CASE STUDY

BANKING

MARS Customer Success Story

AT A GLANCE

Industry

Financial Services

Challenge

One of India's largest banks made a large investment in IT infrastructure that directly benefits its core businesses. The investment was made with significant growth in mind. However, with less than 40% infrastructure utilization, performance and stability issues arose. None of the vendors were able to successfully fix the problem because of interdependencies and complexities of a multi-vendor deployment.

Business Impact

Performance issues adversely impacted vital business processes such as bank teller operations, customer acquisition, sales and customer service. The impact of not determining and fixing the root-cause of the performance issues would have led to the purchase of un-budgeted hardware and slowed down the VDI deployment across additional branches resulting in both short and long term cost escalation.

Using MARS, the bank was able to isolate the root cause of the performance issue, and was also able to 'independently' validate and audit the VDI solution without depending on equipment vendors.

BUSINESS

India's leading bank provides a wide range of financial products and services to its tens of million customers across hundreds of Indian cities using multiple distribution channels including a pan-India network of branches, ATMs, phone banking, net banking and mobile banking. Within a relatively short span of time, the bank has emerged as a leading player in retail banking, wholesale banking, and treasury operations, its three principal business segments.

"IDC predicts that the IT-enabled Services (ITeS) and the banking, financial services and insurance (BFSI) sectors will drive the demand for VDI in India over the next few years. These sectors are good examples where data management, storage and data security are of the utmost importance and where VDI can play a key role in managing data more efficiently and provide flexibility to employees." – IDC, February 17, 2014

PROBLEM

The bank made a strategic investment by deploying a VDI-based (Virtual Desktop Infrastructure) system as a pilot across one thousand of its branches, with a long-term plan of extending the pilot across several thousand additional branches. A centralized multi-vendor VDI Solution was put in place with the following vendors: Storage (NetApp), Hypervisor (XenServer, Citrix) & Hosted Windows Desktops (Windows 2012 OS, Microsoft) accessible through thin client (Ubuntu OS) desktops.

This investment directly impacts two core business objectives: teller operations and customer satisfaction. The requirements from the branch tellers are the most demanding. These users are "basic task workers" -- they perform a long list of critical banking functions.
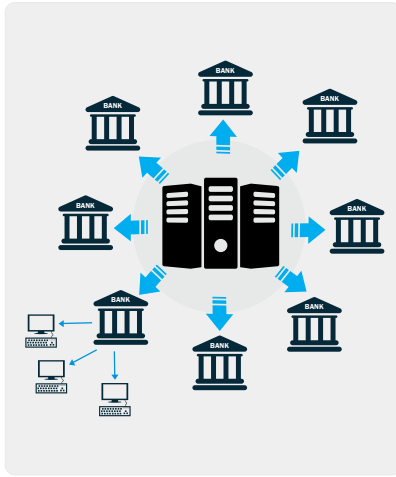
The VDI infrastructure was utilized by four thousand tellers across the branches and an additional two thousand other users, mostly distributed between head offices. The infrastructure was most heavily used during the end of the financial year and the beginning of the next (mid-March to mid-April). During this time, on an average about 5,000 concurrent users log in to the system, however, there were instances where all 6,000 users have concurrently logged in.

While the original infrastructure upgrade plan was to have the system support about 15,000 users, at just 40% of the planned capacity, performance, stability and reliability problems started surfacing. The system became very slow at peak hours.

There were times when several hundred of the teller systems became completely unresponsive for periods of up to 10 minutes. This adversely impacted business and customer satisfaction. Despite spending several months on the problem, none of the infrastructure vendors were able to diagnose and fix the problem because their performance management tools only worked in silos. The only viable option was to have a third party vendor, having tools compatible with multi-vendor solution, perform an independent audit of the system. A holistic root-cause analysis was critically needed to prevent un-budgeted expenditure on additional hardware to mitigate the Problem.

THE MARS APPROACH
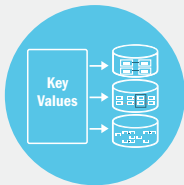
Today's IT infrastructure is more complicated than ever with complex interdependencies between the various sub-systems. To monitor, diagnose and optimize such an environment requires a performance management system to support these heterogeneous components individually but more importantly to understand their inter-dependencies as well. MARS, from Cumulus Systems, is a performance management and analytics platform that has been designed from the ground-up to excel in precisely such environments.

Underlying the MARS platform is a proprietary key-value store purpose built for analysis of time-series data with ad-hoc querying capabilities. MARS probes the entire infrastructure stack without any invasive hardware or agent software and stores configuration and performance data and very high granularity without the need to roll-up the data.

MARS collects and correlates data across all infrastructure subsystems: Compute, Memory, Storage, Network and I/O. MARS performs complex correlations between disparate data

sources and compares it to the benchmarked baselines. This allows MARS to proactively alert operators to possible cascading impacts in a complex infrastructure environment.

The analytics engine built on MARS stores fine grained performance data in a compressed format and allows queries on compressed data. Such historical information combined with the flexible query enables the creation of baselines by capturing operational intelligence from prior months or even quarters.
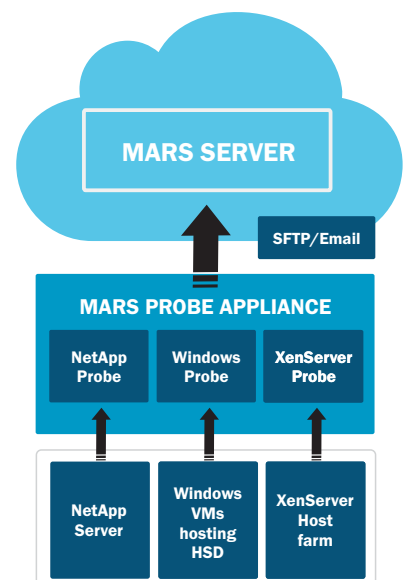
SOLUTION

When vendor specific diagnostics and optimizations failed, the bank approached Cumulus in March 2014, anticipating the same issues as previous year. Cumulus engineers were asked to address the problem at short notice – it was critical that the system operated optimally during the financial year end (mid-March to mid-April time window).

MARS probed data continuously across three main components of the system:

(i) Hosted Microsoft Windows desktops (several hundred serving 10-20 users each)

(ii) Citrix XenServer Hypervisors (master and slave configuration) and

(iii) NetApp Storages. Over a short 4 week period detailed performance data from all of these systems including application performance data from all the 6,000 users, as well as the network traffic was captured. Sufficient data was collected to first create benchmarks and then perform a definitive root-cause analysis.

MARS Deployment at the Bank

MARS SERVER

SFTP/Email

MARS PROBE APPLIANCE

| NetApp Probe | Windows Probe | XenServer Probe |

| NetApp Server | Windows VMs hosting HSD | XenServer Host farm |

The analysis revealed several performance issues affecting the systems:

a. High user process load which peaked around noon

b. Several hosted Windows Desktops going down at peak hours

c. Saturation of NetApp controllers (near 80-90%) with only 40% of planned IOPS

d. XenServer performance issues were also identified

The primary cause of the problem (a) was extra load due to offending processes belonging to an old version of Mail & Documentation System. These processes were consuming abnormally high number of IOPS, because they were performing archival functions. The problem was so crippling that during peak usage times many hundred teller systems would become unresponsive for several minutes. This would have been very difficult if not impossible to detect using traditional methods. MARS was able to do this because it was able to probe, collect, correlate and analyze very granular data across all the components of the infrastructure. Cumulus devised a set of recommendations for addressing the issues including having the Mail System process not perform an archival process during core business hours. The customer made

the required changes resulting in dramatic improvements, for example the task loader process consumed 40% lower IOPS.

Problem (b) was diagnosed using "log analysis" – an old version of some Windows Component Libraries was crashing on peak load. Customer replaced the offending version of the Library and the problem was not observed again.

The root cause for Problem (c) was extra processes being run on the controller due to faulty configuration. After required modifications in NetApp configuration, the CPU controller were no longer getting saturated allowing scale-up to the planned capacity 15,000 users or so.

For Problem (d), MARS XenServer Reports identified the industry best practices being violated. The bank was advised to correct those issues to avoid future performance bottlenecks. Since current performance issues in the VDI infrastructure were fixed, the client deferred fixes to these issues in future by adding more "cache" and other fine tuning.

Thus MARS delivered a cost-effective, vendor neutral long term solution to the performance issues as compared to expensive and stop-gap measures of purchasing additional hardware.

PLATFORM SPECIFICATIONS

VIRTUALIZATION ENVIRONMENTS

VMware

● ESX/ESXi Server	4.0 or above
● vCenter	4.1.0 and above
Hyper-V	2008 R2, 2012, 2012 R2
XenServer	5.5 and above

STORAGE SYSTEMS

NetApp	FAS Storage Systems
EMC	Symmetrix, VMAX Series
IBM	XIV

INSTALLATION ENVIRONMENT

VMware vSphere	4.0 or above; OR
Windows	Windows 2008 R2 or Windows 2012 R2 with Hyper-V
Storage	150GB
Memory	4GB
Cloud service	"Secure FTP"