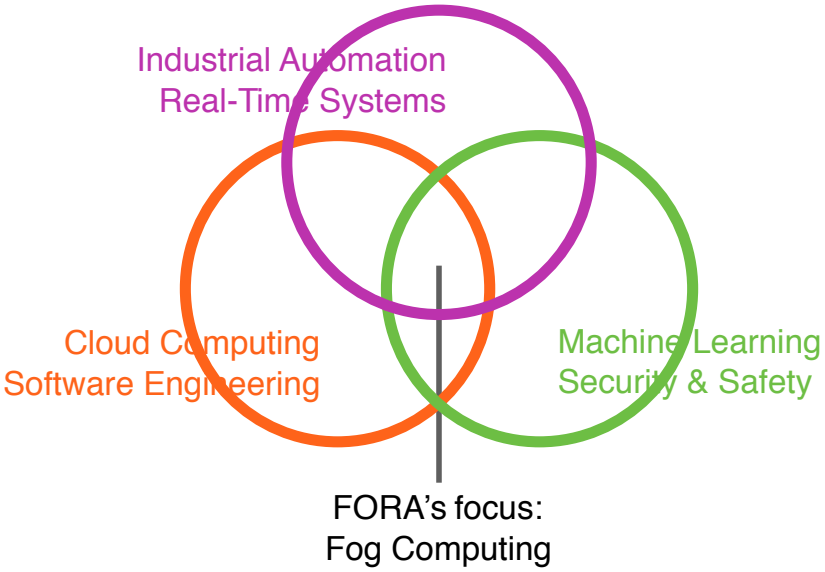

Partners: Denmark—Technical University of Denmark, **Austria**—Vienna University of Technology, TTTech Computertechnik AG, **Sweden**—Mälardalen University, ABB, **Germany**—Technical University of Kaiserslautern, SYSGO.

Associated partner in Silicon Valley, USA: CISCO Systems

Great community, training, summer schools, visits
State-of-the-art research topics relevant for Industry 4.0
Competitive salaries and a PhD from partner universities

This project has received funding from the European Union's Horizon 2020 research and innovation program under the Marie Sklodowska-Curie grant agreement No 764785

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Projektberichte

4.1 Pro²Future – New Austrian Competence Centre on Cognitive Products and Production Systems beyond Industrie 4.0

Pro²Future a new research company of Johannes Kepler University Linz, Graz University of Technology, PROFACTOR GmbH, AVL List GmbH and FRONIUS International GmbH, is dedicated to research in the field of industrial ICT, with special regard on the development of cognitive products and cognitive production systems: in particular, we will focus on the communication and interaction of these cognitive systems, their functional integration, and security aspects along the product lifecycle. Our research efforts are carried out in close collaboration with scientific partners and companies as one of our central objectives is to scientifically support enterprises in their digitalization efforts. Research results from the centre will not only be provided to the partners of the centre, but also to the broader economy, the international scientific community, and to society as a whole. Pro²Future is seeking international research co-operations, for instance in the scope of joint EU projects where we can directly participate as a scientific partner, and we invite applications by Pre-Doc and Post-Doc researchers who are interested in conducting visionary yet practically relevant research beyond Industrie 4.0.

Pro²Future

http://www.pro2future.at

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Calls und Berichte zu Veranstaltungen

5.1 Report on "Crowdsouring and Internet of Things" Summer School

Matthias Hirth, Tobias Hoßfeld
University of Würzburg, University of Duisburg-Essen

Crowdsourcing has become a valuable tool for subjective evaluation as it enables an easy and cost effective access to a large number of diverse users. However, for years the main focus of those evaluation lay on web-based application for PCs or laptops. On the contrary, crowdsensing and some citizen science approaches already use the potential of the increasing number of mobile users, but mainly focus on collecting sensory data from smart devices.

The funded summer school "Crowdsourcing and Internet of Things" (http://iotcrowd.org) held from July 31 to August 4th 2017 in Würzburg focused on combining objective measurement data from mobile sensors, like smart devices or Internet of Things devices, and subjective ratings. This enables for example assessing environmental factors in Quality of Experience studies or adding context information to sensor data measurements.

The program of the summer school included lectures and hands-on sessions from national and international experts from academia and industry. The topics covered general introductions in the research areas of crowdsourcing and mobile sensing, best practices for subjective assessments, and the statistical evaluation of measurements and subjective user studies (http://iotcrowd.org/lectures/).

The summer school attracted 17 participants. While the majority of the participants was associated with German research institutes, there were also participants from France, Czech Republic, Romania, Italy, and Peru (http://iotcrowd.org/participants/). Besides the active participation in the lectures and the hands-on sessions, many participants contributed to the poster session that was also well anticipated by external visitors. The poster session together with the one-minute madness on the first day, helped the participants go gain an overview of each other's research interests and fostered ongoing discussions during the whole summer school. To additionally foster long term collaboration among the participants, working groups where formed with the aim to identify a joint research question during the summer school and tackle it in the following months.

The summer school was organized by Matthias Hirth (University of Würzburg) and Tobias Hoßfeld (University of Duisburg-Essen), financially sponsored by BMBF (01PL16019), technically sponsored by the GI/ITG Technical Committee on "Measurement, Modelling and Evaluation of Computing Systems (MMB)" and supported by Microworkers.com.

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5.2 Bericht über die 15. Fachtagung des ITG Fachausschusses 5.2 Kommunikationsnetze und -systeme: "Zukunft der Netze" (ZdN 2017)

Horst Hellbrück
Fachhochschule Lübeck

Die 15. Fachtagung des ITG Fachausschusses 5.2 Kommunikationsnetze und -systeme "Zukunft der Netze" (ZdN 2017) fand am 28. und 29. September 2017 in der Handwerkskammer zu Lübeck statt. Ein Workshop zu "Smart Cities" bildete den Auftakt zur Fachtagung. Lokaler Organisator der Veranstaltung, die von 60 Teilnehmern besuchte wurde, war das Kompetenzzentrum CoSA des Fachbereichs Elektrotechnik und Informatik der Fachhochschule Lübeck.

Am Vortag zur Fachtagung fand ein gemeinsamer Workshop aller Fachgruppen zu Smart Cities statt. Dieser wurde von Michael Menth (Universität Tübingen), Andreas Timm-Giel (TU Hamburg-Harburg), Mathias Pelka (Fachhochschule Lübeck) und Tobias Hoßfeld (Universität Duisburg-Essen) vorbereitet und durchgeführt. Der sehr gut besuchte Workshop mit den Schwerpunkten Anwendungen und "Internet of Things" bot einen guten Überblick über die Aktivitäten der Fachgruppen. Nach den Vorträgen aus dem akademischen und industriellen Umfeld mit anschließenden Diskussionen wurde der Tag mit einer historischen Stadtführung durch die Altstadt von Lübeck sowie einem anschließenden gemeinsamen Abendessen im Restaurant Schabbelhaus zu Lübeck abgeschlossen.

Die Fachtagung am Folgetag behandelte die Themen Medizintechnik, Security, Automotive, 5G und Industrie 4.0, zu welchen geladene Experten aus Wissenschaft und Wirtschaft über aktuelle Forschungstrends referierten. Eine Poster-Lightning-Session mit anschließenden Poster-Vorträgen inmitten der Fachtagung gaben einen guten Überblick über aktuelle Forschungsansätze und -projekte.

Einblicke in die 15. ITG Fachtagung "Zukunft der Netze" in Lübeck.
(Foto: Fachhochschule Lübeck)

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Die Fachvorträge starteten mit dem Vortrag “A new Paradigm for Networking Infrastructure in Healthcare” von Christian Korff (Cisco Deutschland), in welchem aktuelle Trends der Miniaturisierung im Licht von Software Defined Networking (SDN) für Datennetze beleuchtet wurden. Im Themenkomplex Security begann Manfred Schäfer (Nokia Bell Labs) mit dem Vortrag “Security Policy driven Security Management and Orchestration for distributed Cloud Services”, der ein Framework für verteilte Cloud-Dienste vorstellte. Michael Menth (Universität Tübingen) stellte in seinem Vortrag „Security Advances in the bwNET100G+ Project“ den aktuellen Stand des Projekts bwNET100G+ und die Sicherheitsaspekte vor.

In der Sitzung Automotive referierte Ralf Irmer (Vodafone Germany) über den Wandel und die Herausforderungen des autonomen Fahrens mit seinem Vortrag „Vernetztes und Autonomes Fahren und Testfelder an der A9 und in urbanen Zentren“. Stephan Berg (Deutsche Telekom) zeigte mit “Cooperative driving requires wireless networks” den Nutzen und die Notwendigkeit von robusten und mobilen Netzen beim autonomen Fahren. Das Thema 5G wurde mit dem Vortrag von „5G Readyness der Netze“ von Thomas Weidlich (Vodafone Germany) eröffnet, in welchem technologische Aspekte für die Einführung von 5G diskutiert wurden. Der Vortrag “5G From Vision to Reality” von Michael Meyer (Ericsson Germany) gab einen Ausblick zu 5G mit zukünftigen Anwendungen.

Cyber-Physical Systems und Smart Products wurden von Alexander Fay (HSU Hamburg) in seinem Vortrag “Industrie 4.0 – Chancen durch Vernetzung” für Anwendungen in der Industrie 4.0 thematisiert. Mit dem Vortrag “Funksystem für industrielle Anwendungen – HiFlecs” von Frank Bittner (Universität Bremen) wurden abschließend technische Aspekte beim Einsatz von Funksystemen im industriellen Umfeld dargestellt.

Die Tagung endete mit den Schlussworten von Tagungsleiter Prof. Dr.-Ing. Horst Hellbrück und seinem herzlichen Dank an den Programmausschuss der Tagung, des Workshops, der Teilnehmer, allen Referenten und dem Fachausschuss für die hervorragende Arbeit. Ein besonderer Dank gilt auch dem Team vom Kompetenzzentrum CoSA (Kommunikation – Systeme – Anwendungen) der Fachhochschule Lübeck. Die nächste Fachtagung “Zukunft der Netze” ist im März 2019 an der TU München anvisiert.

Präsentationen der ZdN 2017 und des Workshops sind online verfügbar unter: http://www.vde-itg-kommunikationsnetze.de/veranstaltungen/zukunft-der-netze-2017.html

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5.3 Eine Exkursion in das "Mekka des Europäischen Internets"

Oliver Hohlfeld
RWTH Aachen University

Im Rahmen der Lehrveranstaltung "Internet Architecture and Performance" an der RWTH Aachen führten 42 Teilnehmer am 8. Juni 2017 eine Exkursion zum Internetknotenpunkt "DE-CIX" (Deutscher Commercial Internet Exchange) nach Frankfurt am Main durch. Als weltweit größter Internet Exchange Point (IXP) mit derzeit in der Spitze über 6 Tbit/s Verkehrsaufkommen erwarteten die Teilnehmer Informationen aus erster Hand. Gegründet 1995, um die ersten lokalen Verbindungen (peering) zwischen deutschen Internetanbietern außerhalb der USA zu realisieren, verbindet der DE-CIX allein in Frankfurt[1] heute bereits 792 Netze (ASe) verschiedener Anbieter und verteilt sich über mehrere Standorte des Frankfurter Stadtgebiets. Zusätzlicher Datenaustausch weiterer Internetanbieter machen Frankfurt zu einem der größten europäischen Umschlagplätze für Internetverkehr, weshalb die Stadt manchmal auch als das "Mekka" des europäischen Internets bezeichnet wird – ein interessantes Exkursionsziel also.

Das Grundwissen über die Funktionsweise eines Internetknotenpunktes (IXP) und das Geschäftsfeld des Datentransports im Internet wurde bereits zuvor in der Lehrveranstaltung vermittelt. Zur Vorbereitung eines interessanten Austauschs fertigten die Studierenden Motivationsschreiben inkl. Fragen an die Exkursion bzw. den DE-CIX an, die gleichzeitig über die Vergabe der limitierten Plätze entschieden. Die Motivationsschreiben zeugten durchweg von einer tiefen Beschäftigung mit der Thematik IXP und Peering, die erfreulicherweise deutlich über den behandelten Vorlesungsinhalt hinaus ging. Die daraus ersichtliche Begeisterung der Studierenden für das Thema freute sowohl mich als Lehrenden und Organisator, als auch die Mitarbeiter des DE-CIX, mit denen die Motivationsschreiben und die darin enthaltenen Fragen zur Vorbereitung der Exkursion ausgetauscht und besprochen wurden.

Die Fragen der Studierenden wurden im Programm der, am 8. Juni von Aachen aus startenden, Exkursion aufgegriffen. In Frankfurt angekommen empfing uns Forschungsleiter Christoph

[1] Neben Frankfurt betreibt der DE-CIX IXPs in New York, Dallas, Madrid, Dubai, Marseille, Hamburg, München, Düsseldorf, Istanbul, Palermo und Mumbai.

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Vortragsprogramm

Diskussionen

Dietzel und startete mit der generellen Vorstellung des DE-CIX in seiner Funktion und Rolle als weltweit agierender Internetknotenpunkt (IXP). Sehr dankbar waren wir, dass sich neben dem Forschungsleiter auch Vertriebsleiter Andreas Sturm Zeit genommen hat, um praxisnah aus dem Nähkästchen zu plaudern, was es denn bedeutet, Internetkonnektivität zu verkaufen und wie die Ökonomie des Datentransports im Internet in der Praxis funktioniert. Die zusätzliche Vorstellung aktueller Forschungsprojekte des DE-CIX vermittelte den Studierenden außerdem die forschungstechnische Relevanz eines IXPs. Die Studierenden erhielten hierbei Einblick in Forschungsergebnisse zur Unterbindung von (D)DoS Angriffen mittels BGP-Blackholing, sowie Untersuchungen zu Infrastruktur-Ausfällen, die der Wissenschaftsgemeinde später auf der ACM IMC im November 2017 ("Inferring BGP Blackholing Activity in the Internet") und ACM SIGCOMM im August 2017 ("Detecting Peering Infrastructure Outages in the Wild") präsentiert wurden. Außerdem stellte Christoph aktuelle Infrastrukturprojekte des DE-CIX vor, sowie zukünftige Optimierungsbestrebungen, beispielsweise durch besser skalierbare BGP Route Server. Die Präsentationen waren hierbei interaktiv ausgelegt und boten genügend Gelegenheit zur Diskussion der vorbereiteten Fragen. Darüber hinaus konnten die Studierenden in den Pausen mit den Mitarbeitern des DE-CIX diskutieren und somit direkten Einblick in deren beruflichen Alltag erhalten. Wir möchten uns daher recht herzlich beim Team des DE-CIX für die Möglichkeit der Exkursion, sowie deren Vorbereitung und Durchführung bedanken.

Abschließend denke ich, dass der Aufwand in jeglicher Hinsicht lohneswert war. Der praktische Einblick in die – vorher überwiegend unbekannte – Welt des Geschäfts mit dem Datentransport im Internet war für die Teilnehmer besonders spannend. Durch die persönlichen Gespräche mit den DE-CIX Mitarbeitern gelangen den Teilnehmern neue Einblick in ein berufliches Umfeld – für das sie sich mit ihrem Studium (nach ihrer anfänglichen Einschätzung unerwartet) gut vorbereitet fühlen. Äußerst erfreulich war insgesamt das große Interesse der Studierenden und deren rege Beteiligung. Exkursionen stellen daher eine gute Praxisergänzung in der Lehre da, die in der Informatik leider zu selten Anwendung findet.

5.4 Calls

Auf den folgenden Seiten finden Sie aktuelle Calls.

International Teletraffic Congress ITC 30

September 3-7, 2018 – Vienna, Austria

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General Chairs:
Peter Reichl, University of Vienna, Austria
Tobias Hossfeld, University of Duisburg-Essen, Germany

Technical Program Committee Chairs:
Giuseppe Bianchi, University of Rome Tor Vergata, Italy
Thomas Zinner, University of Würzburg, Germany
Eitan Altman, INRIA Sophia-Antipolis, France

Technical Program Areas Co-Chairs:
Area 1: Sem Borst, TU Eindhoven, The Netherlands
Markus Fiedler, BTH Karlskrona, Sweden
Bruno Tuffin, INRIA Rennes, France
Area 2: Oliver Hohlfeld, RWTH Aachen, Germany
Fabián Bustamante, Northwestern University, USA
David Malone, Hamilton Institute, Ireland
Area 3: Andreas Kassler, University of Karlstad, Sweden
Stefano Secchi, LIP6 Paris, France
Roberto Bifulco, NEC, Germany
Area 4: Steven Latre, University of Antwerp, Belgium
Albert Banchs, UC3 Madrid, Spain
Shiwen Mao, Auburn University, USA

Demo and Poster Chair:
Michael Jarschel, Nokia, Munich, Germany
Corinna Schmitt, University of Zurich, Switzerland

Workshop Chairs:
Chiara Buratti, University of Bologna, Italy
Poul E. Heegaard, NTNU Trondheim, Norway

Publicity Chairs:
Pedro Casas, AIT Vienna, Austria
Frank Restuccia, Northeastern University, Boston, USA
Sheng Zhou, Tsinghua University, China

Publication Chairs:
Lea Skorin-Kapov, University of Zagreb, Croatia
Matthias Hirth, University of Würzburg, Germany

Industry Panel Chair:
Nikhil Jain, Qualcomm Technologies, USA

Awards Chair:
Ravi R. Mazumdar, University of Waterloo, Canada

International Advisory Council Chair:
Michela Meo, Politecnico di Torino, Italy

Local Arrangements:
COSY Research Group, University of Vienna, Austria

Important Dates:
March 1, 2018: Paper registration
March 8, 2018: Submission deadline
May 8, 2018: Expected notification date
June 1, 2018: Camera-ready copy deadline
Sept 3-7, 2018: Conference date

Further information:
http://itc30.org

Local contact:
itc30@cs.univie.ac.at

Preliminary Call for Papers

ITC 30: Teletraffic in a Smart World

The INTERNATIONAL TELETRAFFIC CONGRESS ITC 30, to be held September 3-7, 2018, at the University of Vienna, Austria, is the 30th edition of this international flagship congress in the field of networking science and practice.

ITC was founded back in 1955 by enthusiastic scientists and engineers who were willing to deploy networks in a holistic way. Since then, it has established a multi-decade tradition as the primary forum for presenting and discussing the latest technical advances in the broad areas of teletraffic models, network systems, and measurements.

For ITC 30, cutting-edge papers spanning both theory and experimentation are solicited in all areas of networking, ranging from traffic engineering and control with application also to emerging softwarized/virtualized network paradigms, up to innovative wireless scenarios brought about by the emergence of 5G and IoT systems. We especially encourage original contributions which bridge the gap between performance modeling and real-life operational aspects, including works which leverage measurement data to provide a better understanding of the wired and wireless networks' operation under realistic conditions.

ITC 30 is specifically organized into four (partially overlapping) areas (for a more detailed track description please refer to the conference website):

(1) Performance Evaluation, Control and Optimization,
(2) Network Measurements and Big Data,
(3) Networking Architectures and Paradigms
(4) Wireless and Cellular Networks.

Full papers must contain original work currently not under review for other journals or conferences pages in A4 2-column IEEE conference style, and should be submitted electronically using the EDAS online submission system. All accepted papers must be presented at the conference by one of the authors. Selected papers may be subject to publication in extended form in a special journal issue.

ITC 30 has set up several prestigious awards, including a Best Paper Award and a Best Student Paper Award. These awards are based both on the scientific quality of the paper and the quality of the oral presentation. Moreover, several Student Travel Grants will be available.

In addition, the congress will also host associated workshops as well as exciting social events, including

- City Tour, Reception and Opera Recital on Sept 4, Palais Eschenbach
- Mayor's Reception and Gala Dinner on Sept 5, Vienna City Hall

Looking forward very much to welcoming you at ITC-30 in Vienna 2018!!!

Med-Hoc-Net 2018

17th Annual Mediterranean Ad Hoc Networking Workshop

20-22 June 2018 · Capri, Italy

http://medhocnet18.cnit.it/

In recent years the Internet evolution has undergone a remarkable and unstoppable change of trend, rooted on three main pillars: New technologies (cloud computing, SDN, NFV, etc.), broad connectivity (4G/5G, VANET, FANET, etc.), and the wide deployment of smart edge devices (smart phones, sensors, wearables, etc.), all setting the main concept for the Internet of Things (IoT) and encompassing scenarios such as smart cities, ITS (intelligent transportation systems), smart grid, smart homes, or e-health.

Med-Hoc-Net 2018 extends its focus far beyond traditional networking concepts, highlighting new concepts related to the mentioned three main pillars developed for the future generation of network and cloud computing technologies. Med-Hoc-Net 2018 will accommodate contributions on smart mobile scenarios, focusing on highly relevant developments but also preliminary ideas and concepts in the ICT area, aiming at facilitating the development of new technologies and services with a high societal impact.

Following successful workshops at Sardinia Island (2002), Mahdia (2003), Bodrum (2004), Porquerolles Island (2005), Lipari Island (2006), Corfu Island (2007), Mallorca Island (2008), Haifa (2009), Juan-Les-Pins (2010), Favignana Island (2011), Ayia Napa (2012), Corsica Island (2013), Piran (2014), the Algarve (2015), Barcelona (2016), and Budva (2017), Med-Hoc-Net 2018 will take place on the island of Capri, Italy, in the heart of the Mediterranean Sea.

Topics of interest revolve around ad hoc and mesh networks – for example:

- MAC, routing and transport layer protocols for multi-hop networks
- Wireless sensor networking: Technologies, protocols, etc.
- Vehicular networks
- Smart grid networks
- Cognitive radio networks
- Integration of ad hoc networks with wireless access networks
- Implementations, testbeds, and field tests
- Technology related issues (IEEE 802.11, Bluetooth, ZigBee, etc.)
- Quality of Service
- Optimization models and algorithms
- Energy-efficient networking
- Security and privacy
- Localization and tracking in wireless networks
- Novel communication techniques
- Visible light communication (VLC)
- Software defined networking (SDN)
- Participatory and urban networks
- Underwater wireless networks
- UAVs and Flying ad hoc networks (FANETs)
- Green networking

Manuscript submissions:

Submissions should be original, previously unpublished work not currently under review for publication elsewhere.

All paper submissions must be written in English and must be formatted in standard IEEE 2-column format. The mandatory IEEE template in Microsoft Word and LaTeX format can be found at the IEEE templates page. Only Adobe PDF files will be accepted for the review process. All submissions must be made electronically using EDAS and strictly adhere to the respective page limit when typeset–including figures, tables, and references. Submissions that are not received by the stated deadlines or that do not conform to these rules will not be accepted, nor reviewed at all. We are providing a sample paper for download; please use this as a guide.

The EDAS link to upload papers will be published on http://medhocnet18.cnit.it/

Note that we will consider two different categories of papers: Full papers should describe novel research contributions and are limited in length to eight (8) printed pages. Short papers should be more visionary in nature and may report on work in progress without completed results. They are meant to present novel perspectives, so as to foster discussion about innovative directions and new points of view. They are limited to at most four (4) pages, but might in many cases be even shorter. Accepted short papers will be included in the proceedings and there will be given (a shorter) time for oral presentation at the workshop.

Please note that the full paper and short paper categories target different kinds of contributions. Papers submitted to a category will NOT be moved to a different category: A paper will either be accepted for the category where it has been submitted, or it will be rejected. Full papers will not be "downgraded" to short papers. Therefore, please be sure to carefully assess for yourself prior to submission which is the most suitable submission category for your paper, and to make sure that the presentation in the manuscript is well suited to the aims of this category.

Please also note our strict *no-show policy*, available on http://medhocnet18.cnit.it/

Med-Hoc-Net 2018

All accepted papers will be included in the digital proceedings (barring no-shows). Best papers will be published in the Elsevier Ad Hoc Networks journal.

Important Dates:

Fri, 9 February 2018:
Paper submission deadline

Fri, 13 April 2018:
Author notifications sent

Fri, 4 May 2018:
Camera-ready papers due

Fri, 20 June 2018:
Workshop starts

Preliminary Call for Papers: ACM SIGCOMM 2018 First Workshop on Security in Softwarized Networks: Prospects and Challenges (SecSoN)

The First First Workshop on Security in Softwarized Networks: Prospects and Challenges (SecSoN) will be held in conjunction with ACM SIGCOMM 2018 in Budapest, Hungary, on August 20-24, 2018.

Operators and enterprises in general are increasingly moving towards a softwarization of their networks. Former dedicated network elements are virtualized and placed on commercial-off-the-shelf hardware. Technologies for softwarization are Software Defined Networking (SDN) and Network Function Virtualization (NFV). They allow for a more efficient management of the network. Whereas NFV replaces the tightly integrated middlebox appliances by flexible Virtualized Network Functions (VNFs) running as software instances on standard servers, SDN enables a fine-granular and programmable selection and redirection of flows in the network.
On one hand, this softwarization reduces the costs for network equipment. On the other hand, it broadens the attack surface as novel networking devices and protocols are deployed, which needs to be considered during the risk assessment. Especially due to their critical role within the softwarized management of the network, these devices and protocols are high ranked targets for potential attackers and thus, require extensive testing and hardening.
In addition, the adaptation of these technologies in enterprise networks remains limited. This is due to the fact, that the integration of new technologies into an existing network infrastructure is a highly complex task, as the compatibility with systems such as network management and cloud management must be assured for production environments.

List of Topics

- Securing softwarized network architectures and virtualized environments
- Security for 5G, particularly secure network slicing and isolation
- Integration of hardware security components in a softwarized world
- Cognitive and automated network security management
- Integration of programmable data planes and stateful data path solutions of security functions, e.g., firewalls, intrusion detection systems
- SDN/NFV interface hardening
- Pentesting and test automation in softwarized networks
- Secure placement and orchestration
- Security monitoring of and with softwarized networks and threat analysis
- Trust relationships between softwarized entities
- Forensics, attack analysis and risk evaluation methods tailored to softwarized networks
- Security Events Processing and Configuration Verification and Validation

Preliminary Dates

March, 18th, 2018: Abstract submission deadline
March, 25th, 2018: Submission deadline
Before end of April, 2018: Author notification
Before end of May, 2018: Camera ready Papers

Organizers

Theophilus Benson, Brown University
Pascal Bisson, Thales
Rastin Pries, NOKIA Bell Labs
Thomas Zinner, University of Würzburg

KuVS Newsletter

ACM Symposium on SDN Research: Call for Demos and Posters

The ACM Symposium on SDN Research (SOSR) demos and posters session showcases research-focused work currently underway in academia and research organizations. Topics of interest are the same as research topics in the SOSR call for papers. We particularly invite the submission of emerging results in SDN research that address timely problems, that can help evolve the landscape of SDN (e.g., addressing new applications), that enhance our understanding of how SDN work in real-world deployments or realistic test beds, or that could influence further applied research and experimentation in industry. The SOSR 2018 Demos and Posters committee will review all proposals.

Why should you submit a demo to SOSR?

ACM SOSR offers unique opportunities to presenters because the event is collocated with the Open Networking Summit (ONS), the flagship SDN conference in which industry experts, decision makers, vision and trend setters, researchers, and students mix up all together. In fact the SOSR demos will share the same exhibition floor with ONS industry demos, allowing demo presenters — especially for students — a great opportunity to interact directly with a very knowledgeable and diverse crowd at the conference regarding their ongoing research topics. In addition, accepted demos and posters will be published as a two-page abstract for the archived conference proceedings, giving even more chances to reach broader audience over time.

All demos will be provided with table space, an external display, a poster board and wireless Internet access by default. The demos should be configured to run in a cloud environment accessible via Internet and presented from the exhibition space floor on the demonstrator's laptop. Any additional needs (beyond the defaults: table, monitor, Internet) such as equipment for the demo, required setup time or additional facilities must be requested with submission.

If you have interesting early-stage work, which has not yet evolved into a fully-fledged demo, please consider submitting a poster proposal.

Where to submit

Please submit your abstract to https://sosr18posters.hotcrp.com/. Submissions are single blind, so please include authors' names and affiliation.

Submission instructions: https://conferences.sigcomm.org/sosr/2018/calls.html

Important Dates

Submission Deadline: Monday February 5, 2018 (23:59 PST)
Acceptance Notification: Friday February 15, 2018
Camera-ready Deadline: Wednesday February 28, 2018

Demo and Poster Chairs

Theophilus Benson (Brown University)
Oliver Hohlfeld (RWTH Aachen University)

KuVS Newsletter

IEEE Journal on Selected Areas in Communications

Special Issue on

Scalability Issues and Solutions for Software Defined Networks

Originally proposed in academia, Software Defined Networking (SDN) has already had a far-reaching impact on industry. Today, SDN is deployed in a wide range of contexts: e.g., in enterprise and campus networks, in datacenter networks, in wide-area networks (see e.g., Google B4) as well as in Internet Exchange Points. Despite this large spectrum of deployments, today's SDNs have in common that they are of small scale, e.g., limited to a small network or to a single administrative domain. The next major challenge thus resides in scaling SDNs up.

The scope of this special issue is research addressing the challenge of deploying SDN at scale. Large-scale SDNs may span thousands of switches and routers, for a network that may span large geographic areas and carry millions of flows. Such scenarios require highly scalable control and management planes as well as applications to handle the large amount of control traffic. In addition to the control plane and SDN applications, the data plane must also be scalable. Finally, for cost reasons and to gain confidence in the new technology, software-defined networks should be deployable incrementally.

In this special issue, we are seeking novel approaches and unpublished work related to scalability issues and solutions for SDN. In particular, we would like to focus on recent developments in protocols, application design, and architecture specification for achieving scalability in SDN. We solicit experimental, conceptual, and theoretical contributions on the following topics related to scalability issues in Software-Defined Networks (SDNs):

Experiences with scalability issues in existing SDN deployments in various contexts such as:

- Datacenter networks, enterprise networks, wide-area networks, IXPs, wireless networks, etc.
- Experimental approaches for addressing scalability issues in SDNs
- Scalability and performance issues related to: (Distributed) SDN control planes, Management planes for SDNs, Data planes and virtual switches, SDN applications and algorithms
- Scalable (datacenter) network virtualization based on SDNs
- Foundations and approaches for dynamic scale-out and scale-in of SDNs (horizontal & vertical)
- Incremental SDN deployment
- Scalability using SDN offloading, Scalable programming languages for SDNs
- Scalable switch architectures and programmable pipelines (NetFPGA, P4, etc.)
- Scalable security with SDN

Submission Guideline

All submissions have to be prepared according to the Guide for Authors as published in the Journal website at http://www.comsoc.org/jsac/paper-submission-guidelines.

Manuscript Due: February 1, 2018 **Acceptance notification**: May 1, 2018

Final manuscript due: June 1, 2018 **Expected Publication of the SI**: Third quarter 2018

Guest Editors

Oliver Hohlfeld, RWTH Aachen University, Germany

James Kempf, Ericsson, USA

Martin Reisslein, Arizona State University, Tempe, US

Nadir Shah, COMSATS Institute of Information Technology, Pakistan

Stefan Schmid, Leading Guest Editor, Aalborg University, Denmark

Abgeschlossene Promotionen

6.1 Jonnahtan Eduardo Saltarin De Arco (Torsten Braun, Universität Bern)

Title: Network Coding Enabled Named Data Networking Architectures

Abstract: The volume of data traffic in the Internet has increased drastically in the last years, mostly due to data intensive applications like video streaming, file sharing, etc.. This motivates the development of new communication methods that can deal with the growing volume of data traffic. To this aim, Named Data Networking (NDN) has been proposed as a future Internet architecture that changes how the Internet works, from the exchange of content between particular nodes of the network, to retrieval of particular content in the network. The NDN architecture enables ubiquitous in-network caching and naturally supports dynamic selection of content sources, characteristics that fit well with the communication needs of data intensive applications. However, the performance of data intensive applications is degraded by the limited throughput seen by applications, which can be caused by (i) limited bandwidth, (ii) network bottlenecks and (iii) packet losses. In this thesis, we argue that introducing network coding into the NDN architecture improves the performance of NDN-based data intensive applications by alleviating the three issues presented above. In particular, network coding (i) enables efficient multipath data retrieval in NDN, which allows nodes to aggregate all the bandwidth available through their multiple interfaces; (ii) allows information from multiple sources to be combined at the intermediate routers,which alleviates the impact of network bottlenecks; and (iii) enables clients to efficiently handle packet losses. This thesis first provides an architecture that enables network coding in NDN for data intensive applications. Then, a study demonstrates and quantifies the benefits that network coding brings to video streaming over NDN, a particular data intensive application. To study the benefits that network coding brings in a more realistic NDN scenario, this thesis finally provides a caching strategy that is used when the in-network caches have limited capacity. Overall, the evaluation results show that the use of network coding permits to exploit more efficiently available network resources, which leads to reduced data traffic load on the sources, increased cache-hit rate at the in-network caches and faster content retrieval at the clients. In particular, for video streaming applications, network coding enables clients to watch higher quality videos compared to using traditional NDN, while it also reduces the video servers' load. Moreover, the proposed caching strategy for network coding enabled NDN maintains the benefits that network coding brings to NDN even when the caches have limited storage space.

6.2 Stefan Niemczyk (Kurt Geihs, Universität Kassel)

Title: Dynamische Konfiguration verteilter Informationsverarbeitung in Gruppen heterogener Agenten

Abstract: Das erfolgreiche Agieren von Multiagentensystemen (MAS) setzt eine umfangreiche und hochwertige Wissensbasis voraus. Die Wissensbasis umfasst die von einem Agenten benötigten Informationen, welche primär durch die Verarbeitung von Sensorinformationen erzeugt werden. Die Anpassung der Informationsverarbeitung an die Einsatzdomäne ermöglicht es, die Qualität der Wissensbasis zu gewährleisten und so die Leistung des MAS zu steigern. Mit aktuell verfügbarer Middleware ist eine dynamische Anpassung an Domänen mit zum Zeitpunkt der Entwicklung unbekannten Eigenschaften jedoch nur schwer möglich.

Diese Dissertation adressiert explizit die Variabilität von Domänen mit zur Entwicklungszeit unbekann- ten Eigenschaften und bietet eine Methode zur Konfiguration der Informationsverarbeitung in dynamischen Gruppen heterogener Agenten. Ausgangspunkt ist die Bereitstellung einer OWL- Ontologie, welche ein umfangreiches Vokabular zur semantischen Beschreibung der für die Informationsverarbeitung relevanten Komponenten bietet. Zur Laufzeit wird ein Modell, welches den relevanten Kontext eines Agenten umfasst, auf Grundlage der in der Ontologie modellierten Semantik erzeugt. Für die Repräsentation des Laufzeitmodells sowie für das Schließen aus diesem Wissen wird Antwortmengenprogrammierung (ASP), ein moderner Ansatz für komplexe kombinatorische Suchprobleme, eingesetzt. Das ASP-Programm analysiert das Laufzeitmodell und erzeugt eine optimierte und an die aktuelle Situation angepasste Konfiguration der Informationsverarbeitung. Die Konfiguration beschreibt die Auswahl von Informationsquellen sowie die Verkettung von Verarbeitungsschritten. Für die Optimierung der Konfiguration werden sowohl die Qualität von Informationen als auch gegebene Randbedingungen betrachtet. Die Integration von zur Laufzeit entdeckten Informationsquellen wird durch zwei Mechanismen zur Transformation heterogener Repräsentationen unterstützt. Dies sind eine neue XML-basierte Transformationssprache sowie eine Synthese von Transformationen auf Basis des modellierten Wissens. Beide Mechanismen ermöglichen das Hinzufügen neuer Transformationen ohne externe Dienste und ohne das Neukompilieren oder Neustarten der Software. Eine Implementierung der Methode wird in Form der ICE Middleware bereitgestellt. ICE ist für dynamische Gruppen von Agenten ausgelegt und ermöglicht die optimierte Konfiguration der Informationsverarbeitung in zur Laufzeit geformten Koalitionen. Informationsströme und Verarbeitungskomponenten anderer Agenten können an beliebiger Stelle in die lokale Verarbeitung eines Agenten eingebunden werden.

Die umfangreiche Evaluation in dieser Arbeit zeigt, dass die vorgestellte Methode zur dynamischen Konfiguration eine Anpassung an neue und vorher unbekannte Umgebungen ermöglicht und dabei mit nicht-antizipierbaren Ereignissen umgehen kann. Darüber hinaus belegen die Evaluationen der Laufzeit und des benötigten Arbeitsspeichers die Verwendbarkeit der ICE Middleware auf Systemen mit limitierten Ressourcen.

Die Dissertation liefert einen substantiellen Beitrag zum überregionalen Forschungsverbund NICER, der erforscht, wie infrastrukturlose Informations- und Kommunikationstechnik im Katastrophenfall die betroffenen Menschen, Rettungskräfte und Rettungsroboter vernetzen und damit eine Kooperation zur Bewältigung der Krise ermöglichen kann.

6.3 Michael Seufert (Phuoc Tran-Gia, Julius-Maximilians-Universität Würzburg)

Title: Quality of Experience and Access Network Traffic Management of HTTP Adaptive Video Streaming

Abstract: The thesis focused on Quality of Experience (QoE) of HTTP adaptive video streaming (HAS) and traffic management in access networks to improve the QoE of HAS.

First, the QoE impact of adaptation parameters was investigated with subjective crowdsourcing studies. It was found that only the adaptation amplitude and the time on each layer are key QoE influence factors. The last quality layer, the time after the last quality switch, and the number of quality switches had no significant impact on QoE. The results were used to compute a QoE-optimal adaptation strategy for given video and network conditions with a linear program. This allows video service providers to develop and benchmark improved adaptation logics for HAS.

Furthermore, the thesis presented concepts to monitor video QoE on application and network layer, which can be used by network providers in the QoE-aware traffic management cycle. On network layer, temporal pooling of objective per-frame or per-segment quality metrics was investigated. Simple pooling methods, such as mean, and simple objective quality metrics, such as ordinal quality level or bitrate, showed high correlations to subjective ratings, which makes temporal pooling also applicable in the case of encrypted traffic. Also application-layer monitoring can be used in case of encrypted traffic, as it monitors QoE factors directly at the client. The thesis presented YoMoApp, an Android app, which resembles YouTube with all functionalities, and accurately monitors all relevant QoE factors of HAS, namely, initial delay, stalling, and adaptation. Furthermore, it collects device characteristics, user behavior, and monitors the network traffic. Additionally, it can collect subjective quality ratings of users, which makes YoMoApp a useful tool for QoE research. YoMoApp was used in a subjective study to investigate the correlations between network characteristics and application-layer QoE factors.

Moreover, an analytic and simulative performance evaluation of QoE-aware traffic management on a bottleneck link was conducted. The objective was to minimize the stalling of video flows and the page load time of web flows. Four bandwidth allocation strategies were presented, which use different levels of information about the flows. It was shown that the performance of each strategy depended on the application mix on the bottleneck link. Nevertheless, it was possible for all application mixes to improve the QoE compared to the best effort situation without traffic management. Dynamic strategies, which consider application information for their traffic management decisions, such as the buffer level of video flows, had advantages over only network-based strategies, which confirms the applicability of collaborative and cross-layer traffic management solutions.

Finally, the thesis investigated socially-aware traffic management for HAS via Wi-Fi offloading of mobile HAS flows. A simple model for the distribution of public Wi-Fi hotspot locations and a platform for socially-aware traffic management on private home routers were presented.

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A simulative performance evaluation investigated the impact of Wi-Fi offloading on the QoE and energy consumption of mobile HAS with real data sets from the city of Darmstadt. It was shown that, while operators benefit from Wi-Fi offloading due to reduced load on the mobile network, both QoE and energy consumption of the end user deteriorated for public Wi-Fi offloading due to the low available throughput at public hotspots. However, Wi-Fi offloading to private hotspots with residential broadband connections could improve both metrics. Thus, it was shown that end users can only benefit from Wi-Fi offloading when public Wi-Fi providers offer throughputs similar to the mobile network.

6.4 Mathias Pelka (Horst Hellbrück, Institut für Telematik, Universität zu Lübeck)

Title: Analyse, Optimierung und systematischer Aufbau von Ortungssystemen

Abstract: Der zunehmende Fortschritt in der Miniaturisierung führt zu kleineren Geräten, die mit immer mehr Rechenleistung ausgestattet werden. Drahtlose Sensornetze, Smartphones und Wearables sind vernetzt und werden sowohl im industriellen Umfeld, im Dienstleistungsbereich sowie im privaten Rahmen eingesetzt. Geografischer Kontext ermöglicht neue Anwendungen, z. B. für das Internet der Dinge, bei dem eine Vielzahl von Geräten an das Internet angeschlossen ist. Da sich bisher kein bestimmtes Ortungssystem als Standard etabliert hat, sind Ortungssysteme Spezialanfertigungen für bestimmte Probleme bzw. Anwendungen. Dadurch werden aber bereits bekannte Probleme zum wiederholten Male gelöst. Die Arbeit hat es sich daher zum Ziel gesetzt, Ortungssysteme zu analysieren, zu charakterisieren sowie zu optimieren, um anschließend ein systematisches Vorgehen zum Aufbau abzuleiten. Durch die Diskussion von bestehenden Ortungssystemen werden einzelne Komponenten analysiert. Zugleich werden Differenzierungen aufgezeigt, welche als Unterscheidungsmerkmal dienen. Vorhandene Ortungssysteme werden optimiert, indem bestehende Schwächen analysiert und Vorschläge zur Optimierung der Ortungsalgorithmen und Evaluationskriterien vorgestellt werden. Ein wesentlicher Beitrag der Arbeit ist ein neuartiges passives Ortungssystem. Dieses erreicht nach unseren Messungen eine Ortungsgenauigkeit von 61 cm in 95 Zusätzlich werden Einflussfaktoren, wie z.B. die Geometrie der Referenzpunkte oder der Einfluss der Messabweichungen auf das Ortungsergebnis systematisch untersucht. Anschließend wird ein Vorgehen dargelegt, das es ermöglicht, zeitbasierte Ortungssysteme systematisch aufzubauen. Dieses Vorgehen wird anhand zweier Fallstudien illustriert.

Ein Ergebnis der Arbeit ist eine neue eindeutige Klassifikation von Ortungssystemen, die sich an den Anforderungen der Anwendung orientiert. Durch das in der Arbeit vorgeschlagene automatisierte Verfahren zur Bestimmung der Koordinaten der Referenzpunkte, sowie Verfahren zur Bestimmung von theoretischen Grenzen, wird die Ortungsgenauigkeit des Ortungssystems optimiert. Mit den Ergebnissen dieser Arbeit ist der Einsatz schon bestehender Ortungssysteme für neue Anwendungen möglich, sodass künftige Neuentwicklungen entfallen können.

6.5 Salem Sati (Kalman Graffi, Heinrich-Heine-Universität Düsseldorf)

Title: Efficient Connection Establishment, Message Handling and Content Delivery in Opportunistic Networks

Abstract: Opportunistic networking has recently gained decent attention from the research community. Opportunistic networks in general are characterized by nodes with typically wireless communication capabilities that typically move around and have either no, a single or a few communication partners present. The network is considered as often being so sparsely populated that most paths between arbitrary node pairs do not exist at a given time. Often nodes also just walk alone without communication opportunities. In order to deliver messages from a source node to the destination of a message, the store-carry-forward routing paradigm has been proposed, whereby the source or relay nodes may store the message and carry it until a better forwarding node is encountered. Here the perspective is to forward a message with several carry periods hop-by-hop to its destination node. Nevertheless, the path between the source node and the destination node have a long delay and may never exist.

Many flooding-based routing protocols have been proposed for opportunistic networking environments in order to improve the probability of the message delivery ratio. However, these protocols suffer from excessive resource consumption regarding storage, bandwidth, and energy. This excessive resource usage leads to a significant degradation of the routing performance, especially if we consider the fact that each node in the opportunistic network could be a mobile and battery-powered device with physically limited buffer size. With such buffer limitations of the mobile node, message drop events could occur due to buffer overflow especially with a high traffic pattern combined with an excessive flooding protocol. Forwarding strategies have to be identified to decide which messages should be selected for forwarding if the bandwidth is scarce and the transmission time limited. Also drop policies have to be identified that decide which messages to delete from the buffer once the buffer is full.

Besides the routing challenges, the neighbor discovery and link establishment process are noteworthy, as they also consume resources. The mechanism of neighbor discovery is needed especially when links are established using the infrastructure mode of the IEEE 802.11 Wi-Fi capabilities of the nodes. This connection option is currently the most available link option for smartphones and provides the highest possible bandwidth compared to other wireless communication options such as Bluetooth or NFC. Therefore, it is needed to investigate this step of neighbor discovery and link establishment with special consideration with regard to the signaling overhead and link establishment delay. It is desirable to reduce the control traffic required to build a stable and reliable link connectivity and thus to improve channel utilization and energy conservation. A further effect of improving the neighbor discovery is an impact on the performance of applied routing protocol in form of decreasing the transmission delay and increasing the message delivery ratio. To address the challenges of improving the performance of communications and routing protocols in opportunistic networks and to lower the message overhead and delay costs, this thesis focuses on the following main design objectives.

First, we design and evaluate a new beacon interval in the process of neighbor discovery and

link establishment for infrastructure-based Wi-Fi communications. For that we investigate and analyze the traditional beacon interval and assess the performance of the neighbor discovery mechanisms. We propose to duplicate the traditional beacon interval for a better channel utilization and a higher energy efficiency. Various scenarios are used to evaluate the performance of the proposed Double Hundred Kilo Beacon Interval in terms of contact probability, delay and the channel utilization in comparison to the traditional beacon interval. The proposed beacon interval results in an equal performance of the neighbor discovery mechanism while the signaling costs are halved and thus valuable energy conserved.

Second, we systematically and holistically evaluate all possible scheduling and dropping policies based on a single parameter of the message characteristics, namely arrival time, replication count, number of relayed nodes, time to live and message size. We systematically analyze the question of how the performance of the routing protocol in terms of delivery ratio, delay and message overhead is influenced if messages are selected for scheduling or dropping based on the message with the highest / lowest value with regard to a single of these parameters. We evaluated the impact of 121 scheduling and drop policy combinations using three scenarios with varying node speeds and bandwidths, as well as varying message sizes and generation intervals. Our exhaustive study shows that the impact of each specific message information in the scheduling and drop policies is highly depending on the network conditions. The specific message parameter which leads to the highest delivery ratio or lowest delay and overhead is different in each of the scenarios. The study is very useful to identify the interdependencies of the specific network conditions and the information relevant in the scheduling and drop policies.

Third, we use this insights to design and evaluate optimized scheduling and drop policies for flooding-based and utility-based routing protocols for opportunistic networks that lead to less message loss due to less buffer overflow and further increase the routing performance in terms of delivery ratio in comparison to prominent strategies in literature. Evaluation with several simulation setups shows that our proposed optimized scheduling and drop policies for the epidemic routing protocol and PRoPHET, an utility-based routing protocol, are either on par or better that comparable routing protocols while the traffic overhead and message delivery delays as significantly reduced.

In addition, we design and evaluate a replication-controlled multi-copy routing scheme, which especially aims to balance the need for message replication to improve the chances of the message to be delivered and the risk of congesting the network. This leads to a reduction of the message delivery probability. The proposed Replication Probability-based Routing Scheme explores the possibility of taking local node and message information into account to control the message replication and so increasing the delivery ratio and minimizing the overhead and delay of the messages. In our approach, the best carrier for a message is characterized by the message's delivery probability considering the replication count and hop count in a Markov chain model as well as the network status, information on the mobility of the node and its buffer information. We not only consider the mobility model statistics but also consider the user traffic and network conditions, such as congestion and buffer occupancy, especially when there is a contact with another node. The thesis shows that the node and the message information can serve as meaningful local information to achieve an appropriate message replication decision at

each node. Therefore, the implemented routing scheme achieves high efficiency via an adaptive and precise routing design considering different network conditions.

In order to support these contributions, initially we created an overview on available evaluation environments for opportunistic networks and identified the tools that were used further on to evaluate the impact of our contributions. Within this thesis, we provide several contributions to increase the efficiency of opportunistic networks. For that we either increase the performance or decrease the costs for neighbor discovery, link establishment as well as delay-tolerant routing. Through this work, we hope to further support the spread of opportunistic networks.

6.6 Tobias Amft (Kalman Graffi, Heinrich-Heine-Universität Düsseldorf)

Title: The Impact of Resource Sharing on Coexisting P2P Overlays and Stacked Overlay Modules

Abstract: Different peer-to-peer (P2P) systems have been proposed in the last two decades, first investigated in research, then applied to applications and commercial systems. In contrasttraditional client-server approaches, P2P systems do not follow a strict centralized infrastructure paradigm. Instead, the functionality of one specific P2P system is distributed over allparticipants fully or partially, depending on its purpose. Thus, the most outstanding characteristic of P2P systems is that they organize their own infrastructure and thus remain scalable even if they grow or shrink.

Peer-to-peer overlays which can be part or base of a complex P2P system introduce further logical layers on top of existing layers and extend their underlaying networks with own routing tables and forwarding strategies. The parallel execution and combination of multiple overlays with different and contrasting functionalities has been rarely considered in preceding research, although the combination and conjunction of specialized overlays seem to be a promising approach to reduce maintenance, implementation and execution costs of all overlays running on one single peer.

In order to motivate our research on P2P networks, especially on distributed online social networks and overlays for anonymous communication, we review political events which took place around 2010 and 2011 in the Middle East and Northern African region. We review modern techniques used by governments and oppressive regimes to monitor and censor Internet traffic and we discuss possible countermeasures against their attacks. Considering the uprisings during the Arab Spring and the related Internet shutdown events as they happened in Egypt and Libya in 2011, we find that distributed applications are highly demanded niche products among the increasing amount of services offered on the Internet.

In this thesis, we focus on the optimization of coexisting P2P overlays and applications operated in parallel on one peer. We identify basic requirements and characteristics of P2P overlays and applications and identify patterns which are frequently repeated, with the goal to avoid duplicate implementation and operating costs and to describe a methodology to create new overlays efficiently. As result, we present a novel approach to build coexisting overlays, named overlay stack, which is the idea to combine different overlay parts in a way that a desired behavior is obtained and second, that the implementation of duplicate modules and functionalities is avoided so that unnecessary expenses are kept at a minimum.

Following our goal, we focus on a contrasting set of overlays which differ in their requirements and functionalities so that core functionalities of P2P overlays and applications can be found. We divide the considered overlays into location-centric and social-centric approaches with restricted or free possibilities to communicate. With the implementations and evaluations of the proposed overlays algorithms in the four categories we show that a distributed hash table (DHT) or another indexing overlay constitutes a suitable basis for a diverse set of P2P applications. Moreover, we show that a DHT as basis is suitable to realize a contrasting range of P2P

applications on top and identify one possible way to organize coexisting overlays on a single peer. The main benefit of a common DHT as basis for multiple overlays is that maintenance costs and vital update mechanisms are only spent once. By applying new applications on top of the common DHT and other existing overlays or applications, our overlay stack can be extended vertically with new functionalities.

6.7 Tobias Rückelt (Ralf Steinmetz, TU Darmstadt)

Title: Connecting Vehicles to the Internet - Strategic Data Transmission for Mobile Nodes using Heterogeneous Wireless Networks

Abstract: With the advent of autonomous driving, the driving experience for users of connected vehicles changes, as they may enjoy their travel time with entertainment, or work productively. In our modern society, both require a stable Internet access. However, future mobile networks are not expected to be able to satisfy application Quality of Service (QoS) requirements as needed, e.g. during rush hours. To address this problem, this dissertation investigates data transmission strategies that exploit the potential of using a heterogeneous wireless network environment. To this end, we combine two so far distinct concepts, firstly, network selection and, secondly, transmission time selection, creating a joint time-network selection strategy. It allows a vehicle to plan delay-tolerant data transmissions ahead, favoring transmission opportunities with the best prospective flow-network matches. In this context, our first contribution is a novel rating model for perceived transmission quality, which assesses transmission opportunities with respect to application QoS requirement violations, traded off by monetary cost. To enable unified assessment of all data transmissions, it generalizes existing specialized rating models from network selection and transmission time selection and extends them with a novel throughput requirement model. Based on that, we develop a novel joint time-network selection strategy, Joint Transmission Planning (JTP), as our second contribution, planning optimized data transmissions within a defined time horizon. We compare its transmission quality to that of three predominant state-of-the-art transmission strategies, revealing that JTP outperforms the others significantly by up to 26%. Due to extensive scenario variation, we discover broad stability of JTP reaching 87-91% of the optimum. As JTP is a planning approach relying on prediction data, the transmission quality is strongly impaired when executing its plans under environmental changes. To mitigate this impact, we develop a transmission plan adaptation as our third contribution, modifying the planned current transmission online in order to comply with the changes. Even under strong changes of the vehicle movement and the network environment, it sustains 57%, respectively 36Finally, we present our protocol Mobility management for Vehicular Networking (MoVeNet), pooling available network resources of the environment to enable flexible packet dispatching without breaking connections. Its distributed architecture provides broad scalability and robustness against node failures. It complements control mechanisms that allow a demand-based and connection-specific trade-off between overhead and latency. Less than 9 ms additional round trip time in our tests, instant handover and 0 to 4 bytes per-packet overhead prove its efficiency. Employing the presented strategies and mechanisms jointly, users of connected vehicles and other mobile devices can significantly profit from the demonstrated improvements in application QoS satisfaction and reduced monetary cost.

6.8 Daniel Burgstahler (Ralf Steinmetz, TU Darmstadt)

Title: Collaborative Sensing in Automotive Scenarios - Enhancement of the Vehicular Electronic Horizon through Collaboratively Sensed Knowledge

Abstract: Modern vehicles are equipped with a variety of advanced driver assistance systems, that support to increase driving comfort, economy and safety. Respective information sources are local sensors like cameras, radar or lidar. However, the next generation of assistant systems will cause the need of information above the local sensing range. An extension of the local perception can be provided by appropriate communication mechanisms. For that, other vehicles can serve as a source of perception information, but also any other information source like cloud services. Required communication can take place directly between vehicles via mobile ad-hoc communication or via a backend by the use of cellular communication. The appropriate technology depends on the respective use case, that determines information content, granularity and tolerated latency. Based on literature, we derived a categorization of use case dependent information demands, with respect to communication. The resulting three zones, namely safety zone, awareness zone and information zone, refer to the tolerated latency between the occurrence of an information and the point in time the information has to be processed at the receiver side. While communication mechanisms for the safety zone, i. e., the ego-vehicle's direct surroundings with a remaining driving time of less than 2 - 5 seconds, have been focus in research and standardization in the past, respective mechanisms for larger distances have not been sufficiently considered. In this thesis, we examine information distribution mechanisms in context of the previously mentioned use case categories. As the first key contribution, we consider the gathering of vehicular sensed data with regard to the information zone, i. e., more than 30 seconds remaining driving time to the point of the information origin. We developed a probabilistic data collection model that is able to reduce data traffic up to 85 % compared to opportunistic transmission and still sticks to certain quality metrics, e. g., a maximum detection latency. A central adaption of transmission probabilities to the density of transmitting vehicles is applicable for cellular use and copes with sparse traffic situations. Moreover, we have extended this approach by hybrid communication, i. e., the parallel use of cellular and mobile ad-hoc communication. This allows to further reduce cellular based data traffic, in particular in case of dense traffic. As the second key contribution, we examine the efficient distribution of the previously gathered information. Information is structured and prioritized according to the most probable driving path, as so-called electronic horizon. The transmission towards the vehicles is performed in small data packets, according to the given priorities. The aim is to transmit only information relevant for road segments that will be used. Concerning this, we developed a mechanism for most probable travel path estimation and a data structure for efficient mapping of the electronic horizon. As the third key contribution, we examine the information exchange in the awareness zone, an area between the safety zone and the information zone with about 5 to 30 seconds remaining driving time to the point of the information origin. Derived from the respective use cases, this data is not directly safety relevant, but it is still about dynamic position information of neighboring vehicles. Due to the relatively long distance, direct vehicle

to vehicle communication is not possible. Respective data has to be forwarded by intermediate vehicles. However, position beacons without data forwarding can already cause channel congestion in dense traffic situations. The use of cellular networks would require absolute total network coverage with permanent free channel resources. To enable forwarding of dynamic vehicle information anyhow, we developed at first a mechanism to reduce the channel load for position beacons. Next, we use the freed-up bandwidth to forward dynamic information about neighboring vehicle positions. With this mechanism, we are able to more than double the range of vehicular perception, with respect to moving objects. In extension to standardized communication mechanisms for the safety relevant direct proximity, our three mentioned contributions provide the means to complete the long range vehicular perception for future advanced driver assistance systems.

6.9 Ronny Hans (Ralf Steinmetz, TU Darmstadt)

Title: Qos-Aware Cloud Infrastructure Provisioning in Heterogeneous Environments

Abstract: Over the last decades Information Technology (IT) has become an enabler for nearly all businesses from industrial production to finance. The IT resources required for these business activities are usually provided by local and remote data centers. Although most resources are still hosted in companies' proprietary data centers, cloud computing initiated a paradigm shift in IT service provisioning from owning to leasing resources and services. Today, over 50% of German companies use cloud services while shifting services into the cloud has become an emerging trend. Cloud computing, which is often referred to as the fifth utility in addition to water, electricity, gas, and telephony, provides commoditized computation resources that are available any time on demand in the required quantity. However, in contrast to other commodities, a single quality level is insufficient for IT service provisioning. Instead, the required quality for a provided IT service depends on the various functional and non-functional requirements. For example, highly interactive applications such as cloud gaming require a high quality level in terms of latency. Providers of cloud services have to face a highly competitive market. Cost advantages in cloud computing are primarily achieved by utilizing large centralized data centers at low-cost locations. However, this kind of resource provisioning impacts the quality of service of different types of services such as the aforementioned interactive multimedia services that possess strict quality of service constraints. Hence, infrastructure providers have to face a trade-off between cost reduction and adherence to the required Quality of Service (QoS) attributes. Apart from how services are provisioned, the way of consuming IT services also changed substantially over the last years. Mobile devices have begun to replace locally installed desktop computers at an accelerated pace. By utilizing these mobile devices, service providers are confronted with two major challenges: (i) a cellular network connection, which potentially causes a higher and more fluctuating latency and (ii) severely limited resources compared to local Personal Computers (PCs). These two aspects restrict the utilization of multimedia services, e. g., cloud gaming. To address these challenges, we present two novel approaches for (i) resource planning on a global level for multiple services with heterogeneous QoS characteristics and (ii) the augmentation of the centralized cloud infrastructure with locally installed resources to provide viable multimedia services to mobile devices. As the first major contribution, we introduce the Cloud Data Center Selection Problem (CDCSP). This problem describes the data center placement and resource selection on a global scale. We consider the role of a cloud provider, who aims to dimension resources in a cost-minimal fashion under the consideration of multiple services with different QoS attributes. Based on a mathematical optimization model, we propose the exact solution approach CDCSP-EXA.KOM. Due to the high complexity and the resulting computational effort to find the optimal solution, we propose and analyze four heuristic approaches to identify the most appropriate one for the given problem. As a first heuristic, we propose an approach based on linear program relaxation, CDCSP-REL.KOM. Furthermore, to take the specific structure of the problem into consideration, we develop the custom tailored CDCSP-PBST.KOM approach, which is based on a prioritized processing of demands and supplies. To

further improve the results we combine multiple heuristics to a Best-of-Breed approach, named CDCSP-BoB.KOM. Finally, as a metaheuristic improvement procedure, we propose the tabu search approach CDCSP-TS.KOM. To assess the practical applicability and performance of these optimization approaches, we analyze them in detail and compare their performance in a quantitatively. The second major contribution of this work addresses the augmentation of the centralized cloud infrastructure with local resources to provide services to mobile devices. Therefore, we formulate the Dynamic Cloudlet Placement and Selection Problem (DCPSP), as a multi-period resource planning problem, which includes local characteristics, such as space for hosting resources and available network bandwidth. We focus on a cloud provider who aims to augment the centralized infrastructure using local resources to improve the QoS guarantees for mobile used applications. We formalize the problem as a mathematical optimization model and derive the exact solution approach DCPSP-EXA.KOM. Due to the high complexity that is caused by an optimization over many time slots, we propose the heuristic optimization approach DCPSP-HEU.KOM. We assess the performance of these two approaches by the means of quantitative evaluation. In summary, the contributions of this thesis provide the means for a cost-efficient and QoS-aware resource selection in cloud infrastructures. We contribute the formalization of the problems and algorithms to support the efficient planning of future cloud infrastructures in environments with a multitude of heterogeneous services on a global scale. Furthermore, to enable mobile users to consume multimedia cloud services, we propose an optimization model and algorithms to augment a global centralized infrastructure by local resource units.

6.10 Björn Richerzhagen (Ralf Steinmetz, TU Darmstadt)

Title: Mechanism Transitions in Publish/Subscribe Systems - Adaptive Event Brokering for Location-based Mobile Social Applications

Abstract: Internet traffic caused by mobile devices will exceed the traffic originating from PCs by the year 2020, according to Cisco.With a projected 61-fold increase, location-based applications and augmented reality applications exhibit the fastest growth in the mobile sector. The success of interactive augmented reality games such as Google's Ingress or Pokémon Go is the latest indicator for the increasing popularity of locationbased mobile social applications. However, the direct interaction among users and the inherent locality of this interaction in such applications pose considerable challenges to a communication system. Efficient brokering of content based on the physical location of mobile clients is further complicated by application-specific attraction points and the resulting heterogeneities and dynamics of client mobility. The publish/subscribe paradigm is well suited to model this interest-based communication pattern between users. Distinct mechanisms for both location-based filtering and locality-aware dissemination of events have been proposed for numerous application domains. However, their combined utilization and their adaptation to user mobility, network heterogeneity, and dynamic workload characteristics of mobile social applications remains an open research challenge. In this thesis, we design and implement transitions between distinct mechanisms for location-based filtering and locality-aware dissemination of events as our first contribution to address this challenge. We develop a methodology for the encapsulation of mechanisms and the execution of transitions within our publish/subscribe framework Bypass.kom. Consequently, we apply our methodology to location-based filter schemes and dissemination mechanisms for locality-aware publish/subscribe, integrating state of the art mechanisms into Bypass.kom. We propose distinct execution strategies for transitions, focusing on the seamless operation of the publish/subscribe system during execution by means of state transfer between mechanisms. By deriving common abstractions for transition-enabled mechanisms and the coordinated execution of transitions, we generalize our methodology as part of the Simonstrator.kom platform. These abstractions for the design and evaluation of transition-enabled communication systems constitute our second contribution. This includes mobility and workload models for location-based mobile social applications. Based on a prototype of Bypass.kom, we conduct an extensive evaluation of our contributions using the Simonstrator.kom platform. We show that our state transfer mechanism and the proposed abstractions for transition-enabled mechanisms lead to a seamless execution of transitions. Additionally, we demonstrate the combined utilization of location-based filtering and locality-aware event dissemination as coexisting transition-enabled mechanisms. Overall, we show that our contributions allow the publish/subscribe system to adapt to application-specific mobility and workload characteristics by executing the respective mechanism transitions.

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6.11 Olga Wenge (Ralf Steinmetz, TU Darmstadt)

Title: Optimization in Inter-Cloud Markets - Solution Strategies for the Formation of Profitable Cloud Collaborations in Relation to Quality of Service, Information Security, and Regulatory Aspects

Abstract: Current cloud computing research and industrial communities stress the importance of developing inter-cloud strategies. While inter-clouds may support the improvement of scalability, availability, and cost efficiency of cloud services by utilizing multiple clouds, they have to face a number of risks regarding Quality of Service requirements and information security and regulatory obligations, which pose obstacles in their adoption. To eliminate these risks, these aspects need to be considered in the development of inter-cloud approaches. In this thesis, we focus on solution strategies, which assist in the formation of profitable inter-cloud collaborations that ensure compliance with information security and regulatory requirements, and Quality of Service agreements. We propose the following contributions: As the first major contribution, we introduce the Information Security- and Regulatory-aware Collaboration Framework - SecRegCF. This conceptual framework is based on the results of the conducted risk analysis and reflects corresponding information security and regulatory requirements, necessary for the formation of secure and reliable cloud collaborations. The SecRegCF framework involves a cloud broker and an auditor to establish the governance processes and workflows. Aimed at optimizing the matching process of quantitative and qualitative properties, we enhance the framework with supportive elements, which enable the selection of the optimally suitable allocation of a collaborating partner within collaborations in a timely efficient manner. Moreover, the proposed SecRegCF conceptual framework is theoretically evaluated and discussed. As the second key contribution, we explore the Cloud Collaboration Composition Problem - CCCP. This problem addresses the composition of cloud collaborations among multiple cloud providers and cloud users in relation to Quality of Service and information security requirements. In this context, we take the perspective of a cloud broker, who aims at profit maximization through the composition of cloud collaborations from a set of cloud providers and the assignment of cloud users to these collaborations. The problem is formalized as a mathematical optimization model, which allows us to define the exact optimization approach CCCP-EXA.KOM to the solution of the CCCP. Under assumption of its high time complexity, we introduce heuristic optimization approaches CCCP-COMP.KOM and CCCP-ICC.KOM, and a meta-heuristic approach CCCP-BoB.KOM, which aim at improving time complexity without impacting the solution quality. All proposed approaches are qualitatively and quantitatively evaluated, indicating the level of their applicability in the context of real cloud market scenarios.

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Ankündigungen

Termine

- Bei KOM an der TU Darmstadt findet am 8. - 9. März 2018 das KuVS-Fachgespräch zu Fog Computing statt, weitere Infos hierzu: https://sites.google.com/view/fachgespraechfog/call-for-contributions?authuser=0
- Der MAKI Scientific Workshop zum Thema "Machine Learning für Kommunikationssysteme" findet am 23. März 2018 in Darmstadt statt: https://www.maki.tu-darmstadt.de/vortraege_events/maki_scientific_workshop/2018/agenda.de.jsp
- International Teletraffic Congress ITC 30, September 3-7 2018, Vienna: itc30.org
- ACM Symposium on SDN Research, March 28-29, Los Angeles: https://conferences.sigcomm.org/sosr/2018/
- Network Traffic Measurement and Analysis Conference (TMA) in Wien vom 26-29 Juni 2018. Paper submission 16. Februar 2018. Weitere Informationen unter http://tma.ifip.org/2018/.
- Passive and Active Measurement (PAM) an der TU Berlin vom 26. zum 27. März 2018. Weitere Informationen unter https://pam2018.inet.berlin/

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Nächster Newsletter

Nächster Newsletter : Juni 2018

Einreichungsfrist für Beiträge : 1. Mai 2018

Wir bitten dabei um Einreichungen zu den folgenden Themengebieten:

- Fachgruppe KuVS
  - Geschäftsberichte der GI – KuVS – Fachgruppe
  - ...
- Neues aus den Arbeitsgruppen
  - Abgeschlossene Promotionen
  - Preise
  - Personenbewegungen
  - Stellenmarkt
  - ...
- Neue Projekte
  - Initiativen
  - Großprojekte
  - ...
- Calls und Berichte zu Veranstaltungen
  - Konferenzberichte (Konferenzen, Fachgespräche, Dagstuhl, ...)
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