# PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT6033717

| SUBMISSION TYPE: | NEW ASSIGNMENT |
|---|---|
| NATURE OF CONVEYANCE: | SECURITY AGREEMENT |

### CONVEYING PARTY DATA

| Name | Execution Date |
|---|---|
| DELL PRODUCTS L.P. | 03/26/2020 |
| EMC IP HOLDING COMPANY LLC | 03/26/2020 |

### RECEIVING PARTY DATA

| | |
|---|---|
| Name: | CREDIT SUISSE AG, CAYMAN ISLANDS BRANCH |
| Street Address: | 7033 LOUIS STEPHENS DRIVE |
| Internal Address: | PO BOX 110047 |
| City: | RESEARCH TRIANGLE PARK |
| State/Country: | NORTH CAROLINA |
| Postal Code: | 27709 |

### PROPERTY NUMBERS Total: 672

| Property Type | Number |
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| Application Number: | 16292675 |
| Application Number: | 16673686 |
| Application Number: | 16673714 |
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| **Patent Number:** | 10521398 |
| **Patent Number:** | 10521124 |
| **Patent Number:** | 10528430 |
| **Patent Number:** | 10528741 |
| **Patent Number:** | 10530859 |
| **Patent Number:** | 10528875 |
| **Patent Number:** | 10528529 |
| **Patent Number:** | 10528522 |

| Property Type | Number |
|---|---|
| **Patent Number:** | 10534558 |
| **Patent Number:** | 10536349 |
| **Patent Number:** | 10536518 |
| **Patent Number:** | 10534671 |
| **Patent Number:** | 10534796 |
| **Patent Number:** | 10545547 |
| **Patent Number:** | 10545926 |
| **Patent Number:** | 10545674 |

**CORRESPONDENCE DATA**

**Fax Number:**          (800)914-4240

*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:**               800-713-0755

**Email:**               Michael.Violet@wolterskluwer.com, ECarrera@cahill.com

**Correspondent Name:**  CT CORPORATION

**Address Line 1:**      4400 EASTON COMMONS WAY

**Address Line 2:**      SUITE 125

**Address Line 4:**      COLUMBUS, OHIO 43219

| | |
|---|---|
| **NAME OF SUBMITTER:** | ELAINE CARRERA |
| **SIGNATURE:** | /Elaine Carrera/ |
| **DATE SIGNED:** | 03/26/2020 |

**Total Attachments: 24**

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U.S. DEPARTMENT OF COMMERCE
United States Patent and Trademark Office

## RECORDATION FORM COVER SHEET
# PATENTS ONLY

To the Director of the U.S. Patent and Trademark Office: Please record the attached documents or the new address(es) below.

**1. Name of conveying party(ies)**

Dell Products L.P.
EMC IP Holding Company LLC

Additional name(s) of conveying party(ies) attached? ☐ Yes ☒ No

**2. Name and address of receiving party(ies)**

Name: Credit Suisse AG, Cayman Islands Branch

Internal Address: _____

Street Address: 7033 Louis Stephens Drive,

PO Box 110047

City: Research Triangle Park

State: NC

Country: USA            Zip: 27709

Additional name(s) & address(es) attached? ☐ Yes ☒ No

**3. Nature of conveyance/Execution Date(s):**

Execution Date(s) March 26, 2020

☐ Assignment                    ☐ Merger
☒ Security Agreement            ☐ Change of Name
☐ Joint Research Agreement
☐ Government Interest Assignment
☐ Executive Order 9424, Confirmatory License
☐ Other

**4. Application or patent number(s):**      ☐ This document serves as an Oath/Declaration (37 CFR 1.63).

A. Patent Application No.(s)                    B. Patent No.(s)

See Schedule I                                 See Schedule I

Additional numbers attached? ☒ Yes ☐ No

**5. Name and address to whom correspondence concerning document should be mailed:**

Name: Elaine Carrera, Senior Paralegal

Internal Address: _____

Street Address: c/o Cahill Gordon & Reindel LLP,
80 Pine Street

City: New York

State: NY            Zip: 10005

Phone Number: (212) 701-3365

Docket Number: _____

Email Address: ecarrera@cahill.com

**6. Total number of applications and patents involved:** 672

**7. Total fee (37 CFR 1.21(h) & 3.41)   $_____**

☐ Authorized to be charged to deposit account
☐ Enclosed
☐ None required (government interest not affecting title)

**8. Payment Information**

Deposit Account Number _____

Authorized User Name _____

**9. Signature:** _Elaine Carrera_                    March 26, 2020

Signature                                        Date

Elaine Carrera

Name of Person Signing

Total number of pages including cover sheet, attachments, and documents: 24

Documents to be recorded (including cover sheet) should be faxed to (571) 273-0140, or mailed to:
Mail Stop Assignment Recordation Services, Director of the USPTO, P.O.Box 1450, Alexandria, V.A. 22313-1450

PATENT
REEL: 052243 FRAME: 0793

PATENT SECURITY AGREEMENT dated as of March 26, 2020 (this "<u>Agreement</u>"), among Dell Products L.P. and EMC IP Holding Company LLC (the "<u>Grantors</u>") and Credit Suisse AG, Cayman Islands Branch, as Collateral Agent (in such capacity, the "<u>Collateral Agent</u>").

Reference is made to (a) the Credit Agreement dated as of September 7, 2016 (as amended, supplemented or otherwise modified from time to time, the "<u>Credit Agreement</u>"), among DENALI INTERMEDIATE INC., a Delaware corporation ("<u>Holdings</u>"), DELL INC., a Delaware corporation (the "<u>Company</u>"), DELL INTERNATIONAL L.L.C., a Delaware limited liability company ("<u>Dell International</u>" and a "<u>Borrower</u>"), NEW DELL INTERNATIONAL LLC, UNIVERSAL ACQUISITION CO., a Delaware corporation (a "<u>Borrower</u>" and together with Dell International, the "<u>Borrowers</u>", which on the Effective Date shall be merged with and into EMC Corporation, a Massachusetts corporation (the "<u>Target</u>"), with EMC Corporation surviving such merger, the Lenders party thereto, JPMorgan Chase Bank, N.A., as Term Loan A/Revolver Administrative Agent and Credit Suisse AG, Cayman Islands Branch, as Term Loan B Administrative Agent and Collateral Agent and (b) the Collateral Agreement dated as of September 7, 2016 (as amended, supplemented or otherwise modified from time to time, the "<u>Collateral Agreement</u>"), among the Company, the Borrowers, the other grantors from time to time party thereto and the Collateral Agent. The Lenders have agreed to extend credit to the Borrowers subject to the terms and conditions set forth in the Credit Agreement. The obligations of the Lenders to extend such credit are conditioned upon, among other things, the execution and delivery of this Agreement. The Grantors (other than the Borrowers) are Affiliates of the Borrowers, will derive substantial benefits from the extension of credit to the Borrowers pursuant to the Credit Agreement and are willing to execute and deliver this Agreement in order to induce the Lenders to extend such credit. Accordingly, the parties hereto agree as follows:

SECTION 1.     <u>Terms</u>. Capitalized terms used in this Agreement and not otherwise defined herein have the meanings specified in the Collateral Agreement or the Credit Agreement, as applicable. The rules of construction specified in Section 1.01(b) of the Collateral Agreement also apply to this Agreement.

SECTION 2.     <u>Grant of Security Interest</u>. As security for the payment or performance, as the case may be, in full of the Secured Obligations, the Grantors hereby grant to the Collateral Agent, its successors and assigns, for the benefit of the Secured Parties, a security interest (the "<u>Security Interest</u>") in all of each Grantors' right, title and interest in, to and under any Patents now owned or at any time hereafter acquired by such Grantor, including those listed on Schedule I (the "<u>Patent Collateral</u>").

SECTION 3.     <u>Collateral Agreement</u>. The Security Interest granted to the Collateral Agent herein is granted in furtherance, and not in limitation, of the security interests granted to the Collateral Agent pursuant to the Collateral Agreement. The Grantors hereby acknowledge and affirm that the rights and remedies of the Collateral Agent with respect to the Patent Collateral are more fully set forth in the Collateral Agreement, the terms and provisions of which are hereby incorporated herein by reference as if fully set forth herein. In the event of any conflict between the terms of this Agreement and the Collateral Agreement, the terms of the Collateral Agreement shall govern.

SECTION 4.     <u>Counterparts</u>. This Agreement may be executed in counterparts (and by different parties hereto on different counterparts), each of which shall constitute an original but all of which when taken together shall constitute a single contract. Delivery of an executed signature page to
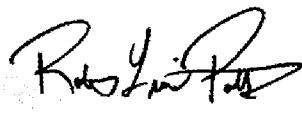
this Agreement by facsimile or other electronic transmission shall be effective as delivery of a manually signed counterpart of this Agreement.

SECTION 5. <u>GOVERNING LAW</u>. THIS AGREEMENT SHALL BE CONSTRUED IN ACCORDANCE WITH AND GOVERNED BY THE LAW OF THE STATE OF NEW YORK.

[Remainder of this page intentionally left blank]

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

Dell Products L.P.
EMC IP Holding Company LLC


By: _____

      Name:  Robert L. Potts
      Title:    Senior Vice President and Assistant
              Secretary

[Signature Page to Patent Security Agreement (Credit)]

CREDIT SUISSE AG, CAYMAN ISLANDS BRANCH,
as Collateral Agent,

By: _____
Name:   Judith E. Smith
Title    Authorized Signatory

By: _____
Name:   Emerson Almeida
Title    Authorized Signatory

[Signature Page to Patent Security Agreement (Credit)]

# SCHEDULE I

## U.S. Patent Applications

| Owner | Title | Date | App. No. |
|---|---|---|---|
| Dell Products L.P. | Information Handling System Including Light-Emitting Diode Lighting Feature | 3/5/2019 | 16/292675 |
| Dell Products L.P. | Redirection of USB Devices in Nested Hub Environments | 11/4/2019 | 16/673686 |
| Dell Products L.P. | Providing Security Features in Write Filter Environments | 11/4/2019 | 16/673714 |
| Dell Products L.P. | Gasket for Electrically Conductive Thermal Interface Material Over a Bare Die Package | 11/4/2019 | 16/672716 |
| Dell Products L.P. | Secure Risk Indicator and Method Therefor | 11/4/2019 | 16/673403 |
| Dell Products L.P. | Tamper Proof Mechanism for An Information Handling System | 11/4/2019 | 16/672760 |
| Dell Products L.P. | System and Method To Handle I/O Page Faults in An I/O Memory Management Unit | 11/4/2019 | 16/673358 |
| Dell Products L.P. | System and Method for Automatic Integration Process Building Between Multiple Applications Using Integration Assistance Bots | 11/4/2019 | 16/672936 |
| Dell Products L.P. | Enterprise Deployment Framework With Artificial Intelligence/Machine Learning | 11/5/2019 | 16/674557 |
| Dell Products L.P. | Method and Apparatus for Micro-Service Architecture for Locally Based Applications | 11/5/2019 | 16/674210 |
| Dell Products L.P. | System and Method for Identifying User Intent Using Four-Dimensional Coordinates of An Input Pointer | 11/5/2019 | 16/674220 |
| Dell Products L.P. | System and Method for Providing An Intelligent Ephemeral Distributed Service Model for Server Group Provisioning | 11/6/2019 | 16/675322 |
| Dell Products L.P. | Method and Apparatus for Improving Power Management By Controlling a System Input Current in a Power Supply Unit | 11/7/2019 | 16/676982 |
| Dell Products L.P. | Information Handling System | 11/7/2019 | 29/712383 |
| Dell Products L.P. | Portable Information Handling System | 11/7/2019 | 29/712373 |
| Dell Products L.P. | Portable Information Handling System | 11/7/2019 | 29/712385 |
| Dell Products L.P. | Information Handling System Communication Device | 11/7/2019 | 29/712379 |
| Dell Products L.P. | AI/ML Based Enterprise Microservice Topology Manager | 11/8/2019 | 16/677890 |
| Dell Products L.P. | Supporting File Exclusions and Commits in Disk-Based Write Filters | 11/8/2019 | 16/678555 |
| Dell Products L.P. | Remote Socket Splicing System | 11/11/2019 | 16/679555 |
| Dell Products L.P. | Systems and Methods for Redirection of Airflow in An Information Handling System After An Air Mover Fault | 11/11/2019 | 16/679813 |
| Dell Products L.P. | Systems and Methods for Signal Integrity Insertion Loss Minimization in Input/Output Backplanes | 11/11/2019 | 16/679867 |
| Dell Products L.P. | Method and Apparatus for Dynamic Adjustment of a Docking Station Fan Operation | 11/11/2019 | 16/679873 |
| Dell Products L.P. | Integrated Shock and Vibration Isolation | 11/12/2019 | 16/681336 |
| Dell Products L.P. | Inventory Identification | 11/12/2019 | 16/681410 |
| Dell Products L.P. | Flat Flexible Cable With Bonded Ground Wires and Method for Forming Same | 11/12/2019 | 16/681000 |
| Dell Products L.P. | System and Method for Dynamic Fan Control in An Information Handling System | 11/12/2019 | 16/681099 |
| Dell Products L.P. | Systems and Methods for Intelligent Availability in a Database Availability Group | 11/13/2019 | 16/682177 |
| Dell Products L.P. | Ruggedized Active Stylus With a Single Mechanism To Enable Access To Two Separate Chambers | 11/13/2019 | 16/681873 |
| Dell Products L.P. | System and Method for Bi-Side Heating Vapor Chamber Structure in An Information Handling System | 11/13/2019 | 16/682448 |
| Dell Products L.P. | System and Method for Generating Documentation for Microservice Based Applications | 11/14/2019 | 16/683450 |
| Dell Products L.P. | Offer Driven Deep Learning Capability | 11/14/2019 | 16/683980 |
| Dell Products L.P. | System and Method for Heat Removal Using a Thermal Potting Solution in An Information Handling System | 11/14/2019 | 16/683824 |
| Dell Products L.P. | Information Handling System Having Synchronized Power Loss Detection Armed State | 11/15/2019 | 16/685339 |
| Dell Products L.P. | Workload Optimized Server for Intelligent Algorithm Trading Platforms | 11/15/2019 | 16/684939 |
| Dell Products L.P. | Modular Data Center Having An Air Cooled External Equipment Panel | 11/15/2019 | 16/685866 |
| Dell Products L.P. | Data Center Having a Differential Pressure Relief Mechanism Between Cold and Hot Aisles | 11/15/2019 | 16/685908 |
| Dell Products L.P. | Pallet Interface for Data Center and Rack Information Handling Systems | 11/15/2019 | 16/685964 |
| Dell Products L.P. | Modular Data Center Testing | 11/15/2019 | 16/686082 |

[Schedule I to Patent Security Agreement]

| Owner | Title | Date | App. No. |
|-------|-------|------|----------|
| Dell Products L.P. | Method and Apparatus To Identify a Problem Area in An Information Handling System Based On Latencies | 11/15/2019 | 16/685303 |
| Dell Products L.P. | Method and Apparatus To Capture, Analyze, Organize, and Present Support Chat Information | 11/15/2019 | 16/685353 |
| Dell Products L.P. | System and Method To Improve Graphic User Interface Content Layout Based On Usage Information | 11/15/2019 | 16/685246 |
| Dell Products L.P. | System and Method for Prioritized Processing of Alerts From Information Handling Systems | 11/15/2019 | 16/685799 |
| Dell Products L.P. | Method and Apparatus for Generation of a Time-Based One-Time Password for Session Encryption of Sensor Data Gathered in Low-Performance and Iot Environments | 11/18/2019 | 16/687437 |
| Dell Products L.P. | Changing Air Flow Direction | 11/18/2019 | 16/687671 |
| Dell Products L.P. | System and Method for Graphical Menu Management | 11/18/2019 | 16/686836 |
| Dell Products L.P. | Universal HDR Supportability in Cross GPU Selection | 11/18/2019 | 16/687232 |
| Dell Products L.P. | Differential Trace Pair System | 11/18/2019 | 16/687408 |
| Dell Products L.P. | Storage Device Firmware Bootloader Recovery System and Method Therefor | 11/19/2019 | 16/688347 |
| Dell Products L.P. | Method and Apparatus for Thermal Management Using Different Customization Modes | 11/19/2019 | 16/688439 |
| Dell Products L.P. | System and Method for Controlling a Dynamic Voltage Regulator Slew Rate in An Information Handling System | 11/20/2019 | 16/689370 |
| Dell Products L.P. | Consistent Structured Data Hash Value Generation Across Formats and Platforms | 11/21/2019 | 16/690771 |
| Dell Products L.P. | Method and System To Avoid Temporary Traffic Loss With Bgp Ethernet Vpn Multi-Homing With Data-Plane Mac Address Learning | 11/22/2019 | 16/692163 |
| Dell Products L.P. | Software Update Compatibility Assessment | 11/22/2019 | 16/691972 |
| Dell Products L.P. | Method and Apparatus for Improving Power Management By Controlling Operations of An Uninterruptible Power Supply in a Data Center | 11/22/2019 | 16/692392 |
| Dell Products L.P. | Expansion Module System | 11/22/2019 | 16/692806 |
| Dell Products L.P. | Systems and Methods for Accelerating User Interactions On Touchscreen Devices | 11/22/2019 | 16693148 |
| Dell Products L.P. | Memory Scrub System | 11/22/2019 | 16/692200 |
| Dell Products L.P. | "Solution Attribute Registry for Providing Reusable and Repeatable Automation" | 11/22/2019 | 16/692683 |
| Dell Products L.P. | Configuring Hot-Inserted Device Via Management Controller | 11/22/2019 | 16/692180 |
| Dell Products L.P. | System and Method for Runtime Firmware Verification, Recovery, and Repair in An Information Handling System | 11/25/2019 | 16/694057 |
| Dell Products L.P. | Automatically Segmenting and Indexing a Video Using Machine Learning | 11/25/2019 | 16/693584 |
| Dell Products L.P. | Solution Workload Aware Server Configuration | 11/25/2019 | 16/695124 |
| Dell Products L.P. | Securing Passwords By Using Dummy Characters | 11/27/2019 | 16/698859 |
| Dell Products L.P. | Smart Mouse for An Information Handling System | 11/27/2019 | 16/697451 |
| Dell Products L.P. | Mechanical Switch for An Information Handling System | 11/27/2019 | 16/697397 |
| Dell Products L.P. | Method and Apparatus for Context Aware Concurrent Radio Communication With Co-Existing Wwan and Wlan Radios in Shared Spectrum | 12/2/2019 | 16/700876 |
| Dell Products L.P. | Enhancing Write Filter Features Using An Auxiliary Overlay | 12/2/2019 | 16/700440 |
| Dell Products L.P. | System and Method for Improving Server Usage Based On Anomaly Detection | 12/3/2019 | 16/701779 |
| Dell Products L.P. | Adjusting a Master Build Plan Based On Events Using Machine Learning | 12/3/2019 | 16/701351 |
| Dell Products L.P. | Contextual Update Compliance Management | 12/3/2019 | 16/701638 |
| Dell Products L.P. | System and Method for Dynamic Remote Power Management of Information Handling Systems | 12/5/2019 | 16/704319 |
| Dell Products L.P. | Runtime Update of Batman Coefficients Through DO | 12/5/2019 | 16/705014 |
| Dell Products L.P. | System and Method for Operating An Antenna Within An Antenna Vent Being Co-Located With An Audio Or Thermal Vent | 12/5/2019 | 16/705129 |
| Dell Products L.P. | System and Method for Antenna Pattern Positioning of Integrated Antenna Vent | 12/5/2019 | 16/704998 |
| Dell Products L.P. | System and Method for a Hinge Cavity Elecrtic Field Trap Using Heat Exhaust Vent Grill | 12/5/2019 | 16/704836 |
| Dell Products L.P. | World Wide Pin Support in Adapter | 12/6/2019 | 16/705834 |
| Dell Products L.P. | Group Pairing of Dongle-Less BTLE Peripherals | 12/6/2019 | 16/705300 |
| Dell Products L.P. | Adaptive Power Over Ethernet Powering System | 12/6/2019 | 16/705722 |
| Dell Products L.P. | Automatic Fabric Provisioning System | 12/6/2019 | 16/705347 |
| Dell Products L.P. | System and Method for Operation of a Hinge Cavity Antenna | 12/6/2019 | 16/706025 |
| Dell Products L.P. | Method and Apparatus for Nomination of Data Transmission Sink in Network of Gateways | 12/9/2019 | 16/708237 |
| Dell Products L.P. | Seamless Creation of Raid Arrays With Optimized Boot Time | 12/9/2019 | 16/707600 |
| Dell Products L.P. | Keyboard Having Keys With Configurable Surface Displays | 12/10/2019 | 16/708702 |

[Schedule I to Patent Security Agreement]

| Owner | Title | Date | App. No. |
|---|---|---|---|
| Dell Products L.P. | Secured Network Management Domain Access System | 12/10/2019 | 16/709214 |
| Dell Products L.P. | Dell EMC Globalization, Localization and Internationalization – Learning and Regulation Model | 12/11/2019 | 16/710592 |
| Dell Products L.P. | System and Method for Improving Thermal Performance of An Information Handling System | 12/11/2019 | 16/710578 |
| Dell Products L.P. | Digital Fulfillment of Documents and Software | 12/11/2019 | 16/709966 |
| Dell Products L.P. | User-Friendly Virtual Keypad for Hand-Held Touchscreen Devices | 12/12/2019 | 16/711740 |
| Dell Products L.P. | System and Method for Automated Management Access Point Network Connection | 12/12/2019 | 16/712127 |
| Dell Products L.P. | System and Method for Reducing Failover Times in a Redundant Management Module Configuration | 12/12/2019 | 16/712036 |
| Dell Products L.P. | Modular Data Center With Integrated Return Air Plenum for External Side-Mounted Air Cooling Unit | 12/13/2019 | 16/714381 |
| Dell Products L.P. | Method for User-Customized Keyboard Input Error Correction | 12/13/2019 | 16/714437 |
| Dell Products L.P. | Cable Isolation System | 12/13/2019 | 16/713673 |
| Dell Products L.P. | Asymmetric Logical Unit Access Path Selection System | 12/16/2019 | 16/715082 |
| Dell Products L.P. | Asymmetric Logical Unit Access Path Distribution System | 12/16/2019 | 16/715001 |
| Dell Products L.P. | System and Method To Ensure Secure and Automatic Synchronization of Credentials Across Devices | 12/16/2019 | 16/715802 |
| Dell Products L.P. | Automatic Aggregated Networking Device Backup Link Configuration System | 12/16/2019 | 16/715107 |
| Dell Products L.P. | Stack Group Merging System | 12/16/2019 | 16/715141 |
| Dell Products L.P. | System and Method for Improving a Graphical Menu | 12/17/2019 | 16/717183 |
| Dell Products L.P. | Artificial Intelligence-Based Resource Selection | 12/17/2019 | 16/716700 |
| Dell Products L.P. | Reducing Audio-Based Distractions in An Information Handling System | 12/19/2019 | 16/720668 |
| Dell Products L.P. | Cache Sharing in Virtual Clusters | 12/20/2019 | 16/723090 |
| Dell Products L.P. | Rack Mounted Equipment With Rear Post Mounted Air Filter Panels | 12/20/2019 | 16/724040 |
| Dell Products L.P. | System and Method for Managing Information Handling Systems | 12/23/2019 | 16/725240 |
| Dell Products L.P. | Compensating for Low Battery Charge Levels of a Battery in An Information Handling System | 12/23/2019 | 16/725675 |
| Dell Products L.P. | Dynamic Airflow Impedance Blank for An Information Handling Resource | 12/23/2019 | 16/725388 |
| Dell Products L.P. | Method and Apparatus for Detecting Monitoring Gap for An Information Handling System | 12/27/2019 | 16/728603 |
| Dell Products L.P. | Mindscape a Deep Learning – Computer Vision Solution Applied On Geographic Artefacts for Determining Neighborhood Score To Study Market Dynamics and Scale Account Coverage and Sales Activity. | 12/29/2019 | 16/729414 |
| Dell Products L.P. | Method Based On Neighborhood Similarity Measurement and Spend Mix Weighting To Induce Customer Spend | 12/29/2019 | 16/729416 |
| Dell Products L.P. | Portable Information Handling System and Detachable Gaming Controllers | 12/31/2019 | 29/719051 |
| Dell Products L.P. | Information Handling System and Game Controller Trigger | 12/31/2019 | 16/731428 |
| Dell Products L.P. | Information Handling System and Detachable Game Controller | 12/31/2019 | 16/731420 |
| Dell Products L.P. | Disassemble-Able Information Handling System Game Controller | 12/31/2019 | 16/731439 |
| Dell Products L.P. | Detachable Information Handling System Game Controller Management | 12/31/2019 | 16/731431 |
| Dell Products L.P. | Information Handling System Controller Illumination | 12/31/2019 | 16/731414 |
| Dell Products L.P. | Information Handling System Controller Distributable Hardware and Logic Management | 12/31/2019 | 16/731423 |
| Dell Products L.P. | Information Handling System Controller Scalable Interface | 12/31/2019 | 16/731426 |
| Dell Products L.P. | Information Handling System Controller Adaptive Haptic Feedback | 12/31/2019 | 16/731436 |
| Dell Products L.P. | Automated Detection of Unauthorized Access To Device Screens Using Machine Learning Facial Recognition Techniques | 12/31/2019 | 16/731358 |
| Dell Products L.P. | Data Center Cooling System That Selectively Delays Compressor Restart of a Mechanical Cooling System | 12/31/2019 | 16/731987 |
| Dell Products L.P. | System Management Domain and Network Management Domain Synchronization System | 12/31/2019 | 16/731946 |
| Dell Products L.P. | Systems and Methods for Pre-Conditioning System Temperature Using Liquid | 1/2/2020 | 16/732624 |
| Dell Products L.P. | Progressive Regression Impact Management for Code Changes in a Computer Program | 1/2/2020 | 16/732810 |
| Dell Products L.P. | Robotic Video Conferencing Audio Dock | 1/2/2020 | 16/733018 |
| Dell Products L.P. | Simple Gestures To Train and Correct ML Behaviors of Robotic Video Conferencing Audio Dock | 1/2/2020 | 16/733049 |
| Dell Products L.P. | Device Charger With Accessory Bays | 1/2/2020 | 16/733075 |
| Dell Products L.P. | Method for Fabricating An Apparatus of a Variable-Torque Laptop Hinge | 1/2/2020 | 16/733103 |
| Dell Products L.P. | Rack Information Handling System Having Modular Liquid Distribution (Mld) Conduits | 1/3/2020 | 16/733857 |

[Schedule I to Patent Security Agreement]

| Owner | Title | Date | App. No. |
|---|---|---|---|
| Dell Products L.P. | Unified Antenna System and Method Supporting 4G and 5G Modems in Same Device | 1/3/2020 | 16/734276 |
| Dell Products L.P. | Augmented Reality Workspace System | 1/3/2020 | 16/733308 |
| Dell Products L.P. | Mouse | 1/3/2020 | 29/719391 |
| Dell Products L.P. | System and Method of Intelligent Detection of Data Model Fieldname Lineage With Geographical Location Movement Control | 1/6/2020 | 16/735345 |
| Dell Products L.P. | Using Artificial Intelligence and Natural Language Processing for Data Collection in Message Oriented Middleware Frameworks | 1/7/2020 | 16/735951 |
| Dell Products L.P. | Using Artificial Intelligence and Natural Language Processing for Data Collection in Message Oriented Middleware Frameworks | 1/7/2020 | 16/735933 |
| Dell Products L.P. | Systems and Methods for Indicating Real Time Availability of Key Assemblies for User Input To An Information Handling System | 1/8/2020 | 16/737625 |
| Dell Products L.P. | Fabric-Based User Interface Buttons and Deformable User Interface Using Bi-Elastic Formed Information Handling System Chassis | 1/8/2020 | 16/737678 |
| Dell Products L.P. | Systems and Methods for Minimizing Boot Time When Using a Unique Key Encryption Key Per Storage Resource in Secure Enterprise Key Management Provisioning | 1/8/2020 | 16/737704 |
| Dell Products L.P. | System and Method of Intelligent Translation of Metadata Label Names and Mapping To Natural Language Understanding | 1/8/2020 | 16/737756 |
| Dell Products L.P. | Rock and Slide Wireless Dongle | 1/8/2020 | 16/737248 |
| Dell Products L.P. | System for a Solid-State Keyboard and Touchpad Providing Haptic Feedback | 1/8/2020 | 16/737331 |
| Dell Products L.P. | System and Method for Graphics Processing Unit Management Infrastructure for Real Time Data Collection | 1/9/2020 | 16/738446 |
| Dell Products L.P. | Distributed Sensing for Passive Pen | 1/9/2020 | 16/738153 |
| Dell Products L.P. | Alert Generation Based On Distance Between Two Wirelessly Connected Electronic Devices | 1/9/2020 | 16/738633 |
| Dell Products L.P. | Credential Management for An Information System | 1/9/2020 | 16/738465 |
| Dell Products L.P. | Portable Power Management Profile for An Information Handling System | 1/9/2020 | 16/738154 |
| Dell Products L.P. | Systems and Methods for Update of Storage Resource Firmware | 1/9/2020 | 16/738327 |
| Dell Products L.P. | Automatic Route Reflector Configuration System | 1/9/2020 | 16/738806 |
| Dell Products L.P. | Data Center Management System That Controls Environmental Conditions To Facilitate Operating State Changes of Individual Equipment | 1/9/2020 | 16/738782 |
| Dell Products L.P. | Systems and Methods for Hardware Root of Trust With Protected Redundant Memory for Authentication Failure Scenarios | 1/10/2020 | 16/740277 |
| Dell Products L.P. | System and Method for Trusted Control Flow Enforcement Using Derived Encryption Keys | 1/10/2020 | 16/739515 |
| Dell Products L.P. | Processor/Endpoint Communication Coupling Configuration System | 1/13/2020 | 16/741361 |
| Dell Products L.P. | Information Handling System Hinge With Integrated Coaxial Cable Connection | 1/13/2020 | 16/740643 |
| Dell Products L.P. | Data Center Cooling System That Prevents Condensation Caused By Opening External Access Doors | 1/13/2020 | 16/740792 |
| Dell Products L.P. | System and Method for An Antenna System Co-Located At a Speaker Grill | 1/13/2020 | 16/741495 |
| Dell Products L.P. | System and Method for Managing a Flow State of a User of An Information Handling System | 1/14/2020 | 16/741871 |
| Dell Products L.P. | Transceiver Device Port Configuration and Monitoring System | 1/14/2020 | 16/742078 |
| Dell Products L.P. | Mindscape a Deep Learning – Computer Vision Solution Applied On Geographic Artefacts To Classify Entities and Profile Neighborhoods Leading To Improved Product Positioning. | 1/14/2020 | 16/741948 |
| Dell Products L.P. | Mindscape a Deep Learning – Computer Vision Solution Applied On Geographic Artefacts To Study Market Dynamics That Provides a Comprehensive View of The Total Addressable Market and a Scientific Approach for Lead Mining. | 1/14/2020 | 16/741955 |
| Dell Products L.P. | Aggregated Networking Device Maintenance System | 1/14/2020 | 16/742498 |
| Dell Products L.P. | Vibration Damping and Shock Isolation in Transportation Tote | 1/15/2020 | 16/743128 |
| Dell Products L.P. | Interlocking Transportation Totes | 1/15/2020 | 16/743198 |
| Dell Products L.P. | Plastic Tote | 1/15/2020 | 16/743280 |
| Dell Products L.P. | Height-Adjustable, Motorized Transportation Tote | 1/15/2020 | 16/743426 |
| Dell Products L.P. | Edge Datacenter Nano Enclosure With Chimney and Return Air Containment Plenum | 1/15/2020 | 16/744090 |
| Dell Products L.P. | Data Center That Regulates Air Pressure Within An Interior Compartment | 1/15/2020 | 16/743193 |
| Dell Products L.P. | Data Center That Regulates Air Pressure Within An Interior Compartment | 1/15/2020 | 16/743227 |
| Dell Products L.P. | Routing Power and Data Cables To Information Handling System Racks in a Data Center | 1/15/2020 | 16/743867 |
| Dell Products L.P. | Managing Peripherals of a Dual-Body Information Handling | 1/16/2020 | 16/744658 |

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| Owner | Title | Date | App. No. |
|-------|-------|------|----------|
| Dell Products L.P. | Systems and Methods for Operating System Deployment and Lifecycle Management of a Smart Network Interface Card | 1/16/2020 | 16/744727 |
| Dell Products L.P. | Adjustable Hinge Module for Information Handling Systems | 1/16/2020 | 16/744730 |
| Dell Products L.P. | Portable Mouse for An Information Handling System | 1/17/2020 | 16/746083 |
| Dell Products L.P. | Automatic Processing of Device Damage Claims Using Artificial Intelligence | 1/17/2020 | 16/745541 |
| Dell Products L.P. | Utilizing a Smartnic for Simplified Remote Office Connectivity | 1/17/2020 | 16/746336 |
| Dell Products L.P. | Battery Management Unit Intrusion Detection | 1/17/2020 | 16/746260 |
| Dell Products L.P. | Artificial Intelligence-Based Application Guard | 1/20/2020 | 16/747083 |
| Dell Products L.P. | Dynamically Configuring a Computing System To Operate With An External Gpu Connected Via Usb-C | 1/21/2020 | 16/747776 |
| Dell Products L.P. | System and Method for Optimizing Hardware Resources for Optimal Workload Performance | 1/21/2020 | 16/748164 |
| Dell Products L.P. | System and Method for Graphics Processing Unit Firmware Updates | 1/21/2020 | 16/748037 |
| Dell Products L.P. | Fine-Grained Extended Product Support | 1/22/2020 | 16/749742 |
| Dell Products L.P. | Environmental Management Based On Temporal and Spatial Predictions | 1/22/2020 | 16/749478 |
| Dell Products L.P. | System and Method of Utilizing Different Power Levels of At Least One Processor of An Information Handling System | 1/23/2020 | 16/750277 |
| Dell Products L.P. | Storage Device Configurable Mapping Granularity System | 1/23/2020 | 16/750594 |
| Dell Products L.P. | Systems and Methods for Minimizing Frequency of Garbage Collection By Deduplication of Variables | 1/24/2020 | 16/751554 |
| Dell Products L.P. | Modified Sleep State Graphics Processing System | 1/24/2020 | 16/751283 |
| Dell Products L.P. | Haptic Pen for An Information Handling System | 1/24/2020 | 16/751365 |
| Dell Products L.P. | Optical Transceiver Monitoring System | 1/24/2020 | 16/752015 |
| Dell Products L.P. | "Llano" Method of USB-C Top Off Charging for Adapter High Voltage Reduction Buck Conversion | 1/24/2020 | 16/751684 |
| Dell Products L.P. | "Llano" Method of High Efficiency High Power Transmission/Conversion Over Conventional USB-C Cabling Into a Notebook. | 1/24/2020 | 16/751574 |
| Dell Products L.P. | "Llano" High Power Transfer Single USB-C Cable Docking Method | 1/24/2020 | 16/751618 |
| Dell Products L.P. | "Llano" Method of Hybrid Dynamic Voltage Boost Control Offsetting Low Voltage S Topology Conditions | 1/24/2020 | 16/751993 |
| Dell Products L.P. | "Llano" Wireless Power Multiply/Divide Transmission Line Topology for Efficient Small Size Transfer | 1/24/2020 | 16/751819 |
| Dell Products L.P. | "Llano" Method To Enable Adaptive High Wattage Turbo AC Adapter Support | 1/24/2020 | 16/751912 |
| Dell Products L.P. | Networking Device Replacement System | 1/24/2020 | 16/751612 |
| Dell Products L.P. | Discovery of Hmds in Co-Located Collaborative Sessions. | 1/27/2020 | 16/773158 |
| Dell Products L.P. | Microservice Management System for Recommending Modifications To Optimize Operation of Microservice-Based Systems | 1/27/2020 | 16/752798 |
| Dell Products L.P. | Machine Learning Based Intelligent Parts Catalog | 1/27/2020 | 16/752761 |
| Dell Products L.P. | "Computing Cost and Trigger Date To Remove Deprecated Softwarecompute Business Impact If Not Removing The Deprecated Softwarecompute Sequence of Updating The Deprecated Software" | 1/27/2020 | 16/773529 |
| Dell Products L.P. | System and Method for Managing Device Updates | 1/27/2020 | 16/773115 |
| Dell Products L.P. | System and Method for Managing Component Updates | 1/27/2020 | 16/773171 |
| Dell Products L.P. | System and Method for Managing Devices During Reboot | 1/27/2020 | 16/773212 |
| Dell Products L.P. | Hash Collision Prevention System | 1/27/2020 | 16/752893 |
| Dell Products L.P. | Method of Utilizing Serpentine Regions | 1/28/2020 | 16/774867 |
| Dell Products L.P. | Game Library Visualization and Recommendation Using Ontological Mapping On Information Handling System | 1/28/2020 | 16/774527 |
| Dell Products L.P. | Customizable User Interface Element Visuals for An Information Handling System | 1/28/2020 | 16/774973 |
| Dell Products L.P. | Prioritization of Processes Based On User Persona and Reinforcement Learning | 1/28/2020 | 16/774836 |
| Dell Products L.P. | Process Prioritization for Information Handling Systems | 1/28/2020 | 16/774700 |
| Dell Products L.P. | System and Method for Providing Per Channel Frequency Optimization in a Double Data Rate Memory System | 1/28/2020 | 16/774574 |
| Dell Products L.P. | System and Method of Adjusting of An Environment Associated With a User | 1/28/2020 | 16/774491 |
| Dell Products L.P. | System and Method of Utilizing Workspace Configurations | 1/28/2020 | 16/774417 |
| Dell Products L.P. | Rack Switch Coupling System | 1/28/2020 | 16/775189 |
| Dell Products L.P. | Keyboard Charging From An Information Handling System | 1/28/2020 | 16/774138 |
| Dell Products L.P. | KBD003 - Method To Utilize Magnetic Virtual Guard Rails for Physical On-Screen Keyboard | 1/28/2020 | 16/774142 |
| Dell Products L.P. | Dynamic Keyboard Support At Support and Display Surfaces | 1/28/2020 | 16/774133 |
| Dell Products L.P. | Touch Calibration At Keyboard Location | 1/28/2020 | 16/774136 |
| Dell Products L.P. | Selectively Transparent and Opaque Keyboard Bottom | 1/28/2020 | 16/774147 |

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|-------|-------|------|----------|
| Dell Products L.P. | Virtual Touchpad At Keyboard Location | 1/28/2020 | 16/774149 |
| Dell Products L.P. | Sm-Wless-007: Adaptive Multi Link Control Mechanism | 1/28/2020 | 16/774441 |
| Dell Products L.P. | Sm-Wless-022: Method for Adaptive Network Selection Using App Context | 1/28/2020 | 16/774517 |
| Dell Products L.P. | SM-WLESS-023: Method for Predictive Scanning and Handover Between 5G and Wifi | 1/28/2020 | 16/774590 |
| Dell Products L.P. | SM-WLESS-027: Method for Variable Scan Interval in Smartconnect Based On Activity/Motion AND SM-WLESS-29: Method for Variable Scan Based On Tof | 1/28/2020 | 16/774667 |
| Dell Products L.P. | SM-WLESS-028: Method for Using BT/2.4 Ghz Interference To Trigger WLAN Switching | 1/28/2020 | 16/774731 |
| Dell Products L.P. | Rack Switch Coupling System | 1/28/2020 | 16/774345 |
| Dell Products L.P. | Rack Switch Coupling System | 1/28/2020 | 16/774872 |
| Dell Products L.P. | Computing System Virtualization Continuous Authentication System | 1/28/2020 | 16/775153 |
| Dell Products L.P. | System and Method for Setting a Power State of An Information Handling System | 1/29/2020 | 16/775862 |
| Dell Products L.P. | Systems and Methods for Communicating Power Event of Display Device Coupled To Information Handling System | 1/29/2020 | 16/775522 |
| Dell Products L.P. | Endpoint Computing Device Network Slice Secure Certificate Provisioning and Management System | 1/29/2020 | 16/775925 |
| Dell Products L.P. | Endpoint Computing Device Dynamic Network Slice Utilization System | 1/29/2020 | 16/776305 |
| Dell Products L.P. | Endpoint Computing Device Multi-Network Slice Remediation/ Productivity System | 1/29/2020 | 16/776278 |
| Dell Products L.P. | Multl-LINK VPN LINK SELECTION SYSTEM | 1/29/2020 | 16/775636 |
| Dell Products L.P. | Endpoint Computing Device Multi-Network Slice Utilization System | 1/29/2020 | 16/775602 |
| Dell Products L.P. | Configurable Response Tracking and Monitoring of Users Who Are Responding To An Email | 1/29/2020 | 16/775367 |
| Dell Products L.P. | System and Method for Air Mover Identification | 1/29/2020 | 16/776002 |
| Dell Products L.P. | System and Method for Enhanced Cooling | 1/29/2020 | 16/776061 |
| Dell Products L.P. | Reversible Air Mover for Modular Processing Unit | 1/29/2020 | 16/775832 |
| Dell Products L.P. | System and Method for Time Synchronization | 1/29/2020 | 16/775963 |
| Dell Products L.P. | System and Method for Device Monitoring | 1/29/2020 | 16/775930 |
| Dell Products L.P. | Data Privacy Plug-In for Enterprise Instant Messaging Platform | 1/29/2020 | 16/775593 |
| Dell Products L.P. | Auto Focus of Laptop Screen Based On User Vision Requirement and Distance From Screen | 1/29/2020 | 16/775399 |
| Dell Products L.P. | Initialization Code/Data Memory Mapping System | 1/29/2020 | 16/775386 |
| Dell Products L.P. | Systems and Methods To Synchronize Power States Between Information Handling System and Display Device | 1/29/2020 | 16/775499 |
| Dell Products L.P. | System and Method for a Slot Antenna Element Co-Located At a Speaker Grill With Parasitic Aperture | 1/29/2020 | 16/776028 |
| Dell Products L.P. | Usage Profile Based Recommendations | 1/30/2020 | 16/776885 |
| Dell Products L.P. | Gameplay Event Detection and Gameplay Enhancement Operations | 1/30/2020 | 16/777199 |
| Dell Products L.P. | Gameplay Event Detection and Gameplay Enhancement Operations | 1/30/2020 | 16/777240 |
| Dell Products L.P. | Gameplay Event Detection and Gameplay Enhancement Operations | 1/30/2020 | 16/777161 |
| Dell Products L.P. | Gameplay Event Detection and Gameplay Enhancement Operations | 1/30/2020 | 16/777127 |
| Dell Products L.P. | Cooling System With Hyperbaric Fan and Evacuative Fan | 1/30/2020 | 16/777431 |
| Dell Products L.P. | System and Method of Determining Attributes of a Workspace Configuration Based On Eye Gaze Or Head Pose | 1/30/2020 | 16/776796 |
| Dell Products L.P. | Machine Learning Based Procurement As a Service | 1/30/2020 | 16/777229 |
| Dell Products L.P. | Device Component Management Using Deep Learning Techniques | 1/30/2020 | 16/776918 |
| Dell Products L.P. | Modular Removable Air Mover for Dual Access | 1/30/2020 | 16/777836 |
| Dell Products L.P. | System and Methods To  Cryptographically Verify An Identity of An Information Handling System | 1/30/2020 | 16/777415 |
| Dell Products L.P. | Data Integration Demand Management Using Artificial Intelligence | 1/30/2020 | 16/776900 |
| Dell Products L.P. | Unified Database Transition Tool | 1/30/2020 | 16/777050 |
| Dell Products L.P. | System and Method of Utilizing a Battery | 1/30/2020 | 16/776832 |
| Dell Products L.P. | Computing System Initialization System | 1/30/2020 | 16/777086 |
| Dell Products L.P. | Discovery and Configuration in Computer Networks | 1/30/2020 | 16/777515 |
| Dell Products L.P. | System and Method for Utilizing Enhanced Thermal Telemetry for Differential Storage of Data On a Memory Module | 1/31/2020 | 16/778683 |
| Dell Products L.P. | Cabled Connector With Sideband Signals To PCB | 1/31/2020 | 16/777983 |
| Dell Products L.P. | System and Method for Dynamic Power Control Based On a Cache Size in Volatile Memory | 1/31/2020 | 16/778104 |
| Dell Products L.P. | Combined Prioritization of Network Traffic Across Multiple Wireless Options. | 1/31/2020 | 16/779,493 |

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|---|---|---|---|
| Dell Products L.P. | Endpoint Triangulation Using Combinations of 5G Mmwave, LTE and Wi-Fi | 1/31/2020 | 16/779,420 |
| Dell Products L.P. | Method To Enable Battery Life Extension/Energy Savings On An Endpoint Deice Connected To Multiple Networks | 1/31/2020 | 16/779,476 |
| Dell Products L.P. | 5G Network Tiering Across Multiple Wireless Options With Load Balancing of Network Traffic | 1/31/2020 | 16/779,389 |
| Dell Products L.P. | System and Method for Beemsteering Acquisition and Optimization Using Triangulation | 1/31/2020 | 16/779344 |
| Dell Products L.P. | System and Method for Beemsteering Acquisition and Optimization in An Enhanced Reality Environment | 1/31/2020 | 16/779267 |
| Dell Products L.P. | System and Method for Beemsteering Acquisition and Optimization Using Bluetooth Protocols | 1/31/2020 | 16/779170 |
| Dell Products L.P. | Information Handling System Display Swivel Arm | 1/31/2020 | 16/778818 |
| Dell Products L.P. | Information Handling System Peripheral Enhanced User Presence Detection | 1/31/2020 | 16/778798 |
| Dell Products L.P. | Information Handling System Notification Presentation Based Upon User Presence Detection | 1/31/2020 | 16/778787 |
| Dell Products L.P. | Information Handling System Adaptive User Presence Detection | 1/31/2020 | 16/778805 |
| Dell Products L.P. | System and Method for Prioritization of Support Requests | 1/31/2020 | 16/778013 |
| Dell Products L.P. | Microcode Update System | 1/31/2020 | 16/778064 |
| Dell Products L.P. | System and Method for Translating a Software Query in An Automated Integration Process Into Natural Language | 1/31/2020 | 16/778998 |
| Dell Products L.P. | System and Method for Integration of An Antenna Element and Front-End Module Co-Located Into a Speaker Chamber | 1/31/2020 | 16/777890 |
| Dell Products L.P. | System and Method for Electromagnetic Interference Mitigation for An Antenna Element and Speaker Co-Located Within a Cavity Formed Behind a Speaker Grill | 1/31/2020 | 16/777893 |
| Dell Products L.P. | System and Method for An Isolator for a Hinge Cavity of An Information Handling System Having One Or More Antenna Elements | 1/31/2020 | 16/778745 |
| Dell Products L.P. | System for Method for a Shared Millimeter Wave Antenna System Co-Located At a Speaker Grill | 1/31/2020 | 16/777896 |
| Dell Products L.P. | System and Method for Vapor Chamber Directional Heat Dissipation for a Piezoelectric Keyboard Assembly | 1/31/2020 | 16/779523 |
| Dell Products L.P. | System for a Solid State Keyboard and Touchpad With a Single Sheet Cover for Providing Haptic Feedback | 1/31/2020 | 16/777900 |
| Dell Products L.P. | Sound Effects On Fingertips With Piezo Actuators (Of a Haptic KB) | 1/31/2020 | 16/779,565 |
| Dell Products L.P. | Mid and High Frequency Piezo Speakers From Haptic KB. | 1/31/2020 | 16/779,567 |
| Dell Products L.P. | System and Method for Application of Piezo Electric Haptic Keyboard Personal Typing Profile | 1/31/2020 | 16/777906 |
| Dell Products L.P. | System and Method for Continuous User Identification Via Piezo Haptic Keyboard and Touchpad Dynamics | 1/31/2020 | 16/777907 |
| Dell Products L.P. | KB and TP Use Dynamics To Sense Mood | 1/31/2020 | 16/779,528 |
| Dell Products L.P. | Extend Key Actions With Hard Press | 1/31/2020 | 16/779,575 |
| Dell Products L.P. | Smart Typing Assist | 1/31/2020 | 16/779,568 |
| Dell Products L.P. | Full Palmrest Haptics in a Fixed Layout | 1/31/2020 | 16/779,546 |
| Dell Products L.P. | Full Palmrest Haptics in a Reconfigurable Layout | 1/31/2020 | 16/779,554 |
| Dell Products L.P. | System and Method for Backlight Integration With Electrical Contact Foil in Piezoelectric Haptic Keyboard | 1/31/2020 | 16/777911 |
| Dell Products L.P. | Connector Release Assist System | 1/31/2020 | 16/778972 |
| Dell Products L.P. | Card/Chassis Coupling System | 1/31/2020 | 16/779308 |
| EMC IP Holding Company LLC | Using Web Application Components With Different Web Application Frameworks in a Web Application | 11/4/2019 | 16/673052 |
| EMC IP Holding Company LLC | Method and System To Efficiently Handle Backup Discovery | 11/4/2019 | 16/673307 |
| EMC IP Holding Company LLC | Method and System To Detect and Mitigate Protection Threats Using Smart Visual Graphics | 11/4/2019 | 16/673341 |
| EMC IP Holding Company LLC | Method and System To Optimize Backup By Change Based Metadata Tracking (CBMT) for Efficient Discovery | 11/4/2019 | 16/673448 |
| EMC IP Holding Company LLC | Method and System To Capture Protection Information in DB Server for Analytics | 11/4/2019 | 16/673468 |
| EMC IP Holding Company LLC | Multi-Cursor Solution for Segment-Selection in An Active-Active Log-Structured Storage System. | 11/5/2019 | 16/674555 |
| EMC IP Holding Company LLC | Technique for Identifying Sector-Splices Caused By Outstanding-Writes During Power-Loss Event. | 11/5/2019 | 16/674477 |

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|---|---|---|---|
| EMC IP Holding Company LLC | System and Method for Dynamically Determining and Non-Disruptively Re-Balancing Memory Reclamation Memory Pools. | 11/6/2019 | 16/675572 |
| EMC IP Holding Company LLC | Method, Electronic Device and Computer Program Product for Processing Data | 11/6/2019 | 16/675397 |
| EMC IP Holding Company LLC | Method and Apparatus for Characterizing Workload Sequentiality for Cache Policy Optimization | 11/8/2019 | 16/678197 |
| EMC IP Holding Company LLC | Pre-Decompressing a Compressed Form of Data That Has Been Pre-Fetched Into a Cache To Facilitate Subsequent Retrieval of a Decompressed Form of The Data From The Cache | 11/8/2019 | 16/678826 |
| EMC IP Holding Company LLC | Method, Electronic Device and Computer Program Product for Processing Machine Learning Model | 11/8/2019 | 16/678758 |
| EMC IP Holding Company LLC | Moving File Sequences Together Across Multiple Folders | 11/12/2019 | 16/681071 |
| EMC IP Holding Company LLC | Method, Device and Computer Readable Storage Media for Managing Storage System | 11/12/2019 | 16/681175 |
| EMC IP Holding Company LLC | Unlocking a Device Using Multiple Prints | 11/13/2019 | 16/681879 |
| EMC IP Holding Company LLC | Method and Device for Data Reading and Writing | 11/14/2019 | 16/684249 |
| EMC IP Holding Company LLC | Resource Adaptation Using Nonlinear Relationship Between System Performance Metric and Resource Usage | 11/15/2019 | 62/935759 |
| EMC IP Holding Company LLC | System and Method for Analyzing Application Maximum Parallel Clone Sessions for Storage Devices | 11/15/2019 | 16/685614 |
| EMC IP Holding Company LLC | Method of Tracking and Analyzing Data Integrity Issues By Leveraging Cloud Services | 11/15/2019 | 16/685638 |
| EMC IP Holding Company LLC | Method of Tracking and Analyzing Data Integrity Issues By Leveraging Cloud Services | 11/15/2019 | 16/685625 |
| EMC IP Holding Company LLC | Method and System for Cached Early-Binding Document Search | 11/15/2019 | 16/686092 |
| EMC IP Holding Company LLC | Method and Apparatus for Adjusting Cache Prefetch Policies Based On Predicted Cache Pollution From Dynamically Evolving Workloads | 11/15/2019 | 16/685222 |
| EMC IP Holding Company LLC | Optimized Filesystem Walk for Backup Operations | 11/18/2019 | 16/686491 |
| EMC IP Holding Company LLC | Dynamic Prioritized Recovery | 11/18/2019 | 16/687440 |
| EMC IP Holding Company LLC | Method and Apparatus for Developer Code Risk Assessment | 11/18/2019 | 16/686410 |
| EMC IP Holding Company LLC | Disaster Recovery in a Distributed File System | 11/18/2019 | 16/686450 |
| EMC IP Holding Company LLC | Secure Cloud-Based Storage of Data Shared Across File System Objects and Clients | 11/18/2019 | 16/687090 |
| EMC IP Holding Company LLC | Using High Speed Data Transfer Protocol | 11/18/2019 | 16/686825 |
| EMC IP Holding Company LLC | Weighted Resource Cost Matrix Scheduler | 11/19/2019 | 16/687730 |
| EMC IP Holding Company LLC | System That Manages Connection Pool As a Common Service With Dynamic AI Based Allocation and Centralized Transaction Handling Across Multiple Micro Service Clients Or Processes | 11/19/2019 | 16/688073 |
| EMC IP Holding Company LLC | Disaster Recovery Specific Configurations, Management, and Application | 11/19/2019 | 16/688812 |
| EMC IP Holding Company LLC | Identifying and Deleting Idle Remote Sessions in a Distributed File System | 11/19/2019 | 16/688183 |
| EMC IP Holding Company LLC | Using a Smart Network Interface Controller With Storage Systems | 11/19/2019 | 16/687791 |
| EMC IP Holding Company LLC | Aperiodic Snapshot Creation Recommendation Engine | 11/20/2019 | 16/689133 |
| EMC IP Holding Company LLC | Automated Generation of An Information Technology Asset Ontology | 11/21/2019 | 16/690572 |
| EMC IP Holding Company LLC | Shared Memory Management | 11/21/2019 | 16/690467 |
| EMC IP Holding Company LLC | Method and Apparatus for Dynamically Adapting Cache Size Based On Estimated Cache Performance | 11/22/2019 | 16/691727 |
| EMC IP Holding Company LLC | Techniques for Providing I/O Hints Using I/O Flags | 11/22/2019 | 16/692145 |

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|-------|-------|------|----------|
| EMC IP Holding Company LLC | Efficient Cache Management | 11/22/2019 | 16/692386 |
| EMC IP Holding Company LLC | Continuous Data Protection | 11/22/2019 | 16/692187 |
| EMC IP Holding Company LLC | Protecting Storage Backup Configuration | 11/22/2019 | 16/692157 |
| EMC IP Holding Company LLC | Efficient Cloning of Logical Storage Devices | 11/22/2019 | 16/692742 |
| EMC IP Holding Company LLC | Enhanced Vault Save With Compression | 11/22/2019 | 16/691657 |
| EMC IP Holding Company LLC | Storage System Having Storage Engines With Multi-Initiator Host Adapter and Fabric Chaining | 11/22/2019 | 16/691814 |
| EMC IP Holding Company LLC | Storage System Having Compute Nodes With Redundant Fabric Access | 11/22/2019 | 16/691842 |
| EMC IP Holding Company LLC | Storage System Having Storage Engines and Disk Arrays Interconnected By Redundant Fabrics | 11/22/2019 | 16/691795 |
| EMC IP Holding Company LLC | User Induced Password Scrambling To Prevent Password Theft | 11/25/2019 | 16/693972 |
| EMC IP Holding Company LLC | Solid State Tier Optimization Using a Content Addressable Caching Layer | 11/25/2019 | 16/693863 |
| EMC IP Holding Company LLC | Host Device With Multi-Path Layer Implementing Efficient Load Balancing for Active-Active Configuration | 11/25/2019 | 16/694291 |
| EMC IP Holding Company LLC | Ai Driven Supplier Selection and Tam Allocation | 11/25/2019 | 16/693819 |
| EMC IP Holding Company LLC | Micro Services Recommendation System for Identifying Code Areas At Risk | 11/25/2019 | 16/694107 |
| EMC IP Holding Company LLC | Storage System With Prioritized Raid Rebuild | 11/25/2019 | 16/693858 |
| EMC IP Holding Company LLC | Method and Apparatus for File System | 11/25/2019 | 16/693510 |
| EMC IP Holding Company LLC | Moving Files Between Storage Devices Based On Analysis of File Operations | 11/25/2019 | 16/693859 |
| EMC IP Holding Company LLC | An Innovative Airflow Leaking-Proof Self-Sealing NVME Drive Carrier Design | 11/26/2019 | 16/696384 |
| EMC IP Holding Company LLC | Metadata-Based Data Valuation | 11/27/2019 | 16/697372 |
| EMC IP Holding Company LLC | Virtual Storage Group Optimization | 11/27/2019 | 16/698530 |
| EMC IP Holding Company LLC | Input/Output Patterns and Data Pre-Fetch | 11/27/2019 | 16/698339 |
| EMC IP Holding Company LLC | Asynchronous In-Memory Data Checkpointing for Distributed Computing Systems | 11/27/2019 | 16/697752 |
| EMC IP Holding Company LLC | Interpretable Supervised Anomaly Detection for Determining Reasons for Unsupervised Anomaly Decision | 11/27/2019 | 16/697483 |
| EMC IP Holding Company LLC | Incremental Snapshot Recovery From Remote Storage System | 11/27/2019 | 16/697544 |
| EMC IP Holding Company LLC | Automated Seamless Migration of Logical Storage Devices | 11/27/2019 | 16/697393 |
| EMC IP Holding Company LLC | Fraud Mitigation Using One Or More Enhanced Spatial Features | 11/27/2019 | 16/697554 |
| EMC IP Holding Company LLC | Storing An Entity As An Object Or a File in a Hybrid Storage System Based On An Accessing Protocol | 11/27/2019 | 16/698133 |
| EMC IP Holding Company LLC | Selective Instantiation of a Storage Service for a Doubly Mapped Redundant Array of Independent Nodes | 11/27/2019 | 16/698096 |
| EMC IP Holding Company LLC | Predicting and Handling of Slow Disk | 11/27/2019 | 16/697260 |
| EMC IP Holding Company LLC | Methods and Systems for Identifying Optimal Network Paths Within An Association | 11/29/2019 | 16/699546 |
| EMC IP Holding Company LLC | Methods and Systems for Automatically and Securely Joining An Association | 11/29/2019 | 16/699548 |
| EMC IP Holding Company LLC | Method, Device, and Computer Program Product for Managing Data Object | 11/30/2019 | 16/699580 |
| EMC IP Holding Company LLC | Method, Apparatus and Computer Program Product for Processing I/O Request | 11/30/2019 | 16/699578 |

[Schedule I to Patent Security Agreement]

| Owner | Title | Date | App. No. |
|-------|-------|------|----------|
| EMC IP Holding Company LLC | Directory Selective Backups | 12/2/2019 | 16/700612 |
| EMC IP Holding Company LLC | Equipment Module Adapter Blocks | 12/2/2019 | 16/700542 |
| EMC IP Holding Company LLC | Detection of Resource Bottlenecks in User Devices Using Artificial Intelligence and Causal Graphs | 12/2/2019 | 16/700428 |
| EMC IP Holding Company LLC | Apparatus, Method and System for Managing Power | 12/3/2019 | 16/701594 |
| EMC IP Holding Company LLC | Method and Apparatus for Data Copy | 12/5/2019 | 16/704748 |
| EMC IP Holding Company LLC | Method Or Apparatus To Read/Recover User Files From a Corrupted Backup Image Using Backup Application | 12/5/2019 | 16/704268 |
| EMC IP Holding Company LLC | Method, Device and Computer Program Product for Performing Test Cases | 12/6/2019 | 16/705686 |
| EMC IP Holding Company LLC | Method and Apparatus for Data Protection | 12/6/2019 | 16/706269 |
| EMC IP Holding Company LLC | System and Method for Secure Communication Channel Establishment | 12/6/2019 | 16/706636 |
| EMC IP Holding Company LLC | Method and System for Providing Processor-Addressable Persistent Memory To Guest Operating Systems in a Storage System | 12/6/2019 | 16/705307 |
| EMC IP Holding Company LLC | Method and System for Efficiently Evicting Data From Memory Slots in a Storage System | 12/6/2019 | 16/705323 |
| EMC IP Holding Company LLC | System and Method for Managing Secured Communication Channel Sessions for Applications Sharing a Port | 12/6/2019 | 16/706621 |
| EMC IP Holding Company LLC | A Summary File Change Log for Faster Forever Incremental Backup | 12/9/2019 | 16/707859 |
| EMC IP Holding Company LLC | Optimized Backup of Clusters With Multiple Proxy Servers | 12/9/2019 | 16/707829 |
| EMC IP Holding Company LLC | Additive Library for Data Structures in a Flash Memory | 12/9/2019 | 16/707895 |
| EMC IP Holding Company LLC | Web Client Authentication and Authorization | 12/9/2019 | 16/707937 |
| EMC IP Holding Company LLC | System and Method for Reference Tracking Garbage Collector | 12/10/2019 | 16/709479 |
| EMC IP Holding Company LLC | Cache Memory Management | 12/10/2019 | 16/709013 |
| EMC IP Holding Company LLC | Techniques for Scavenging of Free Provisioned Blocks | 12/10/2019 | 16/708515 |
| EMC IP Holding Company LLC | Path Selection Modification for Non-Disruptive Upgrade of a Host Device | 12/11/2019 | 16/710804 |
| EMC IP Holding Company LLC | Automated Seamless Migration With Signature Issue Resolution | 12/11/2019 | 16/710828 |
| EMC IP Holding Company LLC | User-Based Recovery Point Objectives for Disaster Recovery | 12/11/2019 | 16/710825 |
| EMC IP Holding Company LLC | User-Based Recovery Point Objectives for Disaster Recovery | 12/11/2019 | 16/710939 |
| EMC IP Holding Company LLC | Methods, Systems, and Computer Readable Mediums for Workload Clustering | 12/12/2019 | 16/712032 |
| EMC IP Holding Company LLC | Method and System for Processing Data | 12/12/2019 | 16/711672 |
| EMC IP Holding Company LLC | RLC in a Distributed System | 12/12/2019 | 16/712747 |
| EMC IP Holding Company LLC | Proxy License Server for Host-Based Software Licensing | 12/12/2019 | 16/711742 |
| EMC IP Holding Company LLC | Web Element Path Location in Dynamic Web Pages | 12/12/2019 | 16/712212 |
| EMC IP Holding Company LLC | System and Method for Intelligent Backup Scheduling and Management | 12/12/2019 | 16/711920 |
| EMC IP Holding Company LLC | Retention Lock Compliance With Dual-Party Authentication for Secure Data Protection | 12/12/2019 | 16/712684 |
| EMC IP Holding Company LLC | System and Method To Enable File Level Recovery of Virtual Disks and Dynamic Disks | 12/13/2019 | 16/713480 |
| EMC IP Holding Company LLC | Installing Patches During Upgrades | 12/13/2019 | 16/714040 |

[Schedule I to Patent Security Agreement]

| Owner | Title | Date | App. No. |
|-------|-------|------|----------|
| EMC IP Holding Company LLC | Automatic IO Stream Timing Determination in Live VM Images | 12/13/2019 | 16/713722 |
| EMC IP Holding Company LLC | Self Healing Fast Sync Any Point in Time Replication Systems Using Augmented Merkle Trees | 12/13/2019 | 16/713734 |
| EMC IP Holding Company LLC | Using Merkle Trees in Any Point in Time Replication | 12/13/2019 | 16/713146 |
| EMC IP Holding Company LLC | System and Method To Enable File Level Recovery of Virtual Disks and Dynamic Disks | 12/13/2019 | 16/713,447 |
| EMC IP Holding Company LLC | Transmission Mechanism Fault Zone Groups Based On Power Sources for Purposes of Data Movement, Protection, Archival and Recovery in Edge and Iot Devices in a 5G, Small Cell World | 12/13/2019 | 16/713347 |
| EMC IP Holding Company LLC | Dynamic Gesture Control for Workload Management in Data Centers | 12/13/2019 | 16/713031 |
| EMC IP Holding Company LLC | System and Method for Generating Asset Maps | 12/13/2019 | 16/713694 |
| EMC IP Holding Company LLC | Configuration System and Method for An Integrated Computing System | 12/16/2019 | 16715622 |
| EMC IP Holding Company LLC | Devices, Systems, and Methods for Thermal Management of Rack-Mounted Computing Infrastructure Devices | 12/16/2019 | 16/715310 |
| EMC IP Holding Company LLC | Cache Storage for Streaming Data | 12/16/2019 | 16/715717 |
| EMC IP Holding Company LLC | Pattern-Aware Prefetching Using Parallel Log-Structured File System | 12/17/2019 | 16/716972 |
| EMC IP Holding Company LLC | System and Method for Policy Based Migration Using Mtree Replication With Data Protection Applications | 12/17/2019 | 16/717,927 |
| EMC IP Holding Company LLC | Installing Multiple Patching During Upgrades | 12/18/2019 | 16/718381 |
| EMC IP Holding Company LLC | Consolidating Garbage Collector in a Data Storage System | 12/18/2019 | 16/718776 |
| EMC IP Holding Company LLC | AI-Based Online Recovery of Non-Critical Business Process Data With Referential Integrity | 12/18/2019 | 16/718363 |
| EMC IP Holding Company LLC | Third Party Management Threat Analysis and Risk Mitigation | 12/20/2019 | 16/722661 |
| EMC IP Holding Company LLC | Crowdsourcing and Organizing Multiple Devices To Perform An Activity | 12/20/2019 | 16/722128 |
| EMC IP Holding Company LLC | An Extremely Reliable Copy Data Management System | 12/20/2019 | 16/722548 |
| EMC IP Holding Company LLC | An Intelligent Method To Schedule Maintenance Jobs Based On CPU Credit in AWS Cloud | 12/20/2019 | 16/723813 |
| EMC IP Holding Company LLC | Preliminary Data Protections Using Composite Copiers of Data in a Data Storage System | 12/23/2019 | 16/724803 |
| EMC IP Holding Company LLC | Predicting and Deleting Idle Remote Sessions in a Distributed File System | 12/23/2019 | 16/725498 |
| EMC IP Holding Company LLC | An AHP Based Load Balance and Scale Out Method in Vcd Data Protection Extension | 12/23/2019 | 16/724709 |
| EMC IP Holding Company LLC | A Method To Provide Seamless Data Protection Between Vsphere and Vcloud Director | 12/23/2019 | 16/724662 |
| EMC IP Holding Company LLC | Affinity Sensitive Storage of Data Corresponding To a Doubly Mapped Redundant Array of Independent Nodes | 12/24/2019 | 16/726428 |
| EMC IP Holding Company LLC | Host Device With Path Selection Modification Responsive To Mismatch in Initiator-Target Negotiated Rates | 12/26/2019 | 16/727079 |
| EMC IP Holding Company LLC | System and Method for Deployment Interface | 12/26/2019 | 16/727705 |
| EMC IP Holding Company LLC | Predictive Content Delivery-Network Protocol | 12/26/2019 | 16/727047 |
| EMC IP Holding Company LLC | System and Method for Enhancing Asset Maps | 12/26/2019 | 16/727672 |
| EMC IP Holding Company LLC | Fast Input/Output in a Content-Addressable Storage Architecture With Paged Metadata | 12/27/2019 | 16/728599 |
| EMC IP Holding Company LLC | Trust Domain Secure Enclaves in Cloud Infrastructure | 12/27/2019 | 16/728112 |
| EMC IP Holding Company LLC | Device Having Time Division Multiplexing Capability of Heat Dissipation | 12/27/2019 | 16/728215 |

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| Owner | Title | Date | App. No. |
|---|---|---|---|
| EMC IP Holding Company LLC | Outlier Object Detection in Tiering File System | 12/27/2019 | 16/728805 |
| EMC IP Holding Company LLC | Client-Side Encryption and Processing of Telemetry Data | 12/27/2019 | 16/728444 |
| EMC IP Holding Company LLC | Determining Capacity in Storage Systems Using Machine Learning Techniques | 12/30/2019 | 16/729841 |
| EMC IP Holding Company LLC | Web Content Transfer Utilizing Messages of Messaging Protocol of Cellular Voice Network | 12/30/2019 | 16/730153 |
| EMC IP Holding Company LLC | A Method of Estimating Remaining Time for Deployment and Upgrade for a Multi-Component Product | 12/30/2019 | 16/730310 |
| EMC IP Holding Company LLC | Automatic Global Dataless File Set Snapshots for Rollback Recovery | 12/30/2019 | 16/730351 |
| EMC IP Holding Company LLC | Increasing Security of a Computing Device Based On Determining a User's State of Consciousness | 12/30/2019 | 16/729920 |
| EMC IP Holding Company LLC | Method and Device for Searching Character String | 12/31/2019 | 16/731374 |
| EMC IP Holding Company LLC | Packaging Container and Method for Charging a Stack of Electronic Devices | 12/31/2019 | 16/731465 |
| EMC IP Holding Company LLC | Method and Apparatus of Smart Watchlist With Limited Resource | 12/31/2019 | 16/731335 |
| EMC IP Holding Company LLC | Obtaining of Statistical Performance of Storage System | 12/31/2019 | 16/731924 |
| EMC IP Holding Company LLC | Storage System With Decrement Protection of Reference Counts | 1/2/2020 | 16/732976 |
| EMC IP Holding Company LLC | Namespace Performance Acceleration By Selective Ssd Caching | 1/2/2020 | 16/732955 |
| EMC IP Holding Company LLC | System and Method of Uninterrupted File Level Restore Service Using Siamese Engine | 1/3/2020 | 16/734243 |
| EMC IP Holding Company LLC | System and Method for Uninterrupted File Level Backup Using a Virtual File Object Queue | 1/3/2020 | 16/734277 |
| EMC IP Holding Company LLC | An Extra-Exogenous Method for The Detection of Anomalies in Data Center Telemetry | 1/6/2020 | 16/734838 |
| EMC IP Holding Company LLC | Multipath Device Pseudo Name To Logical Volume Mapping for Host Devices | 1/6/2020 | 16/734526 |
| EMC IP Holding Company LLC | Function Execution Environment Selection for Decomposed Application | 1/6/2020 | 16/735195 |
| EMC IP Holding Company LLC | Method, Device and Computer Program Product for Controlling a Game | 1/6/2020 | 16/734515 |
| EMC IP Holding Company LLC | Fixing Device for Double Side Heat Sink and Associated Heat Dissipating System | 1/8/2020 | 16/737430 |
| EMC IP Holding Company LLC | Performance Partitioning Leveraging Dynamic Masking Change. | 1/8/2020 | 16/736852 |
| EMC IP Holding Company LLC | Zdp Reduced Snapshot Creation | 1/8/2020 | 16/737259 |
| EMC IP Holding Company LLC | Trivial Snapshots | 1/8/2020 | 16/737360 |
| EMC IP Holding Company LLC | Parallel Processing Database System | 1/9/2020 | 16/738752 |
| EMC IP Holding Company LLC | Virtual Private Cloud That Provides Enterprise Grade Functionality and Compliance | 1/9/2020 | 16/738812 |
| EMC IP Holding Company LLC | Optimizing Write Io Bandwidth and Latency in An Active-Active Clustered System Using Storage Object Affinity To a Single Storage Node | 1/9/2020 | 16/738405 |
| EMC IP Holding Company LLC | Intelligent Data Less Hyper-V Backups in Case of Checkpoint Merging | 1/10/2020 | 16/739242 |
| EMC IP Holding Company LLC | Anonymized Storage of Monitoring Data | 1/10/2020 | 16/740009 |
| EMC IP Holding Company LLC | Activation of Performance Monitoring Component of Network Protocol Based On Network Metrics | 1/13/2020 | 16/741256 |
| EMC IP Holding Company LLC | Method and Apparatus for Dynamically Adapting Sizes of Cache Partitions in a Partitioned Cache | 1/13/2020 | 16/740601 |
| EMC IP Holding Company LLC | Multi-Tenanted Build System With Visualization of Dynamic Build Progress | 1/13/2020 | 16/740642 |
| EMC IP Holding Company LLC | Using Local Files for Multi-Process IPC On Distributed Filesystems | 1/13/2020 | 16/740831 |

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| Owner | Title | Date | App. No. |
|---|---|---|---|
| EMC IP Holding Company LLC | A Group-Based View in User Interfaces | 1/13/2020 | 16/740919 |
| EMC IP Holding Company LLC | Continuous Query Scheduling and Splitting in a Cluster-Based Data Storage System | 1/13/2020 | 16/740672 |
| EMC IP Holding Company LLC | Resource Adaptation Using Nonlinear Relationship Between System Performance Metric and Resource Usage | 1/14/2020 | 16/741962 |
| EMC IP Holding Company LLC | An Adaptor for Storage Device | 1/14/2020 | 16/742413 |
| EMC IP Holding Company LLC | Tracking Status and Restarting Distributed Replication | 1/14/2020 | 16/742665 |
| EMC IP Holding Company LLC | Efficient Non-Transparent Bridge (Ntb) Based Data Transport | 1/14/2020 | 16/742086 |
| EMC IP Holding Company LLC | Efficient Handling of Highly Amortized Metadata Page Updates in Storage Clusters With Delta Log-Based Architectures | 1/14/2020 | 16/742076 |
| EMC IP Holding Company LLC | Intelligent Compressed Data Verification in Storage System Improve Data Reliability With Little Impact | 1/14/2020 | 16/742201 |
| EMC IP Holding Company LLC | Micro Services Tests Prioritization | 1/14/2020 | 16/742470 |
| EMC IP Holding Company LLC | Real-Time Replication of Object Storage in Cloud Storage | 1/14/2020 | 16742258 |
| EMC IP Holding Company LLC | Storage Recommender System Using Generative Adversarial Network | 1/14/2020 | 16/741813 |
| EMC IP Holding Company LLC | Efficient Configuration Replication Using a Configuration Change Log | 1/14/2020 | 16/742227 |
| EMC IP Holding Company LLC | Facial Recognition Iot Application for Multi-Stream Video Using Forecasting Tools | 1/14/2020 | 16/742464 |
| EMC IP Holding Company LLC | A Method and System for Data Integrity | 1/14/2020 | 16/741989 |
| EMC IP Holding Company LLC | Dynamic Authorization in a Multi-Tenancy Environment Via Tenant Policy Profiles | 1/15/2020 | 16/743567 |
| EMC IP Holding Company LLC | Host Device With Active-Active Storage Aware Path Selection | 1/15/2020 | 16/743097 |
| EMC IP Holding Company LLC | Snapshot Rollback for Synchronous Replication | 1/15/2020 | 16/743274 |
| EMC IP Holding Company LLC | Dynamically Adjusting Redundancy Levels of Storage Stripes | 1/15/2020 | 16/743624 |
| EMC IP Holding Company LLC | Dynamic Reclamation of Storage Stripes | 1/15/2020 | 16/743643 |
| EMC IP Holding Company LLC | Dynamic Snapshot Backup in Multi-Cloud Environment | 1/15/2020 | 16/743161 |
| EMC IP Holding Company LLC | Load Balancing in a Hyper-Converged Infrastructure (HCI) Environment | 1/15/2020 | 16/743118 |
| EMC IP Holding Company LLC | Performance Tuning a Data Storage System Based On Quantified Scalability | 1/15/2020 | 16/743352 |
| EMC IP Holding Company LLC | Storage Device and Method for Controlling Fan of Storage Device | 1/15/2020 | 16/743032 |
| EMC IP Holding Company LLC | Mechanism for Intelligent Tiering of Desktop/Laptop Files in a Cloud-Based Backup As a Service (Baas) | 1/15/2020 | 16/743916 |
| EMC IP Holding Company LLC | Method for Backup Data Segregation On Multiple Storage Devices With Different Security Classifications | 1/15/2020 | 16/743863 |
| EMC IP Holding Company LLC | A Userspace Split Data-Centric Heterogeneous Computing Architecture | 1/15/2020 | 16/743553 |
| EMC IP Holding Company LLC | Efficient Data Read Operation | 1/15/2020 | 16/742947 |
| EMC IP Holding Company LLC | Data Encryption for Directly Connected Host | 1/15/2020 | 16/743004 |
| EMC IP Holding Company LLC | Data Compression for Directly Connected Host | 1/15/2020 | 16/742955 |
| EMC IP Holding Company LLC | Automated Network Configuration Changes for I/O Load Redistribution | 1/15/2020 | 16/743125 |
| EMC IP Holding Company LLC | Data Reduction Techniques for Use With Caching | 1/15/2020 | 16/743034 |

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| Owner | Title | Date | App. No. |
|---|---|---|---|
| EMC IP Holding Company LLC | Data Recovery in a Geographically Diverse Storage System Employing Erasure Coding Technology and Data Convolution Technology | 1/15/2020 | 16/743427 |
| EMC IP Holding Company LLC | Techniques for Performing Offload Copy Operations | 1/15/2020 | 16/743019 |
| EMC IP Holding Company LLC | Valency-Based Data Convolution for Geographically Diverse Storage | 1/15/2020 | 16/743397 |
| EMC IP Holding Company LLC | Availability Balanced Geographically Diverse Storage | 1/15/2020 | 16/743376 |
| EMC IP Holding Company LLC | System and Method for Asset Management | 1/15/2020 | 16/743347 |
| EMC IP Holding Company LLC | Method and System for Host-Based Caching | 1/15/2020 | 16/743729 |
| EMC IP Holding Company LLC | Installing Patches Using a Jail | 1/16/2020 | 16/744591 |
| EMC IP Holding Company LLC | Zero-Knowledge Protection for Side Channels in Data Protection To The Cloud | 1/16/2020 | 16/744814 |
| EMC IP Holding Company LLC | Doubly Mapped Redundant Array of Independent Nodes for Data Storage With High Performance | 1/17/2020 | 16/745855 |
| EMC IP Holding Company LLC | Intelligent Recommendation of System Configurations From Workload Characteristics and SLA Requirements | 1/17/2020 | 16/746238 |
| EMC IP Holding Company LLC | Method and Apparatus for Estimating a Distribution of Response Times of a Storage System for a Proposed Workload | 1/20/2020 | 16/747096 |
| EMC IP Holding Company LLC | Remote Rollback of Snapshots for Asynchronous Replication | 1/20/2020 | 16/747169 |
| EMC IP Holding Company LLC | Performance Monitoring for Storage System With Core Thread Comprising Internal and External Schedulers | 1/20/2020 | 16/747138 |
| EMC IP Holding Company LLC | Method and Apparatus for Maintaining Reliability of a Raid | 1/21/2020 | 16/748175 |
| EMC IP Holding Company LLC | Persistence Points Based Coverage Mechanism for Flow Testing in High-Performance Storage Systems | 1/21/2020 | 16/747689 |
| EMC IP Holding Company LLC | Transitioning From An Original Device To a New Device Within a Data Storage Array | 1/21/2020 | 16/747811 |
| EMC IP Holding Company LLC | Non-Disruptive Update of Host Multipath Device Dependency | 1/21/2020 | 16/747631 |
| EMC IP Holding Company LLC | Method, Device, and Computer Program Product for Storage Management | 1/21/2020 | 16/748300 |
| EMC IP Holding Company LLC | Dynamic Application Migration Across Storage Platforms | 1/22/2020 | 16/749516 |
| EMC IP Holding Company LLC | Lazy Lock Queue Reduction for Cluster Group Changes | 1/22/2020 | 16/749159 |
| EMC IP Holding Company LLC | Cluster Feature Activation and Update System | 1/22/2020 | 16/749727 |
| EMC IP Holding Company LLC | Application Aware Cache Management | 1/22/2020 | 16/749175 |
| EMC IP Holding Company LLC | Reducing Overhead of Managing Cache Areas | 1/23/2020 | 16/750067 |
| EMC IP Holding Company LLC | Storage Management Methods and Systems | 1/23/2020 | 16/750166 |
| EMC IP Holding Company LLC | Connection Management During Non-Disruptive Upgrade of Nodes | 1/23/2020 | 16/750412 |
| EMC IP Holding Company LLC | Cluster Group Change Preparation Techniques | 1/23/2020 | 16/750713 |
| EMC IP Holding Company LLC | Telemetry Enabled Power Minimization in Mesh & Edge Computing | 1/23/2020 | 16/750571 |
| EMC IP Holding Company LLC | Dynamic Workload Migration To Edge-Stations | 1/23/2020 | 16/750562 |
| EMC IP Holding Company LLC | Maintenance Cost Estimation | 1/23/2020 | 16/750678 |
| EMC IP Holding Company LLC | Methods, Systems, and Computer Readable Mediums for Selecting and Configuring a Computing System To Support a Replicated Application | 1/24/2020 | 16/752050 |
| EMC IP Holding Company LLC | Dynamic Storage Device System Configuration Adjustment | 1/24/2020 | 16/751754 |
| EMC IP Holding Company LLC | Intelligent Request Control for Rest Service | 1/24/2020 | 16/751536 |

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PATENT
REEL: 052243 FRAME: 0811

| Owner | Title | Date | App. No. |
|-------|-------|------|----------|
| EMC IP Holding Company LLC | Method, Device, and Computer Program Product for Storage Management | 1/24/2020 | 16/751652 |
| EMC IP Holding Company LLC | A Method To Support Hash Based Xcopy Synchronous Replication | 1/27/2020 | 16/773303 |
| EMC IP Holding Company LLC | Managing Uncorrectable User Data | 1/27/2020 | 16/773774 |
| EMC IP Holding Company LLC | Global Backup Scheduler Based On Integer Programming and Machine Learning | 1/27/2020 | 16/773631 |
| EMC IP Holding Company LLC | Automated Detection of User Device Security Risks Related To Process Threads and Corresponding Activity | 1/27/2020 | 16/752825 |
| EMC IP Holding Company LLC | Tape Storage Reclaimation | 1/27/2020 | 16/773139 |
| EMC IP Holding Company LLC | Efficient Deduplication Based File Movement for Load Balancing in a Scaled-Out Backup System | 1/27/2020 | 16/773906 |
| EMC IP Holding Company LLC | Method and Apparatus for Backup Communication | 1/27/2020 | 16/773915 |
| EMC IP Holding Company LLC | Event-Based Search Engine | 1/27/2020 | 16/752775 |
| EMC IP Holding Company LLC | Implementing Multiple Content Management Services Operations | 1/28/2020 | 16/774316 |
| EMC IP Holding Company LLC | System and Method for Faster RAID Rebuild Via Allocation Knowledge | 1/28/2020 | 16/774450 |
| EMC IP Holding Company LLC | System and Method for Content Aware Disk Extents Movement in Mapped RAID | 1/28/2020 | 16/774387 |
| EMC IP Holding Company LLC | Logical Backup Using a Storage System | 1/28/2020 | 16/774369 |
| EMC IP Holding Company LLC | System and Method To Achieve An Uninterrupted File Level Backup Using Passthrough Snapshot Engine | 1/28/2020 | 16/775221 |
| EMC IP Holding Company LLC | An Easy Way To Scale Out Storage Capacity Between Backup Servers Using Same Deduplication Algorithm | 1/28/2020 | 16/775194 |
| EMC IP Holding Company LLC | A Smart Way To Get Users in Data Protection Software for Enterprise Organization | 1/28/2020 | 16/775139 |
| EMC IP Holding Company LLC | Monitoring An Enterprise System Utilizing Hierarchical Clustering of Strings in Data Records | 1/29/2020 | 16/776126 |
| EMC IP Holding Company LLC | Dynamic Cloud Native Cluster Construction Using Under-Utilized Machines | 1/29/2020 | 16/776152 |
| EMC IP Holding Company LLC | Compression and Decompression of Telemetry Data for Prediction Models | 1/29/2020 | 16/775824 |
| EMC IP Holding Company LLC | Predictive Application and Data Movement Based On Secondary Source Event Probability and Priority Effective Across Edge, Cloud, and Data Centers | 1/29/2020 | 16/775690 |
| EMC IP Holding Company LLC | Using Sparse Merkle Trees for Smart Synchronization of S3 | 1/29/2020 | 16/776129 |
| EMC IP Holding Company LLC | Fast Multipath Failover | 1/29/2020 | 16/775892 |
| EMC IP Holding Company LLC | Uninterrupted Block-Based Restore Using a Virtual Container | 1/29/2020 | 16/776447 |
| EMC IP Holding Company LLC | Environmental Aware Witness for Active-Active Storage Cluster Nodes | 1/30/2020 | 16/777687 |
| EMC IP Holding Company LLC | Cache Management for Sequential Io Operations | 1/30/2020 | 16/777129 |
| EMC IP Holding Company LLC | Integration Testing of Web Applications Utilizing Dynamically Generated Automation Identifiers | 1/30/2020 | 16/776911 |
| EMC IP Holding Company LLC | Configuration-Based Code Construct for Restriction Checks in Component of a Web Application | 1/30/2020 | 16/776902 |
| EMC IP Holding Company LLC | Access Restriction for Portions of a Web Application | 1/30/2020 | 16/776892 |
| EMC IP Holding Company LLC | Automated ML Microservice and Function Generation for Cloud Native Platforms | 1/30/2020 | 16/776961 |
| EMC IP Holding Company LLC | Remote Data Forwarding Using a Nocopy Clone of a Production Volume | 1/30/2020 | 16/776615 |
| EMC IP Holding Company LLC | Enhanced Reading Or Recalling of Archived Files | 1/30/2020 | 16/776926 |
| EMC IP Holding Company LLC | Storage System Port Usage Information Sharing Between Host Devices | 1/30/2020 | 16/777064 |

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**PATENT**

| Owner | Title | Date | App. No. |
|---|---|---|---|
| EMC IP Holding Company LLC | Host-Based Transfer of Input-Output Operations From Kernel Space Block Device To User Space Block Device | 1/30/2020 | 16/777162 |
| EMC IP Holding Company LLC | Online Adaptation of Neural Network Compression Using Weight Masking | 1/30/2020 | 16/777200 |
| EMC IP Holding Company LLC | Application Aware Copy Data Management of Apps Deployed in Public Cloud Environments | 1/31/2020 | 16/778311 |
| EMC IP Holding Company LLC | Scaling-In for Geographically Diverse Storage | 1/31/2020 | 16/779208 |
| EMC IP Holding Company LLC | Method and Apparatus for Managing Storage System | 1/31/2020 | 16/778030 |
| EMC IP Holding Company LLC | Automated Stateful Counter Aggregation of Device Data | 1/31/2020 | 16/778850 |
| EMC IP Holding Company LLC | Automatically Remediating Storage Device Issues Using Machine Learning Techniques | 1/31/2020 | 16/778792 |
| EMC IP Holding Company LLC | Method and System for Delivering Message in Storage System | 1/31/2020 | 16/779430 |
| EMC IP Holding Company LLC | Automatic Assignment of Tasks To Users in Collaborative Projects | 1/31/2020 | 16/778142 |
| EMC IP Holding Company LLC | Ranking of Enterprise Devices Using Activity-Based Network Profiles and Functional Characterization-Based Device Clustering | 1/31/2020 | 16/778123 |
| EMC IP Holding Company LLC | Policy-Based Completion of Third Party Risk Assessments | 1/31/2020 | 16/778107 |
| EMC IP Holding Company LLC | Performance Improvement Recommendations for Machine Learning Models | 1/31/2020 | 16/778084 |
| EMC IP Holding Company LLC | A Method To Avoid Full Sync On Bitmap Based Synchronous Replication | 1/31/2020 | 16/778022 |
| EMC IP Holding Company LLC | Automatically Determining Sizing Configurations for Storage Components Using Machine Learning Techniques | 1/31/2020 | 16/778553 |
| EMC IP Holding Company LLC | Automatically Allocating Device Resources Using Machine Learning Techniques | 1/31/2020 | 16/778508 |
| EMC IP Holding Company LLC | Analyzing Time Series Data for Sets of Devices Using Machine Learning Techniques | 1/31/2020 | 16/778456 |
| EMC IP Holding Company LLC | Tracking Application Programming Interface Requests in a Cloud Computing System | 1/31/2020 | 16/779550 |
| EMC IP Holding Company LLC | Container and Data Mobility Platform for Edge Networks | 1/31/2020 | 16/779013 |
| EMC IP Holding Company LLC | Data Confidence Fabric Trust Brokers | 1/31/2020 | 16/778785 |
| EMC IP Holding Company LLC | Data Orchestration for Non-Relational Databases and Key-Value Storage in Multi-Cloud and Edge-Computing | 1/31/2020 | 16/777929 |
| EMC IP Holding Company LLC | Dynamic Application Management Across Multi-Cloud Computing Environment | 1/31/2020 | 16/778611 |
| EMC IP Holding Company LLC | Engramic Indexing: Predictive Mechanism for Increasing The Speed, Search and Display Across Mass Topographies Using Semantic Organization | 1/31/2020 | 16/778215 |
| EMC IP Holding Company LLC | System and Method for Redirecting Data Access To Local Trust Managers Via An Indirection Logic Service | 1/31/2020 | 16/777975 |
| EMC IP Holding Company LLC | Personalized Model Selection, and Result Interpretation, for Automated Machine Learning | 1/31/2020 | 16/777964 |
| EMC IP Holding Company LLC | Single Display of File Sequences in UI Even Though They Are Broken. | 1/31/2020 | 16/779041 |
| EMC IP Holding Company LLC | New Display Mode To Show Information On File Sequences No Matter Wherever They Are. | 1/31/2020 | 16/778973 |
| EMC IP Holding Company LLC | Update Customers When File Having Sequences Is Deleted | 1/31/2020 | 16/779122 |
| EMC IP Holding Company LLC | Methods and Systems for User Space Storage Management | 1/31/2020 | 16/778833 |
| EMC IP Holding Company LLC | Doubly Mapped Cluster Contraction | 1/31/2020 | 16/779180 |
| EMC IP Holding Company LLC | Intelligent Filesystem for Container Images | 1/31/2020 | 16/778896 |

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## Granted U.S. Patents

| Owner | Title | Granted Date | Patent Number |
|---|---|---|---|
| Dell Products L.P. | System and Method of Improving Efficiency in Parallel Data Processing of a RAID Array | 11/5/2019 | 10467156 |
| Dell Products L.P. | Operating Voltage Regulators in An Information Handling System | 11/5/2019 | 10466770 |
| Dell Products L.P. | Lane Reversal Detection and Bifurcation System | 11/12/2019 | 10474612 |
| Dell Products L.P. | Strobe Source Tracking | 11/12/2019 | 10475415 |
| Dell Products L.P. | System and Method for Controlling Cache Flush Size | 11/12/2019 | 10474583 |
| Dell Products L.P. | Remote Socket Splicing System | 11/12/2019 | 10476980 |
| Dell Products L.P. | Dynamic Media Cache Solution for a Data Storage Drive in An Information Handling System | 11/12/2019 | 10474579 |
| Dell Products L.P. | Systems and Methods To Route Over a Link Aggregation Group To a True Next Hop | 11/12/2019 | 10476797 |
| Dell Products L.P. | Metal Ceramic Chassis for Portable Devices | 11/19/2019 | 10481637 |
| Dell Products L.P. | Systems and Methods for Dynamic and Adaptive Cooling Fan Shadowing in Information Handling Systems | 11/19/2019 | 10481655 |
| Dell Products L.P. | Dynamic Thermal Responses for Computing Components | 11/26/2019 | 10488901 |
| Dell Products L.P. | System and Method of Updating An Information Handling System Via Out-Of-Band Data Transfer | 11/26/2019 | 10489162 |
| Dell Products L.P. | Messaging Queue Topology Configuration System | 11/26/2019 | 10491481 |
| Dell Products L.P. | System and Method of Compensation of a Curved Display | 12/10/2019 | 10504421 |
| Dell Products L.P. | Systems and Methods for Hardware-Based Security for Inter-Container Communication | 12/10/2019 | 10503922 |
| Dell Products L.P. | Thermoplastic Composite Materials for Portable Information Handling System Enclosures | 12/10/2019 | 10500814 |
| Dell Products L.P. | Multi Mode Dock for Dual Screen Device | 12/20/2019 | 10503207 |
| Dell Products L.P. | BLACKTOP - Security Module and Method Within An Information Handling System | 12/24/2019 | 10516668 |
| Dell Products L.P. | World Wide Pin Support in Adapter | 1/14/2020 | 10535965 |
| Dell Products L.P. | Method, Device and Computer Program Product for Executing Test Cases | 1/14/2020 | 10534699 |
| Dell Products L.P. | Method To Project Real World Light Sources On Virtual Images for XR Hmds | 1/21/2020 | 10540812 |
| Dell Products L.P. | Faster Frame Buffer Rendering Over a Network | 1/21/2020 | 10540136 |
| Dell Products L.P. | Systems and Methods for Indicating Real Time Availability of Key Assemblies for User Input To An Information Handling System | 1/28/2020 | 10547310 |
| Dell Products L.P. | System and Method for Constructive Bifurcation of I/O Unit Ports in An Information Handling System | 1/28/2020 | 10545769 |
| EMC IP Holding Company LLC | Recovering Compressed Data To Reduce Data Loss | 11/5/2019 | 10467222 |
| EMC IP Holding Company LLC | Cache Data Placement for Compression in Data Storage Systems | 11/5/2019 | 10466932 |
| EMC IP Holding Company LLC | I/O Score-Based Hybrid Replication in a Storage System | 11/5/2019 | 10467102 |
| EMC IP Holding Company LLC | Real-Time Ad Hoc Querying of Data Records | 11/5/2019 | 10467193 |
| EMC IP Holding Company LLC | Performing Application Specific Actions Without In-Guest Credential Information | 11/5/2019 | 10467034 |
| EMC IP Holding Company LLC | Methods and Apparatus for Evaluating Classification Performance of Risk Engine Models | 11/5/2019 | 10,467403 |
| EMC IP Holding Company LLC | Incremental Container State Persistency and Replication for Containerized Stateful Applications | 11/5/2019 | 10469574 |
| EMC IP Holding Company LLC | Dynamic Multitasking for Distributed Storage Systems | 11/12/2019 | 10474496 |
| EMC IP Holding Company LLC | Using Overload Correlations Between Units of Managed Storage Objects To Apply Performance Controls in a Data Storage System | 11/12/2019 | 10474383 |
| EMC IP Holding Company LLC | Method and System for Mitigating The Effect of Write and Read Disturbances in Solid State Memory Regions | 11/12/2019 | 10474370 |
| EMC IP Holding Company LLC | Method and Apparatus for Ssd/Flash Device Replacement Policy | 11/12/2019 | 10474371 |
| EMC IP Holding Company LLC | Browsing Federated Backups | 11/12/2019 | 10474539 |

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|---|---|---|---|
| EMC IP Holding Company LLC | Block Caching in a Shared Storage Environment | 11/19/2019 | 10481808 |
| EMC IP Holding Company LLC | I/O Path Optimization Based On Cache Slot Location | 11/19/2019 | 10482023 |
| EMC IP Holding Company LLC | Method and System for Optimizing Data Replication for Large Scale Archives | 11/19/2019 | 10482101 |
| EMC IP Holding Company LLC | Method and System for Providing Software Functionalities To Users of Multi-Tenant Applications Via Inheritance | 11/19/2019 | 10484483 |
| EMC IP Holding Company LLC | Data Consistency in An Encrypted Replication Environment | 11/19/2019 | 10484179 |
| EMC IP Holding Company LLC | Optimization of Flash Storage | 11/19/2019 | 10481992 |
| EMC IP Holding Company LLC | Policies Based On Combinations of Atomic Constraints | 11/26/2019 | 10489808 |
| EMC IP Holding Company LLC | Method and System for Document Similarity Analysis Based On Weak Transitive Relation of Similarity | 11/26/2019 | 10489466 |
| EMC IP Holding Company LLC | Equipment Module Adapter Blocks | 12/3/2019 | 10499528 |
| EMC IP Holding Company LLC | Forming Storage Containers From Extents Having Different Widths Within a Group of Storage Devices | 12/3/2019 | 10496316 |
| EMC IP Holding Company LLC | Backup Server Selection Based On Data Commonality | 12/3/2019 | 10496322 |
| EMC IP Holding Company LLC | Methods and Systems for Virtual Secured Transactions | 12/3/2019 | 10496972 |
| EMC IP Holding Company LLC | Reaching a Normal Operating Mode Via a Fastboot Procedure | 12/3/2019 | 10496307 |
| EMC IP Holding Company LLC | Using Storage Class Memory As a Persistent Operating System File/Block Cache | 12/3/2019 | 10496539 |
| EMC IP Holding Company LLC | Load Balancing Hadoop Distributed File System Operations in a Non-Native Operating System | 12/3/2019 | 10498804 |
| EMC IP Holding Company LLC | Optimized Tender Processing of Hash-Based Replicated Data | 12/3/2019 | 10496668 |
| EMC IP Holding Company LLC | Selective Raid Repair Based On Content Mapping | 12/3/2019 | 10496482 |
| EMC IP Holding Company LLC | Simulation of Asynchronous Modifications of Shared Data Objects By a Distributed Application | 12/3/2019 | 10496421 |
| EMC IP Holding Company LLC | Network Storage Node and Network Storage System | 12/3/2019 | 10498814 |
| EMC IP Holding Company LLC | System and Method for Capacity Management in Multi-Tiered Storage | 12/3/2019 | 10496318 |
| EMC IP Holding Company LLC | Live Object Level Inter Process Communication in Federated Backup Environment | 12/3/2019 | 10496497 |
| EMC IP Holding Company LLC | Techniques for Optimizing Entropy Computations | 12/10/2019 | 10505563 |
| EMC IP Holding Company LLC | Methods and Apparatus for San Having Local Server Storage Including Ssd Block-Based Storage | 12/10/2019 | 10503413 |
| EMC IP Holding Company LLC | Data Protection Management for Distributed Storage | 12/10/2019 | 10503611 |
| EMC IP Holding Company LLC | Method for Parallel File System Upgrade in Virtual Storage Environment | 12/10/2019 | 10503703 |
| EMC IP Holding Company LLC | Cataloging Storage Arrays | 12/10/2019 | 10503757 |
| EMC IP Holding Company LLC | Small File Storage System | 12/10/2019 | 10503697 |
| EMC IP Holding Company LLC | Fabric Management System and Method | 12/10/2019 | 10503678 |
| EMC IP Holding Company LLC | Techniques for Optimizing Entropy Computations | 12/17/2019 | 10509676 |
| EMC IP Holding Company LLC | Devices, Systems, and Methods for Thermal Management of Rack-Mounted Computing Infrastructure Devices | 12/17/2019 | 10512194 |
| EMC IP Holding Company LLC | Selective Data Mirroring | 12/17/2019 | 10509707 |
| EMC IP Holding Company LLC | Workload Genealogy and Clustering With Machine Learning Algorithms for Converged Infrastructure | 12/17/2019 | 10509685 |

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| Owner | Title | Granted Date | Patent Number |
|---|---|---|---|
| EMC IP Holding Company LLC | Systems and Methods of Predictive Display of Cloud Offerings Based On Real-Time Infrastructure Data Configurations | 12/17/2019 | 10511540 |
| EMC IP Holding Company LLC | Split-Key Based Cryptographic Techniques for Data Protection, Recovery and Synchronization Across Multiple Computing And/Or Computerized Devices | 12/24/2019 | 10516527 |
| EMC IP Holding Company LLC | Additive Library for Data Structures in a Flash Memory | 12/31/2019 | 10521123 |
| EMC IP Holding Company LLC | Hierarchical Value-Based Governance Architecture for Enterprise Data Assets | 12/31/2019 | 10521442 |
| EMC IP Holding Company LLC | Tracking Version Families in a File System | 12/31/2019 | 10521398 |
| EMC IP Holding Company LLC | Application-Specific Workload-Based I/O Performance Management | 12/31/2019 | 10521124 |
| EMC IP Holding Company LLC | Optimized Backup of Clusters With Multiple Proxy Servers | 1/7/2020 | 10528430 |
| EMC IP Holding Company LLC | Third Party Management Threat Analysis and Risk Mitigation | 1/7/2020 | 10528741 |
| EMC IP Holding Company LLC | Blockchain Functionalities in Data Storage System | 1/7/2020 | 10530859 |
| EMC IP Holding Company LLC | Methods and Apparatus Implementing Data Model for Disease Monitoring, Characterization and Investigation | 1/7/2020 | 10528875 |
| EMC IP Holding Company LLC | Multi-Core Journal System and Method | 1/7/2020 | 10528529 |
| EMC IP Holding Company LLC | Metadata-Based Data Valuation | 1/7/2020 | 10528522 |
| EMC IP Holding Company LLC | Relocating Paged Metadata | 1/14/2020 | 10534558 |
| EMC IP Holding Company LLC | Configuration System and Method for An Integrated Computing System | 1/14/2020 | 10536349 |
| EMC IP Holding Company LLC | Resource Configuration Discovery and Replication System for Applications Deployed in a Distributed Computing Environment | 1/14/2020 | 10536518 |
| EMC IP Holding Company LLC | Container Image Layer Compaction | 1/14/2020 | 10534671 |
| EMC IP Holding Company LLC | Maintaining An Active-Active Cloud Across Different Types of Cloud Storage Services | 1/14/2020 | 10534796 |
| EMC IP Holding Company LLC | Device Having Time Division Multiplexing Capability of Heat Dissipation | 1/28/2020 | 10545547 |
| EMC IP Holding Company LLC | Computer Data File System With Consistency Groups As Basic File System Objects | 1/28/2020 | 10545926 |
| EMC IP Holding Company LLC | Method and System for Ssd Performance Jitter Detection and Avoidance | 1/28/2020 | 10545674 |

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