1 Introduction to the PowerOpen ABI

1.1 Introduction

The PowerOpen Application Binary Interface (ABI) defines the system interface and system run-time environment required to enable applications to run on POWER and PowerPC-based systems from multiple vendors without recompilation or recoding. The purpose of this document is to standardize the set of binary interface specifications for application portability, based on AIX Version 4.1 and the POWER architecture (32-Bit/Big-Endian). It also defines or will define the orderly migration of applications and systems based on the POWER hardware to future POWER and the PowerPC hardware architectures. The environment is collectively referred to as the PowerOpen Environment (POE) and includes the ABI and the API (Application Programming Interface).

The ABI defines a binary interface for applications that are compiled and packaged for POE implementations on similar hardware platforms. The ABI includes information specific to the PowerPC architecture. It also includes the execution environment information that must be provided by a PowerOpen-branded operating system and be available to a PowerOpen-branded application.

The PowerOpen Environment (POE) API and ABI are the basis for conformance and testing of PowerOpen systems and applications. They are intended to be used widely within the industry for product development and procurement purposes. Developers who base their products on the POE specification can be assured that the current API specification or an upwards-compatible version of it will be referenced by future PowerOpen-branded systems, and that a variety of compatible, PowerOpen-branded systems capable of hosting their products are immediately available.

The document defines low-level language binding conventions and illustrates them with the C language. Other languages are not precluded.

The PowerOpen ABI today specifies interfaces for a 32-Bit, Big-Endian environment only. A future version of this document will provide interfaces for a 64-Bit, Big-Endian environment.

1.2 Conformance

An implementation conforming to this document must meet the following criteria:

- The system shall support all the PowerOpen execution environment, interfaces and headers defined and listed within this specification that are part of the POE.
- The system may provide additional or enhanced interfaces, headers and facilities not required by this specification, provided that such additions or enhancements do not affect the behavior of an application that requires only the facilities described in this document.

Adherence to the PowerOpen ABI maximizes application portability to future versions of an ABI-conformant system and to future POWER and PowerPC architecture implementations. This portability is certified as a conformant system or application.

1.2.1 ABI-Conformant System

A computer system that provides all the binary system interfaces for application support described in this document and the PowerOpen API documents, is a conforming ABI system.

- A conforming ABI system must provide support for the POWER instructions defined in section 3.2.1 ”Required Instructions for Application Compatibility”, on page 3–4.
- ABI conforming systems can be POWER (RS1), POWER2 (RS2), and future POWER architectures, as well as PowerPC architectures.
- Conforming systems must support the routines and data structures defined as shared libraries in the PowerOpen API Documents, under the Runtime Shared Library Environment.

1.2.2 ABI-Conformant Application

ABI-conformant applications have the following requirements, for portability across all conforming PowerOpen ABI systems:

- Reference only commands and other system resources that are defined in the PowerOpen ABI and PowerOpen API documents.
- The application compiled into an executable file (**a.out**) must have the formats and characteristics specified in Chapter 4, Object File Format.
- Application behavior must conform to the rules given in the ABI.
- Routines and data structures from the system shared libraries are defined in PowerOpen API documents, under Run time Shared Library Environment. The routines in this shared library list must not be bound unshared into the application’s **a.out** file.
- Conforming new applications must be compiled using only the COMMON mode PowerPC instruction set. The COMMON mode instruction set is the intersection set of instructions from the POWER (RS1) and PowerPC User Instruction Sets defined on page 3–5.

1.3 Evolution of the ABI Specification

The PowerOpen ABI will evolve over time to incorporate new technologies and market requirements. It will be reissued at intervals of approximately two years. Each new edition may contain additions to existing interfaces as well as new extensions that will enhance the capabilities and functionality of ABI-compliant applications.

The PowerOpen ABI includes specifications that may be withdrawn in some future version of the document. These specifications will be clearly identified as such.