

DATA

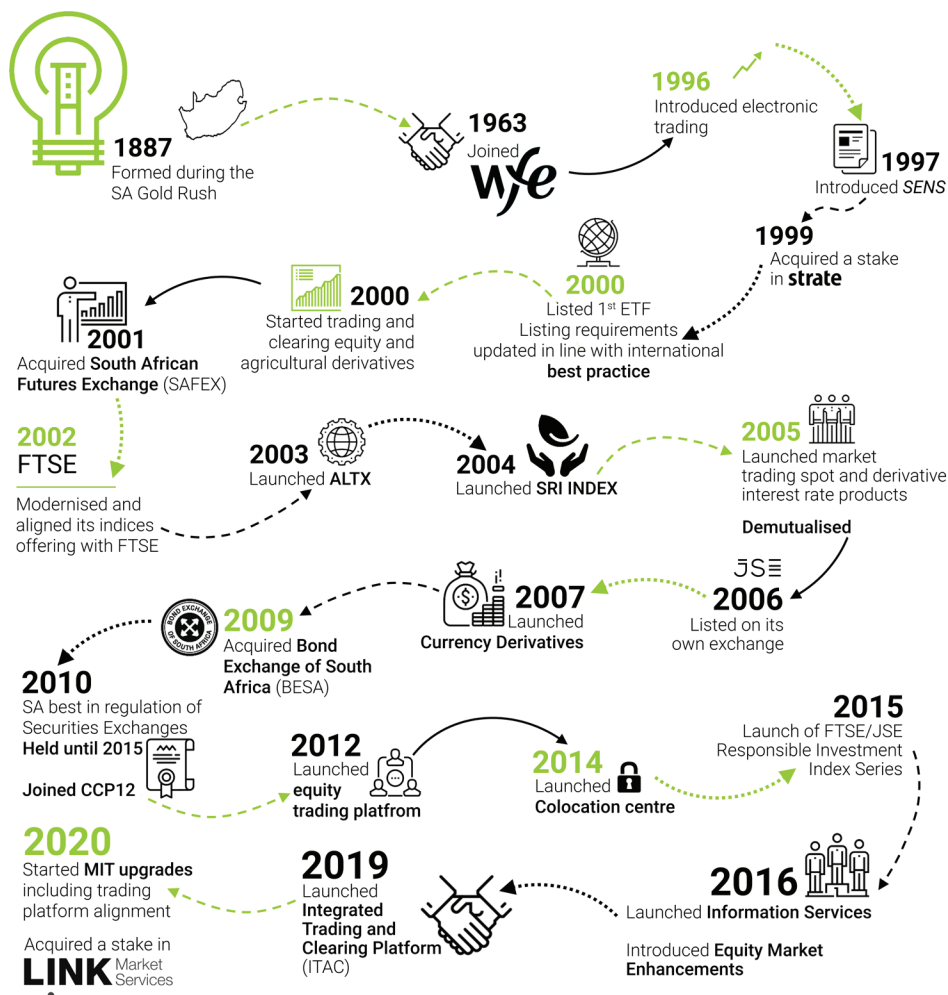
Trade even faster with JSE Colocation

let's connect



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The Johannesburg Stock Exchange (JSE) has a well-established history operating as a market place for trading financial products. We are a pioneering, globally connected exchange group that enables inclusive economic growth through trusted, world class, socially responsible products and services for the investor of the future. We offer secure and efficient primary and secondary capital markets across a diverse range of securities, spanning equities, derivatives and debt markets. We pride ourselves on being the market of choice for local and international investors looking to gain exposure to leading capital markets on the African continent. We are currently ranked in the Top 20 largest stock exchanges in the world by market capitalisation, and is the largest stock exchange in Africa, having been in operation for 130 years.

As a leading global exchange, we co-create, unlock value and make real connections happen.

let's connect

The JSE's Colocation facility provides the lowest-latency connection to JSE markets, allowing clients to host their infrastructure in the same vicinity as the infrastructure that drives the markets at the JSE. This enables low latency trading strategies through high speed trading and market data access.

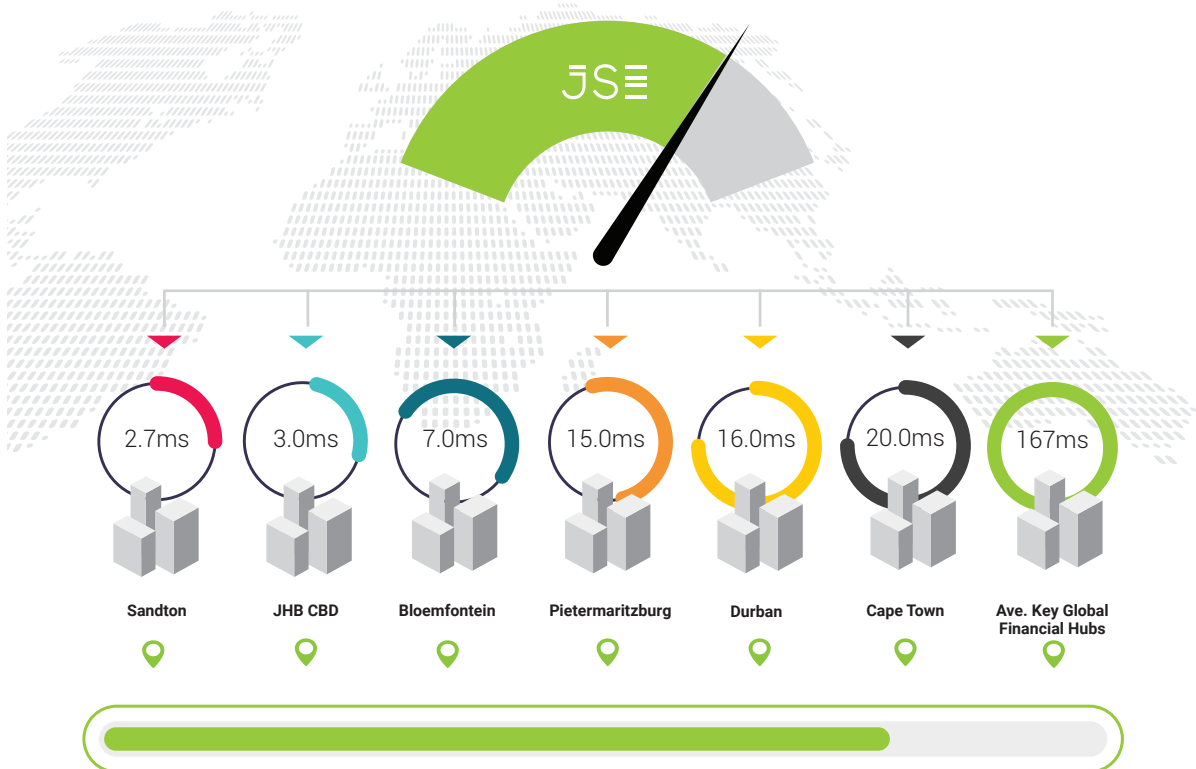
Why Colocation

Hosting infrastructure in the Colocation facility allows for the fastest access to the JSE markets with a latency of approximately ~20 microseconds compared to the existing 2400 microseconds for the surrounding Sandton area, an astounding 120 times faster.

The centre alleviates the administration burden of managing an on-site data centre, whilst allowing clients full access over their own server in the JSE data centre.

Estimated Network Latency Measurement

The diagram below illustrates the roundtrip network latency in microseconds (μs) between the Colocation network switch and the relevant trading/market data gateway(s)/proxy(ies). Please note that the latency from the trading engines is not included.



Benefits



Latency advantage

- Fastest trading and market data access to JSE markets
- Average round-trip Colocation network latency is sub 100 microseconds
- Speeds currently display as little as 20 microseconds
- Reduced bandwidth requirements for connectivity to the JSE



New trading strategies

- Enabler of low latency trading strategies
- Enhanced response to market movements



Cost saving

- Reduced bandwidth requirements between Colocation customers and JSE
- Reduced dependence on telecommunication providers
- Cost optimisation



Infrastructure

- Resilient infrastructure
- Remote hands availability (remote access)
- World class technical engineers
- Network and physical infrastructure security
- Scalability
- Power options include 3KW and 5KW capacity feeds
- 2 Power feeds deployed within IDC
- DR facilities hosted Off -Site in secure location
- During the expansion Phase 1 to 4, there were 35 new racks incorporated into the IDC
- An additional 38 Racks installed/ made available thereby depicting a total of 73 Racks



Risk mitigation

- Sophisticated JSE data centre designed to Tier 3 standards
- World class technical engineers
- Redundant power supply
- Tier 3 IDC Facility
- Escorted access to the IDC
- Biometrics access
- Security camera's enabled
- Tenant cabinet rack authorization
- Customized approach to cabling: equal length deployment



Connectivity:

- All cables between the Hosting Units and the Colocation network switches are of equal length irrespective of the hosting unit position within the Colocation facility
- 10 gigabits per second fibre trading connectivity from the Colocation facility to the meet-me-room is facilitated as required via Cross Connects
- Time synchronisation will be offered via Precision Time Protocol (PTP)
- Currently hosting 16 National Service Providers (NSP) who terminate services directly in the JSE meet-me-room
- Multi-mode fibre deployed for top of the rack infrastructure connectivity

Service Specification (Refer to JSE Price List for Service Fees)

- ● **1. Hosting Unit (choice of 3kW or 5kW), which is inclusive of:**
 - Allowance to JSE Markets and Market data
 - 2 x 10 Gigabits per second fibre trading connectivity
 - 2 x 10 Gigabits per second fibre market data connectivity
 - 2 x 10 Gigabits per second fibre trading and market data connectivity
 - 2 x 1 Gigabits per second fibre customer management connectivity
 - Network latency monitoring

- ● **2. Power**

The Services Fee will be as per the JSE Price List which includes a component that is a pass through expense and this fee shall be subject to any revised charges as notified by the Municipality of the City of Johannesburg, National Energy Regulator of South Africa or any other authorised body from time to time as applicable to the JSE Premises.

- ● **3. Remote Hands Support**

Available on a first come first served basis

- ● **4. Remote Management Connectivity**

- ● **5. Inter – Connect**

A connection between devices within a Colocation customer Hosting Unit or to an adjacent Hosting Unit owned by the same Colocation customer.

- ● **6. Cross Connect (s)**

A connection between multiple Hosting Units across multiple customers or a connection between multiple Hosting Units nonadjacent or not in the same row to each other for the same customer.

- ● **7. Additional network latency monitoring**

Latency monitoring from the Hosting Unit to the Colocation network switch can be performed for a limited period of time upon request at an additional fee.

- ● **8. Time Sync Service**

Time Synchronisation will be offered via Precision Time Protocol (PTP).

- ● **9. Additional Ports**

A customer can request and pay for additional ports subject to availability. If the JSE does not have any ports available, there will be a lead time for the JSE to purchase the relevant infrastructure.

SERVICE TYPE

- Primary Service
- Associated Service
- Secondary Product

JSE MARKETS APPLICABLE

- All JSE Markets
- Equity Markets
- Derivative Markets

Colocation facts

- Colocation provides the fastest access to all JSE markets.
- Average round-trip Colocation network latency is ~20 microseconds over a calendar month on business days during trading hours. The JSE will measure, monitor and report on Colocation network latency and provide this information to Colocation customers.
- During the expansion Phase 1 to 4, there were 35 new racks incorporated into the IDC. An additional 38 Racks installed/made available thereby depicting a total of 73 Racks.
- Hosting Units are allocated on a first come first served basis within a limited capacity constraint in the Colocation facility.
- All cables between the Hosting Units and the Colocation network switches are of equal length irrespective of the Hosting Unit position within the Colocation facility.
- Redundant Power supply availability. Each rack is supplied with two power distribution units A & B (PDU), each coming from separate power sources within the DC. They are structured in going to separate DB boards which cater for: two UPS systems, two MLV centers, two transformers and two generators.
- Sub-letting is allowed by JSE Members to their clients; Accredited Shared infrastructure Providers (SIPs) to JSE Members and Information Subscribers to their clients provided the Information Subscriber is an Accredited SIP.
- 24/7 Colocation facility environment monitoring is performed by the JSE with remote hands availability.
- The JSE provides a facility within the JSE primary data centre which enables telecommunication service providers to make their telecommunication services available to customers. This facility is known as the Meet Me Room. Connectivity from the Colocation facility to the Meet Me Room is facilitated as required via Cross Connects.
- Separate fees are applicable to other JSE services such as those related to trading, market data, JSE London PoP connectivity, etc. These fees are detailed in the JSE Price List.

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