

## FASTER THAN VTL: INCREASE MAINFRAME DATA MANAGEMENT PERFORMANCE WITH MODEL9

Replacing your legacy VTL/Tape solution with Model9 Cloud Data Manager for Mainframe can significantly decrease the amount of time it takes to backup and archive your mainframe data, without increasing resource consumption.

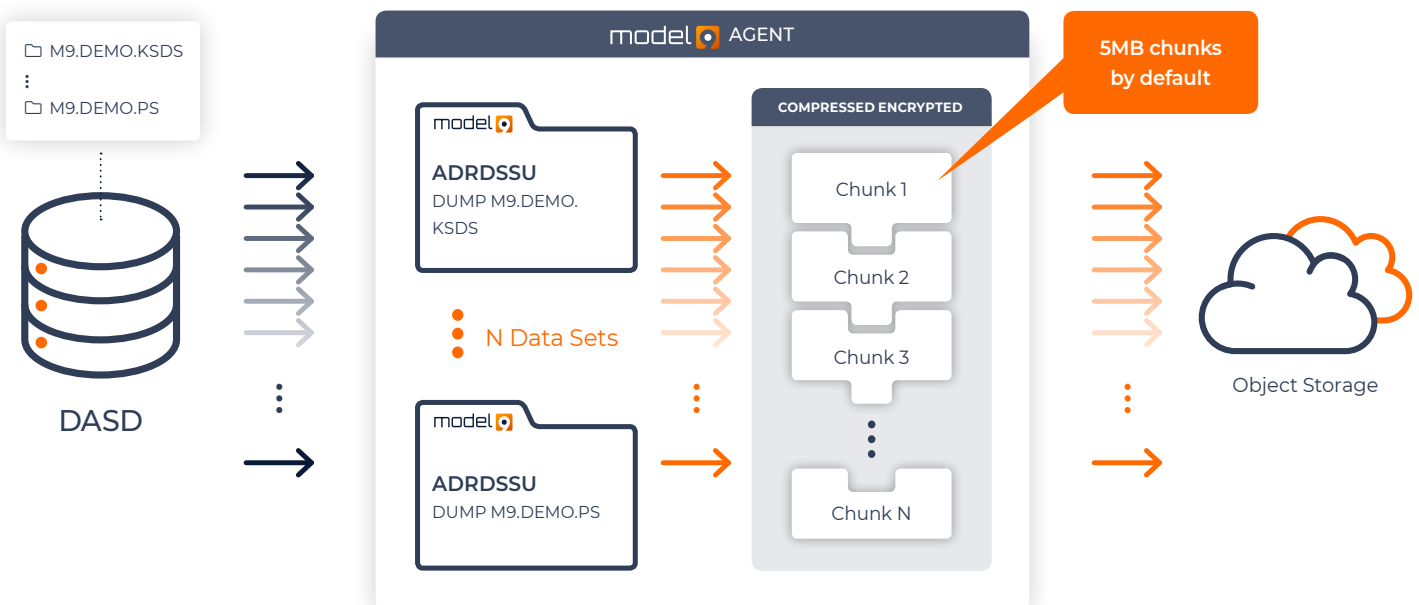
### WHY IS MODEL9'S PERFORMANCE BETTER THAN VTL?

Model9's Cloud Data Manager for Mainframe replaces legacy hardware and software with a single, software-only solution that writes backup and archive copies of data directory to any object storage target — whether it is public cloud or on-prem.

#### INCREASED INGESTION THROUGHPUT

Model9 Cloud Data Manager for Mainframe maximizes your available bandwidth, increasing data throughput speeds when making backup and archived copies of data. It accomplishes this by:

- ◆ **Achieving parallelism** through the use of multiple TCP/IP streams to send data in multiple chunks to any object storage target, instead of writing to tape serially
- ◆ **Compressing data** using zIIP or zEDC capability when available before pushing it out of the mainframe, minimizing the amount of data being sent and increasing the effective capacity of your network connection. For example, compressing data at 3:1 allows a 1Gb line to now handle 3Gb
- ◆ **Using zIIP engines instead of mainframe MIPS** to do the work, reducing CPU overhead that can be used for other mainframe processes
- ◆ **Spreading the workload** across the entire mainframe environment using a multi-agent load-balancing policy
- ◆ **Writing multiple data sets** and breaking large data sets up into chunks



## Replacing Tape/VTL Storage with Model9 - Results and Performance KPIs

Below are two case studies demonstrating how Model9 can increase performance:

### Case Study 1: US-based Bank - Comparing Oracle StorageTek VSM with the Model9 - Azure Joint Solution

A US-based bank was using the Oracle StorageTek Virtual Storage Manager (VSM) System to write to on-prem tape storage, and wanted to reduce the amount of time it took to complete their backup jobs.

Model9's Cloud Data Manager for Mainframe replaced the bank's VTL and backup software and instead began writing data directly from the mainframe to object storage in the Azure public cloud.

#### What is the technological environment?

- z15 with 2 x zIIP engines
- z/OS Version: V2R4
- Virtual Tape: StorageTek VSM6
  - 4 X 8Gb FICON ports
- MF Network: 2 x 1Gb OSA ports
- Azure Network: 1 x 1Gb

#### What is being compared?

	IBM - Oracle Solution	Model9 - Azure Solution
<b>Target Storage:</b>	Oracle StorageTek Virtual Storage Manager System (VSM)	Azure Blob Storage
<b>Backup Management SW:</b>	Multiple DFDSS backup JOBS	Model9 Backup Policy

### The Results

By using the Azure Cloud as a target instead of on-prem tape storage, Model9 was able to push data over TCP/IP and write directly to the cloud. That enabled enough parallelism to use all of the bank's available bandwidth, maximizing throughput performance.

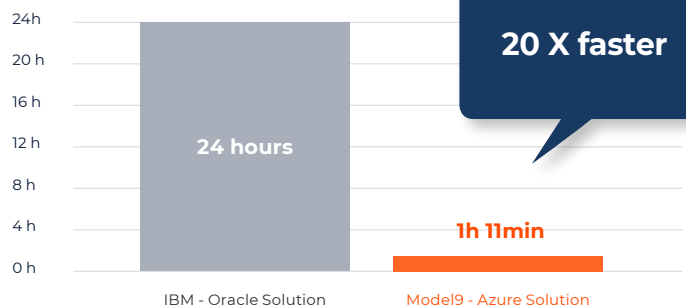
*Instead of taking an entire weekend day to complete writing a backup job to VTL, Model9 was able to write to Azure Cloud in just 1h 11min.*

In fact, the bank's ingestion throughput capabilities increased so dramatically that it decided to increase their cloud network throughput capabilities to take full advantage of what was now possible with Model9.

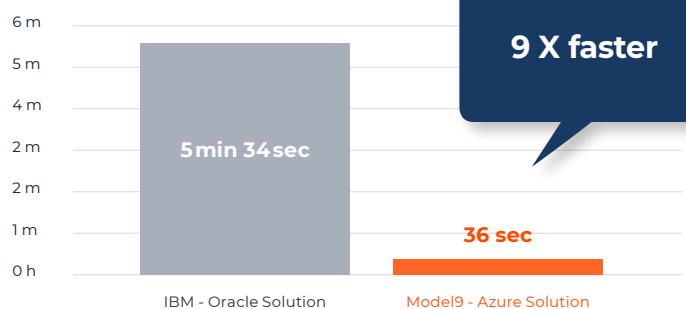
#### Performance KPIs:

Action	IBM - Oracle Solution	Model9 - Azure Solution
<b>Full volume dump backup</b>	Elapsed time: <b>24 hours</b>	Elapsed time: <b>1h 11min</b>
	Ingestion throughput: <b>27MB/s</b>	Ingestion throughput: <b>547.96 MB/s</b>
	FICON throughput: <b>27MB/s</b>	Network throughput: <b>102.89 MB/s</b>
<b>Data sets backup</b>	Elapsed time: <b>5 min 34 sec</b>	Elapsed time: <b>36 sec</b>
	Ingestion throughput: <b>56MB/s</b>	Ingestion throughput: <b>456MB/s</b>
	FICON throughput: <b>56MB/s</b>	Network throughput: <b>23.7MB/s</b>
<b>DB2 recovery</b>	Elapsed time: <b>02 min 13 sec</b>	Elapsed time: <b>01 min 37 sec</b>
	Restore throughput: <b>34MB/s</b>	Restore throughput: <b>47MB/s</b>

#### Full volume dump backup:



#### Data sets backup:



FIND OUT HOW FAST YOU CAN BACKUP & ARCHIVE DATA WITH MODEL9

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## Case Study 2: Using Model9 to Write to IBM Cloud Object Storage

An EMEA bank was looking to replace its IBM virtual tape libraries, and its data management software: DFSMSHsm, DFSMSrmm, and IBM Security Key Lifecycle Manager (ISKLM). It wanted to increase throughput and modernize its mainframe infrastructure to write directly to IBM Cloud Object Storage (COS)

To achieve this, it decided to test the performance of the Model9 Cloud Data Manager - IBM COS solution vs. the IBM TCT - COS solution.

### What is the technological environment?

- z15 with 4 x zIIP engines
- z/OS Version: V2R4
- Network: 2x 10Gb OSA ports

### What is being compared?

	IBM Solution	Model9-IBM COS Solution
<b>Target Storage:</b>	IBM COS	IBM COS
<b>Archive Management SW</b>	IBM DFSMSHsm	Model9 Cloud Data Manager for Mainframe
<b>Additional Hardware Features</b>	IBM DS8900 and Transparent Cloud Tiering (TCT)	None

## The Results

Because the bank wanted to go to a solution with no physical tapes, IBM TCT required additional DASD space to accommodate all writes and reads including DFSMSHsm. In contrast, Model9 does not require DASD space for backups. The bank tested IBM TCT with IBM COS on-premises as the target storage for TCT, and used a large DASD pool for DB2 Image Copies and let DFSMSHsm archive the data to IBM COS using TCT. It found that Model9 offered better performance. It's also worth noting that when writing backups from VTL/Tape, TCT does not replace DFSMSHsm or DFSMSrmm. In contrast, Model9 is a single software solution with no additional hardware footprint — making it a much cheaper and easier solution to implement.

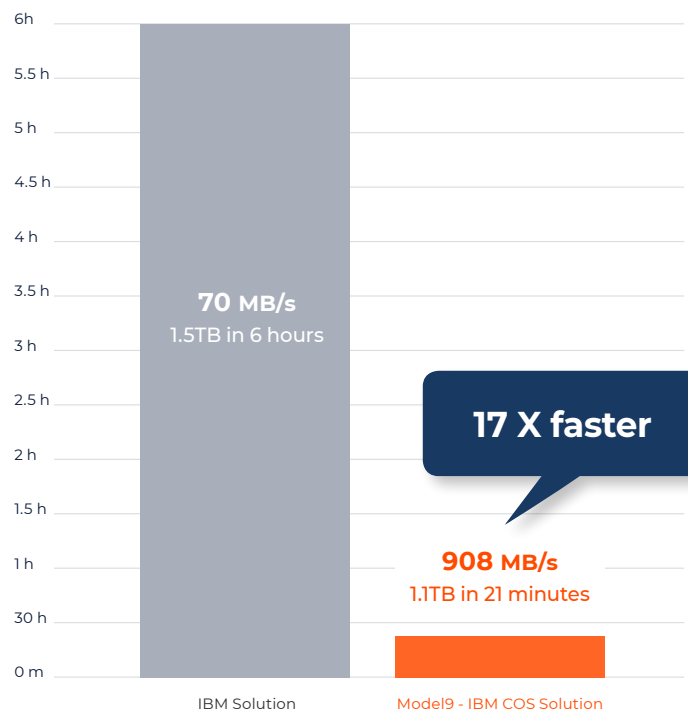
### Performance KPIs:

Action	IBM Solution	Model9 - IBM COS Solution
Image Copy Archive	Size: <b>1.5TB</b>	Size: <b>1.1TB</b>
	Elapsed Time: <b>6 hours</b>	Elapsed Time: <b>21 min</b>
	Ingestion throughput: <b>70MB/s</b>	Ingestion throughput: <b>908MB/s</b>

Model9 reached its peak while archiving 1.1TB in 21 minutes, with a throughput of 908MB/s:

Cloud Storage	IBM COS
#IBM COS Nodes	<b>2</b>
# Model9 Agents	<b>2</b>
Elapsed time (sec)	<b>1270</b>
Total Data GB	<b>1126.4</b>
Size In Cloud GB	<b>469</b>
Ingestion Throughput MB/s	<b>908</b>
Network Throughput After Compression MB/s	<b>378</b>

### DB2 Image Copy Archive:



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