



FIWARE-based Public Transportation use case from Tecnológico de Monterrey



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Transportation Super Action Cluster
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Agenda

- Tecnológico de Monterrey in Numbers
- FIWARE + Tecnológico de Monterrey
- Smart Cities application: Smart Mobility
 - Goal
 - Components
 - Trials
- Questions



Tecnológico de Monterrey in Numbers



Tecnológico de Monterrey

Presence	Alumni	Faculty
31 Campus	•Total: 96,211	Total: 10,117
22 International Offices	•10,458 Graduate	• 2,207 Full time
28 Civil Associations	•242,438 Alumni	• 7,910 lecturers
	•graduate	• 1,500 Researchers
	242,438	



FIWARE + Tecnológico de Monterrey



Tecnológico de Monterrey + FIWARE

Tecnológico de Monterrey is actively participating in 3 FIWARE related projects:

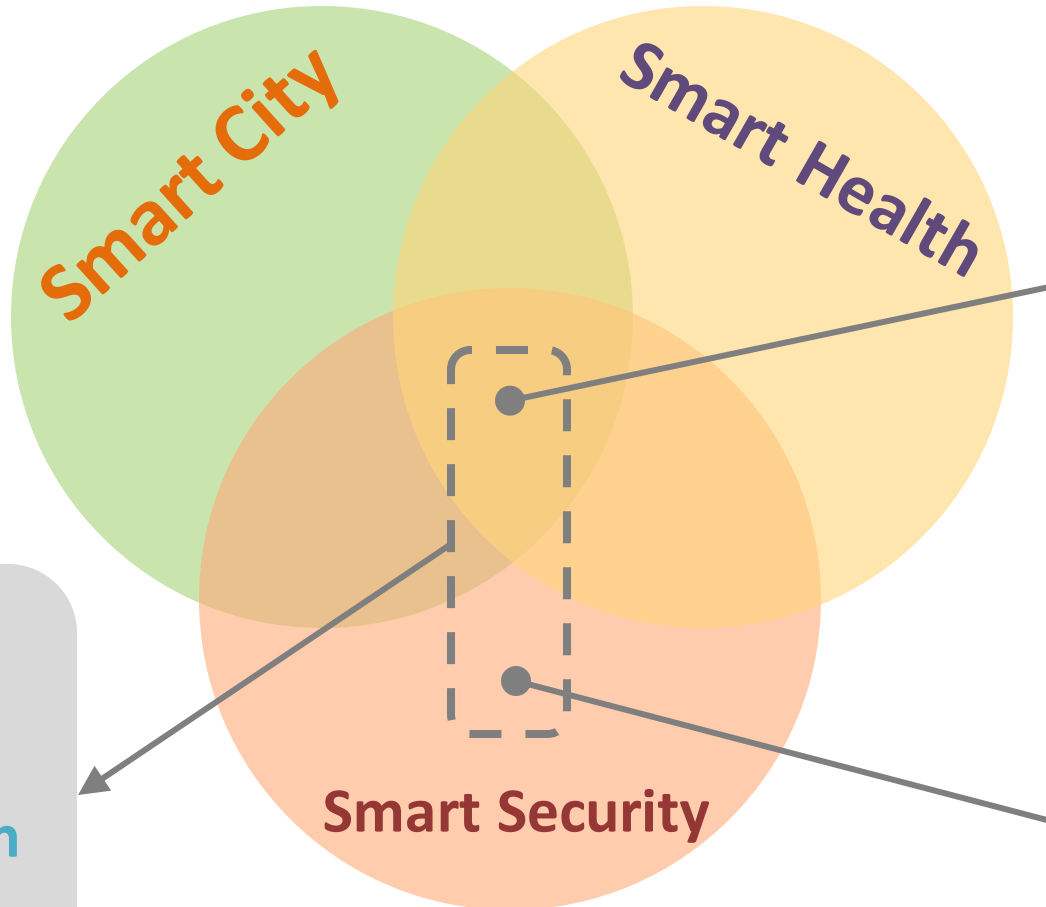


FI-NEXT



Smart Cities: Smart Mobility





- Common architecture patterns:
- Common generic enablers:
- Common data models:

- Specific architecture patterns
- Specific and customised generic enablers
- Specific data models

Smart Security Application “recipe”

Smart City



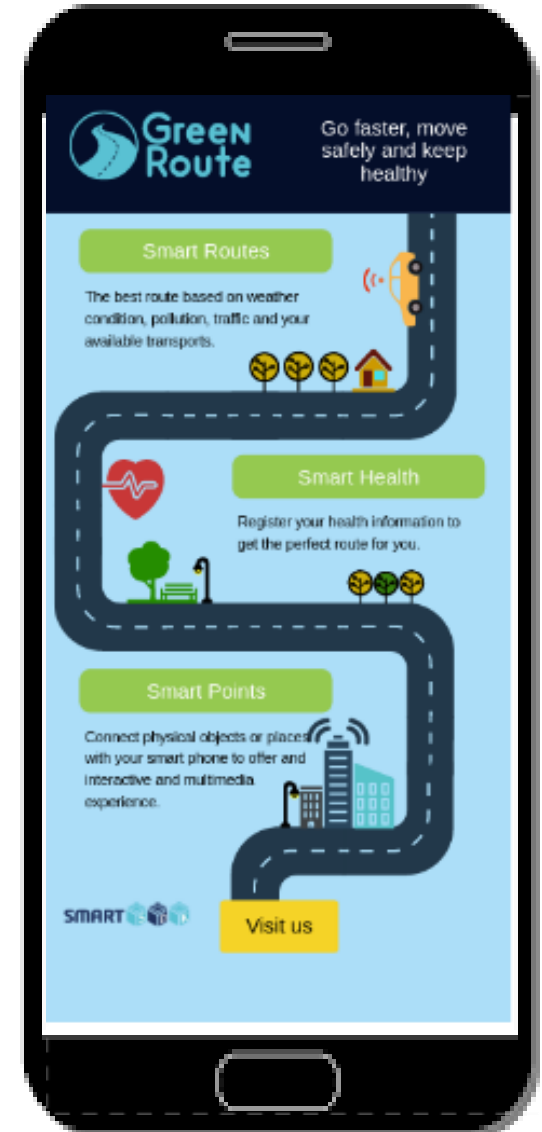
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Goals

Green Route focuses on supporting the citizen's mobility in high polluted cities, like Mexico City, aiming at improving their life quality and fostering environmental friendly behaviors.

The main goal is to help the final user determine the best route to follow to reach a destination, taking into account the user's profile (such as health conditions) along with additional aspects such as environmental conditions, preferred means of transportation, events, etc.

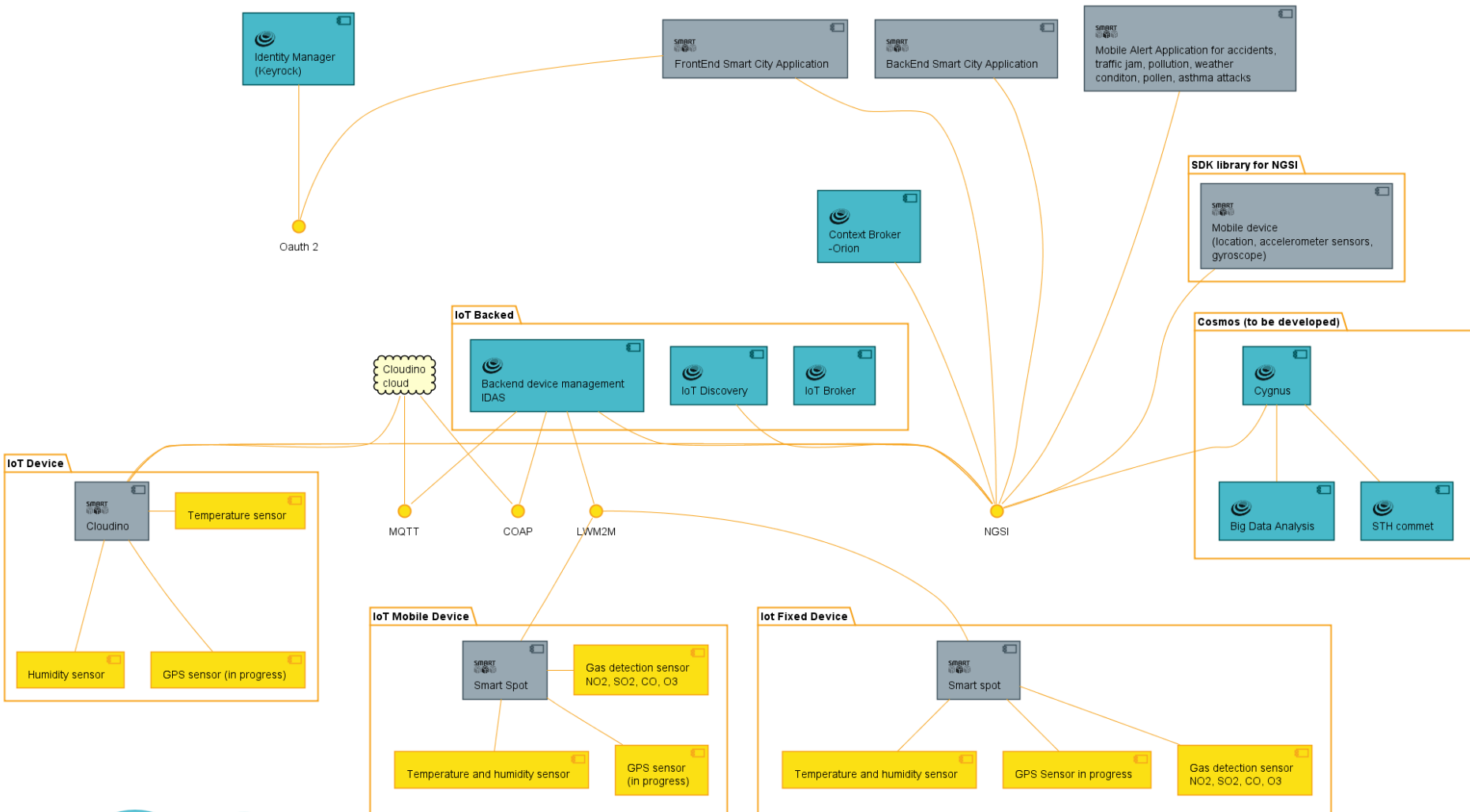


Component Overview (FIWARE)

- Identity Manager (KeyRock)
- Context Broker (Orion)
- Device Manager (IDAS)
- IoT Discovery
- IoT Broker
- Quantum Leap
- Smart Spot (Pollutant detector, GPS sensor, Temp & Humidity)
- Cloudino (IoT broker and sensor)
- Mobile Alerts



Architecture



Overview

- Home
- Alerts
- My Events
- Groups
- Plan your trip
- Create alert

Trip Options

Start: (19.41997, -99.16054)
End: (19.39536, -99.12003)

Depart: 6:34pm 07/12/2017 Now

Travel by: Transit

Maximum walk: 750.0 m Presets:

Preferred Routes: (None) Edit...

Weight: [Slider]

Banned routes: (None) Edit...

Wheelchair accesible trip:

Plan Your Trip

Parameter	Value	AQI
Temperature (T):	19 °C	-
Relative Humidity (RH):	65 %	-
Particle Pollution (PM10):	nr µ	NaN
Sulfur Dioxide (SO2):	3 PPB	4
Nitrogen Dioxide (NO2):	44 PPB	41
Ozone (O3):	39 PPB	31
Carbon Monoxide (CO):	1.0 PPM	11

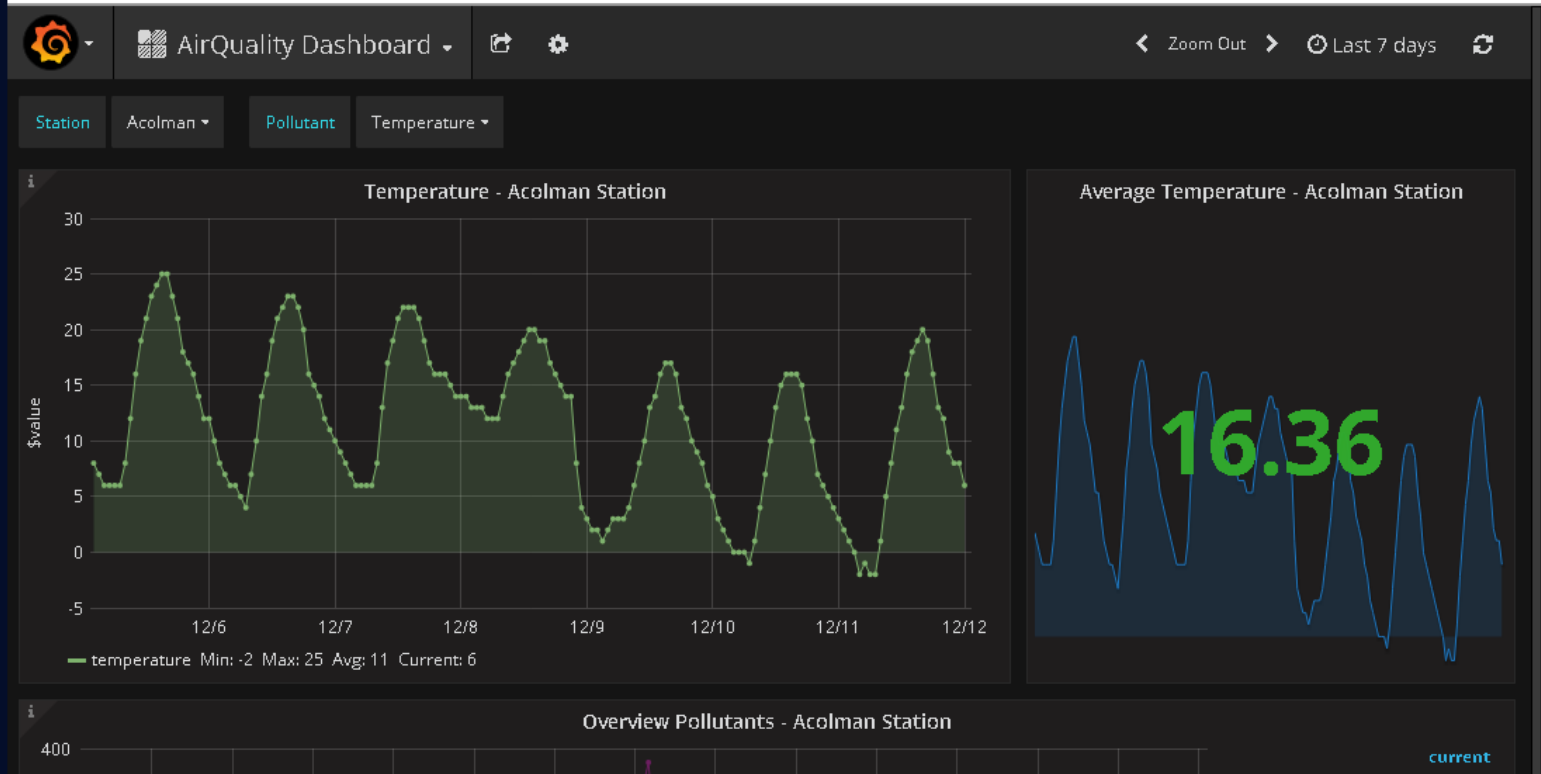
Health Concerns:
Air quality is considered satisfactory, and air pollution poses little or no risk.

Statistics

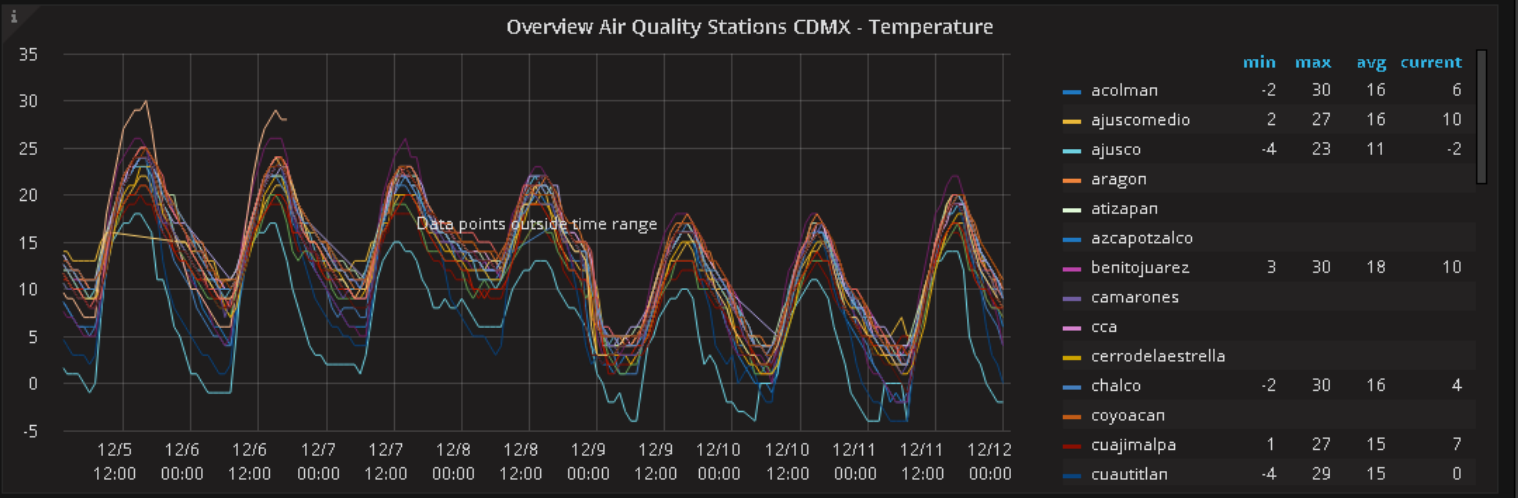
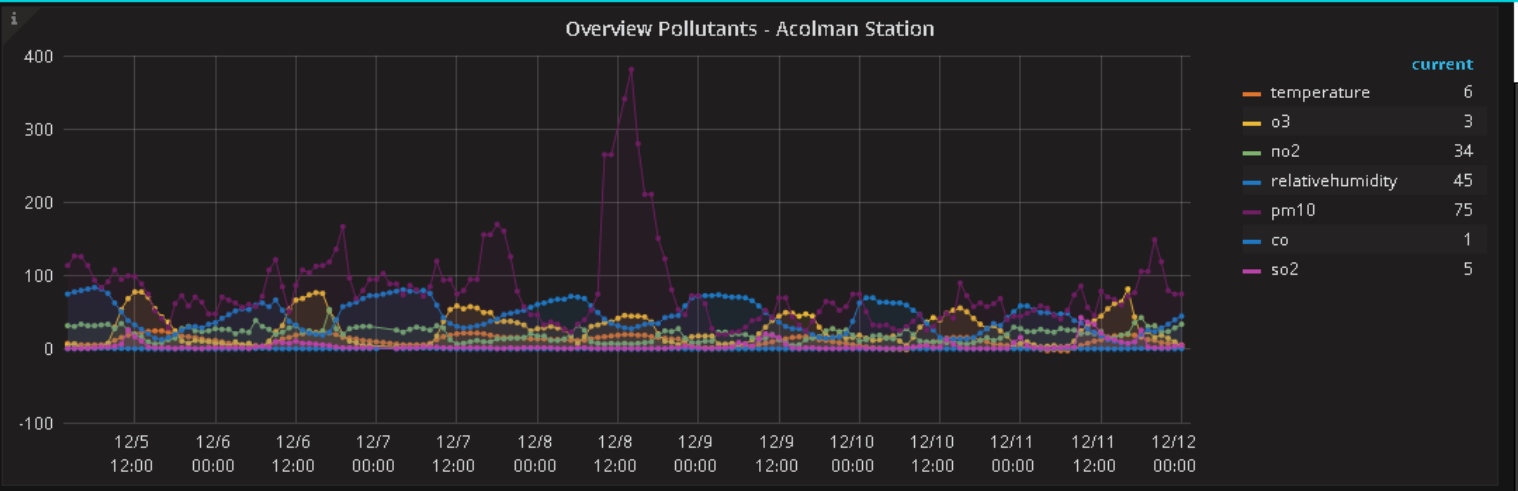
- Home
- Plan my trip
- Earthquake information
- Subscription to Groups
- Alerts
- Statistics

Statistics - Historical Data

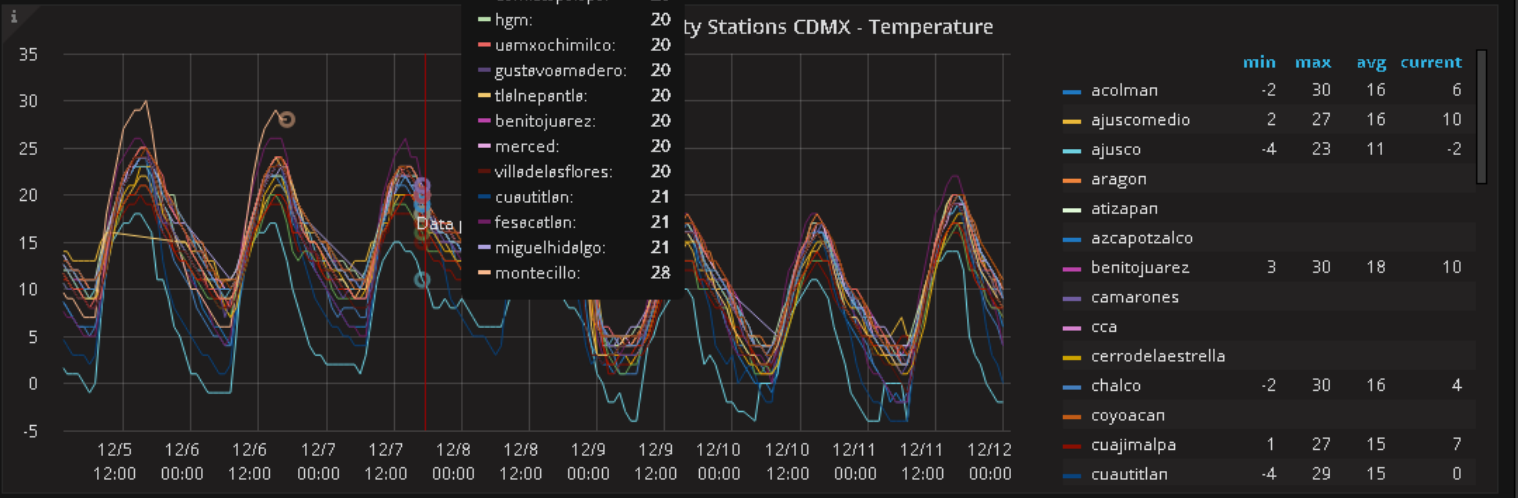
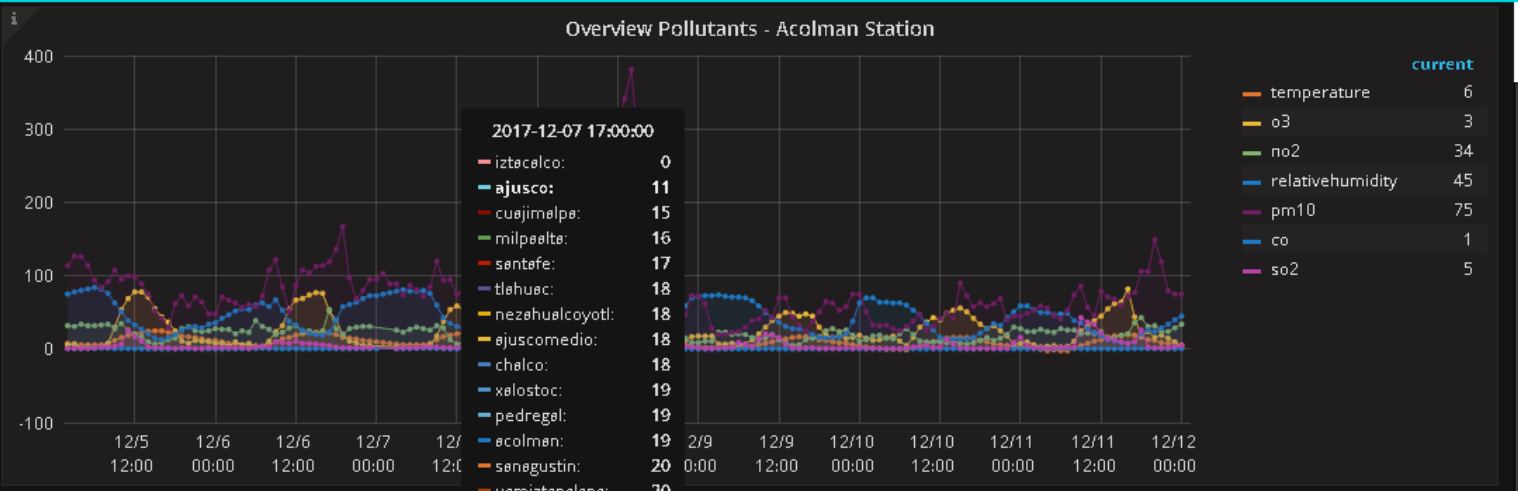
Display a complete visualization of historical data collected by 47 Air Quality stations distributed along Mexico City since January 2017. Review the behaviour of Air Quality conditions as a time-series sequence according to an specific pollutant, station and an overview of the chosen pollutant across all the stations.



- Home
- Plan my trip
- Earthquake information
- Subscription to Groups
- Alerts
- Statistics



- Home
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- Statistics



Route Planning

Smart Cities

303690

Hugo Estrada

Home

Plan my trip

Earthquake information

Subscription to Groups

Alerts

Generate alerts

Show my alerts

Show all alerts

Statistics

Directions

Oriente 101, Ángel Albino Corzo, Ampliación Mártires de Río Blanco, Gt

Lázaro Cárdenas, Guerrero, Mexico City, Cuauhtémoc, Mexico City, 063

Depart at

Options

Date:

12/13/2017

02

23

Max Walking (meters):

1000

Mode:

Transit

Transit

Bicycle Only

Bicycle & Transit

Walk Only

Drive Only

Itineraries Found

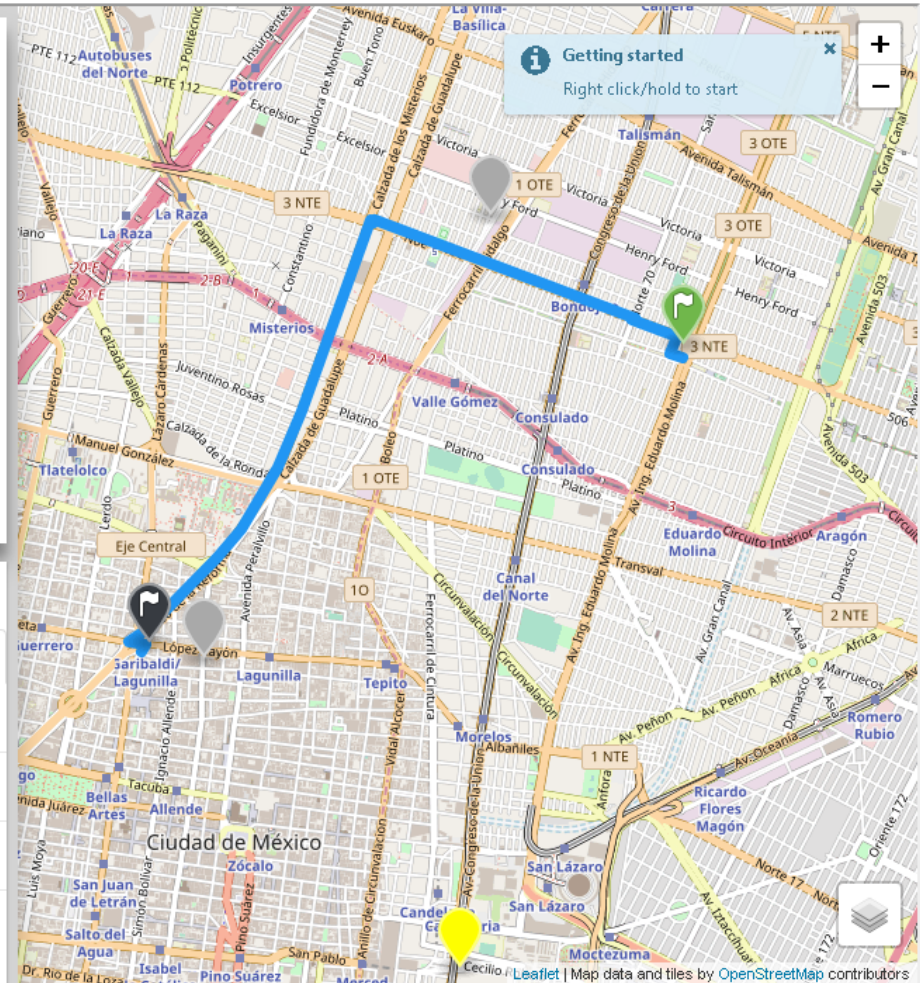
Itinerary

Walk 535 m (8 min)

RTP: Aragón - Panteón San Isidro (Noche Bus)

Walk 25 m (0 min)

RTP: Centro Comercial Santa Fe - La Villa/Cantera por Palmas (Noche Bus)



Route Planning: Vehicle + Bicycle*

Smart Cities

303690

Hugo Estrada

Home

Plan my trip

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Subscription to Groups

Alerts

Generate alerts

Show my alerts

Show all alerts

Statistics

Directions

Elektra, Telurio, Valle Gómez, Mexico City, Cuauhtémoc, Mexico City, 06

Moras, Centro Urbano Presidente Alemán, Benito Juárez, Mexico City, 07

Leave Now

Options

Max Walking (meters):

10

Mode:

Bicycle & Transit

Calculate

Itineraries Found

Itinerary 1

Itinerary 2

Itinerary 3

Bicycle 80 m (0 min)

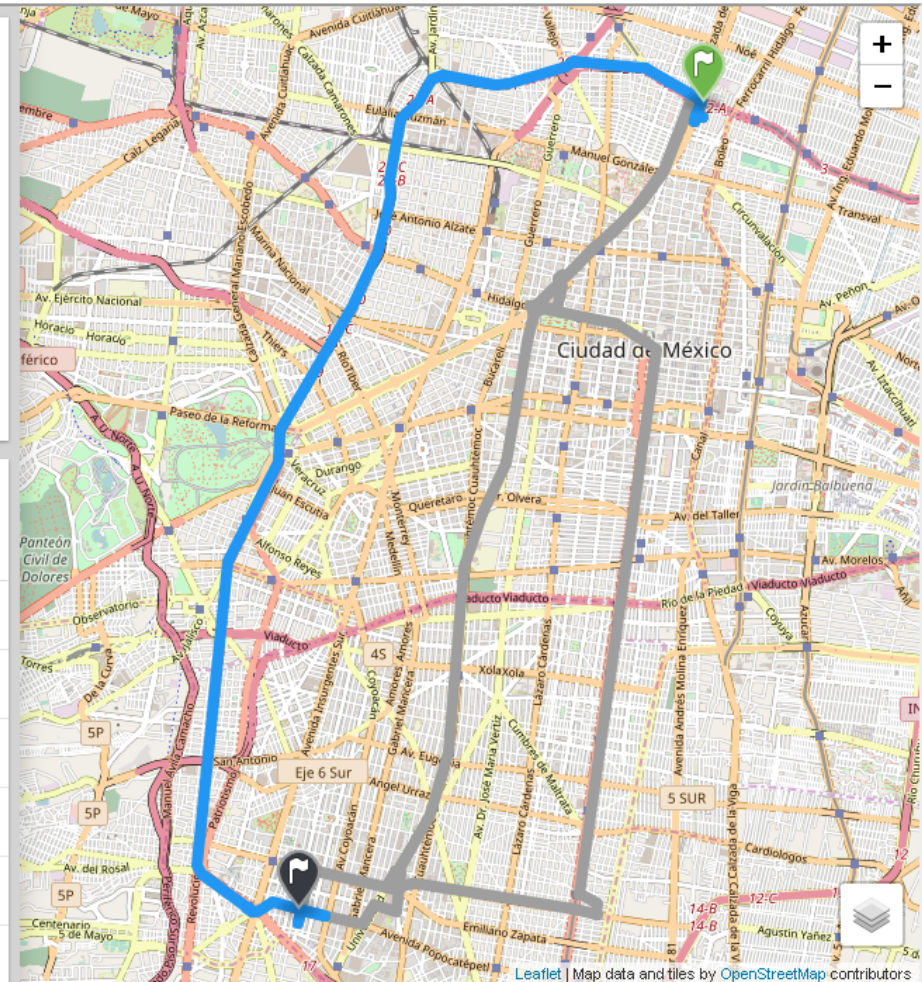
Walk 81 m (0 min)

RTP: Reclusorio Norte - Metro Hidalgo/Alameda Central

Walk 444 m (5 min)

RTP: Circuito Bicentenario (Noche Bus)

Walk 56 m (0 min)



*** ECOBICI: 480 Bike Stations throughout 55 neighborhoods, 6,800 bicycles (Electric and traditional).**

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Health Profile

- Home
- Plan my trip
- Earthquake information
- Subscription to Groups
- Alerts
 - Generate alerts
 - Show my alerts
 - Show all alerts
- Statistics

Health profile

Register / Edit health data (Data marked with * are required)

The objective of Green Route is to help the final user to determine the best route to follow to reach a destination, taking into account your health condition. Please, we invite you to indicate your current health status, this information will be used to generate a route according you health condition.

Health state

Asthma

Asthma level



- Severe persistent asthma
 - Symptoms of a cough, wheeze, chest tightness or difficulty breathing continuously.
 - Severely limit daily physical activities
 - Nighttime symptoms frequently
- Moderate persistent asthma
- Mild persistent asthma
- Mild intermittent asthma

Cancel

Save



Home

Plan my trip

Earthquake information

Subscription to Groups

Alerts



Generate alerts

Show my alerts

Show all alerts

Statistics

Health profile

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The objective of Green Route is to help the final user to determine the best route to follow to reach a destination, taking into account your health condition. Please, we invite you to indicate your current health status, this information will be used to generate a route according you health condition.

Health state

Asthma

Asthma level



- Severe persistent asthma
- Moderate persistent asthma
 - Symptoms of a cough, wheeze, chest tightness or difficulty breathing daily
 - Symptoms interfere with daily activities
 - Nighttime symptoms 5 or more times a month
- Mild persistent asthma
- Mild intermittent asthma

Cancel

Save



Home

Plan my trip

Earthquake information

Subscription to Groups

Alerts

Generate alerts

Show my alerts

Show all alerts

Statistics

Health profile

Register / Edit health data (Data marked with * are required)

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Health state

Asthma

Asthma level



- Severe persistent asthma
- Moderate persistent asthma
- Mild persistent asthma
 - Symptoms of a cough, wheeze, chest tightness or difficulty breathing three to six times a week
 - Attacks interfere with daily activities.
 - Nighttime symptoms three to four times a month
- Mild intermittent asthma

Cancel

Save



Home

Plan my trip

Earthquake information

Subscription to Groups

Alerts



Generate alerts

Show my alerts

Show all alerts

Statistics

Health profile

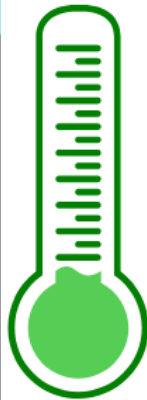
Register / Edit health data (Data marked with * are required)

The objective of Green Route is to help the final user to determine the best route to follow to reach a destination, taking into account your health condition. Please, we invite you to indicate your current health status, this information will be used to generate a route according you health condition.

Health state

Asthma

Asthma level



- Severe persistent asthma
- Moderate persistent asthma
- Mild persistent asthma
- Mild intermittent asthma
 - Symptoms of a cough, wheeze, chest tightness or difficulty breathing less than twice a week
 - Do not interfere with normal activities
 - Nighttime symptoms less than twice a month

Cancel

Save



Trials

- ITESM CEM Transportation (Transportec)**
- Public Transportation**



Transportec, some numbers

Zones

North	7
South	2
East	7
West	2
Satélite	4

Routes

More than 30 routes that cover the vicinity of Mexico State and some areas of Mexico City.

FIWARE GE

SmartSpot* + Cloudino

To track routes:

1. Environmental information
2. Realtime Location of buses
3. Bus usage statistics



Trials: Public Transportation

- Install SmartSpots and Cloumanos in at least 5 different bus routes.
- Collect:
 - Environmental Information (pollutants)
 - User mobility tendencies (drop-off locations)
 - Bus use (Average users per; trajectory, stops, avg speed, etc)
- Data Analysis:
 - Environmental effects on transportation use
 - Stop efficiency
 - Additional Modes of transportation (Bicycle, walk distances, etc)





Questions





Thank you

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