



Hewlett Packard
Enterprise

Business white paper

HPE long-distance replication solutions for demanding disaster tolerant environments

HPE 3PAR Remote Copy and Alcatel-Lucent 1830 PSS





Table of contents

3	Executive summary
3	Disaster tolerance challenges
4	The HPE and Alcatel-Lucent disaster tolerant solution
4	Make swift and simple business case (ROI) for 20G
5	Available solution choices for a range of requirements
5	Key features and benefits
6	HPE certified Alcatel-Lucent solution components
8	Service and support
8	HPE and Alcatel-Lucent: helping IT create and protect business value
9	Don't wait to enjoy groundbreaking disaster tolerance simplicity and efficiency

Executive summary

Today, IT organizations like yours are faced with the difficult task of satisfying the diverse disaster tolerance needs of the entire enterprise. Business, government, and industry-driven requirements compel the need to store more data and make it continuously available. An enterprise that is unable to recover its data assets quickly after a disaster may be at risk for regulatory action—or worse yet, an inability to continue the business. Disaster recovery requirements that include low recovery time objectives (RTOs) and zero-data loss recovery point objectives (RPOs) at a geographically distant site can pose a significant challenge. How do you protect more applications and data than ever without commensurate increases in human and capital resources?

Up until now, solutions that offered both limited data loss and protection from disasters that span wide geographical areas generally required extremely large, high-speed replication links with the accompanying high recurring monthly costs. HPE and Alcatel-Lucent have teamed up to create solutions for remote replication on simplified, yet robust infrastructure that reduces these costs while enabling data replication to a data center up to 130 km away. The joint solution provides a zero RPO at the distant replication site in the event of a disaster in the primary data center. It can also provide a very good RTO and a zero RPO through recovery at the nearby data center.

This white paper describes the HPE-certified solution components of the various tested solutions.

Intended audience: This guide is for system and storage administrators of all levels who are implementing a long-distance replication disaster recovery solution using 3PAR Remote Copy software.

Disaster tolerance challenges

In our Always-On world, there's no room for downtime. Your business must continue to function even after a natural or human-induced disaster that drastically affects your day-to-day operations. Compliance with industry or federal regulations may also place certain requirements on the enterprise that create or expand your needs for disaster recovery. Management has a clear responsibility to protect the business and its data—but also to contain costs as well.

Planning and implementing a disaster recovery solution is one of the most complex, time-consuming, and expensive projects that any enterprise will undertake. Disaster recovery introduces multiple technical and business requirements and decisions. It is important to understand these requirements before designing and deploying a solution, so you can be confident it will meet your requirements for limiting data loss and application downtime.

For some organizations, adequate funding for disaster recovery is difficult to obtain because disaster recovery may be perceived as a huge added expense for a very limited subset of corporate data. Being able to articulate clearly both how and why a particular solution is necessary to meet the requirements put in place by management or the federal government is paramount to deploying a workable solution that meets expectations for defined RPOs and RTOs.

Other organizations may be victim to storage administrators who believe that simply replicating data from the primary data center to a backup data center fulfills the enterprise's requirement for disaster tolerance. This couldn't be farther from the truth. A proper disaster tolerant solution is a combination of technologies, software, and processes, combined into a comprehensive solution designed to meet defined RPO and RTO goals—not just a technology that replicates data from one location to another.

Solutions that offer both limited data loss (very small to zero RPO) and protection from disasters that can span wide geographical areas (a cyclone for example) are typically expensive because they require extremely large, high-speed replication links with high recurring monthly costs. That's why HPE and Alcatel-Lucent have gotten together to provide you with a better way.

The HPE and Alcatel-Lucent disaster tolerant solution

HPE 3PAR Remote Copy and Alcatel-Lucent 1830 4/16 Photonic Service Switch (PSS) solutions allow for secure and synchronous data replication between data centers over distances and at rates not normally achievable via standard SAN switching. These solutions use the low latency of flash to deliver synchronous replication over fiber infrastructure up to 130 km with in-flight encryption to reduce business risk.

This synchronous replication solution gives your enterprise total control over your infrastructure with proven return on investment (ROI) within months. This is compared to long-distance synchronous replication-as-a-service, which limits your ability to own the data and its integrity end-to-end and delivers no ROI whatsoever. The HPE 3PAR StoreServ storage and Alcatel-Lucent solution is the ideal solution when you want to have total control over your data 100 percent of the time—with no third-party intervention—while owning the technologies that comprise the backbone of carrier-class networks so you can benefit from solution ROI.

Make swift and simple business case (ROI) for 20G

Up to 20 month payback

- Longer for longer dark fiber
- Shorter for more capacity (at 80G ~6 months)

Current mode of operation (CMO)



$$2 + 2 \times 4k \text{ EUR per month} = 192k \text{ EUR per year}$$

Future mode of operation (FMO)



CAPEX SKUs: 123k EUR (includes 3-year warranty and technical support)
 OPEX Dark Fiber (1-70 km): 1 + 1 x (14-98k EUR per year) = 2.8-196k EUR per year



Available solution choices for a range of requirements

HPE and Alcatel-Lucent have designed and certified four unique disaster tolerance solutions built for scaling in terms of bandwidth, distance, and encryption requirements:

- Alcatel-Lucent Assured 20G 1830 PSS4 40G 75 km Remote Replication Solution (A20G)** – The A20G is a starting configuration that includes one PSS-4 on each end of the solution. Designed for cost-optimization, it scales to 75 km of distance and 40G bandwidth. Assured – Single Chassis, redundant power, capacity split between active service blades, mux/demux, and network connections.
- Alcatel-Lucent Redundant 20G 1830 PSS4 80G 75 km Remote Replication Solution (R20G)** – The R20G is a redundant configuration that includes two PSS-4s on each end of the solution. Designed for maximum redundancy, it scales to 75 km of distance and 80G bandwidth. Redundant – Dual Chassis, redundant power, capacity split between chassis and active service blades, mux/demux, and network connections.
- Alcatel-Lucent Assured Xlong 20G 1830 PSS16 40G 130 km Remote Replication Solution (XLA20G)** – The XLA20G is a starting configuration for longer distances that includes one PSS-16 on each end of the solution. It scales to 130 km of distance and 40G of bandwidth. Assured – Single Chassis, redundant power, capacity split between active service blades, mux/demux, and network connections.
- Alcatel-Lucent Redundant Xlong 20G-1830-PSS16 200G 130km Remote Replication Solution (XLR20G)** – The XLR20G is a redundant configuration that includes two PSS-16s on each end of the solution. Designed for maximum redundancy it scales to 130 km of distance and 200G bandwidth. Redundant – Dual Chassis, redundant power, capacity split between chassis and active service blades, mux/demux, and network connections.

Key features and benefits

Secure fiber optic data center interconnect

Rather than using a public carrier, the combined HPE 3PAR, Alcatel-Lucent 1830 PSS synchronous replication solution, certified by a third party, allows for DCI-to-DCI connections up to 135 km without mid-point equipment over your dark fiber network.

The Alcatel-Lucent 1830 PSS supports an integrated Layer 1 (L1) hardware encryption option to provide secure transport for critical DCI applications. The Alcatel-Lucent 1830 PSS can manage specific physical and logical security risks regarding individual network elements, including secure device configuration, comprehensive logs with intrusion prevention alarms, and optical interface redundancy options, while continuously monitoring links for unexpected loss of signal strength from unauthorized optical fiber tapping.

Very low latency for synchronous replication

Latency requirements for mission-critical applications usually dictate the fastest and most efficient technology for transport of those applications. These solutions have been engineered to meet the most stringent latency requirements while providing high availability of synchronous replication applications.

In-flight hardware-based L1 encryption

Using industry-standard AES-256 shared key encryption of your HPE 3PAR synchronous replication DCI-to-DCI, the 1830 PSS utilizes hardware-based in-flight encryption not only reduces latency, but also provides for full payload encryption. This includes full AES-256 encryption of native headers, payload, and trailers regardless of the protocol.

While encryption in the higher layers of the Open Systems Interconnection (OSI) network stack can be effective in certain situations, such encryption can be complex—resulting in high CPU utilization, increased latency, and overhead. L1 physical layer encryption implemented on 1830 PSS is therefore the preferred method for securing data across the DCC WAN that adds only nanoseconds of latency. Using dedicated hardware, L1 encryption can closely couple any higher-layer data flow with its transmission medium to maximize the data center interconnection capacity and DCR performance.

The Alcatel-Lucent KMT is a secure, scalable application that supports management of the cryptographic lifecycle of each wavelength service—the keys generated to perform the encryption—as well as the management of encryption key expiration, rotation, and destruction.

Scalable 20-200G+ solution

The 1830 PSS, like the HPE 3PAR replication solution, is sized for the application and expected growth, the DCI-to-DCI 1830 PSS equipment can be sized to the network distance and allow for growth starting at 20G replicated data (40G total active no fault throughput). The various solutions can allow for “in-chassis” growth to up to 200G of data. The solution does not have to stop there; using the virtual chassis concept, where additional chassis can be added in service, the solution can scale to more than nine terabits without the need to change any of the day one hardware.

The 1830 PSS is a scalable, next-generation DWDM platform that provides data center aggregation for Ethernet and Fibre Channel (FC) data sources, allowing smooth in-service activation of additional clients to meet current and future demand of customers BC/DR needs.

Multiprotocol support for all traffic

The 1830 PSS equipment provides for non-bit intrusive of the native protocols, allowing for mix and match traffic on the common network. The solution supports 8/10G Fibre Channel, as well as 10G Ethernet. Being bit transparent, the 1830 PSS does not change or convert the native protocol.

Using the 1830 PSS service modules, wavelengths can be combined onto a single fiber optic pair to quickly and drastically increase overall DCC WAN capacity. Similarly, the ability to take high throughput 8G/10G FC interfaces and transport them between data centers with low latency is a key enabler for mission-critical applications.

HPE certified Alcatel-Lucent solution components

Test configuration

On local site

- Server: Microsoft Windows Server 2008 with VDBench I/O Workload Generator
- Switches: Brocade 6510 and 6505
- Storage: HPE 3PAR StoreServ array

On remote site:

- Switches: Brocade 6505 HPE SN3000
- Storage: HPE 3PAR StoreServ array

Between sites:

- Distance extension gear: Alcatel 1830 PSS 16 and PSS 4 platforms with....
- Solution: HPE Remote Copy Group – Synchronous Replication
- Distance: 125 km
- Encrypted/Unencrypted data: Both

Alcatel-Lucent 1830 PSS

The Alcatel-Lucent 1830 PSS supports next-generation wavelength division multiplexing (WDM) multiservice transport from access to core. The scalable switch drives lower total cost of ownership and extends network life cycles. The 1830 PSS transforms traditional WDM into a flexible transport layer with managed agile photonics, multilayer switching and services, plus network intelligence.

Coarse Wavelength Division Multiplexing (CWDM)

The Alcatel-Lucent 1830 Versatile WDM Module (VWM) is a passive, compact “add-on” shelf that provides CWDM extension to network elements without built-in WDM capability. It is a managed platform that supports point-to-point and ring applications in metro access, metro core, data centers, and enterprise networks. For operators challenged to meet growing and unpredictable bandwidth demands, the scalability and flexibility of the 1830 VWM accelerate time-to-revenue generation and reduce total cost of ownership.

Dense Wave Division Multiplexing (DWDM)

Alcatel-Lucent was the first in the industry to introduce a single-carrier 100 gigabit-per-second (100G)/200G DWDM optical line card providing the ability to more than double network bandwidth capacity. The card plugs into the 1830 PSS platform to provide a flexible network evolution path and meet ever-growing demands for high-bandwidth services such as streaming HD video and cloud computing.

HPE 3PAR Remote Copy software

HPE 3PAR Remote Copy software brings a rich set of features that can be used to design disaster tolerant solutions that cost-effectively address the challenges of implementing disaster-tolerant solutions. HPE 3PAR Remote Copy is a uniquely easy, efficient, and flexible replication technology that allows you to protect and share data from any application.

When implemented over native Fibre Channel, synchronous replication can be used to design a solution that meets solution requirements for an RPO of zero. HPE 3PAR Remote Copy allows you to mirror data between any two models of HPE 3PAR StoreServ Storage systems, eliminating the incompatibilities and complexities associated with trying to mirror between traditional vendors’ midrange and enterprise array technologies. Source and target volumes may also be flexibly and uniquely configured to meet unique needs such as different RAID levels, thick or thin volumes or different drive types, and the like.

Remote Copy over Fibre Channel (RCFC)

If you choose to use Fibre Channel connectivity between the arrays, HPE 3PAR StoreServ Storage offers RCFC. In the past, RCFC was most often used when distances were short, such as with campus or metropolitan distance solutions where native Fibre Channel connectivity between arrays is available. Now, with the integration of the Alcatel-Lucent 1830 PSS, HPE RCFC solutions can be deployed over extended Fibre Channel fabrics spanning up to 130 km.

RCFC uses pairs of Fibre Channel connections between arrays for availability as well as for increasing total available bandwidth for replication. This gives you the flexibility of connections across any approved Fibre Channel fabric to create multiple hops between arrays.

In summary, RCFC supports:

- Load balancing across available links between a source/target pair Remote Copy links configured for the same replication mode
- All HPE 3PAR supported SAN infrastructure
- Synchronous and asynchronous replication mode
- Solutions requiring the replication of large amounts of data
- Up to four RCFC links per node (maximum of 32 per array) with HPE 3PAR StoreServ OS 3.1.3 and later
- Is supported in all Remote Copy topologies
- Distances up to 130 km with the Alcatel-Lucent 1830 PSS via SAN infrastructures

HPE 3PAR replication and disaster recovery technologies

- HPE 3PAR Peer Persistence
- HPE 3PAR StoreServ Recovery Manager software
- Integration with Metrocluster and Continentalcluster products

For more details on these HPE 3PAR software technologies, please refer to the: [HPE 3PAR Replication Software Suite data sheet](#)

Service and support

Service and support are provided directly by Alcatel-Lucent and are included for three years. HPE offers optional installation and integration services for initial setup of the solutions. Please refer to the product [QuickSpecs](#) for more details.

HPE and Alcatel-Lucent: helping IT create and protect business value

HPE offers one of the IT industry's broadest portfolios of products and services, bringing together infrastructure, software, and services through innovation to enable our customers to create value and solve business problems. As consumers and enterprises shift the way technology is created, delivered, consumed, and paid for, they are demanding a foundation that will support much greater resilience, agility, lower costs, quicker time-to-market, and a higher degree of accessibility. We design our solutions to provide that foundation, particularly in the area of disaster tolerance.

Here are some of the reasons to make HPE your disaster recovery partner:

- **Proven approach** – The HPE approach is based on extensive client experience and industry best practices
- **One-stop shopping** – With HPE as your single, reliable vendor, you have the resources to design, implement, manage, and evolve your solution

Related documents and references

For detailed information on supported HPE 3PAR modes and configurations referenced in this document, refer to the following documents:

[Replication solutions for demanding disaster tolerant environments technical white paper](#)

[HPE 3PAR Remote Copy Software User Guide](#)

[HPE 3PAR Replication Software Suite](#)

For more information on ALU PSS, please refer to:

alcatel-lucent.com/products/1830-photonic-service-switch

- **Choice** – We offer a broad range of recovery and continuity options aligned to the criticality of the workloads you need to protect; our solutions span all delivery models—traditional IT, cloud, and hybrid
- **Direction** – We can provide your business with advisors and consultants who bring you the collective knowledge of HPE to develop disaster tolerance solutions that meet the diverse disaster tolerance needs of the entire enterprise
- **Innovation** – Our industry-leading IP has evolved from more than 30 years of experience supporting stock exchanges, financial institutions, and hospitals

Alcatel-Lucent is the leading IP networking, ultra-broadband access, and cloud technology specialist. Because networks are the foundation of our ultra-connected world, they need to be built with flexibility, speed, and trust. Alcatel-Lucent has been recognized by Thomson Reuters as a Top 100 Global Innovator, and by the Dow Jones Sustainability Indices review as the Technology Hardware and Equipment industry group leader for 2014.

Don't wait to enjoy groundbreaking disaster tolerance simplicity and efficiency

Alcatel-Lucent PSS 1830-4/16 combined with HPE 3PAR Remote Copy software provides the data sharing and data protection solutions that today's IT departments require with groundbreaking simplicity and efficiency. By simplifying the deployment of remote replication, HPE Remote Copy over long distances empowers the storage administrator to deploy new disaster recovery solutions quickly and adapt to changing business needs. By taking advantage of the HPE 3PAR StoreServ inherent, fine-grained virtualization and integration into HPE's cluster software solutions based on Cluster Extension, Metrocluster, Continentalcluster, and Peer Persistence Remote Copy offers the administrator a solution that can effectively protect customer data and quickly recover from outages with limited administrative interaction. In addition, HPE 3PAR StoreServ Storage is the first storage platform to support multi-site capability on midrange arrays, enabling cloud service providers and enterprise customers alike to reduce their equipment costs.

Learn more at
hpe.com/info/3par



Sign up for updates

★ Rate this document



© Copyright 2015 Hewlett Packard Enterprise Development LP. The information contained herein is subject to change without notice. The only warranties for Hewlett Packard Enterprise products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. Hewlett Packard Enterprise shall not be liable for technical or editorial errors or omissions contained herein.

Microsoft and Windows are U.S. registered trademarks of the Microsoft group of companies.

4AA6-3380ENW, December 2015