

# Zettaset Enables a Leading Cloud-based Healthcare Ecosystem Data Analysis Platform to Protect Petabyte-Scale PHI Data Running on Pivotal Greenplum Database

Zettaset XCrypt™ Data Encryption Platform delivers the performance, scalability and ease of use required to efficiently encrypt massive amounts of data in a distributed computing environment.



## Customer Profile

The customer is a leading technology company providing cloud-based platforms empowering a data-driven transformation from volume-based to value-based models throughout the healthcare industry. The company's platform interconnects with the healthcare ecosystem on massive scale, aggregating and analyzing data in petabyte volumes to arrive at sophisticated insights in real-time, drive impact wherever it is analytically identified best to intervene, and intuitively visualize data and information to inform business strategy and execution.

Leveraging its platform, the customer enables the assessment and improvement of clinical and quality outcomes and financial performance across the healthcare ecosystem. From health plans and provider organizations, to pharmaceutical, medical device, and diagnostics companies, value is delivered through the effective progression of "Turning Data into Insight, and Insight into Action." Providing technology that supports nearly 500 healthcare organizations, the customer's platforms contain data pertaining to more than 943,000 physicians, 499,000 clinical facilities, 252 million Americans, and 39 billion medical events.

To manage, analyze, and store such massive amounts of data, the customer relies on Pivotal Greenplum, the a fully-featured, multi-cloud, massively parallel processing (MPP) data platform based on the Greenplum Database. Powered by the world's most advanced cost-based query optimizer, Pivotal Greenplum delivers unmatched analytical query performance on massive volumes of data.

## Overview

### Business Challenge

- Maintain highest levels of compliance with HIPAA regulatory requirements
- Ensure that protected health information (PHI) is only accessible by authorized parties
- Deploy a proven data protection solution that does not impact application performance, and can easily scale to petabyte ranges

### Zettaset Solution

- The XCrypt Data Encryption Platform is an easy-to-deploy, all-in-one solution that includes encryption software as well as virtual key manager and virtual HSM (hardware security module)
- XCrypt Full Disk is designed for high-volume, scale-out data environments that require near-zero latency
- XCrypt leverages automation to eliminate error-prone manual processes, improve operation efficiencies, and reduce overall costs

### Business Value

- Automation of critical processes like installation, key management, and encryption enablement/disablement reduces operational complexity, IT resource requirements and TCO
- The software-defined approach of the Zettaset solution presents no limits to scalability, eliminates the need for proprietary appliances, and simplifies deployment in cloud environments
- XCrypt's exceptional performance means that critical delay-sensitive applications are not impacted by the encryption process

## Business Challenge

The customer handles millions of consumer and business healthcare records, which are classified as protected health information (PHI). Under US law, PHI is any information about health status, provision of health care, or payment for health care that is created or collected and can be linked to a specific individual and includes any part of a patient's medical record or payment history. Under the US Health Insurance Portability and Accountability Act (HIPAA), PHI linked to an individual falls under strict privacy and security regulations and must be treated with special care and carefully protected from unauthorized access.

To comply with HIPAA privacy requirements for the petabyte volumes of PHI in its possession, the customer had been relying on a legacy encryption solution from an established vendor. Unfortunately, the solution recommended by the vendor environment was a file-level encryption product. While intended to support the customer's long-term data protection needs, it became clear on many levels that the legacy product was problematic and did not have the performance, scalability, and automated capabilities to meet the exacting demands of a petabyte-scale data environment.

- The extra granularity of file-level encryption added a few milliseconds of overhead to each encryption transaction, but when multiplied by 1 million records, added considerable latency to business-critical applications.
- Lack of automation meant that the security team administering key management servers had to manually create keys for each of the files, a tedious process which did not scale well when numbers reached into the thousands.
- The file-level encryption software was tied to a specific vendor's hard drive. When a hard drive that failed was replaced with a different vendor's drive, it broke the encrypted cluster.
- Disabling the encryption was even more complex when the security team had completed their tests and returned the clusters back to business.

As a result, the system performance and user experience degraded to a point where the customer and Greenplum began to seek an encryption solution that would eliminate these issues and restore digital business operations to optimum levels of performance.

From a technical perspective, the challenge for the customer was to find a HIPAA-compliant data-at-rest encryption solution with these characteristics:

- Optimized for petabyte-scale volumes of data
- Automated access control through a policy server
- Created no negative impact on performance of the Pivotal Greenplum database platform
- Leveraged use of the existing key management infrastructure

## Zettaset Solution

Following weeks of product evaluation and in consultation with Pivotal Greenplum, the customer selected Zettaset as the vendor of choice. While the Zettaset solution appears to be deceptively simple, the all-software approach and intense focus on performance, scalability and ease of deployment in massive, petabyte-scale distributed computing environments has proven to be a powerful and sophisticated combination.

The [Zettaset XCrypt Data Encryption Platform](#) installs and manages all the necessary components to empower IT security teams to encrypt data. Zettaset automates all encryption processes and integrates with any existing key management and HSM (hardware security module) infrastructure, and the [XCrypt Full Disk solution](#) also includes a virtual key manager and virtual HSM which can be deployed if a customer has no existing key management infrastructure.

XCrypt Full Disk is a high-performance, infinitely scalable, full disk encryption solution which is ideal for bulk encryption of stored data and can be applied to both data-at-rest and data-in-motion. Zettaset's all-software approach to encryption simplifies deployment and eliminates the need for proprietary appliances. It also makes all Zettaset encryption solutions, including XCrypt Full Disk, ideal for elastic cloud environments.

XCrypt Full Disk is optimized for superior performance in scale-out distributed computing systems, with near-zero latency: approximately 3% for data- at-rest encryption; 7% for data-in-motion encryption. (Measured using TeraSort MapReduce Benchmark)

*XCrypt Full Disk is optimized for superior performance in scale-out distributed computing systems, with near-zero latency: approximately 3% for data- at-rest encryption; 7% for data-in-motion encryption*

XCrypt Full Disk provides a proven protection for PHI for healthcare-related organizations, as well as proven defense against data breaches in other regulated industries like financial services and retail that manage and store sensitive data. When integrated into a strategic IT security initiative, XCrypt Full Disk can help bring structured and unstructured data stores into compliance with corporate and regulatory data protection initiatives including HIPAA, HITECH, PCI/DSS, and GDPR.

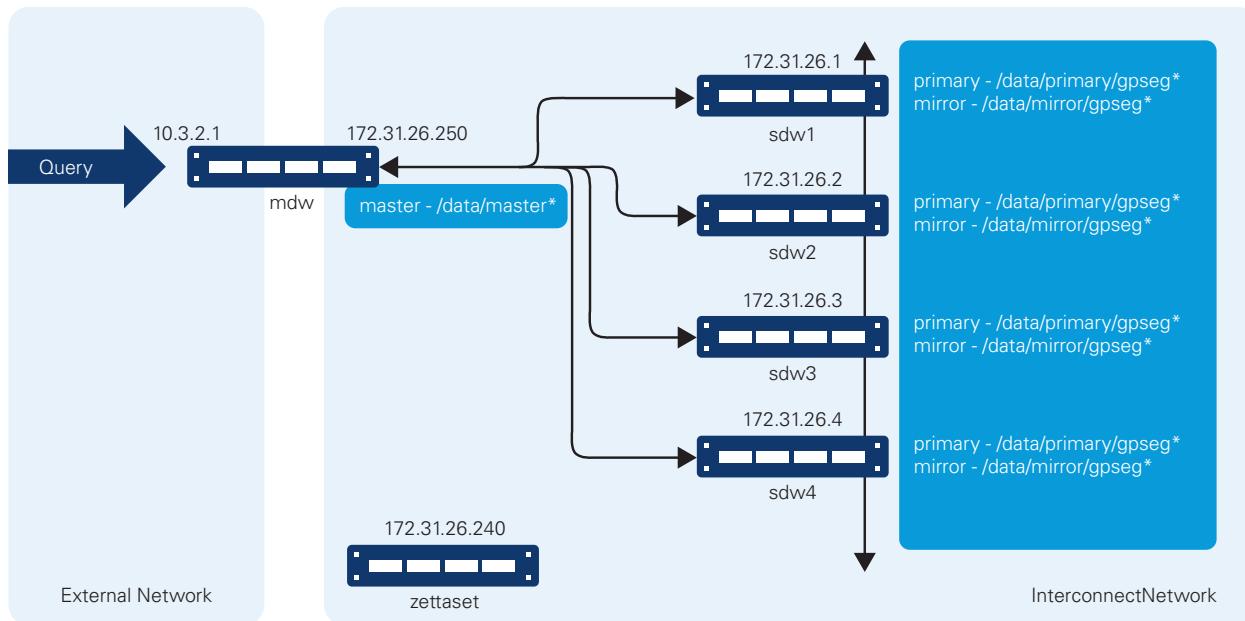


Figure: Pivotal Greenplum cluster with Zettaset XCrypt Full Disk Encryption

## Business Value

When encryption is added to a petabyte-scale, distributed computing architecture, potential performance degradation becomes a major consideration. The near-zero latency associated with the XCrypt Full Disk encryption solution is in stark contrast to legacy encryption products which can cripple delay-sensitive enterprise applications. XCrypt Full Disk combines sizzling performance with unlimited scalability, making it an ideal choice for customers dealing with massive volumes of data.

There are also important standards compliance considerations for key management interoperability protocol (KMIP) and PKCS #11, and XCrypt Full Disk supports both with certified interoperability for several [key management solutions](#) and hardware security modules. This enabled a win-win, as the customer was able to deploy the high-performance, high-scalability XCrypt Data Encryption Platform while leveraging the considerable investment in their existing key management infrastructure.

Another major benefit to the customer was the ease with which they were able to deploy the XCrypt Full Disk solution. Adding encryption can sometimes be a complicated endeavor. However, the automation that drives Zettaset's installation process makes deployment and ongoing administration relatively simple and trouble-free.

Zettaset's pure software approach means that the customer doesn't need to invest in proprietary hardware, saving them from unnecessary capital expense. Having no proprietary hardware requirements simplifies the task of ongoing maintenance, removes a barrier to scalability, and makes it easier for the customer to expand their encrypted data environment on-demand.

With the Zettaset XCrypt Full Disk solution now in place, the customer is in a much stronger position to address strict regulatory compliance requirements mandated by HIPAA for PHI.

## Solution Highlights

Attributes	Benefits
Exceptional Performance	Advanced cryptographic architecture design optimized for high-volume data environments eliminates latency associated with traditional encryption approaches and has no performance impact on the customer's Greenplum analytics applications.
Unlimited Scalability, Cloud and On-Premises	On-demand elasticity matches the dynamic needs of the customer's hybrid data environment. <ul style="list-style-type: none"> <li>• On-premises: EMC DCA, Cisco-UCS, Dell servers</li> <li>• Cloud: AWS EC2, in VM</li> </ul>
Lower TCO	XCrypt all-software solution eliminates requirement for costly proprietary hardware appliances along with the added complexity associated with legacy encryption approaches.
Ease of Use	Bringing up clusters with encryption in a timely fashion is a critical requirement for the customer's production environment. XCrypt Full Disk is easy to use, irrespective of the size / number of nodes in a cluster. XCrypt enabled petabyte-scale production clusters to be up and running in a day.
Interoperability Advantage	The XCrypt Data Encryption Platform includes a software-based Virtual Key Manager and Virtual HSM (hardware security module), which are interoperable with KMIP and PKCS#11 standards respectively. Customers can leverage their existing investments in data security infrastructure.
Simplified Back-up	Typical Greenplum deployments use Data Domain as their backup infrastructure. Unlike file-level encryption approaches, no infrastructure modification is required to back up data encrypted by XCrypt Full Disk.
Plug-and-Play Transparency	XCrypt Full Disk is transparent to higher level file systems, databases and applications. No customization of high-level applications or code modification is required when deploying XCrypt.
Proven Data Protection	XCrypt Full Disk encrypts all the data on drive partitions, ensuring complete protection for organizations that manage and store sensitive data like PHI and PII. XCrypt Full Disk can play a critical role for organizations that must comply with data protection initiatives including HIPAA, HITECH, PCI/DSS, and GDPR.



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