



Team Details

- a. Team name: **Data Driven Droids**
- b. Team leader name: **Utkarsh Tripathi**
- c. Problem Statement: **Enhancing City Infrastructure with Data-Driven Decisions**

Brief about the idea

- **System:** Web application
- **Data Sources:** News API, X-API, 511 NYC, NYC Open Data, NYC311 Data, Weather API
- **Target City for Prototype:** New York, USA
- **User persona:** It will be primarily used by Civic Planners, City Residents and Public Officials
- **Functionality:** The app/ website will have the following key modules as listed below
 - ✓ Smart Street
 - ✓ Urban SoS
 - ✓ City Guard Service
 - ✓ Bin Sync Service
 - ✓ Smart Watts
 - ✓ UtiliGen Service
 - ✓ City 360 Scope dashboard
 - ✓ Resilient Cities
- **Functional usage:** Our platform uses AI to create a safer, more efficient city. For city planners, it offers predictive insights for smarter budgeting and proactive maintenance. For residents, it provides real-time traffic solutions, instant emergency alerts, and easier access to city services, fostering a more responsive and connected community for all.
- **Technology used:** Python, Snowflake Tables, Snow Pipe, Tasks, Materialized Views, Snowflake Cortex Analyst, Snowflake Cortex Search, Snowflake Cortex Agents, Snowflake Intelligence, GCP, Fast API, Streamlit



Opportunities for the solution

† With urban populations projected to reach 68% by 2050, cities struggle with siloed data

Ψ City Scope 360 is an AI-powered dashboard that unifies real-time data on traffic, environment, and services. Using Generative AI, planners, officials, and residents can ask questions in natural language, enabling smarter governance.

† Cities consume 75% of global energy (IEA), but planners struggle to translate complex smart grid data into actionable strategies, leading to inefficiency.

Ψ Our Generative AI tool that lets officials ask plain-language questions to forecast demand and generate optimized strategies for energy distribution and infrastructure placement, turning complex data into clear, actionable plans.

† The world faces a monumental waste crisis, with waste generation projected to hit 3.8 billion tones by 2050. At least one-third is mismanaged, creating pollution and severe health risks. The direct global cost of waste management was estimated at \$252 billion in 2020 and is on track to nearly double to \$640.3 billion by 2050 if current practices continue

Ψ Bin Sync uses smart bins to monitor waste levels in real-time. AI agents create optimized collection routes, reducing emissions. A Generative AI-powered app guides citizens on proper waste sorting.

† With the global economic impact of violence at \$17.5 trillion, cities face escalating physical and cyber threats.

Ψ City Guard is an AI service that unifies security, using ML to predict crimes, riots, and cyber attacks by analyzing city data. AI agents automate responses, while Generative AI gives commanders instant threat briefings, ensuring a faster, more proactive defense.

† Traffic congestion costs nations up to 1% of their GDP (International Transport Forum) through wasted time, fuel, and increased pollution, diminishing urban quality of life.

Ψ Integrating AI, our platform analyzes real-time data to predict congestion, optimize traffic signals, and suggest efficient routes, mitigating delays and economic waste.

† - Opportunity
Ψ - Features

Features enabling Opportunities



† Infrastructure failures costing at least \$390 billion annually in low- and middle-income countries.

Ψ Our unified city platform integrates Generative AI to predict these costly failures by analyzing real-time data, simulating risks, and automatically generating optimized response plans to reduce the impact on daily life.

† According to the UN E-Government Survey(2022), a major challenge for smart cities is overcoming fragmented data. Public utility information is often trapped in departmental silos, forcing citizens to navigate multiple platforms, which causes inefficiency and frustration. This lack of a holistic view hinders effective decision-making for both residents and city planners.

Ψ Our unified city platform solves this by using Generative AI. It provides a conversational interface that allows citizens to ask complex questions in natural language—like how a power outage will affect traffic and public transport. The AI synthesizes real-time data from various departments to provide a single, comprehensive answer, turning data chaos into actionable clarity.

† According to a report by UN DESA, nearly three in five cities are at high risk of natural disasters. This is worsened by a high rate of false alarms—up to 42% of fire service incidents in the UK—which drains resources, delays response to real crises, and creates "alarm fatigue." This operational strain costs billions annually and puts lives at risk

Ψ Our Gen AI system that instantly triages emergency alerts. It analyzes multi-modal data from calls, IoT devices, and social media to generate a real-time confidence score for each incident. This allows dispatchers to filter false alarms, prioritize genuine crises, and deploy resources with greater speed and accuracy, saving crucial time and money while improving situational awareness for first responders.

List of features offered by the solution

Smart Street

- Dynamic Traffic Control:** An AI agent adjusts traffic signals and congestion pricing based on real time traffic.
- Smart Transit Assistant:** An AI agent suggests the fastest public transit routes to bypass traffic congestion.
- Predictive Incident Response:** An AI agent predicts accidents, instantly rerouting traffic and guiding emergency vehicles

Urban SoS

- Vocal Verifier:** AI analyzes caller's voice and speech to detect false alarms in real time.
- Digital Witness:** An AI agent scans social media and news to find real-world incident proof.
- Responder Briefing:** AI transforms chaotic alert data into simple, actionable briefings for emergency responders.

Bin Sync Service

- AI Sorting App:** An app uses your phone's camera to identify trash and instantly show you how to correctly sort and dispose of it.
- Predictive Collection Routes:** AI agents analyze data to predict which bins will be full, creating smarter, fuel-efficient collection routes.
- 24/7 Chatbot Assistant:** A GenAI chatbot on website which provides instant answers to all waste and recycling questions.

City Guard

- AI Briefings:** GenAI synthesizes city data into instant threat briefings and response plans.
- Cyber Analysis:** GenAI analyzes cyber threats, generates reports, and answers security questions.
- Local Watch:** GenAI processes citizen reports for early local threat detection and awareness.

City Scope 360

- Holistic City Monitoring:** Provides a comprehensive, 360-degree view of city operations for holistic monitoring.
- Powered by Real-time Data and Visuals:** Utilizes real-time data and image analysis for immediate, actionable insights.
- Dual-Purpose for Planners and Citizens:** Serves both civic planners for strategic management and citizens for transparent information.

Smart Watts

- Ask-to-Forecast Assistant:** Get energy demand and grid stress forecasts from simple questions.
- Infrastructure Optimizer Agent:** Recommends optimal sites for energy assets using real-time data.
- Demand Strategy Generator:** Simulates energy strategies with cost, impact, and adoption insights.

UtiliGen Service

- City Compass:** AI guides citizens to utility and essential services, routes, and real-time information across city data.
- Citizen Advocate:** AI explains service disruptions, offering insights and actionable advice to citizens.
- Community Pulse:** AI analyzes citizen feedback, synthesizing trends for better city planning insights.

Resilient Cities

- Predictive Maintenance:** An AI agent analyzes data to predict failures and trigger preventative alerts.
- Instant Response Plans:** Gen AI instantly drafts emergency response and traffic rerouting plans during a failure.
- Budget Simulation:** Use AI to simulate the impact of infrastructure investments for smarter budget planning.

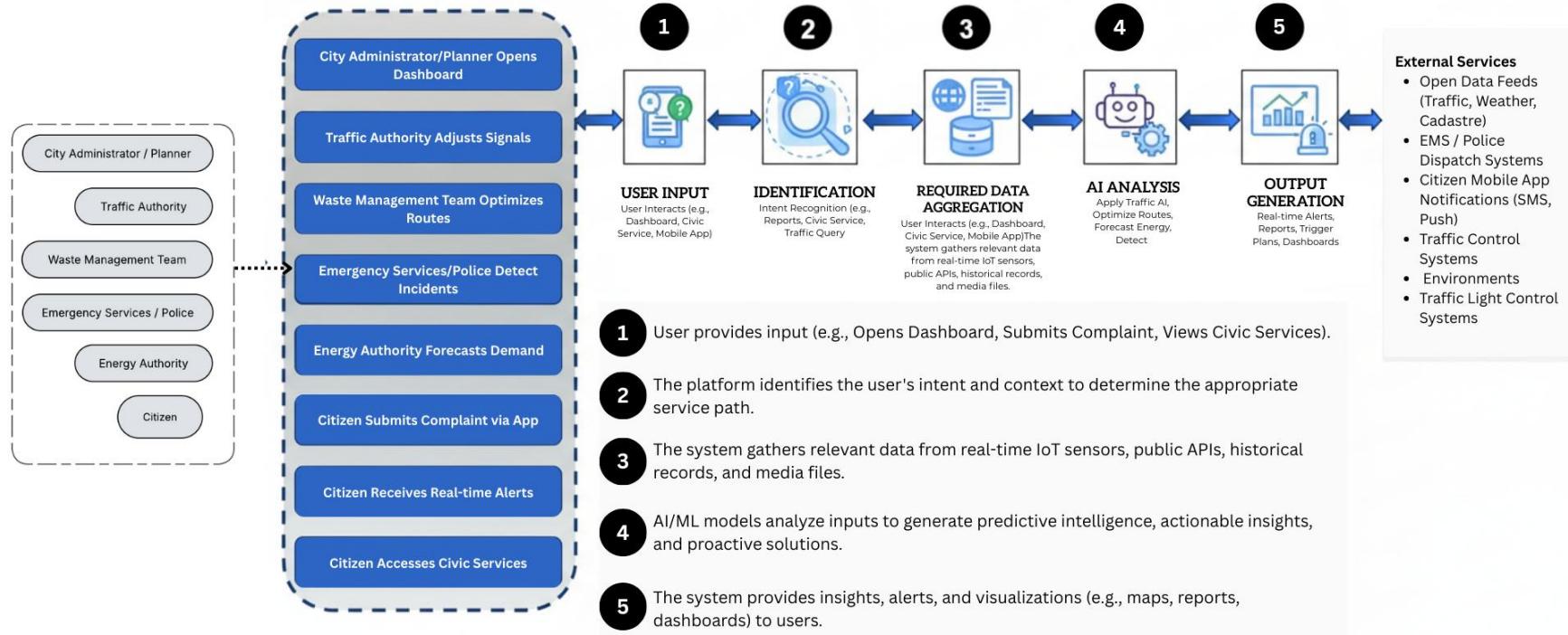
- News analysis
- Real time information

- Google map connectivity
- Utility and Essential Services

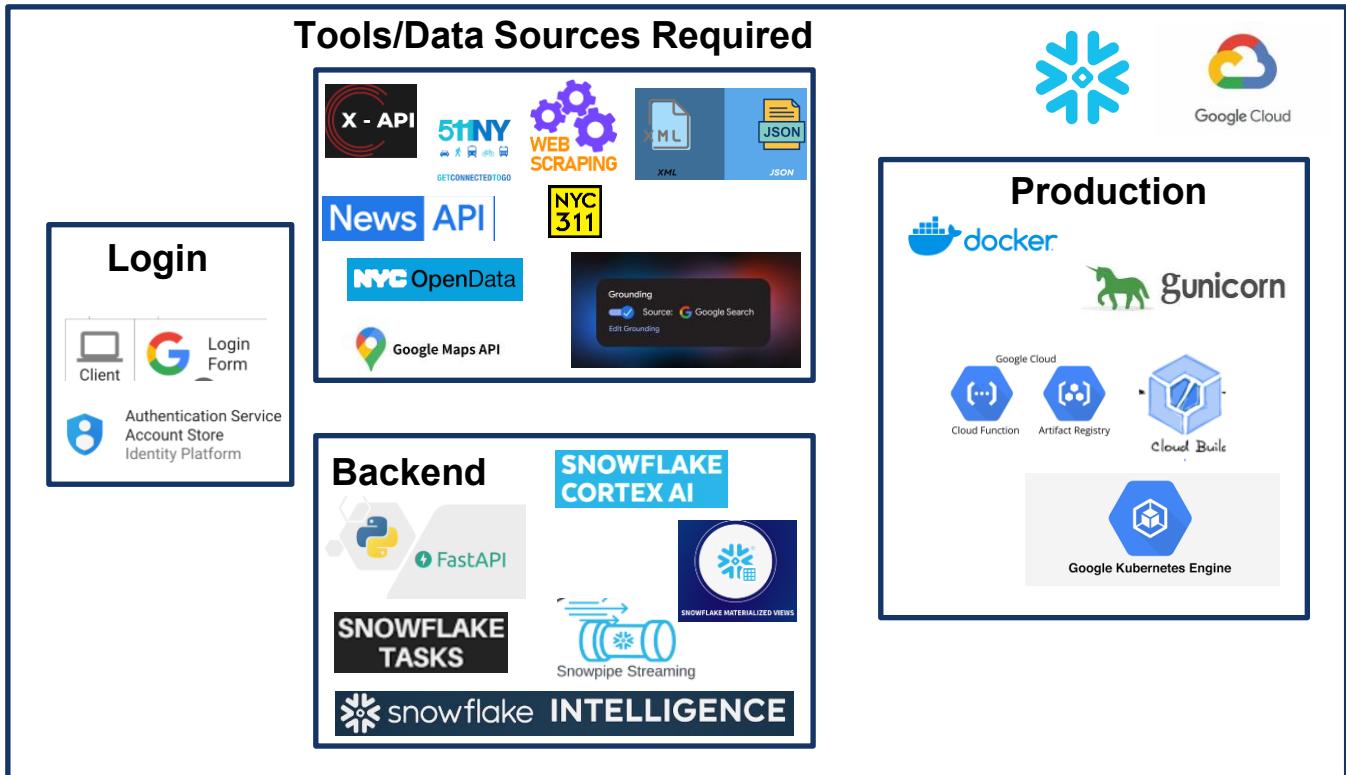
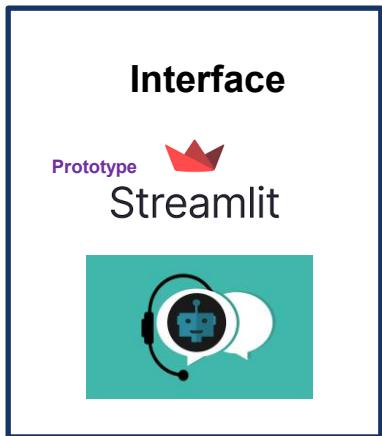
- Energy and Waste Management.
- Emergency and Threat Detection Services

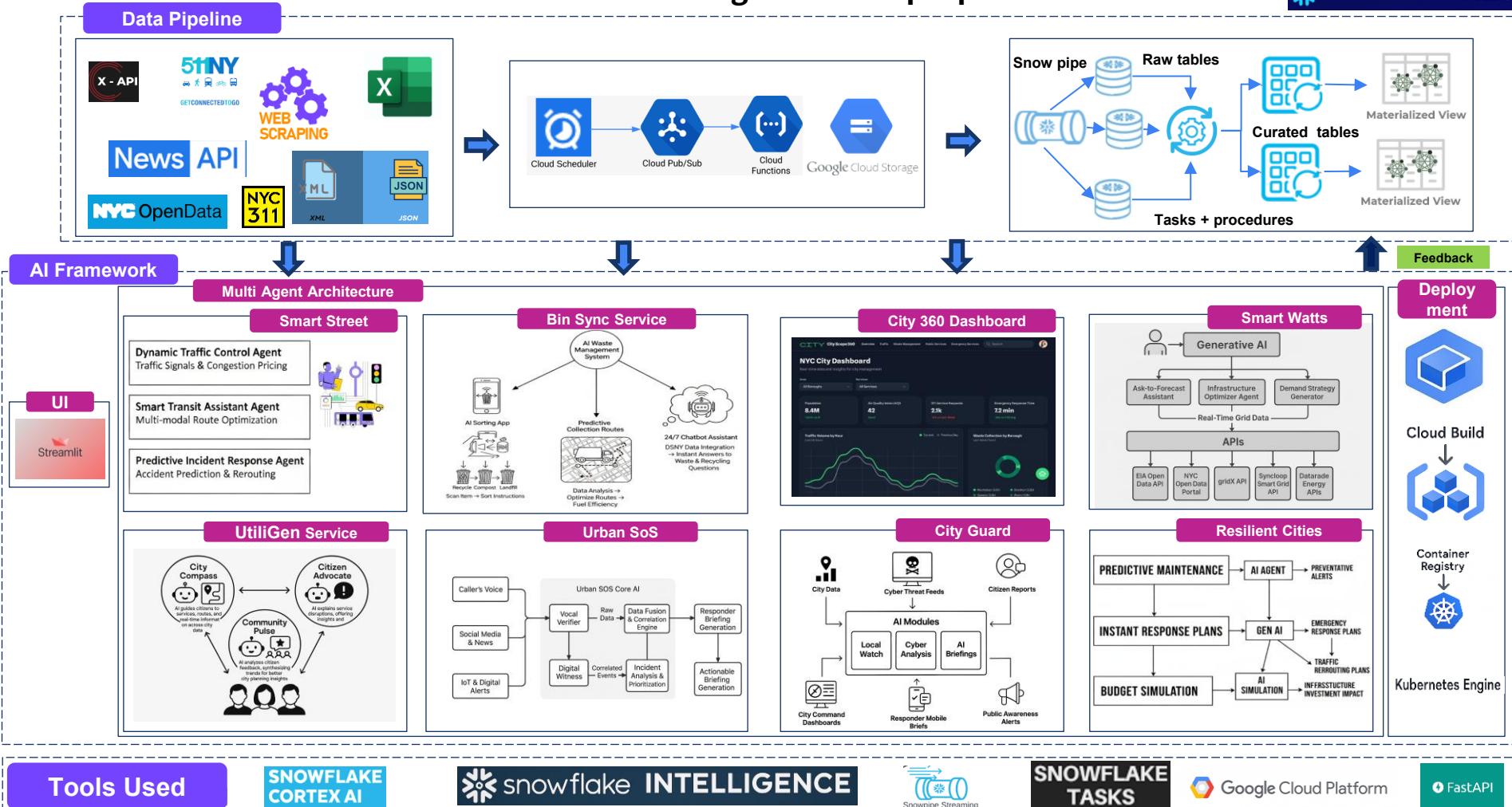
Target City for Prototype: New York, USA

City Scope 360 Platform Process Flow



Technologies to be used in the solution





Wireframes/Mock diagrams of the proposed solution



Smart Incident Feed

- Power Outage Detected: Downtown Brooklyn (2m ago)
- Major Congestion: I-95 near Williamsburg Bridge (5m ago)
- Medical Emergency: Times Square (10m ago)
- Flood Sensor Alert: Red Hook Street (26m ago)
- Air Quality Alert: South Bronx (31m ago)
- Structure Fire Reported: Upper East Side (45m ago)
- Utility Maintenance: Financial District (1h ago)

Urban SOS Service for Emergency Services (Times Square, Healthcare)

Medical Emergency: Times Square (Status: Active)

- Medical Response:** Priority 1 Medical Incident. Multiple callers report a person unconscious.
- Ambulance Dispatch:** 2 ambulances dispatched. Closest units: EMS-45 (1 min), EMS-21 (3 mins).
- Hospital Resources:** NYU Langone: 3 beds available. Mount Sinai: 2 beds available. Diversion status: Normal.

Medical Response Time (Current vs. Average)

Category	Current	Average
Medical Response	5.8 min	12.5 min
Ambulance Arrival	Avg: 6.2 min	Avg: 14.1 min
Patient Handover	Avg: 3.5 min	Avg: 6.5 min



Smart Street

Visualize and manage real-time street conditions with dynamic traffic control, smart transit assistance, and predictive incident response.

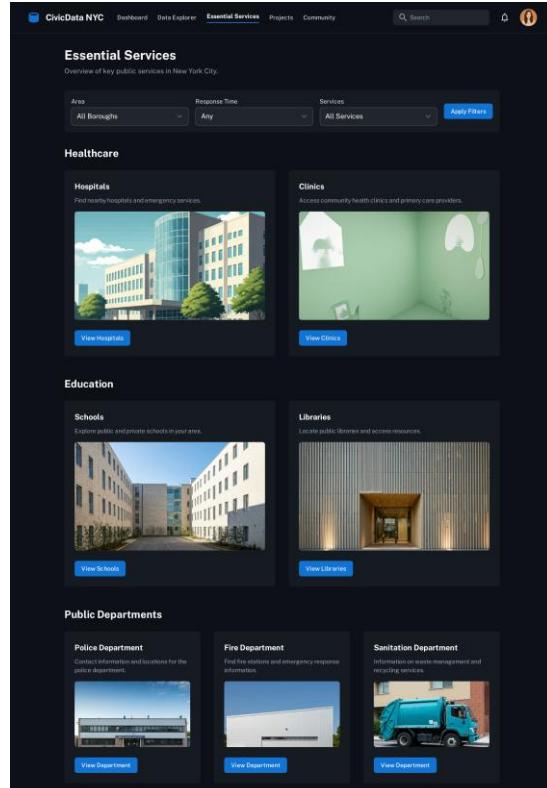
Ave: Manhattan | Services: All Services | Filter

Dynamic Traffic Control

Intersection: 5th Ave & 54th St | Traffic Flow (Vehicles/Hour):

Hour	5th Ave	54th St
00:00	1000	800
01:00	1200	900
02:00	1100	850
03:00	1300	1000
04:00	1200	950
05:00	1400	1100
06:00	1300	1050
07:00	1500	1200
08:00	1400	1150
09:00	1600	1300
10:00	1500	1250
11:00	1700	1400
12:00	1600	1350
13:00	1800	1500
14:00	1700	1450
15:00	1900	1600
16:00	1800	1550
17:00	2000	1700
18:00	1900	1650
19:00	2100	1800
20:00	2000	1750
21:00	2200	1900
22:00	2100	1850
23:00	2300	2000
24:00	2200	1950

Transit Assistant | Incident Response | Green Light Timing (5th Ave) 90s



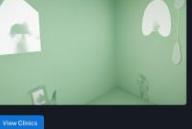
CivicData NYC | Essential Services

Essential Services

Overview of key public services in New York City.

Area: All Boroughs | Response Time: Any | Services: All Services | Apply Filters

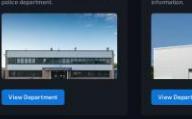
Healthcare

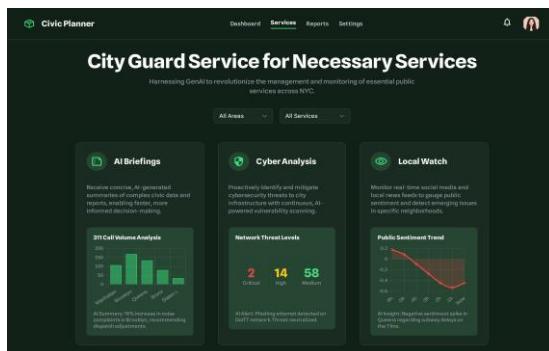
- Hospitals:** Field hospitals and emergency services. 
- Clinics:** Access community health clinics and primary care providers. 

Education

- Schools:** Explore public and private schools in your area. 
- Libraries:** Locate public libraries and access resources. 

Public Departments

- Police Department:** Contact information and locations for the police departments. 
- Fire Department:** Find stations and emergency response information. 
- Sanitation Department:** Information on waste management and recycling services. 



Civic Planner

City Guard Service for Necessary Services

Harnessing AI to revolutionize the management and monitoring of essential public services across NYC.

All Areas | All Services

AI Briefings

Receive concise, AI-generated summaries of complex civic data and informed decision-making.

Cyber Analysis

Proactively identify and mitigate cybersecurity threats to city networks. AI-powered vulnerability scanning.

Local Watch

Monitor real-time social media and local news feeds to gauge public sentiment and identify emerging issues in specific neighborhoods.

Network Threat Levels

2 Low, 14 Medium, 58 High

Public Sentiment Trend

Q1 Forecast demand for next 24 hours



NYC City Planner

Smart Watts

AI-driven tools for urban energy management and optimization.

Area: All Boroughs | Services: All Services | Energy Usage: All Usage

Ask-to-Forecast Assistant

Use natural language to get energy demand forecasts. Ask questions like "What will be the peak demand next Tuesday?" or "Forecast demand for the summer?"

Infrastructure Optimizer

Monitor real-time social media and local news feeds to gauge public sentiment and identify emerging issues in specific neighborhoods.

Demand Strategy Generator

Simulate the impact of new infrastructure like solar panels and EV stations on the grid.

Solar Panel Adoption 45% | **EV Charging Stations** 60%

Public Awareness

Launch a campaign to reduce peak hour usage.

Incentive Program

Offer rebates for off-peak energy consumption.

Smart Metering

Deploy smart meters for real-time data.

Run Optimization | **Generate Strategies**

Wireframes/Mock diagrams of the proposed solution



CivicOS

Resilient Cities

Explore AI-powered features to enhance infrastructure planning and management.

Predictive Maintenance
Utilize AI to predict infrastructure faults and validate maintenance procedures, minimizing disruptions and costs. This feature analyzes historical data and real-time sensor readings.

Emergency Response
Generate instant response plans for emergencies using AI. This feature integrates real-time data from various sources to create optimized action plans for first responders.

Budget Simulation
Simulate budget scenarios for infrastructure projects with AI. This feature allows city planners to model the financial impact of different initiatives and optimize resource allocation.

Infrastructure Health Overview
Real-time data visualization of key infrastructure metrics across NYC.

- Water Main Breaks: 12 (+5% vs last month)
- Power Outages: 8 (-10% vs last month)
- Bridge Structural Alerts: 3 (Stable)

Projected Maintenance Costs
AI-driven forecast of maintenance costs for the next 12 months.

\$2.5M
\$2M
\$1.5M
\$1M
\$0.5M
\$0M

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec



CITY CITY Scope360

NYC City Dashboard

Real-time data and insights for city management

Area: All Boroughs **Services:** All Services

Population: 8.4M (+0.5% vs LY)

Air Quality Index (AQI): 42 (Good)

311 Service Requests: 2.1k (-5% vs Last Week)

Emergency Response Time: 7.2 min (-30s vs YTD Avg)

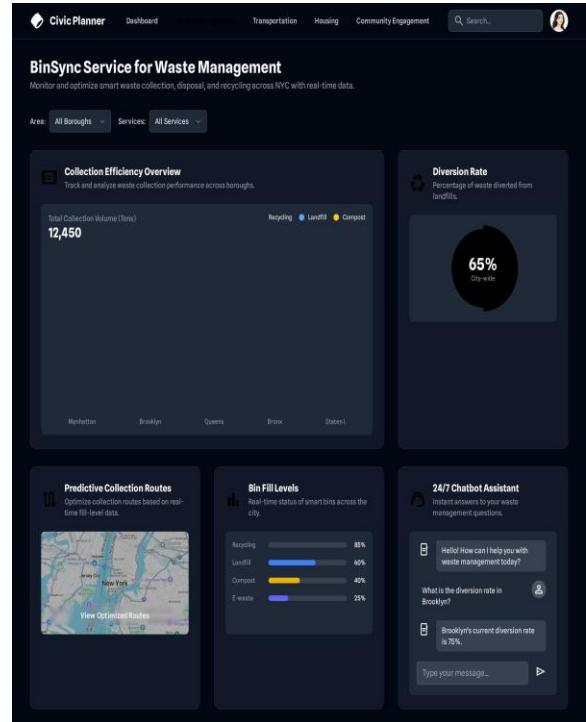
Traffic Volume by Hour: Last 24 Hours

Waste Collection by Borough: Last Month (Tons)

Total Collection Volume (Tons): 12,450

Public Service Requests by Type: Last 30 Days

Borough Demographics: Population Distribution



Civic Planner

BinSync Service for Waste Management

Monitor and optimize smart waste collection, disposal, and recycling across NYC with real-time data.

Area: All Boroughs **Services:** All Services

Collection Efficiency Overview: Track and analyze waste collection performance across boroughs.

Diversion Rate: Percentage of waste diverted from landfills

65% City-wide

Predictive Collection Routes: Optimize collection routes based on real-time fill-level data.

Bin Fill Levels: Real-time status of smartbins across the city.

24/7 Chatbot Assistant: Instant answers to your waste management questions.

Hello! How can I help you with waste management today?

What is the diversion rate in Brooklyn?

Brooklyn's current diversion rate is 75%.

Type your message... ➤

Future Enhancements

- Introduce gamification for residents to report infrastructure issues, earning civic points and promoting community engagement.
- Add an Augmented Reality (AR) mode for field workers to visualize real time infrastructure data on-site.
- Integrate accessibility features, including voice commands and multilingual support, to ensure inclusivity for all city residents.
- Include a "Data Privacy Dashboard," showing citizens how their anonymized data is used to improve city services.
- Develop a hyper local climate impact module to predict and visualize risks like flooding at a street level.



Thank you