SEASON Project

Filippo Cugini, CNIT, Project Coordinator

Ramon Casellas, CTTC, Technical Manager

SEASON Project
Grant No. 101096120
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SEASON Project overview

❖ SELF-mAnaged Sustainable high-capacity Optical Networks (SEASON)
  ❑ Grant agreement ID: 101096120
  ❑ HORIZON-JU-SNS-2022-STREAM-A-01-03 - Sustainable Capacity Networks
  ❑ RIA - Research and Innovation action

❖ Dates
  ❑ Start: 1 Jan 2023
  ❑ End: 31 Dec 2025

❖ Total cost: € 6 393 648
The goal of the SEASON project is to design and validate a transport network infrastructure able to support beyond 5G and new emerging services.

- Network scope includes the access, aggregation, and the metro/long-haul segments
- SEASON targets efficient networks in terms of capacity and energy efficiency.

**Pillars:**

1) **Multi-Band and Space division Multiplexing (SDM)**

2) **Packet/optical/computing integration**

3) **Self-managed and autonomous networking**
Multi-band over Space Division Multiplexing (SDM)

- New MBoSDM infrastructure
  - from C-band (~35 nm) to O, E, S, L, U bands (~415 nm)
  - >10 fibres / cores
  - x120 wrt current C-band.

- Innovative multi-granular switch

- Ultra-high capacity transmission
  - Point-to-point and P2MP
  - Energy-Efficient Coherent DSP

- Optical Midhaul/Fronthaul
  - Coordinated cell activation/deactivation

- Data plane monitoring infrastructure
  - DSP-based monitoring scheme
Converged packet-optical transport

- Converged packet-optical transport solution based on coherent pluggable modules directly inserted into computing resources
  - drastically reducing O/E/O conversions
  - removing boundaries between networks and edge computing resources,

- Decentralize the implementation of UPF-DU-CU (-RU) functions closer to the cell site
  - Reduce latency (user traffic handled at the local CO or at the cell site)
  - Elimination of some GTP interconnects (F1-U, N3, N9) to be bypassed
  - HW acceleration to reduce energy consumption
Self-managed and autonomous networking

- Design and validate a transport network control and orchestration infrastructure able to support beyond 5G and new emerging services
  - Full support of innovative Multi-band over SDM transmission and switching HW solutions
  - Integration of RAN Intelligent Controller (RIC) and access/metro SDN Control
  - Applicability of new control paradigms based on NetDevOps approaches jointly with AI/ML in support of network operation and network orchestration;
AI-driven control

- Monitoring and Streaming Telemetry with Intelligent Data Aggregation (IDA)
- Multi-Agent Systems (MAS) for distributed intelligence
- Optical Layer Digital Twin
Demo 1 – Operator perspective

- Operator Infrastructure with capacity scaling, monitoring and AI/ML network operation in support of Beyond 5G
Demo 2 – User perspective

- Real-time *profiled* content to offer enhanced immersive experience to the user
  - Off-load of the graphical computation for multi-stream transmission of rendered content.
  - High throughput offered by densifying radio access points → dense and high-capacity optical transport.
  - The demo will deploy an open virtual museum in the City of L'Aquila and by leveraging field-deployed experimental infrastructures (O-RAN, SDM optical ring testbed)
info@season-project.eu

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