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6.3 Guidance to Profile Writers

Responsibility: Bob Gambrel

This clause expands the concept of profiling in the manner needed by profile writers and provides detailed guidance to those writers. It includes a description of the basis for this guidance, expands on the purposes served by profiles, and finishes with more detailed guidance specifically aimed at those writing profiles.

Using this guide as a basis, profile writers can develop their own informal profiles, suited to their own needs, or formal standards bodies can develop formal, balloted profiles. This clause details the requirements that should be met by developers of profiles whether they are POSIX SPs, standardized profiles, or less formal profiles. Standardized profiles are formal profiles that meet the requirements of a sponsoring standards body. Standardized profiles that also meet the requirements for POSIX-based profiles (rules established by IEEE) are called POSIX standardized profiles (POSIX SPs.) For more information about writing POSIX SPs, see Annex A.

6.3.1 Basis for This Guidance

Many of the ideas and concepts for profiling described in this section derive from the work of ISO/IEC JTC 1 SGFS as documented in ISO/IEC TR 10000-1 {*ref*}. Some items specified in that document that are not covered here include:

— International standardization considerations

— Conformance issues

— Processes and procedures

— Maintenance

— Taxonomy

Additionally, some consideration was given in this guidance above and beyond that given in ISO/IEC TR 10000 {*ref*}:

— Standardized profiles and POSIX standardized profiles as a conceptual extension to International Standardized Profiles (ISP).

— IEEE basis, not ISO basis, for formatting rules; see Annex A

Writers of profiles following the guidance of this clause should refer to Annex A if they intend to propose IEEE acceptance as a POSIX SP and to ISO/IEC TR 10000 {*ref*} if they intend to propose acceptance as an ISP.

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6.3.2 Purpose of Profiles

Profiles define combinations of base standards and profiles for the purpose of:

— Identifying the base standards, together with appropriate classes, subsets, options, and parameters, that are necessary to accomplish identified functions for purposes such as interoperability and portability.

— Providing a system of referencing the various uses of base standards that is meaningful to both users and suppliers

— Enhancing the availability for procurement of consistent implementations of functionally defined groups of base standards that are expected to be the major components of real application systems

— Promoting uniformity in the development of conformance tests for systems that implement the functions associated with the profiles

6.3.3 Detailed Guidance to Profile Writers

6.3.3.1 The Relationship to Base Standards

Base standards specify procedures and formats that facilitate application portability and interoperability. They provide options, anticipating the needs of a variety of applications and taking into account different capabilities of real systems and networks.

Profiles further promote portability and interoperability by defining how to use a combination of base standards for a given function or application area. Profiles, by definition, do not define new application interfaces.

In addition to the selection of base standards, a choice may be made of permitted options for each base standard and of suitable values for parameters left unspecified in the base standard.

Profiles should not contradict base standards, but should make specific choices where options and ranges of values are available. Profiles must include all of the items made ‘‘mandatory’’ by the standard. The choice of the base standard options should be restricted so as to maximize the probability of interworking between systems implementing different selections of such profile options, consistent with achieving the objectives of the profile.

A profile makes explicit the relationships between a set of base standards used together (relationships that are implicit in the definitions of the Base Documents themselves) and may also specify particular details of each base standard being used.

A profile may contain conformance requirements that are more specific and limited in scope than those of the base standards to which it refers. While the capabilities and behavior specified in a profile will always be valid in terms of the Base Documents, a profile may exclude some valid optional capabilities and optional behavior permitted in those base standards.

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Thus, conformance to a profile implies, by definition, conformance to the set of base standards that it references. However, conformance to that set of Base Documents does not necessarily imply conformance to the profile.

6.3.3.2 Main Elements of a Profile Definition Document

The definition of a profile should comprise the following elements:

— A concise definition of the scope of the function for which the profile is created and of its purpose

— Reference to a set of base standards and other profiles, including precise identification of the actual texts of the base standards and profiles being used and of any approved amendments and technical errata, conformance to which is identified as potentially having an impact on achieving portability and interoperation using the profile

— Specifications of the application of each referenced base standard and profile, covering recommendations on the choice of classes or subsets and on the selection of options, ranges of parameter values, etc.

— A statement defining the requirements to be observed by systems claiming conformance to this profile, including any remaining permitted options of the referenced base standards and profiles, which thus become options of this profile

Systems that interoperate can perform different but complementary roles (e.g., an initiator-responder or a master-slave relationship). In such a situation the profile should identify the separate roles that may be adopted by a system, and these should be stated as either mandatory requirements or options of the profile, as appropriate.

6.3.3.3 Profile Objectives

Completeness

A profile should be complete with respect to its functionality objectives. This may well be an iterative process, since the understanding of the requirements and standards will evolve. Completeness means that all areas where standards should be applied have been identified and the requirements defined. Where standards exist, they have been included, and the options within those standards have been addressed. Where standards do not exist, but are needed, this has been documented in the profile.

It may be appropriate to document (probably in a nonnormative appendix) specifications and alternatives available in areas where standards have not been defined. The meaning of this concept will be relative to the forum for acceptance of the profile. If the profile is targeted at ISO acceptance, then ISO DIS and IS standards should be the reference point, where as a US Government profile might be focused on FIPS and ANSI standards. Within private industry, consortium and even vendor specific specifications could be incorporated, keeping these as

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examples and not explicit requirements, which will simplify harmonization with formal standards as they emerge. Where standardized profiles are being developed and gaps are identified, the profile writer should identify the requirements that are not satisfied by a standard. If there is a preliminary specification available that addresses many of the requirements, that specification should be referred to informatively.

Clear Communications

A key objective for the profile is clear communications between the affected parties. Users, software developers, and platform suppliers all need to have the same terms and specifications. The application software developers and system vendors need a common set of specifications to target for their development efforts.

Harmonization

Harmonization means making the profiles consistent with each other where they overlap. This can often be done among profiles even where the functional areas served differ greatly. This assures that the maximum practical agreement exists between different profiles, maximizing the implementations of that common ground.

Validation

A profile addresses validation in two different ways.

Firstly, by selecting options and parameters within the profile, validation is potentially made simpler.

Secondly, by including more than one base standard, validation potentially becomes more difficult. Now validation extends beyond just insuring a single standard is being complied with into the area of insuring that the interactions between and among multiple base standards is also being complied with.

Coherence

The simple selection of a group of standards does not assure that they will work together on a platform in a predictable way. A profile should contain a matrix of all standard components compared to each other and state what relationship exists between them. A profile may be coherent if it states that between two standards no relationship needs to exist, that none shall exist, or that a specified relation shall exist. Not to speak to an intersection in the matrix would indicate that the issue of coherence has not been addressed.

Gap Identification

In the process of developing profiles, there may be gaps in coverage by standards that become apparent. These may exist in terms of the characteristics available with one standard that need to be made available from another, or missing standards, or additional functionality that is needed for a specific applications

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activity. So, an additional objective for a profile effort is to document the requirements for such additional work and forward it to the appropriate standards effort. Profile groups in industry should consider providing expertise to the associated standards groups to assure that the resulting standards meet the needs of that applications area.

6.3.3.4 Defining a Profile

The process of creating a specific profile is broken down into three stages. These are the creation of a generic information system model, creation of an open system environment that supports application portability and interoperability, and the creation of a application-area-specific profile (see Figure 6-1).

In the first stage, a generic model for an information system is constructed by abstracting the properties and functionality common to all possible information systems and choosing specific system features based on the application requirements of an enterprise, department, or application. Such a model is neither new nor earthshaking; it has been used for more than twenty years to understand, design, and specify a system, as well as to test, redesign, and refine that system. What is new is the refinement of generic models to design open systems for specific application areas.

The second stage of the profile creation process requires the profile developer to identify and choose the functionality, standards or specifications, and interfaces required for application portability and interoperability. The profile developer should probably choose at most one base standard for each service identified. The criteria used for selecting base standards should take into account openness, completeness (maturity), stability, geographic coverage and publicness of the standard. The profile writer should also have in mind a precedence (e.g., international standards take precedence over national standards). There may also be other considerations, of course, such as performance, cost, design, etc. Examples of such considerations, that were used in selecting standards for this guide, can be found in 3.4.2.

To ensure that the open system environment produced is not just a paper standard, it is necessary to check that the component standards and specifications chosen are practical for users, marketable for vendors, integratable with each other, achievable in a short time, and have a good likelihood of widespread acceptance. The X/Open Common Application Environment and the IEEE POSIX. 0 POSIX Open System Environment have been (or are being) produced in this way.

The third stage of the profile-creation process requires making further choices of functionality, standards, mandatory options within standards, subsets of standards, and interfaces to meet the open-systems requirements of a specific application area. As with open system environments, standards for a profile should be chosen based on international standards, national standards, formal professional group standards, consensus-defined consortia specifications, and de facto specifications. Also, where no standards exist for a particular functionality necessary to the application area in question, the profile developer should come up with a plan to produce the missing standard. In addition, the profile's component

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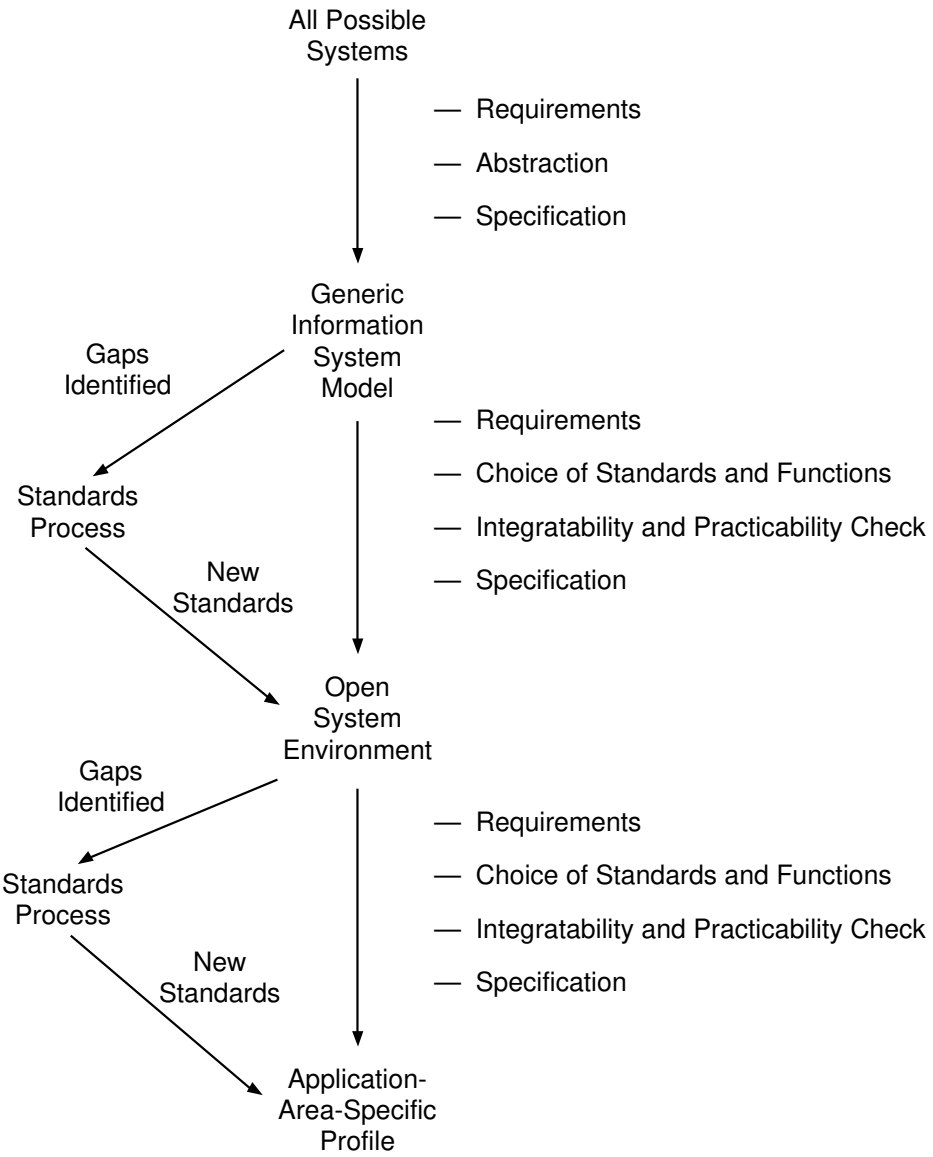

Figure 6-1 – Development of a Profile

standards should be selected bearing in mind practicality, marketability, integration of component standards with each other, and user and vendor acceptance.

The choice of functions and standards applicable to an application area results in a standardized application-area-specific profile. The MAP, TOP, and GOSIP profiles of OSI, as well as the POSIX. 10 (supercomputing), POSIX. 11 (transaction processing), and POSIX. 13 (embedded realtime) profiles have been (or are being) defined in this way.

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6.3.3.5 Types of Profiles

Three different types of profiles have been, or are being, defined by the procedures described above:

— Component Profiles

— Application Area Profiles

— Platform Profiles

A Component profile is mostly a subset of a single standard. The profile developers specify mandatory options for a specific domain, options that are not desirable for that domain, gaps in that parent standard, and, if necessary, specifications to fill that gap. Examples of such profiles are MAP, TOP, and GOSIP profiles and possibly the POSIX.13 embedded realtime POSIX profile if it continues to be based exclusively on functions chosen from the POSIX.4 realtime standard. D

An Application Area Profile is created from multiple standards that specify multiple, diverse types of functionality needed for a particular application area (e.g., database, networking, graphics, operating system). The application area profile developers specify all the diverse standards necessary for the application area in question. Within each standard, they identify mandatory options, functions and options that are not needed, gaps in the standards, and, if necessary, specifications to fill the gaps. Examples of application area profiles are the POSIX.10 supercomputing and POSIX.11 transaction processing profiles.

A Platform Profile focuses on the functionality and interfaces needed for a particular type of platform. The platforms could be traditional platforms (such as time sharing systems) or relatively new or emerging platforms (e.g., workstations, personal computers, or symmetric multiprocessing systems). A platform profile could be created from one or multiple diverse standards. As with other types of profiles, the profile developers have to specify the standards, options, standards gaps, and if necessary, specifications to fill the gaps. Examples of platform profiles are the POSIX.18 Platform Profile for Traditional Multiuser UNIX systems and the POSIX.14 Multiprocessing profile.

All three types of profiles can be seen in the next section.

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Section 7: POSIX SP Profiling Efforts

Responsibility: Wendy Rauch

7.1 Introduction

This section maintains the list of currently known POSIX Standardized Profiles (POSIX SPs). This list is a factual record of which POSIX SPs exist, or are in preparation, together with a summary description of the scope, scenario, and model for each profile. These POSIX SPs might be useful as building blocks for other profiles.

7.1.1 Approved POSIX Standardized Profiles

There are currently no approved POSIX SPs.

7.1.2 POSIX Standardized Profiles In-Progress

The current efforts to develop POSIX SPs are summarized in Table 7-1. They are all being done by IEEE 1003 POSIX working groups. A brief summary of each effort is given in clauses 6.4 and 6.5.

7.2 General Purpose POSIX SPs

7.2.1 POSIX Platform Environment Profile (PEP)

7.2.1.1 Rationale and Overview

The POSIX Platform Environment Profile (PEP), IEEE POSIX.18, is a platform profile based on POSIX.1 {2} and related standards. It defines the functionality and standards needed for a system that is as similar as possible to the traditional UNIX operating system's interactive, multiuser development and run-time environment.

The PEP is valuable for many users, vendors, programmers, and procurement officers who do not have the time or desire to analyze and specify all the individual interfaces for a system they need. The PEP obviates this analysis by

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