



Smart Storage Sizing

Capacity Magic

Practical planning tool for IBM disk configurations

Capacity Magic calculates the effective storage capacity of your current and future IBM Disk Subsystems through an easy-to-use graphical dialog.

As single box capacities keep increasing, Storage Managers may set up a Disk Subsystem for more than one purpose: for instance, to accommodate archival storage capacity as well as high-performance online transaction data base capacity. 'One size fits all' may not always be adequate. You will want to combine different DDM sizes and RAID schemes within one box, and this makes it complex to find out what the effective capacity of your new Disk Subsystem will be.

To manually compute the effective storage capacity of the Disk Subsystem, you would need to be familiar with all the RAID schemes, effective RAID rank capacities and the increasingly complex sparing and configuration rules used by the Disk Subsystem.

Capacity Magic automates this procedure and minimizes the chance of errors. It allows you to define different DDM and RAID type combinations, automatically applying the correct configuration and sparing rules, so you know the result will be a valid configuration with an accurate calculation of how much effective capacity is available to your servers.

You will like the ease-of-use and the speed with which you get results with Capacity Magic.

Use Capacity Magic to:

- ▶ Have a complex set of configuration rules applied for you automatically
- ▶ Explore the net price per GB impact of pursuing different Disk Drive Module capacities and/or RAID types
- ▶ Document your existing Disk Subsystems disk and RAID configuration for later reference
- ▶ Plan for consolidation of different workloads such as Open, iSeries and zSeries on one IBM Disk Subsystem

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The screenshot shows the Capacity Magic software interface for a DS 8300 system. It displays a grid of configurations for different RAID types and disk counts. The configurations are organized into columns: Base Frame, Expansion Frame, and another Expansion Frame. Each configuration shows a visual representation of the disk layout and the RAID type. A summary table on the right provides the following data:

Configuration	Physical capacity	Effective capacity
#2016 RAID-10	33,995.20 GB	63,454.62 GB
#2016 RAID-10 (72.8 GB 15,000 rpm)	16 megapacks	
#2316 (300 GB 10,000 rpm)	16 megapacks	

DS8300 configuration screen

Pick any combination of DDM and RAID types and get an instant visual representation of the resulting configuration.

Capacity Magic Applications

► Consolidation and Migration

Whether you plan to consolidate different subsystems into one, migrate from an existing Disk Subsystem to a new model, or migrate from internal storage for iSeries to external IBM Storage, you will profit from the planning capabilities that Capacity Magic offers. The Wizard allows you to specify the required effective capacity for zSeries, Open, and iSeries Logical Volumes, with different DDM and RAID type requirements for each platform. You can even specify different DDM and RAID types on the level of individual ranks using the Toolbar. Capacity Magic will tell you exactly how many ranks are needed to get a certain usable capacity for each of the platforms.

► What-if Scenarios

Whenever larger capacity disks become available, Capacity Magic can help you see how much the new

types could offer in terms of space saved in the Disk Subsystem. For new RAID schemes, you can see in seconds what the new effective capacity to raw capacity ratio would be for your installation. It only takes a couple of mouse clicks to run some scenarios that show you what the different options have to offer in terms of effective space usage.

► Document Existing Installations

Whenever you create a Capacity Magic calculation, the graphical view and the formatted text report can be saved in a file to be kept for future reference. The attractive dialog that shows all installed ranks is a simple yet effective way to show how many ranks of which disk and RAID type are present. The Capacity Magic file can be reopened at any time, to make changes to the configuration for future upgrades, or just as a reminder of what the disk configuration looks like in detail.

Capacity Magic for Windows - DS 6800 - [Untitled1.ccm]

File Edit View Window Help

2052 2002 2004 2990 RAID RAID RAID RAID zSer Open iSer

Create Extent Pool for each Raid Rank

Enclosure	Rank	Capacity	RAID	Rotation
Server Enclosure	#2004	300 GB	RAID-5	10k rpm
	#2004	300 GB	RAID-5	10k rpm
	#2004	300 GB	RAID-5	10k rpm
	#2004	300 GB	RAID-5	10k rpm
Storage Enclosure 1	#2004	300 GB	RAID-5	10k rpm
	#2004	300 GB	RAID-5	10k rpm
	#2004	300 GB	RAID-5	10k rpm
	#2004	300 GB	RAID-5	10k rpm
Storage Enclosure 2	#2004	300 GB	RAID-5	10k rpm
	#2004	300 GB	RAID-5	10k rpm
	#2004	300 GB	RAID-5	10k rpm
	#2004	300 GB	RAID-5	10k rpm
Storage Enclosure 3	#2004	300 GB	RAID-5	10k rpm
	#2004	300 GB	RAID-5	10k rpm
	#2004	300 GB	RAID-5	10k rpm
	#2004	300 GB	RAID-5	10k rpm
Storage Enclosure 4	#2004	300 GB	RAID-5	10k rpm
	#2004	300 GB	RAID-5	10k rpm
	#2004	300 GB	RAID-5	10k rpm
	#2004	300 GB	RAID-5	10k rpm
Storage Enclosure 5	#2004	300 GB	RAID-10	10k rpm
	#2004	300 GB	RAID-10	10k rpm
	#2004	300 GB	RAID-10	10k rpm
	#2004	300 GB	RAID-10	10k rpm
Storage Enclosure 6	#2004	300 GB	RAID-10	10k rpm
	#2004	300 GB	RAID-10	10k rpm
	#2004	300 GB	RAID-10	10k rpm
	#2004	300 GB	RAID-10	10k rpm
Storage Enclosure 10	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm
Storage Enclosure 11	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm
Storage Enclosure 12	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm
Storage Enclosure 13	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm
Storage Enclosure 14	#2002	146 GB	RAID-10	10k rpm
	#2002	146 GB	RAID-10	10k rpm
	#2002	146 GB	RAID-10	10k rpm
	#2002	146 GB	RAID-10	10k rpm
Storage Enclosure 15	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm
Storage Enclosure 16	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm
	#2002	146 GB	RAID-5	10k rpm

Summary

Physical capacity: 49,258.00 GB
Effective capacity: 31,775.53 GB

Total Array Sites:
FC 2002 (145.6 GB 10,000 rpm): 28 Array Sites
FC 2004 (300 GB 10,000 rpm): 28 Array Sites

Configuration

Modified

◀ DS6800 configuration screen

On the DS6800, you can choose RAID 5 and RAID 10 with 4 disks in a rank, or with 8 disks in a rank. Capacity Magic shows the different effective capacities for these options.

Capacity Magic Features

► IBM ESS 800, DS6000 and DS8000 Support

Capacity Magic supports configuration calculations for IBM ESS 800 with or without Arrays Across Loops, for DS6000 Series and for DS8000 Series. It includes support for Disk LPARs in the DS8300, giving you the opportunity to model the complete physical Storage System as two separate LPARs, each with its own disk and RAID type configuration.

► Enforcement of Installation Rules

Capacity Magic only allows configurations that are allowed in reality. For instance, on initial installations, IBM Disk Subsystems do not allow placing smaller capacity disks before larger capacity disks. Each Disk Subsystem type also has its own rules for DDM type intermixing. Capacity Magic restricts the possible installation options based on these rules, so you cannot create a configuration that is not allowed.

► Upgrades after Installation

During upgrades, you can install large capacity disks even if the existing Disk Subsystem already contains smaller capacity disks. Capacity Magic allows you to specify the existing part of the Disk Subsystem, lock it, and then add larger capacity disks as an upgrade. Capacity Magic still enforces all other applicable installation rules.

► Automatic Sparing

Capacity Magic shows exactly how many spares are needed, using the sparing rules for the different Disk Subsystems. For instance, the IBM ESS 800 allows sparing only to disks of the same size. However, the DS8000 can spare to a larger capacity disk and requires 4 spares of the largest capacity disks per DA pair, and in some cases an additional two spares of the fastest type. Capacity Magic uses all these rules to create a valid configuration with exactly as many spares as you will get in reality.

► zSeries 3390 Volumes

One of Capacity Magic's functions is to compute the number of 3390 volumes that fit on the ranks you plan for zSeries. You can even specify a mix of 3390 types in the Wizard, and Capacity Magic will tell you how many ranks you need. Capacity Magic allows you to choose any combination of 3390-1, 3390-2, 3390-3, 3390-9, 3390-27 and 3390-54 volumes.

► Visual Representation

The dialog with all the enclosures is a great aid because it shows the disk configuration at a glance. The Toolbar and Dialogs are designed for ease-of-use and allow you to evaluate several configuration scenarios quickly.

► Rich Text Format Reporting

Capacity Magic reports are in rich text format and can be printed or saved to a Word file. The outputs are color coded so that for instance LPAR A and LPAR B are easily distinguishable.

► Extent Pools

With DS8000 and DS6800, each RAID rank can be an individual Extent Pool, or several ranks can be combined into one Extent Pool. Combining ranks into one Extent Pool results in more space for 3390 volumes. You can specify whether each rank is a separate Extent Pool or whether ranks are combined, and Capacity Magic will show you the difference in the number of volumes that your Subsystem can contain.

▼ Report for DS83000 with two LPARs
Each LPAR has its own section in the report, showing the Extents available to your servers.

Megapack report LPAR A

Type	Mega packs	RAID ranks	Physical Capacity (GB)	Extent Count	Effective Capacity (GB)	Effective Capacity (binary, GiB)	Effective Utilization (%)
All megapacks	20	40	65614.40	39080	38989.02	36311.36	59%
By DDM type							
FC 2116 (145.6 GB 10,000 rpm)	12	24	27955.20	23272	22015.31	20503.36	79%
FC 2316 (300 GB 10,000 rpm)	8	16	37659.20	15808	16973.71	15808.00	45%
By RAID type							
RAID 5	-	24	27955.20	23272	22015.31	20503.36	79%
RAID 10	-	16	37659.20	15808	16973.71	15808.00	45%
By Extent Pool Platform							
zSeries	-	24	27955.20	23272	22015.31	20503.36	79%
Open Systems	-	16	37659.20	15808	16973.71	15808.00	45%

Megapack report LPAR B

Type	Mega packs	RAID ranks	Physical Capacity (GB)	Extent Count	Effective Capacity (GB)	Effective Capacity (binary, GiB)	Effective Utilization (%)
All megapacks	20	40	65614.40	39080	38989.02	36311.36	59%
By DDM type							
FC 2116 (145.6 GB 10,000 rpm)	12	24	27955.20	23272	22015.31	20503.36	79%
FC 2316 (300 GB 10,000 rpm)	8	16	37659.20	15808	16973.71	15808.00	45%



About IntelliMagic

IntelliMagic takes pride in providing advanced and high quality solutions for performance analysis and storage configuration planning.

IntelliMagic's products incorporate advanced algorithms for data reduction and performance prediction, in combination with an effective, flexible and intuitive user interface. Users are guided safely through valid scenarios. It is this powerful combination that justifies the 'Magic' suffix in the name of each of our products.

Our goal is complete customer satisfaction, so responsiveness to customer questions and issues and a customer-first mentality are very important to us.

We strive towards long-term relationships with our employees, customers, and suppliers.

Other products from IntelliMagic include Disk Magic and RMF Magic.

► Disk Magic

Disk Magic is a Windows-based modelling product that allows you to evaluate upgrade scenarios for your Disk Subsystems.

► RMF Magic

RMF Magic is used for Disk Subsystem performance studies in z/OS environments. You can use it to solve performance problems, optimize workload distribution, plan upgrades and size data mirroring configurations.

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