Computacenter
Services & Solutions

Intellectual Property Office

Storage Requirement IT-2016-092

7th December 2016

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Introduction

7th December 2016

[redacted]
Procurement Manager
Intellectual Property Office
Room GY33, Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ

IT-2016-092

Dear [redacted]

Please find enclosed our response to your requirements. Computacenter have chosen to work with Dell, and as such we will act as the compliant route to market and Prime Contractor under RM3733.

Computacenter has worked with Dell for 15 years and was one of the first companies to enrol in its partner programme. The relationship between Computacenter and Dell has thrived over the last four years thanks to an exceptional synergy between the two organisations at every level. This means we can support customers at every stage of the IT lifecycle - from procurement and implementation to integration and management. And we can support them at every layer of the IT infrastructure.

Our Dell Credentials

- Certified Dell Partner since 2008
- Premier Plus Partner
- Authorised Service Partner
- Server Certified
- System Management Certified
- Networking & Security Certified
- Cloud Services & Solutions Certified
- IT infrastructure experts in Dell technologies
- Risk free test and development at our GSC

Our Experience

From consumerisation and cloud computing to desktop virtualisation and datacenter consolidation, we help our customers realise their IT and business transformation goals. We simplify change. We accelerate change. And we deliver guaranteed outcomes.

This decision is based on the best fit solution for your requirements.

I hope the enclosed is sufficient if not please do not hesitate to contact me on [redacted]

Yours sincerely

[redacted]

Senior Account Manager

Computacenter

[redacted]

E&OE

Management Summary

Dell is pleased to submit our response to your Invitation to Tender for the provision of New Storage Arrays. We believe that our award winning enterprise-class storage solution will satisfy the needs and requirements outlined therein.

Our proposed solution offers the IPO unique advantages based on a highly efficient virtualized storage architecture unavailable anywhere else. With patented built-in storage intelligence, **Dell SC-series** arrays deliver significant efficiency, scalability and flexibility.

A key feature of the value proposition behind the proposed Dell Compellent (SC-series) arrays is **low Total Cost of Ownership**, achieved through:

- **Persistent Hardware Architecture;** which means that never again will you be forced to perform a forklift upgrade. Dell SC-series arrays are built on a single scalable architecture that grows and evolves with your business. The IPO can introduce new components and technology upgrades seamlessly and non-disruptively. Each generation of controller and enclosure hardware are backwards and forwards compatible.
- **Perpetual Software License;** which means that once you have purchased licenses you will never have to pay for them again, since they will transfer forward to future generations of hardware. Also once you have all of the features and drive licensing that you need, any future upgrades will just be at the cost of the hardware.
- **Open standards based x-86 hardware**; designed to enable rapid deployment and expansion of storage - limiting disruption of service. This enables the IPO to be technology neutral, adopting new hardware technologies as required to adapt to your evolving business requirements.

Our proposed SC-series arrays also provide the IPO with a **Performance Advantage** through a combination of Dell Compellent's patented RAID tiering, Dynamic Block Architecture, Disk Level Virtualisation and Data Progression. Our SC-series arrays have the unique ability to provide R10 Write performance to all volumes with the capacity overhead of R5 or R6 i.e. This enables a volume to consist of Tier 1 R10 space for fast Writes, Tier 1 RAID 5 for Fast Reads and Tier 3 RAID 5 or 6 for inactive and historical data.

Dell's SC Series arrays automate the movement and management of data at a granular level, enabling organizations to constantly adapt to change, slash costs and help secure information against downtime or disaster. Detailed information about each block of data is captured in action, providing unprecedented system intelligence inside the volume. A sophisticated data movement engine uses this metadata to intelligently store, recover and manage data. We combine this sophisticated software with standards-based hardware into a single integrated solution that allows enterprises of all sizes to move beyond simply storing data to actively and intelligently managing data. The proposed SC Series arrays have a shared nothing architecture which is designed to provide 99.999% availability.

The Dell Compellent SC arrays also have an integrated management tool **Dell Storage Manager**, which allows centralized management of the SANs from an easy to use wizard based "single pane of glass" tool.

Our proposed arrays include the award winning **Dell Copilot Support**, which offers extensive storage knowledge and industry-leading support tools which go beyond traditional support offerings by identifying and resolving potential problems before they occur. Dell Copilot Support provides prompt and an exceptional quality of support. Inclusive management tools and a unified interface put you in control of your data centre and Copilot is there to assist

anytime an issue arises. Our unique integrated Phone Home technology proactively monitors your SAN and provides rapid event notification to you and your Copilot Support team. With this sophisticated tool, Copilot is able to review and gather data to provide you with system recommendations and proactive issue resolution.

Dell will also provide full installation, configuration, testing, skills transfer and training as required by the IPO.

Like the IPO, Dell believes in service, our commitment to our customers and driving business through innovation.

Understanding of Requirements

Section 2: Understanding of Requirements – Confirm your understanding of the key requirements and scope of the services to be provided to IPO;

Dell understands that the IPO requires:

- 2 x new SANs for the IPO's Newport and Cardiff Data Centres
- Proposed solution must meet the mandatory requirements set out in Section 4 of the Invitation to Tender
- Proposed solution to include option for additional 150TB of capacity for VDI
- Proposed solution must be implemented at the latest by 31st March 2017
- Vendors to provide installation, configuration, skills transfer and training
- Minimum 3 years warranty and support
- Data migration is out of scope.

To meet these requirements Dell is proposing the following:

For the primary site, an SC9000 array configured with 24 x 3.8TB SSD drives, and 168 x 6TB NL-SAS drives. This will provide useable capacities of 56TB from the SSD tier, and 624TB from the NL-SAS tier. Overall usable capacity of this system is 680TB.

Sustained performance available is a minimum of 123,533 IOPS with a 70%/30% Read/Write ratio and 32KB block size. Maximum/peak IOPS performance for these same ratios and block sizes is 230,276 for reads and 87,023 for writes

The SC9000 array has been configured with 4 x FC16 ports per controller, and 2 x 10Gbit SFP+ iSCSI ports (per controller).

The SC9000 supports a maximum of 960 drives per array providing scale up to over 3PB raw SAN and/or NAS capacity per array, SC9000 can also be linked to other SC Series arrays in larger federated systems under unified management. The SC9000 supports multiprotocol networks (FC, iSCSI, FCoE) future proofing the Trust's investment. Additional expansion cards can be added to the SC9000 to enable new network protocols non-disruptively.

Three types of disk enclosures can be added to the SC9000 array. The SC400 and SC420 enclosures are used to add 12 x 3.5" drives and 24 x 2.5" drives respectively, and operate at 12Gbit SAS speeds. The SC280 enclosure can be added with either 42 or 84 x 3.5" drives and operates at 6Gbit SAS speeds.

The SC9000 licensing model is significantly different and offers huge TCO benefits over the life of the project. SC licensing is perpetual, meaning once you have purchased the software you do not have to purchase it again and it is not tied to the hardware. Once a system reaches the end of its lifecycle (usually around 7 years) any replacement cost is based purely around the hardware upgrades themselves, with software maintenance costs remaining flat. This will allow the Trust to move away from an expensive and intrusive "rip and replace" cycle and extend the life of the storage significantly beyond 5 years.

For the secondary site, we have proposed a SC4020 array configured with 10 x 1.9TB SSD's, 14 x 1.8TB 10k SAS drives and 24 x 6TB NL-SAS drives. This will provide capacities of 12.7TB from the SSD tier, 17TB from the 10k SAS tier, and 84.7TB from the NL-SAS tier. Overall, useable capacity of the system will be 114TB.

This secondary site array provides a blended performance of over 42,327 IOPS from the SSD tier, with the remaining two tiers delivering another 3,083 IOPS. We believe this to be the most cost-effective configuration for providing adequate performance while also meeting the 110TB capacity requirement.

The SC4020 has been chosen for the secondary site based on your desire to reduce the total cost of equipment, yet still provide excellent performance and scalability at the secondary site. The SC4020 will scale to 192 drives, providing fantastic scalability to meet the IPO's future needs, but with a more compact footprint and lower total cost of ownership.

For your additional 150TB VDI requirement, the IPO can either utilize the additional capacity included with our proposed Primary array, or we have also including a 150TB enclosure upgrade which can be added to either the Primary or Secondary site arrays.

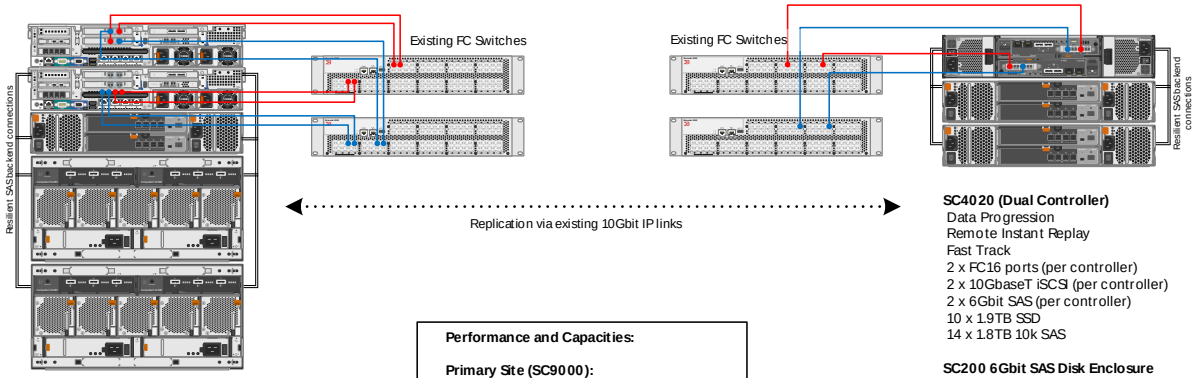
Full installation, configuration, testing and skills transfer will be provided by certified Dell engineers. Full technical and operational documentation is also included as a deliverable as part of the implementation process.

Additional training is available through our Dell TechDirect self-service portal and if the IPO requires staff to become expert in the management and administration of our SC-series arrays, we have proposed our 4 day course which can be taken online, one of our regularly scheduled public courses or onsite at IPO's premises.

Through life support is provided by Dell's award winning Co-Pilot support team which operates 24 x 7 x 365. We have included 4 hour same day business critical support on both arrays.

The following graphic illustrates Dell's proposed arrays:

Intellectual Property Office



SC9000 (Dual Controller)
Data Progression
Remote Instant Replay
Fast Track
4 x FC16 ports (per controller)
2 x 10Gbit SFP+ iSCSI (per controller)
6 x 12Gbit SAS (per controller)
128GB Memory
4GB Write Cache Card

SC420 12Gbit SAS Disk Enclosure
24 x 3.8TB SSD

SC280 6Gbit SAS Disk Enclosure
84 x 4TB NL-SAS

SC280 6Gbit SAS Disk Enclosure
84 x 4TB NL-SAS

Performance and Capacities:

Primary Site (SC9000):
24 x 3.8TB SSD
56.64TB useable capacity
123,533 IOPS
168 x 6TB NL-SAS
624TB useable capacity
11,502 IOPS
Total useable capacity: 680TB

Secondary Site (SC4020):
10 x 1.92TB SSD
12.75TB useable capacity
42,327 IOPS
14 x 1.8TB 10k SAS
17.24TB useable capacity
24 x 6TB NL-SAS
84.75 TB useable capacity
Total useable capacity: 114TB

SC4020 (Dual Controller)
Data Progression
Remote Instant Replay
Fast Track
2 x FC16 ports (per controller)
2 x 10GbaseT iSCSI (per controller)
2 x 6Gbit SAS (per controller)
10 x 1.9TB SSD
14 x 1.8TB 10k SAS

SC200 6Gbit SAS Disk Enclosure
12 x 6TB NL-SAS

SC200 6Gbit SAS Disk Enclosure
12 x 6TB NL-SAS

Storage Fault Domain (fabric) A
Storage Fault Domain (fabric) B

DELL EMC	**Solution Diagram**	Project:	IPO Storage Infrastructure		Customer:	The Intellectual Property Office
		Revision:	1.2		Dell Acount Manager:	[redacted]
		Date:	5 December 2016		Storage Consultant:	[redacted]

Requirements

Mandatory Requirements

Item No.	Requirement	Evaluation Area
1	Being a heavily virtualised environment, the IPO's SAN is the backbone of the estate. It has two units based over 2 sites. The throughput requirements range between 40000 (forty thousand) IOPS during the daytime and 80000 (eighty thousand) IOPS nightly during backups, with an overall peak of 160000 (one hundred and sixty thousand) IOPS. The data throughput requirements range between 1500 (one thousand five hundred) Mbyte/sec during the day, to 3000 (three thousand) Mbyte/sec during the backing up times with an overall Peak-Time data throughput of 4500 (four thousand five hundred) Mbyte/sec. Please describe how the solution you have chosen will achieve this.	
	Dell Response For the primary site, the proposed SC9000 storage has been configured with 24 x 3.8TB SSD drives and 168 x 6TB NL-SAS drives. Given the capacity and performance characteristics required by the IPO, it makes sense to use two tiers of drives rather than three and provide the required tier 2 performance by increasing the number of NL-SAS drives in this tier. As there is little discernible cost difference between 4TB and 6TB NL-SAS drives and considering the extra capacity the 6TB drives will deliver, we have chosen to propose 6TB drives. We do understand that the IPO intend to move more storage to the cloud over time, however this additional capacity will allow you to manage any storage growth that may occur during this time without any additional cost. The tier 1 drives (24 x 3.8TB SSD) will deliver a persistent **123,533 IOPS** with a **32KB block size and 70%/30% read/write ratio**. This would rise to 161,865 IOPS with a 90%/10% read/write ratio. Throughput figures from this tier when using a 32KB block size would be **3860 MB/sec @70/30** and **5058 MB/sec @90/10**. Higher throughputs can be achieved by using a larger block size, although this can affect latency due to the increased time required to perform each I/O. Maximum/peak IOPS performance for this tier is 230,276 for reads and 87,023 for writes. In addition to the SSD Tier, the Tier 2 drives (168 x 6B NL-SAS drives) will deliver 14,775 IOPS at the same 70%/30% 32KB I/O pattern. As the SC9000 is a fully tiered architecture, we would normally expect these drives to have a much higher ratio of read operations; with the Tier 1 SSD's absorbing nearly all of the regular daily writes.	

	For the secondary site, we have proposed an SC4020 with scaled-down performance. This array has been configured with 10 x 1.9TB SSD's, 14 x 1.8TB 10k SAS drives and 24 x 6TB NL-SAS drives. This configuration provides a blended performance of over 42,327 IOPS from the SSD tier, with the remaining two tiers delivering another 3,083 IOPS. We believe this to be the most cost-effective configuration for providing adequate performance while also meeting the 110TB capacity requirement. The above performance figures for both arrays are based on the pure performance of the disk subsystem. System cache and write cache (from the PCIe cache card will have a positive effect on the stated performance and these should be seen as conservative figures.	
2	As stated previously, our storage is split over two sites. Our primary site has a total storage requirement of 400 (four hundred) TB and our secondary site has a requirement of 110 (one hundred and ten) TB. This storage requirement remains the same for our new solution. Please explain how this will be achieved and why you have recommended the proposed solution.	
	Dell Response For the primary site, the proposed SC9000 array is configured with 680.6TB of useable storage. This is comprised of 56.6TB of tier 1 SSD capacity and 624TB of NL-SAS capacity. The SC4020 array proposed for the secondary site has 114.75TB of useable capacity. This consists of 12.75TB from the SSD tier, 17.25TB from the 10k SAS tier and 84.75TB from the NL-SAS tier. All of the above capacity figures do not include any savings made from compression or deduplication, which can be enabled on a per-volume basis as required. In these two configurations, we have tried to create a storage solution that exceeds all of your performance and capacity requirements, while also being cost effect to both purchase now and upgrade in the future. For the SC9000 configuration, we have used the largest drives possible to maintain an optimal configuration. While larger SSD's are available, the 3.8TB SSD provides the best blend of capacity and performance. Likewise, the 168 x 6TB NL-SAS drives are able to deliver an appropriate level of performance but also provide larger increments should you require future capacity upgrades. The SC4020 for the secondary site has been configured to provide a blend of capacity and performance that is scaled down from the primary environment but is still more than capable of running a substantial amount of services in the event of a site failover.	

3	A large portion of data is stored on near line storage. Currently we use automatically tiered storage allowing frequently accessed data that requires low latency to be stored on flash. We would require similar performance and configuration from the new solution. Please explain how this will be achieved with the solution recommended.	
	Dell Response Unlike traditional storage architectures Dell SC-series arrays are architected to provide truly virtualised storage that spans all disks in the storage environment. SC-Series storage virtualises storage at the disk level, creating a dynamic, shared pool of storage resources available to all servers, all of the time. All storage types and RAID levels are pooled by default. Administrators can keep the entire array virtualised as a single pool of high-performance storage (the most common approach) or configure particular subsets of the array as individual pools. The array divides data into pages - preformatted collections of allocated and unallocated disk blocks. The pages are 512KB by default, though administrators have the option to manage storage as 2 MB or 4 MB pages and details about each block are captured in action. This system intelligence is collected at the 512-byte level, the smallest addressable data block available. These tiny blocks are what make up the pages. This granular approach optimises tiering (via our patented Data Progression feature). Using real-time system intelligence, the array identifies very small data blocks that are eligible for movement based on frequency of access and then moves just the small pages that include those blocks to the appropriate Tier or RAID level, creating a finely tuned, tiered storage environment. Using small pages also increases the efficiency of data movement since it is more efficient to read, write and migrate small pages than larger ones. The array maintains constant awareness about small data blocks and captures real-time use characteristics about each block. Collected transparently while in flight, these use characteristics include information on when blocks were created, which drives hold the blocks, the associated virtual volume, how frequently the blocks are accessed or changed, and whether the blocks represent actual data or virtual pointers to data. This information provides the intelligence to determine whether and when blocks of data should be moved from one storage tier or one RAID level to another. The architecture operates at such a granular level, this block-level intelligence requires negligible system overhead to ensure data always stays in tune with application needs. Migration between RAID types and disk tiers occurs automatically while the system is still online. The migration process runs in the background and does not affect data availability or application performance. There is no need to bring down an application, pause I/O, or wait for a minimum I/O requirement. If a read request comes into a page that is being moved, the request is satisfied from the original placement of the page. The page is then moved after the read is complete. If a write request comes in, it will	

	not interfere with the migration process, as new information is always written to Tier 1 RAID 10 and is not eligible for migration. Overwriting a block of protected information also occurs on Tier 1 RAID 10, and moving a block of data receiving writes simply will not occur. There is never a situation when application I/O is denied, application requests always receive priority.	
4	As our estate is heavily virtualised with Solaris physical servers, the storage must be accessible from VSphere and Solaris via 16 (sixteen) gb/sec Fibre channel. As stated we are heavy users of VMware and utilise VAAI to offload work from VSphere to our storage units. For performance reasons, we require this functionality to be available in our new solution. We also require VSphere UI integration and VVOL support in order to continue with day to day operations. Please give an explanation of how the proposed technology will achieve this.	
	Dell Response Dell's proposed solution has full interoperability with VMware and supports the following VMware VAAI imperatives; Thin provisioning stun, Hardware accelerated locking, Full Copy (SCSI EXTENDED COPY), Block Zero (SCSI WRITE SAME). Dead Space reclamation (SCSI UNMAP) of thin provisioned volumes is also supported. We have a SC-series plug-in for vSphere, that where you can manage server and storage resources together through the vSphere interface. vCenter Server integration allows for the creation of data stores, replications, and presentation of guest and host storage statistics data from Dell Storage Manager. Due to the excellent integration with VMware, it is possible to perform the majority of day-to-day functions from with vCenter without actually using the array management tools. A storage replication adapter (SRA) for vCenter SRM leverages space-efficient snapshots to provide seamless and automated SRM-based disaster recovery. Virtual Volumes transforms storage by enabling for the first time VM-awareness on storage arrays with an industry wide approach. With Virtual Volumes we get away from the rigid constraints of LUNs and Volumes and we can now manage storage on a per VM basis using a more flexible policy based approach. This is truly remarkable innovation that enables unique integration between vSphere and our storage ecosystem that drastically improves the efficiency and agility with how you manage your storage. VVOLs supports the following pre-defined capabilities of SCOS: • Snapshots (Replays)/Consistency Group Snapshots	

	• SC Storage Profiles • Data Progression • Data Optimization Compression/Dedupe • Volume(s) QoS Additionally, VVOLs is based on T10 industry standard that makes it non-disruptive to your data path. Solaris is also fully supported with the SC arrays, as per the storage compatibility matrix found at the following link: http://en.community.dell.com/techcenter/storage/w/wiki/5069.dell-storage-compatibility-matrix-ps-series-sc-series-fs-series	
5	Currently we utilise Storage level snapshots as part of our change management process and require this functionality in any replacement. Please describe how this will be achieved using the proposed technology.	
	Dell Response An integral part of the core software functionality on Dell's proposed SC-series arrays is Data Instant Replay, which enables virtually unlimited Replays (Snapshots) to be taken of the data that can be restored and/or deleted to any point in time. Unlike competitive systems, there is no need to pre-allocate any Snapshot reserve. Dell SC arrays deliver robust recovery and continuous data protection using space-efficient snapshots called Replays. With Data Instant Replay™, once an initial snapshot of a volume is taken only incremental changes in data need to be captured. This not only saves disk space, but also speeds local recovery of lost or deleted files. An unlimited number of Replays can be scheduled for near-instant recovery to virtually any point in time. With Data Instant Replay you can: • Create frequent Replays (continuous snapshots) at any time interval using negligible disk capacity and system overhead • Recover any size volume to any server in less than 10 seconds for continuous data protection in the event of disruption • Ensure production data integrity by using Consistency Groups to take simultaneous snapshots of application data spanning multiple volumes • Roll back to any previously known state using a simple point-and-click interface There is no interdependency of multiple snapshots for the same Volume. Each Replay snapshot can have an expiration date/time allocated and full schedule of snapshot can be set for each volume. Replays on the SC arrays are fully integrated with the replication technology, allowing the systems to be synchronously replicated but with	

	subsequent 'recover points' for the replicated volumes. This provides the benefits of replication with zero data loss, but with the ability to perform point-in-time rollbacks if required. The system supports 16,000 Snapshots, and 1,000 Snapshot profiles (schedules).	
6	Our current solution has the ability to replace hardware with no downtime. This is imperative in our new solution, as is the requirement for this hardware to have redundancy. We require this to be present in the proposed solution. Please confirm how will this be achieved, and explain why have you chosen this method.	
	Dell Response The proposed Dell Compellent SC-series SANs are designed for high availability with fully redundant hardware components and advanced failover features that provide uninterrupted data access. The Dell Compellent shared nothing architecture provides 99.999 availability. Controllers feature fully active, dual paths from servers to disk drives; fully redundant power supplies and cooling fans; mirrored, battery-backed or battery-less cache; and failover support using a dual- or quad-port host bus adapter. Virtual ports increase port capacity, disk bandwidth, I/O connectivity and port failover. In a clustered controller configuration, the controllers operate in unison to deliver high availability, but they are connected independently to ensure that there is no single point of hardware failure. Dell Compellent Fluid Data storage provides several high-availability advantages over competing systems. For example, the Dell Compellent hardware architecture avoids the shared backplane of traditional SANs and consequently avoids sharing a point of failure. In addition, while other SANs require custom path failover software, Dell Compellent multipath I/O (MPIO) failover requires no special software. And while other SANs typically require downtime for software and or hardware upgrades, Dell Compellent software and hardware upgrades can be performed with no downtime and without disrupting availability.	
7	The IPO is going through a major digital transformation which will involve future changes for storage provision. For this reason we require any solution to have both Scale-Out and Scale-Up ability. Please give an explanation as to how this requirement will be met by the proposed solution.	
	Dell Response Unlike other SANs, which offer only dead-end growth paths, the Dell Compellent SC-series SANs offer a modular architecture that is built to scale easily from 2TB to 4PB, all on a single platform. Enterprises can start	

	small and then scale an SC-series SAN online, adding capacity, performance or functionality without causing any service disruption or system downtime. Our SC-series SANs are also multi-protocol so you can also add Fibre Channel, FCoE or iSCSI ports to modify an existing system on the fly. Dell's open standards approach and commitment to a Persistent Hardware Architecture means that generations of SC-series controller and enclosure hardware are backwards and forwards compatible with each other to enable your business to scale and grow the Dell SC-series SANs at your pace without ever having to forklift upgrade the whole SAN. This also means that you can take advantage of technological advances such as more powerful controllers or more dense storage enclosures, non-disruptively. Furthermore, with the optional Live Volume feature multiple SANs can be managed as a single federated pool of storage, meaning that our SC-series arrays have an almost limitless ability to scale out and / or scale up.	
8	Currently both our Primary and Secondary sites are connected via TCP/IP and not fibre channel, thus TCP/IP replication functionality is necessary. Please give an explanation as to how this will be achieved.	
	Dell Response The Remote Instant Replay (replication) feature of the SC arrays will allow TCP/IP replication between IPO datacentres. You can create recovery points from days, hours or even down to minutes if required. This ensures that the IPO can create a granular recovery process that can be customised for each application set. Remote Instant Replay allows replication over long distances using Ethernet networks. IP-based replication is easy to implement and manage, delivering business continuance without the traditional complexity and cost. To facilitate this the SC9000 array proposed for the primary site has 2 x 10Gbit SFP+ connections per controller and the SC4020 for the secondary site has 2 x 10GbaseT connections per controller. These ports can be dedicated entirely for replication traffic if required. Remote Instant Replay offers bandwidth optimisation to help you lower transmission costs while maintaining optimal replication performance. Using Dell Storage Manager, administrators can intelligently estimate bandwidth requirements upfront based on actual data, increasing the accuracy of the initial bandwidth purchase. Advanced bandwidth shaping ensures the most efficient use of available bandwidth on a daily basis without forcing you to compromise on performance. Available bandwidth can be metered based on line speed and time of day and comprehensive management and monitoring features help you understand how utilisation is affecting performance. You can also prioritize replication on a per-volume basis, assigning critical volumes priority so they are given more bandwidth and are processed quickly.	

	Replication can be configured from within Dell Storage Manager or from within vCenter via the array vCenter plugin. Although not included as part of this proposal, we can also offer the Live Volume functionality that would greatly enhance system availability for the IPO. Live Volume is a software-defined solution integrated into the SC-series controllers and requires no additional hardware. Live Volume increases operational efficiency, reduces planned outages, and enables planned migrations as well as disaster avoidance. The Live Volume feature provides the following powerful options: • Storage follows mobile virtual machines and applications in virtualised environments • Supports automatic or manual mechanisms to migrate virtual machine storage as virtual machines are migrated within or across hypervisor clusters • Zero application downtime for planned maintenance outages • Enables all data to be moved non-disruptively between SC arrays to achieve full planned site shutdown without downtime • On-demand load balancing. Live Volume enables data to be relocated as desired to distribute workload between Storage Centers • Stretch Microsoft clustered volumes between geographically disperse locations • Live Volume allows VMware vSphere and Microsoft Clusters to see the same disk signature on the volume between data centers and allows the volume to be clustered across Storage Centers • Support for an additional asynchronous or synchronous Live Volume replication to a third Storage Center created and dynamically managed by Live Volume Live Volume runs on existing physical and virtual environments without disruption or significant changes to existing configurations or workflow. Physical and virtual servers see a consistent, unchanging virtual volume. Live Volume can operate asynchronously or synchronously and is designed for planned migration, resource balancing, and disaster recovery.	
9	In order for the IPO to clearly understand the proposed solution, we would like to see the technical roadmap for the product in addition to the cost for the proposed solution. We also require the technical lifespan of the product and the associated support roadmap, e.g. when will support for the product cease. Please include a link to the Technical Roadmap in the response.	
	<u>Dell Response</u> An important feature of the proposed Dell SC-series SANs is the **Persistent Hardware Architecture**, which means that they have no End	

	Of Life, as individual components (controllers and enclosures) can be replaced as and when the IPO wishes to embrace a new technology without ever having to perform a forklift upgrade of your complete SAN. Similarly the Dell Compellent software has no end of life, as it is the same code for all models of Dell Compellent and will continue to work across multiple generations of controller and enclosure hardware. Dell Compellent Software Licensing is **Perpetual** which means that once the IPO has purchased licensing for the features required, these licenses will transfer to any future generation of Dell Compellent controller such that you are not being forced to repay for licenses that you have already purchased. Dell's open standards based approach, commitment to a persistent hardware architecture and perpetual software license, means that generations of controller and enclosure hardware are backwards and forwards compatible with each other to enable your business to scale and grow the Dell SC-series SANs at your pace without ever having to forklift upgrade the whole SAN. Every component of the Dell Compellent SAN hardware is supportable for a minimum of 7 years with a guarantee of no end of life before that term. Underpinning these Persistent Hardware Architecture and Perpetual Software license principles is a commitment to a Technology Roadmap that means that customers will be able to take advantage of major software code upgrades – which are free of charge whilst the arrays are under Dell support - approximately every six months and leverage technology upgrades at a pace that suits your business. Another aspect of the Technology Roadmap that comes with Dell Compellent is our commitment to an end to end Data Centre solution which avoids the IPO having to manage different silos of technology. Central to this philosophy is tight integration with all leading Hypervisors including VMware, whereby VASA and VAAI APIs are used to enable task offloading between your Hypervisor environment and SAN. As a result most of the typical day to day management and administration tasks can be performed directly from your VCentre. Following the release of VMware 6.0, Dell Compellent now supports VVols, to enable a more VM-centric approach to managing your data. Furthermore, following the recent purchase by Dell of the EMC federation of companies, Dell now owns a majority shareholding in VMWare and therefore the IPO can be confident that this commitment to tight integration with VMware will continue. Information and documentation outlining our Technical Roadmap is constantly changing, is subject to strict confidentiality between Dell and our customers and an up to date Non-Disclosure Agreement needs to be in place. So we are unable to provide a link to documentation as requested above, but we would be keen to meet with the IPO at your earliest convenience to share the latest information face to face.	

10	We plan on utilising some of our current solution to provide some of our backup solution. If we increased our storage on our primary site by 150 (one hundred and fifty) TB, we could utilise the new solution for this function. Please explain how this requirement will be met.	
	Dell Response As explained in Question 2 above, we have provided 680TB of useable storage at the primary site, which is 280TB above the 400TB requirement. This increased capacity can be used for the additional 150TB requested above. We have also provided upgrade costs to increase the total useable capacity by a minimum of 150TB in order to be compliant with this requirement. This storage can be added to either the primary (SC9000) or secondary (SC4020) arrays as needed. The additional storage for this requirement consists of 41 x 6TB NL-SAS drives, housed in four SC400 2U 12Gbit SAS disk enclosures.	
11	The demand for our services are 24 hours a day, 7 days a week. Due to this demand, we require the costs for a three (3) year 24x7 support model, with an engineer on-site within 4 (four) hours. Please confirm your approach to how this will be met. Please confirm whether this work will be outsourced or whether you will be utilising internal resources for this work.	
	Dell Response We have included 3 years 4 hour same day support with our proposed arrays, plus a 5 year option and options to extend to 6 or 7 years. This means that if replacement parts and/or engineer is required to fix the problem these will be onsite with the IPO within 4 hours. Dell Copilot Support offers extensive storage knowledge and industry-leading support tools which goes beyond traditional support offerings by identifying and resolving potential problems before they occur. Dell Copilot Support engineers provide prompt and exceptional support. Management tools and a unified interface put you in control of your data centre and Copilot is there to assist anytime an issue arises. Our unique integrated Phone Home technology proactively monitors your SAN and provides rapid event notification to you and your Copilot Support team. With this sophisticated tool, Copilot is able to review and gather data to provide you with system recommendations and proactive issue resolution. The Dell Copilot team operates out of a state-of-the-art call centre in Dublin supported by Subject Matter Experts based in the US, the same facility where product development takes place. All customer support calls are answered by qualified, highly trained storage experts, who are available	

24 hours a day, 7 days a week, 365 days per year. Because of the level of expertise of the Dell Copilot Support team, 90 percent of Copilot cases are resolved in the level one stage of the call.

The EMEA Copilot support organisation consists of Copilot Helpdesk technicians, Copilot System Analysts, support managers and Sky Techs with vast experience and skillsets.

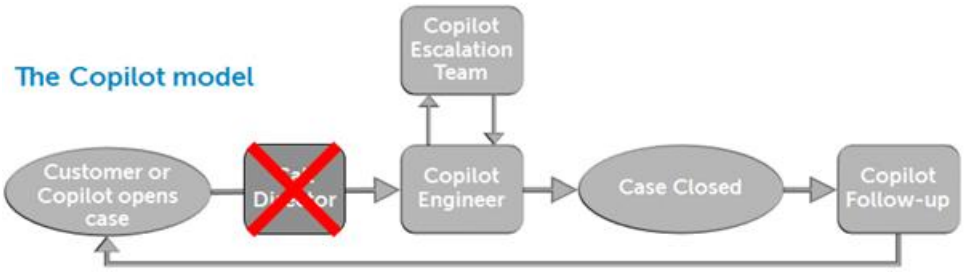
Copilot Support takes ownership and drives resolution, quickly and efficiently. The Copilot Support team serves as a single point of contact for issues with Dell SC-series hardware and software, and will even help to expedite issues involving third-party alliance partner products when possible.

Dell Compellent support technicians and parts distribution centres are strategically located to help ensure prompt issue resolution and delivery of replacement parts within the required SLA.

Our field support technicians are sourced by our strategic partners Unisys and Getronics, both of which have a large number of engineers trained and certified in Dell enterprise and storage technologies.

Copilot Support – How it Works

1. Customer Requests Support Assistance
   - Contact Copilot Call Center
2. Copilot Support Engineer creates / edits CRM Support Case
   - Case tracking number is assigned
   - Specific problem information is collected and recorded
   - Severity is assigned
3. Support Case Diagnosed
   - The Copilot Support Engineer that answers to the request will diagnose the problem and begin resolution
   - Copilot Support Engineer has access to and will use necessary resources to drive resolution
   - When needed, Copilot Support will coordinate onsite resources for field replacement activities
4. Support Case Resolved
   - Status notification to appropriate Compellent, Business Partner and Customer contacts
5. Support Case Closed
   - Customer acknowledges support case is resolved
   - Support Case is marked as closed in Copilot CRM System
   - Customer, Business Partner and Compellent notified via Case Notification preferences

		
12	We have third line engineers on site that can assist with the implementation of the solution. However, please clarify whether this work would be sub-contracted or whether the engineers would be employees of your business.	
	Dell Response Dell will install, configure and test our proposed solution, perform skills transfer to IPO staff as part of the operational handover and provide operational and technical documentation. These engineers are all employees of Dell. An outline of the implementation process is as follows: • Rack, stack, cable and label; Dell technicians physically install hardware onsite according to customer specifications or Dell preferred practices. • Packaging materials disposal; Dell moves used packaging materials to onsite trash and recycling facility or other designated onsite location. • Project management; The assigned Dell Project Manager will guide you through the deployment process—from tracking your equipment through the factory to ensuring your site is prepared through transitioning you past deployment and into the support process. • Site readiness review and implementation planning; The Dell Project Manager reviews multi-point check list with customer to ensure overall site readiness and schedules deployment project. Examples of items include: confirming equipment delivery, power requirements, network connections are complete, and verifying project timelines and site contacts. • Install and configure system software; Dell Technicians Install operating system, drivers, firmware, virtualization software, hypervisors and Dell SupportAssist set up. Feature not tied to application workloads or enterprise software products. • System testing and verification; System deployment and configuration is tested by Dell and verified against documented requirements.	

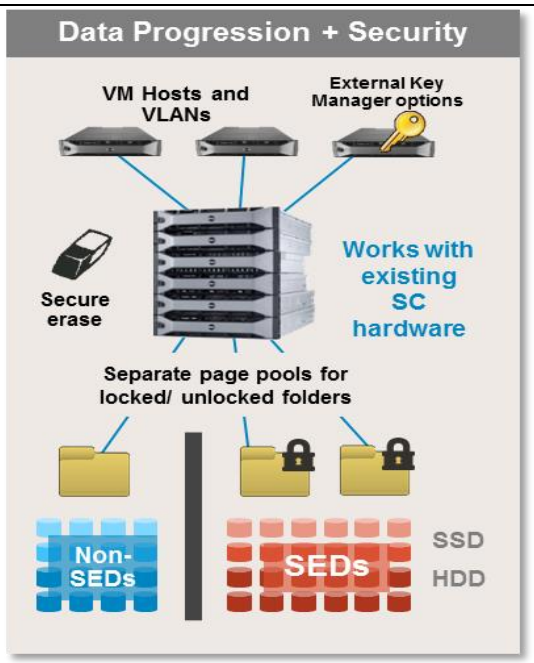
	• Configuration detail transfer to Dell technical support; Dell will capture all pertinent technical and configuration data on the newly deployed components and preload that information into Dell's technical support systems. In case of issues, this detail will enable Dell Technical Support services to more quickly identify root causes and speed problem resolution. • Product Orientation; The Dell Delivery Engineer will complete a verbal product orientation session with the customer at the conclusion of the deployment. Product Orientation; includes a basic review of product features and how to perform common tasks. • Project Documentation; The Dell Project Manager will provide close of engagement documents at the conclusion of the deployment. These documents include "as deployed" documentation and deployment verification report.	
13	The IPO's engineers will require training on the new solution in order to provide 1st, 2nd and 3rd line support. Please explain how you will approach this.	
	Dell Response In the answer to question 12 above we outline how as part of the Installation process, Dell engineers will provide skills transfer and documentation to IPO staff which enable most day to day common tasks to be carried out without further support. In addition Dell's Co-Pilot helpdesk, described in brief in our answer to question 11, will be available 24 x 7 x 365 to assist IPO staff with issues, problems and "how-to" queries. The Co-Pilot support service also includes a self-service portal – Dell TechDirect – which provides access for your IT staff to an on-line training and accreditation programme that will enable IPO staff to become certified to dispatch parts and/or labour without having to go through telephone based troubleshooting. For more in depth training, should the IPO staff wish to become expert in Dell Compellent and take advantage of more advanced features without Co-Pilot support, we would recommend the Dell Compellent Administration and Advanced Management Training Course. This is a 4 day course which can be taken online, as part of a Public Course run at Dell offices or if the IPO wishes, a dedicated course can be run at your offices. The curriculum for the proposed course covers the following topics:	

	• The Dell Compellent Storage Center Architecture • Deployment Options • Detailed functions of hardware components • Storage Center core software benefits • Storage Center applications functions and usage • Creating/Modifying Servers and Server folders • Creating/Modifying Volumes and Volume folders • Mapping Volumes to Servers • Copy, Mirror, and Migrate Volumes • Expand Volumes • Create and Manage Replays • Create and Manage Replay Profiles • Configure Consistency Groups • Data Progression Best Practices • Create and Manage Storage Profiles • Create and Restore Backup Sets with Replay Manager • Manage Storage Center Performance • Manage Disk and Disk Folders • User Group setup • User Management and Security • Management Viewers • Phone Home Tool • Disk Drive Sparing and Replacing a failed drive • Configure SNMP and SMTP • Upgrade Storage Center license and software • Enterprise Manager Configuration • Remote Instant Replay—Replication Setup • Disaster Recovery Activation and Recovery • Enterprise Manager Reporting tools • Configure Threshold Alerts and Queries • Chargeback Setup	

Desirable Requirements

Item No.	Requirement	E
1	We currently use third party tools to monitor our SAN and also provide visibility of our storage mapping (i.e. it informs us which VM's are affected by which hardware). It would be desirable to use an integrated solution to these issues. Please explain how the proposed solution will achieve this.	
	<u>Dell Response</u>	

	We have a storage management pack for VMware vRealize Operations Manager that is available free of charge for Dell SC storage customers. The management pack combines rich storage metrics collected in Dell Storage Enterprise Manager with powerful analytic in vRealize Operations Manager to provide you deep and visual representation of the health of your virtual environment. A YouTube video detailing installation and configuration of this pack is available here: http://en.community.dell.com/techcenter/extras/m/white_papers/20441830. We can also provide the Dell OpenManage Plug-in for Nagios that provides capabilities for monitoring the SC series arrays (as well as the majority of other Dell hardware) through an Agent-Free method using Integrated Dell Remote Access Controller (iDRAC) with Lifecycle Controller (LC), Dell Modular Infrastructure and Dell Storage devices directly from within the Nagios XI console. With this plug-in, the IPO will have comprehensive hardware-level visibility of both SC arrays including overall and component-level health monitoring for quicker fault detection and resolution. More information on this plugin can be found here: http://en.community.dell.com/techcenter/systems-management/w/wiki/8028.dell-openmanage-plug-in-for-nagios-xi. Dell Storage Manager also has an SMI-S provider that enables integration with Solarwinds Storage Resource Manager. Further information on this is available from Solarwinds here: http://www.solarwinds.com/documentation/en/flarehelp/srm/content/srmagadddellcompellent.htm	
2	The IPO values its data and the integrity of this data. It would be desirable if the solution offered *At Rest Encryption* in order to maintain the integrity of data expected. Please explain how this would be achieved and clarify whether there would be any impact on performance.	
	Dell Response Dell has partnered with industry leading Key Management providers – Gemalto and Thales - to offer Data At Rest Encryption as an optional upgrade to our proposed SC-Series Arrays. With the addition of Self Encrypting Drives (SEDs) - SSD and/or HDD - the associated software licensing plus an external key management appliance from either Gemalto or Thales, our proposed arrays can be upgraded to provide encryption protection for data that requires additional security. There is no impact on the performance of the proposed arrays. Unique Dell Storage Encryption features: • SED/non-SEDs in same array • Incremental SED roll-out – no forklift upgrades required • Key FIPS 140-2 Security level 2 certification • External Key Manager protects data against loss or theft of drives, enclosures or an entire array	

		
3	The IPO's transformation work is key to its success going forward. As part of this, it would be desirable if the proposed solution integrated seamlessly with cloud storage. If this is achievable, please confirm how this would be achieved.	
	Dell Response Dell recognises that customers wish to embrace Cloud solutions and are committed to providing seamless integration with both public and private Cloud service provider solutions. For integration at the storage layer, we currently provide Azure Site Recovery (SMI-S replication) for the proposed SC-Series arrays and will be introducing additional Cloud Tiering and Cloud Replication options in the near future. Many customers will also embrace Cloud integration for virtualised workloads via the Orchestration layer of their Hypervisor - eg VRealise for VMware. Our ongoing commitment to providing end to end integrated solutions tightly integrated with your chosen Hypervisor, is reflected in the reference architectures that we have developed as part of our Hybrid Cloud solutions Blueprints. Further details can be provided to the IPO on these solutions as required. We are committed to sharing Technical Roadmap information with customers and would be happy to schedule these with the IPO as part of our ongoing Account Management relationship.	

Additional Requirements

1. **Timing**

- The solution must be successfully implemented by 31st March 2017. Tenderers must submit a proposal that will meet this deadline in line with paragraphs 4.1, 4.2 and 4.4.

2. **Information required from Tenderers**

- Methodology

i. With the above information in mind Tenderers must provide a clear method statement as to how the requirements will be met. This must be included in Section 3: Requirements (see paragraph 7.2 below). Tenderer's proposals must include:

- The tenderers plan to deliver the requirements;
- Proposed dates of delivery, installation, testing and training;
- Staff roles and responsibilities (including C.V's); and
- Overall number of days to successfully deliver this requirement.

Dell Response

An outline plan and timeline for the delivery, installation, testing and handover is as follows:

- Planning – [redacted] (ensuring all pre-requisites are met prior to sending engineer onsite, project delivery dates confirmed with customer etc.)
- Array deployment – [redacted] including setting up replication
- Hosts configuration – [redacted]
- Testing – [redacted]
- Knowledge/Skills Transfer and Handover of the solution – [redacted]

Approx. [redacted] days in total

Standard delivery timescales for Dell equipment from point of order is 2 weeks.

So given a decision date of on or before 15th December and a Purchase Order on or before 3rd January, the solution should be implemented by 31st March 2017.

If the IPO wishes to undertake more advanced training either via the TechDirect Portal and/or the 4 day advanced Management and Administration Course, these can be scheduled at your convenience.

A typical CV for staff involved in the installation, testing and skills transfer on site is as follows:

Curriculum Vitae – Enterprise Deployment Engineer

Profile

Dedicated Deployment Engineer within Dell GSS EDT (enterprise deployment team), core experience in the installation, implementation and configuration of enterprise storage based solutions.

Average Engineer experience within the EDT team >6 years

Average Engineer successful deployments within the EDT team >150

Most EDT Engineers hold DVA level SC clearance.

Experience

Enterprise Products	Technical	Personal Attributes
▪ Dell Compellent ▪ Fibre Channel ▪ ISCSI ▪ Snapshot/ Data Protection ▪ FCoE ▪ Dell Equallogic ▪ Dell PowerVault & PowerEdge ▪ Deduplication ▪ Brocade ▪ VMware ▪ VMware Site Recovery Manager ▪ Microsoft Windows	▪ Compellent Thin Import VMware Storage Vmotion ▪ Compellent Remote Instant Replay ▪ Compellent Replay Manager ▪ PowerConnect ▪ Operating Systems/ Hypervisor MS Windows Server 2003 MS Windows Server 2008 VMware 3.5 VMware 4.x VMware 5.x ▪ PowerEdge Blades ▪ PowerEdge Rack Servers ▪ FS8600 ▪ NAS - CIFS ▪ NAS – NFS	▪ Deep technical knowledge ▪ Quality-focused with fine attention to detail ▪ Committed to customer satisfaction ▪ Dell Compellent Certified Installation Professional ▪ VMware Certified Professional

Further details of specific named engineers assigned to the IPO installation can be provided as required once an order is confirmed.

Pricing

Solution Option - 3 Years Support	Hardware	Licensing	Implementation*	Support	Line Total £ ex vat
Primary Site – Newport - 3 Year Support	[redacted]	[redacted]	[redacted]	[redacted]	**£196,106.37**
Secondary Site - Cardiff - 3 Year Support	[redacted]	[redacted]	[redacted]	[redacted]	**£40,679.02**
150TB Capacity / VDI Upgrade - 3 Year Support	[redacted]		[redacted]	[redacted]	**£31,282.26**

Solution Option - 5 Years Support	Hardware	Licensing	Implementation*	Support	Line Total £ ex vat
Primary Site – Newport - 5 Year Support	[redacted]	[redacted]	[redacted]	[redacted]	**£207,094.15**
Secondary Site - Cardiff - 5 Year Support	[redacted]	[redacted]	[redacted]	[redacted]	**£42,448.25**
150TB Capacity Upgrade / VDI – 5 Year Support	[redacted]		[redacted]	[redacted]	**£32,329.89**

Support Extension Options (Years 6 & 7)					Line Total £ ex vat
Primary Site – Newport - 1 Year Support Extension					[redacted]
Primary Site – Newport - 2 Year Support Extension					[redacted]
Secondary Site - Cardiff - 1 Year Support Extension					[redacted]
Secondary Site - Cardiff - 2 Year Support Extension					[redacted]

Training Options					Line Total £ ex vat
Storage Admin Training - Per Delegate					**£2,794.50**
Storage Admin Training - Onsite up to 10 Delegates					**£13,455.00**

*** Implementation Charges are fixed price. There are no other Professional Services Charges. The roles and process for the Implementation is outlined in Section 3, Question 12. A full Services Description can be provided to the IPO on request.**

Additional Information

Subcontractors

Overview

The Dell Co-Pilot (ProSupport) Hardware and Software support contract is offered and managed by Dell directly. Dell utilises accredited service partners to provide onsite technical engineering resource. Our UK based Dell Service Partners are Unisys and Getronics. Dell's relationship with our service partners has been developed over the last 30 years and is governed by a global process,

Dell Service Partner (DSP)

The Dell services model is based on combining our expertise with carefully selected service partners. When we deliver services with a partner, you still have Dell as your single point of accountability.

Because partner performance management is essential for the continued success of our delivery model, we have robust partner management processes in place. We have a scalable system capable of keeping track of every aspect of partner performance.

As well as managing performance on a project by project basis, Dell has a wider responsibility to ensure that our partner model delivers continuous quality improvements. We apply rigorous review processes that measure current performance and help us to develop improvement plans to implement in the future.

Partners are actively involved in these processes so that the partnership, as well as the service provision, continues to develop to suit the needs of our customers.

Daily, Weekly and Monthly Reporting

A clear reporting structure is in place. We generate reports that are appropriate to the activities and scale of work being performed by the partner. We have clear policies that allow us to consistently monitor partner performance across projects. These are implemented by Dell partner management and project teams.

Our policies provide a framework for managing service quality and they drive our performance management systems. These systems include daily, weekly and monthly reporting. This gives us high visibility of all partner activity and performance against agreed SLAs. The reports help us to quickly identify patterns and trends in performance. This allows us to see any potential issues early, and rapidly escalate and rectify problems before they affect delivery quality.

Global Systems, Local Management

In addition to the stringent partner management systems deployed on a regional level, there are also local representatives managing our partner engagements.

Accenture can be confident that we view reports of our partner activity globally, and manage the findings locally. Partner performance is actively managed in a controlled and structured way and we are continually working to identify ways to enhance our services for the benefit of our customers.

Tactical and Practical – Quarterly Business Reviews

Quarterly reviews are an important tool in managing Dell's service delivery model. They drive best practices and deliver improvements for our customers. Participants in the quarterly review

process include senior services managers from each of Dell's Global regions, and senior representatives from the service partner.

The purpose is to measure improvement quarter on quarter, to highlight any issues that need to be acted upon and ensure that these are followed up on.
The primary focus is always on helping to deliver a positive customer experience. Dell recognizes that in order to continue to improve our services, both we and our partners must understand each other's issues and business goals. Any differences in views need to be acknowledged, understood and rectified in a satisfactory way on a regular basis.

Review Focus and Goals

The reviews cover two key areas:

- Discussion of our overall business strategy and how we can bring benefits to all parties: our customers, the partner and Dell
- Use of scorecards to highlight any major issues and related actions

The goals of quarterly reviews are to:

- Analyse and drive performance metrics
- Ensure that Dell is continuing to work with the most appropriate partners
- Improve quality
- Develop new service offerings
- Drive cost reductions
- Focus on capabilities to ensure continued, relevant resources are available to deliver and improve the services
- Synchronies partner services with Dell's direction
- Ensure that our working relationship is helping to drive customer satisfaction, now and going forward
- Driving consistent procurement processes and metrics
- Communicating the Supplier's/Partner's performance and scorecard
- Performing gap analysis with commitment to continuous improvement
- Conducting a competitive performance review vs. best in class in peer group
- Mutually agreeing on future performance targets
- Escalating critical issues with Dell and Procurement/Partner management

Scorecards

These are designed to measure a range of service performance areas from the previous quarter. We use both quantitative and qualitative measurements and take input from our standard daily metrics. We also seek further information from staff and management within both Dell and the partner.

The purpose is to make sure that major issues and escalations are fully understood, and that action plans are in place to address them. We take data from work already done and use this to improve processes so that we continually improve service delivery.

With the information taken from the scorecards we focus on specific areas for development with the partner. Areas of focus include:

- How can we improve quality? Aspects addressed include:

— Customer Experience

— Break-fix response and fix times

— Installation management

— Use of certified engineers

— Meeting any service-specific SLAs in place (for example, IMACS, logistics and centralized services management such as call center activity and remote management)

- Technology – are we using it for maximum efficiency in areas such effectiveness of reporting, speed and accuracy of data flow, etc?
- Current capabilities and portfolio – could these be expanded or are they currently sufficient to meet our customers' needs?
- Cost control – can we drive further efficiencies through effective processes and management?
- Service management – is the partnership working to maximum effectiveness. For example, could resource availability be improved?
- Account management – are we communicating effectively as a team for the benefit of our customer and are the levels of account management responsiveness meeting expectations?

By using the scorecard system all these elements of partner performance are continuously assessed and discussed. Dell knows that it takes more than careful partner selection to deliver good service. Our regular metrics and scorecard systems are important tools in ensuring that quality is monitored, developed and improved over time.

Twice Yearly Strategic Business Reviews

These involve the highest senior management representatives from Dell and the partner. They include discussions on strategy to ensure alignment our companies.
For the benefit of Dell's customers, we need to be sure that the partner:

- Fully understands Dell's direction, needs and objectives in building out the services for our customers
- Complements Dell's own capabilities
- Aligns development and use of their resources and capabilities with ours so that we deliver to agreed standards for our customers
- Works with us to explore areas for joint development and ensure that new or evolving solutions are properly investigated and developed

Reviews are a critical tool in the process of continuous improvement. We recognize that partners play an important role in bringing benefits to our customers and we work tirelessly to make sure that they fit into our delivery strategy and help us drive positive customer experience.

Selection of Partners

Dell's stringent selection process ensures that we understand our partners' values and business intentions. We perform a one or two day audit during investigations and face-to-face discussions at potential suppliers' premises. Criteria considered include:

- Financial Integrity – having solid financial status and a positive Dun & Bradstreet assessment
- Corporate Compatibility – work ethos compatible with Dell's core values
- Markets and Customers – a clear business strategy and market focus
- Services Fit – ability to demonstrate appropriate services, skills, knowledge and experience in Dell's business sectors

- Process and Procedures – a working and auditable process to record, monitor and report on services provided
- Geographic Cover – located in appropriate geographical areas
- Major Risks – willing to undertake a risk assessment to ensure the stability of the relationship (including people, processes, finance, growth)
- Experience – ability to provide case histories and references, as well as a proactive approach to measuring customer satisfaction
- Quick time-to-market – the speed with which the partner delivers services
- Industry Certifications – an indication of the partner's commitment to training and maintaining up-to-date product knowledge.

Dell subcontractors		
Company	**Tenure of relationship**	**Nature of services provided**
Getronics Services UK Limited 200 Brook Drive, Green Park Reading, Berkshire. RG2 6UB	Getronics has more than 1,200 trained engineers who are focused exclusively on providing maintenance, warranty and life cycle services to Dell customers worldwide. The Getronics/Dell partnership allows Getronics' clients to achieve the lowest possible cost of ownership, while gaining the highest level of service and quality products for their enterprise solutions. In the UK Getronics has circa 100 engineers trained and certified in supporting Dell servers and storage. A number of these hold DVA SC level security clearance.	The processes and exacting methodologies that Getronics has developed over the years are used to meet Dell's own stringent requirements for response time and first time fix rate. Dell measures these on a monthly, weekly, daily, even hourly basis to ensure that customers receive only the very best service and support available. Getronics regularly exceeds the contracted minimum 95% Service Level Agreement. In addition to on-site maintenance activity, Getronics successfully partners with Dell to provide higher value managed services, including: • Same and Next Business Day support • Enhanced desktop and server support • Service related solutions for e-business • Installation, helpdesk and on-site maintenance services for Dell Storage Area Networks and Network Attached Storage solutions • Microsoft consultancy • Desktop out-sourcing, out-tasking, server and infrastructure • Bid and project management • Managed deployment services, transition management • Network break fix

Unisys Ltd Tongwell Street Foxmilne Milton Keynes MK15 0YS	Unisys is a global Dell Designated Service Partner. Together, we build and deliver solutions that help our clients greatly enhance their IT infrastructure performance. As a Global Dell Services Provider, Unisys provides everything from next-day service for desktop systems to high-end support solutions for complex enterprise environments. We use our proven tools and repeatable methodologies to maintain a global service delivery network that can handle our customers' most exacting standards. To streamline service, Dell and Unisys have linked our IT systems and service processes to provide our clients with a single point of accountability and consistent service levels. We also work together to offer a flexible suite of integrated infrastructure services that are delivered worldwide by dedicated personnel. Our world-class Unisys ISO-certified Call System handles more than 1 million support requests a year for Dell worldwide, making Unisys one of Dell's larger service providers. In the UK Unisys has circa 100 engineers trained and certified in supporting Dell servers and storage. A number of these hold DVA SC level security clearance.	Unisys is now an integral part of delivering managed deployments, managed services and professional services to Dell customers. Unisys has helped Dell to design and implement a range of Enterprise solutions including: • Server Consolidation, often using VMware as the tool for management and visualisation • Systems Management utilising OpenManage, OpenView, Altiris and CommandCentre • SAN designs and implementations • Network designs and implementations, utilising skill-sets across Dell, Juniper, Brocade, Nortel, Cisco and 3Com products • Security assessments and Enterprise security design and implementation projects • Data centre design and re-locations • Through this alliance, Dell global customers have access to a worldwide workforce of more than 25,000 Unisys highly trained engineers, technicians, analysts and consultants.

Storage Buy Back and Secure Resale / Disposal

Dell are able to offer to buy back some or all of your existing IBM V7000 and/or V3700 storage.

Subject to agreement of a specific inventory with the IPO, Dell are able to offer [redacted] per TB up to a maximum of [redacted].

This service is provided through Dell's Asset Recovery Services, the key highlights of which are as follows:

- Complete end to end service
- Data Security
- Environmental Compliance
- Resale or recycling

To secure your data, we apply a comprehensive approach. For each device, a technician boots the system using proprietary software that bypasses the normal hard drive boot process and starts wiping the data. Because the operating system does not start, the technician never sees what's stored on the drive. The data on the hard drive is overwritten* three times in a predetermined pattern using a series of 0s, then 1s, and finally random characters.

Once the drive has been overwritten, the software tests that the wipe has been successful and creates a formal report of the wipe. If the software indicates the wipe was not successful, the hard drive is destroyed through shredding. During third-party unscheduled audits, hard drives are checked at random to be sure they were properly wiped.

Dell partners ensure asset security by using a consistent, detailed tracking process. Customer asset tags are recorded in a tracking system and unique ID numbers are assigned for each piece of equipment. The equipment is tracked from beginning to end, including final disposition, resale to another company, or disassembly for recycling and parts reuse.

We provide a detailed status report on the data cleansing and outcome of each retired system, along with a settlement report listing the resale value of each piece of resold hardware and any other disposed equipment. We can also provide a Confirmation of Disposal document verifying that your data was removed or destroyed and that all recycling met or exceeded all local regulatory guidelines.

Dell has a team of experts dedicated to monitoring global and local legislation. We also have a rigorous process for choosing our partners which includes examining their compliance with regulations. In many countries, the government issues licenses to businesses that recycle electronics. In order to be licensed, these businesses must meet government standards and regulations. Before we consider partnering with a company, we confirm that they have the appropriate licenses and are therefore already in compliance with local legislation.

Strong environmental stewardship has long been a core part of Dell's corporate standards. As a matter of policy, Dell does not send e-waste to developing countries. Instead, we meet or exceed all local regulations and recycle enormous amounts of e-waste every year. In fiscal year 2014, Dell recovered 104.7 million kilograms of used electronics.

Reselling is another option to consider since it can offset the cost of new equipment. If an asset is deemed to have residual value, Dell prepares it for resale after first wiping the data, and then returns 90 percent of the asset's residual value to the customer.

Scale Ready: Storage Capacity on Demand

Dell are able to offer a “pay as you grow” approach to the purchase and ownership of your SC-series arrays.

Leveraged through our Dell Financial Services (DFS) team, this approach involves deploying an initial capacity of storage which comprises a Baseline amount - which meets your current needs - and a 50% Buffer.

The IPO would only initially pay for the Baseline amount of storage and through management of your capacity usage via the Dell Storage Manager tool, you will pay for the additional storage as you provision and consume the Buffer space.

The additional charges will be a fixed price per TB agreed as part of the contract. The Buffer will also be replenished (up to the 50% level) as your array grows.

Dell would be happy to describe this option in more detail and discuss how this model can be modified to meet the IPO’s needs.