



MID-OHIO REGIONAL  
**MORPC**  
PLANNING COMMISSION

# COMMUNITY DATA ECOSYSTEMS

---

## INTRODUCTION

In a smart region, individual communities need to have robust data systems and digital infrastructure to fully realize the potential of smart technologies to improve peoples' lives across communities. Digital sensors and connected infrastructure (IoT) generate vast amounts of data. Communities need to be able not only to collect and manage that data for its own use, but also be able to transfer and share data with other communities, public agencies, companies, technology developers and researchers. When this happens, the benefits of a community's investments extend to their region, which in turn strengthens and enriches the individual community.

This guide addresses three components of these community data ecosystems:

- Community data management system
- Interconnected local government fiber-optic network
- Regional integrated data exchange

with the capacity to collect and manage data on a much larger scale than before.

## DEFINITIONS

**Centralized Data System:** A single data system that collects, stores, and provides access to data of participating, connected communities. This system requires a certain level of data standardization. Data are stored and managed by a single data system, in contrast to a Federated Data System.

**Community Data Management System:** A system to collect, validate, process, store, secure and access the high-volume of data that is generated by sensors and IoT devices to support productivity, efficiency, and decision-making

**Data Standardization:** A process to convert data from different datasets into a consistent format to enable various users to process and analyze them.

**Federated Data System:** A group of individual community data systems that are connected to facilitate access and navigation across the individual systems. Data are stored and managed by the individual data systems, in contrast to a Centralized Data System.

**Integrated Data Exchange:** A single interface that allows users to share and access data among multiple systems by employing data standardization. [Either access a federated system or a CDS interface.]

**Interconnected Local Government Fiber-Optic Network:** A network managed by a group of local governments and public agencies for official uses, to connect their data systems and facilitate the accessibility and sharing of data.

## CONSIDERATIONS FOR LOCAL GOVERNMENTS

There are three components in the hierarchy of community data ecosystems.

### Community Data Management System

The foundation of a community data ecosystem is the Community Data Management System. There are three primary approaches to developing a CDMS: custom built, open source, and proprietary systems. The approach to developing a CDMS will depend on the community's priorities and abilities concerning cost, control, staff expertise, and system adaptability.

**Custom-Built:** Custom solutions can be tailored to a community's specific needs, especially if it has unique needs. However, the development costs can be high, and future alterations will incur additional expense.

**Open Source:** An open source solution is a low-cost option, but typically requires some in-house expertise to develop and adapt a system. The size and longevity of the group supporting the open source solution is an important consideration.

**Proprietary:** A proprietary system has the advantage of professional technical support to develop, maintain and adapt the system, but typically requires ongoing subscription payments.

When developing a CDMS and choosing an approach, a community should consider the needs and preferences within the administration, as well as investigate the types and features of CDMSs in use among peer communities. This can help the community align its CDMS with the internal and external systems with which it is intended to connect.

### Interconnected Local Government Network

An interconnected network allows data to be shared within a community among its institutions and departments as well as with other communities in the region. Having a dedicated network for local government operations greatly increases the operating speeds, security, and (if well-managed) reliability of the network. It comes with initial capital costs and ongoing operations and maintenance costs, which should be weighed against the costs of leasing network capacity over a term that is comparable to the life expectancy of the dedicated network.

These networks can take the form of fiber-optic cables that are physically connected or be cloud-based, such as a virtual private network (VPN). Networks can use a combination of the two. Physical connections are more costly but provide better speed, reliability, security, and flexibility. Virtual networks offer more geographic flexibility.

### Integrated Data Exchange

Once a community can manage its data and has a network through which to share them, it can leverage its data and data available throughout the region through an integrated data exchange. IDEs can exchange data between both federated and centralized data systems. A community should survey the region for IDEs that exist or are in development with which it could benefit from sharing and accessing data. If an IDE is lacking, a community could begin working with potential partners to develop an IDE.

## CURRENT STATE & FUTURE DIRECTIONS

### Smart Columbus Operating System

*The [Smart Columbus Operating System](#) is a cloud-agnostic, open-source data platform that houses all the Smart Columbus Program performance indicator data and uniquely generated project data, and integrates all the program's projects into a central data platform. It provides the key functionality to develop and explore new concepts in data-driven transportation infrastructure by sending, receiving and visualizing real-time data from public and private organizations. The goal was to create a replicable and sustainable data platform that enables cities, researchers, nonprofits and businesses to better make decisions and solve problems.*

### COTA Integrated Mobility Innovation Grant

The Central Ohio Transit Authority obtained an Integrated Mobility Innovation grant from the Federal Transit Administration to unify multiple streams of traffic and transit management data on a cloud-based platform and use artificial intelligence to enhance operations, improve safety and efficiency, develop new channels of communication, and improve the rider experience across the region. The platform will integrate data from a 13-county area of Central Ohio.

### Central Ohio Local Government Fiber Network

MORPC and several local governments (Columbus, Franklin County, Westerville, Worthington, and Grove City, as of this writing) are working on the preliminary engineering and developing cost estimates for an interconnected fiber network for local governments in Central Ohio. They have developed a letter of intent that additional local governments can sign to signal their participation in building and operating the network. The group has identified 14 agencies to participate in the initial phase based on their proximity to existing infrastructure and their technical capacity to aid in the development and operation of the network.

These candidate agencies will be invited to learn more about the effort and to sign a letter of intent. When sufficient interest has been expressed and the group is formalized with a governance structure, it will proceed to detailed design and refined cost estimates. With this information, the group can develop financial models to support the construction and operation of the network.

## CASE STUDIES

### NetPGH

[NetPGH](#) is a comprehensive, unified fiber internet connectivity network for the City of Pittsburgh's facilities.

*The RFP will seek a partner or a private-public partnership to build or lease a high availability fiber network that will sustain service for the city into the future. NetPGH will provide fiber connectivity to all city buildings including fire stations, EMS stations, recreation and healthy active living centers, and public safety infrastructure.*

*NetPGH will also help facilitate future plans for critical network use such as creating Smart Corridors by connecting the city's traffic management system to use high-bandwidth technology to prioritize transit vehicles, pedestrians, and cyclists. NetPGH will also support digital equity initiatives*

### UTOPIA Fiber

*(interconnected municipal fiber network)*

*[UTOPIA \(Utah Telecommunication Open Infrastructure Agency\) Fiber](#) is a group of 11 Utah cities that joined together in 2004 to build, deploy and operate a fiber to the home (FTTH) network to every business and household within their communities. (Most current networks operate on copper wire infrastructure*

between a neighborhood node and the end user.) Using an active Ethernet infrastructure and operating at the wholesale level, we support open access and promote competition in all telecommunications services.

## Regional Transportation Commission of Southern Nevada

### Integrated data exchange

Waycare helps improve safety and efficiency on freeways and major arterials by compiling and analyzing data to report in real-time the location of accidents and predict where dangerous driving conditions or congestion may occur. This technology enables faster validation and response to roadway incidents as well as a more efficient use of resources to proactively deploy traffic patrols and abatement efforts with the goal of preventing incidents. Since piloting this platform on a stretch of a busy freeway, Southern Nevada has seen a 17-percent reduction in the number of primary crashes, and public safety partners are responding to incidents up to 12 minutes faster.

## EXAMPLE POLICIES

### Data Privacy Plan for the Smart Columbus Demonstration Program

This [Data Privacy Plan \(DPP\)](#) describes the principles that guide the Smart Columbus project teams in developing governance documents to protect the privacy of users and participants, guard against potential breaches of Smart Columbus systems, and prevent unauthorized use of the participant data and other Personally Identifiable Information (PII). Therefore, the DPP informs all contracts, notices, and processes that are being formed to comply with its stated approach to security and privacy for the Operating System and all Smart Columbus projects.

### Data Management Plan for the Smart Columbus Demonstration Program

The purpose of the [Data Management Plan \(DMP\)](#) is to document how the data within the Smart Columbus Operating System is added, made accessible, and/or stored. The DMP also details how the data is created, captured, transmitted, maintained, accessed, shared, secured, and archived.

## OTHER RESOURCES

### OARnet

[OARnet](#) provides backbone and networking services to local government institutions.

### Commodity Internet Access

The OARnet Internet service provides customers access to fully redundant high-speed connections through its statewide network; four 100 Gigabit internet connections diversely deployed at Akron, Dayton, Cleveland and Columbus; and two Tier 1 carriers AT&T and Lumen. OARnet provides clients with protection against a loss of service from equipment or carrier failure and reduces the cost of ordering another connection from a back-up carrier.

### Last Mile Access

Client connections to the OARnet backbone are provided through a last-mile access service using one or more carrier partners. OARnet has high-speed interconnects with over 15 last-mile partners across Ohio to facilitate a cost-effective solution using a wide range of connectivity options. These include dark fiber, dedicated circuits and shared metro-ethernet connectivity. Clients can use multiple carriers to implement fully redundant and diverse connections to multiple OARnet PoPs.

### Technology for Civic Data Integration

A joint study by the Urban Institute, MetroLab/ Network, and ctionable Intelligence for Social Policy available at: <http://bit.ly/2xaQW2L>

*The purpose of this report is to describe key considerations in building and sustaining Integrated Data Systems (IDS) and the various technology approaches that may be helpful in overcoming challenges in data integration.*

*This report is intended to provide brief technical guidance for jurisdictions that are looking to develop, implement, and/or upgrade their IDS efforts.*