Photonic Service Engine 3

Taking light to the limit!

Opportunity

Customer demands for mobile broadband, cloud services and video streaming continue to grow exponentially, creating a massive requirement for increased bandwidth capacity on optical networks. Communication Service Providers (CSPs) and Internet Content Providers (ICPs) alike are struggling to keep up.

Until now, the optical networking industry has delivered this increased capacity by inventing ever-more sophisticated digital signal processors (DSPs). These have advanced wavelengths from 100G to 200G and beyond. But it's still not enough.

Even with these innovations and capacity gains, performance and flexibility are lagging what the market needs. With 5G on the horizon, the demand for capacity is only going to grow. Nokia believes that a bold new approach is now needed. One that will deliver a seamless evolution path for CSPs and ICPs that want to grow beyond the limited flexibility of the 100G/200G networks prevalent today, to a highly scalable and automation-ready network.

The new Photonic Service Engine 3 is our answer.

Breakthrough Innovations

Nokia is proud to launch our industry-leading new super coherent optical chipset - the Photonic Service Engine 3, or 'PSE-3'. This leverages a recent innovation from Nokia Bell Labs called Probabilistic Constellation Shaping (PCS), which approaches the maximum information transfer rate physically possible. As such, it is fundamentally redefining industry benchmarks for network capacity and distance, enabling finer capacities over a wider range of wavelengths from 100G – 600G.

With this innovation, optical fiber transmission capacity is pushed to very near the Shannon Limit. This is the maximum theoretical capacity of a communications channel as defined by Claude Shannon in 1948, while he was a researcher at Bell Labs.

Description

PCS is a new constellation optimization technique providing superior optical performance and infinitely variable capacity. With standard modulation formats, such as the 64QAM constellation shown in Figure 2, all constellation points are used with equal probability. By intelligently adjusting which constellation points are used and how often, probabilistic shaping matches the wavelength to the optical characteristics of each route. This technique improves optical reach performance by approximately 1 dB, or roughly 25 percent, enabling performance to within a fraction of a dB of Shannon theoretical limits.

PCS not only maximizes performance, but also does so at any possible distance within an optical network on any fiber – from metro to subsea: without compromise.

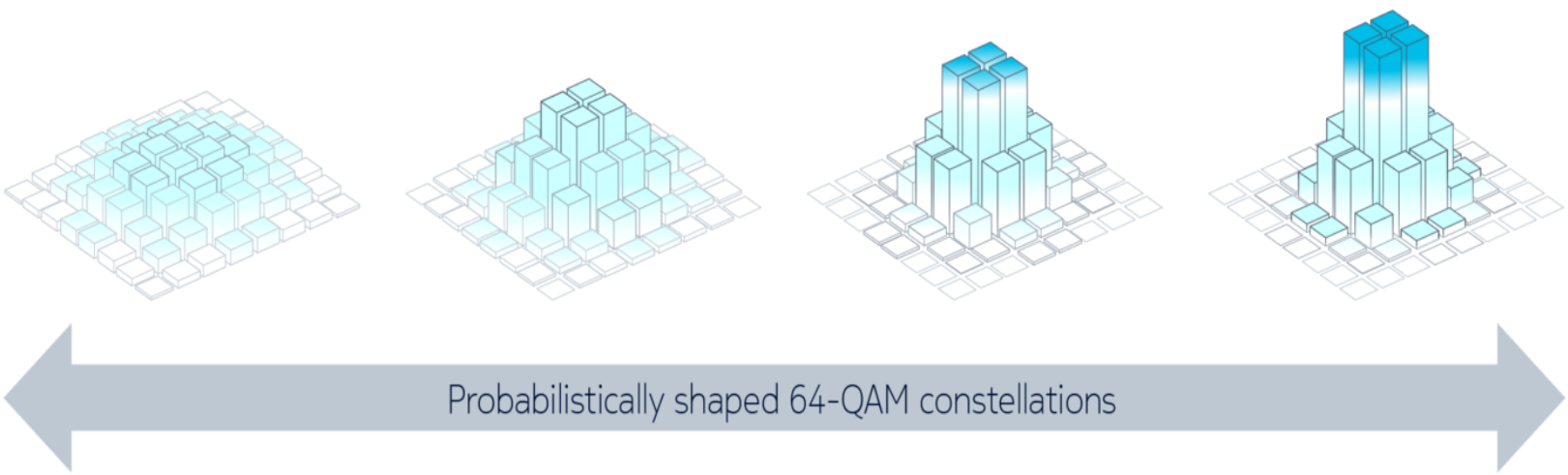
Ultimate performance, unconstrained flexibility, optimized spectral efficiency and extreme programmability are finally possible.

Key Features:

- 65% Increase in capacity over currently deployed 100G networks
- 25% Increase in capacity over the latest technologies
- 60% Reduction in power per bit

Contact

herbert.haunstein@nokia.com



© 2019 Nokia Solutions and Networks GmbH & Co. KG – Innovation Days Stuttgart – 25. bis 28. November 2019