

<b>PATENT ASSIGNMENT COVER SHEET</b>
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Electronic Version v1.1  
 Stylesheet Version v1.2

EPAS ID: PAT4171350

<b>SUBMISSION TYPE:</b>	NEW ASSIGNMENT
<b>NATURE OF CONVEYANCE:</b>	ASSIGNMENT
<b>CONVEYING PARTY DATA</b>	
<b>Name</b>	<b>Execution Date</b>
SATISH VISVANATHAN	10/18/2016
DEBASISH GARAI	10/18/2016
YAMINI ALLU	11/07/2016
BALAJI SUBRAMANIAN	10/18/2016
<b>RECEIVING PARTY DATA</b>	
<b>Name:</b>	EMC IP HOLDING COMPANY LLC
<b>Street Address:</b>	176 SOUTH STREET
<b>City:</b>	HOPKINTON
<b>State/Country:</b>	MASSACHUSETTS
<b>Postal Code:</b>	01748
<b>PROPERTY NUMBERS Total: 2</b>	
<b>Property Type</b>	<b>Number</b>
<b>Application Number:</b>	15280949
<b>Application Number:</b>	15280966
<b>CORRESPONDENCE DATA</b>	
<b>Fax Number:</b>	
<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>	
<b>Phone:</b>	408-562-1446
<b>Email:</b>	deanna.santos@emc.com
<b>Correspondent Name:</b>	DEANNA SANTOS, EMC IP HOLDING COMPANY LLC
<b>Address Line 1:</b>	2831 MISSION COLLEGE BOULEVARD
<b>Address Line 4:</b>	SANTA CLARA, CALIFORNIA 95054
<b>ATTORNEY DOCKET NUMBER:</b>	EMC-16-0425, EMC-16-0873
<b>NAME OF SUBMITTER:</b>	JOHN GOULD
<b>SIGNATURE:</b>	/John Gould/
<b>DATE SIGNED:</b>	12/06/2016
<b>Total Attachments: 12</b>	
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## ASSIGNMENT

WHEREAS, we, Satish Visvanathan, Debasish Garai, Yamini Allu and Balaji Subramanian 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 METHOD TO IMPROVE THE I/O PERFORMANCE IN A DEDUPLICATED STORAGE SYSTEM, the specification of which:

- is being executed on even date herewith and is about to be filed in the United States Patent Office;
- was filed on September 29, 2016 as U.S. Application No. 15/280,949;
- was patented under U.S. Patent No. \_\_\_\_\_ on \_\_\_\_\_.

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

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, we 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 us had this assignment and sale not been made; we 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. We 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, we hereby further agree for ourselves and our 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, we 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, we hereby authorize our attorneys, EMC IP Holding Company LLC, to insert here in parenthesis (\_\_\_\_\_) the application number and filing date of said Application (or foreign counterpart application) to facilitate the recording or other official processing of this Assignment.

IN TESTIMONY WHEREOF, we have hereunto set our hands and affixed our seals as set forth below:

Date: 10/18/2016

[Signature]  
Inventor's Signature

Print full name of inventor: **Satish Visvanathan**  
Residence: 7070 Rainbow Drive, Apt. #2  
San Jose, CA 95129  
Citizenship: India  
Mailing Address: Same as above

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF California  
COUNTY OF Santa Clara

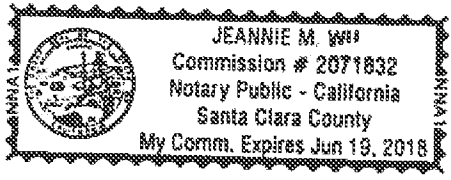
On this 18<sup>th</sup> day of October, 2016, before me appeared Satish Visvanathan who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

[Signature]  
Notary Public

Print Name: Jeannie M. Lev  
My Commission expires 6/19/2018



Date: 10/18/2016

Debasish Garai  
Inventor's Signature

Print full name of inventor: **Debasish Garai**  
Residence: 10200 Miller Avenue, Number 307  
Cupertino, CA 95014  
Citizenship: India  
Mailing Address: Same as above

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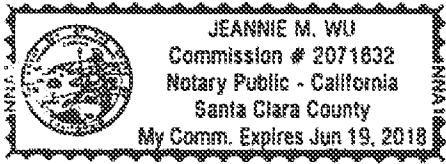
On this 18<sup>th</sup> day of October, 2016 before me appeared Debasish Garai who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

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WITNESS my hand and official seal.

Jeannie M. Wli  
Notary Public

Print Name: Jeannie M. Wli  
My Commission expires 6/19/2018



Date: 11/7/2016

[Handwritten Signature]  
Inventor's Signature

Print full name of inventor: **Yamini Allu**  
Residence: 500 Mansion Court, Apt. 314  
Santa Clara, CA 95054  
Citizenship: India  
Mailing Address: Same as above

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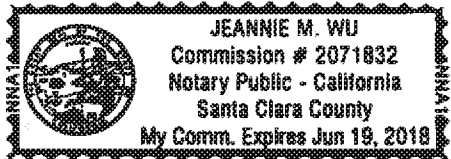
On this 7<sup>th</sup> day of November, 2016, before me appeared Yamini Allu who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

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WITNESS my hand and official seal.

[Handwritten Signature]  
Notary Public

Print Name: Jeannie M. Wu  
My Commission expires 6/19/2018 ow



Date: 10/18/2016

  
Inventor's Signature

Print full name of inventor: **Balaji Subramanian**  
Residence: 1525 White Birch Terrace, Apt. 107  
Fremont, CA 94536  
Citizenship: India  
Mailing Address: Same as above


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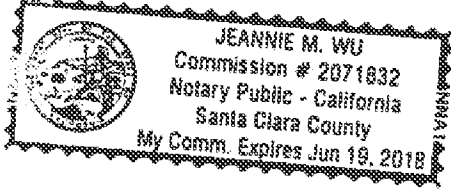
On this 18<sup>th</sup> day of October, 2016, before me appeared Balaji Subramanian who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

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Notary Public

Print Name: Jeannie M. Wu  
My Commission expires 6/19/2018





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- was filed on September 29, 2016 as U.S. Application No. 15/280,966;
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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, we 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 us had this assignment and sale not been made; we 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. We 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, we hereby further agree for ourselves and our 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,

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Date: 10/18/2016

[Signature]  
Inventor's Signature

Print full name of inventor: **Satish Visvanathan**  
Residence: **7070 Rainbow Drive, Apt. #2**  
**San Jose, CA 95129**  
Citizenship: **India**  
Mailing Address: **Same as above**

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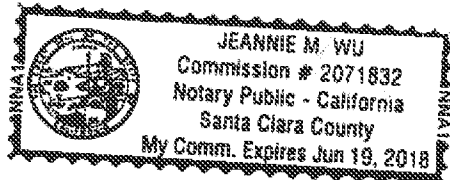
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[Signature]  
Notary Public

Print Name: Jeannie M. Wu  
My Commission expires 6/19/2018



Date: 10/18/2016

Debasish Garai  
Inventor's Signature

Print full name of inventor: **Debasish Garai**  
Residence: 10200 Miller Avenue, Number 307  
Cupertino, CA 95014  
Citizenship: India  
Mailing Address: Same as above

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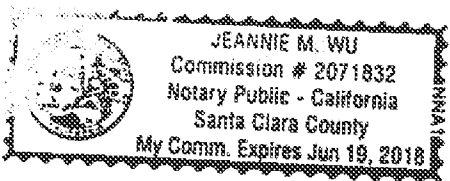
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WITNESS my hand and official seal.

Jeanie M. Wu  
Notary Public

Print Name: Jeanie M. Wu

My Commission expires 6/19/2018



Date: 11/7/2016

[Signature]  
Inventor's Signature

Print full name of inventor: **Yamini Allu**  
Residence: 500 Mansion Court, Apt. 314  
Santa Clara, CA 95054  
Citizenship: India  
Mailing Address: Same as above

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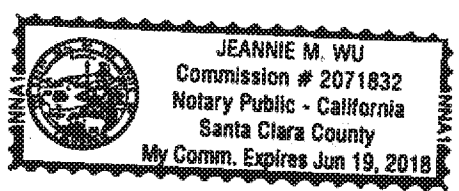
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Print Name: Jeannie M. Wu  
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Date: 10/18/2016

  
\_\_\_\_\_  
Inventor's Signature

Print full name of inventor: **Balaji Subramanian**  
Residence: 1525 White Birch Terrace, Apt. 107  
Fremont, CA 94536  
Citizenship: India  
Mailing Address: Same as above

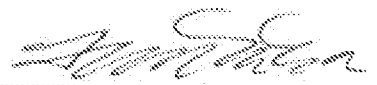
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\_\_\_\_\_  
Notary Public

Print Name: Jeannie M. Wu  
My Commission expires 6/19/2018

