

Technology	Advantages	Limitations	Applications
<b>Compact disc, recordable ( CD-R ) or rewritable ( CD-RW ) and DVD</b>	<ul style="list-style-type: none"> <li>• Low cost per megabyte</li> <li>• Unlimited capacity with multiple discs</li> <li>• Portable</li> <li>• Widely-supported I/O interfaces</li> <li>• Can be formatted for different data formats</li> <li>• Long life</li> <li>• High data density</li> <li>• Immune to corruption once data is written (CD-R and DVD only)</li> </ul>	<ul style="list-style-type: none"> <li>• Limited capacity on one disc(though much greater than diskette)</li> <li>• Slow to moderate read/write speed</li> </ul>	<ul style="list-style-type: none"> <li>• Data archiving</li> <li>• Data distribution</li> <li>• Data migration</li> <li>• Localized file sharing</li> <li>• Offsite storage</li> </ul>
Technology	Advantages	Limitations	Applications
<b>Diskettes, 1.44 MB</b>	<ul style="list-style-type: none"> <li>• Simple to use</li> <li>• Portable</li> <li>• Can be formatted for different data formats</li> </ul>	<ul style="list-style-type: none"> <li>• Limited capacity</li> <li>• Limited read/write speed</li> <li>• Not supported by many newer computers</li> </ul>	<ul style="list-style-type: none"> <li>• Local data transfer of small files</li> <li>• Storage of small files or programs</li> </ul>
Technology	Advantages	Limitations	Applications
<b>Hard drive, external</b>	<ul style="list-style-type: none"> <li>• High read/write speed</li> <li>• Can be moved among computers</li> </ul>	<ul style="list-style-type: none"> <li>• Limited capacity</li> <li>• Awkward for data transfer among multiple computers</li> </ul>	<ul style="list-style-type: none"> <li>• Local backup</li> <li>• Local archiving</li> </ul>
Technology	Advantages	Limitations	Applications
<b>Hard drive, internal</b>	<ul style="list-style-type: none"> <li>• Convenient; usually comes with the computer</li> <li>• High read/write speed</li> <li>• Convenient for use with</li> </ul>	<ul style="list-style-type: none"> <li>• Limited capacity</li> <li>• Without special support, confined to a single computer or server</li> </ul>	<ul style="list-style-type: none"> <li>• Storage in a single computer</li> <li>• Swap files</li> </ul>

	<p>single computer (but can be shared among multiple computers with proper support)</p> <ul style="list-style-type: none"> <li>• Most common form of data storage</li> </ul>		
Technology	Advantages	Limitations	Applications
<b>Removable storage (ZIP disks, JAZ disks, etc.)</b>	<ul style="list-style-type: none"> <li>• Simplicity</li> <li>• Portability</li> <li>• Unlimited capacity with multiple disks</li> <li>• Convenient for use with single computer</li> </ul>	<ul style="list-style-type: none"> <li>• Proprietary media</li> <li>• Limited read/write speed</li> <li>• High cost per megabyte</li> </ul>	<ul style="list-style-type: none"> <li>• Personal computing</li> <li>• Local data transfer of small files</li> <li>• Local backup</li> <li>• Local archiving</li> </ul>
Technology	Advantages	Limitations	Applications
<b>Solid-state storage (USB devices, flash memory, smart cards, etc.)</b>	<ul style="list-style-type: none"> <li>• No mechanical parts</li> <li>• High read/write speed</li> <li>• Small form factor</li> </ul>	<ul style="list-style-type: none"> <li>• Limited storage capacity</li> <li>• High cost per I/O operation</li> </ul>	<ul style="list-style-type: none"> <li>• Swap files</li> <li>• Local data transfer</li> <li>• Internet service providers</li> <li>• Video processing</li> <li>• Relational databases</li> <li>• High-speed data acquisition</li> </ul>

Technology	Advantages	Limitations	Applications
<b>Direct-attached storage (DAS)</b>	<ul style="list-style-type: none"> <li>• Simplicity</li> <li>• Low initial cost</li> <li>• Ease of management</li> </ul>	<ul style="list-style-type: none"> <li>• Storage for each server must be administered separately</li> <li>• Inconvenient for data transfer in network environments</li> <li>• Server bears load of processing applications</li> </ul>	<ul style="list-style-type: none"> <li>• Data and application sharing</li> <li>• Data backup</li> <li>• Data archiving</li> </ul>

Technology	Advantages	Limitations	Applications
<b>Disk library</b>	<ul style="list-style-type: none"> <li>• High speed</li> <li>• High storage capacity</li> <li>• High data availability</li> </ul>	<ul style="list-style-type: none"> <li>• Not as quickly accessible as DAS; intended for "write once, read rarely" data</li> </ul>	<ul style="list-style-type: none"> <li>• Disk-to-disk (D2D) backup</li> <li>• Data archiving</li> <li>• Near line storage</li> </ul>
Technology	Advantages	Limitations	Applications
<b>Disk-to-disk-to-tape ( D2D2T )</b>	<ul style="list-style-type: none"> <li>• Redundancy</li> <li>• High read/write speed</li> <li>• Unlimited capacity with multiple tapes</li> </ul>	<ul style="list-style-type: none"> <li>• Complexity</li> </ul>	<ul style="list-style-type: none"> <li>• Incremental backups</li> <li>• Storage virtualization</li> <li>• Offsite storage</li> <li>• Data archiving</li> </ul>
Technology	Advantages	Limitations	Applications
<b>Fibre Channel (See Storage area network below)</b>	<ul style="list-style-type: none"> <li>• Used to transmit data between devices at gigabit speeds</li> <li>• Frequently used in storage area networks (SANs)</li> <li>• Flexible in terms of distance</li> </ul>	<ul style="list-style-type: none"> <li>• High cost</li> <li>• Management complexity</li> </ul>	<ul style="list-style-type: none"> <li>• Large databases</li> <li>• Bandwidth-intensive applications</li> <li>• Storage area networks (SANs)</li> <li>• Offsite storage</li> <li>• Mission-critical applications</li> </ul>
Technology	Advantages	Limitations	Applications
<b>iSCSI (See Storage area network below)</b>	<ul style="list-style-type: none"> <li>• Used to transmit data between devices using the Internet Protocol (IP)</li> <li>• Frequently used in storage area networks (SANs)</li> <li>• More flexible in terms of distance than Fibre Channel (but not as fast)</li> </ul>	<ul style="list-style-type: none"> <li>• May not compare favorably with Fibre Channel for large database transfers</li> <li>• Management complexity</li> </ul>	<ul style="list-style-type: none"> <li>• Applications involving remotely distributed databases</li> <li>• Storage area networks (SANs)</li> <li>• Offsite storage</li> <li>• Mission-critical applications</li> </ul>

Technology	Advantages	Limitations	Applications
<b>Magnetic tape</b>	<ul style="list-style-type: none"> <li>• Low cost per megabyte</li> <li>• Portability</li> <li>• Unlimited capacity with multiple tapes</li> </ul>	<ul style="list-style-type: none"> <li>• Inconvenient for quick recovery of individual files or groups of files</li> </ul>	<ul style="list-style-type: none"> <li>• Data archiving</li> <li>• Limited-budget businesses</li> <li>• Offsite storage</li> </ul>
Technology	Advantages	Limitations	Applications
<b>Network-attached storage (NAS)</b>	<ul style="list-style-type: none"> <li>• Fast file access for multiple clients</li> <li>• Ease of data sharing</li> <li>• High storage capacity</li> <li>• Redundancy</li> <li>• Ease of drive mirroring</li> <li>• Consolidation of resources</li> </ul>	<ul style="list-style-type: none"> <li>• Less convenient than storage area network (SAN) for moving large blocks of data</li> </ul>	<ul style="list-style-type: none"> <li>• Data backup</li> <li>• Data archiving</li> <li>• Redundant storage</li> </ul>
Technology	Advantages	Limitations	Applications
<b>Redundant array of independent disks (RAID)</b>	<ul style="list-style-type: none"> <li>• High speed</li> <li>• High storage capacity</li> <li>• High data availability</li> <li>• High reliability</li> <li>• Security</li> <li>• Fault tolerance</li> </ul>	<ul style="list-style-type: none"> <li>• Users may develop false sense of security</li> <li>• Recovery from failure is difficult in some systems</li> <li>• High cost for optimum systems</li> </ul>	<ul style="list-style-type: none"> <li>• Swap files</li> <li>• Internet service providers</li> <li>• Redundant storage</li> </ul>
Technology	Advantages	Limitations	Applications
<b>Storage area network (SAN)</b>	<ul style="list-style-type: none"> <li>• Excellent for moving large blocks of data</li> <li>• Exceptional reliability</li> <li>• Wide availability</li> <li>• Fault tolerance</li> <li>• Scalability</li> </ul>	<ul style="list-style-type: none"> <li>• High cost</li> <li>• Lack of standardization</li> <li>• Management complexity</li> </ul>	<ul style="list-style-type: none"> <li>• Large databases</li> <li>• Bandwidth-intensive applications</li> <li>• Mission-critical applications</li> </ul>