

# Secure Data Replication at 100GbE

## Chelsio T6 iWARP RDMA Solution for Microsoft Storage Replica

### Executive Summary

**Storage Replica (SR)** is a feature which enables block-level replication between clusters or individual servers for disaster recovery, and stretching of failover clusters to metropolitan (MAN) and wide area (WAN, US coast-to-coast) distances for high-availability. With new performance improvements to the SR log system in Windows Server 2019, better replication throughput and latency can be achieved on all-flash storage arrays and clusters. Storage Replica over Chelsio’s iWARP RDMA solution combines high performance with the high efficiency provided by the zero copy and kernel/CPU bypass operation of the RDMA transport to provide a reliable, scalable and robust disaster recovery solution for mission critical workloads. Chelsio iWARP RDMA is uniquely capable of sustaining SR’s unique load pattern to provide zero data loss and high-availability during catastrophic disasters across short and long distances.

The paper provides the initial block copy results of SR operating over T62100-CR iWARP RDMA 100G adapter in Windows Server 2019. The results show T62100-CR delivering line-rate 94 Gbps throughput with minimal CPU and memory utilization. It also shows significant gain in replication rate compared to Windows Server 2016.

### Test Results

The following are task manager and event viewer results with initial block copy on Server 2019.

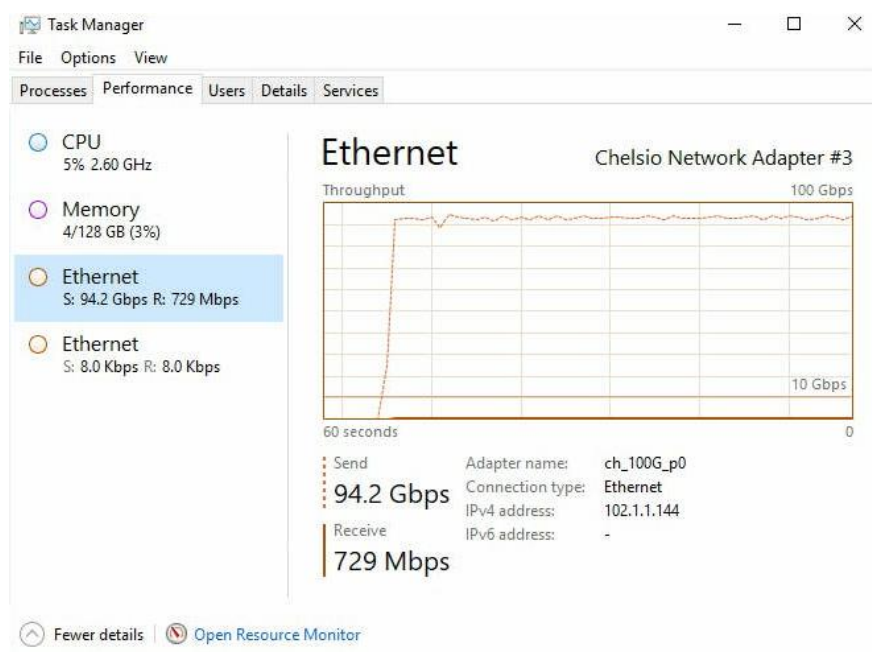


Figure 1 – Task Manager showing throughput

Chelsio’s iWARP RDMA adapter delivers 94.2 Gbps throughput with only 5% CPU utilization and 3% of memory consumption. Considerable processing power is available for other applications.

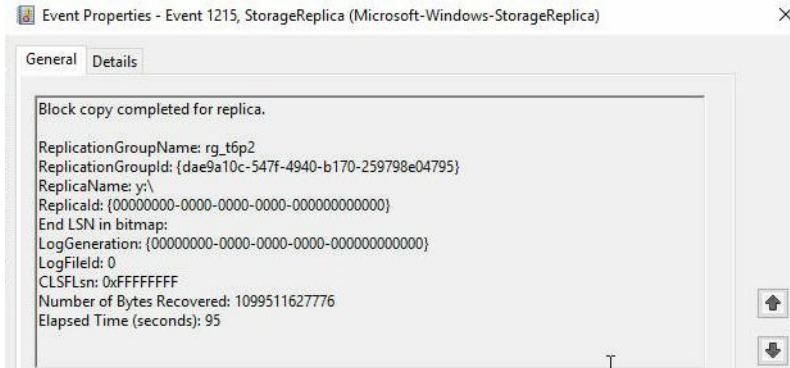


Figure 2 – Event Viewer output

1 TB of data is replicated in under 2 minutes over the Chelsio 100G link.

The following graph compares the Replication rate for Server 2016 (RS1) and Server 2019 (RS5) with 100% WRITE using diskspd tool v2.0.17a across I/O sizes 4K, 8K and 16K bytes.

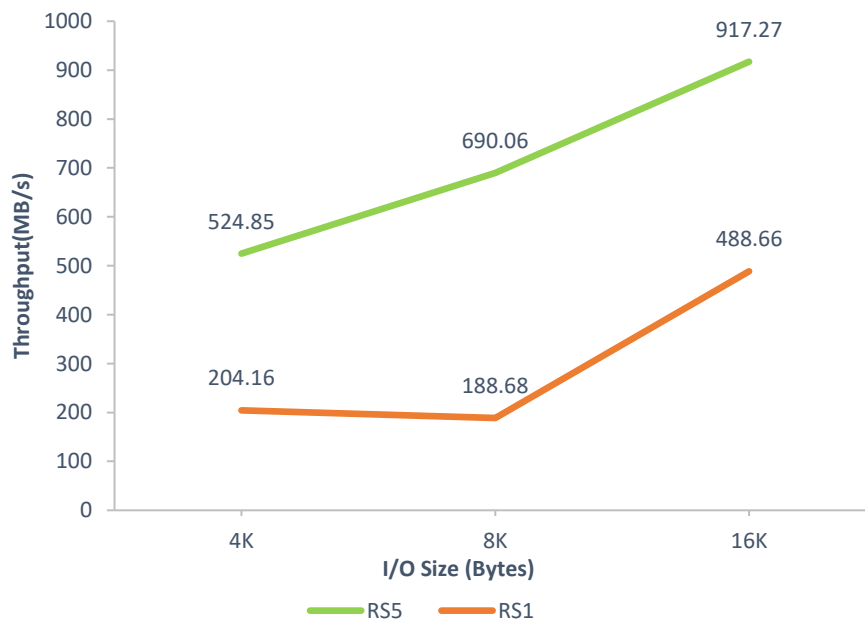


Figure 3 – Replication Rate RS5 vs. RS1

As evident from the graph, Server 2019 provides upto 3x the replication rate of Server 2016, thanks to the new performance optimizations.

## Test Configuration

The test configuration consists of a Server connected to a Client with a single 100G port. Standard MTU of 1500B is configured. The Server consists of 5 Intel NVMe PCIe DC P3600 Series 1.6TB SSDs and Client consists of 5 Micron 9100 PCIe NVMe 2.4TB SSDs. Latest Chelsio Unified Wire is installed on both machines and SR is configured with synchronous replication mode.

- 2 Intel Xeon CPU E5-2687W v4  
12-core @ 3.00GHz (HT disabled)
- 128GB RAM
- Windows Server
- T62100-CR

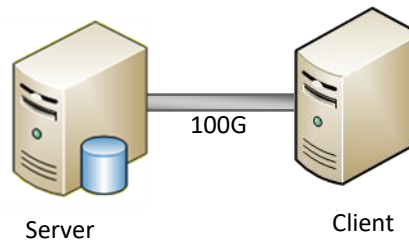


Figure 4 - Test Setup

### Command Used

```
PS C:\Users\Administrator> diskspd.exe -b<IO_SIZE> -w100 -r -o32 -W5 -C5 -d30 -t24 -L -Sh Y:\testfile1.dat
```

## Summary

This paper presented SR performance results with Chelsio T62100-CR iWARP RDMA adapter in Windows Server environment. Microsoft's Storage Replica with T6 provides datacenters high performance data replication over local and remote locations with minimal data loss and ease of use. Enterprises and datacenters searching for a cost-effective and secure data recovery solution need not look beyond Chelsio T6 iWARP RDMA solution.

## Related Links

[Storage Replica and Chelsio iWARP Performance](#)

[Secure Data Replication at 25GbE](#)

[Windows SMB 3.1.1 Performance at 100Gbps](#)

[High Performance Storage Replica at 40GbE](#)