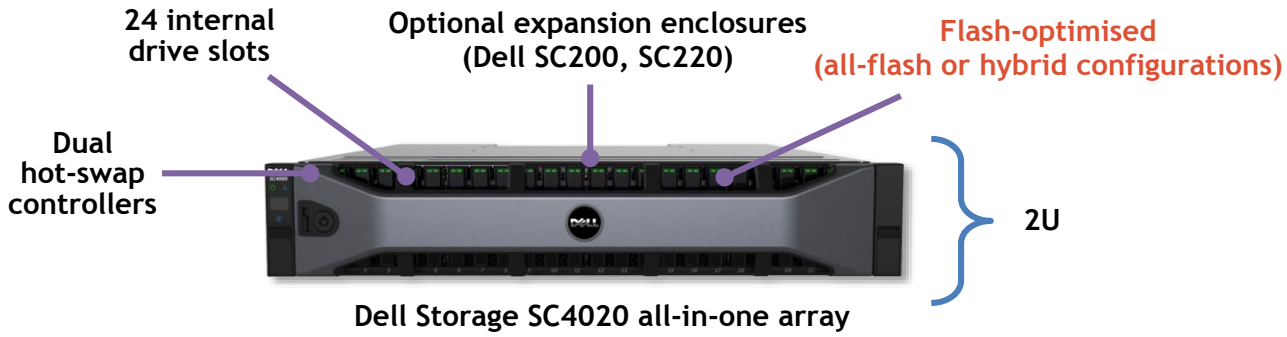
Dell Storage SC4020 sales FAQ



Dell Storage SC4020 all-in-one array

Messaging

What problems are we solving with the Dell Storage SC4020?

More companies need access to high-end storage capabilities than ever before.

1. Capacity requirements are skyrocketing due to increased data generation and acquisition capabilities.
2. The ability to use data to meet business goals has become mission-critical for nearly every organisation.

At the enterprise level, technology now exists that allows the largest installations to fully leverage their data for competitive advantage. Unfortunately, since IT budgets have remained relatively flat for several years, few organisations with mid-sized data centre environments can afford the required investment. These customers need a more cost-effective approach that makes today's best storage technology practical for deployments of any size.

What is Dell's approach?

In recent years, Dell has been redefining the economics of enterprise storage with innovative platforms like Dell Compellent and EqualLogic, offering longer lifespans and drastically reducing overall total cost of ownership (TCO). Dell Fluid Data architecture is an excellent example of technology that actually works to lower costs while simultaneously optimising performance.

The new Dell Storage SC4020 all-in-one array extends the enterprise capabilities of the award-winning Dell Compellent SC8000 to a smaller, more affordable platform. The business and technology benefits of true high-end storage are now practical and achievable for deployments of any size.

What are the key differentiators of Dell Storage SC4020?

Dell Storage SC4020 offers a unique combination of winning attributes:

- **Enterprise performance**: No other mid-size array offers a wider range of performance-enhancing features, including true multi-tier flash optimisation. Dell Storage SC4020 keeps your applications running smoothly (and your users happy) by ensuring all data writes go to your fastest drives at the highest-performing RAID levels.
- **Best-in-class intelligence**: Only Dell Storage Center OS v6.5 — featuring exclusive Data Progression storage automation technology — puts all the right data in the right place, at the right time. Dell Storage SC4020 is a self-optimising, efficient, fully virtualised solution from the company that invented auto-tiering storage.
- **Unprecedented value**: Compact all-in-one format saves heating and cooling costs. Hassle-free deployment, simplified management. Value-priced software with perpetual/transferable licensing. World-class, proactive Dell Copilot Enterprise Support prevents errors, eliminates downtime.

Target markets

Who are the likely customers for the Dell Storage SC4000 series?

As with the Dell Compellent SC8000, Dell Storage SC4020 customers will be found in a wide range of industries, from public sector to healthcare. The new Dell Storage SC4000 series is designed to address three types of deployment scenarios:

1. **Mid-size, standalone storage area networks (SANs)** *(mostly greenfield)*
   $25,000 to $50,000 (USD) entry point is ideal for smaller SAN upgrades and first-time SANs. Customers with smaller deployments no longer need to settle for less capable solutions — they now have access to real enterprise technology, "right sized" for their environment. Dell Storage SC4020 provides a highly strategic entry to thousands of greenfield small and medium-sized business (SMB) opportunities for both the Dell Storage Center series arrays and Dell Fluid FS NAS products.
2. **Distributed enterprise solutions** (existing Dell Compellent SC8000 or greenfield)
   Dell Storage SC4020 is also ideal for "core/edge" deployments with the Dell Compellent SC8000, powering remote office/branch office (ROBO) and departmental SAN solutions. Dell Storage SC4020 makes the entire Dell Storage Center series portfolio more attractive to large enterprise customers by creating a diversified range of solutions which may be deployed in appropriate locations throughout the organisation, and managed seamlessly using end-to-end tools.

3. **Flash deployments**
   The unique flash capabilities of Dell Storage SC4000 can be applied to both standalone and distributed solutions, offering customers an affordable way to move all their hot data to flash — not just select volumes. With cutting-edge performance based on a mature, proven software stack, Dell Storage SC4020 can enable all-flash solutions for the price of disk-based solutions. Dell Storage SC4020 supports multiple solid-state drive (SSD) tiers, leveraging the best attributes of diverse flash types to automatically create the fastest and most cost-optimised configuration.

General product questions

What are the basic Dell Storage SC4020 product parameters I should be familiar with?

Physical
- 2U form factor (compare to 6U minimum for Dell Compellent SC8000)
- 24 internal drive slots (minimum internal 12-drive purchase)
- Dual, hot-swappable controllers

Network/host connections
- Eight 8Gb Fibre Channel or four 10Gb iSCSI ports

Expansion
- 120 drive maximum (>400TB raw capacity)
- Supports standard Dell Storage Center series expansion enclosures (SC220/200, **not** SC280)
- Same drive support as Dell Compellent SC8000 (all SSD and hard disk drive [HDD] types)

Included software
- Dell Storage Center OS (SCOS) Core bundle 48-drive licence: includes Core OS, Dynamic Capacity, Data Instant Replay, Enterprise Manager Foundation/Reporter, Dynamic Controllers, Virtual Ports

Optional software
- 24-drive expansion licences for SCOS Core bundle
- 48-drive base licence and 24-drive expansion licences for:
  - Performance Bundle: Data Progression, FastTrack
  - Remote Data Protection Bundle: Remote Instant Replay (Sync/Async Replication)
  - Live Volume**
- Host-based licences for Replay Manager, Enterprise Manager (EM) Chargeback and vCenter Operations (vCOPs) Manager plug-in

*Network/host type must be selected at time of purchase.
**Live Volume on Dell Storage SC4020 targeted for SCOS v6.6. See Software and Availability sections for detail on licences and release schedules.

Can Dell Storage SC4020 be deployed for network-attached storage (NAS) solutions?

Yes. Dell Storage SC4020 is fully integrated with Dell Compellent FS8600 NAS appliance and Dell Fluid File System (FluidFS) v3, opening new opportunities for unified block and file solutions in

both the mid-tier Fibre Channel (FC) and Internet Small Computer System Interface (iSCSI) spaces. Like Dell Compellent SC8000, Dell Storage SC4020 can support performance clusters of up to four Dell Compellent FS8600 gateways, with up to two Dell Storage SC4020 arrays per cluster.

How many storage tiers can be enabled on Dell Storage SC4020?

Up to three tiers, using any combination of SSDs and HDDs. This includes both single and multiple tiers of flash storage to leverage the unique performance and cost-saving aspects of write-intensive and read-intensive SSDs.

What firmware level is required to operate Dell Storage SC4020?

Dell Storage SC4020 ships with Dell Compellent Storage Center v6.5 software, which is required for operation. Customers' existing Dell Compellent SC8000 arrays may also be upgraded to v6.5, but it is not possible to downgrade Dell Storage SC4020 to previous firmware levels.

Does Dell Compellent Storage Center 6.5 firmware enable the same features on Dell Storage SC4020 as Dell Compellent SC8000?

Dell Storage SC4020 and Dell Compellent SC8000 software capabilities are nearly identical but there are several feature differences. See Dell Compellent SC8000 section for details.

Does Dell Storage SC4020 support simultaneous multiprotocol host connectivity?

No. Unlike Dell Compellent SC8000, simultaneous multiprotocol networks are not supported. The two controllers in each Dell Storage SC4020 chassis must be the same type. Unlike the SC8000, customers must choose between Fibre Channel and iSCSI network connections at the time of purchase.

Are the controllers field-upgradeable from iSCSI to FC or vice versa?

Dell Storage SC4020 controllers are field-replaceable in case of failure, but they may not be changed from iSCSI to FC.

Are the input/output (I/O) cards within each controller independently field-replaceable?

The entire Dell Storage SC4020 controller module is a single field-replaceable unit (FRU). I/O cards are integrated and may not be replaced separately.

What are the media types and protocols for the various controller ports?

- Host/network ports
  - FC version: 8Gb FC, SFP+
  - iSCSI version: 10Gb iSCSI, SFP+ (no 1Gb iSCSI or 10GBaseT)
- Replication and management ports (both controller versions)
  - 10Gb/1Gb/100Mb Ethernet, RJ45/8P8C
- Serial port (both controller versions)

- 3.5 mini to RS232, dongle included

How is replication handled?

Both Dell Storage SC4020 versions can replicate via their host access ports (FC or iSCSI protocol, depending on model), or via their dedicated replication ports (iSCSI protocol).

Does Dell Storage SC4020 include a dedicated write cache card, like Dell Compellent SC8000?

No. Because of its smaller footprint, Dell Storage SC4020 reserves 512MB of system memory for write cache. This provides identical functionality and similar performance to the current Dell Compellent SC8000 cache card. The Dell Storage SC4020 write cache is battery-backed, with a five-year warranty on the battery. In the event of a power failure, the battery powers the controller long enough to flush the contents of the write cache to a 32GB single-level cell (SLC) SSD device on each controller.

Does Dell Storage SC4020 support the Dell Compellent SC280 expansion enclosure?

Dell Storage SC4020 does not support Dell Compellent SC280. Dell Compellent SC200 and SC220 enclosures are used for SSD and 2.5" or 3.5" HDD expansion.

What service offerings are available for Dell Storage SC4020?

Dell offers the same world-class proactive Copilot support options on Dell Storage SC4020 as on Dell Compellent SC8000.

Is Copilot service required for Dell Storage SC4020?

Yes. Like Dell Compellent SC8000, a minimum one-year 24x7 Support Center w/Time and Materials Onsite contract is required. Copilot installation and support eliminates error, minimises disruption and frees up IT staff to focus on other priorities.

Software licencing

How are Dell Storage SC4020 software licences structured?

Most Dell Storage SC4020 features are sold in value-priced bundles with convenient 48-drive initial (base) licences to meet the budgetary needs of smaller deployments — see General Product Questions section above for details. Note the 48-drive “Core OS” base bundle is included with Dell Storage SC4020 hardware, allowing many customers to avoid paying for additional software up to 48 drives. Beyond 48 drives, 24-drive expansion licences are also value-priced.

Is the software enterprise cap applicable to Dell Storage SC4020?

No. Unlike Dell Compellent SC8000, there is no enterprise cap for Dell Storage SC4020. Software licences are required up to its maximum of 120 drives. But again, base licences cover 48 drives, with expansion in 24-drive increments, which means far fewer licences are required overall.

Is the Enterprise System licence available for Dell Storage SC4020?

Stay tuned. Potential discount structures for Dell Compellent SC8000 customers or customers who purchase a second Dell Storage SC4020 system are still being discussed.

Dell Compellent SC8000 comparison and upgrades

What are the key similarities of Dell Storage and Dell Compellent SC8000?

- Same key software features (Data Progression, Replays, Fast Track, etc.)
- Same flash optimisation capabilities
- Same TCO advantages via automation and self-optimisation
- Perpetual software licencing
- Unified end-to-end management via Enterprise Manager
- Roughly equivalent IOPs performance
- Same high-quality drive support (SSD and HDD)
- Common expansion enclosures (Dell Compellent SC200/220)
- Same tight NAS integration
- Copilot support
- Third-party integrations (VMware, SQL, etc.)

What are the key differences between Dell Storage SC4020 and Dell Compellent SC8000?

- Smaller footprint (2U minimum versus 6U minimum)
- Different software licence structure (48-drive base licences versus 16, no Enterprise Cap, etc.)
- Lower overall solution price
- Lower maximum capacity (>400TB versus 3PB raw)
- No simultaneous multiprotocol network support
- Less I/O flexibility and less I/O upgrade flexibility (I/O is fixed protocol and fixed speed. No upgrade)
- Less back-end expansion connectivity (Four 6Gb SAS ports versus 40)
- No Dell Compellent SC280 expansion enclosure support
- No Compression or Fluid Cache for SAN support

What if I want to upgrade from a Dell Storage SC4020 to a Dell Compellent SC8000? What is the process to upgrade and migrate my data?

If a customer outgrows the 400-plus TB capacity of Dell Storage SC4020, they can keep their Dell Storage SC4020 software licences, disk drives and expansion enclosures when upgrading to a Dell Compellent SC8000.

New Dell Compellent SC8000 controllers, expansion enclosures, drives and software licence upgrades will need to be purchased. The software upgrades consist of only a "true-up" charge to allow for the increased capabilities of the Dell Compellent SC8000 platform. New full-priced Dell Compellent SC8000 software licences are not necessary.

Dell Storage SC4020 system data must first be migrated to a new Dell Compellent SC8000 system of identical capacity, using Replication or Live Volume.* This non-disruptive, one-time migration will not require a Remote Data Protection or Live Volume licence, although there will be a required cost for Professional Services planning/deployment of the migration. "Data in-place" migrations (i.e., simply moving the drives and/or enclosures with drives to the new array) are not supported.

Once the data migration is complete, any enclosures and drives previously used in the Dell Storage SC4020 system (including the internal Dell Storage SC4020 chassis drives) may be redeployed in Dell Compellent SC8000 for additional capacity. Only the Dell Storage SC4020 chassis and controllers themselves may not be directly re-deployed in the new Dell Storage SC8000 array — although they can be used with the Dell Compellent SC8000 for other purposes (such as a replication target) in a multiarray system under unified management.

* Live Volume on Dell Storage SC4020 targeted for SCOS v6.6. See Software and Availability sections for detail on licences and release schedules.

Can I "upgrade" to Dell Storage SC4020 from series 20, 30 or 40?

No. The upgrade path from series 20, 30 or 40 arrays is Dell Compellent SC8000. Although Dell Storage SC4020 is a newer product and contains many valuable enhancements, it does not contain simultaneous multi-protocol support and several other features shared by the larger Dell Compellent SC8000 and its series 20/30/40 predecessors. Dell Storage SC4020 is therefore technically considered a downgrade from series 20/30/40. Since purchased functionality would by definition be lost upon the downgrade, perpetual software licensing applies only to replacements and upgrades, as shown in the illustration below.

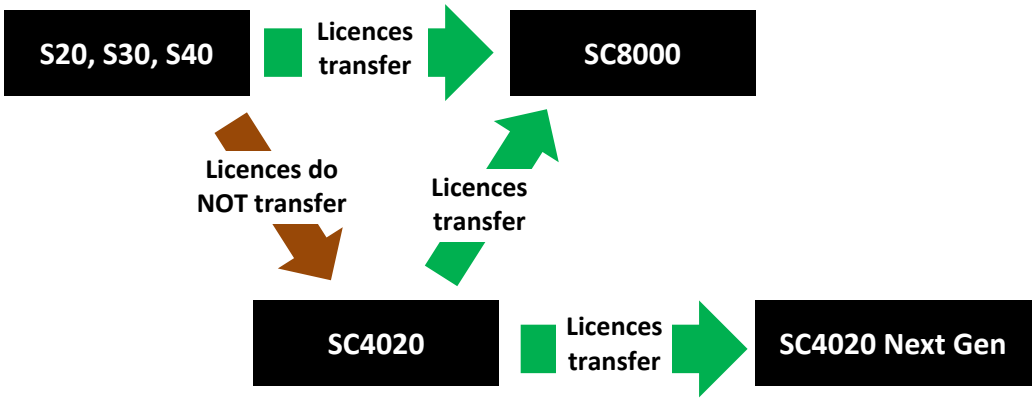


Figure 1 — Perpetual software licences apply to platform upgrades only.

Availability

When will Dell Storage SC4000 be available for quoting and purchase?

Both the Fibre Channel and iSCSI versions of Dell Storage SC4020 are now available worldwide for quoting and purchase.

Which planned Dell Storage SC4020 features will not be available at launch — and when will they be added?

The following two features are available today on Dell Compellent SC8000 with SCOS v6.5 firmware, but are not targeted for availability on Dell Storage SC4020 until SCOS v6.6.

- Live Volume replication enhancements and recovery options (Sync Live Volume, Live Volume External replication)
- Data-at-Rest encryption (Self-Encrypting Drive support)

As stated previously, Compression and Fluid Cache for SAN support are not applicable to Dell Storage SC4020.

SC6.5.20 update — including the new "$25,000 (USD) all-flash-array" configuration

What are the main changes in firmware version SC6.5.20?

SC6.5.20 enables the following:

1. Read-intensive (RI) drives may now be used in Tier 1
    a. Previously, Tier 1 was restricted to write-intensive (WI) drives or spinning disk
2. Dell Storage SC4020 drive minimum changes from 12 to six drives
3. Support for new drives
    a. 480GB read-intensive (RI) SSD (available since January, 2014)
    b. 960GB RI SSD (available since early 2014)
    c. 1.9TB RI SSD (available since early 2014)

What is the impact of these changes?

Taken together, the SC6.5.20 changes produce new lower entry costs for both all-flash arrays (including the publicised "$25,000 (USD) all-flash-array" Dell Compellent SC4020 configuration) and hybrid arrays.

Dell now offers arrays in four distinct categories of drive configurations. The "Entry-Level" solution below is new with SC6.5.20.

- **"Flash-optimised" all-flash arrays** — Multitier combination of WI and RI drives
  Dell flash-optimised AFAs combine the best attributes of write-intensive and read-intensive enterprise-class SSDs for the ultimate in simultaneous performance and cost-savings. Designed to achieve very aggressive performance and drive endurance goals while minimising cost per GB.

- **"Entry-level" all-flash arrays** — Single tier of RI drives
  For the absolute lowest cost all-flash solution, customers may now deploy a single tier of economical RI drives. Entry-Level AFAs provide dramatic performance improvements over traditional spinning disk arrays, while maintaining the option to add a tier of even higher-performing WI SSDs or high-capacity HDDs as needs change in the future.

- **Hybrid arrays** — Multitier combination of SSDs (WI, RI or both) and HDDs
  Either AFA category described above may be further expanded and cost-optimised through the addition of one or more spinning disk tiers. All hot data still goes to flash, but cold data is economically stored on HDDs. Since up to 80 percent of total data is written once and never accessed again, most customers find it economically advantageous to diversify their drive types. Hybrid arrays are by far the most commonly-deployed solution in the Dell Storage Center series portfolio.

- **Traditional hard disk arrays** — Single or multitier all-HDD solutions
  For customers who don't need the performance of flash, Dell Storage Center series Data Progression still provides best-in-class tiering services to optimise cost and performance in pure HDD solutions. Features like FastTrack disk optimisation are specifically designed to help customers get the most out of their hard drive investments.

What are the configuration specifics for the $25,000 (USD) entry-level all-flash-array Dell announced at Dell World, November 2014?

The new Dell Storage SC4020 entry-level all-flash configuration, available worldwide in early 2015, ships with six 480GB enterprise-class RI SSDs, providing over 2.8TB raw flash capacity at an advertised street price of $25,000 (USD).

Customers may choose to expand this initial configuration with additional RI SSDs, or for even better performance, create a "flash-optimised" multitier solution by adding WI SSDs. At any point, they can also add one or more tiers of traditional spinning disc for cold data to further lower costs.

How do I order the new entry-level $25,000 (USD) all-flash array?

See Ordering/Sizing section.

What sort of customer may benefit from a new entry-level array?

The new solution is designed for

- Small to mid-range customers who want the performance of an all-flash array for targeted applications — **on a limited budget**
- Customers who are upgrading their current traditional spinning disk arrays

Although we believe most entry-level customers will eventually evolve to a flash-optimised hybrid solution (combination of WI SSDs, RI SSDs and traditional hard disks), certain read-intensive environments including some database and data warehousing applications may be suitable for continued expansion using RI drives only. Customers should work with their Dell Partner Direct Enterprise Technologists to determine the best-suited array for their deployment.

Do the 6.5.20 firmware capabilities and drive support apply to both Dell Storage SC4020 and Dell Compellent SC8000?

Yes. With SC6.5.20, both Dell Storage SC4020 and Dell Compellent SC8000 now support RI SSDs in Tier 1, as well as the new 480GB, 960GB and 1.9TB RI SSD options.

Is 6.5.20 firmware required in order to use the new drives?

Yes. 6.5.20 firmware is required for the new 480GB, 960GB and 1.9TB RI SSDs.

Which enclosures support the new drives?

Beginning in January, 2015, the new 480GB RI drives will be supported for Dell Storage SC4020 internal drive slots only.

Later in 2015, all three new RI SSDs (480GB, 960GB and 1.9TB) will be supported for both Dell Storage SC4020 internal slots and Dell Compellent SC220 expansion enclosure deployment, and for both Dell Storage SC4020 and Dell Compellent SC8000 platforms.

Can I upgrade existing Dell Storage SC4020 and Dell Compellent SC8000 products to SC6.5.20?

Existing Dell Compellent SC8000 and Dell Storage SC4020 arrays may be updated to 6.5.20 non-disruptively and at no cost, provided the customer's Copilot support contract is current.

Does the new six-drive minimum on Dell Storage SC4020 apply to any supported drive?

Yes, the new minimum applies to all supported WI and RI SSDs, as well as HDDs.

Is there a new drive minimum on Dell Compellent SC8000?

No. The drive minimums for Dell Compellent SC8000 are unchanged, although a six-drive single-tier RI SSD configuration is now allowed.

Branding/portfolio

Why did you name this "Dell Storage SC4020" and not "Dell Compellent SC4020," if it's built on the same platform and offers the same capabilities?

Good question. Over the next few years, you'll see more of a common Dell Storage naming of our storage solutions, similar to what Dell has done with our Dell Networking portfolio.

Will the Dell Compellent and EqualLogic names go away?

Long-term, our plan is to have one common Dell Storage nomenclature branding for our portfolio. To be clear, we remain fully committed to our Dell Compellent and EqualLogic storage lines and customers, and will continue to develop and extend those lines for the foreseeable future. Going forward, the EqualLogic products will be referred to as Dell Storage PS Series, and the Dell Compellent products referred to as Dell Storage SC Series. Existing products (such as Dell Compellent SC8000) will not be rebranded.

What is the difference between Dell Storage SC4000 series and Dell Storage SC4020?

The Dell Storage SC4020 product belongs to the Dell Storage SC4000 series. Currently, there is only one product (Dell Storage SC4020) that is part of the Dell Storage SC4000 series. There is opportunity to add other products to the Dell Storage SC4000 series in the future, but at this time the Dell Storage SC4020 is the only product on the Dell Storage SC4000 series roadmap.

Pricing

What is the cost for a Dell Compellent SC4000 series/SC4020 array?

See Quote Center for details. The minimum Dell Storage SC4020 configuration (now 6 x 1TB 7.2K drives) will have a list price around $23,475 (USD). This includes core software (OS, Snapshot, Enterprise Manager) and three years of Priority Support.

In early 2015, Dell is also announcing availability of a six-drive all-flash configuration with "advertised street price" of $25,000 (USD). See SC6.5.20 update section for details.

Does Dell Storage SC4020 offer the same "flash for the price of disk" advantage as Dell Compellent SC8000?

Yes. As a matter of fact, the story gets even better. For similar workload requirements, we can now provide Dell Storage SC4020 all-flash solutions at a *lower* price than Dell Storage SC4020 all-HDD (15K) disk solutions. The flash solution provides:

- Up to 18 percent lower price
- Up to 80 percent rack space reduction
- Up to 400 percent more IOPS
- Up to 90 percent lower latency
- Lower power consumption

How do Dell Storage SC4020 flash solutions compare with Dell Compellent SC8000 equivalents?

We expect to offer Dell Storage SC4020 all-flash arrays for around 25 percent less cost than the same configuration in a Dell Compellent SC8000 array.

How does Dell Storage SC4020 stack up against competing flash solutions?

- Comparing cost per GB, based on available U.S. pricing, Dell Storage SC4020 all-flash solution costs are:
  - Up to 72 percent less expensive than competing pure-flash vendors and
  - Up to 64 percent less than the competing traditional all-flash storage solutions.

* Source: Based on Dell analysis of competitive US list pricing from Gartner Inc., CP Storage, as of May 27, 2014. Geographic limitations on comparative advertising may apply.

- In addition, the new $25,000 (USD) entry-level all-flash arrays offer the lowest entry price for an all-flash mid-range solution by any major vendor*

*Based on Dell internal analysis leveraging data from industry sources for list and typical discount prices of mid-range arrays over 1TB, including support, as of October 28, 2014.

What are the typical competing flash solutions?

- Pure-flash competitors: IBM FlashSystem V840, NetApp EF550, Violin 6264 and EMC XtremIO.
- Traditional all-flash competitors: IBM V3700, NetApp FAS 2240, EMC VNX5200, HP 3PAR V7450, Hitachi HUS 110 and Fujitsu DC100 S3

Ordering

How do I order Dell Storage SC4020?

Like Dell Compellent SC8000, Dell Storage SC4020 is available exclusively through Quote Center. It is NOT currently available through Gii or DOMS/DellStar.

What ordering options are available for Dell Storage SC4020?

Dell Storage SC4020 may be ordered starting from

1. **Unpopulated "base model" chassis options** (six-drive minimum purchase required)

   Depending on whether you plan to add your initial drives individually, or in six-packs, select one of the following base models in Quote Center:

To purchase initial drives	To purchase initial drives

individually, select:	in six-packs, select:
• Dell Storage SC4020 8Gb Fibre Channel (single drives) • Dell Storage SC4020 10Gb iSCSI (single drives)	• Dell Storage SC4020 8Gb Fibre Channel (6-pack drives) • Dell Storage SC4020 10Gb iSCSI (6-pack drives)

2. Convenient "chassis plus drives" bundle options

For single-SKU ordering convenience, Dell Storage SC4020 may be purchased with specific initial combinations of drives, often at reduced pricing.

To purchase bundles, select:
• Dell Storage SC4020 8Gb Fibre Channel (Six/12-Pack Configurations)* • Dell Storage SC4020 8Gb Fibre Channel (24-Pack Configurations) • Dell Storage SC4020 10Gb iSCSI (Six/12-Pack Configurations) • Dell Storage SC4020 10Gb iSCSI (24-Pack Configurations)

* Choose this option to select the new entry-level $25,000 (USD) all-flash array.

See Quote Center for details. Note single SKU is for ordering convenience only — drives still ship separately from chassis.

Sales objections

It's my understanding that Dell Storage Center series entry-level flash and flash-optimised solutions use a basic desktop/server-class of multi-level cell (MLC) drive that is not considered enterprise-class. Is this true?

No. Dell uses enterprise class MLC (read-intensive) SAS drives for both the entry-level and flash-optimised solutions. SAS drives are by definition enterprise grade, built and tested for the most demanding environments.

Additional background:

Most vendors use only SLC drives in their enterprise arrays order because they provide higher write performance — but this dramatically increases cost. These vendors can't use MLC drives in enterprise arrays because, although the cost is comparable to disk, MLC drives have poor write reliability. Dell's unique ability to send writes to SLC and reads to MLC means we can protect our MLC drives from having to handle primary writes (greatly enhancing their durability), while leveraging MLC's SLC-equivalent read performance and lower cost.

This capability lets Dell Storage Center arrays automatically allocate data between the fewest possible SLC drives and a larger number of MLC drives. Competitors would need to provide an expensive all-SLC array to match Dell performance and reliability.

Doesn't Data Progression strand cold data on Tier 3 disks? What happens when it heats up again?

No, data is never stranded in cold storage. With Dell Storage Center series arrays, ALL writes go to your fastest disks, at blazing RAID 10 performance levels — even writes to infrequently accessed volumes. Once written, data is optimised in place to RAID 5 or 6, maintaining the same performance for subsequent reads, while saving valuable Tier 1 space. Next, directed by real-time metadata tracking actual usage patterns, cooling data is migrated to lower tiers — but again, pages are immediately returned to Tier 1 when a new write comes in.

Because Dell Storage Center Series arrays have a unique ability to support multiple RAID levels per drive, they do not need to reserve drives within a tier to exclusively handle specific RAID levels. All drives are used for all RAID levels, which means Dell Storage SC4020 writes (at RAID 10) and reads (at RAID 5 or 6), so each benefit from the performance of the entire tier. Management tasks are also dramatically reduced, since the RAID levels expand/contract automatically as needed, eliminating the need to pre-configure disk groups.

And remember, with Dell Storage Center series, access to "cold" tiers is almost 100 percent read-only, keeping IOPs higher and latency lower, even when slower disks are used. Dell Storage Center series' ability to treat reads and writes differently increases efficiency at all stages of the data lifecycle.

Do I have to buy a lot of expensive drives to take advantage of this technology?

No. Data Progression helps you get the most out of any combination of drives, leveraging their unique characteristics to auto-configure solutions that are both cost- and performance-optimised.

Claims/proof points

See sales training material for details on the following claims.

- Price:
    - **"All-flash solutions for up to 72 percent less than other vendors."**

      (Based on Dell analysis of US list pricing from Gartner Inc., CP Storage, as of May 27, 2014. Geographic limitations on comparative advertising may apply. A14000382)

    - **"The new entry-level Dell Storage SC4020 all-flash arrays offer the lowest entry price for an all-flash mid-range solution by any major vendor."**

      (Based on Dell internal analysis leveraging data from industry sources for US list and typical US discount prices of mid-range arrays over 1TB, including support, as of

October 28, 2014. Global restrictions to comparative advertising may apply. G14000157)

- Compact format: “Host up to 10,000 Microsoft Exchange mailboxes in a 2U footprint.”

  (Based on Microsoft Exchange Server JetStress Dell Labs testing of 24 x 900GB 10K RPM drive Dell Storage SC4020 configuration in February, 2014. A14000118)

- Performance:

  - “Achieve 120K random IOPs with <1ms latency for OLTP.”

    (Based on one Dell Storage SC4020 array with a total of 24 x 400G write-intensive SSD drives in the base enclosure.)