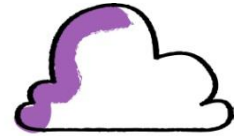




Go further, faster®

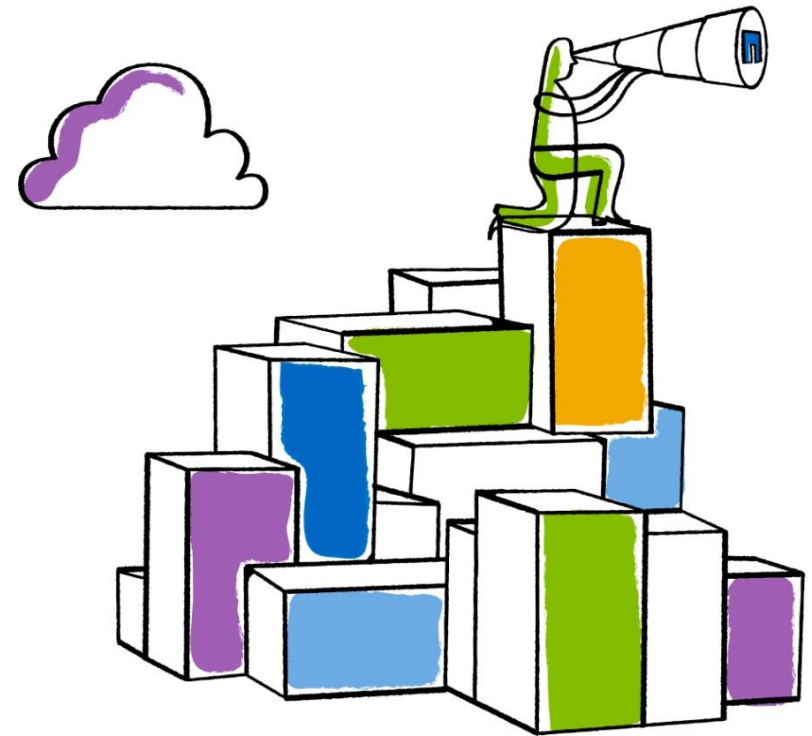
^ L T I M A T E >



# Go Further, Faster with NetApp

Nico de Groot

Technical Consultant – Altimate-Group NL

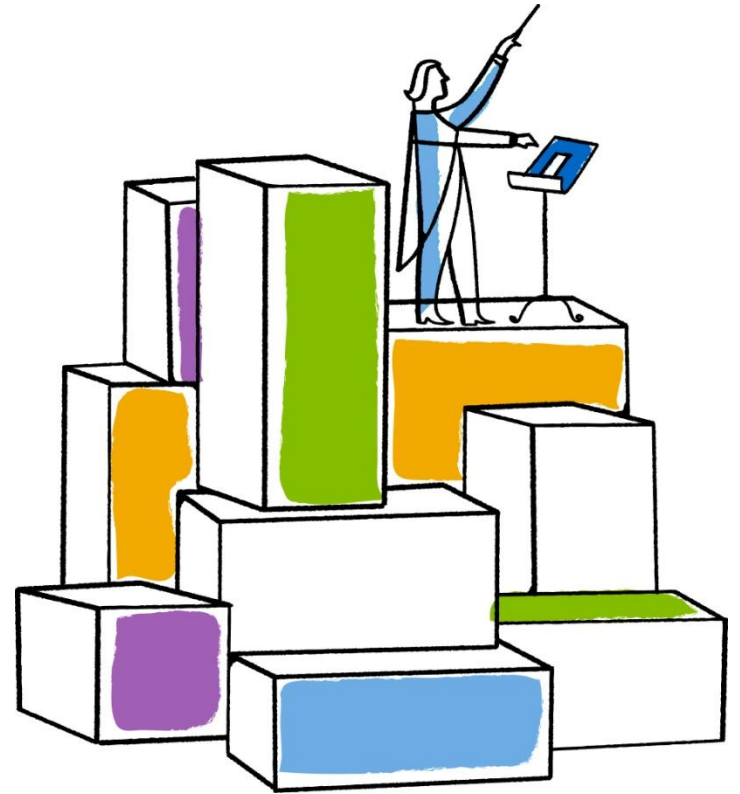




ALTIMATE >

# Ontap upgrade course

Best Practices



ALTIMATE >

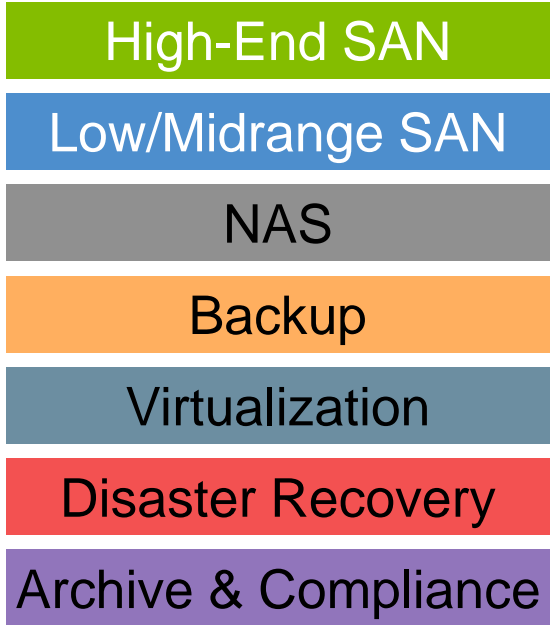
SMART IT  
DISTRIBUTOR



# NetApp Unified Architecture

A single architecture for multiple requirements

## Industry Approach



Different hardware  
Different software  
Different people  
Different processes

## NetApp<sup>®</sup> FAS and V-Series



### Unified Architecture on Data ONTAP

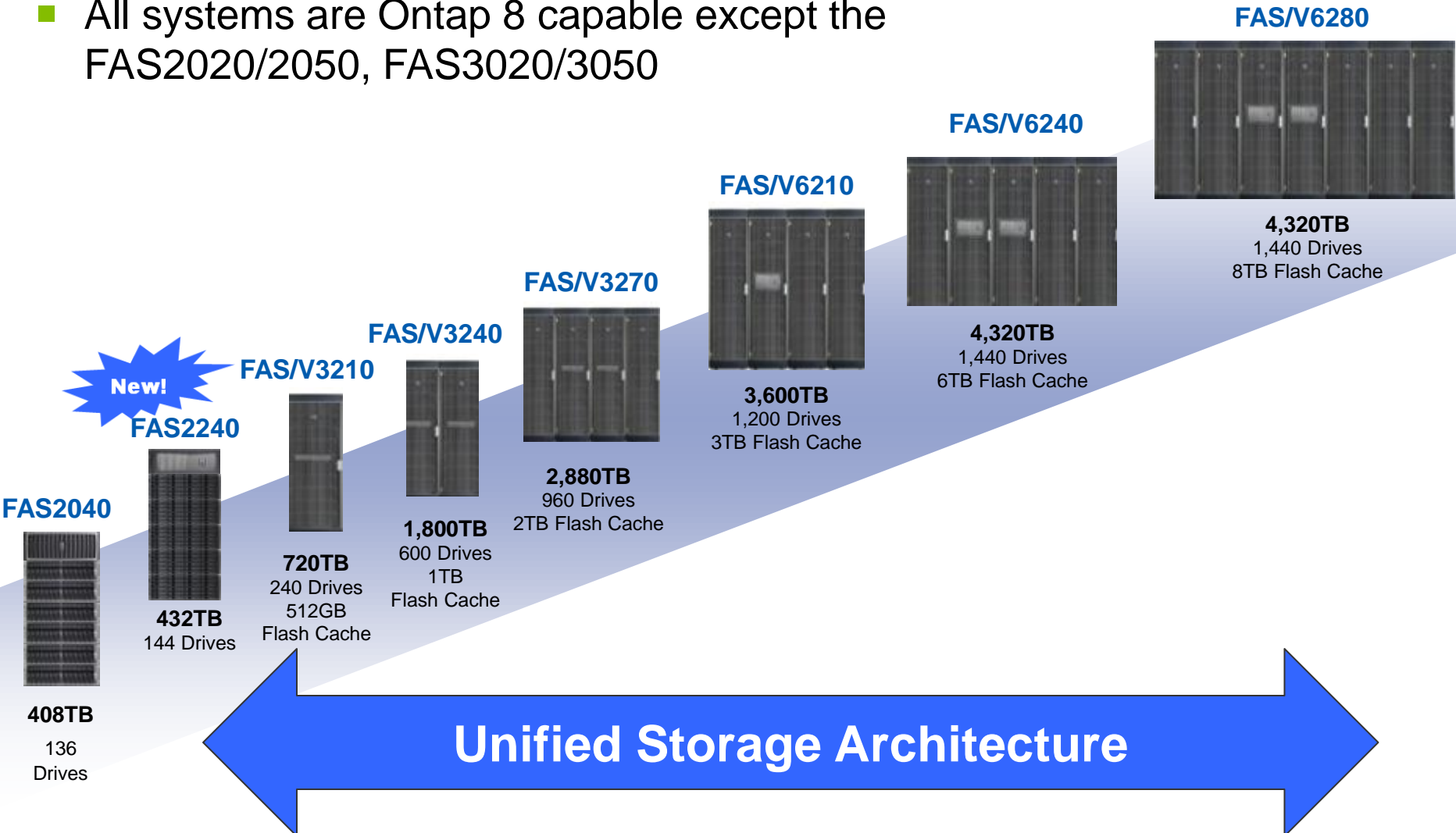
Same hardware  
Same software  
Same people  
Same processes

- One platform for all workloads
- Learn once, deploy everywhere
- Improve IT and business efficiency



# Ontap 8 Capable ?

- All systems are Ontap 8 capable except the FAS2020/2050, FAS3020/3050



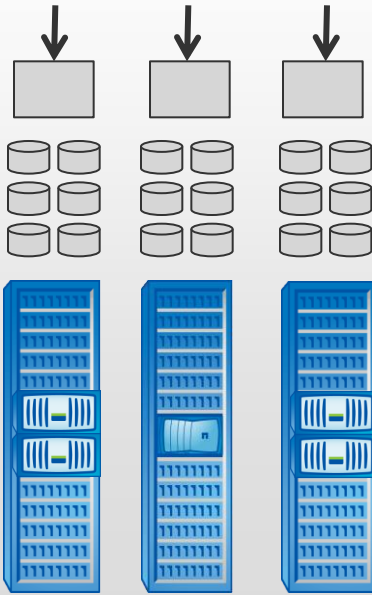


# NetApp Data ONTAP 7G and Data ONTAP 8.0.x 7-Mode/8.1 7-mode

## Scale Up

### Application View:

- Multiple systems
- Multiple containers



Focus is single-system optimization

- Storage efficiency
- Performance optimization
- High availability
- Multiprotocol



# NetApp Data ONTAP 8.0 Cluster-Mode

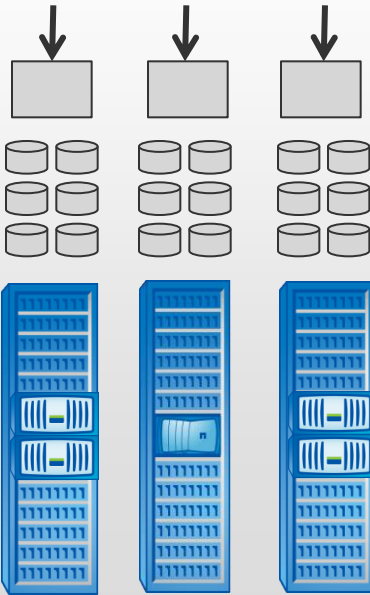
## New Levels of Scalability

Scale Up

Scale Out

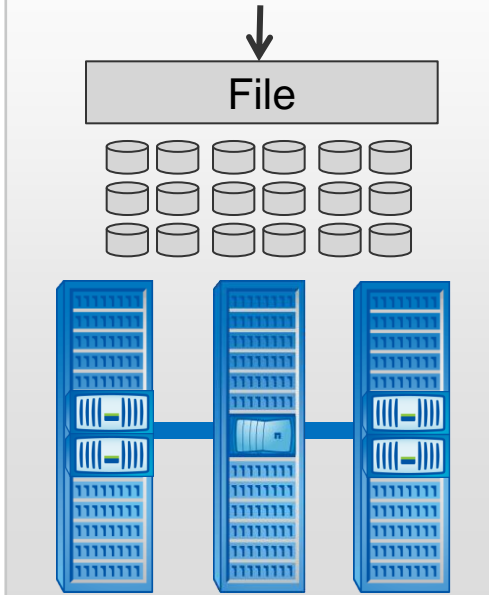
### Application View:

- Multiple systems
- Multiple containers



### Application View:

- 1 storage system
- Multiple containers



## Massive Scalability

- + 24 NAS nodes
- + Single namespace
- + Capacity
- + Performance



# NetApp Data ONTAP 8.1 Cluster-Mode

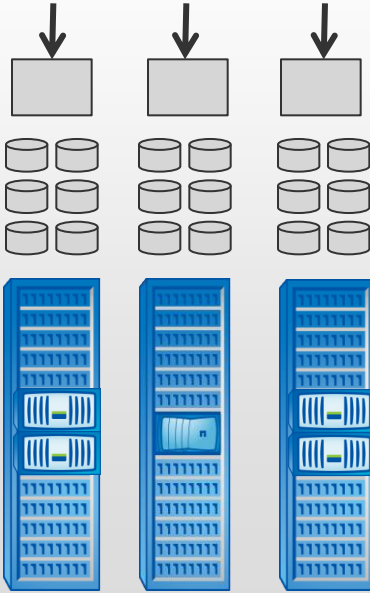
## Enterprise Nonstop Operations

Scale Up

Scale Out

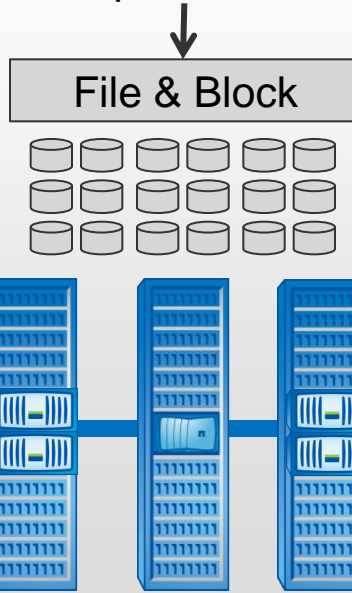
### Application View:

- Multiple systems
- Multiple containers



### Application View:

- 1 storage system
- Multiple containers
- Multiprotocol access



### SAN and NAS access

- + Storage efficiency
- + Integrated data protection
- + Volume mobility
- + On-board antivirus
- + Secure multi-tenancy



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# Data Ontap 7 vs Ontap 8

## Features also in 7.3.4

- SAN and NAS support
  - FC, FCoE, iSCSI
  - CIFS **SMB 2.0**; NFSv2, v3, v4
- Storage efficiency
  - Deduplication, FlexClone®, thin provisioning, Snapshot™
- Data protection
  - SnapVault® and SnapMirror® (including **network compression**)
- Storage & data management
  - Systems Manager; Operations Manager and plug-ins
  - MultiStore®; zAPIs
- Server/application integration
  - SnapDrive® and SnapManager®

## New 8.0.x Features

- 64-bit aggregates (new aggrs)
  - **64-bit root volume aggregate**
- **Data compression**
- **Unified Connect**
- **NetApp DataMotion for Volumes**
- 16TB vols with deduplication
  - **FAS2040, FAS/V 3140 & 3040**
- **VMWare vSphere 4.1 VAAI support**
- **20-drive SATA RAID-DP® groups**

\* Features new in 8.0.1 in **blue**



# 64 bit aggregates

## 7-Mode: 64-bit Aggregates



Current 16TB max size for 32-bit aggregates  
⇒ Limited number of spindles using larger drives  
⇒ More total aggregates required

Solution: 64-bit aggregates – up to 100TB in Data ONTAP 8.0



16 x 2TB drives = 32TB

drives = 64TB

48 x 2TB drives = 96TB



# 64 bit aggregates

- Aggr create aggr1 -N 64 3
- No direct migration path
  - Qtree snapmirror
  - Snapvault
  - ndmpcopy



# Volume SnapMirror® Interoperability Matrix

			Destination Volume				
Data ONTAP			7.3.x	8.0.x		8.1	
		Aggregate Type	32-bit	32-bit	64-bit	32-bit	64-bit
Source Volume	7.3.x	32-bit	Yes	Yes	No	✓	✓
	8.0.x	32-bit	No	Yes	No	✓	✓
		64-bit	No	No	Yes	✓	✓
	8.1	32-bit	No	No	No	✓	✓
		64-bit	No	No	No	✓	✓



# Release difference

- RC: Release candidate have been tested internally but have not reached the minimum number of installs on production systems to be granted GA status. They are production ready and supported by Netapp Global Services (7.3RC1, 7.3RC2, 8.0RC1, 8.1RC1)
  
- GA: General Availability: when an rc has completed all certifications and has caused no significant problems with customer usage
  
- Point release: A point release is based on a GA release and includes a small number of bug fixes (7.2.6.1, 7.3.1.1, 7.3.5.1)
  
- P: Patch release are used to deliver bug fixes in a timely manner
  
- D: Debug release: deliver hot fixes on an urgent as needed basis.
  
- R: Revision release: These are releases that may be created in cases where a critical fix needs to be deployed to all customers



# Disruptive(DR)/nondisruptive(NDR)

- DR are best when you can schedule downtime
- DR 7.X > 8
- NDR infamily upgrades (7.3.2 > 7.3.6)
- NDR 7.3.x > 8
- DR when system is actively serving CIFS to clients
- DR when you need to upgrade disk in RAID4 aggregate



# Determine Feasibility and potential issues

Compare current version with the new version by reading the Release Notes

Read the upgrade guide

Verify free space in aggregates (< 96% full) (df command)

Verify free space in volumes with LUNs

Run the HA configuration checker (cluster configuration checker)



# Determine feasibility and potential issues

Identify SnapMirror/SnapVault source and destination systems and record relationship information

Run the Upgrade Advisor tool

Requirements:        System must have a valid support contract  
                             System must be enabled to send autosupport messages to  
                             Netapp

SAN environments – verify components are still compatible using the interoperability matrix tool

Verify all hosts are multipathed and the multipath connections are working



# Create a checklist

Checklist reduce errors and gives the customer confidence in the process

- Use the *config dump* command to backup the current configuration
- Take snapshots of the root volume and all Snapmirror/Snapvault volumes
- Use the *logger* command to insert comments into the system log
- Capture the *options* setting to a text file before and after the upgrade
- Check for the latest versions of system firmware for your system (sp status)
- Determine the required firmware for your disks and disk shelves

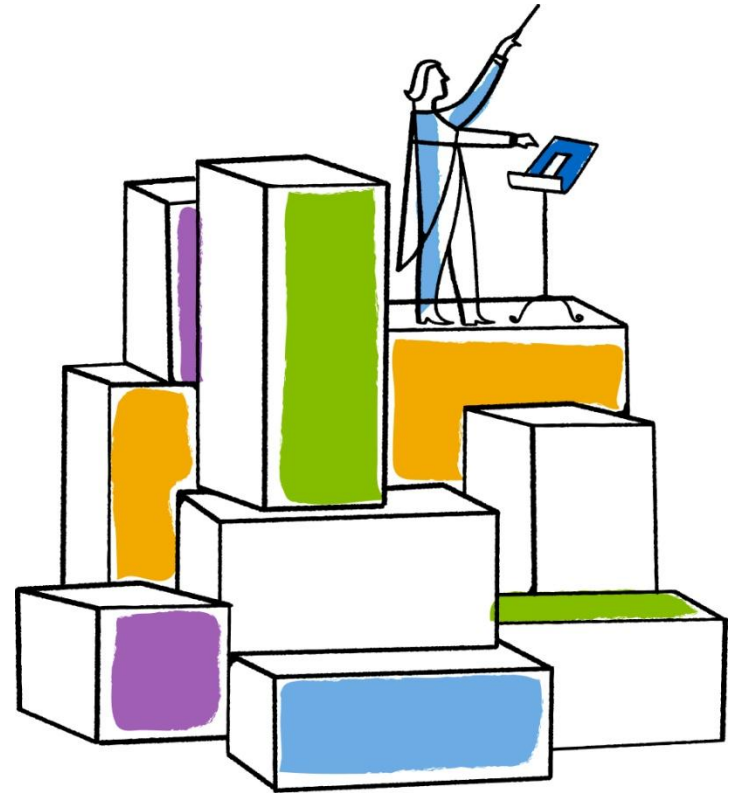


# Performing the upgrade

- Download the correct install package
- Halt or abort Snapmirror, Snapvault and dedup processes
- Verify system configuration and cf functionality by rebooting or performing a takeover/giveback
- Upgrade using the *software update* command
- Use a HTTP server to transfer install packages and firmware
- Install firmware packages that were released after the latest GA version of Data ONTAP



# Known Upgrade Issues



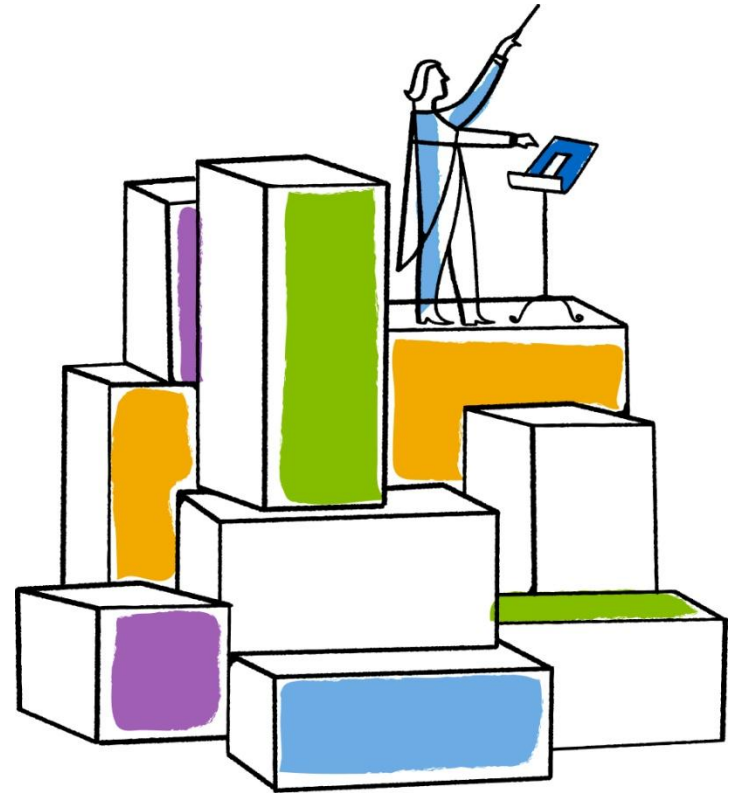


# Upgrade Issues

- Snaplock remains unsupported until Data ONTAP 8.0.1
- 32-bit to 64-bit aggregate conversion still requires data migration
- SnapMirror/Snapvault restart checkpoints deleted during upgrade
  - The replication sessions will restart at the beginning
- Manual editing of the /etc/rc required (upgrade process does not change 'vif' to 'ifgrp')



# Post Upgrade





# Post Upgrade

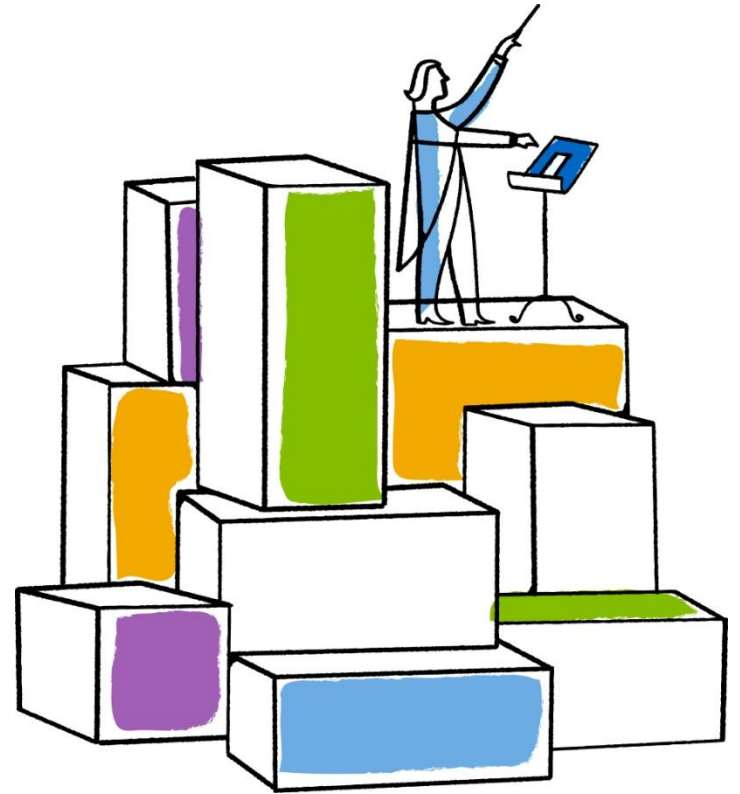
Test client access for every licensed protocol

- failure is often due to changes in the ONTAP options
- Make the customer perform the testing

Test cluster failover functionality



Hands on





# Goal of today

- Upgrade FAS2040
- Now Ontap Version: 7.3.6
- Upgrade to 8.1RC2 7-mode



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# Where to find the software

<http://now.netapp.com>

Products	Subscription Status	View & Download
▶ Data ONTAP	Active/Renewed	<Select Platform> [dropdown] <input type="button" value="Go!"/>
▶ S Family (formerly StoreVault)	Active/Renewed	<Select Platform> [dropdown]

## Data ONTAP for FAS2040

General Deployment Release [ <a href="#">Definition</a> ] Note: GD definition introduced in 7.0	
▶ Data ONTAP 7.3.3	<input type="button" value="View &amp; Download"/>
General Availability Releases [ <a href="#">Definition</a> ] Note: Updated GA definition introduced in 7.0	
▶ Data ONTAP 7.3.6	<input type="button" value="View &amp; Download"/>
▶ Data ONTAP 8.0.2	<input type="button" value="View &amp; Download"/>
Release Candidate [ <a href="#">Definition</a> ] Note: RC designation introduced in 7.0	
▶ Data ONTAP 8.1RC1	<input type="button" value="View &amp; Download"/>

<http://now.netapp.com/NOW/download/software/ontap/8.0.2P5/>

Software Image FAS2040: 802P5\_e\_image.zip



# Steps to follow

- goto <http://now.netapp.com/NOW/asuphome/>
- Launch the my autosupport
- Enter hostname or sysid
- Select the systems you wish to upgrade
- Select the latest autosupport
- Select the upgrade advisor
- Select the data ontap release
  
- You will now get a step by step upgrade plan



### System Tools

- » Performance
- » Upgrade Advisor
- » Event Viewer [New]

### AutoSupport Tools

- » Visualizations
- » Configurations

[Return to Dashboard](#)

Upgrade Advisor

HERA (Serial#:20000252532)

Generate Data ONTAP upgrade plan for:  This system and its HA partner  A group of systems

CONTINUE

1 Current OS: 7.3.4

Target Version: 8.1RC1

Method: Windows  Make NDU Plan where allowed  Verbose Steps  Revert

PREVIOUS CONTINUE

2 Current System: HERA

↑ - Upgrade warning, ↓ - Back-out warning [Save As Excel](#) [Save As PDF](#) [Print](#)

*	Description
↑	You should run <a href="#">AggrSpaceCheck Tool</a> to verify that the system has the requisite available free space needed to upgrade successfully to 7.3 or later (without disabling space guarantees or offlining aggregates/volumes).
↑	These 12 disks will have firmware updates if the latest disk firmware is loaded on the filer:  12 disks of Model X289_HVIPC420A15.  This firmware is not included in 8.1RC1 and must be downloaded separately. When performing a nondisruptive upgrade, NetApp recommends upgrading disk firmware the day before upgrading Data ONTAP.
↑	NetApp Global Services recommends running <a href="#">perfstat</a> during a typical usage time to save a performance baseline prior to an upgrade in case it is needed. This will take about 30 mins of run time.
↑	This system may experience the issue described in Burt 455754, 'Boot Device may be reformatted during Data ONTAP upgrades': <a href="#">455754</a> .



# Lab setup

- 2 x FAS2040 dual controller ( Toaster1 t/m 4)
- Each(in groups) of you will upgrade a single controller from 7.3.6 to 8.1RC2 7-mode
- Ontap software is available on the http server





## Step by step

- Config dump *configdump1* (can be found in */etc/configs/* )
- Options (displays all the options settings)
- Aggr show space
- Snapmirror status



## Step by Step (Cont.)

- Software get  
[http://<ip\\_address>/81RC2\\_e\\_image.zip](http://<ip_address>/81RC2_e_image.zip)
- Software list
- Software install <packetname>
- Download
- Reboot (Filer will reboot directly)
- When rebooted:
  - Login with root
  - Type version to check installed version  
(Should say: NetApp Release 8.1RC2.....)



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# Login to Lab-Environment

## Group 1

<https://ultimate-academy.com>

Nastudent8/upgrade8

FAS2040A : Toaster1

IP :192.168.70.201

root

Upgrade8

## Group 2

<https://ultimate-academy.com>

Nastudent9/upgrade9

FAS2040A : Toaster2

IP :192.168.70.202

root

Upgrade9

## Group 3

<https://ultimate-academy.com>

Nastudent10/upgrade10

FAS2040A : Toaster3

IP :192.168.70.201

root

Upgrade10

## Group 4

<https://ultimate-academy.com>

Nastudent11/upgrade11

FAS2040A : Toaster4

IP :192.168.70.201

root

Upgrade11

**IP- Address HTTP-Server: 192.168.70.131**



# Resources Upgrading

- Data Ontap 8.1 7-mode RC2 documentation

<http://now.netapp.com/NOW/knowledge/docs/ontap/rel81rc2/>

- Data Ontap 8.1 7-mode RC2 upgrade guide:

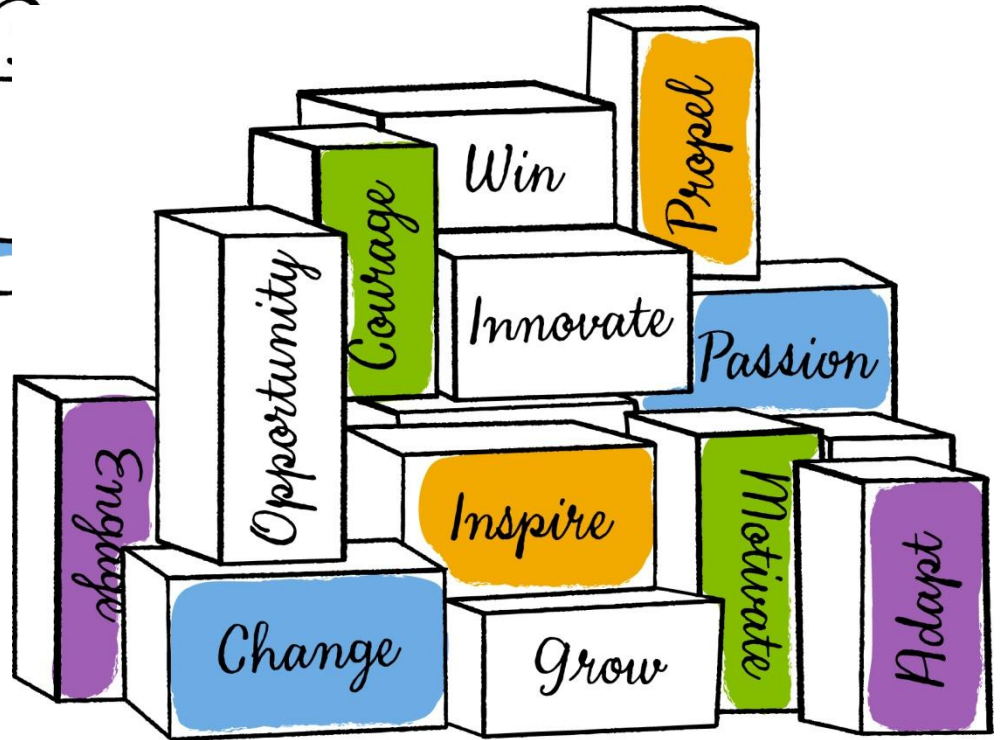
<http://now.netapp.com/NOW/knowledge/docs/ontap/rel81rc2/pdfs/ontap/upgrade.pdf>

- Download 8.1 7-mode RC2 software:

<http://now.netapp.com/NOW/download/software/ontap/8.1RC2/#7mode>



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