



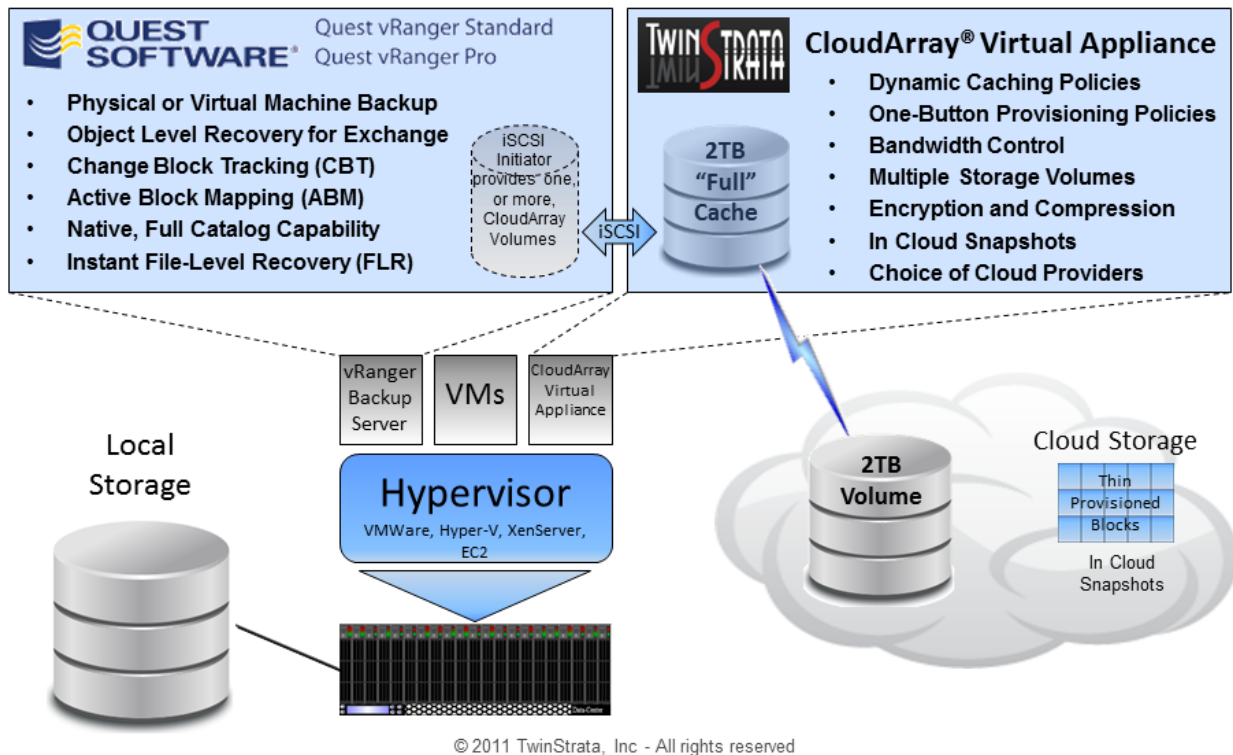
## Quest vRanger & TwinStrata CloudArray - Secure, Offsite Data Protection in the Cloud

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## Solution Overview

Working in concert, Quest vRanger (or vRanger Pro) and TwinStrata CloudArray® provide a powerful solution for system backups with automatic offsite data retention.

- Features of the combined solution include
- Local read/write performance and access
- Multiple copies - a single copy of the data is kept locally while another copy is kept in the cloud
- Deduplication technology – vRanger’s backup of only changed blocks minimizes bandwidth utilization
- In-Cloud snapshots provide point-in-time recovery points



**Diagram 1 – Conceptual Overview of an integrated vRanger/CloudArray solution.**

**NOTE:** Although a virtual environment is depicted above, the architecture can be constructed using virtual or physical machines in any combination.

## Quest vRanger Pro - Image-Based Backup, Replication and Recovery

It's no small feat to protect virtual environments with traditional backup and replication software. These agent-dependent solutions are costly and difficult to manage -- sapping virtual host CPU and I/O resources. And it seems like data protection jobs take forever.

There's a compelling alternative in Quest vRanger Pro. This unrivaled solution can be deployed seamlessly into virtual environments -- and it's simple, fast and scalable for protecting all types of data. In addition, vRanger Pro provides a single console for managing all data-protection jobs, including backup, replication and recovery. These capabilities are all built on Quest's Data Protection Platform (DPP) — the only architecture on the market that's optimized for image handling.

The DPP architecture provides common image-handling modules, shared among all protection jobs. These modules are deployed in your virtual environment once, consuming fewer resources. They also allow Quest to efficiently develop technology innovations that will deliver benefits for all future protection jobs.

### Features and Benefits

- **Active Block Mapping (ABM) (Patent-Pending)** — Eliminates inactive and white space blocks from protected Windows guest images to speed backup, replication and recovery jobs—and to reduce network and storage requirements.
- **Change Block Tracking (CBT)** — Eliminates the time required to scan for changed blocks in guest images on vSphere hypervisor systems, to speed backup and replication jobs.
- **Instant File-Level Recovery (FLR) for Windows and Linux** — Enables you to quickly restore a single file from a backup image in the repository through a one-step process.
- **Native, Full Catalog Capability (Patent-Pending)** — Provides native, full catalog of every image in the backup repository, uniquely designed to take advantage of virtual systems and prevent a longer backup process.
- **One-Step Catalog Recovery** — Includes advanced search and right-click recovery selection directly from the management console to speed restore of VMs, savepoints and hosts.
- **Custom Backup Groups** — Provides greater flexibility in defining backup jobs to protect new VMs automatically as they are created, reducing configuration time and administrative burdens.

## CloudArray – Connects vRanger to Cloud Storage

Whether you are looking to expand data storage capacity, store and protect data offsite or build a disaster recovery and business continuity strategy, CloudArray can extend your storage infrastructure in minutes, without the capital and operational expenses associated with traditional storage solutions. CloudArray®, TwinStrata's breakthrough Cloud storage appliance, is an enterprise-class data storage and data protection solution that enables organizations to instantly and securely expand their storage capacity using one or more cloud storage providers. CloudArray seamlessly integrates into existing on-premise storage environments and delivers cost-effective storage services optimized for performance, multi-site availability and elastic unlimited storage.

Typical use cases for CloudArray include online remote storage for backups, archives, and other business data, including primary storage. CloudArray caches data locally to provide local performance. Flexible and easily configured dynamic caching policies allow different cache configurations for different volumes, based on application requirements.

The CloudArray appliance is available in two deployment models; as a virtual appliance supporting all the market-leading hypervisors (VMware ESX/ESXi, Citrix XenServer, Microsoft Hyper-V and Amazon EC2) and as a physical appliance for customers that prefer dedicated purpose-built hardware. Both software and hardware configurations offer high-availability options to meet the needs of enterprise environments.

### Cloud Storage Volumes

CloudArray volumes are thin-provisioned and easily configured using one-button policies. Volumes are expandable to meet future increased capacity needs. Cloud storage is Storage as a Service and is delivered as a utility, pay-as-you-go model. You only pay for the storage you use.

CloudArray cache provides local performance for volume access and each volume is automatically replicated to Cloud storage for high availability. In the event of a disruption or outage, data can be easily accessed using a variety of methods, either on-site, offsite, or in the cloud.

CloudArray volumes can be individually configured, based on one-click policies, with cache selections ranging from partially cached to fully cached, depending on application needs. Cache is easy to resize as application needs change. Cache can consist of local disk, solid-state, network-attached or SAN storage. For applications requiring the highest performance, a fully cached copy can be kept locally with a replicated copy in the cloud.

CloudArray provides in-cloud data snapshot services for point-in-time copies for rollback, test and development, data analytics and other applications. In-cloud snapshots are space, bandwidth and performance efficient.

### Data Availability and Security

For increased data protection and high data availability, CloudArray offers data copy policies that replicate data across local storage and a variety of third party storage cloud providers. CloudArray also enables replication or migration of data volumes across cloud service providers. CloudArray optionally compresses, deduplicates and encrypts data blocks prior to transporting it to public cloud storage to ensure efficiency, data security and privacy. CloudArray leverages the Advanced Encryption Standard (AES) adopted by the U.S. government, also used to secure top secret information.

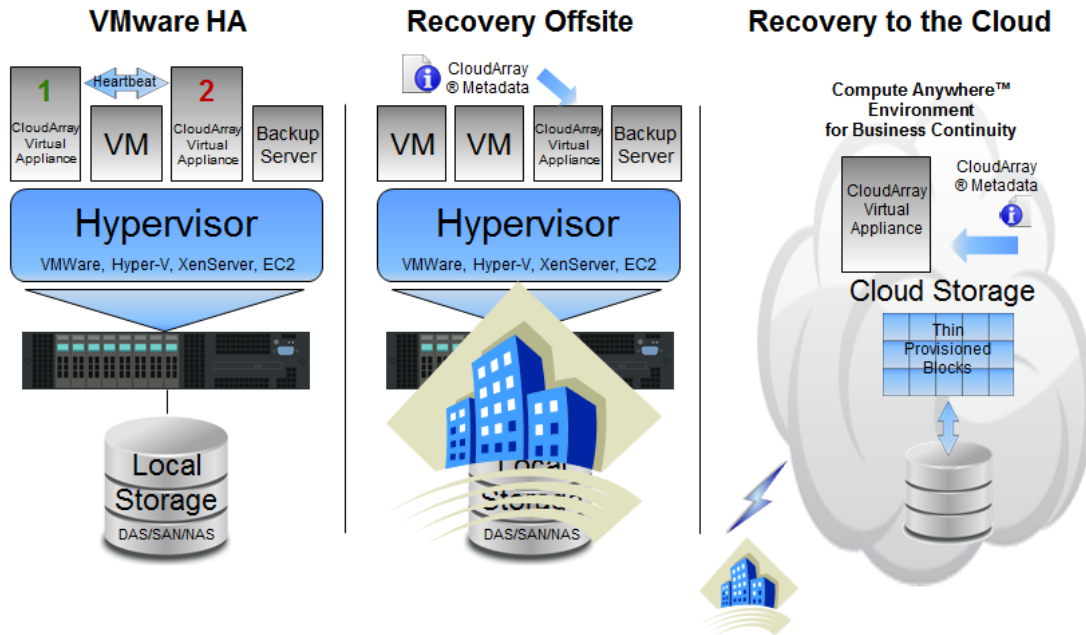
## Implementation Details

It is assumed that the vRanger environment is already running and backing up to a hard drive. It is further assumed that a secondary copy of the data is kept on tape (or some other medium) for retention offsite. This is typically called a D2D2T environment. Using CloudArray, we replace the tape and use Cloud storage providing a D2D2C solution.

To create an automatic, continuous backup to the cloud, follow the steps below.

1. Install and configure CloudArray
  - a. Establish a Cloud Storage account with one or more cloud storage providers
  - b. Configure a Cloud Volume equal in size to the current vRanger backup target. Typically this will be somewhat larger than a compressed and deduplicated full volume backup.
  - c. Create local CloudArray Cache equal in size to the Cloud Volume and mark it as a “full cache” (this means the cache is never flushed or overwritten ensuring you’ll always have a local copy and, therefore, local R/W performance).
2. Replace the internal vRanger backup target hard drive with the volume presented by CloudArray.
  - a. On the vRanger Backup Server, start an iSCSI initiator.
  - b. Connect to the CloudArray Cloud volume.
  - c. Initialize the volume.
  - d. Perform a full volume backup to the CloudArray Volume.
  - e. Make this volume the target for all further backups.
3. Data will automatically be sent to cloud storage. No further changes are necessary.

## Disaster Recovery



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### High Availability

High Availability, including VMware HA, FT and vMotion, are functions within the VMware vSphere environment to ensure the continued operation of Virtual Machines, such as the CloudArray appliance. In order to use these capabilities, you must be running more than one VMware host. vMotion allows you to move the CloudArray Virtual Appliance from one host to another so that maintenance can be performed on the original host. VMware HA (High Availability) allows for the monitoring and rapid restart of a machine in the event of a failure. VMware FT (Fault Tolerance) provides for a zero downtime environment with active machine failover.

The CloudArray Virtual Appliance has been fully tested using all of these advanced VMware vSphere capabilities.

Should you choose to deploy a physical appliance, the CloudArray Model 3 is a highly available physical appliance with two compute nodes and a storage array configured in an active-active configuration with full fail-over capabilities, providing a robust, highly available platform.

### Site Disaster Recovery

In the event your primary site is destroyed, you would need to begin recovery procedures. Thus, you would need an alternate site with connectivity or perhaps a Hosted or Cloud environment.

Should the unthinkable happen, you can easily recreate the CloudArray appliance to gain access to all of the data that has been stored in the Cloud.

### Offsite Recovery

In the event your primary site is destroyed, you would need to begin recovery procedures. Thus, you would need an alternate site with connectivity and a suitable host machine. Once these are available, it's a simple matter to re-install VMware and then download and install the CloudArray virtual appliance. In VMware, the appliance is powered on but instead of configuring it, you'll "restore" your previous configuration from a small meta-data file stored on the CloudArray portal which is protected by your userid and password. At this point, you'll have full access to all of the data you've stored in the cloud, although it will be subject to bandwidth restrictions. Step by step instructions for recovering the CloudArray appliance can be found in the "Backup and Restore Guide" on the CloudArray portal.

At this point, you can recreate the backup server and then restore the production machines.

### In Cloud Recovery

Another option is to recover to the Cloud or to a hosted location. This has the advantage of avoiding month to month charges prior to the disaster and, therefore, prior to use. It would be necessary to have the appropriate accounts and tested procedures in place prior to the disaster. However, this is a very viable solution for machines that have already been virtualized and, thus, are fairly portable.

The basic steps are the same as with "offsite recovery". However, instead of finding a suitable environment, you would turn to your preferred Cloud or Hosted provider. You would re-instantiate CloudArray as before and reapply your configuration data. At this point, you would again have connectivity. Given that iSCSI is a routable protocol, you could attach a local server to the CloudArray Virtual Appliance via iSCSI but it would be subject to performance limitations imposed by bandwidth.

A preferred approach might be to re-instantiate the production level servers in the Cloud/Hosted environment. Next, you'd recreate or re-instantiate your backup server and then you'd use that to re-instantiate your production level machines. Performance would be good during this process due to the locally available bandwidth to the Cloud. At the conclusion of this exercise, you'd have a fully functioning "office in a box" in the Cloud or Hosted environment. The sole remaining challenge would be using these remote resources as they might be slow. Alternatively, you could use Terminal Server, Remote Desktop Connection, or any of a number of other solutions that would address this challenge.

The net result is that you have the ability to quickly recover to an offsite location with no recurring costs until the resources are actually needed. If and when they are needed, your temporary environment becomes your primary environment until new equipment can be acquired and a suitable location prepared. Once that has been completed, your existing Cloud/Hosted environment can be backed up and restored to the "new" production site environment.

### **Try CloudArray for Free**

For more information about TwinStrata CloudArray, or to download a free copy of CloudArray, please visit [www.twinstrata.com](http://www.twinstrata.com).