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STANDARD

12042

First edition
1993-12-15

**Information technology — Data
compression for information
interchange — Binary arithmetic coding
algorithm**

*Technologies de l'information — Compression de données pour
l'échange d'information — Algorithme de codage arithmétique
binaire*



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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 12042 was prepared by the European Computer Manufacturers Association (as Standard ECMA-159) and was adopted, under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

Annex A of this International Standard is for information only.

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Introduction

In the past decades numerous International Standards for magnetic tapes, magnetic tape cassettes and cartridges, as well as for optical disk cartridges have been published. Media developed recently have a very high physical recording density. In order to make an optimal use of the resulting data capacity, compression algorithms have been designed which allow a reduction of the number of bits required for the representation of user data in coded form.

These compression algorithms are registered by an International Registration Authority set up by ISO/IEC. The registration will consist in allocating to each registered algorithm a numerical identifier which will be recorded on the medium and, thus, indicate which compression algorithm(s) has been used.

The first International Standard for compression algorithms was:

ISO/IEC 11558, *Information technology -Data Compression for Information Interchange - Adaptive Coding with Embedded Dictionary - DCLZ Algorithm*

This International Standard is the next one of this series.

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Information technology — Data compression for information interchange — Binary arithmetic coding algorithm

1 Scope

This International Standard specifies an algorithm for the reduction of the number of bits required to represent information. This process is known as data compression. The algorithm uses binary arithmetic coding. The algorithm provides lossless compression and is intended for use in information interchange.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/IEC 11576:1993, Information technology - Procedure for the registration of algorithms for the lossless compression of data.

International Register of Algorithms for Lossless Compression of Data, in accordance with ISO/IEC 11576.

3 Conformance

A compression algorithm shall be in conformance with this International Standard if it satisfies all mandatory requirements of this International Standard.

4 Conventions and notations

The following conventions and notations apply in this International Standard unless otherwise stated:

- In each field the bytes shall be arranged with Byte 1, the most significant, first. Within each byte the bits shall be arranged with Bit 1, the most significant bit, first and Bit 8, the least significant bit, last.
- Letters and digits in parentheses represent numbers in hexadecimal notation.
- The setting of bits is denoted by ZERO or ONE.
- Numbers in binary notation and bit combinations are represented by strings of ZEROs and ONES.
- Numbers in binary notation and bit combinations are shown with the most significant bit to the left.

5 Algorithm identifier

The numeric identifier of this algorithm in the International Register shall be 16.

6 Definitions

For the purposes of this International Standard, the following definitions apply.