

HPE ASE—Storage Solutions Architect V3

OFFICIAL CERTIFICATION STUDY GUIDE

(EXAM HPE0-J57)

First Edition

Radek Zima

HPE Press
660 4th Street, #802
San Francisco, CA 94107

HPE ASE—Storage Solutions Architect V3
Official Certification Study Guide (Exam HPE0-J57)
Radek Zima

© 2018 Hewlett Packard Enterprise Development LP.

Published by:

Hewlett Packard Enterprise Press
660 4th Street, #802
San Francisco, CA 94107

All rights reserved. No part of this book may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without written permission from the publisher, except for the inclusion of brief quotations in a review.

ISBN: 978-1-942741-96-1

WARNING AND DISCLAIMER

This book provides information about the topics covered in the Designing HPE Storage Solutions (HPE0-J57) certification exam. Every effort has been made to make this book as complete and as accurate as possible, but no warranty or fitness is implied.

The information is provided on an “as is” basis. The author, and Hewlett Packard Enterprise Press, shall have neither liability nor responsibility to any person or entity with respect to any loss or damages arising from the information contained in this book or from the use of the discs or programs that may accompany it.

The opinions expressed in this book belong to the author and are not necessarily those of Hewlett Packard Enterprise Press.

Feedback Information

At HPE Press, our goal is to create in-depth reference books of the best quality and value. Each book is crafted with care and precision, undergoing rigorous development that involves the expertise of members from the professional technical community.

Readers' feedback is a continuation of the process. If you have any comments regarding how we could improve the quality of this book, or otherwise alter it to better suit your needs, you can contact us through email at hpepress@epac.com. Please make sure to include the book title and ISBN in your message.

We appreciate your feedback.

Publisher: Hewlett Packard Enterprise Press

HPE Contributors: Wilfred Brown, Chris Hornauer, Ralph Luchs, Chris Smit

HPE Press Program Manager: Michael Bishop

About the Author

Radek Zima is an independent consultant who specializes in IT infrastructure design, implementation and maintenance for HPE servers, storage, networking, management and cloud software. He develops and delivers trainings, workshops, demonstrations, and conference presentations for HPE channel partners, customers and employees at training centers and events around the world. Radek has a Bachelor's degree and a Master of Science degree from the Faculty of Informatics and Statistics, University of Economics in Prague.

Introduction

This book is based on the Designing HPE Storage Solutions course and helps you prepare for the Designing HPE Storage Solutions (HPE0-J57) exam for the HPE ASE - Storage Solutions Architect V3 certification. This certification validates that you can expertly explain, recommend, and design Enterprise Storage Solutions and translate business requirements into storage designs that support applications and data across physical, virtual and cloud environments with a common architecture and converged management. The certification also shows that you can design HPE Backup Solutions including the right Backup, Recovery, and Archive (BURA) strategies for various customer scenarios.

Certification and Learning

Hewlett Packard Enterprise Partner Ready Certification and Learning provides end-to-end continuous learning programs and professional certifications that can help you open doors and accelerate your career. We provide continuous learning activities and job-role based learning plans to help you keep pace with the demands of the dynamic, fast paced IT industry; professional sales and technical training and certifications to give you the critical skills needed to design, manage and implement the most sought-after IT disciplines; and training to help you navigate and seize opportunities within the top IT transformation areas that enable business advantage today.

As a Partner Ready Certification and Learning certified member, your skills, knowledge, and real-world experience are recognized and valued in the marketplace. To continue your professional and career growth, you have access to our large HPE community of world-class IT professionals, trend-makers and decision-makers. Share ideas, best practices, business insights, and challenges as you gain professional connections globally.

To learn more about HPE Partner Ready Certification and Learning certifications and continuous learning programs, please visit

<http://certification-learning.hpe.com>

Audience

This book is designed for presales architects and integrators or HPE channel partners who identify opportunities and define technical requirements for HPE Storage Solutions. It is recommended that candidates have a minimum of one to three years of experience in designing and implementing storage technologies.

Assumed Knowledge

The HPE ASE — Storage Solutions Architect V3 certification Solutions certification is an intermediate-level certification. It is expected that candidates will have industry- standard storage knowledge from training, hands-on experience, or participation in other technical events.

Minimum Qualifications

Pre-requisites to qualify for this certification are the HPE ATP - Storage Solutions V3 or the HPE ATP - Data Center Solutions V1.

Relevant Certifications

After you pass these exams, your achievement may be applicable toward more than one certification. To determine which certifications can be credited with this achievement, log in to The Learning Center and view the certifications listed on the exam's More Details tab. You might be on your way to achieving additional certifications.

Preparing for Exam HPE0-J57

This self-study guide does not guarantee that you will have all the knowledge you need to pass the exam. It is expected that you will also draw on real-world experience and would benefit from completing the hands-on lab activities provided in the instructor-led training. To pass the certification exam, you should...

Recommended HPE Training

Recommended training to prepare for each exam is accessible from the exam's page in The Learning Center. See the exam attachment, "Supporting courses," to view and register for the courses.

Obtain Hands-on Experience

You are not required to take the recommended, supported courses, and completion of training does not guarantee that you will pass the exams. Hewlett Packard Enterprise strongly recommends a combination of training, thorough review of courseware and additional study references, and sufficient on-the-job experience prior to taking an exam.

Exam Registration

To register for an exam, go to https://certification-learning.hpe.com/tr/learn_more_about_exams.html

CONTENTS

1 HPE Storage Enterprise Market	1
Prelearning check.....	1
HPE Storage strategy for the Idea Economy	2
HPE Storage strategy.....	3
Data center is evolving rapidly	4
Changes impacting customers	5
Problems with legacy storage environments.....	6
What do organizations need from their storage?.....	8
Activity: Customer influences, drivers, and challenges	9
Applications and data fuel the digital enterprise.....	9
Infrastructure powering the Idea Economy.....	10
Doing business in the Idea Economy.....	11
Hybrid IT: The solution continuum	12
The way infrastructure should work	12
Deployment comparison	14
Change the approach	15
Optimizing the infrastructure for apps	15
Storage types	16
Learning check.....	17
Storage trends	17
Major market trends.....	18
The HPE Vision	20
HPE Solutions.....	20
HPE Pointnext services	22
HPE OneView	23
Align storage goals with business goals	25
How are IT and storage business demands being measured?.....	26
Moving to Composable Infrastructure	27
Why HPE?.....	28
Gartner Magic Quadrant for solid-state arrays 2016 vs 2017.....	29
Gartner Magic Quadrant for general-purpose disk arrays	30
Learning check.....	31
Activity: HPE Solutions	31
Watch the OneView video at the link below:	32

HPE Converged Infrastructure	32
Key initiatives for long-term IT strategy	33
HPE Converged Storage principles	34
Converged Storage is designed to deliver ROI.....	35
HPE Synergy—The first platform architected for composability.....	36
Synergy composable storage	37
Learning check	38
Summary.....	38
2 HPE Storage Portfolio	39
Prelearning check.....	39
HPE Storage portfolio	41
HPE Storage positioning	42
HPE SimpliVity 380 Gen10.....	43
HPE SimpliVity backups.....	44
Activity: Modernizing the infrastructure.....	44
HPE StoreFabric.....	45
Gen6 Fibre Channel.....	46
HPE StoreEasy	48
HPE StoreEasy 3850 WSS2016 Gateway Single Node.....	48
Software-defined storage.....	50
HPE StoreOnce portfolio.....	51
StoreOnce single-node appliance.....	52
StoreOnce single-node appliance—Key parameters	52
StoreOnce 6600—Key parameters.....	53
HPE StoreEver.....	54
HPE T950 and TFinity ExaScale Edition Tape Library.....	55
Learning check.....	56
HPE primary storage	57
HPE StoreVirtual	58
HPE StoreVirtual 3200	58
Peer Copy from VSA to 3PAR	63
VSA Ready Nodes	63
Network RAID technology.....	64
HPE StoreVirtual Peer Motion.....	66
HPE SmartClone volumes.....	67
Learning check.....	68
Activity: Using VSA Ready Nodes	69
HPE 3PAR StoreServ	70
HPE 3PAR StoreServ Family	71

HPE 3PAR StoreServ 9450 and 20000 provide highest resiliency	73
HPE 3PAR StoreServ 9450 performance	74
HPE 3PAR StoreServ 8000.....	74
HPE 3PAR StoreServ—Converged flash 8440 and all-flash 9450	76
HPE 3PAR StoreServ 20000.....	77
HPE 3PAR StoreServ architecture.....	78
HPE 3PAR ASIC	79
Features of StoreServ architecture	79
No single point of failure with StoreServ components.....	80
Converged block, file, and object access.....	81
HPE 3PAR StoreServ: Embracing new technologies	81
Architected for efficiency today and for what comes next	82
HPE 3PAR gets you ready for what is next.....	83
Fifty percent lower average latencies and 80% higher IOPS	83
HPE InfoSight for 3PAR.....	84
Portal navigation	85
Learning check.....	86
Activity: Understanding 3D Cache	87
HPE Nimble Storage.....	88
Nimble All-Flash storage family.....	89
Scale out with clustered arrays.....	90
Nimble Storage graphical user interface (GUI)	91
HPE InfoSight.....	92
HPE InfoSight Predictive Analytics.....	92
Capacity trending and upgrade recommendations	93
Benefits of radical simplicity are clear and measurable	93
Secondary Flash Arrays—Put your backup data to work	94
Simplified data management	95
Twenty percent more usable capacity than other vendors	95
Viewing data reduction savings	96
Triple parity protection plus spare drive	97
Radically simple “Timeless Storage” business model	98
HPE Cloud Volumes.....	99
Data protection.....	100
Multicloud without lock in	100
Positioning Nimble within the HPE Storage portfolio	101
Activity: Artificial intelligence for the data center.....	102
HPE management tools	103
HPE 3PAR StoreServ Storage management	104
Federation view in SSMC	105
HPE 3PAR StoreServ CLI	106

HPE Smart SAN	107
HPE Insight Remote Support (IRS)	108
HPE Storage Operations Manager	110
HPE Recovery Manager Central	111
HPE OneView—Deploy infrastructure faster	114
HPE OneView licensing	116
Learning check.....	117
HPE 3PAR StoreServ Operating System and Software	117
HPE 3PAR StoreServ Software portfolio.....	118
HPE 3PAR 7/10000 StoreServ Software Suites.....	118
3PAR 8000 and 20000 software suites.....	119
3PAR 8000, 9000, and 20000 software details	120
All-inclusive licensing for existing 8k and 20k customers	122
HPE 3PAR Adaptive Data Reduction	122
HPE Express Layout.....	123
HPE 3PAR Thin Technologies	124
HPE 3PAR Thin Deduplication	125
HPE 3PAR Data-at-Rest Encryption	126
Workload-centric storage personas	127
HPE 3PAR StoreServ File Persona	129
HPE 3PAR File Persona	130
HPE 3PAR File Persona logical architecture	131
HPE 3PAR File Persona features.....	131
HPE 3PAR Dynamic Optimization.....	132
HPE 3PAR Adaptive Optimization	133
HPE 3PAR Priority Optimization (QoS).....	135
HPE 3PAR Adaptive Flash Cache.....	137
Adaptive Flash Cache compared to Adaptive Optimization.....	139
HPE 3PAR StoreServ Peer Motion and Online Import	140
HPE 3PAR Persistent technologies	141
HPE 3PAR Persistent Cache	143
Persistent Ports	144
Persistent Ports on HPE 3PAR StoreServ systems.....	145
HPE 3PAR Remote Copy software.....	146
Asynchronous Periodic mode replication.....	148
Asynchronous Streaming mode replication	149
HPE 3PAR Storage Federation.....	151
Learning check.....	154
Summary.....	156

3 HPE Virtualization, Fabrics, and Converged Management	157
Prelearning check.....	157
Fundamentals of virtualization.....	158
Journey of virtualization	159
Storage integration into hypervisors	159
Software-defined storage.....	160
HPE StoreVirtual VSA.....	161
HPE StoreVirtual VSA Ready Nodes	162
Learning check.....	165
VMware Virtual Volumes	166
VVol integration with shared storage	168
Desktop virtualization.....	172
HPE Nimble solutions for virtual desktop infrastructure	175
HPE InfoSight VMVision	176
VMVision	178
Datastore TreeMap.....	179
Latency analysis.....	180
Virtual machine view.....	180
Operational Dashboard	181
VMware Horizon conceptual architecture	181
Learning check.....	183
Activity: Implementing VMware VVs on HPE 3PAR StoreServ	183
HPE Virtual Connect FlexFabric	185
FlexFabric and HPE 3PAR StoreServ	186
HPE flat SAN architecture.....	187
Convergence with Virtual Connect FlexFabric modules and adapters.....	188
Virtual Connect FlexFabric adapters	191
Learning check.....	192
SAN fabric topologies	193
HPE SAN support	193
Levels of availability	194
Single-switch fabric.....	194
Meshed-switch fabric	195
Multiple fabrics and device paths	196
Routed SAN fabrics	197
Learning check.....	201
Activity: Using the SAN Design Reference Guide	201
Virtualization management with HPE OneView	202

HPE OneView	203
Consumer-inspired user experience	204
HPE OneView for storage management	206
The best of control and agility with storage templates.....	207
StoreVirtual automation—HPE OneView.....	208
Management platform built on the unified REST API.....	210
HPE OneView: Your infrastructure automation engine	211
HPE OneView licensing	211
Managing storage resources with HPE OneView	212
HPE OneView and HPE 3PAR StoreServ systems.....	213
Deploying applications using rapid automation and growth	215
Learning check.....	216
Activity: HPE OneView Licensing Guide video	217
HPE Converged Systems	218
HPE ConvergedSystem 700	220
Hyperconvergence—Support for a hybrid infrastructure.....	221
What is HPE Hyper Converged?.....	222
The evolution of hyperconvergence.....	223
HPE SimpliVity	224
HPE Composable Infrastructure	227
Benefits of Composable Infrastructure	228
The versatility of Composable Storage via HPE OneView	229
HPE Synergy	230
Activity: Using HPE Reference Architecture	231
Learning check.....	232
Summary.....	233
4 HPE Storage Services.....	235
Prelearning check.....	235
Partner Ready Services	236
Value in partnership.....	237
Business benefits of the Partner Ready Services.....	238
Earning competencies	239
Activity: Accessing the Partner Ready Portal	240
Learning check.....	241
Overview of HPE Storage support services	242
Support Services Central	243
HPE Support Center access	243
Firmware updates for eligible products	244

Auditing and call-to-repair times	244
Activity: Understanding severity levels: Part 1	247
Activity: Understanding severity levels: Part 2	248
Packaged service levels	252
HPE Foundation Care	253
HPE Foundation Care support levels	253
HPE Proactive Care	256
HPE Proactive Care Advanced	258
HPE Lifecycle Event Services	259
HPE Insight Remote Support	260
HPE Datacenter Care	262
Activity: Proactive Care Advanced video	264
Learning check	265
HPE Financial Services	266
HPE Financial Services adding value for channel partners	266
Our promise to our partners	267
HPE Renew program	268
Activity: Understanding the Financial Services sales steps	269
HPE Consulting Services	270
Simplify IT with HPE Pointnext Services	270
HPE Services portfolio	271
Professional Services	271
Operational Support Services	272
Data Storage Services	273
HPE Solution Consulting Services	274
HPE 3PAR StoreServ Data Migration Service	275
HPE Network Transformation Experience Workshop	276
Learning check	277
Summary	277
5 Planning HPE Storage Solutions	279
Prelearning check	279
Choosing the most appropriate drive type	280
Hard disk drives	281
IO workloads	281
Considerations while choosing HDDs	282
HDD types	283
Solid-state drives	285
Choosing an HDD or SSD solution for an application	286

Comparing drive performance	287
Drive IO and RAID performance impact	290
Adaptive Flash Cache	292
Using AFC to increase read hits and improve random read performance	293
Moving data from a node's DRAM read cache into AFC	295
HPE SmartCache architecture.....	296
SmartCache—DAS	297
Hybrid flash rules and guidelines for Nimble.....	299
Learning check.....	300
Activity: Choosing the correct SSD.....	301
Planning a RAID configuration	302
3PAR StoreServ RAID 6 concept	303
Using network RAID in a StoreVirtual Cluster	304
Planning and designing a SAN	305
HPE approach to SAN design	306
SAN design principles and considerations	307
SAN components	308
Topology data access performance.....	308
Fibre Channel and converged switches	309
HPE Flex-10 or FlexFabric design.....	309
HPE Virtual Connect for Synergy	311
HPE Synergy composable fabric.....	312
HPE StoreFabric M-Series Ethernet switches—Optimized for storage	313
HPE FlexFabric solution product portfolio	314
HPE FlexFabric switches.....	315
Learning check.....	315
Activity: Understanding SAN extensions	315
Configuring the most resilient HPE 3PAR configuration	317
NinjaSTARS: Elements to be considered	319
Adaptive Data Reduction	320
HPE 3PAR StoreServ 9450 hardware building blocks.....	321
HPE 3PAR StoreServ 9450 controller	322
HPE 3PAR StoreServ 9000 configuration considerations.....	322
Choose drive and host adapter	324
HPE 3PAR StoreServ 9450 port scalability	325
Configuring the 8000, 9450, and 20000 for utmost performance.....	326
Choose cables	331

Choose Service Processor	332
HPE 3PAR StoreServ 9450 racking options	333
HPE 3PAR StoreServ 9450 warranty, support, and installation	334
HPE 3PAR StoreServ 9450 performance	334
Learning check.....	335
Activity: Using NinjaSTARS to create a configuration	335
Examples from NinjaSTARS	336
Activity: Using Nimble Config Sizer to create a configuration	338
HPE Reference Architectures.....	339
HPE Converged Architecture 700 with Arista	341
Activity: Reference Architecture	342
Learning check.....	343
Summary.....	344
6 Staging an Effective Storage Consulting Engagement	345
Prelearning check.....	345
Presales consulting goals	346
Customer culture	347
Recognize the buyer, their top priority, and desired outcomes	347
Align the right solution by workload and use case	348
Use the flash conversation to identify data protection opportunities	349
Do not miss the secondary storage opportunity.....	350
Consulting engagement stages	351
Where do projects come from?	352
Learning check	352
Business value sales with storage.....	353
Engage early in the sales cycle with consultative selling.....	355
HPE Storage business value methodology	356
Defining business value in storage.....	356
Addressing business objectives.....	357
Steps to a successfully architected storage solution.....	358
Four fundamental storage architecture views	359
HPE sizing and planning tools.....	360
HPE Storage Sizing Tool	361
HPE Nimble Config Sizer	362
Storage Assessment Foundry	363
Storage Assessment Foundry Suite	366
HPE NinjaSTARS for HPE 3PAR StoreServ	367

How to achieve better data protection	368
Storage Optimizer	370
One Config Advanced	371
Learning check.....	376
Activity: Completing the OCA introduction	377
Using TCO and ROI tools.....	377
TCO	378
ROI.....	378
Alinean ROI and TCO analysis	379
HPE Storage Quick ROI Calculator.....	380
Alinean customer deliverables.....	381
Technical Enablement Tools and Resources	382
Resources and tools.....	382
HPE Demonstration Portal	384
HPE Storage Information Library	386
HPE QuickSpecs	387
HPE SAN certification and support.....	388
Single Point of Connectivity Knowledge	390
Learning check.....	390
Activity: Using the SAN Design Reference Guide	391
Proof of Concept.....	392
Test guidelines	392
HPE PoC App	394
VSA design considerations	396
Learning check.....	397
Summary.....	398
7 Administering and Monitoring HPE Storage Solutions.....	399
Prelearning check.....	399
HPE 3PAR manageability	400
3PAR—Management options	401
HPE 3PAR StoreServ administration	401
Using the SSMC.....	403
Learning check.....	404
Activity: HPE Smart SAN for 3PAR video.....	405
HPE 3PAR StoreServ System Reporter	405
Threshold alerts	411
Excel add-in for SSMC	413
HPE 3PAR Service Processor	414

Service Console	415
VSP infrastructure planning and deployment best practices	417
Remote support.....	418
Learning check.....	420
Activity: Prerequisite for setting up the Service Processor	420
Managing HPE StoreOnce systems	421
Reporting Central—Reports	422
Firmware updates.....	423
Configuration save.....	424
Confidence Checker	424
HPE StoreOnce RMC for VMware software (RMC-V).....	426
Installing Recovery Manager Central	428
RMC—Fibre Channel connectivity	430
Learning check.....	430
Nimble Storage system	431
NimbleOS home page	432
Administration menu	435
How does InfoSight help customers?	437
Identifying where the problems exist.....	438
Learning check.....	439
HPE StoreVirtual storage systems.....	439
Dashboard view	440
Centralized Management Console main window	440
HPE OneView	441
HPE OneView storage management	442
HPE OneView for VMware vCenter	444
HPE OneView for Microsoft System Center.....	448
Learning check.....	452
Activity: What is new with OneView 4.0?	452
Learning check.....	453
Summary.....	453
8 Upgrading, Optimizing, and Tuning HPE Storage Solutions	455
Prelearning check.....	455
Upgrading the HPE 3PAR StoreServ system	456
High availability	456
Adding new components to an existing system	457
Controller node upgrade	459
Drive enclosure upgrade.....	461

Disk chassis availability	462
Drive and enclosure upgrades.....	464
Allocating and loading guidelines—SFF drives	467
Allocating and loading guidelines—LFF drives	468
Allocating and loading guidelines—Avoid practices	468
Disk drive upgrade	469
Learning check.....	472
Activity: HPE 3PAR StoreServ 9000 Storage Customer Self-Install video.....	473
HPE InfoSight and upgrading HPE Nimble systems.....	474
Upgrading the HPE Nimble system	475
What is in a CSx000 Array?	475
Drive layout—CS1000, CS3000, CS5000, and CS7000	476
Drive layout—DFC details.....	477
Drive layout—CS1000H: A half-populated CS1000	478
CS-Series connectivity options	479
Nimble Storage CSx000 scale to fit	480
CSx000 controller upgrades	480
CS1000H “half-pop” controller upgrades	481
ES2 Expansion Shelf.....	482
Drive layout—ES2.....	482
Upgrading HPE StoreOnce Systems	483
HPE 5100 Capacity Upgrade system components.....	484
Firmware upgrades.....	485
Upgrading firmware	486
Multinode systems	486
Download Quick Restore ISO Image.....	489
Learning check.....	491
Optimizing HPE StoreOnce Storage systems.....	492
Optimizing StoreOnce Catalyst best practices	493
Optimization considerations with deduplication on StoreOnce	494
Optimizing general best practices: HPE 3PAR StoreServ 8000 initial configuration	495
HA disk: Two-node drive upgrade best practice.....	496
HA disk: Two-node enclosure upgrade best practice	497
3PAR OS 3.3.1 and active-active disks	497
How set size affects rebalancing activities and upgrades.....	498
Mixed-drive capacities and speeds.....	498
All-flash array considerations	499
Adaptive Flash Cache	500

Increasing and decreasing the size of Adaptive Flash Cache	500
HPE 3PAR Dynamic Optimization.....	502
HPE 3PAR Adaptive Optimization	503
HPE 3PAR Priority Optimization	504
Learning check.....	505
Tuning HPE 3PAR StoreServ systems.....	505
Introduction to tunesys	505
Tunesys phases	506
Tunesys	508
SSMC—Accessing Tuning from SSMC	511
Learning check.....	513
HPE 3PAR StoreServ operating system upgrade.....	513
Planning information for online HPE 3PAR OS upgrades	515
HPE 3PAR StoreServ Storage configuration guidelines.....	517
Preinstallation requirements	518
Starting HPE 3PAR OS software update from the SP.....	521
Update HPE 3PAR OS	522
HPE 3PAR StoreServ Service Processor upgrade	526
Uploading an ISO image.....	527
Service Processor Update page	528
Activity: HPE 3PAR StoreServ 7000 Storage Remove/Replace disk video.....	528
Learning check.....	529
Summary.....	530
9 HPE Backup Solutions	531
Prelearning check.....	531
HPE StoreOnce overview	532
Block, file, and object compared	533
HPE StoreOnce portfolio.....	534
StoreOnce Deployment planning and sizing considerations.....	536
Choosing the most appropriate StoreOnce system	537
Configuration best practices—General	539
Performance: Understand performance curve progression.....	540
Performance considerations	541
Additional considerations	544
StoreOnce VSA	548
Backup target emulation types—VTL.....	551
Backup target emulation types—NAS	552
Learning check	553

StoreOnce Catalyst	554
HPE StoreOnce Catalyst ISV integration	555
Multihop	556
HPE StoreOnce deduplication	556
Federated deduplication	558
Federated StoreOnce Catalyst.....	559
StoreOnce Catalyst principles	560
STaTS support for customers with 3PAR and StoreOnce	561
StoreVista individual system detail and performance history	562
Nimble SF-Series Secondary Flash Array.....	562
Veeam integration.....	564
Learning check.....	564
Activity: StoreOnce Systems to deal with data growth video	565
Recover Manager Central	566
RMC components.....	566
Monitoring RMC Appliance—Dashboard	569
Peer Copy	570
Express Protect.....	572
Express Restore.....	573
Element Recovery Telemetry	574
Guided workflow—new way to protect the data	575
RMC 4.1 has the ability to suspend schedules	576
RMC-V Snapshots/Veeam Explorer Integration	576
Learning check.....	577
Activity: Creating snapshots and Express Protect backup for Oracle databases video.....	577
StoreOnce operating system features and benefits	578
Hardware Appliances:	578
StoreOnce Virtual Appliances:	578
HPE StoreOnce Cloud Bank Storage.....	579
Reporting Central.....	589
Catalyst Copy over Fibre Channel	590
Learning check.....	593
Activity: HPE Cloud Bank Storage video	594
HPE StoreEver Tape portfolio.....	595
HPE StoreEver—LTO Tape Drive/MSL Tape Libraries	596
HPE LTO Tape Drive portfolio	597

LTO technical specifications	597
HPE StoreEver 1/8 G2 Tape Autoloader family comparison	598
HPE StoreEver MSL 6480 comparison	599
HPE TFinity ExaScale Edition	600
BlueScale tape library software	601
New HPE T950V with LTO-8	602
Learning check.....	603
HPE tape tools.....	604
StoreEver TapeAssure Advanced Software and CV-TL	604
HPE Library and Tape Tools.....	605
Ease of use with HPE StoreOpen and LTFS	606
What is NinjaProtected+?.....	607
Storage Assessment Foundry	608
HPE Storage Sizer input files.....	610
HPE Switch Selector tool	611
Learning check.....	612
Activity: Hewlett Packard Enterprise Switch Selector	612
Learning check.....	614
Summary.....	614
10 Designing HPE BURA Solutions.....	615
Prelearning check.....	616
Availability and downtime	616
Planned downtime	617
Activity: Identifying causes of downtime	618
What is backup?.....	619
What is restore?	620
Identifying the data to be saved	620
Differential backup.....	622
Incremental backup	623
When to choose incremental vs. differential backup.....	624
Synthetic backup.....	624
Conceptual illustration of RMC Express Protect—Inline synthetic full.....	625
Archive bit	625
RPO, RTO, and retention	627
Differences between a backup and archiving	628
Tiered data retention for HPE StoreServ	630
Learning check.....	631

Activity: Calculating the cost of downtime.....	632
Backup strategy planning.....	632
The data protection continuum	634
Defining the requirements of a backup and recovery strategy	635
Preparing the backup design	638
The infrastructure methods and devices.....	639
Capacity and sizing	641
Capacity planning usage models	642
Learning check.....	643
Array snapshot with HPE RMC-V.....	644
Impact of traditional backup on mission-critical applications in all-flash 3PAR environments.....	644
Impact of an incremental backup on mission-critical applications in all-flash 3PAR environments.....	645
Eliminating backup impact on mission-critical applications in all-flash 3PAR environments with 3PAR RMC	646
Snapshots alone cannot deliver comprehensive application protection in all-flash environments.....	646
Protecting workloads at the speed of 3PAR Flash	647
Flash-integrated data protection without compromise.....	649
Sizing an RMC solution	649
Learning check.....	655
Software to support HPE BURA.....	655
Traditional backup and archive is unsustainable	657
HPE BURA.....	659
Data Protector	660
Data Protector 10.0	661
Data Protector Architecture	662
How deduplication integrates into Data Protector.....	663
Target-side deduplication with Data Protector and StoreOnce	664
Server-side deduplication with Data Protector and StoreOnce	665
Source-side deduplication with Data Protector and StoreOnce	666
Capacity planning considerations	667
Activity: Sample backup information collection for capacity planning	670
Micro Focus Adaptive Backup and Recovery	671
Recovery Manager Central and RMC-V	674
Veeam and StoreOnce integration.....	675
Comparison of several item recovery options within Veeam in HPE Storage environment.....	678

Integrate 3PAR Integration with Veeam	679
Veeam with Nimble highlights.....	679
Backup from Storage snapshots	681
Secondary Flash Array Use Cases.....	682
Storage Optimizer	683
Learning check.....	684
Compliant archiving challenge	685
iTernity Compliant Archive Software	686
HPE Complete—iCAS.....	687
HPE StoreEasy Storage and iCAS.....	688
Addressing emerging use cases—Compliance and security	689
HPE Enterprise Secure Key Manager	690
StoreOnce Security Pack.....	693
Local key and centralized key management	694
Learning check.....	696
Summary.....	697
 Practice Test.....	 699
Introduction	699
Ideal candidate for this exam.....	699
HPE0-J57 testing objectives	700
Test preparation questions and answers	700
Questions	700
 Practice Test.....	 709
Answers and explanations	709
 Learning Check Answers	 725
Chapter 1	725
Chapter 2.....	726
Chapter 3.....	728
Chapter 4.....	729
Chapter 5.....	730
Chapter 6.....	731
Chapter 7.....	732
Chapter 8.....	733
Chapter 9.....	734
Chapter 10.....	736
 Index.....	 739

1 HPE Storage Enterprise Market

LEARNING OBJECTIVES

After completing this chapter, you should be able to:

- ✓ Describe the Hewlett Packard Enterprise (HPE) Storage strategy in the Idea Economy
 - ✓ Summarize Storage trends
 - ✓ Explain HPE Solutions
 - ✓ Identify HPE Converged and Composable Infrastructure
-

Prelearning check

1. To survive in today's fast-paced enterprise environment, businesses need to become more agile. What are the three key components fundamental to HPE Composable Infrastructure that enable agility?

HPE Storage strategy for the Idea Economy

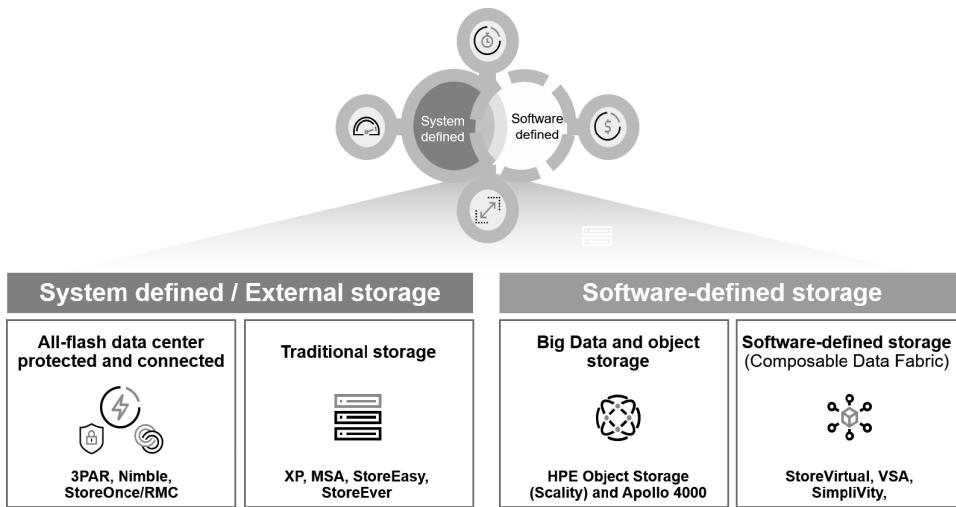


Figure 1-1 System- and software-defined storage

The increasing complexity of the storage decision reflects the growing recognition of storage as a strategic investment. The storage strategy therefore needs to be better aligned to support customers' applications and business goals.

HPE Storage strategy encompasses System Defined and traditional storage as well as Software Defined and Composable Infrastructure, as shown in Figure 1-1.

HPE believes that you will probably need both, especially if you want to build a Data Center Architecture for the New Style of IT.

Today more than ever before businesses need to find the right strategy for their IT. Although they scramble to transform themselves to compete in the digital economy, pressure is placed on them to get it right.

According to Frost & Sullivan research, 40% of CEOs globally are focusing on their technology strategy to drive revenue growth over the next three years. Among IT decision makers, 73% are pursuing a hybrid IT strategy.

HPE Storage strategy

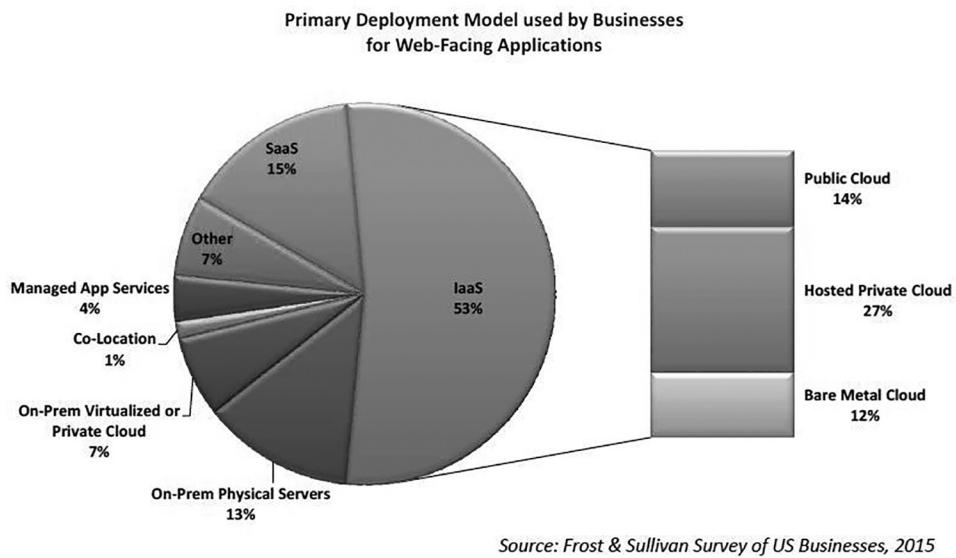


Figure 1-2 Primary deployment model used by businesses

Storage administrators need to address many different challenges:

- What storage technology (flash or HDD)?
- What storage structure (block, file, object)?
- What infrastructure (physical or virtual, standalone or converged)?
- What deployment model (premises-based, cloud, or hybrid)?

As shown in Figure 1-2, more and more businesses today are moving toward a hybrid cloud environment for their IT.

According to a Frost & Sullivan survey of IT decision makers:

- 73% of businesses currently have or plan to implement a hybrid cloud by next year.
- 71% of businesses expect that their hybrid cloud will include their own data center as well as various vendors' public and private cloud services.

Regardless of how comprehensive your strategy is or how committed your company maybe toward transforming to a hybrid IT environment, few companies implement a full-scale infrastructure upgrade. Such an initiative is usually deemed too costly, in terms of time, budget, disruption, and business risk. It is more likely that you will select a few storage optimization projects to get started.

Cloud and hybrid infrastructures are not just the preserve of enterprise customers. Most SMBs (small and medium-sized businesses) understand that they need to put technology to work to transform their businesses for the future.