FUTEBOL: Convergence of Wireless, Optical, and Cloud Domains

Prof. Luiz DaSilva Trinity College Dublin

Cloudscape Brazil 2018 Natal, Brazil, 25 July 2018
The main goal of FUTEBOL is to develop and deploy research infrastructure and an associated control framework for experimentation in Europe and Brazil, that enables experimental research at the convergence point between optical and wireless networks and the cloud domain.
Consortium

• European institutions:
  – 3 academic
  – 1 industry
  – 2 research labs
• Brazilian institutions:
  – 5 academic
  – 2 industry
• 60+ people involved
FUTEBOL facilitates the co-design of wireless and optical network resource management through experimentation.

$10B \quad \text{market for NFV, SDN, virtualization in 2015 alone}$

$1.5T \quad \text{value IoT will add to the economy by 2019}$

$2.7B \quad \text{small cell market by 2017}$
**Objective 1:** To deploy facilities in Europe and Brazil that can be accessed by external experimenters for experimentation that requires integration of wireless and optical technologies.
Objective 2: To develop and deploy a converged control framework for experimentation at the wireless/optical boundary, currently missing in FIRE and FIBRE research infrastructure.
Objective 3: To conduct industry-informed research using the optical/wireless facilities
Objective 4: To create a sustainable ecosystem of collaborative research and industrial/academic partnerships between Brazil and Europe.
Open Access

- **Open Call:**
  - Publication of this call: **August 31st, 2017**
  - Proposal submission cutoff date: **November 20th, 2017**
  - Notification of acceptance: **December 6th, 2017**
  - Submission of the final project report: **October 1st, 2018**

- **Three Proposals selected for advanced support**
  - Universidad del Cauca, Colombia; ICT Lab-Inatel, Brazil, and University of Missouri- Kansas City, USA

- **Two proposals selected for basic support**
  - Federal University of Viçosa, Brazil; and Federal University of Lavras, Brazil
Objective 5: To create education and outreach materials for a broad audience interested in experimental issues in wireless and optical networks
Impact and sustainability

- Improving access to experimental facilities
  - All FUTUREBOL testbed facilities in Brazil (UFRGS, UFMG, and UFES) have reached full federation with Fed4FIRE
  - FUTUREBOL testbeds in Europe are federated with Fed4FIRE
  - Access for experimenters sustained through Fed4FIRE+ (TCD)
  - Access for research and education in Brazil sustained through FIBRE

- Broadening the scope of experimental facilities
  - FUTUREBOL finalized the development, implementation, and validation of the converged control framework for experimentation at the optical/wireless boundary, with orchestration of processing in the cloud (containers) and VNFs
Impact and sustainability

• Promoting experimentally-driven research with end-user involvement
  – Engagement in industry panels, with standards bodies (3GPP), and with regulators in Brazil and Europe
  – FUTEBOL has been presented in one-to-one meetings to operator and vendors such as Telia and Ericsson

• Contribution to improving innovation capacity and the integration of new knowledge
  – Through the open call/open access more researchers are having access to FUTEBOL facilities and new experiments are being performed, pushing the boundaries of the state of the art.

• Contribution to socially important impacts
  – FUTEBOL contributed to the discussions of future international experimentation-based telecommunications and network research facilities – participation in GEFI meeting in Brazil
  – Continuous flow of knowledge exchange among EU and Brazil partners through constant collaboration
Thank You!

Prof. Luiz DaSilva TCD
Prof. Cristiano Bonato Both UFRGS