

## MAINFRAME FIXED CONTENT DATA

### ELIMINATE BATCH, EXPEDITE ACCESS & NAIL COMPLIANCE

*Bus-Tech's Open Systems disk-based solutions for mainframe fixed content data eliminates the need for archiving data onto tape or optical media, nonetheless preserving WORM capabilities to satisfy compliance regulations. The Bus-Tech solutions, delivered using the MAS or zDASD, individually or in parallel, dramatically increase the amount of data that can be kept, affordably, online. Rather than keeping just 3 month's of data online, it would now be possible to keep 18 months or more.*

Fixed content data is a crucial and inescapable byproduct of transaction processing. Fixed content is information that is in final form. Such data does not, and moreover, for compliance reasons alone, cannot change over time. Customer statements, check images and transaction journals are quintessential examples of fixed content data. Fixed content is the fastest growing segment of mainframe data storage. *Mainframe applications generate new fixed content every nano-second.*

The growth of fixed content data is explosive and continuous. The increases in transaction processing rates coupled with the increasing complexity of each transaction fuels this growth. So does the need for regulatory compliance. **Sarbanes-Oxley Section 404** which kicks-in starting as of November 2004 will affect all mainframe shops and further exacerbate the situation. With Sarbanes-Oxley in place, corporations with valuations greater than \$75 million, will by 2006, end up generating, in total, close to **1.6 exabytes of fixed content data per year!** To put it in current terms, that means 1.6 billion gigabytes of fixed content a year, since 'exa' represents  $2^{60}$ , while a 'tera' is still only  $2^{40}$ .

Bus-Tech provides two proven Open Systems disk-based solutions, that can be used individually or in parallel, to help mainframe shops better handle this ever growing volume of fixed content. The Bus-Tech solutions set out to maximize the amount of fixed content data that can be kept on-line – *economically*. The Bus-Tech solutions obviate the need for archiving fixed content data to tape, and with that the need to run batch jobs to retrieve older data.

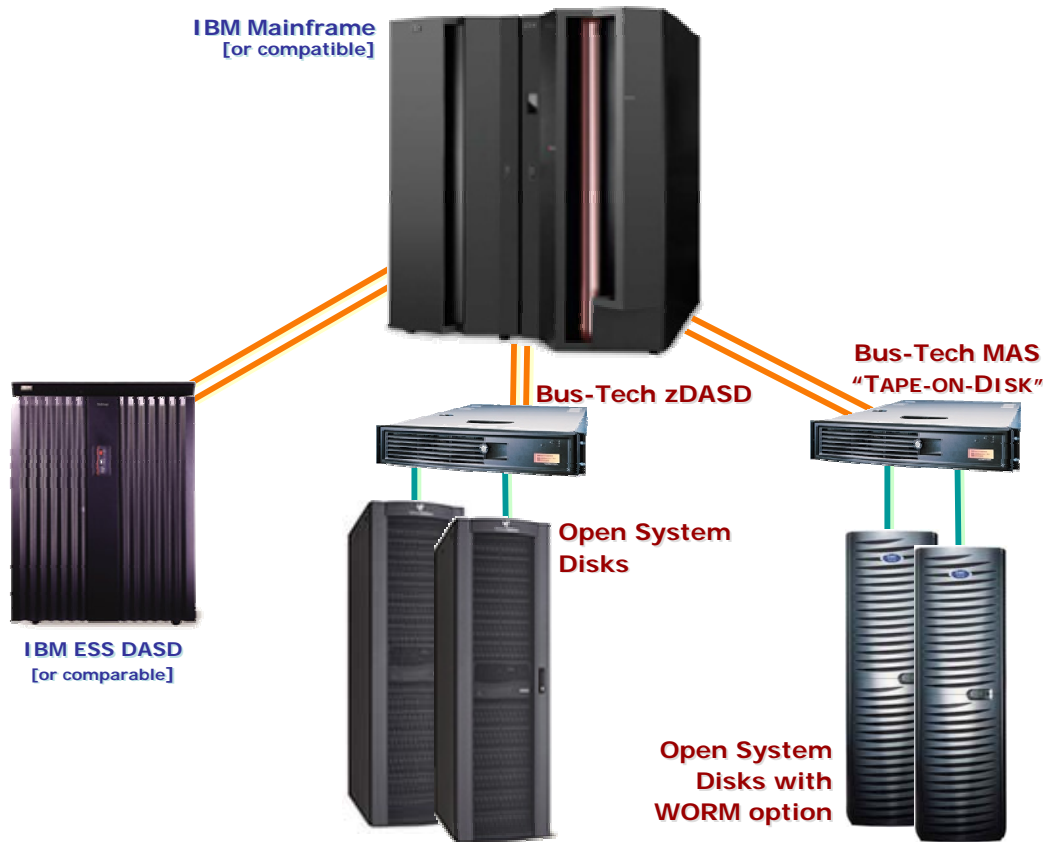
Though eschewing tapes as well as optical media, the 'write once read many times' (WORM) attribute required to meet compliance requirements is, however, assiduously preserved by the Bus-Tech approach. Bus-Tech's solutions are also supported by IBM's **OAM access method** which ensures automated and transparent access to the data, via a 3-tier data storage continuum without the need for any manual operator intervention.

Bus-Tech's mainframe fixed data storage solutions are made possible by the Bus-Tech **Mainframe Appliance for Storage (MAS)** and the Bus-Tech **zDASD**. These Bus-Tech products allow you to totally re-think and reengineer how you handle mainframe fixed content data. With the Bus-Tech approach you will no longer be limited to only being able to store a few months [e.g. 3 months] of fixed content data online – and having to archive the rest. Bus-Tech makes it economically feasible to keep most, if not all, of the necessary fixed content data online.

THE VALUE OF FIXED CONTENT DATA DOES NOT CHANGE OVER TIME. WHAT CHANGES, OVER TIME, IS THE COST OF MAINTAINING THAT DATA. THIS IS WHERE THE BUS-TECH zDASD AND MAS SOLUTIONS OFFER AN UNIQUE VALUE PROPOSITION. THE BUS-TECH SOLUTIONS, BY LEVERAGING RELATIVELY INEXPENSIVE OPEN SYSTEMS DISKS, REDEFINES THE COST CHARACTERISTICS OF PERMANENTLY STORING LARGE VOLUMES OF FIXED CONTENT ONLINE -- IN WORM MODE WHERE NECESSARY. IT IS SIMPLE AS THAT.

*WITH THE BUS-TECH APPROACH YOU GET TO KEEP YOUR CAKE AND EAT IT TOO.*

# Bus-Tech Mainframe Fixed Content Data Management



Continuum of online disk storage for mainframe fixed content data with decreasing cost points

MAINFRAME FIXED CONTENT DATA SPECTRUM		
Current [< 3 months]	Intermediate Term [3 to 24 months]	Long Term/"Online Archived" [> 24 months]
Mainframe DASD	<b>BUS-TECH SOLUTION SET</b>	
Decreasing cost per Terabyte stored → → → → →		
Supported by IBM's OAM 3-tier storage hierarchy		
	<b>zDASD with Open Systems Disks</b>	<b>Mainframe Appliance for Storage (MAS) with Open Systems Disks [with WORM]</b>
	DASD Control Unit	'TAPE-ON-DISK' Controller
	Eliminates need for costly mainframe DASD	Eliminates need for optical & tape libraries along with the associated media
	Reduces DASD costs	Archive/Retrieve from disk using tape procedures
		Guaranteed WORM emulation
Minimize the risk of data corruption and data loss. Keep all fixed content online and eliminate the need for batch-based retrievals.		

## PROVEN AND DEMONSTRABLE ADVANTAGES OF THE BUS-TECH APPROACH

- ❖ Maintain more fixed content data online, affordably, so that all queries (whether from customers, in-house 'controllers', auditors or regulators) can be dealt with in real-time rather than via costly offline batch processing procedures.
- ❖ Eliminate the need for tape drives, IBM 3995 optical storage, and the associated media.
- ❖ Retain guaranteed WORM attributes for meeting compliance requirements despite using Open Systems disks for storage.
- ❖ Support for IBM's Object Access Method (OAM) ensures totally automated and transparent data access from Bus-Tech MAS or zDASD solutions per IBM's System Managed Storage (SMS) hierarchy.
- ❖ Tangibly enhance data integrity, reliability, and availability by storing fixed content data on highly resilient Open Systems disks, with built-in error correction and data mirroring capabilities, rather than on tapes or optical disks which are susceptible to media corruption over time.
- ❖ Minimize the need for costly primary mainframe DASD storage [e.g. IBM's Enterprise Storage Server (ESS)] for fixed content data by supplementing the primary storage with relatively inexpensive Open Systems disks.
- ❖ Significantly reduce the complexity of data center operations and at the same time enhance system operator productivity (not to mention morale) by eliminating the need for tape-based data archival and retrieval which rely heavily on operator intervention.
- ❖ Enhance customer satisfaction, customer loyalty and overall corporate competitiveness by offering fast, online access to historic data [e.g. old statements, financial transaction records particularly those related to the cost of stock purchases, check images etc.] rather than only being able to provide such data using offline batch processing.
- ❖ Start reducing tape library costs, in terms of floor space, racks, equipment, cartridges, and personnel by transitioning to Open Systems disk-based storage.
- ❖ Totally eliminate the unacceptably high, and recurring maintenance costs associated with tape drives and IBM 3995 optical drives [which in terms of capacities and speeds are rapidly becoming technical anachronisms].
- ❖ Phase out anachronistic pre-1980 storage technology and instead implement a streamlined, easily extensible disk-based storage hierarchy for fixed content data – that is moreover totally compliant with OAM philosophy.

## AN OVERVIEW OF THE UNDERLYING TECHNOLOGIES

The Bus-Tech zDASD and MAS are highly proven and widely used mainframe storage solutions that are built upon Bus-Tech's acclaimed mainframe connectivity technology. Both products enable Open Systems disks, whether they be Serial Advanced Technology Attachment (SATA) disk arrays, NAS products, SAN solutions, to be used, transparently, as high-availability mainframe storage.

Mainframe attachment, in each case, could be via dual, 2Gbps FICON Express or 17MB/s ESCON channels. This dual channel attach capability ensures extremely high mainframe data transfer rates as well as redundancy for fail-safe, 24/7 operation. In addition, both the zDASD and MAS include redundant, load-sharing 500W power supplies, auto-adjust hot-swappable fans, and mirrored system boot disks to guarantee the highest possible MTBF for 'zero downtime' operation.

Open Systems disks can be attached to the zDASD or MAS using Ultra 320/LVD SCSI, 2Gbps fiber channel or 1000/100/10 Gigabit Ethernet connections. As with the mainframe-side connectivity, dual ports are also available for disk attachment, yet again to ensure maximum throughput as well as redundancy.

### BUS-TECH zDASD

Bus-Tech's zDASD is an Open Systems disks-to-mainframe solution, while the MAS is a Open Systems disks-based 'TAPE-ON-DISK' virtual tape controller for mainframes. zDASD makes Open Systems disks appear to a mainframe as standard 3390 disk drives – albeit, in some instances, running at a slightly slower speed.

zDASD thus provides a new class of mainframe storage specifically tailored for data that only requires 'intermediate level' access/retrieval speeds; i.e. access speeds in the 5 to 15 second range, as opposed to sub-second access. zDASD thus provides an elegant low-cost alternative to high-end, high-cost mainframe DASD subsystems, and a higher-performance, higher-availability alternative to automated tape libraries, older generation RAMAC arrays and in some cases even optical libraries.

Since it does not require operator intervention nor a steady stream of new media [e.g. tape cartridges or optical platters], zDASD also has significantly lower operational costs than tape libraries or optical systems. zDASD, given its use of highly reliable, redundant disk technology, in addition, greatly minimizes the risk of data loss or data corruption due to media errors. All in all, zDASD is an ideal, win-win, "no downside" solution for 'intermediate term' [i.e. 3 to 18 months old] mainframe fixed content data.

zDASD, given that it is not targeted for data archival, is not a WORM category device. Thus, it cannot be used for fixed content data archival that needs to meet compliance regulations. This is not an issue, whatsoever, since the Bus-Tech solution set also includes the MAS.

### BUS-TECH MAS WITH WORM CAPABILITY

The Bus-Tech MAS, however, though still disk-based, does offer guaranteed WORM emulation that totally fulfills all compliance requirements. This WORM capability is realized using EMC's Centera disk storage or NetApp's NearStor disk storage with the SnapLock feature. The MAS WORM feature ensures that data, once archived, cannot be overwritten or changed in anyway. It even preserves all tape labels and tape marks to deliver total integrity and fidelity. With the MAS WORM feature the authenticity of the archived data can never be questioned. Fixed content data that needs to be retained over long periods of time to meet compliance requirements should be archived using a MAS with this WORM feature.

# Bus-Tech Mainframe Fixed Content Data Management

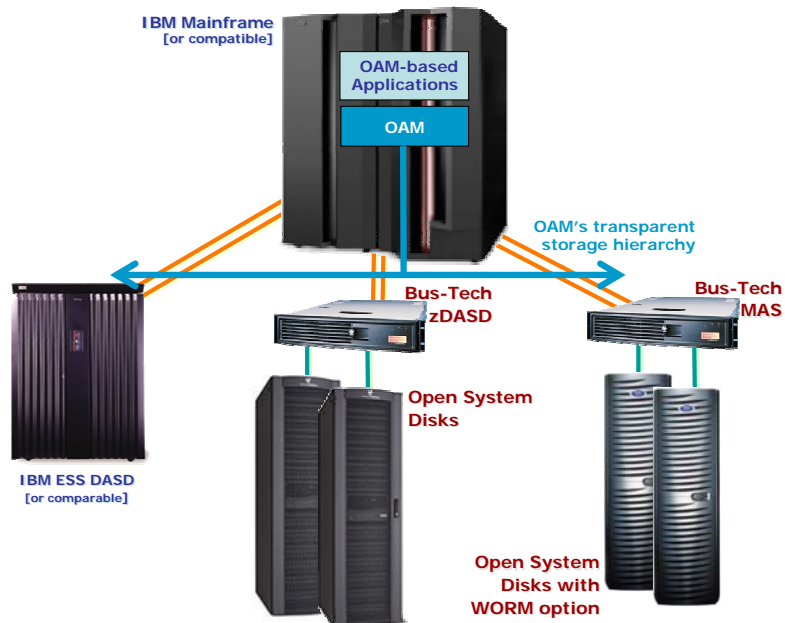
The Bus-Tech MAS is 'TAPE-ON-DISK' virtual tape controller system that can also be used without the WORM feature. The MAS, which was introduced in early 2002, emulates physical tape drives and tape volumes using permanently mounted Open Systems disks. Total software transparency, vis-à-vis the mainframe, is the defining characteristic of this virtual tape system. The 'TAPE-ON-DISK' emulation performed by the MAS is totally transparent to the mainframe, the operating system, and the applications that think that they are still dealing with actual tape units.

The Bus-Tech MAS modernizes tape-based mainframe applications. It eliminates the need for tape cartridges and tape drives. With a MAS, IBM 3480/3490-oriented tape operations are emulated using fast, inexpensive, and permanently mounted disk drives. Rather than reading from and writing to slow, error-prone and labor-intensive tape cartridges, mainframe applications can now use fast, reliable, petabyte range disk stores – *without any changes to the application software*.

## IBM OAM

Both zDASD and MAS are supported by IBM's Object Access Method (OAM). OAM is a strategic IBM access method that provides storage, retrieval, and storage hierarchy management for storage objects [i.e. files]. It includes support for tape volumes contained in system-managed tape libraries. OAM is a standard component of IBM's **System Managed Storage (SMS)** architecture which is used by OS/390 and z/OS.

OAM supports a 3-tier storage hierarchy that can consist of DASD, IBM 3995 optical storage, and IBM 3480/3490 class tape drives. OAM's forte is that permits any of these storage classes to be used, without restriction and totally transparently, as either primary storage or as backup storage. Applications that access data using OAM do not have to be concerned, in anyway, as to the actual location of that vis-à-vis the storage hierarchy in use.



The OAM storage hierarchy is totally transparent to the applications. This data access transparency extends to the Open Systems disks that are attached to the mainframe via the Bus-Tech devices. Consequently, Bus-Tech's mainframe fixed content data management solution set requires no changes, whatsoever, to mainframe applications or operational procedures. It just provides faster, lower cost and more reliable data access and data archiving using the existing data storage hierarchy and infrastructure.

## UTILIZING THE BUS-TECH SOLUTION SET

The Bus-Tech's zDASD and MAS based solution set for optimizing mainframe fixed content data storage management is flexible, extensible, and where applicable, standards-compliant. The two Bus-Tech product offerings can be used separately or in parallel depending on customer requirements. There are no inter-dependencies between the two products.

# Bus-Tech Mainframe Fixed Content Data Management

Thus, a customer could just get a zDASD solution to cost-effectively expand their DASD base and continue to use their existing 3480/3490 tape infrastructure for data archival. Or they could modernize their tape operations using the MAS, without opting to use Open Systems disk storage as DASD via a zDASD. In each instance, a MAS or a zDASD can be effortlessly added at a later date. For maximum benefits and synergy, customers should, however, consider an OAM-based storage hierarchy consisting of both zDASD and MAS.

The matrix below clarifies how best to leverage these two products depending on the exact capabilities being sought when it comes to fixed content data optimization:

	zDASD	MAS
Intermediate term [i.e. 3 to 24 month] data storage	X	
Eliminate the need for batch processing	X	X
Keep fixed content data online	X	X
Affordably store large volumes of data online		X
Eliminate the 3480/3490 tape drives and libraries		X
Eliminate IBM 3995 class optical storage	X	X
Ensure WORM capability for compliance		X
Exploit IBM OAM storage hierarchy support	X	X
Minimize data loss and data corruption	X	X
Reduce the need for expensive primary DASD	X	
Enhance operator productivity		X
Streamline & modernize fixed content data handling	X	X

## PRINCIPLES OF OPERATION

Bus-Tech's solution set for modernizing and optimizing mainframe fixed content data revolves around two simple but solid value propositions. These being:

1. zDASD, by enabling relatively inexpensive Open Systems disks to appear to mainframes as IBM 3390 DASD, reduces the overall cost of mainframe DASD thereby making it cost justifiable to keep larger volumes of fixed content online – without having to resort to archiving the data onto optical media or tape.
2. MAS, by being a proven, high-performance 'TAPE-ON-DISK' solution, obviates the need for low-speed, high-overhead, prone-to-media-corruption tapes and instead allows data to be archived to online disk storage – furthermore, without any changes to archive/retrieval software or procedures.

These two compelling value propositions from Bus-Tech are in turn complemented and enhanced by IBM's OAM and the optional WORM capability of MAS. Together they provide a synergistic solution set that cogently addresses all of the fixed content related issues being faced by mainframe customers.

With zDASD mainframe customers can rationalize and streamline the amount of fixed content that is maintained on 'fast access' DASD. Rather than keeping all of this data on expensive mainframe DASD, customers can now distribute the load across both mainframe DASD and zDASD. Since zDASD attached Open Systems disks have significantly lower cost points than mainframe DASD of comparable capacity, you can now either:

- store the same amount of fixed content data on online DASD at a tangibly lower cost, or
- store more data online on DASD without incurring a significant increase in cost.

## SPREAD YOUR ONLINE FIXED CONTENT DATA ACROSS DASD, zDASD AND MAS

Large mainframe customers, which happens to include one of the largest insurance companies in the U.S., are already exploiting the Bus-Tech zDASD and MAS based solution set extremely successfully and profitably to optimize how they handle their fixed content data. They have, on average, reduced the amount of fixed content they maintain on costly mainframe DASD from 18 months to 3 months. That is close to a 70% reduction. The other 15 months of fixed content is now maintained on zDASD or MAS attached Open Systems disks. The difference in access times is negligible enough not to be an issue let alone a concern.

The cost savings possible with zDASD and MAS is making some reconsider the cut-off point hitherto used for archiving fixed content. Now rather than archiving fixed content after 18 months to 'tape', some are thinking about extending this period significantly by continuing to store the additional data on Open Systems disks. Positive ROI with MAS and zDASD is guaranteed and quick. There are no hidden 'gotchas' with either zDASD or MAS. They are both obvious and logical solutions realized with proven technologies and standards compliant products.

While zDASD permits the data archiving window to be pushed back, the Bus-Tech MAS fundamentally redefines the dynamics of tape-oriented data archiving. MAS, though adhering to all of the conventions and procedures of tape-based archiving, including WORM emulation where necessary, stores archived fixed content data on high-performance, online Open Systems disks. Thus with a MAS there are none of the tape mount or tape access delays inherent in actual tape-based systems. Instead, data archival and subsequent data retrieval is relatively fast – particularly since the MAS includes tape access expediting features such as "Fast Forward" (FF) space file, and relative block offset commands. Thanks to these features the MAS can always locate any specific block within a data file within 100 milliseconds.

## 50,000(+) TAPE CARTRIDGE IMAGES ON ONE ONLINE DISK SUBSYSTEM

The MAS makes it economically feasible to maintain huge quantities of 'archived' fixed content data online – on Open Systems disks. When used with the appropriate Open System disk subsystem [e.g. EMC Celerra or Centera], the MAS permits the volume of data that would require 50,000, or more, IBM 3480/3490 250MB tape cartridges to be stored directly online – with access times typically in the sub 5 second range. The bottom line here is that the fixed content data, though archived in theory, is still online – and can be used to satisfy real-time queries.

OAM now provides the icing on this cake. zDASD and MAS, when used with OAM, result in a homogeneous, 3-tier data storage hierarchy for fixed content where all the data is always stored on some form of disk media. The Bus-Tech scheme eliminates the need for any and all slow speed, error prone media. Instead there is a continuum of disk storage to handle different categories of fixed content data, per the following guidelines introduced on page 2 of this White Paper.

# Bus-Tech Mainframe Fixed Content Data Management

MAINFRAME FIXED CONTENT DATA SPECTRUM		
<b>Current</b> [< 3 months]	<b>Intermediate Term</b> [3 to 24 months]	<b>Long Term/"Online Archived"</b> [> 24 months]
Mainframe DASD	<b>Bus-Tech zDASD with Open Systems Disks</b>	<b>Bus-Tech MAS with Open Systems Disks [with WORM]</b>
<b>Decreasing cost per Terabyte stored → → →</b>		

## KEEPING ALL THE FIXED CONTENT DATA ON DISKS

By now it should be extremely clear how Bus-Tech's zDASD and MAS, in combination with OAM, can be used to:

1. ensure that all fixed content data can be affordably maintained on a disk-based storage hierarchy.
2. provide real-time, online access to all mainframe fixed content data.
3. eliminate the need for batch jobs to retrieve archived data since all data is accessible in real-time.
4. streamline, automate and rationalize fixed content data storage.
5. minimize (if not totally eliminate) data loss and data corruption through the use of error-correcting, redundant hardware Open Systems disk subsystems.
6. meet compliance regulations by exploiting the WORM option.
7. unify mainframe fixed content data with data on other platforms (through the use of common Open Systems disk technology), particularly in the context of disaster recovery backups

## zDASD IN A NUTSHELL

The Bus-Tech zDASD is a channel-attached mainframe control unit that enables Open Systems disk to be used as DASD with IBM (or compatible) mainframes running z/OS, OS/390 or VSE. It has a dual channel attachment capability that can be either 2Gbps FICON Express or 17MB/s ESCON. The zDASD is a 2U (3.5") high rack mount control unit designed to be installed in industry-standard 19" rack units. The zDASD comes standard with dual 17Mbytes/sec ESCON mainframe channels, an Ultra 320/LVD SCSI port and dual 10/100/1000 Giga bit Ethernet connections. The zDASD has internal, mirrored disks which house the zDASD embedded Linux operating system and 3390 DASD emulation software.

Each zDASD control unit emulates up to sixty four (64) IBM 3390 DASD devices per channel interface. Thus a single zDASD with dual channel interfaces can support a total of 128 IBM 3390 devices. Data written to or read from these emulated 3390 devices by mainframe applications will be stored and retrieved, transparently, from an Open-Systems disk subsystem attached to the zDASD.

The Open Systems disk subsystems holding the emulated 3390 volumes can be attached to a zDASD in a number of ways. The options include:

- internally, on disks mounted inside the zDASD chassis;

- ultra 320/LVD SCSI attached disk subsystems external to the zDASD
- fibre-channel storage external to the zDASD;
- network attached storage, external to the zDASD, via the dual 1000/100/10 Gigabit Ethernet interface.

The data associated with a single emulated 3390 volume is stored in a set of binary disk files located on an Open Systems volume. zDASD supports up to a total of hundred and twenty eight 3390 volumes which can be any combination of 3390 model 3, 3390 model 9 or 3390 Model 27. A single Open Systems disk can house multiple 3390 volumes.

Any number of the total 128 emulated devices per zDASD may point to the same 3390 volume on the Open Systems disk. There are options for providing alternate pathing from separate LPARs.

Refer to zDASD datasheet and White Papers available at [www.bustech.com](http://www.bustech.com) for additional data on the Bus-Tech zDASD controller.

## MAS IN A NUTSHELL

The Bus-Tech Mainframe Appliance for Storage (MAS) is a 'TAPE-ON-DISK' virtual tape controller for IBM (or compatible) mainframes running z/OS, OS/390 or VSE. As with the zDASD it has a dual channel attachment capability that can be either 2Gbps FICON Express or 17MB/s ESCON. The MAS is also a 2U (3.5") high rack mount control unit designed to be installed in industry-standard 19" rack units. The MAS comes standard with a single 17Mbytes/sec ESCON mainframe channel, an Ultra 320/LVD SCSI port and dual 10/100/1000 Giga bit Ethernet connections. The MAS has internal, mirrored disks which house the MAS embedded Linux operating system and the tape emulation software.

A single MAS can emulate from one to 64, IBM 3480/3490 tapes drives with alternate path support on the mainframe. A MAS is recognized by OS/390, z/OS or VSE as a logical aggregation of 3480/3490 tape drives. To achieve this, a MAS provides the IBM Hardware Configuration Definition (HCD) utility with its own customized Unit Information Module (UIM) modeled on the 'CBDUS005' definition supplied by IBM. The MAS can also managed under SMS as a Manual Tape Library (MTL).

The MAS UIM ensures that all of the tape drives being emulated by a MAS can be collectively referred to as "VTAPE" in all job control language (JCL) data definition statements. Prior references to tape drives are now replaced with a "UNIT=VTAPE" operand. I/O operations to such "VTAPE" units will be sent to the MAS. Refer to the MAS White Paper at [www.bustech.com](http://www.bustech.com) for details on all of the various configuration options supported by the MAS, such as the MTL option.

When a job with JCL DD statements containing "UNIT=VTAPE" is initiated, the MAS will automatically (and transparently) allocate virtual tape drives [i.e. emulated tapes-on-disk] to that mainframe job. Jobs and tasks running on z/OS, OS/390 and VSE can allocate tape volumes on an emulated virtual tape drives in exactly the same manner they would with a real tape drives. The emulated tape drives are totally transparent to the mainframe applications. There are no changes required to the application software. The only changes required are restricted to the JCL statements.

Though MAS functioning is based on IBM 3480/3490 emulation, the operational characteristics of the MAS are in no way restricted by the speeds or cartridge size limitations of real IBM 3480/3490s. The MAS supports virtual cartridge sizes that are greater than 2GB – though this is the standard, default. A user parameter that is included in the JCL statements is provided to permit allocation of virtual cartridge sizes

that exceed 2GB. Each MAS can emulate tens of thousands of tape volumes. These tape volumes, per standard IBM JCL conventions, are assigned tape volume serial numbers ranging from “AA0001” to “ZZ9999”. Each volume corresponds to a disk file on the SAN, SCSI or Giga-bit Ethernet attached open-system disk storage product.

Refer to MAS datasheet and White Papers available at [www.bustech.com](http://www.bustech.com) for additional data on the Bus-Tech MAS ‘TAPE-ON-DISK’ solution.

## BOTTOM LINE

Mainframe fixed content data is growing at an explosive rate. Sarbanes-Oxley Section 404 that will apply to all large U.S. corporations as of November 2004 will further increase the amount of fixed content data that needs to be collected and preserved. Bus-Tech with zDASD and MAS has a proven and compelling solution set, based on the use of relatively inexpensive but high performance Open Systems disks, that enable mainframe customers to dramatically rethink and reengineer how they handle this growing volume of fixed content.

With the Bus-Tech solution set all of the mainframe fixed data (or at least most of it) can be maintained, affordably, on online disks – moreover, supported transparently by IBM’s OAM-based storage hierarchy. The Bus-Tech approach enables mainframe customers to reduce their overall storage costs though keeping considerably more data online. It also obviates the need for optical and tape libraries while providing WORM capability. Bus-Tech’s use of Open Systems disk subsystems with powerful error-avoiding and error-correcting technology greatly minimizes the risks of data corruption and data loss.

Since all the pertinent fixed content can be maintained online there is no longer a need to run batch jobs to retrieve older data requested by customers, corporate accountants, auditors or regulators. Instead the required data can be accessed quickly, utilizing OAM, from zDASD or MAS supported disks. The Bus-Tech zDASD and MAS based solution set for mainframe fixed content data management, whichever way you look at it, is a ‘no downside’ win-win proposition. When it comes to fixed data, it really does allow you to keep your cake and eat it too.

## ABOUT BUS-TECH

Bus-Tech, Inc., founded in 1987 is the industry’s leading provider of state-of-the-art connectivity solutions for the data center to Original Equipment Manufacturers. IBM is one of its leading customers. The company’s powerful suite of adapter and platform solutions satisfy even the most rugged demands of data processing professionals for high-bandwidth, high-availability and high-performance connectivity. With more than 15,000 installed sites worldwide, Bus-Tech is a recognized leader in the data center interconnect market. Headquartered in Burlington, MA, the company is privately held with locations around the world. For more information about Bus-Tech and its products, please visit the Bus-Tech World Wide Web site at <http://www.bustech.com>, send email to [info@bustech.com](mailto:info@bustech.com), or call 800.284.3172.