MASTER AGREEMENT

THIS MASTER AGREEMENT (this "Master Agreement") is entered into as of the __13th___ day of March, 2017 (the "Effective Date"), by and between DATADIRECT NETWORKS, INC. ("Vendor"), with offices at 9351 Deering Avenue, Chatsworth, CA 91311, and FLORIDA LAMBDARAIL, LLC , a Florida limited liability company ("FLR"), with offices at 1607 Village Square Blvd, Suite 4, Tallahassee, FL 32309.

RECITALS

A. FLR promulgated Invitation to Negotiate #FLRCLDS2016 - Procurement of Long-term Data Storage (the "ITN") to prospective vendors.

B. The ITN was issued by FLR on behalf of its equity partners, associates and affiliates, and the members and affiliates of the Sunshine State Education and Research Computing Alliance (collectively "Eligible Participants").

C. Vendor's initial response to the ITN and subsequent response to FLR's request for a "Best and Final Offer" are attached hereto as Exhibit A and incorporated herein by reference (collectively the "Offering"). The Offering constitutes an offer by Vendor to sell products and services specified in Exhibit A (the "Products and Services") to Eligible Participants in accordance with the terms and conditions of this Agreement.

D. FLR and Vendor have agreed to enter into this Master Agreement to expedite and facilitate the negotiation of purchase contracts (through the issuance and acceptance of purchase orders and/or the execution of separate purchase agreements), based on the Offering, between Vendor and Eligible Participants ("Products and Services Contracts").

NOW, THEREFORE, in consideration of the foregoing and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree as follows:

1. DEFINITIONS.

1.1 "Eligible Participants" means:

a. FLR's partner institutions, associates and affiliates, and
b. SSERCA members and affiliates.

1.2 "SSERCA" means the Sunshine State Education and Research Computing Alliance.

1.3 "Offering" means Vendor's offer to provide the Products and Services to Eligible Participants for the pricing and upon the terms and conditions set forth in Exhibit A (see pages 39-41 of Exhibit A for Best and Final Pricing.)

1.4 "Documentation" means guides, instructions, policies and reference materials provided to Eligible Participants by Vendor in connection with the Products and Services, which may be amended from time to time.

1.5 "Integration Software" means (a) Vendor proprietary software and (b) open source software used in providing the Products and Services, which integrates with Eligible Participants' networks or applications, including SSL or other VPN, Unix operating system, Microsoft application, and/or web application, as provided in the Documentation.

1.6 "Product and Services" means the products and services specified in Exhibit A, including without limitation, equipment, hardware, services, Software, Documentation, etc. as specified in Exhibit A, all of which shall be made available to Eligible Participants pursuant to this Master Agreement.

1.7 "Products and Services Contract" means a contract for the sale and purchase of any of the Products and Services entered into between an Eligible Participant and Vendor pursuant to this Master Agreement, whether formed through the issuance and acceptance of purchase orders and/or the execution of a separate purchase agreement or other contract form.

1.8 "Software" means any and all software specified in Exhibit A, including without limitation Integration Software.

1.9 "Term" shall mean the term of this Master Agreement, which shall commence on the Effective Date and which shall expire five (5) years after the Effective Date, unless this Master Agreement is sooner terminated pursuant to subsection 5.2 hereinbelow.

2. VENDOR RESPONSIBILITIES.

2.1 Vendor agrees to make all elements of the Offering available for acceptance by the Eligible Participants throughout the Term. Each Eligible Participant shall be entitled to issue a purchase order to Vendor for the Products and Services it elects to purchase from Vendor pursuant to the Offering and this Master Agreement. Vendor agrees to accept each such purchase order it receives from an Eligible Participant that is consistent with the terms and conditions of the Offering and this Master Agreement, subject to the applicable Eligible Participant's acceptance of any additional terms or conditions (consistent with the terms and conditions of the Offering) imposed pursuant to Vendor's acceptance of the purchase order. Upon such acceptance, a contract for sale and purchase of the Products and Services specified in the purchase order, herein referred to as a "Products and Services Contract", shall exist between the applicable Eligible Participant and Vendor. Alternatively, each Eligible Participant and Vendor may enter into Products and Services Contract by executing Vendor's standard form of purchase contract or other separate purchase agreement for the applicable Products and Services. In either event, FLR shall not be, or be deemed to be, a party to any Products and Services Contract.

2.2 The pricing for the Products and Services set forth in the Offering may not be modified by Vendor during the Term. The Offering is otherwise subject to reasonable modification by Vendor from time to time at Vendor's sole discretion. Vendor will use commercially reasonable efforts to give Eligible Participants prior written notice of any modification that significantly diminishes any material functionality of the Products and Services.

2.3 Vendor represents and warrants that the Products and Services provided to Eligible Participants pursuant to the Offering will perform substantially as specified in the Offering.

2.4 Vendor will provide Eligible Participants with pre-sales support and access to Documentation in the manner described in Exhibit A.

3. ELIGIBLE PARTICIPANTS RESPONSIBILITIES

3.1 Eligible Participants will make available such personnel and information as may be reasonably required to implement and maintain the Offering.

3.2 Eligible Participants may designate employee(s) for administrative interface on the Offering who will be primary contact(s) for Vendor.

4. STANDARD TERMS AND CONDITIONS OF PRODUCTS AND SERVICES CONTRACTS

The following terms and conditions shall automatically be incorporated into and made a part of each Products and Services Contract entered into by Vendor and Eligible Participants pursuant to this Master Agreement. In the event of any conflict or inconsistency between the terms and conditions set forth in this section 4 and the terms and conditions set forth in purchase order, purchase contract and/ or other documents forming and constituting the applicable Products and Services Contract, the terms and conditions set forth in purchase order, purchase contract and/or other documents forming and constituting the applicable Products and Services Contract shall be construed to control and prevail. References to "this Agreement" in this section 4 mean and refer to the applicable Products and Services Contract. References to "Eligible Participant" in this section 4 mean and refer to the Eligible Participant that is a party to the applicable Products and Services Contract.

4.1 Restrictions. Eligible Participant shall not, and shall not authorize any third party to: reverse engineer, decompile, disassemble or otherwise attempt to discover the source code, object code or underlying structure, ideas or algorithms of the Offering or any data related to the Products and Services (provided that reverse engineering is prohibited only to the extent such prohibition is not contrary to applicable law); modify, translate, or create derivative works based on the Offering; share, rent, lease, loan, resell, sublicense, distribute, use or otherwise transfer the Offering for timesharing or service bureau purposes or for any purpose other than its own use; or use the Offering other than in accordance with this Agreement and in compliance with all applicable laws and regulations (including but not limited to any European privacy laws and intellectual property laws).

4.2 Support. Vendor will use commercially reasonable efforts to provide support to administrative contacts designated by Eligible Participant.

4.3 Indemnification. Vendor shall indemnify and hold Eligible Participant harmless from liability to third parties resulting from infringement by any portion or component of the Offering of any United States patent or any copyright or misappropriation of any trade secret, provided Vendor is promptly notified of any and all threats, claims and proceedings related thereto and given reasonable assistance and the opportunity to assume sole control over defense and settlement. The foregoing obligations do not apply with respect to portions or components of the Offering (i) not created by Vendor or Vendor's suppliers, (ii) that are modified after delivery

by Vendor, (iii) combined by Eligible Participant with other products, processes or materials where the alleged infringement relates to such combination, (iv) where Eligible Participant continues allegedly infringing activity after being notified thereof or after being informed of modifications that would have avoided the alleged infringement, or (v) where Eligible Participant's use of the infringing portion or component of the Offering is not in accordance with this Agreement and all related the Documentation.

4.4 Confidentiality.

(a) Each party (the "Receiving Party") understands that the other party (the "Disclosing Party") has disclosed or may disclose confidential or proprietary information relating to the technology or business of the Disclosing Party. As used in this Agreement, the term "Confidential Information" shall mean all confidential or proprietary information designated as such in writing by the Disclosing Party, whether by letter or by the use of an appropriate proprietary stamp or legend, prior to or at the time any such information is disclosed by the Disclosing Party to the Receiving Party. The Receiving Party agrees: (i) not to divulge to any third person any such Confidential Information, (ii) to give access to such Confidential Information solely to those employees with a need to have access thereto for purposes of this Agreement, and (iii) to take the same security precautions to protect against disclosure or unauthorized use of such Confidential Information that the party takes with its own proprietary information, but in no event will a party apply less than reasonable precautions to protect such Confidential Information. The Disclosing Party agrees that the foregoing will not apply with respect to any information that the Receiving Party can document (a) is or becomes generally available to the public without any action by, or involvement of, the Receiving Party, or (b) was in its possession or known by it prior to receipt from the Disclosing Party, or (c) was rightfully disclosed to it without restriction by a third party, or (d) was independently developed without use of any Confidential Information of the Disclosing Party. Nothing in this Agreement will prevent the Receiving Party from disclosing the Confidential Information pursuant to any judicial or governmental order, provided that the Receiving Party gives the Disclosing Party reasonable prior notice of such disclosure to contest such order.

(b) Eligible Participant acknowledges that Vendor does not wish to receive any Confidential Information from Eligible Participant that is not necessary for Vendor to perform its obligations under this Agreement, and, unless the parties specifically agree otherwise, Vendor may reasonably presume that any unrelated information received from Eligible Participant is not confidential or Confidential Information.

4.5 Intellectual Property Rights. Except as expressly set forth herein, Vendor alone (and its licensors, where applicable) will retain all intellectual property rights relating to the Offering or any suggestions, ideas, enhancement requests, feedback, recommendations or other information provided by Eligible Participant or any third party relating to the Offering, which are hereby assigned to Vendor. This Agreement is not a sale and does not convey to Eligible Participant any rights of ownership in or related to the Offering or any intellectual property rights.

4.6 Payment. Eligible Participant will pay Vendor as specified in Exhibit A (see pages 35-36 of Exhibit A for Best and Final Pricing). All amounts shall be payable within forty-

five (45) days of receipt of invoice from Vendor, subject to any agreed upon acceptance testing. Amounts due under each Products and Services Contract (whether formed through the issuance and acceptance of a purchase order or the execution of a separate purchase agreement or other contract form) are exclusive of all taxes, including national, state or provincial and local use, sales, value-added, property and similar taxes, if any. Each Eligible Participant agrees to pay such taxes (excluding U.S. taxes based on Vendor's net income) unless such Eligible Participant has provided Vendor with a valid exemption certificate.

4.7 Warranty Disclaimer. EXCEPT AS EXPRESSLY SET FORTH HEREIN, THE OFFERING AND VENDOR CONFIDENTIAL INFORMATION AND ANYTHING PROVIDED IN CONNECTION WITH THIS AGREEMENT ARE PROVIDED "AS-IS," WITHOUT ANY WARRANTIES OF ANY KIND. VENDOR HEREBY DISCLAIMS FOR ITSELF AND ITS SUPPLIERS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ALL IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, AND NON-INFRINGEMENT.

4.8 Limitation of Liability. IN NO EVENT WILL VENDOR OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, PUNITIVE, INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE USE OF THE SERVICES OR ANYTHING PROVIDED IN CONNECTION WITH THIS AGREEMENT, THE DELAY OR INABILITY TO USE THE SERVICES OR ANYTHING PROVIDED IN CONNECTION WITH THIS AGREEMENT OR OTHERWISE ARISING FROM THIS AGREEMENT, INCLUDING WITHOUT LIMITATION, LOSS OF REVENUE OR ANTICIPATED PROFITS OR LOST BUSINESS OR LOST SALES, WHETHER BASED IN CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT LIABILITY, OR OTHERWISE, EVEN IF VENDOR HAS BEEN ADVISED OF THE POSSIBILITY OF DAMAGES.

THE TOTAL LIABILITY OF VENDOR, WHETHER BASED IN CONTRACT, TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY), OR OTHERWISE, WILL NOT EXCEED, IN THE AGGREGATE THE FEES PAID TO VENDOR HEREUNDER IN THE SIXTY MONTH PERIOD ENDING ON THE DATE THAT A CLAIM OR DEMAND IS FIRST ASSERTED. THE FOREGOING LIMITATIONS WILL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY.

4.9 U. S. Government Matters. Notwithstanding anything else, Eligible Participant may not provide to any person or export or re-export or allow the export or re-export of the Offering or anything related thereto or any direct product thereof, in violation of any restrictions, laws or regulations of the United States Department of Commerce, the United States Department of Treasury Office of Foreign Assets Control, or any other United States or foreign agency or authority.

5. TERMINATION

5.1 Term. Subject to earlier termination as provided below, this Master Agreement is for the Term specified above.

5.2 Termination. Either party may terminate this Master Agreement for any reason or no reason by delivering one hundred twenty (120) days prior written notice thereof to the other party.

5.3 Effect of Termination. The termination of this Master Agreement only terminate this Master Agreement and shall not terminate or otherwise affect any Products and Services Contract entered into by Vendor and any Eligible Participants pursuant to this Master Agreement.

6. DISCLAIMER OF LIABILITY OF FLR

VENDOR ACKNOWLEDGES AND AGREES THAT FLR ISSUED THE ITN AND HAD ENTERED INTO THIS MASTER AGREEMENT IN ORDER TO EXPEDITE AND FACILITATE THE NEGOTIATION OF PRODUCTS AND SERVICES CONTRACTS BETWEEN VENDOR AND ELIGIBLE PARTICIPANTS. FLR SHALL NOT BE A PARTY TO OR LIABLE IN ANY WAY UNDER ANY OF THE PRODUCTS AND SERVICES CONTRACTS BETWEEN VENDOR AND ELIGIBLE PARTICIPANTS. EACH SUCH PRODUCTS AND SERVICES CONTRACT SHALL BE SOLELY BETWEEN VENDOR AND THE APPLICABLE ELIGIBLE PARTICIPANT, AND FLR SHALL HAVE NO RESPONSIBILITY, LIABILITY OR OBLIGATION OF ANY KIND OR NATURE WHATSOEVER IN CONNECTION THEREWITH. WITHOUT LIMITING THE GENERALITY OF THE IMMEDIATELY PRECEDING SENTENCE, FLR DOES NOT GUARANTY AND SHALL NOT BE DEEMED TO GUARANTY OR PROVIDE ANY ASSURANCE OF ANY KIND OR NATURE WHATSOEVER OF OR WITH RESPECT TO THE PERFORMANCE OF ANY ELIGIBLE PARTICIPANT UNDER ANY SUCH PRODUCTS AND SERVICES CONTRACT. FLR MAKES NO REPRESENTATION OF WARRANTY OF WHATSOEVER KIND, NATURE OR DESCRIPTION CONCERNING OR WITH RESPECT TO (i) THE WILLINGNESS OR FINANCIAL ABILITY OF ELIGIBLE PARTICIPANTS TO ENTER INTO PRODUCTS AND SERVICES CONTRACTS WITH VENDOR, OR (ii) THE FINANCIAL CONDITION OF ANY OR ALL OF THE ELIGIBLE PARTICIPANTS. IN NO EVENT WILL FLR BE LIABLE TO VENDOR OR ANY ELIGIBLE PARTICIPANT FOR ANY DAMAGES OF ANY KIND OR NATURE (INCLUDING WITHOUT LIMITATION COMPENSATORY, DIRECT, INDIRECT, PUNITIVE, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES) ARISING OUT OF OR IN ANY WAY CONNECTED WITH THIS MASTER AGREEMENT OR ANY PRODUCTS AND SERVICES CONTRACT OR OTHER AGREEMENT ENTERED INTO PURSUANT TO THIS MASTER AGREEMENT.

7. MISCELLANEOUS

This Master Agreement or any provision hereof may be amended or waived only by written agreement signed by both parties. This writing constitutes the entire agreement between the parties and supersedes and merges all prior oral or written agreements, representations, statements, proposals and undertakings between the parties regarding the subject matter hereof. Nothing contained herein shall be construed to imply a partnership, joint venture, principal and agent or employer and employee relationship between the parties. Eligible Participants shall be third party beneficiaries of this Master Agreement. No provision in this Master Agreement shall provide to any other person or entity not a party to this Master Agreement (other than an Eligible

Participant) any remedy, claim or cause of action, or create any third-party beneficiary rights against either party. In the event that any one or more of the provisions in this Master Agreement shall for any reason be held to have no force and effect, this Master Agreement shall, if possible, be interpreted in a manner so as to effectuate the intention of the parties. Provisions contained in this Master Agreement that, by their sense and context, are intended to survive the suspension or termination of this Master Agreement, shall so survive. This Master Agreement is the subject of negotiation between the parties and should not be interpreted more favorably toward one party over the other. Neither party may assign this Master Agreement without the prior written consent and approval of the other party. All disputes related to this Master Agreement shall in the first instance be referred to the appropriate executives of each party for resolution. In connection with any litigation, including appellate proceedings, arising out of or under this Master Agreement, the prevailing party in such litigation shall be entitled to recover such party's out-of-pocket costs and reasonable attorneys' fees. This Master Agreement and the interpretation and enforcement thereof shall be governed by and construed in accordance with the laws of the State of Florida. The venue of any litigation arising out of this Master Agreement shall be Leon County, Florida.

[The balance of this page is intentionally left blank. Signatures are on the following page.]

IN WITNESS WHEREOF, the parties hereto have caused this Master Agreement to be duly executed as of the day and year first above written.

<DataDirect Networks>:

By: _____

Name: Ian Gordon Angelo

Title: Chief Operations/Chief Financial Officer

<Florida LambdaRail, LLC>:

By: _____

Name: Joseph A. Lazor

Title: Chief Executive Officer

Primary Contact: Lance Taylor

Address: 1607 Village Square Blvd, Suite 4, Tallahassee, FL 32309

Phone #: 850-385-1250

Email address: info@flrnet.org

EXHIBIT A

DDN® STORAGE

PROPOSAL

FLORIDA LAMBDARAIL, LLC

FLORIDA LAMBDARAIL (FLR), LLC

INVITATION TO NEGOTIATE (ITN # FLRCLDS2016)

FOR THE PROCUREMENT OF:

COST-EFFECTIVE LONG-TERM DATA STORAGE

SUBMISSION DATE/TIME: THURSDAY, NOVEMBER 3RD, 2016. 2.00PM, EDT.

Prepared for:

Lance Taylor
Florida LambdaRail, LLC
Tel: (850) 385-1250
Fax: (850) 385-0379
Email: ITN@firnet.org

Prepared by:

Mark McClung
Account Executive, HPC Academia
DataDirect Networks, Inc
Tel: 818.736.4138
Email: mmclung@ddn.com

Table of Contents

2. Executive Summary

DataDirect Networks ('DDN') is pleased to provide this response to Florida LambdaRail (FLR), Invitation to Negotiate, #FLRCLDS2016, for the Procurement of Cost-effective Long-term Data Storage.

We understand that Florida LambdaRail, headquartered in Tallahassee, Florida's capital city, is an independent regional optical network owned and operated on behalf of partner institutions and affiliates. Utilizing next generation network technologies, protocols and services, FLR facilitates collaboration and academic, scientific, educational, and clinical application development through high-speed communications.

We further understand that Florida's public and private Universities are home to talented scientists, high-end computing facilities and massive data storage systems. Florida LambdaRail and the Sunshine State Education & Research Computing Alliance (SSERCA) brings together these geographically distributed organizations and resources in such a way that their collective impact enables research which is far greater in capability than each organization could provide working separately and independently.

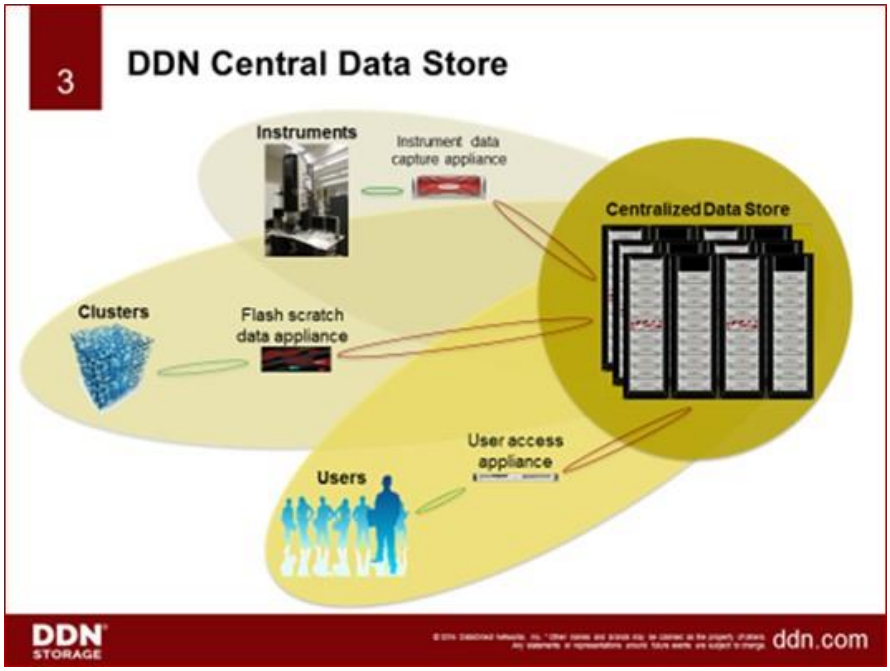
To meet the wide variety of needs represented in the ITN, DDN proposes a Central Data Store (CDS) that provides massive scalability, high reliability and flexibility to provide connectivity to all researchers, including available connections for:

1. Securing key Research Data with encryption.
2. Cloud tiering.
3. Disaster recovery.
4. Online and deep archives.
5. NFS/SMB mounts.
6. Instrument data capture (e.g. CryoEMs, Sequencers, Telescopes).
7. Visualization clusters.
8. Data Analytics (e.g. Hadoop, Spark).
9. IO acceleration/burst buffer.
10. Remote Collaboration.
11. Object Store (e.g., OpenStack Swift).

DDN storage is proven to deliver performance, stability and security with unmatched capabilities for computing solutions. DDN's SFAOS is an interrupt free, real time dedicated storage operating system unlike that includes, in part, the following features, which will be further expanded in later portions of the document:

Tab 2. Executive Summary

1. Real time multi-cpu RAID engine.
2. QOS engine.
3. ReACT intelligent cache management.
4. DirectProtect+
5. Storage Fusion Fabric.



In addition to addressing the technical specification of this ITN for FLR & SSERCA, DDN's CDS proposal meets the ITN request to obtain the best price offer for 1TB data storage at a price not to exceed $25 per Usable TB per year, with the supported life of the solution through five years, looking out to ten years without having to compromise on I/O or throughput performance.

Further Information:

DataDirect NETWORKS

Mark McClung
Account Executive
HPC Academia

DataDirect Networks, Inc.
9351 Deering Ave,
Chatsworth, CA91311
Tel: 818.736.4138
Email: mmclung@ddn.com

ddn.com

~ End of Tab 2 ~
~ Executive Summary ~

3. Company Experience and References

3.1 DDN Experience

DataDirect Networks, Inc., is a privately owned US-based multinational company, founded in 1998 and currently employs approximately 700 personnel worldwide. DDN is recognized as a leading supplier of storage solutions to large-scale and HPC customers and is responsible for powering the largest global web-scale service providers. A summary of awards and accolades can be found at the following URL:

http://www.ddn.com/awards-accolades

DDN can point to many successful relevant engagements that demonstrate our expertise in these fields; below are several press releases of recent significant wins:

- **40PB of vital research data for more than 100 North American Colleges:** http://www.ddn.com/press-releases/ddn-storage-enables-national-center-for-atmospheric-research-to-move-beyond-studying-weather-phenomena-to-advancing-predictions-with-big-data-simulations/

- **18 PB at CEA, the French Atomic Energy and Alternative Energies Commission:** http://www.ddn.com/press-releases/ddn-storage-awarded-18-plus-petabyte-hyper-converged-storage-contract-at-cea-major-french-government-research-site/

- **A Centralized Data Store for 1000s of Researchers:** http://www.ddn.com/press-releases/ddn-storage-selected-by-texas-advanced-computing-center-tacc-to-deliver-a-40x-speed-up-in-scientific-research-and-innovation/

3.1.1 DDN is The Leading Big Data Storage Supplier to Data-Intensive, Global Organizations

For over 17 years, DDN has designed, developed, deployed and optimized systems, software and storage solutions which enable government agencies, enterprises, service providers, and universities to generate more value and accelerate time to insight from their data and information, on premise and in the cloud.

Organizations leverage the power of DDN storage technology and the deep technical expertise of our team to capture, store, process, analyze, collaborate and distribute data, information and content at largest scale in the most efficient, reliable and cost effective manner. Our customers include many of the world's leading government and research facilities, financial services firms and banks, healthcare and life science organizations, manufacturing and energy companies, in addition to web and cloud service providers.

DDN's sustained Vision and execution have made us the World's largest privately held data storage company. Our technological and market leadership comes from our long term investments in leading edge research and development, our relentless focus on solving our customers' end to end data and information management challenges, and the excellence of our employees around the globe, all relentlessly focused on delivering the highest levels of satisfaction to our customers.

We create and bring to market the most advanced and innovative technologies to solve our customers' complex Big Data challenges. Our technology centers are located in the US, France, Germany, Belarus, China, India and Japan, and our manufacturing facilities are based in the US.

3.1.2 DDN Operations in USA and Canada

DDN currently employs ~700 personnel worldwide with ~425 employees in USA/Canada.

3.2 Other

3.2.1 DDN Customer Service Organization/Professional Services

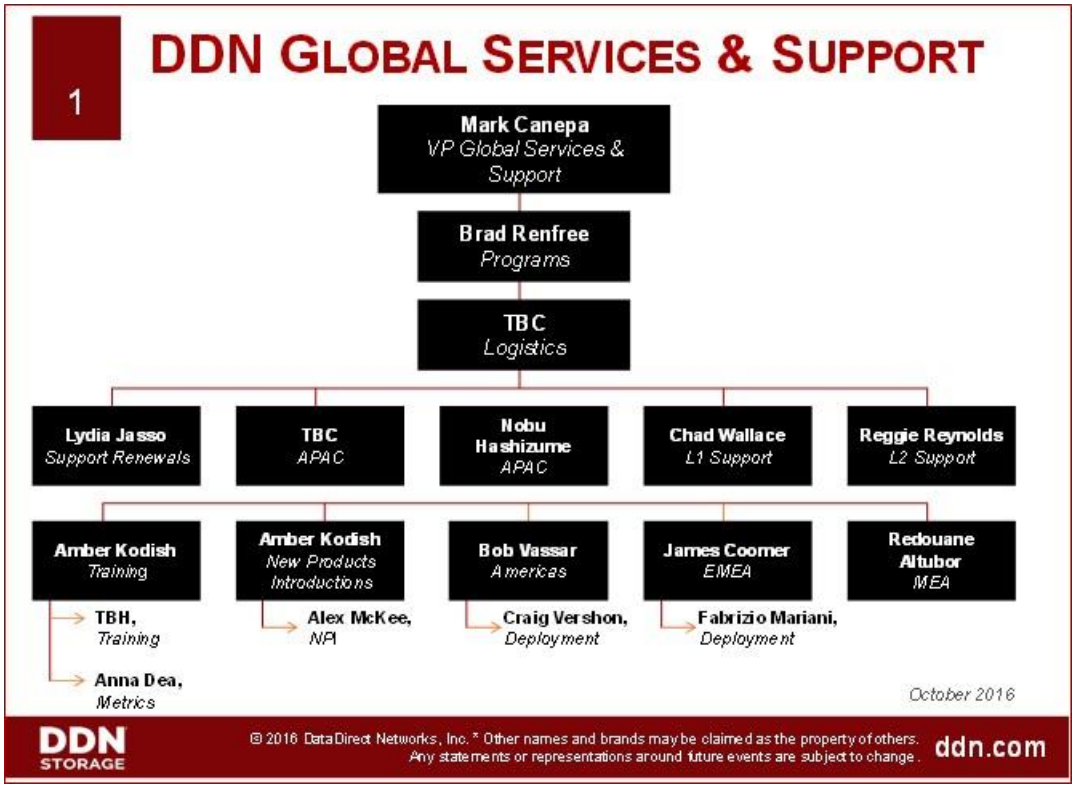
DDN has a team of 60 engineers in North America, backed by hundreds of engineers internationally. We have fully experienced resources to install, implement and support the new proposed systems at FLR. Our deep expertise in storage implementation and support in the GPFS file system allows DDN to implement solutions faster than other storage vendors. Most integrators and partners outsource their storage and file system expertise to different contractors. DDN installs and supports file servers, storage hardware and file systems. This is a unique combination in the industry, which means that DDN is able to offer a strong partnership with FLR & SSERCA.

DDN has built a Services and Support team to help our customers plan, deploy and manage the fastest and most scalable-secure Big Data solutions in the world. Our team is committed to attaining the highest levels of Customer Satisfaction, in the largest, most complex and demanding environments. We have established a critical mass of capability globally, with dedicated Services and Support teams based locally. The teams are also able to call upon a large pool of specialists, already experienced in the region.

DDN's project delivery teams ensure that the solution purchased, will be delivered and accepted in the fastest time possible, minimizing risk and cost. Our personnel are very experienced in delivering solutions of a similar scale and complexity to this Invitation to Negotiate.

DDN services teams understand the importance of delivering the solution, ensuring that it meets requirements, and delivers the service levels and benefits intended. DDN's technical teams are trained extensively on DDN's portfolio of offerings and certified to ensure that we maintain quality, as we continue to grow our business. Our teams remove any complexity for customers; we provide training and documentation, ensuring that the environment is simple to manage. DDN Storage solutions have the lowest Total Cost of Ownership, as demonstrated by DDN's ability to meet the pricing request in the ITN without having to compromise on performance.

DDN's Global Services and Support Organization Chart is illustrated below:



3.2.2 Company Size

DDN is a global, growing organization that operates directly in 20 countries worldwide with customers across more than 50 countries across all major continents, including many Fortune 500 companies.

DDN has 7 Technology Centers, 14 Sales Offices and 11 Worldwide Locations.

3.2.3 Sales Volume Industries

- During the past 14 years, DDN has delivered over an Exabyte of disk capacity to its customers.
- DDN is present in multiple markets such as Education, Government, Financial Services, Energy, Life Sciences, Manufacturing, Web & Cloud and Media.

3.2.4 DDN Warranty and Support

1. Global Services Overview

High Performance Service and Support

DDN team members are proven industry experts specializing in solving a full range of Big Data challenges, monetizing information assets, and optimizing DDN storage solutions that are uniquely configured for efficiency, performance and collaboration. Customers all over the world rely on DDN to maximize and protect their storage investment through flexible, comprehensive professional services, education and support offerings.

STEP 1	STEP 2	STEP 3	STEP 4
Our Big Data experts will work with you to document your requirements and create a solution that meets your needs	Our highly skilled professional services team will get you up and running with installation and configuration services that ensure the optimal design is put into practice	DDN's expert technical support teams will aggressively resolve issues impacting your environment	DDN's optimization and management services will keep your systems running at full speed

2. Support Plans

This proposal includes 5 years of Basic On-Site support, which includes DDN support on site for Field Replaceable Units (FRUs) Next Business Day, in addition to shipping of Customer Replaceable Units (CRUs) Next Business Day, plus an Annual System Health Check. The goal of providing more support than requested in the ITN is to assure FLR, SSERCA and researchers that the CDS remains stable and available.

In today's digital age, IT departments are charged with maximizing system uptime and access to data. This is increasingly challenging as multivendor solutions, complex architectures, and dynamically changing workloads become the norm.

Tab 3. Company Experience and References

When you partner with DDN, you'll align with subject matter experts in at-scale and data-intensive environments, whose experience spans nearly two decades. Our team of highly trained technical support engineers, field engineers, and logistics professionals are committed to prompt resolution, without excuses - so you can get back to your business at-hand.

DDN offers four support plans designed to meet a range of support options based on differing requirements. Entry Self Maintenance is for customers who have the training and experience to perform their own maintenance functions. For onsite requirements, we offer three plans with a range of available response times by DDN's support staff, as well as plans that provide parts delivery Next Business Day or within 4 hours.

Below, you will find a table highlighting the various support plans available. For specific details, please download the Support Plans Brochure or refer to the Terms and Conditions of the DDN Support Contract.

	WARRANTY	CUSTOMER SELF-MAINTENANCE	DDN ONSITE SUPPORT		
SUPPORT OPTION	**Standard**	**Entry**	**Basic** (Annual Remote Health Check at customer request)	**Premium**	**Mission Critical**
PART NUMBER	Included	SUP-ENPO-x	SUP-BSOS-x	SUP-PROS-x	SUP-MCOS-x
TECHNICAL SUPPORT AVAILABILITY	12x7x365	12x7x365 via DDN Customer Support Community Portal only	24x7x365		
SERVICE LEVEL OBJECTIVES (To First Response via DDN Customer Support Community Portal only)					
SEVERITY 1	24 Hours	12 Hours	4 Hours	1 Hour	30 Minutes
SEVERITY 2	48 Hours	16 Hours	8 Hours	3 Hours	1 Hour
SEVERITY 3	Commercially reasonable effort.		24 Hours	6 Hours	2 Hours
SEVERITY 4	Commercially reasonable effort.		48 Hours	24 Hours	4 Hours
PARTS ONSITE RESPONSE **SLO** starts at DDN's determination of need	DOA advance shipment for first 30 days after installation. Return to factory thereafter.	2-5 business days depending on location	Next Business Day		4 Hours
ENGINEER ONSITE RESPONSE **SLO** starts at DDN's determination of need	Commercially reasonable effort. Time and materials charges apply.		Customer replaces CRUs; Next Business Day for FRUs	Next Business Day	4 Hours
ONLINE TOOLS	Access to DDN's Customer Support Community Portal including Knowledge Base articles				
REMOTE SOFTWARE / FIRMWARE UPGRADES	DDN Defined Mandatory Upgrades Only – Customer Installed		All Upgrades – Customer Installed	All Upgrades – Either Customer Installed or DDN Installed Remotely	
HEALTH ASSESSMENT	None Included but available for additional fee		Includes one annual health assessment at the customer's request		Includes one scheduled

			annual health assessment
CONSUMABLES INCLUDED	No	Yes	Yes
SSD REPLACEMENT AFTER DRIVE EXPIRATION	No		
NON-RETURNABLE DISK OPTION	Yes (with Additional Charge)		

Note: *Parts and Labor onsite SLOs (Service Level Objectives) are response time objectives that are measured from the time of determination. Parts shipments can be impacted by local shipping cutoff times, local holidays, import delays and other situations outside of DDN's direct control. DDN will not send labor to a site to replace components until the components are in route to the site. Not all Support Options available in all areas, please contact your DDN Account representative for verification of coverage.*

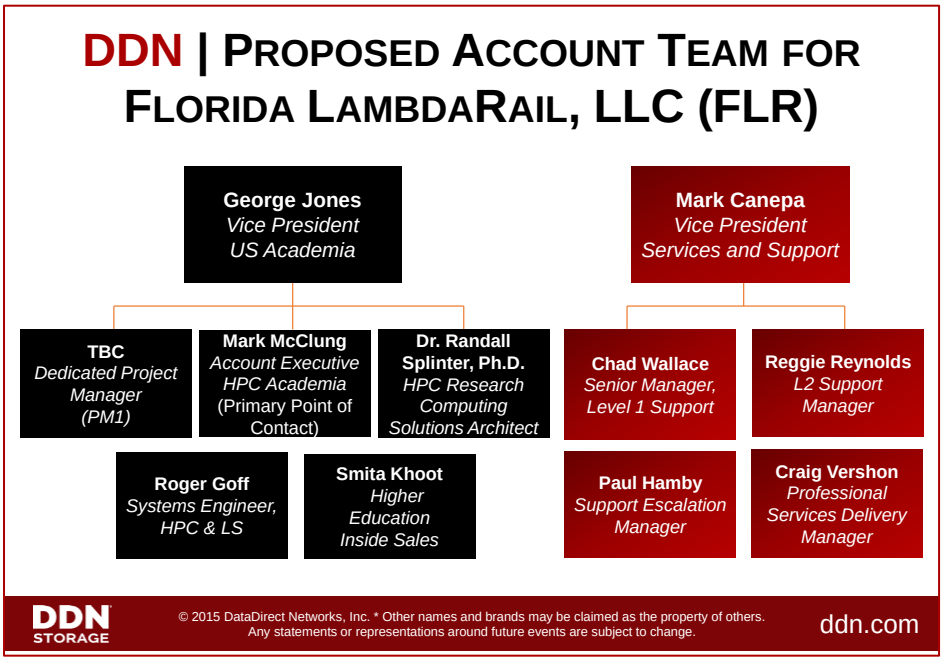
3.2.5 Proposed Account Team for FLR

DDN has a very experienced Account Team to provide coverage for FLR and meet either on-site or via 'phone/Web-ex on a regularly scheduled or ad-hoc basis according to your wishes.

As the Account Executive for FLR, Mark McClung has over 24 years industry experience, including 16 years working in the Higher Education market. Mark will continue to leverage these skills to help accelerate and maintain a high level of customer satisfaction for FLR. It is proposed that the following DDN personnel will be assigned to this project, under the direction of George Jones, Vice President, US Academia and Mark Canepa, VP Services and Support.

The following personnel will be assigned to FLR account:

Name	Title	Location	Function
Mark McClung	Account Executive, HPC Academia	Austin, TX	Primary POC
Dr. Randall Splinter, Ph.D.	HPC Research Computing Solutions Architect	Canton, GA	Consultant and Architect
George Jones	Vice President, US Academia	St. Petersburgh, FL	DDN Executive Sponsor and Escalation POC
TBC	Project Manager (PM1)	TBC	Project Manager (PM1)



3.3 References

3.3.1 Texas Advanced Computing Center (TACC)

Texas Advanced Computing Center (TACC)	
Name:	Niall Gaffney
Title:	Director of Data Intensive Computing Data Management & Collections; Data Mining & Statistics
Email:	ngaffney@tacc.utexas.edu
Summary of Install Base:	Multiple GRIDScaler implementations which include a 14K with 40PB and 12K's replicating with 16PB at one site and 13PB at the other

3.3.2 University of Colorado

University of Colorado	
Name:	John Finigan
Title:	HPC Systems Administrator, Anschutz Medical Campus
Email:	John Finigan@ucdenver.edu
Summary of Install Base:	GRIDScaler 14K with 5PB useable

3.3.3 National Center for Supercomputing Applications (NCSA)

National Center for Supercomputing Applications (NCSA)	
Name:	John Towns
Title:	Executive Director For Science And Technology XSEDE Program Office, National Data Service
Email:	jtowns@illinois.edu
Summary of Install Base:	Multiple GRIDScaler systems; 14K, 12K, 10K & a Private sector system each multi PB.

~ End of Tab 3 ~
~ Company Experience and References ~

4. Overview of Storage Solutions/Price Offer

The Central Data Store (CDS). CDS is a combination of a DDN SFA14KE array, IBM Spectrum Scale filesystem and IBM Cluster Export Services (CES). The DDN 14KE provides the industry's leading high performance disk array with support for up to 1752 disks and up to 40GB/s of bandwidth. We are choosing IBM's Spectrum Scale (formerly GPFS) filesystem to provide parallel filesystem performance on top of the 14KE array. By taking advantage of CES (formerly protocol nodes), this option securely centralizes the storage at a single site with protocol nodes providing the NFS/SMB/Object access to the Spectrum Scale filesystem.

CDS is a pivot in how to think about GPFS. Rather than using it as a parallel filesystem, GPFS is now secondary to CES with the enormous stability and manageability advantage that GPFS provides as the back-end; it enables scale-up of a single filesystem using NAS protocols for simplicity.

The SFA itself remains at the leading edge of high speed storage in the industry with 10PB in two racks. That kind of density saves space, power & cooling, and drives down the cost/TB, which allows DDN to meet the ITN request for $25/Usable TB/Year over 5 years with support.

Using CES offers innovative users the protocols everyone knows and understands. CDS also enables users to better secure data since it lives in their data center and not in a remote data center.

4.1 Central Data Store (CDS)

4.1.1 Overview

Through the use of IBM Spectrum Scale and the DDN SFA14KXE hardware we are choosing a strong and well tested solution that has been shown to scale up and out delivering a nearly ideal solution for large-scale scale-out storage supporting:

- Archive.
- NAS (NFS/CIFS).
- Instruments (e.g. CryoEMs, Sequencers, Telescopes).
- Visualization clusters.
- Data Analytics (e.g. Hadoop, Spark).
- Scratch FS (e.g. SFA-IME).
- Encryption (HIPAA, et al).
- Replication.
- Cloud.
- Collaboration.
- Object Store (e.g. OpenStack Swift).

DDN hardware is dedicated to Stability & Security with the following features, which will be expanded later in the document:

- Storage Fusion Fabric™.
- Real time multi-core RAID engine.
- QOS engine.
- ReACT™ Cache management.
- DirectProtect™ and journaled IO.
- Battery backed cache.
- Automatic hot sparing.

This following illustration is intended to show the flexibility and scalability of the CDS solution. By basing CDS on the SFA platform we get the scale-up and out versatility that the DDN platform is known for and allows for capacity growth to almost unlimited capacities. The use of IBM Spectrum Scale gives the hardware a solid filesystem and a large set of protocols and connectors through which end users can interact with the storage solution.

As shown in the picture, Spectrum Scale provides basic NAS services (NFS and SMB) through the use of Cluster Export Services (CES). Object storage in the form of Swift can also be included from CES.

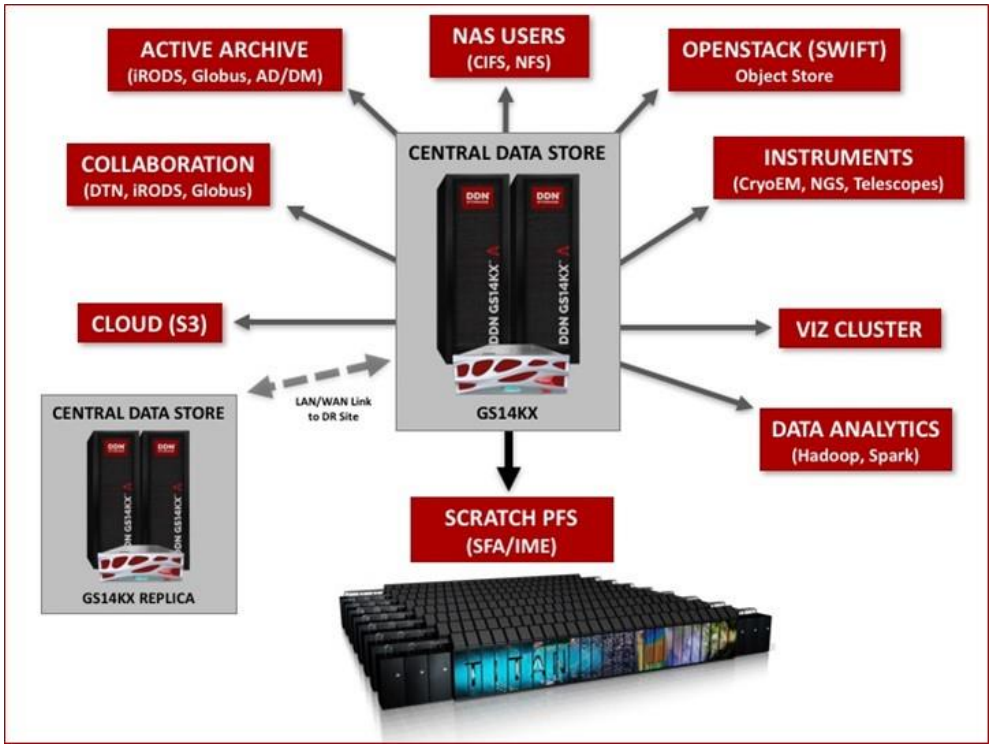
The additional protocol access methods integrated with GPFS are file access using NFS and SMB and object access using OpenStack Swift. While each of these server functions (NFS, SMB and Object) uses open source technologies, this integration adds value by providing the ability to scale and by providing high availability using the clustering technology in GPFS[1].

The proposed solution provides 3 protocol nodes; each has the ability to support up to 3,000 SMB Users, 4,000 NFS Users, or 875 Swift Users. DDN believes this will exceed the ITN request for 2000 Users growing to 4000 Users in 3 years. Actual utilization can be monitored, and, if needed, additional protocol nodes can be easily added. These nodes do not have to be sourced from DDN, and can be existing servers which meet IBM CES specifications, and include a GPFS server license.

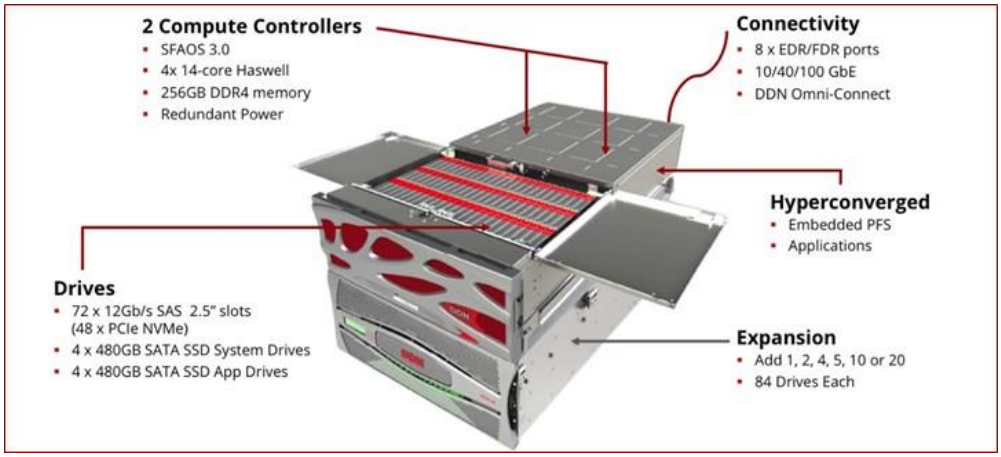
Another option is to use a Hadoop connector, which is a Java-based front-end to Spectrum Scale to provide a Hadoop interface to Spectrum Scale, Hadoop file services can be provided for those users who are doing data analytics. Active archiving and collaboration can be achieved using tools such as iRODS, Globus, and DTN.

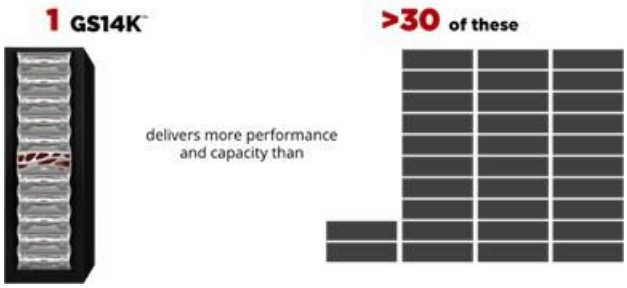
[1] IBM's Spectrum Scale 4.2.1 Product Overview
http://www.ibm.com/support/knowledgecenter/STXKQY_4.2.1/com.ibm.spectrum.scale.v4r21.doc/bl1ins_Protocolsupportoverview.html

Overall, we believe that the proposed CDS provides the flexibility and scalability that few other storage solutions on the market can provide in general, and even fewer can provide at a price point of $25/Usable TB/Year/Supported.



4.1.2 SFA14KXE Specifications





The modern data center requires next generation NAS solutions to keep pace and efficiently deliver high speed data ingest and processing, as well as long-term data retention and global collaboration. DDN GRIDScaler parallel file system appliances combine the accessibility of network data protocols with the industry's fastest and densest embedded storage solutions for 10-30x higher performance and 2-6x higher capacity per data center rack U. Cutting edge enterprises demand high-performance infrastructure to harness data growth and provide insight from data analytics.

4.1.3 GS14KXE Specifications

Protocols:

- Linux and Windows Native parallel filesystem clients.
- Hadoop using the Hadoop connector in Spectrum Scale.
- With Cluster Export Services:
  - NFSv3 and mandatory features of NFSv4.
  - SMB1, 2, 2.1 and mandatory features of SMB3.
  - OpenStack Swift (Kilo version) and Keystone (Keystone V3).

Performance: 42GB/s per Base Enclosure.

Metadata: All GRIDScaler appliances feature distributed metadata.

Storage Host Ports:

- 8x InfiniBand EDR/FDR or Ethernet**.**
- 8x DDN OmniPath Connect Ports

Supported Drive Types: NL SAS or SSD.

Supported Drive Sizes: LFF 3.5" and SFF 2.5"**;** 72 in base unit, 1752 with 20 expansion enclosures.

File Servers per Base Enclosure: 4 NSDs.

Supported Raid Levels: RAID 1/5/6.

Data Protection:

- Up to 256 Snapshots per Volume - policy driven, Snapshot Rollback.
- DirectProtect and DirectProtect+
  - Enterprise class silent data corruption detection and correction for pools of drives.
- Journaled Drive Rebuild Capability - Accelerates drive rebuild times for recoverable drives by only requiring new/changed blocks to be written to the drive.
  - Controller can take suspected drives off line for re boot or re sync. Once drive is clean, data can be written back from journal, brought back on line, without rebuilding total drive. Fewer drive replacements and rebuilds required.
  - Allows for partial instead of full drive rebuilds in a number of cases, such as:
    - Drive inaccessibility for a period of time.
    - Replacement of enclosures.
    - Online Power cycling of drives.
- Online and Automatic Storage Rebalancing.
- High Speed Defragmentation.

Replication: Synchronous Data and Metadata, Asynchronous using WOS.

4.1.4 GS14KE (Please refer to Appendix B for further details of DDN's GRIDScaler 14KE)

4.2 Spectrum Scale Cluster Export Services

Cluster Export Services (CES), formerly known as Protocol Nodes, provide additional protocol access methods.

Providing these additional file and object access methods and integrating them with GPFS™ offers several benefits. It enables users to consolidate various sources of data efficiently in one global namespace. It provides a unified data management solution and enables not just efficient space utilization but also avoids having to make unnecessary data moves just because access methods may be different [2]

[2] http://www.ibm.com/support/knowledgecenter/STXKQY_4.2.1/com.ibm.spectrum.scale.v4r21.doc/bl1ins_Protocolsupportoverview.html

- NFS support overview:
  - The NFS support enables clients to access the GPFS™ file system by using NFS clients with their inherent NFS semantics. With support for NFSv3 and mandatory features of NFSv4.
- SMB support overview:
  - The SMB support allows clients to access the GPFS file system using SMB clients with their inherent SMB semantics. With support for SMB2 and SMB2.1 and mandatory SMB3 features.
- Object storage support overview:
  - IBM Spectrum Scale for object storage combines the benefits of IBM Spectrum Scale with the most widely used open source object store, OpenStack Swift (Kilo version) and Keystone (Keystone V3).
- Cluster Export Service Overview:
  - Cluster Export Services (CES) includes support for monitoring high availability through protocols and commands.

4.2.1 Details of the Centralized Data Store Solution

4.2.1.1 Summary

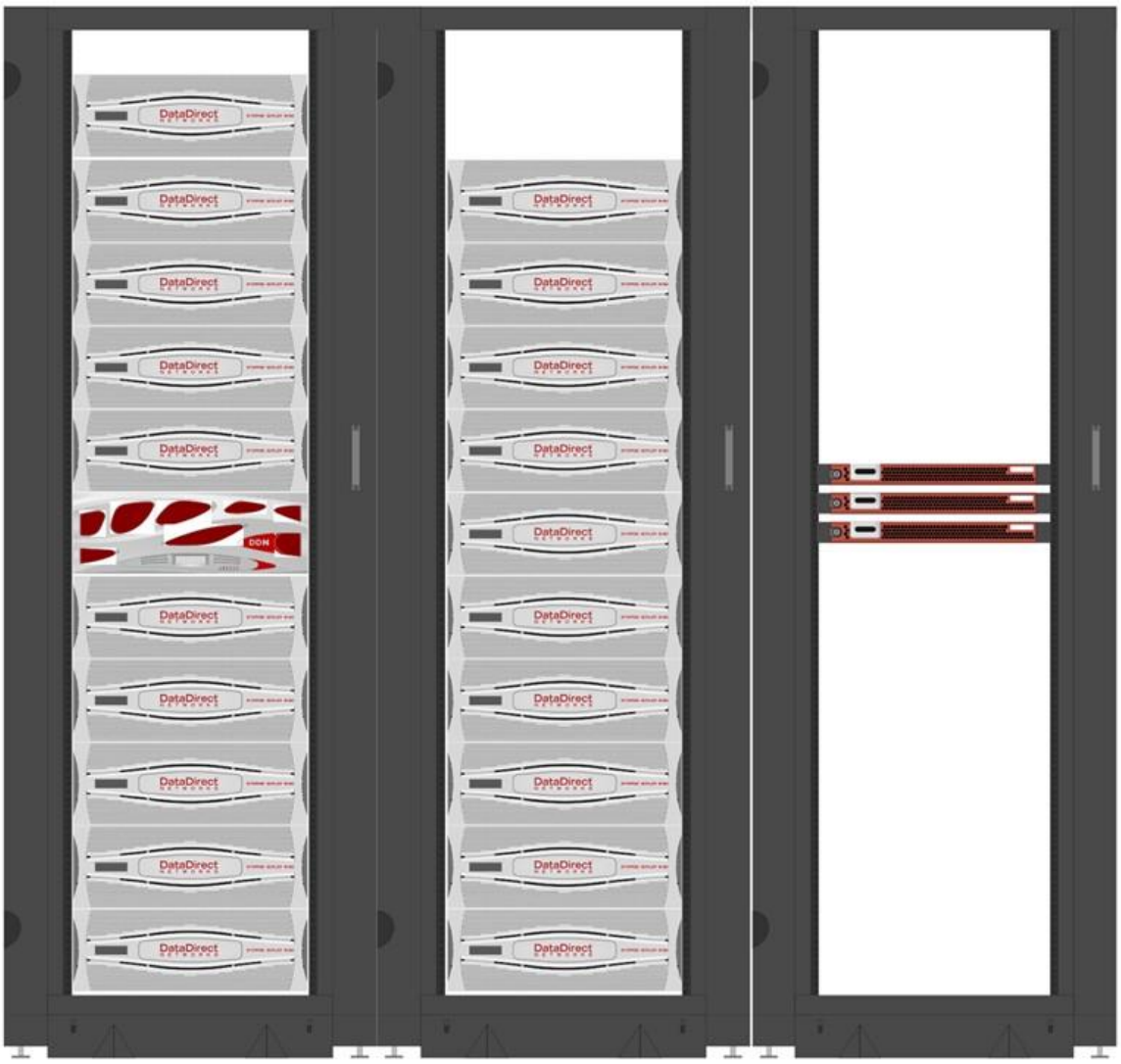
The DDN proposal is based upon the SFA14KE disk array and the IBM Spectrum Scale filesystem with Cluster Export Services. The SFA14KE provides the hardware platform, while Spectrum Scale provides the back-end parallel filesystem and Cluster Export Services provides the access to the filesystem over a variety of protocols.

A summary of the hardware configuration is below:

- 3 x DDN 45U Racks.
- 1 x DDN GS14KX72E-EDR Appliance:
  - 20 x SS8460 Disk Enclosures:
    - 1600 x 8TB 7.2K RPM SAS 4Kn Drives (Data Drives).
    - 114 x 1.8TB 10K RPM SAS 4Kn Drives (Metadata Drives).
- Drive Spares:
  - 10 x 8TB 7.2K RPM SAS 4Kn Drives (Data Drives).
  - 2 x 1.8TB 10K RPM SAS 4Kn Drives (Metadata Drives).

The number of metadata drives was determined using the recommended IBM practice of setting aside ≈1% of the total usable capacity in TiB for metadata.

Tab 4. Overview of Storage Solutions/Price Offer



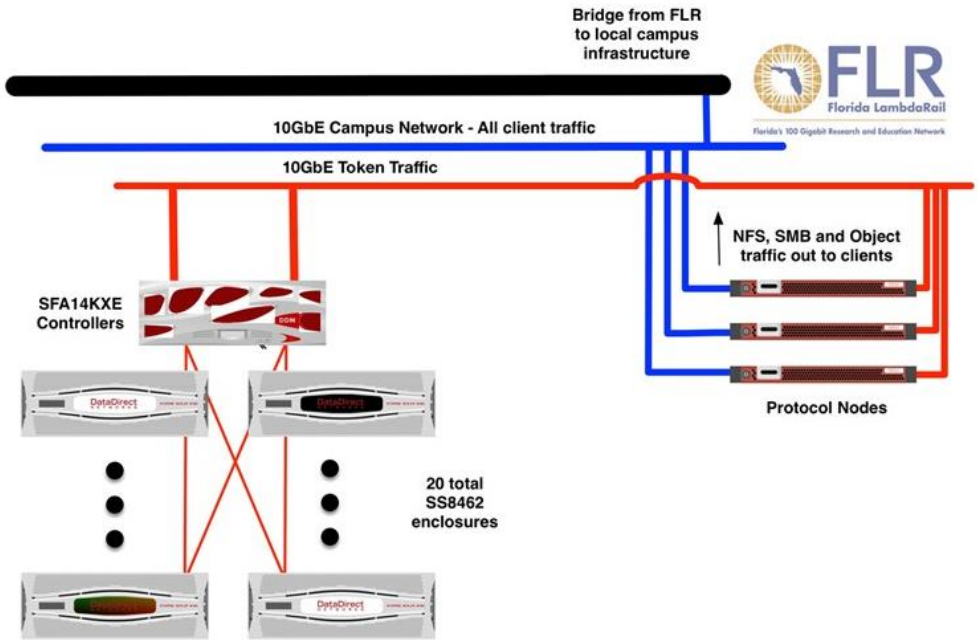
The capacity of the proposed solution is:

Capacity Storage = 1280 TB Raw, 10240 TB Usable. (Using RAID6 [8+2]).
Performance Storage = 205 TB Raw, 102 TB Usable. (Using RAID1).

4.2.1.2 Example Network Diagram

For Spectrum Scale the most important thing is that all nodes in the cluster must be able to communicate with one another. Therefore, the protocol nodes and the NSD servers must be able to communicate over an IP network. This is for the token management traffic that is required. Since presumably the preferred networking for this solution will be at least 10GbE Ethernet the NSD servers and protocol server(s) should all live on the same 10GbE network so they can correctly pass the token traffic when need be.

The following diagram demonstrates this design:



4.2.1.3 Security

Security of the CDS breaks down to several components:

1. Access to GPFS

For the CDS the primary access point for the end users will be one of NAS protocols (NFS or SMB). If direct client access to the underlying GPFS filesystem is required then several things must be kept in mind. Foremost is the fact that all GPFS clients must be part of the GPFS cluster. This is for token management. For a client at a remote site that can prove cumbersome and cause issues with GPFS. Any anomalous latency in the WAN link could cause the token manager problems that could lead directly to the filesystem locking up.

If the CDS is located at a central location then it might be possible to allow clients to connect directly using the native client, but DDN will ask that those clients reside in the same data center as the CDS to avoid any network issues that could cause token management issues and filesystem hangs.

2. Access to the CES Servers

The CES servers should be treated as any other NAS server. Any security policies that are used for normal NAS server security should be implemented on the CES servers as well.

The CES servers are considered part of the GPFS cluster. Therefore, passwordless ssh logins between the GPFS cluster must be allowed. This is to enable token management between the servers in the GPFS cluster. To isolate the GPFS servers from unwanted traffic the CES servers are configured with dual Mellanox CX-3 HCAs. One HCA could be used for the backend network, while the second can be used for the client-facing network. For more details on the passwordless ssh requirement please refer to:

http://www.ibm.com/developerworks/aix/library/au-aix-modifying-ssh-configuration/

3. End User Data Security

End user data security is handled as it would be for any NAS server device using standard UNIX/Linux permissions for NSF or Windows ACLs for SMB.

4.2.1.4 Valuable Features

1. Hierarchical Storage Management

There are two DDN supported methods to enable HSM managed GPFS files-system automatic migration, GPFS policy triggered automatic migration and HSM threshold controlled classic automatic migration:

1.1 Spectrum Scale ILM Policy Engine

The Spectrum Scale ILM policy engine can be used to create policy-based migration and threshold controlled migration policies. Spectrum Scale can tier the data out to slower disk tiers in the same Spectrum Scale filesystem.

1.2 WOS Bridge

WOS Bridge represents a future potential add-on to the CDS. We are not quoting it as part of this ITN response. We are including it here since it represents a means for merging the functionality of the CDS with existing WOS installations at a number of institutions.

WOS Bridge was introduced by DDN to provide a means by which to transparently move data from a GPFS filesystem to the DDN WOS object storage platform using the GPFS ILM policy engine. WOS Bridge introduces a pair (or more) of bridge servers between the GPFS NSD servers and a WOS cluster. The bridge server capture incoming DMAPI commands from the GPFS ILM policy engine and react by either moving a file (leaving a stub on the GPFS filesystem) or copying the file (leaving a copy of the file on GPFS and WOS) to WOS. WOS Bridge is not a DR or backup solution, because any delete command issued on a file will remove the file from the system, both GPFS and/or WOS.

Some of the potential uses of WOS Bridge in this context are:

1. Tier data out to WOS to reduce the used capacity on CDS. There are a number of reasons why this could be useful, for instance:
   a. Secure data and IP from researchers that are leaving the institution by moving the data to WOS and then using the compliance control setting to guarantee that should a file be deleted in GPFS, then it can be recovered from WOS through Bridge and back to GPFS.
   b. Provide a means for moving data that needs to be kept for long periods of time for regulatory reasons "out of the way" reducing the capacity on CDS.
2. Using a WOS replicate policy to share data transparently between sites once the data has migrated to WOS, helping to enable collaboration between researchers at separate FLR/SSERCA institutions.

2. Data Compression

IBM Spectrum Scale™ V4.2 adds file compression to reduce the size of data at rest. File compression is intended primarily for cold data and favors saving space over access speed. File compression can be driven by policies that enabled administrators to compress only files that are not accessed for some specified time. Data is decompressed inline for each read access.

File compression in this release is designed to be used only for compressing cold data or write-once objects and files. Compressing other types of data can result in performance degradation. File compression uses the zlib data compression library and favors saving space over speed.

4.3 CDS Solution Price Offer

The total for the complete DDN solution proposed in this response, including 5 years of Basic On-Site support, is: $1,279,991.38

For disk, it includes:

Capacity Storage = 1280 TB Raw, 10240 TB Usable (Using RAID6 [8+2]).
Performance Storage = 205 TB Raw, 102 TB Usable (Using RAID1).

Calculating cost based solely on Capacity Storage (Performance storage is for metadata) and using DDN Best Practices RAID 6, this solution is $24.99 per TB/Per Year for 5 years.

Each year post the five-year contract will be $80,329 annually for HW Basic On-Site Support & GPFS FS support for the complete solution herein. DDN's End of Life Policy is to provide support for 5 years after End of Sale is announced; both the 14K, and the Protocol nodes are the most recent DDN offerings and a time frame of 3 to 5 years of system life past the 5 years of support included is realistic.

DDN is committed to the relationship with FLR & SSERCA and will work with FLR & SSERCA for the longevity desired.

DDN is compliant with the effective Period of Proposals for this ITN and DDN's pricing shall remain firm for a period of one hundred and twenty (120) days following the closing date.

4.3.1 The Bill of Materials in the Solution is as Follows:

4.3.1.1 CDS

Product	Qty	Description
CDS Storage System		
GS14KX-EDR	1	GS14KX GRIDScaler 3.x appliance. Includes 14KX72E-EDR, GPFS v4 Standard Edition server and DirectMon DM-LFSA-LIC licenses with 1 year support; not included: DirectMon DM-VSN-LIC for each NSD and at least one DM server in the environment
SS8462-SBOD	20	SS8462 84-slot 12Gb/s SAS/SATA HDD/SSD enclosure. Includes 2x I/O modules, redundant power supplies, power cables, rail kit for rack mounting and cable management arms.
CBL-HMSHMS12O-7	40	12Gb/s HD mSAS to HD mSAS Optical cable, 7m
RK45-9900US-RL	2	45U Rack with 2x three phase 35A managed PDUs for USA 10kW max. Remotely managed outlets via Web, SNMP, Telnet. Remote on/off, power cycle and power sequencing.
CR-LC-LC-10	8	LC-LC FC cable optical to storage, 10m
ADPT-CX2-SFPP	8	QSFP to SFP+ Cable Adapter - Converts 1X QSFP to SFP+ 10GbE port for ConnectX2 and ConnectX3 HCA
MFM1T02A-SR	8	SFP+ optical module for 10GBASE-SR; for use with ADPT-CX2-SFPP to convert SFP+ to short range fibre Ethernet
Drives		
H01P0180224CH14	114	1.8TB 10K RPM 12Gb/s SAS 4Kn drive module for base SFA14K enclosure
H08C0800234NSS2	1600	8TB 7,200 RPM 12Gb/s SAS 4Kn drive module for SS8460/8462/8412 enclosure.
H01P0180224CH14	2	1.8TB 10K RPM 12Gb/s SAS 4Kn drive module for base SFA14K enclosure
H08C0800234NSS2	10	8TB 7,200 RPM 12Gb/s SAS 4Kn drive module for SS8460/8462/8412 enclosure.
Support		
SUP-BSOS-3	1	Basic Onsite Support; storage systems, storage servers, disk drives and accessories; 7x24 remote support; NBD parts and labor onsite; CRUs are customer replaceable; does not include SW support for apps or file systems; 3-yr pricing
SUP-BSOS-1	2	Basic Onsite Support; storage systems, storage servers, disk drives and accessories; 7x24 remote support; NBD parts and labor onsite; CRUs are customer replaceable; does not include SW support for apps or file systems; annual pricing
SUPSP-GSS-S-1	8	Premium Software Support, GRIDScaler Standard Server Software, price is per socket, provides support for years 2 and above, annual pricing
Services		
INS-SFA-FR10	1	Installation and Configuration of SFA block storage systems; up to 10 enclosures factory assembled rack; 30U, 42U and 45U racks only (50U racks require onsite assembly INS-SFA-OS10)
INS-SFA-OS10	1	Installation and Configuration of SFA block storage systems; up to 10 enclosures onsite assembly
INS-GRDS-4	1	Installation and configuration of GRIDScaler software; up to 4 Servers

4.3.1.2 CES (Protocol Nodes)

Product	Qty	Description
CES		
CR-LC-LC-10	6	LC-LC FC cable optical to storage, 10m
ADPT-CX2-SFPP	6	QSFP to SFP+ Cable Adapter - Converts 1X QSFP to SFP+ 10GbE port for ConnectX2 and ConnectX3 HCA
MFM1T02A-SR	6	SFP+ optical module for 10GBASE-SR; for use with ADPT-CX2-SFPP to convert SFP+ to short range fibre Ethernet
Software		
GSS-PN-BDL	3	GRIDScaler Standard Protocol Node Bundle, includes 2 GSS-S and 1 Dual socket server
Support		
SUP-BSOS-3	3	Basic Onsite Support; storage systems, storage servers, disk drives and accessories; 7x24 remote support; NBD parts and labor onsite; CRUs are customer replaceable; does not include SW support for apps or file systems; 3-yr pricing
SUP-BSOS-1	6	Basic Onsite Support; storage systems, storage servers, disk drives and accessories; 7x24 remote support; NBD parts and labor onsite; CRUs are customer replaceable; does not include SW support for apps or file systems; annual pricing
SUP-GSPN-BSOS-3	3	Support; GRIDScaler Protocol Node; includes server and software; Basic NBD onsite for hardware; price is per server, 3-year
SUP-GSPN-BSOS-1	3	Support; GRIDScaler Protocol Node; includes server and software; Basic NBD onsite for hardware; price is per server, annual
Services		
INS-GSPN	3	Installation and configuration of GRIDScaler Protocol Node Appliance; per instance; does not include client configuration

~ End of Tab 4 ~
~ *Overview of Storage Solutions/Price Offer* ~

5. For Off-Premise Solutions

Overview of Ability and Capability to Comply with Federal, State and Local Government Physical Security, Safeguarding and Security Mandates

Not applicable. DDN is not proposing an Off-Premise Solution.

~ End of Tab 5 ~
~ For Off-Premise Solutions. Overview of Ability and Capability to Comply with Federal, State and Local Government Physical Security, Safeguarding and Security Mandates ~

6. Terms of Payment and Payment Schedule

DDN has negotiated Terms & Conditions with seven SSERCA member Universities (FAU, FIU, FSU, UCF, UF, UM & USF) and can honor those terms for this ITN, and/or we will be pleased to open a discussion for new or updated terms with each purchasing organization, should that be preferred.

~ End of Tab 6 ~
~ Terms of Payment and Payment Schedule ~

7. Marketing, Supplemental or Non-Required Materials

Please refer to the following Appendices:

- Appendix A, About DDN, Key Statistics.
- Appendix B, DDN GRIDScaler14KE.

~ End of Tab 7 ~
~ Marketing, Supplemental or Non-Required Materials ~

Appendix A. About DDN, Key Statistics

A.1 Market Leaders in Big Data

- Largest Privately-Held Storage Company in the World (IDC).
- 30% sustained annual growth, very profitable.
- Significant Global Footprint: 20 Industries, 4 Continents, 50+ Countries.
- Customers: Over 1,200 Worldwide.
- Delivering the **world's fastest** systems from the **world's most scalable** building blocks.
- Powering 7 of the world's Top10 most powerful supercomputers.
- Key Market Segments:
  - Supercomputing: Over 2/3 of the Top100.
  - Financial Services: Powering 40% of leading global investment banks.
  - Rich Media: Over 600 HD workflow customers.
  - Oil and Gas: Over 1/2 of the largest sites.
  - Life Sciences: Over 1/3 of top sequencing centers.
  - Financial Services: Over 40% of leading global investment banks.
  - Manufacturing: Powering 30% of top aero and auto manufacturers.

A.2 DDN is The Leading Big Data Storage Supplier to Data-Intensive, Global Organizations

For over 17 years, DDN has designed, developed, deployed and optimized systems, software and storage solutions which enable Government Agencies, Enterprises, Service Providers, and Universities to generate more value and accelerate time to insight from their data and information, on premise and in the cloud.

Organizations leverage the power of DDN storage technology and the deep technical expertise of our team to capture, store, process, analyze, collaborate and distribute data, information and content at largest scale in the most efficient, reliable and cost-effective manner. Our customers include many of the world's leading government and research facilities, financial services firms and banks, healthcare and life science organizations, manufacturing and energy companies, in addition to web and cloud service providers.

DDN's sustained Vision and execution have made us the World's largest privately held data storage company. Our technological and market leadership comes from our long term investments in leading edge research and development, our relentless focus on solving our customers' end to end data and information management challenges, and the excellence of our employees around the globe, all relentlessly focused on delivering the highest levels of satisfaction to our customers.

Appendix A. About DDN, Key Statistics

We create and bring to market the most advanced and innovative technologies to solve our customers' complex Big Data challenges. Our technology centers are located in the US, France, Germany, Belarus, China, India and Japan, and our manufacturing facilities are based in the US.

DDN has been recognized by Gartner as the leading challenger to legacy storage vendors of general purpose storage systems. DDN has been named a leader in the new IDC MarketScape: Worldwide Object-Based Storage Vendor Assessment.

DDN WIDENS LEAD AS TOP STORAGE SUPPLIER FOR A GROWING NUMBER OF HPC CUSTOMERS

More organizations are turning to DDN to accelerate scientific discoveries and time to insight to solve many of the world's most complex data and analytics challenges.

For the second consecutive year, Intersect360 Research's HPC User Site Census shows DDN with the largest share of installed systems at HPC sites surveyed.

DDN is leading the market with massively scalable storage that outpaces the growth and performance requirements of Enterprise Big Data and enables HPC users to achieve EXAScale. When users migrate to DDN solutions, many realize a staggering 3X to 10X performance increase.

A.2.1 DDN History of Industry Leading Performance

DDN is a leader in the HPC industry, and it has earned this leadership position by supporting the world's largest file storage systems for more than a decade. Over 2/3rd of the world's 100 fastest supercomputers are powered by DDN according to the most recent rankings published by Top500.org. This is more than all other storage vendors combined.

In terms of product leadership, DDN ships, installs and supports more Lustre and GPFS filesystem solutions than any other vendor. Our success is due in part to our close working relationships with our filesystem partners. DDN is tightly aligned at the engineering level with Intel and its Lustre development team, as well as with the IBM GPFS development team.

DDN is recognized by the HPC industry with six HPCWire Reader's and Editor's Choice Awards at the SC15 in Austin, Texas. These latest awards bring the total count to 31 HPCWire lifetime wins, affirming that DDN is the most lauded HPC provider in the industry.

As a result, DDN customers enjoy the benefits of deploying the fewest number of systems, networking components, floor space, power and points of management to meet the requirements and grow as their needs evolve.

A.3 Industry Validation

IDC Analyze the Future	Leader in Object-Based Storage Market
Gartner	Leading Challenger in The 2014 Magic Quadrant
IDC Analyze the Future	World's Largest Privately-Held Storage Co.
Deloitte.	Fast500 Technology Company
Inc.	Inc. 500|5000 High-Growth Company
HPCwire	Best HPC Storage Platforms
FROST & SULLIVAN	Best Practice for Digital Media

A.4 A Thriving, Global Channel

A.5 Expert Validation

"*DDN sits in a prime position to help companies enter this new Web 2.0 reality with products that offer performance and scale for this class of data that traditional implementations can only dream about".* Steve Duplessie, Senior Analyst	ESG Enterprise Strategy Group
"We believe DDN is positioned incredibly well for this decade. Their product portfolio is solid as ever. These capabilities with the scalability, data center density and volumetric efficiency which DDN has always been known to serve as a leading foundation for enterprise file systems and data management software which can be deployed at big data scale".	TANEJA GROUP TECHNOLOGY ANALYSTS
"CTO's involved in developing throughput-intensive applications such as rich media, technical computing, high speed backup or applications with multiple large streams to a single source should become familiar with DataDirect Networks and its technology. Where bandwidth is king, DDN should be invited into the royal enclosure".	Wikibon
"Instead of pushing the envelope from the bottom up, as other manufacturers do, DataDirect Networks has taken the efficiency and performance advancements of their HPC technologies and applied them to a different problem: large, scalable, distributed file storage".	Storage Switzerland, LLC

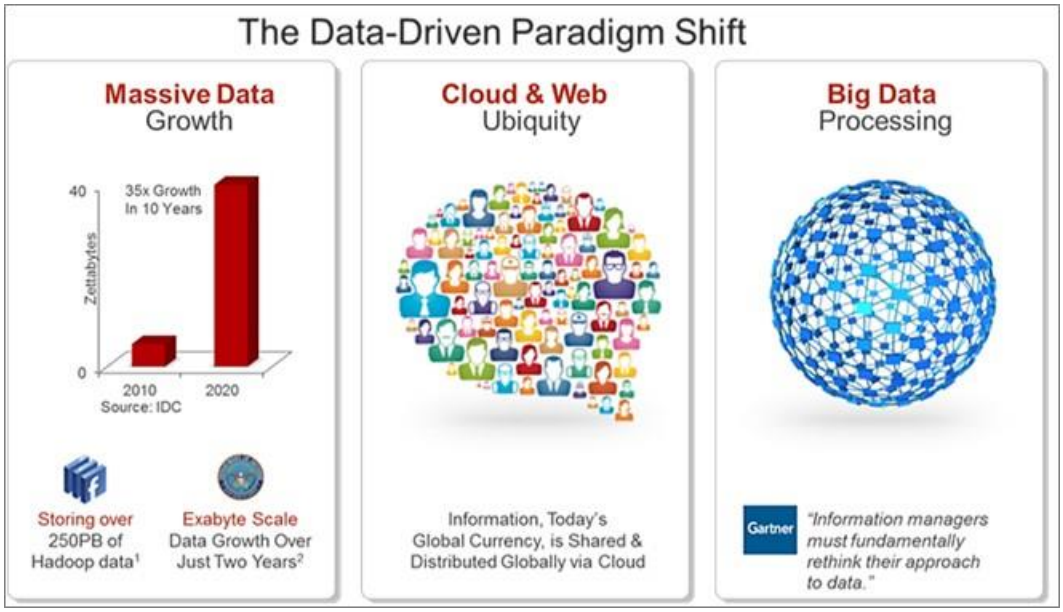
A.6 World Leading Deployments

A.7 The "Big" in Big Data: Performance, Scale and Application Acceleration

800% Faster Processing	1TB/s File System	World's Largest CCTV Installation
PayPal accelerates stream processing and fraud analytics by 8x **with DDN**, saves $100Ms.	Oakridge houses the **world's fastest** file system, to power the fastest supercomputer, is **powered by DDN**.	In the GCC, **DDN technology** is being used to record 16,000 Megapixel streams, 100PB, 5 Years.
PayPal	OAK RIDGE National Laboratory	

A.8 Big Data is Presenting New Challenges and Opportunities

For over 17 years, DDN has been mastering Big Data challenges before the term 'Big Data' was even invented. By supporting the requirements of the world's largest file storage systems and demanding applications for over a decade, DDN has developed both domain expertise and an unfair advantage in today's new data explosion. This advantage is driven by the observation that data storage and retrieval has fundamentally shifted from traditional transaction processing with predictable access patterns to unstructured file content with unpredictable, scalable access.



Appendix A. About DDN, Key Statistics

This unstructured file content includes:

- User generated content for social media.
- Rich media content.
- Video surveillance and intelligence.
- Seismic processing.
- Online and web archive.
- Computational simulation.
- Life sciences research.
- Sensors from smart grids.

This unstructured content is fast becoming the primary data type of the 21st century. It is overwhelming IT managers and becoming an increasingly serious problem.

According to the IDC Enterprise Disk Storage Consumption Model, traditional Unstructured Data and Content Depots' are projected to grow at a compound annual growth rate of almost 54.8% and 75.6% respectively, and will be the new drivers of growth in traditional data centers.

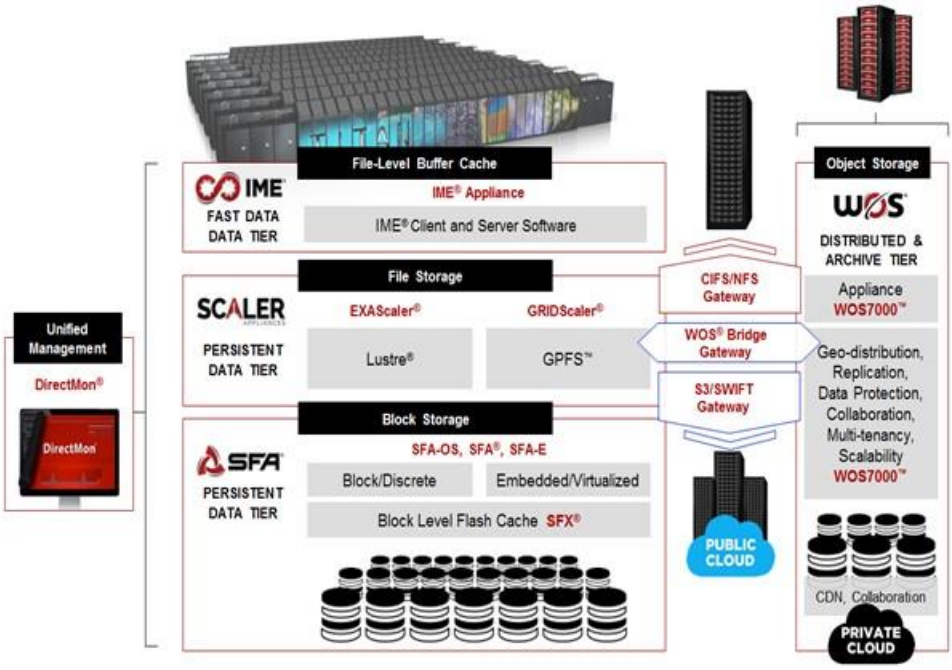
According to the Enterprise Strategy Group, *"…unstructured, file-based data will continue to grow at a blistering pace and IT will continue to struggle to manage it."*

Data center managers face the challenge of exploding data and performance demands while their headcount and budget remains fixed. In addition to the challenges of data growth, data center managers face the ongoing challenge to increase services while reducing costs.

To address these growing trends, DDN has fully aligned its corporate mission around engineering to deploy storage solutions that enable the simple, safe and efficient management of the world's most scalable Big Data environments. Because of this focus, DDN has secured a leadership position in the storage marketplace as a supplier to many of the world's most complex environments from HPC to Rich Media, Genomics to Video Surveillance, Web and Cloud Content, Intelligence and more. DDN customers depend on our enterprise storage technology that is designed to support not only production service levels but also budget levels - enabling simple scaling to petabyte levels.

A.9 Game Changing Big Data Product Portfolio

DDN's portfolio of products features the world's highest performing block storage arrays designed for the most data-intensive environments. Coupled with these array platforms are the world's most scalable file storage appliances to scale-out for performance and scale-deep for capacity. DDN also offers a HyperScale object-based storage solution that radically simplifies and improves how Big Data is stored, distributed, and accessed across multiple geographically dispersed sites.



~ End of Appendix A ~
~ About DDN, Key Statistics ~

Appendix B. DDN GRIDScaler14KE

(Section 4, Overview of Storage Solutions/Price Offer, sub-section 4.1.4 Refers)

1. Overview, GRIDScaler14KE

Delivering Game-changing Data Center Performance and Flexibility - Today and Tomorrow

Traditional NAS solutions were deeply customized for data sizes and patterns of 5+ years ago; they are fundamentally bottlenecked by network protocols and dependent on architectures that have no flexibility to avoid performance and capacity tradeoffs. Low density nodes with power hungry CPUs each house small numbers of drives, so that scaling equals sprawl and added complexity of managing many devices. Their fixed architectures inhibit modification; new technologies are incorporated very slowly - keeping them behind the innovation curve. Value added features are also licensed per node, astronomically increasing the cost of scaling. Today, DDN GRIDScaler parallel file system-based, Scale-Out NAS appliances deliver bottom line results faster and more efficiently by simply integrating mixed workloads, providing high speed data ingest and processing and ensuring long-term data retention and global collaboration.

The DDN GS14K is the industry's fastest and most scalable Enterprise Scale-Out NAS solution. Featuring the best of breed hardware and software components, GS14K appliances scale up or out, leveraging SSD-accelerated, converged and hyper-converged, parallel architectures to deliver industry-leading performance for financial services, manufacturing, energy, life sciences and web/cloud hosting workloads.

Cutting edge enterprises demand high-performance infrastructures to harness data growth and provide insight from data analytics. To keep pace, Enterprise NAS Solutions need to efficiently deliver high speed data ingest and processing, long-term data retention and global collaboration. With over 30x the performance per system and 3x the density, the GS14K delivers the simplicity of NAS with the speed of more advanced storage architectures. GS14K configurations start at under 100 TB and 3 GB/s of performance, scale to 32 GB/s in 4U, and to over 350 GB/s per rack. The appliance is configurable as all SSD, SSD accelerated or all HDD.

Appendix B. DDN GRIDScaler14KE

(Section 4, Overview of Storage Solutions/Price Offer, Sub-section 4.1.4 Refers)

The Benefits of Traditional Scale-Out NAS, Now With Performance for Data-Intensive Enterprise

Eliminates Traditional NAS Bottlenecks (SMB, NFS) with high-speed parallel client connectivity – up to 6 GB/s per client and optional Burst Buffer.
Open Architecture means faster availability of new technology - EDR InfiniBand, DDN Omni-Connect™, NVMe SSDs – and simpler integration with new software tools such as OpenStack SWIFT and Hadoop.
Eliminates sprawl with the industry's highest capacity per rack. By consolidating multiple data types for ease of access, the GS14K eliminates storage and data silos while reducing management cost, complexity and data risk.
Simplifies management by presenting a single, unified data view to users, administrators and applications across over any tier of storage including high performance, active archive, tape and cloud.
Decouples performance and capacity for complete cost control, better support and lower TCO through its ability to scale up or out. It ingests data at scale, reliably, with room to grow with inputs.

1.1 Rich Software Features

Scale-Out and Scale-Up
Add capacity and performance independently with the industry's densest NAS to reduce sprawl, simplify management and control cost – up to 30x the performance and 3x the density of traditional Enterprise Scale **-**Out NAS**.**

SSD and Flash Acceleration
All SSD, or SSD-Accelerated Metadata, SSD-Acceleration for Specific Application(s)**.**

- ReACT Caching optimizes performance for small and mixed IO workloads coalescing malformed writes in cache so only well-formed IO goes to spinning media.
- Storage Fusion Xcelerator® (SFX) Cache Acceleration extends ReACT® capabilities to tier(s) of SSD, pinning data or metadata, or dynamically warming cache based on file system or application hinting.

Integrated Software Stack
Integrated Appliance with single view for installation, configuration and administration.
Performance-optimized and extensively tested.

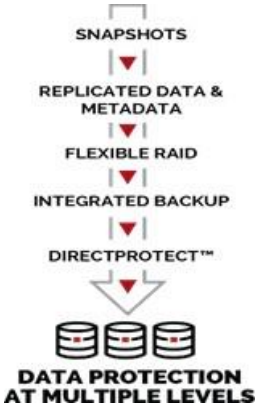
- DDN SFAOS.
- IBM Spectrum Scale 4.2 Express, Standard or Advanced Editions.
- SFAOS/Spectrum Scale integrated, installation, configuration and management tools.

Integrated Tiering
Automatically tier data across SSD, HDD and Tape; across Performance, Active Archive, Deep Archive, Collaboration Cloud, Content Distribution Network.

Appendix B. DDN GRIDScaler14KE

(Section 4, Overview of Storage Solutions/Price Offer, Sub-section 4.1.4 Refers)

Data Management and Protection
Snapshots, synchronous and asynchronous replication, asynchronous, error diagnosis while affected I/O operations continue and compression, protect file system performance with QoS**.**



Cloud Connectivity
OpenStack Swift; higher performance migration to WOS; integrated single namespace tiering to on premise and off site for collaboration**.**

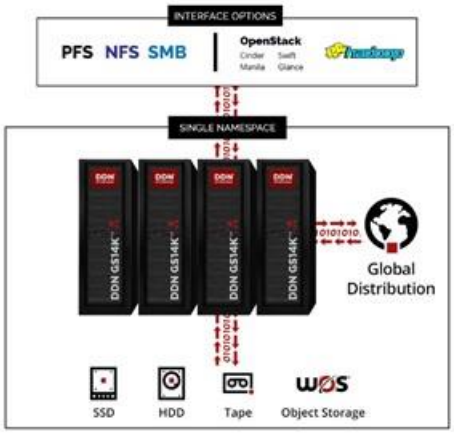
Integrated Data Analytics
Hadoop connector support.

Multi-Protocol Support
NFS, SMB, OpenStack Swift.

Data Security
Native encryption; secure erase, WORM.

1.2 Unique Data Federation Capabilities Over All Tiers of Storage

GS14K delivers end-to-end management with a single, unified view of data across high performance storage (SSD, HDD), active archive (Object), deep archive (Tape) and cloud, making it ideal for consolidating multiple data types for simple, fast access. Data is visible to end users, applications and administrators as though it is local, regardless of its location or what media type it is on. A powerful policy engine automatically migrates or replicates data for cost reduction with archive, distribution or collaboration with cloud, fast HDD access, or to SSD tiers for lowest latency applications.



Hybrid Architecture Improves TCO and Takes Advantage of New Technologies
Grow a GS14K appliance with all-SSD, SSD-accelerated or all HDD options. Mix and match the right storage media for your workloads and independently scale out or up to create the right sized building blocks for your environment with complete cost control. Start with a small system and grow performance and/or capacity for a data storage infrastructure that has fewer systems to manage, lower power, heating and cooling requirements and much a smaller data center footprint.

~ End of Appendix B ~
~ DDN GRIDScaler14KE
(Section 4, Overview of Storage Solutions/Price Offer, Sub-section 4.1.4 Refers)~

DDN STORAGE

9351 Deering Avenue, Chatsworth, CA 91311

Date	December 13, 2016
Contact Name	Lance Taylor
Company Name	FLR
Quote	FLR_ITN_CDS_PAYG_EXP_120136_MEM
Salesperson	Mark McClung
Salesperson email	mmcclung@ddn.com
Salesperson phone	512-415-1183
Installation city, country	Florida
Description	10 x 8TB Capacity Drives

PRODUCT	QTY	DESCRIPTION	PRICE (USD)
Drives			
H08C0800234NSS2	10	**80TB Raw / 64TB Usable** 8TB 7,200 RPM 12Gb/s SAS 4Kn drive module for SS8460/8462/8412 enclosure.	
Support			
SUP-BSOS-3	1	**Hardware Support (5 Years)** Basic Onsite Support; storage systems, storage servers, disk drives and accessories; 7x24 remote support; NBD parts and labor onsite; CRUs are customer replaceable; does not include SW support for apps or file systems; 3-yr pricing	
SUP-BSOS-1	2	Basic Onsite Support; storage systems, storage servers, disk drives and accessories; 7x24 remote support; NBD parts and labor onsite; CRUs are customer replaceable; does not include SW support for apps or file systems; annual pricing	
		GRAND TOTAL	**$7,999.95**

This DataDirect Networks Inc. ("DDN") quote is valid for 30 days from the date above; and subject to (i) the DDN Terms and Conditions of Sale; (ii) the terms and conditions of the DataDirect Networks Support Plans; (iii) shipping terms as ExWorks, Origin; and (iv) credit approval.

DDN STORAGE

9351 Deering Avenue, Chatsworth, CA 91311

Date	December 13, 2016
Contact Name	Lance Taylor
Company Name	FLR
Quote	FLR_ITN_CDS_EXT_1201316_MEM
Salesperson	Mark McClung
Salesperson email	mmcclung@ddn.com
Salesperson phone	512-415-1183
Installation city, country	Florida
Description	One x SFA14KX with with Twenty SS8462 Enclosures, Four NSD Server Nodes, 1600 8TB Capacity Drives, and Three Protocol Nodes

PRODUCT	QTY	DESCRIPTION	PRICE (USD)
Storage Systems			
		GS14KXE w/ 20 SS8462 Enclosures (Supports 1752 HDs)	
14KX72-EDR	1	SFA14KX power-fail safe active/active storage appliance with 72x internal 2.5" drive bays, 12x EDR IB ports, 4x system SSDs, 4x power supply modules and SFAOS license. Connect to enclosures via optical SAS.	
SS8462-SBOD	20	SS8462 84-slot 12Gb/s SAS/SATA HDD/SSD enclosure. Includes 2x I/O modules, redundant power supplies, power cables, rail kit for rack mounting and cable management arms.	
CBL-HMSHMS12O-3	30	12Gb/s HD mSAS to HD mSAS Optical cable, 3m	
CBL-HMSHMS12O-7	10	12Gb/s HD mSAS to HD mSAS Optical cable, 7m	
RK45-9900US-RL	3	45U Rack with 2x three phase 35A managed PDUs for USA 10kW max. Remotely managed outlets via Web, SNMP, Telnet. Remote on/off, power cycle and power sequencing.	
		NSD Server nodes	
SER3-1U-268C2S	4	1U Server; Dual 2.6GHz Intel E5-2640v3 8 core 20M Haswell, 32GB (+22 slots), 2x 300GB 10K RPM SAS (+6 slots), 4x1GigE, 2x HH/HL x16 + 1 HH/HL x8 PCIe slots, RAID Contr, iDRAC8 Ent, rail w/cbl mgmt. No OS. RHEL subs req'd if RHEL inst.	
SER3-32G-UP	4	Two (2x) 16 GB RDIMM memory upgrade/extension for SER3 servers (16GB RDIMM 2133MHz), dual rank; Note: max MEM depending on server model.	
CARD100IBGE	8	ConnectX-4 VPI adapter card, dual-port QSFP, EDR IB (100Gb/s) / 100GigE, PCIe 3.0 x16 8GT/s, tall bracket	
ADPT-CX2-SFPP	8	QSFP to SFP+ Cable Adapter - Converts 1X QSFP to SFP+ 10GbE port for ConnectX2 and ConnectX3 HCA	
MFM1T02A-SR	8	SFP+ optical module for 10GBASE-SR; for use with ADPT-CX2-SFPP to convert SFP+ to short range fibre Ethernet	
CR-LC-LC-10	8	LC-LC FC cable optical to storage, 10m	
CBL-100IBGE-005	8	Active Fibre Cable for IB or Ethernet, 4X QSFP, 100Gb/s, 5m	
Drives			
		12.8PB Raw / 10.2PB Usable	
H08C0800234NSS2	1600	8TB 7,200 RPM 12Gb/s SAS 4Kn drive module for SS8460/8462/8412 enclosure.	
		Hot Spares	
H08C0800234NSS2	10	8TB 7,200 RPM 12Gb/s SAS 4Kn drive module for SS8460/8462/8412 enclosure.	
Other Equipment			
GSS-PN-BDL	3	GRIDScaler Standard Protocol Node Bundle, includes 2 GSS-S and 1 Dual socket server	
Software			
		Protocol Node Bundle	
GSS-S	8	GRIDScaler Standard Server per socket License including initial year support	
		Protocol Node Parts	
CR-LC-LC-10	6	LC-LC FC cable optical to storage, 10m	
ADPT-CX2-SFPP	6	QSFP to SFP+ Cable Adapter - Converts 1X QSFP to SFP+ 10GbE port for ConnectX2 and ConnectX3 HCA	
MFM1T02A-SR	6	SFP+ optical module for 10GBASE-SR; for use with ADPT-CX2-SFPP to convert SFP+ to short range fibre Ethernet	
Support			
		Hardware Support (5 Years)	
SUP-BSOS-3	1	Basic Onsite Support; storage systems, storage servers, disk drives and accessories; 7x24 remote support; NBD parts and labor onsite; CRUs are customer replaceable; does not include SW support for apps or file systems; 3-yr pricing	
SUP-BSOS-1	2	Basic Onsite Support; storage systems, storage servers, disk drives and accessories; 7x24 remote support; NBD parts and labor onsite; CRUs are customer replaceable; does not include SW support for apps or file systems; annual pricing	
		Software Support (Years 2-5)	
SUPSP-GSS-S-1	32	Premium Software Support, GRIDScaler Standard Server Software, price is per socket, provides support for years 2 and above, annual pricing	
SUP-GSPN-BSOS-3	3	Support; GRIDScaler Protocol Node; includes server and software; Basic NBD onsite for hardware; price is per server, 3-year	
SUP-GSPN-BSOS-1	3	Support; GRIDScaler Protocol Node; includes server and software; Basic NBD onsite for hardware; price is per server, annual	
Services			
		Installation & Configuration	
INS-SFA-FR10	2	Installation and Configuration of SFA block storage systems; up to 10 enclosures factory assembled rack; 30U, 42U and 45U racks only (50U racks require onsite assembly INS-SFA-OS10)	
INS-GRDS-4	1	Installation and configuration of GRIDScaler software; up to 4 Servers	
		Installation & Configuration: Protocol Node	
INS-GSPN	3	Installation and configuration of GRIDScaler Protocol Node Appliance; per instance; does not include client configuration	
		GRAND TOTAL	**$1,279,991.38**

This DataDirect Networks Inc. ("DDN") quote is valid for 30 days from the date above; and subject to (i) the DDN Terms and Conditions of Sale; (ii) the terms and conditions of the DataDirect Networks Support Plans; (iii) shipping terms as ExWorks, Origin; and (iv) credit approval.

DDN STORAGE

9351 Deering Avenue, Chatsworth, CA 91311

Date	December 13, 2016
Contact Name	Lance Taylor
Company Name	FLR
Quote	FLR_ITN_CDS_EXT_PAYG_121316_MEM
Salesperson	Mark McClung
Salesperson email	mmcclung@ddn.com
Salesperson phone	512-415-1183
Installation city, country	Florida
Description	One x SFA14KX with with Twenty SS8462 Enclosures, Four NSD Server Nodes, 1600 8TB Capacity Drives, and Three Protocol Nodes

PRODUCT	QTY	DESCRIPTION	PRICE (USD)
Storage Systems			
		GS14KXE w/ 20 SS8462 Enclosures (Supports 1752 HDs)	
14KX72-EDR	1	SFA14KX power-fail safe active/active storage appliance with 72x internal 2.5" drive bays, 12x EDR IB ports, 4x system SSDs, 4x power supply modules and SFAOS license. Connect to enclosures via optical SAS.	
SS8462-SBOD	20	SS8462 84-slot 12Gb/s SAS/SATA HDD/SSD enclosure. Includes 2x I/O modules, redundant power supplies, power cables, rail kit for rack mounting and cable management arms.	
CBL-HMSHMS12O-3	30	12Gb/s HD mSAS to HD mSAS Optical cable, 3m	
CBL-HMSHMS12O-7	10	12Gb/s HD mSAS to HD mSAS Optical cable, 7m	
RK45-9900US-RL	3	45U Rack with 2x three phase 35A managed PDUs for USA 10kW max. Remotely managed outlets via Web, SNMP, Telnet. Remote on/off, power cycle and power sequencing.	
		NSD Server nodes	
SER3-1U-268C2S	4	1U Server; Dual 2.6GHz Intel E5-2640v3 8 core 20M Haswell, 32GB (+22 slots), 2x 300GB 10K RPM SAS (+6 slots), 4x1GigE, 2x HH/HL x16 + 1 HH/HL x8 PCIe slots, RAID Contr, iDRAC8 Ent, rail w/cbl mgmt. No OS. RHEL subs req'd if RHEL inst.	
SER3-32G-UP	4	Two (2x) 16 GB RDIMM memory upgrade/extension for SER3 servers (16GB RDIMM 2133MHz), dual rank; Note: max MEM depending on server model.	
CARD100IBGE	8	ConnectX-4 VPI adapter card, dual-port QSFP, EDR IB (100Gb/s) / 100GigE, PCIe 3.0 x16 8GT/s, tall bracket	
ADPT-CX2-SFPP	8	QSFP to SFP+ Cable Adapter - Converts 1X QSFP to SFP+ 10GbE port for ConnectX2 and ConnectX3 HCA	
MFM1T02A-SR	8	SFP+ optical module for 10GBASE-SR; for use with ADPT-CX2-SFPP to convert SFP+ to short range fibre Ethernet	
CR-LC-LC-10	8	LC-LC FC cable optical to storage, 10m	
CBL-100IBGE-005	8	Active Fibre Cable for IB or Ethernet, 4X QSFP, 100Gb/s, 5m	
Drives			
		3.04PB Raw / 2.432PB Usable	
H08C0800234NSS2	380	8TB 7,200 RPM 12Gb/s SAS 4Kn drive module for SS8460/8462/8412 enclosure.	
		Hot Spares	
H08C0800234NSS2	10	8TB 7,200 RPM 12Gb/s SAS 4Kn drive module for SS8460/8462/8412 enclosure.	
Other Equipment			
		Protocol Node Bundle	
GSS-PN-BDL	3	GRIDScaler Standard Protocol Node Bundle, includes 2 GSS-S and 1 Dual socket server	
		Protocol Node parts	
CR-LC-LC-10	6	LC-LC FC cable optical to storage, 10m	
ADPT-CX2-SFPP	6	QSFP to SFP+ Cable Adapter - Converts 1X QSFP to SFP+ 10GbE port for ConnectX2 and ConnectX3 HCA	
MFM1T02A-SR	6	SFP+ optical module for 10GBASE-SR; for use with ADPT-CX2-SFPP to convert SFP+ to short range fibre Ethernet	
Software			
GSS-S	8	GRIDScaler Standard Server per socket License including initial year support	
Support			
		Hardware Support (5 Years)	
SUP-BSOS-3	1	Basic Onsite Support; storage systems, storage servers, disk drives and accessories; 7x24 remote support; NBD parts and labor onsite; CRUs are customer replaceable; does not include SW support for apps or file systems; 3-yr pricing	
SUP-BSOS-1	2	Basic Onsite Support; storage systems, storage servers, disk drives and accessories; 7x24 remote support; NBD parts and labor onsite; CRUs are customer replaceable; does not include SW support for apps or file systems; annual pricing	
		Software Support (Years 2-5)	
SUPSP-GSS-S-1	32	Premium Software Support, GRIDScaler Standard Server Software, price is per socket, provides support for years 2 and above, annual pricing	
SUP-GSPN-BSOS-3	3	Support; GRIDScaler Protocol Node; includes server and software; Basic NBD onsite for hardware; price is per server, 3-year	
SUP-GSPN-BSOS-1	3	Support; GRIDScaler Protocol Node; includes server and software; Basic NBD onsite for hardware; price is per server, annual	
Services			
		Installation & Configuration	
INS-SFA-FR10	2	Installation and Configuration of SFA block storage systems; up to 10 enclosures factory assembled rack; 30U, 42U and 45U racks only (50U racks require onsite assembly INS-SFA-OS10)	
INS-GRDS-4	1	Installation and configuration of GRIDScaler software; up to 4 Servers	
		Installation & Configuration: Protocol Node	
INS-GSPN	3	Installation and configuration of GRIDScaler Protocol Node Appliance; per instance; does not include client configuration	
		GRAND TOTAL	**$303,997.95**

This DataDirect Networks Inc. ("DDN") quote is valid for 30 days from the date above; and subject to (i) the DDN Terms and Conditions of Sale; (ii) the terms and conditions of the DataDirect Networks Support Plans; (iii) shipping terms as ExWorks, Origin; and (iv) credit approval.