Bulgarian Internet eXchange
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BIX.BG – concise company presentation

Contents

Facts about Bulgarian Broadband (BB) Market

- **Bulgaria ranks 1st in the European Union for usage of high-speed Internet** (above 10 Mbps). 46.5 % of the Internet users in Bulgaria, are accessing the Net at speeds above 10 Mbps. Sweden is second, with 36 %.

  Source: COMMISSION OF THE EUROPEAN COMMUNITIES - Brussels, 24.03.2009.
  Figure 107 EU countries by speeds – retail fixed broadband lines (page 114)

- Bulgaria's total number of broadband lines increased to 853 089 in January 2009, compared to 580 226 in January 2008, mainly because of the local area networks (LANs) offers. The broadband market is characterized by platform competition between LANs, cable operators, satellite and the fixed incumbent (through DSL). 70% of broadband lines were non-DSL, mainly **owned by LANs (57% of the broadband lines)**, while the incumbent had 29% of the broadband lines by January 2009.

  Source: EUROPEAN COMMISSION. 14th Report on the Implementation of the Telecommunications Regulatory Package – 2008. Country chapters - Bulgaria

- Amongst efficiency-driven economies, **Bulgaria topped the most** improved list with a 57% increase in BQS (Broadband Quality Score) from 2009.

  Broadband Quality Score (BQS):
  - BQS is calculated based on normalized values of: Download and Upload throughput, and Latency

  Source: Survey made by the Oxford and Oviedo Universities[1]

- Nine countries, South Korea, Japan, Sweden, Lithuania, **Bulgaria**, Latvia, The Netherlands, Denmark and Romania, were found to have the broadband quality required for future web applications, such as **high definition Internet TV viewing and high-quality video** communications (such as home telepresence) that will become mainstream in the next 3 to 5 years. In 2008, only Japan exceeded this threshold.

  Source: Survey made by the Oxford and Oviedo Universities[1]

- **Sofia's BQS is 4th in the Europe**, after Kaunas (Lithuania), Malmo and Uppsala (Sweden) and 10th of all the countries in the study.

  Source: Survey made by the Oxford and Oviedo Universities[1]

- Bulgaria ranks **3rd by Upload Speed** of all the countries in the study.

  Source: Survey made by the Oxford and Oviedo Universities[1]

[1] **Study of the Saïd Business School at the University of Oxford and the University of Oviedo's**

Global Broadband Quality Study Shows Progress, Highlights Broadband Quality Gap

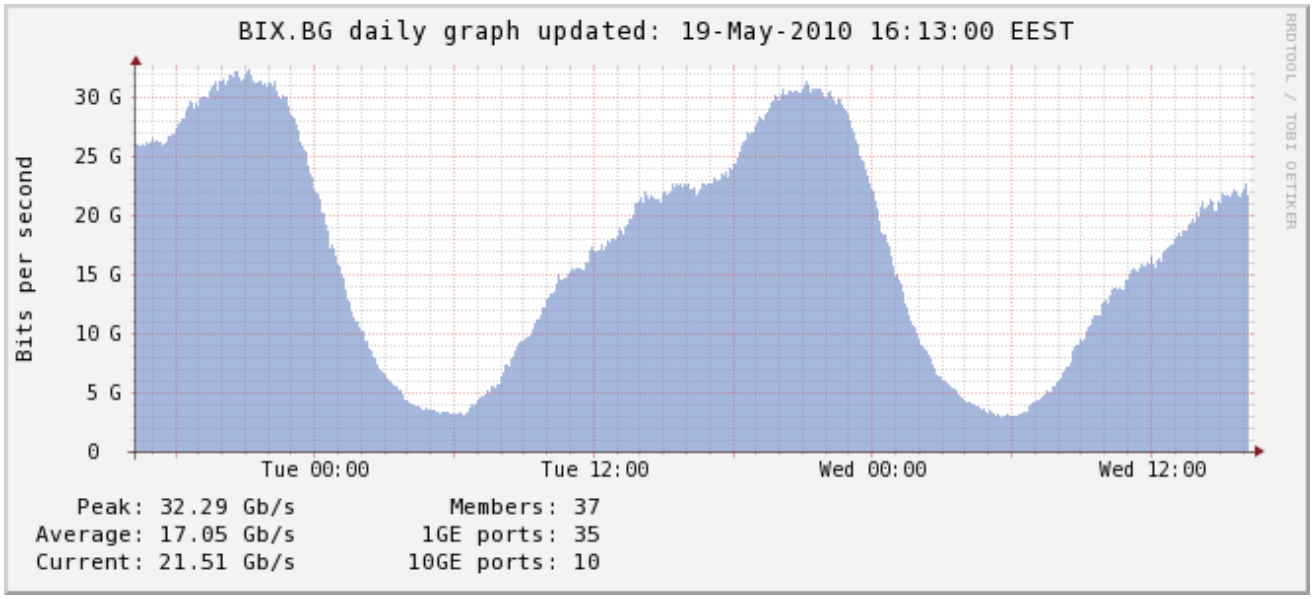
The complete documents are published here: Broadband Quality Study 2009, Broadband Quality Study 2009 - Appendix and Broadband Quality Study 2009 – Report.

Connected members

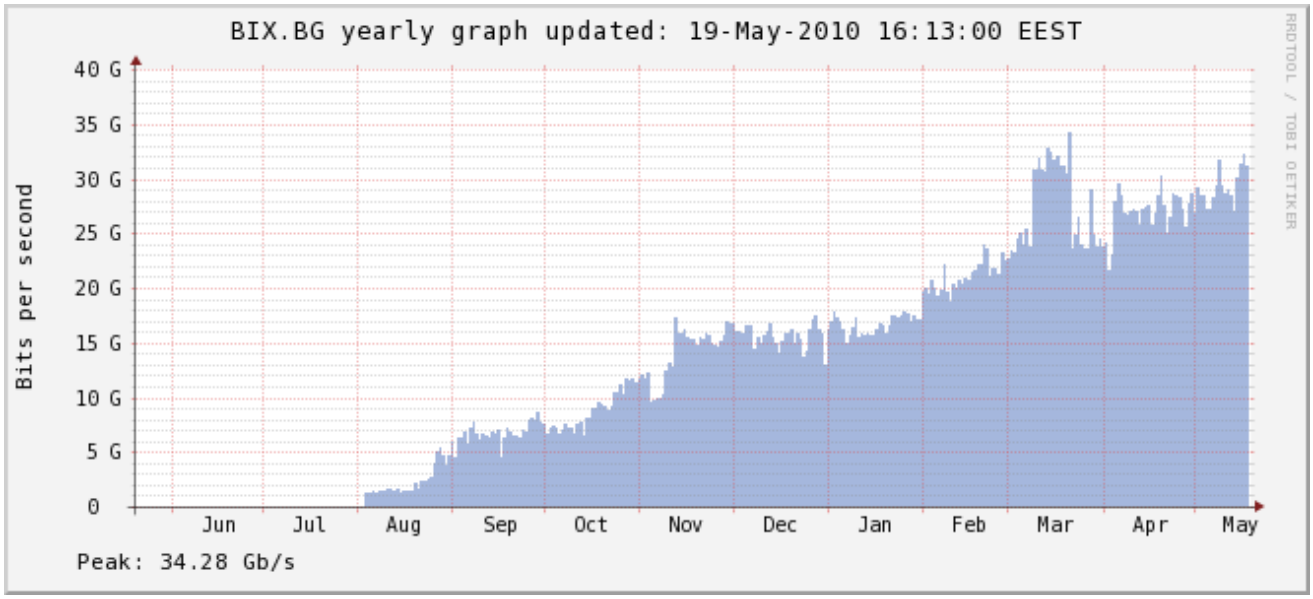
AS	Member	Home page	Speed (Gbps)
8877	PowerNet	www.powernet.bg	10
9070	ITD Network	www.itdnet.net	10
12615	GCN	www.gcn.bg	10
13124	CableTEL EBPOKOM	www.cabletel.bg	10
13147	Netinfo / ABV.BG	www.abv.bg	10
29084	ComNet	www.comnet.bg	10
35141	Megalan	www.megalan.bg	10
39184	UltraNet	www.ultranet.biz	10
41313	Novatel	www.novatel.bg	10
43205	Bulsatcom	www.bulsat.com	10
8717	Spectrum Net	www.spnet.net	5
25374	Escom	www.escom.bg	2
28909	DCC (Digital Cable Company)	www.dcc.bg	2
29582	OptiSprint	www.optisprint.net	2
43561	Net1	www.net1.bg	2
3245	Digital Systems	www.digsys.bg	1
8390	Interoute	www.interoute.bg	1
8431	TEA	www.tea.bg	1
8860	Dir.bg	www.dir.bg	1
8866	VIVACOM	www.vivacom.bg	1
9002	RETN	www.retn.net	1
12716	Mobiltel EAD	www.mtel.bg	1
20911	NetSurf	www.netsurf.bg	1
21415	Internet Group	www.inetg.bg	1
24964	EVO.BG	www.evo.bg	1
29667	Atlantis Net	www.botevgrad.com	1
31291	SKKNet	www.skknet.net	1
31340	SofiaOnline	www.sofiaonline.net	1
34224	Neterra	www.neterra.net	1
34577	SKAT TV	www.tvskat.net	1
35249	UnitedNet	www.unitednet.bg	1
39251	NetGuard	www.netguard.bg	1
39505	Vestitel	www.vestitel.bg	1
42081	SpeedyNet	www.speedy-net.bg	1
43589	CityNet	www.citybs.net	1
44553	FColor.bg	www.fcolor.bg	1
49737	Jobs.bg/Cars.bg	www.jobs.bg	1

Traffic statistics

Daily



Yearly



About BIX.BG

ABOUT US

BIX.BG was established in mid 2009 with focus on optimizing the peering between Internet companies in Bulgaria, giving clients the opportunity to decrease relevant costs significantly.

BIX.BG (Bulgarian Internet eXchange) is the first neutral Bulgarian Internet eXchange Point (IXP). Internet providers and other companies are connected to it through high speed connections. These are companies for which Internet is the means of creating business.

The main purpose of BIX.BG is to provide every member with the possibility to exchange traffic (Public Peering) with all other parties at reliable quality and optimized expenses. The end result for the member is that only one connection to BIX.BG ensures connectivity to all other members.

OUR VISION

NEUTRALITY: All employees, employers and owners of BIX.BG are COMPLETELY NEUTRAL to the Internet Business.

Neutrality is very important since anyone who is in control of an IX (Internet eXchange) could bend its purpose (in case he is part of the Internet Market) in a way that he would win a competitive advantage. In this relation BIX.BG will expand only IX and will not be active in any other Internet Market.

TRANSPARENCY AND EQUAL CONDITIONS: Public and equal financial conditions for all members.

TECHNOLOGICAL RELIABILITY: Our equipment is the newest generation, delivered by proven suppliers with guaranteed maintenance in two hours. Nonstop (24x7x365) technical maintenance provided by experts and functionalized procedures is guaranteed.

OUR MISSION

To make Sofia the main Internet Exchange Center on the Balkans by attracting the public peering members from Bulgaria and the neighboring countries.

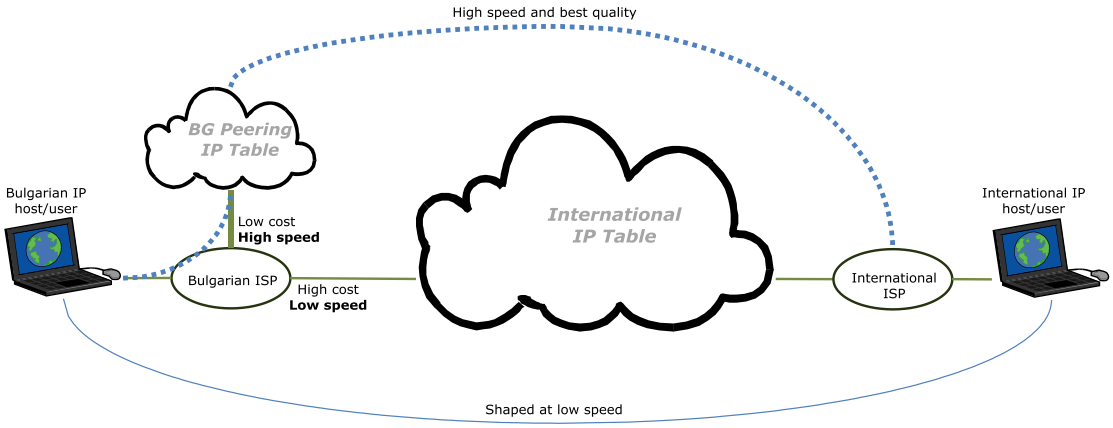
Further, to cooperate for optimization of the business model, by creating the best conditions for successful cooperation with all Internet companies.

To be a trustworthy, honest and predictable partner for all members.

Why to choose BIX.BG?

To make high-quality-connection with all Bulgarian end-users

- Most of Bulgarian Broadband operators (mainly LANs & FTTH) offer **very high speed** (often more than 50Mbps) to their residential customers;
- **Different International & BG Peering/BIX.BG** speed to end-users;
- Bulgarian ISPs usually have a strong restrictive shaping policy for their **expensive International traffic**;
- The shaping policy for **BG Peering/BIX.BG is always open**, because the BG Peering traffic is cheap;



Easy and affordable maintenance and expansion

- PREDICTABILITY OF EXPENSES – the prices of BIX.BG are public, so the cost can easily be calculated and planned into the budget. With the private peering every case is quite different, which makes it harder to predict: if the traffic expands with 50% for example, how many and which exactly physical connections should be upgraded and what would be the real price.
- THE RESPONSIBILITY TO SEARCH FOR NEW PEERING PARTNERS SWITCHES FROM THE MEMBER TO BIX.BG – the effect for every new member attracted by BIX.BG is equivalent to the benefit of all members setting up direct connection to him. However they will not have to invest any time or money.
- BIX.BG ALLOWS EASY AND FAST CONNECTING of NEW or disconnecting the available peering sessions without the need to establish/cancel a separate physical connection for every peer. Peering is a software configuration between two members and the session will run right away. With the help of Route Servers one can use only two BGP sessions to exchange traffic with all other parties involved.
- One can easily create new test peering sessions – if two members have free capacity, they can start such a connection without ANY ADDITIONAL EXPENSES and administrative work. This would prevent irrelevant private peering without clear traffic and financial impact.
- Usually the peering coordinators work without a budget and have no rights to make decisions about additional expenses for the new peering connections. When the port BIX.BG is available, they can deliver free set up of new peering sessions without facing the difficulties and additional expenses for lines, ports, optical modules, etc.

Geographic location independence

- The Public Peering model, which BIX.BG uses, allows for complete independence between the physical location of your network center and your peering partners.

  The networks of many of the Internet companies in Bulgaria are located in rented warehouses. If for any reason there is a need to change location of the network center with the private peering model this will demand a physical move of all physical lines (for example 50), which is costly and hard to arrange. In some cases (if for example the distance between the new and old location is very large) it may come out that there is a need to change of the interface at both ends of the connection. If a similar situation occurs with BIX.BG you will have to arrange only one move to the more convenient for you location point of BIX.BG.

Aggregation benefits

- BIX.BG (public peering) is VERY EFFECTIVE FINANCIALLY FOR SET UP OF NUMEROUS PEERING SESSIONS with comparatively small peering partners with fixed costs per port and NO INCREASE OF THE COST when new peers are added.

  Private Peering provides at least one separate physical port for every peer, rental of lines, taxes for cross-connections and other. Usually the traffic with many of the peers varies with large inclinations and with private peering all the physical connections have to be circumspect according to the maximum quantity of the traffic. The total volume of the traffic for every member is stable and variations are limited to the boarders of the actual peers. With BIX.BG the whole traffic passes through one port and the fluctuations of the traffic volume to the different peers do not demand change of the network.

- For companies which exchange relatively large traffic volumes it is MUCH MORE CONVENIENT TO USE 10GE PORTS OF BIX.BG.

  For Private Peering one should use the relatively expensive 10Gbps ports for both peers or should build several 1Gbps lines, which is sometimes technically inconvenient and more expensive.

  With Private Peering if the traffic between two peers reaches 1.1Gbps there should be an increase of the speed to 10Gbps, which is extremely expensive as an investment in equipment that is not effectively used. Another possibility is to create one more 1Gbps connection, which means that two additional ports, new physical line, and new cross-connections will be needed. Do not forget that the above actions need cooperation of both sides of the peering. Due to the aggregation of traffic, through BIX.BG an investment in one 10Gbps port can provide traffic for much bigger number of peers without having new 10Gbps port for each one.

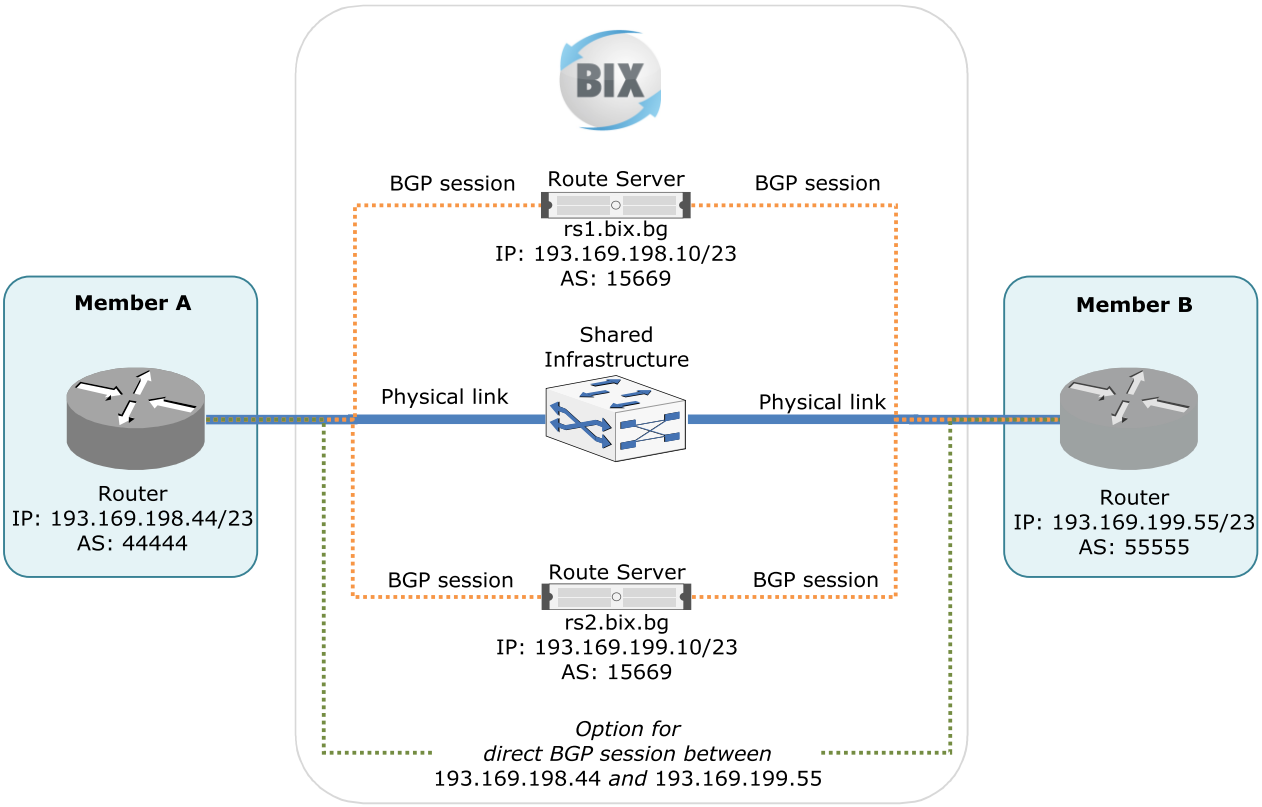
Reservation availability

- If certain Internet traffic is of particular importance for your business, it is recommended that the equipment is fully reserved. If you decide to make full reservation with a Private Peering model you will have to double all used resources (lines and ports). With full reservation at BIX.BG (public peering) you can accomplish the same with just two ports to the two different locations of BIX.BG.

Technical information

Scheme of functionality

For simplicity on the scheme there is an example of two members. The number of members does not affect the functionality principles.



Every member has physical connection to BIX.BG at a particular speed.

Through the created physical connections every member receives a static IP address of the BIX.BG network. All IP addresses are in the range of one and the same network mask and consequently:

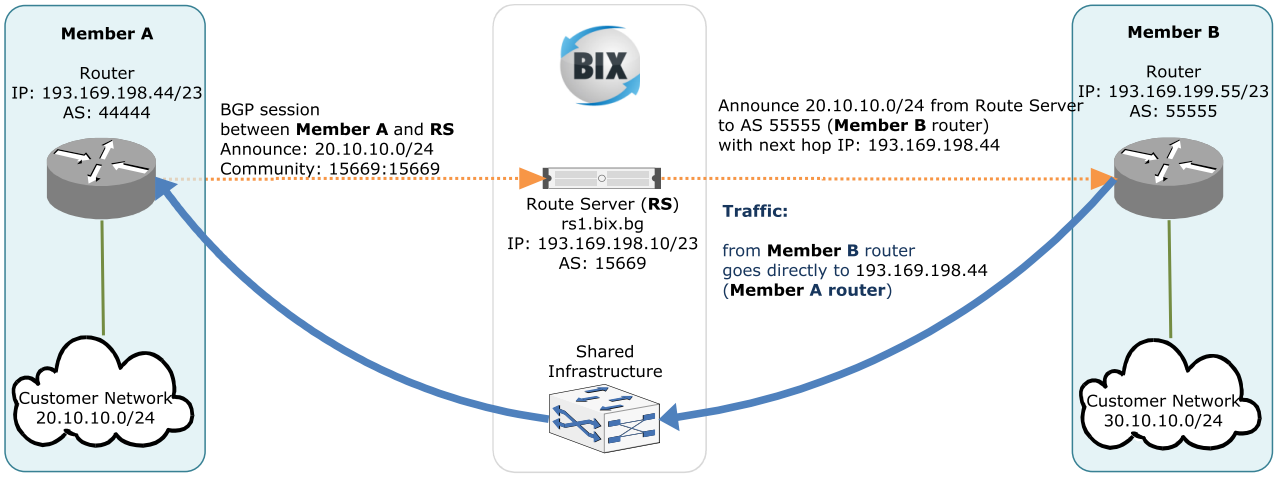
- The traffic between members is switching directly through the shared switch infrastructure, instead of routing;
- The members have direct visibility towards the IP addresses and are able to organize direct BGP sessions among each other;

All members maintain two BGP4 sessions with RS1 and RS2, where they announce all networks which are willing to exchange traffic through BIX.BG.

Route Servers

The purpose of Route Servers (RS) is to simplify the process of routing so that with only two BGP sessions every member can exchange routing information about the announces of all others.

On the scheme below is shown only one of the two Route Servers. There are two identical RS, positioned on different locations ensuring full reservation.



The scheme illustrates how the Route Server is functioning and how member B finds the network of a client of member A (20.10.10.0/24) and when receives traffic for that client sends it through the shared switching infrastructure.

Members can use BGP communities to control which members receive their prefixes.

BGP Community	TIPS for RS
0:MEMBER-AS	DO NOT ANNOUNCE TO THIS MEMBER
15669:MEMBER-AS	ANNOUNCE TO THIS MEMBER
0: 15669	DO NOT ANNOUNCE TO ANY MEMBER
15669: 15669	ANNOUNCE TO ALL MEMBERS

Only the member decides to accept or reject the incoming RS announces.

There are additional communities for controlling local preference (default = 100).

BGP Community	TIPS for RS
15669:65000	Local preference* = 0
15669:65050	Local preference* = 50

With the idea of full coverage of the functionality of both Public and Private Peering, RS can remove its own AS from the route, which will make them seem directly connected without a necessary BGP session between them.

The received RS announces will be checked in RIPE and announces, if they are not described in detail, they will not be accepted. This is done to prevent errors when announcing prefixes which cannot be maintained by the respective member.

Topology

The shared switching infrastructure is based on 10GE highly productive switches (line rate, non-blocking) by Extreme Networks (Summit X650-24x - line rate 24x10GE, 488Gbps bandwidth, 363Mpps forwarding rate, with the possibility of stacking at 512Gbps).

The equipment is collocated in professional datacenters with 24/7 maintenance, in accordance to all contemporary criteria.

The connection between the separate switches is organized through dark fibers via diverse physical routes, leased by different operators.

Connectivity between the switches is designed so that an eventual breakdown of half of 10 Gbps circuits will not affect the normal work of all existing services.

Automatic protection of the links between the switches is realized by using EAPS v2 (Ethernet Automatic Protection Switching) protocol, which switches over the traffic to the alternative route in less than 50ms.

BIX.BG services and prices

Main port

- PHYSICAL INTERFACE* with capacity 1GE or 10GE for Public Peering;
- IP address and two BGP sessions with Route Servers;
- Possibility for configuration of direct BGP sessions with other members.

Additional port

One or more additional PHYSICAL INTERFACES* (1GE or 10GE) with the following possibilities:

- **Aggregation of traffic** together with the main port, on the basis of LACP (Link Aggregation Control Protocol). Eight ports are maintained;
- **Reservation of the service** to another location of BIX.BG. In this case the configuration is analogical to the main port configuration (with separate IP address, BGP sessions and etc.).

Virtual IP connection

Additional service based on VLAN ID, which allows the members to exchange IP traffic (IPv4, IPv6 and ARP) independently of the PUBLIC PEERING, but through the same PORTS.

For the activation of this SERVICE there is always a MEMBER who initiates and a MEMBER who accepts, where the accepting party can be more than one.

The INITIATOR requests the SERVICE and the ACCEPTOR accepts it.

On MEMBERS' demand, the SERVICE can be configured on the main port or on the additional ports with no additional payment.

Prices

Service	Single fee without VAT	Monthly fee without VAT
MAIN PORT, 1GE (Gigabit Ethernet) line rate	NONE	300 euro
ADDITIONAL PORT, 1GE (Gigabit Ethernet) line rate	NONE	200 euro
MAIN / ADDITIONAL PORT, 10GE, fractional (2500Mbps)	NONE	500 euro
MAIN PORT, 10GE (10 Gigabit Ethernet) line rate	NONE	900 euro
ADDITIONAL PORT, 10GE (10 Gigabit Ethernet) line rate	NONE	700 euro
VIRTUAL IP CONNECTION	NONE	30 euro

**The following physical interfaces are maintained:*

- *1000Base-T (twisted-pair cabling, CAT-5e/CAT-6, 100m), IEEE 802.3ab*
- *1000Base-LX/LH (single-mode, duplex fiber, 1310nm, 10/20km), IEEE 802.3z*
- *1000Base-BX-D (single-mode, single fiber, Tx:1490nm Rx:1310nm, 10/20km), IEEE 802.3z*
- *1000Base-BX-U (single-mode, single fiber, Tx:1310nm Rx:1490nm, 10/20km), IEEE 802.3z*
- *10GBASE-LR (Single-mode, duplex fiber, 1310nm, 10km), IEEE 802.3ae*

If you want a connection with other kind of interface please contact us.