

PATENT ASSIGNMENT COVER SHEET

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 Stylesheet Version v1.2

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SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT
CONVEYING PARTY DATA	
Name	Execution Date
PS12 LUXCO S.A.R.L.	11/07/2014
RECEIVING PARTY DATA	
Name:	LONGITUDE ENTERPRISE FLASH S.A.R.L.
Street Address:	208, VAL DES BONS MALADES
City:	LUXEMBOURG
State/Country:	LUXEMBOURG
Postal Code:	L-2121
PROPERTY NUMBERS Total: 10	
Property Type	Number
Application Number:	14569021
Application Number:	14631648
Application Number:	14675521
Application Number:	14793245
Application Number:	14794483
Application Number:	14822351
Application Number:	14834157
Application Number:	14841323
Application Number:	14933806
Application Number:	14962621
CORRESPONDENCE DATA	
Fax Number:	(801)578-6999
<i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i>	
Phone:	(801) 328-3131
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ATTORNEY DOCKET NUMBER:	54361/VARIOUS

PATENT

NAME OF SUBMITTER:	JOSEPH J. HAWKINS
SIGNATURE:	/Joseph J. Hawkins/
DATE SIGNED:	03/03/2016
Total Attachments: 24 source=2016_03_03_Assignment_2#page1.tif source=2016_03_03_Assignment_2#page2.tif source=2016_03_03_Assignment_2#page3.tif source=2016_03_03_Assignment_2#page4.tif source=2016_03_03_Assignment_2#page5.tif source=2016_03_03_Assignment_2#page6.tif source=2016_03_03_Assignment_2#page7.tif source=2016_03_03_Assignment_2#page8.tif source=2016_03_03_Assignment_2#page9.tif source=2016_03_03_Assignment_2#page10.tif source=2016_03_03_Assignment_2#page11.tif source=2016_03_03_Assignment_2#page12.tif source=2016_03_03_Assignment_2#page13.tif source=2016_03_03_Assignment_2#page14.tif source=2016_03_03_Assignment_2#page15.tif source=2016_03_03_Assignment_2#page16.tif source=2016_03_03_Assignment_2#page17.tif source=2016_03_03_Assignment_2#page18.tif source=2016_03_03_Assignment_2#page19.tif source=2016_03_03_Assignment_2#page20.tif source=2016_03_03_Assignment_2#page21.tif source=2016_03_03_Assignment_2#page22.tif source=2016_03_03_Assignment_2#page23.tif source=2016_03_03_Assignment_2#page24.tif	

ASSIGNMENT AND AGREEMENT

THIS ASSIGNMENT AND AGREEMENT (this "**Agreement**"), is entered into by and between **PS12 Luxco S.à.r.l.** having the principal place of business at 208, Val des Bons Malades, L-2121, Luxembourg ("**Assignor**"), and **Longitude Enterprise Flash S.à.r.l.**, having the principal place of business at 208, Val des Bons Malades, L-2121, Luxembourg ("**Assignee**").

For good and valuable consideration, the receipt of which is hereby acknowledged, **Assignor** does hereby sell, assign, transfer and convey unto **Assignee**, its successors, assigns or its designees and legal representatives, **Assignor's** entire right, title and interest that exists today and may exist in the future in and to any and all of the patents and applications listed in the attached Exhibit 1 ("**Patents**"), the inventions described therein, and any other governmental grants or issuances throughout the world which directly or indirectly claim priority from **Patents** or for which any of the **Patents** directly or indirectly forms a basis for priority, including but not limited to: (1) any patents, registrations, or certificates of invention that have issued or may issue in the future on any patent applications listed in Exhibit 1 attached hereto; (2) any and all counterpart United States, international, and foreign patents, applications, utility models, industrial design protection, design patent protection, and certificates of invention based upon, covering, or otherwise related to any portion of the foregoing; (3) any expired or abandoned applications or patents based upon, covering, or otherwise related to any portion of the foregoing; (4) patents or other governmental rights that may be granted in the future based upon, covering, or otherwise related to any portion of the foregoing; (5) any continuations, continuations-in-part, divisionals, provisionals, renewals, and extensions of any of the foregoing; (6) all reissues and reexamination certificates of any of the foregoing, and (7) all applications or patents subject to or resulting from any pending inter-partes review, supplemental examination, post-grant review, derivation proceedings, or other review proceeding of any of the foregoing (the foregoing are collectively referred to herein as the "**Patent Rights**").

Assignor further agrees to and hereby does sell, assign, transfer and convey unto **Assignee** all rights: (i) in and to causes of action and enforcement rights for the

Patent Rights (whether known or unknown or whether currently pending, filed, or otherwise), including, without limitation, all rights to pursue damages, injunctive relief and other remedies for past, current and future infringement of the **Patent Rights and to license the Patent Rights**; (ii) to apply in any or all countries of the world for patents, certificates of invention or other governmental grants for the **Patent Rights**, including, without limitation, to invoke and claim for any application for patent or other form of protection for said **Patents** filed by it or them, the benefit of the right of priority provided by under the Paris Convention for the Protection of Industrial Property, the International Patent Cooperation Treaty, or any other convention, treaty, agreement or understanding and to invoke and claim such right of priority without further written or oral authorization from **Assignor**; (iii) to assert the attorney/client and/or solicitor/client privilege associated with the prosecution of the **Patent Rights and/or work product immunity associated with enforcement of the Patent Rights**. **Assignor** further agrees to assert the attorney/client and/or solicitor/client privilege and/or work product immunity to the fullest extent of the law to promote enforcement of the patents; (iv) to collect royalties or other payments under or on account of the Patent Rights; and (v) of cooperation assigned or granted by any third party with respect to the Patent Rights. **Assignor** also hereby authorizes the respective patent office or governmental agency in each jurisdiction to issue any and all patents or certificates of invention which may be granted upon any of the **Patent Rights** in the name of the **Assignee**, as the assignee to the entire interest therein.

Assignor agrees that, when requested, **Assignor** without any further consideration will (i) sign all papers, cause all rightful oaths to be taken, and do or cause to be done all acts which may be necessary, desirable or convenient for securing, maintaining, and enforcing said **Patents** in any and all countries and for vesting title thereto in said **Assignee**, its successors, assigns and legal representatives or nominees.

Assignor hereby consents that a copy of this assignment shall be deemed a full legal and formal equivalent of any assignment, consent to file or like document which may be required in any country for any purpose and more particularly in proof of the right of the said **Assignee** or nominee to claim the aforesaid benefit of the right of priority provided by: (a) the International Convention for the protection of Industrial Property, as amended, or by any convention which may henceforth be substituted for it; and (b) the Patent Cooperation Treaty, as amended, or by any treaty which may henceforth be substituted for it.

Assignor covenants with said **Assignee**, its successors and assigns and legal representatives that the rights and property herein conveyed are free and clear of any encumbrance, and that **Assignor** owns and has full right to convey the same as herein expressed.

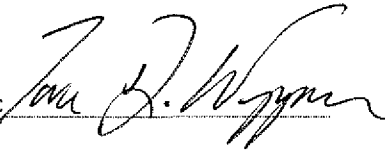
Should any part of this Agreement be rendered or declared invalid by a court of competent jurisdiction, such invalidation of such part or portion of this Agreement should not invalidate the remaining portions thereof, and the remaining portions shall remain in full force and effect.

[signature page follows]

IN WITNESS WHEREOF, the **Assignor** and the **Assignee** have caused this Assignment and Agreement to be duly executed below by their duly authorized representatives on **7th day of November, 2014**.

Assignor

PS12 Luxco S.à.r.l.,
208, Val des Bons Malades
L-2121, Luxembourg
Grand Duchy of Luxembourg

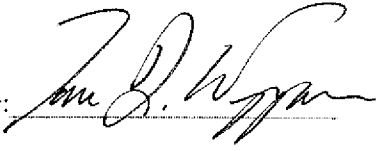
By: 

Name: Tom Wippman

Title: Manager A

Assignee

Longitude Enterprise Flash S.à.r.l.,
208, Val des Bons Malades
L-2121, Luxembourg
Grand Duchy of Luxembourg

By: 

Name: Tom Wippman

Title: Manager A

Exhibit I
ASSIGNED PATENTS

country	title	status	ser_no	filing_date	pub_no	pub_date	pat_no	issue_date
CA	ASMF MANAGING DATA IN A STORAGE DEVICE WITH AN EMPTY DATA TOKEN DIRECTIVE	Pending	2672035	6/5/2009				
CA	ASMF SOLID-STATE STORAGE AS CACHE FOR HIGH-CAPACITY, NON-VOLATILE STORAGE	Abandoned	2672100	6/5/2009				
EPO	REMOTE DIRECT MEMORY ACCESS TO A SOLID-STATE STORAGE DEVICE	Abandoned	7853274.4	7/6/2009				
EP	ASMF SERVICING OBJECT REQUESTS WITHIN A STORAGE CONTROLLER	Abandoned	7865334.2	7/6/2009	EP-A-2108143	10/14/2009		
EP	ASMF STORAGE SPACE RECOVERY IN SOLID-STATE STORAGE	Issued	7865335.9	7/6/2009	WO2009070800	6/12/2008	2100214	10/30/2013
EPO	ASMF MANAGING DATA IN A STORAGE DEVICE WITH AN EMPTY DATA TOKEN DIRECTIVE	Abandoned	7865345.8	7/6/2009				
EPO	ASMF DATA STORAGE USING PROGRESSIVE RAID	Abandoned	7865346.6	7/6/2009	EP-A-2126679	12/2/2009		
EP	ASMF SOLID-STATE STORAGE AS CACHE FOR HIGH-CAPACITY, NON-VOLATILE STORAGE	Abandoned	7867661.6	7/6/2009				
EPO	ASMF AN IN-SERVER STORAGE AREA NETWORK	Abandoned	7869018.7	7/6/2009	EP-A-2109812	10/21/2009		
EPO	ASMF A FRONT-END, DISTRIBUTED RAID	Abandoned	7869020.3	7/6/2009				
EPO	ASMF A SHARED, FRONT-END, DISTRIBUTED RAID	Abandoned	7873664.2	7/6/2009	EP-A-2126698	12/2/2009		
EPO	ASMF EFFICIENT MAPPING OF VIRTUAL AND PHYSICAL ADDRESSES	Abandoned	9729887.1	11/4/2010	2286326	1/26/2011		
EPO	ASMF COORDINATING STORAGE REQUESTS IN A MULTI-PROCESSOR/MULTI-THREAD ENVIRONMENT	Abandoned	9730535.3	11/4/2010				

EP	ASMF CONVERTING A STORAGE REQUEST INTO AN APPEND DATA STORAGE COMMAND	Office Action	9731243.3	11/4/2010	2271978	12/15/2010
HK	ASMF STORAGE SPACE RECOVERY IN SOLID-STATE STORAGE; GC	Pending	10102629.3	3/12/2010	1136058	6/18/2010
HK	ASMF STORAGE SPACE RECOVERY IN SOLID-STATE STORAGE	Pending	10102630	3/12/2010		
HK	ASMF SERVICING OBJECT REQUESTS WITHIN A STORAGE CONTROLLER	Abandoned	10103632.5	4/14/2010	HK1135401	6/4/2010
HK	ASMF SERVICING OBJECT REQUESTS WITHIN A STORAGE CONTROLLER	Abandoned	10103633.5	4/14/2010	HK1135402	6/4/2010
HK	ASMF AN IN- SERVER STORAGE AREA NETWORK	Abandoned	10103636.2	4/14/2010	HK1135403	6/4/2010
HK	ASMF AN IN- SERVER STORAGE AREA NETWORK	Abandoned	10103637.1	4/14/2010	HK1135404	6/4/2010
HK	ASMF SOLID-STATE STORAGE AS CACHE FOR HIGH- CAPACITY, NON- VOLATILE STORAGE	Abandoned	10103934.1	4/21/2010		
HK	ASMF SOLID-STATE STORAGE AS CACHE FOR HIGH- CAPACITY, NON- VOLATILE STORAGE	Abandoned	10103935	4/21/2010		
HK	ASMF MANAGING DATA IN A STORAGE DEVICE WITH AN EMPTY DATA TOKEN	Abandoned	10104585.1	5/11/2010		
HK	ASMF DATA STORAGE USING PROGRESSIVE RAID	Abandoned	10104724.3	5/14/2010	7865347	7/16/2010
HK	ASMF DATA STORAGE USING PROGRESSIVE RAID	Abandoned	10104725.2	5/14/2010	1137071	7/16/2010
HK	ASMF A SHARED, FRONT-END, DISTRIBUTED RAID	Abandoned	10104726.1	5/14/2010	1138082	8/13/2010
HK	REMOTE DIRECT MEMORY ACCESS TO A SOLID-STATE STORAGE DEVICE	Abandoned	10104727	5/14/2010		
HK	ASMF MANAGING DATA FROM A REQUESTING DEVICE WITH AN EMPTY DATA TOKEN	Abandoned	10106128	6/21/2010		

HK	ASMF MANAGING DATA IN A STORAGE DEVICE WITH AN EMPTY DATA TOKEN DIRECTIVE	Abandoned	10106134.2	6/22/2010				
HK	ASMF MANAGING COMMANDS OF SOLID-STATE STORAGE USING BANK INTERLEAVE	Abandoned	10107616.7	8/10/2010				
HK	REMOTE DIRECT MEMORY ACCESS TO A SOLID-STATE STORAGE DEVICE	Abandoned	10108055.3	8/24/2010				
HK	ASMF DATA STORAGE USING PROGRESSIVE RAID	Abandoned	10109328.2	9/29/2010	HK1142971	12/17/2010		
HK	ASMF A DEVICE SHARED BETWEEN MULTIPLE INDEPENDENT HOSTS	Abandoned	10109329.1	9/29/2010				
HK	ASMF A SHARED, FRONT-END, DISTRIBUTED RAID	Abandoned	10109330.8	9/29/2010	HK1142972	12/7/2010		
HK	ASMF MANAGING DATA USING A DATA PIPELINE	Abandoned	10110541.1	11/12/2010	HK1144213	2/2/2011		
US	ASMF MANAGING DATA USING A DATA PIPELINE	Issued	11952091	12/6/2007	US 2008-0141043	6/12/2008	8266496	9/11/2012
US	ASMF MANAGING COMMANDS OF SOLID-STATE STORAGE USING BANK INTERLEAVE	Pending	11952095	12/6/2007	2.01E+10	5/18/2008		
US	ASMF SERVICING OBJECT REQUESTS WITHIN A STORAGE CONTROLLER	Abandoned	11952098	12/6/2007	US 2008-0140724	6/12/2008		
US	ASMF STORAGE SPACE RECOVERY IN SOLID-STATE STORAGE, GC	Issued	11952101	12/6/2007	3.01E+10	7/31/2008	8402201	3/19/2013
US	ASMF AN IN-SERVER STORAGE AREA NETWORK TRIM ASMF	Issued	11952106	12/6/2007	US 2008-0140932 A1	6/12/2008	8495292	7/23/2013
US	MANAGING DATA FROM A REQUESTING DEVICE WITH AN EMPTY DATA TOKEN DIRECTIVE	Issued	11952109	12/6/2007	2.01E+10	6/12/2008	8296337	10/23/2012
US	TRIM ASMF MANAGING DATA IN A STORAGE DEVICE WITH AN EMPTY DATA	Issued	11952113	12/6/2007	3.01E+10	6/12/2008	8261005	9/4/2012
US	TOKEN DIRECTIVE ASMF DATA STORAGE USING PROGRESSIVE RAID	Issued	11952115	12/6/2007	US 2008-0168304 A1	7/10/2008	8015480	9/6/2011
US	ASMF A FRONT-END, DISTRIBUTED RAID	Issued	11952116	12/6/2007	2.01E+10	10/16/2008	8019940	9/13/2011

US	Composite Backplane - Abbrev title	Expired	11952118	12/6/2007	US 2008-0225474 A1	9/18/2008	7713068	5/11/2010
US	Module Pairings - abbrev title	Issued	11952119	12/6/2007	US 2008-0137284 A1	6/12/2008	7778020	8/17/2010
US	ASMF A SHARED, FRONT-END, DISTRIBUTED RAID ASMF A DEVICE SHARED BETWEEN MULTIPLE INDEPENDENT HOSTS	Issued	11952120	12/6/2007	US 2008-0256292 A1	10/16/2008	7934055	4/26/2011
US	ASMF SOLID-STATE STORAGE AS CACHE FOR HIGH-CAPACITY, NON-VOLATILE STORAGE	Pending	11952121	12/6/2007	2.01E+10	7/31/2008		
US	REMOTE DIRECT MEMORY ACCESS TO A SOLID-STATE STORAGE DEVICE	Issued	11952123	12/6/2007			8019938	9/13/2011
US	ASMF A RECONFIGURABLE BASEBOARD MANAGEMENT CONTROLLER	Abandoned	11952124	12/6/2007	20080313364 A1	12/18/2008		
US	No Gap in Protection	Issued	12001065	12/6/2007	US 2008-0313312 A1	12/18/2008	8417774	4/9/2013
US	ASMF VALIDATING THAT A CORRECT DATA SEGMENT IS READ FROM A DATA STORAGE DEVICE	Issued	12098427	4/5/2008	US 2009-0150744 A1	6/11/2009	8316277	11/20/2012
US	ASMF CONVERTING A STORAGE REQUEST INTO AN APPEND DATA STORAGE COMMAND	Issued	12098431	4/6/2008	US 2010-0031000 A1	2/4/2010	8161353	4/17/2012
US	ASMF EFFICIENT MAPPING OF VIRTUAL AND PHYSICAL ADDRESSES	Issued	12098433	4/6/2008	US 2009-0150605 A1	6/11/2009	8151082	4/3/2012
US	ASMF COORDINATING STORAGE REQUESTS IN A MULTI-PROCESSOR/MULTI-THREAD ENVIRONMENT	Issued	12098434	4/6/2008	2.01E+10	6/11/2009	8195912	6/5/2012
US	ASMF STORAGE SPACE RECOVERY IN SOLID-STATE STORAGE, GC, groomer	Issued	12098435	4/5/2008	2.01E+10	9/3/2009	7835236	11/16/2010
US	ASMF data block usage information synchronization for a non-volatile storage volume	Office Action	12273532	11/18/2008	2.01E+10	5/14/2009	8074011	12/6/2013
US	ASMF REDUNDANT WRITE CACHING	Issued	12711113	2/23/2010	2.01E+10	8/19/2010		
US			13847952	7/30/2010	US-2011-0022801	1/27/2011	8706968	4/22/2014

US	Graceful Cache Degrade ASMF COORDINATING STORAGE REQUESTS IN A MULTI- PROCESSOR/MULTI- THREAD ENVIRONMENT	Issued	12885285	9/17/2010	US 2011- 0047437 A1	2/24/2011	8448134	5/14/2013
US	ASMF BIASING DATA IN A SOLID- STATE STORAGE DEVICE	Issued	12900336	10/7/2010	20110029496 A1	2/3/2011	8046500	10/25/2011
US	ASMF A SHARED, FRONT-END, DISTRIBUTED RAID	Issued	12981394	12/29/2010	US 2011- 0157992 A1	6/30/2011	8189407	5/29/2012
US	ASMF A SHARED, FRONT-END, DISTRIBUTED RAID	Abandoned	13053021	3/21/2011				
US	ASMF DESTAGING CACHED DATA	Issued	13075000	3/29/2011	US 2011- 0179225 A1	7/21/2011	8412904	4/2/2013
US	TRIM ASMF MANAGING DATA FROM A REQUESTING DEVICE WITH AN EMPTY DATA TOKEN DIRECTIVE	Pending	13088211	4/15/2011	2.01E+10	10/20/2011		
US	ASMF SERVICING OBJECT REQUESTS WITHIN A STORAGE CONTROLLER	Abandoned	13118237	5/27/2011	2.01E+10	10/13/2011		
US	ASMF DATA STORAGE USING PROGRESSIVE RAID	Abandoned	13174449	6/30/2011	US 2011- 0258512 A1	10/20/2011		
US	ASMF A FRONT- END, DISTRIBUTED RAID	Issued	13182315	7/13/2011	2.01E+10	7/12/2012	8412979	4/2/2013
US	ASMF SOLID-STATE STORAGE AS CACHE FOR HIGH- CAPACITY, NON- VOLATILE STORAGE	Issued	13204436	8/5/2011	2.01E+10	12/1/2011	8214591	7/3/2012
US	ASMF REFERENCING DATA BLOCK USAGE INFORMATION BY WAY OF AN INTERFACE	Issued	13204551	8/5/2011	2.01E+10	11/24/2011	8285927	10/9/2012
US	ASMF COORDINATING STORAGE REQUESTS IN A MULTI- PROCESSOR/MULTI- THREAD ENVIRONMENT	Abandoned	13227088	9/7/2011	2.01E+10	3/7/2013		
US	ASMF STORAGE SPACE RECOVERY IN SOLID-STATE STORAGE, GC	Issued	13235114	9/16/2011	20120005443 A1	1/5/2012	8205015	6/19/2012
US	groomer APPARATUS, SYSTEM, AND METHOD FOR MANAGING	Pending	13296834	11/15/2011	2.01E+10	3/8/2012		
US		Pending	13357465	1/24/2012	US20120124294- A1	5/17/2012		

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	ASMF VALIDATING THAT A CORRECT DATA SEGMENT IS READ FROM A DATA STORAGE DEVICE							
US	ASMF COORDINATING STORAGE REQUESTS IN A MULTI- PROCESSOR/MULTI- THREAD ENVIRONMENT	Issued	13442638	4/9/2012	US-2012- 0203980	8/9/2012	8392798	3/5/2013
US	ASMF BIASING DATA IN A SOLID- STATE STORAGE DEVICE	Pending	13456119	4/25/2012	2.01E+10	8/16/2012		
US	Apparatus, System, and Method for Efficient Mapping of Virtual and Physical Addresses	Issued	13461628	5/1/2012	US-2012- 0215961	8/23/2012	8482993	7/9/2013
US	STORAGE SYSTEM WITH FRONT-END CONTROLLER	Abandoned	13480791	5/25/2012	3.01E+10	9/13/2012		
US	PTRIM, APPARATUS, SYSTEM, AND METHOD FOR MANAGING DATA IN A STORAGE DEVICE WITH AN EMPTY DATA TOKEN DIRECTIVE	Issued	13488301	6/4/2012	2.01E+10	3/14/2013	8601211	12/3/2013
US	ASMF MANAGING DATA USING A DATA PIPELINE	Issued	13566471	8/3/2012	2.01E+10	12/27/2012	8762658	5/24/2014
US	TRIM ASMF Identifying Data that is No Longer in Use	Issued	13600077	8/30/2012	US 2012- 0324311	12/20/2012	8533569	9/10/2013
US	ASMF SOLID-STATE STORAGE AS CACHE FOR HIGH- CAPACITY, NON- VOLATILE STORAGE	Issued	13607486	9/7/2012	2.01E+10	1/24/2013	8533406	9/10/2013
US	ASM for Log Storage	Office Action	13648009	10/9/2012	2.01E+10	4/18/2013		
US	ASMF STORAGE SPACE RECOVERY IN SOLID-STATE STORAGE; GC	Office Action	13693772	12/4/2012	2.01E+10	7/18/2013		
US	Adaptive LDPS N- channels vertical codeword VCVW SYSTEMS AND METHODS FOR ADAPTIVE ERROR- CORRECTION	Pending	13730602	12/28/2012	2.01E+10	5/16/2013		
US	CODING	Pending	13784705	3/4/2013	2.01E+10	7/11/2013		
US	ASMF AN IN- SERVER STORAGE AREA NETWORK	Pending	13830653	3/14/2013	2013-0205183	8/8/2013		
US		Pending	13939927	7/11/2013	2.01E+10	11/14/2013		

	TRIM ASMF MANAGING DATA IN A STORAGE DEVICE WITH AN EMPTY DATA TOKEN DIRECTIVE	Pending	14309751	6/19/2014				
US	First Filed							
US	provisional	Expired	60873111	12/6/2006				
US	2nd Provisional Filed	Expired	60974470	9/22/2007				
	ASMF BIASING DATA IN A SOLID- STATE STORAGE DEVICE	Expired	61290816	12/29/2009				
US	ASMF BIASING DATA IN A SOLID- STATE STORAGE DEVICE	Expired	61305496	2/17/2010				
US	ASMF DESTAGING CACHED DATA	Expired	61435192	1/21/2011				
US	Increase READ IOPS N-channels vertical ECC	Expired	61606253	3/2/2012				
US	Increase READ IOPS N-channels vertical ECC	Expired	61606755	3/5/2012				
JP	ASMF AN IN- SERVER STORAGE AREA NETWORK ASMF CONVERTING A STORAGE REQUEST INTO AN APPEND DATA STORAGE	Abandoned	2009540483	6/6/2009	2010-515116	5/6/2010		
JP	COMMAND ASMF STORAGE SPACE RECOVERY IN SOLID-STATE STORAGE	Issued	2011504112	10/6/2010	2011-517820	6/16/2011	5431453	12/13/2013
CN	ASMF MANAGING DATA FROM A REQUESTING DEVICE WITH AN EMPTY DATA TOKEN DIRECTIVE TRIM	Pending	200780050969.8	8/6/2009				
CN	ASMF SOLID-STATE STORAGE AS CACHE FOR HIGH-CAPACITY, NON-VOLATILE	Issued	200780050970.0	8/6/2009			ZL 200780050970.0	3/13/2013
CN	STORAGE ASMF MANAGING DATA USING A DATA PIPELINE	Issued	200780050973.4	8/6/2009	CN101622606A	1/6/2010	ZL 200780050973.4	4/9/2014
CN	ASMF A FRONT- END, DISTRIBUTED RAID	Abandoned	200780050974.9	8/6/2009	CN 101715575A	5/26/2010		
CN	REMOTE DIRECT MEMORY ACCESS TO A SOLID-STATE STORAGE DEVICE	Abandoned	200780050981.3	8/6/2009				
CN	ASMF AN IN- SERVER STORAGE AREA NETWORK	Abandoned	200780050983.8	8/6/2009				
CN	ASMF A SHARED, FRONT-END, DISTRIBUTED RAID	Abandoned	200780050989.5	8/6/2009	101622595A	1/6/2010		
CN		Issued	200780051010.6	8/6/2009	CN101689131A	3/31/2010	ZL 200780051010.6	3/20/2013

CN	ASMF MANAGING COMMANDS OF SOLID-STATE STORAGE USING BANK INTERLEAVE ASMF SERVICING OBJECT REQUESTS WITHIN A STORAGE CONTROLLER	Pending	200780051027.1	8/6/2009		
CN	ASMF VALIDATING THAT A CORRECT DATA SEGMENT IS READ FROM A DATA STORAGE DEVICE	Office Action	200780051034.1	8/6/2009	CN 101636712A	1/27/2010
CN	ASMF COORDINATING STORAGE REQUESTS IN A MULTI- PROCESSOR/MULTI- THREAD ENVIRONMENT	Abandoned	2009801211047.0	12/6/2010	CN 102084360 A	6/1/2011
CN	ASMF MANAGING DATA USING A DATA PIPELINE ASMF CONVERTING A STORAGE REQUEST INTO AN APPEND DATA STORAGE COMMAND	Abandoned	2009801211155.8	12/6/2010	CN 103084343 A	6/1/2011
CN	ASMF A DEVICE SHARED BETWEEN MULTIPLE INDEPENDENT HOSTS	Pending	2009801211161.3	12/6/2010	CN 102084332	6/1/2011
CN	ASMF MANAGING DATA IN A STORAGE DEVICE WITH AN EMPTY DATA TOKEN	Abandoned	201080050430.4	8/6/2009		
KR	DIRECTIVE ASMF MANAGING COMMANDS OF SOLID-STATE STORAGE USING BANK INTERLEAVE	Abandoned	10-2009-7014054	7/6/2009		
KR	ASMF SOLID-STATE STORAGE AS CACHE FOR HIGH- CAPACITY, NON- VOLATILE STORAGE	Office Action	10-2009-7014055	7/6/2009		
KR	ASMF A FRONT- END, DISTRIBUTED RAID	Abandoned	10-2009-7014058	7/6/2009		
KR	ASMF MANAGING DATA USING A DATA PIPELINE	Abandoned	10-2009-7014064	7/6/2009		
KR	ASMF DATA STORAGE USING PROGRESSIVE RAID	Abandoned	10-2009-7014065	7/6/2009		
KR	ASMF EFFICIENT MAPPING OF VIRTUAL AND PHYSICAL ADDRESSES	Abandoned	10-2009-7014067	7/6/2009		
KR		Pending	10-2010-7024893	11/4/2010		

KR	ASMF CONVERTING A STORAGE REQUEST INTO AN APPEND DATA STORAGE COMMAND	Pending	10-2010-7024894	11/4/2010				
KR	ASMF COORDINATING STORAGE REQUESTS IN A MULTI- PROCESSOR/MULTI- THREAD ENVIRONMENT	Abandoned	10-2010-7024895	11/4/2010				
CN	ASMF MANAGING DATA IN A STORAGE DEVICE WITH AN EMPTY DATA TOKEN DIRECTIVE	Abandoned	2007800501030.X	8/6/2009				
CN	ASMF DATA STORAGE USING PROGRESSIVE RAID ASMF SOLID-STATE STORAGE AS CACHE FOR HIGH- CAPACITY, NON- VOLATILE STORAGE	Abandoned	200780050972.X	8/6/2009	CN101689130A	3/31/2010		
JP	ASMF MANAGING DATA FROM A REQUESTING DEVICE WITH AN EMPTY DATA TOKEN	Issued	2009-540309	6/6/2009	2,01E+09	4/23/2010	5523835	4/18/2014
JP	TOKEN DIRECTIVE ASMF MANAGING DATA IN A STORAGE DEVICE WITH AN EMPTY DATA TOKEN	Abandoned	2009-540484	6/6/2009				
JP	DIRECTIVE ASMF EFFICIENT MAPPING OF VIRTUAL AND PHYSICAL ADDRESSES	Pending	2009-540489	6/6/2009				
CN	No Gap in Protection	Abandoned	200980121088.X	12/6/2010	1,02E+08	6/1/2013		
JP	ASMF EFFICIENT MAPPING OF VIRTUAL AND PHYSICAL ADDRESSES	Abandoned	2011-503238	10/5/2010	2011-516984	5/26/2011		
JP	ASMF COORDINATING STORAGE REQUESTS IN A MULTI- PROCESSOR/MULTI- THREAD ENVIRONMENT	Abandoned	2011-504097	10/6/2010	2011-518380	6/23/2011		
JP	ASMF VALIDATING THAT A CORRECT DATA SEGMENT IS READ FROM A DATA STORAGE DEVICE	Abandoned	2011-504100	10/6/2010				
JP		Abandoned	2011-504104	10/6/2010	2011-518381	6/23/2011		

IN	ASMF MANAGING DATA IN A STORAGE DEVICE WITH AN EMPTY DATA TOKEN DIRECTIVE	Pending	3892CHENP2009	7/3/2009		
IN	ASMF SOLID-STATE STORAGE AS CACHE FOR HIGH- CAPACITY, NON- VOLATILE STORAGE	Abandoned	3894CHENP2009	7/3/2009		
PCT	ASMF SERVICING OBJECT REQUESTS WITHIN A STORAGE CONTROLLER	Expired	PCT/US07/086687	12/6/2007		
PCT	ASMF REDUNDANT WRITE CACHING	Abandoned	PCT/US11/46005	7/29/2011	WO 2012/016209	2/2/2012
PCT	ASMF AN IN- SERVER STORAGE AREA NETWORK	Expired	PCT/US2007/086690	12/6/2007	WO2008070802	10/9/2008
PCT	Module Pairings - abbrev title	Expired	PCTUS2007025054	12/6/2007	WO2008070175	6/12/2008
PCT	ASMF A RECONFIGURABLE BASEBOARD MANAGEMENT CONTROLLER	Expired	PCTUS2007025188	12/6/2007	WO2008070191	6/12/2008
PCT	APPARATUS, SYSTEM, AND METHOD FOR MANAGING DATA USING A DATA PIPELINE	Expired	PCTUS2007086683	12/6/2007	WO2008070796	6/12/2008
PCT	APPARATUS, SYSTEM, AND METHOD FOR DATA STORAGE USING PROGRESSIVE RAID	Expired	PCTUS2007086702	12/6/2007	WO2008070812	6/12/2008
PCT	Composite Backplane - Abbrev title	Expired	PCTUS2007086704	12/6/2007	WO2008070814	6/12/2008
PCT	ASMF A SHARED, FRONT-END, DISTRIBUTED RAID	Expired	PCTUS2007086705	12/6/2007	WO2008127458	10/23/2008
PCT	Module Pairings - abbrev title	Abandoned	PCTUS2007086706	12/7/2007		
PCT	APPARATUS, SYSTEM, AND METHOD FOR ENSURING DATA VALIDITY IN A DATA STORAGE PROCESS	Expired	PCTUS2009039572	4/4/2009	WO2009124304	10/8/2009
PCT	ASMF VALIDATING THAT A CORRECT DATA SEGMENT IS READ FROM A DATA STORAGE DEVICE	Expired	PCTUS2009039626	4/6/2009	WO2009126562	10/15/2009
PCT	ASMF CONVERTING A STORAGE REQUEST INTO AN APPEND DATA STORAGE COMMAND	Expired	PCTUS2009039673	4/6/2009	WO 2009126581	10/15/2009
PCT	REMOTE DIRECT MEMORY ACCESS TO A SOLID-STATE	Expired	US2007025048	12/6/2007	WO2008070172	12/6/2008

STORAGE DEVICE

PCT	ASMF A DEVICE SHARED BETWEEN MULTIPLE INDEPENDENT HOSTS	Expired	US2007025050	12/6/2008	WO2008070174	12/6/2008		
PCT	TRIM ASMF MANAGING DATA FROM A REQUESTING DEVICE WITH AN EMPTY DATA	Expired	US2007086691	12/6/2007	WO2008070803	12/6/2008		
PCT	TOKEN DIRECTIVE TRIM ASMF MANAGING DATA IN A STORAGE DEVICE WITH AN EMPTY DATA	Expired	US2007086791	12/6/2007	WO2008070811	12/6/2008		
PCT	TOKEN DIRECTIVE ASMF A FRONT-END, DISTRIBUTED RAID	Expired	US2007086703		WO2008070813	12/6/2008		
PCT	ASMF SOLID-STATE STORAGE AS CACHE FOR HIGH-CAPACITY, NON-VOLATILE STORAGE	Expired	US200725049	12/6/2007	WO2008070173	12/6/2008		
PCT	ASMF MANAGING COMMANDS OF SOLID-STATE STORAGE USING BANK INTERLEAVE	Expired	US200786686	12/6/2007	WO2008070798	12/6/2008		
PCT	ASMF STORAGE SPACE RECOVERY IN SOLID-STATE STORAGE; GC	Expired	US200786688	12/6/2007	WO2008070800	12/6/2008		
PCT	ASMF STORAGE SPACE RECOVERY IN SOLID-STATE STORAGE; GC	Expired	US2009039570	4/4/2009	WO2009126542			
PCT	ASMF COORDINATING STORAGE REQUESTS IN A MULTI-PROCESSOR/MULTI-THREAD ENVIRONMENT	Expired	US2009039618	4/6/2009	WO2009126557	10/15/2009		
PCT	ASMF data block usage information synchronization for a non-volatile storage volume	Expired	US2011025885	2/23/2011	WO2011106394	9/1/2011		
EP	ASMF CACHING DATA ON A SOLID-STATE STORAGE DEVICE	Pending	10816043.3	9/8/2010	2476055	7/18/2012		
EP	ASM for Allocating Storage	Pending	10816110	9/9/2010	2476079			
US	ASMF CACHING DATA ON A SOLID-STATE STORAGE DEVICE	Issued	12877971	9/8/2010	2,01E+10	3/17/2011	8719501	5/6/2014
US	ASM for Allocating Storage	Issued	12879004	9/9/2010	2,01E+10	3/10/2011	8578127	11/5/2013

US	ASMF A VIRTUAL STORAGE LAYER / DirectFS	Office Action	12986117	1/6/2011	2.01E+10	1/11/2012		
US	ASMF CONDITIONAL AND ATOMIC STORAGE OPERATIONS	Issued	13107820	5/13/2011	2.01E+10	12/1/2011	8601222	12/3/2013
US	Atomic Writes ASMF CACHING	Pending	13193559	7/28/2011	2.01E+10	2/2/2012		
US	DATA	Issued	13209007	8/12/2011	US-2012-0210041	8/16/2012	8489817	7/16/2013
US	Atomic Writes II NON-VOLATILE	Issued	13335922	12/23/2011	2.01E+10	6/27/2013	8725994	5/13/2014
US	CACHE	Issued	13931897	6/29/2013	US-2013-0297880	11/7/2013	8756375	6/17/2014
US	ASM for Allocating Storage	Pending	14072697	11/5/2013		9/9/2009		
US	ASMF A VIRTUAL STORAGE LAYER / - Atomic Write - DIV ASMF	Pending	14087297	11/22/2013	US-2014-0189216-A1	7/3/2014		
US	CONDITIONAL AND ATOMIC STORAGE OPERATIONS	Pending	14094121	12/2/2013	2014-0101376	4/10/2014		
US	ASMF CACHING DATA ON A SOLID-STATE STORAGE DEVICE	Expired	61240573	9/8/2009				
US	ASM for Allocating Storage	Expired	61240966	9/9/2009				
US	File system for virtualized solid-state storage	Expired	61292555	1/6/2010				
US	ASMF CONDITIONAL AND ATOMIC STORAGE OPERATIONS	Expired	61334532	5/13/2010				
US	Atomic Writes	Expired	61368564	7/28/2010				
US	ASMF CACHING DATA	Expired	61373271	8/12/2010				
US	Atomic Writes	Expired	61382816	9/14/2010				
US	Atomic Writes II	Expired	61579627	12/22/2011				
JP	ASM for Allocating Storage	Pending	2012528912	9/9/2010				
CN	ASMF CACHING DATA ON A SOLID-STATE STORAGE DEVICE	Pending	201080090301.5	9/8/2010	1.03E+09	9/26/2012		
CN	ASM for a Device Shared Between Multiple Independent Hosts	Pending	201080050430.4	9/9/2010				
KR	ASMF CACHING DATA ON A SOLID-STATE STORAGE DEVICE	Pending	1020127006053.0	9/8/2010				
KR	ASM for Allocating Storage	Pending	1020127008023.0	9/9/2010	1.02E+12	3/13/2013		
JP	ASMF CACHING DATA ON A SOLID-STATE STORAGE DEVICE	Pending	10-2012-7006053	9/8/2010				
PCT	Allocation/thin provisioning	Expired	PCT/US10/048325	9/9/2010				

PCT	ASMF CONDITIONAL AND ATOMIC STORAGE OPERATIONS	Abandoned	PCT/US11/036539	5/13/2011	WO20110143628	11/17/2011		
PCT	Atomic Writes	Expired	PCT/US11/45801	7/28/2011	WO2012/016089			
PCT	ASMF CACHING DATA	Abandoned	US11/47659	8/12/2011	WO 2012/021847	2/16/2012		
PCT	ASMF CACHING DATA ON A SOLID- STATE STORAGE DEVICE	Expired	US2010048174	9/8/2010	WO2011031796	3/17/2011		
US	ASMF RECONFIGURING AN ARRAY TO OPERATE WITH LESS STORAGE ELEMENTS	Issued	12468040	5/18/2009	US 2010- 0293439 A1	11/18/2010	8307258	11/6/2012
US	ASMF RECONFIGURING AN ARRAY TO OPERATE WITH LESS STORAGE ELEMENTS	Issued	13645353	10/4/2012	US 2013- 0096327	2/7/2013	8495460	7/23/2013
US	ASMF RECONFIGURING AN ARRAY OF STORAGE ELEMENTS	Issued	13907479	5/31/2013	2.01E+10	4/3/2014	8738991	5/27/2014
US	ASMF RECONFIGURING AN ARRAY OF STORAGE ELEMENTS	Pending	14286712	5/23/2014				
PCT	ASMF RECONFIGURING AN ARRAY TO OPERATE WITH LESS STORAGE ELEMENTS	Expired	PCTUS1035318	5/18/2010	WO2010135368	11/25/2010		
US	ASM TO INCREASE DATA INTEGRITY IN A REDUNDANT STORAGE SYSTEM - parity substitution APPARATUS, SYSTEM, AND METHOD TO INCREASE DATA INTEGRITY IN A REDUNDANT	Issued	12468041	5/18/2009	US 2010- 0293440 A1	11/18/2010	8281227	10/2/2012
US	STORAGE SYSTEM ASM TO INCREASE DATA INTEGRITY IN A REDUNDANT	Allowed Issue fee paid	13321484	11/18/2011	US20120131413	5/24/2010		
PCT	STORAGE SYSTEM APPARATUS, SYSTEM, AND METHOD FOR MANAGING OUT- OF-SERVICE CONDITIONS,	Expired	PCTUS2010035320	5/18/2010				
US	adaptive APPARATUS, SYSTEM, AND METHOD FOR	Office Action	13954215	1/19/2012	2.01E+10	1/17/2013		
US	MANAGING OUT-	Expired	61434362	1/19/2011				

	OF-SERVICE CONDITIONS						
	APPARATUS, SYSTEM, AND METHOD FOR MANAGING OUT- OF-SERVICE CONDITIONS						
PCT	Persistent TRIM,	Abandoned	US201221914	1/19/2012	WO2012100087	7/26/2012	
US	PTRIM, exists	Abandoned	13330554	12/19/2011	2.01E+10	9/20/2012	
US	Persistent TRIM -- exists	Pending	14045605	10/3/2013			
US	Persistent TRIM	Expired	61424585	12/17/2010			
US	Persistent TRIM	Expired	61425167	12/20/2010			
PCT	Persistent TRIM Systems and Methods for Managing file	Abandoned	US201165927	12/19/2011	2.01E+09	6/21/2012	
US	deduplication - FLD	Pending	13750904	1/25/2013	2013-0198455	8/1/2013	
US	(iQVD) Systems and Methods for Managing file	Pending	14245893	4/4/2014			
US	deduplication - FLD	Expired	61591822	1/27/2012			
US	(iQVD) Systems and Methods for Managing I/O	Expired	61946708	2/28/2014			
US	operations - CFS Systems and Methods for Managing I/O	Allowed	13028149	3/15/2011	2.01E+10	8/16/2012	
PCT	Managing Input/Output Operations-VLUN	Expired	US201225295	2/15/2011	WO20121112710	8/23/2012	
US	Managing Input/Output Operations-VLUN	Pending	13192365	7/27/2011	2.01E+10	11/29/2012	
US	Managing Input/Output Operations-VLUN	Expired	61489230	5/23/2011			
PCT	Operations-VLUN	Abandoned	US201239189	5/23/2012	WO2012162420	11/29/2012	
US	Persistent TRIM II APPARATUS, SYSTEM, AND METHOD FOR DETECTING AND REPLACING FAILED	Abandoned	61625585	4/17/2012			
DE	DATA STORAGE ASMF DETECTING AND REPLACING FAILED DATA	Issued	9747781.4	12/16/2010		2297742	7/24/2013
EP	STORAGE APPARATUS, SYSTEM, AND METHOD TO INCREASE DATA INTEGRITY IN A REDUNDANT	Expired	9747781.4	12/16/2010	2297742	2/23/2011	2297742 7/24/2013
FR	STORAGE SYSTEM	Issued	9747781.4	12/16/2010		2297742	7/24/2013

GB	APPARATUS, SYSTEM, AND METHOD FOR DETECTING AND REPLACING FAILED DATA STORAGE ASMF DETECTING AND REPLACING FAILED DATA	Issued	9747781.4	12/16/2010			2297742	7/24/2013
HK	STORAGE ASMF DETECTING AND REPLACING FAILED DATA	Abandoned	12100295.8	1/11/2012	1160289A	8/10/2012		
US	FLASHBACK ASMF DETECTING AND REPLACING FAILED DATA	Issued	12467914	5/18/2009	US 2009- 0287956 A1	11/19/2009	8195978	6/5/2012
US	STORAGE ASMF DETECTING AND REPLACING FAILED DATA	Issued	13466845	5/8/2012	US-2012- 0221924	8/30/2012	8412978	4/2/2013
US	FLASHBACK ASMF DETECTING AND REPLACING FAILED DATA	Expired	61054055	5/16/2008				
JP	STORAGE ASMF DETECTING AND REPLACING FAILED DATA	Issued	2011509798	11/16/2010	2011-521397	7/21/2011	5220185	3/15/2013
CN	STORAGE ASMF DETECTING AND REPLACING FAILED DATA	Abandoned	200980128013.4	1/17/2011	CN 103124527 A	7/13/2011		
KR	STORAGE ASMF DETECTING AND REPLACING FAILED DATA	Abandoned	1020107028363.0	12/16/2010	1.02E+12	5/13/2011		
PCT	STORAGE Apparatus, System and Method for Determining a Configuration Parameter for Solid- State Storage	Expired	PCTUS2009044414	5/18/2009	WO 2009/140700	11/19/2009		
EP	Media ASMF USING MLC SOLID-STATE STORAGE AS SLC SOLID-STATE	Office Action	12176825.1	7/18/2012	2549482A	1/23/2013		
US	STORAGE SMLC ASMF DETERMINING A READ VOLTAGE THRESHOLD FOR SOLID-STATE	Issued	12724401	3/15/2010	US 2010- 0235715 A1	9/16/2010	8261158	9/4/2012
US	STORAGE MEDIA whiten ASMF USING MLC SOLID-STATE STORAGE AS SLC SOLID-STATE	Issued	13015458	1/27/2011	US 2011- 0182119 A1	7/28/2011	8315092	11/20/2012
US	STORAGE ASMF PROACTIVE VOLTAGE	Issued	13175637	7/1/2011	US 2012- 0173827 A1	7/5/2012	8266503	9/11/2012
US	THRESHOLD FOR	Issued	13189402	7/22/2011	US-2012- 0203951	8/9/2012	8380915	2/19/2013

	SOLID-STATE STORAGE MEDIA VTM open loop APPARATUS, SYSTEM, AND METHOD FOR USING MULTI-LEVEL CELL SOLID-STATE STORAGE AS SINGLE-LEVEL CELL SOLID-STATE							
US	STORAGE APPARATUS, SYSTEM, AND METHOD FOR USING MULTI-LEVEL CELL SOLID-STATE STORAGE AS REDUCED-LEVEL CELL SOLID-STATE	Issued	13531240	6/22/2012			8443259	5/14/2013
US	STORAGE ASMF DETERMINING A READ VOLTAGE THRESHOLD FOR SOLID-STATE	Issued	13609527	9/11/2012	US 2013- 0003457 A1	1/3/2013	8527841	9/3/2013
US	STORAGE MEDIA REDUCED LEVEL CELL MODE FOR NON-VOLATILE MEMORY	Issued	13719045	12/18/2012	US 2013- 0132652	5/23/2013	8661184	2/25/2014
US	CONFIGURING STORAGE CELLS	Pending	14016203	9/2/2013	US 2014- 0059406	2/27/2014		
US	MANAGING NON- VOLATILE MEDIA ASMF USING MLC	Allowed	14067323	10/30/2013	US 2014- 0056068	2/27/2014		
US	SOLID-STATE STORAGE AS SLC SOLID-STATE	Allowed	14106566	12/13/2013	US 2014- 0108891	4/17/2014		
US	STORAGE SMLC ASMF DETERMINING A READ VOLTAGE THRESHOLD FOR SOLID-STATE	Expired	61160258	3/13/2009				
US	STORAGE MEDIA ASMF DETERMINING A READ VOLTAGE THRESHOLD FOR SOLID-STATE	Expired	61298861	1/27/2010				
US	STORAGE MEDIA Apparatus, System, and Method for Determining a Configuration Parameter for Solid- State Storage Media	Expired	61305205	2/17/2010				
CN	Apparatus, System and Method for Determining a Configuration Parameter for Solid- State Storage Media	Pending	201210252369.8	7/20/2012	102890621 A	1/13/2013		
KR	Media	Office Action	2012-0080003	7/23/2012	2013-12062	1/31/2013		

JP	Apparatus, System and Method for Determining a Configuration Parameter for Solid-State Storage Media	Office Action	2012-161748	7/20/2012	2013-025821	2/4/2013		
PCT	ASMP DETERMINING A READ VOLTAGE THRESHOLD FOR SOLID-STATE STORAGE MEDIA	Expired	PCT/US11/22786	1/29/2011	WO 2011/094454	8/4/2011		
US	APPARATUS, SYSTEM, AND METHOD FOR MANAGING CONTENTS OF A CACHE	Office Action	13406287	2/27/2012	US-2012-0221774	8/30/2012		
US	APPARATUS, SYSTEM, AND METHOD FOR MANAGING CONTENTS OF A CACHE	Office Action	13776389	2/25/2013	US-2013-0166881	5/27/2013		
US	APPARATUS, SYSTEM, AND METHOD FOR MANAGING CONTENTS OF A CACHE	Allowed issue fee paid	13776406	2/25/2013	US-2013-0166816	5/27/2013		
US	APPARATUS, SYSTEM, AND METHOD FOR MANAGING CONTENTS OF A CACHE	Expired	61446889	2/25/2011				
PCT	ASMP DESTAGING CACHED DATA	Abandoned	PCT/US12/26790	2/27/2012	WO 2012/116369	3/14/2013		
PCT	APPARATUS, SYSTEM, AND METHOD FOR AN INTERFACE BETWEEN A MEMORY CONTROLLER AND A NON-VOLATILE MEMORY CONTROLLER USING A COMMAND PROTOCOL	Abandoned	PCT/US12/22244	1/23/2012	WO2012/100257	10/4/2012		
US	A NON-VOLATILE MEMORY INTERFACE	Issued	13248006	9/28/2013	US 2012-0079174 A1	3/29/2012	8688899	4/1/2014
US	Direct Attached VSL	Pending	14231437	3/11/2014				
US	Direct Attached VSL	Expired	61387400	9/28/2010				
PCT	Direct Attached VSL	Abandoned	PCT/US11/53792	9/28/2011	WO 2012/050934	4/19/2012		

EP	ASM FOR CONDITIONAL AND ATOMIC STORAGE OPERATIONS	Pending	11813216.6	1/30/2013				
US	passing Atomics to backing stores through cache	Pending	13837628	3/15/2013	2.01E+10	8/8/2013		
CN	ASM FOR CONDITIONAL AND ATOMIC STORAGE OPERATIONS	Pending	201180037001.8	1/28/2013				
US	Closed loop Groomer scheduling - GC	Issued	13267811	10/6/2011	US 2013- 0024641	1/24/2013	8671249	3/11/2014
US	Closed loop Groomer scheduling	Expired	61510974	7/22/2011				
US	DirectCache	Pending	13362952	1/31/2012				
US	Eviction Algorithm Log-based Cache	Action	13362973	1/31/2012	2.01E+10			
US	Eviction Algorithm Log-based Cache	Expired	61436182	1/31/2011				
US	Eviction Algorithm DirectCache	Expired	61436194	1/31/2011				
PCT	Log-based Cache Eviction Algorithm Input/Output (I/O) Virtualization	Abandoned	PCT/US12/23373	1/31/2012	WQ2012/106362	9/27/2012		
US	System Communicating between Host Computers and Peripheral Resources in an I/O Virtualization	Issued	12751543	3/31/2010	2.01E+10	3/3/2011	8412860	4/2/2013
US	System Assignment of Resources in an I/O Virtualization	Issued	12790930	5/31/2010	2.01E+10	3/3/2011	8521915	8/27/2013
US	System Input/Output (I/O) Virtualization	Issued	12790921	5/31/2010	2.01E+10	5/19/2011	8732349	5/20/2014
US	System Communicating between Host Computers and Peripheral Resources in an I/O Virtualization	Expired	61165772	4/1/2009				
US	System Assignment of Resources in an I/O Virtualization	Expired	61234972	8/18/2009				
US	System COMMUNICATING BETWEEN HOST COMPUTERS AND PERIPHERAL RESOURCES IN AN INPUT/OUTPUT (I/O) VIRTUALIZATION SYSTEM	Expired	61262416	11/18/2009				
CN	Input/Output (I/O) Virtualization	Pending	2.0108E+11	4/18/2012				
PCT	System	Expired	PCT/US10/29433	3/31/2010	WD2010114910	10/7/2010		

	COMMUNICATING BETWEEN HOST COMPUTERS AND PERIPHERAL RESOURCES IN AN INPUT/OUTPUT (I/O)						
PCT	VIRTUALIZATION SYSTEMS AND METHODS FOR A FILE-LEVEL CACHE - FLK	Expired	PCT/US10/45730	8/17/2010	WO2011022375	2/24/2011	
US	SYSTEMS AND METHODS FOR A MULTI-LEVEL CACHE - MLC	Pending	13287998	11/2/2011	2.01E+10	8/16/2012	
US	Systems and Methods for Managing Data I/O operations - FLK	Pending	13288005	11/2/2011	2.01E+10	8/16/2012	
US	Systems and Methods for a File-Level Cache Admission Control	Expired	61521676	8/9/2011			
PCT	Cache Admission Control	Expired	2012050194	8/9/2012	2.01E+09	2/14/2013	
US	Systems and Methods for Cache Profiling	Issued	13349417	1/12/2013	2.01E+10		8782344 7/15/2014
US	Systems and Methods for Cooperative Cache Management	Pending	13774874	2/22/2013	2013/0185475	7/18/2013	
US	Cache Admission Control	Pending	13774881	2/22/2013	2.01E+10	7/18/2013	
PCT	facade team direct cache dc	Pending	PCT/US12/021094	1/12/2012	WO2013105960	7/18/2013	
US	Managing Multiple Sets of Metadata	Expired	61576980	12/16/2011			
US	Systems, Methods, and Apparatus for a Virtual Machine Cache, nic2nic, nic-to-rik	Pending	13840418	3/15/2013			
US	Systems, Methods, and Apparatus for a Virtual Machine Cache, nic2nic, nic-to-nic	Pending	13541659	7/3/2012	2014/0012940	1/9/2014	
US	Disk optimized Cache Warming - directcache	Pending	13687979	11/28/2012	2014/0013099	1/9/2014	
US	DISK-OPTIMIZED WARMING OF A MEMORY CACHE	Pending	13829152	3/14/2013	2014-0101389	4/10/2014	
US	Systems, Methods and Interfaces for Vector Input/Output Operations	Expired	61711120	10/8/2012			
US	Composite Vectored Atomic Storage Operations	Pending	13725728	12/21/2012	2013-0166855	6/27/2013	
US	Composite Vectored Atomic Storage Operations	Expired	61625475	4/17/2012			
US	AW	Expired	61637155	4/23/2012			

US	Annotated Atomic Write	Pending	14230844	3/31/2014		
US	Annotated AW&E™ writing atomic writes across N devices	Expired	61865565	8/13/2013		
US	SYSTEMS AND METHODS FOR STORAGE COMPRESSION	Pending	61943900	2/24/2014		
US	Systems, Methods, and Interfaces for Managing Persistent Data of Atomic Storage	Pending	13539235	6/29/2012	2014/0006685	1/2/2014
US	Operations SYSTEMS AND METHODS FOR STORAGE	Pending	14303419	6/12/2014		
US	CONSISTENCY SYSTEMS AND METHODS FOR STORAGE	Expired	61858812	7/26/2013		
US	Write Touch Counts Atomic Write across logical/physical storage devices	Pending	13832843	3/15/2013		
US	Atomic Write across logical/physical storage devices	Expired	61892962	10/18/2013		
US	Operations Atomic Via Clone/Merge	Pending	14313933	6/24/2014		
US	Operations Atomic Via Clone/Merge	Expired	61861314	8/1/2013		
US	Systems and Methods for Cache Endurance (HEC)	Pending	14098281	12/5/2013		
US	Systems and Methods for a High Endurance Cache	Expired	61733540	12/5/2012		
US	Redo Log for CFS	Pending	13837210	3/15/2013		
US	Dynamic Reservations	Pending	14333365	7/16/2014		
US	Dynamic Reservations Systems and Methods for Storage Collision Management	Pending	61883024	10/18/2013		
US	(Range Move/Key-Value)	Pending	61881861	9/24/2013		
US	Log running on Log - interaction Virtual Log Defragger	Pending	14075951	11/8/2013		
US	AutoCache	Pending	14332696	7/16/2014		
US	AutoCache	Expired	62017128	6/25/2014		