Executive Summary

Western Asset is embarking on a multi-year technology modernization initiative to further optimize its investment management process. The firm selected Risk Focus to help it take the first step on its journey by re-architecting its real-time pre-trade compliance engine with the goals of achieving scalable high performance, a modern architecture for enhanced portfolio-management optimizations, and a modern, high-velocity development process.

The Challenge

As the first step in its technology modernization, Western decided to re-architect its pre-trade compliance engine to provide near-instant response times to their trading desk for client guideline trading decisions as well as to provide high-capacity automation between portfolio management and compliance guidelines.

To address peak trade and automation volumes, the re-architected system had to support many simultaneous trades each with potentially hundreds of accounts and with each account often having dozens of client-specific guideline rules. Furthermore, the system required a large amount of data and data dependencies to be processed in real-time as well as inter-trade dependencies. To achieve near-instant response times for the users, peak computation alone would be in the millions of calculations per second not including the timely delivery of data. Risk Focus is migrating Western's workload to AWS and layering in Kafka and Flink as a foundation for scalable data and compute fabric.

Why AWS

AWS offers massively scalable infrastructure that is highly secure, available, and fault tolerant. Additionally, AWS's cloud-based resources provide technological, operational, and cost efficiencies compared to Western Asset running its own data center. AWS is supporting Western's technology modernization through the AWS Migration Acceleration Program (MAP).

About Western Asset

Western Asset is one of the world's leading fixed-income managers. With a focus on long-term fundamental value investing that employs a top-down and bottom-up approach, the firm has nine offices around the globe and deep experience across the range of fixed-income sectors. Founded in 1971, Western Asset has been recognized for an approach emphasizing team management and intensive proprietary research supported by robust risk management.

Why Risk Focus

Risk Focus is an [AWS Advanced Consulting Partner](#) with Financial Services, Migration, and DevOps Competencies. The firm has years of experience delivering technology modernization to large financial institutions leveraging Kafka-based [streaming architectures](#). Risk Focus has developed a successful, repeatable pattern for stepwise technology modernization, which is enabling Western Asset to transition to the cloud without business disruption. Risk Focus's unique combination of business domain knowledge, technology expertise, and Agile delivery process were uniquely suited to lead Western Asset's technology modernization.

The Solution

Western Asset's pre-trade compliance engine was an ideal candidate to leverage a modern cloud-based streaming architecture resulting in a scalable, high-performance data and computing fabric. This foundation is expected to be leveraged for future modernizations. Since most individual compliance rules themselves are not dependent on other ones, Confluent Cloud served as a messaging bus to orchestrate parallel computation of the compliance rules.

Risk Focus recommended AWS as an infrastructure solution to scale and deliver quickly while exceeding Western Asset's business objectives. Risk Focus then developed a Proof of Concept (POC) similar to Western Asset's real use, which allowed teams to evaluate the effectiveness of the proposed streaming architecture.

<u>POC Application Design</u>

The POC developed by the Risk Focus was designed to:

- Leverage Infrastructure as Code to allow each developer to spin up and test variable configurations of a Confluent Kafka and Flink application in AWS using self-service tools
- Prove massive and near-perfect scaling of all 1.5M calculations so the total time was approximately the time to calculate one rule
- Demonstrate control order, aggregation, and impact on performance
- Monitor and track drift to the source and between any two consumers
- Manage capacity and costs in AWS using a pricing calculator
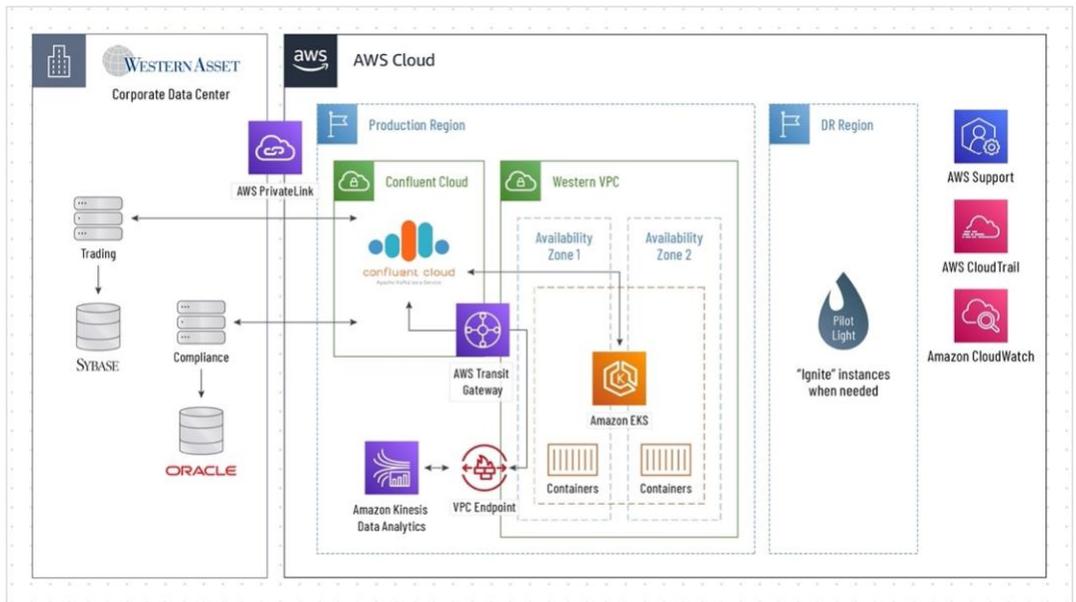
Results and Benefits

Risk Focus demonstrated that a Kafka-based streaming architecture could achieve near-perfect parallelism by scaling perfectly across the CPU allocated. Risk Focus achieved 100 calculates per CPU, and the stack scaled linearly based on the number of CPUs configured. With a throughput of just one second, Western Asset seeks to significantly increase its capacity at peak times of the year and as overall trading volumes and automation algorithms grow.

In addition to meeting Western Asset's throughput requirements, the architecture's AWS-based infrastructure is expected to provide increased stability, resiliency, fault tolerance, and cost-savings compared to running the same workload in its own data center.

Based on the success of the POC, Risk Focus is now laying the groundwork for additional technology modernization with AWS at Western Asset. The re-architected pre-trade functionality of the compliance engine, the first milestone in this initiative, is on track to go live in 2021.

About Risk Focus

Risk Focus, a Ness company, solves capital-markets business problems with technology and insight. Our business domain knowledge, technology expertise, and Agile delivery process have delivered seamless Digital Transformations at many of the largest exchanges and investment banks. We're a Premier Confluent Systems Integrator and an AWS Advanced Consulting Partner with Financial Services, Migration, and DevOps Competencies. For more information, visit www.Ness.com.

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