# Deployment and Configuration Guide

## Lumen Validated Design for Cyber Resilience with Commvault

Lumen as the Operational Environment

## Introduction

Lumen Validated Design (LVD) for Cyber Resilience with Commvault combines Lumen's network innovation with Commvault's advanced data protection to deliver secure, scalable recovery across hybrid environments. This validated design provides a proven architecture for deploying automated, resilient backup and recovery solutions that protect critical data and support business continuity.

The purpose of this guide is to translate architectural principles into actionable deployment and configuration steps. It details how to align infrastructure, integrate network and transport, enforce security controls, and coordinate operations to enable cleanroom recovery and zero-trust enforcement. Built on Lumen's own production experience with Commvault, the guide enables organizations to achieve consistency, resilience, and compliance for enterprise-grade deployments.

The entire validation process has been documented in the White Paper **The technical case for the Lumen® Validated Design for Cyber Resilience with Commvault.**

# Deployment strategy and validation

## Deployment strategy

Deployment followed a phased, infrastructure-aware rollout designed to minimize disruption, accelerate onboarding and provide consistent protection across hybrid environments. The strategy emphasized modular integration, transport optimization and security-first architecture.

### Infrastructure alignment

- On-premises deployment: Commvault C2 nodes, media agents and vaulting infrastructure were deployed across six primary data centers. These sites were equipped with HyperScale X appliances and NetApp storage arrays to support primary and secondary backup tiers.
- Cloud deployment: Commvault Air Gap Protect (AGP) tenants were provisioned in multiple CSPs. Each tenant was configured with 3-2-1 architecture to help provide redundancy and immutability.

### Network and transport integration

- Bulk Data Transfer (BDT): High-throughput backup traffic was routed over dedicated Lumen wavelength circuits between data centers and cloud vaults. This BDT core network was isolated from corporate traffic to help performance and security.
- Lumen IP VPN backbone: All backup and replication traffic was encrypted and routed via Lumen IP VPN (ASN 3549) to help enable secure, multicloud connectivity and consistent transport behavior across CSPs.

### Security and access controls

- Authentication enforcement: Commvault Air Gap Protect (AGP) required authentication for every read/write operation to help prevent unauthorized access and provide zero-trust compliance.
- Logical Air Gapping: Immutable vaults were deployed with separate authentication domains and no direct access from production networks, enabling isolation and integrity.

### Operational coordination

- Commvault SaaS orchestration: Deployment and policy management were coordinated via Commvault's SaaS platform, which resides in the cloud and interfaces with Media Agents across all environments. While deployment and validation were performed using native Commvault Cloud SaaS, the same product and capabilities are available through Lumen® Data Protect for organizations preferring a managed procurement and support model.
- Standardized retention policies: Backup retention was standardized across all environments to help simplify governance and help maintain consistent recovery point objectives.

## Validation

Validation of the deployment was conducted across eight key dimensions to check that the solution met enterprise-grade standards for reliability, scalability and operational excellence.

### Functional validation

- Infrastructure setup: Two virtual CommServe instances (primary and DR) were configured with LiveSync replication to support high availability and disaster recovery.
- Client deployment: Silent push installations were initiated for approximately 20,000 hosts.
- Proof of Concept (POC) execution: A proof-of-concept test was conducted with ~20 different client types to validate compatibility and operational readiness.
- SQL cluster configuration: Automatic discovery and configuration of SQL clusters were validated as part of operational checks, confirming reliable support for clustered environments.
- Knowledge transfer and task testing: All major tasks were tested and verified, with knowledge transfer sessions conducted to secure operational continuity.

### Performance and scalability

- Node deployment: 72 HPE HSX nodes were successfully configured across six geographically distributed sites.
- Stream optimization: Stream limits were adjusted dynamically (from 1,500 to 1,800) to accommodate job volume, demonstrating elastic scalability.
- CommServe optimization: SQL memory allocation was increased to improve LiveSync job performance.
- Tomcat heap tuning: Memory allocation was increased to maintain User Interface (UI) responsiveness.
- Deduplication Accelerated Streaming Hash (DASH) copy reliability: DASH copy operations were validated for performance and reliability, with configuration tuning applied to maximize throughput and service stability.

### Resilience and high availability

- Network bonding issues: Misconfigured Link Aggregation Control Protocol (LACP) bonding on Cisco Nexus switches was corrected to restore expected throughput.
- Node configuration failures: Installation issues caused by conflicting network bonds were resolved through targeted configuration changes and reboot procedures.
- Disaster Recovery (DR) execution: CommServe DR backups were performed, followed by service suspension and cumulative updates to validate recovery protocols.

### Security and compliance

- Credential management: SQL cluster credential required customization to maintain reliability.
- Certificate handling: Certificate import was required for NetApp StorageGrid integration, highlighting compliance with secure storage protocols.

### Manageability and monitoring

- CommCell console performance: Socket/core allocations were increased in line with environment growth to maintain UI performance.
- Anomaly reporting: Custom reports were built to focus on monitoring indicators.
- Alerting and Service Level Agreements (SLA) tracking: Alerts were configured for failed jobs and SLA compliance was reviewed and adjusted where necessary.

### Interoperability and compatibility

- Multi-platform support: Customizations were deployed to provide wide supportability across Windows, Linux, Solaris, HP-UX and Oracle RAC environments.
- Legacy system integration: Specialized feature flags were deployed to support integration with older systems.

### Deployment repeatability

- Standardized procedures: Silent install scripts and plan association reports were used to streamline deployment across thousands of hosts.

### Workload simulation

- POC testing: Simulated workloads across ~20 client types validated system behavior under varied conditions.

- Backup load testing: Synthetic full backups and LiveSync jobs were monitored and optimized to simulate production-scale operations.
- Restore scenarios: Multiple restore tests—including SQL, guest file, VM—were executed to validate recovery under stress.

## Bill of Materials

| Component | How to Buy |
|---|---|
| **Lumen IP VPN** | https://www.lumen.com/en-us/networking/ipvpn-on-demand.html |
| **Lumen Wavelengths** | https://www.lumen.com/en-us/services/wavelengths.html |
| **Lumen Ethernet** | https://www.lumen.com/en-us/networking/ethernet.html |
| **Lumen Cloud Connect** | https://www.lumen.com/en-us/edge-cloud/cloud-connect.html |
| **Commvault Cloud Air Gap Protect for Commvault, US & Canada, AWS Infrequent Tier** | Available via Lumen Data Protect (https://www.lumen.com/en-us/services/lumen-data-protect.html) |
| **CVLT Sensitive Data Governance for Non-Virtual and File, Unlimited Front-End TerabyteCVLT Sensitive Data Governance for Non-Virtual and File, Unlimited Front-End Terabyte** | Available via Lumen Data Protect (https://www.lumen.com/en-us/services/lumen-data-protect.html) |
| **Commvault Sensitive Data Governance, Per Front-End Terabyte** | Available via Lumen Data Protect (https://www.lumen.com/en-us/services/lumen-data-protect.html) |
| **Commvault File Optimization, Per Front-End Terabyte** | Available via Lumen Data Protect (https://www.lumen.com/en-us/services/lumen-data-protect.html) |
| **CVLT File Optimization for Non-Virtual and File, Unlimited Front-End Terabyte** | Available via Lumen Data Protect (https://www.lumen.com/en-us/services/lumen-data-protect.html) |
| **Commvault Cloud Air Gap Protect for Commvault, US & Canada, AWS Frequent Tier** | Available via Lumen Data Protect (https://www.lumen.com/en-us/services/lumen-data-protect.html) |
| **Commvault Complete DP, Per Front-End Terabyte** | Available via Lumen Data Protect (https://www.lumen.com/en-us/services/lumen-data-protect.html) |
| **Commvault Complete DP, Per Front-End Terabyte** | Available via Lumen Data Protect (https://www.lumen.com/en-us/services/lumen-data-protect.html) |
| **CVLT HyperScale X Reference Architecture 24-Drive Node, Per Node** | SOW via Lumen or direct from Commvault (SKU: CV-HSRA-24-1N) |

## Lumen support guides:

- https://www.lumen.com/help/en-us/products.html
- https://www.lumen.com/help/en-us/readiness/prepare-to-activate-your-services-in-north-america.html

## Commvault support guides:

- Best Practices for the CommCell Environment - https://documentation.commvault.com/11.40/expert/best_practices_for_commcell_environment.html
- Ransomware Protection - https://documentation.commvault.com/11.40/expert/ransomware_protection_01.html

## Why Lumen?

With the rapidly changing marketplace, you need a partner to help you transform your organization. Lumen is committed to being a trusted partner to help you realize your security needs and priorities so you can focus on growing your business. Reach out today for a free consultation with the Lumen team.