



# Smart Mobility Hubs (SMH) Interface Control Document

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for the Smart Columbus  
Demonstration Program

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# Executive Summary

The Smart Mobility Hubs (SMH) project is one of the eight Smart Columbus projects that aims to connect people by creating opportunity for City residents to better access jobs and services while improving the overall safety and efficiency of the transportation network.

This Interface Control Document (ICD) is intended to define the interfaces for the SMH project and describe the relationship between the designated SMH facilities and the respective functionality being added through the Smart Columbus SMH project. This ICD specifies the interface requirements the participating systems must meet. It provides a concept for how the interface should operate, defines the message structure and protocols that govern the interchange of data where applicable, and identifies the communication paths along which the project team expects data to flow.

The ICD has been updated to reflect the as-built project changes to better allow readers to see the actual project that has been implemented while also sharing changes that took place from the concept phase to the demonstration phase of the project.



# Chapter 1. Introduction

## 1.1. DOCUMENT PURPOSE

The purpose of this Interface Control Document (ICD) is to define the interfaces for the Smart Mobility Hubs (SMH) project and describe the relationship between the designated SMH facilities and the respective functionality being added through the Smart Columbus SMH project. This ICD specifies the interface requirements the participating systems must meet. It provides a concept for how the interface should operate, defines the message structure and protocols that govern the interchange of data where applicable, and identifies the communication paths along which the project team expects data to flow.

For each interface, the ICD provides the following information:

- A general description of the interface
- A description of the data exchange format and protocol for exchange
- Estimated size and frequency of data exchange
- Assumptions where appropriate

The document contains the following sections:

- **Chapter 1. Introduction** provides an overview of the SMH project, the key elements that guide the development of this ICD, stakeholders, and referenced materials.
- **Chapter 2. System Description** focuses on describing and extending the system concepts established in the Concept of Operations (ConOps), including any system capabilities, conditions, and constraints.
- **Chapter 3. System Interfaces** defines the interfaces for the SMH project.

The intended audience for this document is the City of Columbus project team, the vendor development team, the United States Department of Transportation (USDOT), and project stakeholders interested in understanding the interfaces for the SMH project.

## 1.2. RELATED DOCUMENTS

The interface concepts generated in this ICD derive from the project's ConOps and System Requirements and Specifications (SyRS) and form a part of this document to the extent specified herein. In the event of a conflict between the documents referenced and the contents of this document, this document shall be considered superseding.

- Concept of Operations for Smart Mobility Hubs for the Smart Columbus Demonstration Program
- System Requirements for Smart Mobility Hubs for the Smart Columbus Demonstration Program

These documents are available from the digital document library on the Smart Columbus project site at: <https://smart.columbus.gov/projects/smart-mobility-hubs>.

## 1.3. PROJECT BACKGROUND

The SMH project was scoped to deploy several transportation amenities at six different proposed facilities. These amenities provide Travelers with new and consolidated transportation capabilities, such as the deployment of Interactive Kiosks (IKs), which provide access to Comprehensive Trip Planning (CTP) services including the Multimodal Trip Planning Application (MMTPA), referred to as the Pivot App, an Emergency Call Button (ECB) for emergency services, Wi-Fi internet access, notifications/advisories, and local event information. The facilities were also designed to accommodate multiple modes of transportation including bike-share, car-share, and dockless device parking while facilitating pickup/drop-off points for Mobility Providers. These services are particularly useful in the completion of first-mile/last-mile (FMLM) and multimodal trip options.

### 1.3.1. Assumptions

Given the complexity of the applications proposed in the Smart Columbus program and the integration of various capabilities across City projects, a form follows function approach was used during the development of the requirements. This priority on functionality was a key priority during the SMH deployment and was used to define the operational concepts for the interfaces discussed herein. It is further understood the interface specifications were not based on a particular product or vendor, rather developed based on the knowledge and collective experience the team has gained through similar projects or implementation of systems. This understanding allowed for the avoidance of the cost and risk associated with unnecessary customizations. It was also assumed that the size and dimensional constraints for installation will differ from site to site.

### 1.3.2. Constraints

Following is a list of constraints for the SMH project.

- Advertisement material located in the City's right of way will be subject to City regulations. Advertisement material located on private property may be subject to additional requirements from the property owner.
- Physical right of way and existing infrastructure may limit the features that a specific facility can offer.
- Ride-hail companies (including taxis and Transportation Network Companies known as TNCs) interested in operating in the State of Ohio and City of Columbus are required to abide by laws and ordinances to help ensure safe and reliable service to consumers, including:
  - State of Ohio – chapters 4925 and 3942 of the Ohio Revised Code (ORC) detail the procedures and requirements for the TNCs to obtain permits and operate in Ohio.
  - City of Columbus – chapter 585 Vehicle for Hire Board of the Code of Ordinances detail the procedures and requirements for operating and licensing vehicle for hire companies, drivers and vehicles.
- Scooter and bike-share companies interested in operating in the City of Columbus are required to abide by the following Columbus City Code:
  - City of Columbus – chapter 904 – Shared Mobility Devices Rules and Regulations.
- The availability of Wi-Fi and accessibility to internet content is determined by the kiosk vendor. The intent of the Wi-Fi service is to provide users access to trip planning applications and information systems. For example, changes to the policies in place that might provide users with access to

internet content outside of the intended use, such as social media or video streaming, will greatly reduce available bandwidth of the communications network and may present security concerns as well.

- Access to Pivot App via interface SMH-IX2431-V02 may be competing with other IK applications for bandwidth, especially if wireless backhaul bandwidth becomes limited.
- IK Closed-Circuit Television (CCTV) system video from interface SMH-IX2433-V02 will not be transmitted to Emergency Call Center(s) (ECCs). Policies need to be developed specifying the retention of saved video and procedure for law enforcement to request saved video in the event of an incident at the SMH.
- Public Wi-Fi provisioned through interface SMH-IX2435-V02 may be slow or even ineffective if wireless backhaul bandwidth to IK becomes limited or number of Wi-Fi users becomes greater than anticipated.

### 1.3.3. Risks

Even projects with well-established components that have a high degree of implementation maturity still face risk. Potential areas of risk facing the SMH may come in various forms such as unforeseen technical challenges and operational or institutional roadblocks – most commonly, the acceptance of terms, conditions, or other agreements among stakeholders or users. Following are the risks that were identified during the concept phase of the project:

- Kiosk installation and operation by third party. Multiple agreements need to be in place between various agencies before kiosks can be deployed.
- Agreements regarding content to be displayed on kiosks need to be adopted.
- Designation of parking spaces for car-share, ride-hail, etc. may be difficult to enforce at sites located within private property leading to inconsistent expectations of SMH users.
- Lack of instrumentation of park and ride facilities, designated parking spaces, and dockless parking zones may lead to challenges during performance measures evaluation.

Following are the risks identified after project go-live:

- Identifying additional mobility providers, like car-share services, to provide Travelers with all available options at SMH.
- Identifying a city project manager for sustainability of the project and contracts. The Smart Columbus team continues to work with stakeholders and the City of Columbus to identify and mitigate the potential for these risks.

## 1.4. PROJECT CHANGES DURING DEVELOPMENT

Listed below are the major changes that were initially planned during the concept phase of the project and have not been developed for implementation.

### 1.4.1. Universal Serial Bus Charging Ports

The SMH locations were initially planned to be equipped with Universal Serial Bus (USB) charging ports for Travelers to recharge personal electronic devices like cellular phones, tablets and other wireless devices while planning a trip or waiting for transportation services. During the design phase of the project,

the project team decided not to include USB ports at the SMH locations due to environmental and security concerns. Since most of the SMH locations are not protected from weather, it was not environmentally safe to include USB charging ports at the SMH locations. To charge personal electronic devices, Travelers may have had to stay at the SMH location for a longer period which could increase security concerns at the SMH locations during night times. Further, bad actors could place USB skimmers into the ports and a user may unknowingly plug into the skimmer, potentially exposing personal information. For the above reasons, the project team decided not to equip the SMH with USB charging ports.

### **1.4.2. Interactive Voice Response**

The IK was originally slated to have an Interactive Voice Response (IVR) system as part of the MMTPA project. The IVR was going to provide a payment option for Travelers without a smartphone. The MMTPA project canceled the IVR system once it was concluded that Travelers would need a smartphone to conduct the trips planned through MMTPA. Travelers would need a smartphone to scan barcodes to unlock bike and scooter devices, to access mobility provider apps, and to use navigation services.

### **1.4.3. Common Payment System**

The Common Payment System (CPS) was a Smart Columbus project that was canceled in August 2020. It was the payment support piece to the MMTPA project that was to function as a mobility wallet. Instead, MMTPA created a direct, deep link payment connection with each mobility provider that requires the Traveler to register with the mobility provider and execute the payment through the installed app on the smartphone.

# Chapter 2. System Description

Smart Columbus is focused on advancing Mobility as a Service (MaaS) amenities along the Central Ohio Transit Authority (COTA) CMAX line within and adjacent to the Linden neighborhood at selected facilities. Some amenities are concentrated within a short walk to COTA's CMAX Bus Rapid Transit (BRT), while others may be designed for Travelers who bike or use a motorized device (e.g., scooters, e-bikes, etc.) to reach a destination.

Each SMH location is designed to create a physical space with consolidated transportation resources for Travelers. With community input, the Smart Columbus team identified key locations to focus and deploy new features. The program aimed to integrate new features, catalog the process, and set the stage to deploy more SMH locations in other parts of the city.

The SMH project establishes both a physical location for the Traveler to access multimodal transportation options as well as provide an IK with a software interface for Travelers to access the Pivot App for CTP. Trip data for each SMH will be collected for trips created and executed in the Pivot App that originate, pass through, or end at a SMH. This data will be de-identified and sent to the Smart Columbus Operating System (Operating System) where it will be made available to City of Columbus and third-party users for reports and analysis. The IK will be managed by a content management system (CMS) and deliver general information as well as location-specific content to Travelers, such as local dining and entertainment, maps, routes, etc. The IKs provide Wi-Fi capability, an ECB, and features to accommodate for the Americans with Disabilities Act (ADA).

SMH facilities provide multiple modes of transportation in the form of designated dockless bike and scooter parking areas, pickup/drop-off zones for ride-hailing, park and ride lots, car-share parking, and access to COTA services.

## 2.1. FUNCTIONAL SYSTEM OVERVIEW

**Figure 1** illustrates the proposed functionalities of the SMH project. The proposed infrastructure and technology-based improvements vary at each site due to differences in the physical constraints and specific needs of the location.

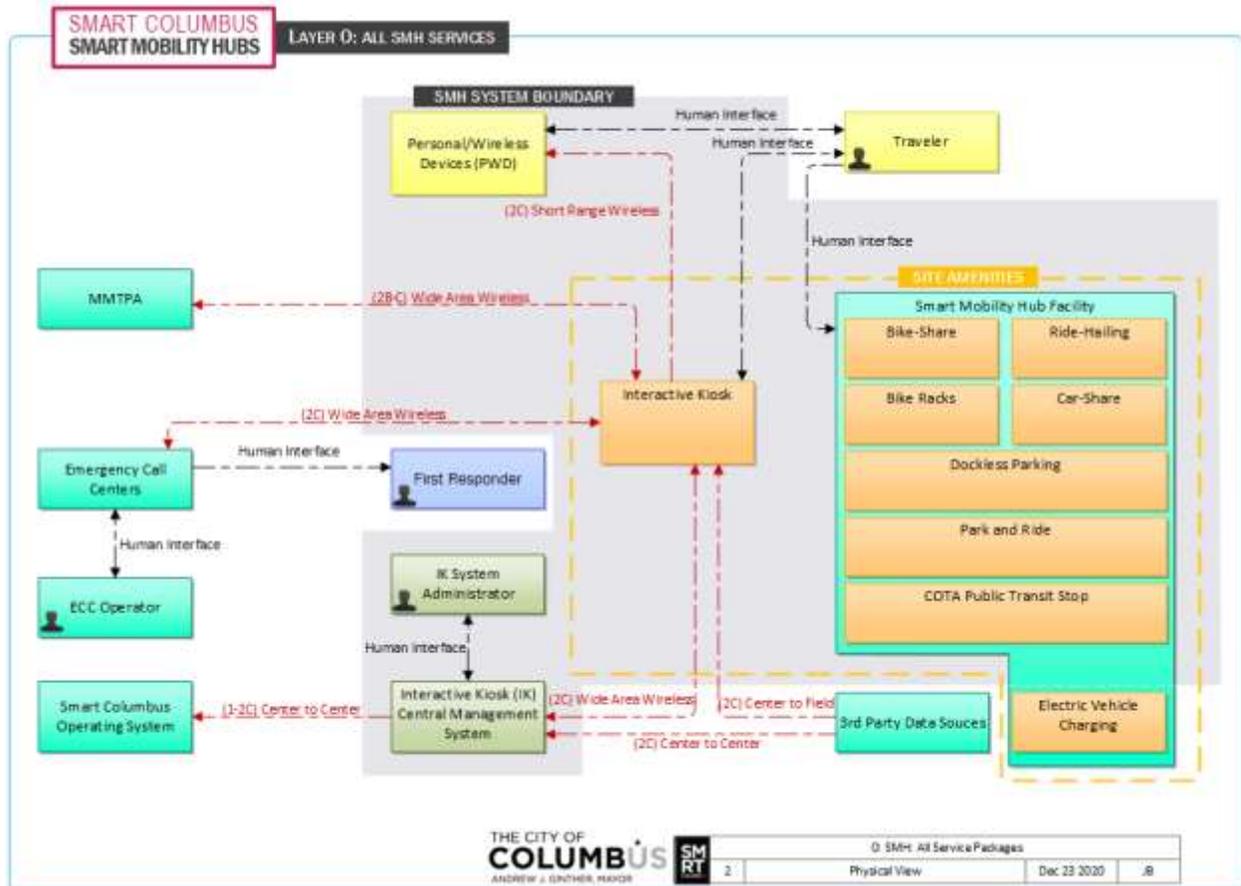


Figure 1: Smart Mobility Hubs Functional System Overview

Source: City of Columbus

Within the system boundary, the context diagram shows field infrastructure amenities proximate to COTA transit stops and SMH Facilities, which enable mode transfer for Travelers. The IK is Traveler equipment that will be used to access local information, transportation related services, emergency services, and is powered by a CMS. The IK will also provide Wi-Fi signal to personal wireless (traveler) devices. Additional in-depth descriptions and specifics concerning the interfaces associated with elements within the system boundary are detailed in **Chapter 3**.

External to the SMH system boundary are a number of centers instrumental to the SMH mobility network. The Pivot App that is accessible on the IK satisfies the requirement for CTP as detailed in **Chapter 3**. Additional information on the features and functions of the Pivot App and the Operating System are provided by each project’s documentation which is located at <https://smart.columbus.gov/projects>.

## 2.2. INTERFACE STATUS

For the post-deployment update of the ICD, each interface has been reviewed thoroughly to make sure it is in line with the final design and development of the project. Each interface is given a status to reflect the changes made as per the current system. The following interface status options are used for each of the interfaces below:

- Original Interface: No changes made to the data flow
- Amended Interface: Changes made to the data flow and/or to communication layers
- Removed Interface: No data flow established between source and destination
- New Interface: New data flow established between source and destination

### 2.3. LIST OF INTERFACES

**Table 1** lists the SMH system interfaces presented in **Figure 1**.

Table 1: List of Interfaces

Interface ID	Reference	Interface Type	Source Element	Destination Element	Data Flow	Communications Media	Interface Status
SMH-IX2431-V02	Interface 1.1	External	IK Touch Screen	Pivot App	Request for trip planning services (car-share, ride-hail, bike-share, paratransit), request to enter email or phone number, request to enter verification code.	Hyper-Text Transfer Protocol Secured (HTTPS), secured Application Programming Interface (API) over Wide Area Wireless	<p>Amended Interface</p> <p>Original Interface: Request for trip planning services (car-share, ride-share, bike-share, paratransit, account information and session token hand-offs to payment device)</p> <p>Interface is updated to remove the payment related data flow since CPS project is no longer part of Smart Columbus program. Interface also now includes the data flow that would take place for the two-factor authentication to receive the trip plan information Pivot app on the Kiosk to the Pivot App on the mobile device.</p>

Interface ID	Reference	Interface Type	Source Element	Destination Element	Data Flow	Communications Media	Interface Status
SMH-IX2432-V02	Interface 1.2	External	Pivot App	IK Touch Screen	Real-time trip planning data associated with mode of transport (public transportation, ride-hailing, bike-sharing, etc.), email and phone number verification data.	HTTPS, secured API over Wide Area Wireless	<p>Amended Interface</p> <p>Original Interface: Real-time trip planning data associated with mode of transport (public transportation, ride sharing services, bike sharing, etc.), session token hand-offs to payment device and confirmations.</p> <p>Interface is updated to remove the payment related data flow since CPS project is no longer part of Smart Columbus program. Interface also now includes the data flow that would take place for the two-factor authentication to receive the trip plan information Pivot app on the Kiosk to the Pivot App on the mobile device.</p>
SMH-IX2433-V01	Interface 2.1	External	ECB	ECCs (Columbus and Franklin County)	Request for emergency services, voice and location data.	Voice Over Internet Protocol (VOIP) over Wide Area Wireless	Original Interface

Interface ID	Reference	Interface Type	Source Element	Destination Element	Data Flow	Communications Media	Interface Status
SMH-IX2434-V01	Interface 2.2	External	ECCs (Columbus and Franklin County)	ECB	Emergency response service, notifications and voice response.	(VOIP) over Wide Area Wireless	Original Interface
SMH-IX2435-V02	Interface 3.1	Internal	IK System	Personal Wireless Device	Wireless Internet Access for public use including access to Pivot App.	Wireless Network Interface Card	Amended Interface  Original Interface: Wireless Internet Access for public use.  Interface included the access of Pivot App using Wi-Fi available at the IK.
SMH-IX2436-V01	Interface 3.2	External	Personal Wireless Device	Pivot App	Request for trip planning services (car-share, ride-share, bike-share, paratransit, account information and payment request data)	Wireless Ethernet	Removed Interface  The interface between personal wireless device and Pivot app installed on the mobile device is outside of the SMH system boundary. For this reason, this interface is no longer part of the SMH system.
SMH-IX2437-V01	Interface 5	Internal	USB Charging Port	Personal Wireless Device	Power only (no signal) for electronic device charging	USB	Removed Interface  Interface is no longer part of the SMH system since USB Charging Ports are not installed at the SMH locations.

Interface ID	Reference	Interface Type	Source Element	Destination Element	Data Flow	Communications Media	Interface Status
SMH-IX2438-V01	Interface 6.1	External	Personal Wireless Device	IVR System	Alternative for MMTPA Travelers with visual disabilities or those without Smart Phones	Telephone	Removed Interface  Interface is no longer part of the SMH system since IVR System is not part of the MMTPA project.
SMH-IX2439-V01	Interface 6.2	External	IVR System	Personal Wireless Device	Information delivery via voice data	Telephone	Removed Interface  Interface is no longer part of the SMH system since IVR System is not part of the MMTPA project.
SMH-IX3252-V01	Interface 7.1	External	CPS Application	IK Touch Screen	Request for CPS account authentication, payment authorization and payment confirmation	HTTPS, secured API over Wide Area Wireless	Removed Interface  Interface removed from the SMH System since CPS project is no longer part of Smart Columbus program.
SMH-IX3253-V01	Interface 7.2	External	IK Touch Screen	CPS Application	Request for CPS account credentials and other authentication data, payment approval and agreement to pay	HTTPS, secured API over Wide Area Wireless	Removed Interface  Interface removed from the SMH System since CPS project is no longer part of Smart Columbus program.

Interface ID	Reference	Interface Type	Source Element	Destination Element	Data Flow	Communications Media	Interface Status
SMH-IX3254-V01	Interface 8.1	Internal	IK System	IK-CMS	Administrative coordination includes usage data on the kiosk (Wi-Fi and Apps), software health monitoring of the kiosks, application accesses, logs and other Information Technology (IT) monitoring (identifiers, location, timestamp, applications accessed, duration, engagement intervals, etc.), and physical health monitoring heartbeats from the kiosk	HTTPS/WebSockets/Extensible Markup Language (XML), secured API over Wide Area Wireless	Original Interface

Interface ID	Reference	Interface Type	Source Element	Destination Element	Data Flow	Communications Media	Interface Status
SMH-IX3255-V01	Interface 8.2	Internal	IK-CMS	IK System	Administrative coordination includes configuring, uploading, and managing kiosk content (location-specific) such as approved advertising content, custom imaging, messages, posters, configuring applications that require data feeds like local events, job boards, surveys, business listings and directory information for Eat and Drink, Play, Shop, Stay, Social Services, Shelter, Job Board, and Civic Resources	HTTPS/WebSockets/XML, secured API over Wide Area Wireless	Original Interface

Interface ID	Reference	Interface Type	Source Element	Destination Element	Data Flow	Communications Media	Interface Status
SMH-IX3256-V01	Interface 9.1	External	IK-CMS	Operating System	Operational usage data such as kiosk access point usage, application clicks/usage, etc. will be recorded in the Operating System to provide report data to SMH stakeholders via its information exchange portal interface	HTTPS/WebSockets/XML, secured API over Wide Area Wireless	Original Interface
SMH-IX3258-V01	Interface 9.2	External	Operating System	IK-CMS	COTA transit real-time arrival countdowns, a display of the minutes to arrival of the next bus to arrive for each route servicing the SMH location. These countdowns will be processed from the COTA General Transit Feed Specification (GTFS) feed saved in the Operating System	HTTPS, secured API over Wide Area Wireless	Removed Interface  Interface removed since there is no data flow from Operating System to IK-CMS.

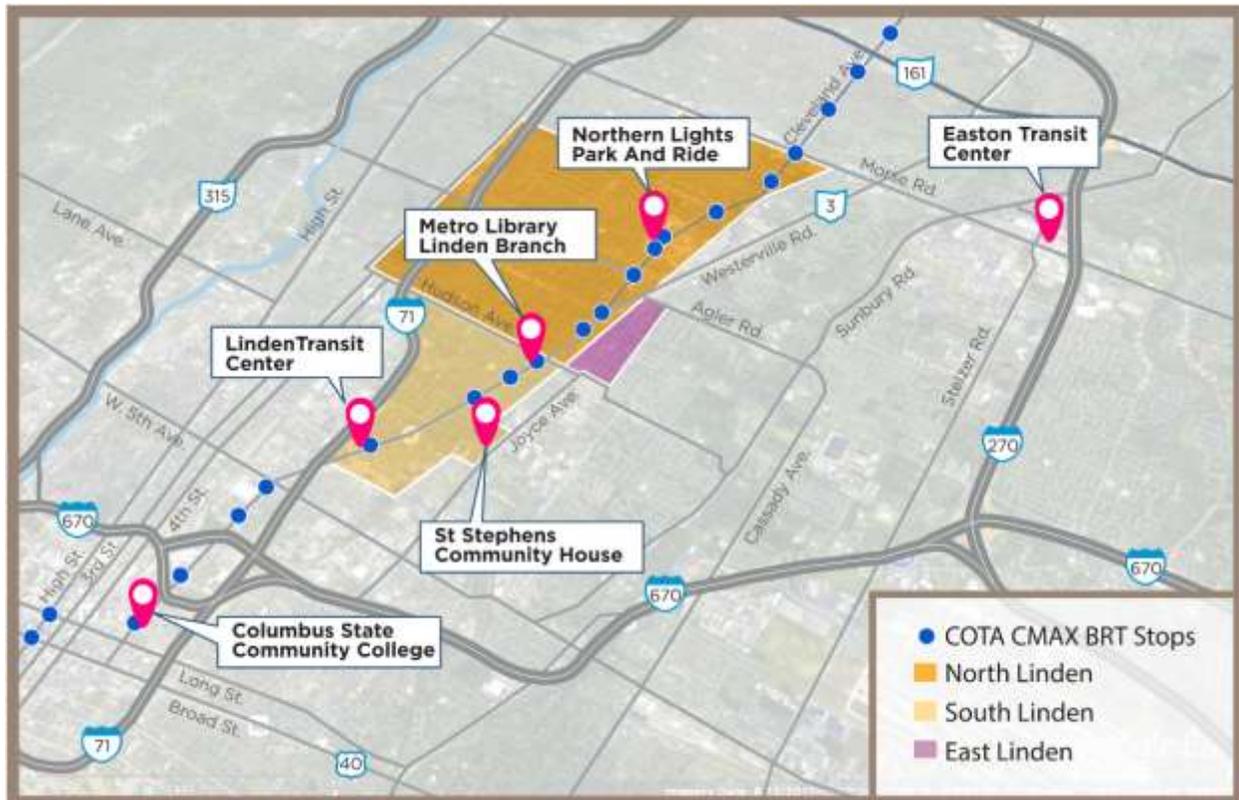
Interface ID	Reference	Interface Type	Source Element	Destination Element	Data Flow	Communications Media	Interface Status
SMH-IX3257-V01	Interface 10	External	COTA Back Office	IK-CMS	COTA provides schedule and real-time arrival data for usage at the kiosk via the GTFS	HTTPS, secured GTFS feed over Wide Area Wireless	Removed Interface  Interface removed since there is no data flow from COTA Back Office to IK-CMS.
SMH-IX3288-V01	Interface 11.1	External	Third-Party Data Sources	IK System	Data feed from the third-party apps available on the IK such as local events, job boards, surveys, business listings and directory information for Eat and Drink, Play, Shop, Stay, Social Services, Shelter, Job Board, and Civic Resources	HTTPS/WebSockets/XML, secured API over Wide Area Wireless	New Interface

Interface ID	Reference	Interface Type	Source Element	Destination Element	Data Flow	Communications Media	Interface Status
SMH-IX3289-V01	Interface 11.2	External	Third-Party Data Sources	IK-CMS	Data feed from the third-party apps available on the IK such as local events, job boards, surveys, business listings and directory information for Eat and Drink, Play, Shop, Stay, Social Services, Shelter, Job Board, and Civic Resources	HTTPS/WebSockets/XML, secured API over Wide Area Wireless	New Interface

Source: City of Columbus

## 2.4. FACILITIES

The geographic area of the SMH deployments extends on the Cleveland Avenue corridor coinciding with COTA's CMAX BRT to the Easton commercial district. Individual SMH facilities vary in size, configuration and available services since the goal of the sites was to incorporate the amenities within the existing physical constraints. The following are facility descriptions with a list of existing facility amenities and the SMH project enhancements. The facilities are described from the south traveling north as shown in Figure 2.



**Figure 2: SMH Locations**

Source: City of Columbus

### 2.4.1. Columbus State Community College

The Columbus State Community College (CSCC) attracts largely local commuter students and is a major employment center. COTA serves this site, which also contains a CMAX BRT station. A considerable number of transit-users access this site and the COTA station also has access to real-time transit information displays. An IK was installed at this site where users can access features such as the Pivot App, Wi-Fi and an ECB. The site also offers bike-share docking, a dockless parking zone, and car-share parking spaces.

**Table 2** summarizes the CSCC mobility hub amenities.

**Table 2: Columbus State Community College Hub Amenities**

Existing Facility Amenities	SMH Enhancements
<ul style="list-style-type: none"> <li>• Bike-Sharing</li> <li>• Bike Rack</li> <li>• Real-Time Display</li> </ul>	<ul style="list-style-type: none"> <li>• Car-Share Parking</li> <li>• Dockless Parking Zone</li> <li>• IK <ul style="list-style-type: none"> <li>▪ CTP</li> <li>▪ ECB</li> <li>▪ Wi-Fi</li> </ul> </li> </ul>

Source: City of Columbus

### 2.4.2. Linden Transit Center

The Linden Transit Center is a COTA location which also contains a CMAX BRT station within a revitalized area that includes direct access to healthcare and daycare centers. The facility offers public Wi-Fi, real-time transit information displays, and features an IK at which users can access the Pivot App and an ECB. A bike-sharing dock, dockless device parking zone, and reserved space for ride-hailing pickup/drop-off are also available at this location. The Linden Transit Center was also an original stop and turnaround point for the Connected Electric Automated Vehicle (CEAV) project (see CEAV project documentation located at <https://smart.columbus.gov/projects/> for more information).

**Table 3** summarizes the Linden Transit Center mobility hub amenities.

**Table 3: Linden Transit Center Amenities**

Existing Facility Amenities	SMH Enhancements
<ul style="list-style-type: none"> <li>• Facility Wi-Fi</li> <li>• Real-Time Display</li> </ul>	<ul style="list-style-type: none"> <li>• Smart Columbus CEAV Shuttle</li> <li>• Bike-Sharing</li> <li>• Pickup/Drop-off Zone</li> <li>• Dockless Parking Zone</li> <li>• IK <ul style="list-style-type: none"> <li>▪ CTP</li> <li>▪ ECB</li> <li>▪ Wi-Fi</li> </ul> </li> </ul>

Source: City of Columbus

### 2.4.3. St. Stephen's Community House

St. Stephen's Community House is located near the intersection of 17th and Joyce Avenues. The lobby at the St. Stephen's Community House houses an IK, which provide users access to the Pivot App, Wi-Fi and an ECB. This project also provides zones for dockless device parking, bike-sharing, ride-hailing pickup/drop-off, and car-share parking spaces. St. Stephen's Community House is the starting point for the automated shuttle for the CEAV project (see CEAV project documentation located at <https://smart.columbus.gov/projects/> for more information).

**Table 4** summarizes the St. Stephen's Community House mobility hub amenities.

**Table 4: St. Stephen’s Community House Hub Amenities**

Existing Facility Amenities	SMH Enhancements
<ul style="list-style-type: none"> <li>• Bike Racks</li> </ul>	<ul style="list-style-type: none"> <li>• Smart Columbus CEAV Shuttle</li> <li>• Park and Ride</li> <li>• Car-Share Parking</li> <li>• Pickup/Drop Off Zone</li> <li>• Bike-Sharing</li> <li>• Dockless Parking Zone</li> <li>• IK <ul style="list-style-type: none"> <li>▪ CTP</li> <li>▪ ECB</li> <li>▪ Wi-Fi</li> </ul> </li> </ul>

Source: City of Columbus

#### 2.4.4. Columbus Metropolitan Library – Linden Branch

The Columbus Metropolitan Library – Linden Branch is located on Cleveland Avenue between Kenmore Road and Kohr Place. This location includes an IK which provides users with the Pivot App, Wi-Fi and an ECB. This location also provides bike-sharing docks and reserved car-share parking spaces and ride-hail pick-up/drop-off zone.

**Table 5** summarizes the mobility hub amenities for the Metro Library in Linden.

**Table 5: Metro Library Hub Amenities**

Existing Facility Amenities	SMH Enhancements
<ul style="list-style-type: none"> <li>• Bike Racks</li> <li>• Real-Time Display</li> </ul>	<ul style="list-style-type: none"> <li>• Car-Share Parking</li> <li>• Bike-Sharing</li> <li>• Pickup/Drop-off Zone</li> <li>• Dockless Parking Zone</li> <li>• IK <ul style="list-style-type: none"> <li>▪ CTP</li> <li>▪ ECB</li> <li>▪ Wi-Fi</li> </ul> </li> </ul>

Source: City of Columbus

#### 2.4.5. Northern Lights Park and Ride

The Northern Lights Park and Ride is a new COTA-operated facility at the Northern Lights shopping center. This location includes an IK at which users can access the Pivot App, Wi-Fi and an ECB. The Northern Lights Park and Ride also provides space for dockless device parking, car-share parking spaces, and a ride-hailing pickup/drop-off zone. A separate COTA-led initiative also installed Electric Vehicle (EV) charging stations.

**Table 6** summarizes the Northern Lights Park and Ride mobility hub amenities.

**Table 6: Northern Lights Park and Ride Amenities**

Existing Facility Amenities	SMH Enhancements
<ul style="list-style-type: none"> <li>• Park and Ride</li> <li>• Real-Time Display</li> <li>• Bike Racks</li> </ul>	<ul style="list-style-type: none"> <li>• Car-Share Parking</li> <li>• Pickup/Drop-off Zone</li> <li>• Dockless Parking Zone</li> <li>• IK                             <ul style="list-style-type: none"> <li>▪ CTP</li> <li>▪ ECB</li> <li>▪ Wi-Fi</li> </ul> </li> <li>• EV Charging</li> </ul>

Source: City of Columbus

### 2.4.6. Easton Transit Center

The COTA Easton Transit Center is near the intersection of Stelzer Road and Transit Drive and serves transit and FMLM needs of Travelers accessing the Easton mixed-use development. An IK is installed at the transit center at which users can access the Pivot App, Wi-Fi and an ECB. A bike-share dock and a ride-hailing pickup/drop-off zone are also available at the transit center.

**Table 7** summarizes the Easton Transit Center mobility hub amenities.

**Table 7: Easton Transit Center Amenities**

Existing Facility Amenities	SMH Enhancements
<ul style="list-style-type: none"> <li>• Wi-Fi</li> <li>• Bike Racks</li> <li>• Real-Time Display</li> <li>• Park and Ride</li> </ul>	<ul style="list-style-type: none"> <li>• Bike-share</li> <li>• Pickup/Drop-off Zone</li> <li>• IK                             <ul style="list-style-type: none"> <li>▪ CTP</li> <li>▪ ECB</li> <li>▪ Wi-Fi</li> </ul> </li> </ul>

Source: City of Columbus

# Chapter 3. System Interfaces

## 3.1. INTERACTIVE KIOSK

The IK is a standalone machine used to deliver a variety of services in the SMH context, from being an information interface for Travelers to providing access to other information systems. The IK consists of several hardware and software interfaces as outlined below.

### 3.1.1. Interactive Kiosk Physical Hardware

The following list of hardware components contribute to the functionality offered to Travelers as part of the kiosk, are assumed to be physically affixed to the IK, and may differ in physical connection type to the IK itself depending on the vendor product. As such, the descriptions below only describe how the physical hardware will be used by SMH.

- Capacitive Touchscreen – the kiosk is organized around a physical touchscreen monitor sensitive to touch with options displayed as on-screen software buttons and a virtual (screen) keyboard displayed when needed. It is the unit's main input/output device and interface to SMH Travelers.
- ECB – a physical button affixed to the exterior of the IK that initiates a direct audio connection to the 911 ECC operated by the City of Columbus or Franklin County upon activation by the Traveler.
- Video Camera – the IK camera is a physical imaging interface that can serve multiple functions such as snapshot acquisition, user identification, gesture recognition, and Traveler security support. Under the scope of the SMH project, video collected during an emergency call will be flagged with a timestamp and can be provided to law enforcement by the vendor if requested.
- Audio Hardware – the audio interface is a piece of hardware that connects the IK's sound components, connecting the signals from the microphone, speaker, and sound card interfaces. Under the scope of the SMH project, audio will be available only upon activation of the ECB for communication with ECCs as described in **Section 3.1.5**.
- Wi-Fi – the physical wireless network interface controller that operates on 802.11 a/b/g/n radio signals as the kiosk's integrated communications module provides Travelers with internet connectivity.

### 3.1.2. Interactive Kiosk Administrative Interfaces

Generally speaking, the kiosks provide access to other systems via software interfaces using the touchscreen. All software interfaces share a few common options or buttons like help, canceling a process, and navigating back or forward one screen. Each screen a user may see or interact with represents a different state and conditions for transferring from state to state may differ. While each software interface aims to provide a service to its user, all software interfaces must continually check their own state, check conditions before allowing users to advance to the next screen, periodically report status, and immediately log and report all critical errors and conditions. In addition, the kiosk will also keep an internal log of any hardware-related triggers or flags; therefore, the administrative data flows associated with all software interfaces on the kiosk are as follows:

### 3.1.2.1. Data and Information Flow

- **Interface 8.1 SMH-IX3254-V01 IK System to the IK-CMS** – the IK’s central management system (IK-CMS) will provide the following information flows through this interface:
  - **Kiosk Usage** – a means of storing usage data, application accesses from each kiosk, and the usage for each access point will be monitored (identifiers, location, timestamp, applications accessed, duration, engagement intervals, etc.), and health monitoring heartbeats from the kiosk will be processed.
  - **Physical and Administrative** – health monitoring of the kiosks, kiosk configuration information, field device state, access panel status, status of hardware components, checksums, error logs.
  - **Wi-Fi Security Administration** – intrusion detection attempts and its associated metadata (e.g., source Internet Protocol (IP), timestamp, violation codes, description, mitigation response, etc.), violation attempts with browsing to sites not permitted and associated metadata, bandwidth statistics (avg, max, min, durations, etc.).
  - **Wi-Fi Compliance Administration** – industry standard monitoring on Wi-Fi health and usage will be collected in order to enforce Wi-Fi usage policies. This includes broadcast information from connected devices, how devices establish a connection to the Wi-Fi with inferred device info (e.g., manufacturer Open Usability Interface (OUI), order of Dynamic Host Configuration Protocol (DHCP) options, Media Access Control (MAC) address, etc.), network status, data usage such as current transfer speeds, historical data consumption (to see which devices are consuming network resources), wireless environment information for automatic channel selection, which helps improve Wi-Fi performance for its users and their neighbors by reducing interference due to channel congestion, anonymous usage data such as aggregated counts of Wide Area Network (WAN) types, mean download time for update payloads, website (optional).
  - **Emergency Calls** – visual data captured by the kiosk’s camera during emergency call-button activation along with associated properties (kiosk identifiers and timestamp) will be saved locally within the IK-CMS for use only by local law enforcement agencies if requested. The vendor will retrieve and provide the data to law enforcement following the request.
- **Interface 8.2 SMH-IX3255-V01 IK-CMS to IK System** – in addition to the technical administration provided through interface 8.1, kiosk administrators will be responsible for managing the content on each kiosk. This coordination includes configuring, uploading, and managing location-specific content, such as approved advertising, custom designs and messaging, photo booth, arcade, posters, configuring applications that require data feeds like local events, job boards, surveys, business listing and directory information for Eat and Drink, Play, Shop, Stay, Social Services, Shelter, Job Board, Civic Resources, and send directions to mobile devices or tablets that can be used with native navigation apps.
- **Interface 9.1 SMH-IX3256-V01 IK-CMS to the Operating System** – Operational usage data such as kiosk access point usage, application clicks/usage, etc. will be recorded in the Operating System to provide report data to SMH stakeholders via its information exchange portal interface.
- **Interface 11.2 SMH-IX3289-V01 Third-Party Data Sources to IK-CMS** – Information includes data feeds like local events, job boards, surveys, business listing and directory information for Eat and Drink, Play, Shop, Stay, Social Services, Shelter, Job Board and Civic Resources.

### 3.1.2.2. Communications, Security

- Security Plane: Internet Engineering Task Force (IETF) Hyper-Text Transfer Protocol (HTTP) Auth, HTTPS Auth, Transport Layer Security (TLS) Auth
- Intelligent Transportation System (ITS) Application Information Layer: Undefined
- Application Layer: IETF HTTP, IETF HTTPS, IETF WebSockets, W3C XML
- Presentation Layer: W3C HTML5, IETF JavaScript Object Notation (JSON), W3C XML
- Session Layer: IETF TLS
- Transport Layer: IETF Transmission Control Protocol (TCP)
- Network Layer: IETF IPv4
- Data Link: City Fiber Optic Network (FON), Wireless WAN
- Physical Layers: City FON, Wireless WAN

### 3.1.2.3. Standards and Protocols

- File formats include Portable Document Format (PDF), image, Document File (DOC)
- Data transfers from external sources include API, external Uniform Resource Locator (URL) iframe, and Comma-Separated Values (CSV)

## 3.1.3. Comprehensive Trip Planning

A software interface to the Pivot App will provide Travelers the ability to plan a multimodal trip from start to completion. This CTP service can be performed at the kiosk through the kiosk's internal browser and through Wi-Fi. Using this software interface, Travelers will be able to click on the Pivot App selection tile on the kiosk's touch screen display, where the Pivot App will guide the Traveler through a series of screens to enter destination, view routes various modes, and travel times. The Pivot App will then allow the trip plan to be sent to the Traveler's smartphone or tablet to be opened in the Pivot App to pay for the modes via deep linking. The Pivot App on the kiosk will request a phone number or an email to be able to send the trip information to the smartphone. As an added security layer, the Pivot App will first send the Traveler a security verification code and then once that code is entered on the kiosk, the trip plan will be sent via email or text as the Traveler first selected.

### 3.1.3.1. Non-Sensitive Data and Information Flow

- **Interface 1.1 SMH-IX2431-V02 IK Touch Screen to Pivot App** – Kiosk identifier, Global Positioning System (GPS) coordinates, current timestamp, touchscreen option selected, keyboard inputs transmitted
- **Interface 1.2 SMH-IX2432-V02 Pivot App to IK Touch Screen** – Webpages (http) with images and Geographic Information System (GIS) map data, request prompts for trip planning (e.g., source location selection, destination location selection, mode selection etc.), turn-by-turn directions with mobile integration to transfer those directions to mobile devices or tablet. As part of the CTP, the Pivot App will establish its own interfaces to collect data that will be presented to the Traveler during the trip planning session. The data and information flows that may be transmitted through this interface by the Pivot App to the Traveler during a given trip planning session could include the following type of information:

- **COTA CMAX and Other Transit Data** – identifiers (destination cross street or numbered lettered), logos, location name, routes (route identifiers), system maps, strip maps of single routes, fixed schedules, frequencies schedules, pertinent transfer maps, stop name and number, clear indication of stop location and position, expected travel times, and ridership procedures
- **Ride-Hail Services** – identifiers, logos, location name, address, phone, ride-hail type, ride identifier, estimated trip cost
- **Bike-Sharing**– identifiers, location name, address, county, region/area, station capacity, bike availability, open docks, trip start timestamp, trip end timestamp, trip start station, trip end station, rider type (account holder, single ride, pass-based), account holder metadata, estimated trip cost
- **Dockless Parking Zones** – at the time of this project, parking zones are not instrumented. However, the Pivot App has worked with bike and scooter providers and has access to data relating to device/unit availability and estimated trip cost

### 3.1.3.2. Sensitive Data and Information Flow

- **Interface 1.2 SMH-IX2432-V02 Pivot App to IK Touch Screen** – Webpages (https) with GIS map data, Traveler preferences, turn-by-turn directions with mobile integration to transfer those directions to mobile devices or tablet. As part of the CTP, the Pivot App will establish its own interfaces to collect data that will be presented to the Traveler during the trip planning session.

### 3.1.3.3. Non-Sensitive Communications, Security

- ITS Application Information Layer: Undefined
- Application Layer: IETF HTTP, IETF WebSockets, W3C XML
- Presentation Layer: W3C HTML5, IETF JSON, W3C XML
- Session Layer: IETF TLS
- Transport Layer: IETF TCP
- Network Layer: IPv4
- Data Link and Physical Layers: Wireless WAN

### 3.1.3.4. Sensitive Communications, Security

- Application Layer: IETF HTTPS, IETF WebSockets, W3C XML
- Presentation Layer: W3C HTML5, IETF JSON, W3C XML
- Session Layer: Secure Socket Layer (SSL), TLS
- Transport Layer: IETF TCP
- Network Layer: IPv4
- Data Link and Physical Layers: WAN

### 3.1.3.5. Standards and Protocols

- Non-Sensitive Institute of Electrical and Electronics Engineers (IEEE) 1690.2 Security Plane
- Sensitive Asymmetric Public Key Infrastructure (PKI) sessions over secure hypertext transfer protocol to encrypt communications between the kiosk URL iframe and the Pivot App

### 3.1.4. Real-Time Display

Real-time displays are an existing service provided by COTA at COTA CMAX locations and other select transit centers or park and ride facilities that show travel information related specifically to COTA bus service. A display of the minutes to arrival of the next bus for each route servicing the SMH location will be provided (the St. Stephen's location does not have direct bus service).

#### 3.1.4.1. Communications, Security

- Security Plane HTTP Auth, SSL, TLS
- ITS Application Information Layer Undefined
- Application Layer HTTP, WebSockets
- Session Layer SSL, TLS
- Transport Layer TCP
- Network Layer IPv4, IPv6, dual stack
- Data Link and Physical Layers Wireless WAN

#### 3.1.4.2. Standards and Protocols

- Web services via URL iframe.

### 3.1.5. Emergency Call Button

The ECB is located on the kiosk unit and when activated by a Traveler, it initiates an incident/event notification along with location information and direct audio connection to the ECC.

#### 3.1.5.1. Information Flows and/or Data and Formats

- **Interface 2.1 SMH-IX2433-V01 ECB to the ECC** – SMH location data where incident/event is taking place automatically sent to ECC. Upon call button activation, a timestamp is saved to the local IK-CMS for use to retrieve video for law enforcement if requested.
- **Interface 2.2 SMH-IX2434-V01 ECC to the ECB** – SMH Emergency response service, notifications, and voice data.

#### 3.1.5.2. Communications, Security

- Bi-directional audio connection between SMH kiosk and ECC. ECC is network isolated and does not receive other data for security reasons.
- ITS Application Information Layer: Undefined

- Application Layer: IETF SIP
- Presentation Layer: ITU-T G.729(A), ITU-T G.723, ITU-T G.711
- Session Layer: ITU-T H.323
- Transport Layer: IETF TCP, IETF UDP
- Network Layer: IPv4
- Data Link and Physical Layers: Wireless WAN

### 3.1.5.3. Standards and Protocols

VOIP phone call.

### 3.1.6. Wireless Internet

Complimentary, publicly accessible Wi-Fi will be provided at SMH locations. The kiosk will include a Wi-Fi hotspot and the kiosk vendor will serve as the Internet Service Provider (ISP). Travelers will be able to use this connection on their personal wireless devices to access trip planning tools available on the kiosk, as well as access internet within constraints set by the kiosk vendor.

#### 3.1.6.1. Information Flows and/or Data and Formats

- **Interface 3.1 SMH-IX2435-V02 IK System to Personal Wireless Device** – general internet access between personal wireless devices and kiosk vendor ISP via Wi-Fi hotspot. All users must accept the general terms and conditions of Wi-Fi usage. The use of Wi-Fi may be limited, preventing access to inappropriate sites or terminating connections consuming unusually high bandwidth. Using the Wi-Fi, Pivot App can also be accessed on the personal wireless device. In this context, without Wi-Fi provisioning, a data-limited personal wireless device would not be able to connect to Pivot App and therefore, is an interface SMH is delivering. For this interface a request for Pivot App services will be sent, which includes device identifier, GPS coordinates, current timestamp, menu option selected, keyboard inputs transmitted. However, once the request is sent, the IK System would not be able to track return responses on a personal wireless device

#### 3.1.6.2. Communications, Security

- All applicable industry standards related to public Wi-Fi will be included.
- Security Plane: IETF HTTP Auth, IETF TLS
- ITS Application Information Layer: Undefined
- Application Layer: IETF HTTP, IETF WebSockets
- Presentation Layer: W3C HTML5, IETF JSON
- Session Layer: IETF TLS
- Transport Layer: IETF TCP
- Network Layer: IPv4
- Data Link and Physical Layers: Wireless WAN

### 3.1.6.3. Standards and Protocols

All applicable industry standards related to public Wi-Fi will be included.

### 3.1.7. Americans with Disabilities Act Compliance

The kiosk will provide accommodations in compliance with the ADA. The accommodations will include mobility disabilities as well as partial visual impairments. The expected data and information flows, and protocols for communications and security are listed below. Web pages used at the kiosk display should obtain an AA rating or better as per Web Content Accessibility Guidelines (WCAG) 2.0 level guidelines. Additionally, kiosk content and management software should be evaluated for ADA compliance prior to deployment.

#### 3.1.7.1. Data and Information Flow

For Travelers with visual disabilities, contrast adjustments, text size and the height of the screen can be adjusted to aid in the sight of the screen. This is a physical interface. There is no digital communication or data flow related to ADA.

#### 3.1.7.2. Standards and Protocols

Standard website accessibility guideline will be used. WCAG 2.0 <https://www.w3.org/TR/WCAG20/>.

### 3.1.8. Third-Party Data Sources

Complimentary, publicly accessible Wi-Fi will be provided at SMH locations. The kiosk will include a Wi-Fi hotspot and the kiosk vendor will serve as the Internet Service Provider (ISP). Travelers will be able to use this connection on their personal wireless devices to access trip planning tools available on the kiosk, as well as access internet within constraints set by the kiosk vendor.

#### 3.1.8.1. Information Flows and/or Data and Formats

**Interface 3.1 SMH-IX3288-V01 Third-Party Data Sources to IK System** – Information includes data feeds like local events, job boards, surveys, business listing and directory information for Eat and Drink, Play, Shop, Stay, Social Services, Shelter, Job Board and Civic Resources.

#### 3.1.8.2. Communications, Security

- Security Plane: IETF HTTP Auth, HTTPS Auth, TLS Auth
- ITS Application Information Layer: Undefined
- Application Layer: IETF HTTP, IETF HTTPS, IETF WebSockets, W3C XML
- Presentation Layer: W3C HTML5, IETF JSON, W3C XML
- Session Layer: IETF TLS
- Transport Layer: IETF TCP
- Network Layer: IETF IPv4
- Data Link: Wireless WAN

- Physical Layers: City FON, Wireless WAN

### 3.1.8.3. Standards and Protocols

- File formats include PDF, image
- Data transfers from external sources include API, external URL iframe, and CSV

## 3.2. PARK AND RIDE

Designated parking spaces will be available at select SMH locations and allow a Traveler the option to complete a segment of his or her trip using a personal vehicle and parking at an SMH facility, where he or she can utilize the SMH amenities to continue his or her trip using alternate modes of transportation. It is common to track capacity, occupancy, utilization rate, and service type with this mobility feature.

At the time of this project, Park and Ride amenities are lots without instrumentation and no data is expected to be collected by the SMH project at this time.

### 3.2.1. Data and Information Flow

No data is expected to be collected at this time.

## 3.3. DESIGNATED PASSENGER PICKUP/DROP-OFF ZONES

Designated passenger pick-up/drop-off zones will be made available at select SMH facilities in the form of pull-off lanes and/or parking spaces located away from travel lanes that allow the safe transfer of Travelers for ride-hail services. These zones will primarily be used by Mobility Providers and will be clearly marked with signage and pavement markings.

### 3.3.1. Data and Information Flow

SMH will leverage trip data collected by the Pivot App. This de-identified trip data will be available in the Operating System. Updated site maps may be loaded to the kiosks through Interface 8.2 as outlined in **Section 3.1.2**. The Pivot App will provide these same site maps to mobility providers as well.

### 3.3.2. Communications, Security

Refer to the CTP section that describes the communication protocols SMH will adhere to when interfacing with the Pivot App.

### 3.3.3. Standards and Protocols

Refer to the CTP section that describes the communication protocols SMH will adhere to when interfacing with the Pivot App.

## 3.4. CAR-SHARE

Designated car-share zones will be made available at select SMH facilities in the form of pull-off lanes and/or parking spaces located away from travel lanes that allow the safe transfer of Travelers for car-

share services. These zones will primarily be used by Mobility Providers and will be clearly marked with signage and pavement markings.

### 3.4.1. Data and Information Flow

SMH will leverage trip data collected by the Pivot App. This de-identified trip data will be available in the Operating System. Updated site maps may be loaded to the kiosks through Interface 8.2 as outlined in **Section 3.1.2**. The Pivot App will provide these same site maps to mobility providers as well.

### 3.4.2. Communications, Security

Refer to the CTP section that describes the communication protocols SMH will adhere to when interfacing with the Pivot App.

### 3.4.3. Standards and Protocols

Refer to the CTP section that describes the communication protocols SMH will adhere to when interfacing with the Pivot App.

## 3.5. DOCKLESS DEVICE PARKING ZONES

Select SMH sites will include designated zones for parking dockless devices such as scooters and e-bikes. These services were strategically designed with the vision that new and existing Travelers would have several mobility options with seamless and efficient mode changes. Travelers will be able to continue a trip by renting a dockless scooter or e-bike at one station and end the trip anywhere they choose.

### 3.5.1. Data and Information Flow

- Dockless device information will flow between the mobility service provider(s) system and the Pivot App and will be made available to SMH Travelers through the Pivot App via the kiosk touch screen interface.
- The Pivot App project will detail the data elements and information flows scoped for collection and dissemination. Information that is commonly collected with this mobility hub feature includes parking zone location, device availability, trip start and end timestamps, trip start and end parking zones, device type, rider type and associated account holder meta data. At the time of this project, the dockless device parking zone amenities are paved areas without instrumentation and no data is expected to be collected at this time.

## 3.6. BIKE-SHARE

Bike-share services are a transportation service designed to provide Travelers with a convenient way to make short-trips along the corridor. Amenities associated with this service include bike rentals, privately operated bike-share docking stations, and the back-end software system. These services were strategically designed along with the vision that new and existing Travelers would have several mobility options with seamless and efficient mode changes.

### 3.6.1. Data and Information Flow

- Bike-share information will flow between bike-share service provider(s) system and the Pivot App and will be made available to SMH Travelers through the Pivot App via the kiosk touch screen interface.
- When bike-share features are scheduled as part of a Traveler's CTP, the kiosk will send basic identification data to the Pivot App, including kiosk identifier, GPS latitude/longitude and date/time.

### 3.6.2. Communications, Security

- Security Plane: IETF HTTP Auth, IETF TLS
- ITS Application Information Layer: Society of Automotive Engineers (SAE) J3067
- Application Layer: IETF HTTP, IETF WebSockets
- Presentation Layer: IETF JSON
- Session Layer: IETF TLS
- Transport Layer: IETF TCP
- Network Layer: IETF IPv4
- Data Link and Physical Layers: Wireless WAN

### 3.6.3. Standards and Protocols

- Wide Area Wireless WWWBrowser, JSON

## 3.7. BIKE RACKS

Outdoor bicycle racks are a common short-term bike parking option offered at the SMH facilities. The bicycle rack frames are inverted-U shaped and constructed of multiple galvanized posts, which hold two or more bikes per frame. Typically, there is no fee associated for bicycle parking. This feature can be used in areas with limited sidewalk spaces to make use of on-street areas that are unsuitable for auto parking.

# Appendix A. Data Matrix

The following table summarizes the data expected as part of the SMH project and identifies the data associated with each SMH feature, its source, destination, and required attribute.

**Table 8: Data Matrix**

Data Element	Description	Type	Source	Destination	Required
<b>Interface 1.1 SMH-IX2431-V02 IK Touch Screen to Pivot App</b>					
kiosk identifier	A globally unique identifier	String	IK Touch Screen	Pivot App	yes
location	Latitude longitude geographical coordinates of the physical kiosk location	String or Decimal	IK Touch Screen	Pivot App	yes
timestamp	Current timestamp when the request to connect to Pivot App was initiated	Datetime	IK Touch Screen	Pivot App	yes
trip date	Scheduled date and time Traveler is requesting transportation services	Datetime	IK Touch Screen	Pivot App	yes
pick up location	Address of the location where Traveler is requesting to be picked up	String	IK Touch Screen	Pivot App	yes
drop off location	Address of the destination where Traveler is requesting to be dropped off	String	IK Touch Screen	Pivot App	yes
preferred mode(s) of transport	Traveler prioritized selection of one or more modes of transport that may be preferred	String, multi-choice array	IK Touch Screen	Pivot App	no
route plan selection	Traveler selected trip plan	Globally Unique Identifier	IK Touch Screen	Pivot App	yes
Phone number	Traveler entered phone number to send trip plan to personal device	String	IK Touch Screen	Pivot App	no
Email address	Traveler entered email address to send trip plan to personal device	String	IK Touch Screen	Pivot App	no

Data Element	Description	Type	Source	Destination	Required
<b>Interface 1.2 SMH-IX2432-V02 Pivot App to IK Touch Screen</b>					
session identifier	Unique identifier assigned to the kiosk when a Traveler accesses the Pivot App and is maintained for the duration of the Traveler's visit (session)	String	Pivot App	IK Touch Screen	yes
Bike-share availability	Number of currently available shared bikes at SMH facility	Numeric	Pivot App	IK Touch Screen	yes
trip identifier	Unique identifier generated when a user requests to plan trip; used to link to Traveler's data elements	String	Pivot App	IK Touch Screen	yes
Traveler request summary	Summarized overview of the Traveler's trip request (datetime, pick up, drop-off, preferred mode)	String	Pivot App	IK Touch Screen	yes
<b>Interface 2.1 SMH-IX2433-V01 ECB to ECC</b>					
kiosk identifier	A globally unique identifier	String	ECB on Kiosk	ECC	yes
location	Latitude longitude geographical coordinates of the physical kiosk location	String or Decimal	ECB on Kiosk	ECC	yes
timestamp	Timestamp (date and time) when the ECB was activated	Datetime	ECB on Kiosk	ECC	yes
status	Current status of the ECB	Boolean	ECB on Kiosk	ECC	yes
requester activated audio	Active audio connection from the kiosk to the ECC	Audio	ECB on Kiosk	ECC	yes
<b>Interface 2.2 SMH-IX2434-V01 ECC to ECB</b>					
responder activated audio	Active audio connection from the kiosk to the ECC	Audio	ECC	Kiosk	yes
<b>Interface 3.1 SMH-IX2435-V02 IK System to Personal Wireless Device</b>					
SSID	Service Set Identifier (SSID), also known as a Network Name, identifies the kiosk's wireless network users would request to join	String	Wi-Fi on IK	Wi-Fi Enabled Device	yes
IP address	A unique IP address is assigned by the Wi-Fi (automatically) when a device is connected to the network in order to uniquely identify the device	Numeric	Wi-Fi on IK	Wi-Fi Enabled Device	yes

Data Element	Description	Type	Source	Destination	Required
usage terms	Vendor Wi-Fi usage terms	Text	Wi-Fi on IK	Wi-Fi Enabled Device	yes
usage agreement	Request for user to accept Wi-Fi usage terms	Boolean	Wi-Fi on IK	Wi-Fi Enabled Device	yes
TCP/IP packets	TCP/IP transmission data packets from the Internet, requested by the device	Variant	Wi-Fi on IK	Wi-Fi Enabled Device	yes
device metadata	Wi-Fi collects session metadata on device connections to ensure terms of use are in compliance	Variant	Wi-Fi on IK	Wi-Fi Enabled Device	yes
<b>Interface 8.1 SMH-IX3254-V01 IK System to IK-CMS</b>					
IK admin username	Kiosk administrative username to access IK-CMS	String	IK System	IK-CMS	yes
IK admin password	Kiosk administrative password to access IK-CMS	String	IK System	IK-CMS	yes
kiosk identifier	A globally unique identifier	String	IK System	IK-CMS	yes
timestamp	Current timestamp when communicating between IK and the IK-CMS	Datetime	IK System	IK-CMS	yes
system state	State of the kiosk (active, standby)	String or Boolean	IK System	IK-CMS	yes
display mode	Mode of the IK display (interactive, advertisement, Public Service Announcement, other)	String	IK System	IK-CMS	yes
touch screen status	Status of touch screen (on, off)	String or Boolean	IK System	IK-CMS	yes
Wi-Fi status	Status of Wi-Fi service	String or Boolean	IK System	IK-CMS	yes
onboard computer status	Status of kiosk's local onboard computer	String or Boolean	IK System	IK-CMS	yes
software version	Version of kiosk's internal software operating system	String	IK System	IK-CMS	yes
intrusion detection alert	Security Status of kiosk's internal software operating system (normal, security threat detected, other abnormal function detected)	String or Boolean	IK System	IK-CMS	yes

Data Element	Description	Type	Source	Destination	Required
Alert and notification codes	Alert codes when a system flag is raised (for instance code ABC123 when an intrusion is detected or code XYZ999 when power goes out, etc.)	String	IK System	IK-CMS	yes
configuration values	Active configuration values of IK	Variant	IK System	IK-CMS	yes
browser logs	Historical log of internet sites accessed using IK web-browser	String or File	IK System	IK-CMS	yes
error logs	Historical log of IK system errors	String or File	IK System	IK-CMS	yes
system logs	Historical log of IK system monitoring (this could include software, hardware, and other items monitored specific to vendor product)	String or File	IK System	IK-CMS	yes
security logs	Historical log of IK system security logs		IK System	IK-CMS	yes
usage logs	Historical log of IK system usage	String or File	IK System	IK-CMS	yes
language	Language activity	String	IK System	IK-CMS	yes
<b>Interface 8.2 SMH-IX3255-V01 IK-CMS to IK System</b>					
IK admin username	Administrative username to access local kiosk operating software	String	IK-CMS	IK System	yes
IK admin password	Administrative password to access local kiosk operating software	String	IK-CMS	IK System	yes
kiosk identifier	A globally unique identifier	String	IK-CMS	IK System	yes
timestamp	Current timestamp when communicating between IK-CMS and the kiosk	Datetime	IK-CMS	IK System	yes
configuration values	Configuration values to the operational software of the local kiosk	String or File	IK-CMS	IK System	yes
software updates	Patch updates to the operational software of the local kiosk	String or File	IK-CMS	IK System	yes
maps	Maps location-specific content uploaded to kiosk to be made available to Travelers	File	IK-CMS	IK System	no

Data Element	Description	Type	Source	Destination	Required
images	Images to be used for display on the kiosk. This could include City branded logos, wayfinding icons, posters, etc.	File	IK-CMS	IK System	no
custom advertising	Approved advertising content or other location-specific advertising	File	IK-CMS	IK System	no
data feeds	Data for applications that require data feeds such as, local events feed, job boards, surveys, business listing and directory information for Eat and Drink, Play, Shop, Stay, Social Services, Shelter, Job Board, and Civic Resources.	GTFS, JSON, CSV, Delimited, File (Other)	IK-CMS	IK System	no
<b>Interface 9.1 SMH-IX3256-V01 IK-CMS to the Operating System</b>					
IK – Operating System username	Assigned username to access the Operating System for data transfers	String	IK-CMS	Operating System	yes
IK – Operating System password	Assigned password to access the Operating System for data transfers	String	IK-CMS	Operating System	yes
application identifier	A globally unique identifier	String	IK-CMS	Operating System	yes
timestamp	Current timestamp when communicating between IK-CMS and the kiosk	Datetime	IK-CMS	Operating System	yes
access point usage logs	Historical logs of kiosk usage. This could include kiosk identifier, time stamp kiosk accessed, session length, interfaces used (touch screen apps, Wi-Fi, etc.)	File	IK-CMS	Operating System	yes
application usage logs	Historical log of the Kiosk's application usage. (This could include kiosk identifier, application click counts, page transitions, time within each app, etc.)	File	IK-CMS	Operating System	yes
<b>Interface 11.1 SMH-IX3288-V01 Third-Party Data Sources to the IK System</b>					
configuration values	Configuration values to the operational software of the local kiosk	String or File	Third-party sources	IK System	yes
software updates	Patch updates to the operational software of the local kiosk	String or File	Third-party sources	IK System	yes

Data Element	Description	Type	Source	Destination	Required
maps	Maps location-specific content uploaded to kiosk to be made available to travelers	File	Third-party sources	IK System	no
images	Images to be used for display on the kiosk. This could include City branded logos, wayfinding icons, posters, etc.	File	Third-party sources	IK System	no
custom advertising	Approved advertising content or other location-specific advertising	File	Third-party sources	IK System	no
data feeds	Data for applications that require data feeds such as, local events feed, job boards, surveys, business listing and directory information for Eat and Drink, Play, Shop, Stay, Social Services, Shelter, Job Board, and Civic Resources.	GTFS, JSON, CSV, Delimited, File (Other)	Third-party sources	IK System	no

**Interface 11.2 SMH-IX3289-V01 Third-Party Data Sources to IK-CMS**

configuration values	Configuration values to the operational software of the IK-CMS	String or File	Third-party sources	IK System	yes
software updates	Patch updates to the operational software of the local kiosk	String or File	Third-party sources	IK System	yes
maps	Maps location-specific content uploaded to kiosk to be made available to travelers	File	Third-party sources	IK System	no
images	Images to be used for display on the kiosk. This could include City branded logos, wayfinding icons, posters, etc.	File	Third-party sources	IK System	no
custom advertising	Approved advertising content or other location-specific advertising	File	Third-party sources	IK System	no
data feeds	Data for applications that require data feeds such as, local events feed, job boards, surveys, business listing and directory information for Eat and Drink, Play, Shop, Stay, Social Services, Shelter, Job Board, and Civic Resources.	GTFS, JSON, CSV, Delimited, File (Other)	Third-party sources	IK System	no

Source: City of Columbus

## Appendix B. Acronyms and Definitions

**Table 9: Acronym List** contains project specific acronyms used throughout this document.

**Table 9: Acronym List**

Abbreviation/Acronym	Definition
ADA	Americans with Disabilities Act
API	Application Programming Interface
BRT	Bus Rapid Transit
CCTV	Closed-Circuit Television Camera
CEAV	Connected Electric Automated Vehicle
CMAX	COTA's BRT Line
CMS	Content Management System
ConOps	Concept of Operations
COTA	Central Ohio Transit Authority
CPS	Common Payment System
CSCC	Columbus State Community College
CSV	Comma-Separated Values
CTP	Comprehensive Trip Planning
DHCP	Dynamic Host Configuration Protocol
DOC	Document File
ECB	Emergency Call Button
ECCs	Emergency Call Centers
EV	Electric Vehicle
FMLM	first-mile/last-mile
FON	Fiber Optic Network
GIS	Geographic Information System
GPS	Global Positioning System
GTFS	General Transit Feed Specification
HTML5	Hypertext Markup Language
HTTP	Hyper-Text Transfer Protocol
HTTPS	Hyper-Text Transfer Protocol Secured
ICD	Interface Control Document

## Appendix B. Acronyms and Definitions

Abbreviation/Acronym	Definition
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IKs	Interactive Kiosks
IP	Internet Protocol
IPv4	Internet Protocol version 4
IPv6	Internet Protocol version 6
ISP	Internet Service Provider
IT	Information Technology
ITS	Intelligent Transportation Systems
ITU-T	International Telecommunication Union Telecommunication
IVR	Interactive Voice Response
JSON	JavaScript Object Notation
MaaS	Mobility as a Service
MAC	Media Access Control
MMPA	Multimodal Trip Planning Application
ORC	Ohio Revised Code
Operating System	Smart Columbus Operating System
OUI	Open Usability Interface
PDF	Portable Format Document
PKI	Public Key Infrastructure
SAE	Society of Automotive Engineers
SIP	Session Initiation Protocol
SMH	Smarty Mobility Hubs
SSID	Service Set Identifier
SSL	Secure Socket Layer
SyRS	System Requirements and Specifications
TCP	Transmission Control Protocol
TLS	Transport Layer Security
TNCs	Transportation Network Companies
UDP	User Datagram Protocol
URL	Uniform Resource Locator
USB	Universal Serial Bus
USDOT	United States Department of Transportation

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Abbreviation/Acronym	Definition
VOIP	Voice Over Internet Protocol
W3C	World Wide Web Consortium
WAN	Wide Area Network
WCAG	Web Content Accessibility Guidelines
XML	Extensible Markup Language

Source: City of Columbus



## Appendix C. Glossary

**Table 10: Glossary** contains project specific terms used throughout this document.

**Table 10: Glossary**

Term	Definition
App	Software application
Aggregate data	Data that has been combined in collective or summary form
API	The specific method specified by an operating system or program through which a programmer can make requests to the operating system of another application. An API can be differentiated with a graphical user interface (GUI) or a command interface, which are direct user interfaces to an operating system or a program
Archive	A collection of data that has been packaged together for backup, for transfer to some other location, for saving away from the computer making hard disk storage available. An archive can include a simple list of files or files organized under a directory or catalog structure, depending upon how a particular program supports archiving
Authorization request	A request initiated by a user to access a data or part of a system for which he or she does not have access privileges. The criteria used to evaluate this request is called the “authorization rule.”
Bulk data transfers	A computer-based procedure designed to move large data files. The procedure usually involves data compression, blocking, or buffering to maximize data transfer rates
Travelers (end users)	The Travelers (residents and visitors) in Columbus who will be interacting with the SMH system to view, plan, reserve, and navigate to desired parking
Communications protocol	A set of conventions that governs the communications between systems, applications, processes, or objects. These conventions specify the format and content of messages to be exchanged and allow different computers using different software to communicate
Data exchange format	A proprietary but published two-dimensional graphics file format supported by virtually all PC-based computer-aided design (CAD) products. It is now a de facto standard for exchanging graphics data

Source: City of Columbus



THE CITY OF  
**COLUMBUS**  
ANDREW J. GINTHER, MAYOR