THE SNIA DICTIONARY

A glossary of storage and information management terminology

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Advancing storage & information technology

About SNIA

SNIA is a not-for-profit global organization made up of corporations, universities, startups, and individuals. The members collaborate to develop and promote vendor-neutral architectures, standards, and education for management, movement, and security for technologies related to handling and optimizing data. SNIA focuses on the transport, storage, acceleration, format, protection, and optimization of infrastructure for data.

The SNIA Dictionary

Generated on June 26, 2024

The SNIA Dictionary contains terms and definitions related to storage and other information technologies and is the storage networking industry's most comprehensive effort to arrive at a common body of terminology for the technologies it represents. The terms go through a rigorous technical review and approval process by the SNIA Technical Council to assure their accuracy. The SNIA Technical Council is a group of technical experts elected by the members of the SNIA to guide the SNIA's technical efforts. Their extensive individual technical backgrounds cover all aspects of storage.

The reader should recognize that in this rapidly evolving field, new terminology is constantly being introduced, and common usage is shifting. SNIA regards this dictionary as a living document, to be updated as necessary to reflect a consensus on common usage and encourages readers to treat it in that spirit. Suggestions for improvement (e.g., new terms or definitions, or modifications to existing ones) are welcomed at any time and should be submitted on the form located at:

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Definition Format

Terms are defined using the substitution principle, which states that a term's definition should be substitutable for the term itself in a sentence.

In the case that more text is required or deemed helpful, it is contained in one or more separate paragraphs after the definition itself. This text is informative in nature, and while intended to be accurate, is not technically part of the definition itself.

All terms in our online dictionary (https://www.snia.org/dictionary) have an associated permanent link (permalink) that allows you to easily link directly to any term in our dictionary. Improve your online writing by taking advantage of this great resource.

Deprecated Synonyms

In many cases, as technology develops, companies invent new terminology to describe innovations in their products. As the technology matures and vendors attempt to compete and compare their products with others, some terms become widely used, while other terms may remain in limited use and are synonyms for the widely used terms. This causes confusion in the marketplace. To encourage crispness and uniformity in the industry, this dictionary lists synonyms of this type as "Deprecated synonym for xxxx," where xxxx is the term that has become widely used in the industry. This is to guide the reader toward use of the more widely used term.

In cases where a synonym is not deprecated, SNIA does not endorse the use of one synonym over another.

Definitions Taken from Standards Documents

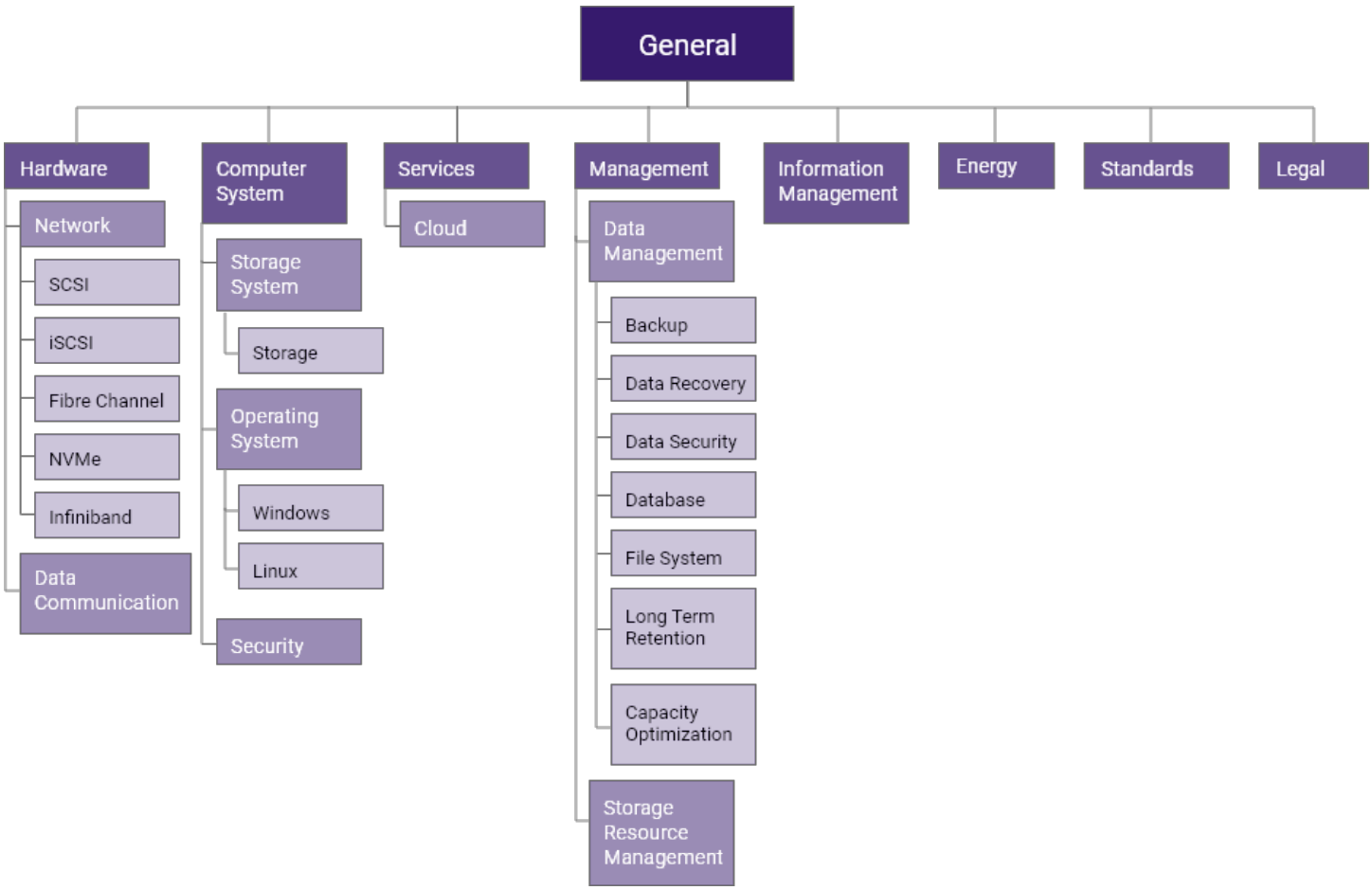
SNIA has a strong interest in keeping definitions harmonized across various industry groups and national and international standards bodies. Towards this end, some definitions have been quoted from standards (e.g., SNIA Standards, INCITS Standards, ISO/IEC Standards, IEEE Standards). In all such cases, the quoted standard is authoritative.

- Copies of SNIA standards are available at https://www.snia.org/standards.
- Copies of INCITS standards are available at https://webstore.ansi.org.
- Copies of ISO/IEC Standards are available at https://www.iso.org/store.html.
- Copies of IEEE Standards are available at https://www.techstreet.com/ieee.

The SNIA wishes to thank ANSI and INCITS for their cooperation in this matter.

Context Hierarchy

Most of the terms in this dictionary have meaning primarily in specific contexts (e.g., SCSI or File Systems). The following categories are used to specify the context for a given definition. These categories are a guide to understanding, not a formal system.



In the above hierarchy representation, context labels indented beneath other context labels represent specializations of the higher-order label concept. For additional information on contexts, see the Storage Industry Resource Domain model. Below is an example of how context is indicated:

term name
[Context] The context is called out in square brackets at the beginning of each definition, as in this example.

Numbers

3D NAND

[Hardware]

A stack of multiple layers of NAND memory cells.

64B/66B

[Data Communication]

An algorithm for encoding data for transmission in which each 64-bit data word is converted to a 66-bit transmission character.

Each transmission character is prefixed with either binary "01" or binary "10". This, combined with scrambling, gives the signal desirable engineering properties, yet incurs a much lower overhead than the traditional 8b/10b encoding.

8B/10B encoding

[Data Communication]

An algorithm for encoding data for transmission in which each eight-bit data byte is converted to a 10-bit transmission character.

8B/10B encoding is used in transmitting data on Fibre Channel, ESCON, Gigabit Ethernet, and Serial Attached SCSI. It supports continuous transmission with a balanced number of ones and zeros in the code stream and detects single bit transmission errors.

A

AAA

[Data Security]
Acronym for Authentication, Authorization, and Accounting.

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access control

[Data Security]
Prevention of unauthorized use of a resource, including the prevention of use of a resource in an unauthorized manner [ISO/TS 14265:2011]

Access Control Entry

[File System][Data Security]
A single entry in an Access Control List, which either denies or grants access to a given resource by one principal (a user or a group of users and/or groups).

Access Control List

[Data Security][File System]
List of entities, together with their access rights, that are authorized to access a resource [ISO/IEC 20944-1:2013]

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access fairness

A process by which nodes are provided access to a Fibre Channel arbitrated loop independently of other nodes' activity.

---

access method

[Operating System]
1. The means used to access a physical transmission medium in order to transmit data.

2. In IBM Corporation's OS/390 operating system and its precursors, a file organization method, such as sequential, random, indexed, etc., and the operating system software used to implement it.

A

access path

[Storage System]

The combination of adapters, addresses and routes through a switching fabric used by a computer to communicate with a storage device.

Some configurations support multiple access paths to a single device. See multi-path I/O.

---

account

[Data Security]

An established relationship between a principal and a computer, network or service.

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accountability

[Data Security]

1. The property enabling principals' actions to be attributed to them in such a way that there is little possibility for denying responsibility for those actions.

2. The security goal that generates the requirement for actions of an entity to be traced uniquely to that entity.

This supports non-repudiation, deterrence, fault isolation, intrusion detection and prevention, and after-action recovery and legal action. [NIST SP 800-33]

ACE

[File System][Data Security]

Acronym for Access Control Entry.

ACL

[File System][Data Security]

Acronym for Access Control List.

ACS

[Data Recovery]

Acronym for Automated Cartridge System.

active

1. The state of a Fibre Channel Sequence Initiator between the start of transmission of the first data frame of a sequence and the completion of transmission of the last data frame in the sequence.

2. The state of a Fibre Channel Sequence Recipient between the start of reception of the first data frame of a sequence and the completion of reception of the last data frame in the sequence.

Active archive

[Long-Term Retention]

A long-term data retention system that allows online access to retained file and object data.

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active component

[Storage System]

A system component that requires electrical power to operate, such as a power supply, fan, or controller.

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active data

[Data Management]

Data that is immediately accessible to an application without the need to stage it in from a lower tier of storage.

See near-online data.

Active Directory

[Windows]

A Microsoft technology for the central and hierarchical administration of large groups of computers, users and groups.

---

active power

[Energy]

The power consumption of a system when powered on and under normal workload.

---

active-active

[Storage System]

Synonym for dual active components or controllers.

active-active

[Computer System]

A pair of components that share a task or class of tasks when both are functioning normally, where one takes on the entire task or tasks when the other component fails.

An example is when active-active controllers are connected to the same set of storage devices and improve failure tolerance compared to a single controller.

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active-passive

[Storage System]

Synonym for hot standby components or controllers.

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actuator

[Hardware]

The physical element of an HDD that moves the heads to position them to a particular cylinder on the media.

AD

[Windows]

Acronym for Active Directory.

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adapter

[General]

A hardware device, typically an add-in card or specialized component on a system board, that converts the timing and protocol of one bus or interface to another, to enable a computer system's processing hardware to access peripheral devices.

A Fibre Channel Host Bus Adapter and an Ethernet Network Interface Card are both kinds of adapters.

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adaptive array

[Storage System]

A disk array that is capable of changing its virtual-to-physical location mapping algorithm (e.g., from mirrored to parity RAID) while the array is operating.

ADC

[Hardware][SCSI]

1. Acronym for Analog Digital Converter.

2. Acronym for the INCITS T10 Automation/Drive Interface Commands standards family.

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address

[Computer System][SCSI][Network]

1. A fixed length bit pattern that uniquely identifies a block of data stored on a disk or tape.

2. A fixed-length bit pattern that uniquely identifies a location (bit, byte, word, etc.) in a computer memory.

3. An identifier whose value uniquely identifies a SCSI port connected to a SCSI interconnect for purposes of communication.

4. A bit pattern that uniquely identifies a device on a network.

---

address identifier

[Fibre Channel]

A 24-bit value used to identify the source or destination of a frame.

The source of a frame is identified by an S_ID and the destination of a frame is identified by a D_ID, as specified in the FC-FS standard. The FC-SW standard includes a table of special address identifier values and their meanings.

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address resolution

[Network]

The process of determining a MAC address, given a more abstract LAN or WAN address.

Address Resolution Protocol

[Network]

1. Any protocol used to obtain a mapping from a higher layer address to a lower layer address; when abbreviated as ARP, the Ethernet Address Resolution Protocol (see 2) is most often meant.

2. The protocol used by an IP networking layer to map IP addresses to lower level hardware (i.e., MAC) addresses.

addressable capacity

[Storage System]

The number of bytes available to be written via a transport protocol.

Transport protocols include SCSI and NVMe. Addressable capacity does not include unaddressable space, such as ECC (error correcting code) data, remap areas, and inter-sector gaps. See theoretical capacity.

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addressing

[Computer System]

An algorithm by which areas of fixed disk, removable cartridge media, or computer system main memory are uniquely identified.

See block addressing, C-H-S addressing, explicit addressing, implicit addressing.

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administration host

[Storage System]

A computer that manages one or more storage subsystems (e.g., filers, disk array subsystems, tape subsystems, etc.).

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administrator

[Storage System][Data Security]

A person charged with the installation, configuration, and management of a computer system, network, storage subsystem, database, or application.

Advanced Encryption Standard

[Data Security]

A cryptographic algorithm designated by NIST [NIST FIPS 197] as a replacement for DES.

Advanced Technology Attachment

[Storage System]

A standard designed to connect storage devices to computer systems.

ATA is also the official name for Integrated Drive Electronics (IDE).

adverse inference

[Legal]
Inference that destroyed or missing evidence (data) would have been harmful to a party who failed to provide it.

AES

[Data Security]
Acronym for Advanced Encryption Standard.

AFA

[Storage System]
Acronym for All Flash Array.

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agent

[General]
A program that performs one or more services (such as gathering information from the Internet), acting for or as a principal.

---

aggregation

[Network][Storage System]
A process related to consolidation, consisting of combining multiple similar and related objects or operations into a single one.

AISL

Acronym for Augmented ISL.

AISL Set

A set of AISLs that connect the controlling switches that are part of a distributed switch.

AIT

[Storage System]
Acronym for Advanced Intelligent Tape.

algorithmic mapping

[Computer System]

Use of an algorithm to translate from one data addressing domain to another.

If a volume is algorithmically mapped, the physical location of a block of data may be calculated from its virtual volume address using known characteristics of the volume (e.g., stripe depth and number of member disks). See dynamic mapping, tabular mapping.

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alias

[General]

An alternate name for an entity, sometimes used to create names that are more easily human readable.

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alias address identifier

One or more address identifiers that may be recognized by an N-Port in addition to its N-Port Identifier, used to form groups of N-Ports so that frames may be addressed to a group rather than to individual N-Ports.

See multicast group.

All Flash Array

[Storage System]

A synonym for all solid state array.

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all solid state array

[Storage System]

A storage subsystem or array where all persistence is provided by Solid State Storage.

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alternate client restore

[Data Recovery]

The process of restoring files to a different client than the one from which they were backed up.

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alternate path restore

[Data Recovery]

The process of restoring files to a different directory than the one from which they were backed up.

always on

[General]

1. The state of always having power applied (systems) or of being continually active (communication links).

2. A state of an operational link of always being powered on and continually transmitting either data frames, idles or fill words, in contrast to bursty transmissions and listening for a quiet line in earlier 10 and 100 Mbit/sec Ethernet.

AL_PA

Acronym for Arbitrated Loop Physical Address.

American National Standards Institute

[Standards]

A body that coordinates the development and use of voluntary consensus standards in the United States and represents the needs and views of U.S. stakeholders in international standardization forums around the globe.

ANSI accredits both standards certification organizations and standards development organizations. The IEEE Standards Association (which standardizes Ethernet and many other technologies) and INCITS (which standardizes SCSI, Fibre Channel, MPEG, and many other technologies) are two of over 100 ANSI accredited standards organizations.

Analog Digital Converter

[Hardware]

A device that converts a continuously valued (analog) input to a discretely valued (digital) output.

ANSI

[Standards]

Acronym for American National Standards Institute.

ANSI T10

[Standards]

The standards development committee accredited by INCITS to develop SCSI standards for communication between initiators (i.e., host devices) and targets (e.g., storage device controllers).

The full name of this committee is the INCITS SCSI Storage Interfaces Technical Committee (INCITS TC T10).

ANSI T11

[Standards]

The standards development committee accredited by INCITS to develop standards related to Fibre Channel, related serial storage interfaces, and certain storage management interfaces.

The full name of this committee is the INCITS Fibre Channel Interfaces (T11) Technical Committee (INCITS TC T11). T11.2 (physical) and T11.3 (protocol) are current task groups in ANSI T11.

ANSI T13

[Standards]

The standards development committee accredited by INCITS to develop ATA standards for communication between a host and a storage device.

The full name of this committee is the INCITS ATA Storage Interfaces Technical Committee (INCITS TC T13).

API

[General]

Acronym for Application Programming Interface.

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appliance

[General]

An intelligent device programmed to perform a single well-defined function, such as providing file, web, network or print services.

Appliances differ from general purpose computers in that their software is normally customized for the function they perform, pre-loaded by the vendor, and not alterable by the user. See filer.

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application

[Storage System]

A client of a storage system.

Applications range from desktop productivity applications to enterprise-wide federated applications spanning multiple databases and file systems.

Application Programming Interface

[General]

An interface used by an application program to request services.

The term API is usually used to denote interfaces between applications and the software components that comprise the operating environment (e.g., operating system, file system, volume manager, device drivers, etc.).

Application Response Measurement

[Standards]

An Open Group technical standard, being developed in both The Open Group and the Distributed Management Task Force, which defines function calls for transaction monitoring.

Application Specific Integrated Circuit

[Computer System]

An integrated circuit designed for a particular application, such as interfacing to a SCSI interconnect.

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application write request

[Storage System]

I/O requests made by storage clients, as distinguished from I/O requests made by a storage subsystem 's own control software.

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arbitrated loop

1. A Fibre Channel interconnect topology in which each port is connected to the next, forming a loop.

At any instant, only one port in a Fibre Channel Arbitrated Loop can transmit data. Before transmitting data, a port in a Fibre Channel Arbitrated Loop must participate with all other ports in the loop in an arbitration to gain the right to transmit data. The arbitration logic is distributed among all of a loop's ports.

2. The version of the Fibre Channel protocol used with the arbitrated loop physical topology.

Arbitrated Loop Physical Address

An 8-bit value used to identify a participating device in an Arbitrated Loop.

arbitration

[General]

Any process by which a user of a shared resource–such as a port connected to a shared bus–negotiates with other users for the (usually temporary) right to use the resource (in the given example, by transmitting data on the bus).

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archive

[Data Management]

1. A collection of data objects, perhaps with associated metadata, in a storage system whose primary purpose is the long-term preservation and retention of that data.

2. An organization of people and systems that have accepted the responsibility to protect, retain, and preserve information and data and make it available for a Designated Community. (Source: ISO 14721)

ARM

[General][Computer System]

1. Acronym for Application Response Measurement.

2. A common microprocessor architecture, as well as the name of the company that created the architecture.

ARP

[Network]

Acronym for Address Resolution Protocol.

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array

[Storage System]

A storage array, i.e., a disk array or tape array.

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array configuration

[Storage System]

1. Assignment of the disks and operating parameters for a disk array by setting parameters such as stripe depth, RAID model, cache allowance, spare disk assignments, etc. See configuration, physical configuration.

2. The arrangement of disks and operating parameters that results from such an assignment.

ASIC

[Computer System]
Acronym for Application Specific Integrated Circuit.

ASL

[Fibre Channel]
Acronym for A_Port Switch Link.

assigned capacity

[Storage System]
The amount of space on a system or data container which has been allotted to be written.

On thin provisioning systems, an assigned capacity number represents a promise of the amount of space that is available on demand; usable capacity is allocated as the container is written. On fully provisioned systems, usable capacity must be committed at the same time the container is allocated. See thin provisioning.

Association ID

[Fibre Channel]
A value that uniquely identifies an NVMeoFC association.

Association Identifier

[Fibre Channel]
A value that uniquely identifies an FC_NVMe association.

See FC-NVMe.

assurance

[Data Security]
A process for demonstrating that the security goals and objectives for an IT product or system are met on a continuing basis.

assurance level

[Data Security]
The measure of confidence that the security features, practices, procedures, and architecture of an information system accurately mediate and enforce the security policy.

asymmetric cryptography

[Data Security]

Cryptography that uses an asymmetric cryptosystem.

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asymmetric cryptosystem

[Data Security]

A cryptographic algorithm in which different keys are used to encrypt and decrypt a single message or block of stored information.

One of the keys is kept secret and referred to as a private key; the other key can be freely disclosed and is called a public key.

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asynchronous I/O operation

[Storage System]

An I/O operation whose initiator does not await its completion before proceeding with other work, enabling an initiator to have multiple concurrent I/O operations in progress.

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asynchronous I/O request

[Storage System]

A request to perform an asynchronous I/O operation.

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asynchronous mirroring

[Storage System]

Deprecated synonym for asynchronous replication.

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asynchronous replication

[Storage System]

A replication technique in which data must be committed to storage at only the primary site and not the secondary site before the write is acknowledged to the host. Data is then forwarded to the secondary site as the network capabilities permit.

Asynchronous Transfer Mode

[Network]

A connection-oriented data communications technology based on switching 53 byte fixed-length units of data called cells.

ATM transmission rates are multiples of 51.840 Mbits per second. Each cell is dynamically routed. In the United States, a public communications service called SONET uses ATM at transmission rates of 155, 622, 2048, and 9196 Mbits per second. These are called OC-3, OC-12, OC-48, and OC-192 respectively. A similar service called SDH is offered in Europe. ATM is also used as a LAN infrastructure, sometimes with different transmission rates and coding methods than are offered with SONET and SDH.

ATA

[Storage System]

Acronym for Advanced Technology Attachment.

ATM

[Network]

Acronym for Asynchronous Transfer Mode.

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atomic operation

[General]

An operation that, from an external perspective, occurs either in its entirety or not at all.

For example, database management systems that implement the concept of business transactions treat each business transaction as an atomic operation on the database. This means that either all of the database updates that comprise a transaction are performed or none of them are performed; it is never the case that some of them are performed and others not. RAID arrays must implement atomic write operations to properly reproduce single-disk semantics from the perspective of their clients.

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attack

[Data Security]

Attempt to destroy, expose, alter, disable, steal or gain unauthorized access to or make unauthorized use of an asset. [ISO/IEC 27000:2018]

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attenuation

[Network]

The power loss between an optical or electrical transmitter and a receiver, typically expressed in units of decibels (dB).

audit

[General]

Independent review and examination of records and activities to assess the adequacy of controls, to ensure compliance with established policies and operational procedures, and to recommend necessary changes in controls, policies, or procedures.

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audit log

[Data Security]

Synonym for audit trail.

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audit trail

[Network][Data Security]

A chronological record of system activities that enables the reconstruction and examination of a sequence of events and/or changes in a system such as an information system, a communications system or any transfer of sensitive material and/or information.

Augmented ISL

An E_Port to E_Port link used by the FC-SW redundancy protocol.

---

authentic

[General]

Being genuine, or accurate in representation of facts.

[Legal] For evidence, being found by a jury (or trier of fact) to be what it purports to be and thus being worthy of trust, reliance, or belief.

---

authentication

[Data Security][Legal]

1. The act of verifying the identity claimed by a party to an interaction.

2. The act of meeting the threshold level for admissibility, but not necessarily of authenticity, of evidence (e.g., ESI).

authenticity

[Data Management][Data Security][Legal]

1. Synonym for data integrity.

2. The property of being genuine and being able to be verified and trusted; confidence in the validity of a transmission, a message, or message originator. [NIST SP 800-53]

3. The property, condition, or quality of being worthy of trust, reliance, or belief because the proponent (offeror) has shown enough corroborating evidence to a jury (or trier of fact) to warrant such.

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authorization

[Network][Data Security]

1. The process of determining–for example via access control–that a requestor is allowed to receive a service or perform an operation.

2. The limiting of usage of information system resources to authorized users, programs, processes or other systems, formally described as controlling usage by subjects of objects.

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auto-swap

[Computer System]

Abbreviation for automatic swap.

See cold swap, hot swap, warm swap.

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auto-tiering

[Storage System]

Synonym for automated storage tiering.

Automated Cartridge System

[Data Recovery]

Synonym for tape cartridge handling robot.

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automated storage tiering

[Storage System]

Automatic movement of data between storage tiers based on policy.

The tiers may be within a single storage system or may span storage systems, including a cloud storage tier.

automatic backup

[Data Recovery]

A backup triggered by an event (e.g., a schedule point, or a threshold reached) rather than by human action.

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automatic failover

[Storage System]

Failover that occurs without human intervention.

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automatic swap

[Computer System]

The substitution of a replacement unit (RU) in a system for a defective one, where the substitution is performed by the system itself while it continues to perform its normal function (possibly at a reduced rate of performance).

Automatic swaps are functional rather than physical substitutions, and do not require human intervention. Ultimately, however, defective components must be replaced in a physical hot, warm, or cold swap operation. See cold swap, hot swap, warm swap, hot spare.

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automatic switchover

[Storage System]

Deprecated synonym for automatic failover.

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autonomic storage management

[Storage System]

The ability of a storage system to self-regulate attributes such as capacity, performance, and resiliency based on application demands, without any administrative intervention.

availability

[General]

1. The amount of time that a system is available during those time periods when it is expected to be available, often measured as a percentage of an elapsed year.

For example, 99.95% availability equates to 4.38 hours of downtime in a year (0.0005 * 365 * 24 = 4.38) for a system that is expected to be available all the time. See data availability, high availability.

2. The property of being accessible and usable upon demand by an authorized entity.

[ISO/IEC 27000]

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available capacity

[Data Management][Storage System]

Synonym for free space.

A_Port

[Fibre Channel]

A type of port used to communicate within a Fibre Channel distributed switch.

A_Port Switch Link

[Fibre Channel]

A link connecting one A_Port to another A_Port.

B

backup

[Data Recovery]

1. A collection of data stored on (usually removable) non-volatile storage media for purposes of recovery in case the original copy of data is lost or becomes inaccessible; also called a backup copy or replica.

To be useful for recovery, a backup must be made by copying the source data image when it is in a consistent state.

2. The act of creating a backup. See archive.

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backup client

[Data Recovery]

A computer system containing online data to be backed up.

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backup copy

[Data Recovery]

A collection of data stored on (usually removable) non-volatile storage media for purposes of recovery in case the original copy of data is lost or becomes inaccessible; also called a backup or replica.

---

backup manager

[Data Recovery]

An application program whose purpose is to schedule and manage backup operations.

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backup policy

[Data Recovery]

Rules for how and when backup should be performed.

The policy includes which data is to be backed up, the schedule on which backups should occur, which devices and media are eligible to receive the backups, how many copies are to be made, and actions to be performed if a backup does not succeed.

Backup to Disk

[Data Recovery]
Backup onto disk drive(s).

Backup to Tape

[Data Recovery]
Backup onto tape media.

backup window

[Data Recovery]
An interval of time during which a set of data can be backed up without affecting applications that use the data.

backup window duration

[Data Recovery]
The amount of time required to create a backup.

For example, if a backup uses different resources (storage devices, I/O paths, processing power) than an application, as is common with split mirror point-in-time copies, then the backup window duration is the time required to create the image. If an online backup shares resources with the applications using the data, as is common with copy-on-write point in time copies, the backup window duration may be increased due to resource contention. For an offline backup, the backup window duration is the time during which applications are not allowed to modify the data while the backup operation completes.

Bandwidth

[General][Data Communication]
1. The numerical difference between the upper and lower frequencies of a band of electromagnetic radiation.

2. A deprecated synonym for data transfer capacity that is often incorrectly used to refer to throughput.

bandwidth-length product

[Network]
A figure of merit for optical fiber, usually expressed as MHz*kilometer.

As an example, a Fibre Channel link operating at 1 Gb/s using a fiber with a bandwidth-length product of 500 MHz*kilometer will support a link distance of approximately 500 meters.

baud

[Network]
The maximum rate of signal state changes per second on a communications circuit.

If each signal state change corresponds to a code bit, then the baud rate and the bit rate are the same. It is also possible for signal state changes to correspond to more than one code bit, so the baud rate may be lower than the code bit rate.

BB_credit

[Fibre Channel]
Synonym for buffer-to-buffer credit.

BCP

[General]
Acronym for Best Current Practice.

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beginning running disparity

[Fibre Channel]
For a data stream using 8B/10B encoding, the running disparity present at a transmitter or receiver when an ordered set is initiated.

BER

[Network][Storage System]
Acronym for Bit Error Rate.

Berkeley RAID Levels

[Storage System]
A classification of disk array data protection and mapping techniques developed by Garth Gibson, Randy Katz, and David Patterson in papers written while they were performing research into I/O subsystems at the University of California at Berkeley.

There are seven Berkeley RAID Levels, usually referred to by the names RAID Level 0 through RAID Level 6. See RAID 0, RAID 1, RAID 2, RAID 3, RAID 4, RAID 5, RAID 6. Many other levels such as RAID 10, RAID 50 and so on have since been proposed.

Best Current Practice

[General]

A recommendation for what is currently believed to be the best manner of proceeding.

---

best effort

[Network]

A class of service that does not guarantee delivery of packets, frames, or datagrams, but for which the network, fabric, or interconnect makes every reasonable delivery effort.

---

bidirectional authentication

[Data Security]

Synonym for mutual authentication.

---

big data

[Computer System]

A characterization of datasets that are too large to be efficiently processed in their entirety by the most powerful standard computational platforms available.

---

big endian

[Computer System]

A format for the storage and transmission of binary data in which the most significant bits are stored at the numerically lowest addresses, or are transmitted first on a serial link.

BIOS

[Computer System]

A program that resides in programmable, non-volatile memory on a computer and that is responsible for booting that computer and performing certain operating system independent I/O operations.

Standard BIOS interrupts are defined to allow access to the computer's disk, video and other hardware components (for example, INT13 for disk access).

---

bit

[Computer System]

A binary digit.

bit error rate

[Network][Storage System]
The probability that a transmitted bit will be erroneously received at the point of measurement.

The BER at a measurement point is determined by counting the number of bits in error at that measurement point and dividing by the total number of bits in the transmission. BER is typically expressed as a negative power of 10.

---

bit synchronization

[Data Communication]
The process by which the receiver of a serial communication establishes its clocking used to locate code bits in a received data stream.

---

blade system

[Computer System]
A computer or storage system composed of a chassis that provides power, cooling and other common infrastructure, and one or more removable server or storage units, usually called blades.

Blade systems are designed as a scalable solution to efficiently package and operate multiple processing or storage units in a single enclosure, and are designed for technicians to be able to easily add or replace hot-swappable boards in the field.

---

blanking plate

[General][Energy]
A solid plate that mounts over unused slots to maintain efficient air flow through components.

---

blind mating

[Hardware]
The ability of pairs of components to be connected without the connection points being visible.

Blind mating is usually accomplished by mechanical guides (e.g., slots and rails) on the components.

---

block

[Storage System]
1. A unit in which data is stored and retrieved on storage media.

[Fibre Channel] 2. A unit of application data from a single information category that is transferred within a single sequence.

block addressing

[Storage System]

A form of addressing data on storage media where units (blocks) of data are identified by integers that are typically sequential.

See C-H-S addressing.

---

block cipher

[Data Security]

A symmetric encryption algorithm that operates on a block of plaintext, i.e., a string of bits of a defined length, to yield a block of ciphertext. [ISO/IEC 18033-1:2015]

---

block cipher mode of operation

[Data Security]

Algorithm that uses a block cipher to provide an information service such as confidentiality or authenticity [ISO/TS 21219-24:2017]

---

block services

[Storage System]

A subsystem that provides block level access to storage for other systems or other layers of the same system.

See block.

---

block storage

[Storage System]

A method of storing data in blocks.

Disk devices typically store data in fixed size blocks (e.g., 512 byte blocks, or 4,096 byte blocks). Tape devices may provide fixed size blocks or variable sized blocks. The arrangement of those blocks into files occurs using a host file system. Various storage protocols (e.g., SCSI, SATA, FC, iSCSI, RDMA) may be used to access the data in those blocks.

Ssee File storage

block virtualization

[Storage System]

The act of applying virtualization to a block based (storage) service for the purpose of providing a new aggregated, higher level (e.g., richer, simpler, more secure) block service to clients.

Block virtualization functions can be nested. A disk drive, RAID system or volume manager all perform some form of block address to (different) block address mapping or aggregation. See file virtualization.

Blocking

[Computer System]

A property of an operation that it may stop and wait for other operations to occur.

For example, an operation on file 1 blocks (i.e., stops and waits) for another operation on file 1 to complete.

BNC

[Network]

A type of coaxial cable connector formerly used in Ethernet applications; the specification is contained in EIA/TIA 403-A and MIL-C-39012.

---

bootstrapping

[Computer System]

The process of loading Operating System code from a disk or other storage device into a computer's memory and preparing it to run.

Bootstrapping typically occurs in steps, starting with a very simple program (BIOS) that initializes the computer's hardware and reads a sequence of data blocks from a fixed location on a pre-determined disk, into a fixed memory location. The data thus read is the code for the next stage of bootstrapping, usually an operating system loader. The loader completes the hardware setup and results in an executing operating system, in memory.

---

break mirror

[Storage System]

Remove a component from a mirror and make it an independent volume in the system, ending its synchronization with the other mirror components.

bridge

[Network][Fibre Channel]

1. [Network] A technology that enables traffic from a source device using one physical transport network technology to be transmitted to the destination device using an alternative physical transport network technology.

   gateway or storage router.

2. [Network] A device that connects multiple LAN segments at the physical address layer.

   hub, which indiscriminately rebroadcasts everything from one segment to the other, a bridge only retransmits traffic from one segment to another when the traffic is intended for the destination segment.

3. [Fibre Channel] A Fibre Channel technology that provides a transparent Fibre Channel Fabric extension between two Fibre Channel Switch E_Ports through the use of two B_Ports tunneling through some alternative technology, resulting in an Inter-Switch Link.

---

broadcast

A single transmission of a message to all receivers connected to a transport network. Broadcast can be contrasted with unicast (sending a single message to a single receiver) and multicast (sending a single message to select subset of receivers).

---

buffer

[Computer System]

A solid state memory device or programming construct, used to hold data momentarily as it moves along an I/O path or between software components.

---

buffer-to-buffer credit

Value used to determine how many frames can be sent to a recipient when buffer-to-buffer flow control is in use.

See Credit.

---

buffer-to-buffer flow control

[Fibre Channel]

Flow control between two connected ports.

Flow control occurs between two connected Fibre Channel ports (e.g., an N_Port and its associated F_Port or two E_Ports). A port indicates the number of frames that can be sent to it (i.e., its buffer-to-buffer credit) before the sender is required to stop transmitting and wait for the receipt of additional credit.

business continuity

[Data Security]

Capability of an organization to continue the delivery of products or services at acceptable predefined levels following a disruption [ISO 22300:2018]

---

bypass circuit

[Fibre Channel]

A circuit that provides for removal of a device from a data path.

A device may be removed from a data path (e.g., a Fibre Channel Arbitrated Loop) if valid signaling is lost or if a controller directs the removal of the device for any reason.

---

byte

[Computer System]

An 8 bit unit of data.

Byte and bit ordering and meaning vary depending on context. It is necessary to consult the standards that apply in a given context to determine ordering and meaning.

B_Port

[Fibre Channel]

The bridge port within a bridge used to extend an Inter-Switch Link.

C

C-H-S addressing

[Storage System]
Acronym for Cylinder-Head-Sector addressing.

CA

[Data Security]
Acronym for Certificate Authority.

---

cable plant

[Network]
All of an installation's passive communications elements (e.g., optical fiber, twisted pair, coaxial cable, connectors, splices, etc.) between transmitters and receivers.

---

cache

[Computer System]
1. To store data temporarily for expedited access.

2. The location in which data is stored temporarily for expedited access.

There are a variety of cache types. Read cache holds data in anticipation that it will be requested. Write cache holds data written by a client until it can be stored on other (typically slower) storage media such as disk or tape. See buffer, disk cache, write back cache, write through cache.

---

canister

[Storage System]
An enclosure for one or more storage devices.

A canister is usually designed to mount in a shelf or other enclosure that supplies power, cooling, and I/O interconnect services. It is used to minimize RF emissions and to simplify insertion and removal in multi-device storage subsystems. See shelf.

CAP Theorem

A hypothesis that it is impossible for a distributed system to provide Consistency, Availability, and Partition Tolerance guarantees at the same time.

See eventual consistency.

---

capacity optimization methods

[Storage System]

Methods which reduce the consumption of space required to store a data set, such as compression, data deduplication, thin provisioning, and delta snapshots.

RAID 5 and RAID 6 may also be considered as capacity optimizing methods, as they use less space than ordinary mirroring to perform a necessary function: protecting data from storage device failure.

---

capacity optimizing system

[Storage System]

A system which employs at least one capacity optimization method.

---

capacity planning

[General]

The process of optimizing supply of a given resource to satisfy current and future demand for that resource.

Common methods used for capacity planning include tracking, trending, forecasting and scenario planning to predict future demand.

---

carousel

[Data Recovery]

A library or a component of a library in which the media are stored in and selected from a rotating assembly.

Carrier Sense Multiple Access with Collision Detection

[Network]

A physical layer data transmission protocol used in some Ethernet networks.

cascading

The process of connecting two or more hubs or switches together to increase the number of ports or extend distances.

---

catalog

[Data Recovery][File System]

1. [Data Recovery] A list of backed up files, directories, and the locations (media identifiers) of the backup copies.

2. [File System] A persistent data structure used by some file systems to keep track of the files they manage.

CBC

[Data Security]
Acronym for Cipher Block Chaining.

CC

[Data Security]
Acronym for Common Criteria.

CDB

[SCSI]
Acronym for Command Descriptor Block.

CDMI

[Standards]
Acronym for Cloud Data Management Interface.

CDP

[Data Recovery]
Acronym for Continuous Data Protection.

CDR

Acronym for Clock and Data Recovery.

CE

[Network]
Acronym for Converged Ethernet.

certificate

[Data Security]
A data structure signed with a digital signature that is based on a public key and which asserts that the key belongs to a subject identified in the structure.

Certificate Authority

[Data Security]
In a Public Key Infrastructure (PKI), the authority and organization responsible for issuing and revoking user certificates, and ensuring compliance with the PKI policies and procedures.

The reputation of the certificate authority determines the trust that may be placed in the identity assurance provided by the certificates issued by the authority.

Certificate Revocation List

[Data Security]
A time-stamped list of certificates, signed by the issuing Certification Authority, that have been revoked by that CA.

The CRL is made available to entities that need to rely on a certificate for authentication.

chain of custody

[Legal]
A process that tracks the movement of evidence through its collection, safeguarding, and analysis lifecycle by documenting each person who handled the evidence, the date/time it was collected or transferred, and the purpose for the transfer. [NIST SP 800-72]

challenge

[Data Security]
A step in an authentication dialog that must be answered using either a secret or process assumed to be known only by the other party.

A challenge can be as simple as "What's your password?" or as complex as "Send me the result of a retinal scan of your right eye."

Challenge Handshake Authentication Protocol

[Data Security]
A password-based authentication protocol that uses a challenge to verify that a user has access rights to a system.

A hash of the supplied password with the challenge is sent for comparison so the cleartext password is never sent over the connection.

---

channel

[Storage System][Computer System]
1. The electrical circuits that sense or cause the state changes in recording media and convert between those state changes and electrical signals that can be interpreted as data bits.

2. Synonym for I/O interconnect.

The term channel has other meanings in other branches of computer technology. The definitions given here are commonly used when discussing storage and networking. See device channel, I/O interconnect, host I/O bus.

---

character

[Network][Computer System]
1. [Computer System] Synonym for byte.

2. [Computer System] One or more bytes that represent a single element in a character set.

Examples of character sets include ASCII and UTF-8.

2. [Network] A 10-bit unit of information transmitted and received in certain protocols, consisting of 8 bits of data encoded as 10 bits using 8B/10B encoding.

checkpoint

[Data Recovery][File System]

1. [Data Recovery] (noun) The recorded state of an application at an instant of time, including data, in-memory variables, program counter, and all other context that would be required to resume application execution from the recorded state.

2. [File System] (verb) An activity of a file system, such as the High Performance File System, (HPFS) or the Andrew File System (AFS), in which cached metadata (data about the structures of the file system) is periodically written to the file system's permanent store, allowing the file system to maintain consistency if an unexpected stop occurs.

---

checksum

[Data Security]

A value computed across a set of data, used to detect change.

A checksum is often used for error and manipulation detection.

CHS

[Hardware]

Acronym for Cylinder Head Sector.

CID

[iSCSI]

Acronym for Connection Identifier.

CIFS

[File System]

Acronym for Common Internet File System.

CIM

[Management]

Acronym for Common Information Model.

cipher

[Data Security]

A cryptographic system where plaintext is rearranged through transposition and/or substitution under direction of a cryptographic key.

When a cipher is applied to plaintext to produce ciphertext, the process is called encryption. When the cipher is applied to ciphertext to produce plaintext, the process is called decryption.

Cipher Block Chaining

[Data Security]

A block cipher mode of operation, in which each block of plaintext is XORed with the previous ciphertext block before being encrypted, making each ciphertext block dependent on all preceding plaintext blocks.

---

ciphertext

[Data Security]

Data that has been encrypted.

See cleartext.

CKD

[Storage System]

Acronym for Count-Key-Data.

Class 1

[Fibre Channel]

A connection-oriented class of Fibre Channel communication service in which the entire data transfer rate of the link between two ports is dedicated for communication between the ports and not used for other purposes.

Class 1 is also known as dedicated connection service, and is not widely implemented. See intermix.

Class 2

[Fibre Channel]

An acknowledged connectionless Fibre Channel communication service.

Class 2 multiplexes frames from one or more N_Ports or NL_Ports that are explicitly acknowledged by the receiver and notification of delivery failure is provided. This class of service includes end-to-end flow control.

Class 3

[Fibre Channel]
An unacknowledged connectionless Fibre Channel communication service.

Class 3 multiplexes frames from one or more N_Ports or NL_Ports and are not explicitly acknowledged. These frames are delivered on a "best effort" (e.g., a datagram service) basis.

---

class of service

[Network][Fibre Channel]
1. [Network] A mechanism for managing traffic in a network by specifying message or packet priority or delivery acknowledgement.

Network mechanisms include identification and grouping of data packets based on a priority label (in the packet header) or via mechanisms such as "per hop behavior", defined by the IETF's Differentiated Services.

2. [Fibre Channel] The characteristics and guarantees of the transport layer of a Fibre Channel network.

Fibre Channel classes of service include acknowledged frame delivery with end to end flow control (i.e., Class 2), and packetized frame datagrams (i.e., Class 3). Different classes of service may simultaneously exist in a Fibre Channel Fabric. The form and reliability of delivery in Class 3 circuits may vary with the topology.

---

cleartext

[Data Security]
Alternative term for plaintext. Stating that data is in cleartext implies that the data is not scrambled or rearranged, and is in its raw form.

CLI

[Computer System]
Acronym for Command Line Interface.

client

[Computer System][General]
1. An intelligent device or system that requests services from other intelligent devices, systems, or appliances.

See server.

2. An asymmetric relationship with a second party (a server) in which the client initiates requests and the server responds to those requests.

---

clone

[Data Management]
Synonym for snapshot.

Clones and snapshots are full copies. See delta snapshot.

---

cloud auditor

[Cloud]
A party trusted conduct independent assessment of cloud services, information system operations, performance and information security of the cloud implementation. [ISO/IEC 17788]

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cloud carrier

[Cloud]
An intermediary that provides connectivity and transport of cloud services between cloud providers and cloud consumers. [ISO/IEC 17788]

---

cloud consumer

[Cloud]
A person or organization that uses cloud services. [ISO/IEC 17788]

Cloud Data Management Interface

[Cloud][Standards]

[Standards] A SNIA Technical Position for Data storage as a Service (DaaS).

[Cloud] CDMI is an interface for both the data path and the control path of cloud storage. CDMI can also be used to manage storage in Cloud Computing deployments.

cloud infrastructure

[Cloud]

A set of data processing components that can be automatically provisioned by consumers, accessed over a network and that provide secure multitenancy. [ISO/IEC 17788]

---

cloud provider

[Cloud]

An entity responsible for making cloud services available to cloud consumers. [ISO/IEC 17788].

---

cloud security audit

[Cloud][Data Security]

Systematic evaluation of a cloud system by assessing how well it conforms to a set of established security criteria. [ISO/IEC 17788]

---

cloud service

[Cloud]

A function useful to a cloud consumer provided by a cloud provider. [ISO/IEC 17788]

---

cloud storage

[Services]

Synonym for Data storage as a Service. [ISO/IEC 17788]

---

cluster

[Computer System]

A collection of computers that are interconnected (typically at high speeds) for the purpose of improving reliability, availability, serviceability, load balancing and/or performance.

Often, clustered computers have access to a common pool of storage and run special software to coordinate the component computers' activities.

CMIP

[Management][Network]

Acronym for Common Management Information Protocol.

CMR

[Storage System]
Acronym for conventional magnetic recording.

---

code bit

[Computer System]
A bit (binary digit) of an encoded datum.

Sequences of code bits make up symbols, each of which corresponds to a data element (word, byte, or other unit). For an example see 8b/10b encoding.

---

code violation

[Fibre Channel]
The error condition that occurs when a received transmission character cannot be decoded into a valid data byte or special code using the validity checking rules specified by the transmission code.

---

cold backup

[Data Recovery]
Synonym for offline backup.

See hot backup, online backup.

---

cold data

[Data Management]
Data that is accessed infrequently.

---

cold storage

[Data Management]
Data storage device, system, or service used to store cold data at a cost that is at least an order of magnitude less than the cost of primary storage.

Cold Storage features large capacity, energy saving and long-term data preservation, in order to achieve low-cost rather than performance.

cold swap

[Computer System]

The substitution of a replacement unit (RU) in a system for a defective one, where external power must be removed from the system in order to perform the substitution.

A cold swap is a physical substitution as well as a functional one. See automatic swap, hot swap, warm swap.

Command Descriptor Block

[SCSI]

A sequence of bytes that defines a single SCSI command.

Command Line Interface

[Computer System]

A form of human interface to intelligent devices characterized by non-directive prompting and character string user input.

CLIs are used by system consoles and remote shell sessions (RSH, SSH). They are very useful for scripting and other administrative purposes.

---

committed data

[Storage System]

Data that has been written to stable storage.

Common Criteria

[Data Security]

A multi-part International Standard that is meant to be used as the basis for evaluation of security properties of IT products and systems.

The CC is specified in ISO/IEC 15408-1:1999, ISO/IEC 15408-2:1999, and ISO/IEC 15408-3:1999.

Common Information Model

[Data Management][Network]

An object oriented description of the entities and relationships in a business' management environment maintained by the Distributed Management Task Force.

CIM is divided into a Core Model and Common Models. The Core Model addresses high-level concepts (such as systems and devices), as well as fundamental relationships (such as dependencies). The Common Models describe specific problem domains such as computer system, network, user or device management. The Common Models are subclasses of the Core Model and may also be subclasses of each other.

Common Management Information Protocol

[Management][Network]

A network management protocol built on the Open Systems Interconnection (OSI) communication model.

CMIP is more complete, and therefore larger than, SNMP.

Common Schema Definition Language

[Management]

An OASIS standard language used to define a model over which an OData service acts.

For more information and current state see https://www.odata.org/documentation/.

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communications security

[Network][Data Security]

Protection of information while it's being transmitted, particularly via telecommunications.

A particular focus of communications security is message authenticity. Communications security may include cryptography, transmission security, emission security, and physical security.

---

community cloud

[Cloud]

A cloud infrastructure shared by several organizations and supporting a specific community that has shared concerns (e.g., mission, security requirements, policy, and compliance considerations).

compensating control

[Data Security]

A way - also known as a band-aid - of mitigating a known risk where it may not be feasible to deploy specific technical enablement.

Completion Queue Entry

[NVMe]

A fixed size entry in a CQ that contains completion status for a single command.

---

compliance

[General][Legal]

1. The state of being in accordance with a standard, specification, or clearly defined requirements.

2. The state of being in accordance with legal requirements.

The "compliance market" is centered around storage and systems that support the retention and discovery of data as required by law or regulation.

Compliant Jitter Tolerance Pattern

[Data Communication]

A test pattern for jitter testing.

---

compression

[General]

Synonym for data compression.

---

compression ratio

[Storage System]

A space reduction ratio that is the ratio of the size of the uncompressed data to the size of the compressed data.

---

compromise

[Data Security]

An incident that subjects data to unauthorized disclosure, modification, destruction, or loss.

Computational Storage

[Computer System]

Architectures that provide Computational Storage Functions (CSF) coupled to storage, offloading host processing or reducing data movement.

These architectures enable improvements in application performance and/or infrastructure efficiency through the integration of compute resources (outside of the traditional compute & memory architecture) either directly with storage or between the host and the storage. The goal of these architectures is to enable parallel computation and/or to alleviate constraints on existing compute, memory, storage, and I/O.

Computational Storage Array

[Computer System]

Storage Array that contains one or more Computational Storage Engines.

Abbreviated as CSA.

Computational Storage Device

[Computer System]

A Computational Storage Drive, Computational Storage Processor, or Computational Storage Array.

Abbreviated as CSx.

Computational Storage Drive

[Computer System]

A storage element that contains one or more Computational Storage Engines (CSE) and persistent data storage.

Abbreviated as CSD.

Computational Storage Engine

[Computer System]

A Component that is able to perform computation on data. The computation is defined by a Computational Storage Function (CSF).

Abbreviated as CSE.

Computational Storage Function

[Computer System]

Specific operations that may be configured and executed by a Computational Storage Engine (CSE).

Abbreviated as CSF.

Computational Storage Processor

[Computer System]

A component that contains one or more Computational Storage Engines (CSE) for an associated storage system without providing persistent data storage.

Abbreviated as CSP.

Computational Storage Resource

[Computer System]

Resource available for a host to provision a Computational Storage Device (CSx) that enables that CSx to be programmed to perform a Computational Storage Function (CSF).

Abbreviated as CSR.

compute virtualization

[Computer System]

Software that enables a single server hardware platform to support multiple concurrent instances of an operating system and applications.

computer security

[Data Security]

Measures and controls that ensure confidentiality, integrity, and availability of information system assets including hardware, software, firmware, and information being processed, stored, and communicated.

computer virus

[Data Security]

Malware that propagates itself by modifying other programs to include a possibly changed copy of itself and that is executed when the infected program is invoked.

computer worm

[Data Security]

Malware that is a self-contained program that can propagate itself through data processing systems or computer networks.

concurrency

[Computer System]

The property of overlapping in time, often in reference to the execution of I/O operations or I/O requests.

confidentiality

[Data Security]

The property that data cannot be accessed by unauthorized parties.

Confidentiality may be created by the use of encryption or access controls.

configuration management

[General]

The management of system features and behaviors through the control of changes made to hardware, software, firmware documentation and related resources throughout the life cycle of an information system.

congestion

[Computer System]

A condition that occurs when more services have been requested than are able to be delivered.

Congestion Notification

[Network]

A notification mechanism that supports congestion management for long-lived data flows within network domains of constrained data transfer rate.

connection

[iSCSI]

1. Short form of dedicated connection.

2. A communication path between the initiator and target using a TCP/IP connection.

In iSCSI, one or more connections make up a session. Connections carry control messages, SCSI commands, parameters, and data within iSCSI PDUs.

Connection ID

[Fibre Channel]

A value that uniquely identifies an NVMe-oF/FC connection.

---

connection identifier

[iSCSI]

An identifier generated by the initiator and sent to the target upon logging in or out, that uniquely identifies each connection within a session.

---

connectionless frame

[Network]

A frame used in a connectionless service (i.e., Class 2, and Class 3 frames referred to individually or collectively).

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connectionless integrity service

[Network][Data Security]

A security service that provides data integrity service for an individual IP datagram by detecting modification of the datagram without regard to the ordering of the datagram in a stream of datagrams.

---

connectionless service

[Fibre Channel]

Communication between two N_Ports or NL_Ports for connectionless frames.

---

consistency group

[Storage System]

A collection of replication sets grouped together to ensure write order consistency across all the replication sets' primary volumes.

An operation on a consistency group, such as changing replication from asynchronous to synchronous, applies to all the replication sets within the consistency group, and consequently their volumes.

consistent volume

[Storage System][File System]

1. [Storage System] A volume that satisfies the consistency criteria of the system on which it is hosted.

2. [File System] In LTFS, a volume in which all partitions are complete, and the last LTFS Index in the Index partition has a back pointer to the last LTFS Index in the data partition.

If an LTFS volume is not consistent, some form of recovery may be necessary.

---

console

[Computer System]

1. A device for graphical or textual visual output from a computer system.

2. In systems, network and device management, an application that provides graphical and textual feedback regarding operation and status, and that may accept operator commands and input influencing operation and status.

Sophisticated consoles designed for the management of many systems from one location are sometimes called enterprise management consoles.

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content-agnostic data deduplication

[Storage System]

A data deduplication method that does not require awareness of specific application data formats.

See content-aware data deduplication.

---

content-aware data deduplication

[Storage System]

A data deduplication method that leverages knowledge of specific application data formats.

See content-agnostic data deduplication.

Continuous Data Protection

[Data Recovery]

A class of mechanisms that continuously capture or track data modifications enabling recovery to previous points in time.

continuously increasing relative offset

[Network]

A transmission control algorithm that requires the frames for a block of data to be transmitted strictly in order.

Continuously increasing relative offset offers simpler reassembly and detection of lost frames than random relative offset. See relative offset.

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control plane

[Computer System]

The portion of a system that controls the operation of the system.

Also see data plane.

---

control software

[Computer System]

A body of software that provides common control and management.

When it executes on a device, control software is often referred to as firmware.

---

controller

[Hardware][NVMe][Storage System][Management]

1. [Hardware] A device or component of a system that performs a control function.
2. [Storage System] The control logic in an array, disk, or tape that performs command decoding and execution, host data transfer, serialization and deserialization of data, error detection and correction, and overall management of device operations.
3. [Management] The control logic in a storage subsystem that performs command transformation and routing, aggregation (RAID, mirroring, striping, or other), high-level error recovery, and performance optimization for multiple storage devices.
4. [NVMe] The interface between a host and an NVM subsystem.

---

controller based array / controller based disk array

[Storage System]

A disk array whose control software executes in a disk subsystem controller.

controller cache

[Storage System]

A cache that resides within a controller and whose primary purpose is to improve storage performance.

See cache, disk cache, host cache.

Controlling FCF

[Fibre Channel]

A Controlling Switch that supports Lossless Ethernet MACs.

Controlling Switch

[Fibre Channel]

A switch ablA Fibre Channel Switch able to control a set of FCDFs in order to create a Distributed Switch to control a set of FCDFs in order to create a distributed switch.

---

conventional magnetic recording

[Storage System]

A recording technique for storing data on an HDD where data is recorded on individual non-overlapping tracks which may be written randomly.

Converged Ethernet

[Network]

A set of Ethernet technologies and protocols defined in IEEE 802.3 that combine to reduce packet loss.

---

converged infrastructure

[Computer System]

The pooling of compute, storage, and networking resources using either common management tools or common (shared) physical resources.

---

copy on write

[Data Recovery]

A technique for maintaining a point in time copy of a collection of data such that when a logical data location is written, a new physical location is chosen for the existing data, and the existing data is copied to that new physical location.

See pointer remapping.

copyback

[Storage System]

Deprecated synonym for rebuild / rebuilding.

Core N_Port_Name

A set of entities with the same Core Switch_Name that may host multiple Virtual Switches.

A Core Switch may be a set of ports in a physical chassis, or in multiple physical chassis.

Core Switch

[Network][Fibre Channel]

1. [Fibre Channel] A set of entities in a Virtual Fabric that all have the same Core Switch_Name.

A Core Switch may contain multiple Virtual Switches.

2. [Network] A backbone switch (or set of switches) that act as the final aggregation layer for its network.

Core Switch_Name

[Fibre Channel]

In a Virtual Fabric capable Fibre Channel Switch, the Switch_Name identifying the Core Switch.

Count Key Data

[Storage System]

A disk data organization model in which the disk is assumed to consist of a fixed number of tracks, each having a maximum data capacity.

Multiple records of varying length may be written on each track of a Count-Key-Data disk, and the usable capacity of each track depends on the number of records written to it. The CKD architecture derives its name from the record format, which consists of a field containing the number of bytes in the key and data fields and a record address, an optional key field by which particular records can be easily recognized, and the data itself. CKD is the storage architecture used by IBM Corporation's mainframe computer systems. See fixed block architecture.

---

counter measure

[Data Security]

Any action, device, procedure, technique, or other measure that reduces the vulnerability of or threat to a system.

covert channel

[Data Security]

An unintended and/or unauthorized communications path that can be used to transfer information in a manner that violates a security policy.

COW

[Data Recovery]

Abbreviation for copy on write.

CPU

[Hardware]

Acronym for Central Processing Unit.

CQ

[NVMe]

Acronym for Completion Queue.

CQE

[NVMe]

Acronym for Completion Queue Entry.

CRC

[Data Communication][Storage System]

Acronym for Cyclic Redundancy Check.

---

credentials

[Data Security]

Information, passed from one entity to another, used to establish the sending entity's identity and/or access rights.

---

credit

[Fibre Channel]

The number of receive buffers at a recipient available to receive frames from a transmitting FC_Port.

CRL

[Data Security]

Acronym for Certificate Revocation List.

---

cryptanalysis

[Data Security]

A set of operations performed in converting encrypted information to plaintext without initial knowledge of the algorithm and/or key employed in the encryption.

---

cryptographic algorithm

[Data Security]

An algorithm whose outputs have cryptanalytic security properties with respect to its inputs, or vice versa.

---

cryptographic erase

[Data Security]

Method of sanitization in which the encryption key for the encrypted target data is sanitized, making recovery of the decrypted target data infeasible. [ISO/IEC 27040]

---

cryptographic erasure

[Data Security]

A method for rendering encrypted data unrecoverable by securely deleting the keying material required to decrypt the data.

The encrypted data itself is not modified. The protection offered by cryptographic erasure is bounded by the work factor involved in discovering the decryption key or mounting a cryptanalytic attack on the encryption algorithm itself.

---

cryptographic hash function

[Data Security]

A function that maps plaintext strings of any length to bit strings of fixed length, such that it is computationally infeasible to find correlations between inputs and outputs, and such that given one part of the output, but not the input, it is computationally infeasible to predict any bit of the remaining output.

Cryptographic hash functions have many information security applications, notably in digital signatures, message authentication codes (MACs), and other forms of authentication. The output from a cryptographic hash function is known as a message digest or hash value.

cryptography

[Data Security]

The principles, means and methods for rendering information unintelligible, and for restoring encrypted information to intelligible form.

---

cryptoperiod

[Data Security]

The time span during which a specific key is authorized for use or in which the keys for a given system or application may remain in effect. [NIST SP 800-57 Part 1]

---

cryptosystem

[Data Security]

A system for encrypting and decrypting data.

CSA

[Computer System]

Abbreviation for Computational Storage Array.

CSD

[Computer System]

Abbreviation for Computational Storage Drive.

CSDL

[Management]

Acronym for Common Schema Definition Language.

CSE

[Computer System]

Abbreviation for Computational Storage Engine.

CSF

[Computer System]

Abbreviation for Computational Storage Function.

CSMA/CD

[Network]
Acronym for Carrier Sense Multiple Access with Collision Detection.

CSP

[Computer System]
Abbreviation for Computational Storage Processor.

CSR

[Computer System]
Abbreviation for Computational Storage Resource.

CSx

[Computer System]
Abbreviation for Computational Storage Device.

cumulative incremental backup

[Data Recovery]
A backup in which all data objects modified since the last full backup are retained as the backup.

To restore data when cumulative incremental backups are in use, only the latest full backup and the latest cumulative incremental backup are required.

See differential incremental backup, full backup.

current running disparity

[Network][Fibre Channel]
The running disparity present at a transmitter when 8B/10B encoding of a data byte or special code is initiated, or at a receiver when 8B/10B decoding of a Transmission Character is initiated.

cut through

A switching technique that allows a routing decision to be made and acted upon as soon as the destination address of a frame is received.

cut through routing

[Network][Fibre Channel]

Synonym for cut through switching.

---

cut through switching

[Network][Fibre Channel]

A switching technique that allows a routing decision to be made and acted upon as soon as the destination address of a frame is received.

Cyclic Redundancy Check

[Data Communication][Storage System]

A scheme for checking the integrity of data that has been transmitted or stored and retrieved.

A CRC consists of a fixed number of bits computed as a function of the data to be protected, and appended to the data. When the data is read or received, the function is recomputed, and the result is compared to that appended to the data. Cyclic redundancy checks differ from error correcting codes in that they can detect a wide range of errors, but are not capable of correcting them. See error correcting code.

Cylinder-Head-Sector

[Storage System]

A form of addressing data stored on a disk in which the cylinder, head/platter combination, and relative sector number on a track are specified.

See block addressing.

D

DAC

[Hardware][Data Security]

1. [Data Security] Acronym for Discretionary Access Control.

2. [Hardware] Acronym for Digital Analog Converter.

---

daemon

[Operating System]

A long running process on a computer system that services a particular type of request.

DAS

[Storage System]

Acronym for Direct Attached Storage.

---

data

[Computer System]

The digital representation of anything in any form.

---

data at rest

[Data Security]

Data stored on stable non-volatile storage. [ISO/IEC 27040].

---

data authentication

[Legal]

The process of substantiating that the data is an accurate representation of what it purports to be. [SWGDE/ SWGIT Glossary]

data availability

[Storage System]

The amount of time that data is accessible by applications during those time periods when it is expected to be available, often expressed as a percentage.

See availability, high availability.

---

data breach

[Data Security]

A compromise of security that leads to the accidental or unlawful destruction, loss, alteration, unauthorized disclosure of, or access to protected data transmitted, stored or otherwise processed. [ISO/IEC 27040]

Data Center Bridging

[Network]

The suite of Ethernet protocol extensions defined for reliable storage transports such as FCoE.

DCB includes the following protocols: IEEE 802.1Qau (CN), IEEE 802.1Qaz (ETS and DCBX), and IEEE 802.1Qbb (PFC).

A data center bridge implements the above protocols and capabilities for use in the data center.

Data Center Bridging eXchange protocol

[Network]

A DCB component for discovery and exchange of DCB information.

---

data character

[Network]

Any transmission character associated by the transmission code with a valid data byte.

---

data classification

[Data Management]

An organization of data into sets for management purposes.

A frequent purpose of a classification scheme is to associate service level objectives with sets of data based on their value to the business.

data compression

[General]

The process of encoding data to reduce its size.

Lossy compression (i.e., compression using a technique in which a portion of the original information is lost) is acceptable for some forms of data (e.g., digital images) in some applications, but for most IT applications, lossless compression (i.e., compression using a technique that preserves the entire content of the original data, and from which the original data can be reconstructed exactly) is required.

---

data deduplication

[Storage System]

The replacement of multiple copies of data, at variable levels of granularity, with references to a shared copy in order to save storage space and/or data transferred.

See also inline data deduplication, post-process data deduplication.

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data deduplication ratio

[Storage System]

A space reduction ratio that includes only the space reduction effects of data deduplication.

---

data frame

[Fibre Channel]

A frame containing information used by an FC-4.

---

data in flight

[Data Security]

Synonym for data in motion.

---

data in motion

[Data Security]

Data being transferred from one location to another [ISO/IEC 27040:2015].

Those transfers typically involve interfaces that are externally accessible and do not include internal transfers (i.e., never exposed to outside of an interface, chip, or device).

data in transit

[Data Security][Legal]

1.[Data Security] Synonym for data in motion.

2.[Legal] Data in motion across a jurisdictional boundary.

Jurisdictions (usually nation states) may have policies and enforcement points that determine whether data may cross their borders.

---

data in use

[Data Security]

Data in the process of being created, retrieved, manipulated, updated, or deleted.

---

data ingestion

[Data Management]

A process for depositing data into a system.

---

data integrity

[Data Management][Data Security]

1. [Data Security] The property that data has not been altered or destroyed in an unauthorized manner [ISO 7498-2:1988].
2. [Data Management] The property that data has not been altered or destroyed, in an unintended manner, due to physical or logical events.

---

data lake

[Data Management]

A large repository for storing data in an unstructured way, in anticipation of future analytics.

This term originated in the big data community.

Data Lifecycle Management

[Data Management]

The policies, processes, practices, services and tools used to align the business value of data with the most appropriate and cost-effective storage infrastructure from the time data is created through its final disposition.

Data is aligned with business requirements through management policies and service levels associated with performance, availability, recoverability, cost, etc. DLM is a subset of ILM.

data management

[Management]

The discipline and function of oversight and control of data.

D

data management services

[Data Management]

A set of services that control data from the time it is created until it no longer exists.

Data Management services are not in the data path; rather, they provide control or utilize data in the delivery of their services. This includes services such as data movement, data redundancy, and data deletion. Some data management services are managed using the control plane.

data manager

[File System]

A function that presents a view of data to applications, and maps that view to an internal representation on a system, subsystem or device.

File systems and database management systems are examples of data managers.

data plane

[Computer System]

The portion of a system that moves user data.

In a storage system the data plane is responsible for storing and retrieving data.

Also see control plane.

data portability

[Data Communication]

The ability to transfer data with its metadata from one system to another system that preserves meaning.

data preservation

[Data Management]

The processes of ensuring data integrity, continued existence, and usability of stored data over a period of time.

data processing unit

[Network]

An accelerator element capable of parsing, processing, and transferring data with performance efficiency.

A data processing unit (DPU) usually has a set of programmable acceleration engines that offload and improve performance for applications such as AI/ML, security, telecommunications, or storage. DPUs may also be called SmartNICs, IPUs or NAPUs.

---

data protection

[Data Management]

The combination of data integrity, data availability, and confidentiality.

---

data reliability

[Data Management]

The length of the statistically expected continuous span of time over which data stored by a population of identical storage subsystems can be correctly retrieved, expressed as Mean Time to Data Loss (MTDL).

---

data replication

[Storage System]

Continuously maintaining a copy of data–possibly at a remote site–from a volume to provide high availability and redundancy.

Data replication may be used for disaster recovery and business continuance.

---

data repository

[Data Security]

Implementation of a collection of data along with data access and control mechanisms, such as search, indexing, storage, retrieval and security. [ISO/IEC 20944-1:2013]

EXAMPLE: A repository might support services such as search, indexing, storage, retrieval and security.

---

data resource domain

[Management]

The category of resources that exclusively encompass data management services.

data retention

[Long-Term Retention]

Preserving the existence and integrity of data for some period of time or until certain events have transpired.

D

data service

[Data Management]

A set of functions that process data without interpretation.

This processing may involve copying, movement, security and/or protection, but not the actual storage of the data.

data shredding

[Data Management]

A process for deleting data that is intended to make the data unrecoverable.

One such process consists of repeated overwrites of data on the storage media. Data shredding is not generally held to make data completely unrecoverable in the face of modern forensic techniques–that requires physical destruction of the storage media. Forensic techniques, however, do require physical access to the storage media.

Data Storage as a Service

[Services]

Typically, Data Storage as a Service (DSaaS) hides limits to scalability, is either self-provisioned or provisionless and is billed based on consumption.

data striping

[Storage System]

A disk array data mapping technique in which fixed-length sequences of virtual disk data addresses are mapped to sequences of member disk addresses in a regular rotating pattern.

Data stripping is commonly used in RAID implementations.

data transfer capacity

[Computer System]

The maximum rate at which data can be transmitted.

See data transfer rate.

data transfer device

[SCSI]

A removable media storage device in a library.

Examples are magnetic disk drives, cartridge tape drives, optical disk drives, and CD-ROM drives.

---

data transfer rate

[Computer System]

The amount of data per unit time actually moved across an interconnect.

Database Management System

[Database]

A database management system (DBMS) removes the need for a user or program to manage low level database storage. It also provides security for and assures the integrity of the data it contains. Types of database management systems are relational (table-oriented), network, hierarchical and object oriented.

---

datagram

[Network]

A message sent between two communicating entities for which no explicit acknowledgement is expected.

Datagrams are often said to be sent on a best effort basis.

DBMS

[Database]

Abbreviation for Database Management System.

DCB

[Network]

Acronym for Data Center Bridging.

DDR / DDR2 / DDR3 / DDR4 / DDR5

[Hardware]

Acronym for Double Data Rate.

The number after the DDR term designates the generation of the memory (e.g., DDR4 is the fourth generation of a DDR bus).

decoding

[Network]

Conversion of received transmission characters to valid data bytes and special codes.

decryption

[Data Security]

Conversion of encrypted information to plaintext based on the algorithm and key(s) used to encrypt it.

dedicated connection

A communication circuit between two N-Ports maintained by a Fibre Channel fabric.

The port resources used by a dedicated connection cannot be used for other purposes during the life of the dedicated connection.

deduplication

[Storage System]

See data deduplication.

defense-in-depth

[Data Security]

An information assurance strategy integrating people, technology, and operations capabilities to establish multiple security barriers across layers and dimensions of a protected system. [NIST SP 800-53]

degaussing

[Data Security]

1. A procedure that renders data unreadable by applying a strong magnetic field to the media.

2. Applying a degaussing procedure.

Degaussing is also called demagnetizing and erasure. Both of these terms are misleading, because in magnetic digital media the individual magnetic domains are not erased or demagnetized, but simply made to line up in the same direction, which eliminates any previous digital structure.

degraded mode

[Storage System]

1. [Storage System] A mode of RAID array operation in which not all of the array's member disks are functioning, but the array as a whole is able to respond to application read and write requests.
2. [Storage System] A mode where redundancy of a storage system is lost impacting its performance and/or functionality while the system is still able to respond to application read and write requests.

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delimiter

[Fibre Channel]

An ordered set used to indicate a frame boundary.

---

delta snapshot

[Data Recovery]

A type of point in time copy that preserves the state of data at an instant in time by storing only those blocks that are different from an already existing full copy of the data.

---

delta-based data deduplication

[Storage System]

A method of performing data deduplication by storing or transmitting data in the form of differences from a baseline point in time copy.

See hash-based data deduplication.

DEN

[Network]

Acronym for Directory Enabled Network.

Denial of Service

[Data Security]

Prevention of authorized access to a system resource or the delaying of system operations and functions, with resultant loss of availability to authorized users. [ISO/IEC 27033-1:2015]

---

destination identifier

[Fibre Channel]

An address contained in a Fibre Channel frame that identifies the destination of the frame.

destination Nx_Port

[Fibre Channel]
The Nx-Port to which a frame is addressed.

device

[Storage System]
Synonym for storage device.

device bus

[Storage System]
Synonyms for I/O interconnect.

device channel

[Storage System]
A channel used to connect storage devices to a host bus adapter or an intelligent controller.

The preferred term is I/O interconnect.

device fanout

[Storage System]
Synonym for fanout.

device I/O bus

[Storage System]
Synonyms for I/O interconnect.

DF_ID

[Fibre Channel]
Acronym for destination Fabric_Identifier.

DH-CHAP

[Data Security]
Acronym for Diffie-Hellman augmented Challenge Handshake Authentication Protocol.

DHCP

[Network]
Acronym for Dynamic Host Control Protocol.

D

differential

[SCSI]
A SCSI electrical signaling technique in which each control and data signal is represented by a voltage differential between two signal lines.

Differential signaling can be used over longer distances than the alternative single ended signaling. See single ended (signaling).

differential incremental backup

[Data Recovery]
A backup in which data objects modified since the last full backup or incremental backup are copied.

To restore data when differential incremental backups are in use, the newest full backup and all differential backups newer than the newest full backup are required. See cumulative incremental backup, full backup.

differential signaling

[Hardware]
An electrical signaling technique in which each logical signal is represented by a voltage differential between two signal lines.

Differential signaling can be used over longer distances than the alternative single ended signaling.

Differentiated Services

[Management]
A protocol defined by the IETF for managing network traffic based on the type of packet or message being transmitted.

The Differentiated Services protocol is often abbreviated as DiffServ. DiffServ rules define how a packet flows through a network based on a 6 bit field (the Differentiated Services Code Point) in the IP header. The Differentiated Services Code Point specifies the "per hop behavior" for the packet or message.

Diffie-Hellman

[Data Security]

A key agreement protocol that was developed by W. Diffie and M. E. Hellman in allowing two entities to exchange a secret key over an insecure medium without any prior secrets.

Diffie-Hellman augmented Challenge Handshake Authentication Protocol

[Data Security]

A password based Authentication and key management protocol that uses the CHAP algorithm (RFC 1994) augmented with an optional Diffie-Hellman algorithm.

DH-CHAP provides bidirectional and may provide unidirectional Authentication between a Fibre Channel Initiator and Responder. DH-CHAP is defined by Fibre Channel â€“ Security Protocols - 2 (FC-SP-2).

DiffServ

[Management]

Abbreviation for Differentiated Services.

digest

[Data Security]

A binary string of some fixed length derived by a computationally efficient function from a binary input string of arbitrary length.

A key feature of cryptographic digests is that given a digest, it is computationally infeasible to find another plaintext string that generates the same digest.

Digital Analog Converter

[Hardware]

A device that converts a discretely valued (digital) input to a continuously valued (analog) output.

digital archive

[Data Management]

A storage repository or service used to secure, retain, and protect digital information and data for periods of time less than that of long-term data retention.

A digital archive can be an infrastructure component of a complete digital preservation service, but is not sufficient by itself to accomplish digital preservation, i.e., long-term data retention.

digital forensics

[Legal]

The identification, collection, preservation and analysis of digital evidence for use in legal proceedings.

Digital Linear Tape

[Data Recovery]

A family of tape device and media technologies.

digital object auditing

[Long-Term Retention]

A methodology to verify and detect threats to the validity of digital preservation objects.

Digital object auditing is a process of routine periodic testing of stored digital objects, usually using cryptographic techniques, by comparing their previous signatures and time stamps to their current to verify that change, loss of access, or data loss has not occurred.

digital preservation

[Long-Term Retention]

Ensuring continued access to, and usability of, digital information and records, especially over long periods of time.

digital preservation object

[Long-Term Retention]

A collection of data, metadata and possibly other resources treated as a unit for digital preservation purposes.

A preservation object provides the functionality required to assure the future ability to use, secure, interpret, and verify authenticity of the metadata, information, and data in the container and is the foundational element for digital preservation of information and data.

digital preservation service

[Long-Term Retention]

A service providing digital preservation.

A digital preservation service includes a comprehensive management and curation function that controls its supporting infrastructure, information, data, and storage services in accordance with the requirements of the information objects it manages to accomplish the goals of digital preservation.

digital signature

[Data Security]

A cryptographically derived binary string used to assure information authenticity, integrity, and nonrepudiation.

Digital signatures can generally be externally verified by entities not in possession of the key used to sign the information. For example, a secure hash of the information encrypted with the originator's private key when an asymmetric cryptosystem is used. Some algorithms that are used in digital signatures cannot be used to encrypt data. (e.g., DSA).

Digital Signature Algorithm

[Data Security]

A subset of the Digital Signature Standard that represents a specific public key algorithm that is only used for digital signatures.

The secret key used in DSA operates on the message hash generated by SHA-1; to verify a signature, one recomputes the hash of the message, uses the public key to decrypt the signature and then compares the results.

This algorithm is obsolete.

Digital Signature Standard

[Data Security]

A standard for digital signature that is published by the National Institute of Standards and Technology (NIST) in Federal Information Processing Standard (FIPS) Publication 186-4.

DSS specifies DSA as the algorithm for digital signatures and SHA-x for hashing.

DIMM

[Hardware]

Acronym for Dual Inline Memory Module.

Direct Attached Storage

[Storage System]

A storage device locally connected to a server and dedicated to that server.

direct connected storage

[Storage System]

Synonym of direct attach storage.

direct memory access

[Computer System]

The ability for an entity to access memory without processing CPU instructions.

direct routing method

[SCSI]

A method used by expanders to route connection requests to devices directly attached to that expander, including other expanders.

directory

[Management][File System]

1. [File System] A mechanism for organizing information.

2. [File System] A file or other persistent data structure in a file system that contains information about other files.
3. [Management] An LDAP-based repository consisting of class definitions and instances of those classes.

Microsoft's Active Directory (AD) and Novell's NetWare Directory Service (NDS) are examples of enterprise-wide LDAP directories.

directory tree

[File System]

A collective term for a directory, all of its files, and each of its subdirectories.

Disaster Recovery

[General]

The recovery of data, access to data and associated processing after a loss of use of all or part of a data center.

This involves not only an essential set of data but also an essential set of all the hardware and software to continue processing of that data and business. Any disaster recovery may involve some amount of down time.

discard policy

[Fibre Channel]

An error handling policy that allows an N_Port or NL_Port to discard data frames received following detection of a missing frame in a Sequence.

disconnection

[Fibre Channel]

The process of removing a dedicated connection between two N_Ports.

discovery

[General][Network][Storage System][Services][Legal]

1. [Legal] Process by which each party obtains information held by another party or non-party concerning a matter. [ISO/IEC 27050-1]

2. [General] The process of finding accessible devices, interfaces, and services.
3. [Storage System] The process of finding devices attached to a storage infrastructure.
4. [Network] The process of finding network interfaces in a networking infrastructure.
5. [Services] The process of finding service interfaces.

Discretionary Access Control

[Data Security]

A type of access control that allows a principal owning an object to grant or deny access to other principals.

disk

[Storage System]

Synonym for disk drive.

disk array

[Storage System]

A set of disks from one or more commonly accessible disk subsystems, combined with a body of control software.

The control software presents the disks' storage capacity to hosts as one or more virtual disks. Control software is often called firmware or microcode when it runs in a disk controller. Control software that runs in a host computer is usually called a volume manager.

disk cache

[Storage System]

1. [Storage System] A cache that resides within a disk.
2. [Storage System] A cache that resides in a controller or host.

The primary purpose of a disk cache is to improve disk or disk array I/O performance. See controller cache, host cache.

---

disk drive

[Storage System]

A non-volatile, randomly addressable, re-writable data storage device made up of one or more rotating platters.

This definition includes rotating magnetic and optical disks.

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disk image backup

[Data Recovery]

A backup consisting of a copy of each of the blocks comprising the usable storage area of a storage device.

---

disk striping

[Storage System]

Deprecated synonym for data striping.

---

disk subsystem

[Storage System]

A storage subsystem that supports only disks.

---

disparity

[Network]

For a data stream using 8B/10B encoding, the difference between the number of ones and the number of zeros in a transmission character.

---

disposition

[Legal]

Range of processes associated with implementing records retention, destruction or transfer decisions that are documented in disposition authorities or other instruments.

disposition policy

[Data Management]

A policy that defines when lifecycle deletion should occur, and/or what actions to perform.

D

Distributed FCF

[Fibre Channel]

Synonym for Distributed Switch.

Distributed Switch

[Fibre Channel]

A set of FCDFs associated with at least one Controlling Switch that controls the operations of the set of FCDFs.

DLM

[Data Management]

Acronym for Data Lifecycle Management.

DLT

[Storage System]

Acronym for Digital Linear Tape.

DMA

[Computer System]

Shorthand for direct memory access.

DMTF

[Management]

An industry organization that develops management standards for computer system and enterprise environments.

DMTF standards include CIM and Redfish. The DMTF web site is www.dmtf.org.

DNS

[Network]

Acronym for Domain Name Service.

Document Type Definition

[Standards]

In XML, a specification of the permissible tags or "markup codes" in a document, and their meanings.

XML tags are delimited by the characters, "<" and ">". When a Document Type Definition (DTD) is available for a document, a universal reader (program) can parse the document and display or print it.

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domain

[Network][Fibre Channel][NVMe][Computer System]

1. [Computer System] A shared user authorization database that contains users, groups, and their security policies.
2. [Fibre Channel] The portion of the Fibre Channel address identifier that represents the highest level in the three-level addressing hierarchy.

   Fibre Channel Switch.
3. [Network] A set of interconnected network elements and addresses that are administered together and that may communicate.
4. [NVMe] The smallest indivisible unit of an NVM subsystem that has a common state.

---

domain controller

[Fibre Channel][Operating System]

1. [Operating System] A Windows or Linux server that contains a copy of a user account database. domain may contain zero or more backup domain controllers and contains a primary domain controller.
2. [Fibre Channel] The control function addressable by an N_Port attached to a Switch using the Domain Controller address identifier of 0xFFFCnn, where nn is the Domain Controller being accessed.

Domain Name Service

[Network]

A computer program that converts between IP addresses and symbolic names for nodes on a network in a standard way.

Domain Name Service (DNS) is defined by IETF RFC 1035. Most operating systems include a version of DNS.

DoS

[Data Security]

Acronym for Denial of Service.

double buffering

[Computer System]

{Historical} A technique used to increase data transfer rate by keeping two I/O requests outstanding.

Double Data Rate

[Hardware]

A type of bus used to connect a memory DIMM to a CPU.

DPU

[Network]

Shorthand for data processing unit

DR

[General]

Acronym for Disaster Recovery.

DRAM

[Hardware]

Acronym for Dynamic Random Access Memory.

drive

[Storage System]

Synonym for storage element (e.g., disk drive, solid state drive, or tape drive).

drive letter

[Windows]

A single letter of the alphabet by which applications and users identify a partition or physical or virtual disk to the Windows operating system.

driver

[Computer System]

A host computer software component (usually part of an operating system) whose function is to control the operation of peripheral controllers or adapters attached to the host computer.

Drivers manage communication and data transfer between applications and devices.

DSA

[Data Security]
Acronym for Digital Signature Algorithm.

DSaaS

[Services]
Acronym for Data Storage as a Service.

DSS

[Data Security]
Acronym for Digital Signature Standard.

DTD

[General]
Acronym for Document Type Definition.

dual active

[Computer System]
Synonym for active-active.

Dual Inline Memory Module

[Hardware]
A set of random access memory integrated circuits or chips mounted on a circuit board, providing a 64-bit or greater data path using connectors on both sides of a single card edge.

Abbreviated as DIMM.

dual parity

[Storage System]
A synonym for RAID 6.

due care

[Data Security]
The responsibility that managers and their organizations have a duty to provide for information security to ensure that the type of control, the cost of control, and the deployment of control are appropriate for the system being managed. [NIST SP 800-30]

duplicate

[Computer System][Data Management]

1. [Data Management] A general term for a copy of a collection of data, including point in time copies.
2. [Data Management] The action of making a copy of a collection of data. See replicate, snapshot.
3. [Computer System] Any redundant component in a system.

---

duplicate data

[Storage System]

Data that is redundant with data that is already in a dataset or I/O stream.

Dynamic Host Control Protocol

[Network]

An Internet protocol that allows nodes to dynamically acquire ("lease") network addresses for periods of time.

Dynamic Host Control Protocol (DHCP) simplifies the administration of networks by avoiding the need to pre-configure nodes.

---

dynamic mapping

[Storage System]

A form of mapping in which the correspondence between addresses in the two address spaces can change over time.

See algorithmic mapping, tabular mapping.

Dynamic Random Access Memory

[Hardware]

Byte-addressable computer memory that requires periodic refreshing.

D_ID

[Fibre Channel]

A three-byte field that contains the address identifier of the destination Nx_Port.

E

e-discovery

[Legal]

Short for electronic discovery.

EAL

[Data Security]

Acronym for Evaluation Assurance Level.

EAMR

[Hardware]

Acronym for energy assisted magnetic recording.

EB

[General]

Shorthand for exabyte.

Ebit

[General]

Shorthand for exabit.

Ebyte

[General]

Shorthand for exabyte.

ECC

[Data Communication][Storage System]

Acronym for error correcting code.

economizer

[Management][Energy]

[Energy] Heat exchanger technology used to leverage colder external air to provide data center cooling.

Dry side economizers use cooler outdoor air; wet side economizers use cooling towers or chillers.

[Management] An accountant that prevents the use of new technology. (e.g. commonly uses the phrase "It's out of budget or too expensive").

E

EE_credit

[Fibre Channel]

A credit scheme used to manage end-to-end flow control during the exchange of frames between two communicating devices using Class 2 service.

---

effective capacity

[Storage System]

The amount of data stored on a storage system, plus the amount of unused formatted capacity in that system.

This measure is normally used on systems employing space optimization technologies. On these systems, there is no way to precisely predict the effective capacity.

---

egress routing function

[Fibre Channel]

An entity within a Routing Function that performs the egress routing function role.

---

egress routing function role

[Fibre Channel]

A process within a Routing Function that validates the frame, translates the S_ID, and then forwards the frame to the Native Fabric.

EiB

[General]

Shorthand for exbibyte.

Eibit

[General]

Shorthand for exbibit.

---

electronic discovery

[Legal]

Discovery that includes the identification, preservation, collection, processing, review, analysis, or production of Electronically Stored Information. [ISO/IEC 27050-1]

Although electronic discovery is often considered a legal process, its use is not limited to the legal domain.

Electronically Stored Information

[Legal]

Data or information of any kind and from any source, whose temporal existence is evidenced by being stored in, or on, any electronic medium. [ISO/IEC 27040]

Electronically Stored Information (ESI) includes traditional e-mail, memos, letters, spreadsheets, databases, office documents, presentations, and other electronic formats commonly found on a computer. ESI also includes system, application, and file-associated metadata (3.26) such as timestamps, revision history, file type, etc. Electronic medium can take the form of, but is not limited to, storage devices and storage elements.

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embedded controller

[Storage System]

A controller that is a non-removable component within a larger system.

---

embedded storage controller

[Storage System]

An embedded controller that exclusively performs storage functions.

Emerald

[Storage System]

SNIA Emerald™ Power Efficiency Measurement Specification or SNIA Emerald™ Program.

Emerald Specification

[Storage System]

SNIA Emerald™ Power Efficiency Measurement Specification [ISO/IEC 24091:2019].

Defines a uniform taxonomy of storage subsystems and a standard way of measuring power efficiency of the storage subsystems defined in the taxonomy. For more detailed information, please consult the SNIA Emerald Program website (https://www.snia.org/emerald).

Encapsulating Security Payload

[Data Security]

A component of IPsec that permits the specification of various confidentiality mechanisms.

---

encoding

Process of generating transmission characters from data bytes.

---

encryption

[Data Security]

Reversible operation by a cryptographic algorithm converting data into ciphertext so as to hide the information content of the data [ISO/IEC 9798-1:2010]

Enc_Header

[Fibre Channel]

An encapsulation header used for forwarding FC frames from a source Routing Function to a destination Routing Function.

End-of-frame

[Fibre Channel]

A sequence of bits that delineate the end of a frame.

---

end-to-end encryption

[Data Security]

Encryption of information at its origin and decryption at its intended destination without intermediate decryption.

end-to-end flow control

[Network][Fibre Channel]

1. [Network] Control of message flow between the two end parties of a communication on a network.

2. [Fibre Channel] Flow control that occurs between two communicating Fibre Channel Nx_Ports.

E

---

end-to-end flow control buffer

[Fibre Channel]

A buffer associated with end-to-end flow control.

---

end-to-end security

[Data Security]

Safeguarding information in an information system from point of origin to point of destination. [CNSSI-4009]

---

energy assisted magnetic recording

[Hardware]

A recording technique that directs energy at the media to aid the recording process of an HDD.

---

energy efficiency

[Computer System]

The power efficiency of a system over time.

While power and energy efficiency look about the same to a layman, the numbers may be different (even neglecting the units) on account of temporal variations in supply voltages, power and load factors and so on.

Enhanced Transmission Selection

[Network]

A Data Center Bridging component that specifies a frame scheduling mechanism to support the allocation of data transmission capacity amongst traffic classes that share a link.

ENode

[Network][Fibre Channel]

Synonym for FCoE Node.

ENode MAC address

[Fibre Channel]

The MAC address used by the ENode during the FCoE Initialization Protocol.

Enterprise Resource Management

[Management][Network]

Software that manages all aspects of an organization's assets, systems, services and functions.

ERM systems manage a set of resources in the wider perspective of an organization's entire business. Managing in an enterprise context requires that entities be named uniquely and locatable within the enterprise, that heterogeneity of platforms and services may be assumed, and that the dynamic nature of the environment is taken into account.

Enterprise Systems Connection

[Storage System]

A serial I/O interconnect used on data center mainframes.

Similar to Fibre Channel in many respects, ESCON is based on redundant switches to which computers and storage subsystems connect using serial optical connections.

---

entropy

[Data Security]

A measure of the amount of uncertainty that an attacker faces to determine the value of a secret. [NIST SP 800-63]

The value is sometimes measured in bits of security strength, where a value of 0 indicates no security strength (i.e., full predictability or no randomness) and a positive value indicates increasing security strength.

---

entry/exit slot

[Storage System]

A location in a library through which a removable volume can be inserted or removed.

EOF

[Fibre Channel][File System]

1. [Fibre Channel] Abbreviation for End-of-Frame.

2. [File System] A designation or marker for the end of a file.

erasure coding

[Data Recovery]

An error correcting coding technology.

ERM

[Management][Network]

Acronym for Enterprise Resource Management.

Error Correcting Code

[Data Communication][Storage System]

A scheme for checking the correctness of data and correcting errors in that data.

ESCON

[Storage System]

Acronym for Enterprise Systems Connection.

ESI

[Legal]

Acronym for Electronically Stored Information.

ESP

[Data Security]

Acronym for Encapsulating Security Payload.

Ethernet

[Network]

A local area networking technology based on packetized transmissions between physical ports over a variety of electrical and optical media.

Ethernet transports various upper layer protocols, the most popular of which is TCP/IP. Ethernet standards are maintained by the IEEE 802.3 committee.

Ethernet adapter

[Network]

An adapter that connects an intelligent device to an Ethernet network, usually called an Ethernet network interface card or Ethernet NIC.

eventual consistency

A behavior of a distributed system that provides consistency over time but does not provide immediate consistency guarantees.

EVSN

[Data Recovery]

Acronym for External Volume Serial Number.

E

Exabit

[General]

Shorthand for 1,000,000,000,000,000,000 (1018) bits.

See also exbibit.

Exabyte

[General]

Shorthand for 1,152,921,504,606,846,976 (260) bytes.

Binary notation is commonly used for semiconductor memory sizes.

See also exabyte.

Exbibit

[General]

Shorthand for 1,152,921,504,606,846,976 (260) bits.

Binary notation is most commonly used for semiconductor memory sizes.

See also Exabit.

Exbibyte

[General]

Shorthand for 1,152,921,504,606,846,976 (260) bytes.

Binary notation is most commonly used for semiconductor memory sizes.

See also Exabyte.

Exchange

[Fibre Channel]

A set of one or more non-concurrent related Sequences passing between a pair of Fibre Channel ports.

An Exchange encapsulates a "conversation". Exchanges may be bidirectional and may be short or long lived.

E

Exchange Status Block

[Fibre Channel]

A data structure that contains the state of an Exchange.

An originator FC_Port has an Originator Exchange Status Block for each concurrently active Exchange and a responder FC_Port has a Responder Exchange Status Block for each concurrently active Exchange.

Exchange_Identifier

[Fibre Channel]

A generic term denoting either an Originator Exchange Identifier (OX-ID) or a Responder Exchange Identifier (RX_ID).

---

expansion card

[Computer System]

A term for optional adapters in the form of printed circuit modules that can be added to intelligent devices.

Expansion cards include host bus adapters, network interface cards, NVRAM, and other special purpose adapters.

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expansion module

[Computer System]

Synonym for expansion card.

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expansion slot

[Computer System]

A mounting and internal bus attachment point within an intelligent device into which expansion cards are able to be inserted.

expired data

[Data Management]

Data that is no longer required to be retained for any reason.

Data may become expired data when it has reached its defined retention period or when an event makes it obsolete and it has no further value to the organization becoming a candidate for permanent deletion.

See disposition policy.

E

---

explicit addressing

[Storage System]

A form of addressing in which the data's address is explicitly specified in the access request.

See implicit addressing.

---

exploit

[Data Security]

A defined way to breach the security of an IT system through a vulnerability.

---

export

[Computer System]

1. To cause to appear or make available.

2. To move objects, such as data, from within a system to a location outside the system, usually requiring a transformation during the move.

Disk array control software exports virtual disks to its host environment. In file systems, a directory may be exported or made available for access by remote clients.

3. [legal] To move across international borders.

---

extended file attribute

[File System]

An element of file metadata.

Extended_Header

[Fibre Channel]

A sequence of words that may be present in a frame between the SOF delimiter and the Frame_Header to support frame handling functions not enabled by the Frame_Header.

eXtensible Access Method

[Standards]

An interface standardized by the SNIA that provides applications with standard methods for storing data and associated metadata on fixed content storage.

The eXtensible Access Method (XAM) Application Programming Interface (API) is standardized by SNIA.

eXtensible Markup Language

[Standards]

A universal format for structured documents and data on the World Wide Web.

The World Wide Web Consortium is responsible for the eXtensible Markup Language (XML) specification. See www.w3.org.

extent

[Storage System]

1. A set of consecutively addressed blocks that is allocated to a single file.

2. A set of consecutively located tracks on a CKD disk that is allocated to a single file.

3. A set of consecutively addressed blocks that is part of a single virtual disk.

A single storage device may be organized into multiple extents of different sizes, and may have multiple (possibly) non-adjacent extents that are part of the same virtual disk-to-member disk array mapping. This type of extent is sometimes called a logical disk.

external controller

[Storage System]

An intelligent controller that exists outside the host computer enclosure and attaches via external connections.

external disk controller

[Storage System]

Synonym for external storage controller.

---

external storage controller

[Storage System]

A type of external controller used to control storage.

External storage controllers usually mount in the enclosure containing the disks they control and may be a component of a disk array.

External Volume Serial Number

[Data Recovery]

A human-readable volume serial number on a removable volume.

---

eye

[Data Communication]

The center region of an eye diagram that does not occur for correctly formed signals, that distinguishes presence of signal (region above the eye) from absence of signal (region below the eye).

---

eye diagram

[Data Communication]

A diagram used to specify optical or electrical signal transition characteristics for transmitters, in which the horizontal axis represents normalized time from pulse start and the vertical axis represents normalized amplitude.

---

eye opening

[Data Communication]

Quantitative measure of the space in an eye diagram that does not occur for correctly formed signal transitions, and that prevents signal values from incorrectly being identified as high or low.

E_Port

[Fibre Channel]

The port within a Fibre Channel Switch that connects to another Fibre Channel Switch via an Inter-Switch Link.

E_Ports are used to connect Fibre Channel Switches to form a multi-Switch Fabric.

F

fabric

[Network]
Synonym for a network.

Fabric Login

[Fibre Channel]
The process by which a Fibre Channel node establishes a logical connection to a Fibre Channel Fabric Switch.

Fabric Provided MAC Address

[Network]
A MAC address that is assigned by an FCF and is fabric-wide unique.

Fabric_Identifier

An identifier assigned to each Fabric in an Inter-Fabric Routing environment.

Fabric_Name

[Fibre Channel]
A Name_Identifier associated with a Fibre Channel Fabric.

failback

[Computer System]
The restoration of a failed system component's share of a load to a replacement component after a failback event.

When a failed controller in a redundant configuration is replaced, the devices that were originally controlled by the failed controller are usually failed back to the replacement controller to restore the I/O balance, and to restore failure tolerance. Similarly, when a defective fan or power supply is replaced, its load, previously borne by a redundant component can be failed back to the replacement part.

failed over

[Computer System]

A mode of operation for failure tolerant systems in which a component has failed and its function has been assumed by a redundant component.

A system that protects against single failures operating in failed over mode may not be failure tolerant, since failure of the redundant component may render the system unable to function. Some systems (e.g., clusters) are able to tolerate more than one failure; these remain failure tolerant until no redundant component is available to protect against further failures.

F

---

failover

[Computer System]

The automatic substitution of a functionally equivalent system component for a failed one.

The term failover is most often applied to intelligent controllers connected to the same storage devices and host computers. If one of the controllers fails, failover occurs, and the survivor takes over its I/O load .

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failure tolerance

[Computer System]

Synonym for fault tolerance.

---

fanout

[Storage System]

The number of storage devices to which a storage controller is connected.

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fast SCSI

[SCSI]

A form of SCSI that provides 10 megatransfers per second.

Wide fast SCSI has a 16-bit data path, and transfers 20 MBytes per second. Narrow fast SCSI transfers 10 MBytes per second. See wide SCSI, Ultra SCSI, Ultra2 SCSI, Ultra3 SCSI.

---

fault domain

[Hardware]

A set of hardware components that share a single point of failure.

fault tolerance

[Computer System]
The ability of a system to continue to perform its function (possibly at a reduced performance level) when one or more of its components has failed.

Fault tolerance in disk subsystems is often achieved by including redundant instances of components whose failure would make the system inoperable, coupled with facilities that allow the redundant components to assume the function of failed ones.

F

FBA

[Storage System]
Acronym for Fixed Block Architecture. Acronym for Fixed Block Address.

FC

[Fibre Channel]
Abbreviation for Fibre Channel.

FC Entity

[Fibre Channel]
The interface between a Fibre Channel Switch or a Fibre Channel stack and the FCoE Entity.

Each FC Entity contains a single instance of either a VE_Port, a VF_Port, or a VN_Port.

FC-0

[Fibre Channel]
The level that encompasses the physical characteristics of the interface and data transmission media.

FC-1

[Fibre Channel]
The level that encompasses the encoding and transmission protocol.

FC-2

[Fibre Channel]
The level that encompasses signaling protocol rules and the organization of data into frames, Sequences, and Exchanges.

FC-2M

[Fibre Channel]

The sublevel that routes frames between VN_Ports and Link Control Facilities, based on the D_ID in the Frame_Header and the VF_ID in the VFT_Header if there is a VFT_Header.

FC-2P

[Fibre Channel]

The physical sublevel that defines the rules and provides mechanisms that shall be used to transfer frames via the FC-1 level.

FC-2V

[Fibre Channel]

The virtual sublevel that defines functions and facilities that a VN_Port may provide for use by an FC-4 level, regardless of the FC-1 that is used.

FC-3

[Fibre Channel]

The level that defines a set of services that are available in a Fabric.

FC-4

[Fibre Channel]

The level that encompasses the mapping of upper layer protocols (ULP) such as IP and SCSI to lower protocol layers (FC-0 through FC-3).

Examples of FC-4 standards are the mapping of SCSI commands to Fibre Channel (FCP), mapping of Single-Byte Command Code Sets (FC-SB), and the mapping of NVMe to Fibre Channel (FC-NVMe-3).

FC-AE

[Fibre Channel]

Shorthand for Fibre Channel Avionics Environment.

FC-AL

[Fibre Channel]

Shorthand for Fibre Channel Arbitrated Loop.

When used with a number, the number (e.g., FC-AL-2) denotes a version of the standard.

FC-AV

[Fibre Channel]
Shorthand for Fibre Channel Audio Video.

FC-BB

[Fibre Channel]
Shorthand for Fibre Channel Backbone.

When used with a number, the number (e.g., FC-BB-6) denotes a version of the standard.

FC-DA

[Fibre Channel]
Shorthand for Fibre Channel Device Attach.

When used with a number, the number (e.g., FC-DA-2) denotes a version of the standard.

FC-FS

[Fibre Channel]
Shorthand for Fibre Channel Framing and Signaling.

When used with a number, the number (e.g., FC-FS-4) denotes a version of the standard.

FC-FS-4

Shorthand for Fibre Channel Framing and Signaling.

When used, the number denotes a version of the spec. The listed version is current as of this writing.

FC-GS

[Fibre Channel]
Shorthand for Fibre Channel Generic Services.

When used with a number, the number (e.g., FC-GS-8) denotes a version of the standard.

FC-IFR

[Fibre Channel]
Shorthand for Fibre Channel Inter-Fabric Routing.

This standard is maintained by the INCITS Fibre Channel (T11) Technical Committee.

FC-LS

[Fibre Channel]
Shorthand for Fibre Channel Link Services.

When used with a number, the number (e.g., FC-LS-4) denotes a version of the standard.

FC-MI

[Fibre Channel]
Shorthand for Fibre Channel Methodologies for Interconnects.

When used with a number, the number (e.g., FC-MI-3) denotes a version of the standard.

FC-NVMe

[Fibre Channel]
Shorthand for Fibre Channel NVMe.

When used with a number, the number (e.g., FC-NVMe-3) denotes a version of the standard.

FC-PI

[Fibre Channel]
Shorthand for Fibre Channel Physical Interface.

When used with a number, the number (e.g., FC-PI-7) denotes a version of the standard.

FC-SB

[Fibre Channel]
Shorthand for Fibre Channel Single Byte command sets.

When used with a number, the number (e.g., FC-SB-6) denotes a version of the standard.

FC-SP

[Fibre Channel]
Shorthand for Fibre Channel Security Protocols.

When used with a number, the number (e.g., FC-SP-2) denotes a version of the standard.

FC-SW

[Fibre Channel]
Shorthand for Fibre Channel Switch Fabric.

FC-VI

[Fibre Channel]
Shorthand for Fibre Channel Virtual Interface.

This standard is maintained by the INCITS Fibre Channel (T11) Technical Committee.

FCDF

Shorthand for Fibre Channel Data-Plane Forwarder

FCDF

[Fibre Channel]
Shorthand for Fibre Channel Data-Plane Forwarder.

FCF

[Network][Fibre Channel]
Shorthand for FCoE Forwarder.

FCIA

[Fibre Channel]
Shorthand for Fibre Channel Industry Association.

FCoE

[Network]
Acronym for Fibre Channel over Ethernet.

FCoE Controller

[Network][Fibre Channel]

A functional entity, coupled with a Lossless Ethernet MAC, that instantiates VE_Ports, VF_Ports, and VN_Ports, and/or creates FCoE_LEPs.

FCoE Entity

[Network][Fibre Channel]

The interface between the FC Entity and a Lossless Ethernet MAC. Each FCoE Entity contains one or more FCoE_LEPs.

FCoE Forwarder

[Network][Fibre Channel]

An element of a Fibre Channel Switch with one or more lossless Ethernet MACs, each coupled with an FCoE Controller.

An FCoE Forwarder (FCF) forwards FCoE frames based on the D_ID of the encapsulated Fibre Channel frames. An FCoE Forwarder may contain one or more Lossless Ethernet bridging elements and may contain a Fibre Channel Fabric interface.

FCoE Initialization Protocol

[Network][Fibre Channel]

A protocol that enables the discovery, initialization, and link maintenance of FCoE devices.

FCoE Link Endpoint

[Network][Fibre Channel]

The data forwarding component of an FCoE Entity that handles Fibre Channel frame encapsulation/decapsulation, and transmission/reception of the encapsulated frames through a single Virtual Link.

FCoE Node

[Network][Fibre Channel]

A Fibre Channel Node with one or more lossless Eethernet MACs, each coupled with an FCoE Controller.

FCoE_LEP

[Network][Fibre Channel]

Shorthand for FCoE Link Endpoint.

FCP

[Fibre Channel]
Shorthand for Fibre Channel Protocol for SCSI

When used with a number, the number (e.g., FCP-2) denotes a version of the standard.

F

FC_NVMe association

[Fibre Channel]
An NVMe/FC layer abstraction specified by FC-NVMe for an exclusive communication relationship between an NVMe host and an NVMe controller connected by an initiator NVMe_Port and a target NVMe_Port.

FC_NVMe connection

[Fibre Channel]
An NVMe/FC layer abstraction representing an NVMe Submission Queue and NVMe Completion Queue pair.

FC_NVMe I/O operation

[Fibre Channel]
A Fibre Channel Exchange that is uniquely associated with an NVMe command.

FC_NVMe port

[Fibre Channel]
An NVMe_Port connecting one or more NVMe hosts or NVM subsystems in a Fibre Channel environment.

FC_Port

[Fibre Channel]
A port that is capable of transmitting and receiving Fibre Channel frames according to the FC-0, FC-1, FC-2, and FC-3 levels of the Fibre Channel standards.

An FC_Port includes an LCF. The following are examples of FC_Ports: N_Ports, F_Ports, E_Ports, and B_Ports.

FEC

[Data Communication]
Synonym for forward error correction.

Federal Information Processing Standard

[Data Security]

Standards (and guidelines) produced by NIST for government-wide use in the specification and procurement of Federal computer systems.

Fiber Distributed Data Interface

[Network]

An ANSI standard for a token ring Metropolitan Area Networks (MANs), based on the use of optical fiber cable to transmit data at a rate of 100 Mbits/second.

Both optical fiber and twisted copper pair variations of the FDDI physical standard exist. FDDI is a completely separate set of standards from Fibre Channel. The two are not directly interoperable.

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fibre

The international spelling of the American word fiber.

The British spelling was selected for the Fibre Channel technology, though the American spelling is used to describe the fiber optic technologies defined for Fibre Channel.

Fibre Channel

[Fibre Channel]

A serial I/O interconnect capable of supporting multiple protocols.

Protocols supported include FCP, FICON, and IP.

Fibre Channel (FC) supports switched, point-to-point, and Arbitrated Loop topologies with a variety of copper and optical links running at speeds from 1 Gb/s to 128 Gb/s. The committee standardizing Fibre Channel is the INCITS Fibre Channel (T11) Technical Committee.

Fibre Channel Arbitrated Loop

[Fibre Channel]

A form of Fibre Channel interconnect in which up to 126 nodes are connected in a loop topology, with each node's L_Port transmitter connecting to the L_Port receiver of the next node on the loop.

The network is defined by the FC-AL standard.

Fibre Channel Audio Video

[Fibre Channel]

The standard that defines the mapping of digital audio and video formats to Fibre Channel.

This standard is maintained by the INCITS Fibre Channel (T11) Technical Committee.

F

Fibre Channel Avionics Environment

[Fibre Channel]

The technical report describing a specific subset of Fibre Channel for use in defense and avionic applications.

Fibre Channel Backbone

[Network][Fibre Channel]

Standard that defines mappings for transporting Fibre Channel over different network technologies, including operation of Fibre Channel over Ethernet (FCoE).

Fibre Channel Data-Plane Forwarder

[Fibre Channel]

A simplified Fibre Channel Switch that forwards Fibre Channel frames via A_Ports and F_Ports through an FCDF switching element.

Fibre Channel Device Attach

[Fibre Channel]

A technical report that selects and restricts logical options from the Fibre Channel Framing and Signaling , Fibre Channel Protocol for SCSI, Fibre Channel Arbitrated Loop, Fibre Channel Generic Services, and Fibre Channel Single Byte Command Set standards.

Fibre Channel Device Attach (FC-DA) standardization is the responsibility of the INCITS Fibre Channel (T11) Technical Committee

Fibre Channel Fabric

[Fibre Channel]

A fabric composed of Fibre Channel entities.

Fibre Channel Framing and Signaling

[Fibre Channel]

A standard describing the framing and signaling requirements for Fibre Channel links.

Fibre Channel Generic Services

[Fibre Channel]

A standard describing in detail the Generic Services used for Fibre Channel management.

Fibre Channel Generic Services include name services, management services, and discovery services.

F

Fibre Channel Industry Association

[Fibre Channel]

A trade association that promotes all forms of Fibre Channel technology.

See www.fcia.org.

Fibre Channel Inter-Fabric Routing

[Fibre Channel]

A standard that specifies a set of protocols and methods to enable selective communication among Nx_Ports connected to different Fibre Channel Fabrics.

Fibre Channel Interaction Space

The set of Fibre Channel ports, devices, and Fabrics that are connected by Fibre Channel links or are accessible by a common instance of an administrative tool or tools.

Fibre Channel Link Services

[Fibre Channel]

A series of standards describing the functions that support Fibre Channel links.

Fibre Channel Methodologies for Interconnects

[Fibre Channel]

A technical report specifying common methodologies for both switched and Arbitrated Loop environments, with the intention of facilitating interoperability between devices whether they are connected in a loop or Fibre Channel Fabric topology.

Fibre Channel NVMe

[Fibre Channel]

A series of standards that define the requirements for operation of the NVMe protocol in a Fibre Channel environment.

Fibre Channel over Ethernet

[Network][Fibre Channel]

A technology that encapsulates Fibre Channel frames in Ethernet frames, allowing Fibre Channel traffic to be transported over Ethernet networks.

Fibre Channel Physical Interface

[Fibre Channel]

The standard that describes the point-to-point physical interface of a high-performance serial link for support of the higher level protocols associated with HIPPI, IPI, SCSI, and others.

Fibre Channel Protocol for SCSI

[Fibre Channel]

The standard that defines the mapping of SCSI over Fibre Channel.

Fibre Channel Protocol for SCSI (FCP) standardization is the responsibility of the INCITS T10 committee.

Fibre Channel Security Protocols

[Fibre Channel]

The standard that describe the protocols used to implement security in a Fibre Channel Fabric.

This standard includes the definition of protocols to authenticate Fibre Channel entities, protocols to set up session keys, protocols to negotiate the parameters required to ensure frame-by-frame integrity and confidentiality, and protocols to establish and distribute policies across a Fibre Channel Fabric.

Fibre Channel Service Protocol

A FC-4 protocol that defines all services independently of topology or fabric type.

Fibre Channel Single Byte

[Fibre Channel]

The industry standard command protocol for ESCON over Fibre Channel.

This is also referred to as FICON.

Fibre Channel Switch

[Fibre Channel]

An entity that routes frames in a Fibre Channel Fabric.

Fibre Channel Switch Fabric

[Fibre Channel]

The series of standards that describe the requirements for an interconnecting Fibre Channel Fabric consisting of one or more Fibre Channel Switches that support the Fibre Channel protocols.

Fibre Channel Virtual Interface

[Fibre Channel]

A standard for application-level distributed interprocess communication.

The standard is based on Intel Corporation's V1.0 Virtual Interface (VI) Architecture formerly known as VIA.

Fibre Connection

[Fibre Channel]

IBM Corporation's implementation of the Fibre Channel Single Byte Command Set standards.

FICON

[Fibre Channel]

IBM Corporation's implementation of the Fibre Channel Single Byte Command Set standards.

FICON was developed to provide a Fibre Channel compatible implementation of Enterprise Systems Connection (ESCON).

Field Programable Gate Array

[Hardware]

An integrated circuit composed of an array of transistors that may be programmed after manufacture to perform a specific function.

field replaceable unit

[Computer System]

A unit or component of a system that is designed to be replaced at a customer location.

A field replaceable unit (FRU) may either be customer-replaceable or replacement may require trained service personnel.

file

[File System]
An abstract data object made up of (a.) data bytes stored on a storage element, (b.) a symbolic name by which the object can be uniquely identified, and (c.) a set of properties that allow the object to be managed.

A file may be created and deleted and, in most file systems, be extended or contracted in size during its lifetime.

F

file extent

[File System]
A logically contiguous region of file data.

file level deduplication

[File System]
Reduction of the number of copies of a file by replacing duplicate copies with pointers to a single copy of the file.

See data deduplication.

file mark

[Storage System]
A data separator within a volume.

Commonly used to indicate the boundary between files on a tape.

file server

[File System]
A computer that serves files to clients.

A file server may be a general purpose computer that is capable of hosting additional applications or a special purpose computer capable only of serving files (see filer).

file storage

[Storage System]
A method of storing data as files.

See block storage.

file system

[File System]

A software component that imposes structure on the address space of one or more storage elements or virtual disks so that applications may deal with files.

File systems are often supplied as operating system components, but are also implemented and marketed as independent software components.

F

file system virtualization

[File System]

1. The act of aggregating multiple file systems into one virtual file system.

2. The act of providing different functionality, e.g., a different file access protocol, on top of one or more existing file systems.

file virtualization

[File System]

1. The use of virtualization to present several underlying file or directory objects as one single composite file.
2. The use of virtualization to provide HSM like properties in a storage system.
3. The use of virtualization to present an integrated file interface where file data and metadata are managed separately in the storage system.

filer

[File System]

An intelligent network node whose hardware and software are designed to provide file services to client computers.

Filers are pre-programmed by vendors to provide file services. See appliance, file server.

filesystem

[File System]

Synonym for file system.

Fill Word

[Fibre Channel]

A transmission word that is an idle or an ARBx primitive signal.

Fill words are transmitted between frames, primitive signals, and Primitive Sequences to keep a Fibre Channel network active.

FIM

[Data Recovery]

Acronym for Frozen Image Method.

fingerprint

[Storage System]

An identifier derived from the data, used to detect redundancy.

FIPS

[Data Security]

Acronym for Federal Information Processing Standard.

firmware

[Computer System]

Low-level software for booting and operating an intelligent device.

Firmware generally resides in read-only memory (ROM) on the device.

First Burst

An optimization for the transmission, by an initiator, of the first DATA IU in a Data Series for a write operation.

Fixed Block Architecture

[Storage System]

A data layout model in which storage space is organized as linear, dense address spaces of blocks of a fixed size.

Fixed block architecture is the disk model on which SCSI is predicated. See count-key-data for an alternate approach.

fixed content

[Data Management]

1. Content that does not change.
2. Content that is prevented from changes by the storage container in which it is kept.

---

fixed content storage

[Storage System]

Storage systems and technology specialized for storing fixed content .

---

fixed-length segmentation

[Storage System]

Partitioning a byte stream into parts that are a constant number of bytes when performing compression or hash-based data deduplication.

See variable-length segmentation for an alternative method.

---

flash

Shorthand for flash memory.

---

flash array

[Storage System]

Synonym for solid state storage array.

---

flash memory

[Hardware]

A type of non-volatile memory used in solid state storage.

---

flash memory array

[Storage System]

Synonym for solid state storage array.

FLOGI

[Fibre Channel]

Acronym for Fabric LOGIn.

flywheel UPS

[Energy]

A UPS that uses the momentum of a spinning disk or wheel to temporarily generate electricity in the event of a power failure.

Flywheel energy storage technology provides a bridge between normal power distribution and backup diesel generators and can replace conventional battery rooms.

F

FL_Port

[Fibre Channel]

A Fibre Channel Fabric Loop port within a Fibre Channel Switch, capable of Fibre Channel Arbitrated Loop operations and connected to one or more NL_Ports via a Fibre Channel Arbitrated Loop.

FOB

[Solid State]

The Fresh (new) Out-of-the-Box state of an FRU.

Used in reference to flash storage.

forensic copy

[Data Security]

An accurate bit-for-bit reproduction of the information contained on an electronic device or associated media, whose validity and integrity has been verified using an accepted algorithm. [NIST SP 800-72]

formatted capacity

[Storage System]

The total amount of bytes available to be written after a system or device has been formatted for use.

Formatted capacity, also called usable capacity, is less than or equal to raw capacity. It does not include areas set aside for system use, spares, RAID parity areas, checksum space, host- or filesystem-level remapping, "right sizing" of disks, disk labeling and so on. However, it may include areas that are normally reserved–such as snapshot set-asides–if they can alternatively be configured for ordinary data storage by the storage admin.

formatting

[Storage System]

The preparation of a device for use by writing required information on the media.

Device controllers format devices by writing block header and trailer information for every block on the device. Host software components such as volume managers and file systems format devices by writing the initial structural information required for the volume or file system to be populated with data and managed.

F

---

forward error correction

[Data Communication]

A set of algorithms that perform corrections on received data.

FPGA

[Hardware]

Acronym for Field Programable Gate Array.

FPMA

[Fibre Channel]

Abbreviation for Fabric Provided MAC Address.

---

frame

[Network][Fibre Channel]

[Network] The basic unit of data transmission in a network.

[Fibre Channel] The basic unit of data transmission in a Fibre Channel network.

In Fibre Channel, a frame consists of: a Start-of-Frame (SOF), frame headers, data, a CRC, and an End-of-Frame (EOF). See data frame.

---

frame content

[Fibre Channel]

The information contained in a frame between its Start-of-Frame and End-of-Frame.

Frame Scrambling

[Fibre Channel]
Encoding frame content to minimize repetitive bit sequences.

Frame Scrambling is used to lower the electromagnetic emission from Fibre Channel equipment.

Frame_Header

[Fibre Channel]
A sequence of words in a frame that contain routing and identification information.

The Frame_Header follows the SOF delimiter and any Extended_Headers in a frame.

---

free capacity

Deprecated synonym for free space.

---

free space

[Storage System][Data Management]
1. The amount of capacity reported to an end user as unused assigned capacity.

In a simple world, free space is normally the same as assigned capacity less the amount of assigned capacity already written. But restrictions such as quotas, thin provisioning, and interactions between systems using different arithmetic may cause the reported free space to vary from the actual quantity.

2. The amount of capacity reported to the storage admin as unused formatted capacity.

Front Domain

[Fibre Channel]
A domain presented by a Front Domain Switch.

Front Domain Switch

[Fibre Channel]
A Fibre Channel Switch within an Inter-Fabric Router that provides connectivity to the Fibre Channel Fabrics that are interconnected by the Inter-Fabric Router.

---

frozen image

[Data Recovery]
Synonym for point in time copy.

FRU

[Computer System]
Acronym for field replaceable unit.

FSP

Acronym for Fibre Channel Service Protocol.

F

full backup

[Data Recovery]
A backup in which all of a defined set of data objects are copied, regardless of whether they have been modified since the last backup.

A full backup is the basis from which incremental backups are taken. See cumulative incremental backup, differential incremental backup.

full duplex

[Data Communication]
Concurrent transmission and reception of data on a single link.

Fx_Port

[Fibre Channel]
A Fibre Channel Switch port capable of operating as an F_Port or FL_Port.

F_ID

[Fibre Channel]
Abbreviation for Fabric_Identifier.

F_Port

[Fibre Channel]
A port within a Fibre Channel Switch that provides a point-to-point link attachment to a single PN_Port.

An F_Port is assumed to always refer to a port to which non-loop PN_Ports are attached to a Fibre Channel Fabric, and does not include FL_Ports.

F_Port Name

[Fibre Channel]

A Name-Identifier associated with an F-Port.

G

garbage collection

[Computer System]
The process of reclaiming resources that are no longer in use.

Garbage collection has uses in many aspects of computing and storage. See also trim.

---

gateway

[Network]
A device that receives data via one port and transmits it via another port.

This may involve the use of different protocols on each port.

Gb / Gbit

[General]
Shorthand for Gigabit.

GB / GByte

[General]
Shorthand for Gigabyte.

GB/W

[General]
Short for Gigabytes gigabytes per watt.

GB/W is a metric for evaluating the storage capacity provided per unit of power.

GBE

[Network]
Synonym for Gigabit Ethernet.

GBIC

[Network][Fibre Channel]
Acronym for gigabit interface converter.

Gbps/W

[General]
Short for Gigabits per second per watt.

Gbps/W is a metric for evaluating data transfer rate provided per unit of power.

geometry

[Storage System]
The mathematical description of the layout of blocks on a disk.

The primary aspects of a disk's geometry are the number of recording bands and the number of tracks and blocks per track in each, the number of data tracks per cylinder, and the number and layout of spare blocks reserved to compensate for media defects.

GFC

[Fibre Channel]
The defined label associated with a Fibre Channel speed.

Examples include 32GFC, 64GFC, and 128GFC.

GiB

[General]
Synonym for Gibibyte.

GiB/W

[General]
Short for gibibytes per watt.

GiB/W measures capacity in units of 230 bytes/watt, while GB/W uses units of 109 bytes/watt.

Gibibit

[General]
Shorthand for 1,073,741,824 (230) bits.

See also gigabit.

Gibibyte

[General]
Shorthand for 1,073,741,824 (230) bytes.

Binary notation is commonly used for semiconductor memory sizes.

See also gigabyte.

Gibit

[General]
Synonym for Gibibit.

Gibps/W

[General]
Short for gibibits per second per watt.

Gibps/W measures data transfer rate in units of 230 bits/second/watt, in contrast to Gbps/W, which measures it in units of 109 bits/second/watt.

GiByte

[General]
Synonym for gibibyte.

GID

[Management][Data Security]
Abbreviation for "group identifier" (Group IDentifier).

Gigabit

[General]
Shorthand for 1,000,000,000 (109) bits.

Gigabit Ethernet

[Network]

A group of Ethernet standards that define the transmission of data at 1 Gbit per second.

Gigabit Ethernet (GBE) standards are defined by IEEE 802.3.

---

gigabit interface converter

[Network][Fibre Channel]

A transceiver that converts between electrical signals internal to a device and the external optical or electrical interface of that device.

These devices are obsolete and have been replaced by other devices, including SFP, SFP+, and XFP.

Gigabyte

[General]

Shorthand for 1,000,000,000 (109) bytes.

The SNIA uses the base 10 convention commonly found in I/O-related and scientific literature rather than the base 2 convention (1,073,741,824, i.e., 230) common in computer system and software literature.

See also gibibyte.

GL_Port

[Fibre Channel]

A generic loop port that is able to operate as an A_Port, E_Port, F_Port or FL_Port.

The operating mode of the GL_Port is determined during Fibre Channel Switch port initialization.

Graphical User Interface

[Computer System]

A form of user interface to intelligent devices characterized by pictorial displays and highly structured, forms oriented input.

A GUI is valued for perceived ease of use compared with a command line interface.

Green Storage Initiative

[Standards][Energy]

An initiative within the SNIA with a special interest in marketing, education, promotion and development of green storage technologies and support for the technical work of the Green Storage TWG.

---

greenwashing

[Energy]

A result of excessive marketing and ineffective engineering.

In fond memory of Tom Clark, who penned this definition ca. 2008.

Group Identifier

[Data Security]

A collection of computer user identifiers and possibly other group identifiers used as a convenience in assigning resource access rights or operational privileges.

---

groupid

[Data Security]

Shorthand for group identifier.

GSI

[Standards]

Acronym for the SNIA Green Storage Initiative.

GSN

[Network]

Acronym for Gigabyte System Network.

GUI

[Computer System]

Acronym for Graphical User Interface.

G_Port

[Fibre Channel]
A generic Fibre Channel Switch port that is able to operate as an A_Port, E_Port, or an F_Port.

The operating mode of the G_Port is determined during Fibre Channel Switch port initialization.

H

hacker

[Data Security]

An unauthorized user who attempts to gain and/or succeeds in gaining access to an information system .

halt

[Computer System]

To stop all activity in a computer system in an orderly manner.

halt and catch fire

[Computer System]

To stop all activity in a computer system in a disorderly manner.

HAMR

[Hardware]

Acronym for heat assisted magnetic recording

Hard Disk Drive

[Storage System]

Rotating magnetic non-volatile disk drive.

hard link

[File System]

A path that provides a different name for a file.

Hard links are independent references to the same file; the file content is not deleted until every hard link to the file is deleted.

Hard Zone

[Fibre Channel]

A zone consisting of zone members that are permitted to communicate with one another via the Fibre Channel Fabric where the zoning is enforced by hardware.

See zone, Soft Zone.

---

hash value

[Data Management]

A value deterministically derived from data and assumed to be unique enough within the domain of that data for the purposes of its application.

---

hash-based data deduplication

[Storage System]

A method of performing data deduplication by calculating and comparing hash values.

See delta-based data deduplication.

Hashed Message Authentication Code

[Data Security]

A value calculated over the contents of a message (usually using a cryptographic hash algorithm) that can be used to demonstrate that the contents of the message have not been changed during transmission.

HBA

[Computer System]

Acronym for Host Bus Adapter.

HDD

[Storage System]

Acronym for Hard Disk Drive

---

head

[Hardware]

Synonym for Read/Write head.

heat assisted magnetic recording

[Hardware]

A recording technique that directs heat at the media to aid the recording process of an HDD.

---

heuristic

[General]

An approximation for a calculation that is too expensive to perform in its entirety.

---

hierarchical storage management

[Data Management]

The automated migration of data objects among storage devices, usually based on inactivity.

Hierarchical storage management (HSM) is based on the concept of a cost-performance storage hierarchy. By accepting lower access performance (higher access times), one can store objects less expensively. By automatically moving less frequently accessed objects to lower levels in the hierarchy, higher cost storage is freed for more active objects, and a better overall cost to performance ratio is achieved.

High Availability

[Computer System]

The ability of a system to perform its function continuously (without interruption) for a significantly longer period of time than the reliabilities of its individual components would suggest.

High availability (HA) is most often achieved through failure tolerance. High availability is not an easily quantifiable term. Both the bounds of a system that is called highly available and the degree to which its availability is extraordinary must be clearly understood on a case-by-case basis.

High Performance Parallel Interface

[Network][Standards]

An obsolete ANSI standard.

HIPPI

[Network][Standards]

Acronym for High Performance Parallel Interface.

HMAC

[Data Security]

Acronym for Hashed Message Authentication Code.

---

host

[Computer System]

Synonym for host computer.

---

host adapter

[Computer System]

Synonym for host bus adapter.

---

host based array

[Storage System]

A disk array whose control software executes in one or more host computers rather than in a disk controller.

The member disks of a host-based array may be part of different disk subsystems. See controller based array.

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host based disk array

[Storage System]

Synonym for host based array.

---

host based virtualization

[Computer System]

Virtualization implemented in a host computer.

---

host bus

[Computer System]

Synonym for host I/O interconnect.

Host Bus Adapter

[Computer System]

An I/O adapter that connects a host computer bus to an I/O interconnect.

HBA is the preferred term for Fibre Channel and SAS interconnects.

---

host cache

[Storage System]

A cache that resides within a host computer whose primary purpose is to improve disk or array I/O performance.

Host cache may be associated with a file system or database, in which case, the data items stored in the cache are file or database entities. Alternatively, host cache may be associated with the device driver stack, in which case the cached data items are sequences of disk blocks. See cache, controller cache, disk cache.

---

host computer

[Computer System]

Any computer system to which disks, disk subsystems, or file servers may be attached and accessible for data storage and I/O.

Mainframes, servers, workstations and personal computers, as well as multiprocessors and clustered computer complexes, are all referred to as host computers in SNIA publications.

---

host I/O interconnect

[Computer System]

An I/O interconnect used to connect a host computer's host bus adapter to storage subsystems or storage devices.

See I/O interconnect, channel.

---

hot aisle/cold aisle

[Energy]

Arranging Data Center IT equipment in racks such that heat is exhausted in designated aisles while cool air is supplied in the alternating aisles.

hot backup

[Data Recovery]

Synonym for online backup.

See cold backup, offline backup.

---

hot band

[Storage System]

A range of storage addresses that are accessed with relatively high frequency.

---

hot banding

[Storage System]

The use of hot bands in a workload for test purposes to reward cache behavior.

---

hot disk

[Storage System]

A disk whose capacity to execute I/O requests is saturated by the aggregate I/O load directed to it from one or more applications.

---

hot file

[File System]

A frequently accessed file.

Hot files are generally the root cause of hot disks, although this is not always the case. A hot disk can also be caused by operating environment I/O, such as paging or swapping.

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hot spare

[Storage System]

A disk being used as a hot standby component.

---

hot spot

[Storage System]

Synonym for hot band

hot standby

[Computer System]

A redundant component in a failure tolerant subsystem that is powered and ready to operate and does not operate as long as the primary component is functioning.

Hot standby components increase storage subsystem availability by allowing systems to continue to function when the associated primary component fails. When the term *hot standby* is used to denote a disk, it specifically means a disk that is ready to perform I/O operations, for example, as the target of a rebuilding operation.

hot swap

[Computer System]

The substitution of a replacement unit (RU) in a system for a defective unit, where the substitution can be performed while the system is performing its normal functioning normally.

Hot swaps are physical operations typically performed by humans. See automatic swap, cold swap, warm swap.

hot swap adapter

[Computer System]

An adapter that supports hot swap.

Houlderize

[General]

Flip/flopping; when an opinion continually switches back and forth between choices.

For example: Design choice "A" is selected; but a week later, design choice "B" is selected; then after another week of consideration, the design choice is switched back to "A".

HSM

[Data Recovery]

Acronym for hierarchical storage management.

HTML

[Standards]

Acronym for HyperText Markup Language.

HTTP

[Standards]
Acronym for HyperText Transfer Protocol.

hub

[Network]
A communications infrastructure element to which nodes on a multi-point bus or loop are physically connected.

Unlike switches, hubs do not aggregate data transfer capacity.

hub port

A port on a Fibre Channel hub whose function is to pass data transmitted on the physical loop to the next port on the hub.

Hub ports include loop healing port bypass functions. Some hubs have additional management functionality. There is no definition of a hub port in any Fibre Channel standard.

hybrid array

[Storage System]
A storage array consisting of multiple types of storage devices.

hybrid cloud

[Cloud]
A composition of two or more clouds of different types (private, community, or public).

Hybrid DIMM

[Hardware]
A dual in-line memory module that contains both volatile memory and non-volatile memory.

See NVDIMM.

hybrid drive

[Storage System]
A drive that consists of multiple types of storage media.

hyper-converged system

[Computer System]

A product that combines server, client, storage, network, and management software in a single unit.

HyperText Markup Language

[Standards]

A computer language consisting of a set of tags or "markup" codes that describe how a document is displayed by a web browser.

HyperText Markup Language (HTML) tags are delimited by the characters "<" and ">". For example, the markup code " " indicates that a new paragraph is beginning, while " " indicates that the current paragraph is ending.

HyperText Transfer Protocol

[Standards]

An application level protocol, usually run over TCP/IP, that enables the exchange of data via the Internet.

I

I/O

[Computer System]
Abbreviation for input/output.

I/O adapter

[Computer System]
An adapter that converts between the timing and protocol requirements of a system's memory bus and those of an I/O interconnect or network.

In the context of storage subsystems, I/O adapters are contrasted with embedded storage controllers, that not only adapt between buses and interconnects, but also perform transformations such as device fan-out, data caching, and RAID. Host bus adapters (HBAs) and Ethernet NICs are types of I/O adapters.

I/O bottleneck

[Computer System]
Any resource in the I/O path that limits data transfer capacity of a system.

Examples of resources that may limit the data transfer capacity of a system include a device driver, host bus adapter, I/O interconnect, intelligent controller, and disk.

I/O bus

[Computer System]
Synonym for I/O interconnect.

I/O driver

[Computer System]
A host computer software component (usually part of an operating system) whose function is to control the operation of peripheral controllers or adapters attached to the host computer.

I/O drivers manage communication and data transfer between applications and I/O devices.

I/O intensity

[Computer System]

A characterization of an application that describes how strongly performance depends on the performance of the I/O subsystem that provides I/O services to the application.

I/O intensive applications may be either data transfer intensive or I/O request intensive or both.

I/O interconnect

[Computer System]

Any path used to transfer data and control information between components of an I/O subsystem.

An I/O interconnect consists of cables, connectors, and all associated transmitters, receivers, and other required components. I/O interconnects are typically optimized for the transfer of data. See channel, device channel, network.

I/O load

[Computer System]

A metric of I/O requests made to an I/O subsystem over a period of time.

I/O load balancing

[Computer System]

Load balancing of I/O.

I/O operation

[Computer System]

A read, write, or control function performed to, from or within a computer system.

See I/O request.

I/O power efficiency

[Storage System]

1. The ratio of maximum IOPS deliverable by a system, to the input power required to deliver those IOPS.

2. The ratio of data transfer rate readable or writable by a system, to the input power required to achieve that data transfer rate.

I/O request

[Computer System]
A request by an application to read or write a specified amount of data.

In the context of real and virtual disks, I/O requests specify the transfer of a number of blocks of data.
See I/O operation.

I/O subsystem

[Computer System]
A set of devices and software components that operate together to provide data services.

A storage subsystem is one type of I/O subsystem.

I2C

[Network]
The first generation of a hardware bus typically used to connect management related devices to a system.

See System Management Bus.

I3C

[Hardware]
The second generation of a hardware bus typically used to connect management related devices to a system.

IaaS

[Services]
Acronym for Infrastructure as a Service.

ICMP

[Network]
Acronym for Internet Control Message Protocol.

IDE

[Storage System]
Acronym for Integrated Drive Electronics.

idempotence

[General]

A property of an operation in which the same result is obtained no matter how many times the operation is repeated.

---

idempotent

[Computer System]

A property of an operation in which a single effect occurs no matter how many times the operation is invoked.

---

identification

[Data Security]

The process of determining the unique identity of an entity.

---

identity

[Data Security]

Representation of an actual user (or application or service or device).

An example is the assignment of the user name joej (the identity) to represent the human user Joe Jones for purposes of authentication and authorization.

---

idle

[Storage System]

A state in which a storage system is serving no user-initiated I/O requests, but is ready to service them upon arrival with normal latency.

Storage systems may perform extensive system-initiated I/O during idle periods as they execute routine background housekeeping tasks.

---

idle power

[Energy]

The power consumption of a system that is idle.

Idle word

[Network]

In a data stream using 8B/10B encoding, an ordered set of four transmission characters normally transmitted between frames to indicate that no data is being transmitted.

IDS

[Data Security]
Acronym for Intrusion Detection System.

IETF

[Network][Standards]
Acronym for Internet Engineering Task Force.

iFCP

[Network][Fibre Channel]
A gateway-to-gateway protocol that provides Fibre Channel Fabric services to Fibre Channel devices over a TCP/IP network.

ignored

A field that is not interpreted by its receiver.

IKE

[Network][Data Security]
Acronym for Internet Key Exchange.

ILM

[Data Management]
Acronym for Information Lifecycle Management.

IMA

[iSCSI]
Acronym for iSCSI Management API.

implicit addressing

[Storage System]
A form of addressing, usually used with tapes, in which the data's address is inferred from the form of the access request.

Tape commands that do not include an explicit block address but implicitly specify the *next* or *previous* block from the current tape position, from which the block address must be inferred by the device. See explicit addressing.

import/export element

[SCSI]

Synonym for entry/exit slot.

in-band

[Network]

Transmission of a separate data stream, such as management information, over the same medium as the primary data stream.

See out-of-band.

in-band data deduplication

[Storage System]

Deprecated synonym for inline data deduplication.

incident

[Data Security]

An occurrence that actually or potentially jeopardizes the confidentiality, integrity, or availability of an information system or the information the system processes, stores, or transmits or that constitutes a violation or imminent threat of violation of security policies, security procedures, or acceptable use policies. [NIST FIPS 200]

incineration

[Data Security]

A method of sanitization that reduces a storage device or element to ash, in an approved facility. [ISO/IEC 27040]

INCITS

[SCSI][Standards]

The INCITS SCSI Storage Interfaces Technical Committee.

The INCITS T10 Technical Committee is the standards development committee accredited by INCITS to develop SCSI standards for communication between host devices (initiators) and external controllers (targets).

INCITS Fibre Channel (T11) Technical Committee

[Fibre Channel][Standards]

The standards development committee accredited by INCITS to develop standards related to Fibre Channel.

INCITS T10

[SCSI][Standards]

The INCITS SCSI Storage Interfaces Technical Committee (INCITS TC T10).

The INCITS T10 Technical Committee is the standards development committee accredited by INCITS to develop SCSI standards for communication between from host devices (initiators) to storage device controllers (targets).

INCITS T13

[Standards]

The INCITS ATA Storage Interfaces Technical Committee.

The INCITS T13 Technical Committee is the standards development committee accredited by INCITS to develop ATA standards for communication between a host and a storage device.

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incremental backup

[Data Recovery]

A backup of data objects modified since a previous backup.

Incremental backup is a collective term for cumulative incremental backups and differential incremental backups. See full backup.

---

independent access array

[Storage System]

A disk array whose data mapping is such that different member disks can execute multiple application I/O requests concurrently.

See parallel access array.

InfiniBand

[Computer System]

An industry standard, channel-based, switched fabric interconnect architecture for server and storage connectivity

The committee standardizing InfiniBand™ is the InfiniBand® Trade Association.

information

[Data Management]

Data that is interpreted within a context such as an application or a process.

information assurance

[Data Security]

Measures that protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality, and nonrepudiation.

Information assurance encompasses system reliability and strategic risk management, and includes providing for restoration of information systems using protection, detection, and reaction capabilities.

Information Lifecycle Management

[Data Management]

The policies, processes, practices, services and tools used to align the business value of information with the most appropriate infrastructure from the time information is created through its final disposition.

Information is aligned with business requirements through management policies and service levels associated with applications, metadata and data.

information management

[Data Management]

The discipline and function of oversight and control of information resources.

information management services

[Data Management]

The processes associated with managing information as it progresses through various lifecycle states associated with a business process.

These services exploit information about data content and relationships in making decisions. Examples include records management and content management applications.

---

information model

[Data Management]

A repository-independent definition of entities (objects) and the relationships and interactions between these entities.

The CIM schemas are an example of an information model. An information model differs from a data model, which is repository-specific.

---

information resource domain

[Management]

The category of resources that exclusively encompass information services.

---

information security

[Data Security]

Preservation of confidentiality, integrity and availability of information. [ISO/IEC 27000:2018]

In addition, other properties such as authenticity, accountability, non-repudiation and reliability can also be involved.

---

information service

[Management]

A set of functions that treat data within an interpretation context.

---

information system

[Data Security]

The entire infrastructure, organization, personnel and components for the collection, processing, storage, transmission, display, dissemination and disposition of information.

Information Technology

[General]

All aspects of digital information creation, access, use, storage, transport and management.

The term Information Technology addresses all aspects of computer and storage systems, networks, users and software in an enterprise.

Information Unit

[iSCSI][Fibre Channel]

1. 1. [iSCSI] A delimited and sequenced set of information in a format appropriate for transport by the service delivery subsystem.

   iSCSI Information Unit may contain a command, data, response, or task management request.
2. [Fibre Channel] A related collection of data specified by an FC-4 to be transferred as a single FC-2 Sequence.

Infrastructure as a Service

[Services]

Delivery over a network of an appropriately configured virtual computing environment, based on a request for a given service level.

Typically, Infrastructure as a Service (IaaS) is either self-provisioned or provisionless and is billed based on consumption.

---

infrastructure-based virtualization

[Computer System]

Virtualization implemented in the storage fabric, in separate devices designed for the purpose, or in network devices.

Examples are separate devices or additional functions in existing devices that aggregate multiple individual file system appliances or block storage subsystems into one such virtual service, functions providing transparent block or file system mirroring functions, or functions that provide new security or management services.

---

ingress Routing Function role

[Fibre Channel]

A process within a Routing Function that forwards the frame to the next hop Routing Function or Egress Routing Function.

initial relative offset

[Network]

The relative offset of the block or sub-block transmitted by the first frame in a sequence, specified by an upper layer protocol.

The initial relative offset need not be zero.

---

initialization

[Computer System]

1. The startup and initial configuration of a system or component.

---

initiator

[SCSI][Computer System]

1. [Computer System] The system component that originates an I/O command over an I/O interconnect.

2. [SCSI] The endpoint that originates a SCSI I/O command sequence.

I/O adapters, network interface cards, and intelligent I/O interconnect control ASICs are typical initiators. See LUN, originator, target, target port identifier.

---

initiator NVMe_Port

[Fibre Channel]

NVMe_Port that is the NVMe host port for an FC_NVMe association.

---

initiator port identifier

[SCSI]

The interconnect address of an initiator.

Initiator Session Identifier

[iSCSI]

The unique identifier that an initiator assigns to its end point of the session.

When combined with the iSCSI Initiator Name, the Initiator Session Identifier provides a worldwide unique name for its SCSI Initiator Port.

inline data deduplication

[Storage System]

Data deduplication performed before writing the deduplicated data.

See post-process data deduplication

---

inode

[File System]

A persistent data structure in a UNIX or UNIX-like file system that describes the location of some or all of the disk blocks allocated to a file.

---

input/output

The process of moving data between a computer system's main memory and an external device or interface.

Input/output (I/O) encompasses *reading,* or moving data into a computer system's memory from another location, and *writing*, or moving data from a computer system's memory to another location. Example locations include storage device, display, printer, or network connected to another computer system.

---

instantiation

[General]

The creation of an instance of a class or object oriented abstraction.

Integrated Drive Electronics

[Computer System]

A type of hardware interface formerly used to connect hard disks, CD-ROMs and tape drives to a PC.

The IDE interface is defined by the ATA specification.

---

integrity

[Data Security]

Property of accuracy and completeness. [ISO/IEC 27000:2018]

intelligent controller

[Computer System]

A device for handling requests that includes a processor or sequencer programmed to autonomously process a substantial portion of requests.

A storage controller is an example of an intelligent controller.

---

intelligent device

[Computer System]

A computer, storage controller, storage device, or appliance.

Intelligent Platform Management Interface

[Management]

A protocol used to perform management and monitoring operations on a system independent of the host system components.

Inter-Fabric

The entire interconnection of Fabrics and Inter-Fabric Routers.

Inter-Fabric Router

[Fibre Channel]

A device that performs Inter-Fabric Routing and consists of a Routing Function, Translate Domain Switches, and Front Domain Switches.

Inter-Fabric Routing

The process of forwarding frames through a specific Routing Function, including the translation of N_Port_IDs.

Inter-Switch Link

[Fibre Channel]

A Fibre Channel link connecting one switch to another switch.

See FC-SW.

interconnect

[Computer System]

A physical means by which system elements and devices are connected together and through which they can communicate with each other.

I/O buses and networks are examples of interconnects.

---

interface connector

[Network]

An optical or electrical connector that connects the media to the transmitter or receiver.

An interface connector consists of a receptacle and a plug.

Intermediate Routing Function

A process within a Routing Function that validates the frame headers, updates the IFR-Header, removes and adds a new Enc_Header, then forwards the frame to the next hop Routing Function.

---

intermix

A Fibre Channel class of service that provides a full data transfer capacity dedicated Class 1 connection, but allows connectionless Class 2 and Class 3 traffic to share the link during intervals when data transfer capacity is unused.

International Organization for Standardization

[Standards]

A worldwide federation of national standards bodies.

A non-governmental organization, covering more than 145 countries, whose work results in international agreements that are published as International Standards and other types of ISO documents.

Internet Control Message Protocol

[Network]

A control protocol, strongly related to IP and TCP, used to convey a variety of control and error messages.

Internet Engineering Task Force

[Network][Data Security][Standards]

The community concerned with evolution and operation of the Internet.

The IETF is the standards body responsible for Internet standards called RFCs, including SNMP, TCP/IP and policy for QoS. The IETF has a web site at www.ietf.org.

Internet Key Exchange

[Network][Data Security]

A protocol specified by the IETF that performs mutual authentication between two parties and establishes an IKE Security Association (SA) that includes shared secret information that can be used to efficiently establish SAs for Encapsulating Security Payload (ESP) or Authentication Header (AH) and a set of cryptographic algorithms to be used by the SAs to protect the traffic that they carry.

IKEv2 is defined in RFC-4306.

IKE Version 2 (IKEv2) is not compatible with Version 1.

Internet Protocol

[Network]

A standard protocol that provides connectionless, best effort delivery of datagrams across heterogeneous physical networks.

See TCP, UDP.

Internet Small Computer Systems Interface

[Storage System]

A transport protocol that provides for the SCSI protocol to be carried over a TCP based IP network, standardized by the Internet Engineering Task Force and described in RFCs 791, 1122, 2003, and 3720.

Internet Storage Name Service

[iSCSI]

A protocol and mechanism for intelligent discovery of storage devices in an IP network.

---

interoperability

[Computer System]

The ability of systems to work with or use data and protocols from other systems.

interrupt

[Computer System]

A hardware or software signal that causes a computer to stop executing its instruction stream and switch to another stream.

Software interrupts are triggered by application or other programs. Hardware interrupts are caused by external events, to notify software so it can deal with the events.

---

intrusion

[Data Security]

Unauthorized access to a network or a network-connected system, that is, deliberate or accidental unauthorized access to information systems, to include malicious activity against information systems, or unauthorized use of resources within information systems. [ISO/IEC 27039:2015]

---

intrusion detection

[Data Security]

The process of identifying that an intrusion has been attempted, is occurring, or has occurred.

Intrusion Detection System

[Data Security]

Technical system that is used to identify that an intrusion has been attempted, is occurring, or has occurred and possibly respond to intrusions in information systems and networks. [ISO/IEC 27039:2015]

IOPS / IOPs / iops

[Storage System]

Shorthand for I/O Operations per second.

IOPs can also be the plural of IOP (short for I/O operation), depending on context.

IOPS/W

[Energy]

Input/Output operations per second per watt.

IOPS/W is a metric for evaluating storage I/O performance per unit of power.

IP

[Network]
Acronym for Internet Protocol.

IP Security

[Network][Data Security]
A suite of cryptographic algorithms, protocols and procedures used to protect information, authenticate communications, control access, and provide non-repudiation at the IP layer.

The two key protocols in IPsec are the Authentication Header (AH) and Encapsulating Security Payload (ESP) protocols.

IPMI

[Hardware]
Acronym for Intelligent Platform Management Interface.

IPsec

[Network][Data Security]
Shorthand for IP security.

iSCSI

[Storage System]
Acronym for internet Small Computer Systems Interface.

iSCSI Device

[iSCSI]
A SCSI device using an iSCSI service delivery subsystem, in other words an iSCSI-specific transport mechanism for SCSI commands and responses.

See IETF RFC 3720.

iSCSI initiator Name

[iSCSI]
The worldwide unique name of an iSCSI initiator.

iSCSI Initiator Node

[iSCSI]

The initiator in an iSCSI Device.

---

iSCSI initiator port

[iSCSI]

A SCSI initiator port used for iSCSI.

---

iSCSI layer

[iSCSI]

The layer that builds/receives iSCSI Protocol Data Units and relays/receives them to/from one or more TCP connections that form an iSCSI session.

---

iSCSI Management API

[iSCSI]

SNIA standard for a C language based API for managing iSCSI capable HBAs and NICs, along with the device drivers that control them.

---

iSCSI name

[iSCSI]

The name of an iSCSI initiator or iSCSI target.

---

iSCSI Network Entity

[iSCSI]

A device or gateway that is accessible from a TCP/IP network and has one or more iSCSI Network Portals.

---

iSCSI Network Portal

[iSCSI]

A component of an iSCSI Network Entity that has a TCP/IP address and can be used by a node within that component for connections to another iSCSI Node.

An Initiator iSCSI Network Portal is identified by its IP address. A target iSCSI Network Portal is identified by its IP address and listening TCP port.

iSCSI Node

[iSCSI]

A single iSCSI Initiator Node or iSCSI Target Node.

iSCSI Portal Group

[iSCSI]

A set of iSCSI Network Portals within an iSCSI Node.

When a session has multiple connections, all connections in a session must use the portals in a single iSCSI Portal Group.

iSCSI Portal Group Tag

[iSCSI]

A tag identifying all portals in an iSCSI Portal Group.

iSCSI SAN

[iSCSI]

Block-level Storage Area Network over TCP/IP using the iSCSI protocol.

iSCSI Session

[iSCSI]

The top level relationship between a specific iSCSI Initiator Node and iSCSI Target Node, equivalent to the I_T nexus.

A session contains one or more connections.

iSCSI Session Identifier

[iSCSI]

A unique identifier for a session between an iSCSI Initiator Node and iSCSI Target Node.

iSCSI Target Name

[iSCSI]

The worldwide unique name of an iSCSI Target Node.

iSCSI Target Node

[iSCSI]

The target in an iSCSI Device.

iSCSI Target Port

[iSCSI]

A SCSI target port used for iSCSI.

iSER

[Storage System]

iSCSI Extensions for RDMA.

See IETF RFC 7145.

ISID

[iSCSI]

Acronym for Initiator Session Identifier.

ISL

[Fibre Channel]

Abbreviation for Inter-Switch Link.

iSNS

[iSCSI]

Acronym for Internet Storage Name Service.

iSNS Discovery Domain

[iSCSI]

Grouping of storage nodes for facilitating discovery and login control of these nodes.

ISO

[Standards]

Acronym for International Organization for Standardization.

IT

[General]

Acronym for Information Technology.

IT security

[Data Security]

All aspects related to defining, achieving, and maintaining confidentiality, integrity, availability, non-repudiation, accountability, authenticity, and reliability of information assets.

IU

[General]

Acronym for Information Unit.

iWARP

[Network][Storage System]

The Internet Wide Area Remote Direct Memory Access Protocol.

See IETF RFC 7306.

I_T nexus

[SCSI]

A relationship specified in SAM between a SCSI initiator port and a SCSI target port.

J

Java

[Computer System]
An object oriented computer programming language that is similar to C++.

JBOD

[Storage System]
Acronym for Just a Bunch Of Disks.

JBOF

[Storage System]
Acronym for Just a Bunch Of Flash.

Jini

[Computer System]
A Java-based architecture and supporting services for publishing and discovering devices and services on a network.

---

jitter

[Hardware]
Deviation in timing that a bit stream encounters as it traverses a physical medium.

Just a Bunch Of Disks

[Storage System]
A collection of disks without the coordinated control provided by control software.

Just a Bunch Of Flash

[Storage System]
A collection of solid state storage drives without the coordinated control provided by control software

K

K28.5

[Fibre Channel]
A 10-bit special character used in 8B/10B encoding to indicate the beginning of an Ordered Set.

kb / kbit

[General]
Abbreviations for kilobit.

kB / kbyte

[General]
Abbreviations for kilobyte.

key

[Storage System]

[Storage] The address of an object in a key-value storage system.

[Data Security] A sequence of bits used for cryptographic operations and/or for producing other keys.

The same plaintext encrypted with different keys yields different ciphertexts, each of which requires a different key for decryption. In a symmetric cryptosystem the encryption and decryption keys are the same. In an asymmetric cryptosystem the encryption and decryption keys are different.

key backup

[Data Security]
A process used in a cryptographic system that provides key deposit and recovery.

Key backup is sometimes used as a replacement term for key escrow, which has become encumbered with additional meanings.

key escrow

[Data Security]

A process in which the storage of a cryptographic key is entrusted to a third party escrow agent who will disclose it only to the owner or another authorized user.

---

key exchange

[Data Security]

A cryptographic protocol and procedure in which two communicating entities determine a shared key in a fashion such that a third party that reads all of their communication cannot effectively determine the value of the key.

A common approach to key exchange requires such a third party to compute a discrete logarithm over a large field in order to determine the key value, and relies for its security on the computational intractability of the discrete logarithm problem.

---

key management

[Data Security]

The supervision and control of the process, usually in accordance with a security policy, by which cryptographic keys are generated, stored, protected, distributed, applied, archived, revoked and destroyed.

Key Management Interoperability Protocol

[Data Security]

An OASIS standard that establishes a single, comprehensive protocol for communication between key management servers and cryptographic clients.

---

key pair

[Data Security]

A public key and its corresponding private key as used in public key cryptography.

See asymmetric cryptosystem.

---

key recovery

[Data Security]

A system characterized by the presence of some mechanism for obtaining exceptional access to a cryptographic key in case of loss by error, disaster, or malicious intent.

See also key escrow.

key wrapping

[Data Security]

A method of encrypting keys (along with associated integrity information) that provides both confidentiality and integrity protection using a symmetric key. [NIST SP 800-57 Part 1]

---

key-value storage

[Storage System]

A type of object storage interface where a key is used to address the associated object.

---

keying material

[Data Security]

A key or authentication information in physical or magnetic form.

KiB / KiByte

[General]

Shorthand for kibibyte.

Kibibit

[General]

Shorthand for 1,024 (210) bits.

Binary notation is most commonly used in computer system and software literature.

See also kilobit.

Kibibyte

[General]

Shorthand for 1,024 (210) bytes.

Binary notation is most commonly used in computer system and software literature.

See also kilobyte.

Kibit

[General]

Shorthand for kibibit.

Kilobit

[General]
1,000 (103) bits.

The base 10 convention is commonly found in I/O-related and scientific literature.

See also kibibit.

Kilobyte

[General]
1,000 (103) bytes.

The base 10 convention is commonly found in I/O-related and scientific literature.

See also kibibyte.

KMIP

[Data Security]
Acronym for Key Management Interoperability Protocol.

L

label

[Storage System]

An identifier associated with a removable media or cartridge.

Labels may be humanly readable, machine readable, or both. See external volume serial number, media ID.

---

laboratory attack

[Data Security]

Use of sophisticated signal recovery equipment in a laboratory environment to recover information from data storage media. [NIST SP 800-88]

Magnetic force microscopes and other similar equipment can be used to recover data from magnetic media that has been erased or damaged.

LAN

[Network]

Acronym for Local Area Network.

LAN-free backup

[Data Recovery]

A backup methodology that moves data without using LAN resources.

Data may be moved over a SAN or via direct attached storage.

---

lane

[Network]

One of multiple point-to-point physical connections that make up a single link.

latency

[Computer System]
A time period between two events.

Synonym for I/O request execution time, the time between the making of an I/O request and completion of the request's execution.

Short for rotational latency, the time between the completion of a seek and the instant of arrival of the first block of data to be transferred at the disk's read/write head.

---

latent fault

[Computer System]
A failure of a system component that has not been observed because the failed aspect of the component has not been exercised since the occurrence of the failure.

A media defect on a disk surface is a latent fault until an attempt is made to read the data in a block that spans the defect.

LBA

[Storage System]
Acronym for Logical Block Address.

LC

[Network]
An optical fiber connector complying with international standard IEC 61754-20.

LC connectors are the most common connector in optical data communications networks, including Ethernet and Fibre Channel. A dual LC connector is used, carrying separate fibers for transmitted and received data.

LCF

[Fibre Channel]
Abbreviation for Link Control Facility.

LDAP

[Network]
Acronym for Lightweight Directory Access Protocol.

LDM

[Storage System]
Acronym for Logical Disk Manager.

least privilege

[Data Security]
The security objective of granting users only those accesses they need to perform their official duties. [NIST SP 800-12]

LED

[Computer System]
Acronym for light emitting diode.

legal hold

[Legal]
Process of suspending the normal disposition or processing of records and Electronically Stored Information as a result of current or anticipated litigation, audit, government investigation or other such matters. [ISO/IEC 27050-1]

The issued communication that implements the legal hold can also be called a "hold," "preservation order," "suspension order," "freeze notice," "hold order," or "hold notice."

library

[Storage System]
A storage device containing a robotic media handler capable of storing multiple pieces of removable media and loading and unloading them from one or more drives in arbitrary order.

See also virtual tape library.

lifecycle deletion

[Storage System]
The deletion of data at the end of its lifecycle.

See disposition policy.

light emitting diode

[Computer System]

A multimode light source based on optical diodes.

Lightweight Directory Access Protocol

[Network]

An IETF protocol for creating, accessing and removing objects and data from a directory.

LDAP, originally a subset of the X.500 protocol, provides the ability to search, compare, add, delete and modify directory objects, as well as modifying the names of these objects.

Linear Tape File System

[File System]

1. [File System] A self-describing, self-contained tape storage format intended for interchange of data between different software systems.

See ISO/IEC 20919.

2. [File System] A software or hardware implementation of a file system using the LTFS format.

Linear Tape Open

[Tape]

An open standard magnetic tape technology developed in cooperation by HP, IBM and Quantum.

---

link

[Network][Fibre Channel]

1. [Network] A physical connection (electrical or optical) between two nodes of a network.

2. [Network] Two unidirectional fibers or conductors transmitting in opposite directions and their associated transmitters and receivers.

3. [Network] A collection of multiple lanes.

4. [Fibre Channel] The full-duplex FC-0 level association between FC-1 entities in directly attached ports.

5. [Fibre Channel] The point-to-point physical connection from one element of a Fibre Channel fabric to the next.

Link Control Facility

[Fibre Channel]

A function of a link that facilitates transmission and reception of data.

LIP

[Fibre Channel]

Acronym for Loop Initialization Primitive.

LISM

[Fibre Channel]

Acronym for Loop Initialization Select Master.

---

litigation hold

[Legal]

Synonym for legal hold.

L

---

load balancing

[Computer System]

The adjustment of system and/or application components and data so that work is spread as evenly as possible across a system's physical resources.

Load balancing may be done manually (by a human) or automatically (by some means that does not require human intervention). See load optimization, load sharing.

---

load generator

[Hardware][Computer System]

Hardware and software environment executing the workload generator to drive the system under evaluation.

---

load optimization

[Computer System]

The manipulation of an I/O load in such a way that performance is optimal by some objective metric.

Load optimization may be achieved by load balancing across several components, or by other means, such as request reordering or interleaved execution. See load balancing, load sharing.

load sharing

[Computer System]

The division of a task among several components, without any attempt to equalize each component's share of the work.

See I/O load balancing, load optimization.

load/store architecture

[Computer System]

A CPU architecture in which memory is only accessed through load and store instructions, and all other instructions access data in registers only.

load/store operations

[Computer System]

Operations that move data between CPU registers and memory.

local area network

[Network]

A communications infrastructure, typically Ethernet, designed to connect intercommunicating nodes over a limited distance.

See wide area network.

Local Area Network Emulation

[Network]

A collection of protocols and services that combine to create an emulated local area network using ATM as the underlying network.

Local area network emulation (LANE) enables intelligent devices with ATM connections to communicate with remote LAN-connected devices as if they were directly connected to the LAN.

local backup

[Data Recovery]

A backup methodology that utilizes host resources to copy data to a backup location that is accessible to the same host.

See LAN-free backup.

local F_Port

[Fibre Channel]

The F_Port to which a particular N_Port is directly attached by a link.

---

locking

[General]

Any method of managing concurrent access to a resource.

---

logical block

[Storage System]

A block of data stored on a storage device, and associated with an address for purposes of retrieval or overwriting.

The term *logical block* is typically used to refer to the host's view of data addressing on a physical device. Within a storage device, there is often a further conversion between the logical block addresses presented to hosts and the physical media locations at which the corresponding data is stored. See physical block, virtual block.

---

logical block address

[Storage System]

The address of a logical block.

Logical block addresses are typically used in hosts' I/O commands. The SCSI block command protocol, for example, uses logical block addresses.

---

logical disk manager

[Windows]

A name for the volume management control software used by Microsoft Windows.

---

logical drive

[Storage System]

A deprecated synonym for virtual drive.

---

logical unit

[SCSI]

The addressable entity within a SCSI target that executes I/O commands.

logical unit number

[SCSI][Storage System]

1. [SCSI] The SCSI identifier of a logical unit within a target.
2. [Storage System] The address for a logical unit.

---

logical volume

[Storage System]

A synonym for virtual disk.

---

long wavelength laser

[Network]

A laser with a wavelength of 1300 nm or longer.

A long wavelength laser usually has a wavelength of 1300 or 1550 nanometers.

---

long-term data retention

[Data Management]

The practice of storing data for an extended period of time.

In order to achieve long-term data retention, issues related to security, media, and data formats must be addressed. See data preservation.

---

long-term preservation

The act of maintaining information, in a correct and independently understandable form, over a period of decades or longer.

See digital preservation.

---

loop initialization

[Fibre Channel]

A Fibre Channel Arbitrated Loop primitive used during loop initialization.

Loop Initialization Primitive

[Fibre Channel]

A Fibre Channel Arbitrated Loop primitive used during loop initialization.

loopback

[Network]

An operational mode where transmitted data is directed back to the local receiver.

---

lossless Ethernet bridging element

[Network]

An Ethernet bridging function supporting lossless Ethernet MACs.

---

lossless Ethernet MAC

[Network]

A full duplex Ethernet MAC that supports at least 2.5KB jumbo frames and implements extensions to avoid Ethernet frame loss due to congestion (e.g., the Ethernet Pause mechanism).

---

lossless Ethernet network

[Network]

An Ethernet network composed only of full duplex links, Lossless Ethernet MACs, and Lossless Ethernet bridging elements.

LTFS

[File System]

Acronym for Linear Tape File System.

LTFS Index

[File System]

Metadata which describes the file data types and locations on an LTFS volume.

LTFS Volume

[File System]

A tape cartridge utilizing the LTFS format.

LTO

[Storage System]

Acronym for Linear Tape Open.

LU

[SCSI]
Acronym for logical unit.

LUN

[SCSI][Storage System]

1. [SCSI] Abbreviation for logical unit number.
2. [Storage System] Synonym for logical volume

LWL

[Network]
Acronym for long wavelength laser.

L_Port

[Fibre Channel]
An FC-Port that contains functions associated with the Arbitrated Loop topology.

M

M.2

[Hardware]

A card form factor and connector interface defined by the PCI-SIG that is most commonly used for solid state storage.

M.2 interfaces to PCI Express, SATA-IO, and USB.

MAC

[Network][Data Security]

1. Acronym for Media Access Control.

2. Acronym for Message Authentication Code.

3. Acronym for Mandatory Access Control.

---

magnetic remanence

[Data Security]

Residual magnetic information remaining on a magnetic medium after the medium has been degaussed.

---

malware

[Computer System][Data Security]

Malicious software designed specifically to damage or disrupt a system, attacking confidentiality, integrity and/or availability. [ISO/IEC 27033-1]

Examples are a computer virus, computer worm, Trojan horse, spyware, adware, ransomware, or scareware.

MAM

[Storage System]

Acronym for Medium Auxiliary Memory.

MAMR

[Hardware]

Acronym for microwave-assisted magnetic recording.

MAN

[Network]

Acronym for Metropolitan Area Network.

Managed Object Format

[Management]

The syntax and formal description of the classes and associations in a CIM schema.

Managed Object Format (MOF) can be translated to XML using a Document Type definition published by the DMTF.

Management Component Transport Protocol

A DMTF-defined protocol that supports management communication between internal hardware components.

MCTP is carried over an underlying bus (e.g., SMBus/I2C, serial links, PCI Express, or USB).

---

management framework

[Management]

A structure and set of services exposed for use by management applications and other services in the management environment.

Management Information Base

[Management]

The specification and formal description of a set of objects and variables that can be read and possibly written using the SNMP protocol.

Various standard Management Information Bases (MIBs) are defined by the IETF and other standards bodies. Vendors define vendor-specific MIBs.

mandatory

[Standards]

A provision in a standard that must be supported in order for an implementation of the standard to be compliant with the standard.

Mandatory Access Control

[Data Security]

A type of access control based on the security clearance of the subject and the classification of the object.

The control is mandatory in that a subject is not allowed to change either their security clearance or the classification of an object.

---

map

[General]

The relationship between two or more items.

For example, the relationship of virtual memory addresses to a portion of a file (e.g., POSIX).

M

---

mapping

[General]

The establishment of a relationship between two or more items.

An example is the establishment of a relationship between physical disk block addresses and the block addresses of the virtual disks presented to operating environments.

---

maximum time to first data

[Storage System]

The maximum time required to start receiving data from a storage system to satisfy a read request for data.

---

maximum transfer unit

[Network]

The largest amount of data that it is permissible to transmit as one unit according to a protocol specification.

MaxTTFD

[Storage System]
Shorthand for maximum time to first data.

Mb / Mbit

[Computer System]
Abbreviations for Megabit.

MB / MByte

[Computer System]
Shorthand for megabyte.

Mbps

[Computer System]
Megabits per second.

A measure of data transfer rate.

M

MCTP

[Management]
Acronym for Management Component Transport Protocol

MD5

[Data Security]
Acronym for Message Digest 5.

mean time between failures

[General]
The average time between consecutive failures of a system or component.

Mean Time To

[General]
The average time from start of use to first failure in a large population of identical systems, components, or devices.

mean time to data

[Storage System]

The average time required to stage a data stream from storage and make it available for reading by a client.

---

mean time to data loss

[Storage System]

The average time, in a large population of storage elements, from first use until a failure results in a permanent loss of user data.

---

mean time to failure

[General]

The average time from start of use to first failure in a large population of identical systems, components, or devices.

---

mean time to loss of data availability

[Storage System]

The average time, in a large population of storage elements, from first use until a failure results in a loss of timely user data access.

Loss of availability does not mean loss of data; data remains intact.

---

mean time to repair

[General]

The average time, in a large population of identical systems, components, or devices, between a failure and completion of repair.

Mean time to repair (MTTR) comprises all elements of repair time, from the occurrence of the failure to restoration of complete functionality. This includes time to notice and respond to the failure, time to repair or replace the failed component, and time to make the replaced component fully operational.

---

meaningful

[Standards]

In a standard, a control field or bit that must be correctly interpreted by a receiver.

Control fields are either meaningful or "not meaningful." In the latter case they must be ignored.

meaningful control field

[Standards]

In a standard, a control field or bit that must be interpreted.

Control fields are either meaningful or "not meaningful." In the latter case they must be ignored.

---

measured service

[Services]

Metered dispensation of resources appropriate to a given type of service.

Usage can be monitored, controlled, reported and billed. Examples include storage, processing, data transfer rate, and active user accounts.

---

mebibit

[General]

Shorthand for 1,048,576 (220) bits.

See also Megabit.

---

mebibyte

[General]

Shorthand for 1,048,576 (220) bytes.

See also megabyte.

---

media

[Network][Storage System]

1. [Storage System] Synonym for storage media.

2. [Network] A physical link on which data is transmitted between two points.

---

media access control

[Network]

1. Algorithms that control access to physical media.

2. The media access control (MAC) layer in the Ethernet protocol.

media changer

[Storage]

Deprecated term for library.

---

media ID

[Data Recovery]

A machine-readable identifier written on a storage volume that remains constant throughout the volume's life.

See external volume serial number, label.

---

media manager

[Storage System]

A software component responsible for tracking the location, contents, and state of removable storage volumes.

---

media robot

[Storage System]

Synonym for robotic media handler.

---

media sanitization

[Data Security]

A general term referring to the actions taken to render data written on media unrecoverable by both ordinary and extraordinary means. [NIST SP 800-88]

---

medium

[Network][Storage System]

Synonym for media.

Medium Auxiliary Memory

[Storage System]

A non-volatile memory, other than the recording medium, residing in a storage element (e.g., a tape cartridge) that is accessible to the storage device.

medium transport element

[SCSI]

Synonym for robotic media handler.

---

megabaud

[Data Communication]

One million baud.

---

megabit

[Computer System]

1,000,000 (106) bits.

See also Mebibit.

---

megabyte

[Computer System]

1,000,000 (106) bytes.

See also mebibyte.

---

megatransfer

[SCSI]

The transfer of one million data units per second.

The term is used to describe the characteristics of parallel I/O interconnects like SCSI, for which the data transfer rate depends upon the amount of data transferred in each data cycle.

---

melting

[Data Security]

A method of sanitization that uses extreme heat to cause a device or component to change state, from solid to liquid and/or gas, in an approved facility. [ISO/IEC 27040]

---

member disk

[Storage System]

A disk used as a member of a disk array.

memory cell

[Hardware]

The smallest physical storage entity within storage.

Message Authentication Code

[Data Security]

A cryptographic hash appended to a message to allow a receiver to ensure that the contents have not been changed in transit.

message digest

[Data Security]

Synonym for hash value.

Message Digest 5

[Data Security]

A message digest algorithm producing a 128-bit digest.

This algorithm is deprecated for cryptographic use.

message digest algorithm

[Data Security]

An algorithm that produces a secure hash.

metadata

[Data Management]

Data associated with other data.

Examples of metadata are protection information, time last accessed, and permissions.

metering

[Services]

Measuring resources appropriate to the type of service.

Metropolitan Area Network

[Network]

A network that connects nodes distributed over a city-wide area.

MIB

[Management]

1. [Management] Acronym for Management Information Base.

2. [Security] Men in Black

Mibit

[General]

Shorthand for mebibit.

Mibyte

[General]

Shorthand for mebibyte.

---

microwave-assisted magnetic recording

[Hardware]

A recording technique that directs microwaves at the media of an HDD to aid the recording process.

Abbreviated as MAMR.

---

migration

[Data Management]

Movement of data or information between information systems, formats, or media.

Migration is performed for reasons such as possible decay of storage media, obsolete hardware or software (including obsolete data formats), changing performance requirements (see tiered storage), or the need for cost efficiencies.

MIME

[Network]

Acronym for Multipurpose Internet Mail Extensions.

---

mirror

[Storage System]

A replica of a storage volume, consisting of separate components with identical contents on each component, that can be accessed independently by the storage system.

mirror

[Storage System]

A RAID 1 volume, consisting of separate components with identical contents on each component, that can be accessed independently by the storage system.

---

mirrored array

[Storage System]

A disk array that implements RAID Level 1.

---

mirrored disks

[Storage System]

The disks of a mirrored array.

---

mirroring

[Storage System]

Maintaining two or more separate, identical copies of data.

MLC

[Hardware]

Acronym for multi-level cell

MMA

[Management]

Acronym for Multipath Management API.

---

modal dispersion

[Network]

Distortion in the optical signal transmitted through a multimode fiber caused by different time delays for the various modes of propagation.

Modal dispersion results in a smearing of the signal edges that increases with the length of a fiber, thereby limiting the useful maximum length of a fiber as a function of the data rate.

model

[Management]

A set of entities and the relationships among them that define the semantics, behavior, and state of that set.

---

modeling language

[Management]

A language for describing the concepts of an information or data model.

A popular modeling language in use today is UML (Unified Modeling Language).

MOF

[Management]

Acronym for Managed Object Format.

---

monitor program

[Computer System]

A program that keeps track of system resource utilization.

Monitor programs typically record CPU utilization, I/O request rates, data transfer rates, RAM utilization, and similar statistics. A monitor program, which may be an integral part of an operating system, a separate software product, or a part of a related component, such as a database management system, is a necessary prerequisite to manual I/O load balancing.

---

mount

[File System]

An operation that makes a block or file device, that is local or network attached, available to an operating system.

MTBF

[Computer System]

Acronym for mean time between failures.

MTDL

[Computer System]

Acronym for mean time to data loss.

MTTD

[General]

Acronym for mean time to data.

MTTF

[General]

Abbreviation for Mean Time to (first) Failure.

MTTR

[General]

Acronym for mean time to repair.

MTU

[Network]

Acronym for maximum transfer unit.

multi-actuator

[Hardware]

The presence of more than one actuator within a single HDD.

multi-factor authentication

[Data Security]

Verification of an individual's identity using more than one factor pertaining to knowledge, possession or biometrics.

A knowledge factor is something an individual knows; a possession factor is something an individual has, and a biometric factor is something an individual is or is able to do.

multi-level cell

[Hardware]

A solid state memory cell that stores two bits of data.

Multi-level cell (MLC) is not a generic term for all memory cell types that store more than one bit.

multi-threaded

[Computer System]

Having multiple concurrent or pseudo-concurrent execution sequences.

---

multicast

[Network]

A single transmission of a message to a select subset of receivers connected to a transport network.

Multicast is contrasted with broadcast (sending a message to all receivers on a network) and unicast (sending a message to a single receiver).

---

multicast group

[Network]

A set of addresses that serves as the destination for multicast packets or frames.

---

multilevel security

[Data Security]

A security system that allows users and resources of different sensitivity levels to access a system concurrently, while ensuring that only information for which the user or resource has authorization is made available.

---

multimode

[Network]

Designed to carry multiple light rays or modes concurrently.

In optical fiber, each mode is transmitted at a slightly different reflection angle within the optical fiber core. Multimode fiber transmission is used for relatively short distances.

---

multimode fiber optic cable

[Network]

An optical fibre designed to carry multiple light rays or modes concurrently.

In optical fiber, each mode is transmitted at a slightly different reflection angle within the optical fiber core. Multimode fiber transmission is used for relatively short distances.

multipath I/O

[Storage System]

The facility for a host to direct I/O requests to a storage device on more than one access path.

Multipath Management API

[Management]

A SNIA Standard for discovery and management of the multipath devices on a host system and the associated local and device ports.

---

multiprotocol storage

[Storage System]

A storage system that provides consolidated file, block, object, and possibly other storage interfaces.

Multipurpose Internet Mail Extensions

[Network]

A set of IETF specifications that define the mechanisms for specifying and describing the format of Internet message bodies.

An HTTP response containing a Multipurpose Internet Mail Extensions (MIME) Content-Type header allows the HTTP client to invoke the appropriate application for processing the received data.

---

multitenancy

[Data Security]

Allocation of physical and virtual resources such that multiple tenants and their computations and data are isolated from and inaccessible to one another. [ISO/IEC 17788]

---

mutual authentication

[Data Security]

A process that verifies the identity of two entities prior to establishing communication between those entities.

N

NAA

[Network][Standards]
Acronym for Network Address Authority.

Name Server

[Network][Fibre Channel]

1. [Fibre Channel] A distributed service provided by the Fibre Channel Fabric to register and discover the attributes of Fibre Channel N_Ports.

2. [Network] Another name for the DNS server.

---

namespace

[General][NVMe][Management][File System]

1. [General] A domain of identifiers.
2. [File System] The set of valid names recognized by a file system.
3. [Management] In CIM and WBEM, a collection of object definitions and instances that are logically consistent.
4. [NVMe] Formatted non-volatile storage that may be accessed by a host.

Name_Identifier

[Fibre Channel]
An identifier used to identify entities in Fibre Channel.

Example Name_Identifiers are Port_Name and Node_Name.

NAND

[General][Hardware]

1. [General] The boolean logic operation 'not and'.
2. [Hardware] A type of non-volatile memory commonly used in flash memory.

NAS

[Network][Storage System]

Acronym for Network Attached Storage.

National Institute of Standards and Technology

[Data Security][Standards]

A non-regulatory federal agency within the U.S. Commerce Department's Technology Administration.

National Institute of Standards and Technology's (NIST) mission is to develop and promote measurement, standards, and technology to enhance productivity, facilitate trade, and improve the quality of life.

---

native data format

[Legal]

The original, non-derived format and structure of data, together with its associated metadata.

Where data is unstructured, native file format means the original format of a file. While structured data or unstructured data may be read by other programs, native data format means data whose state and integrity are unchanged since generation by its instantiating application.

Native Fabric

[Fibre Channel]

In Inter-Fabric Routing, the local Fibre Channel Fabric where the Native Nx_Port resides.

Native Nx_Port

[Fibre Channel]

A role of an Nx_Port in an IFR environment.

A Native Nx_Port is physically attached to the local fabric.

NDMP

[Management][Network]

Acronym for Network Data Management Protocol.

NDU

[Hardware][Computer System]

Acronym for non-disruptive upgrade.

near-online data

[Data Management]

Data that is accessible within some moderate length of time, usually some number of seconds.

See active data, offline data.

---

near-online storage

[Storage][Energy]

1. [Storage] Storage that is accessible within some moderate length of time, usually some number of seconds.
2. [Energy] Storage systems with first data access times > 80 ms and less than several seconds, as specified in the *SNIA Emerald™ Power Efficiency Measurement Specification*.

---

network

[Network]

An interconnect that enables communication among a collection of attached nodes.

A network consists of optical or electrical transmission media, infrastructure in the form of hubs and/or switches, and protocols that make message sequences meaningful. In comparison to I/O interconnects, networks are typically characterized by large numbers of nodes that act as peers, large inter-node separation, and flexible configurability. See channel, I/O interconnect, local area network, storage area network.

---

network adapter

[Network]

An adapter that connects an intelligent device to a network, also called a network interface card, or NIC.

See Ethernet adapter, NIC.

Network Address Authority

[Network][Fibre Channel]

1. [Network] A management authority that allocates addresses used to create unique names.

2. [Fibre Channel] A 4-bit field used to identify the controlling authority for guaranteeing uniqueness of World Wide Names (WWNs).

In a Fibre Channel environment, several Naming Authorities can be active at the same time, therefore Fibre Channel prepends the NAA field to World Wide Names to guarantee global uniqueness. An NAA =1, for example, indicates IEEE 48-bit Identifiers.

Network Attached Storage

[Storage System]

A storage device that connects to a network and provides file access services to clients.

Network Attached Storage (NAS) devices generally consist of an engine that implements file services and one or more storage devices. File services are provided to clients using file access protocols such as NFS and SMB.

See storage area network.

---

network backup

[Data Recovery]

A backup methodology that copies data over a network to a backup server.

Network Data Management Protocol

[Data Recovery]

A communications protocol that allows data storage devices, robotic library devices, and backup applications to intercommunicate for the purpose of performing backups.

Network Data Management Protocol (NDMP) is an open standard protocol for network-based backup of NAS devices. It allows a network backup application to control the retrieval of data from, and backup of, a server. The control and data transfer components of backup and restore are separated. NDMP is intended to support tape drives and can be extended to address other devices and media. The SNIA offers an NDMP v4 reference implementation.

Network File System

[File System][Standards]

A family of network protocols defined by the IETF to access a file system.

Network Interface Card

[Network]

An I/O adapter that connects a node to a network.

A network interface card (NIC) is commonly a plug-in circuit board, however, the term is also used to denote an ASIC or set of ASICs on a computer system board that perform the network I/O adapter function. The term NIC is universally used in Ethernet context. In Fibre Channel contexts, the terms host bus adapter, HBA and adapter are used in preference to NIC. See host bus adapter, I/O adapter.

nexus

[SCSI]

A temporary relationship, consisting of at least a target identifier and initiator identifier, between two SCSI devices.

NFS

[File System][Standards]

Abbreviation for Network File System.

NIC

[Network]

Acronym for Network Interface Card.

NIST

[Data Security]

Acronym for National Institute of Standards and Technology.

NL_Port

[Fibre Channel]

An Nx_Port that is communicating via an Arbitrated Loop.

---

node

[Network]

An addressable entity connected to an I/O interconnect or network.

The term *node* is used to refer to computers, storage devices, and network interconnection devices such as switches, routers and gateways. The component of a node that connects to the bus or network is a port.

Node_Name

[Fibre Channel]

A Name-Identifier that is associated with a Fibre Channel node.

non-blocking

[Network][Computer System]

1. [Computer System] A property of an operation such that the operation does not stop and wait for other operations to occur.
2. [Computer System] A property of an operation such that the operation does not cause delay in other operations.
3. [Network] A property of a switch such that one data path through the switch does not delay the flow of traffic on another data path through that switch.

---

non-disruptive serviceability

[Hardware][Computer System]

Support for continued availability of data during FRU service operations.

Some examples of non-disruptive serviceability are code patches, software/firmware upgrades, configuration changes, data migrations, and system expansion done during production time.

Non-disruptive service operations may result in performance impacts to data availability but do not result in a loss of access.

---

non-disruptive upgrade

[Hardware][Computer System]

A type of non-disruptive serviceability that upgrades the entity without impacting availability of that entity during the upgrade process.

---

non-erasable content

[Data Management]

Content that should not be deleted except in accordance with a retention policy.

---

non-linear mapping

[Storage System]

Any form of tabular mapping in which there is not a fixed size correspondence between mapped address spaces.

Non-linear mapping is required in disk arrays that compress data, since the space required to store a given range of virtual blocks depends on the degree to which the contents of those blocks can be compressed, and therefore changes as block contents change. See algorithmic mapping, dynamic mapping, tabular mapping.

non-transparent failover

[Computer System]

A failover, visible to external components of a system, of one component of that system to another component of that system.

An example is a controller failover in a redundant disk subsystem if the surviving controller exports the other's virtual disks at different addresses or on a different host I/O interconnect. See transparent failover.

---

non-uniform memory access

[Hardware]

A computer architecture with memory shared by multiple processors, but with different processors having different access times to memory.

Non-Uniform Memory Architecture

[Computer System]

A computer architecture that enables memory to be shared by multiple processors, but with different processors having different access speeds to different parts of the memory.

---

non-volatile

[Storage System]

The property that data is preserved in the absence of electrical power.

---

non-volatile cache

[Storage System]

A cache that retains data through power cycles.

---

non-Volatile Dual Inline Memory Module

[Hardware]

A dual inline memory module (DIMM) that operates as standard RAM while also having persistence across power cycles.

---

non-volatile memory

[Computer System]

Synonym for non-volatile random access memory.

non-volatile random access memory

[Computer System]

Computer system random access memory that preserves data over power failures.

Non-volatile random access memory (NVRAM) is typically implemented through the use of UPS, batteries, or implementation technology such as flash memory.

non-volatility

[Storage System]

The property of an electronic device that data is preserved even when electrical power is removed.

nonrepudiation

[Data Security]

Ability to prove the occurrence of a claimed event or action and its originating entities [ISO/IEC 27000].

NPIV

[Fibre Channel]

Acronym for N_Port_ID Virtualization.

NQN

[NVMe]

Shorthand for NVMe Qualified Name.

NUMA

[Computer System]

Abbreviation for non-uniform memory access.

NVDIMM

[Hardware]

Acronym for non-volatile dual inline memory module.

NVDIMM-F

[Hardware]

A non-volatile dual in-line memory module that is accessed using a block access protocol.

NVDIMM-N

[Hardware]

A dual in-line memory module that operates as non-volatile DRAM.

NVDIMM-P

[Hardware]

A dual in-line memory module that operates as non-volatile DRAM (NVDIMM-N) and also as a non-volatile block-accessed device (NVDIMM-F).

NVM

[Computer System]

Shorthand for non-volatile memory.

NVM Express Management Interface

[NVMe][Management]

A protocol for managing an NVMe subsystem that is carried over a management bus such as MCTP.

NVM Express™

[Storage System][Standards]

1. [Standards] An organization responsible for developing the family of NVM Express specifications and marketing NVM Express technologies. The NVM Express Work Group was incorporated as NVM Express in 2014.

2. [Storage System] NVM Express (NVMe™) is an open collection of standards and information created to fully expose the benefits of non-volatile memory in all types of computing environments from mobile to data center. The family of NVMe specifications defines how host software communicates with non-volatile memory.

NVM subsystem

[NVMe]

A device that implements the NVMe protocol.

NVMe

[NVMe]

An acronym for NVM Express™.

NVMe command

[NVMe]

A command issued by an NVMe host to an NVMe controller.

NVMe Completion Queue

[NVMe]

] A circular buffer used to return status for completed NVMe commands.

NVMe host

[NVMe]

An entity that submits NVMe commands to an NVMe controller through an SQ for processing and receives NVMe command completions from that controller through a CQ.

NVMe host port

[Fibre Channel]

VN_Port that acts as an interface between an NVMe host and an NVMe/FC Fabric.

NVMe over fabrics

[NVMe]

A protocol that supports message-based NVMe operations over a network fabric.

Example network fabrics include Ethernet, Fibre Channel, and InfiniBand.

NVMe over Fibre Channel

[Fibre Channel]

A protocol defined by the INCITS Fibre Channel (T11) Technical Committee FC-NVMe standard.

NVMe Qualified Name

[NVMe]

Name that uniquely describe an NVMe host or NVM subsystem.

NVMe Submission Queue

[NVMe]

A circular buffer used to submit NVMe commands for processing.

NVMe subsystem

[NVMe]

A component that processes NVMe commands.

NVMe-MI™

[NVMe][Management]

An acronym for NVM Express Management Interface.

NVMe-oF™

[NVMe]

An acronym for NVMe over Fabrics.

NVMe/FC

[Fibre Channel]

An acronym for NVM Express over Fibre Channel.

NVMe_DATA IUs

[Fibre Channel]

The FC-NVMe Information Unit for data frame(s) transfers.

NVMe_Port

Nx_Port that supports the FC-NVMe standard.

NVRAM

[Computer System]

Acronym for non-volatile random access memory.

NVRAM cache

[Storage System]

A quantity of NVRAM used as a cache.

NVRAM cache is particularly useful in RAID array subsystems, filers, database servers, and other intelligent devices that must keep track of the state of multi-step I/O operations even if power fails during the execution of the steps. It also allows arrays to reply to writes before they are committed to disk, as the NVRAM becomes the non-volatile store for the writes.

NVRAM card

[Computer System]

A printed circuit module containing NVRAM.

Nx_Port

[Fibre Channel]

An end point for Fibre Channel frame communication, having a distinct address identifier and Name_Identifier, providing an independent set of Fibre Channel functions.

N_Port

[Fibre Channel]

A port that connects via a point-to-point link to either a single N_Port or a single F_Port.

N_Port Login

[Fibre Channel]

The port-to-port login process by which Fibre Channel end devices establish sessions.

N_Port_ID

[Fibre Channel]

A unique 24 bit address used for frame routing that is assigned to an N_Port or NL_Port.

N_Port_ID Virtualization

[Fibre Channel]

The ability of an F_Port or a PN_Port to support more than one VN_Port on a single point-to-point link.

N_Port_Name

[Fibre Channel]

A Name-Identifier associated with an N_Port.

O

OASIS

[General]

The Organization for the Advancement of Structured Information Standards.

See https://www.oasis-open.org.

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object

[General][Data Management][Data Security]

1. [General] An instantiated instance of a class in an Object Oriented system.
2. [Data Security] In the context of access control, an entity such as an information system resource to which access is controlled and/or usage of which is restricted to authorized subjects.
3. [Data Management] The encapsulation of data and associated metadata.

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object drive

[Storage System]

A storage element that directly provides object services.

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object service

[Storage System]

Object-level access to storage.

---

object storage

[Storage System]

A storage device that provides object services.

Object storage includes DSaaS.

object-oriented

[General]

A methodology for decomposing an entity or problem by its key abstractions, versus by its procedures or steps.

The key abstractions become classes in an information or data model, and embody well-defined behaviors called methods, with a unique set of data attributes. An instance of a class is an object.

OC-n

[Network]

An optical carrier data rate that is a multiple of the fundamental SONET rate of 51.84 Mbits/sec.

OC-3 (155 Mbits/sec), OC-12 (622 Mbits/sec), OC-48 (2488 Mbits/sec) and OC-192 (9953 Mbits/sec) are currently in common use. See Asynchronous Transfer Mode.

OData

[Management]

The Open Data Protocol.

OData is an OASIS standard protocol that enables the creation and consumption of RESTful APIs.

OData service

[Management]

A service conforming to the OData standard.

OData allows resources, identified using Uniform Resource Locators (URLs) and defined in a model, to be published and edited by Web clients using simple HTTP messages.

---

offline backup

[Data Recovery]

A form of backup in which the data being backed up is not accessed by applications for the duration of the backup.

offline data

[Data Management]

Data that may not be accessible for an extended period of time, for example data on removable media at a remote site.

See near-online data.

OM1

[Network]

A designation for a multimode optical fiber with a 62.5 micrometer core diameter and a bandwidth-length product of 200 MHz*km for 850 nm optical signals.

This fiber is typical of FDDI installations. Specified by ISO 11801 second edition.

OM2

[Network]

A designation for a multimode optical fiber with a 50 micrometer core diameter and a bandwidth-length product of 500 MHz*km for 850 nm optical signals.

This fiber is typical of 1 Gb/s Ethernet and Fibre Channel installations. Specified by ISO 11801.

OM3

[Network]

A designation for a multimode optical fiber with a 50 micrometer core diameter and a bandwidth-length product of 2000 MHz*km for 850 nm optical signals.

Specified by ISO 11801.

OM4

[Network]

A designation for a multimode optical fiber with a 50 micrometer core diameter and a bandwidth-length product of 4700 MHz*km for 850 nm optical signals.

Specified by ISO 11801.

OM5

[Network]

A designation for a multimode optical fiber with a 50 micrometer core diameter and a bandwidth-length product of 4700 MHz*km for 850 nm optical signals and a bandwidth-length product of 2470 MHz*km for 953 nm optical signals.

Specified by ISO 11801.

---

online backup

[Data Recovery]

A form of backup in which the data being backed up may be accessed by applications during the backup.

Online backup of a set of data is usually accomplished using a frozen image of the data.

Op/s

[Storage System]

Operations per second.

This is similar to *IOPS* but includes non-read and non-write operations (e.g., NFS SETATTR call, SCSI TEST UNIT READY).

Op/s is the preferred term as opposed to OPS or OPs since these terms are more often associated with the plural operations.

Open Group

[General]

An organization for open systems standards and their certification.

UNIX, management, and security standards are developed within the Open Group, homed at www.opengroup.org.

---

open interconnect

[Computer System]

Synonym for standard interconnect.

operating environment

[Computer System]

A collective term for the hardware architecture and operating system of a computer system.

---

operational

The condition of a receiver that is capable of receiving an encoded bit stream based on the rules defined by FC-FS-2 for the FC receiver state machine.

Operational Recovery

[Data Recovery]

Recovery of one or more applications and associated data to correct operational problems such as a corrupt database, user error or hardware failure.

Operational recovery may use a point in time copy or other techniques that create a consistent set of recoverable data.

---

optical fall time

[Network]

The time interval required for the falling edge of an optical pulse to transition between specified percentages of the signal amplitude.

---

optional characteristics

[Standards]

Characteristics of a standard that are specified by the standard but not required for compliance, but which, if implemented, must be implemented as defined in the standard.

Ordered Set

[Fibre Channel]

A transmission word with a special character in its most significant position and data characters in the remaining three positions.

An Ordered Set is identified by the combination of special codes and data bytes that, when encoded, result in the generation of the transmission characters specified for the ordered set. Ordered Sets are used for low-level Fibre Channel link functions such as frame demarcation, signaling between the ends of a link, initialization after power on, and some basic recovery actions.

Originator

[General][Fibre Channel]

1. [General] In a negotiation, the party that initiates the negotiation.

2. [Fibre Channel] With reference to an Exchange, the Nx_Port that sent the frame that caused the Exchange to become open.

Originator Exchange_Identifier

[Fibre Channel]

An identifier assigned by an Exchange Originator to identify an Exchange.

OSD

[Storage System]

Acronym for Object Storage Device.

---

out-of-band

[Network]

A separate data stream sent over a different protocol than the primary data stream.

An example is management information.

See in-band.

---

out-of-band data deduplication

[Storage System]

Deprecated synonym for post-process data deduplication.

---

over provisioning

[Storage System][Management]

Purposely providing more capacity than advertised.

The over provisioned capacity is used to replace capacity that is no longer useable (e.g., due to media defects or wear out). The over provisioned capacity is reserved for controller use, is not addressable by the user, and is used to improve performance and device life.

oversubscription

[Computer System]

A property where more services are requested than are able to be delivered.

---

overwrite procedure

[Data Security]

A process of writing patterns of data on a medium for the purpose of obliterating data that was formerly stored there.

See purge.

OX_ID

[Fibre Channel]

Acronym for Originator Exchange_Identifier.

P

PaaS

[Services]
Shorthand for Platform as a Service.

---

panic

[Computer System]
A colloquial term describing a software program's reaction to an incomprehensible state.

---

parallel transmission

[Network]
Simultaneous transmission of multiple data bits over multiple physical lines.

---

parity data

[Storage System]
In a RAID array, data stored on member drives that can be used for regenerating any user data that becomes inaccessible.

---

parity drive

[Storage System]
In a RAID 3 array or RAID 4 array and some RAID 6 arrays, a dedicated drive on which parity data is stored.

---

partition

[Storage System]
1. A subdivision of the capacity of a physical disk or virtual disk.

2. A contiguously addressed range of logical blocks on a physical media that is identifiable by an operating system.

Partitions are consecutively numbered ranges of blocks that are created and used by Windows and most UNIX operating systems.

partitioning

[Storage System]

Presentation of the usable storage capacity of a drive or array to an operating environment in the form of several virtual drives.

The aggregate capacity of the partitions of a drive approximates the capacity of the underlying physical drive or virtual drive. Partitioning is common in modern operating systems.

---

passphrase

[Data Security]

A sequence of characters longer than the typical length of a password.

---

password

[Data Security]

A private alphanumeric string used to authenticate an identity.

---

password digest

[Data Security]

The hashed form of a cleartext password.

---

path

[Network][Computer System][Storage System][Cloud][File System]

1. [Storage System] The access path from a host computer to a storage device.
2. [File System] The combination of device address and file system directory elements used to locate a file within a file system.
3. [Network] Any route through an interconnect that allows two devices to communicate.
4. [Computer System] A sequence of computer instructions that performs a given function, such as I/O request execution.
5. [Cloud] The access path from an internet-connected computer to a cloud service endpoint, typically in the form of a URI or URL.

---

path length

[Computer System][File System]

1. [Computer System] The number of instructions (a rough measure of the amount of time) required by a computer to perform a specific activity, such as I/O request execution.
2. [File System] The number of characters in a path name.

path name

[File System]
The complete list of nested sub-directories through which a file is reached.

---

payload

[Network][Fibre Channel]
[Network] Contents of the data field of a communication frame or packet.

[Fibre Channel] The user data contained in a frame, excluding optional headers and fill bytes, if present.

PB

[Computer System]
Shorthand for Petabyte (1015 bytes).

PBA

[Storage System]
Shorthand for physical block address.

Pbit

[General]
Shorthand for petabit.

Pbyte

[Computer System]
Shorthand for petabyte (1015 bytes).

PCI

[Computer System]
Shorthand for Peripheral Component Interconnect

PCI Express Queuing Interface

[SCSI][Standards]
A standard describing a circular queue interface for transferring information between a host and a device on a PCI Express bus or fabric.

PCI Express®

[Computer System]
High speed interconnect specification developed and maintained by PCI-SIG.

PCI-SIG®

Shorthand for Peripheral Component Interconnect Special Interest Group.

This is the commonly used term for this organization.

PCIe®

[Computer System]
An acronym for Peripheral Component Interconnect Express.

---

pcnfsd

[File System]
A daemon that permits personal computers to access file systems via the NFS protocol.

PDU

[Network][Computer System]
1. [Network] Acronym for Protocol Data Unit.

2. [Computer System] Acronym for Power Distribution Unit.

P

---

pebibit

[General]
Shorthand for 1,125,899,906,842,624 (250) bits.

Binary notation is most commonly used for semiconductor memory sizes.

See also petabit.

Pebibyte

[General]

Shorthand for 1,125,899,906,842,624 (250) bytes.

Binary notation is most commonly used for semiconductor memory sizes.

See also Petabyte.

---

peer

[Computer System]

One of multiple complementary but physically separate systems.

---

penetration

[Data Security]

An unauthorized bypassing of the security mechanisms of a system.

---

penetration testing

[Data Security]

A test methodology that attempts to circumvent or defeat the security features of an information system .

---

penta-level cell

[Hardware]

A memory cell that stores five bits of data.

---

performance audit

[Computer System]

Systematic evaluation of a system by assessing how well it conforms to a set of established performance criteria.

Peripheral Component Interconnect

[Computer System]

A set of standards for buses connecting interface modules to a computer system.

Older variations of the PCI standards support 32 bit and 64 bit parallel data transfers at 33 MHz and 66 MHz rates. The newer PCIe standards support one bit wide serial "lanes" operating at various data rates (e.g., 250MB/sec or 500MB/sec). See PCI-SIG.

Peripheral Component Interconnect Special Interest Group

An organization responsible for developing the family of PCI™ specifications and PCIe® specifications.

The commonly used term for this organization is PCI-SIG®.

Permanent Port Name

[Fibre Channel]

The Name_Identifier common among all VN_Ports that are associated with the PN_Port, and is set to the F_Port_Name of the F_Port that is attached to the physical interface.

---

persistence

[Computer System]

A synonym for non-volatility, usually used to distinguish between data and metadata held in DRAM, which is lost when electrical power is lost, and data held on non-volatile storage (disk, tape, battery-backed DRAM, etc.) that survives, or persists across power outages.

---

persistent memory

[Computer System]

Non-volatile, byte addressable, low latency memory.

---

persistent memory access model

[Computer System]

Semantic definition of how software accesses persistent memory hardware

---

persistent memory hardware

[Computer System]

NVRAM that is byte addressable.

Personally Identifiable Information

[Data Security]

Information associated with a person, as defined in ISO/IEC 29100.

petabit

[General]

Shorthand for 1,000,000,000,000,000 (1015) bits.

The base 10 convention is commonly found in I/O-related and scientific literature; the base 2 convention (1,125,899,906,842,624, i.e., 250) is commonly used for memory capacity.

See also pebibit.

---

petabyte

[Computer System]

Shorthand for 1,000,000,000,000,000 (1015) bytes.

The base 10 convention is commonly found in I/O-related and scientific literature; the base 2 convention (1,125,899,906,842,624, i.e., 250) is commonly used for memory capacity.

See also pebibyte.

PFC

[Network]

Shorthand for Priority-based Flow Control.

---

phy

[Computer System]

The component that connects a port to a physical link.

The physical link may be electrical, optical, radio, or other.

---

physical block

[Storage System]

A physical location on storage media where data is stored.

A physical block is different from the logical block and virtual block typically presented to the operating environment by a storage device.

---

physical block address

[Storage System]

A number that is associated with a physical block.

physical configuration

[General]

1. The installation, removal, or re-installation of disks, cables, HBAs, and other components required for a system or subsystem to function.

2. The combination of disks, cables, HBAs, and other components required for a system or subsystem to function.

---

physical disk

[Storage System][Operating System]

1. [Storage System] A disk that is not virtual.

2. [Operating System] An online storage device that is visible to a host operating system.

---

physical extent

[Storage System]

A number of physically consecutive blocks on a physical disk.

Physical extents are created by control software as building blocks from which redundancy groups and volume sets are created. Called a p-extent by ANSI.

---

physical extent block number

[Storage System]

The relative position of a block within a physical extent.

Physical extent block numbers are used to develop higher-level constructs in RAID array striped data mapping, not for application or data addressing.

Pib

[General]

Shorthand for 1,125,899,906,842,624 (250) bits.

Binary notation is commonly used for semiconductor memory sizes.

See also petabit.

Pibit

[General]
Shorthand for Pebibit.

PiByte

[General]
Shorthand for Pebibyte.

PII

[Data Security]
Shorthand for Personally Identifiable Information.

PIT copy

[Data Recovery]
Shorthand for point in time copy.

PKCS

[Data Security]
Shorthand for Public Key Cryptography Standards.

PKI

[Data Security]
Shorthand for Public Key Infrastructure.

---

plaintext

[Data Security]
Unencrypted information.

---

platform

A physical entity that contains nodes.

Platforms include all end devices that are attached to a Fabric, for example, hosts and storage subsystems. Platforms communicate with other platforms in the storage area network using the facilities of a Fabric or other topology

Platform as a Service

[Services]
Delivery over a network of a virtualized programming environment, consisting of an application deployment stack based on a virtual computing environment.

Typically, PaaS is based on IaaS, is either self-provisioned or provisionless, and is billed based on consumption.

PLC

[Hardware]
Shorthand for Penta-Level Cell

PLOGI

[Fibre Channel]
Acronym for N_Port Login.

PN_Port

[Fibre Channel]
A Fibre Channel Link Control Facility that supports only Nx_Ports in a node.

---

point in time copy

[Data Recovery]
A fully usable copy of a defined collection of data that contains an image of the data as it appeared at a single instant in time.

A point in time copy is considered to have logically occurred at that point in time, but implementations may perform part or all of the copy at other times (e.g., via database log replay or rollback) as long as the result is a consistent copy of the data as it appeared at that point in time.

See snapshot, copy on write, and pointer remapping.

point of encryption

[Data Security]

Location within the Information and Communications Technology (ICT) infrastructure where data are encrypted on its way to storage (3.43) and, conversely, where data are decrypted when accessed from storage.
[ISO/IEC 27040]

The point of encryption is only applicable for data at rest.

---

pointer copy

[Data Recovery]

A point in time copy made using the pointer remapping technique.

---

pointer remapping

[Data Recovery]

A technique for maintaining a point in time copy such that when a logical data location is written, a new physical location is chosen for the updated data, and the pointer for that data is remapped to point to it.

See Copy on Write.

Policy

[General][Management]

1. [General] A definite goal, course, or method of action to guide and determine present and future decisions.
2. [Management] Policies as a set of rules to administer, manage, and control access to network resources.

This definition reflects the definition in RFC 3198. Policies are implemented or executed within a particular context, such as policies defined within a business unit. See policy goal and policy rule. See RFC 3060.

policy goal

[Management]

The objectives or desired state intended to be maintained by a policy system.

This definition reflects the definition in RFC 3198. As the highest level of abstraction of policy, these goals are most directly described in business rather than technical terms. For example, a goal might state that a particular application operate on a network as though it had its own dedicated network, despite using a shared infrastructure. 'Policy goals' can include the objectives of a service level agreement, as well as the assignment of resources to applications or individuals. A policy system may be created that automatically strives to achieve a goal through feedback regarding whether the goal (such as a service level) is being met.

---

policy processor

[Computer System]

The processor that schedules the overall activities in an intelligent device.

Policy processors are usually augmented by additional processors, state machines, or sequencers that perform the lower-level functions required to implement overall policy.

---

policy rule

[Management]

The binding of a set of actions to a set of conditions, where the conditions are evaluated to determine whether the actions are performed.

P

---

port

[Network]

1. An entrance to or exit from a storage network.

2. A connection point for a peripheral device or an application program.

Ports can be logical, physical or both. Examples include Fibre Channel ports, Internet Protocol ports and SCSI ports.

---

port login

The port-to-port login process by which Fibre Channel initiators establish sessions with targets.

Port VF_ID

[Fibre Channel]

A configurable VF-ID that is associated with any untagged frame received by a VF capable multiplexer.

Port_ID

[Fibre Channel]

Shorthand for N_Port_ID.

Port_Name

[Fibre Channel]

A Name-Identifier that is associated with a Fibre Channel port.

POST

[Computer System]

Acronym for power-on self-test.

---

post-process data deduplication

[Storage System]

Data deduplication performed after the data to be deduplicated has been initially stored.

See inline data deduplication.

---

power conditioning

[General]

The regulation of power supplied to a system so that acceptable ranges of voltage and frequency are maintained.

Power conditioning is sometimes done by a storage subsystem, but may also be an environmental requirement.

---

power distribution unit

[Computer System]

An element or device which distributes power to and possibly monitors the power consumption of other devices in a system.

power efficiency

[Computer System]

Synonym for electrical efficiency.

---

power supply

[Computer System]

A component which converts an AC or DC voltage input to one or more DC voltage outputs for the purpose of powering a system or subsystem.

Power supplies may be redundant and hot swappable.

---

power supply efficiency

[Storage System]

The efficiency of a power supply.

---

power supply unit

[Computer System]

Synonym for power supply.

---

power-on self-test

[Computer System]

A set of internally stored diagnostic programs run by intelligent devices when powered on, that verify the basic integrity of hardware before software is permitted to run on it.

P

PP

[Data Security]

Acronym for Protection Profile.

PQI

[SCSI]

Shorthand for PCI Express Queuing Interface.

---

preservation

[Data Management]

The processes and operations involved in ensuring the ability to read, interpret, authenticate, secure and protect against the loss of data or information throughout its lifecycle.

preservation object

[Long-Term Retention]

The basic unit of data or information that is preserved by a preservation system.

The Archival Information Package (AIP) defined in Open Archival Information System (OAIS) is an example of a preservation object.

---

preservation system

[Long-Term Retention]

A repository that, either as its sole responsibility or as one of multiple responsibilities, undertakes all necessary actions for the long-term preservation of the data or information in its custody.

Primary storage

[Data Management]

Data storage device, system, or service used to store data that is accessed frequently by applications.

Primitive Sequence

[Fibre Channel]

In an encoded data stream, an Ordered Set transmitted repeatedly and continuously until a specified response is received.

Primitive Signal

[Fibre Channel]

In an encoded data stream, an Ordered Set with a special meaning such as an idle or Receiver_Ready (R_RDY).

Priority-based Flow Control

[Network]

A Data Center Bridging (DCB) mechanism that provides link level flow control on a per-priority basis for full-duplex links.

---

privacy breach

[Data Security]

Situation where personally identifiable information is processed in violation of one or more relevant privacy safeguarding requirements [source: ISO/IEC 29100:2011].

private cloud

[Services]
Delivery of SaaS, PaaS, IaaS and/or DaaS to a restricted set of customers, usually within a single organization.

Private Clouds are created due to issues of trust.

---

private key

[Data Security]
The cryptographic key in an asymmetric cryptosystem that is not made public.

---

private key cryptography

[Data Security]
An encryption methodology in which the encryptor and decryptor use the same key, which must be kept secret.

See symmetric cryptosystem.

---

private loop

[Fibre Channel]
A Fibre Channel Arbitrated Loop with no Fibre Channel Fabric attachment.

---

privilege

[Data Security]
A right granted to an individual, a program, or a process. [source: CNSSI-4009]

---

privileged user

[Data Security]
A user who, by virtue of function or seniority, has been allocated powers within a system that are significantly greater than those available to the majority of users.

Such persons will include, for example, the system administrator(s), storage administrator(s), and network administrator(s) who are responsible for keeping the system available and may need powers to create new user profiles as well as add to or amend the powers and access rights of existing users.

process policy

[Fibre Channel]

An error handling policy that allows a port to continue processing data frames following detection of one or more missing frames in a Sequence.

---

product under test

[Computer System]

A system or component that is the subject of a test.

---

profile

[Standards]

A proper subset of a standard or specification that supports interoperability across a set of products or in a specific application.

A profile is a vertical slice through a standard or specification containing physical, logical and behavioral elements required for interoperability. A profile may make some optional features of a standard or specification mandatory or prohibited.

---

proprietary interconnect

[Computer System]

An I/O interconnect or network interconnect whose transmission characteristics and/or protocols are not standardized and require the permission of the owner to be implemented.

See standard interconnect.

---

protection profile

[Data Security]

An implementation-independent set of security functional and assurance requirements for a category of IT products that meet specific consumer needs.

Protection profiles (PP) are most commonly associated with ISO 15408.

protocol

[General]

A set of rules that control an interaction between two or more entities in communication with one another.

Rules may specify the formats of a set of communication messages, and in what sequences they are expected to occur. Examples of protocols include TCP/IP and Fibre Channel.

Protocol Data Unit

[Network]

A single message between two network nodes used for communication.

---

provenance

[General]

Information regarding an item's source, origin, custody and ownership.

---

provisioning

[Computer System]

The process of initializing and equipping a system to provide services.

Proxy Fabric

[Fibre Channel]

In an IFR environment, the remote Fibre Channel Fabric associated with a Proxy Nx_Port.

P

Proxy Nx_Port

A role of an Nx_Port in an IFR environment.

From the perspective of a remote (Proxy) Fabric, an Nx_Port assumes the role of a Proxy Nx_Port.

PSU

[Computer System]

Shorthand for power supply unit.

---

public cloud

[Services]

Delivery of SaaS, PaaS, IaaS and/or DaaS to a relatively unrestricted set of customers.

public key

[Data Security]

A cryptographic key that is made public for purposes of using asymmetric encryption with an entity that has the private key.

---

public key cryptography

[Data Security]

Synonym for asymmetric cryptography.

Public Key Infrastructure

[Data Security]

A collection of software, hardware, people and procedures that facilitate secure creation and management of digital certificates.

---

public loop

[Fibre Channel]

A Fibre Channel Arbitrated Loop with an attachment to a Fibre Channel Fabric.

---

pull technology

[Computer System]

The transmission of information in response to a request for that information.

An example of a pull technology is polling. See push technology.

---

pulverization

[Data Security]

A method of sanitization that reduces devices or components to fine particles of a specified size.

Pulverization is related to shredding, but usually uses a grinding process as opposed to a cutting process. [ISO/IEC 27040]

purge

[Storage System][Data Security]

1. [Data Security] A class of sanitization that makes recovery infeasible using state of the art laboratory techniques, but which preserves the storage media in a potentially reusable state. [ISO/IEC 27040]
2. [Storage System] The process of returning a solid state storage device to a state in which subsequent writes execute, as closely as possible, as if the device had never been used and does not contain any valid data.

   FOB.

---

push technology

[Computer System]

The transmission of information from a source or initiator without a request to the source to send that information.

An example of a push technology is an SNMP trap. See pull technology.

Q

QLC

[Hardware]
Acronym for Quad-Level Cell

QoS

[Management]
Acronym for Quality of Service.

Quad-Level Cell

[Hardware]
A memory cell that stores four bits of data.

Quality of Service

[Management]
A technique for managing computer system resources by specifying user visible parameters.

Policy rules are used to describe the operation of network elements to make QoS guarantees. Message delivery time is an example of a user visible parameter that manages the rate of a data transfer. Relevant IETF standards for QoS are RSVP (Resource Reservation Protocol) and COPS (Common Open Policy Service).

quiesce

[Computer System]
To bring a system or component to a quiescent state.

quiescent state

[Computer System]
A state in which all activity has been suspended.

quota

[File System]

A limit that restricts the amount of a resource that a user, group or directory structure may consume.

An example of a resource that may have an associated quota is storage capacity.

Q

R

RADIUS

[Data Security]

Acronym for Remote Authentication Dial In User Service.

RAID

[Storage System]

Acronym for Redundant Array of Independent Disks.

RAID 0

[Storage System]

A data placement policy where consecutive logical blocks of data are uniformly distributed across a set of independent storage devices without offering any form of redundancy.

This is commonly referred to as data striping. This form of RAID will encounter data loss with the failure of any storage device in the set.

RAID 00

[Storage System]

A data placement policy that creates a RAID 0 stripe set over two or more RAID 0 sets.

This is commonly referred to as RAID 0+0. This form of data layout is not fault tolerant; if any storage device fails there will be data loss.

RAID 1

[Storage System]

A data placement policy where each logical block of data is stored on more than one independent storage device.

This is commonly referred to as mirroring. Data stored using this form of RAID is able to survive a single storage device failure without data loss.

RAID 10

[Storage System]

A data placement policy that creates a striped device (RAID 0) over a set of mirrored devices (RAID 1).

This is commonly referred to as RAID 1/0. Data stored using this form of *RAID* is able to survive a single storage device failure in each RAID 1 set without data loss.

RAID 2

[Storage System]

A data placement policy in which an error detecting code computed on stripes of data from some independent storage devices is stored on additional independent storage devices.

RAID 2 is not widely used.

RAID 3

[Storage System]

A data placement policy using parity-based protection where logical bytes of data are uniformly distributed across a set of independent storage devices and the parity is stored on a dedicated independent storage device.

Data stored using this form of RAID survives a single storage device failure.

If the storage devices use rotating media, they are assumed to be rotationally synchronized, and the data stripe size should be no larger than the exported block size.

RAID 4

[Storage System]

A data placement policy using parity-based protection where logical blocks of data are uniformly distributed across a set of independent storage devices and the parity is stored on a dedicated independent storage device.

Data stored using this form of RAID is able to survive a single storage device failure without data loss.

RAID 5

[Storage System]

A data placement policy using parity-based protection for storing stripes of 'n' logical blocks of data and one logical block of parity across a set of 'n+1' independent storage devices where the parity and data blocks are interleaved across the storage devices.

Data stored using this form of RAID is able to survive a single storage device failure without data loss.

RAID 6

[Storage System]

A data placement policy using parity-based protection that allows stored data to survive any two storage device failures without data loss.

RAID array

[Storage System]

Shorthand for Redundant Array of Independent Disks.

RAID-Z

[Storage System]

A form of RAID implemented in the open source ZFS project.

RAID01

[Storage System]

A data placement policy that creates a mirrored device (RAID 1) over a set of striped devices (RAID 0).

This is commonly referred to as RAID 0+1 or RAID 0/1. Data stored using this form of RAID is able to survive a single RAID 0 data set failure without data loss.

RAID1Triple

[Storage System]

A placement policy where each logical block of data is mirrored three times across a set of three independent storage devices.

This is commonly referred to as three-way mirroring. This form of RAID can survive two device failures without data loss.

raised floor

[General]

An elevated floor providing space for cable runs between equipment cabinets and cold air flow for cooling.

Many mainframe systems are designed to intake cool air from the bottom and exhaust heat from the top of a closed cabinet system.

RAM drive

[Storage System]

A quantity of host system random access memory (RAM) managed by software and presented to applications as a high-performance drive.

RAM drives generally emulate disk I/O functional characteristics, but unless augmented by special hardware to make their contents non-volatile, they cannot tolerate loss of power without losing data. See solid state drive.

---

random I/O load

[Storage System]

An I/O load that consists of random I/Os.

The term random I/O is commonly used to denote an I/O load that is not sequential, whether or not the distribution of data locations is indeed random. Random I/O is characteristic of I/O request-intensive applications. See sequential I/O.

---

random I/Os

[Storage System]

A combination of random reads and/or random writes.

---

random number

[General]

A number having properties of randomness or unpredictability.

There are three basic classes of random number. Deterministic or pseudorandom numbers are generated by an algorithm that produces a predictable sequence of values from an initial value called a seed. Cryptographically secure random numbers are produced in a sequence that, while deterministic, cannot be feasibly discovered or computed by examination of previous numbers in the sequence. Nondeterministic generators incorporate input from some unpredictable physical source that is outside human control.

random reads

[Storage System]

Consecutively issued read requests that do not specify adjacently addressed data.

---

random relative offset

[Network]

A transmission control algorithm that allows frames for a block of data to be transmitted in any order.

Each frame of a block of data contains an offset relative to the beginning of that block of data. See relative offset and continuously increasing relative offset.

---

random writes

[Storage System]

Consecutively issued write requests that do not specify adjacently addressed data.

---

rank

[Storage System]

1. [Storage System] A set of physical disk positions in an enclosure.

2. [Storage System] The set of corresponding target identifiers on all of a controller's device I/O interconnects.

3. [Storage System] Synonym for a stripe in a redundancy group.

Because of the diversity of meanings attached to this term, SNIA publications make minimal use of it.

---

ransomware

[Data Security]

A type of malicious software designed to block access to data until funds are paid.

---

rapid elasticity

[Computer System]

Quick scaling of resources and capabilities to meet expansion and contraction of demand.

To the consumer, the capabilities available for provisioning often appear to be unlimited and available for purchase in any quantity at any time.

rapid provisioning

[Computer System]

Quickly and automatically deploying services in response to requests.

RAS

[Computer System][Windows]

1. [Computer System] Acronym for reliability, availability, and serviceability.

2. [Windows] Acronym for Remote Access Service.

---

raw capacity

[Storage System]

The total addressable capacity of the storage devices in a storage system.

---

raw partition

[Storage System]

A device partition not managed by a volume manager.

The term raw partition is frequently encountered when discussing database systems because some database system vendors recommend volumes or files for underlying database storage, while others recommend direct storage on raw partitions.

---

raw partition backup

[Data Recovery]

A bit-by-bit copy of a partition image.

A raw partition backup incorporates no information about the objects contained on the partition, and hence cannot be used for individual object restoration. See disk image backup.

RBAC

[Data Security]

Acronym for role-based access control.

RDMA

[Computer System]

Acronym for remote direct memory access

read/write head

[Storage System]

The magnetic or optical recording element of a disk drive.

---

ready idle

[Storage System]

Synonym for idle.

---

real time data deduplication

[Storage System]

Synonym for inline data deduplication.

---

rebuild

[Storage System]

The regeneration and writing onto one or more replacement devices of all of the data that was on a failed device in a RAID array.

In most arrays, a rebuild can occur while applications continue to access the data.

---

receiver

[Hardware][Fibre Channel]

1. [Hardware] An interconnect or network device that includes a detector and signal processing electronics.

2. [Hardware] A circuit that converts an optical or electrical media signal to an electrical serial logic signal.

3. [Fibre Channel] The portion of a Link Control Facility dedicated to receiving an encoded bit stream using the rules specified by FC-0.

---

receptacle

[Network]

The stationary half of the interface connector on a transmitter or receiver.

---

reconstruction

[Storage System]

Synonym for rebuilding.

Recorded Volume Serial Number

[Data Recovery]

Synonym for media ID.

recovery

[Data Recovery]

The recreation of a past operational state of an entire application or computing environment.

Recovery is required after an application or computing environment has been destroyed or otherwise rendered unusable. It may include restoration of application data, if that data had been destroyed as well.

Recovery Point Objective

[Data Recovery]

The maximum acceptable time period prior to a failure or disaster during which changes to data may be lost as a consequence of recovery.

Data changes preceding the failure or disaster by at least this time period are preserved by recovery. Zero is a valid value and is equivalent to a "zero data loss" requirement.

Recovery Time Objective

[Data Recovery]

The maximum acceptable time period required to bring one or more applications and associated data back from an outage to a correct operational state.

Redfish

[Management]

A DMTF open standard specification and schema that specifies a RESTful interface that utilizes JSON and OData for managing scalable hardware platforms.

Redfish schema

[Management]

The representation of Redfish resources and data model using Common Schema Definition Language.

Redfish service

[Management]

An OData service that conforms to Redfish.

Redfish service entry point

[Management]

A URI through which a particular instance of a Redfish service is accessed.

---

reduced mode

[Storage System]

Synonym for degraded mode.

---

reduction

[Storage System]

The removal of a member disk from a RAID array, placing the array in degraded mode.

Reduction most often occurs because of a member drive failure, however, some RAID implementations allow reduction for system management purposes.

---

redundancy

[General]

The inclusion of extra components of a given type in a system (beyond those required by the system to carry out its function) for the purpose of enabling continued operation in the event of a component failure.

---

redundancy group

[Storage System]

A collection of extents organized for the purpose of providing data protection.

Within a redundancy group in a storage array, a single type of data protection is employed. All of the usable storage capacity in a redundancy group is protected by check data stored within the group, and no usable storage external to a redundancy group is protected by check data within it.

---

redundancy group stripe

[Storage System]

A set of strips comprising a redundancy group.

The check data blocks in a redundancy group stripe protect the protected space in that stripe.

redundancy group stripe depth

[Storage System]

The number of blocks in one strip of a redundancy group stripe.

In the conventional striped data mapping model, redundancy group stripe depth is the same for all stripes in a redundancy group.

Redundant Array of Independent Devices

[Storage System]

A storage array in which part of the physical storage capacity is used to store redundant information about user data stored on the remainder of the storage capacity.

The redundant information enables regeneration of user data in the event that one of the array's member disks or the access path to it fails. Although it does not conform to this definition, disk striping is often referred to as RAID 0.

The phrase Redundant Array of Independent Devices is adapted from the 1988 SIGMOD paper *A Case for Redundant Arrays of Inexpensive Disks*. The term was changed to Redundant Array of Independent Disks. In modern systems, RAID techniques are often applied to independent storage devices that implement block storage, including technologies other than disk.

Redundant Array of Independent Disks

[Storage System]

Deprecated term for Redundant Array of Independent Devices

Redundant Array of Independent Nodes

[Storage System]

A collection of networked server nodes with software that provides and maintains pools of highly available storage capacity.

---

redundant configuration

[Computer System]

A configuration of a system in which failure tolerance is achieved by the presence of redundant instances of all components that are critical to operation.

redundant configuration

[Computer System]

A configuration of a system in which failure tolerance is achieved by the presence of redundant instances of all components that are critical to operation.

---

redundant system

[Computer System]

A system in which failure tolerance is achieved by the presence of redundant instances of all components that are critical to operation.

---

reference data

[Data Management]

Synonym for fixed content.

---

reference information

[Data Management]

Synonym for fixed content.

---

refreshment

[General][Long-Term Retention]

1. [General] Synonym for beer.

2. [Long-Term Retention] A type of migration where the contents of some media are copied onto newer media of the same type.

---

regeneration

[Storage System]

Recreation of user data from a failed drive in a RAID array using check data and user data from surviving members.

Regeneration may be used to recover data from an unrecoverable media error.

---

registered state change notification

[Fibre Channel]

A Fibre Channel function that allows notification to registered nodes if a change occurs to other specified nodes.

rejoin mirror

[Storage System]

To bring a split mirror component back into the mirror.

---

rekeying

[Data Security]

Process of updating and redistributing the shared secret key, and optionally, key encryption keys [ISO/IEC 11770-5].

This process is executed by the key distribution center.

---

relative offset

[General]

The offset of a piece of data relative to a reference point.

Remote Access Service

[Windows]

A Windows service that provides remote access capabilities to client applications.

Remote Authentication Dial-In User Service

[Data Security]

An authentication and accounting protocol used by many Internet Service Providers (ISPs).

Information such as username and password is entered when a connection is made. This information is passed to a RADIUS server that verifies the information in order to authorize access to the system. RADIUS is defined in RFC 2865.

---

remote direct memory access

[Network]

A protocol that enables direct memory access over a network.

---

removable media library

[Backup]

Synonym for library.

removable media storage device

[Storage System]

A storage device designed so that its storage volumes can be readily removed and inserted.

Tapes, DVDs, and optical disks are examples of removable media storage devices.

---

replacement disk

[Storage System]

Synonym for spare disk.

---

replay attack

[Data Security]

An attack in which a valid data transmission is maliciously or fraudulently repeated, either by the originator or by an adversary who intercepts the data and retransmits it.

---

replica

[Data Recovery]

1. A general term for a copy of a collection of data.

See duplicate, point in time copy, snapshot.

2. An image of data usable by one or more applications without an intermediate restore process.

---

replicate

[Data Recovery]

The action of making a replica.

Representational State Transfer

[Services]

A specific set of principles for defining, addressing and interacting with resources addressable by URIs.

Architectures that follow these principles are said to be RESTful. The principles include: abstraction of state into resources and a uniform set of representations and operations (e.g., HTTP verbs like GET and PUT as the only means to manipulate a resource).

repudiation

[Data Security]

The act of a principal in denying, disowning or disavowing an act, event or transaction.

---

request for comment

[General]

A process used to request feedback.

---

reserved field

[Standards]

A field in a data structure set aside for future definition.

Some standards prescribe implementation behavior with respect to reserved fields (e.g., originators of data structures containing reserved fields must zero fill them; consumers of data structures containing reserved fields must ignore them, etc.).

---

resiliency

[Storage System]

The ability of a storage subsystem to preserve data integrity and availability of access despite the unavailability of one or more of its storage devices.

---

resource pooling

[Computer System]

Aggregation of a provider's resources to serve multiple consumers using a multitenant model, with physical and virtual resources dynamically assigned and reassigned on demand.

Resource Reservation Protocol

[Management]

An IETF protocol for requesting reservation of network bandwidth in advance.

---

responder

[Fibre Channel][Storage System]

1. [Storage System] The entity that responds to a request.
2. [Fibre Channel] The Nx-Port that received a frame that caused an Exchange to become open.

Responder Exchange Identifier

[Fibre Channel]

An identifier assigned by a responder to identify an Exchange.

REST

[Services]

Abbreviation for Representational State Transfer.

---

restoration

[Data Recovery]

Synonym for recovery.

---

retention period

[Data Management][Data Recovery][File System]

1. [Data Recovery] The length of time that a backup copy should be kept.

2. [File System] A property of a file that can be used to implement backup and data migration policies.

3. [Data Management] The length of time a compliance volume or file must be maintained undeleted and unchanged.

---

retention policy

[Data Management]

A policy governing when and for how long a record must be retained by a storage system.

This may be a rule that applies to a record or groups or categories of records. The policy may be time or event based.

---

retimer

[Hardware]

A circuit that uses a clock independent of the incoming signal to generate an outbound signal.

return loss

[Hardware]

The ratio of the strength of a returned signal to that of the incident signal that caused it.

In electrical circuits, return loss is caused by impedance discontinuities. Optical return loss is caused by index of refraction differences.

RFC

[General][Standards]

1. [General] Shorthand for request for comment.
2. [Standards] A series of documents published by the IETF that are developed by the IETF, the Internet Architecture Board (IAB), and the Internet Research Task Force (IRTF).

---

risk

[Data Security]

The combination of the probability of an event and the significance of its consequences. [ISO Guide 73].

The term "risk" is generally used only when there is at least the possibility of negative consequences. In some situations, risk arises from the possibility of deviation from the expected outcome or event.

---

risk acceptance

[Data Security]

Informed decision to take a particular risk [ISO Guide 73].

Risk acceptance can occur without risk treatment or during the process of risk treatment. Accepted risks are subject to monitoring and review.

R

---

risk analysis

[Data Security]

Process to comprehend the nature of risk and to determine the level of risk [ISO Guide 73].

Risk analysis provides the basis for risk evaluation and decisions about risk treatment. Risk analysis includes risk estimation.

---

risk management

[Data Security]

Coordinated activities to direct and control an organization with regard to risk [ISO Guide 73].

risk treatment

[Data Security]

Process to eliminate risk (3.16) or reduce it to a tolerable level [ISO Guide 73].

---

robotic media handler

[Storage System]

The mechanical component of a library which moves removable media within the library.

RoCE

[Network]

RDMA over Converged Ethernet.

RoCE V1 is a non-routed protocol and RoCE V2 is a routed protocol. Both were developed by the InfiniBand Trade Association.

---

role-based access control

[Data Security]

An access control method that assigns permissions to roles that reflect the organization and policies of an organization.

---

rollback to snapshot

[Storage System][File System]

1. [Storage System] The process of resetting a volume's data to become identical to a snapshot taken of that volume.

2. [File System] In LTFS, the process of modifying the index to match a previous version of the index.

---

rotational latency

[Storage System]

The time interval between the end of a disk seek and the time at which the starting block address specified in the I/O request passes the disk head.

---

routing function

[Network]

A switching entity that forwards packets towards their destination.

row

[Storage System]
The set of blocks with corresponding physical extent block addresses in each member disks physical extents.

The concept of rows is useful for locking the minimal amount of data during a RAID array update so as to maximize the potential for parallel execution.

RPO

[Data Recovery]
Shorthand for Recovery Point Objective.

RSA

[Data Security]
A public key algorithm developed by Rivest, Shamir & Adelman.

RSCN

[Fibre Channel]
Shorthand for registered state change notification.

RSVP

[Management]
Shorthand for Resource Reservation Protocol.

RTO

[Data Recovery]
Shorthand for Recovery Time Objective.

---

run length

[Data Communication]
The number of consecutive identical bits in a transmitted signal.

For example, the pattern 0011111010 has run lengths of 2, 5, 1, 1, and 1.

running disparity

[Data Communication]

In a data stream using 8B/10B encoding, the cumulative disparity (positive or negative) of all previously issued transmission characters.

RVSN

[Data Recovery]

Shorthand for Recorded Volume Serial Number.

RX_ID

[Fibre Channel]

Abbreviation for Responder Exchange Identifier.

S

SaaS

[Services]
Acronym for Software as a Service.

SAM

[SCSI]
Acronym for SCSI Architecture Model.

The SCSI Architecture Model is developed and owned by the T10 working group of ANSI. SAM has undergone numerous revisions, each being consecutively named as SAM-2, SAM-3 and so on, the latest revision being SAM-5.

SAN

[iSCSI][Network][Computer System]
1. Storage Area Network.

This is the normal meaning in SNIA documents.

2. Acronym for Server Area Network, which connects one or more servers.

3. Acronym for System Area Network, an interconnected set of system elements.

---

sanitization

[Data Security]
A process or method to sanitize.
[ISO/IEC 27040]

---

sanitize

[Data Security]
Render access to target data on storage media infeasible for a given level of effort. [ISO/IEC 27040]

Clear, purge, and destruct are actions that can be taken to sanitize storage media. See media sanitization.

SAS

[SCSI]
Acronym for Serial Attached SCSI.

SAS Expander

[SCSI]
Short for Serial Attached SCSI Expander.

SAS Protocol Layer

[SCSI]
The layer of the SAS interconnect that comprises the Serial SCSI Protocol (SSP), the Serial ATA Tunneled Protocol (STP) and the Serial Management Protocol (SMP).

SATA

[Storage System]
Acronym for Serial Advanced Technology Attachment.

saturated disk

[Storage System]
A disk whose instantaneous I/O load is as great as or greater than its capability to satisfy the requests comprising the load.

Mathematically, a saturated disk's I/O queue eventually becomes indefinitely long. In practice, however, user reaction or other system factors generally reduce the rate of new request arrivals for a saturated disk.

scale

[Computer System]
To grow or support growth in such a way that all capabilities of the system remain in constant ratio to each other.

A storage subsystem whose data transfer capacity increases by the addition of buses as its storage capacity increases by the addition of disks is said to scale.

schema

[Management][Data Management]

1. A collection of information models or data models.

2. Data that describes the organization and format of other data.

---

scrambling

[Data Communication]

Modifying data to minimize repetitive character patterns.

---

script

[Storage System][Computer System]

1. A parameterized list of primitive I/O interconnect operations intended to be executed in sequence.

Often used with respect to ports, most of which are able to execute scripts of I/O commands autonomously (without policy processor assistance).

2. A sequence of instructions intended to be parsed and carried out by a command line interpreter or other scripting language.

Perl, VBScript, JavaScript and Tcl are all scripting languages. See Command Line Interface.

---

scrubbing

[Storage System]

A background function that reads user data and check data blocks in a storage device and relocates them if media defects or errors are found.

SCSI

[SCSI]

Acronym for Small Computer System Interface.

SCSI adapter

[SCSI]

An adapter that connects an intelligent device to a SCSI interconnect.

See HBA, host bus adapter.

SCSI address

[SCSI]

The full address used by a computer to communicate with a SCSI device, including an adapter number (required with computers configured with multiple SCSI adapters), and the target ID of the device.

SCSI addresses do not include logical unit number, because those are not used for communication.

SCSI Architecture Model

[SCSI]

An ANSI standard that defines the generic requirements and overall framework in which other SCSI standards are defined.

New generations of this standard are identified by a numeric suffix; for example the second generation standard is SAM2.

SCSI bus

[SCSI]

Deprecated synonym for SCSI interconnect.

SCSI Device

[SCSI]

Entity that contains other SCSI entities.

For example, a SCSI initiator device contains one or more SCSI initiator ports and zero or more application clients. See SAM.

SCSI Enclosure Services

[SCSI]

A standard for management of environmental factors such as temperature, power, voltage, etc.

SCSI Initiator Port

[SCSI]

The initiator endpoint of an I_T nexus.

SCSI interconnect

[SCSI]

A serial or parallel interconnect that implements a SCSI transport standard.

The number of SCSI initiator ports and SCSI target ports which may be connected on a SCSI bus is dependent upon the particular transport standard. See initiator, target.

SCSI Media Changer Commands

[SCSI]

A standard for media changer devices (i.e., libraries).

SCSI Over PCI Express

[SCSI]

A protocol to transport SCSI operations over PCI Express.

SCSI Parallel Interface

[SCSI]

The family of SCSI standards that define the characteristics of the parallel version of the SCSI interface.

Several versions of SPI, known as SPI, SPI2, SPI3, etc., have been developed. Each version provides for greater performance and functionality than preceding ones.

SCSI port

[SCSI]

The SCSI term for an entity in a SCSI Device that provides the SCSI functionality to interface with a service delivery subsystem or transport.

SCSI Stream Commands

[SCSI]

A standard for sequential-access devices (i.e., tape drives).

SCSI target port

[SCSI]

The target endpoint of an I_T nexus.

SCSI Trade Association

[General]

A trade association incorporated in 1996 to promote all forms of SCSI technology in the market.

See http://www.scsita.org/.

SDDC

[Management]

Acronym for Software Defined Data Center.

SDH

[Network]

Acronym for Synchronous Digital Hierarchy.

SDS

[Storage System]

Shorthand for software-defined storage.

---

secret key

[Data Security]

A key used in a symmetric cryptosystem to both encrypt and decrypt data.

The key must remain confidential to the using parties to ensure the security of the cryptosystem.

---

sector

[Storage System]

The unit in which data is physically stored and protected against errors on a fixed block architecture disk.

A sector typically consists of a synchronization pattern, a header field containing the block's address, data, a checksum or error correcting code, and a trailer. Adjacent sectors are often separated by information used to assist in track centering. Most often, each sector holds a block of data. See disk block.

---

secure data deletion

[Data Security]

Synonym for sanitize.

secure hash

[Data Security]

An algorithm that generates a fixed-size digest from its input (e.g., a message).

The algorithm has the properties that different inputs are extraordinarily unlikely to yield the same digest, small changes in its input lead to large changes in its output, and it is computationally intractable to generate an input that yields the same digest as another given input.

---

secure multi-tenancy

A type of multi-tenancy that employs security controls to explicitly guard against data breaches and provides validation of these controls for proper governance. [ISO/IEC 27040]

Secure multi-tenancy exists when the risk profile of an individual tenant is no greater than it would be in a dedicated, single-tenant environment. In very secure environments even the identity of the tenants is kept secret. See multi-tenancy.

Secure Sockets Layer

[Data Security]

A suite of cryptographic algorithms, protocols and procedures used to provide security for communications used to access the world wide web.

The characters "https:" at the front of a URL cause SSL to be used to enhance communications security. More recent versions of SSL are known as TLS (Transport Level Security) and are standardized by the Internet Engineering Task Force (IETF).

SSL is a predecessor of TLS and is considered a vulnerability if it is supported in a product.

See also SSL.

---

security domain

[Data Security]

A set of elements, a security policy, a security authority, and a set of security-relevant activities in which the set of elements are subject to the security policy for the specified activities, and the security policy is administered by the security authority for the security domain. [ISO/IEC 10181-1:1996].

---

security incident

[Data Security]

A single or a series of unwanted or unexpected events that have a significant probability of compromising business operations and threatening information security.

security safeguards

[Data Security]

The protective measures and controls that are prescribed to meet the security requirements specified for a system.

Safeguards may include but are not necessarily limited to: hardware and software security features, operating procedures, accountability procedures, access and distribution controls, management constraints, personnel security, and physical structures, areas, and devices. Also called safeguards (without the adjective).

---

security strength

[Data Security]

A measure of the difficulty of subverting the cryptographic protection (e.g. discovering the key) using classical computers.

Security strength is specified in bits and is a specific value from the set {80, 112, 128, 192, 256}. A security strength of b bits means that of the order of 2b operations are required to break the system.

Security Target

[Data Security]

A set of security functional and assurance requirements and specifications to be used as the basis for evaluation of an identified product or system, most commonly associated with ISO 15408.

---

self encrypting drive

[Storage System]

A type of self encrypting storage device.

---

self encrypting storage device

[Storage System]

A storage device that has the native ability to encrypt all user data written to and decrypt the same data read from it, and that prevents access until a credential is supplied.

Tape drives, disk drives and other types of storage devices may all be designed to be self encrypting storage devices.

Self-contained Information Retention Format

[Long-Term Retention]

A self-describing container format, developed by the SNIA, appropriate for the long-term storage of digital information.

---

self-signed certificate

[Data Security]

A public key certificate whose digital signature may be verified by the public key contained within the certificate.

The signature on a self-signed certificate protects the integrity of the data, but does not guarantee authenticity of the information. The trust of self-signed certificates is based on the secure procedures used to distribute them. [NIST SP 800-57 Part 1]

---

sensitive information

[Data Security]

Information that, as determined by a competent authority, must be protected because its disclosure, modification, destruction, or loss will cause perceivable damage to someone or something [ISO/IEC 2382:2015].

Sequence

[Fibre Channel]

A set of Fibre Channel data frames with a common Sequence_ID), corresponding to one message element, block, or Information Unit.

Sequences are transmitted from the Sequence Initiator to the Sequence Recipient.

Sequence Identifier

[Fibre Channel]

A number transmitted with each data frame in a Sequence that identifies the frame as part of the Sequence.

Sequence Initiative

[Fibre Channel]

A Fibre Channel signaling feature that designates which end of an Exchange has authority to send the next Sequence.

Sequence Initiator

[Fibre Channel]
An FC_Port that initiates a Sequence and transmits data frames to a destination FC_Port.

Sequence Recipient

[Fibre Channel]
An FC_Port that receives data frames from a Sequence Initiator and, if applicable, transmits responses to the Sequence Initiator.

Sequence Status Block

[Fibre Channel]
A data structure that tracks the state of a Sequence.

Both Sequence Initiators and Sequence Recipients have Sequence Status Blocks for each active sequence.

---

sequential I/O / sequential I/O load / sequential reads / sequential writes

[Storage System]
An I/O load consisting of consecutively issued read or write requests to adjacently addressed data.

Sequential I/O is characteristic of data transfer intensive applications. See random I/O.

SEQ_ID

[Fibre Channel]
Shorthand for Sequence Identifier.

SERDES

[Computer System]
Short for Serializer Deserializer.

---

serial

[General]
The transmission of data bits one at a time over a single link.

serial adapter

[Computer System]

An adapter that connects an intelligent device to an RS232 or RS425 serial communications link.

Serial adapters are sometimes used by storage subsystems, filers, and other intelligent devices to connect to serial consoles for management purposes. See host adapter.

Serial Advanced Technology Attachment

[Storage System]

A version of the ATA interface that uses a serial connection architecture.

Serial Attached SCSI

[SCSI]

A SCSI interface standard that provides for attaching hosts to SCSI devices, including SAS and SATA disk and tape drives.

INCITS Technical Committee T10 is responsible for the national (ANSI) and international (ISO) standards for SAS. See www.t10.org.

Serial Attached SCSI Expander

[SCSI]

A switching device that uses virtualization to allow multiple SAS devices to be connected to each initiator port.

---

serial console

[Computer System]

A real or emulated communication terminal used by humans to manage an intelligent device.

Serial consoles connect to the devices' virtual or physical serial adapters.

Serializer Deserializer

[Computer System]

A mechanism for converting data from parallel to serial form and from serial to parallel form.

server

[Computer System]

1. An intelligent device, usually a computer, that provides services to other intelligent devices, usually other computers or appliances. See client.

2. An asymmetric relationship with a second party (a client) in which the client initiates requests and the server responds to those requests.

---

server based virtualization

[Computer System]

Synonym for host based virtualization.

Server Message Block

[Network]

A network file system access protocol designed primarily used by Windows clients to communicate file access requests to Windows servers.

Current versions of the SMB protocol are referred to as CIFS, the Common Internet File System.

---

serverless backup

[Data Recovery]

A backup methodology that utilizes a device other than the server to copy data without using the LAN.

The copy may be performed by a network-attached controller (e.g., utilizing SCSI Extended Copy), by an appliance within the SAN, or by a Backup Server.

Service Incident Standard

[Management]

A DMTF standard that defines how a support or help desk incident is processed.

Service Level Agreement

[General]

An agreement between a service provider, such as an IT department, an internet services provider, or an intelligent device acting as a server, and a service consumer.

A service level agreement defines parameters for measuring the service, and states quantitative values for those parameters.

Service Level Objective

[General]
A partition of an SLA consisting of individual metrics and operational information to enforce and/or monitor the SLA.

Service Level Objectives may be defined as part of an SLA, an SLS, or in a separate document. Each is a set of parameters and their values. The actions of enforcing and reporting monitored compliance can be implemented as one or more policies. See Service Level Agreement.

Service Location Protocol

[Management]
An IETF standards track protocol that provides a framework to allow networking applications to dynamically discover the existence, location, and configuration of networked services in enterprise networks.

---

service root

[Management]
A particular resource that is directly accessed via the Redfish service entry point.

This resource serves as a starting point for locating and accessing the other resources and associated metadata that together make up an instance of a Redfish service.

SES

[SCSI][Standards]
1. Acronym for SCSI Enclosure Services.

2. Acronym for Solution Exchange Standard.

S

SFF

[Hardware][Standards]
[Standards] The SNIA SFF Technology Affiliate Technical Work Group.

[Hardware] Acronym for Small Form Factor.

SFP

[Hardware]
Acronym for Small Form Factor Pluggable

SF_ID

Abbreviation for Source Fabric_Identifier.

---

share

[File System]

A resource such as a data volume or a printer device made available for use by users on other computer systems.

For example, a printer or a collection of files stored in a single directory tree on a file server may be made available as a share. CIFS clients, which include most networked personal computers, typically map a share to a drive letter.

---

shared secret

[Data Security]

A pre-shared key that has been distributed to communicating parties prior to beginning of an encrypted communication.

---

shelf

[Storage System]

A modular enclosure for storage devices such as disks, tapes, and canisters. Storage shelves usually contain power supplies and cooling devices, and have pre-wired backplanes that carry power and I/O interconnect signals to storage devices.

---

shielded enclosure

[Data Security]

A room or container designed to attenuate electromagnetic radiation.

---

shingled magnetic recording

[Storage System]

A recording technique for storing data on an HDD where data is recorded on overlapping tracks which must be written sequentially.

SIA

[General][SCSI]

1. Acronym for Semiconductor Industries Association.

2. Acronym for SCSI Industry Association.

Simple Network Management Protocol

[Network][Standards]

An IETF protocol for monitoring and managing systems and devices in a network.

The data being monitored and managed is defined by a MIB. The functions supported by the protocol are the request and retrieval of data, the setting or writing of data, and traps that signal the occurrence of events.

---

single

[General]

A configuration in which the referenced component is not redundant.

See redundant (component).

---

single ended

[SCSI]

An electrical signaling technique in which all control and data signals are represented by a voltage difference from a common ground.

See differential.

---

single instance storage

[Storage System]

A form of data deduplication that operates at a granularity of an entire file or data object.

See data deduplication, subfile data deduplication.

---

single mode

[Network]

A fiber optic cabling specification that provides for up to 10 kilometer distance between devices.

---

single mode fibre

Optical fiber that is designed for the transmission of a single ray or mode of light as a carrier.

Single mode fibre transmission is typically used for long-distance signal transmission.

Single Point Of Failure

[General]

One component or path in a system, the failure of which would make the system inoperable.

Single Sign On

[Data Security]

A form of centralized authentication employing a single set of credentials that are used transparently to perform subsequent authentications on behalf of the users.

Single-Level Cell

[Hardware]

A memory cell that stores a single bit of data.

SIRF

[Long-Term Retention]

Acronym for Self-contained Information Retention Format.

SIS

[Management][Standards][Storage System]

1. Acronym for Service Incident Standard.

2. Acronym for Single Instance Storage.

SLA

[General]

Acronym for Service Level Agreement.

SLC

[Hardware]

Acronym for Single-Level Cell

SLO

[General]

Acronym for Service Level Objective.

SLP

[Management]

Acronym for Service Location Protocol.

Small Computer System Interface

[SCSI]

A collection of ANSI standards and proposed standards that define I/O interconnects primarily intended for connecting storage subsystems or devices to hosts through host bus adapters.

Originally intended primarily for use with small (desktop and desk-side workstation) computers, SCSI has been extended to serve most computing needs, and is arguably the most widely implemented I/O interconnect in use today.

Small Form Factor

[Hardware]

Various connectors and form factors related to computers.

Small Form Factor Pluggable

[Hardware]

A fiber optic socket and plug connector used by Fibre Channel and other technologies.

---

small read request / small write request / small I/O request

[Storage System]

An I/O, read, or write request that specifies the transfer of a relatively small amount of data.

â€˜Small' usually depends on the context, but most often refers to 8 KBytes or fewer. See large I/O request.

S

SMB

[File System][Network]

Acronym for Server Message Block.

SMBus

[Management]

Abbreviation for System Management Bus.

SMI

[Management][Network]

1. The Storage Networking Industry Association's (SNIA) Storage Management Initiative (SMI).

SMI develops and standardizes interoperable storage management technologies, including providing conformance testing for products.

2. Acronym for Structure of Management Information.

SMI-S

[Standards]

Acronym for Storage Management Initiative Specification.

SMPTE

[Standards]

Acronym for Society of Motion Picture and Television Engineers.

SMR

[Storage System]

Acronym for shingled magnetic recording.

---

snapshot

[Data Management]

A point in time copy of a defined collection of data.

Clones and snapshots are full copies. See delta snapshot. Depending on the system, snapshots may be of files, LUNs, file systems, or any other type of container supported by the system.

S

SNIA

[Storage System][Standards]

An industry organization focused on standardization and education for the transport, optimization of infrastructure, storage, acceleration, format, and protection of data.

---

sniffer

[Data Security]

A software tool for auditing and identifying network traffic packets.

SNMP

[Network][Management]
Acronym for Simple Network Management Protocol.

SNS

[Network]
Acronym for Simple Name Server.

SOC

[Hardware]
Acronym for System on a Chip.

---

social engineering

[Data Security]
Act of manipulating people into performing actions or divulging confidential information [ISO/IEC 27033-3:2010]

Examples include tricking people into downloading and executing files that appear to be benign but are actually malicious, revealing passwords, etc.

Society of Motion Picture and Television Engineers

[Standards]
An industry association whose goal is to standardize television and motion picture industry information interchange protocols.

SOF

[Fibre Channel]
Abbreviation for Start Of Frame.

---

soft link

[File System]
Synonym for symbolic link.

Soft Zone

[Fibre Channel]

A zone consisting of zone members that are permitted to communicate with each other via the Fibre Channel Fabric where the zoning is not enforced by hardware.

See zone, Hard Zone.

---

software appliance

[Computer System]

An application combined with an operating environment designed to run on industry standard hardware.

If a vendor installs the software appliance on hardware prior to customer delivery, the offering is considered an appliance.

Software as a Service

[Services]

Delivery over a network, on demand, of the use of an application.

Software Defined Data Center

[Management]

A virtualized data center with a service management interface.

Application requirements determine the service levels provided.

---

software-defined storage

[Storage System]

Virtualized storage with a service management interface.

SDS includes pools of storage with data service characteristics that may be applied to meet the requirements specified through the service management interface.

---

solid state array

[Storage System]

Synonym for solid state storage array.

Solid State Disk

[Storage System]

Deprecated synonym for Solid State Drive.

Solid State Drive

[Storage System]

A storage device in which the storage capability is provided by Solid State Storage.

Abbreviated as SSD.

Solid State Storage

[Storage System]

A storage capability built from solid state electronics.

---

solid state storage array

[Storage System]

A storage array that uses solid state storage and may contain other storage media.

Solution Exchange Standard

[Management]

A DMTF standard that defines the exchange of support or help desk information.

---

solution under test

[Computer System]

All hardware and software components that are exercised during a test to verify functional behavior or determine performance characteristics.

The solution under test comprises the infrastructure including software components, application(s), test system(s), and the system(s) under test.

See also system under test and test system.

SONET

[Network]

Shorthand for Synchronous Optical Network.

Source Identifier

[Fibre Channel]

An address identifier in a Fibre Channel frame that identifies the source FC_Port of the frame.

---

source N_Port

[Fibre Channel]

The N_Port from which a frame is transmitted.

---

space reduction

[Storage System]

Deprecated synonym for capacity optimization.

---

spare disk

[Storage System]

A disk reserved for the purpose of substitution for a like disk in case of that disk's failure.

---

spare extent

[Storage System]

An extent reserved for the purpose of substitution for a like extent in case of that extent's failure.

---

sparse file

[File System]

A file that has empty (unwritten and unallocated) data regions, which on reading back are implicitly filled with bytes containing the value zero (0x00).

On some file systems all files are implicitly sparse.

S

---

special character

Any transmission character that is valid in the transmission code but does not correspond to a valid data byte.

Special characters are used to denote special functions.

special code

A code that, when encoded using the rules specified by the transmission code, results in a special character.

Special codes are typically associated with control signals related to protocol management (e.g., K28.5).

SPI

[SCSI]

Acronym for SCSI Parallel Interface.

---

spiral data transfer rate

[Storage System]

Synonym for full volume transfer rate.

---

split I/O request

[Storage System]

1. An I/O request to a virtual disk that requires two or more I/O operations to satisfy, because the virtual data addresses in the request map to more than one extent on one or more disks.

2. An application I/O request that is divided into two or more sub-requests by a file system or other operating system component because the amount of data requested is too large for the operating environment to handle as a unit.

---

split mirror, split mirror copy

[Storage System][Data Recovery]

1. [Storage System] Any of a class of point in time copy implementations or the resulting copies in which the storage for the copy is synchronized to the source of the copy and then split.

A split mirror copy occupies as much storage as the source of the copy.

2. [Data Recovery] A method for generating a frozen image of a set of data.

SPOF

[General]

Acronym for Single Point Of Failure.

spoofing

[Data Security]
Unauthorized use of legitimate identification and authentication data to mimic a subject different from the attacker.

Impersonating, masquerading, piggybacking and mimicking are forms of spoofing.

SQ

Acronym for Submission Queue.

SQE

[NVMe]
Acronym for Submission Queue Entry.

SR

Acronym for Sequence Recipient.

SRAM

[Hardware]
Acronym for Static Random Access Memory.

SRM

[Management]
Acronym for Storage Resource Management.

SSD

[Storage System]
Acronym for Solid State Drive.

SSID

[iSCSI]
Shorthand for iSCSI Session Identifier.

SSL

[Data Security]
Acronym for Secure Sockets Layer.

SSO

[Data Security]
Acronym for Single Sign On.

ST

[Data Security]
Acronym for Security Target.

STA

[SCSI]
Acronym for SCSI Trade Association.

stable storage

[Storage System]
Stable storage is persistent storage where data survives: 1. Repeated power failures, including cascading power failures, 2. Single hardware failures (of any board, power supply, etc. but not including media), 3. Repeated software crashes, including reboot cycle, and 4. A minimum number of hours without external power.

For more information on stability evaluation it is suggested to read:

- SNIA Emerald Specification annex C
- Description of Stable Storage for SPEC SFS 2014

stand alone drive

[Data Recovery]
A removable media drive that is not associated with a media stacker or robot.

standard interconnect

[Computer System][Standards]

An I/O interconnect or network interconnect whose specifications are readily available to the public, and that can be implemented in products.

Also called an open interconnect.

---

star

[Network]

A physical network configuration in which every node is connected directly to, and only to, a central point; all communications pass through the central point, which may be a hub or a switch.

Start-of-Frame

[Fibre Channel]

A group of ordered sets that delineates the beginning of a frame.

---

state

[Computer System]

The condition of a system at a point in time.

Examples of systems that have states could be a program, software routine, or hardware component.

---

stateful

[Computer System]

A property of a system where operation of that system is dependent on state.

Examples of systems that are stateful include SMB and NFS v4.1.

S

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stateless

[Computer System]

A property of a system where operation of that system is independent of state.

Examples of systems that are stateless include NFS v3 and HTTP.

Static Random Access Memory

[Hardware]

Byte-addressable computer memory that maintains state indefinitely given continuous power.

storage

[General]

A function that records data and supports retrieval.

Storage Area Network

[Network][Storage System]

1. A network whose primary purpose is the transfer of data between computer systems and storage devices and among storage devices.

A SAN consists of a communication infrastructure, which provides physical connections, and a management layer, which organizes the connections, storage devices, and computer systems so that data transfer is secure and robust. The term SAN is usually (but not necessarily) identified with block I/O services rather than file access services.

2. A storage system consisting of storage elements, storage devices, computer systems, and/or appliances, plus all control software, communicating over a network.

The SNIA definition specifically does not identify the term SAN with Fibre Channel technology. When the term SAN is used in connection with Fibre Channel technology, use of a qualified phrase such as "Fibre Channel SAN" is encouraged. According to this definition, an Ethernet-based network whose primary purpose is to provide access to storage devices would be considered a SAN. SANs are sometimes also used for system interconnection in clusters.

---

storage array

[Storage System]

A collection of storage devices from one or more commonly accessible storage subsystems, combined with a body of control software that presents an abstracted view of the storage.

---

storage controller

[Storage System]

A device for handling storage requests that includes a processor or sequencer programmed to autonomously process a substantial portion of I/O requests directed to storage devices.

Aggregating RAID controllers and filers are examples of storage controllers.

---

storage device

[Storage System]

Any storage element or aggregation of storage elements designed and built for data storage and delivery.

storage domain

[Storage System]

A collection of storage resources and supporting software and interfaces that are managed as a unit.

---

storage efficiency

[Storage System]

The ratio of a storage system's effective capacity to its raw capacity.

An estimated efficiency calculation is permissible using estimated effective capacity.

The storage efficiency of a system is normally low when it is new. On a capacity optimizing system efficiency generally increases as the system is loaded with data. There is no way to precisely predict the storage efficiency of a loaded capacity optimizing system before data is loaded onto it.

---

storage element

[Storage System]

Any component that is used to build storage devices and which contributes to persistent data storage and delivery.

Storage elements are components of storage devices. Examples of a storage element include: disk drive, flash memory, tape cartridge, tape drive, and library.

---

storage extent

[Storage System]

A contiguous array of bytes–real or virtual–as exposed by a storage container.

A storage extent instance may include data on either removable or nonremovable media storage devices. See extent.

S

---

storage federation

[Storage System]

Making multiple storage systems appear to a user as a single system.

Storage Interoperability

[Storage System]

The ability of storage devices, products, or systems to work together in a correct, predictable and interchangeable fashion.

Storage Management Initiative-Specification

[Management][Standards]

A storage management interface developed by SNIA, and standardized via ANSI and ISO.

---

storage media

[Storage System]

The material in a storage device on which data is recorded.

Storage media includes electrical (e.g., solid state), magnetic (hard disk, tape), and optical media.

---

storage medium

[General][Storage System]

1. An individual that makes prophesies regarding the storage industry.

2. See storage media.

---

storage networking

[Storage System][Network]

The practice of creating, installing, administering, or using networks whose primary purpose is the transfer of data between computer systems and storage elements and among storage devices.

---

storage protection

[Storage System]

Stable storage that includes any combination of hardware and software (e.g., RAID, NVRAM, disk sparing and background disk scrubbing or media scan) that assures that all committed IO operations will be preserved in the event of power loss or storage device failure.

---

storage resource domain

[Management]

The category of resources that encompasses storage services.

---

storage resource management

[Management]

Management of physical and logical storage resources, including storage elements, storage devices, appliances, virtual devices, disk volume and file resources.

storage security

[Data Security]

Application of physical, technical, and administrative controls to protect storage systems and infrastructure as well as the data stored (3.50) within them. [ISO/IEC 27040]

Storage security is focused on protecting data (and its storage infrastructure) against unauthorized disclosure, modification, or destruction while assuring its availability to authorized users. These controls may be preventive, detective, corrective, deterrent, recovery, or compensatory in nature.

---

storage service

[Management]

A set of functions that provide storage.

---

storage subsystem

[Storage System]

An integrated collection of (a.) storage controllers and/or host bus adapters, (b.) storage devices, CD-ROM drives, tape drives, and libraries, and (c.) any required control software, that provides storage services to one or more computers.

---

storage system power efficiency

[Storage System]

The power efficiency of a storage system, where input power is measured at the wall socket and output power is measured at the power inputs to the disks, fans, robotics and electronics.

Measurement points of interest include the idle and maximum activity states.

---

storage taxonomy

[Standards]

A hierarchical categorization of storage networking products based on capacity, availability, port count and other attributes.

The SNIA Emeraldâ„¢ Power Efficiency Measurement Specification presents a storage taxonomy.

---

storage tier

[Storage System]

Storage space that has availability, performance, and cost characteristics that justify the movement of data between it and other storage tiers based on the requirements of the stored data.

storage virtualization

[Storage System]

The application of virtualization to storage services or devices.

Storage can be virtualized simultaneously in multiple layers of a system, for instance to create HSM-like systems.

---

store and forward

[Network]

A switching technique that requires buffering an entire frame before it is routed.

---

stream

[Network][File System]

1. Continuous media content served over a specialized protocol in real-time.

2. A subfile in the CIFS protocol.

NFSv4 provides equivalent functionality using Named Attributes.

---

streamed sequence

[Fibre Channel]

A new Sequence initiated by a Sequence Initiator in any class of service for an Exchange, while that Exchange already has one or more Sequences open.

---

strip

[Storage System]

The consecutively addressed blocks in a single extent.

A disk array's controller uses strips to map virtual disk block addresses to member disk block addresses. Also known as stripe element.

---

strip size

[Storage System]

Synonym for stripe depth.

stripe

[Storage System]

The set of strips at corresponding locations of each member extent of a disk array that uses striped data mapping.

The strips in a stripe are associated with each other in a way (e.g., relative extent block addresses) that allows membership in the stripe to be quickly and uniquely determined by a computational algorithm. Parity RAID uses stripes to map virtual disk block addresses to member extent block addresses.

---

stripe depth

[Storage System]

1. The number of blocks in a strip in a disk array that uses striped data mapping.

2. The number of consecutively addressed virtual disk blocks mapped to consecutively addressed blocks on a single member extent of a disk array.

---

stripe element

[Storage System]

Synonym for strip.

---

stripe size

[Storage System]

The number of blocks in a stripe.

A striped array's stripe size is the stripe depth multiplied by the number of member extents. A parity RAID array's stripe size is the stripe depth multiplied by the number of member extents less the number of parity extents.

---

striped array / striped disk array

[Storage System]

A disk array with striped data mapping but no redundancy for failure protection.

Striped arrays are sometimes used to improve I/O performance on data that is of low value or easily replaced. Virtualizers may also use simple striping of the extents that they import, on the grounds that the underlying storage is responsible for data protection.

stripeset

[Storage System]
Synonym for striped array.

---

striping

[Storage System]
1. Short for data striping.

Also known as RAID Level 0 or RAID 0, striping is a mapping technique in which fixed-size consecutive ranges of virtual disk data addresses are mapped to successive array members in a cyclic pattern.

2. A network technique for aggregating the data transfer rates of several links between the same pair of nodes.

A single data stream can be spread across the links for higher aggregate data transfer rate. Sometimes called port aggregation.

Structure of Management Information

[Management][Network]
A notation for setting or retrieving management variables over SNMP.

SNMP queries are in the form of GET requests for one or more Object IDs (OIDs), which take the form 1.3.1.1.4.6.123.1.1.0; an encoding called ASN.1 is used to transmit both request and reply. The SMI spec–not to be confused with the SNIA's Storage Management Initiative–specifies the schema used in the OID strings.

---

structured data

[Data Management]
Data that is organized and formatted in a known and fixed way.

The format and organization are customarily defined in a schema. The term structured data is usually taken to mean data generated and maintained by databases and business applications.

---

subdirectory

[File System]
A directory in a hierarchical directory tree whose parent is a directory.

subfile data deduplication

[Storage System]

A form of data deduplication that operates at a finer granularity than an entire file or data object.

See data deduplication, single instance storage.

---

subject

[Data Security]

In the context of access control or authorization, an entity whose access or usage is controlled.

Submission Queue Entry

[NVMe]

A fixed size entry in an SQ that contains a single command.

---

substitution

[General]

The assumption of a component's function in a system by a functionally equivalent component.

---

subtractive routing method

[SCSI]

A method used by SAS expanders that forwards connection requests for unknown (i.e., not directly attached) devices via special designated phy links to another more authoritative expander.

The more authoritative expander is usually, but does not have to be, the "root" expander.

SUT

[Computer System]

Shorthand for solution under test.

SVC

[Network]

Acronym for Switched Virtual Circuit.

swap

[General]

The installation of a replacement unit in place of a defective unit in a system.

Units are any parts of a system that may either be field replaceable (FRUs) by a vendor service representative or consumer replaceable (CRUs). A physical swap operation may be cold, warm, or hot, depending on the state in which the disk subsystem must be in order to perform it. A functional swap operation may be an auto swap or it may require human intervention.

---

switch

[Network]

A network infrastructure component to which multiple ports attach.

Unlike hubs, switches typically have internal bandwidth that is a multiple of link bandwidth, and the ability to rapidly switch port connections from one to another. A typical switch can accommodate several simultaneous full link bandwidth transmissions between different pairs of ports. See hub.

---

switch-back

[Computer System]

Synonym for failback.

---

switch-over

[Computer System]

Synonym for failover.

---

switched over

[Computer System]

Synonym for failed over.

Switch_Name

[Fibre Channel]

A Name-Identifier that is associated with a Fibre Channel Switch or bridge.

Swordfish

[Storage Management]

A SNIA open standard for managing data and storage services.

Swordfish is an extension of the Redfish specification that enables simple, scalable, and interoperable management of storage resources, ranging from direct attached storage to complex enterprise class storage servers.

Swordfish service

[Storage Management]

A Redfish service that conforms to requirements of the Swordfish specification.

Swordfish service entry point

[Storage Management]

A Redfish service entry point through which a particular instance of a Swordfish Service is accessed.

---

symbolic link

[File System]

A special type of file that can be used to redirect a file or directory path transparently to another file or directory that may be on another system.

Also known as symlink or soft link. Symbolic links differ from hard links in that deletion of the underlying file causes them to be "broken", and subsequent attempts to traverse them fail.

---

symlink

[File System]

Shorthand for a symbolic link.

---

symmetric cryptography

[Data Security]

Cryptography that uses a symmetric cryptosystem.

symmetric cryptosystem

[Data Security]

A cryptographic algorithm in which the same key is used to encrypt and decrypt a single message or block of stored information.

Keys used in a symmetric cryptosystem must be kept secret, yet are required on both ends of a protocol exchange. They are commonly used on a per-session basis by layered protocols such as TLS and SSL.

---

symmetric virtualization

[Computer System]

Deprecated synonym for in-band virtualization.

---

synchronization

[General]

1. A receiver's identification of a transmission word boundary.

2. The act of aligning or making two entities be equivalent at a specified point in time.

---

synchronize

[Data Management]

In the context of data replication, to establish an identical copy of the user data on the primary volume onto the secondary volume.

Synchronous Digital Hierarchy

[Network]

A common worldwide telecommunications methodology, standardized by ISO with 155, 622, 2048 and 9953 Mbps serial data rates in steps of 4.

An SDH uses a light scrambling of data to remove only the lowest frequency elements with the goal of achieving maximum digital bandwidth use.

---

synchronous mirroring

[Storage System]

Deprecated synonym for synchronous replication.

synchronous operations

[Computer System]

Operations that have a fixed time relationship to each other.

Most commonly used to denote I/O operations that occur in time sequence, i.e., a successor operation does not occur until its predecessor is complete.

Synchronous Optical Network

[Network]

A standard for optical network elements and transmission.

SONET provides modular building blocks, fixed overheads, integrated operations channels, and flexible payload mappings. Basic SONET provides a data transfer capacity of 51.840 megabits/second. This is known as OC-1. Higher data transfer rates that are n times the basic rate are available (known as OC-n). OC-3, OC-12, OC-48, and OC-192 are currently in common use.

---

synchronous replication

[Storage System]

A replication technique in which data must be committed to stable storage at both the primary site and the secondary site before the write is acknowledged to the host.

---

system board

[Computer System]

A printed circuit module containing mounting devices for processor(s), memory, and adapter cards, and implementing basic computer functions such as memory access, processor and I/O interconnect clocking, and human interface device attachment.

---

system crash

[Hardware]

Hardware and/or software failure that causes the system to be non-functional.

---

system disk

[Computer System]

The disk on which a computer system's operating software is stored.

The system disk is usually the disk from which the operating system is bootstrapped (initially loaded into memory). It frequently contains the computer system's swap and/or page files as well, and may also contain libraries of common software shared among several applications.

System Management Bus

[Hardware][Management]

A management bus including hardware based on I2C and the associated protocols.

See I2C.

System on a Chip

[Hardware]

A composition of multiple components such as CPU, memory, and I/O interface, that perform as a system and are integrated into a single integrated circuit.

---

system portability

[Computer System]

The ability of a service, application or system to run in more than one environment.

---

system under test

[General]

An entity being tested to verify functional behavior or determine performance characteristics.

See also solution under test and test system.

S_ID

[Fibre Channel]

Acronym for Source Identifier.

T

T10

[SCSI]
Short name for the ANSI INCITS T10 technical committee.

T11

Short name for the ANSI INCITS TC T11 committee.

T13

[Standards]
Short name for the ANSI INCITS T13 technical committee.

table routing method

[SCSI]
A method used by SAS expanders for routing connection requests when multiple devices are accessible through a single SAS switch port.

tabular mapping

[Storage System]
A form of mapping in which a lookup table contains the correspondence between the two address spaces being mapped to each other.

If a mapping between two address spaces is tabular, there is no mathematical formula that will convert addresses in one space to addresses in the other. See algorithmic mapping, dynamic mapping.

tampering

[Data Security]
An unauthorized modification that alters the proper functioning of a device, system or communications path in a manner that degrades the security or functionality it provides.

tape

[Storage System]
A removable storage element containing a flexible substrate stored on a reel used as a storage medium.

The data on a tape is accessed by a tape drive.

---

tape autoloader

[Storage System]
A robotic tape media handler in which media is sequentially loaded and unloaded by the robot.

The term tape autoloader is typically used to indicate a single drive library that may have a sequential operation mode.

---

tape cartridge

[Storage System]
A tape with its carrier.

A tape cartridge may also contain other storage elements (e.g., a medium auxiliary memory).

---

tape drive

[Storage System]
A storage device that reads and writes data on tapes.

Unlike disks, tapes use implicit data addressing. See disk.

---

tape eject slot

[Storage System]
An entry/exit slot in a tape library.

---

tape library

[Storage System]
A storage device that provides addressable access to multiple tape cartridges, typically via multiple tape drives.

A robotic media handler is used to move tape cartridges between the tape drives, tape slots, and tape entry/exit slots.

tape slot

[Storage System]

A physical location used to hold a tape cartridge when not in a tape drive.

---

tape virtualization

[Storage System]

The application of storage virtualization to create a virtual tape or a virtual tape library.

---

target

[SCSI]

The endpoint that receives a SCSI I/O command sequence.

See initiator, LUN, target port identifier.

---

target NVMe_Port

[Fibre Channel]

NVMe-Port which is the NVM subsystem port for an NVMeoFC association.

Target of Evaluation

[Data Security]

An IT product or system and its associated guidance documentation that is the subject of evaluation.

This term is most commonly associated with ISO 15408.

---

target port identifier

[SCSI]

The interconnect address of a target or controller.

Target Session Identifying Handle

[iSCSI]

An identifier, assigned by the iSCSI target, for a session with a specific named initiator.

TB / TByte

[Computer System]

Shorthand for Terabyte.

Tbit

[General]

Shorthand for Terabit.

TCG

[Data Security]

Acronym for Trusted Computing Group.

TCO

[General]

Acronym for Total Cost of Ownership.

TCP

[Network]

Acronym for Transmission Control Protocol.

TCP Offload Engine

[Network]

A technology for improving TCP/IP performance by offloading TCP/IP processing to a Network Interface Card.

TCP/IP

[Network]

Shorthand for the suite of protocols that includes TCP, IP, UDP, and ICMP.

This is the basic set of communication protocols used on the Internet.

Tebibit

[General]

Shorthand for 1,099,511,627,776 (240) bits.

Binary notation is most commonly used for semiconductor memory sizes.

See also Terabit.

Tebibyte

[General]
Shorthand for 1,099,511,627,776 (240) bytes.

Binary notation is most commonly used for semiconductor memory sizes.

See also Terabyte.

---

technical controls

[Data Security]
Security controls (i.e., safeguards or countermeasures) for an information system that are primarily implemented and executed by the information system through mechanisms contained in the hardware, software, or firmware components of the system. [NIST Special Pub 800-53]

Technical Working Group

[Standards]
A SNIA working group in which specific technical work is undertaken, protected by the SNIA IP Policy.

Within the SNIA, technical work for standards development is conducted by volunteer technologists from member companies. The TWGs report to the SNIA Technical Council, which in turn reports to the SNIA Board.

Terabit

[General]
Shorthand for 1,000,000,000,000 (1012) bits.

The SNIA uses the base 10 convention commonly found in I/O-related and scientific literature rather than the base 2 convention (1,099,511,627,776, i.e., 240) common in computer system and software literature.

See also Tebibit.

Terabyte

[Computer System]
Shorthand for 1,000,000,000,000 (1012) bytes.

The SNIA uses the base 10 convention commonly found in I/O-related and scientific literature rather than the base 2 convention (1,099,5111,627,776, i.e., 240) common in computer system and software literature.

See also Tebibyte.

---

test system

[Storage System]
A collection of equipment used to perform a test on a system under test.

See also solution under test and system under test.

---

theoretical capacity

[Storage System]
The total number of bytes on the physical media.

Theoretical capacity includes addressable capacity, ECC (error correcting code) data, remap areas, and other capacity used for the operation of the device. See addressable capacity.

---

thin provisioning

[Storage System]
A technology that allocates the physical capacity of a volume or file system as applications write data, rather than preallocating all the physical capacity at the time of provisioning.

---

third party authentication

[Data Security]
Reliance on an authentication service, such as a RADIUS server, that is separate from (or external to) the entities of an authentication transaction.

---

third party copy

[Data Recovery][Management][SCSI]
A technique for performing backups using minimal host resources by copying data directly from the source to the destination without passing through a host.

threat

[Data Security]

Any possible intentional action or series of actions with a damaging potential to any of the stakeholders, the facilities, operations, the supply chain, society, economy, or business continuity and integrity [ISO 28004-1:2007].

---

threat monitoring

[Data Security]

Analysis, assessment, and review of audit trails and other information collected for the purpose of searching out system events that may constitute violations of system security.

---

throughput

[Computer System]

A deprecated synonym for data transfer capacity.

TiB / TiByte

[General]

Shorthand for Tebibyte.

Tibit

[General]

Shorthand for Tebibit.

---

tiered storage

[Storage System]

Storage that is physically partitioned into multiple distinct classes based on price, performance or other attributes.

Data may be dynamically moved among classes in a tiered storage implementation based on access activity or other considerations.

---

time server

[Network]

An intelligent entity in a network that enables all nodes in the network to maintain a common time base within close tolerances.

TLC

[Hardware]
Acronym for Triple-Level Cell

TLS

[Data Security]
Acronym for Transport Layer Security.

TNC

[Network]
Acronym for Threaded Neil Councilman, a type of coaxial cable connector.

Specifications for TNC style connectors are defined in MIL-C-39012 and MIL-C-23329.

TOE

[Network][Data Security]
1. Acronym for TCP Offload Engine.

2. Acronym for Target of Evaluation.

---

token ring

[Network]
1. A network in which each node's transmitter is connected to the receiver of the node to its logical right, forming a continuous ring.

Nodes on a token ring network gain the right to transmit data by retaining a token (a specific unique message) when they receive it. When a node holding the token has transmitted its allotment of data, it forwards the token to the next node in the ring.

2. A LAN protocol for token ring networks governed by IEEE Standard 802.3 that operates at speeds of 4 Mbits/second and 16 Mbits/second.

topology

[Network]

1. The logical layout of the components of a computer system or network and their interconnections.

Topology deals with questions of what components are directly connected to other components from the standpoint of being able to communicate. It does not deal with questions of physical location of components or interconnecting cables.

2. The communication infrastructure that provides Fibre Channel communication among a set of PN-Ports (e.g., a Fabric, an Arbitrated Loop, or a combination of the two).

Total Cost of Ownership

[General]

The comprehensive cost over its lifetime of a particular capability such as data processing, storage access, file services, etc.

Total Cost of Ownership (TCO) includes acquisition, environment, operations, management, service, upgrade, loss of service, and residual value.

TPC

[Data Recovery][Management]

Acronym for Third Party Copy.

---

track

[Hardware]

A portion of a recording address (see CHS) on an HDD that defines the combination of the cylinder and head.

---

transceiver

A transmitter and receiver combined in one package.

T

transformation

[Long-Term Retention]

A type of migration in which a format or representation change occurs during the movement of data or information.

Transformation involves possible information loss, since newer formats may be incapable of capturing all the functionality of the original format, or the migration system may be unable to interpret all the nuances of the original format.

Translate Domain

[Fibre Channel]

A domain presented by a Translate Domain Switch.

Translate Domain switch

[Fibre Channel]

A Fibre Channel Switch within an Inter-Fabric Router that is created for each set of Proxy Nx_Ports whose corresponding Native Nx_Ports exist within a set of Native Fabrics.

---

transmission character

[Network]

Any encoded character (valid or invalid) transmitted across a physical interface.

Valid transmission characters are specified by the standard defining the transmission code and include data characters and special characters.

---

transmission code

[General][Network]

1. A means of encoding data to enhance its transmission characteristics.

2. A byte-oriented transmission code specified by FC-FS-2 for 1/2/4/8 GFC, with valid data bytes and special codes encoded into 10-bit Transmission Characters according to the 8B10B encoding.

3. A word-oriented transmission code specified by 10GFC, with 64 bits of data and special codes encoded into a 66-bit transmission unit according to the 64/66 encoding.

Transmission Control Protocol

[Network]

The Internet connection oriented network transport protocol, which provides a reliable delivery service.

transmission word

[Fibre Channel]
A string of four contiguous transmission characters aligned on boundaries that are zero modulo 4 from a previously received or transmitted special character.

Fibre Channel transmission and reception operates in transmission word units when using 8B/10B encoding.

---

transmitter

1. The portion of a Link_Control_Facility that converts valid data bytes and special codes into transmission characters using the rules specified by the transmission code, converting these transmission characters into a bit stream, and transmitting this bit stream on an optical or electrical transmission medium.

2. An electronic circuit that converts an electrical logic signal to a signal suitable for an optical or electrical communications media.

---

transparent failover

[Computer System]
A failover, not visible to external components of a system, of one component of that system to another component of that system.

Often used to refer to paired disk controllers, one of which exports the other's virtual disks at the same addresses after a failure. See non-transparent failover.

Transport Layer Security

[Data Security]
A protocol suite defined by the IETF that provides privacy and data integrity between two communicating applications, using higher-level protocols that can layer on top of the TLS protocol transparently.

There are multiple versions of TLS, which are not compatible with each other, and early versions are considered less secure and should not be used. Multiple SNIA specifications leverage TLS as an important security mechanism; to ensure both security and interoperability, SNIA has published the SNIA TLS specification for storage systems (also ISO/IEC 20648) to identify specific requirements and guidance for TLS when it is used in conjunction with these SNIA specifications.

trap

[Management]
A type of SNMP message used to signal that an event has occurred.

Trap delivery to recipients uses UDP and is not completely reliable. See best effort.

---

triaxial cable

[Network]
An electrical transmission medium consisting of three concentric conductors separated by a dielectric material with the spacings and material arranged to give a specified electrical impedance.

See coaxial cable.

---

trim

[Storage System]
A method by which the host operating system may inform a storage device of blocks of data that are no longer in use and can be reclaimed.

Many storage protocols support this functionality via various names, e.g., ATA TRIM and SCSI UNMAP. See also garbage collection.

Triple-Level Cell

[Hardware]
A memory cell that stores three bits of data.

---

trojan horse

[Data Security]
Malware that masquerades as a benign application containing malicious logic that allows the unauthorized collection, falsification, or destruction of data.

T

---

trust

[Data Security]
Belief in the reliability, truth, ability, or strength of someone or something.

A trusted system is believed to have the ability to function as expected and to not misbehave.

Trusted Computing Group

[Data Security]

A not-for-profit organization formed to develop, define, and promote open standards for hardware-enabled trusted computing and security technologies, including hardware building blocks and software interfaces, across multiple platforms, peripherals, and devices.

---

trusted system

[Data Security]

A system that may be used for processing of sensitive or classified information, that employs sufficient hardware and software integrity measures to assure that it performs according to its documented specification and acts in a predictable manner.

Such a system is developed in accordance with security criteria and evaluated by these criteria.

TSIH

[iSCSI]

Acronym for Target Session Identifying Handle.

---

tunneling

[Data Security]

A technology that enables one network protocol to send its data via another network protocol's connections.

Tunneling works by encapsulating the first network protocol within packets carried by the second protocol. A tunnel may also encapsulate a protocol within itself (e.g., an IPsec gateway operates in this fashion, encapsulating IP in IP and inserting additional IPsec information between the two IP headers).

TWG

[Standards]

Acronym for Technical Working Group.

U

U.2

[Hardware]
The SFF-8639 connector used for a Quad (4x) PCIe bus.

UDP

[Network]
Acronym for User Datagram Protocol.

UID

[Management][Data Security]
Short for "user identifier" (User IDentifier).

ULP

[Fibre Channel]
Acronym for Upper Level Protocol.

Ultra SCSI

[SCSI]
A form of SCSI capable of 20 megatransfers per second.

Single ended Ultra SCSI supports bus lengths of up to 1.5 meters. Differential Ultra SCSI supports bus lengths of up to 25 meters. Ultra SCSI specifications define both narrow (8 data bits) and wide (16 data bits) buses. A narrow Ultra SCSI interconnect transfers data at a maximum of 20 MBytes per second. A wide Ultra SCSI interconnect transfers data at a maximum of 40 MBytes per second.

Ultra2 SCSI

[SCSI]

A form of SCSI capable of 40 megatransfers per second.

There is no single ended Ultra2 SCSI specification. Low voltage differential (LVD) Ultra2 SCSI supports bus lengths of up to 12 meters. High voltage differential Ultra2 SCSI supports bus lengths of up to 25 meters. Ultra2 SCSI specifications define both narrow (8 data bits) and wide (16 data bits) buses. A narrow Ultra SCSI interconnect transfers data at a maximum of 40 MBytes per second. A wide Ultra2 SCSI interconnect transfers data at a maximum of 80 MBytes per second.

Ultra3 SCSI

[SCSI]

A form of SCSI capable of 80 megatransfers per second.

There is no single ended Ultra3 SCSI specification. Low voltage differential (LVD) Ultra2 SCSI supports bus lengths of up to 12 meters. There is no high voltage differential Ultra3 SCSI specification. Ultra3 SCSI specifications only define wide (16 data bits) buses. A wide Ultra3 SCSI interconnect transfers data at a maximum of 160 MBytes per second.

Ultrium

[Storage System]

The half-inch, 'square' tape implementation of the LTO format, currently in its 4th generation, LTO-4 Ultrium.

UML

[Management]

Acronym for Unified Modeling Language.

---

unauthorized disclosure

[Data Security]

The exposure of information to individuals not authorized to receive or access it.

U

---

unicast

[Network]

A single transmission of a message to a single receiver connected to a transport network. Unicast is contrasted with broadcast (sending a message to all receivers on a network) and multicast (sending a message to a select subset of receivers).

Unicode

[General]

A set of standards intended to allow representation of every character in each of the world's languages; usually understood to mean the 16-bit variant.

Sixteen-bit Unicode allows for up to 216, or 65,536 characters, each of which may have a unique representation. It accommodates numerous non-English character sets and symbols, and is therefore an aid to development of products with multilingual user interfaces. Sixteen bits are not enough, however, to represent all the several hundred thousand Asian ideograms. Other 32-bit variants are available for these, but the increased inefficiency in representation of Western text inherent in them has been a barrier to widespread adoption.

---

unidirectional authentication

[Data Security]

Authentication that provides one party to a communication with assurance of another's identity.

Unified Modeling Language

[Management]

A visual approach that uses a variety of diagrams such as use case, class, interaction, state, activity and others to specify the objects of a model and their relationships.

Various tools exist for turning UML diagrams into program code.

Uniform Resource Identifier

URI

Compact sequence of characters that identifies an abstract or physical resource.

See RFC2396.

Uniform Resource Locator

URL

Compact sequence of characters that identifies an abstract or physical resource, including its location.

See RFC1738.

Uninterruptible Power Source

[General]

A source of electrical power that is not affected by outages in a building's external power source.

UPSs may generate their own power using generators, or they may consist of large banks of batteries. UPSs are typically installed to prevent service outages due to external power grid failure in computer applications deemed by their owners to be "mission critical."

---

unmap

[Storage System][Operating System]

See trim.

Removal of the virtual addresses from a portion of a file (e.g., POSIX).

---

unstructured data

[Data Management]

Data that cannot be easily described as structured data.

In general any non-database filesystem content is considered to be unstructured.

Upper Level Protocol

[Fibre Channel]

A protocol used on a Fibre Channel network at or above the FC-4 level.

SCSI, SBCCS, and NVMe are examples of Upper Level Protocols.

UPS

[General]

Acronym for Uninterruptible Power Source.

---

usable capacity

[Storage System]

Synonym for formatted capacity.

user data extent

[Storage System]

The protected space in one or more contiguously located redundancy group stripes in a single redundancy group.

In RAID arrays, collections of user data extents comprise the virtual disks or volume sets presented to the operating environment.

---

user data extent stripe depth

[Storage System]

The number of consecutive blocks of protected space in a single user data extent that are mapped to consecutive virtual disk block addresses.

In principle, each user data extent that is part of a virtual disk may have a different user data extent stripe depth. User data extent stripe depth may differ from the redundancy group stripe depth of the protected space extent in which it resides.

User Datagram Protocol

[Network]

An Internet protocol that provides connectionless datagram delivery service to applications.

UDP over IP adds the ability to address multiple endpoints within a single network node.

User Identifier

[Management][Data Security]

A unique number that identifies an individual to a computer system.

UIDs are the result of authentication processes that use account names, passwords and possibly other data to verify that a user is actually who she represents herself to be. UIDs are input to authorization processes that grant or deny access to resources based on the identification of the requesting user.

---

userid

[Management][Data Security]

Shorthand for User Identifier.

UTF-8

[General]

An encoding for multi-byte character schemes such as Unicode, in which ASCII text encodes to itself and POSIX string manipulation routines work largely as expected.

A 16-bit Unicode string that encodes ASCII text will have every other data byte within it set to zero. The UTF-8 encoding of this text will have a zero only at the end.

---

utilized capacity power efficiency

[Storage System]

The ratio of bytes stored on an idle storage system to the amount of power required to maintain the system in a ready idle state.

UUID

[Computer System]

An identifier that is expected to be universally unique across systems, space and time.

V

valid frame

[Fibre Channel]

A received frame containing a valid Start of Frame , a valid End of Frame , valid data characters, and proper Cyclic Redundancy Check (CRC) of the Frame_Header and Data_Field.

---

variable-length segmentation

[Storage System]

Partitioning a byte stream into parts that are not a constant number of bytes when performing compression or hash-based data deduplication.

See fixed-length segmentation.

VBA

[Storage System]

Acronym for Virtual Block Address.

VCI

[Network]

Acronym for Virtual Channel Identifier.

VCSEL

Acronym for Vertical Cavity Surface Emitting Laser.

---

vendor unique

[Standards]

Aspects related to a standard (e.g., functions, codes, etc.) not defined by the standard, but offered by a single vendor within the framework of the standard.

Functionality unique to a given vendor may be exposed using standard methods. For example, many vendors offer vendor-specific SNMP MIBs that users of the SNMP standard can use to obtain system information.

verify / verification

[Data Recovery]

The object-by-object comparison of the contents of a backup image with the online data objects from which it was made.

---

versioning

[Data Recovery]

The maintenance of multiple point-in-time copies of a collection of data.

Versioning is used to minimize recovery time by increasing the number of intermediate checkpoints from which an application can be restarted.

Vertical Cavity Surface Emitting Laser

A surface emitting laser source fabricated on a planar wafer with emission perpendicular to the wafer.

VE_Port

[Fibre Channel]

Shorthand for Virtual E_Port.

VE_Port_Name

[Fibre Channel]

The Name_Identifier of a VE_Port.

VF

[Fibre Channel]

Shorthand for Virtual Fabric.

VFT Tagging E_Port

[Fibre Channel]

An E-Port that has enabled processing of Virtual Fabric Tagging Headers.

VFT Tagging F_Port

[Fibre Channel]

An F_Port that has enabled processing of Virtual Fabric Tagging Headers.

VFT Tagging PN_Port

[Fibre Channel]

A PN_Port that has enabled processing of Virtual Fabric Tagging Headers.

VFT_Header

[Fibre Channel]

Shorthand for Virtual Fabric Tagging Header.

VF_ID

[Fibre Channel]

Acronym for Virtual Fabric Identifier.

VF_Port

[Fibre Channel]

Shorthand for Virtual F_Port.

VF_Port

[Fibre Channel]

Shorthand for Virtual F_Port.

VF_Port_Name

[Fibre Channel]

The Name_Identifier of a VF_Port.

VIA

[Computer System]

Acronym for Virtual Interface Architecture.

---

virtual block

[Storage System]

A block in the address space presented by a virtual disk.

Virtual blocks are the atomic units in which a virtual disk's storage capacity is typically presented by RAID arrays to their operating environments.

V

virtual block address

[Storage System]
The address of a virtual block.

Virtual block addresses are typically used in hosts' I/O commands addressed to the virtual disks instantiated by RAID arrays. SCSI disk commands addressed to RAID arrays are actually using virtual block addresses in their logical block address fields.

Virtual Channel Identifier

[Network]
A unique numerical tag contained in an ATM cell header.

A VCI identifies an ATM virtual channel over which the cell containing it is to travel.

---

virtual device

[Storage System]
A device presented to an operating environment by control software or by a volume manager.

From an application standpoint, a virtual device is equivalent to a physical one. In some implementations, virtual devices may differ from physical ones at the operating system level. E.g., booting from a host based disk array may not be possible.

---

virtual drive

[Storage System]
A set of blocks presented to an operating environment as a range of consecutively numbered logical blocks.

From the operating environment's viewpoint, the virtual drive mimics a physical drive.

Virtual E_Port

[Fibre Channel]
The data forwarding component of an FC Entity that emulates an E_Port and is dynamically instantiated on successful completion of an ELP SW_ILS exchange.

The term virtual indicates the use of a non Fibre Channel link connecting the VE_Ports.

Virtual Fabric

[Fibre Channel]

A Fibre Channel Fabric identified by a VF_ID composed of partitions of Fibre Channel Switches and N_Ports independent of all other Virtual Fabrics with single Fibre Channel Fabric management.

---

virtual fabric identifier

A value that uniquely identifies a Virtual Fabric among all the Virtual Fabrics that share a set of switches and N_Ports.

Virtual Fabric Tagging Header

[Fibre Channel]

An Extended_Header that contains information to associate a frame to a specific Virtual Fabric.

Virtual F_Port

[Fibre Channel]

The data forwarding component of an FC Entity that emulates an F_Port and is dynamically instantiated on successful completion of an FLOGI Exchange.

The term virtual indicates the use of a non-Fibre Channel link connecting a VF_Port with a VN_Port.

Virtual Interface Architecture

[Computer System]

An API specification for direct communication among distributed applications developed by Intel, Compaq, and Microsoft.

VIA reduces interprocess communication latency by obviating the need for applications to use processor interrupt or operating system paths to intercommunicate, while maintaining security on the communications path. VIA is interconnect neutral. See Fibre Channel Virtual Interface.

Virtual Link

[Network][Fibre Channel]

The logical link connecting two FCoE_LEPs over a Lossless Ethernet network.

Virtual Local Area Network

[Network]

A logical network that behaves as if it is physically separate from other physical and virtual LANs supported by the same switches and/or routers.

Virtual N_Port

[Fibre Channel]

The data forwarding component of an FC Entity that emulates an N_Port and is dynamically instantiated on successful completion of a FLOGI or FDISC Exchange.

Virtual Path Identifier

[Network]

An eight-bit field in an ATM cell header that denotes the cell over which the cell should be routed.

Virtual Switch

[Network][Fibre Channel]

[Fibre Channel] A Switching Construct that resides in a Core Switch and corresponds to a Virtual Fabric.

[Network] A software layer in a hypervisor that emulates a physical switch for the hosted virtual machines to offer connectivity to the larger physical network.

---

virtual tape

[Storage System]

A virtual device with the characteristics of a tape.

Virtual Tape Library

[Storage System]

A storage system that emulates a tape library.

Virtual-Tape-Libraries are usually classified as near-online devices, and provide faster Max TTFD than tape, but normally not as fast as online systems. They typically use slower drives with higher capacities than high-performance systems, and therefore offer a better energy footprint per unit of data.

---

virtualization

[Computer System]

Software that enable a single hardware platform to support multiple concurrent instances of systems such as storage, networking, or computing facilities.

Examples of virtualization are compute virtualization and storage virtualization.

VLAN

[Network]

Acronym for Virtual Local Area Network.

---

vnode

[Computer System]

Synonym for node, used when it is desired to emphasize the support for multiple nodes within a platform .

VN_Port

[Fibre Channel]

Synonym for Virtual N_Port.

VN_Port MAC address

[Network][Fibre Channel]

The MAC address used by an ENode for a particular address identifier during Fibre Channel operation using FCoE frames.

VN_Port_Name

[Fibre Channel]

The Name-Identifier of a VN_Port.

---

volatility

[Computer System]

A property of data yielding the possibility that it will be obliterated if certain environmental conditions are not met.

For example, data held in DRAM is volatile, since if electrical power to DRAM is cut, the data in it is lost. See non-volatility, persistence.

---

volume

[Storage System][Storage System]

1. Synonym for virtual disk.

2. A storage element that has been prepared for use.

Examples include Logical Unit, tape cartridge, LTFS Volume, and USB thumb drive.

volume group

[Data Recovery]

A collection of removable media that reside in a single location, for example in a single robot or group of interconnected robots.

---

volume manager

[Storage System]

Common term for host-based control software.

---

volume pool

[Data Recovery]

A logical collection of removable media designated for a given purpose, for example, for holding the copies of a single repetitive backup job, or for backing up data from a given client or set of clients.

A volume pool is an administrative entity, whereas a volume group is a physical one.

---

volume set

[Storage System]

Synonym for virtual disk.

VPI

[Network]

Acronym for Virtual Path Identifier.

VSAN

[Network]

A virtual Storage Area Network.

VTL

[Backup]

Acronym for Virtual Tape Library.

---

vulnerability

[Data Security]

Weakness of an asset or control that can be exploited by one or more threats [ISO/IEC 27000].

W

WAN

[Network]

Acronym for Wide Area Network.

---

warm spare

[Storage System]

A spare to which power is applied, and which is not operating, but which is otherwise usable as a hot spare.

---

warm swap

[Computer System]

The substitution of a replacement unit (RU) in a system for a defective one, where in order to perform the substitution, the system must be stopped (causing it to cease performing its function), but power need not be removed.

Warm swaps are manual operations performed by humans. See automatic swap, cold swap, hot swap.

Wave Division Multiplexing

[Network]

The splitting of light into a series of "colors" from a few (sparse WDM) to many with a narrow wavelength separation (dense WDM) for the purpose of carrying simultaneous traffic over the same physical fiber (9 micron usually).

Each "color" carries a separate data stream.

WBEM

[Management]

Acronym for Web Based Enterprise Management.

WDM

[Network][Windows]

1. Acronym for Wave Division Multiplexing.

2. Acronym for Windows Driver Model.

---

weak key

[Data Security]

A key that interacts with some aspect of a particular cipher's definition in such a way that it weakens the security strength of the cipher. [ISO/IEC 27040]

---

wear leveling

[Storage System]

A set of algorithms utilized by a flash controller to distribute writes and erases across the cells in a flash device.

Cells in flash devices have a limited ability to survive write cycles. The purpose of wear leveling is to delay cell wear out and prolong the useful life of the overall flash device.

Web Based Enterprise Management

[Management]

An initiative in the DMTF, comprising a set of technologies that enable interoperable management of an enterprise.

WBEM consists of CIM, an XML DTD defining the tags (XML encodings) to describe the CIM Schema and its data, and a set of HTTP operations for exchanging the XML-based information. CIM joins the XML data description language and HTTP transport protocol with an underlying information model (the CIM schema) to create a conceptual view of the enterprise.

---

well-known address

[Fibre Channel]

An address identifier used to access a service provided by a Fibre Channel fabric.

The service may be distributed in many elements throughout the Fibre Channel Fabric or it may be centralized in one or a few elements. A well-known address is not subject to zone restrictions (i.e., a well-known address is always accessible, irrespective of the current active zone set).

Wide Area Network

[Network]

A communications network that is geographically dispersed and that includes telecommunications links.

---

wide link

[SCSI]

A group of physical links that attaches a wide port to another wide port.

---

wide port

[SCSI]

A port that contains more than one phy.

---

wide SCSI

[SCSI]

Any form of SCSI using a 16-bit data path.

In a wide SCSI implementation, the data transfer rate in MBytes per second is twice the number of megatransfers per second because each transfer cycle transfers two bytes. See fast SCSI, Ultra SCSI, Ultra2 SCSI, Ultra3 SCSI.

Windows Internet Naming Service

[Windows]

A facility of the Windows operating system that translates between IP addresses and symbolic names for network nodes and resources.

Windows Management Instrumentation

[Windows]

The Microsoft framework that supports CIM and WBEM; a set of Windows operating system facilities that enable operating system components to provide management information to management agents.

WINS

[Windows]

Acronym for Windows Internet Naming Service.

WMI

[Windows]
Acronym for Windows Management Instrumentation.

---

word

[General]
A unit of data.

The length is specified by the architecture in which it is referenced and is typically 16 or 32 bits.

---

workgroup

[Computer System]
A group of UNIX or Windows computer system users and/or computers, usually with a common mission or project, that is created for administrative simplicity.

---

workload

[Computer System]
Characterization of the operations comprising a load placed upon a system.

---

workload generator

[Computer System]
Software used in the load generator to stimulate the product under test.

World Wide Node Name

A Node_Name that is worldwide unique

World Wide Port Name

A Port_Name that is worldwide unique.

Worldwide_Name

A Name_Identifier that is worldwide unique, and represented by a 64-bit value.

Write Amplification

Storage System] Increase in the number of write operations by the device beyond the number of write operations requested by hosts.

Examples: In flash storage this may happen because of garbage collection. In filesystems this may happen because writes to data blocks generally also require writes to inode blocks.

See JEDEC JESD218A,2/11

---

write amplification factor

[Storage System]

The ratio of the number of write operations on the device to the number of write operations requested by the host.

I.e., WAF = Device Write Ops / Host Write Ops.

---

write back cache

[Computer System]

A caching technique in which the completion of a write request is signaled as soon as the data is in cache, and actual writing to non-volatile media occurs at a later time.

Write-back cache includes an inherent risk that an application will take some action predicated on the write completion signal, and a system failure before the data is written to non-volatile media will cause media contents to be inconsistent with that subsequent action. For this reason, good write-back cache implementations include mechanisms to preserve cache contents across system failures (including power failures) and to flush the cache at system restart time. See write through cache.

---

write consolidation

[Storage System]

The process of accumulating the data for a number of sequential write requests in a cache, and performing a smaller number of larger write requests to achieve more efficient device utilization.

write hole

[Storage System]

A potential data corruption problem for parity RAID technology resulting from an array failure while application I/O is outstanding, followed by an unrelated member disk failure (some time after the array has been returned to service).

Data corruption can occur if member data and parity become inconsistent due to the array failure, resulting in a false regeneration when data from the failed member disk is subsequently requested by an application. Parity RAID implementations typically include mechanisms to eliminate the possibility of write holes.

Write Once Read Many

[Storage System]

A type of storage, designed for fixed content, that preserves what is written to it in an immutable fashion.

Optical disks are an example of WORM storage.

---

write through cache

[Computer System]

A caching technique in which the completion of a write request is not signaled until data is safely stored on non-volatile media.

Write performance with a write-through cache is approximately that of a non-cached system, but if the data written is also held in cache, subsequent read performance may be dramatically improved. See write back cache.

X

XAM

[Standards]
Acronym for eXtensible Access Method.

XAM API

[Standards]
The methods that a XAM Application uses to communicate with XAM enabled storage, via the XAM Library.

XAM Storage System

[Storage System]
A storage system that provides XAM-compliant storage services.

Typically this type of storage system is used for data that is not expected to change during its lifetime (e.g., fixed content, reference information, archival data). The contents of a XAM Storage System are exposed to applications via one or more XSystem objects in the XAM API.

XML

[General]
Acronym for eXtensible Markup Language.

XSet

[Storage System]
The primary stored object abstraction in XAM.

An XSet binds data and metadata into a single entity that is stored and retrieved as a unit. MIME types are used to specify data and metadata formats.

XSystem

[Storage System]
A logical container of XSets independent of the means (e.g., communication) used to access XSet contents.

An XSystem is visible to XAM applications as an abstraction in the XAM API.

XTS-AES

[Data Security]
An encryption mode developed for data at rest protection, specified in the IEEE Std 1619-2018 "Cryptographic Protection of Data on Block-Oriented Storage Devices."

X_ID

Acronym for Exchange_Identifier.

Y

YB / YByte

[General]
Shorthand for Yottabyte.

Ybit

[General]
Shorthand for Yottabit.

YiB / YiByte

[General]
Shorthand for Yobibyte.

Yibit

[General]
Shorthand for Yobibit.

Yobibit

[General]
Shorthand for 1,208,925,819,614,629,174,706,176 (280) bits.

Binary notation is most commonly used for semiconductor memory sizes.

See also Yottabit.

Yobibyte

[General]
Shorthand for 1,208,925,819,614,629,174,706,176 (280) bytes.

Binary notation is most commonly used for semiconductor memory sizes.

See also Yottabyte.

Yottabit

[General]
Shorthand for 1,000,000,000,000,000,000,000,000 (1024) bits.

The SNIA uses the base 10 convention commonly found in I/O-related and scientific literature rather than the base 2 convention (1,208,925,819,614,629,174,706,176, i.e., 280) common in computer system and software literature.

See also Yobibit.

Yottabyte

[General]
Shorthand for 1,000,000,000,000,000,000,000,000 (1024) bytes.

The SNIA uses the base 10 convention commonly found in I/O-related and scientific literature rather than the base 2 convention (1,208,925,819,614,629,174,706,176, i.e., 280) common in computer system and software literature.

See also Yobibyte.

Z

ZB / ZByte

[General]
Shorthand for Zettabyte.

Zbit

[General]
Shorthand for Zettabit.

Zebibit

[General]
Shorthand for 1,180,591,620,717,411,303,424 (270) bits.

Binary notation is most commonly used for semiconductor memory sizes.

See also Zettabit.

Zebibyte

[General]
Shorthand for 1,180,591,620,717,411,303,424 (270) bytes.

Binary notation is most commonly used for semiconductor memory sizes.

See also Zettabyte.

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zero filling

[Data Security]
The process of filling unused storage locations in an information system with the value of 0.

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zero-day vulnerability

[Data Security]
A previously unknown vulnerability to the vendor that may or may not have been exploited by malware.

zeroing

[File System]
The process of writing zeroes (0x00) to all the bytes in a block or an entire disk before delivering it for use, or upon its release from use.

Zeroing renders any data formerly stored on the block or device inaccessible except by forensic means such as magnetic force microscopy and other techniques that physically scan the storage media.

Zettabit

[General]
Shorthand for 1,000,000,000,000,000,000,000 (1021) bits.

The SNIA uses the base 10 convention commonly found in I/O-related and scientific literature rather than the base 2 convention (1,180,591,620,717,411,303,424, i.e., 270) common in computer system and software literature.

See also Zebibit.

Zettabyte

[General]
Shorthand for 1,000,000,000,000,000,000,000 (1021) bytes.

The SNIA uses the base 10 convention commonly found in I/O-related and scientific literature rather than the base 2 convention (1,180,591,620,717,411,303,424, i.e., 270) common in computer system and software literature.

See also Zebibyte.

ZiB / ZiByte

[General]
Shorthand for Zebibyte.

Zibit

[General]
Shorthand for Zebibit.

zone

[Fibre Channel][Storage System]

1. [Storage System] A group of sectors on an HDD that uses SMR that must be written sequentially.
2. [Fibre Channel] A collection of Fibre Channel N_Ports and/or NL_Ports (i.e., device ports) that are permitted to communicate with each other via the Fibre Channel Fabric.

Zone Set

[Fibre Channel]

A set of zone definitions for a Fibre Channel Fabric.

Zones in a zone set may overlap (i.e., a port may be a member of more than one zone). Fibre Channel Fabric management may support switching between zone sets to enforce different access restrictions (e.g., at different times of day).

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zoning

[Fibre Channel]

A method of subdividing a storage area network into disjoint zones, or subsets of nodes on the network.

Storage area network nodes outside a zone, except those with well-known addresses, are invisible to nodes within the zone.

SNIA

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