



IntelliMagic



Storage Intelligence

IntelliMagic Balance

Improve storage hardware efficiency

When designing the layout for z/OS logical volumes over physical resources, either when migrating to new hardware or when optimizing data placement on existing storage, a z/OS storage team faces two challenges.

The first challenge is to place the data in a way that minimizes the chance of performance issues. The second is to create a solution that will maximize the useful life of the expensive storage hardware. Although there are tools to assist with non-disruptive moves, up to now there has been no feasible way to calculate exactly which volume should go where.

Using manual methods it is virtually impossible to choose the best data placement, especially considering every time interval. If volumes that are very active at the same time are located on the same RAID array group, this will cause unwanted delays. This imbalance is commonly referred to as “hotspots”.

IntelliMagic Balance is designed to minimize the risks of performance issues and inefficient use of hardware. It shows exactly where to place or move volumes in order to optimize throughput and avoid hotspots. This results in a much more efficient use of hardware resources compared to methods commonly in use today.

More efficient use of hardware results in fewer performance issues, a longer useful life for your hardware, and reduced storage hardware costs.

When used for z/OS storage migrations, IntelliMagic Balance provides a ready-to-use migration plan based on an analysis of measurement data from the current configuration. It also shows which workloads to place on which disk drive technology in a new target environ-

ment. When used to optimize existing storage hardware, it analyzes a week's worth of data to provide a list of those volume moves that will give the most improvement in terms of hotspot avoidance. IntelliMagic Balance can be used for tiered or for single-tier storage environments.

Use IntelliMagic Balance to:

- ▶ Extend the useful life of expensive storage hardware
- ▶ Enable more throughput on the existing environment by selecting the best logical volume moves
- ▶ Create an optimal mapping for consolidating small logical volumes to larger volumes
- ▶ Plan data moves to tiered storage hardware without introducing performance risks
- ▶ Merge SMS storage groups for more efficient space utilization
- ▶ Significantly reduce job processing times by moving the right data to SSDs
- ▶ Create a migration plan that maps logical volumes to physical RAID array groups
- ▶ Show how to increase space utilization without negatively impacting performance

IntelliMagic Headquarters
Leiden, The Netherlands
T +31(0)71-5796000

IntelliMagic, Inc.
Southlake, Texas, USA
T 1-214-432-7920

sales@intellimagic.net
www.intellimagic.net



IntelliMagic Balance

Applications

► Optimize Existing Storage Systems

The performance and throughput capabilities of storage systems are highly influenced by the amount of balance on the back-end. Moving logical volumes from busy to less busy RAID array groups will improve the balance and increase the throughput potential.

IntelliMagic Balance can pinpoint exactly those volume moves that would make the biggest impact in terms of balance and performance. By using the 'best moves' function regularly, the storage systems will be able to perform much better. This way, workload growth can be handled easily without new investments.

► Create a Data Migration Implementation Plan

When migrating to a new storage system, an essential task is the creation of a migration plan to determine where each of the logical volumes should be placed on the target storage system to get the best performance. IntelliMagic Balance takes out the guesswork and ensures that this is no longer a time-consuming task.

IntelliMagic Balance creates a migration plan that considers both the front-end and back-end activity of the logical volumes over time. It provides a volume layout so that each of the physical RAID array group handles about the same level of work during each shift. Such a balanced configuration provides better performance and enables a longer useful life for the new hardware.

► Migrate to Larger Logical Volumes

The most difficult part of migrating to larger logical volumes is the design of the mapping that determines which logical volumes are combined.

IntelliMagic Balance combines the source volumes into target volumes such that each target volume handles the same level of work in both front-end and back-end activity. This allows you to migrate to larger logical volumes without a significant increase in the peak I/O load for individual logical volumes.

► Create a Tiering Implementation Plan

A tiered configuration can be significantly less expensive than a single-tier configuration and offer great performance. The difficulty in designing a tiered configuration is to split the data into the part that needs faster disks and the part that can reside on slower disks. Splitting the workload manually is tedious and error-prone, especially as you need to consider all time periods like batch and online.

IntelliMagic Balance automates this task and creates the best possible workload split. It generates charts that show how well the target combination of disk types fits the workload requirements and it can be rerun with various mixtures of disks to create several tiering scenarios.

► Find SSD Candidate Volumes

Solid State Devices (SSDs), also known as Flash Drives, form a special tier because of their exceptional performance. By moving the appropriate workloads onto SSDs, the average back-end access density of the workloads remaining on spinning disks can be decreased so dramatically that larger physical disks can be used for the remaining workload.

IntelliMagic Balance can be used during two phases: first to assess the optimal number of SSDs and then to create the migration plan at the logical volume level.

IntelliMagic Balance Process

► Activity Levels over Time

When deciding on volume placement it is important to account for the fact that the activity levels change constantly. For example, heavy SORT work may be very active at night, development may be active mostly during the day, and your major databases may always be in use. IntelliMagic Balance uses a week's worth of RMF data and creates a plan that optimally balances the workload across all intervals in the period.

► Intelligent Storage Group Awareness

Storage groups play an important part in z/OS storage management. IntelliMagic Balance considers the storage group information in all its recommendations. For each storage group, you can indicate whether the datasets on that storage group are mostly static (seldom reallocated), or dynamic (often reallocated). For a multi-tier environ-

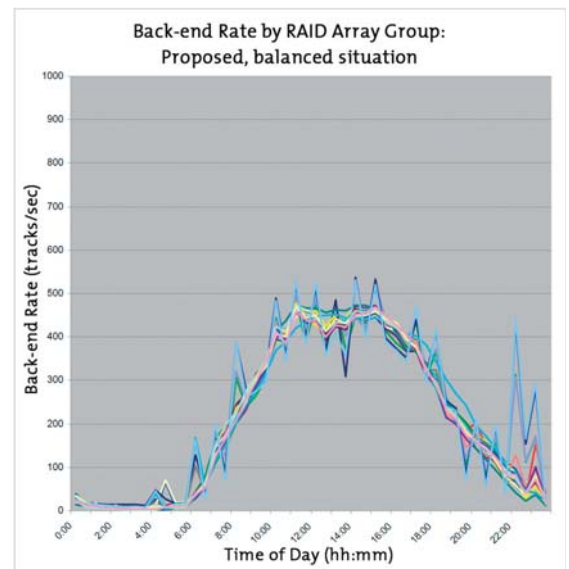
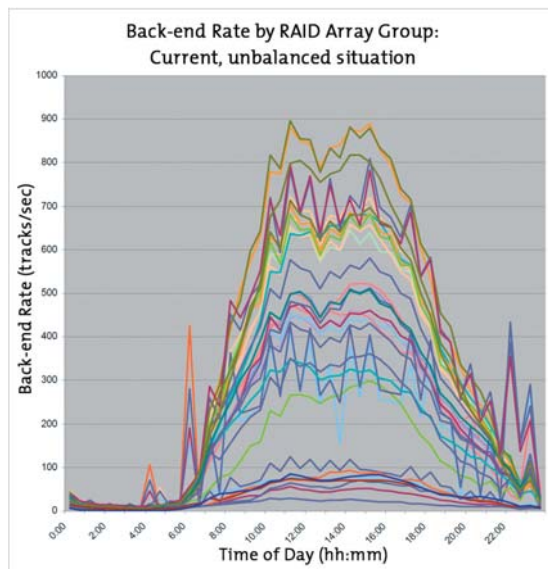
ment, all devices from a dynamic storage group are assigned to a particular tier and a 'horizontal' storage pool scheme is created within that tier. For a static storage group, individual volumes may be mapped to a particular tier.

► Prerequisites, Input and Output

IntelliMagic Balance can be used to create a migration plan or to create a list of the best volume moves within an existing environment. The product itself runs on a PC or server with Microsoft® Windows XP or higher. The input is RMF or CMF data together with user commands. IntelliMagic Balance supports all types of disk drives, including SSDs, and all RAID types. IntelliMagic Balance can work together with external data mover software such as FDRPAS from Innovation Data Processing, by automatically creating migration JCL.

► Improved Throughput

These two charts show how balance improves the throughput potential. The graph on the left shows an actual non-optimized situation. The right-hand graph shows the effect if the volumes were balanced over the same ranks. The peak back-end I/O rate per rank drops from 900 to 530, which translates to a much higher throughput potential on the same hardware.





About IntelliMagic

IntelliMagic is known for its expertise in Storage Performance Management. Our suite of software products enables proactive performance management for complex storage configurations for z/OS mainframes as well as open systems environments.

The IntelliMagic product suite enables you to use your storage hardware efficiently, save cost, and increase end-user satisfaction.

The IntelliMagic product suite uses advanced algorithms for data analysis and performance prediction, in combination with a flexible and intuitive user interface. The products are easy to use and do not require time-consuming implementation projects.

With the IntelliMagic product suite, truly proactive Storage Performance Management is possible, both through early warning of potential problems before they affect production applications, as well as by being able to choose and configure storage hardware components in a way that maximizes the benefit-cost ratio.

As a company, we strive towards long-term relationships with our employees, customers, and suppliers. Our goal is complete customer satisfaction. Responsiveness to questions and a customer-first mentality are very important to us.

Besides IntelliMagic Balance, the IntelliMagic Storage Performance Suite consists of two other products:

► IntelliMagic Vision

IntelliMagic Vision analyzes the performance utilization and health of all the storage system components. Direct benefits are the prevention of performance issues, faster problem resolution and more efficient usage of storage hardware. Using IntelliMagic Vision, you can optimize the throughput of your disk configurations, use existing hardware for a longer period, and save on new hardware. IntelliMagic Vision supersedes RMF Magic, our previous storage performance management product for z/OS attached storage. IntelliMagic Vision still contains the z/OS functionality, but now supports enterprise storage attached to any server platform.

► IntelliMagic Direction

IntelliMagic Direction is a Windows-based modeling product that evaluates upgrade scenarios for your disk storage systems. This is essential for every storage manager considering hardware upgrades or replacements because it accurately determines the required storage configurations and shows the growth potential of the different options. This product saves organizations money because it enables them to buy exactly the hardware and options that their workload needs. IntelliMagic Direction was formerly known as Disk Magic.

Contact us ▼

IntelliMagic Headquarters

Leiden, The Netherlands

T +31(0)71-5796000

IntelliMagic, Inc.

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