Deutsche Glasfaser

Technical Specification – DG – Point-to-Point DGH and DGB

Informationsklasse: Öffentlich / Information class: Public

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2 Document Control

2.1 Releases

Version	Date	Changes
V.0.1	28-05-2022	Document structure and description of the design, including technical specifications and visualizations
V.1.0	01-06-2022	Editorial adjustments
V.1.1	05-10-2022	Editorial adjustments
V.1.2	14-12-2023	Editorial adjustments

3 Contact Information

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4 Abbrevations

AN	Access Node
CPE	Customer Premises Equipment
DGB	Deutsche Glasfaser - Business Service
DGH	Deutsche Dlasfaser – Home Service
NT	Network Termination
PE	Provider Edge
SFP	Small Form Factor Pluggable device
SMB	Small & Medium Business

5 Introduction

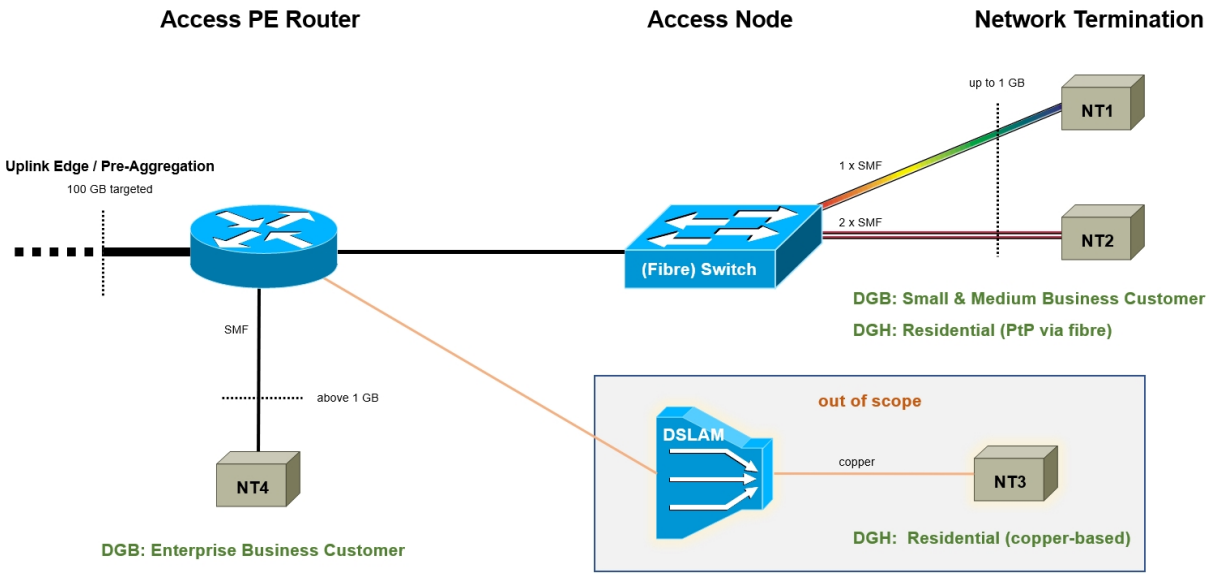
5.1 Document Purpose and Scope

The services Residential (DGH) and Business (DGB) described in this document are based on optical access for point-to-point Ethernet. Implementations for one-fiber and two-fiber variants are supported. This document highlights parameters and requirements for the fibre-based DG solution.

Scalability is excellent and data rates can be adapted to the requirements of the individual customer. Bandwidth ranges from 100 Mbit/s up to 10 Gigabit Ethernet are technically feasible.

5.2 Underlying Network Design for point-2-point connections

The below diagram is depicting the point-to-point (PtP) connectivity from access area perspective.



At the time of writing this document the following implementation details relate to PtP-based access:

- Access Nodes are target-function dependend (usage for DGH or for DGB) mapped to dedicated Nokia 7360 ISAM hardware, resulting in the following splitting:
  - type OLT: focus on GPON connectivity → out of scope for this document
  - type BAR: focus on business customer access and PtP connectivity

- Sample product mapping to above figure:
  - AN for fibre PtP access = Nokia 7360 ISAM with NELT-B or FELT-C line cards … aka L2 (fibre-ports) Switch for PtP connections for DGB and DGH
  - DG used NT's:
    - Nokia 7210 SAS-K (5 and 12 LAN ports variants)
    - Cisco ME1200 →as EOL this product will be replaced by Cisco NCS 520 !
    - Genexis Fibertwist (just for DGH !)

- As copper-based access is no topic for this document, all DSLAM-related aspects are omitted.

5.3 Delimitation and Parameters

The PtP-related document objective for DGH and DGB is focused on Active Ethernet. Shared media solutions based on PON are out of scope in this document.

Bandwidth dependent termination of fibre-based connection services:

- up to 1GB: on Access Node
- > 1GB: on Access PE Router

Copper-based access connections (aka DSL via DSLAM'S) are not subject to this document.

6 Technical Description

6.1 Physical Layer Requirements

The following requirements must be met for one-fiber GB connections towards AN:

- Single mode fiber (ITU-T G.657)
- Connector type: cSFP Bidi (LC Duplex)
- Max. distance: 10km
- Wavelengths:
  - downstream (RX): 1480-1500 nm, center 1490 nm
  - upstream (TX): 1260-1360 nm, center 1310 nm
- Max. line rate:
  - downstream: 2.488 Gbit/s
  - upstream: 1.244 Gbit/s
- Application: Base1000-BX10-D

The following requirements must be met for two-fiber 10GB connections towards Access PE Router:

- Single mode fiber (ITU-T G.657)
- Connector type: SFP+ (LC Duplex)
- Max. distance: 10km
- Wavelengths:
  - downstream (RX): 1310 nm
  - upstream (TX): 1310 nm
- Application: Base10G-LR

6.2 Data Link Layer Requirements

The NT must allow the configuration of P-bit settings on a per VLAN basis.

6.3 Management Requirements

Management requirements NT DGH:

- CPE WAN Management Protocol (TR-069)
- CLI
- DHCP/TFTP

6.4 Supported Protocols and DG Services

Supported protocols for DGH:

- IPoE with support for
  - DHCPv4 (RFC 2131) and
  - DHCPv6 (RFC 8415)
- PPPoE for LNS/LAC deployments

Supported protocols for DGB:

- • IPoE with support for
- o DHCPv4 (RFC 2131) and
- o DHCPv6 (RFC 8415)
- • PPPoE for LNS/LAC deployments
- • Static
- • MEF E-LAN, E-Line, E-Tree

A maximum of 5 customer MAC addresses are supported per VLAN interface. Traffic from additional MAC addresses will be silently dropped.

Relevant security features are primarily implemented and inforced on the Access Node and/or Access PE Router.