DISTRIBUTED MANAGEMENT OF NETWORK SLICES IN BEYOND 5G

CONTENTS

CONSORTIUM

Project Coordinator

France

Poland

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OVERVIEW

As 5G technology is maturing, and in view of new pervasive mobile services of different vertical industries, it will be a necessity to support massive numbers of coexisting network slices, with different performance requirements, functionality, and timespans. This puts significant strain on the management and orchestration system that traditional centralized designs, as in Cloud Computing and NFV, fail to cope with.

MonB5G aims at deploying a novel autonomous management and orchestration mechanism framework by heavily leveraging distribution of operations together with state-of-the-art Artificial Intelligence (AI) based mechanisms. The developed system is based on a hierarchical approach that allows the flexible and efficient management of network tasks, while at the same time, introduces a diverse set of centralization levels through an optimal adaptive assignment of monitoring, analysis, and decision-making tasks. The MonB5G approach focuses on the design of a hierarchical, fault-tolerant, automated data driven network management system that incorporates security as well as energy efficiency as key features, in order to orchestrate a massive number of parallel network slices and significantly higher types of services in an adaptive and zero-touch way.

The MonB5G project will last three years and will deliver a proof-of-concept providing a hierarchical, fault-tolerant, automated data driven network management system that incorporates security as well as energy efficiency. Demonstration will be carried out in two experimental platforms:

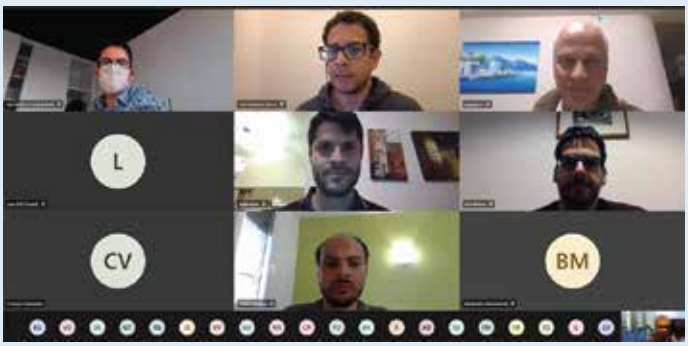
(i) CTTC's 5G testbed in Barcelona, Spain.

(ii) Eurecom's 5G trial facility in Sophia Antipolis, France.

MEETINGS

In the past period, 2 plenary meetings took place, hosted by the project coordinator, the Telecommunications Technological Centre of Catalonia's (CTTC) SMARTECH department, to review the project's progress, and outline the roadmap ahead. All 12 partners joined remotely via teleconference due to COVID-19 restrictions.

MonB5G 4th Plenary Meeting
16th-17th December 2020



MonB5G 3rd Plenary Meeting
25th-26th June 2020

PUBLICATIONS

Type	#	Publications	Title	Partners	Authors
Journals	1	European 5G Annual Journal (5th Edition)	MonB5G Project	CTTC	
	2	Transactions on Intelligent Transportation Systems (IEEE)	Data Driven Service Orchestration for Vehicular Networks	IQU, CTTC	Anestis Dalgkitsis, Prodromos-Vasileios Mekikis, Angelos Antonopoulos, Christos Verikoukis
	3	IEEE Network Magazine	A novel QoS framework for network slicing in 5G and beyond networks based on SDN and NFV	AALTO	S. Zhaogang and T. Taleb
	4	IEEE IoT Journal	Federated Deep Reinforcement Learning for Internet of Things with Decentralized Cooperative Edge Caching	AALTO	X. Wang, C. Wang, X. Li, V. C. M. Leung, and T. Taleb
	5	IEEE Trans on Wireless Communications	On SDN-driven Network Optimization and QoS aware Routing using Multiple Paths	AALTO	M. Bagaa, D.L.C. Dutra, T. Taleb and K. Samdanis
	6	IEEE Network Magazine	A Service-Based Architecture for enabling UAV enhanced Network Services	AALTO	Oussama Bekkouche, Konstantinos Samdanis, Miloud Bagaa, Tarik Taleb
	7	IEEE Network Magazine	The Road beyond 5G: A Vision and Insight of the Key Technologies	AALTO	K. Samdanis and T. Taleb
	8	IEEE Network Magazine	Towards ML/AI-based Prediction of Mobile Service Usage in Next-Generation Networks	AALTO	T. Taleb, A. Laghrissi, and D.E. Bensalem
	9	IEEE Network Magazine	AI for Beyond 5G Networks: A Cyber-Security Defense or Offense Enabler?	AALTO	C. Benzaid and T. Taleb
	10	IEEE Network Magazine	Service Function Chaining in Next-Generation networks: Challenges and Open Research Issues	AALTO	H. Hantouti, N. Benamar, and T. Taleb
	11	IEEE Transactions on Mobile Computing	QoS and Resource-aware Security Orchestration and Life Cycle Management	AALTO	M. Bagaa, Tarik Taleb, Jorge Bernal Bernabe, Antonio Skarmeta
	12	IEEE Transaction on Wireless Communications	LACO: A Latency-Driven Network Slicing Orchestration in Beyond-5G Networks	NEC	Lanfranco Zanzi, Vincenzo Sciancalepore, Andres Garcia-Saavedra, Hans D. Schotten, Xavier Costa-P'erez

Type	#	Publications	Title	Partners	Authors
	13	IEEE Transaction on Network and Service Management	ARENA: A Data-driven Radio Access Networks Analysis of Football Events	NEC, OTE	Lanfranco Zanzi, Vincenzo Sciancalepore, Andres Garcia-Saavedra, Xavier Costa-Perez, George Agapiou, Hans D. Schotten
Conferences	14	IEEE International Conference on Communications (ICC) 2020	NSBchain: A Secure Blockchain Framework for Network Slicing Brokerage	NEC	Lanfranco Zanzi, Antonio Albanese, Vincenzo Sciancalepore,Xavier Costa-Perez
	15	IEEE Global Communications Conference (GlobeCom)	Dynamic Resource Aware VNF Placement with Deep Reinforcement Learning for 5G Networks	IQU, CTTC	Anestis Dalgkitsis, Prodromos-Vasileios Mekikis, Angelos Antonopoulos, Georgios Kormentzas, Christos Verikoukis
	16	IEEE ICC'20	Latency-aware Service Placement and Live Migrations in 5G and Beyond Mobile Systems	AALTO	B. Mada, M. Bagaa, T. Taleb, and H. Flinck
	17	16th International Conference on Network and Service Management (CNSM 2020)	Heuristic for Edge-enabled Network Slicing Optimization using the "Power of Two Choices"	ORA-FR	José Jurandir Alves Esteves , Amina Boubendir, Fabrice Guillemin, Pierre Sens
	18	IEEE LCN 2020 conference	On Predicting Service-oriented Network Slices Performances in 5G: A Federated Learning Approach	EUR	Bouziane Brikz and Adlen Ksentini
	19	11th International Conference on Networks of the Future (NoF 2020)	Edge-enabled Optimized Network Slicing in Large Scale Networks	ORA-FR	José Jurandir Alves Esteves , Amina Boubendir, Fabrice Guillemin, Pierre Sens
	20	2020 6th IEEE International Conference on Network Softwarization (NetSoft)	Location-based Data Model for Optimized Network Slice Placement	ORA-FR	José Jurandir Alves Esteves , Amina Boubendir, Fabrice Guillemin, Pierre Sens
	21	23rd Conference on Innovation in Clouds, Internet and Networks (ICIN 2020)	Optimized Network Slicing Proof-of-Concept with Interactive Gaming Use Case	ORA-FR	José Jurandir Alves Esteves , Amina Boubendir, Fabrice Guillemin, Pierre Sens
	22	IEEE INFOCOM 2021	π-ROAD: a Learn-as-You-Go Framework for On-Demand Emergency Slices in V2X Scenarios	NEC	Armin Okic, Lanfranco Zanzi, Vincenzo Sciancalepore, Alessandro Redondi, and Xavier Costa-Perez

INVITED TALKS

Event	Partner	Date
5G-PPP TB eWorkshop	Eurecom (Thrasyvoulos Spyropoulos)	9 Dec 2020
IEEE COMSOC Industrial Talk: Network Slicing - Concepts, Standardization, Open Issues	ORA-P (Slawomir Kuklinksi)	1 Dec 2020

5G-PPP PARTICIPATION

WG	Institution
5G Architecture WG	ORA-PL
Software Networks WG	CITRIX, ORA-PL
Trials WG	EBOS, CTTC

WHITE PAPERS CONTRIBUTIONS:

1. Edge Computing (CITRIX, ORA-PL)
2. AI (CITRIX, ORA-PL)

DELIVERABLES

Deliverable	Lead Beneficiary	Submission Date
D2.2 Techno-economic analysis of the beyond 5G environment use case requirements and KPIs	OTE	November 2020
D2.3 Trust model and trust management approaches	AAL	November 2020
D7.3 Press Release	OTE	June 2020

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