



STORAGE DEVELOPER CONFERENCE

SNIA ■ SANTA CLARA, 2016

# Hyper-V Windows Server 2016 Storage QoS and Protocol Updates

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# Agenda

A whirlwind tour of Hyper-V storage related protocols ...

- ❑ Overview of notable changes
- ❑ Details on Storage Quality of Service
- ❑ Specific updates on:
  - ❑ MS-SQOS: Storage Quality of Service
  - ❑ MS-HVRS: Hyper-V Remote Storage
  - ❑ MS-RSVD: Remote Shared Virtual Disk
  - ❑ MS-VHDX: Virtual Hard Disk v2
  - ❑ MS-HRL: Hyper-V Replica Log

# MS-SQOS Protocol function

The MS-SQOS protocol allows a client to perform the following operations:

- ❑ Create logical flows and associate handles to logical flows
- ❑ Tag logical flows with policy IDs
- ❑ Provide performance data for logical flows
- ❑ Retrieve status information for logical flows

Management of QoS policies is not performed through the MS-SQOS protocol.

No significant updates to MS-SQOS

# Big changes!

- ❑ Two new formats related to snapshots for shared virtual hard disks:
  - ❑ MS-VHDX – Describes the virtual hard disk v2 file format
  - ❑ MS-HRL – Describes the Hyper-V replica log file format
- ❑ Now available as preview:
  - ❑ <https://msdn.microsoft.com/en-us/library/ee941641.aspx#windows>
- ❑ Why?
  - ❑ Shared virtual hard disks support “export snapshot” functionality. Hyper-V works best when the snapshots are in these formats

# MS-HVRS Protocol function

- ❑ The MS-HVRS protocol describes the requirements on other protocols for Hyper-V to work or to work well:
  - ❑ MS-SMB2 – Server Message Block (SMB) Protocols Version 2 and 3
  - ❑ MS-FSA – File System Algorithms
  - ❑ MS-RSVD – Remote Shared Virtual Disk Protocol
  - ❑ MS-SQOS – Storage Quality of Service Protocol
  - ❑ MS-FSRVP – File Server Remote VSS Protocol

No significant updates to MS-HVRS

# MS-RSVD Protocol function

The MS-RSVD protocol allows one or more clients to share a virtual hard disk among multiple virtual machines

- ❑ RSVD v1 provides for basic sharing and transport mechanisms
- ❑ RSVD v2 extends this with online operations, including:
  - ❑ Creating, managing, and referring to point-in-time snapshots of a shared disk
  - ❑ Resizing a shared disk



# Why snapshots?

- Allows for Business Continuity & Disaster Recovery scenarios with guest clusters
  - Backup
  - Hyper-V replica

# Kinds of snapshots

- ❑ VM (0x01) – Point in time backup (read-only)
- ❑ CDP (0x03) – Point in time for real-time continuous data protection (read-only)
- ❑ Writable (0x04) – Open a handle and write to it

# What can you do with snapshots?

- ❑ Create them
- ❑ Export them
- ❑ Delete them
- ❑ Apply them (go back in time)

# Protocol updates

- New messages:
  - Meta operation start / apply snapshot
  - Get smallest safe virtual size (coming in WS2016 RTM)

# MS-VHDX Overview

- ❑ Essentially what used to be on MSDN, now in the normative format
- ❑ Describes the file format
- ❑ Does not describe:
  - ❑ Snapshot relations
  - ❑ Required SCSI commands
  - ❑ SCSI behavior (follow the T10 specification)
  - ❑ Parser behavior beyond creating valid files
  - ❑ .vhds files

# MS-HRL Overview

The MS-HRL file format describes a log file used by Hyper-V replica.

# Questions or Comments?

**Thank you!**