To:          T10 Technical Committee
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Subject:    CMDDT and variable length CDBs

## Revision History
Revision 0 (2 May 2001) first revision

## Related Documents
spc2r17 – SCSI Primary Commands – 2 revision 17

## Overview
If the CmdDT bit is set, the PAGE OR OPERATION CODE field in the INQUIRY CDB (one byte) indicates an opcode for which a CDB bitmask is returned.  The read data includes a CDB length and a bitmask indicating supported bits.  This indicates
       a) whether an opcode is supported, and
       b) which fields are supported in the CDB.

The variable length command proposals overlooked the CmdDT bit in INQUIRY.  What does a query for opcode 7Fh (the variable length CDB) return?  How long is the data?  There may be different lengths of CDBs and they all have different bit masks.  There are not enough bits free in the INQUIRY CDB to add the 2 byte variable-length service action field.

This is also an issue for fixed length CDBs with overloaded opcodes like MAINTENANCE IN/OUT which are hosting new unrelated commands like SET/REPORT TARGET GROUPS via service actions.   Each of those commands/service actions may have a different bit mask.  REPORT/SET TARGET GROUPS support can be inferred from the new INQUIRY data bits indicating implicit or explicit support.  This may not hold true for all the other commands packed onto MAINTENANCE IN/OUT.

There is always one alternative that always works:  try the command with zero length data to see whether it is supported or not.  This involves error-handling code.

## Suggested Changes
Should we:
- obsolete CmdDT
- add a bit to INQUIRY byte 2 to query variable-length CDBs.  Combine the existing PAGE OR OPCODE field byte with the reserved byte and use it for the 2-byte service action. (rename PAGE OR OPCODE to PAGE OR OPCODE OR SERVICE ACTION UPPER BYTE)
- add bits to INQUIRY byte 2 to query MAINTENANCE IN and MAINTENANCE OUT commands.  Use the PAGE OR OPCODE field byte for the 1-byte service action.
- provide a new variable length CmdDT retrieval command (for opcode 7Fh)
- provide a new MAINTENANCE IN/OUT CmdDT retrieval command (for opcode A4h)
- ignore the problem
- add a bit that says return all the service actions (new report format) and maybe bitmasks for them all.  allocation length is too short for all possible bitmasks.  2 bytes per service action in the return data. If too big, tough.  CMDDT only for variable length CDB returns invalid field in CDB with byte 2 marked as bad.

## 7.3.1 INQUIRY command introduction
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| Bit Byte | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | OPERATION CODE (12H) | | | | | | | |
| 1 | | | | | | SVCACT | CMDDT | EVPD |
| 2 | PAGE OR OPCODE | | | | | | | |
| 3 | RESERVED | | | | | | | |
| 4 | ALLOCATION LENGTH | | | | | | | |
| 5 | CONTROL | | | | | | | |

A command support data (CMDDT) bit of one specifies that the device server shall return the optional command support data specified by the PAGE OR OPERATION CODE field. If the device server does not support returning command data and this bit is set to one, the device server shall return CHECK CONDITION status with the sense key set to ILLEGAL REQUEST and an additional sense code of INVALID FIELD IN CDB. Details of the command support data may be found in 7.3.5.

NOTE 11 An application client may receive a CHECK CONDITION status response with the sense key set to ILLEGAL REQUEST upon sending an INQUIRY command with the CMDDT bit set to one to some SCSI-2 device servers, since this bit was reserved in SCSI-2.

If both the EVPD and CMDDT bits are zero, the device server shall return the standard INQUIRY data (see 7.3.2). If the PAGE OR OPERATION CODE field is not zero when both EVPD and CMDDT are zero, the device server shall return CHECK CONDITION status with the sense key set to ILLEGAL REQUEST and an additional sense code of INVALID FIELD IN CDB.

If both the EVPD and CMDDT bits are one, the device server shall return CHECK CONDITION status with the sense key set to ILLEGAL REQUEST and an additional sense code of INVALID FIELD IN CDB.

When the EVPD bit is one, the PAGE OR OPERATION CODE field specifies which page of vital product data information the device server shall return (see 8.4).

When the CMDDT bit is one, the PAGE OR OPERATION CODE field specifies the SCSI operation code for which device server shall return command support data (see 7.3.5).
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### 7.3.5 Command support data
Implementation of command support data is optional. The application client may request the command support data information by setting the CMDDT bit to one and specifying the SCSI operation code of the desired CDB.

If the device server implements the requested SCSI operation code, it shall return the data defined in table 55. If the device server does not implement the requested SCSI operation code it shall return the peripheral qualifier and type byte and 001b in the SUPPORT field.
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