

The Connected Bus—Go Green

An Innovative Transit Pilot by the Cisco Internet Business Solutions Group (IBSG) and the City and County of San Francisco



Background

Attempts to reduce carbon emissions by cutting consumption of greenhouse gas-producing fuels have been largely unsuccessful. Reduction of energy consumption is viewed by many as counterproductive to economic growth, and such measures have been difficult to implement and impossible to enforce. Developing a new way of approaching the problem is critical, given the urgency posed by rapid climate change.

Connected Urban Development (CUD) was born from Cisco's participation in the Clinton Global Initiative—launched by the William J. Clinton Foundation in 2005 to solve global problems that affect the quality of human life—to help reduce carbon emissions and improve energy efficiency. Through its partnership with San Francisco, CUD has created a best practice—*The Connected Bus*—that can be referenced by other cities and scaled around the globe.

The Connected Bus: Overview

The Connected Bus is a landmark innovation and a key element of the Connected Urban Development program's Urban Transportation Technology framework. Begun in summer 2007, the pilot project is a collaborative effort involving Cisco and the San Francisco Municipal Transportation Agency (SFMTA), who are jointly designing, developing, and delivering The Connected Bus pilot for the City and County of San Francisco.

Through The Connected Bus pilot, the team seeks to enhance the overall customer experience of using public transportation in San Francisco, thereby attracting more riders. The program is designed to provide accessible passenger information through prominent display of on-bus, real-time information, including status of connecting lines at key transfer points, allowing riders to reach their destinations more reliably. In addition, it streamlines transportation management operations and delivers capabilities and services that address carbon emission reduction and operational costs. An enhanced transit experience, together with the operational efficiencies and green benefits derived from this unique configuration of technologies, positions The Connected Bus as a transit breakthrough that—if deployed broadly—can significantly reduce carbon emissions in cities around the world.



In addition, The Connected Bus is the first public transit vehicle of its kind to showcase the following combination of technologies: a mobile access router, personal computers, touchscreen monitors, "green" gauge digital displays, and software content.

The Connected Bus will be showcased at *Connected Urban Development Global Conference 2008* in San Francisco, February 21-22, 2008. This demonstration will serve as the official kickoff of pilot-testing that will occur over the next 12-plus months in San Francisco. Not all of the capabilities described at the conference will be part the first iteration of The Connected Bus; additional functionality will be incorporated at regular intervals throughout the trial period.

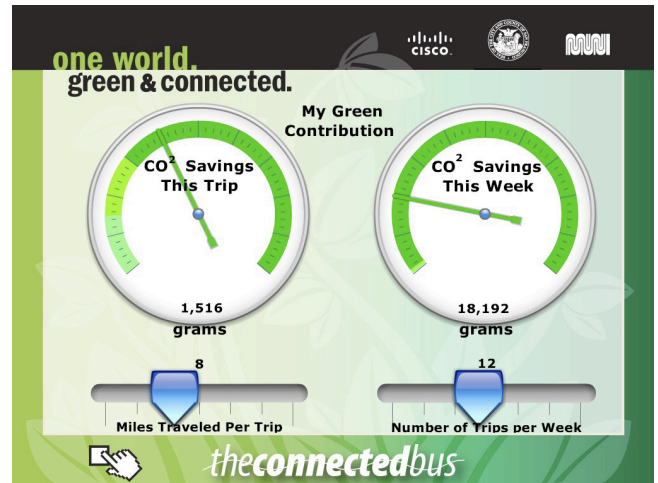
Key Features

- 95 percent emissions-free hybrid vehicle that helps offset up to 55,000 car trips (270 tons of carbon emissions) each year
- Pervasive, high-speed Internet access for all passengers
- Live NextMuni updates (route information, wait times, and more) via touchscreen
- Ability to contact friends, family, and coworkers via wireless devices
- "Green Gauge" that provides information on the environmental impact of The Connected Bus as it travels through San Francisco

Benefits

- **Reduces emissions** as more drivers turn to public transit, and as vehicles themselves run more efficiently. Emission-reduction factors fall into four categories:
 - *Reduced dwell time*: The amount of time a transit vehicle remains idling at a stop while passengers board, make inquiries of the operator, pay fares, and exit the vehicle.
 - *Timely maintenance*: A rigorous preventive maintenance program geared to each vehicle manufacturer, ensuring that transit vehicles stay in good repair and produce fewer emissions.
 - *Efficient on-street operation*: Efficient operation of the vehicle at the individual operator level will reduce emissions, as will efficient management of vehicles on each line of service.
 - *Enhanced rider experience*: By offering real-time information and enhanced safety and security to passengers, public transit becomes a more attractive option in San Francisco, a “Transit First” city.
- **Enriches transit rider and operator experience**, as defined by information accessibility, increased comfort, and green incentives. Connected Bus riders and operators will experience:
 - Prominent display of on-bus, real-time information, including status of connections at key transfer points. Allows riders to reach their destinations more reliably.
 - Real-time arrival information and passenger counts to help fleet managers ensure adequate capacity; addresses loading conditions and bus-to-bus transfers.
 - “Green” programs, which increase the reward for new riders who have switched from driving by offering data counts of environmental benefits per rider.
 - Online trackability of new, integrated data, allowing potential riders to follow select routes on the network, inviting them to switch to public transit with greater assurance.
 - New, publicly accessible data linkages, which offer innovative lifestyle benefits such as a parent tracking a child’s use of SFMTA by employing a mobile device to monitor a trip connection in real time, or a hotel concierge directing visitors to destinations with greater confidence.
- **Helps the SFMTA comply** with Federal Transit Administration (FTA) standards regarding regional and national interoperability.
 - Enables vendors to connect to one standard device, exclusive of vehicle manufacturer, for both bus and rail.

- Increases operational effectiveness because there will be fewer on-board devices and points of failure.
- Enables on-board integration of systems such as APC (automatic passenger counter) and Transit Signal Priority to ensure that priority is given based on vehicle load to create a smarter vehicle.
- Decreases technology upgrade costs—only one device (versus many) will require cyclical upgrades based on technological advancements.



- **Improves reliability**, as measured by schedule accuracy, operator availability, vehicle reliability, supervisor coverage, and congestion management. The Connected Bus on-board integration device address all five of these criteria:
 - Helps improve *schedule accuracy* by linking GPS to APC.
 - Addresses *operator availability* by using AVL (automatic vehicle location) to manage headways that are impacted by missed runs.
 - Increases *vehicle reliability* by tracking vehicle health and integrating resulting data to inform fleet deployment more effectively.
 - Provides the *on-street supervisor* with the technology to cover the system through NextMuni AVL/GPS data, vehicle health-monitoring data, APC, and other critical, real-time information.
 - Improves *congestion management* through integration of signal timing, cameras, and other traffic-monitoring devices.
- **Increases transit operator effectiveness** by enabling more effective communications, including:
 - Real-time display of key data, relieving the burden of information sharing between driver and rider. Destinations, transfer points, and arrival times of connecting buses are all immediately evident to passengers.

For more information, please visit the *Connected Urban Development* Website at www.cisco.com/go/connectedurbandevlopment