CASE STUDY

Cloud
Data Center

Sify Expands Cloud Business with Financial Trading Solution

For one of its first Software as a Service implementations in financial services, Sify Technologies Limited worked with 63 Moons Technologies Limited to introduce Brokerage as a Service. Based on Intel® architecture, it enables India's brokers to trade with three major exchanges

At a Glance:

- Sify and 63 Moons created Brokerage as a Service
- It enables traders to use the cloud for trading on India's exchanges
- The Intel® Xeon® Scalable platform delivers the performance required
- VMware vSphere* and Intel® Trusted Execution Technology (Intel® TXT) help enhance security and performance

For India's brokers trading on major commodities and stock exchanges, agile IT offers huge potential. They can leave their dedicated trading systems and terminals behind, and benefit from the enhanced scalability, security, and manageability of a hosted, managed platform. To expand its Hybrid IT business, Sify Technologies Limited worked with 63 Moons Technologies Limited to bring the latter's ODIN platform for brokers to the cloud. The infrastructure is based on the Intel® Xeon® Scalable processor platform, to ensure it delivers the performance that brokers need.

Challenge

- Deliver a highly regulated trading platform on a cloud consumption model (Pay per Broker) that can withstand highly volatile demand (extreme peaks and lows)
- Establish a highly-performant and reliable architecture for delivering brokerage services in the cloud

Solution

- Intel worked with Sify to create a proof of concept and total cost of ownership analysis, to help Sify choose the right architecture
- Sify worked with 63 Moons and Intel to launch Brokerage as a Service, based on 63 Moons' ODIN platform
- The Intel® Xeon® Scalable processor platform delivers the performance required, with enhanced security and micro segmentation
- VMware vSphere* and Intel® Trusted Execution Technology (Intel® TXT) are used to manage an isolated VPDC (Virtual Private Data Center) for each broker, to increase the security and performance of the solution

Results

- Sify has been able to extend its business into Software as a Service, creating a new opportunity for Sify and 63 Moons to reach over 11,000 brokers who trade on India's exchanges

Launching SaaS in Financial Services

As a company that began life as India's first Internet Service Provider back in 1998, Sify has experienced many changes. Today, the company is one of the largest integrated information and communications technology (ICT) providers in

India, with 8,500 enterprise customers. Its cloud business is mostly based on managed hosting, however, as the market has evolved and continues to change, Software as a Service (SaaS) has become a key differentiator in creating greater value with customers, and accelerating growth.

For one of its first major SaaS implementations, Sify partnered with independent software vendor (ISV) 63 Moons, which specializes in creating digital marketplaces enabling price discovery and transaction efficiencies across industry sectors. The jointly developed solution introduced a platform that enables brokers to trade in India's three major financial markets, the National Stock Exchange (NSE), Bombay Stock Exchange (BSE), and Multi Commodity Exchange of India (MCX). Typically Brokers have dedicated hardware in their office and their own secure connection to the exchanges to enable the trades.

Sify and 63 Moons identified the opportunity to host the trading solutions in the cloud, creating Brokerage as a Service, a solution that enables brokers to more easily trade, and benefit from the flexibility and efficiency of the cloud. Traders are able to use standard hardware to connect to the cloud solution from wherever they are, without a dependence on dedicated trading hardware, or the overhead of managing and maintaining it.

Traders also benefit from the scalability and manageability advantages of using hosted solutions. Using Brokerage as a Service, traders can more easily scale up their computing and memory resources as the frequency of their trading increases, and can more easily subscribe to trade on additional exchanges, without needing to make any hardware or software modifications in-house. Additionally, the security and availability of the trading infrastructure is managed by Sify, so the broker firms can focus on their priority: trading.

Delivering Brokerage Services in the Cloud

Brokerage as a Service is an end-to-end solution that comprises the application software and a fully managed infrastructure, including a fully dedicated connection between the data center and the brokers and financial services firms. It is a cloud-based version of 63 Moons' existing ODIN brokerage platform.

The solution enables broker firms to subscribe to trade on India's major exchanges, with different subscription options depending on which markets they wish to access. Using a web-based client, brokers can submit their trades in online or offline mode. Online trades are those that are submitted when the market is open, and so they can take place straight away. Offline trades are submitted when the market is closed, and the solution carries out the trade when the market next opens.

The solution is based on 63 Moons software in Sify's cloud, hosted on virtual private data center (VPDC) architecture built on Intel Xeon Scalable processors. Each client has its own VPDC setup, which is isolated from other clients to improve security and performance using VMware vSphere and Intel TXT.

Customers classify their businesses as small, medium, or large, depending on the number of market connection events and orders they need to carry out. Brokerage as a Service allocates hardware resources to their trading application based on these parameters (see Figure 1). If the broker exceeds the expected requirements, Sify identifies this based on system reports, and works with the broker to scale up their compute, memory and storage resources. Conversely, if the broker has been allocated resources they don't need, they can save money by scaling back the IT resources

	Small	Medium	Large
Connections per second	250	500	1000
Orders per second	50	100	150
Cores	12	18	24
RAM (GB)	24	48	64
Storage (GB)	280	330	330

Figure 1: Brokerage as a Service allocates resources depending on the client's expected trading requirements. Customers classify their businesses as small, medium, or large, depending on the number of market connection events and orders they need to carry out.

allocated to their Brokerage as a Service instance. Rescaling can take place in 30 minutes, a big improvement on the time that might be required to reconfigure a dedicated trading machine in the broker's office.

In the future, Sify and 63 Moons aim to extend the service to offer the automatic calculation and execution of complex arbitrage, spread strategies and institutional algorithms.

Solution Architecture: Brokerage as a Service

Traders use their own devices to log in to the brokerage service through their web browser. Their trades are processed by their own instance of the 63 Moons software running on their own virtual machine, hosted in the Sify data center. The virtual machine is managed using VMware vSphere, and runs on servers based on the Intel® Xeon® Gold 6148 processor. Figure 2 shows the architecture for the solution.

Technical Components of the Solution

- **Intel® Xeon® Gold 6148 processor.** The Intel Xeon Gold 6148 processor offers up to 20 cores, providing a platform for high-performance computing. It is used in the front-end servers that support the virtualized applications and the separate servers that connect to the markets
- **Intel® Solid State Drives (Intel® SSDs).** Intel SSDs deliver exceptional performance in the storage attached network used for storage data on brokers and their trades
- **25/40 GBE Intel® Ethernet Network Adapters.** Intel Ethernet Network Adapters are used to accelerate performance and to help ensure that network latency does not delay a trade. Trading performance is an important aspect of the solution, from the broker's point of view

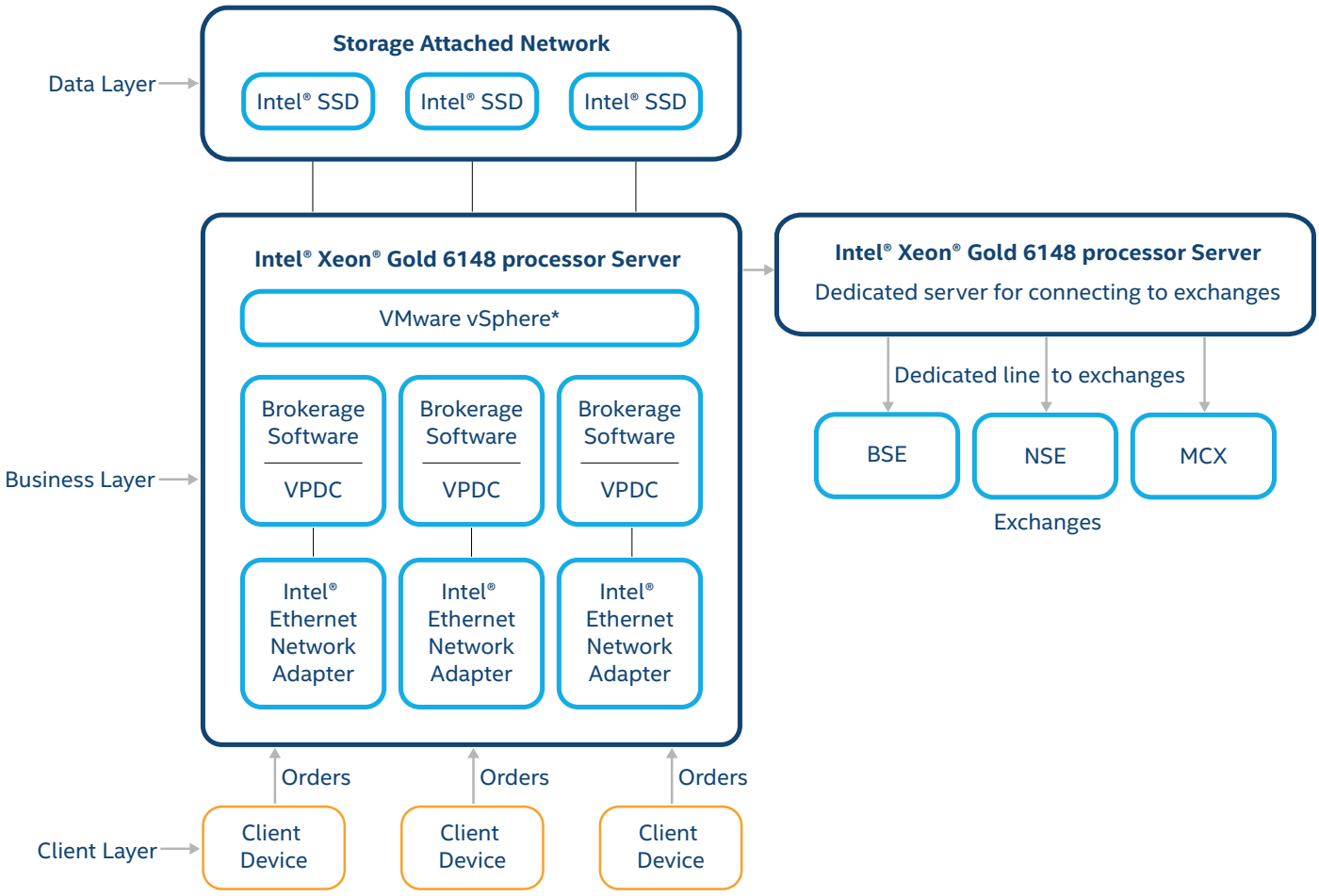

Figure 2: Shows how the different components of the solution work together to deliver Brokerage as a Service.

Lessons Learned

- Intel works with CSPs to help them to identify the right infrastructure for their applications
- Using virtual machines and dedicated NICs on the servers provides an isolated infrastructure for each customer, increasing security and performance
- Leveraging both Intel® Trusted Execution Technology (Inte® TXT) and VMware vSphere* together establishes a trusted boot environment, protecting virtual machines from software-based attacks and potentially enabling geo-fencing when used with other solutions

As Figure 2 shows, the solution is based on a three tier architecture: the client layer, the business layer and the data layer.

The client software is delivered in the browser. It runs on the broker's own mobile devices and desktop computers using a secured web connection.

The business layer is responsible for taking the trades from the front end, processing the orders, transferring payments, and generating the associated completion reports. The 63 Moons software in this layer runs in a virtual machine, which is hosted in a server farm in Sify's data center.

Considered the workhorses of the operation, the servers need high-frequency and high-core processors. Following testing with Intel, Sify selected the Intel® Xeon® Gold 6148 processor with 20 cores running at a frequency of 2.4Ghz for these servers. The two-socket servers will provide up to 40 cores. Each socket has 128GB RAM. Additionally, there are servers that connect to the exchanges using a dedicated line, which are based on the same Intel Xeon Scalable processor. The front-end application sends its trades through these servers.

Data on users, trades, logs, and key performance indicators is stored in a storage attached network (SAN) based on Intel® Solid State Drives (Intel® SSDs) for exceptional performance.

25/40 GBE Intel® Ethernet Network Adapters are used to accelerate the delivery of services. Each customer has a dedicated network interface controller (NIC) and a dedicated virtual machine on the server to ensure isolation for improved performance and security.

The VPDC and virtual machines are managed using VMware vSphere, which uses Intel® Cloud Integrity Technology (Intel® CIT) to establish a trusted compute pool. Intel CIT provides a chain of trust with complete visibility into the cloud data center, enhancing monitoring capabilities and offering greater

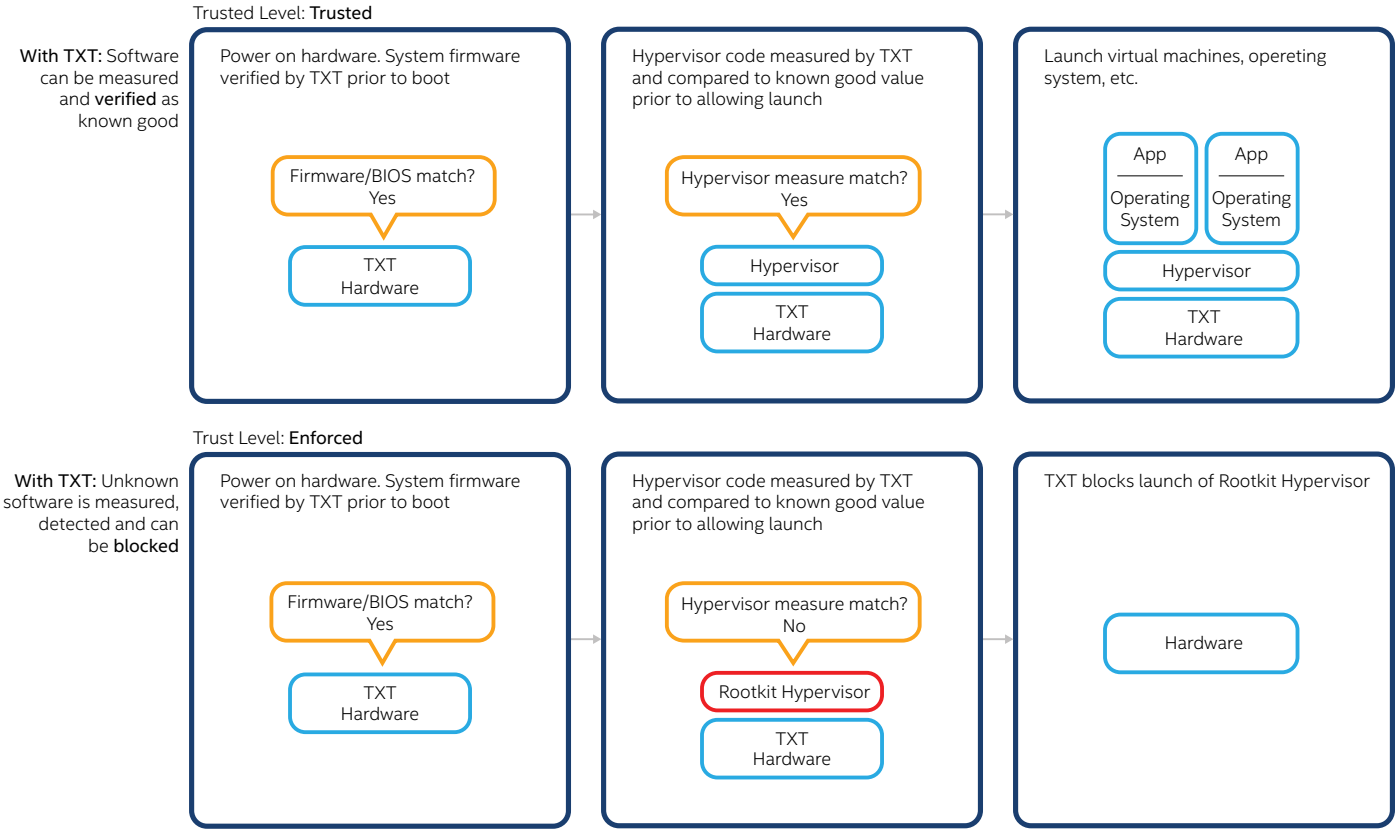

Figure 3: Intel® TXT enforces the trust level in virtual machines

assurance of quality service delivery. Intel TXT establishes a more secure platform using processor, chipset, and BIOS enhancements to measure the components of a launch environment so that only "known good" configurations are launched. This helps protect against a number of software based attacks and provides a powerful control point for securing virtualized workloads.

Intel Team is a Close Ally

Intel's technical team helped Sify with the architecture for the compute, storage and networking parts of the solution.

Intel ran a proof-of-concept with Sify using the Intel Xeon Scalable processors to identify the most suitable processor for the application. A total cost of ownership (TCO) analysis was also carried out, comparing the new Intel Xeon Gold processor with the previous generation processor. The analysis concluded that the Intel Xeon Gold processor was the most cost-effective option for Sify's requirements.

Together, Sify and Intel ran a series of performance tests to identify the appropriate resource allocations to satisfy small, medium and large brokers, based on their orders per second. Intel also assisted Sify with load testing using the live market feed.

"Intel's support has enabled us to accelerate the deployment of Brokerage as a Service, and be confident that it will meet our client's requirements for performance and isolation," said Kamal Nath, CEO, Sify Technologies Limited.

Find the solution that is right for your organization. Contact your Intel representative or visit **intel.com/CSP**.

Spotlight on Sify

Sify is one of the largest integrated ICT Solutions and Services companies in India, offering end-to-end solutions with a comprehensive range of products, delivered over a common telecom data network infrastructure that reaches more than 1,400 cities and towns in India. This telecom network today connects 48 data centers across India, including Sify's six Tier-3 data centers across the cities of Chennai, Mumbai, Delhi, and Bengaluru. Sify has also expanded to the United States, with headquarters in the heart of California's Silicon Valley. Over 8,500 businesses have become Sify customers.

Learn More

- Intel® Xeon® Scalable processor
- Intel® Xeon® Gold 6148 processor
- Intel® Solid State Drives (Intel® SSDs)
- Intel® Trusted Execution Technology (Intel® TXT) : White paper
- 25/40 GBE Intel® Ethernet Network Adapters

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