Security Architecture for Intelligent Attachment Device Specifications

– File System for iVDR –

Version 1.01

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- *SAFIA License Group*

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Preface

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Contents

1   General

1.1   Scope

This document describes the volume structure and file system format for iVDR on which functions described in SAFIA implemented. By constructing this logical volume structure, interoperability is accomplished among various devices that are able to interpret the structure correctly.

1.2   References

1)   iVDR Hard Disk Drive Consortium,,
     iVDR File System Specification Version 2.1, November 2005 [iVDR/FS]

2)   iVDR Hard Disk Drive Consortium,
     Interface Specification Version 2.0, April 2006 [iVDR/IF]

3)   Security Architecture for Intelligent Attachment Device Specifications,
     Protocol and Data Structure Volume 1 [SAFIA/PDS1]

1.3   Definitions

1.3.1   Definition in iVDR/FS

The following term used in this document is defined in iVDR/FS.

- Logical Cluster Address for Qualified Space

1.3.2   Definition in iVDR/IF

The following term used in this document is defined in iVDR/IF.

- Qualified Space

1.3.3   Definitions in SAFIA/PDS1

The following terms used in this document are defined in SAFIA/PDS1.

- Usage Pass

- Usage Pass Identifier

1.4   Abbreviations

1.4.1   Abbreviations in iVDR/FS

The following abbreviations used in this document are described in iVDR/FS.

- LBAQ

- LCAQ

- RBP

- Uint32

1.5   Conventions

The following conventions are used in this document.

1.5.1   Keywords

Shall and reserved follow the description provided in section 1.5.1 of SAFIA/PDS1.

1.5.2   Numerical values

Numerical values follow the description provided in section 1.5.2 of SAFIA/PDS1.

1.6   Notations

The following notations are used in this document.

1.6.1   Operations

- ip(x)   the integer part of x.

- rem(a, b) $a - b \times ip(a/b)$, where a and b are integers.

- +   Addition

- ×   Multiplication

- /   Division

- =   Assignment

2   Condition for SAFIA compliance

2.1   Volume Structure

Volume Structure follows iVDR Volume Structure specified in iVDR/FS.

2.2   File System Format

File System Format follows iVDR File System Format specified in iVDR/FS.

iVDR Qualified Space Bitmap and iVDR Usage Control Information Stream for SAFIA are described in section 3.2 and 3.3.

3 Data Structure

3.1 LCAQ

LCAQ is determined by the following equation

$$LCAQ = LBAQ / N.$$

Here N is power of 2 such as 1, 2, 4, 8, ...

Any part of Qualified Space shall be accessed with unit of LCAQ. A logical cluster shall be a region pointed by N continuous LBAQs. The number of Usage Pass recorded in a logical cluster is 1.

In this document, N shall be 1.

3.2 iVDR Qualified Space Bitmap Stream

3.2.1 iVDR_QSBM Stream Type

The value of iVDR_QSBM Stream Type for SAFIA is 1. This field shall be set to 1.

3.2.2 iVDR_QSBM Stream Type Specific Data

iVDR_QSBM Stream Type Specific Data for SAFIA is described in Table 3.1.

Table 3.1   Format of iVDR_QSBM Stream Type Specific Data

RBP	Length	Field name	Contents
0	4	Start LBAQ	Uint32
4	4	Sector Count	Uint32
8	4	Logical Cluster Size	Uint32
12	4	Number of Bits (= N_BT)	Uint32
16	4	Number of Bytes (= N_B)	Uint32
20	N_B	Bitmap Information	Bytes

3.2.2.1 Start LBAQ

An LBAQ is set to this field. A disk partition in Qualified Space managed with this stream starts from this address.

3.2.2.2 Sector Count

The number of sectors managed with this stream is set to this field.

3.2.2.3 Logical Cluster Size

The size of an LCAQ is set to this field. The value shall be 512 × N, where N is the same value described in section 3.1.

3.2.2.4 Number of Bits (= N_BT)

The number of valid bits in the Bitmap Information field is set to this field. This value shall not be less than Sector Count / N, where N is the same value described in section 3.1.

3.2.2.5 Number of Bytes (= N_B)

The number of bytes in the Bitmap Information field is set to this field. This value shall not be less than $ip((N\_BT + 7) / 8)$.

3.2.2.6 Bitmap Information

The validity of a logical cluster in the QS Disk partition is set to this field. If a bit is set to 0b, the logical cluster is valid. The bit related to the logical cluster corresponds to a bit at $rem(LCAQ - Start\_LBAQ / N, 8)$ in byte $ip((LCAQ - Start\_LBAQ / N) / 8)$, here byte 0 is the first byte in this field and bit 0 is the most significant bit. N is the same value described in section 3.1.

3.3 iVDR Usage Control Information Stream

The relationships between Usage Pass and LCAQs are recorded in iVDR Usage Control Information stream.

3.3.1 iVDR_UCInfo Stream Type

The value of iVDR_UCInfo Stream Type for SAFIA is 1. This field shall be set to 1.

3.3.2 iVDR_UCInfo Stream Type Specific Data

The structure of iVDR_UCInfo Stream Type Specific Data is described in Table 3.2.

Table 3.2 Structure of iVDR_UCInfo Stream Type Specific Data

RBP	Length	Field name	Contents
0	4	Number of Usage Pass Location (= N_UPL)	Uint32
4	24	Reserved	Bytes
28	N_UPL × 64	Usage Pass Location	Bytes

3.3.2.1 Number of Usage Pass Location

The number of Usage Pass Location fields is set in this field.

3.3.2.2 Usage Pass Location

The relationships between a Usage Pass and an LCAQ are described in Usage Pass Location field. The structure of this field is described in Table 3.3.

Table 3.3 Structure of Usage Pass Location

RBP	Length	Field name	Contents
0	1	Validity	Bytes
1	7	Reserved	Bytes
8	32	Usage Pass Identifier	Bytes
40	4	LCAQ	Uint32
44	20	Reserved	Bytes

Validity: If the most significant bit of Validity is 0b, this Usage Pass Location is not valid.

LCAQ: The LCAQ where Usage Pass is stored.

Usage Pass Identifier: Usage Pass Identifier of the stored Usage Pass.