Quantum

Обзор решений и сервисов Quantum

CREATE. INNOVATE. PROTECT.
ON QUANTUM.

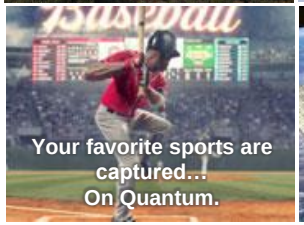
Компания Quantum (NASDAQ: QMCO)

40 лет опыта на рынке систем хранения и защиты данных

20+ лет экспертизы по работе с видео в Голливуде

30,000+ активных контрактов поддержки по всему миру

24/7/365 сервисная поддержка мирового уровня



Богатый опыт и история в производстве систем хранения.

1980

HDD диски
(Бизнес продан в 2001)

1994

Защита данных: Ленточные устройства

2002

Защита данных: Дисковые системы

2006

Высоко-производительные хранилища данных и файловые системы

2012

Внедрение облачных технологий в устройства

2015

Многоуровневые системы для бизнеса со сложными требованиями к хранению данных

Области применения решений Quantum

Защита данных, катастрофоустойчивые системы, защита от Вирусов-шифровальщиков/вымогателей	Использование ленточных и объектных платформ для автономного хранения
Низкая стоимость хранение в течение многих лет, GDPR, соответствие нормативным требования, аудит	Использование ленточных систем/носителей для больших архивов
Сокращение времени резервного копирования/восстановления данных; сокращение места, занимаемого в ЦОД; консолидация систем резервного копирования	Системы дедупликации Quantum DXi
Неструктурированные данные, гиперконвергентные решеня для Интернета вещей (IoT) и Видеонаблюдения	Высокопроизводительная файловая система StorNext; программно-аппаратные NVMe комплексы, HCI и VS комплексы
Тенденция к управляемым услугам и гибридные облачные модели	Решения Quantum StorNext и Scalar, в качестве частного облачного сервиса (Quantum Cloud Services)

Quantum В МИРЕ

ФИНАНСЫ И БАНКИ

Caja Duero, SOCIETE GENERALE, KB Kredyt Bank, BARCLAYS, GAZPROMBANK, BS Busan Bank, BNP PARIBAS, CAISSE D'EPARGNE

ОБРАЗОВАНИЕ

OXFORD UNIVERSITY PRESS, The City of Leicester College, SAN DIEGO STATE UNIVERSITY, SBCC, THE IVY LEAGUE, BYU HAWAII, Universität Hamburg

РОЗНИЦА

DECATHLON, MIGROS, LIDL, EDEKA, Carrefour, ALDI, Auchan

СПОРТ, МЕДИА, НАУКА И ПРОЧЕЕ...

RICHEMONT, L'ORÉAL, Heineken, Red Bull MEDIA HOUSE, FERRERO, PPR, CERN, West Coast Customs, THE SALVATION ARMY, BBC SPORT, Virgin, Panasonic ideas for life, The West Australian, nc+, TORONTO MAPLE LEAFS, SIB

ТЕЛЕКОММУНИКАЦИИ

T-Systems, interoute, Telefónica, SFR Business Team, rackspace HOSTING, BT, Telia, SIGMA, Attenda

ПРАВИТЕЛЬСТВО И E-GOV

UGAP, ASSISTANCE PUBLIQUE HÔPITAUX DE PARIS, UniHA, Cal EMA, UHSM Your Hospital, MAIRIE DE PARIS, SAE Service des achats de l'Etat, NASA, IGE | IPI, KANTON AARGAU

НЕФТЬ И ГАЗ

TOTAL, NOV NATIONAL OILWELL VARCO, RIO TINTO MINERALS

IT СЕРВИСНЫЕ КОМПАНИИ

itelligence, WINCOR NIXDORF, Atos, expedient, FUJITSU, SAP, serco, NEC, orange Business Services, WorkForce SOFTWARE

ОБОРОНА

DGA, NAVSEA NAVAL SEA SYSTEMS COMMAND, Ministry of Defence, MINISTÈRE DE LA DÉFENSE, Achats.defense.gouv.fr, THALES

МАШИНОСТРОЕНИЕ

Continental Tyres - Engineered in Germany., ROLLS ROYCE, PORSCHE, NISSAN, Valeo, AIRBUS, DAIMLER, BASF, Ferrari

Резервное копирование

Архивы под управлением StorNext

Неструктурированные данные - это основа цифровой трансформации

Autonomous Car:
40 TB every 8 hours

Source: FTI Consulting, “The Data Center Market is About to Get Edgy”, 2017

Bioimaging Microscope:
5 TB to 10 TB per day

Source: Western Digital Healthcare Research

Video Surveillance:
Up to 15 TB per day
(mid-size business)

Source: Western Digital Surveillance Storage Capacity Estimator

Commercial Jet:
20 TB per hour

Source: FTI Consulting, “The Data Center Market is About to Get Edgy”, 2017

Large Retailer:
2.5 PB per hour

Source: Forbes, “Really Big Data at Walmart”, 2017

Earth Observation System:
20 TB to 30 TB per day

Source: German Aerospace Center (DLR), Earth Observation Center, 2018

Smart Factory:
1 TB per day

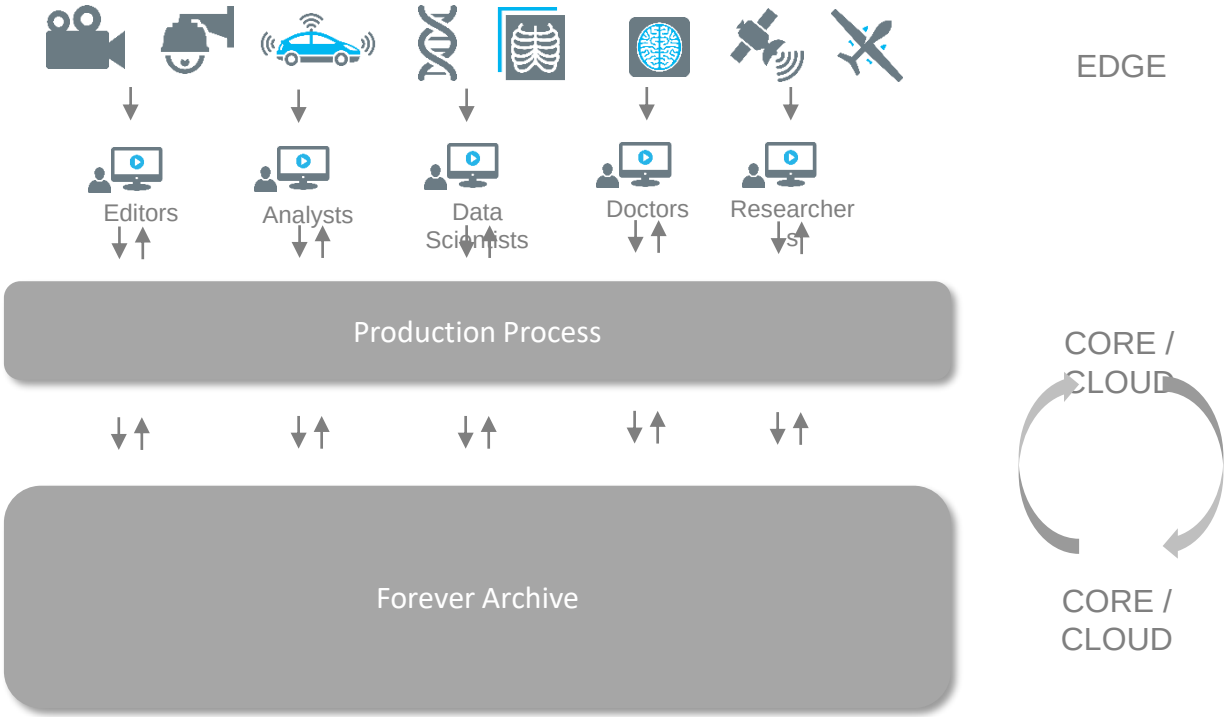
Source: IBM Institute for Business Value

Типичный цикл жизни неструктурированных данных

1 Захват

2 Анализ/ Модификация

3 Архивирование



Технологии и сервисы Quantum

Высокопроизводительные рабочие процессы, управление неструктурированными данными и их обогащение

Долгосрочное хранение, резервное копирование и аварийное врсстановление

Специфические решения

CatDV Asset Management Software

Платформа управления активами и автоматизации рабочих процессов, для более эффективно взаимодействия.

StorNext File System

Высокопроизводительные файловые системы для хранения и управления медиа-контентом и неструктурированными данными

ATFS NAS Platform

Простое в использовании и развертывании, сетевое хранилище, обеспечивающее интегрированную классификацию ваших данных.

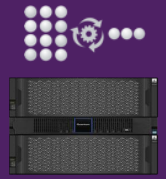
ActiveScale Object Storage

Решения высокой доступности Quantum для долгосрочного архивного хранения данных

Scalar Tape Storage

Ленточные решения Quantum для долгосрочного архивного хранения данных

Enterprise Backup DXi-Series



Дисковые решения Quantum для резервного копирования и DR

Гиперконвергентные решения для построения систем видеонаблюдения и IoT

Мобильные платформы для сбора и аналитики данных

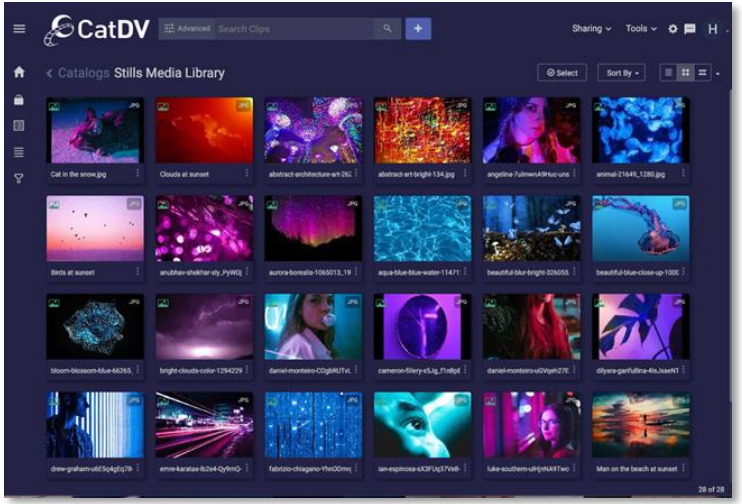
Quantum Distributed Cloud Services

Полный набор профессиональных сервисных услуг, включая Quantum-as-a-Service

CatDV Asset Management Platform

CatDV is an agile media management and workflow orchestration platform.

It helps organizations with large volumes of media and metadata to organize, communicate and collaborate more effectively.



Benefits include:

- Communicate and Collaborate More Effectively
- Unlock Value in Large Content Archives
- Automate Workflows Across Complex Tiered Storage
- Save Time and Money by Leveraging AI

Quantum

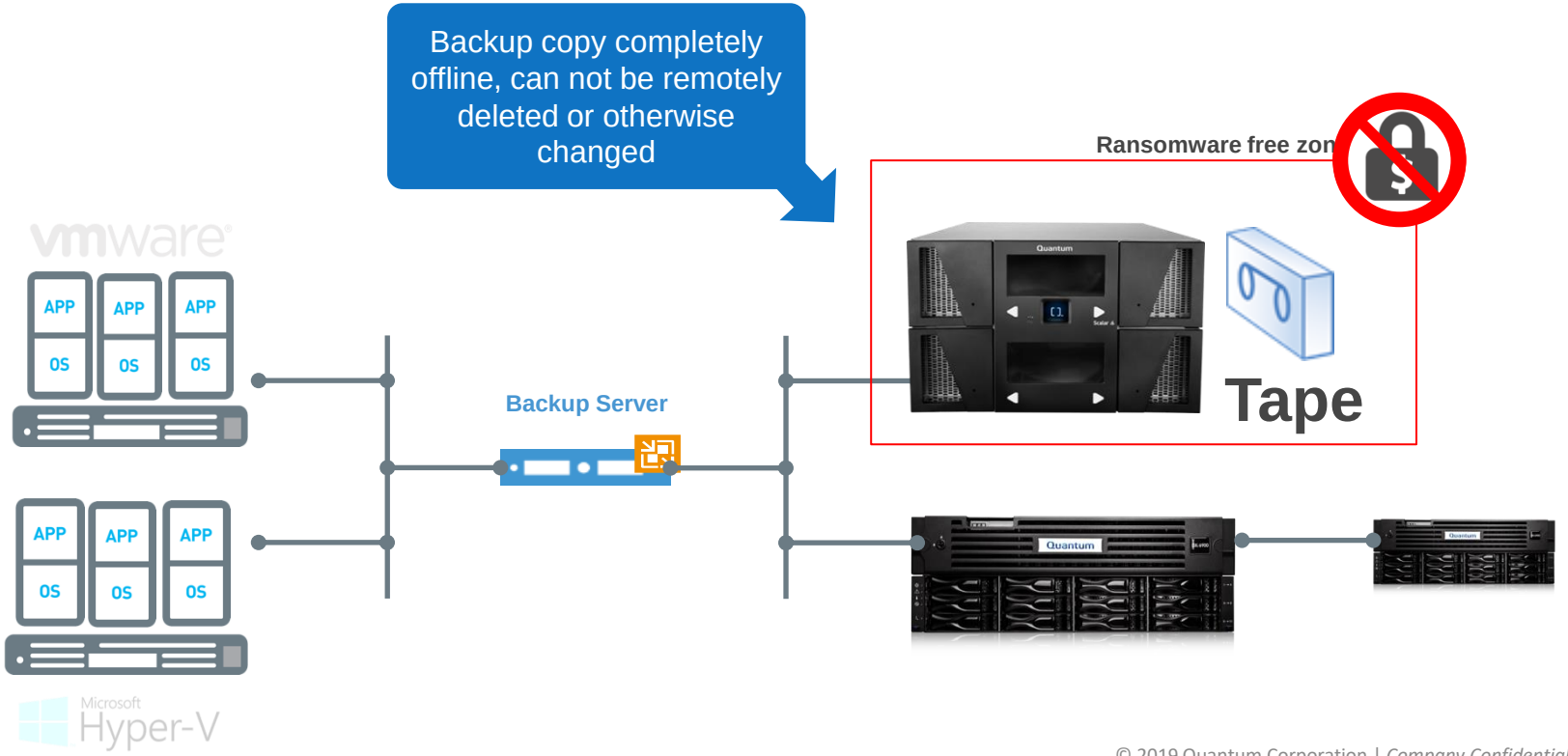
Quantum Scalar Tape Library

CREATE. INNOVATE. PROTECT.
ON QUANTUM.

Потребители ленточных систем

- Огромное количество компаний в мире!
- Транснациональные провайдеры онлайн-сервисов (GAFA: Facebook, Amazon, Google, Apple, MS)
- Преимущества использования ленточных систем
  - портативность (LTFS)
  - защищенность, требования регулятора (Encryption, WORM)
  - низкая вероятность возникновения ошибок (error rate)
  - низкая стоимость хранения даных
  - защита от вирусов-вымогателей
  - низкое энергопотребление
  - широкие функциональные возможности
  - уникальные технологии и решения: iBlade/Active Vault/iLayer
  - только собственные разработки Quantum

Защита от вирусов-шифровальщиков



Сравнительный анализ рынка ленточных систем

Quantum

Scalar i6000
100-12K tapes
1-192 FH drives

Scalar i6
50 – 800 tapes
1-24 FH drvs

Scalar i3
25-400 tapes
1-24 HH drvs

ORACLE

SL8500
1k – 10K tapes
1-64 FH drives
LTO or T10000

SL4000/3000
300-9K/200-6k tapes
1-120/56 FH drives
LTO or T10000

SL150
30 – 450 tapes
30 HH drives

SPECTRA
SPECTRALOGIC.COM

TFinity
100 – 50K tapes
1-144 FH drives
LTO, TS11X0,
T10000D

T950 / T950v
100 – 20K tapes
1-120 drives
FH in T950
HH in T950v
LTO or TS11X0

STACK
10 - 560 tapes
1-42 HH drives

Hewlett Packard Enterprise

Resells Spectra T950 and TFinity

MSL6480
80-560 tapes
1-42 HH drives

MSL3040
40-280 tapes
1-21 HH drives

IBM

TS4500
100 – 23K tapes
1-128 FH drives
LTO or TS11X0

TS4300
40-280 tapes
1-21 HH drives

DELL EMC

ML6000
43 – 409 tapes
1-18 FH drives

ML3
40-280 tapes
1-21 HH drives

© Comp

Сравнительный анализ рынка ленточных систем

Quantum

Scalar i6000
100-12K tapes
1-192 FH drives

Scalar i6
50 – 800 tapes
1-24 FH drvs

Scalar i3
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ORACLE

SL8500
1k – 10K tapes
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LTO or T10000

SL4000/3000
300-9K/200-6k tapes
1-120/56 FH drives
LTO or T10000

SL150
30 – 450 tapes
30 HH drives

SPECTRA
SpectraLogic.com

TFinity
100 – 50K tapes
1-144 FH drives
LTO, TS11X0,
T10000D

T950 / T950v
100 – 20K tapes
1-120 drives
FH in T950
HH in T950v
LTO or TS11X0

STACK
10 - 560 tapes
1-42 HH drives

Hewlett Packard Enterprise

Resells
Spectra
T950 and
TFinity

MSL6480
80-560 tapes
1-42 HH drives

MSL3040
40-280 tapes
1-21 HH drives

6U BDT

IBM

TS4500
100 – 23K tapes
1-128 FH drives
LTO or TS11X0

TS4300
40-280 tapes
1-21 HH drives

3U BDT

DELL EMC

ML6000
43 – [illegible] tapes
1-1[illegible] drives

i500

ML3
40-280 tapes
1-21 HH drives

© Comp

Спецификации LTO

Generation	Compression Rate	Native Cartridge Capacity	Native Throughput	Interface	Feature Support
LTO-4	2:1	800GB	120MB/s	1x4Gb	WORM, Encryption
LTO-5	2:1	1.5TB	140MB/s	1x8Gb 2x8Gb (w/PF)	WORM, Encryption, Partition/LTFS, Path Failover
LTO-6	2.5:1	2.5TB	160MB/s	1x8Gb 2x8Gb (w/PF)	WORM, Encryption, Partition/LTFS, Path Failover
LTO-7	2.5:1	6TB	300 MB/s	1x8Gb 2x8Gb (w/PF)	WORM, Encryption, Partition/LTFS, Path Failover
LTO-8	2.5:1	12TB	360 MB/s	1x8Gb 2x8Gb (w/PF)	WORM, Encryption, Partition/LTFS, Path Failover, LTO-7 Media with M Format*

* LTO-7 M formatted media in an LTO-8 drive provides 9TB native capacity at LTO-7 native throughput (300 MB/s).

LTO-9 pre-purchased program is available - https://cdn.allbound.com/iq-ab/2020/05/ST02312A-v01.pdf

Портфолио ленточных систем Qauntum Scalar

Common Features, Interfaces (iLayer, REST API and SCSI) and Encryption Key Management

	Entry	Midrange	Enterprise	Cloud/Hyperscale
	Scalar i3	**Scalar i6**	**Scalar i6000**	**RAIL Scalar i6s**
Capacity	• 25 – 400 slots • COD: 25-slot increments • 1 – 24 HH drives • 0 – 100 I/E slots, bulk load	• 50 – 800 slots • COD: 25-slot increments • 1 – 24 FH drives • 0 – 240 I/E slots, bulk load	• 100 – 12,006 slots • COD: 100-slot increments • 1 – 192 FH drives • 24– 1,104 I/E slots, bulk load	• 50-830 (w/DBMs)/library • 1-22 FH drives • Multi-library installs
Key Features	• iLayer • Advanced Reporting • Active Vault • Partitioning • Redundant Power • Control Path Failover • Web Services API	**Adds:** • EDLM • Control and Data Path Failover • Full Height drives w/dual ports	**Adds:** • Dual Robot • Advanced I/E Options • Webcam/Aisle Lights • HDEM	**Adds:** • Control Service Module (w/robot service tray, special orders) • One-side service

Larger i6s

Full Rack i6s

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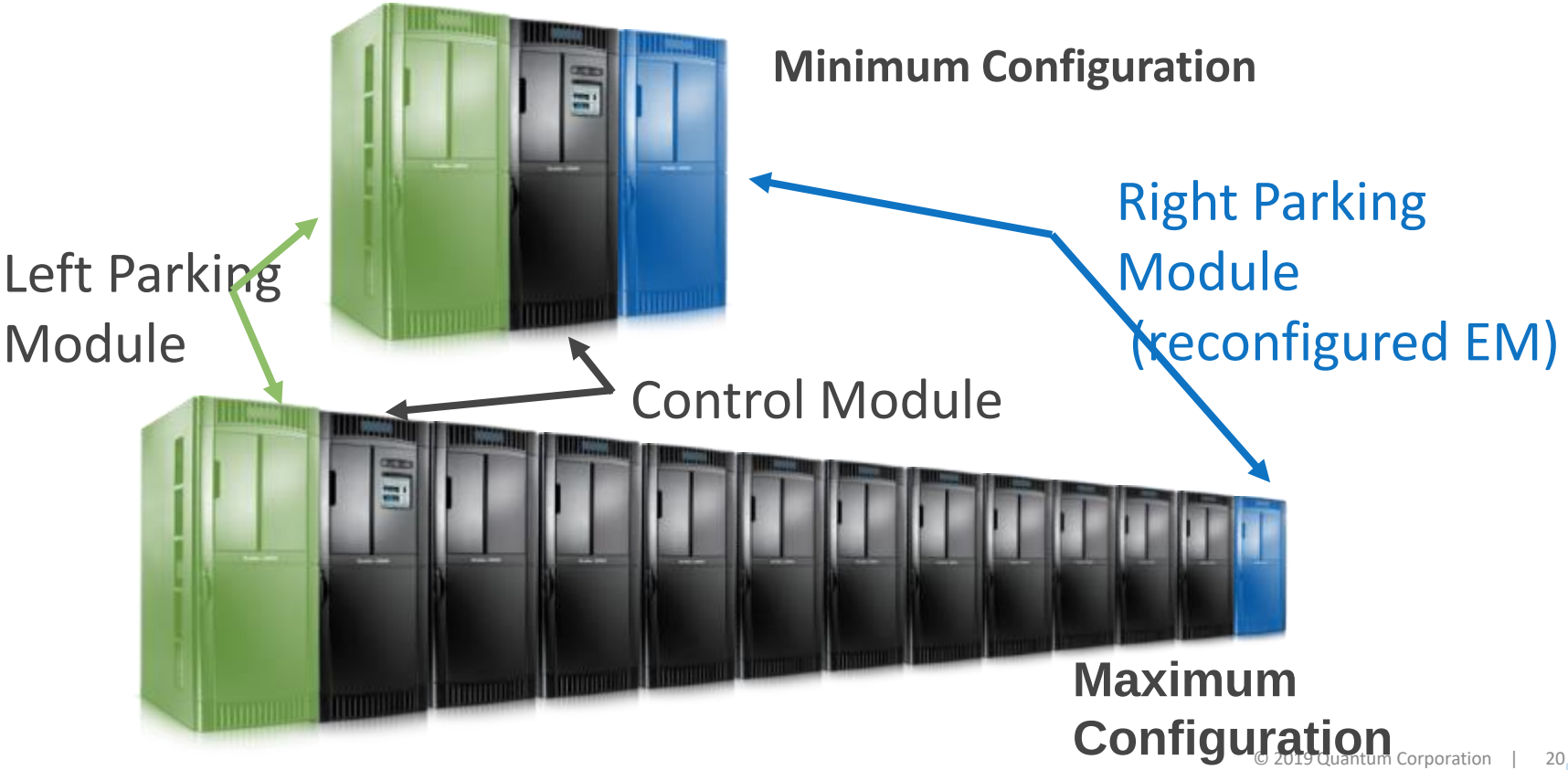
Модули расширения Scalar i6000/AEL6000

Module Dimensions

- Height: 77.4”
- Width: 23.6” (two side covers add 0.7”)
- Depth: 38.3”

Attribute	Left Parking Module	Control Module	Drive Ready Expansion Module	Storage Expansion Module	High-Density Expansion Module	Right Parking Module
Max Slots	228	306 Single robot 384 Dual Robot	456	456	780	228
Max Drives	0	1-18	0-24	0	0	0-12 (DREM)
I/E Station	Options: • none	24-Slot standard no other options	Options: • 24 slot • 72 slot	Options: • 24 slot • 72 slot	Options: • 24 slot • 72 slot • Bulk Load	Options: • 24 slot

Scalar i6000. Конфигурации с 2-мя роботами



Подходы к расширению систем (концепция “Capacity-On-Demand”)

i6000 Example:

Initial Configuration

- 500 slots
- 8 LTO-5 drives
- 50% annual growth

Standard Capacity on Demand Model

Install Extra Unlicensed Expansion Modules

Benefits:

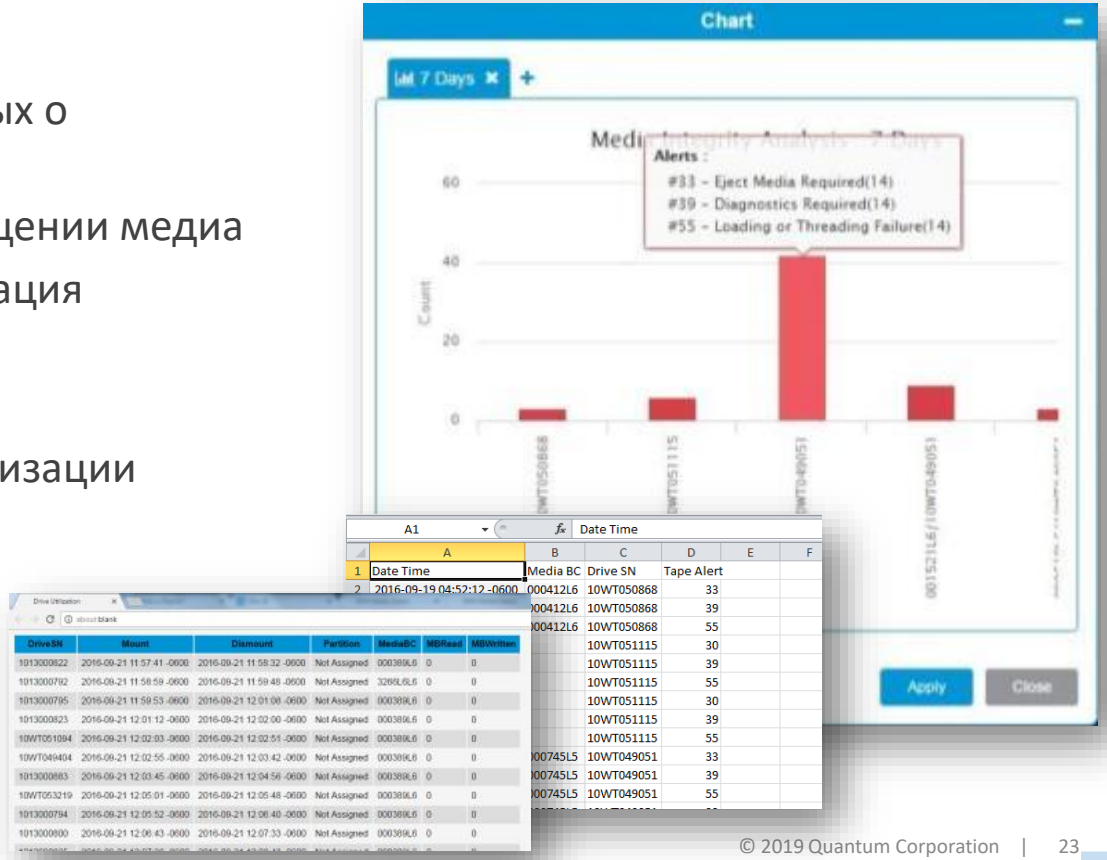
- Grow via SW keys
- Non-disruptive growth
- Avoid administrative processes

Интегрированное ПО управления iLayer

1. Library
2. Library Name
3. Library Status
4. Date and Time
5. Saved Configuration
6. Library Device Status
7. System Status
8. Help
9. Current User Role

Расширенный репортинг (Advanced reporting)

- Удобная графическая панель
- Хранение исторических данных о приводах/медиа
- Данные об изъятии / перемещении медиа
- Создание политик, автоматизация оповещения (E-mail)
- CSV выгрузка
- Идентификация высокой утилизации драйвов
- Информативные счетчики:
  - запись/чтение данных
  - монтирование драйвов



Технология Extended Data Life Management (EDLM)

Самовосстановление архива данных

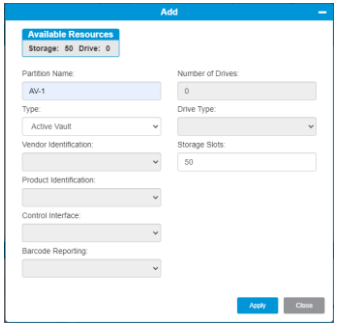
4. StorNext/Artico переносит данные, обновлет таблицу метаданных

1. Пользователь настраивает политику проверки целостности медиа

3. При обнаружении деградации лент, Scalar коммуницирует с StorNext для перемещения данных на новые носители

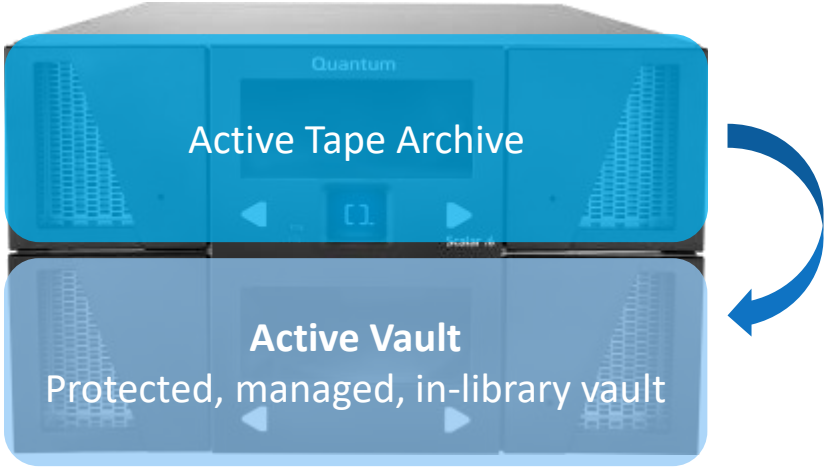
2. Система проводит проверку в соответствии с заданной политикой

Технология Active Vault



3. Автоматическая системная нотификации, при обнаружении ошибок целостности данных

сохранение содержимого в защищенной локальной системе, без ручного вмешательства

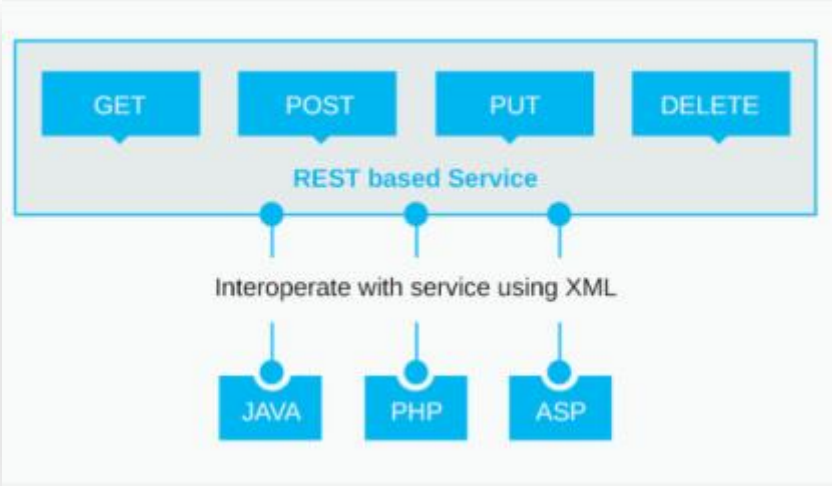


2. Возможность настройки политик проверки целостности данных Active Vault партиции

1. Экспорт “холодных” данных в архивную партицию Active Vault внутри библиотеки, без необходимости ручных операций

RESTful Web Services

- Доступно для Scalar i3, Scalar i6, AEL6 и Scalar i6000
- Поддержка более 300 Post, Get, Put и Release запросов
- Автоматизация административных операций, конфигурирования библиотекой и сбора информации о системе



Преимущества ленточных библиотек Quantum Scalar:

- Простое администрирование
  - Единое и полностью интегрированное централизованное управления любым функционалом
  - Автоматизация управления на базе политик
  - Расширенная диагностика
  - Поддержка открытых стандартов (Web Services интерфейс)
- Высокая доступность и надежность
  - Проактивный мониторинг
  - Проверка целостности медиа
  - Резервирование компонентов
- Защита данных
  - FIPS сертификация,
  - система управления ключами шифрования (AES-256)
  - Логирование и нотификация
- Динамическое масштабирования
  - Расширение емкости по требованию (CoD)
  - Высочайшая плотность размещения данных

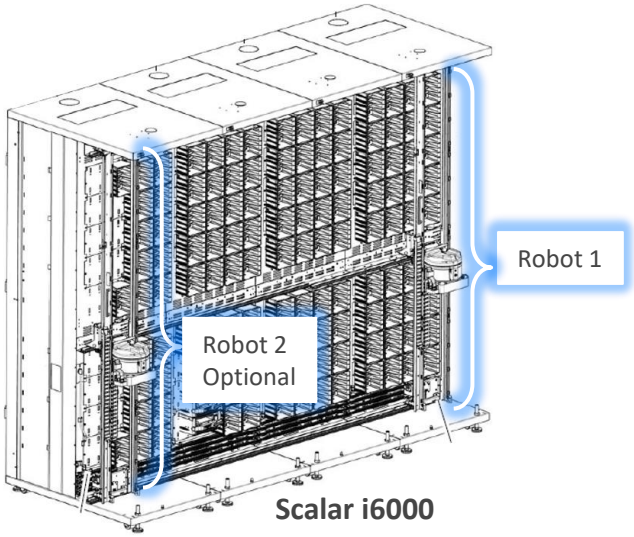
Примеры OEM

HP ESL G3 = Quantum Scalar i6000

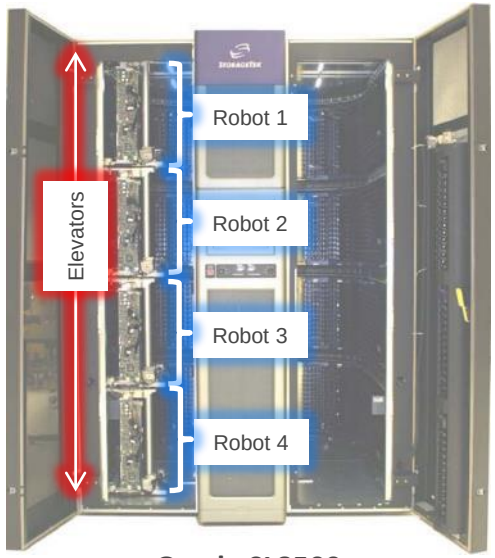
Предлагается обновление до Quantum

IBM TS3310 = Quantum Scalar i500

Scalar i6K vs Oracle SL8500
Less Complex Design = Higher Reliability & Performance



Scalar i6000



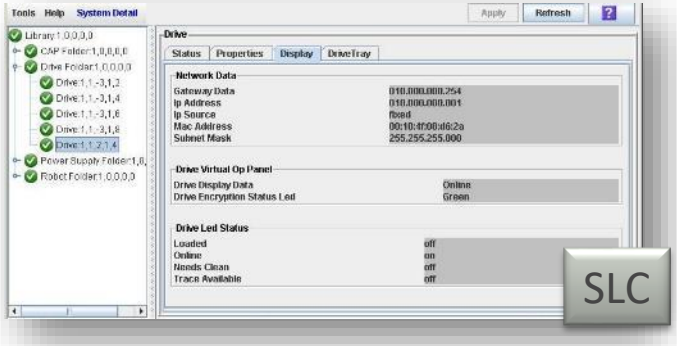
Oracle SL8500

ACSLS

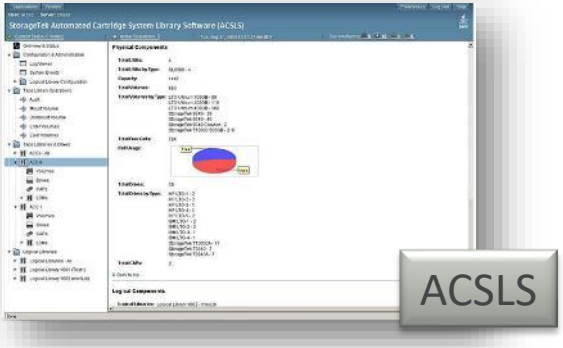
- ✓ 1 robot accesses all tapes & drives
- ✓ Fewer robots = better reliability
- ✓ No elevator = faster performance
- ✓ Native FC control path (no ACSLS)

- ✓ 4 robots required (optional 8 robots)
- ✓ Elevator required to move tapes between robots

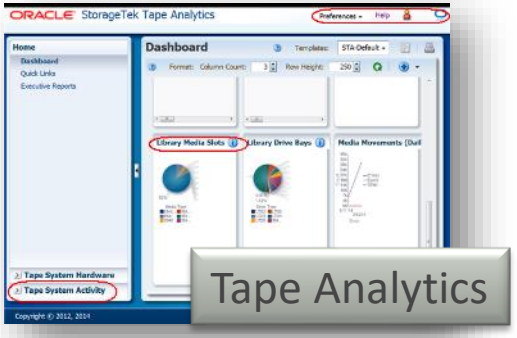
Scalar i6K vs Oracle SL8500
SL8500 Has (3) User Interfaces to Partially Do What Scalar iLayer Does



Provides remote management (firmware)



Provides open systems control path connectivity (external HW and SW)



Provides media reporting (external SW)

Scalar i6K vs Oracle SL8500
Oracle T10K Users: Now is the time to switch to LTO

Feature	Oracle T10000D	Scalar with LTO-8 Quantum Certified Media
Capacity (native/compressed)	8 / 21 TB	12 / 30 TB
Performance (native/compressed)	252 / 800 MB/sec	360 / 900 MB/sec
Bit Error Rate (BER)	1 in 10^{19}	1 in 10^{19}
Cartridge Load/Unloads	150,000	300,000
Roadmap	EOL	12th Generation

Quantum

Портфолио платформ хранения данных Quantum

CREATE. INNOVATE. PROTECT.
ON QUANTUM.

Портфолио платформ хранения данных Quantum

Quantum StorNext® Scale-Out File Storage

StorNext File System (and associated data services)

StorNext NVMe Storage
F-series

F1000 and F2000
Chassis 10 or 24 disks
NVMe
Up to 25GB/s

StorNext Storage
QXS-Series and QTM H-series

QXS-3/QXS-4 and H-series
Chassis 12/24/84 disks
SSD, NL-SAS and SAS
Up to 7GB/s

Archive Storage Systems

ActiveScale
object storage

Scalar
Tape Storage

P100 and X100
1 site or 3 Geo Spread Sites

Scalar i3, Scalar i6 and Scalar i6000
Up to 192 LTO drives
Up to 360PB

Блочные системы хранения Quantum QXS3 и QXS4

Model	QXS-4 12G	QXS-3 12G
Chassis	2U12 2U24 5U84 - New	2U12 2U24
Read Perf	7.0GB/s	3.5GB/s
Write Perf	5.5GB/s	3.0GB/s

2U 12 Drive Chassis

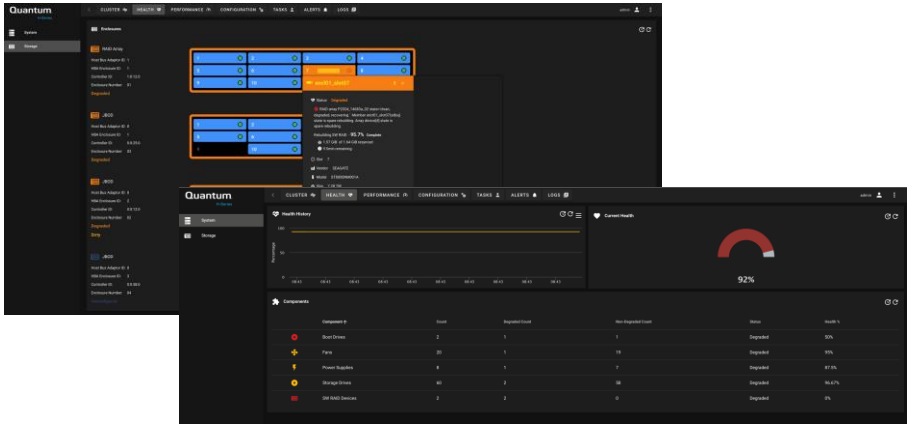
2U 24 Drive Chassis

5U 84 Drive Chassis

https://cdn.allbound.com/iq-ab/2020/02/DS00503A-v04.pdf

Блочные и гибридные системы хранения данных Quantum H-Series

- New line of hybrid storage arrays
- Designed to optimize performance with StorNext, and across all high throughput, multi-streaming, low latency workloads
- H2000 is designed for scaling out file system capacity using SSD or HDD storage
- Quantum software stack
- 2U12, 2U24 form factors
- SSD, 10K SAS, NL-SAS HDD
- Scale out to 100’s of GB/s in StorNext environment
- up to 12GB/s performance



Системы хранения данных Quantum H-Series

- PCIe 4.0
- End-to-end 12G SAS
- Flexible networking
  - RDMA capable 100GbE, 25GbE NICs
  - 32Gb FC
- DRAM write cache

Dual controller hardware architecture using latest AMD 2 CPU

Архитектура Quantum F-серии

Quantum F-Series Software

Management API

Storage Network Interface | FC SAN / iSCSI / iSER/RDMA

High Availability Services | Active / active clustering

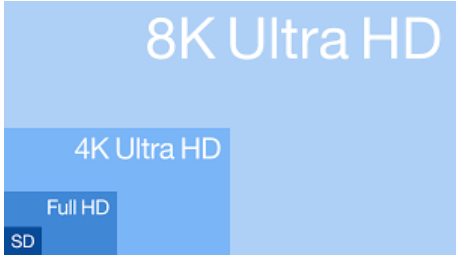
Data Protection | RAID, DDP*, Erasure Coding*

Device Block Interface | SCSI / SAS / SATA / NVMe

- ✓ Software-defined
- ✓ Low latency
- ✓ Cloud-connected

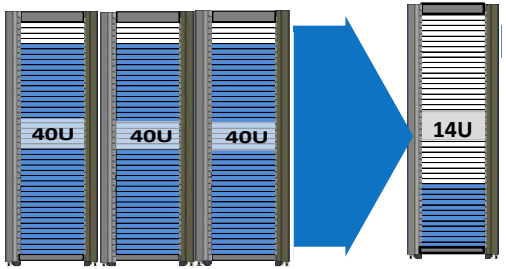
** Future features*

Quantum F-серия. Область применения.



Higher-res content, higher data rates,
faster ingest requirements

VFX, CGI, animation, large render farms,
More throughput and IOPs



More content, more capacity
Reduce data center space

RDMA decreases enet latencies to
reduce infrastructure cost and complexity

Система Quantum F2000

- All flash NVMe
- Best performance value
- Up to 184.32TB NVMe
- Powered by Quantum SDS

Feature	F2000
RAID	Dual Controller
Chassis	2U24
Drive Type	NVMe Flash
Drive Options	24x 1.92TB 24x 3.84TB 24x 7.68TB
RAID Configuration	RAID 5
Ethernet	Four 100Gb ports
Fibre Channel	Eight 32Gb ports
Read Throughput	25GB/s
Write Throughput	20GB/s

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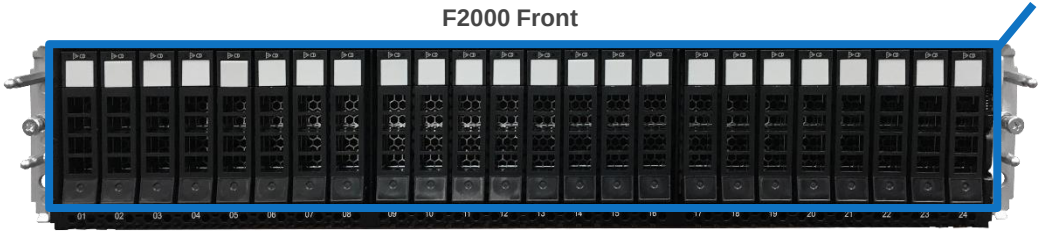
Архитектура Quantum F2000 NVMe

F2000 Front



24 dual-ported NVMe drives
Available in three capacities:

- 46TB (24 x 1.92TB)
- 92TB (24 x 3.84TB)
- 184TB (24 x 7.68TB)

F2000 Rear

Redundant 1800W PSUs

Dual-node server with two hot-swappable compute canisters.

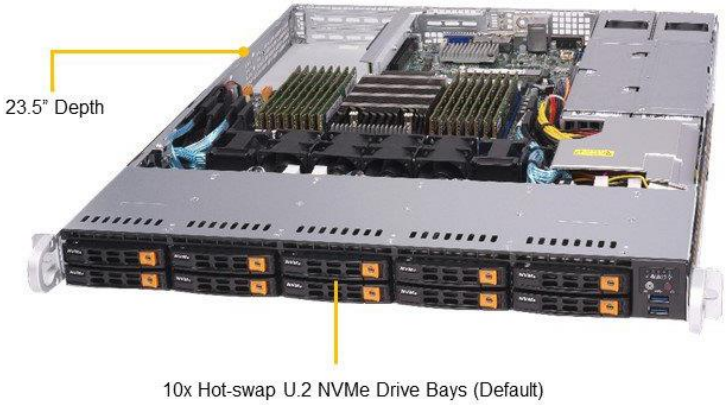
Each compute cannister can access all 24 drives.

Each compute cannister includes:

- 2 Intel Xeon 6140 CPUs (18 cores/36 threads)
- 256GB DRAM (32GB x 8 slots)
- 2 M.2 Boot Drives (512GB)
- 2 100GbE ports (or) 4 FC-32G ports
- 3 PCiE slots
- Battery Backup

Система Quantum F1000

- All flash NVMe
- Best performance value
- 15.36TB and 7.68TB NVMe at launch
- Powered by Quantum SDS



Feature	F1000
RAID	Single Controller
Chassis	1U10
Drive Type	NVMe Flash
Drive Options	10x 7.68 10x 15.36
RAID Configuration	RAID 10
Ethernet	Four 100Gb ports
Fibre Channel	Eight 32Gb ports
Read Throughput	24GB/s
Write Throughput	16GB/s

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Quantum F-Series. Сравнение платформ

Specification	Quantum F1000	Quantum F2000
Server Size and architecture	1U, Single Controller	2U, Dual Controllers
Number of NVMe drives	10	24
Type of NVMe drives	Single-Ported	Dual-Ported
RAID type	RAID 10	RAID 5 with Parity
Storage Efficiency	50%	83%
Raw Capacity Points	**76.8 TB** (10x 7.68 TB NVMe drives) **153.6 TB** (10x 15.36 TB drives)	**46 TB** (24 x 1.92 TB drives) **92 TB** (24 x 3.84 TB drives) **184 TB** (24 x 7.68 TB drives)
Useable capacity points	38.4 TB 76.8 TB	38.2 TB 76.5 TB 153 TB
Write Performance	16 GB / sec	21 GB /sec
Read Performance	24 GB / sec	25 GB / sec
System Software	Quantum F-Series SDS	Quantum F-Series SDS

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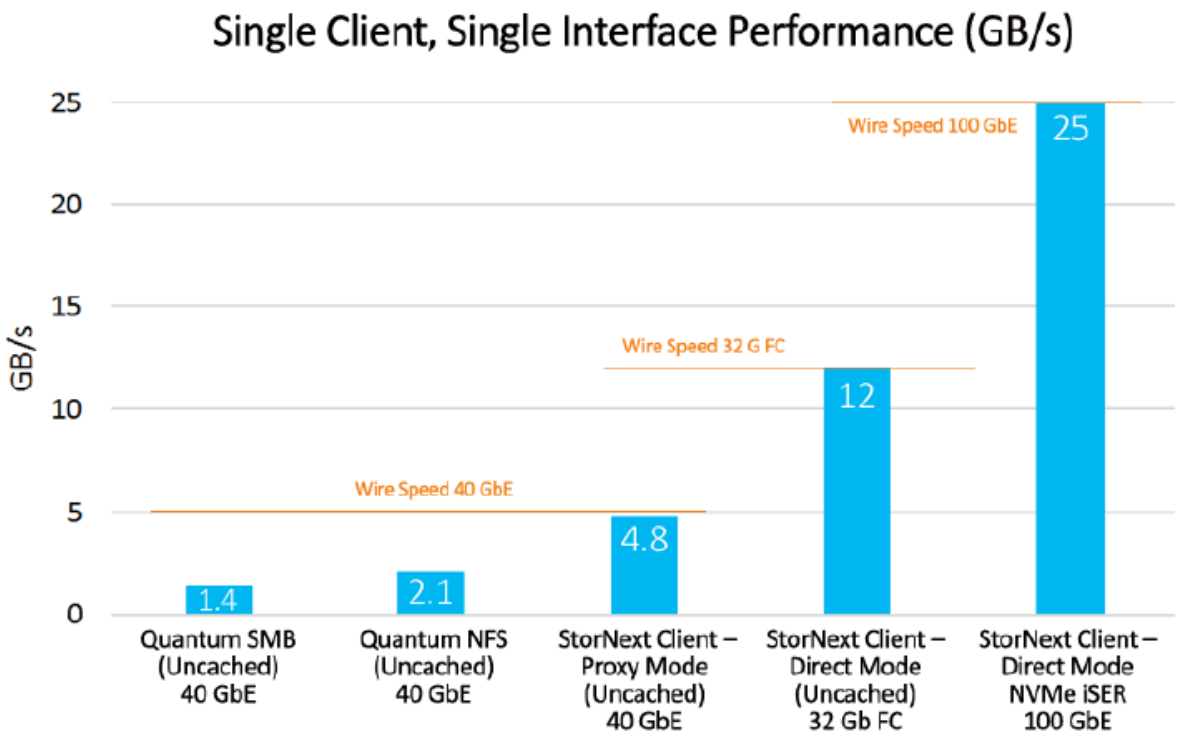
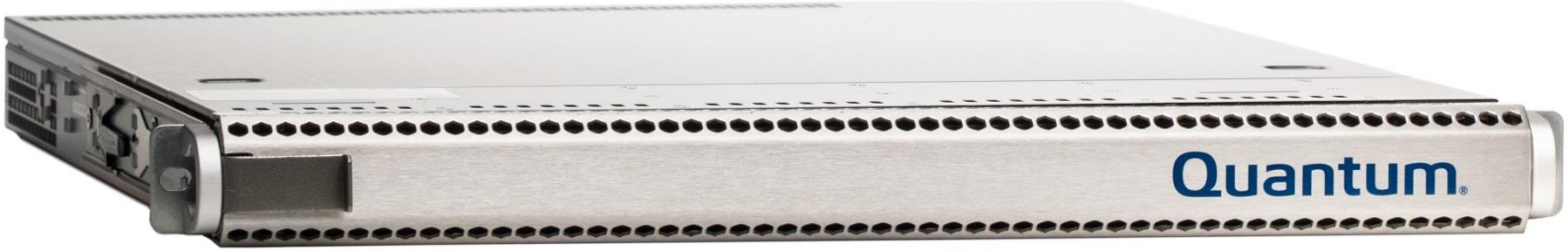
Quantum F-series NMVe

Производительность



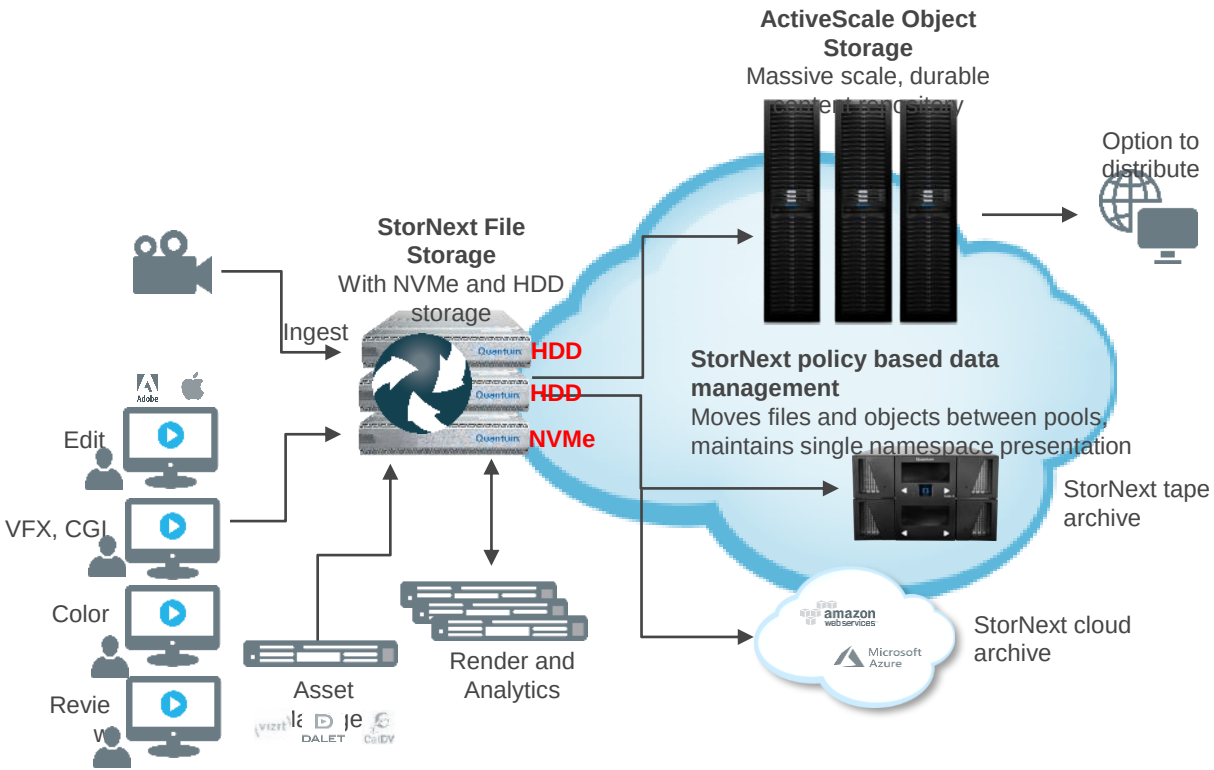
Quantum F-Series NVMe Storage Servers

Награды



Ultra-fast NVMe storage servers for ingest, edit, render, analysis, processing of video content and other large unstructured data sets

Использование StorNext, QXS и F-Series NVM систем для M&E



Quantum

Qauntum StorNext

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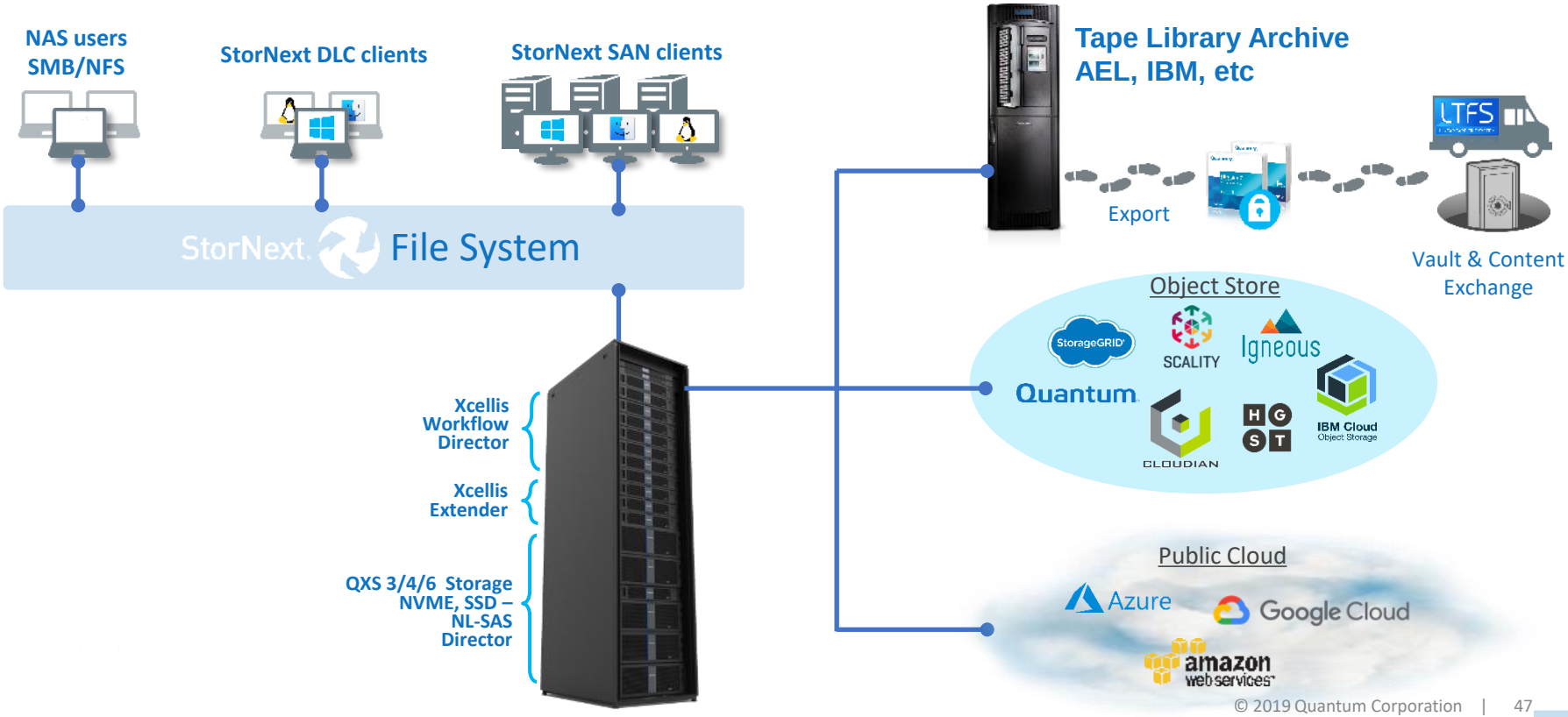
ON QUANTUM.

Файловая система Quantum StorNext



Основа Quantum StorNext

- Архитектурно, StorNext представляется из себя 2 основных компонента:

- SNFS – Высокопроизводительная фаловая систем для хранения большого количества файлов
  - Зрелая файловая система протестирована на сотнях узлов и доступна на всех основных ОС
  - Гетерогенная кластеризованная реализация с разделением метаданных
  - Поддерка доступа через IP или FC
  - Поддержка гибкого расширения, миграции и уменьшения файловых систем

Production

- SNSM – сервис “тиринга” и управления данными
  - Набор модулей, расширяющих SNFS сервисами по управлению жизненным циклом и многоуровневого хранения.
  - Поддержка:
    - различных дисковых систем (включая, бюджетные)
    - технологии “Tape erasure code”
    - S3 протокола/ Storage Object репозиториев
    - перемещение данных/файлов по политикам

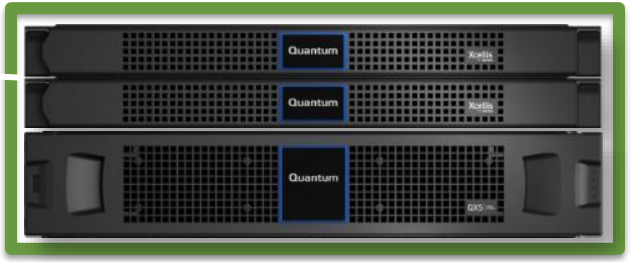
Archive

Single Name Space

Программно-аппаратный комплекс Xcellis Workflow Director (MDC)

Workflow Directors (MDCs)

Dedicated Metadata



Initial Investment Protected
Single or Dual node

12 Drives
NL-SAS

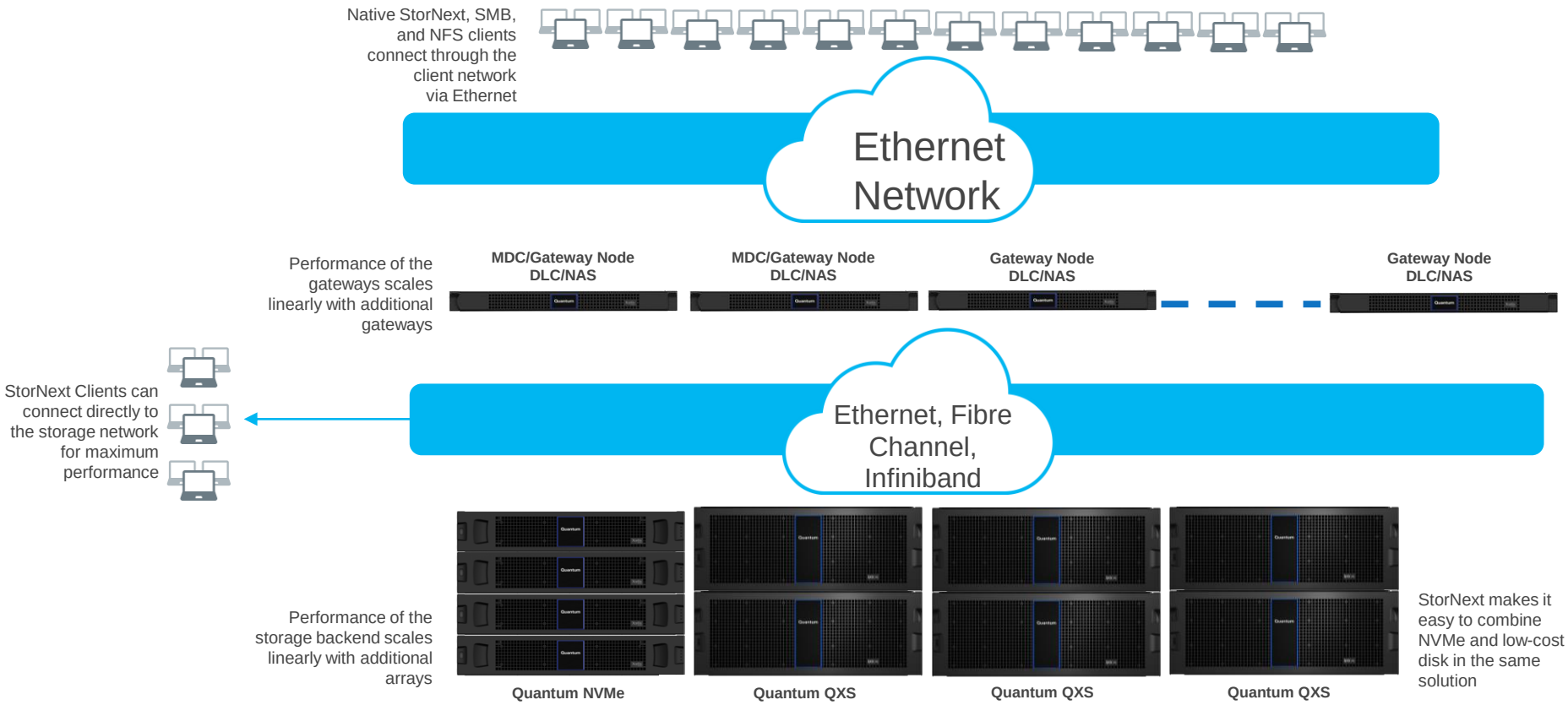
24 Drives
SAS, SSD

File Data

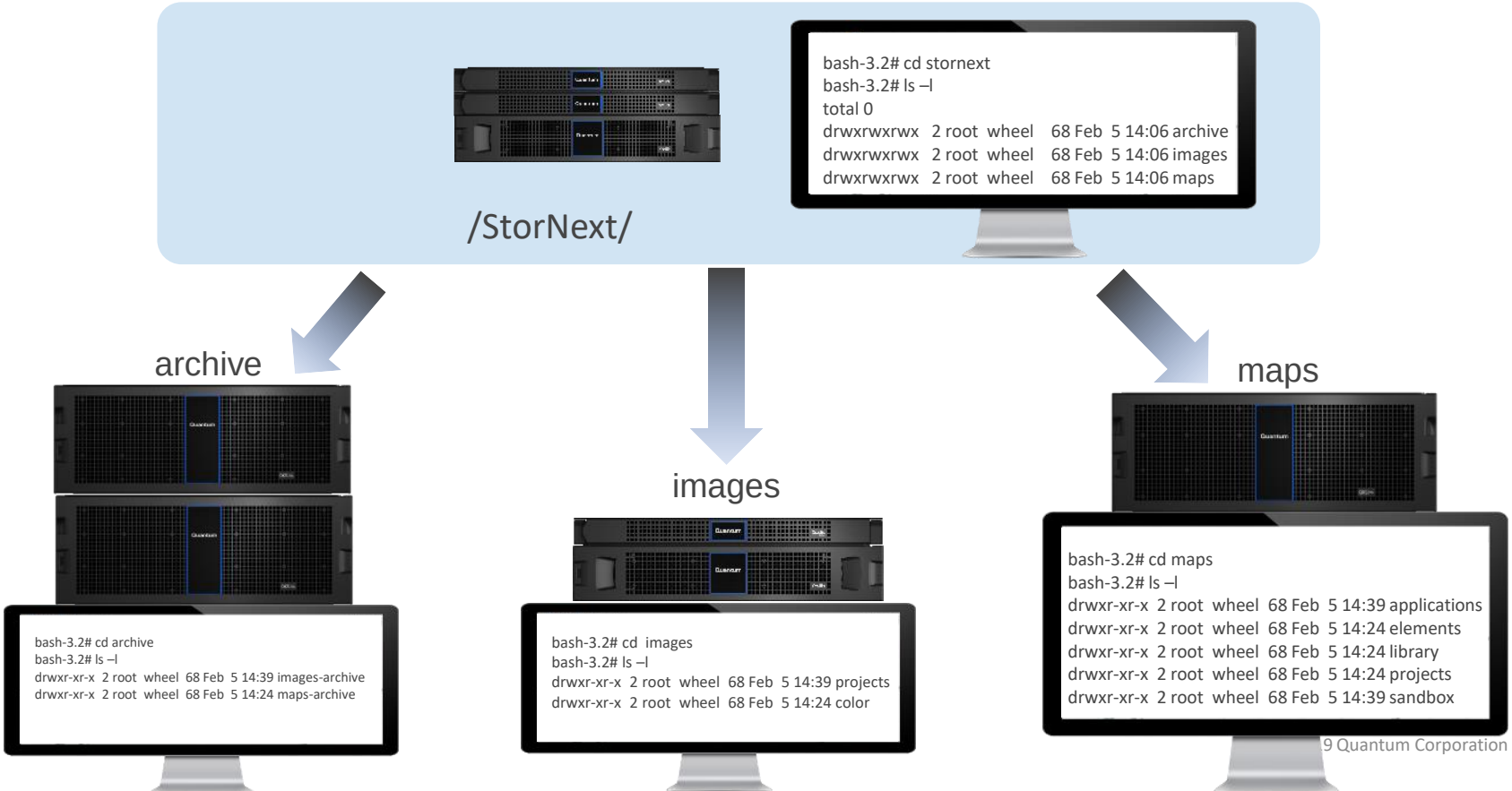
84 Drives
NL-SAS

- Add RAIDs for Capacity + Bandwidth
- Any combination of disk performance
- Add JBODS for Capacity

StorNext Scale-out NAS топология

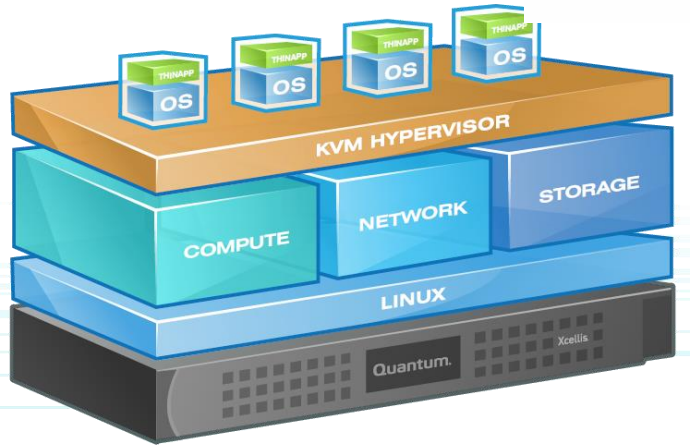


StorNext: Единое пространство имен



Уникальный функционал: Dynamic Application Environment (DAE)

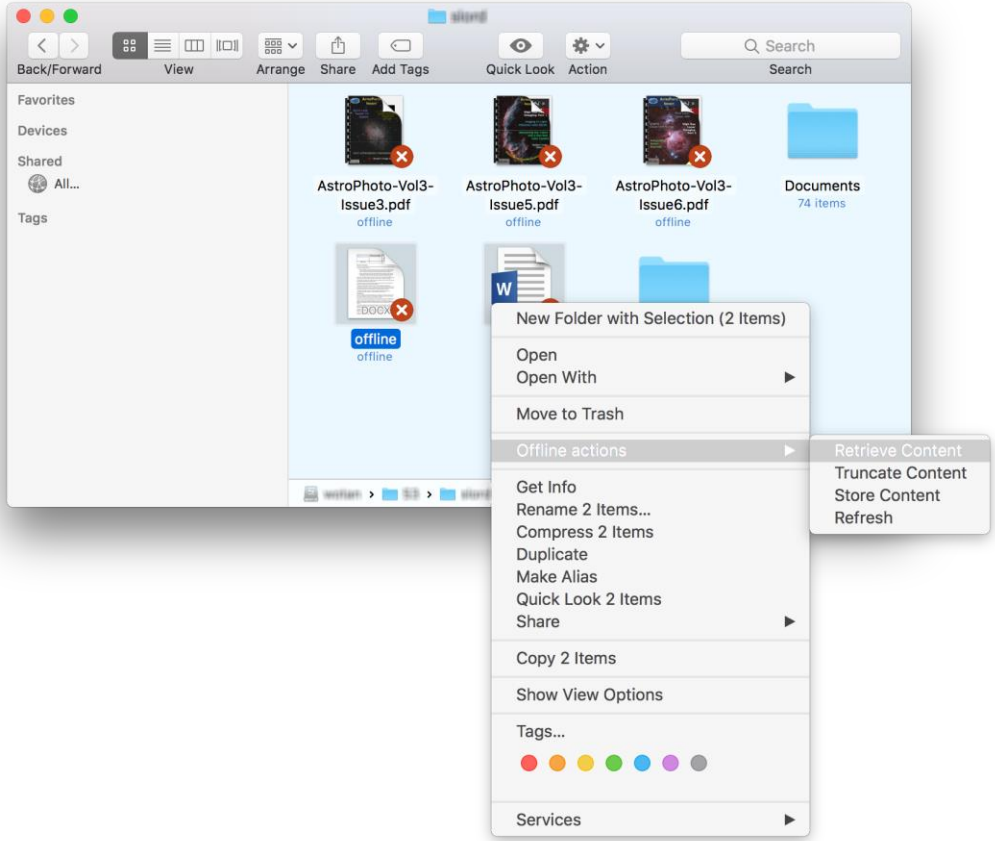
- Ability to run applications inside an Xcellis Workflow Director
- Simplifies deployment, eliminates the need for additional servers and network connections, brings applications closer to the data
- Applications run in a KVM environment which allows Windows or Linux applications and resource controls

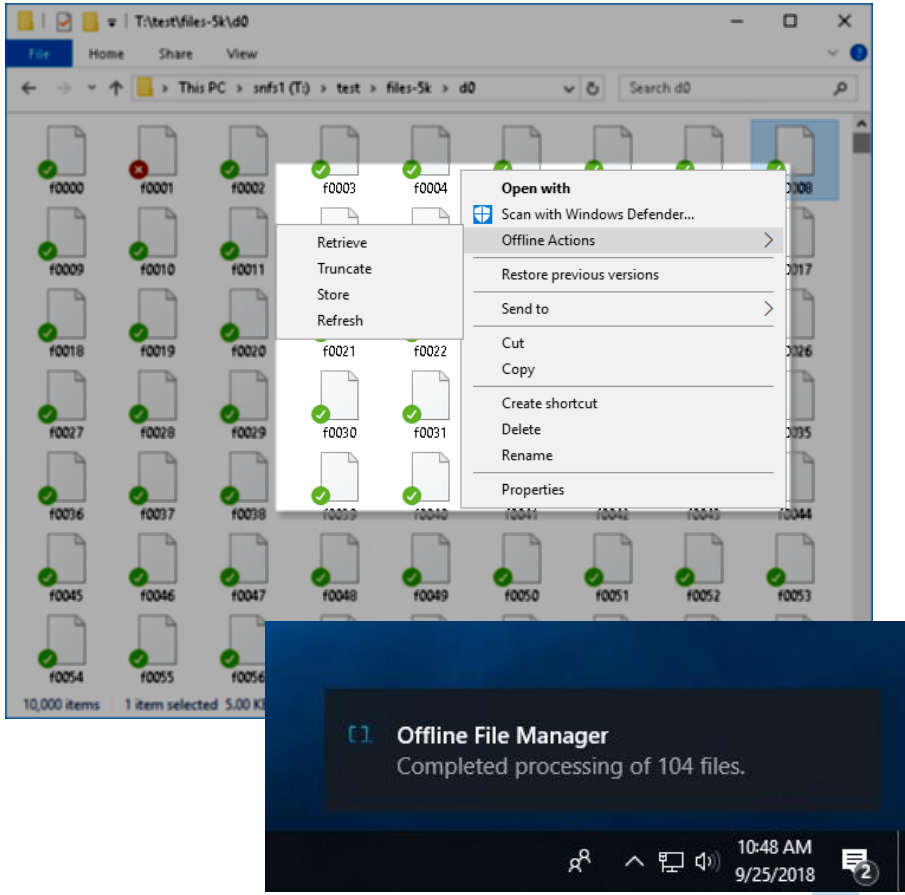


VM OS support

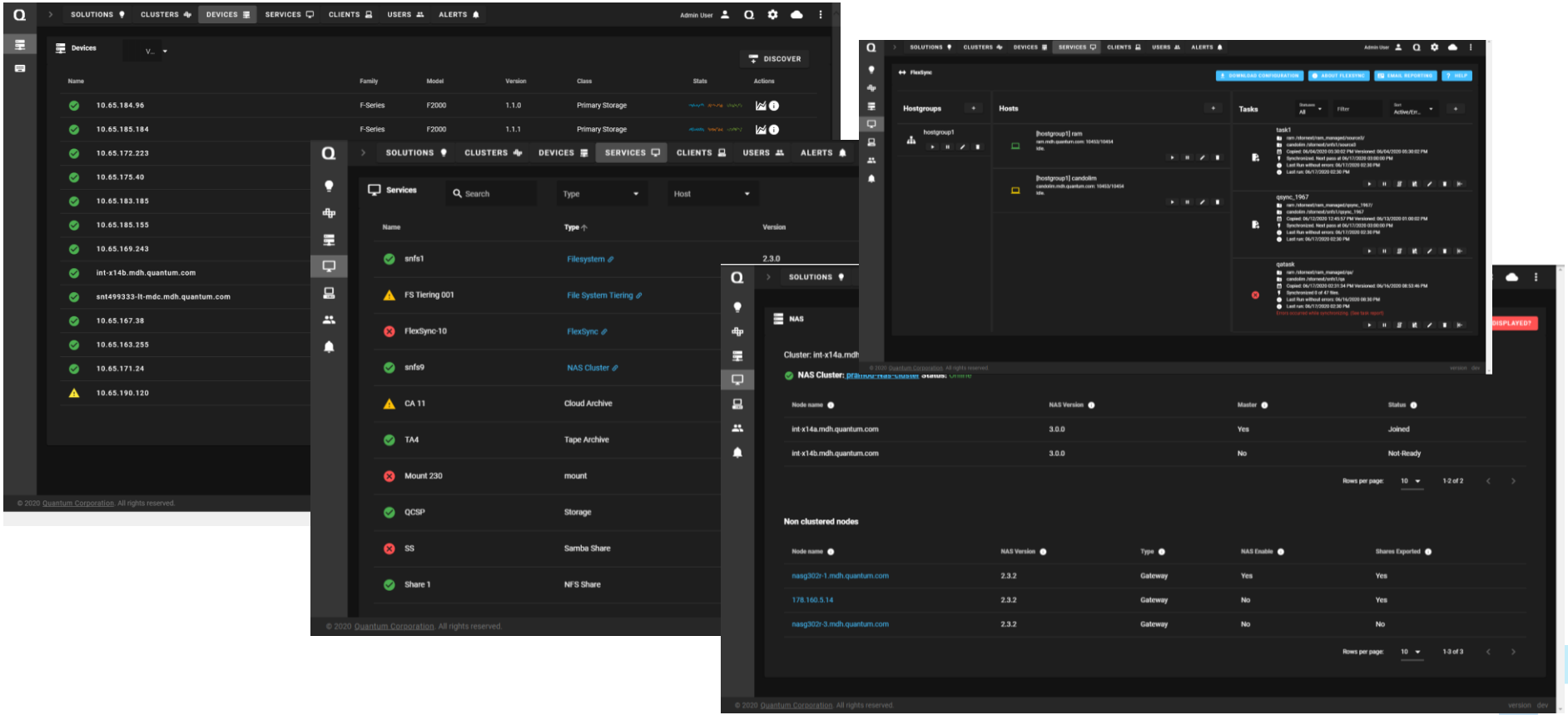
- Supports 32bit or 64bit versions of Microsoft Windows
- Supports 32bit or 64bit versions of SuSe, Ubuntu, CentOS and RHEL Linux

Специальные возможности StorNext для MAC и Windows клиентов

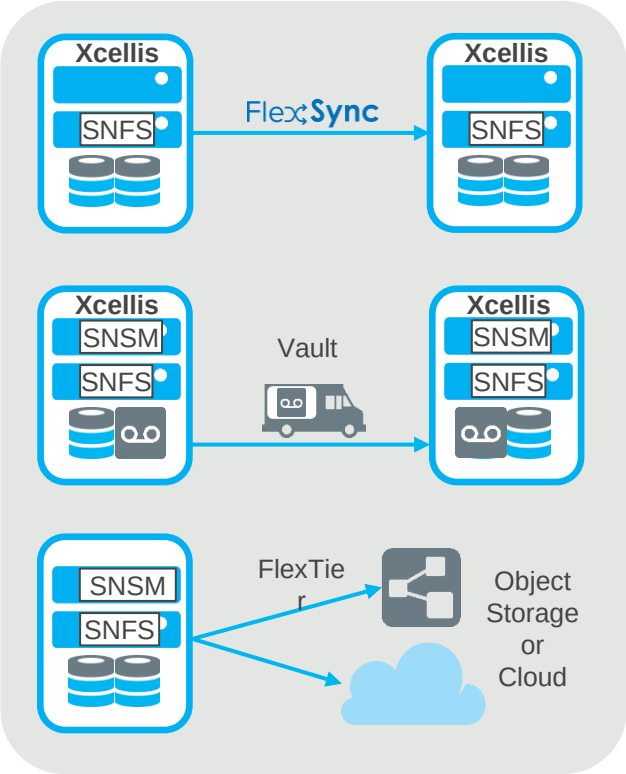


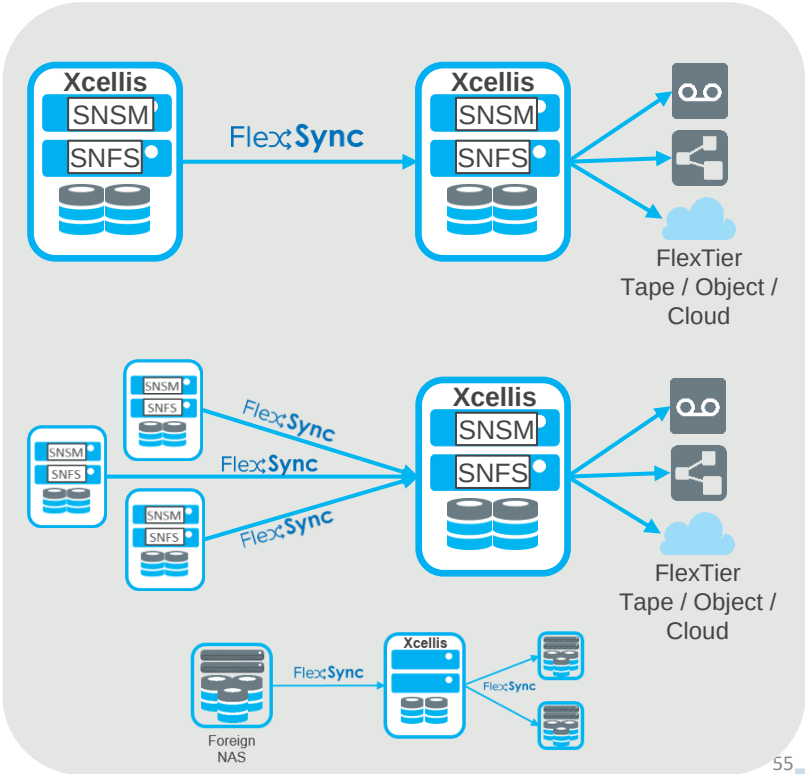


StorNext: Унифицированный графический интерфейс

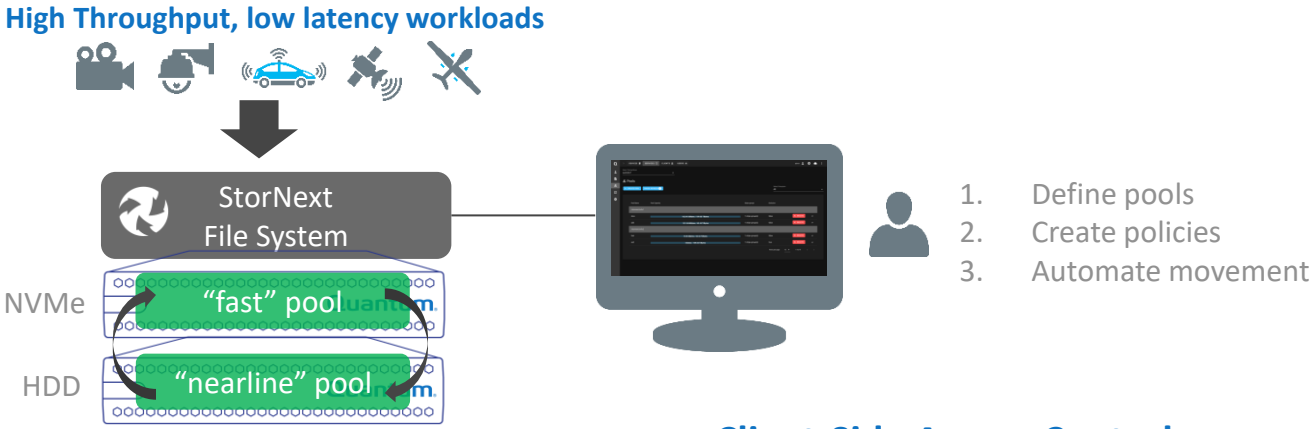


StorNext: FlexSync репликация данных





Технология StorNext Primary File System Tiering



Introducing File System Pools

- Reduce cost of high-performance storage
- Improve production storage efficiency

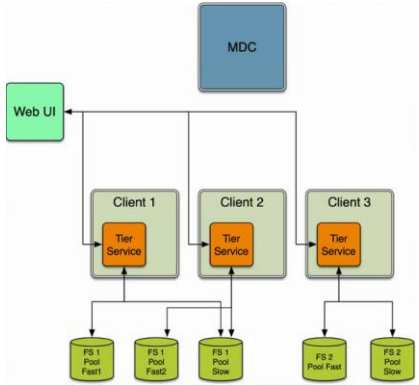
Client-Side Access Controls

- Define who can access a directory or file system at the client, securing who and how data is accessed.
- Prevents data being downloaded or stolen by connecting unauthorized devices to network
- With ActiveScale object lock delivers unique data and storage security

*standard feature of SN7.x

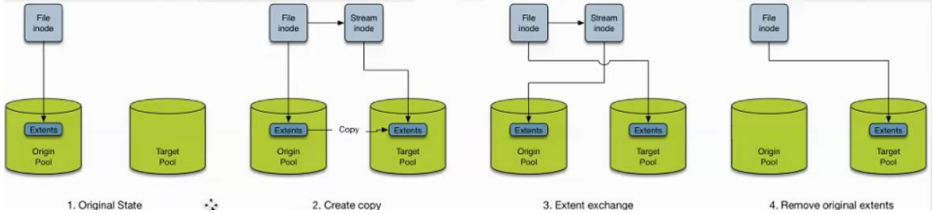
Технология StorNext Primary File System Tiering

- Multiple Hosts servicing movement
- Multiple File systems and different storage pool configurations.
- Any one job or policy runs on one host
- Single UI presentation across several hosts
  - Not yet developed



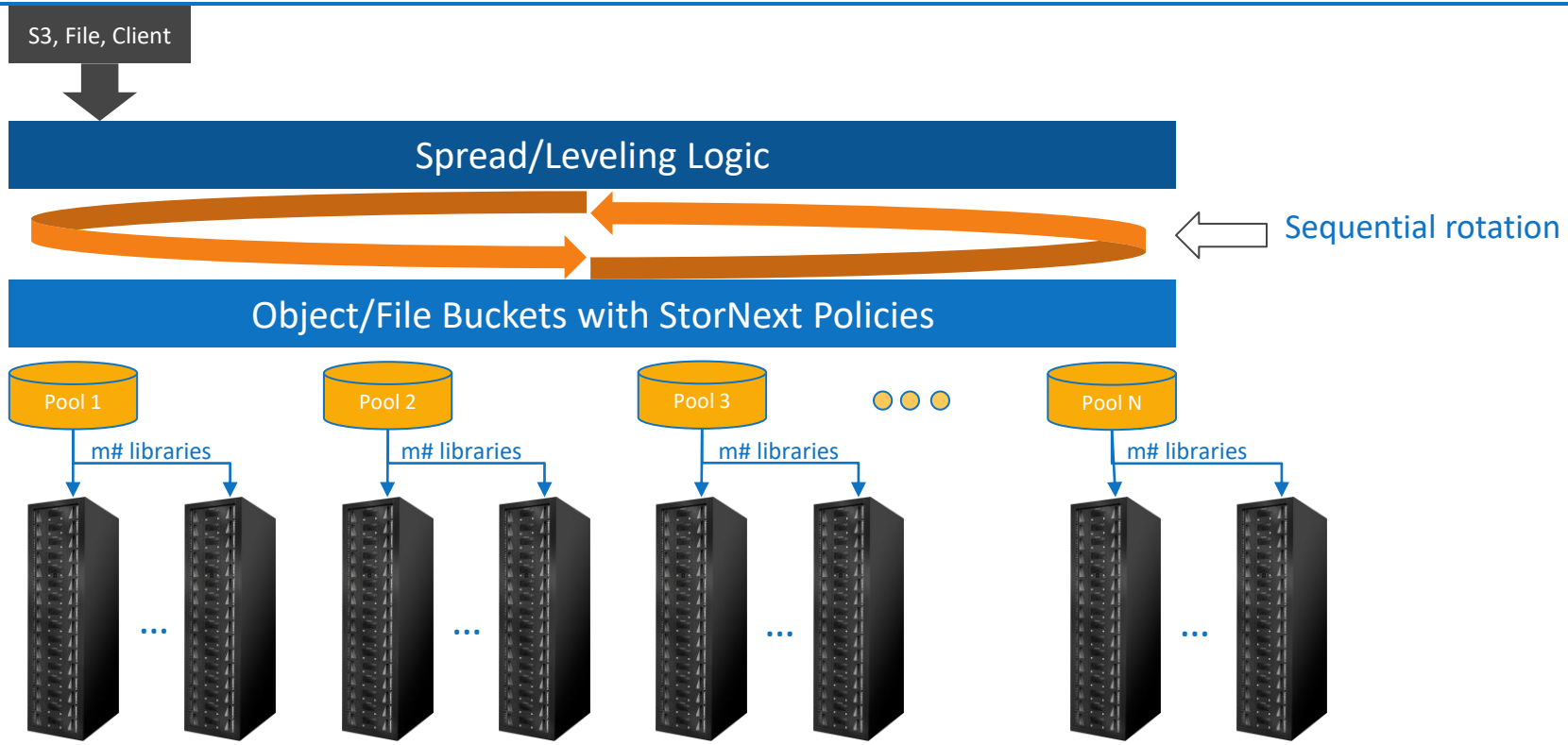
Movement Process

- Content may be moved between pools
- Or it may be promoted and demoted
  - Promoted content maintains its original copy, plus the new pool copy.
  - For unchanged content, demote is just remove the copy from one pool
  - This uses more space, but half the bandwidth for movement, reduces time to recycle space.



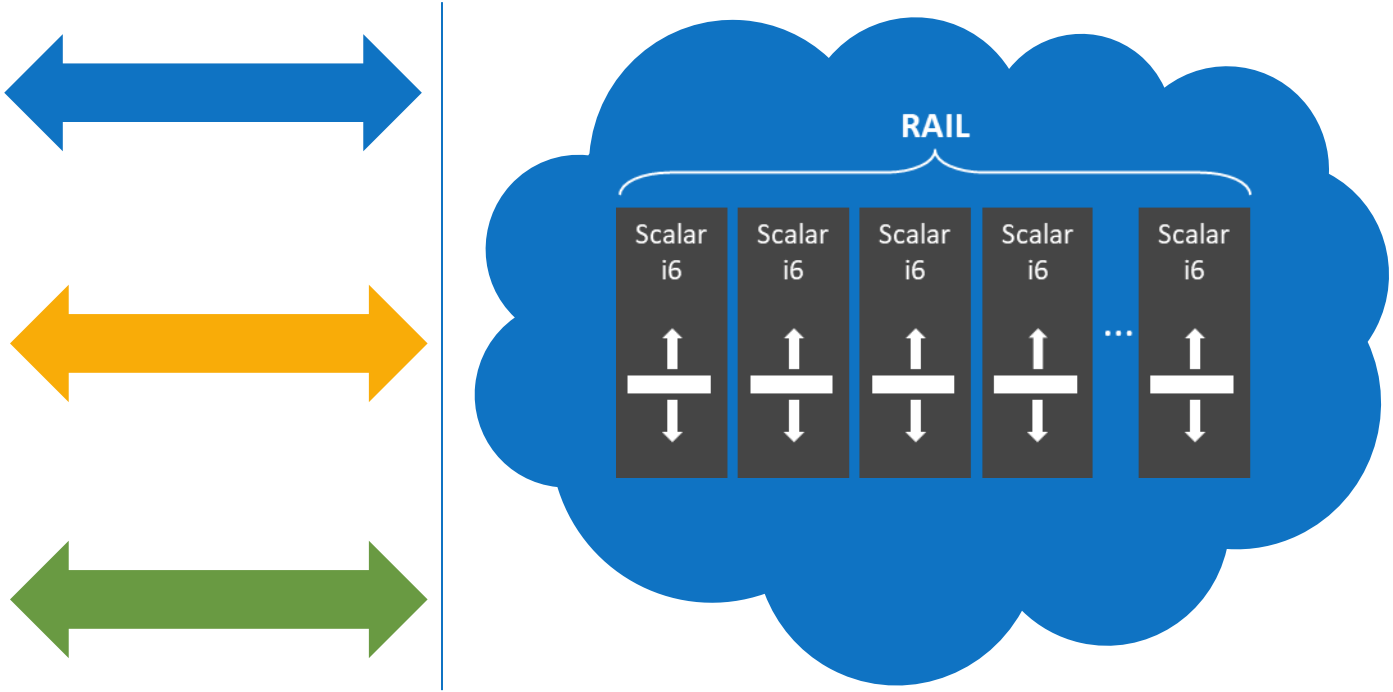
*part of SN7 release

Dynamic Library Pooling



Starting point is m# = 2 to satisfy data durability protection

StorNext Digital Tape Archive: Now with DLP & RAIL



File and/or S3

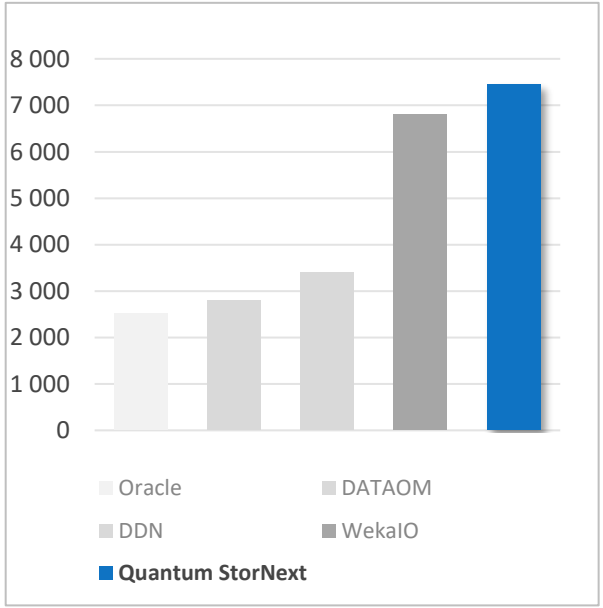
StorNext Digital Tape Archive: Now with DLP & RAIL

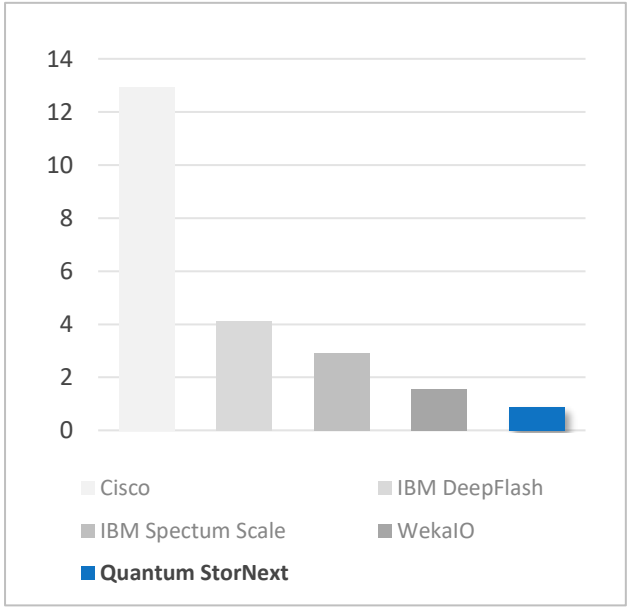
- 70% less expensive than disk-based object stores
- Lower TCO than Amazon Deep Glacier
- High durability
- Scalable performance
- No retrieval or data access fees
- Keeps your data in a secure, controlled on-premise environment

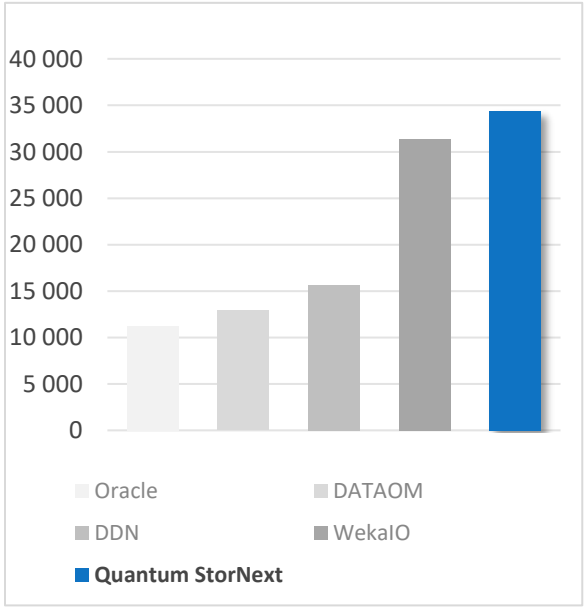
File and/or S3

StorNext is the World's Fastest File System for Video Workloads

StorNext demonstrates best value in terms of cost per concurrent streams







✓ **Highest Number of Streams**

✓ **Fastest Overall Response Times** (msecs, low number is best)

✓ **Highest Throughput** (MB/sec)

https://www.spec.org/sfs2014/results/res2021q1/sfs2014-20210126-00075.html

Quantum StorNext – продукт, спроектированный для управления цифровыми данными

Быстродействие

Высокопроизводительные дисковые системы и интерфейсы для цифровых данных

Совместимость

Многопротокольные решения в любой среде, включая облачную, FC, Gbe, S3 …

Дизайн для дата центров

Решения высокой плотности и низкого энергопотребления, облачная инфраструктура

Безопасность

Резервирование, Шифрование, Объектное хранение

Управление

Полный графический интерфейс администрирования, Веб-сервисы, широкая интеграция с существующими системами

Свобода

Нет привязки к производителю оборудования

Quantum

Решения Quantum по видеонаблюдению

CREATE. INNOVATE. PROTECT.
ON QUANTUM.

Потребность в физической безопасности продолжает рости

предлагая широкий выбор ИТ-ориентированных решений для защиты и хранения данных

Quantum's industry-leading portfolio delivers the right solution
for projects of every size, every scope, and every vertical

Stadiums

Health Care

Critical Infrastructure

Airports

Logistics

Retail

Military

Banks

Commercial

City Surveillance
Smart Cities
IoT

Casinos

Public Transit

Education

Correctional Facilities

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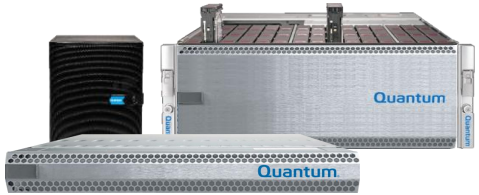
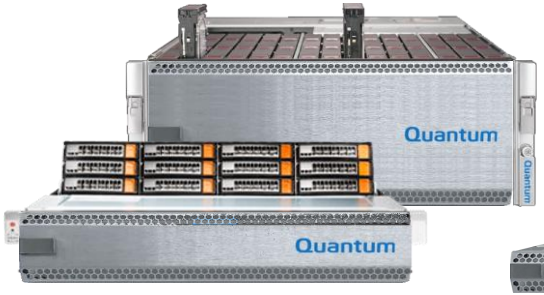
Портфолио Quantum для видеонаблюдения



VS-NVR Series
High performance, cost-effective network video recording servers.



VS-HCI Series
Hyperconverged infrastructure for surveillance recording and management.

VS-A Series
GPU analytics servers, and application servers for access control systems and more.

Shared and Archive Storage
Scale-out file storage, object storage, tape, and cloud

Широкий портфель решений для инфраструктур различных размеров.
Разработано и оптимизировано для рабочих нагрузок видеонаблюдения и безопасностного хранения данных, обеспечивая высочайшую производительность, высокую плотность размещения, а также предоставляя одно из лучших решений в классе по экономичности на рынке.

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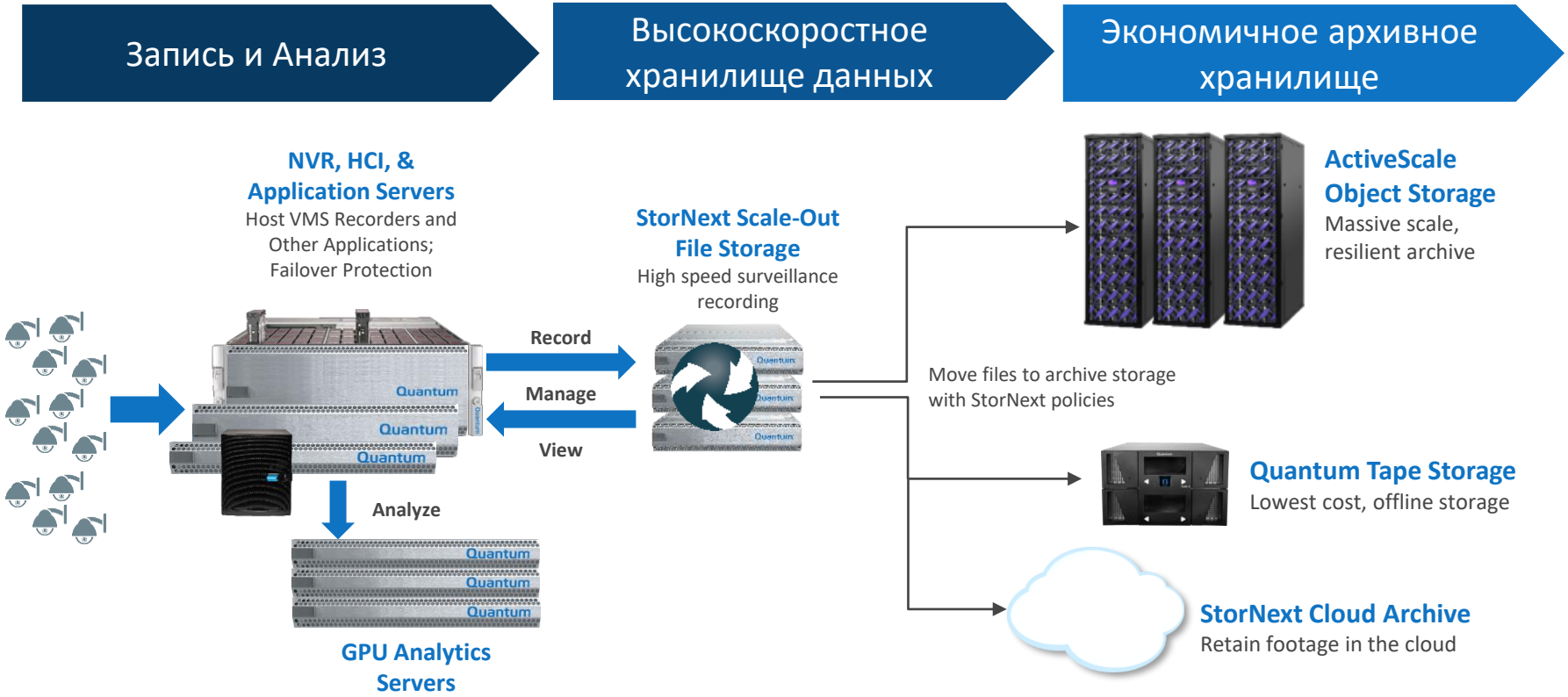
Серверы и платформы хранения для инфраструктур по видеонаблюдению от Quantum

Запись, управление, аналитика, HCI, многоуровневое и архивное хранение



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Сетевые видеорегистраторы Quantum VS-NVR

VST102-NVR
VST104-NVR
5-30 cameras
Ideal for multiple small locations (i.e. Retail Chain)

VS1004-NVR
1U
Up to 3 Digital Monitors
<50 2MP cameras

VS4160
<400 2MP cameras @30fps
Longer Retentions (90 days+)

✓ **High performance** ✓ **Cost effective** ✓ **Easy to deploy** ✓ **Cloud-based monitoring***

**Future support planned*

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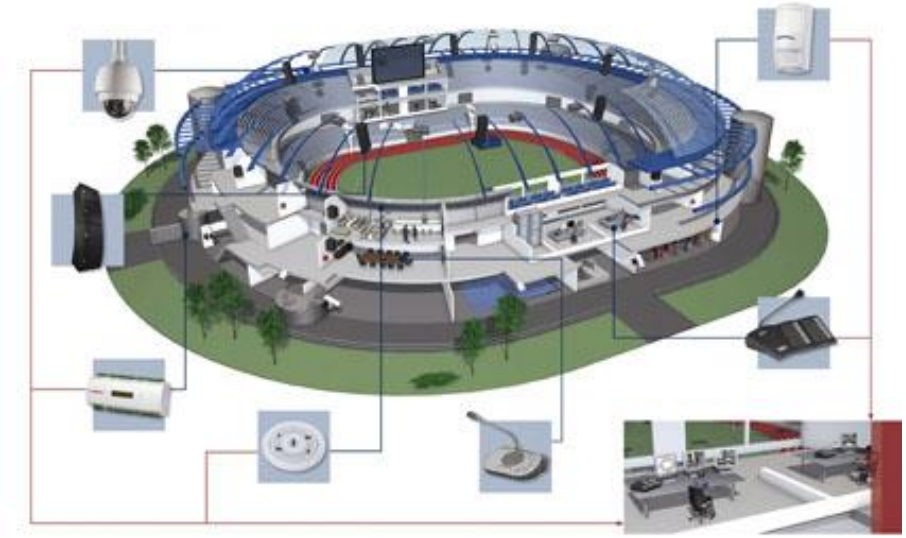
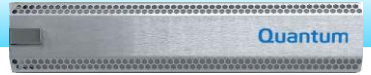
Гиперконвергентные системы Quantum VS-HCI

Единая платформа для различных рабочих нагрузок



- ✓ Video Recording
- ✓ Management Server
- ✓ Access Control
- ✓ Building Automation



VS-HCI Series

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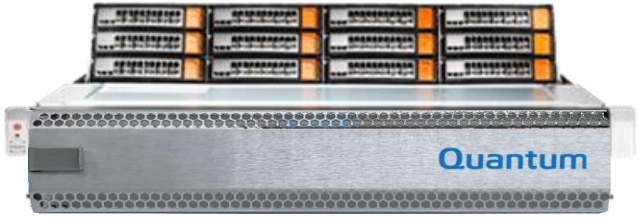
Модели Quantum VS-HCI системы



Quantum VS2124-HCI

- 2U rackmount server, 24x HDDs
- 240 TB useable with 12TB HDD
- 320TB useable with 16TB HDD

Quantum VS4160-HCI

- 4U rackmount server, 60x HDDs
- 600 TB useable capacity with 12TB HDD
- 800TB usable capacity with 16TB HDD

✓ **High performance**

✓ **Automatic failover**

✓ **Future support for shared storage**

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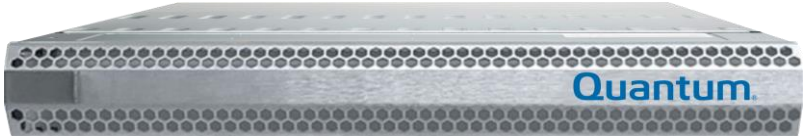
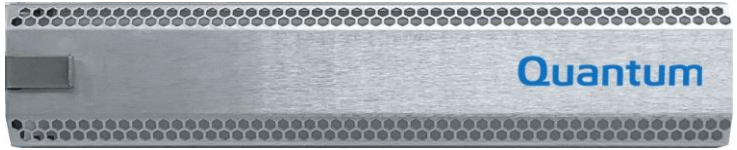
Quantum VS-A: серверы аналитики и приложений



VS1110-A

- Application server for access control and building automation systems
- Resilient design with automatic failover



VS2108-A

- Dense GPU appliance for video analytics
- Support for market leading products like BriefCam, Anyvision, AgentVI

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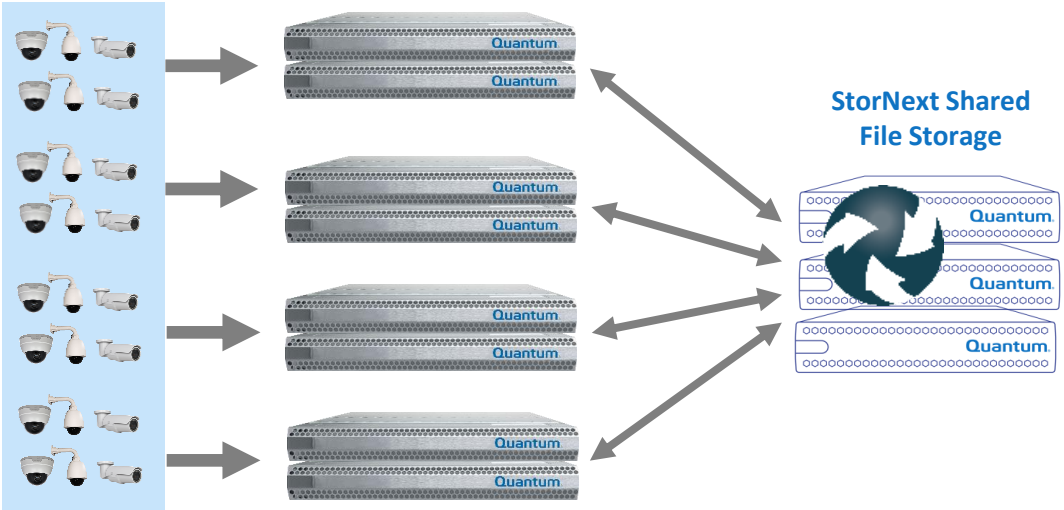
Quantum референс-архитектура для решений по видеонаблюдению

от 500 до 2000 камер

1. Surveillance Cameras send video over TCP/IP network
2. VMS application running on highly available* server pairs stores video in StorNext storage pool using LAN or SAN connections
3. StorNext stores all incoming video files on disk. 160TB to many Petabytes disk tier for incoming video



StorNext Shared File Storage

Each StorNext storage system can support:

- ✓ Multiple Recording Servers (or Server Pairs) running the VMS application
- ✓ Multiple Recording Server Types and Brands
- ✓ Multiple VMS Applications
- ✓ Multiple Sites and Geographic Locations

**Optional Failover: Primary Server synchronously replicates Virtual Machine running VMS application to a Secondary Server. If Primary Server fails; Secondary Server automatically takes over all responsibilities.*

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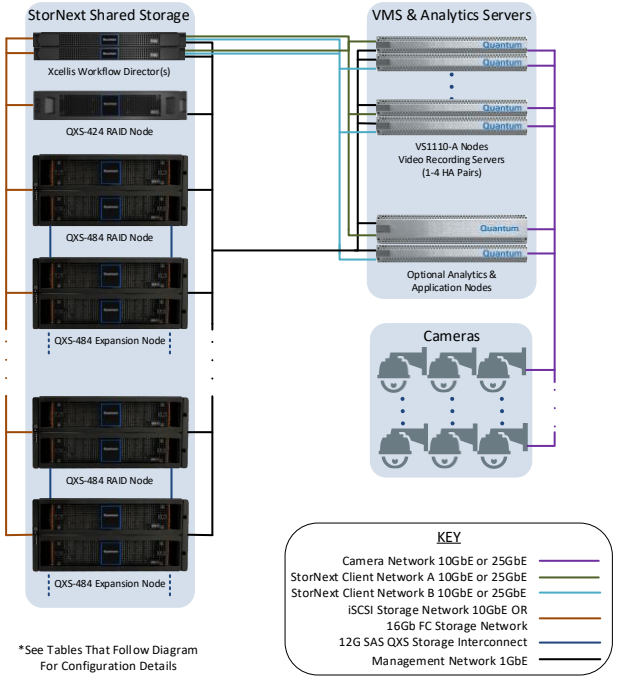
Quantum референс-архитектура для решений по видеонаблюдению

от 500 до 2000 камер

		StorNext and QXS Capacities For Varying Retention Times			
Camera Count	VS1110-A Nodes	30 Days	90 Days	180 Days	365 Days
500	2	1.1 PB	3.4 PB	6.9 PB	14.208 PB
1000	4	2.3 TB	6.9 PB	13.8 PB	28.2 PB
1500	6	3.4 TB	10.4 PB	20.7 PB	42.2 PB
2000	8	4.6 PB	13.8 PB	27.6 PB	56.1 PB



*See Tables That Follow Diagram
For Configuration Details

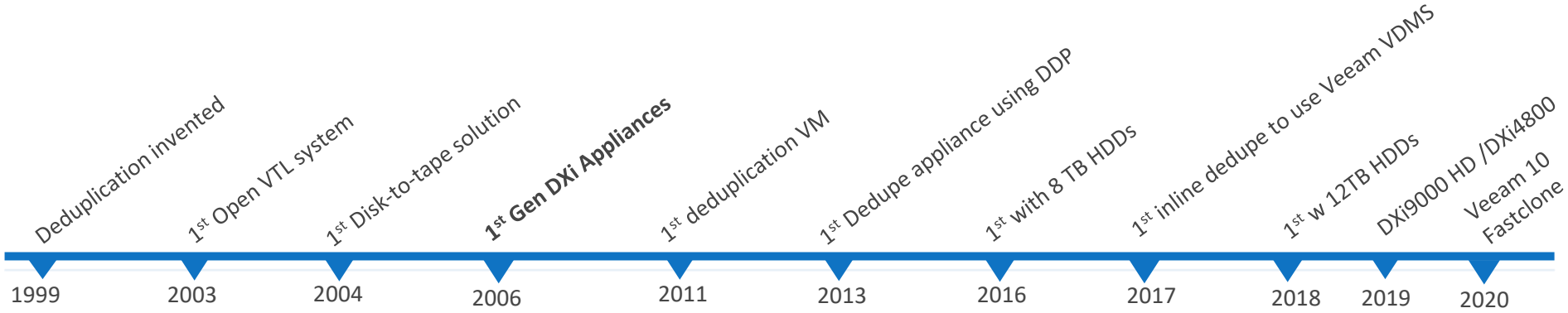
Quantum

Системы дедупликации Quantum DXi

Сокращение времени резервного копирования и восстановления данных

CREATE. INNOVATE. PROTECT.
ON QUANTUM.

Эволюция систем дедупликации Quantum DXi



4th

Generation Software and Hardware

15K+

Instances in production worldwide

Защита данных: дисковые системы дедупликации Quantum DXi

- **Высокопроизводительные плафтормы** для резервного копирования
- **Адаптивная дедупликация** для эффективного хранения
- **Высокая плотность решения** для минимизации места в ЦОД
- **Уникальная репликация** для построения DR защиты
- **Мультипротокольная поддержка:** CIFS/NFS, VTL, OST и VDMS
- **Широчайшая интеграция** с производителями ПО СРК

DXi V-Series (виртуальный аплайнс)

DXi in a Virtual Machine
Key features of DXi but in virtual format. Leverage VM benefits (VMotion, HA…)

For physical and VM backup
Deduplicates Physical and virtual backup streams

Up to 5 TB / hr performance
Variable-length block algorithm

DXi V-Series

Three Models
DXi V1000 is 1 TB free download
DXi V2000 Scales from 2 to 8 TB
DXi V4000 scales from 4 to 24TB blockpool (V4000)
All features included

Full replication
Full replication and recovery to/ from other DXi systems

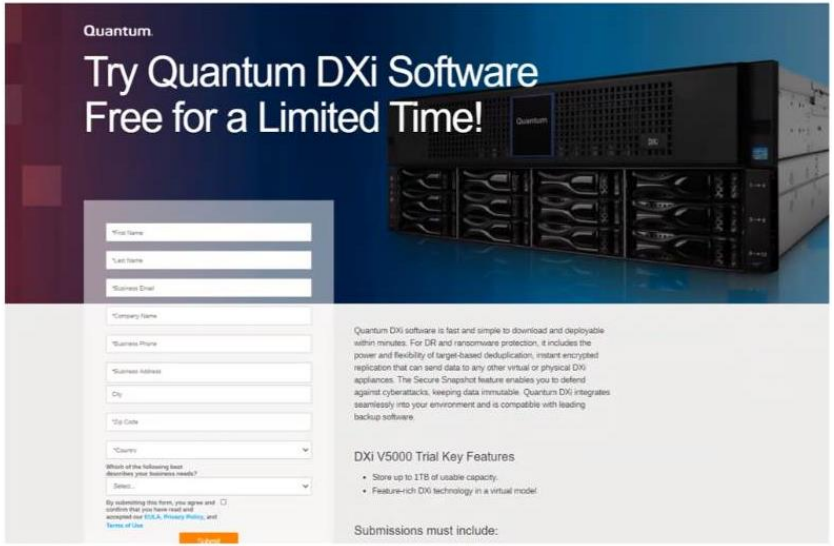
Multiprotocol
NAS (CIFS, NFS) / OST /DXi Accent

https://forms.quantum.com/Software/V1000/download.aspx

New DXi V-5000

DXi V5000 Trial

- **DXi V5000 free trial download available 23APR21 (similar to ATFS download)**
  - Free version, not for production data, no QTM support
  - Up to 1TB capacity
  - Expires 8 months after install
  - Offers no extensions or path to purchase/upgrade
  - Available only for VMware environments
- **DXi V5000 (step up from Free Trial) - GA 31JUL21**
  - Free 'non-expiring' "Community" license from 1-5 TB capacity
  - Can be used for production data
  - Support only available through Community Forum http://forumv.co
  - Customer can upgrade to convert to full production DXi V5000 (5-256 TB Capacity)
  - More to come



Quantum DXi4800

Software

- DAE or Veeam VDMS adds additional 48GB RAM
- NO optional encryption license

Base Node

- 48GB RAM
- 480GB SSD Cache
- 4TB HDD

Connectivity VT/OST/NAS/VDMS

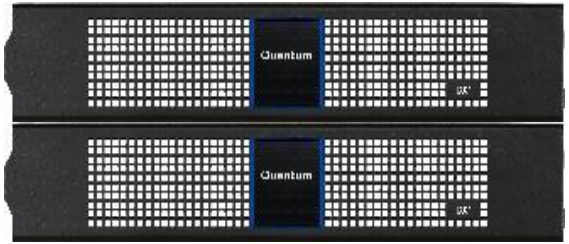
- **2x1GbE + 2x10GbE ports onboard**
- **Up to 16x10GbE ports additional**
- **Up to 8x16FC ports additional**

Scaling

- Base system is 8TB – 27TB
- 3TB COD added at 8, 16, or 24TB
- 8TB added at 8, 11, or 16TB

Performance

- **Up to 16.5 TB/h**
- **Up to 34 TB/h using Accent**



JBOD

- Increases capacity 45TB – 171TB (**315TB***)
- 8TB HDD
- Each JBOD is licensed for 18TB with 3X 18TB COD available
- 48GB RAM added with first JBOD if no DAE or Veeam already installed

Service

- Bronze, Gold NBD, Gold 4H uplifts and renewals

Расширение емкости системы DXi4800

+3 or +8TB options

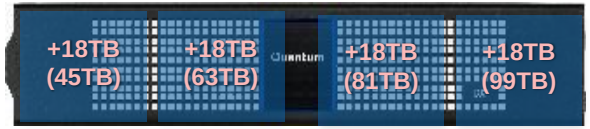
2U

System node (up to 27TB useable)

+18TB options

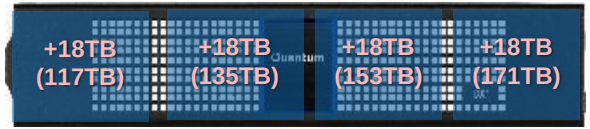
Up to 4 additional Expansion modules supplied fully populated with 8TB NL-SAS drives

2U



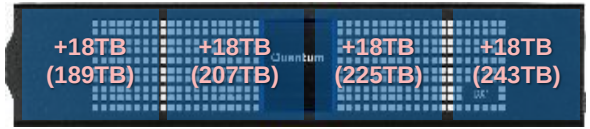
Expansion 1 (up to 99TB useable)

2U



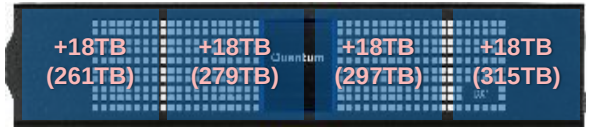
Expansion 2 (up to 171TB useable)

2U



Expansion 3 (up to 243TB useable)

2U



Expansion 4 (up to 315TB useable)

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Quantum DXi9000/9100

Memory and Storage

- 768 GB / 1536 GB RAM
- 15 TB / 21TB SSD for ultra-fast metadata management
- 12 TB HDDs for user storage

Connectivity VT/OST/NAS/VDMS

- 2x1GbE + 2x10GbE onboard (FC or Twinax)
- Up to 4 Host HBA combination, up to 16 ports total :
  - Quad ports 16Gbps Fiber Channel
  - Quad ports 10/25Gbe (Optic, Twinax , BaseT RJ45)

Scaling

- Standard : Base system starts at 51TB -> 1PB / 102TB - > 2PB
- High density : Base systems starts at 204TB -> 1PB / 102TB - > 2PB
- Scales in 51/102TB increments via COD licenses
- Scales to 1.02 / 2 PB useable – over 20PB / 40PB of logical storage @ 20:1

Performance

- Ingest : Up to 64 TB/h and 99TB/h with Accent

Optional Software

- DAE or Veeam VDMS

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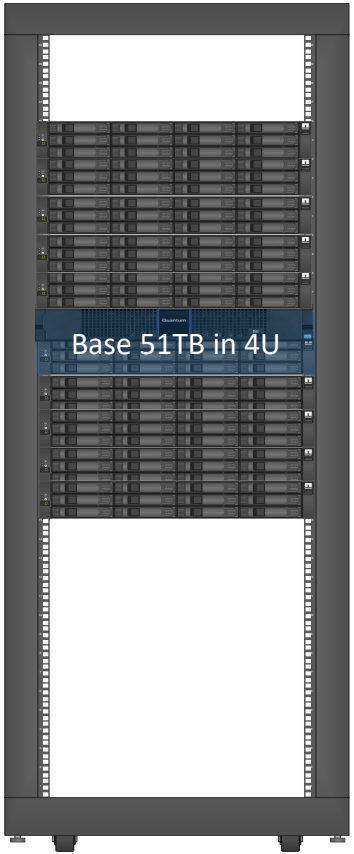
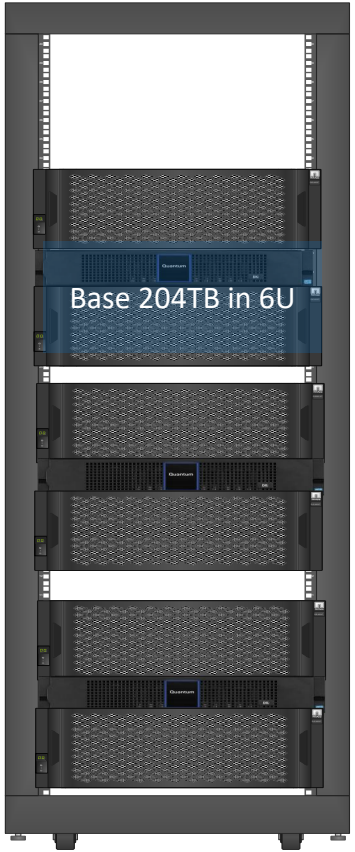
DXi9000. Плотность размещения в стойке

Standard Chassis
1.02 PB in 22U
Starts at 51 TB, scales in 51TB increments.



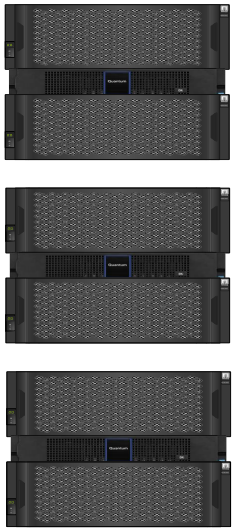


Hi-Density Chassis
1.02 PB in 10U
Starts at 204 TB, scales in 51TB increments.

Hi-Density Chassis
3.06 PB in 30U

Системы DXi9000/9100 – лучшее в классе D2D решение по плотности размещения консолидированных ресурсов!

(25) Veritas NBU Appliances

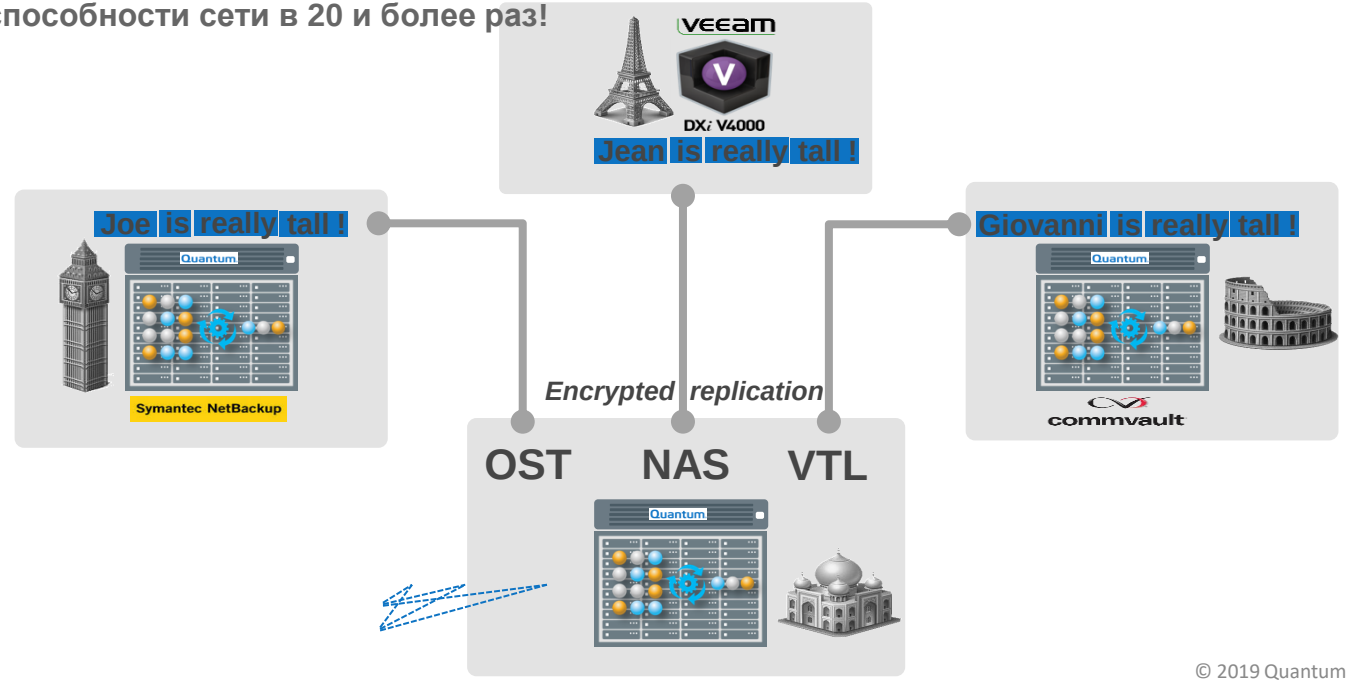


1 PB (useable) in 10U of rack space

(3) DXi9000 or (2) DXI9100 Appliances

Quantum DXi: глобальная дедупликация

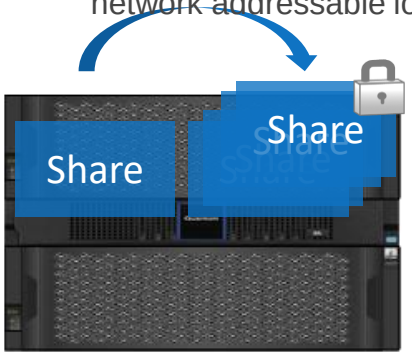
Использование репликации резервных копий позволяет существенно упростить процесс аварийного восстановления данных, а также управления носителями/медиа. При репликации пересылаются только новые уникальные блоки данных. Устройство серии Quantum DXi распознает и дедуплицирует блоки, поступающие из разных источников и через разные интерфейсы, снижая типичные требования к пропускной способности сети в 20 и более раз!



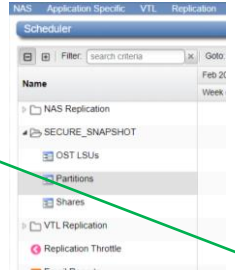
DXi Secure Snapshots*

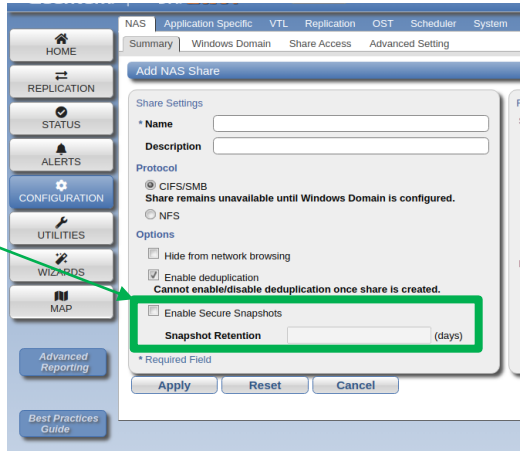
1 Snapshots of shares are taken and put in a non-network addressable location

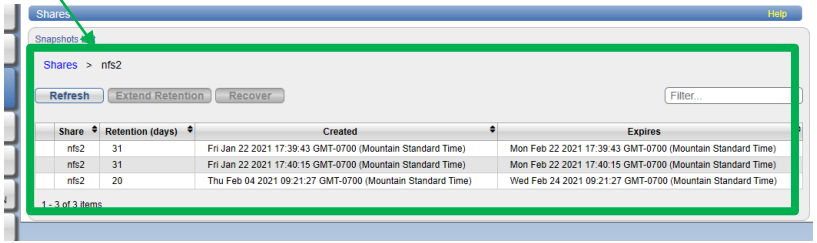
2 Kept for specified time, then automatically deleted



3 Admin chooses snapshot(s) to restore via management interface







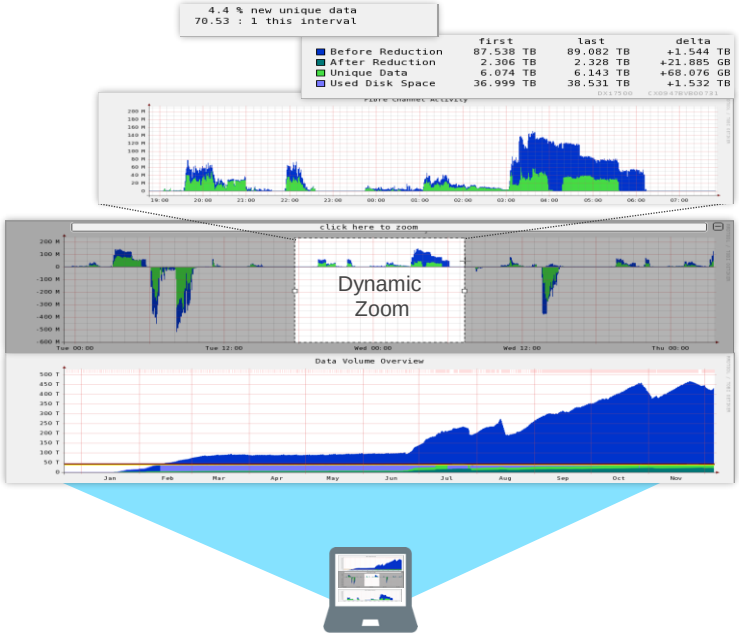
First level defence against ransomware

- No datapath access
- Attacker can't use generic attacks on mounted backup filesystem
- Attacker can't use DXi GUI or Rest API to delete snapshots
- Attacker can't use non-root authorized access to DXi to delete snapshots
- Creation, control and monitoring via Management Interface

*coming soon

DART – репортинг и расширенный мониторинг DXi

- Monitor replication for data protection effectiveness
- Measure data reduction
  - Deduplication, compression, replication…
- Measure backup activity
  - Steady state monitoring, compressibility…
- Monitor replication for data protection effectiveness
- Plan for capacity upgrades
- Chargeback
- Bandwidth throttling
- Present up to six years of historical data
- And more…



DART – репортинг и расширенный мониторинг DXi

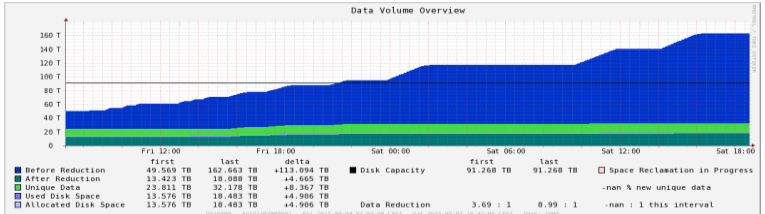
DXi Advanced Reporting native tool

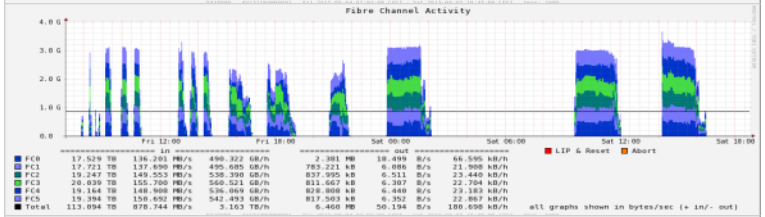
Review Capacity trending

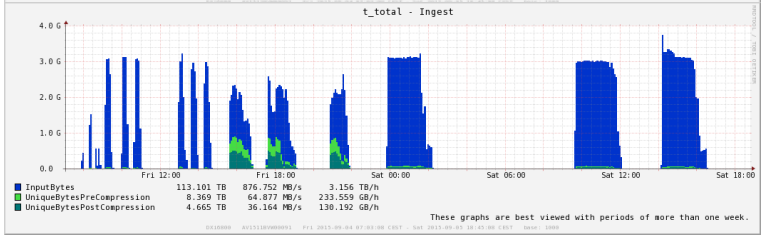
I/O FC /Ethernet performance

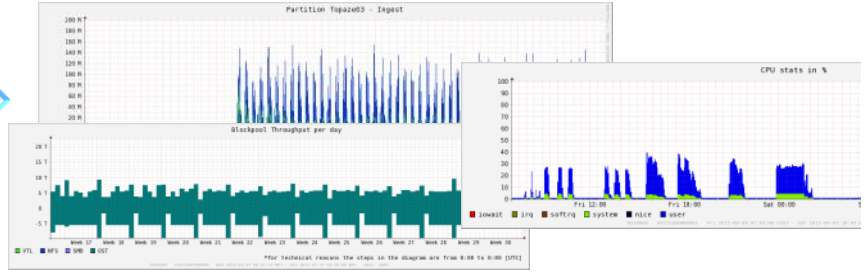
Ingest and reduction deduplication behavior

Chargeback reporting, System load, Daily/Weekly ingest









Инструменты управления и мониторинга DXi

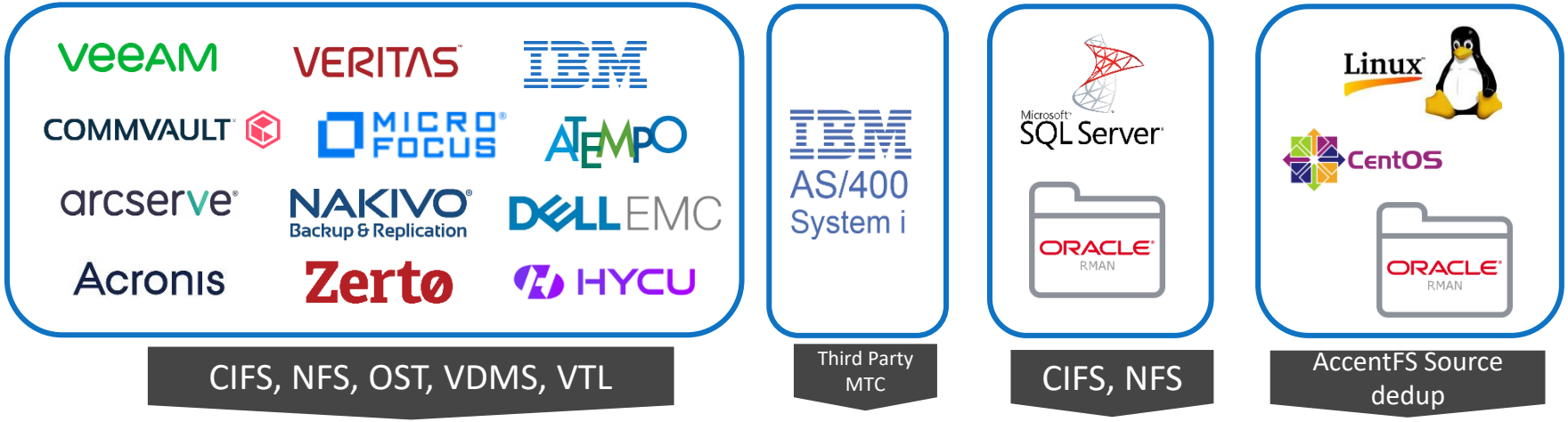
- **Graphical User Interface (GUI)** : Administration, configuration of the VTL/NAS/OST/VDMS protocols, Replication, Hardware and software reporting , Alertes E-mail/SNMP …

- **DXi Advanced Reporting (DART) :** Part of the GUI this real live tool will provide you all statistics to improve and predict the DXi usage. Deduplication and compression ratio, data send , data replicated , performance activity per ports, capacity trending and much more with up to 6 years of history .

- **WebService/CLI** available for datacenter integration;

- **Cloud Based Analytics (CBA)**, Quantum products can connect to the CBA software to send log files and other telemetry data about their environment to this central hub, making them part of Quantum’s distributed cloud support.

Quantum DXi. Совместимость и интеграция

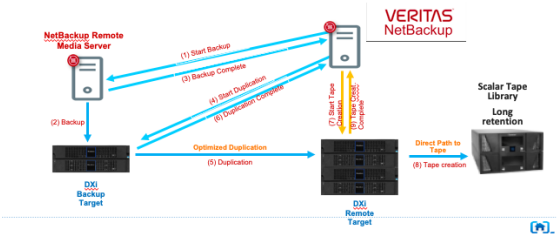


Global deduplication pool

Интеграция с Veritas

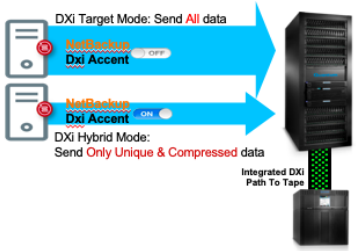
Integration with VERITAS OST

- OST Cloud AWS, Accelerator, Accel_NDMP, Accel_Vmware
- Direct_Copy_Shared, Granular_Recovery, GRT_VMware, IR_Vmware
- KMS, Opt_Dup, Opt_Synth, OST AIR
- Direct tape Copy



Concurrent Optimized replication

- Reduces time to complete OST image replication.
- Works with OST Optimized Duplication and OST AIR.
- Begins copying image content to target DXi while OST backup ingest is occurring

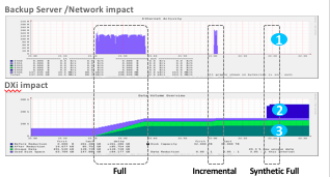


DXi Accent – Quantum source Hybrid deduplication

- Reduces network traffic for backup and DR
- Supports backup over WANs as an alternative to the local appliance
- Integration of low-cost long-term retention

Optimized Synthetic Full Backup

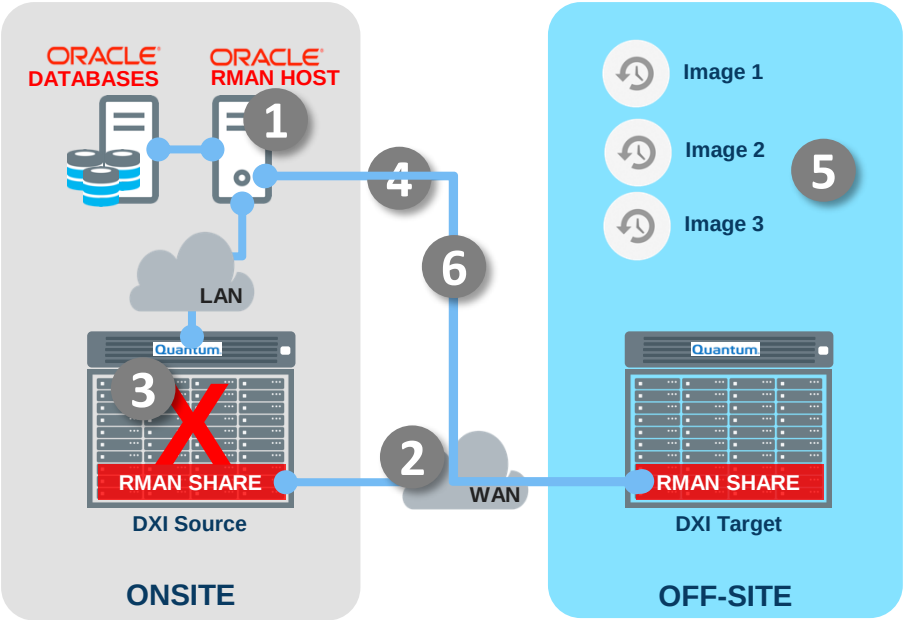
- Optimized synthetics are created by the storage server
- NetBackup instructs which parts of the previous backups to are used



DAE – Dynamic Application Environment

- Run NBU Media Server on the DXi itself

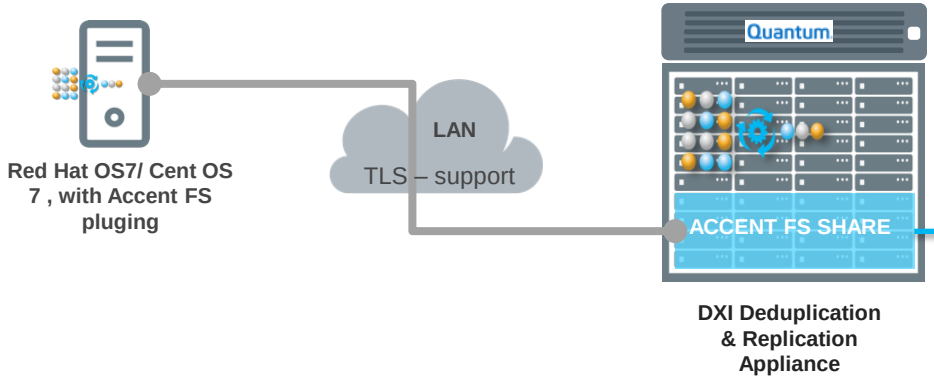
Интеграция с Oracle RMAN

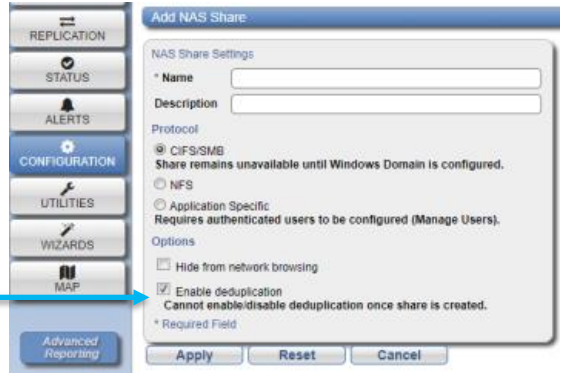


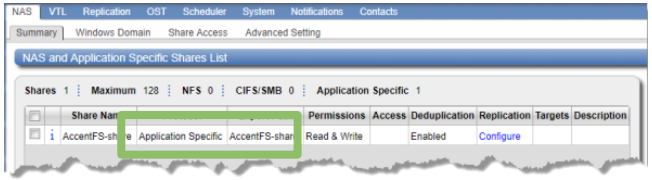
1. Backup to local DXi
2. Local DXi replicates to target DXi
3. Local DXi becomes unavailable
4. Point RMAN to target DXi
5. Update RMAN catalog with target images
6. Restore

ACCENT FS – распределенная дедупликация для Linux

Any application tool writting to Mount Point







AccentFS enables a hybrid or collaborative approach to deduplication, combining the best features of both target and source-based systems. It moves a portion of the deduplication process to the backup server, so that only unique blocks are transmitted to the target appliance. This system, which leverages many of the underlying functionalities of DXi replication, allows DXi Accent to accelerate backups where network bandwidth is the limiting factor.

- DXi4800 and DXi9000 with Code 4.01

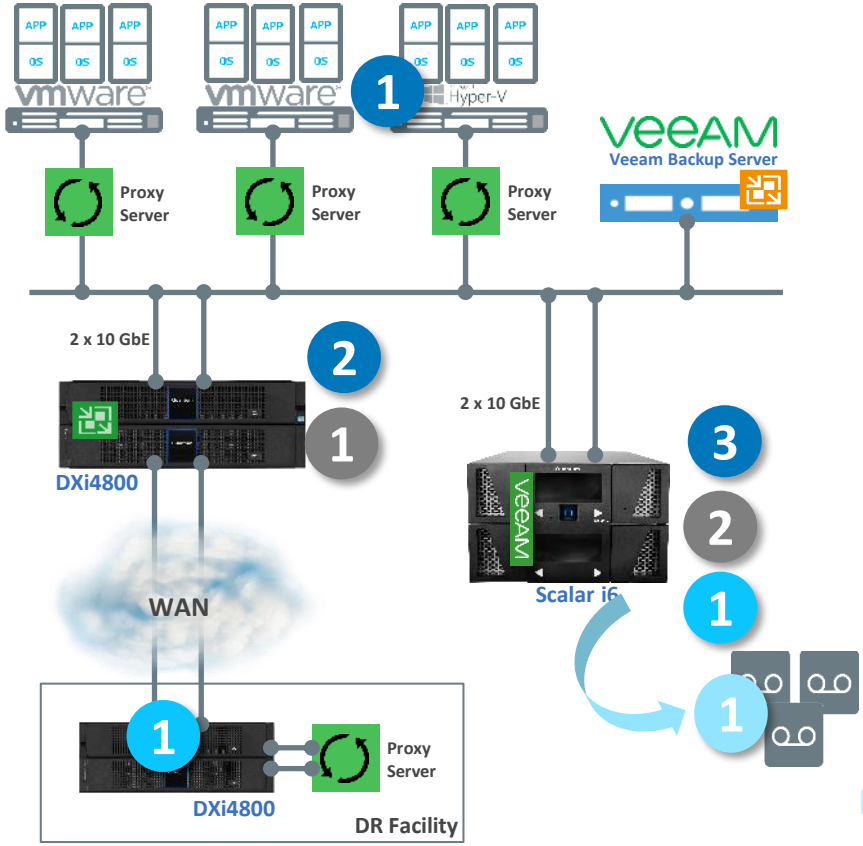
Концепция эффективной защиты данных “3-2-1-1”

3 копий данных

2 различных типа носителей

1 удаленная копия (онлайн)

1 защищенная копия (офлайн)

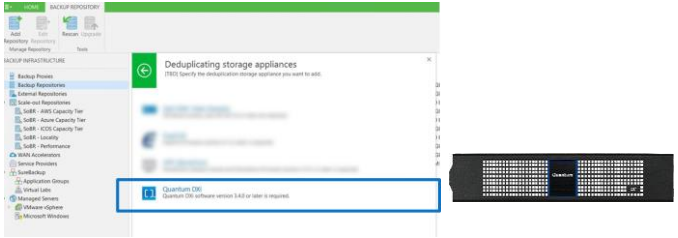


Quantum

Интеграция с Veeam

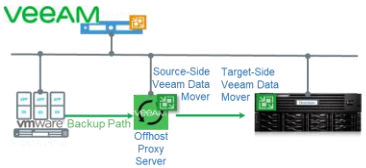
Integration with Veeam VDMS

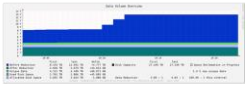
- Since 9.5 VDMS is supported
- Ease of use since 9.5U4, drop down list
- Enable secure connection between Veeam proxy and DXi



FastClone feature -> Synthetic Full Backup

- Optimized synthetics are created on the DXi
- Veeam instructs which parts of the previous backups are to be used





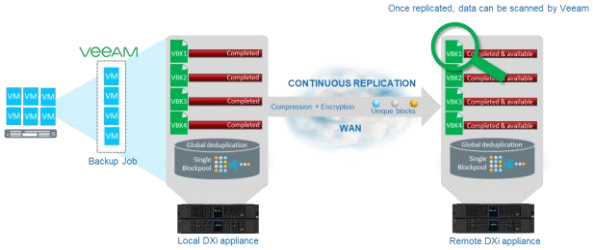
Instant VM Recovery (IVMR)

(VM) back into customer production environment by running it directly from the backup file to:

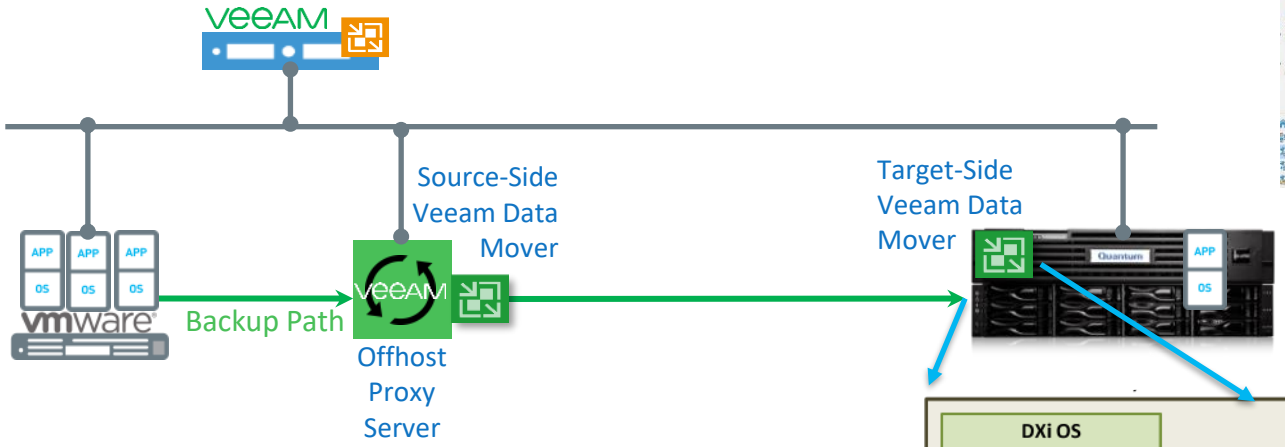
- Maintain low recovery time objectives (RTOs)
- Minimize disruption
- Minimize system downtime of crucial production VMs

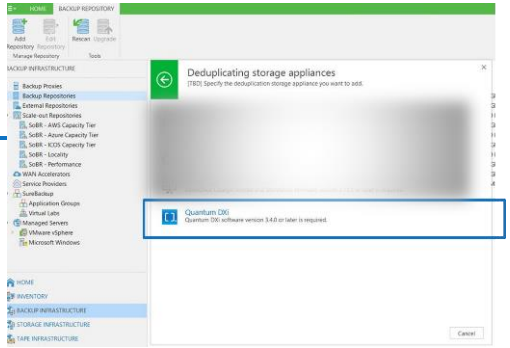
DXi Continuous replication

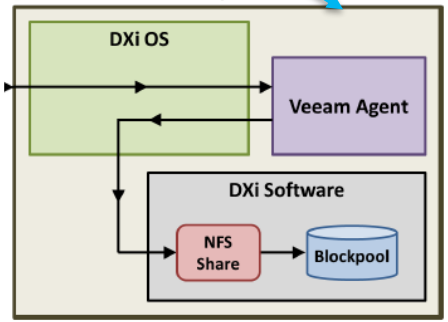
- Improve replication speed
- Ease of access to replicated data, no maual actiosn is required



DXi – интеграция с Veeam (VDMS)



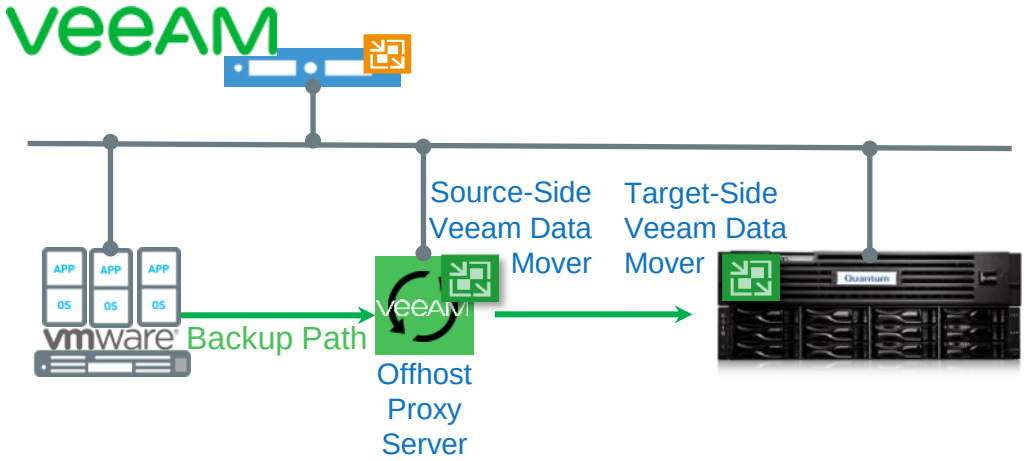


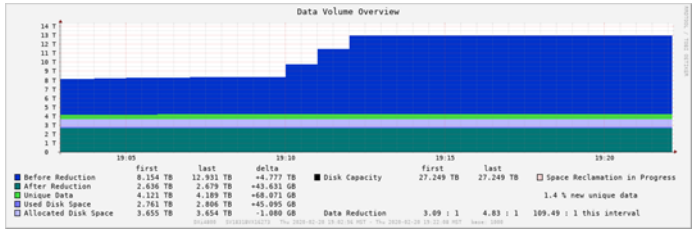


The Veeam Agent runs in the DXi process space with direct access to DXi resources, providing better performance than Veeam running against a DXi NAS share as a shared folder.

- DXi with code 3.4 and beyond

Ускорение Synthetic Full бэкапов с DXi – интеграция Fast Clone Veeam V10





Fast Clone is the Veeam Backup & Replication technology that helps create quick file copies. Fast Clone increases the speed of synthetic backup creation and transformation, reduces disk space requirements and decreases the load on storage devices.

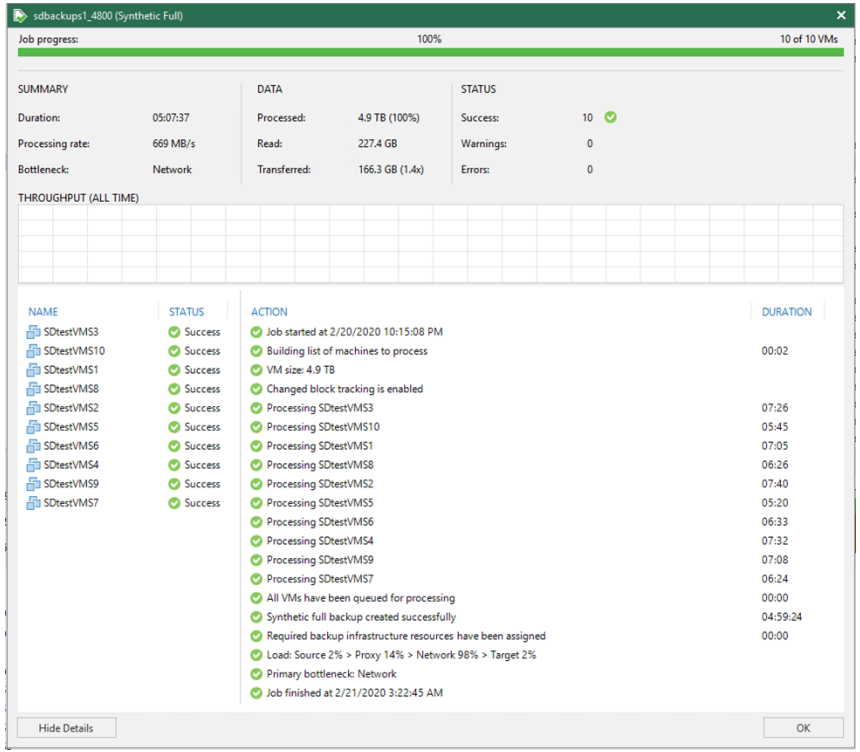
With this technology, Veeam Backup & Replication references existing data blocks on volumes instead of copying data blocks between files. Data blocks are copied only when files are modified.

To use such feature you will need DXi4800 or DXi9000 deduplication Appliance, please contact your Quantum Presales representative for more information.

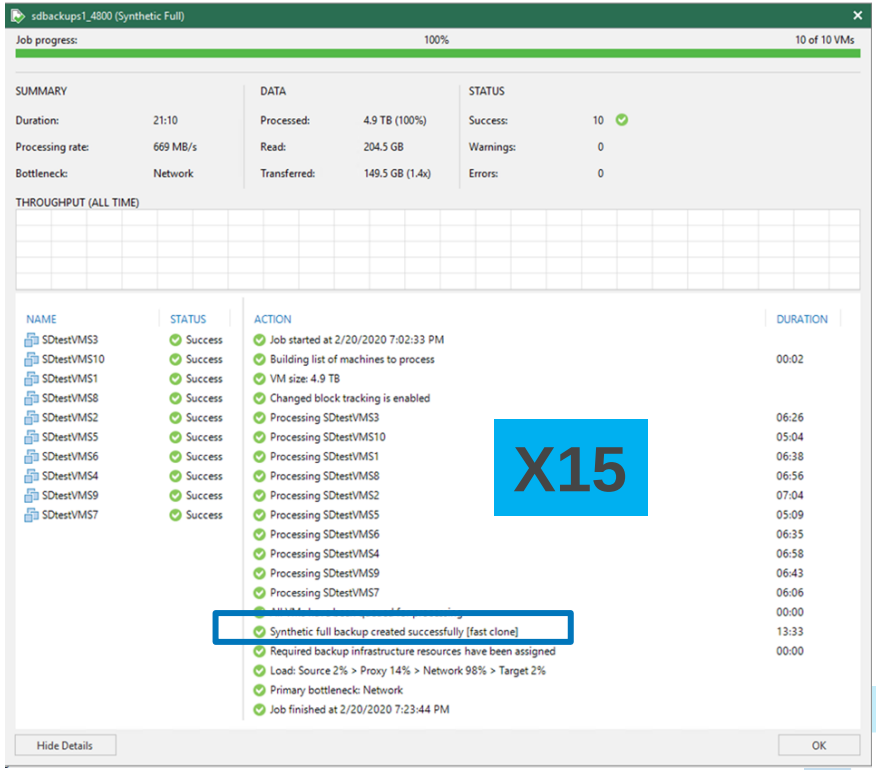
Сравнение производительности на примере DXi4800

10 x VM’S 4.9TB

Without Fast Clone -> 5h:07 mns



With Fast Clone -> 21mns 10

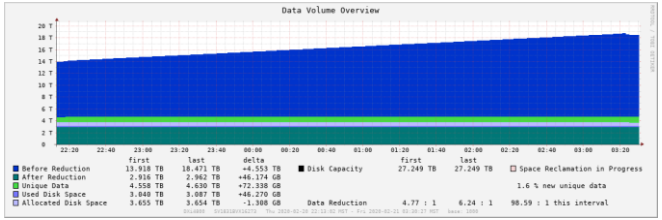


X15

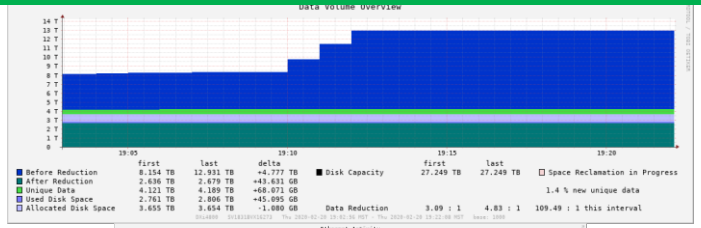
Сравнение производительности на примере DXi4800

Without Fast Clone: 5h:07 minutes

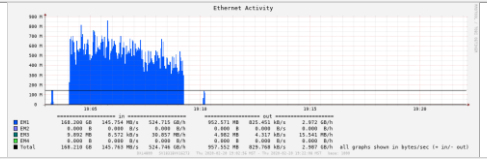
With Fast Clone: 21 minutes

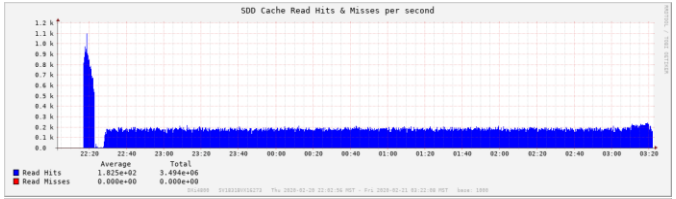


Synthetic Full 4.9TB

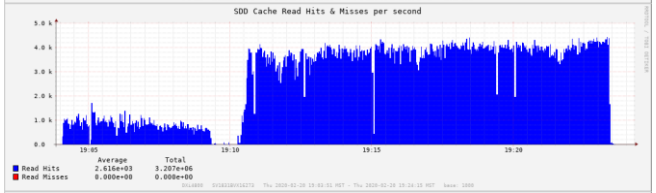


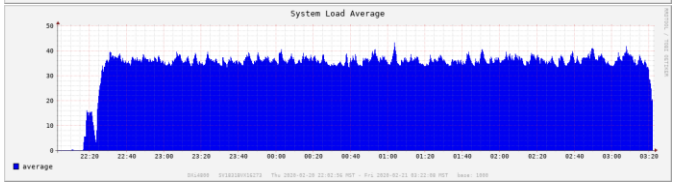
Always starts with Incremental



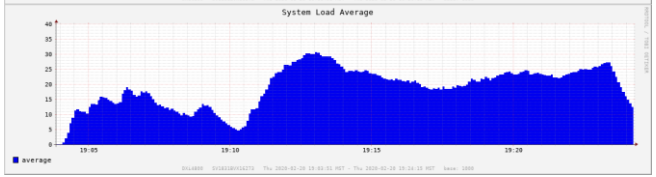


SSD cache

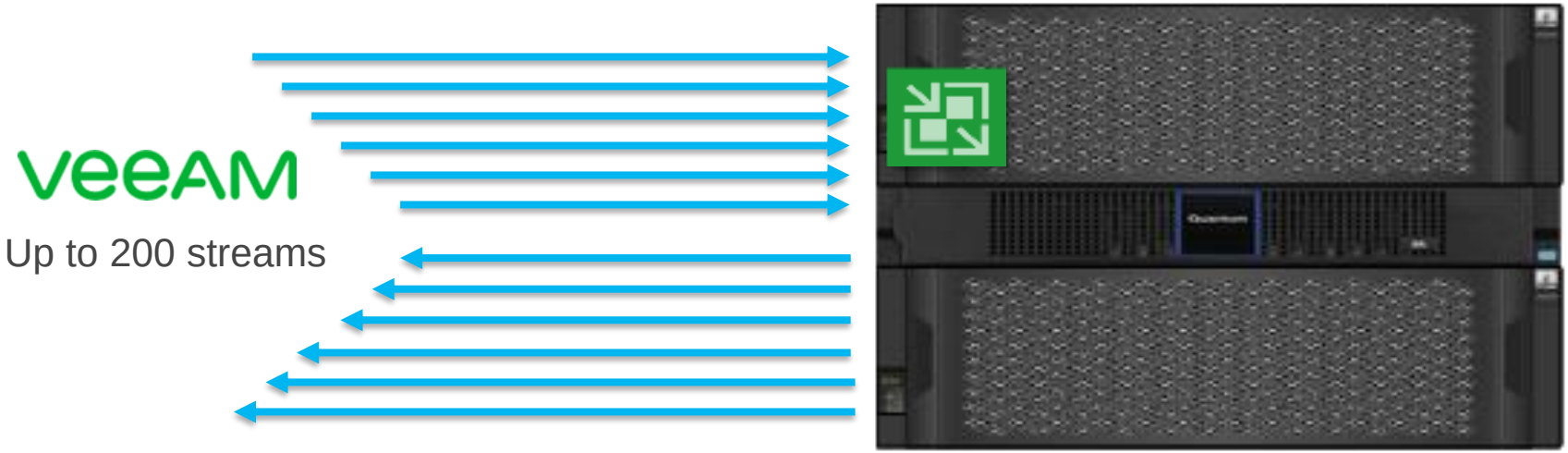




System load

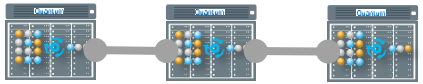


Система DXi9000 позволяет увеличить количество потоков бэкапа Veeam до 200!



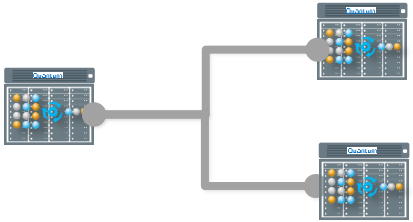
Репликация данных с Quantum DXi

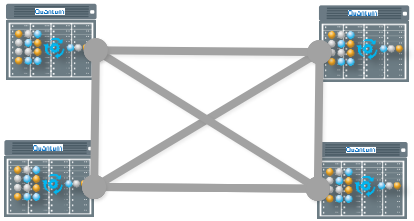
Any DXi to any DXi
Virtual ⇔ Physical,
Physical/Virtual ⇔ Cloud
Small ⇔ Big



Cascading/ Replicate to tape
Cascading (snapshots)
Path to tape (long term reten.)

Multiple targets
1 to 1
Peer to Peer
1 to 2

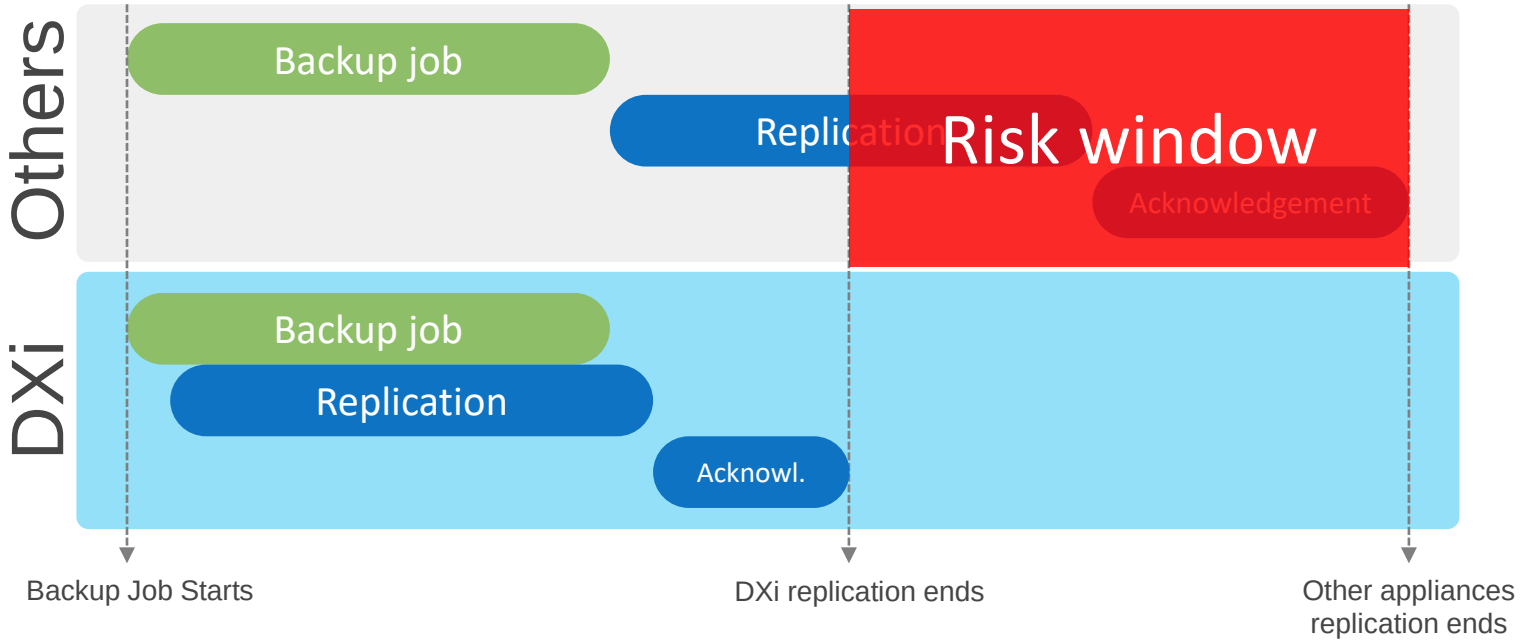




Multiple Sources
Many to 1
Many to Many (OST)

Уникальная репликация систем DXi

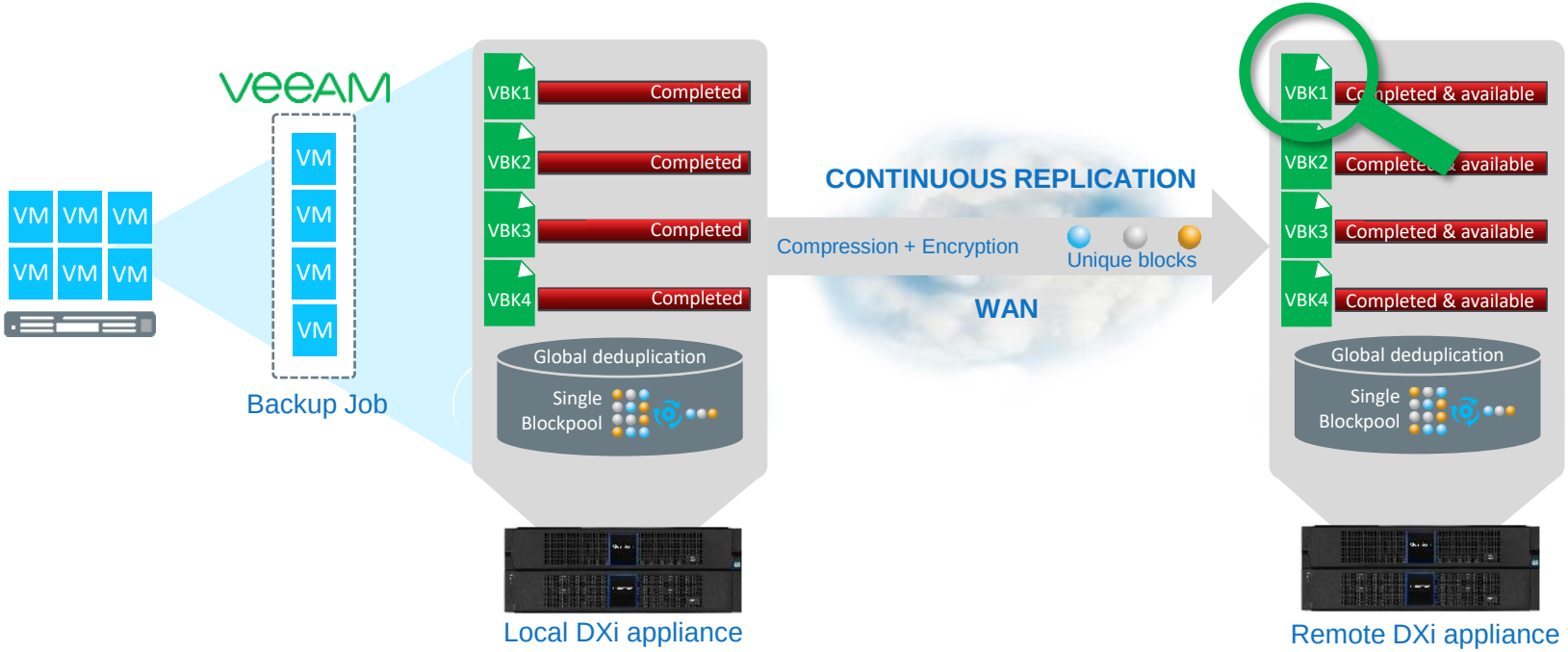
Continuous replication



Уникальная репликация систем DXi

Continuous replication

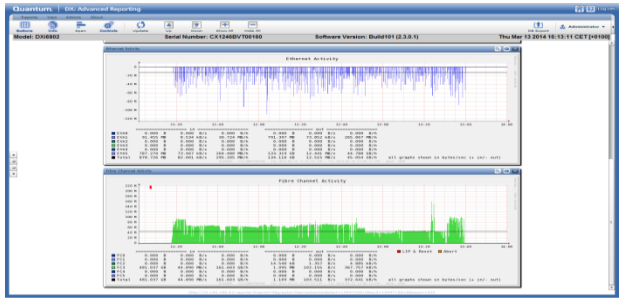
Once replicated, data can be scanned by Veeam

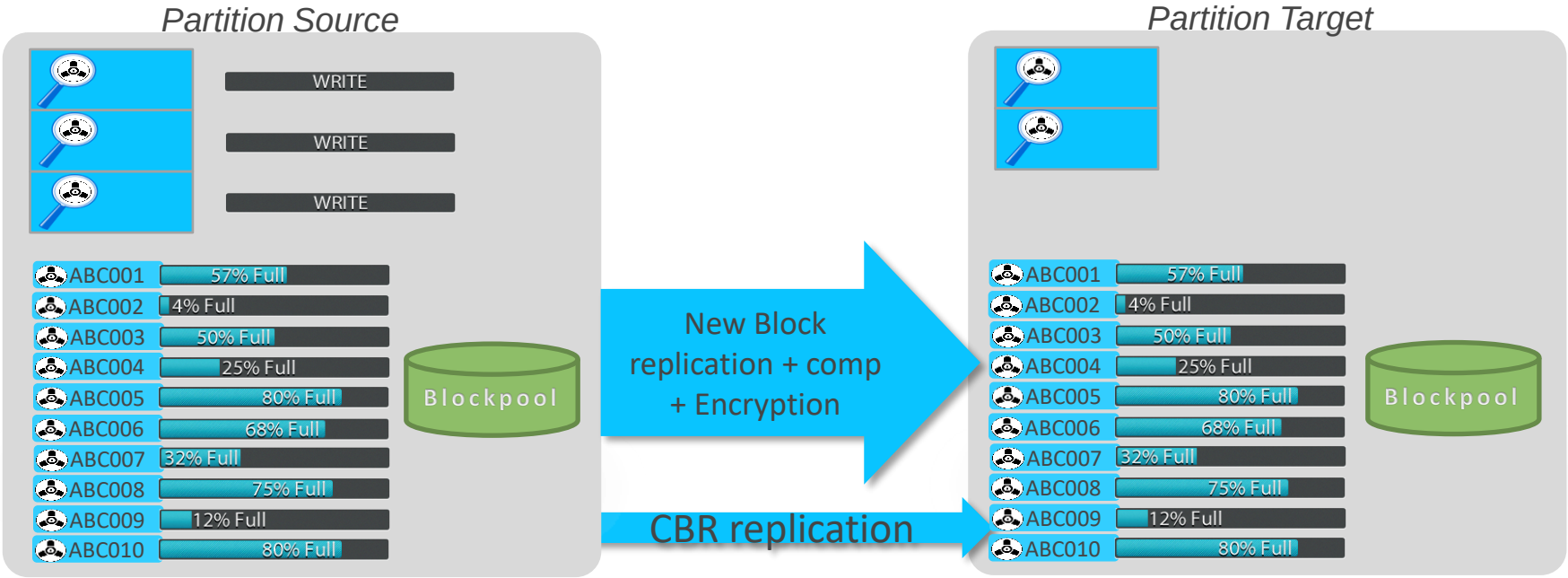


Уникальная репликация систем DXi

Cartridge Base replication

1. Load tape
2. Write to tape
3. Deduplication and replication immediately





Уникальная репликация систем DXi

Cartridge Base replication

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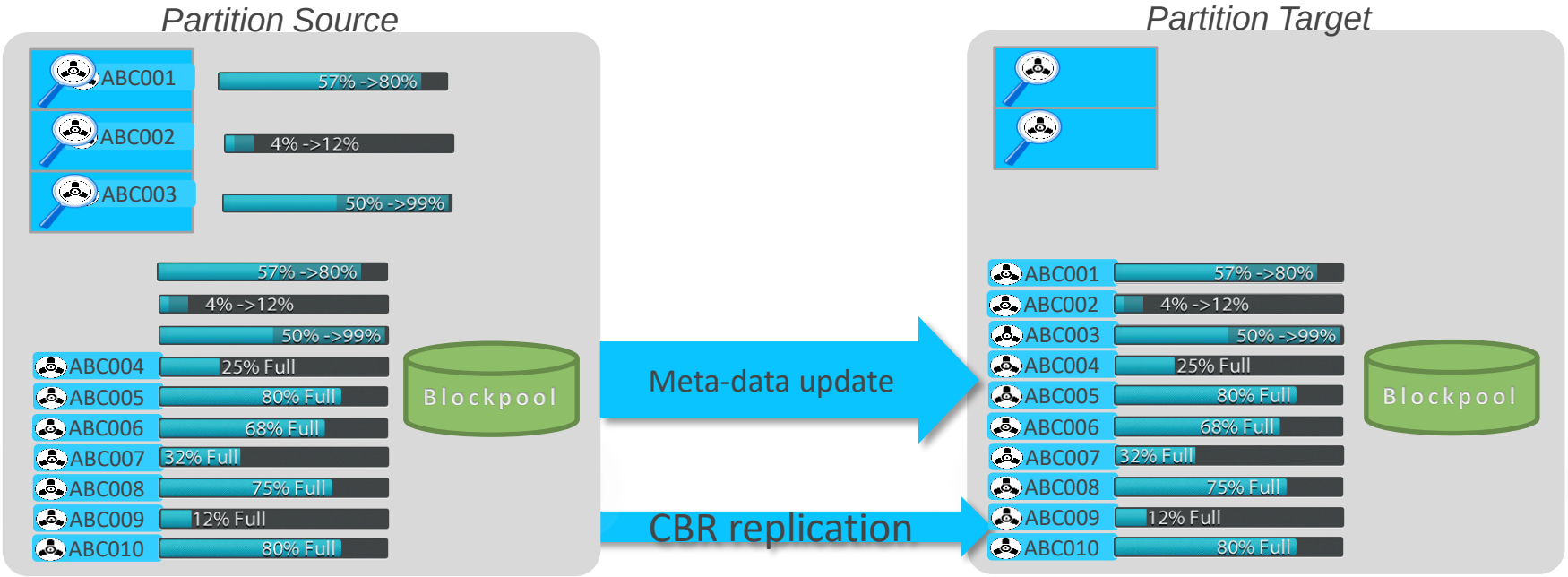


Территориальные локации Quantum в мире

North & South America

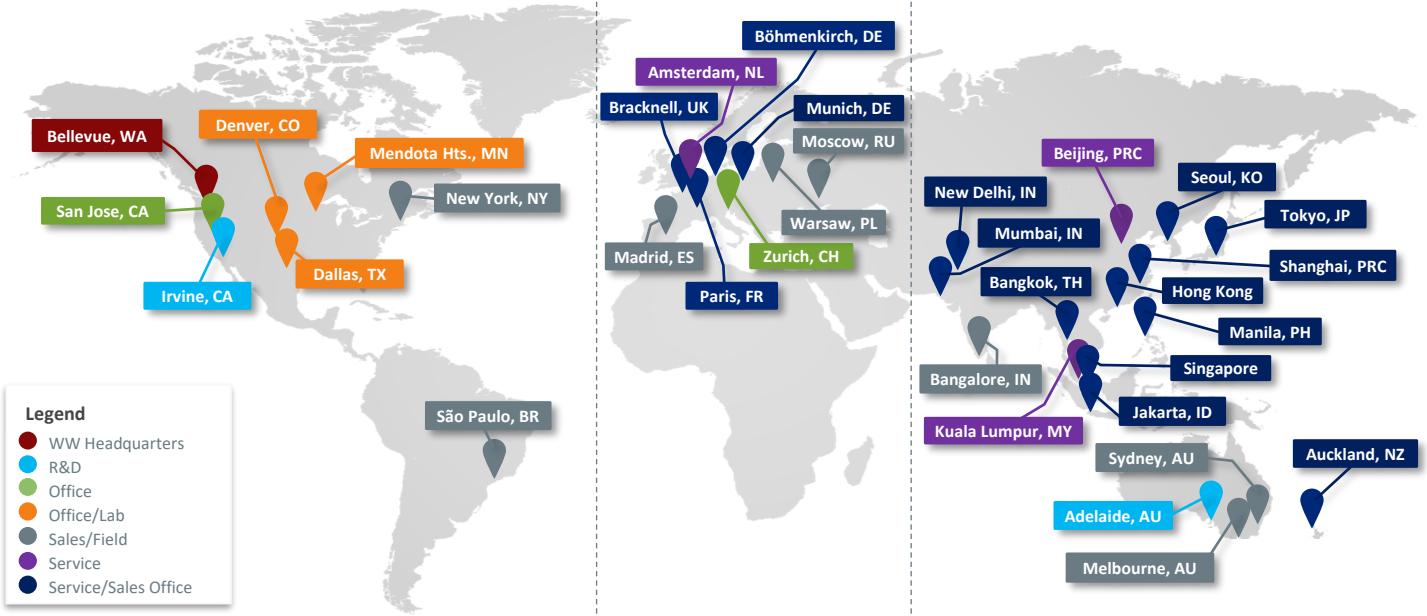
- NA Call Center
- PMO/Implementation teams
- Training & Docs
- Field Support
- Professional Services

EMEA

- EMEA Call Centers
- TPM, Tech Support, Field
- PMO/Implementation teams
- Training
- SAMs, PS, Field Support

Asia/ANZ

- APAC Call Center
- Training
- PMO/Implementation
- Service Delivery across Asia via Quantum TMs and strategic partners



- Key Tech Support Offices in each GEO
- “Follow-The-Sun” Model with Defined Responsibilities
- One global data base; Call queue displays case priority by SLA and hour of the day
- 16 Languages spoken
- 100K+ deployments in 100+ countries
- 31,500 Support Contracts
- 70 Net Promoter Score

Эксклюзивный брифинг-центр Quantum

Расположен в Энглвуде, штат Колорадо, является инновационным конференц-центром и технологической демонстрационной лабораторией, где руководители предприятий и заинтересованные стороны, могут лично ознакомиться с интегрированными решениями Quantum.

Уникальная возможность встретиться непосредственно с нашими руководителями, инженерами, архитекторами программного обеспечения, менеджерами продуктов и экспертами, чтобы сотрудничать и участвовать в интерактивных демонстрациях и обсуждениях.

Техцентр Quantum предлагает экскурсии и интерактивные демонстрации решений нашего новейшего технологического портфеля и современного инновационного центра.

Quantum®

CREATE. INNOVATE. PROTECT. ON QUANTUM.

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