## srce
University of Zagreb
University Computing Centre - SRCE

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According to Article 5, 6 and 7 of the Policy of Croatian Internet Exchange (CIX), Croatian Centre for Exchange of Internet Traffic, this document defines technical specifications, possible types of services and prices of certain types of services.

## CIX TEHNICAL DESCRIPTION AND SERVICES

**Technical description**

CIX Infrastructure is distributed and its nodes are located at:

- CIX1 - Josipa Marohnića 5, Zagreb (Data center Srce)
- CIX2 - Selska cesta 93, Zagreb (InterXion Hrvatska d.o.o.)

CIX Infrastructure consists·of:

- Active Network switching equipment (1/10/100G)
- Linux Servers (Route Servers)
- 19 " racks in protected and air-conditioned data centers
  - Two redundant optical links and CWDM system with 16x10Gbit/s capacity (connection between CIX1 and CIX2)

CIX members are connected within CIX over peering VLAN: IPv4 address space 185.1.87.0/24, IPv6 address space 2001: 7f8: 28 :: / 64 and AS number 51702.

For the purpose of connecting to peering VLAN, one IPv4 and one IPv6 address per interface/channel is assigned to CIX member.

It is allowed to use 10 MAC (Media Access Control) addresses per interface/channel within the peering VLAN. The use of STP (Spanning Tree Protocol) protocol is not allowed.

Connection of a CIX member's equipment to CIX can be performed by using a Copper/UTP or optical connection to LC connector via SFP or SFP+ module. Supported types and characteristics of the physical connection can be found in the table below.

| Connection type | Characteristics |
| --- | --- |
| 1GE | 1000Base-T; UTP CAT 5E |
| | LC 1000Base-LH; wave length: 1310 nm; up to 40 km with single-mode optics |
| | LC 1000Base-LX; wave length: 1310 nm; up to 10 km with single-mode optics |
| | LC 1000Base-SX; wave length: 850 nm; up to 550 m with multi-mode optics |
| | LC 1000Base-BX-D wave lenght 1490 nm TX/1310 nm RX (on CIX side); 1000Base-BX-U wave lenght 1310 nm TX/1490 nm RX (on member side); up to 10 km with single-mode optics |
| 10GE | LC 10-GbE port (IEEE 802.3ae Type 10Gbase-SR); wave length: 850 nm; up to 300 m with multi-mode optics |
| | LC 10-GbE port (IEEE 802.3ae Type 10Gbase-LR); wave length: 1310 nm; up to 10 km with single-mode optics |
| | LC 10GBASE-BX-D wave lenght 1330 nm TX/1270 nm RX (on CIX side); 10GBASE-BX-U wave lenght 1270 nm TX/1330 nm RX (on member side); up to 10 km with single-mode optics |
| 100GE | LC 100GBASE-LR4 wave lenght WDM 1295.56 nm, 1300.05 nm, 1304.59 nm, 1309.14 nm; up to 10 km with single-mode optics |

To achieve the desired bandwidth, it is possible to connect the same types of interfaces to the channels using the Link Aggregation Control Protocol (LACP) inside the same CIX node. For establishment of multilateral peerings inside peering VLAN, a redundant Route Server infrastructure has been established using OpenBGPd and MD5 algorithm. The condition for redundancy is peering with both Route Servers. In order to achieve maximum efficiency in the exchange of traffic through CIX, it is recommended to use the Open Peering Policy.

To ensure high availability, CIX's network infrastructure is monitored by network monitoring tools.

CIX information services include the public and internal CIX web.

On public CIX web www.cix.hr, all public information about CIX has been published without access restrictions.

On internal CIX web, CIX members have limited access and they can only access their own data.

## Services and prices

According to Article 5 of CIX Policy, SRCE, as the CIX host, provides each CIX member the following services at quoted prices:

**1.** Connection to CIX:

| Service name | Service description (level) | Monthly fee (HRK) | Monthly fee (EUR) |
|---|---|---|---|
| 1G | • 1 Gbit/s interface for connection to CIX<br>• access to CIX *peering VLAN* | 1.130,18 | 150,00 |
| First 10G | • 10 Gbit/s interface for connection to CIX<br>• access to CIX *peering VLAN* | 3.390,53 | 450,00 |
| Additional 10G | • 10 Gbit/s interface for connection to CIX<br>• access to CIX *peering VLAN* | 1.695,26 | 225,00 |
| 100G | • 100 Gbit/s interface for connection to CIX<br>• access to CIX *peering VLAN* | 12.055,20 | 1.600,00 |

| Service name | Service description (level) | One-time setup fee (HRK) | One-time setup fee (EUR) |
|---|---|---|---|
| Setup fee | • one-time fee for administrative tasks of access to CIX membership | 3.013,80 | 400,00 |

It is possible to use multiple interfaces in one channel (*LACP*).

**2.** Route Servers for establishing multilateral peering between CIX members.

The service is included in the price of item 1 Connection to CIX.

**3.** Additional VLANs for specific purposes for connecting members regardless of CIX peering VLAN.

The service is included in the price of item 1 Connection to CIX.

**4.** Limited accommodation of network equipment for CIX members connected **at CIX1 location.**

| Service name | Space in 19" rack at CIX1 location | Monthly fee (HRK) | Monthly fee (EUR) |
|---|---|---|---|
| Colocation of equipment CIX1 1RU | • Colocation of equipment in a 19" rack at the CIX1 location in a space of 1RU (rack unit)<br>• Ensuring the conditions for the correct operation of the equipment | 226,04 | 30,00 |

Colocation of CIX members equipment at CIX2 is regulated by InterXion Hrvatska d.o.o. and isn't part of the CIX services.

**5.** Information services of CIX.

The service is included in the price of item 1 Connection to CIX.
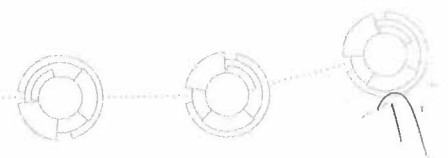
The amounts in items 1 and 4 of the Services and prices are taxable with value added tax by the headquarters of service recipient (taxpayer), in accordance with the value added tax law.

The amounts in items 1 and 4 of the Services and prices are dually shown with a fixed conversion rate 1 EUR = 7.53450 HRK.

Prices are valid from 1st September 2022.

Director

Ivan Marić