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Storage Virtualization in Modern Data Centers

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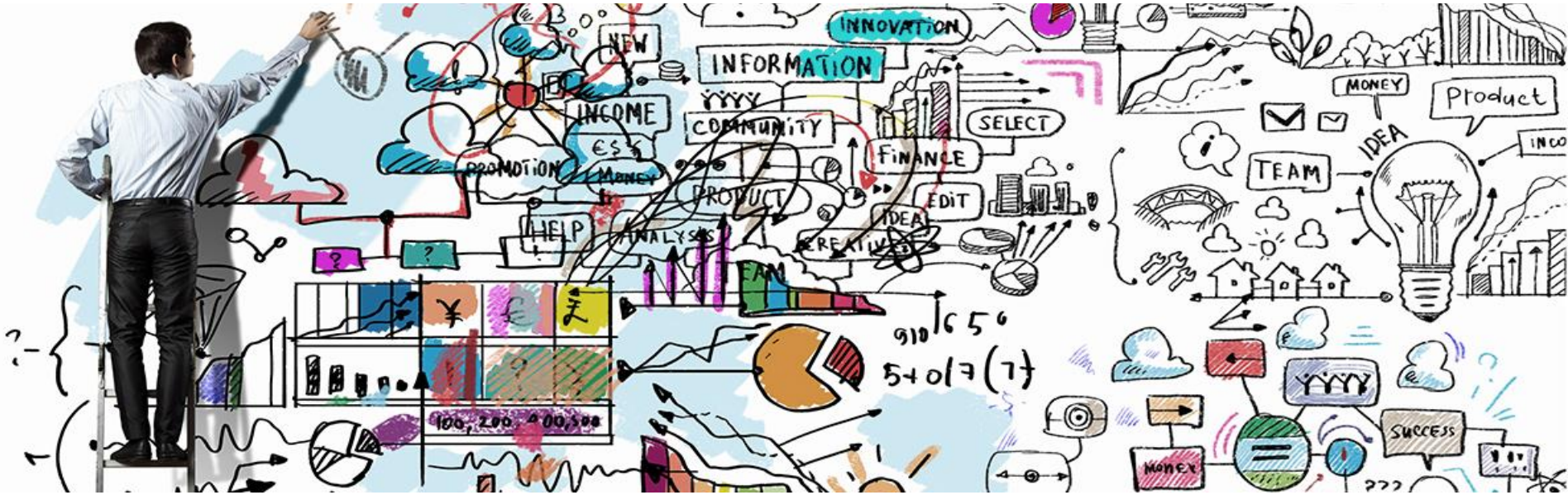
Presentation Overview

- About me
- Modern Data Centers
- Role of Storage in Modern Data Centers
  - Storage Virtualization
  - Challenges
  - Opportunities
- Q&A

Modern Data Centers

- Scale-Out
- Lights Out
- Always On
- Everything as a service
- Virtualization and Integration
- Less complex



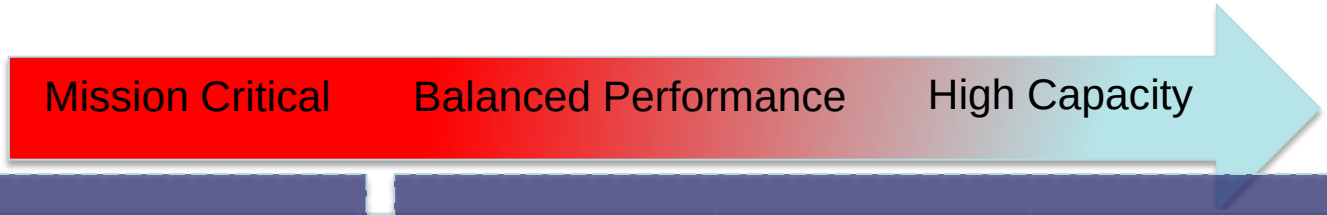
Storage Trends in Scale-Out Data Centers

- Explosive Growth in Storage
  - Big Data Analytics,
  - Object Store,
  - Cloud,
  - No-SQL
- Disaggregation of Compute and Storage
  - Scaling and Refresh
  - Application Driven Tiering
- Increased Network Bandwidth
- Scale-Out solutions driven by TCO
  - Storage density, Cost, Performance

Storage Trends in Scale-Out Data Centers

- Flash Everywhere
- Storage Class Memory
- Storage Density Scales to 1Pb/RU
- Storage networking moves to Ethernet
- Software Defined Everything
- Hyperscale Storage Implementations
- Exabytes of Analytics
- Multiple Flash Tiers:
  - High Performance
  - Commodity Flash

Hyper-scale Storage Infrastructure



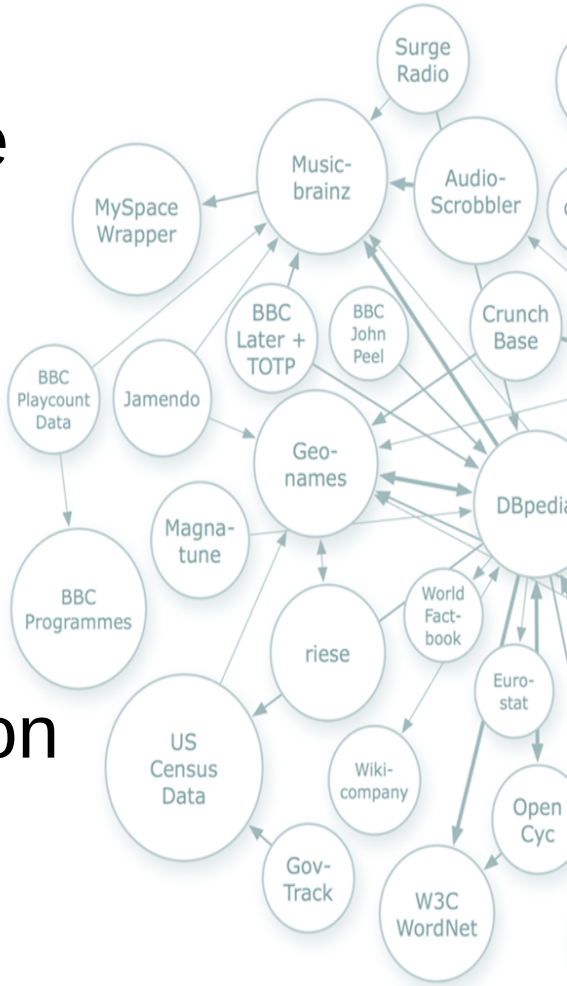
	OLTP	NoSQL	Big Data	Cloud
Topology	Centralized	DAS → Disaggregated	DAS→ Disaggregated	DAS → Disaggregated
Scale	TB → PB	TB→ PB	100's PB	10's PB
Growth	Organic/Low	Medium	High	High
Protocols	FC, NFS → ISCSI	DAS, ISCSI	DAS, ISCSI, Object	DAS, ISCSI, Object, File
Management	SAN/NAS	Local/Cinder	Cinder, Swift, Ceph?	Cinder, Swift, Ceph?

SAN / STORAGE APPLIANCE

SCALE-OUT / SERVER STORAGE

Not all data is the Same

- Data is as critical to a business as are people and capital
- Not all data is the same
- Different data types require different ways to manage and protect
- Traditional approaches (SAN, NAS, DAS) require new levels of optimization and efficiency
- Silo approach can't scale



Modernizing Traditional Infrastructure is HARD

- Legacy is expensive to modernize
- New technology does not fit easily
- Change can introduce more complexity

The cloud is not as Simple as it appears

- Moving the data
- Common tools to manage across platforms
- Tracking & managing by user, tenant and/or location

Rethink How Data is Managed

A new, comprehensive approach to real-world data management challenges

Intelligent Abstraction

Intelligent Predictive Analytics

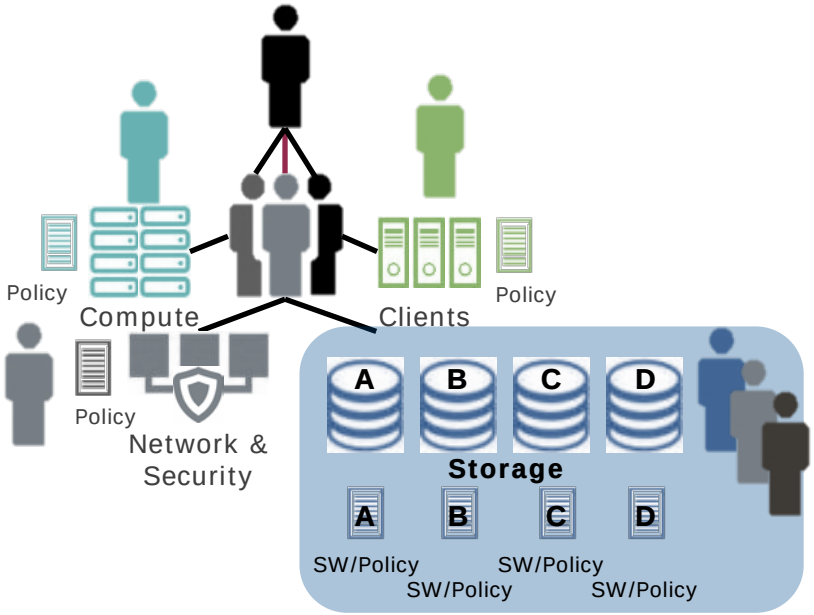
Intelligent Action

What is FreeStor?

- FreeStor® is a software-defined storage platform that gives customers the power to seamlessly migrate, recover, protect, and deduplicate data -on or off the cloud - without tying their business to specific hardware, networks, or protocols
- FreeStor gives customers the Power to Be Free:
  - **Free to choose**
  - **Free to innovate**
  - **Free to do business**

Storage Abstraction

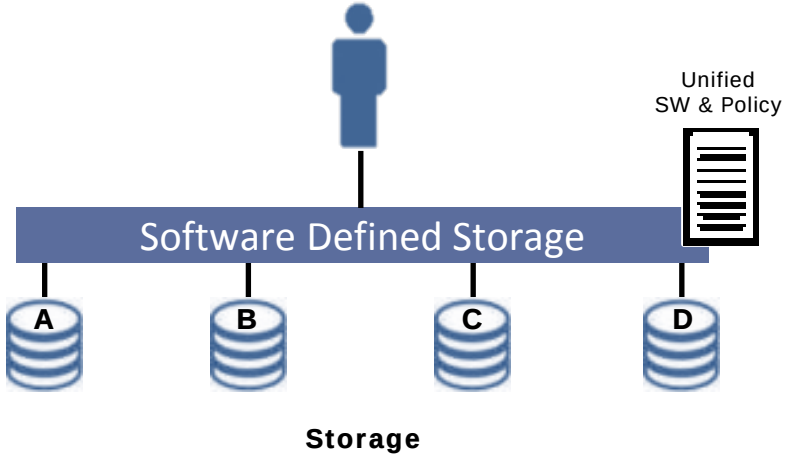
BEFORE: Traditional Approach



Low to Medium Standardization,
High Touch, High Capex and Opex

Dedicated platforms (HW & SW)
Manual or limited automation & optimization

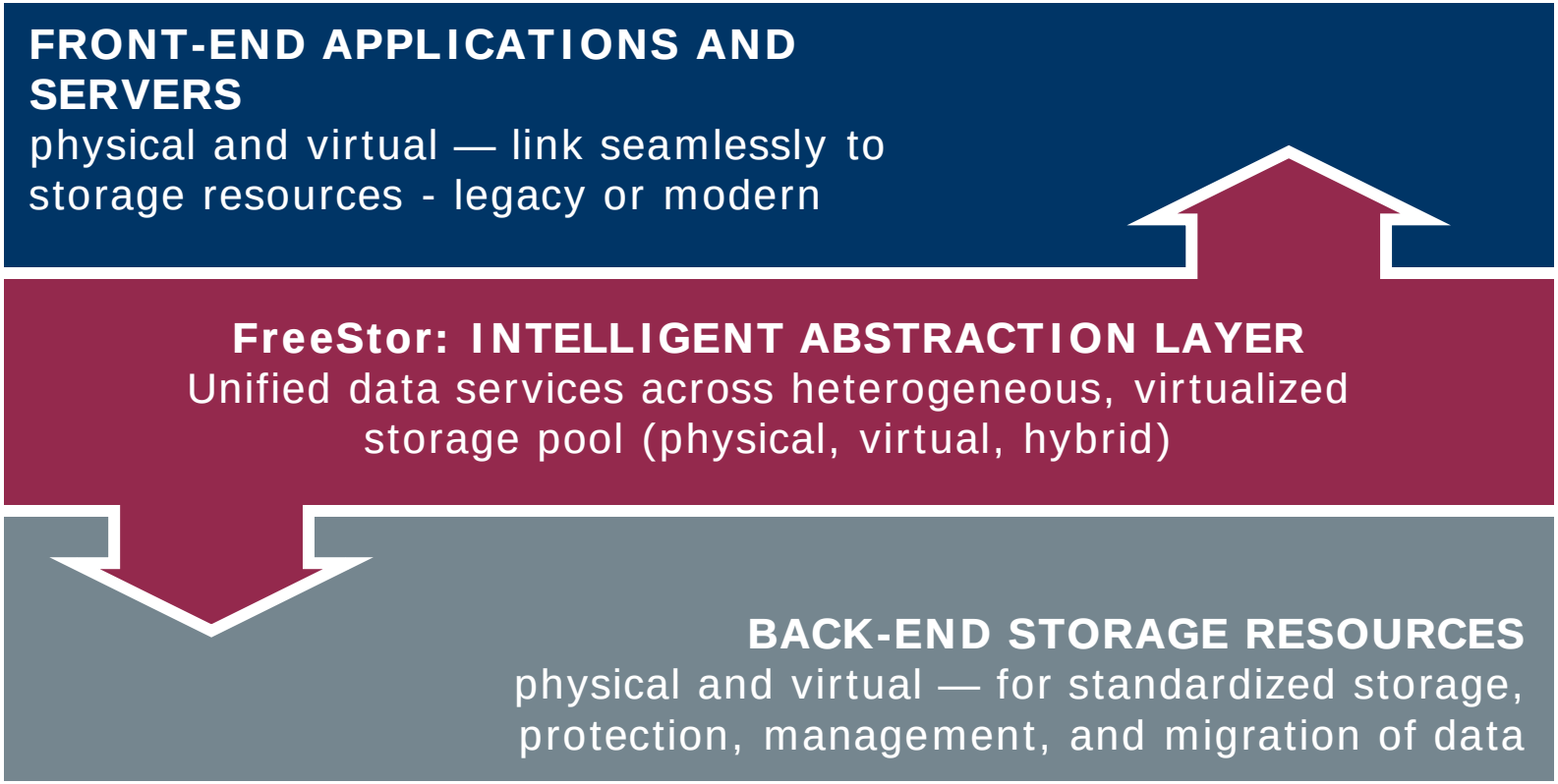
AFTER: SDS Approach



Highly Standardized,
Low Touch, Low Opex

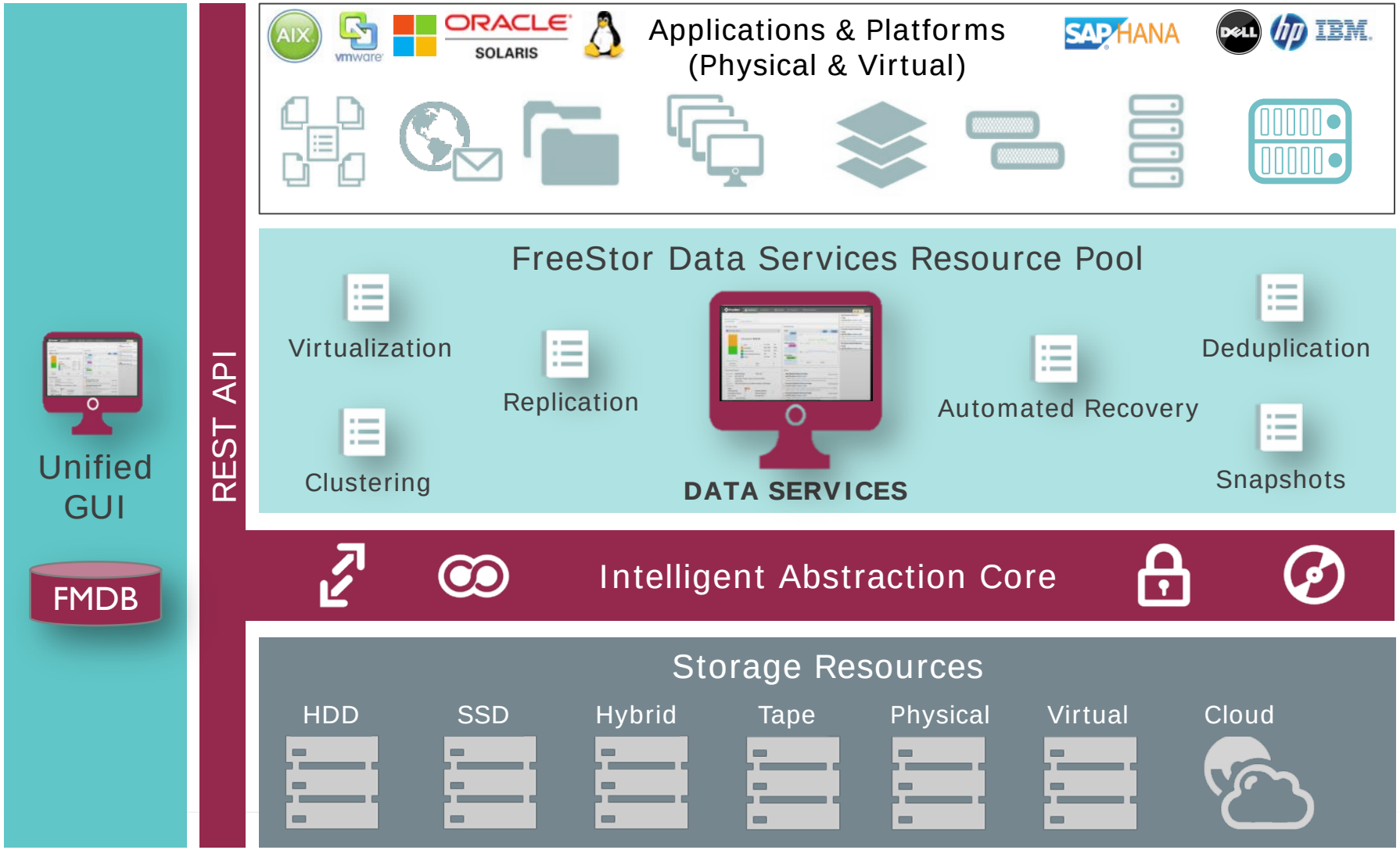
Shared/non-dedicated platforms
Automated, continuous optimization

The Power of Intelligent Abstraction



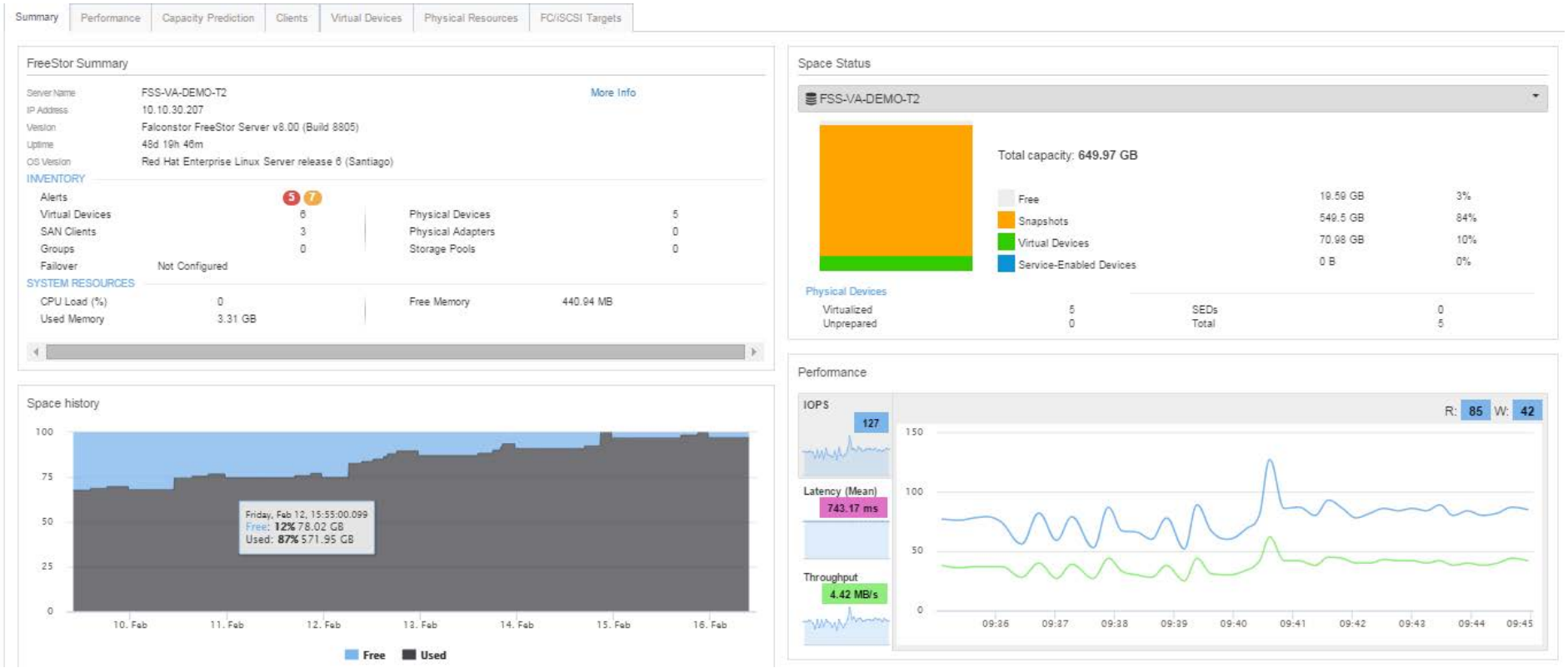
Decouples the storage hardware, networks, and protocols, enabling the free flow of data and common services regardless of environment or location

Intelligent Abstraction Architecture



Intelligent Predictive Analytics

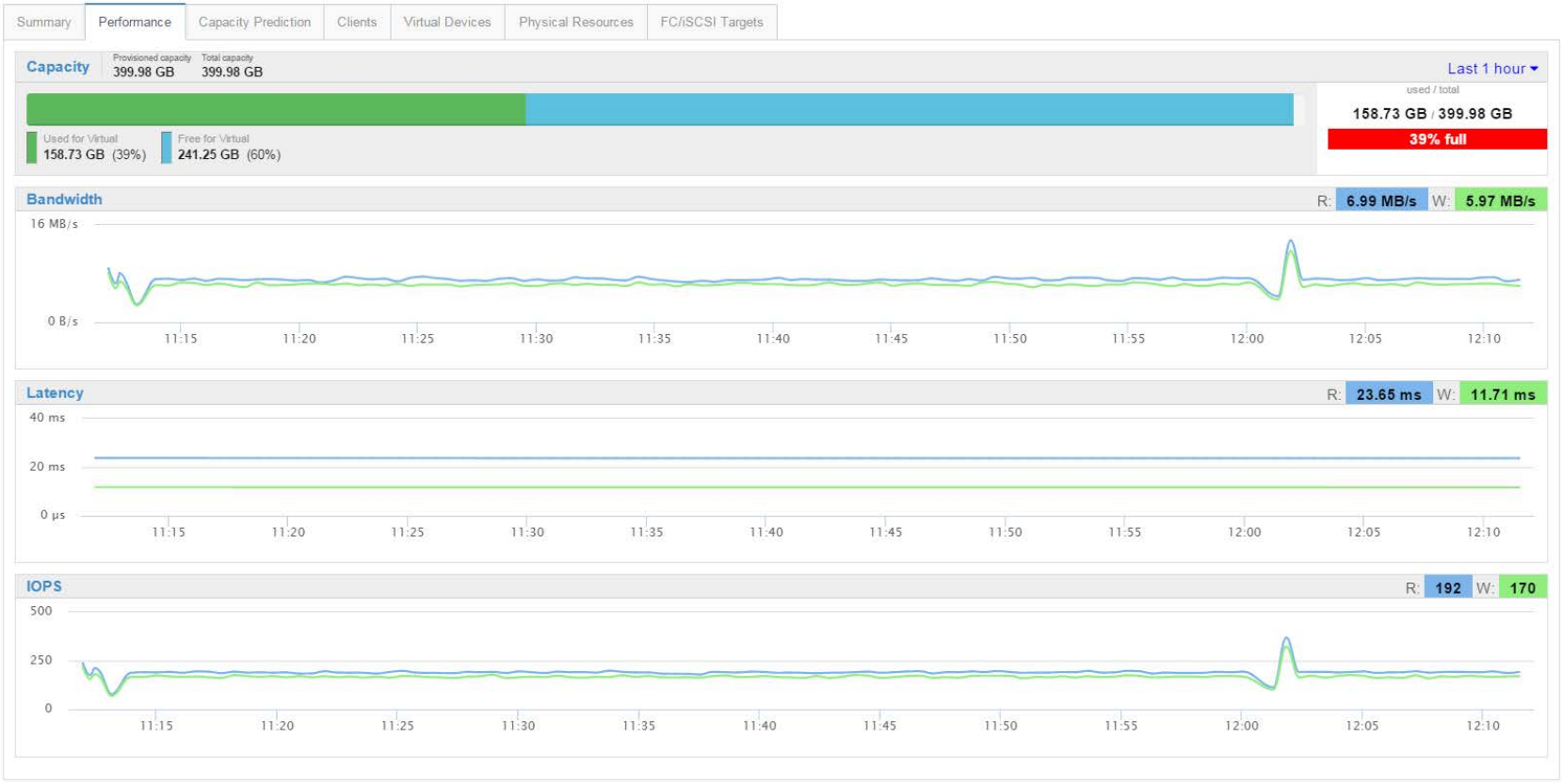
Stop guessing and start using real-time information across your entire storage infrastructure



Real-Time Views ▪ Real-Time Metrics ▪ Real-Time Answers

Intelligent Predictive Analytics

Easily identify hotspots and bottlenecks to optimize performance and availability



Intelligent Predictive Analytics

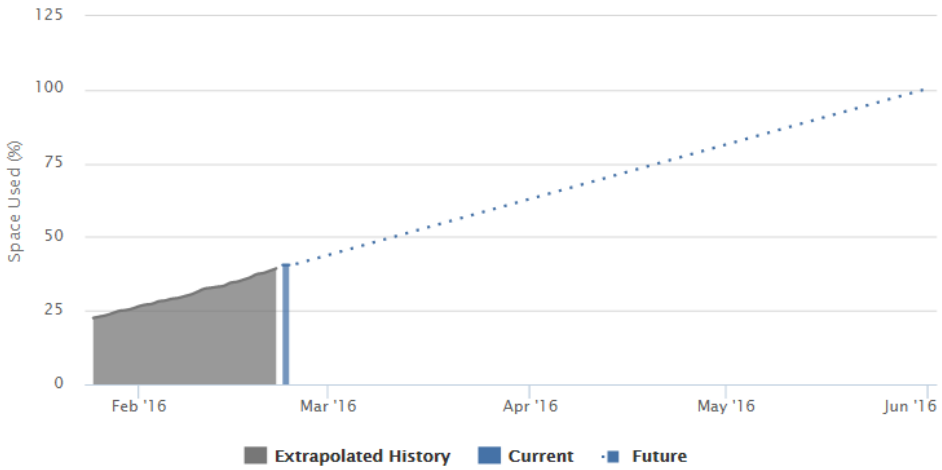
Predict capacity utilization across ALL storage

Summary | Performance | Capacity Prediction | Clients | Virtual Devices | Physical Resources | FC/iSCSI Targets

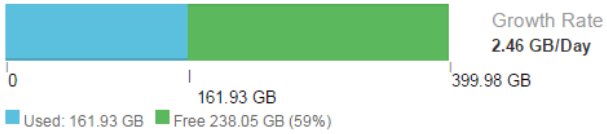
Name	Type	Total Size	Allocated Size	Free Size	Free %	Days to reach 100%	% free in 1 month
FSS-VA-DEMO-T1	Server	399.98 GB	161.93 GB	238.05 GB	59%	98	41.97%
Wittenstein_Pool1	Storage Pool	349.99 GB	146.19 GB	203.79 GB	58%	108	42.91%
Wittenstein_Pool2	Storage Pool	49.99 GB	15.74 GB	34.25 GB	68%	145	55.30%

Analysis for FSS-VA-DEMO-T1

Capacity trend with prediction



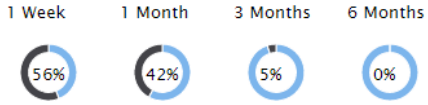
Current Allocation



Prediction Based on Usage Thresholds

90% full	95% full	100% full
< 81 Day(s)	< 90 Day(s)	< 98 Day(s)

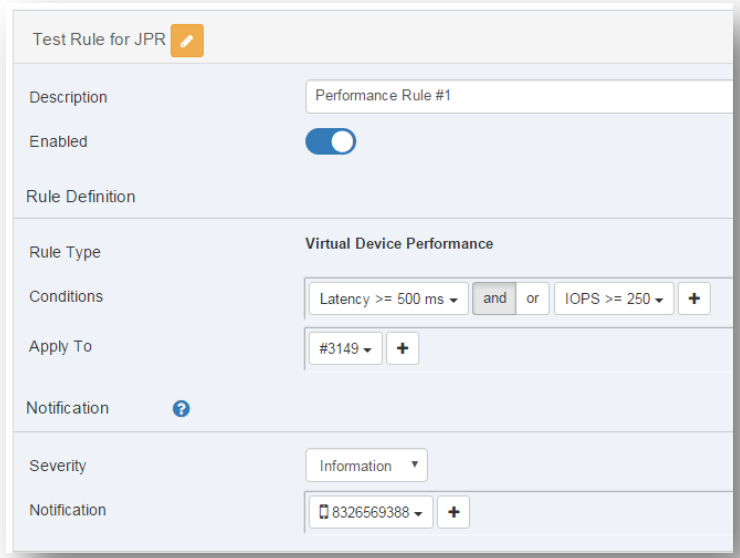
Prediction Based on Time Thresholds



Intelligent Action

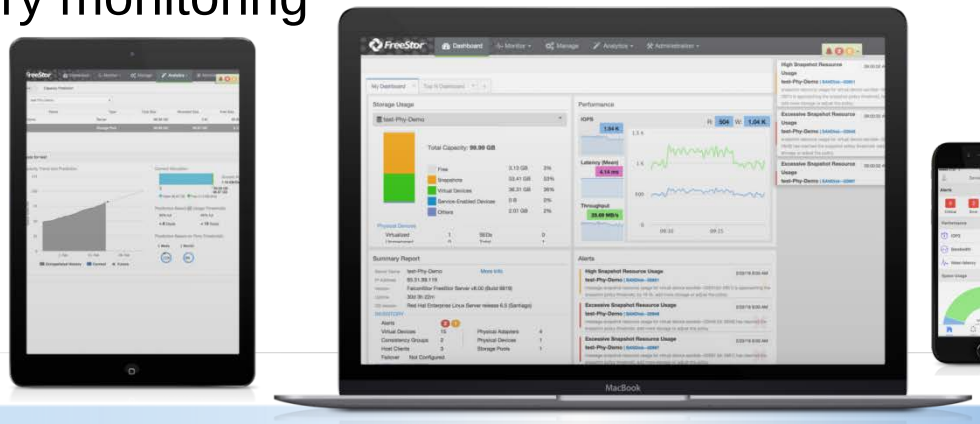
Take Action - Only FreeStor offers analytics and insight across heterogeneous storage environments, allowing users to take action, both proactively and reactively, as needed.

- **Open Approach**
- **Move data**
- **User-Defined Smart Rules**
- **Proactively Detect & Alert**
- **Optimize & Simplify**
- **Point & Click Easily**



FreeStor – What's New

- Centralized monitoring, analytics, and configuration
- New GUI to simplify and improve usability
- Historical and real-time trends and reports
- Streaming analytics and real-time insights
- Real-time performance, health and inventory monitoring
- Proactively detect and alert usir real-time analytics
- Personalized, customizable dashboards
- Native iPhone/Android apps
- OpenStack Cinder Driver
- SAP Hana Certification



Customer Use Case

Key Challenges to Address

- **Migrations**: Move to a new platform WITHOUT downtime
- **Business Continuity**: Eliminate silos and point solutions, unify capability across applications and department
- **Vendor lock-in**: Remove limitations and costly licensing of features by each storage array vendor
- Internal **SLA fulfillment** for the business services
- **Flexibility** to react to business needs for new services

Outcome With FreeStor

- **Migrations**: Leverage existing investments while providing evolution path forward (new platforms/technology)
- **Business Continuity**: Improve Business Continuity/HA to active/active with synchronous replication across existing dis-similar storage arrays
- **Vendor lock-in**: Lower costs – savings from eliminating multiple feature licensing fees and maintenance will pay for and SDS platform
- Internal **SLA fulfillment:** Common data services across all storage, no longer array by array ensures consistent internal SLA's
- **Flexibility:** Single console to manage storage infrastructure to reduce complexity/silos

THANK YOU

Q&A