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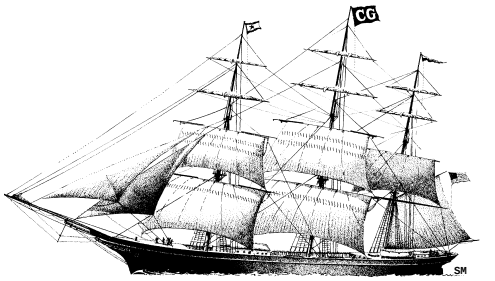

Navigating Information Technology Horizons℠

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Luminex's Mainframe Tape Encryption Solution

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Management Summary

Years ago, when I was supporting large enterprises in the Boston area, one storage administrator (an admitted fan of open systems) had a poster of a dinosaur and a large mainframe on his cubicle wall. The poster stated that mainframes, like dinosaurs, were dead. The poster wasn't very accurate then and it is still inaccurate today. Dinosaurs may be extinct, but mainframes are alive and well, supporting critical applications in many enterprises today. These enterprises run *OS/390*, *z/OS*, or *z/VM* operating systems and have been writing to tape drives since the day they first installed the operating system. Many of these companies send tapes off site for disaster recovery or to share information with other companies.

Many states have passed legislation that specifies that if a tape that contains sensitive information is lost on the way to its destination, the sending company must notify its customers about the wayward tape. However, if the content of the tape is encrypted, then the company is not required to notify customers. For any company that ships information offsite the answer is obvious - all tapes transported offsite should be encrypted to avoid public disclosure and negative publicity. Mainframe tape drive encryption is not available yet, but mainframe enterprises have other solutions that are available now.

IBM announced the *Encryption Facility for z/OS*, which uses host-based software to encrypt mainframe data. It requires one of IBM's newer mainframes, such as the System z9, z900, or z800 servers. However, there are many enterprises that do not own these newer servers. In fact, there are still hundreds of Amdahl servers that continue to run applications today, years after Amdahl stopped manufacturing mainframes.

For customers running older versions of mainframes, or those that choose not to implement Encryption Facility for z/OS, there are other choices available, such as using the encryption features available within backup software. However, mainframe-based encryption can slow down the backup process, which is not an attractive option for mainframe customers that have a short backup window. Current versions of encryption appliances only support open systems connectivity. Luminex has developed products that work with existing encryption appliances to write encrypted data directly to tape without increasing the time it takes to complete the backups.

Luminex is not new to mainframe connectivity. The company was founded in 1994 and has developed numerous products over the years that allow mainframes to connect to open systems tape, disks, and optical storage devices.

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Mainframe Connectivity

Mainframes communicate to storage devices today with two commonly-used protocols – *Enterprise Systems Connection (ESCON)* and *Fiber Connectivity (FICON)*. ESCON is an optical serial connection that replaced the copper-based bus and tag connections available on mainframes in the 1960s and 1970s. FICON was later developed to provide higher speed and extended distance support. Open systems, on the other hand, use Fibre Channel, SCSI, or IP protocols to communicate to their storage devices.

Luminex developed a series of products, named *Virtual|BLUE* to allow mainframes to connect and use open systems devices.[1] For example, *Virtual|BLUE 3990* connects mainframe ESCON channels to Fibre Channel or SCSI JBOD or RAID disks as native mainframe DASD. Another product, *Virtual|BLUE VTS* allows mainframe ESCON channels to connect to Fiber Channel or SCSI open systems disk. Here, the disk emulates tape to provide an inexpensive virtual tape solution for mainframe customers. *Virtual|BLUE 3490* provides mainframe ESCON connectivity to open systems tape, such as LTO and DLT tape drives and ADIC, Overland, Quantum, Sun/STK libraries.

Adding Encryption Support

Luminex has partnered with leading encryption suppliers NeoScale and Decru to provide a mainframe tape encryption solution. The tape encryption appliance can encrypt data to SCSI or Fibre Channel tape. Luminex's newest product, *Channel Gateway 3400*, offers both ESCON and FICON connectivity to open systems devices. Combining the two products allows mainframe applications to write encrypted data directly to open systems tape.

How It Works

1. The mainframe backup application sends data over an ESCON or FICON channel to the Luminex Channel Gateway product.
2. The Luminex Channel gateway translates the backup data to an open systems format.
3. The Luminex Channel Gateway sends the data to the SCSI or Fibre Channel-attached tape encryption appliance.
4. The tape encryption appliance compresses, encrypts, and then writes the data to the open systems tape drive.

These encrypted tapes can be later shipped offsite, if required. Since the data is encrypted, the company is not required to notify customers if the tape is accidentally lost. That should make management sleep better at night.

Restoring Tapes

If the contents of a volume or file is corrupted and must be restored from a backup tape, then the restore procedure is fairly simple:

1. The backup application requests the mount of a specific backup tape.
2. Luminex Channel gateway accepts the mount request and forwards that request to the open systems tape drive.
3. When the tape is mounted, the tape encryption appliance reads the tape label and looks up the encryption key in its catalog. It then decrypts the data and sends it to the Luminex Channel Gateway.
4. The Luminex Channel Gateway converts the data into mainframe format and ships the data back to the application.

Does It Work?

We talked to Luminex's customers to determine if the solution worked as advertised. The answer was simple – it did. Why did they choose this solution? There were several reasons.

- It is available today.
- They did not have to change their backup or restore processes.
- It did not utilize any processor cycles (MIPS).
- The backup process did not slow down.

Conclusion

Enterprises running open systems platforms have appliances available today that provide tape encryption services. However, these appliances do not currently support ESCON or FICON connections.

Luminex's Channel Gateway product allows mainframe enterprises to write encrypted data directly to tape. The good news is that it is available today, it works, and it provides good performance. If you need to support tape encryption today, then it should be on your short list of products to evaluate.

[1] See The Clipper Group Navigator dated September 26, 2004, entitled *The Mainframe Adds to its Versatility and Power - Luminex Provides Open Storage Accessibility*, at http://www.clipper.com/research/TCG2003050.pdf.

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About the Author

Dianne McAdam **is Director of Enterprise Information Assurance for the Clipper Group**. She brings over three decades of experience as a data center director, educator, technical programmer, systems engineer, and manager for industry-leading vendors. Dianne has held the position of senior analyst at Data Mobility Group and at Illuminata. Before that, she was a technical presentation specialist at EMC's Executive Briefing Center. At Hitachi Data Systems, she served as performance and capacity planning systems engineer and as a systems engineering manager. She also worked at StorageTek as a virtual tape and disk specialist; at Sun Microsystems, as an enterprise storage specialist; and at several large corporations as technical services directors. Dianne earned a Bachelor's and Master's degree in mathematics from Hofstra University in New York.

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