AWS for Industries

Rethinking the low latency trade value proposition using AWS Local Zones

by Amanveer Singh, Amandeep Bajwa, and Mike Perna | on 03 JUN 2022 | in Financial Services, Healthcare, Industries, Media & Entertainment | Permalink | Share

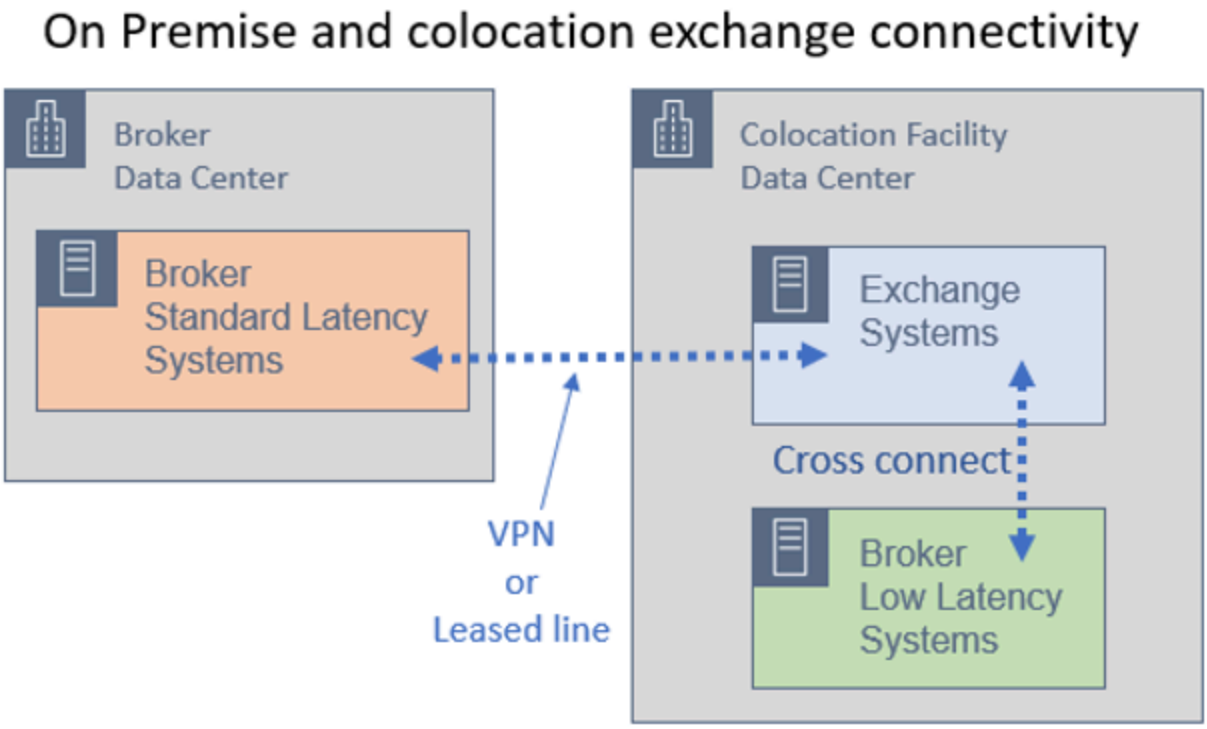
At the 2021 re:Invent, it was announced that NASDAQ was partnering with AWS to transform Capital Markets and migrate its North American markets to the cloud. This means that it's time to rethink the "art of the possible" for cloud trading. With the recent launch of AWS Local Zones in New York, Chicago, Kansas City, and Minneapolis, AWS can support an even broader array of trading needs in the cloud. Although cloud trading used to be limited primarily to high touch and screen-trading (less latency sensitive) order flow, now there is an opportunity for low latency ATS (automated trading system) and algorithmic (algo) platforms to execute from Local Zones. In this post, we'll explore potential options for leveraging Local Zones for low latency[1] trading.

The Challenges of Low Latency Trading Solutions

Low latency trading has strict latency service level agreements (SLAs), where a millisecond can make the difference between completing a transaction or missing an opportunity. A slight latency variance can lead to differences amounting to millions of dollars. Due to these low latency requirements, brokers' low latency trading systems must be in close proximity to the exchanges. Traditional, collocated, low latency trading solutions pose many challenges for brokers, such as:

1. Colocation space is limited and expensive, often requiring long lease terms.
2. Support contracts are needed for equipment to be managed at the facility.
3. Equipment is finite, and delivery and install times can be lengthy.
4. Carrier contracts are required, often in multiples for redundancy.
5. Most importantly – this equipment is not scalable and needs to be provisioned at maximum estimated capacity requirements.

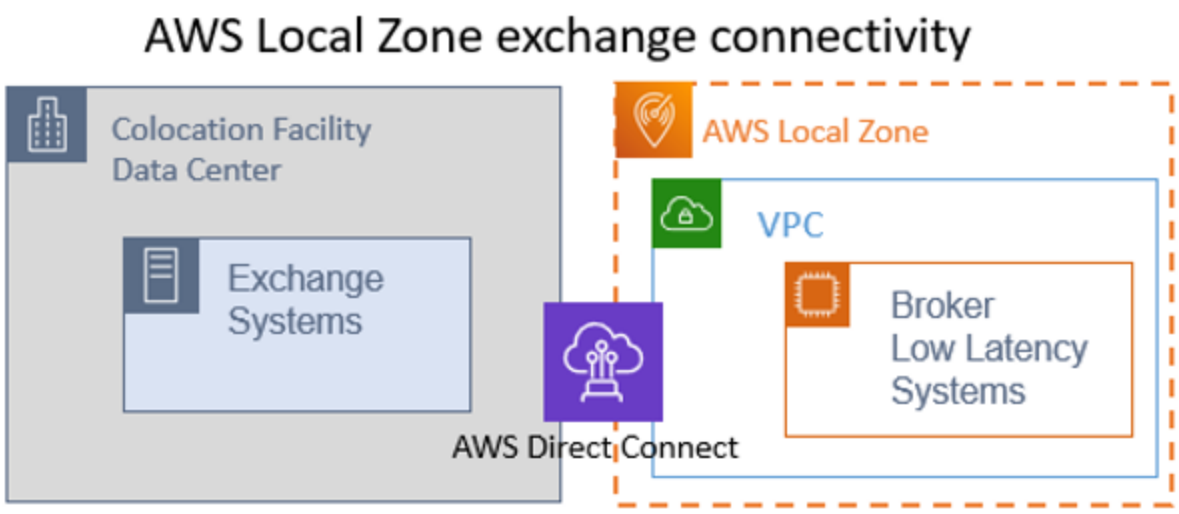
Colocation space and systems are generally cost prohibitive and labor intensive. Latency caused by long-line or internet-based connections are unacceptable for low latency trading. Due to the challenges above, not all brokers can provide their customers a low latency offering or the algo order types requiring low latency market access. Local Zones changes this.



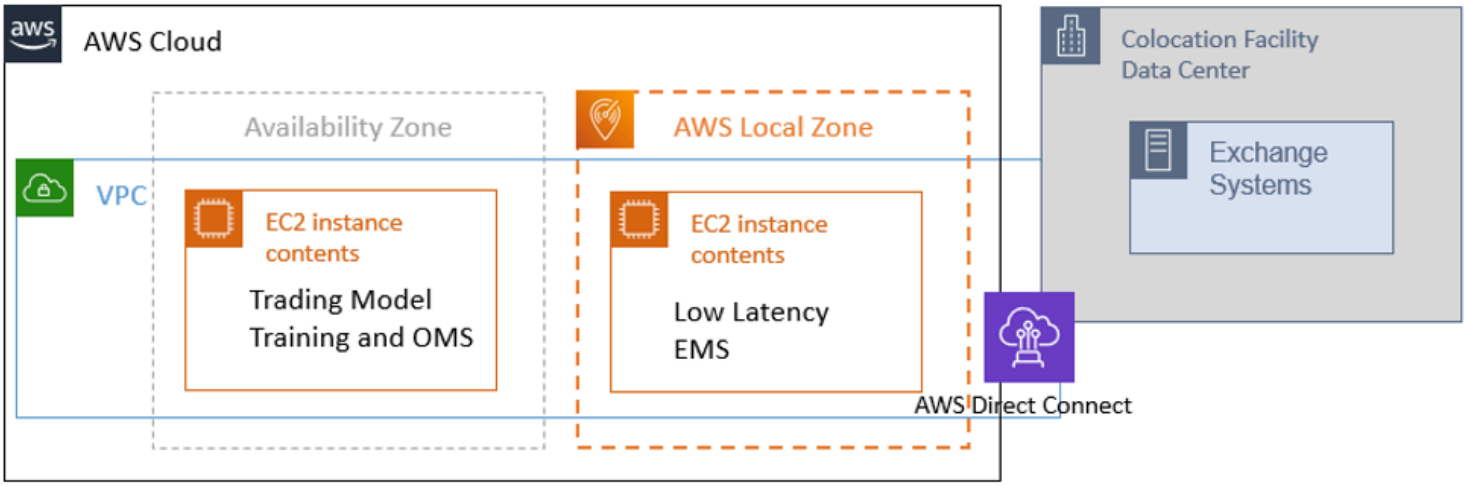
Local Zones Reduce the Barriers for Brokers to Perform Low Latency Trading

Local Zones[2] are helping advance cloud adoption in the trading industry. This is because they significantly reduce the transaction latency from cloud trading systems while providing a highly elastic and a secure solution. They not only let current cloud platforms access markets faster, but they also lower the barriers of entry for other low latency systems. The launch of Local Zones in New York and Chicago means that trading workloads with exchange access requirements[3] as low as 1 millisecond can be hosted in AWS Local Zones.

Most trading strategies can be divided into the macro-strategy (time horizon of seconds, minutes, or hours) and the micro-tactics (time horizon of microseconds or milliseconds). New Local Zones in New York and Chicago3 areas make them the right environment to implement low latency trading capabilities[4], such as trading strategy models, pre-defined market triggers, auto hedging, and other algo solutions. Furthermore, as Proof Trading has implemented their institutional equities execution platform in AWS, it can achieve latency of ~50µs between AWS servers within the same availability zone[5], and ~400µs across availability zones[6]. Splitting latency sensitive execution components to Local Zones close to exchanges and having high performance supporting systems in resilient Availability Zones gives both the execution performance, scalability, and reliability customers need for their trading workloads.



Architecture



Local Zones work in conjunction with Availability Zones to achieve the single-digit millisecond latency to exchanges and scalability required by trading platforms. Functions, such as the development of trading strategies and building of capital management plans, are implemented in Availability Zones. Functions required to execute trading strategies – such as taking positions based on pre-defined triggers, and order management based on the state of the market – are implemented in Local Zones.

Local Zone Benefits

Local Zones provide the following benefits:

1. **Low latency**: Local Zones reduce the network latency by bringing IT resources required to run trading systems closer to the trading exchange.
2. **Scalable and elastic**: Financial markets systems are often bursty workloads requiring highly elastic and scalable platforms. Current on-premises data center solutions solve this challenge by building infrastructure for the highest load which is costly and underutilized most of the time. Local Zone can provide high elasticity and scalability through features such as auto scaling.

3. **Low upfront cost**: The proposed solution lowers the cost significantly and lets low latency trading systems switch to a pay-as-you-go model as opposed to costly traditional colocation infrastructure.
4. **Secure and reliable**: AWS industry leading technologies make this solution highly reliable and secure.
5. **No geo-dependency**: Ancillary trading systems applications can be located across global AWS regions facing broker customers at the edges with just latency sensitive systems running in Local Zones.
6. **Increased market access**: The proposed solution helps lower the barriers of entry for low latency trading systems allowing for a more competitive provider market and increased liquidity.

Conclusion

This post demonstrates some low latency trading options available to the financial services community. Traditionally, trading systems were run on-premises or on AWS Outposts[7]. However, as AWS offerings have evolved, Local Zones provide a cost-efficient, scalable, and secure solution for migrating low-latency trading workloads to AWS.

Contact Amanveer Singh (amanvsin@amazon.com), Amandeep Bajwa (amanbajw@amazon.com), or Mike Perna (michpern@amazon.com) if you would like to discuss this use case further.

- [1] For discussion in this post, we will consider Ultra Low latency (ULL) as FPGA style solutions at microsecond order to ack latencies. We will consider Low latency as high performance systems with order to ack in single digit milliseconds. We will consider standard latency systems generally utilized for screen trading sub 500 milliseconds.
- [2] Local Zones are a type of AWS infrastructure deployment that places AWS compute, storage, database, and other select services close to large population, industry, and IT centers. Local Zones lets you easily run applications that need single-digit millisecond latency closer to end-users in a specific geography.
- [3] New AWS Local Zones deliver lower latency in Chicago and New York City
- [4] Local Zones are 1ms from Exchange collocation facilities.
- [5] Availability Zones are distinct locations within an AWS Region that are engineered to be isolated from failures in other Availability Zones.
- [6] Proof Engineering: The Algorithmic Trading Platform
- [7] AWS Outposts is a fully managed service that offers the same AWS infrastructure, AWS services, APIs, and tools to virtually any datacenter, colocation space, or on-premises facility for a truly consistent hybrid experience.

TAGS: AWS Local Zones, Capital Markets, High Frequency Trading