WHITEPAPER

Secure your data, your recovery and your mission

Data protection software needs to share your mission with proven technology, constant vigilance, updates and guidance.

The cyber threat landscape including ransomware has transitioned to a case of when, not if. In order to ensure you can recover your data and not pay the ransom, you need to trust that your data protection vendor shares your level of vigilance. The right solution requires the best technology, the right people, and processes.

At Commvault, much like a CISO, we operate in a constant state of alertness. We are highly responsive to our customers with the products and services we deliver. Commvault has earned a strong reputation as a dedicated and trusted partner; and **has many customers** who will testify to our responsiveness, innovation, and rapid execution in the high pressure, high impact world of a ransomware attack.

Recovery readiness is a key strategic goal for Commvault. Organization require tools to constantly measure their recovery readiness state so they can expose and remediate problems, validate the recoverability of their data and business applications through automated testing, and continually harden their environment to improve their security and reduce their risk profile.

When thinking about threats to the backup data itself, a common approach is to create data copies with a level of isolation, such as an air gap and immutable copies. Commvault agrees with this approach and has a proven history of providing immutable protection, geographic segregation, and air gap capabilities for the on-premises and cloud storage targets we write to, with the choice of using our appliances or your own storage.

Providing data security while allowing for software to be administered effectively can be a challenge for many. Commvault leads the way, securing data and providing protection for concerns such as privacy, theft, corruption and deletion whether by internal, external threats, either malicious or mis-guided.

The AAA Security Framework for Authentication, Authorization and Accounting is a useful way to assess any software solution and is well known within the security community. Commvault uses it to assess, improve, and showcase its capabilities and adherence to industry regulations and best practices. Commvault provides customers the range of capability they require to establish the user identity, provide access with the least required privilege, safe from user error, with a full granular logging and auditing capability. These controls work via all access types, UI, Command Line or API.

Threats are not always externally sourced, the result of compromised credentials or deliberate acts of rogue actors. To combat internal threats, Commvault has implemented a control mechanism to ensure administrative tasks that could threaten data is approved by two or more administrators from a selected privilege group, applying the four-eyes principle to data security.

A recovery solution is only viable if it is resilient across various failure modes. One scenario may be a data recovery event to revert to the prior instances before the corruption, while another may require a complete recovery of the business applications at a new location. Designing recoverability across environments and providing simplified automation to test and validate each scenario helps build the recovery readiness state. Knowing the mission critical data and applications were already validated for recovery by an automated process, completes the needed level of security, compliance, and comfort.

With the critical aspects of a data protection architecture delivered, Commvault has developed ways to supplement security software with monitoring and detection capabilities. Machine Learning (ML) algorithms detect anomalies in file activity, and the implementation of honey pot files provide early warning about potential ransomware attacks. These tools provide additional early warning capabilities without increasing cost or management effort.

The chart below summarizes key concerns and how they can be addressed with Commvault.

Threat	Strategy
Backup data volumes are targeted for destruction by ransomware	Secure backup volumes, making them immutable to any administrator account. Modifications can only be made for verified Commvault processes. Additional security is provided by digitally signing the Commvault binaries and requiring certificate authentication between Commvault components.
Passwords, policies and data are targeted by threat actor	Secure authentication with a choice of multi-factor controls, with granular role-based access lock-down to capabilities and systems within their scope. Data is encrypted and has external key management support. Four-eyes principle workflow protects against potentially destructive administration tasks.
Rogue administrator access to backup data	In addition to the four-eyes principle and being limited by granular role-based lockdown, every access and change will be logged, with any critical changes alerted to a system of choice. The privacy lock option protects sensitive and private data by ensuring it cannot be seen or restored by an administrator.
Accidental deletion by administrator	All controls that keep out a threat actor and rogue administrator will also apply and remove the potential for mistakes by an administrator.
Comply with security implications and regulations for log file management	Organizations must establish policies to ensure compliance with laws and regulations they are subject to, typically preserving logs for extended periods. Log files from servers, endpoints, and network devices can be preserved independently from the regular backup retention policy

This discussion guide offers a collection of key security best-practices employed across our global customer base. These practices have been adapted through a process of continuous improvement and innovation to provide data security and recovery readiness as data volume continually increases and the data landscape expands beyond open storage systems and into the cloud.

Cyber security recommendations

Develop a plan with a multi-layer strategy

Commvault knows when it comes to data security, it is paramount to have a multi-layer security strategy and to keep in mind that recovery readiness is key. Ensuring your mission-critical data can withstand a targeted attack designed to destroy primary and backup copies of your data, and that complexity has been removed with a recovery that is as automated and orchestrated as possible.

Any plan you develop must work broadly and deeply enough to reach valuable data wherever it resides. Your plan should extend beyond central servers and organization-wide applications to cover laptops, files in a wide range of media formats, and function-specific applications.

Backup target immutability

Ensuring backup copies are immutable and cannot be altered or encrypted by ransomware is critical. It must be cost-effective for all data within your environment and can be turned on for the storage of your choice; on premises, in the cloud, or Commvault Hyperscale™ solutions. It is a clear choice that has greater benefit than air gap only solutions without additional complexity and cost.

The backup store immutability feature employs proven methods to restrict write and delete operations, which prevent bad actors or malware from modifying files in the protected path. The reliability and effectiveness of this capability was recently tested by Commvault with the RIPlace bypass technique, which was able to breach several security endpoint solutions that share similarity in the reported capability. Commvault, however, was proven to provide secure protection from the RIPlace bypass method.

With a multi-layer strategy recommendation, some customers choose to implement additional strategies for greater protection. For specific data, organizations may make write once, read many (WORM) copies on premises or in the cloud as well as implement air gap isolation strategies. These are simple to implement in Commvault through policies, including network segmentation, encrypted network topologies, gateways, and firewalls. Also, it supports automation to orchestrate network and server disconnection.

Foundational hardening

The principal of foundational hardening is important for all software environments. The core components of the Commvault solution rely on the underlying operating system, database, application and web server technology, therefore all security vulnerabilities within the underlying technologies need to be closed so that they do not become entry points for cyber threats.

- **Apply hardening recommendations** – Automatic enablement of hardening recommendations based on NIST Standards.
- **Binary signing including 3rd party** – A Commvault framework to digitally sign binaries and ensure they have not been modified by a malicious actor. Any 3rd party libraries are updated regularly and in response to reported vulnerabilities.
- **CIS Level 1 hardening** – Commvault software has been tested and confirmed as capable of CIS Level 1 hardening.

Application hardening with authentication, authorization and accounting

Authentication, authorization, and accounting (AAA) is a Security Framework for intelligently controlling access to computer resources, enforcing policies, and auditing usage. These combined processes are considered important for effective network management and security. Commvault delivers a secure, robust, and complete set of features in each of these three areas.

AAA Security framework for controlling access

Authentication	Authorization	Accounting
Proving and granting access	Control what level of access is required	Tracking and auditing access and capabilities

Authentication

The process of authentication is based on each user having a unique set of criteria for gaining access. Commvault enables multi-factor authentication methods to make it highly unlikely that a valid user account can be impersonated.

- **Secure LDAP** – supports Activate Director as well as generic LDAP identity servers.
- **External identity providers** – are supported using secure protocols such as OAUTH and SAML.
- **Two factor authentication** – with logins using authenticator application.
- **Certification authentication** – for Commvault infrastructure to protect against spoofing.
- **Credential manager** – a secure container for account credentials for shared resources in the environment.

Authorization

Following authentication, authorization must be granted to the user to allow certain tasks. Commvault provides a rich and complete set of capabilities:

- **Role-based security** – manage capabilities by assigned roles to users and groups, including support for multi-tenant environments, and limited in function and scope of servers, applications and data sets that can be accessed and managed.
- **Authorization approval workflow** – supporting the four-eyes principle for administrative tasks such as deleting data sets, clients, restores, targets, jobs and policies.
- **Passkey and privacy lock** – supporting the principle that administrators manage the data but should not be able to view or restore the data they do not own. Used together, only the owner of the dataset, at the individual, department, or company level can restore data with the required passkey.
- **Data encryption** – FIPS certified encryption, 6+ ciphers including AES 256, to encrypt data from the first touch and throughout the full data management lifecycle.
- **Encryption key management** – built in Key Management System (KMS) or use external including Key Management Interoperability Protocol (KMIP), including AWS KMS, Azure Key Vault and passphrase KMS support.
- **Network encryption** – HTTPS encapsulation, TLS 1.2, Proxy/Gateway support.
- **Third party port mapping (TPPM)** – Tunnel third party communications through Commvault network ports, dramatically reducing complexity of implementation in a secure environment.
- **WORM copy support** – WORM policies, when applied to data copies, enforce the removal and deletion rights, and impose a fixed data retention.
- **Cloud WORM service support** – Bucket and object level storage supported for WORM configurations.

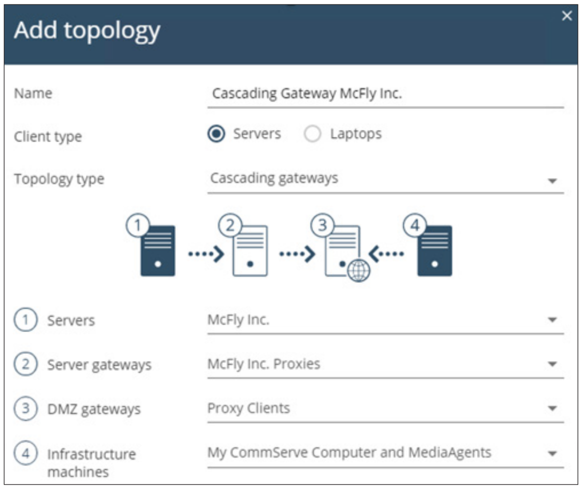
Accounting

From the security aspect, accounting should focus on complete logging of user access and actions, ensuring observability through specific reports and alerting for certain conditions. Answering important questions such as:

- **Who has too much access?** The volume of access via UI, Command line, and API is tracked and reported on.
- **What is being done with the access?** A full audit trail of user access and action.
- **What access can be removed?** The system will report users who have not accessed in a specific time period for possible removal.
- **What data is not encrypted?** A report confirming encryption status which is a typical recommendation

Data isolation and air gap

The "Air Gap" control concept is a data protection architecture that limits exposure to an attack and allows for restoration of data to a point in time before the attack began. Commvault can effectively address the risk of encrypted data being replicated in the data backup architecture with; immutable backup targets, periodically applying a WORM security policy to data copies, and removing deletion capability until the retention policy is met. Commvault has improved upon physical access controls which are available to every solution, enhanced security, simplified and reduced cost.


Add topology

Name	Cascading Gateway McFly Inc.
Client type	● Servers ○ Laptops
Topology type	Cascading gateways
1 Servers	McFly Inc.
2 Server gateways	McFly Inc. Proxies
3 DMZ gateways	Proxy Clients
4 Infrastructure machines	My CommServe Computer and MediaAgents

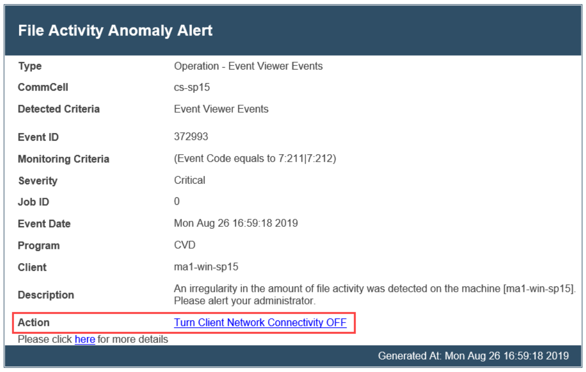
- **Air gap orchestration** – automation workflows to orchestrate network and server disconnection.
- **Network segmentation** – use data interface policies to automatically route backups to secondary networks dedicated to data transfer.
- **Encrypted network topologies** – network policies to isolate communications, such as the isolated environment initiating the tunnel out, or making the isolated environment only accessible via a gateway.

Greater ransomware protection with data isolation and air gap technologies. Read >

Monitoring and detection

It is recommended by many experts to have a layered anti-malware and ransomware strategy. Commvault has built these capabilities to existing security software and policies for greater benefits and without incremental management overhead.

- **Monitor file system activity** – utilizes historic data and a machine learning algorithm to detect statistically variant file system behavior.
- **Monitor honey pot files** – hidden files that are common and attractive to ransomware attacks are monitored for signature changes.
- **Certificate authentication lockdown** – when certification lockdown is enabled; clients cannot be added to the data protection architecture without additional administrative steps and privileges.
- **Actionable alerting** – automatically act and alert for awareness or embed a recommended action workflow into the alert for administrator execution.


File Activity Anomaly Alert

Type	Operation - Event Viewer Events
CommCell	cs-sp15
Detected Criteria	Event Viewer Events
Event ID	372993
Monitoring Criteria	(Event Code equals to 7:211|7:212)
Severity	Critical
Job ID	0
Event Date	Mon Aug 26 16:59:18 2019
Program	CVD
Client	ma1-win-sp15
Description	An irregularity in the amount of file activity was detected on the machine [ma1-win-sp15]. Please alert your administrator.
Action	Turn Client Network Connectivity OFF

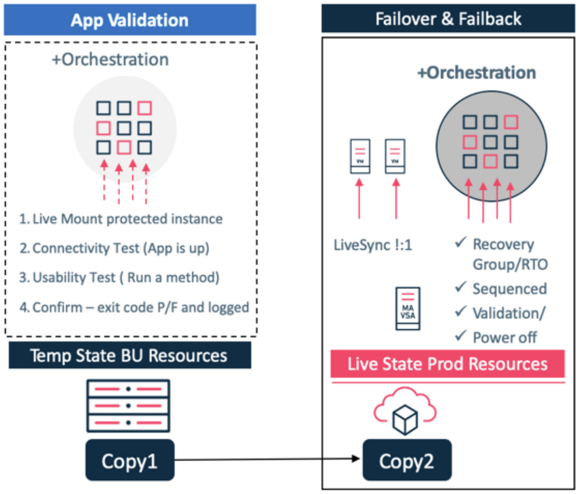
Please click here for more details

Generated At: Mon Aug 26 16:59:18 2019

Simplifying recovery readiness

True peace of mind comes from having a comprehensive, continuous recovery readiness plan. The last thing you want to do when contending with a high-pressure attack is to stop to figure out which data needs to be recovered in what order. Recovery readiness means that recovery stages are documented, automated, and predictable. Commvault capabilities to support recovery readiness include:

- **Highly available data protection architecture** – Commvault architecture can be protected using Live Sync replication of the database to one or more standby nodes. The database can be protected natively in any public cloud and is a free protection service offered by Commvault.
- **Recovery orchestration** – the Commvault control plane manages, operates, and maintains records for all managed data. It can be fully recovered with a single click, which can be tested ahead of time by a fully orchestrated test failover to provide restore validation without disrupting production.
- **Data integrity validation** – Commvault provides multiple methods of data integrity validation. Data signatures are used to confirm the integrity of any data transferred, received, and written to storage media. In addition, automated tasks for regularly validating the data on storage are provided.
- **Application recoverability validation** – a fully orchestrated application recovery validation task can provide access directly to the data protection copy from the backup infrastructure, start the application, connect and run a test method to validate both the data and application recoverability.
- **Easily identify data to recover** – data can be searched across any time period and options applied include show/hide deleted items, latest, specific point-in-time, and time range. These options provide a simple way to select the right data to recover.



Industry certifications

The following certifications of compliance are held (or pending where indicated) with the Commvault data protection solution:

- **FIPS 140-2 Certified:** Cryptographic Module Validation Program
- **NIST 800-53 CP9 Compliant:** NIST Special Publication 800-53 (Rev. 4) CP-9
- **NIST 800-53 CP10 Compliant:** NIST Special Publication 800-53 (Rev. 4) CP-10
- **VPAT 2.0 - WCAG and 508 Compliant:** VPAT 2.0 Statement
- **Common Criteria Certification:** Pending
- STIG (Security Technical Implementation Guide) Certification for HyperScale Storage Pool.
  - STIG Certification - Scan Results at **https://documentation.commvault.com ›**

The risks and rewards of defending a ransomware attack are significant to your organization and career. Done poorly, it results in lost data, revenue, and credibility. Done correctly, it can lead to operations being successfully restored in a timely manner, and greater recognition for a job well done. The choice is yours, the choice is simple, be ready!

Learn more about using data protection as your defense against ransomware. Visit **commvault.com/ransomware** ›