



APTA Universal Transit Farecard Standard Work Scope Specification

APTA UTFS-D-TC-01A-05

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Abstract: To move forward with development of key standards in the Universal Transit Farecard Standard (UTFS) program, an agreed upon refinement of the scope of the UTFS effort is needed, in part to resolve intellectual property issues as well as to establish a clear definition of and path for achieving system level interoperability. This document provides the course of action that has been approved by vendors and agencies attending a series of meetings that were held at the Port Authority of New York and New Jersey, November 17-18, 2004, and subsequently approved by the Rail CEO Steering Committee on January 29, 2005.

Introduction / Background

The mission of the APTA Universal Transit Farecard Standards Task Force (UTFS) is to develop a series of documents that provides industry guidance for the creation of an open architecture payment environment that promotes greater access and convenience to the public transportation network and enables integration of independent payment systems. A key feature of the original UTFS effort was providing interoperability between components or subsystems of complete fare collection systems that use contactless smartcard type transaction devices. The original goal was interoperability that allows agencies to use different vendors for components or subsystems of the fare collection system, thus providing a greater opportunity for increased competition and greater flexibility in system maintenance and expansion. Creating standards that provide interoperability realistically involves obtaining agreements on the use of vendor controlled intellectual property (IP) rights for vendor supplied equipment or software. Whether such intellectual property would be made available to support interoperability and how an agreement on intellectual policy can be formulated is tied to understanding the scope of the proposed standard, i.e. the level of interoperability.

The Universal Transit Farecard Standard Task Force held a series of meetings and working sessions with transit agencies and fare system vendors at the Port Authority of New York and New Jersey November 17-18, 2004 to develop a declarative statement on the level of interoperability to be considered under the standards setting process, so that issues relating to intellectual property agreements on behalf of UTFS members, agencies and vendors could be resolved and an IP Policy faithfully executed. The meetings were well attended, participated in by experts representing 17 transit agencies, all major fare collection system vendors, government agencies and consultants totaling 59 attendees¹. From this meeting the following scope declaration was developed and subsequently approved by rail chief executive officers at a meeting of the APTA Rail CEO Subcommittee on January 29, 2005. The Bylaws have been modified to reflect this clarification of scope, and the IP Policy has been referenced to the Bylaws, thus creating definitive document precedence.

Summary

This scope statement clarifies, and provides details of newly added, subsystem level interoperability capability, but declares component level interoperability at the card reader or card interface device to be out of scope for UTFS development.

The agreed upon overall scope definition provides interoperability at the subsystem level, in which a subsystem is defined as a “black box” encompassing the Automatic Fare Collection (AFC) equipment, local computer, and central server. This subsystem “black box” is bounded at the front end by the standard established for fare media card structure, referred to as WP1 under the UTFS structure (which is unaffected by this most recent change in scope), and at the back-end by a new messaging standard that controls data communication between the “black box” and the agency central computer system, referred

¹ APTA UTFS Meetings Summary Report and Report of Agreement, November 17-18, 2004, PANYNJ Offices, One Madison Ave., New York, NY.

to as WP4-Plus as depicted in Figure 1. The standard that links the agency central computer with the regional clearinghouse referred to as WP4 is generally unaffected by the addition of WP4-Plus.

The agreed upon approach encompassing WP4-Plus will provide agencies the capability to capture and report data from different Automatic Fare Collection (AFC) systems/equipment, e.g. gates, ticket vending machines, and garage systems installed at the agency's site with the addition, if not already present, of a subsystem controller that utilizes the necessary interoperable interface between the subsystem and the agency central computer for processing transaction data. At the front end, the system will offer interoperability in processing standards-compliant fare media, for example UTFS WP1 compliant smart cards. WP4-Plus permits agencies to facilitate multi-vendor integrated audit/customer service, multi-vendor integrated ridership and revenue data, and multi-vendor integrated simple status updates regarding system-wide devices.

The approach will not provide interoperability at the component level, including components such as card readers and card interface devices (CID). Requiring interoperability at this component level places an artificial limitation on device design variability thus hindering vendors' ability to innovate and advance technology, as well as requiring vendors to reveal valuable intellectual property royalty free. The approach will also not automatically provide interoperability of legacy fare media that use magnetic stripe tickets between subsystems purchased from different vendors primarily because of intellectual property rights for magnetic fare format retained by suppliers.

The approach will also not automatically provide interoperability of legacy fare media that use magnetic stripe tickets between subsystems purchased from different vendors, primarily because of intellectual property rights for magnetic fare format retained by suppliers of these legacy systems. However, the UTFS will be inclusive of an interoperable magnetic and smart card specification for those transit agencies that elect to implement a new system with these formats. Since the specification for such systems would be part of the UTFS, vendors would not have any intellectual proprietary rights to any of these systems.

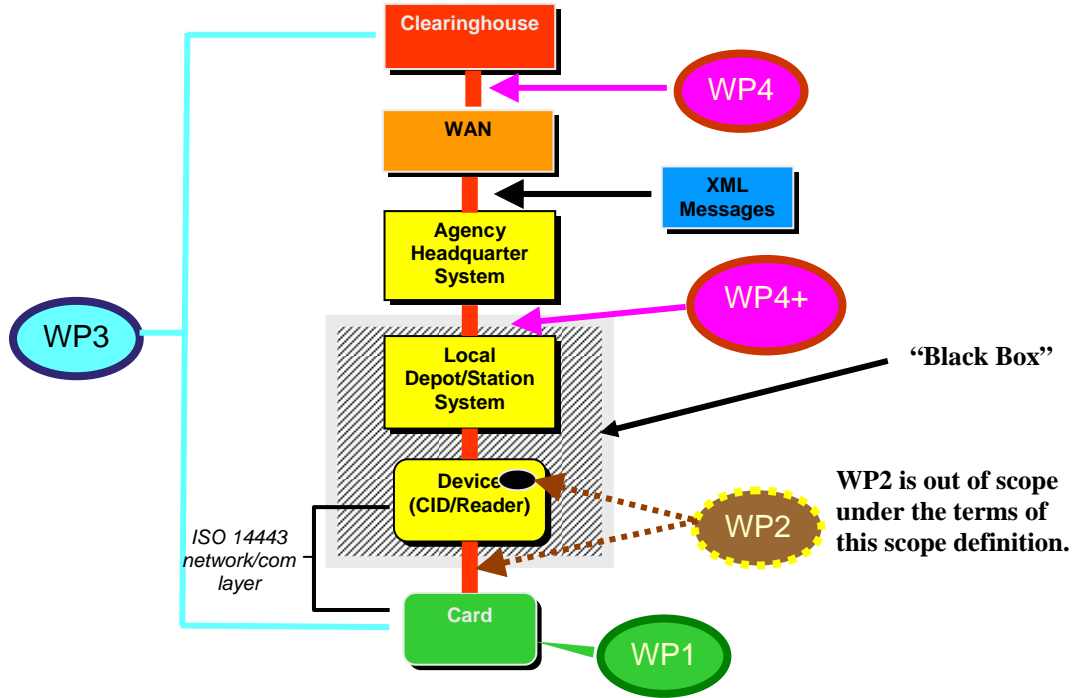


Figure 1 System and Subsystem Interfaces

Details of Scope Declaration

Building on the summary description, the proposed scope will lead to increased interoperability at the subsystem level allowing agencies to purchase subsystems from different vendors while providing an interface between subsystems and the agency central computer. This increase in interoperability or change in scope adds a new interface, now referred to as WP4-Plus that essentially changes the scope of the UTFS standard by providing an interface between subsystems and the agency central computer. These subsystems, which are defined by a single family of devices or the AFC equipment resident in, for example, a garage, rail station, or a new light rail extension, further consist of:

- Fare vending equipment devices including ticket vending machines, fireboxes, validators, etc.
- Computer controller (subsystem controller) for processing data from the fare vending equipment devices in the subsystem and for communicating with the agency central computer.
- Agency-specific application software tailored to support customized fare collection systems that meet the needs of agency specific tariff applications or any other software interface needs.

The added level of interoperability is depicted graphically in Figure 2, which shows how subsystem interoperability is used to expand a system composed of subsystems from different vendors. To understand this figure, note the addition of a new connection made between CCS Agency 2 and the subsystem controller of Agency 2 Subsystem C. This new connection, noted as WP4+ (WP4-Plus) is

made possible by the use of a subsystem controller. It is this additional link, called WP4-Plus together with the subsystem controller that is at the heart of the scope agreement. WP4-Plus would require vendors to reveal data elements and any necessary protocols, interfaces, or APIs between the Subsystem Controller and the Central Computer System (CCS). WP4-Plus permits agencies to facilitate multi-vendor integrated audit/customer service, multi-vendor integrated ridership and revenue data, and multi-vendor integrated simple status updates regarding system-wide devices, e.g. (red, yellow, green)

For interoperability (defined as seamless patron travel across modes and between authorities, agency consolidation between subsystems and between data for ridership, revenue and high level alarm data), transit agencies shall have the right to share:

- Fare media physical characteristics, data content, and security, and
- Interface definitions for data exchange and processing between Subsystem Controller, and Agency Central Computer and between Subsystem Controllers and Regional Clearinghouse.

The subsystem controller which acts as a mini-agency HQ computer enables its attached devices to operate on a standalone basis and to provide the translation mechanism from its native formats to or from that of WP4-Plus. The subsystem controller is the sole “node of communication” between a subsystem and the CCS. The data elements addressed by WP4-Plus would have the capability to process data taken from all fare collection instruments including magnetic and Smartcard, etc.

Further, this scope statement considers the generation of standards or practices at the lower level of components specifically the card reader or card interface device originally defined as WP2 within the UTFS program to be out of scope. All other work group efforts of UTFS including WP3 and WP4 remain within scope as does the newly created work effort of WP4-Plus defined above.

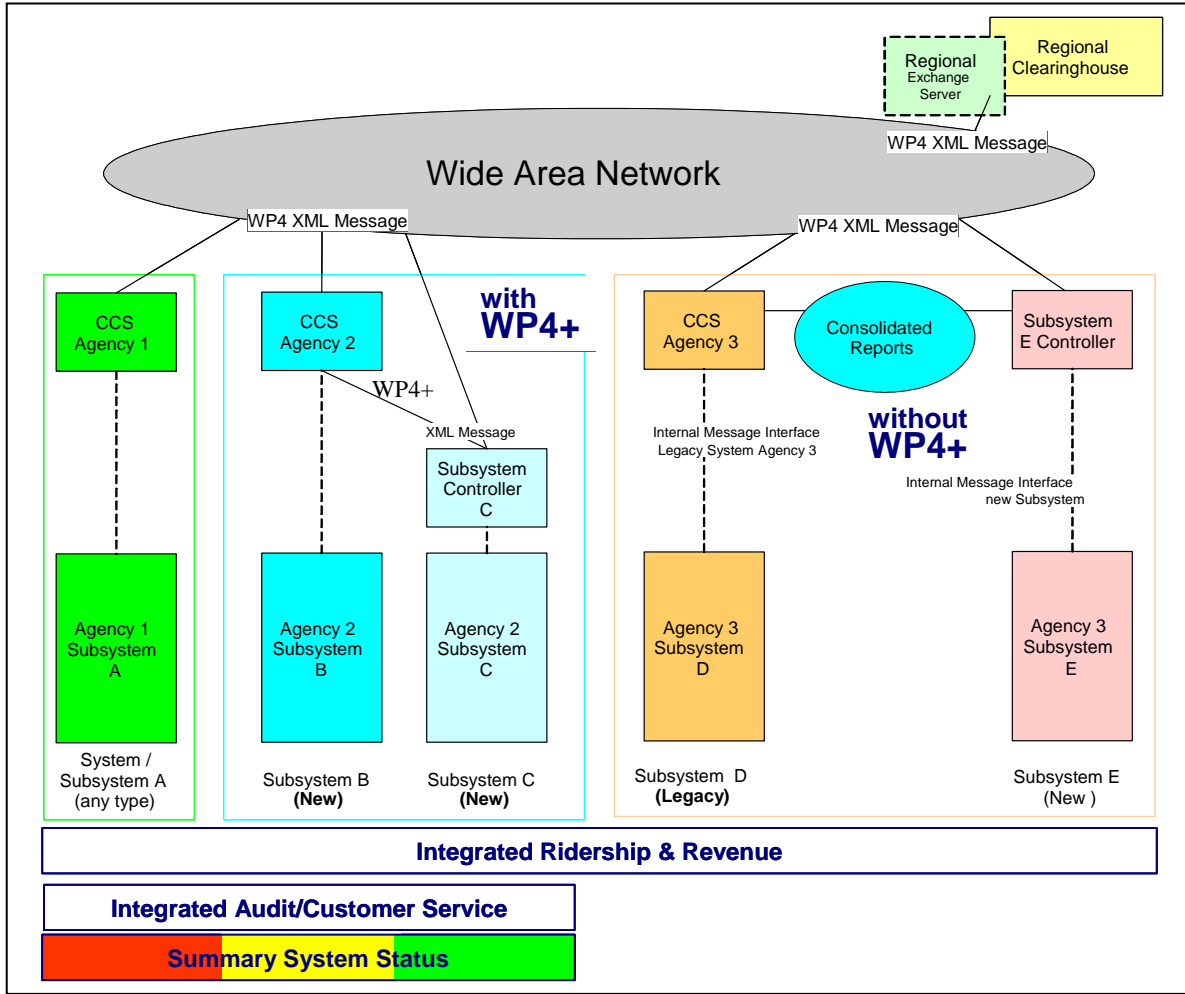


Figure 2 Integration of WP4-Plus