Copenhagen, Denmark, is aggressively moving towards becoming a smart, carbon-neutral city by 2025. To achieve this goal, the city is initiating smart city programs such as smart lighting, sensor-based traffic management, intelligent building management and more. Up to now, data from individual smart city initiatives has been kept in silos. Copenhagen and Hitachi have joined forces to launch an integrated data service to eliminate these silos. In addition to smart city data integration, this solution will also enable the integration of data from private companies and open data from public authorities.

Share Data to Improve Quality of Life

The vision of this collaboration is to create a shared data hub to foster innovation and inspire new thinking that will improve the quality of life in the Copenhagen area, stimulate business activity, and help to achieve Copenhagen's goal to be carbon neutral by 2025. This solution establishes a citywide data marketplace for data owned by public authorities and private companies, and presents a novel approach to a common issue of data availability. The name of the marketplace is the City Data Exchange.

The City Data Exchange is a software-as-a-service solution that will allow for the sale, purchase and sharing of a wide variety of data from multiple sources among all types of users in a city – citizens, city government, businesses. The exchange enables large companies, small and medium enterprises, startup companies, as well as the academic and public sectors, to come together and integrate multiple sources of information to meet the challenges of sustainability and quality of life.
The purpose of the City Data Exchange is to collect data from public and private data owners and make it readily available for consumption by other public and private entities that are working on solutions to improve their efficiency and effectiveness. This service streamlines the analytic process by eliminating the need to rebuild the big-data plumbing for each analysis, and eliminates the big-data silos that make it difficult to share information among entities and constrain innovation. Over time, it can be used to integrate data from multiple sources, such as demographics, crime statistics, energy consumption, air quality sensors and traffic sensors. Figure 1 provides examples of the types of data suppliers that could provide data to the marketplace.

Hitachi Insight Group will also be developing applications leveraging the data in this marketplace. The solution is designed to allow other developers (such as small medium enterprises, innovative startups and developers) to quickly develop applications that use this shared information. Taking advantage of this data marketplace will help the city of Copenhagen, the capitol region of Denmark, and businesses operating there to improve their operations and provide better services for their customers, without needing a huge investment in infrastructure and data gathering.

Data Exchange and Advanced Analytics

The vision of Copenhagen’s new City Data Exchange is that it will become a digital marketplace. The exchange will be a gathering place for all players – public and private, large and small companies – who are interested in big data, either as data suppliers or as data consumers. Some participants in this marketplace will be interested in selling or providing data for free, others may be interested in subscribing to data, while others may be interested in both supplying data and consuming data. Entrepreneurs and application developers will be able to use the data to develop new services and software solutions for their customers, such as benchmarking energy consumption, finding an available parking space or determining where best to locate a business. Figure 2 shows some examples of potential data suppliers and consumers.

In Copenhagen, we are at the forefront when it comes to creating sustainable, high-tech solutions. The new big data solution is expected to provide citizens and businesses access to information, which among other things can create new technological solutions. For instance developing applications to save energy and increase mobility for companies and citizens. Innovative solutions can also help foster growth and create jobs in Copenhagen.

Lord Mayor of Copenhagen, Frank Jensen
In 2015, business and IT leaders, especially information executives such as chief data officers, must make concerted efforts to transform from an inward focus on information management and value generation to participating in the growing global pool of information assets.

Doug Laney, Research Vice President, Gartner, Ltd.

The second application will enable citizens to track their transportation behaviors via smartphones and to calculate time spent, calories burned, and their GHG footprint. The app will also recommend alternative transportation options with a lower journey time, higher calorie burn, and lower GHG footprint.

Hitachi will establish an organization and processes to enable this data marketplace, and will provide data analytics and help third-party developers use the data in their applications. In addition, this Hitachi organization will assist businesses and researchers — subscribers who are interested in analytics — to access data directly from the data marketplace. While this is a novel solution with a new business model, it is supported by predictions from The International Institute of Analytics that “2015 will mark an inflection point of intentional investment by companies to generate and monetize new and unique data sources.”

Gartner confirms that this model is coming. “For city and national data portals this means they will have to become more like data marketplaces, where (think of an application store or marketplace such as Apple or Amazon) the data and information is packaged and presented based on the demand of the users.”

How Can City Data Exchange Help Improve Cities?

**Gehl Architects**
Gehl Architects studies urban foot traffic and public space usage to help cities create better public space and public life. The company will use access to new data to improve their urban space analysis — by combining different data sources, City Data Exchange illuminates some of the typical blind spots of public life studies, leading to better informed design decisions and policy making.

**Geo**
Copenhagen is experiencing rapid population growth, increasing land prices and generally a more concentrated cityscape and increasing number underground structures. Geo assists with a groundwater monitoring network that will use data from City Data Exchange in addition to existing data to further reduce the cost to cities and construction firms of projects affected by underground construction and drilling.

**Vizalytics**
Mind My Business™ from Vizalytics is a city-specific mobile app for shopkeepers. The Vizalytics Knowledge Graph collects information from a range of government and public data sources and will provide Mind My Business™ subscribers with real-time alerts about construction, traffic, regulatory issues, health and safety concerns, fines, events, and other concerns.

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2. Gartner, Ltd. September 2015: “Open Data Governance Is Key to Building a Smart City”