Hewlett Packard Enterprise
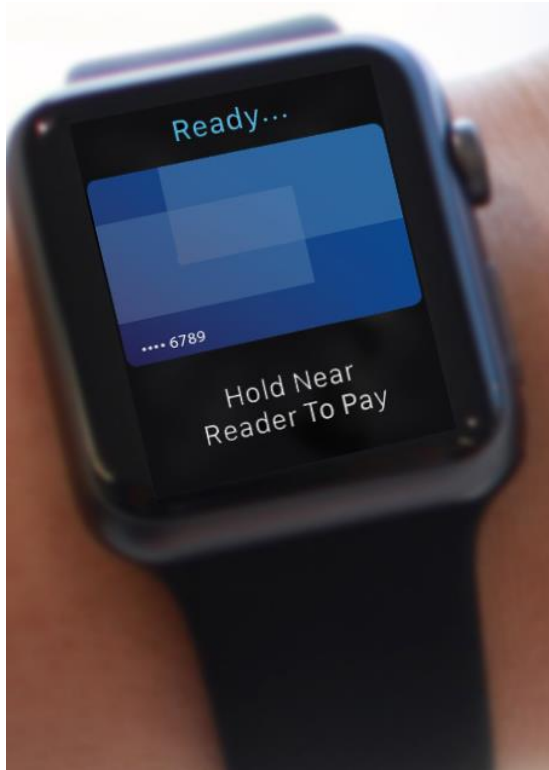
Data protection in flash and cloud age
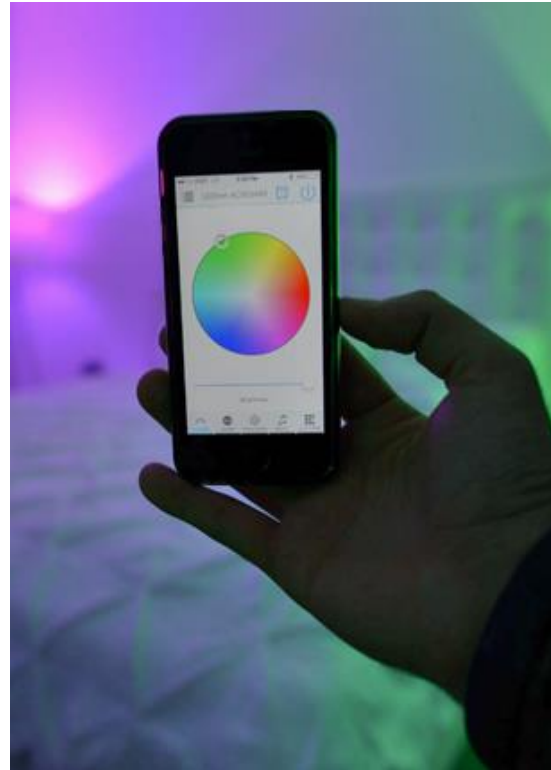
Data protection challenges

Data is most valuable currency of modern app-centric world
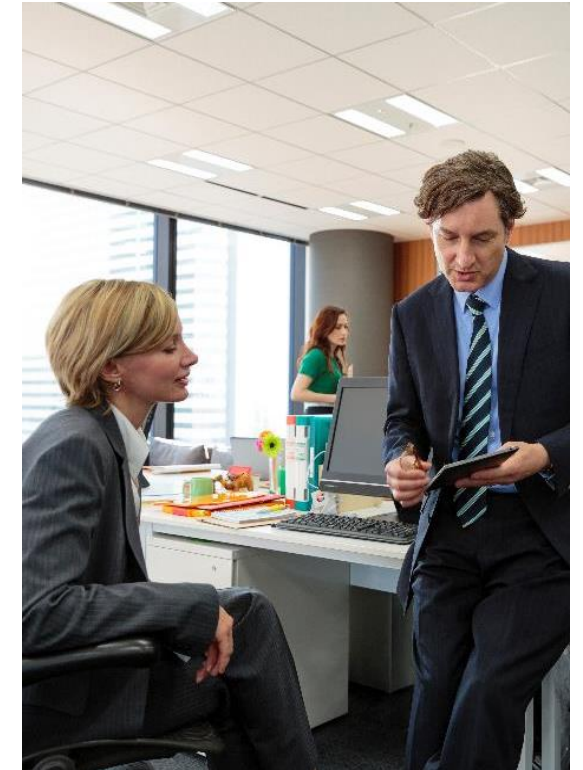
Apps that
transact and record

Apps that
power things

Apps that
engage and delight

Apps that
support how we work

← Business data — Machine data — Human data →

Hewlett Packard
Enterprise

2

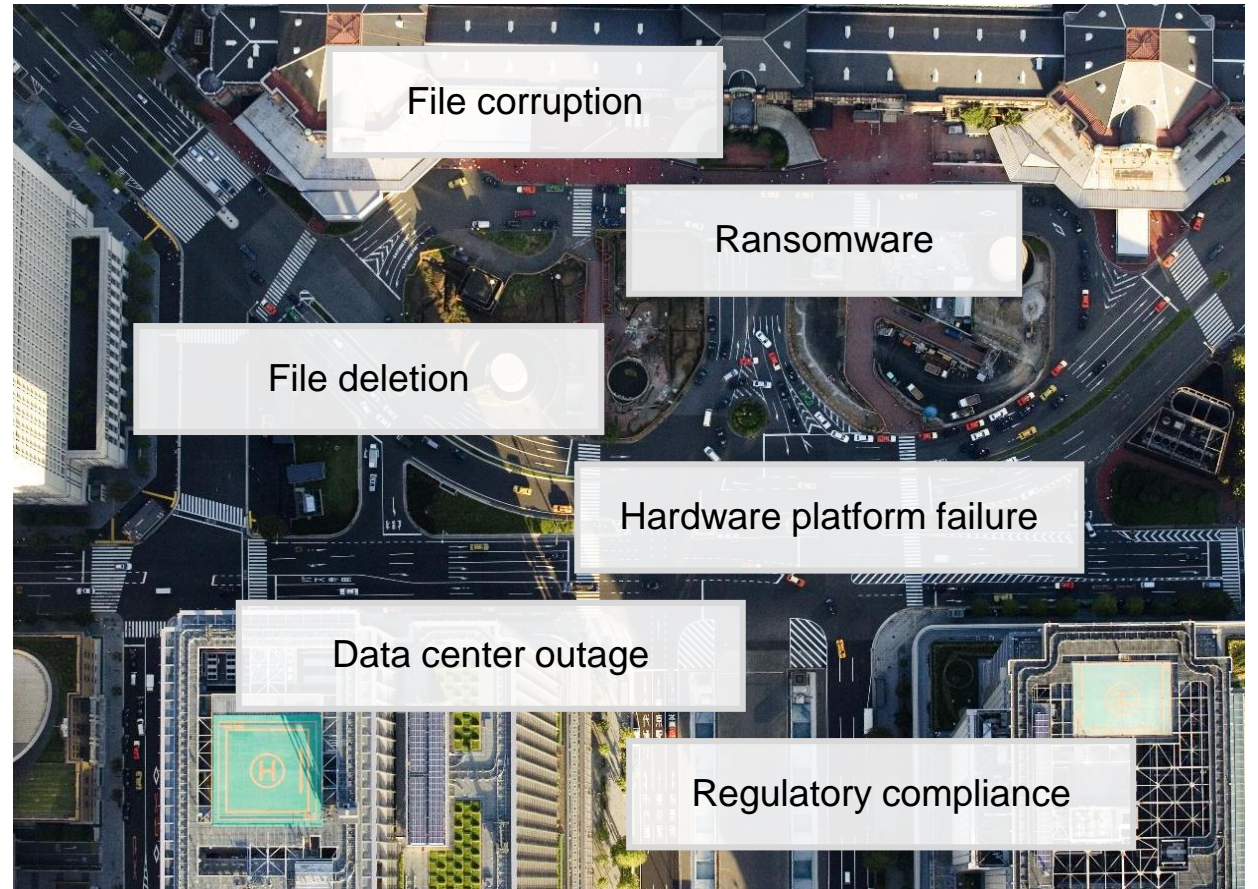# Protecting data is increasingly challenging

Are you protected against every data loss and downtime scenario?

Data Growth is accelerating

**Dependency on data is increasing –** needs to be available 24x7x365

Recovery SLA requirements are transforming – from days/hours to minutes
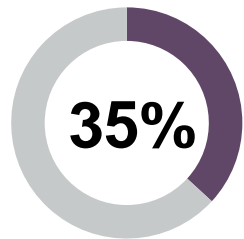
The threat and compliance landscape is evolving

File corruption

Ransomware

File deletion

Hardware platform failure

Data center outage

Regulatory compliance

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Enterprise

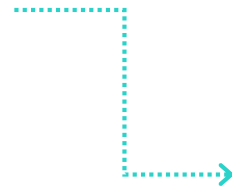# The speed and scale of flash is changing the game
Can your current data protection solution keep pace?
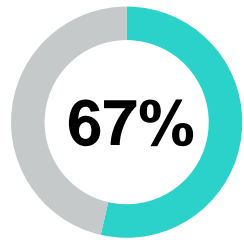
67% Of enterprises have adopted flash storage[1]

35% Of enterprises will be running >50% flash in data center within next 2 years[1]

Challenges of flash storage data protection

Performance
Always-on workloads = zero backup windows

Risk
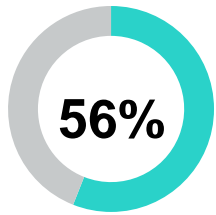More consolidation = higher risk profile

Efficiency
Need for flash-integrated app protection

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Reducing risk and ensuring resilience for Hybrid IT
How are you protecting your mix of traditional IT and private cloud infrastructure?

56% Of organizations use private, on-premises cloud[1]
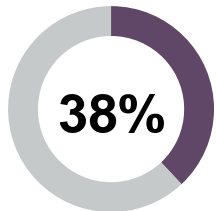
38% Of organizations use hosted, private clouds[1]
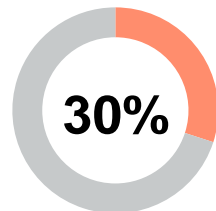
30% Of enterprises running an average of more than 1000 VMs in a private cloud[2]

Enable protection of workloads on optimal service

Traditional IT
45%

Private Cloud
55%

As internal service provider

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Enterprise

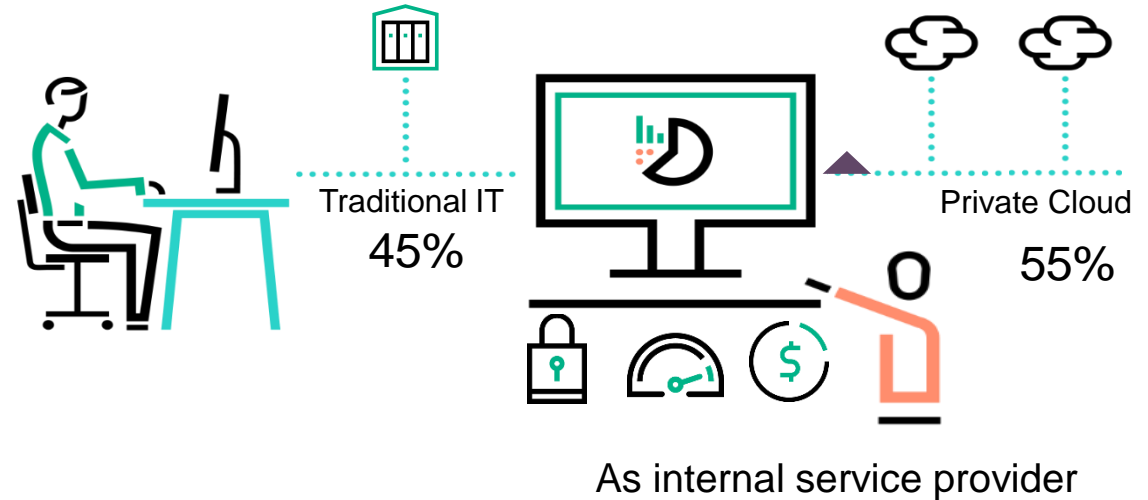# Long term retention and DR are prime use cases for the cloud
Is cloud a part of your data protection strategy?
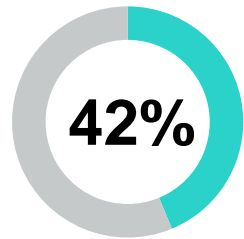
42% Of enterprises use cloud for backup and archive[1]
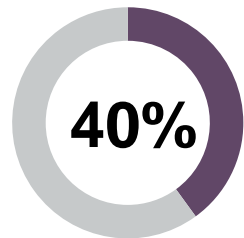
40% Of enterprises use cloud for disaster recovery[1]

Benefits of cloud based data protection

Reduce TCO
Lower cost of long term retention

Mitigate Risk
Simplify off-prem disaster recovery
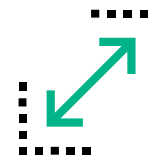
Improve Agility
Leverage cloud scalability + flexible consumption models

Increase Efficiency
Reduce operational effort and cost

Hewlett Packard Enterprise

How are your backups performing?

Key learnings from examining **>1000** PetaBytes from **>10 million** backup jobs[1]

96+
hour backup jobs
50%

≥5%
failure rates
37%

40%
multi-year retention

Hot Spots

> Databases

> Files

> Virtualization

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Enterprise
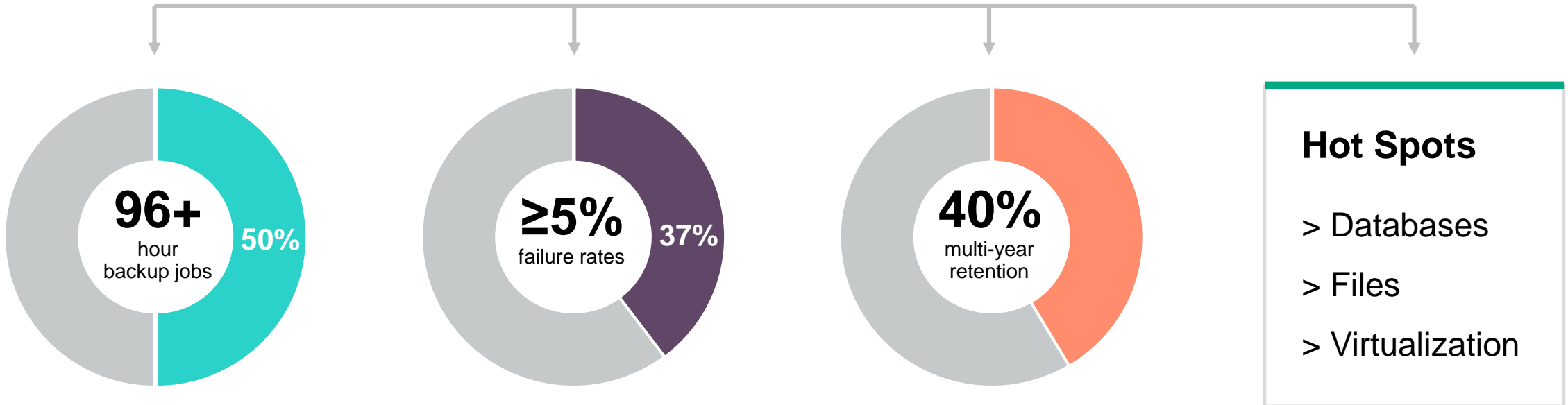
HPE approach to data protection

The 3-2-1 Rule for best practice Hybrid IT data protection
Protecting data against ANY failure...wherever it lives

3-2-1 Best Practice: **3 copies of data, 2 copies on 2 different types of media, 1 copy offsite**

1st copy on
primary storage

2nd copy on
disk backup appliance

3rd copy on another disk
backup appliance,

(optional) copy to tape (archive
& compliance) or cloud

On-premises

Offsite

Minimize risk with a comprehensive end-to-end approach to data protection

Failures and Business Contingencies

	File Loss	File Corruption	Hardware Platform Failure	Data Center Outage & Power Failure	Malware/ Ransomware	Retention Compliance
Primary Storage			← System replication or Primary Storage Replication →			
	← Snapshots* →					
Secondary Storage	← Disk Backup →					
	← Tape and/or Cloud Archive →					
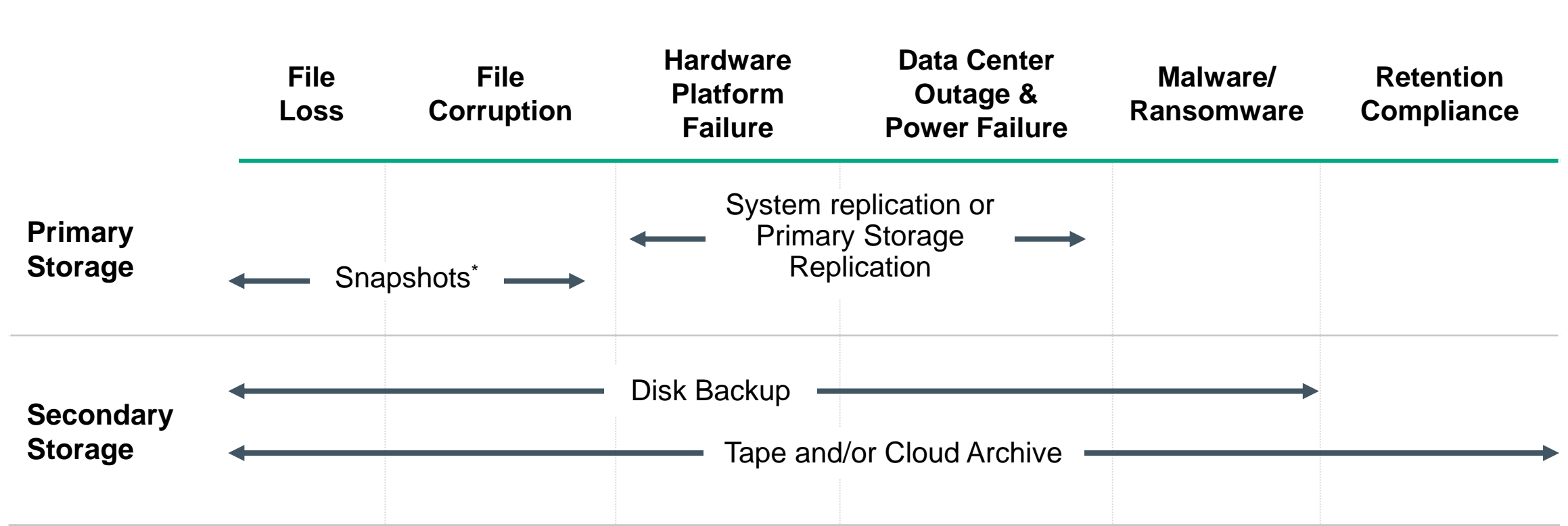
* Only for <u>recent</u> file loss or file corruption

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HPE solutions follow the 3-2-1 rule

To ensure complete data availability

3 **Three** copies of data
2 **Two** different media types
1 **One** copy off-site

On-premises

Application Data

VM VM VM

Hypervisor

Snapshot **3** **2**

HPE 3PAR
or HPE Nimble Storage
snapshots

ISV Backup
Applications
/ RMC

Private   Public

Cloud **3** **1**

**HPE 3PAR/ Nimble
Storage or
HPE StoreOnce** **3** **2**

**HPE StoreEver
(tape)** **3** **1**
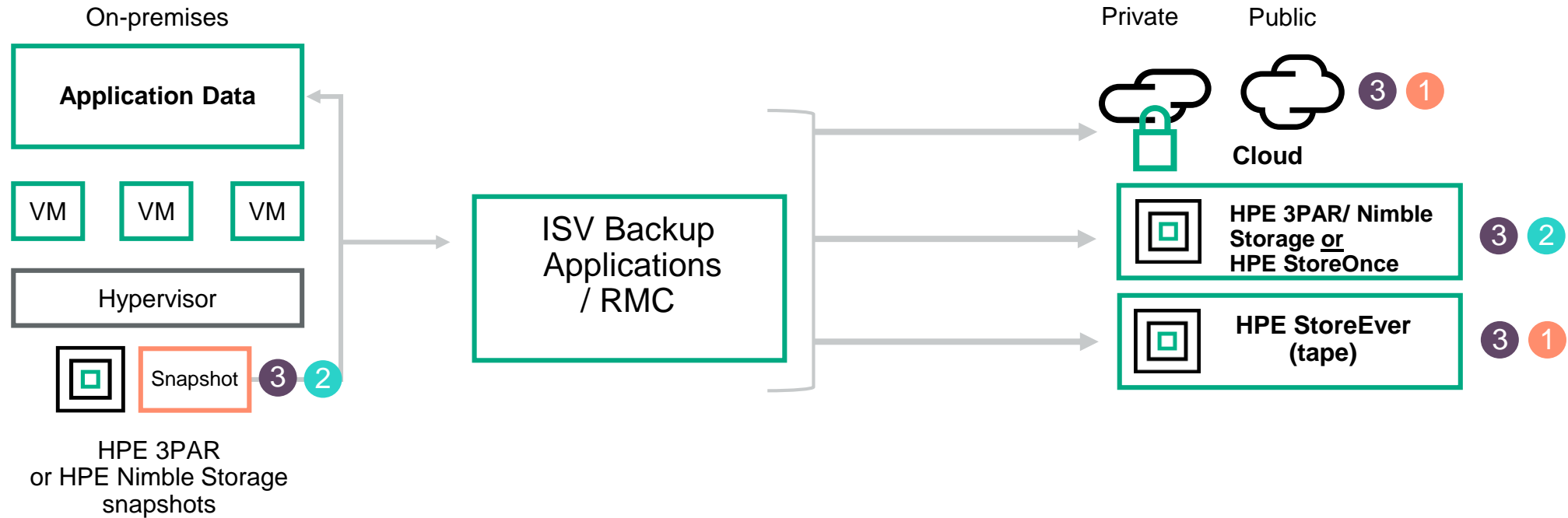
Services

▲ **HPE Pointnext and partners**
Consulting/Support/Education

$ **HPE Financial Services**
Flexible Capacity/Technology Refresh

Optimized Data Protection for Hybrid IT by the numbers
How we have helped our customers

23X
faster backup[1]

20X
reduction in backup
storage required[2]

15X
faster recovery[1]

$0.001
GB/month[3]

9X
Lower CPU consumption[1]

>100PB
Long term data retention
in the cloud[4]

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What
Is
StoreOnce

HPE StoreOnce Systems

Simple affordable and flexible data protection with rapid recovery and application integration

Effective
HPE patented deduplication technology to enable long term retention of backup data

Flexible
Hardware and virtual appliances, LAN and SAN environments, 3PAR and Nimble array integration

RPO/RTO driven
Industry leading backup and restore performance
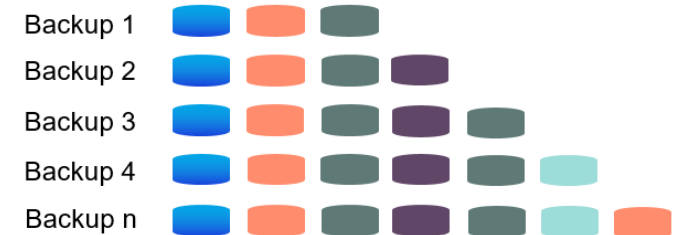
Application-centric
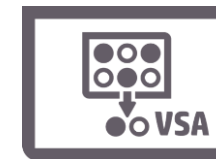Broad ecosystem of ISV integration and app plug-ins

Hybrid cloud ready
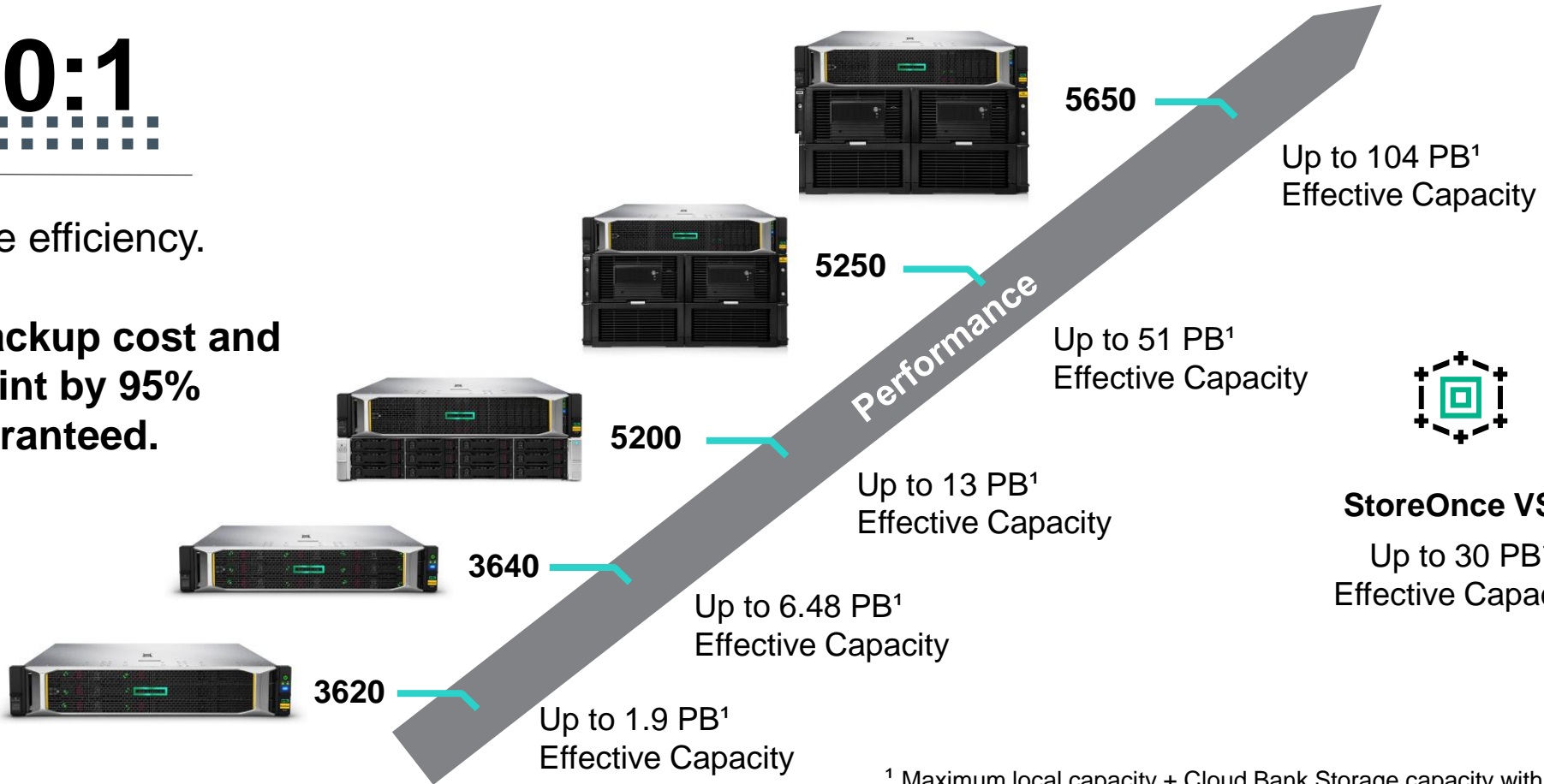Native private/public cloud tiering for long term retention and DR

Backup 1
Backup 2
Backup 3
Backup 4
Backup n

Unique blocks
Stored on D2D

VSA

Take control of data growth

20:1

Storage efficiency.

Reduce backup cost and footprint by 95% Guaranteed.

5650

Up to 104 PB[1]
Effective Capacity

5250

Up to 51 PB[1]
Effective Capacity

5200

Up to 13 PB[1]
Effective Capacity

Performance

3640

Up to 6.48 PB[1]
Effective Capacity

3620

Up to 1.9 PB[1]
Effective Capacity

StoreOnce VSA

Up to 30 PB[1]
Effective Capacity

[1] Maximum local capacity + Cloud Bank Storage capacity with 20:1 deduplication

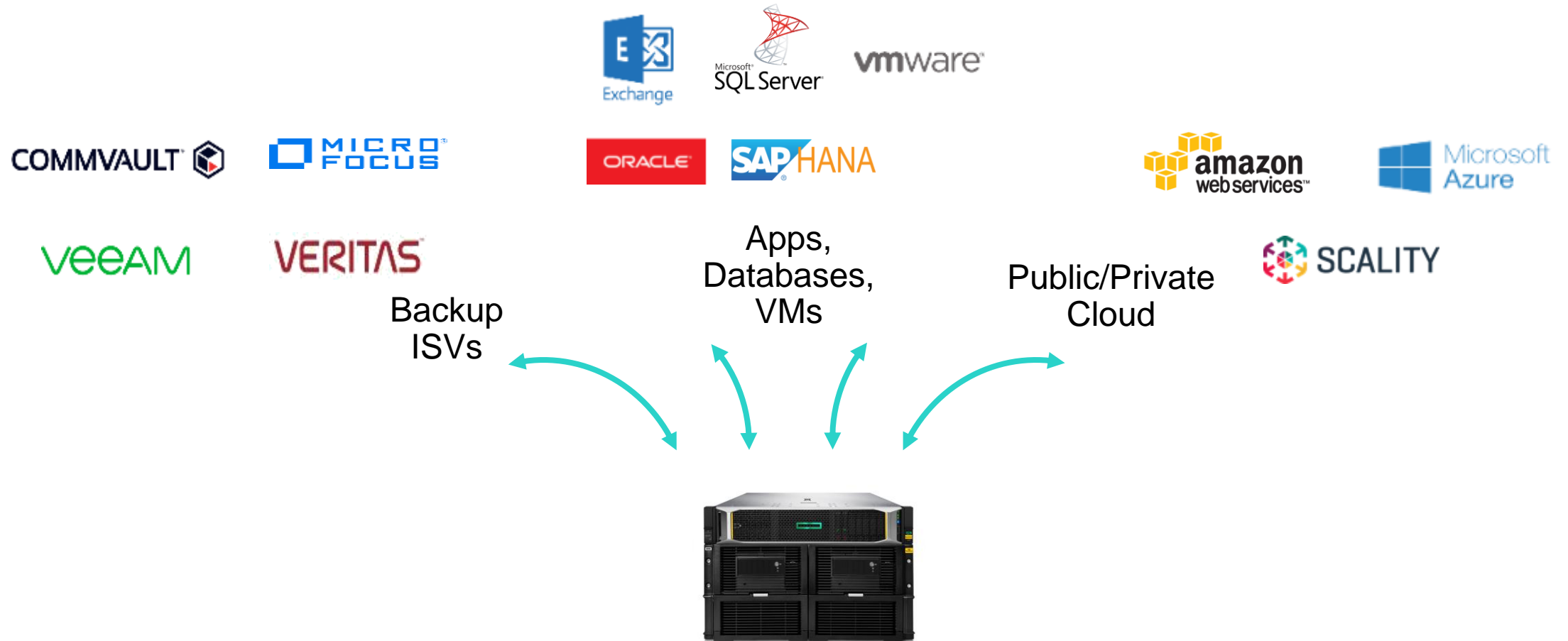**Hewlett Packard**
Enterprise

StoreOnce Catalyst ecosystem
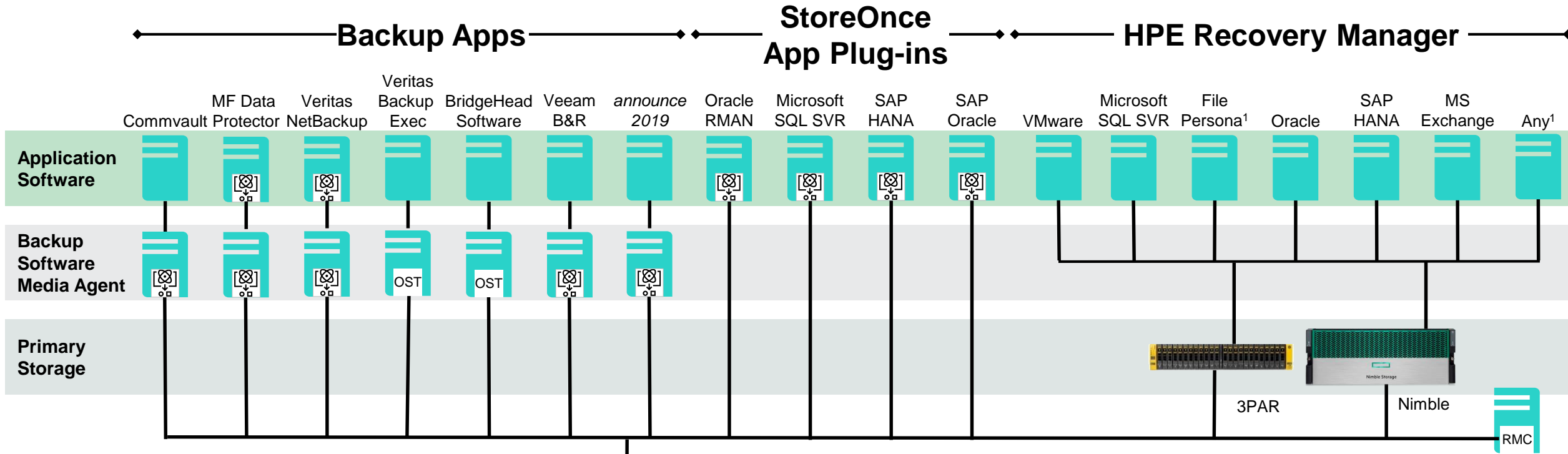
- Source or target side deduplication
- Optimized deduped replication
- App plug-ins and RMC - FREE
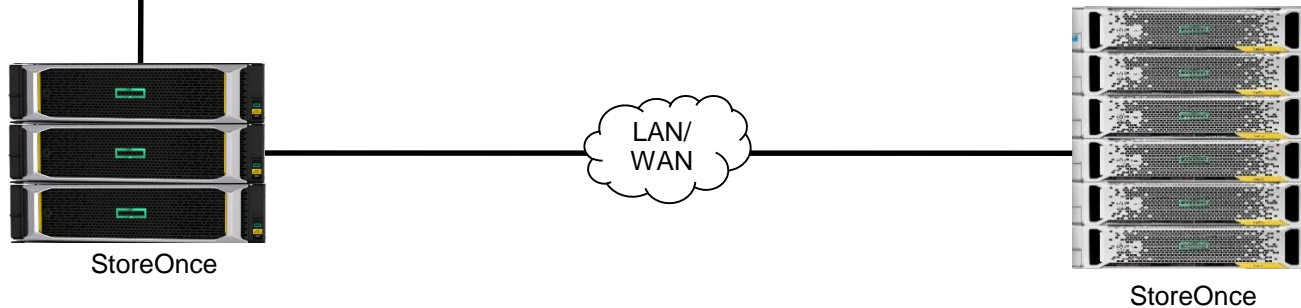
Best of breed partner ecosystem

Apps, Databases, VMs

Backup ISVs

Public/Private Cloud

Best of breed partner integration

HPE Cloud Bank Storage – StoreOnce goes cloud
Optional cloud backup

Retain 100 PB[1] + data from $0.001/GB/month[2]

Economic
Low-cost, scalable, long-term retention

Efficient
Ability to send, store, and retrieve **only unique** data for lower TCO

Flexible
Automated, native tiering of backup data to the cloud platform of your choice

Secure
Simple, encrypted, and reliable cloud disaster recovery

[1]Assuming dedupe ratio of 20:1 and the maximum logical capacity of StoreOnce 6600 of 34 PB

[2]Assuming dedupe ratio of 20:1 and AWS (S3) standard object storage pricing of $0.02 per GB per month

Does your backup infrastructure look like this?

Storage from A,
      CDM software from B,
            Backup Software from C,
                 Backup Hardware from D,
                     Data Center Monitoring software from E,
                            and Cloud F.

…. and still on the pursuit to getting business outcomes delivered, reducing operational

expense and delivering a data experience to my customers**"**

HPE Recovery Manager Central (RMC)

Flash speed protection for Hybrid IT with less cost and complexity

3PAR

23x Faster backup[2]

15x Faster restore[2]

Nimble

RMC[1]

20X less backup storage required[3]

StoreOnce

$0.001 /GB/month[4]

Cloud Bank Storage for StoreOnce
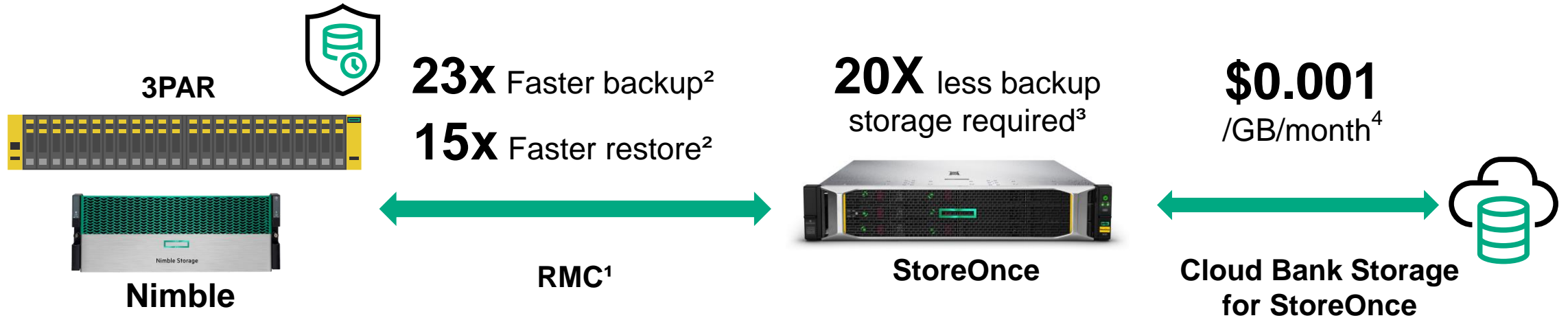
Fast	**Efficient**	**Simple**	**Reliable**
Flash speed with zero app impact	Flash and app-embedded, de-duplicated and cloud ready	Automated with self-service for app owners	Replication performance + backup protection

Traditional backup was not designed for the speed and efficiency requirements of all flash environments

Traditional Backup Data Flow

Backup Admin

Application Server

Backup software agent

Backup Server

All Flash Array

Backup Target

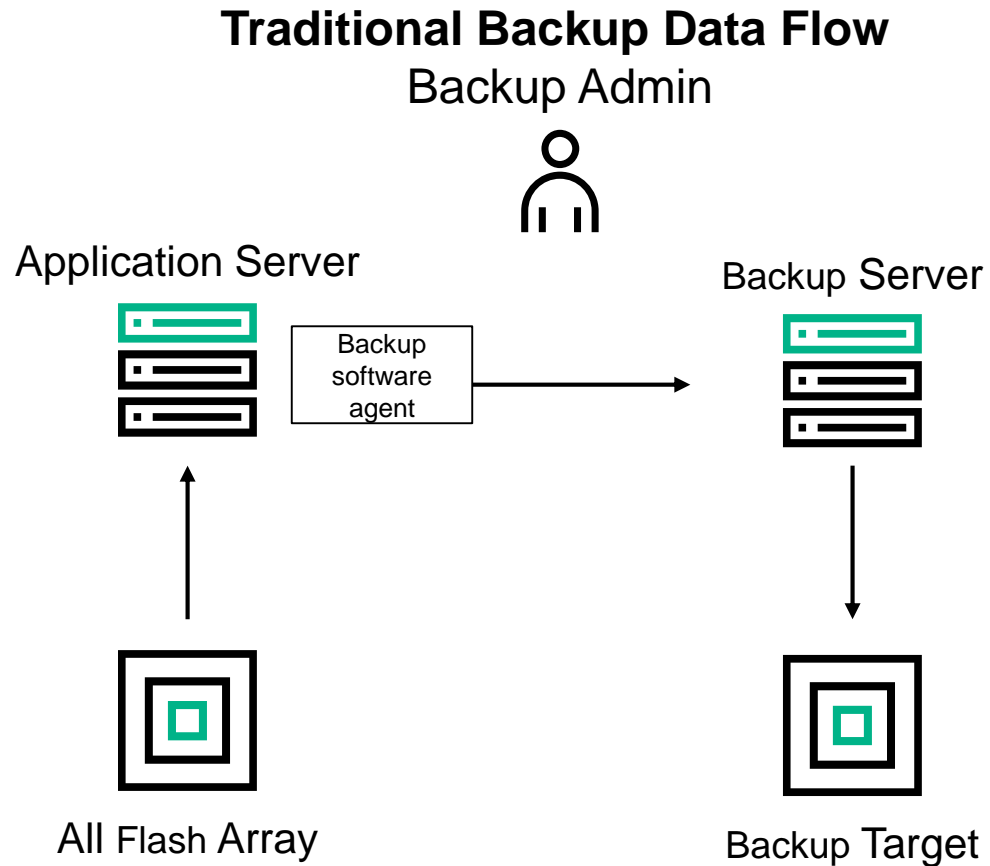– Reliable "off box" recovery and cost effective retention

– Catalogue and policy management, granular restore

– Application performance impacted
Data flows through the application and backup server

– Data Protection SLAs at risk
Unrelenting data growth and a complex data path = missed RPO/RTO SLAs

– Escalating cost and complexity
Need to acquire and manage additional backup servers, software licenses and networking equipment as application data grows

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23

Fast, simple and affordable application protection with HPE Flash Integrated Data Protection

Application Owner

(1)

Application Server

(2)   (4)   (6)

Direct backup

(3)

3PAR or Nimble Array   StoreOnce System   (5)
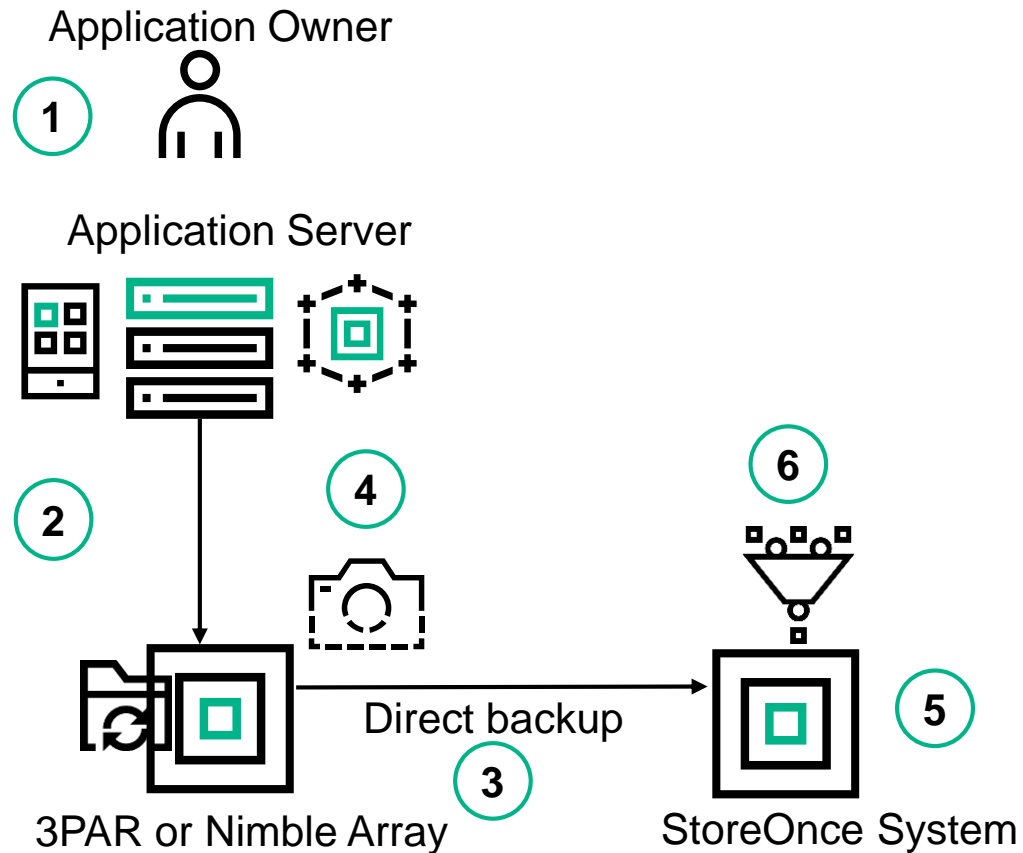
(1) **Reduce complexity for application owners** with self-service backup

(2) **Deliver on SLAs** with fast, non-disruptive, application consistent snapshots

(3) **Reduce cost and complexity of traditional backup approaches** with direct backup from array to StoreOnce

(4) **Backup at the speed of flash** by only sending unique changed data to StoreOnce

(5) **Reduce your risk exposure** with reliable and cost-effective "off box" retention and recovery

(6) **Reduce backup requirements** by up to 20X with StoreOnce deduplication

Application-managed end-to-end availability and protection

Reduce cost and complexity for application owners with self-service backup

Application Consistency

ORACLE®

vmware®

Microsoft® SQL Server

Microsoft

*apps using VSS

SAP HANA

Crash Consistency

> All other applications on 3PAR

HPE 3PAR storage

Recovery Manager Central

Flash Integrated Data Protection!

HPE StoreOnce System

Hewlett Packard Enterprise
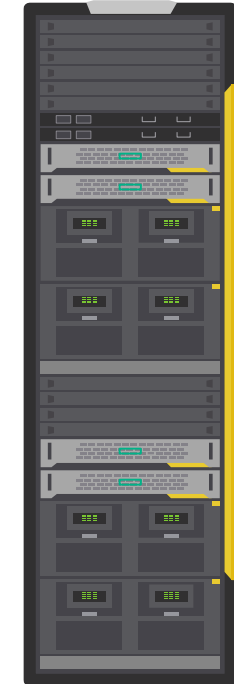
# Efficient data protection with Express Protect
Reduces TCO compared to traditional backup processes

Features

- For synthetic full backups only block deltas between current and previous snapshots are moved during backup
- RMC creates synthetic full backups without additional overhead
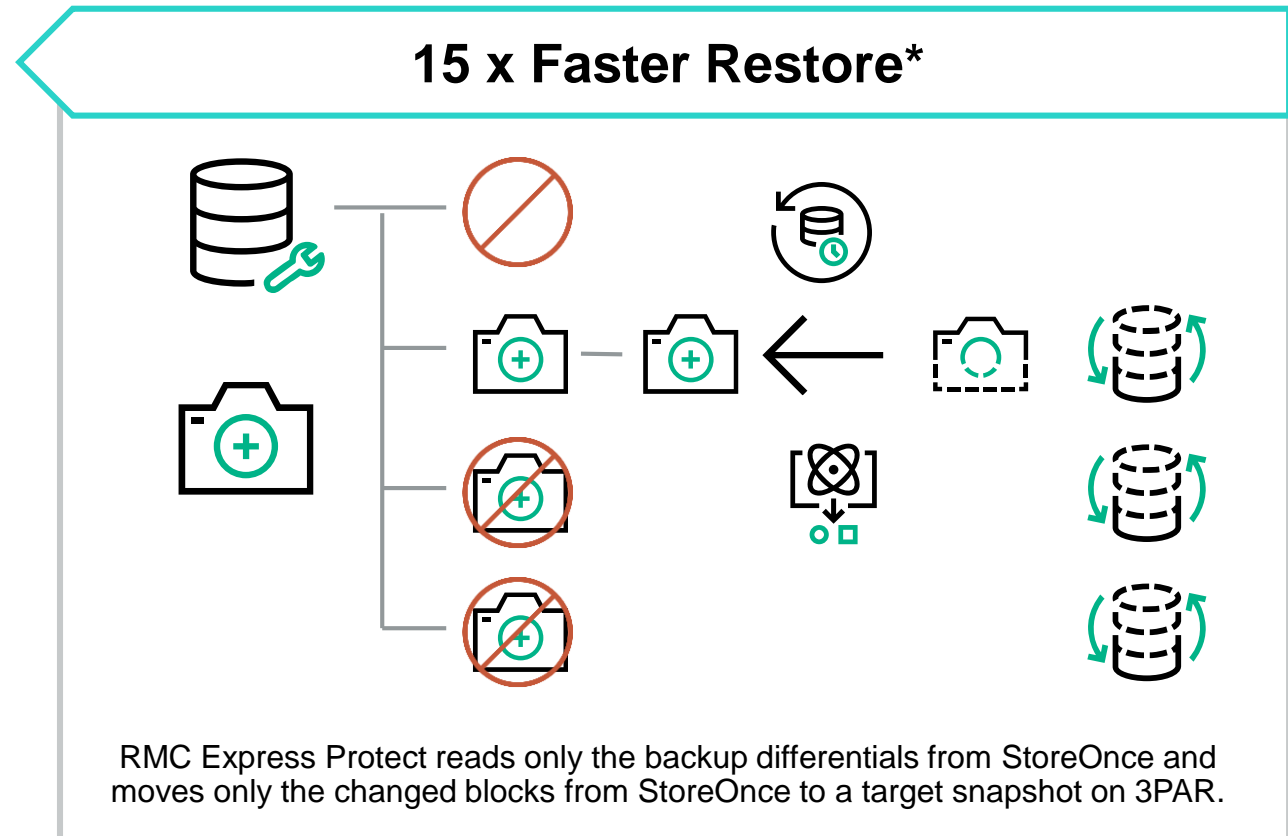- Backups are deduplicated to save space

Benefits

- Significantly reduces costs and complexity compared to traditional backup infrastructure
- Improves storage efficiency using cost effective backup retention
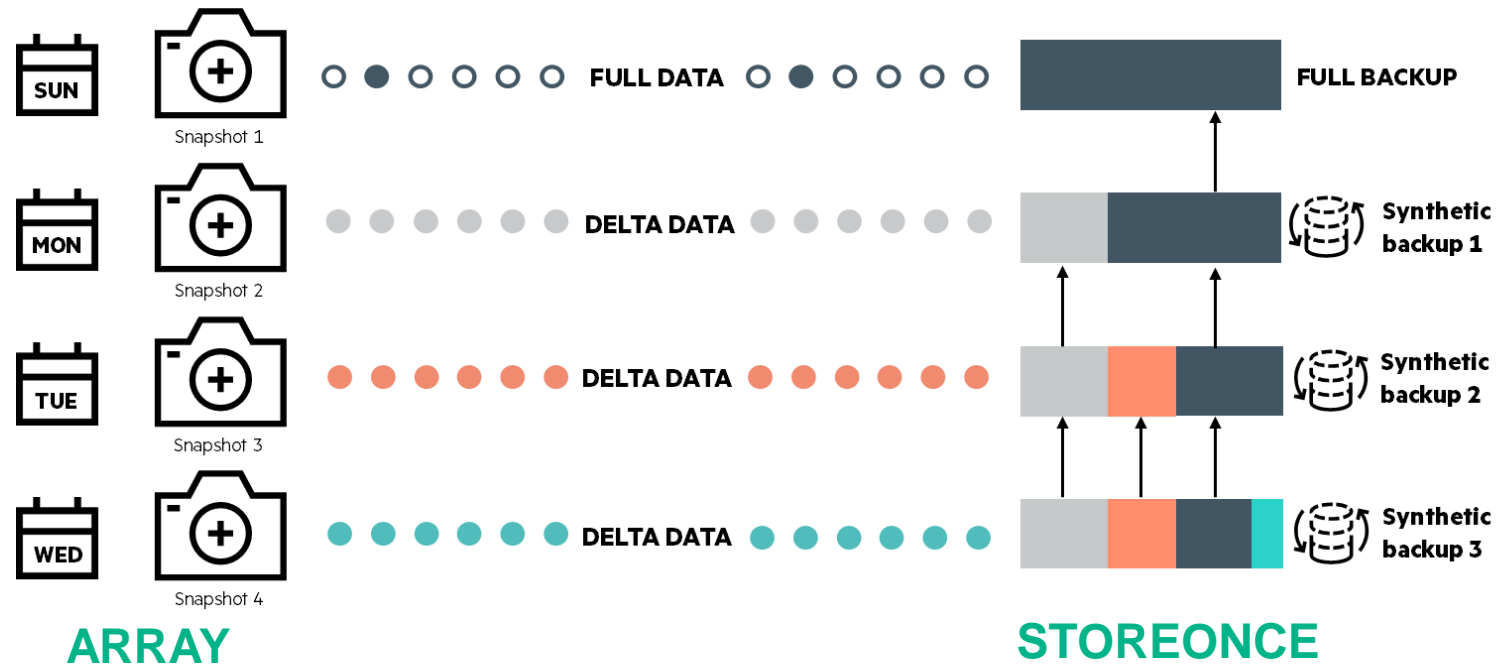
RMC Express Restore
Flash speed recovery while reducing cost and complexity

– **Recover at the speed of flash** by only sending unique changed data from StoreOnce to 3PAR

– **Deliver on SLAs with** 15X faster recovery* than traditional backup application

– **Reduce cost and complexity of traditional recovery approaches** with direct restore from 3PAR to StoreOnce

15 x Faster Restore*
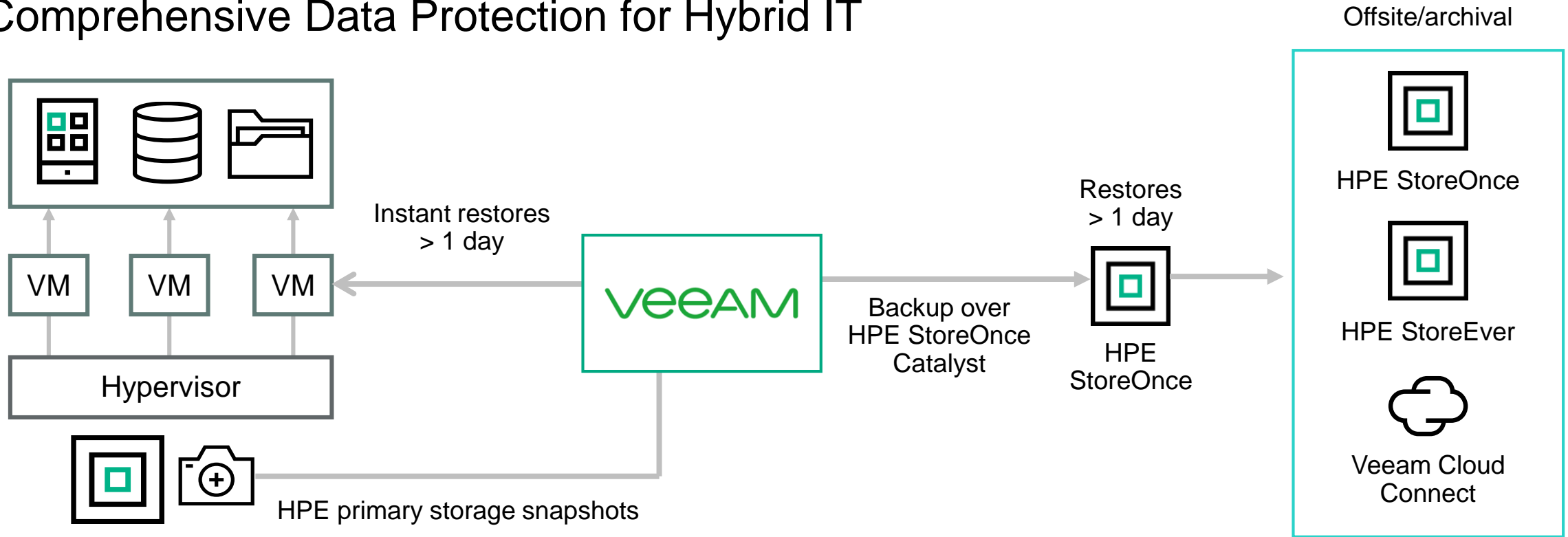
RMC Express Protect reads only the backup differentials from StoreOnce and moves only the changed blocks from StoreOnce to a target snapshot on 3PAR.

HPE and Veeam: Comprehensive Data Protection for Hybrid IT

Hewlett Packard Enterprise

HPE and Veeam[1]

Comprehensive Data Protection for Hybrid IT

Offsite/archival

HPE StoreOnce

HPE StoreEver

Veeam Cloud Connect

Instant restores > 1 day

Restores > 1 day

veeAM

Backup over HPE StoreOnce Catalyst

HPE StoreOnce

VM VM VM

Hypervisor

HPE primary storage snapshots

High Speed Recovery | **Verified Recoverability** | **Complete Visibility** | **Data Loss Avoidance** | **Leveraged Data**

[1]Veeam software products are available from HPE via the HPE Complete program

Veeam and HPE Storage Integration

Multiple options for composing your data protection solution

1) Veeam schedules Consistent Storage **Snapshot-only Jobs**
2) Veeam triggers Nimble Snap Replication to a remote array
3) Veeam makes **Backup from remote / local Snapshots** to StoreOnce
4) Veeam copies selected backup from StoreOnce to Tape
5) Veeam's Catalog tracks all the independent restore points
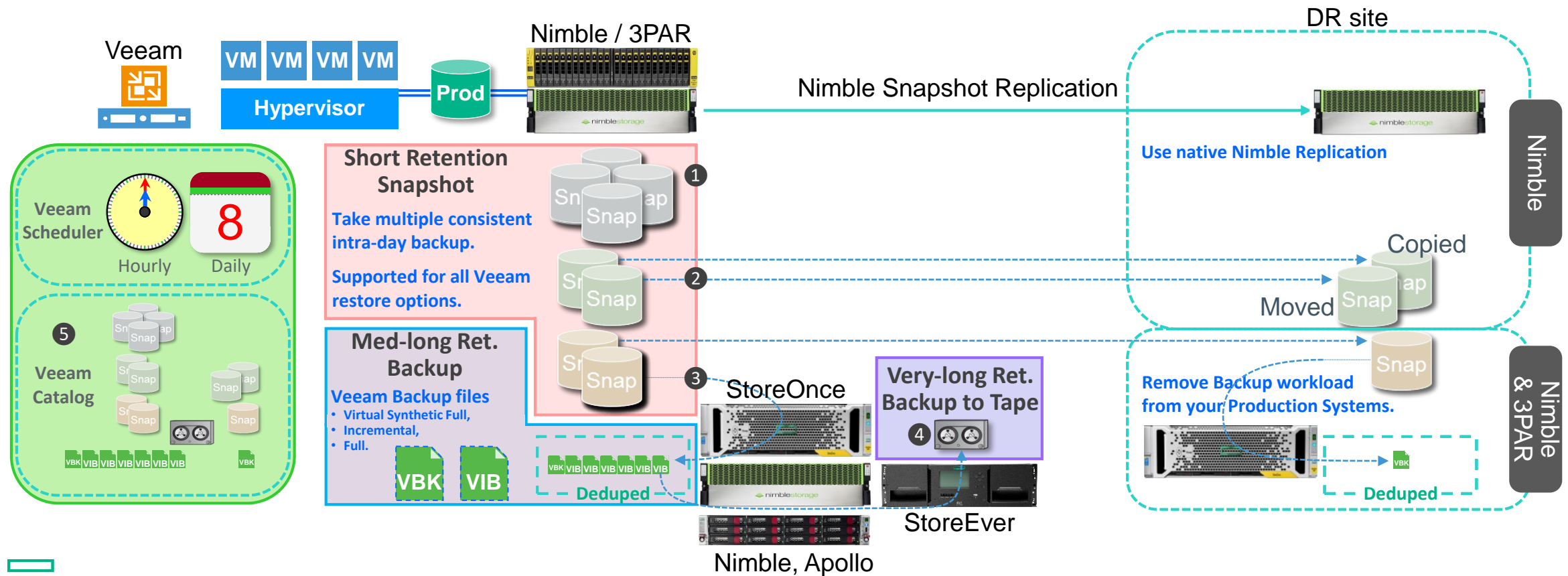
What about tape?

Protect and retain your data and applications with HPE StoreEver tape solutions.
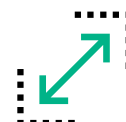
Economic
Lowest cost storage at $0.005 per GB for life[1]

Efficient
Tape energy consumption <2% of equivalent storage using HDDs[2]

Highly scalable
New LTO-8 tape cartridge holds up to 30TB[3] compressed data

Secure
Offline and off-premises protection against ransomware

[1] *Assumes 2.5:1 compression ratio for the life of the cartridge. Based on current audit of LTO-7 Type M media pricing (Mar'17) at $115.55 per 22.5TB.*
[2] *State of the Tape Industry 2017*
[3] *2.5:1 compression ratio*

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HPE StoreEver Tape Portfolio

LTO-8 Tape Media

Up to 30TB** capacity

HPE T950

HPE TFinity ExaScale

LTO Ultrium Tape Drive

1/8 G2 Autoloader

HPE MSL2024

HPE MSL4048

HPE MSL3040

HPE MSL6480

	Entry level	SMB & distributed environments		Mid-Range			Enterprise	
Form factor	Half Height	1U Form Factor	2U Form Factor	4U Form Factor	Scales from 3U-21U	Scales from 6U-42U	47U Form Factor	
Max. slots	1 slot	8 slots	24 slots	48 slots	32 slot base module 40 slot expansion module Scales from 32-272 slots	Scales from 80-560 slots	50 to 10,020 LTO slots 45 to 7,614 TS11xx slots	50 to 53,460 LTO slots 45 to 40,680 TS11xx slots
Max. drives	1	1	2	4	21HH	42HH	120 FH	144 FH
Max. capacity	30 TB LTO-8 ** 15 TB LTO-7 ** 6.25 TB LTO-6** 3 TB LTO-5*	240 TB LTO-8 ** 120 TB LTO-7 ** 50 TB LTO-6** 24 TB LTO-5*	720 TB LTO-8 ** 360 TB LTO-7** 150 TB LTO-6** 72 TB LTO-5*	1.44 PB LTO-8 ** 720 TB LTO-7** 300 TB LTO-6** 144 TB LTO-5*	8.16 PB LTO-8 ** 4.08 PB LTO-7 ** 1.7 PB LTO-6 **	16.8 PB LTO-8 ** 8.4 PB LTO-7** 3.5 PB LTO-6** 1.68 PB LTO-5*	300.6 PB LTO-8 ** 285.5 PB TS1155** 190.3 PB TS1150** 150.3 PB LTO-7** 62.62 PB LTO-6**	1.6 EB LTO-8** 1.52 EB TS1155** 1 EB TS1150** 801.9 PB LTO-7** 334.12 PB LTO-6**

*2:1 compression
**2.5:1 compression

Hot Topic: Tape or Cloud for long-term retention?

TCO factors you should consider

Cost factors	Tape	Cloud storage
Raw storage capacity in a remote location	Relatively low-cost	Cost varies
On-premises backup infrastructure (SW/HW)	Costs can be significantly reduced when using tape	Systems costs and separate management processes are required
Off-site DR of backup data	Media transport, facility rental and media management	High bandwidth link
Long-term retention	Tape saves storage costs	Cloud storage, data transport and access or e-delivery

When **cost** is your key driver

$0.001/GB	$0.01/GB	$0.1GB	$1.0GB

Tape
$0.005/GB

Deduplication
$0.02/GB
Cloud
$0.02/GB

When **retention period** is key

Days	Weeks	Months	Years

**Snapshots
and replication**

Deduplication

Tape

Cloud

Some more options?

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Enterprise

More Secondary Storage Offerings

HPE Complete program – multiple secodnatry storage and data protection solutions

Cohesity

Scality

Zerto
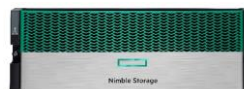
HPE Nimble Storage for secondary storage

Inline dedup and compression

Use your backup data for Test/Dev, QA, Analytics

DR with primary storage performance

Veeam, Comvault integrations

HPE Apollo and HPE ProLiant for software defined solutions

HPE Apollo servers are optimized for storage density

Consolidation of multiple secondary data and apps

Reference architectures

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Enterprise

Why HPE?

Why HPE for Hybrid IT Data Protection?

Federated

Primary Storage
3PAR StoreServ
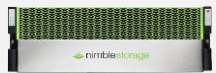
Nimble Storage

Secondary Storage
StoreOnce

Nimble SF

Integrated

Zero Impact App Protection
Recovery Manager Central

vmware · **ORACLE** · **SAP HANA**

Microsoft SQL Server · Microsoft apps using VSS

ISV Integrations
StoreOnce Catalyst

veeam · **VERITAS**

Cloud-Ready

Move to Object Storage

Cloud Bank Storage for StoreOnce

amazon web services · Microsoft Azure · SCALITY

$0.001/GB/month *
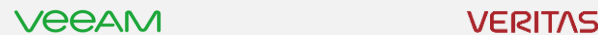
*Assuming dedupe ratio of 20:1 and AWS (S3) standard object storage pricing of $0.02 per GB/Month

Still not sure how to proceed?

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HPE NinjaProtected + Backup Assessment

Delivering a free simple and complete health check for your data protection environment

- Free, secure and non invasive backup storage assessment

- Ensures your backup environment is operating with optimal efficiency and reliability

- Provides a detailed report including:
  - current backup capacity and performance
  - key performance indicators such as backup windows
  - backup success rates
  - opportunities for cost reduction

Ninja Protected +

Data Domain Analyzer

Thank You