# iWARP RDMA – Best Fit for Storage Spaces Direct

## High Performance, Ease of Use and Seamless Deployment

Microsoft recommends[1] two RDMA networking choices for Windows Server 2016 Storage Spaces Direct (S2D): TCP-based iWARP and UDP-based RoCEv2. iWARP provides a dramatically superior choice vs. RoCEv2 along performance, ease of use, and ease of deployment dimensions.

### Performance

Chelsio iWARP solution delivers industry-leading IOPS and throughput performance for S2D, as evidenced by the following:

- IOPS: Storage IOPS update with Storage Spaces Direct[2] (MS blog) & Meet Windows Server 2016 and System Center 2016[3] (MS Presentation, IOPS discussion is at 28-minute mark).
- Throughput: Storage Spaces Direct throughput with iWARP[4] (MS blog).
- Latency: S2D Performance iWARP vs. RoCEv2[5] (Chelsio benchmark report).

### Ease of Use

Unlike RoCEv2, Chelsio iWARP solution does not require the complexity of configuring Data Center Bridging (DCBX) protocols either on network adapters or on network switches allowing for improved ease of use.

- Storage Spaces Direct throughput with iWARP[4] makes specific mention of this point: *"We did not configure DCB (PFC) in our deployment, since it is not required in iWARP configurations."*
- MS article[6] on configuration of hyper-converged S2D systems mentions that (unlike the case for RoCEv2) *"if you are deploying with iWARP, the TOR (Top-of-Rack switch) may not need any configuration."*
- Page 20 of Lenovo's S2D Deployment Guide[7] mentions *"If Chelsio NICs are being used, eliminate the first 9 steps* (for configuring DCBX)."

### Ease of Deployment

- Chelsio iWARP adapters are Certified for Windows Server 2016[8], and Certified for Microsoft Software-Defined Datacenter (SDDC)[9] with in-box drivers.
- iWARP works with any legacy Ethernet switch, thereby enabling incremental Windows Server 2016 installations without requiring a concurrent forklift upgrade of the switch infrastructure, or the entire datacenter. This ability to work with any non-DCBX switch, allows iWARP to use of the most cost effective new or existing switch infrastructure with the least amount of support, while enabling an immediate plug-and-play deployment.
- iWARP is also supported in Windows 10 for Client RDMA (RoCE is not) enabling iWARP-based high-performance desktop to storage communications for professional applications such as video editing, seismic analysis, etc.
- Upcoming servers are expected to enable integrated support for iWARP this year, thus dramatically expanding the iWARP ecosystem.
- Chelsio has assembled a collection of iWARP support snippets for Server 2016 at the previous Ignite conference [10].

**Why Chelsio for Cloud Deployment?**

1. Chelsio does not require a DCB switch, resulting in Network freedom and cost efficiency.
2. Chelsio iWARP shows 10%+ better IOPs and 30%-40% better latency than RoCEv2.
3. Can use Storage Replica for inter-data-center disaster recovery without a gateway.
4. Major server OEMs will be supporting iWARP natively this year.
5. Concurrent support for iWARP on the Client side starting with Windows 10.
6. Can also develop high performance iSCSI based solutions.
7. Can also develop high performance NVMe-oF based solutions.
8. Integrated support for encryption.

**References**

(1) https://technet.microsoft.com/en-us/windows-server-docs/storage/storage-spaces/storage-spaces-direct-hardware-requirements

(2) https://blogs.technet.microsoft.com/filecab/2016/07/26/storage-iops-update-with-storage-spaces-direct/

(3) https://myignite.microsoft.com/videos/3199

(4) https://blogs.technet.microsoft.com/filecab/2017/03/13/storage-spaces-direct-throughput-with-iwarp/

(5) http://www.chelsio.com/wp-content/uploads/resources/s2d-iwarp-roce.pdf

(6) https://technet.microsoft.com/en-us/windows-server-docs/storage/storage-spaces/hyper-converged-solution-using-storage-spaces-direct#step-21-configure-the-top-of-rack-tor-switch

(7) https://lenovopress.com/lp0064.pdf

(8) http://www.chelsio.com/wp-content/uploads/resources/server.html

(9) https://www.windowsservercatalog.com/item.aspx?idItem=e47ba87e-72b5-6a7f-14ad-4f0cc0d896f8&bCatID=1466

(10) https://www.youtube.com/watch?v=PqbQUgG2IqI


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