

Service description blizznetVLL and blizznetVPLS

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1. Basic service

Wien Energie offers the products blizznetVLL (point2point) and blizznetVPLS (multipoint) on the basis of its IP-based MPLS network (Multiprotocol Label Switching). This service description applies to both products. Exceptions are expressly pointed out. The basic differences are explained in items 1.1 and 1.2.

A redundant connection of the customer sites is optionally possible.

All information refers to the fact that the realisation takes place exclusively with network infrastructure from Wien Energie. This service description applies exclusively to contracts with entrepreneurs within the meaning of § 1 KSchG.

1.1. *blizznetVLL*

Using blizznetVLL (Virtual Leased Line), Ethernet-based point-to-point connections are provided via the MPLS network. If the customer orders several blizznetVLL connections, a bundled handover is possible (see Figure 2: blizznetVLL with centralised handover).

1.2. *blizznetVPLS*

Using blizznetVPLS (Virtual Private LAN Service), Ethernet-based multipoint-to-multipoint connections are made available via the MPLS network. This allows distributed customer sites to share an Ethernet broadcast domain. The customer sites are connected to each other via the connection to the MPLS network, whereby the MPLS network emulates a switch and thus creates a single-bridged LAN.

1.3. *Access bandwidths*

The following access bandwidths are available for selection:

- 10 Mbit/s
- 20 Mbit/s
- 50 Mbit/s
- 100 Mbit/s
- 200 Mbit/s
- 500 Mbit/s
- 1,000 Mbit/s (= 1 Gbit/s)
- 2,500 Mbit/s (= 2.5 Gbit/s)
- 5,000 Mbit/s (= 5 Gbit/s)
- 10,000 Mbit/s (= 10 Gbit/s) on a project basis

The selected access bandwidth is available to the customer in both directions (sending and receiving) at the same time (full duplex).

1.4. Examples

blizznetVLL: 100 Mbit/s

The customer has a blizznetVLL connection with an access bandwidth of 100 Mbit/s.

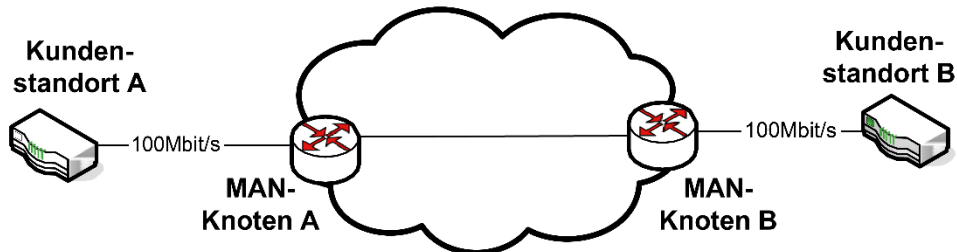


Figure 1: blizznetVLL

blizznetVLL: Separate blizznetVLLs with centralised handover

The customer has several separate blizznetVLL connections with different access bandwidths. The handover is centralised. The bandwidth requirement of the central handover is calculated from the cumulative access bandwidths of the individual blizznetVLLs. To separate the VLLs, they are assigned VLAN IDs. These can be freely selected by the customer in consultation with Wien Energie.

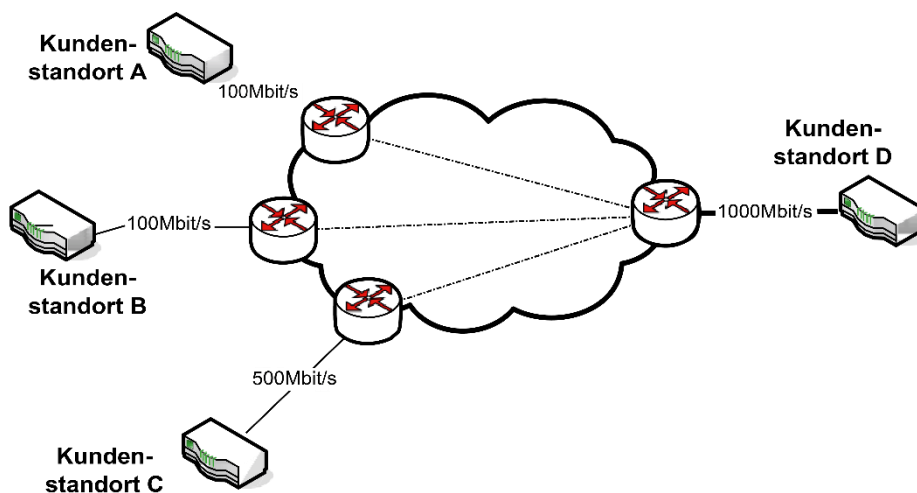


Figure 2: blizznetVLL with centralised handover

blizznetVPLS

The following diagram illustrates blizznetVPLS with different access bandwidths. With blizznetVPLS, access refers to the connection of the individual sites to the shared network solution.

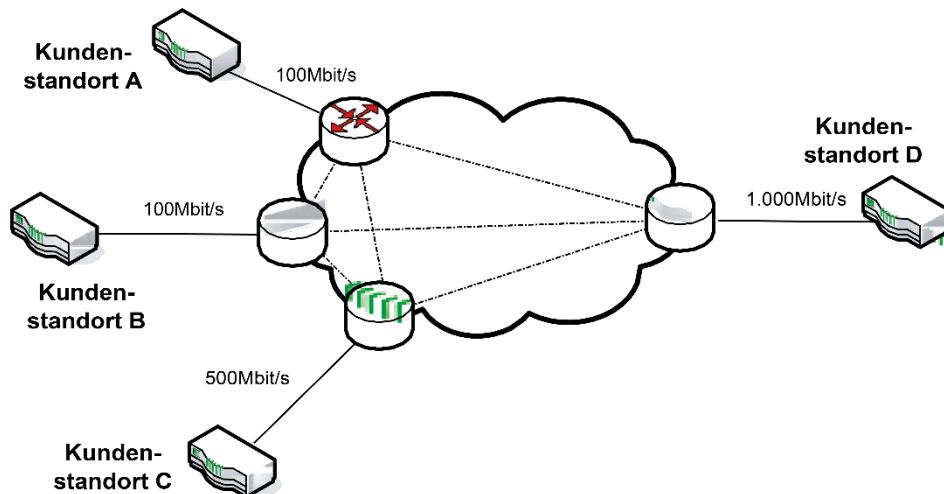


Figure 3: blizznetVPLS

2. Prerequisites

2.1. *Physical availability*

blizznetVLL and -VPLS are available wherever Wien Energie can provide a fibre optic connection.

2.2. *Structural/spatial requirements*

The installation site for the equipment provided by Wien Energie at the customer's premises must be clean, dry, safe and adequately ventilated. In particular, the customer must ensure at their own expense that the following general conditions are guaranteed if a CE (customer edge) is used:

- Power supply: 230 V ~/ power consumption max. 150 W
- Space requirement: usually 1 HU (height unit) in a 19" cabinet
- Ambient temperature: 0°C to +50°C
- Relative humidity 5% to 95% (non-condensing)
- Connection options (via any in-house cabling) to the CE

2.3. *Applicable legal provisions*

Details can be found in the General Terms and Conditions of Wien Energie GmbH for blizznet products as amended ('blizznet GTCs', download at <https://www.wienenergie.at/agb/>).

3. Access

Access to the Wien Energie equipment/network connection point (NAP) at the customer's premises is regulated in the GTCs.

4. Network connection point (NAP)

The transfer to the customer takes place on an active component. This is a CE (customer edge). In special cases, the transfer can also take place at a MAN node. The customer-side connection socket forms the network connection point (NAP). All network facilities up to this point are the responsibility of Wien Energie. This does not include components and connections provided by the customer (e.g. in-house cabling).

5. Provision periods

The realisation times depend on the desired sites and are therefore specified in the respective offer. Details are regulated in the GTCs.

6. Service handover

Upon completion, Wien Energie hands over the service handover notification to the customer. This includes at least the following parameters:

-
- Confirmation of fulfilment of the ordered parameters
- Realisation date
- Start of billing
- Connection and service number(s)

7. Monitoring

The Network Operation Centre (NOC) monitors the Wien Energie network 24 hours a day, 7 days a week, 365/6 days a year. The CE are also integrated into Wien Energie's central fault management system. This is used for operational monitoring and to guarantee a flawless service.

7.1. Web interface for service monitoring

Customers can access a password-protected web interface at monitoring.blizznet.at. This provides extensive information and statistics on all connections ordered. For example, the utilisation of the customer's access lines can be evaluated over different time periods.

For example:

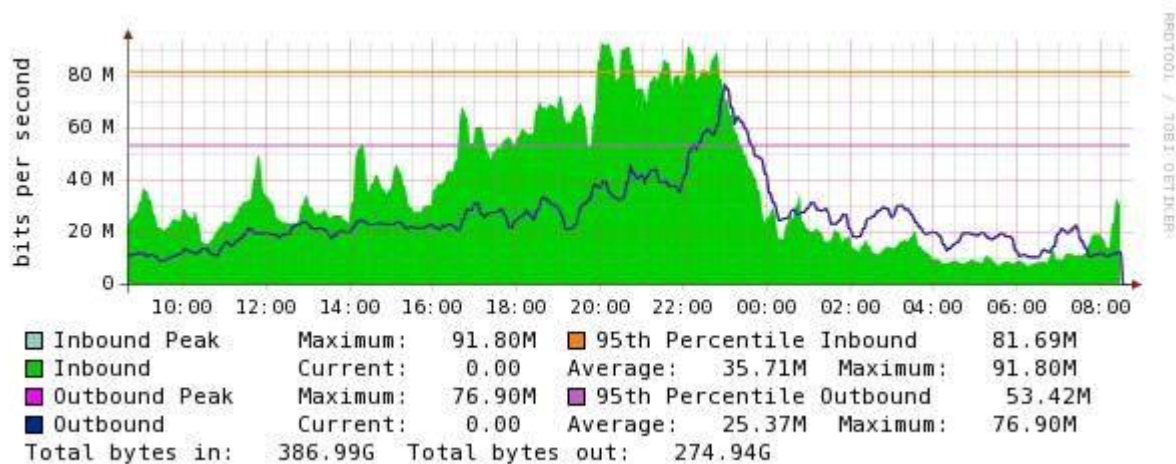


Figure 4: Example of monitoring evaluation

8. Service management & SLA

Information on faults, maintenance, guaranteed availability, contact persons and escalation levels can be found in the blizznetSLA (Service Level Agreement).

Unless expressly offered otherwise, the STANDARD SLA class is deemed to have been agreed.

9. Technical service data

Access – LAN customer	IEEE Standard
100Base – TX; RJ 45	802.3u
1,000Base – T; RJ 45	802.3ab
optional:	
1,000Base – SX; LC socket; multi mode (850nm)	802.3z
1,000Base – LX; LC socket; single mode (1310nm)	802.3z
1,000Base – LHA; LC socket; single mode (1550nm)	802.3z
10GBase – LR; LC socket; single mode (1310nm)	802.3ae
10GBase – ZR; LC socket; single mode (1550nm)	802.3ae
EVC	Parameter
CIR-100	CIR = 100% EVC; EIR 0% EVC

Details	
Mode	full duplex
MAC layer	IEEE 802.3
Maximum number of MAC addresses	8k for VPLS/VLL transparent
Unicast Service Frame Delivery	transparent
Multicast Service Frame Delivery	transparent
Broadcast Service Frame Delivery	transparent
Flooding unknown MAC addresses	transparent
VLAN trunk	802.1q (transparent)
CoS tags	802.1p (transparent)
DSCP	transparent
Frame delay	≤ 5 ms for CIR (128Byte frame size)
Frame loss	≤ 0.1% for CIR
Jitter	≤ 1 ms for CIR
VC restore	≤ 1s
max. frame size	max. MTU 9,000 ₁
Layer 2 protocols	
STP, RSTP	transparent
HSRP	transparent
CDP	transparent
GARP	transparent
GVRP	transparent
IGMP	transparent
LACP	optional

Table 2: Technical data

This technical data refers to a packet size of 1500 bytes.

With lower/larger packet sizes, there may be deviations in the guaranteed bandwidth and latency.

¹ The maximum size is MTU 9,216. A maximum of 9,000 can be used by the customer.