

# Distributed ROADM Technology for Future Mobile Fronthaul Network

## Introduction

In recent years, balancing the rapidly increasing traffic demand with cost reduction in Mobile Fronthaul Networks has become a major challenge for telecommunications carriers.

Our Distributed ROADM technology maximizes optical fiber capacity utilization, significantly reduces construction and operating costs, and enables the realization of future mobile networks with high reliability and flexibility.

## As-Is

- RUs and DUs are connected using fixed dark fiber.
- Challenges: While simple to implement, this approach results in higher fiber costs and limited network flexibility.

## To-Be

- Extends RU-DU distance from 10 km to 30 km, enabling efficient aggregation of signals from RUs distributed over a wide area to a single DU using a single optical fiber.
- Optical path switching enables flexible network operation that adapts to traffic fluctuations and facilitates rapid recovery in the event of a failure.

## Advantages of using Distributed ROADM

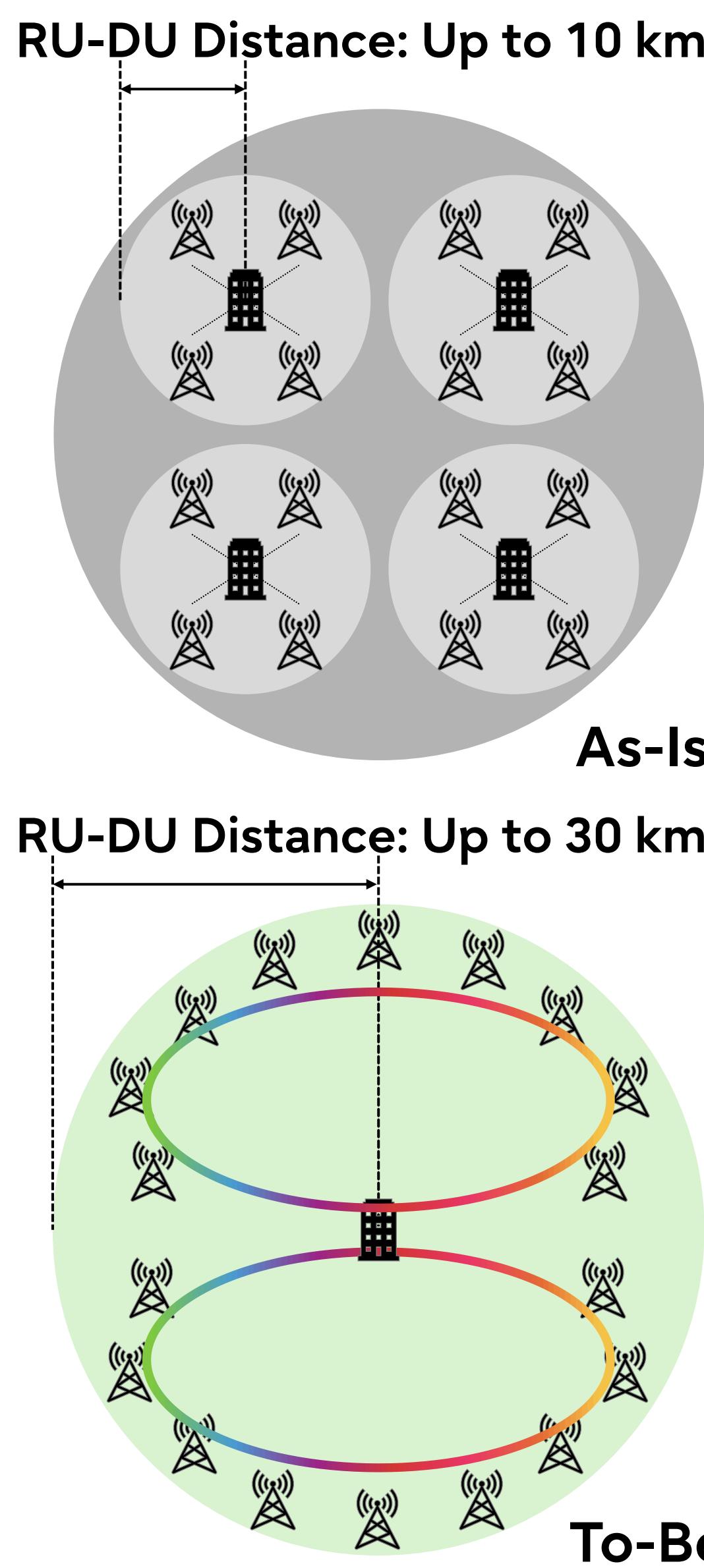
**Expanded Coverage Area:** ROADM extends the RU-DU distance from 10 km to 30 km, tripling the coverage area. This allows a single DU to aggregate signals from RUs over a wider area.

**Space Savings:** The passive remote node under development requires approximately half the space of existing products, improving space efficiency.

**Flexible Resource Management:** End-to-end wavelength path control dynamically adapts to traffic demands. This allows for reduced DU operating time during low-traffic periods, resulting in lower overall network power consumption.

**Reduced Fiber Length:** Wavelength multiplexing reduces fiber length by approximately 40% compared to conventional networks, resulting in significant installation cost savings.

**Maximized Transmission Capacity:** Wavelength multiplexing increases the capacity per fiber by approximately 190-fold compared to conventional networks.



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## Use Case for Flexible Resource Management

At night, DUs in commercial areas can be placed in sleep mode, and traffic can be concentrated on DUs in residential areas via optical path switching, resulting in power savings. Specifically, in a network with two DUs, putting one DU into sleep mode between midnight and 6:00 AM can reduce operating time by approximately 13% compared to conventional networks.

