

February 24, 2010

2 TiB Boundary Reporting

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Revision 1

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Document Status

| Revision History | | |
|-------------------------|-------------------|------------------------------------------------------------------------------------------|
| Rev | Date | Description |
| 0 | February 23, 2010 | 1) Initial Revision |
| 1 | February 24, 2010 | 1) Added Extended Capacity field 2) imported and updated rules for capacity reporting |

1 Introduction

Storage devices are developing the need to report that they support more than 32 bits of LBA space. The current ACS-2 project allows for the device to report up to 64 bits of LBA space, but application clients are improperly handling this field and treating the high order 32 bits as reserved. As a result, a device which reports 2.010TiB bytes of capacity is seen by the application client as having 10GiB of capacity. The purpose of this proposal is to provide a mechanism for the device to limit the current capacity reporting to 2TiB and to provide a new reporting value for >2TiB.

2 Changes to ACS

<Current>

4.13.4 IDENTIFY DEVICE data

When the host issues a SETMAX ADDRESS command or SETMAX ADDRESS EXT command, several IDENTIFY DEVICE data words may be affected. The following guidelines are used for setting IDENTIFY DEVICE data:

- a) if the 48-bit Address feature set is not supported then words 60..61 shall contain the total number of user addressable sectors and words 100..103 shall be reserved;
- b) if the 48-bit Address feature set is supported and the total number of user addressable sectors is less than or equal to 0FFF_FFFFh then Words 60..61 and 100..103 shall contain the total number of user addressable sectors; and
- c) if the 48-bit Address feature set is supported and the total number of user addressable sectors is greater than 0FFF_FFFFh then words 60..61 shall contain 0FFF_FFFFh and words 100..103 shall contain the total number of user addressable sectors.

<New>

4.13.4 IDENTIFY DEVICE data

If the host issues a SETMAX ADDRESS command or SETMAX ADDRESS EXT command, **then** several IDENTIFY DEVICE data words may be affected. The following guidelines are used for setting IDENTIFY DEVICE data:

- a) if the 48-bit Address feature set is not supported then words 60..61 shall contain the total number of user addressable sectors, ~~and~~ words 100..103 shall be reserved, and bit TBD1 shall be cleared to zero;
- b) if the 48-bit Address feature set is supported and the total number of user addressable sectors is less than or equal to 0FFF_FFFFh then
 - A) words 60..61 and words 100..103 shall contain the total number of user addressable sectors; and
 - B) if bit TBD1 is set to one, then words TBD B..TBD B+3 shall contain the total number of user addressable sectors;
- c) if the 48-bit Address feature set is supported and the total number of user addressable sectors is greater than 0FFF_FFFFh then words 60..61 shall contain 0FFF_FFFFh and:
 - A) If bit TBD1 is cleared to zero, then words 100..103 shall contain the total number of user addressable sectors; and
 - B) If bit TBD1 is set to one, then words TBD B..TBD B+3 shall contain the total number of user addressable sectors and words 100.103 words 100.103 shall contain a value less than or equal to the total number of user addressable sectors and greater than 0000 0000 0FFF FFFFh (e.g., words 100..103 may be limited to 0000 0000 FFFF FFFFh and the full capacity is reported in TBD B..TBD B+3).

2.0.1 Changes to IDENTIFY DEVICE data

Add a bit to IDENTIFY DEVICE data to indicate that the value in words 100..103 is limited to 0000_0000_FFFF_FFFFh and that the full size of the device is reported elsewhere.

| Word | O | S | F | Description |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---------------------------------------------------------------------------------------------------------------------------------------|
| TBD A | O | | | |
| | | B | F | TBD 1 1 = Extended Number of User Addressable Sectors is supported (see x.x.x) |
| TBD B..TBD B+3 | O | B | F | Extended Number of User Addressable Sectors (QWord) (see x.x.x) |
| Key: | | | | V – The contents of the field is variable and may change depending on the state of the device or the commands executed by the device. |
| O/M – Mandatory/optional requirement. | | | | |
| M – Support of the word is mandatory. | | | | |
| O – Support of the word is optional. | | | | |
| F/V – Fixed/variable content | | | | X – The content of the field may be fixed or variable |
| F – The content of the field is fixed and does not change. The DCO command may change the value of a fixed field. For removable media devices, these values may change when media is removed or changed. | | | | S/P – Content applies to Serial or Parallel transport |
| | | | | S – Serial Transport |
| | | | | P – Parallel Transport |
| | | | | B – Both Serial and Parallel Transports |
| | | | | N – Belongs to a transport other than Serial or Parallel |

If bit TBD1 is set to one, then words TBD B..TBD B+3 are valid. If bit TBD1 is cleared to zero, then Words TBD B..TBD B+3 are reserved.

Words TBD B..TBD B+3: Extended Number of User Addressable Sectors (QWord)

If bit TBD1 is set to one, then Words TBD B..TBD B+3 contain a value that is one greater than the maximum LBA in user accessible space. The maximum value that shall be placed in this field is 0000_FFFF_FFFF_FFFFh.