Application: 7443

Vishal Jose Mannanal: Next-Generation Storage Platform with SMR Technology

Page: General Information

Provide information about the company to be considered for the award. If you will be nominating an individual, specify the nominee's employer.

Name of Organization/Company

Dropbox Inc.

[redacted]

Additional Contacts

I do not wish to list additional contacts

Page: Entry Information

Entry Title

Vishal Jose Mannanal: Next-Generation Storage Platform with SMR Technology

Category

Q05e. New Product of the Year - Information Technology - Hardware/Peripherals

New Product Submission Format

Written Answers

a. Briefly describe the organization that developed the nominated new product: its history and past performance (up to 200 words). Required

Dropbox Inc. has established itself as a leading cloud storage and collaboration platform, serving millions of users worldwide with its innovative storage infrastructure solutions. The company has continuously evolved its technology stack to meet growing demands for scalable and reliable data storage. Under its Platform Team's leadership, Dropbox has successfully engineered multiple generations of storage servers, with the most recent being their 7th Generation Storage server, demonstrating the company's commitment to continuous improvement and innovation.

The organization has shown remarkable foresight in adopting cutting-edge storage technologies, including the implementation of Shingled Magnetic Recording (SMR) support and the strategic adoption of Zoned Namespace (ZNS) technology. These initiatives have positioned Dropbox at the forefront of storage innovation. The company's performance optimization efforts, particularly through the reworking of IO paths with libzbd integration, have resulted in significant improvements in storage efficiency and reliability. Dropbox's collaborative approach with hardware vendors for identifying next-generation solutions and its strategic pathfinding of NVMe features demonstrate its commitment to staying ahead of industry trends while maintaining its position as a technology leader in the cloud storage space.

b. Specify the date on which this nominated product was introduced to the marketplace. Outline the nominated product's features, functions, benefits and novelty (up to 250 words). Required

Launch Date
The 7th Generation Storage Server Platform was introduced in April 2024 at Dropbox Inc.

Revolutionary Features

Vishal Jose Mannanal designed this next-generation storage platform with groundbreaking capabilities. The platform integrates libzbd, an open-source library for zoned block devices, which optimizes operations on SMR drives. This integration enables efficient sequential write strategies and better management of zoned media.

Core Functions

The platform features a custom-developed hardware library that facilitates seamless communication between the storage stack and underlying storage components. This enhances modularity and streamlines future technology integrations. The system supports Heat-Assisted Magnetic Recording (HAMR) drives and is prepared for Zoned Namespace (ZNS) SSD technology adoption.

Key Benefits

The platform delivers substantial improvements:

20% reduction in I/O latency

Enhanced sequential write performance on zoned storage devices

Improved SMR drive endurance through optimized zone management

Extended device lifetimes and reduced replacement cycles

Lower overall storage cost ($/GB)

Reduced physical footprint and energy consumption per petabyte stored

Novel Innovation

What makes this platform truly innovative is its ability to support 12 Exabytes of user and application data while positioning Dropbox's infrastructure for five years of future growth. The modular design streamlines hardware onboarding and facilitates rapid integration of emerging device technologies, making it a pioneering solution in enterprise storage.

c. Explain why the nominated product is unique or significant. If possible compare the product to competitors' offerings and/or to the organization's other or past products (up to 250 words). Required

Vishal Jose Mannanal's achievements at Dropbox Inc. as a Storage Technologist represent groundbreaking advancements in enterprise-scale storage infrastructure. His work on the 7th Generation Storage Platform demonstrates exceptional technical leadership in addressing the challenges of managing 12 Exabytes of data while preparing for future growth.

The integration of libzbd into the Linux I/O path showcases Mannanal's ability to transform proof-of-concept ideas into production-ready solutions. This enhancement achieved a 20% reduction in I/O latency and significantly improved sequential write performance on zoned storage devices, directly impacting system efficiency and drive endurance.

Technical Innovation

HAMR Technology Enablement - Partnered with leading vendors to validate Heat-Assisted Magnetic Recording drives for production deployment
ZNS Pathfinding - Led strategic evaluation of Zoned Namespace SSD technology, including BtrFS and ZenFS integrations
Modular Hardware Library - Developed streamlined communication between the storage stack and components

Business Impact

Cost Efficiency - Reduced storage cost per GB through platform optimizations

Sustainability - Decreased physical footprint and energy consumption per petabyte

Patents Filed - Two patents under review for scalable storage design

Strategic Leadership

Vishal Jose Mannanal's contributions shaped Dropbox's medium and long-term storage roadmap, positioning the company for continued infrastructure scalability. His work enables seamless technology adoption while maintaining operational resilience across the fleet.

d. Reference any attachments of supporting materials throughout this nomination and how they provide evidence of the claims you have made in this nomination (up to 250 words). Optional

Vishal Jose Mannanal works as a Storage Technologist at Dropbox Inc., where he built the 7th Generation Storage Platform that now holds 12 Exabytes of user data. The Dropbox Tech Blog article "Extending Magic Pocket Innovation with the first-petabyte scale SMR drive deployment" confirms that Vishal Jose Mannanal's work made Dropbox the first major tech company to use SMR drives at this scale, adding hundreds of petabytes of new storage space while saving money.

Vishal Jose Mannanal's libzbd integration started as a test idea but worked so well that it went into real use, cutting I/O latency by 20% and making drives last longer through better write methods. The blog post "How we optimized Magic Pocket for cold storage" shows how Vishal Jose Mannanal's work reduced storage use by 25% by organizing data based on how often people access it.

Looking ahead, Vishal Jose Mannanal worked on HAMR Technology and ZNS Pathfinding to prepare Dropbox for new types of drives. He also built a hardware library that makes it easier to add new storage technologies to the system. Vishal Jose Mannanal's efforts help Dropbox store over 90% of user files on its servers, growing from 40 petabytes to almost 500 petabytes - a 12x increase.

Vishal Jose Mannanal has filed two patents for his storage platform design. His work shows real hardware innovation that saves money, runs faster and grows with user needs.

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Supporting Document

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