CRUNCH™ for **DPM**

Virtual Deduplication Appliance for Microsoft System Center Data Protection Manager (DPM 2010 and 2012)



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BridgeSTOR CRUNCH for Microsoft Data Protection Manager (DPM 2010 and 2012)

Building on a highly successful and industry-exclusive DPM Advanced Data Reduction product family, BridgeSTOR now offers the next generation of data deduplication products specially optimized for Microsoft DPM 2010 and 2012. This 2nd generation approach to DPM deduplication significantly enhances both performance and data reduction effectiveness.

BridgeSTOR's 2nd generation DPM deduplication approach incorporates a number of technology breakthroughs, all of which are described in this document. Those breakthroughs include the following:

- BridgeSTOR's DDFS the Data Deduplication File System the software engine that powers both file level and sub-file (block level) DPM data deduplication.
- Optimized to interoperate with the data types and patterns produced by Microsoft's DPM 2010 and 2012
- DDFS includes BridgeSTOR's proprietary algorithms that optimize the deduplication of selected data types including virtual machine image files (VMDK, VHD, etc.).
- The CRUNCH Virtual Deduplication Appliance operates as a Guest in a Microsoft Windows Server 2008 R2 Hyper-V system, co-resident with DPM 2010 or 2012. The Virtual Deduplication Appliance is fully compatible with your Microsoft server applications while featuring ease of integration into the data center environment.
- No specialized or proprietary hardware required.
- A Virtual Tape (VT) interface in which special software is employed to make disk storage appear to operating systems and applications as physical tape drives and tape cartridges – enables DPM servers to write deduplicated data to disk storage (with disk storage responsiveness and performance) while ensuring compatibility with Microsoft DPM storage attachment specifications.
- An added benefit of BridgeSTOR's Virtual Tape interface is that it enables the CRUNCH user to point tape jobs directly to specific CRUNCH containers, enabling DPM to schedule all CRUNCH operations.
- A data block alignment mechanism that enables DPM data to be efficiently and effectively deduplicated by DDFS.
- The ability to deduplicate and store data produced by Linux and UNIX computers.
- A new medium-to-long-term DPM disk storage data retention tier.
- A new long-term deduplicated DPM tape storage tier.

CRUNCH for DPM is the only product available today that brings proven, 2nd generation advanced data reduction to Microsoft System Center Data Protection Manager environments.

CRUNCH for DPM finally adds the missing element of capacity optimization through data deduplication to DPM storage.

BridgeSTOR deduplication for DPM is optimized to interoperate with the unique storage workloads produced by DPM 2010 and 2012 when protecting Hyper-V, Exchange, SQL Server, SharePoint and shared storage (NAS, CIFS) servers. Using CRUNCH for DPM, Microsoft's Data Protection Manager can finally offer "bullet-proof" data protection coupled with market-leading data storage efficiency.

Microsoft System Center Data Protection Manager Storage Capacity Management

Microsoft's DPM natively supplies two (2) storage tiers: 1) a disk tier for short term storage from which data can be quickly and conveniently recovered in the case of data loss or corruption and 2) a tape tier for long term storage and archive from which data can be recovered if it is no longer available from the disk tier.

This storage hierarchy is illustrated in Figure 1 below.

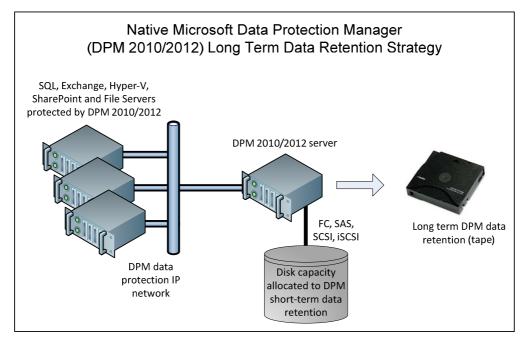


Figure 1. Native Microsoft DPM Storage Hierarchy

The native Microsoft DPM storage hierarchy provides a balance between operational data recovery and long term data retention, but some users say that it has significant limitations in production environments. Because the long term data retention tier is based on tape — with tape a far less convenient media type for data recovery — many administrators view the tape tier as strictly an offsite disaster recovery tier while increasing the size of the short-term disk tier to accommodate more recovery points or to protect more servers by simply adding disk

capacity. The feedback we have received from many DPM users is that DPM's disk capacity requirements are "voracious" and the product needs a data deduplication capability.

First Generation DPM Data Deduplication Solution

BridgeSTOR's first generation data deduplication solution for DPM extended the short-term disk storage tier effective capacity through a combination of data compression and deduplication by inserting a specialized hardware/software "deduplication layer" between the DPM server and short-term DPM disk storage.

The 1st generation architecture proved to be highly efficient in reducing capacity requirements. But Introducing deduplication between the DPM server and short-term DPM disk storage simply "kicked the can down the road" in solving the real problem which is that DPM has no long-term disk storage data retention tier.

This approach, illustrated in Figure 2, greatly reduced the disk capacity requirements of the DPM data store through the insertion of an Advanced Data Reduction layer between DPM and the disk storage.

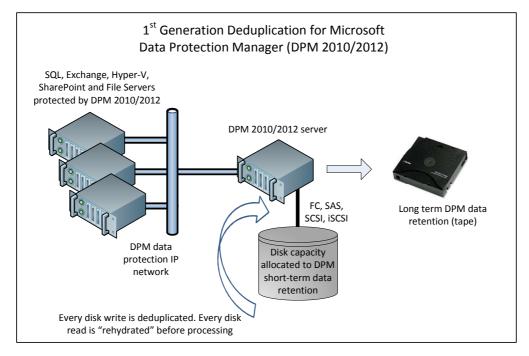


Figure 2. First Generation Microsoft DPM Data Deduplication and Storage Hierarchy

First generation DPM data reduction approaches, while relieving the capacity requirements of the short-term disk data retention tier and enabling the retention of more recovery points or the protection of more servers, did not affect the role of the long-term data retention tier. Data that had been deduplicated when stored on disk had to be returned to its original non-reduced state (rehydrated) as it was being written to tape.

Introducing BridgeSTOR's CRUNCH for DPM

Microsoft's System Center Data Protection Manager provides a comprehensive solution for data protection requirements in Windows Server, Exchange, SQL, SharePoint, file serving and Hyper-V environments as well as for corporate desktops and laptops. BridgeSTOR's CRUNCH now adds data deduplication to create a new long-term disk storage tier to reduce short-term storage pool capacity requirements. BridgeSTOR's capacity optimization is the ideal response to DPM's voracious storage appetite and helps you extend the life of your in-place storage hardware.

CRUNCH for DPM is a true 2nd generation implementation of BridgeSTOR's Advanced Data Reduction technology. The principal technological advance that enables BridgeSTOR to leap from previous implementations to CRUNCH is DDFS – the Data Deduplication File System. DDFS represents a breakthrough in cloud-enabled data deduplication that operates at both the file and sub-file (data block) level. Other key DDFS features that specifically address the unique requirements of DPM data deduplication are: deduplication across multiple sources, Synthetic Data Archiving™ and an unlimited number of data Recovery Points.

DDFS deduplication effectively reduces the off-site storage requirements of all data types and includes specialized algorithms that recognize the unique characteristics of virtual machine images (VHD, VMDK, VDI and others). When a virtual machine image is encountered, DDFS automatically invokes these specialized algorithms to maximize the deduplication of these data types.

The first virtual appliance utilizing DDFS is targeted at the perplexing requirement to store Hyper-V and other virtual server image types on magnetic tape and in the cloud – in a deduplicated, compressed and encrypted (for tape, compression and encryption are performed by the tape drive) format to minimize the cost and complexity of storing critical data offsite.

CRUNCH for DPM, through DDFS, enables the storage of deduplicated DPM data on magnetic tape.

The illustration in Figure 3 below describes how BridgeSTOR's new generation of DPM deduplication becomes integrated into your DPM data protection environment.

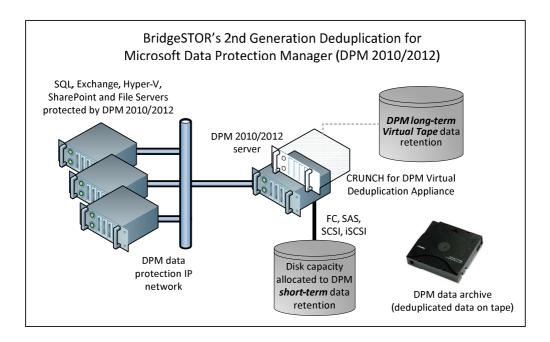


Figure 3. BridgeSTOR's CRUNCH for DPM Data Deduplication

BridgeSTOR's CRUNCH-based deduplication products for DPM offer the following advantages and benefits:

- Most recoveries will be performed from short-term disk storage, so initial synchronizations, consistency checks and recovery point creations will proceed at native DPM speed.
- 2. Less disk storage capacity is required to setup and maintain short-term DPM data stores.
- 3. Data stored by CRUNCH for the long term can be recovered from standard Windows shares without using DPM.
- 4. Introducing Virtual Tape and disk-based data deduplication at the point where DPM archives data to tape creates a new long term disk data retention tier.
- 5. Data is deduplicated only once when being prepared for storage on the long-term tier the deduplication process no longer has to be reversed for every read operation, greatly reducing processing overhead.

Operationally, DPM data protection would follow these steps:

- 1. Create protection group(s).
- 2. Perform initial sync (DPM)
- 3. Create recovery point(s).
- 4. Perform consistency check(s) (optional).

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- 5. Data in steps 2, 3 and 4 is written to short-term disk and held there for seven (7) days for immediate recoveries thus reducing the disk capacity required for short-term data availability.
- 6. Set up Protection Group policies using the DPM Storage Pool for short-term protection and the CRUNCH Virtual Tape interface for long term protection.
- 7. Set up daily recovery points and a weekly write to tape using the latest recovery point on that day. (Smaller systems might write to tape daily after that day's recovery point.)
- 8. Schedule long term protection as suggested in #7 above.
- 9. Short term recovery data is stored on physical disk and long term recovery data is stored in CRUNCH containers. Immediate recoveries come from physical disk and recoveries requiring data older than what is maintained on the short-term disk come from CRUNCH containers.
- 10. Data stored in CRUNCH containers on disk can be readily restored from a Windows share.
- 11. To store long term recovery data on tape, perform steps 12 and 13 below.
- 12. Utilize the CRUNCH Post Copy process to copy CRUNCH container(s) to a network share or shares.
- 13. Run a DPM job that backs up the CRUNCH containers on the network share to tape.

Protecting/Archiving Linux and UNIX Servers and Data

DPM is a Microsoft Windows data protection product. BridgeSTOR's CRUNCH, however, is not restricted to deduplicating Windows data and hence can be employed to protect and archive data produced and stored by Linux and UNIX systems.

While CRUNCH for DPM employs "push" Virtual Tape technology to allow DPM to transfer data to CRUNCH containers, other CRUNCH containers can be exposed to external Linux and UNIX servers. Linux and UNIX data deduplication is performed as CRUNCH's data protection and archiving capability "pulls" data from protected NFS servers – without the need for server agents.

CRUNCH's "agent-less" architecture additionally simplifies laptop and workstation data protection because DPM agents do not have to be installed in these devices. The use of standard network shares for this purpose (NFS/Windows) is a CRUNCH operational benefit.

Finally, to archive the Linux and/or UNIX data to tape in deduplicated form, simply use a CRUNCH post copy to copy containers containing Linux and/or UNIX data to Windows shares and instruct DPM to back up those shares to physical tape.

Key Business Benefits

- 1. Capacity optimization reduces System Center Data Protection Manager physical disk capacity requirements through data deduplication.
- 2. Extends data protection, data deduplication and long-term archive to non-Windows computing platforms.
- 3. Storage capacity is optimized in NearTime without performance penalty.
- 4. Cuts capital expenses by reducing the number of RAID arrays and disk drives required.
- 5. Slashes operating expenses by reducing power and cooling requirements.
- 6. No server agents are required; CRUNCH utilizes standard NFS or Windows shares for storage capacity.

Comparing CRUNCH for VM Images and CRUNCH for DPM

Feature	CRUNCH for VM Images	CRUNCH for DPM		
DDFS (Data Deduplication File System)	Yes	Yes		
DDFS optimized for	VHD, VMDK and other virtual machine images	Server data in DPM data protection format		
Principal data transfer interface	Windows Shares	Virtual Tape (VT)		
Data transfer	"Pull" from Windows Shares	"Push" to VT		
Server agents	No	Relies upon standard Microsoft DPM server agents		
Data center business case	Reduce Iron Mountain tape storage costs; buy fewer tape cartridges; use smaller tape library	Reduce DPM disk storage requirements		
Data deduplicated on/to physical tape	Yes - VHD, VMDK and other virtual machine images	DPM recovery data > seven (7) days old		
Usable with unstructured data produced by Windows systems	Yes	Not recommended for data other than DPM and Linux/UNIX server data		

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Summary

Microsoft's System Center Data Protection Manager (DPM 2010 and 2012) provides a comprehensive solution for data protection requirements in Windows Server, Exchange, SQL Server, SharePoint, file serving and Hyper-V environments as well as for corporate desktops and laptops. CRUNCH reduces the capacity requirements of DPM and extends data protection beyond Microsoft Windows-based computing platforms and into Linux and/or UNIX systems.

BridgeSTOR's products do not interfere with DPM data backup or recovery operations while transparently providing data deduplication to minimize long-term storage capacity requirements. BridgeSTOR's capacity optimization is the ideal response to DPM's voracious storage appetite and helps you extend the life of your in-place storage hardware.

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