



Host Bus Adapters (HBAs): The Basics

University Training Module

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Host Bus Adapters (HBAs): The Basics

Introduction

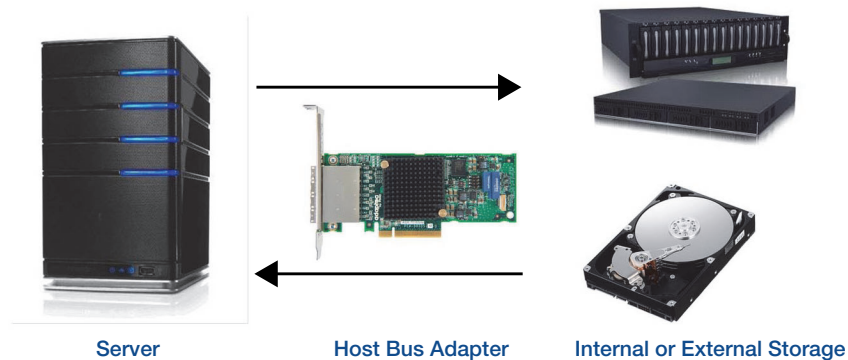
Before you begin learning about specific Adaptec products and solutions, make sure you are familiar with the basics. This module introduces you to host bus adapters, or HBAs.

At the completion of this module, you should be able to:

- Describe what an HBA is.
- Explain the function of an HBA.
- List some applications for an HBA.
- Understand when to use an HBA, and when to use a RAID adapter instead.

What is a Host Bus Adapter (HBA)?

An HBA is a circuit board or expansion card that physically connects a host system, such as a server, to internal and/or external storage, such as hard disk drives (HDDs), Solid State drives (SSDs), and external storage enclosures. An HBA allows a host system and connected storage devices to communicate with each other.



HBAs support specific types of devices, such as Serial ATA (SATA), Serial Attached SCSI (SAS), and Fiber Channel. Not all HBAs support all types of devices.

What is the Function of an HBA?

An HBA is installed in a PCI slot on the host system motherboard and then connected with compatible cables to storage devices that are either internal (HDDs or SSDs within the host system) or external (storage enclosures).

Note: Currently, no Adaptec HBA has both internal and external ports.

Basically, an HBA sits in the center of the input/output (I/O) path, communicating data from the host system to the storage devices and vice versa, taking on the tasks of storing and retrieving data that are otherwise done by the host system's microprocessor.

Additionally, because the HBA is doing some of the microprocessor's work, system performance is improved.

What is the Difference Between an HBA and a RAID Adapter?

An HBA is an add-in card that presents the devices that are connected to it to the operating system (OS), doing nothing with those devices but showing them to the OS so the OS can read and write data to and from them.

An HBA does not provide any form of redundancy or data protection, does not have any cache to manipulate data with, and cannot join drives together to make larger drives.

An HBA relies on the speed of the individual devices connected to it for its performance.

A RAID adapter, on the other hand, is an add-in card that takes the physical devices connected to it and turns them into a logical device (or RAID array), which the operating system then sees as a single physical drive. The RAID adapter hides the fact that it has combined multiple physical drives using RAID algorithms, and uses its built-in cache to improve read and write performance.

Note: You can read more about RAID adapters in the Adaptec University Training Module, *RAID Adapters: The Basics*.

Where are HBAs Used?

HBAs can reliably connect hundreds or even thousands of HDDs, SSDs, tape drives, and external storage enclosures to the host, making them ideal for cost-sensitive tape backup solutions or high-performance SSD environments.

HBAs are used:

- In workstations, servers, and data centers.
- For gaming and video editing.
- In security and surveillance systems.
- For direct-attached storage and network-attached storage.

When to Use an HBA

Choose an HBA in situations where you don't need RAID protection against drive failure.

You could use an HBA when:

- The device you are connecting to is not a disk device (for example, a tape drive).
- The device you are connecting to provides its own RAID (for example, an external storage enclosure such as an RBOD).
- Software provides data protection (for instance, in large data centers).

When Not to Use an HBA

Don't choose an HBA in situations where you need to add RAID protection against drive failure.

Use a RAID adapter instead of an HBA:

- In systems running standard off-the-shelf software, such as Windows or Linux.
- If you plan to connect a JBOD (as opposed to an RBOD), because a JBOD has no built-in data protection.

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