2024 Annual Report on Implementation of Next Generation 9-1-1 in New York City

Pursuant to Local Law 78 of 2016

City of New York
Office of Technology and Innovation
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New York City Next Generation 9-1-1

2024 Annual Report

Contents

1.0 Introduction

New York City's 9-1-1 system is the largest and most complex emergency communications system in the country, receiving approximately 9 million calls each year. To enhance the public's access to this critical 9-1-1 service, in 2014, the city began developing a long-term strategy to implement a Next Generation 9-1-1 (NG9-1-1) system, which would allow for the seamless transfer of digital information from the public to the city's 9-1-1 system. Administration and agency executives recognized that widespread adoption of rapidly advancing technologies like text, video, Voice over Internet Protocol (VoIP), and the saturation of high-speed broadband access have changed expectations for how people communicate, not only with each other but with their government, including 9-1-1 services.

Improvements to the core infrastructure of the city's 9-1-1 system are needed to support these new demands. To this end, the New York City Office of Technology & Innovation (OTI)[1] has been collaborating with the Fire Department of the City of New York (FDNY) and the New York City Police Department (NYPD) to migrate the city to a NG9-1-1 system, technically ensuring the city's provision of a world class 9-1-1 call-taking operation for decades to come while continuing to provide essential, uninterrupted emergency response services.

1.1 Background on Next Generation 9-1-1

Telecommunications carriers have been building out an entirely new digital infrastructure, separate from their copper-based legacy networks, to transition from older, analog telephone landline-based systems to current cellular phone technology-based systems. Similarly, 9-1-1 systems across the country have had to transition to an all-digital network infrastructure.

NG9-1-1 systems built on this new infrastructure can accept multimedia data (e.g., text, photographs, video, etc.), have improved interoperability between all public safety agencies that share a 9-1-1 system, have improved call routing between neighboring jurisdictions, and have greater accuracy when identifying a caller's location.

The federal government and the State of New York recognize the importance of NG9-1-1. Congress, the Federal Communications Commission (FCC), the United States Department of Transportation (DOT), and the New York State Department of Homeland Security and Emergency Services (DHSES) have all initiated efforts to advance NG9-1-1 at national and state levels. The city continues to support, monitor and participate in this dialogue, whenever appropriate.

[1] Effective January 19, 2022, pursuant to Mayoral Executive Order 3 of 2022, OTI was created and the New York City Department of Information Technology (DoITT) was included under its umbrella.

1.2 Business Need and Technical Benefits

The current 9-1-1 system is based on analog technologies designed to support calls received from landline phones, wireless cell phones and Voice over Internet Protocol (VoIP) phones. To support calls from wireless phones and, more recently, from VoIP phones, accommodations were made to the 9-1-1 system to adapt an older system to current technologies. For NG9-1-1, the system is being designed from the groundup to interact seamlessly with current and future technologies. The National Emergency Number Association (NENA), which acts as the 9-1-1 standards body for North America, has developed standards for NG9-1-1, which the city is using as a basis for its development of a NG9-1-1 system.

The primary technical benefits of NG9-1-1 include the following:

1. Improved system quality, accuracy, and efficiency (e.g., passing information gathered during the initial interaction with other public safety personnel when 9-1-1 calls are transferred);

2. Enhanced support for all communications devices currently capable and/or required to provide 9-1-1 service (e.g., faster call setup time, quicker delivery to call taker);

3. Support for future communications devices and services that may provide 9-1-1 service (e.g., Text to 9-1-1, transmission of incident data, photos, and video);

4. Increased cost-effectiveness of the system through the use of commercially available, off-the-shelf products. (e.g., computer servers and network elements such as firewalls and routers); and,

5. Enhanced system supportability and maintainability through the elimination of outdated products and technologies.

Of these technical benefits, the critical driver to the program is enhancing police, fire and medical response to the public. By moving to a NG9-1-1 system, the city will position itself to be able to incrementally offer these benefits, resulting in more effective and efficient responses to 9-1-1 calls for years to come.

2.0 Implementation Plan for Next Generation 9-1-1

The city is planning an infrastructure upgrade of its 9-1-1 telecommunications network and the various subsystems that accept, route, and answer 9-1-1 calls so that it can reliably support any IP

addressable device or service accessing 9-1-1 and quickly and seamlessly connect callers to police, fire or emergency medical personnel. The city's NG9-1-1 system will allow its public safety agencies to continue to provide high quality and responsive emergency services that those calling 9-1-1 depend upon.

2.1 Program Objectives

The city's plan for NG9-1-1 is based on the following program objectives:

1. Avoid any disruption to answering and processing of 9-1-1 calls;

2. Limit disruptions to the public safety agency operations of the city's Public Safety Answering Centers (PSAC);

3. Replace the systems that are at end of life prior to cessation of support;

4. Provide a platform that allows PSAC call-taking operations to evolve their methods and procedures at a pace chosen by the NYPD and FDNY;

5. Provide training for the NYPD, FDNY, and OTI staff who will be interfacing with the new systems;

6. Plan and execute a public awareness campaign, highlighting the benefits of the new system and new features that will enhance New Yorkers' experience with 9-1-1 services;

7. Provide a flexible platform that allows ancillary systems and stakeholder groups to evolve at their own pace; and

8. Deploy a 9-1-1 system that is more accessible to all members of the public because it can accept requests for emergency services in a variety of ways, not simply through a voice call or short text message.

2.2 High-Level Scope

1. Replace the end-of-life components of the current 9-1-1 system.
   a. Replace the functionality of the current 9-1-1 call routing systems with NG9-1-1 call routing functionality.
   b. Replace the current call handling systems at PSAC I and PSAC II. These systems will be replaced with systems that not only answer and process voice calls but handle native NG9-1-1 functionality (i.e., text, photo, video).

c. Replace the current network facilities that connect the Originating Service Providers (OSPs, a.k.a. "telcos," "carriers," and "telecom service providers") to the call routing systems and to the PSACs.

2. Interface to Computer Aided Dispatch and/or other public safety ancillary systems.
   a. Implement enhanced logging and recording technologies supporting quality controls and agency subpoena systems.

3. Interconnect with 9-1-1 systems in neighboring jurisdictions.
   a. Work in parallel with DHSES for interconnections with neighboring jurisdictions within New York State and with jurisdictions in neighboring states.

4. Provide interfaces to public safety agency ancillary systems.
   a. Provide an interface to the NG9-1-1 system with functionality materially the same or better than as is in place today.

5. Provide for the implementation of native NG9-1-1 capabilities. This includes:
   a. Text to 9-1-1.
   b. Data, photos and video.
   c. Internet of Things (which would allow for the future support of new communications devices, particularly those that address the needs of people with disabilities).
   d. Training for all city staff who will be using and/or supporting the new systems.

6. Provide a platform that supports operational efficiencies.
   a. Provide a platform that supports operational changes identified by the NYPD and FDNY during the initiation and planning phases.
   b. Provide a flexible platform that allows for future changes to accommodate police, fire or emergency medical operations.

7. Cybersecurity requirements for vendors and contractors.
   a. The Next Generation architecture and platform will be designed and implemented in a manner that protects the city's infrastructure and critical systems from malicious attacks through the use of the latest technologies, public-private partnerships, and regular training and exercises for city employees. In implementing the NG9-1-1 system, city agencies, their employees, contractors and vendors will follow the latest established editions of the Citywide Information Security Policies and Standards.

2.3 Process and Methodology

The NG9-1-1 program is being delivered by procuring products and services from vendors who specialize in NG9-1-1 networks and systems, in accordance with best practices and national standards established for NG9-1-1 using the city's established procurement processes. The program is following the business processes and management plans established by OTI's Public Safety IT Program Management Office (the "NG9-1-1 team"). The NG9-1-1 team works in collaboration with the FDNY and NYPD (as mentioned above) as they are the identified 9-1-1 operational subject matter experts, and both agencies provide functional approval and final system acceptance along with OTI.

The NG9-1-1 program's phases and their associated deliverables are as follows:

1. Initiation Phase:
   a. Assesses high-level requirements for a new system and create a straw-man target architecture, schedule, and implementation plan.
   b. Issue a Request for Information (RFI) to solicit vendor feedback on the straw-man plan and to further inform the city's Request for Proposals (RFP) process.

2. Planning Phase:
   a. Develops RFPs to facilitate the procurement of the required products and services.
   b. Releases the RFPs and facilitate a process that results in responses from qualified vendors for all products and services required.
   c. Selects qualified vendors and negotiate contracts.

3. Design Phase[2]:
   a. Defines requirements, establishing initial requirements baseline, including the program schedule, test and training strategies, project management, implementation, business continuity and disaster recovery plans.
   b. Reviews preliminary design documents, including use cases and business process flows, moving from outline to draft plans.
   c. Finalizes critical design, equipment lists, the final design of use cases, business process flows, and baseline requirements, including finalized security baseline, subsystem documentation and technical drawings, and final implementation, build and training plans.

[2] Previously, the Design Phase was included in the report as part of the Implementation Phase. It is broken out now to show its complexity and allow for a fuller description of design milestones.

4. Implementation Phase:
   a. Build, configure and test all individual NG 9-1-1 system components.
   b. Integrate, test and migrate all subsystems.
   c. Test system reliability, availability, resiliency, and capacity.
   d. Perform quality assurance verification.
   e. Validate end-to-end functionality.
   f. Train all end users on the use of the system.

5. Steady-State Operations:
   a. Place the NG9-1-1 system into production, including both operational cutover and operational support.
   b. Conduct a lessons-learned process, culminating in the release of a final program report.

3.0 Update on NG9-1-1 Program Delivery

Progress since 2023 NG9-1-1 Annual Report. The NG9-1-1 program continues in the Implementation Phase (see section 2.4).

1. *Class 1 – Emergency Services IP Network (ESInet) and Core Services*.

   Class 1 completed milestones include:
   - Winter 2024: Solutions Development Environment (SDE) Penetration Testing analysis
   - Winter 2024: SDE rebuild & validation (post Penetration Testing)
   - Spring 2024: Vesta Router software upgrade in SDE & Production
   - Summer 2024: Network Large Scale Testing (NLST) in Production
   - Summer 2024: System Performance Testing in Production
   - Fall 2024: SDE User Acceptance Testing
   - Fall 2024: Production User Acceptance Testing
   - Fall 2024: Cutover first voice OSP (Verizon Telecom) in Production

2. *Class 2 – Logging & Recording.*

   Class 2 completed milestones include:
   - Spring 2024: SDE Penetration Testing and analysis
   - Summer 2024: Supported NLST in Production
   - Summer 2024: System Performance Testing in Production
   - Fall 2024: SDE User Acceptance Testing

- Fall 2024: Production User Acceptance Testing

3. *Class 3 – Geographic Information System.*

   Class 3 completed milestones include:
   - Summer 2024: NLST in Production
   - Summer 2024: System Performance Testing in Production
   - Fall 2024: Web Database Management System (WebDBMS) User Acceptance Testing (SDE & Production)
   - Fall 2024: OSP's onboarded & dual provisioning to WebDBMS
   - Fall 2024: Cutover NextGen Location Database (LDB) in Production

4. *Call Handling System*.

   Call Handling completed milestones include:
   - Winter 2024: Integration with Vesta Router in SDE
   - Spring 2024: Completed workstation installations at PSAC I & PSAC II
   - Summer 2024: Hands-on User Experience Training in SDE
   - Summer 2024: System Integration Testing (SIT) Phase 3 software development/deployment
   - Fall 2024: SIT Phase 4 software development/deployment

5. *Independent Validation and Verification Services (IV&V)*. IV&V vendor continues to support program by reviewing all documentation, advising, performing quality checks, etc.

   IV&V completed milestones in 2024 include:
   - Ongoing monthly IV&V reporting for the program

3.1 Past Accomplishments and Milestones

1. Initiation Phase (2016):
   a. The NG9-1-1 team developed high-level requirements for a new system and created a target state architecture, schedule, and implementation plan.
   b. A Request for Information (RFI) was publicly released in January 2016 to gain insight into NG9-1-1 technologies and to solicit vendor feedback to further inform the city's Request for Proposals (RFP) process. Eighteen (18) highly-qualified vendors responded to the RFI, further informing the city's plans for a NG9-1-1 system with

information from experts across the industry on the benefits, challenges, risks, and issues associated with migrating to NG9-1-1 platform.

2. Planning Phase (2017-2019):
   a. The NG9-1-1 team developed RFPs and other related solicitations to begin the procurement process for the primary subsystems that compose the larger NG9-1-1 system: (1) ESInet, (2) Core Services (i.e. the Call Routing Services) and (3) Call Handling (i.e., the Call Answering System).
   b. The ESInet and Core Services RFP was completed and competitively bid.
      - June 13, 2017: RFP released
      - June 26, 2017: Mandatory pre-proposal conference held
      - July 7, 2017: Deadline for submission of questions from proposers
      - July 28, 2017: RFP Q&A addendum published
      - September 21, 2017: A sufficient number of responsive proposals received
      - 2018: Technical evaluations of RFPs completed; financial evaluations began
      - Spring 2019: Final financial evaluation of vendor submissions completed
      - Summer 2019: Contract negotiation team formed with representatives from OTI, FDNY, NYPD, NYC Cyber Command
      - Summer 2019 – Fall 2019: Ongoing negotiations with vendors commenced on submissions
      - Fall – Winter 2019: All contractual attachments developed, and legal terms and conditions finalized
      - Summer 2020: Contract registered, and program kickoff conducted for all 3 classes
   c. OTI, in collaboration with Mayor's Office for People with Disabilities (MOPD), reserved contractual authority to hire a deaf and hard of hearing subject matter expert to help OTI map NG9-1-1 capabilities with NYPD and FDNY operational requirements as applicable.

3. IV&V
   - Fall 2019: Request for Solicitation was released Fall 2020: IV&V kick-off conducted with NG9-1-1 team

4. Design Phase (2020)
   - ESInet, Core Services and GIS
     a. Fall 2020: Project requirements and schedule baselined. QA, Business Continuity, and PMP Plans completed
     b. Fall/Winter 2020: Preliminary design initiated

- Logging & Recording
    a. Fall 2020: Project requirements and schedule baselined. Quality Assurance, Business Continuity, and Project Management Plans completed
    b. Fall/Winter 2020: Preliminary design initiated

5. Design / Test / Implementation Phases (2021-2023)
    - ESInet, Core Services
        a. Winter 2021: Preliminary design completed
        b. Spring 2021: Critical design completed
        c. Summer/Fall 2021: Procured all system hardware and completed SDE build and configuration
        d. Fall/Winter 2021: Completed SDE Factory Acceptance Testing of hardware at vendor site
        e. Winter 2022: Received SDE system hardware at New York City location
        f. Spring 2022: Received production hardware at New York City locations
        g. Summer 2022: SDE integration activities
        h. Fall 2022: Production integration of ESInet with GIS
        i. Winter 2023: SDE Subsystem Acceptance Testing
        j. Winter 2023: OSP DS3 circuit turn-up; Point of Interface (POI) to PSACs
        k. Spring 2023: Production Subsystem Acceptance Testing
        l. Spring 2023: SDE software upgrades
        m. Summer 2023: DDoS on-prem / off-prem configuration and Testing
        n. Summer 2023: Production integration activities
        o. Fall 2023: Production Subsystem Integration Testing
        p. Fall 2023: SDE Penetration Testing

    - Logging & Recording
        a. Summer 2021: Preliminary design completed
        b. Fall 2021: Procured all system hardware and completed SDE build and configuration
        c. Fall 2021: Completed SDE Factory Acceptance Testing of hardware at vendor site
        d. Winter 2021: Delivered SDE hardware to New York City PSAC I datacenter
        e. Winter 2022: SDE Subsystem Acceptance Testing
        f. Spring 2022: Production Factory Acceptance Testing
        g. Summer 2022: Production Subsystem Acceptance Testing
        h. Fall 2022: Call Handling production Factory Acceptance Testing

i. Winter 2023: Shipped production hardware to support CHS to New York City
j. Winter 2023: Integration and support of Class 1 Subsystem Acceptance Testing
k. Spring 2023: CHS Subsystem Acceptance Testing
l. Summer 2023: Commenced production integration activities
m. Fall 2023: Production Subsystem Integration Testing
n. Winter 2023: Commenced SDE Penetration Testing

- Geographic Information System (GIS)
  a. Winter 2021: Preliminary design completed
  b. Spring 2021: Critical design completed
  c. Summer/Fall 2021: Procured all system hardware and completed SDE build and configuration
  d. Fall/Winter 2021: Completed SDE Factory Acceptance Testing of hardware at vendor site
  e. Winter 2022: Completed Requirements Design
  f. Spring 2022: Completed Preliminary Design
  g. Summer 2022: Completed Critical Design
  h. Fall 2022: Production integration with ESInet
  i. Winter 2023: Automated data delivery process (ETL) in SDE
  j. Winter 2023: SDE Subsystem Acceptance Testing

- Call Handling
  a. Summer 2021: Contract registered, and program kickoff conducted
  b. Fall/Winter 2021: Project requirements gathering in process. Quality Assurance, Business Continuity, and Project Management Plans initiated
  c. Winter 2022: Completed Requirements Design
  d. Spring 2022: Completed Preliminary Design
  e. Summer 2022: Completed Critical Design
  f. Summer 2022: Received SDE & Production hardware at NYC locations
  g. Winter 2023: SDE Lab positions built & configured
  h. Spring 2023: Shipped production console equipment from vendor facility
  i. Spring 2023: SDE Factory Acceptance Testing
  j. Summer 2023: Commenced workstation installations at PSAC I & PSAC II
  k. Summer 2023: Production Factory Acceptance Testing
  l. Fall 2023: Software and User Interface demos for NYPD & FDNY
  m. Fall 2023: SDE SAT Software Development/Deployment

- Independent Validation and Verification Services (IV&V)
    a. Ongoing monthly IV&V reporting for the program
    b. Phase Summary Report: Initiation Phase through Critical Design Subphase
    c. Phase Summary Report: Build & Configure Phase
    d. Phase Summary Report: Integration Phase

3.2 Next Steps

The NG9-1-1 team will continue focusing on OSP cutovers and then transition to the migration of the new Call Handling System. The team is aiming to complete the City's transition to a NG9-1-1 System by the end of 2025.

Following the Class 1, 2, 3 and Call Handling System cutovers, the City intends to pursue further enhancements to the NG9-1-1 System.

4.0 Interim Text to 9-1-1 Solution

On June 2, 2020, the city launched a major enhancement to its existing 9-1-1 system to allow for text message communication between 9-1-1 operators and persons in the five boroughs. The Interim Text to 9-1-1 (TT9-1-1) solution utilizes Short Message Service (SMS), a text messaging service component of phone, web or mobile communications systems, that uses standardized communications protocols to allow fixed line or cellphones to exchange short text messages. Unlike Teletypewriters (TTY), Telecommunications Relay Services (TRS) and Video Relay Services (VRS), which are out of date and/or not broadly used, this solution now provides people who are unable to connect via existing voice services with greater access to the 9-1-1 system.

TT9-1-1 allows those who are unable to make a voice call to text 9-1-1 so that they can readily access emergency services. The solution was specifically designed with input from the Deaf and Hard of Hearing (DHH) community, and it is intended for the DHH community and others who have a need to access emergency services but for whom a voice call is not an option (e.g., persons with speech disabilities and victims of crimes).

4.1 Past Accomplishments and Milestones

The TT9-1-1 team that delivered this interim solution included the same public safety stakeholders as the NG9-1-1 team from OTI, FDNY, and NYPD.

1. Initiation Phase (2018):

a. Preliminary requirements, system architecture and implementation plan were developed with the NYPD and FDNY for an Interim TT9-1-1 system. These were reviewed with existing 9-1-1 vendors and their subcontractors.

2. Planning Phase: (2019)
   a. Requirements were finalized with the NYPD and FDNY and Change Orders were released to provide TT9-1-1 capabilities, using the existing contract vehicles with the city's current 9-1-1 vendors. This includes requirements related to cybersecurity and resiliency.
   b. Change Orders were registered by the Comptroller.

3. Implementation and Steady State Phases (2020)
   a. Cybersecurity-related and User Acceptance Testing of the system were completed in the early months of 2020.
   b. DHH trainings for the NYPD and FDNY were completed in Spring 2020.
   c. TT9-1-1 launched on June 2, 2020 and transitioned within a week to steady-state operations.

5.0 Program Governance

The city's transition and phased migration to a NG9-1-1 system is a complex, multi-year technology initiative, and its success is contingent on close coordination and collaboration with OTI's public safety partners at the FDNY and NYPD as well as other city offices and agencies. OTI is proud of the open and inclusive relationship we continue to strengthen with these agencies, exemplified by their active participation in OTI's integrated Public Safety Program Management Office, and governed by the multi-agency Public Safety Steering Committee of agency executives. We also rely on and appreciate the regular feedback and ongoing support we continue to receive from various 9-1-1 stakeholders across New York City, including community partners, government oversight entities, and local elected officials.