International Standards and off line archiving through the use of recordable optical discs

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1. Introduction
How to create safe redundant copies while securing authenticity, longevity and minimum technology obsolescence risks?

2. Comparison of data medium

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Optical Disc</th>
<th>Hard Disc</th>
<th>Magnetic Tape</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>X 650MB to 100GB</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>International Standard</td>
<td>◎</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Authenticity</td>
<td>◎</td>
<td>Physical WORM</td>
<td>X</td>
</tr>
<tr>
<td>Migration/Longevity</td>
<td>30 years</td>
<td>5 years</td>
<td>10 years</td>
</tr>
<tr>
<td>Disaster Recovery</td>
<td>◎</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Storage Condition(Temp)</td>
<td>◎ 20 - 50°C</td>
<td>X 20 - 50°C</td>
<td>X 15 - 32°C</td>
</tr>
<tr>
<td>Cost</td>
<td>◎ $</td>
<td>△ $</td>
<td>△ $</td>
</tr>
<tr>
<td>Virus Risk</td>
<td>◎</td>
<td>△</td>
<td>X</td>
</tr>
<tr>
<td>Energy Consumption</td>
<td>◎</td>
<td>X</td>
<td>△</td>
</tr>
</tbody>
</table>

Optical discs are ideal choice for off-line archiving.

3. Technology obsolescence risk

- This technology is used for servers, medical equipment, etc.
- Approximately 300 million units were shipped in 2012 (total shipped is 4 billion units).
- Blu-ray drives are also capable of playing CDs and DVDs. No compatibility problems in generation.

4. Benefit of optical discs

A) ISO/IEC 10995 defines the life measurement method

B) ISO/IEC 29121 defines the safe error rate levels for writing and storage.

6. Basic Disc Design for Archiving

A) Recording layer (Dye design)

- Since the recording layer uses an organic dye, it is important to use the stable and high purity raw materials.
- The defects of a recording layer with insufficient purity design may accelerated deformation.

B) Light Stability

- Some dyes have very low (“Bad”) light stability. At JVC, we have improved the light stability by tuning up the dye layer during development and trial manufacturing process.

C) Reflective layer

- The higher the reflectivity, the higher the stability of reproduction on the drive.

5. ISO standards for optical disc archiving

A) ISO/IEC 10995 defines the life measurement method

B) ISO/IEC 29121 defines the safe error rate levels for writing and storage.

7. Methods of long-term data preservation and disc migration with the international standards

A) Data migration flow making use of ISO/IEC29121

B) Ideal System to comply with ISO standards.

8. Technology road map of JVC

It is desirable to use an archive-dedicated product with an appropriate level of basic performance and variance characteristics. ISO/IEC 29121 also mentions the necessity of test drive calibration using a calibration disc to ensure the drive’s performance.

9. Conclusion
By utilizing these standards together with properly designed tools, users can create safe archives without complex IT knowledge while minimizing obsolescence risks and the efforts are minimum.