

**VION CORPORATION FAX COVER SHEET**

Date: August 9, 2011 **Time:** 10:30 a.m.
Number of Pages: 7 + Cover Sheet
From: David Pruyn **Phone:** 202-448-4876
To: BID CLERK
Company: State of West Virginia
Fax #: 304-558-3970 **Phone #:** _____

Message:

Please see the attached letter and acknowledged Addenda 2 and 3 for Request for Quote ISCL0093 to provide a Virtual Tape Library. Please add these documents to our initial bid response, which was received July 19, 2011 (per the Federal Express receipt also attached).

Should you have any questions, please contact me

If possible, we would like an acknowledgement of receipt of this fax.

Thank you.

SEALED BID

BUYER: KRISTA FERRELL-FILE 21
RFQ. NO.: ISCL0093
BID OPENING DATE: 08/11/2011
BID OPENING TIME: 1:30 PM

RECEIVED
2011 AUG - 9 A 10:49
BID DIVISION
STATE OF WV



August 9, 2011

Department of Administration
Purchasing Department
Building 15
2019 Washington Street, East
Charleston, WV 25305-0130

Attn: Ms. Krista Ferrell
Buyer Supervisor

Subject: Request for Quotation ISCL0093 to provide a Virtual Tape Library

Dear Ms. Ferrell:

ViON Corporation (ViON) respectfully submits our response to the State of West Virginia's Office of Technology RFQ ISCL0093 to provide a Virtual Tape Solution, as modified by Addenda No. 1 through 3. After reviewing Addenda 2 and 3, we believe our proposal did address the requirements, and no changes are needed. Per your instructions, we provide the acknowledgement of Addenda 2 and 3 and this letter to be added to our initial response, which was sent July 18, 2011, when the RFQ was initially due on July 20, 2011.

ViON's proposal offers the maximum benefit to the State of West Virginia in terms of total overall cost, features, and quality. We request the opportunity to repair or clarify our proposal should you find any errors or discrepancies.

If you need further information, please contact David Pruyn, ViON's Marketing Representative; Dwayne Dahl, Public Sector Sales Operations Manager; Roseanne Cinnamond; Vice President of Marketing and Proposals; or me.

Sincerely,

A handwritten signature in black ink, appearing to read "Tom Frana". The signature is written in a cursive, flowing style with a long horizontal line extending to the right.

Tom Frana
President & CEO



State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

Request for Quotation

RFC NUMBER
ISCL0093

PAGE
2

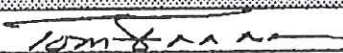
ADDRESS CORRESPONDENCE TO ATTENTION OF
KRISTA FERRELL
304-558-2596

RFQ COPY
TYPE NAME/ADDRESS HERE

VION Corporation
1055 Thomas Jefferson Street, N.W., Suite 406
Washington, DC 20007

DEPARTMENT OF ADMINISTRATION
IS&C - DATA CENTER MANAGER
BUILDING 6, ROOM B110
1900 KANAWHA BOULEVARD, EAST
CHARLESTON, WV
25305-0135 304-558-5914

DATE PRINTED	TERMS OF SALE	SHIP VIA	FOB	FREIGHT TERMS
06/16/2011				
BID OPENING DATE: 07/21/2011		BID OPENING TIME 01:30PM		

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
<p>PERMITTED WITHOUT THE EXPRESS WRITTEN CONSENT OF THE STATE BUYER. VIOLATION MAY RESULT IN THE REJECTION OF THE BID. THE STATE BUYER NAMED ABOVE IS THE SOLE CONTACT FOR ANY AND ALL INQUIRIES AFTER THIS RFQ IS RELEASED.</p> <p>EXHIBIT 10</p> <p>REQUISITION NO.:</p> <p>ADDENDUM ACKNOWLEDGEMENT</p> <p>I HEREBY ACKNOWLEDGE RECEIPT OF THE FOLLOWING CHECKED ADDENDUM(S) AND HAVE MADE THE NECESSARY REVISIONS TO MY PROPOSAL, PLANS AND/OR SPECIFICATION, ETC.</p> <p>ADDENDUM NO.'S:</p> <p>NO. 1 07/11/2011</p> <p>NO. 2 07/19/2011</p> <p>NO. 3 07/28/2011</p> <p>NO. 4</p> <p>NO. 5</p> <p>I UNDERSTAND THAT FAILURE TO CONFIRM THE RECEIPT OF THE ADDENDUM(S) MAY BE CAUSE FOR REJECTION OF BIDS.</p> <p>VENDOR MUST CLEARLY UNDERSTAND THAT ANY VERBAL REPRESENTATION MADE OR ASSUMED TO BE MADE DURING ANY ORAL DISCUSSION HELD BETWEEN VENDOR'S REPRESENTATIVES AND ANY STATE PERSONNEL IS NOT BINDING. ONLY THE INFORMATION ISSUED IN WRITING AND ADDED TO THE</p> <p>SEE REVERSE SIDE FOR TERMS AND CONDITIONS</p>						
SIGNATURE				TELEPHONE		DATE
				(202) 467-5500		August 9, 2011
TITLE		FAX		ADDRESS CHANGES TO BE NOTED ABOVE		
President and CEO		52-1167763				

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'



State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER
ISCL0093

PAGE
3

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304-558-2596

RFQ COPY
TYPE NAME/ADDRESS HERE

ViON Corporation
1055 Thomas Jefferson Street, N.W., Suite 406
Washington, DC 20007

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06/16/2011						
BID OPENING DATE:	07/21/2011	BID OPENING TIME 01:30PM				
LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
<p>SPECIFICATIONS BY AN OFFICIAL ADDENDUM IS BINDING.</p> <p>..... SIGNATURE</p> <p>ViON Corporation COMPANY</p> <p>..August 9, 2011 DATE</p> <p>NOTE; THIS ADDENDUM ACKNOWLEDGEMENT SHOULD BE SUBMITTED WITH THE BID.</p> <p>REV. 09/21/2009</p> <p>NOTICE TO PROCEED: THIS CONTRACT IS TO BE PERFORMED WITHIN 30 CALENDAR DAYS AFTER THE NOTICE TO PROCEED IS RECEIVED. THE AGENCY WILL ISSUE A WRITTEN NOTICE TO PROCEED TO THE VENDOR AFTER THE INITIAL MEETING DESCRIBED IN SECTION IV.2 OF THE ATTACHED SPECIFICATIONS. MAINTENANCE SHALL BE ADDED BY FORMAL CHANGE ORDER AFTER THE INSTALLATION, TESTING, AND ACCEPTANCE OF THE SOLUTION BY THE AGENCY.</p> <p>THE MODEL/BRAND/SPECIFICATIONS NAMED HEREIN ESTABLISH THE ACCEPTABLE LEVEL OF QUALITY ONLY AND ARE NOT INTENDED TO REFLECT A PREFERENCE OR FAVOR ANY PARTICULAR BRAND OR VENDOR. VENDORS WHO ARE BIDDING ALTERNATES SHOULD SO STATE AND INCLUDE PERTINENT LITERATURE AND SPECIFICATIONS. FAILURE TO PROVIDE INFORMATION FOR ANY ALTERNATES MAY BE GROUNDS FOR REJECTION OF THE BID. THE STATE RESERVES THE RIGHT</p>						
SEE REVERSE SIDE FOR TERMS AND CONDITIONS						
SIGNATURE		TELEPHONE		DATE		
.....		(202) 467-5500		August 9, 2011		
TITLE		FERN		ADDRESS CHANGES TO BE NOTED ABOVE		
President and CEO		52-1167763				

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DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS		
07/19/2011						
BID OPENING DATE: 08/11/2011		BID OPENING TIME 01:30PM				
LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
<p>ADDENDUM NO. 2</p> <p>THIS ADDENDUM IS ISSUED TO:</p> <p>1.) PROVIDE ADDITIONAL INFORMATION AS DEFINED IN QUESTION 20 OF ADDENDUM NO. 1 (PER THE ATTACHED CDS)</p> <p>2.) TO SET A DEADLINE FOR ALL INQUIRIES FOR INFORMATION.</p> <p>DEADLINE FOR ALL INFORMATION REQUESTS IS 07/25/2011 AT THE CLOSE OF BUSINESS.</p> <p>3.) EXTEND THE BID OPENING DATE</p> <p>BID OPENING DATE IS EXTENDED TO: 08/11/2011</p> <p>BID OPENING TIME REMAINS: 1:30 PM</p> <p>***** END ADDENDUM NO. 2 *****</p>						
0001	1	EA		205-43		
PERIPHERAL DEVICES AND ACCESSORIES, COMPUTER SYSTEM						
SEE REVERSE SIDE FOR TERMS AND CONDITIONS						
SIGNATURE <i>Tom...</i>			TELEPHONE (202) 467-5500		DATE August 9, 2011	
TITLE President and CEO		FEIN 52-1167763		ADDRESS CHANGES TO BE NOTED ABOVE		

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DATE PRINTED	TERMS OF SALE	SHIP VIA	FOB	FREIGHT TERMS		
07/28/2011						
BID OPENING DATE: 08/11/2011		BID OPENING TIME 01:30PM				
LINE	QUANTITY	UOP	QAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
<p align="center">ADDENDUM NO. 3</p> <p>THIS ADDENDUM IS ISSUED TO:</p> <p>1.) PROVIDE INFORMATION REQUESTED IN ACCORDANCE WITH QUESTION NO. 29 OF ADDENDUM NO. 1 AND SUBMITTED BY THE DEADLINE FOR SAID REQUESTS AS DEFINED IN ADDENDUM NO. 2 AND</p> <p>2.) ADD THE FOLLOWING LANGUAGE</p> <p>"CD FILE METHODOLOGY: THE COMPRESSION METHOD USED TO CREATE THE FILES ON THE CD'S ACCOMPANYING ADDENDUM NO. 2 AND THE CD ACCOMPANYING THIS ADDENDUM WAS AMATERSE. THIS MAINFRAME COMPRESSION PROGRAM USED TO SHRINK LARGE FILES. THE VENDORS WILL NEED TO USE A PROGRAM THAT IS CAPABLE OF READING AMATERSE FILES TO UNPACK THEM. VENDORS WITH MAINFRAME EQUIPMENT SHOULD BE CAPABLE OF READING THESE FILES. THESE FILES CANNOT BE UNPACKED OR VIEWED ON PCS WITH A PC-BASED COMPRESSION\DECOMPRESSION SOFTWARE."</p> <p>BID OPENING DATE REMAINS: 08/11/2011 BID OPENING TIME REMAINS: 1:30 PM</p> <p>***** END ADDENDUM NO. 3 *****</p>						
0001	1	EA		205-43		
PERIPHERAL DEVICES AND ACCESSORIES, COMPUTER SYSTEM						
SEE REVERSE SIDE FOR TERMS AND CONDITIONS						
SIGNATURE <i>Tom S. ...</i>			TELEPHONE (202) 467-5500		DATE August 9, 2011	
TITLE President and CEO		FEIN 52-1167763		ADDRESS CHANGES TO BE NOTED ABOVE		

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

Armelle Tallec

From: TrackingUpdates@fedex.com
Sent: Wednesday, July 20, 2011 10:18 AM
To: Armelle Tallec
Subject: FedEx Shipment 794988609293 Delivered

This tracking update has been requested by:

Company Name: VION
Name: Armelle Tallec
E-mail: atallec@vion.com

Our records indicate that the following shipment has been delivered:

Reference: ISCL0093
Ship (P/U) date: Jul 19, 2011
Delivery date: Jul 20, 2011 10:08 AM
Sign for by: S. THOMPSON
Delivery location: CHARLESTON, WV
Delivered to: Receptionist/Front Desk
Service type: FedEx Priority Overnight
Packaging type: FedEx Box
Number of pieces: 1
Weight: 3.00 lb.
Special handling/Services: Deliver Weekday
Residential Delivery

Tracking number: 794988609293

Shipper Information	Recipient Information
Armelle Tallec	Krista Ferrell
ViON	WV Department of Administration
1055 Thomas Jefferson St. NW	2019 WASHINGTON ST E BLDG 15
Suite 406	EAST
Washington	CHARLESTON
DC	WV
US	US
20007	25311

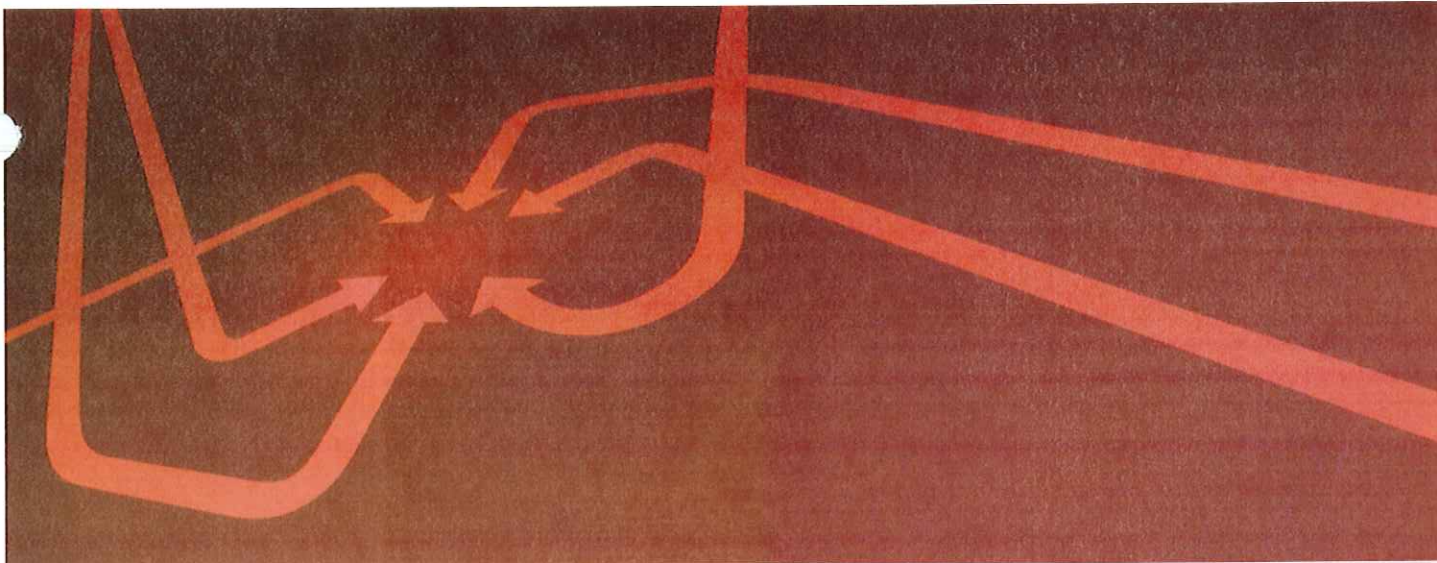
Please do not respond to this message. This email was sent from an unattended mailbox. This report was generated at approximately 9:10 AM CDT on 07/20/2011.
To learn more about FedEx Express, please visit our website at fedex.com.

All weights are estimated.

To track the latest status of your shipment, click on the tracking number above, or visit us at fedex.com.
This tracking update has been sent to you by FedEx on the behalf of the Requestor noted above. FedEx does not validate the authenticity of the requestor and does not validate, guarantee or warrant the authenticity of the

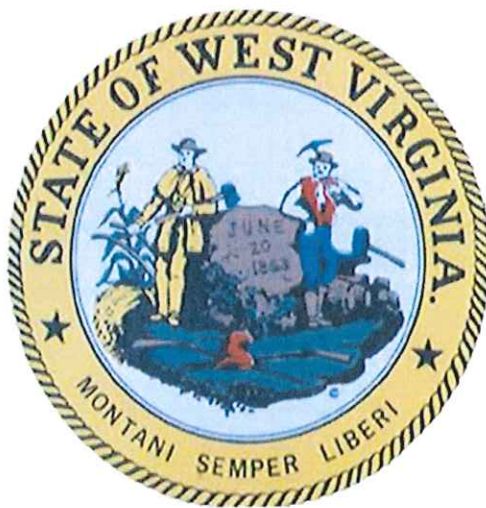
request, the requestor's message, or the accuracy of this tracking update. For tracking results and fedex.com's terms of use, go to fedex.com.

Thank you for your business.



VION

Response to:



RECEIVED
2011 JUL 20 A 10:13
CLERK DIVISION
STATE OF WV

VIRTUAL TAPE SOLUTION

RFQ NO. ISCL0093



July 19, 2011

Department of Administration
Purchasing Department
Building 15
2019 Washington Street, East
Charleston, WV 25305-0130

Attn: Ms. Krista Ferrell
Buyer Supervisor

Subject: Request for Quotation ISCL0093 to provide a Virtual Tape Library

Dear Ms. Ferrell:

ViON Corporation (ViON) respectfully submits our response to the State of West Virginia's Office of Technology RFQ ISCL0093 to provide a Virtual Tape Solution, as modified by Addendum No. 1. Per your instructions, we provide one (1) original of our response.

ViON's proposal offers the maximum benefit to the State of West Virginia in terms of total overall cost, features, and quality. We request the opportunity to repair or clarify our proposal should you find any errors or discrepancies.

If you need further information, please contact David Pruyn, ViON's Marketing Representative; Dwayne Dahl, Public Sector Sales Operations Manager; Roseanne Cinnamond; Vice President of Marketing and Proposals; or me.

Sincerely,

A handwritten signature in black ink, appearing to read "Tom Frana". The signature is written in a cursive, flowing style.

Tom Frana
President & CEO

Let ViON help you succeed with your requirements today.

ViON Corporation (ViON) is a small, veteran-owned corporation, established in 1980, and headquartered in Washington, DC. We specialize in designing, delivering and maintaining storage and server solutions to enterprise-wide data centers throughout the federal government and public sector & commercial marketplaces. We excel in solutions addressing Enterprise Storage, Disaster Recovery, Server Consolidation, Business Continuity and File Services in the Windows, UNIX and z/OS environments.

ViON leads as the most certified vendor of storage, services and critical IT solutions. Our customers choose us because we provide a cost-effective storage environment capable of delivering the right data to the right people – no matter what/ no excuses.

ViON offers Assured Computing as one of our unique solutions for disaster recovery problems facing Agencies today. Assured Computing is comprised of ViON plus our partnerships with the market leaders in storage and storage management. It is the combination of teamwork, business sensitivity and technical leadership that enables us to provide value added solutions for our customers.

Contracting Vehicles

The following is a list of our major Public Sector (State & Local) contracting vehicles:

- California
- Florida
- GSA
- Kansas
- North Carolina
- Ohio
- Pennsylvania COSTARS
- Texas DIR Networking
- Texas DIR Storage.

ViON's consistent, successful track record is a direct reflection of our people, our products and our skill – as evidenced by our growing customer base and their continued reliance on ViON as the architect and builder of their storage environment.

Our Current GSA Schedule

Contract Number: GS-35F-0739M

Contract Period: August 29, 2002 through August 27, 2012

ViON offers convenient purchases using your government credit card.

ViON Corporation

- ViON is a **privately held, veteran-owned** business located in Washington, DC, since 1980.
- ViON specializes in **designing, providing and maintaining storage and server solutions** to the federal government and public sector & commercial arenas.
- ViON has served **federal** customers for over 31 years and in the **public sector & commercial** marketplaces for 12 years.
- ViON is the **largest reseller of Hitachi Data Systems** and **one of the largest hardware resellers of IBM equipment** to the Federal government.
- ViON is an **Authorized Service Provider** and **Certified Solution Provider** for Hitachi Data Systems.
- ViON has **over 31 years** of mainframe and open systems expertise.
- ViON is a small Hardware Integrator that can truly **meet and exceed** all IT storage and server requirements.



THE STORAGE EXPERTS

www.vion.com

Corporate Headquarters
1055 Thomas Jefferson St., NW
Washington, DC 20007-5234
Phone: 202-467-5500
Toll Free: 1-800-761-9691
Fax: 202-342-1404

ViON Dulles Demo Center (DDC)
196 Van Buren St., Suite 100
Herndon, VA 20170-5349
Phone: 571-485-4600
Fax: 703-870-7415

Experts in Providing Enterprise Storage and Server Solutions

Cloud

- ViON Private Cloud
- Hitachi Cloud Services
- Hitachi Content Platform (HCP)
- Hitachi Unified Compute Platform (UCP)

Data Center Infrastructure

- CTI
- Virtual Instruments
- Xsigo

Data Deduplication

- FalconStor File-Interface Deduplication System (FDS)
- FalconStor Virtual Tape Library (VTL) with Deduplication
- IBM TS7650G ProtecTIER Deduplication Gateway
- IBM TS7680 ProtecTIER Deduplication Gateway for System z

Disk Storage

- Hitachi Virtual Storage Platform (VSP)
- Hitachi Universal Storage Platform V (USP V), VM (USP VM)
- Hitachi Adaptable Modular Storage (AMS)
- ViON HyperStor

File Services & NAS

- ViON File Services (VFS)
- Hitachi High-Performance NAS (HNAS)

SAN Directors & Switches

- Brocade
- Cisco
- Qlogic

Security

- Thales Key Management

Servers

- Hitachi BladeSymphony
- IBM System x, p, z

Services

- Hitachi Authorized Service Provider (ASP)
- Hitachi Certified Solution Provider (CSP)
- ViON Bandwidth Analysis Service
- ViON Hitachi Performance Assessment Service
- ViON Mainframe Tape Study Service

Storage Software

- Hitachi Command Suite
- Hitachi Data Discovery Suite

Tape Storage

- IBM 1130 Tape Drive
- IBM LTO Tape Drive
- IBM 3500 Tape Library
- IBM TS7700 Virtualization Engine

WAN Optimization

- Riverbed



THE STORAGE EXPERTS

www.vion.com

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State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER
ISCL0093

PAGE
1

ADDRESS CORRESPONDENCE TO ATTENTION OF
KRISTA FERRELL 304-558-2596

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RFQ COPY
TYPE NAME/ADDRESS HERE

ViON Corporation
1055 Thomas Jefferson Street, N.W., Suite 406
Washington, DC 20007

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DEPARTMENT OF ADMINISTRATION
IS&C - DATA CENTER MANAGER
BUILDING 6, ROOM B110
1900 KANAWHA BOULEVARD, EAST
CHARLESTON, WV
25305-0135 304-558-5914

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
07/11/2011				

BID OPENING DATE:

07/21/2011

BID OPENING TIME

01:30PM

LINE	QUANTITY	UOP	CAT NO	ITEM NUMBER	UNIT PRICE	AMOUNT
ADDENDUM NO. 1						
THIS ADDENDUM IS ISSUED TO PROVIDE ANSWERS TO ALL TECHNICAL QUESTIONS SUBMITTED IN ACCORDANCE WITH THE PROVISIONS OF THE ORIGINAL RFQ (ISCL0093).						
BID OPENING DATE REMAINS: 07/21/2011						
BID OPENING TIME REMAINS: 1:30 PM						
***** END ADDENDUM NO. 1 *****						
0001	1	EA		205-43		
PERIPHERAL DEVICES AND ACCESSORIES, COMPUTER SYSTEM						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE <i>Tom Sarna</i>	TELEPHONE (202) 467-5500	DATE July 19, 2011
TITLE President and CEO	FEIN 52-1167763	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'



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Department of Administration
Purchasing Division
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KRISTA FERRELL 304-558-2596

V E N D O R	RFQ COPY
	TYPE NAME/ADDRESS HERE
	ViON Corporation
	1055 Thomas Jefferson Street, N.W., Suite 406 Washington, DC 20007

S H I P T O	DEPARTMENT OF ADMINISTRATION
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0001	1	EA		205-43		
PERIPHERAL DEVICES AND ACCESSORIES, COMPUTER SYSTEM						
REQUEST FOR QUOTATION						
THE WEST VIRGINIA STATE PURCHASING DIVISION FOR THE AGENCY, THE WEST VIRGINIA OFFICE OF TECHNOLOGY, IS SOLICITING BIDS TO PROVIDE THE AGENCY WITH A VIRTUAL TAPE SOLUTION INCLUDING: A TWO-WAY GRID WITH REPLICATION BETWEEN ITS PRIMARY DATA CENTER LOCATED IN CHARLESTON, WEST VIRGINIA AND ITS RECOVERY CENTER LOCATED IN FLATWOODS, WEST VIRGINIA PER THE ATTACHED SPECIFICATIONS.						
TECHNICAL QUESTIONS CONCERNING THIS SOLICITATION MUST BE SUBMITTED IN WRITING TO KRISTA FERRELL IN THE WEST VIRGINIA STATE PURCHASING DIVISION VIA FAX AT 304-558-4115 OR VIA EMAIL AT KRISTA.S.FERRELL@WV.GOV.						
DEADLINE FOR ALL TECHNICAL QUESTIONS IS 07/06/2011 AT THE CLOSE OF BUSINESS.						
ANY TECHNICAL QUESTIONS RECEIVED WILL BE ANSWERED BY FORMAL WRITTEN ADDENDUM TO BE ISSUED BY THE PURCHASING DIVISION AFTER THE DEADLINE HAS LAPSED.						
VERBAL COMMUNICATION: ANY VERBAL COMMUNICATION BETWEEN THE VENDOR ANY STATE PERSONNEL IS NOT BINDING. ONLY INFORMATION ISSUED IN WRITING AND ADDED TO THE RFQ SPECIFICATIONS BY FORMAL WRITTEN ADDENDUM IS BINDING.						
NO CONTACT BETWEEN THE VENDOR AND THE AGENCY IS						
SEE REVERSE SIDE FOR TERMS AND CONDITIONS						
SIGNATURE <i>Tom S. ...</i>		TELEPHONE (202) 467-5500		DATE July 19, 2011		
TITLE President and CEO		FEIN 52-1167763		ADDRESS CHANGES TO BE NOTED ABOVE		

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EXHIBIT 1.0						
REQUISITION NO.:						
ADDENDUM ACKNOWLEDGEMENT						
I HEREBY ACKNOWLEDGE RECEIPT OF THE FOLLOWING CHECKED ADDENDUM(S) AND HAVE MADE THE NECESSARY REVISIONS TO MY PROPOSAL, PLANS AND/OR SPECIFICATION, ETC.						
ADDENDUM NO.'S:						
NO. 1 07/11/2011						
NO. 2						
NO. 3						
NO. 4						
NO. 5						
I UNDERSTAND THAT FAILURE TO CONFIRM THE RECEIPT OF THE ADDENDUM(S) MAY BE CAUSE FOR REJECTION OF BIDS.						
VENDOR MUST CLEARLY UNDERSTAND THAT ANY VERBAL REPRESENTATION MADE OR ASSUMED TO BE MADE DURING ANY ORAL DISCUSSION HELD BETWEEN VENDOR'S REPRESENTATIVES AND ANY STATE PERSONNEL IS NOT BINDING. ONLY THE INFORMATION ISSUED IN WRITING AND ADDED TO THE						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE <i>Tom ...</i>	TELEPHONE (202) 467-5500	DATE July 19, 2011
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RFQ NUMBER
ISCL0093

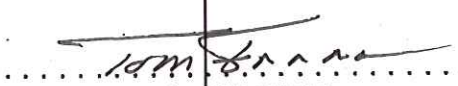
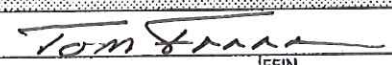
PAGE
3

ADDRESS CORRESPONDENCE TO ATTENTION OF:
KRISTA FERRELL 304-558-2596

RFQ COPY
TYPE NAME/ADDRESS HERE

VION Corporation
1055 Thomas Jefferson Street, N.W., Suite 406
Washington, DC 20007

DEPARTMENT OF ADMINISTRATION
IS&C - DATA CENTER MANAGER
BUILDING 6, ROOM B110
1900 KANAWHA BOULEVARD, EAST
CHARLESTON, WV
25305-0135 304-558-5914

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS		
06/16/2011						
BID OPENING DATE: 07/21/2011		BID OPENING TIME 01:30PM				
LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
SPECIFICATIONS BY AN OFFICIAL ADDENDUM IS BINDING.						
						
SIGNATURE						
VION Corporation						
COMPANY						
July 19, 2011						
DATE						
NOTE: THIS ADDENDUM ACKNOWLEDGEMENT SHOULD BE SUBMITTED WITH THE BID.						
REV. 09/21/2009						
NOTICE TO PROCEED: THIS CONTRACT IS TO BE PERFORMED WITHIN 30 CALENDAR DAYS AFTER THE NOTICE TO PROCEED IS RECEIVED. THE AGENCY WILL ISSUE A WRITTEN NOTICE TO PROCEED TO THE VENDOR AFTER THE INITIAL MEETING DESCRIBED IN SECTION IV.2 OF THE ATTACHED SPECIFICATIONS. MAINTENANCE SHALL BE ADDED BY FORMAL CHANGE ORDER AFTER THE INSTALLATION, TESTING, AND ACCEPTANCE OF THE SOLUTION BY THE AGENCY.						
THE MODEL/BRAND/SPECIFICATIONS NAMED HEREIN ESTABLISH THE ACCEPTABLE LEVEL OF QUALITY ONLY AND ARE NOT INTENDED TO REFLECT A PREFERENCE OR FAVOR ANY PARTICULAR BRAND OR VENDOR. VENDORS WHO ARE BIDDING ALTERNATES SHOULD SO STATE AND INCLUDE PERTINENT LITERATURE AND SPECIFICATIONS. FAILURE TO PROVIDE INFORMATION FOR ANY ALTERNATES MAY BE GROUNDS FOR REJECTION OF THE BID. THE STATE RESERVES THE RIGHT						
SEE REVERSE SIDE FOR TERMS AND CONDITIONS						
SIGNATURE		TELEPHONE			DATE	
		(202) 467-5500			July 19, 2011	
TITLE		FEIN		ADDRESS CHANGES TO BE NOTED ABOVE		
President and CEO		52-1167763				

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'



State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER

ISCL0093

PAGE

4

ADDRESS CORRESPONDENCE TO ATTENTION OF

KRISTA FERRELL
304-558-2596

RFQ COPY

TYPE NAME/ADDRESS HERE

VENDOR
ViON Corporation
1055 Thomas Jefferson Street, N.W., Suite 406
Washington, DC 20007

SHIP TO

DEPARTMENT OF ADMINISTRATION
IS&C - DATA CENTER MANAGER
BUILDING 6, ROOM B110
1900 KANAWHA BOULEVARD, EAST
CHARLESTON, WV
25305-0135 304-558-5914

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS		
06/16/2011						
BID OPENING DATE: 07/21/2011		BID OPENING TIME 01:30PM				
LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
TO WAIVE MINOR IRREGULARITIES IN BIDS OR SPECIFICATIONS IN ACCORDANCE WITH SECTION 148-1-4(F) OF THE WEST VIRGINIA LEGISLATIVE RULES AND REGULATIONS.						
NOTICE						
A SIGNED BID MUST BE SUBMITTED TO:						
DEPARTMENT OF ADMINISTRATION PURCHASING DIVISION BUILDING 15 2019 WASHINGTON STREET, EAST CHARLESTON, WV 25305-0130						
THE BID SHOULD CONTAIN THIS INFORMATION ON THE FACE OF THE ENVELOPE OR THE BID MAY NOT BE CONSIDERED:						
SEALED BID						
BUYER:		KRISTA FERRELL-FILE 21				
RFQ. NO.:		ISCL0093				
BID OPENING DATE:		07/21/2011				
BID OPENING TIME:		1:30 PM				
PLEASE PROVIDE A FAX NUMBER IN CASE IT IS NECESSARY TO CONTACT YOU REGARDING YOUR BID:						
(202) 342-1404						
SEE REVERSE SIDE FOR TERMS AND CONDITIONS						
SIGNATURE <i>Tom Ferrara</i>		TELEPHONE (202) 467-5500			DATE July 19, 2011	
TITLE President and CEO		FEIN 52-1167763			ADDRESS CHANGES TO BE NOTED ABOVE	

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'



State of West Virginia
Department of Administration
Purchasing Division
2019 Washington Street East
Post Office Box 50130
Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER

ISCL0093

PAGE

5

ADDRESS CORRESPONDENCE TO ATTENTION OF:

KRISTA FERRELL
304-558-2596

RFQ COPY

TYPE NAME/ADDRESS HERE

ViON Corporation
1055 Thomas Jefferson Street, N.W., Suite 406
Washington, DC 20007

DEPARTMENT OF ADMINISTRATION
IS&C - DATA CENTER MANAGER
BUILDING 6, ROOM B110
1900 KANAWHA BOULEVARD, EAST
CHARLESTON, WV
25305-0135 304-558-5914

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
06/16/2011				

BID OPENING DATE: 07/21/2011 BTD OPENING TIME 01:30PM

LINE	QUANTITY	UOP	CAT NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
CONTACT PERSON (PLEASE PRINT CLEARLY): David Pruyn						
***** THIS IS THE END OF RFQ ISCL0093 *****						
TOTAL: OPTION 1						\$1,836,537.00
TOTAL: OPTION 2						\$1,935,078.00

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE <i>Tom Sanna</i>	TELEPHONE (202) 467-5500	DATE July 19, 2011
TITLE President and CEO	FEIN 52-1167763	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

**GENERAL TERMS & CONDITIONS
REQUEST FOR QUOTATION (RFQ) AND REQUEST FOR PROPOSAL (RFP)**

6

ViON so notes and accepts.

1. Awards will be made in the best interest of the State of West Virginia.
2. The State may accept or reject in part, or in whole, any bid.
3. Prior to any award, the apparent successful vendor must be properly registered with the Purchasing Division and have paid the required \$125 fee.
4. All services performed or goods delivered under State Purchase Order/Contracts are to be continued for the term of the Purchase Order/Contracts, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise available for these services or goods this Purchase Order/Contract becomes void and of no effect after June 30.
5. Payment may only be made after the delivery and acceptance of goods or services.
6. Interest may be paid for late payment in accordance with the *West Virginia Code*.
7. Vendor preference will be granted upon written request in accordance with the *West Virginia Code*.
8. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.
9. The Director of Purchasing may cancel any Purchase Order/Contract upon 30 days written notice to the seller.
10. The laws of the State of West Virginia and the *Legislative Rules* of the Purchasing Division shall govern the purchasing process.
11. Any reference to automatic renewal is hereby deleted. The Contract may be renewed only upon mutual written agreement of the parties.
12. **BANKRUPTCY:** In the event the vendor/contractor files for bankruptcy protection, the State may deem this contract null and void, and terminate such contract without further order.
13. **HIPAA BUSINESS ASSOCIATE ADDENDUM:** The West Virginia State Government HIPAA Business Associate Addendum (BAA), approved by the Attorney General, is available online at www.state.wv.us/admin/purchase/vrc/hipaa.htm and is hereby made part of the agreement. Provided that the Agency meets the definition of a Cover Entity (45 CFR §160.103) and will be disclosing Protected Health Information (45 CFR §160.103) to the vendor.
14. **CONFIDENTIALITY:** The vendor agrees that he or she will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the agency's policies, procedures, and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in <http://www.state.wv.us/admin/purchase/privacy/noticeConfidentiality.pdf>.
15. **LICENSING:** Vendors must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, and the West Virginia Insurance Commission. The vendor must provide all necessary releases to obtain information to enable the director or spending unit to verify that the vendor is licensed and in good standing with the above entities.
16. **ANTITRUST:** In submitting a bid to any agency for the State of West Virginia, the bidder offers and agrees that if the bid is accepted the bidder will convey, sell, assign or transfer to the State of West Virginia all rights, title and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the State of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to the bidder.

I certify that this bid is made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, or person or entity submitting a bid for the same material, supplies, equipment or services and is in all respects fair and without collusion or Fraud. I further certify that I am authorized to sign the certification on behalf of the bidder or this bid.

INSTRUCTIONS TO BIDDERS

1. Use the quotation forms provided by the Purchasing Division. Complete all sections of the quotation form.
2. Items offered must be in compliance with the specifications. Any deviation from the specifications must be clearly indicated by the bidder. Alternates offered by the bidder as **EQUAL** to the specifications must be clearly defined. A bidder offering an alternate should attach complete specifications and literature to the bid. The Purchasing Division may waive minor deviations to specifications.
3. Unit prices shall prevail in case of discrepancy. All quotations are considered F.O.B. destination unless alternate shipping terms are clearly identified in the quotation.
4. All quotations must be delivered by the bidder to the office listed below prior to the date and time of the bid opening. Failure of the bidder to deliver the quotations on time will result in bid disqualifications: Department of Administration, Purchasing Division, 2019 Washington Street East, P.O. Box 50130, Charleston, WV 25305-0130
5. Communication during the solicitation, bid, evaluation or award periods, except through the Purchasing Division, is strictly prohibited (W.Va. C.S.R. §148-1-6.6).

I. SCOPE

The Data Center, West Virginia Office of Technology, identified hereinafter as "the agency", seeks a virtual tape solution that includes a two-way grid with replication between its primary Data Center located in Charleston, W. Va., and its Recovery Center located in Flatwoods, W. Va. This system will replace the current physical tape solution described in Section II, Current Environment.

The agency is seeking a virtual tape solution that replaces the current system, but also includes physical tape drives and an automated tape library at the Recovery Center as a means for feeding the agency's contracted disaster recovery facility (SunGard).

Details for mandatory requirements are described in Section III. The State shall make the award to the lowest-cost response that meets all the mandatory requirements.

II. CURRENT ENVIRONMENT

The agency currently owns and operates the following tape storage systems:

Qty.	Machine/Product	Product Description
2	9310	StorageTek library storage modules
2	9311	StorageTek library control units
1	4410	StorageTek library storage modules
1	4411	StorageTek library control units
12	3590-B1A	IBM Magstar tape drives
3	3590-A50	IBM Magstar control units
16	9490-M34	StorageTek Timberline tape drives

The agency currently operates a z/10 IBM mainframe utilizing the above-listed tapes hardware at its primary Data Center in Charleston. CA-1's TMS is used to manage the tapes, with HSM also utilized to provide automatic migration of data from disk to physical tape. The agency currently has approximately 42 terabytes of compressed tape data located on 3490 and 3590 tape media.

On Sunday mornings, a full backup of the operating system and disk is made on 3590 tapes, then they are transported offsite. This backup is kept for two weeks, then rotated back and scratched when the third weekly backup is made. These backups are

the primary means by which a Disaster Recovery system, currently provided by SunGard, is created.

User agencies create copies of their own data on more frequent intervals, and make those tapes available for offsite transport. These tapes are also taken to Sungard in the event of a disaster.

III. REQUIREMENTS

The vendor shall provide a solution that includes systems located in the primary Data Center in Charleston and the Recovery Center in Flatwoods. The system at the Recovery Center shall include physical tape drives. The solution must meet all of the following mandatory requirements.

1. The vendor will supply all the equipment and software specified in Appendix A, or equal.
2. The equipment shall be new. Remanufactured or warranted-as-new equipment is unacceptable.
3. The solution shall support data replication between the primary virtual tape server at the primary Data Center and the Recovery Center. The customer will provide the telecommunication equipment and bandwidth required to enable replication between the Centers.
4. The solution shall allow for creation of physical tapes at the remote location for disaster recovery purposes. Physical tapes must be capable of holding at least 700 GB of uncompressed data.
5. The solution shall allow for removal of physical tapes from the remote location for disaster recovery purposes.
6. The physical tape drives hardware (minimum of 6 drives) shall be capable of selectable encryption, in order for the customer to encrypt data that is on physical tape. All software and hardware required for encryption, including, but not limited to, key management, must be included in the proposal.
7. The automated physical tape library, to be located at the Recovery Center, must to capable of holding a minimum of 210 physical tapes initially (including up to ten cleaning tapes). The tape library must be expandable to allow for future growth.
8. The system shall be capable of handling 70 TB of uncompressed usable data.
9. The solution will support z/OS, z/VM and Linux environments, and shall be capable of defining virtual drives that are usable by applications residing in any of those environments.

10. The solution must allow for remote monitoring and operation of all hardware.
11. The solution must support and be compatible with all other current hardware and software currently in production at the customer's site. A list of the customer's current hardware and software is provided in Appendices B and C.
12. The system must be capable of recovering volume serial numbers in the event of a file system failure.
13. The system must be capable of data compression.
14. The vendor shall specify the bandwidth requirements for replication between the primary Data Center and the Recovery Center.

IV. INSTALLATION AND MAINTENANCE

1. The vendor shall install the primary virtual tape server at the customer's central site:

Building 6, Room 110
1900 Kanawha Blvd. E.
Charleston, WV 25305

The vendor shall install the secondary virtual tape server at the Recovery Center located approximately 75 miles from the central site. The address of the secondary location is:

Braxton Technology Center
89 Richard D. Minnich Drive STE 103
Sutton, WV 26601

2. The vendor and agency shall meet, at the agency's primary Data Center, within 15 days after issuance of purchase order, to discuss pre-installation activities as well as the actual installation, and to agree on an installation date.
3. The systems shall be operational within 30 days after they are installed. The virtual tape solution will not be considered fully operational until the offsite component is fully integrated with the central site component and a migration plan for data from existing tapes has been agreed upon and implemented.
4. The vendor shall provide on-site hardware, firmware, and software engineering support, and agency training, at or about the time of systems installation.
5. The systems shall be maintained by the manufacturer or by a representative(s) trained and authorized by the manufacturer.

6. The vendor shall **warrant and maintain** the systems for 48 months after installation. During this 48-month period, the vendor shall make any necessary repairs, replace any defective parts, perform preventative maintenance, install engineering changes and modifications, and otherwise maintain the systems at no cost to the agency.
7. The vendor shall identify any trade-in allowances for existing equipment replaced by the system. All de-installation and shipping costs shall be borne by the vendor.

V. IMPLEMENTATION OF THE VIRTUAL TAPE SOLUTION

The services specified in the following subsections shall be performed at the agency's sites and shall continue until all the services have been provided to the agency's satisfaction and the system is fully operational.

1. Assist with System Planning and Preparation

The vendor shall provide on-site consulting to discuss resource allocation management, storage administration and systems programming requirements. Topics may include the following:

1. DF/SMS allocation methodologies;
2. JCL requirements;
3. DF/SMS ACS utilization;
4. Planning and implementation of library partitioning.

2. Provide Technical Consultation

The vendor shall review the following topics with the customer and give detailed instructions and guidance:

1. DF/SMS software support;
2. Data migration considerations, including coexistence with other automation solutions;
3. Interaction between the Virtual Tape Equipment and DF/SMS software support;
4. Interaction between the Virtual Tape Equipment and the TMS tape management system;
5. Interaction between the Virtual Tape Equipment and applicable OEM software;

6. Logical partitioning;
7. Preparation for installation;
8. Interaction between Virtual Engine, the Library Manager and the host, including physical tapes, logical volumes ("LVOLs"), and inventories.
9. Device table generations such as Unit Control Blocks ("UCB") and Eligible Device Table ("EDT");
10. Generation of the Hardware Configuration Definition ("HCD").

3. **Provide Operational Training and Education**

The vendor shall provide sessions to cover the following:

1. System overview of Hosts and Virtual Engine in a grid configuration;
2. Console messages meaning and operator actions;
3. Operator intervention procedures;
4. Abnormal situations and recovery;
5. Interaction between the Virtual Tape environment and TMS
6. Interaction between the Virtual Tape Equipment and other software products;
7. Operator actions with DF/SMS;
 - a. System status displays
 - b. System commands
 - c. Messages and meanings
8. System commands- system status displays- messages and meanings;
9. DF/SMS Definitions;
10. ISMF panels;
 - a. Parmlib member changes
 - b. Proclib member change
 - c. ACS routines
11. Parmlib member changes- Proclib member changes;
12. Tape management system User Exit processing.

VI. MISCELLANEOUS TERMS AND CONDITIONS

1. The customer will purchase the systems outright. Other procurement options will not be considered.
2. The customer will not formally accept a system until it has operated without failure for 30 consecutive days.
3. The vendor will be considered prime contractor, and shall therefore be solely responsible for satisfying all mandatory requirements of this RFQ, including maintenance. The use of subcontractors will not relieve the vendor of its prime contractor responsibilities.
4. A manufacturer's business partner submitting a bid independently of the manufacturer, or on behalf of the manufacturer, will have prime contractor responsibilities. The State will not act as a third party in any arrangements between the manufacturer and its business partners.

VII. COSTS

1. The vendor shall complete the following cost sheet and submit it as part of the bid response. All costs shall be identified on the cost sheet. Costs will be all inclusive including all hourly rates, travel, and all goods/services needed to fulfill the mandatory requirements. **The Grand Total Cost will be the firm bid price.**



RFQ - ISCL0093 VIRTUAL TAPE SOLUTION RESPONSE

EXECUTIVE OVERVIEW

ViON Corporation (ViON) and Computer Associates (CA) are jointly offering a Virtual Tape Solution to the State of West Virginia Office of Technology, which addresses the requirements set forth in RFQ ISCL0093. We feel that our joint solution offers compelling value by reducing costs, complexity, and risk while increasing performance and agility for your organization.

We are proposing two (2) different solutions that address the State's requirements. The first solution is the recommended solution. It is a traditional CA VTape solution capable of satisfying 10+ TB/day in backup requirements. The second offering satisfies the 70 TB of storage requested by the RFQ in a tapeless backup solution. Both solutions solve for the requirement to create tapes for delivery to the remote disaster recovery site.

CA VTape Offering Value Proposition

The CA Virtual Tape Solution is uniquely positioned, as it is both the low-cost solution offering greater performance and less risk when compared to "appliance based" competitors. CA VTape leverages your existing hardware resources (DASD and MF general purpose or zIIP engines). As a result, CA VTape has fewer moving parts, lower risk, and higher performance as we will take advantage of the latest and processor technology that you have in your z/OS environment. Alternative "appliance based solutions" require an additional layer (greater risk of failure), the need additional floor space and energy requirements.

ViON and CA are uniquely positioned to offer a cost-effective solution and enable the State of West Virginia to reduce cost as compared to current run rate by approximately 70%. CA's Virtual tape solution will benefit the State of West Virginia in the following ways:

- ☐ It is a software-based solution that leverages your existing tape, mainframe hardware, and applications to implement a virtual tape system. A major Financial Services Firm has found CA V-Tape's ROI to be a 70% reduction when contrasted with the various hardware solutions available.

- ☒ CA's VTape will generally outperform third-party solutions since we use and support the current z/OS processors (either General Purpose Engines or available zIIP engines).
- ☐ The VTape Solution will allow the State of West Virginia the flexibility to write to tape or DASD whichever they choose.
- ☐ There are no JCL changes required with the CA VTape solution.
- ☐ The CA VTape solution offers tight integration with CA-1 and Vantage SRM offerings. This translates to lower cost conversation.
- ☐ The VTape solution has less moving parts meaning fewer points of failure.
- ☐ The CA VTape solution supports heterogeneous a hardware and software environment and therefore reduces vendor lock in. Third-party hardware solutions lock in buyers to periodic hardware upgrades.
- ☐ The VTape solution:
 - ☒ VTape reduces number of tapes and tape drives
 - ☒ Reduces overall need for FTEs to handle tapes
 - ☒ Reduces energy cost required for powering cooling needed for the VTS/VSM hardware solutions
 - ☒ Reduce floor space requirements of the third party solution
- ☐ The VTape solution only requires that The State of West Virginia purchase the actual number of virtual drives needed. Third-party hardware solutions typically require purchases in fixed-block increments of 128 devices.

Traditional CA VTape Configuration

The traditional CA VTape configuration involves an asynchronously mirrored SMS storage group along with some physical tape resources located at the primary Data Center and another set of physical tape resources at the Recovery Center. The SMS storage group is used like a scratch pad to hold recently created Virtual Volumes and those Virtual Volumes that have an unexpired Cache Residency time. Virtual Volumes are automatically stacked onto Primary and Duplex physical tapes located at the primary Data Center and Recovery Center respectively.

Once stacked to physical tape, the Virtual Volumes remain in the SMS storage group until the space is needed to satisfy other Virtual Volume mounts, where upon they may be safely deleted. Virtual Volumes that are mounted after they have been removed from the SMS storage group are recalled from either the Primary or Duplex physical tapes.

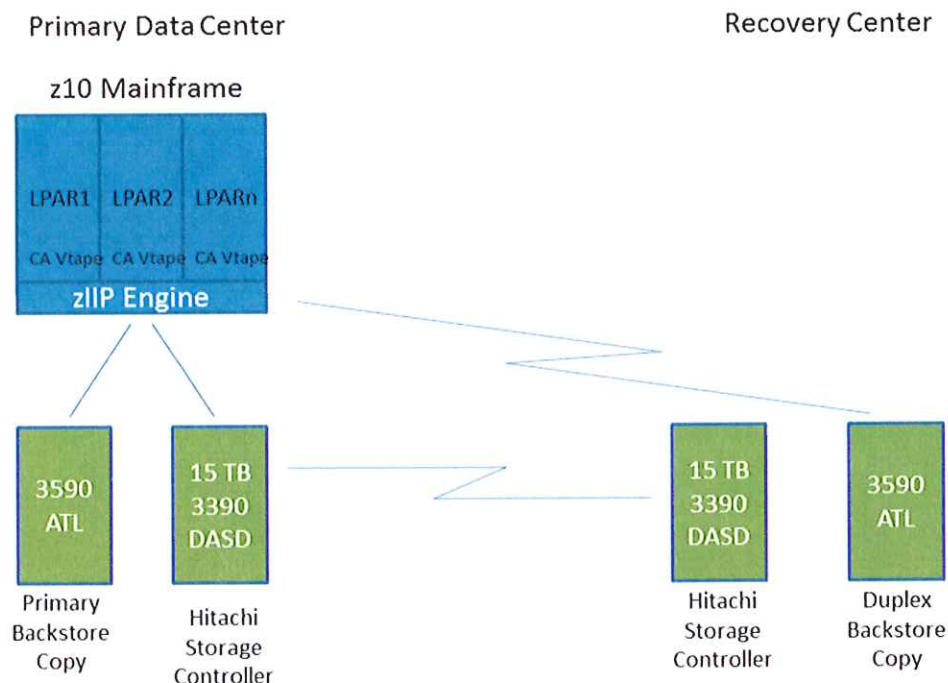
CA VTape allows you separate your Virtual Volumes into different groups, which can have different attributes. A subset of Virtual Volumes can be assigned to a group that will stack the weekly backups onto the same physical tapes written as Duplex copies at the Recovery Center. The Duplex copy can then be removed from the ATL and sent offsite for use at a disaster recovery site.

Tapeless CA VTape Configuration

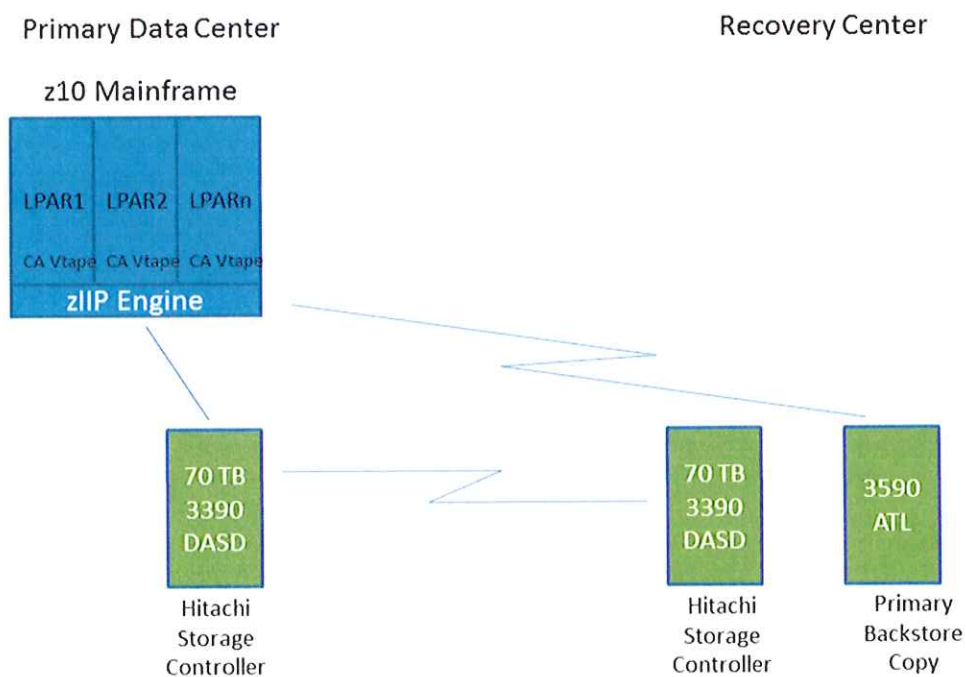
The tapeless CA VTape configuration involves an asynchronously mirrored SMS storage group along with minimal physical tape resources located at the Recovery Center. The SMS storage group is used to hold all Virtual Volumes permanently. CA VTape allows you separate your Virtual Volumes into different groups, which can have different attributes. A subset of Virtual Volumes can be assigned to a group that will stack the Virtual Volumes onto Primary physical tapes located at the Recovery Center. An optional Duplex copy can be made at the Recovery Center. The physical tape copy can then be removed from the ATL and sent offsite for use at a disaster recovery site.

On the following page are graphical representations of our solutions.

Traditional CA VTape Configuration



Tapeless CA VTape Configuration



I. SCOPE

The Data Center, West Virginia Office of Technology, identified hereinafter as “the agency”, seeks a virtual tape solution that includes a two-way grid with replication between its primary Data Center located in Charleston, W. Va., and its Recovery Center located in Flatwoods, W. Va. This system will replace the current physical tape solution described in Section II, Current Environment.

The agency is seeking a virtual tape solution that replaces the current system, but also includes physical tape drives and an automated tape library at the Recovery Center as a means for feeding the agency’s contracted disaster recovery facility (SunGard).

Details for mandatory requirements are described in Section III. The State shall make the award to the lowest-cost response that meets all the mandatory requirements.

ViON along with CA is pleased to offer the VTape for the State of West Virginia’s Virtual Tape Solution (VTS). A CA VTape VTS complex is comprised of one (1) or more subsystems accessing a common set of control files and virtual volumes using shared DASD. These subsystems may be running on one (1) or more LPARs. This configuration relies on shared DASD and works well in a multi-system environment for sharing virtual volumes with zIIP exploitation. The zIIP exploitation has made CA VTape VTS into a green appliance. The virtualization and compression engine (I/O engine) is zIIP enabled and is easy to support and maintain.

- ☐ CA VTape VTS’ zIIP exploitation make it a “green appliance”
- ☐ Up to 85-percent of CA VTape VTS’ work is zIIP eligible
- ☐ CA VTape VTS exploits mainframe improvements and upgrades
- ☐ Midaw, PAV, HyperDispatch, zIIP
- ☐ CA VTape VTS scales extremely well
- ☐ 550 MBps per disk subsystem (doubles when 2ND added)
- ☐ Flexible management and disaster backup solutions
- ☐ Mirrored disk cache and tape channel extenders eliminate single points of failure
- ☐ The USS Backstore feature allows access to NFS servers to facilitate tapeless implementations or to permit up to three (3) Backstore copies of a virtual volume in addition to the traditional primary and duplex physical tape copies.

Like most virtual tape solutions, CA VTape intercepts tape Input Output (I/O) and redirects them to disk. At predetermined times or when thresholds are exceeded, the disk data is written onto physical tapes as stacked files. This optional process is called externalization and is handled by CA VTape’s Backstore server. A primary and optional duplex copy can be written to physical

tape. All physical tape processing can be consolidated into one (1) or more LPARs using Backstore and failover servers.

Some customers prefer to implement CA VTape using an asynchronously mirrored disk cache and channel extenders for writing the duplex physical tape copy to a remote data center. This approach offers a fast disaster backup recovery time objective (RTO) and simplifies the entire disaster backup and recovery plan. CA VTape does not require any special configuration settings to exploit this implementation.

Other CA VTape VTS customers choose the CA VTape peer-to-peer option, which employs a shared TCP/IP network instead of expensive channel extenders. A peer-to-peer option solution provides real-time tape mirroring and immediate sharing of virtual volumes to disaster recovery (DR) or remote sites. The size and number of TCP/IP links is handled by z/OS. For those applications that can tolerate a delay in transmission, CA recommends exploiting “exchange metadata only” to prevent network delays from affecting elapsed runtimes. Batch jobs run at local cache speeds while transmissions can be deferred to times when links are less utilized. The CA VTape VTS peer-to-peer option lets IT organizations centralize physical tape processing and support remote sites that do not use physical tape. For example, one (1) data center may elect to not have any physical tape drives at all, allowing a remote data center to handle all Backstore processing.

The USS Backstore feature can be used to create a Backstore copy of virtual volumes on network file systems. The USS Backstore feature supports integration of Network File System (NFS) servers through UNIX System Services. Some NFS servers can also support both data duplication and data replication. These types of devices allow you to backup virtual volumes using less expensive disks and when combined with data replication, allow you to send virtual volume data to a remote backup site without involving any other significant hardware or software resources. The USS Backstore copy enables up to three (3) Backstore copies of a virtual volume.

With CA VTape’s flexible policy-based grouping, performance, replication, compression, USS Backstore, and physical tape requirements they can be assigned uniquely by application. This allows a small number of administrators to control the Disaster Backup and Recovery Time

Objectives (RTO) for the Enterprise. Groups are assigned by dataset or data-class name filters when a virtual volume is first created. The dataset and data-class filter lists can be maintained by a small number of administrators.

For example, a group can be considered tapeless when data is written to virtual volumes with short retention and which do not require offsite replication. These virtual volumes can be directed to a group that is not externalized (written to physical tape).

Another group may require synchronous replication to a remote datacenter to ensure the RTO is met. Additionally, zIIP-eligible compression can be enabled for this workload to decrease network bandwidth and DASD cache space requirements.

Another group may externalize one (1) copy to a NFS server, which is replicated to a remote data center. Finally, another group writes all three (3) Backstore copies, primary to a local physical tape, duplex channel extended to another data center, and a 3rd to a USS NFS server, which is situated locally, performs data deduplication, and replicates to another location.

To attain the shortest possible RTO, CA recommends DASD mirroring important tape data, which includes the tape database (CA-1, RMM), CA VTape control files, and ICF catalogs used by CA VTape.

CA VTape is able to utilize any mainframe vendor's physical tape drives when stacking virtual volumes to physical tape. The externalization drives can encrypt and or utilize data deduplication techniques.

CA VTape also has some notable integration points with CA-1 and CA Vantage. For example, CA-1 is able to pre-stage multi-volume tape datasets into the CA VTape disk cache. This helps prevent delays when reading the second and other volumes of the multi-volume dataset. Another integration point is CA VTape queries the CA-1 calculated tape expiration date to ensure virtual volumes with similar expiration dates are written to the same physical tapes. This helps avoid the need to consolidate physical tapes. Likewise, CA VTape informs CA-1 to which physical volume a virtual volume has been written. CA Vantage SRM is able to report and automate many CA VTape actions further decreasing the demands of administrators.

Scope, Approach, and Methodology

CA VTape utilizes the IBM Volume Mount Analysis (VMA) utility to analyze SMF information to forecast the number of licensed CA VTape drives. The VMA also reveals the peak days for the amount of data written in a 24-hour period and the peak hour in the day. This information is used to calculate the amount of 3390 disk cache CA VTape will need, the minimal number of physical drives required, and the amount of general CPU and zIIP processor required to support the environment.

The VMA data was not available to size the environment, and therefore, it has been estimated. All estimates must be confirmed by analyzing the VMA data to achieve accurate resource projections.

Conversion Assessment

Since CA VTape VTS can be licensed for fewer virtual tape devices (CA uses the term devices rather than drives, however; the terms are interchangeable) than are commercially available from most hardware vendors, unless there is some administrative benefit for the State of West Virginia to maintain the capacity of current hardware, licensing costs could be reduced.

CA would recommend a minimum of 64-96 VTDs pending verification of VMA analysis.

Recommended cache sizes are; 2.1 or 4.2 TB for workloads that write five (5) or ten (10) TB/day, with 25-percent set aside for cache residency. These amounts are estimates and must be verified by the VMA analysis.

CA recommends mirroring between the primary and secondary sites asynchronously, meaning the total amount would be 4.2 or 8.4 TB for workloads that write five (5) or ten (10) TB/day respectively. This capacity is most affordable when able to be satisfied by integrating into existing mainframe storage controllers.

Recommended minimal physical tape drive requirements are three (3) primary local drives and three (3) duplex channel extended drives for five (5) TB/day or five (5) primary local drives and five (5) duplex channel extended drives for ten (10) TB/day.

The estimated general CPU and zIIP processor for a model 2817-708 processor would be as follows pending verification of VMA analysis:

TB/Day	Projected %zIIP processor @ Peak	Average Projected %zIIP processor	Projected %GP processor @ Peak	Average Projected %GP processor
5	13.03%	7.44%	2.94%	1.68%
10	26.03%	14.88%	5.87%	3.35%

We have provided two (2) options for our proposal. The first option includes 15 TB of storage to be used with VTape. Fifteen (15) TB would be the total storage required for our solution. The second option includes the 70 TB of storage to meet the storage requirement for your RFP.

The following hardware and software is included in our proposal:

Option 1:

The recommended option of a system that is capable of satisfying 10+ TB/day, which includes:

- a. Hitachi Data Systems (Hitachi) Virtual Storage Platform (VSP) at local data center
 - b. IBM tape library at local data center
 - c. VSP at recovery center
 - d. IBM tape library at recovery center
- ☐ Two (2) IBM TS3500 tape library
- ☐ Six (6) 3,592 fibre drive mounting kit
 - ☐ Sixteen (16) additional 3,592 i/o slots
 - ☐ ALMS
 - ☐ Encryption configuration
 - ☐ Six (6) 3592-E05 TS1120 Tape drive
 - ☐ Six (6) 9000 zSeries ESCON/FICON attach
 - ☐ Six (6) Encryption capable – plant
 - ☐ Two (2) 3599-014 IBM tape cartridge 3592 extended data with labeling and initialization
 - ☐ Ten (10) 20-pack 3,592 extended data cartridges
 - ☐ Two (2) 3952-F05 tape frame

- ☐ Two (2) Hitachi VSP
 - ☐ Eight (8) 2-TB 7.2K SATA HDDs, 11 TB useable RAID-5
 - ☐ One (1) 2-TB 7.2K SATA HDDs, spare
 - ☐ Eight (8) 600 GB 10K SAS HDDs, Journal Volumes for Replication
 - ☐ One (1) 600 GB 10K SAS HDDs, spare
 - ☐ Sixty-four (64) GB cache
 - ☐ One (1) 8-GB 16-port FICON Longwave Channel Cards
 - ☐ One (1) 8-GB 16-port FIBRE Shortwave Channel Cards
- ☐ Two (2) Cisco 9200
 - ☐ 18/4 port multiservice module 18-port 4-Gb FC and 4-GigE port

Software – VTL

- ☐ CA's VTape

Software - VSP

- ☐ Basic Operating System (BOS)
- ☐ Parallel Access Volume
- ☐ Universal Replicator (UR)

Services

- ☐ CA implementation
- ☐ Training
- ☐ Tape migration
- ☐ IBM implementation.

Option 2:

A nearly tapeless solution that is capable of holding 70 TB of DASD along with an IBM tape library at the recovery center

- a. VSP at local data center
- b. VSP at recovery center
- c. IBM tape library at recovery center

- ☐ One (1) IBM TS3500 tape library
 - ☐ Six (6) 3,592 fibre drive mounting kit
 - ☐ Sixteen (16) additional 3,592 i/o slots
 - ☐ ALMS
 - ☐ Encryption configuration
 - ☐ Six (6) 3592-E05 TS1120 Tape drive
 - ☐ Six (6) 9000 zSeries ESCON/FICON attach
 - ☐ Six (6) Encryption capable – plant
 - ☐ Two (2) 3599-014 IBM tape cartridge 3592 extended data with labeling and initialization
 - ☐ Ten (10) 20-pack 3,592 extended data cartridges
 - ☐ Two (2) 3952-F05 tape frame
- ☐ Two (2) Hitachi VSP
 - ☐ Fifty six (56) 2-TB 7.2K SATA HDDs, 11 TB useable RAID-5
 - ☐ One (1) 2-TB 7.2K SATA HDDs, spare
 - ☐ Sixteen (16) 600 GB 10K SAS HDDs, Journal Volumes for Replication
 - ☐ One (1) 600 GB 10K SAS HDDs, spare
 - ☐ Ninety Six (96) GB cache
 - ☐ One (1) 8-GB 16-port FICON Longwave Channel Cards
 - ☐ One (1) 8-GB 16-port FIBRE Shortwave Channel Cards
- ☐ Two (2) Cisco 9200
 - ☐ 18/4 port multiservice module 18-port 4-Gb FC and 4-GigE port

Software – VTL

- ☐ CA's VTape

Software - VSP

- ☐ Basic Operating System (BOS)
- ☐ Parallel Access Volume
- ☐ Universal Replicator (UR)

Services

- ☐ CA implementation
- ☐ Training
- ☐ Tape migration
- ☐ IBM implementation.

Hitachi VSP

The storage included in our proposal is the industry-unique Hitachi VSP storage subsystem to the State of West Virginia. The VSP—the industry’s highest performing and most scalable storage solution—represents the first implementation of a large-scale, Enterprise-class virtualization software delivering virtualization of internal and external storage into one (1) pool. It is the only storage architecture that scales flexibly for performance, capacity, and the virtualization of multivendor storage to optimize return on storage assets. The mobility it gives to data reduces the business impact of adapting to change. A highly efficient design allows for unsurpassed performance and capacity in addition to the lowest power and cooling requirements. Hitachi Dynamic Tiering makes block, file, and content data mobile across virtual storage tiers.

We have supplied Hitachi UR for your remote copies, as well as Parallel Access Volume (PAV).

The VSP is extremely versatile and can be configured to meet all of our customers’ requirements. The Hitachi VSP is the only 3-dimensional scaling storage platform designed for all data types. It contains the only storage architecture that scales flexibly for performance, capacity, and the virtualization of multivendor storage to optimize the return on storage assets.



The mobility it gives to data reduces the business impact of adapting to change. A highly efficient design allows unsurpassed performance and capacity with the lowest power and cooling requirements. The Hitachi VSP is a high-capacity, high-performance data storage system that offers a wide range of storage and data services, software, logical partitioning, and simplified and unified data replication across heterogeneous storage systems. Its large-scale, Enterprise-

class virtualization layer combined with dynamic provisioning, dynamic tiering, and thin provisioning software, delivers virtualization of internal and external storage into one (1) pool.

- ☐ Rack-mountable design: can be used as a diskless controller; can grow its storage up to 2,048 SAS 2.5-inch drives or 1,280 SATA 3.5-inch drives and support up to 256 flash drives for exceptional performance
- ☐ Unmatched multiplatform connectivity with up to 192 fibre-channel eight (8) GBps host ports or 176 IBM FICON eight (8) GBps host ports
- ☐ Up to eight (8) virtual storage directors and one (1) TB single image global cache
- ☐ Powered by our fifth-generation crossbar switch architecture, which joins multiple control chassis under one (1) logical system.
- ☐ Virtualization of internal and externally attached storage from Hitachi, EMC, IBM, Sun, and other manufacturers up to 255 PB under management
- ☐ Multi-tenancy support enabled by virtual port, cache partitioning, resource group access control, and volume ownership management.

The VSP offers these features:

- ☐ The HiStar-E PCI express switched grid acts as the interconnection among front-end directors, back-end directors, data cache adapter boards, and virtual storage director boards.
- ☐ Data accelerator processors on the front-end directors and back-end directors work with central processor boards called virtual storage directors that manage all I/O by sets of assigned logical devices (LDEVs).
- ☐ Dual SAS controllers on back-end director boards contain eight (8) 6-GBps SAS links per board.
- ☐ The control memory function resides in global cache and each VSD board contains a local copy with information for its LDEVs. Most control memory accesses are lookups to the local copy.
- ☐ Global cache is backed up to solid-state drives (SSDs) on the cache boards.

- ☐ Each virtual storage director board controls all I/O operations for a discrete group of LDEVs.

LDEVs are assigned round-robin across the installed virtual storage director boards as they are created. If necessary, you can manually reassign LDEV ownership to a different virtual storage director.

- ☐ Each virtual storage director board executes the code for initiator mode (hosts), external mode (virtualization), back-end director mode or the copy products send and receive modes. Code execution is done on a per-job basis.
- ☐ A VSP can be scaled from a single chassis system to a dual chassis system. Each chassis has a control rack and a logic box.
- ☐ Up to 1,280 3.5-inch large form factor (LFF) drives or 2,048 2.5-inch small form factor (SFF) drives can be installed in a dual-chassis system. If you install both LFF and SFF disk containers and drives in a storage system, the limits change, based on the configuration you choose.

Using this system, you can deploy applications within a new framework and leverage, add value to current investments, and more closely align IT with business objectives. VSP storage systems provide the foundation for matching application requirements to different classes of storage and deliver critical services, including:

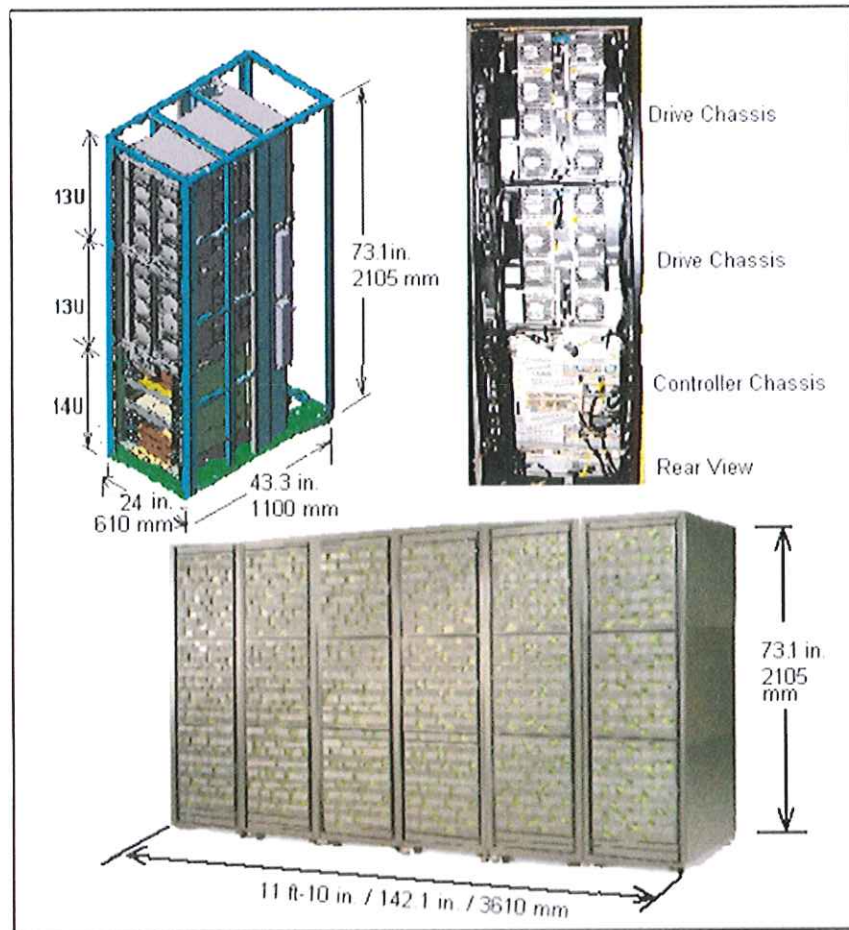
- ☐ Business continuity (BC) services
- ☐ Content management services (search, indexing)
- ☐ Non-disruptive data migration
- ☐ Thin provisioning
- ☐ Dynamic Tiering
- ☐ High availability
- ☐ Security services
- ☐ I/O load balancing
- ☐ Data classification
- ☐ File management services
- ☐ PAV and Hyper-PAV.

New technological advances improve reliability, serviceability, and access to disk drives and other components when maintenance is needed. Each component contains a set of LEDs that indicate the operational status of the component. The system includes new and upgraded software features, including dynamic tiering and a significantly improved, task-oriented version of Storage Navigator, which is designed for ease-of-use and includes context-sensitive online help. The system documentation has been changed to a task-oriented format that is designed to help you find information quickly and complete tasks with ease.

VSP systems contain significant new technology that was not available in previous Hitachi storage systems. The system can be configured in many ways, starting with a small, one (1) rack, diskless system to a large, six (6)-rack system that includes two (2) controller chassis, up to 2,048 HDD drives or 256 SSD drives, and a total of one (1) TB of cache. The system provides a highly granular upgrade path, allowing the addition of disk drives to the drive chassis, and virtual storage directors and other components to the controller chassis in an existing system as storage needs increase.

VSP systems can be combined so that what would previously have been two (2) separate storage systems are now a single storage system with homogeneous logic control, cache, and front-end and back-end interfaces, all mounted in standard Hitachi 19-inch racks.

A basic VSP storage system consists of a controller chassis and one (1) or more drive chassis that contain the disk drives or SSD arrays. The system includes a control rack (Rack-00) that contains a controller chassis and may be either diskless (no drive chassis) or may contain one (1) or two (2) drive chassis. The controller chassis contains the control logic, processors, memory, and interfaces to the drive chassis and the host servers. A drive chassis consist of disk or SSD drives, power supplies, and the interface circuitry connecting it to the controller chassis. The remaining racks (Rack-01 and Rack- 02) contain from one (1) to three (3) drive chassis.

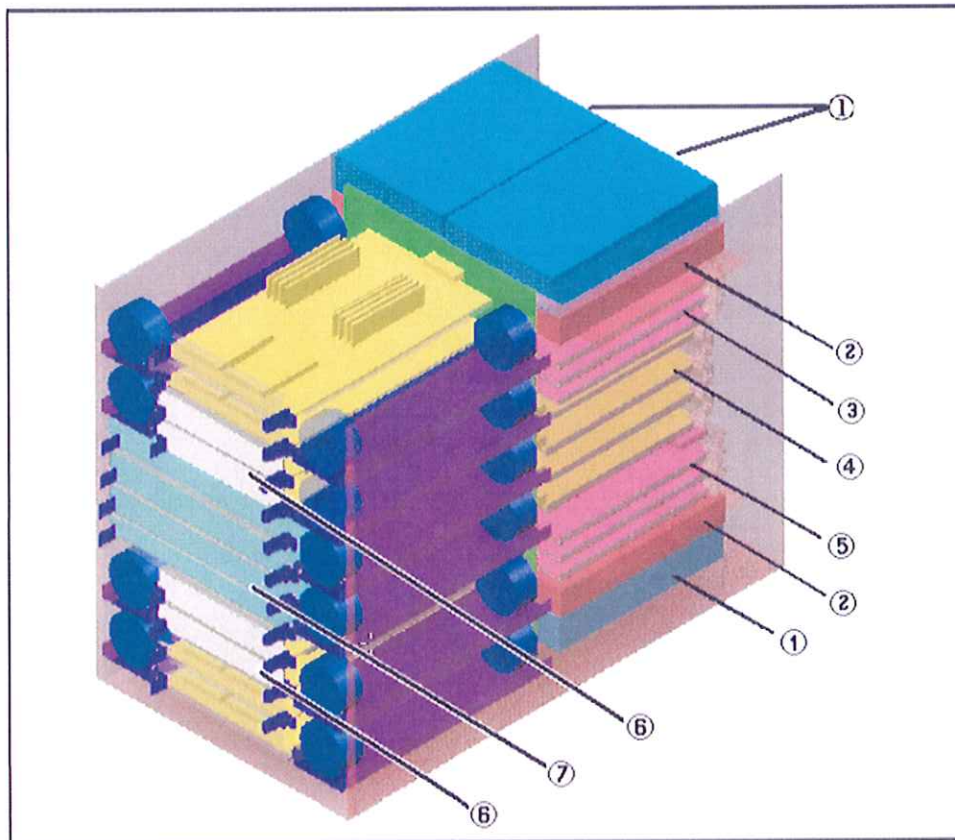


The following sections provide descriptions of the Hitachi VSP storage system and its components.

Controller chassis

The controller chassis (factory designation DKC) includes the logical components, memory, disk drive interfaces, and host interfaces. It can be expanded with a high degree of granularity to a system offering up to twice the number of processors, cache capacity, host interfaces, and disk storage capacity.

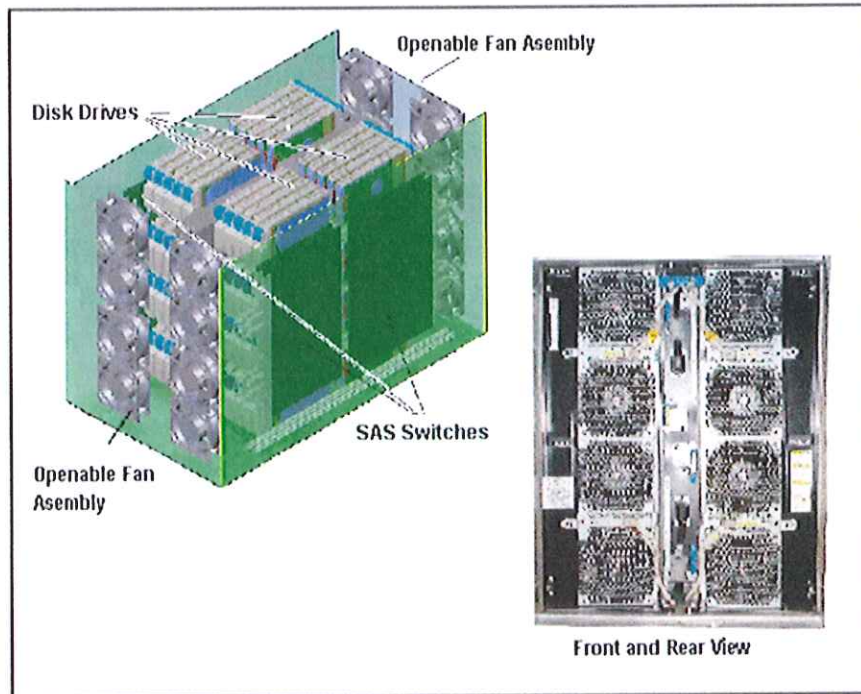
The controller chassis includes the following maximum number of components: two (2) service processors, 256 GB cache memory, four (4) grid switches, four (4) redundant power supplies, eight (8) front-end directors, four (4) back-end directors, and ten (10) dual fan assemblies. It is mounted at the bottom of the rack because it is the heavier of the two (2) units. If a system has two (2) SVPs, both SVPs are mounted in controller chassis #0.



Item	Description	Item	Description
①	AC/DC Power Supply 2, 3 or 4 units per controller	②	Service Processor One or two units in the #0 controller chassis.
③	FED (front-end director)	④	Grid switches
⑤	FED (up to 8, and BED (up to 4)	⑥	Cache (2 to 8 boards)
⑦	Virtual Storage Directors (2 to 4 microprocessor boards)	-	-

Drive chassis

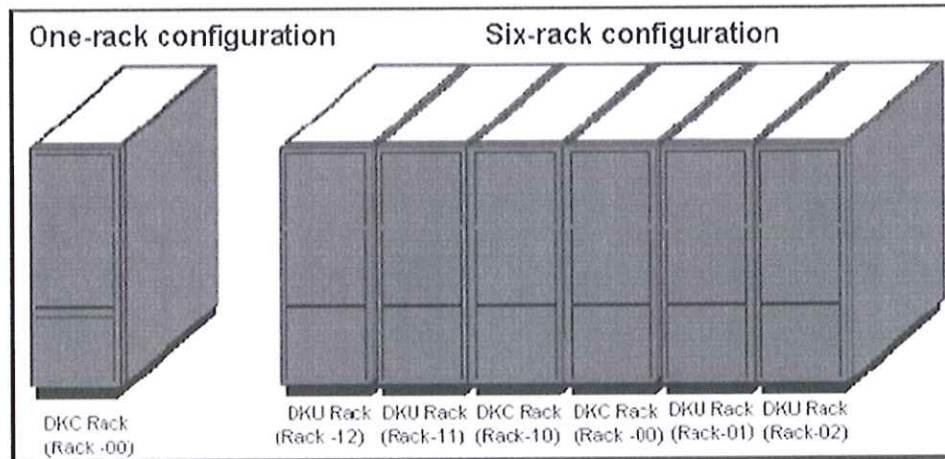
The drive chassis (factory designation DKU) contains HDD or SSD drives, eight (8) SAS switches, and two (2) 8-fan “door” assemblies that can be easily opened to allow access to the drives. There are two (2) types of drive chassis. One (1) type can contain up to 80 3½-inch disk drives or SSD drives. The other can contain up to 128 2½-inch disk drives or SSD drives. A VSP storage system can contain both types of drive chassis, but 3½-inch drives and 2½-inch drives cannot be intermixed within the same drive chassis. The maximum number of 3½-inch drives in a VSP storage system is 1,280. The maximum number of 2½-inch drives is 2,048.



Scalability

The VSP storage system is highly scalable and can be configured in several ways as needed to meet customer requirements:

- ❑ The **minimum configuration** is a single rack containing one (1) controller chassis in a diskless configuration
- ❑ A single rack containing one (1) controller chassis and one (1) or two (2) disk drive units
- ❑ One (1) to three (3) racks containing one (1) controller chassis and up to eight (8) drive chassis. A drive chassis can contain up to 80 3½-inch disk drives, 128 2½-disk drives, or 128 SSDs. Drive sizes can be intermixed within a system but not within a single chassis. Different chassis are required for the 2½-inch and 3½-inch drives.
- ❑ The maximum configuration is a six (6)-rack, twin version of the above that contains two (2) controller chassis and up to 16 drive chassis containing up to 2,048 2½-inch disk drives or 1,280 3½-inch disk drives. The total storage space of this configuration is 2½ PB.



In addition to the number of disk drives, the system can be configured with disk drives of different capacities and speeds, varying numbers of front-end directors (FED) and back-end directors (BED), and varying cache capacities, as follows:

- ☐ Two (2) to six (6) FEDs (each is a pair of boards); this provides a total of 12 when all of the FED slots are used and there are no BEDs installed, as in a diskless system. The maximum total number of FEDs and BEDs is 12.
- ☐ Two (2) to four (4) BEDs (each is a pair of boards); this provides a total of eight (8) when all of the BED slots are used. In this case, only two (2) FEDs can be installed.
- ☐ Cache memory capacity: 256 GB [one (1) module / three (3)-rack system] and 512 GB [two (2) modules / six (6)-rack system].
- ☐ Disk drive capacities of 200 GB and 400 GB (SSD), 146 GB, 300 GB, 600 GB (SAS) and two (2) TB (SATA).
- ☐ 128 8-GBps FC or FICON ports if all back-end directors are being used.

High Performance

The VSP includes several new features that improve the performance over previous models. These include:

- ☐ High speed disk drives that run at 7,200, 10,000, or 15,000 RPM SSD flash drives with ultra-high speed response
- ☐ High speed data transfer between the BED and HDDs at a rate of six (6) GBps with the SAS interface

- ❑ High-speed quad core CPUs that provide three (3) times the performance of a Universal Storage Platform VM (USP VM) storage system.

High Capacity

The VSP supports the following high-capacity features:

- ❑ HDD (disk) drives with capacities of 146 GB, 300 GB, 600 GB, and two (2) TB
- ❑ SSD (flash) drives with capacities of 200 GB and 400 GB
- ❑ Controls up to 65,280 logical volumes and up to 2,048 disk drives, and provides a maximum physical disk capacity of approximately 2.521 PB per storage system.

Connectivity

The VSP storage system supports most major IBM Mainframe operating systems such as z/OS, z/VM, and Linux, as well as Open System operating systems, including Microsoft Windows, Oracle Solaris, IBM AIX, Linux, HP-UX, and VMware.

VSP supports the following host interfaces. They can mix within the storage system.

- ❑ Mainframe fibre-channel (FICON)
- ❑ Open Systems fibre channel.

High Reliability

The VSP storage system includes the following features that make the system extremely reliable:

- ❑ Support for RAID-6 (6D+2P), RAID-5 (3D+1P/7D+1P), and RAID-1 (2D+2D/4D+4D).
- ❑ All main system components are configured in redundant pairs. If one (1) of the components in a pair fails, the other component performs the function alone until the failed component is replaced. Meanwhile, the storage system continues normal operation.
- ❑ The VSP is designed so that it cannot lose data or configuration information if the power fails.

Non-disruptive service and upgrades

The VSP storage system is designed so that service and upgrades can be performed without interrupting normal operations. These features include:

- ❑ Main components can be “hot swapped”—added, removed, and replaced without any disruption — while the storage system is in operation. The front and rear fan assemblies can be moved out of the way to enable access to disk drives and other components but not both at the same time. There is no time limit on changing disk drives because either the front or rear fans cool the unit while the other fan assembly is turned off and moved out of the way.
- ❑ A Service Processor (SVP) mounted on the controller chassis monitors the running condition of the storage system. Connecting the SVP with a service center enables remote maintenance.
- ❑ The firmware (microcode) can be upgraded without disrupting the operation of the storage system. The firmware is stored in shared memory (part of the cache memory module) and transferred in a batch, reducing the number of transfers from the SVP to the controller chassis via the LAN; this increases the speed of replacing the firmware online because it works with two (2) or more processors at the same time.

Economical and quiet

The three-speed fans in the control and drive chassis are thermostatically controlled. Sensors in the units measure the temperature of the exhaust air and set the speed of the fans only as high as necessary to maintain the unit temperature within a preset range. When the system is not busy and generates less heat, the fan speed is reduced, saving energy and reducing the noise level of the system.

When the storage system is in standby mode, the disk drives spin down and the controller and drive chassis use significantly less power. For example, a system that consumes 100 amps during normal operation uses only 70 amps while in standby mode.

Hitachi Compatible Parallel Access Volume

Parallel Access Volume (PAV), Compatible PAV, enables a single IBM zSeries or S/390 host computer to issue multiple I/O requests in parallel to a single logical device (LDEV).

Compatible PAV operations may be performed in one (1) of two (2) standard operational modes. When the VSP is operating in IBM 2105 control unit emulation, dynamic or static PAV mode can be used. When the VSP is operating in IBM 2107 control unit emulation, dynamic or static compatible PAV, or compatible hyper PAV modes can be used. The compatible PAV mode is controlled by the dynamic alias management parameter setting for the IBM Workload Manager (WLM) and the WLMPAV parameter setting in the HCD file.

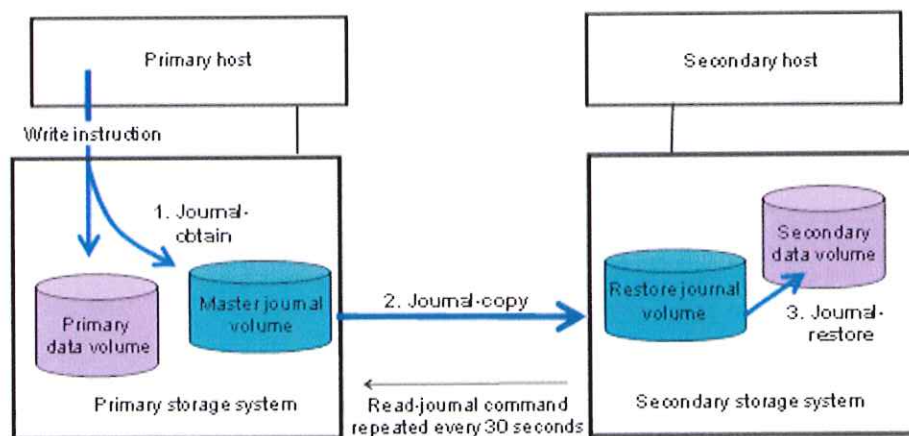
UR Software

UR software, included in our proposal, is an advanced technology for asynchronously replicating data hosted on VSP models, or externally attached storage systems to a remote site. UR software uses disk-based journaling and an optimized replication engine to reduce resource consumption and costs, while increasing performance and operational resilience.

The following sections describe two (2) key technical innovations that underlie the strengths and benefits of UR software:

- ☐ Performance optimized, disk-based journaling
- ☐ Pull style replication engine.

Journal-based Replication



The figure on the previous page illustrates UR software's application of performance optimized, disk-based journaling. In this illustration, online transaction processing (OLTP) data volumes at the primary data center are being replicated to a second VSP at the remote data center.

When collecting the data to be replicated, the primary VSP writes the designated records to a special set of journal volumes. The remote storage system then reads the records from the journal volumes, pulling them across the communication link as described in the next section. By writing the records to journal disks instead of keeping them in cache, UR software overcomes the limitations of earlier asynchronous replication methods. Writes to the journal are cached for application performance reasons, but de-staged to disk quickly to minimize cache usage. The journal disks are specially architected and optimized for maximum performance.

In addition to the records being replicated, the journal contains metadata for each record to ensure the integrity and consistency of the replication process. Each transmitted record set includes sequence number information, enabling the replication engine to verify that all the records are received at the remote site, and to arrange them in the correct write order for storage. These processes build on the proven algorithms of Hitachi TrueCopy software products. The journaling and replication processes also support consistency across multiple volumes. UR software, therefore, builds on the proven performance and efficiency.

In addition to disk-based journaling, UR software uses pull style replication. The primary storage system does not push data across the replication link unless requested by the remote site. The replication engine on the remote system receives the data from the primary system's journal volume and writes it to the journal volume at the receiving site. The replication engine then applies the journaled writes to the remote data volumes, using metadata and consistency algorithms to ensure data integrity. In the default configuration, UR software considers replication complete when the data is received in mirrored system cache at the remote system, written to the journal disk, and applied to the remote data volumes. Since the processes that control asynchronous replication are located on the remote system, fewer resources are consumed on the primary storage system, thus improving production application performance. In effect, UR software restores primary site storage to its intended role as a transaction processing resource, not a replication engine.

HiTrack

Also configured with the VSP are Hitachi's predictive maintenance strategy, HiTrack. HiTrack helps ensure zero failures with "Call Home" diagnostics. ViON/Hitachi customers enjoy a unique advantage of high product availability and reliability. HiTrack is one of the specialized tools that help ensure this advantage, giving ViON/Hitachi a distinctive competitive edge. HiTrack embodies the "zero failure maintenance philosophy" which contributes to the strategic mission of Hitachi. This unique, proprietary remote monitoring tool facilitates the diagnosis and circumvention of technical problems.

What Are HiTrack's Major Functions?

HiTrack performs five (5) major functions:

- ☐ Monitoring
- ☐ Data gathering
- ☐ Data analysis
- ☐ Action recommendation
- ☐ Execution.

Monitoring - When installed, HiTrack provides continuous, objective monitoring of supported equipment to help deliver non-stop operation. It records statistical data, including activities and events that are not harmful in themselves but may indicate trends. In normal operating mode, HiTrack is invisible; therefore, it is non-invasive and cannot access application data so confidentiality is assured. HiTrack does not interfere with standard error recording. A multi-layered security system provides an additional guarantee of data protection.

Data Gathering - HiTrack makes certain that data is sent to the customer support center by polling the devices. If HiTrack observes an internal situation that indicates a problem or a potential problem (such as a power fault or an approaching error threshold), it will immediately initiate a phone call to the customer support center without waiting to be polled. This call-home capability is based on Hitachi's proprietary expert system—a set of rules that considers the type of irregularity and the history of similar events on similar configurations.

Data Analysis - HiTrack analyzes problems far faster than that of an onsite technician. It immediately compares the data it has gathered against performance histories of our installations

throughout the world. Patterns are compared at electronic speeds with previous histories to forecast probabilities for the continued proper operation of the equipment. This statistical data is also used by Hitachi's engineering staff to design even more reliable products for the next generation.

Action Recommendation - Once sufficient information is gathered, HiTrack uses its expert systems to establish the probable source of a real or anticipated problem and to recommend a solution. Most problems are prevented or solved at this point. If a problem is not solved, the customer support center and factory personnel throughout the world can review the data from the HiTrack expert system to resolve especially complex problems.

Execution - HiTrack also supports problem repair. Should onsite parts and service be necessary, HiTrack can identify the necessary parts and cause the customer service representative (CSR) to be dispatched automatically via the Central Call Management (CCM) system. While this is happening, an automatic escalation plan goes into effect to make sure your customer is receiving maximum attention. The operations center at the customer support center follows this activity on a minute-by-minute basis to take the actions necessary for the best possible response.

HiTrack can be configured to email customers when component failures occur.

IBM System Storage TS3500 Tape Library

The IBM System Storage TS3500 Tape Library is designed to provide a highly scalable, automated tape library for mainframe Open Systems backup and archive that can scale from midrange to enterprise environments.

The TS3500 Tape Library continues to lead the industry in tape drive integration with features such as persistent World Wide Name, multipath architecture, drive/media exception reporting, remote drive/media management, and host-based path failover.



and

The TS3500 Tape Library supports System Z when used with the IBM 3953 Tape System, the IBM Virtualization Engine TS7740, or the IBM System Storage Tape Controller for System Z with its embedded library manager. These systems enable System Z hosts to access the TS3500

Tape Library cartridge inventory and allow connection to TS1140, TS1130, TS1120 and IBM TotalStorage 3592 Model J1A Tape Drives. The TS3500 Tape Library can support up to four (4) 3953 tape systems, up to eight (8) IBM Virtualization Engine TS7740 subsystems per physical library, and up to sixteen (16) IBM System Storage Tape Controllers for System Z per logical library.

Highlights

- ☐ Supports highly scalable, automated data retention on tape utilizing LTO Ultrium and IBM 3592 and TS1100 families of tape drives
- ☐ Extreme scalability and capacity growing from 1-to-16 frames per library and from 1-to-15 libraries per library complex, using the TS3500 shuttle connector
- ☐ Up to 900 PB of automated, low cost storage under a single library image, dramatically improves floor space utilization and reduces storage cost per terabyte
- ☐ Optional second robotic accessor enhances data availability and reliability
- ☐ Provides data security and regulatory compliance via support for tape drive encryption and WORM cartridges.

Common features

- ☐ Ability to attach multiple simultaneous heterogeneous servers
- ☐ Remote management using a web browser
- ☐ SNMP functionality
- ☐ Advanced Library Management System (ALMS)
- ☐ Persistent World Wide Name
- ☐ Multipath architecture
- ☐ Drive/media exception reporting
- ☐ Shuttle connector
- ☐ Remote drive/media management
- ☐ Host-based path failover
- ☐ Supports TS1120, TS1130, TS1140, TS1040 and TS1050 Tape Drive encryption.

Hardware summary

- ☐ One (1) base frame, and up to fifteen (15) expansion frames per library; up to fifteen (15) libraries interconnected per complex
- ☐ Up to twelve (12) drives per frame (up to 192 per library, up to 2,700 per complex)
- ☐ Up to 224 I/O slots (16 I/O slots standard)
- ☐ IBM 3592 JA/JJ/JB/JC and JW/JR/JX/JY (WORM) cartridges or IBM LTO Ultrium 5, 4, 3, 2, 1 cartridges
- ☐ Up to 60 PB compressed with IBM Ultrium 5 cartridges per library, up to 900 PB compressed per complex
- ☐ Up to 180 PB compressed with 3592 extended capacity cartridges per library, up to 2.7 EB compressed per complex
- ☐ LTO fibre channel interface for server attachment.

II. CURRENT ENVIRONMENT

The agency currently owns and operates the following tape and storage systems:

Qty.	Machine/Product	Product Description
2	9310	StorageTek library storage modules
2	9311	StorageTek library control units
1	4410	StorageTek library storage modules
1	4411	StorageTek library control units
12	3590-B1A	IBM Magstar tape drives
3	3590-A50	IBM Magstar control units
16	9490-M34	StorageTek Timberline tape drives

So noted and accepted.

The agency currently operates a z/10 IBM mainframe utilizing the above-listed tapes hardware at its primary Data Center in Charleston. CA-1's TMS is used to manage the tapes, with HSM also utilized to provide automatic migration of data from disk to physical tape. The agency currently has approximately 42 terabytes of compressed tape data located on 3490 and 3590 tape media.

On Sunday mornings, a full backup of the operating system and disk is made on 3590 tapes, then they are transported offsite. This backup is kept for two weeks, then rotated back and scratched when the third weekly backup is made. These backups are the primary means by which a Disaster Recovery system, currently provided by SunGard, is created.

User agencies create copies of their own data on more frequent intervals, and make those tapes available for offsite transport. These tapes are also taken to SunGard in the event of a disaster.

So noted and accepted.

III. Requirements

The vendor shall provide a solution that includes systems located in the primary Data Center in Charleston and the Recovery Center in Flatwoods. The system at the Recovery Center shall include physical tape drives. The solution must meet all of the following mandatory requirements.

1. The vendor will supply all the equipment and software specified in Appendix A, or equal.

So noted and accepted. We are proposing the CA VTape with Hitachi VSP storage subsystem, and IBM tape libraries.

2. The equipment shall be new. Remanufactured or warranted as new equipment is unacceptable.

So noted and accepted. All proposed equipment is new

3. The solution shall support data replication between the primary virtual tape server at the primary Data Center and the Recovery Center. The customer will provide the telecommunication equipment and bandwidth required to enable replication between the Centers.

So noted and accepted. Hitachi Universal Replicator is included in our proposal. Also included are Cisco 9200 switches with FCIP connectivity. The ViON proposed CA VTape VTS supports tape replication, DASD replication, P2P and NFS files with any hardware vendor. It also supports De-DUP

4. The solution shall allow for creation of physical tapes at the remote location for disaster recovery purposes. Physical tapes must be capable of holding at least 700 GB of uncompressed data.

So noted and accepted. The ViON proposed CA VTape VTS allows for both physical and remote tapes with Backstore options.

-
- 5. The solution shall allow for removal of physical tapes from the remote location for disaster recovery purposes.**
-

So noted and accepted. The ViON proposed CA VTape VTS supports any tape drives. It also support hardware Tape Encryption drives with key manager or support CA Tape Encryption with key Manager or both.

-
- 6. The physical tape drives hardware (minimum of 6 drives) shall be capable of selectable encryption, in order for the customer to encrypt data that is on physical tape. All software and hardware required for encryption, including, but not limited to, key management, must be included in the proposal.**
-

So noted and accepted. Option 1 includes two (2) IBM TS3500 tape libraries and Option 2 includes one (1) IBM TS3500 tape library.

The ViON proposed CA VTape VTS supports any tape drives. It also support hardware Tape Encryption drives with key manager or support CA Tape Encryption with key Manager or both. Also supports compression with LZ78 and can also use the zIIP processor for compression and Tape encryption, but not required. CA VTape VTS has the encryption option or standalone product.

-
- 7. The automated physical tape library, to be located at the Recovery Center, must to capable of holding a minimum of 210 physical tapes initially (including up to ten cleaning tapes). The tape library must be expandable to allow for future growth.**
-

So noted and accepted. Our proposal includes 210 physical tapes. The ViON proposed CA VTape VTS supports any mainframe tape library.

-
- 8. The system shall be capable of handling 70 TB of uncompressed usable data.**
-

So noted and accepted. The ViON Option 2 supports 70 TB or more uncompressed data.

-
- 9. The solution will support z/OS, z/VM and Linux environments, and shall be capable of defining virtual drives that are usable by applications residing in any of those environments.**
-

The ViON proposed CA VTape VTS support z/OS 1.4 or above. Any application can use Virtual tapes across those systems.

10. The solution must allow for remote monitoring and operation of all hardware.

So noted and accepted. HiTrack is included for monitoring of the Hitachi VSP. IBM phone home capabilities are available for the Tape Library.

11. The solution must support and be compatible with all other current hardware and software currently in production at the customer's site. A list of the customer's current hardware and software is provided in Appendices B and C.

So noted and accepted. All hardware and software is compatible with the State of West Virginia's current hardware and software.

12. The system must be capable of recovering volume serial numbers in the event of a file system failure.

The ViON proposed CA VTape solution involves SMS managed Storage Groups which will be mirrored asynchronously between the primary Data Center and the Recovery Center. The CA VTape control files, CA1 database, and ICF catalog used by CA VTape should reside on the mirrored SMS Storage Group used by CA VTape. If the storage controller fails at the primary Data Center then the storage controller at the Recovery Center can be used. The recovery can be extremely fast and is able to be controlled by your own personnel. In addition, multiple Backstore copies of Virtual Volumes can be created locally at the primary Data Center and Duplex copies can be created at the Recovery Center. Should Virtual Volumes age off of the SMS managed storage, then they can be recalled from the Backstore copies. Should a media error occur, the alternate Backstore source would be automatically used to recall the Virtual Volume.

13. The system must be capable of data compression.

So noted and accepted.

14. The vendor shall specify the bandwidth requirements for replication between the primary Data Center and the Recovery Center.

Estimating network bandwidth is accomplished using IBM's Volume Mount Analyzer to determine tape peak hourly and daily write activity. The SMF data necessary to accomplish this

analysis was not available but medium to large installations often write around ten (10) TB/day. This number represents the maximum uncompressed amount of data needed to be transmitted between data centers to enable 100% replication. Additionally, CA VTape can make Backstore copies of Virtual Volumes that are created on physical tapes at the Primary Data Center and/or Duplex copies to physical tape at the Recovery Center. The copies written at the Recovery Center would require additional network bandwidth. Fortunately, CA VTape can be customized to replicate all or selected workloads. Additionally, CA VTape also supports zIIP-enabled compression which can decrease the amount of data that must be transmitted.

IV. INSTALLATION AND MAINTENANCE

- 1. The vendor shall install the primary virtual tape server and the customer's central site:**

**Building 6, Room 110
1900 Kanawha Blvd. E,
Charleston, WV 25305**

The vendor shall install the secondary virtual tape server at the Recovery Center located approximately 75 miles from the central site. The address of the secondary location is:

**Braxton Technology Center
89 Richard D Minnich Drive STE 103
Sutton, WV 26601**

So noted and accepted.

-
- 2. The vendor and agency shall meet, at the agency's primary data center, within 15 days after issuance of purchase order, to discuss pre-installation activities as well as the actual installation, and to agree on an installation date.**
-

So noted and accepted.

-
- 3. The system shall be operational within 30 days after they are installed. The virtual tape solution will not be considered fully operational until the offsite component is fully integrated with the central site component and a migration plan for data from existing tapes has been agreed upon and implemented.**
-

So noted and accepted.

RESPONSE

-
4. The vendor shall provide on-site hardware, firmware, and software engineering support, and agency training, at or about the time of system installation.
-

So noted and accepted.

-
5. The systems shall be maintained by the manufacturer or by representative(s) trained and authorized by the manufacturer.
-

So noted and accepted.

-
6. The vendor shall *warrant and maintain* the system for 48 months after installation. During this 48-month period, the vendor shall make and necessary repairs, replace the defective parts, perform preventative maintenance, install engineering changes and modifications, and otherwise maintain the system at no cost to the agency.
-

So noted and accepted.

-
7. The vendor shall identify any trade-in allowances for existing equipment replaced by the system. All de-installation and shipping costs shall be done by the vendor.
-

So noted and accepted.

V. IMPLEMENTATION OF THE VIRTUAL TAPE SOLUTION

The services specified in the following subsections shall be performed at the agency's sites and shall continue until all the services have been provided to the agency's satisfaction and the system is fully operational.

1. Assist with System Planning and Preparation

The vendor shall provide on-site consulting to discuss resource allocation management, storage administration and system programming requirements.

Topics may include the following:

1. DF/SMS allocation methodologies;
 2. JCL requirements;
 3. DF?SMS ACS utilization;
 4. Planning and implementation of library partitioning.
-

The ViON proposed CA VTape VTS has checklist for each process.

1. CA VTape supports DF/SMS
 2. NO JCL changes needed
 3. CA VTape VTS supports
 4. Checklist for each step
-

2. Provide Technical Consultation

The vendor shall review the following topics with the customer and give detailed instructions and guidance:

1. DF/SMS software support;
 2. Data migration considerations, including coexistence with other automation solutions;
 3. Interaction between the Virtual Tape Equipment and DF/SMS software support;
 4. Interaction between the Virtual Tape Equipment and the TMS tape management system;
 5. Interaction between the Virtual Tape Equipment and applicable OEM software;
 6. Logical partitioning;
 7. Preparation for installation;
 8. Interaction between Virtual Engine, the Library Manager and the host, including physical tapes, logical volumes ("LVOLs"), and inventories.
 9. Device table generations such as Unit Control Blocks ("UCB") and Eligible Device Table ("EDT");
 10. Generation of the Hardware Configuration Definition ("HCD").
-

DF/SMS supports all:

1. CA VTape VTS will use CA CopyCat for migrations
2. CA VTape VTS supports all DF/SMS options
3. CA VTape VTS supports all tape management products
4. CA VTape VTS supports all mainframe OEM software products
5. CA VTape VTS supports up to 8 per plex with failed over
6. CA VTape VTS has checklist and prep sections for installation
7. CA VTape VTS has checklist and prep sections Tape management updates and logical setups.
8. CA VTape VTS support all.
9. CA VTape VTS (Software HCD) setups for the VTDs.

3. Provide Operational Training and Education

The vendor shall provide sessions to cover the following:

1. System overview of Hosts and Virtual Engine in a grid configuration;
 2. Console messages meaning and operation actions;
 3. Operator intervention procedures;
 4. Abnormal situations and recovery;
 5. Interaction between the Virtual Tape environment and TMS
 6. Interaction between the Virtual Tape Equipment and other software products;
-

7. Operator actions with DF/SMS;
 - a. System status displays
 - b. System commands
 - c. Messages and meanings
 8. System commands- system status displays- messages and meanings;
 9. DF/SMS Definitions;
 10. ISMF panels;
 - a. Parmlib member changes
 - b. Proclib member change
 - c. ACS routines
 11. Permilib member changes- Proclib member changes;
 12. Tape management system User Exit processing.
-

The following training will be provided: CA-Vantage SRM Storage Resource Managing DASD and Tape Storage Student Guide BR750.

VI. MISCELLANEOUS TERMS AND CONDITIONS

1. The customer will purchase the system outright. Other procurement options will not be considered.
 2. The customer will not formally accept a system until it has operated without failure for 30 consecutive days.
 3. The vendor will be considered prime contractor, and shall therefore be solely responsible for satisfying all mandatory requirements of this RFQ, including maintenance. The use of subcontractors will not relieve the vendor of its prime contractor responsibilities.
 4. A manufacturer's business partner submitting a bid independently of the manufacturer, or on behalf of the manufacturer, will have prime contractor responsibilities. The State will not act as a third party in any arrangements between the manufacturer and its business partners.
-

So noted and accepted.

VII. COSTS

1. The vendor shall complete the following cost sheet and submit it as part of the bid response. All costs shall be identified on the cover sheet. Costs will be all inclusive including all hourly rates, travel, and all goods/services needed to fulfill the mandatory requirements. The Grand Total Cost will be the firm bid price.
-

Please see the completed cost sheet.

COST SHEET

-- OPTION 1 --

VENDOR NAME ViON Corporation

VENDOR ADDRESS 1055 Thomas Jefferson St, NW, Suite 406, Washington, DC 20007

VENDOR CONTACT David Pruyn

VENDOR PHONE NO. (202) 467-5500

COST OF VIRTUAL TAPE EQUIPMENT \$1,412,270.00
(including 48 month warranty)

COST OF SOFTWARE \$384,267.00
(for 48 months)

COST OF INSTALLATION Included

COST OF SHIPPING Included

COST OF VTS IMPLEMENTATION (see Section VI) \$42,500.00

TRADE-IN ALLOWANCE (\$2,500.00)

GRAND TOTAL COST \$1,836,537.00

COST SHEET

-- OPTION 2 --

VENDOR NAME ViON Corporation

VENDOR ADDRESS 1055 Thomas Jefferson St, NW, Suite 406, Washington, DC 20007

VENDOR CONTACT David Pruyn

VENDOR PHONE NO. (202) 467-5500

COST OF VIRTUAL TAPE EQUIPMENT \$1,510,811.00
(including 48 month warranty)

COST OF SOFTWARE \$384,267.00
(for 48 months)

COST OF INSTALLATION Included

COST OF SHIPPING Included

COST OF VTS IMPLEMENTATION (see Section VI) \$42,500.00

TRADE-IN ALLOWANCE (\$2,500.00)

GRAND TOTAL COST \$1,935,078.00

APPENDIX A

Product	Description	Qty
5608-A93	IBM Tivoli Lifecycle Manager Reg:3 Yr	1
0003	TKLM For Storage RVU SWMA 3Y Reg	6
5608-A99	IBM Tivoli Key Lifecycle Manager V2.0	1
0003	TKLM for Storage per RVU	6
5811	IBM Tiv Key Lifecycle Mgr for Storage	1

Product	Description	Qty
3584-L23	TS3500 Tape Library	1
1515	3592 Fibre Drive Mounting Kit	6
1643	Intermediate Capacity on Demand	1
1644	Full Capacity on Demand	1
1659	16 Additional 3592 I/O Slots	1
1692	Entry ALMS	1
1693	Intermediate ALMS	1
1694	Full ALMS	1
1950	Power Distribution Unit	1
2710	Remote Support Facility	1
2732	TS3000 System Console	1
2733	Internal Modem	1
4871	TS7700 BE SW Mounting Hardware	1
4872	TS7700 BE 4Gb Switch	1
9217	Attach to 3953 LM/TS7700	1
9680	Plant Install 3592 E05 in 3584	6
9700	No Host Cables From Plant	1
9900	Encryption Configuration	1
9954	Nema L6-30 Power Cords	1
3592-E05	IBM TS1120 Tape Drive	6
6013	13 Meter LC/LC Fibre Channel Cable	12
9000	zSeries ESCON/FICON Attach	6

9592 Encryption Capable - Plant	6
9677 Plant Install 3592 in 3584	6
3599-014 IBM Tape Cartridge 3592 Extended Data with Labeling and Initialization	1
4020 20-Pack 3592 Extended Data Cartridges	7
9003 Alpha prefix background - red	1
9022 Label background: Color/Vibrant	1
9032 Media Identifier Letters 'JB'	1
9082 E3 Format	1
9133 First character of Volser is X	1
9200 Second character of Volser is 6	1
9300 Third character of Volser is 0	1
9400 Fourth character of Volser is 0	1
9500 Fifth character of Volser is 0	1
3599-014 IBM Tape Cartridge 3592 Extended Data with Labeling and Initialization	1
4020 20-Pack 3592 Extended Data Cartridges	3
9004 Alpha prefix background - yellow	1
9022 Label background: Color/Vibrant	1
9032 Media Identifier Letters 'JB'	1
9082 E3 Format	1
9121 First character of Volser is L	1
9200 Second character of Volser is 5	1
9300 Third character of Volser is 0	1
9400 Fourth character of Volser is 0	1
9500 Fifth character of Volser is 0	1
3599-017 3592 Tape Cartridge (cleaning)	1
7005 5-Pack Cleaner Cartridges with Media ID Labels	2
3952-F05 Tape Frame	1
1903 Dual AC Power	1
1904 Redundant AC Power	1
2732 TS3000 System Console	1
2733 Internal Modem	1
5628 Plant Install 3957-V06	1
5640 Plant Install 3956-CC8	1
5759 Integrated Control Path	1

7312 TS7700 Base Frame	1
9954 NEMA L6-30 Power Cord	1
3952-F05 Tape Frame	1
1903 Dual AC Power	1
1904 Redundant AC Power	1
2732 TS3000 System Console	1
2733 Internal Modem	1
5626 Plant Install 3957-VEA	1
5635 Plant Install 3956-CS8	1
5646 Plant Install 3956-XS7	1
5759 Integrated Control Path	1
7322 TS7720 Base Frame	1
9954 NEMA L6-30 Power Cord	1
3956-CC8 TS7740 Cache Controller	1
7123 9.6 TB Fibre Storage	1
9352 Plant Install in F05	1
3956-CS8 TS7720 SATA Cache Controller	1
7114 32 TB SATA Storage	1
9352 Plant Install in F05	1
3956-XS7 TS7720 SATA Cache Module	1
7114 32 TB SATA Storage	1
9354 Plant Install in F05	1
3957-V06 TS7740 Virtualization Engine	1
0201 9 Micron LC/LC 31 Meter	2
1033 1Gb Grid Dual Port Optical SW Connection	2
2715 Console Attachment	1
3442 FICON Long Wavelength Attachment	2
4015 Grid Enablement	1
5240 Dual Port FC HBA	1
5267 1 TB Cache Enablement	3
5268 100 MB/sec Increment	2
9000 Mainframe Attachment	1
9219 TS3500 Attach	1
9350 Plant Install V06 in F05	1
9461 8GB Memory Upgrade - Plant	1
9900 Encryption Configuration	1

3957-VEA TS7720 Virtualization Engine Server	1
0201 9 Micron LC/LC 31 Meter	2
1033 1Gb Grid Dual Port Optical SW Connection	2
2715 Console Attachment	1
3442 FICON Long Wavelength Attachment	2
4015 Grid Enablement	1
5268 100 MB/sec Increment	1
9000 Mainframe Attachment	1
9268 100 MB/s Throughput - Plant	1
9350 Plant Install V06 in F05	1
9461 8GB Memory Upgrade - Plant	1

APPENDIX B**WVOT DATA CENTER HARDWARE**
Effective 11/17/10**CPUs**

- 1 IBM z10 (Model 2098-E10) capacity setting V02 Enterprise Server
also containing one IFL and one zIIP engine

DASD

- 1 IBM 2105-800 TotalStorage Enterprise Storage Server with 5.2 TB with 6 FICON
Ports, FlashCopy, PAV, and:
- 2 2124 72.8GB Disk, 8-pack, 10K RPM
- 4 2125 145.6GB Disk, 8-pack
- 1 2717 ESS Master Console
- 1 2924 Operator Panel Lang, US English
- 7 3013 Dual Port 64 Bit ESCON Adapters
- 1 4014 16 GB Cache
- 1 8005 PAV - Up to 6TB
- 1 8305 FlashCopy - Up to 6TB
- 7 9770 STD ESCON Cable (MT/RJ-DUP QTY 14)
- 1 9854 Three-Phase 50/60 Hz, 60 Amp
- 1 9870 Nominal AC Voltage: 200V240V
- 1 2240-FLC ESS Function Authorization
- 1 8305 FlashCopy - Up to 6TB
- 1 9934 IBM E-server z Series Designator
- 1 2240-PAV ESS Function Authorization
- 1 8005 PAV - Up to 6TB
- 1 9934 IBM E-Server z Series Designator

**Tape
Units**

- *** (TO BE REPLACED BY THIS PROCUREMENT) ***
- 2 STK 9310 Library Storage Module
- 1 STK 9311 Library Control Unit
- 1 STK 4410 Library Storage Module
- 1 STK 4411 Library Control Unit
- 1 STK 4430 Library Management Unit
- 4 STK 9490 M34 Cartridge Drive (16 Transports)
- 1 IBM 3590-B1A Cartridge Drive (12 Transports)
- 3 IBM 3590-A50 Tape Control Unit

Printers

- 2 IBM InfoPrint 4000 Printer (Models ID1/ID2)
- 1 STK 5000 Impact Printer

Supplementary Printing Equipment

- 1 Roll Systems 800152 Unwinder
- 2 Roll Systems 800162 Folder/Job Separator
- 1 Roll Systems 501254 Output Unloader
- 1 Roll Systems 503176 Cutter
- 1 Roll Systems 503410 Trimmer
- 1 Roll Systems 500777 Stacker
- 1 Roll Systems 50386601 Web Handler

Communications Equipment

- 1 Cisco Systems 7513 Router
- 1 Cisco Systems AS5200 (used for remote ISDN applications)
- 1 Cisco Systems Pix Firewall
- 2 IBM 31741L Cluster Controller

Spectrol 601C Data Analyzer

So noted and accepted.

APPENDIX C

WVOT DATA CENTER ENTERPRISE SERVER SOFTWARE Effective 02/15/11

<u>VENDOR/SOFTWARE</u>	<u>FUNCTION</u>
IBM	
z/OS Version 1, Release 11 (5751-CS9)	Operating System
RMF V1, R11 (5694-A01)	Provides basis for tuning the system to user requirements and tracks resource utilization
DFSMS/DFP/DSS/HSM V1, R11 (5694-A01)	Provides data management, device support, program library management, utility functions, user and system catalog support, hierarchical storage manager, and dataset services for ESA operating system
SMP/E V3, R5 (5694-A01)	Supports software changes and new functions, corrective and preventative service, and user modifications in ESA
z/OS Security Server (RACF) V1, R11 (5694-A01)	Security server
EREP V1, R11 (5654-260)	Reports on hardware/software exceptions and conditions
SecureWay Communications Server V1, R11 (5694-A01)	Telecommunications access method.
TSO/E V1, R11 (5694-A01)	Allows users to interactively share computer time and resources
z/VM V5, R4.0 (5741-A05)	Operating system (z/VM). NOTE: V6, R1 is undergoing in-house testing.

DB2 V8, R1.0 (V9R1 in-house) (5675-DB2)	Relational database management system that allows definition, access, and recovery of data.
CICS Transaction Server for z/OS R3.2 (5655-M15)	Transaction processor
DB2 Connect Unlimited Edition for Linux & z Series V8.2 (fixpack 7) Part No. D50MQLL	Allows remote access to DB2 mainframe databases.
AFP Collection Fonts V1, R1.0 (5648-113)	Advanced function printing
Page Printer Formatting Aids/370 V1, R1.0 (5688-190)	Advanced function printing
Overlay Generation Language (OGL/370) V1, R1.0 (5688-191)	Advanced function printing
Print Services Facility V4, R3 (5655-M32)	Advanced function printing
ACIF V4, R3 (5655-M32)	Indexing facility for PSF
DFSORT V1, R11 (5694-A01)	Sort and merge
DITTO/ESA V1, R11 (5655-103)	Multipurpose disk and tape utility
Enterprise COBOL for z/OS V3.4.1	Programming language

(5655-G53)	
High Level Assembler V1, R9 (5694-A01)	Language base required in operating system
SDSF V1, R11 (5694-A01)	Productivity aid used in conjunction with ISPF/PDF (TSO)
SDFII/CICS V1, R4 (5665-366)	CICS screen definition facility
ISPF V1, R11 (5694-A01)	TSO programmer productivity aid
OS/PL/1 Optimizer, Compiler V2, R3.0 (5668-910)	PL/1 compiler with optimizer and Library
GDDM/MVS V1, R11 (5694-A01)	Graphical data display manager
HTTP Server V5.3 (5694-A01)	Web Server
Tivoli Storage Manager V5.5.4.2 (5698-A11)	Data Backup
z/OS V1.11 C/C++ Compiler (5694-A01)	Compiler
Ported Tools for z/OS V1.01.04 (5655-M23)	Provides secure encryption for remote login to the z/OS shell and to remote file transfer
DITTO/ESA for MVS V1.03 (5655-103)	Tape utility
XML Toolkit for z/OS	Assists in creating, integrating, and maintaining

V1.10
(5655-J51)

business-tobusiness solutions (open source code)

ASG

The Monitor for CICS
V3.1

CICS performance monitor

The Monitor for DB2
V4.0

DB2 performance monitor
Upgrade to V4.1 in progress

ViewDirect for MVS
V6.4

Report distribution

DocumentDirect
V4.2

Report distribution for the client

BMC Software

Control-M
V6.2.20

Batch job scheduler

Control-M/Restart
V6.2.20

Batch job restart facility

Candle

AF/OPERATOR
V340

Data Center Automation

SA IOM
V2R1

Enterprise server beeper/pager support

Chicago-Soft

MVS/QuickRef
R7.3

Online message and code reference

Computer Associates

CA-UNICENTER TNG
R11.5 SP08

Common services and enabling technology for CA systems
management solutions

CA-PMA/LOOK R7.1	Real-time system performance measurement
CA-1 R12.0	Tape management system
CA-InterTest R8.0	CICS source code tool
CA-N-VISION/TPX R5.2	VTAM session manager
CA-LIBRARIAN/VS R4.3	User source code library
Plan Analyzer Unicenter PPA 11.5.1 (installing 14.0)	DB2 development aids
Batch Processor Unicenter RBP 11.5.1 (installing 14.0)	DB2 development aids
RC/Migrator Unicenter RCM 11.5.1 (installing 14.0)	DB2 development aids
RC/QUERY Unicenter RCQ 11.5.1 (installing 14.0)	DB2 development aids
RC/Secure Unicenter RCS 11.5.1 (installing 14.0)	DB2 development aids
RC/Update Unicenter RCU 11.5.1 (installing 14.0)	DB2 development aids
Info-Refiner Advantage INFOREF 11.5.1 (installing 14.0)	DB2 development aids
PRF Adv. Rept. Facility 11.5.1 (installing 14.0)	DB2 development aids

VISION:RESULTS
R12.0

4GL information management and report generator

VISION:Sixty
R12.0

Fixed-form report generator and extended utility

**The following CA products
are for
Tax & Revenue use only**

CA-Datcom/DB Product Pak
R11.0 SP04

Database

CA-Datcom Server
R3.0

Communications component. Provides SQL access to CA-Datcom/DB mainframe data.

CA-Datcom/CICS Services
R11.0 SPO1

Provides communications to programs operating with CA-Datcom/DB

CA-Datcom Datadictionary
R9.0

Datadictionary for CA-Datcom/DB

CA-Datcom/DL1
Transparency
R2.3 (9912)

Allows programs that were written for IMS/DB or DL/1 to execute unchanged under CA-Datcom/DB

CA-Datcom/Ext SQL
R9.0

Extension beyond ANSI standard. Allows SQL queries on a relational database.

CA-Datcom/IMS DC
Services
R1.0A

Allows interfacing between IMS and Datcom: the ability to write in IMS and read in Datcom

CA-Datcom/VSAM
Transparency
R2.2

Conversion tool that permits a VSAM-based application to operate under the control of CA-Datcom/DB

CA-Quikserv for VSAM
R1.0

Allows VSAM application to access data in Datcom that has been migrated from a VSAM environment

Innovation

FATS/FATAR
R4.0

Tape surface verification and copy

Levi, Ray and Shoup

VTAM Printer Support System (VPS) V1, R8.0	Supports remote printers without need for RJE connection
VPS/TCPIP R1, R8.0	Supports TCP/IP Printers
DRS V1, R3.4	Dynamically routes print output
VMCF/TSO V1, R8.1	Facilitates control of printers

MacKinney Systems

Batch To CICS V1, R3	Allows programmers to move all or part of files in and Out of CICS via TSO
KWIK-KEY R3.3	VSAM alternate index builder
CICS/MORNING NEWS R3.1	Broadcasts news to CICS users
CICS/MESSAGE R5.1	Sends messages to terminals, userids, and operator consoles

Novell

Linux SLES 9 and 10	Operating System
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Oracle

Oracle 9i and 10G R9.2.0.3.0	Relational data base management system
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Pitney Bowes

StreamWeaver	Provides added print design functionality
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R6.4.7

PROGINET

Cyberfusion Integration Suite Data mover

**Software AG
(for DHHR use only)**ADABAS
R8.1.3 Relational database facility
Upgrade to R8.2.2 in progressADABAS CICS Interface
R8.1.3 Relational database facility
Upgrade to R8.2.2 in progressNATURAL
R4.2.5 Software development tool
Upgrade to R4.2.6 in progressNATURAL CICS Interface
R4.2.5 Software development tool
Upgrade to R4.2.6 in progressNATURAL Security
R4.2.5 Software development tool
Upgrade to R4.2.6 in progressNATURAL TSO Interface
R4.2.5 Software development tool
Upgrade to R4.2.6 in progressNATURAL for DB2
R4.2.5 Software development tool
Upgrade to R4.3.1 in progressPREDICT
R4.5.2 Data dictionary
Upgrade to R4.6.1 in progressSYSTEM MAINTENANCE
AID
R1.3.1 Software installation tool
Upgrade to R2.1.2 in ProgressEntireX Broker
V7.2.1 Messaging Server
Upgrade to R8.0.1 awaiting user-agency action**SAS Institute**SAS
R9.2 Statistical analysis, data creation, report writing

SAS ACCESS/DB2
R9.2

DB2 interface

SAS/FSP
R9.2

Editing procedure for SAS datasets

SAS/SHARE
R9.2

SAS file updating tool

Serena International

COMPAREX
R6.2.0

Compares, and highlights the difference between, two files of any structure or organization

Serena StarTool FDM
V7.7.0

Multipurpose online utility

Sterling Commerce (for DHHR use only)

Connect:Direct for OS/390
V4, R4.04

Host-to-Host file transfer

StorageTek

HSC
R6.1

Host software component for automatic cartridge system

PM2
V6.0A

Reports on StorageTek hardware exceptions

Unicom Systems

CARTS-TS
R3.6.0

Tape stacking

Rev. 09/08

State of West Virginia**VENDOR PREFERENCE CERTIFICATE**

Certification and application* is hereby made for Preference in accordance with *West Virginia Code*, §5A-3-37. (Does not apply to construction contracts). *West Virginia Code*, §5A-3-37, provides an opportunity for qualifying vendors to request (at the time of bid) preference for their residency status. Such preference is an evaluation method only and will be applied only to the cost bid in accordance with the *West Virginia Code*. This certificate for application is to be used to request such preference. The Purchasing Division will make the determination of the Resident Vendor Preference, if applicable.

1. **Application is made for 2.5% resident vendor preference for the reason checked:**
 _____ Bidder is an individual resident vendor and has resided continuously in West Virginia for four (4) years immediately preceding the date of this certification; or,
 _____ Bidder is a partnership, association or corporation resident vendor and has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or 80% of the ownership interest of Bidder is held by another individual, partnership, association or corporation resident vendor who has maintained its headquarters or principal place of business continuously in West Virginia for four (4) years immediately preceding the date of this certification; or,
 _____ Bidder is a nonresident vendor which has an affiliate or subsidiary which employs a minimum of one hundred state residents and which has maintained its headquarters or principal place of business within West Virginia continuously for the four (4) years immediately preceding the date of this certification; or,
2. **Application is made for 2.5% resident vendor preference for the reason checked:**
 _____ Bidder is a resident vendor who certifies that, during the life of the contract, on average at least 75% of the employees working on the project being bid are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; or,
3. **Application is made for 2.5% resident vendor preference for the reason checked:**
 _____ Bidder is a nonresident vendor employing a minimum of one hundred state residents or is a nonresident vendor with an affiliate or subsidiary which maintains its headquarters or principal place of business within West Virginia employing a minimum of one hundred state residents who certifies that, during the life of the contract, on average at least 75% of the employees or Bidder's affiliate's or subsidiary's employees are residents of West Virginia who have resided in the state continuously for the two years immediately preceding submission of this bid; or,
4. **Application is made for 5% resident vendor preference for the reason checked:**
 _____ Bidder meets either the requirement of both subdivisions (1) and (2) or subdivision (1) and (3) as stated above; or,
5. **Application is made for 3.5% resident vendor preference who is a veteran for the reason checked:**
 _____ Bidder is an individual resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard and has resided in West Virginia continuously for the four years immediately preceding the date on which the bid is submitted; or,
6. **Application is made for 3.5% resident vendor preference who is a veteran for the reason checked:**
 _____ Bidder is a resident vendor who is a veteran of the United States armed forces, the reserves or the National Guard, if, for purposes of producing or distributing the commodities or completing the project which is the subject of the vendor's bid and continuously over the entire term of the project, on average at least seventy-five percent of the vendor's employees are residents of West Virginia who have resided in the state continuously for the two immediately preceding years.

Bidder understands if the Secretary of Revenue determines that a Bidder receiving preference has failed to continue to meet the requirements for such preference, the Secretary may order the Director of Purchasing to: (a) reject the bid; or (b) assess a penalty against such Bidder in an amount not to exceed 5% of the bid amount and that such penalty will be paid to the contracting agency or deducted from any unpaid balance on the contract or purchase order.

By submission of this certificate, Bidder agrees to disclose any reasonably requested information to the Purchasing Division and authorizes the Department of Revenue to disclose to the Director of Purchasing appropriate information verifying that Bidder has paid the required business taxes, provided that such information does not contain the amounts of taxes paid nor any other information deemed by the Tax Commissioner to be confidential.

Under penalty of law for false swearing (*West Virginia Code*, §61-5-3), Bidder hereby certifies that this certificate is true and accurate in all respects; and that if a contract is issued to Bidder and if anything contained within this certificate changes during the term of the contract, Bidder will notify the Purchasing Division in writing immediately.

Bidder: _____ Signed: _____

Date: _____ Title: _____

*Check any combination of preference consideration(s) indicated above, which you are entitled to receive.

ISCL0093

RFQ No. _____

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

West Virginia Code §5A-3-10a states: No contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and the debt owed is an amount greater than one thousand dollars in the aggregate.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Debtor" means any individual, corporation, partnership, association, limited liability company or any other form or business association owing a debt to the state or any of its political subdivisions. "Political subdivision" means any county commission; municipality; county board of education; any instrumentality established by a county or municipality; any separate corporation or instrumentality established by one or more counties or municipalities, as permitted by law; or any public body charged by law with the performance of a government function or whose jurisdiction is coextensive with one or more counties or municipalities. "Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceeds five percent of the total contract amount.

EXCEPTION: The prohibition of this section does not apply where a vendor has contested any tax administered pursuant to chapter eleven of this code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

Under penalty of law for false swearing (*West Virginia Code §61-5-3*), it is hereby certified that the vendor affirms and acknowledges the information in this affidavit and is in compliance with the requirements as stated.

WITNESS THE FOLLOWING SIGNATURE

Vendor's Name: ViON Corporation

Authorized Signature:  Date: July 19, 2011

State of DISTRICT OF COLUMBIA

County of Washington, DC, to-wit:

Taken, subscribed, and sworn to before me this 19th day of July, 2011.

My Commission expires 11/14/, 2015.

AFFIX SEAL HERE

NOTARY PUBLIC 

Hitachi Virtual Storage Platform

Hitachi Virtual Storage Platform is the only 3D scaling storage platform designed for all data types. It is the only storage architecture that flexibly adapts for performance and capacity, and virtualizes multivendor storage. With the unique management capabilities of Hitachi Command Suite software, it transforms the data center.

Transform the Data Center into the Information Center. Make IT More Agile.

Hitachi Data Systems delivers on our vision that IT is virtualized, automated, cloud-ready and sustainable to help organizations to transform their data centers. At the heart of our vision, we offer a virtualized platform for all data with the ability to manage multivendor environments.

Hitachi Virtual Storage Platform is the only 3D scaling storage platform designed for all data types. It is the only storage architecture that flexibly scales for performance, capacity and the virtualization of multivendor storage to optimize return on storage assets. The mobility it gives to data reduces the business impact of adapting to change. A highly efficient design allows unsurpassed performance and capacity, and the lowest power and cooling requirements.

Hitachi Dynamic Tiering makes block, file and content data mobile across virtual storage tiers. Hitachi Virtual Storage Platform, when combined with Hitachi Command Suite management software, transforms the data center and makes IT more agile.

3D scaling delivers a storage environment that is reliable, dynamic and open. It is highly reliable, with leading capabilities for data protection and high availability. It is dynamic, automating data placement and resource addition. It is also open, supporting a wide variety of operating systems, data types, and storage and server environments.

Business Benefits

Superior Data Center Efficiency, Manageability and Cost Savings

- Creates a more agile storage infrastructure
- Increases the productivity of IT staff
- Reduces storage costs
- Increases return on storage assets
- Supports scalable management for growing and complex storage environments using fewer resources
- Enables the move to a new storage platform with up to 80% less effort and cost compared to the industry average
- Increases performance and lowers operating cost with automated data placement

- Automatically matches business value of data to the cost of storage
- Extends to multivendor storage assets
- Consolidates management with end-to-end virtualization to prevent virtual server sprawl across virtualized storage and server environments
- Achieves up to 48% better power efficiency for more sustainable data centers compared to the previous generation
- Stores up to 40% more capacity per square foot to increase data center density
- Lowers operational risk and data loss exposure by optimizing growth of virtual storage with data resilience solutions
- Offers comprehensive services that optimize your new Virtual Storage Platform for rapid transition to a new environment
- Supports unique universal replication for open systems and mainframe environments across multiple data centers
- Provides high availability to satisfy resilience and availability needs of demanding enterprise applications

Feature Highlights

3D scaling allows for optimal infrastructure growth in all dimensions.

- **Scale up** to meet increasing demands by dynamically adding processors, connectivity and capacity in a single unit. This gives you optimal performance for open systems and mainframe environments.
- **Scale out** to meet demands by dynamically combining multiple units into a single logical system with shared resources. Support increased needs in virtualized server environments and ensure safe multi-tenancy and quality of service through partitioning of cache and ports.
- **Scale deep** to extend the advanced functions of Hitachi Virtual Storage Platform to multivendor storage through virtualization. Offload less-critical data to external tiers; optimize availability of Tier 1 resources

3D management is enabled by Hitachi Command Suite efficiencies, which lower costs and properly manage all data types.

- **Manage up** capabilities unify management and scale to the largest infrastructure deployments.
- **Manage out** features deliver a single management framework with the breadth to manage storage, servers and the IT infrastructure.
- **Manage deep** with Hitachi Virtual Storage Platform integration for the highest operational efficiency and up to 50% time savings for storage management.

Data mobility functions give you the fastest way to move to new storage with host-transparent migration. Lower operational risks with advanced data replication topologies. Increase performance and lower cost with automated data placement.

Unmatched efficiency gives you the highest capacity available in the least space, and automates data placement for higher performance and lower cost. It also shares a single image

VIRTUAL STORAGE PLATFORM SPECIFICATIONS

Architecture	Hitachi Hierarchical Star Network
Aggregate Bandwidth	192GB/sec
Host Interfaces (maximum)	192 Fibre Channel: 8Gb/sec, 192 FICON: 8Gb/sec 88 FCoE: 10Gb/sec
Internal Raw Capacity	2,521TB (2TB 3.5" SATA), 1,180TB (600GB 2.5" SAS) 102TB (400GB SSD)
Internal and External Capacity	255PB (maximum)
Flash Drive Options	200GB 2.5" SAS, 400GB 3.5" SAS
Hard Disk Drive Options	146GB 2.5" SAS, 300GB 2.5" SAS 600GB 2.5" SAS, 2TB 3.5" SATA II
Minimum to Maximum Hard Drives	0-2,048 2.5" and/or 0-1,280 3.5" including spares
Maximum Number Flash Drives	256
Back-end Disk Interface	6Gb/sec SAS
RAID Configurations	RAID-1+0, RAID-5, RAID-6
Cache Options	32GB to 1TB
Maximum LUNs	65,280
Volume Size	4MB-60TB
Virtual Storage Machines	32 (maximum)
High Reliability	Redundant power supplies, fans, batteries
High Availability	N+1 architecture, controller clustering

Note: All capacities are based on 1GB = 1,000,000,000 bytes; 1TB = 1000GB

global cache across all virtual storage directors for maximum performance, the lowest power consumption per capacity stored, and faster and simpler storage management.

Dynamic tiering automates data placement for higher performance and lower cost. It places the right data in the right place at the right time with no performance degradation.

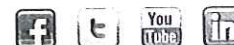
Server virtualization integration with leading virtual server platforms delivers end-to-end visibility from individual virtual machine to storage logical unit and protects large-scale multivendor environments.

Sustainable design allows up to 40% better capacity per square foot and 48% lower power consumption per terabyte compared to

the previous generation, plus greater capacity utilization with Hitachi Dynamic Provisioning.

Data resilience is supported with in-system data replication and protection across multiple data centers using unique journal-based replication. It includes integrated protection frameworks that are hypervisor agnostic. It also offers application-aware replication management, enhanced encryption and advanced security management to protect data.

Mainframe enhancements enable virtual storage tiering to improve data management efficiency and advanced replication to reduce risk through superior data protection.



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Highlights

- Supports highly scalable, automated data retention on tape utilizing LTO Ultrium and IBM 3592 and TS1100 families of tape drives
- Extreme scalability and capacity growing from 1 to 16 frames per library and from one to 15 libraries per library complex using the TS3500 shuttle connector
- Up to 900 PB of automated, low cost storage under a single library image, dramatically improves floor space utilization and reduces storage cost per terabyte
- Optional second robotic accessor enhances data availability and reliability
- Provides data security and regulatory compliance via support for tape drive encryption and WORM cartridges

IBM System Storage TS3500 Tape Library

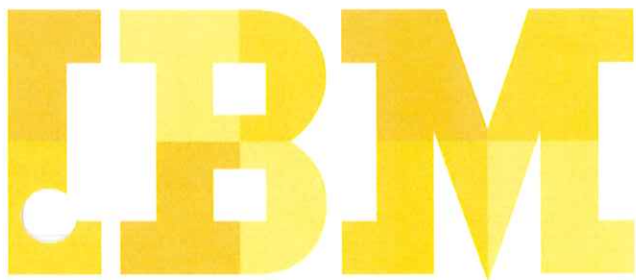
A highly scalable, automated tape solution to address data protection and long term retention

The IBM System Storage® TS3500 Tape Library is designed to provide a highly scalable, automated tape library for mainframe and open systems backup and archive that can scale from midrange to enterprise environments.

Automated solutions for open and mainframe environments

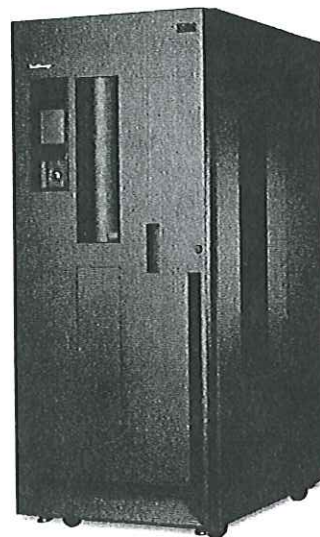
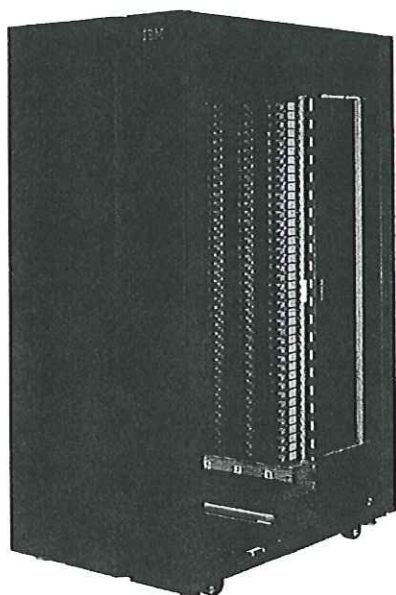
The TS3500 Tape Library continues to lead the industry in tape drive integration with features such as persistent World Wide Name, multipath architecture, drive/media exception reporting, remote drive/media management, and host-based path failover. The L23 and D23 frames support the TS1140, TS1130, TS1120 or 3592 J1A Tape Drives. The L53 and D53 frames support IBM System Storage TS1050 Tape Drives as well as previous generation IBM LTO® Ultrium® Tape Drives. L-frame models support improved cartridge handling, hot-swap drive packaging, and the option of an additional 16-slot Input/Output (I/O) station. The TS3500 Model D23 and D53 frames can be attached to existing model L22 or D52 frames. Mixed media is supported by combining LTO Ultrium Tape Drives and the TS1140, TS1130, TS1120 or 3592 J1A Tape Drives within the TS3500 library frame by frame.

The TS3500 Tape Library supports System z® when used with the IBM 3953 Tape System, the IBM Virtualization Engine TS7740, or the IBM System Storage Tape Controller for System z with its embedded library manager. These systems enable System z hosts to access the TS3500 Tape Library cartridge inventory and allow connection to TS1140, TS1130, TS1120 and IBM TotalStorage 3592 Model J1A Tape



Drives. The TS3500 Tape Library can support up to four 3953 tape systems, up to eight IBM Virtualization Engine TS7740 subsystems per physical library, and up to sixteen IBM System Storage Tape Controllers for System z per logical library.

The IBM System Storage Tape Controller for System z offers FICON attachments of TS1140 Tape Drives in a TS3500 tape library or rack and reduces hardware and infrastructure requirements by sharing tape drives with FICON hosts. The Tape Controller for System z also offers the ability to perform nondisruptive addition of tape drives, which helps enhance configuration flexibility and availability.



High capacity, high density, low cost storage

Storage requirements are exploding in your enterprise. You're storing more and more, emails, documents, images, video, and application data. Data retention and protection policies further increase these demands while at the same time available floor space in the data center is becoming an issue. To balance out these diverging priorities the TS3500 Tape Library supports storage-only, library frames with patented high density slots, which can significantly increase a library's total capacity. These frames contain multiple tiers of cartridge slots, yet have the same physical footprint as L and D frames. S24 frames can store up to 1,000 3592 cartridges with 12 PB of compressed data, and S54 frames support up to 1,320 LTO cartridges with

3.9 PB of compressed data, all in just 10 square feet. A TS3500 Tape Library configured with high density frames can store up to 60 PB of compressed data with LTO cartridges, or up to 180 PB of compressed data with 3592 cartridges.

The IBM TS3500 now supports the IBM System Storage Tape Library Connector (shuttle connector), which allows single or multiple interconnection of library strings to form a library complex of up to 15 libraries with a total capacity of 900 PB of data and up to 2,880 tape drives for storing and managing vast amounts of information in an automated fashion.

High availability and Capacity on Demand

An IBM TS3500 Tape Library can be ordered with a dual accessor model option to help increase mount performance and overall system reliability and availability. The TS3500 Model HA1 allows two robotic accessors to operate simultaneously in configurations from two to 16 frames.

The TS3500 Tape Library's entry base frame provides a more flexible upgrade path for users who want to expand their tape storage as needs grow. Capacity on Demand (CoD) configurations for TS3500 Tape Library L-frame models include the "entry level" configuration, an "intermediate" configuration, and a "full capacity" configuration. S-frame models also allow two CoD configurations.

Advanced features

The TS3500 Tape Library is designed with a number of advanced features to deliver cutting edge performance and long-term value. Highlights include:

- Flexible library capacity with up to 192 drives in up to 16 TS3500 Tape Library frames, and up to 15 libraries interconnected in a library complex.
- Architecture designed to allow simultaneous attachment of servers and applications to logical library partitions.

- Remote management with a web-based interface for library control and configuration.
- Simple Network Management Protocol (SNMP) query and trap functionality.
- Automatic control path and data path failover to support improved continuity and disaster recovery.
- Redundant control paths, grippers, power supplies, and AC feeds for enhanced availability.

The Advanced Library Management System (ALMS) is an available feature that supports dynamic storage management, allowing the user to dynamically create and change logical libraries and configure any drive into any logical library. ALMS is required when attaching to mainframe environments, when integrating high-density frames or IBM LTO Ultrium 5 Tape Drives into a library configuration. Based on capacity requirements, ALMS can be implemented as an "entry," "intermediate" or "full" CoD level in the TS3500 Tape Library.

Encryption and WORM cartridge support

To keep information confidential if backup tapes are lost or stolen, the TS3500 Tape Library supports TS1140, TS1130 and TS1120 Tape Drive encryption, also TS1050 and TS1040 LTO Tape Drive encryption. These tape drives include data encryption capabilities within the drives, helping to avoid the need for host-based encryption of data—and the concurrent drain on host performance—or the use of specialized encryption appliances.

The IBM Tivoli® Key Lifecycle Manager component for the Java platform can help generate and manage encryption keys for TS1140, TS1130, TS1120, TS1050 and TS1040 Tape Drives across the enterprise. This feature uses standard key repositories and supports three different encryption key management methods: application managed, system managed or library managed. The IBM LTO Ultrium Generation 5, 4 and 3 Tape Drives can also support WORM LTO media.

Next-generation tape drives support

The new TS1140 Tape Drive supports new IBM JC and JY 3592 Advanced standard and WORM cartridges that feature 4x more capacity than the previous generation, up to 4 TB native or 12 TB compressed, with over 50 percent faster data transfer rates at 250 Mbps native, and the new IBM JK 3592 Economy cartridge with a capacity of up to 500 GB. The TS1140 Tape Drive can read and write IBM JB and JX 3592 cartridges with improved performance.

New IBM LTO Ultrium 5 1.5 TB cartridges (standard and WORM) and TS1050 Tape Drives are supported and designed to provide 88 percent more tape cartridge capacity and over 16 percent improvement in tape drive performance over the fourth generation LTO Ultrium drives. They can also support media partitioning and LTFS to help improve data management on tape media. The fifth generation LTO Ultrium is designed to support up to 140 Mbps native data-transfer rates. The TS1050 Tape Drive can read and write IBM LTO Ultrium 4 cartridges and read LTO Ultrium 3 cartridges at original capacities with improved performance.

The new TS1140 and TS1050 Tape Drives and cartridges (standard or WORM) can be resident in the same TS3500 Tape Library string with previous generations of 3592 or LTO Ultrium Tape Drives and cartridges protecting your current investments.

Software support

You can increase the power of the TS3500 Tape Library by integrating it with industry-leading storage management solutions such as IBM Tivoli Storage Manager and a wide array of other storage software.

Monitoring appliance support

The ReadVerify® Appliance (RVA) from Crossroads Systems is also available as part of your tape solution through IBM and IBM Business Partners. This appliance is a powerful monitoring tool for your TS3500 Tape Library designed to proactively identify degrading or unbalanced conditions, as well as maximize performance, utilization and efficiency of tape resources. Advanced features provide a fully-automated approach to verifying readability of long-idle or suspect media, as well as create an audit trail for regulatory compliance policies.

TS3500 Tape Library at a glance

Characteristics

Frame definition	L23—base frame for TS1140, TS1130, TS1120 or 3592, D23—drive capable and storage expansion frame for TS1140, TS1130, TS1120 or 3592, S24—storage only expansion frame for 3592 cartridges L53—base frame for LTO, D53—drive capable and storage expansion frame for LTO, S54—storage only expansion frame for LTO cartridges HA1—high availability service bay frame for use with the dual accessor feature SC1—library strings shuttle connector
Library Shuttle Connector	IBM System Storage Tape Library Connector Model SC1
Tape drive types	TS1140, TS1130, TS1120 or 3592 Tape Drives or IBM LTO Ultrium 5, 4, 3, 2 or 1 Tape Drives
Number of frames per library	One base frame, up to 15 expansion frames The TS3500 Model HA1 installation provides one of the two additional frames required as service bays in a dual accessor library
Number of libraries per complex	Up to 15 libraries

TS3500 Tape Library at a glance

Number of drives	Up to 12 per frame Up to 192 per library string Up to 2,700 per library complex
Number of tape cartridges	L23—up to 260; D23—up to 400; S24—up to 1,000 Total supported per library: >15,000 Total supported per complex: >225,000 L53—up to 287; D53—up to 440; S54—up to 1,320 Total supported per library: >20,000 Total supported per complex: >300,000
Number of Input/Output slots	Up to 224 per library (16 I/O slots standard) Up to 3,360 per complex
Number of logical libraries	Maximum of 192 per library (up to number of drives installed) Maximum of 2,700 per complex
Number of 3953 Systems	Maximum of four per TS3500 subsystem
Number of TS7700 Virtualization Engine	Maximum of eight per TS3500 subsystem
Number of Tape Controller for System z	Maximum of sixteen per TS3500 logical library
Capacity ¹	IBM Ultrium 5 Cartridges: up to 30 PB per library (up to 60 PB with 2:1 compression), up to 900 PB per complex when compressed 3592 Advanced cartridges: up to 60 PB per library (180 PB with 3:1 compression), up to 2.7 EB per complex when compressed
Media type	L23/D23/S24: IBM 3592 JA/JJ/JB/JC and JW/JR/JX/JY Write Once Read Many (WORM) cartridges L53/D53/S54: IBM LTO Ultrium 5, 4, 3, 2, 1 Cartridges
Dimensions (all frames)	70.9 in. H x 30.8 in. W x 47.7 in. D (1,800 mm x 782 mm x 1,212 mm)
Max. weight	L23—1,079 lbs (490 kg); D23—994 lbs (451 kg), S24—1,160 lbs (526 kg) L53—1,061 lbs (481 kg); D53—970 lbs (440 kg), S54—1,240 lbs (563 kg)
Warranty	One year limited warranty, on-site service, same day 24x7, service upgrades available
Operating environment	
Temperature	16° to 32°C (61° to 90°F)
Relative humidity	20% to 80% (noncondensing)
Wet bulb maximum	23.0°C (73.4°F)
Electrical power	8.0 A at 200 - 240 V ac; 1.6 kVA
Attachment and systems support	The TS3500 Tape Library can attach to IBM Power Systems™, System p®, System i®, and System x® servers and non-IBM servers, workstations. Attach to System z can be made via the IBM 3953 Tape System (3953 tape system), the IBM Virtualization Engine TS7740, or the IBM System Storage® Tape Controller for System z
Operating systems support	Device driver support is available for IBM AIX®; IBM OS/400®; IBM i, IBM z/OS®; Windows 2000; Windows Server 2008; Linux; Sun Solaris; and HP-UX

3953 Tape System at a glance

Characteristics

Frame	3953 Model F05 + feature code 5505—base frame for the 3953 tape system, consisting of the mechanical frame, power and cabling infrastructure to support the library manager(s) and a single TS1120 tape controller Up to five additional F05s can be configured as expansion frames, each capable of supporting up to three TS1120 tape controllers
Library Manager	3953 Model L05—single library manager. Maximum of two (redundancy only) per 3953 tape system
Number of frames	Six total: One base frame, and up to five expansion frames
TSSC	One per 3953 tape system
TS7700 Virtualization Engine support	Maximum of two TS7700s per 3953 tape system, maximum of eight per TS3500 Tape Library
TS1120 Tape Controller support	Maximum of 14 with two TS7700s, up to 16 with 0 TS7700s
TSSC capability	Yes, required
Dimensions (all frames)	71 in. H x 43.4 in. W x 25.4 in. D (1,804 mm x 1,102 mm x 644 mm)
Weight	3953 Model F05—620.4 lbs (282 kg)
Warranty	One Year Limited Warranty , On-site service, Same Day 24x7, service upgrades available

Operating environment

Temperature	16° to 32°C (61° to 90°F)
Relative humidity	20% to 80% (noncondensing)
Wet bulb maximum	23.0°C (73.4°F)
Electrical power	8.0 A at 200 - 240 V ac; 1.5 kVA
Attachment and systems support	The 3953 tape system enables the TS1130, TS1120 and 3592 J1A Tape Drives within the TS3500 Tape Library to attach to System z hosts or the TS7700 Virtualization Engine
Operating systems support	IBM z/OS®

Crossroads ReadVerify Appliance* at a glance

1U Appliance providing real-time Tape Library Monitoring and Alerting

Individual drive utilization and performance metrics as well as comparison across drives in a system
Statistics correlating activity by drive and cartridge
Supports LTO, IBM Enterprise TS11x0 and other enterprise-class tape drives
Tape/drive read/write error correlation, drive cleaning metrics

Policy-based Alerting and Reporting

Daily and weekly reporting on tape library system activity—load-balancing, drive performance and utilization, hard/soft errors correlated to drives and tapes, alert activity
Configurable alerts on potential data recovery issues, such as communication loss, degrading device conditions, stuck tape, excessive tape loads
Accessible database of all monitored and derived statistics

ArchiveVerify™ (AV) Optional Feature

Enables users to ensure that the data written to tape media can be read for recovery or compliance audits
Offers a completely automated process to validate media readability based on administrator-applied policies
Verification procedures test the entire written length of written media with no disruption of existing operations, all while the data remains securely within the library

Physical characteristics

SAN Connectivity	1, 2, 4 GB FC Support
AC Power	100 - 240 V ac autosensing 50/60 Hz, 4.0 A
Dimensions	43.1 mm H (1U) x 426 mm W x 358 mm D (1.72 in. H x 16.8 in. W x 14.1 in. D)
Weight	10.4 kg (23 lbs)

Operating environment

Temperature	10° to 40°C (50° to 104°F)
Relative humidity	20% to 80% noncondensing
Heat output	564 BTUs

* Only available in the US, Canada and Europe

For more information

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¹ Capacity depends on drives installed, number and type of cartridges used, and compression ratio achieved. Listed capacity is physical. Usable capacity may be less.



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