



# DiskProphet®

## Analytics for Massive Disk Deployments

From scale-up SANs, scale-out NAS to hyper-converged storage, storage systems share one thing: disks. Disks are the foundations behind storage systems and relies on techniques such as RAID to protect the data residing in them. However, when failure occurs and recovery is necessary, it is time consuming and expensive, affecting the quality of service provided by the storage systems.

ProphetStor has built DiskProphet, a patented and intelligent solution to address data loss prevention for enterprise storage systems using disks of any type. With DiskProphet, data is continuously collected from traditional hard disks and solid state disks (SSD) to not only predict behavior but to also provide actionable insights.

Supporting industry standard interfaces such as SATA, SAS and NVMe, DiskProphet accurately predicts failure, fatigue, performance and usage trends to ensure that the storage infrastructure continues to operate optimally to meet the expectations of the business.

### New Approach to Data Loss Prevention for Software-Defined Storage

Software-Defined Storage (SDS) represents a way for modern business to businesses to reduce the cost of IT infrastructure. Unlike the past when proprietary storage systems required custom designs, SDS transforms commodity hardware into powerful storage systems at a fraction of the cost.

While SDS can successfully reduce infrastructure expenses, businesses must consider how it manages data loss prevention. Relying solely on techniques such as RAID, erasure code or multi-copy makes businesses reactive and only act after a failure.

DiskProphet moves businesses from a reactive to a service aware proactive state. Through state of the art machine learning, DiskProphet accurately predicts the expected life span and likelihood of failure before it can occur. Most importantly, it predicts the performance characteristics to identify the best time for replacements to be made without impacting quality of services on offer.

### DiskProphet for Storage Solutions

DiskProphet provides more than just predictive disk maintenance. It provides solutions for different types of storage systems, including scale-up, scale-out, and direct attached storage (DAS).

#### StellarFlash

ProphetStor StellarFlash, a Federator SDS powered storage array running on certified Intel®-based commodity hardware, is protected by DiskProphet. DiskProphet accesses operational data of hard disks and SSDs on the StellarFlash array through Federator SDS's REST API to predict when disk failures will occur and generates actionable prescriptions for data protection. With DiskProphet, StellarFlash becomes a resilient, cost effective and simple to manage enterprise class storage array.

#### Ceph

Ceph is an open source prominent scale-out SDS platform. It splits encoded data into chunks that are then stored on disks on hosts connected over the network. However, performance can be encumbered by disks of slower speeds. While SSDs can be used to ensure the performance of Ceph, it becomes a prohibitively expensive solution.

ProphetStor has extended DiskProphet's prediction capability to optimize Ceph operations. With this extension, DiskProphet automatically replaces slower disks with faster ones whenever IO contentions arise and automatically configures Ceph CRUSH rules after new disks are applied.



ProphetStor

#### Features

- Predictive insights
- Preventive warning
- Any storage media
- Fully automatic deployment
- Reporting and Open Rest APIs
- Improve operational efficiency

Disk



#### Performance

Predictive accuracy is over 95% (for the next 7 days)



**We Define**

[www.prophetstor.com](http://www.prophetstor.com)

## Non-stop, Cloud-ready Architecture

DiskProphet is built on a cloud ready architecture that is:

- Scalable: start from a single node and scale to hundreds of nodes or more.
- Fault tolerant: non-stop and self-healing system that protects against data loss.
- Distributed: increase performance linearly by adding more nodes.
- Easy-to-manage: Dynamically scale-up or scale-out based on the loading of data processing.

DiskProphet generates daily, weekly, and monthly reports in both HTML and CSV formats that can be saved locally, on AWS S3 or sent as an e-mail. Businesses can integrate DiskProphet as part of its storage solutions by querying the prediction results output from its REST API.

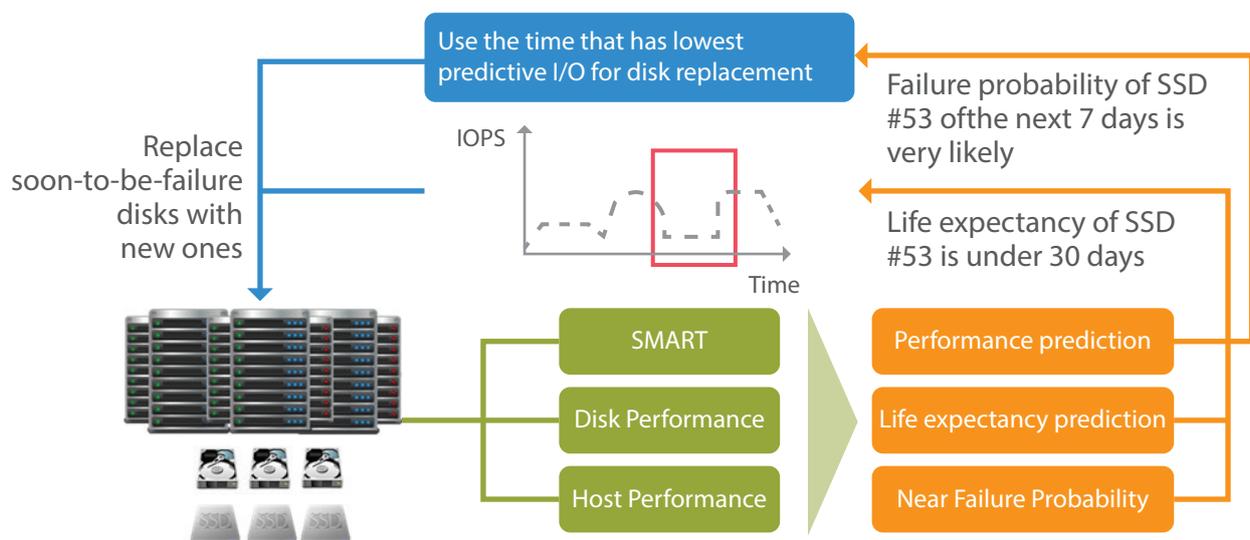
## Summary

In summary, DiskProphet helps enterprise avoid data loss resulting from disk failures and performance degradation that is caused by disk fatigue. DiskProphet delivers cloud-ready, non-stop system design and helps make SDS more reliable by addressing the high cost of current data redundancy technologies.

## Key Benefits

- Fully automatic deployment and operation
  - Deploy DiskProphet automatically on both physical machines or virtual machines with a single line of command.
  - DiskProphet is design based on Microservices architecture and is deployed as many dynamically scale-up and scale-out Docker Containers.

- Data collection
  - DiskProphet collects disk metadata and SMART values from open source disk monitoring utilities (CollectD and smartmontool)
  - ProphetStor works closely with SSD vendors to support vender-specific disk monitoring tools that provide more information than open source generic monitoring disk utilities
- Prediction
  - Apply state-of-the-art and innovative machine learning algorithms to predict behavior of disks including HDDs and SSDs across SATA, SAS, and NVMe .
  - Predict disk behaviors including performance, usage, failure, and fatigue that are critical to streamlining the operation of software-defined storage.
- Report
  - Generates both HTML and CSV format reports
  - REST API allows fine-grained query of predictive results, such as by data centers, hosts, racks, vendors, etc.
- Storage solution
  - Improve operational efficiency of the leading scale-up and scale-out storage, i.e ProphetStor StellarFlash and Ceph.
  - Automate backup and snapshot configuration of Federator StellarFlash array based on future disk failure prediction.
  - Solve Ceph-specific problems by applying disk prediction technology, avoid performance degradation due to I/O storm among OSDs after unexpected disk failure.
  - Ceph solution powered by DiskProphet self-learns and identifies degraded SSDs that become performance bottleneck of all-flash Ceph cluster.



DiskProphet helps administrators plan disk replacement schedule based on disk failure and I/O prediction

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