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To: X3T9.2 Committee (SCSI)

From: George Penokie (IBM)

Subject: SDA States and Types

1.0 Overview

The SCSI-3 Disk Array Model requires the definition of several new SCSI device types. This proposal lists all the new SCSI devices types that are required for the SCSI-3 Disk Array Model.

The SCSI-3 Disk Array Model also needs to define the state of SCSI devices. The state of a device is an indication of its current operating condition. The state information gives an application client the information required for to do configuration services to a SDA.

2.0 SCSI-3 Device Types

This proposal requests the following peripheral device type be added to the SCSI-3 peripheral device type table:

Code	Description
0Ch	SCSI disk array device

These changes would become part of the peripheral device type table in the SCC standard. The new peripheral device type table would appear as follows:

.pa

Table xx - Peripheral device type

Code	Description
00h	Direct-access device (e.g. magnetic disk)
01h	Sequential-access device (e.g. magnetic tape)
02h	Printer device
03h	Processor device
04h	Write-once device (e.g. some optical disks)
05h	CD-ROM device
06h	Scanner device
07h	Optical memory device (e.g. some optical disks)
08h	Medium changer device (e.g. jukeboxes)
09h	Communications device
0Ah-0Bh	Defined by ASC IT8 (Graphic arts pre-press devices)
0Ch	SCSI disk array device
0Dh-1Eh	Reserved
1Fh	Unknown or no device type

3.0 Reporting of SCSI-3 Disk Array States

The reasons for reporting states depend on the which logical

unit is being addressed. The following sections describe the possible states for each of the addressable components within an SCSI Disk Array.

3.1 SCSI Disk Array States (LUN 0)

The state of the SDA may be determined by using the same methods as any other SCSI device(e.g. TUR followed by Request Sense). However, more detailed state information may be obtained by issuing a state request to the base device address of the SDA.

All valid base device address states shall be reported within a single state request by setting the appropriate bit(s). If all the bits within the state information field are set to zero then the SDA is available.

The base device address of an SDA may report any of the following states under the listed conditions:

Readying Bit - The selected SDA is being initialized and access to the SDA is limited.

Available - The selected SDA is operational.

Present Bit - The selected SDA is present but no other status is available.

Component Failure Bit - Within the selected SDA a non-addressable part has failed. In this state all data is still fully protected (e.g. power supply failure, LED failure, cache failure, etc. that are not defined as C-LUIs). More information on the failure may be available within the sense data from a Request Sense Command issued to base device address of the SDA.

Abnormal Bit - Within the selected SDA an addressable device (C-LUI, P-LUI, R-LUI, V-LUI, or S-LUI) is indicating a state other than available. To determine which device is indicating it is not available issue a state request to each addressable device within the SDA.

3.2 Volume Set States

Only a single volume set state shall be reported within a single state request.

Volumes set may report any of the following states under the listed conditions:

Not Available - The selected V-LUI is capable of being supported but has not been configured.

Readying - The selected V-LUI is being initialized and access to the V-LUI is limited.

Available - The selected V-LUI is fully operational.

Rebuild - One or more of the redundancy groups associated with the selected V-LUI is in the process of a rebuild operation. In this state data is not protected.

Protected Rebuild - One or more of the redundancy groups associated with the selected V-LUI is in the process of a rebuild operation. In this state all data is fully protected.

Recalculate - The selected V-LUI is in the process of a recalculate operation.

Spare in Use - Within the selected V-LUI a spare is being used. In this state all data is still fully protected.

Exposed - Within the selected V-LUI data is not protected. In this state all data is still valid.

Data Lost - Within the selected V-LUI data has been lost.

Broken - The selected V-LUI is capable of being supported but it has failed.

3.3 Redundancy Group States

| Only a single redundancy group state shall be reported
| within a single state request.

Redundancy groups may report any of the following states under the listed conditions:

Not Available - The selected redundancy group is capable of being supported but has not been configured.

Available - The selected redundancy group is fully configured.

Present - The selected redundancy group is present but no other status is available.

Rebuild - The selected redundancy group is in the process of a rebuild operation. In this state data is not protected.

Protected Rebuild - The selected redundancy group is in the process of a rebuild operation. In this state all data is fully protected.

Recalculate - The selected redundancy group is in the process of a recalculate operation.

Exposed - Within the selected redundancy group data is not protected. In this state all data is still valid.

3.4 P-LUI/P-extent States

The state of the P-LUI may be determined by using the same methods as any other SCSI device(e.g. TUR followed by Request Sense). However, more detailed state information may be obtained by issuing a state request to the P-LUI.

| Only a single P-LUI/P-extent state shall be reported within a
| single state request.

P-LUIs and P-extents may report any of the following states under the listed conditions:

Not Available - The selected P-LUI or P-extent is capable of being supported but no device is connected.

Readying - The selected P-LUI or P-extent is being initialized and access to the P-LUI or P-extent is limited.

Available - The selected P-LUI or P-extent is fully operational.

Present - The selected P-LUI or P-extent is present but no other status is available.

Broken - The selected P-LUI or P-extent is capable of being supported but it has failed.

Not Supported - The SDA is not capable of supporting a device on the selected P-LUI or P-extent.

3.5 Spare States

| Only a single spare state shall be reported within a single state request.

Spares may report any of the following states under the listed conditions:

Not Available - The selected spare is capable of being supported but has not been configured.

Available - The selected spare is fully operational.

Present - The selected spare is present but no other status is available.

Spare in Use - The selected spare is being used. In this state all data is still fully protected.

Exposed - The selected spare is being used. In this state data is not protected. In this state all data is still valid.

Broken - The selected spare is capable of being supported but it has failed.

3.6 C-LUI States

| Only a single C-LUI shall be reported within a single state request.

Components(C-LUI) may report any of the following states under the listed conditions:

Not Available - The selected C-LUI is capable of being
| supported but no component is present.

Readying - The selected C-LUI is being initialized and access to the C-LUI is limited.

Available - The selected C-LUI is fully operational.

Present - The selected C-LUI is present but no other status is available.

Broken - The selected C-LUI is capable of being supported but it has failed.

Not Supported - The SDA is not capable of supporting a component on the selected C-LUI.