Summary of best practices

ONTAP Select

Barb Einarsen, David Peterson
November 21, 2019

This PDF was generated from https://docs.netapp.com/us-en/ontap-select/reference_plan_best_practices.html on October 12, 2020. Always check docs.netapp.com for the latest.

Table of Contents

Summary of best practices 1
- Storage 1
- Networking 2
- HA 3

Summary of best practices

There are best practices that you should consider as part of planning an ONTAP Select deployment.

Storage

Consider the following storage best practices.

All-Flash or Generic Flash arrays

ONTAP Select virtual NAS (vNAS) deployments using all-flash VSAN or generic flash arrays should follow the best practices for ONTAP Select with non-SSD DAS storage.

Hypervisor core hardware

All of the drives in a single ONTAP Select aggregate should be the same type. For example, you should not mix HDD and SSD drives in the same aggregate.

RAID controller

The server RAID controller should be configured to operate in writeback mode. If write workload performance issues are seen, check the controller settings and make sure that writethrough or writearound is not enabled.

If the physical server contains a single RAID controller managing all locally attached disks, NetApp recommends creating a separate LUN for the server OS and one or more LUNs for ONTAP Select. In the event of boot disk corruption, this best practice allows the administrator to recreate the OS LUN without affecting ONTAP Select.

The RAID controller cache is used to store all incoming block changes, not just those targeted toward the NVRAM partition. Therefore, when choosing a RAID controller, select one with the largest cache available. A larger cache allows less frequent disk flushing and an increase in performance for the ONTAP Select VM, the hypervisor, and any compute VMs collocated on the server.

RAID groups

The optimal RAID-group size is eight to 12 drives. The maximum number of drives per RAID group is 24.

The maximum number of NVME drives supported per ONTAP Select node is 14.

A spare disk is optional, but recommended. NetApp also recommends using one spare per RAID group; however, global spares for all RAID groups can be used. For example, you can use two spares for every three RAID groups, with each RAID group consisting of eight to 12 drives.

ONTAP Select receives no performance benefits by increasing the number of LUNs within a RAID group. Multiple LUNs should only be used to follow best practices for SATA/NL-SAS configurations or to bypass hypervisor file system limitations.

VMware ESXi hosts

NetApp recommends using ESX 6.5 U2 or later and an NVMe disk for the datastore hosting the system disks. This configuration provides the best performance for the NVRAM partition.

When installing on ESX 6.5 U2 and higher, ONTAP Select uses the vNVME driver regardless of whether the system disk resides on an SSD or on an NVME disk. This sets the VM hardware level to 13, which is compatible with ESX 6.5 and later.

Define dedicated network ports, bandwidth, and vSwitch configurations for the ONTAP Select networks and external storage (VMware vSAN and generic storage array traffic when using iSCSI or NFS).

Configure the capacity option to restrict storage utilization (ONTAP Select cannot consume the entire capacity of an external vNAS datastore).

Assure that all generic external storage arrays use the available redundancy and HA features where possible.

VMware Storage vMotion

Available capacity on a new host is not the only factor when deciding whether to use VMware Storage vMotion with an ONTAP Select node. The underlying storage type, host configuration, and network capabilities should be able to sustain the same workload as the original host.

Networking

Consider the following networking best practices.

Duplicate MAC addresses

To eliminate the possibility of having multiple Deploy instances assign duplicate MAC addresses, one Deploy instance per layer-2 network should be used to create or manage an ONTAP Select cluster or node.

EMS messages

The ONTAP Select two-node cluster should be carefully monitored for EMS messages indicating that storage failover is disabled. These messages indicate a loss of connectivity to the mediator service and should be rectified immediately.

Load balancing

To optimize load balancing across both the internal and the external ONTAP Select networks, use the Route Based on Originating Virtual Port load-balancing policy.

Multiple layer-2 networks

If data traffic spans multiple layer-2 networks and the use of VLAN ports is required or when you are using multiple IPspaces, VGT should be used.

Physical switch configuration

VMware recommends that STP be set to Portfast on the switch ports connected to the ESXi hosts. Not setting STP to Portfast on the switch ports can affect the ONTAP Select ability to tolerate uplink failures. When using LACP, the LACP timer should be set to fast (1 second). The load-balancing policy should be set to Route Based on IP Hash on the port group and Source and Destination IP Address and TCP/UDP port and VLAN on the LAG.

HA

Consider the following HA best practices.

Deploy backups

It is a best practice to back up the Deploy configuration data on a regular basis, including after creating a cluster. This becomes particularly important with two-node clusters, because the mediator configuration data is included with the backup.

After creating or deploying a cluster, you should back up the ONTAP Select Deploy configuration data.

Mirrored aggregates

Although the existence of the mirrored aggregate is needed to provide an up-to-date (RPO 0) copy of the primary aggregate, take care that the primary aggregate does not run low on free space. A low-space condition in the primary aggregate might cause ONTAP to delete the common NetApp Snapshot™ copy used as the baseline for storage giveback. This works as designed to accommodate client writes. However, the lack of a common Snapshot copy on failback requires the ONTAP Select node to do a full baseline from the mirrored aggregate. This operation can take a significant amount of time in a shared-nothing environment.
A good baseline for monitoring aggregate space utilization is up to 85%.

NIC aggregation, teaming, and failover

ONTAP Select supports a single 10Gb link for two-node clusters; however, it is a NetApp best practice to have hardware redundancy through NIC aggregation or NIC teaming on both the internal and the external networks of the ONTAP Select cluster.

If a NIC has multiple application-specific integrated circuits (ASICs), select one network port from each ASIC when building network constructs through NIC teaming for the internal and external networks.

NetApp recommends that the LACP mode be active on both the ESX and the physical switches. Furthermore, the LACP timer should be set to fast (1 second) on the physical switch, ports, port channel interfaces, and on the VMNICs.

When using a distributed vSwitch with LACP, NetApp recommends that you configure the load-balancing policy to Route Based on IP Hash on the port group, Source and Destination IP Address, TCP/UDP Port, and VLAN on the LAG.

Two-node stretched HA (MetroCluster SDS) best practices

Before you create a MetroCluster SDS, use the ONTAP Deploy connectivity checker to make sure that the network latency between the two data centers falls within the acceptable range.

There is an extra caveat when using virtual guest tagging (VGT) and two-node clusters. In two-node cluster configurations, the node management IP address is used to establish early connectivity to the mediator before ONTAP is fully available. Therefore, only external switch tagging (EST) and virtual switch tagging (VST) tagging is supported on the port group mapped to the node management LIF (port e0a). Furthermore, if both the management and the data traffic are using the same port group, only EST and VST are supported for the entire two-node cluster.

Copyright Information

Copyright © 2020 NetApp, Inc. All rights reserved. Printed in the U.S. No part of this document covered by copyright may be reproduced in any form or by any means-graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system-without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP “AS IS” AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

RESTRICTED RIGHTS LEGEND: Use, duplication, or disclosure by the government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.277-7103 (October 1988) and FAR 52-227-19 (June 1987).

Trademark Information

NETAPP, the NETAPP logo, and the marks listed at http://www.netapp.com/TM are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.