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TrueBlue® Support

Doc. Title:	Redundant Storage System (RSS) ECA4 performance study	Date:	Dec 2018	Revision:	1.0
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Introduction

To understand best possible performance in redundant storage system (RSS) according to actual real world CCTV workloads. As well as to conduct test on RSS in worse case scenario (which is in repairing stage) having any impact to CCTV recording performance.

The performance test consists of these the following stages of testing, to obtain the following important parameters.

1. Number of HDDs in RSS which directly impact the VMS workloads
2. RSS Storage efficiency
3. Computer (ECA) Platform Level maximum Read and Write performance
4. Optimized (max capable) write performance in actual VMS Work Loads without frame (recording) lost.

Objective

To understand actual best optimized VMS workloads without recording frame lost based on worse case repairing stage of single or dual RSS parity.

Test method and tools used:

Describe the tools, software, etc that you will use to aid your work.

1. Testbed number: Testbed-I at GSFtech LAB.
2. Platform model: ECA4 Model-FX40ESM . Intel Xeon E3-1245v6 . 16GB ECC DDR4 system memory.
3. OS version: ECAOS 5.0.1811.1521
4. Windows version: Windows 10 Enterprise LTSB 1607.Build 14393.2395
5. Network: LAN in single 1Gbps
6. VMS: Macula Enterprise version: 1.11.0 x64Bits.
7. RTSP over ONVIF protocol simulation server for 600Mbps workloads (or equivalent to 3Mbps/CH constant bit rate by 200CH total)
8. Main Stream Profile: 3Mbps 25FPS by 200CH
9. Sub Stream Profile: 512kbps 25FPS by 200CH
10. HDD: Seagate SkyHawk AI 8TB Model: ST8000VE0004 256MB Cache. By 15unit.
11. RSS configurations property for StoragePool and StorageSpace accordingly to GSF-RSS-PowerShell Scrips.
12. Software Tools used: Crystaldisk Mark x64 version 6.0.1 for HDDs benchmark
13. Microsoft Windows Performance Monitor Console (PerfMon) and Task Manager. For Disk, Network, CPU and Memory monitor and recording.
14. Macula Console for Frame Rate or Drop Frame Monitoring.

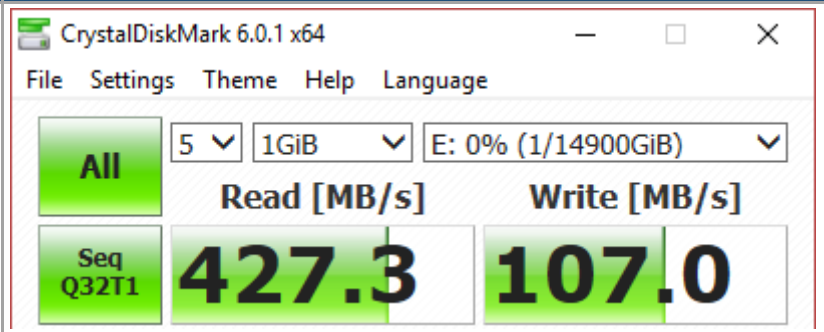
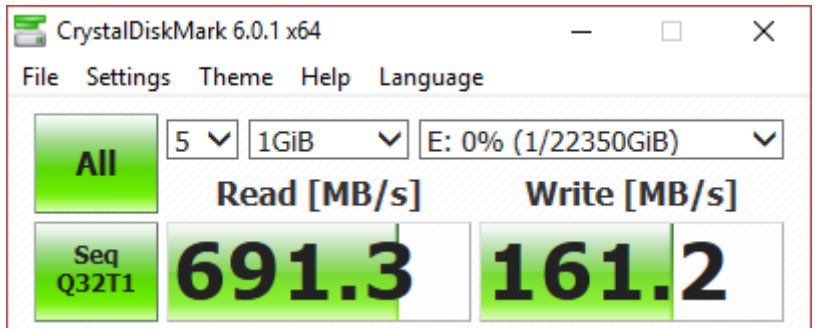
Phase 1 – RSS Storage Efficiency

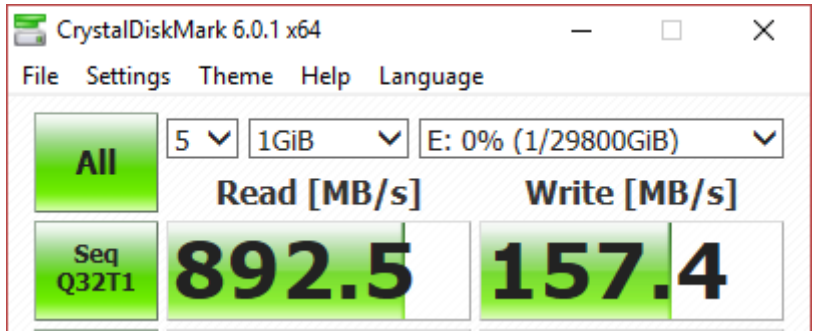
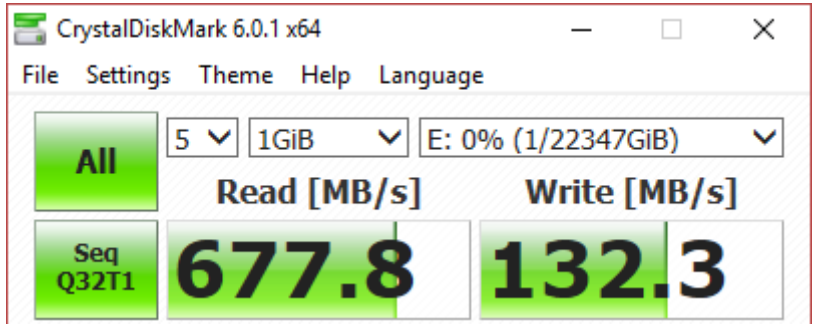
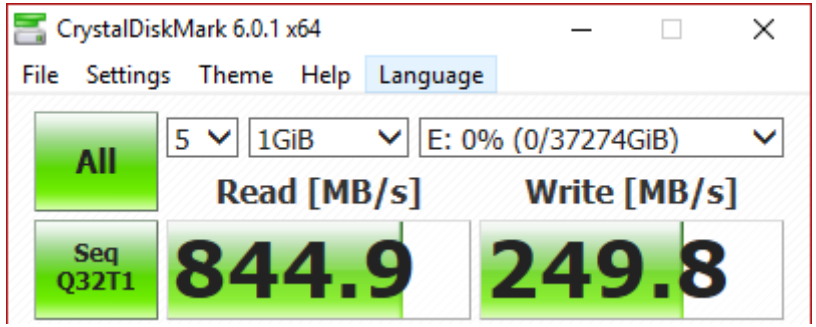
Note, this test we based on the maximum available columns to optimize write performance. When failed disk occurred, human interaction to remove, insert, and repair steps are required.

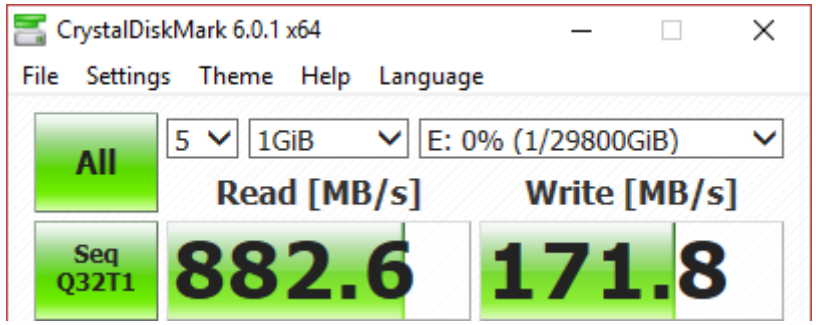
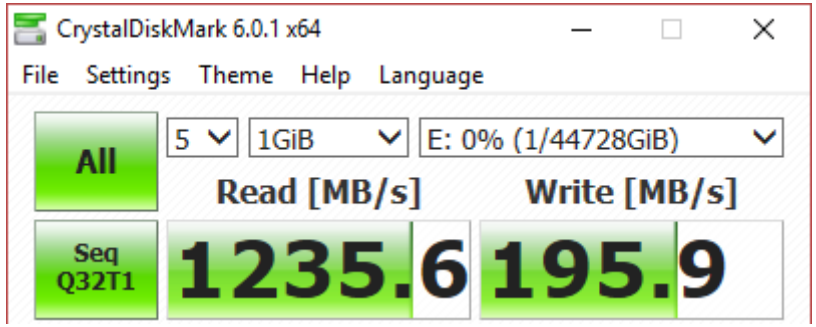
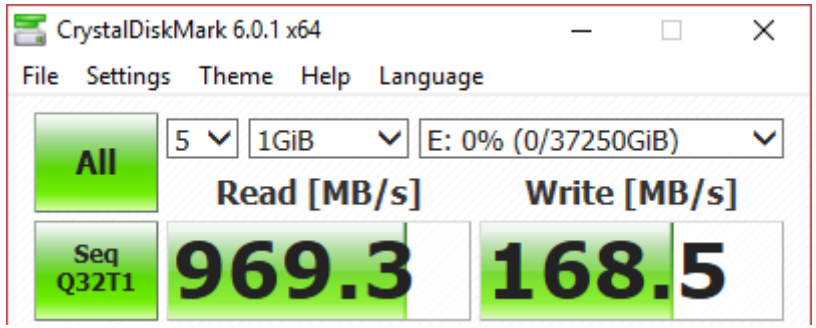
NOTE: FOR YOUR REFENCE ONLY in comparing Conversation RAID5 and RAID6 Storage Efficiency.

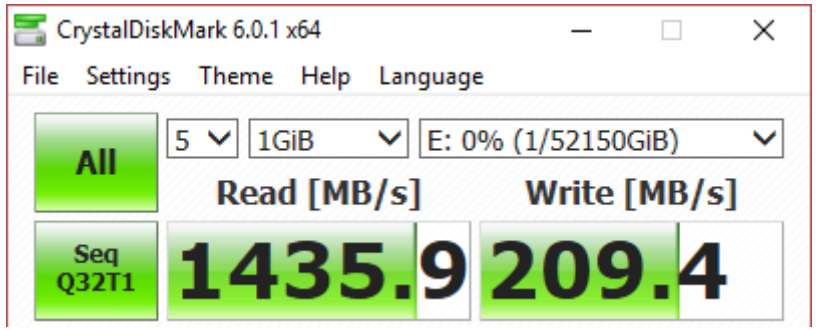
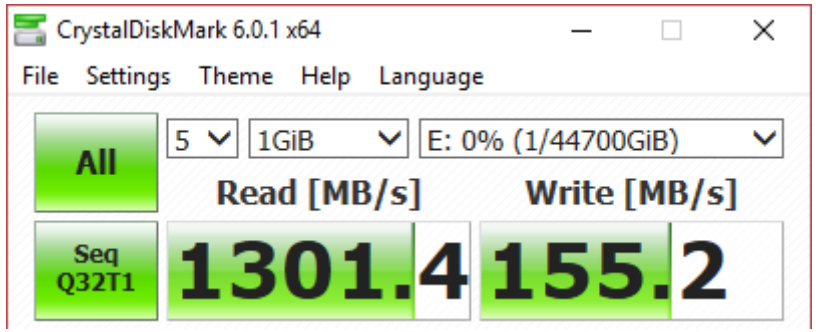
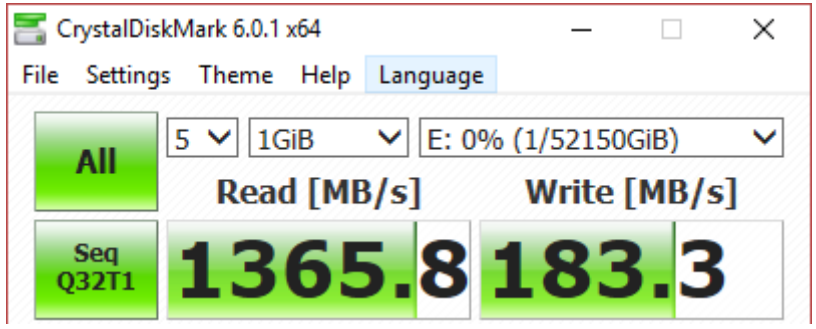
3 Disk RAD5 = 66.7%	4 Disk RAID5 = 75%	5 Disk RAID5 = 80%	6 Disk RAID5 = 83.33%	7 Disk RAID5 = 85.71%
7 Disk RAID6 = 77.78%	8 Disk RAD6 = 80%	10 Disk RAID6 = 83.33%	13 Disk RAID6 = 84.62%	15 Disk RAID6 = 86.67%

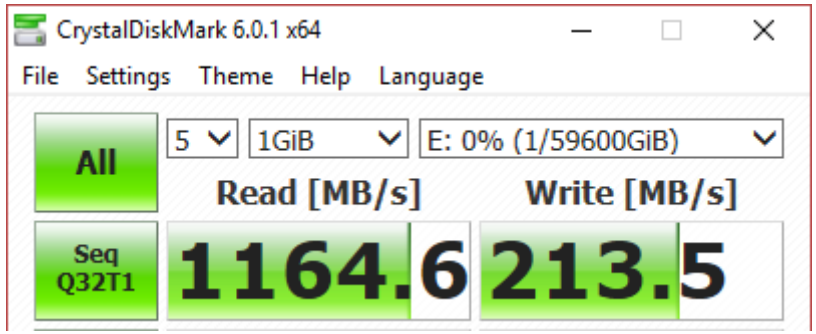
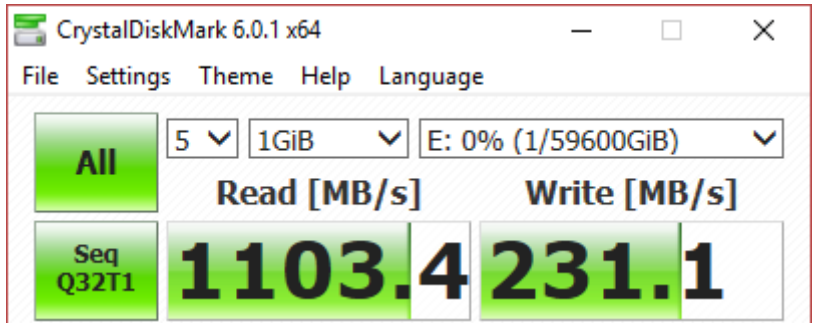
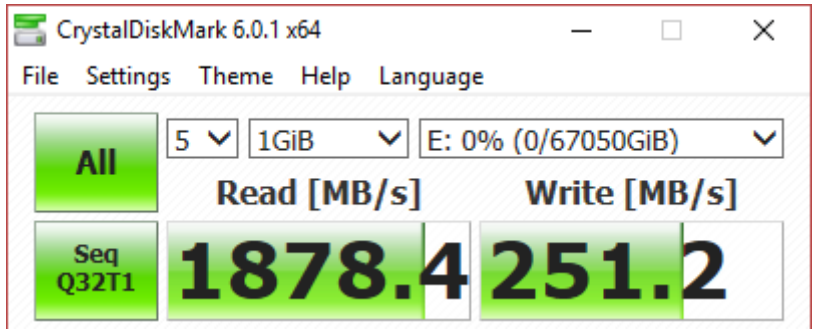
NOTE2: Refer to Phase 7 at the end of this report for single disk non RSS reference point.

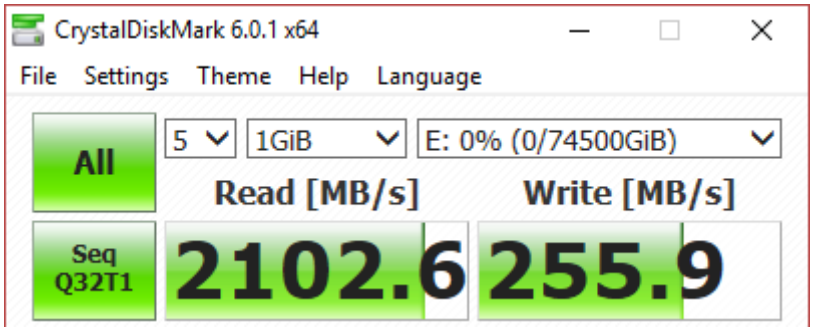
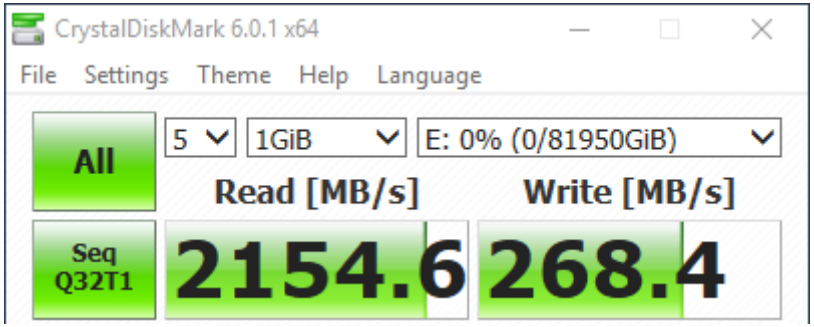
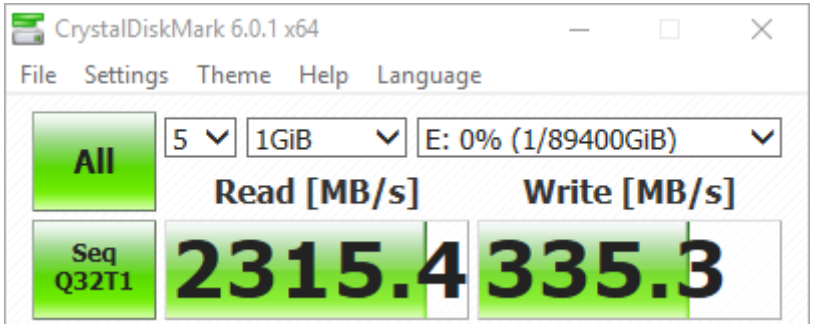
HDD	Parity	Efficiency	Number of Columns	READ/WRITE in NORMAL condition	Remark
3	Single	66.6% (3-1)/3	3		240mbps
HDD	**Parity**	**Efficiency**	**Number of Columns**	**READ/WRITE in NORMAL condition**	**Remark**
4	Single	75% (4-1)/4	4		
HDD	**Parity**	**Efficiency**	**Number of Columns**	**READ/WRITE in NORMAL condition**	**Remark**

5	Single	80% (5-1)/5	5		VMS Workloads: 240mbps Model: ECA-DX40E Series
5	Dual	60% (5-2)/5	5		
HDD	**Parity**	**Efficiency**	**Number of Columns**	**READ/WRITE in NORMAL condition**	**Remark**
6	Single	83.3% (6-1)/6	6		

6	Dual	66.6% (6-2)/6	6		
HDD	**Parity**	**Efficiency**	**Number of Columns**	**READ/WRITE in NORMAL condition**	**Remark**
7	Single	85.7% (7-1)/7	7		400mbps
7	Dual	71.4% (7-2)/7	7		250mbps
HDD	**Parity**	**Efficiency**	**Number of Columns**	**READ/WRITE in NORMAL condition**	**Remark**

8	Single	87.5% (8-1)/8	8		
8	Dual	75% (8-2)/8	8		
HDD	**Parity**	**Efficiency**	**Number of Columns**	**READ/WRITE in NORMAL condition**	**Remark**
9	Dual	77.7% (9-2)/9	9		
HDD	**Parity**	**Efficiency**	**Number of Columns**	**READ/WRITE in NORMAL condition**	**Remark**

10	Dual	80% (10-2)/10	10		VMS Workloads: 400mbps Model: ECA-EX40E Series
HDD	**Parity**	**Efficiency**	**Number of Columns**	**READ/WRITE in NORMAL condition**	**Remark**
11	Dual	72.7% (11-3)/11	11		
HDD	**Parity**	**Efficiency**	**Number of Columns**	**READ/WRITE in NORMAL condition**	**Remark**
12	Dual	75% (12-3)/12	12		
HDD	**Parity**	**Efficiency**	**Number of Columns**	**READ/WRITE in NORMAL condition**	**Remark**

13	Dual	76.9% (13-3)/13	13		600mbps
HDD	**Parity**	**Efficiency**	**Number of Columns**	**READ/WRITE in NORMAL condition**	**Remark**
14	Dual	78.5% (14-3)/14	14		
HDD	**Parity**	**Efficiency**	**Number of Columns**	**READ/WRITE in NORMAL condition**	**Remark**
15	Dual	80% (15-3)/15	15		VMS Workloads: 600Mbps Model: ECA-FX40E Series

Phase 2 – 13 Drive Dual Parity RSS Performance Study

Disk Benchmarking.

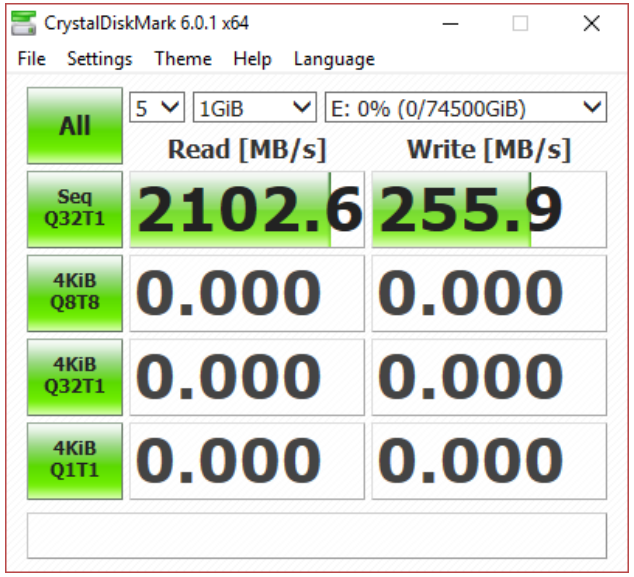
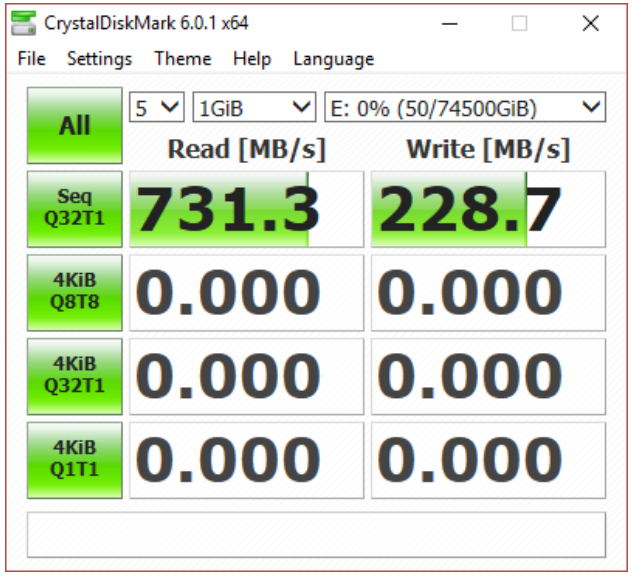
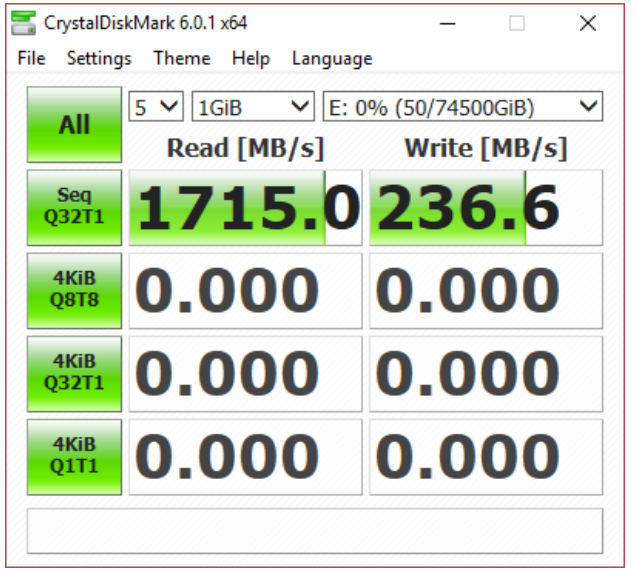
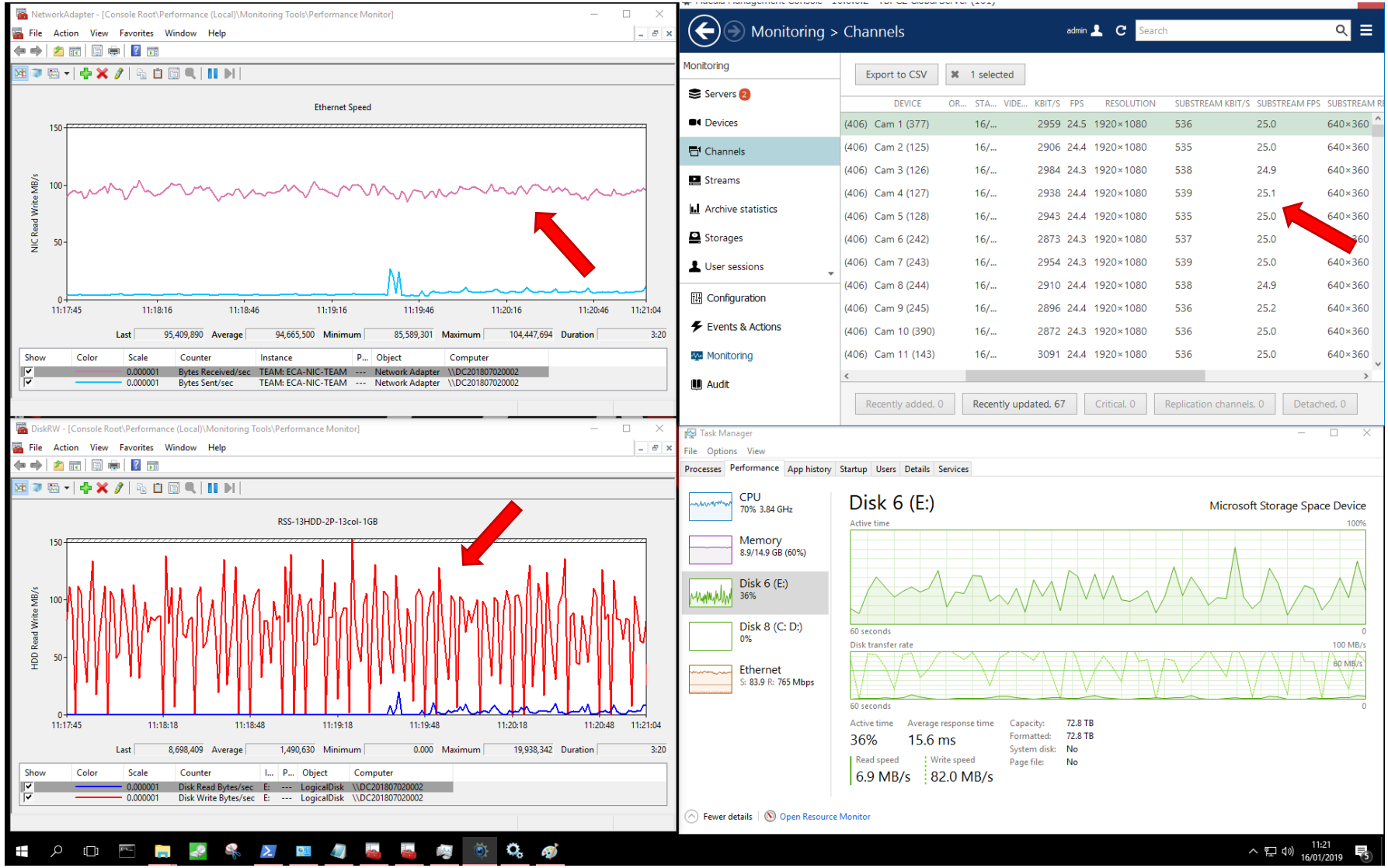
Normal condition with 1GB write cache	Degrade condition with 1GB write cache	Repair condition with 1GB write cache
		

Figure Below: 13 Drive Dual Parity RSS Performance Study StoragePool in repair condition 600mbps Test – Passed

Observation: Network receiving is consistence without drop. Frame Recordings for all 200CH maintained at 25FPS. Disk Write performance remain consistence. CPU: 60-75% , RAM Usage: 9GB

Conclusion: RSS 13 HDD pool with dual parity & 1GB write cache: 600Mbps passed normal, degrade, rebuild conditions



Phase 3 - 10 Drive Dual Parity RSS Performance Study

Disk Benchmarking.

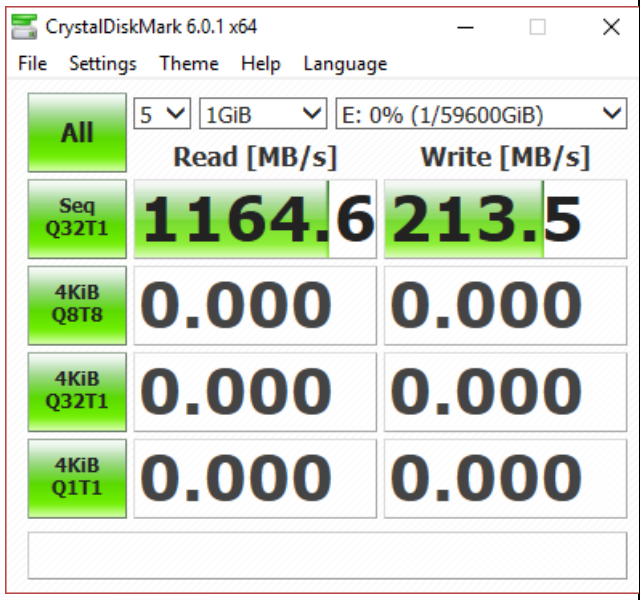
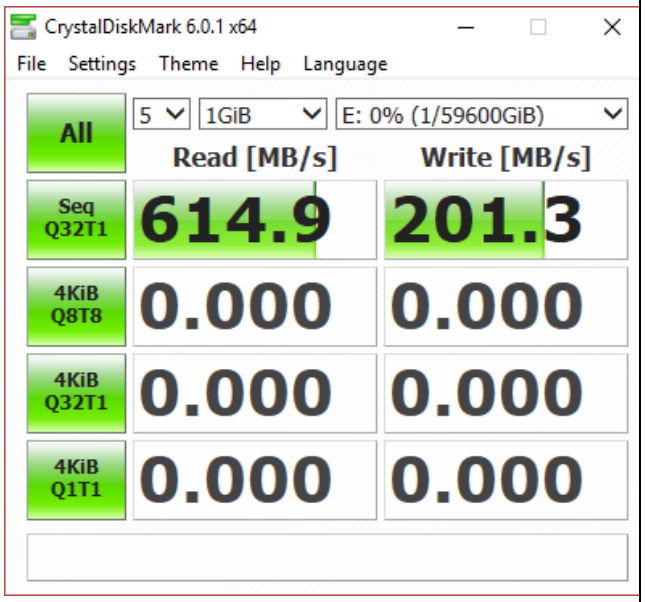
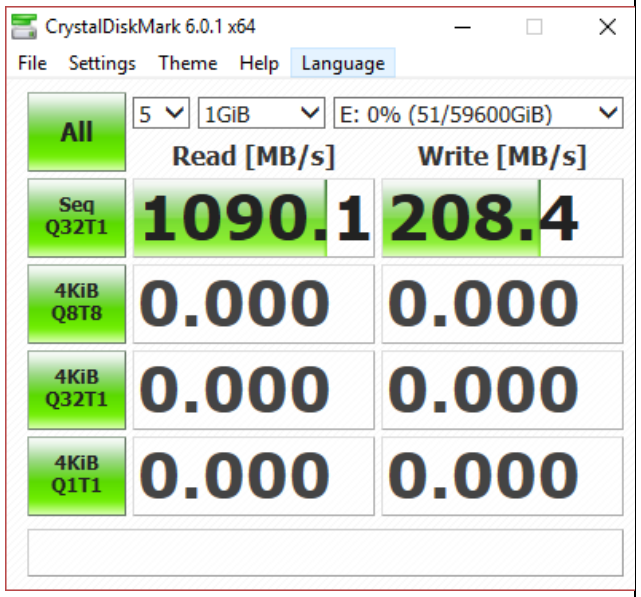
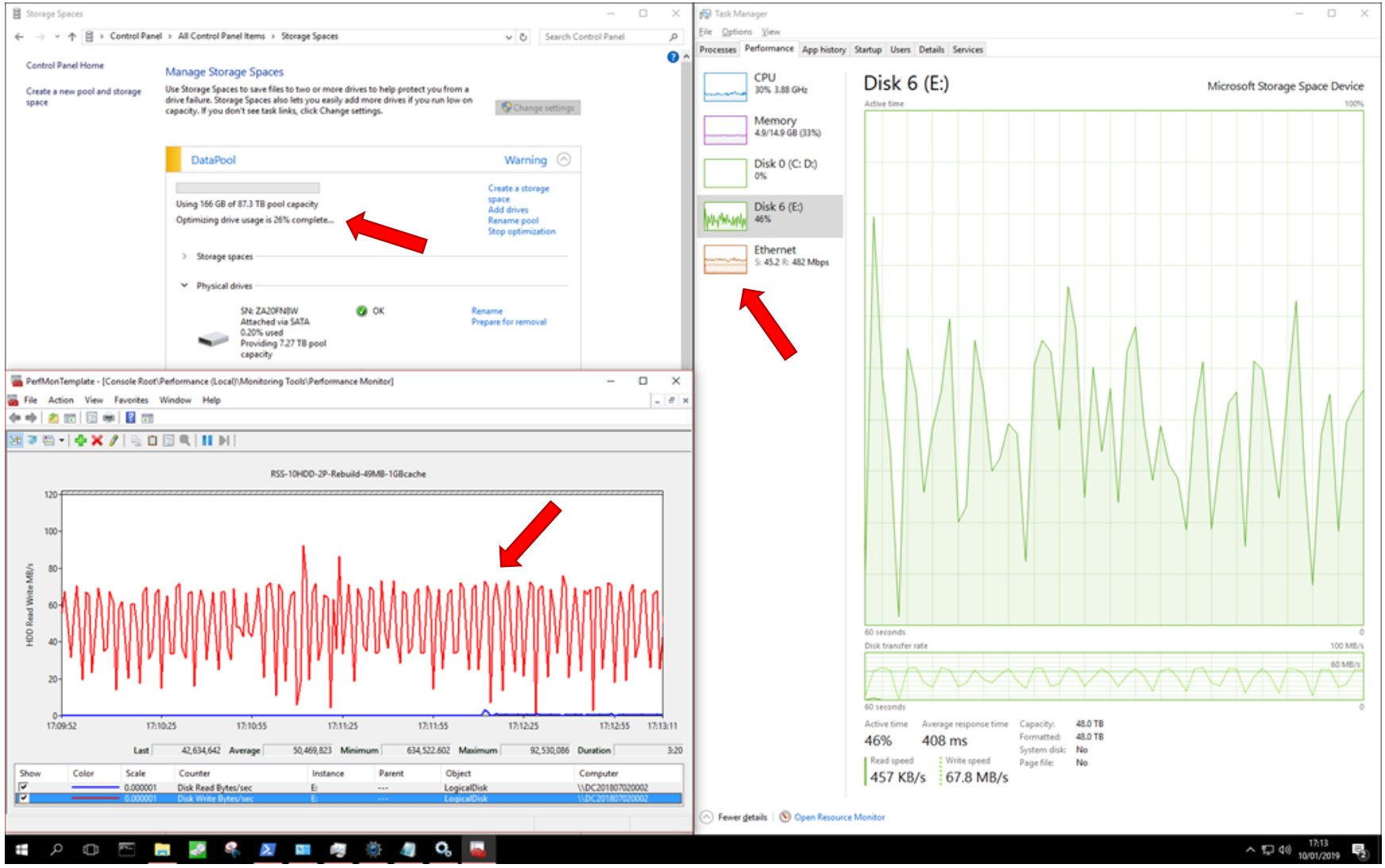
Normal condition with 1GB write cache	Degrade condition with 1GB write cache	Repair condition with 1GB write cache
		

Figure Below: 10 Drive Dual Parity RSS Performance Study StoragePool in repair condition 400mbps Test – Passed
Observation: Network receiving is consistence without drop. Frame Recordings for all 133CH maintained at 25FPS. Disk Write performance remain consistence. CPU: 20-30% , RAM Usage: 5GB
Conclusion: RSS 10 HDD pool with dual parity & 1GB write cache: 400Mbps passed normal, degrade, rebuild conditions



Phase 4 - 7 Drive Dual Parity RSS Performance Study

Disk Benchmarking.

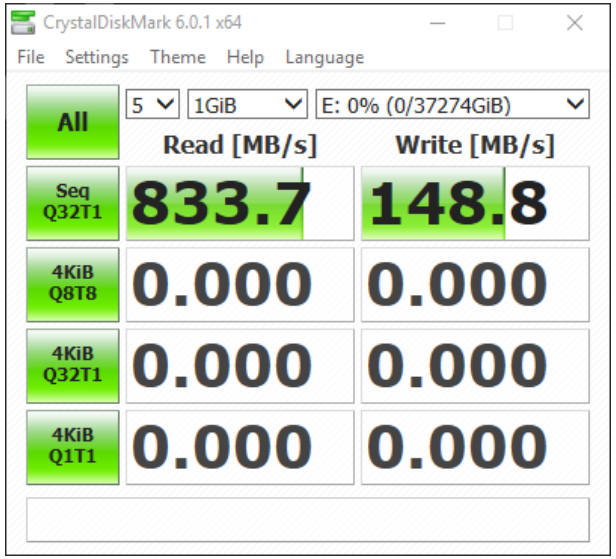
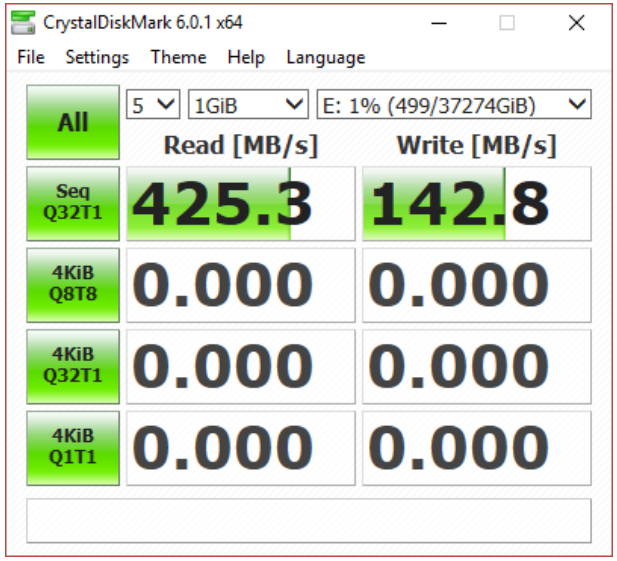
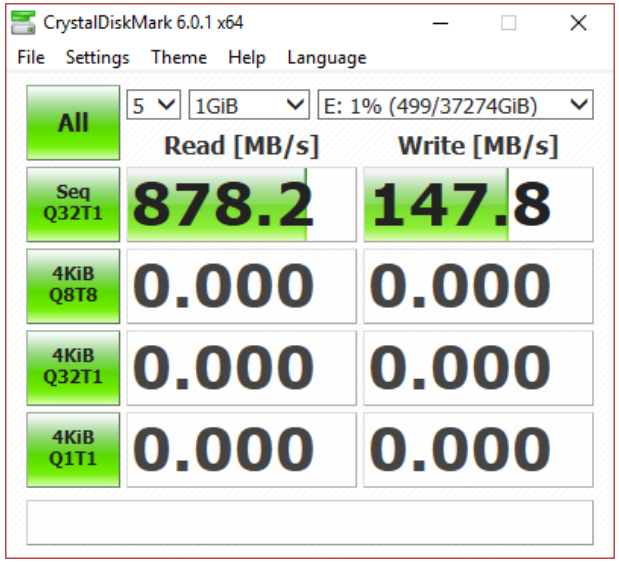
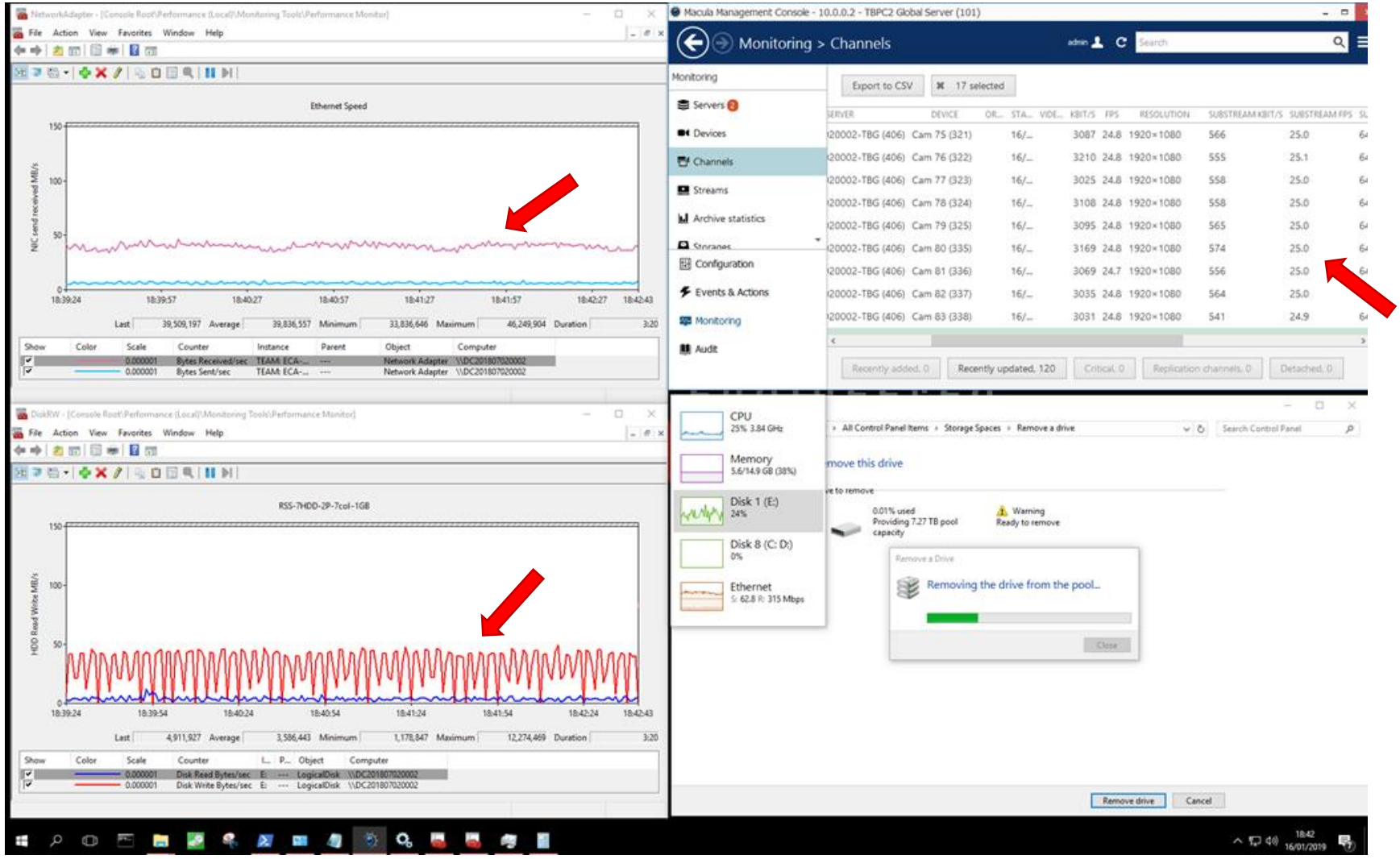
Normal condition with 1GB write cache	Degrade condition with 1GB write cache	Repair condition with 1GB write cache
		

Figure Below: 7 Drive Dual Parity RSS Performance Study StoragePool in repair condition 250mbps Test – Passed
Observation: Network receiving is consistence without drop. Frame Recordings for all 83CH maintained at 25FPS when rebuilding the storage pool. Disk Write performance remain consistence. CPU: 20-30% , RAM Usage: 5.6GB
Conclusion: RSS 7 HDD pool with dual parity & 1GB write cache: 250Mbps passed normal, degrade, rebuild conditions



Phase 4 - 7 Drive Single Parity RSS Performance Study

Disk Benchmarking.

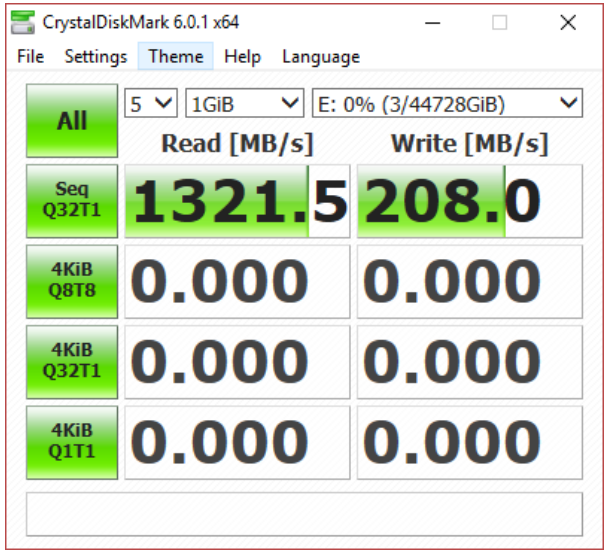
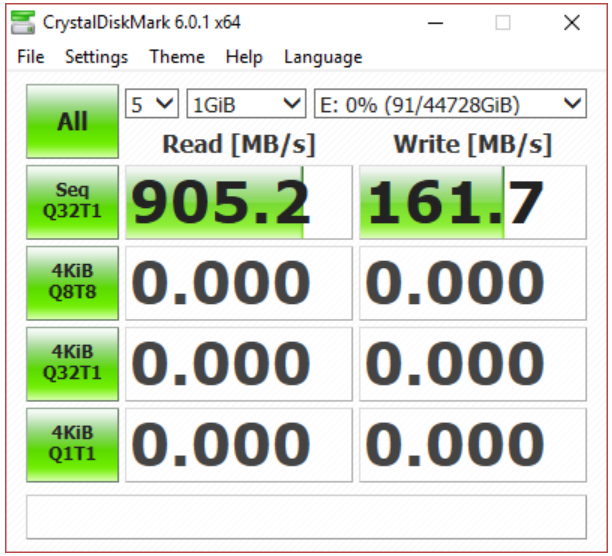
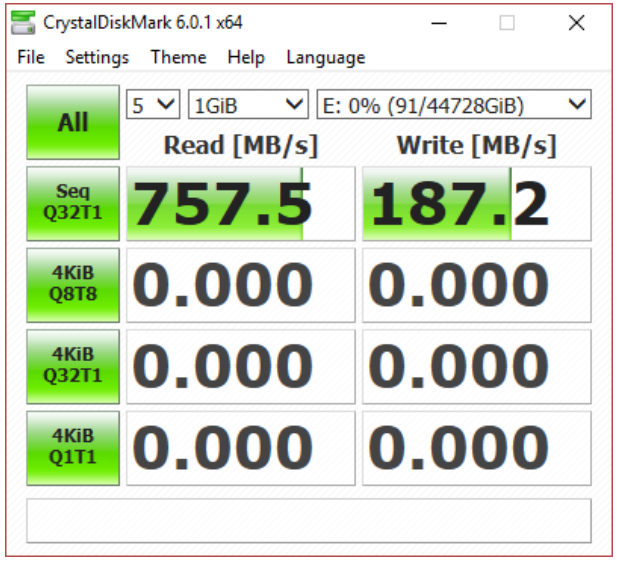
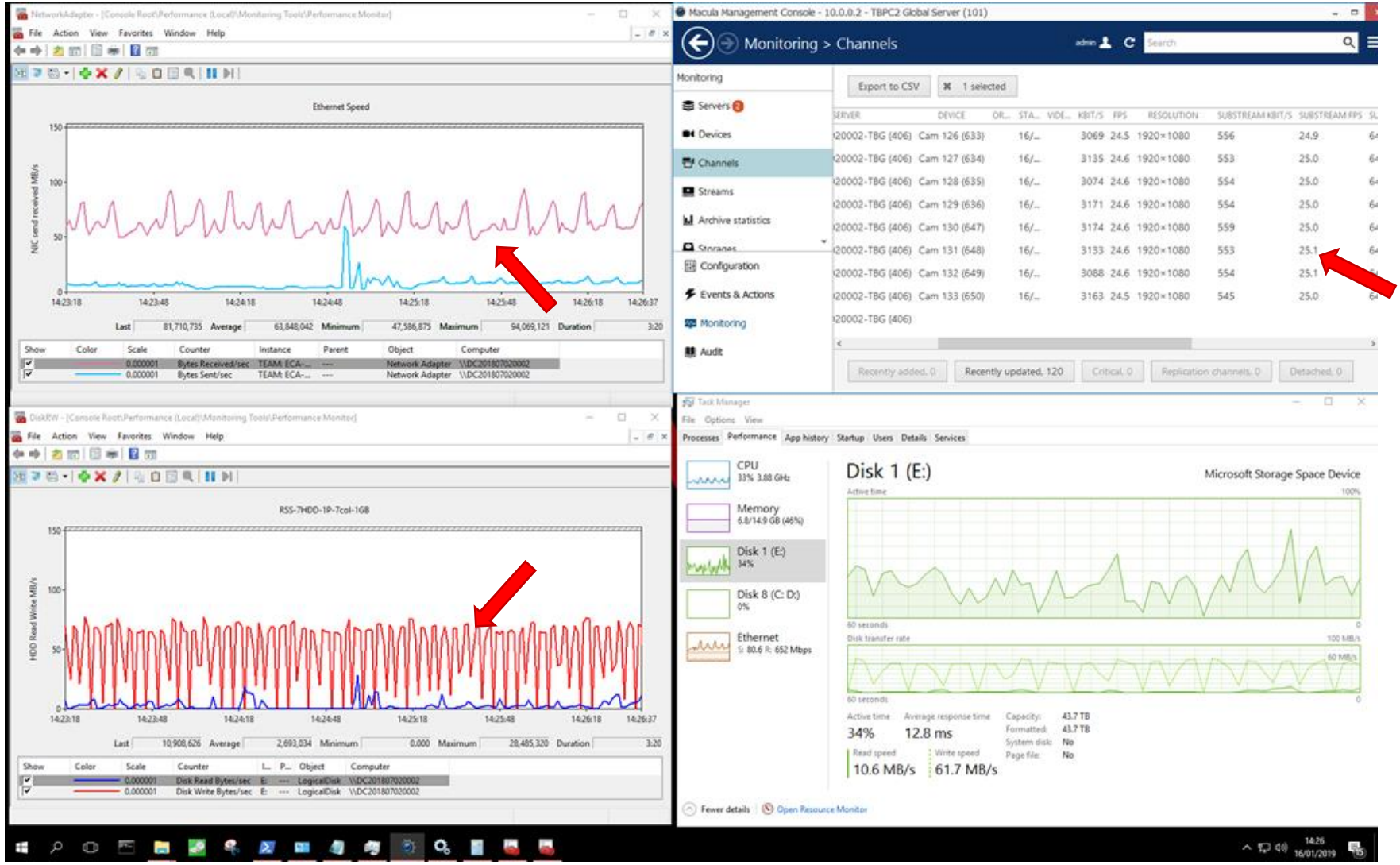
Normal condition with 1GB write cache	Degrade condition with 1GB write cache	Repair condition with 1GB write cache
		

Figure Below: 7 Drive Single Parity RSS Performance Study StoragePool in repair condition 400mbps Test – Passed

Observation: Network receiving is consistence without drop. Frame Recordings for all 133CH maintained at 25FPS. Disk Write performance remain consistence. CPU: 30-40% , RAM Usage: 7GB

Conclusion: RSS 7 HDD pool with single parity & 1GB write cache: 400Mbps passed normal, degrade, rebuild conditions



Phase 5 - 5 Drive Single Parity RSS Performance Study

Disk Benchmarking.

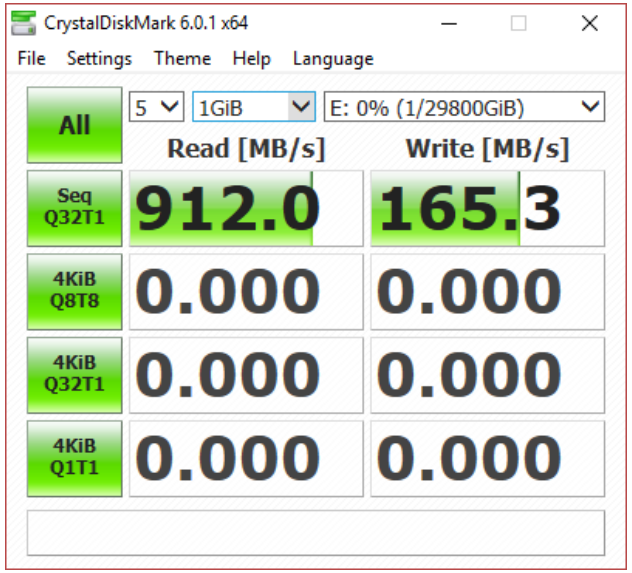
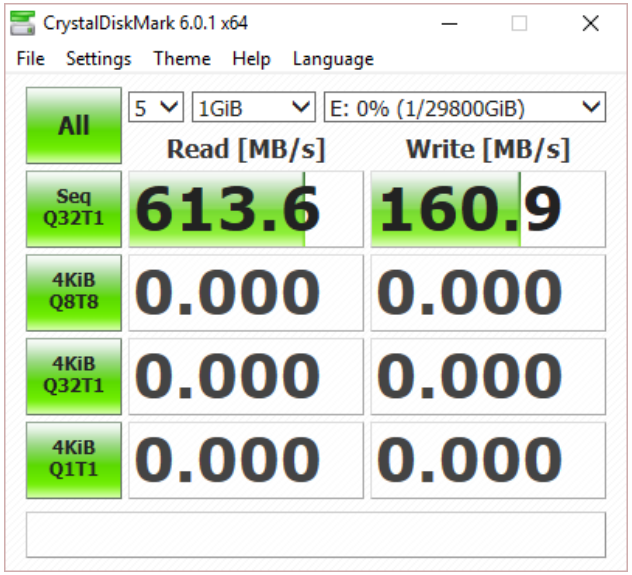
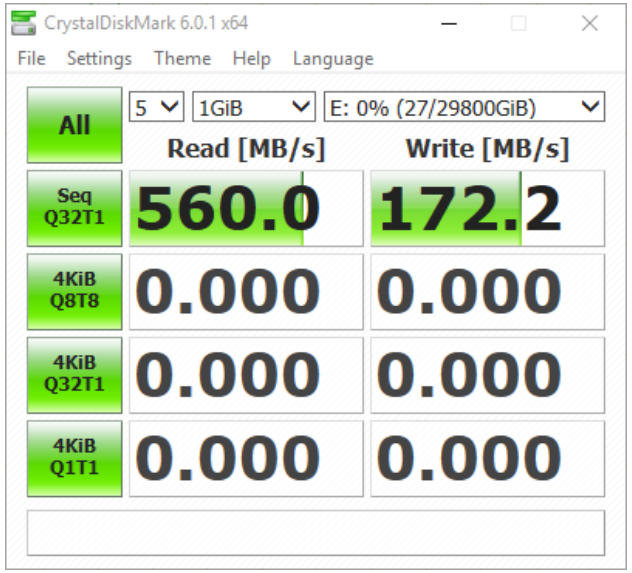
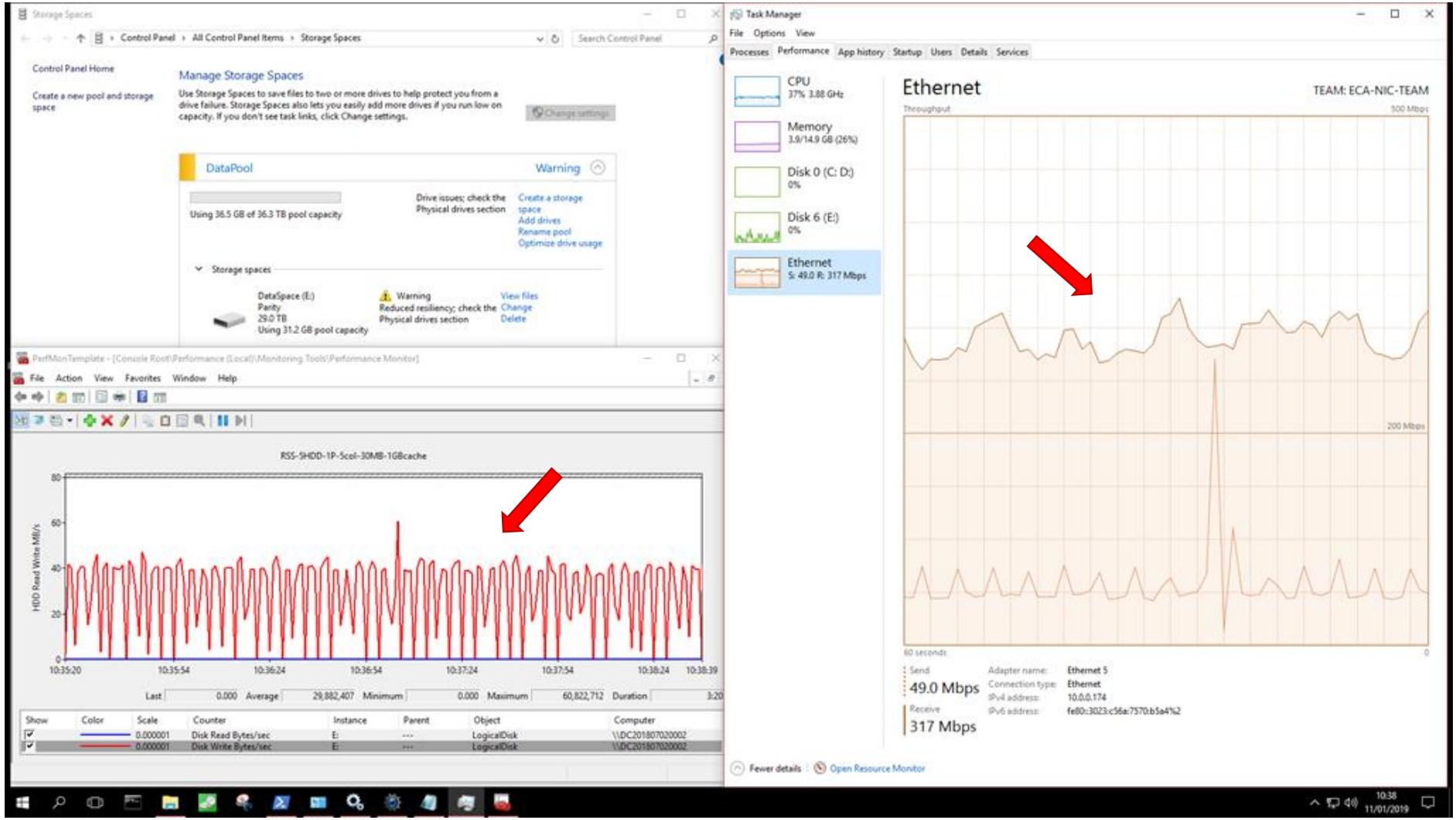
Normal condition with 1GB write cache	Degrade condition with 1GB write cache	Repair condition with 1GB write cache
		

Figure Below: 5 Drive Single Parity RSS Performance Study StoragePool in repair condition 240mbps Test – Passed
Observation: Network receiving is consistence without drop. Frame Recordings for all 80CH maintained at 25FPS. Disk Write performance remain consistence. CPU: 20-40% , RAM Usage: 4GB
Conclusion: RSS 5 HDD pool with single parity & 1GB write cache: 240Mbps passed normal, degrade, rebuild conditions



Phase 6 - 3 Drive Single Parity RSS Performance Study

Disk Benchmarking.

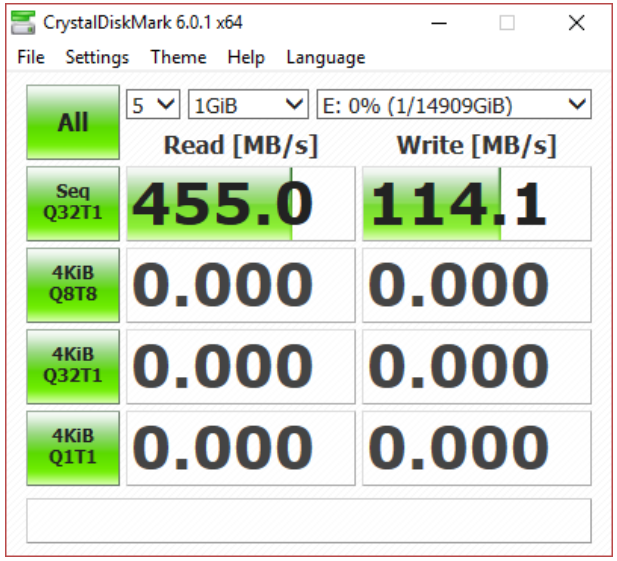
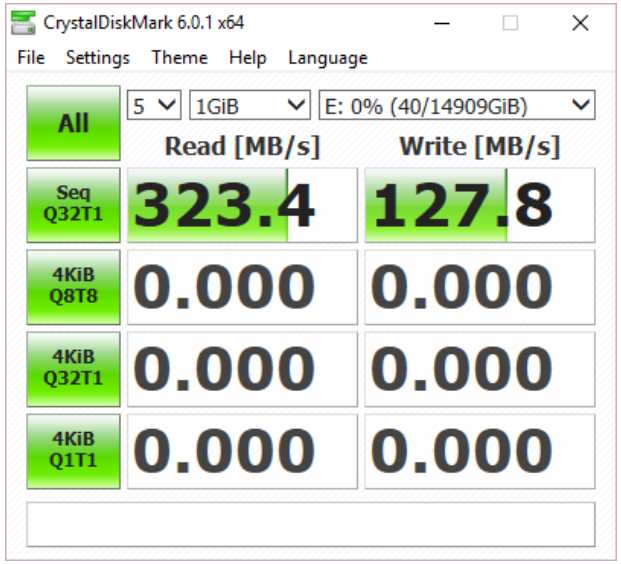
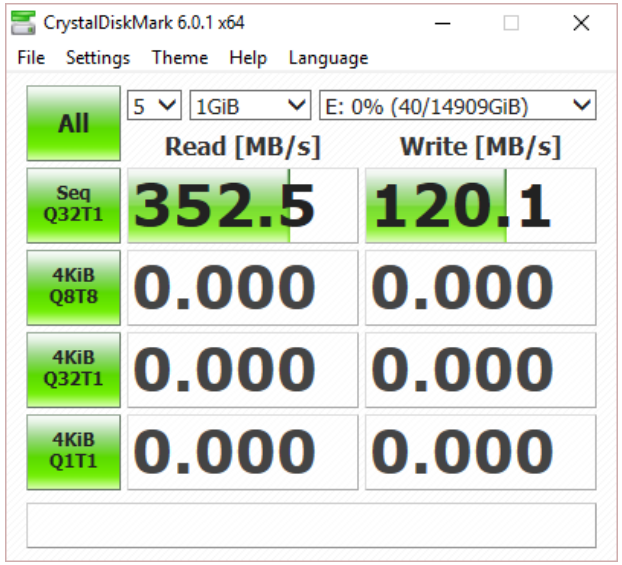
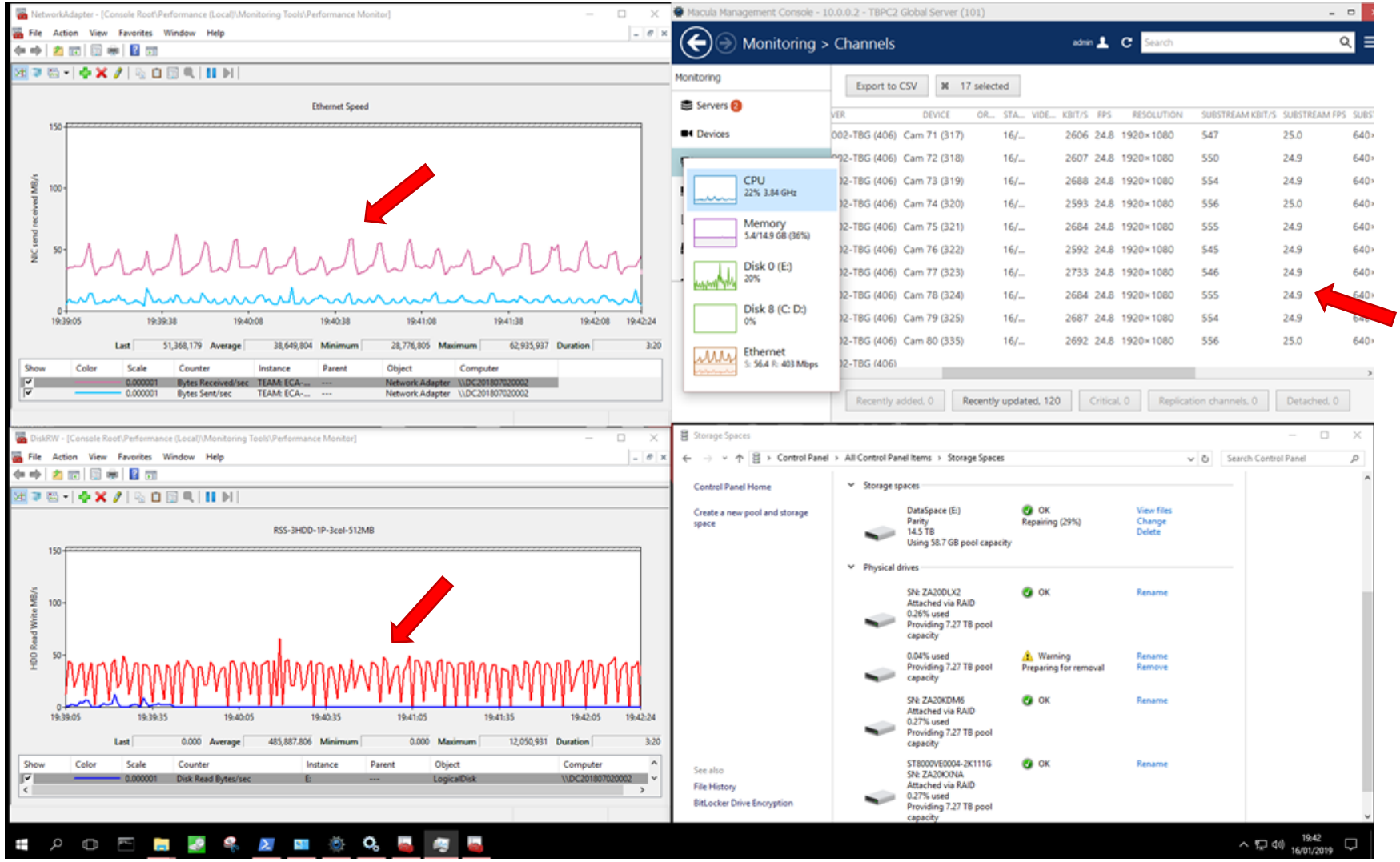
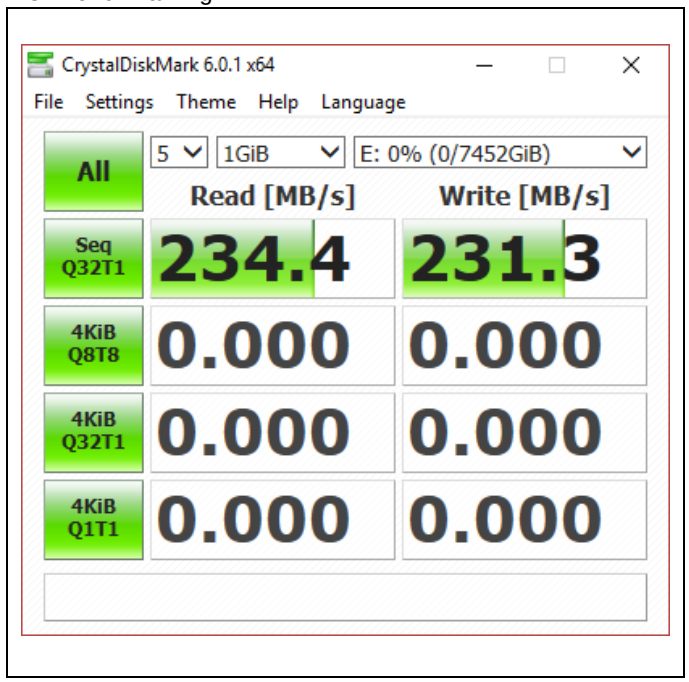
Normal condition with 512MB write cache	Degrade condition with 512MB write cache	Repair condition with 512MB write cache
		

Figure Below: 3 Drive Single Parity RSS Performance Study StoragePool in repair condition 240mbps Test – Passed
Observation: Network receiving is consistence without drop. Frame Recordings for all 80CH maintained at 25FPS. Disk Write performance remain consistence. CPU: 20-30% , RAM Usage: 5.4GB
Conclusion: RSS 3 HDD pool with single parity & 512MB write cache: 240Mbps passed normal, degrade, rebuild conditions



Phase 7 - Single Disk (NO RSS) Drive Performance Study (As REFERENCE POINT)

Disk Benchmarking.



NOTE: this performance match Seagate published “sustainable” rate in their datasheet.

Figure Below: Single Disk Drive Performance Study 600mbps Test – Passed

Observation: Network receiving is consistence without drop. Frame Recordings for all 200CH maintained at 25FPS. Disk Write performance remain consistence. CPU: 50-60% , RAM Usage: 8.6GB

Conclusion: Single Disk drive with 256MB cache passed 600mbps test.