Simplified Submarine Cable Design
Where subsea meets terrestrial…
Simpler Networks
Intelligent SLTE with D+ Cable Designs

Previous typical design
• Multiple fibre types
• Precise fiber design
• Complex Repairs

Coherent Optimised Designs
• Simplified fiber type
• Simple Repairs (single fiber type)
• 100G services and beyond
Geo Mesh for simplified Submarine Solutions
Submarine-Terrestrial Networks Demarcation Point

Simplifying the Cable Landing Station via GeoMesh

Metro/Regional

Terrestrial Backhaul

Cable Landing Station

Wet Plant

OEO Stage

TLTE

SLTE

XCON

SIE

Amp

Facing overland

Facing undersea

Metro/Regional

Terrestrial Backhaul

Cable Landing Station

Wet Plant

OEO Stage

SLTE + XCON

OEO Stage

OEO Stage

OEO Stage

OEO Stage

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GeoMesh: POP-to-POP Connectivity

Integrated PoP-to-PoP network design, with optional diverse (redundant) terrestrial backhaul at one end or both ends

PoP = Point of Presence
CLS = Cable Landing Station
Photonic Cable Landing Station
Simplified “all optical” network design

Submarine SLTE ROADM

Power management channels added locally

Submarine SLTE ROADM

Cost / Opex Reduction
Reliability Improvement

Submarine transponders are relocated directly into the PoP
Removes four terrestrial backhaul transponders for each inland wavelength

Terrestrial Backhaul Route

Redundant Terrestrial Backhaul Routes

Submarine Tx/Rx

Submarine Tx/Rx
Photonic Cable Landing Station
Express wavelength pass-through network design

Express Wavelengths

Submarine SLTE ROADM

\[ \lambda_1 \ldots \lambda_n \]

Submarine SLTE ROADM

\[ \lambda_1 \ldots \lambda_n \]

Submarine SLTE ROADM

\[ \lambda_1 \ldots \lambda_n \]

0 to N wavelengths may be added/dropped at the intermediate station

Flexible wavelength routing between express and drop ports
No regeneration for express wavelengths
Fixed channel filters for connecting client ports
Power management filters added/dropped in both directions

Cost Reduction, Latency Reduction, & Improved Reliability
Geo Mesh
Customer examples
SLTE Upgrade Highlights

- Utilizing GeoMesh for terrestrial backhaul and optical bypass at two cable stations, AMX have achieved unregenerated distances >11,000km with Wavelogic 3 extreme QPSK modulation
- Over 250,000ps/nm of dispersion compensation within the DSP
Upgrade Highlights

- NYC to Dublin and London un-regenerated with GeoMesh capabilities
- Terrestrials builds in NYC / Ireland and UK
- Solution includes Unified Management System / PinPoint Advanced Fibre Analytics / Layer 0 Control Plane.
Intelligent GeoMesh SLTE
Operational Savings
GeoMesh with Intelligent SLTE provides the following benefits:

- Optimised network infrastructure with reductions in power, space,
- simplified operations,
- Lower costs
- End-to-end service provisioning
- Improved traffic handoff between submarine networks and terrestrial networks
- Reduced latency by avoiding unnecessary optical-electrical conversion stages
- Improved network resiliency
Thank You
Intelligent SLTE
WaveLogic Ai
Integrated Test-set Capability (ITS)

A high level summary of the benefits of the Integrated Test Set are as follows:

- Enables generating & monitoring of 10Gb/s & 100Gb/s traffic patterns
- Performed remotely from the Network Operations Center (NOC)
- Alleviates buying expensive test-sets
- Can be enabled on one or more client ports simultaneously
- ITS operations do not affect traffic on other client ports that are in service
- Each client port is treated as an individual test set and can be operated independently of other client ports
Marine Pin-Point Break Identification

Loss of traffic detected on DLS by SLTE
C-OTDR run to identify failure point and cable distance
SLD database analysed to determine GPS coordinated of failure
GPS information sent to marine maintenance company

34.37035
137.0098