

# Preliminary Root Cause Analysis (RCA) for AAMVAnet Network Intermittent Outage of January 7, 2008

## Problem Description

1/7/08 – 7:18 AM ET, AAMVA Operations Help Desk received the initial report of slow message responses from PDPS central site. Additional states sent communications to AAMVA reporting similar problems with message response times from CDLIS, NMVTIS and SSOLV/HAVA central sites. Between the 7:00 AM and 8:00 AM ET, other states report no responses received from message inquiries directed to central site systems. AAMVA immediately declared a Severity 1 (System Outage/Slowdown) condition opened a conference bridge and assembled an integrated response team consisting of AAMVA staff and support vendor staff to begin the problem determination and remediation process.

## Problem Investigation

Due to the wide-spread nature of the issue, initial focus was directed at reviewing and assessing the AAMVAnet network (AT&T). In a parallel track, the production NCS system in the Ashburn, VA data center was immediately assessed as routine monthly server patching had occurred in that facility on 1/6/08. The NCS software functionality was reviewed by FarPoint for any possible performance issues.

AAMVA staff with vendor support worked to eliminate possible points of initiation of the intermittent outages. All Central Sites were polled and systems assessed. No issues were identified with any central site system. Network analysis, pings and traces were run throughout the AAMVAnet architecture and no issues were found. The NCS server cluster at the Ashburn Data Center was analyzed to determine if any other maintenance or performance issues were impacting the cluster performance. The NCS system in the back-up production site in the Chicago Data center was triaged to ensure that there were no identified collateral issues.

At 11:48 AM ET when no specific cause had been identified for the intermittent outages, production traffic was switched from the primary site in Ashburn to the secondary site in Chicago. The secondary site had been running with the same operating system patches for more than two weeks without any problem in the test environment supporting the jurisdictions' testing activities.

All jurisdictional sites switched connectivity to Chicago and AAMVA immediately began checking system performance. A few minutes later it became apparent that the same problem was still affecting the production traffic. About half of the messages were processed at sub-second response time and the other half were dropped and never sent to the destination. AAMVA immediately backed out the server patches of the NCS server cluster in Ashburn. Testing continued on AT&T circuits and hardware with no issues identified. Testing also continued on the NCS cluster in Ashburn to validate that all patches had been removed.

At 2:36 PM ET, Production traffic was then switched back to the NCS production site in Ashburn. All jurisdictional sites switched connectivity back to Ashburn and AAMVA immediately began checking system performance. The intermittent outage was still occurring. At this time, AAMVA had narrowed the focus for the issue down to the NCS hardware or application environment.

AAMVA staff with FarPoint continued to test and isolate components of the NCS architecture component by component. Additional tests were run and detailed analysis was performed on the data pathways within the cluster architecture and some evidence was identified that there could be an issue with the Message Processing server cluster. At 4:00 PM ET, testing was initiated in the Chicago NCS system to attempt to replicate the conditions and responses. That testing isolated the component that was malfunctioning and additional testing and analysis was performed to attempt to confirm the initial indications. By 7:30 PM ET, testing had confirmed an issue related to the performance of the Message Processing cluster and its response to the Microsoft server OS patching which had occurred on 1/6/08.

## Problem Remediation

At 8:05 PM ET, one of the two message processing components in the Ashburn NCS cluster was shutdown and restarted. Restarting the application reestablished proper functioning of the load balancing function of the operating system and restored normal system performance. Testing was accomplished with both AZ and AK to confirm message response times.

## Future Remediation Activities

AAMVA in collaboration with its vendors is proceeding with additional testing activities to reproduce the symptoms and adjust the patching procedure accordingly.

AAMVA will also continue to review the step by step trouble shooting procedures to identify possible improvements.