

# Scale-Out File Server

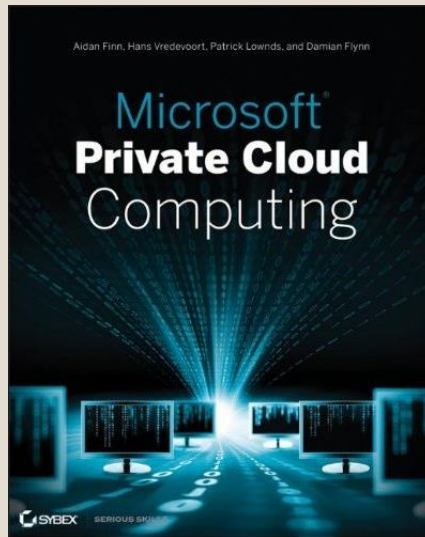
Subtitle

## About Aidan Finn

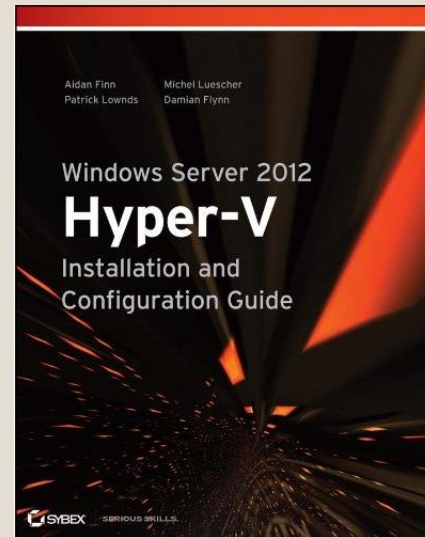


- Technical Sales Lead at MicroWarehouse (Dublin)
- Working in IT since 1996
- MVP (Virtual Machine)
- Experienced with Windows Server/Desktop, System Center, virtualisation, and IT infrastructure
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- <http://www.aidanfinn.com>
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- Published author/contributor of several books

## Books



System Center  
2012 VMM



Windows Server  
2012 Hyper-V

# Agenda

- Item 1
- Item 2
- Item 3

# Introducing SOFS

# The Problem

- While SANs offer lots of functionality
- They are EXPENSIVE
- A problem for:
  - The SME that would like a small cluster
  - The massive data centre that needs lots of storage
- Inflexible
- Client scalability limited by fabric switches
- Hardware defined storage

# The Solution

- Scalable & continuously available SMB 3.0 storage \*
- Otherwise known as
  - The File Server for Application Data cluster role
- Otherwise known as
  - The Scale-Out File Server

# What SOFS Offers

- Ability to use cheap storage:
  - Storage Spaces
  - The SAN(s) you already own
- Simplify LUN configurations
- Use the skills you already know
  - File shares
  - Clustering
  - Windows networking
- Present storage as SMB 3.0 shares to Hyper-V hosts
- Use those shares for clustered and non-clustered hosts
  - Live migration options that SAN can't offer
  - Zero downtime cluster migrations



# Failover Clustering

# Cluster Storage - WS2012 & Later

Option	Support For Clusters?
PCI RAID	Yes
SAS SAN	Yes
iSCSI SAN	Yes
Fibre Channel SAN	Yes
FCoE SAN	Yes
Storage Spaces !!!	Yes
SMB 3.0 Shared Folders	Yes

# Cluster Shared Volumes (CSVs)

- Microsoft's cluster file system
- Volumes are active on all nodes in the cluster
- Changes in WS2012:
  - New Redirected I/O-free synchronised single-VSS snapshot backup
  - CSV Cache: Use up to 20% of cluster nodes RAM as a read cache
- Changes in WS2012 R2:
  - CSV Cache: Use up to 80% of cluster nodes RAM as a read cache
    - See Scale-Out File Server

# Scale-Out File Server

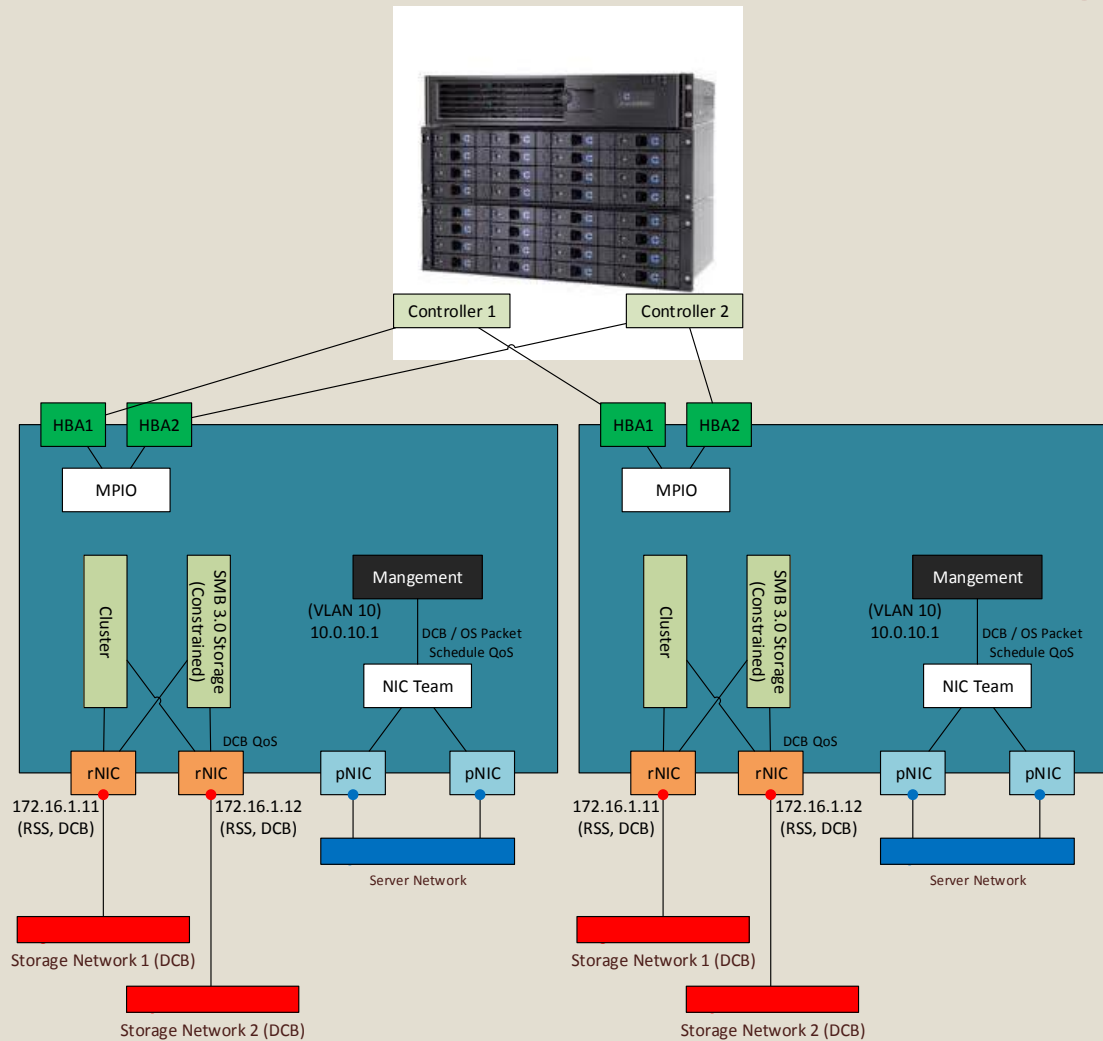
# Scale-Out File Server (SOFS)

- Software-defined storage
- Place 2-8 cluster nodes in front of cluster supported storage
  - SAS/iSCSI/FC/FCoE SANs, PCI RAID, JBOD + clustered Storage Spaces
- Create Cluster Shared Volumes (CSVs) on storage
  - Active/active cluster file system
- Create File Server for Application Data role on cluster (the SOFS)
  - Active/active
- Create file shares on SOFS, stored on CSVs
  - Permission to servers (Hyper-V) and administrators
  - Store data (virtual machines on file shares)

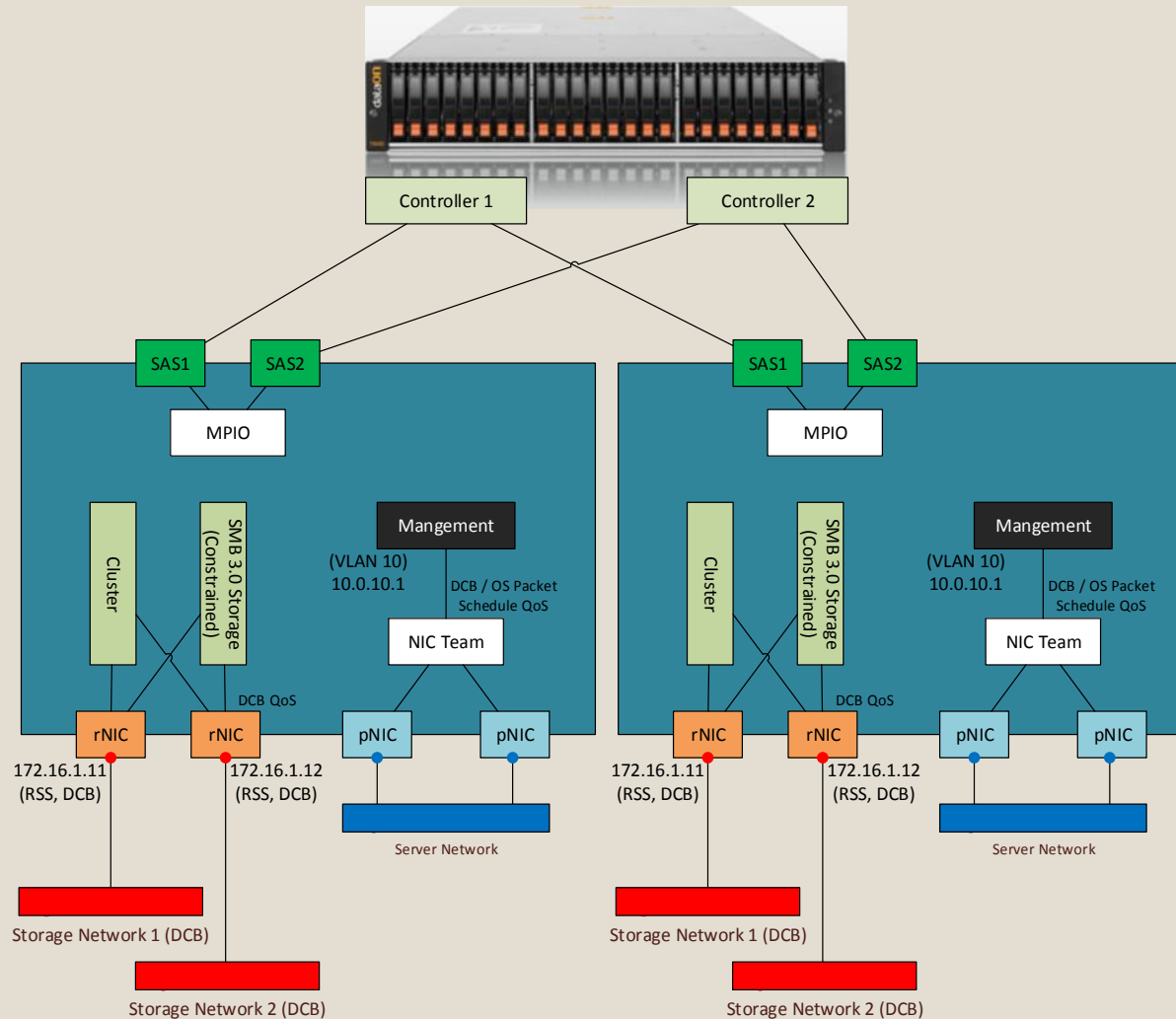
# Features of WS2012 SOFS

- Scalable & Continuously Available Storage
  - That's 2 drinks in the Windows Server drinking game!
- Scalable
  - Add more nodes, storage, or networking
- Active/Active disks
  - CSV
- Active/Active shares
  - SOFS (“File Server for Application Data”) role
- Continuously available (all automatic)
  - SMB Client redirection and SMB Multichannel
- It's “just” Windows Server administration!

# Simple SOFS + SAN Design

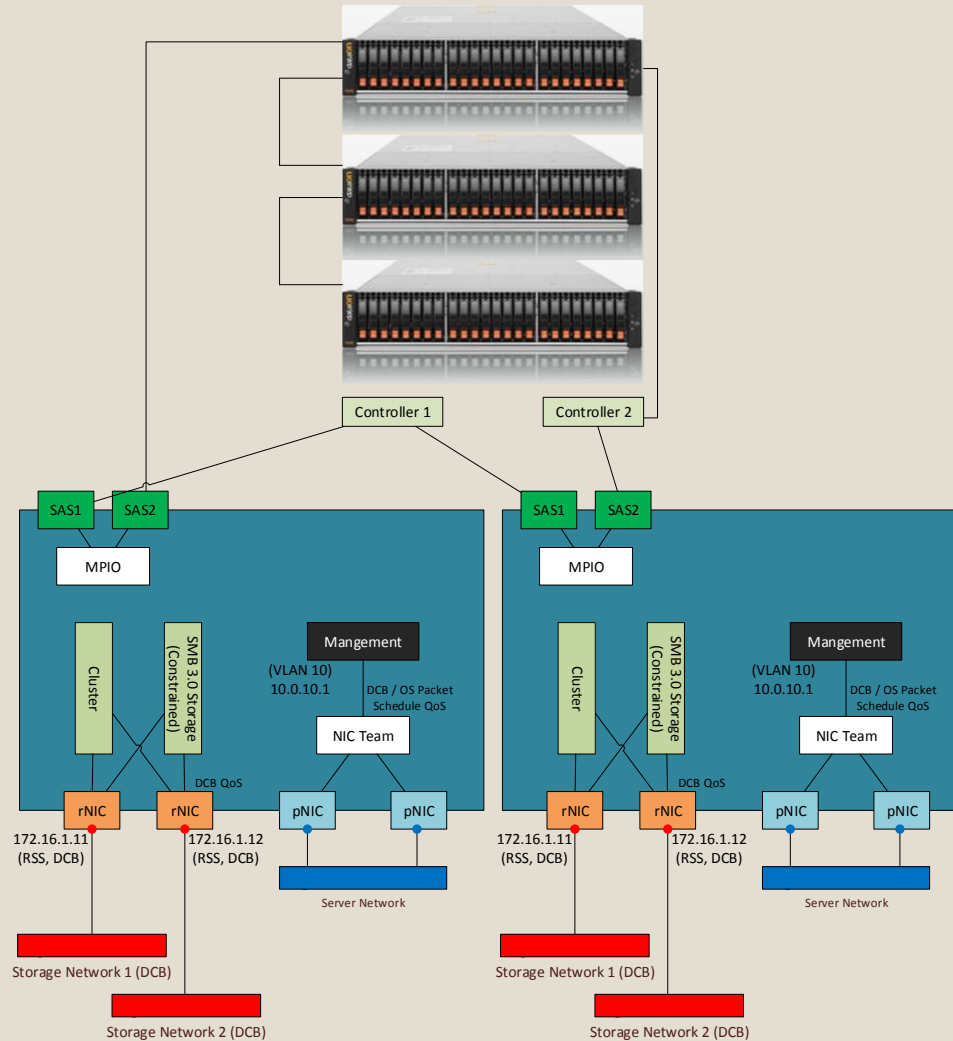


# Simple SOFS + Storage Spaces Design

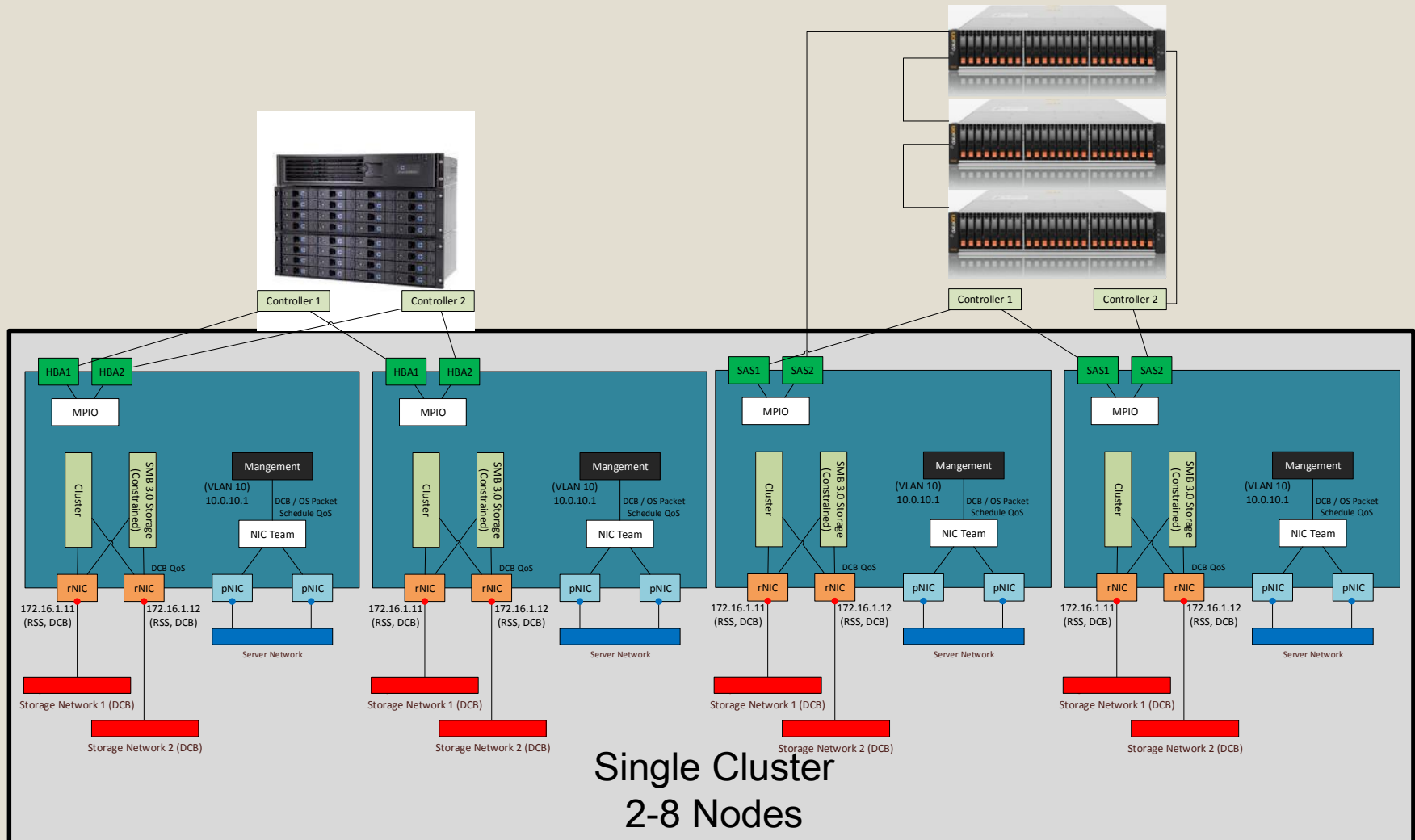




# Added JBOD Capacity & Fault Tolerance



# Added Scalability Via Storage Bricks



# Changes to WS2012 R2 SOFS

- CSV ownership is (re-)balanced automatically
- SMB clients continue to connect to any node
  - But redirected to owner of the CSV that share is placed on
  - Much better performance when combined with CSV ownership balancing
- Dedicated SMB Server instance for Redirected IO
  - Caused by metadata operations and storage path fault tolerance
- Can do bare-metal SOFS deployment from SCVMM 2012 R2

# Build a Scale-Out File Server