Removable Disk Cartridge

RDX

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Agenda

- ## General
  - What is RDX all about

- ## AIX
  - Using RDX with AIX
  - Gareth Coates

- ## IBM I
  - Using RDX with IBM I
  - Jyoti Dodhia

Highlights

- Disk backup solution

- Durable, reliable and secure removable

- Affordable, high-capacity, shock-resistant 320 GB, 500 GB, 1.0 TB and 1.5TB cartridges

- Fast, efficient USB performance, up to 96 MBps

- Internal and external options
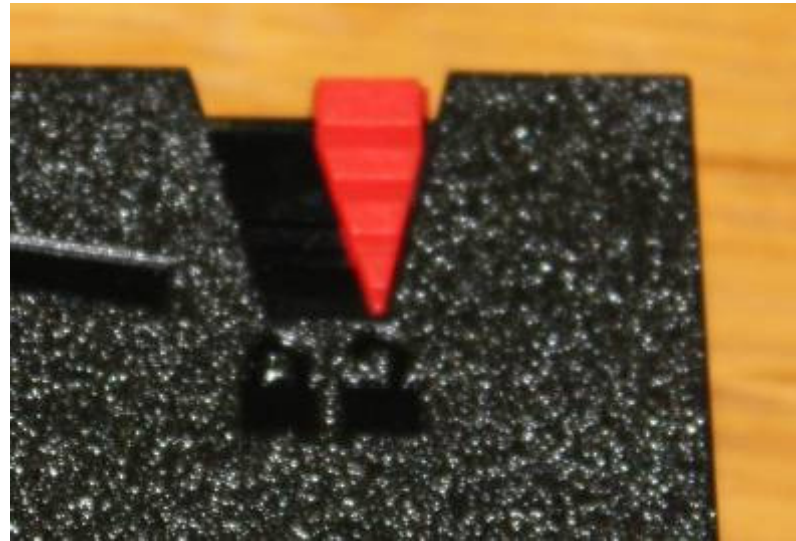
Pictures paint thousands of words

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RDX

Removable Disk Drive (RDX)

Key point review:
- Entry tape alternative to VXA-2, VXA-320, DAT72, DAT160, DAT320 or 8mm
- For AIX/Linux/IBM i on POWER6 or POWER7 servers
- Rugged & Fast
- Good fit for "dirty" environments like back offices - much better than tape
- Lower total cost of ownership for many tape cartridge users

▪BladeCenter support

- **RDX already available for BladeCenter PS703/704**

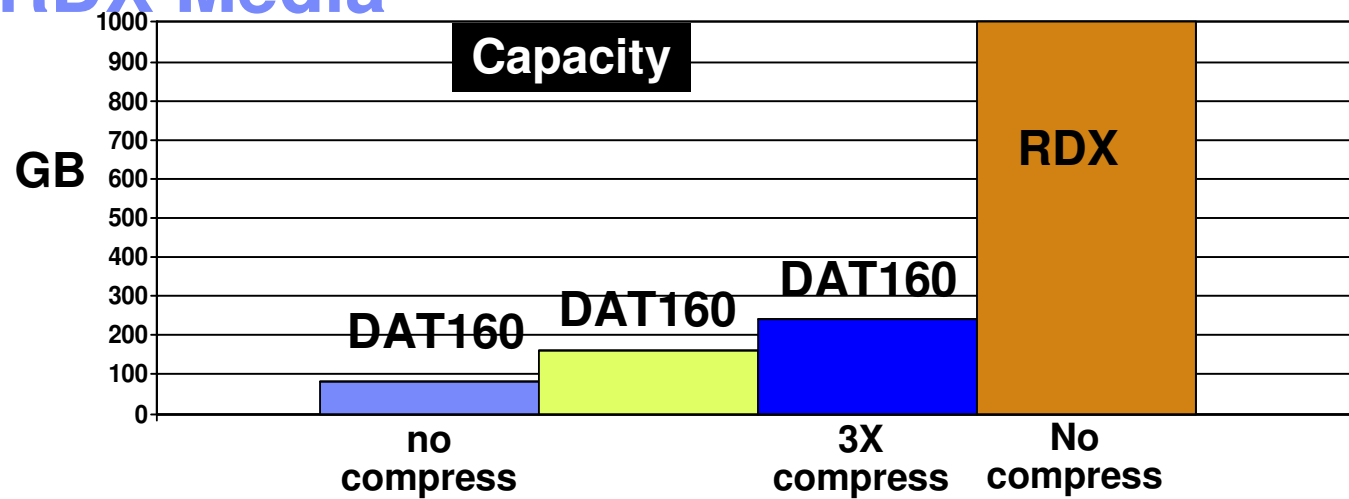- **Attach an external docking station (#1104) to USB port on the blade**

RDX

Existing Docking stations	New Docking Stations
Internal Docking Station #1103	Internal Docking Station #EU03
External Docking Station #1104	External Docking Station #EU04
Internal Docking Station #1123	Internal Docking Station #EU23

- Faster than tape
- Portable (DLPAR supports it)
- Rugged
- Direct access
- Up to 1.5TB per cartridge
- Can move to bigger media
  - without needing to buy a new drive

RDX Media

Capacity

GB

1000					
900					
800					
700			**RDX**		
600					
500					
400		**DAT160**			
300	**DAT160**				
200	**DAT160**				
100					
0	no compress		3X compress	No compress	

RDX cartridge capacity up to 6x larger than DAT160 cartridge (uncompressed)

- RDX capacity shown is uncompressed. Any RDX compression done by software in server, not the drive.

- DAT160 compresses in the drive. DAT160 capacity uncompressed is 80GB per cartridge.

- Typical 2X compression provides for 160GB capacity. 3X compression would yield 240GB. 4X compression would yield 320GB. Etc, etc.

New RDX 1.5 TB Cartridge (#EU15)

- Expanding strategic ENTRY save/restore technology

- 50% larger capacity than previous max capacity

- Larger capacity than DAT 80/160 cartridge

- Lower cost per GB RDX storage

  - 1770% more no compression (80GB)
  - 830% more with 2X compression (160 GB)
  - 360% more with 4X compression (320 GB)

- Works on all RDX docking stations

  - #EU03, #EU04, #EU23, #1103, #1104, #1123

- Supported by AIX, IBM i, Linux

**NEW
Feb 2013**

RDX Cartridge	320GB #EU08	500GB #1107	1 TB #EU01	1.5 TB #EU15
$/GB	$0.70	$0.59	$0.35	$0.33

160GB #1106 RDX withdrawn from marketing

Prices shown are IBM USA suggested list prices as of Feb 2013 on a Power 720 and are subject to change without notice; Reseller prices may vary.

RDX Potential Benefits vs Other Entry Tape Options

- Equivalent throughput to DAT160 or VXA

- Much faster access, save 30 seconds or more on start/finish of each job

- Direct access to files saves a lot of time if there are multiple files per tape and you access a single file

- Capacity - Up to 1TB uncompressed capacity per cartridge

- Media durability – RDX drives/cartridges can last for many years, up to 50 times more loads/unloads

- Cleaner: No cleaning operations or cleaning drives. Save time, money and avoid save/restore problems caused by dirty heads

RDX Potential Benefits vs Other Entry Tape Options

- Environmentally tough: Ability to work well even in 'office-dirty' environments such as a typical back office or store room

- Rugged: tougher than most tape cartridges, designed to withstand drops from table top heights

- Inexpensive docking stations

- Can move to larger capacity RDX drives from smaller capacity RDX drives without changing docking stations

- Natural fit for applications such as data logging

- Combining the ability for quickly accessing different files on the cartridge and a large 1TB capacity, can more easily use one cartridge to do daily backups without operator involvement.

HMC

Hardware Management Console (V7R7.0.1)

This web server is hosting the Hardware Management Console application. Click on the link below to begin.

Log on and launch the Hardware Management Console web application.

You can also view the online help for the Hardware Management Console.

✓ **System Status**
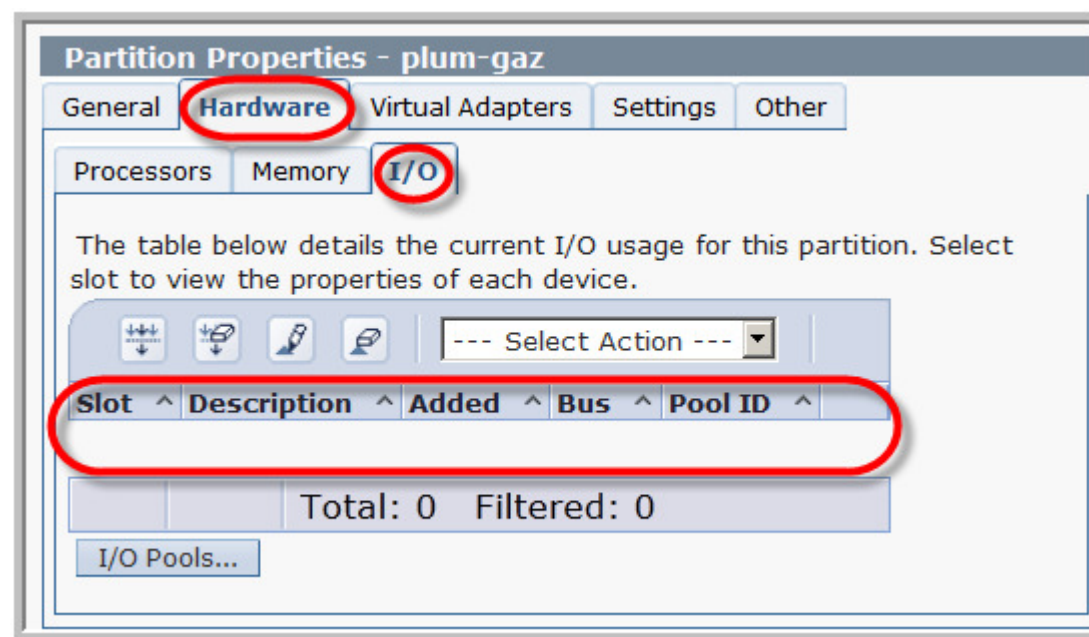Status is good.

✓ **Attention LEDs**
Status is good.

✓ **Serviceable Events**
Status is good.

No USB in the LPAR

```
# lsdev | grep usb
usb0        Defined        USB System Software
#
```

No adapter

A context menu showing options: Properties, Change Default Profile, Operations, Configuration — for partition plum-gaz.

Partition Properties - plum-gaz

General **Hardware** Virtual Adapters Settings Other

Processors Memory **I/O**

The table below details the current I/O usage for this partition. Select slot to view the properties of each device.

--- Select Action ---

Slot ^	Description ^	Added ^	Bus ^	Pool ID ^

Total: 0   Filtered: 0

I/O Pools...

Add it

			2	4	normal	AIX or Linux
	plum-gaz	Properties				
	plum-milan	Change Default Profile	2	10	normal	AIX or Linux
	plum-parha	Operations ▶	0.2	1	normal	AIX or Linux
	plumbing	Configuration ▶	2	2	normal	AIX or Linux
		Hardware Information ▶				
		Dynamic Logical Partitioning ▶	Processor ▶			
		Console Window ▶	Memory ▶			
		Serviceability ▶	Physical Adapters ▶	Add		
			Virtual Adapters ▶	Move or Remove		
			Host Ethernet ▶			

lum-gaz

...anaged system that are not currently assigned to a partition are
...apters you would like to add to the partition in the table and click

--- Select Action --- ▼

^	Bus ^	Description ^	Pool ID ^
GF0P-P1-C10	518	Empty slot	Unassigned
☐ U78A0.001.DNWGF0P-P1-C4	514	Fibre Channel Serial Bus	Unassigned
☑ U78A0.001.DNWGF0P-P1-T3	513	Universal Serial Bus UHC Spec	Unassigned

Options

I/O Pool ID :   Unassigned ▼

Timeout (minutes) :   5

Detail level :   1 ▼

OK   Cancel   Help

We now have some devices

```
# lsdev | grep usb
usb0      Defined              USB System Software
usbhc0    Defined    00-08     USB Host Controller (33103500)
usbhc1    Defined    00-09     USB Host Controller (33103500)
usbhc2    Defined    00-0a     USB Enhanced Host Controller (3310e000)


# cfgmgr


# lsdev | grep usb
usb0      Available            USB System Software
usbhc0    Available 00-08      USB Host Controller (33103500)
usbhc1    Available 00-09      USB Host Controller (33103500)
usbhc2    Available 00-0a      USB Enhanced Host Controller (3310e000)
usbms0    Available 2.3        USB Mass Storage
```

AIX

- AIX names the drive usbms*x*
  - usbms0

- AIX also can use the device as a raw device,
  - rusbms0

- AIX uses the removable disk drive differently depending on the program being used.

AIX

- The AIX tar, backup, restore, dd, and cpio commands can write to the removable disk drive as a raw device or "cooked" (nonraw) device.

- You might get improved performance by using the device as a raw device.

- See the AIX documentation for additional information.

tar - "tape archive"

```
#  time tar cvf /dev/usbms0 ./snap.pax.Z
a ./snap.pax.Z 101087 blocks.

real    0m14.48s
user    0m0.01s
sys     0m0.19s
#

#  time tar cvf /dev/rmt0  ./snap.pax.Z
a ./snap.pax.Z 101087 blocks.

real    1m16.35s
user    0m0.02s
sys     0m0.13s
#
```

mksysb

- **mksysb**
  - builds a list of files to back up,
  - creates a universal disk format (UDF) file system
  - puts a boot image and the root volume group on the removable disk drive.
  - When the mksysb process is complete the removable disk drive can be used to boot the system.
  - If you mount the removable disk drive, you can display and copy files to and from the UDF file system on the removable disk drive.

mksysb – bootable system backup

```
# time mksysb -e -X -p /dev/usbms0

Creating list of files to back up.


Populating the UDF file system...
...
bosboot: Boot image is 34816 512 byte blocks.


Backing up 86750 files.............................
3858 of 86750 files (4%)...............................
62275 of 86750 files (71%).......

86750 of 86750 files (100%)
0512-038 mksysb: Backup Completed Successfully.

real      11m52.80s
user      1m10.90s
sys       1m20.49s
```

smitty mountfs

```
 Mount a File System

Type or select values in entry fields.
Press Enter AFTER making all desired changes.


                                                 [Entry Fields]
    FILE SYSTEM name                             [/dev/usbms0]              +
    DIRECTORY over which to mount                [/rdx]                     +
    TYPE of file system                           udfs                     +
    FORCE the mount?                              no                       +
    REMOTE NODE containing the file system       []
      to mount
    Mount as a REMOVABLE file system?             no                       +
    Mount as a READ-ONLY system?                  no                       +
    Disallow DEVICE access via this mount?        no                       +
    Disallow execution of SUID and sgid programs  no                       +
      in this file system?




F1=Help              F2=Refresh          F3=Cancel             F4=List
F5=Reset             F6=Command          F7=Edit               F8=Image
F9=Shell             F10=Exit            Enter=Do
```

/usr/sbin/mount -v'udfs' /dev/usbms0 /rdx

filesystem

```
# ls -l /rdx
total 24
-rw-r--r--    1 root     system         6195 17 Apr 07:03 bosinst.data
-rw-r--r--    1 root     system          302 17 Apr 07:03
   .files_not_found
-rw-r--r--    1 root     system         9502 17 Apr 07:03 image.data
drwxrwxrwx    1 root     system        16384 17 Apr 07:02 lostfile.dir
-rw-r--r--    1 root     system           60 17 Apr 07:14 mkcd.data
-rw-r--r--    1 root     system           16 17 Apr 07:03 OSLEVEL
drwxr-xr-x    2 root     system         2048 17 Apr 07:03 ppc
drwxr-xr-x    3 root     system         2048 17 Apr 07:03 root
drwxr-xr-x    2 root     system         2048 17 Apr 07:03 sbin
drwxr-xr-x    8 root     system         2048 17 Apr 07:03 usr
#


# cd /rdx
# touch hello_world
# ls -l he*
-rw-r--r--    1 root     system            0 17 Apr 07:44 hello_world
#
```

JFS2

```
# mkfs -V jfs2 /dev/rusbms0
mkfs: destroy /dev/rusbms0 (yes)? yes
File system created successfully.
156281832 kilobytes total disk space.
Device /dev/rusbms0:
  Standard empty filesystem
  Size:           312563664 512-byte (DEVBLKSIZE) blocks
#

# mount -o log=NULL  /dev/usbms0 /rdx
#

# ls -l /rdx
total 0
drwxr-xr-x    2 root     system          256 17 Apr 07:49 lost+found
#
```

booting

```
HMC11                                                          _ □ ×

Version EL350_118
SMS 1.7 (c) Copyright IBM Corp. 2000,2008 All rights reserved.
------------------------------------------------------------------
Select Media Type
1.      SCSI
2.      SSA
3.      SAN
4.      SAS
5.      SATA
6.      USB
7.      IDE
8.      ISA
9.      List All Devices




        ------------------------------------------------------
Navigation keys:
M = return to Main Menu
ESC key = return to previous screen          X = eXit System Management Services
------------------------------------------------------------------
Type menu item number and press Enter or select Navigation key:
```

```
HMC11                                                      _ □ ×

Version EL350_118
SMS 1.7 (c) Copyright IBM Corp. 2000,2008 All rights reserved.
------------------------------------------------------------------
Select Device
Device   Current   Device
Number   Position  Name
1.         -         USB Disk
           ( loc=U78A0.001.DNWGFOP-P1-T4-L1-L0-L0 )
```

booting

```
-----------------------------------------------------------------------
                         Welcome to AIX.
                boot image timestamp: 06:03:23 04/17/2013
              The current time and date: 06:30:16 04/17/2013
          processor count: 4;  memory size: 4096MB;  kernel size: 36256296
boot device: /pci@800000020000201/usb@1,1/hub@1/usb-
  scsi@1/disk@0,0:\ppc\chrp\bootfile.exe
-----------------------------------------------------------------------


 ******* Please define the System Console. *******

Type a 1 and press Enter to use this terminal as the
  system console.
Pour definir ce terminal comme console systeme, appuyez
  sur 1 puis sur Entree.
Taste 1 und anschliessend die Eingabetaste druecken, um
  diese Datenstation als Systemkonsole zu verwenden.
Premere il tasto 1 ed Invio per usare questo terminal
  come console.
Escriba 1 y pulse Intro para utilizar esta terminal como
  consola del sistema.
Escriviu 1 1 i premeu Intro per utilitzar aquest
  terminal com a consola del sistema.
Digite um 1 e pressione Enter para utilizar este terminal
  como console do sistema.
```

Using the drive with Linux

- Linux configures the drive as a disk drive with a name in the format sd*x*,
  - sda

- See the Linux documentation for information about using Linux copy and backup commands.

Removable Disk Cartridge (RDX) and IBM i

Jyoti Dodhia

jyoti_dodhia@uk.ibm.com

IBM i RDX Support

- Strategic alternate entry media option to DAT160

- Can improve performance, reliability, operations

- POWER6 and POWER7 config options

- IBM i RDX support provided in two ways
  - Via USB interface
    - IBM i 7.1 TR5
    - For POWER7 servers
    - #EU03 or #EU04 docking stations
  - Via SATA interface … new RDX docking station
    - IBM i 6.1.1 and 7.1 TR5
    - Used for many POWER6 and POWER7 servers

- Oct 2012 announcement letter
  - http://www-01.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/rep_ca/0/897/ENUS112-180/index.html&lang=en&request_locale=en

- Wiki
  - https://www.ibm.com/developerworks/mydeveloperworks/wikis/home?lang=en#/wiki/IBM%20Removable%20Media%20on%20IBM%20i/page/Removable%20Disk%20Cartridge%20%28RDX%29%20on%20Removable%20Mass%20Storage%20%28RMS%29

- Blog entry
  - http://ibmsystemsmag.blogs.com/i_can/2012/12/removable-mass-storage.html

What is supported from IBM i perspective?

	USB Internal Docking EU03	USB Internal Docking EU23	USB External Docking EU04	SATA Internal Docking EU07
Power 6	-	-	-	Y 520, 550
Power 7	Y 720, 740, 750, 760	-	Y 710→780	Y 720, 740, 750, 760
IBM i6.1.1 + PTFs (alternate IPL not supported)	-	-	-	Y dev type 632A
IBM i7.1 + TR5 (alternate IPL supported)	Y	-	Y	Y dev type 63B8
IBM iVirtualization **(IBMi hosting IBMi):** Hosting = i7.1 Client = i7.1 TR5 or i6.1.1+PTFs	Y Devtype – i6.1.1 : 632C i7.1 : 63B8	-	Y Devtype – i6.1.1 : 632C i7.1 : 63B8	Y Devtype – i6.1.1 : 632C i7.1 : 63B8
VIOS	-	-	-	-

IBM i USB RDX Support Details

- **IBM i 7.1 TR5 required**
  - **Alternate IPL supported**
  - **(See SATA RDX #EU07 for IBM i 6.1)**

- **Used for POWER7 servers**
  - **Internal docking station:**
    - **Power 720 (8202-E4B/E4C/E4D)**
    - **Power 740 (8205-E6B/E6C/E6D)**
    - **Power 750 (8233-E8B/8408-E8D)**
    - **Power 760 (9109-RMD)**
  - **External docking station:**
    - **710 → 780 (8231-E2B/E1C/E2C/E1D/E2D, 8202-E4B/E4C, 8205-E6B/E6C, 8233-E8B, 9117-MMB/MMC/MMD and 9179-MHB/MHC/MHD)**

- **#EU03 internal and #EU04 external docking stations**
  - **#EU23 internal docking station not supported**
  - **Older USB-2 #1103/#1104/#1123 not supported**

IBM i supports the USB ports on the system unit, but does not support the USB adapter #2728.   Note on the 9117-MMC/D and 9179-MHC/MHD a Multifunction Card #1768/#1769 is required for the USB ports on that system unit to be active.

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IBM i SATA RDX Support Details

- **IBM i 6.1.1 with PTFs or 7.1 TR5 required**
  - **Alternate IPL supported for 7.1 TR5**
  - **Alternate IPL not supported for 6.1.1**
  - **(If IBM i 7.1 see also USB RDX #EU03/EU04)**

- **Used for POWER6 servers**
  - **Internal docking station:**
    - **Power 520 (8203-E4A, 9407-M15, 9408-M25)**
    - **Power 550 (8204-E8A, 9409-M50)**

- **Used for POWER7 servers**
  - **Internal docking stations:**
    - **Power 720 (8202-E4B/E4C/E4D)**
    - **Power 740 (8205-E6B/E6C/E6D)**
    - **Power 750 (8233-E8B/8408-E8D)**
    - **Power 760 (9109-RMD)**

- **#EU07 SATA Internal Docking Station**
  - **External SATA docking stations: Not offered**

IBM i RDX Operational Details/Insights

- Hardware Infocenter – Managing removable disk drives -
  http://pic.dhe.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdt/p7hdtrdx.htm

- Section on Storage Solutions on InfoCenter provides key RDX information for IBM i clients:
  http://pic.dhe.ibm.com/infocenter/iseries/v7r1m0/index.jsp?topic=/rzam4/rzam4rms.htm

- For example …
  - "RMS devices and media are similar to optical storage regarding behavior and access interfaces. They are managed and used with existing optical device functions and commands. See Optical storage as a reference guide for use of these devices and media. RMS media are handled the same as optical volumes, and as such are also accessible through the QOPT file system by using the hierarchical file system (HFS) and integrated file system (IFS) APIs. RMS media are formatted with the industry standard Universal Disk Format (UDF) version 2.5."

- Shows up at RMSxx device

- IBM i 7.1 can virtualize to other IBM i partitions

- VIOS does not virtualize RDX

- Alternate IPL supported for 7.1 TR5
  - Without an HMC, there is no way to tag the USB bus as the source for a D-mode IPL. So…
    - You must IPL from a DVD
    - Use the alternate device support at DST to select a USB device
    - This is true for ALL the USB devices

BRMS Updated to Support RDX

This offering will show up as RMSxx devices, but will be classified as Optical (random access spinning media) and associated commands.

BRMS support via Optical Support

- 32 character volume ids

- Volume selection done upfront

- DUPMEDBRM (DUPOPT), etc.

- BRMS PTF requirements for RDX listed on BRMS for i wiki :

  - https://www.ibm.com/developerworks/mydeveloperworks/wikis/home?lang=en#/wiki/IBM%20Backup%2C%20Recovery%20and%20Media%20Services%20%28BRMS%29%20for%20i/page/Removable%20Disk%20Cartridge%20%28RDX%29%20on%20Removable%20Mass%20Storage%20%28RMS%29

    - i7.1 TR5 + SI47039

    - i6.1.1 + SI47038, SI47648, MF54369

BRMS RDX Considerations

There are RDX operational differences of "optical" vs "tape" in BRMS … true for all optical (RDX is categorized as optical)

Restrictions/Requirements

- The media policy option to 'Mark history for duplication' is restricted to *NO. BRMS does not allow duplication of optical history items.

- BRMS does not provide tracking of opposite side volume identifiers or double-sided volumes. Each piece of media is viewed as a single volume.

- No optical support for the following BRMS functions: Dump BRMS (DMPBRM), Add Media Information to BRM (ADDMEDIBRM), Extract Media Information (EXTMEDIBRM), Print Media Exceptions for BRM (PRTMEDBRM), and no reclaim support.

- Only one Device (DEV) parameter can be specified. Optical support does not support cascading or parallel processing.

- Optical media libraries cannot be shared between systems in a BRMS network.

- Duplicate media using BRM (DUPMEDBRM) will only duplicate entire optical volumes and the output volume must have the same physical characteristics as the volume specified on the FROMVOL parameter.

- Optical does not support remote duplication. Duplicate media using BRM (DUPMEDBRM) values for the From system (FROMSYS) parameter only support *LCL.

- Optical devices do not support software data encryption.

- BRMS has the same restrictions as the system save/restore commands.

New RDX 1.5 TB Cartridge (#EU15)

- **Expanding strategic ENTRY save/restore technology**
- **50% larger capacity than previous max capacity**
- **Larger capacity than DAT 80/160 cartridge**
- **Lower cost per GB RDX storage**
  - **1770% more no compression (80GB)**
  - **830% more with 2X compression (160 GB)**
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  - **#EU03, #EU04, #EU23, #1103, #1104, #1123**
- **Supported by AIX, IBM i, Linux**

**NEW
Feb 2013**

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Performance

- **Performance better than typical for low cost tape drives (DAT)**

- **SATA device can achieve rates over 180GB/Hr.**

- **Performance Capabilities Reference**
  - http://www-03.ibm.com/systems/resources/systems_power_software_i_perfmgmt_pcrm_feb2013.pdf

  - Chapter 9.1 Supported Backup Device Rates
    - RDX USB – 5.5 MB/s, 2.8 compaction factor
    - RDX SATA - 26 MB/s, 2.8 compaction factor

  - Chapter 9.29 RDX Device Performance
    - Detailed table comparing tape drives and SATA/USB RDX with and without data compression for different type of save/restore

Session A - [24 x 80]

File   Edit   View   Communication   Actions   Window   Help

Host: hmc10.aixncc.uk.ibm.   Port: 2300   Workstation ID: JDTP   Disconnect

```
                         Work with Device Descriptions
                                                    System:     DIAMOND5
Position to  . . . . .    _____     Starting characters


Type options, press Enter.
  2=Change    3=Copy      4=Delete    5=Display    6=Print    7=Rename
  8=Work with status    9=Retrieve source


Opt  Device        Type       Text
  _    QPADEV0001    3477       Device created for DIAMOND5.
  _    QPADEV0002    V100       Device created for DIAMOND5.
  _    QQAHOST       *APPC
  _    QTIDA         *APPC
  _    QTIDA2        *APPC
  _    RMS01         63B8       CREATED BY AUTO-CONFIGURATION




                                                                Bottom
Parameters or command
===>
F3=Exit    F4=Prompt    F5=Refresh    F6=Create    F9=Retrieve    F12=Cancel
F14=Work with status
```

MA   A   10/003

Connected to remote server/host hmc10.aixncc.uk.ibm.com using port 2300

INZOPT NEWVOL(JDRDXTEST) DEV(RMS01) TEXT('Testing for RDX on IBM i') :


```
                          Initialize Optical (INZOPT)

 Type choices, press Enter.

 Volume identifier  . . . . . . . .     *MOUNTED
 New volume identifier  . . . . . >     JDRDXTEST
 Device . . . . . . . . . . . . . >     RMS01           Name
 Volume full threshold  . . . . .       *CALC           1-100, *CALC
 Check for an active volume . . .       *YES            *NO, *YES
 End of media option  . . . . . . .     *LEAVE          *LEAVE, *UNLOAD
 Clear  . . . . . . . . . . . . . .     *NO             *NO, *YES
 Text 'description' . . . . . . . >     'Testing for RDX on IBM i'


                            Additional Parameters

 Volume type  . . . . . . . . . . .     *PRIMARY        *PRIMARY, *BACKUP
 Coded character set ID . . . . .       *CALC           *CALC, 500, 850
 Media format . . . . . . . . . . .     *MEDTYPE        *MEDTYPE, *HPOFS, *UDF

                                                                  Bottom
 F3=Exit    F4=Prompt    F5=Refresh    F12=Cancel    F13=How to use this display
 F24=More keys
 Already at bottom of area.
```

SAVLIB LIB(QGPL) DEV(RMS01)

→ 91 objects saved from library QGPL

Display Optical :

```
Session A - [24 x 80]
File   Edit   View   Communication   Actions   Window   Help

Host: hmc10.aixncc.uk.ibm.    Port: 2300        Workstation ID: JDTP        Disconnect

                         Display Optical Volume Attributes

    Volume . . . . . . . . . . . . . . . . . :    JDRDXTEST
    Device . . . . . . . . . . . . . . . . . :    RMS01
    Authorization list . . . . . . . . . . . :    QOPTSEC

Volume Header Information:
    Internal Volume ID . . . . . . . . . . . :    JDRDXTEST
    Serial Number  . . . . . . . . . . . . . :    5166025
    Volume type  . . . . . . . . . . . . . . :    *PRIMARY
    Media type . . . . . . . . . . . . . . . :    *UNKNOWN
    Media format . . . . . . . . . . . . . . :    *UDF
    Coded character set ID . . . . . . . . . :    500
    Volume-full threshold  . . . . . . . . . :    100
    Volume sequence number . . . . . . . . . :    0
    Create date  . . . . . . . . . . . . . . :    19/12/12
    Create time  . . . . . . . . . . . . . . :    11:34:42
    Text . . . . . . . . . . . . . . . . . . :    Testing for RDX on IBM i

                                                                     More...

Press Enter to continue.

_F3=Exit    F12=Cancel    F14=Additional volume attributes

MA    A                                                              23/001
Connected to remote server/host hmc10.aixncc.uk.ibm.com using port 2300
```
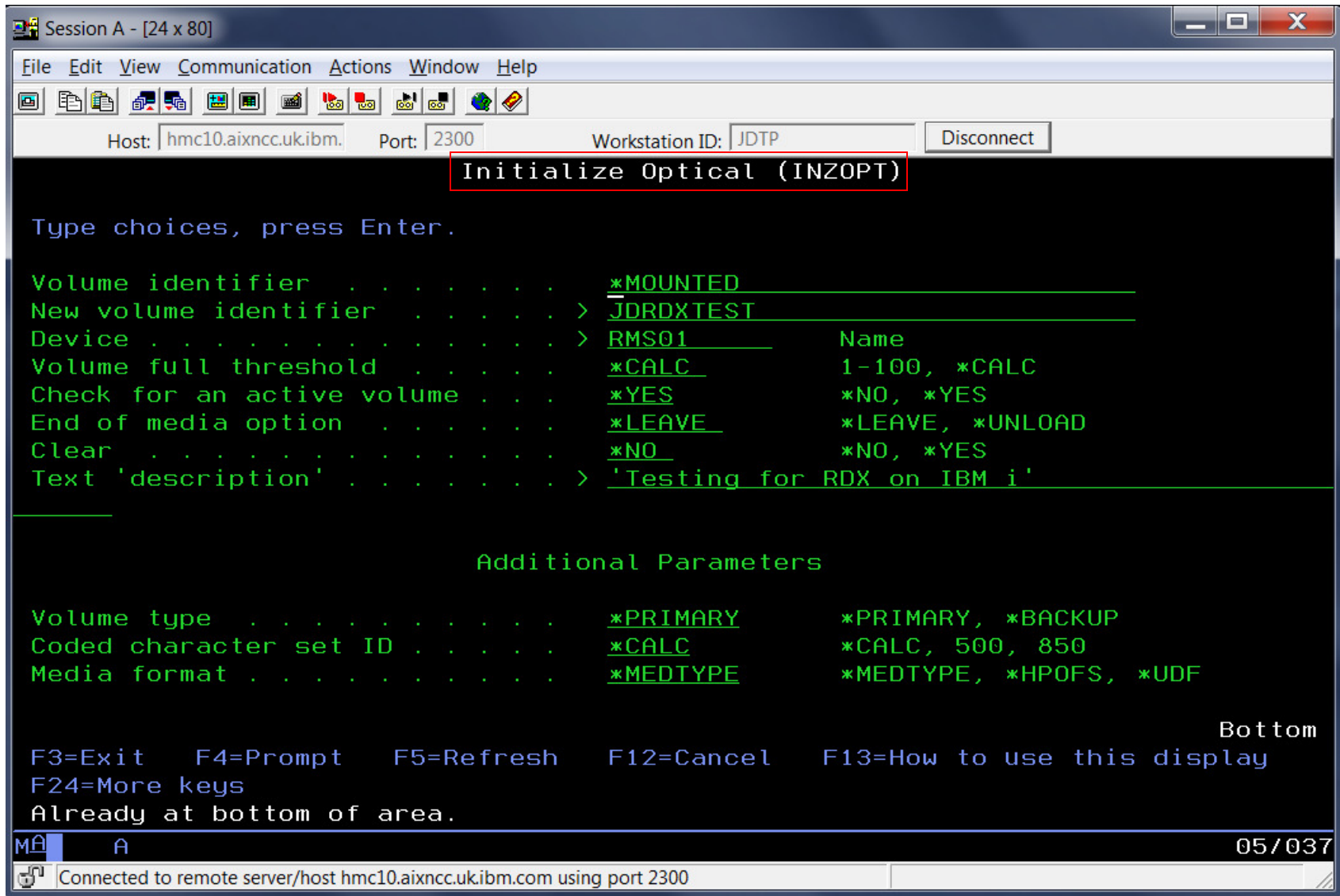
2 of 2

Session A - [24 x 80]

File Edit View Communication Actions Window Help

Host: hmc10.aixncc.uk.ibm.   Port: 2300   Workstation ID: JDTP   Disconnect

```
                      Display Optical Volume Attributes

 Usage Information:
   Last reference date  . . . . . . . . . :    19/12/12
   Volume on opposite side  . . . . . . . :
   Block size . . . . . . . . . . . . . . :    512
   Volume capacity (bytes)  . . . . . . . :    160037691392
   Space available on volume (bytes)  . . :    159031462400
   Percentage used  . . . . . . . . . . . :    .62

 Status Information:
   Volume location  . . . . . . . . . . . :    RMS01
   Volume access  . . . . . . . . . . . . :    Writeable
   Double volume  . . . . . . . . . . . . :    No
   Double sided . . . . . . . . . . . . . :    No
   IPL capable  . . . . . . . . . . . . . :    No
   Volume held by . . . . . . . . . . . . :    *SYSTEM



                                                              Bottom
 Press Enter to continue.

_F3=Exit    F12=Cancel    F14=Additional volume attributes
```

MA   A   23/001

Connected to remote server/host hmc10.aixncc.uk.ibm.com using port 2300

DSPOPT VOL(*MOUNTED) DEV(RMS01) DATA(*SAVRST) PATH(*ALL) :

```
Session A - [24 x 80]
File  Edit  View  Communication  Actions  Window  Help

Host: hmc10.aixncc.uk.ibm.    Port: 2300    Workstation ID: JDTP    Disconnect

                            Display Saved Objects

Library saved . . . . . . . . . :     QGPL

Type Options, press Enter.
  5=Display

Opt  Object      Type       Attribute   Owner          Size (K)   Data
 _   QGPL        *LIB       PROD        QSYS               5304    YES
 _   QZDAPKG     *SQLPKG                QSYS                 96    YES
 _   QBASE       *JOBQ                  QPGMR                32    YES
 _   QBATCH      *JOBQ                  QPGMR                32    YES
 _   QFNC        *JOBQ                  QFNC                 32    YES
 _   QINTER      *JOBQ                  QPGMR                32    YES
 _   QPGMR       *JOBQ                  QPGMR                32    YES
 _   QSNADS      *JOBQ                  QSNADS               32    YES
 _   QSPL        *JOBQ                  QPGMR                32    YES
 _   QS36EVOKE   *JOBQ                  QPGMR                32    YES
 _   QS36MRT     *JOBQ                  QPGMR                32    YES
 _   QTXTSRCH    *JOBQ                  QPGMR                32    YES
 _   QDKT        *OUTQ                  QPGMR                32    YES
                                                               More...
F3=Exit    F11=Alternate view    F12=Cancel    F16=Display header

MA   A                                                            09/003
Connected to remote server/host hmc10.aixncc.uk.ibm.com using port 2300
```

RSTLIB SAVLIB(QGPL) DEV(RMS01) RSTLIB(JYOTI) :

```
Session A - [24 x 80]

File  Edit  View  Communication  Actions  Window  Help

Host: hmc10.aixncc.uk.ibm.   Port: 2300      Workstation ID: JDTP      Disconnect

                              Display Library

 Library  . . . . . . . :   JYOTI          Number of objects  . :    89
 Type . . . . . . . . . :   PROD           Library ASP number . :    1
 Create authority . . . :   *SYSVAL        Library ASP device . :    *SYSBAS
                                           Library ASP group  . :    *SYSBAS


 Type options, press Enter.
   5=Display full attributes    8=Display service attributes


 Opt  Object      Type      Attribute           Size   Text
  =    QBASE      *JOBQ                         32768   QBASE Subsystem Job Q
  _    QBATCH     *JOBQ                         32768   Batch Subsystem Queue
  _    QFNC       *JOBQ                         32768   Finance Subsystem Job
  _    QINTER     *JOBQ                         32768   Interactive Subsystem
  _    QPGMR      *JOBQ                         32768   Programmer Subsystem
  _    QSNADS     *JOBQ                         32768   SNADS Subsystem Job Q
  _    QSPL       *JOBQ                         32768   Spooling Subsystem Qu
  _    QS36EVOKE  *JOBQ                         32768   QS36EVOKE Job Queue
  _    QS36MRT    *JOBQ                         32768   QS36MRT Job Queue.
  _    QTXTSRCH   *JOBQ                         32768   Text Search Services
                                                                      More...
 F3=Exit    F12=Cancel    F17=Top    F18=Bottom
 (C) COPYRIGHT IBM CORP. 1980, 2009.

MA   A                                         A                        12/003
```

Connected to remote server/host hmc10.aixncc.uk.ibm.com using port 2300

When done….

Vary off RMS01 - VRYCFG CFGOBJ(RMS01) CFGTYPE(*DEV) STATUS(*OFF)

Note :

The external USB devices allow the cable to be unplugged without a configuration change (removing the IOA from the partition, or powering off), but the device should be varied off (VRYCFG) before the device is unplugged.

USB devices

- Without an HMC
  - There is no way to tag the USB bus as the source for a D-mode IPL
  - So…
    - You must IPL from a DVD
    - Use the alternate device support at DST to select a USB device
    - This is true for ALL the USB devices

- Note: new – IBM i supports USB Flash Drive
  - IBM i 7.1 TR 6 on POWER7+ and POWER7 systems
  - Device appears to the system when plugged into a USB port that is configured to be in an i partition.
  - Like RDX, it is an optical class device, and may be used with save/restore or with the QOPT file system in IFS

  - More info at :
  - IBM i Technology Updates wiki
    - IBM i I/O Support Details
    - https://www.ibm.com/developerworks/mydeveloperworks/wikis/home/wiki/IBM%20i%20Technology%20Updates/page/IBM%20i%20IO%20Support%20Details?lang=en
  - Blog entry
    - http://ibmsystemsmag.blogs.com/i_can/2013/02/ibm-i-now-supports-usb-flash-drives.html

Resources

- Oct 2012 announcement letter
  - http://www-01.ibm.com/common/ssi/ShowDoc.wss?docURL=/common/ssi/rep_ca/0/897/ENUS112-180/index.html&lang=en&request_locale=en

- Wiki
  - https://www.ibm.com/developerworks/mydeveloperworks/wikis/home?lang=en#/wiki/IBM%20Removable%20Media%20on%20IBM%20i/page/Removable%20Disk%20Cartridge%20%28RDX%29%20on%20Removable%20Mass%20Storage%20%28RMS%29

- Blog entry
  - http://ibmsystemsmag.blogs.com/i_can/2012/12/removable-mass-storage.html

- Hardware Infocenter – Managing removable disk drives -
  http://pic.dhe.ibm.com/infocenter/powersys/v3r1m5/topic/p7hdt/p7hdtrdx.htm

- Section on Storage Solutions on InfoCenter provides key RDX information for IBM i clients:
  http://pic.dhe.ibm.com/infocenter/iseries/v7r1m0/index.jsp?topic=/rzam4/rzam4rms.htm

- BRMS PTF requirements for RDX listed on BRMS for i wiki :
  - https://www.ibm.com/developerworks/mydeveloperworks/wikis/home?lang=en#/wiki/IBM%20Backup%2C%20Recovery%20and%20Media%20Services%20%28BRMS%29%20for%20i/page/Removable%20Disk%20Cartridge%20%28RDX%29%20on%20Removable%20Mass%20Storage%20%28RMS%29

- Performance Capabilities Reference
  - http://www-03.ibm.com/systems/resources/systems_power_software_i_perfmgmt_pcrm_feb2013.pdf

Summary

- The RDX family of docking stations and cartridges offer flexible and cost-effective alternatives to tape drives.

- They are easy to use and are very portable.

Thanks !!!

W5: Pillars of Star Formation © NASA