Trading Infrastructure graphic...

### Trading Infrastructure

This graphic represents the levels at which risk controls may be set for trading firms that access the markets directly. The graphic shows a stylized model of one trading system accessing one exchange.

Each level of the trade life cycle – from order execution to clearing and settlement – is depicted. This includes the trading firm that is accessing the markets directly, its clearing broker-dealer (B-D) or futures commission merchant (FCM), exchange, and clearing house. The graphic also depicts a co-location facility.

**Background**

This graphic represents the levels at which risk controls may be set for trading firms that access the markets directly. The graphic shows a stylized model of one trading system accessing one exchange.

Each level of the trade life cycle – from order execution to clearing and settlement – is depicted. This includes the trading firm that is accessing the markets directly, its clearing broker-dealer (B-D) or futures commission merchant (FCM), exchange, and clearing house. The graphic also depicts a co-location facility.

---

Financial Markets Group
Federal Reserve Bank of Chicago
Levels of trading infrastructure:

1. Co-location Facility

Co-location facilities typically host servers for trading firms, B-Ds/FCMs, exchanges, telecommunications providers, and data vendors.

In the graphic, the co-location facility houses:

- **Exchange server(s)** where pre-trade risk controls may be established for every order before it is routed to the trade matching engine where buy and sell orders are compared. Risk controls on the exchange server may be set by:
  - The exchange
  - B-D/FCM
  - Trading firm

Not all trading venues offer functionality to B-Ds/FCMs and trading firms to set pre-trade risk controls and/or limits on the exchange server.

- **Trading server** that contains a **trading system** built by a trading firm (proprietary) or by a vendor. The diagram depicts a single trading server although co-location facilities house servers for multiple trading firms and B-Ds/FCMs.
  - The **trading system** may contain:
    - Algorithmic/Order management system (OMS) – A system that runs pricing model(s) and routes orders to a desired trading venue.
    - Risk platform – where pre-trade risk limits/checks are performed before forwarding an order to the exchange.
2. **Trading Firm**

Depending on the trading firm, **risk managers** control exposures to individual traders and/or trading groups and/or the overall firm by:

- Setting risk limits on the risk platform on the trading server.

- Using functionality provided by the exchange(s) that enables them to set risk limits on the exchange server. This functionality may be mandatory or optional or may not be offered at all, depending on the exchange.

Individual traders and/or trading groups may also set risk limits on their own client systems (on the graphical user interfaces - **GUI**) below those established by the risk manager.
3. **Broker-Dealers/Futures Commission Merchants**

Clearing B-Ds/FCMs may manage the risks of trading firms that access the markets directly in one or more of the following ways:

- Remotely accessing the trading firm’s server at the co-location facility and checking whether the trading firm has established risk limits on that server.

- Using functionality provided by the exchange that enables them to set risk limits on the exchange server. This functionality may be mandatory or optional or may not be offered at all, depending on the exchange.
• Relying on risk checks set by the exchange on the exchange server.

• Setting risk limits on the B-D/FCM’s own trading server at the co-location facility and requiring its customers that access the markets directly to connect to this server(s).

4. Exchange
U.S. exchanges typically establish pre-trade risk checks on their servers and subject all orders/quotes against these limits before they are sent to the matching engine. Some exchanges also offer functionality to B-D/FCMs and trading firms that access the markets directly to set limits below those established by the exchange.
5. Clearing house

Clearing houses issue settlement data (pays/collect information) to each clearing B-D/FCM, which captures trading activity for the B-D/FCM’s house and customer accounts. The frequency of clearing house calculation and monitoring of intraday exposures of clearing members is based in part on the frequency with which they receive up to date matched trade information from exchanges.