



## Versatility of InfoSlice RAID configurations

Depending on which InfoSlice model you have, it can contain up to 16 hard disk drives in a storage volume with total raw storage of up to 2,560 GBytes. This much storage is rarely used for a single application. Rather a Storage Array is frequently split into several partitions and each partition is given to a separate application. For example, one partition may be allocated for a mail server, another for a database server, and another for a backup server. Each application may have different size, reliability, throughput and/or latency requirements.

The diversity in Application requirements is a reason why, in addition to the partitioning, creating more than one RAID device of different RAID levels is desired, when many different Applications share a Storage Array. Because most of block Storage Arrays available on the market do not allow you to have more than one RAID or do partitioning, the additional SAN management software has to be purchased for creating of virtual volumes and partitions on those Storage Arrays. In contrast, the InfoSlice software allows you to create variety of RAID Arrays and partition them.

The InfoSlice disks can be organized into JBOD **and/or one** or **several** RAID Arrays. Each RAID Array can be configured as **any** of the five RAID levels: Concatenated, Striped (RAID0), Mirrored (RAID1), Parity (RAID4), or Redundant (RAID5). Each RAID device or independent disk can be partitioned into **many** chunks and each chunk can be **grown** at anytime if additional unused storage capacity exists. Each partition, or un-partitioned RAID, or independent disk is presented to the servers as an individual LUN for an access.

To configure RAID Arrays and partitions, the InfoSlice Graphical User Interface has two modules, called "RAID Manager" and "Device Partition Manager". The Graphical User Interface called Webmin is Web-based configuration tool, which allows you to configure all functions of the InfoSlice. Webmin is accessed remotely through secure connection using graphical web browser, such as MS Explorer or Netscape. Webmin is described in detail in the InfoSlice "Installation and Maintenance Manual".

When desired, access to any InfoSlice Partition, RAID volume or LUN can be controlled. For example, InfoSlice administrator can prevent all machines except one from accessing a RAID volume. The InfoSlice Access Control List module allows you to configure and control access rules. ACL configuration module is discussed in detail in the InfoSlice "Installation and Maintenance Manual".

The rest of this document describes two scenarios of InfoSlice possible configurations, depending on storage requirements of Applications that use the InfoSlice storage volumes.

### **Applications with *similar* storage requirements**

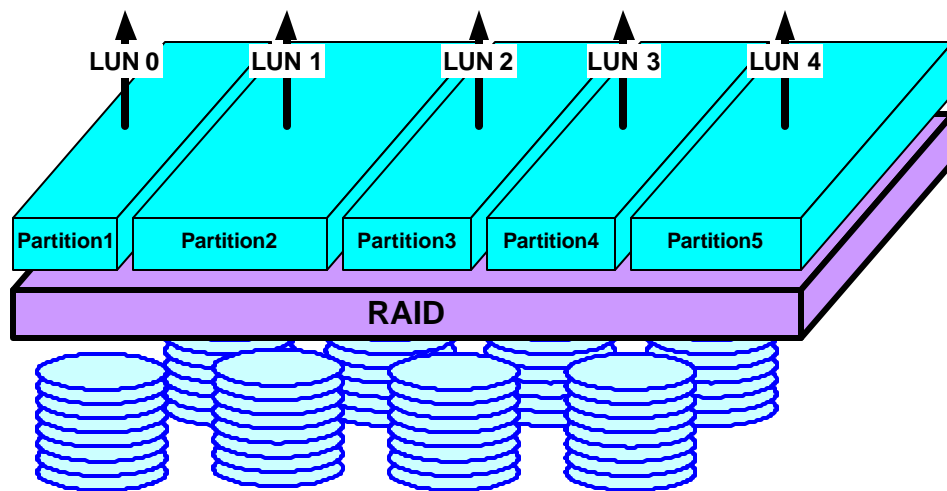
When the InfoSlice is being used by the Applications, which have similar storage requirements such as throughput, latency and reliability requirements, it can be configured as a single RAID device, which is further divided into several partitions each used by its own application or server, as presented on **Figure 1**.

To configure the InfoSlice array you need to access "RAID Manager" interface of Webmin, corresponding to the InfoSlice Storage Array of interest. In the "RAID Manager" interface, choose RAID level and the set of devices that RAID Array should consist of. If desired, you may configure RAID Array with a spare disk to further increase the reliability of the array.

After the RAID is created, access “Device Partition Manager“ Webmin interface. It allows you to create, delete, and resize partitions for RAID Arrays and independent disks, if the latter are not part of RAID Arrays. If you configured all disks as one single Array, you will be presented with a single RAID device.

After all the partitions were created they are not accessible yet to the computers attached to the InfoSlice Array. To make them accessible, you need to “map” the partitions, which you would like to be accessed. The act of “mapping” makes partitions or any other storage units accessible by computers connected to InfoSlice. Mapping is necessary to eliminate several improper configuration possibilities such as a disk being accessed individually when it is a part of a raid volume. To make mappings, go to “Storage Device Mapping” Interface. You will be presented with the list of all RAID volumes, disks and their partitions. Choose the partitions destined for external server access, and click on “Map” buttons corresponding to those volumes. The details of mapping module interface are described in the “Installation and Maintenance Manual”.

After all three procedures described above are done, the computers, which access the InfoSlice, will see a list of LUNs corresponding to the created partitions.



**Figure 1 Configuration of InfoSlice for use by Applications that have similar storage requirements. All disks are combined into a single RAID, which is further split into partitions. Each partition has an individual LUN visible to the attached computers as a separate device.**

For the Applications such as intermediate disk backup (for example, with Bakbone Software’s Netvault or Veritas NetBackup), the throughput and latency are not very important requirements. On the other hand, the volume of storage usually consumed by those applications is quite high. So, the appropriate RAID level would be RAID5 or even RAID 0, since it consumes less physical disk space then a mirror.

For the Applications, such as MS Exchange or MS SQL server, throughput and latency are critical, so appropriate RAID level to configure would be RAID1. While this RAID configuration would consume double amount of disk space, then data actually takes, the performance would be much better in contrast to RAID5.

## **Applications with *different* storage requirements**

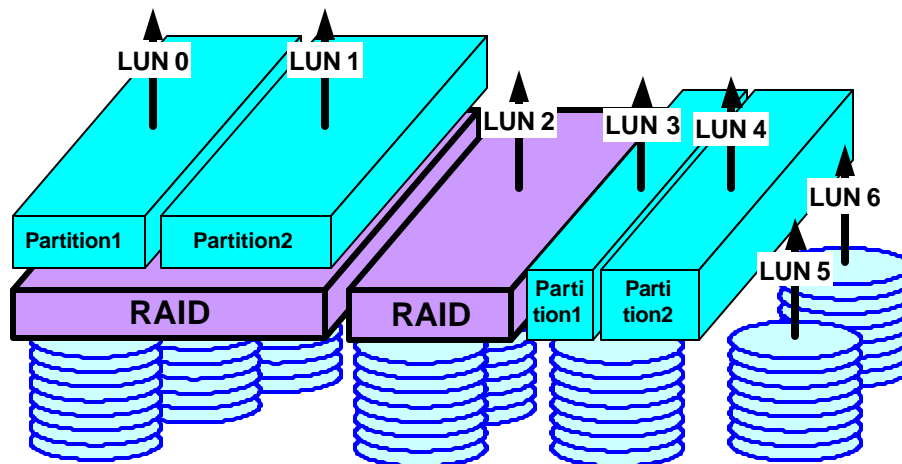
When InfoSlice is intended for usage by several different Applications, which have different storage requirements, it is advisable to create several RAID devices, where each would have properties appropriate for a particular Application. Then these RAID devices can be divided into partitions, if smaller volumes are desired, or be accessed as is by the attached computers. Sometimes, the creation of RAID may not even be

necessary. In such cases, you can configure the InfoSlice so the disks will be accessible directly. Alternatively, those disks can be partitioned and then each partition will be accessed as independent LUN. Such setup is shown on Figure 2.

To configure the InfoSlice similar to the example shown on **Figure 2**, access “RAID Manager” interface of Webmin, corresponding to the InfoSlice Storage Array of interest. In the “RAID Manager” interface, configure the RAID Arrays desired.

After the RAID was created, access “Device Partition Manager” Webmin interface. You will be presented with a list of RAID devices, which you created using “RAID Manager” interface, and a list of independent disks, which are not part of any RAID array. If desired, create partitions of these devices. If you create several partitions on a RAID volume or a disk, but leave some unused space, this space can be later added to any partition to grow it when needed.

After the partitions were created, you need to “map” those partitions, RAIDs and independent disks, which you would like to be accessed by the servers. For this, go to “Storage Device Mapping” Interface. Choose the partitions, RAID, and/or disks desired for external server access, and click on “Map” buttons corresponding to those volumes.



**Figure 2 Configuration of InfoSlice for using by Applications that have different storage requirements. Several RAID devices are created and then split into partitions, if needed. Each partition, un-partitioned RAID, or independent disk, which is not part of a RAID, has an individual LUN visible to the servers as a separate device**

The configuration such as the one presented on **Figure 2** may be needed for the following Application setup. For example, the mail server, database server, and backup server for backing up from several clients are the Applications, which will use the InfoSlice storage volume. In this case, the RAID1 of the desired size should be created, and then partitioned into two chunks, for use by mail and database servers, correspondingly. Further, for use by backup server as an intermediate staging area, a RAID5 should be created. Depending on how the backup software is functioning, this RAID5 device may be partitioned into several chunks. Sometimes, such partitioning is desired when doing backups from different client machines in order to prevent those machines from using each other storage volume.

As you can see from the two scenarios discussed in this paper, the InfoSlice provides a significant configuration flexibility, which allows you to use its storage capacity efficiently for a variety of Applications.