Discussion of File name goal. Reference: VI.6.

Character and byte counts may be different when a multibyte character set is used. In particular, the ‘space’ and ‘solidus’ (/) characters may be used without restriction in file names. Also, any number (including none) ‘full stop’ (.) characters may be used.

Character names are from ISO 8859/1:87.

Discussion of Path names goal. Reference: VI.7.

Path names shall not be stored as a single character string that reserves some character such as ‘solidus’ (/) as a separator. Directory depths for X/Open systems are often very deep. For example, the widely used X11 window system from MIT includes directories that are 11 steps deep.

Discussion of Performance goal. Reference: VI.10.

Directory information access should be optimized by physically placing all directory information in one area. Directory information (file dates, etc) should not only be physically near the file information.

Alternative 2: This type of interchange would allow the CD-ROM to contain files which are available to some but not all types of receiving platforms. For example, in a network environment, an X/Open platform which acted as a server might not be able to export the DOS files on a CD-ROM disc to the networked DOS PC's since the files would be invisible to the X/Open platform.

Discussion of File attribute interchange goal. Reference: VI.2.

UID and GID mapping between values stored on the disc and values used by a particular X/Open system are defined by the XCDR proposal. Per section VI.5, XCDR's mechanisms shall be used whenever possible.

Discussion of Execution goal. Reference: VI.4.

Execution of software directly from a CD-ROM disc without first copying the software to magnetic disc is desirable for several reasons:

Ease of use: no installation of the software onto magnetic disc means that the user can "load and go" his or her software. By providing a complete runtime environment on the CD-ROM, a publisher can reduce the complexity of installations. The application would not have to be adapted to a specific system's file layout.

Ease of documentation: A CD-ROM can contain many software packages which are infrequently used or which are meant as demonstration/trial applications. Direct execution allows the user to demonstrate or use low-usage applications without having to load and then unload an application each time it is used.

No consumption of magnetic disc resources: often, magnetic disc resources are highly constrained on an operational system. Direct execution from the CD-ROM means that magnetic disc space does not need to be planned, allocated or consumed before using software.

Discussion of Backwards compatibility goal. Reference: VI.5.

Backwards compatibility with current ISO 9660:88 hardware and software is required for the following reasons:

It is unrealistic to expect that the embedded base of current CD-ROM drives will be updated to take advantage of a new CD-ROM format specification. Discs produced using this specification must be readable by the installed base or publishers will not make use of it.

Maintaining compatibility will reduce ISV concerns about migrating to use a new disc format.

Publishers wish to leverage their ISO 9660:88 experience and expertise.

VII. Non-Goal

Common Application data format. We do not seek to define a common data format. For example, requiring ASN.1 descriptions of file data. Binary executable formats are also outside the scope of the Rock Ridge Group.

Reference

[Philips]	X/Open CD-ROM Support Component (XCDR). Version 2, June 1990. This document is available from Hans de Jong, Philips Information Systems. Telephone +31 55 43 27 74.

Appendix

The appendix contains additional information that may be of interest to the reader.

Discussion of information interchange goal. Reference: VI.1.
We define two types of information interchange between platforms.

Alternative 1 - Common file system format and all file data can be read by all platforms.
Alternative 2 - Common file system format and all file data can be read by some platforms.

Alternative 1: This type of interchange maintains the original ISO 9660:88 concept of "...[enabling] information to be interchanged between different systems..." [Section 1, ISO 9660:88].

This type of data interchange assures the accessibility of files in a heterogeneous work group environment. Any type of platform connected to a common LAN would be able to access all of the information on a disc, no matter the type of disc server.

This type of data interchange encourages the creation of "open" applications whose data is available to all users.

Counter argument: some architects feel that it would be desirable for the file labeled 'start' to refer to different file information dependent on the machine type or architecture. The user would only have to invoke 'start' no matter his or her machine type.

But this would make information inaccessible in many circumstances. In addition, the same effect can be gained within the X/Open market by writing a single 'shell script' which used the uname(1) command to execute the correct binary file.

It may be difficult or impossible for a common shell script to probe for and correctly handle the needs of X/Open, DOS, and other types of systems.

Discs conforming to this specification must meet the requirements of the proposed XCDR API [Philips]. (Assuming adoption of XCDR by X/Open.)

6. File names

   Extremely long name lengths shall be possible. Name lengths as long as possible shall be handled in an optimal manner.

   ‘Reader makes right’ interchange: it is the responsibility of the receiving system to modify names as needed.

   Support ISO 8859/1:87 character set for file names and allow for support of future character set standards.

7. Path names

   Extremely long path names shall be possible. A system independent method for defining pathname components shall be provided. There shall not be any limitations on directory depth.

8. Application Programming Interfaces

   No impact on X/Open system APIs including XCDR. If necessary, an additional API will be proposed.

9. Service Interfaces

   Same as the following sections in XPG 3 v2 [88].
   2.1.19 Directory
   2.1.20 Directory Entry including symbolic links
   2.1.26 Empty Directory
   2.1.32 File
   2.1.33 File Access Permissions
   2.1.37 File Hierarchy
   2.1.38 File Mode
   2.1.39 Filename except, allow longer names. See VI.6.
   2.1.43 File Permission Bits
   2.1.46 File Times Update as defined for read-only filesystems
   2.1.71 Portable Filename Character Set-- use XPG 3 specified ISO 8859/1 character set except no reserved characters.

10. Performance

    The format shall be optimized for on-line access to a disc’s executable, data and library files. In addition, the format shall optimize for directory information access.

Customers

- Allow 1 disc to be used for all types of platforms.
- Provide delivery of file data in a heterogeneous environment.
- Provide access to all of a disc's data via ISO 9660:88 file data.
- Optimize performance for operations involving X/Open extensions.

IV. Motivations for solving the problem co-operatively, not individually

Single vendor solutions are no longer a viable strategy in today's business climate.

Third party X/Open software vendors (ISV's) want to minimize the business risk of moving to CD-ROM as a new distribution format. They want a single solution for the open systems market, not multiple solutions or sub-solutions.

Facilitate ISV expansion to support X/Open systems by current DOS and Macintosh CD-ROM publishers.

Provide the basis for creating an international standard.

V. Definition of terms

'file data', 'file information', 'information' - the data contained within a file.
'file attributes' - the name of the file, dates associated with the data, permission modes, etc.

VI. Goals

1. Information interchange
   Maintain the ISO 9660:88 information interchange capability between all ISO 9660:88 and Rock Ridge systems.
2. File attribute interchange
   Allow interchange of file attribute information among X/Open class systems. The following file attributes should be supported as defined by X/Open: UID, GID, mode bits, major and minor device, UID, and GID numbers by receiving systems shall be provided.
3. Complete
   The format standard should meet the needs of distribution X/Open file data and file attribute information. No additional or optional tagged fields shall be required to deliver file information required for complete X/Open systems.
4. Execution
   The format shall allow direct execution of software from the CD-ROM in a heterogeneous environment.
5. Full backwards compatibility
   All file data on discs conforming to these extensions must be accessible on current Microsoft CD-ROM Extensions version 2.1 and other current ISO-9660:88/level 1 interchange drivers.

Rock Ridge Group Goals Document

I. Purpose

This document has the following purposes:

- a. establish and document common goals for group participants
- b. define a charter for the technical working group
- c. act as a tool for gaining consensus within participating companies
- d. act as a tool for gaining consensus with non-participating companies; this document may serve as the first formal release from the group
- e. communicate our group's intentions and interest with respect to the CD-WO ad hoc group and other groups

II. Executive Summary

The companies participating in the Rock Ridge Group CD-ROM initiative desire the ability to use a CD-ROM as a *complete* implementation of X/Open filesystem directories. This would allow CD-ROM technology to be used for

- + software distribution in a heterogeneous environment
- + on-line access to CD-ROM executable, data and library files
- + database distribution in a heterogeneous environment

without restrictions in a complete X/Open environment.

Today, there is no commonly agreed CD-ROM format for accomplishing these goals. The purpose of the Rock Ridge initiative is to create and agree upon a common format that meets the needs presented above while maintaining compatibility with the installed base of ISO 9660:88 CD-ROM hardware and software.

The remainder of this document provides further information on the goals of the group.

III. Desired Benefits from different viewpoints

Publisher

Provide product distribution via 1 disc to all platforms--
The publisher should not be required to tailor CD-ROM products to different delivery platforms (PC vs. X/Open vs. OS/2 servers).

OS Vendor

Minimize software investment; single initial investment and reduce ongoing investments.
Allow one software solution which meets all X/Open needs.
Provide full X/Open File information.
Allow future extensions for security purposes.
Discourage ad hoc file format solutions.
Allow current software applications to run without modification using a CD-ROM.