MoSMB
SMB with Mojo

Case Study

HYPER-V VM STORAGE FOR HYPER-CONVERGED SOLUTION

Futuristic SMB3 stack for forward thinking companies

MOSMB (SMB WITH MOJO) IS RYUSSI'S ADVANCED SERVER MESSAGE BLOCK (SMB) SERVER COMPONENT LIBRARY OFFERING FOR THE DATA STORAGE MARKET TO ENABLE FILE SHARING IN A HETEROGENEOUS ENVIRONMENT THAT INCLUDES BOTH WINDOWS AND NON-WINDOWS COMPUTERS.

EXECUTIVE SUMMARY

This case study illustrates how a tight integration of MoSMB source code with the customer's HCI platform helped achieve the high performance, low latency Hyper-V VDI use case.

MoSMB design is highly flexible and modular with well-defined interface for different module. This facilitated a deep integration of MoSMB source with their platform code. Additionally, MoSMB's advanced architecture enables high performance and low latency for the most demanding SMB3 NAS use cases.

The customer was able to demonstrate the basic Hyper-V VDI use case in just 30 days of joint effort of a Ryussi developer and the customer team. Phase II involving additional scenarios such as a custom persistent layer, SCVMM integration, Live Migration, Cloning etc. was achieved in just 90 days.

OVERVIEW

Ryussi's customer has an enterprise grade, top of line hyper-converged platform. They were looking to build a Hyper-V based VDI solution. The data platform is based on a proprietary distributed object store and aggregated memory, flash and disk resources across a cluster of servers to deliver an optimal cost-effective solution. The VDI solution required it to be "always on"– addition or removal of capacity as well as software upgrades was to be done without downtime. It was to be designed to effectively utilize all resources across nodes to highest levels of I/O performance at low latencies with predictable performance.

The customer had tried to develop the SMB protocol internally for almost a year but because of the inherent complexity and vastness of SMB protocol had not progressed significantly. With MoSMB, they identified a cost-effective alternative which met their varied requirements and was easy to integrate.

SOLUTION

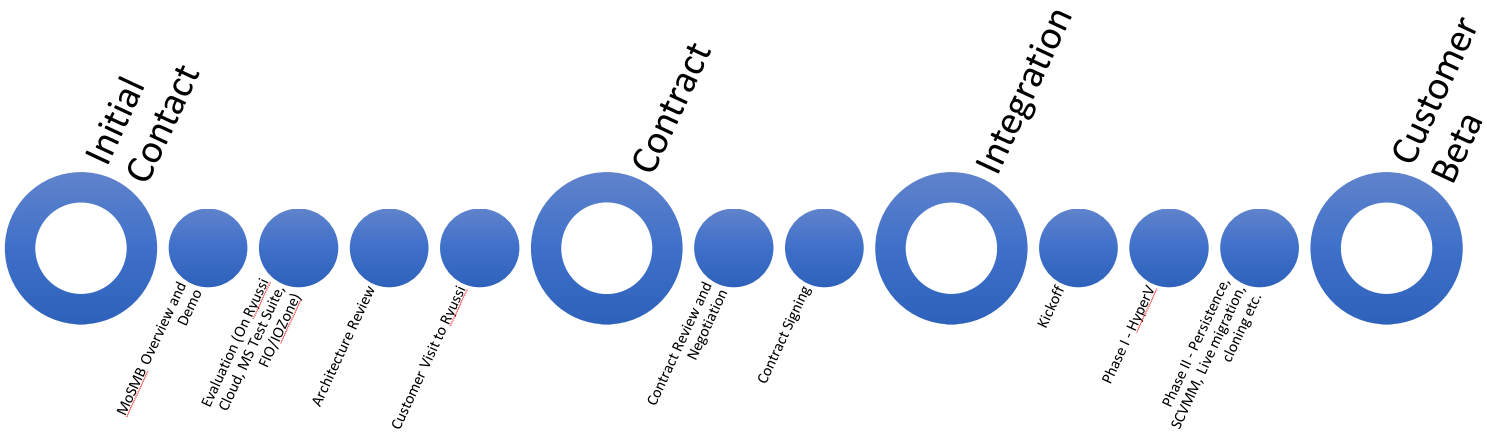
Customer's requirement was that MoSMB as an SMB3 stack should easily integrate with their platform providing high throughput, high IOPS & low latency so that the users would be able to use MoSMB shares as Hyper-V VM store. The customer also needed that the solution should integrate and work with Microsoft tools such a Hyper-V Manager

and SCVMM. These requirements implied that the customer needed deep integration points with the transport & persistent storage layer in addition to the IOS interface.

MoSMB supports Hyper-V over SMB use case whereby MoSMB shares can store live virtual machine files, which includes configuration, virtual hard disk (VHDX) files, and snapshots on MoSMB file shares. MoSMB met the customer's functional, performance, scalability and HA requirements for their VDI solution and the customer licensed MoSMB source code.

MoSMB is also highly modular with well-defined interface for each module. It is possible to replace any MoSMB module and integrate with core libraries e.g. IOS, encryption, memory, transport etc. This immensely helped meet the customer's need for a deep integration of MoSMB source code with their platform code. A Ryussi developer worked alongside the customer development team at their premise to assist with the integration. Additionally, architecture support was provided remotely to address all of the customer requirements.

ENGAGEMENT MILESTONES



The integration was a joint effort between Ryussi and the customer team. Once the integration was kicked-off, Phase I which was related to accomplishing the basic Hyper-V over SMB use case and was completed in just 30 days of joint effort of a Ryussi developer and the customer team. Phase II involved additional scenarios such as a custom persistent layer, SCVMM integration, Live Migration, Cloning etc. and was achieved in 90 days.

KEY INTEGRATION AND DEVELOPMENT TASKS

The customer needed a deep integration of MoSMB source code with their platform spanning across several modules, e.g. IOS, core, persistence, transport etc. Ryussi provided the architectural and engineering support for integration effort.

IOS DRIVER

MoSMB provides a default VFS driver to work with POSIX file systems. In the customer's case, since the underlying storage was a proprietary distributed object store, a custom IOS driver had to be developed to support the various file and filesystem operations. MoSMB provides an IOS SDK to facilitate IOS driver development and the entire IOS driver was developed entirely by the customer's development team in a matter of 30 days as a Phase I task.

ASYNCHRONOUS IO

HIGH AVAILABILITY

MoSMB supports high availability and has a well-defined interface for persistent storage for integration into various clustering solutions that exist today. The persistent storage module of MoSMB enabled the customer to maintain persistent data (such as open file table) on a high-speed memory and integrate with their global namespace providing high availability in an efficient manner. This task was done by the Ryussi team. In a later release, the customer plans to support Continuous Availability using the Witness Protocol Server provided by Ryussi.

The VDI use case is extremely demanding in terms of throughput and latency. MoSMB has been built from ground up to incorporate modern architecture principles such as asynchronous, non-blocking, event based architecture for packet handling to achieve highest performance. The customer also wanted all IO operations to be asynchronous so as to achieve the best possible throughput and latency measures. This involved joint effort by Ryussi and customer team and was accomplished in the second phase of development.

GLOBAL NAMESPACE INTEGRATION

The customer had a high performance, scalable, high available object store implementation and had a global namespace to handle the objects & data in a highly efficient and consistent manner. The object store context was required to be passed for efficient IO read/writes. A mechanism was implemented by Ryussi in MoSMB stack to pass the SMB client context to the IOS layer. The object store received the context via the pass-thru mechanism of MoSMB stack and was used to enable high IO performance.

ACTIVE-ACTIVE CLUSTER

The preferred deployment model of the customer was to use a 3 or 4 node active-active cluster. The customer requirement was to establish an SMB3 connection to the nearest node in the data cluster so that the VHDX file access is fastest over the network to the MoSMB shares. Ryussi team added support for DFS requests over RPC and the customer could use MoSMB as a DFS server. This enabled the customer to provide an algorithm for balancing SMB connections based on the selection logic.

ODX COPY OFFLOAD

The VDI use case involves scenarios like copying very large files, import/export of VMs and VM storage migration. By use of ODX feature, these file operations are offloaded to the storage array bypassing the host computer. This results in higher throughput, lower latency and lower CPU and network resource usage on the host computer. This feature which depends on the underlying platform was implemented by the customer team.

INTEGRATION WITH MICROSOFT TOOLS LIKE SCVMM

MoSMB shares were made to work with Microsoft tools like SCVMM for manageability by Ryussi. This SCVMM integration effort was done by the customer team in Phase II.

To know how you can use MoSMB as a VDI solution, please contact sales@ryussi.com