Hardware Universe v 4.7 User Guide

June 2015

TABLE OF CONTENTS

1 Hardware Universe Overview

Hardware Universe (HWU) is a web-based tool that replaced the *NetApp System Configuration Guide*, providing you with a visual presentation of the complete NetApp line of hardware products. HWU also replaces the *NetApp Site Requirements Guide*, which included controller information on a variety of chassis details: electrical requirements in worst-case and typical situation, clearance information, temperature ranges, humidity levels, altitude parameters, acoustic noise. and more.

HWU is a powerful configuration resource for NetApp employees, partners, and customers by consolidating hardware specifications for the following products and components.

- Platforms: FAS, All-Flash FAS, V-Series, ONTAP-v, E-Series, FlashRay and SA Series
- Adapters: FAS, V-Series, E-Series and SA Series
- Shelves: ONTAP, SANtricity and MARS
- Drives: ONTAP, SANtricity and MARS
- Cabinets: power configurations, 3rd-party rackmount kits
- Switches: Cluster, MetroCluster and SAN
- Cables: data cables, power cords

You can also make side-by-side comparisons of the various platforms in terms of system capacity, memory size, maximum spindle count, and other features, allowing you to decide which platforms will meet your requirements.

In addition, you can save your personal queries for re-use, or draw from your last 20 queries. This is a handy way to revisit your favorite configurations over time.

Finally, you can download printable PDF files of the many configurations, based on OS.

1.1 Requirements

To view the Hardware Universe you can use any of the following browsers and operating systems:

- Supported browsers
  - Internet Explorer 8+
  - Firefox 10+
  - Safari 5+
  - Google Chrome 18+
  - Opera 11+
- Supported desktop operating systems:
  - Microsoft Windows XP, Vista, Windows 7 and 8
  - Mac OS 10.6+
  - Linux
- Supported mobile operating systems:
  - Apple iOS
  - Google Android

1.2 Supported NetApp Software Versions

Hardware Universe supplies hardware configuration information for Data ONTAP versions 7.2 and later, and Data ONTAP 7-Mode and Clustered Data ONTAP versions 8.0 and later.

1.3 Acronyms

The following acronyms are used throughout the Hardware Universe user interface:

ACP – Alternate Control Path

BTU – British Thermal Unit

Cu – Copper Connector

EOA – End of Availability

EOS – End of Support

ESH – Electronically Switched Hub

FAS – Fabric-Attached Storage

FCP – Fibre Channel Protocol

FC – Ferrule Connector

FC – Fibre Channel

FRU – Field Replacement Unit

GbE – Gigabit Ethernet

HA – High Availability

HSSDC – High-Speed Serial Data Connector

HT – Hyper-Threading

IB4X – InfiniBand 4X

IEC – International Electrotechnical Commission

IOM3 – I/O Module 3Gbit per second

IOM6 – I/O Module 6Gbit per second

LC – Lucent Connector

LRC – Loop Resiliency Circuit

LUN – Logical Unit Number

MARS – Operating system for FlashRay

MTP – Mechanical Transfer Pull-Off

NEMA – National Electrical Mfg. Association

NIC – Network Interface Card

NL-SAS – Nearline SAS (drive)

NVRAM – Nonvolatile RAM

Op – Optical Connector

PAM – Performance Acceleration Module

PSU – Power Supply Unit

QSFP – Quad Small Form-Factor Pluggable

RAID – Redundant array of independent disks

RAID-DP – Redundant array of independent disks, double-parity

RLM – Remote LAN Module

RPM – Revolutions Per Minute

SAS – Serial-Attached SCSI

SATA – Serial ATA

SC – Subscriber Connector

SFP – Small Form-Factor Pluggable Connector

SSD – Solid State Drives

ST – Straight Tip Connector

TOE –TCP/IP Offload Engine

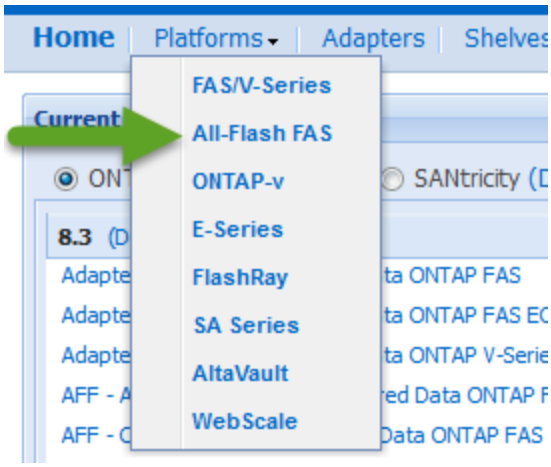
N/A – Not Applicable

2 What's New in Hardware Universe version 4.7?

The following enhancements are new in Hardware Universe version 4.7.

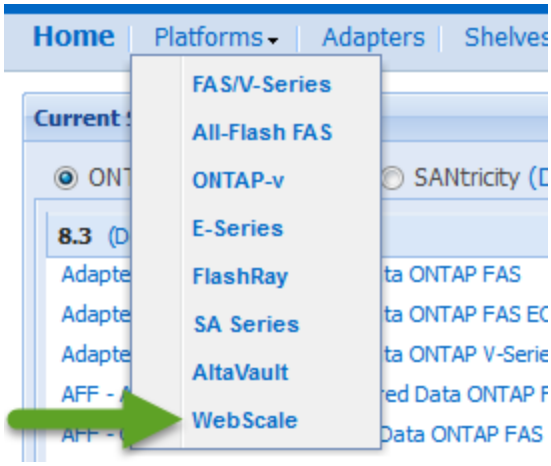
2.1 All Flash FAS Rebranding

Hardware Universe version 4.7 introduces the newly rebranded All Flash FAS platform models



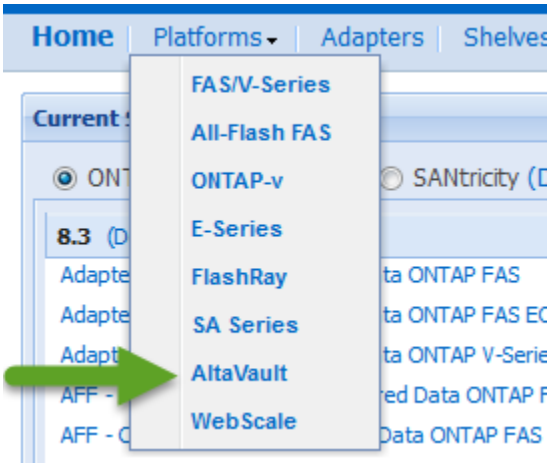
2.2 StorageGRID WebScale Appliance

Hardware Universe version 4.7 introduces the StorageGRID WebScale object storage appliance integrated with the E-Series Hardware



2.3 AltaVault Data Protection Appliance

Hardware Universe version 4.7 introduces the AltaVault (fka SteelStore) cloud-integrated storage with enterprise-class data protection

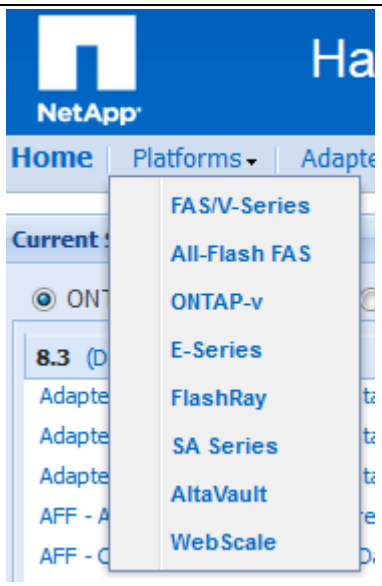
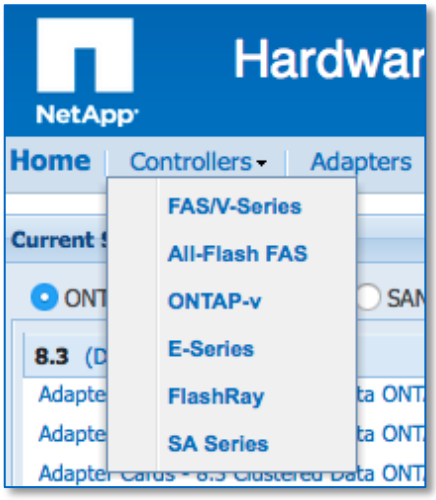

Home
Platforms
Adapters
Shelves
FAS/V-Series
All-Flash FAS
ONTAP-v
E-Series
FlashRay
SA Series
AltaVault
WebScale
SANtricity

2.4 OS Compatible Platform Configurations

Hardware Universe version 4.7 introduces support for OS compatible configurations in rear view window of the platform image

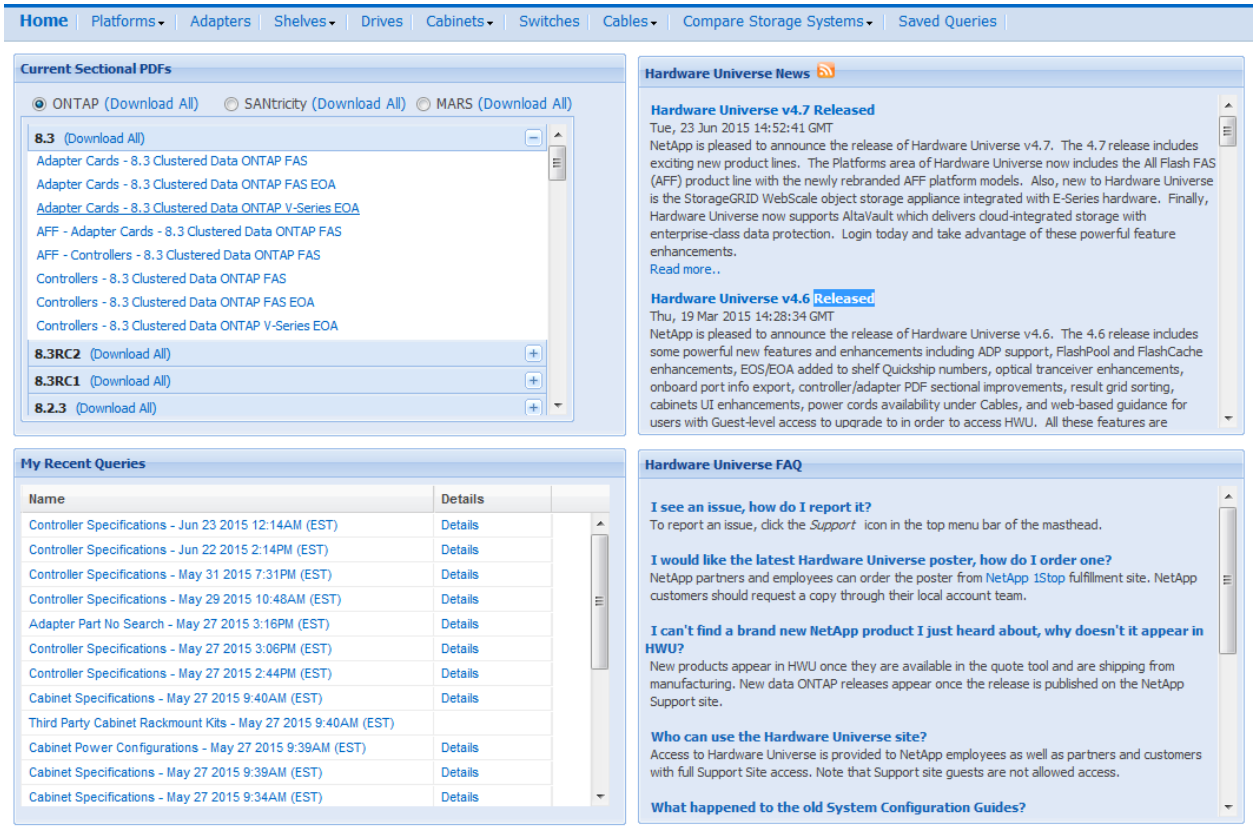
2.5 Controller Section Changing to Platforms Section

Hardware Universe version 4.7 introduces a change to the main menu bar. With the introduction of converged infrastructure platforms, like StorageGRID WebScale, the “Controllers” menu option has been updated to “Platforms” to reflect NetApp’s diverse product lines

NEW LOOK	OLD LOOK
	

3 Using Hardware Universe

After logging into Hardware Universe, you arrive at the home page:



The home page displays four quadrants of information.

- **Current Sectional PDFs** – for your convenience, you can select from a variety of pre-configured hardware "sectionals" in PDF format. These sectionals are organized by Data ONTAP, SANtricity or MARS versions within each expandable pane. They are terrific "leave behinds" for customers.

  PDF Download Options:

  1. The entire set of PDFs for all Data ONTAP, SANtricity or MARS versions by using each *Download All* link at the top of the quadrant.
  2. A bundled PDF for a given Data ONTAP version, SANtricity version, or MARS version. Scroll through the available versions and click a *Download All* link.
  3. A single PDF for an individual adapter card or a controller, based on a given Data ONTAP version, SANtricity version, or MARS version. Simply expand a version pane and scroll through the available options and select one.

- **My Recent Queries** – this quadrant displays up to 20 of your most recent HWU queries. Click the title of a query to display its configuration in the HWU interface. You can click *Details* to view the specifications before opening the query.
- **Hardware Universe News** – refer to this area for the latest news and updates regarding the HWU tool. You can also subscribe by clicking the orange RSS icon.
- **Hardware Universe FAQ** – refer to this area for frequently asked questions. If you have a question that is not answered here, then hover over the Support icon in the top banner (looks like

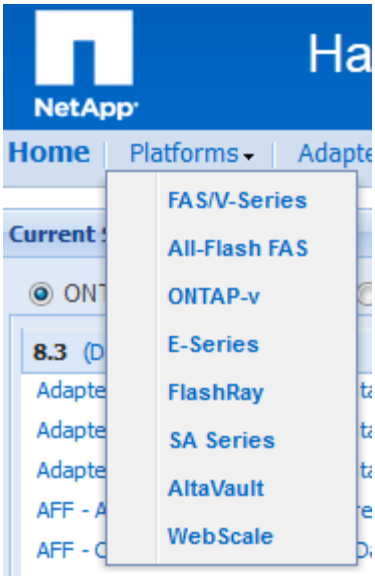
a person with headset on far right) and click **Contact Us** to submit a Help ticket.

3.1 Platforms

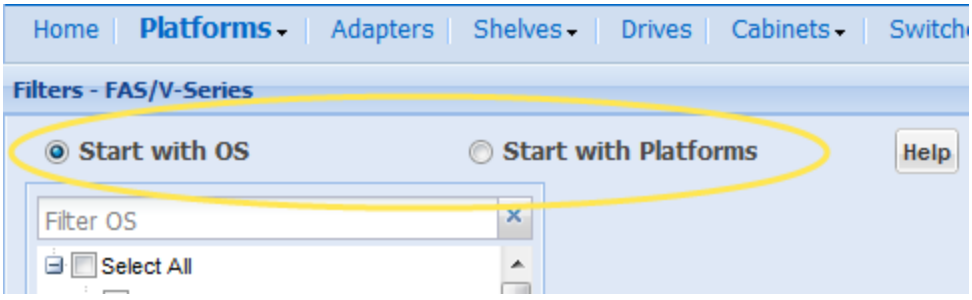
This is the most common starting point in the HWU tool, as many users elect to build a configuration around platforms first. The final results provide you with all related adapters, shelves, drives and more, that you need for a complete integrated system. Alternatively, you can explore the other menu options for adapters/shelves/drives/etc. to find both specific and integrated component data.

The **Platforms** tab allows you access to information about the supported platforms by OS or by platform.

1. Hover over the **Platforms** tab in the menu bar and select a platform option from the drop-down menu. For example, select **FAS/V-Series**.



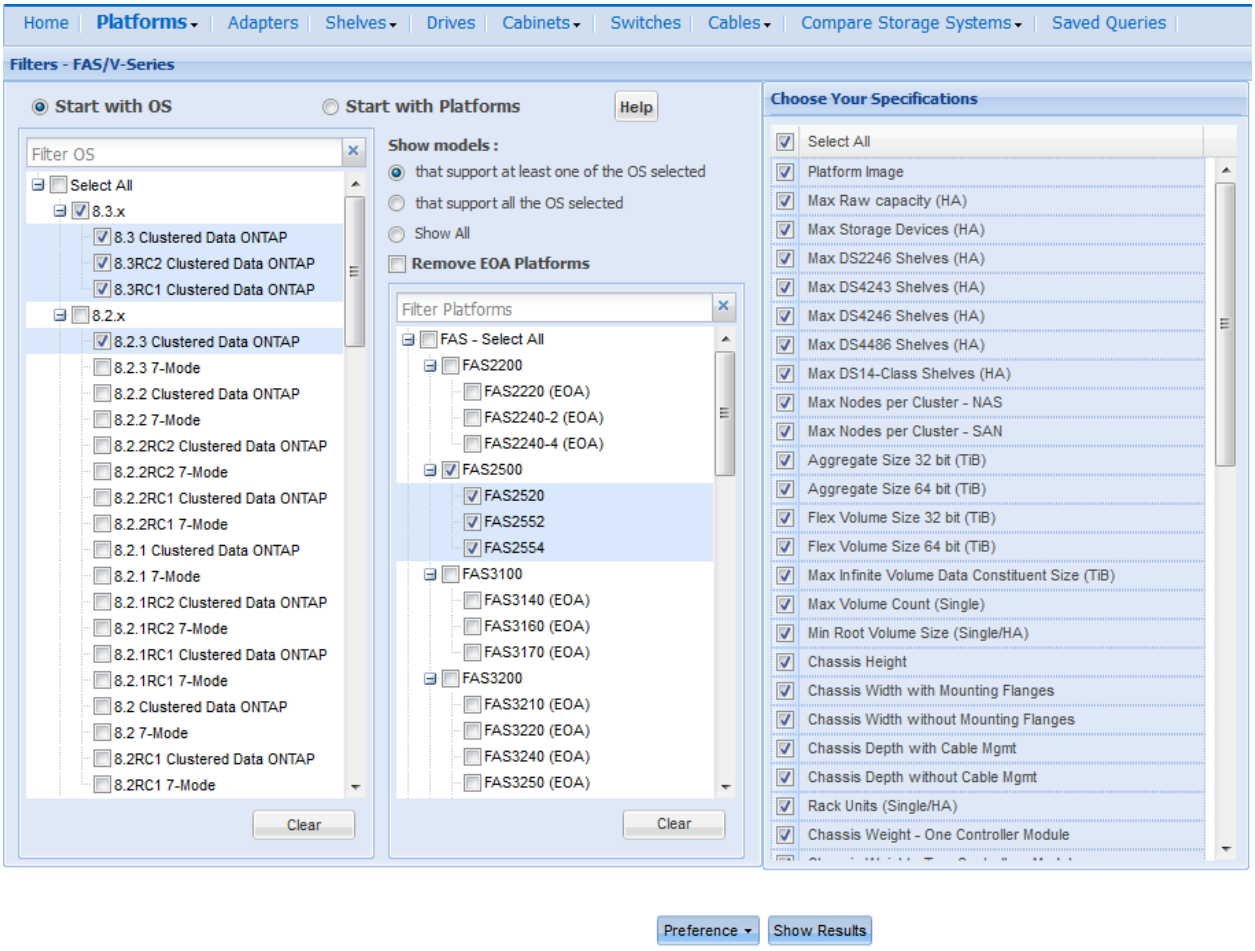
2. The *Filters* page then allows you to select the method of configuring your system. You can select **Start with OS** or **Start with Platforms**.



3. **Start with OS** – This is the default option.
   a. Use the **Filter OS** search box to quickly find an OS that you seek. Example filter strings: *8.2.x, 8.3rc1, cluster-mode*.
   b. Select one or more OS versions. The *Platform Model* pane displays with a tree of supported platforms.

- By default, the tree shows models that support at least one of the OS versions, as indicated by the radio button labeled **that support at least one of the OS selected**.
- If you select the radio button labeled **that support all the OS selected**, then the tree refreshes to show models that support all selected OS versions.
- Special Note: The **Show All** radio button lists all the models for the chosen platform, regardless of OS support. Unsupported models are grayed out in the tree. Hover your mouse over a grayed-out model to see its supported OS information.
- To further refine the scope of the platform list, you can select **Remove EOA Platforms.**
- Use the **Filter Platforms** search box to quickly find a platform by family or model. Example filter stings: *FAS6200, FAS6220*.

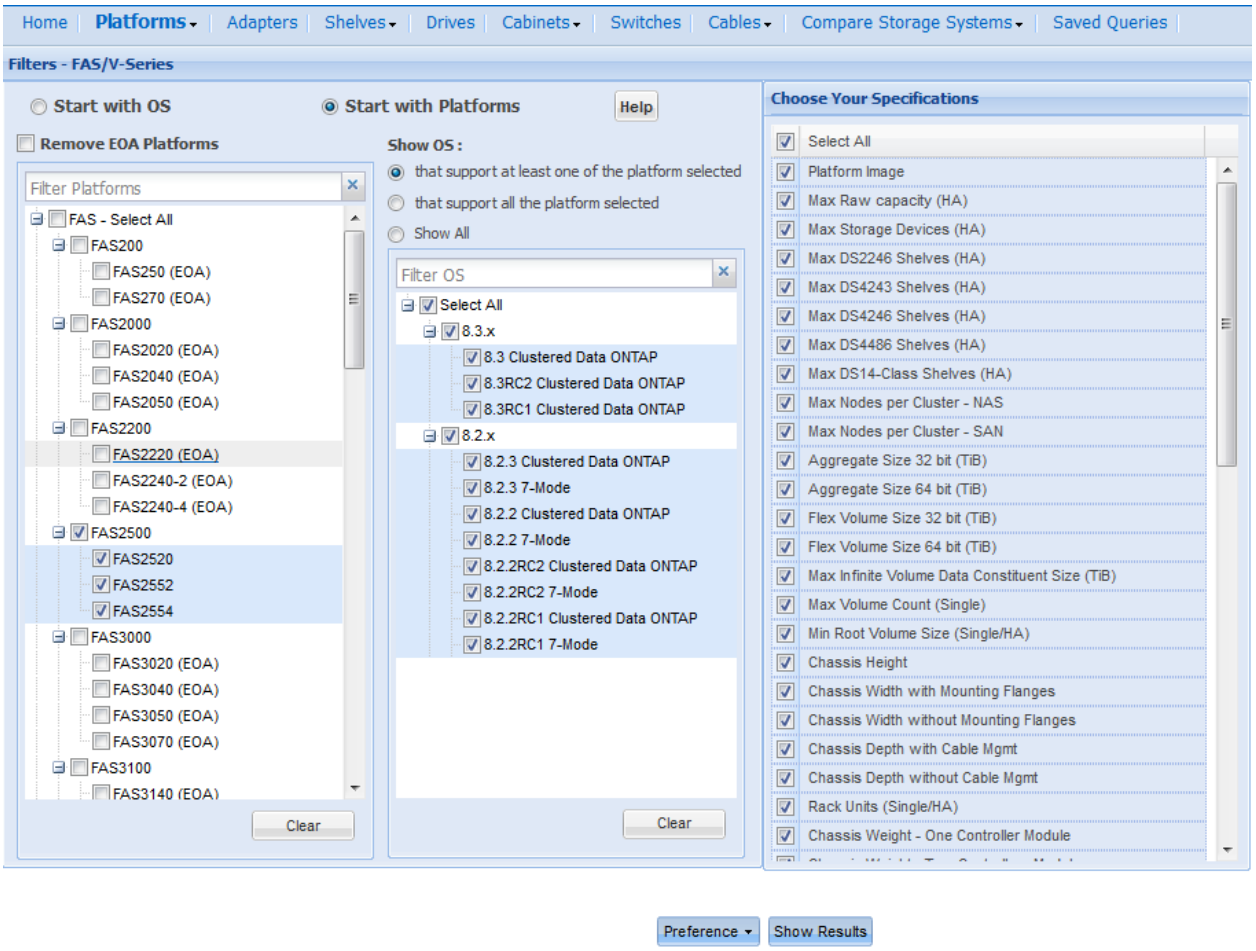
c. Select one or more platforms. The *Choose Your Specifications* pane displays. See an example **Start with OS** page below:



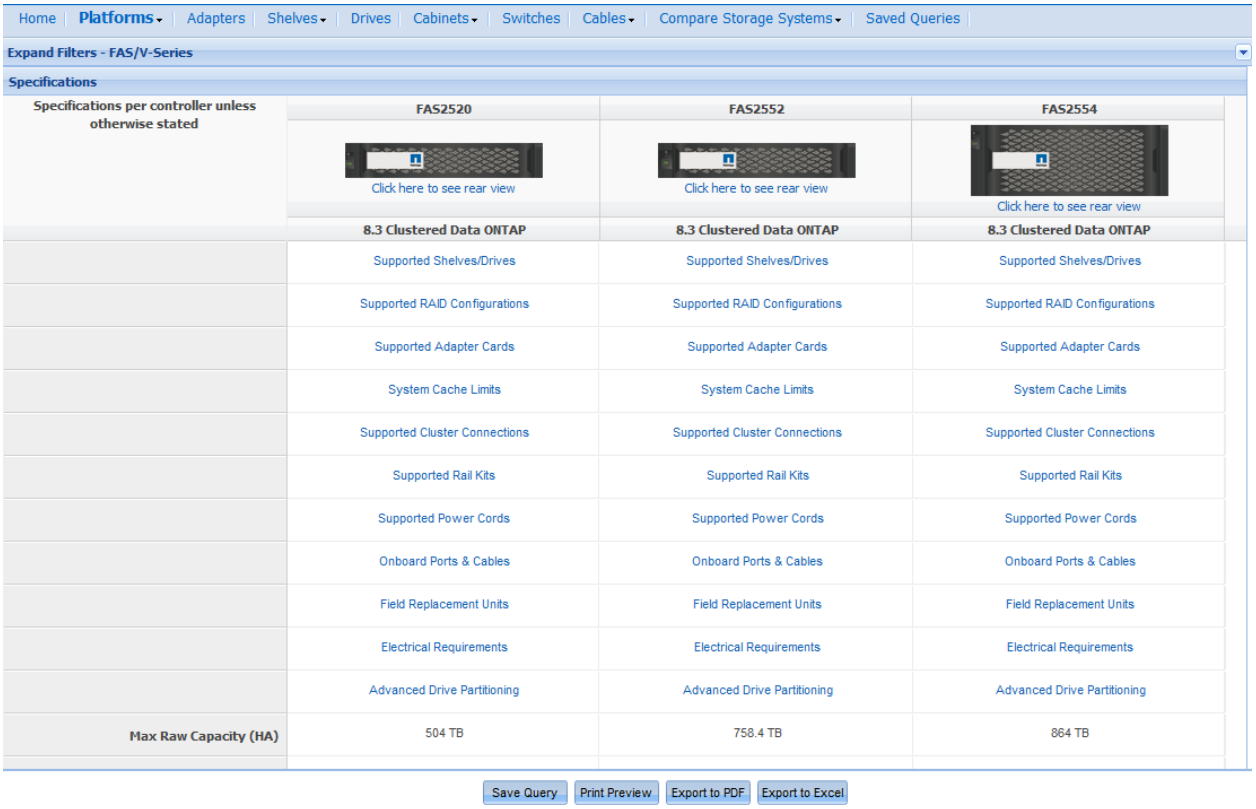
4. **Start with Platforms**– This is not the default, but you can make it so by using the **Preference** button at the bottom of the page after you complete your configuration.
   - This option works in a similar way as **Start with OS**, except that you start with model selections instead of OS selections.

- Special Note: The **Show All** radio button lists all the OS versions for the chosen platform, regardless of platform support. Unsupported OS versions are grayed out in the tree. Hover your mouse over a grayed-out OS version to see its supported model information.
- Saving Preference – You can choose to save your selections as your preference for a specific controller platform type (FAS/V-Series, All-Flash FAS, ONTAP-v, E-Series, FlashRay, SA Series). After you complete your configuration, simply click the **Preference** button at the bottom of the page. Then each time you access the same controller platform type, your saved preferences will display by default. You can delete the preference settings using the same **Preference** button.

5. Select one or more platforms and OS versions. The *Choose Your Specifications* pane displays. See an example **Start with Platforms** page below:



6. Select any specifications you want in the *Choose Your Specifications* pane and then click the **Show Results** button at the bottom of the page. Your results will look like the following, along with footnotes wherever applicable:

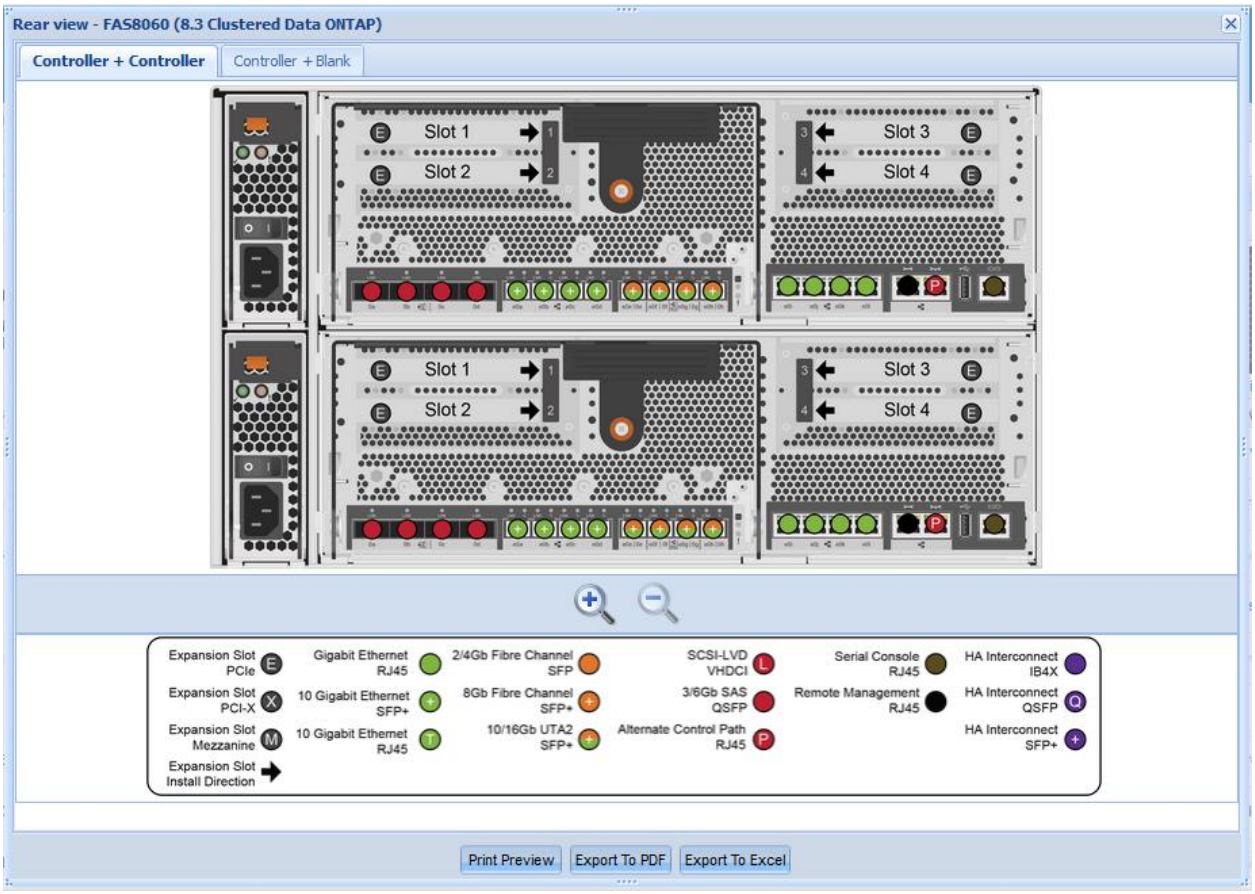


7. Refer to the next section to explore additional features.

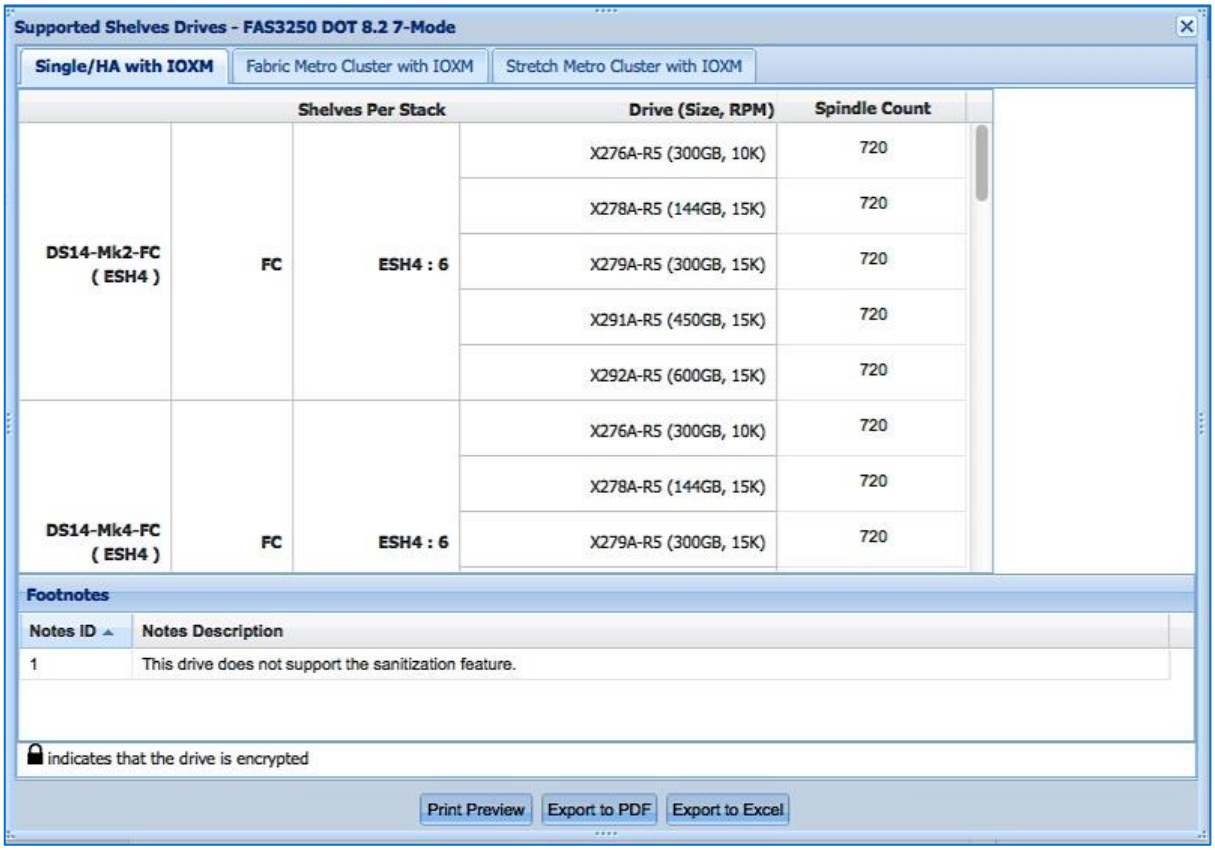
3.1.1 Platforms Specifications Results Page Options

The *Platforms Specifications* results page provides options to view more data about the platforms you have selected. You can also print and export these items:

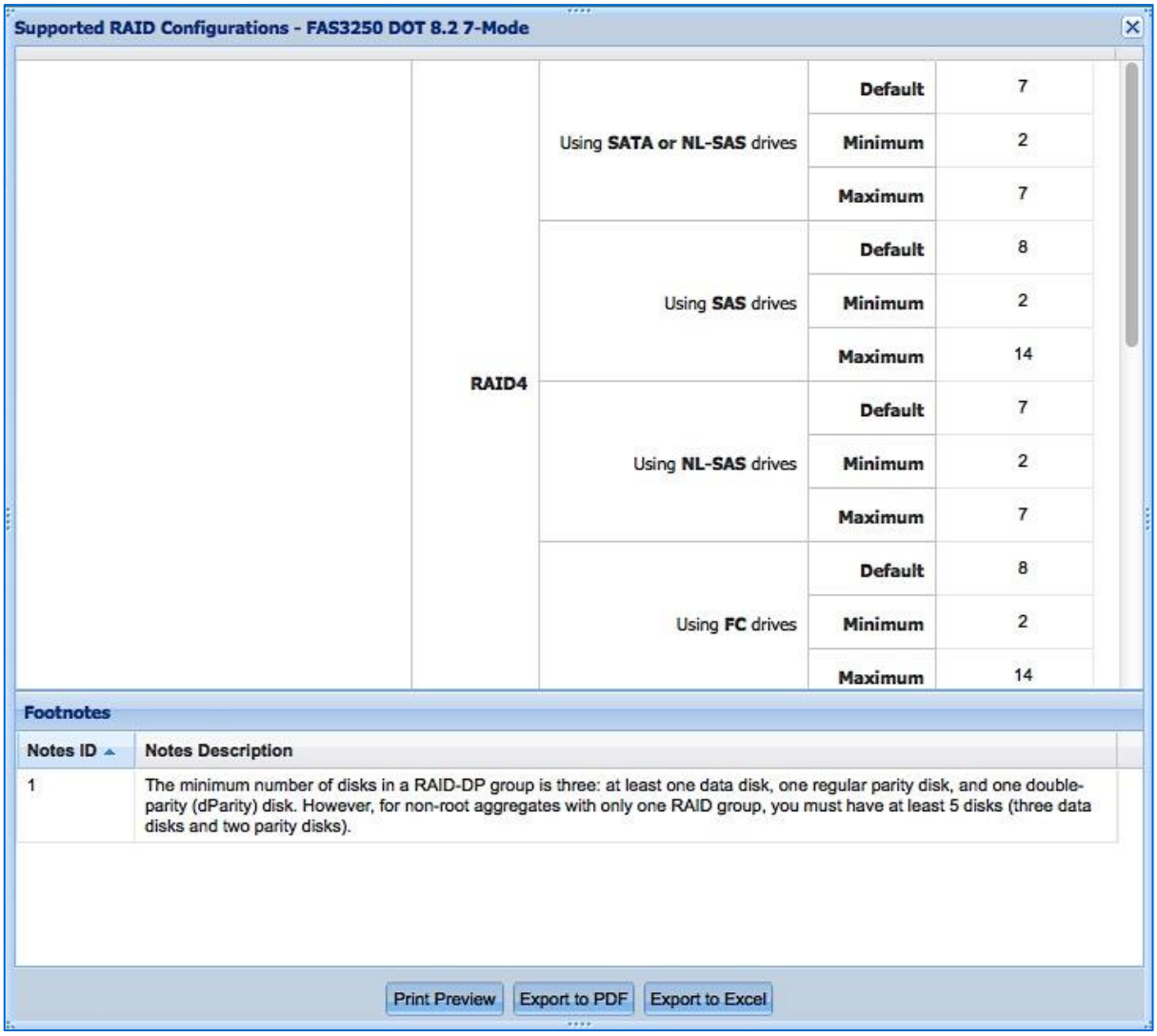
- *Click here to see rear view* shows the rear view of a controller with a color-coded legend to easily locate slots and connections. Rear view images for platforms are shown in different tabs for all supported configurations.



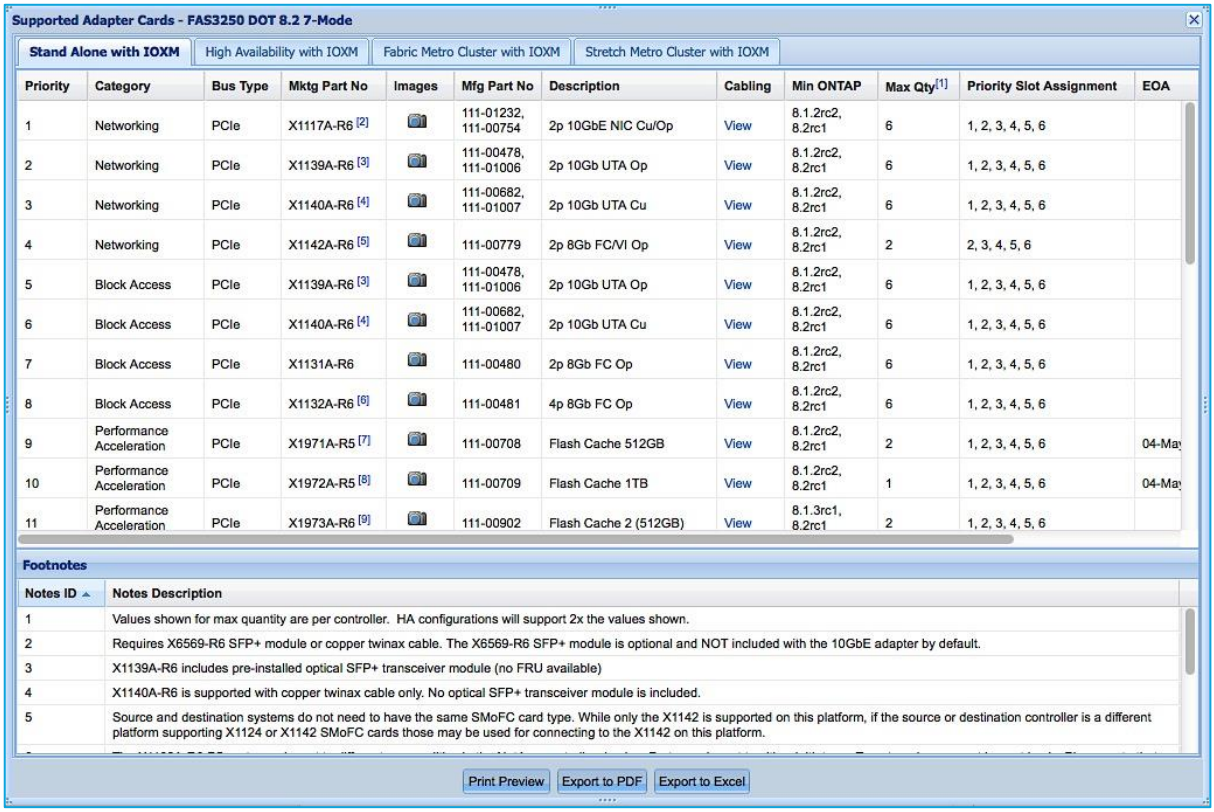
- *Supported Shelves/Drives* shows the supported shelves, shelf modules, disk drives, drive type, shelves per stack, and spindle count for that controller along with the footnotes if any. Some platforms will have internal shelves on a separate tab with the same information. See sections 3.3 and 3.4 for more information about shelves and drives.
  Note: If you specify a controller configuration supporting Fabric MetroCluster or Stretch MetroCluster, then the *Supported Shelves/Drives* popup will show additional tabs, as depicted below.



- *Supported RAID Configurations* shows the RAID group size, RAID type and type of drives used, and the minimum, maximum and default number of disks.



- *Supported Adapter Cards* shows the type of adapters available for a controller and all its associated details. Adapters include Stand Alone, HA, Fabric and Stretch MetroCluster. See section 3.2 for more information about adapter cards.



Supported Adapter Cards - FAS3250 DOT 8.2 7-Mode

Stand Alone with IOXM | High Availability with IOXM | Fabric Metro Cluster with IOXM | Stretch Metro Cluster with IOXM

Priority	Category	Bus Type	Mktg Part No	Images	Mfg Part No	Description	Cabling	Min ONTAP	Max Qty[1]	Priority Slot Assignment	EOA
1	Networking	PCIe	X1117A-R6 [2]		111-01232, 111-00754	2p 10GbE NIC Cu/Op	View	8.1.2rc2, 8.2rc1	6	1, 2, 3, 4, 5, 6	
2	Networking	PCIe	X1139A-R6 [3]		111-00478, 111-01006	2p 10Gb UTA Op	View	8.1.2rc2, 8.2rc1	6	1, 2, 3, 4, 5, 6	
3	Networking	PCIe	X1140A-R6 [4]		111-00682, 111-01007	2p 10Gb UTA Cu	View	8.1.2rc2, 8.2rc1	6	1, 2, 3, 4, 5, 6	
4	Networking	PCIe	X1142A-R6 [5]		111-00779	2p 8Gb FC/VI Op	View	8.1.2rc2, 8.2rc1	2	2, 3, 4, 5, 6	
5	Block Access	PCIe	X1139A-R6 [3]		111-00478, 111-01006	2p 10Gb UTA Op	View	8.1.2rc2, 8.2rc1	6	1, 2, 3, 4, 5, 6	
6	Block Access	PCIe	X1140A-R6 [4]		111-00682, 111-01007	2p 10Gb UTA Cu	View	8.1.2rc2, 8.2rc1	6	1, 2, 3, 4, 5, 6	
7	Block Access	PCIe	X1131A-R6		111-00480	2p 8Gb FC Op	View	8.1.2rc2, 8.2rc1	6	1, 2, 3, 4, 5, 6	
8	Block Access	PCIe	X1132A-R6 [6]		111-00481	4p 8Gb FC Op	View	8.1.2rc2, 8.2rc1	6	1, 2, 3, 4, 5, 6	
9	Performance Acceleration	PCIe	X1971A-R5 [7]		111-00708	Flash Cache 512GB	View	8.1.2rc2, 8.2rc1	2	1, 2, 3, 4, 5, 6	04-May
10	Performance Acceleration	PCIe	X1972A-R5 [8]		111-00709	Flash Cache 1TB	View	8.1.2rc2, 8.2rc1	1	1, 2, 3, 4, 5, 6	04-May
11	Performance Acceleration	PCIe	X1973A-R6 [9]		111-00902	Flash Cache 2 (512GB)	View	8.1.3rc1, 8.2rc1	2	1, 2, 3, 4, 5, 6	

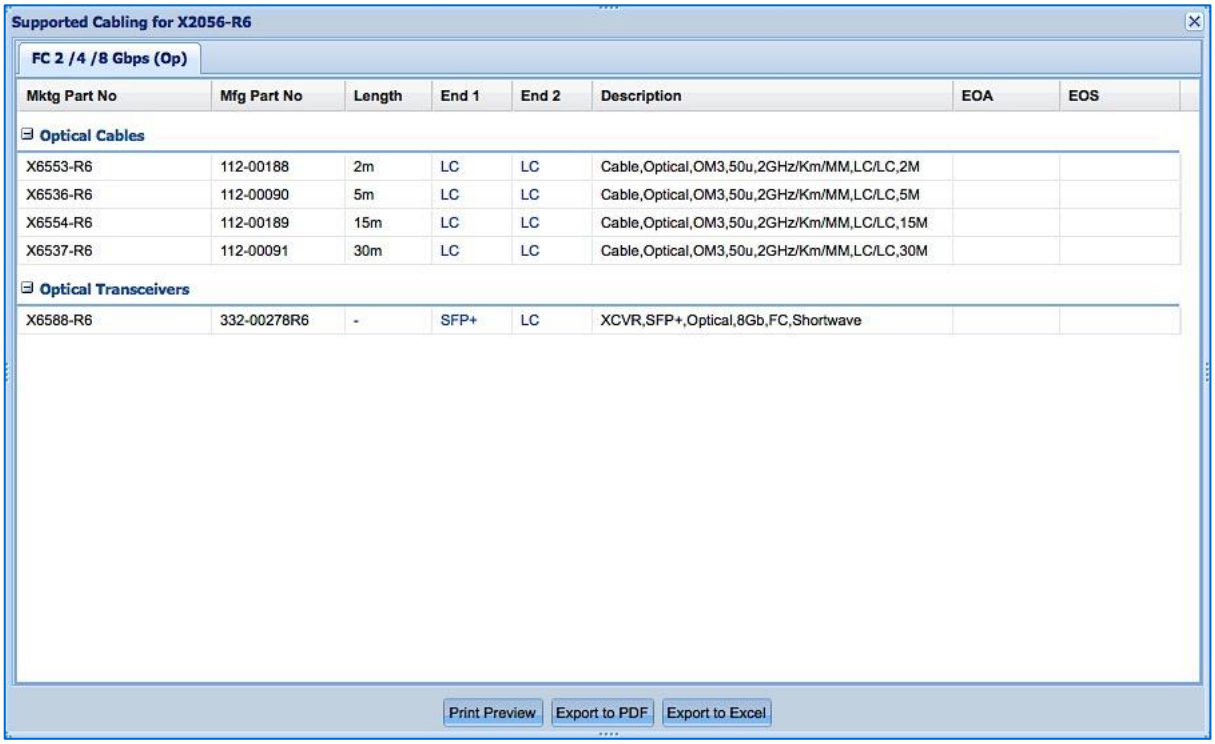
Footnotes

Notes ID	Notes Description
1	Values shown for max quantity are per controller. HA configurations will support 2x the values shown.
2	Requires X6569-R6 SFP+ module or copper twinax cable. The X6569-R6 SFP+ module is optional and NOT included with the 10GbE adapter by default.
3	X1139A-R6 includes pre-installed optical SFP+ transceiver module (no FRU available)
4	X1140A-R6 is supported with copper twinax cable only. No optical SFP+ transceiver module is included.
5	Source and destination systems do not need to have the same SMoFC card type. While only the X1142 is supported on this platform, if the source or destination controller is a different platform supporting X1124 or X1142 SMoFC cards those may be used for connecting to the X1142 on this platform.

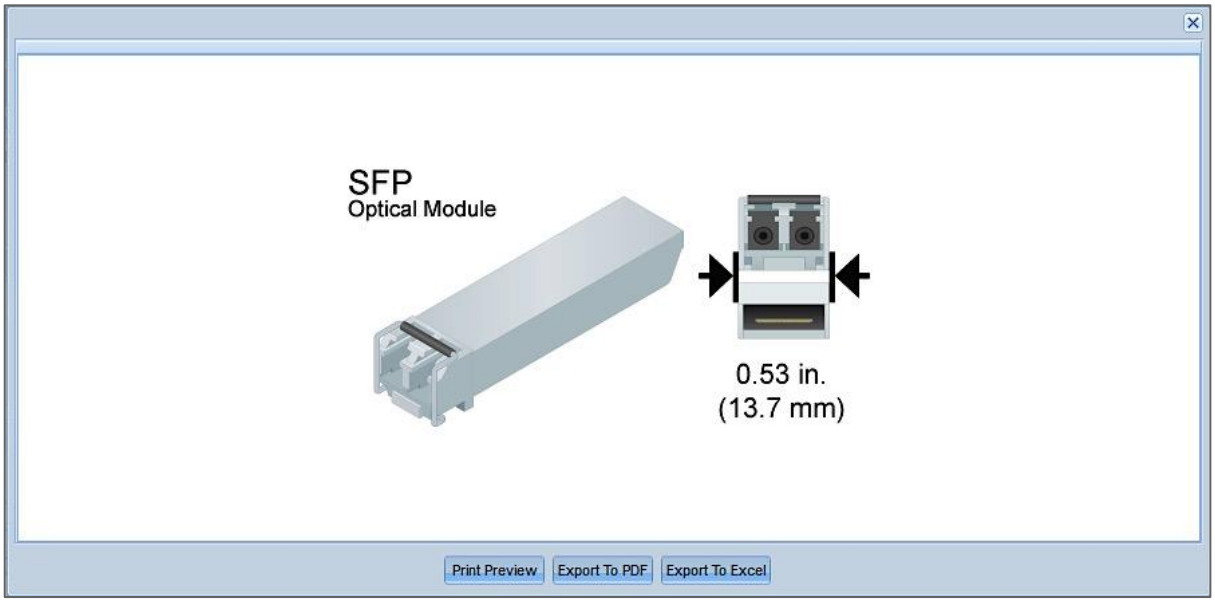
Print Preview | Export to PDF | Export to Excel

In the **Images** column, click the camera icon to view a photograph of the adapter. You can view front, rear and end/backplate images where available. See example below.

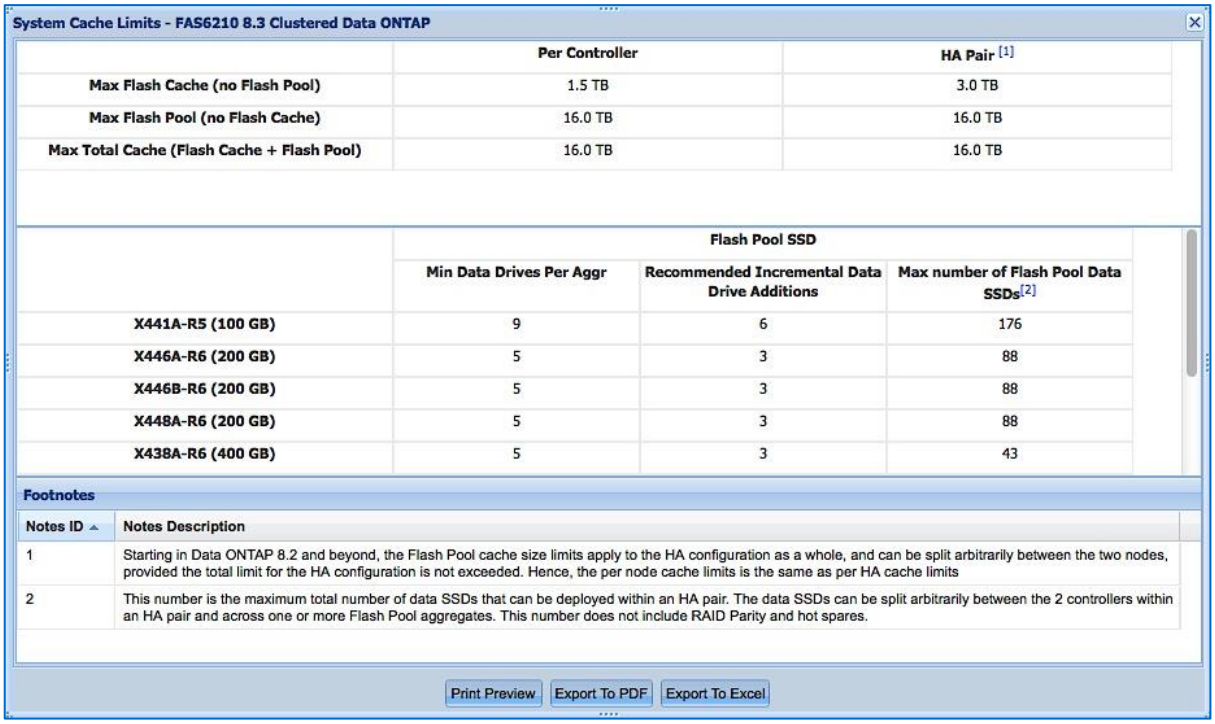
In the **Cabling** column, click **View** to see details for the associated adapter's cables and transceivers, based on protocol and media type.



Click a link in one of the **End** columns to view an image of the cable end. See example below.



- *System Cache Limits* shows the metrics for both Flash Cache and Flash Pool, per controller and HA pair, including drive minimums/maximums and incremental additions, along with any footnotes.



System Cache Limits - FAS6210 8.3 Clustered Data ONTAP

	Per Controller	HA Pair [1]
Max Flash Cache (no Flash Pool)	1.5 TB	3.0 TB
Max Flash Pool (no Flash Cache)	16.0 TB	16.0 TB
Max Total Cache (Flash Cache + Flash Pool)	16.0 TB	16.0 TB

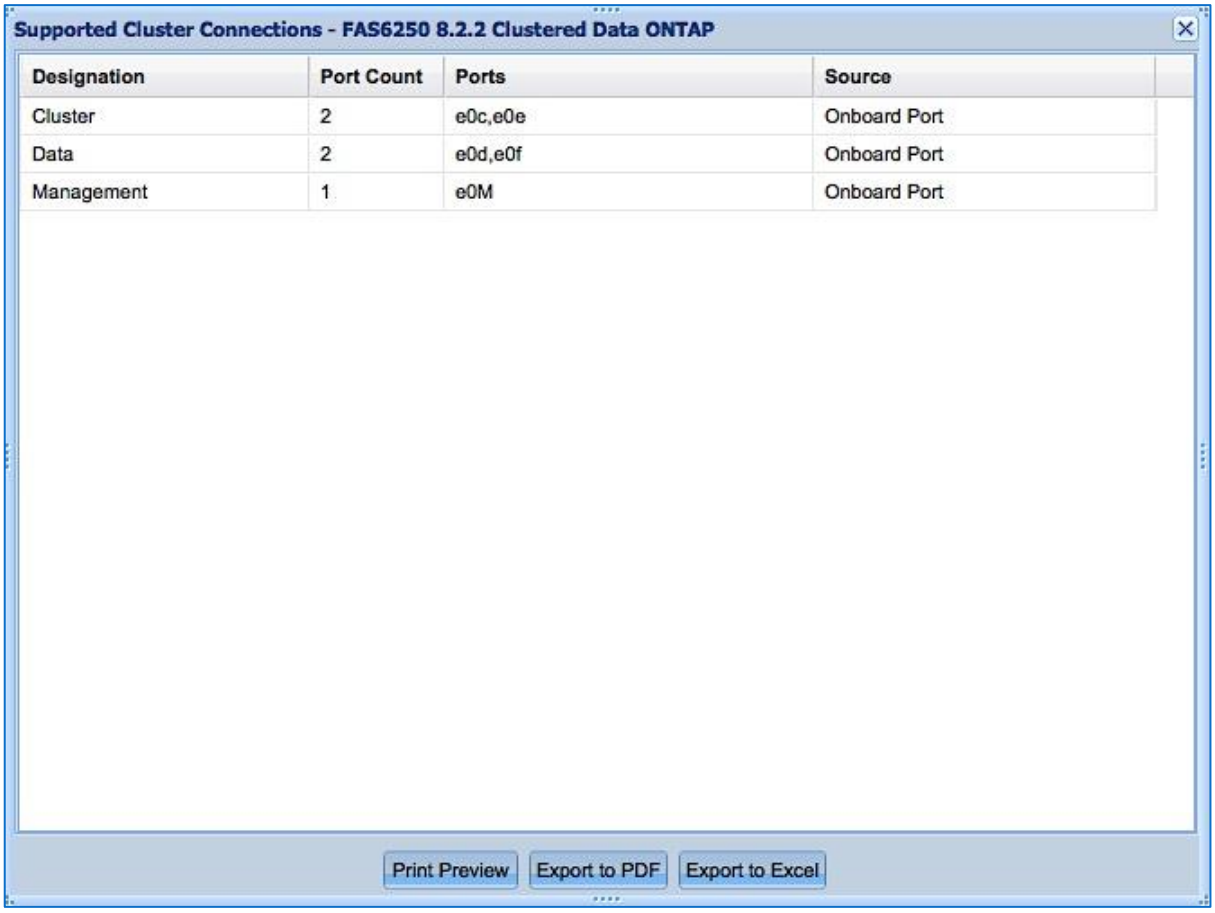
	Flash Pool SSD		
	Min Data Drives Per Aggr	Recommended Incremental Data Drive Additions	Max number of Flash Pool Data SSDs [2]
X441A-R5 (100 GB)	9	6	176
X446A-R6 (200 GB)	5	3	88
X446B-R6 (200 GB)	5	3	88
X448A-R6 (200 GB)	5	3	88
X438A-R6 (400 GB)	5	3	43

Footnotes

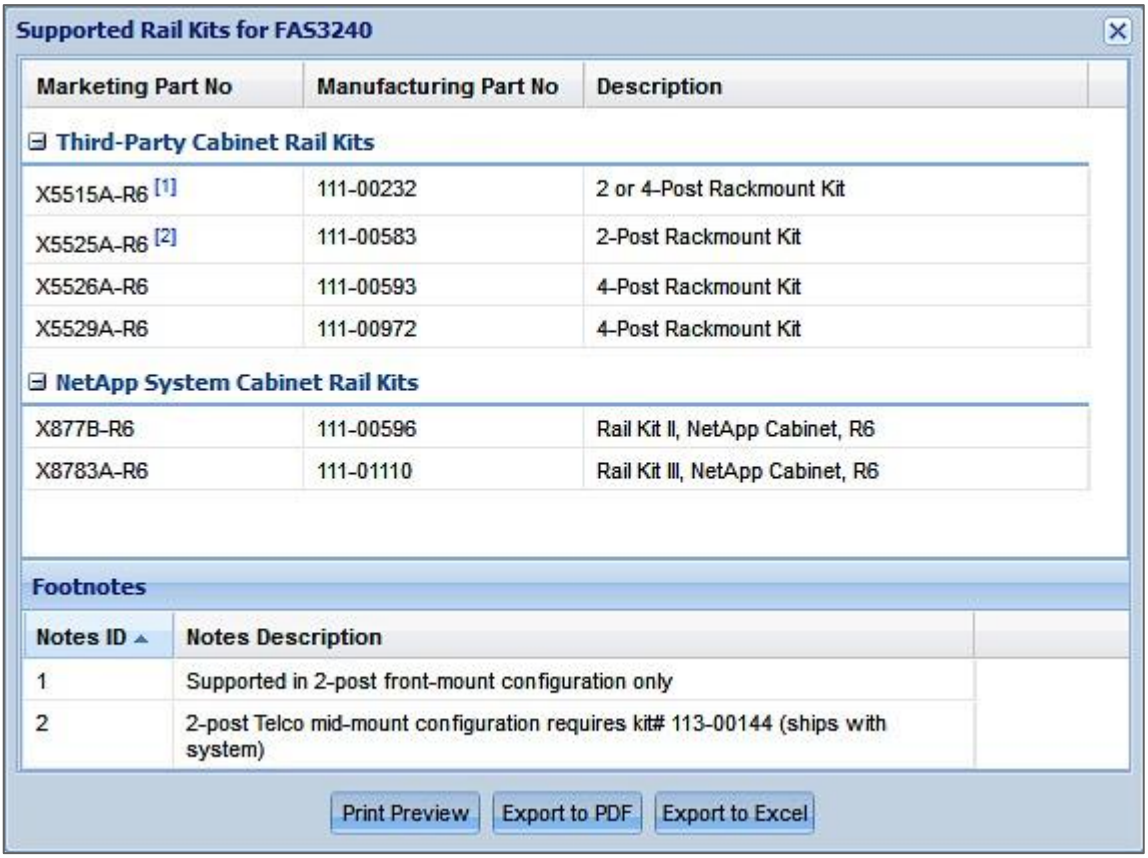
Notes ID	Notes Description
1	Starting in Data ONTAP 8.2 and beyond, the Flash Pool cache size limits apply to the HA configuration as a whole, and can be split arbitrarily between the two nodes, provided the total limit for the HA configuration is not exceeded. Hence, the per node cache limits is the same as per HA cache limits
2	This number is the maximum total number of data SSDs that can be deployed within an HA pair. The data SSDs can be split arbitrarily between the 2 controllers within an HA pair and across one or more Flash Pool aggregates. This number does not include RAID Parity and hot spares.

Print Preview | Export To PDF | Export To Excel

- *Supported Cluster Connections* is available if you select a cluster configuration only, and shows designation, port count, ports and source information.



- *Supported Rail Kits* shows supported third-party rail kit part numbers and rail kits for NetApp system cabinets.



Supported Rail Kits for FAS3240

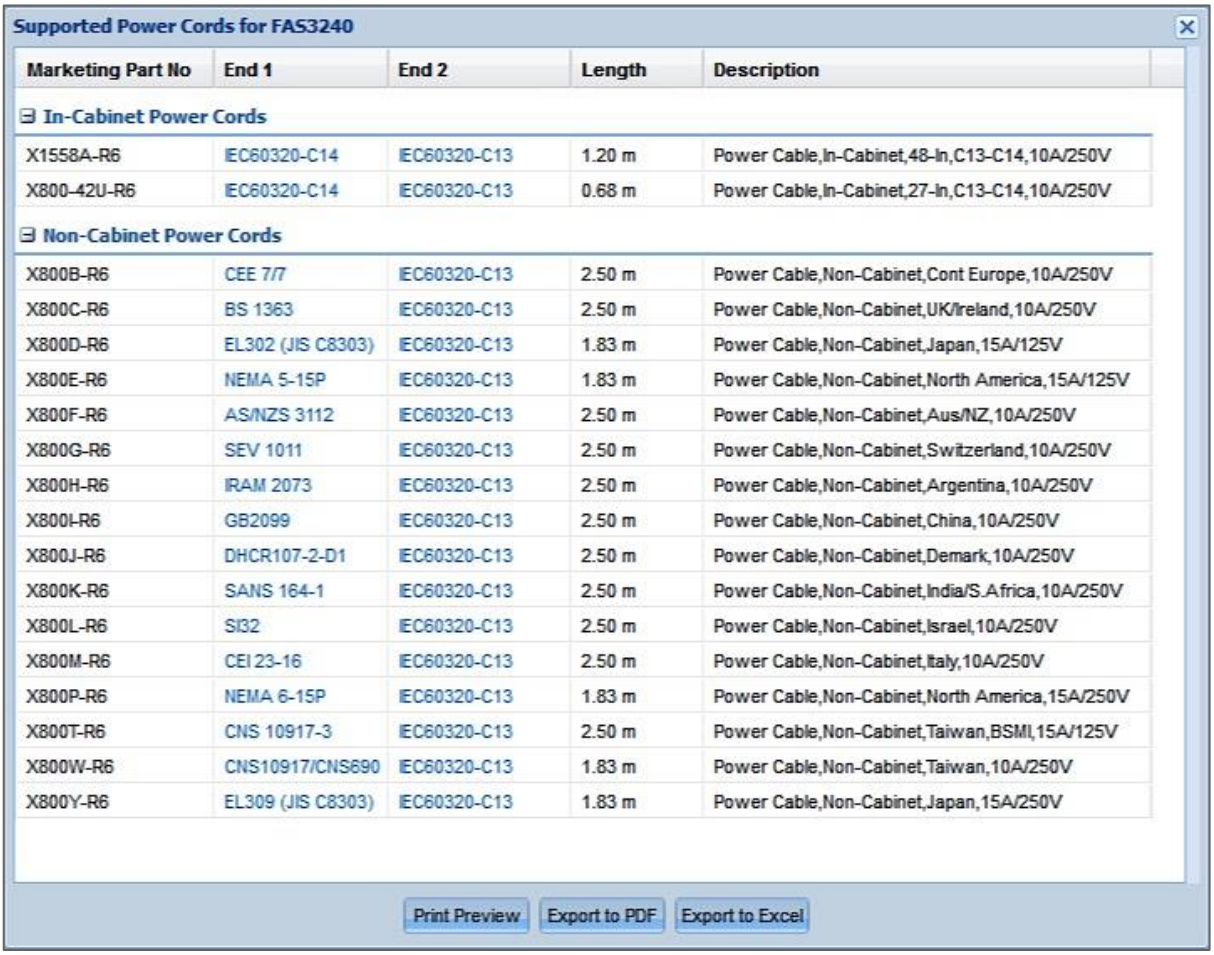
Marketing Part No	Manufacturing Part No	Description
Third-Party Cabinet Rail Kits		
X5515A-R6 [1]	111-00232	2 or 4-Post Rackmount Kit
X5525A-R6 [2]	111-00583	2-Post Rackmount Kit
X5526A-R6	111-00593	4-Post Rackmount Kit
X5529A-R6	111-00972	4-Post Rackmount Kit
NetApp System Cabinet Rail Kits		
X877B-R6	111-00596	Rail Kit II, NetApp Cabinet, R6
X8783A-R6	111-01110	Rail Kit III, NetApp Cabinet, R6

Footnotes

Notes ID ▲	Notes Description
1	Supported in 2-post front-mount configuration only
2	2-post Telco mid-mount configuration requires kit# 113-00144 (ships with system)

Print Preview | Export to PDF | Export to Excel

- *Supported Power Cords* shows marketing part number, end 1, end 2, length and description.

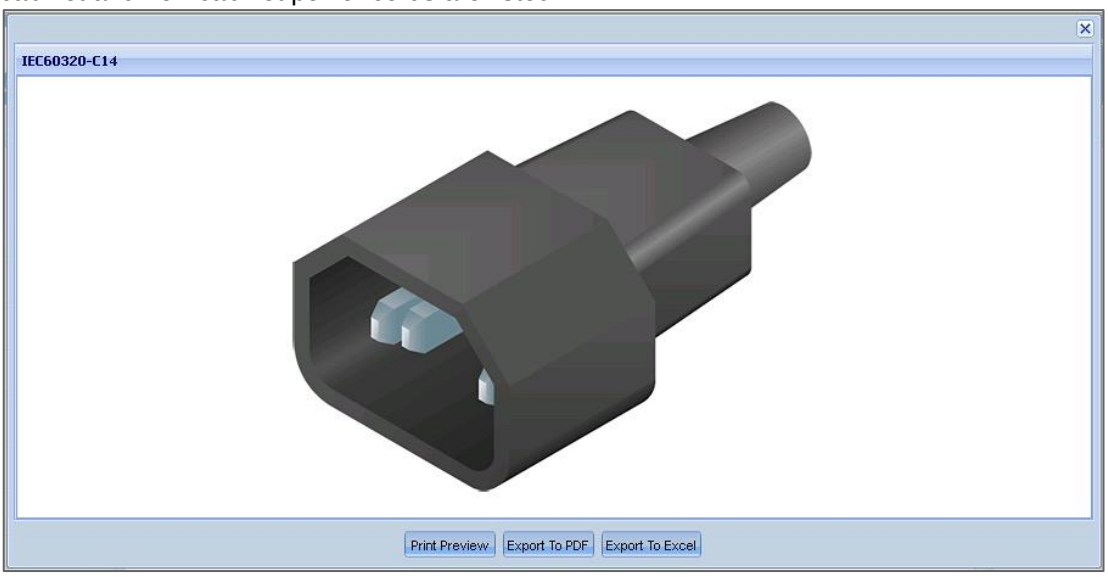


Supported Power Cords for FAS3240

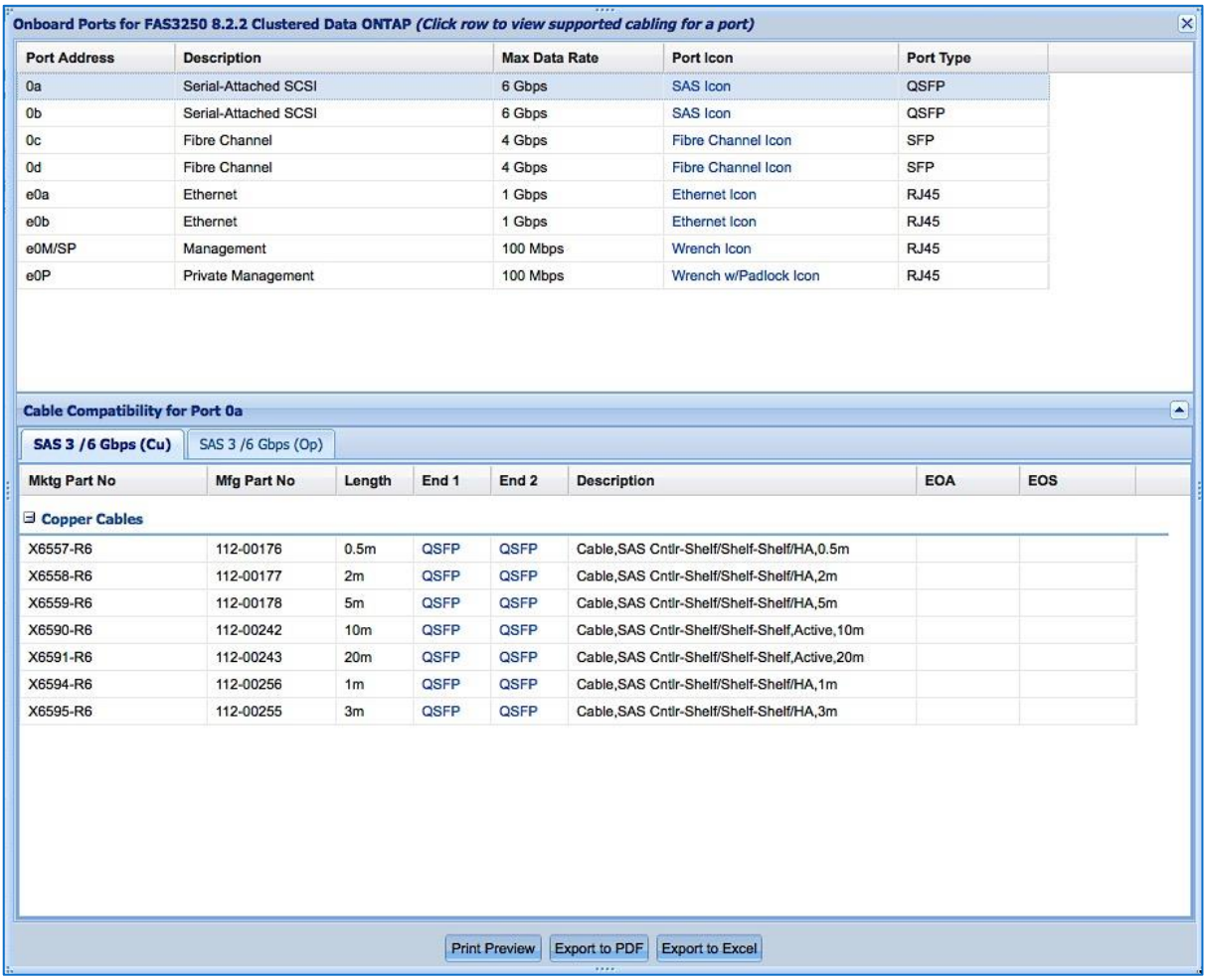
Marketing Part No	End 1	End 2	Length	Description
In-Cabinet Power Cords				
X1558A-R6	IEC60320-C14	IEC60320-C13	1.20 m	Power Cable,In-Cabinet,48-In,C13-C14,10A/250V
X800-42U-R6	IEC60320-C14	IEC60320-C13	0.68 m	Power Cable,In-Cabinet,27-In,C13-C14,10A/250V
Non-Cabinet Power Cords				
X800B-R6	CEE 7/7	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Cont Europe,10A/250V
X800C-R6	BS 1363	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,UK/Ireland,10A/250V
X800D-R6	EL302 (JIS C8303)	IEC60320-C13	1.83 m	Power Cable,Non-Cabinet,Japan,15A/125V
X800E-R6	NEMA 5-15P	IEC60320-C13	1.83 m	Power Cable,Non-Cabinet,North America,15A/125V
X800F-R6	AS/NZS 3112	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Aus/NZ,10A/250V
X800G-R6	SEV 1011	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Switzerland,10A/250V
X800H-R6	IRAM 2073	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Argentina,10A/250V
X800I-R6	GB2099	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,China,10A/250V
X800J-R6	DHCR107-2-D1	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Demark,10A/250V
X800K-R6	SANS 164-1	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,India/S.Africa,10A/250V
X800L-R6	SI32	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Israel,10A/250V
X800M-R6	CEI 23-16	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Italy,10A/250V
X800P-R6	NEMA 6-15P	IEC60320-C13	1.83 m	Power Cable,Non-Cabinet,North America,15A/250V
X800T-R6	CNS 10917-3	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Taiwan,BSMI,15A/125V
X800W-R6	CNS10917/CNS690	IEC60320-C13	1.83 m	Power Cable,Non-Cabinet,Taiwan,10A/250V
X800Y-R6	EL309 (JIS C8303)	IEC60320-C13	1.83 m	Power Cable,Non-Cabinet,Japan,15A/250V

Print Preview | Export to PDF | Export to Excel

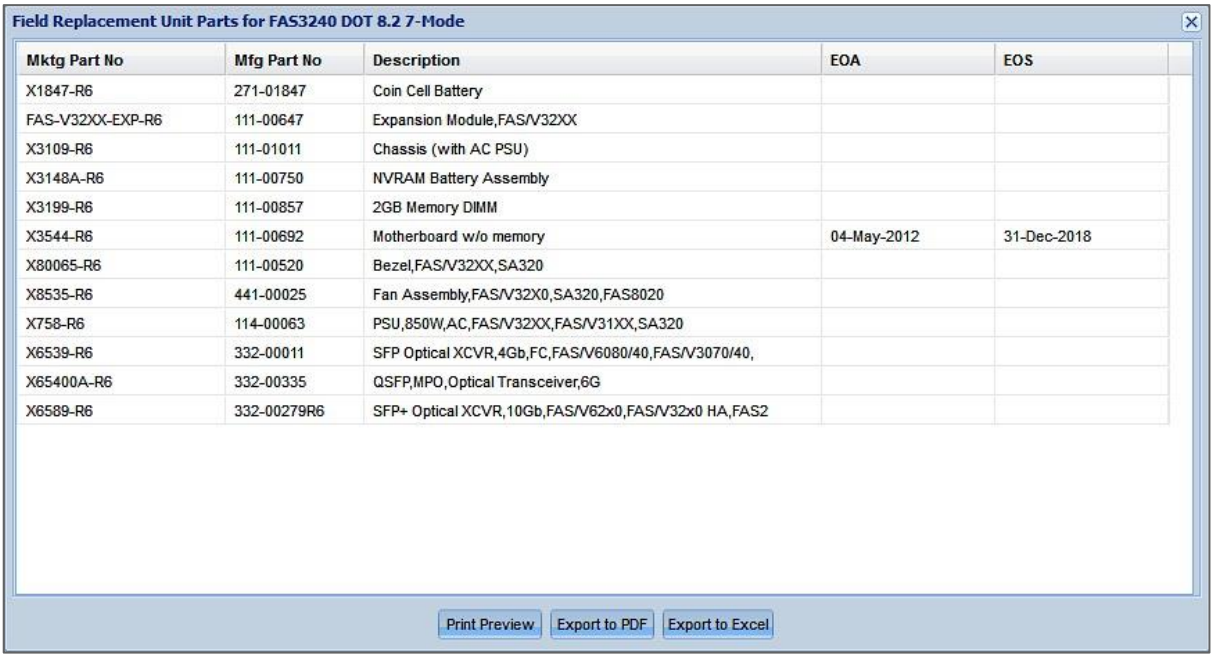
End 1 and end 2 images can be viewed using the corresponding column links. Note that both in-cabinet and non-cabinet power cords are listed.



- *Onboard Ports and Cabling* shows the compatibility of data cable and transceivers with adapter cards, onboard controller ports, and disk shelf ports. Related imagery is available for port icons and copper or optical cable ends. Click any row in the upper pane to view its associated cabling in the lower pane. See example below, where the upper pane's Port is highlighted and its related Cable Compatibility information is displayed in the lower pane below.



- *Field Replacement Units (FRUs)* shows FRU part numbers for each controller model. Components may include power supply units, memory DIMMS, fans and more. EOA/EOS dates are also provided.



Field Replacement Unit Parts for FAS3240 DOT 8.2 7-Mode

Mktg Part No	Mfg Part No	Description	EOA	EOS
X1847-R6	271-01847	Coin Cell Battery		
FAS-V32XX-EXP-R6	111-00647	Expansion Module,FAS/V32XX		
X3109-R6	111-01011	Chassis (with AC PSU)		
X3148A-R6	111-00750	NVRAM Battery Assembly		
X3199-R6	111-00857	2GB Memory DIMM		
X3544-R6	111-00692	Motherboard w/o memory	04-May-2012	31-Dec-2018
X80065-R6	111-00520	Bezel,FAS/V32XX,SA320		
X8535-R6	441-00025	Fan Assembly,FAS/V32X0,SA320,FAS8020		
X758-R6	114-00063	PSU,850W,AC,FAS/V32XX,FAS/V31XX,SA320		
X6539-R6	332-00011	SFP Optical XCVR,4Gb,FC,FAS/V6080/40,FAS/V3070/40,		
X65400A-R6	332-00335	QSFP,MPO,Optical Transceiver,6G		
X6589-R6	332-00279R6	SFP+ Optical XCVR,10Gb,FAS/V62x0,FAS/V32x0 HA,FAS2		

Print Preview | Export to PDF | Export to Excel

- *Electrical Requirements* shows power requirements specific to the controller you selected. Beginning in Hardware Universe version 4.6, extensive scrolling is eliminated by providing users with individual results for each controller configuration – simply click the groupings shown in the top pane to display those specific electrical requirements in the pane(s) below.

Electrical Requirements for FAS2220

Single Controller, 6 internal drives
Single Controller, 12 internal drives
Dual Controllers, 12 internal drives
Show All

Single Controller, 6 internal drives

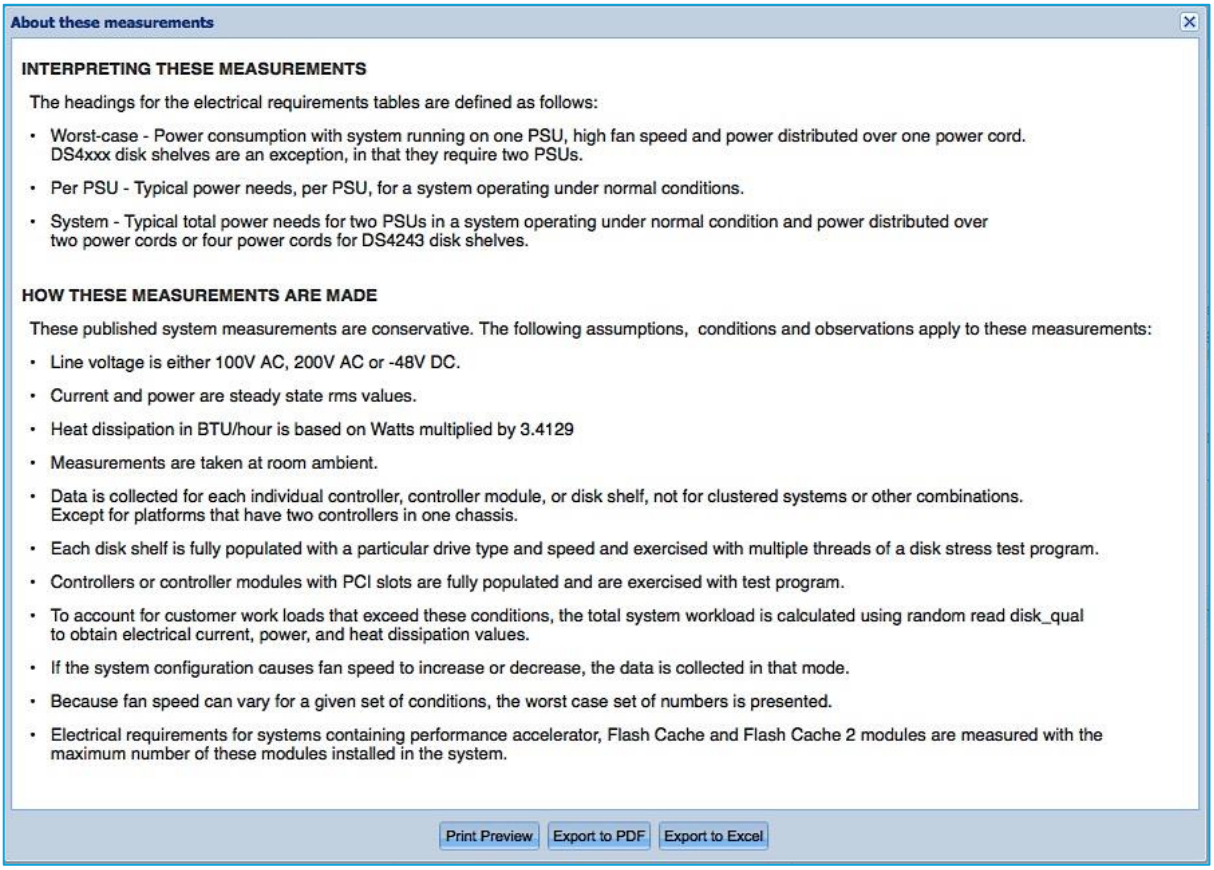
		100 to 120V (100V actual)		200 to 240V (200V actual)		200 to 240V (215V actual)		-60 to -40V (-40V actual)	
		Worst-Case, Single PSU	Typical System, Two PSU	Worst-Case, Single PSU	Typical System, Two PSU	Worst-Case, Single PSU	Typical System, Two PSU	Worst-Case, Single PSU	Typical System, Two PSU
Input Current Measured (Amps)	6 x 1TB 7.2K SATA	3.57	1.86	1.77	1.03	N/A	N/A	N/A	N/A
Input Power Measured (Watts)	6 x 1TB 7.2K SATA	356	184	349	180	N/A	N/A	N/A	N/A
Thermal Dissipation (BTU/hr)	6 x 1TB 7.2K SATA	1215	628	1192	615	N/A	N/A	N/A	N/A

Single Controller, 12 internal drives

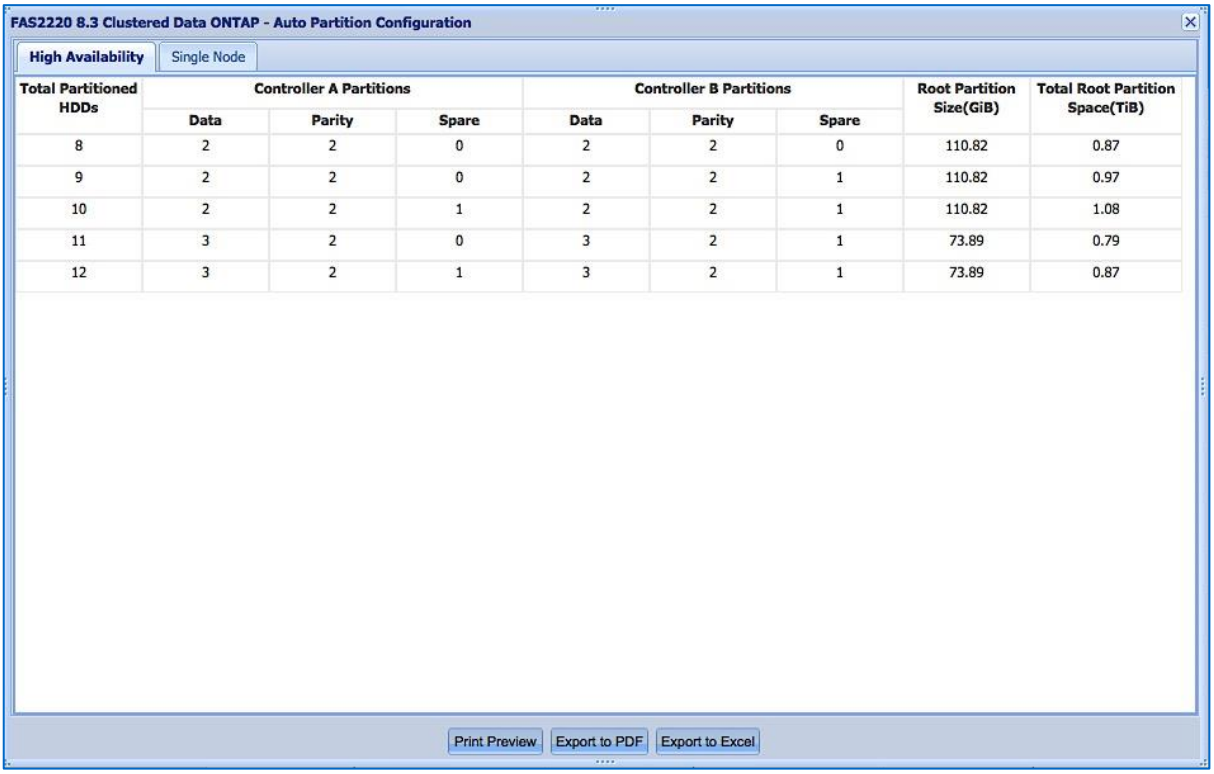
		100 to 120V (100V actual)		200 to 240V (200V actual)		200 to 240V (215V actual)		-60 to -40V (-40V actual)	
		Worst-Case, Single PSU	Typical System, Two PSU	Worst-Case, Single PSU	Typical System, Two PSU	Worst-Case, Single PSU	Typical System, Two PSU	Worst-Case, Single PSU	Typical System, Two PSU
	4 x 400GB SSD 8 x 4TB 7.2K NL-SAS	3.52	2.94	1.91	1.66	N/A	N/A	N/A	N/A
	12 x 4TB 7.2K NL-SAS	3.3	2.48	1.69	1.27	N/A	N/A	N/A	N/A
	12 x 450GB 10K SAS	3.72	1.95	1.81	1.07	N/A	N/A	N/A	N/A
	12 x 600GB 10K SAS	3.71	1.97	1.82	1.08	N/A	N/A	N/A	N/A
		3.76	2.56	1.82	1.3	N/A	N/A	N/A	N/A

Print Preview | Export to PDF | Export to Excel | How are these measurements made?

- Click the **How are these measurements made?** button in the bottom right corner for important additional information. The following popup appears with information on how to interpret the measurements and how they were derived.



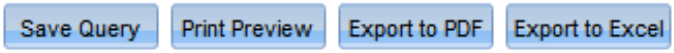
- *Advanced Drive Partitioning* (where supported) shows High Availability and Single Node data on a per-controller basis for the specified configuration. For high-end systems such as the FAS8000 series, an All Flash FAS tab may appear. This feature is new beginning in HWU 4.6.



Total Partitioned HDDs	Controller A Partitions			Controller B Partitions			Root Partition Size(GiB)	Total Root Partition Space(TiB)
	Data	Parity	Spare	Data	Parity	Spare		
8	2	2	0	2	2	0	110.82	0.87
9	2	2	0	2	2	1	110.82	0.97
10	2	2	1	2	2	1	110.82	1.08
11	3	2	0	3	2	1	73.89	0.79
12	3	2	1	3	2	1	73.89	0.87

3.1.2 Saving, Printing and Exporting Results

At the bottom of every Results page, you have options to save your query, print the current configuration, or export it to PDF or Excel. These options appear throughout the HWU interface.



Note that whenever you click the **Show Results** button, HWU automatically saves your recently accessed criteria. This can be viewed later in two ways: from the *My Recent Queries* quadrant of the home page or from the **Saved Queries** tab (discussed later in this guide). To save a query, simply click the button at the bottom of the results page and enter a name and short description.

3.2 Adapters

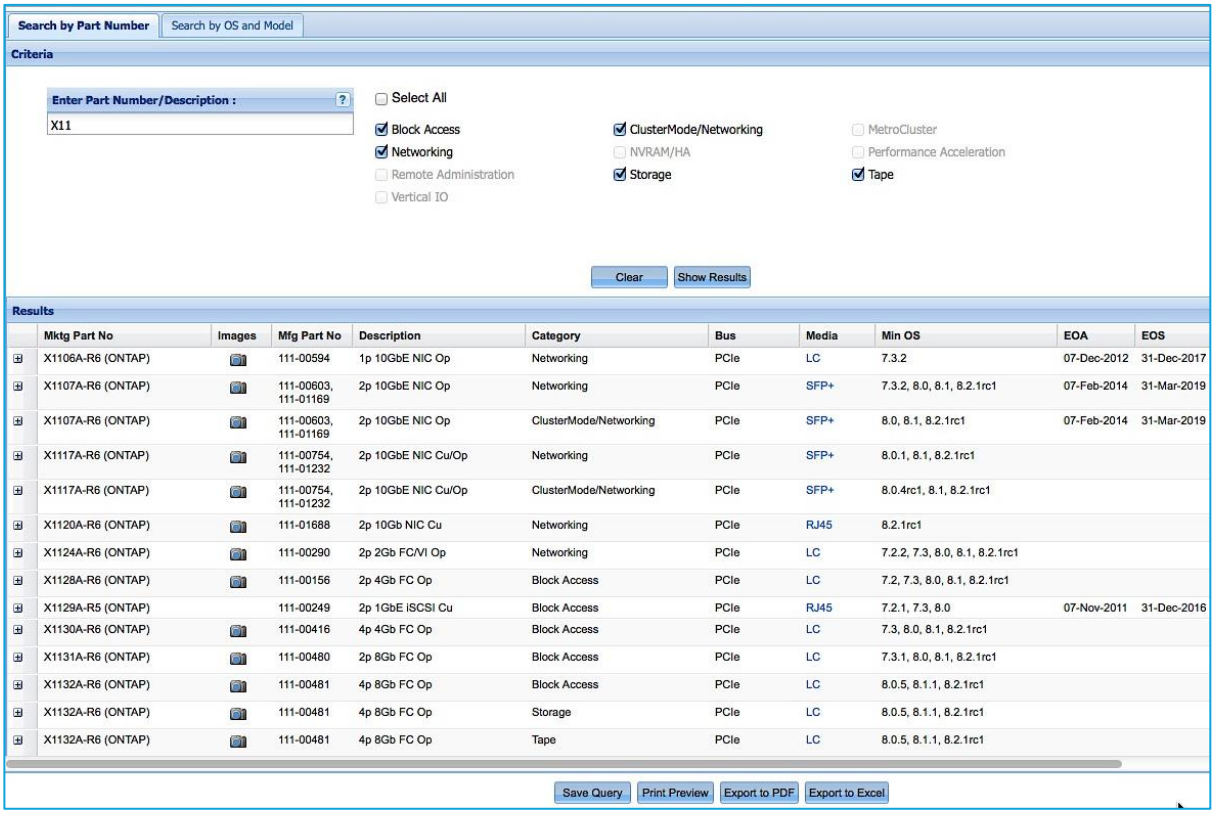
By default, the **Adapters** tab allows you search for adapter cards by part number. Alternatively, you can conduct a search of adapters by OS and model. Both search procedures are explained below.

3.2.1 Searching Adapters by Part Number

To search adapter cards by part number:

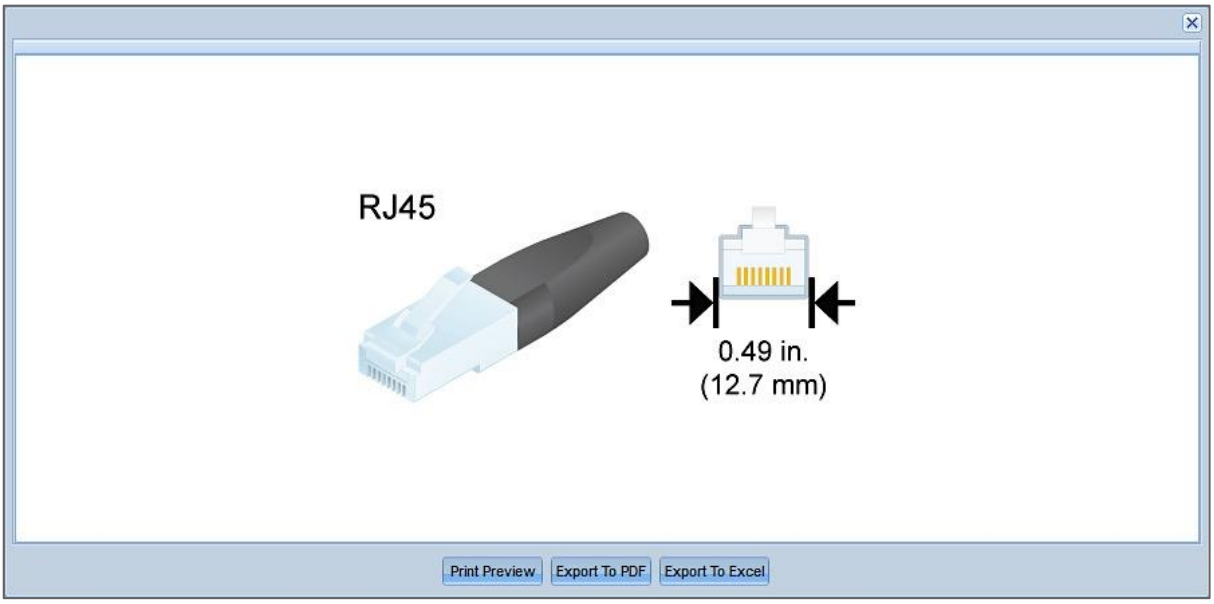
1. Click the **Adapters** tab in the menu bar. The **Search by Part Number** tab appears by default.
2. When you type in the search text box, the system auto-suggests adapters that you can choose from, or you can enter:
   a. Nothing, select any number of card categories or **Select All** and then click **Show Results** to return a list of all adapters.
   b. A string, such as "X11" and then click **Show Results** to return a list of all adapters fitting that criteria.
   c. A partial part number or description. As you type, suggested options appear and the supported categories are checked. You can then select a single adapter and click **Show Results** for that adapter only.

   To see a list of both valid and invalid search patterns, click the '?' icon in the top right corner of the auto-suggestion box.
3. Below is an example results page from searching on "X11."

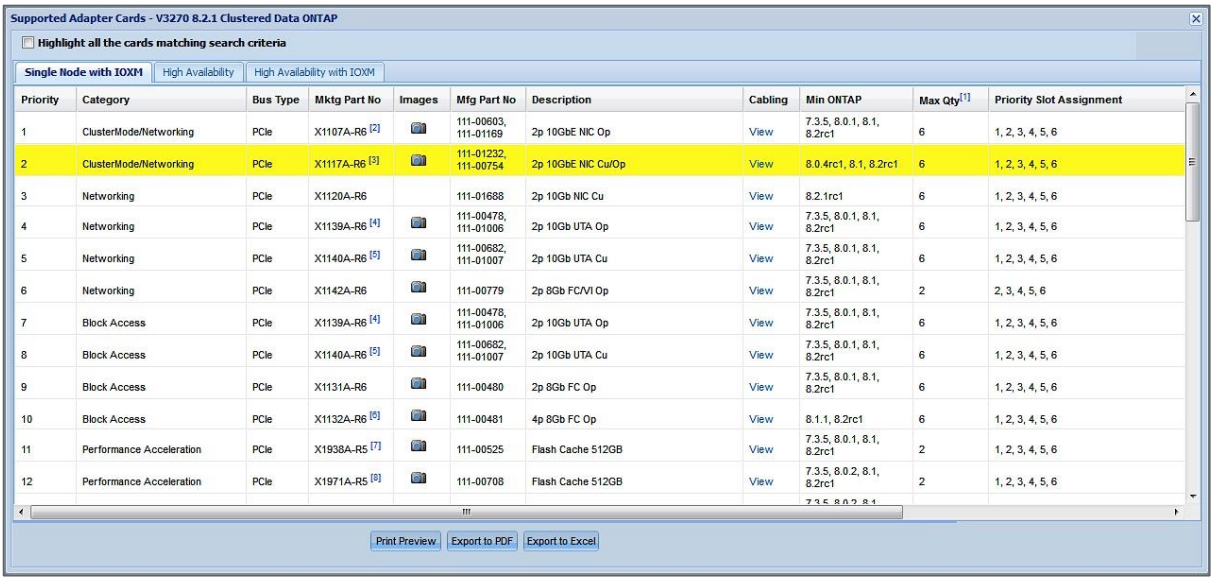


4. In the **Images** column, click the camera icon to view a photograph of the adapter. You can view front, rear and end/backplate images where available. See example below.

5. In the **Media** column, click a link to view an image of the supported media, as shown in the example below:



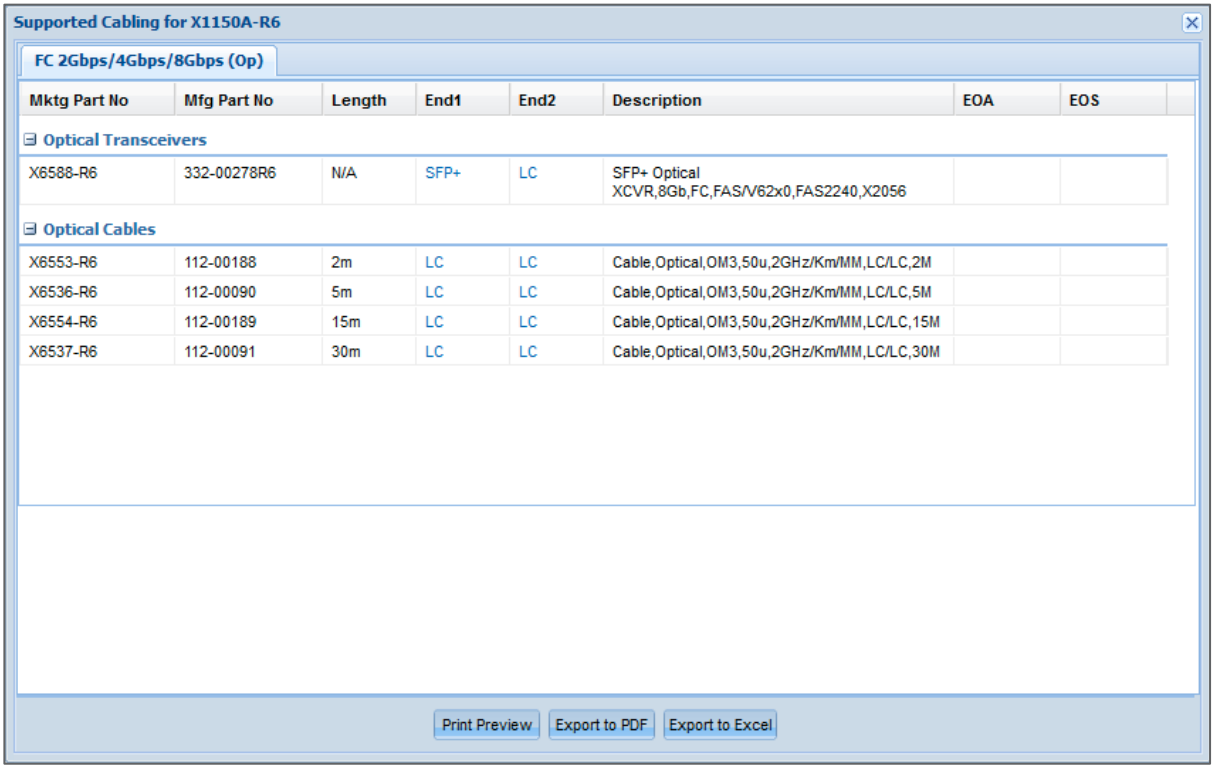
6. In the lower pane, click the '+' icon to view expanded details of any adapter card.
7. Click any platform model name. A popup appears showing the supported adapter cards for the associated platform.
8. In the top left corner, click the checkbox labeled **Highlight all the cards matching search criteria**. See example below.



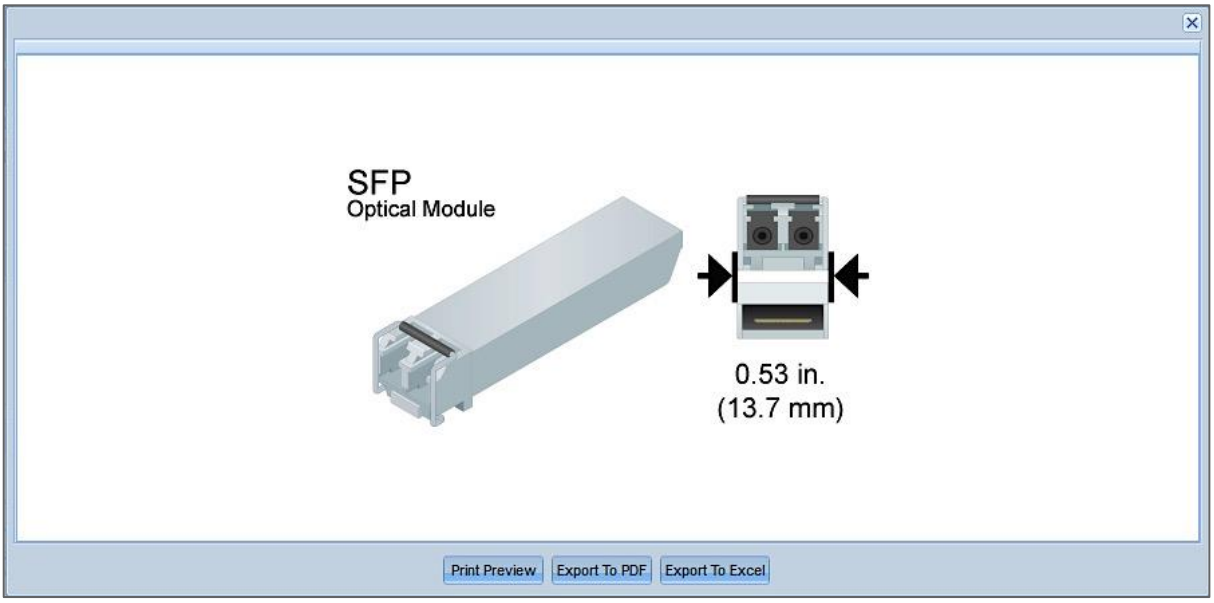
Priority	Category	Bus Type	Mktg Part No	Images	Mfg Part No	Description	Cabling	Min ONTAP	Max Qty[1]	Priority Slot Assignment
1	ClusterMode/Networking	PCIe	X1107A-R6 [2]		111-00603, 111-01169	2p 10GbE NIC Op	View	7.3.5, 8.0.1, 8.1, 8.2rc1	6	1, 2, 3, 4, 5, 6
2	ClusterMode/Networking	PCIe	X1117A-R6 [3]		111-01232, 111-00754	2p 10GbE NIC Cu/Op	View	8.0.4rc1, 8.1, 8.2rc1	6	1, 2, 3, 4, 5, 6
3	Networking	PCIe	X1120A-R6		111-01688	2p 10Gb NIC Cu	View	8.2.1rc1	6	1, 2, 3, 4, 5, 6
4	Networking	PCIe	X1139A-R6 [4]		111-00478, 111-01006	2p 10Gb UTA Op	View	7.3.5, 8.0.1, 8.1, 8.2rc1	6	1, 2, 3, 4, 5, 6
5	Networking	PCIe	X1140A-R6 [5]		111-00682, 111-01007	2p 10Gb UTA Cu	View	7.3.5, 8.0.1, 8.1, 8.2rc1	6	1, 2, 3, 4, 5, 6
6	Networking	PCIe	X1142A-R6		111-00779	2p 8Gb FC/VI Op	View	7.3.5, 8.0.1, 8.1, 8.2rc1	2	2, 3, 4, 5, 6
7	Block Access	PCIe	X1139A-R6 [4]		111-00478, 111-01006	2p 10Gb UTA Op	View	7.3.5, 8.0.1, 8.1, 8.2rc1	6	1, 2, 3, 4, 5, 6
8	Block Access	PCIe	X1140A-R6 [5]		111-00682, 111-01007	2p 10Gb UTA Cu	View	7.3.5, 8.0.1, 8.1, 8.2rc1	6	1, 2, 3, 4, 5, 6
9	Block Access	PCIe	X1131A-R6		111-00480	2p 8Gb FC Op	View	7.3.5, 8.0.1, 8.1, 8.2rc1	6	1, 2, 3, 4, 5, 6
10	Block Access	PCIe	X1132A-R6 [6]		111-00481	4p 8Gb FC Op	View	8.1.1, 8.2rc1	6	1, 2, 3, 4, 5, 6
11	Performance Acceleration	PCIe	X1938A-R5 [7]		111-00525	Flash Cache 512GB	View	7.3.5, 8.0.1, 8.1, 8.2rc1	2	1, 2, 3, 4, 5, 6
12	Performance Acceleration	PCIe	X1971A-R5 [8]		111-00708	Flash Cache 512GB	View	7.3.5, 8.0.2, 8.1, 8.2rc1	2	1, 2, 3, 4, 5, 6

9. Note that you can again view photographs of the adapter card using the **Images** camera icon.

10. In the **Cabling** column click **View** to see cabling details, as shown below.



11. Click a link in one of the **End** columns to view an image of the cable end. See example below.



12. When finished, use the **Save Query, Print Preview**, and **Export** options at the bottom to save your selections.

Adapter Card 'Priority' Notes

Installation Priority: This is the installation priority for the adapter cards and should be taken into consideration first. Adapters with higher priority should be installed before cards with lower priority. For example: Adapter X1234A-R6 has a priority of 2 and should be installed before adapter X3456A-R6 which has a priority of 5.

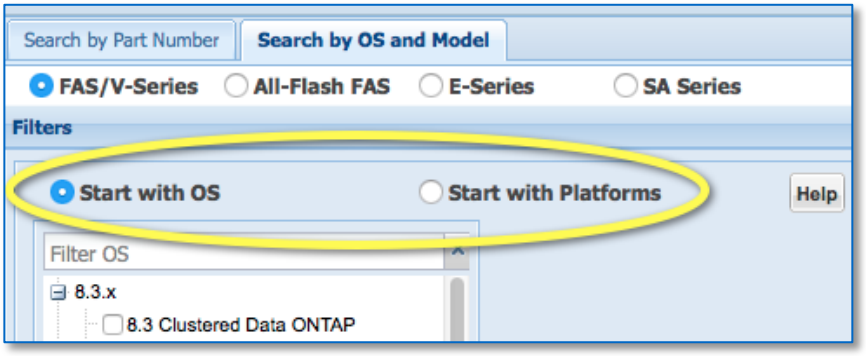
Slot Assignment Priority: This is the order that the slots should be populated in the controller for a given adapter. For example: Adapter X1234A-R6 has slot priority of (1, 3, 5, 2, 4). This means the X1234A-R6 adapter should be installed in slot 1 first. However, if slot 1 is already occupied by an adapter with higher install priority, then slot 3 is the next slot that should be used for the installation (followed by 5, 2, or 4).

Note: If you are adding an adapter to an existing controller and a slot is occupied by an adapter with lower install priority, you may choose to install the adapter in the next available slot rather than rearranging the adapter(s) that are already installed.

3.2.2 Searching Adapters by OS and Model

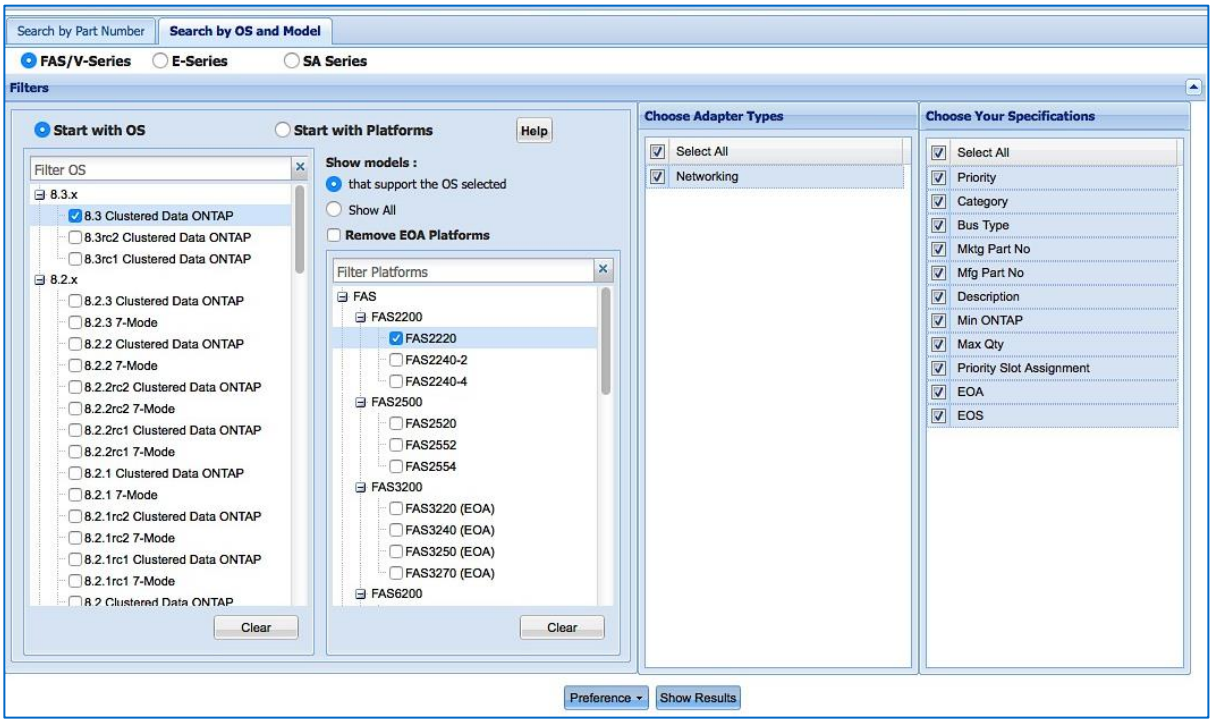
To search adapter cards by OS and model:

1. Click the **Adapters** tab, and then select the **Search by OS and Model** tab. The **FAS/V-Series** option is selected by default. You can optionally select **All-Flash FAS**, **E-Series** or **SA Series**.
2. The *Filters* page then allows you to select the method of configuring your system. You can select **Start with OS** or **Start with Platforms**.



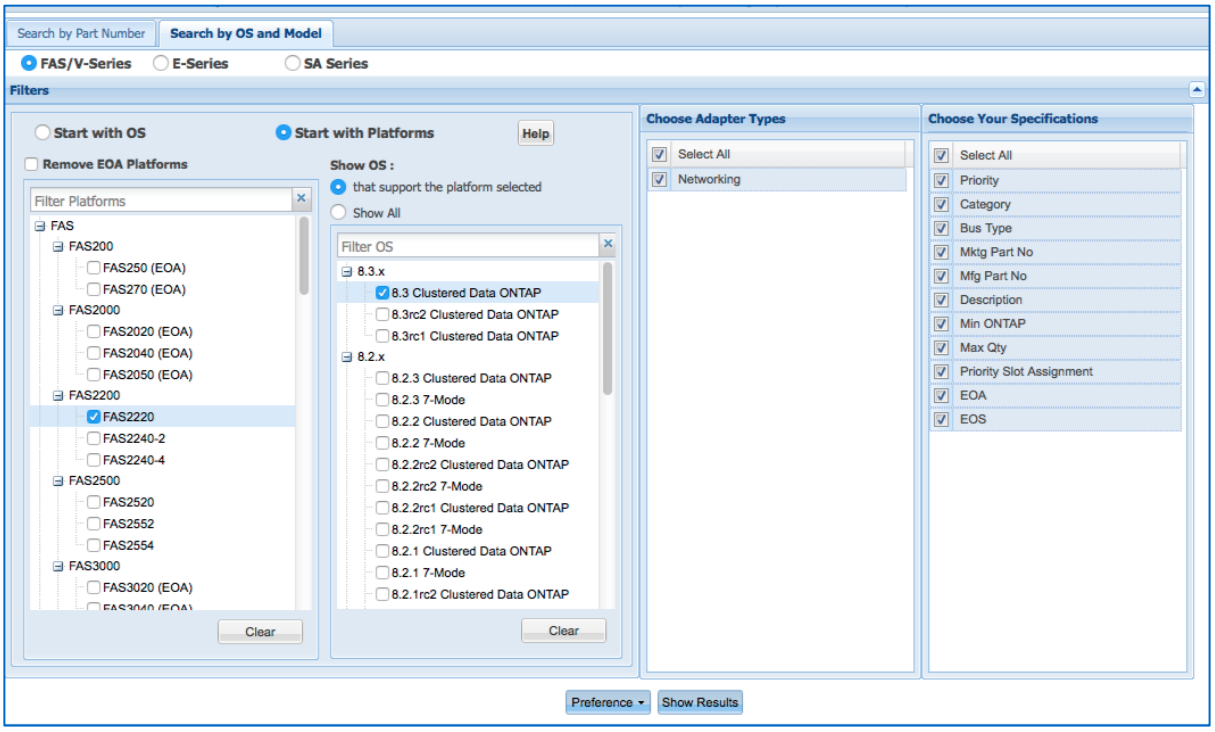
3. **Start with OS** – This is the default option.
   a. Use the **Filter OS** search box to quickly find an OS that you seek. Example filter strings: *8.2.x, 8.3rc1, cluster-mode*.
   b. Select an OS version. The *Show Models* pane displays with a tree of supported platforms.
      - By default, the tree shows models that support the OS version, as indicated by the radio button labeled **that support the OS selected**.
      - Special Note: The **Show All** radio button lists all the models for the chosen platform, regardless of OS support. Unsupported models are grayed out in the tree. Hover your mouse over a grayed-out model to see its supported OS information.
      - To further refine the scope of the platform list, you can select **Remove EOA Platforms.**
      - Use the **Filter Platforms** search box to quickly find a platform by family or model. Example filter stings: *FAS6200, FAS6220*.
   c. Select a platform. Two panes then display: the *Choose Adapter Types* pane and the *Choose Your Specifications* pane.
   d. Select adapter types and specifications as you like.

4. See an example **Start with OS** page below:

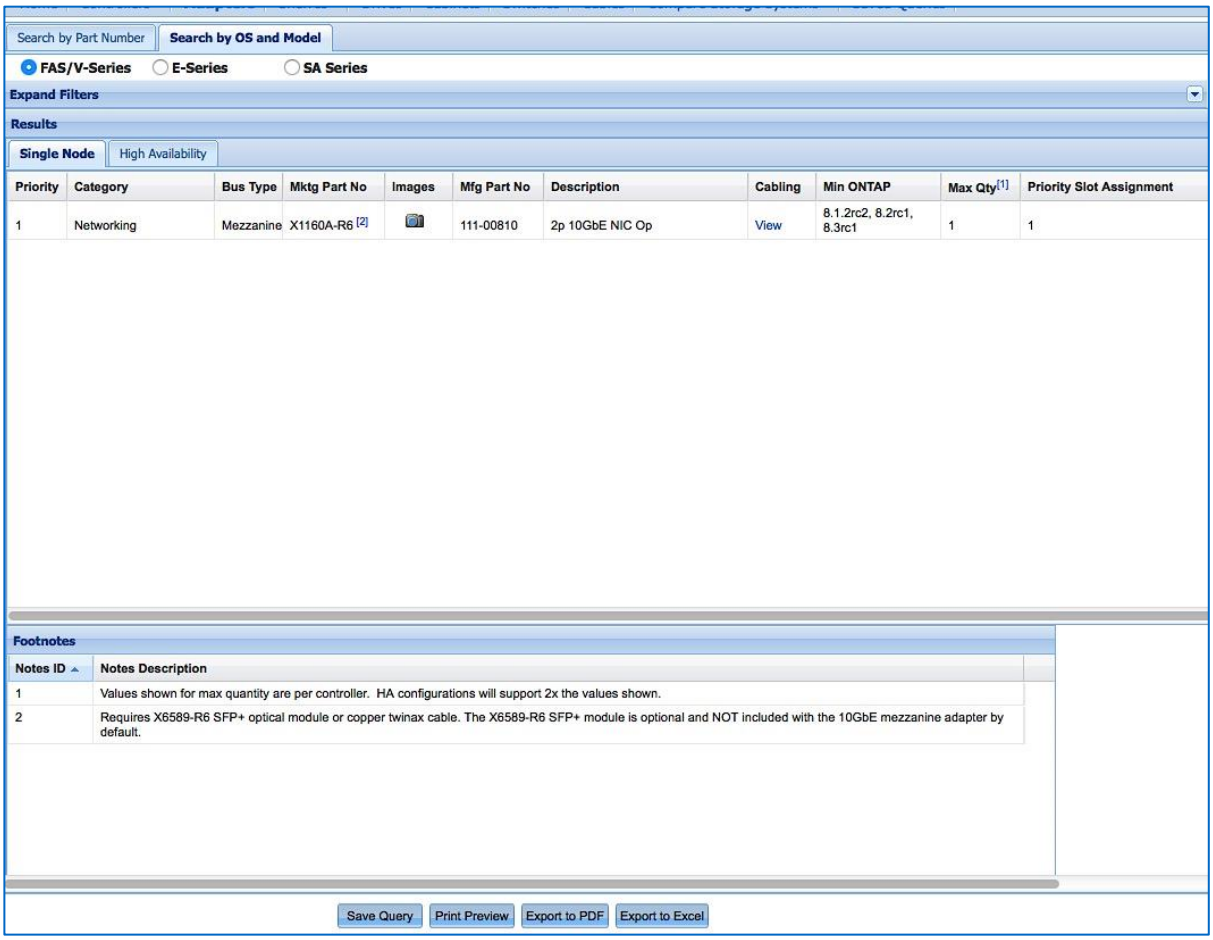


5. **Start with Platforms**– This is not the default, but you can make it so by using the **Preference** button at the bottom of the page after you complete your configuration.
   a. This option works in a similar way as **Start with OS**, except that you start with model selections instead of OS selections.
      - Special Note: The **Show All** radio button lists all the OS versions for the chosen platform, regardless of platform support. Unsupported OS versions are grayed out in the tree. Hover your mouse over a grayed-out OS version to see its supported model information.
      - **Saving Preference** – You can choose to save your selections as your preference for a specific controller platform type (FAS/V-Series, All-Flash FAS, E-Series, SA Series). After you complete your configuration, simply click the **Preference** button at the bottom of the page. Then each time you access the same controller platform type, your saved preferences will display by default. You can delete the preference settings using the same **Preference** button.
   b. Select one or more platforms and OS versions. Two panes then display: the *Choose Adapter Types* pane and the *Choose Your Specifications* pane.
   c. Select adapter types and specifications as you like.

6. See an example **Start with Platforms** page below:

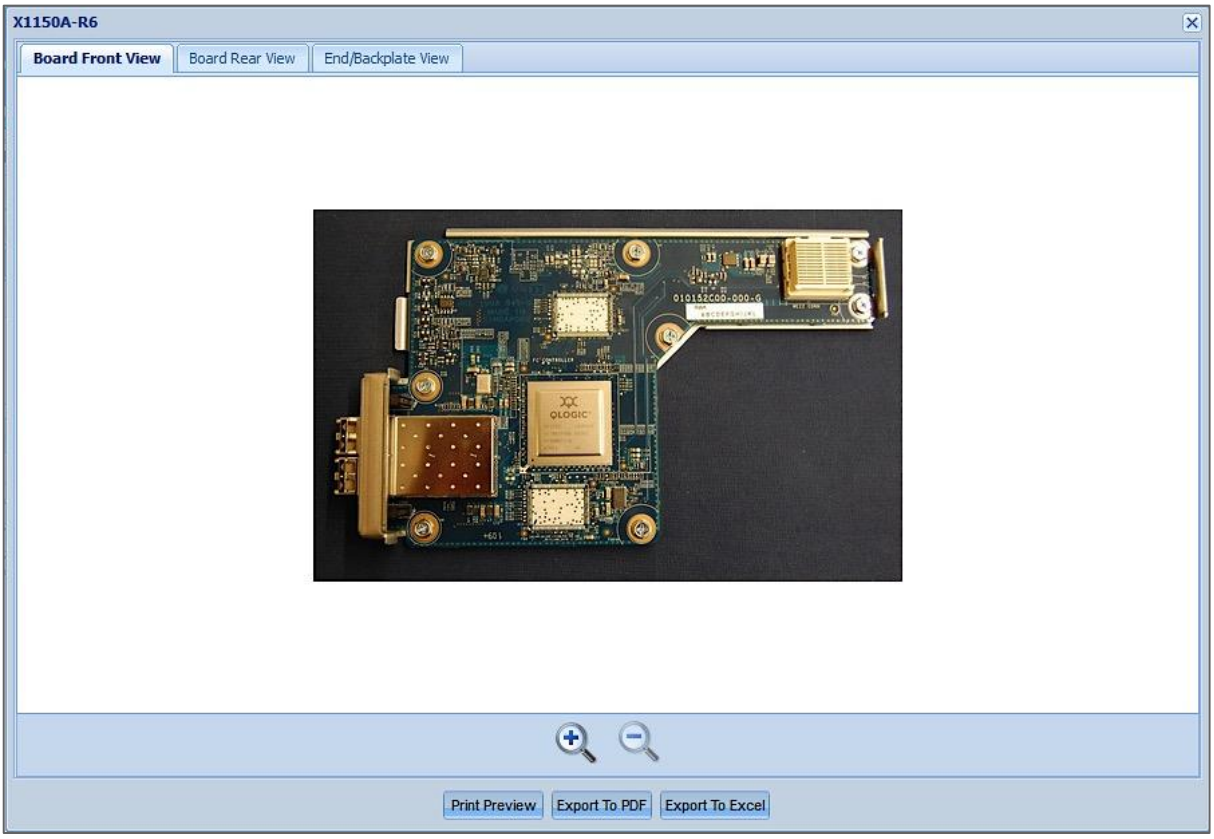


7. When finished, either by using the OS or Platform starting point, click the **Show Results** button at the bottom of the page. Your results will look like the following, along with footnotes wherever applicable:

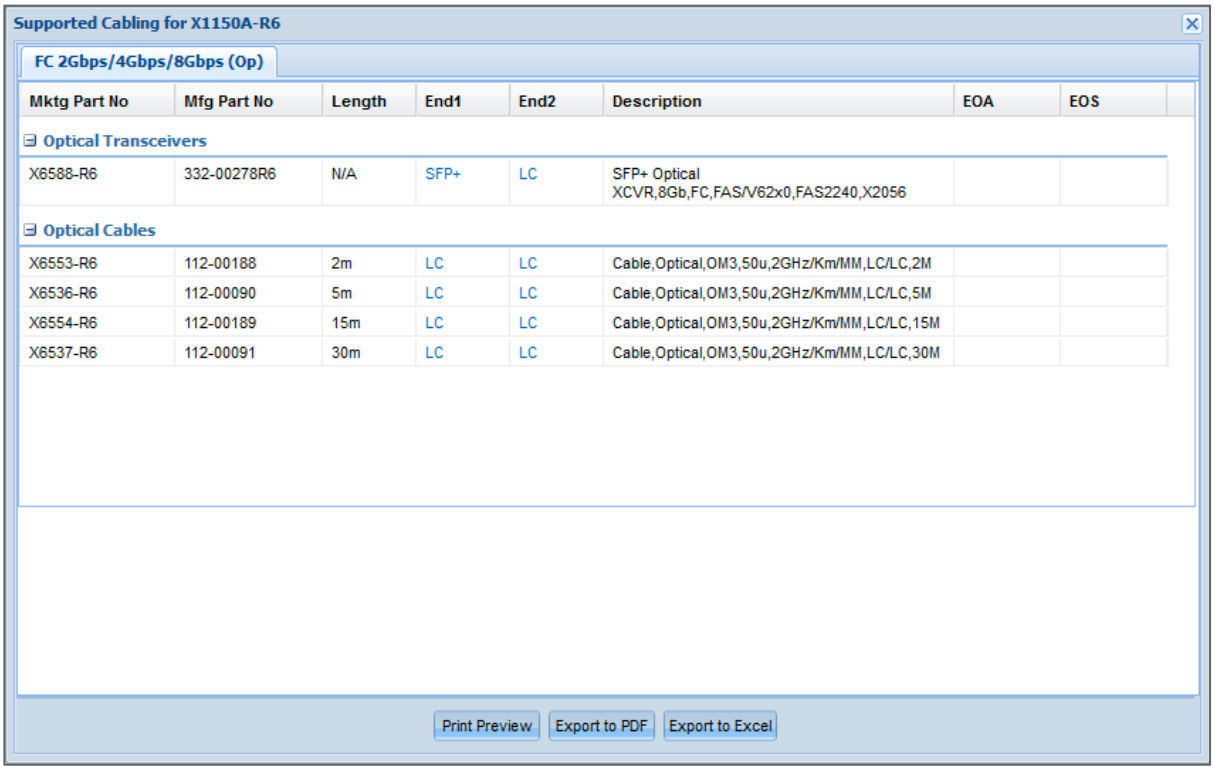


Note the **Results** pane includes tabs for **Stand Alone** and **High Availability**. Where available, you can switch views to see associated **HA** adapter card details.

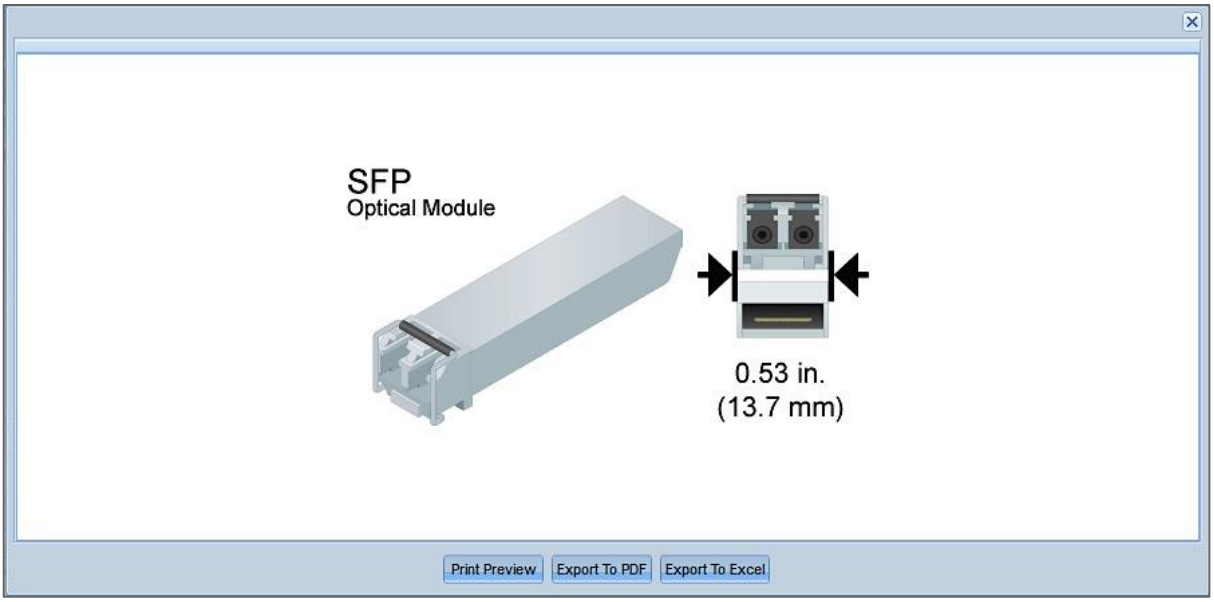
8. In the **Images** column, click the camera icon to view a photograph of the adapter. You can view the front, rear and end/backplate where available, as shown in the example below.



9. In the **Cabling** column click **View** to see additional cabling details, as shown below.



10. Click a link in one of the **End** columns to view an image of the cable end. See example below.



11. When finished, use the **Save Query**, **Print Preview**, and **Export** options in the bottom menu to save your selections.

Adapter Card 'Priority' Notes

Installation Priority: This is the installation priority for the adapter cards and should be taken into consideration first. Adapters with higher priority should be installed before cards with lower priority. For example: Adapter X1234A-R6 has a priority of 2 and should be installed before adapter X3456A-R6 which has a priority of 5.

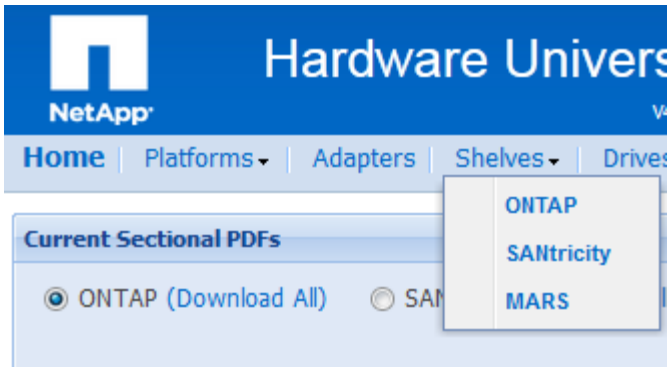
Slot Assignment Priority: This is the order that the slots should be populated in the controller for a given adapter. For example: Adapter X1234A-R6 has slot priority of (1, 3, 5, 2, 4). This means the X1234A-R6 adapter should be installed in slot 1 first. However, if slot 1 is already occupied by an adapter with higher install priority, then slot 3 is the next slot that should be used for the installation (followed by 5, 2, or 4).

Note: If you are adding an adapter to an existing controller and a slot is occupied by an adapter with lower install priority, you may choose to install the adapter in the next available slot rather than rearranging the adapter(s) that are already installed.

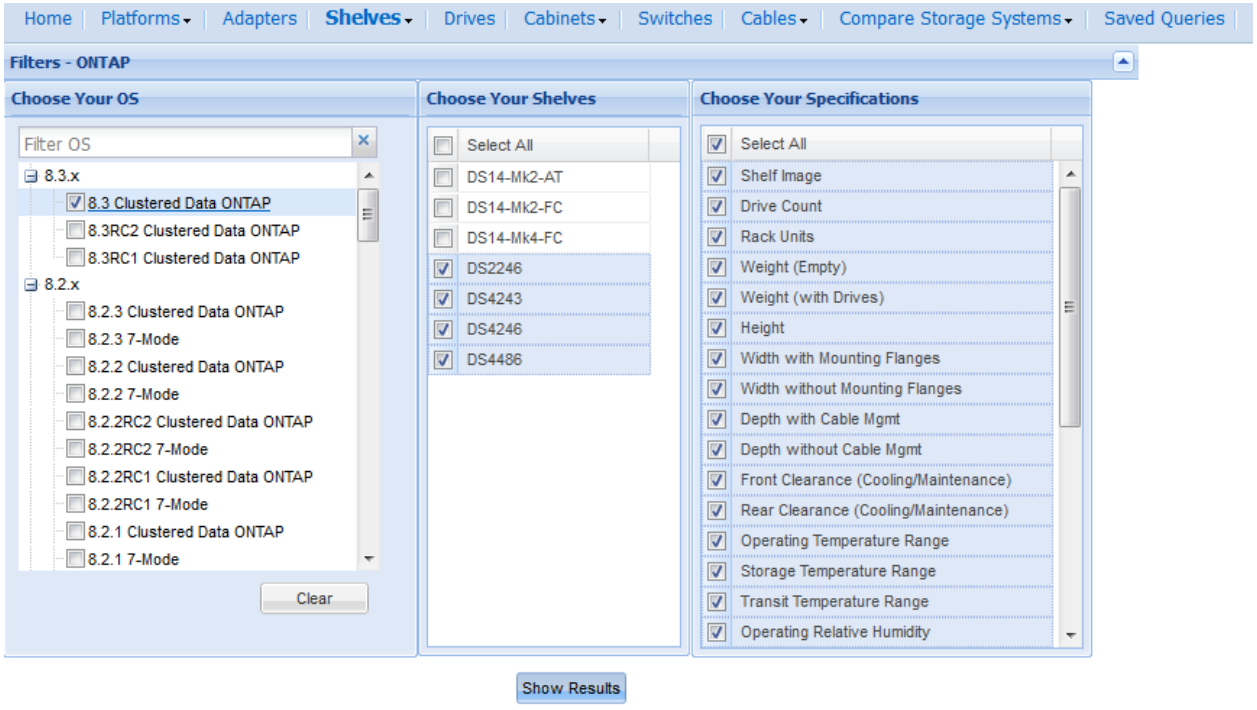
3.3 Shelves

The **Shelves** tab allows you access information about the supported shelves for a controller by Data ONTAP, SANtricity or MARS. In addition to specific details about a given shelf, HWU also provides supported drives, switch modules and cabling, rail kits, FRU's, power cords, electrical requirements and Quickship part numbers.

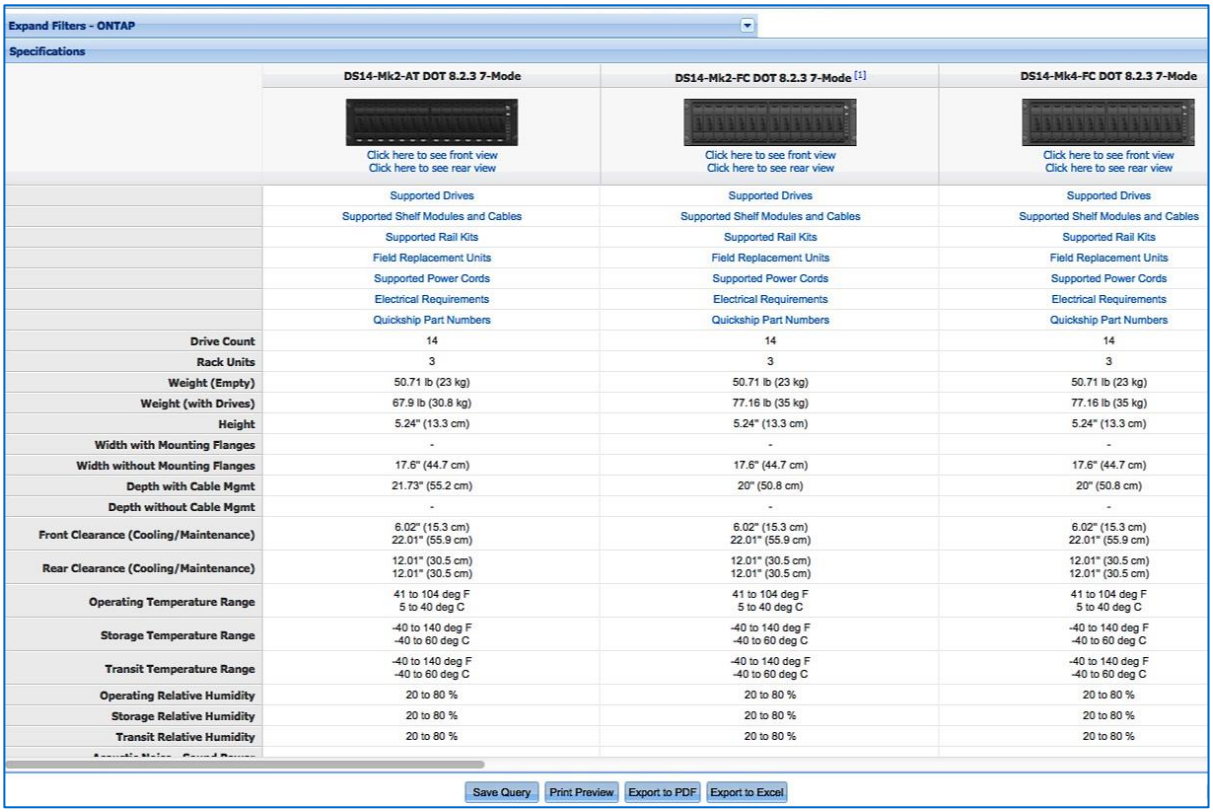
1. Hover over the **Shelves** tab in the menu bar and select a shelf option from the drop-down menu:



2. Choose a software version from the *Choose Your OS* pane.
3. The *Choose Your Shelves* pane appears. Choose one or more shelves.
4. The *Choose Your Specifications* pane appears. Choose one or more specifications. The page will look like the example below.



5. Click the **Show Results** button at the bottom of the page. Your results will look like the example below.



Expand Filters - ONTAP

Specifications

	DS14-Mk2-AT DOT 8.2.3 7-Mode	DS14-Mk2-FC DOT 8.2.3 7-Mode [1]	DS14-Mk4-FC DOT 8.2.3 7-Mode
	Click here to see front view Click here to see rear view	Click here to see front view Click here to see rear view	Click here to see front view Click here to see rear view
	Supported Drives	Supported Drives	Supported Drives
	Supported Shelf Modules and Cables	Supported Shelf Modules and Cables	Supported Shelf Modules and Cables
	Supported Rail Kits	Supported Rail Kits	Supported Rail Kits
	Field Replacement Units	Field Replacement Units	Field Replacement Units
	Supported Power Cords	Supported Power Cords	Supported Power Cords
	Electrical Requirements	Electrical Requirements	Electrical Requirements
	Quickship Part Numbers	Quickship Part Numbers	Quickship Part Numbers
Drive Count	14	14	14
Rack Units	3	3	3
Weight (Empty)	50.71 lb (23 kg)	50.71 lb (23 kg)	50.71 lb (23 kg)
Weight (with Drives)	67.9 lb (30.8 kg)	77.16 lb (35 kg)	77.16 lb (35 kg)
Height	5.24" (13.3 cm)	5.24" (13.3 cm)	5.24" (13.3 cm)
Width with Mounting Flanges	-	-	-
Width without Mounting Flanges	17.6" (44.7 cm)	17.6" (44.7 cm)	17.6" (44.7 cm)
Depth with Cable Mgmt	21.73" (55.2 cm)	20" (50.8 cm)	20" (50.8 cm)
Depth without Cable Mgmt	-	-	-
Front Clearance (Cooling/Maintenance)	6.02" (15.3 cm) 22.01" (55.9 cm)	6.02" (15.3 cm) 22.01" (55.9 cm)	6.02" (15.3 cm) 22.01" (55.9 cm)
Rear Clearance (Cooling/Maintenance)	12.01" (30.5 cm) 12.01" (30.5 cm)	12.01" (30.5 cm) 12.01" (30.5 cm)	12.01" (30.5 cm) 12.01" (30.5 cm)
Operating Temperature Range	41 to 104 deg F 5 to 40 deg C	41 to 104 deg F 5 to 40 deg C	41 to 104 deg F 5 to 40 deg C
Storage Temperature Range	-40 to 140 deg F -40 to 60 deg C	-40 to 140 deg F -40 to 60 deg C	-40 to 140 deg F -40 to 60 deg C
Transit Temperature Range	-40 to 140 deg F -40 to 60 deg C	-40 to 140 deg F -40 to 60 deg C	-40 to 140 deg F -40 to 60 deg C
Operating Relative Humidity	20 to 80 %	20 to 80 %	20 to 80 %
Storage Relative Humidity	20 to 80 %	20 to 80 %	20 to 80 %
Transit Relative Humidity	20 to 80 %	20 to 80 %	20 to 80 %

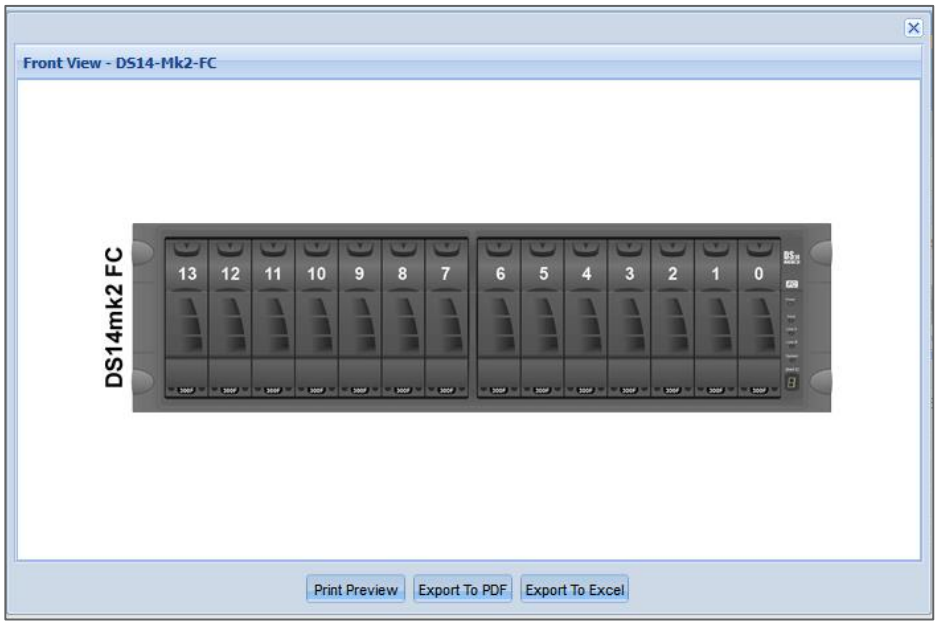
Save Query | Print Preview | Export to PDF | Export to Excel

6. Refer to the next section to explore additional features.

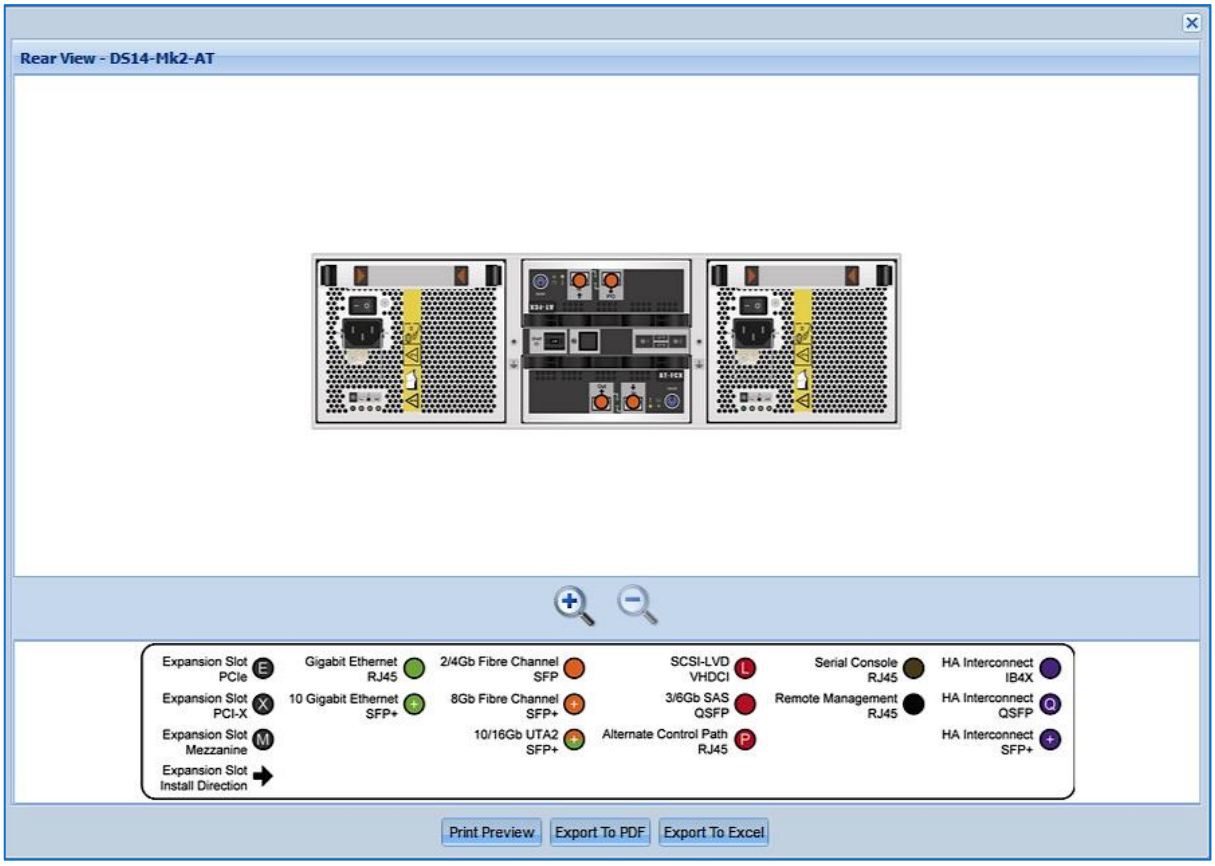
3.3.1 Shelves Specifications Results Page Options

The *Shelves Specifications* results page provides options to view more data about the shelves you selected. You can also print and export these items:

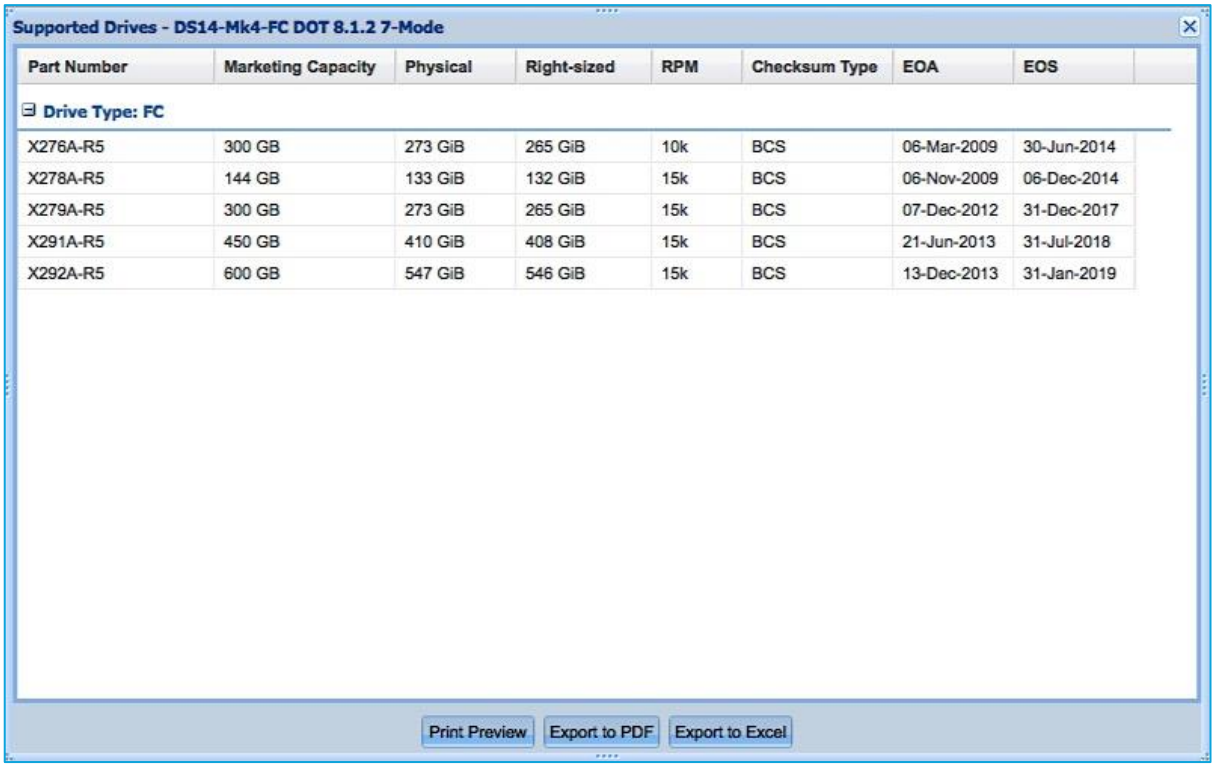
- *Click here to see front view* displays an image showing the front of a shelf.



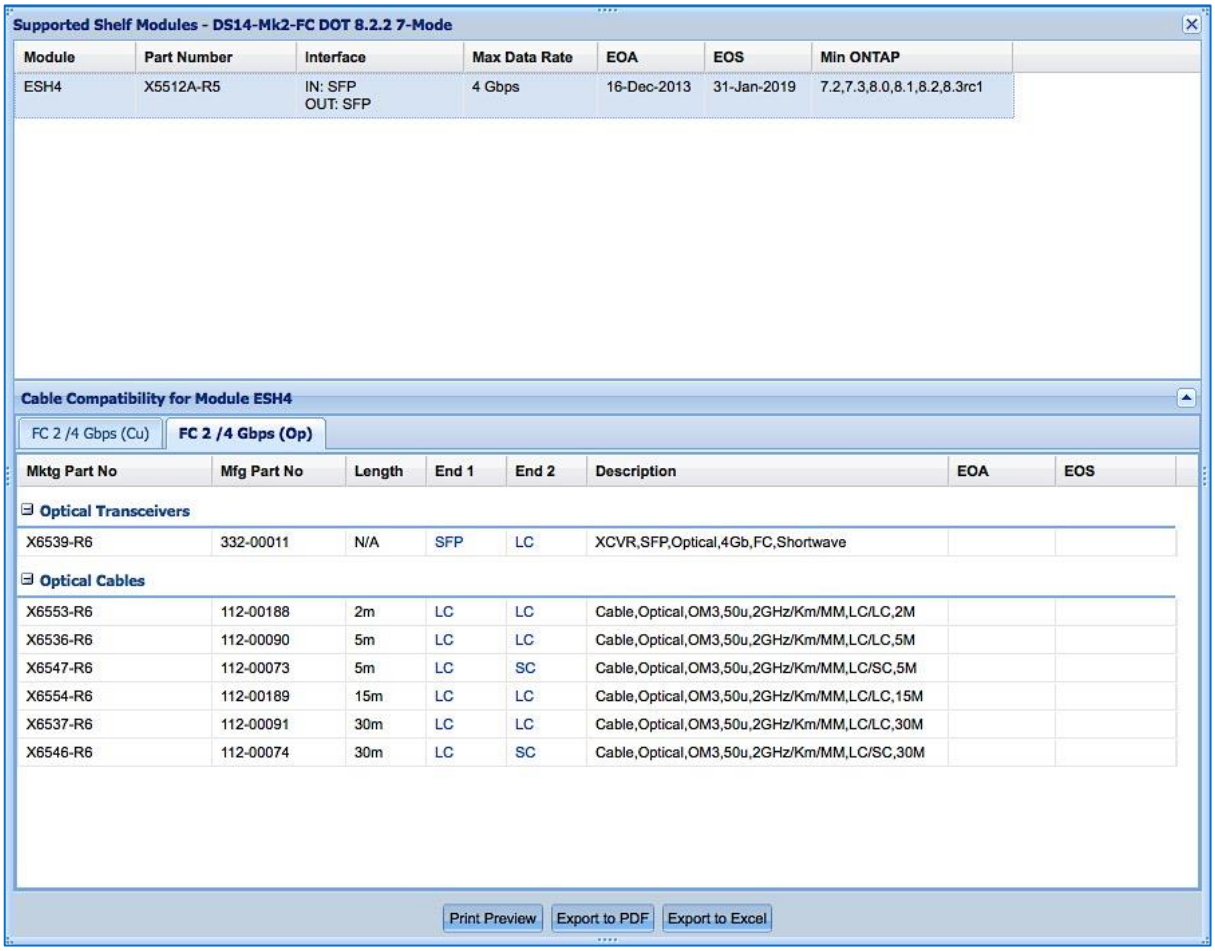
- *Click here to see rear view* displays in image showing the rear of a shelf with a color-coded legend to easily locate slots and connections.



- *Supported Drives* displays a table showing the type of drives supported by a shelf. See section 3.4 for more information on drives.



- *Supported Shelf Modules and Cabling* displays a table showing the module name, part number, interface, and maximum data rate, EOA/EOS dates, and minimum Data ONTAP versions. It also shows applicable cabling with associated imagery, and cable and transceiver compatibility. See example below.



Supported Shelf Modules - DS14-Mk2-FC DOT 8.2.2 7-Mode

Module	Part Number	Interface	Max Data Rate	EOA	EOS	Min ONTAP
ESH4	X5512A-R5	IN: SFP OUT: SFP	4 Gbps	16-Dec-2013	31-Jan-2019	7.2,7.3,8.0,8.1,8.2,8.3rc1

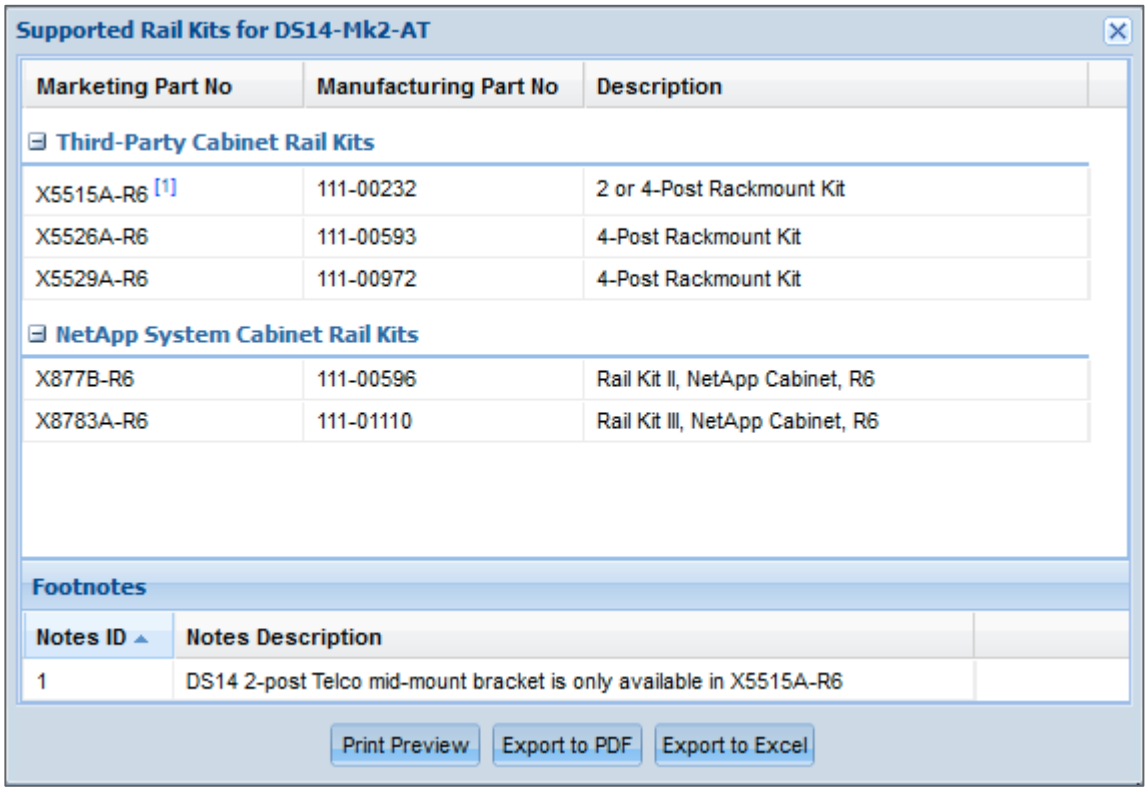
Cable Compatibility for Module ESH4

FC 2 /4 Gbps (Cu) | **FC 2 /4 Gbps (Op)**

Mktg Part No	Mfg Part No	Length	End 1	End 2	Description	EOA	EOS
Optical Transceivers							
X6539-R6	332-00011	N/A	SFP	LC	XCVR,SFP,Optical,4Gb,FC,Shortwave		
Optical Cables							
X6553-R6	112-00188	2m	LC	LC	Cable,Optical,OM3,50u,2GHz/Km/MM,LC/LC,2M		
X6536-R6	112-00090	5m	LC	LC	Cable,Optical,OM3,50u,2GHz/Km/MM,LC/LC,5M		
X6547-R6	112-00073	5m	LC	SC	Cable,Optical,OM3,50u,2GHz/Km/MM,LC/SC,5M		
X6554-R6	112-00189	15m	LC	LC	Cable,Optical,OM3,50u,2GHz/Km/MM,LC/LC,15M		
X6537-R6	112-00091	30m	LC	LC	Cable,Optical,OM3,50u,2GHz/Km/MM,LC/LC,30M		
X6546-R6	112-00074	30m	LC	SC	Cable,Optical,OM3,50u,2GHz/Km/MM,LC/SC,30M		

Print Preview | Export to PDF | Export to Excel

- *Supported Rail Kits* shows supported third-party rail kit part numbers and rail kits for NetApp system cabinets.



Supported Rail Kits for DS14-Mk2-AT

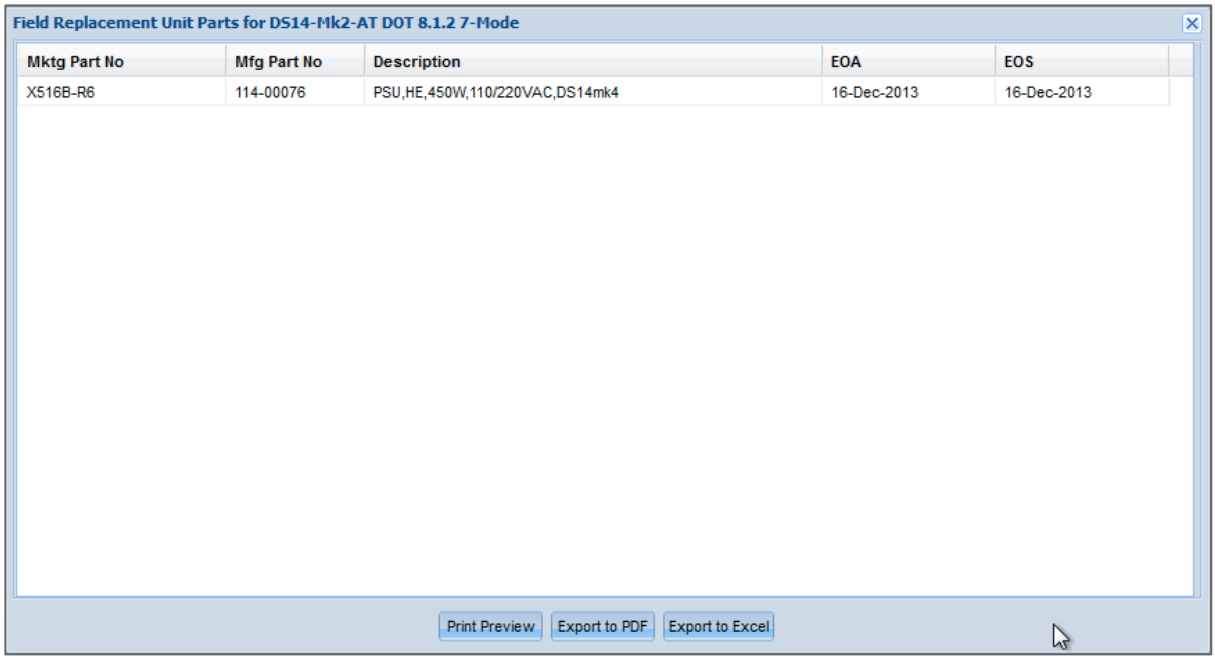
Marketing Part No	Manufacturing Part No	Description
Third-Party Cabinet Rail Kits		
X5515A-R6 [1]	111-00232	2 or 4-Post Rackmount Kit
X5526A-R6	111-00593	4-Post Rackmount Kit
X5529A-R6	111-00972	4-Post Rackmount Kit
NetApp System Cabinet Rail Kits		
X877B-R6	111-00596	Rail Kit II, NetApp Cabinet, R6
X8783A-R6	111-01110	Rail Kit III, NetApp Cabinet, R6

Footnotes

Notes ID	Notes Description
1	DS14 2-post Telco mid-mount bracket is only available in X5515A-R6

Print Preview | Export to PDF | Export to Excel

- *Field Replacement Units (FRUs)* shows FRU part numbers for each controller model. Components may include power supply units, memory DIMMS, fans and more. EOA/EOS dates are also provided.

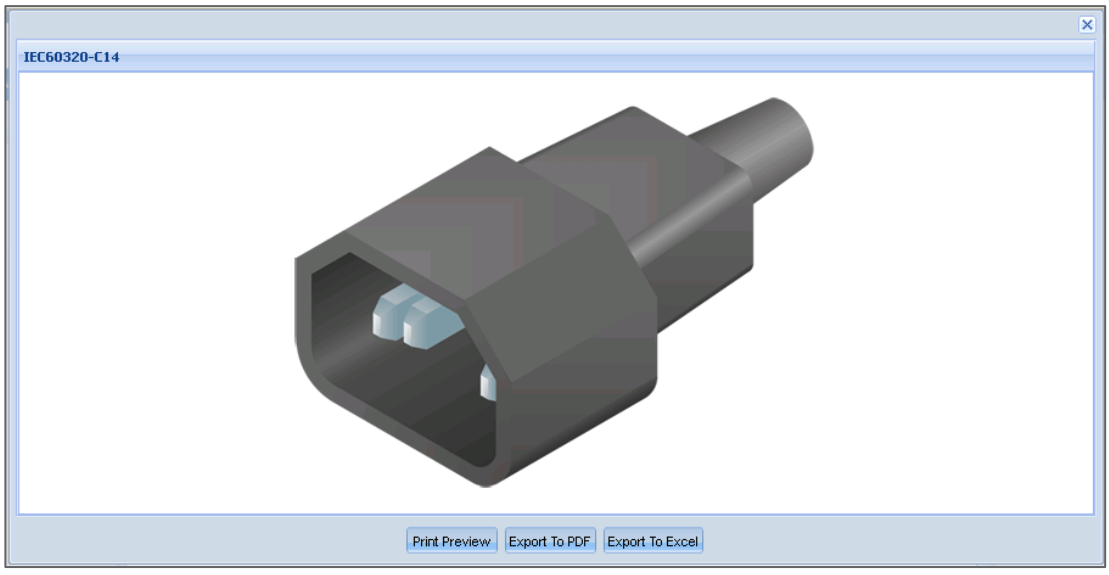


- *Supported Power Cords* shows marketing part number, ends, length and description. Click a link in one of the **End** columns to view an image of the cable end. See examples below.

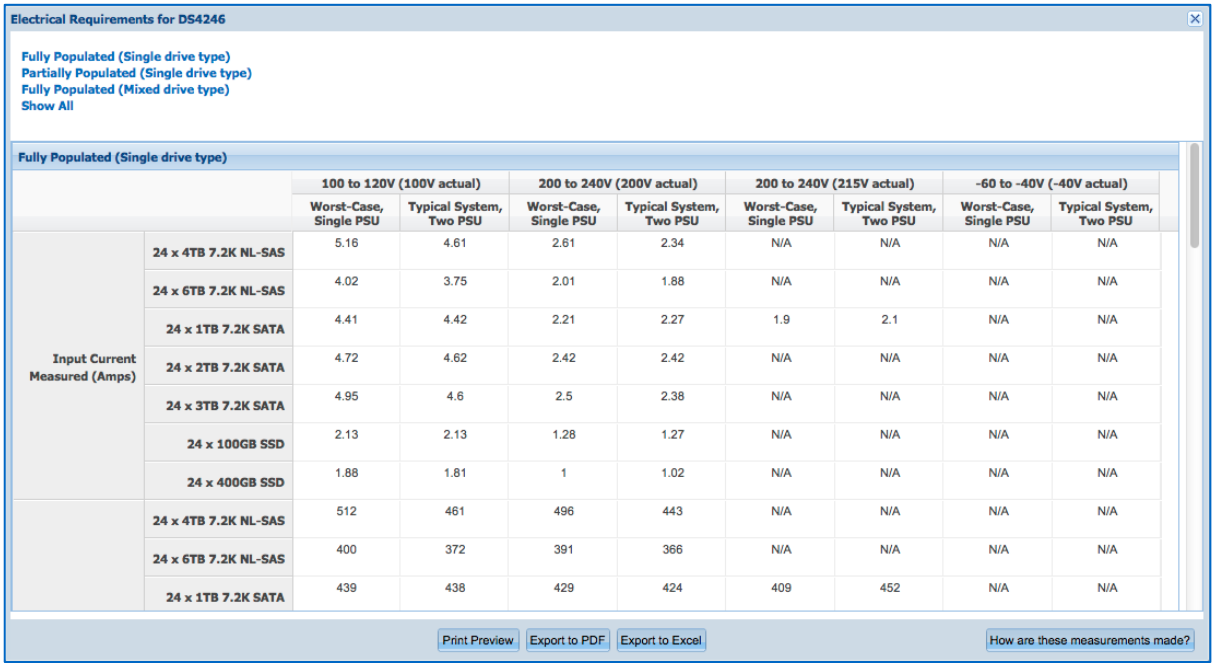
Supported Power Cords for DS14-Mk2-AT

Marketing Part No	End 1	End 2	Length	Description
In-Cabinet Power Cords				
X1558A-R6	IEC60320-C14	IEC60320-C13	1.20 m	Power Cable,In-Cabinet,48-In,C13-C14,10A/250V
X800-42U-R6	IEC60320-C14	IEC60320-C13	0.68 m	Power Cable,In-Cabinet,27-In,C13-C14,10A/250V
Non-Cabinet Power Cords				
X800B-R6	CEE 7/7	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Cont Europe,10A/250V
X800C-R6	BS 1363	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,UK/Ireland,10A/250V
X800D-R6	EL302 (JIS C8303)	IEC60320-C13	1.83 m	Power Cable,Non-Cabinet,Japan,15A/125V
X800E-R6	NEMA 5-15P	IEC60320-C13	1.83 m	Power Cable,Non-Cabinet,North America,15A/125V
X800F-R6	AS/NZS 3112	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Aus/NZ,10A/250V
X800G-R6	SEV 1011	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Switzerland,10A/250V
X800H-R6	IRAM 2073	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Argentina,10A/250V
X800I-R6	GB2099	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,China,10A/250V
X800J-R6	DHCR107-2-D1	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Demark,10A/250V
X800K-R6	SANS 164-1	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,India/S.Africa,10A/250V
X800L-R6	SI32	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Israel,10A/250V
X800M-R6	CEI 23-16	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Italy,10A/250V
X800P-R6	NEMA 6-15P	IEC60320-C13	1.83 m	Power Cable,Non-Cabinet,North America,15A/250V
X800T-R6	CNS 10917-3	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Taiwan,BSMI,15A/125V
X800VB-R6	NBR 6147/2000	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Brazil,10A/250V
X800W-R6	CNS10917/CNS690	IEC60320-C13	1.83 m	Power Cable,Non-Cabinet,Taiwan,10A/250V
X800Y-R6	EL309 (JIS C8303)	IEC60320-C13	1.83 m	Power Cable,Non-Cabinet,Japan,15A/250V

Print Preview | Export to PDF | Export to Excel



- *Electrical Requirements* shows power requirements specific to the shelf you selected. Beginning in Hardware Universe version 4.6, extensive scrolling is eliminated by providing users with individual results for each shelf configuration – simply click the groupings shown in the upper pane.



Electrical Requirements for DS4246

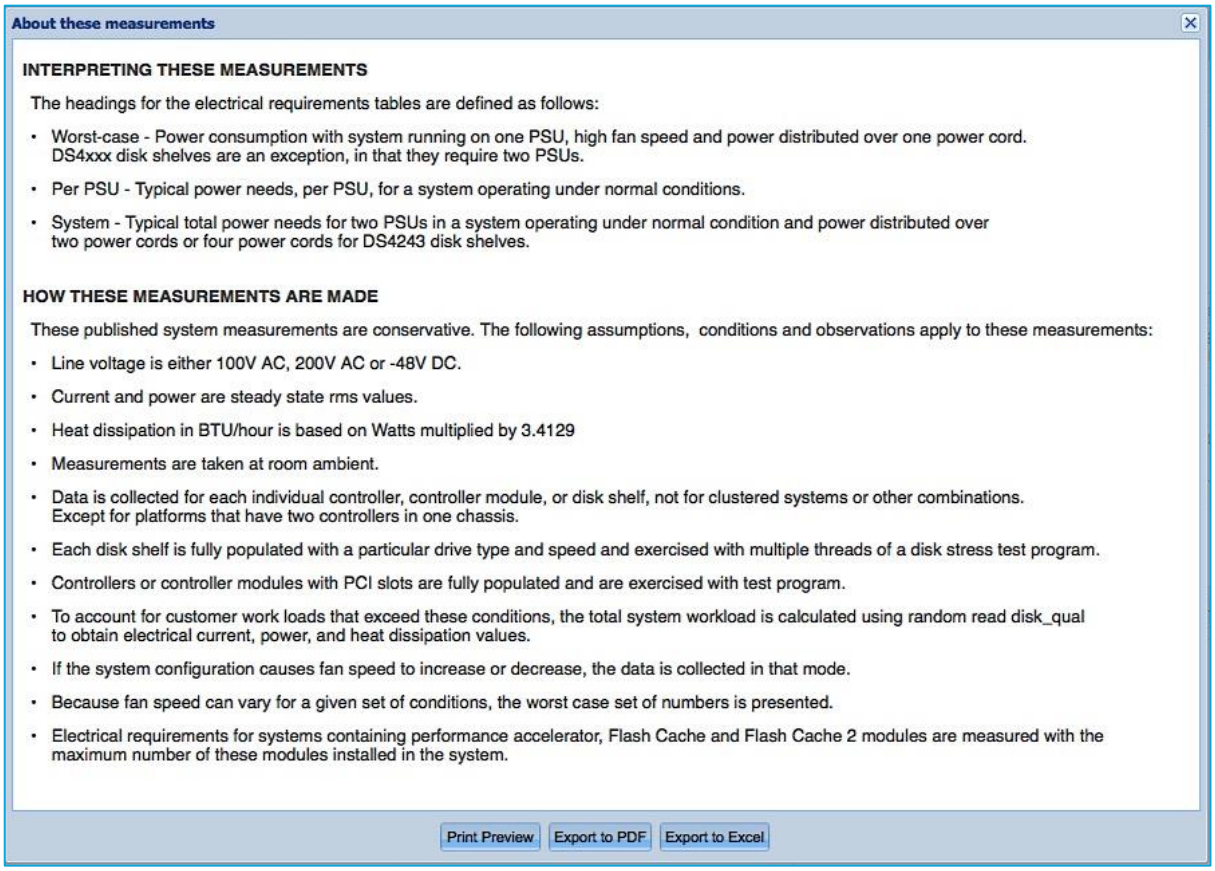
Fully Populated (Single drive type)
Partially Populated (Single drive type)
Fully Populated (Mixed drive type)
Show All

Fully Populated (Single drive type)

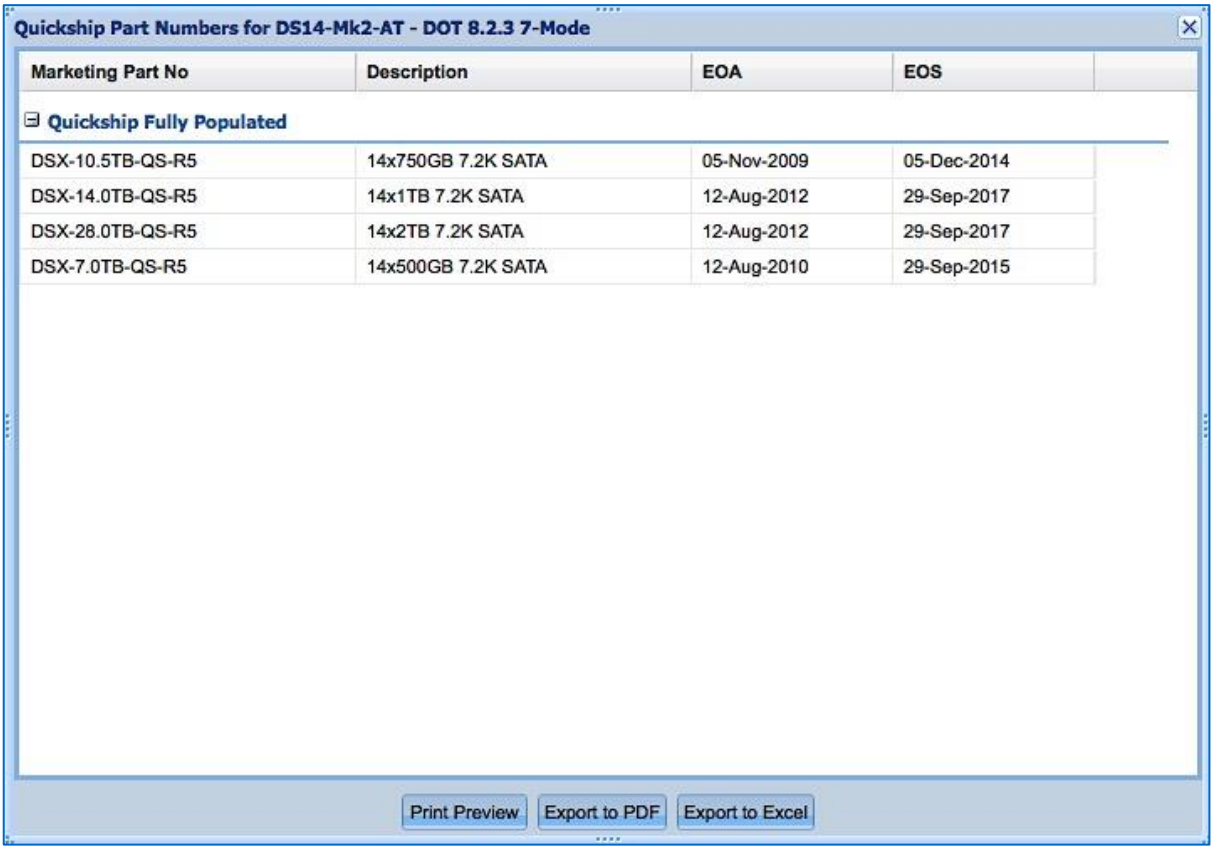
		100 to 120V (100V actual)		200 to 240V (200V actual)		200 to 240V (215V actual)		-60 to -40V (-40V actual)	
		Worst-Case, Single PSU	Typical System, Two PSU	Worst-Case, Single PSU	Typical System, Two PSU	Worst-Case, Single PSU	Typical System, Two PSU	Worst-Case, Single PSU	Typical System, Two PSU
Input Current Measured (Amps)	24 x 4TB 7.2K NL-SAS	5.16	4.61	2.61	2.34	N/A	N/A	N/A	N/A
	24 x 6TB 7.2K NL-SAS	4.02	3.75	2.01	1.88	N/A	N/A	N/A	N/A
	24 x 1TB 7.2K SATA	4.41	4.42	2.21	2.27	1.9	2.1	N/A	N/A
	24 x 2TB 7.2K SATA	4.72	4.62	2.42	2.42	N/A	N/A	N/A	N/A
	24 x 3TB 7.2K SATA	4.95	4.6	2.5	2.38	N/A	N/A	N/A	N/A
	24 x 100GB SSD	2.13	2.13	1.28	1.27	N/A	N/A	N/A	N/A
	24 x 400GB SSD	1.88	1.81	1	1.02	N/A	N/A	N/A	N/A
	24 x 4TB 7.2K NL-SAS	512	461	496	443	N/A	N/A	N/A	N/A
	24 x 6TB 7.2K NL-SAS	400	372	391	366	N/A	N/A	N/A	N/A
	24 x 1TB 7.2K SATA	439	438	429	424	409	452	N/A	N/A

Print Preview | Export to PDF | Export to Excel | How are these measurements made?

Click the **How are these measurements made?** button in the bottom right corner for important additional information. The following popup appears with information on how to interpret the measurements and how they were derived.



- *Quickship Part Numbers* shows part numbers for “Quickship Fully Populated” or “Quickship Half Populated” shelves, their description and EOA and EOS dates. This feature is new beginning in HWU v 4.6.



3.4 Drives

By default, the **Drives** tab allows you to search for drives by part number, description, marketing capacity, and RPM.

Alternatively, you can search for drives by OS and drive type. Both procedures are explained below.

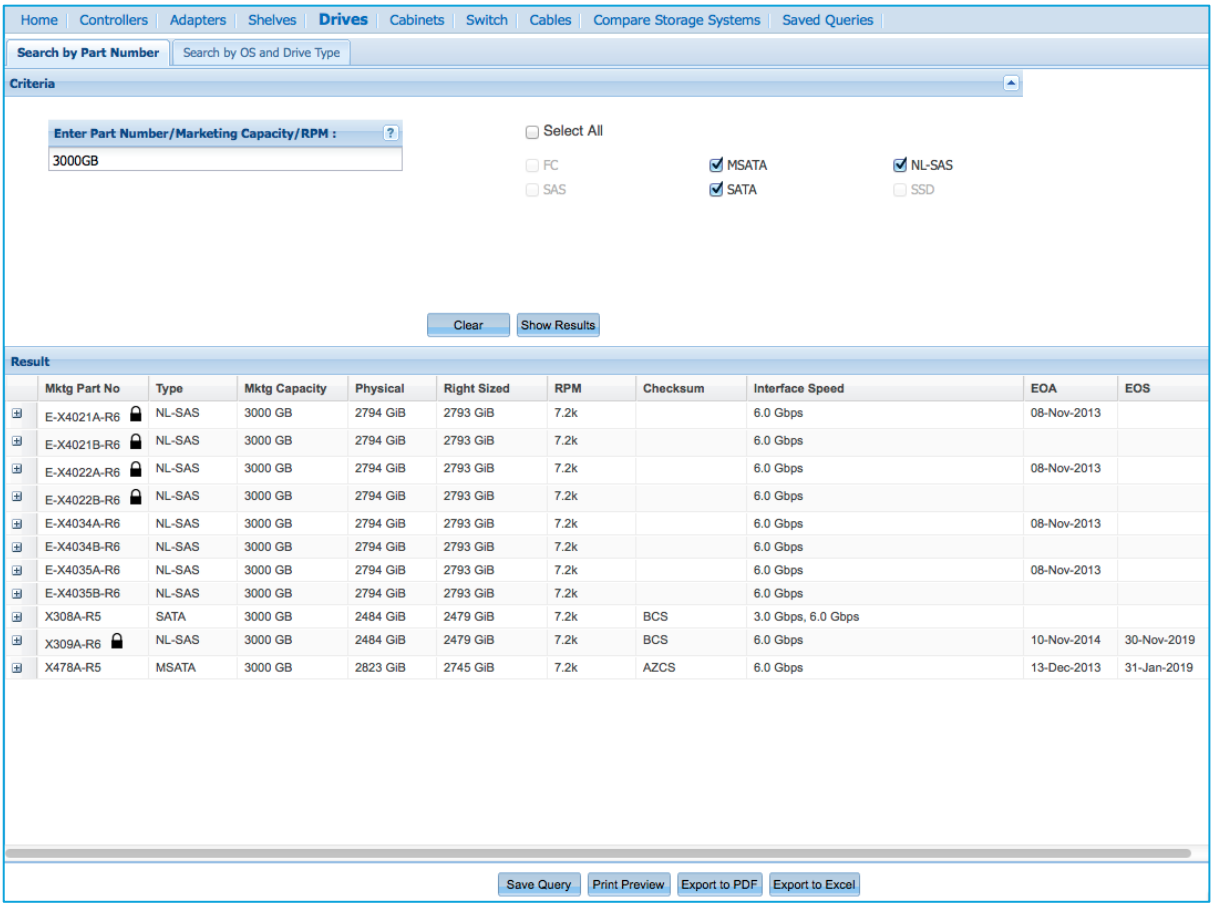
3.4.1 Searching Drives by Part Number

To search drives by part number:

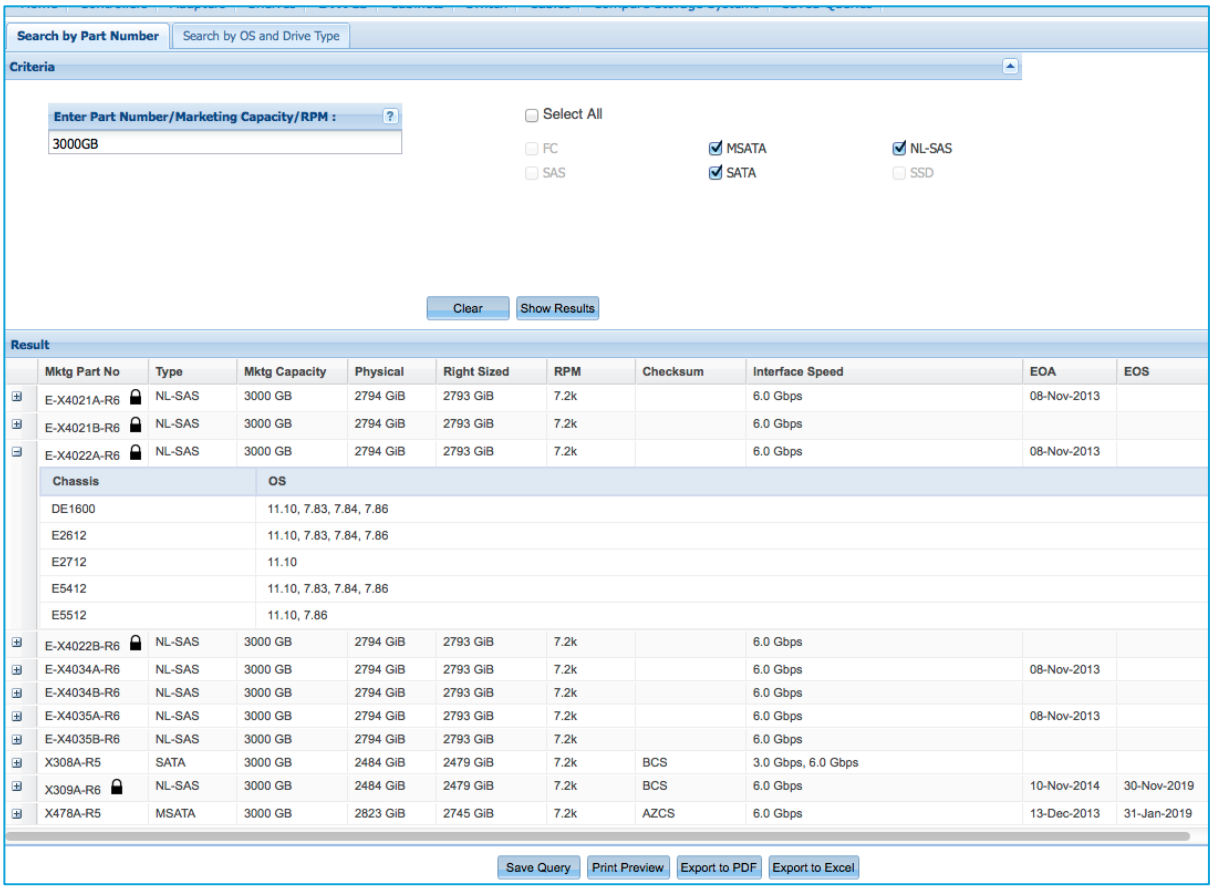
1. Click the **Drives** tab in the menu bar. The **Search by Part Number** tab is displayed by default.
2. When you type in the search text box, the system auto-suggests drives that you can choose from, or you can enter:
   a. Nothing, select any number of drive categories or **Select All** and then click **Show Results** to return a list of all drives.
   b. A string, such as “3000GB” and then click **Show Results** to return a list of all drives fitting that criterion. **Note:** convert TB to GB when searching.
   c. A partial part number, description, capacity, or RPM. As you type, suggested options appear and the supported categories are checked. You can then select a single drive and click **Show Results** for that drive only.

   To see a list of both valid and invalid search patterns, click the ‘?’ icon in the top right corner of the auto-suggestion box.

3. Below is an example results page from searching on “3000GB.” **Note:** drives showing a padlock icon indicates encryption.



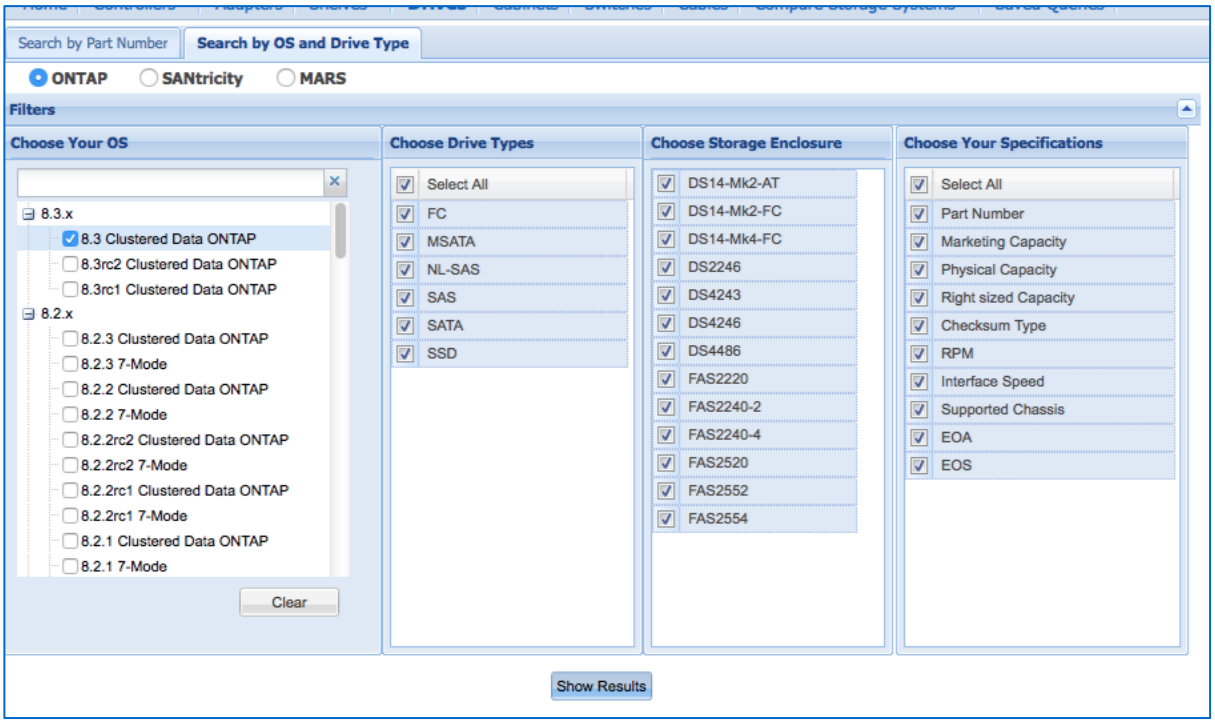
4. In the lower pane, click the '+' icon to view expanded details of any drive. Its details appear as shown in the example below. **Note:** drives showing a padlock icon indicates encryption.



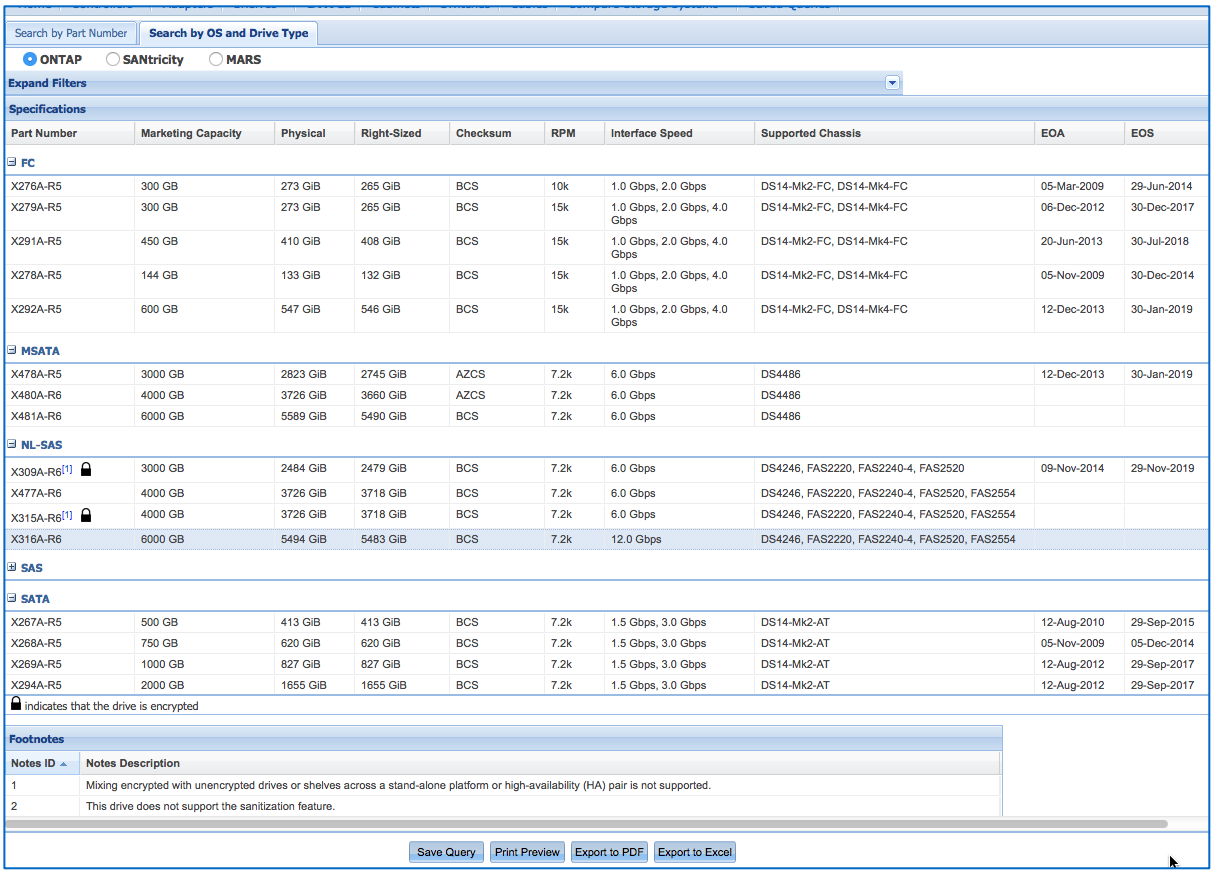
3.4.2 Searching Drives by OS and Type

To search drives by OS and Type:

1. Click the **Drives** tab and then select the **Search by OS and Drive Type** tab. The **ONTAP** option is selected by default. You can optionally select **SANtricity** or **MARS**.
2. Choose a software version. Three panes then appear: *Choose Drive Types*, *Choose Storage Enclosure* and *Choose Your Specifications*.
3. Select the options you want. See an example page below:



4. Click the **Show Results** button at the bottom of the page. Your results will look like the following:



Search by Part Number | Search by OS and Drive Type

ONTAP | SANtricity | MARS

Expand Filters

Specifications

Part Number	Marketing Capacity	Physical	Right-Sized	Checksum	RPM	Interface Speed	Supported Chassis	EOA	EOS
FC									
X276A-R5	300 GB	273 GiB	265 GiB	BCS	10k	1.0 Gbps, 2.0 Gbps	DS14-Mk2-FC, DS14-Mk4-FC	05-Mar-2009	29-Jun-2014
X279A-R5	300 GB	273 GiB	265 GiB	BCS	15k	1.0 Gbps, 2.0 Gbps, 4.0 Gbps	DS14-Mk2-FC, DS14-Mk4-FC	06-Dec-2012	30-Dec-2017
X291A-R5	450 GB	410 GiB	408 GiB	BCS	15k	1.0 Gbps, 2.0 Gbps, 4.0 Gbps	DS14-Mk2-FC, DS14-Mk4-FC	20-Jun-2013	30-Jul-2018
X278A-R5	144 GB	133 GiB	132 GiB	BCS	15k	1.0 Gbps, 2.0 Gbps, 4.0 Gbps	DS14-Mk2-FC, DS14-Mk4-FC	05-Nov-2009	30-Dec-2014
X292A-R5	600 GB	547 GiB	546 GiB	BCS	15k	1.0 Gbps, 2.0 Gbps, 4.0 Gbps	DS14-Mk2-FC, DS14-Mk4-FC	12-Dec-2013	30-Jan-2019
MSATA									
X478A-R5	3000 GB	2823 GiB	2745 GiB	AZCS	7.2k	6.0 Gbps	DS4486	12-Dec-2013	30-Jan-2019
X480A-R6	4000 GB	3726 GiB	3660 GiB	AZCS	7.2k	6.0 Gbps	DS4486		
X481A-R6	6000 GB	5589 GiB	5490 GiB	BCS	7.2k	6.0 Gbps	DS4486		
NL-SAS									
X309A-R6[1]	3000 GB	2484 GiB	2479 GiB	BCS	7.2k	6.0 Gbps	DS4246, FAS2220, FAS2240-4, FAS2520	09-Nov-2014	29-Nov-2019
X477A-R6	4000 GB	3726 GiB	3718 GiB	BCS	7.2k	6.0 Gbps	DS4246, FAS2220, FAS2240-4, FAS2520, FAS2554		
X315A-R6[1]	4000 GB	3726 GiB	3718 GiB	BCS	7.2k	6.0 Gbps	DS4246, FAS2220, FAS2240-4, FAS2520, FAS2554		
X316A-R6	6000 GB	5494 GiB	5483 GiB	BCS	7.2k	12.0 Gbps	DS4246, FAS2220, FAS2240-4, FAS2520, FAS2554		
SAS									
SATA									
X267A-R5	500 GB	413 GiB	413 GiB	BCS	7.2k	1.5 Gbps, 3.0 Gbps	DS14-Mk2-AT	12-Aug-2010	29-Sep-2015
X268A-R5	750 GB	620 GiB	620 GiB	BCS	7.2k	1.5 Gbps, 3.0 Gbps	DS14-Mk2-AT	05-Nov-2009	05-Dec-2014
X269A-R5	1000 GB	827 GiB	827 GiB	BCS	7.2k	1.5 Gbps, 3.0 Gbps	DS14-Mk2-AT	12-Aug-2012	29-Sep-2017
X294A-R5	2000 GB	1655 GiB	1655 GiB	BCS	7.2k	1.5 Gbps, 3.0 Gbps	DS14-Mk2-AT	12-Aug-2012	29-Sep-2017

indicates that the drive is encrypted

Footnotes

Notes ID	Notes Description
1	Mixing encrypted with unencrypted drives or shelves across a stand-alone platform or high-availability (HA) pair is not supported.
2	This drive does not support the sanitization feature.

Save Query | Print Preview | Export to PDF | Export to Excel

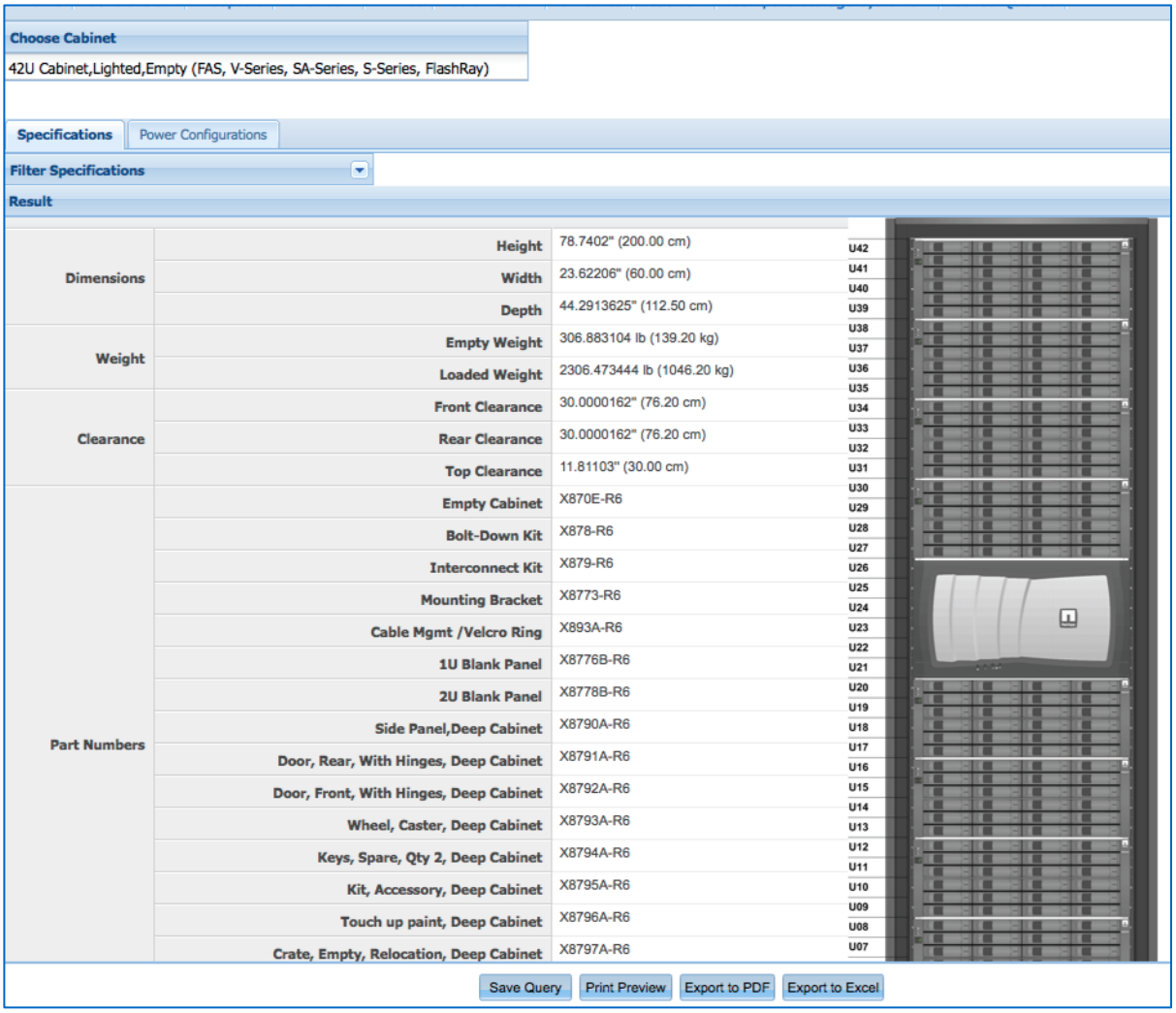
5. When finished, use the **Save Query**, **Print Preview** and **Export** options at the bottom to save your selections.

3.5 Cabinets

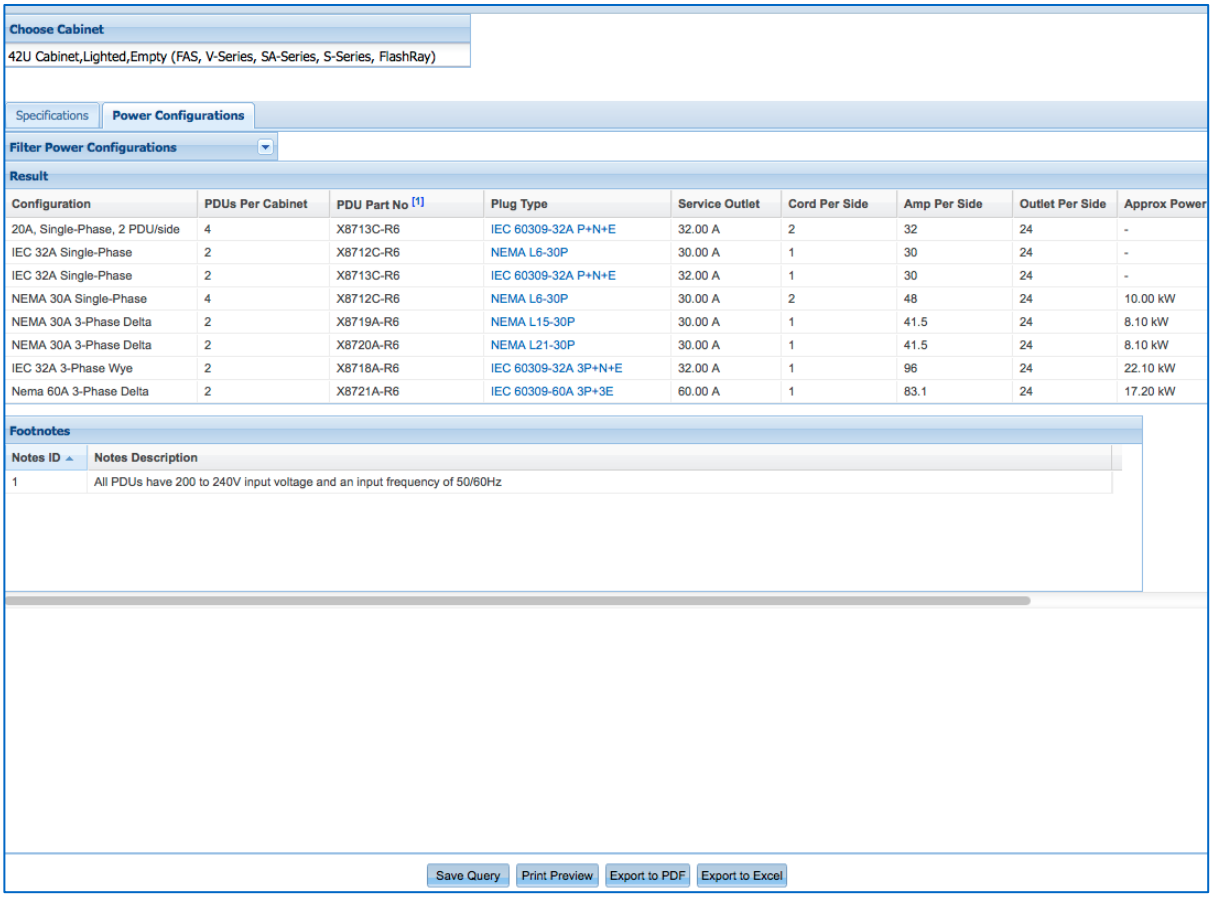
The **Cabinets** tab provides specifications and power configurations about the NetApp 42U cabinets, and associated third-party rackmount kits.

1. Hover over the **Cabinets** tab in the menu bar and choose **Cabinets, Power Configs** in the drop-down menu.

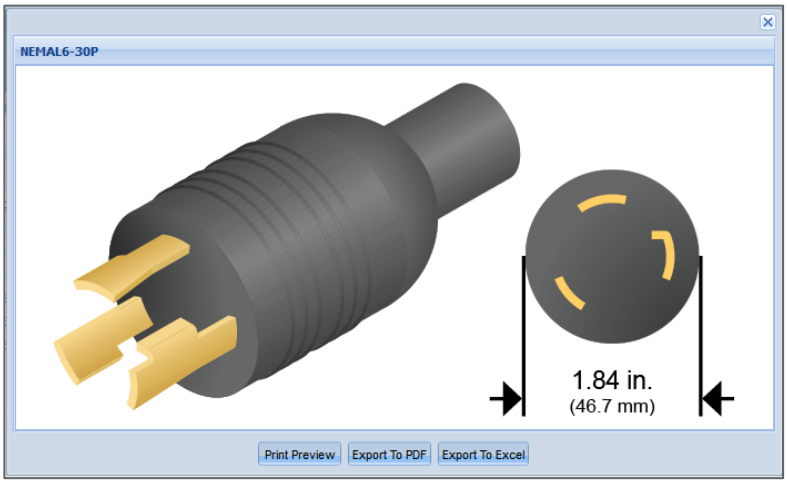
2. By default, **42 U Deep Cabinet** specifications display, as shown in the following example.



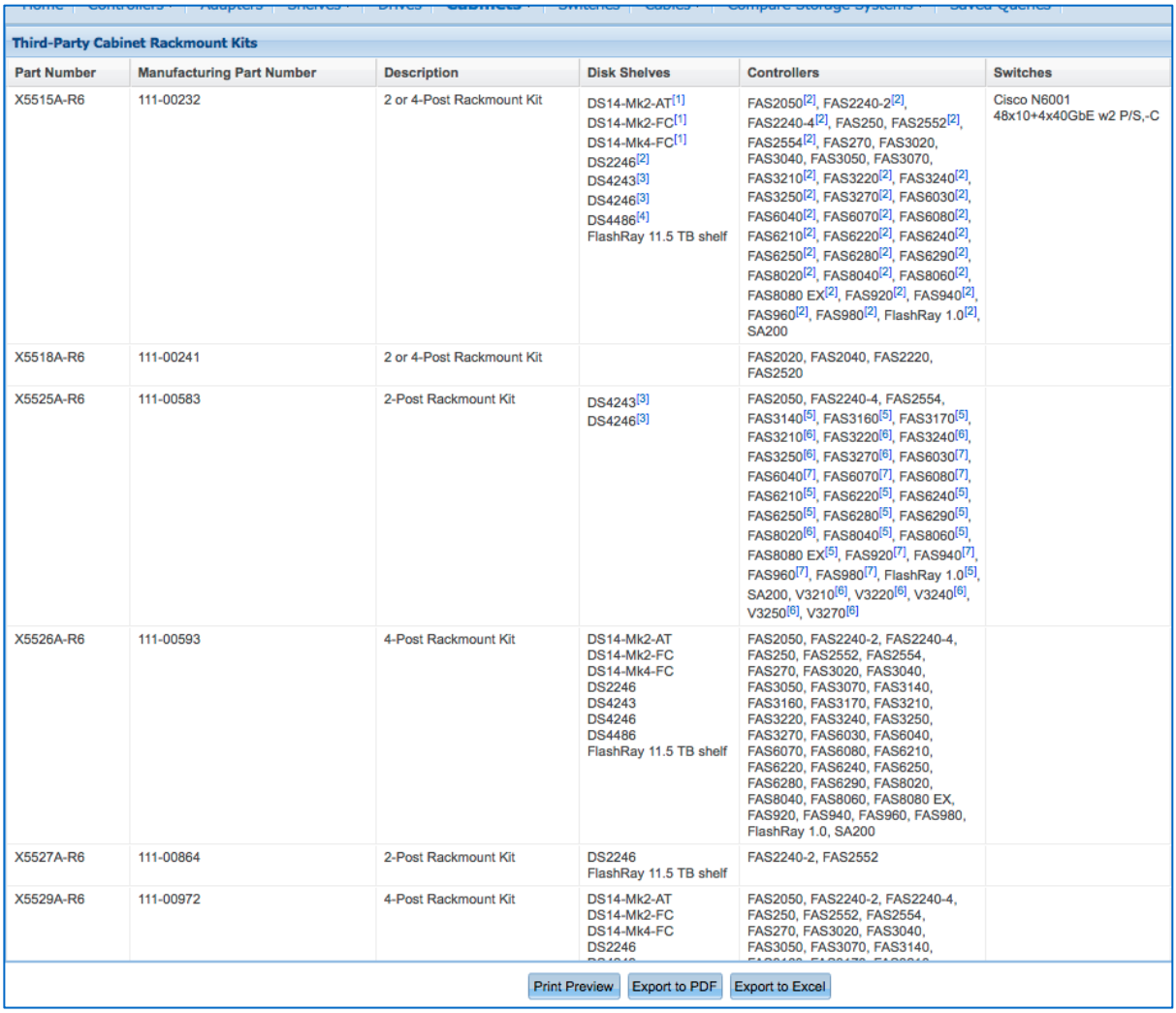
3. Click the lower **Power Configurations** tab. All the power configurations display, as shown in the following example. You can also click the **Filter Power Configurations** drop-down menu to use filter options.



4. Click any of the links under the **Plug Type** column to see an image of a chosen plug, as shown below.



5. To view information about the third-party rackmount kits and their compatibility with platform models/shelves, hover over the **Cabinets** tab and click the **Third-Party Cabinet Rackmount Kits.** Be sure to click on any linked superscript to view its footnote, or scroll to the bottom of the screen to view all footnotes. See example below.



Third-Party Cabinet Rackmount Kits

Part Number	Manufacturing Part Number	Description	Disk Shelves	Controllers	Switches
X5515A-R6	111-00232	2 or 4-Post Rackmount Kit	DS14-Mk2-AT[1] DS14-Mk2-FC[1] DS14-Mk4-FC[1] DS2246[2] DS4243[3] DS4246[3] DS4486[4] FlashRay 11.5 TB shelf	FAS2050[2], FAS2240-2[2], FAS2240-4[2], FAS250, FAS2552[2], FAS2554[2], FAS270, FAS3020, FAS3040, FAS3050, FAS3070, FAS3210[2], FAS3220[2], FAS3240[2], FAS3250[2], FAS3270[2], FAS6030[2], FAS6040[2], FAS6070[2], FAS6080[2], FAS6210[2], FAS6220[2], FAS6240[2], FAS6250[2], FAS6280[2], FAS6290[2], FAS8020[2], FAS8040[2], FAS8060[2], FAS8080 EX[2], FAS920[2], FAS940[2], FAS960[2], FAS980[2], FlashRay 1.0[2], SA200	Cisco N6001 48x10+4x40GbE w2 P/S,-C
X5518A-R6	111-00241	2 or 4-Post Rackmount Kit		FAS2020, FAS2040, FAS2220, FAS2520	
X5525A-R6	111-00583	2-Post Rackmount Kit	DS4243[3] DS4246[3]	FAS2050, FAS2240-4, FAS2554, FAS3140[5], FAS3160[5], FAS3170[5], FAS3210[6], FAS3220[6], FAS3240[6], FAS3250[6], FAS3270[6], FAS6030[7], FAS6040[7], FAS6070[7], FAS6080[7], FAS6210[5], FAS6220[5], FAS6240[5], FAS6250[5], FAS6280[5], FAS6290[5], FAS8020[6], FAS8040[5], FAS8060[5], FAS8080 EX[5], FAS920[7], FAS940[7], FAS960[7], FAS980[7], FlashRay 1.0[5], SA200, V3210[6], V3220[6], V3240[6], V3250[6], V3270[6]	
X5526A-R6	111-00593	4-Post Rackmount Kit	DS14-Mk2-AT DS14-Mk2-FC DS14-Mk4-FC DS2246 DS4243 DS4246 DS4486 FlashRay 11.5 TB shelf	FAS2050, FAS2240-2, FAS2240-4, FAS250, FAS2552, FAS2554, FAS270, FAS3020, FAS3040, FAS3050, FAS3070, FAS3140, FAS3160, FAS3170, FAS3210, FAS3220, FAS3240, FAS3250, FAS3270, FAS6030, FAS6040, FAS6070, FAS6080, FAS6210, FAS6220, FAS6240, FAS6250, FAS6280, FAS6290, FAS8020, FAS8040, FAS8060, FAS8080 EX, FAS920, FAS940, FAS960, FAS980, FlashRay 1.0, SA200	
X5527A-R6	111-00864	2-Post Rackmount Kit	DS2246 FlashRay 11.5 TB shelf	FAS2240-2, FAS2552	
X5529A-R6	111-00972	4-Post Rackmount Kit	DS14-Mk2-AT DS14-Mk2-FC DS14-Mk4-FC DS2246	FAS2050, FAS2240-2, FAS2240-4, FAS250, FAS2552, FAS2554, FAS270, FAS3020, FAS3040, FAS3050, FAS3070, FAS3140,	

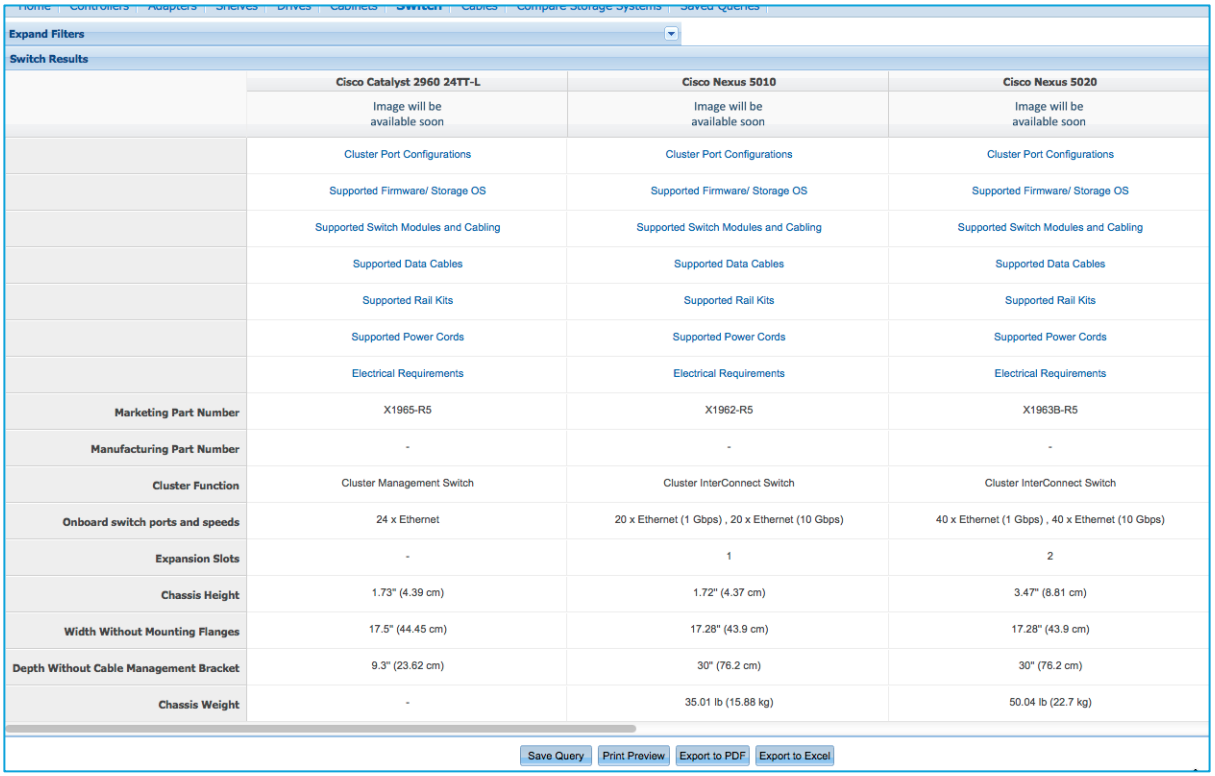
Print Preview | Export to PDF | Export to Excel

6. When finished, use the **Save Query**, **Print Preview** and **Export** options at the bottom to save your selections.

3.6 Switches

The **Switches** tab provides you with information about the various switches supplied by NetApp. In addition to specific details about a given switch, HWU also provides supported cluster configurations, OS versions, switch modules and cabling, data cables, rail kits, power cords and electrical requirements.

1. Click the **Switches** tab in the menu bar. The page displays and allows you to search switches using filters.
2. To start, choose **Cluster**, **MetroCluster** or **SAN**.
3. In the lower pane, select one or more switch types.
4. Select the specifications you want in the *Choose Your Specifications* pane, and then click **Show Results**. See example page below.



Expand Filters

Switch Results

	Cisco Catalyst 2960 24TT-L	Cisco Nexus 5010	Cisco Nexus 5020
	Image will be available soon	Image will be available soon	Image will be available soon
	Cluster Port Configurations	Cluster Port Configurations	Cluster Port Configurations
	Supported Firmware/ Storage OS	Supported Firmware/ Storage OS	Supported Firmware/ Storage OS
	Supported Switch Modules and Cabling	Supported Switch Modules and Cabling	Supported Switch Modules and Cabling
	Supported Data Cables	Supported Data Cables	Supported Data Cables
	Supported Rail Kits	Supported Rail Kits	Supported Rail Kits
	Supported Power Cords	Supported Power Cords	Supported Power Cords
	Electrical Requirements	Electrical Requirements	Electrical Requirements
Marketing Part Number	X1965-R5	X1962-R5	X1963B-R5
Manufacturing Part Number	-	-	-
Cluster Function	Cluster Management Switch	Cluster InterConnect Switch	Cluster InterConnect Switch
Onboard switch ports and speeds	24 x Ethernet	20 x Ethernet (1 Gbps) , 20 x Ethernet (10 Gbps)	40 x Ethernet (1 Gbps) , 40 x Ethernet (10 Gbps)
Expansion Slots	-	1	2
Chassis Height	1.73" (4.39 cm)	1.72" (4.37 cm)	3.47" (8.81 cm)
Width Without Mounting Flanges	17.5" (44.45 cm)	17.28" (43.9 cm)	17.28" (43.9 cm)
Depth Without Cable Management Bracket	9.3" (23.62 cm)	30" (76.2 cm)	30" (76.2 cm)
Chassis Weight	-	35.01 lb (15.88 kg)	50.04 lb (22.7 kg)

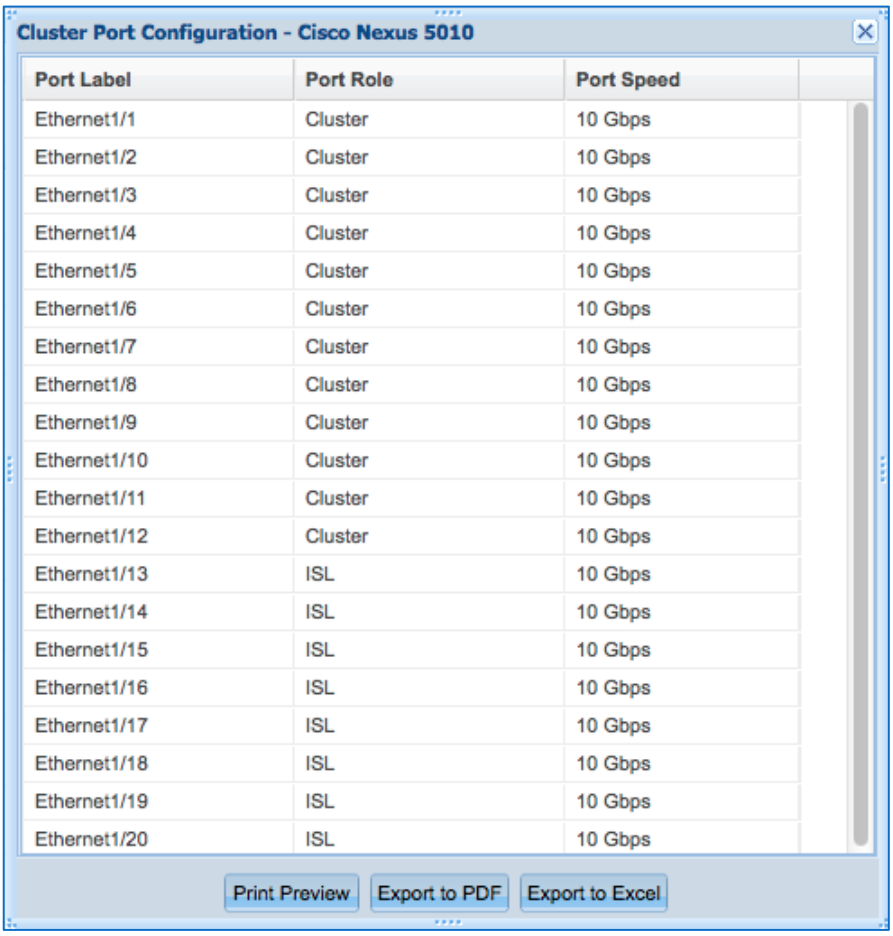
Save Query | Print Preview | Export to PDF | Export to Excel

5. Refer to the next section to explore additional features of the *Show Results* page.

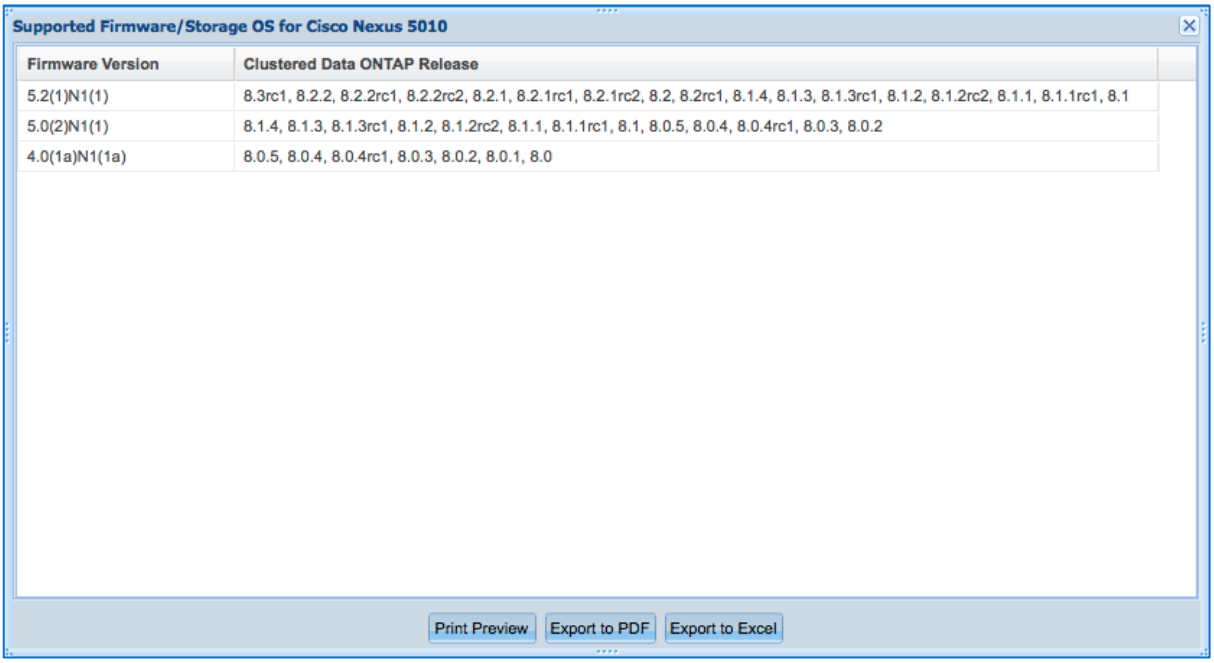
3.6.1 Switch Results Page Options

The *Switch Results* page provides options to view more data about the switches you have selected. You can also print and export these items:

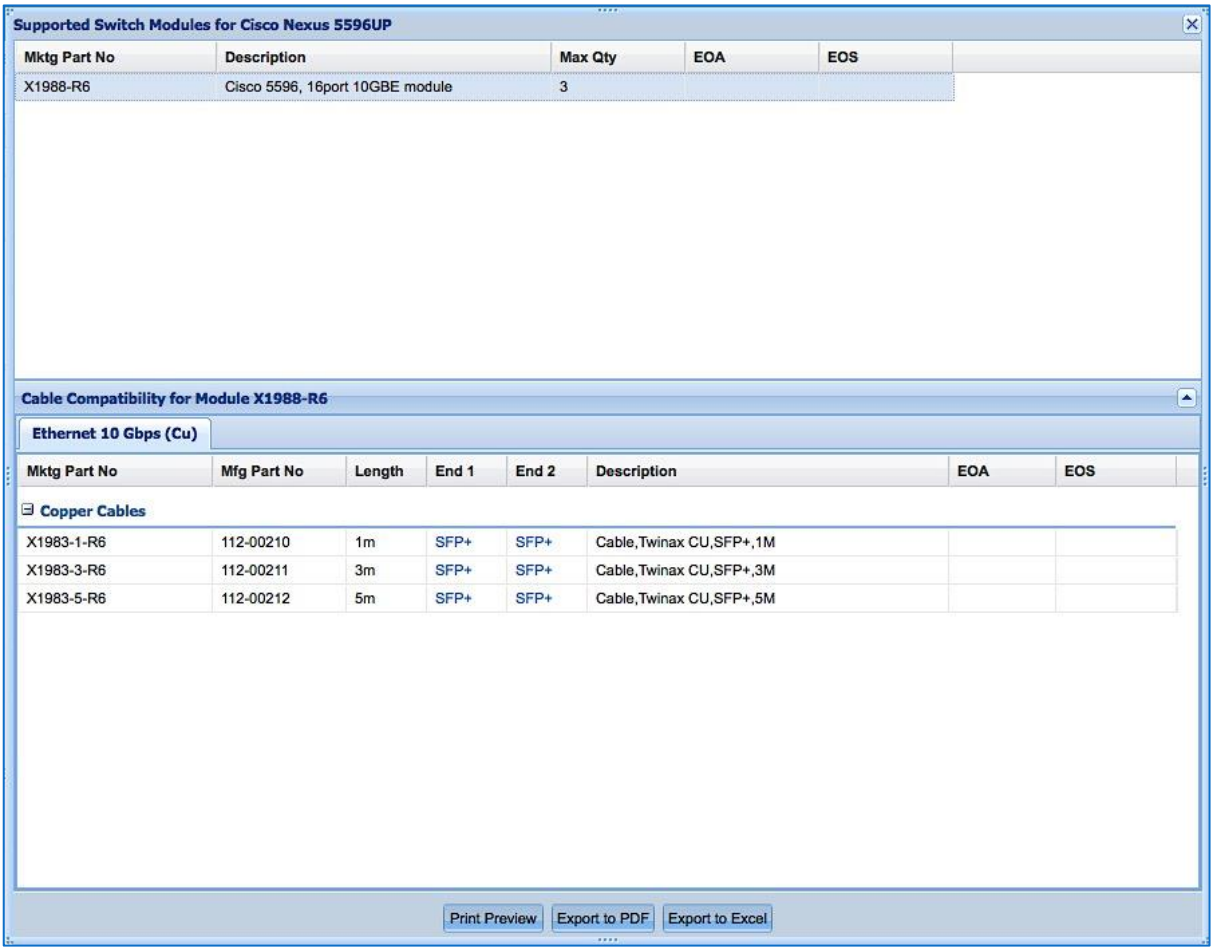
- *Cluster Port Configurations* shows the port label/role/speed for the selected switch. See example below.



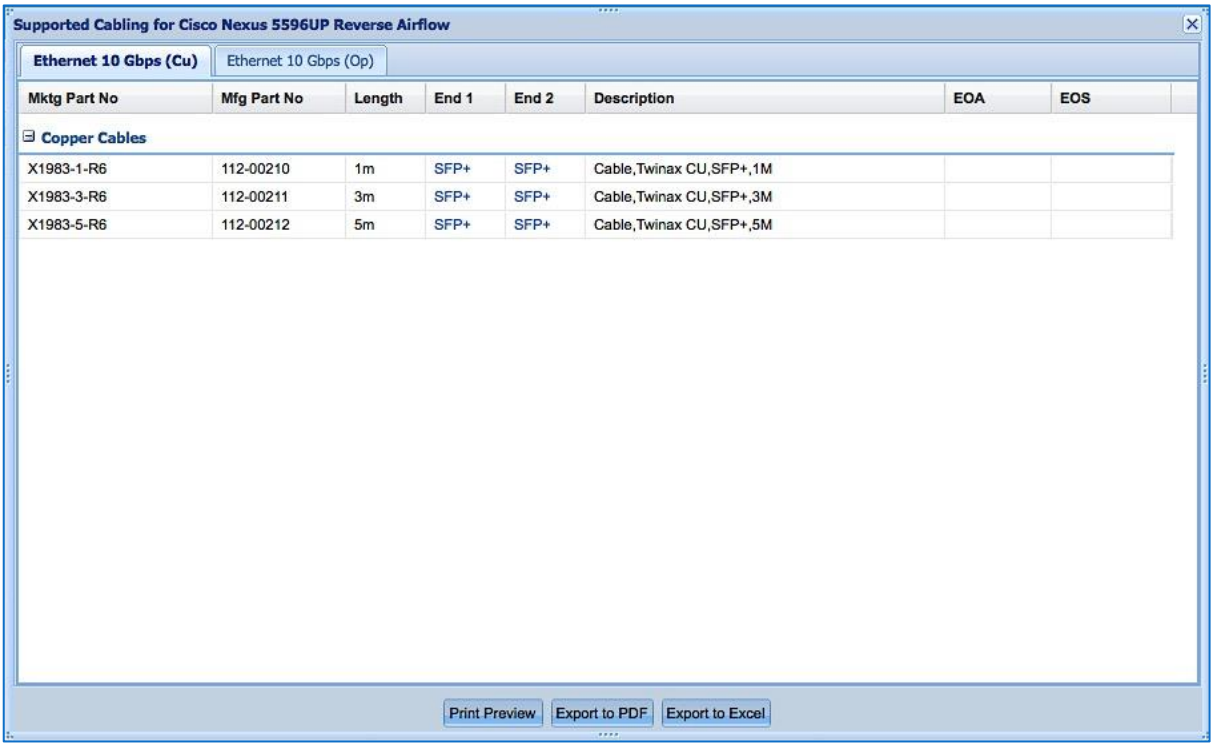
- *Supported Firmware/Storage OS* shows the firmware version and release associated with the selected switch. See example below.



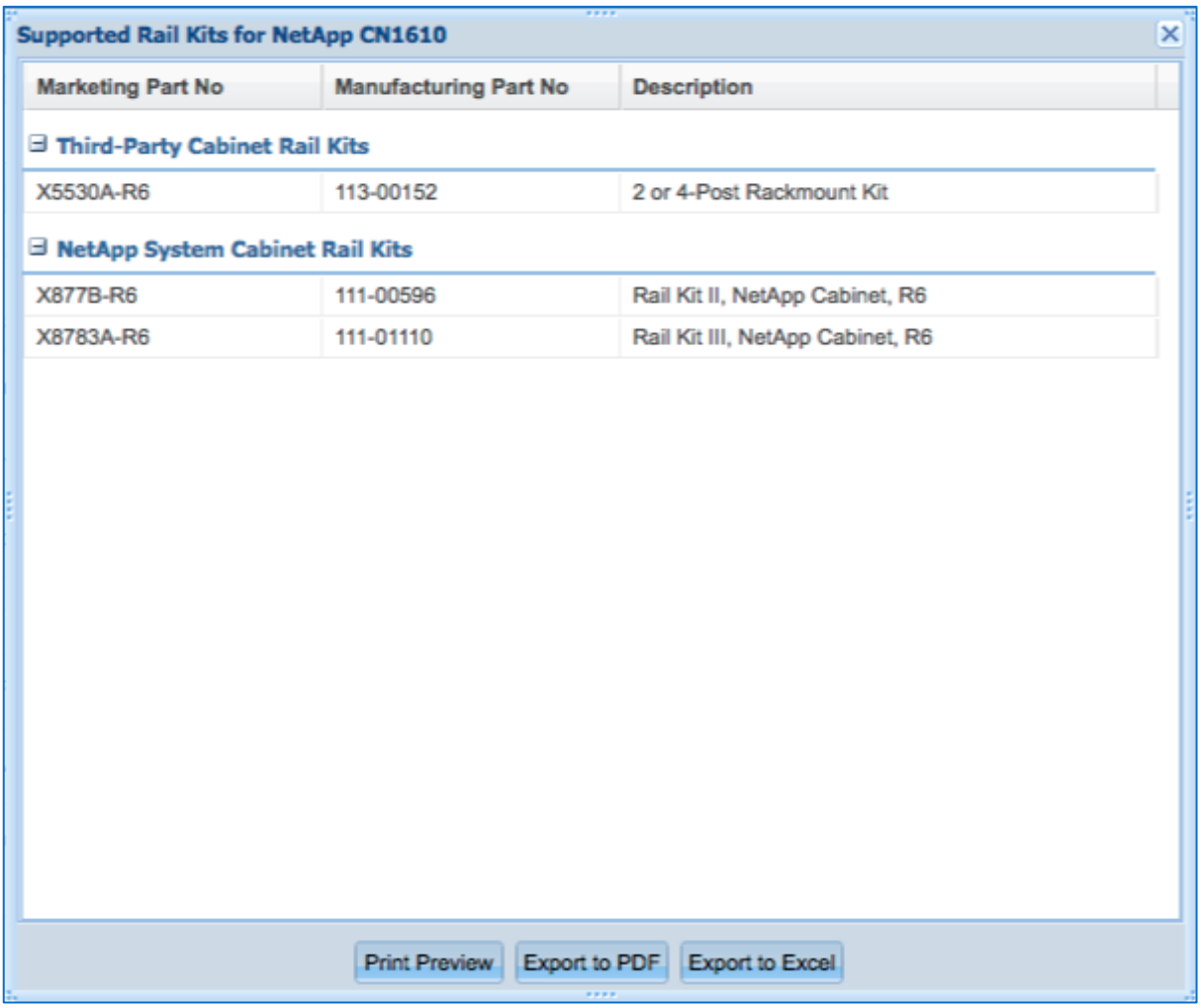
- *Supported Switch Modules and Cables* gives details of supported modules, if any. See example below. Open a link in the **End 1** or **End 2** columns to view an image showing the end of the cable.



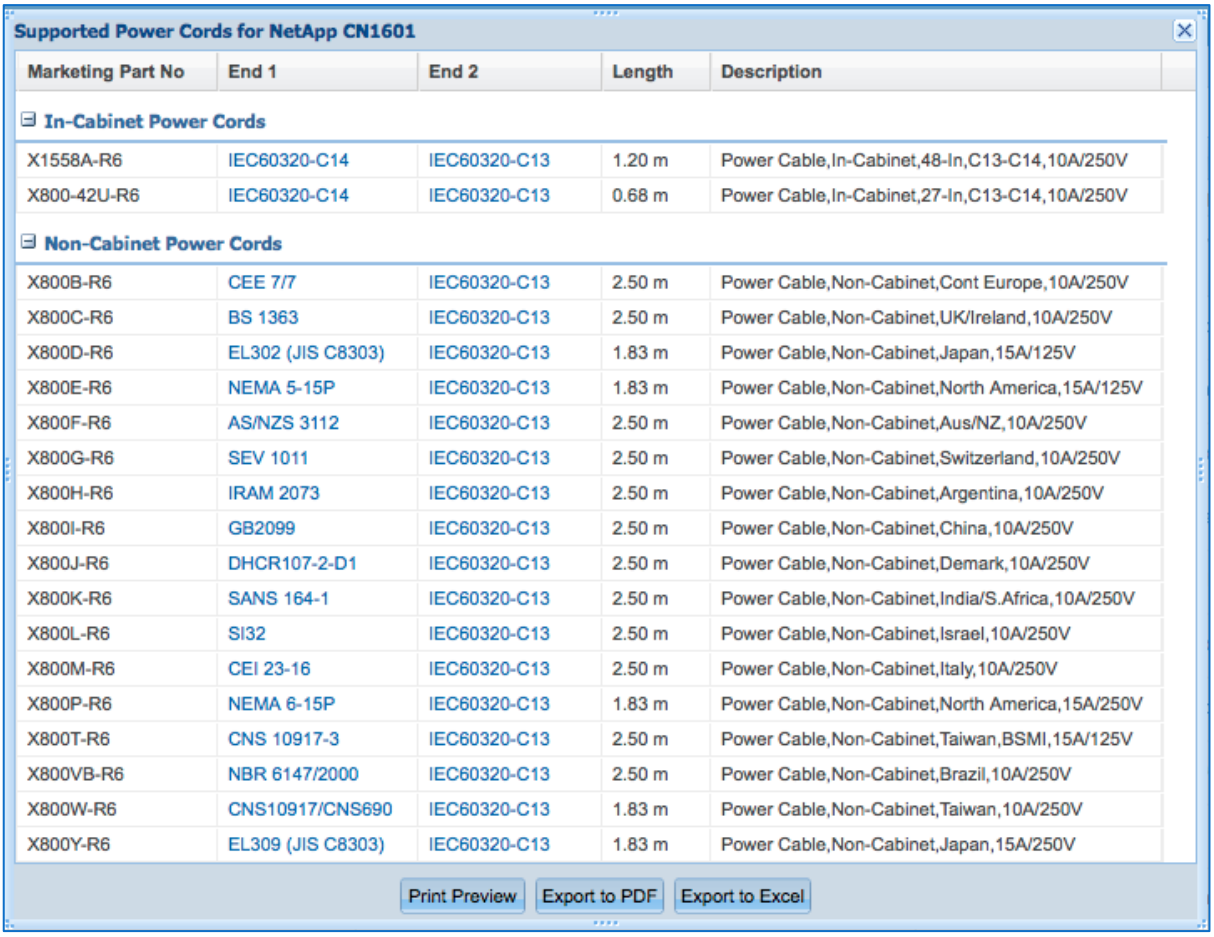
- *Supported Data Cables* shows details for any supported cables. See example below. Click a link in one of the **End** columns to view an image of the cable end. See example below.



- *Supported Rail Kits* shows details for both third-party and NetApp rail kits. See example below.



- *Supported Power Cords* shows both in-cabinet and non-cabinet power cords for the switch. Click a link in one of the **End** columns to view an image of the cable end. Copper and optical cables may be listed. See example below.



Supported Power Cords for NetApp CN1601

Marketing Part No	End 1	End 2	Length	Description
In-Cabinet Power Cords				
X1558A-R6	IEC60320-C14	IEC60320-C13	1.20 m	Power Cable,In-Cabinet,48-In,C13-C14,10A/250V
X800-42U-R6	IEC60320-C14	IEC60320-C13	0.68 m	Power Cable,In-Cabinet,27-In,C13-C14,10A/250V
Non-Cabinet Power Cords				
X800B-R6	CEE 7/7	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Cont Europe,10A/250V
X800C-R6	BS 1363	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,UK/Ireland,10A/250V
X800D-R6	EL302 (JIS C8303)	IEC60320-C13	1.83 m	Power Cable,Non-Cabinet,Japan,15A/125V
X800E-R6	NEMA 5-15P	IEC60320-C13	1.83 m	Power Cable,Non-Cabinet,North America,15A/125V
X800F-R6	AS/NZS 3112	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Aus/NZ,10A/250V
X800G-R6	SEV 1011	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Switzerland,10A/250V
X800H-R6	IRAM 2073	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Argentina,10A/250V
X800I-R6	GB2099	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,China,10A/250V
X800J-R6	DHCR107-2-D1	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Demark,10A/250V
X800K-R6	SANS 164-1	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,India/S.Africa,10A/250V
X800L-R6	SI32	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Israel,10A/250V
X800M-R6	CEI 23-16	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Italy,10A/250V
X800P-R6	NEMA 6-15P	IEC60320-C13	1.83 m	Power Cable,Non-Cabinet,North America,15A/250V
X800T-R6	CNS 10917-3	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Taiwan,BSMI,15A/125V
X800VB-R6	NBR 6147/2000	IEC60320-C13	2.50 m	Power Cable,Non-Cabinet,Brazil,10A/250V
X800W-R6	CNS10917/CNS690	IEC60320-C13	1.83 m	Power Cable,Non-Cabinet,Taiwan,10A/250V
X800Y-R6	EL309 (JIS C8303)	IEC60320-C13	1.83 m	Power Cable,Non-Cabinet,Japan,15A/250V

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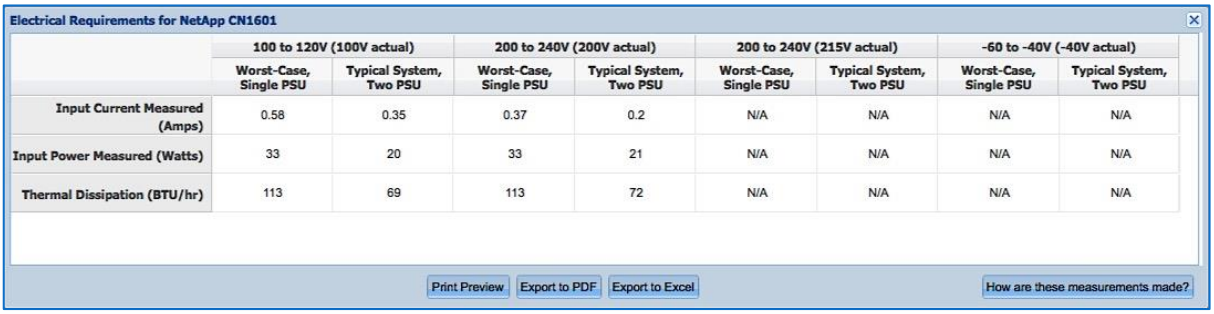
- *Electrical Requirements* shows power requirements specific to the switch you selected.

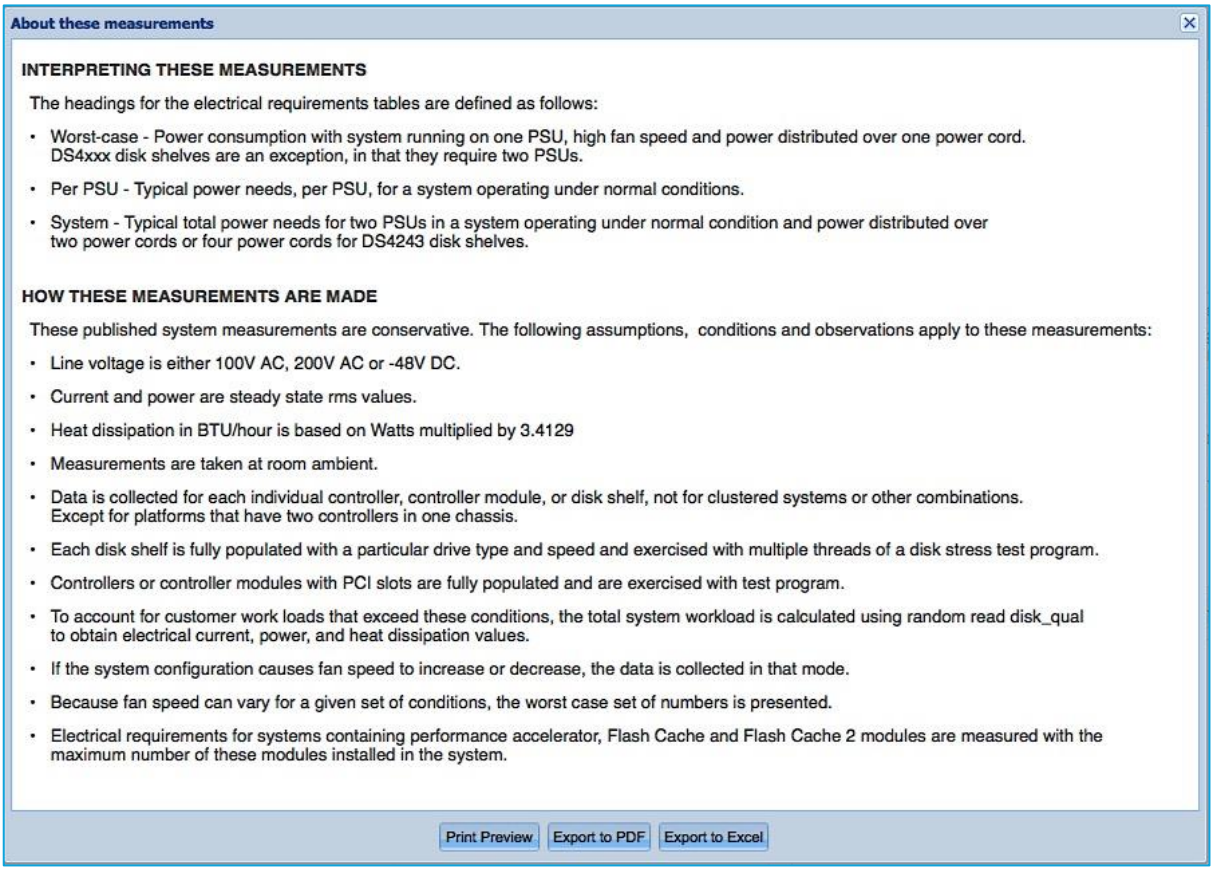


Electrical Requirements for NetApp CN1601

	100 to 120V (100V actual)		200 to 240V (200V actual)		200 to 240V (215V actual)		-60 to -40V (-40V actual)	
	Worst-Case, Single PSU	Typical System, Two PSU	Worst-Case, Single PSU	Typical System, Two PSU	Worst-Case, Single PSU	Typical System, Two PSU	Worst-Case, Single PSU	Typical System, Two PSU
Input Current Measured (Amps)	0.58	0.35	0.37	0.2	N/A	N/A	N/A	N/A
Input Power Measured (Watts)	33	20	33	21	N/A	N/A	N/A	N/A
Thermal Dissipation (BTU/hr)	113	69	113	72	N/A	N/A	N/A	N/A

Print Preview | Export to PDF | Export to Excel | How are these measurements made?

Click the **How are these measurements made?** button in the bottom right corner for important additional information. The following popup appears with information on how to interpret the measurements and how they were derived.



About these measurements

INTERPRETING THESE MEASUREMENTS

The headings for the electrical requirements tables are defined as follows:

- Worst-case - Power consumption with system running on one PSU, high fan speed and power distributed over one power cord. DS4xxx disk shelves are an exception, in that they require two PSUs.
- Per PSU - Typical power needs, per PSU, for a system operating under normal conditions.
- System - Typical total power needs for two PSUs in a system operating under normal condition and power distributed over two power cords or four power cords for DS4243 disk shelves.

HOW THESE MEASUREMENTS ARE MADE

These published system measurements are conservative. The following assumptions, conditions and observations apply to these measurements:

- Line voltage is either 100V AC, 200V AC or -48V DC.
- Current and power are steady state rms values.
- Heat dissipation in BTU/hour is based on Watts multiplied by 3.4129
- Measurements are taken at room ambient.
- Data is collected for each individual controller, controller module, or disk shelf, not for clustered systems or other combinations. Except for platforms that have two controllers in one chassis.
- Each disk shelf is fully populated with a particular drive type and speed and exercised with multiple threads of a disk stress test program.
- Controllers or controller modules with PCI slots are fully populated and are exercised with test program.
- To account for customer work loads that exceed these conditions, the total system workload is calculated using random read disk_qual to obtain electrical current, power, and heat dissipation values.
- If the system configuration causes fan speed to increase or decrease, the data is collected in that mode.
- Because fan speed can vary for a given set of conditions, the worst case set of numbers is presented.
- Electrical requirements for systems containing performance accelerator, Flash Cache and Flash Cache 2 modules are measured with the maximum number of these modules installed in the system.

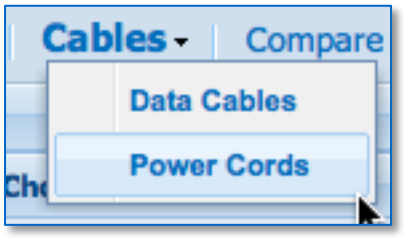
Print Preview | Export to PDF | Export to Excel

3.7 Cables

The **Cables** tab provides descriptive details of system cables, including their supported platforms, adapters and switches. The same tab also provides details of power cords, including supported shelves, platforms, switches and End imagery.

Data Cables

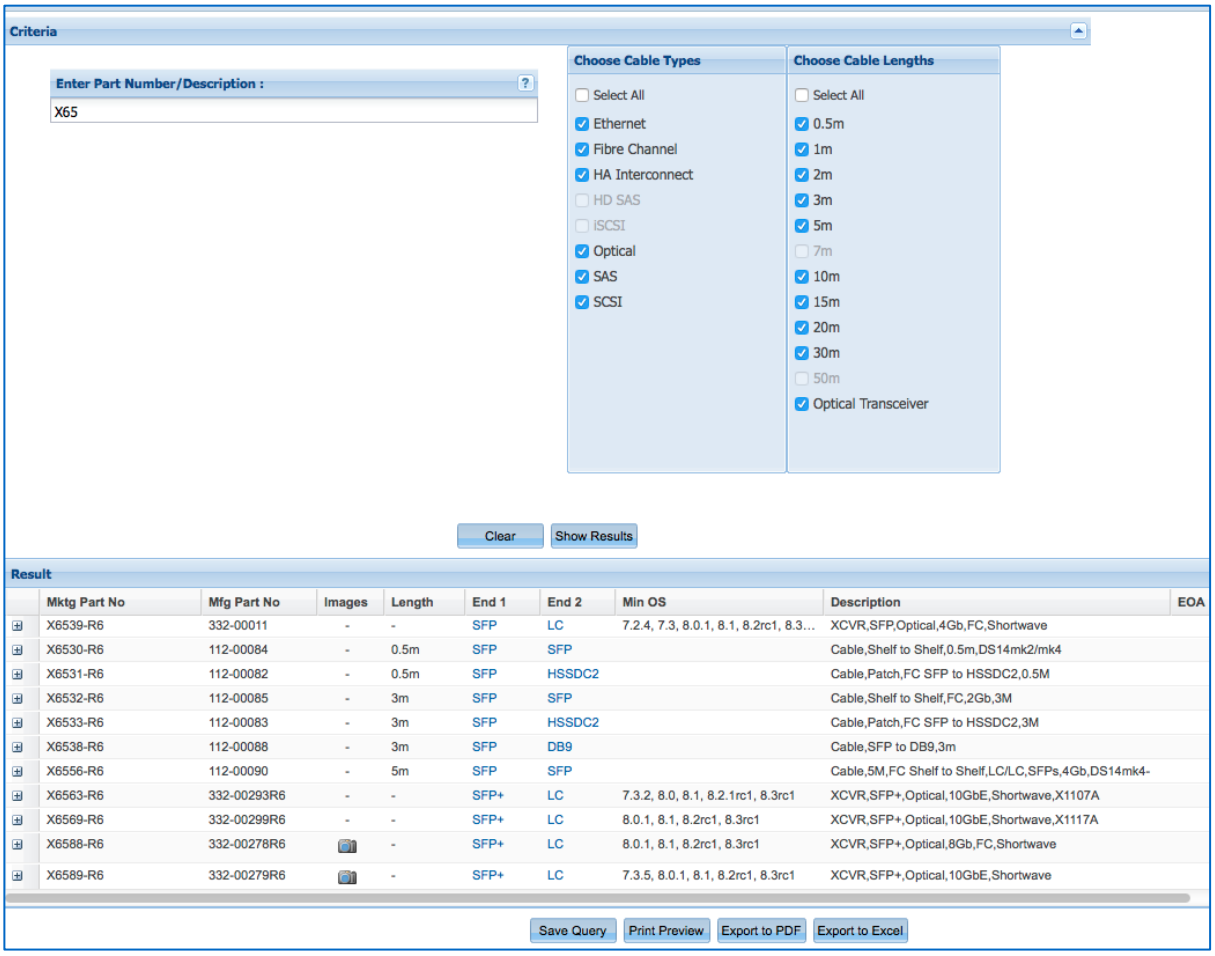
1. Hover over the **Cables** tab in the menu bar and click **Data Cables**.



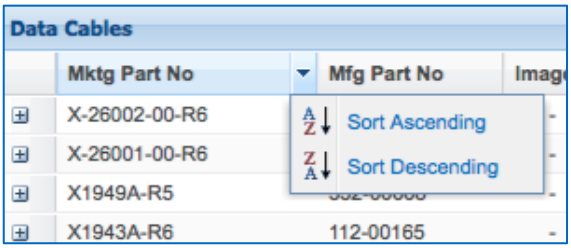
2. The page displays with a search box where you can enter part numbers and descriptions. When you type in the search text box, the system auto-suggests cables that you can choose from, or you can enter:
   a. Nothing, select any number of cable categories or **Select All** and then click **Show Results** to return a list of all cables.
   b. A string, such as “X65” and then click **Show Results** to return a list of all cables fitting that criteria.
   c. A partial part number, description, length or end. As you type, suggested options appear and the supported categories are checked. You can then select a single cable and click **Show Results** for that cable only.

   To see a list of both valid and invalid search patterns, click the ‘?’ icon in the top right corner of the auto-suggestion box.

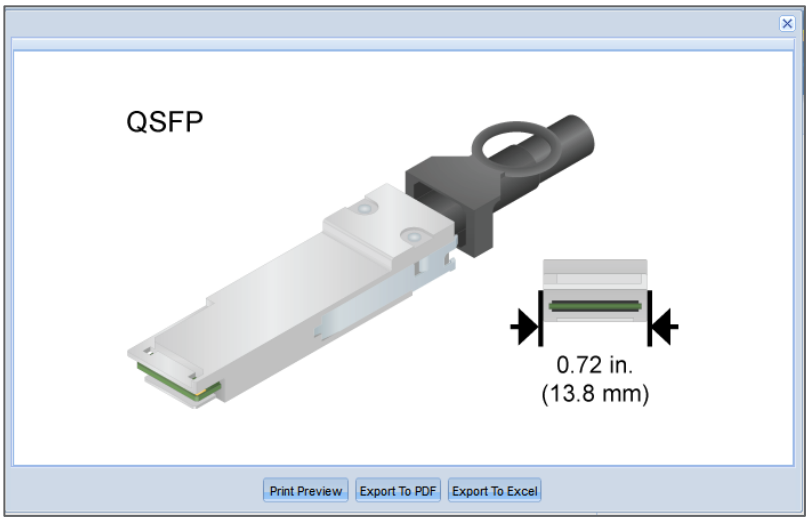
3. Below is an example results page from searching on “X65.”



4. In the lower pane, you can select any column heading to sort the results. See example below. This feature is new beginning in HWU v 4.6.

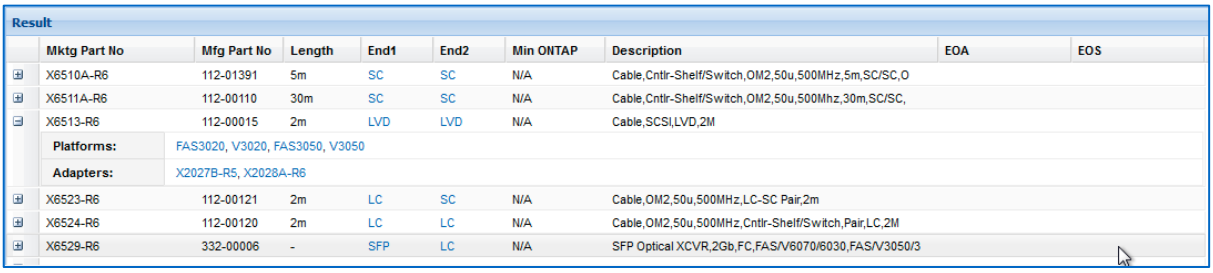


5. Click a link in the **End 1** or **End 2** columns to view an image showing the end of the cable. See example below.



6. Likewise, in the **Images** column where available, click the small camera icon to view an optical transceiver. See example below. This feature is new beginning in HWU v 4.6.

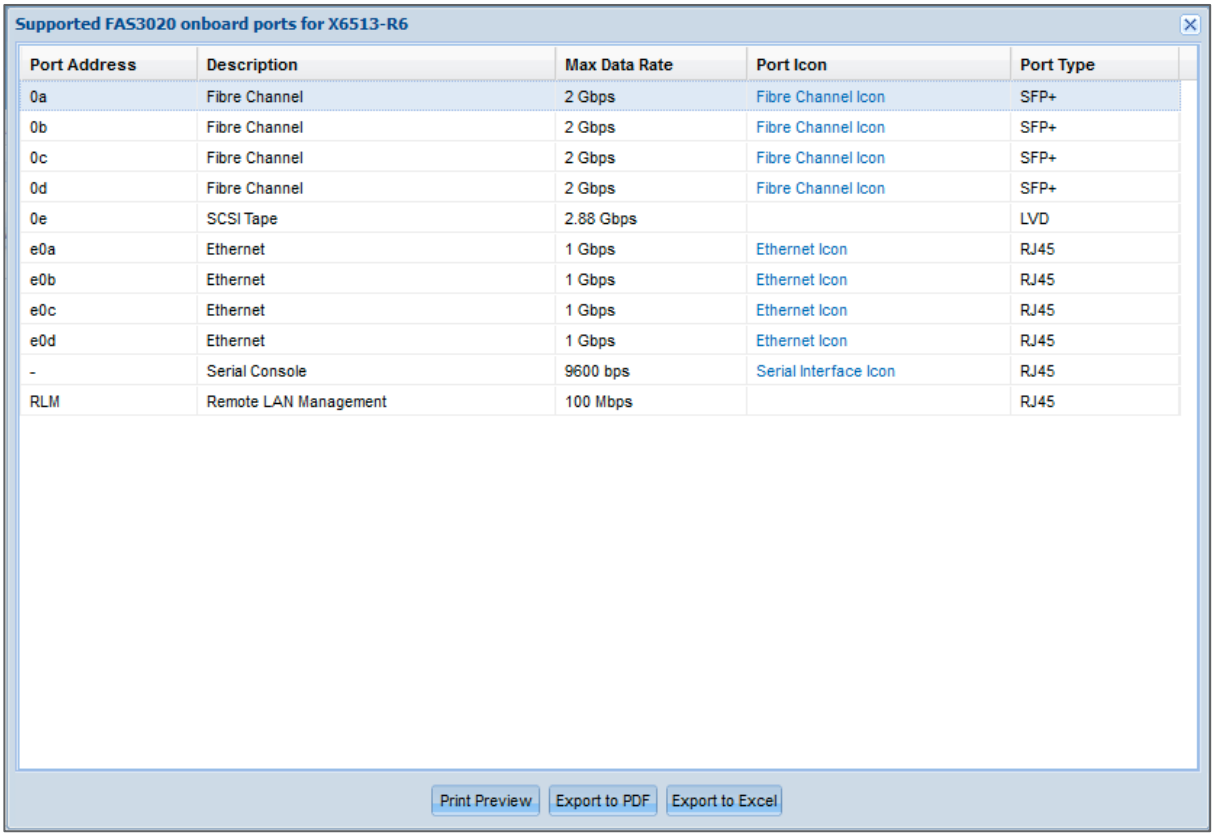
7. In the lower pane, click the '+' icon to view expanded details of any cable. Note that each cable selection also displays supported platforms and adapters where applicable. See example below.



Result

	Mktg Part No	Mfg Part No	Length	End1	End2	Min ONTAP	Description	EOA	EOS
⊞	X6510A-R6	112-01391	5m	SC	SC	N/A	Cable,Cntlr-Shelf/Switch,OM2,50u,500MHz,5m,SC/SC,O		
⊞	X6511A-R6	112-00110	30m	SC	SC	N/A	Cable,Cntlr-Shelf/Switch,OM2,50u,500Mhz,30m,SC/SC,		
⊟	X6513-R6	112-00015	2m	LVD	LVD	N/A	Cable,SCSI,LVD,2M		
	Platforms:	FAS3020, V3020, FAS3050, V3050							
	Adapters:	X2027B-R5, X2028A-R6							
⊞	X6523-R6	112-00121	2m	LC	SC	N/A	Cable,OM2,50u,500MHz,LC-SC Pair,2m		
⊞	X6524-R6	112-00120	2m	LC	LC	N/A	Cable,OM2,50u,500MHz,Cntlr-Shelf/Switch,Pair,LC,2M		
⊞	X6529-R6	332-00006	-	SFP	LC	N/A	SFP Optical XCVR,2Gb,FC,FAS/V6070/6030,FAS/V3050/3		

8. From the lower pane, click a platform link to view additional details of the compatibility relationship. You can also view a port icon where available. See example below.

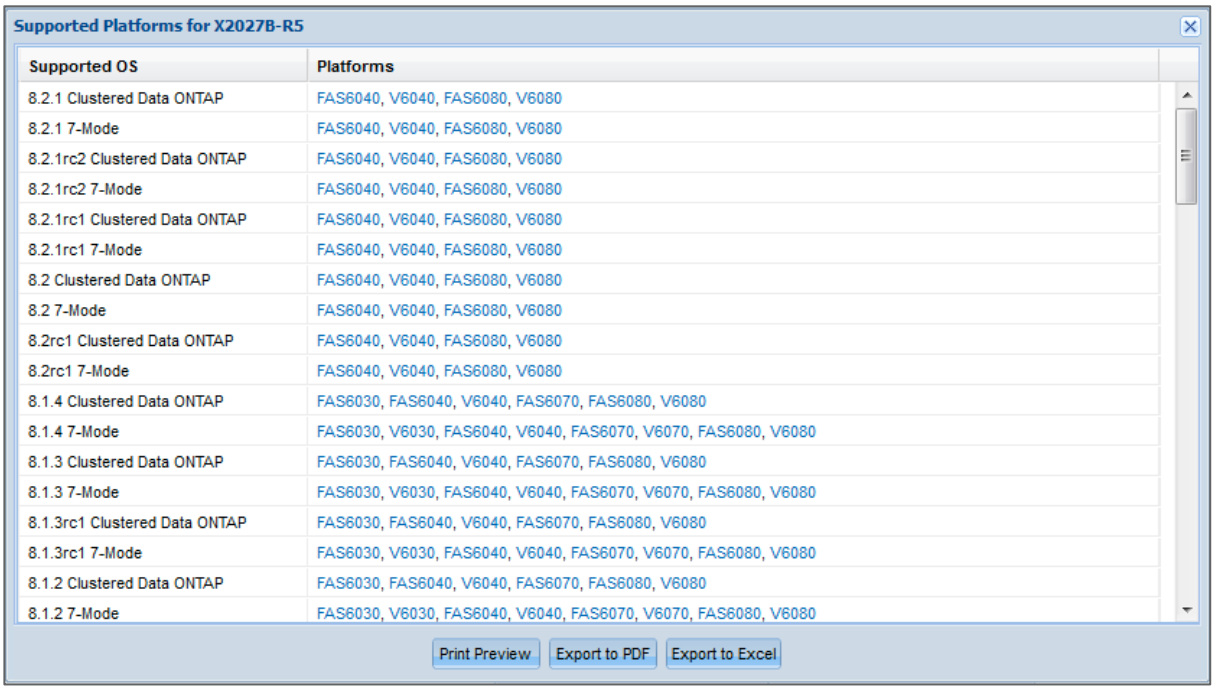


Supported FAS3020 onboard ports for X6513-R6

Port Address	Description	Max Data Rate	Port Icon	Port Type
0a	Fibre Channel	2 Gbps	Fibre Channel Icon	SFP+
0b	Fibre Channel	2 Gbps	Fibre Channel Icon	SFP+
0c	Fibre Channel	2 Gbps	Fibre Channel Icon	SFP+
0d	Fibre Channel	2 Gbps	Fibre Channel Icon	SFP+
0e	SCSI Tape	2.88 Gbps		LVD
e0a	Ethernet	1 Gbps	Ethernet Icon	RJ45
e0b	Ethernet	1 Gbps	Ethernet Icon	RJ45
e0c	Ethernet	1 Gbps	Ethernet Icon	RJ45
e0d	Ethernet	1 Gbps	Ethernet Icon	RJ45
-	Serial Console	9600 bps	Serial Interface Icon	RJ45
RLM	Remote LAN Management	100 Mbps		RJ45

Print Preview | Export to PDF | Export to Excel

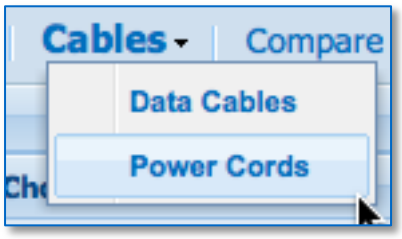
9. From the lower pane, click an adapter link to view additional details of its compatibility relationship. See example below.



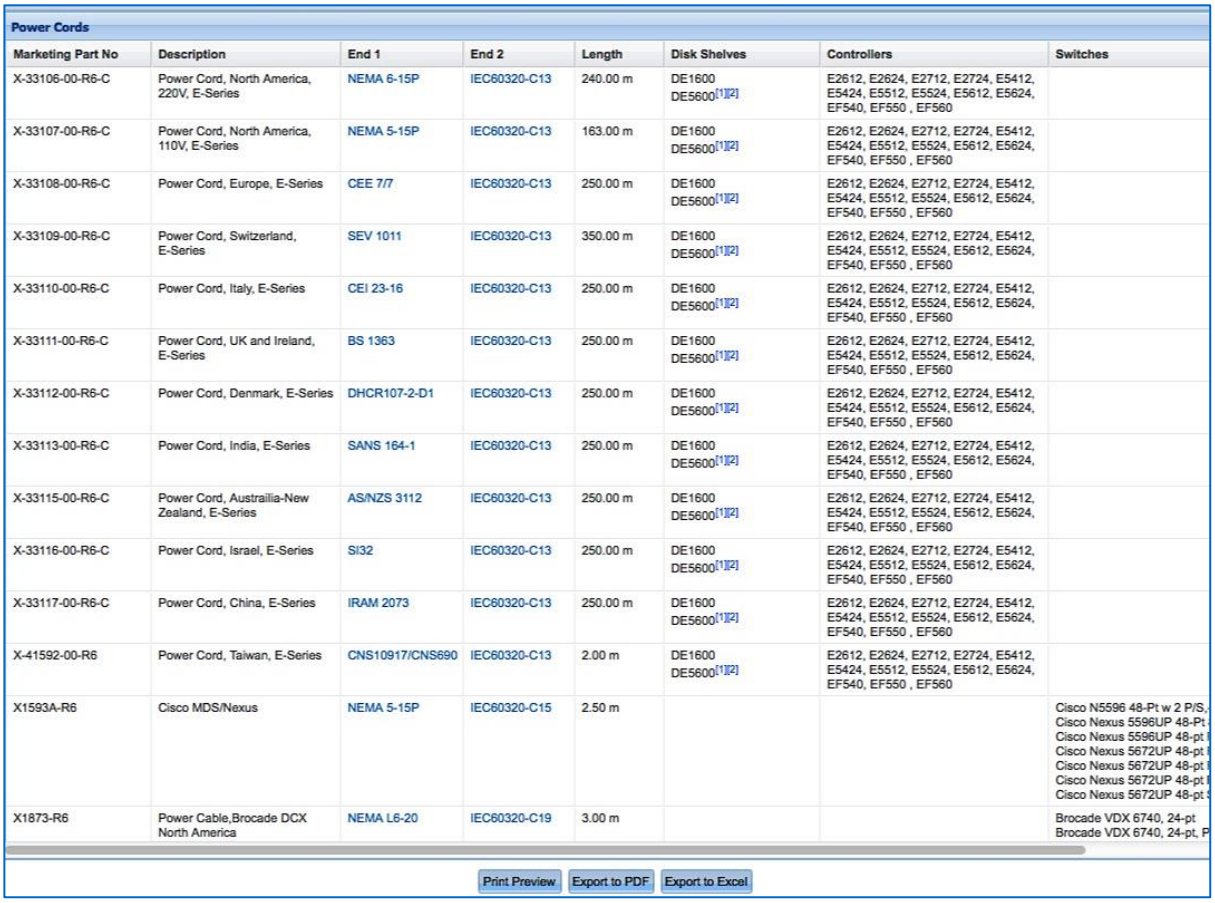
10. When finished, use the **Save Query**, **Print Preview** and **Export** options at the bottom to save your selections.

Power Cords

1. Hover over the **Cables** tab in the menu bar and click **Power Cords**.



2. The page displays a complete list of NetApp power cords, listed by Marketing Part Number. See example below.

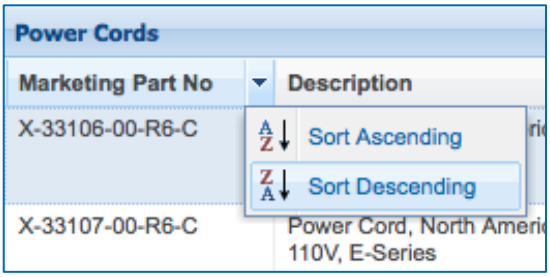


Power Cords

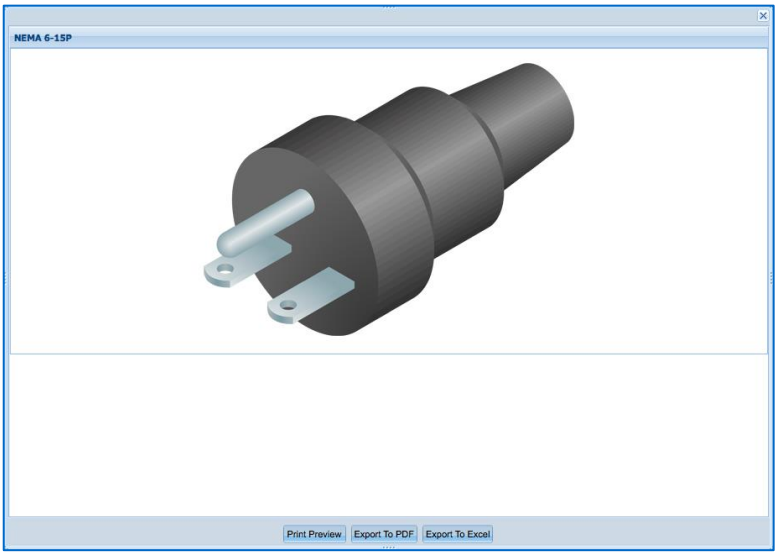
Marketing Part No	Description	End 1	End 2	Length	Disk Shelves	Controllers	Switches
X-33106-00-R6-C	Power Cord, North America, 220V, E-Series	NEMA 6-15P	IEC60320-C13	240.00 m	DE1600 DE5600[1][2]	E2612, E2624, E2712, E2724, E5412, E5424, E5512, E5524, E5612, E5624, EF540, EF550 , EF560	
X-33107-00-R6-C	Power Cord, North America, 110V, E-Series	NEMA 5-15P	IEC60320-C13	163.00 m	DE1600 DE5600[1][2]	E2612, E2624, E2712, E2724, E5412, E5424, E5512, E5524, E5612, E5624, EF540, EF550 , EF560	
X-33108-00-R6-C	Power Cord, Europe, E-Series	CEE 7/7	IEC60320-C13	250.00 m	DE1600 DE5600[1][2]	E2612, E2624, E2712, E2724, E5412, E5424, E5512, E5524, E5612, E5624, EF540, EF550 , EF560	
X-33109-00-R6-C	Power Cord, Switzerland, E-Series	SEV 1011	IEC60320-C13	350.00 m	DE1600 DE5600[1][2]	E2612, E2624, E2712, E2724, E5412, E5424, E5512, E5524, E5612, E5624, EF540, EF550 , EF560	
X-33110-00-R6-C	Power Cord, Italy, E-Series	CEI 23-16	IEC60320-C13	250.00 m	DE1600 DE5600[1][2]	E2612, E2624, E2712, E2724, E5412, E5424, E5512, E5524, E5612, E5624, EF540, EF550 , EF560	
X-33111-00-R6-C	Power Cord, UK and Ireland, E-Series	BS 1363	IEC60320-C13	250.00 m	DE1600 DE5600[1][2]	E2612, E2624, E2712, E2724, E5412, E5424, E5512, E5524, E5612, E5624, EF540, EF550 , EF560	
X-33112-00-R6-C	Power Cord, Denmark, E-Series	DHCR107-2-D1	IEC60320-C13	250.00 m	DE1600 DE5600[1][2]	E2612, E2624, E2712, E2724, E5412, E5424, E5512, E5524, E5612, E5624, EF540, EF550 , EF560	
X-33113-00-R6-C	Power Cord, India, E-Series	SANS 164-1	IEC60320-C13	250.00 m	DE1600 DE5600[1][2]	E2612, E2624, E2712, E2724, E5412, E5424, E5512, E5524, E5612, E5624, EF540, EF550 , EF560	
X-33115-00-R6-C	Power Cord, Austrailia-New Zealand, E-Series	AS/NZS 3112	IEC60320-C13	250.00 m	DE1600 DE5600[1][2]	E2612, E2624, E2712, E2724, E5412, E5424, E5512, E5524, E5612, E5624, EF540, EF550 , EF560	
X-33116-00-R6-C	Power Cord, Israel, E-Series	SI32	IEC60320-C13	250.00 m	DE1600 DE5600[1][2]	E2612, E2624, E2712, E2724, E5412, E5424, E5512, E5524, E5612, E5624, EF540, EF550 , EF560	
X-33117-00-R6-C	Power Cord, China, E-Series	IRAM 2073	IEC60320-C13	250.00 m	DE1600 DE5600[1][2]	E2612, E2624, E2712, E2724, E5412, E5424, E5512, E5524, E5612, E5624, EF540, EF550 , EF560	
X-41592-00-R6	Power Cord, Taiwan, E-Series	CNS10917/CNS690	IEC60320-C13	2.00 m	DE1600 DE5600[1][2]	E2612, E2624, E2712, E2724, E5412, E5424, E5512, E5524, E5612, E5624, EF540, EF550 , EF560	
X1593A-R6	Cisco MDS/Nexus	NEMA 5-15P	IEC60320-C15	2.50 m			Cisco N5596 48-Pt w 2 P/S, Cisco Nexus 5596UP 48-Pt Cisco Nexus 5596UP 48-pt Cisco Nexus 5672UP 48-pt Cisco Nexus 5672UP 48-pt Cisco Nexus 5672UP 48-pt Cisco Nexus 5672UP 48-pt
X1873-R6	Power Cable,Brocade DCX North America	NEMA L6-20	IEC60320-C19	3.00 m			Brocade VDX 6740, 24-pt Brocade VDX 6740, 24-pt, P

Print Preview | Export to PDF | Export to Excel

3. In the lower pane, you can select any column heading to sort the results. See example below. This feature is new beginning in HWU v 4.6.



4. Click a link in the **End 1** or **End 2** columns to view an image showing the end of the power cord. See example below.

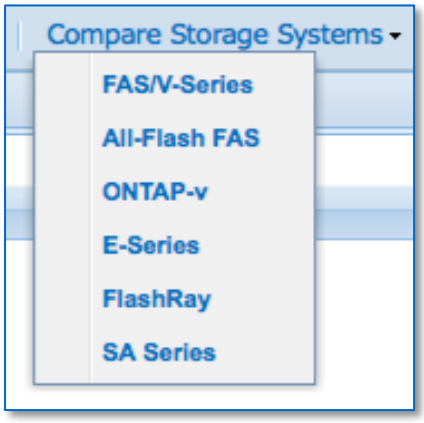


5. You can also click any footnote link to view its popup information, or scroll to the bottom of the page to see all footnotes.
6. When finished, use the **Save Query**, **Print Preview** and **Export** options at the bottom to save your selections.

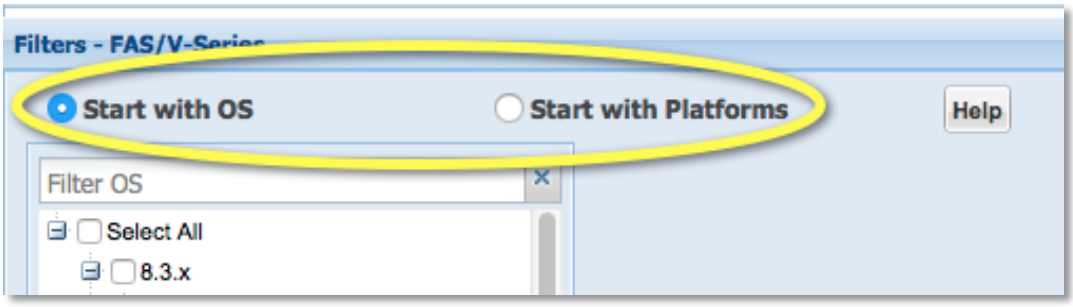
3.8 Comparing Storage Systems

One of the most useful features of Hardware Universe is the ability to compare storage systems between different Data ONTAP versions or within the same version. For example, you can compare similar or disparate platforms running various OS versions to find an ideal solution to your customers needs. This gives you a convenient and powerful side-by-side view to make quick comparisons. In addition to comparing controller configurations, HWU also provides comparison data for related drives, shelves and adapters.

1. Hover over the **Compare Storage Systems** tab in the menu bar and select a platform option from the drop-down menu. For example, select **FAS/V-Series**.



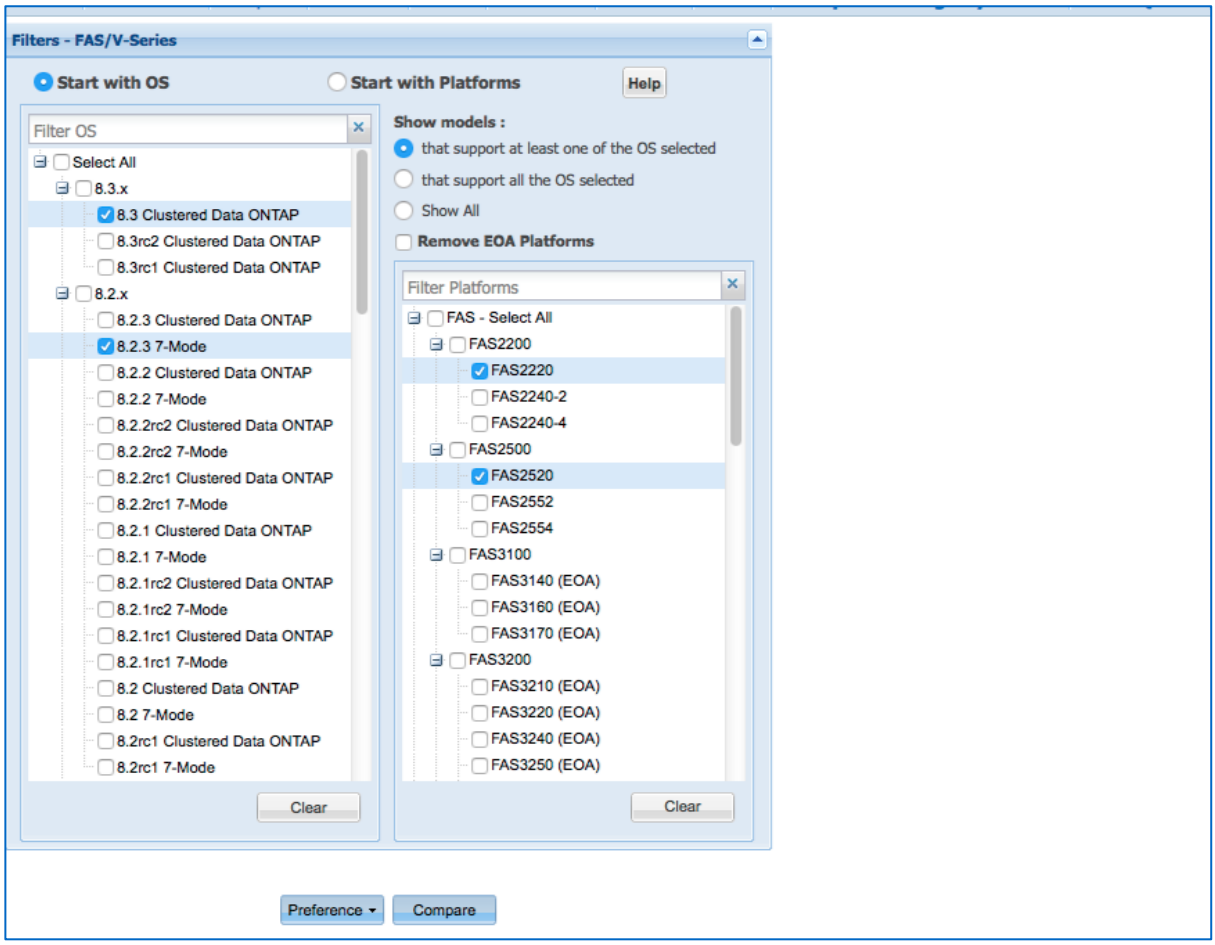
2. The *Filters* page then allows you to select the method of configuring your system. You can select **Start with OS** or **Start with Platforms**.



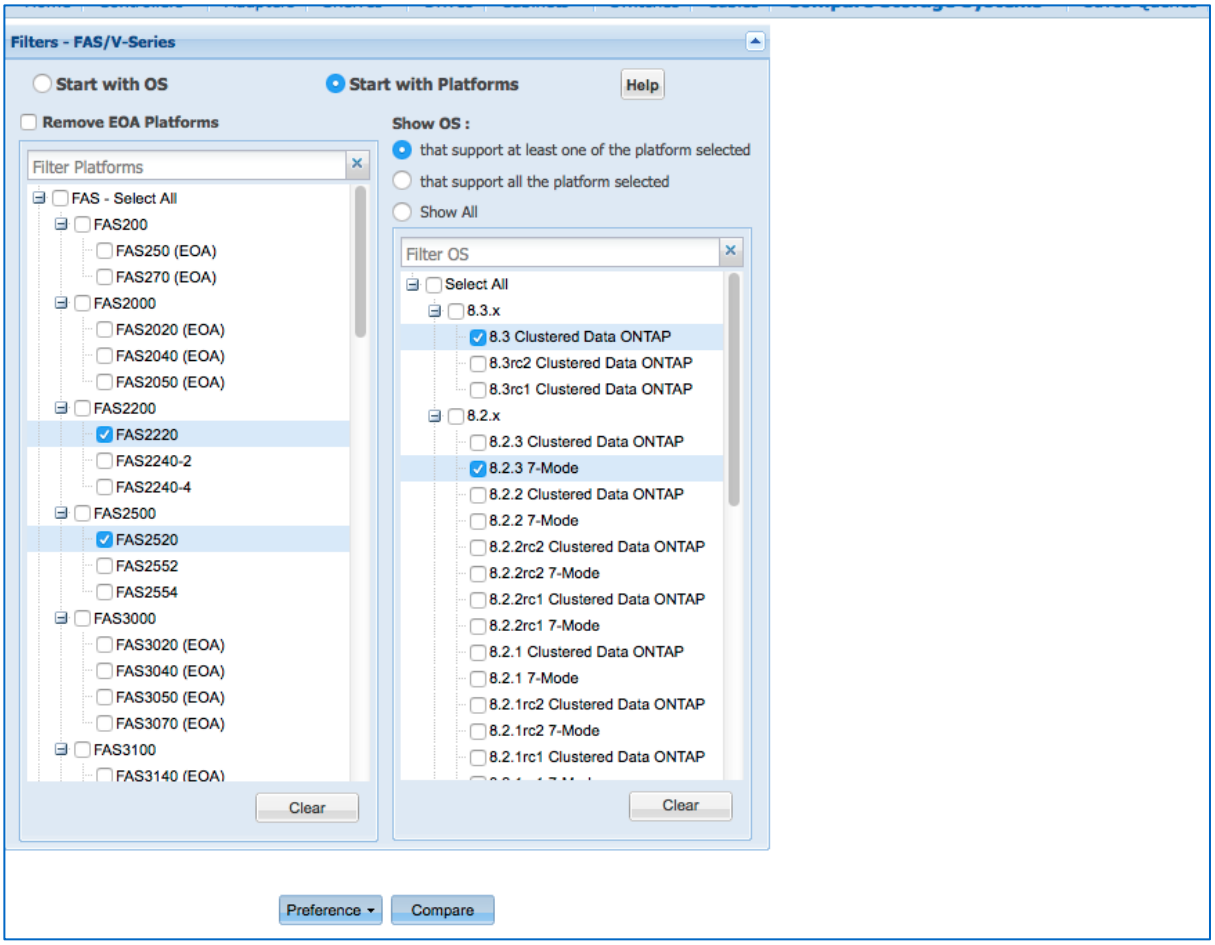
3. **Start with OS** – This is the default option.
   a. Use the **Filter OS** search box to quickly find an OS that you seek. Example filter strings: *8.2.x, 8.3rc1, cluster-mode*.
   b. Select one or more OS versions. The *Show Models* pane displays with a tree of supported platforms.
      - By default, the tree shows models that support the OS version, as indicated by the radio button labeled **that support at least one of the OS selected**.
      - If you select the radio button labeled **that support all the OS selected**, then the tree refreshes to show models that support all selected OS versions.
      - Special Note: The **Show All** radio button lists all the models for the chosen platform, regardless of OS support. Unsupported models are grayed out in the tree. Hover your mouse over a grayed-out model to see its supported OS information.

- To further refine the scope of the platform list, you can select **Remove EOA Platforms.**
- Use the **Filter Platforms** search box to quickly find a platform by family or model. Example filter stings: *FAS6200, FAS6220*.

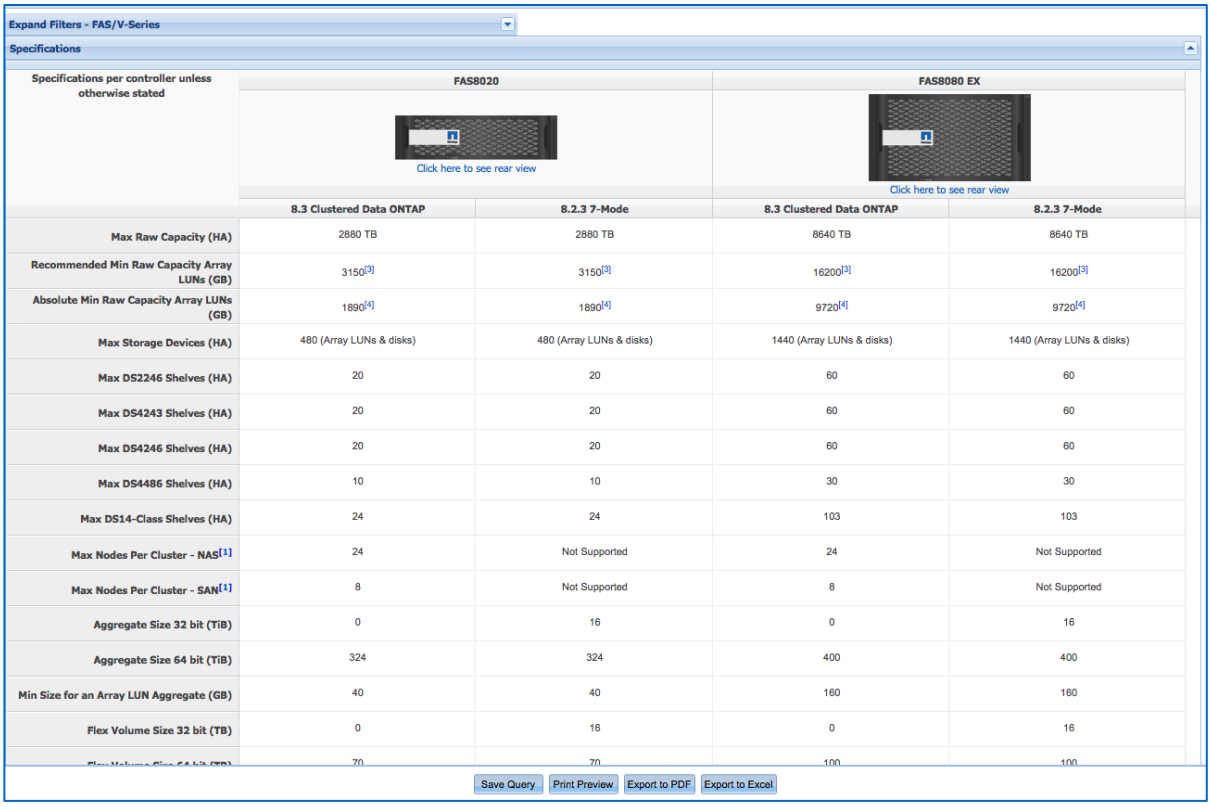
c. Select one or more models to be compared. Your page will look like the example below.



4. **Start with Platforms**– This is not the default, but you can make it so by using the **Preference** button at the bottom of the page after you complete your configuration.
   - This option works in a similar way as **Start with OS**, except that you start with model selections instead of OS selections.
   - Special Note: The **Show All** radio button lists all the OS versions for the chosen platform, regardless of platform support. Unsupported OS versions are grayed out in the tree. Hover your mouse over a grayed-out OS version to see its supported model information.
   - Saving Preference – You can choose to save your selections as your preference for a specific controller platform type (FAS/V-Series, All-Flash FAS, ONTAP-v, E-Series, FlashRay, SA Series). After you complete your configuration, simply click the **Preference** button at the bottom of the page. Then each time you access the same controller platform type, your saved preferences will display by default. You can delete the preference settings using the same **Preference** button.
5. Select one or more platforms and OS versions. See an example **Start with Platforms** page below:



6. After selecting the OS and platforms you want to compare, click the **Compare** button at the bottom of the page. Your results will look like the following, which shows the platforms side-by-side and the OS breakdowns below:



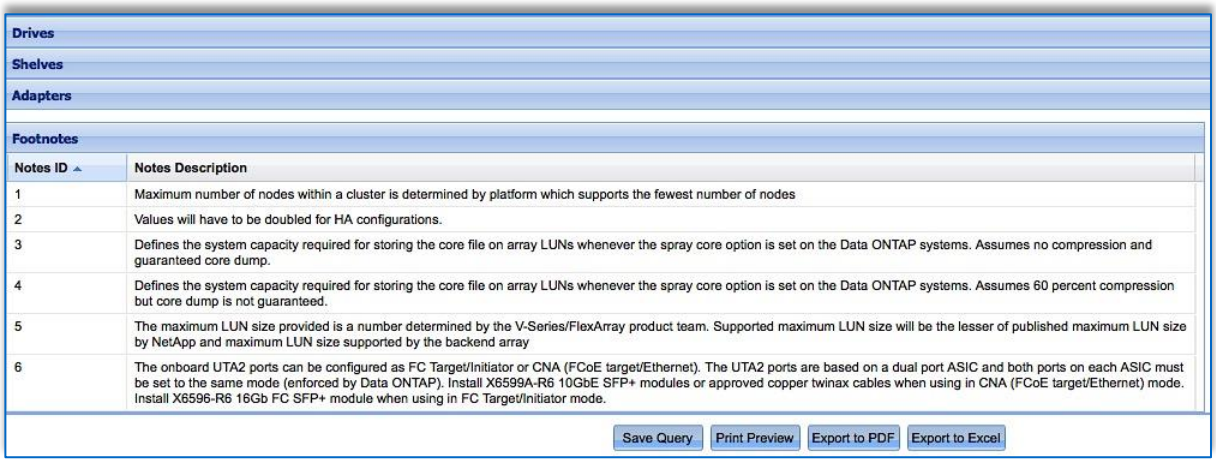
Expand Filters - FAS/V-Series

Specifications

Specifications per controller unless otherwise stated	FAS8020		FAS8080 EX	
	Click here to see rear view		Click here to see rear view	
	8.3 Clustered Data ONTAP	8.2.3 7-Mode	8.3 Clustered Data ONTAP	8.2.3 7-Mode
Max Raw Capacity (HA)	2880 TB	2880 TB	8640 TB	8640 TB
Recommended Min Raw Capacity Array LUNs (GB)	3150[3]	3150[3]	16200[3]	16200[3]
Absolute Min Raw Capacity Array LUNs (GB)	1890[4]	1890[4]	9720[4]	9720[4]
Max Storage Devices (HA)	480 (Array LUNs & disks)	480 (Array LUNs & disks)	1440 (Array LUNs & disks)	1440 (Array LUNs & disks)
Max DS2246 Shelves (HA)	20	20	60	60
Max DS4243 Shelves (HA)	20	20	60	60
Max DS4246 Shelves (HA)	20	20	60	60
Max DS4486 Shelves (HA)	10	10	30	30
Max DS14-Class Shelves (HA)	24	24	103	103
Max Nodes Per Cluster - NAS[1]	24	Not Supported	24	Not Supported
Max Nodes Per Cluster - SAN[1]	8	Not Supported	8	Not Supported
Aggregate Size 32 bit (TiB)	0	16	0	16
Aggregate Size 64 bit (TiB)	324	324	400	400
Min Size for an Array LUN Aggregate (GB)	40	40	160	160
Flex Volume Size 32 bit (TB)	0	16	0	16
	70	70	100	100

Save Query | Print Preview | Export to PDF | Export to Excel

7. Scroll to the bottom of the comparison results page to locate expandable bars labeled **Drives**, **Shelves**, **Adapters** and **Footnotes**. See example below.



Drives

Shelves

Adapters

Footnotes

Notes ID	Notes Description
1	Maximum number of nodes within a cluster is determined by platform which supports the fewest number of nodes
2	Values will have to be doubled for HA configurations.
3	Defines the system capacity required for storing the core file on array LUNs whenever the spray core option is set on the Data ONTAP systems. Assumes no compression and guaranteed core dump.
4	Defines the system capacity required for storing the core file on array LUNs whenever the spray core option is set on the Data ONTAP systems. Assumes 60 percent compression but core dump is not guaranteed.
5	The maximum LUN size provided is a number determined by the V-Series/FlexArray product team. Supported maximum LUN size will be the lesser of published maximum LUN size by NetApp and maximum LUN size supported by the backend array
6	The onboard UTA2 ports can be configured as FC Target/Initiator or CNA (FCoE target/Ethernet). The UTA2 ports are based on a dual port ASIC and both ports on each ASIC must be set to the same mode (enforced by Data ONTAP). Install X6599A-R6 10GbE SFP+ modules or approved copper twinax cables when using in CNA (FCoE target/Ethernet) mode. Install X6596-R6 16Gb FC SFP+ module when using in FC Target/Initiator mode.

Save Query | Print Preview | Export to PDF | Export to Excel

8. Click the **Drives** bar. The drives appear that are supported for the configurations. **Tip**: Some users find the tabular format suitable for printing to use for later reference. See example below.

Drives

	FAS8020		FAS8080 EX	
	8.3 Clustered Data ONTAP	8.2.3 7-Mode	8.3 Clustered Data ONTAP	8.2.3 7-Mode
FC	X276A-R5 (300GB, 10k) **FlexArray Supported** X278A-R5 (144GB, 15k) **FlexArray Supported** X279A-R5 (300GB, 15k) **FlexArray Supported** X291A-R5 (450GB, 15k) **FlexArray Supported** X292A-R5 (600GB, 15k) **FlexArray Supported**	X276A-R5 (300GB, 10k) **FlexArray Supported** X278A-R5 (144GB, 15k) **FlexArray Supported** X279A-R5 (300GB, 15k) **FlexArray Supported** X291A-R5 (450GB, 15k) **FlexArray Supported** X292A-R5 (600GB, 15k) **FlexArray Supported**	X276A-R5 (300GB, 10k) **FlexArray Supported** X278A-R5 (144GB, 15k) **FlexArray Supported** X279A-R5 (300GB, 15k) **FlexArray Supported** X291A-R5 (450GB, 15k) **FlexArray Supported** X292A-R5 (600GB, 15k) **FlexArray Supported**	X276A-R5 (300GB, 10k) **FlexArray Supported** X278A-R5 (144GB, 15k) **FlexArray Supported** X279A-R5 (300GB, 15k) **FlexArray Supported** X291A-R5 (450GB, 15k) **FlexArray Supported** X292A-R5 (600GB, 15k) **FlexArray Supported**
MSATA	X478A-R5 (3000GB, 7.2k) **FlexArray Supported** X480A-R6 (4000GB, 7.2k) **FlexArray Supported** X481A-R6 (6000GB, 7.2k)	X478A-R5 (3000GB, 7.2k) **FlexArray Supported** X480A-R6 (4000GB, 7.2k) **FlexArray Supported** X481A-R6 (6000GB, 7.2k)	X478A-R5 (3000GB, 7.2k) **FlexArray Supported** X480A-R6 (4000GB, 7.2k) **FlexArray Supported** X481A-R6 (6000GB, 7.2k)	X478A-R5 (3000GB, 7.2k) **FlexArray Supported** X480A-R6 (4000GB, 7.2k) **FlexArray Supported** X481A-R6 (6000GB, 7.2k)
NL-SAS	X309A-R6 (3000GB, 7.2k) **FlexArray Supported** X315A-R6 (4000GB, 7.2k) **FlexArray Supported** X316A-R6 (6000GB, 7.2k) **FlexArray Supported** X477A-R6 (4000GB, 7.2k) **FlexArray Supported**	X309A-R6 (3000GB, 7.2k) **FlexArray Supported** X315A-R6 (4000GB, 7.2k) **FlexArray Supported** X316A-R6 (6000GB, 7.2k) **FlexArray Supported** X477A-R6 (4000GB, 7.2k) **FlexArray Supported**	X309A-R6 (3000GB, 7.2k) **FlexArray Supported** X315A-R6 (4000GB, 7.2k) **FlexArray Supported** X316A-R6 (6000GB, 7.2k) **FlexArray Supported** X477A-R6 (4000GB, 7.2k) **FlexArray Supported**	X309A-R6 (3000GB, 7.2k) **FlexArray Supported** X315A-R6 (4000GB, 7.2k) **FlexArray Supported** X316A-R6 (6000GB, 7.2k) **FlexArray Supported** X477A-R6 (4000GB, 7.2k) **FlexArray Supported**
SAS	X410A-R5 (300GB, 15k) **FlexArray Supported** X411A-R5 (450GB, 15k) **FlexArray Supported** X412A-R5 (600GB, 15k) **FlexArray Supported** X414A-R5 (600GB, 15k) **FlexArray Supported** X416A-R5 (600GB, 10k) **FlexArray Supported** X417A-R6 (900GB, 10k) **FlexArray Supported** X421A-R5 (450GB, 10k) **FlexArray Supported** X422A-R5 (600GB, 10k) **FlexArray Supported** X423A-R5 (900GB, 10k) **FlexArray Supported** X425A-R6 (1200GB, 10k) **FlexArray Supported**	X410A-R5 (300GB, 15k) **FlexArray Supported** X411A-R5 (450GB, 15k) **FlexArray Supported** X412A-R5 (600GB, 15k) **FlexArray Supported** X414A-R5 (600GB, 15k) **FlexArray Supported** X416A-R5 (600GB, 10k) **FlexArray Supported** X417A-R6 (900GB, 10k) **FlexArray Supported** X421A-R5 (450GB, 10k) **FlexArray Supported** X422A-R5 (600GB, 10k) **FlexArray Supported** X423A-R5 (900GB, 10k) **FlexArray Supported** X425A-R6 (1200GB, 10k) **FlexArray Supported**	X410A-R5 (300GB, 15k) **FlexArray Supported** X411A-R5 (450GB, 15k) **FlexArray Supported** X412A-R5 (600GB, 15k) **FlexArray Supported** X414A-R5 (600GB, 15k) **FlexArray Supported** X416A-R5 (600GB, 10k) **FlexArray Supported** X417A-R6 (900GB, 10k) **FlexArray Supported** X421A-R5 (450GB, 10k) **FlexArray Supported** X422A-R5 (600GB, 10k) **FlexArray Supported** X423A-R5 (900GB, 10k) **FlexArray Supported** X425A-R6 (1200GB, 10k) **FlexArray Supported**	X410A-R5 (300GB, 15k) **FlexArray Supported** X411A-R5 (450GB, 15k) **FlexArray Supported** X412A-R5 (600GB, 15k) **FlexArray Supported** X414A-R5 (600GB, 15k) **FlexArray Supported** X416A-R5 (600GB, 10k) **FlexArray Supported** X417A-R6 (900GB, 10k) **FlexArray Supported** X421A-R5 (450GB, 10k) **FlexArray Supported** X422A-R5 (600GB, 10k) **FlexArray Supported** X423A-R5 (900GB, 10k) **FlexArray Supported** X425A-R6 (1200GB, 10k) **FlexArray Supported**
SATA	X267A-R5 (500GB, 7.2k) **FlexArray Supported** X268A-R5 (750GB, 7.2k) **FlexArray Supported** X269A-R5 (1000GB, 7.2k) **FlexArray Supported** X294A-R5 (2000GB, 7.2k) **FlexArray Supported** X302A-R5 (1000GB, 7.2k) **FlexArray Supported** X306A-R5 (2000GB, 7.2k) **FlexArray Supported** X308A-R5 (3000GB, 7.2k) **FlexArray Supported** X310A-R5 (500GB, 7.2k) **FlexArray Supported**	X267A-R5 (500GB, 7.2k) **FlexArray Supported** X268A-R5 (750GB, 7.2k) **FlexArray Supported** X269A-R5 (1000GB, 7.2k) **FlexArray Supported** X294A-R5 (2000GB, 7.2k) **FlexArray Supported** X302A-R5 (1000GB, 7.2k) **FlexArray Supported** X306A-R5 (2000GB, 7.2k) **FlexArray Supported** X308A-R5 (3000GB, 7.2k) **FlexArray Supported** X310A-R5 (500GB, 7.2k) **FlexArray Supported**	X267A-R5 (500GB, 7.2k) **FlexArray Supported** X268A-R5 (750GB, 7.2k) **FlexArray Supported** X269A-R5 (1000GB, 7.2k) **FlexArray Supported** X294A-R5 (2000GB, 7.2k) **FlexArray Supported** X302A-R5 (1000GB, 7.2k) **FlexArray Supported** X306A-R5 (2000GB, 7.2k) **FlexArray Supported** X308A-R5 (3000GB, 7.2k) **FlexArray Supported** X310A-R5 (500GB, 7.2k) **FlexArray Supported**	X267A-R5 (500GB, 7.2k) **FlexArray Supported** X268A-R5 (750GB, 7.2k) **FlexArray Supported** X269A-R5 (1000GB, 7.2k) **FlexArray Supported** X294A-R5 (2000GB, 7.2k) **FlexArray Supported** X302A-R5 (1000GB, 7.2k) **FlexArray Supported** X306A-R5 (2000GB, 7.2k) **FlexArray Supported** X308A-R5 (3000GB, 7.2k) **FlexArray Supported** X310A-R5 (500GB, 7.2k) **FlexArray Supported**
SSD	X438A-R6 (400GB) **FlexArray Supported** X439A-R6 (1600GB) **FlexArray Supported** X440A-R6 (800GB) X441A-R5 (100GB) **FlexArray Supported** X442A-R5 (100GB) **FlexArray Supported** X446A-R6 (200GB) **FlexArray Supported** X446B-R6 (200GB) **FlexArray Supported** X447A-R6 (800GB) **FlexArray Supported** X448A-R6 (200GB) **FlexArray Supported** X575A-R6 (400GB) **FlexArray Supported**	X438A-R6 (400GB) **FlexArray Supported** X439A-R6 (1600GB) **FlexArray Supported** X440A-R6 (800GB) X441A-R5 (100GB) **FlexArray Supported** X442A-R5 (100GB) **FlexArray Supported** X446A-R6 (200GB) **FlexArray Supported** X446B-R6 (200GB) **FlexArray Supported** X447A-R6 (800GB) **FlexArray Supported** X448A-R6 (200GB) **FlexArray Supported** X449A-R6 (800GB)	X438A-R6 (400GB) **FlexArray Supported** X439A-R6 (1600GB) **FlexArray Supported** X440A-R6 (800GB) X441A-R5 (100GB) **FlexArray Supported** X442A-R5 (100GB) **FlexArray Supported** X446A-R6 (200GB) **FlexArray Supported** X446B-R6 (200GB) **FlexArray Supported** X447A-R6 (800GB) **FlexArray Supported** X448A-R6 (200GB) **FlexArray Supported** X575A-R6 (400GB) **FlexArray Supported**	X438A-R6 (400GB) **FlexArray Supported** X439A-R6 (1600GB) **FlexArray Supported** X440A-R6 (800GB) X441A-R5 (100GB) **FlexArray Supported** X442A-R5 (100GB) **FlexArray Supported** X446A-R6 (200GB) **FlexArray Supported** X446B-R6 (200GB) **FlexArray Supported** X447A-R6 (800GB) **FlexArray Supported** X448A-R6 (200GB) **FlexArray Supported** X449A-R6 (800GB)

Save Query | Print Preview | Export to PDF | Export to Excel

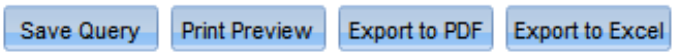
9. Likewise, you can view the **Shelves** and **Adapters** results to view similar comparison information for those options.

10. When finished, use the **Save Query**, **Print Preview** and **Export** options at the bottom to save your selections.

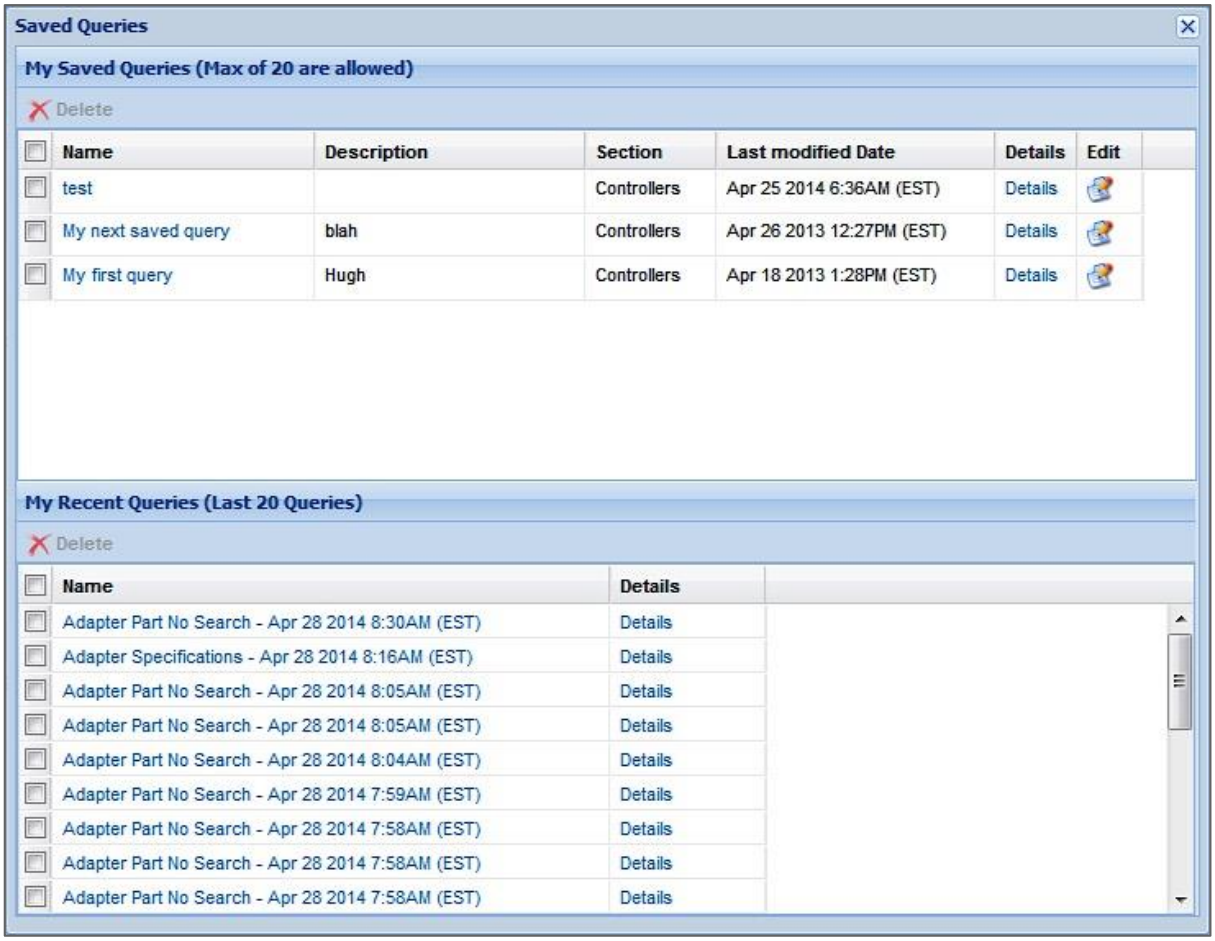
3.9 Saving Queries

You can save your queries in HWU for later use and viewing. This is a handy time-saving feature that saves you the burden of re-entering the same configuration whenever you conduct a query.

1. On any results page, you can save a query by simply clicking the **Save Query** button at the bottom of the page. If you want to use one of your 20 most recent queries, then refer to the *My Recent Queries* quadrant of the home page.



2. To view your previously saved queries, click the **Saved Queries** tab in the menu bar. The *Saved Queries* popup displays, where you can view both your saved and recent query criteria in the two panes – a maximum of 20 queries for each pane. See example below.



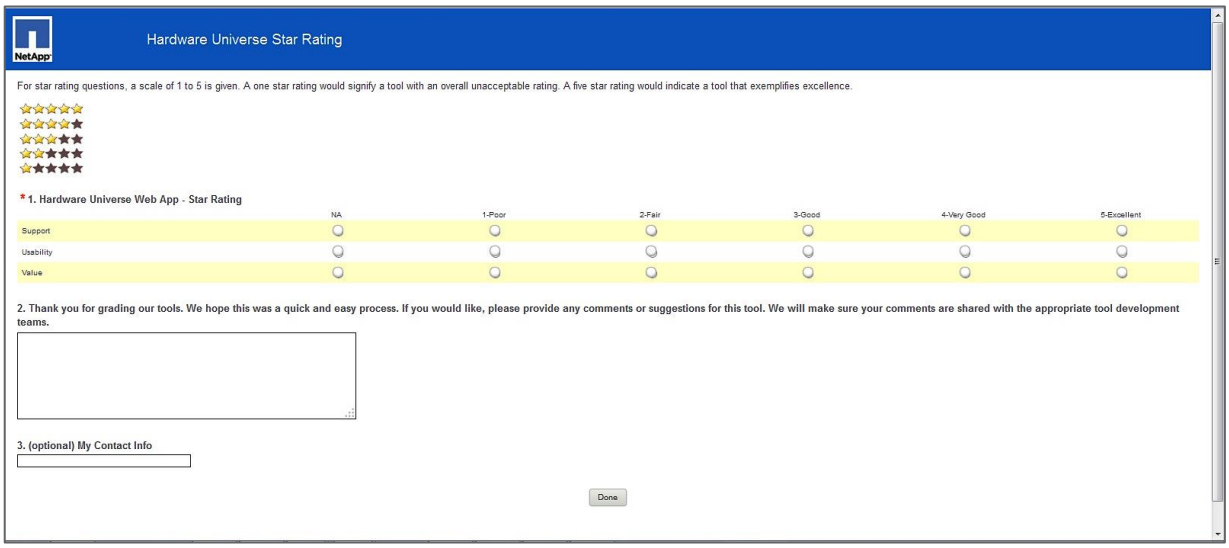
In the *My Saved Queries* pane:

a. The **Name** column loads the query for your review.
b. The **Details** column opens a popup displaying the query details such as *Selected ONTAPs, Selected Platform Models and Selected Specifications.*
c. The **Edit** column opens a popup where you can modify the query name and its description.
d. Check boxes next to query names allow you to select and **Delete**.

4 Resources

4.1 Rating Hardware Universe

Your feedback is extremely valuable in helping us make Hardware Universe a better tool. Thank you for taking a moment to give us your feedback. In the top banner, hover over the **Community** icon (looks like 3 people) and click **Rate This Tool**. The following page appears in a new window.



Enter your feedback regarding support, usability and value, along with any comments and optional contact information, and click on **Done**.

4.2 Contacting Hardware Universe

If you have any issues, comments or concerns about Hardware Universe, hover over the **Support** icon in the top banner (looks like a person wearing a headset on far right).

- **NetApp Support Site** – for Customers
- **Contact Us** – for Partners and Employees

4.3 Online & Mobile

HWU Community – You can enter discussions with your peers and experts in the Hardware Universe community by hovering over the **Community** icon in the top banner (looks like 3 people) and click **Community**, or go directly there via this URL: https://private-communities.netapp.com/community/netapp_partners_network/netapp_tools/hardware_universe.

@NetAppTools – Sign up to get the latest news/alerts/updates on all NetApp technical tools by hovering over the **Community** icon in the top banner (looks like 3 people) and click **@NetAppTools**, or go directly there via this URL: https://twitter.com/netapptools

HWU Mobile Apps – Hardware Universe is also available for iPhone and Android mobile phones and tablets. To download the mobile HWU apps, visit http://app.netapp.com/public/hardware.html.

HWU Support Email – If you have comments about this guide, please email your feedback to HWU Support at xdl-hwu-support@netapp.com.