



**White Paper
Blu-ray Disc™
Read-Only Format**

**CMP Export Specifications
Version 1.1**

August 2015

White Paper Blu-ray Disc™ Read-Only Format

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Table of contents

1	Foreword.....	1
2	Overview of CMP Export.....	3
3	CMP Export Process.....	5
4	CMP Export Data Format.....	7
4.1	Data for Export (DfE).....	7
4.2	Manifest files	8
4.3	Common Media Package Format	8

White Paper Blu-ray Disc™ Read-Only Format

Table of Contents

List of figures

Figure 2-1 – Scope of CMP Export.....	3
Figure 3-1 – CMP Export Process (high level overview)	5
Figure 4-1 – BDMV Export Overview.....	7
Figure 4-2 – CMP structure	8

1 Foreword

The Blu-ray Disc format has been the highest quality option for distribution of High Definition Video Content for nearly a decade. Recently, several key factors have impacted the television entertainment market, including the emergence of new screen technologies such as larger, brighter, and more colorful displays with resolutions up to UHD.

The Blu-ray Disc Association created an internal task force of industry professionals from the Consumer Electronics Industries, Information Technology Companies, and Studio Content Providers to propose an extension to the current Blu-ray Disc format.

This task force has worked diligently to develop a new, next generation format extension that provides new Blu-ray format features taking advantage of advanced in device capabilities.

This document describes the overview of Blu-ray Disc format “System Description Blu-ray Disc Read-Only Format: CMP Export Specifications Blu-ray Disc Book Version 1.1” (hereafter CMP Export) by referring to the Ultra HD Blu-ray format “System Description Blu-ray Disc Read-Only Format Part3: Audio Visual Basic Specifications Version 3.0” (hereafter Ultra HD Blu-ray or BD-ROM Part3 V3.0) and Blu-ray Disc format “System Description Blu-ray Disc Read-Only Format Part3: Audio Visual Basic Specifications Version 2.5” (hereafter BD-ROM Part3 V2.5) and their White Papers.

White Paper Blu-ray Disc™ Read-Only Format

Foreword

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2 Overview of CMP Export

The Blu-ray Disc format has developed a new feature which enables a Blu-ray Disc Player to export Blu-ray Disc Movie format (BDMV) encoded data together with additional Publisher provided data (Data for Export) into a Common Media Package (CMP)^[1] file which can then be used within different Digital Ecosystems. This process is called “CMP Export”. An implementation of the processes to support this functionality is known as an Exporter.

The CMP Export of Blu-ray Disc format is applicable for both Blu-ray™ and Ultra HD Blu-ray™. It is intended to be used together with the specifications defined by a particular CMP Export Service to perform CMP Export. The CMP Export Service is not operated by BDA, but by a Licensee of the CMP Export Specifications. There can be more than one CMP Export Service.

The CMP file exported by an Exporter will contain multiple Digital CFF Containers (DCCs)^[1] that contain either audio, video or subtitle data. These DCCs are either not encrypted or encrypted using technology agnostic to a particular DRM or particular Digital Ecosystem.

CMP Export addresses only the processes required for export to a CMP file and does not address the processes required for transfer or playback of the content within a CMP by a particular DRM or particular Digital Ecosystem. Figure 2-1 depicts the scope of CMP Export.

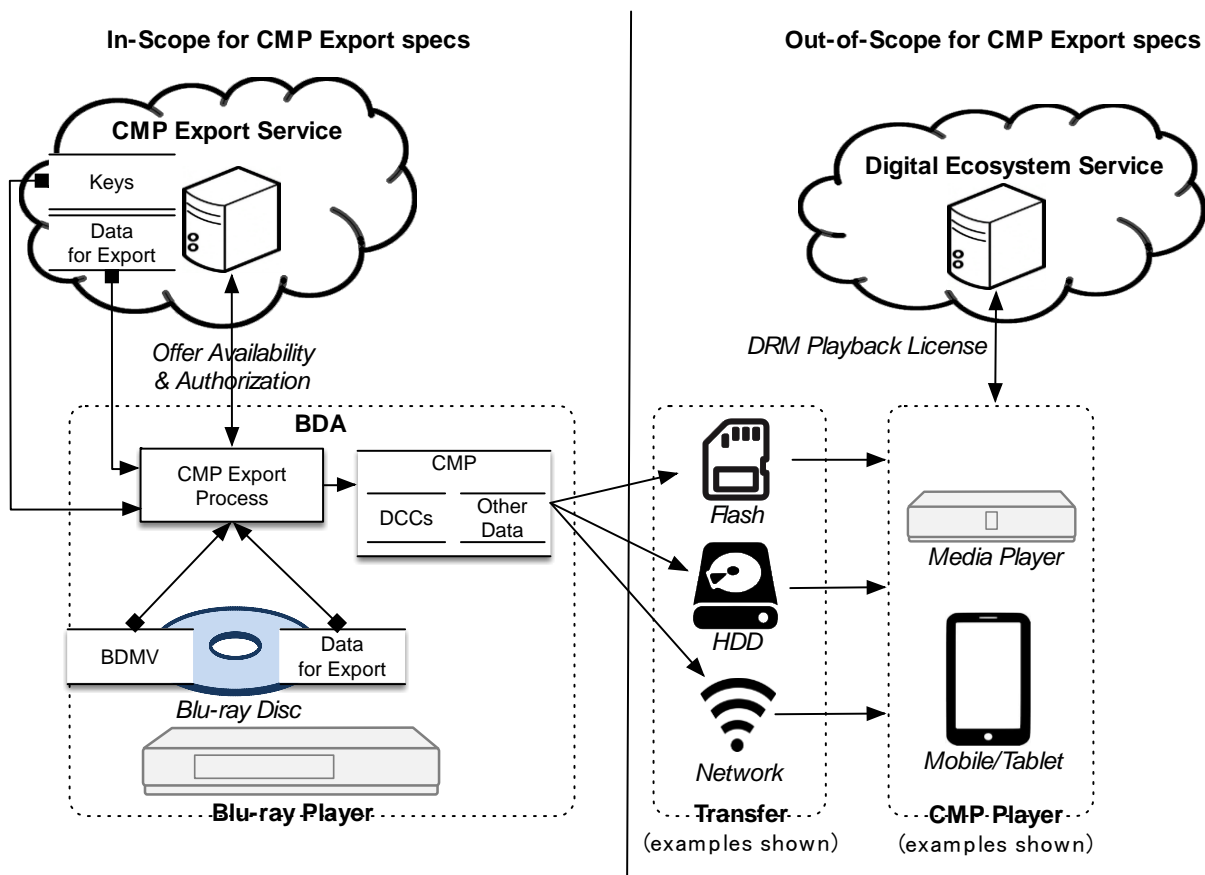


Figure 2-1 – Scope of CMP Export

[1] Common File Format & Media Format Specification, Version 2.1, DECE LLC

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CMP Export Process

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3 CMP Export Process

The CMP Export Process consists of three process steps:

1. Offer Selection: this process obtains the offers available for a particular disc from a particular CMP Export Service, manages user selection of an individual offer from the list of offers available, including user selection of optional streams, and obtains authorization from the particular CMP Export Service to proceed with export.
2. BDMV Export: this process manages the export of BDMV encoded data into the exported CMP file.
3. DfE Copy: this process manages the direct copy of Publisher provided Data for Export (DfE) into the exported CMP file. A Publisher can choose to use DfE to include additional features in the CMP file which are not exportable from BDMV encoded data e.g. Timed Text subtitle streams can be included as DfE whereas BDMV subtitle streams are not exportable.

Figure 3-1 provides a high level overview of the CMP Export Process.

1. The Offer Selection process is initiated on the Blu-ray Disc Player by the user (Start Export Process). This caused the Exporter to run.
2. Once initiated, the Exporter presents the user with one or more offers. The user selects an Offer (Offer Selection) and may also select any available optional streams within the Offer.
3. The Exporter then performs BDMV Export and DfE Copy for the Offer Selection to create the exported CMP file. When both BDMV Export and Direct Copy have completed, the Exporter presents a completion message to the user (Show ExportComplete Message).

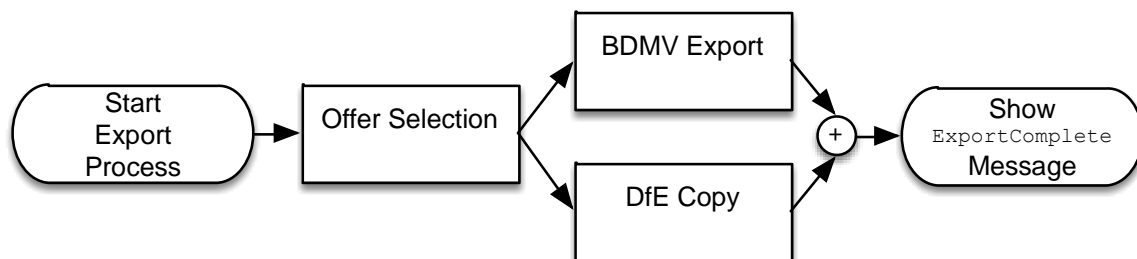


Figure 3-1 – CMP Export Process (high level overview)

White Paper Blu-ray Disc™ Read-Only Format

CMP Export Process

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4 CMP Export Data Format

4.1 Data for Export (DfE)

The following is the set of data structures referred to collectively as “Data for Export” (DfE). The sections and subsections below provide detailed definitions.

- ISOBMFF Definitions File (ISODF): The ISODF is created by the publisher for each ES (audio and video) of each Seamless Connection Unit ¹ that can be exported by virtue of it being referenced in one or more offers.
- Media Extraction Table (MET): The Media Extraction Table (MET) provides a simplified approach to exporting audio and video ESs from a Blu-ray disc. The MET allows an export engine to perform a media extraction without having any knowledge of the structure of the ISODF.
- Original Common Media Package (OCMP): The OCMP is a framework image of a CMP. The CMP Export process adds DCC files and other data to the OCMP to create a valid CMP.
- Media complete DCCs: A media complete DCC is a single track DCC that contains all media samples. Each of these media complete DCCs is referenced in one or more offers. If selected for export, the Exporter will “direct copy” the media complete DCC from the DfE to the output CMP.

The figure below illustrates CMP Export from BDMV using the MET. This figure is for illustrative purposes only.

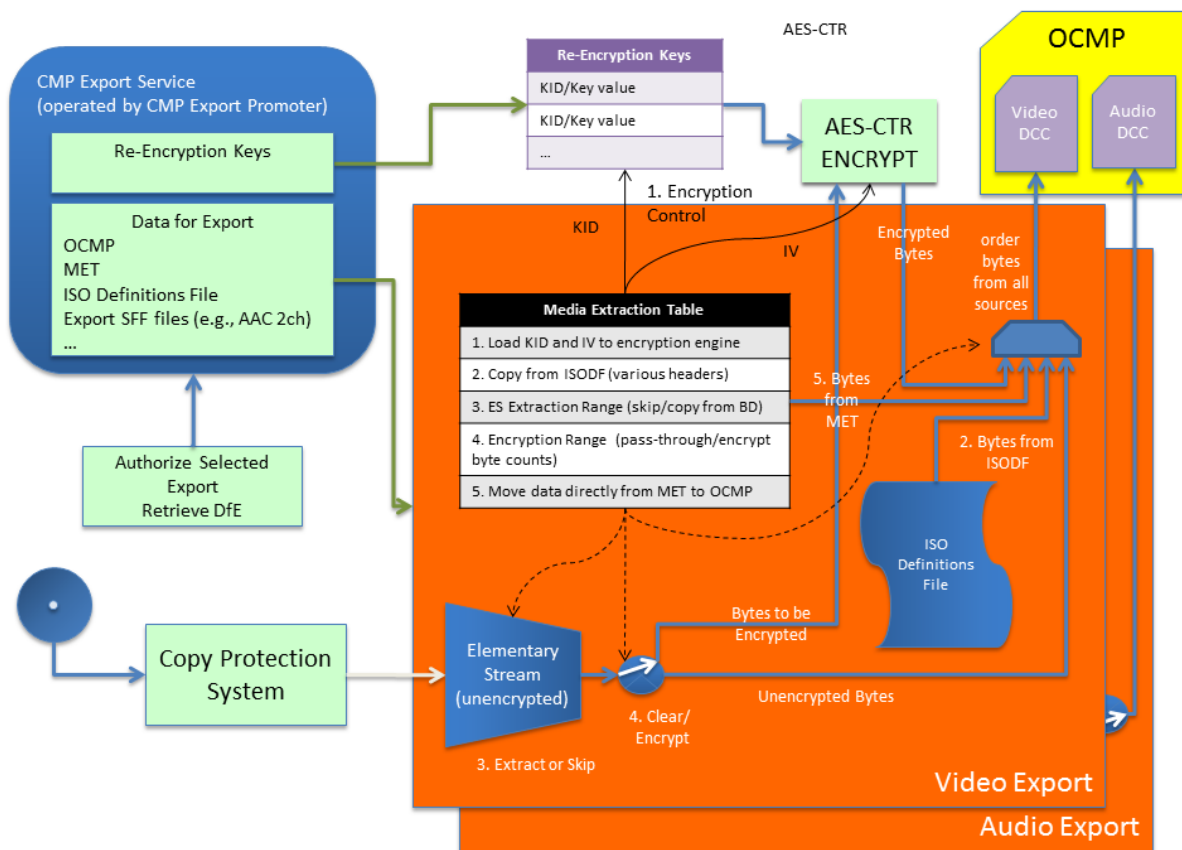


Figure 4-1 – BDMV Export Overview

¹ Seamless Connection Unit: One BDMV PlayItem that is not connected to other PlayItems with connection_condition=5 (seamless connection), or two or more BDMV PlayItems each connected with connection_condition=5 (seamless connection).

The CMP Export from BDMV process is represented in the orange box. The Exporter progressively reads an unencrypted ES from the Copy Protection System (CPS), and an ISODF from the CMP Export Service, and outputs a properly formatted and encrypted stream to a destination DCC in the output CMP. The MET, contained in the DfE, controls the export process by instructing the BDMV Exporter to selectively copy bytes from the CPS box, encrypt portions of that stream using Key Values and Initialization Vectors from the CMP Export Service, copy bytes from the ISODF, and write the results to a DCC in the output CMP.

4.2 Manifest files

The Ultra HD Blu-ray format defines Offer Manifest, Offer Selection and Export Manifest.

- The Offer Manifest allows an Exporter to present a user interface to users to select valid Offers. It also indicates if no Offer is available.
- Offer Selection expresses information about which Offer a user has selected.
- Export Manifest contains information an Exporter needs to perform the CMP Export operation.

4.3 Common Media Package Format

The CMP Export process produces a CMP file which complies with the CMP file format. This format is a structured container (uncompressed zip) that includes one or more related media presentations for use in one or more digital ecosystems. It is based on SMPTE ST 2053 (Media Package for Storage, Distribution and Playback of Multimedia File Sets and Internet Resources). Figure 4-2 shows the structure of the CMP.

Although digital ecosystem integration is out-of-scope for the CMP Export specifications and the CMP Export specifications cover the production of a CMP file by a Blu-ray Player, the CMP file format is specifically designed to not preclude subsequent addition of content into a CMP file by a digital ecosystem service (late binding) after the CMP Export process.

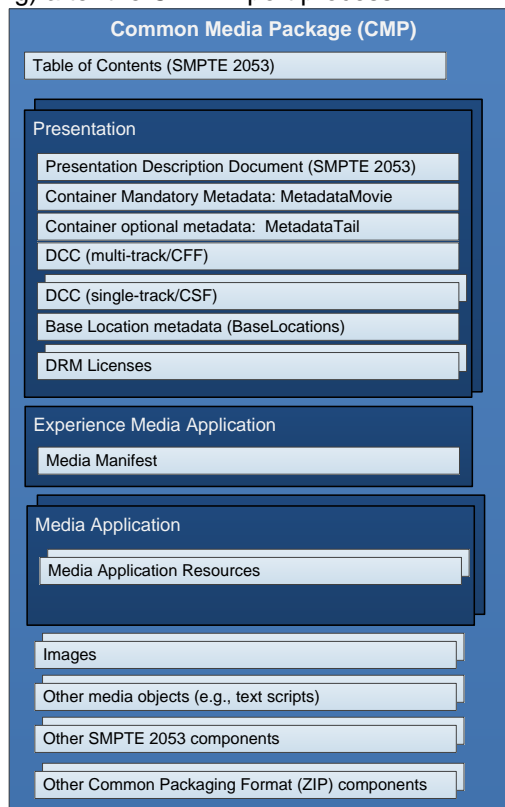


Figure 4-2 – CMP structure