

TNC16 - Building the Internet of People

Building the Internet of People

TNC16, its 32nd edition, was hosted by the Czech National Research and Education Network (CESNET) and held in Prague in Czechia between 12-16 June 2016. The conference provided an opportunity for researchers, operators and suppliers of research and education networks in Europe and beyond to meet, present and discuss their latest results and requirements in an ideal environment for promoting collaboration

This year's conference theme was "Building the Internet of People". Without the relationships between research teams, individual researchers at higher education institutions there would be no successful research done. At the center of this collaboration and as an enabler stands the NRENS. From the start NRENS have been in the business of connecting, not only campuses to each other and to the rest of the Internet but also people belonging to many different communities.

Conference summary

The conference series that has led to TNC16 has been at the heart of developments in research and education networking for around three decades. An ever growing global network of people, from a vast number of professional disciplines, meet to share views and experiences on how to provide the internet of people.

"Building the internet of people" is not only the theme of this year's conference but it is also at the core to why TNC and the NREN community has been able to walk alongside world leading research and education. Not only the technical but also the inter-personal exchange of information drives successful research and educational collaboration.

Through a new conference format, with more invited speakers and a more dense program, in total 9 plenary speakers addressed many different and thought-provoking topics related to the conference theme. Grouped in two each set of plenaries were focused on a specific sub theme.

In Monday's opening plenary was in the form of a dialog between Kees Neggers, from the Netherlands and a long time thought leader in the NREN community and the newly appointed CEO of GEANT Steve Cotter. The dialog was focused on the ever evolving NREN community looking back at 30 years of development and then extrapolating where it could lead.

Tuesday started off with two insightful exposé on security and openness of internet. Olaf

Kolkman from the Internet Society, spoke of the security and governing challenges with an ever growing internet. The second plenary was delivered by Deborah Estrin from Cornell University. Where Olaf Kolkman spoke of the forces on a macro perspective, Deborah focused on the micro implications of information interactions between man and machine, specifically mobile health.

Wednesday's plenary sessions, 6 plenaries in total, covered several separate topics. Firstly, Anna Wilson of HEAnet spoke about how the internet has had an impact on LGBT peoples' lives. Maria Farrell of InterConnect Communications described how the emerging trends of Internet of Things is not altogether a saviour but will exacerbate problems we already have including ever-reducing civil liberties and ever-increasing inequality.

The second set of plenary speakers on Wednesday were Steven Tingay and Peter Holub. Steven Tingay, founding Director of the recently formed Osservatorio di Radio Astronomia (ORA: Radio Astronomy Observatory) of the Italian Istituto Nazionale di Astrofisica (National Institute of Astrophysics) described how the largest radio telescope ever conceived, the Square Kilometre Array (SKA), is advanced networking, computation, and data handling to new levels of volume and complexity. Petr Holub, an Associate Professor of computer science at Masaryk University, Czech Republic, spoke about the challenges and possible solutions for storing and processing privacy-sensitive data in a scalable way.

The third session on Wednesday was also the closing session of TNC16. John Sexton, former president of New York University, held the honor of giving the final keynote of the conference. By discussing perspectives on the future of the global university and the case for globalization in higher education across the world John argued for the tremendous opportunities for students, researchers and faculty throughout the world.

As always the TNC conference, as the theme implies, is about the people. Excellent submitted papers and abstracts were presented to the audience and several workshops, BoFs and impromptu meetings were held during 5 sunny days in Prague.

Selected Papers Summary

Once again, nine papers presented in parallel sessions were selected for this publication. These papers cover both research and practical approaches to some of the challenges faced by today's research and education networks. In keeping with the conference theme, one thing they have in common looking at the people connecting with monitoring, management, analysis and use of the network and human factor on top of those services.

The first of these, "Ludo - Kids playing Distributed Denial of Service" by Jessica Steinberger of University of Twente in The Netherlands looked at the simplicity with which Distributed Denial of Service attacks can be bought online by customers with little technical knowledge and introducing a framework to test mitigation and response capabilities. This paper was presented within a session of the same name with complimentary presentations on DDoS.

Three papers in the session "Monitoring and management" were presented. The first of these is a paper entitled "Simplifying multi-layer network management with RINA" by Eduard Grasa from Fundació i2CAT and co-authors from Ericsson NM Labs (Sven van der Meer), Waterford Institute of Technology (Michael Crotty) and Atos Research and Innovation (Miguel Angel Puente). This paper describes RINA, a network architecture featuring a single type of layer that recurses as many times as needed by the network designer rather than multiple co-operating layers performing different functions implemented by a diverse set of protocols.

The second paper, by Abraham Gebrehiwot of the Institute of Informatics and Telematics of CNR in Pisa, Italy, called: "6MoNPlus:Geographically distributed DualStack network monitoring" which propose a geographically distributed, scalable and extensible open tool for monitoring and controlling geographically distributed Dual Stack (IPv4/IPv6) networks using a single management interface by solving the NAT traversal and firewall issues.

The final paper in this session by Alberto Gonzalez, Jason Leigh, Sean Peisert, Brian Tierney, Andrew Lee, and Jennifer M. Schopf, titled "NetSage – Measurement and Monitoring for International Links" details the NetSage tool and its goal of building and deploying advanced passive and active measurement services for the NSF-funded international backbones and exchange points aggregating SNMP, flow data, Bro-based traffic analysis as well as perfSONAR.

A multi-country development was presented by Sonja Filiposka from Ss. Cyril and Methodius University in Skopje, Macedonia, Yuri Demchenko, University of Amsterdam, Tasos Karaliotas, GRNET, Migiel de Vos, SURFnet and Damir Regvart, CARNet titled "Distributed cloud services based on programmable agile networks" showed the design of a proof of concept open multi-cloud ecosystem to support the agile reconfiguration of applications for the research and education space.

In "Multipresence: towards videoconference and collaboration", by Valter Roesler, Luiz Eduardo de Souza Coelho, Guilherme Longoni, André Marins, Leonardo Crauss Daronco, Leandro Ciuffo and Renato Duarte, the authors presented their paper on an architectural and technological view of a new video conference and collaboration system called "Multipresence", which adapts to various physical environment settings and enables the interoperability of various technologies.

"Innovating Colosseo: a distr-active artistic performance " by Edoardo Angelucci 1, Alex Barchiesi, Andrea De Tommasi, Bruno Nati, Mirella Serlorenzi, Sabrina Tomassini, Cristiano Valli, Giancarlo Viola and Carlo Volpe from Italy addressed the important topic of support for the cultural heritage community by providing advanced network infrastructure and tailored technical solutions that answer its specific requirements in her presentation of the paper.

The paper "State-of-the-Art in Biometrics for Multi-Factor Authentication" by Martijn Oostdijk from InnoValor in The Netherlands presents how improved use of biometrics have been a

promising technology for authentication but have yet to see large scale adoption. The challenges for biometrics at scale and the critical success factors that need to be implemented in order to address these challenges were also explored.

The final selected paper was presented in the topic "Bridging the Digital Divide in Tropical South America" in a session called "Global Network Architecture". Michael Stanton from RNP in Brazil showed the evolution of an innovative proposal to lay optical communication cables along the courses of the large rivers found in the Amazon basin of South America, targeting the population concentrated along the rivers utilising the same infrastructure that provides food and transportation for the inhabitants.

Archives of live-streamed speeches, speakers' slides and other TNC16 information are all available via the conference website: tnc16.geant.org. We look forward to very warmly welcoming you to TNC17, which will be held on 29 May - 2 June 2016, Linz, Austria and at tnc17.geant.org.

TNC16 Programme Committee

SELECTED PAPERS

(alphabetically by presenting author)

Monitoring, management and measurement, biometrics, digital divide, performance, video conference.

[6MoNPlus: Geographically distributed Dual Stack network monitoring](#)

[Watch the presentation](#)

[Abraham Gebrehiwot](#)

[Simplifying multi-layer network management with RINA: analysis of a multi-tenant data center network](#)

[Watch the presentation](#)

[Eduard Grasa](#)

[NETSAGE: open privacy-aware network measurement, analysis and visualization service](#)

[Watch the presentation](#)

[Jennifer Schopf](#)

[Ludo - Kids playing Distributed Denial of Service](#)

[Watch the presentation](#)

[Jessica Steinberger](#)

[State-of-the-Art in Biometrics for Multi-Factor Authentication in a Federative Context](#)

[Watch the presentation](#)

[Martijn Oostdijk](#)

[Bridging the Digital Divide in Tropical South America](#)

[Watch the presentation](#)

[Michael Stanton](#)

[Innovating Colosseo: a distr-active artistic performance](#)

[Watch the presentation](#)

[Sabrina Tomassini](#)

[Distributed cloud services based on programmable agile networks](#)

[Watch the presentation](#)

[Sonja Filiposka](#)

[Multipresence: towards videoconference and collaboration in multi-use environments](#)

[Watch the presentation](#)

[Valter Roesler](#)