SUCCESS STORY

Intel® Network Platforms Group

Financial Services

SDN Transforms Mission-Critical Financial Services Networks: Lucera Success Story

Executive Summary

Mission-critical financial systems have evolved substantially in recent years, and the demands for both agility and performance have superseded the capabilities of traditional network architectures. To maintain leadership in this highly competitive sector, Lucera has built a software-defined wide area network (SD-WAN) enabled by Intel® architecture. This cloud-based, high-performance network infrastructure accommodates high-frequency trading, liquidity matching, and foreign exchange, capitalizing on the agility and flexibility of software-defined networking (SDN). With the steady performance advances assured from Moore's Law, Lucera is able to keep up with the ever-increasing bandwidth and latency needs of its trading customers. As a result, Lucera® Connect™, an on-demand infrastructure-as-a-service (IaaS) platform, maintains an edge in a market sector that values performance as much as Formula One racing buffs do.

Challenges

- **Mission-critical requirements**. Reliability, scalability, and consistent performance are essential hallmarks of a successful financial services IT network.
- **Widely varying traffic patterns**. Bursty traffic patterns and wild swings in service demands create challenges in developing a network infrastructure that adapts to widely varying demands.
- **Fierce competition in the financial services sector**. In a sector where participants compete to trim microseconds from response times, network performance represents a vital component of business success.

Solution

- **Enhanced agility with SDN**. The capability of Lucera Connect to reconfigure and rapidly provision a network infrastructure without requiring a complete shutdown offers immediate benefits
- **Leveraging Moore's Law**. Regular increases in processor capabilities enabled by Moore's Law drive the performance gains—generation by generation—enabling Lucera to meet the essential performance demands in the industry.
- **Fluid scalability**. When traffic and trades on the network can boom exponentially in a very short period, capacity and compute across the infrastructure must scale fluidly in near real-time to meet requirements.

Results

- By engineering an IaaS framework around the principles of SDN, Lucera can deliver flexible, responsive services to customers and stay abreast of the competitive requirements that characterize financial services IT in a global race that rewards even small increments of performance improvement.

LUCERA™
FINANCIAL INFRASTRUCTURES

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Top SDN Criteria for Financial Service IT Leaders

According to an article in Information Week, financial service IT leaders evaluating SDN solutions favor those capabilities that let them forecast demands and rapidly provision to accommodate changing requirements. As shown in Figure 1, high availability and resiliency were key requirements for more than a third of respondents, and analytics and reporting features also rated high. More than half of those surveyed planned to deploy SDN solutions within the next year.

Visibility into the network operation on a real-time basis was mentioned as a high-priority item (and a factor that has been difficult to obtain prior to SDN technologies).[1]

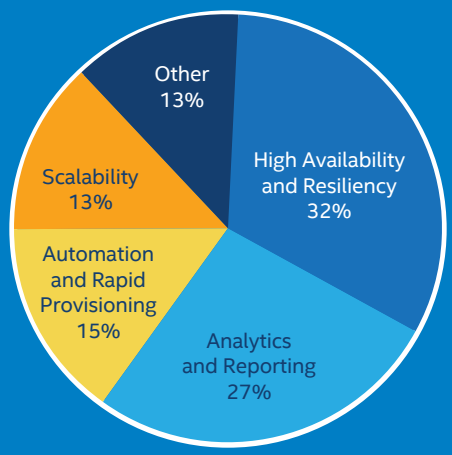

Figure 1. Top SDN criteria in the financial services industry

"The reality of infrastructure is this: you've got security, reliability, and performance. If you go extreme in any one direction, you have to sacrifice something. You have to sacrifice one of the other two. I think as you look at the history of electronic trading, especially over the last ten years, latency arbitrage was prevalent and you wanted to push systems to the edge of capabilities. Those days are behind us—the idea of being highly specialized in an individual asset. They're gone and the reason they're gone is due to exponential performance improvements in Intel architecture, thanks to Moore's Law. The barriers to entry are lower since a high-performance, software-defined WAN can run on Intel architecture-based servers. There are more players in the space. It is easier for the everyday man to have access to this technology. If you're going to give up on performance and bring things back, it is time to refocus on reliability."

- Jacob Loveless, CEO, Lucera

The Changing Landscape of Financial Services Industry Networks

Today's financial service industry (FSI) networks are characterized by the prevalence of mission-critical applications, sensitivity to low-latency network issues, and an abundance of high-speed traffic that frequently occurs in bursts. The adoption of cloud services in the financial services industry has lagged to some degree behind other industry sectors because of data privacy and regulatory compliance issues, but situation appears to be changing rapidly. A survey conducted by the Cloud Security Alliance indicated that over 60 percent of financial services firms have deployed cloud services for customers and have a cloud strategy ready for implementation.[2]

Data is king in the FSI world. To establish rates on various financial products, the financial services industry—encompassing lenders, capital markets, credit unions, banks, and other financial organizations—relies on a combination of current data from a number of sources, including the Federal Reserve. In comparison, agricultural and energy forecasts require historical data from long-term weather patterns. Collecting and analyzing real-time data and historical data on systems partitioned into the traditional silos—compute, storage, and network—presents provisioning difficulties and configuration challenges. The promise of SDN is based on the agility and flexibility available to provision virtualized network components automatically in response to immediate demands.

Despite improvements in FSI networks over the past 10 years, inherent limitations remain:

- An increasing need for agile provisioning and the need to extend the network edge to hundreds of counterparties
- A tendency to overbuild bandwidth capacity to accommodate anticipated demand
- The long depreciation schedule for capital expenditures

SDN counters these limitations, providing:

- Agility due to the ease and speed at which software-based network interfaces can be created and scaled
- The use of standard high-volume servers that can be upgraded frequently as technologies advance
- Lower capital expenditures because of the commodity hardware equipment and faster refresh rates on equipment

The visibility and accessibility of the SDN infrastructure also offer a key advantage to organizations adopting the technology. Jacob Loveless, founder and CEO of Lucera, described the value this way, "Flow-based networking elevates networking to a level a manager can understand. In a flow-based model, you're able to look at each application and see what generates revenue and value, and then make modifications to the network to improve upon those." As an example, he explained that one port may connect to the database and another to customers in China, giving the organization's decision makers a clear means to understand and prioritize the connections.[3]

Lucera Success Story

The Lucera Connect platform—designed for reliable, high-speed financial services transactions—includes multiple layers of redundancy, a global network built around SDN principles that traverses six continents, and a network isolation model that enforces rigorous security. Resources are defined and self-provisioned through a centralized portal for administration that enables customers to establish logical flows, which define inbound and outbound connections. The cost model for Lucera Connect, based on the logical flows in use, removes unnecessary, expensive bandwidth charges from IaaS pricing and provides clarity into the billing model. The platform provides an on-demand infrastructure highly adaptable to creating and deploying financial services products rapidly and making it possible to easily enter and explore new markets anywhere on the planet with the click of a button.

Provisioning Agility Unlocks FSI Opportunities

Traditional deployment requirements in a fixed hardware network often require up to 90 days to accomplish—with a long program management cycle that involves hardware requisitioning and installment, as well as a network shutdown to complete the deployment process.

In comparison, Lucera Connect empowers customers to use portal features to self-provision according to immediate needs and requirements, a process that incorporates virtualized components implemented on Standard High-Volume Servers. By removing much of the need to depreciate collections of physical networking devices, including switches and routers, SDN makes it possible to leverage the latest server hardware advances and more easily capitalize on current technologies. The Lucera Connect platform is based on a proprietary software stack and a structure that lets the client administrator control resources and connections through a central portal, as shown in Figure 2.

SDN on Intel® Hardware

Lucera works closely with Intel to perform pre-release testing on upcoming processors and regularly upgrades its platform components to capitalize on the latest hardware architectures and features. The current Lucera Connect platform utilizes Intel® Xeon® Processor E5 v3 Family processors and Intel® Ethernet Converged Network Adapters to deliver the performance, scalability and flexibility required for high-performance cloud environments. Lucera runs on the IllumOS* operating system, which includes a deep heritage of OS virtualization and network isolation. Custom SDN software developed by Lucera and use of Intel® Data Direct I/O Technology and the Data Plane Development Kit complete the mix, providing an extra measure of SDN network efficiency. The Illumos project, to which Lucera is an active contributor, is an open community fork of the OpenSolaris* OS.

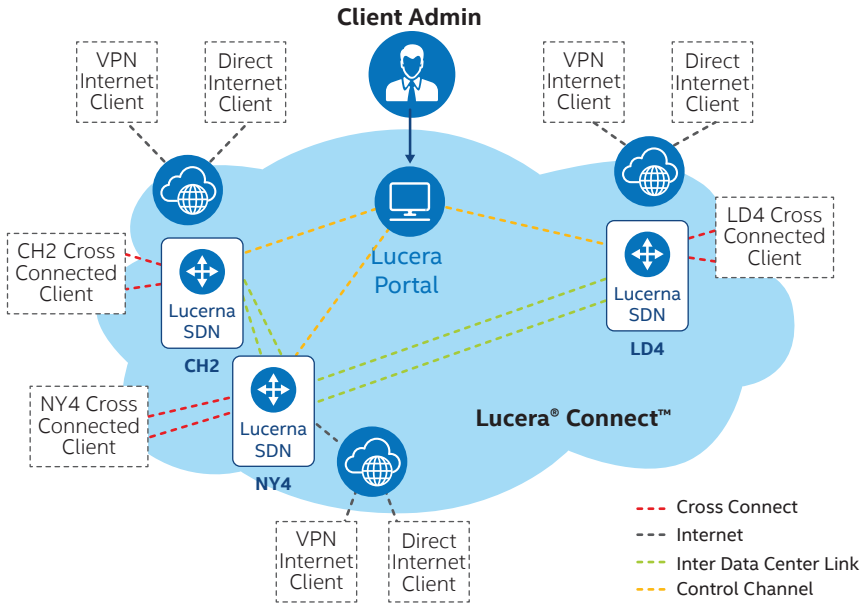

Figure 2. Lucera® Connect™ architecture.

Lucera attributes much of its success to knowing how to balance compute and networking resources in a way that keeps it highly competitive and near the top of the performance spectrum in its sector.

"Intel just keeps cranking out chips," Loveless said, "and we just keep getting more and more density and that's great because that just continues to lower our unit cost. So we're finding the balances in our network interfaces and in Intel's CPUs. As you scale the core count, we get to scale the number of network interfaces that are interacting with that and that just lowers the overall cost of our solution. We're popping the old chips out and popping new chips in. Our gear is designed to be upgradable by swapping components."

Conclusion

Using technologies that were not even available a few years ago, financial service companies are now able to lower the costs of their infrastructures using SDN and reach markets at lower costs than ever dreamed possible. Lucera empowers the financial services industry with an SD-WAN based on Intel architecture. Lucera offers on-demand IaaS that takes full advantage of the technology leaps afforded by Intel architecture-based servers, without sacrificing reliability or performance. The benefits of cost-effective financial service infrastructures enabled by SDN ultimately is passed down to consumers who also enjoy the benefits of a wider range of financial services products scaled to their needs and expectations.

Call to Action

Learn more about Lucera Connect:
lucera.com/connect.html

Learn more about Intel® Network Builders:
networkbuilders.intel.com

[1] "Half of Financial Services Companies Plan to Adopt SDN," Information Week, 2014.
http://www.wallstreetandtech.com/infrastructure/half-of-financial-services-companies-plan-to-adopt-sdn/a/d-id/1306951

[2] "Mitigating Cloud Data Privacy And Security Risks In The Financial Services Industry," Digitalist magazine, 2015.
http://www.digitalistmag.com/cloud-computing/mitigating-cloud-data-privacy-security-risks-financial-services-industry-03062829

[3] "SDN: The Silver Bullet for Financial Services," Information Week, 2014.
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