



Exceed Together

Algo Trading: Role of the Network

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Agenda

- > What COLT is seeing in the markets
- > Some facts about latency
- > Steps COLT is taking to tackle network latency

COLT's Market View

- > There's a lot of hype around low latency, but where has it come from?
- > Which customers are demanding the lowest latency services?
- > Focus on milliseconds now...what next...micro- & nanoseconds?

A sense of perspective:

- > There is nothing we can do about the speed of light
- > Network performance is limited by the fibre optic and a few other things
- > Every 200k of fibre represents 1ms of delay
- > It takes us 300 milliseconds to blink our eyes

So What Causes Latency and can it be prevented?

Switching latency

- > Introduced by hardware to “route” packets.
 - COLT Vision: Close to optical layer

Serialisation latency

- > Amount of serialised time a packet takes over a connection
 - COLT Vision: Adequate dimensions for bandwidth

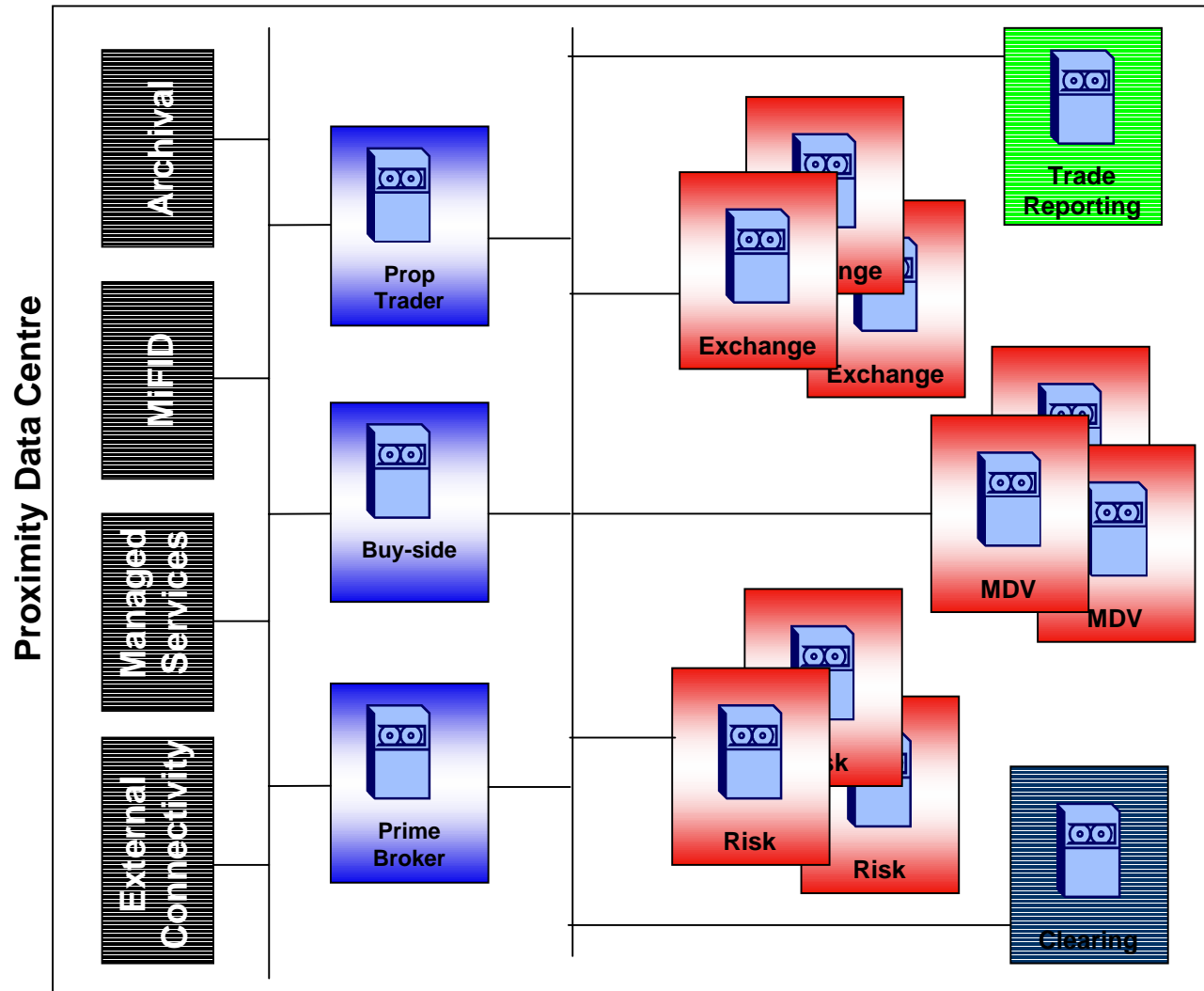
Propagation delay

- > Optical latency of data through fibre
 - COLT Vision: close proximity to trading venues using local data centres

Some real network facts...

A-end	B-end	Distance (as crow flies, in km)	Fibre distance (km)	Straight line in vacuum (RTD ms)	Straight line over fibre (RTD ms)	Speed of light over actual distance	COLT performance (RTD ms)
London	Paris	343	694	2.2	3.43	6.94	7.77
London	Frankfurt	634	1137	4.22	6.34	11.37	12.7

Further Development of Proximity Market



Conclusions / Final Thoughts

- > Network latency is improving with advancing technology, but will always be limited by laws of physics
- > Some systems will always remain in-house – COLT will continue to invest in lower latency technology to serve these institutions.
- > Opportunities do exist for arbitrage & market making firms to capitalise on a location advantage, but requires major architecture changes
- > Small proportion of buy-side pushing for lower latency solutions, but soft-dollar and broker-independence influencing decisions