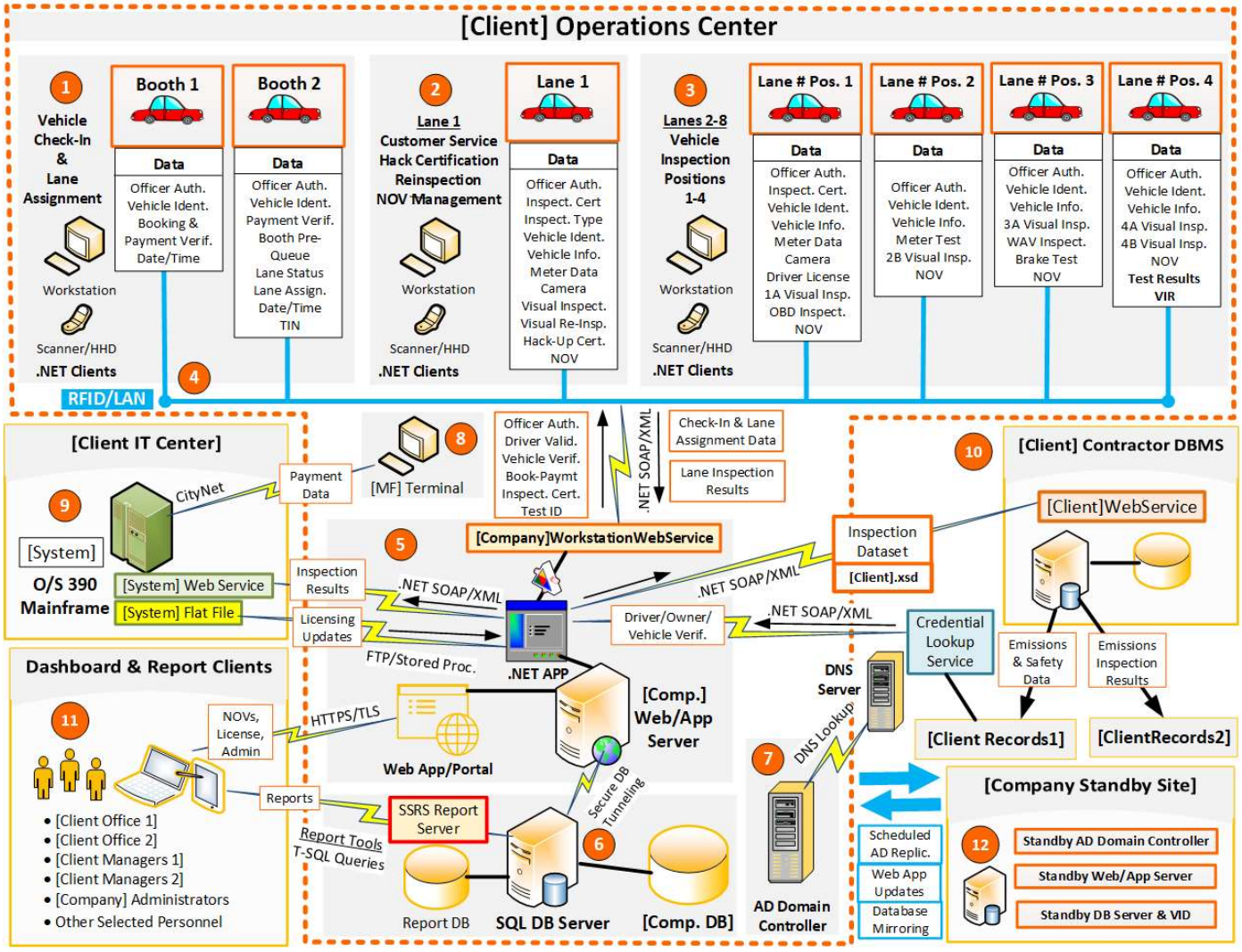
4 Data Architecture and Processing

This section presents a diagram and corresponding descriptions of the processing of data through the sequential phases of data generation and collection, processing, and storage, including the technologies and interfaces used by [Company] to securely interact with the various [Client System] data providers and consumers.

4.1 [Company/Client System] Data Architecture

The following diagram presents the data architecture of the [Company/Client System].



4.2 [Company/Client System] Data Processing

The following sections describe how data is processed by [Company] through the [Client System]. The numbers in parentheses in each section title correspond to the numbered areas of the data architecture diagram shown in the preceding section.

4.2.1 Vehicle Check-In & Lane Assignment (1)

Vehicle Check-In (Booth 1) is where drivers enter the facility and are checked in by an [Client] Officer. Lane Assignment (Booth 2) is the area where drivers are assigned to inspection lanes. Each booth is equipped with a [Company] Workstation and a scanner/hand-held device (HHD). Each of these devices run the [Company] Booth/Lane software .NET clients to interface with the .NET application web service ([Company]WorkstationWebService) provided on the [Company] Web/Application server.

4.2.1.1 Data Processing – Booth 1

In Booth 1, the .NET Workstation and HHD clients send requests and data to the [Company]WorkstationWebService provided by the [Company] .NET application server for the following:

- **Officer (User) Authentication:** Officers using the Lane Software will be required to authenticate themselves at the Booth 1 Workstation as valid [System] Booth/Lane software users prior to running tests or accessing any of the software menu items. The Workstation .NET client must send requests to the server for authentication data through two of four data collection methods: Facial recognition, RFID badge, User ID, and Password.
    - Successful authentication requires successful validation through both of the selected methods as specified in the **[Client] Lane Requirements** document.
    - Other [System] user roles who may authenticate in Booth 1 include Supervisor, Technician, and Admin.
- **Vehicle Identification:** The Workstation or HHD .NET client can send requests to the server for vehicle identification data through one of four data collection methods: LPR (License Plate Recognition), RFID, Barcode scan (Vehicle VIN, Vehicle RFID tag, Previous test VIR), or Manual entry (Vehicle License).
- **Booking & Payment Verification:** The .NET clients can use one of the following data collection methods to send a request to the server for data confirming the inspection appointment booking and payment verification: LPR, RFID Sticker, Barcode Scan, and Manual Entry with Supervisor Override (if enabled on Dashboard).
- **Date/Time of Vehicle Arrival:** The .NET clients send the date and time that the vehicle arrived at Booth 1 to the server.

4.2.1.2 Data Processing – Booth 2

In Booth 2, the .NET Workstation and HHD clients send requests and data to the [Company]WorkstationWebService provided by the [Company] .NET application server for the following:

- **Officer (User) Authentication:** See Data Processing – Booth 1.
- **Vehicle Identification:** See Data Processing – Booth 1.
- **Payment Verification:** If payment has not been received by the time the customer reaches Booth 2, the .NET client will receive instructions from the server to direct the customer to the cashier.
- **Booth Pre-Queue Status:** The server will send pre-queue status data to the Booth 2 Workstation .NET client indicating the next vehicle(s) to direct from the pre-queue to Booth 2, as specified in the **[Client] Lane Requirements** document. The software will select the vehicle(s) automatically if RFID is detected, or can be selected manually by the Officer.
- **Lane Status:** The .NET client requests and receives lane status and capacity data from the server.
- **Lane Assignment:** The server will send the lane assignment for the vehicle to the Booth 2 Workstation .NET client, indicating to the officer to direct the customer to that lane.
- **Date/Time of Vehicle Lane Assignment:** The .NET client sends the date and time that the vehicle is assigned an inspection lane as well as the number of the lane assigned to be stored in the test record.
- **TIN (Test Identification Number):** The server will generate and send a TIN (Test Identification Number) that will be stored in the test record and printed on applicable forms.

4.2.2 Lane 1 – Customer Service, Hack Certification, Reinspection, NOV Management (2)

Lane 1 is where [Client System] customers are directed for customer service, hack-up certification, reinspections, and Notice of Violation (NOV) clearance. Lane 1 is equipped with an [System] Workstation and a scanner/hand-held device (HHD). Each of these devices run the [Company] Booth/Lane software for the [Client System] .NET clients to interface with the .NET application web service ([Company]WorkstationWebService) provided on the [Company] Web/Application server.

4.2.2.1 Data Processing – Lane 1

In Lane 1, the .NET Workstation and HHD clients send requests and data to the [Company]WorkstationWebService provided by the [Company] .NET application server for the following:

- **Officer (User) Authentication:** See Data Processing – Booth 1.
- **Inspection Certification:** Upon Officer authentication, the .NET client will send a request to the server for the DMV Inspection Certification status of the officer. The software will not allow the user to perform an inspection if their DMV Inspection Certification has expired.
- **Vehicle Identification:** See Data Processing – Booth 1.

(Continued on Next Page)

- **Vehicle Information:** The Workstation or HHD .NET client will send requests to the .NET application server for complete Vehicle Information based on the vehicle identification. Vehicle information returned from the server will include the following:
    - VIN
    - License Plate
    - Permit Number
    - Vehicle Make
    - Vehicle Model
    - Model Year
    - Vehicle Type
    - Base Code
    - Base Name
    - Owner Name
    - Owner Address
    - Meter Make
    - Meter Serial #
    - Meter Mile Run Date
- **Meter Data:** For [Client] Licenses, the server will send previous values for meter data. The officer will be required to enter the current meter data in the .NET client for mileage, meter trips, and units, which will then be transmitted to the .NET application server.
- **Camera Inspection Data:** If a camera is present in the vehicle, the inspector will be required to enter the data for the results of the camera inspection in the .NET Client, which will then be transmitted to the .NET application server.
- **Visual Inspection:** If a visual inspection is required, the officer will be required to enter the data for the results of the visual inspection in the .NET client, which will then be transmitted to the .NET application server.
- **Visual Reinspection:** If a visual reinspection is required, the officer will be required to enter the data for the results of the visual reinspection in the .NET client, which will then be transmitted to the .NET application server.
- **Hack-Up Certification:** If a hack-up certification is required, the officer will be required to enter the data for the results of the certification in the .NET client, which will then be transmitted to the .NET application server.
- **NOV (Notice of Violation) Management:** If a violation is found during any inspection type in Lane 1, the officer will be required to enter the data for the violation in the .NET client, which will then be transmitted to the .NET application server, and be able to print the violation to provide to the customer. Officers will also be able to clear existing NOVs based on passed reinspections in the Lane 1 .NET client, which will then be transmitted to the .NET server.

4.2.3 Lanes 2-8 – Vehicle Inspection Positions 1-4 (3)

Each lane in Lanes 2-8 in the inspection facility have four positions where various types of inspection tasks are completed. Each position in each lane is equipped with an [System] Workstation and a scanner/hand-held device (HHD). Each of these devices run the [Company] Booth/Lane software .NET clients to interface with the .NET application web service ([Company]WorkstationWebService) provided on the [Company] Web/Application server.

> **Note:** Lane 2 is equipped and has the capability to support inspections but is not actively operational as of the date of this document submission (November 14, 2018).

4.2.3.1 Data Processing – Lane X Position 1

In Position 1 of Lanes 2-8, the .NET Workstation and HHD clients send requests and data to the [Company]WorkstationWebService provided by the [Company] .NET application server for the following:

- **Officer (User) Authentication:** See Data Processing – Booth 1.
- **Inspection Certification:** See Data Processing – Lane 1.
- **Vehicle Identification:** See Data Processing – Booth 1.
- **Vehicle Information:** See Data Processing – Lane 1.
- **Meter Data:** See Data Processing – Lane 1.
- **Camera Inspection Data:** See Data Processing – Lane 1.
- **1A Visual Inspection:** The vehicle information will be used to determine which specific 1A Visual Inspection items are indicated for the particular license type. The officer will be required to enter the data for the results of the 1A visual inspection in the .NET client, which will then be transmitted to the .NET application server.
- **OBD Inspection:** The software automatically determines whether or not an OBD test is required for the vehicle being tested as defined by the [Client] OBD. If an OBD inspection is required, the officer will be required to enter the data for the results of the OBD test in the .NET client, which will then be transmitted to the .NET application server.
- **NOV (Notice of Violation):** If a violation is found during any inspection type in Position 1, the officer will be required to enter the data for the violation in the .NET client, which will then be transmitted to the .NET application server, and be able to print the violation to provide to the customer.

4.2.3.2 Data Processing – Lane X Position 2

In Position 2 of Lanes 2-8, the .NET Workstation and HHD clients send requests and data to the [Company]WorkstationWebService provided by the [Company] .NET application server for the following:

- **Officer (User) Authentication:** See Data Processing – Booth 1.
- **Vehicle Identification:** See Data Processing – Booth 1.
- **Vehicle Information:** See Data Processing – Lane 1.
- **Meter Test:** The .NET Workstation client will send a request to the .NET application to determine if a Taxi Meter test is necessary for the current vehicle, based on license type. All [Client] licensed vehicles require Taxi Meter tests. If the test is not necessary, the vehicle will be instructed proceed to the next position. The Taxi Meter Test will test the taxi meter to ensure the meter is charging the correct amount for the distance traveled. This is done by driving the vehicle on the dyne until the meter reads $3.80. The distance traveled during this time should be 2,112 feet (2/5th's of a mile). When complete, the officer will be required to enter the data for the results of the Taxi Meter Test in the .NET client, which will then be transmitted to the .NET application server.
- **2B Visual Inspection:** The vehicle information will be used to determine which specific 2B Visual Inspection items are indicated for the particular license type. The officer will be required to enter the data for the results of the 2B visual inspection in the .NET client, which will then be transmitted to the .NET application server.
- **NOV (Notice of Violation):** If a violation is found during any inspection type in Position 2, the officer will be required to enter the data for the violation in the .NET client, which will then be transmitted to the .NET application server, and be able to print the violation to provide to the customer.

4.2.3.3 Data Processing – Lane X Position 3

In Position 3 of Lanes 2-8, the .NET Workstation and HHD clients send requests and data to the [Company]WorkstationWebService provided by the [Company] .NET application server for the following:

- **Officer (User) Authentication:** See Data Processing – Booth 1.
- **Vehicle Identification:** See Data Processing – Booth 1.
- **Vehicle Information:** See Data Processing – Lane 1.
- **3A Visual Inspection:** The vehicle information will be used to determine which specific 3A Visual Inspection items are indicated for the particular license type. The officer will be required to enter the data for the results of the 3A visual inspection in the .NET client, which will then be transmitted to the .NET application server.
- **WAV Inspection:** If the appointment indicated this vehicle is a WAV (Wheelchair Accessible Vehicle), the officer will be prompted to inspect the WAV system. If a WAV inspection is required, the officer will be required to enter the data for the results of the inspection in the .NET client, which will then be transmitted to the .NET application server.
- **Brake Test:** During a vehicle's initial inspection, a Brake Test is required in Lane 3. The .NET Client will display instructions for the officer to prepare the vehicle for the brake test, and to initiate the test from the Hunter WA130 system adjacent to the lane. The lane software will monitor for the test results file that is generated from the Hunter system. Once the brake test is complete, the Workstation .NET client will send the brake test results to the .NET application server.
- **NOV (Notice of Violation):** If a violation is found during any inspection type in Position 3, the officer will be required to enter the data for the violation in the .NET client, which will then be transmitted to the .NET application server, and be able to print the violation to provide to the customer.

4.2.3.4 Data Processing – Lane X Position 4

In Position 4 of Lanes 2-8, the .NET Workstation and HHD clients send requests and data to the [Company]WorkstationWebService provided by the [Company] .NET application server for the following:

- **Officer (User) Authentication:** See Data Processing – Booth 1.
- **Vehicle Identification:** See Data Processing – Booth 1.
- **Vehicle Information:** See Data Processing – Lane 1.
- **4A Visual Inspection:** The vehicle information will be used to determine which specific 4A Visual Inspection items are indicated for the particular license type. The officer will be required to enter the data for the results of the 4A visual inspection in the .NET client, which will then be transmitted to the .NET application server.
- **4B Visual Inspection:** The vehicle information will be used to determine which specific 4B Visual Inspection items are indicated for the particular license type. The officer will be required to enter the data for the results of the 4B visual inspection in the .NET client, which will then be transmitted to the .NET application server.
- **NOV (Notice of Violation):** If a violation is found during any inspection type in Position 4, the officer will be required to enter the data for the violation in the .NET client, which will then be transmitted to the .NET application server, and be able to print the violation to provide to the customer.
- **Test Results and VIR:** The software will automatically parse the data retrieved for this inspection, including all positions, and determine the Overall Result of Pass or Fail and generate a VIR (Vehicle Inspection Report) and sticker for the customer.

4.2.4 RFID/LAN (4)

An RFID network is used in the Woodside facility to identify and track inspectors and vehicles through the inspection process. A TCP/IP LAN in the facility is used to provide secure (HTTPS) communications from the Booth/Lane .NET client systems to the [Company] .NET application server.

4.2.5 [Company] Web/App Server (5)

The [Company] Web/App server in the [Client Operations] inspection facility provides a .NET application, Web/App Portal (Dashboard), and Web Services capabilities as described in the following sections.

4.2.5.1 [Company] .NET Application

The [Company] .NET application provides the [Company]WorkstationWebService to service requests from the Booth/Lane .NET clients, and calls the CredentialLookupService web service provided by the [Client System 1]. It calls the [Client System 2] web service provided by [Client System] to provide inspection results to the [Client System] mainframe, and sends the inspection dataset using the [Client].xsd to the [Client]WebService provided by the [Client] Contractor VID. It also retrieves and processes the flat file provided by [Client System] with licensing updates into the [Company] VID.

4.2.5.2 [Company] Web/App Portal (Dashboard)

The Dashboard Web/App Portal provides capabilities to manage NOVs, licensing, and administration tasks.

4.2.6 [Company] SQL DB Server and VID (6)

The [Company] VID is the central repository for storage of all relevant program data, including but not limited to, inspection results, scheduling data, and Notices of Violations (NOVs). The VID is built on a SQL Server 2016 database management system. The [Company] Web/App Server sends all inspection data to the SQL DB server for storage in the VID and queries the VID through a secure DB tunneling connection.

4.2.7 [Company] Active Directory (AD) Domain Controller (7)

The [Company] Active Directory (AD) Domain Controller is used to securely manage access for the users of the [Client System] through role-based access control (RBAC).

4.2.8 [Client Mainframe] Terminal (8)

The [Client Mainframe] Terminal is used to enter payment data received through a connection directly to the TAMIS mainframe over NYC CityNet.

4.2.9 [Client Mainframe] (9)

The [Client] mainframe provides the [Client] web service used by the [Company] .NET application to send inspection results. The [Client] mainframe also provides a flat file with licensing updates that the [Company] .NET application sends to the [Company] VID.

4.2.10 [Client] Contractor VID (10)

The [Client] Contractor VID provides the [Client]WebService that the [Company] .NET application uses to send the inspection dataset through the [Client].xsd.

4.2.11 Dashboard & Report Clients (11)

The Dashboard Web/App Portal supports the following users:

- [Client Office 1]
- [Client Office 2]
- Client Manager 1
- Client Manager 2
- [Company] Administrators

4.2.12 [Company Standby Site] for Standby Systems (12)

The [Company Standby Site] for standby systems for the AD Domain Controller, Web/App Server, and SQL DB Server and VID:

- The AD Domain Controller is replicated every 15 seconds for user updates and every hour for a full domain replication.
- The Standby [Company] Web/Application at the Coresite will be updated by [Company] personnel any time the Web/App software at the Woodside facility is updated.
- The Primary SQL DB Server at the Woodside facility is duplicated to the Mirror SQL DB Server at the [Company] Coresite. The current mirroring mode is High Performance, but can be changed to High Safety if required.

4.2.12.1 High Performance versus High Safety Database Mirroring Modes

High Performance mode has a small potential for data loss but better performance, particularly in high-volume systems because it does not wait for the mirror DB server to respond that it has successfully recorded the transaction before it responds to the client. High Safety mode greatly limits the possibility of data loss, but requires a separate "witness" server to monitor the connection between the Primary and Mirror DB servers. High Safety mode is also required if you want the system to be able to do auto-failover, but can have slow performance for clients in high-volume environments.