Multifunction Peripheral Association
Technical Contribution To Printer Working Group

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Ref: Port Mapping for IEEE-1284 and other interfaces

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Title: Service Triplet Assignment Guidelines

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Abstract

This document provides guidelines for assigning Service Triplets for use by drivers and other intelligent software to determine the sort of services provided by a device. The document **MFPA-95-037** describes a method of describing the Service available in the device using a *Service Triplet* for the IEEE-1284 interface. The **ServiceRegistry**, **ServiceFamily**, and **ServiceVersion** comprise the **ServiceTriplet**, which uniquely and unambiguously identifies the service. It is a requirement that the *Access Protocol* (i.e. raw stream, Remote procedure call, etc.) be implied by the **ServiceTriplet**, and so it is not specified separately. This document forms the basis for numerical assignments of the values in the **ServiceTriplet**, and provides guidelines for assignments and harmonization of preexisting service registries.

Introduction

A peripheral or other intelligent device is connected to a host computer. The peripheral will provide a set of services to the host computer. Also, services may exist in the host computer which are usable by the attached peripheral devices. Between the devices, a communication channel of some type is provided. This channel must have some means of identifying the services that are available to the other. The method of communicating this information varies on different channels, but the need for a consistent syntax and semantics to describe the services is needed. Historically, each vendor provides this information in a vendor specific way, such as Manufacturer, Model, Version designations. Because of the need to allow dial-up or other access by drivers and entities that are not local and may not have access to the specific Manufacturer/Model information, the need for the approach as described in this document became apparent.

Service Triplet

The concept of a service provider or server will be used in this development. A given service will be provided on a given "port" or logical channel of the interface. For an interface which does not have multiple logical channels, there will be a single service provider (server). For those with multiple channels, there may be more than one server, one for each logical channel. A given server may provide multiple capabilities. Each capability is specified as a separate **Service Triplet**. Multiple Service Triplets may be specified to fully characterize the server.

The **ServiceRegistry**, **ServiceFamily**, and **ServiceVersion** comprise the **ServiceTriplet**. This triplet exactly identifies the access protocol, and command set, language, or RPC (Remote Procedure Call) function set available as a capability of that server. Because there may be more than one capability of the server, several **ServiceTriplets** may be specified if the syntactical and semantic elements of one service is a proper subset of another, such that the interaction with either service is supported with no automatic switching required. This is commonly the case for services which have been upgraded so as to be backward compatible with older versions of the same service.

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Also, if automatic switching is supported between services where the syntactical and semantic elements of one is not a proper subset of the other, then these may also be specified for the same Server.

The **ServiceTriplet** may inexactly identify a command set by leaving the **ServiceVersion** as "Not Applicable" only if the service identified by the other two components of the triplet has syntactical and semantic facilities that can be used to identify any version variations of that service. It is recommended, however, that the various versions which are selectable by that service also be listed under the same **ServiceTag** to allow more up-front selection by the Host without resorting to deeper inquiry utilizing the specific syntax of that service. It is the goal of this recommendation to maintain knowledge of the syntax and semantics of the services as unnecessary to perform the service selection process.

Method of Identifying Services

The method of specifying the capabilities of the service will vary based on the physical channel. The IEEE-1284 method will be used here to allow complete specification of the method. That method uses a **ServiceTag** so that more than one service triplet may be assigned to a given **ServiceTag**, and there is only one **ServiceTag** per server type. The expression of the service capabilities provided by a given **ServiceTag** is provided by the **SRVC** statement. The mapping of these services to logical channel addresses is performed by the **SCKT** statement. The exact syntax of the **SRVC** and **SCKT** statements is not defined here. Further information can be found in the referenced document.

ServiceRegistry

The **ServiceRegistry** identifies a specific registry which provides the **ServiceFamily** and **ServiceVersion** values. This allows various registries to be utilized for various functions within the device, yet not require passing a variable-length "OBJECT IDENTIFIER" prefix. This document will therefore become the "Registry of Registries".

0	= Reserved
1	= Unknown
2	= Not Applicable
3	= Manufacturer Specific
4	= This document, see below
5	= (PWG) RFC-1759 PrtInterpreterFamily and IANA extensions
6	= (AIIM) Scanner
7	= (TIA) Facsimile
8	= (TIA) Data / Simultaneous Voice and Data / Voice
9	= File Services
10	= Database Services
>10	= Reserved for Standardization

ServiceFamily

The Service Family should provide a Family of Services which have the same syntax and semantics or are otherwise automatic switching between different semantics and syntaxes. The ServiceFamily may be all that is necessary to completely specify a given service capability, and if that is the case, the ServiceVersion shall be specified as '02', "Not Applicable".

ServiceVersion

The service version specifies variations within a given ServiceFamily. If an entity is unfamiliar with a specific version within a known ServiceFamily, that entity may wish to attempt to work with the responder within the known parameters of the ServiceFamily. This is an important benefit derived by breaking the identity of a service into a Family and Version.

The following ServiceVersion values are standard for all ServiceFamily registries.

0	= Reserved
1	= Unknown
2	= Not Applicable - Family set can self-identify version generations.

For other values, see the registry as specified by the **ServiceRegistry** parameter.

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Defined ServiceTriplet Values

The following **ServiceTriplet** values are defined by this document:

4,1,1	= Unknown
4,2,1	= Echo
4,3,2	= Internal Session-Level Port Manager
4,4,2	= MLC Command Processor

Harmonization with RFC-1759 PrtInterpreterFamilyTable

RFC-1759 "Printer MIB" provides a table of values which define services provided by a printer. In this case, the services are limited to the definition of the Page Description Language Interpreter or Job Control Language Interpreter. In some cases, knowledge of the Interpreter Language is sufficient to allow determination of the other service capabilities that can be provided by the device. In many cases, due to the historical unidirectional channel utilized by printers, it is not always possible to determine the full set of capabilities from this information.

The **prtInterpreterLangTable** consists of entries describing a given interpreter available on the printer. The attribute **prtInterpreterLangFamily** is a controlled ("Type 2") enumeration, so that each addition requires committee review. It is defined as "the family name of a Page Description Language (PDL) or control language which this interpreter in the printer can interpret or emulate."

The **prtInterpreterLangLevel** allows further definition of the interpreter language. Unfortunately, this value is not controlled and requires no review. There are no firm rules about the contents of this attribute. It is defined as "The level of the language which this interpreter is interpreting or emulating. This might contain a value like '5e' for an interpreter which is emulating level 5e of the PCL language. It might contain '2' for an interpreter which is emulating level 2 of the PostScript language. Similarly it might contain '2' for an interpreter which is emulating level 2 of the HPGL language."

It is desired to allow drivers and other software to make a determination of the capabilities of the device without needing additional "smarts" regarding the backward compatibility of each version. Therefore, it is desired to define the **prtInterpreterLangLevel** further to obtain this precision. The **prtInterpreterLangFamily** will be used to express both the ServiceFamily and ServiceVersion in the following way:

1) The existing values will be multiplied by 100 to form the new PrtInterpreterLangFamily values. Values less than 100 will be deprecated.

2) The ServiceVersion value will be a value less than 100 and will be added to the PrtInterpreterLangFamily base as derived in step (1).

3) When a service is declared, it is preferred that all compatible services capabilities be described separately such that a user of the information need not keep or know any other compatibility information to determine if the service will perform the desired function. (This is in contrast to the current intention that only one PrtInterpreterLangEntry be provided for each interpreter, and compatibilities with older versions of that Interpreter would only be implied. Instead, multiple entries may exist to explicitly describe various interpreter capabilities.)

The result is a flat list of identifiers which are structured according to the family and level. This list is summarized below. (This list is summarized from the list in the RFC-1759 document and does not include all the appropriate trademark and reference information. Please see that document for more detail.) Items that deserve special note are **highlighted**.

```
prtInterpreterLangFamily OBJECT-TYPE
    -- This value is a type 2 enumeration
    SYNTAX     INTEGER {
          other(1),
          langPCL3(303),      -- PCL3
          langPCL4(304),      -- PCL4
          langPCL5(305),      -- PCL5
          langPCL5e(306),     -- PCL5e
          langHPGL(403),      -- HPGL
```

```
153             langHPGL2(404),     -- HPGL/2
154             langPJL(502),       -- Peripheral Job Language. Can provide
155                                    capabilities internally.
156             langPS1(603),       -- PostScript Level I Language
157             langPS2(604),       -- PostScript Level II Language
158             langPSPrinter(4202),
159                                 -- The PostScript Language used for
160                                 -- control (with any PDLs)
161             langIPDS(702),      -- Intelligent Printer Data Stream
162             langPPDS(803),      -- IBM Personal Printer Data Stream.
163                                 -- Originally called IBM ASCII, the name
164                                 -- was changed to PPDS when the Laser
165                                 -- Printer was introduced in 1989.
166             langEscapeP(903),
167             langEpson(1003),
168             langDDIF(1103),     -- Digital Document Interchange Format
169             langInterpress(1203),
170             langISO6429(1303), -- ISO 6429.
171             langLineData(1403),-- line-data See ISO 10175 Document
172                                 -- Printing Application (DPA)
173             langMODCA(1503),    -- Mixed Object Document Content
174                                 -- Architecture
175             langREGIS(1603),    -- Remote Graphics Instruction Set,
176             langSCS(1703),      -- SNA Character String
177             langSPDL(1803),     -- ISO 10180 Standard Page Description
178                                 -- Language
179                                 -- ISO Standard
180             langTEK4014(1903),
181             langPDS(2003),
182             langIGP(2103),
183             langCodeV(2203),    -- Magnum Code-V, Image and printer control
184             langDSCDSE(2303),   -- DSC-DSE:  Data Stream Compatible and
185             langWPS(2403),      -- Windows Printing System, Resource based
186             langLN03(2503),     -- Early DEC-PPL3, Digital Equipment Corp.
187             langCCITT_T4(2603),-- Group 3 facsimile encoding
188                                 -- (See ITU-T T.4)
189                                 -- NOTE: Page breaks not defined.
190             langCCITT_T4(2604),-- Group 4 facsimile encoding
191                                 -- (See ITU-T T.6)
192                                 -- NOTE: Page breaks not defined.
193             langQUIC(2703),     -- QUIC (Quality Information Code), Page
194             langCPAP(2803),     -- Common Printer Access Protocol
195             langDecPPL(2903),   -- Digital ANSI-Compliant Printing Protocol
196             langSimpleText(3003),
197                                 -- simple-text:  character coded data,
198                                 -- including NUL, CR , LF, HT, and FF
199                                 -- control characters.
200             langNPAP(3102),     -- Network Printer Alliance Protocol
201                                 -- IEEE 1284.1
202             langDOC(3203),      -- Document Option Commands
203             langimPress(3303), -- imPRESS, Page description language
204             langPinwriter(3403),
205                                 -- 24 wire dot matrix printer
206             langNPDL(3503),     -- Page printer  for Japanese market.
207             langNEC201PL(3603),-- Serial printer language used in the
208                                 -- Japanese market.
209             langAutomatic(37), -- (Deprecate)
210             langPages(3803),    -- Page printer Advanced Graphic Escape Set
211             langLIPS(3903),     -- LBP Image Processing System
212             langTIFF(4003),     -- Tagged Image File Format (Aldus) V 5
213             langTIFF(4004),     -- Tagged Image File Format (Aldus) V 6
```

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```
            langDiagnostic(4103),
                                -- A hex dump of the input to the
                                -- interpreter
            langCaPSL(4303),    -- Canon Print Systems Language
            langEXCL(4403),     -- Extended Command Language
            langLCDS(4503),     -- Line Conditioned Data Stream
            langXES(4603)       -- Xerox Escape Sequences
                 }
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The family name of a Page Description Language (PDL) or
        control language which this interpreter in the printer can
        interpret or emulate.  This type 2 list of enumerations
        requires review before additional entries are made. The portion
        of the value greater than 100 provides the LangFamily
        information. The portion less than 100 provides the LangLevel
        information."
    ::= { prtInterpreterEntry 2 }
```

The **prtInterpreterLangLevel** will remain as a user-readable interpretation of the Level (ServiceVersion) enumeration. This is used by management stations for direct display to the user. It is generally not used by drivers and other software wishing to gain capability information.

```
prtInterpreterLangLevel OBJECT-TYPE
    SYNTAX     OCTET STRING (SIZE(0..31))
    MAX-ACCESS read-only
    STATUS     current
    DESCRIPTION
        "The level of the language which this interpreter is
        interpreting or emulating.  This might contain a value like
        '5e' for an interpreter which is emulating level 5e of the PCL
        language.  It might contain '2' for an interpreter which is
        emulating level 2 of the PostScript language.  Similarly it
        might contain '2' for an interpreter which is emulating level
        2 of the HPGL language."
    ::= { prtInterpreterEntry 3 }
```

Summary

This document includes a proposal to the Printer Working Group for changes to the **`PrtInterpreterLangFamily`** enumeration, including change of existing values to values greater than 100 and deprecation of the old values. Additional entries would be made to allow for know versions of the popular languages. This single enumeration would be maintained in the normal fashion (through IANA). Also, it is suggested that managed printers respond not with a single service, but will all services provided by that printer. For example, if a printer was a PCL5e printer, it would respond with all of the following:

```
            langPCL3(303),      -- PCL3
            langPCL4(304),      -- PCL4
            langPCL5(305),      -- PCL5
            langPCL5e(306),     -- PCL5e
            langHPGL(403),      -- HPGL
            langHPGL2(404),     -- HPGL/2
```

If the capabilities of the language is inherently available internal to that language, such as with PJL, it still may be a good idea to provide the full list of capabilities up front instead of making it necessary to use PJL to make the inquiry.

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