TeWi-Kolloquia „Verteilte Systeme“
(Vorträge im Berufungsverfahren „Verteilte Systeme / Distributed Systems" an der AAU Klagenfurt)

Montag, 20. Februar 2017, 8.30 Uhr, E.1.05

Vortragende/r	Titel	Abstract
Dr. Andreas Mauthe Lancaster University School of Computing and Communications	**Resilience in Dynamic, Opportunistic Systems-of-Systems**	Distributed computing environments nowadays are becoming increasingly diverse and differentiated in nature. They are moving from traditional distributed systems comprising PCs/mobiles + IP networks to ecosystems that include Internet of Things (IoT) installations (e. g. smart cities and buildings), environmental sensor and actuator networks (e. g. WSNs) using non-IP protocols, cluster-based cloud systems, ad-hoc networks such as MANETs and VANETs, and virtualised systems supported by network overlays (e. g. Clouds). In order to exploit the full potential of these various "systems" they need to be dynamically interconnected, so they can interact with, and respond to each other. For example, VANETs talk to smart cities, WSNs process data in back-end clouds, and overlay-based systems adjust their resilience properties when their underlying IP environment changes. It is becoming recognised in many research communities that this can be best achieved through a "systems-of-systems" approach. However, this also requires a new approach towards system resilience and security considering the autonomic characteristics and dynamic nature of systems-to-systems approach. We have developed a programming approach called *tecton*, which is a distributed representation of a potentially-opportunistically-interacting distributed system. It provides support for opportunistic, rule-based interaction with low overhead. In this presentation I will introduce the tecton abstraction, and in particular discuss how resilience can be ensured within a dynamic systems-of-systems ecosystem. The resilience mechanisms are based on D^2R^2+DR framework originally conceived within an autonomic networking concept. Resilience is provided through structural means but also active components call Resilience Managers. Through these, independent systems can interact while ensuring that security and resilience are maintained. A central component of this framework is anomaly detection that operates in conjunction with remediation to provide operational resilience considering the environmental dynamics as well as novel threats. The talk will also provide and outlook on further research challenges in the context of critical systems infrastructure, Internet of Things (IoT) and Cyber Physical Systems. Further, it will outline how the research relates to teaching and collaborative research opportunities within AAU.

Montag, 20. Februar 2017, 10.45 Uhr, E.1.05

Vortragende/r	Titel	Abstract
Dr. Stefan Schulte TU Wien Fakultät für Informatik	**Elastic Computing**	Especially in volatile IT environments, there is a constant necessity to adapt computational resources to fulfil the resource and quality demands of service users. Permanently providing resources which are able to handle peak loads is not the best solution for this, as these capacities will not be fully utilized most of the time, leading to unnecessary cost. However, permanent underprovisioning of computational resources is obviously also not an option. Within this talk, elastic computing will be discussed as a solution to satisfy volatile demands for computational resources. A special focus will be on elastic processes and elastic stream processing. Also, a brief outlook on how Internet of Things devices could be used to provide computational resources for services will be given.

Montag, 20. Februar 2017, 14.00 Uhr, E.1.05

Vortragende/r	Titel	Abstract
Dr. Vlado Handziski TU Berlin / TU Dresden	**The Ever-changing Landscape of Distributed Systems**	During the last two decades the distributed systems research had to constantly adapt to a rapidly changing technological landscape bringing novel challenges and questioning long-held assumptions. The talk will provide a brief overview of this evolution, focusing on several important paradigm shifts like the emergence of resource-constrained wireless devices with rich sensing and actuation capabilities, the rise of the smartphone platform, the cloud-centric architecture and big-data processing frameworks, the microservices model and the renewed interest in data-centric middleware. I will elaborate on the major milestones as part of this evolution and highlight some of my own contributions to the field. In the final part of the talk I will concentrate on the future of distributed systems and explore some novel challenges from new application fields (e.g. cyber-physical systems), new technologies (e.g. blockchains) and new algorithms (e.g. deep learning).

Montag, 20. Februar 2017, 16.15 Uhr, E.1.05

Vortragende/r	Titel	Abstract
Dr. Thomas Zinner Universität Würzburg Institute für Informatik	**SDN, NFV & DASH: Leistungsbewertung neuer Mechanismen zur Netz- und Anwendungs-steuerung**	Das heutige Internet hat sich über Jahrzehnte zu einer globalen, universalen Kommunikations- und Diensteplattform entwickelt. Der Erfolg des Internets wird vor allem vorangetrieben durch das vielfältige Angebot an Anwendungen, einhergehend mit der steigenden Verbreitung durch immer schnelleren Breitband-Internetzugang. Leider kommt es aufgrund der starren Architektur, fehlender Flexibilität, und mangelnder Ressourcensteuerung immer wieder zu Beeinträchtigung der Dienstqualität und damit der vom Nutzer wahrgenommenen Dienstgüte. Neue Technologien und Konzepte wie Cloud Computing, Software Defined Networking oder die Virtualisierung von Netzfunktionen ermöglichen eine Flexibilisierung der Kommunikationsarchitektur und damit die Überwindung dieser Nachteile. Der Vortrag befasst sich mit Leistungsuntersuchungen neuartiger Mechanismen zur Netz- und Anwendungssteuerung, die sich durch diese Technologien ergeben.

Dienstag, 21. Februar 2017, 8.30 Uhr, E.1.05

Vortragende/r	Titel	Abstract
Dr. Radu Prodan Universität Innsbruck Institut für Informatik	**Multi-objective Modelling and Optimization of Scientific and Industrial Applications on Distributed Computing Infrastructures**	The presentation is structured in four parts. It starts with an overview of the current research conducted by the applicant at the University of Innsbruck in the field of distributed and parallel systems. The second part introduces the ASKALON environment, the main research product of the applicant, designed to simplify and support the development cycle of scientific applications on distributed computing infrastructures. Afterwards, it presents a selection of the latest research methods and results obtained in two important areas: modelling, prediction and simulation of energy consumption and multi-objective optimisation and scheduling of scientific applications on distributed computed infrastructures with respect to time, cost, energy, robustness and storage as simultaneous conflicting objectives. The third part of the talk presents the research conducted by the applicant in the area of industrial applications, with focus on massively multiplayer online gaming on distributed computing resources. The talk concludes with an outlook into the future research plans.

Dienstag, 21. Februar 2017, 10.45 Uhr, E.1.05

Vortragende/r	Titel	Abstract
Dr. Karin Anna Hummel Universität Linz Department of Telecooperation	**The Interplay of Physical Mobility and Wireless Networked Systems**	Physical device mobility challenges networked systems as it causes degraded quality of wireless communication links, disconnections, and mobility management overhead, e.g. in the cellular network. The effects of physical mobility are on the one hand observable in the network, on the other hand, mobility context can be exploited to improve networking. In this talk, I explain the relation between physical mobility and networked systems and present two lines of my recent research. In the first part, I focus on the question whether the cellular network can be used as a reliable ubiquitous sensor of physical mobility. As the observation of signaling caused by mobile devices comes with considerable spatial uncertainties, characterizing mobility is challenging. I present a robust method that allows to counteract these uncertainties for vehicular traffic estimation. The outcomes of a one-month study based on real cellular data on a European highway reveal that our method can detect road congestion episodes reliably, and even faster than methods based on traditional road observation technologies. In the second part, I discuss how delay-tolerant networks can take smarter packet forwarding decisions about when, where, and to whom to transmit by being aware of the devices' mobility context. In this frame, I detail results of several experimental studies with our fleet of micro aerial vehicles and demonstrate that leveraging mobility information and moreover anticipating mobility characteristics improves single link transmissions and data forwarding performance over multiple links.