PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT4848432

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
QINGYUN LIU	01/25/2018
JAMIN KANG	01/25/2018
SHAOQIN GONG	01/25/2018
REE SUN	01/25/2018
JIAN GAO	01/25/2018

RECEIVING PARTY DATA

Name:	EMC IP HOLDING COMPANY LLC
Street Address:	176 SOUTH STREET
City:	HOPKINTON
State/Country:	MASSACHUSETTS
Postal Code:	01748

PROPERTY NUMBERS Total: 1

Property Type	Number
Application Number:	15888647

CORRESPONDENCE DATA

Fax Number: (508)366-4688

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.

Phone: 508-616-2900
Email: Docket@BainwoodHuang.com
Correspondent Name: BAINWOOD, HUANG & ASSOCIATES, LLC
Address Line 1: 2 CONNECTOR ROAD
Address Line 4: WESTBOROUGH, MASSACHUSETTS 01581

ATTORNEY DOCKET NUMBER:	1003-595.001
NAME OF SUBMITTER:	DAVID A. DAGG, ESQ.
SIGNATURE:	/David Dagg/
DATE SIGNED:	03/02/2018

Total Attachments: 15
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PATENT ASSIGNMENT
Attorney Docket No.: 1003-595.001
Client Docket No.: 109918.02

ASSIGNMENT

WHEREAS, I, Qingyun Liu, as the original inventor or an original joint inventor have invented an invention comprising and/or embodying certain improvements or discoveries or both as described in an application for Letters Patent of the United States entitled

RELOCATING DATA FROM AN END OF LIFE STORAGE DRIVE BASED ON STORAGE DRIVE LOADS IN A DATA STORAGE SYSTEM USING MAPPED RAID (REDUNDANT ARRAY OF INDEPENDENT DISKS) TECHNOLOGY

which is further identified by Attorney Docket Number 1003-595.001;

WHEREAS, EMC IP Holding Company LLC (hereinafter "ASSIGNEE"), a limited liability company organized and existing under the laws of the state of Delaware and having a usual place of business at 176 South Street, Hopkinton, MA, 01748, USA, desires to acquire an interest therein in accordance with agreements duly entered into with me;

NOW, THEREFORE, to all whom it may concern be it known that for and in consideration of said agreements and of other good and valuable consideration, the receipt of which is hereby acknowledged, I have sold, assigned and transferred and by these presents do hereby sell, assign and transfer unto said ASSIGNEE, its successors, assigns and legal representatives, the entire right, title and interest in and throughout the United States of America, its territories and all foreign countries, in and to said invention as described in said application, together with the entire right, title and interest in and to said application and such Letters Patent as may issue thereon; said invention, application and Letters Patent to be held and enjoyed by said ASSIGNEE for its own use and behalf and for its successors, assigns and legal representatives, to the full end of the term for which said Letters Patent may be granted as fully and entirely as the same would have been held by me had this assignment and sale not been made; I hereby convey to ASSIGNEE all rights arising under or pursuant to any and all international agreements, treaties or laws relating to the protection of industrial property by filing any such applications for Letters Patent. I hereby acknowledge that this assignment, being of the entire right, title and interest in and to said invention, carries with it the right in ASSIGNEE to apply for and obtain from competent authorities in all countries of the world any and all Letters Patent by attorneys and agents of ASSIGNEE's selection and the right to procure the grant of all such Letters Patent to ASSIGNEE for its own name as assignee of the entire right, title and interest therein;

AND, I hereby further agree for myself and my executors and administrators to execute upon request any other lawful documents and likewise to perform any other lawful acts which may be deemed necessary to secure fully the aforesaid invention to said ASSIGNEE, its successors, assigns and legal representatives, but at its or their expense and charges, including the execution of applications for patents in foreign countries, and the execution of substitution, reissue, divisional or continuation applications and preliminary or other statements and the giving of testimony in any interference or other proceeding in which said invention or any application or patent directed thereto may be involved;

AND, I do hereby authorize and request the Commissioner of Patents of the United States to issue such Letters Patent as shall be granted upon said application or applications based thereon to said ASSIGNEE, its successors, assigns, and legal representatives;

AND I hereby authorize the attorneys at Bainwood Huang & Associates LLC to insert here in parentheses

(15/888,647 , filed 2/5/18)

the application number and filing date of said application (or foreign counterpart application) to facilitate the recording or other official processing of this Assignment.

PATENT ASSIGNMENT
Attorney Docket No.: 1003-595.001
Client Docket No.: 109918.02

Date: 2018 . 1 . 25

Qingyun Liu
Inventor's Signature

Legal name of inventor:	Qingyun Liu
Residence:	No. 1, Zhongguancun Dong Road Haidian District Beijing, 100084 China (People's Republic)
Mailing Address:	Same as Above
Citizenship:	CN

I Sihang Xia (name) whose residential address is
7F, Block D, Tsinghua Science Park, No. 1 Zhongguancun East Road, Beijing,
was personally present and did see Qingyun Liu (name of person signing the assignment) who is personally known to me, execute the above assignment.

Sihang Xia (signature of first witness)

Signed at Beijing, China (location of witness signature)

on this day 1/25 of 2018. (date of signature)

7F,B

I Zhenhua Zhao (name) whose residential address is
7F, Block D, Tsinghua Science Park No. 1 Zhongguancun East Road. Beijing
was personally present and did see Qingyun Liu (name of person signing the assignment) who is personally known to me, execute the above assignment.

Zhenhua Zhao (signature of second witness)

Signed at Beijing, China (location of witness signature)

on this day Jan 25 of 2018. (date of signature)

PATENT ASSIGNMENT
Attorney Docket No.: 1003-595.001
Client Docket No.: 109918.02

ASSIGNMENT

WHEREAS, I, Jamin Kang, as the original inventor or an original joint inventor have invented an invention comprising and/or embodying certain improvements or discoveries or both as described in an application for Letters Patent of the United States entitled

RELOCATING DATA FROM AN END OF LIFE STORAGE DRIVE BASED ON STORAGE DRIVE LOADS IN A DATA STORAGE SYSTEM USING MAPPED RAID (REDUNDANT ARRAY OF INDEPENDENT DISKS) TECHNOLOGY

which is further identified by Attorney Docket Number 1003-595.001;

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NOW, THEREFORE, to all whom it may concern be it known that for and in consideration of said agreements and of other good and valuable consideration, the receipt of which is hereby acknowledged, I have sold, assigned and transferred and by these presents do hereby sell, assign and transfer unto said ASSIGNEE, its successors, assigns and legal representatives, the entire right, title and interest in and throughout the United States of America, its territories and all foreign countries, in and to said invention as described in said application, together with the entire right, title and interest in and to said application and such Letters Patent as may issue thereon; said invention, application and Letters Patent to be held and enjoyed by said ASSIGNEE for its own use and behalf and for its successors, assigns and legal representatives, to the full end of the term for which said Letters Patent may be granted as fully and entirely as the same would have been held by me had this assignment and sale not been made; I hereby convey to ASSIGNEE all rights arising under or pursuant to any and all international agreements, treaties or laws relating to the protection of industrial property by filing any such applications for Letters Patent. I hereby acknowledge that this assignment, being of the entire right, title and interest in and to said invention, carries with it the right in ASSIGNEE to apply for and obtain from competent authorities in all countries of the world any and all Letters Patent by attorneys and agents of ASSIGNEE's selection and the right to procure the grant of all such Letters Patent to ASSIGNEE for its own name as assignee of the entire right, title and interest therein;

AND, I hereby further agree for myself and my executors and administrators to execute upon request any other lawful documents and likewise to perform any other lawful acts which may be deemed necessary to secure fully the aforesaid invention to said ASSIGNEE, its successors, assigns and legal representatives, but at its or their expense and charges, including the execution of applications for patents in foreign countries, and the execution of substitution, reissue, divisional or continuation applications and preliminary or other statements and the giving of testimony in any interference or other proceeding in which said invention or any application or patent directed thereto may be involved;

AND, I do hereby authorize and request the Commissioner of Patents of the United States to issue such Letters Patent as shall be granted upon said application or applications based thereon to said ASSIGNEE, its successors, assigns, and legal representatives;

AND I hereby authorize the attorneys at Bainwood Huang & Associates LLC to insert here in parentheses

(15/888,647 , filed 2/15/2018)

the application number and filing date of said application (or foreign counterpart application) to facilitate the recording or other official processing of this Assignment.

Date: 2018.1.25   Jamin Kang
Inventor's Signature

Legal name of inventor: Jamin Kang

Residence:
#902, Building 13, Weihui Yuan
Beijing, 100082
China (People's Republic)

Mailing Address: Same as Above
Citizenship: CN

I Sihang (name) whose residential address is
7F, Block D, Tsinghua Science Park, Zhongguancun East Road, Beijing,
was personally present and did see Jamin Kang (name of person signing the assignment) who is personally known to me, execute the above assignment.

Sihang Xia (signature of first witness)

Signed at Beijing, China (location of witness signature)

on this day 1/25 of 2018. (date of signature)

I Zhenhua Zhao (name) whose residential address is
7F, Block D, Tsinghua Science Park No. 1 Zhongguancun East Road Beijing,
was personally present and did see Jamin Kang (name of person signing the assignment) who is personally known to me, execute the above assignment.

Zhenhua Zhao (signature of second witness)

Signed at Beijing, China (location of witness signature)

on this day Jan 25 of 2018. (date of signature)

ASSIGNMENT

WHEREAS, I, Shaoqin Gong, as the original inventor or an original joint inventor have invented an invention comprising and/or embodying certain improvements or discoveries or both as described in an application for Letters Patent of the United States entitled

RELOCATING DATA FROM AN END OF LIFE STORAGE DRIVE BASED ON STORAGE DRIVE LOADS IN A DATA STORAGE SYSTEM USING MAPPED RAID (REDUNDANT ARRAY OF INDEPENDENT DISKS) TECHNOLOGY

which is further identified by Attorney Docket Number 1003-595.001;

WHEREAS, EMC IP Holding Company LLC (hereinafter "ASSIGNEE"), a limited liability company organized and existing under the laws of the state of Delaware and having a usual place of business at 176 South Street, Hopkinton, MA, 01748, USA, desires to acquire an interest therein in accordance with agreements duly entered into with me;

NOW, THEREFORE, to all whom it may concern be it known that for and in consideration of said agreements and of other good and valuable consideration, the receipt of which is hereby acknowledged, I have sold, assigned and transferred and by these presents do hereby sell, assign and transfer unto said ASSIGNEE, its successors, assigns and legal representatives, the entire right, title and interest in and throughout the United States of America, its territories and all foreign countries, in and to said invention as described in said application, together with the entire right, title and interest in and to said application and such Letters Patent as may issue thereon; said invention, application and Letters Patent to be held and enjoyed by said ASSIGNEE for its own use and behalf and for its successors, assigns and legal representatives, to the full end of the term for which said Letters Patent may be granted as fully and entirely as the same would have been held by me had this assignment and sale not been made; I hereby convey to ASSIGNEE all rights arising under or pursuant to any and all international agreements, treaties or laws relating to the protection of industrial property by filing any such applications for Letters Patent. I hereby acknowledge that this assignment, being of the entire right, title and interest in and to said invention, carries with it the right in ASSIGNEE to apply for and obtain from competent authorities in all countries of the world any and all Letters Patent by attorneys and agents of ASSIGNEE's selection and the right to procure the grant of all such Letters Patent to ASSIGNEE for its own name as assignee of the entire right, title and interest therein;

AND, I hereby further agree for myself and my executors and administrators to execute upon request any other lawful documents and likewise to perform any other lawful acts which may be deemed necessary to secure fully the aforesaid invention to said ASSIGNEE, its successors, assigns and legal representatives, but at its or their expense and charges, including the execution of applications for patents in foreign countries, and the execution of substitution, reissue, divisional or continuation applications and preliminary or other statements and the giving of testimony in any interference or other proceeding in which said invention or any application or patent directed thereto may be involved;

AND, I do hereby authorize and request the Commissioner of Patents of the United States to issue such Letters Patent as shall be granted upon said application or applications based thereon to said ASSIGNEE, its successors, assigns, and legal representatives;

AND I hereby authorize the attorneys at Bainwood Huang & Associates LLC to insert here in parentheses

(15/888,647 , filed 2/5/18)

the application number and filing date of said application (or foreign counterpart application) to facilitate the recording or other official processing of this Assignment.

Date: 2018. 1. 25 Shaoqin Gong
Inventor's Signature

Legal name of inventor:	Shaoqin Gong
Residence:	7 FL., Building D, TSP Beijing, 100084 China (People's Republic)
Mailing Address:	Same as Above
Citizenship:	CN

I Sihang Xia (name) whose residential address is 7F. Block D, Tsinghua Science Park, No.1 Zhongguancun East Road, Beijing was personally present and did see Shaoqin Gong (name of person signing the assignment) who is personally known to me, execute the above assignment.

Sihang Xia (signature of first witness)

Signed at Beijing, China (location of witness signature)

on this day 1/25 of 2018. (date of signature)

I Zhenhua Zhao (name) whose residential address is 7F, Block D, Tsinghua Science Park No. 1 Zhongguancun East Road Beijing was personally present and did see Shaoqin Gong (name of person signing the assignment) who is personally known to me, execute the above assignment.

Zhenhua Zhao (signature of second witness)

Signed at Beijing, China (location of witness signature)

on this day Jan 25 of 2018. (date of signature)

ASSIGNMENT

WHEREAS, I, Ree Sun, as the original inventor or an original joint inventor have invented an invention comprising and/or embodying certain improvements or discoveries or both as described in an application for Letters Patent of the United States entitled

RELOCATING DATA FROM AN END OF LIFE STORAGE DRIVE BASED ON STORAGE DRIVE LOADS IN A DATA STORAGE SYSTEM USING MAPPED RAID (REDUNDANT ARRAY OF INDEPENDENT DISKS) TECHNOLOGY

which is further identified by Attorney Docket Number 1003-595.001;

WHEREAS, EMC IP Holding Company LLC (hereinafter "ASSIGNEE"), a limited liability company organized and existing under the laws of the state of Delaware and having a usual place of business at 176 South Street, Hopkinton, MA, 01748, USA, desires to acquire an interest therein in accordance with agreements duly entered into with me;

NOW, THEREFORE, to all whom it may concern be it known that for and in consideration of said agreements and of other good and valuable consideration, the receipt of which is hereby acknowledged, I have sold, assigned and transferred and by these presents do hereby sell, assign and transfer unto said ASSIGNEE, its successors, assigns and legal representatives, the entire right, title and interest in and throughout the United States of America, its territories and all foreign countries, in and to said invention as described in said application, together with the entire right, title and interest in and to said application and such Letters Patent as may issue thereon; said invention, application and Letters Patent to be held and enjoyed by said ASSIGNEE for its own use and behalf and for its successors, assigns and legal representatives, to the full end of the term for which said Letters Patent may be granted as fully and entirely as the same would have been held by me had this assignment and sale not been made; I hereby convey to ASSIGNEE all rights arising under or pursuant to any and all international agreements, treaties or laws relating to the protection of industrial property by filing any such applications for Letters Patent. I hereby acknowledge that this assignment, being of the entire right, title and interest in and to said invention, carries with it the right in ASSIGNEE to apply for and obtain from competent authorities in all countries of the world any and all Letters Patent by attorneys and agents of ASSIGNEE's selection and the right to procure the grant of all such Letters Patent to ASSIGNEE for its own name as assignee of the entire right, title and interest therein;

AND, I hereby further agree for myself and my executors and administrators to execute upon request any other lawful documents and likewise to perform any other lawful acts which may be deemed necessary to secure fully the aforesaid invention to said ASSIGNEE, its successors, assigns and legal representatives, but at its or their expense and charges, including the execution of applications for patents in foreign countries, and the execution of substitution, reissue, divisional or continuation applications and preliminary or other statements and the giving of testimony in any interference or other proceeding in which said invention or any application or patent directed thereto may be involved;

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AND I hereby authorize the attorneys at Bainwood Huang & Associates LLC to insert here in parentheses

(15/888,647 , filed 2/5/18)

the application number and filing date of said application (or foreign counterpart application) to facilitate the recording or other official processing of this Assignment.

Date: 2018. 1. 25

Sun Lei
Inventor's Signature

Legal name of inventor:	Ree Sun
Residence:	No. 1, Zhongguancun Dong Road Tsinghua Science Park, Block D Haidian District Beijing, 100084 China (People's Republic)
Mailing Address:	Same as Above
Citizenship:	CN

I Sihang Xia (name) whose residential address is
7F, Block D, Tsinghua Science Park, Zhongguancun East Road, Beijing
was personally present and did see Ree Sun (name of person signing the assignment) who is personally known to me, execute the above assignment.

Sihang Xia (signature of first witness)

Signed at Beijing, China (location of witness signature)

on this day 1/25 of 2018. (date of signature)

I Zhenhua Zhao (name) whose residential address is
7F, Block D, Tsinghua Science Park No. 1 Zhongguancun East Road Beijing
was personally present and did see Ree Sun (name of person signing the assignment) who is personally known to me, execute the above assignment.

Zhenhua Zhao (signature of second witness)

Signed at Beijing, China (location of witness signature)

on this day Jan 25 of 2018. (date of signature)

ASSIGNMENT

WHEREAS, I, Jian Gao, as the original inventor or an original joint inventor have invented an invention comprising and/or embodying certain improvements or discoveries or both as described in an application for Letters Patent of the United States entitled

RELOCATING DATA FROM AN END OF LIFE STORAGE DRIVE BASED ON STORAGE DRIVE LOADS IN A DATA STORAGE SYSTEM USING MAPPED RAID (REDUNDANT ARRAY OF INDEPENDENT DISKS) TECHNOLOGY

which is further identified by Attorney Docket Number 1003-595.001;

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NOW, THEREFORE, to all whom it may concern be it known that for and in consideration of said agreements and of other good and valuable consideration, the receipt of which is hereby acknowledged, I have sold, assigned and transferred and by these presents do hereby sell, assign and transfer unto said ASSIGNEE, its successors, assigns and legal representatives, the entire right, title and interest in and throughout the United States of America, its territories and all foreign countries, in and to said invention as described in said application, together with the entire right, title and interest in and to said application and such Letters Patent as may issue thereon; said invention, application and Letters Patent to be held and enjoyed by said ASSIGNEE for its own use and behalf and for its successors, assigns and legal representatives, to the full end of the term for which said Letters Patent may be granted as fully and entirely as the same would have been held by me had this assignment and sale not been made; I hereby convey to ASSIGNEE all rights arising under or pursuant to any and all international agreements, treaties or laws relating to the protection of industrial property by filing any such applications for Letters Patent. I hereby acknowledge that this assignment, being of the entire right, title and interest in and to said invention, carries with it the right in ASSIGNEE to apply for and obtain from competent authorities in all countries of the world any and all Letters Patent by attorneys and agents of ASSIGNEE's selection and the right to procure the grant of all such Letters Patent to ASSIGNEE for its own name as assignee of the entire right, title and interest therein;

AND, I hereby further agree for myself and my executors and administrators to execute upon request any other lawful documents and likewise to perform any other lawful acts which may be deemed necessary to secure fully the aforesaid invention to said ASSIGNEE, its successors, assigns and legal representatives, but at its or their expense and charges, including the execution of applications for patents in foreign countries, and the execution of substitution, reissue, divisional or continuation applications and preliminary or other statements and the giving of testimony in any interference or other proceeding in which said invention or any application or patent directed thereto may be involved;

AND, I do hereby authorize and request the Commissioner of Patents of the United States to issue such Letters Patent as shall be granted upon said application or applications based thereon to said ASSIGNEE, its successors, assigns, and legal representatives;

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(15/888,647 , filed 2/5/18)

the application number and filing date of said application (or foreign counterpart application) to facilitate the recording or other official processing of this Assignment.

PATENT ASSIGNMENT
Attorney Docket No.: 1003-595.001
Client Docket No.: 109918.02

Date: 2018.1.25

Inventor's Signature

Legal name of inventor: Jian Gao

Residence:
601#, Building 16, Rongfeng 2008
Guanganmen Wai Street, Xicheng District
Beijing, 100000
China (People's Republic)

Mailing Address: Same as Above
Citizenship: CN

I Sihang Xia (name) whose residential address is 7F, Block D, Tsinghua Science Park, NO.1 Zhongguancun East Road, Beijing was personally present and did see Jian Gao (name of person signing the assignment) who is personally known to me, execute the above assignment.

Sihang Xia (signature of first witness)

Signed at Beijing, China (location of witness signature)

on this day 1/25 of 2018. (date of signature)

I Zhenhua Zhao (name) whose residential address is 7F, Block D, Tsinghua Science Park No.1 Zhongguancun East Road Beijing was personally present and did see Jian Gao (name of person signing the assignment) who is personally known to me, execute the above assignment.

Zhenhua Zhao (signature of second witness)

Signed at Beijing, China (location of witness signature)

on this day Jan 25 of 2018. (date of signature)