1. **What is IBM® FlashSystem™ V840 Enterprise Performance Solution?**

   IBM FlashSystem™ V840 Enterprise Performance Solution merges IBM software defined storage with the scalable performance of IBM FlashSystem storage to accelerate critical business applications and decrease data center costs simultaneously. As a result, your organization can gain a competitive advantage via a more flexible, responsive and efficient storage environment.  

   - [Data Sheet: IBM FlashSystem V840 Enterprise Performance Solution](#)
   - [Video: IBM FlashSystem V840 is designed to harness the power of data](#)
   - [Product demo: IBM FlashSystem V840 3D Product Tour](#)

2. **When is IBM FlashSystem V840 available?**


   - [Document: FlashSystem Order Guide](#)

3. **What are the recent enhancements for the FlashSystem V840?**

   Recent enhancements of the FlashSystem V840 include simplified configurations for scalable architectures, new Control enclosure model for improved performance per node, FlashSystem V7 software refresh, and the introduction of 1TB flash modules for more capacity options.

4. **What value does IBM FlashSystem V840 bring to clients?**

   FlashSystem V840 accelerates applications while making your entire storage environment easier to manage and preserving your investments in legacy storage with these built-in capabilities:

   - **Flash for less than the cost of performance disk:** Reduces the effective cost/capacity of flash by up to 80% with IBM Real-time Compression™. Unlike inline data deduplication, Real-time Compression is effective on active data sets such as OLTP and analytics data sets.
   - **Software defined storage virtualization technology:** Helps you manage FlashSystem V840, other IBM, or third-party storage arrays with thin provisioning, copy services and disaster-recovery tools, such as data replication; also, helps ease the migration of data from one storage device to another.
   - **Easy Tier:** Enables pooling of internal flash storage with external disk storage to create adaptive tiers of data—that is, an environment that blends flash storage for performance with high-capacity HDD storage for less-frequently accessed data.
   - **Scalable architecture:** Allows flash capacity to be added (scaled up) to support multiple applications, the virtualized system to be expanded (scaled out) to support higher IOPS and bandwidth, or the solution to be simultaneously scaled up and out to improve capacity, IOPS and bandwidth while maintaining IBM MicroLatency™.
   - **Flexible deployments:** Enables organizations to tailor the deployment architecture to the workload, data access via Easy Tier, data compression using IBM Real-time Compression™ and data replication to disaster-recovery sites.

5. **How does FlashSystem V840 enable IBM data architecture?**

   FlashSystem V840 Enterprise Performance Solution supports an optimized data architecture by providing continuous operations, helping solve data migration issues and delivering advanced data capabilities. It gives all of your storage the same advanced data functions for efficiency,
extreme performance, business continuity and optimal workload availability—allowing your organization to do things that were not possible before.

**Provide non-disruptive operations, thanks to storage virtualization.** Virtualization helps insulate applications from changes made to the physical storage infrastructure. When you add storage capacity or a new tier of storage, for example, the changes are transparent to applications.

**Allocate storage in the most cost-effective manner, solving data migration issues.** Many data centers are reluctant to move data, since it could result in application downtime. As a result, data that may not be accessed very often is still stored on expensive storage. With an optimized data architecture, organizations can quickly move data to cost-effective storage tiers. Flash systems are easily installed into the existing storage infrastructure for a fast ROI.

**Leverage a common set of advanced data capabilities.** Data architecture can help organizations manage an entire pool of storage from multiple vendors—all from a single interface. This can reduce the time required for managing storage, freeing up IT staff for more strategic activities.

6. **Can you provide scenarios where FlashSystem V840 might be used?**

By offering extreme performance and IBM MicroLatency™ for microsecond response times, FlashSystem V840 can take the place of multiple racks of HDDs—lowering your power, space and cooling costs. It can increase server efficiency, which can further cut your power and cooling costs and reduce your software licensing expenses. Furthermore, when using Real-time Compression for active data sets, FlashSystem V840 can increase the effective capacity of your flash storage up to five times.1 Typical FlashSystem deployments involve accelerating virtualization platforms (server virtualization or desktop virtualization), databases (transactional/OLTP or batch/analytical workloads), or storage infrastructure (file systems or general metadata) so critical business applications can run faster and wait less. Such applications include everything from video transcoding to enterprise resource planning (ERP) systems to high-performance computing (HPC) environments in organizations around the world.

Presentation: Where to Use Flash
Redbook: IBM FlashSystem in OLAP Database Environments
Redbook: IBM FlashSystem in OLTP Database Environments
White Paper: Technical computing benefits with IBM FlashSystem

7. **What flash technology is used in FlashSystem V840?**

FlashSystem V840 uses enterprise MLC (eMLC) flash technology.

8. **What is the difference between a fixed building block and a scalable building block?**

A single FlashSystem V840 storage platform consists of two FlashSystem V840 Control Enclosures directly cabled to one FlashSystem V840 Storage Enclosure, representing a fixed building block. The scalable building blocks require Fibre Channel switches in addition to the two Control Enclosures and Storage Enclosure. The scalable building block configurations allow for up to four additional FlashSystem Storage Enclosures to be added to the storage system and/or for a balanced increase of performance and scale, up to four FlashSystem building blocks may be clustered into a single storage system, multiplying performance and capacity with each addition.
9. **What capacity options are available for FlashSystem V840?**

FlashSystem V840 is available with usable capacities 2TB, 4TB, 6TB, 8TB, 10TB, 12TB, 16TB, 20TB, 24TB, 32TB, and 40TB in system-level RAID 5 mode. FlashSystem V840 supports the installation of 4, 6, 8, 10, or 12 flash modules, which are available in 1TB, 2TB or 4TB capacities. With Real-time Compression for active data sets, effective capacity ranges from 10TB to 200TB for a single building block.

10. **What are the warranty length options for FlashSystem V840?**

FlashSystem V840 is available with two standard warranty lengths, depending on machine type. Machine type 9846 includes a 1-year warranty. Machine type 9848 includes a 3-year warranty. Both warranties provide a 24x7 service level and support from a Technical Advisor, subject to certain terms and conditions. Additional maintenance agreements with other terms are available for purchase.

11. **How is FlashSystem V840 licensing calculated?**

The base software and optional features (External Virtualization, Real-time Compression and Remote Mirror) are licensed per capacity bearing storage enclosure.

**Document: FlashSystem Order Guide**

12. **Can FlashSystem V840 capacity be scaled-out in the field?**

The FlashSystem V840 can scale-up capacity with additional storage enclosures and it can scale-out performance with additional V840 systems (2 control enclosures and 1 storage enclosure) through RPQ. Scalable configurations will be GA September 5, 2014.

13. **What are the FlashSystem V840 connection options?**

The FlashSystem V840 Control enclosure connects to the storage enclosure either directly (with the fixed building block) or through dedicated internal switches (with the scalable building block).

14. **What front-end host connections are supported on FlashSystem V840?**

FlashSystem V840 supports up to 10 ports of 8Gb Fibre Channel for fixed building block configurations or 12 ports per scalable building block.

15. **Can FlashSystem V840 I/O interfaces be upgraded?**

FlashSystem V840 is sold with a full set of interface cards, so there is no room to add additional interfaces.

16. **Can FlashSystem V840 I/O interfaces be changed?**

At this time, the only interface available for the FlashSystem V840 is 8Gb Fibre Channel.

17. **When I select the FlashSystem V840 software feature for Real-time Compression, is there any additional hardware included to accelerate compression performance?**

Yes, when the Software feature 5639-FC7 is added to the order, the FlashSystem V840 Control Enclosure (model AC1) will automatically include two Compression Accelerators (Feature Code AH1A) for each V840 Control Enclosure in the configuration.

18. **Does FlashSystem V840 support data encryption?**

FlashSystem V840 supports AES-XTS 256-bit data-at-rest encryption with local key management. Encryption is an optional feature.
19. Does FlashSystem V840 data-at-rest encryption affect performance?  
There is no tangible performance penalty for FlashSystem data-at-rest encryption, because it is  
especially performed at line speed using dedicated hardware. Furthermore, hardware  
encryption is always on so the impact on latency is already factored in the performance  
numbers.

20. Are the Control enclosures of the FlashSystem V840 Enterprise Performance Solution using the  
SVC DH8 Nodes?  
The FlashSystem V840 Control Enclosure model AC1 is similar to the SAN Volume Control 2145-DH8. The selection of the Control Enclosure is tuned for high performance flash. FlashSystem  
V840 Control enclosure contains two 8-core CPUs each with 32GB of RAM as part of the base,  
along with three 4-port 8Gb host interface ports, where as the SVC DH8 must be built up with  
optional feature codes to get to that configuration.

21. Can FlashSystem V840 do something like SVC stretched cluster?  
Not at this time. The standard FlashSystem V840 offering only has the one storage enclosure  
drawer.

22. Can FlashSystem 840 be deployed without FlashSystem V840?  
Yes. FlashSystem 840 is a standalone solution and can be deployed without a  
virtualization/advanced services layer. Multiple FlashSystem 840 units can be deployed to scale  
performance and capacity linearly.

23. Can the Storage Enclosure be managed by Control enclosures?  
The FlashSystem storage enclosures and Control enclosures are currently managed separately  
through a GUI with an identical look and feel.

24. Where is the FlashSystem interoperability matrix?  
Visit IBM System Storage Interoperability Center for interoperability information.

25. What advanced storage services are available with FlashSystem V840 Enterprise Performance  
Solution?  
FlashSystem V840 provides IBM Real-time Compression™, IBM Easy Tier, IBM FlashCopy®, thin  
provisioning, mirroring and Copy Services, external virtualization, snapshots and broader host  
support that enriches any storage environment.

26. Why don’t you offer data deduplication with FlashSystem V840?  
Despite claims to the contrary, we believe other competitors who implement full-time inline  
deduplication sacrifice latency, peak IOPS, and peak bandwidth – while at the same time usually  
providing fewer benefits versus compression on workloads where data reduction is appropriate.  
IBM research has shown that inline deduplication does not provide significant benefits for the  
kind of active data sets that are best accelerated by all-flash arrays, such as database workloads.  
Analyst Paper: Storage Switzerland: All-flash Needs End to End Storage Efficiency

27. Does FlashSystem V840 support integration with VMware?  
Yes, FlashSystem V840 can integrate with VMware using vStorage APIs for Array Integration  
(VAAI) including VMotion. There is also a VCenter plug-in for the Control enclosures.
28. Does FlashSystem V840 use two-dimensional (2D) Flash RAID like other FlashSystem products?
Yes. FlashSystem V840 continues to use flash modules designed and manufactured by IBM which include patented IBM Variable Stripe RAID™ data protection, as well as optional RAID 5 that protects data at the system level; together, these protections form our 2D Flash RAID technology. While competing products mostly include some form of system level RAID, they do not generally include module-level protections like IBM Variable Stripe RAID. As a result, these competing products, which are nearly all based on third-party SSDs, are likely to experience more SSD failures and require more SSD replacements over their usable lifespans.

29. Why is the latency for the FlashSystem V840 higher than just the FlashSystem 840?
The software defined storage layer adds some latency versus direct access. But the impact is quite small relative to the overall improvement clients experience versus other storage technologies. Our testing indicates that the combination still generally performs better (lower latency) and more efficiently than competing solutions due to optimizations in our software and hardware layers. The key to lower latency in the V840 is in distributed processing, handling data movement and advanced software functions with separate hardware.

30. Why should clients care about latency more than they care about IOPS?
Clients should focus on read and write latency at the particular IOPS level that their applications require. For example, an application that drives 30,000 IOPS can be serviced by a HDD-based solution, but the latency for reads and writes at 30,000 IOPS could easily be 7-20 milliseconds (depending on the storage array). At this latency, the application and servers spend most of their time waiting and the overall efficiency is very low. Lower latency means accomplishing more with less.

IBM FlashSystem clients consistently experience measurable improvements to number of concurrent users supported, run times of reports, response times for transactions, and completion times of batch processes (to name a few performance metrics) that are dramatically better with FlashSystem versus traditional hard drive arrays and SSDs. In some instances, FlashSystem may process the same number of “transactions” (or other activities) but they individually happen more quickly due to lower latency. Focus on IOPS alone has led to a problem many enterprise clients face today: using large quantities of HDD not because large capacity is needed, but rather because high IOPS are needed. FlashSystem offers a combination of higher IOPS and lower latency that delivers strong performance and economic benefits for clients versus such systems.

Web Site: IBM FlashSystem Case Studies List
Deck: IBM FlashSystem Client Stories | PW
Video: Business Waits Less with IBM FlashSystem

31. Is FlashSystem V840 performance linear for scale-up and scale-out implementations?
Latency will remain consistently low and predictable as the system is scaled-up and scaled-out. For pure scale-up scenarios, where only flash is added to a configuration, the solution will continue to deliver consistent low latency, although IOPS and bandwidth will not scale linearly. For scale-up and scale-out scenarios the system can achieve up to 2.5 million IOPS and 19.2GB/second of bandwidth. Simply stated: V840 can scale performance and capacity independently.
32. **What competitive FUD does FlashSystem V840 Enterprise Performance Solution help us overcome?**

Competitors talk about FlashSystem as a fast but dumb solution without data reduction or other advanced data services; FlashSystem V840 offers Real-time Compression and advanced data services with a broader feature set than most competitors.

33. **Where can I find more information?**

   a. IBM Flash Page
   b. IBM FlashSystem V840 Product Page
   c. Sales Kit IBM BP
   d. Flash Essentials Community
   e. IBM Flash Systems Sales & Marketing Community
   f. IBM FlashSystem Tech Sales Community
   g. FlashSystem Sales Team Coverage Map

1 Compression data based on IBM measurements. Compression rates vary by data type and content.