

# Requirements and Solutions for Next-Generation Access

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## Abstract

The EU FP7 project "OASE" examines Fiber-to-the-Home solutions for the next generation of broadband optical access. The original requirements set of 1 Gb/s per-client bandwidth, 1000 clients per access system (i.e., per PON or AON [Passive / Active Optical Network] domain), and 100 km reach has been refined since the start of the project. The newer numbers now also indicate *meaningful lower bounds* of the respective parameters. They are now also in line with the so-called FSAN (Full-Service Access Network) Strawman requirements.

A number of potential solutions have already been identified which are capable of coping with these requirements. These contain WDM-PON (Wavelength-Domain Multiplex PON) as well as various hybrid solutions which either combine WDM with further multiple-access techniques, or active with fully passive techniques. Next-generation AON is also under consideration, whereas it already became apparent that solutions like single-lambda ultra-high-speed TDMA or OFDMA (Time-Domain / Orthogonal Frequency-Domain Multiple Access) can not meet the next-generation access requirements.

A more detailed analysis takes system CapEx (Capacity Expenditures), power consumption and the achievable (reach × client-count)-product at high sustained bit rate (1Gb/s or half of that) into consideration. It can be shown that if client count requirements do not exceed the range of 80...160, then non-coherent wavelength-routed – i.e., filtered – WDM-PON can provide the most economical solution, and also one which can cope with the long-reach and bit-rate requirements.

Numbers for various potential solutions, including cost normalized to G-PON will be presented.

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