Vess A2000 Series
NVR Storage Appliance

Genetec Surveillance Solution

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Introduction

Overview

This document provides an overview of the Promise Vess A2000 Series NVR Storage Appliance. It includes a test case that simulates a large scale network based surveillance solution. The test case utilizes **Genetec Security Center v5.2-SR7** VMS to determine performance results.
This document also includes key performance indicators and test results for reference and comparison.

Purpose

Purpose of this document is to demonstrate the capabilities of Vess A2000 Series platform, in optimally utilizing the resources for NVR usage.

This note gives the detailed understanding of overall Vess A2000 Series platform and **Genetec Security Center v5.2-SR7** VMS-based surveillance solution.

The monitor data indicates the improved performance results using same/similar hardware components.

Scope

The scope of this document is to create and test an IP camera based surveillance solution using the Promise Vess A2000 Series NVR Storage Appliance with the Promise RAID platform running a **Genetec Security Center v5.2-SR7** VMS software solution.

This note limits itself within the resource intense test configurations intended to simulate a real use large scale surveillance application environment. It does not test and verify every given matrix of video and hardware variables.

Audience

The intended audience for this document includes design and deployment Engineers, as well as persons involved in sale and marketing of Vess A2000 Series **based Genetec Security Center v5.2-SR7** solutions.

Components

Key components involved in technical note are:

- Promise Vess A2200 NVR Storage Appliance and Vess A2600 NVR Storage Appliance, hardware and Promise RAID platform
- Genetec Security Center v5.2-SR7 video surveillance software

Promise Vess A2000 Series System

The Vess A2000 NVR storage appliance is specially engineered for medium to large scale IP video surveillance deployment. The subsystems provide continuous recording and playback operation for networked installations of 32 to 100 High-Definition IP cameras.

The Vess A2000 Series includes the robust and market tested Promise RAID engine, Intel based server platform, industrial grade housing, smart sensors thermal and electrical enclosure protection, N+1 power redundancy, a choice of Linux or Windows operating systems, and intuitive web-based graphical user interface and command line utility for simplified system administration.
Promise Technology Inc is a longtime market leader of RAID based storage solution.

Hardware Components

This document presents two systems for testing:

- Vess A2600 NVR Storage Appliance 3U 16-Bay system that includes:
- Intel Xeon E3-1245V2 (CPU Benchmark: 8942)
- 8GB DDR3 RAM.
- Four gigabit network ports.

Vess A2200 NVR Storage Appliance2U 6-Bay system that includes:

- Intel i3-3245 (CPU benchmark: 4360)
- 8GB DDR3 RAM.
- Four gigabit network ports.

Operating System
- 64bit Windows Embedded Standard 7 + Service Pack 1.

RAID Engine
This test utilizes all drives in single Logical Drive in a RAID 5 arrangement.

Genetec VMS

Genetec develops open-platform software, hardware and cloud-based services for the physical security and public safety industry. Its flagship product, Security Center, unifies IP-based video surveillance, access control and license plate recognition (LPR) into one platform. A global innovator since 1997, Genetec is headquartered in Montreal, Canada, and serves enterprise and government organizations via an integrated network of resellers, integrators and consultants in over 80 countries. Genetec was founded on the principle of innovation and remains at the forefront of emerging technologies that unify physical security systems. For more information about Genetec, visit: www.genetec.com.

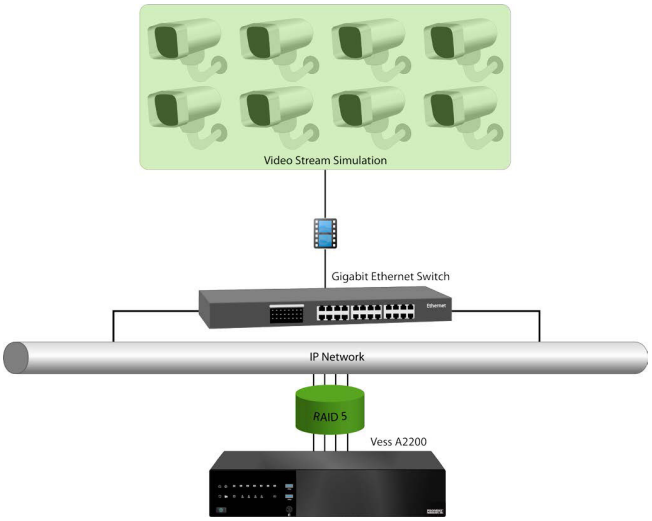
Test Environment

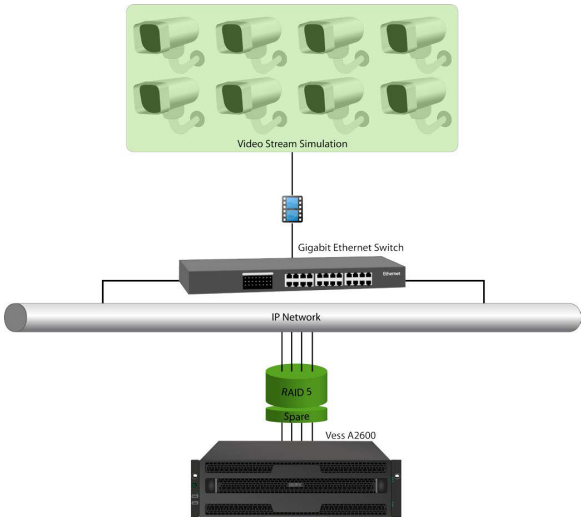
Machine Under Test (MUT) System configuration

	Vess A2600	Vess A2200
VMS	Genetec Security Center v5.2-SR7	Genetec Security Center v5.2-SR7
OS	Windows Embedded Standard 7 SP1 64bit	Windows Embedded Standard 7 SP1 64bit
CPU	Xeon E3-1245V2 CPU Benchmark: 8942	i3-3245 CPU benchmark: 4360
RAM	8GB DDR3	GB DDR3
HDD	16SATA HDD	6SATA HDD
RAID CFG	R5 + Spare	R5
Install PKG	1.02.0000.29	1.02.0000.29
DOM	64GB	64GB

Topology

Test Topology Includes the Vess A2000 and a Virtual Video Stream feed server. All software components are installed on the Vess A2000.





Test Matrix and Criteria

To evaluate different aspects of the solution, the test is divided into multiple parts:

Test	Test Purpose
Pure Recording	Platform Performance Test
Local Liveview	System performance test while local live view.
Local playback	System performance test while local playback.
Remote liveview	System performance test while remote live view.
Remote playback	System performance test while remote playback.
System Critical	System performance test while Vess A2000 system is in critical condition.
System Rebuild	System performance test while Vess A2000 system is rebuilding.

The focus of the platform stress test is to test the system using real world user settings.
The throughput test demonstrates the capability of the Vess A2000 system in handling large volume data streams.

Conditions to obtain the results includes:

Resource	Criteria
CPU Utilization	Less than 70%
Data loss	Less than 5% Recording Data loss = (Expected throughput data) - (Disk Write data) ÷ Expected throughput data
Disk Write latency	The average of the disk write latency is less than 200ms, and the maximum of the disk write latency is less than 1000ms.
Recording status	Recording is under over-write status.
Test duration	1 hour

Vess A2000 Platform Performance

Recording Performance Test

Overview

This test simulates real world user settings. It is intended to check the stability and performance of Vess A2600 and Vess A2200 systems.

Video stream configurations used in this test are:

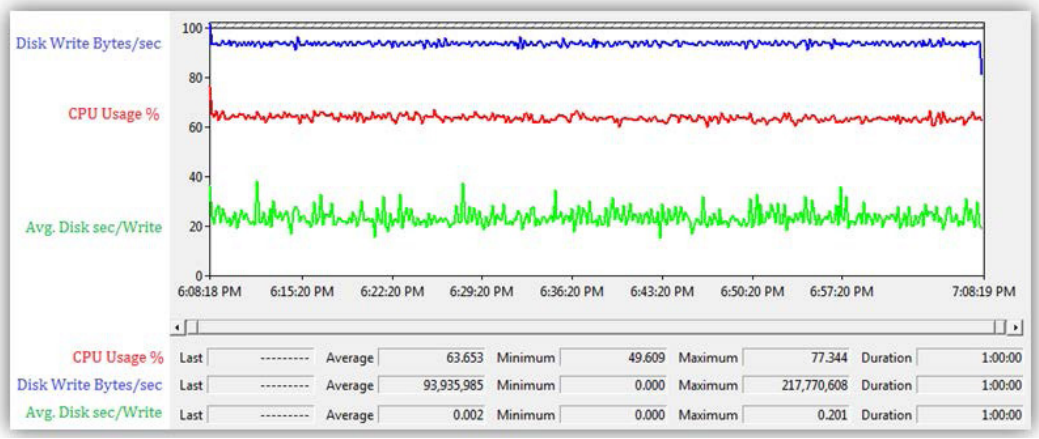
- Codec: H.264
- Res: 1280x1024
- FPS: 20
- Bitrates: 9.54 Mbit/sec

Observation and Highlights

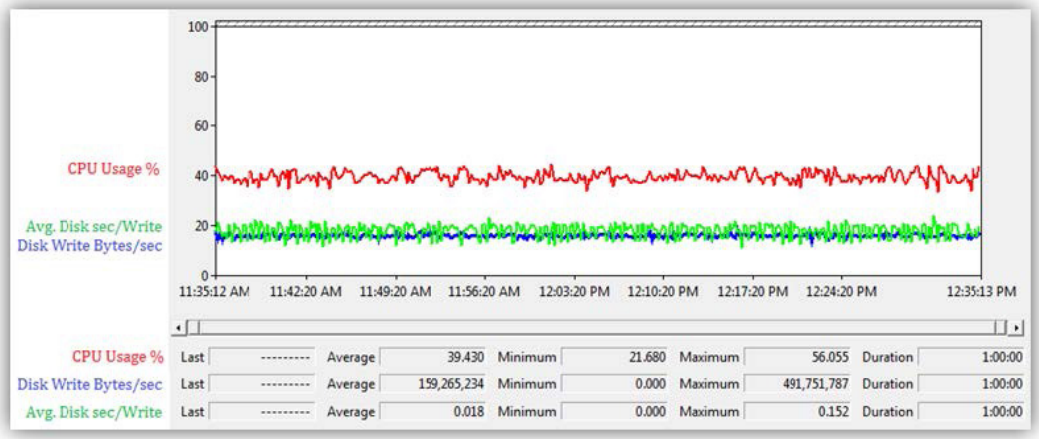
It is observed that PROMISE Vess A2200 and Vess A2600 system perform stable within the criteria defined.

Model	Cameras	Throughput (MB/s)	CPU Usage
Vess A2200	74	89.34	64%
Vess A2600	134	151.86	40%

Vess A2200 system performance monitor



Vess A2600 system performance monitor



Simultaneous Recording and Playback Test

Overview
This test evaluates system performance and stability while simultaneously recording (data in) and streaming (data out).

Video stream configurations used in this test are:

- Codec: H.264
- Res: 1280 x 1024
- FPS: 20
- Bitrates: 9.54 Mbit/sec
- Stream-Out Channels: All

Observation and Highlights
Significant drop in performance was observed in remote Live View.

Model	Recording and Remote Live View		Recording Only	
	Cameras	Throughput (MB/s)	Cameras	Throughput (MB/s)
Vess A2200	26	31.4	74	89.43
Vess A2600	52	62.82	134	151.86

Significant drop in performance was observed in remote playback.

Model	Recording and Remote playback		Recording Only	
	Cameras	Throughput (MB/s)	Cameras	Throughput (MB/s)
Vess A2200	11	13.22	74	89.34
Vess A2600	18	21.74	134	151.86

Background Activity Test

Recording during Rebuilding

Overview

This test is to verify system functioning and stability while the Logical Drive is Rebuilding. When a Hard Disk Drive (HDD) within a Logical Drive fails, the rebuild process of the RAID system is triggered. The recovered data is written either onto a Spare HDD, or on the replacement HDD.
Expected behavior from the Recording Appliance is to be available for recording, while the rebuilding process works in the background. A minimal drop in performance is expected.

Video stream configurations used in this test are:

- Codec: H.264
- Res: 1280 x 1024
- FPS: 20
- Bitrates: 9.54 Mbit/sec

Observation and Highlights

- Both Vess A2600 and Vess A2200 ran stable throughput the test.
- Performance Vess A2600 and Vess A2200 dropped around 20 - 25%.

Model	Recording and Rebuilding		Recording Only	
	Cameras	Throughput (MB/s)	Cameras	Throughput (MB/s)
Vess A2200	48	56.39	74	89.34
Vess A2600	90	105.06	134	151.86

Recording While RAID is in Critical Mode

Overview
This test is to verify system functioning and stability during a Critical RAID condition.
Whenever an HDD of a RAID enclosure fails or stops working, the entire RAID volume is degraded and its status changes to Critical mode.

Note: For real applications, when a RAID goes into critical mode, the faulty hard disk drive should be replaced as soon as possible.

Expected behavior from the Recording Appliance is to be available for recording, while minimal drop in performance is expected.

Video stream configurations used in this test are:
- Codec: H.264
- Res: 1280 x 1024
- FPS: 20
- Bitrates: 9.54 Mbit/sec

Observation and Highlights
- Both Vess A2600 and Vess A2200 ran stable throughput the test.
- No drop in performance is observed in the Vess A2200.
- A small drop in performance is observed in the Vess A2600.

Model	Recording in Critical Mode		Recording Only	
	Cameras	Throughput (MB/s)	Cameras	Throughput (MB/s)
Vess A2200	73	88.18	74	89.34
Vess A2600	115	132.04	134	151.86

Conclusion and Observation

Major requirement of Surveillance Recording Servers are:
Stability: Performance stability of the Surveillance Recording Server is very important for critical safety and security related applications. A Surveillance Recording Server System should maintain stable operation without interruption for long periods of time.

RAID Storage Throughput: Storage data throughput is typically the first performance bottleneck encountered in Surveillance Servers. A surveillance setup generates complex data patterns affected by three factors: the number of cameras, camera frame rate (fps) and data size (resolution). With advancements in recording technology, HD format surveillance cameras are available and affordable for large scale deployments. A storage server must match the data size and complexity of HD cameras on the network.

Test results show the Promise Vess A2000 Series NVR Storage Appliance operated with a high degree of stability throughout the test period. In addition, it also achieved high storage throughput with a reasonable level of resource usage.

Reference