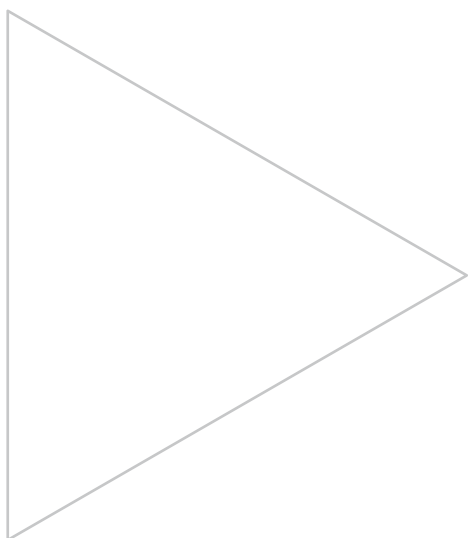


**APPENDIX**  
**CARRIER**  
**INTERNET**



# Contend

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## 1 INTRODUCTION

The Wholesale Carrier Internet service provides a reliable and secure high-speed connection to the global Internet with all the essential features that our Partner needs.

The Wholesale Carrier Internet can be provided as asymmetrical or symmetrical connection with guaranteed parameters by means of an IP communication protocol.

The Wholesale Carrier Internet service offers the high performance, scalability and optional services.

CETIN has following public and private peering agreements:

- Private peerings – two independent Tier-1 providers at two geographically separate locations + Google a.s.
- Local Public Peering – NIX s.r.o.
- International Public Peering – DE-CIX Frankfurt

The Wholesale Carrier Internet service makes use of the most extensive metallic and optical network in the Czech Republic including all qualitative features of its ring-shaped topology.

The terms of the Wholesale Carrier Internet service stated in this Appendix applies only to Carrier Internet service provided in the Czech Republic. The Wholesale Carrier Internet service provided outside of the Czech Republic, the service conditions stated in this Appendix also apply, unless otherwise specified in the service order form.

## 2 PARTNER BENEFITS OF WHOLESALE CARRIER INTERNET SERVICE

- Highly scalable range of transmission rates from 512/128 Kbps to 2 Gbps,
- No contention ratio for asymmetrical lines,
- Quick delivery for own infrastructure,
- Ethernet interface with easy and cheap implementation towards the Partner,
- Flat or burstable billing available,
- Wide range of access type technology options (fibre, copper, radio),
- Guaranteed SLA starting with 99 Level,
- Non-stop monitoring and secured by our Help Desk specialist available 24 hours a day, 7days a week.

### 3 WHOLESALE SERVICE PARAMETERS

The Wholesale Carrier Internet service is the fully-managed Service that CETIN monitors throughout the entire IP network and along the access line to the Ethernet interface of the Customer premises equipment.

The Wholesale Carrier Internet service can be delivered in two options:

- Carrier internet Basic service – delivered via copper ADSL, VDSL, SHDSL or unlicensed professional Point to Point radio. The Service can be provided from asymmetrical speeds 512/128 Kbps to 40/2 Mbps and symmetrical speeds from 2 Mbps to 300 Mbps. The available Service speeds are specified under 6.1 of this Appendix. The contention ratio is not applied. The guaranteed SLA is 99 level.
- Carrier internet SPECI service – delivered via fibre, licensed professional point to point radio or SHDSL (dedicated DSLAM) technology. The Service speeds are only symmetrical and can be provided from 2 Mbps to 2 Gbps. The available transmission rates are specified under 6.1 of this Appendix. The guaranteed SLA is 99,5 level.

Product option	ACCESS TECHNOLOGY				
	Copper (DSLAM)	Copper (Business SHDSL)	Unlicensed radio	Licensed radio	Optical access
Carrier Internet Basic	Yes	No	Yes	No	No
Carrier Internet Speci	No	Yes	No	Yes	Yes

#### 3.1 Access

The individual Access services are provided through various technologies in the CETIN network depending on Carrier internet service option, local conditions and required transmission rate.

### 3.1.1 Optical infrastructure:

- MPLS MBH (Mobile Back Haul), NG-SDH or NG-DWDM network to Partner locality.
- Service variants:
  - Carrier Internet Speci



### 3.1.2 Professional radio infrastructure

- Availability from CETIN mobile base stations or fixed network aggregation sites.
- Connecting directly on optical ring based topology
- Qualitative parameters are identical with optical connection
- Service variants:
  - Carrier Internet Basic – unlicensed radio (non-coordinated frequencies 10,5 GHz, 17 GHz and 24 GHz)
  - Carrier Internet Speci – licensed radio (coordinated frequencies 7-42 GHz or 80 GHz)



### 3.1.3 Copper infrastructure

- ADSL/VDSL/SDSL/SHDSL system using up to 4 copper pairs
- Service variants:
  - Carrier Internet Basic – ADSL, VDSL, SDSL (DSLAM) –asymmetrical and symmetrical speeds up to 20 Mbps.
  - Carrier Internet Speci – SHDSL (Business DSLAM) – symmetrical speeds from 2 Mbps to 20 Mbps.



### 3.2 Customer premises equipment (hereinafter CPE)

The Wholesale Carrier Internet service can be delivered on CETIN managed or unmanaged CPE:

- **No CPE** - own Partner equipment - can be provided only in case of symmetrical access. The WAN interface of the Individual service is always Ethernet.
- **Managed CPE** – the demarcation of the Carrier Internet service is a standard Ethernet interface on the local area network (LAN) port of the CETIN’s managed CPE. The CPE type is selected by the Partner from the list of the supported CPEs in the Carrier Internet price list.
- **Unmanaged CPE with hardware maintenance** - the CPE is delivered and installed at the End point of CETIN network with a first basic configuration by CETIN. The CPE type is selected by the Partner from the list of the supported CPEs in the Carrier Internet price list. The hardware maintenance is the responsibility of CETIN. The management of the CPE is responsibility of the Partner. When the failure is not hardware issue but it is wrong configuration caused by Partner then Partner is billed for Baseless service maintenance departure.

## 4 INTERFACES

Carrier Internet Service is provided on the following interfaces:

### End point of CETIN Network:

10BASE-T, 100BASE-TX, 1000BASE-T	1000BASE-ZX (1550nm)
1000BASE-LX (1310nm)	1000BASE-LX+ (1310nm)

## 5 OPTIONAL SERVICES

### 5.1 Back-up

The primary access line can be backed-up by a secondary access line. Both primary and secondary access lines are terminated on the same CPE at the End point of CETIN Network. The pricing and ordering process of the back-up line is the same as ordering the primary line. The additional optional back-up service is provided only by CETIN managed CPE.

### 5.2 IP addresses

CETIN can provide additional block of IPv4 or IPv6 addresses. The IP address allocation is subject to approval. The pricing is provided individually.

## 6 OPERATING PARAMETERS

### 6.1 Service speeds and recommended values of CPE configuration

Service speeds to 100 Mbit/s are defined on Link Layer (Layer 2):

Product speed	Nominal speed L2	Product speed	Nominal speed L2
512/128 Kbps*	320/160 Kbps 640/160 Kbps	10 Mbps	10240 Kbps
2048/256 Kbps*	1280/320 Kbps 2560/320 Kbps 3840/320 Kbps	12 Mbps	12288 Kbps
4096/512 Kbps*	5120/640 Kbps	14 Mbps	14336 Kbps
8192/512 Kbps*	10240/640 Kbps	16 Mbps	16384 Kbps
16/1 Mbps*	12/1 Mbps 14/1 Mbps 16/1 Mbps 18/1 Mbps	18 Mbps	18432 Kbps
24/2 Mbps*	20/2 Mbps 22/2 Mbps 24/2 Mbps 27/2 Mbps	20 Mbps	20480 Kbps
40/4 Mbps	40/4 Mbps	30 Mbps	30720 Kbps
2 Mbps	2048 Kbps	40 Mbps	40000 Kbps
4 Mbps	4096 Kbps	50 Mbps	48128 Kbps
6 Mbps	6144 Kbps	100 Mbps	96256 Kbps
8 Mbps	8192 Kbps		

\*the nominal Layer 2 speeds depends on copper cable attenuation

Service speeds from 100 Mbps are defined on physical layer (Layer 1) and product speed corresponds to parameters of the physical layer:

Service speed	Speed L2
150 Mbps	148 Mbps
200 Mbps	197 Mbps
300 Mbps	296 Mbps
400 Mbps	395 Mbps
450 Mbps	445 Mbps
500 Mbps	493 Mbps
600 Mbps	593 Mbps
1 Gbps	987 Mbps
2 Gbps*	1973 Mbps

\*service speed 2 Gbps can be provided only 10GBASE-xx interfaces

Other guaranteed parameters of Carrier Internet Service:

- The Packet loss = 0,01% for the optical access and radio access and 0,1% for copper access,
- The Round Trip Delay (RTD) < 20 ms in case the End point of CETIN Networks located in the Czech Republic
- Minimum guaranteed packet size is 64B, guaranteed maximum size is 1500B.

## 7 Charges

For the provision or modification of the Wholesale Carrier Internet service Partner pays non-recurring charge. For providing the Individual services the Partner pays recurring monthly price. These charges are mandatory part of the Wholesale service order.