B3 TECHNOLOGY INFRASTRUCTURE ACCESS MANUAL

CONTENTS

CHANGE LOG

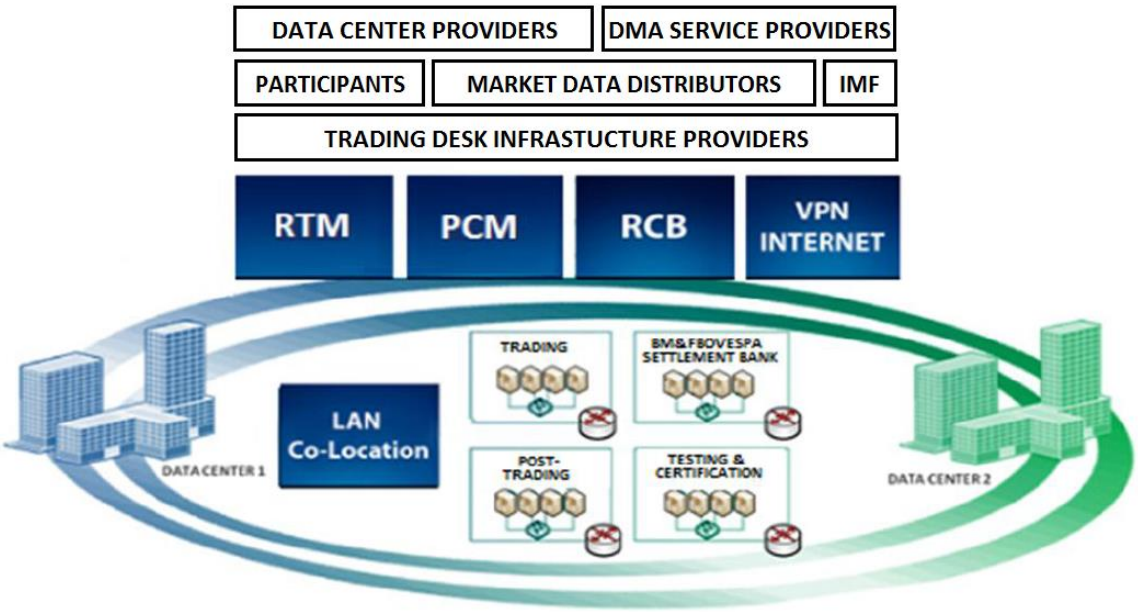
Date	Version	Description	Area Responsible
2013/11/09	2.1	UOL DIVEO included as Annex 3 accredited telecommunications operator for RCB	DO/DRD-GDSE
2013/22/09	2.2	TIM/AES discontinued as B3-accredited operator	DO/DRD-GDSE
2013/26/09	2.2	Operator name change: Global Crossing now called Level 3	DO/DRD-GDSE
2014/19/09	3.0	LAN-to-LAN Internet VPN – Trading for Estação Mega Bolsa discontinued	DI-CSSR
2014/19/09	3.0	Embratel / Primesys contact details updated	DO/DRD-GDSE
2014/19/09	3.0	RCB – Way of Access 5 – included	DO-CMKD
2014/19/09	3.0	LAN-to-LAN Internet VPN included for shared access to B3's technology infrastructure	DO/DRD-GDSE
2014/19/09	3.0	Annex 5 – Access to Data Center 1 and Data Center 2 included	DI-CPRE
2014/19/09	3.0	RCB – Way of Access 4 revised	DI-GSSR
2014/19/09	3.0	Chapter 8 revised and updated ("Provider of Technology Infrastructure for Connecting Trading Desks to the Trading System")	DI-GSSR
2014/19/09	3.0	Chapter 9 included ("Data Center Provider")	DI-GSSR
2014/19/09	3.0	Annexes 1 and 3 revised and updated	DO/DRD-GDSE
2015/13/03	3.0	Oi Telecomunicações discontinued as B3-accredited operator	DI-GSSR
2015/13/03	3.0	RCCF – Financial Community Communications Network discontinued.	DI-GSSR
2015/13/03	3.0	Annex 4: Post-trading and B3 Market Data - BOVESPA Segment - minimum recommended bandwidth updated.	DI-GSSR
2015/13/03	3.0	New reference for B3 Market Data Conflated, iBalcão, and ePUMA - minimum recommended bandwidth.	DI-GSSR
2015/13/03	3.0	Annex 6 included – Technical reference to access types discontinued	DI-GSSR
2016/18/10	4.0	Operators contact updated Annex 6 – Previous topic and content excluded and a new topic included: B3 Data Center physical address	DO/DRD-GDSE
2016/12/10	5.0	Co-Location, DMA and operators rules revised	DO-DRD-GDSE

2017/08/04	5.2	Network diagrams revised as requested by the services team.	DI-GTRE
2018/22/03	6.0	IMF service was included.	DI-GTRE
2019/15/03	7.0	Annex 3 - New reference for B3 Market Data – BM&F Segment - minimum recommended bandwidth updated.	DI-GTRE
2021/28/06	8.0	Inclusion of ways to access RCB via Cloud, site-to-site VPN and RTM for cloud customers, in addition to updating the contact list with operators and bandwidth recommendations in annex 3.	DI-GTRE
2021/28/12	8.1	Inclusion of trading systems in the RCB structure via Cloud and approval of the Oracle OCI cloud.	DI-GTRE
2022/03/18	8.1.1	The update of the Operators is now in the link provided in this manual. RCB Certification Review	DI-GTRE
2022/07/05	8.1.2	Update of the basic technical requirements for establishing LAN-to-LAN VPN access and additional clarifications on the process of contracting the forms of access to the RCB.	DI-GTRE
2022/09/29	8.1.3	Adding Google Cloud Platform (GCP) as Cloud Provider to RCB	DI-GTRE
2023/05/30	8.1.4	Inclusion of a new RCB provider via CLOUD and update of the RCB ways of access with the Co-location modality.	DI-GTRE
2023/07/11	8.2	Inclusion of the upgrade in the RCB access up to 10 Gbps.	DI-GTRE
2025/03/10	8.2.1	Update the minimum speed suggested for Trading and Market Data at B3.	DI-GISR

1. INTRODUCTION

This Manual aims to explain how resident and nonresident institutions can access B3's technology infrastructure, and provides information designed to help them to choose the access type best suited to their technology requirements and budget.

As shown in the following figure, B3 offers fouraccess types to its technology infrastructure – RCB, Internet VPN, LAN Co-Location (details of this access are available in the exclusive document "B3 Co-Location Commercial Policy"), PCM, as well as the B3-RTM agreement. The scopes, limits and other access characteristics vary according to the systems to be accessed, as detailed below in the respective sections of this Manual.



IMPORTANT NOTE

Regardless of how they access B3's technology infrastructure, institutions are responsible for acquiring the communications lines used as the physical way for data transport from telecommunications service providers authorized by Anatel, the Brazilian telecommunications regulator, permitting interconnection between their systems and those of B3. The specifications listed by B3 for access via RCB are described in item 3.4 of this Manual.

Institutions must contract directly with accredited third parties at their own discretion to acquire the services offered for access to B3's technology infrastructure, including communications links provided by telecommunications operators for RCB, RTM, administrative access to Co-location and to the internet, and to the services offered by trading desk infrastructure providers, data center providers, Market Data distributors, and DMA service providers. Accredited third parties must comply with the technological and security requirements stipulated by B3.

Failure to comply with any such requirements may entail disqualifying of the third party concerned and does not exempt any service providers from the responsibilities established contractually with the institutions.

2. B3 DATA CENTER PHYSICAL ADDRESS – B3 SEGMENT

The B3 Data Centers that serve the B3 segment are located at the following addresses:

Data Center 1 - SPA (active): Rua Ricardo Prudente de Aquino, 85, Tamboré – Santana de Parnaíba – SP – CEP 06543-004

Data Center 2 - XV (DR): Rua Quinze de Novembro, 275 – CEP 01013-001 – São Paulo – SP

3. RCB – B3 COMMUNICATIONS NETWORK

3.1 DESCRIPTION OF ACCESS VIA RCB

RCB is a high-technology, high-performance communications network that provides institutions with direct access to trading systems, post-trading systems, and B3 Settlement Bank's systems. This access can be granted via communications lines or services acquired by institutions directly from the following providers of services and/or connections:

- DMA service providers (trading systems);
- Providers of infrastructure for connecting brokerage house trading desks;
- Telecommunications operators (trading systems, post-trading systems, and B3 Settlement Bank);
- Data center providers.

Institutions who access systems via RCB are free to choose service providers (from those listed in item 3.6), speed, technology and contingency backup level. However, they must comply with the standards and criteria established by B3.

It is important to note that institutions who access the systems via DMA service providers, infrastructure providers or data center providers are responsible for deciding which network solution to use together with the respective providers.

To access B3's technology infrastructure via RCB, the contracting party will need to check if the network solution offered by providers complies with the following conditions:

- Low latency (directly linked to the technology used and bandwidth acquired);
- Various technological options to assure high availability; and
- Scalability of access and bandwidth.

The contracting party is responsible for: (i) acquiring communications channels and equipment, (ii) configuring and maintaining equipment, (iii) monitoring, (iv) managing capacity, and (v) technical support for the network solution used to access B3's technology infrastructure.

In order to use the RCB network, institutions must acquire telecommunications services between their premises and B3's data centers from operators that meet the technical requirements and are listed in item 3.6.

IMPORTANT NOTE

To mitigate the risks associated with a single point of failure, B3's specific participants (brokerage houses, banks and broker-dealers), DMA service providers or providers of technology infrastructure for connecting brokerage house trading desks to the Exchange must contract two different network providers using different physical routes. This rule does not apply to geographical areas not covered by two or more providers with different routes or to access by Market Data distributors and DMA customers. DMA providers hosted by B3's data centers may have circuits without contingency backup that exclusively serve their backup infrastructure located outside the Exchange.

For B3 participants (brokerage houses, banks and broker-dealers) that use the B3 Data Center as one of their sites, by contracting Co-location services, connections with B3 within this area (to the trading and post-trading environments) will replace one of the circuits presented on the diagrams in the forms of RCB access, indicated in item 3.4.

3.2 TECHNICAL CHARACTERISTICS OF ACCESS VIA RCB

The technologies used to access B3's technology infrastructure have been selected based on performance and availability. The operators recommended by B3 offer services with these characteristics using the following technologies:

- Dark Fiber;
- DWDM;
- Ethernet over SDH (EoSDH); and
- MetroEthernet.

The availability of each technology depends on the structure of an operator's service offering in the geographical area concerned.

The maximum bandwidth allowed is 10 Gbps.

Operators' networks and routers installed on the institutions' premises (CPE) must support BGP dynamic routing protocol, high-availability functionality (HSRP, VRRP), and multicast traffic**. CPE units for installation on institutions' premises can be supplied by operators or by the institutions themselves.

The Unified Market Data Feed (UMDF) requires the functionalities provided by the multicast protocol. To this end it is important to implement a network design project that considers the availability characteristics of the institution's applications and information volume analysis based on the market data segments to be used. Regarding the support for multicast protocol in the solution provided by the operator, broadcast or multicast filters must be disabled.

Market data in the UMDF format is generated by both B3's data centers independently (with different logical addresses) but both feeds have the same information content and use the same protocols. The feed generated by Data Center 1 is called Feed A, and the feed generated by Data Center 2 is called Feed B. Because they are identical, customers can arbitrate between data feeds using both access circuits as active.

The following equipment specifications offer the capacity to support B3's systems, based on a specific network design to be developed by each institution:

- Support for BGP routing protocol;
- Support for hardware-based multicast**;
- PIM v2 Sparse Mode and IGMP v2**;
- Equipment throughput compatible with the link acquired;
- Interface modules compatible with the link acquired;
- FHRP – First Hop Redundancy Protocol (e.g. HSRP or VRRP)*;
- Feature Track;
- NAT, if applicable;

- Support for QoS (Quality of Service).

* If two routers are acquired, bear in mind that VRRP and HSRP are not compatible with each other. Use either one or the other.
** Applies to institutions that use market data UMDF only. (Multicast)

It is essential that the links used enable routes to be changed transparently via dynamic routing between B3's edge devices and CPE units.

3.3 ACCESS TO RCB THROUGH CLOUD INFRASTRUCTURE (RCB VIA CLOUD)

To facilitate access to some of RCB's services, B3 has so far ratified connectivity models via infrastructure from Amazon Web Services (AWS), Microsoft Azure, Google Cloud (GCP), Oracle Cloud OCI and IBM Cloud. The models, called RCB via Cloud, provide access to all Post Trading systems.

Institutions that join the RCB via Cloud access mode will have a free choice of operators (available in this manual), speed, technology and contingency level, however, they must comply with the standards and criterias established by B3.

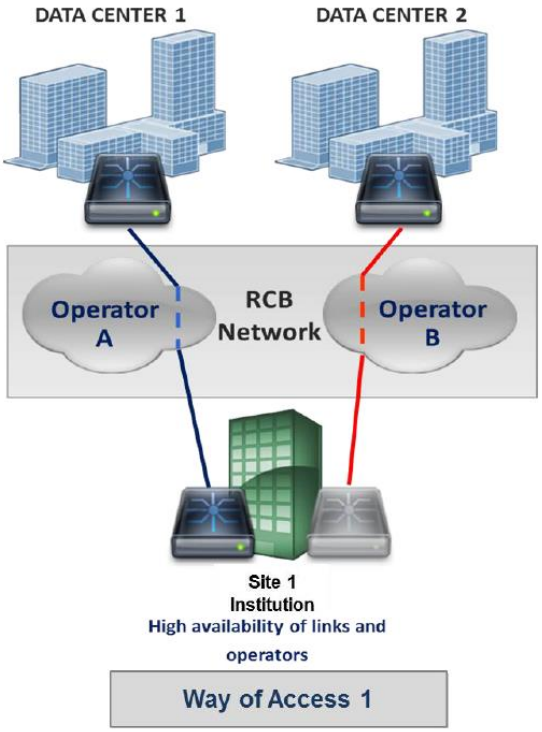
It is the responsibility of the contracting party: (i) contracting the links with the cloud provider as well as its subscriptions with the provider; (ii) configuration and maintenance of your cloud infrastructure; (iii) monitoring; (iv) capacity management; and (v) technical support for the B3 technology infrastructure access solution.

In RCB via Cloud, the institution must contract the means of telecommunication between its cloud provider and B3's Data Centers with operators that meet the technical requirements and listed in item 3.6.1 of this manual.

3.4 WAYS OF ACESS VIA RCB

Access to B3's technology infrastructure via RCB can be established in different ways, with variations in availability, performance and latency depending on the characteristics of each way of access. These ways are designed to assure optimized levels of support, management and maintenance, including rapid identification and resolution of problems.

3.4.1 WAY OF ACCESS 1 – HIGH AVAILABILITY OF LINKS AND OPERATORS



This way of access uses two links: two routers on the institution's premises are connected to one link at Data Center 1 and another link at Data Center 2 via any two of the operators listed in item 3.6. Institutions are responsible for CPE routers, which they may purchase or lease from a partner or from one of the operators recommended by B3.

IMPORTANT NOTE

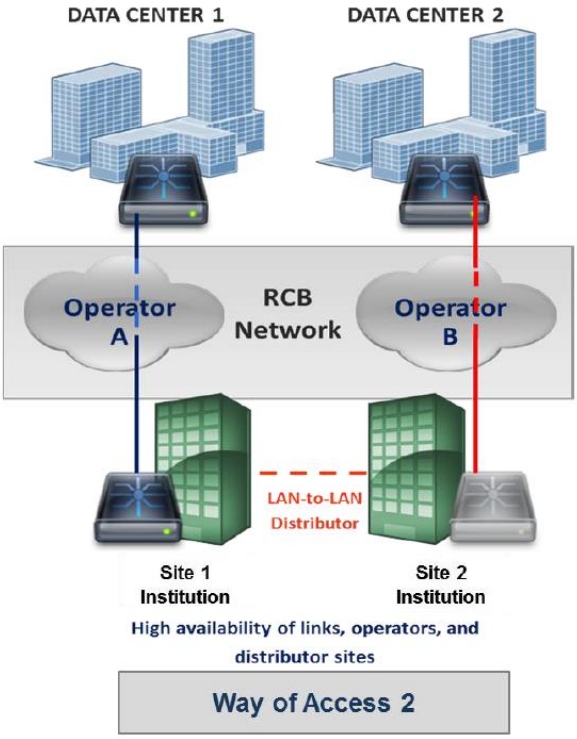
For trading participants this way of access cannot be acquired individually, given the obligation to have site redundancy, i.e., a backup site or branch location with links provided by different operators for Data Center 1 and Data Center 2, respectively.

In this way of access, if the active CPE fails, the other CPE rapidly takes over and provides the necessary connectivity for the operation to continue.

To access trading systems, the active link is installed at Data Center 1. In the case of access to post-trading systems and the B3 Settlement Bank, the active link is installed at Data Center 2. Both links (Data Center 1 and Data Center 2) can be used as active to receive the market data feed (UMDF).

This environment must be set up by contracting with two operators to prevent instability in one operator's network from degrading or interrupting access to the Exchange's technology infrastructure.

3.4.2 WAY OF ACCESS 2 – HIGH AVAILABILITY OF LINKS, OPERATORS AND INSTITUTION SITES



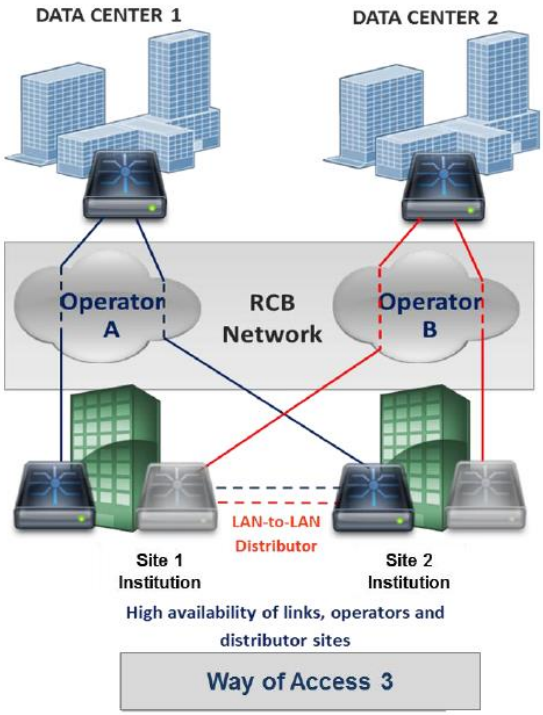
In this configuration, each of the institution's sites (main site and backup site or branch) has one link to Data Center 1 and another to Data Center 2. Links for different sites are provided by different operators. In addition to last-mile and operator backbone contingency backup, the institution can switch to an adjacent backup site in the event of main site failure. If the active CPE fails, the other CPE takes over immediately and will provide the necessary connectivity for the operation to continue.

To access trading systems, the active link is installed at Data Center 1. To access post-trading systems and B3 Settlement Bank, the active link is installed at Data Center 2. Both links (Data Center 1 and Data Center 2) can be used as active circuits to receive the market data feed (UMDF).

In order to guarantee the availability of the structure, the institution is responsible for implementing LAN-to-LAN links between its sites with appropriate redundancy, availability and capacity to handle the requisite transaction volumes. CPE requirements are as indicated in the preceding model.

This model is suitable for institutions with a main site and a backup site, and for institutions with a main site and a branch site.

3.4.3 WAY OF ACCESS 3 – HIGH AVAILABILITY OF LINKS, OPERATORS AND INSTITUTION ACTIVE SITES



In this configuration, each of the institution's sites has two links, one to Data Center 1 and another to Data Center 2. Links for the same sites must be provided by different operators. This is the most complete configuration: in addition to redundant access to B3's technology infrastructure and to the operator's backbone, it allows institutions to operate via an adjacent active site if one of their sites is totally unavailable.

In order to guarantee the availability of the structure, the institution must implement LAN-to-LAN links between its sites with appropriate redundancy, availability and capacity to handle the requisite transaction volumes.

Through this option, each of the institution's sites is given an AS Number and IP address block, so that all sites operate independently. If the main link at one of the sites should fail, the backup link at the same site takes over, or the main link at the adjacent site provides the requisite access for operations to continue via the LAN-to-LAN connection.

To access trading systems, the active link is installed at Data Center 1. To access post-trading systems and the B3 Settlement Bank, the active link is installed at Data Center 2. Both links (Data Center 1 and Data Center 2) can be used as active circuits to receive the market data feed (UMDF).

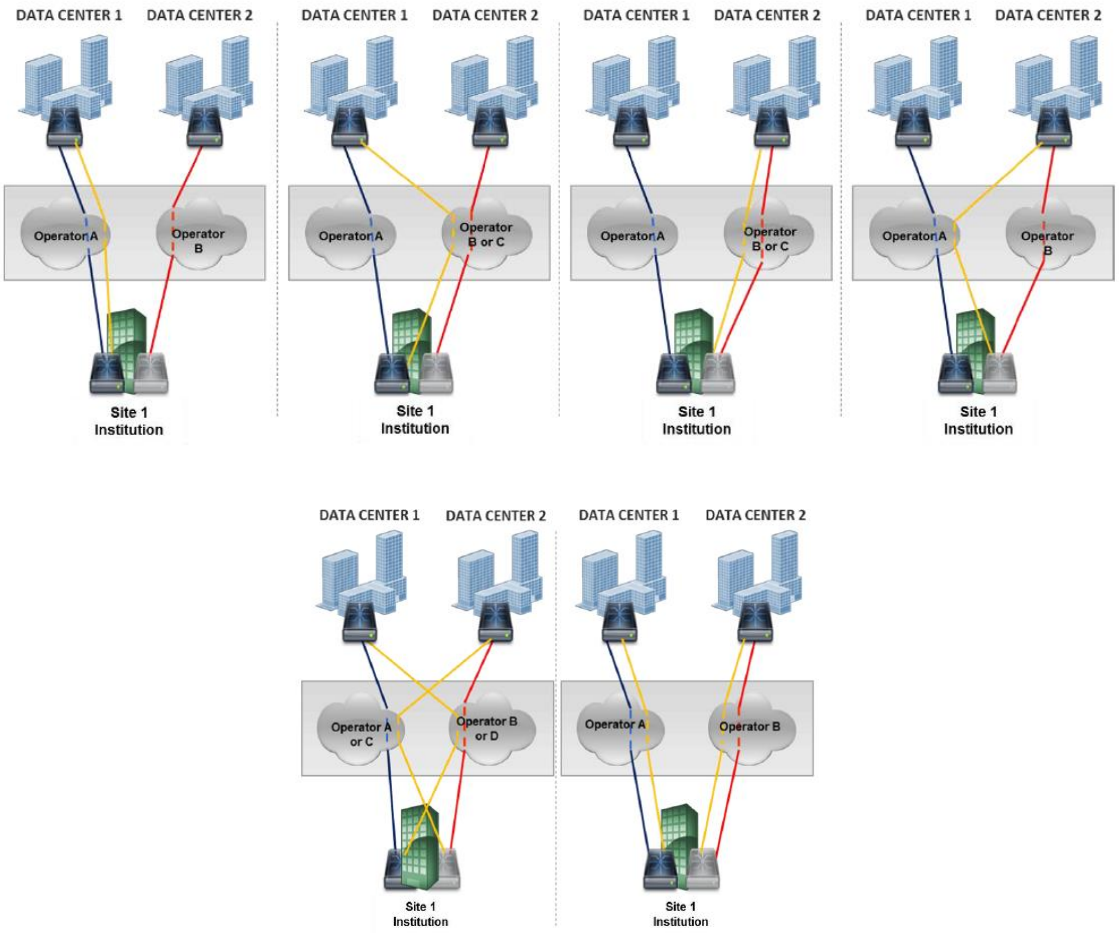
This model is suitable for institutions with more than one site operating in parallel. Under normal operating conditions, all transactions regardless of physical location are performed by the site and the adjacent site takes over via the institution's LAN-to-LAN connection in the event of a failure.

3.4.4 WAY OF ACCESS 4 – VARIANTS OF MODES 1, 2 AND 3

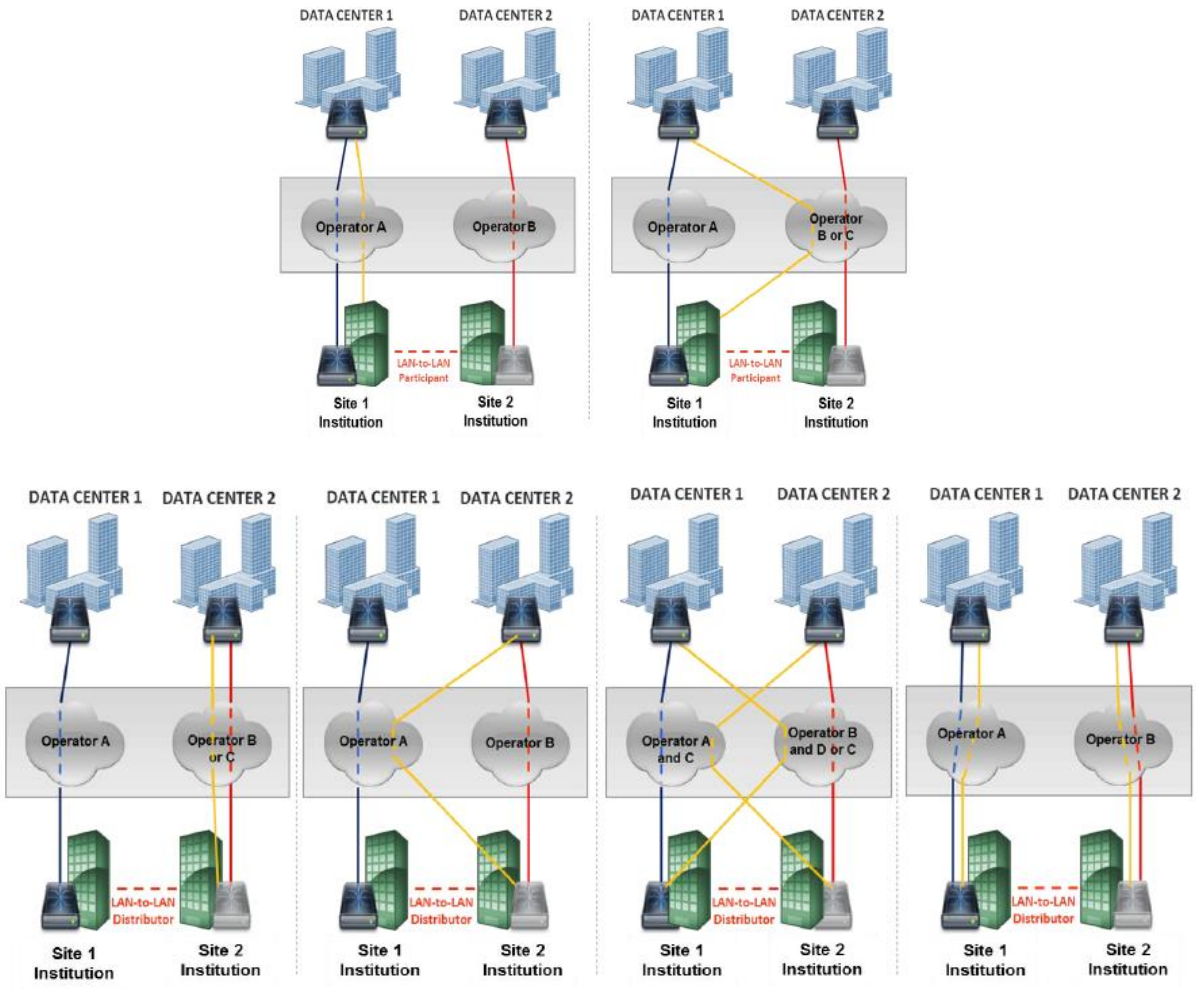
This way of access is based on the standard ways of access described above. Customers can install additional links per site at their discretion, provided the network bandwidth characteristics are the same between the institution's site and B3's site. A different operator for each link is recommended.

The authorized possibilities for Way of Access 4 are shown below.

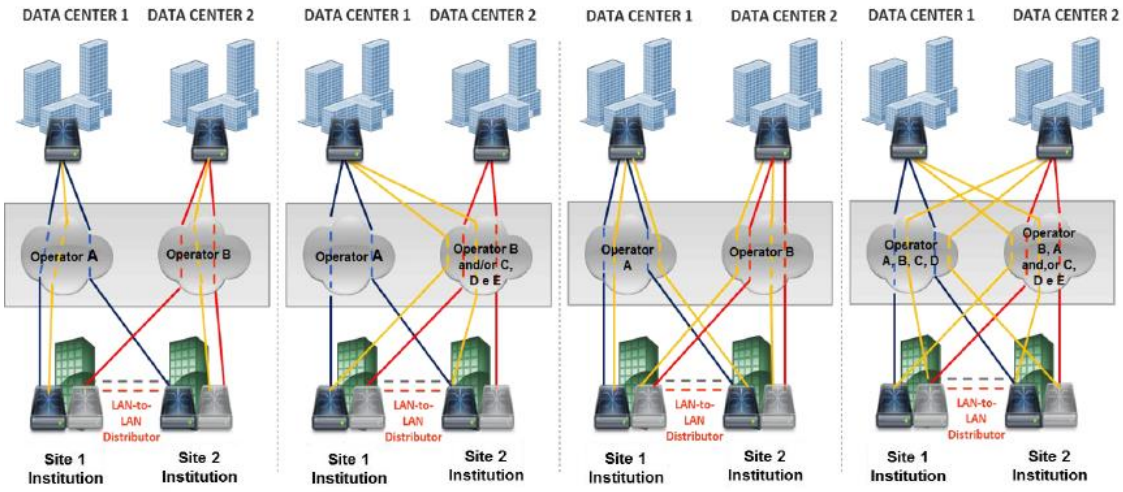
Variants of Way of Access 1



Variants of Way of Access 2



Variants of Way of Access 3



Because the point of this way of access is to add link contingency for the institution in the same CPE to the respective B3 data center, it is important to bear in mind not only that sufficient bandwidth must be acquired for the additional links to be equal in capacity to the primary link and connected to the same CPE, but also that this configuration does not permit segmentation by type of traffic, service or load balancing between primary and secondary links.

3.4.5 WAY OF ACCESS 5 – ACCESS WITHOUT CONTINGENCY

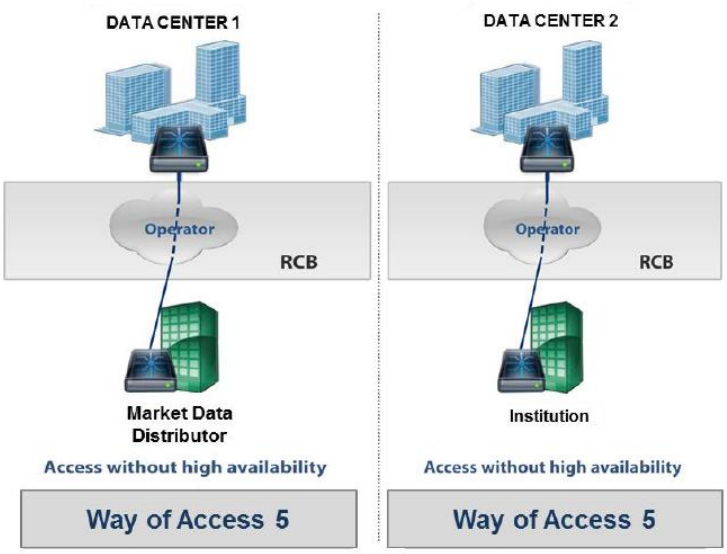
Way of Access 5 is aimed at Market Data distributor and customers who wish to obtain access without contingency to B3's market data and/or order routing platforms.

This way of access is also permitted to participants that work solely in the post-trade environment and those that have a Disaster Recovery (DR) site. However, the principal site must be in compliance with one of the ways of access contained in this Manual.

This way of access uses a circuit with a router at the participant's premises and a connection to B3's Data Center 1 through any of the operators listed in item 3.6 of this Manual. Participants are responsible for CPE routers, which they may purchase or lease from a partner or from one of the operators recommended by B3.

In this configuration there is no contingency backup, so that if the active CPE fails there is no convergence to B3's Data Center 2, which does not provide the necessary connectivity for operations to continue.

It is important to note that UMDF is B3's native market feed platform. It is a dual feed available in a hot-hot configuration, i.e., market data is supplied by both Data Center 1 (Feed A) and Data Center 2 (Feed B).



3.5 WAYS OF ACESS RCB VIA CLOUD

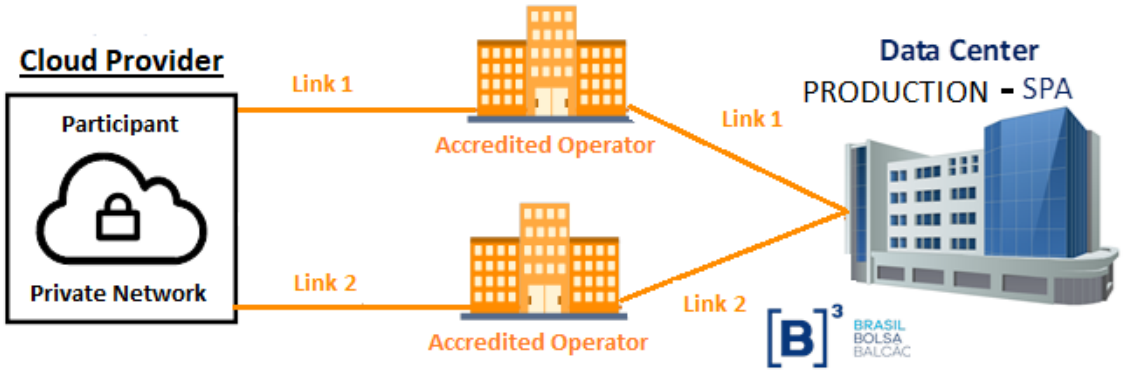
The access to B3's technological infrastructure via RCB Cloud can be established in different ways, with availability, performance and latency that vary according to the characteristics of each one. These forms aim to establish optimized levels of support, management and maintenance, which speed up the process of identifying and solving problems.

The LAN addressing to be used by the participant in its virtual network, as well as the transit addressing, will be provided by B3 in all the following forms of access:

3.5.1 ACCESS 1 - SINGLE LINK

This way of access connects the participant's private cloud network via a single link to B3's production data center, on one of RCB edge routers.

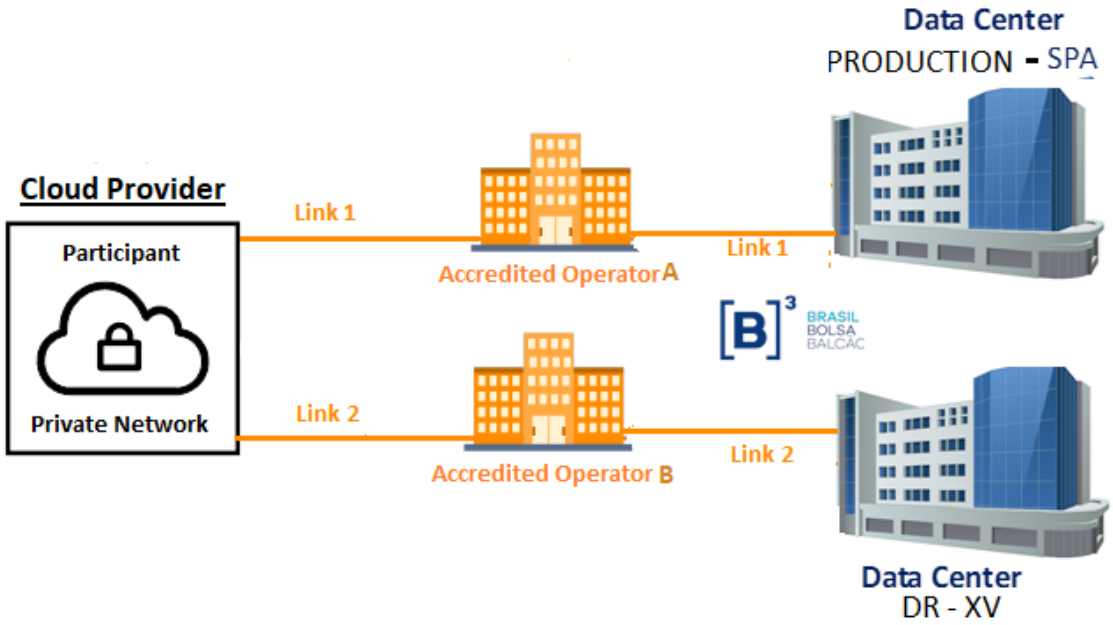
3.5.2 ACCESS 2 – ACCESS WITH H.A



This way of access connects the participant's private network with high availability through two links to B3's production data center, each link being received on one of the two RCB edge routers

Although the use of two different operators is not required, it is recommended to mitigate total access failure in an eventual problem in the operator's backbone. It is also recommended that the two links be connected to different POPs on the cloud provider.

3.5.3 ACCESS 3 – ACCESS WITH DR

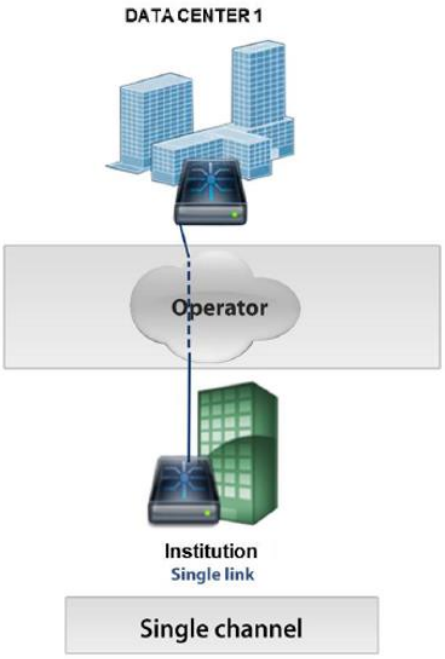


This way of access connects the participant with access to B3's Production and DR data centers through two different operators. It is also recommended that the links be connected to different POPs from the cloud provider.

3.6 RCB CHARACTERISTICS – CERTIFICATION

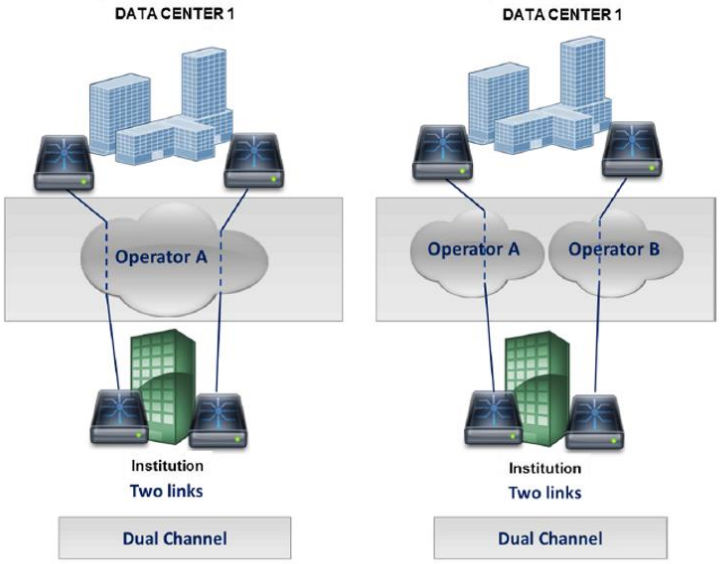
RCB for certification, unlike RCB for the production environment, is available only from B3's Data Center 1. The infrastructure available for this purpose is exclusive and segregated from the production environment, comprising the following ways of access. For this environment, the maximum bandwidth is 1 Gbps.

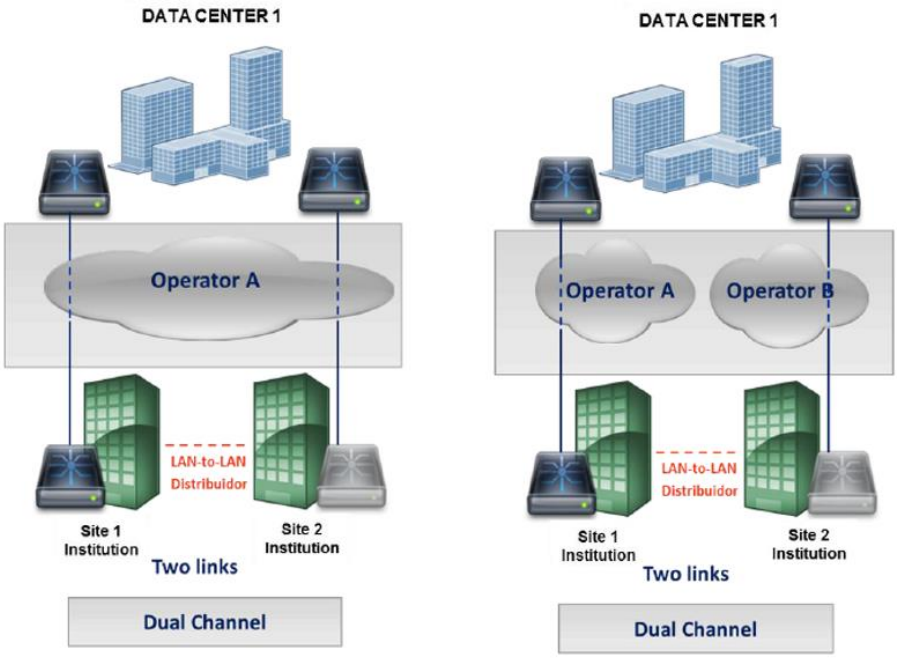
3.6.1 ACCESS VIA A SINGLE COMMUNICATION CHANNEL (ONE LINK)



3.6.2 ACCESS VIA A DUAL COMMUNICATION CHANNEL (TWO LINKS)

This way of access can be structured in various ways, such as:





IMPORTANT NOTE

BANDWIDTH CHANGE

Regardless of the way of access acquired and its variants, B3 must be notified whenever there is a bandwidth change (increase or reduction) of the links acquired.

Market participants should notify B3 through the B3 Service Portal system.

Institutions that do not have access to the B3 Service Portal system should send the following bandwidth change information to contratacao@b3.com.br**:**

Connection with change of bandwidth	( ) RCB ( ) VPN ( ) RCB w/ CLOUD
Data Center where change will take place	( ) CT1 ( ) CT2
Name of operator	
Size of current bandwidth (FROM)	
Size of new bandwidth (TO)	
DWDM	( ) Yes ( ) No
Name of technical contact	
Telephone no. of technical contact	
E-mail of technical contact	

CHANGE OF WAY OF ACCESS

If you wish to change the acquired way of access via RCB, which may or may not involve cancellation of the link with the operator, it will be necessary to inform B3.

B3 participants in the B3 segment must also use the B3 Service Portal system to cancel the current way of access, and request the new way of access desired.

Institutions that do not have access to the B3 Service Portal system should send the change request to contratacao@b3.com.br.

3.7 TELECOMMUNICATIONS OPERATORS RECOMMENDED FOR RCB

Institutions who use RCB to access B3's technology infrastructure must acquire access ports and the Exchange's management services, monitoring services and technical support services, as well as telecommunications between their premises and B3's data centers via the ways of access described in item 3.4 of this Manual.

In the link www.b3.com.br/en_us/solutions/hosting-colocation/data-center/data-center/providers.htm is shown the telecommunications operators that meet the minimum technical requirements established by B3 for access via RCB.

3.8 COMMUNICATION OPERATORS INDICATED FOR THE RCB VIA CLOUD

The institution that chooses to access the RCB via the Cloud must contract not only access to the institution's technological infrastructure to B3's systems through the Exchange's gateways and management, monitoring and technical support services, but also the means of telecommunications between its location(s) and B3's Data Centers, according to the forms of access described in this manual.

In the link www.b3.com.br/en_us/solutions/hosting-colocation/data-center/data-center/providers.htm is shown the telecommunications operators that meet the minimum technical requirements established by B3 for access RCB via Cloud.

3.9 SYSTEMS AND ENVIRONMENTS

B3's systems and environments can be accessed via RCB using the same communication link, which will logically segregate trading and market data systems from post-trading and B3 Settlement Bank systems, as described in Annex 1.

3.10 MANAGEMENT, MONITORING AND TECHNICAL SUPPORT SERVICES

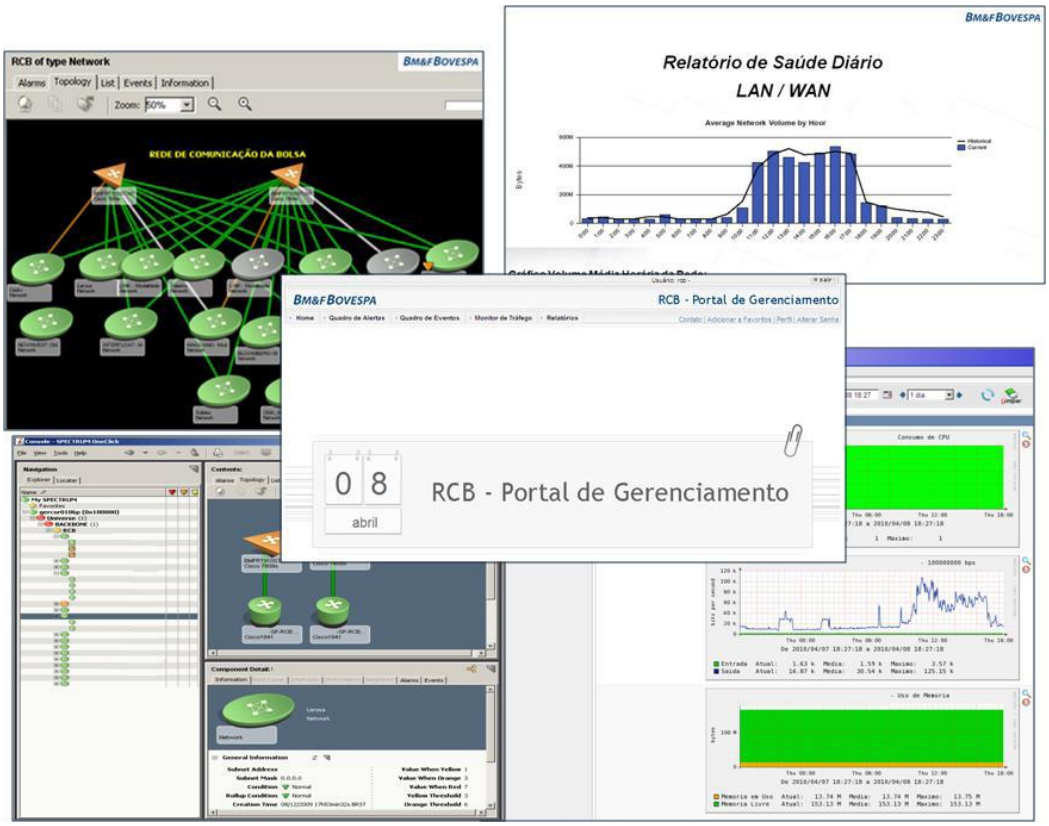
Institutions can acquire the services detailed below from B3 regardless of the way chosen to access its technology infrastructure via RCB. These services relate directly to the structure of each way of access and not to the communications lines offered by operators. Services relating to the communications lines must be acquired from the operator.

Management, monitoring and technical support services can be acquired for the production and certification environment, but it is important to note that in the case of an incident priority will be given to institutions who have acquired these services for RCB in the production environment.

3.10.1 MANAGEMENT AND MONITORING

The RCB management and monitoring service offered by B3 is run by technical staff, is an optional service and has the following scope:

- Management of availability and status (online supervision of connectivity and RCB-interfacing equipment);
- Alarm history;
- Failure alerts;
- Traffic volume measurement;
- Bandwidth and equipment upgrade recommendations, when deemed necessary.



3.10.2 REMOTE TECHNICAL SUPPORT

RCB Remote Technical Support is an optional service available from B3 and run by technical staff that can solve problems relating to access by institutions to the Exchange's technology infrastructure via one of the RCB Ways of Access. The scope of the service is confined to the institution's internal infrastructure up to and no further than the CPE router installed on the institution's premises.

Requirement	Contact
Sales & Other Services	Service Contract Manager Tel: (+55 11) 2565-5084 E-mail: contratacao@b3.com.br
Technical Support	NOC – Network Operation Center Tel: (+55 11) 2565-5130 E-mail: suporte.redes@b3.com.br

3.11 HOW TO CONTRACT

To acquire the RCB ways of access and management, monitoring and technical support services, contact B3's Service Development. For sales matters and clarification of technical doubts, please contact NOC – Network Operation Center.

Requirement	Contact
Sales & Other Services	Service Contract Manager Tel: (+55 11) 2565-5084 E-mail: contratacao@b3.com.br
Technical Support	NOC – Network Operation Center Tel: (+55 11) 2565-5130 E-mail: suporte.redes@b3.com.br

General information:

- Evaluate the best option among the previous forms of access, according to sections 3.4 and 3.5.

- Set your Telecom Operator according to the table of authorized Operators in section 3.7 and 3.8.
  a) If you have doubts about the bandwidth to be hired, check Annex 3, it is possible to measure the bandwidth according to your need. If you need to, get in touch with the teams mentioned above. The maximum bandwidth allowed is 10 Gbps.
  b) Exclusively for forms of access by Cloud, the operators listed in this manual (section 3.8) will be responsible for delivering links between B3's data centers and the cloud provider. If you have any other carrier listed through your B3 authorized cloud provider, consult them about delivery to B3 data centers.
  c) The operators' infrastructure is ready in our datacenters, and it is not necessary to request any technical visit or field activity involving B3's data centers.

- Once the contract has been signed with the Operator, ask then for the VLAN ID of the contracted circuit(s), as it is essential information for B3's technical team to prepare the technical document and the paving of the environment. For 10Gbps links, also request the port and switches reserved by the operator. With the circuit information, you will be able to contract your RCB access through the service channel of the contracting team or through the corporate portal.

- With all the circuit data filled in the request, the B3 teams will evaluate the information and proceed with the availability of the RCB usage networks providing the ASN, negotiation networks, post-trade, transit and other necessary information for you and your operator, as well as all support and clarification needed until production activation.

After receiving the documentation sent by B3, configure your equipment with your network team. If there are doubts or difficulties, the technical contact can be made directly to the sender of the e-mail with the documentation, who will provide the necessary support.

3.12 SYSTEMS AND ENVIRONMENTS

Through the RCB, it is possible to access B3 systems and environments using the same communication link, which will logically segregate the trading systems/Market Data from the post-trading systems/B3 Bank, as described in Annex 1.

4. VPN – VIRTUAL PRIVATE NETWORK

4.1 DESCRIPTION OF ACCESS VIA INTERNET VPN

Internet VPN is an access type to B3's technology infrastructure. This type is an option that uses encryption between two points connected to the internet to create secure communications "tunnels".

VPNs can access all of B3's internet-based systems and environments except B3 Settlement Bank's systems, which are accessible without the establishment of a VPN but requires a specific process of encryption over the internet. Customers' drop copy messages will also be allowed via this type of access but must be contracted for separately.

Since 2021, site-to-site VPN access is possible

4.2 HOW TO CONTRACT FOR ACCESS VIA INTERNET VPN

To contract an Internet VPN access (LAN-to-LAN VPN or LAN-to-client VPN), contact B3's Contract Manager team.

Requirement	Contact
Sales & Other Services	Service Contract Manager Tel: (+55 11) 2565-5084 E-mail: contratacao@b3.com.br
Technical Support	NOC – Network Operation Center Tel: (+55 11) 2565-5130 E-mail: suporte.redes@b3.com.br

4.3 TECHNICAL CHARACTERISTICS OF ACCESS VIA INTERNET VPN

B3 is connected to the internet via redundant links, different access providers and high-availability equipment. B3 also has its own autonomous systems (AS) to guarantee secure access. The following table shows the recommended minimum bandwidths and ways of access available for Internet VPN access to each system and environment

Systems & Environments	Minimum bandwidth (bps)	LAN-to-LAN	LAN-to-Client	VPN Cloud Site-to-Site	Web (3)
Trading – government and private bonds(1)	**1M**	✓	✓		
Trading – Tesouro direto	**1M**	✓	✓		
Registration – iBalcão(5)	**1M**	✓	✓		
Drop copy	**1M(4)**	✓		✓	
Post-trading	**2M**	✓		✓	
SPI Liquidity Chamber	**512**	✓			
Certification and testing environment(2)	**512 K**	✓		✓	
B3 Settlement Bank	**512 K**	✓	✓	✓	✓
(1) In compliance with External Communication 029/2010-DN, trading in government bonds via VPN is permitted only for the categories PLC and PLM.					
(2) VPN devices must support multicast protocols in the case of UMDF certification.					
(3) Secure SSL connection for access to web applications.					
(4) Although the recommended minimum bandwidth to receive drop copies via a VPN is 1Mbps, actual bandwidth consumption will depend on trading volume by customers whose trading messages are transported by the VPN.					
(5) iBalcão registration is for Registration Participants.					

Institutions should negotiate the technical characteristics of their internet connections, such as bandwidth and availability, with their access providers as required.

Institutions must have the infrastructure, IPsec capable equipment, encryption and internet connections appropriate to their business needs.

4.4 WAYS OF ACCESS VIA VPN

4.4.1 PRODUCTION ENVIRONMENT

Internet VPN access can be established via LAN-to-LAN VPN or LAN-to-client VPN.

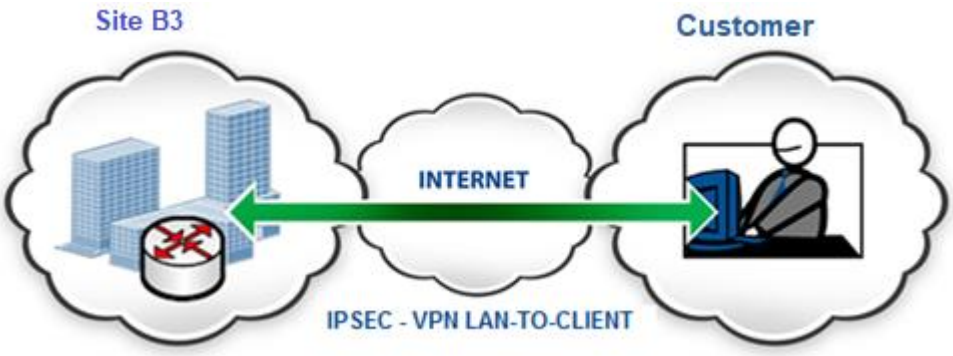
4.4.1.1 LAN-to-LAN VPN

LAN-to-LAN VPN access is available for all the systems and environments listed in Annex 1, guaranteeing greater scalability for institutions. Access is authorized only using the address block supplied by B3. Other network addresses may have to be translated to the address supplied using NAT. In this way of access, customers are responsible for equipment configuration, management, internet access and security.

The basic technical requirements for establishing LAN-to-LAN VPN access are as follows:

- IPsec support IKEv2;
- NAT support;
- AES encryption support;
- SHA-2 support;

4.4.1.2 LAN-TO-CLIENT VPN



LAN-to-client VPN access is available only for the systems and environments listed in Annex 1. B3 provides installation software (via download), as well as a VPN username and password allowing one

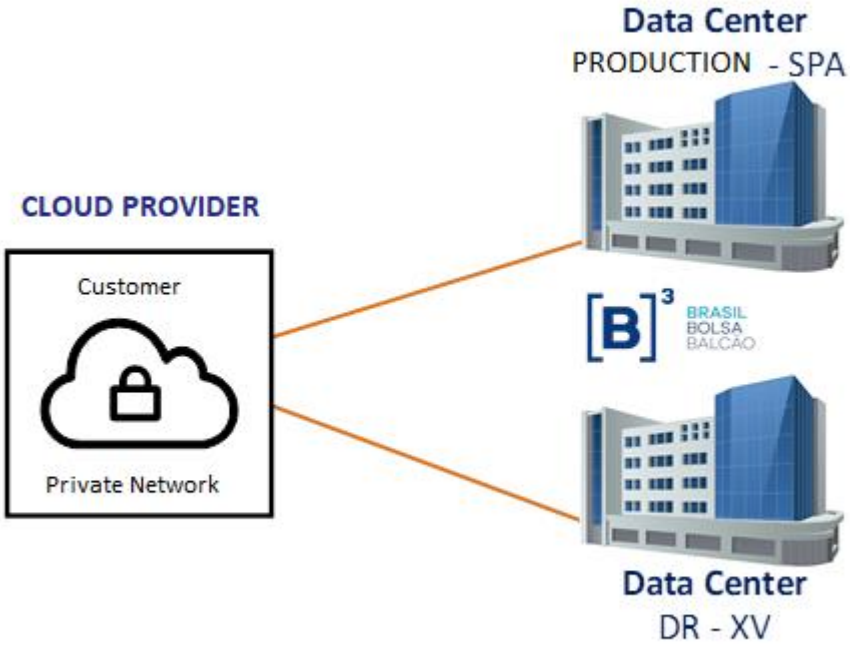
connection per login. LAN-to-client VPN access is recommended for up to five connections. Customers with more than five connections should use LAN-to-LAN VPN access.

4.4.1.3 VPN VIA CLOUD SITE_TO_SITE UNICAST

The Site-to-Site VPN access method is available for all systems and environments mentioned in Annex 1 of this manual and guarantees greater scalability for the institution. Only the address block provided by B3 is allowed access. If necessary, the customer must perform the address translation (NAT) to the address provided. In this form of access, the customer is responsible for the configuration, administration, internet access and security of their private network in the cloud.

Basic technical requirements to establish Site-to-Site VPN via Cloud Provider:

- IPSec IKEv2 support;
- Support for 3DES and AES encryption;
- Support SHA-1 and SHA-2;



4.4.2 CERTIFICATION ENVIRONMENT

4.4.2.1 UNICAST LAN-TO-LAN VPN

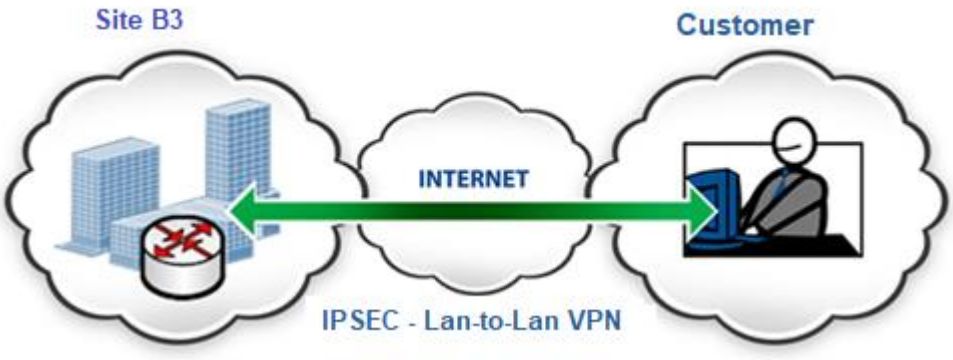
LAN-to-LAN VPN access is available for all the systems and environments listed in Annex 1, guaranteeing greater scalability for institution. Access is authorized only using the address block

supplied by B3. Other network addresses may have to be translated to the address supplied using NAT. In this way of access, customers are responsible for equipment configuration, management, internet access and security.

The basic technical requirements for establishing LAN-to-LAN VPN access are as follows:

- Ipsec IKEv2 support;
- NAT support;
- AES encryption support;
- SHA-2 support;
- GRE support*.

*A GRE tunnel is necessary for multicasting in the certification environment



4.4.2.2 MULTICAST LAN-TO-LAN VPN

The Internet LAN-to-LAN VPN way of access is available for functional testing certification and qualification of applications. The available systems are listed on the extranet. This tunnel is segregated from production, i.e. this is a network solution segregated from the production infrastructure.

To receive the Unified Market Data Feed (UMDF) in the certification environment via Internet LAN-to-LAN VPN, institutions require the functionality provided by the multicast protocol. To this end, in addition to using the GRE protocol it is important to implement a network design project that takes into account the availability characteristics of the institution's applications and information volume analysis based on the market data segments to be used. Regarding support for multicast in the solution provided by the operator, broadcast or multicast filters must be disabled.

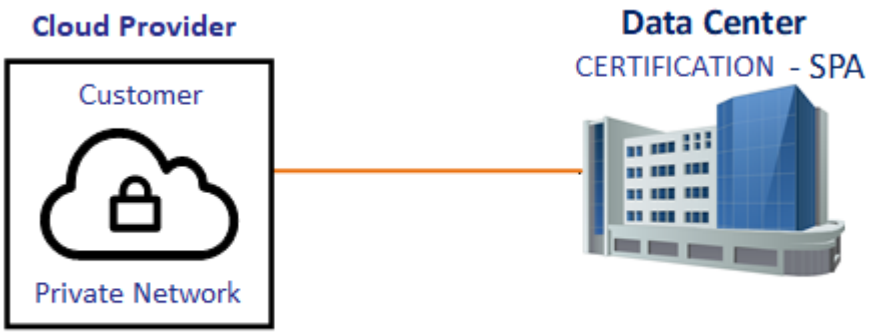
4.4.2.3 VPN VIA CLOUD SITE-TO-SITE UNICAST

The VPN Cloud Site-to-Site access via internet is available for all systems and environments mentioned in Annex 1 of this manual and ensures greater scalability for the institution. Only the IP address block provided by B3 is allowed access. If necessary, the customer must perform the address translation (NAT) to the address provided. In this form of access, the customer is responsible for configuration, administration, internet access and security of their equipment.

Basic technical requirements for establishing the Site-to VPN:

- IPSec IKEv2 support;
- NAT support;

- Support for 3DES encryption;
- Support for SHA-1 and SHA-2;



4.5 MANAGEMENT, MONITORING AND SUPPORT

B3's technology infrastructure is managed and monitored by specific tools used internally to mitigate the risk of unavailability of VPNs and VPN access.

The VPN client software supplied by B3 comes with an installation manual.

Requirement	Contact
Technical Support	NOC – Network Operation Center Tel: (+55 11) 2565-5130 E-mail: suporte.redes@b3.com.br

5 LAN CO-LOCATION

5.1 DESCRIPTION OF ACCESS VIA LAN CO-LOCATION

Access via LAN Co-location offers institutions the lowest level of network infrastructure latency for electronic trading on B3, because their equipment is physically installed in the same network infrastructure (LAN) as the trading gateways.

Institutions must comply with the following conditions for this access type:

- Layer 3 access (routed to provide logical isolation);
- Dual connections for high availability;
- Optimized routing for rapid convergence;
- High performance with bandwidth of 10 Gbps.

5.2 HOW TO HIRE LAN CO-LOCATION

To contract the access via LAN Co-location, the institutions must sign the respective agreement ("Adhesion Term for B3 Co-Location") and send it to Sales Data Center Team.

This agreement ("Adhesion Term for B3 Co-location") and others specific documents can be found at www.b3.com.br/en_us > Solutions > Hosting & Colocation > Data Center > Co-location Services.

Requirement	Contact
Sales Data Center	Connectivity Products, Front and Middle Tel: (+55 11) 2565-5996 e-mail : salesdatacenter@b3.com.br
Technical Support	NOC – Network Operation Center Tel: (+55 11) 2565-5130 E-mail: suporte.redes@b3.com.br
IT Services	Production & Co-location Tel: +55 11 2565-5140 E-mail: colocation@b3.com.br
Operational Support	Trading Support Tel: (+55 11) 2565-5021 E-mail: suporteanegociacao@b3.com.br

5.3 TECHNICAL CHARACTERISTICS OF ACCESS VIA LAN CO-LOCATION

The automated trading system (ATS) software used for algorithmic trading requires specific levels of performance, availability and latency. The access option that satisfies such conditions is direct access to B3's trading environment via Gigabit Ethernet technology.

The co-location service offered by B3 provides physical space (half-rack units) for institutions to install their equipment (servers, network, security, monitoring, etc.) in accordance with pre-defined technical limits and facilities.

Because the institution's equipment is installed inside B3's environment, B3 furnishes two UTP cables for physical connection of the institution's infrastructure to its systems, as well as the necessary IP address and routing parameters.

It should be noted that institutions are responsible for installing, maintaining and providing support for their equipment.

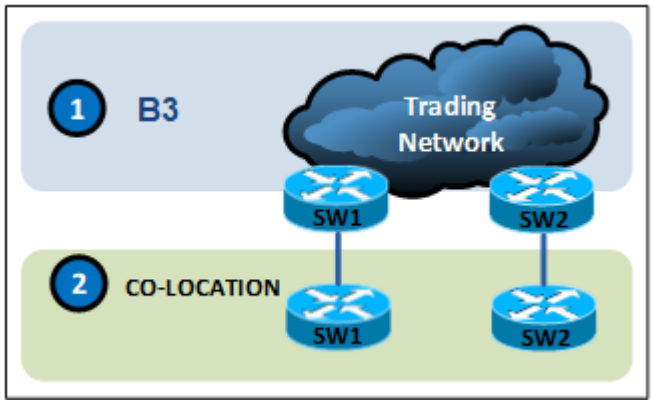
Institutions can manage their environment remotely via one of the following access types: Internet VPN or a dedicated link acquired by the institution and connected directly to the acquired infrastructure with B3.

Note: Internet VPN access is included in the co-location services package acquired with B3. However, institutions must acquire dedicated links for environment management.

5.4 SYSTEMS AND ENVIRONMENTS

5.4.1 LAN CO-LOCATION

Access via LAN Co-location is for trading via Co-location (via Direct Connection – Co-Location), a type of electronic trading whereby the customer's orders are entered directly to B3's trading systems by ATS software running on equipment hosted at B3's data center. The systems and environments that can be accessed via LAN Co-Location are described in Annex 1.



By definition, there is only one way of access via LAN Co-Location, comprising two pairs of 10Gbps multimode optical fiber cables. Each pair of optical fiber cable is connected to a different device in B3's data center to assure high availability of physical resources and network equipment.

The physical layout of the solution is shown in the connectivity diagram below.

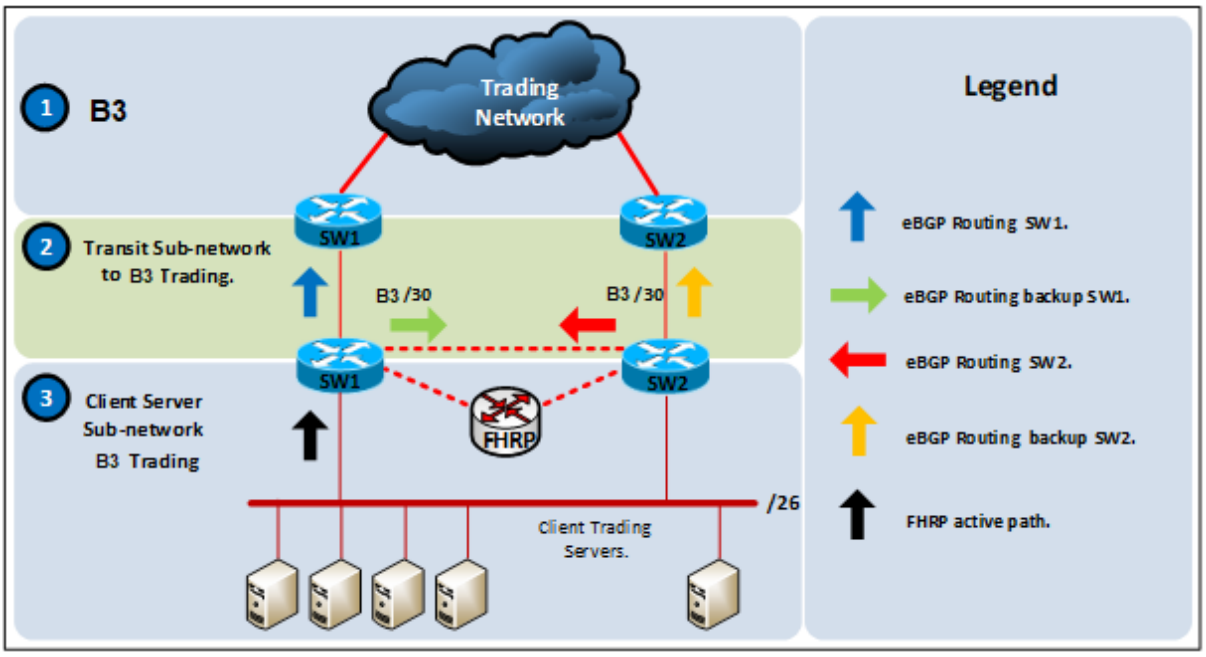
From a logical standpoint, the two connections to the trading bridge networks are point-to-point with IP addressing parameters supplied by B3 and /30 netmasks. The BGP protocol configuration is enabled on the bridging perimeter for connecting the institution's environment to B3's trading network.

5.4.2 WEB CO-LOCATION

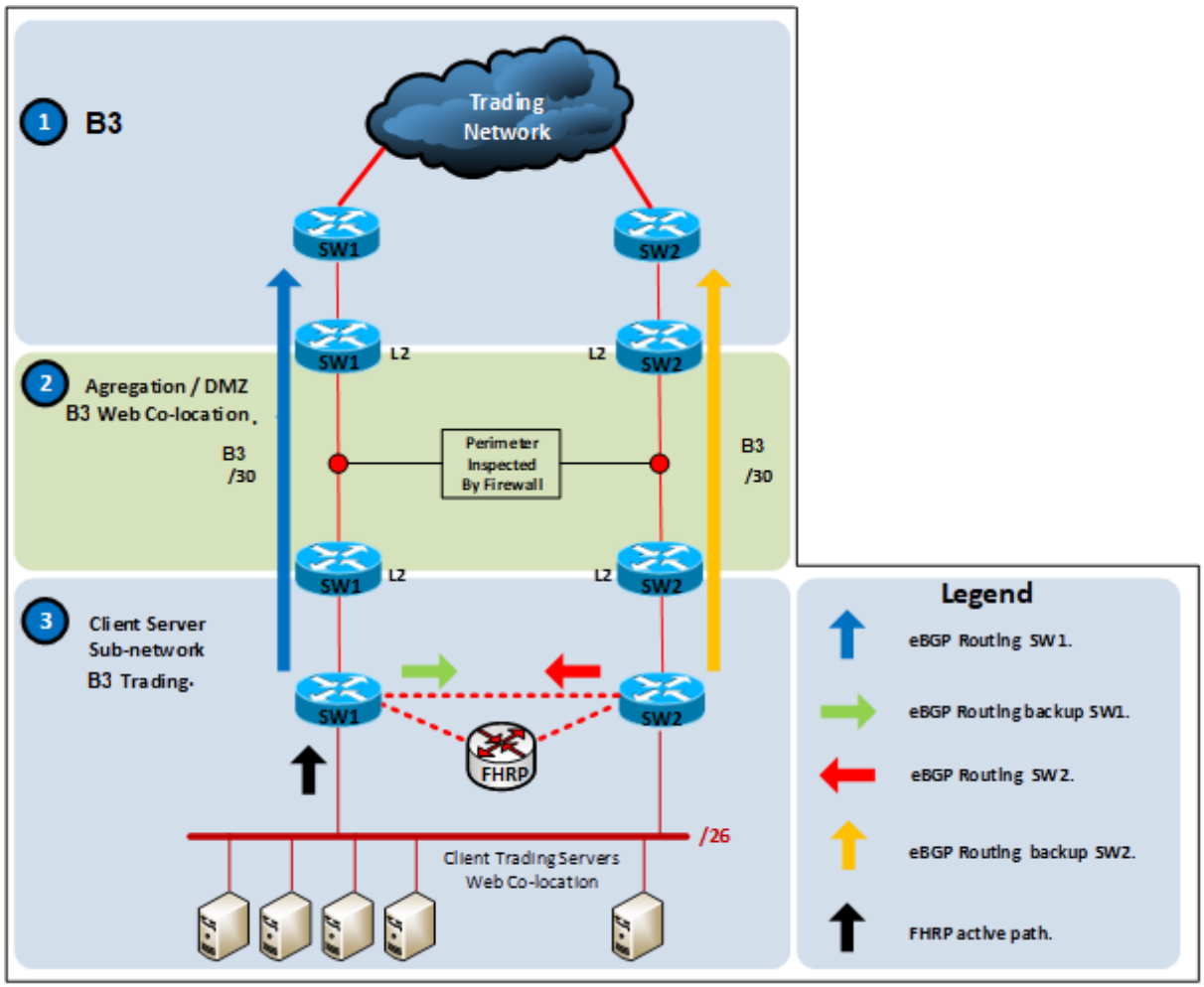
Web Co-location provides access to trading Web servers allocated in Co-location (via Co-location Inspected Connection). This perimeter is for institutions with platforms exposed on the Internet (Homebrokers) for access by end customers. The servers installed in this perimeter will have access to B3's trading platforms restricted and will also have access restrictions if the institution needs to perform the connection between its servers connected to the Web Co-location environment and its servers connected to the LAN Co-location environment.

For customers using the Web Co-location service, the following scenarios are available:

5.4.2.1 CUSTOMERS WHO USE THE WEB CO-LOCATION SERVICE ONLY.



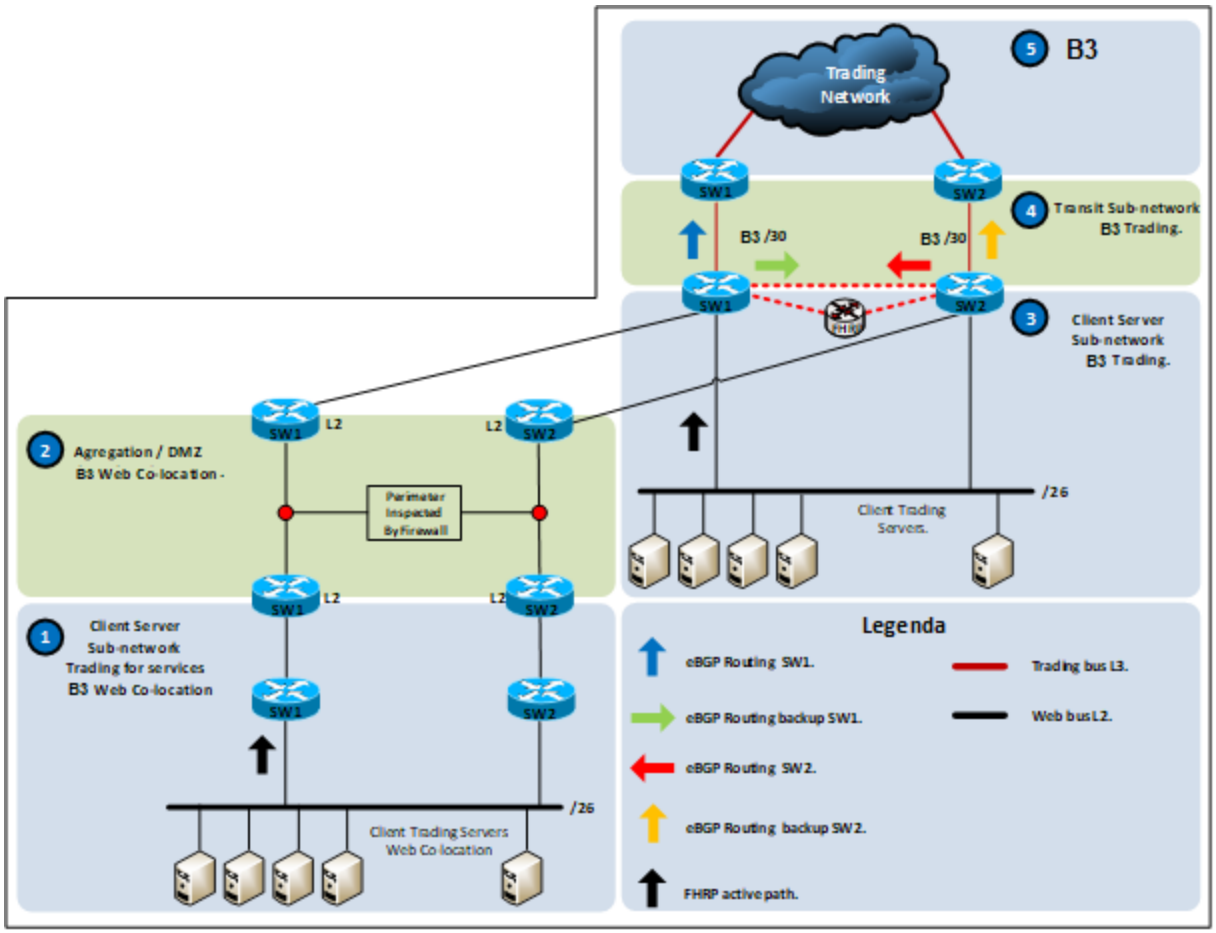
By definition, there is only one way of access via Web Co-Location, comprising two 1Gbps UTP cables. Each cable is connected to a different device at B3's data center to assure high availability of physical resources and network equipment.



From the logical standpoint, the two connections to the trading bridge networks are point-to-point with IP addressing parameters supplied by B3 and /30 netmasks. The BGP protocol configuration is enabled on the bridging perimeter for connecting the institution's environment to B3B3´s trading network.

5.4.2.2 CUSTOMERS WHO USE THE WEB CO-LOCATION SERVICE AND THE LAN CO-LOCATION SERVICE.

By definition, there are two ways of access via Web Co-Location and LAN Co-location, comprising two 1Gbps UTP cables for the Web Co-location environment and two pairs of 10Gbps multimode optical fiber cables for the LAN Co-location environment. Each cable is connected to a different device at B3's data center to assure high availability of physical resources and network equipment.



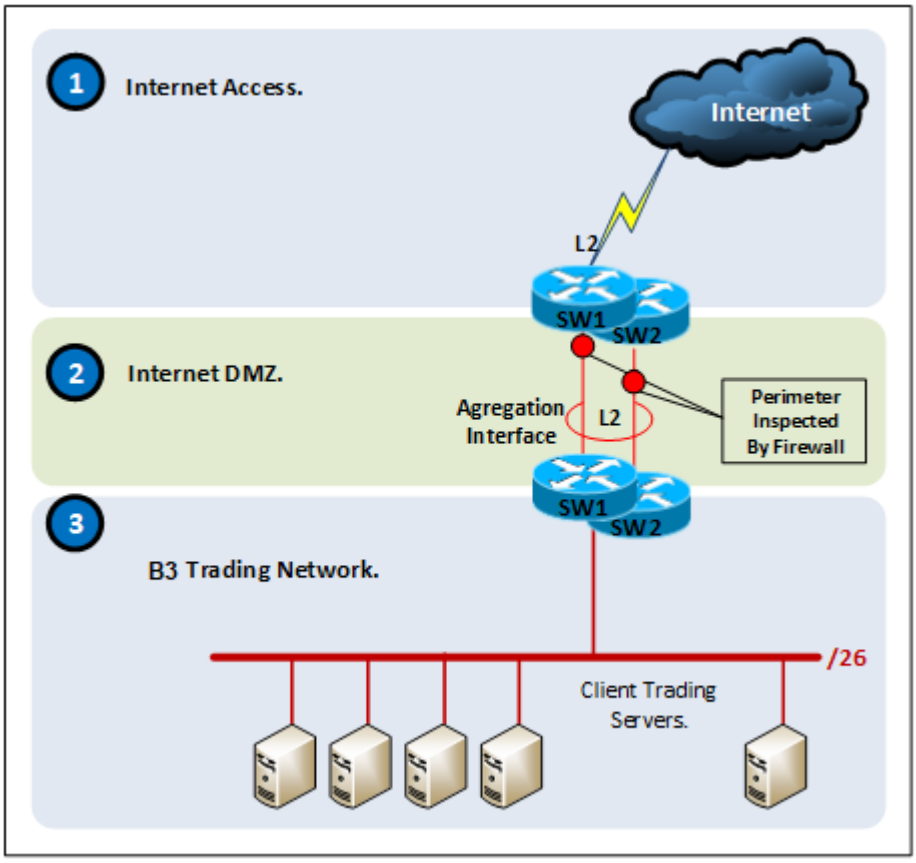
From a logical standpoint, the two environments will have layer 2 connectivity to be monitored by firewall. In the LAN Co-location perimeter, the BGP protocol configuration is enabled for connecting the institution's environment to B3's trading network. This environment will have IP addressing parameters supplied by B3 and /26 netmasks. The /26 address block should also be used in the Web Co-location environment, thus enabling connection between the LAN Co-location, Web Co-location environments and B3's trading environments.

5.4.3 INTERNET ACCESS VIA CO-LOCATION

Internet access via Co-location environments is standardized and should follow the ways of access described below:

5.4.3.1 INTERNET ACCESS LINK FOR CUSTOMERS USING THE LAN CO-LOCATION RACK SERVICE.

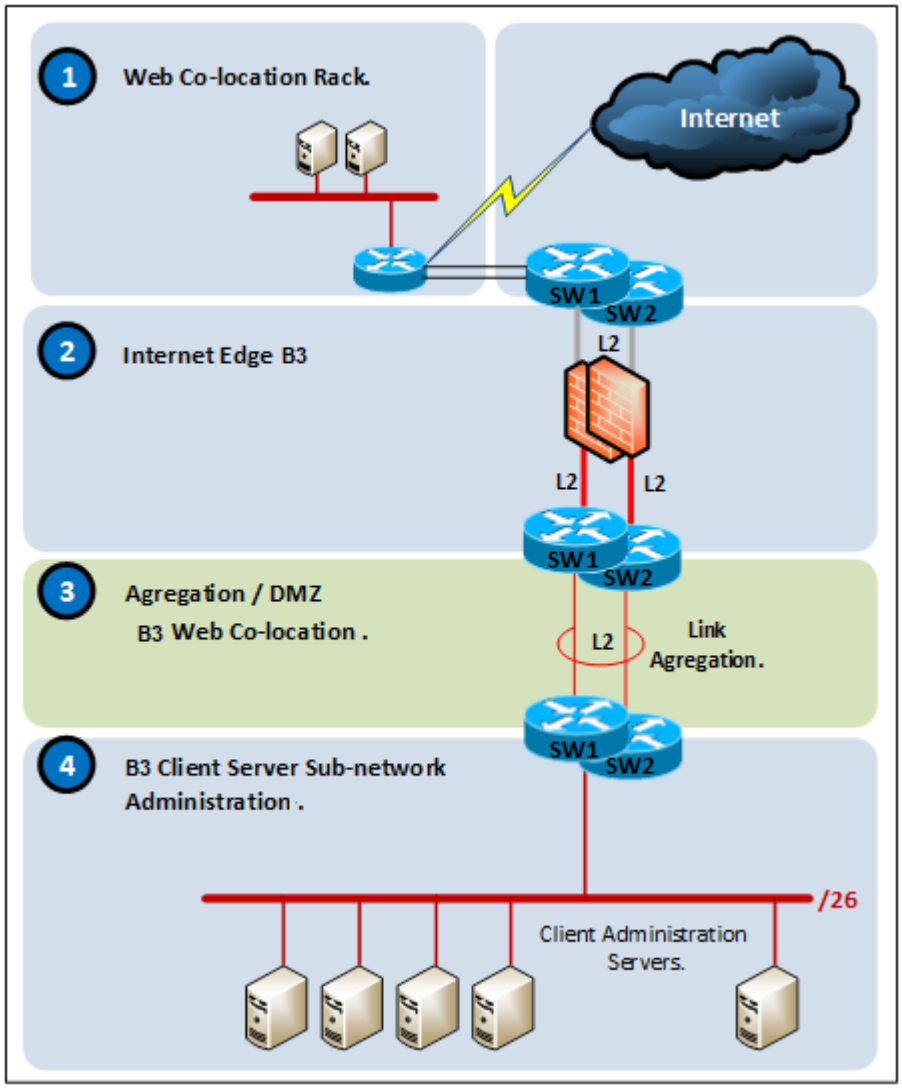
By definition, there is only one way of access via LAN Co-location Rack, comprising one 1Gbps UTP cable. This cable is connected to the internet link acquired by the participant and takes the layer 2 connectivity to the trading environment acquired by the participant.



From a logical standpoint, the participant's internet connection link switch will run a layer 2 configuration, which will pass through a firewall and take this access to the participant's trading rack. In this perimeter, the internet inbound and outbound communication ports will be restricted.

5.4.3.2 INTERNET ACCESS LINK FOR CUSTOMERS USING THE LAN CO-LOCATION RACK AND WEB CO-LOCATION RACK SERVICE.

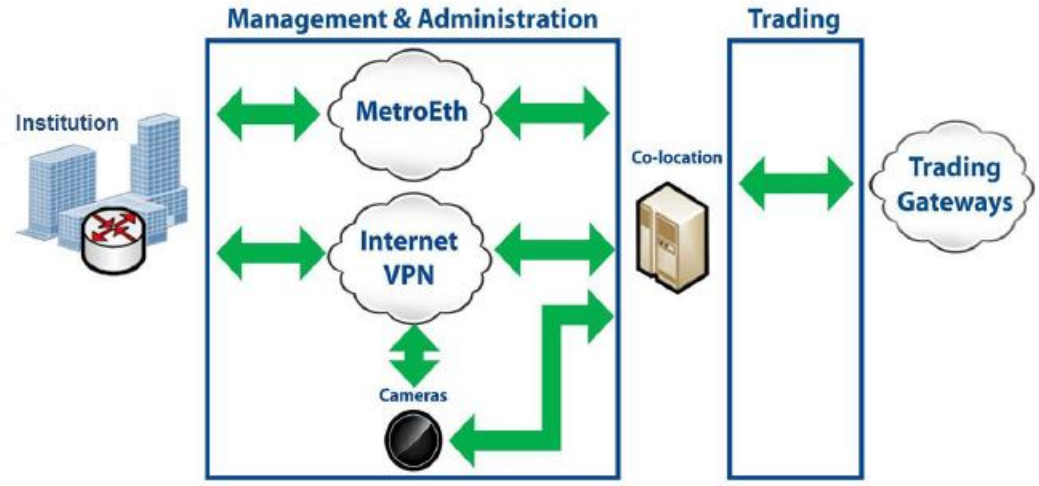
By definition, in this way of access, the internet link will be connected directly to the Web Co-location Rack acquired by the participant with B3. The internet link must be acquired by the participant and delivered through UTP port so that B3 can make the access available in the participant's Web Co-location Rack.



From a logical standpoint, the participant's internet connection link switch will run a layer 2 configuration, which will pass through a firewall and take this access to the participant's trading rack. In the LAN Co-location perimeter, the BGP protocol configuration is enabled for connecting the institution's environment to B3's trading network. This environment will have IP addressing parameters supplied by B3 and /26 netmasks. The /26 address block should also be used in the Web Co-location environment, thus enabling connection between the LAN Co-location, Web Co-location environments and B3's trading environments.

5.5 MANAGEMENT, MONITORING AND SUPPORT

All infrastructure (platforms) supplied by B3 from its own network assets (edge connections) is monitored in real time by three platforms: Security Management, Infrastructure Availability Management, and Application Management.



Institutions are responsible for managing and monitoring co-located infrastructure. This can be done via the remote management system.

Any anomalous behavior detected by B3's security management platforms or support staff may result in temporary suspension of access to B3's technology infrastructure until the institution concerned has taken the necessary action to mitigate or eliminate the problem.

Requirement	Contact
Technical Support	NOC – Network Operation Center Tel: (+55 11) 2565-5130 E-mail:suporte.redes@b3.com.br
IT Services	Production & Co-location Tel: (+55 11) 2565-5140 E-mail: colocation@b3.com.br
Operational Support	Trading Support Tel: (+55 11) 2565-5000 – option 2 E-mail: suporteanegociacao@b3.com.br

6 B3-RTM AGREEMENT

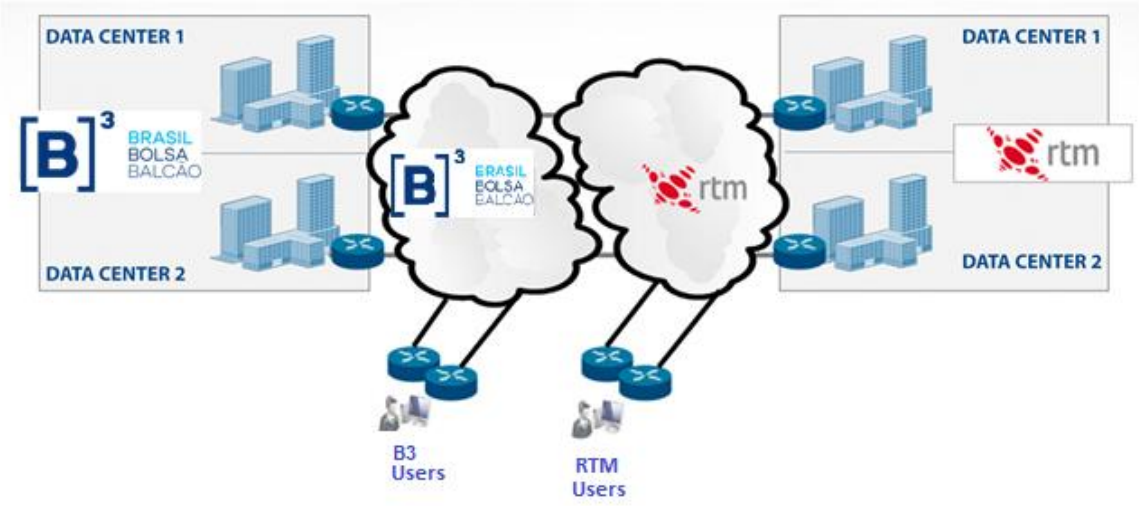
6.1 DESCRIPTION OF ACCESS VIA RTM

B3 S.A. – Bolsa de Valores, Mercadorias e Futuros and RTM – Rede de Telecomunicações para o Mercado Ltda. have established an agreement to interconnect the technology infrastructures maintained and managed by B3 and RTM respectively, in order to enable:

a) RTM's participants to access the services and information offered by B3 via their connections to RTM (RTM Users); and

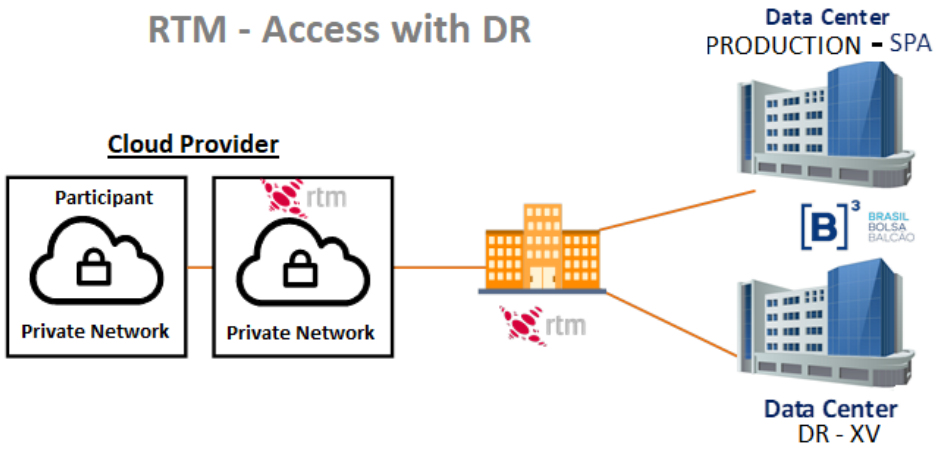
b) B3's participants to access the services and information offered by RTM through their connections to RCB (B3 Users).

Note: The item above is of informational nature only for institutions that still have such active services. The way of access of item (b) above was discontinued and new contracts are not available.



6.2 DESCRIPTION OF ACCESS MODE VIA CLOUD

Through the agreement between B3 and RTM, access to B3's production and DR data centers to B3's post-trade services is available via RTM's private networks on AWS, Google Cloud, Azure and Oracle.



6.3 HOW TO CONTRACT

Requirement	Contact
Contracting and Services (B3)	Service Contract Manager Tel: (+55 11) 2565-7102 E-mail: contratacao@b3.com.br
Commercial and services (RTM)	São Paulo – Tel: (+55 11) 2102-7860 Rio de Janeiro – Tel: (+55 21) 2102-7860 http://www.rtm.net.br/institucional/fale_conosco.asp

More information could be found http://www.rtm.net.br.

6.4 SYSTEMS AND ENVIRONMENTS

6.4.1 SERVICES AND INFORMATION OFFERED BY B3

6.4.1.1 SYSTEMS AND ENVIRONMENTS - EX-BM&FBOVESPA SEGMENT (“B3”):

1) Direct Treasury Trading Services;
2) Derivatives Trading;
3) Equities & Corporate Bonds Trading – Listed B3;
4) Electronic Exchange Trading Services (Except Market Data);
5) Post-Trade Services Provided by Clearing B3, with The Exception of Smp (Own Network Message System) Bank B3;
6) RTC Web Systems;
7) Access Systems to The Liquidity Chamber (Paghub);

6.4.1.2 RTM

1) Sisbacen
2) Cetip
3) Selic

7 TECHNOLOGY INFRASTRUCTURE PROVIDER FOR CONNECTING TRADING DESKS TO THE TRADING SYSTEM

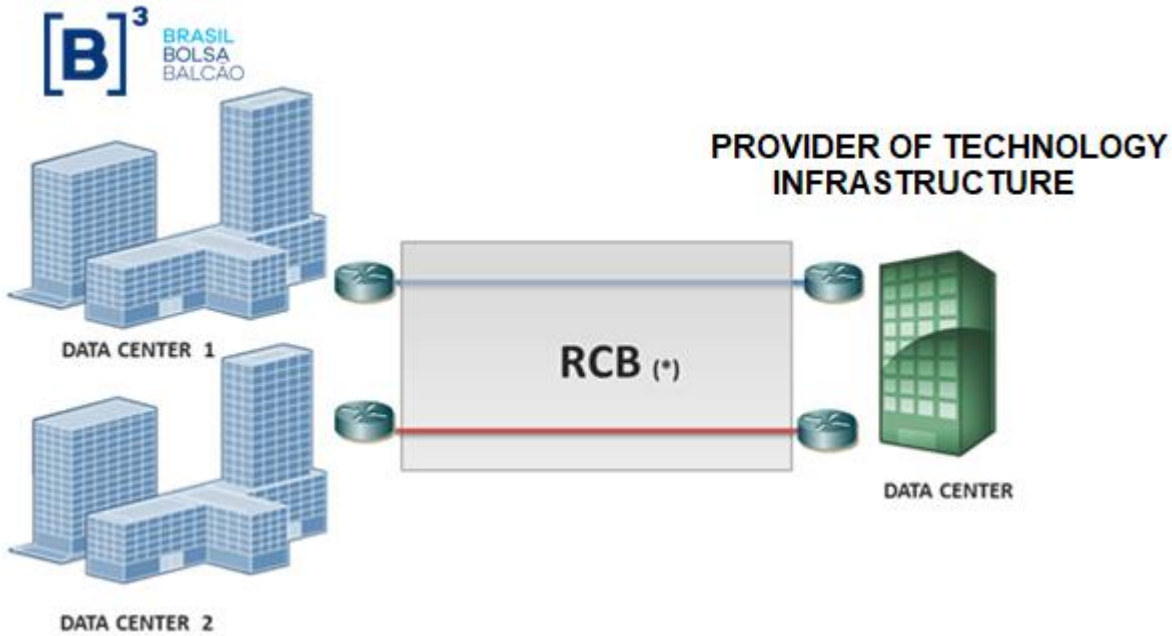
7.1 DESCRIPTION OF ACCESS VIA TRADING DESKS

Brokerage houses may use the technology infrastructure supplied by an independent provider to send trading messages to B3. This infrastructure comprises all the components for generating and transmitting orders, potentially including market data, the trading screen, the order management system (OMS), the risk and trading limit control system, connectivity with B3's trading environment and drop copy.

In terms of infrastructure and connectivity, this access type is basically identical to direct market access via a provider (DMA 2), with the difference that it is not for final investors but for traders on the trading desks of trading participants. Each trading participant connects technologically to a provider who is directly connected to B3's trading and/or market data platforms via RCB.

The technology infrastructure can be installed and processed in the independent provider's data center or B3's data center.

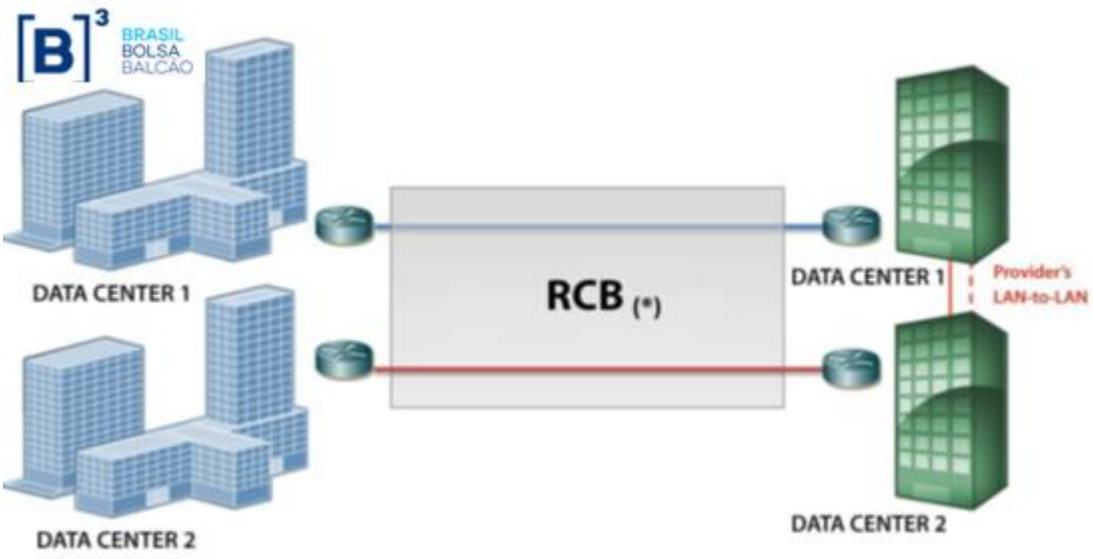
The use of this infrastructure is permitted only if it complies with all the requirements described in Co-Location Commercial Policy.



(*) Minimum requirement: Way of Access 1 (RCB). However, the provider may opt for Way of Access 4 (RCB). Further details on ways of access via RCB can be found in Chapter 3 of this Manual.

The figures show only the circuits of providers hosted outside B3's data centers. For infrastructure providers co-located in B3's data centers, the RCB circuits that connect their servers to the electronic trading system will be provided by the Exchange after the technology infrastructure provider signs with B3 the hosting contract or any other contract that may replace it, to be signed between the technology infrastructure provider and the Exchange.

All technology infrastructure providers are responsible for acquiring the dedicated circuits or other ways of connectivity that assure access to their applications by customers. In addition, the provider must acquire circuits that connect to both of B3's data centers. Such circuits are not illustrated in this Manual but must be sufficient to assure compliance with all terms and conditions established by B3 for reliable connection to its technological environments and communication with its systems and activities associated with trading in its markets.



(*) Minimum requirement: Way of Access 2 (RCB). However, the provider may opt for Way of Access 3 or Way of Access 4 (RCB). Further details on ways of access via RCB can be found in Chapter 3 of this Manual

Independent providers must sign the Agreement to Authorize the Provision of Electronic Order Routing Services for Participants in the Markets Managed by B3. Any technology infrastructure provider that is also an order routing service provider for trading via Customer must comply with the rules established by B3 for these services.

7.2 HOW TO CONTRACT

Requirement	Contact
Sales Data Center	Connectivity Products, Front and Middle Tel: (+55 11) 2565-5996 e-mail: salesdatacenter@b3.com.br
Service Contract Manager	Service Contract Manager Tel: (+55 11) 2565-5084 E-mail: contratacao@b3.com.br
Technical Support	Trading Support Tel: (+55 11) 2565-5021 E-mail: tradingsupport@b3.com.br

8 DATA CENTER PROVIDER

8.1 DESCRIPTION OF ACCESS VIA DATA CENTER PROVIDERS

Data center providers offer participants and Market Data distributors a wide array of aggregated services, sparing them the need to acquire links (internal or external), manage IT resources, etc. In addition to these characteristics, because they provide a specialized and centralized service, they offer multicast and other forms of sharing that reduce bandwidth consumption by downstream links (additional customers), as well as optimizing infrastructure resources for internal networks and external links thanks to VLAN logic segregation.

It is important to note that data center providers supply the means of communication (networks) to access B3's technology infrastructure but cannot operate without connectivity via RCB (B3's network) with the Exchange.

8.2 TECHNICAL CHARACTERISTICS OF ACCESS VIA DATA CENTER PROVIDERS

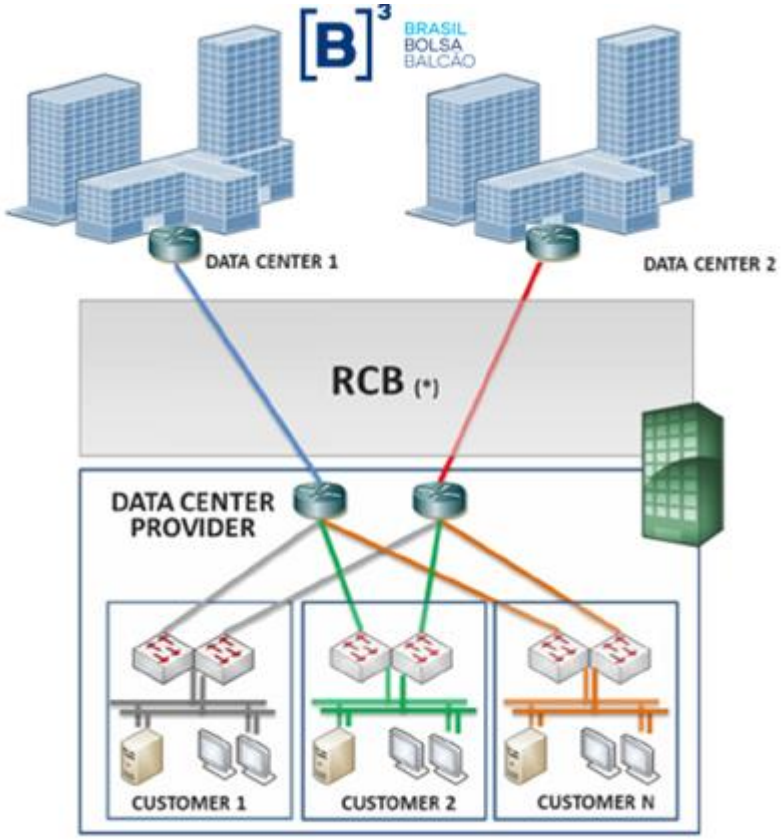
As customers of data center providers, each institution receives a specific network to access B3's systems and environments. This exclusivity permits segregated access security and traceability. The key premise is that no customer can access any network except its own.

Contracting with a data service provider does not exempt the institution from having an alternative primary or backup site. This is because depending on the institution's operational choice the provider's data center can be its primary or backup site. This applies to access via a provider with only one data center.

If the data center provider has more than one data center providing these services, the institution may contract it to operate as primary and/or backup site. B3 requires compliance from the institution with the complete operational qualification process (PQO). The institution is responsible for evaluating compliance by the services acquired from the provider.

8.3 SERVICE TYPES

8.3.1 PROVIDER WITH A SINGLE DATA CENTER

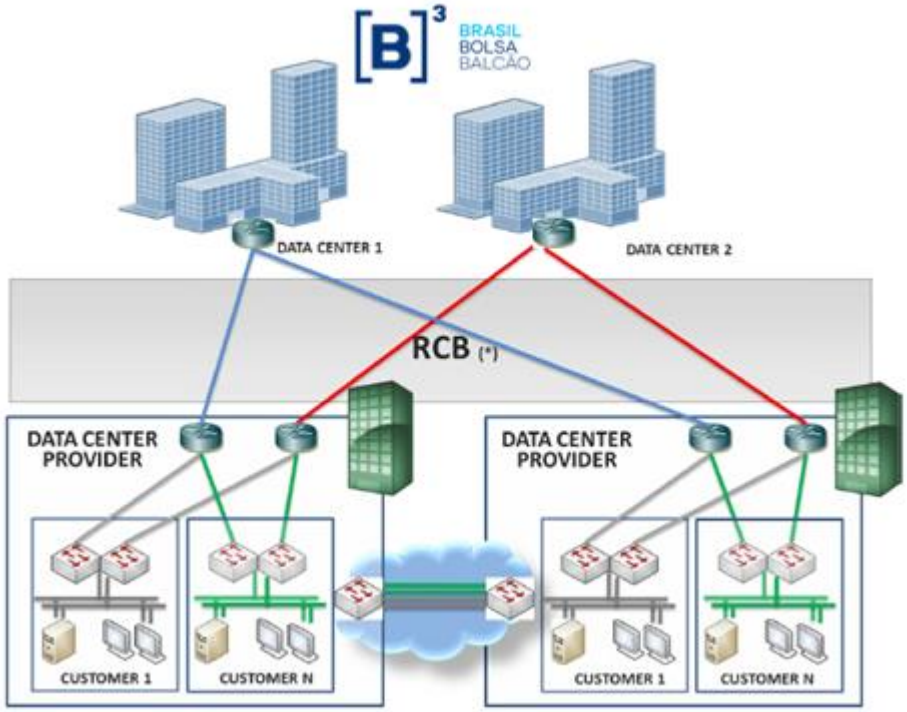


* Links can be installed in one or more data centers on the data center provider's side, varying according to its structure.

Data center providers may permit administrative or remote access to IT resources by distributors, but this is not shown in the above diagram. Ask your provider for technical details.

Interconnection of the distributor's primary or secondary (backup) site is likewise not specified by the above diagram. The interconnection process must be designed and developed by the distributor's technical team (in house or external) in collaboration with the institution and the provider.

8.3.2 PROVIDER WITH TWO DATA CENTERS



* Links can be installed in one or more data centers on the data center provider's side, varying according to its structure.

Data center providers may permit administrative or remote access to IT resources by distributors, but this is not shown in the above diagram. Ask your provider for technical details.

8.4 ACCREDITED DATA CENTER PROVIDER

Requirement	Contact
Sales & Other Services	UOL DIVEO TECNOLOGIA LTDA. – Francisco Moura Tel: (+ 55 11) 99613-1415 E-mail: jmsilva@uoldiveo.com.br

8.5 HOW TO CONTRACT

Requirement	Contact
Sales Data Center	Connectivity Products, Front and Middle Tel: (+55 11) 2565-5996 e-mail: salesdatacenter@b3.com.br

9 CERTIFICATION AND TESTING ENVIRONMENT

A dedicated link completely segregated from the production environment is required to access B3's certification and testing environment.

The following ways of access to B3's certification and testing environment are available:

- RCB – see item 3 of this Manual for details;
- Internet LAN-to-LAN VPN – see item 4 of this Manual for details.

10. SHARED ACCESS TO B3'S TECHNOLOGY INFRASTRUCTURE

B3 recommends a segregation to each way of access to its technology infrastructure. However, institutions belonging to the same economic group may share the following ways of access:

- RCB; and
- Internet LAN-to-LAN VPN.

The institutions that grant and use shared access are responsible for arranging the appropriate bandwidth provisioning for the circuits acquired for this purpose from the operators accredited by B3.

When opting for shared access, institutions declare that they are conversant with and undertake to abide by all the conditions established by BMF&FBOVESPA in its manuals, rulebooks, circular letters, communications, notices and other guidelines relating to contracted-for access, including the provisions of the Access Agreement, and assume sole liability for the obligations arising from improper and/or criminal use of access to B3's technology infrastructure, including any damage or loss sustained by the grantor, grantee or third parties owing to negligence, imprudence or malpractice, as well as losses due to unforeseeable circumstances or force majeure.

Institutions accept and recognize that any alteration made by the grantor to the way and/or access type to B3 shall entail the grantee's automatic adherence to and strict observance of all the conditions established by B3 in its manuals, rulebooks, circular letters, communications, notices and other guidelines relating to the contracted-for way or access type.

Regardless of whether access is shared, the Exchange reserves the right to charge all member institutions of the same economic group that access B3's technological infrastructure in accordance with the current price list.

In order to obtain authorization for shared access, the grantor must enter into a joint liability agreement with each grantee belonging to the same economic group with B3 as consenting party.

Requests for shared access to B3's technology infrastructure by institutions belonging to the same economic group, as well as questions about services providers and technology infrastructure connectivity for connecting brokerage houses' trading desks to the Exchange, must be sent by email to contratacao@b3.com.br .

ANNEX 1. SYSTEMS AND ENVIRONMENTS X ACCESS TYPES

System and Environment	Type of Access								
	RCB	RCB VIA CLOUD	RTM(2)	TRADING DESK INFRASTUCTURE PROVIDERS (4)	DATA CENTER PROVIDERS (4)	LAN CO-LOCATION	INTERNET LAN-TO-CLIENT VPN	INTERNET LAN-TO-CLIENT VPN	CLOUD VPN VIA SITE-TO-SITE
DERIVATIVES TRADING	✓	✓		✓	✓	✓			
FOREIGN EXCHANGE TRADING	✓	✓		✓	✓				
EQUITIES & CORPORATE BONDS TRADING	✓	✓		✓	✓	✓			
GOVERNMENT BONDS TRADING			✓	✓	✓				
TESOURO DIRETO TRADING	✓	✓		✓	✓		✓	✓	
REGISTRATION IBALCÃO	✓	✓	✓	✓	✓		✓	✓	✓
B3 MARKET DATA	✓			✓	✓	✓			
UMDF PUMA CONFLATED	✓	✓	✓(5)	✓	✓	✓			✓
DROP COPY	✓	✓	✓(5)	✓	✓	✓		✓	✓
POST-TRADING	✓	✓	✓(3)	✓	✓			✓	✓
B3 SETTLEMENT BANK	✓	✓	✓	✓	✓		✓	✓	✓
IMF	✓	✓							
CERTIFICATION & TESTING ENVIRONMENT (1)	✓	✓						✓	✓

(1) Environment to be used exclusively for certification and testing, i.e. via connections totally segregated from the production environment.
(2) SPI Liquidity Chamber is not available for RTM connection
(3) Exception: STM and SMP systems not available.
(4) Depends on services contracted for.
(5) Accessible via cloud providers with RTM only

ANNEX 2. LOGICAL ADDRESSES FOR ACCESS TO SYSTEMS AND ENVIRONMENTS

The table of IP addresses and access ports for access to servers and systems can be obtained from B3 Post-Trading Support.

For institutions that are already participants in B3, the table is available in Portuguese only on the extranet, at the link below:

http://www.bvmfnet.com.br/pt-br/downloads/downloads-conectividade.aspx?idioma=pt-br

Requirement	Contact
Operational Support	B3 Post-Trading Support Tel: (+55 11) 2565-5120 E-mail: sat@b3.com.br

ANNEX 3. BANDWIDTH PROVISIONING REQUIREMENTS BY ACCESS TYPES *

		MINIMUM SPEED SUGGESTED FOR ACCESS SYSTEMS AND ENVIRONMENTS [2]						
		LINK dedicado	256 Kbps	1 Mbps	10 Mbps	50 Mbps	500 Mbps	1 Gbps
	Trading & Market Data	X						X
	Foreign Exchange Trading[1]			X				
	Govemment Bonds Trading			X				
	ePUMA – Equities and Derivatives				X			
	Trading - Tesouro Direto			X				
	iBalcão Registration			X				
	Market Data B3 Conflated					X		
	Drop Copy [6]			X				
	Post-Trading					X		
	B3 Settlement Bank			X				
	IMF	X					X	
	Certification and Test Enviornment	X		X				
VPN [4]	Govemment Bonds Trading			X				
	Trading - Tesouro Direto			X				
	iBalcão Registration			X				
	Mangement inside Co-location	X	X					
	Drop Copy [6]			X				
	Post-Trading					X		
	Certification and test enviorment [3]			X				
	B3 Settlement Bank			X				
RTM	iBalcão Registration			X				
	Post-Trading					X		

The speeds shown above are suggested minimum values. It is recommended to customers in production and who feel some delay or degraded performance to analyze the possibility of upgrading the above recommended values recommended.

(1) Recommended bandwidth for trading does not include a unicast or multicast market data session.

(2) Minimum recommended bandwidth. May vary depending on number of stations, trades and shared services in the link or VPN..

(3) Minimum recommended bandwidth considering only functional tests..

(4) In this access mode, verify way of access available (LAN-to-LAN or LAN-to-client) for systems and environments as per ANNEX 1.

(5) Market data via PCM (Market Data Connective Provider).

(6) This is a minimum bandwidth recommended for simultaneous subscription to all market data feed channels.

(7) Minimum recommended bandwidth. It may vary depending on number of trades executed and number of services shared in VPN.

(8) Important Note: B3 must be informed of any change to the bandwidth contracted for with the operators as soon as it is made.

ANNEX 5. GLOSSARY

A

Access
The term **access types** used in this manual refers to the following networks for access to B3's systems and environments: RCB, LAN Co-Location, Internet VPN, PCM, and RTM.
The term **ways of access** used in this manual refers to the various configurations of each **access type**. For example, the RCB access type has five ways of access: 1, 2, 3, 4 and 5.

AES
Advanced **E**ncryption **S**tandard. An encryption algorithm for symmetric key exchange.

AS
Autonomous **S**ystem: A group of IP networks managed by one or more network operators with a single clearly defined routing policy. Each AS is associated with a number (AS identifier, or ASN) used to exchange routes with other external systems. External routing protocols such as BGP are used to exchange routes between AS.

ASN
Autonomous **S**ystem **N**umber. Each AS is associated with a number (AS identifier, or ASN) used to exchange routes with other external systems. External routing protocols such as BGP are used to exchange routes between AS.

ATM
Asynchronous **T**ransfer **M**ode. Technology for transmitting any kind of information (data, voice, image and video) over computer networks at speeds that may range from 2 Mbps to 1 Gbps or more.

ATS
Automated **T**rading **S**ystem. Software responsible for securities trading in the Co-Location environment.

AWS
Amazon Web Services - Cloud Computing Services Platform, which form a cloud computing platform offered by Amazon.com.

Azure
Cloud Computing Services Platform, which form a cloud computing platform offered by Microsoft.

B

Backbone
A number of mostly high-speed circuits forming the main segments of a communications network and connected to the secondary segments.

Bandwidth
The amount of data that can be transmitted over a communication channel in a given period of time.

BGP
Border **G**ateway **P**rotocol. Exterior gateway protocol, which performs routing between multiple autonomous systems in TCP/IP networks.

Bps
Bits **p**er **s**econd. Measures a communications line's real data transfer rate.

CE
Customer **E**dge routers and other network devices (hosts, switches etc.) that belong to a customer's site.

Client Server
See Client.

Client
Process or program that requests services from a server. See also Server.

Co-location
For the purposes of this document, B3's co-location environment is a segregated area of the data center with restricted and controlled access and the physical and logical infrastructures required to enable ATS to access the Exchange's trading systems.

Communications line
A physical medium for data transmission provided by a telecommunications operator.

CoS
Class **o**f **S**ervice. Mechanism for treating packets in a network with QoS, identified by a 3-bit field in an Ethernet frame header, which specifies a priority value between 0 and 7. See QoS.

CPE
Customer **P**rovided **E**quipment. Network element installed on the customer's premises.

Cryptography (Encryption)
The science and art of secret writing using codes and ciphers. Encryption changes data so that it is unrecognizable and useless to an unauthorized person. Decryption changes it back to its original form. Used to authenticate users and banking transactions, protect the integrity of electronic funds transfers, and guarantee the secrecy of personal and commercial communications, among other things.

Customer
A final investor directly accessing the markets managed by B3. They depend on a PNP (Full Trading Participant) to access the Exchange. The order entry system connected to the B3 trading session is from a customer previously authorized by PNPs or PNs (Trading Participants) who enters orders generated exclusively for them.

D

Dark Fiber
Optical fiber infrastructure (cabling and repeaters) put in place by telecommunications companies that offer access without value-added services. In this case, all the equipment belongs to the customer.

Data Center
Infrastructure offering large-scale data processing and storage resources.

DiffServ
Differentiated **Serv**ices. Mechanism for treating packets in a network with QoS. While CoS operates only at the data link layer, other QoS mechanisms, such as DiffServ, operate at the network layer and higher. See QoS.

DMA
Direct **M**arket **A**ccess. Functionality that enables customers (investors such as hedge funds or investment banks) to access B3's electronic trading system directly.

DNS
Domain **N**ame **S**ystem. The service that translates domain names into IP addresses and vice-versa.

Drop Copy
Mechanism for copying and sending messages relating to orders (acceptance, modification, cancellation or execution). Messages are sent from the trading system for parallel monitoring by brokerage houses.

DS3
European standard used in Brazil for digital transmission links with a capacity of 44.736 Mbps (cf. T3 in the U.S.).

DWDM
Dense **W**avelength **D**ivision **M**ultiplexer. Technology generally used in fiber optic networks to enable network equipment to use different frequencies (light wavelengths) at the same time.

E

Ethernet
Standard for the physical connection of LANs, describing protocol, cabling, topology and transmission mechanisms.

EoSDH

Ethernet over SDH (EoS or EoSDH). Refers to a set of protocols used to transmit Ethernet traffic efficiently and flexibly over SDH (Synchronous Digital Hierarchy) networks.

F

Facilities
Electricity and air conditioning infrastructure.

Firewall
Hardware and/or software used to control access to a computer or network and protect its resources from intruders or hackers.

G

Gateway
A device or set of devices that converts protocols among different types of communications networks and applications.

Gbps
Giga**b**its **p**er **s**econd. See bps.

Google Cloud
Google Cloud Platform (GCP) consists of a set of physical assets, such as computers and hard disk drives, and virtual resources, such as virtual machines (VMs), that are contained in Google's data centers around the globe

GRE
Generic **R**outing **E**ncryption

H

Host
A computer or similar device connected to a network.

HSRP
Hot **S**tandby **R**outer **P**rotocol. Provides high network availability and transparent network topology changes

Hub
For the purposes of this document, the term hub refers to the server responsible for concentrating market data feed connections.

I

IDS
Intrusion **D**etection **S**ystem. Hardware and/or software that detects malicious or anomalous activity.

IMF

Infraestrutura de **M**ercado **F**inanceiro (Finance Market Infrastucture). B3 offers clearing, settlement and central depository services for other IMFs. (For more details: CE 033/2017-DO)

Internet
A global system of interconnected computer networks that use the standard Internet Protocol Suite (TCP/IP) enabling users to access, exchange and transfer information. Originally created in the United States.

Institution
Institutions connected to B3's technology infrastructure, whether the trading environment (brokerage houses; DMA providers; providers of infrastructure for connecting brokerage house trading desks to B3; banks; broker dealers) or post-trading environment (brokerage houses, banks, broker-dealers), or for receiving market data (Market Data Distributor) or for the development/certification of software for the market (ISVs).

IP
Internet **P**rotocol. Responsible for routing packets across network boundaries between systems that use the TCP/IP protocol suite. The primary protocol that establishes the internet. See also IP Address.

IP address
A standardized numerical label that identifies any device in a network using IP. See also IP.

IPsec
Internet **P**rotocol **S**ecurity. A protocol suite enabling VPNs to use the issuer's authentication and cryptography.

K

KB
Kilobyte (also kB).

Kbps
Kilo**b**its **p**er **s**econd. See bps.

L

LAN
Local **A**rea **N**etwork. A computer network usually confined to a building or group of buildings used by the same organization.

Last mile
The telecommunications infrastructure between the telecommunications operator and the user (e.g. institutions, the Exchange).

Latency
Latency (or delay) is an expression of the time between the moment a data packet is transmitted and the moment it reaches its destination. Together with bandwidth, it defines the maximum capacity and speed of a network.

Link
A logical representation of a physical connection between locations, sites or hosts.

MAN
Metropolitan **A**rea **N**etwork. A high-speed computer network spanning a city or large campus.

Market data
Quotes, prices, latest trades, volumes and other market information associated with equities, bonds, derivatives, currencies and other investment instruments, for use in evaluating market opportunities.

Market Data Distributor
A Market Data Distributor is considered to be any organization that distributes or displays B3 Market Data, including Trading Participants and/or clearing institutions. The classification encompasses **distributors** (which capture B3 Market Data, directly from the Exchange's infrastructure in real time) and **redistributors** (which, via a market data distributor, capture B3 market data in real time or with a 15-minute delay).

Mb
Megabit (as opposed to megabyte, which is abbreviated MB). See bps.

Mbps
Mega**b**its **p**er **s**econd. See bps.

MetroEthernet
An approach to using Ethernet networks in metropolitan areas or distributed across multiple remote locations. The concept arose in response to the growth of MAN data traffic, which overtook that of voice traffic, leading to a preference for data transmission infrastructure over Time Division Multiplex (TDM), created for voice transmission.

MPLS
Multi Protocol Label Switching. Data transport mechanism belonging to the family of packet switching networks. Standardized by the Internet Engineering Task Force (IETF) in RFC-3031. Operates at an OSI Model layer that lies between traditional definitions of Layer 2 (Data Link Layer) and Layer 3 (Network Layer), and thus is often referred to as a "Layer 2.5" protocol.

Multicast
An address for a specific node collection in a network or a message sent to a specific node collection.

N

NAT
Network **A**ddress **T**ranslation. Process of modifying IP addresses in packet headers while in transit across routers or firewalls for the purpose of remapping one IP address space into another so that a local (private) network device can access a public network.

Netmask
See VLSM.

NTP
Network **T**ime **P**rotocol. Protocol used to synchronize the clock in a client (computer, server or other network host) with the clock in a server.

O

OIC
Cloud Computing Services Platform, which form a cloud computing platform offered by Oracle.

P

Participant
Financial Institutions (securities brokerage houses, securities broker-dealers, commodity brokerage houses, and banks) that B3 authorizes to operate in the markets that it manages and which are linked to B3's technology infrastructure in the trading or post-trading environment.

PCM
In this Manual, PCM stands for market data connectivity provider (***P**rovedor de **C**onectividade de **M**arket Data*).

PE
Provider **E**dge. Routers and other network devices that belong to the service provider and are connected directly to Customer Edge (CE) devices.

PLC

In this Manual, PLC stands for Centralized Settlement Participant (***P**articipante com **L**iquidação **C**entralizada*).

PLM
In this Manual, PLM stands for Master Centralized Settlement Participant (***P**articipante com **L**iquidação Centralizada **M**aster*).

Protocol
A formal description of digital message formats and the rules for exchanging those messages in or between computing systems. A standardized set of specifications covering format, synchronization, sequencing and error detection and correction in data communications. The basic protocol for the internet is TCP/IP.

Q

QoS
Quality **o**f **S**ervice. Techniques that provide different priority to different data flows such as voice, video and other sensitive applications. Includes bandwidth reservation and latency control as required by the various applications involved, as well as reducing packet loss. DiffServ and CoS are packet treatment mechanisms used in QoS.

R

RCB
R**ede de **C**omunicação **B3 (B3 Communications Network). High-availability network with high scalability, high performance and low latency that provides access to B3's trading and post-trading environment.

Router
An electronic device that forwards data packets within a network or between networks. When using the internet, an organization requires a router to connect its LAN to the nearest point of presence.

Routing protocol
Sends and receives routing information packets to and from other routers to build a routing table and determine the appropriate path over which packets are transmitted. The routing protocol also specifies how routers in a network share information with each other.

RTM
Rede de **T**elecomunicações para o **M**ercado Ltda.

S

Scalability
Property of a system, network or process that indicates its ability to handle growing amounts of work in a uniform manner.

SDH
Synchronous **D**igital **H**ierarchy. International standard for high-speed telecommunications over fiber-optic networks capable of transporting digital signals at variable capacities. Direct access to lower-speed tributaries within a synchronous signal avoids the need to multiplex/demultiplex the entire high-speed signal. SDH and SONET have the same specification but different channel layouts.

Server
1. In the client-server model, a client is a program that responds to client requests for a specific service, such as email and www.
2. A computer or similar device running systems that provide resources such as data storage, printing and access for users of a computer network.

SHA
Secure **H**ash **A**lgorithm. An algorithm used for encryption.

Site
1. An institution where computers and servers are installed and operated.
2. A host computer on the internet.

SMP
In this Manual, SMP stands for Proprietary Network Messaging System (***S****istema de* ***M****ensageria de Rede* ***P****rópria*).

Solution Provider
Institution providing various types of services to other institutions such as distributing or redistributing market data, providing order routing and applications for use in trading environments, etc.

SONET
Synchronous **O**ptical **Net**work. Standard for fiber-optic telecommunications transport. Synchronous system controlled by a high-precision master clock (approximately one failure per billion hours) to which all clocks in the network are locked. The bits in a SONET line are transmitted at extremely precise intervals controlled by the master clock. Created by Bellcore (USA) in 1985 and now in worldwide use.

SSL
Secure **S**ocket **L**ayer. An open standard and commonly used protocol for managing the security of message transmission to prevent interception of critical information such as credit card numbers. One of the main advantages of SSL is that it guarantees the security of online financial transactions, although it was originally developed for other web services.

STM
In this Manual, STM stands for Messaging Transfer System (***S****istema de* ***T****ransferência de* ***M****ensagens*).

Switch

A computer networking device that connects network segments and switches packets between hosts on the network.

T

T1
Data circuit running at 1.544 Mbps. A T1 line can carry 24 channels, each encoded in 64 kbps streams.

TCP/IP
Transmission **C**ontrol **P**rotocol/**I**nternet **P**rotocol. A suite of protocols for internetworking data communications, originally developed for the ARPANET. TCP/IP is the de facto standard for open networks, widely used in the U.S. and globally.

TDM
Time **D**ivision **M**ultiplex. Multiplexing technique in which two or more signals are transferred simultaneously in one communication channel. The time domain is divided into several recurrent timeslots of fixed length (in bps), one for each sub-channel.

Topology
Layout of the various elements (links, nodes etc.) in a LAN or other communications system.

U

UMDF
Unified **M**arket **D**ata **F**eed. Solution for distribution of market data via multicast channels.

UTP cable
Unshielded **T**wisted **P**air. Type of wiring in which two conductors are twisted together. Used extensively in Ethernet networks, LANs and telephone systems.

V

VLSM [Netmask]
Variable **L**ength **S**ubnet **M**asks. Subnet masking replaces the two-level IP addressing scheme with a more flexible three-level method, segmenting the network so as to optimize use of the IP addresses available.

VPN
Virtual **P**rivate **N**etwork. A private network that uses public infrastructure such as the internet and security mechanisms such as encryption to provide secure access to an organization's network for authorized users only and prevent interception of data while on the public network.

VRRP
Virtual **R**outer **R**edundancy **P**rotocol. Like HSRP, VRRP also provides high network availability and enables transparent network topology changes.

VLSM
Variable **L**ength **S**ubnet **M**asks.

WAN
Wide-**A**rea **N**etwork. Geographically dispersed telecommunications or computer network, such as the internet.

Ways of Access
See Access.

3DES
Also known as Triple DES, a mode of the DES encryption algorithm that encrypts data three times..