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Implementation Guidelines for DPS over IP

(White paper)

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Overview

This document specifies implementation guidelines for using the DPS standard in LAN environments, through the use of CIPA DC-001 (Digital Photo Solutions for Imaging Devices) (hereinafter called "DPS standard"), typically called PictBridge, and CIPA DC-005 ("Picture Transfer Protocol" over TCP/IP networks (PTP-IP)) (hereinafter called "PTP-IP standard"), which are defined by CIPA. Methods of verifying interconnectivity between DPS devices in wireless LAN environments and conformance specifications for use of logotypes will be separately defined.

Background and Overview

Background

The DPS standard is independent of the physical I/F. However, the only physical I/F specified in the implementation guidelines is USB.

In 2005, CIPA established the PTP-IP standard for PTP (Picture Transfer Protocol) communication on TCP (Transfer Control Protocol), but did not specify implementation guidelines for DPS, assuming the PTP-IP standard, thereby causing a problem in interconnectivity.

Overview

The objective of the present guidelines is to compile mutually-respected conventions into guidelines, for various settings that have not yet been determined in LAN I/F connection environments and unclear technical items for realizing DPS services using the PTP-IP standard.

Scope

The present guidelines define conventions for expansion to LAN connection environments, in addition to USB supported as the sole physical I/F of the DPS standard.

The present guidelines apply to image input devices such as DSC and image output devices such as printers, which are connected to each other in a LAN environment and have a direct print function.

Communication Protocol Architecture of DPS over IP

A Communication Protocol Architecture of LAN I/F-based DPS is described below in comparison with a USB I/F-based Communication Protocol Architecture.

Communication Protocol Architecture of USB I/F-Based DPS

USB I/F-based DPS is described in detail in the DPS standard in CIPA.

USB I/F is characterized by the adoption of SICD (Still Image Capture Device) as a USB device class for connecting PTP, an image transfer protocol.
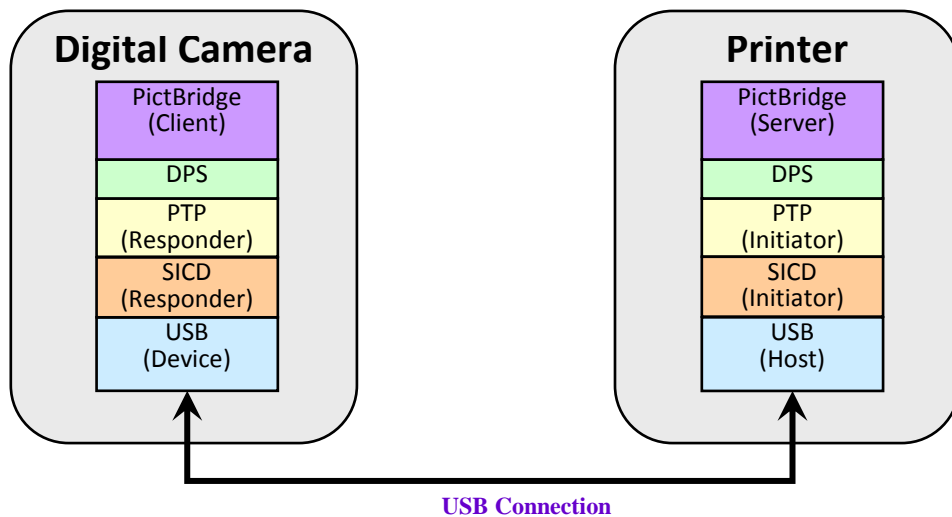
Digital Camera

PictBridge (Client)
DPS
PTP (Responder)
SICD (Responder)
USB (Device)

Printer

PictBridge (Server)
DPS
PTP (Initiator)
SICD (Initiator)
USB (Host)

USB Connection

Figure 4-1

Communication Protocol Architecture of LAN I/F-Based DPS

Figure 4-2 is a Communication Protocol Architecture of LAN I/F-based DPS.

Wired LAN/wireless LAN shall be used as the physical I/F. The PTP-IP standard (CIPA DC-005-2005 "Picture Transfer Protocol over TCP/IP networks") standardized by CIPA shall be adopted as the protocol for connecting the above TCP/IP layer and PTP, an image transfer protocol, to each other using a TCP session.

In order to select a device to be connected in a PTP session from among devices in the network, DPSPrinterDevice and DPSConnectionManagerService defined by CIPA on the basis of UPnP DA1.0 shall be adopted.
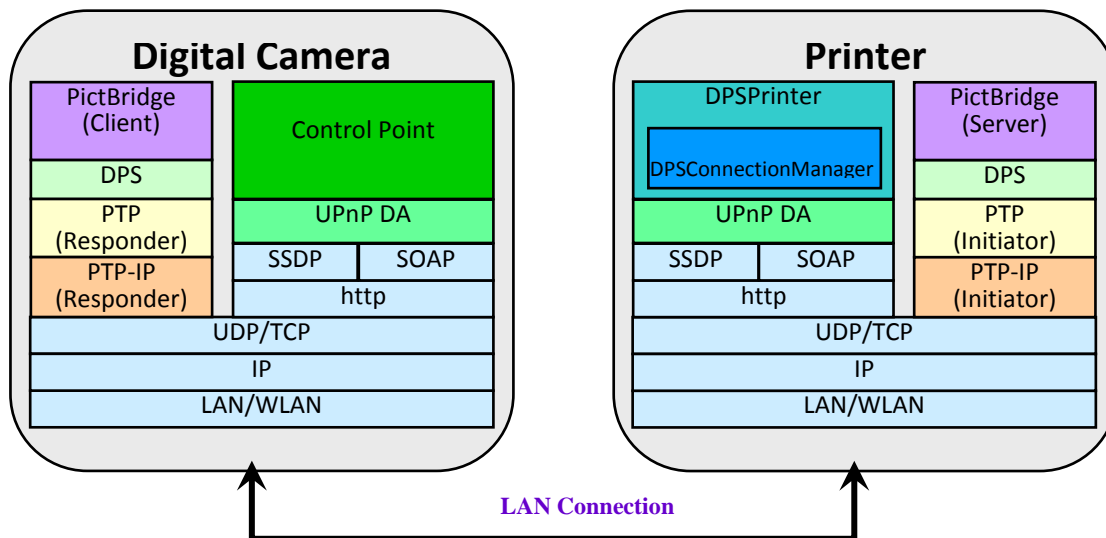
Figure 4-2

Connection Topology in LAN Environments

The LAN connection topology in DPS over IP is specified as follows.

Physical Connection Topology

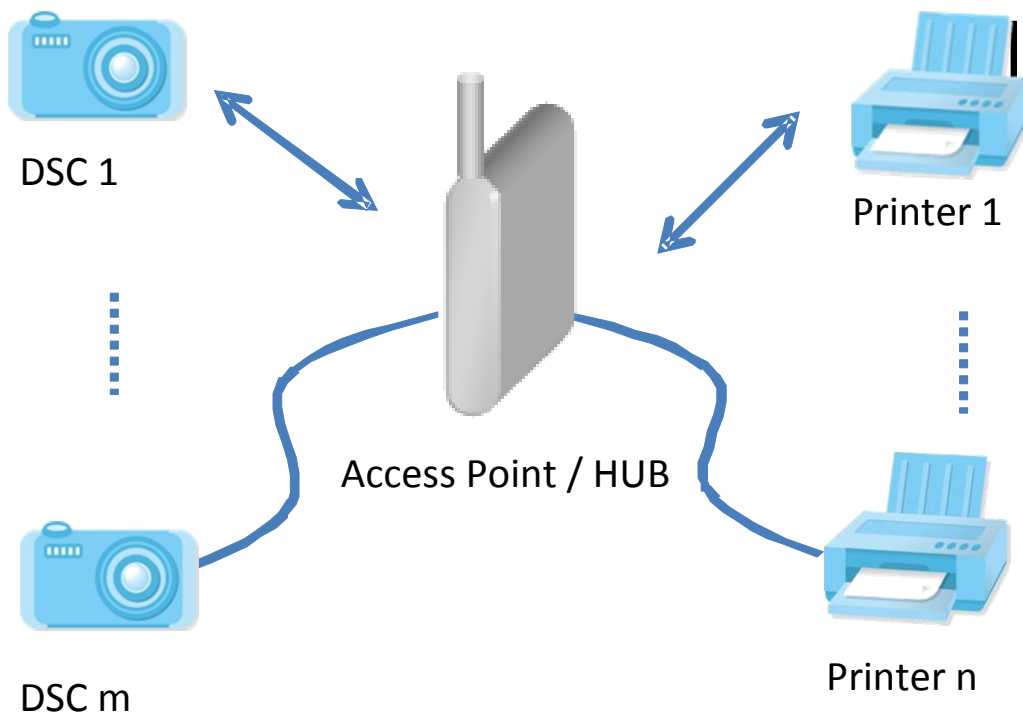Figure 5-1 shows an example of a physical connection topology in DPS over IP.

Figure 5-1

As shown in the example of Figure 5-1, in the case of using LAN I/F, it shall be assumed, in a physical connection topology, that DSCs and PRTs are connected to each other and even a Multi Point-Multi Point connection topology is configured.

Connection via 100BASE-TX of the IEEE802.3 standard shall be adopted as a physical I/F for using wired LAN I/F; another connection may be adopted. Connection via an infrastructure mode of any IEEE802.11b/g/n (2.4 GHz band) should be adopted as a physical I/F for using wireless LAN I/F; another connection may be adopted.

Logical Connection Topology

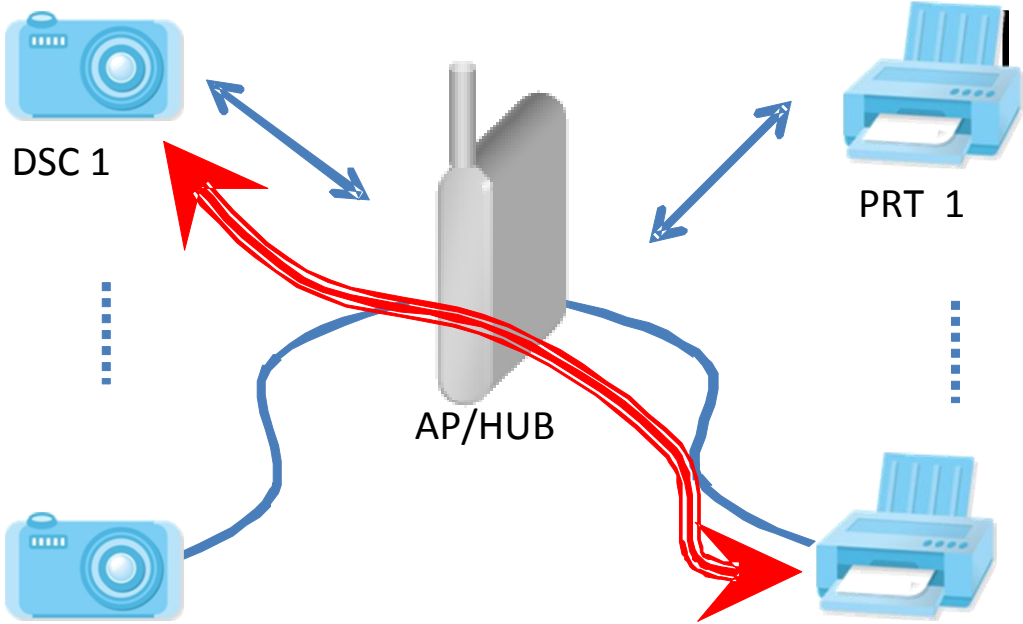Figure 5-2 shows an example of a logical connection topology of DPS over IP.

Figure 5-2

In order to implement DPS services between DSC1 and PRTn in a physical connection topology shown in the example of Figure 5-1, a Point-Point logical communication path as shown in Figure 5-2 shall be configured for DPS to establish a PTP-IP session.

The connection and termination of the PTP-IP session will be described in Section 10.

About Logo Certification

In order to improve the interconnectivity between DSC and PRT, Logo Certification Program is provided. The PictBridge Logo certification certifies that products have passed the PictBridge Logo Certification Test by executing the PictBridge Compliance Test Suite.

Please refer to the Logo Certification Guideline that describes the test method and the logo application methods.